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February 18, 2015

495791.A1.03

Mr. Paul Cho
Regional Water Quality Control Board,
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, California 90013

Subject: Horizontal Biosparge Well and Soil Vapor Monitoring Probe Completion Report
SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California

Dear Mr. Cho:

On behalf of SFPP, L.P. (SFPP), an operating partner of Kinder Morgan Energy Partners, L.P. (KMEP), CH2M HILL Engineers, Inc. (CH2M HILL) has prepared this report detailing the drilling and installation of horizontal biosparge well BS-01 and soil vapor monitoring probes SVM-11 through SVM-16, at the SFPP Norwalk Pump Station. Figure 1 shows the location of the Norwalk site. Figure 2 displays the location of the biosparge well and new soil vapor monitoring probes.

This work was performed by CH2M HILL in accordance with the following work plan and response to Regional Water Quality Control Board, Los Angeles Region (RWQCB) comments:

- *Horizontal Biosparge System Construction and Pilot Test Work Plan, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California*, prepared by CH2M HILL, dated November 18, 2013.
- *Response to Comments – Horizontal Biosparge System Construction and Pilot Test Work Plan, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California*, prepared by CH2M HILL, dated February 14, 2014.

In the work plan, KMEP proposed to install two biosparge wells in 2014: one well in the southeastern area and one well in the south-central area. KMEP has since changed their approach and installed one well in the south-central area to be used for pilot testing in 2015. Expansion of the biosparge system to the southeastern area will be evaluated after sufficient pilot test data are collected over a 1-year period for the initial biosparge well. Pilot test data will be provided to the RWQCB and Restoration Advisory Board (RAB) members under separate cover on a monthly basis once pilot testing activities commence.

Background

This section presents background information including a summary of the site description, hydrogeologic conditions, and an overview of biosparge technology. This summary was extracted from the Light Nonaqueous Phase Liquids (LNAPL) Conceptual Site Model (CSM)[1]. Please refer to the LNAPL CSM for additional details and rationale for implementation of the biosparge technology at the Norwalk site.

[1] CH2M HILL. 2013. *Conceptual Site Model and Proposed Alternate Interim Remedy for Soil, Groundwater, and LNAPL, Defense Fuel Support Point Norwalk, California*. September 3.

Site Description

The SFPP Norwalk Pump Station is located within the Defense Fuel Support Point (DFSP) Norwalk facility at 15306 Norwalk Boulevard in Norwalk, California. The DFSP is owned by Defense Logistics Agency (DLA) Energy (formerly Defense Energy Support Center) and was formerly occupied by 12 inactive aboveground fuel storage tanks and associated piping and facilities. The tanks had a maximum capacity of 35 million gallons and were used to store and distribute refined petroleum products including jet propellant numbers 5 and 8 (JP-5 and JP-8), and reportedly also stored aviation gasoline and jet propellant number 4 (JP-4). DLA Energy also previously operated truck fill stands and various fuel transfer systems. The facility was decommissioned in 2001 and is no longer used to handle fuel. The aboveground tanks and the main infrastructure were demolished in 2011; demolition of the subsurface piping was completed in 2012.

SFPP has equipment within 2 acres at the DFSP facility and easements for its pipelines along the southern and eastern boundaries of the facility. Previously, SFPP operated a pump station near the south-central area of the site. The pump station was used to transfer fuel to and from the DFSP facility, and as an in-line pumping station for portions of the SFPP pipeline network. The pump station was decommissioned in 2001, but three pipelines heading eastward along the southern boundary of the DFSP facility (one of which bends at the southeastern corner of the facility and continues northward within the eastern easement) remain in service and continue to convey refined petroleum fuels including gasoline, diesel, and jet fuel. The pipelines are fitted with block valves, two of which are located along a 24-inch-diameter pipeline and within areas currently undergoing remediation. One block valve is located in the south-central portion of the site and is referred to as the “intermediate 24-inch block valve.” The other block valve is located offsite near the southeastern area of the site and is referred to as the “southeastern 24-inch block valve” or “offsite 24-inch block valve.”

Subsurface assessments have been performed at the DFSP facility since 1986. Groundwater monitoring and remediation wells have been installed at the site for monitoring and as components of groundwater remediation systems. The investigations have evaluated and defined subsurface soil and groundwater within the uppermost groundwater zone that has been impacted by fuel-related hydrocarbons from historical releases from SFPP’s pipelines at the DFSP facility. The primary impacts are to groundwater associated with fuel product that historically leaked from block valves and migrated vertically downward to the water table. Separate-phase floating product, or LNAPL, as well as sorbed-phase and dissolved-phase fuel hydrocarbons have been delineated in areas beneath the DFSP facility and at offsite properties to the south, west, and east. Site assessments indicated that the chemicals of potential concern are total petroleum hydrocarbons (TPH), including TPH quantified as gasoline (TPH-g), diesel fuel (TPH-d), JP-4, JP-5, and JP-8; benzene, toluene, ethylbenzene, and total xylenes (BTEX); 1,2-dichloroethane (1,2-DCA); methyl tertiary butyl ether (MTBE); and tertiary butyl alcohol (TBA). A groundwater Monitoring and Reporting Program (MRP) has been in effect at the site since 1995.

Hydrogeologic Conditions

The DFSP facility is underlain by the following hydrogeologic units (listed in order of shallowest to deepest):

- **Semiperched groundwater zone between depths of approximately 25 and 50 feet below ground surface (bgs).** Groundwater flow within this uppermost zone is generally north to northwestward with a horizontal gradient of approximately 0.001 foot per foot (ft/ft).
- **Bellflower aquitard of the Lakewood Formation between depths of approximately 50 and 80 feet bgs beneath the site**. The Bellflower aquitard consists of predominantly clay, silty clay, and sandy clay with some interbedded sand with silt.
- **Exposition aquifer between depths of approximately 80 and 220 feet bgs.** The potentiometric surface in the Exposition aquifer is approximately 20 feet lower than that in the semiperched uppermost

groundwater zone. This relatively consistent difference in hydraulic heads between the semiperched upper groundwater zone and the Exposition aquifer indicates that the Bellflower aquitard inhibits the vertical movement of groundwater in the site area. The horizontal hydraulic gradient in the Exposition aquifer beneath the site area has had a magnitude of approximately 0.001 ft/ft and a generally southeastward direction.

Biosparge Technology Overview

Several remediation technologies were evaluated in the LNAPL CSM; however, biosparge technology (a form of air sparging) coupled with soil vapor extraction (SVE) was selected as the alternate interim remedy for achieving project objectives based on evaluation of the cost, effectiveness (including timeframe required for treatment), implementability, and third-party impacts. The horizontal biosparge system at buildout will supplement and ultimately replace the current dual-phase extraction remediation system. The evaluation of remedial alternatives and selection of biosparge technology was performed in accordance with the guidance document, *Evaluating LNAPL Remedial Technologies for Achieving Project Goals*[2].

Air sparging (that is, biosparging) technology involves the injection of ambient air or other gases (for example, oxygen) into groundwater, typically beneath the smear zone, to increase dissolved oxygen (DO) levels that enhance aerobic biodegradation. Some volatilization of low-molecular-weight hydrocarbons may also occur during the initial period of operation. Volatilized hydrocarbons are captured using SVE wells and treated using thermal or catalytic oxidization or carbon adsorption.

Biosparging generally utilizes the same principles as traditional air sparging, although at a lower and/or "pulsed" air injection rate. In addition, the primary mechanism for reducing residual LNAPL is through solubilization, followed by enhanced biodegradation of hydrocarbons. The relatively low delivery rate of air reduces the potential for volatilization and migration of volatile hydrocarbons through the vadose zone.

Biosparging is a proven and effective technology for enhanced mass removal at sites impacted by hydrocarbon constituents. Previous investigations at the site indicate that the lithology present in the target treatment zone (uppermost groundwater zone) consists of poorly graded sand, silty sand, clayey sand, and sandy silt. In general, the lower 20 feet (from 30 to 50 feet bgs) consist of sands, while the upper 30 feet (from ground surface to 30 feet bgs) predominantly consist of interbedded sand, silty sand, clayey sand, and sandy silt.

Project Objectives and Approach

The work performed includes the installation of a pilot-scale horizontal biosparge well in the south-central area of the site. Once the well is operational, pilot testing data will be collected to evaluate the feasibility of biosparge technology to enhance mass removal of free-phase and dissolved-phase hydrocarbon constituents beneath the south-central and southeastern areas of the site.

Six nested soil vapor probes also were installed as part of this investigation to supplement the existing soil vapor probes and provide a more robust soil vapor network in the south-central area. The data from this network will be used to:

- Evaluate biosparge system performance and assist with natural source zone depletion (NSZD) testing and monitoring. NSZD testing and monitoring will be performed to evaluate the potential future use of this technology as a stand-alone remedy.
- Evaluate potential for vapor migration beneath the offsite residential areas located immediately south of the site. This objective will be accomplished by conducting routine sampling of the new and previously installed soil vapor monitoring probes (Figure 2).

[2] Interstate Technology & Regulatory Council (ITRC). 2009. *Evaluating LNAPL Remedial Technologies for Achieving Project Goals.* December.

Field Activities

Field activities included the drilling and installation a biosparge well and soil vapor monitoring probes as follows:

- One 4-inch-diameter horizontal biosparge well (BS-01) was drilled and installed in the south-central area of the site.
- Six nested soil vapor monitoring probes (SVM-11 to SVM-16) were installed in the south-central area to provide a more robust monitoring network during future pilot testing activities.

The following sections provide additional details regarding the field activities. The work was performed between August 11 and September 26, 2014.

Pre-field Activities

CH2M HILL performed the following permitting and field preparation tasks prior to commencement of field construction activities:

- Updated the existing site-specific health and safety plan to incorporate the planned fieldwork.
- Notified the RWQCB a minimum of 1 week in advance of the planned field activities.
- Marked the proposed biosparge well and soil vapor monitoring probe locations.
- Notified Underground Service Alert (USA). As required by USA, the borings were called-in and marked-out in white paint at least 2 business days prior to drilling. Dig Alert Number A42051301 was assigned for this project.
- Obtained the required biosparge well permit from the Los Angeles County Department of Public Health (Attachment A). County permits were not required for the soil vapor monitoring probes.
- Performed an underground utility check using a private utility-locating subcontractor. CH2M HILL and the subcontractor met with KMEP operations staff, marked-out the boring locations, and cleared the boring locations of potential underground utilities and other infrastructure.
- Coordinated with KMEP personnel to arrange for a KMEP field inspector to be present during field activities.

Horizontal Biosparge Well Completion

CH2M HILL and the directional drilling subcontractor, Directed Technologies Drilling, Inc. (DTD), used blind-end horizontal drilling technology to drill and install a 4-inch-diameter horizontal biosparge well to a vertical depth of approximately 45 feet bgs. A conceptual well construction diagram is presented in Figure 3. The purpose of installing the well to this depth is to place the horizontal well screens as close as practicable to the bottom of the uppermost groundwater zone to maximize its radius of influence (ROI). The ROI will be greater with maximum submergence below the water table, which will allow the sparged air to spread laterally as it rises after injection. Well construction activities were conducted between August 12 and August 27, 2014.

Borehole Navigation

DTD used a Gyroscopic Steering Tool (GST), supplied and operated by SlimDril International of Houston, Texas, to determine the precise location of the drilling bit during borehole advancement. The GST is an advanced navigation and locating tool that does not rely on electromagnetic signals, which can be distorted or attenuated, for positional locating. Instead, the GST uses a series of networked optical gyroscopes that provide inertial navigation. The GST is considered to have an accuracy within 2 percent of the intended bore path. The use of the GST was required for this project due to potential electromagnetic interferences from

nearby KMEP pipelines and the Southern California Edison (SCE) power substation, which lies directly above the biosparge well bore path.

Prior to drilling, the proposed bore path of the well (at surface) was surveyed by Calvada Surveying, Inc. (Calvada) and the results were submitted to DTD. SlimDril used the survey data to navigate the advancement of the drill bit along the proposed bore path with minimal lateral deviation. A copy of the surveyor report is provided in Attachment B.

Drilling and Construction

The drill bit diameter of the BS-01 borehole for biosparge well installation was approximately 12.5 inches. The borehole diameter ranged from 100 to 150 percent of the drill bit size, due to asymmetrical enlargement of the horizontal borehole by gravitational effects during drilling. Biodegradable guar-based drilling fluid (Baroid BioBore biodegradable biopolymer with small additions of Zanflow viscosifier, xanthan gum, and soda ash) was used to facilitate advancement of the drill bit and circulation of the drill cuttings from the borehole. Prior to drilling, another subcontractor (BC2 Environmental) air knifed to 6 feet bgs at the entry point and 30 lateral feet west of the entry point to check for the presence of underground utilities.

The well entry point was positioned just south of the southeastern corner of the former truck fill stand (Figure 2). The well bore was drilled 861.7 lateral feet from the entry point. Soil cutting returns at the drilling rig mud system were logged by a CH2M HILL geologist for color, moisture content, grain size, and other pertinent soil characteristics. Soil also was screened in the field using a photoionization detector (PID) for the potential presence of volatile organic compounds (VOCs). A copy of the boring log is provided in Attachment C.

Two hundred fifty-feet of riser pipe (blank casing) were installed from the entry point to the beginning of the screened interval. The well was screened between 250 feet and 850 feet from the entry point. The screened interval was placed so that it is beneath the LNAPL smear zone in the south-central area. Ten feet of blank casing and a 0.75-foot-long end cap was installed at the distal end of the well. The well was constructed of 4-inch-diameter, flush threaded PVC Schedule 80 casing and slotted pipe. The screen has a maximum slot width of 0.011 inches, a slot length of 1.2 inches, and 3 rows at 11 slots per foot (total of 33 slots per foot; 0.28 to 0.30 percent open area). The pipe was slotted longitudinally to create a single slot zone, with slots uniformly distributed around the circumference of the pipe. No filter pack was required for the screen interval.

After the casing and screen were installed, a 4-inch-diameter shale trap packer was installed at 39 feet from the entry point (equates to approximately 12 vertical feet bgs) to facilitate grouting the surface completion. Approximately 40 cubic feet of 5 percent bentonite cement was used to grout the well to land surface via a 2-inch PVC tremie pipe; 1.5 bags of hydrated bentonite pellets were used to complete the surface seal. A biosparge well construction diagram is presented in Attachment D. A subcontractor well completion report, provided by DTD, is included in Attachment E.

Well Development

Well development was conducted to ensure effective communication between the well and the surrounding geologic formation. A combination of jetting and flushing clean water and a drilling-fluid-breaking enzyme through the well screen was employed for development. The total development water flushed and jetted into the well was approximately 8,900 gallons, with a total of 23 jetting passes through the well screen section. Field water quality parameters (pH, temperature, conductivity, turbidity, and sand content) were collected during development activities and are included in the well development log (Attachment F).

Well Vault Completion

A 2-foot by 4-foot steel-walled, bottomless vault was installed. The vault assembly includes a diamond plate, H-20 traffic-rated lid with spring assist and bolted down locking device. The vault has sidewalls approximately 24 inches in height.

The vault was set and leveled to prevent ponding or entrapment of rainwater on the wellhead. Openings were drilled through the vault walls to provide entry for the well riser and access for the air supply stub out. The wellhead assembly of a "Y", with a 4-inch ball valve, 3-inch reducer, and 3-inch stub out was made on the angled portion of the "Y". The stub out terminates approximately 2 to 3 feet beyond the concrete apron surrounding the vault, and is closed with a flush-threaded 3-inch cap. The straight part of the "Y" was completed with a flush-threaded, 4-inch cap with O-ring and pipe dope to form an airtight seal and provide access for future downhole activities.

A concrete slab was constructed that exceeds 18 inches in all directions from the rim of the vault, to a slab depth of nominal 6 inches.

Soil Vapor Probe Completion

CH2M HILL and a drilling subcontractor, Environmental Support Technologies, Inc. (EST) drilled and installed six triple nested soil vapor monitoring probes (SVM-11 to SVM-16) to supplement the existing monitoring probes in the south-central area. The objective is to have a sufficient coverage of probes spatially to evaluate the ROI of the biosparge well, potential migration of vapor hydrocarbons, and the changes in vapor chemistry with distance above the smear zone and increasing distance from the biosparge well.

The work was completed in general accordance with the *Advisory - Active Soil Gas Investigations* (Advisory) (California Department of Toxic Substances Control [DTSC], 2012 and updates). Each monitoring point consists of a soil vapor probe nest with probes completed at approximately 7, 15, and 22 feet bgs in a single borehole. Figure 2 shows the locations of the soil vapor monitoring points. In general, new soil vapor monitoring points were positioned at locations with increasing lateral distance from the biosparge well screen.

Prior to drilling, the boring locations were cleared to a depth of approximately 12 feet bgs using hand-auger methods to check for the presence of underground utilities. Borings were then advanced using direct-push methods to approximately 23 feet bgs. Continuous soil cores were collected using a macro-core sampler during borehole advancement; the cores were described by a CH2M HILL geologist for color, moisture content, grain size, and other pertinent soil characteristics. Soil also was screened in the field using a PID for the potential presence of VOCs. Boring logs and soil vapor probe completion diagrams are included in Attachment G.

Each vapor probe was constructed with new ¼-inch-outside-diameter Teflon tubing with a nominal 6-inch-long stainless steel screen. A 1-foot-thick filter pack consisting of No. 3 sand was placed around each screen. A 1-foot-thick dry granular bentonite was placed on top of each filter sand pack. Granular bentonite was then installed and hydrated in place (at 6-inch lifts) between the top of the dry granular bentonite and the bottom of each screen interval. A sampling valve was fitted to the end of each tubing. The valve will be kept closed until purging and sampling activities commence. Each soil vapor monitoring point was completed at the surface with a flush-mounted, traffic-rated well box. Construction details of the soil vapor monitoring probes are provided in Table 1 and Attachment G.

Surveying

Following completion of the field investigation, the location (northing and easting coordinates) and ground surface elevation of the soil vapor probes were surveyed in accordance with the RWQCB GeoTracker requirements by Calvada, a California-licensed land surveyor. The surveyor's report is provided in Attachment B**.**

Investigative-Derived Waste

Investigation-derived waste (IDW) generated during field activities included soil cuttings/drilling fluids, decontamination water, purged groundwater, and disposable sampling supplies and personal protective equipment (for example, nitrile gloves). Soil cuttings and drilling fluids were containerized in 20-cubic-yard roll-off bins. Rinse water and purged groundwater were containerized in 8,000-gallon polyethylene holding tanks with secondary containment. Drilling fluids were eventually transferred from the roll-off bins to the holding tanks prior to offsite transport. The containers were labeled and temporarily stored at the drilling site pending analytical results for waste classification and eventual disposal by KMEP's waste hauling contractor (Patriot Environmental Services [Patriot]).

Provided below is a summary of liquid and solid waste removed from the site during the investigation.

Liquids

- Approximately 9,000 gallons of nonhazardous waste liquids (biosparge well drilling fluids and development water) were removed from the site on September 10, 2014, by Patriot and transported to Demenno/Kerdoon at 2000 North Alameda Street, Compton, California 90222.
- Approximately 8,000 gallons of nonhazardous waste liquids (biosparge well drilling fluids and development water) were removed from the site on September 11, 2014, by Patriot and transported to Demenno/Kerdoon.
- Approximately 750 gallons of nonhazardous biosparge well drilling fluids and development water were removed from the site by Patriot on September 23, 2014, and transported to Demenno/Kerdoon.

Solids

- Approximately 5 cubic yards of nonhazardous waste solids (biosparge well drill cuttings) were removed from the site on September 23, 2014, by Patriot and transported to Filter Recycling Services, Inc., at 180 West Monte Avenue, Bloomington, California 92316.
- Approximately 15 cubic yards of nonhazardous waste solids (biosparge well drill cuttings) were removed from the site on September 30, 2014, by Patriot and transported to Filter Recycling Services, Inc.
- General refuse (such as disposable sampling supplies and used gloves) was disposed of onsite as municipal trash.

Copies of the waste manifests are provided in Attachment H.

Pilot Test Schedule

It is anticipated that pilot testing of the horizontal biosparge well will commence in the first or second quarter of 2015. As mentioned above, pilot test status reports will be provided to the RWQCB and RAB on a monthly basis during pilot test activities. The reports will include analytical and operational data, and a brief discussion of the results.

If you have any additional questions regarding this investigation, please contact Dan Jablonski at (213) 228-8271, or Mr. Stephen Defibaugh, KMEP's Remediation Project Manager, at (714) 560-4802.

Sincerely,

CH2M HILL Engineers, Inc.

Dan Jablonski
Project Manager

Mark Wuttig, P.G.
Senior Geologist

Attachments:

Table 1 – Soil Vapor Monitoring Probe Completion Details
Figure 1 – Site Location Map
Figure 2 – Biosparge Well and Soil Vapor Monitoring Probe Locations
Figure 3 – Conceptual Horizontal Biosparge Well Construction Diagram
Attachment A – Los Angeles County Department of Public Health Well Permit
Attachment B – Surveyor Reports
Attachment C – Biosparge Well Boring Log
Attachment D – Biosparge Well Construction Diagram
Attachment E – DTD Well Completion Report
Attachment F – Biosparge Well Development Log
Attachment G – Soil Vapor Probe Boring Logs and Construction Diagrams
Attachment H – Waste Manifests

Distribution:

- Steve Defibaugh, Kinder Morgan Energy Partners, L.P.
- Eugene N. Garcia, Ph.D.
- Minxia Dong, Norwalk Public Library
- Mary Jane McIntosh, RAB Co-Chair (electronic only)
- Tracy Winkler, RAB (electronic only)
- Adriana Figueroa, City of Norwalk (electronic only)
- Neil F. Irish, P.G., The Source Group, Inc.
- Norman Dupont, Esq., Richards, Watson, Gershon (electronic only)
- Charles Emig, City of Cerritos (electronic only)
- Gary Lynch, Park Water Co. (electronic only)
- Phuong Ly, Water Replenishment District of Southern California (electronic only)
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- Evelyn Herrera, Office of Congresswoman Napolitano (electronic only)
- Angelina Mancillas, Office of Congresswoman Linda T. Sanchez (electronic only)
- Luis Gonzalez, Office of State Senator Ron Calderon (electronic only)

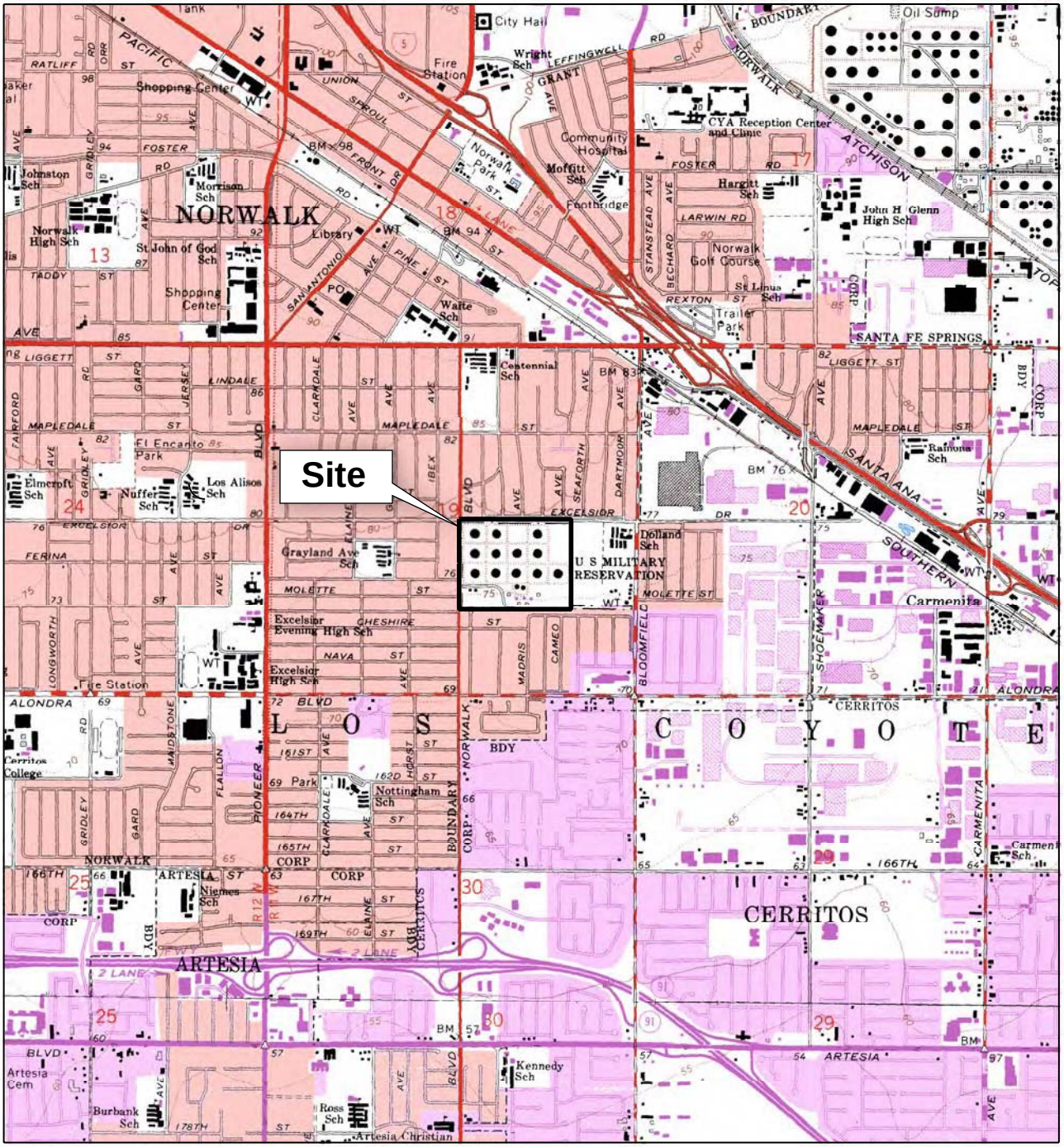
Table

TABLE 1
Soil Vapor Monitoring Probe Completion Details
SFPP Norwalk Pump Station, Norwalk, California

Probe	Zone	Installation Method	Borehole Diameter (inches)	Boring Total Depth (feet bgs)	Bentonite Backplug Top (feet bgs)	Bentonite Backplug Bottom (feet bgs)	Screen Interval		Filter Pack Top (feet bgs)	Filter Pack Bottom (feet bgs)	Dry Bentonite Top (feet bgs)	Dry Bentonite Bottom (feet bgs)	Hydrated Bentonite Top (feet bgs)	Hydrated Bentonite Bottom (feet bgs)
							From	To						
SVM-11	Shallow	Hand auger	3	---	---	---	7	7.5	6.5	7.5	5.5	6.5	0.5	5.5
	Middle	Geoprobe	2.25	---	---	---	15	15.5	14.5	15.5	13.5	14.5	7.5	13.5
	Deep	Geoprobe	2.25	23	21.5	23	21	21.5	20.5	21.5	19.5	20.5	15.5	19.5
SVM-12	Shallow	Hand auger	3	---	---	---	7	7.5	6.5	7.5	5.5	6.5	0.5	5.5
	Middle	Geoprobe	2.25	---	---	---	15	15.5	14.5	15.5	13.5	14.5	7.5	13.5
	Deep	Geoprobe	2.25	24	22.5	24	22	22.5	21.5	22.5	20.5	21.5	15.5	20.5
SVM-13	Shallow	Hand auger	3	---	---	---	7	7.5	6.5	7.5	5.5	6.5	0.5	5.5
	Middle	Geoprobe	2.25	---	---	---	15.5	16	15	16	14	15	7.5	14
	Deep	Geoprobe	2.25	23	---	---	22.5	23	22	23	21	22	16	21
SVM-14	Shallow	Hand auger	3	---	---	---	7	7.5	6.5	7.5	5.5	6.5	0.5	5.5
	Middle	Geoprobe	2.25	---	---	---	15	15.5	14.5	15.5	13.5	14.5	7.5	13.5
	Deep	Geoprobe	2.25	23	22.5	23	22	22.5	21.5	22.5	20.5	21.5	15.5	20.5
SVM-15	Shallow	Hand auger	3	---	---	---	7	7.5	6.5	7.5	5.5	6.5	0.5	5.5
	Middle	Geoprobe	2.25	---	---	---	15	15.5	14.5	15.5	13.5	14.5	7.5	13.5
	Deep	Geoprobe	2.25	23	22.5	23	22	22.5	21.5	22.5	20.5	21.5	15.5	20.5
SVM-16	Shallow	Hand auger	3	---	---	---	7	7.5	6.5	7.5	5.5	6.5	0.5	5.5
	Middle	Geoprobe	2.25	---	---	---	15.5	16	15	16	14	15	7.5	14
	Deep	Geoprobe	2.25	23	22.5	23	22	22.5	21.5	22.5	20.5	21.5	16	20.5

Notes:
--- = does not apply
bgs = below ground surface
Filter pack consists of No. 3 Monterey fine sand.
Bentonite is granular bentonite.

Figures



N

Approximate Scale in Feet

0 1200 2400

0 0 0

Approximate Scale in Meters

BASEMAP MODIFIED FROM U.S.G.S. 7.5 MINUTE QUADRANGLE MAP
LOS ALAMITOS 1964, CALIFORNIA. PHOTO-REVISED 1981.
WHITTIER 1965, CALIFORNIA. PHOTO-REVISED 1981.

SITE LOCATION MAP

SFPP Norwalk Pump Station
Norwalk, California

By: Andy Vollmar	Date: July 21, 2010	Project No: 407609

CH2MHILL

Figure 1

ES070610212914SCO407609.A1.03 DFSP_sitelocation.ai 7/10

Legend

- New Soil Vapor Monitoring Probes
- Previously Installed Soil Vapor Monitoring Probes
- Horizontal Biosparge Well Entry Point
- Existing Groundwater Monitoring Well
- Existing Remediation Well
- Horizontal Biosparge Well (dashed line depicts approximate lateral extent of well screen)
- KMEP Remediation Piping Layout (above ground and below ground)
- Horizontal Vapor Extraction Well Piping

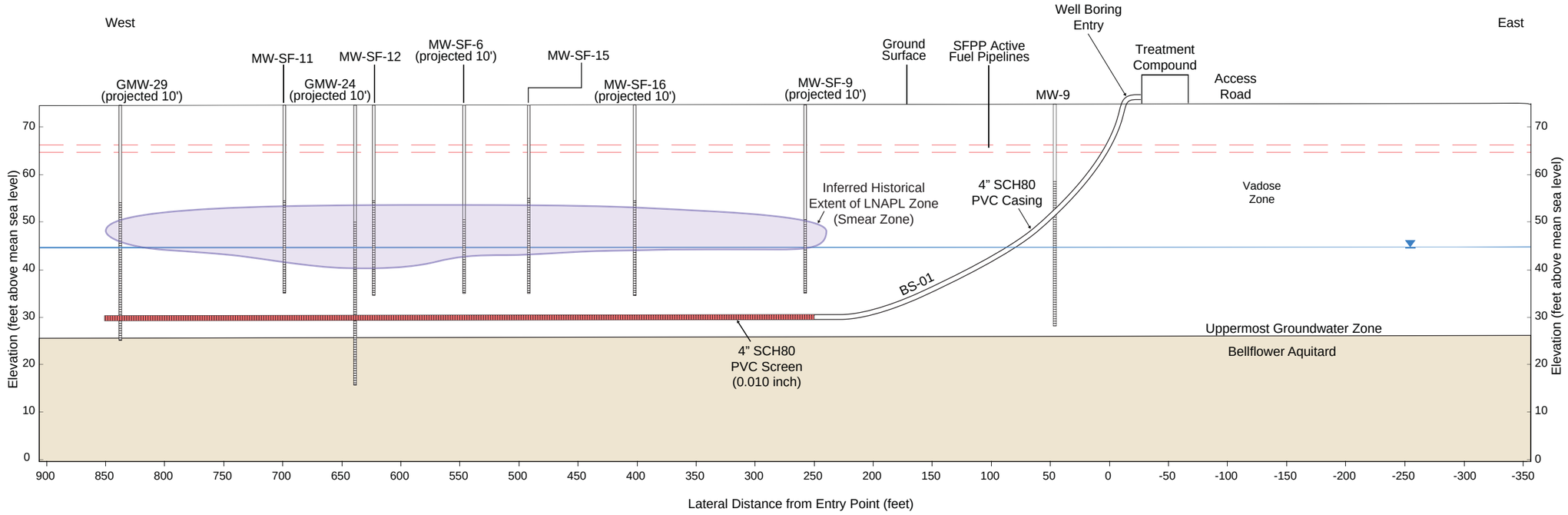
Imagery Source:
Google Earth April 17, 2013.

N

0 75 150 300
Feet

1 inch = 150 feet

Figure 2
Biosparge Well and Soil Vapor Monitoring Probe Locations
SFPP Norwalk Pump Station
Norwalk, California



LEGEND

- Monitoring or TFE/SVE Well Screen
- Horizontal Biosparge Well Screen
- Approximate Groundwater Elevation in Uppermost Groundwater Zone (April 2013)

Note:
Top of the Bellfower Aquitard was interpreted based on (1) review of the lithological descriptions provided on the select well and boring logs (Preliminary Conceptual Site Model, AMEC Geomatrix, Inc., February 13, 2009) and (2) Conceptual Site Model and Proposed Alternate Interim Remedy for Soil, Groundwater, and LNAPL (CH2M HILL, September 3, 2013)

FIGURE 3
Conceptual Horizontal Biosparge Well Completion Diagram
SFPP Norwalk Pump Station
Norwalk, California

Attachment A
Los Angeles County
Department of Public Health Well Permit

ENVIRONMENTAL HEALTH

Drinking Water Program

5050 Commerce Drive, Baldwin Park, CA 91706
Telephone: (626) 430-5420 • Facsimile: (626) 813-3013 • Email: waterquality@ph.lacounty.gov
http://publichealth.lacounty.gov/eh/ep/dw/dw_main.htm

890917-67
15306 Norwalk Blvd Norwalk 90650 Work Plan Approval

TO BE COMPLETED BY APPLICANT:

WORK SITE ADDRESS	CITY	ZIP	EMAIL ADDRESS FOR WELL PERMIT APPROVAL
15306 Norwalk Blvd	Norwalk	90650	Djablon1@ch2m.com

NOTICE:

- WORK PLAN APPROVALS ARE VALID FOR 180 DAYS. 30 DAY EXTENSIONS OF WORK PLAN APPROVALS ARE CONSIDERED ON AN INDIVIDUAL (CASE-BY-CASE) BASIS AND MAY BE SUBJECT TO ADDITIONAL PLAN REVIEW FEES (HOURLY RATE AS APPLICABLE).
- WORK PLAN MODIFICATIONS MAY BE REQUIRED IF WELL AND GEOLOGIC CONDITIONS ENCOUNTERED AT THE SITE INSPECTION ARE FOUND TO DIFFER FROM THE SCOPE OF WORK PRESENTED TO THE DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM.
- WORK PLAN APPROVALS ARE LIMITED TO COMPLIANCE WITH THE CALIFORNIA WELL STANDARDS AND THE LOS ANGELES COUNTY CODE AND DOES NOT GRANT ANY RIGHTS TO CONSTRUCT, RENOVATE, OR DECOMMISSION ANY WELL. THE APPLICANT IS RESPONSIBLE FOR SECURING ALL OTHER NECESSARY PERMITS SUCH AS WATER RIGHTS, PROPERTY RIGHTS, COASTAL COMMISSION APPROVALS, USE COVENANTS, ENCROACHMENT PERMISSIONS, UTILITY LINE SETBACKS, CITY/COUNTY PUBLIC WORKS RIGHTS OF WAY, ETC.
- ALL FIELD WORK MUST BE CONDUCTED UNDER THE DIRECT SUPERVISION OF A PROFESSIONAL GEOLOGIST LICENSED IN THE STATE OF CALIFORNIA.
- THIS PERMIT IS NOT COMPLETE UNTIL ALL OF THE FOLLOWING REQUIREMENTS ARE SIGNED BY THE DEPUTY HEALTH OFFICER. WORK SHALL NOT BE INITIATED WITHOUT A WORK PLAN APPROVAL STAMPED BY THE DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM.
- ***ONCE APPROVED NOTIFY VINCENT GALLEGOS AT vgallegos@ph.lacounty.gov PREFERABLY 4 BUSINESS DAYS BEFORE WORK IS SCHEDULED TO BEGIN.***

TO BE COMPLETED BY DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM:

X WORK PLAN APPROVED DATE: June 30, 2014

ADDITIONAL APPROVAL CONDITIONS:

- Please provide project dates and time via my email listed above this comment box
- Submit Copy of DWR Well Completion Report for final signoff.

Vincent Gallegos R.E.H.S.
Drinking Water Program

☐ ANNULAR SEAL FINAL INSPECTION REQUIRED

DATE ACCEPTED: REHS signature

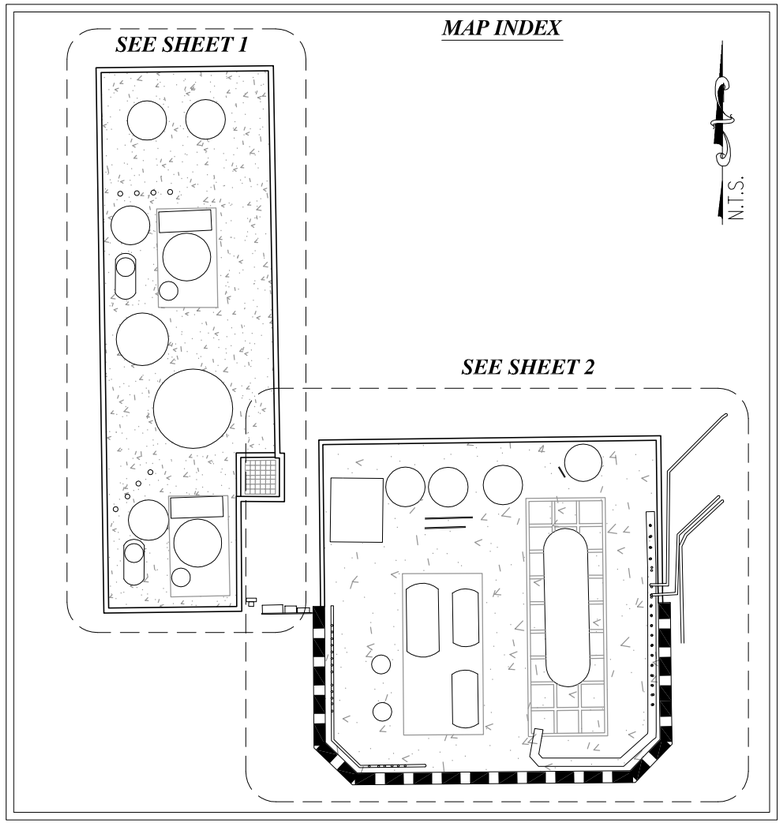
X WELL COMPLETION REPORT REQUIRED

DATE ACCEPTED: REHS signature

Attachment B
Surveyor Reports

SITE PLAN

SFPP GROUNDWATER AND SOIL REMEDIATION SYSTEM
DEFENSE FUEL SUPPORT POINT
15306 NORWALK BOULEVARD, NORWALK, CA



DATE OF SURVEY

MAY 2, 2014

BENCH MARK

THE ELEVATIONS SHOWN HEREON ARE BASED UPON THE COUNTY OF LOS ANGELES BENCHMARK NO. CY8835
CS BM MON IN S END C.B. 3.3' N/O BCR AT NW COR OF ALONDRA BLVD. AND NORWALK BLVD. MKD (BM 41–7A 1970)
1980 ELEVATION = 69.014 FEET (NGVD 29)

COORDINATES

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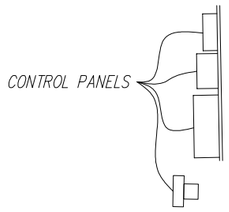
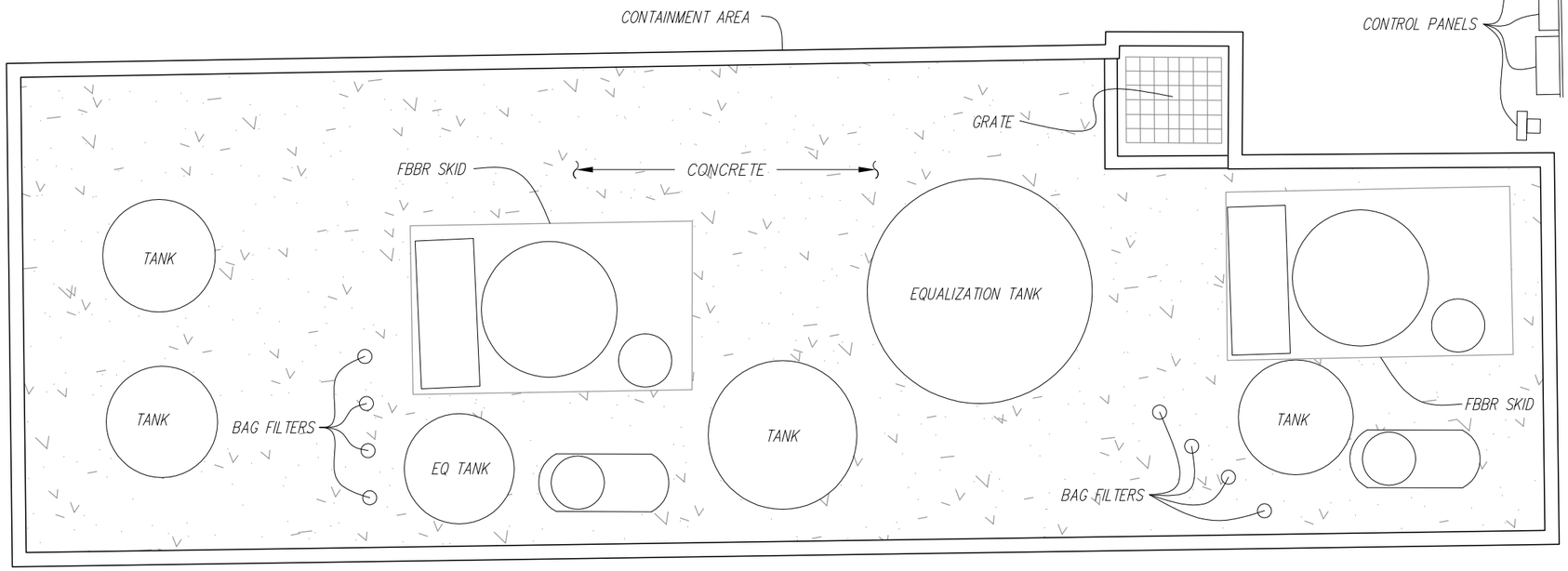
05 0 2.5 05

SCALE 1" = 05'



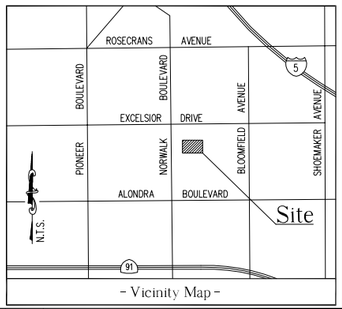


LICENSED LAND SURVEYOR
Armando D. DuPont
L.S. 7780
Exp. 12-31-15
STATE OF CALIFORNIA

PREPARED FOR

CH2MHILL

6 HUTTON CENTER DRIVE, SUITE 700
SANTA ANA, CA 92707
PHONE: (714) 435–6194 OFFICE
(714) 424–2033 FAX



- Vicinity Map -

NO.	DATE	REVISIONS	BY
1	5/29/14	SURVEY WELLS AND STKD LINE	SM
2	6/12/14	POINT NUMBERS	SM

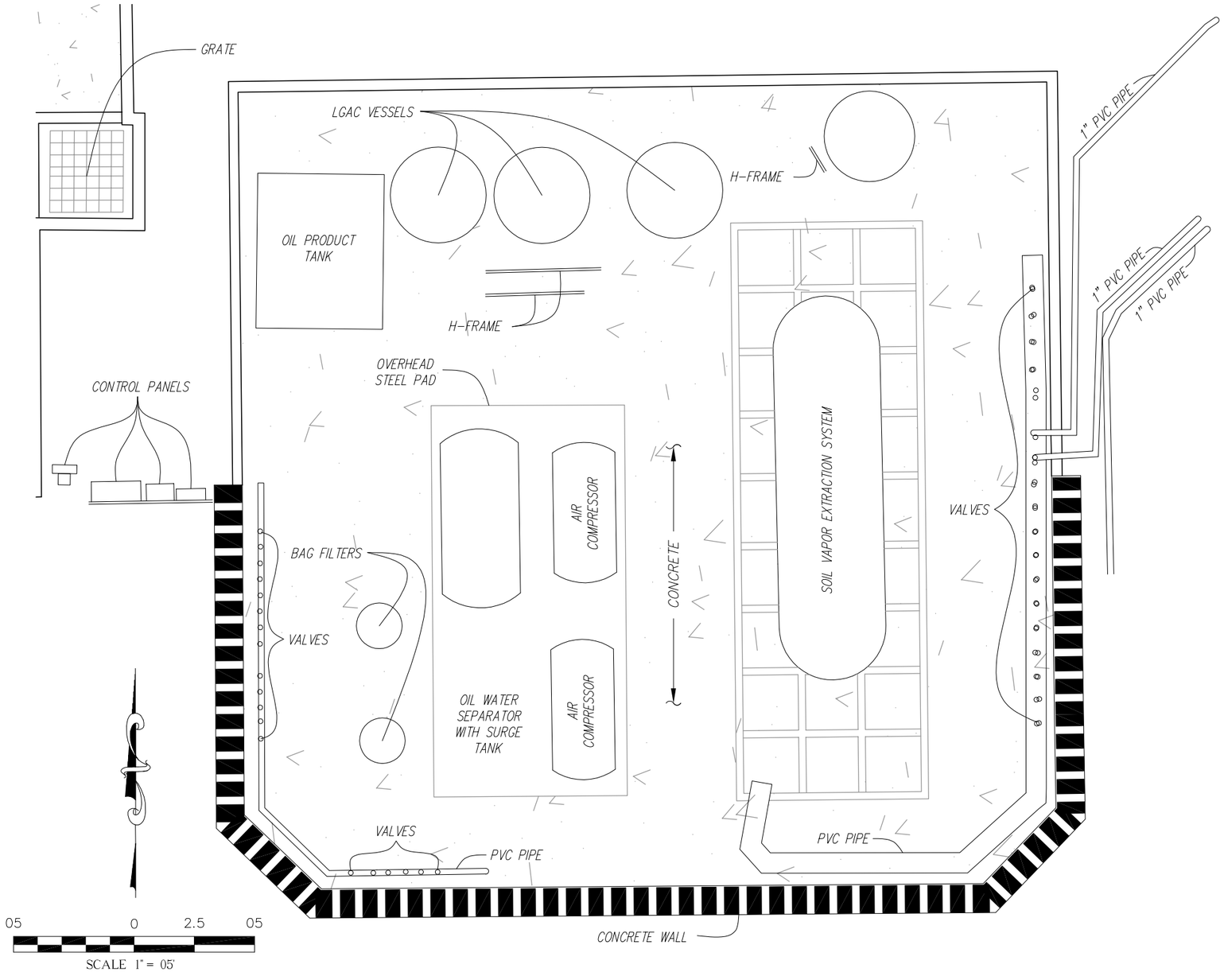
CALVADA SURVEYING, INC.
411 Jenks Cir., Suite 205, Corona, CA 92880
Phone: 951-280-9960 Fax: 951-280-9746
Toll Free: 800-CALVADA www.calvada.com

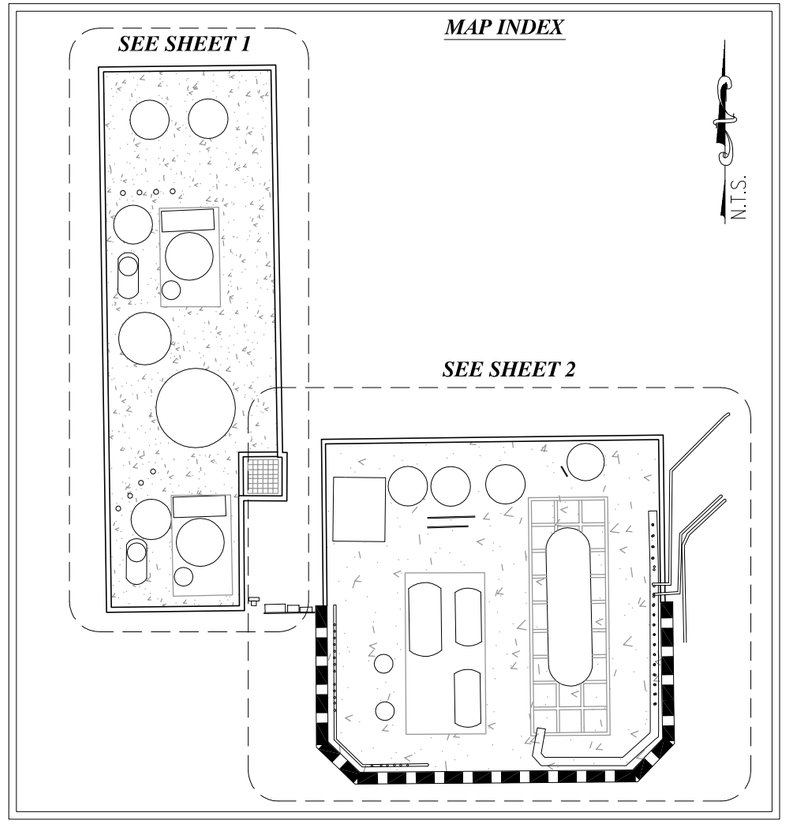
JOB NO. 14413

SUBMITTAL DATE: 05–09–14_SM

SITE PLAN

SFPP GROUNDWATER AND SOIL REMEDIATION SYSTEM
DEFENSE FUEL SUPPORT POINT
15306 NORWALK BOULEVARD, NORWALK, CA





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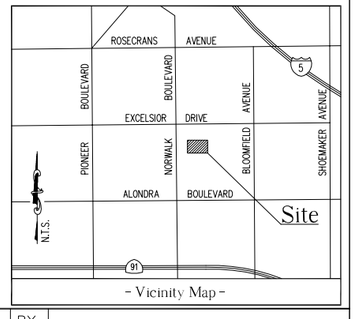

- Vicinity Map -

DATE OF SURVEY

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PREPARED FOR

CH2MHILL

6 HUTTON CENTER DRIVE, SUITE 700
SANTA ANA, CA 92707
PHONE: (714) 435-6194 OFFICE
(714) 424-2033 FAX

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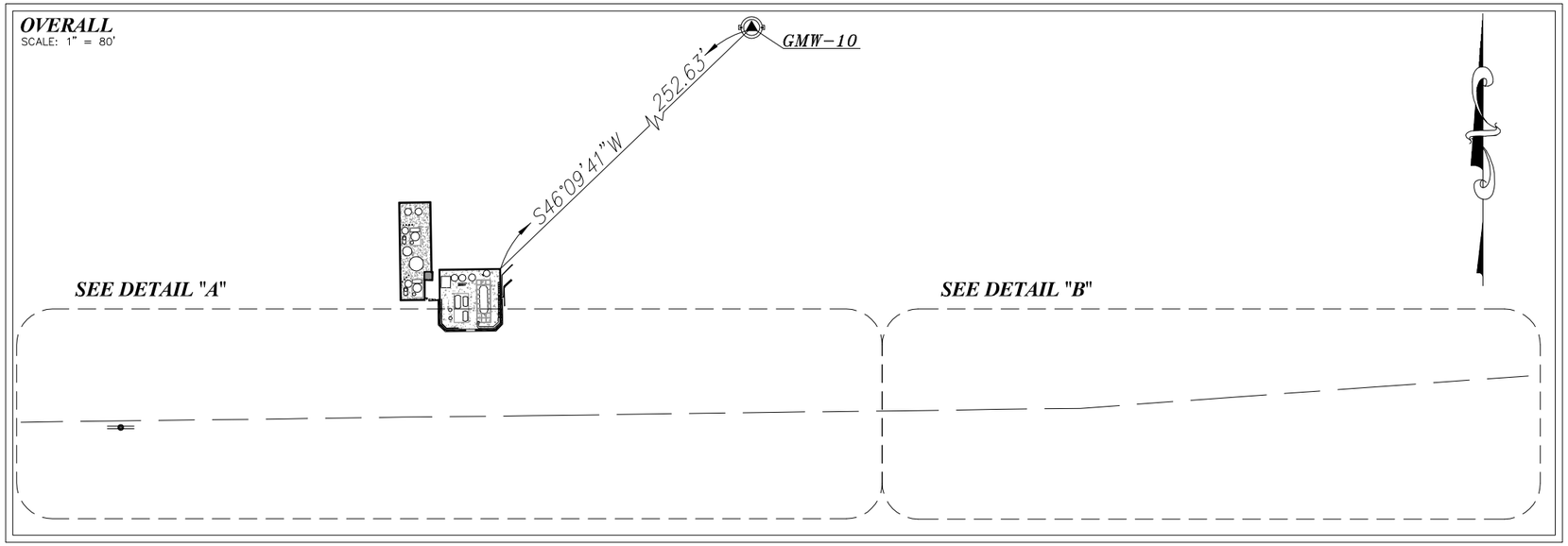
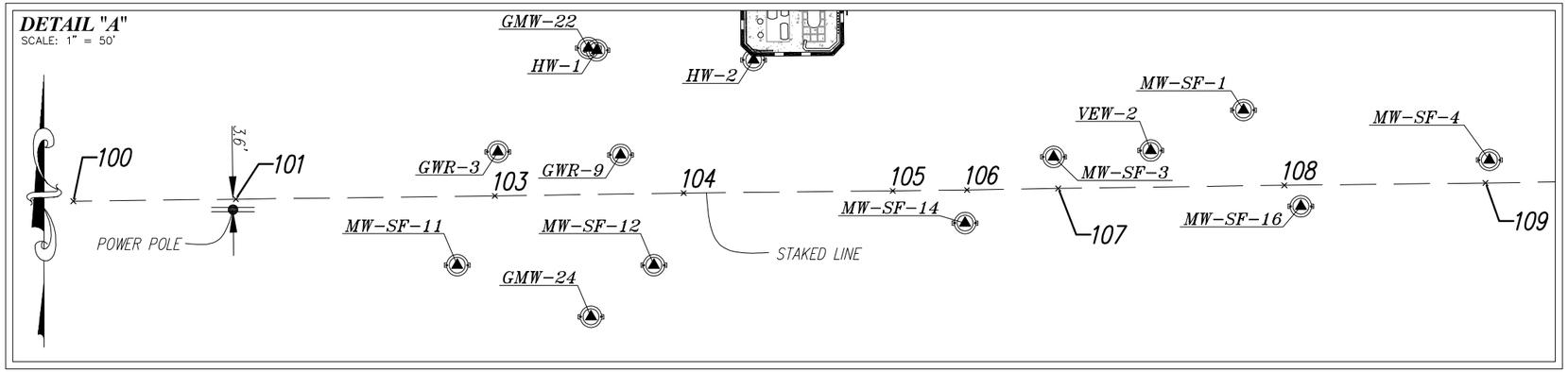
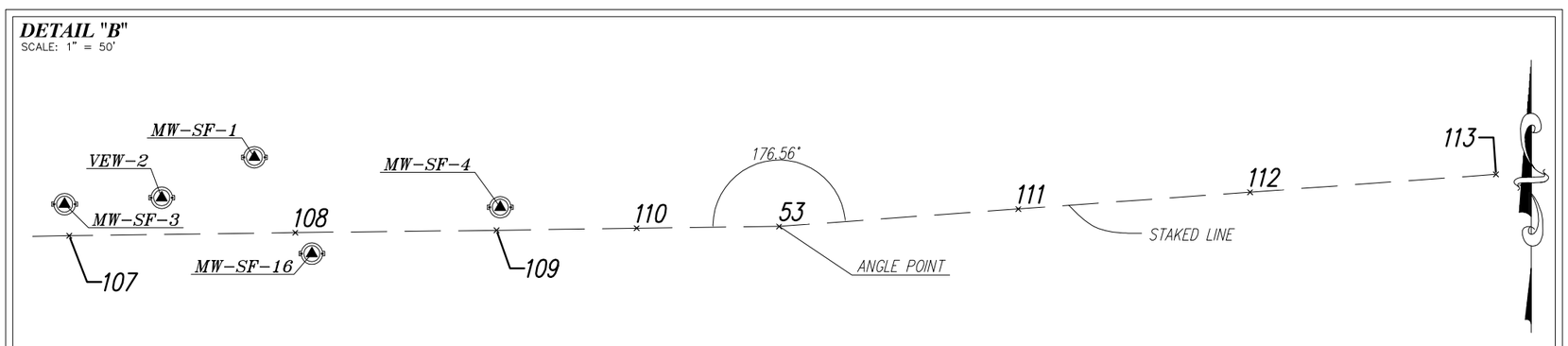
15306 NORWALK BOULEVARD, NORWALK, CA



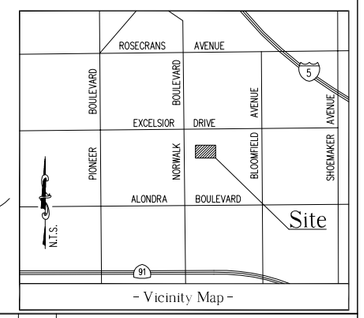




STAKED POINTS ON LINE					
POINT	NORTH (FEET)	EAST (FEET)	LATITUDE (DD)	LONGITUDE (DD)	NG (ELEVATION)
53	1782914.98	6540413.93	33.8915302	-118.0700269	74.85
100	1782907.25	6539822.23	33.8915078	-118.0719765	74.80
101	1782907.95	6539878.97	33.8915098	-118.0717895	75.04
103	1782909.11	6539969.38	33.8915132	-118.0714916	74.63
104	1782910.10	6540035.28	33.8915160	-118.0712745	75.17
105	1782910.86	6540108.27	33.8915183	-118.0710340	74.80
106	1782911.18	6540134.21	33.8915192	-118.0709485	74.52
107	1782911.73	6540166.08	33.8915207	-118.0708435	74.70
108	1782912.82	6540245.00	33.8915239	-118.0705835	74.86
109	1782913.59	6540315.23	33.8915262	-118.0703521	75.77
110	1782914.35	6540364.17	33.8915283	-118.0701908	74.65
111	1782921.06	6540497.38	33.8915470	-118.0697519	75.05
112	1782926.91	6540578.30	33.8915632	-118.0694853	74.83
113	1782933.10	6540664.18	33.8915804	-118.0692023	75.59

MONITORING WELLS								
WELL	NORTH	EAST	LATITUDE (DD)	LONGITUDE (DD)	TOR (ELEVATION)	FS (ELEVATION)	TOC (ELEVATION)	RISER_HT
GMW-9	1782923.43	6540013.28	33.8915526	-118.0713470	74.93			
GMW-10	1783167.89	6540272.46	33.8922248	-118.0704936	75.04	74.40	73.35	-1.05
GWR-3	1782924.52	6539970.43	33.8915555	-118.0714882	75.03			
HW-1	1782959.93	6540004.99	33.8916529	-118.0713744	75.43			
HW-2	1782956.55	6540059.72	33.8916437	-118.0711941	75.13			
MW-SF-1	1782939.06	6540230.72	33.8915960	-118.0706306	75.35			
MW-SF-3	1782922.72	6540164.45	33.8915509	-118.0708489	75.12			
MW-SF-4	1782921.65	6540316.56	33.8915483	-118.0703477	75.30			
MW-SF-14	1782899.63	6540133.55	33.8914874	-118.0709507	75.06			
MW-SF-16	1782905.48	6540250.77	33.8915037	-118.0705645	74.76			
VEW-2	1782924.95	6540198.38	33.8915571	-118.0707371	75.16			

LICENSED LAND SURVEYOR
Armando D. DuPont
L.S. 7780
Exp. 12-31-15
STATE OF CALIFORNIA



- Vicinity Map -

NO.	DATE	REVISIONS	BY
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2	6/12/14	POINT NUMBERS	SM

DATE OF SURVEY

MAY 2, 2014

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PREPARED FOR

CH2MHill

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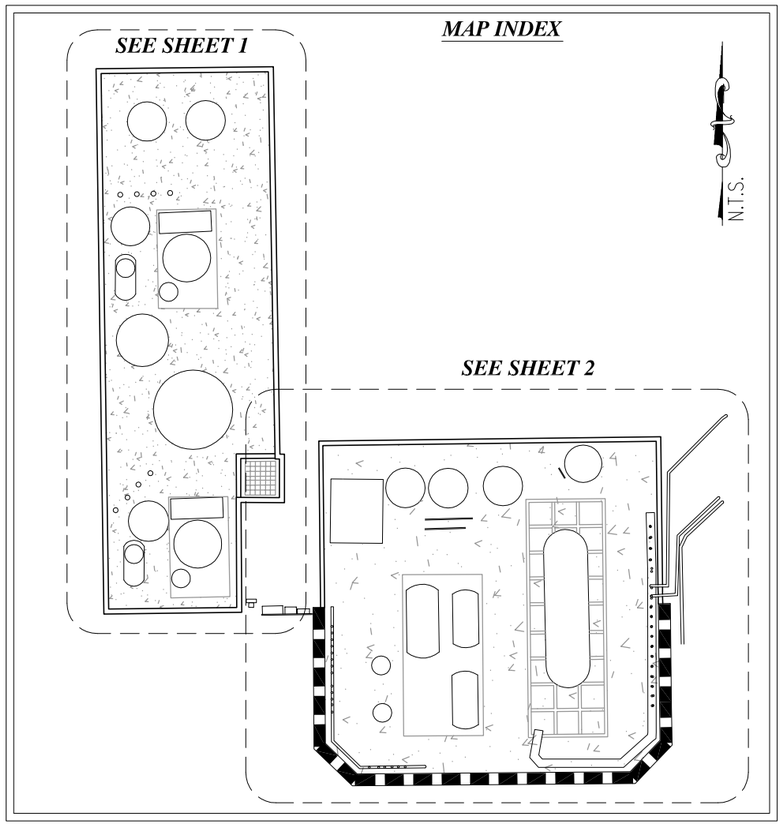
JOB NO. 14413

SUBMITTAL DATE: 05-09-14_SM

SITE PLAN

SFPP GROUNDWATER AND SOIL REMEDIATION SYSTEM
DEFENSE FUEL SUPPORT POINT
15306 NORWALK BOULEVARD, NORWALK, CA



DATE OF SURVEY

MAY 2, 2014
OCTOBER 2, 2014

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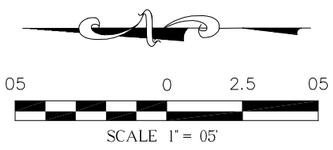

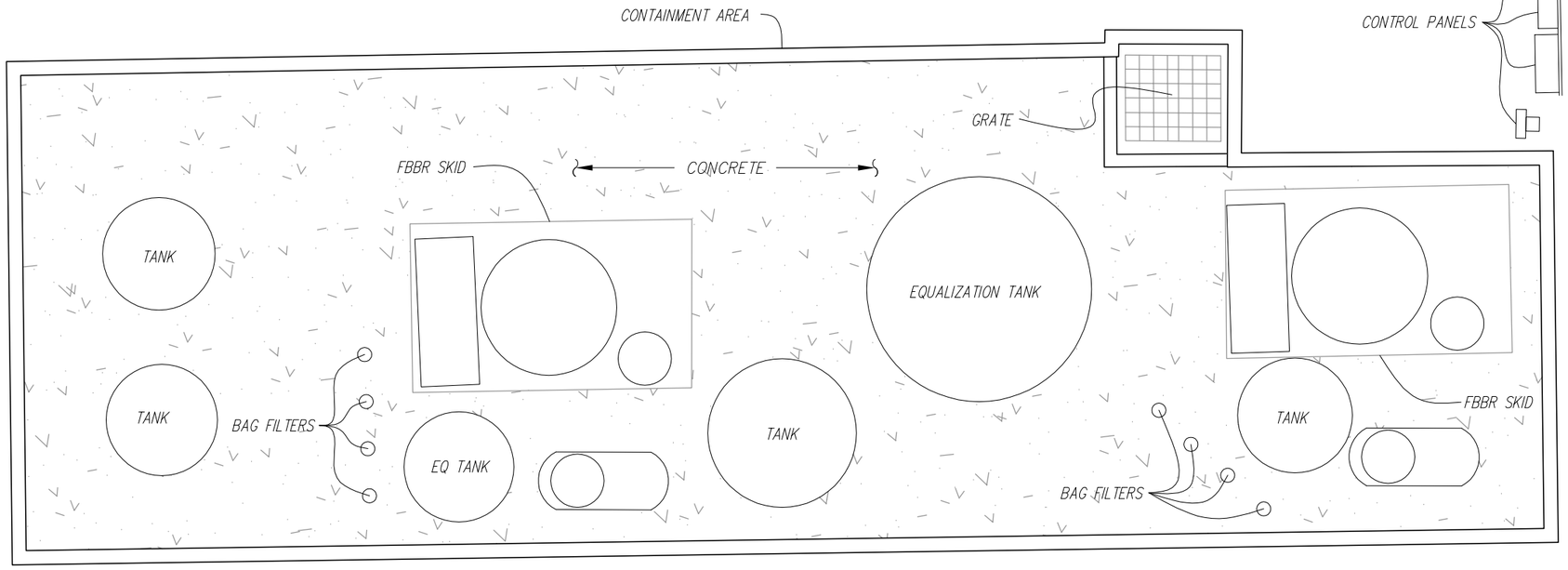

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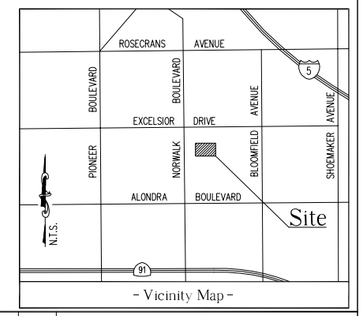

PREPARED FOR

CH2MHILL

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NO.	DATE	REVISIONS	BY
1	5/29/14	SURVEY WELLS AND STKD LINE	SM
2	10/03/14	ADDITIONAL WELLS	GBM

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SITE PLAN

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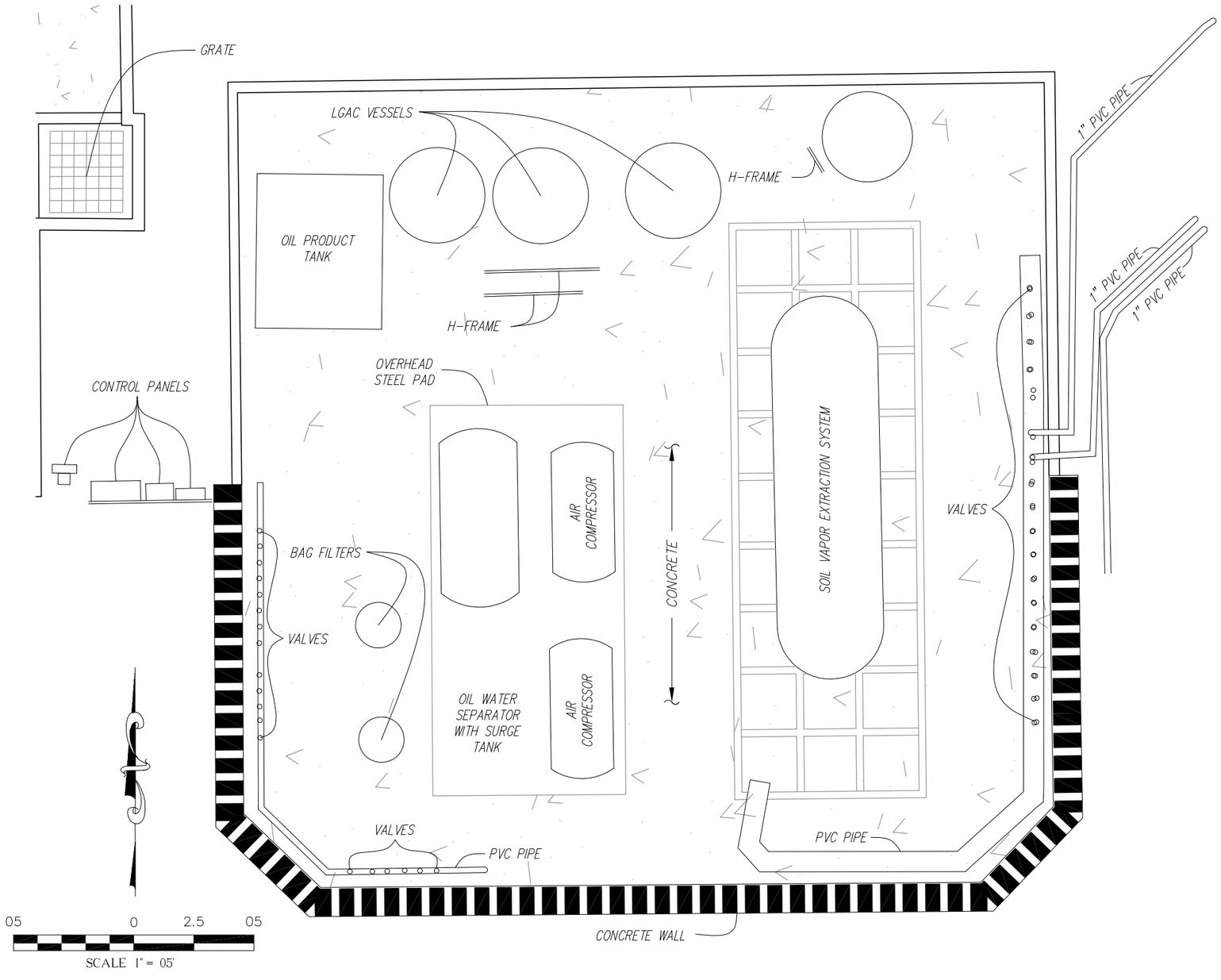
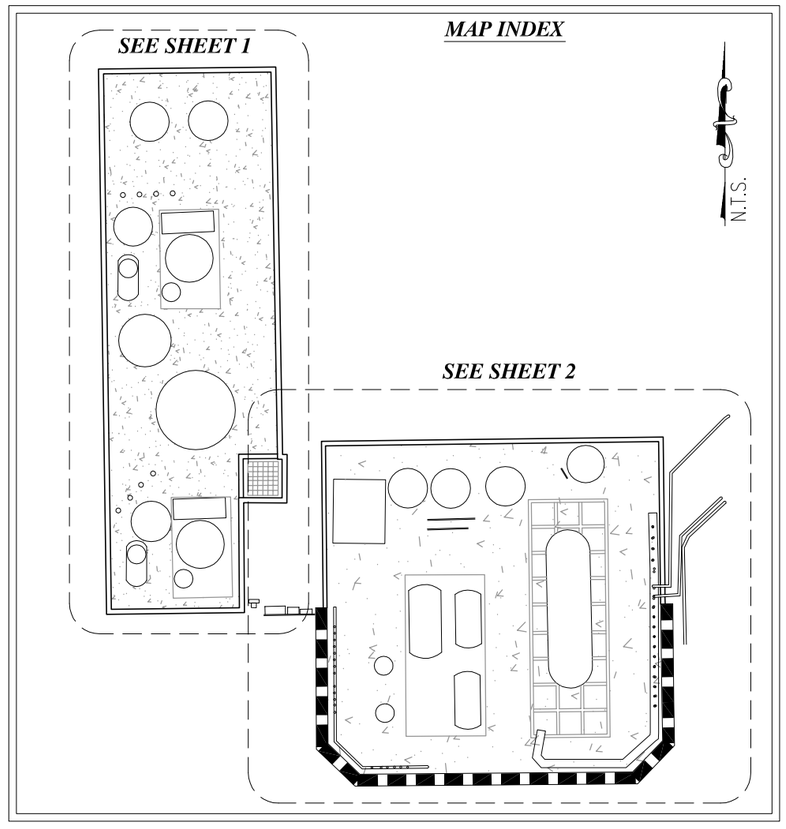
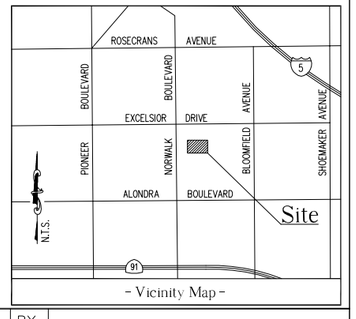
15306 NORWALK BOULEVARD, NORWALK, CA







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DATE OF SURVEY

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2	10/03/14	ADDITIONAL WELLS	GBM

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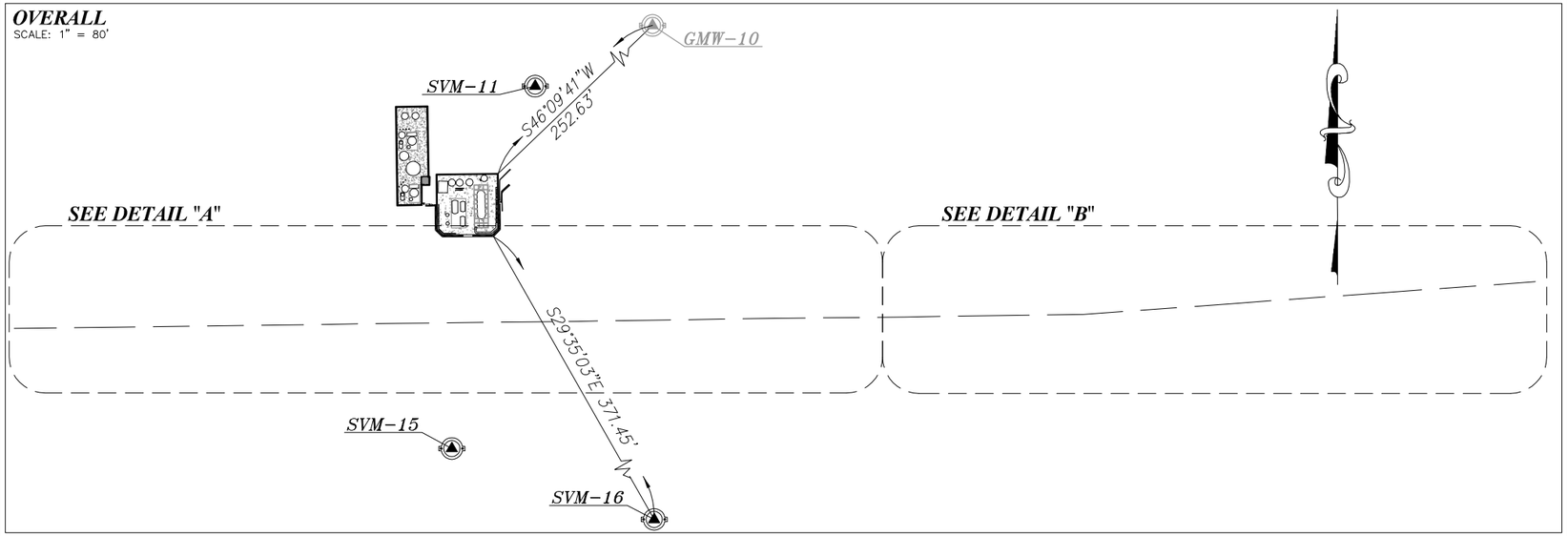
JOB NO. 14413

SUBMITTAL DATE: 05-09-14_SM

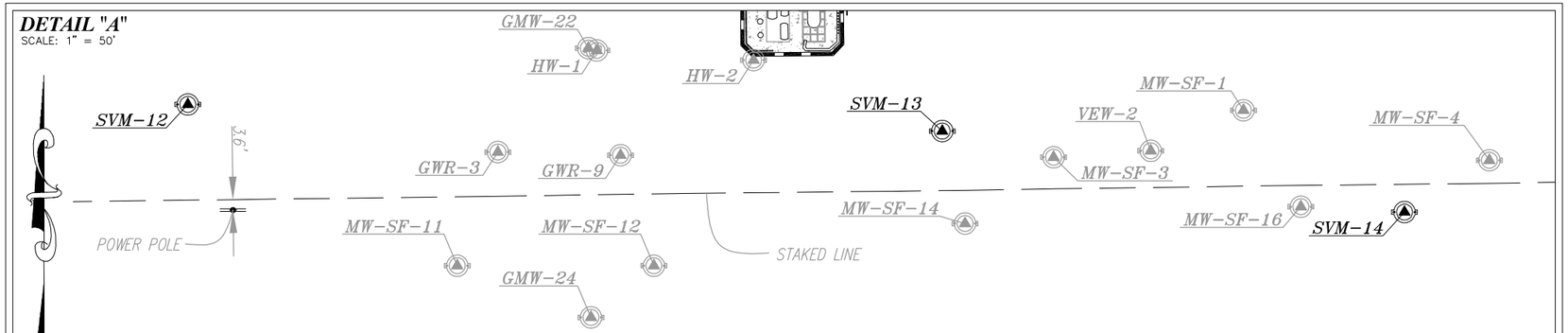
SITE PLAN

DEFENSE FUEL SUPPORT POINT
15306 NORWALK BOULEVARD, NORWALK, CA

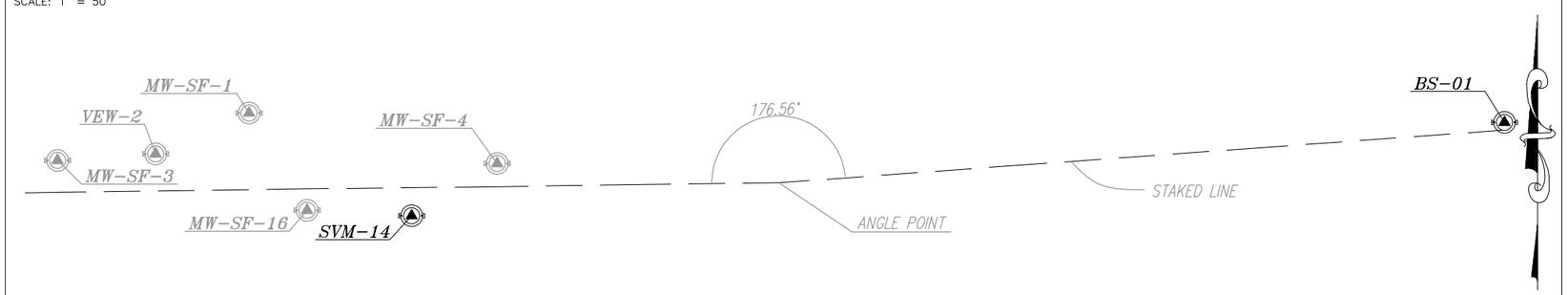
OVERALL
SCALE: 1" = 80'



DETAIL "A"
SCALE: 1" = 50'



DETAIL "B"
SCALE: 1" = 50'



SURVEYED OCTOBER 02, 2014

MONITORING WELLS						
WELL	NORTH	EAST	LATITUDE (DD)	LONGITUDE (DD)	TOR (ELEVATION)	TOP (ELEVATION)
BS-01	1782935.84	6540665.00	33.8915880	-118.0691996		75.06
SVM-11	1783041.31	6540110.55	33.8918767	-118.0710268	74.71	
SVM-12	1782941.12	6539862.22	33.8916009	-118.0718448	74.79	
SVM-13	1782931.84	6540125.56	33.8915759	-118.0709771	74.78	
SVM-14	1782903.60	6540286.95	33.8914987	-118.0704452	75.03	
SVM-15	1782840.80	6540064.44	33.8913256	-118.0711783	74.96	
SVM-16	1782635.09	6540270.96	33.8907608	-118.0704973	73.21	

DD: DECIMAL DEGREES
TOR: TOP OF RIM
TOP: TOP OF PIPE

LICENSED LAND SURVEYOR
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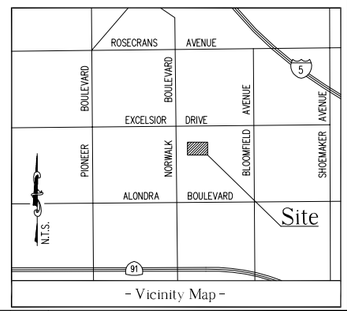
STATE OF CALIFORNIA



- Vicinity Map -

DATE OF SURVEY
MAY 2, 2014
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BENCH MARK
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2	10/03/14	ADDITIONAL WELLS	GBM

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JOB NO. 14413

SUBMITTAL DATE: 05-09-14_SM

Attachment C
Biosparge Well Boring Log

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	BS-01	SHEET 1 OF 8

Directional Borehole Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 75.06 (top of casing) ft msl NGVD29
DRILLING CONTRACTOR AND RIG : Directed Technologies Drilling, Directional Drill CMS9030TMSC

COORDINATES : N 1782935.84, E 6540665, CA State Plane NAD83
DRILLING METHOD AND EQUIPMENT : Directional Drilling, Chisel-tooth tri-cone bit with 2° bend

STEERING CONTRACTOR: SlimDril International
STEERING METHOD AND EQUIPMENT: GST, Brownline Drill Guide 135.034

WATER LEVEL : NA
START : 8/13/2014
END : 8/21/2014
LOGGER : M. Mayry

BOREHOLE LENGTH (ft)	STEERING DATA: DEPTH BELOW GROUND (ft)	STEERING DATA: BOREHOLE INCLINATION (DEGREES)	DRILLING PIPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION	WELL DETAILS
10						**SILTY SAND (SM)** grayish brown (2.5Y 5/2), 85% fine to medium sand, subangular, 15% fines, trace mica	Geophysical utility survey performed for subsurface clearance. Air knifed to 6 ft bgs at borehole entry and to 8 ft bgs at 30 ft west of entry point along borehole alignment. No conflicts encountered. Samples for logging were collected from drill cuttings from the borehole drilling fluid returns. Drilling fluid viscosity averaged 50 sec/qt. Drilling fluid pressure averaged 150-175 psi. Drilling fluid borehole return averaged 160 gpm.	Portland Cement-Bentonite Grout
20			1					4-inch SCH 80 PVC well casing
30	7.43	-17.18				as above		
40				0.2		**POORLY GRADED SAND (SP)** dark grayish brown (2.5Y 4/2), 95% fine sand, micaceous, 5% fines, trace medium sand		14-inch shale trap packer
50			2					Natural Formation Sand
60	16.25	-15.55						
70				44.7		greenish gray (10Y 5/1), as above, 95% fine to medium sand, 5% fines, trace coarse sand, subangular	strong hydrocarbon odor	
80			3					
90	24.28	-13.51						
100				73.2		**SILTY SAND (SM)** greenish gray (10Y 5/1), 70% fine to medium sand, micaceous, 30% fines, trace medium sand, subangular	strong hydrocarbon odor	
110								
120			4					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	BS-01	SHEET 2 OF 8

Directional Borehole Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 75.06 (top of casing) ft msl NGVD29
DRILLING CONTRACTOR AND RIG : Directed Technologies Drilling, Directional Drill CMS9030TMSC

COORDINATES : N 1782935.84, E 6540665, CA State Plane NAD83
DRILLING METHOD AND EQUIPMENT : Directional Drilling, Chisel-tooth tri-cone bit with 2° bend

STEERING CONTRACTOR: SlimDril International
STEERING METHOD AND EQUIPMENT: GST, Brownline Drill Guide 135.034

WATER LEVEL : NA
START : 8/13/2014
END : 8/21/2014
LOGGER : M. Mayry

BOREHOLE LENGTH (ft)	STEERING DATA: DEPTH BELOW GROUND (ft)	STEERING DATA: BOREHOLE INCLINATION (DEGREES)	DRILLING PIPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION	WELL DETAILS
	31.06	-10.53						
130				20.0		**POORLY GRADED SAND (SP) WITH INTERBEDDED SANDY SILT (ML)** light brownish gray (2.5Y 6/2), fine to medium sand, subangular, silt is 60% fines, 40% fine sand	hydrocarbon odor	
140								
150			5					
	36.44	-8.32						
160								
				20.2		**POORLY GRADED SAND (SP)** light brownish gray (2.5Y 6/2), fine to medium sand, subangular	hydrocarbon odor	
170								
180			6					
	40.36	-6.15						
190								
200				34.0		as above	hydrocarbon odor	
210			7					
	43	-4						
220								
230				53.5		as above	strong hydrocarbon odor	
240								

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	BS-01	SHEET 3 OF 8

Directional Borehole Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 75.06 (top of casing) ft msl NGVD29
DRILLING CONTRACTOR AND RIG : Directed Technologies Drilling, Directional Drill CMS9030TMSC

COORDINATES : N 1782935.84, E 6540665, CA State Plane NAD83
DRILLING METHOD AND EQUIPMENT : Directional Drilling, Chisel-tooth tri-cone bit with 2° bend

STEERING CONTRACTOR: SlimDril International
STEERING METHOD AND EQUIPMENT: GST, Brownline Drill Guide 135.034

WATER LEVEL : NA
START : 8/13/2014
END : 8/21/2014
LOGGER : M. Mayry

BOREHOLE LENGTH (ft)	STEERING DATA: DEPTH BELOW GROUND (ft)	STEERING DATA: BOREHOLE INCLINATION (DEGREES)	DRILLING PIPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION	WELL DETAILS
250	44.67	-1.44	8				Beginning of Screen at 250 feet	4-inch SCH 80 PVC 0.01-inch transverse-slotted screen with 1.2-inch slot lengths and 11 slots per foot along 3 tri-symmetric rows for a total of 33 slots per foot along the screen.
260								
270				115		gray (5Y 5/1), as above, fine to medium sand, subangular, trace fines	strong hydrocarbon odor	
280	45.11	-0.25	9					
290								
300				125		**POORLY GRADED SAND (SP) WITH INTERBEDDED SILTY SAND (SM)** gray (5Y 5/1), fine to medium sand, subangular, micaceous, fines as silt, some interbeds of laminated SILT (ML), very dark gray (2.5Y 3/1)	strong hydrocarbon odor	
310	45.13	-0.55	10					
320								
330				25.2		as above with interbeds of laminated SILT (ML)	strong hydrocarbon odor	
340	45.2	-0.13	11					
350				102		**POORLY GRADED SAND (SP)** gray (5Y 5/1), fine to medium sand	strong hydrocarbon odor	
360								

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	BS-01	SHEET 4 OF 8

Directional Borehole Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 75.06 (top of casing) ft msl NGVD29
DRILLING CONTRACTOR AND RIG : Directed Technologies Drilling, Directional Drill CMS9030TMSC

COORDINATES : N 1782935.84, E 6540665, CA State Plane NAD83
DRILLING METHOD AND EQUIPMENT : Directional Drilling, Chisel-tooth tri-cone bit with 2° bend

STEERING CONTRACTOR: SlimDril International
STEERING METHOD AND EQUIPMENT: GST, Brownline Drill Guide 135.034

WATER LEVEL : NA
START : 8/13/2014
END : 8/21/2014
LOGGER : M. Mayry

BOREHOLE LENGTH (ft)	STEERING DATA: DEPTH BELOW GROUND (ft)	STEERING DATA: BOREHOLE INCLINATION (DEGREES)	DRILLING PIPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION	WELL DETAILS
370			12					
	45.35	-0.33				as above		
380								
390						as above	hydrocarbon odor	
400			13					
	45.42	-0.36						
410								
420				40.7		as above with interbeds of laminated SILT (ML) very dark gray (2.5Y 3/1)	hydrocarbon odor	
430			14					
	45.49	0.23						
440								
450				37.0		**POORLY GRADED SAND (SP)** olive gray (5Y 4/2), fine to medium sand, subangular, trace fines, micaceous	hydrocarbon odor	
460			15					
	45.4	-0.03						
470								
480								

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	BS-01	SHEET 5 OF 8

Directional Borehole Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 75.06 (top of casing) ft msl NGVD29
DRILLING CONTRACTOR AND RIG : Directed Technologies Drilling, Directional Drill CMS9030TMSC

COORDINATES : N 1782935.84, E 6540665, CA State Plane NAD83
DRILLING METHOD AND EQUIPMENT : Directional Drilling, Chisel-tooth tri-cone bit with 2° bend

STEERING CONTRACTOR: SlimDril International
STEERING METHOD AND EQUIPMENT: GST, Brownline Drill Guide 135.034

WATER LEVEL : NA
START : 8/13/2014
END : 8/21/2014
LOGGER : M. Mayry

BOREHOLE LENGTH (ft)	STEERING DATA: DEPTH BELOW GROUND (ft)	STEERING DATA: BOREHOLE INCLINATION (DEGREES)	DRILLING PIPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION	WELL DETAILS
490				36.7		as above, fine to medium sand, subangular		
500	45.39	0.15	16					
510								
520				36.0		as above	hydrocarbon odor	
530	45.24	-0.06	17					
540								
550				31.0		**SILTY SAND (SM)** dark greenish gray (10Y 4/1), 85% fine sand, micaceous, 15% fines, trace medium sand, subangular	No odor	
560	45.39	0.08	18					
570								
580							No odor	
590			19	8.3		**POORLY GRADED SAND (SP)** dark greenish gray (10Y 4/1), 90% fine sand, micaceous, 5% medium sand, subangular, 5% fines. Interbeds of SILT (ML), laminated, very dark gray		
600	45.35	-0.11						

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	BS-01	SHEET 6 OF 8

Directional Borehole Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 75.06 (top of casing) ft msl NGVD29
DRILLING CONTRACTOR AND RIG : Directed Technologies Drilling, Directional Drill CMS9030TMSC

COORDINATES : N 1782935.84, E 6540665, CA State Plane NAD83
DRILLING METHOD AND EQUIPMENT : Directional Drilling, Chisel-tooth tri-cone bit with 2° bend

STEERING CONTRACTOR: SlimDril International
STEERING METHOD AND EQUIPMENT: GST, Brownline Drill Guide 135.034

WATER LEVEL : NA
START : 8/13/2014
END : 8/21/2014
LOGGER : M. Mayry

BOREHOLE LENGTH (ft)	STEERING DATA: DEPTH BELOW GROUND (ft)	STEERING DATA: BOREHOLE INCLINATION (DEGREES)	DRILLING PIPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION	WELL DETAILS
						(10YR 3/1), some plastic fines		
610								
620				11.3		as above, increase in medium sand to 65% fine sand, 30% medium sand, 5% fines with interbeds of laminated SILT (ML)	slight chemical odor	
			20					
630	45.35	-0.03						
640				8.1		as above, 95% fine sand, micaceous, subangular, trace medium sand, 5% fines	slight chemical odor	
650								
			21					
660	45.37	0.31						
670								
680				13.2		as above with interbeds of laminated SILT (ML)		
			22					
690	45.24	0.2						
700								
710				11.3		as above, increase in medium sand, subangular, interbeds of laminated SILT (ML)		
720			23					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	BS-01	SHEET 7 OF 8

Directional Borehole Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 75.06 (top of casing) ft msl NGVD29
DRILLING CONTRACTOR AND RIG : Directed Technologies Drilling, Directional Drill CMS9030TMSC

COORDINATES : N 1782935.84, E 6540665, CA State Plane NAD83
DRILLING METHOD AND EQUIPMENT : Directional Drilling, Chisel-tooth tri-cone bit with 2° bend

STEERING CONTRACTOR: SlimDril International
STEERING METHOD AND EQUIPMENT: GST, Brownline Drill Guide 135.034

WATER LEVEL : NA
START : 8/13/2014
END : 8/21/2014
LOGGER : M. Mayry

BOREHOLE LENGTH (ft)	STEERING DATA: DEPTH BELOW GROUND (ft)	STEERING DATA: BOREHOLE INCLINATION (DEGREES)	DRILLING PIPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION	WELL DETAILS
	45.18	-0.09						
730								
740				13.1		as above	slight chemical odor	
750			24					
	45.07	0.34						
760								
770				22.2		as above, 60% fine sand, 40% medium sand		
780			25					
	45.02	-0.15						
790								
800				47.6		as above	hydrocarbon odor	
810			26					
	44.97	0.43						
820								
830								
840								

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	BS-01	SHEET 8 OF 8

Directional Borehole Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 75.06 (top of casing) ft msl NGVD29
DRILLING CONTRACTOR AND RIG : Directed Technologies Drilling, Directional Drill CMS9030TMSC

COORDINATES : N 1782935.84, E 6540665, CA State Plane NAD83
DRILLING METHOD AND EQUIPMENT : Directional Drilling, Chisel-tooth tri-cone bit with 2° bend

STEERING CONTRACTOR: SlimDril International
STEERING METHOD AND EQUIPMENT: GST, Brownline Drill Guide 135.034

WATER LEVEL : NA
START : 8/13/2014
END : 8/21/2014
LOGGER : M. Mayry

BOREHOLE LENGTH (ft)	STEERING DATA: DEPTH BELOW GROUND (ft)	STEERING DATA: BOREHOLE INCLINATION (DEGREES)	DRILLING PIPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION	WELL DETAILS
850			27			as above	hydrocarbon odor	
	44.66	0.03				as above	End of Screen at 850 feet	4-inch SCH 80 blank well casing
860						Subsurface Boring Length: 861.70 ft. End Depth: 44.66 ft bgs. Maximum Depth: 45.49 ft bgs.		
870								
880								
890								
900								
910								
920								
930								
940								
950								
960								

Attachment D
Biosparge Well Construction Diagram

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
495791.A1.02	BS-01	SHEET 1 OF 1

WELL COMPLETION DIAGRAM

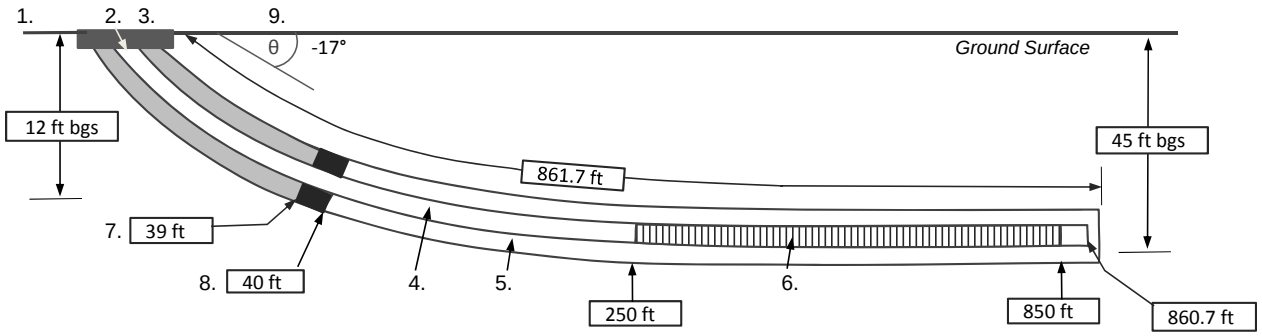
PROJECT : KMEP Norwalk Biosparge Well Installation LOCATION : 15306 Norwalk Blvd, Norwalk, CA

DRILLING CONTRACTOR : Directed Technologies Drilling and SlimDril International

DRILLING METHOD AND EQUIPMENT USED : Directional Mud Drilling. Directional Drill CMS9030TMSC with 12.5" chisel-tooth tricone bit with 2° bend.

STEERING METHOD AND EQUIPMENT USED : Brownline DrillGuide GST model 135.034

WATER LEVELS : Refer to Site Data for Water Levels START : 8/13/2014 END: 8/26/2014 LOGGER : M. Mayry



Screen from 250 - 850 feet. *Not to Scale*

1- Ground elevation at well 75.59 ft msl

2- Top of casing elevation 75.06 ft msl

3- Wellhead protection cover type H20 spring-assist vault box 24"x48"
a) concrete pad dimensions 48" x 72" x 6" concrete pad

4- Dia./type of well casing 4-inch SCH 80 PVC with O-rings

5- Type/slot/aperture of screen 4-inch SCH 80 slotted PVC
0.010" to 0.011" transverse slots, cut in 3 rows tri-symmetrically
Slot Length/Spacing 1.2 to 1.3 inch slots, 33 slots/ft
Field Measured? Yes / No

6- Type screen filter Natural Filter Pack from Borehole
a) Quantity used N/A

7- Type of seal Portland-Cement Bentonite Grout
a) Quantity used 80 bags of Portland with 5% Bentonite

8- Grout stop seal 14" shale trap packer in annulus at 40 feet

9- Angle at Point of Entry -17°
a) Boring angle at screen -0.55° to 0.43°

Drilling Fluid employed Bio-Bore and Zan-Flo biodegradable drilling fluid.

Fluid degrader CETCO LEB-CD Liquid Enzyme Breaker

Development method Water Flushing and Jetting

Development time 11.55 hours

Final Development Parameters
Temp: 32.30° C
pH: 7.34
Conductivity: 2.93 µmhos/cm
Turbidity: 1236 NTU
Sand Content: 1.0 ml/L
Mud Content: 2.0 ml/L
Total Water Volume Discharged: ~8900 gallons

Comments
Drill bit has a 12.5" diameter; however, horizontal borehole diameters vary slightly (likely 100% to 150% of drill bit size) due to gravitational effects.

Attachment E
DTD Well Completion Report

Directed Technologies Drilling Incorporated

November 24, 2014

Dan Jablonski
CH2M HILL Engineers, Inc.
1000 Wilshire Boulevard
Suite 2100
Los Angeles, CA 90017
Daniel.Jablonski@ch2m.com

RE: Final Well Completion Report – Well BS-01, Norwalk DFSP, Norwalk, CA

Dear Dan:

Thank you again for selecting DTD to install a biosparge well (BS-01) for pilot testing at the Norwalk DFSP site in Norwalk, CA. We are pleased that the installation was concluded successfully. This letter is to document various aspects of the well completion for your project records.

I have documented construction details in the table below. The as-built information, including bore profile, 3D coordinates of the locating plots of the Gyroscopic Steering Tool, and X-Y coordinates of the as-built well location in reference to your staked survey points are all provided as attachments. These were generated by our navigation subcontractor, SlimDril, and reviewed by DTD.

Well Construction Details – Biosparge Well BS-01

Well Length: 860 feet
Screened Length: 600 feet
Distal Blank Length: 10 feet
End Cap: Flush Threaded, with O-ring. Installed length ~ 0.75 feet
Riser Length: 250 feet to ground vault entry
Screen Depth (Average – center of borehole): 45 feet
Screen and Riser Material: 4-inch Schedule 80 PVC [white], flush threaded with 4 TPI threads
Slot Specifications (as installed) (0.010x1.2" [nominal] slots, 33 slots per foot 0.28%-0.30% Open Area
Wellhead Components: 4" "Y" connection. 4" flush threaded with cap for cleanout. 4" PVC ball valve to 4"x3" bushing reducer, to 3" PVC stub out (3" flush threaded cap) outside vault.
Drilling Fluid: Baroid BioBore biodegradable biopolymer; small additions of Zanflow viscosifier and xanthan gum, and soda ash.
Well Development additives: CETCO LEB-CD enzyme breaker

After an initial delay due to schedule conflicts with the gyroscopic steering subcontractor, the pilot bore was drilled on August 19-21, 2014. Drilling proceeded continuously during day shifts through this period, with short breaks for waste transfer, mixing of drilling fluid, and other routine tasks. Constant contact was

maintained between driller and GST technician to maintain the borepath typically within < 0.5 feet from designed path.

The pilot bore was completed on August 21, to a total length of 861.7 feet. The as-built data and drawings for the completed bore were completed by SlimDril and submitted to DTD. These were reviewed and are attached with this submittal, as listed in the table:

Item #	Title	Description
1	PLOT – 0.pdf	PDF file of CAD plot, showing as-built coordinates of pilot bore
2	PLOT – 0.dwg	AutoCAD DWG file of above
3	DrillingReport8-21-14 Final.xls	Excel Spreadsheet of final as-built coordinates
4	Coordinate bore locations14413-ACAD_05-16-14.xls	Combined spreadsheet showing supplied coordinates of bore path stakes and as-built offsets from those locations

During drilling, the tooling advanced through alternating beds of sandy silt, and, silt, and clay. Drilling mud color varied from medium to dark gray in color, apparently depending on fines content. Matt Mayry (CH2M – HILL) collected soil cuttings at intervals during the drilling process.

Upon attempting to remove the drill rods and GST tooling from the bore on August 21, the hydraulic controller for the drill rig's rotary motor failed. After on-site trouble shooting, a new controller was ordered. While waiting for delivery of the controller, site activities included waste management and conditioning the drilling fluid in the bore to prevent bore collapse.

The new controller was installed the morning of August 23 and the removal of the drill tooling was immediately resumed. Once all tooling was removed, the drill rods were then tripped back in (with no bottom hole drill bit assembly) to near the end of the bore. The drill operator observed the bore was stable, with no indications of collapse.

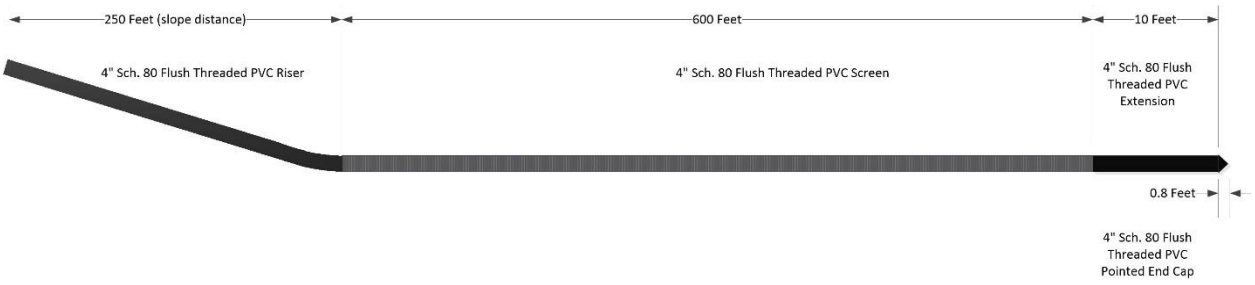
All well materials were installed through the middle of the open drill rod on August 24th. The drill rods were then withdrawn from the bore, leaving the well materials in place in the open borehole.

The well assembly included:

1pc. – Pointed, Flush-threaded Sch. 80 PVC end cap. Approximate length 0.75 feet.

30 pcs. – Flush-threaded, White, Schedule 80 PVC well screen. Slotting as described in table above. Total 600 feet in 20 foot (make-up length) sticks. Threaded joints made up with factory O-Rings and PTFE pipe threading compound.

13 pcs. – Flush-threaded, White, Schedule 80 PVC blank riser. Total 260 feet in 20 foot (make up length) sticks. Approximately 10 feet of stick up remaining when well materials seated in hole. Stick up subsequently shortened and removed to facilitate well development, later cut to length for vault installation.



Well materials were supplied through PQ Products of Spokane, Washington. However, problems with the order quantities, and also the product quality resulted in the rejection of the delivered well materials. New materials were secured by PQ Products through a local supplier, Drillers Pipe Manufacturing. The new well materials were inspected and met the project specifications.

Well Development:

Upon installation of the well casing and screen, DTD undertakes a well development process to ensure effective communication between the well and the surrounding geologic formation. DTD began the well development process on August 25th. A Vactor combination jetting/vacuum truck was used for the development. We began the process by jetting inside the screen section with clear water from the site hydrant, after filling the Vactor truck tanks (1300 gallons). Water started flowing up the bore annulus upon the first flushing pass. We continued this flushing for approximately two hours, then attached fittings to the end of wellhead to allow direct connection of the hydrant hose to the well head. This forces water down the well riser and out through the screen, pushing the drilling fluid and cuttings out of the bore annulus. Flushing continued for approximately 15 minutes at an estimated flow rate of 55 gpm.

On August 26, we continued well development with an additional flush of water down the inside of the well materials and back to the ground surface through the bore annulus. After noting that the water level in the well would drop immediately upon halting the flush, we set up to continue jetting. Three pints of LEB-CD enzyme was added to 1300 gallons of water in the jetting tanks. The enzyme accelerates breakdown of the biopolymer drilling fluid. Multiple passes of the jetting tool were made through the well screen until 1500 hr. in the afternoon. At this point, the total development water pumped or jetted into the well was approximately 4600 gallons, with a total of 12 jetting passes through the well screen section. DTD demobilized the jetting truck.

Though the well was deemed adequately developed, CH2M-HILL requested additional development on the morning of August 27.

DTD reacquired the Vactor truck and made eleven (11) additional jetting passes, for a total of 23 jetting passes. The first 1300 gallons of water included enzyme breaker to assure any residual mud was broken. We used approximately 4300 gallons of water on August 27, for a total of approximately 8900 gallons.

Water was collected using the vacuum truck, and conveyed directly to the Baker tanks on site. Matt Mayry (CH2M-HILL) collected water samples at intervals during the process and confirmed that the water parameters of sand and silt content, pH, and turbidity were remaining stable throughout the day. CH2M directed DTD to cease well development efforts at 1340. DTD removed the jetting assembly from the well and removed the truck from site shortly after.

Well Surface Completion:

Concurrent with well development efforts, staged appropriately to prevent interference in the operations and the setting of grout, DTD commenced efforts to construct the surface completion of the well on August 26. Gregg Drilling provided a grouting truck and two operators/laborers to assist in grouting the well annulus. The Statement of Work specified to grout the well from a depth of 12 feet of vertical depth below ground surface. This equated to a borehole length of 39 feet, measured from the wellhead/ground level, resulting in a required volume of approximately 32 cubic feet of cement. DTD procured 80, forty-seven (47) pound bags of Type II Portland Cement. This yields approximately 40 cubic feet of grout. The grout was mixed in 5-6 bag batches, to each batch 5% bentonite (by weight) was mixed in.

A packer was set at a depth of 39 feet. The packer consisted of a 4" x 9.5" shale trap packer that fit closely to the well casing, attached by self-tapping screw to an 8" x 14" shale trap packer to form a close interference fit to the bore annulus.

A tremie tube (2" PVC) was placed at a depth of 35 feet with no obstructions noted. Grout was mixed and emplaced in batches, as the tremie was slowly withdrawn. Color changes and visual evidence of grout was noted at surface as the last of the grout was emplaced. During excavation for the vault the following day, partly-cured grout was noted around the bore annulus. Prior to setting the vault, DTD placed 1.5 bags of hydrated bentonite pellets to complete a surface seal.

Well Vault:

A 2 foot by 4 foot, steel walled, bottomless vault was installed. The vault assembly includes a diamond plate, H-20 traffic rated lid with spring assist and bolted down locking device. The vault has sidewalls of approximately 24 inches height.

The vault was set and leveled to prevent ponding or entrapment of rainwater on the wellhead. Openings were drilled through the vault walls to provide entry for the well riser and access for the air supply stub out. The well head assembly of a "Y", with a 4-inch ball valve, 3-inch reducer, and 3-inch stubout was made on the angled portion of the "Y". The stub out terminates approximately 2-3 feet beyond the concrete apron surrounding the vault, and is closed with a flush-threaded 3-inch cap. The straight part of the "Y" was completed with a flush-threaded, 4-inch cap with O-ring and pipe dope to form an air-tight seal and provide access for future downhole activities.

A concrete slab was constructed, using 18 bags of pre-mixed Sakcrete, 40 lb. bags, plus 11, ninety (90) lb. bags. This was calculated to build a slab that exceeds 18 inches in all directions from the rim of the vault, to a slab depth of nominal 6 inches, per specifications. No slump test or other testing of the concrete was made. The slab was troweled and brushed with a broom to finish the surface. The completed wellhead was delineated with cones and flagging to prevent intrusion, and a steel T-post was set to indicate the position of the stub out.

At the conclusion of the wellhead completion, DTD rough-graded the surrounding area, picked up remaining debris and/or trash, then completed demobilization of equipment from the well site.

Sincerely,

Directed Technologies Drilling, Inc.

Michael D. Lubrecht
Senior Geologist

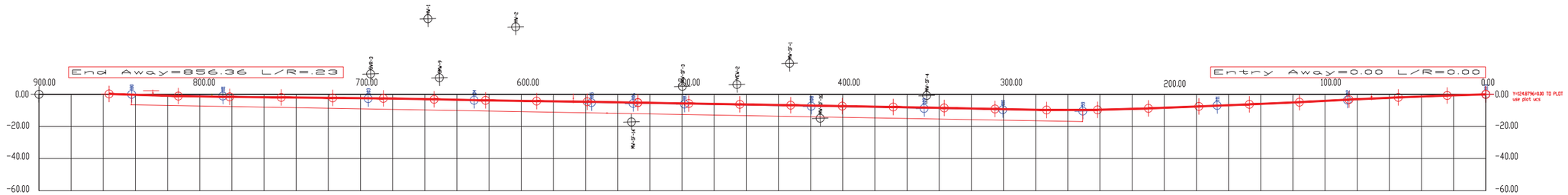
Cc: Matthew Mayry – CH2M-HILL
Dan Ombalski – Directed Technologies Drilling, Inc.

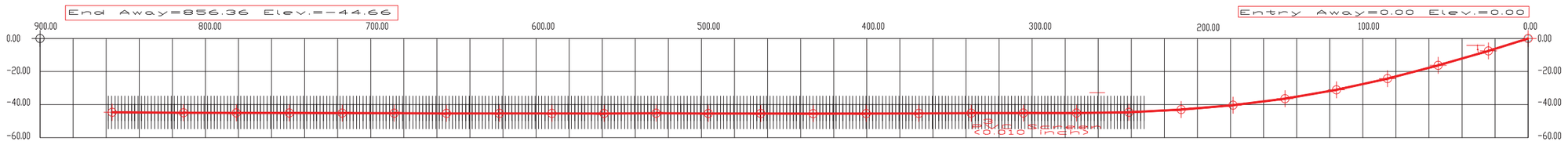
DRILLING REPORT

Client Name:	34104 DTD
Surveyor:	NORB
Project Number:	34104 DTD - Norwalk, Calinfornia - 140815
First Date:	19-August-14
Place:	Norwalk, Calinfornia

Nr	X(ft)	Y(ft)	Z(ft)	Elevation (ft)	Inclination (°)	Azimuth (°)	Total Distance (ft)
0	0	0	0	0	-17.18	266.44	0
1	24.02	-0.74	-7.43	-7.429	-17.18	266.44	25.15
2	54.39	-1.9	-16.25	-16.25	-15.55	265.74	56.8
3	85.02	-3.28	-24.28	-24.277	-13.51	265.69	88.5
4	115.94	-4.89	-31.06	-31.062	-10.53	265.84	120.2
5	147.04	-6.25	-36.44	-36.444	-8.32	265.87	151.8
6	178.47	-7.53	-40.36	-40.355	-6.15	265.61	183.5
7	209.83	-8.75	-43	-43.001	-4	266.16	215
8	241.47	-9.65	-44.67	-44.669	-1.44	267.29	246.7
9	273.11	-9.76	-45.11	-45.108	-0.25	268.55	278.35
10	305.21	-9.14	-45.13	-45.128	-0.55	269.31	310.45
11	336.85	-8.48	-45.2	-45.197	-0.13	269.37	342.1
12	368.59	-7.89	-45.35	-45.348	-0.33	269.21	373.85
13	400.29	-7.34	-45.42	-45.416	-0.36	269.07	405.55
14	432.38	-6.78	-45.49	-45.484	0.23	269.29	437.65
15	464.08	-6.23	-45.4	-45.392	-0.03	269.22	469.35
16	495.77	-5.72	-45.39	-45.387	0.15	269.19	501.05
17	527.42	-5.18	-45.24	-45.229	-0.06	269.2	532.7
18	558.91	-4.62	-45.39	-45.382	0.08	269.23	564.2
19	590.41	-4.23	-45.35	-45.337	-0.11	268.9	595.7
20	622.21	-3.76	-45.35	-45.344	-0.03	269.1	627.5
21	654.15	-3.08	-45.37	-45.36	0.31	269.31	659.45
22	685.79	-2.53	-45.24	-45.23	0.2	268.73	691.1
23	717.29	-2.22	-45.18	-45.166	-0.09	269.13	722.6
24	749.29	-1.89	-45.07	-45.055	0.34	268.83	754.6
25	781.29	-1.6	-45.02	-45.01	-0.15	268.77	786.6
26	813.28	-1.09	-44.97	-44.955	0.43	269.56	818.6
27	856.36	0.23	-44.66	-44.642	0.03	270.17	861.7

Biosparge Well BS-01 Navigation Plot
SFPP Norwalk Pump Station
Norwalk, CA





Proposed versus As-built Survey Coordinates
Horizontal Biosparge Well BS-01
SFPP Norwalk Pump Station
Norwalk, CA

Calvada Survey Coordinates (Proposed)				SlimDril Survey Coordinates			As-built Deviation	
Point	**Description**	**Northing**	**Easting**	**Northing**	**Easting**	**Depth**	**Northing**	**Easting**
113	Entry Point	1782933.10	6540664.18	1782933.10	6540664.18	0	0	0
112		1782926.91	6540578.30	1782927.13	6540578.28	-24.29	-0.22	0.018
111		1782921.06	6540497.38	1782920.91	6540497.39	-38.40	0.15	-0.011
53	Screen Start	1782914.98	6540413.93	1782915.73	6540413.90	-44.95	-0.75	0.026
110		1782914.35	6540364.17	1782914.65	6540364.17	-45.13	-0.30	0.003
109		1782913.59	6540315.23	1782914.13	6540315.22	-45.26	-0.54	0.007
108		1782912.82	6540245.00	1782913.22	6540244.99	-45.46	-0.40	0.005
107		1782911.73	6540166.08	1782912.13	6540166.07	-45.37	-0.40	0.005
106		1782911.18	6540134.21	1782911.69	6540134.20	-45.25	-0.51	0.007
105		1782910.86	6540108.27	1782911.36	6540108.26	-45.37	-0.50	0.006
104		1782910.10	6540035.28	1782910.18	6540035.28	-45.35	-0.08	0.001
103		1782909.11	6539969.38	1782909.32	6539969.38	-45.22	-0.21	0.005
101		1782907.95	6539878.97	1782907.45	6539878.98	-45.01	0.50	-0.007
100		1782907.25	6539822.23	1782907.04	6539822.23	-44.76	0.21	0
---	Termination Point	---	---	1782907.04	6539808.22	-44.66	---	---

Notes:
Northing and Easting coordinates in units of feet
Depth is feet below ground surface
Coordinates shown are based upon the State Plane Coordinate System (NAD 83)
California Zone 5 based on static GPS observation

Attachment F
Biosparge Well Development Log

CH2MHILL

PROJECT NUMBER	WELL ID	
495791.A1.02	BS-01	Sheet 1 of 1

WELL DEVELOPMENT LOG

PROJECT : KMEP Norwalk Biosparge Well Installation LOCATION : 15306 Norwalk Blvd, Norwalk, CA

DEVELOPMENT CONTRACTOR : Directed Technologies Drilling

DEVELOPMENT METHOD AND EQUIPMENT USED : Flush and Jet, Vactor 1200 Jet/Vacuum Unit

START WATER LEVELS : Not monitored START : 8/25/2014 END : 8/27/2014 LOGGER : M. Mayry

MAXIMUM DRAWDOWN DURING PUMPING: Not determined (ND)

RANGE AND AVERAGE DISCHARGE RATE: 20 to 58 gpm

TOTAL QUANTITY OF WATER DISCHARGED: 8900 gallons

DISPOSITION OF DISCHARGE WATER: Discharge water held in rolloff bins and poly tanks for profiling and disposal.

MONITORING EQUIPMENT USED: Horiba U-52 cal'd to 4.0 pH, cond. 4.49 mS/cm, and LaMotte Turbidimeter to 10 NTU. 1000 mL Imhoff Cone

Date/Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Mud (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
8/25/14 15:00	--	--	--	--	--	--	--	--	Flush casing/borehole with hydrant water.
16:00	1300	--	--	--	--	--	3.0	35	Flushed inside casing. 5 passes in screen.
17:45	2800	--	--	--	--	--	ND	ND	Flush annulus outside of casing.
8/26/14 07:45	3000	--	--	--	--	--	ND	ND	Flush annulus outside of casing.
9:15	3600	--	26.45	6.89	0.757	1627	0.5	3.0	Add 3 pints of enzyme to water flush.
9:20	3800	--	24.44	6.28	0.560	2502	1.0	5.0	
9:35	4000	--	27.00	6.51	0.841	2338	1.0	5.0	Stop to pump water into Baker.
10:00	4300	--	27.66	6.41	0.800	2292	1.0	5.0	
10:08	4600	--	27.50	6.30	0.816	1920	0.5	4.0	12 jetting passes through screen.
8/27/14 09:30	--	--	--	--	--	--	--	--	Resume jetting. Add 3 pints of enzyme.
9:45	4800	--	30.44	6.73	0.83	1092	0.7	3.0	
10:40	5800	--	25.83	4.18	1.27	1346	1.0	2.0	6 jetting passes through screen.
10:45	5900	--	--	--	--	--	--	--	Shutdown to refill water.
11:10	--	--	--	--	--	--	--	--	Resume jetting.
11:30	6700	--	30.54	6.50	3.09	1634	1.0	3.0	2 jetting passes through screen.
11:45	7200	--	--	--	--	--	--	--	Shutdown to refill water and offload water.
13:00	--	--	--	--	--	--	--	--	Resume jetting.
13:35	7800	--	32.40	7.32	3.08	1571	1.0	2.0	2 jetting pass through screen.
14:10	8500	--	--	--	--	--	--	--	Stop jetting to refill.
15:40	--	--	32.30	7.34	2.93	1236	1.0	2.0	1 jetting pass through screen.
16:00	8900	--	--	--	--	--	--	--	Terminate jetting/flushing.
									11.55 total hours of development.

Attachment G
Soil Vapor Probe Boring Logs and Construction Diagrams

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	SVM-11	SHEET 1 OF 1

Soil Boring Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 74.71 ft msl NGVD29 DRILLING CONTRACTOR AND DRILL RIG : EST, Geoprobe 5400

COORDINATES : E 6540110.55, N 1783041.31, CA State Plane NAD83 DRILLING METHOD AND EQUIPMENT : Direct Push Technology with Macrocore

WATER LEVEL : NA START : 9/24/2014 END : 9/24/2014 LOGGER : M. Mayry

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (ft)	SAMPLE TYPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING DETAILS, INSTRUMENTATION	WELL DETAILS
5		HA	0.0		**POORLY GRADED SAND WITH SILT (SP-SM)** pale yellow (2.5Y 7/3), dry, 90% fine sand, 10% fines	Hand auger to 12 ft bgs to clear for subsurface utilities.	Flush Mount Traffic Rated Well Box Hydrated Bentonite Dry Granulated Bentonite Filter Sand Vapor Probe 7 to 7.5 ft Hydrated Bentonite
10			0.0				
15	4.0	DPT	0.0		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), dry, 100% fine sand		Dry Granulated Bentonite Filter Sand Vapor Probe 15 to 15.5 ft Hydrated Bentonite
	4.0	DPT			as above		
20	2.0	DPT	0.0 0.0		**CLAYEY SAND (SC)** light olive brown (2.5Y 5/3), moist, 85% fine sand, micaceous, 15% fines		Dry Granulated Bentonite Filter Sand Vapor Probe 21 to 21.5 ft
					Boring terminated at 23.0 ft bgs.		
25							
30							

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	SVM-12	SHEET 1 OF 1

Soil Boring Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 74.79 ft msl NGVD29 DRILLING CONTRACTOR AND DRILL RIG : EST, Geoprobe 5400

COORDINATES : E 6539862.22, N 1782941.12, CA State Plane NAD83 DRILLING METHOD AND EQUIPMENT : Direct Push Technology with Macrocore

WATER LEVEL : NA START : 9/26/2014 END : 9/26/2014 LOGGER : M. Mayry

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (ft)	SAMPLE TYPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING DETAILS, INSTRUMENTATION	WELL DETAILS
0					**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/3), moist, 95% fine sand, 5% fines	Hand auger to 12 ft bgs to clear for subsurface utilities.	Flush Mount Traffic Rated Well Box Hydrated Bentonite
5		HA	0.1				Dry Granulated Bentonite Filter Sand Vapor Probe 7 to 7.5 ft Hydrated Bentonite
10			0.0		dark gray (2.5Y 4/1), as above		
	4.0	DPT			grayish brown (2.5Y 5/2), as above, dry, 100% fine sand		Dry Granulated Bentonite
15			0.0				Filter Sand Vapor Probe 15 to 15.5 ft Hydrated Bentonite
	4.0	DPT	0.0		**SANDY SILTY CLAY (ML/CL)** dark grayish brown (2.5Y 4/2), moist, 75% fines, some clay, 25% fine sand, low plasticity, low toughness		
20					**POORLY GRADED SAND (SP)** grayish brown (2.5Y 5/2), as above, dry, 100% fine sand		Dry Granulated Bentonite
	3.0	DPT	0.0				Filter Sand Vapor Probe 22 to 22.5 ft
25					Boring terminated at 24.0 ft bgs.		
30							

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	SVM-13	SHEET 1 OF 1

Soil Boring Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 74.78 ft msl NGVD29 DRILLING CONTRACTOR AND DRILL RIG : EST, Geoprobe 5400

COORDINATES : E 6540125.56, N 1782931.84, CA State Plane NAD83 DRILLING METHOD AND EQUIPMENT : Direct Push Technology with Macrocore

WATER LEVEL : NA START : 9/23/2014 END : 9/23/2014 LOGGER : M. Mayry

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (ft)	SAMPLE TYPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING DETAILS, INSTRUMENTATION	WELL DETAILS
					Gravel 4 inches	Hand auger to 12 ft bgs to clear for subsurface utilities.	Flush Mount Traffic Rated Well Box
					POORLY GRADED SAND WITH SILT (SP-SM) dark grayish brown (2.5Y 4/2), dry, 90% fine sand, 10% fines		Hydrated Bentonite
5		HA	0.0				Dry Granulated Bentonite
			0.0				Filter Sand Vapor Probe 7 to 7.5 ft
							Hydrated Bentonite
10			0.0				
	3.0	DPT					Dry Granulated Bentonite
15			0.0		**SILTY SAND (SM)** dark gray (2.5Y 4/1), moist, 80% fine sand, micaceous, 20% fines		Filter Sand Vapor Probe 15.5 to 16 ft
					POORLY GRADED SAND (SP) light olive gray (5Y 6/2), moist, 100% fine sand		Hydrated Bentonite
	4.0	DPT			**SILTY SAND (SM)** dark gray (2.5Y 4/1), moist, 75% fine sand, micacous, 25% fines		
20			0.0				
	3.0	DPT			**POORLY GRADED SAND WITH SILT (SP-SM)** dark grayish brown (2.5Y 4/2), dry, 90% fine sand, 10% fines		Dry Granulated Bentonite
			0.1		**SANDY SILT (ML)** olive (5Y 4/3), 70% fines, 30% fine sand, micaceous		Filter Sand Vapor Probe 22.5 to 23 ft
					POORLY GRADED SAND (SP) olive (5Y 4/3), moist, 100% fine sand Boring terminated at 23.0 ft bgs.		
25							
30							

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	SVM-14	SHEET 1 OF 1

Soil Boring Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : 75.03 ft msl NGVD29 DRILLING CONTRACTOR AND DRILL RIG : EST, Geoprobe 5400

COORDINATES : E 6540286.95, N 1782903.6, CA State Plane NAD83 DRILLING METHOD AND EQUIPMENT : Direct Push Technology with Macrocore

WATER LEVEL : NA START : 9/23/2014 END : 9/23/2014 LOGGER : M. Mayry

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (ft)	SAMPLE TYPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING DETAILS, INSTRUMENTATION	WELL DETAILS
			0.0		Gravel 4 inches **SILTY SAND (SM)** dark gray (2.5Y 4/1), dry, 75% fine sand, micaceous, 25% fines	Hand auger to 12 ft bgs to clear for subsurface utilities.	Flush Mount Traffic Rated Well Box Hydrated Bentonite
5		HA			Brick and glass debris at 5 ft		Dry Granulated Bentonite Filter Sand Vapor Probe 7 to 7.5 ft Hydrated Bentonite
			0.0				
10			0.0		**POORLY GRADED SAND (SP)** dark gray (2.5Y 4/1), dry, 100% fine sand, micaceous, trace fines		
	3.0	DPT	0.0				Dry Granulated Bentonite Filter Sand Vapor Probe 15 to 15.5 ft Hydrated Bentonite
15					3 inches of interbedded SANDY SILT (ML), 55% fines, 45% fine sand		
	4.0	DPT	0.0				
20					**SILTY SAND (SM)** dark grayish brown (2.5Y 4/2), moist, 80% fine sand, 15% fines, 5% medium sand, subangular		
	3.0	DPT					Dry Granulated Bentonite Filter Sand Vapor Probe 22 to 22.5 ft
			118		**SANDY SILT (ML)** olive (5Y 4/3), moist, 60% fines, 40% fine sand, micaceous, hydrocarbon odor		
25					Boring terminated at 23.0 ft bgs.		
30							

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	SVM-15	SHEET 1 OF 1

Soil Boring Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA LOCATION : 12247 Cheshire St, Norwalk, CA

ELEVATION : 74.96 ft msl NGVD29 DRILLING CONTRACTOR AND DRILL RIG : EST, Geoprobe 5400

COORDINATES : E 6540064.44, N 1782840.8, CA State Plane NAD83 DRILLING METHOD AND EQUIPMENT : Direct Push Technology with Macrocore

WATER LEVEL : NA START : 9/25/2014 END : 9/25/2014 LOGGER : M. Mayry

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (ft)	SAMPLE TYPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING DETAILS, INSTRUMENTATION	WELL DETAILS
0					Concrete 4 inches	Hand auger to 12 ft bgs to clear for subsurface utilities.	Flush Mount Traffic Rated Well Box
					POORLY GRADED SAND (SP) olive brown (2.5Y 4/3), 95% fine sand, micaceous, 5% fines		Hydrated Bentonite
5		HA	0.0				Dry Granulated Bentonite
			0.0				Filter Sand Vapor Probe 7 to 7.5 ft Hydrated Bentonite
10			0.2				
	4.0	DPT	0.0		light brownish gray (2.5Y 6/2), as above, dry		Dry Granulated Bentonite
15							Filter Sand Vapor Probe 15 to 15.5 ft Hydrated Bentonite
	4.0	DPT					
20	3.0	DPT	0.0				Dry Granulated Bentonite
							Filter Sand Vapor Probe 22 to 22.5 ft
					SILTY SAND (SM) gray (2.5Y 5/1), moist, 85% fine sand, 15% fines		
25					Boring terminated at 23.0 ft bgs.		
30							

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
495791.A1.02	SVM-16	SHEET 1 OF 1

Soil Boring Log

PROJECT : KMEP Norwalk Biosparge Well Installation, Norwalk, CA LOCATION : 12313 Cheshire St, Norwalk, CA

ELEVATION : 73.21 ft msl NGVD29 DRILLING CONTRACTOR AND DRILL RIG : EST, Geoprobe 5400

COORDINATES : E 6540270.96, N 1782635.09, CA State Plane NAD83 DRILLING METHOD AND EQUIPMENT : Direct Push Technology with Macrocore

WATER LEVEL : NA START : 9/25/2014 END : 9/25/2014 LOGGER : M. Mayry

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (ft)	SAMPLE TYPE	ENVIRONMENTAL DATA (PID = ppm)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING DETAILS, INSTRUMENTATION	WELL DETAILS
0					Concrete 4 inches **POORLY GRADED SAND (SP)** grayish brown (2.5Y 5/2), moist, 100% fine sand	Hand auger to 12 ft bgs to clear for subsurface utilities.	Flush Mount Traffic Rated Well Box Hydrated Bentonite
5		HA	0.0				Dry Granulated Bentonite Filter Sand Vapor Probe 7 to 7.5 ft Hydrated Bentonite
10							
	4.0	DPT			as above, moist to wet, 95% fine sand, 5% fines		
15			0.0		light brownish gray (2.5Y 6/2), as above, dry, 100% fine sand		Dry Granulated Bentonite Filter Sand Vapor Probe 15.5 to 16 ft Hydrated Bentonite
	4.0	DPT			**POORLY GRADED SAND WITH SILT (SP-SM)** dark olive brown (2.5Y 3/3), moist to wet, 90% fine sand, 10% fines		
20							
	3.0	DPT	0.0		**POORLY GRADED SAND (SP)** light brownish gray (2.5Y 6/2), as above, dry, 100% fine sand		Dry Granulated Bentonite Filter Sand Vapor Probe 22 to 22.5 ft
25					Boring terminated at 23.0 ft bgs.		
30							

Attachment H
Waste Manifests

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number: Not Required	2. Page 1 of 1	3. Emergency Response Phone: 800-624-9136	4. Waste Tracking Number: NH 0102671

GENERATOR

5. Generator's Name and Mailing Address
SFPP-LP Attn: Ms. Karina Hanking
1100 Town and Country Rd.
Orange CA 92868
Generator's Phone: 714-560-4400

Generator's Site Address (if different than mailing address)
Norwalk Tank Farm
15306 Norwalk Blvd
Norwalk, CA 90650

6. Transporter 1 Company Name: PATRIOT ENVIRONMENTAL SERVICES
U.S. EPA ID Number: CAD053866794

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
DEMENNO KERDOON
2000 N. ALAMEDA ST.
COMPTON CA 90222
Facility's Phone: 310-537-7100
U.S. EPA ID Number: CAT080013352

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non Hazardous Waste, Liquid (drilling mud with trace hydrocarbons)	1	TT	4500	G	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
Wear Appropriate PPE when handling: PATRIOT JOB NUMBER:
9b.1) Profile Number: Bill: SFPP-LP

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: x Patrick Lopez
Signature: x
Month 9 Day 11 Year 14

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: JESUS R ESPINOZA
Signature:
Month 9 Day 11 Year 14

Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Marcus Mcdonnell
Signature:
Month 09 Day 11 Year 14

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
Not Required	1	800-624-9136	NH 0102672

GENERATOR

5. Generator's Name and Mailing Address
SFPP-LP Attn: Ms. Karina Hankins
1100 Town and Country Rd.
Orange CA 92868
Generator's Phone: 714-560-4400

Generator's Site Address (if different than mailing address)
Norwalk Tank Farm
15306 Norwalk Blvd
Norwalk, CA 90650

6. Transporter 1 Company Name: PATRIOT ENVIRONMENTAL SERVICES
U.S. EPA ID Number: CAD053866794

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
DEMENNO/KERDOON
2000 N. ALAMEDA ST.
COMPTON CA 90222
Facility's Phone: 310-537-7100
U.S. EPA ID Number: CAT080013352

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non Hazardous Waste, Liquid (drilling mud with trace hydrocarbons)	1	TT	3500	G	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
Wear Appropriate PPE when handling. PATRIOT JOB NUMBER:
9b.1) Profile Number: Bill: SFPP-LP

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Patrick Lopez
Signature: X
Month: 9 Day: 11 Year: 14

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: JESUS RESPINOZA
Signature:
Month: 9 Day: 11 Year: 14

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
3500
Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:
1235

18. Designated Facility/Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Marcus Worthley
Signature:
Month: 09 Day: 11 Year: 14

169-BLC-O 5 11977 (Rev. 9/09)

DESIGNATED FACILITY'S COPY

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	Not Required	1	800-624-9136	NH 0102675

GENERATOR

5. Generator's Name and Mailing Address

SFPP,LP Attn: Ms. Karina Hankins
1100 Town and Country Rd.
Orange CA 92868
Generator's Phone: 714-560-4400

Generator's Site Address (If different than mailing address)

Norwalk Tank Farm
15306 Norwalk Blvd
Norwalk, CA 90650

6. Transporter 1 Company Name: PATRIOT ENVIRONMENTAL SERVICES — U.S. EPA ID Number: CAD053666794

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address

DEMENNO KERDOON
2000 N. ALAMEDA ST.
COMPTON CA 90222
Facility's Phone: 310-537-7100

U.S. EPA ID Number: CAT080013352

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non Hazardous Waste, Liquid (drilling mud with trace hydrocarbons)	1	TT	4500	G	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Wear Appropriate PPE when handling!. PATRIOT JOB NUMBER:

9b.1) Profile Number: Bill: SFPP,LP

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: * Matt Murry / CH2M HILL on behalf of SFPP, L.P. — Signature: * — Month: 9 Day: 10 Year: 14

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: JESUS R ESPINOZA — Signature: — Month: 9 Day: 10 Year: 14

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Marcus Wormley — Signature: — Month: 09 Day: 10 Year: 14

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: Not Required | 2. Page 1 of 1 | 3. Emergency Response Phone: 800-624-9136 | 4. Waste Tracking Number: NH 0102677

5. Generator's Name and Mailing Address
SFPP-LP Attn: Ms. Karina Hankins
1100 Town and Country Rd.
Orange CA 92868
Generator's Phone: 714-560-4400

Generator's Site Address (if different than mailing address)
Norwalk Tank Farm
15306 Norwalk Blvd
Norwalk, CA 90650

6. Transporter 1 Company Name: PATRIOT ENVIRONMENTAL SERVICES | U.S. EPA ID Number: CAD053866794

7. Transporter 2 Company Name | U.S. EPA ID Number

8. Designated Facility Name and Site Address
DEMENNO KERDOON
2000 N. ALAMEDA ST.
COMPTON CA 90222
Facility's Phone: 310-537-7100

U.S. EPA ID Number: CAT080013352

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
GENERATOR	1. Non Hazardous Waste, Liquid (drilling mud with trace hydrocarbons)	1	TT	450	G	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
Wear Appropriate PPE when handling: PATRIOT JOB NUMBER:
9b.1) Profile Number: Bill: SFPP LP

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: x Matt Mayo CHANHILL on behalf of SFPP L.P. | Signature: x | Month 9 | Day 10 | Year 14

INTL
15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER
16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: JESUS ESQUINOZA | Signature | Month 9 | Day 10 | Year 14
Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY
17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) | U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) | Month | Day | Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Alejandro Rangel | Signature | Month 09 | Day 10 | Year 14

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
EXEMPT	1	800 624-9124	

GENERATOR

5. Generator's Name and Mailing Address
SFPPLP
1100 TOWN & COUNTRY RD.
ORANGE CA 92868
Generator's Phone: (714) 560-9200

Generator's Site Address (if different than mailing address)
NORWALK TANK FARM SFPPLP
13537½ NORWALK BLVD
NORWALK CA 90650

6. Transporter 1 Company Name
PATRIOT ENVIRONMENTAL SERVICES
U.S. EPA ID Number
CAD052866714

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
DEMENNO KERDOON
2000 N. ALAMEDA ST.
COMPTON CA 90222
Facility's Phone: (310) 537-7100
U.S. EPA ID Number
CAT080013352

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	NON-HAZARDOUS WASTE, LIQUID (DRILLING MUD WITH TRACE OF HYDROCARBONS)	001	TT	750	G	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
Tbl. profile # 3FC1167
Bill To: SFPPLP
ALWAYS WEAR PROPER P.P.E. PO# 2L4P455

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: JAMES DYE
Signature:
Month: 9 Day: 23 Year: 14

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: CESAR ZORRILLA
Signature:
Month: 09 Day: 23 Year: 14

Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name
Signature
Month Day Year

GENERATOR'S/SHIPPER'S INITIAL COPY

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
NOT required	1	800-624-9136	NH 0102676

GENERATOR

5. Generator's Name and Mailing Address
SEPP-LP
1100 Town & Country Rd
Orange, CA. 92868
Attn: MS Karina Hanlon
Generator's Phone: 714) 560 4400

Generator's Site Address (if different than mailing address)
SEPP-LP
Norwalk Tank Farm
is 306 Norwalk Blvd.
Norwalk, CA. 90650

6. Transporter 1 Company Name
Patriot Environmental Services
U.S. EPA ID Number
CADOS 3866794

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Filter Recycling Corp.
180 W. Monte
Bloomington, CA. 92316
Facility's Phone: 909) 421-2012
U.S. EPA ID Number
CAD982442451

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non Hazardous Waste, Solid (TPH Contaminated Soil)	1	cm	5	Y	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
Wear Appropriate PPE when handling
9b. 1) Profile # 12031521
Patriot Job# 40455
Bin #65082

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: JAMES DYE
Signature:
Month: 9 Day: 23 Year: 14

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: JESUS R ESPINOZA
Signature:
Month: 9 Day: 23 Year: 14

Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name
Signature
Month Day Year

GENERATOR'S/SHIPPER'S INITIAL COPY

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NOT REQUIRED
2. Page 1 of: 1
3. Emergency Response Phone: 800-624-9136
4. Waste Tracking Number:

GENERATOR

5. Generator's Name and Mailing Address
S.F.P.P.L.P
1100 TOWN & COUNTRY RD
ORANGE CA 92868
Generator's Phone: (714) 560-4400

Generator's Site Address (if different than mailing address)
SFPPLP
NORWALK TANK FARM
15306 NORWALK BLVD.
NORWALK CA 90650

6. Transporter 1 Company Name: PATRIOT ENVIRONMENTAL SERVICES
U.S. EPA ID Number: CHD053864754

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
FILTER RECYCLING CORP.
180 WEST MONTE
BLOOMINGTON CA 92316
Facility's Phone: (909) 421-2012
U.S. EPA ID Number: CAD982444481

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	NON HAZARDOUS WASTE, SOLID (TPH Contaminated Soil)	2	CM	15	Y	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
QBI profile # 12031521

Bill To: SFPPLP
BIN # R228946PL
R29915PL

ALWAYS WEAR PROPER P.P.E WHEN HANDLING 50 # 4105553

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Patrick Lopez
Signature:
Month: 9 Day: 30 Year: 14

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: JESUS R ESPINOZA
Signature:
Month: 9 Day: 30 Year: 14

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name:
Signature:
Month: Day: Year:

GENERATOR'S/SHIPPER'S INITIAL COPY