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02 May 2017
Project 731641603

Mr. Keith Nowell, PG
Alameda County Health Care Services Agency
Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

**Subject: Feasibility Study and Corrective Active Plan
Cleanup Case No. Ro03236
3000 Broadway SPE LLC
260 30th Street
Oakland, California
Langan Project: 731635603**

Dear Mr. Nowell:

I have read and acknowledge the content, recommendations and/or conclusions contained in the attached document submitted on my behalf to ACDEH's FTP server and the SWRCB's GeoTracker website.

Sincerely yours,



Alan Chamorro
Senior Vice President
3000 Broadway SPE LLC

**FEASIBILITY STUDY AND CORRECTIVE
ACTION PLAN
3000 Broadway Redevelopment
Oakland, California 94611**

Prepared For:
**Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502**

Prepared By:
**Langan Engineering and Environmental Services, Inc.
501 14th Street, 3rd Floor
Oakland, California 94612**



A handwritten signature in blue ink, appearing to read "Chris Glenn".

**Christopher N. Glenn, P.E., LEED GA
Senior Project Engineer**

A handwritten signature in black ink, appearing to read "Joshua Graber".

**Joshua Graber, CHMM
Associate**

**2 May 2017
750635602**

LANGAN

2 May 2017

Mr. Keith Nowell, PG
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502

**Subject: Feasibility Study and Corrective Action Plan
3000 Broadway Redevelopment
Oakland, California
Langan Project No. 750635602**

Dear Mr. Nowell,

On behalf of 3000 Broadway SPE LLC (Client), Langan Engineering and Environmental Services, Inc. (Langan) has prepared the enclosed Feasibility Study and Corrective Action Plan (FS/CAP) for the 3000 Broadway Redevelopment (site), located in Oakland, California (Figure 1). The Client plans on redeveloping the site for residential and commercial purposes. The redevelopment will include removing soil between 8 to 18 feet below grade to facilitate the construction of a partially to fully below grade parking level. Soil containing contaminants exceeding the Regional Water Quality Control Board's Tier 1 Environmental Screening Levels will be removed and properly disposed of during construction. The development is currently being designed to incorporate a vapor mitigation system to protect the future building occupants from potential vapor intrusion concerns, where elevated concentrations of volatile organic compounds exist.

This report was prepared by Langan under the supervision of the Professional Engineer whose seal and signature appear hereon. The findings, recommendations, specifications, or professional opinions are presented within the limits described by the client, after being prepared in accordance with generally accepted professional engineering practice. No warranty is expressed or implied.

If you have any questions or comments, please do not hesitate to Josh Graber at (510) 874-7083.

Sincerely yours,

Langan Engineering and Environmental Services, Inc.



Christopher N. Glenn, P.E., LEED GA
Senior Project Engineer



Joshua Graber, CHMM
Associate

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Acronym and Abbreviation List

ACEH	Alameda County Department of Environmental Health
ACEH-LOP	Alameda County Department of Environmental Health – Local Oversight Program
ACPWA	Alameda County Public Works Agency – Water Resources
a-MSL	above mean sea level
AS/SVE	Air sparging with soil vapor extraction
Basin Plan	Water Quality Control Plan for the San Francisco Bay Basin
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and xylenes
Cis-1,2-DCE	cis-1,2-dichloroethene
CSM	Conceptual Site Model
DECON	DECON Environmental Services, Inc.
DPT	Direct push technology
DTSC	Department of Toxic Substances Control
ESC	Environmental Site Characterization
ESLs	Environmental Screening Levels
ESA	Environmental Site Assessment
Faultline	Faultline Associates, Inc.
FS/CAP	Feasibility Study and Corrective Action Plan
Langan	Langan Engineering and Environmental Services, Inc.
LTCP	Low-Threat Underground Storage Tank Case Closure Policy
mg/kg	Milligrams per kilogram
MIP	Membrane Interface Probe
mL/min	Milliliter per minute
MNA	Monitoring natural attenuation
MTBE	Methyl-t-butyl ether
NFA	No Further Action
OCP	Organochlorine Pesticides
OFD	Oakland fire department
PAHs	polycyclic aromatic hydrocarbons

Acronym and Abbreviation List (Continued)

PCBs	polychlorinated biphenyls
PCE	tetrachloroethylene
PE	Professional engineer
P&D	P & D Environmental, Inc.
PID	photoionization detector
QA/QC	Quality Assurance/Quality Control
RBCG	Risk-based cleanup goal
RWQCB	San Francisco Regional Water Quality Control Board
SMP	Site Management Plan
SWRCB	State Water Resources Control Board
SVOCs	Semi-volatile Organic Compounds
TPHd	Total Petroleum Hydrocarbons as diesel
TPHg	Total Petroleum Hydrocarbons as gasoline
TPHmo	Total Petroleum Hydrocarbons as motor oil
TPHog	Total Petroleum Hydrocarbons as oil and grease
TCE	Trichloroethylene
USA	Underground Services Alert
USCS	Unified Soil Classification System
UST	underground storage tank
VMS	vapor mitigation system
VOCs	Volatile Organic Compounds
Water Board	San Francisco Bay Regional Water Quality Control Board
WQOs	Water Quality Objectives
ZVI	Zero Valent Iron
µg/L	micrograms per liter

FEASIBILITY STUDY AND CORRECTIVE ACTION PLAN
3000 Broadway Redevelopment
Oakland, California

EXECUTIVE SUMMARY

This *Feasibility Study and Corrective Action Plan (FS/CAP)* was prepared for the proposed 3000 Broadway Redevelopment project, which encompasses 3000 and 3020 Broadway, 250, 260 and 288 30th Street and 3007 and 3009 Brook Street properties (site) in Oakland, California (Figure 1). Recent environmental investigations indicate that soil and groundwater are impacted by petroleum hydrocarbon related compounds and volatile organic compounds (VOCs). However, significant impacts appear to be limited to the 260 30th Street property. The objectives of this FS/CAP are to identify and evaluate potential remedial alternatives, based on existing site conditions and future site use, and propose corrective action measures to address identified impacts at the 260 30th Street property.

Current development plans include the construction of a five-story, wood-frame apartment building, over a one- to two-story concrete podium with parking. The proposed development will have a single level basement along Broadway leveling out to approximately two feet below the current grade at Brook Street, as the ground surface elevation drops. The partial basement will be used for parking and storage. The partial below grade parking level will be naturally ventilated along the southern and eastern faces of the site. Mechanical ventilation will be provided on the interior parking area as well. All residential and commercial units are situated above the concrete parking podium.

Two active Fuel Leak Sites (RO0247 and RO03236) are currently associated with the site. Leak Case RO0247 is associated with a former 1,000 gallon underground storage tank which was abandoned in place in 1997. A request for No Further Action for Leak Case RO0247 was submitted on 24 October 2016 and is currently under review by the ACEH. Leak Case RO03236 was opened following the discovery of residual petroleum hydrocarbons and VOCs present in soil and groundwater, which appear to be related to a former floor drain located on the 260 30th Street property.

Recent soil and groundwater analytical results were compared to Tier 1 Regional Water Quality Control Board Environmental Screening Levels dated February 2016 (ESLs). In general, petroleum hydrocarbons and VOCs were detected at concentrations above the ESLs in soil and groundwater collected from borings located in the southeastern corner of the site (260 30th

Street), near a former floor drain system and former floor hoists. In soil, elevated concentrations of petroleum hydrocarbons and VOCs appear to be limited to the upper 10 feet of soil. The groundwater impacted by petroleum hydrocarbons and VOCs appears to be limited to the area beneath the 260 30th Street property and immediately downgradient within Brook Street.

Based on the current extent of contamination, corrective action objectives were established for soil, groundwater and soil vapor. The corrective action objective for soil is to excavate and dispose of soil containing concentrations of total petroleum hydrocarbons (TPH) and VOCs that exceed Tier 1 ESLs. The corrective action objectives for groundwater are to 1) reduce the petroleum hydrocarbon related and VOC mass in the subsurface contributing to groundwater impacts, such that concentrations in groundwater will be at or below water quality objectives in a reasonable time frame; 2) eliminate the potential for groundwater to pose an unacceptable vapor intrusion concern; and 3) reduce potential risk of construction worker exposure to groundwater during site development. The corrective action objective for soil vapor is to mitigate potential risk of vapor intrusion into indoor air related to petroleum hydrocarbons and VOCs detected at elevated concentrations in soil and groundwater.

Soil vapor and grab groundwater samples were collected downgradient of 260 30th Street in Brook and 30th Streets, respectively, in April 2017. Soil vapor sample results were below Tier 1 ESLs, which indicates vapor intrusion is not a significant concern downgradient. Groundwater samples collected closest to Glen Echo Creek were below Freshwater Ecological ESLs, which indicates impacts to the creek are not significant.

Corrective action alternatives for soil, groundwater and soil gas that can be implemented to meet corrective action objectives to mitigate risks to human health were evaluated in this FS/CAP. The proposed development plan includes excavating soil up to 18 feet below ground surface (bgs). Therefore, the selected corrective action alternative for soil is to excavate and dispose of soil during site construction. Over-excavation will be proposed in the southeastern corner of the site (260 30th Street) to remove soil containing concentrations exceeding Tier 1 ESLs.

Based on recent groundwater elevations, it is anticipated that groundwater dewatering, treatment and discharge during construction is needed to achieve proposed excavation depths. Groundwater extraction and treatment during construction activities is the primary, selected corrective action alternative for on-site groundwater. Groundwater conditions will be reassessed after the excavation and dewatering is completed. If the post-construction

groundwater monitoring results indicate that the groundwater corrective action objectives have not been met, implementation of an additional alternative will be proposed.

Off-site groundwater well installation and sampling is proposed to evaluate the extent of groundwater impacts migrating off-site. If groundwater results indicate that additional groundwater treatment is necessary, groundwater impacts will be addressed by one of the following treatment alternatives: enhanced bioremediation, in-situ chemical oxidation or zero valent iron (ZVI). If additional groundwater treatment is necessary, the final groundwater corrective action alternative and implementation plan will be presented in an addendum to this FS/CAP.

Due to elevated petroleum hydrocarbon and VOC concentrations in groundwater under the eastern portion of the site which will predominantly be removed during construction, the soil vapor corrective action alternative is a vapor mitigation system (VMS). A VMS will be installed under the area currently occupied by the 260 30th Street property. In addition, a waterproof, solvent-resistant membrane will be installed beneath the remainder of the proposed building. The membrane will protect the building foundation from moisture and coupled with the VMS under 260 30th Street will mitigate potential vapors from migrating into the garage and building indoor air following site development.

FEASIBILITY STUDY AND CORRECTIVE ACTION PLAN 3000 Broadway Redevelopment Oakland, California

1.0 INTRODUCTION

On behalf of 3000 Broadway SPE LLC (Client), Langan Engineering and Environmental Services, Inc. (Langan) has prepared this *Feasibility Study and Corrective Action Plan (FS/CAP)* for the proposed 3000 Broadway Redevelopment project, which encompasses 3000 and 3020 Broadway, 250, 260 and 288 30th Street and 3007 and 3009 Brook Street properties (Broadway Redevelopment, site) in Oakland, California (Figure 1).

Recent environmental investigations indicate that soil and groundwater at the 260 30th Street parcel are impacted by petroleum related and volatile organic compounds (VOCs). The 260 30th Street property, which is part of the Broadway Redevelopment, is currently in the Alameda County Department of Environmental Health Local Oversight Program (ACEH-LOP) with active cleanup site case number RO03236.

The objectives of this FS/CAP are to identify the extent of contamination, evaluate potential remedial alternatives based on existing property conditions and future site use and propose corrective action measures to address identified impacts at the 260 30th Street property. This FS/CAP presents the site background, a conceptual site model (CSM) including site geology and hydrogeology, site conditions including current extent of contamination, corrective action objectives and an evaluation of corrective action alternatives.

2.0 SITE DESCRIPTION

The site is part of a redevelopment project encompassing four warehouse-like structures (250, 260, and 288 30th Streets and 3020 Broadway), including one former restaurant (3000 Broadway), and two private residential properties (3007 and 3009 Brook Street) in a fully developed mixed-use area of Oakland, commonly referred to as Auto Row. Until recently, the warehouse-like structures were used as automobile sales, repair and service shops, a restaurant, or were vacant. Currently, only the 250 and 288 30th Street addresses are an active business (XYZ Motors). The restaurant (3000 Broadway) recently closed; the former showroom (3020 Broadway) and a former repair warehouse at 260 30th Street are vacant; and the two private residences (3007 and 3009 Brook Street) are vacant and planned for either relocation or demolition.

As shown in Figure 2, the larger development area is bound by a commercial property and asphalt parking area to the north, Brook Street to the east, 30th Street to the south, and Broadway to the west. The site and surrounding area generally slopes to the southeast. The larger development area has an approximate high elevation of 50 feet above mean sea level (a-msl) at the northwest corner along Broadway, and an approximate low elevation of 30 feet a-msl at the southeast corner near the intersection of 30th and Brook Streets.

Current development plans include the construction of a five-story, wood-frame apartment building, over a one- to two-story concrete podium with parking. The proposed development will have a single level basement along Broadway leveling out to the current grade at Brook Street, as the ground surface elevation drops. The partial basement will be used for parking and storage. The entrance to the partial below grade parking will be along Brook Street. The partial below grade parking level will be naturally ventilated along the southern and eastern faces of the site. Mechanical ventilation will be provided on the interior parking area as well. All residential and commercial units are situated above the concrete parking podium.

3.0 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Several investigations have been conducted at the site by both Langan and others. The sections below provide a brief summary of the environmental investigations previously conducted at the site.

3.1 Underground Storage Tank Activities

Three historical underground storage tanks (USTs) containing gasoline, diesel and waste oil were located on-site in the sidewalk along 30th Street. Two USTs (350 gallon gasoline and 1,000 gallon diesel) were located adjacent to the 288 30th Street property. One 1,000 gallon waste oil UST was located adjacent to the 250 30th Street property. Locations of former USTs are shown on Figure 2. This section summarizes the UST removal and abandonment activities conducted by others.

3.1.1 1992 UST Removals at 288 30th Street

Two USTs (350 gallon gasoline and 1,000 gallon diesel) were located in the sidewalk, adjacent to the 288 30th Street property. In July 1992, DECON Environmental Services, Inc. (DECON) was contracted to excavate and remove the 1,000 gallon diesel UST (DECON, 1992). Reportedly, the 1,000 gallon diesel UST had not been in use for a least a decade and was presumed to be empty at the time of removal.

Subsequent to its removal, two soil samples were collected from the material beneath the former UST and two soil samples were collected from the stockpiled soil material from the UST removal excavation. The soil samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg), diesel (TPHd), and benzene, toluene, ethylbenzene, and xylenes (BTEX). However, the soil analytical results did not detect any concentrations of these compounds at or above laboratory detection limits.

During the UST removal activities, a leaky sewer line, located near the north side of the excavation sidewall, was discovered when the excavation pit had filled with water and sewage. Reportedly, DECON applied for a sewer repair permit and made the necessary repairs. With the permission of the ACEH, DECON backfilled the UST excavation with the previously stockpiled soil material and approximately 15 cubic yards of imported Class II base rock, and repaired the sidewalk. During the repair work, an unknown fuel fill pipe was discovered under the concrete sidewalk, which was connected to an undocumented 350 gallon gasoline UST. With permission from both the ACEH and the Oakland Fire Department (OFD), the 350 gallon gasoline UST was also removed from beneath the 30th Street sidewalk. Two soil samples were collected from beneath the former gasoline UST and one from the stockpiled soil material from the excavation pit. The analytical results indicated no detectable concentrations of TPH. Of the BTEX compounds analyzed, xylenes were detected at a low concentration of 0.007 milligrams per kilogram (mg/kg). With the permission of both the ACEH and the OFD, the excavation was backfilled with the stockpiled soil and approximately 12 cubic yards of imported Class II base rock.

In a letter dated 7 February 2000 from the City of Oakland, additional analysis of soil and/or groundwater for methyl tertiary butyl ether (MTBE) was required before "no further action" could be granted. According to DECON, a soil sample was collected from beneath the 30th Street sidewalk on 12 May 2000, and submitted for MTBE analysis. MTBE was not detected at or above the laboratory detection limits, and the property was granted UST case closure as it relates to the USTs near 288 30th Street by the City of Oakland's Fire Services Agency, and no further action by OFD and the Hazardous Materials Management Program in a letter dated 7 June 2000.

3.1.2 1997 Active Fuel Leak Site at 250 30th Street

One 1,000 gallon waste oil tank was located in the sidewalk adjacent to the 250 30th Street property. Based on the September 1997 Underground Storage Tank Closure Report, conducted by Faultline Associates, Inc. (Faultline), the waste oil UST was maintained for an unspecified

period of time and was abandoned in-place in March 1997 (Faultline, 1997). Reportedly, the UST was rinsed and inerted with dry ice, before pressure grouting. The 30th Street sidewalk above the abandoned in-place UST was finished with a concrete patch. In addition to abandoning the UST in-place, a limited subsurface soil investigation was conducted by drilling four soil borings (SB-1 through SB-4) to a maximum depth of 20 feet below the ground surface (bgs), directly adjacent to the abandoned in-place UST. Approximate boring locations are shown on Figure 2.

The soil analytical results indicated the presence of TPH and VOCs in the upper 15 feet of soil. TPHg, TPHd, and TPH as oil and grease (TPHog) were detected at maximum concentrations of 9,600 mg/kg, 4,500 mg/kg, and 18,000 mg/kg, respectively. Toluene, ethylbenzene, and xylene were detected at maximum concentrations of 21 mg/kg, 54 mg/kg, and 89 mg/kg, respectively. The maximum concentrations of TPHg, TPHd, TPHog, toluene, ethylbenzene, and xylene were all detected in the same soil sample collected from boring location SB-1 (which was located to the southeast from the abandoned in-place UST) at an approximate depth of 15 feet bgs. The soil sample collected from boring location SB-1, at an approximate depth of 20 feet bgs, did not detect any of the previous contaminants at or above method reporting limits. Benzene and MTBE were not detected at or above method reporting limits in any of the samples analyzed.

Because elevated concentrations of volatile and non-volatile compounds (associated with fuel-related hydrocarbons) were present in the site and site-adjacent shallow soil subsurface, both the San Francisco Regional Water Quality Control Board (RWQCB) and ACEH required an additional subsurface investigation to further characterize and delineate the extent of contamination in both soil and groundwater.

P & D Environmental, Inc. (P&D) performed a soil and groundwater investigation in the vicinity of the former UST in September 2014 (P&D, 2014). P&D's investigation consisted of drilling four borings (B1 through B4) for the collection of soil and groundwater samples. The purpose of this subsurface investigation and the resulting October 2014 report was to provide additional data to support administrative case closure through the RWQCB's low threat closure policy (LTCP). Approximate boring locations are shown on Figure 2.

The soil analytical results indicated that no petroleum hydrocarbons were detected in the shallow soil samples analyzed (less than 10 feet bgs) in excess of residential or commercial 2013 RWQCB environmental screening levels (ESLs). For soil samples collected at depths greater than 10 feet bgs, no petroleum hydrocarbon concentrations were detected in the samples analyzed exceeding residential or commercial 2013 RWQCB ESLs, with one

exception. TPHg was detected at a concentration of 640 mg/kg in soil collected from boring B1 at 15 feet bgs, which exceeded the 2013 residential ESL for TPHg (500 mg/kg) but not the 2013 commercial ESL (770 mg/kg). Ethylbenzene, xylene, and naphthalene were also detected in soil sample B1-15.0 at concentrations of 0.16 mg/kg, 0.65 mg/kg, and 0.12 mg/kg, respectively. However, these detections are all below their respective residential and commercial 2013 ESLs. No MTBE, BTEX compounds, naphthalene, semi-volatile organic compounds (SVOCs) or polycyclic aromatic hydrocarbons (PAHs) were detected in any of the soil samples analyzed.

TPHg was detected in groundwater samples B1-W and B4-W at concentrations of 2,400 micrograms per liter ($\mu\text{g/L}$) and 450 $\mu\text{g/L}$, respectively. TPHd was detected in samples B1-W, B2-W, and B3-W at concentrations of 600 $\mu\text{g/L}$, 72 $\mu\text{g/L}$, and 450 $\mu\text{g/L}$, respectively. TPHmo was detected in samples B2-W and B3-W at concentrations of 350 $\mu\text{g/L}$ and 1,400 $\mu\text{g/L}$, respectively. All of these detected concentrations of petroleum hydrocarbon compounds exceed their respective RWQCB 2013 ESLs, with the exception of the detection at B2-W which reported a TPHd concentration of 72 $\mu\text{g/L}$. TPHg, TPHd, and TPHmo were not detected in any other groundwater samples collected during P&D's investigation. Ethylbenzene, xylenes, and naphthalene were detected in sample B1-W at concentrations of 60 $\mu\text{g/L}$, 210 $\mu\text{g/L}$, and 9.1 $\mu\text{g/L}$, respectively. All three detections exceeded their respective 2013 ESLs. MTBE, BTEX, and naphthalene were not detected in any of the other groundwater samples analyzed.

In an ACEH letter dated 4 November 2015, Alameda County stated that the previous subsurface investigation and associated report provided insufficient data and analysis to meet the RWQCB LTCP criteria. Specifically, ACEH stated that the contaminant plume had not been defined, as the detected concentrations of TPHd and TPHmo increase in a downgradient direction, and the distances from the leading edge of the plume to the nearest supply well and surface water body had not been determined. Based on these technical comments, ACEH requested the preparation of an additional work plan and sensitive receptor survey.

Langan addressed ACEH's November 2015 comments by collecting additional data and preparing a report requesting case closure in 2016. The data collected and request for case closure are discussed below in Sections 3.2 and 3.3, respectively.

3.2 Phase II Environmental Site Assessment

Langan performed a Phase II Environmental Site Assessment (ESA) in April 2016 to determine the downgradient extent of TPH impacts in groundwater related to the closed-in-place UST

located at 250 30th Street (RO0247) and to assess the soil proposed for excavation during redevelopment (Langan Treadwell Rollo, 2016). During this assessment, Langan collected soil samples from a total of 12 soil borings (B-1 through B-12). Grab groundwater samples were collected from two of the borings (B-11 and B-12), to evaluate potential petroleum impacts associated with the former closed-in-place UST located in front of 250 30th Street. Previous sampling locations are shown on Figure 2.

No TPHg, TPHd, TPHmo, VOCs, SVOCs, polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs), or asbestos were detected above laboratory reporting limits in the composite soil samples analyzed. Of the metals analyzed only lead was detected in one composite soil sample from borings B-3 and B-4 (beneath the 3020 Broadway building) at elevated levels.

Groundwater samples collected in the area of the closed-in-place UST (B-11) indicate that residual concentrations of TPHg, TPHd, and TPHmo are present. TPHg, TPHd, or TPHmo were not detected in the groundwater sample (B-12) collected from the downgradient area, near the corner of 30th and Brook Streets, which suggests that the residual TPH is localized and has not migrated significantly away from the former UST location. With the exception of toluene at a low concentration, no other VOCs were detected in boring B-12. Analytical results associated with the groundwater samples from borings B-11 and B-12 are included in Table 1. Soil analytical results for non-metals and metals are presented in Tables 2 and 3, respectively.

Based on the soil and groundwater sampling conducted in April 2016, and the corresponding analytical results, Langan's Phase II ESA report concluded that low levels of contaminants are present in the subsurface in the areas investigated.

3.3 Langan Request for No Further Action

As part of the April 2016 Phase II ESA, Langan evaluated groundwater downgradient of the closed-in-place UST associated with 250 30th Street. Based on the lack of significant detections in the downgradient location (boring B-12, Figure 2), Langan prepared a *Response to 4 November 2015 Letter and Request for No Further Action* letter for the site dated 24 October 2016. This letter summarized previous environmental work and compared the existing conditions related to the former closed-in-place UST to criteria required to achieve regulatory closure under the RWQCB LTCP. Langan recommended that the 1,000 gallon, closed-in-place UST be granted no further action (NFA) status. During a project meeting on 26 January 2017, the ACEH verbally indicated that the information provided meets the criteria for regulatory case

closure under the LTCP and the ACEH will be granting closure for this open case (RO0247), although the timeline for closure is not currently known.

3.4 Geotechnical Investigation and Environmental Sampling

In order to obtain subsurface geotechnical data for the design of the proposed development, Langan advanced four borings (B-13 through B-16) in November 2016 for geotechnical purposes. Environmental samples were also collected from Borings B-13 and B-16. The four borings were advanced to a maximum depth of 46.5 feet bgs. Boring locations are shown on Figure 2.

A groundwater sample was collected from boring B-13, which is located along the northwest boundary of the property. The groundwater sample was collected to determine if concentrations of contaminants previously detected in groundwater were migrating onto the property from upgradient near Broadway. The groundwater sample was analyzed for TPHg, TPHd, TPHmo and VOCs. No TPHg, TPHd or TPHmo were detected in the groundwater sample from boring B-13. Low levels of chloroform and trichloroethylene (TCE) were detected at concentrations of 0.62 and 1.8 µg/L, respectively. No other VOCs were detected. Analytical results associated with the groundwater sample collected from boring B-13 are included in Table 1.

Additionally, a petroleum odor was noted and responses on a photoionization detector (PID) were detected in soil collected from boring B-16, starting at 6.0 feet bgs. Soil samples were collected from boring B-16 at depths of 6.0, 10, and 20.5 feet bgs and submitted for TPHg, TPHd, TPHmo, VOCs, and metal analyses.

Elevated concentrations of TPHg, TPHd, and TPHmo were detected in soil samples from boring B-16 collected at depths of six and ten feet bgs. Significantly lower concentrations were detected in soil from 20.5 feet bgs, which at the time was above the observed groundwater table. Concentrations of tetrachloroethene (PCE), TCE and cis-1,2-dichloroethene (cis-1,2-DCE) were also detected in soil, with the highest concentrations in the six and ten foot samples. Low levels of chromium, lead, nickel and zinc were also detected in soil samples from boring B-16 but were generally below the RWQCB's 2016 ESLs. Analytical results associated with the soil samples from boring B-16 are included in Tables 2 and 3.

The contamination observed in boring B-16 is likely associated with a nearby floor drain and the long historical use as an automobile service facility. The floor drain located within the 260 30th

Street property appears to be connected to the same drain line as the adjacent 250 30th Street property. The approximate location of both floor drains within the 250 and 260 30th Street properties are shown on Figure 2.

3.5 Floor Drain Exploration

On 14 November 2016, Langan observed exploration activities centered around the existing floor drain located within the northwest portion of the 260 30th Street site property. Activities included removing portions of the concrete slab and ramp leading to 250 30th Street to reveal the cast iron piping leading away (north) from the floor drain toward the existing building perimeter wall, and excavating the contents of the exposed drain and some of the surrounding soil material. The exposed drain piping was traced by a private utility locator and found to run west to east ultimately joining the sanitary sewer and water cleanouts along Brook Street. The drain piping was estimated to be about 1.5 feet below the slab by the private utility locator. The drain sump was found to be constructed of concrete walls and bottom and did not have any visible holes. It should also be noted that the drain sump held water. During our exploratory activities, olfactory observations indicated potential impacts and PID readings of the material contained in the drain sump indicated low-level contamination. The proximity and orientation of the drain and associated piping indicate that concentrations observed in boring B-16 soil may be related to the drain and/or its associated piping. Approximate locations of the floor drains and the drain lines are shown on Figure 2.

3.6 Additional Environmental Site Characterization – February 2017

Langan conducted additional environmental soil and groundwater sampling at the site in February 2017. The primary objective of the additional environmental investigation was to further evaluate subsurface conditions prior to redevelopment, specifically related to impacted soil encountered during the recent geotechnical investigation at boring B-16 located in the 260 30th Street property and near a floor drain system. Langan's *Additional Environmental Site Characterization* (ESC) dated 8 March 2017 summarized the sampling activities and analytical results associated with this investigation, which was outlined in Langan's *Work Plan for Additional Environmental Sampling* dated 5 January 2017 and approved by the ACEH in a letter dated 30 January 2017.

In February 2017, a total of 14 exploratory borings (B-17 through B-30) were advanced to a maximum depth of 28 feet bgs. Borings B-17 through B-26 were advanced within the 250 and 260 30th Street properties to assess soil and groundwater conditions upgradient, around, and

downgradient of the floor drains located within each property. Two borings (B-27 and B-28) were drilled within the Brook Street right-of-way to a maximum depth of 16 feet bgs to facilitate the collection of soil and groundwater samples downgradient of the site. Elevated groundwater levels were observed during the geotechnical and environmental investigation conducted in November 2016. Due to the higher groundwater levels, a single exploratory environmental boring (B-29) was drilled to an approximate depth of 28 feet bgs within the 3020 Broadway property to document upgradient groundwater elevation changes only. No soil or groundwater samples were collected from this boring due to the proximity of boring B-13, where groundwater was previously sampled. In their 30 January 2017 Work Plan approval letter, ACEH requested that an additional boring (B-30) be drilled within the 288 30th Street property to investigate the subsurface conditions in the vicinity of former USTs. Boring B-30 was drilled to an approximate depth of 24 feet bgs. Grab-groundwater samples were collected from borings B-17 through B-30, except B-29. The boring locations associated with this investigation are shown on Figure 2. Figure 3 illustrates a cross-section (A to A') of the site that extends from Broadway to Brook Street. Figure 4 illustrates a cross-section (B to B') of the site that extends northwest to southeast across the 260 30th Street property. The cross-sectional lines are illustrated on Figure 2. The cross-sections illustrate the soil types encountered, the approximate slab elevations of current buildings and the approximate elevation of the 30th Street sidewalk. Additionally, PID readings measured in borings from 260 30th Street property are also presented adjacent to borings on the cross-section.

Soil Analytical Results

Soil analytical results are summarized in Table 2 and 3. Figure 5 shows concentrations of non-metals detected in soil collected from the 250 and 260 30th Street property. TPHg, TPHd, and TPHmo were detected in soil from borings B-16, B-23, B-24, B-25, and B-26, which are all located along the eastern portion of the 260 30th Street parcel, which coincides with the location of former floor hoists. Reportedly, the floor hoists were mounted to the slab and did not have a subsurface component.

TPHg was detected at concentrations ranging from 2.9 to 810 mg/kg. TPHd was detected at concentrations ranging from 8.1 mg/kg to 2,900 mg/kg. TPHmo was detected at concentrations ranging from 25 mg/kg to 6,100 mg/kg. Three samples (B-16-6.0, B-16-10.0, and B-26-10.0) had concentrations of petroleum hydrocarbons that exceeded one or more established RWQCB Tier 1 ESLs. Two of these samples are from boring B-16 at 6.0 and 10.0 feet bgs. The third sample was from boring B-26 at an approximate depth of 10 feet bgs. These TPH ESL exceedances are relatively shallow and appear to be isolated. Additionally, this material will be excavated and

disposed of off-site during the proposed development; therefore, these petroleum impacts will not remain a long-term risk/concern to human health post-development.

The VOCs detected in soil generally consisted of VOCs associated with chlorinated solvents (including PCE, TCE, and cis-1,2-DCE) and with petroleum products (including butyl benzene, propyl benzene, methyl benzene isomers). The highest concentrations of chlorinated VOCs were detected near the floor drain whereas the highest petroleum VOCs were detected along the eastern portion of the 260 30th Street parcel. PCE was detected at concentrations ranging from 0.013 mg/kg to 2.0 mg/kg, one of which exceeded the Tier 1 ESL for PCE (0.42 mg/kg). TCE was detected at concentrations ranging from 0.0074 mg/kg to 6.4 mg/kg, three of which exceed the Tier 1 ESL for TCE (0.46 mg/kg). Cis-1,2-DCE was detected at concentrations ranging from 0.0063 mg/kg to 1.1 mg/kg, three of which exceed the Tier 1 ESL for cis-1,2-DCE (0.19 mg/kg). The only other VOC exceeding Tier 1 ESLs in soil was 1,1,2,2-tetrachloroethane detected at a concentration of 0.35 mg/kg in the sample collected from B-16 at a depth of 6 feet bgs (B-16-6). Soil with VOCs detected in excess of Tier 1 ESLs (Figure 5) will be excavated and disposed of off-site during the proposed development; therefore, these VOC impacts in soil will not remain a long-term risk/concern to human health at the site post-development.

Trace to low concentrations of PAHs were also detected in four of the 26 soil samples analyzed, none of which exceeded their respective Tier 1 ESLs, where established. Concentrations of metals detected in soil were below hazardous waste criteria and were within background ranges found in the western United States, specifically the San Francisco Bay Area (ERM, 2006).

Groundwater Analytical Results

Groundwater analytical results are summarized in Table 1. Figure 6 shows concentrations of contaminants detected in groundwater collected from the 250 and 260 30th Street property. TPHg was detected at concentrations ranging from 55 µg/L to 1,400 µg/L, four of which exceed the Tier 1 ESL (100 µg/L). TPHd was detected at concentrations ranging from 200 µg/L to 250,000 µg/L, all of which exceed the Tier 1 ESL (100 µg/L). TPHmo was detected at concentrations ranging from 510 µg/L to 500,000 µg/L, two of which exceed the Tier 1 ESL of 50,000 µg/L. The highest concentrations of TPH in groundwater were detected in borings B-23 and B-24, which are located along the eastern site boundary.

VOCs were detected at or above their respective laboratory reporting limits in each of the 13 grab-groundwater samples analyzed in February 2017. TCE was detected at concentrations ranging from 1.4 µg/L to 6,100 µg/L, 11 of which exceed the Tier 1 ESL for TCE (5.0 µg/L). Cis-

1,2-DCE was detected at concentrations ranging from 2.7 µg/L to 2,200 µg/L, nine of which exceed the Tier 1 ESL for cis-1,2-DCE (6.0 µg/L). Chloroform was detected in one of the 13 samples analyzed at a concentration of 3.3 µg/L, which exceeds the Tier 1 ESL for chloroform (2.3 µg/L). Trace concentrations of PAHs were detected in four of the grab-groundwater samples analyzed. Benzo(a)anthracene was detected in one sample from boring B-23-GW at a concentration of 0.64 µg/L, which exceeds the Tier 1 ESL, 0.027 µg/L. No other VOCs or PAHs exceeded their Tier 1 ESLs in groundwater samples collected in February 2017.

3.7 Additional Environmental Sampling and Monitoring – April 2017

Based on the findings of the Additional Environmental Site Characterization, Langan conducted additional environmental investigation. The objectives of this additional environmental investigation were to:

- 1) Further investigate and delineate subsurface conditions near the floor drain and former floor hoists located at 260 30th Street to determine the extent of soil removal during excavation;
- 2) Install shallow groundwater monitoring wells at and downgradient of 260 30th Street to establish a monitoring well network, determine a groundwater flow direction, monitor groundwater elevations, and collect groundwater samples;
- 3) Complete deeper (greater than 20 feet bgs) groundwater sampling near the floor drain and along the eastern portion of 260 30th Street near the former floor hoists to evaluate vertical impacts to groundwater (if any);
- 4) Evaluate downgradient groundwater contamination by collecting grab-groundwater samples from the area southeast of 260 30th Street along 30th Street; and
- 5) Evaluate the potential for vapor intrusion at adjacent properties by collecting soil vapor samples in Brook Street.

In an effort to meet the objectives listed above, Langan prepared a *Work Plan for Additional Environmental Sampling and Monitoring* (Work Plan) dated 17 March 2017. The Work Plan proposed additional sampling activities, associated with the subsurface characterization of the Broadway Redevelopment related to soil disposal, which are not discussed in this FS/CAP, but will be summarized in our *Soil and Groundwater Management Plan* (SGMP), which is anticipated to be issued in May 2017.

3.7.1 Field Investigation

The field activities, including private utility location, concrete coring, drilling and sampling of soil, groundwater and soil vapor, and the installation of groundwater monitoring wells were initiated on 24 March 2017 and completed on 17 April 2017.

Prior to drilling and sampling, Langan obtained the required permits from Alameda County Public Works Agency – Water Resources (ACPWA) and the City of Oakland, and notified Underground Services Alert (USA) to locate and identify underground utilities. Langan also sub-contracted OHJ, Inc., a private underground utility locator to clear each of the individual sampling locations for underground utilities.

Drilling was conducted by Gregg Drilling and Testing (Gregg) of Martinez, California using a hydraulically-driven, direct push and hollow stem auger drill rig. The drilling and sampling locations are shown on Figure 2.

3.7.2 Membrane Interface Probe Investigation

On 25 March 2017, four borings (MIP-1 through MIP-4) were advanced to a maximum depth of 24.5 feet bgs using membrane interface probe (MIP) technology. Borings MIP-3 and MIP-4 were not proposed in the Work Plan but were advanced to provide additional site information. MIP technology is an in-situ logging tool used for the detection and relative measurement of VOCs and related petroleum hydrocarbon compounds within the soil subsurface. The primary purpose of the MIP borings was to determine the vertical distribution of volatile contaminants, specifically near the former floor drain at the 260 30th Street property.

The continuously logged data from the MIP locations helped to establish the proposed groundwater monitoring wells screen intervals. The MIP data was also intended to also determine deep groundwater sampling intervals; however, due to the density of the soil, the MIP was only able to be advanced to a maximum depth of 24 feet bgs. The MIP data and results collected by Gregg are summarized in their *High Resolution Site Characterization Investigation* (HRSC) report dated 29 March 2017. A copy of the HRSC report is provided in Appendix A.

3.7.3 Soil and Grab-Groundwater Sampling

From late March to mid-April 2017, a total of six exploratory borings (B-31 through B-36) were drilled to a maximum depth of 20 feet bgs. Borings B-31 through B-35 were advanced within the 260 30th Street property to further delineate soil and groundwater impacts downgradient and cross-gradient of the floor drain system. Boring B-36 was drilled within the 30th Street

right-of-way, to a maximum depth of 16 feet bgs, for both soil and grab-groundwater sampling to assess off-site and downgradient subsurface conditions. Soil cores from each boring were logged in the field by qualified field staff working under the direction of a professional geologist, following the Unified Soil Classification System (USCS). Soil was screened using a photoionization detector (PID) and these data were recorded on boring logs. Boring logs are presented in Appendix B as Figures B-31 through B-36.

3.7.3.1 Soil Sampling

Soil samples were collected from borings B-31 through B-36 at depths ranging from 2.5 to 20 feet bgs. Soil samples were covered with Teflon sheets, sealed with tight-fitting, plastic end caps, labeled, and stored on ice until delivery to McCampbell Analytical, Inc. (McCampbell), a California Department of Public Health certified analytical laboratory in Pittsburg, California. Select soil samples were submitted for some or all of the following analyses:

- TPHg, TPHd, and TPHmo by EPA Method 8015;
- VOCs by EPA Method 8260; and
- PAHs by EPA Method 8310.

3.7.3.2 Grab-Groundwater Sampling

Shallow grab-groundwater samples were collected from borings B-31, B-34, B-35, and B-36. Grab-groundwater samples were not collected from B-32 or B-33, due to the proximity of the proposed monitoring wells. Each boring had 10 feet of temporary, slotted PVC placed at the bottom of the boring to facilitate grab-groundwater sampling. Grab-groundwater samples were collected from borings B-31, B-34, and B-35 between 10 and 20 feet bgs and a sample was collected from boring B-36 between six and 16 feet bgs.

Deep grab-groundwater borings GGW-1 and GGW-2 were advanced within the 260 30th Street property to evaluate the vertical extent of groundwater contamination (Figure 2). Deep groundwater borings were advanced with dual tube direct push technology, to prevent cross-contamination from shallower soil and groundwater. Borings GGW-1 and GGW-2 were proposed to extend to a depth of 28 feet bgs using the dual-tube sampling system; however, borings GGW-1 and GGW-2 hit refusal due to dense drilling conditions at depths of 22 and 19 feet bgs, respectively. Five feet of one-inch screened PVC well casing, pre-packed with sand, was inserted into GGW-1 from 17 to 22 feet bgs to facilitate the collection of deeper grab-groundwater samples and the outer casing was pulled up to 17 feet bgs. The boring was left overnight to allow water to equilibrate; however, sufficient groundwater was not present to

sample the next day. The lack of groundwater at that depth interval can be related to the tight clay that was observed at that depth in boring GGW-1.

Due to refusal at a depth of 19 feet bgs in boring GGW-2 and the proximity to the shallow groundwater sampling interval, groundwater sampling was not performed via the dual-tube system in GGW-2. In an effort to collect a deeper sample from GGW-2, hollow stem augers were used to drill to a depth of 29 feet bgs. Five feet of one-inch screened PVC well casing, pre-packed with sand, was inserted through the hollow stem augers in boring GGW-2 from 24 to 29 feet bgs to facilitate the collection of deeper grab-groundwater samples. Once the casing was in place, the hollow stem augers were pulled up to a depth of 24 feet bgs and groundwater samples were collected.

Grab-groundwater samples were collected using a clean stainless steel bailer, decontaminated after each use, and decanted into laboratory supplied containers, labeled, and stored on ice until delivery to the analytical laboratory.

The grab-groundwater samples were submitted for all of the following analyses:

- TPHg, TPHd, and TPHmo by EPA Method 8015;
- VOCs by EPA Method 8260; and
- PAHs by EPA Method 8310.

Following sample collection, each boring was properly abandoned via tremie grouting under supervision of an Alameda County inspector.

3.7.4 Shallow Groundwater Wells

On 25 March 2017, Gregg advanced two borings at the 260 30th Street property to a final depth of 18 feet bgs to facilitate the installation of two groundwater monitoring wells (GW-1 and GW-2, Figure 2). The borings were drilled with eight-inch diameter hollow-stem augers. Both monitoring wells were constructed to the final depth of each boring using 2-inch diameter PVC casing. Ten feet of PVC casing with 0.01-inch factory slotted screen was placed from 8 to 18 feet bgs. The borehole annulus was filled with #2/12 silica sand to a depth of approximately two-foot above the screen and two-foot of bentonite chips were placed above the sand and then hydrated to seal the well. The remainder of the boring annulus was filled with cement grout to the slab surface. Since the wells are temporary and constructed in a protected area

inside the 260 30th Street building, the wells were not finished with traffic rated well boxes. Well completion diagrams are presented in Appendix C as Figure C-1.

On 4 April 2017, groundwater monitoring wells GW-1 and GW-2 were developed by Blaine Tech Services, Inc. of San Jose, California. Well development removes suspended solids in the well and filter pack created during well construction. The wells were developed by surging, bailing, and pumping approximately 10 casing volumes of water from each well. On 5 April 2017, a Langan field representative performed groundwater monitoring and low flow sampling at both monitoring wells with a peristaltic pump, new and clean tubing at each well, and a multi-parameter water quality meter with a flow through cell for real-time data logging.

Groundwater samples from monitoring wells GW-1 and GW-2 were delivered under chain-of-custody control to McCampbell and analyzed for the following:

- TPHg, TPHd, and TPHmo by EPA Method 8021/8015;
- VOCs by EPA Method 8260;
- PAHs by EPA Method 8310; and
- CAM 17 metals by EPA Method 6010/6020.

Groundwater samples were also collected for remedial parameters discussed in the Work Plan, which are not presented in this report. A discussion of remedial parameter results will be included if in-situ remediation is proposed in the future.

3.7.6 Soil Vapor Sampling

Soil vapor sampling was performed in accordance with Department of Toxic Substances Control (DTSC) documents titled “Advisory—Active Soil Gas Investigation” dated July 2015 and “Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air” dated October 2011 and our Work Plan.

On 11 April 2017, Langan personnel collected two soil vapor samples (SV-1 and SV-2) from the locations shown on Figure 2. Soil vapor sampling could not be performed at the third location, proposed north of SV-1 in our Work Plan, due to shallow groundwater in that boring at a depth of three feet bgs.

Temporary soil vapor wells were installed by Gregg via direct push technology, to an approximate depth of five feet bgs. All temporary soil vapor wells were constructed with

Nylaflow[®] tubing with a 1/8-inch inside diameter connected to a nylon soil vapor screen with a 1.5-inch length and 3/8-inch diameter. Monterey kiln-dried sand with 30% porosity was used to install a one foot filter pack, based on DTSC guidance, at the bottom of the vapor well borehole. The 1.5-inch screen was placed at the midpoint of the sand filter pack. A one foot layer of dry bentonite chips was placed above the filter pack followed by hydrated bentonite to the ground surface. The hydrated bentonite serves to create a seal around the sample collection tubing to prevent ambient air intrusion into the soil vapor sample. A closed valve was installed at the end of the sample collection tubing at the surface and the well system was allowed to equilibrate for at least two hours.

The vapor sampling manifolds consisted of 1/4-inch stainless steel or Teflon tubing, a valve for connecting a luer-lock syringe for purging, a maximum 200 milliliters per minute (mL/min) flow regulator, and two vacuum pressure gauges. One pressure gauge was installed between the flow regulator and the well head to monitor the vacuum maintained during the shut-in test and to measure the vacuum applied to the vapor well, and the other was placed after the flow regulator to measure the vacuum pressure within the sample canister. Samples were collected in 1L Summa canisters with an initial vacuum of approximately 30-inches-Hg. New tubing was used for each sample collection.

A shut-in test was performed after the construction of each sampling manifold. The shut-in test consisted of closing the valves at the vapor well head and on the Summa canister, then using a syringe to create a 14- to 20-inches-Hg vacuum within the sampling system. If the vacuum was maintained with less than 10% deviation for five minutes, then the manifold was determined to be sufficiently sealed. Following a successful shut-in test, the valve to the vapor well was placed under a helium shroud and opened.

The helium shroud allows an atmosphere of known helium content to be maintained above the vapor well, which allows for the detection of leaks of ambient air into the vapor well and sample. Helium was used as a leak-check tracer gas using a helium shroud around the vapor well during sampling as a quality assurance/quality control (QA/QC) measure to confirm sample integrity. The helium content within the shroud was maintained at least 15% and monitored with a portable helium detector during purging and sampling. The shroud consisted of a clear plastic box with ports for connecting a helium compressed gas cylinder and the helium detector.

A single purge volume was calculated by adding the pore space volume associated with the filter pack and/or the volume of all of the tubing within the well and the sampling manifold.

In accordance with DTSC sampling guidelines, approximately three times the single purge volume was purged from the system using a 60 mL luer lock syringe. The vapor that was purged was analyzed in real time for helium with a portable helium detector, to ensure that there were no ambient air leaks into the sampling train. The vapor samples were then collected into Summa canisters until a residual vacuum of approximately 5-inches-Hg was left. The canisters remained under the residual vacuum during transport from the sampling location to the analytical laboratory to indicate if any leaks of ambient air into the canister occurred, none of which were noted.

After the equilibration period, shut-in testing, leak testing (using a helium shroud), and purging was performed prior to sampling at each of the two locations. The flow controllers on the sample trains were set to a maximum rate of 125 mL/min. Following sample collection, the 1L Summa canisters were delivered under chain-of-custody protocol to K-Prime Technologies, Inc. (K-Prime), a State of California certified laboratory in Santa Rosa, California.

The soil vapor samples were analyzed for the following:

- VOCs by EPA Method TO-15; and
- Methane and helium by ASTM D-1946.

3.7.7 Analytical Results and Evaluation

The laboratory analytical results and field parameters are presented in Tables 1 through 5 and are discussed in the following sections. Copies of the laboratory analytical reports are presented in Appendix D.

3.7.7.1 Soil Results

Soil analytical results from borings B-31 through B-36 for TPH, VOC, and PAHs parameters are summarized in Table 2 and were compared to the RWQCB Tier 1 ESLs (RWQCB, February 2016 [Rev. 3]).

TPHg was detected at or above the laboratory reporting limit (1.0 mg/kg) in two of the 15 soil samples analyzed. Both TPHg was detected at concentrations of 1,200 mg/kg and 420 mg/kg from boring B-33 in samples collected at depths of 13.5 and 17.5 feet bgs, respectively, which exceed the Tier 1 ESL (100 mg/kg). TPHd was detected at or above the laboratory reporting limit (1.0 mg/kg) in three of the 15 soil samples analyzed, at concentrations ranging from 1.5 mg/kg to 1,100 mg/kg. Two samples, both from boring B-33 at depths of 13.5 and 17.5 feet

bgs, detected TPHd at 1,100 mg/kg and 250 mg/kg, respectively, which exceed the Tier 1 ESL (100 mg/kg). TPHmo was detected at or above the laboratory reporting limit (5.0 mg/kg) in three of the 15 soil samples analyzed at concentrations ranging from 6.6 mg/kg to 2,900 mg/kg, none of which exceed the Tier 1 ESL (5,100 mg/kg).

VOCs, specifically cis-1,2-DCE, TCE, and PCE were detected at or above their respective laboratory reporting limits in eight of the 16 soil samples analyzed from borings B-31 through B-36. VOCs were not detected in soil samples from borings B-31, B-35 or B-36. Boring B-31 is located southwest and cross-gradient of the floor drain. Boring B-35 is located furthest from the floor drain in the southern direction and B-36 is located downgradient in 30th Street.

Cis-1,2-DCE was detected in four of the 16 samples analyzed at concentrations ranging from 0.011 to 0.51 mg/kg, one of which (B-32-10.0) exceeds the Tier 1 ESL for cis-1,2-DCE (0.19 mg/kg). TCE was detected in eight of the 16 samples analyzed at concentrations ranging from 0.0098 to 19 mg/kg, three of which exceed the Tier 1 ESL for TCE (0.46 mg/kg). TCE exceeded the Tier 1 ESL in samples B-32-10, B-33-13.5 and B-33-17.5. PCE was detected in two of the 16 samples analyzed (B-33-13.5 and B-33-17.5) at concentrations of 4.6 mg/kg and 1.5 mg/kg, respectively, which exceed the Tier 1 ESL for PCE (0.42 mg/kg). Trace concentrations of various other VOCs and PAHs were detected in some of the shallow soil samples analyzed, but at concentrations that were below Tier 1 ESLs, where established.

3.7.7.2 Grab-Groundwater Results

Grab-groundwater analytical results from borings B-31, B-34, B-35, B-36 and deep groundwater sample GGW-2 are summarized in Table 1. TPHg was not detected at or above the laboratory reporting limit (50 µg/L) in the five samples analyzed. TPHd was detected at or above the laboratory reporting limits in five samples (B-31-GW, B-34-GW, B-35-GW, B-36-GW, and GGW-2) at concentrations ranging from 110 µg/L to 150 µg/L, all of which slightly exceed the Tier 1 ESL (100 µg/L). TPHmo was detected at or above the laboratory reporting limit (250 µg/L) the five samples analyzed at concentrations ranging from 420 µg/L to 1,100 µg/L, none of which exceeded the Tier 1 ESL (50,000 µg/L).

VOCs were detected at or above their respective laboratory reporting limits in the five grab-groundwater samples analyzed. Cis-1,2-DCE was detected in four samples at concentrations ranging from 1.0 to 72 µg/L, two of which exceeded the Tier 1 ESL for cis-1,2-DCE (6.0 µg/L). TCE was detected five samples at concentrations ranging from 4.3 to 160 µg/L, four of which exceeded the Tier 1 ESL for TCE (5.0 µg/L). Chloroform was detected in two samples analyzed at concentrations of 1.8 and 2.9 µg/L, one of which exceeded the Tier 1 ESL for chloroform

(2.3 µg/L). Vinyl chloride was detected in a single sample analyzed (B-35-GW) at a concentration of 0.79 µg/L, which exceeds the Tier 1 ESL (0.061 µg/L). PCE was not detected in any groundwater samples collected during this sampling event. Trace concentrations of various other VOCs and PAHs were detected in each of the shallow grab-groundwater samples analyzed, but at concentrations that were below Tier 1 ESLs, where established.

As mentioned previously, groundwater was collected from boring B-36 to evaluate potential downgradient, off-site impacts toward Glen Echo Creek. As shown in Table 1, TPHd and TCE were detected in groundwater collected from boring B-36 at concentrations of 120 and 28 µg/L, respectively. These detected concentrations exceeded the TPHd and TCE Tier ESLs, but were below Fresh Water Ecological ESLs (RWQCB, 2016 [Rev. 3]) for TPHd and TCE of 640 and 120 µg/L, respectively.

Deeper groundwater (between 24 and 29 feet bgs) was collected from boring GGW-2. TPHd was detected at a concentration of 150 µg/L, which exceeds its Tier 1 ESL of 100 µg/L. TPHmo was detected below its Tier 1 ESL at concentration of 420 µg/L. TCE was detected at a concentration of 5.2 µg/L, which slightly exceeds its Tier 1 ESL of 5.0 µg/L. No other VOC or PAHs were detected at or above laboratory reporting limits in GGW-2.

3.7.7.3 Shallow Groundwater Well Results

Groundwater analytical results for samples collected from shallow groundwater wells GW-1 and GW-2 are presented in Tables 1 and 4.

TPHg was detected at or above the laboratory reporting limit (50 µg/L) in both GW-1 and GW-2 at concentrations of 67 µg/L and 130 µg/L, respectively. Sample GW-2 exceeds the Tier 1 ESL for TPHg, 100 µg/L. TPHd was only detected above the laboratory reporting limit (50 µg/L) in sample GW-2 at a concentration of 56 µg/L, which does not exceed the Tier 1 ESL (100 µg/L). TPHmo was not detected at or above the laboratory reporting limit (250 µg/L) in either of the well samples analyzed. The highest concentrations of TPH in groundwater were detected in GW-2, which is located along the eastern portion of 260 30th Street (Figure 2).

VOCs were detected at or above their respective laboratory reporting limits in each groundwater samples analyzed. Cis-1,2-DCE was detected in both GW-1 and GW-1 at concentrations of 170 and 300 µg/L, respectively. Both samples exceed the Tier 1 ESL for cis-1,2-DCE, 6.0 µg/L. TCE was detected in both GW-1 and GW-2 at concentrations of 1,200 and 2,400 µg/L, respectively. Both samples exceed the Tier 1 ESL for TCE, 5.0 µg/L. No other VOCs or PAHs were detected at or above the laboratory reporting limits in the two samples analyzed.

3.7.7.4 Soil Vapor Results

Soil vapor analytical results for samples collected from soil vapor wells SV-1 and SV-2 are presented in Table 5. Soil vapor analytical results were compared to RWQCB Tier 1 ESLs, where established. Trace concentrations of VOCs and methane were detected in the samples analyzed, but no Tier 1 ESL exceedances were identified.

3.7.8 Conclusions

VOCs, predominantly cis-1,2-DCE, TCE, and PCE were detected in soil and shallow groundwater at the 260 30th Street property at depths less than 18 feet bgs. The highest concentrations of these compounds were detected in soil and groundwater near and downgradient of the floor drain location (Figure 2). Concentrations decrease downgradient towards Brook Street and are significantly lower in the cross-gradient direction to the north in borings B-19 and B-21 and to the south in boring B-26. The most significant TPH impacts in soil and/or groundwater appear to be limited to the eastern portion of 260 30th Street with concentrations diminishing within Brook Street and lower concentrations detected near the floor drain.

The deeper grab-groundwater sample (GGW-2), collected at an approximate depth of 24 to 29 feet bgs had low concentrations of TPHd, TPHmo and TCE detected. Concentrations of TPHd and TCE only slightly exceeded their Tier 1 ESLs. Significant detections in the deeper groundwater were not detected, which indicates that the elevated groundwater impacts are limited by the dense, less permeable soil observed between 18 and 20 feet bgs at the 260 30th Street property.

Based on the low soil vapor VOC concentrations in Brook Street, the potential risk of vapor intrusion to indoor air at off-site properties appears to be insignificant.

4.0 CONCEPTUAL SITE MODEL

This CSM describes the geology, depth to groundwater and groundwater flow direction, current known extent of impacts to soil, groundwater and soil vapor, contaminants of concern, potential receptors and potential contaminant migration and exposure pathways.

4.1 Geology and Hydrogeology

The site lithology and groundwater conditions are summarized below and cross-sections are provided in Figures 3 and 4.

4.1.1 Geology

Recent environmental and geotechnical investigations conducted by Langan indicate that the soil profiles vary from east to west across the site. The site is blanketed by medium dense clayey sand underlain by very stiff to hard clay, sandy clay and clay with sand in the eastern portion of the site. A medium stiff to stiff sandy clay underlain by alternating layers of stiff clays and medium dense to very dense sands underlie the western portion of the site. Environmental and geotechnical boring logs prepared by Langan are provided in Appendix B.

An idealized subsurface profile presented in Figure 3 illustrates the approximate grade of the 30th Street sidewalk, the approximate elevation of the existing building slabs fronting 30th Street, the proposed excavation depths associated with the development, soil types and PID measurements observed in borings within the 260 30th Street property, and seasonal groundwater levels as measured in November 2016 and February 2017.

4.1.2 Hydrogeology

Groundwater is anticipated to flow in the southeasterly direction towards the Glen Echo Creek, which is located over 300 feet away from the site boundary. Groundwater elevations measured in November 2016 ranged from about 21 feet a-msl in boring B-13 located in the 3020 Broadway parcel to about 9 feet a-msl in boring B-16 located in the 260 30th Street parcel. Groundwater elevations measured in February 2017 at the site were significantly higher than those observed in November 2016. February 2017 groundwater elevations ranged from about 29 feet a-msl in boring B-29 located in the 3020 Broadway parcel to an average of about 26 feet a-msl in borings located in the 260 30th Street parcel. Above average rainfall occurred at the site between November 2016 and February 2017 (over 32 inches of rain), which contributed to the significant rise in groundwater elevation beneath the site. Additionally, the 3007 and 3009 Brook Street properties, which are located upgradient to the northwest of the 260 30th Street parcel, have unpaved backyards. The presence of unpaved backyards in the upgradient and uphill location relative to the 260 30th Street parcel likely contributed to the greater rise in groundwater elevation along the eastern portion relative to the western portion of the site, due to rainfall infiltration and southeasterly flow towards 260 30th Street.

4.2 Current Extent of Contamination

The objective of this section is to identify the extent of residual contaminants likely to be in soil, soil vapor, and groundwater. For comparison purposes, soil and groundwater analytical results were conservatively screened against RWQCB Tier 1 ESLs summary table (RWQCB, February 2016 [Rev. 3]).

4.2.1 Soil

Tables 2 and 3 present recent non-metals and metals analytical results, respectively. Figure 5 shows sample locations with non-metals exceedances of the ESLs, collected prior to April 2017. TPHg, TPHd and TPHmo were detected in samples from three boring locations (B-16, B-26, and B-33) at concentrations in exceedance of the ESLs. TPHg, TPHd and TPHmo were not detected at concentrations above the ESLs in the deepest samples collected from borings B-16, B-26, and B-33. In general, the depth of significant TPH contamination in soil at the 260 30th Street property appears to be limited to the upper 10 foot bgs interval. However, boring B-33 had exceedances at a depth of 17.5 feet bgs, but not at 20 feet bgs.

VOCs, including PCE, TCE and cis-1,2-DCE, were detected at concentrations above ESLs in samples collected from borings B-16, B-18, B-21, B-22, B-32, and B-33. 1,1,2,2-Tetrachloroethane was detected in one sample (B-16-6.0) at a concentration above its ESL. In general, similar to the detected concentrations of petroleum hydrocarbons, elevated concentrations of VOCs appear to be limited to the upper 10 feet of soil, with the exception of boring B-33 which had elevated concentrations detected at a depth of 17.5 feet bgs. The elevated concentrations of VOCs are limited to the area around and downgradient of the floor drain system at 260 30th Street property.

Lead was detected in one composite soil sample at a concentration in exceedance of the ESL of 80 mg/kg. This composite sample was collected from shallow borings B-3 and B-4. As shown on Figure 2, borings B-3 and B-4 located at the 3020 Broadway property in the northwestern portion of the site.

4.2.2 Groundwater

Table 1 presents recent groundwater analytical results. Figure 6 shows sample locations with exceedances of the ESLs. TPHg, TPHd and TPHmo were detected in samples collected from 13 borings (B-11, B-18, B-20, B-22, B-23, B-24, B-25, B-26, B-31, B-34, B-35, B-36, and GGW-2) and two monitoring wells (GW-1 and GW-2) at concentrations above their respective ESLs. The maximum detected concentrations of TPHg, TPHd and TPHmo were detected in the groundwater sample collected boring B-24, which is located along the eastern boundary of the property, downgradient of the floor drain (Figure 6). However, these detections were likely related to a significant amount of sediment in the sample. Subsequent TPHd concentrations detected in the nearby monitoring well GW-2 were significantly less (56 µg/L). In general, the most significant TPH impacts in groundwater appear to be limited to the eastern portion of 260

30th Street and are likely related to soil concentrations now in contact with the high, seasonal groundwater table.

Elevated concentrations of TCE and cis-1,2-DCE were observed in groundwater collected from borings B-18 through B-28, B-31, and B-34 and groundwater wells GW-1 and GW-2. Borings B-18 through B-26, B-31, and B-34 are located on the 260 30th Street property along the eastern boundary of the Broadway Redevelopment. Borings B-27 and B-28 are located off-site in Brook Street. The highest concentrations of VOCs were detected in groundwater near and downgradient of the floor drain location. Concentrations of VOCs decrease downgradient towards Brook Street and are significantly lower in the cross-gradient direction to the north in borings B-19 and B-21 and to the south in borings B-26 and B-35.

Boring B-17 is located west and upgradient of the floor drain in the 250 30th Street parcel. This boring was advanced to determine if the use of the floor drain associated with the 250 30th Street parcel also had impacted soil and groundwater and to evaluate groundwater conditions upgradient of the 260 30th Street floor drain. No TPH or TCE was detected above ESLs in the groundwater sample collected from boring B-17. Borings B-13 and B-30 were advanced on the 3020 Broadway and 288 30th Street parcels, respectively. These borings were advanced to evaluate upgradient groundwater conditions and groundwater conditions near the former USTs associated with the 288 30th Street parcel. Neither groundwater sample from boring B-13 or B-30 had concentrations detected above Tier 1 ESLs.

A deeper grab-groundwater sample (GGW-2), collected at an approximate depth of 24 to 29 feet bgs had low concentrations of TPHd, TPHmo and TCE detected. Concentrations of TPHd and TCE only slightly exceeded their Tier 1 ESLs. The lack of significant detections in the deeper groundwater sample collected in an area with elevated shallow concentrations indicates that the elevated groundwater impacts are limited to the shallow (i.e. less than 18 feet) groundwater zone. Deeper groundwater impacts are likely limited by the dense, less permeable soil observed between 18 and 20 feet bgs at the 260 30th Street property.

Boring B-36 is located downgradient of the 260 30th Street property in 30th Street and towards Glen Echo Creek. This boring was advanced to evaluate downgradient impacts to groundwater. TPHd and TCE were detected at concentrations slightly above the Tier 1 ESLs, but below the Fresh Water Ecotox ESLs. In general, the most significant groundwater impacts related to petroleum hydrocarbons and chlorinated solvents appears to be limited to the shallow groundwater beneath the 260 30th Street property.

4.2.3 Soil Vapor

VOCs present in soil and groundwater pose a potential vapor intrusion to indoor air risk. As discussed previously, due to the significant rise in groundwater elevations and the proposed excavation depth, soil vapor samples have not been collected at the 260 30th Street property. However, conservatively, vapor mitigation measures consisting of a vapor barrier and vapor mitigation system will be employed in the building design even though all soil exceeding Tier 1 ESLs is proposed for excavation and off-site disposal.

Based on the rise in groundwater elevation and the presence of VOCs at elevated concentrations, the proposed building will be designed with a waterproofing membrane, which will be compatible with the VOCs present in the subsurface. The waterproofing membrane will function as a vapor barrier. In addition to the waterproofing membrane, a passive vapor mitigation system consisting of horizontal, slotted pipes, gravel, air intakes, and risers is proposed beneath the 260 30th Street portion of the new building.

Soil vapor sampling was completed in April 2017 in Brook Street to evaluate the potential for vapor intrusion off-site. Based on the soil vapor analytical results presented in Table 5, potential vapor intrusion to indoor air in off-site properties does not appear to be a significant risk. No additional actions or evaluations related to off-site vapor intrusion are necessary at this time.

4.3 Potential Receptors and Exposure Pathways

The site is currently being used for commercial purposes. The proposed development will have a single level basement along Broadway leveling out to the current grade at Brook Street, which will be used for parking and storage. The partial below grade parking level will be naturally ventilated along the southern and eastern faces and mechanically ventilated on the western portion of the site.

Future site users are expected to include residents, site visitors, workers and construction workers. Due to concentrations of petroleum hydrocarbons and VOCs detected in soil and groundwater, potential exposure pathways to future site users include:

- Construction workers: direct contact with soil during construction.
- Construction workers: direct contact with groundwater during construction.
- Construction workers: inhalation of volatilized vapors from groundwater during construction;

- Site visitors, workers and residents: inhalation of vapors in indoor air due to vapor intrusion of contaminants from soil and groundwater; and
- Ecological receptors: via potential surface water exposure at Glen Echo Creek, which is located over 300 feet from the site.

The RWQCB's Water Quality Control Plan for the San Francisco Bay Basin Plan (Basin Plan) designates groundwater in the site vicinity as having beneficial uses which include domestic and municipal supply. However, the East Bay Municipal Utility District (EBMUD) provides inhabitants of this area with potable drinking water and therefore, the exposure pathway of ingestion of groundwater is not complete.

The site lies within the Santa Clara Valley East Bay Plain groundwater sub-basin of the Santa Clara Valley groundwater basin (Figure 2-10 of Basin Plan). In addition to domestic and municipal water supply, the existing and potential beneficial uses for groundwater include industrial process, industrial service, and agricultural water supply (Table 2-2 of Basin Plan).

5.0 CORRECTIVE ACTION OBJECTIVES

The following sections describe the corrective action objectives and the associated remedial objective for soil, groundwater and soil gas at the site.

5.1 Corrective Action Objectives for Soil, Groundwater, and Soil Vapor

5.1.1 Corrective Action Objectives for Soil

Petroleum hydrocarbons, VOCs and, to a lesser extent, heavy metals (including lead), have been detected at elevated concentrations in soil up to 10 feet bgs. The resulting corrective action objective for soil is to remove by excavation soil containing concentrations of contaminants that exceed Tier 1 ESLs, which will significantly reduce (or eliminate) concentrations of contaminants in soil to levels protective of construction workers and future site users. Prior to soil removal, appropriate mitigative controls to minimize potential pathways for soil exposure will be established.

5.1.2 Corrective Action Objectives for Groundwater

The State Water Resources Control Board (SWRCB) Resolution No. 92-49 requires responsible parties to cleanup and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best reasonable water quality, if background water quality levels cannot be restored. The RWQCB's Water Quality Control Plan for the San

Francisco Bay Basin Plan (Basin Plan) designates groundwater in the site vicinity as having beneficial uses which include domestic and municipal supply. Therefore, subject to the technical and economic feasibility of further active cleanup, further groundwater remediation is required to expedite restoration of the potential use of groundwater as a drinking water source.

The resultant corrective action objectives for groundwater are to 1) reduce the petroleum and VOC mass in the subsurface contributing to groundwater impacts, such that concentrations in groundwater will be at or below water quality objectives (WQOs) in a reasonable time frame; 2) eliminate the potential for groundwater to pose an unacceptable vapor intrusion concern; and 3) reduce potential risk of construction worker exposure to groundwater during site development. Current Basin Plan WQOs, applicable ESLs and potential site-specific risk-based clean-up goals (RBCGs) will be evaluated and established prior to the implementation of the groundwater corrective action alternative.

5.1.3 Corrective Action Objectives for Soil Vapor

The corrective action objective for soil vapor is to mitigate potential risk of vapor intrusion into indoor air related to petroleum hydrocarbons and VOCs detected at elevated concentrations in soil and groundwater.

6.0 EVALUATION OF CORRECTIVE ACTION ALTERNATIVES

To meet the corrective action objectives outlined above, alternatives for the treatment or mitigation of soil, groundwater, and soil vapor impacts have been evaluated. The following sections describe the alternatives evaluated for soil, groundwater, and soil vapor.

6.1 Corrective Action Alternatives for Soil

A formal evaluation of potential remedial alternatives was not performed to address contamination identified in soil because the appropriate technology was apparent based on proposed development plan. The current development plan includes significant excavation of soil during construction. It is anticipated that planned excavation and off-site disposal of soil during construction will remove and significantly reduce concentrations of contaminants in soil. Over-excavation of soil beneath the 260 30th Street property will be performed to remove soil containing petroleum hydrocarbons and VOCs above Tier 1 ESLs.

Langan will prepare a soil and groundwater management plan (SGMP) which will include procedures to manage potential risk of exposure to construction workers and off-site receptors

during development. Additionally, to facilitate over-excavating soil below the groundwater table, dewatering and groundwater treatment prior to permitted discharge is anticipated.

6.2 Evaluation of Groundwater Remediation Technologies

As discussed in Section 6.1, soil exceeding Tier 1 ESLs is proposed for excavation and off-site disposal. To facilitate over-excavation, construction dewatering is proposed. The combination of soil removal and construction dewatering and treatment prior to permitted discharge is anticipated to predominantly address elevated concentrations on contaminants detected in groundwater at the 260 30th Street property. Post-excavation groundwater conditions and the need for additional groundwater remediation will then be assessed. In anticipation of the potential need for additional in-situ groundwater remediation, Langan performed an evaluation of potential remediation technologies that could be implemented to meet the corrective action objectives for groundwater at the site. The potential technologies considered groundwater remediation or mitigation are presented in Table 4 and listed below:

- No action;
- Monitoring Natural Attenuation;
- Air Sparging with Soil Vapor Extraction;
- Enhanced Bioremediation;
- In-situ Chemical Oxidation; and
- Zero Valent Iron (ZVI).

The remedial alternatives were evaluated based on the following criteria: technical effectiveness, implementability, remedial time frame and relative cost range. These criteria were ranked as “low”, “medium” and “high” range as defined below.

Technical Effectiveness – Ability to reach groundwater remedial goals under site specific conditions, regardless of time frame:

- Low – Unlikely to meet remedial goals.
- Medium – Likely to meet remedial goals with active management and, if necessary, intervention or optimization.
- High – Highly likely to meet remedial goals under standard operating practices.

Implementability – Potential to be implemented as planned without need of any extraordinary measures that affect the cost and/or implementation time frame of the remedial plan and/or cause disruption to the site, such as the use of fracturing for delivery for reagents instead of use of direct push technology (DPT) or injection wells.

- Low – Unlikely to meet the remedial plan and will likely require measures that may affect cost and/or implementation time frame of the remedial plan and/or will cause disruption to the site.
- Medium – May meet the remedial goals as planned, and may not require measures that may affect the cost and/or implementation time frame of the remedial plan and/or may not cause disruption to the site.
- High – Highly likely to meet the remedial plan, and not expected to require measures that may affect the cost and implementation time frame of the remedial plan or not expected to cause disruption to the site.

Remedial Time Frame – The estimated timeframe required for remediation from the start of remediation to attainment of regulatory case closure.

- Short – Less than three years
- Medium – Three to five years
- Long – Five to twenty years

Relative Cost - Relative costs were estimated based on implementation and performance monitoring of the remedial alternatives. Relative costs consider injection events, water pumping, air sparging and vapor extraction, operation and maintenance and performance monitoring. Relative costs were estimated as low, medium or high.

The potential alternatives considered groundwater remediation or mitigation are discussed in more detail below. Each potential alternative will be refined at a later date based on the results of the additional environmental sampling and monitoring presented in Section 3.7.

6.2.1 No Action

The “No Action” alternative is included for the purpose of comparison to the other remediation alternatives. This alternative would take no action to accelerate or monitor the attenuation of the source area groundwater impacts at the site. The technical effectiveness of this alternative is rated “low” because there would be no action or monitoring to meet the remedial objective.

The implementability is rated “high” because no actions are required that would affect site access, public safety or require feasibility. The remediation timeframe is not applicable as no action will be taken. The relative cost is rated “very low,” because the cost of this alternative is zero.

6.2.2 Monitored Natural Attenuation

Monitored natural attenuation utilizes naturally-occurring processes in the subsurface that reduce the mass, toxicity, mobility, volume or concentration of the chemicals of concern. In monitored natural attenuation (MNA), the natural biological activity, as well as the other attenuation mechanisms such as adsorption, dilution, and convection, is monitored carefully to predict and evaluate the reduction in concentrations of chlorinated solvents in the selected media. Natural biological attenuation of PCE relies on the metabolic processes of specific anaerobic microbes, which utilize PCE as an electron acceptor and subsequently transform PCE to TCE. Under optimal conditions, this reductive dechlorination process may continue such that TCE is transformed to cis-1,2-DCE, then to vinyl chloride, then to ethene, which is non-toxic and readily degraded in the environment.

Due to the recently detected elevated concentrations of TCE and daughter product cis-1,2-DCE in groundwater, it is assumed that geochemical conditions are favorable for reductive dechlorination. However, vinyl chloride has not been detected indicating that biological attenuation may be stalled at cis-1,2-DCE. Given lack of evidence for reductive dechlorination beyond cis-1,2-DCE, this alternative is rated “low to medium” for technical effectiveness.

Petroleum hydrocarbon compounds can be rapidly degraded under aerobic conditions by natural microbial populations. When oxygen is depleted, microbes can use other electron acceptors such as nitrate, manganese, ferric iron, and sulfate to degrade hydrocarbons. Additional groundwater samples will be collected and analyzed for natural attenuation parameters to confirm that groundwater conditions are favorable for natural aerobic or anaerobic degradation.

Implementation of this alternative would involve a groundwater monitoring program to collect contaminant concentration data and natural attenuation parameters. Groundwater wells will need to be installed to collect contaminant concentration and natural attenuation parameter data. After the wells are installed, groundwater samples would need to be collected periodically; therefore, this alternative is rated “medium” for implementability.

This alternative requires on-going, periodic monitoring. Natural attenuation processes are generally slower than other, more active, remediation technologies. For this reason, this alternative is rated “long” for remediation timeframe.

The relative cost of this alternative is rated “low” because the required well installation and periodic groundwater collection and analysis would be relatively low cost, as compared to active remediation.

6.2.3 Air Sparging with Soil Vapor Extraction (AS/SVE)

This alternative involves continuous injection of atmospheric air into the groundwater through air sparging wells to volatilize contaminants from the groundwater to the vadose zone, where they are captured by vapor extraction wells and brought to the surface for off-gas treatment. The radius of influence of the air sparging injection wells may be limited due to the site’s underlying clayey soils and dense sands; therefore, the effectiveness of an AS/SVE system may be reduced. In addition, injecting air in the subsurface will create an aerobic environment, which will decrease the rate of naturally occurring reductive dechlorination, but increase the rate of petroleum hydrocarbon degradation. For these reasons, the technical effectiveness for this alternative is rated “low to medium”.

Prior to implementation of this alternative, a pilot study would need to be conducted to verify the effectiveness of this alternative and to refine the design of the full-scale AS/SVE system. Based on the results of the pilot study, a full-scale version of the AS/SVE system would then be installed. Both the pilot study and full-scale AS/SVE system would involve installation of air sparge and soil vapor extraction wells, system piping and trenching and above-ground equipment for treatment of extracted vapors. Given the complexity of the full-scale AS/SVE system and duration of operation, the implementation of this alternative is anticipated to have a significant impact on the proposed development design and construction schedule. For these reasons, this alternative is rated “low” for implementability.

The pilot study would require up to six months to be completed. After the initial pilot study is completed, the full-scale AS/SVE system would need to be installed, operated, monitored and managed to meet the project remedial goals, which may require up to three or four years. For this reason, this alternative is rated “medium” for remediation timeframe.

Costs for air sparging would include capital costs for the pilot study and full-scale system installation and operation and monitoring costs during the duration of operation, which may be

one year to three years. Considering the capital and operations costs, this alternative is rated “medium” for cost.

6.2.4 Enhanced Bioremediation

This alternative involves injection of a slow release electron donor reagent, such as vegetable oil, into the groundwater to provide a carbon and hydrogen source to enhance the natural biological processes to promote reductive dechlorination under anaerobic conditions. If necessary, this alternative could be augmented to include injection of a microbial culture. A microbial culture would be injected with the electron donor to increase populations of the microbes responsible for reductive dechlorination of chlorinated ethenes. The microbial culture would specifically target the conversion of TCE to cis-1,2-DCE and cis-1,2-DCE to vinyl chloride and vinyl chloride to ethene, thus increasing the degradation rate of VOCs in groundwater. This alternative would be effective in the long-term as the microbial culture would continue to grow in the subsurface and the electron donor (e.g., vegetable oil) will continue to release carbon and hydrogen as it degrades slowly over time. Since it is likely that bioaugmentation with electron donor will meet remedial goals for VOCs, this alternative is rated “medium to high” for effectiveness.

If needed, this alternative could be replaced or augmented to address petroleum hydrocarbon contamination by implementing one of the following methods:

- Aerobic Bioremediation to Promote Co-metabolism – This alternative involves injection of oxygen to promote the biodegradation of petroleum hydrocarbons. An enzyme produced during aerobic petroleum hydrocarbon degradation (metabolism) is able to oxidize chlorinated solvents (TCE and cis-1,2-DCE) to innocuous end products (ethene), meaning that this alternative is potentially able to remediate both petroleum and VOCs with the same treatment process; or
- Aerobic Bioremediation, Post-Anaerobic Bioremediation – This alternative involves injection of oxygen to promote biodegradation of petroleum hydrocarbons after the anaerobic remedial alternative for VOC biodegradation has been completed.

These additional/alternative approaches will be evaluated pending the results of the additional environmental sampling and monitoring, as presented in Section 3.7.

Implementation of this technology would involve periodic injection of the slow-release donor reagent into the groundwater. The microbial culture and electron donor would be injected using direct push injections. High injection pressures may be required as the site is underlain by clayey soils. This alternative would also require on-going, periodic monitoring of groundwater

conditions to verify that reducing conditions have been achieved. Installation of permanent injection and groundwater monitoring wells may have an impact on the proposed development design and the construction schedule. For these reasons, this alternative is rated “medium” for implementability.

This alternative would be applied over a “medium” timeframe, which includes at least one injection event and on-going monitoring and management. While each injection event would require one to two weeks to complete, the ongoing bioremediation monitoring may require two to three years to attain groundwater corrective action objectives.

Costs for enhanced reductive dechlorination would include the cost of injection wells or boreholes (or direct push injection points), costs of the slow-release electron donor reagent, and the cost to inject the reagent through the wells or boreholes. Subsequent re-injection would likely be required and result in additional costs. Reagent costs may be higher than typical due to the need for additional reagent to change oxidative aquifer conditions to reductive conditions. This alternative also includes costs for installation of groundwater monitoring wells and on-going, periodic groundwater monitoring. For this reason, the cost of this alternative is rated “medium.”

6.2.5 Chemical Oxidation

This alternative involves the injection of a highly oxidizing chemical reagent into the subsurface to chemically react with petroleum hydrocarbons and VOCs and transform them into carbon dioxide and water. The chemical oxidant reagent, such as Fenton’s reagent (a mixture of hydrogen peroxide with an iron catalyst), activated persulfate, permanganate or ozone, reacts relatively quickly with most organic compounds, including TCE and other chlorinated ethenes. The effectiveness of this alternative is dependent on the degree to which the oxidant is in contact with contaminated soil. Therefore, in-situ chemical oxidation effectiveness can be limited by soil heterogeneity because injected oxidant will tend to flow into the coarse-grained soils and bypass fine-grained soils. Because oxidants have limited longevity, full contact is generally not achieved after a single injection event. Installation of oxidants using direct soil mixing can improve the contact and may achieve full contact after a single event. Additional injection events are often necessary to meet remedial action objectives due to “rebounding” of contaminant concentrations after initial injection events. Based on the high level of contaminant mass removal that is possible using chemical oxidation, this alternative is rated “medium-high” for effectiveness.

Negative factors associated with chemical oxidation include concerns regarding injection of chemical reagents and the potential for mobilization of hexavalent chromium. The reaction of chemical oxidant with organic compounds can be a violent and exothermic process that produces a large amount of off-gas and creates high pressures. It is not uncommon during chemical oxidation events for the high pressures to push reagent far from the site and to have reagent emerge above the ground surface. For these reasons, this alternative is rated "medium" for implementability.

Oxidation injection events can be conducted over the course of several weeks or months, however more than one injection event may be required. Periodic monitoring and management would be needed. For these reason, this alternative is rated "short" for remediation timeframe. Costs for chemical oxidation would include the cost of injection wells or boreholes, costs of the chemical reagent, and the cost to inject the reagent through the wells or boreholes. The cost of the chemical oxidation reagent is relatively high compared to other remediation technologies. Subsequent re-injection would likely be required and result in additional costs. For this reason, the cost of this alternative is rated "high."

6.2.6 Zero Valent Iron

This alternative involves injection of micro-scale zero-valent iron (ZVI) in slurry form, typically using pneumatic fracturing and injection drilling techniques or direct soil mixing, to spread the ZVI throughout the treatment area. ZVI creates strongly reducing conditions and can be supplemented with electron donor such that this approach can transform TCE through both abiotic and biotic processes; therefore, ZVI is effective for remediation of TCE and other chlorinated ethenes. For this reason, this alternative is rated "medium to high" for effectiveness. However, ZVI is not effective for remediation of petroleum hydrocarbons, and would create highly reducing conditions for an extended period that would likely reduce the rate of natural biological degradation of petroleum hydrocarbons. The rating for this alternative is based on chlorinated ethene remediation only, and would be significantly lower if remediation of petroleum hydrocarbons is also required.

Implementation of this technology would involve injection of the ZVI into the groundwater. Disruption of the site activities would generally be limited to this injection event, which would likely last for two to four weeks. Reinjection of ZVI is unlikely because ZVI can last for up to ten years in the saturated zone. Above-ground equipment is not required for this technology. Pneumatic fracturing utilizes high pressure injection techniques that can potentially result in

surfacing of the ZVI reagent. For these reasons, this alternative is rated “medium” for implementability.

Periodic monitoring of groundwater conditions would be required after injection of the ZVI reagent, however the effect of ZVI on groundwater concentrations is often apparent immediately after ZVI injection. For this reason, this alternative is rated “short” for the project remediation timeframe.

ZVI reagent and pneumatic fracturing injection techniques generally come with a much higher cost than other remediation technologies. This technology is often reserved for sites with especially high contaminant concentrations or where the remediation must be completed in a single injection event. For these reasons, this technology is rated “high” for cost.

6.2.7 Assessment of the Preferred Alternatives

The first three remedial alternatives (No Action, MNA and AS/SVE) are rated low or low to medium for effectiveness. Due to the limited effectiveness of these technologies at the site, they are not acceptable and are rejected from further consideration.

The three remaining in-situ alternatives (enhanced bioremediation, in-situ chemical oxidation and ZVI) are all rated medium to high for effectiveness and medium for implementability. In-situ chemical oxidation and ZVI have the shortest anticipated remediation time frame; however, enhanced anaerobic bioremediation is expected to have the lowest cost.

As stated above in Section 6.1, the selected corrective action alternative for soil is excavation and off-site disposal. Based on recent groundwater elevations, it is anticipated that groundwater dewatering, treatment and permitted discharge during construction is needed to achieve proposed excavation depths. Therefore, groundwater extraction and treatment during construction activities is the primary, selected corrective action alternative for on-site groundwater.

Groundwater conditions will be reassessed after the excavation and dewatering is completed. If groundwater results indicate that additional groundwater treatment is necessary, groundwater contamination will be addressed by one of the following in-situ treatment alternatives: enhanced bioremediation, chemical oxidation or zero valent iron (ZVI). If additional groundwater treatment is necessary, the final groundwater corrective action alternative and implementation plan will be presented in an addendum to this FS/CAP.

6.3 Corrective Action Alternatives for Soil Vapor

A formal evaluation of potential remedial alternatives was not performed to address impacts to soil vapor because the appropriate technology was apparent based on proposed development plan. The following measures will be implemented to address potential indoor air intrusion due to soil vapor during site development:

- Soil containing volatile compounds exceeding Tier 1 ESLs will be excavated and disposed of off-site during construction.
- As a preventative measure, due to elevated concentrations of contaminants in groundwater under the eastern portion, a vapor mitigation system (VMS) will be installed at the 260 30th Street property. The VMS system will be designed at a later date, pending the results of the proposed soil vapor sampling.
- A one- to two-story concrete podium garage along Brook Street. The partial below grade parking level will be naturally ventilated along the southern and eastern faces and mechanical ventilation will be provided on the interior parking area.
- Due to depths of proposed excavation and recent elevated groundwater levels, a waterproof, solvent-resistant membrane will be installed at the remaining properties (including 250 and 288 30th Street, 3000 and 3020 Broadway and 3007 and 3009 Brook Street), where appropriate. The membrane will protect the building foundation from moisture and it will mitigate potential vapors from migrating into indoor air following development.

7.0 CONCLUSIONS

This FS/CAP was prepared for the proposed 3000 Broadway Redevelopment project, which encompasses 3000 and 3020 Broadway, 250, 260 and 288 30th Street and 3007 and 3009 Brook Street properties in Oakland, California. Recent environmental investigations indicate that soil and groundwater are impacted by petroleum hydrocarbon related compounds and VOCs. However, significant impacts appear to be limited to the 260 30th Street parcel. The objectives of this FS/CAP are to identify and evaluate potential remedial alternatives, based on existing site conditions and planned future use, and propose corrective action measures.

Based on the current extent of contamination, corrective action objectives were established for soil, groundwater and soil vapor. The corrective action objective for soil is to excavate and dispose of soil containing concentrations of total petroleum hydrocarbons (TPH) and VOCs that exceed Tier 1 ESLs. The corrective action objectives for groundwater are to 1) reduce the

petroleum hydrocarbon related and VOC mass in the subsurface contributing to groundwater impacts, such that concentrations in groundwater will be at or below water quality objectives in a reasonable time frame; 2) eliminate the potential for groundwater to pose an unacceptable vapor intrusion concern; and 3) reduce potential risk of construction worker exposure to groundwater during site development. The corrective action objective for soil vapor is to mitigate potential risk of vapor intrusion into indoor air related to petroleum hydrocarbons and VOCs detected at elevated concentrations in soil and groundwater.

Soil vapor and grab groundwater samples were collected downgradient of 260 30th Street in Brook and 30th Streets, respectively, in April 2017. Soil vapor sample results were below Tier 1 ESLs, which indicates vapor intrusion is not a significant concern downgradient. Groundwater samples collected closest to Glen Echo Creek were below Freshwater Ecological ESLs, which indicates impacts to the creek are not significant.

Corrective action alternatives for soil, groundwater and soil gas to mitigate risks to human health were evaluated in this FS/CAP to meet corrective action objectives. The proposed development plan includes excavation of soil at depths of up to 18 feet bgs. Therefore, the selected corrective action alternative for soil is to excavate and dispose of soil during construction. Over-excavation will be proposed in the southeastern corner of the site (260 30th Street) to remove soil containing concentrations exceeding Tier 1 ESLs.

Based on recent groundwater elevations, it is anticipated that groundwater dewatering will be required to facilitate over-excavation. Extracted groundwater is anticipated to require treatment prior to discharge. Groundwater extraction and treatment during construction activities is the primary, selected corrective action alternative. Groundwater conditions will be reassessed after the excavation and dewatering is completed. If the post-construction groundwater monitoring results indicate that the groundwater corrective action objectives have not been met, implementation of an additional corrective actions will be proposed.

If groundwater results indicate that additional groundwater treatment is necessary, groundwater contamination will be addressed by one of the following treatment alternatives: enhanced bioremediation, in-situ chemical oxidation or ZVI. If additional groundwater treatment is necessary, the final corrective action and implementation plan to address groundwater will be presented in an addendum to this FS/CAP.

Due to elevated concentrations of contaminants in groundwater under the eastern portion of the site, the soil vapor corrective action alternative is a VMS, which will be installed under the

area currently occupied by the 260 30th Street property. In addition, a waterproof, solvent-resistant membrane will be installed beneath the remainder of the proposed building. The membrane will protect the building foundation from moisture and it will mitigate potential vapors from migrating into indoor air following development.

8.0 PROPOSED SCHEDULE AND NEXT STEPS

The following schedule for remedial planning and design, pre-design investigations and corrective action implementation is proposed:

- Soil and Groundwater Management Plan: May 2017
 - Outline soil handling procedures and risk management
 - Procedures for unanticipated conditions
 - Define extent of soil excavation
 - Discuss construction dewatering, treatment and discharge
- Fact Sheet and Public Comment Period: May to June 2017
 - Preparation of Fact Sheet based on the FS/CAP
- Corrective Action Implementation: July to August 2017
- Excavation and Site Development: July 2017 to February 2018
- Addendum to Feasibility Study and Corrective Action Plan (FS/CAP Addendum): Spring 2018:
 - FS/CAP Addendum will provide updates based on findings from the additional environmental sampling and monitoring completed in April/May 2017. The selected remedy and implementation strategy will be one of the alternatives discussed in this FS/CAP.
 - The selected groundwater remedy and implementation strategy will be identified in FS/CAP Addendum based on the findings from the additional environmental sampling and monitoring completed in April/May 2017.
- Construction Completion Report: Spring 2018
 - Pre- and post-construction off-site groundwater monitoring results;
 - Summary of construction dewatering and discharge activities; and
 - Summary of soil sampling analytical results and off-haul quantities.

REFERENCES

DECON Environmental Services, Inc., 1992. *Letter Re: Tank Removal Project, 3000 Broadway, Oakland, California*. 28 December.

Environmental Resources Management (ERM), 2006. *Feasibility Study, Hookston Station, Pleasant Hill, California*. Appendix A, Table A-2, "Comparison of Background Concentrations of Metals in Bay Area Soils," July.

Faultline Associates, Inc., 1997. *Underground Storage Tank Closure Report, 260 30th Street, Oakland, California*. 22 September.

Langan Treadwell Rollo, 2016. *Phase II Environmental Site Assessment, 3000 and 3020 Broadway, and 250, 260 and 288 30th Street, Oakland, California*. 27 April.

Langan Treadwell Rollo, 2016. *Response to 4 November 2015 Letter and Request for No Further Action*. 24 October.

P & D Environmental, Inc., 2014. *Soil and Groundwater Investigation Report, 260 30th Street, Oakland, California*. 15 October.

San Francisco Regional Water Quality Control Board (RWQCB), 2016. *Environmental Screening Levels*. February.

TABLES

Table 1
Groundwater Analytical Results for Non-Metals
3000 Broadway Redevelopment
Oakland, California

Sample ID	Date	TPHg	TPHd	TPHmo	VOCs					PAHs		
					PCE	TCE	cis- 1,2 DCE	Xylenes	All Other VOCs	2- Methyl-naphthalene	Naphthalene	All Other PAHs
(µg/L)												
B-11-GW	04/02/16	250	460	6,900	< 0.50	< 0.50	< 0.50	0.88	acetone = 15 benzene = 0.65 bromodichloromethane = 0.61 t-butyl alcohol = 12 sec-butyl benzene = 0.67 tert-butyl benzene = 0.96 chlorobenzene = 0.65 isopropylbenzene = 1.3 n-propyl benzene = 0.93	--	< 0.50	--
B-12-GW	04/16/16	< 50	< 50	< 250	< 0.50	< 0.50	< 0.50	< 0.50	toluene = 0.50	--	< 0.50	--
B-13-GW	11/03/16	< 50	< 50	< 250	< 0.50	1.8	< 0.50	< 0.50	chloroform = 0.62	--	< 0.50	--
B-17-GW	02/03/17	< 50	< 50	< 250	0.58	3.5	2.7	< 0.50	chloroform = 3.3	< 0.50	< 0.50	< 0.50
B-18-GW	02/02/17	55	200	1,200	< 100	2,000	350	< 100	ND	0.54	0.62	< 0.50
B-19-GW	02/02/17	< 50	< 100	630	< 1.2	41	4.5	< 1.2	ND	< 0.50	< 0.50	< 0.50
B-20-GW	02/02/17	75	2,400	8,600	< 120	4,700	460	< 120	ND	< 0.50	< 0.50	< 0.50
B-21-GW	02/02/17	< 50	< 100	510	< 5.0	170	19	< 5.0	ND	< 0.50	< 0.50	< 0.50
B-22-GW	02/02/17	120	< 100	680	< 120	6,100	2,200	< 120	ND	< 0.50	< 0.50	< 0.50
B-23-GW	02/03/17	250	40,000	110,000	< 12	470	210	< 12	chlorobenzene = 19	4.6	3.5	benzo (a) anthracene = 0.64 fluorene = 0.83 1-methylnaphthalene = 3.0 phenanthrene = 1.2
B-24-GW	02/02/17	1,400	250,000	500,000	< 50	590	1,600	< 50	ND	3.4	3.5	fluorene = 3.3 1-methylnaphthalene = 2.8 pyrene = 1.4
B-25-GW	02/03/17	66	5,100	18,000	< 5.0	210	29	< 5.0	ND	--	< 5.0	--
B-26-GW	02/03/17	110	770	1,300	< 2.5	63	20	< 2.5	1,2,3-trichlorobenzene = 3.7 1,2,4-trimethylbenzene = 3.1	< 0.50	0.64	ND
B-27-GW	02/03/17	59	< 100	540	< 1.7	48	4.8	9.4	ND	--	< 1.7	--
B-28-GW	02/03/17	< 50	< 100	960	< 10	230	37	< 10	ND	--	< 10	--
B-30-GW	02/04/17	< 50	< 50	< 250	< 0.5	1.4	< 0.5	< 0.5	ND	< 0.50	< 0.50	ND
B-31-GW	03/29/17	< 50	110	870	< 1.7	68	72	< 1.7	chloroform = 1.8	< 0.0500	0.0632	ND
B-34-GW	03/29/17	< 50	140	700	< 2.5	160	26	< 2.5	chloroform = 2.9	< 0.0500	0.0735	ND
B-35-GW	03/29/17	< 50	140	1,100	< 0.50	4.3	1.0	< 0.50	vinyl chloride = 0.79	< 0.0500	< 0.0500	ND
B-36-GW	04/11/17	< 50	120	580	< 0.50	28	4.7	< 0.50	methyl t-butyl ether = 1.6	< 0.500	< 0.500	ND
GGW-2	03/30/17	< 50	150	420	< 0.50	5.2	< 0.5	< 0.50	ND	< 0.50	< 0.50	< 0.50
GW-1	04/05/17	67	< 50	< 250	< 25	1,200	170	< 25	ND	< 0.0500	< 0.0590	ND
GW-2	04/05/17	130	56	< 250	< 50	2,400	300	< 50	ND	< 0.0500	< 0.0500	ND
Tier 1 ESL		100	100	50,000	3.0	5.0	6.0	20	Various	36*	20**	Various

Notes:

Bold - Detection exceeds Tier 1 ESL

µg/L - micrograms per liter

VOCs - Volatile Organics Compounds, EPA Method 8260B

PAHs - Polycyclic aromatic hydrocarbons

TPHg - Total Petroleum Hydrocarbons as Gasoline, EPA Method 8015B

TPHd - Total Petroleum Hydrocarbons as Diesel Range, EPA Method 8015B

TPHmo - Total Petroleum Hydrocarbons as Motor Oil, EPA Method 8015B

Cis-1,2-DCE - Cis-1,2-dichloroethene

TCE - Trichloroethene

PCE - Tetrachloroethene

< 0.50 - Analyte was not detected above the laboratory reporting limit (0.50 µg/L)

ND - Not detected at or above the laboratory reporting limit(s)

-- Sample not analyzed

ESL - Environmental screening level(s)

Various - ESLs, where established, vary for each of the multiple compounds analyzed

*Direct exposure Human Health Risk Level (Table GW-1) ESL

**Groundwater Vapor Intrusion Human Health Risk Levels (Table GW-3) ESL for Residential Shallow Groundwater

Tier 1 ESLs - San Francisco Bay Regional Water Quality Control Board's Environmental Screening Levels - *Tier 1 Groundwater*. February 2016 [Rev. 3]

Table 2
Soil Analytical Results for Non-Metals
3000 Broadway Redevelopment
Oakland, California

Sample ID	Sample Depth (ft bgs)	Date Sampled	TPHg	TPHd	TPHmo	VOCs				PAHs			OCPs/PCBs	Asbestos
						PCE	TCE	cis- 1,2-DCE	All Other VOCs	2-Methyl-naphthalene	Naphthalene	All Other PAHs		
(mg/kg)														
B1-1, 3 & B2-1, 3	1, 3	4/1/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	--	--	--	--	--
B3-2.5, 5 & B4-2.5, 5	2.5, 5	4/1/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	<0.25	<0.25	ND	--	ND
B3-7.5, 10 & B4-7, 10.5	7.5, 10, 10.5	4/1/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	<0.25	<0.25	ND	ND	--
B3-12.5, 15 & B4-12.5, 15	12.5, 15	4/1/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	--	--	--	--	--
B3-17.5, 20 & B4-17.5, 20	17.5, 20	4/1/2016	< 1.0	< 1.0	< 5.0	--	--	--	--	--	--	--	--	--
B5-2.5, 5 & B6-2.5, 5	2.5, 5	4/2/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	<0.25	<0.25	ND	ND	--
B5-7.5, 10 & B6-7.5, 10	7.5, 10	4/2/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	<0.25	<0.25	ND	ND	ND
B5-12.5, 15 & B6-12.5, 15	12.5, 15	4/2/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	--	--	--	--	--
B7-2 & B8-2	2	4/2/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	<0.25	<0.25	ND	ND	--
B7-4 & B8-4	4	4/2/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	--	--	--	ND	--
B7-6 & B8-6	6	4/2/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	--	--	--	ND	--
B7-8 & B8-8	8	4/2/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	--	--	--	--	--
B7-10 & B8-10	10	4/2/2016	< 1.0	< 1.0	< 5.0	--	--	--	--	--	--	--	--	--
B9-1, 3 & B10-1, 3	1, 3	4/1/2016	< 1.0	< 1.0	< 5.0	<0.005	<0.005	<0.005	ND	<0.25	<0.25	ND	ND	--
B9-5 & B10-5	5	4/1/2016	< 1.0	< 1.0	< 5.0	--	--	--	--	--	--	--	--	--
B-16-6.0	6	11/03/16	810	2,900	6,100	2.0	< 0.20	< 0.20	n-butyl benzene = 0.35 1,2-dichlorobenzene = 0.53 1,1,2,2-tetrachloroethane = 0.35 1,2,4-trimethylbenzene = 1.4 1,3,5-trimethylbenzene = 0.44	0.26	0.22	benzo (a) anthracene = 0.13 fluorene = 0.13 1-methylnaphthalene = 0.21 phenanthrene = 0.38 pyrene = 0.14	--	--
B-16-10.0	10	11/03/16	460	1,600	3,600	0.059	0.29	0.29	n-butyl benzene = 0.17 sec-butyl benzene = 0.072 1,2-dichlorobenzene = 0.37 n-propyl benzene = 0.068 1,2,4-trimethylbenzene = 0.77 1,3,5-trimethylbenzene = 0.26 xylenes = 0.15	0.19	0.15	benzo (a) anthracene = 0.10 1-methylnaphthalene = 0.13 phenanthrene = 0.16	--	--
B-16-20.5	20.5	11/03/16	15	46	100	0.013	0.017	< 0.0050	1,2,4-trimethylbenzene = 0.012	< 0.010	< 0.010	< 0.010	--	--
B-17-10.0	10	02/03/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-18-10.0	10	02/02/17	< 1.0	< 1.0	< 5.0	< 1.0	6.4	1.1	ND	< 0.010	< 0.010	< 0.010	--	--
B-18-15.0	15	02/02/17	< 1.0	< 1.0	< 5.0	< 0.0050	0.025	0.0063	ND	< 0.010	< 0.010	< 0.010	--	--
B-18-20.0	20	02/02/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-19-10.0	10	02/01/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-20-10.0	10	02/01/17	< 1.0	< 1.0	< 5.0	< 0.010	0.21	0.011	ND	< 0.010	< 0.010	< 0.010	--	--
B-20-15.0	15	02/01/17	< 1.0	< 1.0	< 5.0	< 0.0050	0.021	< 0.0050	ND	--	< 0.0050	--	--	--
B-20-20.0	20	02/01/17	< 1.0	< 1.0	< 5.0	< 0.0050	0.0097	< 0.0050	ND	--	< 0.0050	--	--	--
B-21-10.0	10	02/02/17	< 1.0	< 1.0	< 5.0	< 0.025	0.50	0.065	ND	< 0.010	< 0.010	< 0.010	--	--
B-21-15.0	15	02/02/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	--	< 0.0050	--	--	--
B-22-10.0	10	02/01/17	< 1.0	< 1.0	< 5.0	< 0.33	5.0	0.81	ND	< 0.010	< 0.010	< 0.010	--	--
B-22-15.0	15	02/01/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-22-20.0	20	02/01/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-23-10.0	10	02/02/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-23-12.5	12.5	02/02/17	20	8.1	25	< 0.0050	< 0.0050	< 0.0050	n-butyl benzene = 0.010 sec-butyl benzene = 0.0066 1,2-dichlorobenzene = 0.0061 1,2,4-trimethylbenzene = 0.024 1,3,5-trimethylbenzene = 0.0098	--	0.0064	--	--	--
B-23-16.0	16	02/02/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	--	< 0.005	--	--	--
B-24-8.0	8	02/01/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-24-10.0	10	02/01/17	12	70	180	< 0.0050	0.010	0.012	n-butyl benzene = 0.012 sec-butyl benzene = 0.012 chlorobenzene = 0.0069 4-isopropyl toluene = 0.0080 1,2,4-trimethylbenzene = 0.0099	0.032	0.012	fluorene = 0.013 1-methylnaphthalene = 0.021 phenanthrene = 0.037 pyrene = 0.012	--	--
B-24-15.0	15	02/01/17	< 1.0	< 1.0	< 5.0	< 0.0050	0.047	0.14	ND	< 0.010	< 0.010	< 0.010	--	--
B-24-20.0	20	02/01/17	< 1.0	< 1.0	< 5.0	< 0.0050	0.030	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-25-10.0	10	02/02/17	18	33	150	< 0.0050	0.011	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-25-15.5	15.5	02/02/17	2.9	42	170	< 0.0050	0.0074	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-25-20.0	20	02/02/17	< 1.0	< 1.0	< 5.0	< 0.0050	0.0075	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-26-10.0	10	02/02/17	170	1,500	2,800	< 0.10	< 0.10	< 0.10	n-butyl benzene = 0.21 sec-butyl benzene = 0.19 4-isopropyl toluene = 0.17 n-propylbenzene = 0.12 1,2,4-trimethylbenzene = 0.67 1,3,5-methylbenzene = 0.25	0.095	0.25	fluorene = 0.020 1-methylnaphthalene = 0.058	--	--
B-26-15.0	15	02/02/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-27-10.0	10	02/03/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-28-8.0	8	02/03/17	< 1.0	< 1.0	< 5.0	< 0.0050	0.017	< 0.0050	ND	< 0.010	< 0.010	< 0.010	--	--
B-30-10.0	10	02/04/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	< 0.01	< 0.01	ND	--	--
B-31-12.5	12.5	3/29/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	--	--	--	--	--
B-31-15.0	15	3/29/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	--	--	--	--	--
B-32-10.0	10	3/29/17	< 1.0	< 1.0	< 5.0	< 0.5	5.2	0.51	ND	--	--	--	--	--
B-32-12.5	12.5	3/29/17	< 1.0	< 1.0	< 5.0	< 0.020	0.28	0.04	ND	--	--	--	--	--
B-32-15.0	15	3/29/17	< 1.0	< 1.0	< 5.0	< 0.0050	0.011	< 0.0050	ND	--	--	--	--	--
B-32-20.0	20	3/29/17	--	--	--	< 0.0050	< 0.0050	< 0.0050	ND	--	--	--	--	--
B-33-13.5	13.5	3/25/17	1,200	1,100	2,900	4.6	19	< 1.0	1,2-dibromo-3-chloropropane = 0.85 1,2,4-trimethylbenzene = 1.4	0.28	0.14	fluorene = 0.057 1-methylnaphthalene = 0.28 phenanthrene = 0.15	--	--
B-33-17.5	17.5	3/25/17	420	250	810	1.5	4.3	< 0.33	1,2,4-trimethylbenzene = 0.35	0.17	0.081	1-methylnaphthalene = 0.15 phenanthrene = 0.060	--	--
B-33-20.0	20	3/25/17	< 1.0	< 1.0	< 5.0	< 0.0050	0.0098	< 0.0050	ND	< 0.0050	< 0.0050	ND	--	--
B-34-8.0	8	3/29/17	< 1.0	< 1.0	< 5.0	< 0.020	0.39	0.027	ND	--	--	--	--	--
B-34-12.5	12.5	3/29/17	< 1.0	< 1.0	< 5.0	< 0.0050	0.043	0.011	ND	--	--	--	--	--
B-34-15.0	15	3/29/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	--	--	--	--	--
B-35-10.0	10	3/29/17	< 1.0	1.5	6.6	< 0.0050	< 0.0050	< 0.0050	ND	--	--	--	--	--
B-36-2.5	2.5	4/11/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	--	--	--	--	--
B-36-8.0	8	4/11/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	--	--	--	--	--
B-36-12.0	12	4/11/17	< 1.0	< 1.0	< 5.0	< 0.0050	< 0.0050	< 0.0050	ND	--	--	--	--	--
Tier 1 ESL			100	230	5,100	0.42	0.46	0.19	Various	240*	3.3*	Various		

Notes:

- Bold** - Detection exceeds Tier 1 ESL
- mg/kg - milligrams per kilogram
- VOCs - Volatile organic compounds, EPA Method 8260B
- PAHs - Polycyclic aromatic hydrocarbons
- TPHg - Total Petroleum Hydrocarbons as Gasoline, EPA Method 8015B
- TPHd - Total Petroleum Hydrocarbons as Diesel Range, EPA Method 8015B
- TPHmo - Total Petroleum Hydrocarbons as Motor Oil, EPA Method 8015B
- Cis-1,2-DCE - Cis-1,2-dichloroethene
- TCE - Trichloroethene
- PCE - Tetrachloroethene
- < 1.0 - Analyte was not detected above the laboratory reporting limit (1.0 mg/kg)
- ND - Not detected at or above the laboratory reporting limit(s)
- - Sample not analyzed
- Various - Environmental screening levels, where established, vary for each of the multiple compounds analyzed
- * Direct exposure Human Health Risk Level (TableS-1) ESL for Residential Shallow Soil Exposure
- Tier 1 ESLs - San Francisco Bay Regional Water Quality Control Board's Environmental Screening Levels - Tier 1 Soil, February 2016 [Rev. 3]

Table 3
Soil Analytical Results for Metals
3000 Broadway Redevelopment
Oakland, California

Sample ID	Sample Depth	Date Sampled	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	STLC Chromium	Cobalt	Copper	Lead	STLC Lead	TCLP Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
			(mg/kg)																			
B1-1, 3 & B2-1, 3	1, 3	4/1/2016	< 0.50	2.7	120	< 0.50	< 0.25	36	--	4.9	11	7.5	--	0.28	< 0.050	< 0.50	26	< 0.50	< 0.50	< 0.50	30	20
B3-2.5, 5 & B4-2.5, 5	2.5, 5	4/1/2016	2.7	4.5	150	0.5	< 0.25	63	0.1	12	19	270	100	0.28	0.15	2.1	38	< 0.50	< 0.50	< 0.50	34	64
B3-7.5, 10 & B4-7, 10.5	7.5, 10, 10.5	4/1/2016	< 0.50	6.1	140	0.53	< 0.25	44	--	10	19	6.4	--	--	0.05	< 0.50	63	< 0.50	< 0.50	< 0.50	38	44
B3-12.5, 15 & B4-12.5, 15	12.5, 15	4/1/2016	0.52	5.3	290	0.57	< 0.25	54	< 0.1	11	26	19	--	--	< 0.050	0.55	95	< 0.50	< 0.50	< 0.50	42	88
B3-17.5, 20 & B4-17.5, 20	17.5, 20	4/1/2016	< 0.50	3.1	140	0.76	< 0.25	53	< 0.1	12	22	10	--	--	< 0.050	< 0.50	58	< 0.50	< 0.50	< 0.50	43	60
B5-2.5, 5 & B6-2.5, 5	2.5, 5	4/2/2016	< 0.50	4.2	110	< 0.50	< 0.25	52	< 0.1	8.8	14	7.6	--	--	< 0.050	< 0.50	44	< 0.50	< 0.50	< 0.50	38	27
B5-7.5, 10 & B6-7.5, 10	7.5, 10	4/2/2016	0.54	4.6	160	0.62	< 0.25	60	< 0.1	12	27	7.8	--	--	< 0.050	< 0.50	89	< 0.50	< 0.50	< 0.50	47	62
B5-12.5, 15 & B6-12.5, 15	12.5, 15	4/2/2016	< 0.50	2.6	130	0.61	< 0.25	56	< 0.1	12	25	7.1	--	--	0.081	< 0.50	75	< 0.50	< 0.50	< 0.50	40	60
B7-2 & B8-2	2	4/2/2016	< 0.50	3.8	200	1	< 0.25	59	< 0.1	11	23	6.9	--	--	< 0.050	< 0.50	140	< 0.50	< 0.50	< 0.50	41	46
B7-4 & B8-4	4	4/2/2016	< 0.50	4.1	120	0.69	< 0.25	65	< 0.1	7.6	22	6.2	--	--	< 0.050	< 0.50	75	< 0.50	< 0.50	< 0.50	45	47
B7-6 & B8-6	6	4/2/2016	< 0.50	4.3	140	0.60	< 0.25	58	< 0.1	8.6	23	6.7	--	--	< 0.050	< 0.50	70	< 0.50	< 0.50	< 0.50	46	51
B7-8 & B8-8	8	4/2/2016	--	--	--	--	< 0.25	63	< 0.1	--	--	6.6	--	--	--	--	72	--	--	--	--	52
B7-10 & B8-10	10	4/2/2016	< 0.50	2.2	130	< 0.50	< 0.25	52	< 0.1	9.6	18	5.7	--	--	< 0.050	< 0.50	62	< 0.50	< 0.50	< 0.50	37	49
B9-1, 3 & B10-1, 3	1, 3	4/1/2016	< 0.50	5.0	180	0.55	< 0.25	45	--	15	17	7.0	--	--	0.057	< 0.50	47	< 0.50	< 0.50	< 0.50	39	34
B9-5 & B10-5	5	4/1/2016	--	--	--	--	< 0.25	55	< 0.1	--	--	7.4	--	--	--	--	71	--	--	--	--	48
B-16-6	6.0	11/3/16	--	--	--	--	< 0.25	42	--	--	--	6.9	--	--	--	--	50	--	--	--	--	39
B-16-10	10.0	11/3/16	--	--	--	--	< 0.25	31	--	--	--	5.4	--	--	--	--	37	--	--	--	--	37
B-16-20.5	20.5	11/3/16	--	--	--	--	< 0.25	46	--	--	--	7.3	--	--	--	--	46	--	--	--	--	48
B-20,21,25,26-8.0	8	2/1/17	< 0.50	5.0	140	0.54	< 0.25	45		11	20	6.6			< 0.050	< 0.50	68	< 0.50	< 0.50	< 0.50	36	46
	8	2/2/17																				
	8	2/2/17																				
	8	2/2/17																				
Tier 1 ESL			31	0.067	3,000	42.0	39	NE	NE	23	3,100	80	NE	NE	13	390	86	390	390	0.8	390	23,000
Background [Metal] in Bay Area Soils*			1.5-7.1	1.2-31	41-411	0.29-1.1	0.27-3.3	10-142	NE	6.5-25.5	5.4-100	4.8-65	NE	NE	0.07-0.6	0.33-11.4	16-144	< 0.25-7	0.2-2.2	< 0.25-42.5	22-90	33-282

Notes:
Bolded values exceed the Tier 1 ESL
 mg/kg - milligrams per kilogram
 mg/L - milligrams per liter
 < 0.25 - Analyte was not detected above the laboratory reporting limit (0.25 mg/kg)
 -- - Sample not analyzed
 TTLC - California Total Threshold Limit Concentration - State hazardous waste criterion
 STLC - California Soluble Threshold Limit Concentration
 TCLP - Federal Toxicity Characteristic Leaching Procedure
 *Background concentration ranges of metals in Bay Area soils, Appendix A, Table A-2 from Environmental Resources Management. *Feasibility Study, Hookston Station, Pleasant Hill, California.* July 2006
 Tier 1 ESLs - San Francisco Bay Regional Water Quality Control Board's Environmental Screening Levels - *Tier 1 Soil.* February 2016 [Rev. 3]

Table 4
Groundwater Analytical Results for Metals
3000 Broadway Redevelopment
Oakland, California

Sample ID	Date Sampled	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
		(µg/L)																	
GW-1	04/05/17	< 0.50	3.1	55	< 0.50	< 0.25	3.1	0.65	< 2.0	280	< 0.50	< 0.050	0.59	3.1	< 0.50	< 0.19	< 0.50	4.7	< 15
GW-2	04/05/17	< 0.50	4.1	22	< 0.50	< 0.25	3.5	< 0.50	< 2.0	74	< 0.50	< 0.050	2.1	1.6	0.83	< 0.19	< 0.50	4.8	< 15
Tier 1 ESL		6.0	10	1000	2.7	0.25	50	3.0	3.1	NE	2.5	0.051	100	8.2	5.0	0.19	2.0	19	81

Notes:

µg/L - Micrograms per liter

< 0.50 - Analyte was not detected above the laboratory reporting limit (0.50 µg/L)

Tier 1 ESLs - San Francisco Bay Regional Water Quality Control Board's Environmental Screening Levels - *Tier 1 Groundwater*. February 2016 [Rev. 3]

Table 5
Soil Vapor Analytical Results for VOCs
3000 Broadway Redevelopment
Oakland, California

Sample ID	Date Sampled	Depth	Acetone	Benzene	2-Butanone (MEK)	Chloroform	cis- 1,2-DCE	Ethylbenzene	Naphthalene	Toluene	TCE	1,2,4-Trimethylbenzene	PCE	Vinyl Chloride	Xylenes	All Other VOCs	Methane	Helium
		(feet)																
SV-1	04/11/17	5.0	46.8	22.6	14.0	< 4.88	< 3.97	< 4.34	< 5.24	22.5	< 5.37	< 4.92	< 6.78	< 2.56	< 8.68	ND	0.00239	< 0.100
SV-2	04/11/17	5.0	44.3	18.2	13.3	< 4.88	41.0	6.17	< 5.24	26.5	98.3	9.14	< 6.78	< 2.56	25.22	ND	0.00366	< 0.150
Tier 1 ESLs			15,000,000	48	2,600,000	61	4,200	560	41	160,000	240	NE	240	4.7	52,000	Various	1.25*	--

Notes:

MEK - Methyl ethyl ketone

VOCs - Volatile organic compounds

Cis-1,2-DCE - Cis-1,2-dichloroethene

TCE - Trichloroethene

PCE - Tetrachloroethene

$\mu\text{g}/\text{m}^3$ - Micrograms per cubic meter

%v - Percent by volume

< 4.88 - Analyte was not detected above the laboratory reporting limit ($4.88 \mu\text{g}/\text{m}^3$)

NE - Environmental screening level not established

Various - Analysis of multiple compounds with various Tier 1 ESLs

* - No Tier 1 ESL for methane. 5% is the Lower Explosive Limit (LEL) for methane and 25% of the LEL is standard for the comparison of analytical data (1.25%)

-- - Not applicable

Tier 1 ESLs - RWQCB Environmental Sub-slab and Soil Gas Screening Levels based on a generic conceptual site model designed for use at most sites. The Tier 1 ESL summary table is generally derived from the most conservative ESL for each compound (February 2016 [Rev.3])

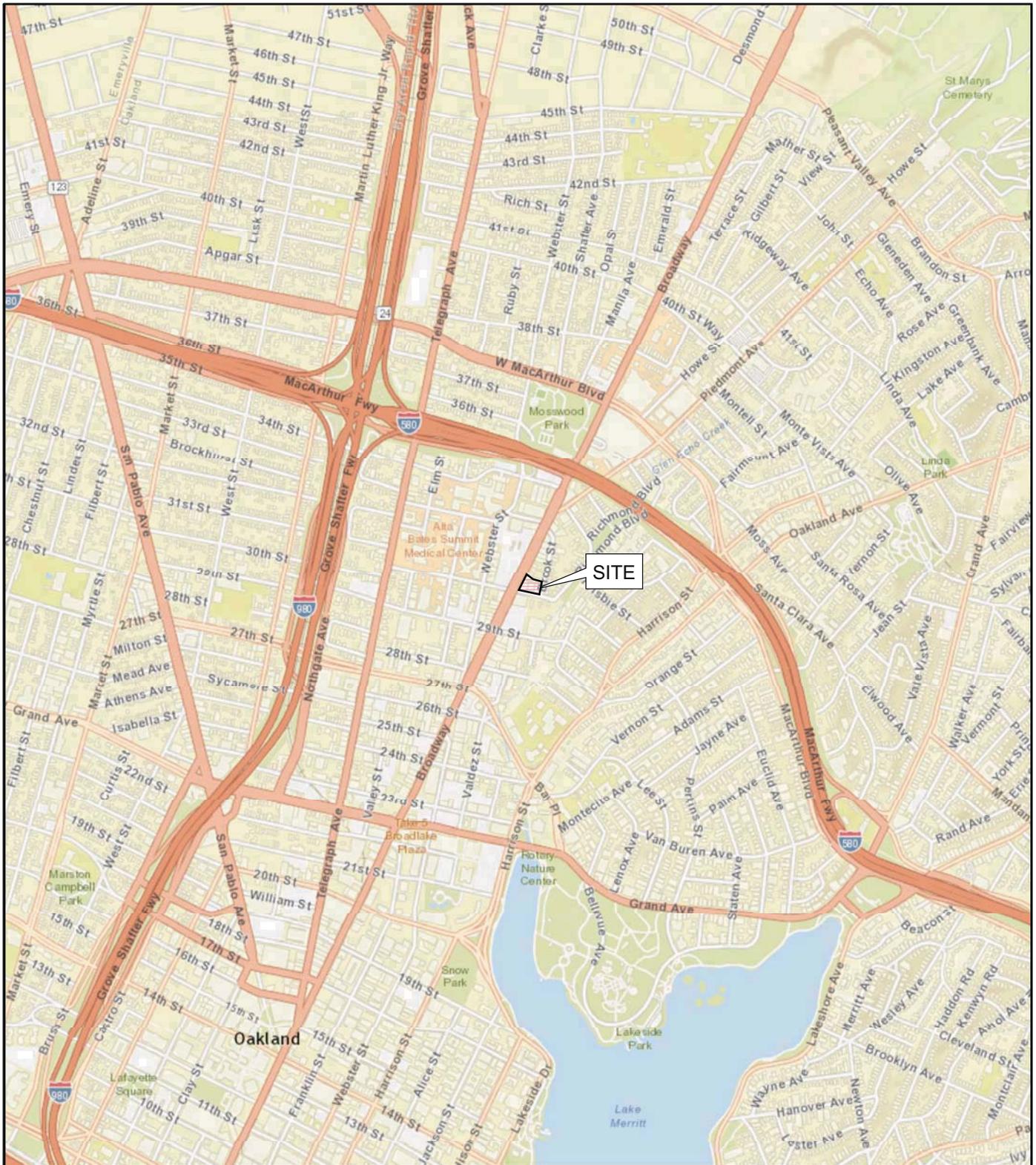
Table 6
Screening of Groundwater Remediation Technologies
3000 Broadway Development
Oakland, California

	Remedial Action/Technology	Technology Description	Technical Effectiveness	Implementability	Remediation Timeframe	Relative Cost
1	No Action	No action will be taken.	Low Included for comparison purposes only	High No actions are required that would affect site access, public safety or require feasibility	Long Not applicable as no action will be taken.	Vey Low Not applicable as no action will be taken.
2	Monitored Natural Attenuation (MNA)	Groundwater monitoring to verify the progress of natural attenuation processes that can reduce groundwater chlorinated VOCs, TCE, cis-1,2-DCE and VC in particular.	Low to Medium This approach will monitor the degradation of VOCs due to naturally occurring physical, chemical and biological processes.	Medium Groundwater monitoring is required. Long-term groundwater monitoring wells will need to be installed. It is assumed that associated wells will be sampled, quarterly for two years, semi-annually for next three years and annually for the following five years.	Long Remediation timeframe is long as natural attenuation processes are usually less rapid.	Low Costs include installation of groundwater monitoring well network, periodic monitoring and reporting.
3	Air Sparging with Soil Vapor Extraction (AS/SVE)	An in-situ technology, involves Injection of air through the saturated zone to enable phase transfer of VOCs from dissolved state to vapor phase. Vapor phase VOCs are then removed by soil vapor extraction.	Low to Medium This technology is unlikely to meet the remedial goals. Injection of air in the subsurface will decrease the rate of naturally occurring reductive dechlorination processes. Air Sparging alone is unlikely to be effective as the subsurface has clayey soils and therefore will reduce the effectiveness of air sparging by limiting the radius of influence.	Low A pilot study would first need to be conducted to evaluate the technical effectiveness of this alternative; however, air sparging may not be feasible in the subsurface clayey soils. This technology may significantly affect the design and cost of the proposed development plan and construction schedule.	Medium The pilot study may require six months to be completed. After the pilot study is completed, air sparging will be needed with monitoring and management.	Medium Costs includes a pilot study, work plan, installation of AS/SVE, chimney and vapor monitoring wells, two years of operation and maintenance.
4	Enhanced Anaerobic Bioremediation	An in-situ technology, involves injection electron donor into the subsurface to accelerate reductive dechlorination of TCE, cis-1,2-DCE and VC into innocuous end products. Bioremediation could be enhanced by injection of a microbial culture to increase populations of naturally occurring microbes in the subsurface (i.e. bioaugmentation). Commercially available bioaugmentation culture would be used along with emulsified vegetable oil (EVO) as an electron donor. To address petroleum hydrocarbon contamination, oxygen may be injected during (to promote cometabolism) or after enhanced bioremediation.	Medium to High Amendment with an electron donor and an appropriate microbial culture will enhance the rate of TCE, cis-1,2-DCE and VC degradation and will specifically target the conversion of TCE to cis-1,2-DCE, which is usually a rate limiting step in the naturally occurring reductive dechlorination. The rapid influx of electron donor and microbial population will boost the VOC degradation rate. It is highly likely that this technology can meet and exceed the remedial goals and will continue to be effective in the long-term as the microbial culture will continue to grow in the subsurface, and because EVO is a slowly degradable electron donor. If oxygen is injected during enhanced bioremediation, the petroleum hydrocarbon degradation process will produce an enzyme that will oxidize chlorinated solvents.	Medium Microbial culture and diluted EVO (solution will be a consistency similar to water) can be injected in the native soil using DPT. High injection pressures may be required as the subsurface has clayey soils, thus affecting the implementation time frame and costs.	Medium At least one injection event followed by monitoring and management will be required.	Medium Costs includes work plan, installation of monitoring wells, one injection event, and on-going, periodic performance monitoring.
5	In-situ Chemical Oxidation	Injection of a strongly oxidizing reagent to chemically react with contaminants, breaking them down into innocuous byproducts. Potential reagents include Fenton's reagent (hydrogen peroxide with an iron catalyst), activated persulfate, sodium or potassium permanganate and ozone.	Medium to High Chemical oxidation will effectively transform contaminants into innocuous products, when contact is made between the oxidant and the contaminant. The effectiveness of contact can be limited by soil heterogeneity, because injected oxidant will tend to flow into the coarse-grained sediments and bypass fine-grained sediments. Such limitations will impact short-lived oxidants (such as hydrogen peroxide) more than long-lived oxidants (such as permanganate). Multiple injections of oxidants may be required for full remediation, due to rebound of contaminants in areas where contact did not occur.	Medium This technology requires direct push injection of oxidant reagents. Oxidants can also be applied by soil mixing, although some earthwork may be required for the soil mixer to reach the desired depth. Heavy equipment would be on-site during injection or soil mixing events. Site development and future land use would be disrupted if multiple injection events are required. High injection pressures may be required as the subsurface has clayey soils, thus affecting the implementation time frame and costs. Surfacing of the reagents may occur and will require special containment measures as the oxidant can cause a health and safety hazard. In addition, the heat and gas generation associated with many of the commonly-used oxidants can also present a health and safety hazard.	Short Oxidant injection events can be performed in a matter of weeks or months, however several rounds of injections events may be required and spaced months apart. Periodic monitoring and management may be required.	High Costs include direct push injection or soil mixing equipment, oxidant reagent and monitoring over the course of several injection events.
6	Zero Valent Iron (ZVI)	Involves the injection of ZVI and electron donor in the subsurface for chemical and induced biological reduction of chlorinated VOCs. The decrease in oxidation reduction potential and presence of electron donor can enhance microbial reductive dechlorination of chlorinated VOCs.	Medium to High ZVI can effectively meet and exceed the remedial goals for VOCs.	Medium Injections would be performed through pneumatic fracturing or direct soil mixing. High injection pressures and longer injection time may be required as the subsurface has intermittent clay layers, thus affecting the implementation time frame and costs. Fracturing if required may significantly increase the cost of implementation.	Short At least one injection/mixing event will be required. Periodic groundwater monitoring and management will be required after injection events are completed.	High Costs includes work plan, installation of injection wells, one monitoring event, and performance monitoring.

Notes:
MNA - Monitored natural attenuation
cis-1,2-DCE - Cis-1,2-dichloroethene
TCE - Trichloroethene
VC - Vinyl chloride

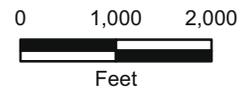
DPT - Direct push technology
EVO - emulsified vegetable oil
As/SVE - Air sparging /soil vapor extraction
VOCs - volatile organic compounds
ZVI - Zero valent iron

FIGURES



NOTES:

World street basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online.
Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, IPC, NRCAN.



3000 BROADWAY REDEVELOPMENT
260 30TH STREET
 Oakland, California

SITE LOCATION MAP

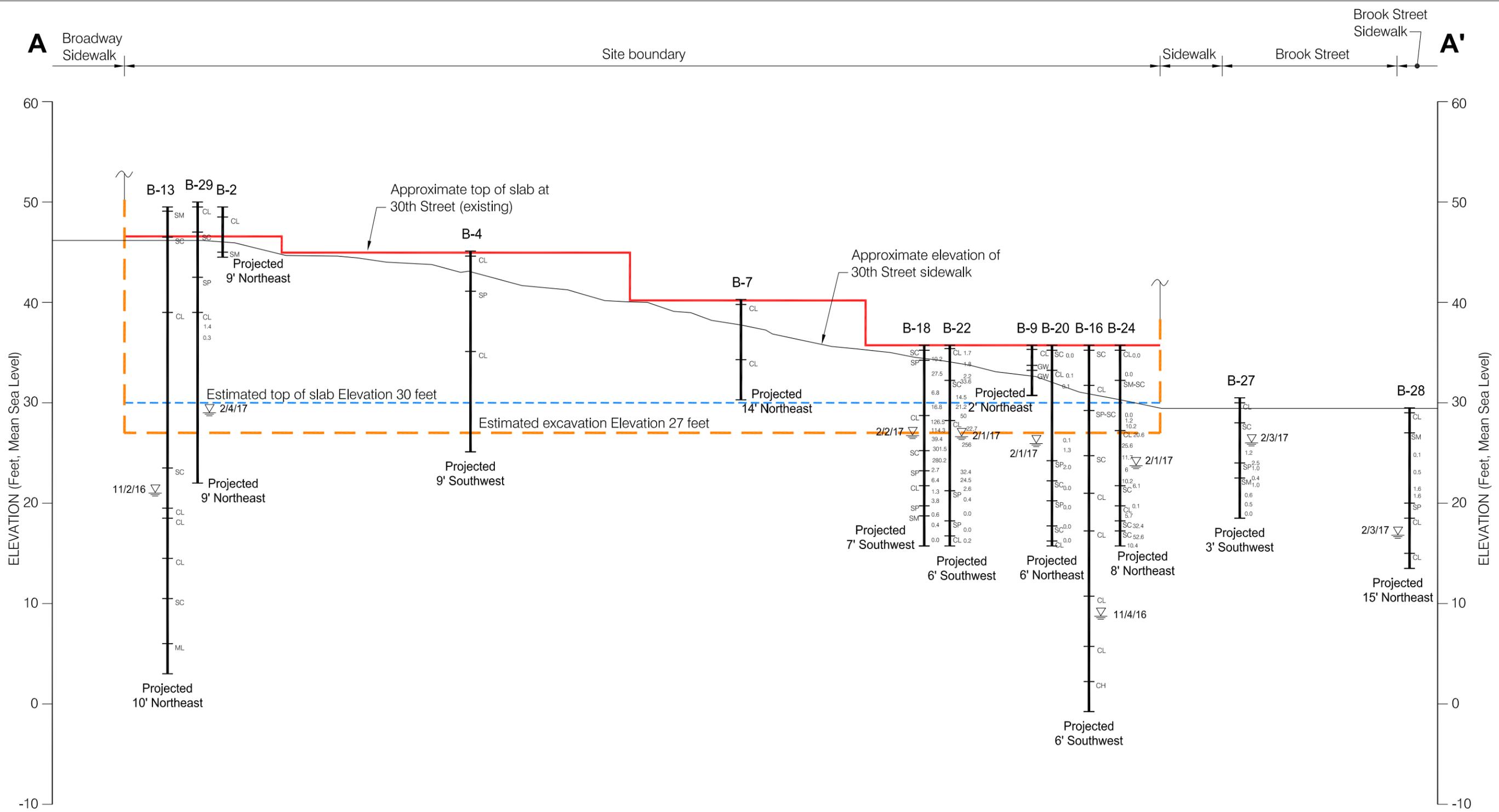
LANGAN

Date 02/08/17

Project No. 750635602

Figure 1

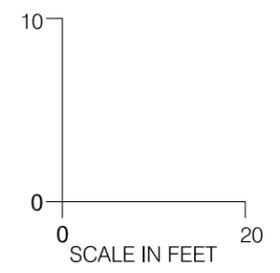
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EXPLANATION

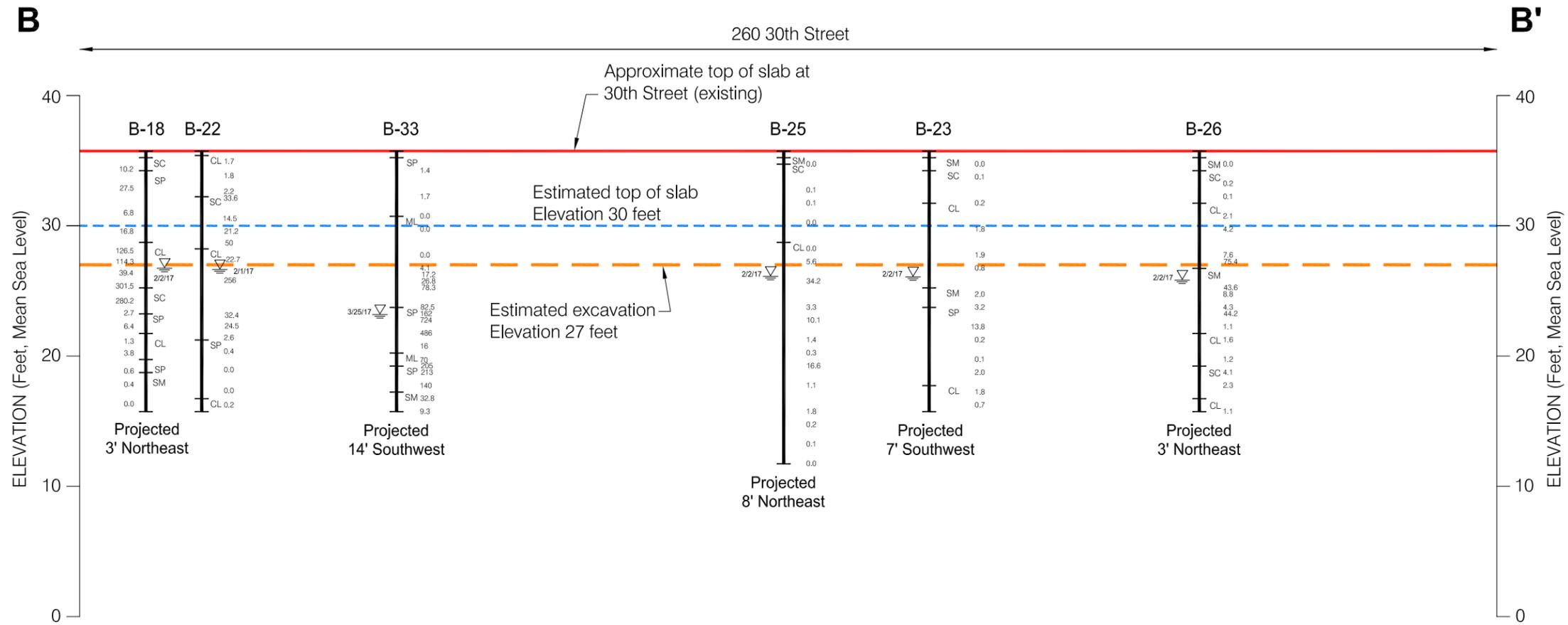
10.2 PID measurement in parts per million (ppm)

Notes:
 1. The above profile represents a generalized soil cross section interpreted from widely spaced borings. Soil deposits may vary in type, strength, and other important properties between points of exploration. All elevations are approximate.



3000 BROADWAY REDEVELOPMENT Oakland, California		
IDEALIZED SUBSURFACE PROFILE A-A'		
Date 04/24/17	Project No. 750635603	Figure 3
LANGAN		

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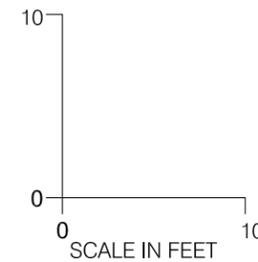


EXPLANATION

10.2 PID measurement in parts per million (ppm)

Notes:

1. The above profile represents a generalized soil cross section interpreted from widely spaced borings. Soil deposits may vary in type, strength, and other important properties between points of exploration. All elevations are approximate.



3000 BROADWAY REDEVELOPMENT Oakland, California		
IDEALIZED SUBSURFACE PROFILE B-B'		
Date 04/24/17	Project No. 750635603	Figure 4
LANGAN		

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Sample ID - Depth (ft bgs)	B-18-10	B-18-15	B-18-20
Date	2/2/2017	2/2/2017	2/2/2017
Chemical Name	Matrix / Units	Soil / mg/kg	
TPH gasoline	< 1.0	< 1.0	< 1.0
TPH diesel	< 1.0	< 1.0	< 1.0
TPH motor oil	< 5.0	< 5.0	< 5.0
PCE	< 1.0	<0.005	<0.005
TCE	6.4	0.025	<0.005
Cis-1,2-DCE	1.1	0.0063	<0.005

Sample ID - Depth (ft bgs)	B-21-10
Date	2/2/2017
Chemical Name	Matrix / Units
TPH gasoline	< 1.0
TPH diesel	< 1.0
TPH motor oil	< 5.0
PCE	<0.025
TCE	0.50
Cis-1,2-DCE	0.065

Sample ID - Depth (ft bgs)	B-19-10
Date	2/1/2017
Chemical Name	Matrix / Units
TPH gasoline	< 1.0
TPH diesel	< 1.0
TPH motor oil	< 5.0
PCE	< 0.005
TCE	< 0.005
Cis-1,2-DCE	< 0.005

Sample ID - Depth (ft bgs)	B-16-6	B-16-10	B-16-20.5
Date	11/3/2016	11/3/2016	11/3/2016
Chemical Name	Matrix / Units	Soil / mg/kg	
TPH gasoline	810	460	15
TPH diesel	2,900	1,600	100
TPH motor oil	6,100	3,600	100
PCE	2.0	0.059	0.013
TCE	< 0.20	0.29	0.017
Cis-1,2-DCE	< 0.20	0.29	< 0.005

Sample ID - Depth (ft bgs)	B-27-10
Date	2/3/2017
Chemical Name	Matrix / Units
TPH gasoline	<1.0
TPH diesel	<1.0
TPH motor oil	<5.0
PCE	<0.005
TCE	<0.005
Cis-1,2-DCE	<0.005

Sample ID - Depth (ft bgs)	B-17-10
Date	2/3/2017
Chemical Name	Matrix / Units
TPH gasoline	< 1.0
TPH diesel	< 1.0
TPH motor oil	< 5.0
PCE	< 0.005
TCE	< 0.005
Cis-1,2-DCE	< 0.005

Sample ID - Depth (ft bgs)	B-30-10
Date	2/4/2017
Chemical Name	Matrix / Units
TPH gasoline	<1.0
TPH diesel	<1.0
TPH motor oil	<5.0
PCE	<0.005
TCE	<0.005
Cis-1,2-DCE	<0.005

Sample ID - Depth (ft bgs)	B-24-8	B-24-10	B-24-15	B-24-20
Date	2/1/2017	2/1/2017	2/1/2017	2/1/2017
Chemical Name	Matrix / Units	Soil / mg/kg		
TPH gasoline	< 1.0	12	< 1.0	< 1.0
TPH diesel	< 1.0	70	< 1.0	< 1.0
TPH motor oil	< 5.0	180	< 5.0	< 5.0
PCE	<0.005	<0.005	<0.005	<0.005
TCE	<0.005	0.010	0.047	0.030
Cis-1,2-DCE	<0.005	0.012	0.14	<0.005

Sample ID - Depth (ft bgs)	B-28-8
Date	2/3/2017
Chemical Name	Matrix / Units
TPH gasoline	<1.0
TPH diesel	<1.0
TPH motor oil	<5.0
PCE	<0.005
TCE	0.017
Cis-1,2-DCE	<0.005

Sample ID - Depth (ft bgs)	B-23-10	B-23-12.5	B-23-16
Date	2/2/2017	2/2/2017	2/2/2017
Chemical Name	Matrix / Units	Soil / mg/kg	
TPH gasoline	<1.0	20	<1.0
TPH diesel	<1.0	8.1	<1.0
TPH motor oil	<5.0	25	<5.0
PCE	<0.005	<0.005	<0.005
TCE	<0.005	<0.005	<0.005
Cis-1,2-DCE	<0.005	<0.005	<0.005

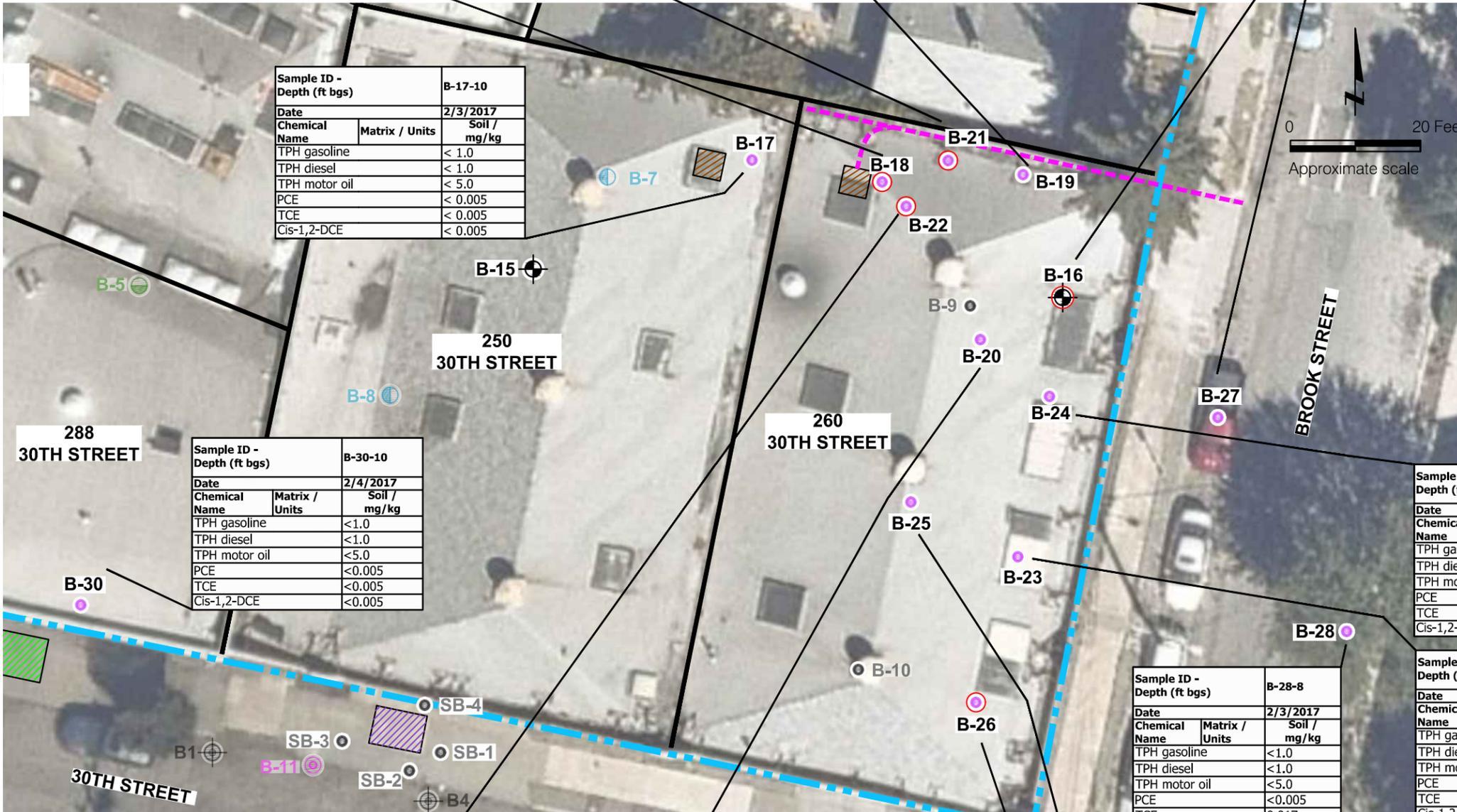
Sample ID - Depth (ft bgs)	B-22-10	B-22-15	B-22-20
Date	2/1/2017	2/1/2017	2/1/2017
Chemical Name	Matrix / Units	Soil / mg/kg	
TPH gasoline	< 1.0	< 1.0	< 1.0
TPH diesel	< 1.0	< 1.0	< 1.0
TPH motor oil	< 5.0	< 5.0	< 5.0
PCE	<0.33	< 0.005	< 0.005
TCE	5.0	< 0.005	< 0.005
Cis-1,2-DCE	0.81	< 0.005	< 0.005

Sample ID - Depth (ft bgs)	B-20-10
Date	2/1/2017
Chemical Name	Matrix / Units
TPH gasoline	< 1.0
TPH diesel	< 1.0
TPH motor oil	< 5.0
PCE	< 0.01
TCE	0.21
Cis-1,2-DCE	0.011

Sample ID - Depth (ft bgs)	B-26-10	B-26-15
Date	2/2/2017	2/2/2017
Chemical Name	Matrix / Units	Soil / mg/kg
TPH gasoline	170	<1.0
TPH diesel	1,500	<1.0
TPH motor oil	2,800	<5.0
PCE	<0.10	<0.005
TCE	<0.10	<0.005
Cis-1,2-DCE	<0.10	<0.005

Sample ID - Depth (ft bgs)	B-25-10	B-25-15.5	B-25-20
Date	2/2/2017	2/2/2017	2/2/2017
Chemical Name	Matrix / Units	Soil / mg/kg	
TPH gasoline	18	3	<1.0
TPH diesel	33	42	<1.0
TPH motor oil	150	170	<5.0
PCE	<0.005	<0.005	<0.005
TCE	0.011	0.0074	0.0075
Cis-1,2-DCE	<0.005	<0.005	<0.005

- EXPLANATION**
- B-18 ○ Approximate location of environmental boring by Langan, February 2017
 - B-13 ⊕ Approximate location of geotechnical boring by Langan, November 2016
 - B-1 ○ Approximate location of 5-foot boring by Langan Treadwell Rollo, April 2016
 - B-11 ⊕ Approximate location of 20-foot boring by Langan Treadwell Rollo, April 2016
 - B-5 ⊕ Approximate location of 15-foot boring by Langan Treadwell Rollo, April 2016
 - B-7 ⊕ Approximate location of 10-foot boring by Langan Treadwell Rollo, April 2016
 - B1 ⊕ Approximate location of boring by P&D Environmental, Inc., September 2014
 - SB-1 ○ Approximate location of boring by Faultline Associates, Inc., March 1997
 - Approximate location of abandoned in-place 1,000-gallon waste oil UST, March 1997
 - Approximate location of former USTs (350-gallon gasoline and 1,000-gallon diesel), removed in July 1992
 - Approximate location of floor drain
 - Approximate footprint of proposed 3000 Broadway Redevelopment
 - Approximate location of drain line piping
 - 6.4 Sample concentration in exceedance of Tier 1 ESLS
 - Sample location in exceedance of Tier 1 Environmental screening wells (ESLS) as established by the San Francisco Regional Water Quality Control Board (RWQCB) in February 2016.



3000 BROADWAY REDEVELOPMENT
260 30TH STREET
 Oakland, California

SITE PLAN WITH SOIL EXCEEDANCES

Date 04/24/17 | Project No. 750635602 | Figure 5

LANGAN

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Sample ID - Depth (ft bgs)			B-17-GW
Date			2/3/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		<50	
TPH diesel		<50	
TPH motor oil		<250	
PCE		0.58	
TCE		3.5	
Cis-1,2-DCE		2.7	

Sample ID - Depth (ft bgs)			B-18-GW
Date			2/2/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		55	
TPH diesel		200	
TPH motor oil		1,200	
PCE		<100	
TCE		2,000	
Cis-1,2-DCE		350	

Sample ID - Depth (ft bgs)			B-21-GW
Date			2/2/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		<50	
TPH diesel		<100	
TPH motor oil		510	
PCE		<5.0	
TCE		170	
Cis-1,2-DCE		19	

Sample ID - Depth (ft bgs)			B-19-GW
Date			2/2/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		<50	
TPH diesel		<100	
TPH motor oil		630	
PCE		<1.2	
TCE		41	
Cis-1,2-DCE		5	

Sample ID - Depth (ft bgs)			GW-1
Date			4/5/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		67	
TPH diesel		<50	
TPH motor oil		<250	
PCE		<25	
TCE		1,200.0	
Cis-1,2-DCE		170.0	

Sample ID - Depth (ft bgs)			GW-2
Date			4/5/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		130	
TPH diesel		56	
TPH motor oil		<250	
PCE		<50	
TCE		2,400.0	
Cis-1,2-DCE		300.0	

Sample ID - Depth (ft bgs)			GGW-2
Date			3/30/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		<50	
TPH diesel		150	
TPH motor oil		420	
PCE		<0.5	
TCE		5.2	
Cis-1,2-DCE		<0.5	

Sample ID - Depth (ft bgs)			B-27-GW
Date			2/3/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		59	
TPH diesel		<100	
TPH motor oil		540	
PCE		<1.7	
TCE		48	
Cis-1,2-DCE		4.8	

Sample ID - Depth (ft bgs)			B-28-GW
Date			2/3/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		<50	
TPH diesel		<100	
TPH motor oil		960	
PCE		<10	
TCE		230	
Cis-1,2-DCE		37	

Sample ID - Depth (ft bgs)			B-24-GW
Date			2/2/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		1,400	
TPH diesel		250,000	
TPH motor oil		500,000	
PCE		<50	
TCE		590	
Cis-1,2-DCE		1,600	

Sample ID - Depth (ft bgs)			B-22-GW
Date			2/2/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		120	
TPH diesel		<100	
TPH motor oil		680	
PCE		<120	
TCE		6,100	
Cis-1,2-DCE		2,200	

Sample ID - Depth (ft bgs)			B-31-GW
Date			3/29/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		<50	
TPH diesel		110	
TPH motor oil		870	
PCE		<1.7	
TCE		68.0	
Cis-1,2-DCE		72.0	

Sample ID - Depth (ft bgs)			B-34-GW
Date			3/29/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		<50	
TPH diesel		140	
TPH motor oil		700	
PCE		<2.5	
TCE		160.0	
Cis-1,2-DCE		26.0	

Sample ID - Depth (ft bgs)			B-20-GW
Date			2/2/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		75	
TPH diesel		2,400	
TPH motor oil		8,600	
PCE		<120	
TCE		4,700	
Cis-1,2-DCE		460	

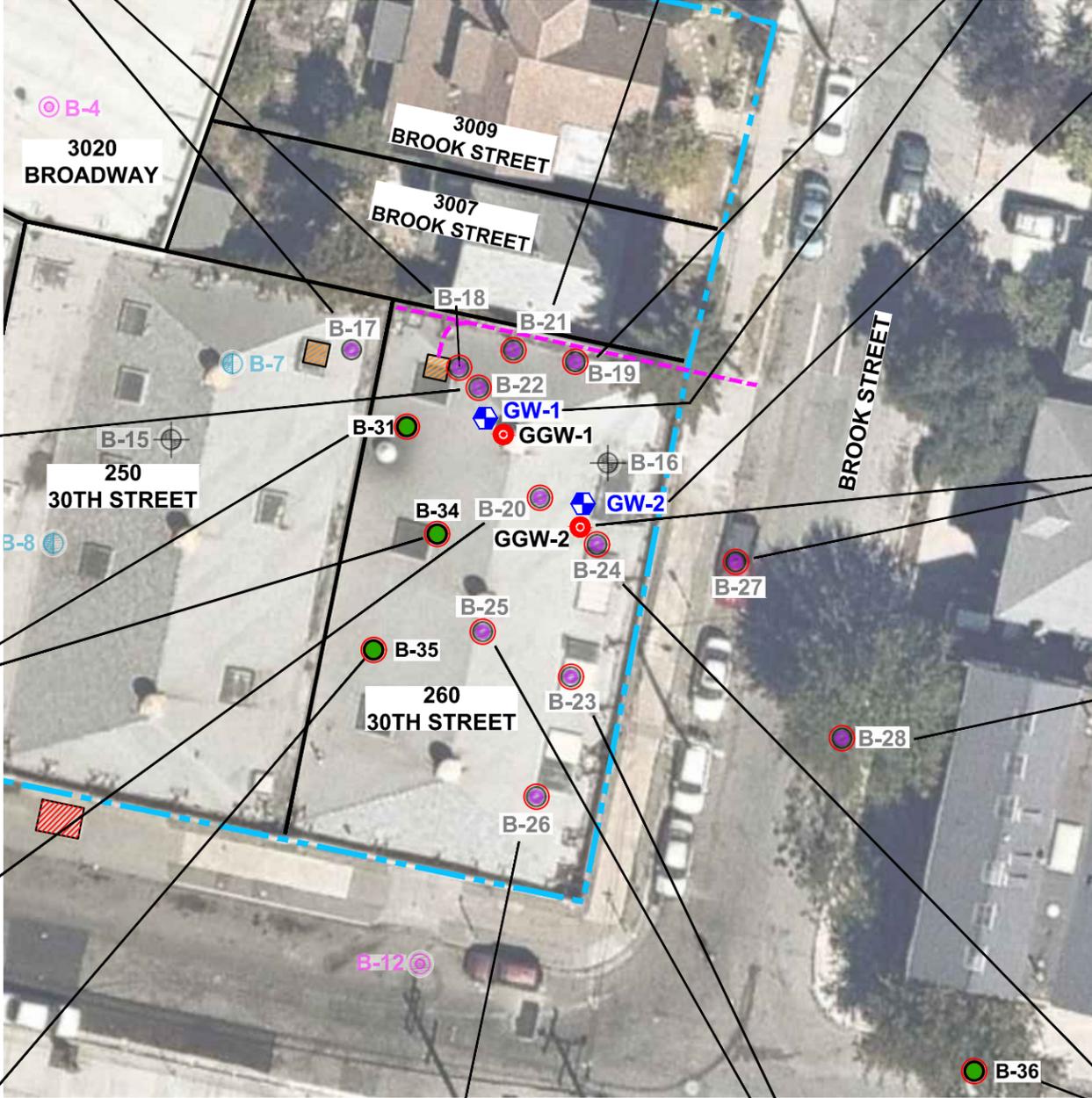
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Date			3/29/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		<50	
TPH diesel		140	
TPH motor oil		1,100	
PCE		<0.5	
TCE		4.3	
Cis-1,2-DCE		1.0	

Sample ID - Depth (ft bgs)			B-26-GW
Date			2/3/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		110	
TPH diesel		770	
TPH motor oil		1,300	
PCE		<2.5	
TCE		63	
Cis-1,2-DCE		20	

Sample ID - Depth (ft bgs)			B-25-GW
Date			2/3/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		66	
TPH diesel		5,100	
TPH motor oil		18,000	
PCE		<5.0	
TCE		210	
Cis-1,2-DCE		29	

Sample ID - Depth (ft bgs)			B-23-GW
Date			2/3/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		250	
TPH diesel		40,000	
TPH motor oil		110,000	
PCE		<12	
TCE		470	
Cis-1,2-DCE		210	

Sample ID - Depth (ft bgs)			B-36-GW
Date			4/11/2017
Chemical Name	Matrix / Units	Groundwater / µg/L	
TPH gasoline		<50	
TPH diesel		120	
TPH motor oil		580	
PCE		<0.5	
TCE		28.0	
Cis-1,2-DCE		4.7	



- EXPLANATION**
- GGW-1** ○ Approximate location of deep grab groundwater sample by Langan, March 2017
 - GW-1** ⊕ Approximate location of groundwater monitoring well
 - B-31** ● Approximate location of soil and/or groundwater boring by Langan, March and April 2017
 - B-17** ⊕ Approximate location of environmental boring by Langan, February 2017
 - B-15** ⊕ Approximate location of geotechnical boring by Langan, November 2016
 - B-4** ⊕ Approximate location of 20-foot boring by Langan Treadwell Rollo, April 2016
 - B-7** ⊕ Approximate location of 10-foot boring by Langan Treadwell Rollo, April 2016
 - Approximate location of abandoned in-place 1,000-gallon waste oil UST, March 1997
 - Approximate location of floor drain
 - Sample concentration in exceedance of Tier 1 ESLS
 - Sample location in exceedance of Tier 1 Environmental screening wells (ESLS) as established by the San Francisco Regional Water Quality Control Board (RWQCB) in February 2016.
 - Approximate footprint of proposed 3000 Broadway Redevelopment
 - Approximate location of drain line piping

3000 BROADWAY REDEVELOPMENT
Oakland, California

**SITE PLAN WITH
GROUNDWATER EXCEEDANCES**

Date 05/03/17 Project No. 750635603 Figure 6

LANGAN

APPENDIX A
MEMBRANE INTERFACE PROBE DATA REPORT



GREGG DRILLING & TESTING, INC.

GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

March 29, 2017

Langan Treadwell Rollo
Attn: Joshua Graber

Subject: High Resolution Site Characterization (HRSC) Investigation
3000 Broadway
Oakland, California
GREGG Project Number: D2170127

Dear Mr. Graber:

The following report presents the results of Gregg Drilling and Testing's High Resolution test investigation for the above referenced site. The following testing services were performed:

1	Membrane Interface Probe	(MIP)	<input checked="" type="checkbox"/>
2	Hydraulic Profiling Tool	(HPT)	<input checked="" type="checkbox"/>
3	Soil Sampling	(SS)	<input checked="" type="checkbox"/>

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact our office at (562) 427-6899.

Sincerely,

GREGG Drilling & Testing, Inc.


Frank Stolfi
HRSC Division Manager



Mary Walden
Operations Manager



GREGG DRILLING & TESTING, INC.

GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

HRSC Boring Summary

Table 1

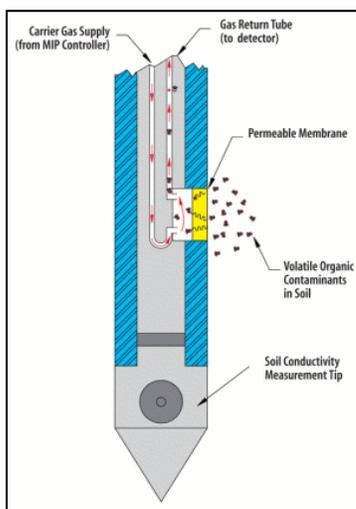
Boring Identification	Date	Termination Depth (feet)	Depth of Groundwater Samples (feet)	Depth of Soil Samples (feet)	Depth of Pore Pressure Dissipation Test (feet)
MIP-1	3/25/17	23.35	-	-	-
MIP-2	3/25/17	24.35	-	-	-
MIP-3	3/25/17	24.10	-	-	-
MIP-4	3/25/17	21.95	-	-	-
B-33	3/25/17	20.00	-	0'-20'	-

Membrane Interface Probe

System Overview:

The MIP is a direct push tool that produces continuous chemical and physical logs of the vadose and saturated zones. The system detects VOCs in-situ and shows where the contaminants occur relative to the geologic and hydrologic units. Vertical profiles, transects, 3D images and maps can all be produced from the electronic data generated by the MIP logs. The unique capability of providing reliable, real-time information allows for informed and timely decision making in the field.

The MIP is a downhole tool that heats the soil and groundwater adjacent to the probe to 120 degrees Celsius. This increases volatility and the vapor phase diffuses across a membrane into a closed, inert gas loop that carries these vapors to a series of detectors housed at the surface. Continuous chemical logs or profiles are generated from each hole. Soil conductivity is also measured and these logs can be compared to chemical logs to better understand where the VOCs occur. The MIP technology is only appropriate for volatile organic compounds (VOCs). The gas stream can be analyzed with multiple detectors; for example an XSD detector is used to detect chlorinated solvents, a photo-ionization detector is used to detect petroleum hydrocarbons, and a flame ionization detector is used to detect methane.



Detector Overview:

- XSD – The Halogen Specific Detector converts compounds containing halogens to their oxidation products and free halogen atoms by oxidative pyrolysis. These halogen atoms are adsorbed onto the activated platinum surface of the detector probe assembly resulting in an increase thermionic emission. This emission current provides a corresponding voltage that is measured via an electrometer circuit in the detector controller.
- PID – Photo Ionization Detector sample stream flows through the detector's reaction chamber where it is continuously irradiated with high energy ultraviolet light. When compounds are present that have a lower ionization potential than that of the irradiation energy (10 electron volts with standard lamp) they are ionized. The ions formed are collected in an electrical field,

producing an ion current that is proportional to compound concentration. The ion current is amplified and output by the gas chromatograph's electrometer.

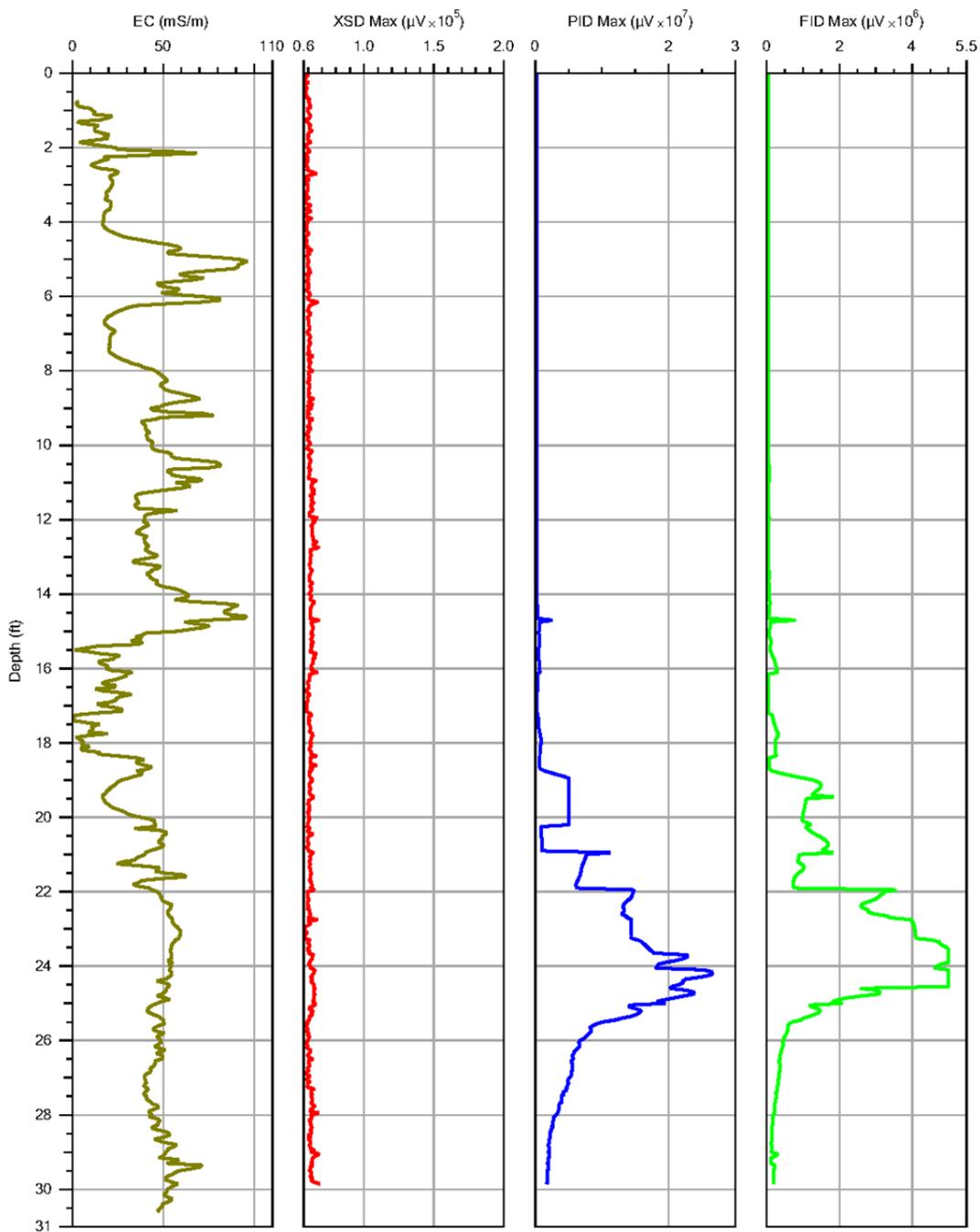
- FID – Flame Ionization Detector consists of a hydrogen/air flame and a collector plate. The effluent from the GC (trunk line) passes through the flame, which breaks down organic molecules and produces ions. The ions are collected on a biased electrode and produce an electric signal.

Data Collected:

- Depth - Data is collected from twenty data points per foot. 0.05', 0.10', 0.15', etc...
- Electrical Conductivity - Electrical Conductivity data is measured/collected in milli-siemens per Meter (ms/M). The conductivity of soils is different for each type of media. Finer grained sediments, such as silts or clays, will have a higher EC signal. While coarser grained sediments, sands and gravel, will have a lower EC signal. The coarser grained sediments will allow the migration of contaminants and the finer grained sediments will trap the contaminant.
- Speed/Advancement Rate - Speed data is measured/collected in feet per minute (ft/min). Speed is an indication of the physical advancement rate of the MIP probe. Speed of the MIP probe can vary due to operator advancement and dense soil types. Speed log can provide soil type information which can be correlated with electrical conductivity. Lower advancement speeds are correlated with lower conductivity and larger grained soils that are most likely associated with dense or compacted sands.
- Temperature - Temperature data is measured/collected in Degrees Celsius. Temperature is an indication of the physical temperature of the MIP block. Minimum and Maximum temperature is collected at each vertical interval. Gregg Drilling's temperature protocol indicates that the MIP probe shall maintain a minimum temperature of 75 Degrees Celsius.
- Pressure - Pressure data is measured/collected in PSI. Pressure is an indication of the internal pressure of the nitrogen lines located within the trunk line and the pressure behind the membrane. Gregg Drilling's protocol indicates that the MIP probe pressure shall not exceed 1.5 PSI difference from baseline.
- Detector (XSD, PID, FID) - Detector responses are measured/collected in micro Volts (uV). Detector responses are an indication of relative contaminant responses. Minimum and Maximum detector responses are collected at each vertical interval.



MIP Boring Example



Company: Gregg Drilling and Testing	Operator: M. Sullivan	File:
Project ID:	Client:	Date:
		Location:

Hydraulic Profiling Tool

System Overview:

The HPT system is designed to evaluate the hydraulic behavior of unconsolidated materials. As the probe is pushed or hammered at 2cm/s, clean water is injected through a screen on the side of the HPT probe at a flow rate usually less than 300 mL/min. The injection pressure, which is monitored and plotted with depth, is an indication of the hydraulic properties of the soil. A relatively low pressure response indicates a relatively large grain size, and the ability to easily transmit water. However, a relatively high pressure response indicates a relatively small grain size, which correlates with the inability to transmit water.

Additionally, an EC dipole is integrated into the HPT probe. This allows for the collection soil electrical conductivity (EC) data to interpret the lithology of the subsurface. In general, the higher the electrical conductivity value, the smaller the grain size, the lower the electrical conductivity value, the larger the grain size. However, other factors can affect EC, such as mineralogy and pore water chemistry (brines, extreme pH, contaminants). Conversely, the HPT pressure response is independent of these chemical and mineralogical factors.

There are five primary components of the HPT system: the probe assembly, controller, pump, trunkline, and field instrument. The probe assembly consists of the section that houses the 100 psi pressure transducer, water and electrical connections, and the probe body with the injection screen and electrical conductivity.

Injecting water at a constant rate is integral to system operation. A controller box houses components that monitor and regulate the water injection rate and pressure, as well as pressure transducer signal conditioning electronics. The flow rate is set manually on the front of the controller, and a valve is used to turn on or shut off flow.

A vane pump provides system pressure ensuring adequate flow to the screen. The pump is secured to a frame with an integrated visual flow meter. Water and power are transmitted from the controller to the probe assembly via the trunkline. The probe rods are pre-strung with the trunkline before advancing of the HPT probe begins.

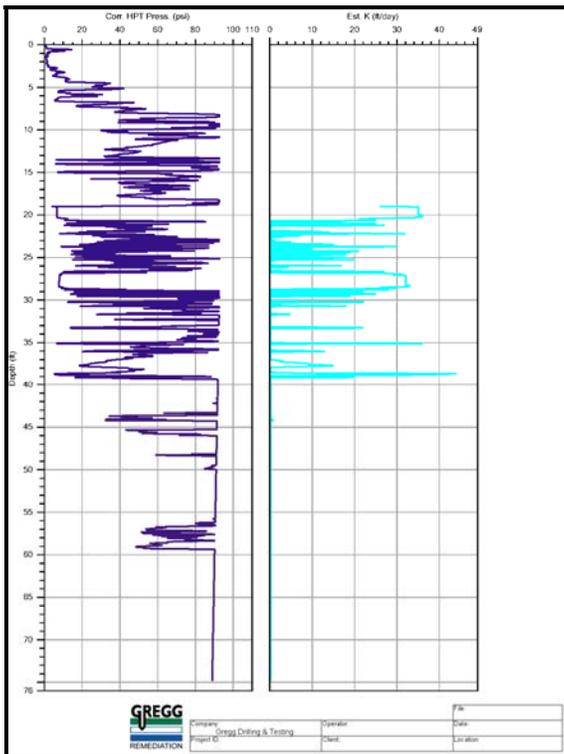
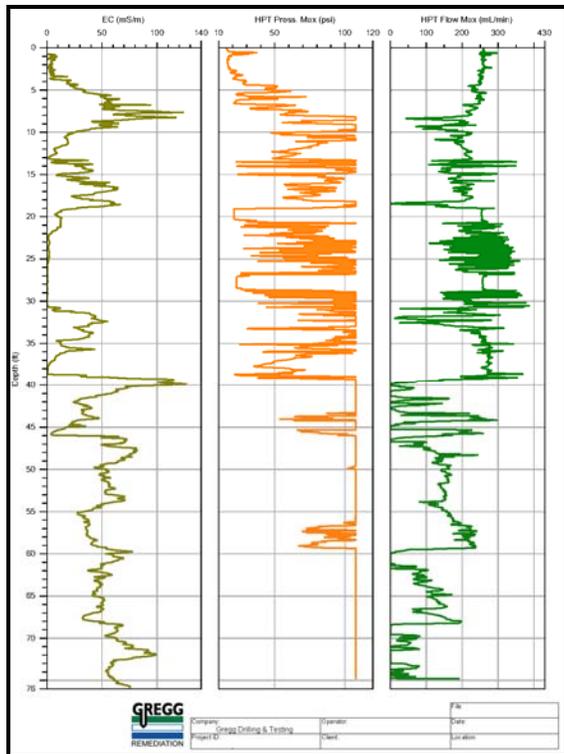
Data Collected:

The HPT system collects depth, electrical conductivity, advancement rate, hydraulic pressure, and flow information. Additional detail regarding each of these parameters is provided below.

- Depth - Data is collected from twenty data points per foot. 0.05', 0.10', 0.15', etc...
- Electrical Conductivity - Electrical Conductivity (EC) data is collected in milli-siemens per meter (ms/M). The conductivity of soils is different for each type of media. Finer grained sediments, such as silts or clays, will have a higher EC signal. While coarser grained sediments, sands and gravel, will have a lower EC signal. The coarser grained sediments will allow the migration of contaminants and the finer grained sediments will trap the contaminant.

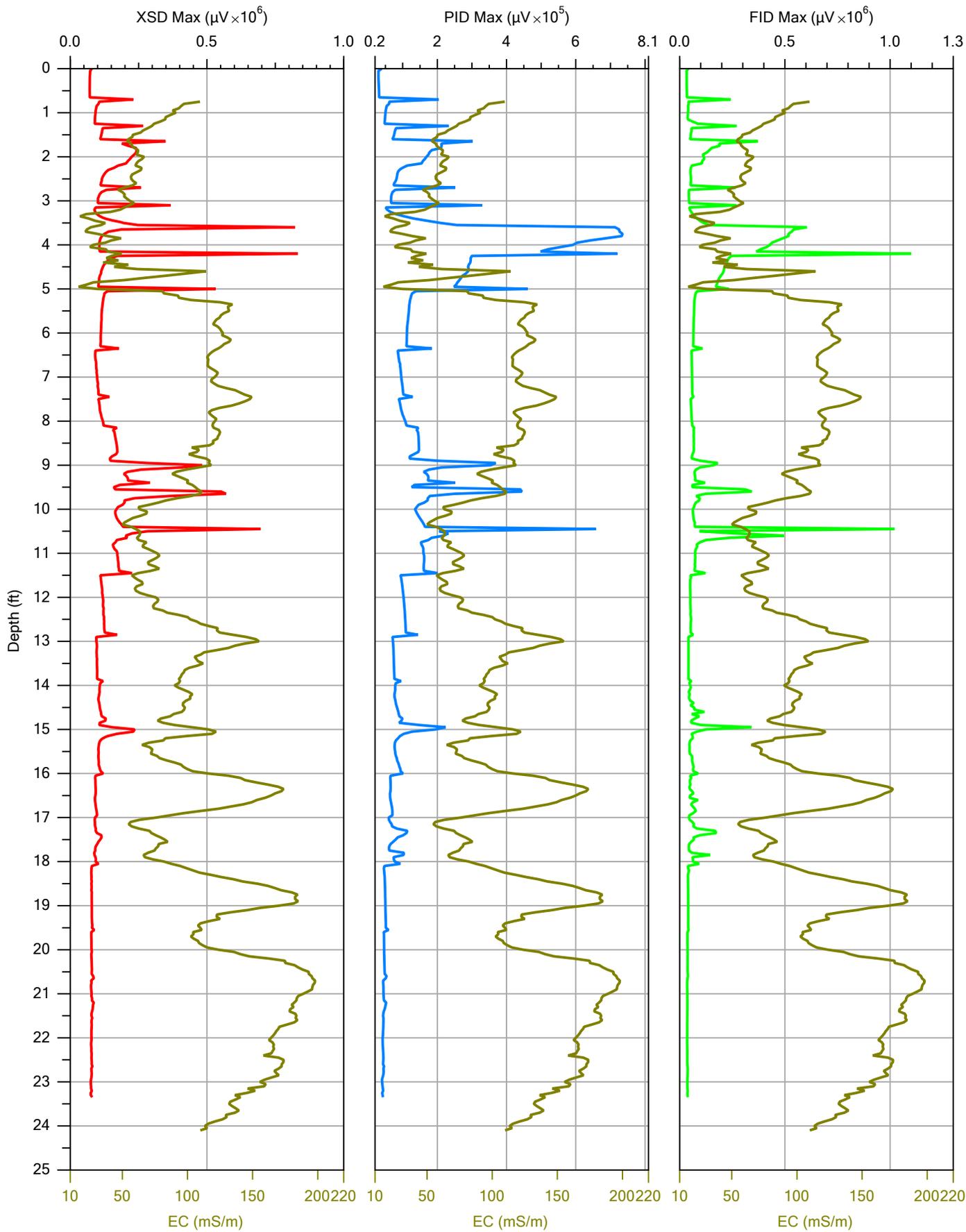
- Advancement Rate – Advancement rate is collected in units of feet per minute (ft/min). Advancement rate of the HPT probe can vary due to operator advancement and soil types encountered.
- Pressure - Pressure data is collected in pounds per square inch (PSI). Pressure is an indication of hydraulic pressure applied to the subsurface by the HPT system. The system collects both the minimum and maximum pressures over each vertical interval.
- Flow - Flow data is collected in milliliters per minute (mL/min). Flow is an indication of the rate water that is pumped out of the membrane at the HPT probe. The system collects both the minimum and maximum flow over each vertical interval.
- Estimated Hydraulic Conductivity (est. K) – Hydraulic conductivity, symbolically represented as K, is an in-situ property that describes the ease with which water can move through pore spaces or fractures. It is dependent on the intrinsic permeability of the material and on the degree of saturation. With respect to the HPT system, the estimated K values are only applicable to the saturated portion of the formation. The estimated K value is calculated using the HPT pressure and flow data. It is also necessary to collect HPT response test data before and after each boring. Additionally, it is necessary to conduct at least one pressure dissipation test during the logging operation, below the static water table level.

HPT Boring Example





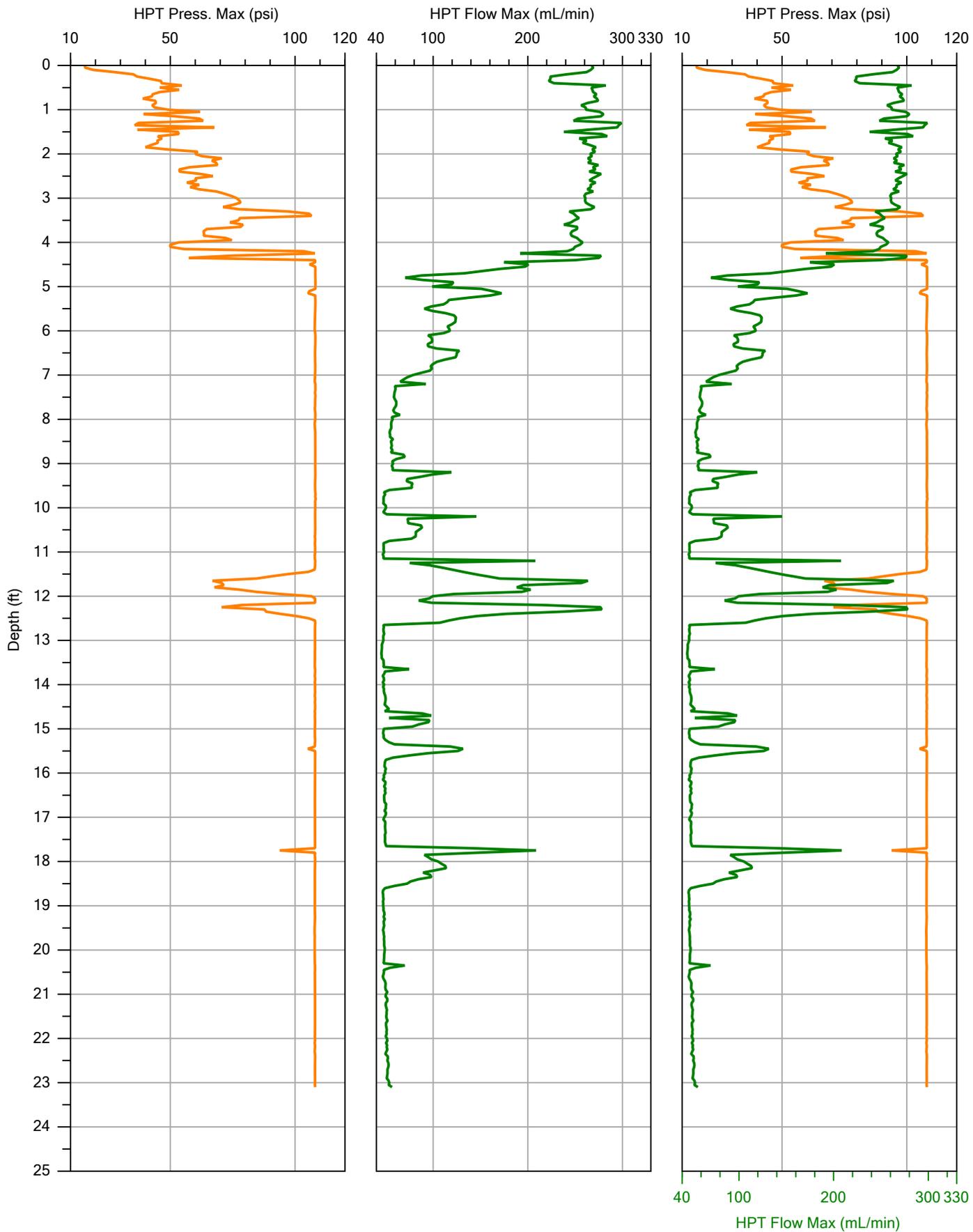
MEMBRANE INTERFACE PROBE
HYDRAULIC PROFILING TOOL
BORINGS (AUTO SCALE)



Company: Langan Treadwell Rollo
 Project ID: 3000 Broadway

Operator: M.Haske
 Client: Annie Staehlin

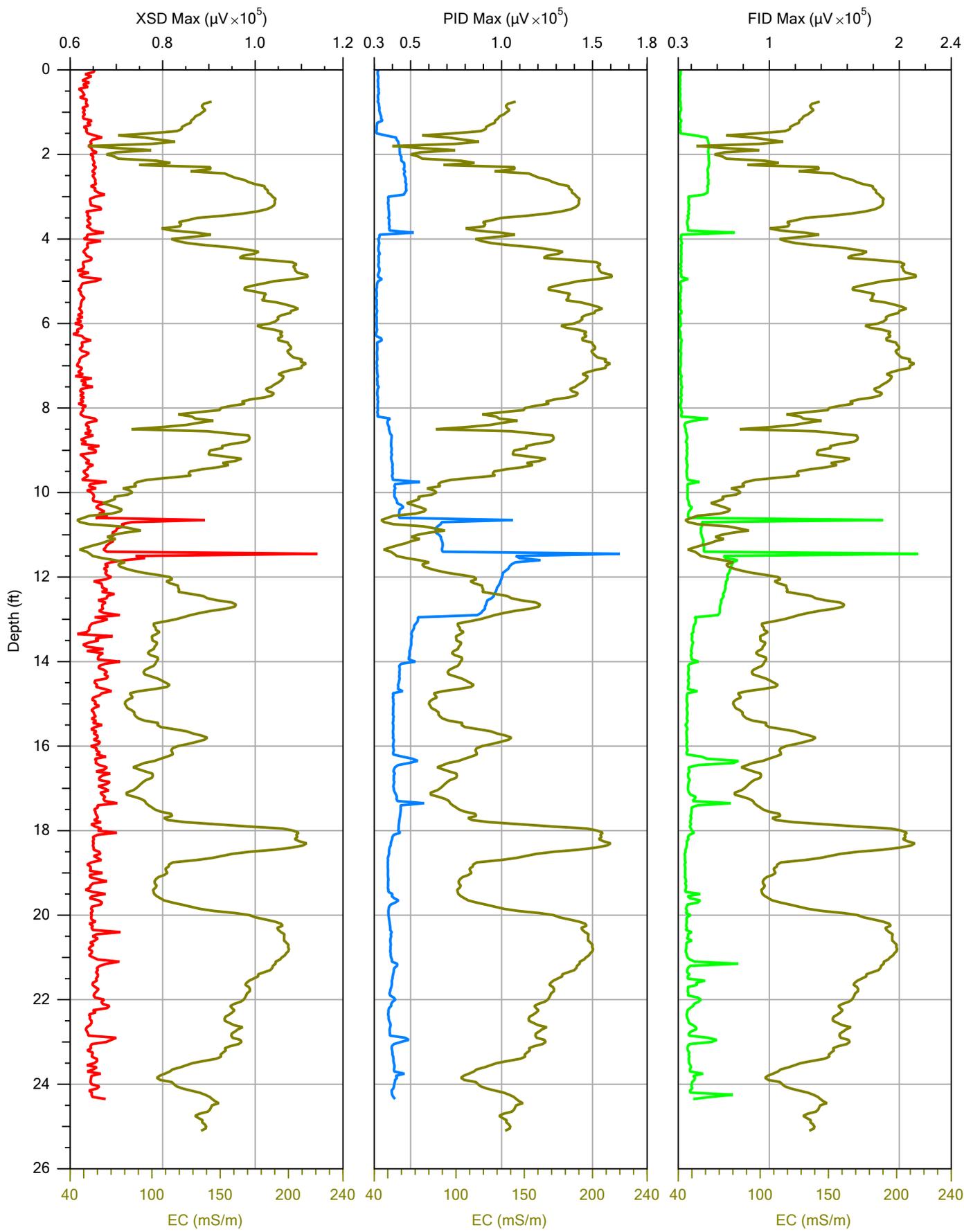
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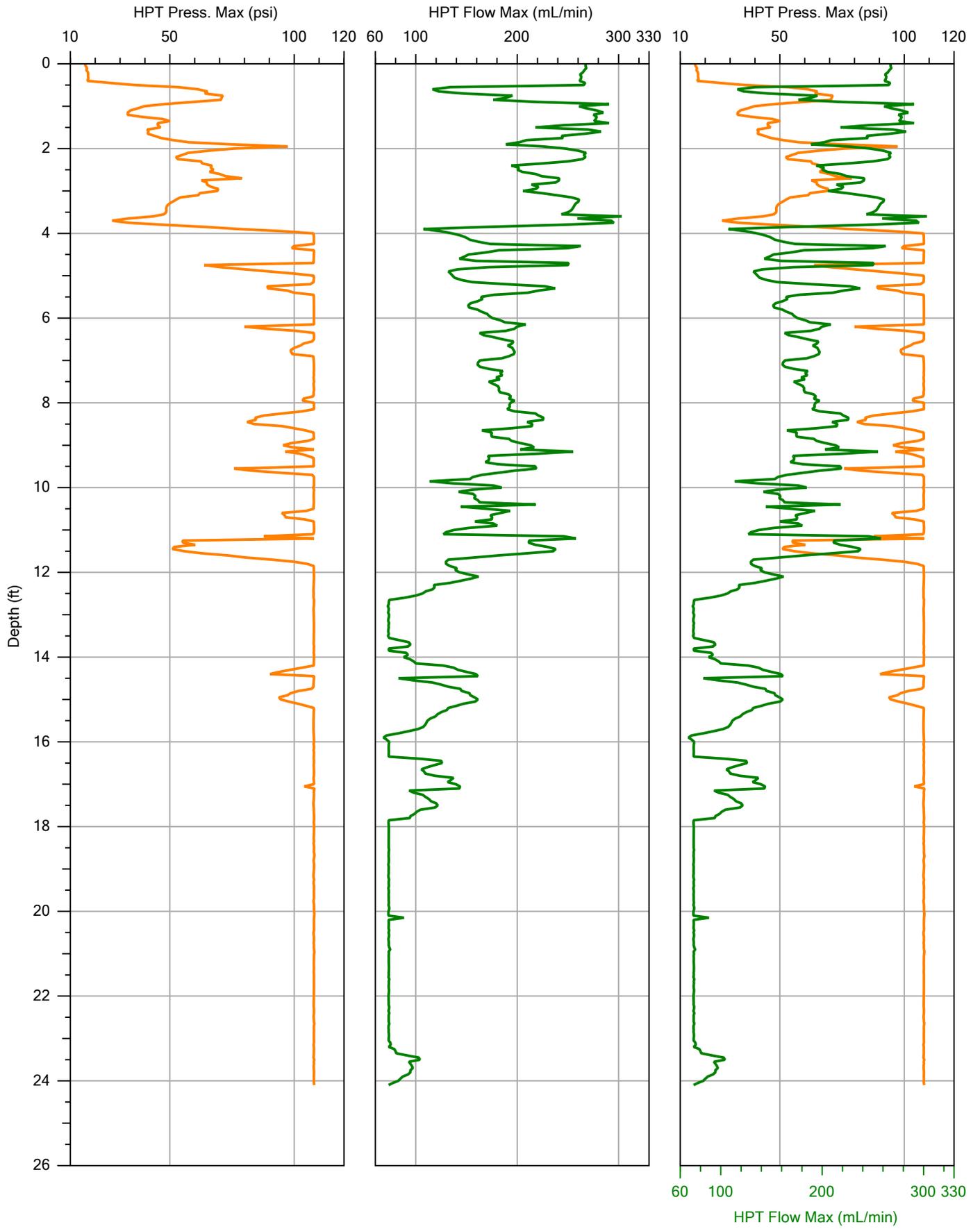
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 Project ID: 3000 Broadway

Operator: M.Haske
 Client: Annie Staehlin

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Date:	3/25/2017
Location:	



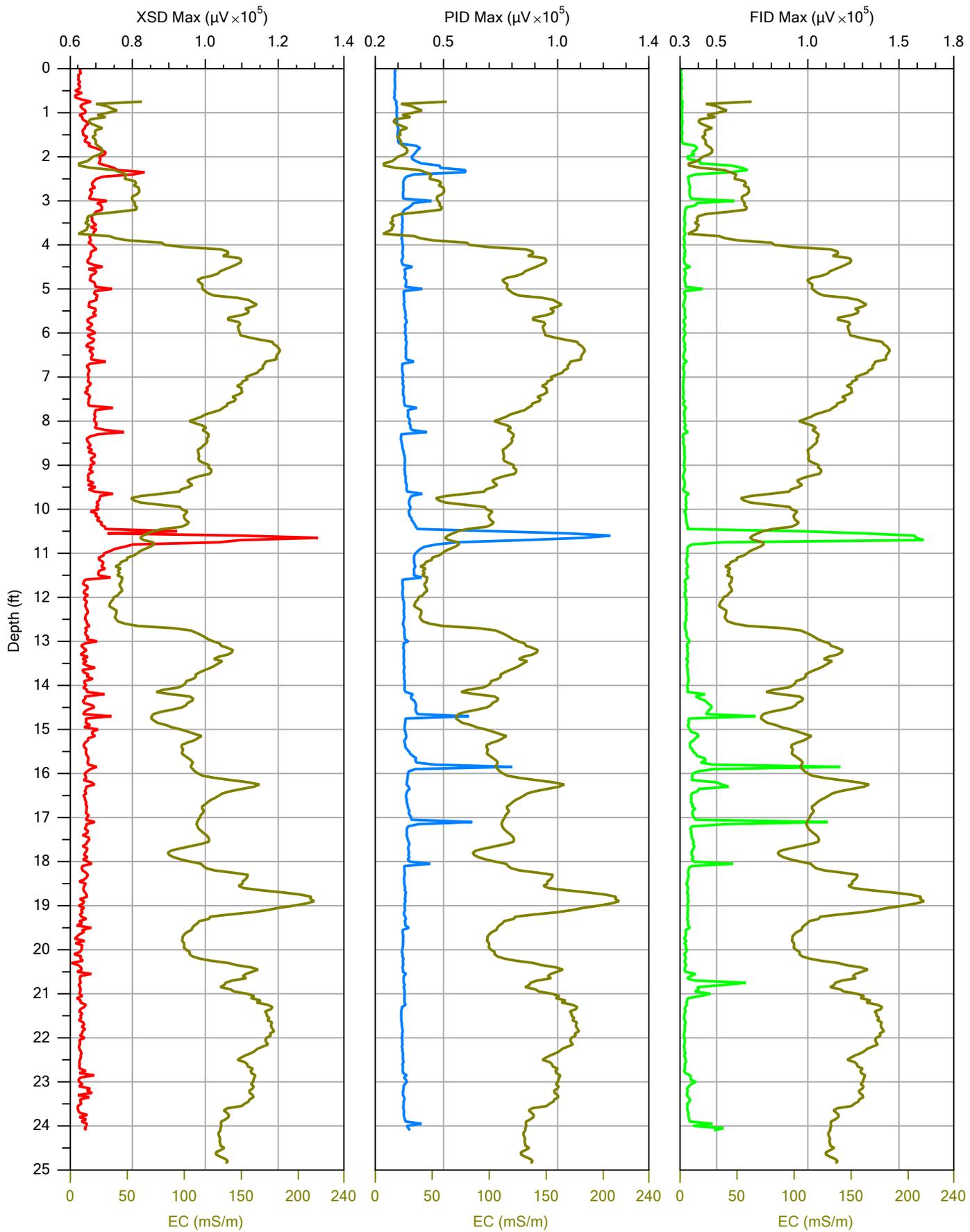
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Project ID: 3000 Broadway	Client: Annie Staehlin	Date: 3/25/2017
		Location:



Company: Langan Treadwell Rollo
 Project ID: 3000 Broadway

Operator: M.Haske
 Client: Annie Staehlin

File:	MIP-2.MHP
Date:	3/25/2017
Location:	



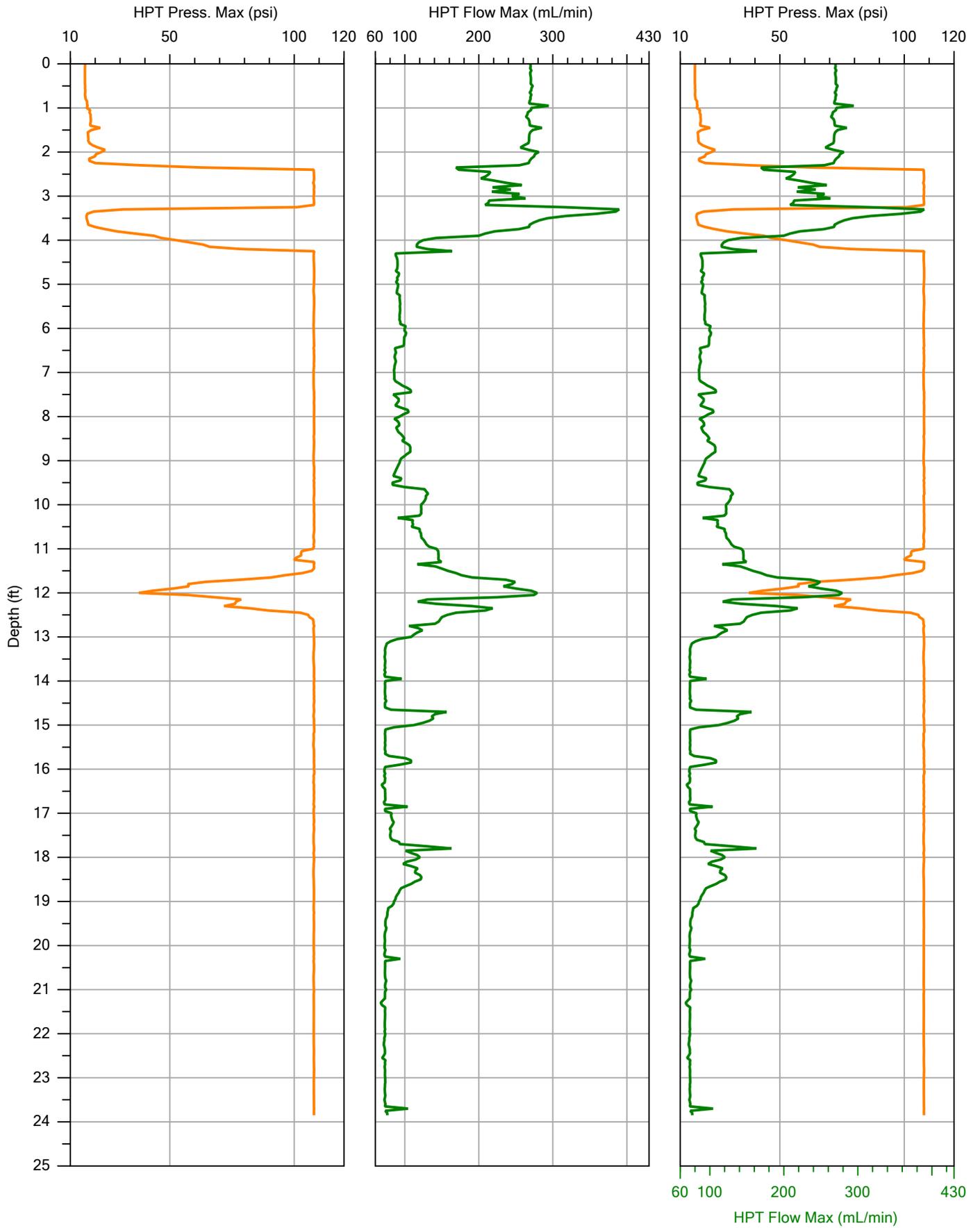
Company:
Langan Treadwell Rollo

Project ID:
3000 Broadway

Operator:
M.Haske

Client:
Annie Staehlin

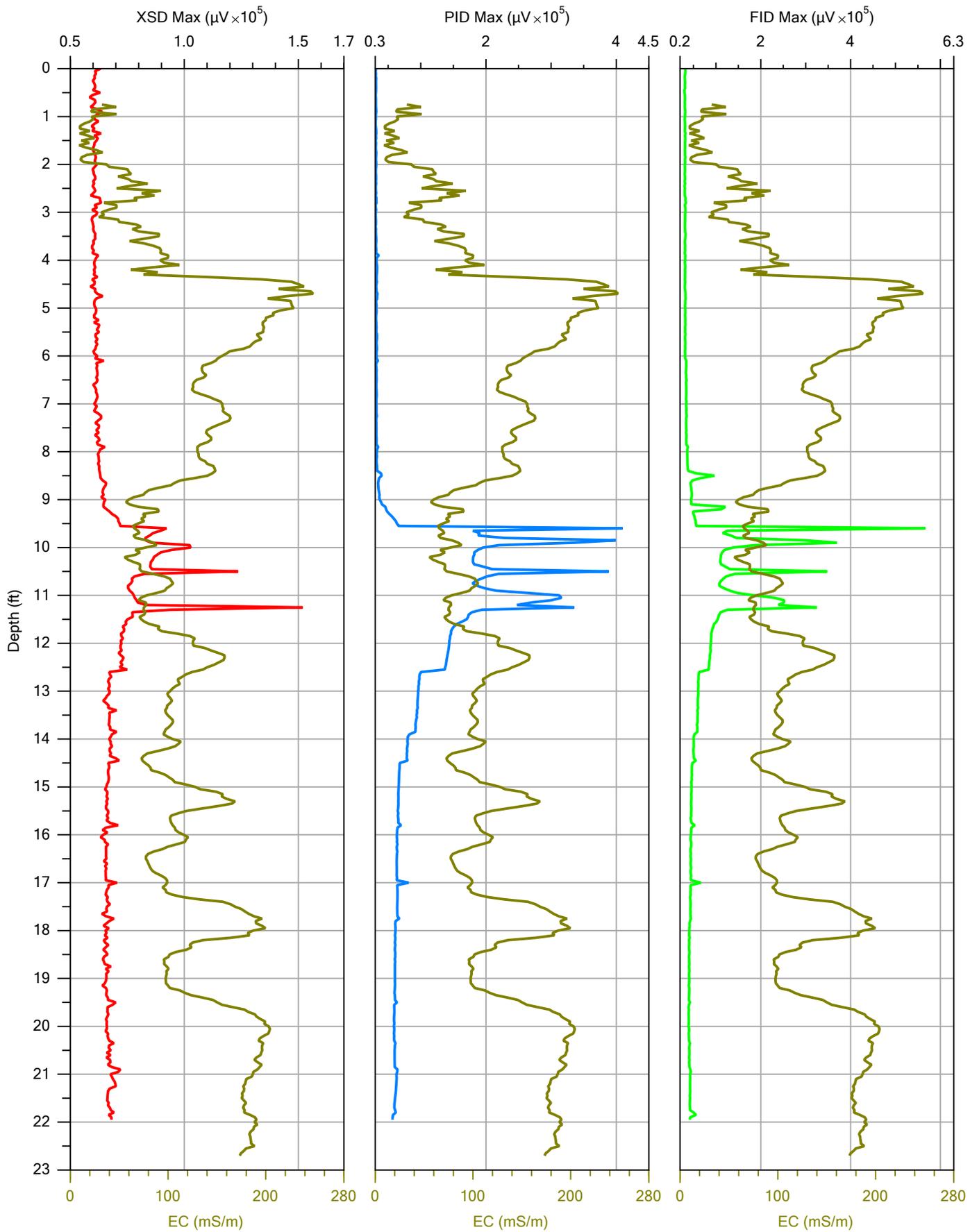
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Company: Langan Treadwell Rollo
Project ID: 3000 Broadway

Operator: M.Haske
Client: Annie Staehlin

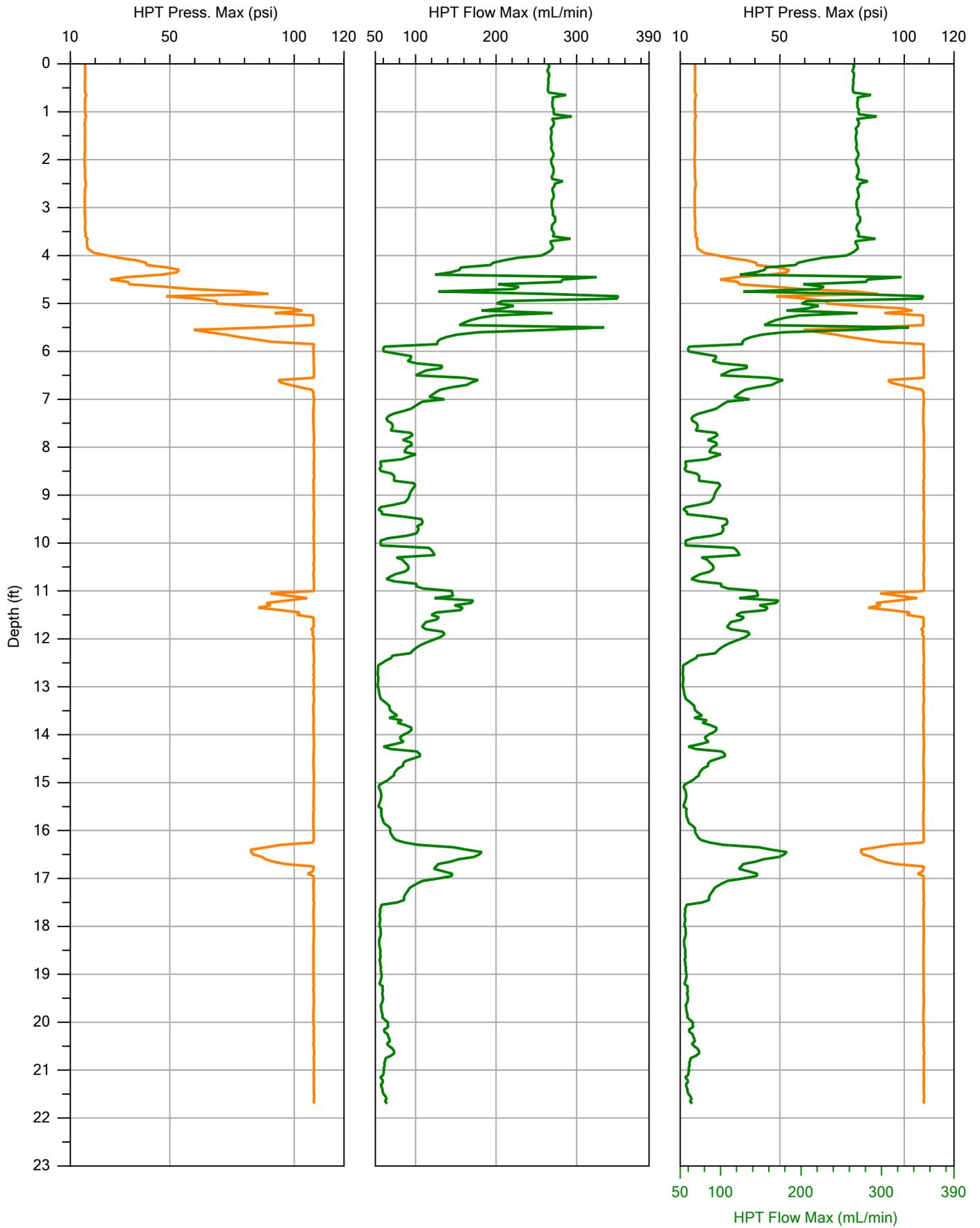
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Location:	



Company: Langan Treadwell Rollo
 Project ID: 3000 Broadway

Operator: M.Haske
 Client: Annie Staehlin

File:	MIP-4.MHP
Date:	3/25/2017
Location:	



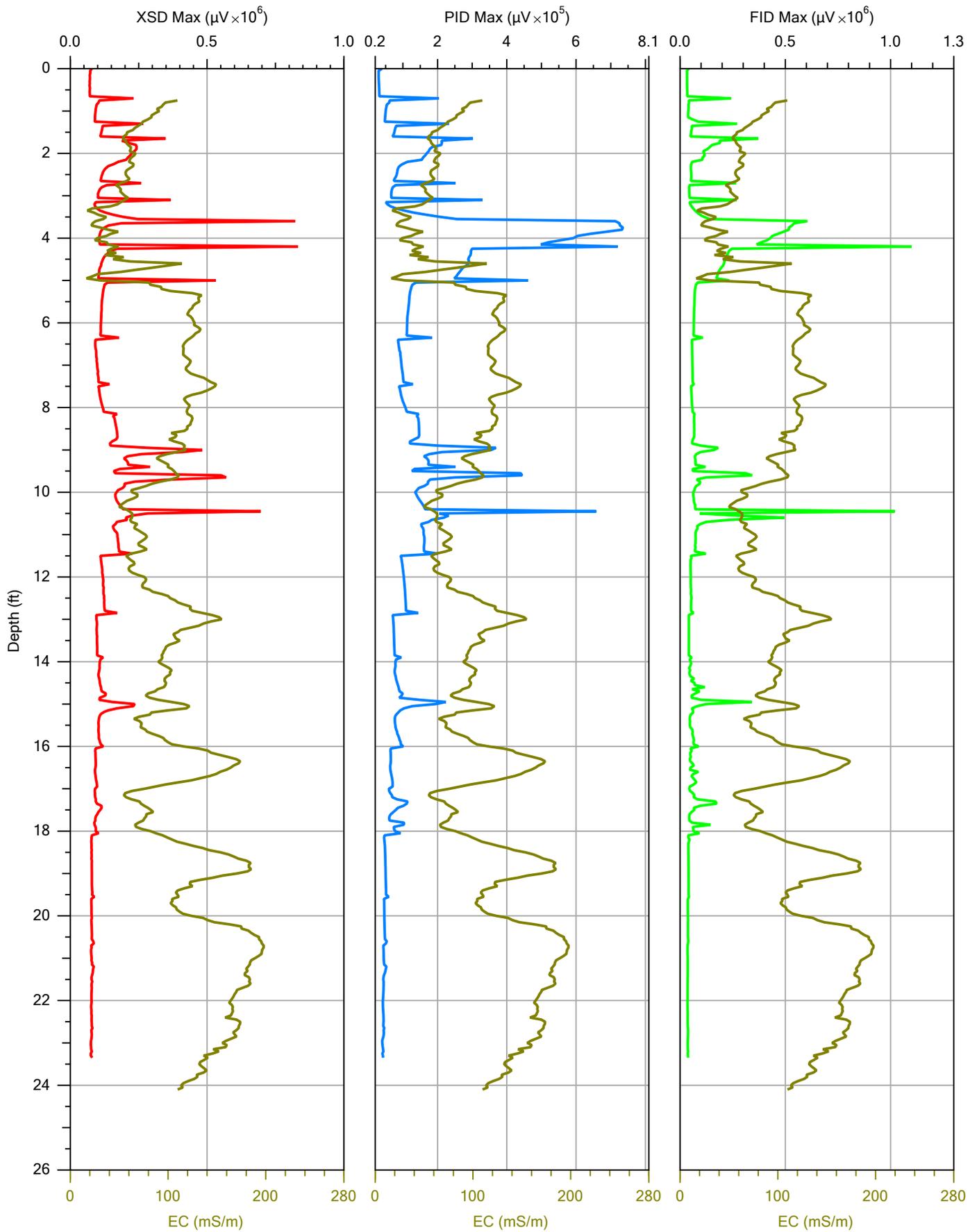
Company: Langan Treadwell Rollo
 Project ID: 3000 Broadway

Operator: M.Haske
 Client: Annie Staehlin

File:	MIP-4.MHP
Date:	3/25/2017
Location:	



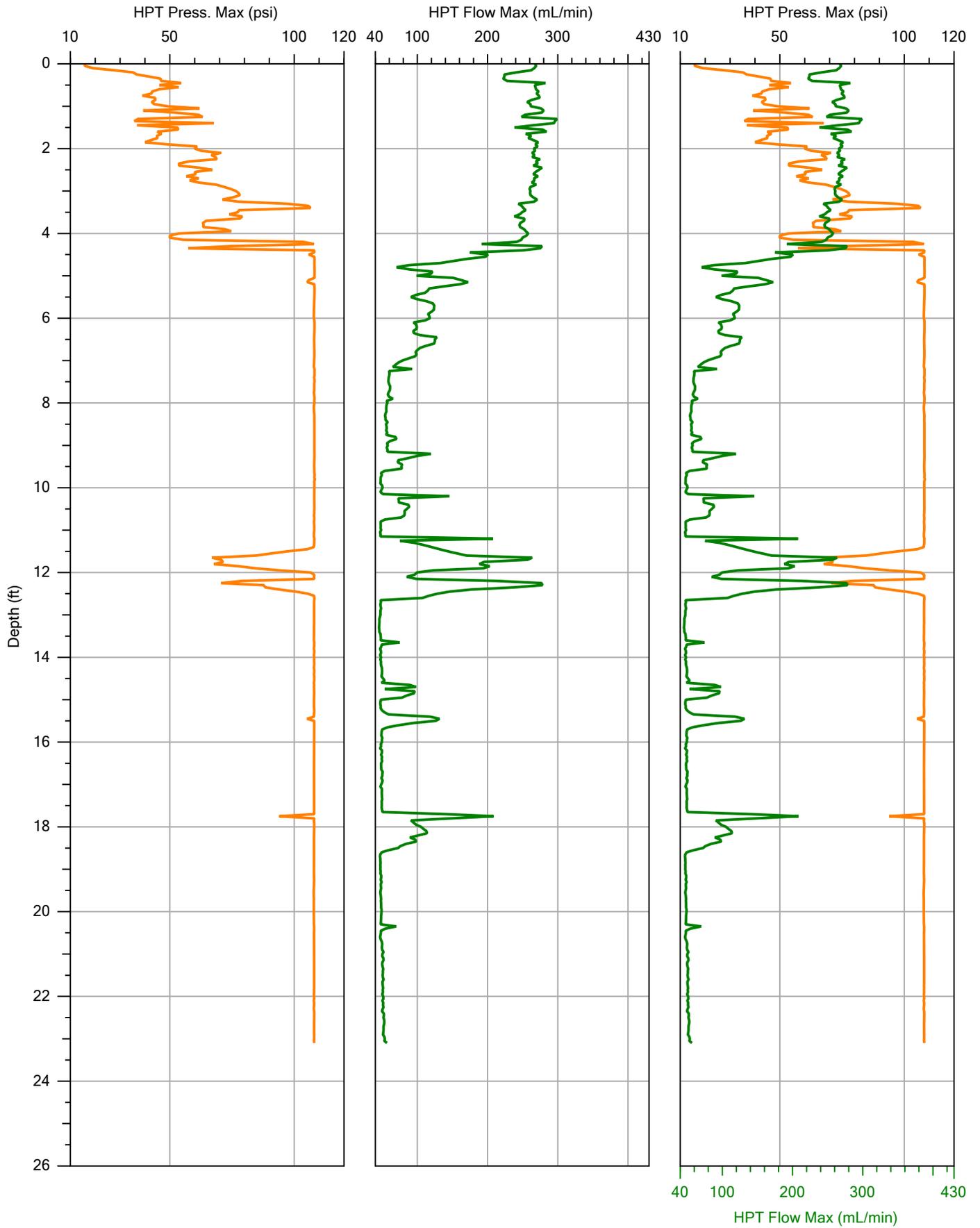
**MEMBRANE INTERFACE PROBE
HYDRAULIC PROFILING TOOL
BORINGS (NORMALIZED SCALE)**



Company: Langan Treadwell Rollo
Project ID: 3000 Broadway

Operator: M.Haske
Client: Annie Staehlin

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Date:	3/25/2017
Location:	



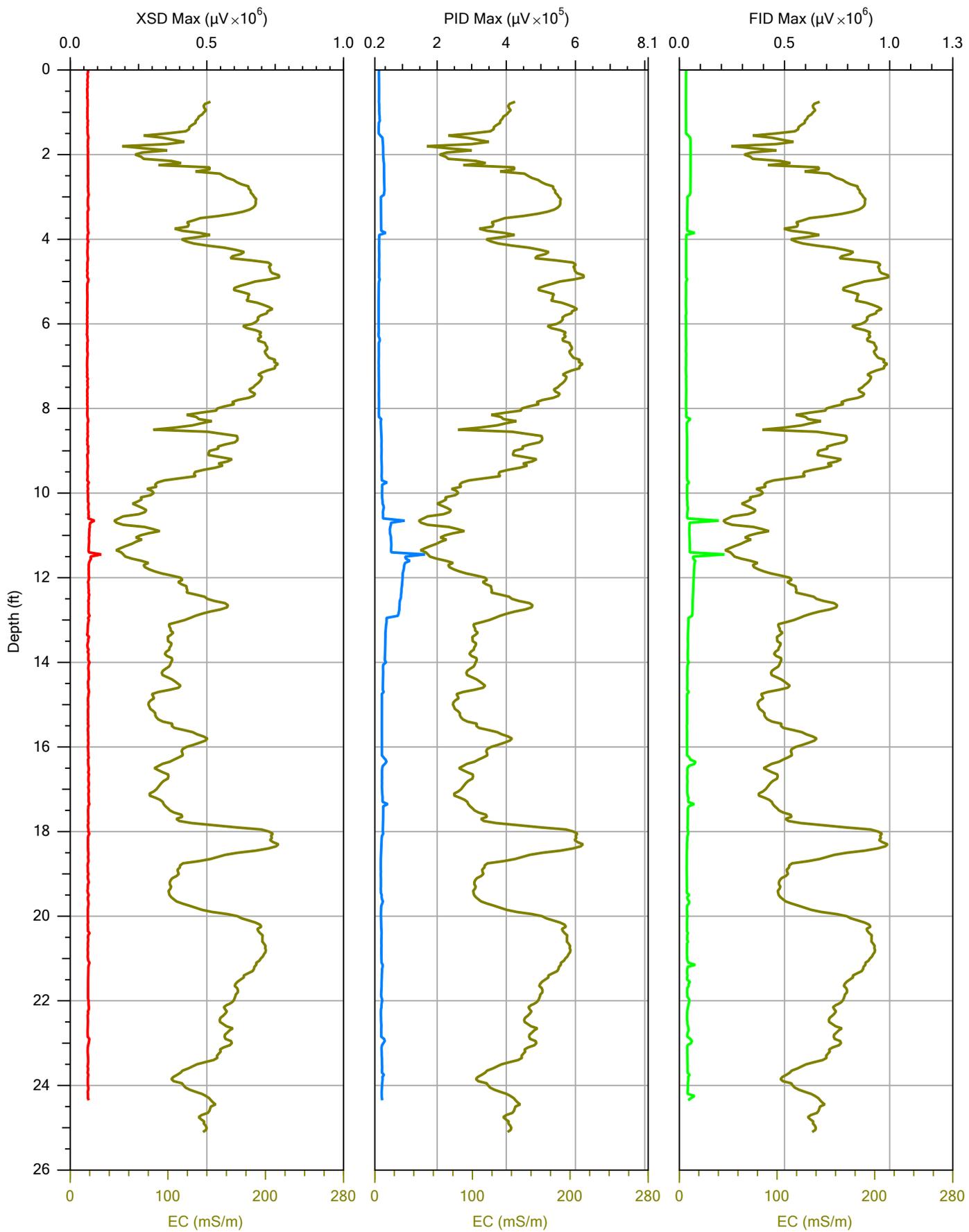
Company:
Langan Treadwell Rollo

Project ID:
3000 Broadway

Operator:
M.Haske

Client:
Annie Staehlin

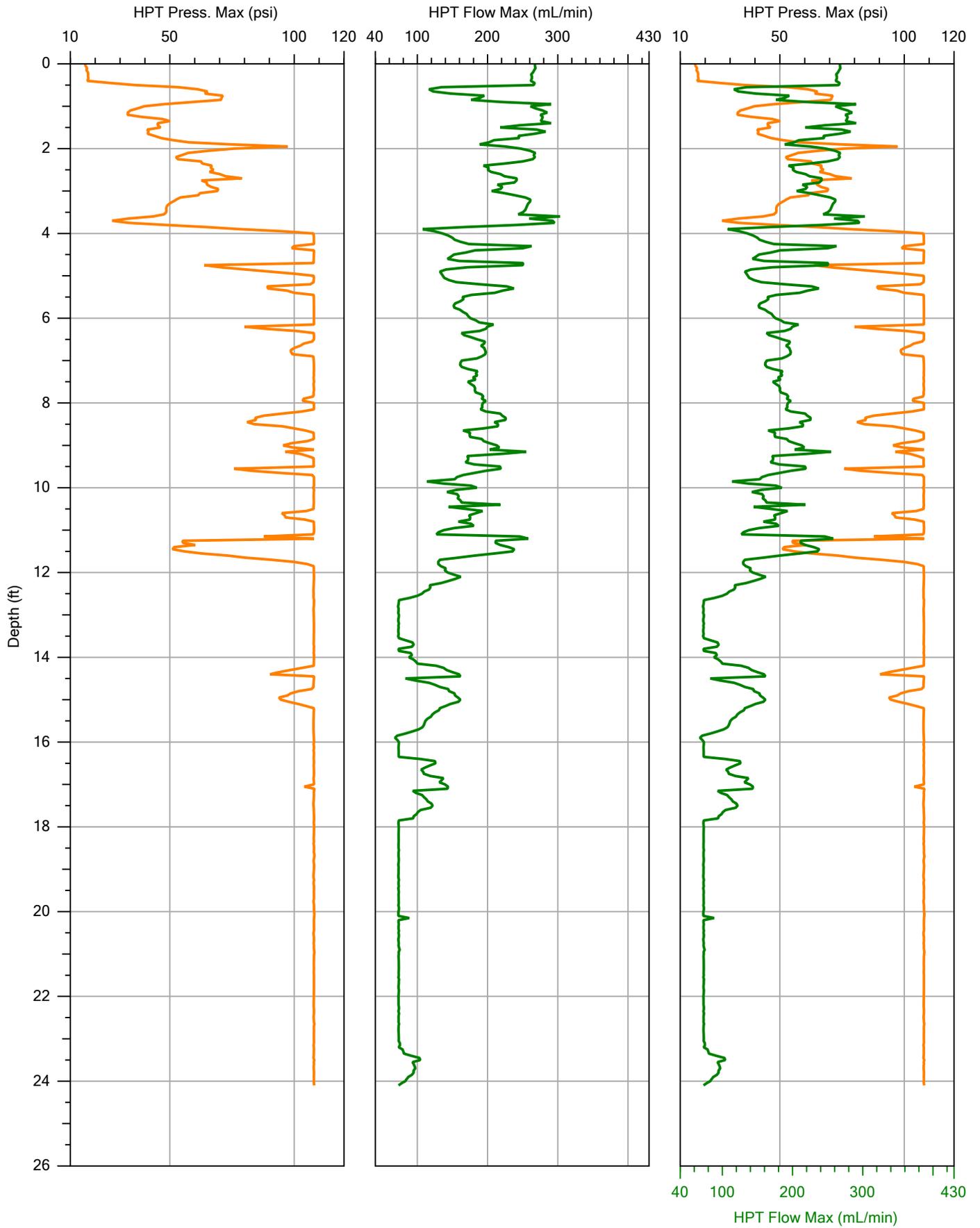
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Location:	



Company: Langan Treadwell Rollo
 Project ID: 3000 Broadway

Operator: M.Haske
 Client: Annie Staehlin

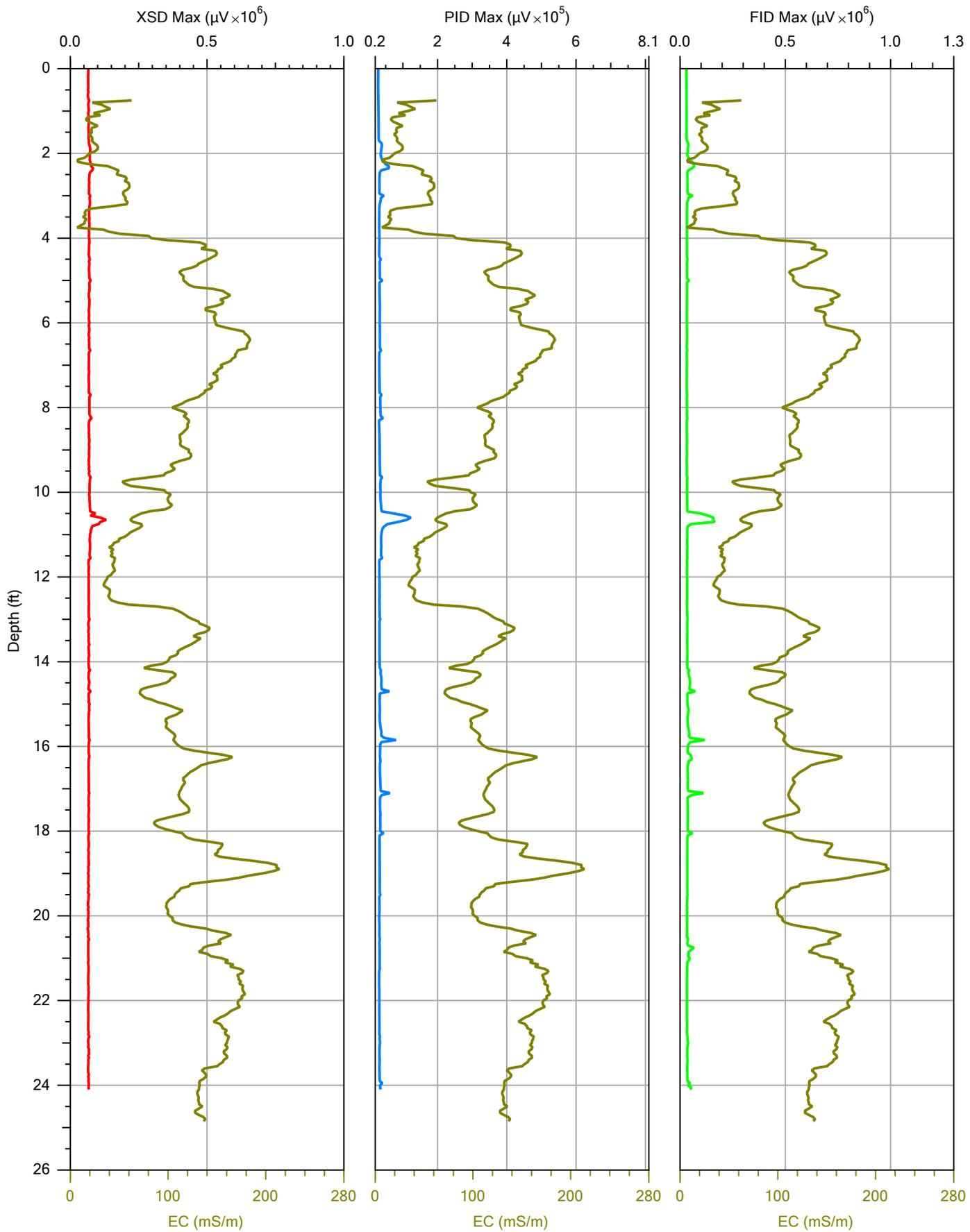
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Date:	3/25/2017
Location:	



Company: Langan Treadwell Rollo
Project ID: 3000 Broadway

Operator: M.Haske
Client: Annie Staehlin

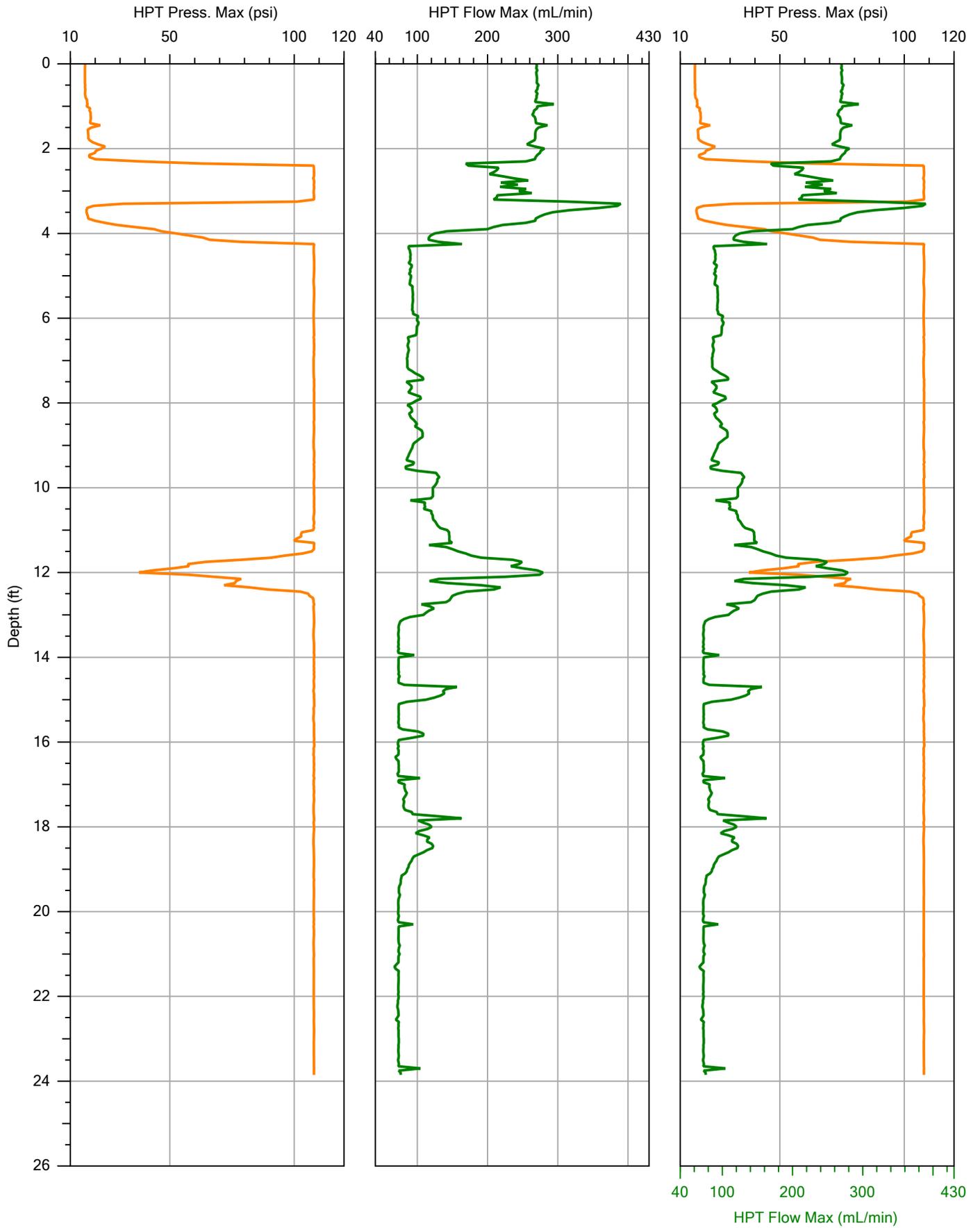
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Date:	3/25/2017
Location:	



Company: Langan Treadwell Rollo
 Project ID: 3000 Broadway

Operator: M.Haske
 Client: Annie Staehlin

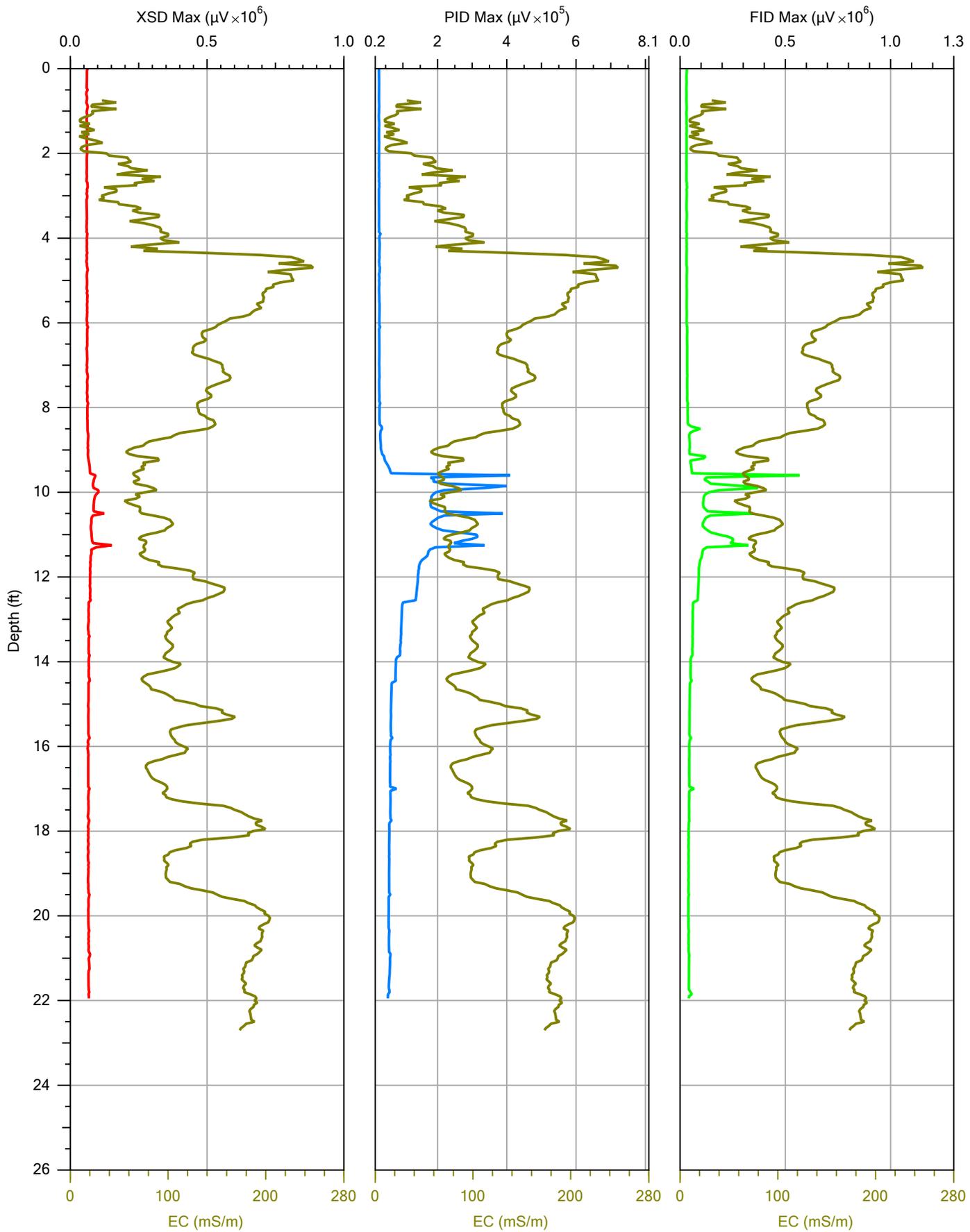
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Location:	



Company: Langan Treadwell Rollo
Project ID: 3000 Broadway

Operator: M.Haske
Client: Annie Staehlin

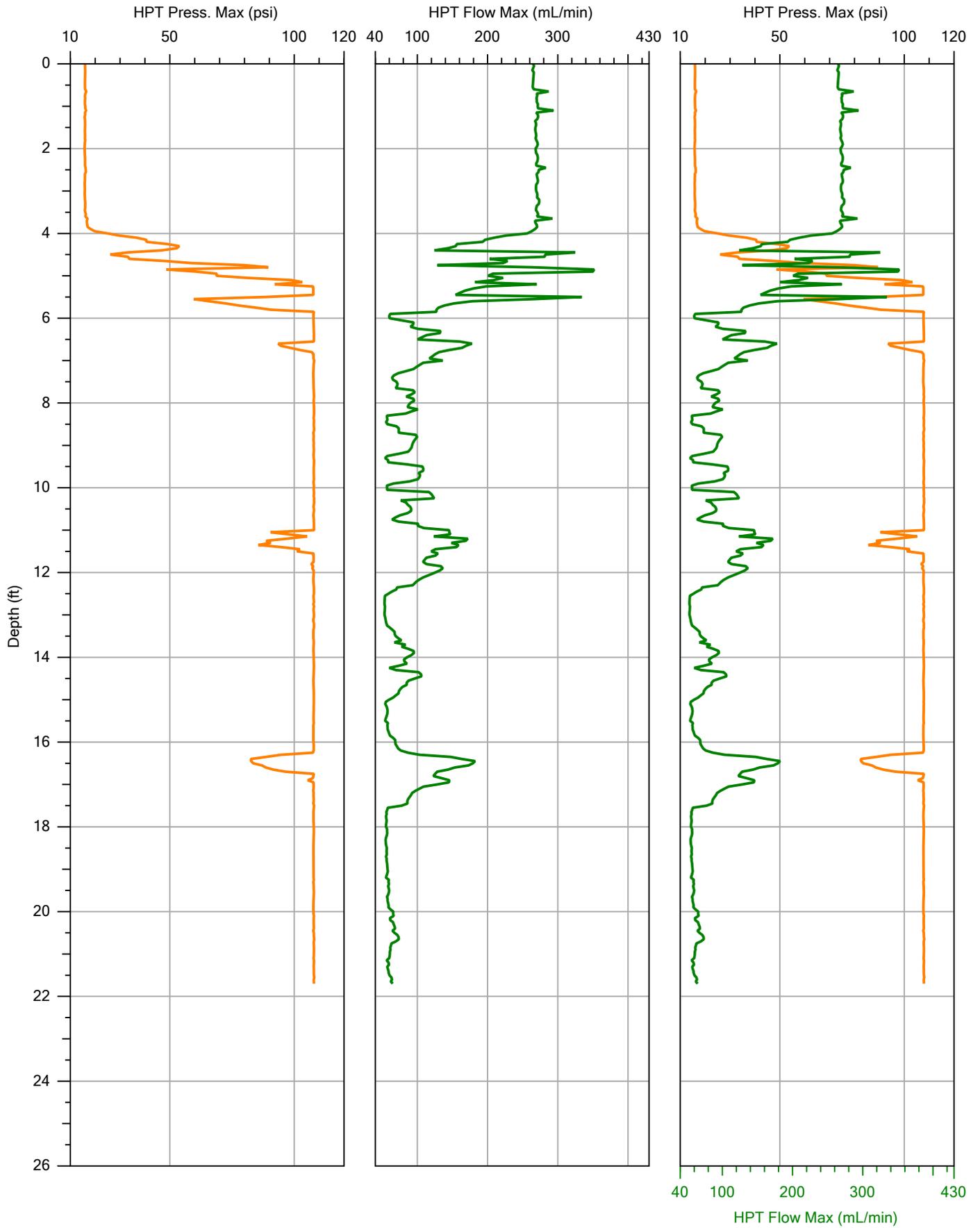
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Date:	3/25/2017
Location:	



Company: Langan Treadwell Rollo
 Project ID: 3000 Broadway

Operator: M.Haske
 Client: Annie Staehlin

File:	MIP-4.MHP
Date:	3/25/2017
Location:	



Company:
Langan Treadwell Rollo
Project ID:
3000 Broadway

Operator:
M.Haske
Client:
Annie Staehlin

File:	MIP-4.MHP
Date:	3/25/2017
Location:	

APPENDIX B
ENVIRONMENTAL AND GEOTECHNICAL BORING LOGS

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu

Date started: 4/1/16

Date finished: 4/1/16

Drilling method: Hand Auger

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1		✕			0.0	SC	1 inch tile
2						SC	7 inches concrete
3		✕			0.0	CL	CLAYEY SAND with GRAVEL (SC) 5 percent gravel, 60 percent sand, 35 percent fines, brown, medium dense, dry, subrounded up to 1/2-inch, slightly plastic, no odor
4						CL	SANDY CLAY (CL) 35 percent sand, 65 percent fines, brown, medium stiff, dry, subangular up to 1/2-inch, slightly plastic, no odor
5		✕			0.0	GM	GRAVEL-SAND-SILT (GM) 35 percent gravel, 40 percent sand, 25 percent fines, tan, loose to medium dense, dry, subrounded to subangular up to 1-inch, no odor
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
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28							
29							
30							

FILL

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 5 feet below ground surface.
Boring backfilled with grout.
Groundwater not encountered during drilling.



Project No.: 750635603

Figure: B-1

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-2

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu

Date started: 4/1/16

Date finished: 4/1/16

Drilling method: Hand Auger

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1		✕			0.0		1 inch tile
2							7 inches concrete
3		✕			0.0	CL	SANDY CLAY with GRAVEL (CL0) 10 percent gravel, 20 percent sand, 70 percent fines, brown, medium stiff, dry, subrounded up to 1/2-inch, slightly plastic to plastic, no odor
4							
5		✕			0.0	SM	SILTY SAND with GRAVEL (SM) 15 percent gravel, 55 percent sand, 30 percent fines, brown, medium dense, dry, subrounded up to 1/2-inch, no odor
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

FILL

Boring terminated at a depth of 5 feet below ground surface.
Boring backfilled with grout.
Groundwater not encountered during drilling.



Project No.: 750635603

Figure: B-2

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-3

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu
Drilled By: Gregg Drilling Co.

Date started: 4/1/16

Date finished: 4/1/16

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Direct Push

DEPTH (feet)	SAMPLES				OVW (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1							6 inches concrete
2					0.0	SM	SILTY SAND with GRAVEL (SM) 5 percent gravel, 70 percent sand, 25 percent fines, brown, loose, dry, subrounded up to 1-inch, no odor
3							
4							GRAVELY SAND with CLAY (SW) 40 percent gravel, 50 percent sand, 10 percent fines, brown, medium dense, dry, subangular up to 1/2-inch, non plastic, no odor
5				9"/24"	0.0	SW	
6					0.0		
7							SANDY CLAY (CL) 15 percent sand, 85 percent fines, brown, stiff to very stiff, dry to moist, plastic, no odor
8				48"/36"	0.0	CL	
9					0.0		
10							CLAY (CL) 100 percent fines, brown, very stiff, dry to moist, plastic, no odor
11				48"/36"	0.0		
12					0.0		
13							CLAY (CL) 100 percent fines, brown, very stiff, dry to moist, plastic, no odor
14				48"/36"	0.0	CL	
15					0.0		
16							CLAY (CL) 100 percent fines, brown, very stiff, dry to moist, plastic, no odor
17				48"/36"	0.0		
18					0.0		
19							CLAY (CL) 100 percent fines, brown, very stiff, dry to moist, plastic, no odor
20				48"/12"	0.0		
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

FILL

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater not encountered during drilling.



Project No.: 750635603

Figure: B-3

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-4

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu
Drilled By: Gregg Drilling Co.

Date started: 4/1/16

Date finished: 4/1/16

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Direct Push

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1							6 inches concrete
2					0.0	CL	SANDY CLAY with GRAVEL (CL) 10 percent gravel, 25 percent sand, 55 percent fines, brown, medium stiff, dry, subrounded to subangular up to 1/2-inch, slightly plastic, no odor
3					0.0	CL	
4							GRAVELLY SAND (SP) 35 percent gravel, 60 percent sand, 5 percent fines, light brown, loose to medium dense, dry, subangular up to 1-inch, no odor
5					0.0		
6			24"/24"		0.0		
7			1.5"/36"		0.0	SP	
8							CLAY (CL) 100 percent fines, light brown, stiff to very stiff, dry to moist, plastic, no odor
10			24"/36"		0.0	CL	
11							moist at 13 feet
12					0.0		
13							CLAY (CL) 100 percent fines, light brown, stiff to very stiff, dry to moist, plastic, no odor
14							
15			36"/36"		0.0	CL	
16							
17					0.0		CLAY (CL) 100 percent fines, light brown, stiff to very stiff, dry to moist, plastic, no odor
18			48"/48"		0.0	CL	
19							Boring terminated at a depth of 20 feet below ground surface. Boring backfilled with grout. Groundwater not encountered during drilling.
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

FILL

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater not encountered during drilling.



Project No.: 750635603

Figure: B-4

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-5

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu
Drilled By: Gregg Drilling Co.

Date started: 4/2/16

Date finished: 4/2/16

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Direct Push

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1							6 inches concrete
2					0.0	SM	SILTY SAND with GRAVEL (SM) 15 percent gravel, 55 percent sand, 25 percent fines, light brown, loose, dry, subangular up to 2 1/2 inches, no odor
3					0.0	GW	SANDY GRAVEL (GW) 80 percent gravel, 20 percent sand, brown/ gray, loose, dry, subangular up to 4 inches, no odor
4				48"/36"	0.0	SC	CLAYEY SAND with GRAVEL (SC) 15 percent gravel, 65 percent sand, 20 percent fines, brown, medium dense, dry, subangular up to 1/4-inch, no odor few brick fragments at 2.5 feet to 3 feet
5					0.0		
6					0.0		
7				48"/36"	0.0		
8					0.0		
9					0.0		
10				47"/36"	0.0	CL	CLAY (CL) 100 percent fines, light brown to brown, stiff to very stiff, moist, plastic, no odor
11					0.0		
12					0.0		
13				42"/42"	0.0		
14					0.0		
15					0.0		
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

FILL

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 15 feet below ground surface.
Boring backfilled with grout.
Groundwater not encountered during drilling.



Project No.: 750635603

Figure: B-5

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-6

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu
Drilled By: Gregg Drilling Co.

Date started: 4/2/16

Date finished: 4/2/16

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Direct Push

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1						CL	6 inches concrete
2					0.0	SC	SANDY CLAY (CL) 20 percent sand, 80 percent fines, brown, medium stiff, dry, slightly plastic, no odor
3				12" / 12"	0.0		CLAYEY SAND with GRAVEL (SC) 10 percent gravel, 70 percent sand, 25 percent fines, brown, medium dense, dry, subangular up to 1/2-inch, slightly plastic, no odor
4					0.0	SM	SILTY SAND with GRAVEL (SM) 20 percent gravel, 55 percent sand, 25 percent fines, brown, medium dense, dry, subangular up to 1/2-inch, no odor
5				46" / 48"	0.0	CL	gravel later at 3 feet fill with brick at 3 feet
6					0.0		
7					0.0	CL	SANDY CLAY (CL) 30 percent sand, 70 percent fines, brown, medium stiff, moist, slightly plastic, no odor
8					0.0		
9					0.0	CL	CLAY (CL) 100 percent fines, brown, stiff to very stiff, mist, plastic, no odor
10				45" / 48"	0.0		
11					0.0	CL	
12					0.0		
13				48" / 36"	0.0		
14					0.0		
15					0.0		

FILL

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 15 feet below ground surface.
Boring backfilled with grout.
Groundwater not encountered during drilling.



Project No.: 750635603

Figure: B-6

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-7

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu
Drilled By: Gregg Drilling Co.

Date started: 4/2/16

Date finished: 4/2/16

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Direct Push

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1							6 inches concrete
2					0.0		SANDY CLAY (CL) 30 percent sand, 70 percent fines, tan, medium stiff, dry, slightly plastic, no odor
3							
4					0.0	CL	
5							SANDY CLAY (CL) 40 percent sand, 60 percent fines, light brown, soft, dry to moist, slightly plastic, no odor
6					0.0		
7				28"/24"	0.0		
8					0.0	CL	moist at 8 feet
9				36"/24"	0.0		
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring terminated at a depth of 10 feet below ground surface.
Boring backfilled with grout.
Groundwater not encountered during drilling.

LANGAN

Project No.: 750635603

Figure: B-7

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-8

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu
Drilled By: Gregg Drilling Co.

Date started: 4/2/16

Date finished: 4/2/16

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Direct Push

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1							6 inches concrete
2					0.0	CL	SANDY CLAY (CL) 15 percent sand, 85 percent fines, brown, stiff, dry, slightly plastic, no odor
3						GC	GRAVEL with CLAY (GC) 45 percent gravel, 10 percent sand, 45 percent fines, light brown to brown, loose, medium stiff, dry, subangular up to 1-inch, slightly plastic, no odor
4				44"/36"	0.0		
5					0.0	CL	SANDY CLAY with GRAVEL (CL) 10 percent gravel, 20 percent sand, 70 percent fines, brown, stiff to very stiff, subangular up to 1/2-inch
6				42"/30"	0.0		
7					0.0		
8				48"/30"	0.0	CL	CLAY (CL) 100 percent fines, brown, stiff to very stiff, moist, plastic, no odor
9					0.0		
10					0.0		
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring terminated at a depth of 10 feet below ground surface.
Boring backfilled with grout.
Groundwater not encountered during drilling.



Project No.: 750635603

Figure: B-8

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-9

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu

Date started: 4/1/16

Date finished: 4/1/16

Drilling method: Hand Auger

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1		☒			0.0	CL	5 inches concrete
2						GW	SANDY CLAY with GRAVEL (CL) 10 percent gravel, 30 percent sand, 60 percent fines, light brown, medium stiff, dry, subangular up to 1/2-inch, slightly plastic to plastic, no odor
3		☒			0.0	GW	SANDY GRAVEL (GW) 80 percent gravel, 20 percent sand, light brown, loose, dry, subrounded to subangular up to 2 inches, no odor
4						GW	SANDY CLAY (GW) 30 percent sand, 70 percent fines, light brown, medium stiff, dry, plastic, no odor
5		☒			0.0		
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

FILL

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 5 feet below ground surface.
Boring backfilled with grout.
Groundwater not encountered during drilling.



Project No.: 750635603

Figure: B-9

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-10

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu

Date started: 4/1/16

Date finished: 4/1/16

Drilling method: Hand Auger

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.0	SM	<p>4 inches concrete</p> <p>SILTY SAND with GRAVEL (SM) 5 percent gravel, 65 percent sand, 30 percent fines, brown, medium dense, dry, subrounded up to 1/4-inch, no odor</p> <p>gravel later at 2.5 feet</p> <p>GRAVELLY SAND with SILT (SP) 40 percent gravel, 50 percent sand, 10 percent fines, light brown, loose, dry, subangular up to 2 1/2 inches, no odor</p> <p style="text-align: right;">FILL</p>
2							
3					0.0	SP	
4							
5					0.0		
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring terminated at a depth of 5 feet below ground surface.
Boring backfilled with grout.
Groundwater not encountered during drilling.

LANGAN

Project No.: 750635603

Figure: B-10

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-11

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu
Drilled By: Gregg Drilling Co.

Date started: 4/2/16

Date finished: 4/2/16

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Direct Push

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1						SP	3 inches Asphalt
2							GRAVELLY SAND with SILT (SP) 35 percent gravel, 50 percent sand, 15 percent fines, dark brown, medium dense, dry, subangular up to 1/2-inch, no odor some clay
3							SANDY CLAY (CL) 35 percent sand, 65 percent fines, light brown, medium stiff, dry to moist, slightly plastic to plastic, no odor
4							
5							
6				39"/36	0.0	CL	
7							
8							
9							
10				48"/48"	0.0		
11							▽ SANDY CLAY (CL) 25 percent sand, 75 percent fines, grayish-brown, stiff, wet, plastic, no odor
12						CL	
13							
14				48"/48"	0.0		CLAY (CL) 100 percent fines, brown, stiff, wet, slightly plastic to plastic, no odor.
15							
16							
17						CL	
18				48"/48"	0.0		
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered 10.7 feet.

LANGAN

Project No.: 750635603

Figure: B-11

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-12

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: N. Tu
Drilled By: Gregg Drilling Co.

Date started: 4/2/16

Date finished: 4/2/16

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Direct Push

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1						SC	3 inches Asphalt CLAYEY SAND with GRAVEL (SC) 10 percent gravel, 60 percent sand, 30 percent fines, brown, medium dense, dry, subrounded to subangular up to 1/2-inch, non plastic to slightly plastic, no odor
2							
3						GW	SANDY GRAVEL (GW) 70 percent gravel, 20 percent sand, 10 percent fines, brown, loose, dry, subrounded to subangular up to 1-inch, no odor
4							
5						CL	SANDY CLAY (CL) 20 percent sand, 80 percent fines, brown/ gray, stiff, moist, slightly plastic to plastic, no odor
6				36"/36"	0.0		
7						SM	SILTY SAND (SM) 70 percent sand, 30 percent fines, brown, loose, moist, no odor
8						CL	SANDY CLAY (CL) 20 percent sand, 80 percent fines, brown/ grayish, medium stiff, wet, plastic, no odor
9							
10				48"/48"	0.0		CLAY (CL) 100 percent fines, light brown/ blue-green, stiff, wet, plastic, no odor
11							
12							
13							
14				48"/48"	0.0	CL	
15							
16							
17							
18				38"/48"	0.0		
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

FILL

TEST ENVIRONMENTAL INCHES 750635603 ENV-BROADWAY.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 7 feet.



Project No.: 750635603

Figure: B-12

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-13

Boring location: See Figure 2

Logged by: J. Sanglerat
Drilled by: Gregg Drilling

Date started: 11/2/16

Date finished: 11/2/16

Drilling method: Hollow Stem Auger

Hammer weight/drop: 140 lbs./30 inches

Hammer type: Safety Auto

Samplers: Sprague & Herwood (S&H), Standard Penetration Test (SPT), Shelby Tube (ST)

LABORATORY TEST DATA

DEPTH (feet)	SAMPLES				LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
	Sampler Type	Sample	Blows/ 6"	SPT N-Value ¹								
1						1 inch tile						
2					SC	4 inches concrete slab						
3					SC	CLAYEY SAND with GRAVEL (SC) dark brown, moist, fine- to medium-grained sand, fine subangular gravel						
4					SC	CLAYEY SAND with GRAVEL (SC) light brown to yellow-brown, medium dense, moist, fine- to medium-grained, fine subangular gravel						
5												
6	SPT		8 11 9	24	SC							
7					SC							
8												
9												
10												
11	S&H		13 12 12	17	CL	CLAY (CL) light brown to yellow-brown mottling, very stiff, moist, fine-grained, with trace sand						
12												
13												
14												
15												
16	ST		800 psi		CL	trace silt Consolidation Test, see Figure C-4					22.9	100
17							PP	3,500				
18												
19												
20												
21	S&H		3 4 5	6	CL	olive-gray with gray mottling, medium stiff, trace sand Triaxial Test, see Figure C-6						
22							PP	3,500				
23							TxUU	2,100	2,850	25.4	100	
24												
25												
26	S&H		12 18 25	30	SC	very stiff, with orange-brown mottling, and trace organic rootlets					22.8	103
27					SC	CLAYEY SAND (SC) yellow-brown, medium dense to dense, moist, fine-grained			3,500			
28						(11/2/16, 9:45 a.m.)						
29												
30												

TEST GEOTECH LOG 750635601-GEOTECH - 3000-BROADWAY B-12 TO B-16.GPJ TR.GDT 5/3/17

LANGAN

Project No.: 750635603

Figure: B-13a

DEPTH (feet)	SAMPLES				LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA					
	Sampler Type	Sample	Blows/6"	SPT N-Value ¹			Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	S&H		5	20	CL	CLAY (CL) olive-gray with dark gray mottling, very stiff, wet CLAY with SAND (CL) gray-brown, very stiff, wet, fine-grained sand LL = 41, PI = 23, see Figure C-2	PP	4,000		22.1	105	
32			12		CL							
33			17									
34												
35	S&H		10	32	CL	CLAY (CL) olive-gray with trace gray mottling, hard, wet						
36			20		CL							
37			26									
38												
39												
40	S&H		20	45	SC	CLAYEY SAND with trace GRAVEL (SC) gray-brown, dense, wet, fine- to medium-grained, fine subangular gravel	PP	3,500		15.8	117	
41			31		SC							
42			33									
43												
44												
45	S&H		9	37	ML	SILT (ML) olive-gray to brown, hard, wet			43.1	21.5	106	
46			18		ML							
47			35									
48												
49												
50												
51												
52												
53												
54												
55												
56												
57												
58												
59												
60												

TEST GEOTECH LOG 750635601-GEOTECH - 3000-BROADWAY B-12 TO B-16.GPJ TR.GDT 5/3/17

Boring terminated at a depth of 46.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater stabilized at 28.5 feet at time of drilling.
PP = pocket penetrometer.

¹ S&H and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.7 and 1.2, respectively to account for sampler type and hammer energy.
² Elevations based on Oakland City Datum. Elevations referenced were obtained from the ALTA Survey performed by Luk and Associates, dated 20 April 2016.

LANGAN

Project No.:
750635603

Figure:
B-13b

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-14

Boring location: See Figure 2

Logged by: J. Sanglerat
Drilled by: Gregg Drilling

Date started: 11/3/16

Date finished: 11/4/16

Drilling method: Hollow Stem Auger

Hammer weight/drop: 140 lbs./30 inches

Hammer type: Safety Auto

Samplers: Sprague & Herwood (S&H), Standard Penetration Test (SPT), Shelby Tube (ST)

LABORATORY TEST DATA

DEPTH (feet)	SAMPLES				LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
	Sampler Type	Sample	Blows/ 6"	SPT N-Value ¹								
1						4 inches concrete slab						
2						CLAYEY SAND with GRAVEL (SC) dark brown, moist, fine- to medium-grained, fine subangular gravel						
3					SC							
4												
5												
6	SPT		7 5 6	13		SANDY CLAY (CL) yellow-brown with black mottling, stiff, moist, fine-grained sand						
7						CLAY (CL) yellow-brown, very stiff, mist, trace fine-grained sand						
8					CL							
9												
10												
11	S&H		10 14 20	24		CLAY (CL) yellow-brown, very stiff, mist, trace fine-grained sand						
12												
13												
14												
15												
16	S&H		11 17 20	26		olive-brown with trace black mottling					25.9	100
17												
18												
19												
20												
21	ST			250 psi		Triaxial Test, see Figure C-6	TxUU PP	2,000	3,600 4,500		25.7	96
22												
23												
24												
25												
26	S&H		6 12 21	23		SANDY CLAY (CL) yellow-brown, very stiff, wet, fine-grained sand LL = 33, PI = 17, see Figure C-2 (11/3/16, 3:15 p.m.)	PP		3,000			
27					CL						57.9	
28												
29												
30												

FILL

TEST GEOTECH LOG 750635601-GEOTECH - 3000-BROADWAY B-14 TO B-16.GPJ TR.GDT 5/3/17

LANGAN

Project No.: 750635603

Figure: B-14a

DEPTH (feet)	SAMPLES				LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA					
	Sampler Type	Sample	Blows/6"	SPT N-Value ¹			Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	S&H		5	23	CL	CLAY with SAND (CL) olive-gray, very stiff, wet, fine-grained sand	PP	3,500				
32			13									
33												
34												
35			6	31		olive-gray to gray, hard	PP	>4,500				
36	S&H		11									
37			25									
38												
39												
40												
41												
42												
43												
44												
45												
46												
47												
48												
49												
50												
51												
52												
53												
54												
55												
56												
57												
58												
59												
60												

TEST GEOTECH LOG 750635601-GEOTECH - 3000-BROADWAY B-14 TO B-16.GPJ TR.GDT 5/3/17

Boring terminated at a depth of 36.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater stabilized at 26.5 feet at time of drilling.
PP = pocket penetrometer.

¹S&H and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.7 and 1.2, respectively to account for sampler type and hammer energy.
²Elevations based on Oakland City Datum. Elevations referenced were obtained from the ALTA Survey performed by Luk and Associates, dated 20 April 2016.

LANGAN

Project No.:
750635603

Figure:
B-14b

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-15

Boring location: See Figure 2

Logged by: J. Sanglerat
Drilled by: Gregg Drilling

Date started: 11/4/16

Date finished: 11/4/16

Drilling method: Hollow Stem Auger

Hammer weight/drop: 140 lbs./30 inches

Hammer type: Safety Auto

Samplers: Sprague & Herwood (S&H), Standard Penetration Test (SPT), Shelby Tube (ST)

LABORATORY TEST DATA

DEPTH (feet)	SAMPLES				LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
	Sampler Type	Sample	Blows/6"	SPT N-value ¹								
1						4 inches of concrete slab						
2						CLAYEY SAND with GRAVEL (SC) yellow-brown, moist, fine-grained, fine subangular gravel						
3					SC							
4												
5						SANDY CLAY (CL) yellow-brown with trace black inclusions, very stiff, moist, medium-grained Consolidation Test, see Figure C-5						
6	S&H		9	16			PP		1,250			
7			11								30.8	89
8						SANDY CLAY (CL) olive-gray with trace black mottling, stiff, moist, fine- to medium-grained sand						
9												
10					CL				2,500 to 3,000			
11	S&H		3	10								
12			5									
13			9									
14						SANDY CLAY (CL) olive-gray, moist, medium-grained sand, fine subangular gravel Particle Size Analysis, see Figure C-3						
15												
16	ST		200	psi			PP		1,500		59.9	22.9
17												
18					CL							
19						lense of CLAYEY SAND (SC) olive-gray, medium-grained, dense, moist						
20												
21	S&H		8	45	SC		PP		4,000			
22			33									
23			31			CLAY with trace SAND (CL) olive-gray, hard, mist, fine- to medium-grained sand						
24					CL							
25						CLAY with trace SAND and SILT (CL) olive-gray to dark gray, very stiff, moist, fine-grained sand						
26	S&H		4	16								
27			8									
28			15									
29					SP-SC	SAND with CLAY (SP-SC) olive-gray, medium dense, moist, fine-grained						
30												

TEST GEOTECH LOG 750635601-GEOTECH - 3000-BROADWAY B-15 TO B-16.GPJ TR.GDT 5/3/17

LANGAN

Project No.: 750635603

Figure: B-15a

DEPTH (feet)	SAMPLES				LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA							
	Sampler Type	Sample	Blows/6"	SPT N-Value ¹			Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft		
31	S&H		8	26	SC	SAND with CLAY (SP-SC) (continued)								
32			19			CLAYEY SAND (SC) olive-gray with yellow-brown mottling, very stiff, moist, fine-grained LL = 36, PI = 17, see Figure C-2				45.6	20.4	108		
33														
34														
35														
36	S&H		6	27	CL	CLAY (CL) olive-gray with brown mottling, wet, very stiff, trace fine-grained sand								
37			15											
38			23											
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														
56														
57														
58														
59														
60														

TEST GEOTECH LOG 750635601-GEOTECH - 3000-BROADWAY B-12 TO B-16.GPJ TR.GDT 5/3/17

Boring terminated at a depth of 36.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater encountered at 32.5 feet (not stabilized).
PP = pocket penetrometer.

¹ S&H and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.7 and 1.2, respectively to account for sampler type and hammer energy.
² Elevations based on Oakland City Datum. Elevations referenced were obtained from the ALTA Survey performed by Luk and Associates, dated 20 April 2016.



PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-16

Boring location: See Figure 2

Logged by: J. Sanglerat
Drilled by: Gregg Drilling

Date started: 11/4/16

Date finished: 11/4/16

Drilling method: Hollow Stem Auger

Hammer weight/drop: 140 lbs./30 inches

Hammer type: Safety Auto

Samplers: Sprague & Herwood (S&H), Standard Penetration Test (SPT), Shelby Tube (ST)

LABORATORY TEST DATA

DEPTH (feet)	SAMPLES				LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
	Sampler Type	Sample	Blows/ 6"	SPT N-Value ¹								
1						6 inches of concrete slab						
2					SC	CLAYEY SAND with GRAVEL (SC) yellow-brown, moist, fine- to medium-grained						
3												
4												
5	S&H		8	18	CL	CLAY with SAND (CL) yellow-brown, very stiff, moist, fine-grained sand LL = 45, PI = 25, see Figure C-2 strong hydrocarbon odor at 6.5 feet	PP		>4,500		23.9	102
6			9									
7			16									
8					SP-SC	SAND with CLAY (SP-SC) yellow-brown, medium dense, moist, fine-grained						
9												
10	S&H		8	28							24.5	99
11			15									
12			25		SC	CLAYEY SAND (SC) yellow-brown, medium dense, mist, fine-grained reduced hydrocarbon odor at 12 feet LL = 30, PI = 11, see Figure C-2						
13												
14												
15	S&H		4	27	CL	SANDY CLAY (CL) yellow-brown to olive-gray trace orange-brown and black inclusions, very stiff, fine- to coarse-grained sand color change to gray at 18 feet, strong hydrocarbon odor LL = 40, PI = 23, see Figure C-2				58.2		
16			13									
17			26									
18												
19												
20	S&H		4	21	CL	CLAY (CL) gray, very stiff, wet, fine-grained sand strong hydrocarbon odor Triaxial Test, see Figure C-6	PP TxUU	2,100	>4,500 5,700		22.3	105
21			9									
22			21									
23												
24												
25	S&H		6	26	CL	no hydrocarbon odor at 24 feet, color chage to yellow-brown SANDY CLAY (CL) yellow-brown, very stiff, moist to wet, fine- to medium-grained sand (11/4/16. 12:33 p.m.)	PP		2,500			
26			15									
27			20									
28												
29												
30												

FILL

TEST GEOTECH LOG 750635601-GEOTECH - 3000-BROADWAY B-12 TO B-16.GPJ TR.GDT 5/3/17

LANGAN

Project No.: 750635603

Figure: B-16a

DEPTH (feet)	SAMPLES				LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA					
	Sampler Type	Sample	Blows/6"	SPT N-Value ¹			Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	S&H		8	28	CL	CLAY (CL) olive-brown, very stiff, wet, with hard silty nodules	PP	4,000				
32			14									
33			17									
34					CH	CLAY (CH) brown with trace black specks, very stiff, wet LL = 63, PI = 41, see Figure C-2	PP	3,000		30.2	94	
35	S&H		7	21								
36			14									
37			16									
38												
39												
40												
41												
42												
43												
44												
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56												
57												
58												
59												
60												

TEST GEOTECH LOG 750635601-GEOTECH - 3000-BROADWAY B-12 TO B-16.GPJ TR.GDT 5/3/17

Boring terminated at a depth of 36.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater stabilized at 27 feet at time of drilling.
PP = pocket penetrometer.

¹S&H and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.7 and 1.2, respectively to account for sampler type and hammer energy.
²Elevations based on Oakland City Datum. Elevations referenced were obtained from the ALTA Survey performed by Luk and Associates, dated 20 April 2016.

LANGAN

Project No.:
750635603

Figure:
B-16b

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-17

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/3/17

Date finished: 2/3/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.1		6-inch-thick concrete slab
2				42/42			CLAYEY SAND (SC) orange-brown, medium dense to dense, moist, brick debris, no odor
3					0.3		
4					0.1		increasing sand and moisture
5					0.1	SC	
6				20/48	0.0		
7					0.0		
8					0.6		
9					0.3	SP	GRAVELLY SAND (SP) red-brown to orange-brown, dry to moist, subangular gravel less than 0.75 inches in diameter, no odor
10	B-17-10.0	•		48/48	0.2		
11					0.0		SILTY CLAY (CL) light gray-brown with orange mottling, medium stiff, moist, no odor (02/03/17, 10:00 a.m.)
12					0.0	CL	
13					1.1		
14				48/48	0.5		
15	B-17-15.0	•			0.2		increasing sand content
16					0.0		
17					0.0		SAND (SP) brown, loose to medium dense, wet to saturated, no odor saturated from 16 to 19 feet
18					0.0	SP	
19				48/48	0.0		
20	B-17-20.0	•			0.0		
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 12.1 feet below ground surface during drilling.

LANGAN

Project No.: 750635603

Figure: B-17

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-18

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/2/17

Date finished: 2/2/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVW (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1							6-inch-thick concrete slab
2				42/42	10.2	SC	CLAYEY SAND (SC) light brown with orange and dark brown mottling, loose to medium dense, dry to moist, brick debris, no odor
3							GRAVELLY SAND (SP) red-brown, loose to medium dense, moist, subangular gravel less than 1.25 inches in diameter, brick debris, trace organics, no odor
4					27.5	SP	
5					6.8		
6				36/48	16.8		
7							
8	B-18-8.0	•			126.5	CL	SILTY CLAY (CL) light gray, medium stiff to stiff, moist, very slight odor
9					114.3	CL	▼ hydrocarbon odor at 9 feet bgs (02/03/17, 10:52 a.m.)
10	B-18-10.0	•		48/48	39.4		
11					301.5		
12					280.2	SC	CLAYEY SAND (SC) gray with some orange mottling, medium dense to dense, moist, weak hydrocarbon odor
13					2.7		increasing sand content
14				48/48	6.4	SP	SAND with GRAVEL (SP) brown, saturated, medium dense, subangular gravel less than 0.5 inches in diameter, no odor
15	B-18-15.0	•			1.3	CL	dark brown at 13 feet bgs orange-brown, increasing fines 13.5 feet bgs
16					3.8		
17					0.6	SP	SILTY CLAY (CL) gray-brown, stiff, moist, no odor
18				48/48	0.4	SM	GRAVELLY SAND (SP) dark brown, loose to medium dense, subangular gravel less than 0.5 inch in diameter, no odor
19							SILTY SAND (SM) light brown to gray-brown, dense, moist, no odor
20	B-18-20.0	•			0.0		

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 9.15 feet below ground surface on 02/03/17, after drilling.

LANGAN

Project No.: 750635603

Figure: B-18

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-19

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/1/17

Date finished: 2/1/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.0	SC	6-inch-thick concrete slab
2					0.0	SC	CLAYEY SAND (SC) orange-brown, loose to medium dense, moist, subangular gravel less than 0.75 inches in diameter, brick and gravel debris, no odor
3					0.0	CL	SANDY CLAY (CL) light gray-brown with orange mottling, medium stiff, moist, no odor
4			48/48		0.0	CL	
5					0.0	CL	
6					0.0	CL	
7					0.0	CL	
8	B-19-8.0	•	48/48		0.0	CL	
9					0.0	CL	▼ (02/02/17, 7:18 a.m.)
10	B-19-10.0	•	48/48		0.0	CL	
11					0.0	CL	
12			48/48		0.0	SP	SAND (SP) orange-brown to brown, medium dense to dense, wet to saturated, no odor
13					0.0	SP	
14					0.0	SP	
15	B-19-15.0	•	48/48		0.0	SP	
16			48/48		0.0	SP	
17					0.0	SP	
18					0.0	SP	
19					0.0	SP	
20	B-19-20.0	•	48/48		0.0	SP	
21					0.0	CL	CLAY (CL) gray-brown, stiff, moist, no odor dark brown at 21.75 feet bgs
22	B-19-22.0	•	48/48		0.0	CL	
23					0.0	CL	
24					0.0	CL	
25					0.0	CL	
26					0.0	CL	
27					0.0	CL	
28					0.0	CL	
29					0.0	CL	
30					0.0	CL	

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 22 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 9.15 feet below ground surface on 02/02/17, after drilling.

LANGAN

Project No.: 750635603

Figure: B-19

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-20

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/1/17

Date finished: 2/1/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.0	SC	6-inch-thick concrete slab
2				42/42			CLAYEY SAND (SC) red-brown to orange-brown, loose to medium dense, moist, subangular gravel less than 0.75 inches in diameter, brick debris, no odor
3					0.1		SANDY CLAY (CL) light brown with orange mottling, medium stiff, moist, no odor
4					0.1		
6				48/48			
7						CL	
8	B-20-8.0	•			0.1		
9							▼ (02/02/17, 7:23 a.m.)
10	B-20-10.0	•		48/48	1.3		
12					2.0	SP	SAND (SP) orange-brown to brown, medium dense, wet to saturated, no odor
14				48/48	0.0	SC	CLAYEY SAND (SC) orange-brown to light brown, medium dense, moist, no odor
15	B-20-15.0	•					
16					0.0	SP	SAND (SP) orange-brown to light brown, loose to medium dense, wet to saturated, no odor
18				48/48	0.0	SC	CLAYEY SAND (SC) light brown, dense to very dense, moist, no odor
19					0.0	CL	CLAY (CL) light gray-brown to brown, stiff to very stiff, moist, no odor
20	B-20-20.0	•					

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 9.17 feet below ground surface on 02/02/17, after drilling.

LANGAN

Project No.: 750635603

Figure: B-20

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-21

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/2/17

Date finished: 2/2/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.0		6-inch-thick concrete slab
2				36/42	0.0		CLAYEY SAND with GRAVEL (SC) brown with orange mottling, medium dense, moist, subangular gravel less than 1 inch in diameter, brick debris, trace organics, no odor
3							
4					0.0	SC	
5					4.1		
6				48/48	17.2		
7							
8	B-21-8.0	•			22.6		SILTY CLAY (CL) light gray-brown with orange mottling, medium stiff, moist, very slight hydrocarbon odor (02/03/17, 10:40 a.m.)
9					7.3	CL ▼	
10	B-21-10.0	•		48/48			increasing sand content
11							
12					15.8		CLAYEY SAND (SC) light gray-brown with orange mottling, medium dense to dense, moist, no odor wet at 12 feet bgs
13					0.3	SC	
14				34/48	0.2		increasing sand content
15	B-21-15.0	•					
16					0.0	SP	SAND with CLAY (SP) brown, loose to medium dense, wet to saturated, no odor saturated from 15.5 to 17 feet bgs.
17							
18				48/48	0.4	SC	CLAYEY SAND (SC) light gray, dense, moist, no odor
19							
20	B-21-20.0	•			0.2		
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 9.1 feet below ground surface on 02/03/17, after drilling.

LANGAN

Project No.: 750635603

Figure: B-21

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-22

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/1/17

Date finished: 2/1/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					1.7		6-inch-thick concrete slab
2				42/42	1.8	CL	SANDY CLAY (CL) brown, soft, moist, trace organics, no odor red-brown to orange-brown
3					2.2		
4					33.6		
5					14.5	SC	CLAYEY SAND with GRAVEL (SC) red-brown to orange-brown, loose to medium dense, subangular gravel less than 1 inch in diameter, trace organics, gravel and brick debris, no odor
6				36/48	21.2		
7					50		
8	B-22-8.0	•			22.7		SILTY CLAY (CL) light gray-brown with orange mottling, stiff, moist, no odor (02/02/17, 7:21 a.m.)
9							
10	B-22-10.0	•		48/48	256	CL	
11							
12					32.4		
13					24.5		
14				48/48	2.6		
15	B-22-15.0	•			0.4	SP	GRAVELLY SAND (SP) black, medium dense, wet, no odor brown at 14.5 feet bgs
16							
17					0.0	SP	SAND with CLAY (SP) brown, medium dense, wet, no odor
18				48/48	0.0	SP	SAND (SP) brown, loose to medium dense, saturated, no odor
19							
20	B-22-20.0	•			0.2	CL	SANDY CLAY (CL) brown, soft, moist, no odor
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 9 feet below ground surface on
02/02/17, after drilling.

LANGAN

Project No.:
750635603

Figure:
B-22

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-23

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/2/17

Date finished: 2/2/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVW (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.0	SM	6-inch-thick concrete slab
2					0.1	SM	SILTY SAND (SM) dark brown, loose to medium dense, dry to moist, no odor
3			36/42			SC	CLAYEY SAND with GRAVEL (SC) light brown, medium dense, moist, subangular gravel less than 0.75 inches in diameter, no odor
4					0.2		orange-brown at 3 feet bgs
5						CL	CLAY (CL) light brown, medium stiff, moist, very slight hydrocarbon odor
6			48/48		1.8		blue-green
7						CL	
8	B-23-8.0	•			1.9		
9					0.8		increasing sand content (02/03/17, 9:04 a.m.)
10	B-23-10.0	•	38/48				
11					2.0	SM	SILTY SAND (SM) blue-green, loose to medium dense, moist, no odor
12	B-23-12.5	•			3.2		
13						SP	SAND with CLAY (SP) blue-green, loose to medium dense, saturated, weak hydrocarbon odor
14			48/48		13.8		orange-brown, medium dense to dense, moist, no odor
15					0.2		
16	B-23-16.0	•			0.1		
17					2.0	SP	SAND (SP) brown to orange -brown, loose to medium dense, saturated, slight hydrocarbon odor
18			48/48				
19					1.8	CL	SANDY CLAY (CL) gray-brown, stiff to very stiff, moist, no odor
20	B-23-20.0	•			0.7		brown

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 9.6 feet below ground surface on 02/03/17, after drilling.

LANGAN

Project No.:
750635603

Figure:
B-23

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-24

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/1/17

Date finished: 2/1/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.0		6-inch-thick concrete slab
2				38/42		CL	SANDY CLAY with GRAVEL (CL) red-brown to orange-brown, medium stiff, moist, subangular gravel less than 0.75 inches in diameter, trace brick debris and organics, no odor
3					0.0		
4							CLAYEY SILTY SAND (SM-SC) light brown, medium dense, moist, no odor
5							
6				30/48	0.0	SM-SC	
7					1.2		olive-gray and hydrocarbon odor, trace organics
8	B-25-8.0	•			10.2		
9					20.6		
10	B-25-10.0	•		48/48	25.6	CL	▼ SILTY CLAY (CL) olive-gray, stiff to very stiff, moist, trace organics, weak to moderate odor (02/02/17, 7:27 a.m.)
11					11.7		
12					66		
13					10.2		
14				48/48	6.1		
15	B-25-15.0	•				SC	CLAYEY SAND with GRAVEL (SC) light brown, medium dense to dense, moist, subangular gravel less than 0.5 inches in diameter, no odor
16					0.1		
17					5.7	CL	SILTY CLAY (CL) olive-gray, stiff, moist, weak hydrocarbon odor brown
18				48/48	32.4	SC	GRAVELLY SAND with CLAY (SC) brown, loose to medium dense, wet, weak hydrocarbon odor
19					52.6	SC	CLAYEY SAND (SC) brown to light brown, dense, moist, weak hydrocarbon odor
20	B-25-20.0	•			10.4		
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 9.65 feet below ground surface on 02/02/17, after drilling.



Project No.: 750635603

Figure: B-24

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-25

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/2/17

Date finished: 2/2/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.0	SM	6-inch-thick concrete slab
2				42/42			SILTY SAND (SM) dark brown, loose to medium dense, dry to moist, brick debris, no odor
3					0.1		
4					0.1	SC	CLAYEY SAND (SC) orange-brown, medium dense, moist, subangular gravel less than 1.5 inches in diameter, brick debris, no odor
5					0.0		
6				24/48			
7					0.0		
8	B-25-8.0	•			0.0		CLAY (CL) light gray-brown, medium stiff, moist, no odor
9					5.6		▼ slight hydrocarbon odor from 9 to 13.5 feet bgs (02/03/17, 9:36 a.m.)
10	B-25-10.0	•		48/48	34.2		
11							
12					3.3		
13					10.1	CL	
14				48/48			
15	B-25-15.5	•			1.4		dark brown
16					0.3		
17					16.6		
18				48/48			
19					1.1		SANDY CLAY (CL) brown, stiff, moist, no odor
20	B-25-20.0	•			1.8	CL	
21					0.2		
22				48/48			
23					0.1	CL	CLAY (CL) dark brown with orange mottling, very stiff to hard, moist, no odor
24					0.0		
25							
26							
27							
28							
29							
30							

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 24 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 9.45 feet below ground surface on 02/03/17, after drilling.



Project No.: 750635603

Figure: B-25

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-26

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/2/17

Date finished: 2/2/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVW (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.0	SM	6-inch-thick concrete slab
2							SILTY SAND (SM) dark brown, loose to medium dense, dry to moist, brick debris, no odor
3			36/48		0.2	SC	CLAYEY SAND with GRAVEL (SC) orange-brown, medium dense, moist, subangular gravel less than 1 inch in diameter, brick debris, no odor
4					0.1		
5					2.1		CLAY (CL) light brown with blue and green mottling, medium stiff, moist, no odor
6			48/48		4.2	CL	blue-green, hydrocarbon odor
7							
8	B-26-8.0	•			7.6		
9					75.4		
10	B-26-10.0	•	48/48		43.6	SM	▼ SILTY SAND (SM) blue-green, medium dense to dense, moist, weak hydrocarbon odor (02/03/17, 9:19 a.m.)
11					8.8		
12					4.3		
13					44.2		orange-brown, no odor
14			48/48		1.1		
15	B-26-15.0	•			1.6	CL	CLAY (CL) brown, medium stiff to stiff, moist, no odor
16					1.2		saturated from 16 to 17 feet bgs
17					4.1		
18			48/48		2.3	SC	CLAYEY SAND (SC) brown, medium dense to dense, moist, hydrocarbon odor from 16.5 to 17.5 feet bgs
19							
20	B-26-20.0	•			1.1	CL	CLAY (CL) brown, stiff to very stiff, moist, no odor
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 20 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 9.85 feet below ground surface on 02/03/17, after drilling.

LANGAN

Project No.: 750635603

Figure: B-26

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-27

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/3/17

Date finished: 2/3/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVN (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1							6-inch asphalt concrete over aggregate base
2						CL	CLAY (CL) gray-brown, soft to medium stiff, moist, no odor
3							SAND with CLAY (SC) light gray-brown with orange mottling, medium dense, moist, no odor
4						SC	(02/03/17, 11:51 a.m.)
5					1.2		
6				36/36	2.5		
7					1.0	SP	GRAVELLY SAND (SP) orange-brown to red-brown, medium dense, moist, brick debris, no odor
8	B-27-8.0	•			0.4		
9					1.0		SILTY SAND (SM) brown, dense, moist to wet, no odor
10	B-27-10.0	•		48/48	0.6	SM	
11					0.5		
12					0.0		
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 12 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 4.09 feet below ground surface during drilling.



Project No.: 750635603

Figure: B-27

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-28

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/3/17

Date finished: 2/3/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1							6-inch-thick concrete slab
2						CL	CLAY (CL) gray-brown, medium stiff, moist, no odor
3							SILTY SAND (SM) light brown, medium dense, moist, slight hydrocarbon odor
4							
5					0.1		∇ (02/03/17, 11:40 a.m.)
6						SM	blue-green
7			36/36		0.5		
8	B-28-8.0	•					
9					1.6		
10						SP	SAND with CLAY (SP) light gray-brown, dense, moist, no odor
11			48/48				
12	B-28-12.0	•				CL	CLAY (CL) dark brown, stiff, moist, no odor
13							
14			4/48				
15						CL	SANDY CLAY (CL) orange-brown, stiff, moist, no odor
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 16 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 4.8 feet below ground surface during drilling.



Project No.:
750635603

Figure:
B-28

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-29

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/4/17

Date finished: 2/4/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.0		6-inch-thick concrete slab
2					0.0	SM	SILTY SAND (SM) dark brown, medium dense, moist, no odor
3				36/42	0.0		orange-brown
4					0.0		CLAYEY SAND (SC) orange-brown, dense, moist, no odor
5					0.0	SC	
6				48/48	0.0		
7					0.0		
8	B-29-8.0	•			0.0		brown
9					0.0	SP	SAND with GRAVEL (SP) orange-brown, loose to medium dense, moist, subangular gravel less than 1 inch in diameter, brick debris, no odor
10	B-29-10.0	•		48/48	0.0		increasing fines
11							
12					0.0		CLAY (CL) light brown with orange mottling, stiff to very stiff, moist, no odor
13					1.4		
14				48/48	0.3		brown
15	B-29-15.0	•			0.0		
16					0.0		
17					0.0		
18				48/48	0.0		
19					0.0		
20	B-29-20.0	•			0.0	CL	▼ (02/06/17)
21					0.0		
22				48/48	0.0		
23							increasing sand content
24	B-29-24.0	•			0.0		
25					0.0		
26				36/48	0.0		
27					0.0		
28					0.0		

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

Boring terminated at a depth of 28 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 19.8 feet below ground surface during drilling.

LANGAN

Project No.:
750635603

Figure:
B-29

PROJECT: **3000 BROADWAY REDEVELOPMENT**
Oakland, California

Log of Boring B-30

PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: K. Staehlin

Date started: 2/4/17

Date finished: 2/4/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.1	CL	6-inch-thick concrete slab
2				42/42	0.2	CL	SANDY CLAY (CL) dark brown, soft to medium stiff, moist, subangular gravel less than 0.75 inches in diameter, no odor
3					0.0	SP	brown with orange mottling at 0.75 feet bgs
4					0.1	SP	SAND with GRAVEL (SP) red-brown to orange-brown, loose to medium dense, dry to moist, subangular gravel less than 1.25 inches in diameter, brick debris, no odor
5							
6				48/48	0.0		
7							SILTY CLAY (CL) light brown, medium stiff to stiff, moist, no odor
8	B-30-8.0	•			0.0	CL	
9					0.0		
10	B-30-10.0	•		48/48	0.0	SM	SILTY SAND with CLAY (SM) light brown, dense, moist, no odor
11							
12							
13							
14				48/48	0.0	CL	SILTY CLAY (CL) light gray-brown with orange mottling, stiff to very stiff, moist, no odor
15	B-30-15.0	•			0.0	CL	∇ (02/04/17, 10:01 a.m.)
16					0.0		
17							increasing sand content
18				32/48	0.1		
19					0.0	SP	SAND (SP) brown to orange-brown, medium dense, moist, no odor
20	B-30-20.0	•			0.0	SP	
21							increasing fines
22				30/48			
23					0.0		
24							
25							
26							
27							
28							
29							
30							

Boring terminated at a depth of 24 feet below ground surface.
Boring backfilled with grout.
Groundwater encountered at 15.2 feet below ground surface during drilling.

LANGAN

Project No.: 750635603

Figure: B-30

TEST ENVIRONMENTAL INCHES 750635602 - 3000 - BROADWAY B-17 TO B-30.GPJ T&R.GDT 5/3/17

PROJECT: **3000 BROADWAY REDEVELOPMENT**
260 20TH STREET
 Oakland, California

Log of Boring B-31
 PAGE 1 OF 1

Boring location: See Figure 2

Logged by: K. Staehlin

Date started: 3/29/17

Date finished: 3/29/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

TEST ENVIRONMENTAL INCHES 750635603 - 3000 - BROADWAY B-31 TO B-36 3000 BROADWAY REDEVEL 260 20TH ST.GPJ T&R.GDT 5/3/17

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					1.3	CL	4 - 6-inch-thick concrete slab
2							SANDY CLAY (CL) brown, soft to medium stiff, moist, no odor
3				30/60	1.8		SAND with SILT and GRAVEL (SM) orange-brown to red-brown, medium dense, moist, trace brick and metal debris, no odor
4					7.2		
5	B-31-5.0	•			21.1	SM	
6							
7							
8				0/60			∇ (03/29/17, initial at 8.5 ft, stabilized at 8.6 ft at 3:00 p.m.)
9							
10					31.1		
11					31.4		SILTY SAND/SAND (SP-SM) gray-brown with orange mottling, medium dense, moist to wet, no odor
12	B-31-12.5	•		60/60	5.7	SP-SM	dense
13					2.3		
14					0.6		
15	B-31-15.0	•			0.0		
16					0.3		SANDY CLAY (CL) brown, stiff to very stiff, moist, no odor
17					0.6	CL	
18				60/60	0.3		increasing sand
19					0.5		
20	B-31-20.0	•			0.2	SP	SAND with SILT (SP) gray-brown, dense to very dense, moist, no odor
21					0.3		
22							
23							
24							
25							
26							
27							
28							
29							
30							

ROCK OBSTRUCTION

Boring terminated at a depth of 20 feet below ground surface.
 Boring backfilled with cement grout.
 Groundwater encountered at 8.6 feet below ground surface during drilling.



Project No.: 750635603

Figure: B-31

PROJECT: **3000 BROADWAY REDEVELOPMENT**
260 20TH STREET
 Oakland, California

Log of Boring B-32

Boring location: See Figure 2
 Logged by: K. Staehlin
 Date started: 3/29/17 Date finished: 3/29/17
 Drilling method: Direct Push
 Hammer weight/drop: NA Hammer type: NA
 Sampler: Continuous

TEST ENVIRONMENTAL INCHES 750635603 - 3000 - BROADWAY B-31 TO B-36 3000 BROADWAY REDEVEL 260 20TH ST.GPJ T&R.GDT 5/3/17

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					14.8	CL	4 - 6-inch-thick concrete slab SANDY CLAY (CL) brown, soft, moist, no odor
2							
3			36/60		71.2	SM	SILTY SAND with GRAVEL (SM) brown to red-brown, medium dense, moist, subangular gravel less than 0.5 inches in diameter, weak odor
4							
5					202		
6					276		
7					214		SANDY CLAY (CL) light brown to gray with orange mottling, soft to medium stiff, moist, weak odor
8	B-32-8.0	•		60/60	362	CL	increasing sand
9					628		
10	B-32-10.0	•			330		SILTY SAND/SAND (SP-SM) orange-brown with gray mottling, medium dense to dense, moist no to weak odor
11					178	SP-SM	
12	B-32-12.5	•		60/60	187		
13					5.4		
14					2.8		
15	B-32-15.0	•			1.0	CL	CLAY (CL) stiff
16					0.2		SILTY SAND (SM) light gray-brown with orange mottling, dense to very dense, moist, no odor
17							light brown/olive
18			60/60		0.8	SM	
19							
20	B-32-20.0	•			0.6		
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring terminated at a depth of 20 feet below ground surface.
 Boring backfilled with cement grout.
 Groundwater not encountered during drilling.



Project No.: 750635603 Figure: B-32

PROJECT: **3000 BROADWAY REDEVELOPMENT**
260 20TH STREET
 Oakland, California

Log of Boring B-33

Boring location: See Figure 2
 Date started: 3/25/17 Date finished: 3/25/17
 Drilling method: Direct Push
 Hammer weight/drop: NA Hammer type: NA
 Sampler: Continuous

Logged by: K. Staehlin

TEST ENVIRONMENTAL INCHES 750635603 - 3000 - BROADWAY B-31 TO B-36 3000 BROADWAY REDEVEL 260 20TH ST.GPJ T&R.GDT 5/3/17

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1							4 - 6-inch-thick concrete slab
2				48/48	1.4	SP	GRAVELLY SAND (SP) brown to orange-brown, medium dense, moist, subangular gravel less than 0.5 inches in diameter, no odor
3					1.7		increasing fines
4							
5					0.0	ML	SANDY SILT (ML) gray-brown with orange mottling, medium stiff, moist, no odor
6				48/48	0.0		
7							
8	B-33-8.0	•			0.0		
9					4.1		
10				36/48	17.2		
11					26.8		
12					78.3		
13	B-33-13.5	•			82.5	SP	wet ▽ (03/25/17) SAND (SP) dark gray, medium dense, wet, medium to strong hydrocarbon odor orange-brown, increasing fines
14				48/48	162		
15					724		
16	B-33-16.0	•			486		
17					16	ML	SANDY SILT (ML) orange-brown, medium stiff to stiff, wet, weak odor
18	B-33-17.5	•			70		
19					205	SP	SAND with CLAY (SP) dark gray, medium dense to dense, wet to saturated, medium to strong hydrocarbon odor
20	B-33-20.0	•			213		
21					140		
22						SM	SILTY SAND (SM) orange-brown to gray, dense, moist, no to weak hydrocarbon odor
23					32.8		
24					9.3		
25							
26							
27							
28							
29							
30							

Boring terminated at a depth of 20 feet below ground surface.
 Boring backfilled with cement grout.
 Groundwater at approximately at 12.5 feet below ground surface during drilling.



Project No.: 750635603 Figure: B-33

PROJECT: **3000 BROADWAY REDEVELOPMENT**
260 20TH STREET
 Oakland, California

Log of Boring B-34

Boring location: See Figure 2
 Logged by: K. Staehlin
 Date started: 3/29/17 Date finished: 3/29/17
 Drilling method: Direct Push
 Hammer weight/drop: NA Hammer type: NA
 Sampler: Continuous

TEST ENVIRONMENTAL INCHES 750635603 - 3000 - BROADWAY B-31 TO B-36 3000 BROADWAY REDEVEL 260 20TH ST.GPJ T&R.GDT 5/3/17

DEPTH (feet)	SAMPLES				OVW (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					2.0	CL	4 - 6-inch-thick concrete slab
2							SANDY CLAY (CL) brown, soft to medium stiff, moist, no odor
3				32/60	1.2	SM	SAND with SILT and GRAVEL (SM) orange-brown to red-brown, medium dense to dense, subangular gravel less than 1.5 inches in diameter, no odor
4					20.8		
5	B-34-5.0	•			10.3		
6					15.4		SANDY CLAY (CL) light brown to gray with orange mottling, soft to medium stiff, moist, no odor
7							
8	B-34-8.0	•		14/60	8.8	CL	▼ (03/29/17, 2:49 p.m.)
9							
10					5.0		
11					19.4		SILTY SAND (SM) orange-brown with gray mottling, medium dense to dense, moist, no odor
12	B-34-12.5	•		60/60	14.2	SM	
13					16.2		
14					2.4		
15	B-34-15.0	•			0.0	CL	CLAY (CL) stiff
16					0.4		SANDY SILT (ML) brown with orange and gray mottling, dense to very dense, moist, no odor
17					0.4		
18				60/60	0.9	ML	▽ gray-brown/olive, very dense (03/29/17)
19					1.1		
20	B-34-20.0	•			0.1		
21					0.2		
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring terminated at a depth of 20 feet below ground surface.
 Boring backfilled with cement grout.
 Groundwater encountered at 8.8 feet below ground surface during drilling.



Project No.: 750635603 Figure: B-34

PROJECT: **3000 BROADWAY REDEVELOPMENT**
260 20TH STREET
 Oakland, California

Log of Boring B-35

Boring location: See Figure 2
 Date started: 3/29/17 Date finished: 3/29/17
 Drilling method: Direct Push
 Hammer weight/drop: NA Hammer type: NA
 Sampler: Continuous

Logged by: K. Staehlin

TEST ENVIRONMENTAL INCHES 750635603 - 3000 - BROADWAY B-31 TO B-36 3000 BROADWAY REDEVEL 260 20TH ST.GPJ T&R.GDT 5/3/17

DEPTH (feet)	SAMPLES				OVM (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1					0.7		4 - 6-inch-thick concrete slab
2							SILTY SAND (SM) brown, medium dense to dense, moist, subangular gravel less than 2 inches in diameter
3			42/60		1.4		gravel and brick debris from 3 to 4.5 feet
4						SM	orange-brown
5					1.4		gray-brown, soft, moist to wet, increasing fines
6					1.3		
7					1.6		
8	B-35-8.0	•		50/60	2.0		CLAY (CL) light brown, very stiff to stiff, moist to wet, no odor
9					2.5		∇ (03/29/17, initial at 8.9 ft, stabilized at 8.98 ft 2:37 p.m.)
10	B-35-10.0	•			1.4		
11					0.7	CL	medium stiff, increasing sand
12	B-35-12.5	•		60/60	0.8		very stiff
13					0.5		
14					0.0		
15	B-35-15.0	•			0.0	ML	SANDY SILT (ML) orange-brown to brown, dense, moist, no odor
16					0.3		
17					0.1		SANDY CLAY (CL) brown, stiff to very stiff, moist, no odor
18			60/60		0.2	CL	gray-brown/olive
19					0.2		
20	B-35-20.0	•			0.0		
21					0.2		
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring terminated at a depth of 20 feet below ground surface.
 Boring backfilled with cement grout.
 Groundwater encountered at 8.98 feet below ground surface during drilling.



Project No.: 750635603 Figure: B-35

PROJECT: **3000 BROADWAY REDEVELOPMENT**
260 20TH STREET
 Oakland, California

Log of Boring B-36
 PAGE 1 OF 1

Boring location: See Figure 2

Logged by: K. Staehlin

Date started: 4/11/17

Date finished: 4/11/17

Drilling method: Direct Push

Hammer weight/drop: NA

Hammer type: NA

Sampler: Continuous

TEST ENVIRONMENTAL INCHES 750635603 - 3000 - BROADWAY B-31 TO B-36 3000 BROADWAY REDEVEL 260 20TH ST.GPJ T&R.GDT 5/3/17

DEPTH (feet)	SAMPLES				OVW (ppm)	LITHOLOGY	MATERIAL DESCRIPTION
	Sample Number	Sample	Blow Count	Recovery (inches)			
1							6 inches asphalt concrete (AC) over aggregate base (AB)
2	B-36-2.5	•		48/48	0.0	SP-SC	SAND with SILT and CLAY (SP-SC) dark brown with orange mottling, loose to medium dense, moist, trace organics and brick debris, no odor
3							
4					0.1	ML	CLAYEY SILT (ML) dark brown with orange mottling, soft, moist, trace organics and brick debris, no odor medium stiff to stiff increasing sand
5							
6				48/48	0.1		(04/11/17, initial at 5.2 ft, stabilized at 5.75 ft)
7							
8	B-36-8.0	•			0.0	SM	SILTY SAND with CLAY (SM) brown with orange mottling, medium dense, moist, no odor
9					2.2		gray-brown to olive, increasing clay
10	B-36-10.0	•		48/48	6.0		
11					7.1	ML	SANDY SILT (ML) olive to blue-green, medium stiff, moist, no odor
12	B-36-12.0	•			8.0		
13					4.4		
14				48/48	0.2	SM	SILTY SAND with CLAY (SM) brown, medium dense, wet to saturated, no odor
15							
16	B-36-16.0	•			0.0		
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring terminated at a depth of 16 feet below ground surface.
 Boring backfilled with cement grout.
 Groundwater encountered at 5.75 feet below ground surface during drilling.

LANGAN

Project No.: 750635603 Figure: B-36

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions		Symbols	Typical Names
Coarse-Grained Soils (more than half of soil > no. 200 sieve size)	Gravels (More than half of coarse fraction > no. 4 sieve size)	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	Sands (More than half of coarse fraction < no. 4 sieve size)	SW	Well-graded sands or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
Fine-Grained Soils (more than half of soil < no. 200 sieve size)	Silts and Clays LL = < 50	ML	Inorganic silts and clayey silts of low plasticity, sandy silts, gravelly silts
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	Silts and Clays LL = > 50	MH	Inorganic silts of high plasticity
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic silts and clays of high plasticity
Highly Organic Soils	PT	Peat and other highly organic soils	

SAMPLE DESIGNATIONS/SYMBOLS

GRAIN SIZE CHART		
Classification	Range of Grain Sizes	
	U.S. Standard Sieve Size	Grain Size in Millimeters
Boulders	Above 12"	Above 305
Cobbles	12" to 3"	305 to 76.2
Gravel coarse fine	3" to No. 4	76.2 to 4.76
	3" to 3/4" 3/4" to No. 4	76.2 to 19.1 19.1 to 4.76
Sand coarse medium fine	No. 4 to No. 200	4.76 to 0.075
	No. 4 to No. 10	4.76 to 2.00
	No. 10 to No. 40	2.00 to 0.420
	No. 40 to No. 200	0.420 to 0.075
Silt and Clay	Below No. 200	Below 0.075

-  Sample taken with Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter. Darkened area indicates soil recovered
-  Classification sample taken with Standard Penetration Test sampler
-  Undisturbed sample taken with thin-walled tube
-  Disturbed sample
-  Sampling attempted with no recovery
-  Core sample
-  Analytical laboratory sample
-  Sample taken with Direct Push or Drive sampler

 Unstabilized groundwater level

 Stabilized groundwater level

SAMPLER TYPE

- | | |
|--|---|
| <p>C Core barrel</p> <p>CA California split-barrel sampler with 2.5-inch outside diameter and a 1.93-inch inside diameter</p> <p>D&M Dames & Moore piston sampler using 2.5-inch outside diameter, thin-walled tube</p> <p>O Osterberg piston sampler using 3.0-inch outside diameter, thin-walled Shelby tube</p> | <p>PT Pitcher tube sampler using 3.0-inch outside diameter, thin-walled Shelby tube</p> <p>S&H Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter</p> <p>SPT Standard Penetration Test (SPT) split-barrel sampler with a 2.0-inch outside diameter and a 1.5-inch inside diameter</p> <p>ST Shelby Tube (3.0-inch outside diameter, thin-walled tube) advanced with hydraulic pressure</p> |
|--|---|

3000 BROADWAY REDEVELOPMENT
Oakland, California

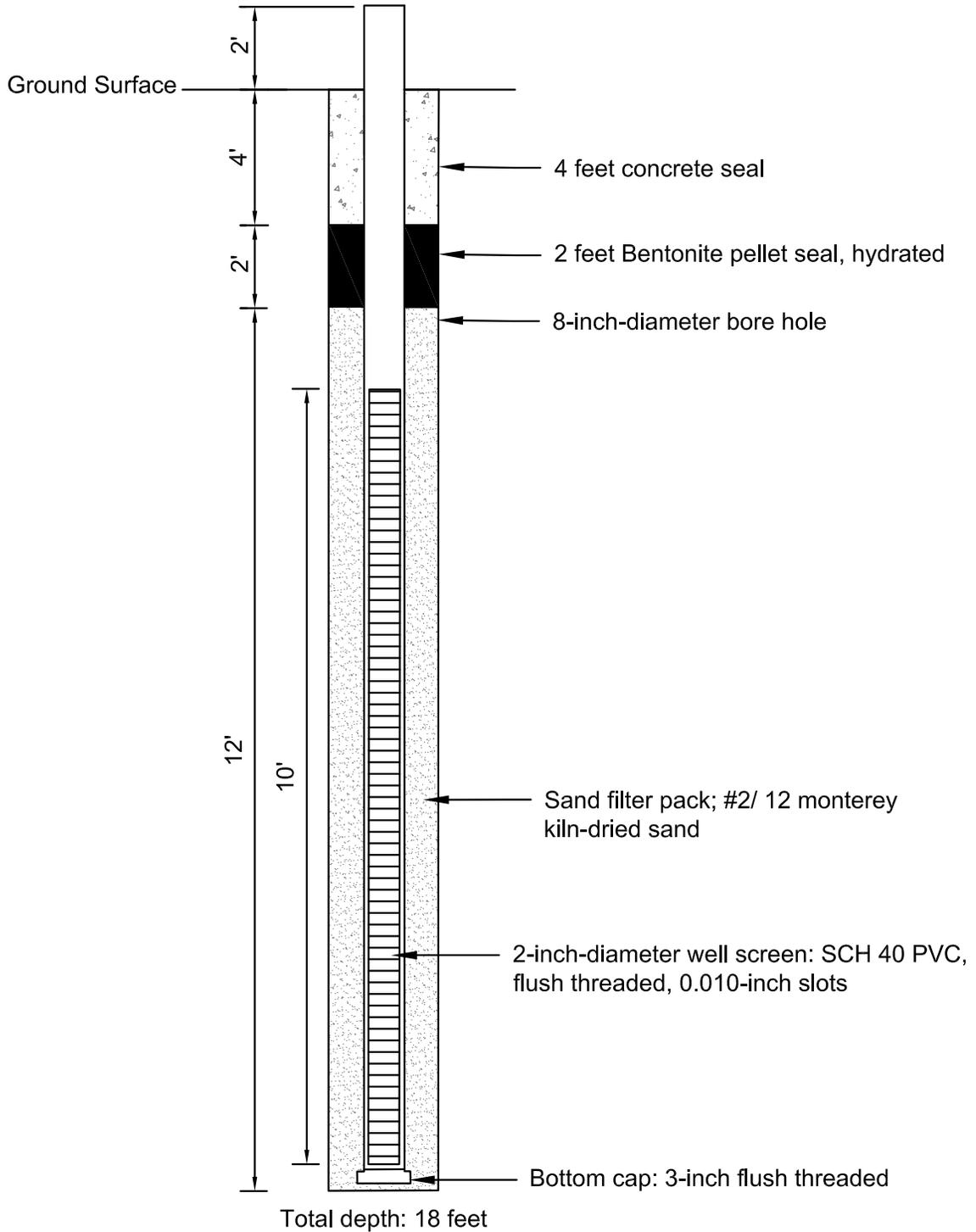
CLASSIFICATION CHART

LANGAN

Date 05/03/17 Project No. 750635603 Figure B-37

APPENDIX C
WELL CONSTRUCTION LOGS

\\langen.com\data\OAK\data6\750635603\Cadd Data -- 750635603\2D-DesignFiles\Environmental\750635603-N-GI0103.dwg 5/03/17



NOT TO SCALE

3000 BROADWAY REDEVELOPMENT
Oakland, California

WELL CONSTRUCTION DIAGRAM
GW-1 AND GW-2

LANGAN

Date 04/28/17 Project No. 750635603 Figure C-1

**APPENDIX D
CERTIFIED ANALYTICAL REPORTS**



McC Campbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1703E11

Report Created for: Langan

555 Montgomery St., Suite 1300
San Francisco, CA 94111

Project Contact: Josh Graber

Project P.O.:

Project Name: 750635603; 260 30th Street

Project Received: 03/27/2017

Analytical Report reviewed & approved for release on 04/03/2017 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.





Glossary of Terms & Qualifier Definitions

Client: Langan
Project: 750635603; 260 30th Street
WorkOrder: 1703E11

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



Glossary of Terms & Qualifier Definitions

Client: Langan
Project: 750635603; 260 30th Street
WorkOrder: 1703E11

Analytical Qualifiers

S	surrogate spike recovery outside accepted recovery limits
a2	sample diluted due to cluttered chromatogram
a4	reporting limits raised due to the sample's matrix prohibiting a full volume extraction.
c2	surrogate recovery outside of the control limits due to matrix interference.
c4	surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
c7	surrogate value diluted out of range
d7	strongly aged gasoline or diesel range compounds are significant in the TPH(g) chromatogram
e2	diesel range compounds are significant; no recognizable pattern
e7	oil range compounds are significant
e11	stoddard solvent/mineral spirit (?)



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-13.5	1703E11-002A	Soil	03/25/2017 13:12	GC16	136315
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Acetone	ND		20	200	03/28/2017 20:22
tert-Amyl methyl ether (TAME)	ND		1.0	200	03/28/2017 20:22
Benzene	ND		1.0	200	03/28/2017 20:22
Bromobenzene	ND		1.0	200	03/28/2017 20:22
Bromochloromethane	ND		1.0	200	03/28/2017 20:22
Bromodichloromethane	ND		1.0	200	03/28/2017 20:22
Bromoform	ND		1.0	200	03/28/2017 20:22
Bromomethane	ND		1.0	200	03/28/2017 20:22
2-Butanone (MEK)	ND		4.0	200	03/28/2017 20:22
t-Butyl alcohol (TBA)	ND		10	200	03/28/2017 20:22
n-Butyl benzene	ND		1.0	200	03/28/2017 20:22
sec-Butyl benzene	ND		1.0	200	03/28/2017 20:22
tert-Butyl benzene	ND		1.0	200	03/28/2017 20:22
Carbon Disulfide	ND		1.0	200	03/28/2017 20:22
Carbon Tetrachloride	ND		1.0	200	03/28/2017 20:22
Chlorobenzene	ND		1.0	200	03/28/2017 20:22
Chloroethane	ND		1.0	200	03/28/2017 20:22
Chloroform	ND		1.0	200	03/28/2017 20:22
Chloromethane	ND		1.0	200	03/28/2017 20:22
2-Chlorotoluene	ND		1.0	200	03/28/2017 20:22
4-Chlorotoluene	ND		1.0	200	03/28/2017 20:22
Dibromochloromethane	ND		1.0	200	03/28/2017 20:22
1,2-Dibromo-3-chloropropane	0.85		0.80	200	03/28/2017 20:22
1,2-Dibromoethane (EDB)	ND		0.80	200	03/28/2017 20:22
Dibromomethane	ND		1.0	200	03/28/2017 20:22
1,2-Dichlorobenzene	ND		1.0	200	03/28/2017 20:22
1,3-Dichlorobenzene	ND		1.0	200	03/28/2017 20:22
1,4-Dichlorobenzene	ND		1.0	200	03/28/2017 20:22
Dichlorodifluoromethane	ND		1.0	200	03/28/2017 20:22
1,1-Dichloroethane	ND		1.0	200	03/28/2017 20:22
1,2-Dichloroethane (1,2-DCA)	ND		0.80	200	03/28/2017 20:22
1,1-Dichloroethene	ND		1.0	200	03/28/2017 20:22
cis-1,2-Dichloroethene	ND		1.0	200	03/28/2017 20:22
trans-1,2-Dichloroethene	ND		1.0	200	03/28/2017 20:22
1,2-Dichloropropane	ND		1.0	200	03/28/2017 20:22
1,3-Dichloropropane	ND		1.0	200	03/28/2017 20:22
2,2-Dichloropropane	ND		1.0	200	03/28/2017 20:22

(Cont.)



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-13.5	1703E11-002A	Soil	03/25/2017 13:12	GC16	136315

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	1.0	200	03/28/2017 20:22
cis-1,3-Dichloropropene	ND	1.0	200	03/28/2017 20:22
trans-1,3-Dichloropropene	ND	1.0	200	03/28/2017 20:22
Diisopropyl ether (DIPE)	ND	1.0	200	03/28/2017 20:22
Ethylbenzene	ND	1.0	200	03/28/2017 20:22
Ethyl tert-butyl ether (ETBE)	ND	1.0	200	03/28/2017 20:22
Freon 113	ND	1.0	200	03/28/2017 20:22
Hexachlorobutadiene	ND	1.0	200	03/28/2017 20:22
Hexachloroethane	ND	1.0	200	03/28/2017 20:22
2-Hexanone	ND	1.0	200	03/28/2017 20:22
Isopropylbenzene	ND	1.0	200	03/28/2017 20:22
4-Isopropyl toluene	ND	1.0	200	03/28/2017 20:22
Methyl-t-butyl ether (MTBE)	ND	1.0	200	03/28/2017 20:22
Methylene chloride	ND	1.0	200	03/28/2017 20:22
4-Methyl-2-pentanone (MIBK)	ND	1.0	200	03/28/2017 20:22
Naphthalene	ND	1.0	200	03/28/2017 20:22
n-Propyl benzene	ND	1.0	200	03/28/2017 20:22
Styrene	ND	1.0	200	03/28/2017 20:22
1,1,1,2-Tetrachloroethane	ND	1.0	200	03/28/2017 20:22
1,1,2,2-Tetrachloroethane	ND	1.0	200	03/28/2017 20:22
Tetrachloroethene	4.6	1.0	200	03/28/2017 20:22
Toluene	ND	1.0	200	03/28/2017 20:22
1,2,3-Trichlorobenzene	ND	1.0	200	03/28/2017 20:22
1,2,4-Trichlorobenzene	ND	1.0	200	03/28/2017 20:22
1,1,1-Trichloroethane	ND	1.0	200	03/28/2017 20:22
1,1,2-Trichloroethane	ND	1.0	200	03/28/2017 20:22
Trichloroethene	19	1.0	200	03/28/2017 20:22
Trichlorofluoromethane	ND	1.0	200	03/28/2017 20:22
1,2,3-Trichloropropane	ND	1.0	200	03/28/2017 20:22
1,2,4-Trimethylbenzene	1.4	1.0	200	03/28/2017 20:22
1,3,5-Trimethylbenzene	ND	1.0	200	03/28/2017 20:22
Vinyl Chloride	ND	1.0	200	03/28/2017 20:22
Xylenes, Total	ND	1.0	200	03/28/2017 20:22

(Cont.)



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-13.5	1703E11-002A	Soil	03/25/2017 13:12	GC16	136315

Analytes	Result		RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>	<u>Qualifiers</u>	<u>Limits</u>		
Dibromofluoromethane	90		70-130		03/28/2017 20:22
Toluene-d8	97		70-130		03/28/2017 20:22
4-BFB	105		70-130		03/28/2017 20:22
Benzene-d6	0	S	60-140		03/28/2017 20:22
Ethylbenzene-d10	0	S	60-140		03/28/2017 20:22
1,2-DCB-d4	106		60-140		03/28/2017 20:22

Analyst(s): JEM

Analytical Comments: c7



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-17.5	1703E11-004A	Soil	03/25/2017 13:26	GC18	136315
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Acetone	ND		6.7	67	03/31/2017 19:42
tert-Amyl methyl ether (TAME)	ND		0.33	67	03/31/2017 19:42
Benzene	ND		0.33	67	03/31/2017 19:42
Bromobenzene	ND		0.33	67	03/31/2017 19:42
Bromochloromethane	ND		0.33	67	03/31/2017 19:42
Bromodichloromethane	ND		0.33	67	03/31/2017 19:42
Bromoform	ND		0.33	67	03/31/2017 19:42
Bromomethane	ND		0.33	67	03/31/2017 19:42
2-Butanone (MEK)	ND		1.3	67	03/31/2017 19:42
t-Butyl alcohol (TBA)	ND		3.3	67	03/31/2017 19:42
n-Butyl benzene	ND		0.33	67	03/31/2017 19:42
sec-Butyl benzene	ND		0.33	67	03/31/2017 19:42
tert-Butyl benzene	ND		0.33	67	03/31/2017 19:42
Carbon Disulfide	ND		0.33	67	03/31/2017 19:42
Carbon Tetrachloride	ND		0.33	67	03/31/2017 19:42
Chlorobenzene	ND		0.33	67	03/31/2017 19:42
Chloroethane	ND		0.33	67	03/31/2017 19:42
Chloroform	ND		0.33	67	03/31/2017 19:42
Chloromethane	ND		0.33	67	03/31/2017 19:42
2-Chlorotoluene	ND		0.33	67	03/31/2017 19:42
4-Chlorotoluene	ND		0.33	67	03/31/2017 19:42
Dibromochloromethane	ND		0.33	67	03/31/2017 19:42
1,2-Dibromo-3-chloropropane	ND		0.27	67	03/31/2017 19:42
1,2-Dibromoethane (EDB)	ND		0.27	67	03/31/2017 19:42
Dibromomethane	ND		0.33	67	03/31/2017 19:42
1,2-Dichlorobenzene	ND		0.33	67	03/31/2017 19:42
1,3-Dichlorobenzene	ND		0.33	67	03/31/2017 19:42
1,4-Dichlorobenzene	ND		0.33	67	03/31/2017 19:42
Dichlorodifluoromethane	ND		0.33	67	03/31/2017 19:42
1,1-Dichloroethane	ND		0.33	67	03/31/2017 19:42
1,2-Dichloroethane (1,2-DCA)	ND		0.27	67	03/31/2017 19:42
1,1-Dichloroethene	ND		0.33	67	03/31/2017 19:42
cis-1,2-Dichloroethene	ND		0.33	67	03/31/2017 19:42
trans-1,2-Dichloroethene	ND		0.33	67	03/31/2017 19:42
1,2-Dichloropropane	ND		0.33	67	03/31/2017 19:42
1,3-Dichloropropane	ND		0.33	67	03/31/2017 19:42
2,2-Dichloropropane	ND		0.33	67	03/31/2017 19:42

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Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-17.5	1703E11-004A	Soil	03/25/2017 13:26	GC18	136315

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.33	67	03/31/2017 19:42
cis-1,3-Dichloropropene	ND	0.33	67	03/31/2017 19:42
trans-1,3-Dichloropropene	ND	0.33	67	03/31/2017 19:42
Diisopropyl ether (DIPE)	ND	0.33	67	03/31/2017 19:42
Ethylbenzene	ND	0.33	67	03/31/2017 19:42
Ethyl tert-butyl ether (ETBE)	ND	0.33	67	03/31/2017 19:42
Freon 113	ND	0.33	67	03/31/2017 19:42
Hexachlorobutadiene	ND	0.33	67	03/31/2017 19:42
Hexachloroethane	ND	0.33	67	03/31/2017 19:42
2-Hexanone	ND	0.33	67	03/31/2017 19:42
Isopropylbenzene	ND	0.33	67	03/31/2017 19:42
4-Isopropyl toluene	ND	0.33	67	03/31/2017 19:42
Methyl-t-butyl ether (MTBE)	ND	0.33	67	03/31/2017 19:42
Methylene chloride	ND	0.33	67	03/31/2017 19:42
4-Methyl-2-pentanone (MIBK)	ND	0.33	67	03/31/2017 19:42
Naphthalene	ND	0.33	67	03/31/2017 19:42
n-Propyl benzene	ND	0.33	67	03/31/2017 19:42
Styrene	ND	0.33	67	03/31/2017 19:42
1,1,1,2-Tetrachloroethane	ND	0.33	67	03/31/2017 19:42
1,1,2,2-Tetrachloroethane	ND	0.33	67	03/31/2017 19:42
Tetrachloroethene	1.5	0.33	67	03/31/2017 19:42
Toluene	ND	0.33	67	03/31/2017 19:42
1,2,3-Trichlorobenzene	ND	0.33	67	03/31/2017 19:42
1,2,4-Trichlorobenzene	ND	0.33	67	03/31/2017 19:42
1,1,1-Trichloroethane	ND	0.33	67	03/31/2017 19:42
1,1,2-Trichloroethane	ND	0.33	67	03/31/2017 19:42
Trichloroethene	4.3	0.33	67	03/31/2017 19:42
Trichlorofluoromethane	ND	0.33	67	03/31/2017 19:42
1,2,3-Trichloropropane	ND	0.33	67	03/31/2017 19:42
1,2,4-Trimethylbenzene	0.35	0.33	67	03/31/2017 19:42
1,3,5-Trimethylbenzene	ND	0.33	67	03/31/2017 19:42
Vinyl Chloride	ND	0.33	67	03/31/2017 19:42
Xylenes, Total	ND	0.33	67	03/31/2017 19:42

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Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-17.5	1703E11-004A	Soil	03/25/2017 13:26	GC18	136315

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>		
Dibromofluoromethane	102	70-130		03/31/2017 19:42
Toluene-d8	97	70-130		03/31/2017 19:42
4-BFB	92	70-130		03/31/2017 19:42
Benzene-d6	68	60-140		03/31/2017 19:42
Ethylbenzene-d10	78	60-140		03/31/2017 19:42
1,2-DCB-d4	84	60-140		03/31/2017 19:42

Analyst(s): AK



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-20.0	1703E11-005A	Soil	03/25/2017 13:30	GC10	136315

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	04/02/2017 03:41
tert-Amyl methyl ether (TAME)	ND	0.0050	1	04/02/2017 03:41
Benzene	ND	0.0050	1	04/02/2017 03:41
Bromobenzene	ND	0.0050	1	04/02/2017 03:41
Bromochloromethane	ND	0.0050	1	04/02/2017 03:41
Bromodichloromethane	ND	0.0050	1	04/02/2017 03:41
Bromoform	ND	0.0050	1	04/02/2017 03:41
Bromomethane	ND	0.0050	1	04/02/2017 03:41
2-Butanone (MEK)	ND	0.020	1	04/02/2017 03:41
t-Butyl alcohol (TBA)	ND	0.050	1	04/02/2017 03:41
n-Butyl benzene	ND	0.0050	1	04/02/2017 03:41
sec-Butyl benzene	ND	0.0050	1	04/02/2017 03:41
tert-Butyl benzene	ND	0.0050	1	04/02/2017 03:41
Carbon Disulfide	ND	0.0050	1	04/02/2017 03:41
Carbon Tetrachloride	ND	0.0050	1	04/02/2017 03:41
Chlorobenzene	ND	0.0050	1	04/02/2017 03:41
Chloroethane	ND	0.0050	1	04/02/2017 03:41
Chloroform	ND	0.0050	1	04/02/2017 03:41
Chloromethane	ND	0.0050	1	04/02/2017 03:41
2-Chlorotoluene	ND	0.0050	1	04/02/2017 03:41
4-Chlorotoluene	ND	0.0050	1	04/02/2017 03:41
Dibromochloromethane	ND	0.0050	1	04/02/2017 03:41
1,2-Dibromo-3-chloropropane	ND	0.0040	1	04/02/2017 03:41
1,2-Dibromoethane (EDB)	ND	0.0040	1	04/02/2017 03:41
Dibromomethane	ND	0.0050	1	04/02/2017 03:41
1,2-Dichlorobenzene	ND	0.0050	1	04/02/2017 03:41
1,3-Dichlorobenzene	ND	0.0050	1	04/02/2017 03:41
1,4-Dichlorobenzene	ND	0.0050	1	04/02/2017 03:41
Dichlorodifluoromethane	ND	0.0050	1	04/02/2017 03:41
1,1-Dichloroethane	ND	0.0050	1	04/02/2017 03:41
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	04/02/2017 03:41
1,1-Dichloroethene	ND	0.0050	1	04/02/2017 03:41
cis-1,2-Dichloroethene	ND	0.0050	1	04/02/2017 03:41
trans-1,2-Dichloroethene	ND	0.0050	1	04/02/2017 03:41
1,2-Dichloropropane	ND	0.0050	1	04/02/2017 03:41
1,3-Dichloropropane	ND	0.0050	1	04/02/2017 03:41
2,2-Dichloropropane	ND	0.0050	1	04/02/2017 03:41

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Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-20.0	1703E11-005A	Soil	03/25/2017 13:30	GC10	136315
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
1,1-Dichloropropene	ND		0.0050	1	04/02/2017 03:41
cis-1,3-Dichloropropene	ND		0.0050	1	04/02/2017 03:41
trans-1,3-Dichloropropene	ND		0.0050	1	04/02/2017 03:41
Diisopropyl ether (DIPE)	ND		0.0050	1	04/02/2017 03:41
Ethylbenzene	ND		0.0050	1	04/02/2017 03:41
Ethyl tert-butyl ether (ETBE)	ND		0.0050	1	04/02/2017 03:41
Freon 113	ND		0.0050	1	04/02/2017 03:41
Hexachlorobutadiene	ND		0.0050	1	04/02/2017 03:41
Hexachloroethane	ND		0.0050	1	04/02/2017 03:41
2-Hexanone	ND		0.0050	1	04/02/2017 03:41
Isopropylbenzene	ND		0.0050	1	04/02/2017 03:41
4-Isopropyl toluene	ND		0.0050	1	04/02/2017 03:41
Methyl-t-butyl ether (MTBE)	ND		0.0050	1	04/02/2017 03:41
Methylene chloride	ND		0.0050	1	04/02/2017 03:41
4-Methyl-2-pentanone (MIBK)	ND		0.0050	1	04/02/2017 03:41
Naphthalene	ND		0.0050	1	04/02/2017 03:41
n-Propyl benzene	ND		0.0050	1	04/02/2017 03:41
Styrene	ND		0.0050	1	04/02/2017 03:41
1,1,1,2-Tetrachloroethane	ND		0.0050	1	04/02/2017 03:41
1,1,2,2-Tetrachloroethane	ND		0.0050	1	04/02/2017 03:41
Tetrachloroethene	ND		0.0050	1	04/02/2017 03:41
Toluene	ND		0.0050	1	04/02/2017 03:41
1,2,3-Trichlorobenzene	ND		0.0050	1	04/02/2017 03:41
1,2,4-Trichlorobenzene	ND		0.0050	1	04/02/2017 03:41
1,1,1-Trichloroethane	ND		0.0050	1	04/02/2017 03:41
1,1,2-Trichloroethane	ND		0.0050	1	04/02/2017 03:41
Trichloroethene	0.0098		0.0050	1	04/02/2017 03:41
Trichlorofluoromethane	ND		0.0050	1	04/02/2017 03:41
1,2,3-Trichloropropane	ND		0.0050	1	04/02/2017 03:41
1,2,4-Trimethylbenzene	ND		0.0050	1	04/02/2017 03:41
1,3,5-Trimethylbenzene	ND		0.0050	1	04/02/2017 03:41
Vinyl Chloride	ND		0.0050	1	04/02/2017 03:41
Xylenes, Total	ND		0.0050	1	04/02/2017 03:41

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-20.0	1703E11-005A	Soil	03/25/2017 13:30	GC10	136315

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	85	70-130		04/02/2017 03:41
Toluene-d8	101	70-130		04/02/2017 03:41
4-BFB	77	70-130		04/02/2017 03:41
Benzene-d6	75	60-140		04/02/2017 03:41
Ethylbenzene-d10	90	60-140		04/02/2017 03:41
1,2-DCB-d4	74	60-140		04/02/2017 03:41

Analyst(s): KF



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/29/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW3550C
Analytical Method: SW8310
Unit: mg/kg

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) by HPLC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-13.5	1703E11-002A	Soil	03/25/2017 13:12	HPLC4	136407

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.050	1	03/30/2017 11:31
Acenaphthylene	ND	0.050	1	03/30/2017 11:31
Anthracene	ND	0.25	5	03/30/2017 13:43
Benzo (a) anthracene	ND	0.25	5	03/30/2017 13:43
Benzo (a) pyrene	ND	0.25	5	03/30/2017 13:43
Benzo (b) fluoranthene	ND	0.25	5	03/30/2017 13:43
Benzo (g,h,i) perylene	ND	0.25	5	03/30/2017 13:43
Benzo (k) fluoranthene	ND	0.25	5	03/30/2017 13:43
Chrysene	ND	0.25	5	03/30/2017 13:43
Dibenzo (a,h) anthracene	ND	0.25	5	03/30/2017 13:43
Fluoranthene	ND	0.25	5	03/30/2017 13:43
Fluorene	0.057	0.050	1	03/30/2017 11:31
Indeno (1,2,3-cd) pyrene	ND	0.25	5	03/30/2017 13:43
1-Methylnaphthalene	0.28	0.050	1	03/30/2017 11:31
2-Methylnaphthalene	0.28	0.050	1	03/30/2017 11:31
Naphthalene	0.14	0.050	1	03/30/2017 11:31
Phenanthrene	0.15	0.050	1	03/30/2017 11:31
Pyrene	ND	0.25	5	03/30/2017 13:43

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Decafluorobiphenyl	144	S	70-130	03/30/2017 11:31
4,4-Dichlorobiphenyl	244	S	70-130	03/30/2017 11:31

Analyst(s): BBO

Analytical Comments: a4,a2



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/29/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW3550C
Analytical Method: SW8310
Unit: mg/kg

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) by HPLC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-17.5	1703E11-004A	Soil	03/25/2017 13:26	HPLC4	136407

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.050	1	03/30/2017 12:15
Acenaphthylene	ND	0.050	1	03/30/2017 12:15
Anthracene	ND	0.25	5	03/30/2017 14:27
Benzo (a) anthracene	ND	0.25	5	03/30/2017 14:27
Benzo (a) pyrene	ND	0.25	5	03/30/2017 14:27
Benzo (b) fluoranthene	ND	0.25	5	03/30/2017 14:27
Benzo (g,h,i) perylene	ND	0.25	5	03/30/2017 14:27
Benzo (k) fluoranthene	ND	0.25	5	03/30/2017 14:27
Chrysene	ND	0.25	5	03/30/2017 14:27
Dibenzo (a,h) anthracene	ND	0.25	5	03/30/2017 14:27
Fluoranthene	ND	0.25	5	03/30/2017 14:27
Fluorene	ND	0.050	1	03/30/2017 12:15
Indeno (1,2,3-cd) pyrene	ND	0.25	5	03/30/2017 14:27
1-Methylnaphthalene	0.15	0.050	1	03/30/2017 12:15
2-Methylnaphthalene	0.17	0.050	1	03/30/2017 12:15
Naphthalene	0.081	0.050	1	03/30/2017 12:15
Phenanthrene	0.060	0.050	1	03/30/2017 12:15
Pyrene	ND	0.25	5	03/30/2017 14:27

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Decafluorobiphenyl	106		70-130	03/30/2017 12:15
4,4-Dichlorobiphenyl	157	S	70-130	03/30/2017 12:15

Analyst(s): BBO

Analytical Comments: a4,a2



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/29/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW3550C
Analytical Method: SW8310
Unit: mg/kg

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) by HPLC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-20.0	1703E11-005A	Soil	03/25/2017 13:30	HPLC4	136407

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.0050	1	03/29/2017 19:54
Acenaphthylene	ND	0.0050	1	03/29/2017 19:54
Anthracene	ND	0.0050	1	03/29/2017 19:54
Benzo (a) anthracene	ND	0.0050	1	03/29/2017 19:54
Benzo (a) pyrene	ND	0.0050	1	03/29/2017 19:54
Benzo (b) fluoranthene	ND	0.0050	1	03/29/2017 19:54
Benzo (g,h,i) perylene	ND	0.0050	1	03/29/2017 19:54
Benzo (k) fluoranthene	ND	0.0050	1	03/29/2017 19:54
Chrysene	ND	0.0050	1	03/29/2017 19:54
Dibenzo (a,h) anthracene	ND	0.0050	1	03/29/2017 19:54
Fluoranthene	ND	0.0050	1	03/29/2017 19:54
Fluorene	ND	0.0050	1	03/29/2017 19:54
Indeno (1,2,3-cd) pyrene	ND	0.0050	1	03/29/2017 19:54
1-Methylnaphthalene	ND	0.0050	1	03/29/2017 19:54
2-Methylnaphthalene	ND	0.0050	1	03/29/2017 19:54
Naphthalene	ND	0.0050	1	03/29/2017 19:54
Phenanthrene	ND	0.0050	1	03/29/2017 19:54
Pyrene	ND	0.0050	1	03/29/2017 19:54
Surrogates	REC (%)	Limits		
Decafluorobiphenyl	83	70-130		03/29/2017 19:54
4,4-Dichlorobiphenyl	74	70-130		03/29/2017 19:54

Analyst(s): BBO



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-13.5	1703E11-002A	Soil	03/25/2017 13:12	GC19	136314

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	1200	200	200	03/30/2017 22:11
MTBE	---	10	200	03/30/2017 22:11
Benzene	---	1.0	200	03/30/2017 22:11
Toluene	---	1.0	200	03/30/2017 22:11
Ethylbenzene	---	1.0	200	03/30/2017 22:11
Xylenes	---	3.0	200	03/30/2017 22:11

Surrogates	REC (%)	Limits
2-Fluorotoluene	116	62-126

Analyst(s): IA **Analytical Comments:** d7

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-17.5	1703E11-004A	Soil	03/25/2017 13:26	GC19	136314

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	420	200	200	03/30/2017 14:23
MTBE	---	10	200	03/30/2017 14:23
Benzene	---	1.0	200	03/30/2017 14:23
Toluene	---	1.0	200	03/30/2017 14:23
Ethylbenzene	---	1.0	200	03/30/2017 14:23
Xylenes	---	3.0	200	03/30/2017 14:23

Surrogates	REC (%)	Qualifiers	Limits
2-Fluorotoluene	179	S	62-126

Analyst(s): IA **Analytical Comments:** d7,c4



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-20.0	1703E11-005A	Soil	03/25/2017 13:30	GC19	136314

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	04/01/2017 18:51
MTBE	---	0.050	1	04/01/2017 18:51
Benzene	---	0.0050	1	04/01/2017 18:51
Toluene	---	0.0050	1	04/01/2017 18:51
Ethylbenzene	---	0.0050	1	04/01/2017 18:51
Xylenes	---	0.015	1	04/01/2017 18:51

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	78	62-126	04/01/2017 18:51

Analyst(s): LT



Analytical Report

Client: Langan
Date Received: 3/27/17 16:10
Date Prepared: 3/28/17
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
Extraction Method: SW3550B
Analytical Method: SW8015B
Unit: mg/Kg

Total Extractable Petroleum Hydrocarbons w/out SG Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-13.5	1703E11-002A	Soil	03/25/2017 13:12	GC6A	136313
<u>Analytes</u>					
	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	1100		10	10	03/31/2017 02:32
TPH-Motor Oil (C18-C36)	2900		50	10	03/31/2017 02:32
<u>Surrogates</u>					
	<u>REC (%)</u>		<u>Limits</u>		
C26	96		70-130		03/31/2017 02:32
<u>Analyst(s):</u> TK			<u>Analytical Comments:</u> e7,e2,e11		

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-17.5	1703E11-004A	Soil	03/25/2017 13:26	GC6A	136313
<u>Analytes</u>					
	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	250		100	100	03/31/2017 00:36
TPH-Motor Oil (C18-C36)	810		500	100	03/31/2017 00:36
<u>Surrogates</u>					
	<u>REC (%)</u>	<u>Qualifiers</u>	<u>Limits</u>		
C9	124	S	78-109		03/31/2017 00:36
<u>Analyst(s):</u> TK			<u>Analytical Comments:</u> e7,e2,e11,c2		

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-33-20.0	1703E11-005A	Soil	03/25/2017 13:30	GC9a	136313
<u>Analytes</u>					
	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	ND		1.0	1	03/28/2017 15:04
TPH-Motor Oil (C18-C36)	ND		5.0	1	03/28/2017 15:04
<u>Surrogates</u>					
	<u>REC (%)</u>		<u>Limits</u>		
C9	100		78-109		03/28/2017 15:04
<u>Analyst(s):</u> TK					



Quality Control Report

Client: Langan
Date Prepared: 3/28/17
Date Analyzed: 3/28/17
Instrument: GC18
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
BatchID: 136315
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-136315
 1703E11-002AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	0.10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.0384	0.0050	0.050	-	77	53-116
Benzene	ND	0.0469	0.0050	0.050	-	94	63-137
Bromobenzene	ND	-	0.0050	-	-	-	-
Bromochloromethane	ND	-	0.0050	-	-	-	-
Bromodichloromethane	ND	-	0.0050	-	-	-	-
Bromoform	ND	-	0.0050	-	-	-	-
Bromomethane	ND	-	0.0050	-	-	-	-
2-Butanone (MEK)	ND	-	0.020	-	-	-	-
t-Butyl alcohol (TBA)	ND	0.137	0.050	0.20	-	69	41-135
n-Butyl benzene	ND	-	0.0050	-	-	-	-
sec-Butyl benzene	ND	-	0.0050	-	-	-	-
tert-Butyl benzene	ND	-	0.0050	-	-	-	-
Carbon Disulfide	ND	-	0.0050	-	-	-	-
Carbon Tetrachloride	ND	-	0.0050	-	-	-	-
Chlorobenzene	ND	0.0480	0.0050	0.050	-	96	77-121
Chloroethane	ND	-	0.0050	-	-	-	-
Chloroform	ND	-	0.0050	-	-	-	-
Chloromethane	ND	-	0.0050	-	-	-	-
2-Chlorotoluene	ND	-	0.0050	-	-	-	-
4-Chlorotoluene	ND	-	0.0050	-	-	-	-
Dibromochloromethane	ND	-	0.0050	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.0040	-	-	-	-
1,2-Dibromoethane (EDB)	ND	0.0436	0.0040	0.050	-	87	67-119
Dibromomethane	ND	-	0.0050	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.0050	-	-	-	-
Dichlorodifluoromethane	ND	-	0.0050	-	-	-	-
1,1-Dichloroethane	ND	-	0.0050	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.0436	0.0040	0.050	-	87	58-135
1,1-Dichloroethene	ND	0.0439	0.0050	0.050	-	88	42-145
cis-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
1,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,3-Dichloropropane	ND	-	0.0050	-	-	-	-
2,2-Dichloropropane	ND	-	0.0050	-	-	-	-

(Cont.)

NELAP 4033ORELAP

QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 3/28/17
Date Analyzed: 3/28/17
Instrument: GC18
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
BatchID: 136315
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-136315
 1703E11-002AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1-Dichloropropene	ND	-	0.0050	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
Diisopropyl ether (DIPE)	ND	0.0444	0.0050	0.050	-	89	52-129
Ethylbenzene	ND	-	0.0050	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.0429	0.0050	0.050	-	86	53-125
Freon 113	ND	-	0.0050	-	-	-	-
Hexachlorobutadiene	ND	-	0.0050	-	-	-	-
Hexachloroethane	ND	-	0.0050	-	-	-	-
2-Hexanone	ND	-	0.0050	-	-	-	-
Isopropylbenzene	ND	-	0.0050	-	-	-	-
4-Isopropyl toluene	ND	-	0.0050	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.0416	0.0050	0.050	-	83	58-122
Methylene chloride	ND	-	0.0050	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.0050	-	-	-	-
Naphthalene	ND	-	0.0050	-	-	-	-
n-Propyl benzene	ND	-	0.0050	-	-	-	-
Styrene	ND	-	0.0050	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
Tetrachloroethene	ND	-	0.0050	-	-	-	-
Toluene	ND	0.0491	0.0050	0.050	-	98	76-130
1,2,3-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.0050	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.0050	-	-	-	-
Trichloroethene	ND	0.0476	0.0050	0.050	-	95	72-132
Trichlorofluoromethane	ND	-	0.0050	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.0050	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.0050	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.0050	-	-	-	-
Vinyl Chloride	ND	-	0.0050	-	-	-	-
Xylenes, Total	ND	-	0.0050	-	-	-	-

(Cont.)

NELAP 4033ORELAP

QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 3/28/17
Date Analyzed: 3/28/17
Instrument: GC18
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
BatchID: 136315
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-136315
 1703E11-002AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Surrogate Recovery							
Dibromofluoromethane	0.1223	0.124		0.12	98	99	70-130
Toluene-d8	0.1357	0.135		0.12	109	108	70-130
4-BFB	0.01277	0.0126		0.012	102	101	70-130
Benzene-d6	0.08919	0.0858		0.10	89	86	60-140
Ethylbenzene-d10	0.1053	0.101		0.10	105	101	60-140
1,2-DCB-d4	0.07716	0.0811		0.10	77	81	60-140

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
tert-Amyl methyl ether (TAME)	NR	NR		ND<1	NR	NR	-	NR	-
Benzene	NR	NR		ND<1	NR	NR	-	NR	-
t-Butyl alcohol (TBA)	NR	NR		ND<10	NR	NR	-	NR	-
Chlorobenzene	NR	NR		ND<1	NR	NR	-	NR	-
1,2-Dibromoethane (EDB)	NR	NR		ND<0.8	NR	NR	-	NR	-
1,2-Dichloroethane (1,2-DCA)	NR	NR		ND<0.8	NR	NR	-	NR	-
1,1-Dichloroethene	NR	NR		ND<1	NR	NR	-	NR	-
Diisopropyl ether (DIPE)	NR	NR		ND<1	NR	NR	-	NR	-
Ethyl tert-butyl ether (ETBE)	NR	NR		ND<1	NR	NR	-	NR	-
Methyl-t-butyl ether (MTBE)	NR	NR		ND<1	NR	NR	-	NR	-
Toluene	NR	NR		ND<1	NR	NR	-	NR	-
Trichloroethene	NR	NR		19	NR	NR	-	NR	-
Surrogate Recovery									
Dibromofluoromethane	NR	NR			NR	NR	-	NR	-
Toluene-d8	NR	NR			NR	NR	-	NR	-
4-BFB	NR	NR			NR	NR	-	NR	-
Benzene-d6	NR	NR			NR	NR	-	NR	-
Ethylbenzene-d10	NR	NR			NR	NR	-	NR	-
1,2-DCB-d4	NR	NR			NR	NR	-	NR	-



Quality Control Report

Client: Langan
Date Prepared: 3/29/17
Date Analyzed: 3/29/17
Instrument: HPLC4
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
BatchID: 136407
Extraction Method: SW3550C
Analytical Method: SW8310
Unit: mg/kg
Sample ID: MB/LCS-136407
 1703E11-005AMS/MSD

QC Summary Report for SW8310

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acenaphthene	ND	-	0.0050	-	-	-	-
Acenaphthylene	ND	-	0.0050	-	-	-	-
Anthracene	ND	-	0.0050	-	-	-	-
Benzo (a) anthracene	ND	0.0130	0.0050	0.015	-	87	70-130
Benzo (a) pyrene	ND	0.0126	0.0050	0.015	-	84	70-130
Benzo (b) fluoranthene	ND	-	0.0050	-	-	-	-
Benzo (g,h,i) perylene	ND	-	0.0050	-	-	-	-
Benzo (k) fluoranthene	ND	-	0.0050	-	-	-	-
Chrysene	ND	0.0140	0.0050	0.015	-	93	70-130
Dibenzo (a,h) anthracene	ND	-	0.0050	-	-	-	-
Fluoranthene	ND	-	0.0050	-	-	-	-
Fluorene	ND	-	0.0050	-	-	-	-
Indeno (1,2,3-cd) pyrene	ND	-	0.0050	-	-	-	-
1-Methylnaphthalene	ND	0.0127	0.0050	0.015	-	85	70-130
2-Methylnaphthalene	ND	0.0123	0.0050	0.015	-	82	70-130
Naphthalene	ND	-	0.0050	-	-	-	-
Phenanthrene	ND	0.0138	0.0050	0.015	-	92	70-130
Pyrene	ND	0.0144	0.0050	0.015	-	96	70-130
Surrogate Recovery							
Decafluorobiphenyl	0.7498	0.697		1	75	70	70-130
4,4-Dichlorobiphenyl	0.3913	0.467		0.50	78	93	70-130



Quality Control Report

Client: Langan
Date Prepared: 3/29/17
Date Analyzed: 3/29/17
Instrument: HPLC4
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
BatchID: 136407
Extraction Method: SW3550C
Analytical Method: SW8310
Unit: mg/kg
Sample ID: MB/LCS-136407
 1703E11-005AMS/MSD

QC Summary Report for SW8310

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Benzo (a) anthracene	0.0131	0.0131	0.015	ND	88	88	70-130	0	30
Benzo (a) pyrene	0.0111	0.0114	0.015	ND	74	76	70-130	2.48	30
Chrysene	0.0140	0.0140	0.015	ND	94	93	70-130	0.320	30
1-Methylnaphthalene	0.0136	0.0136	0.015	ND	90	91	70-130	0.267	30
2-Methylnaphthalene	0.0132	0.0130	0.015	ND	88	87	70-130	1.26	30
Phenanthrene	0.0145	0.0140	0.015	ND	97	94	70-130	3.25	30
Pyrene	0.0157	0.0152	0.015	ND	105	101	70-130	3.40	30
Surrogate Recovery									
Decafluorobiphenyl	0.710	0.770	1		71	77	70-130	8.06	30
4,4-Dichlorobiphenyl	0.575	0.512	0.50		115	102	70-130	11.6	30



Quality Control Report

Client: Langan
Date Prepared: 3/28/17
Date Analyzed: 3/29/17
Instrument: GC19
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
BatchID: 136314
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg
Sample ID: MB/LCS-136314
 1703E11-004AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	0.581	0.40	0.60	-	97	82-118
MTBE	ND	0.111	0.050	0.10	-	111	61-119
Benzene	ND	0.118	0.0050	0.10	-	118	77-128
Toluene	ND	0.122	0.0050	0.10	-	122	74-132
Ethylbenzene	ND	0.122	0.0050	0.10	-	122	84-127
Xylenes	ND	0.345	0.015	0.30	-	115	86-129
Surrogate Recovery							
2-Fluorotoluene	0.09476	0.102		0.10	95	102	75-134

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	NR	NR		ND<80	NR	NR	-	NR	-
MTBE	NR	NR		ND<10	NR	NR	-	NR	-
Benzene	NR	NR		ND<1	NR	NR	-	NR	-
Toluene	NR	NR		ND<1	NR	NR	-	NR	-
Ethylbenzene	NR	NR		ND<1	NR	NR	-	NR	-
Xylenes	NR	NR		ND<3	NR	NR	-	NR	-
Surrogate Recovery									
2-Fluorotoluene	NR	NR			NR	NR	-	NR	-



Quality Control Report

Client: Langan
Date Prepared: 3/28/17
Date Analyzed: 3/28/17
Instrument: GC9b
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703E11
BatchID: 136313
Extraction Method: SW3550B
Analytical Method: SW8015B
Unit: mg/Kg
Sample ID: MB/LCS-136313
 1703E11-004AMS/MSD

QC Report for SW8015B w/out SG Clean-Up

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH-Diesel (C10-C23)	ND	39.5	1.0	40	-	99	79-133
TPH-Motor Oil (C18-C36)	ND	-	5.0	-	-	-	-
Surrogate Recovery							
C9	25.02	25.1		25	100	100	77-109

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	NR	NR		250	NR	NR	-	NR	-
Surrogate Recovery									
C9	NR	NR			NR	NR	-	NR	-



1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1703E11

ClientCode: TWRF

WaterTrax
 WriteOn
 EDF
 Excel
 EQulS
 Email
 HardCopy
 ThirdParty
 J-flag

Report to:

Josh Graber
 Langan
 555 Montgomery St., Suite 1300
 San Francisco, CA 94111
 (415) 955-9040 FAX: (415) 955-9041

Email: jdgraber@treadwellrollo.com
 cc/3rd Party: kstaehlin@langan.com;
 PO:
 ProjectNo: 750635603; 260 30th Street

Bill to:

Accounts Payable
 Langan
 555 Montgomery St., Suite 1300
 San Francisco, CA 94111
 Langan_InvoiceCapture@concursolutio

Requested TAT: 5 days;

Date Received: 03/27/2017

Date Logged: 03/28/2017

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)												
					1	2	3	4	5	6	7	8	9	10	11	12	
1703E11-002	B-33-13.5	Soil	3/25/2017 13:12	<input type="checkbox"/>	A	A	A	A									
1703E11-004	B-33-17.5	Soil	3/25/2017 13:26	<input type="checkbox"/>	A	A	A	A									
1703E11-005	B-33-20.0	Soil	3/25/2017 13:30	<input type="checkbox"/>	A	A	A	A									

Test Legend:

1	8260B_S	2	8310_S	3	G-MBTEx_S	4	TPH(DMO)_S
5		6		7		8	
9		10		11		12	

Prepared by: Maria Venegas

The following SampIDs: 002A, 004A, 005A contain testgroup Multi Range_S.

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



WORK ORDER SUMMARY

Client Name: LANGAN
Client Contact: Josh Graber
Contact's Email: jdgraber@treadwellrollo.com

Project: 750635603; 260 30th Street

Work Order: 1703E11
QC Level: LEVEL 2
Date Logged: 3/28/2017

Comments:

WaterTrax WriteOn EDF Excel Fax Email HardCopy ThirdParty J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1703E11-001A	B-33-8.0	Soil		1	Acetate Liner	<input type="checkbox"/>	3/25/2017 12:50			<input checked="" type="checkbox"/>	
1703E11-002A	B-33-13.5	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm	1	Acetate Liner	<input type="checkbox"/>	3/25/2017 13:12	5 days		<input type="checkbox"/>	
			SW8310 (PAHs/PNAs)			<input type="checkbox"/>		5 days		<input type="checkbox"/>	
			SW8260B (VOCs)			<input type="checkbox"/>		5 days		<input type="checkbox"/>	
1703E11-003A	B-33-16.0	Soil		1	Acetate Liner	<input type="checkbox"/>	3/25/2017 13:19			<input checked="" type="checkbox"/>	
1703E11-004A	B-33-17.5	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm	1	Acetate Liner	<input type="checkbox"/>	3/25/2017 13:26	5 days		<input type="checkbox"/>	
			SW8310 (PAHs/PNAs)			<input type="checkbox"/>		5 days		<input type="checkbox"/>	
			SW8260B (VOCs)			<input type="checkbox"/>		5 days		<input type="checkbox"/>	
1703E11-005A	B-33-20.0	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm	1	Acetate Liner	<input type="checkbox"/>	3/25/2017 13:30	5 days		<input type="checkbox"/>	
			SW8310 (PAHs/PNAs)			<input type="checkbox"/>		5 days		<input type="checkbox"/>	
			SW8260B (VOCs)			<input type="checkbox"/>		5 days		<input type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



Sample Receipt Checklist

Client Name: **Langan**
 Project Name: **750635603; 260 30th Street**
 WorkOrder No: **1703E11** Matrix: Soil
 Carrier: Bernie Cummins (MAI Courier)

Date and Time Received: **3/27/2017 16:10**
 Date Logged: **3/28/2017**
 Received by: **Maria Venegas**
 Logged by: **Maria Venegas**

Chain of Custody (COC) Information

Chain of custody present? Yes No
 Chain of custody signed when relinquished and received? Yes No
 Chain of custody agrees with sample labels? Yes No
 Sample IDs noted by Client on COC? Yes No
 Date and Time of collection noted by Client on COC? Yes No
 Sampler's name noted on COC? Yes No

Sample Receipt Information

Custody seals intact on shipping container/cooler? Yes No NA
 Shipping container/cooler in good condition? Yes No
 Samples in proper containers/bottles? Yes No
 Sample containers intact? Yes No
 Sufficient sample volume for indicated test? Yes No

Sample Preservation and Hold Time (HT) Information

All samples received within holding time? Yes No NA
 Sample/Temp Blank temperature Temp: 3.4°C NA
 Water - VOA vials have zero headspace / no bubbles? Yes No NA
 Sample labels checked for correct preservation? Yes No
 pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)? Yes No NA
 Samples Received on Ice? Yes No
 (Ice Type: WET ICE)

UCMR3 Samples:

Total Chlorine tested and acceptable upon receipt for EPA 522? Yes No NA
 Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539? Yes No NA

Comments:



McC Campbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1703F87 A

Report Created for: Langan

501 14th Street, 3rd Floor
Oakland, CA 94612

Project Contact: Josh Graber

Project P.O.:

Project Name: 750635603; 260 30th Street

Project Received: 03/30/2017

Analytical Report reviewed & approved for release on 04/13/2017 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.





Glossary of Terms & Qualifier Definitions

Client: Langan
Project: 750635603; 260 30th Street
WorkOrder: 1703F87

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



Glossary of Terms & Qualifier Definitions

Client: Langan
Project: 750635603; 260 30th Street
WorkOrder: 1703F87

Analytical Qualifiers

S surrogate spike recovery outside accepted recovery limits
b1 aqueous sample that contains greater than ~1 vol. % sediment
c4 surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
c7 surrogate value diluted out of range
e2 diesel range compounds are significant; no recognizable pattern
e4 gasoline range compounds are significant.
e7 oil range compounds are significant

Quality Control Qualifiers

F1 MS/MSD recovery and/or RPD is out of acceptance criteria; LCS validates the prep batch.
F2 LCS/LCSD recovery and/or RPD is out of acceptance criteria.



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/10/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-20.0	1703F87-009A	Soil	03/29/2017 08:48	GC18	137049
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Acetone	ND		0.10	1	04/12/2017 17:58
tert-Amyl methyl ether (TAME)	ND		0.0050	1	04/12/2017 17:58
Benzene	ND		0.0050	1	04/12/2017 17:58
Bromobenzene	ND		0.0050	1	04/12/2017 17:58
Bromochloromethane	ND		0.0050	1	04/12/2017 17:58
Bromodichloromethane	ND		0.0050	1	04/12/2017 17:58
Bromoform	ND		0.0050	1	04/12/2017 17:58
Bromomethane	ND		0.0050	1	04/12/2017 17:58
2-Butanone (MEK)	ND		0.020	1	04/12/2017 17:58
t-Butyl alcohol (TBA)	ND		0.050	1	04/12/2017 17:58
n-Butyl benzene	ND		0.0050	1	04/12/2017 17:58
sec-Butyl benzene	ND		0.0050	1	04/12/2017 17:58
tert-Butyl benzene	ND		0.0050	1	04/12/2017 17:58
Carbon Disulfide	ND		0.0050	1	04/12/2017 17:58
Carbon Tetrachloride	ND		0.0050	1	04/12/2017 17:58
Chlorobenzene	ND		0.0050	1	04/12/2017 17:58
Chloroethane	ND		0.0050	1	04/12/2017 17:58
Chloroform	ND		0.0050	1	04/12/2017 17:58
Chloromethane	ND		0.0050	1	04/12/2017 17:58
2-Chlorotoluene	ND		0.0050	1	04/12/2017 17:58
4-Chlorotoluene	ND		0.0050	1	04/12/2017 17:58
Dibromochloromethane	ND		0.0050	1	04/12/2017 17:58
1,2-Dibromo-3-chloropropane	ND		0.0040	1	04/12/2017 17:58
1,2-Dibromoethane (EDB)	ND		0.0040	1	04/12/2017 17:58
Dibromomethane	ND		0.0050	1	04/12/2017 17:58
1,2-Dichlorobenzene	ND		0.0050	1	04/12/2017 17:58
1,3-Dichlorobenzene	ND		0.0050	1	04/12/2017 17:58
1,4-Dichlorobenzene	ND		0.0050	1	04/12/2017 17:58
Dichlorodifluoromethane	ND		0.0050	1	04/12/2017 17:58
1,1-Dichloroethane	ND		0.0050	1	04/12/2017 17:58
1,2-Dichloroethane (1,2-DCA)	ND		0.0040	1	04/12/2017 17:58
1,1-Dichloroethene	ND		0.0050	1	04/12/2017 17:58
cis-1,2-Dichloroethene	ND		0.0050	1	04/12/2017 17:58
trans-1,2-Dichloroethene	ND		0.0050	1	04/12/2017 17:58
1,2-Dichloropropane	ND		0.0050	1	04/12/2017 17:58
1,3-Dichloropropane	ND		0.0050	1	04/12/2017 17:58
2,2-Dichloropropane	ND		0.0050	1	04/12/2017 17:58

(Cont.)



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/10/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-20.0	1703F87-009A	Soil	03/29/2017 08:48	GC18	137049

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.0050	1	04/12/2017 17:58
cis-1,3-Dichloropropene	ND	0.0050	1	04/12/2017 17:58
trans-1,3-Dichloropropene	ND	0.0050	1	04/12/2017 17:58
Diisopropyl ether (DIPE)	ND	0.0050	1	04/12/2017 17:58
Ethylbenzene	ND	0.0050	1	04/12/2017 17:58
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	04/12/2017 17:58
Freon 113	ND	0.0050	1	04/12/2017 17:58
Hexachlorobutadiene	ND	0.0050	1	04/12/2017 17:58
Hexachloroethane	ND	0.0050	1	04/12/2017 17:58
2-Hexanone	ND	0.0050	1	04/12/2017 17:58
Isopropylbenzene	ND	0.0050	1	04/12/2017 17:58
4-Isopropyl toluene	ND	0.0050	1	04/12/2017 17:58
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	04/12/2017 17:58
Methylene chloride	ND	0.0050	1	04/12/2017 17:58
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	04/12/2017 17:58
Naphthalene	ND	0.0050	1	04/12/2017 17:58
n-Propyl benzene	ND	0.0050	1	04/12/2017 17:58
Styrene	ND	0.0050	1	04/12/2017 17:58
1,1,1,2-Tetrachloroethane	ND	0.0050	1	04/12/2017 17:58
1,1,2,2-Tetrachloroethane	ND	0.0050	1	04/12/2017 17:58
Tetrachloroethene	ND	0.0050	1	04/12/2017 17:58
Toluene	ND	0.0050	1	04/12/2017 17:58
1,2,3-Trichlorobenzene	ND	0.0050	1	04/12/2017 17:58
1,2,4-Trichlorobenzene	ND	0.0050	1	04/12/2017 17:58
1,1,1-Trichloroethane	ND	0.0050	1	04/12/2017 17:58
1,1,2-Trichloroethane	ND	0.0050	1	04/12/2017 17:58
Trichloroethene	ND	0.0050	1	04/12/2017 17:58
Trichlorofluoromethane	ND	0.0050	1	04/12/2017 17:58
1,2,3-Trichloropropane	ND	0.0050	1	04/12/2017 17:58
1,2,4-Trimethylbenzene	ND	0.0050	1	04/12/2017 17:58
1,3,5-Trimethylbenzene	ND	0.0050	1	04/12/2017 17:58
Vinyl Chloride	ND	0.0050	1	04/12/2017 17:58
Xylenes, Total	ND	0.0050	1	04/12/2017 17:58

(Cont.)



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/10/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-20.0	1703F87-009A	Soil	03/29/2017 08:48	GC18	137049

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>		
Dibromofluoromethane	99	70-130		04/12/2017 17:58
Toluene-d8	104	70-130		04/12/2017 17:58
4-BFB	95	70-130		04/12/2017 17:58
Benzene-d6	83	60-140		04/12/2017 17:58
Ethylbenzene-d10	92	60-140		04/12/2017 17:58
1,2-DCB-d4	72	60-140		04/12/2017 17:58

Analyst(s): AK



Quality Control Report

Client: Langan
Date Prepared: 4/10/17
Date Analyzed: 4/11/17 - 4/12/17
Instrument: GC16, GC18
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 137049
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-137049

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	0.10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.0391	0.0050	0.050	-	78	53-116
Benzene	ND	0.0495	0.0050	0.050	-	99	63-137
Bromobenzene	ND	-	0.0050	-	-	-	-
Bromochloromethane	ND	-	0.0050	-	-	-	-
Bromodichloromethane	ND	-	0.0050	-	-	-	-
Bromoform	ND	-	0.0050	-	-	-	-
Bromomethane	ND	-	0.0050	-	-	-	-
2-Butanone (MEK)	ND	-	0.020	-	-	-	-
t-Butyl alcohol (TBA)	ND	0.144	0.050	0.20	-	72	41-135
n-Butyl benzene	ND	-	0.0050	-	-	-	-
sec-Butyl benzene	ND	-	0.0050	-	-	-	-
tert-Butyl benzene	ND	-	0.0050	-	-	-	-
Carbon Disulfide	ND	-	0.0050	-	-	-	-
Carbon Tetrachloride	ND	-	0.0050	-	-	-	-
Chlorobenzene	ND	0.0485	0.0050	0.050	-	97	77-121
Chloroethane	ND	-	0.0050	-	-	-	-
Chloroform	ND	-	0.0050	-	-	-	-
Chloromethane	ND	-	0.0050	-	-	-	-
2-Chlorotoluene	ND	-	0.0050	-	-	-	-
4-Chlorotoluene	ND	-	0.0050	-	-	-	-
Dibromochloromethane	ND	-	0.0050	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.0040	-	-	-	-
1,2-Dibromoethane (EDB)	ND	0.0441	0.0040	0.050	-	88	67-119
Dibromomethane	ND	-	0.0050	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.0050	-	-	-	-
Dichlorodifluoromethane	ND	-	0.0050	-	-	-	-
1,1-Dichloroethane	ND	-	0.0050	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.0448	0.0040	0.050	-	90	58-135
1,1-Dichloroethene	ND	0.0490	0.0050	0.050	-	98	42-145
cis-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
1,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,3-Dichloropropane	ND	-	0.0050	-	-	-	-
2,2-Dichloropropane	ND	-	0.0050	-	-	-	-

(Cont.)

NELAP 4033ORELAP

QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 4/10/17
Date Analyzed: 4/11/17 - 4/12/17
Instrument: GC16, GC18
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 137049
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-137049

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1-Dichloropropene	ND	-	0.0050	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
Diisopropyl ether (DIPE)	ND	0.0459	0.0050	0.050	-	92	52-129
Ethylbenzene	ND	-	0.0050	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.0438	0.0050	0.050	-	88	53-125
Freon 113	ND	-	0.0050	-	-	-	-
Hexachlorobutadiene	ND	-	0.0050	-	-	-	-
Hexachloroethane	ND	-	0.0050	-	-	-	-
2-Hexanone	ND	-	0.0050	-	-	-	-
Isopropylbenzene	ND	-	0.0050	-	-	-	-
4-Isopropyl toluene	ND	-	0.0050	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.0425	0.0050	0.050	-	85	58-122
Methylene chloride	ND	-	0.0050	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.0050	-	-	-	-
Naphthalene	ND	-	0.0050	-	-	-	-
n-Propyl benzene	ND	-	0.0050	-	-	-	-
Styrene	ND	-	0.0050	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
Tetrachloroethene	ND	-	0.0050	-	-	-	-
Toluene	ND	0.0496	0.0050	0.050	-	99	76-130
1,2,3-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.0050	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.0050	-	-	-	-
Trichloroethene	ND	0.0505	0.0050	0.050	-	101	72-132
Trichlorofluoromethane	ND	-	0.0050	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.0050	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.0050	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.0050	-	-	-	-
Vinyl Chloride	ND	-	0.0050	-	-	-	-
Xylenes, Total	ND	-	0.0050	-	-	-	-



Quality Control Report

Client: Langan
Date Prepared: 4/10/17
Date Analyzed: 4/11/17 - 4/12/17
Instrument: GC16, GC18
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 137049
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-137049

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Surrogate Recovery							
Dibromofluoromethane	0.1074	0.125		0.12	86	100	70-130
Toluene-d8	0.1312	0.131		0.12	105	105	70-130
4-BFB	0.01178	0.0134		0.012	94	107	70-130
Benzene-d6	0.09094	0.0945		0.10	91	95	60-140
Ethylbenzene-d10	0.1062	0.106		0.10	106	106	60-140
1,2-DCB-d4	0.07366	0.0839		0.10	74	84	60-140



1534 Willow Pass Rd
 Pittsburg, CA 94565-1701
 (925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1703F87 **A** ClientCode: TWRK

WaterTrax
 WriteOn
 EDF
 Excel
 Fax
 Email
 HardCopy
 ThirdParty
 J-flag

Report to:
 Josh Graber
 Langan
 501 14th Street, 3rd Floor
 Oakland, CA 94612
 (415) 955-9040 FAX: (415) 955-9041

Email: jdgraber@treadwellrollo.com
 cc/3rd Party: kstaehlin@langan.com;
 PO:
 ProjectNo: 750635603; 260 30th Street

Bill to:
 Accounts Payable
 Langan
 555 Montgomery St., Suite 1300
 San Francisco, CA 94111
 Langan_InvoiceCapture@concursoft.com

Requested TAT: 3 days;

Date Received: 03/30/2017
Date Logged: 03/30/2017
Date Add-On: 04/10/2017

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)												
					1	2	3	4	5	6	7	8	9	10	11	12	
1703F87-009	B-32-20.0	Soil	3/29/2017 08:48	<input type="checkbox"/>	A												

Test Legend:

1	8260B_S	2		3		4	
5		6		7		8	
9		10		11		12	

Prepared by: Alexandra Iniguez
Add-On Prepared By: Agustina Venegas

Comments: 009 Taken off hold, set up for 8260 on a 72R Rush 4/10/17

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



WORK ORDER SUMMARY

Client Name: LANGAN

Project: 750635603; 260 30th Street

Work Order: 1703F87

Client Contact: Josh Graber

QC Level: LEVEL 2

Contact's Email jdgraber@treadwellrollo.com

Comments: 009 Taken off hold, set up for 8260 on a 72R Rush 4/10/17

Date Logged: 3/30/2017

Date Add-On: 4/10/2017

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1703F87-009A	B-32-20.0	Soil	SW8260B (VOCs)	1	Acetate Liner	3/29/2017 8:48	3 days		<input type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

RUSH

* PLEASE C.C. ANNIE S. AT * 10433
KSTAEHLIN@LANGAN.COM

LANGAN

CHAIN OF CUSTODY RECORD

1703787 Page 1 of 2

- 555 Montgomery Street, Suite 1300, San Francisco, CA 94111
- 501 14th Street, Third Floor, Oakland CA 94612
- 3320 Data Drive, Suite 350, Rancho Cordova, CA 95670-7982
- 4030 Moorpark Ave. Suite 210, San Jose, CA 95117-1849

Site Name: 260 30TH STREET
 Job Number: 750635603
 Project Manager/Contact: JOSH GRABER
 Samplers: KARIANNE STAEHLIN
 Recorder (Signature Required): [Signature]

Turnaround Time
72-Hour

Field Sample Identification No.	Date	Time	Lab Sample No.	Matrix & Preservative								Analysis Requested			Remarks		
				Soil	Water	Air	Other	HCL	H ₂ SO ₄	HNO ₃	Ice	TPH (g/d, ml)	VOCS	PAHs (8310)		Silica gel clean-up	Hold
B-31-5.0	3/29/17	1138		X													X *TAKEN OFF HOLD & PLACED ON A 72 HR 4/10/17
B-31-12.5		1155		X													
B-31-15.0		1200		X													
B-31-20.0		1214		X													
B-32-8.0		0806		X													
B-32-10.0		0810		X													
B-32-12.5		0830		X													
B-32-15.0		0835		X													
B-32-20.0		0848		X													
B-34-5.0		0900		X													
B-34-8.0		0911		X													
B-34-12.5		0920		X													
B-34-15.0		0925		X													
B-34-20.0	3/29/17	0934		X													

Relinquished by: (Signature) <u>[Signature]</u>	Date: <u>3-30-17</u>	Time: <u>1420</u>	Received by: (Signature) <u>[Signature]</u>	Date: <u>3-30-17</u>	Time: <u>1235</u>
Relinquished by: (Signature) <u>[Signature]</u>	Date: <u>3-30-17</u>	Time: <u>1420</u>	Received by: (Signature) <u>[Signature]</u>	Date: <u>3/30/17</u>	Time: <u>1420</u>
Relinquished by: (Signature) <u>[Signature]</u>	Date:	Time:	Received by Lab: (Signature)	Date:	Time:

Sent to Laboratory (Name): McCAMPBELL ANALYTICAL
 Laboratory Comments/Notes:
 Method of Shipment: Lab courier Fed Ex Airborne UPS
 Hand Carried Private Courier (Co. Name)



McC Campbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1703F87

Report Created for: Langan

501 14th Street, 3rd Floor
Oakland, CA 94612

Project Contact: Josh Graber

Project P.O.:

Project Name: 750635603; 260 30th Street

Project Received: 03/30/2017

Analytical Report reviewed & approved for release on 04/05/2017 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.





Glossary of Terms & Qualifier Definitions

Client: Langan
Project: 750635603; 260 30th Street
WorkOrder: 1703F87

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



Glossary of Terms & Qualifier Definitions

Client: Langan
Project: 750635603; 260 30th Street
WorkOrder: 1703F87

Analytical Qualifiers

S surrogate spike recovery outside accepted recovery limits
b1 aqueous sample that contains greater than ~1 vol. % sediment
c4 surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
c7 surrogate value diluted out of range
e2 diesel range compounds are significant; no recognizable pattern
e4 gasoline range compounds are significant.
e7 oil range compounds are significant

Quality Control Qualifiers

F1 MS/MSD recovery and/or RPD is out of acceptance criteria; LCS validates the prep batch.
F2 LCS/LCSD recovery and/or RPD is out of acceptance criteria.



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-12.5	1703F87-002A	Soil	03/29/2017 11:55	GC10	136565

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	04/01/2017 14:33
tert-Amyl methyl ether (TAME)	ND	0.0050	1	04/01/2017 14:33
Benzene	ND	0.0050	1	04/01/2017 14:33
Bromobenzene	ND	0.0050	1	04/01/2017 14:33
Bromochloromethane	ND	0.0050	1	04/01/2017 14:33
Bromodichloromethane	ND	0.0050	1	04/01/2017 14:33
Bromoform	ND	0.0050	1	04/01/2017 14:33
Bromomethane	ND	0.0050	1	04/01/2017 14:33
2-Butanone (MEK)	ND	0.020	1	04/01/2017 14:33
t-Butyl alcohol (TBA)	ND	0.050	1	04/01/2017 14:33
n-Butyl benzene	ND	0.0050	1	04/01/2017 14:33
sec-Butyl benzene	ND	0.0050	1	04/01/2017 14:33
tert-Butyl benzene	ND	0.0050	1	04/01/2017 14:33
Carbon Disulfide	ND	0.0050	1	04/01/2017 14:33
Carbon Tetrachloride	ND	0.0050	1	04/01/2017 14:33
Chlorobenzene	ND	0.0050	1	04/01/2017 14:33
Chloroethane	ND	0.0050	1	04/01/2017 14:33
Chloroform	ND	0.0050	1	04/01/2017 14:33
Chloromethane	ND	0.0050	1	04/01/2017 14:33
2-Chlorotoluene	ND	0.0050	1	04/01/2017 14:33
4-Chlorotoluene	ND	0.0050	1	04/01/2017 14:33
Dibromochloromethane	ND	0.0050	1	04/01/2017 14:33
1,2-Dibromo-3-chloropropane	ND	0.0040	1	04/01/2017 14:33
1,2-Dibromoethane (EDB)	ND	0.0040	1	04/01/2017 14:33
Dibromomethane	ND	0.0050	1	04/01/2017 14:33
1,2-Dichlorobenzene	ND	0.0050	1	04/01/2017 14:33
1,3-Dichlorobenzene	ND	0.0050	1	04/01/2017 14:33
1,4-Dichlorobenzene	ND	0.0050	1	04/01/2017 14:33
Dichlorodifluoromethane	ND	0.0050	1	04/01/2017 14:33
1,1-Dichloroethane	ND	0.0050	1	04/01/2017 14:33
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	04/01/2017 14:33
1,1-Dichloroethene	ND	0.0050	1	04/01/2017 14:33
cis-1,2-Dichloroethene	ND	0.0050	1	04/01/2017 14:33
trans-1,2-Dichloroethene	ND	0.0050	1	04/01/2017 14:33
1,2-Dichloropropane	ND	0.0050	1	04/01/2017 14:33
1,3-Dichloropropane	ND	0.0050	1	04/01/2017 14:33
2,2-Dichloropropane	ND	0.0050	1	04/01/2017 14:33

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-12.5	1703F87-002A	Soil	03/29/2017 11:55	GC10	136565

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.0050	1	04/01/2017 14:33
cis-1,3-Dichloropropene	ND	0.0050	1	04/01/2017 14:33
trans-1,3-Dichloropropene	ND	0.0050	1	04/01/2017 14:33
Diisopropyl ether (DIPE)	ND	0.0050	1	04/01/2017 14:33
Ethylbenzene	ND	0.0050	1	04/01/2017 14:33
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	04/01/2017 14:33
Freon 113	ND	0.0050	1	04/01/2017 14:33
Hexachlorobutadiene	ND	0.0050	1	04/01/2017 14:33
Hexachloroethane	ND	0.0050	1	04/01/2017 14:33
2-Hexanone	ND	0.0050	1	04/01/2017 14:33
Isopropylbenzene	ND	0.0050	1	04/01/2017 14:33
4-Isopropyl toluene	ND	0.0050	1	04/01/2017 14:33
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	04/01/2017 14:33
Methylene chloride	ND	0.0050	1	04/01/2017 14:33
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	04/01/2017 14:33
Naphthalene	ND	0.0050	1	04/01/2017 14:33
n-Propyl benzene	ND	0.0050	1	04/01/2017 14:33
Styrene	ND	0.0050	1	04/01/2017 14:33
1,1,1,2-Tetrachloroethane	ND	0.0050	1	04/01/2017 14:33
1,1,2,2-Tetrachloroethane	ND	0.0050	1	04/01/2017 14:33
Tetrachloroethene	ND	0.0050	1	04/01/2017 14:33
Toluene	ND	0.0050	1	04/01/2017 14:33
1,2,3-Trichlorobenzene	ND	0.0050	1	04/01/2017 14:33
1,2,4-Trichlorobenzene	ND	0.0050	1	04/01/2017 14:33
1,1,1-Trichloroethane	ND	0.0050	1	04/01/2017 14:33
1,1,2-Trichloroethane	ND	0.0050	1	04/01/2017 14:33
Trichloroethene	ND	0.0050	1	04/01/2017 14:33
Trichlorofluoromethane	ND	0.0050	1	04/01/2017 14:33
1,2,3-Trichloropropane	ND	0.0050	1	04/01/2017 14:33
1,2,4-Trimethylbenzene	ND	0.0050	1	04/01/2017 14:33
1,3,5-Trimethylbenzene	ND	0.0050	1	04/01/2017 14:33
Vinyl Chloride	ND	0.0050	1	04/01/2017 14:33
Xylenes, Total	ND	0.0050	1	04/01/2017 14:33

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-12.5	1703F87-002A	Soil	03/29/2017 11:55	GC10	136565

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	85	70-130		04/01/2017 14:33
Toluene-d8	106	70-130		04/01/2017 14:33
4-BFB	75	70-130		04/01/2017 14:33
Benzene-d6	84	60-140		04/01/2017 14:33
Ethylbenzene-d10	99	60-140		04/01/2017 14:33
1,2-DCB-d4	71	60-140		04/01/2017 14:33

Analyst(s): KF



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-15.0	1703F87-003A	Soil	03/29/2017 12:00	GC18	136485

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	03/31/2017 15:47
tert-Amyl methyl ether (TAME)	ND	0.0050	1	03/31/2017 15:47
Benzene	ND	0.0050	1	03/31/2017 15:47
Bromobenzene	ND	0.0050	1	03/31/2017 15:47
Bromochloromethane	ND	0.0050	1	03/31/2017 15:47
Bromodichloromethane	ND	0.0050	1	03/31/2017 15:47
Bromoform	ND	0.0050	1	03/31/2017 15:47
Bromomethane	ND	0.0050	1	03/31/2017 15:47
2-Butanone (MEK)	ND	0.020	1	03/31/2017 15:47
t-Butyl alcohol (TBA)	ND	0.050	1	03/31/2017 15:47
n-Butyl benzene	ND	0.0050	1	03/31/2017 15:47
sec-Butyl benzene	ND	0.0050	1	03/31/2017 15:47
tert-Butyl benzene	ND	0.0050	1	03/31/2017 15:47
Carbon Disulfide	ND	0.0050	1	03/31/2017 15:47
Carbon Tetrachloride	ND	0.0050	1	03/31/2017 15:47
Chlorobenzene	ND	0.0050	1	03/31/2017 15:47
Chloroethane	ND	0.0050	1	03/31/2017 15:47
Chloroform	ND	0.0050	1	03/31/2017 15:47
Chloromethane	ND	0.0050	1	03/31/2017 15:47
2-Chlorotoluene	ND	0.0050	1	03/31/2017 15:47
4-Chlorotoluene	ND	0.0050	1	03/31/2017 15:47
Dibromochloromethane	ND	0.0050	1	03/31/2017 15:47
1,2-Dibromo-3-chloropropane	ND	0.0040	1	03/31/2017 15:47
1,2-Dibromoethane (EDB)	ND	0.0040	1	03/31/2017 15:47
Dibromomethane	ND	0.0050	1	03/31/2017 15:47
1,2-Dichlorobenzene	ND	0.0050	1	03/31/2017 15:47
1,3-Dichlorobenzene	ND	0.0050	1	03/31/2017 15:47
1,4-Dichlorobenzene	ND	0.0050	1	03/31/2017 15:47
Dichlorodifluoromethane	ND	0.0050	1	03/31/2017 15:47
1,1-Dichloroethane	ND	0.0050	1	03/31/2017 15:47
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	03/31/2017 15:47
1,1-Dichloroethene	ND	0.0050	1	03/31/2017 15:47
cis-1,2-Dichloroethene	ND	0.0050	1	03/31/2017 15:47
trans-1,2-Dichloroethene	ND	0.0050	1	03/31/2017 15:47
1,2-Dichloropropane	ND	0.0050	1	03/31/2017 15:47
1,3-Dichloropropane	ND	0.0050	1	03/31/2017 15:47
2,2-Dichloropropane	ND	0.0050	1	03/31/2017 15:47

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-15.0	1703F87-003A	Soil	03/29/2017 12:00	GC18	136485

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.0050	1	03/31/2017 15:47
cis-1,3-Dichloropropene	ND	0.0050	1	03/31/2017 15:47
trans-1,3-Dichloropropene	ND	0.0050	1	03/31/2017 15:47
Diisopropyl ether (DIPE)	ND	0.0050	1	03/31/2017 15:47
Ethylbenzene	ND	0.0050	1	03/31/2017 15:47
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	03/31/2017 15:47
Freon 113	ND	0.0050	1	03/31/2017 15:47
Hexachlorobutadiene	ND	0.0050	1	03/31/2017 15:47
Hexachloroethane	ND	0.0050	1	03/31/2017 15:47
2-Hexanone	ND	0.0050	1	03/31/2017 15:47
Isopropylbenzene	ND	0.0050	1	03/31/2017 15:47
4-Isopropyl toluene	ND	0.0050	1	03/31/2017 15:47
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	03/31/2017 15:47
Methylene chloride	ND	0.0050	1	03/31/2017 15:47
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	03/31/2017 15:47
Naphthalene	ND	0.0050	1	03/31/2017 15:47
n-Propyl benzene	ND	0.0050	1	03/31/2017 15:47
Styrene	ND	0.0050	1	03/31/2017 15:47
1,1,1,2-Tetrachloroethane	ND	0.0050	1	03/31/2017 15:47
1,1,2,2-Tetrachloroethane	ND	0.0050	1	03/31/2017 15:47
Tetrachloroethene	ND	0.0050	1	03/31/2017 15:47
Toluene	ND	0.0050	1	03/31/2017 15:47
1,2,3-Trichlorobenzene	ND	0.0050	1	03/31/2017 15:47
1,2,4-Trichlorobenzene	ND	0.0050	1	03/31/2017 15:47
1,1,1-Trichloroethane	ND	0.0050	1	03/31/2017 15:47
1,1,2-Trichloroethane	ND	0.0050	1	03/31/2017 15:47
Trichloroethene	ND	0.0050	1	03/31/2017 15:47
Trichlorofluoromethane	ND	0.0050	1	03/31/2017 15:47
1,2,3-Trichloropropane	ND	0.0050	1	03/31/2017 15:47
1,2,4-Trimethylbenzene	ND	0.0050	1	03/31/2017 15:47
1,3,5-Trimethylbenzene	ND	0.0050	1	03/31/2017 15:47
Vinyl Chloride	ND	0.0050	1	03/31/2017 15:47
Xylenes, Total	ND	0.0050	1	03/31/2017 15:47

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-15.0	1703F87-003A	Soil	03/29/2017 12:00	GC18	136485

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>		
Dibromofluoromethane	96	70-130		03/31/2017 15:47
Toluene-d8	106	70-130		03/31/2017 15:47
4-BFB	95	70-130		03/31/2017 15:47
Benzene-d6	82	60-140		03/31/2017 15:47
Ethylbenzene-d10	96	60-140		03/31/2017 15:47
1,2-DCB-d4	80	60-140		03/31/2017 15:47

Analyst(s): AK



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-10.0	1703F87-006A	Soil	03/29/2017 08:10	GC10	136485
Analytes	Result	RL	DF	Date Analyzed	
Acetone	ND	10	100	04/01/2017 15:51	
tert-Amyl methyl ether (TAME)	ND	0.50	100	04/01/2017 15:51	
Benzene	ND	0.50	100	04/01/2017 15:51	
Bromobenzene	ND	0.50	100	04/01/2017 15:51	
Bromochloromethane	ND	0.50	100	04/01/2017 15:51	
Bromodichloromethane	ND	0.50	100	04/01/2017 15:51	
Bromoform	ND	0.50	100	04/01/2017 15:51	
Bromomethane	ND	0.50	100	04/01/2017 15:51	
2-Butanone (MEK)	ND	2.0	100	04/01/2017 15:51	
t-Butyl alcohol (TBA)	ND	5.0	100	04/01/2017 15:51	
n-Butyl benzene	ND	0.50	100	04/01/2017 15:51	
sec-Butyl benzene	ND	0.50	100	04/01/2017 15:51	
tert-Butyl benzene	ND	0.50	100	04/01/2017 15:51	
Carbon Disulfide	ND	0.50	100	04/01/2017 15:51	
Carbon Tetrachloride	ND	0.50	100	04/01/2017 15:51	
Chlorobenzene	ND	0.50	100	04/01/2017 15:51	
Chloroethane	ND	0.50	100	04/01/2017 15:51	
Chloroform	ND	0.50	100	04/01/2017 15:51	
Chloromethane	ND	0.50	100	04/01/2017 15:51	
2-Chlorotoluene	ND	0.50	100	04/01/2017 15:51	
4-Chlorotoluene	ND	0.50	100	04/01/2017 15:51	
Dibromochloromethane	ND	0.50	100	04/01/2017 15:51	
1,2-Dibromo-3-chloropropane	ND	0.40	100	04/01/2017 15:51	
1,2-Dibromoethane (EDB)	ND	0.40	100	04/01/2017 15:51	
Dibromomethane	ND	0.50	100	04/01/2017 15:51	
1,2-Dichlorobenzene	ND	0.50	100	04/01/2017 15:51	
1,3-Dichlorobenzene	ND	0.50	100	04/01/2017 15:51	
1,4-Dichlorobenzene	ND	0.50	100	04/01/2017 15:51	
Dichlorodifluoromethane	ND	0.50	100	04/01/2017 15:51	
1,1-Dichloroethane	ND	0.50	100	04/01/2017 15:51	
1,2-Dichloroethane (1,2-DCA)	ND	0.40	100	04/01/2017 15:51	
1,1-Dichloroethene	ND	0.50	100	04/01/2017 15:51	
cis-1,2-Dichloroethene	0.51	0.50	100	04/01/2017 15:51	
trans-1,2-Dichloroethene	ND	0.50	100	04/01/2017 15:51	
1,2-Dichloropropane	ND	0.50	100	04/01/2017 15:51	
1,3-Dichloropropane	ND	0.50	100	04/01/2017 15:51	
2,2-Dichloropropane	ND	0.50	100	04/01/2017 15:51	

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-10.0	1703F87-006A	Soil	03/29/2017 08:10	GC10	136485

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	100	04/01/2017 15:51
cis-1,3-Dichloropropene	ND	0.50	100	04/01/2017 15:51
trans-1,3-Dichloropropene	ND	0.50	100	04/01/2017 15:51
Diisopropyl ether (DIPE)	ND	0.50	100	04/01/2017 15:51
Ethylbenzene	ND	0.50	100	04/01/2017 15:51
Ethyl tert-butyl ether (ETBE)	ND	0.50	100	04/01/2017 15:51
Freon 113	ND	0.50	100	04/01/2017 15:51
Hexachlorobutadiene	ND	0.50	100	04/01/2017 15:51
Hexachloroethane	ND	0.50	100	04/01/2017 15:51
2-Hexanone	ND	0.50	100	04/01/2017 15:51
Isopropylbenzene	ND	0.50	100	04/01/2017 15:51
4-Isopropyl toluene	ND	0.50	100	04/01/2017 15:51
Methyl-t-butyl ether (MTBE)	ND	0.50	100	04/01/2017 15:51
Methylene chloride	ND	0.50	100	04/01/2017 15:51
4-Methyl-2-pentanone (MIBK)	ND	0.50	100	04/01/2017 15:51
Naphthalene	ND	0.50	100	04/01/2017 15:51
n-Propyl benzene	ND	0.50	100	04/01/2017 15:51
Styrene	ND	0.50	100	04/01/2017 15:51
1,1,1,2-Tetrachloroethane	ND	0.50	100	04/01/2017 15:51
1,1,2,2-Tetrachloroethane	ND	0.50	100	04/01/2017 15:51
Tetrachloroethene	ND	0.50	100	04/01/2017 15:51
Toluene	ND	0.50	100	04/01/2017 15:51
1,2,3-Trichlorobenzene	ND	0.50	100	04/01/2017 15:51
1,2,4-Trichlorobenzene	ND	0.50	100	04/01/2017 15:51
1,1,1-Trichloroethane	ND	0.50	100	04/01/2017 15:51
1,1,2-Trichloroethane	ND	0.50	100	04/01/2017 15:51
Trichloroethene	5.2	0.50	100	04/01/2017 15:51
Trichlorofluoromethane	ND	0.50	100	04/01/2017 15:51
1,2,3-Trichloropropane	ND	0.50	100	04/01/2017 15:51
1,2,4-Trimethylbenzene	ND	0.50	100	04/01/2017 15:51
1,3,5-Trimethylbenzene	ND	0.50	100	04/01/2017 15:51
Vinyl Chloride	ND	0.50	100	04/01/2017 15:51
Xylenes, Total	ND	0.50	100	04/01/2017 15:51

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-10.0	1703F87-006A	Soil	03/29/2017 08:10	GC10	136485

Analytes	Result		RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>	<u>Qualifiers</u>	<u>Limits</u>		
Dibromofluoromethane	86		70-130		04/01/2017 15:51
Toluene-d8	96		70-130		04/01/2017 15:51
4-BFB	70		70-130		04/01/2017 15:51
Benzene-d6	0	S	60-140		04/01/2017 15:51
Ethylbenzene-d10	0	S	60-140		04/01/2017 15:51
1,2-DCB-d4	0	S	60-140		04/01/2017 15:51

Analyst(s): KF

Analytical Comments: c7



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-12.5	1703F87-007A	Soil	03/29/2017 08:30	GC10	136485
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Acetone	ND		0.40	4	04/01/2017 20:32
tert-Amyl methyl ether (TAME)	ND		0.020	4	04/01/2017 20:32
Benzene	ND		0.020	4	04/01/2017 20:32
Bromobenzene	ND		0.020	4	04/01/2017 20:32
Bromochloromethane	ND		0.020	4	04/01/2017 20:32
Bromodichloromethane	ND		0.020	4	04/01/2017 20:32
Bromoform	ND		0.020	4	04/01/2017 20:32
Bromomethane	ND		0.020	4	04/01/2017 20:32
2-Butanone (MEK)	ND		0.080	4	04/01/2017 20:32
t-Butyl alcohol (TBA)	ND		0.20	4	04/01/2017 20:32
n-Butyl benzene	ND		0.020	4	04/01/2017 20:32
sec-Butyl benzene	ND		0.020	4	04/01/2017 20:32
tert-Butyl benzene	ND		0.020	4	04/01/2017 20:32
Carbon Disulfide	ND		0.020	4	04/01/2017 20:32
Carbon Tetrachloride	ND		0.020	4	04/01/2017 20:32
Chlorobenzene	ND		0.020	4	04/01/2017 20:32
Chloroethane	ND		0.020	4	04/01/2017 20:32
Chloroform	ND		0.020	4	04/01/2017 20:32
Chloromethane	ND		0.020	4	04/01/2017 20:32
2-Chlorotoluene	ND		0.020	4	04/01/2017 20:32
4-Chlorotoluene	ND		0.020	4	04/01/2017 20:32
Dibromochloromethane	ND		0.020	4	04/01/2017 20:32
1,2-Dibromo-3-chloropropane	ND		0.016	4	04/01/2017 20:32
1,2-Dibromoethane (EDB)	ND		0.016	4	04/01/2017 20:32
Dibromomethane	ND		0.020	4	04/01/2017 20:32
1,2-Dichlorobenzene	ND		0.020	4	04/01/2017 20:32
1,3-Dichlorobenzene	ND		0.020	4	04/01/2017 20:32
1,4-Dichlorobenzene	ND		0.020	4	04/01/2017 20:32
Dichlorodifluoromethane	ND		0.020	4	04/01/2017 20:32
1,1-Dichloroethane	ND		0.020	4	04/01/2017 20:32
1,2-Dichloroethane (1,2-DCA)	ND		0.016	4	04/01/2017 20:32
1,1-Dichloroethene	ND		0.020	4	04/01/2017 20:32
cis-1,2-Dichloroethene	0.040		0.020	4	04/01/2017 20:32
trans-1,2-Dichloroethene	ND		0.020	4	04/01/2017 20:32
1,2-Dichloropropane	ND		0.020	4	04/01/2017 20:32
1,3-Dichloropropane	ND		0.020	4	04/01/2017 20:32
2,2-Dichloropropane	ND		0.020	4	04/01/2017 20:32

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-12.5	1703F87-007A	Soil	03/29/2017 08:30	GC10	136485

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.020	4	04/01/2017 20:32
cis-1,3-Dichloropropene	ND	0.020	4	04/01/2017 20:32
trans-1,3-Dichloropropene	ND	0.020	4	04/01/2017 20:32
Diisopropyl ether (DIPE)	ND	0.020	4	04/01/2017 20:32
Ethylbenzene	ND	0.020	4	04/01/2017 20:32
Ethyl tert-butyl ether (ETBE)	ND	0.020	4	04/01/2017 20:32
Freon 113	ND	0.020	4	04/01/2017 20:32
Hexachlorobutadiene	ND	0.020	4	04/01/2017 20:32
Hexachloroethane	ND	0.020	4	04/01/2017 20:32
2-Hexanone	ND	0.020	4	04/01/2017 20:32
Isopropylbenzene	ND	0.020	4	04/01/2017 20:32
4-Isopropyl toluene	ND	0.020	4	04/01/2017 20:32
Methyl-t-butyl ether (MTBE)	ND	0.020	4	04/01/2017 20:32
Methylene chloride	ND	0.020	4	04/01/2017 20:32
4-Methyl-2-pentanone (MIBK)	ND	0.020	4	04/01/2017 20:32
Naphthalene	ND	0.020	4	04/01/2017 20:32
n-Propyl benzene	ND	0.020	4	04/01/2017 20:32
Styrene	ND	0.020	4	04/01/2017 20:32
1,1,1,2-Tetrachloroethane	ND	0.020	4	04/01/2017 20:32
1,1,2,2-Tetrachloroethane	ND	0.020	4	04/01/2017 20:32
Tetrachloroethene	ND	0.020	4	04/01/2017 20:32
Toluene	ND	0.020	4	04/01/2017 20:32
1,2,3-Trichlorobenzene	ND	0.020	4	04/01/2017 20:32
1,2,4-Trichlorobenzene	ND	0.020	4	04/01/2017 20:32
1,1,1-Trichloroethane	ND	0.020	4	04/01/2017 20:32
1,1,2-Trichloroethane	ND	0.020	4	04/01/2017 20:32
Trichloroethene	0.28	0.020	4	04/01/2017 20:32
Trichlorofluoromethane	ND	0.020	4	04/01/2017 20:32
1,2,3-Trichloropropane	ND	0.020	4	04/01/2017 20:32
1,2,4-Trimethylbenzene	ND	0.020	4	04/01/2017 20:32
1,3,5-Trimethylbenzene	ND	0.020	4	04/01/2017 20:32
Vinyl Chloride	ND	0.020	4	04/01/2017 20:32
Xylenes, Total	ND	0.020	4	04/01/2017 20:32

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-12.5	1703F87-007A	Soil	03/29/2017 08:30	GC10	136485

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	86	70-130		04/01/2017 20:32
Toluene-d8	98	70-130		04/01/2017 20:32
4-BFB	71	70-130		04/01/2017 20:32
Benzene-d6	70	60-140		04/01/2017 20:32
Ethylbenzene-d10	72	60-140		04/01/2017 20:32
1,2-DCB-d4	66	60-140		04/01/2017 20:32

Analyst(s): KF



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-15.0	1703F87-008A	Soil	03/29/2017 08:35	GC10	136485

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	04/01/2017 21:11
tert-Amyl methyl ether (TAME)	ND	0.0050	1	04/01/2017 21:11
Benzene	ND	0.0050	1	04/01/2017 21:11
Bromobenzene	ND	0.0050	1	04/01/2017 21:11
Bromochloromethane	ND	0.0050	1	04/01/2017 21:11
Bromodichloromethane	ND	0.0050	1	04/01/2017 21:11
Bromoform	ND	0.0050	1	04/01/2017 21:11
Bromomethane	ND	0.0050	1	04/01/2017 21:11
2-Butanone (MEK)	ND	0.020	1	04/01/2017 21:11
t-Butyl alcohol (TBA)	ND	0.050	1	04/01/2017 21:11
n-Butyl benzene	ND	0.0050	1	04/01/2017 21:11
sec-Butyl benzene	ND	0.0050	1	04/01/2017 21:11
tert-Butyl benzene	ND	0.0050	1	04/01/2017 21:11
Carbon Disulfide	ND	0.0050	1	04/01/2017 21:11
Carbon Tetrachloride	ND	0.0050	1	04/01/2017 21:11
Chlorobenzene	ND	0.0050	1	04/01/2017 21:11
Chloroethane	ND	0.0050	1	04/01/2017 21:11
Chloroform	ND	0.0050	1	04/01/2017 21:11
Chloromethane	ND	0.0050	1	04/01/2017 21:11
2-Chlorotoluene	ND	0.0050	1	04/01/2017 21:11
4-Chlorotoluene	ND	0.0050	1	04/01/2017 21:11
Dibromochloromethane	ND	0.0050	1	04/01/2017 21:11
1,2-Dibromo-3-chloropropane	ND	0.0040	1	04/01/2017 21:11
1,2-Dibromoethane (EDB)	ND	0.0040	1	04/01/2017 21:11
Dibromomethane	ND	0.0050	1	04/01/2017 21:11
1,2-Dichlorobenzene	ND	0.0050	1	04/01/2017 21:11
1,3-Dichlorobenzene	ND	0.0050	1	04/01/2017 21:11
1,4-Dichlorobenzene	ND	0.0050	1	04/01/2017 21:11
Dichlorodifluoromethane	ND	0.0050	1	04/01/2017 21:11
1,1-Dichloroethane	ND	0.0050	1	04/01/2017 21:11
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	04/01/2017 21:11
1,1-Dichloroethene	ND	0.0050	1	04/01/2017 21:11
cis-1,2-Dichloroethene	ND	0.0050	1	04/01/2017 21:11
trans-1,2-Dichloroethene	ND	0.0050	1	04/01/2017 21:11
1,2-Dichloropropane	ND	0.0050	1	04/01/2017 21:11
1,3-Dichloropropane	ND	0.0050	1	04/01/2017 21:11
2,2-Dichloropropane	ND	0.0050	1	04/01/2017 21:11

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-15.0	1703F87-008A	Soil	03/29/2017 08:35	GC10	136485

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.0050	1	04/01/2017 21:11
cis-1,3-Dichloropropene	ND	0.0050	1	04/01/2017 21:11
trans-1,3-Dichloropropene	ND	0.0050	1	04/01/2017 21:11
Diisopropyl ether (DIPE)	ND	0.0050	1	04/01/2017 21:11
Ethylbenzene	ND	0.0050	1	04/01/2017 21:11
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	04/01/2017 21:11
Freon 113	ND	0.0050	1	04/01/2017 21:11
Hexachlorobutadiene	ND	0.0050	1	04/01/2017 21:11
Hexachloroethane	ND	0.0050	1	04/01/2017 21:11
2-Hexanone	ND	0.0050	1	04/01/2017 21:11
Isopropylbenzene	ND	0.0050	1	04/01/2017 21:11
4-Isopropyl toluene	ND	0.0050	1	04/01/2017 21:11
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	04/01/2017 21:11
Methylene chloride	ND	0.0050	1	04/01/2017 21:11
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	04/01/2017 21:11
Naphthalene	ND	0.0050	1	04/01/2017 21:11
n-Propyl benzene	ND	0.0050	1	04/01/2017 21:11
Styrene	ND	0.0050	1	04/01/2017 21:11
1,1,1,2-Tetrachloroethane	ND	0.0050	1	04/01/2017 21:11
1,1,2,2-Tetrachloroethane	ND	0.0050	1	04/01/2017 21:11
Tetrachloroethene	ND	0.0050	1	04/01/2017 21:11
Toluene	ND	0.0050	1	04/01/2017 21:11
1,2,3-Trichlorobenzene	ND	0.0050	1	04/01/2017 21:11
1,2,4-Trichlorobenzene	ND	0.0050	1	04/01/2017 21:11
1,1,1-Trichloroethane	ND	0.0050	1	04/01/2017 21:11
1,1,2-Trichloroethane	ND	0.0050	1	04/01/2017 21:11
Trichloroethene	0.011	0.0050	1	04/01/2017 21:11
Trichlorofluoromethane	ND	0.0050	1	04/01/2017 21:11
1,2,3-Trichloropropane	ND	0.0050	1	04/01/2017 21:11
1,2,4-Trimethylbenzene	ND	0.0050	1	04/01/2017 21:11
1,3,5-Trimethylbenzene	ND	0.0050	1	04/01/2017 21:11
Vinyl Chloride	ND	0.0050	1	04/01/2017 21:11
Xylenes, Total	ND	0.0050	1	04/01/2017 21:11

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-15.0	1703F87-008A	Soil	03/29/2017 08:35	GC10	136485

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	85	70-130		04/01/2017 21:11
Toluene-d8	106	70-130		04/01/2017 21:11
4-BFB	74	70-130		04/01/2017 21:11
Benzene-d6	74	60-140		04/01/2017 21:11
Ethylbenzene-d10	91	60-140		04/01/2017 21:11
1,2-DCB-d4	69	60-140		04/01/2017 21:11

Analyst(s): KF



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-8.0	1703F87-011A	Soil	03/29/2017 09:11	GC10	136485
Analytes	Result	RL	DF	Date Analyzed	
Acetone	ND	0.40	4	04/01/2017 21:50	
tert-Amyl methyl ether (TAME)	ND	0.020	4	04/01/2017 21:50	
Benzene	ND	0.020	4	04/01/2017 21:50	
Bromobenzene	ND	0.020	4	04/01/2017 21:50	
Bromochloromethane	ND	0.020	4	04/01/2017 21:50	
Bromodichloromethane	ND	0.020	4	04/01/2017 21:50	
Bromoform	ND	0.020	4	04/01/2017 21:50	
Bromomethane	ND	0.020	4	04/01/2017 21:50	
2-Butanone (MEK)	ND	0.080	4	04/01/2017 21:50	
t-Butyl alcohol (TBA)	ND	0.20	4	04/01/2017 21:50	
n-Butyl benzene	ND	0.020	4	04/01/2017 21:50	
sec-Butyl benzene	ND	0.020	4	04/01/2017 21:50	
tert-Butyl benzene	ND	0.020	4	04/01/2017 21:50	
Carbon Disulfide	ND	0.020	4	04/01/2017 21:50	
Carbon Tetrachloride	ND	0.020	4	04/01/2017 21:50	
Chlorobenzene	ND	0.020	4	04/01/2017 21:50	
Chloroethane	ND	0.020	4	04/01/2017 21:50	
Chloroform	ND	0.020	4	04/01/2017 21:50	
Chloromethane	ND	0.020	4	04/01/2017 21:50	
2-Chlorotoluene	ND	0.020	4	04/01/2017 21:50	
4-Chlorotoluene	ND	0.020	4	04/01/2017 21:50	
Dibromochloromethane	ND	0.020	4	04/01/2017 21:50	
1,2-Dibromo-3-chloropropane	ND	0.016	4	04/01/2017 21:50	
1,2-Dibromoethane (EDB)	ND	0.016	4	04/01/2017 21:50	
Dibromomethane	ND	0.020	4	04/01/2017 21:50	
1,2-Dichlorobenzene	ND	0.020	4	04/01/2017 21:50	
1,3-Dichlorobenzene	ND	0.020	4	04/01/2017 21:50	
1,4-Dichlorobenzene	ND	0.020	4	04/01/2017 21:50	
Dichlorodifluoromethane	ND	0.020	4	04/01/2017 21:50	
1,1-Dichloroethane	ND	0.020	4	04/01/2017 21:50	
1,2-Dichloroethane (1,2-DCA)	ND	0.016	4	04/01/2017 21:50	
1,1-Dichloroethene	ND	0.020	4	04/01/2017 21:50	
cis-1,2-Dichloroethene	0.027	0.020	4	04/01/2017 21:50	
trans-1,2-Dichloroethene	ND	0.020	4	04/01/2017 21:50	
1,2-Dichloropropane	ND	0.020	4	04/01/2017 21:50	
1,3-Dichloropropane	ND	0.020	4	04/01/2017 21:50	
2,2-Dichloropropane	ND	0.020	4	04/01/2017 21:50	

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-8.0	1703F87-011A	Soil	03/29/2017 09:11	GC10	136485

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.020	4	04/01/2017 21:50
cis-1,3-Dichloropropene	ND	0.020	4	04/01/2017 21:50
trans-1,3-Dichloropropene	ND	0.020	4	04/01/2017 21:50
Diisopropyl ether (DIPE)	ND	0.020	4	04/01/2017 21:50
Ethylbenzene	ND	0.020	4	04/01/2017 21:50
Ethyl tert-butyl ether (ETBE)	ND	0.020	4	04/01/2017 21:50
Freon 113	ND	0.020	4	04/01/2017 21:50
Hexachlorobutadiene	ND	0.020	4	04/01/2017 21:50
Hexachloroethane	ND	0.020	4	04/01/2017 21:50
2-Hexanone	ND	0.020	4	04/01/2017 21:50
Isopropylbenzene	ND	0.020	4	04/01/2017 21:50
4-Isopropyl toluene	ND	0.020	4	04/01/2017 21:50
Methyl-t-butyl ether (MTBE)	ND	0.020	4	04/01/2017 21:50
Methylene chloride	ND	0.020	4	04/01/2017 21:50
4-Methyl-2-pentanone (MIBK)	ND	0.020	4	04/01/2017 21:50
Naphthalene	ND	0.020	4	04/01/2017 21:50
n-Propyl benzene	ND	0.020	4	04/01/2017 21:50
Styrene	ND	0.020	4	04/01/2017 21:50
1,1,1,2-Tetrachloroethane	ND	0.020	4	04/01/2017 21:50
1,1,2,2-Tetrachloroethane	ND	0.020	4	04/01/2017 21:50
Tetrachloroethene	ND	0.020	4	04/01/2017 21:50
Toluene	ND	0.020	4	04/01/2017 21:50
1,2,3-Trichlorobenzene	ND	0.020	4	04/01/2017 21:50
1,2,4-Trichlorobenzene	ND	0.020	4	04/01/2017 21:50
1,1,1-Trichloroethane	ND	0.020	4	04/01/2017 21:50
1,1,2-Trichloroethane	ND	0.020	4	04/01/2017 21:50
Trichloroethene	0.39	0.020	4	04/01/2017 21:50
Trichlorofluoromethane	ND	0.020	4	04/01/2017 21:50
1,2,3-Trichloropropane	ND	0.020	4	04/01/2017 21:50
1,2,4-Trimethylbenzene	ND	0.020	4	04/01/2017 21:50
1,3,5-Trimethylbenzene	ND	0.020	4	04/01/2017 21:50
Vinyl Chloride	ND	0.020	4	04/01/2017 21:50
Xylenes, Total	ND	0.020	4	04/01/2017 21:50

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-8.0	1703F87-011A	Soil	03/29/2017 09:11	GC10	136485

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	86	70-130		04/01/2017 21:50
Toluene-d8	93	70-130		04/01/2017 21:50
4-BFB	72	70-130		04/01/2017 21:50
Benzene-d6	66	60-140		04/01/2017 21:50
Ethylbenzene-d10	72	60-140		04/01/2017 21:50
1,2-DCB-d4	71	60-140		04/01/2017 21:50

Analyst(s): KF



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-12.5	1703F87-012A	Soil	03/29/2017 09:20	GC18	136485
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Acetone	ND		0.10	1	04/01/2017 06:03
tert-Amyl methyl ether (TAME)	ND		0.0050	1	04/01/2017 06:03
Benzene	ND		0.0050	1	04/01/2017 06:03
Bromobenzene	ND		0.0050	1	04/01/2017 06:03
Bromochloromethane	ND		0.0050	1	04/01/2017 06:03
Bromodichloromethane	ND		0.0050	1	04/01/2017 06:03
Bromoform	ND		0.0050	1	04/01/2017 06:03
Bromomethane	ND		0.0050	1	04/01/2017 06:03
2-Butanone (MEK)	ND		0.020	1	04/01/2017 06:03
t-Butyl alcohol (TBA)	ND		0.050	1	04/01/2017 06:03
n-Butyl benzene	ND		0.0050	1	04/01/2017 06:03
sec-Butyl benzene	ND		0.0050	1	04/01/2017 06:03
tert-Butyl benzene	ND		0.0050	1	04/01/2017 06:03
Carbon Disulfide	ND		0.0050	1	04/01/2017 06:03
Carbon Tetrachloride	ND		0.0050	1	04/01/2017 06:03
Chlorobenzene	ND		0.0050	1	04/01/2017 06:03
Chloroethane	ND		0.0050	1	04/01/2017 06:03
Chloroform	ND		0.0050	1	04/01/2017 06:03
Chloromethane	ND		0.0050	1	04/01/2017 06:03
2-Chlorotoluene	ND		0.0050	1	04/01/2017 06:03
4-Chlorotoluene	ND		0.0050	1	04/01/2017 06:03
Dibromochloromethane	ND		0.0050	1	04/01/2017 06:03
1,2-Dibromo-3-chloropropane	ND		0.0040	1	04/01/2017 06:03
1,2-Dibromoethane (EDB)	ND		0.0040	1	04/01/2017 06:03
Dibromomethane	ND		0.0050	1	04/01/2017 06:03
1,2-Dichlorobenzene	ND		0.0050	1	04/01/2017 06:03
1,3-Dichlorobenzene	ND		0.0050	1	04/01/2017 06:03
1,4-Dichlorobenzene	ND		0.0050	1	04/01/2017 06:03
Dichlorodifluoromethane	ND		0.0050	1	04/01/2017 06:03
1,1-Dichloroethane	ND		0.0050	1	04/01/2017 06:03
1,2-Dichloroethane (1,2-DCA)	ND		0.0040	1	04/01/2017 06:03
1,1-Dichloroethene	ND		0.0050	1	04/01/2017 06:03
cis-1,2-Dichloroethene	0.011		0.0050	1	04/01/2017 06:03
trans-1,2-Dichloroethene	ND		0.0050	1	04/01/2017 06:03
1,2-Dichloropropane	ND		0.0050	1	04/01/2017 06:03
1,3-Dichloropropane	ND		0.0050	1	04/01/2017 06:03
2,2-Dichloropropane	ND		0.0050	1	04/01/2017 06:03

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-12.5	1703F87-012A	Soil	03/29/2017 09:20	GC18	136485

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.0050	1	04/01/2017 06:03
cis-1,3-Dichloropropene	ND	0.0050	1	04/01/2017 06:03
trans-1,3-Dichloropropene	ND	0.0050	1	04/01/2017 06:03
Diisopropyl ether (DIPE)	ND	0.0050	1	04/01/2017 06:03
Ethylbenzene	ND	0.0050	1	04/01/2017 06:03
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	04/01/2017 06:03
Freon 113	ND	0.0050	1	04/01/2017 06:03
Hexachlorobutadiene	ND	0.0050	1	04/01/2017 06:03
Hexachloroethane	ND	0.0050	1	04/01/2017 06:03
2-Hexanone	ND	0.0050	1	04/01/2017 06:03
Isopropylbenzene	ND	0.0050	1	04/01/2017 06:03
4-Isopropyl toluene	ND	0.0050	1	04/01/2017 06:03
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	04/01/2017 06:03
Methylene chloride	ND	0.0050	1	04/01/2017 06:03
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	04/01/2017 06:03
Naphthalene	ND	0.0050	1	04/01/2017 06:03
n-Propyl benzene	ND	0.0050	1	04/01/2017 06:03
Styrene	ND	0.0050	1	04/01/2017 06:03
1,1,1,2-Tetrachloroethane	ND	0.0050	1	04/01/2017 06:03
1,1,2,2-Tetrachloroethane	ND	0.0050	1	04/01/2017 06:03
Tetrachloroethene	ND	0.0050	1	04/01/2017 06:03
Toluene	ND	0.0050	1	04/01/2017 06:03
1,2,3-Trichlorobenzene	ND	0.0050	1	04/01/2017 06:03
1,2,4-Trichlorobenzene	ND	0.0050	1	04/01/2017 06:03
1,1,1-Trichloroethane	ND	0.0050	1	04/01/2017 06:03
1,1,2-Trichloroethane	ND	0.0050	1	04/01/2017 06:03
Trichloroethene	0.043	0.0050	1	04/01/2017 06:03
Trichlorofluoromethane	ND	0.0050	1	04/01/2017 06:03
1,2,3-Trichloropropane	ND	0.0050	1	04/01/2017 06:03
1,2,4-Trimethylbenzene	ND	0.0050	1	04/01/2017 06:03
1,3,5-Trimethylbenzene	ND	0.0050	1	04/01/2017 06:03
Vinyl Chloride	ND	0.0050	1	04/01/2017 06:03
Xylenes, Total	ND	0.0050	1	04/01/2017 06:03

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-12.5	1703F87-012A	Soil	03/29/2017 09:20	GC18	136485

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	101	70-130		04/01/2017 06:03
Toluene-d8	105	70-130		04/01/2017 06:03
4-BFB	89	70-130		04/01/2017 06:03
Benzene-d6	79	60-140		04/01/2017 06:03
Ethylbenzene-d10	87	60-140		04/01/2017 06:03
1,2-DCB-d4	70	60-140		04/01/2017 06:03

Analyst(s): AK



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-15.0	1703F87-013A	Soil	03/29/2017 09:25	GC10	136485

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	04/01/2017 04:28
tert-Amyl methyl ether (TAME)	ND	0.0050	1	04/01/2017 04:28
Benzene	ND	0.0050	1	04/01/2017 04:28
Bromobenzene	ND	0.0050	1	04/01/2017 04:28
Bromochloromethane	ND	0.0050	1	04/01/2017 04:28
Bromodichloromethane	ND	0.0050	1	04/01/2017 04:28
Bromoform	ND	0.0050	1	04/01/2017 04:28
Bromomethane	ND	0.0050	1	04/01/2017 04:28
2-Butanone (MEK)	ND	0.020	1	04/01/2017 04:28
t-Butyl alcohol (TBA)	ND	0.050	1	04/01/2017 04:28
n-Butyl benzene	ND	0.0050	1	04/01/2017 04:28
sec-Butyl benzene	ND	0.0050	1	04/01/2017 04:28
tert-Butyl benzene	ND	0.0050	1	04/01/2017 04:28
Carbon Disulfide	ND	0.0050	1	04/01/2017 04:28
Carbon Tetrachloride	ND	0.0050	1	04/01/2017 04:28
Chlorobenzene	ND	0.0050	1	04/01/2017 04:28
Chloroethane	ND	0.0050	1	04/01/2017 04:28
Chloroform	ND	0.0050	1	04/01/2017 04:28
Chloromethane	ND	0.0050	1	04/01/2017 04:28
2-Chlorotoluene	ND	0.0050	1	04/01/2017 04:28
4-Chlorotoluene	ND	0.0050	1	04/01/2017 04:28
Dibromochloromethane	ND	0.0050	1	04/01/2017 04:28
1,2-Dibromo-3-chloropropane	ND	0.0040	1	04/01/2017 04:28
1,2-Dibromoethane (EDB)	ND	0.0040	1	04/01/2017 04:28
Dibromomethane	ND	0.0050	1	04/01/2017 04:28
1,2-Dichlorobenzene	ND	0.0050	1	04/01/2017 04:28
1,3-Dichlorobenzene	ND	0.0050	1	04/01/2017 04:28
1,4-Dichlorobenzene	ND	0.0050	1	04/01/2017 04:28
Dichlorodifluoromethane	ND	0.0050	1	04/01/2017 04:28
1,1-Dichloroethane	ND	0.0050	1	04/01/2017 04:28
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	04/01/2017 04:28
1,1-Dichloroethene	ND	0.0050	1	04/01/2017 04:28
cis-1,2-Dichloroethene	ND	0.0050	1	04/01/2017 04:28
trans-1,2-Dichloroethene	ND	0.0050	1	04/01/2017 04:28
1,2-Dichloropropane	ND	0.0050	1	04/01/2017 04:28
1,3-Dichloropropane	ND	0.0050	1	04/01/2017 04:28
2,2-Dichloropropane	ND	0.0050	1	04/01/2017 04:28

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-15.0	1703F87-013A	Soil	03/29/2017 09:25	GC10	136485

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.0050	1	04/01/2017 04:28
cis-1,3-Dichloropropene	ND	0.0050	1	04/01/2017 04:28
trans-1,3-Dichloropropene	ND	0.0050	1	04/01/2017 04:28
Diisopropyl ether (DIPE)	ND	0.0050	1	04/01/2017 04:28
Ethylbenzene	ND	0.0050	1	04/01/2017 04:28
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	04/01/2017 04:28
Freon 113	ND	0.0050	1	04/01/2017 04:28
Hexachlorobutadiene	ND	0.0050	1	04/01/2017 04:28
Hexachloroethane	ND	0.0050	1	04/01/2017 04:28
2-Hexanone	ND	0.0050	1	04/01/2017 04:28
Isopropylbenzene	ND	0.0050	1	04/01/2017 04:28
4-Isopropyl toluene	ND	0.0050	1	04/01/2017 04:28
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	04/01/2017 04:28
Methylene chloride	ND	0.0050	1	04/01/2017 04:28
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	04/01/2017 04:28
Naphthalene	ND	0.0050	1	04/01/2017 04:28
n-Propyl benzene	ND	0.0050	1	04/01/2017 04:28
Styrene	ND	0.0050	1	04/01/2017 04:28
1,1,1,2-Tetrachloroethane	ND	0.0050	1	04/01/2017 04:28
1,1,2,2-Tetrachloroethane	ND	0.0050	1	04/01/2017 04:28
Tetrachloroethene	ND	0.0050	1	04/01/2017 04:28
Toluene	ND	0.0050	1	04/01/2017 04:28
1,2,3-Trichlorobenzene	ND	0.0050	1	04/01/2017 04:28
1,2,4-Trichlorobenzene	ND	0.0050	1	04/01/2017 04:28
1,1,1-Trichloroethane	ND	0.0050	1	04/01/2017 04:28
1,1,2-Trichloroethane	ND	0.0050	1	04/01/2017 04:28
Trichloroethene	ND	0.0050	1	04/01/2017 04:28
Trichlorofluoromethane	ND	0.0050	1	04/01/2017 04:28
1,2,3-Trichloropropane	ND	0.0050	1	04/01/2017 04:28
1,2,4-Trimethylbenzene	ND	0.0050	1	04/01/2017 04:28
1,3,5-Trimethylbenzene	ND	0.0050	1	04/01/2017 04:28
Vinyl Chloride	ND	0.0050	1	04/01/2017 04:28
Xylenes, Total	ND	0.0050	1	04/01/2017 04:28

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-15.0	1703F87-013A	Soil	03/29/2017 09:25	GC10	136485

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	86	70-130		04/01/2017 04:28
Toluene-d8	103	70-130		04/01/2017 04:28
4-BFB	76	70-130		04/01/2017 04:28
Benzene-d6	83	60-140		04/01/2017 04:28
Ethylbenzene-d10	95	60-140		04/01/2017 04:28
1,2-DCB-d4	71	60-140		04/01/2017 04:28

Analyst(s): AK



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-35-10.0	1703F87-016A	Soil	03/29/2017 10:12	GC10	136565

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	04/01/2017 15:12
tert-Amyl methyl ether (TAME)	ND	0.0050	1	04/01/2017 15:12
Benzene	ND	0.0050	1	04/01/2017 15:12
Bromobenzene	ND	0.0050	1	04/01/2017 15:12
Bromochloromethane	ND	0.0050	1	04/01/2017 15:12
Bromodichloromethane	ND	0.0050	1	04/01/2017 15:12
Bromoform	ND	0.0050	1	04/01/2017 15:12
Bromomethane	ND	0.0050	1	04/01/2017 15:12
2-Butanone (MEK)	ND	0.020	1	04/01/2017 15:12
t-Butyl alcohol (TBA)	ND	0.050	1	04/01/2017 15:12
n-Butyl benzene	ND	0.0050	1	04/01/2017 15:12
sec-Butyl benzene	ND	0.0050	1	04/01/2017 15:12
tert-Butyl benzene	ND	0.0050	1	04/01/2017 15:12
Carbon Disulfide	ND	0.0050	1	04/01/2017 15:12
Carbon Tetrachloride	ND	0.0050	1	04/01/2017 15:12
Chlorobenzene	ND	0.0050	1	04/01/2017 15:12
Chloroethane	ND	0.0050	1	04/01/2017 15:12
Chloroform	ND	0.0050	1	04/01/2017 15:12
Chloromethane	ND	0.0050	1	04/01/2017 15:12
2-Chlorotoluene	ND	0.0050	1	04/01/2017 15:12
4-Chlorotoluene	ND	0.0050	1	04/01/2017 15:12
Dibromochloromethane	ND	0.0050	1	04/01/2017 15:12
1,2-Dibromo-3-chloropropane	ND	0.0040	1	04/01/2017 15:12
1,2-Dibromoethane (EDB)	ND	0.0040	1	04/01/2017 15:12
Dibromomethane	ND	0.0050	1	04/01/2017 15:12
1,2-Dichlorobenzene	ND	0.0050	1	04/01/2017 15:12
1,3-Dichlorobenzene	ND	0.0050	1	04/01/2017 15:12
1,4-Dichlorobenzene	ND	0.0050	1	04/01/2017 15:12
Dichlorodifluoromethane	ND	0.0050	1	04/01/2017 15:12
1,1-Dichloroethane	ND	0.0050	1	04/01/2017 15:12
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	04/01/2017 15:12
1,1-Dichloroethene	ND	0.0050	1	04/01/2017 15:12
cis-1,2-Dichloroethene	ND	0.0050	1	04/01/2017 15:12
trans-1,2-Dichloroethene	ND	0.0050	1	04/01/2017 15:12
1,2-Dichloropropane	ND	0.0050	1	04/01/2017 15:12
1,3-Dichloropropane	ND	0.0050	1	04/01/2017 15:12
2,2-Dichloropropane	ND	0.0050	1	04/01/2017 15:12

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-35-10.0	1703F87-016A	Soil	03/29/2017 10:12	GC10	136565

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.0050	1	04/01/2017 15:12
cis-1,3-Dichloropropene	ND	0.0050	1	04/01/2017 15:12
trans-1,3-Dichloropropene	ND	0.0050	1	04/01/2017 15:12
Diisopropyl ether (DIPE)	ND	0.0050	1	04/01/2017 15:12
Ethylbenzene	ND	0.0050	1	04/01/2017 15:12
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	04/01/2017 15:12
Freon 113	ND	0.0050	1	04/01/2017 15:12
Hexachlorobutadiene	ND	0.0050	1	04/01/2017 15:12
Hexachloroethane	ND	0.0050	1	04/01/2017 15:12
2-Hexanone	ND	0.0050	1	04/01/2017 15:12
Isopropylbenzene	ND	0.0050	1	04/01/2017 15:12
4-Isopropyl toluene	ND	0.0050	1	04/01/2017 15:12
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	04/01/2017 15:12
Methylene chloride	ND	0.0050	1	04/01/2017 15:12
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	04/01/2017 15:12
Naphthalene	ND	0.0050	1	04/01/2017 15:12
n-Propyl benzene	ND	0.0050	1	04/01/2017 15:12
Styrene	ND	0.0050	1	04/01/2017 15:12
1,1,1,2-Tetrachloroethane	ND	0.0050	1	04/01/2017 15:12
1,1,2,2-Tetrachloroethane	ND	0.0050	1	04/01/2017 15:12
Tetrachloroethene	ND	0.0050	1	04/01/2017 15:12
Toluene	ND	0.0050	1	04/01/2017 15:12
1,2,3-Trichlorobenzene	ND	0.0050	1	04/01/2017 15:12
1,2,4-Trichlorobenzene	ND	0.0050	1	04/01/2017 15:12
1,1,1-Trichloroethane	ND	0.0050	1	04/01/2017 15:12
1,1,2-Trichloroethane	ND	0.0050	1	04/01/2017 15:12
Trichloroethene	ND	0.0050	1	04/01/2017 15:12
Trichlorofluoromethane	ND	0.0050	1	04/01/2017 15:12
1,2,3-Trichloropropane	ND	0.0050	1	04/01/2017 15:12
1,2,4-Trimethylbenzene	ND	0.0050	1	04/01/2017 15:12
1,3,5-Trimethylbenzene	ND	0.0050	1	04/01/2017 15:12
Vinyl Chloride	ND	0.0050	1	04/01/2017 15:12
Xylenes, Total	ND	0.0050	1	04/01/2017 15:12

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17-4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-35-10.0	1703F87-016A	Soil	03/29/2017 10:12	GC10	136565

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	84	70-130		04/01/2017 15:12
Toluene-d8	108	70-130		04/01/2017 15:12
4-BFB	75	70-130		04/01/2017 15:12
Benzene-d6	89	60-140		04/01/2017 15:12
Ethylbenzene-d10	107	60-140		04/01/2017 15:12
1,2-DCB-d4	74	60-140		04/01/2017 15:12

Analyst(s): KF



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-GW	1703F87-020B	Water	03/29/2017 15:05	GC18	136542
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Acetone	ND		33	3.3	04/01/2017 03:28
tert-Amyl methyl ether (TAME)	ND		1.7	3.3	04/01/2017 03:28
Benzene	ND		1.7	3.3	04/01/2017 03:28
Bromobenzene	ND		1.7	3.3	04/01/2017 03:28
Bromochloromethane	ND		1.7	3.3	04/01/2017 03:28
Bromodichloromethane	ND		1.7	3.3	04/01/2017 03:28
Bromoform	ND		1.7	3.3	04/01/2017 03:28
Bromomethane	ND		1.7	3.3	04/01/2017 03:28
2-Butanone (MEK)	ND		6.7	3.3	04/01/2017 03:28
t-Butyl alcohol (TBA)	ND		6.7	3.3	04/01/2017 03:28
n-Butyl benzene	ND		1.7	3.3	04/01/2017 03:28
sec-Butyl benzene	ND		1.7	3.3	04/01/2017 03:28
tert-Butyl benzene	ND		1.7	3.3	04/01/2017 03:28
Carbon Disulfide	ND		1.7	3.3	04/01/2017 03:28
Carbon Tetrachloride	ND		1.7	3.3	04/01/2017 03:28
Chlorobenzene	ND		1.7	3.3	04/01/2017 03:28
Chloroethane	ND		1.7	3.3	04/01/2017 03:28
Chloroform	1.8		1.7	3.3	04/01/2017 03:28
Chloromethane	ND		1.7	3.3	04/01/2017 03:28
2-Chlorotoluene	ND		1.7	3.3	04/01/2017 03:28
4-Chlorotoluene	ND		1.7	3.3	04/01/2017 03:28
Dibromochloromethane	ND		1.7	3.3	04/01/2017 03:28
1,2-Dibromo-3-chloropropane	ND		0.67	3.3	04/01/2017 03:28
1,2-Dibromoethane (EDB)	ND		1.7	3.3	04/01/2017 03:28
Dibromomethane	ND		1.7	3.3	04/01/2017 03:28
1,2-Dichlorobenzene	ND		1.7	3.3	04/01/2017 03:28
1,3-Dichlorobenzene	ND		1.7	3.3	04/01/2017 03:28
1,4-Dichlorobenzene	ND		1.7	3.3	04/01/2017 03:28
Dichlorodifluoromethane	ND		1.7	3.3	04/01/2017 03:28
1,1-Dichloroethane	ND		1.7	3.3	04/01/2017 03:28
1,2-Dichloroethane (1,2-DCA)	ND		1.7	3.3	04/01/2017 03:28
1,1-Dichloroethene	ND		1.7	3.3	04/01/2017 03:28
cis-1,2-Dichloroethene	72		1.7	3.3	04/01/2017 03:28
trans-1,2-Dichloroethene	ND		1.7	3.3	04/01/2017 03:28
1,2-Dichloropropane	ND		1.7	3.3	04/01/2017 03:28
1,3-Dichloropropane	ND		1.7	3.3	04/01/2017 03:28
2,2-Dichloropropane	ND		1.7	3.3	04/01/2017 03:28

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-GW	1703F87-020B	Water	03/29/2017 15:05	GC18	136542

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	1.7	3.3	04/01/2017 03:28
cis-1,3-Dichloropropene	ND	1.7	3.3	04/01/2017 03:28
trans-1,3-Dichloropropene	ND	1.7	3.3	04/01/2017 03:28
Diisopropyl ether (DIPE)	ND	1.7	3.3	04/01/2017 03:28
Ethylbenzene	ND	1.7	3.3	04/01/2017 03:28
Ethyl tert-butyl ether (ETBE)	ND	1.7	3.3	04/01/2017 03:28
Freon 113	ND	1.7	3.3	04/01/2017 03:28
Hexachlorobutadiene	ND	1.7	3.3	04/01/2017 03:28
Hexachloroethane	ND	1.7	3.3	04/01/2017 03:28
2-Hexanone	ND	1.7	3.3	04/01/2017 03:28
Isopropylbenzene	ND	1.7	3.3	04/01/2017 03:28
4-Isopropyl toluene	ND	1.7	3.3	04/01/2017 03:28
Methyl-t-butyl ether (MTBE)	ND	1.7	3.3	04/01/2017 03:28
Methylene chloride	ND	1.7	3.3	04/01/2017 03:28
4-Methyl-2-pentanone (MIBK)	ND	1.7	3.3	04/01/2017 03:28
Naphthalene	ND	1.7	3.3	04/01/2017 03:28
n-Propyl benzene	ND	1.7	3.3	04/01/2017 03:28
Styrene	ND	1.7	3.3	04/01/2017 03:28
1,1,1,2-Tetrachloroethane	ND	1.7	3.3	04/01/2017 03:28
1,1,2,2-Tetrachloroethane	ND	1.7	3.3	04/01/2017 03:28
Tetrachloroethene	ND	1.7	3.3	04/01/2017 03:28
Toluene	ND	1.7	3.3	04/01/2017 03:28
1,2,3-Trichlorobenzene	ND	1.7	3.3	04/01/2017 03:28
1,2,4-Trichlorobenzene	ND	1.7	3.3	04/01/2017 03:28
1,1,1-Trichloroethane	ND	1.7	3.3	04/01/2017 03:28
1,1,2-Trichloroethane	ND	1.7	3.3	04/01/2017 03:28
Trichloroethene	68	1.7	3.3	04/01/2017 03:28
Trichlorofluoromethane	ND	1.7	3.3	04/01/2017 03:28
1,2,3-Trichloropropane	ND	1.7	3.3	04/01/2017 03:28
1,2,4-Trimethylbenzene	ND	1.7	3.3	04/01/2017 03:28
1,3,5-Trimethylbenzene	ND	1.7	3.3	04/01/2017 03:28
Vinyl Chloride	ND	1.7	3.3	04/01/2017 03:28
Xylenes, Total	ND	1.7	3.3	04/01/2017 03:28

(Cont.)



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-GW	1703F87-020B	Water	03/29/2017 15:05	GC18	136542

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	107	70-130		04/01/2017 03:28
Toluene-d8	96	70-130		04/01/2017 03:28
4-BFB	82	70-130		04/01/2017 03:28

Analyst(s): AK

Analytical Comments: b1



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-GW	1703F87-021B	Water	03/29/2017 14:50	GC18	136542
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Acetone	ND		50	5	04/01/2017 04:07
tert-Amyl methyl ether (TAME)	ND		2.5	5	04/01/2017 04:07
Benzene	ND		2.5	5	04/01/2017 04:07
Bromobenzene	ND		2.5	5	04/01/2017 04:07
Bromochloromethane	ND		2.5	5	04/01/2017 04:07
Bromodichloromethane	ND		2.5	5	04/01/2017 04:07
Bromoform	ND		2.5	5	04/01/2017 04:07
Bromomethane	ND		2.5	5	04/01/2017 04:07
2-Butanone (MEK)	ND		10	5	04/01/2017 04:07
t-Butyl alcohol (TBA)	ND		10	5	04/01/2017 04:07
n-Butyl benzene	ND		2.5	5	04/01/2017 04:07
sec-Butyl benzene	ND		2.5	5	04/01/2017 04:07
tert-Butyl benzene	ND		2.5	5	04/01/2017 04:07
Carbon Disulfide	ND		2.5	5	04/01/2017 04:07
Carbon Tetrachloride	ND		2.5	5	04/01/2017 04:07
Chlorobenzene	ND		2.5	5	04/01/2017 04:07
Chloroethane	ND		2.5	5	04/01/2017 04:07
Chloroform	2.9		2.5	5	04/01/2017 04:07
Chloromethane	ND		2.5	5	04/01/2017 04:07
2-Chlorotoluene	ND		2.5	5	04/01/2017 04:07
4-Chlorotoluene	ND		2.5	5	04/01/2017 04:07
Dibromochloromethane	ND		2.5	5	04/01/2017 04:07
1,2-Dibromo-3-chloropropane	ND		1.0	5	04/01/2017 04:07
1,2-Dibromoethane (EDB)	ND		2.5	5	04/01/2017 04:07
Dibromomethane	ND		2.5	5	04/01/2017 04:07
1,2-Dichlorobenzene	ND		2.5	5	04/01/2017 04:07
1,3-Dichlorobenzene	ND		2.5	5	04/01/2017 04:07
1,4-Dichlorobenzene	ND		2.5	5	04/01/2017 04:07
Dichlorodifluoromethane	ND		2.5	5	04/01/2017 04:07
1,1-Dichloroethane	ND		2.5	5	04/01/2017 04:07
1,2-Dichloroethane (1,2-DCA)	ND		2.5	5	04/01/2017 04:07
1,1-Dichloroethene	ND		2.5	5	04/01/2017 04:07
cis-1,2-Dichloroethene	26		2.5	5	04/01/2017 04:07
trans-1,2-Dichloroethene	ND		2.5	5	04/01/2017 04:07
1,2-Dichloropropane	ND		2.5	5	04/01/2017 04:07
1,3-Dichloropropane	ND		2.5	5	04/01/2017 04:07
2,2-Dichloropropane	ND		2.5	5	04/01/2017 04:07

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-GW	1703F87-021B	Water	03/29/2017 14:50	GC18	136542

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	2.5	5	04/01/2017 04:07
cis-1,3-Dichloropropene	ND	2.5	5	04/01/2017 04:07
trans-1,3-Dichloropropene	ND	2.5	5	04/01/2017 04:07
Diisopropyl ether (DIPE)	ND	2.5	5	04/01/2017 04:07
Ethylbenzene	ND	2.5	5	04/01/2017 04:07
Ethyl tert-butyl ether (ETBE)	ND	2.5	5	04/01/2017 04:07
Freon 113	ND	2.5	5	04/01/2017 04:07
Hexachlorobutadiene	ND	2.5	5	04/01/2017 04:07
Hexachloroethane	ND	2.5	5	04/01/2017 04:07
2-Hexanone	ND	2.5	5	04/01/2017 04:07
Isopropylbenzene	ND	2.5	5	04/01/2017 04:07
4-Isopropyl toluene	ND	2.5	5	04/01/2017 04:07
Methyl-t-butyl ether (MTBE)	ND	2.5	5	04/01/2017 04:07
Methylene chloride	ND	2.5	5	04/01/2017 04:07
4-Methyl-2-pentanone (MIBK)	ND	2.5	5	04/01/2017 04:07
Naphthalene	ND	2.5	5	04/01/2017 04:07
n-Propyl benzene	ND	2.5	5	04/01/2017 04:07
Styrene	ND	2.5	5	04/01/2017 04:07
1,1,1,2-Tetrachloroethane	ND	2.5	5	04/01/2017 04:07
1,1,2,2-Tetrachloroethane	ND	2.5	5	04/01/2017 04:07
Tetrachloroethene	ND	2.5	5	04/01/2017 04:07
Toluene	ND	2.5	5	04/01/2017 04:07
1,2,3-Trichlorobenzene	ND	2.5	5	04/01/2017 04:07
1,2,4-Trichlorobenzene	ND	2.5	5	04/01/2017 04:07
1,1,1-Trichloroethane	ND	2.5	5	04/01/2017 04:07
1,1,2-Trichloroethane	ND	2.5	5	04/01/2017 04:07
Trichloroethene	160	2.5	5	04/01/2017 04:07
Trichlorofluoromethane	ND	2.5	5	04/01/2017 04:07
1,2,3-Trichloropropane	ND	2.5	5	04/01/2017 04:07
1,2,4-Trimethylbenzene	ND	2.5	5	04/01/2017 04:07
1,3,5-Trimethylbenzene	ND	2.5	5	04/01/2017 04:07
Vinyl Chloride	ND	2.5	5	04/01/2017 04:07
Xylenes, Total	ND	2.5	5	04/01/2017 04:07

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-GW	1703F87-021B	Water	03/29/2017 14:50	GC18	136542

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	107	70-130		04/01/2017 04:07
Toluene-d8	95	70-130		04/01/2017 04:07
4-BFB	83	70-130		04/01/2017 04:07

Analyst(s): AK **Analytical Comments:** b1



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-35-GW	1703F87-022B	Water	03/29/2017 14:40	GC18	136542

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	10	1	04/01/2017 04:45
tert-Amyl methyl ether (TAME)	ND	0.50	1	04/01/2017 04:45
Benzene	ND	0.50	1	04/01/2017 04:45
Bromobenzene	ND	0.50	1	04/01/2017 04:45
Bromochloromethane	ND	0.50	1	04/01/2017 04:45
Bromodichloromethane	ND	0.50	1	04/01/2017 04:45
Bromoform	ND	0.50	1	04/01/2017 04:45
Bromomethane	ND	0.50	1	04/01/2017 04:45
2-Butanone (MEK)	ND	2.0	1	04/01/2017 04:45
t-Butyl alcohol (TBA)	ND	2.0	1	04/01/2017 04:45
n-Butyl benzene	ND	0.50	1	04/01/2017 04:45
sec-Butyl benzene	ND	0.50	1	04/01/2017 04:45
tert-Butyl benzene	ND	0.50	1	04/01/2017 04:45
Carbon Disulfide	ND	0.50	1	04/01/2017 04:45
Carbon Tetrachloride	ND	0.50	1	04/01/2017 04:45
Chlorobenzene	ND	0.50	1	04/01/2017 04:45
Chloroethane	ND	0.50	1	04/01/2017 04:45
Chloroform	ND	0.50	1	04/01/2017 04:45
Chloromethane	ND	0.50	1	04/01/2017 04:45
2-Chlorotoluene	ND	0.50	1	04/01/2017 04:45
4-Chlorotoluene	ND	0.50	1	04/01/2017 04:45
Dibromochloromethane	ND	0.50	1	04/01/2017 04:45
1,2-Dibromo-3-chloropropane	ND	0.20	1	04/01/2017 04:45
1,2-Dibromoethane (EDB)	ND	0.50	1	04/01/2017 04:45
Dibromomethane	ND	0.50	1	04/01/2017 04:45
1,2-Dichlorobenzene	ND	0.50	1	04/01/2017 04:45
1,3-Dichlorobenzene	ND	0.50	1	04/01/2017 04:45
1,4-Dichlorobenzene	ND	0.50	1	04/01/2017 04:45
Dichlorodifluoromethane	ND	0.50	1	04/01/2017 04:45
1,1-Dichloroethane	ND	0.50	1	04/01/2017 04:45
1,2-Dichloroethane (1,2-DCA)	ND	0.50	1	04/01/2017 04:45
1,1-Dichloroethene	ND	0.50	1	04/01/2017 04:45
cis-1,2-Dichloroethene	1.0	0.50	1	04/01/2017 04:45
trans-1,2-Dichloroethene	ND	0.50	1	04/01/2017 04:45
1,2-Dichloropropane	ND	0.50	1	04/01/2017 04:45
1,3-Dichloropropane	ND	0.50	1	04/01/2017 04:45
2,2-Dichloropropane	ND	0.50	1	04/01/2017 04:45

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-35-GW	1703F87-022B	Water	03/29/2017 14:40	GC18	136542

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	1	04/01/2017 04:45
cis-1,3-Dichloropropene	ND	0.50	1	04/01/2017 04:45
trans-1,3-Dichloropropene	ND	0.50	1	04/01/2017 04:45
Diisopropyl ether (DIPE)	ND	0.50	1	04/01/2017 04:45
Ethylbenzene	ND	0.50	1	04/01/2017 04:45
Ethyl tert-butyl ether (ETBE)	ND	0.50	1	04/01/2017 04:45
Freon 113	ND	0.50	1	04/01/2017 04:45
Hexachlorobutadiene	ND	0.50	1	04/01/2017 04:45
Hexachloroethane	ND	0.50	1	04/01/2017 04:45
2-Hexanone	ND	0.50	1	04/01/2017 04:45
Isopropylbenzene	ND	0.50	1	04/01/2017 04:45
4-Isopropyl toluene	ND	0.50	1	04/01/2017 04:45
Methyl-t-butyl ether (MTBE)	ND	0.50	1	04/01/2017 04:45
Methylene chloride	ND	0.50	1	04/01/2017 04:45
4-Methyl-2-pentanone (MIBK)	ND	0.50	1	04/01/2017 04:45
Naphthalene	ND	0.50	1	04/01/2017 04:45
n-Propyl benzene	ND	0.50	1	04/01/2017 04:45
Styrene	ND	0.50	1	04/01/2017 04:45
1,1,1,2-Tetrachloroethane	ND	0.50	1	04/01/2017 04:45
1,1,2,2-Tetrachloroethane	ND	0.50	1	04/01/2017 04:45
Tetrachloroethene	ND	0.50	1	04/01/2017 04:45
Toluene	ND	0.50	1	04/01/2017 04:45
1,2,3-Trichlorobenzene	ND	0.50	1	04/01/2017 04:45
1,2,4-Trichlorobenzene	ND	0.50	1	04/01/2017 04:45
1,1,1-Trichloroethane	ND	0.50	1	04/01/2017 04:45
1,1,2-Trichloroethane	ND	0.50	1	04/01/2017 04:45
Trichloroethene	4.3	0.50	1	04/01/2017 04:45
Trichlorofluoromethane	ND	0.50	1	04/01/2017 04:45
1,2,3-Trichloropropane	ND	0.50	1	04/01/2017 04:45
1,2,4-Trimethylbenzene	ND	0.50	1	04/01/2017 04:45
1,3,5-Trimethylbenzene	ND	0.50	1	04/01/2017 04:45
Vinyl Chloride	0.79	0.50	1	04/01/2017 04:45
Xylenes, Total	ND	0.50	1	04/01/2017 04:45

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/1/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-35-GW	1703F87-022B	Water	03/29/2017 14:40	GC18	136542

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	106	70-130		04/01/2017 04:45
Toluene-d8	96	70-130		04/01/2017 04:45
4-BFB	85	70-130		04/01/2017 04:45

Analyst(s): AK

Analytical Comments: b1



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/4/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW3510C
Analytical Method: SW8310
Unit: µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) by HPLC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-GW	1703F87-020C	Water	03/29/2017 15:05	HPLC4	136711

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.0500	1	04/04/2017 15:27
Acenaphthylene	ND	0.0500	1	04/04/2017 15:27
Anthracene	ND	0.0500	1	04/04/2017 15:27
Benzo (a) anthracene	ND	0.0250	1	04/04/2017 15:27
Benzo (a) pyrene	ND	0.0500	1	04/04/2017 15:27
Benzo (b) fluoranthene	ND	0.0250	1	04/04/2017 15:27
Benzo (k) fluoranthene	ND	0.0250	1	04/04/2017 15:27
Benzo (g,h,i) perylene	ND	0.0500	1	04/04/2017 15:27
Chrysene	ND	0.0500	1	04/04/2017 15:27
Dibenzo (a,h) anthracene	ND	0.0500	1	04/04/2017 15:27
Fluoranthene	ND	0.0500	1	04/04/2017 15:27
Fluorene	ND	0.0500	1	04/04/2017 15:27
Indeno (1,2,3-cd) pyrene	ND	0.0250	1	04/04/2017 15:27
1-Methylnaphthalene	ND	0.0500	1	04/04/2017 15:27
2-Methylnaphthalene	ND	0.0500	1	04/04/2017 15:27
Naphthalene	0.0632	0.0500	1	04/04/2017 15:27
Phenanthrene	ND	0.0500	1	04/04/2017 15:27
Pyrene	ND	0.0500	1	04/04/2017 15:27
Surrogates	REC (%)	Limits		
Decafluorobiphenyl	87	70-130		04/04/2017 15:27
	0	0-0		04/04/2017 15:27

Analyst(s): BBO

Analytical Comments: b1



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/4/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW3510C
Analytical Method: SW8310
Unit: µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) by HPLC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-GW	1703F87-021C	Water	03/29/2017 14:50	HPLC4	136711

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.0500	1	04/04/2017 17:39
Acenaphthylene	ND	0.0500	1	04/04/2017 17:39
Anthracene	ND	0.0500	1	04/04/2017 17:39
Benzo (a) anthracene	ND	0.0250	1	04/04/2017 17:39
Benzo (a) pyrene	ND	0.0500	1	04/04/2017 17:39
Benzo (b) fluoranthene	ND	0.0250	1	04/04/2017 17:39
Benzo (k) fluoranthene	ND	0.0250	1	04/04/2017 17:39
Benzo (g,h,i) perylene	ND	0.0500	1	04/04/2017 17:39
Chrysene	ND	0.0500	1	04/04/2017 17:39
Dibenzo (a,h) anthracene	ND	0.0500	1	04/04/2017 17:39
Fluoranthene	ND	0.0500	1	04/04/2017 17:39
Fluorene	ND	0.0500	1	04/04/2017 17:39
Indeno (1,2,3-cd) pyrene	ND	0.0250	1	04/04/2017 17:39
1-Methylnaphthalene	ND	0.0500	1	04/04/2017 17:39
2-Methylnaphthalene	ND	0.0500	1	04/04/2017 17:39
Naphthalene	0.0735	0.0500	1	04/04/2017 17:39
Phenanthrene	ND	0.0500	1	04/04/2017 17:39
Pyrene	ND	0.0500	1	04/04/2017 17:39
Surrogates	REC (%)	Limits		
Decafluorobiphenyl	93	70-130		04/04/2017 17:39
4,4-Dichlorobiphenyl	79	70-130		04/04/2017 17:39

Analyst(s): BBO

Analytical Comments: b1



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 4/4/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW3510C
Analytical Method: SW8310
Unit: µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) by HPLC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-35-GW	1703F87-022C	Water	03/29/2017 14:40	HPLC4	136711

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.0500	1	04/04/2017 18:23
Acenaphthylene	ND	0.0500	1	04/04/2017 18:23
Anthracene	ND	0.0500	1	04/04/2017 18:23
Benzo (a) anthracene	ND	0.0250	1	04/04/2017 18:23
Benzo (a) pyrene	ND	0.0500	1	04/04/2017 18:23
Benzo (b) fluoranthene	ND	0.0250	1	04/04/2017 18:23
Benzo (k) fluoranthene	ND	0.0250	1	04/04/2017 18:23
Benzo (g,h,i) perylene	ND	0.0500	1	04/04/2017 18:23
Chrysene	ND	0.0500	1	04/04/2017 18:23
Dibenzo (a,h) anthracene	ND	0.0500	1	04/04/2017 18:23
Fluoranthene	ND	0.0500	1	04/04/2017 18:23
Fluorene	ND	0.0500	1	04/04/2017 18:23
Indeno (1,2,3-cd) pyrene	ND	0.0250	1	04/04/2017 18:23
1-Methylnaphthalene	ND	0.0500	1	04/04/2017 18:23
2-Methylnaphthalene	ND	0.0500	1	04/04/2017 18:23
Naphthalene	ND	0.0500	1	04/04/2017 18:23
Phenanthrene	ND	0.0500	1	04/04/2017 18:23
Pyrene	ND	0.0500	1	04/04/2017 18:23
Surrogates	REC (%)	Limits		
Decafluorobiphenyl	84	70-130		04/04/2017 18:23
4,4-Dichlorobiphenyl	74	70-130		04/04/2017 18:23

Analyst(s): BBO

Analytical Comments: b1



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-12.5	1703F87-002A	Soil	03/29/2017 11:55	GC19	136448

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	03/31/2017 08:18
MTBE	---	0.050	1	03/31/2017 08:18
Benzene	---	0.0050	1	03/31/2017 08:18
Toluene	---	0.0050	1	03/31/2017 08:18
Ethylbenzene	---	0.0050	1	03/31/2017 08:18
Xylenes	---	0.015	1	03/31/2017 08:18

Surrogates	REC (%)	Limits
2-Fluorotoluene	84	62-126

Analyst(s): IA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-15.0	1703F87-003A	Soil	03/29/2017 12:00	GC19	136448

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	03/31/2017 08:49
MTBE	---	0.050	1	03/31/2017 08:49
Benzene	---	0.0050	1	03/31/2017 08:49
Toluene	---	0.0050	1	03/31/2017 08:49
Ethylbenzene	---	0.0050	1	03/31/2017 08:49
Xylenes	---	0.015	1	03/31/2017 08:49

Surrogates	REC (%)	Limits
2-Fluorotoluene	78	62-126

Analyst(s): IA



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-10.0	1703F87-006A	Soil	03/29/2017 08:10	GC19	136448

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	03/31/2017 09:50
MTBE	---	0.050	1	03/31/2017 09:50
Benzene	---	0.0050	1	03/31/2017 09:50
Toluene	---	0.0050	1	03/31/2017 09:50
Ethylbenzene	---	0.0050	1	03/31/2017 09:50
Xylenes	---	0.015	1	03/31/2017 09:50

Surrogates	REC (%)	Limits
2-Fluorotoluene	80	62-126

Analyst(s): IA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-12.5	1703F87-007A	Soil	03/29/2017 08:30	GC19	136448

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	03/31/2017 10:20
MTBE	---	0.050	1	03/31/2017 10:20
Benzene	---	0.0050	1	03/31/2017 10:20
Toluene	---	0.0050	1	03/31/2017 10:20
Ethylbenzene	---	0.0050	1	03/31/2017 10:20
Xylenes	---	0.015	1	03/31/2017 10:20

Surrogates	REC (%)	Limits
2-Fluorotoluene	81	62-126

Analyst(s): IA



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-15.0	1703F87-008A	Soil	03/29/2017 08:35	GC19	136521

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	03/31/2017 10:51
MTBE	---	0.050	1	03/31/2017 10:51
Benzene	---	0.0050	1	03/31/2017 10:51
Toluene	---	0.0050	1	03/31/2017 10:51
Ethylbenzene	---	0.0050	1	03/31/2017 10:51
Xylenes	---	0.015	1	03/31/2017 10:51

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	86	62-126	03/31/2017 10:51

Analyst(s): IA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-8.0	1703F87-011A	Soil	03/29/2017 09:11	GC19	136521

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	03/31/2017 17:06
MTBE	---	0.050	1	03/31/2017 17:06
Benzene	---	0.0050	1	03/31/2017 17:06
Toluene	---	0.0050	1	03/31/2017 17:06
Ethylbenzene	---	0.0050	1	03/31/2017 17:06
Xylenes	---	0.015	1	03/31/2017 17:06

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	82	62-126	03/31/2017 17:06

Analyst(s): IA



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-12.5	1703F87-012A	Soil	03/29/2017 09:20	GC19	136521

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	03/31/2017 17:37
MTBE	---	0.050	1	03/31/2017 17:37
Benzene	---	0.0050	1	03/31/2017 17:37
Toluene	---	0.0050	1	03/31/2017 17:37
Ethylbenzene	---	0.0050	1	03/31/2017 17:37
Xylenes	---	0.015	1	03/31/2017 17:37

Surrogates	REC (%)	Limits
2-Fluorotoluene	79	62-126

Analyst(s): IA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-15.0	1703F87-013A	Soil	03/29/2017 09:25	GC19	136521

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	04/01/2017 17:48
MTBE	---	0.050	1	04/01/2017 17:48
Benzene	---	0.0050	1	04/01/2017 17:48
Toluene	---	0.0050	1	04/01/2017 17:48
Ethylbenzene	---	0.0050	1	04/01/2017 17:48
Xylenes	---	0.015	1	04/01/2017 17:48

Surrogates	REC (%)	Limits
2-Fluorotoluene	84	62-126

Analyst(s): LT



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-35-10.0	1703F87-016A	Soil	03/29/2017 10:12	GC19	136521

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	03/31/2017 19:09
MTBE	---	0.050	1	03/31/2017 19:09
Benzene	---	0.0050	1	03/31/2017 19:09
Toluene	---	0.0050	1	03/31/2017 19:09
Ethylbenzene	---	0.0050	1	03/31/2017 19:09
Xylenes	---	0.015	1	03/31/2017 19:09

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	87	62-126	03/31/2017 19:09

Analyst(s): IA



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/31/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: µg/L

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-GW	1703F87-020A	Water	03/29/2017 15:05	GC3	136723

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	50	1	03/31/2017 21:17
MTBE	---	5.0	1	03/31/2017 21:17
Benzene	---	0.50	1	03/31/2017 21:17
Toluene	---	0.50	1	03/31/2017 21:17
Ethylbenzene	---	0.50	1	03/31/2017 21:17
Xylenes	---	1.5	1	03/31/2017 21:17

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
aaa-TFT	557	S	89-115	03/31/2017 21:17

Analyst(s): HD

Analytical Comments: c4,b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-GW	1703F87-021A	Water	03/29/2017 14:50	GC3	136723

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	50	1	03/31/2017 22:17
MTBE	---	5.0	1	03/31/2017 22:17
Benzene	---	0.50	1	03/31/2017 22:17
Toluene	---	0.50	1	03/31/2017 22:17
Ethylbenzene	---	0.50	1	03/31/2017 22:17
Xylenes	---	1.5	1	03/31/2017 22:17

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
aaa-TFT	752	S	89-115	03/31/2017 22:17

Analyst(s): HD

Analytical Comments: c4,b1

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/31/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: µg/L

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-35-GW	1703F87-022A	Water	03/29/2017 14:40	GC3	136613

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	50	1	03/31/2017 13:33
MTBE	---	5.0	1	03/31/2017 13:33
Benzene	---	0.50	1	03/31/2017 13:33
Toluene	---	0.50	1	03/31/2017 13:33
Ethylbenzene	---	0.50	1	03/31/2017 13:33
Xylenes	---	1.5	1	03/31/2017 13:33

Surrogates	REC (%)	Limits	Date Analyzed
aaa-TFT	115	70-130	03/31/2017 13:33

Analyst(s): IA

Analytical Comments: b1



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW3550B
Analytical Method: SW8015B
Unit: mg/Kg

Total Extractable Petroleum Hydrocarbons w/out SG Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-12.5	1703F87-002A	Soil	03/29/2017 11:55	GC9b	136449

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	ND	1.0	1	03/31/2017 10:52
TPH-Motor Oil (C18-C36)	ND	5.0	1	03/31/2017 10:52

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	<u>Date Analyzed</u>
C9	102	78-109	03/31/2017 10:52

Analyst(s): TK

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-15.0	1703F87-003A	Soil	03/29/2017 12:00	GC9b	136449

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	ND	1.0	1	03/31/2017 07:38
TPH-Motor Oil (C18-C36)	ND	5.0	1	03/31/2017 07:38

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	<u>Date Analyzed</u>
C9	102	78-109	03/31/2017 07:38

Analyst(s): TK

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-10.0	1703F87-006A	Soil	03/29/2017 08:10	GC6A	136449

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	ND	1.0	1	03/31/2017 10:18
TPH-Motor Oil (C18-C36)	ND	5.0	1	03/31/2017 10:18

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	<u>Date Analyzed</u>
C9	95	78-109	03/31/2017 10:18

Analyst(s): TK

(Cont.)



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW3550B
Analytical Method: SW8015B
Unit: mg/Kg

Total Extractable Petroleum Hydrocarbons w/out SG Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-12.5	1703F87-007A	Soil	03/29/2017 08:30	GC6A	136449

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	ND	1.0	1	03/31/2017 11:35
TPH-Motor Oil (C18-C36)	ND	5.0	1	03/31/2017 11:35

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	<u>Date Analyzed</u>
C9	97	78-109	03/31/2017 11:35

Analyst(s): TK

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-32-15.0	1703F87-008A	Soil	03/29/2017 08:35	GC9b	136449

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	ND	1.0	1	03/31/2017 06:20
TPH-Motor Oil (C18-C36)	ND	5.0	1	03/31/2017 06:20

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	<u>Date Analyzed</u>
C9	101	78-109	03/31/2017 06:20

Analyst(s): TK

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-8.0	1703F87-011A	Soil	03/29/2017 09:11	GC6A	136449

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	ND	1.0	1	03/31/2017 10:56
TPH-Motor Oil (C18-C36)	ND	5.0	1	03/31/2017 10:56

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	<u>Date Analyzed</u>
C9	96	78-109	03/31/2017 10:56

Analyst(s): TK

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Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW3550B
Analytical Method: SW8015B
Unit: mg/Kg

Total Extractable Petroleum Hydrocarbons w/out SG Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-12.5	1703F87-012A	Soil	03/29/2017 09:20	GC6A	136449

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	1.0	1	03/31/2017 09:39
TPH-Motor Oil (C18-C36)	ND	5.0	1	03/31/2017 09:39

Surrogates	REC (%)	Limits	Date Analyzed
C9	96	78-109	03/31/2017 09:39

Analyst(s): TK

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-15.0	1703F87-013A	Soil	03/29/2017 09:25	GC9b	136449

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	1.0	1	03/31/2017 10:13
TPH-Motor Oil (C18-C36)	ND	5.0	1	03/31/2017 10:13

Surrogates	REC (%)	Limits	Date Analyzed
C9	102	78-109	03/31/2017 10:13

Analyst(s): TK

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-35-10.0	1703F87-016A	Soil	03/29/2017 10:12	GC9a	136519

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	1.5	1.0	1	03/31/2017 03:45
TPH-Motor Oil (C18-C36)	6.6	5.0	1	03/31/2017 03:45

Surrogates	REC (%)	Limits	Date Analyzed
C9	105	78-109	03/31/2017 03:45

Analyst(s): TK

Analytical Comments: e7,e2



Analytical Report

Client: Langan
Date Received: 3/30/17 14:20
Date Prepared: 3/30/17
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
Extraction Method: SW3510C
Analytical Method: SW8015B
Unit: µg/L

Total Extractable Petroleum Hydrocarbons w/out SG Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-31-GW	1703F87-020A	Water	03/29/2017 15:05	GC9b	136511

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	110	50	1	03/31/2017 05:03
TPH-Motor Oil (C18-C36)	870	250	1	03/31/2017 05:03

Surrogates	REC (%)	Limits	Date Analyzed
C9	104	66-138	03/31/2017 05:03

Analyst(s): TK **Analytical Comments:** e7,e2,e4,b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-34-GW	1703F87-021A	Water	03/29/2017 14:50	GC9b	136511

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	140	50	1	03/31/2017 03:45
TPH-Motor Oil (C18-C36)	700	250	1	03/31/2017 03:45

Surrogates	REC (%)	Limits	Date Analyzed
C9	104	66-138	03/31/2017 03:45

Analyst(s): TK **Analytical Comments:** e7,e2,e4,b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-35-GW	1703F87-022A	Water	03/29/2017 14:40	GC9b	136511

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	140	50	1	03/31/2017 00:31
TPH-Motor Oil (C18-C36)	1100	250	1	03/31/2017 00:31

Surrogates	REC (%)	Limits	Date Analyzed
C9	102	66-138	03/31/2017 00:31

Analyst(s): TK **Analytical Comments:** e7,e2,b1



Quality Control Report

Client: Langan
Date Prepared: 3/30/17
Date Analyzed: 3/30/17 - 3/31/17
Instrument: GC10
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136485
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-136485
 1703F72-019AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	0.10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.0341	0.0050	0.050	-	68	53-116
Benzene	ND	0.0428	0.0050	0.050	-	86	63-137
Bromobenzene	ND	-	0.0050	-	-	-	-
Bromochloromethane	ND	-	0.0050	-	-	-	-
Bromodichloromethane	ND	-	0.0050	-	-	-	-
Bromoform	ND	-	0.0050	-	-	-	-
Bromomethane	ND	-	0.0050	-	-	-	-
2-Butanone (MEK)	ND	-	0.020	-	-	-	-
t-Butyl alcohol (TBA)	ND	0.133	0.050	0.20	-	66	41-135
n-Butyl benzene	ND	-	0.0050	-	-	-	-
sec-Butyl benzene	ND	-	0.0050	-	-	-	-
tert-Butyl benzene	ND	-	0.0050	-	-	-	-
Carbon Disulfide	ND	-	0.0050	-	-	-	-
Carbon Tetrachloride	ND	-	0.0050	-	-	-	-
Chlorobenzene	ND	0.0423	0.0050	0.050	-	85	77-121
Chloroethane	ND	-	0.0050	-	-	-	-
Chloroform	ND	-	0.0050	-	-	-	-
Chloromethane	ND	-	0.0050	-	-	-	-
2-Chlorotoluene	ND	-	0.0050	-	-	-	-
4-Chlorotoluene	ND	-	0.0050	-	-	-	-
Dibromochloromethane	ND	-	0.0050	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.0040	-	-	-	-
1,2-Dibromoethane (EDB)	ND	0.0388	0.0040	0.050	-	78	67-119
Dibromomethane	ND	-	0.0050	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.0050	-	-	-	-
Dichlorodifluoromethane	ND	-	0.0050	-	-	-	-
1,1-Dichloroethane	ND	-	0.0050	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.0403	0.0040	0.050	-	81	58-135
1,1-Dichloroethene	ND	0.0442	0.0050	0.050	-	88	42-145
cis-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
1,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,3-Dichloropropane	ND	-	0.0050	-	-	-	-
2,2-Dichloropropane	ND	-	0.0050	-	-	-	-

(Cont.)

NELAP 4033ORELAP

 QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 3/30/17
Date Analyzed: 3/30/17 - 3/31/17
Instrument: GC10
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136485
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-136485
 1703F72-019AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1-Dichloropropene	ND	-	0.0050	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
Diisopropyl ether (DIPE)	ND	0.0407	0.0050	0.050	-	81	52-129
Ethylbenzene	ND	-	0.0050	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.0395	0.0050	0.050	-	79	53-125
Freon 113	ND	-	0.0050	-	-	-	-
Hexachlorobutadiene	ND	-	0.0050	-	-	-	-
Hexachloroethane	ND	-	0.0050	-	-	-	-
2-Hexanone	ND	-	0.0050	-	-	-	-
Isopropylbenzene	ND	-	0.0050	-	-	-	-
4-Isopropyl toluene	ND	-	0.0050	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.0381	0.0050	0.050	-	76	58-122
Methylene chloride	ND	-	0.0050	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.0050	-	-	-	-
Naphthalene	ND	-	0.0050	-	-	-	-
n-Propyl benzene	ND	-	0.0050	-	-	-	-
Styrene	ND	-	0.0050	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
Tetrachloroethene	ND	-	0.0050	-	-	-	-
Toluene	ND	0.0461	0.0050	0.050	-	92	76-130
1,2,3-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.0050	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.0050	-	-	-	-
Trichloroethene	ND	0.0436	0.0050	0.050	-	87	72-132
Trichlorofluoromethane	ND	-	0.0050	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.0050	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.0050	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.0050	-	-	-	-
Vinyl Chloride	ND	-	0.0050	-	-	-	-
Xylenes, Total	ND	-	0.0050	-	-	-	-



Quality Control Report

Client: Langan
Date Prepared: 3/30/17
Date Analyzed: 3/30/17 - 3/31/17
Instrument: GC10
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136485
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-136485
 1703F72-019AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Surrogate Recovery							
Dibromofluoromethane	0.104	0.109		0.12	83	87	70-130
Toluene-d8	0.1335	0.134		0.12	107	107	70-130
4-BFB	0.01012	0.0102		0.012	81	82	70-130
Benzene-d6	0.07858	0.0856		0.10	79	86	60-140
Ethylbenzene-d10	0.107	0.111		0.10	107	111	60-140
1,2-DCB-d4	0.07664	0.0785		0.10	77	79	60-140

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
tert-Amyl methyl ether (TAME)	0.0344	0.0346	0.050	ND	69	69	53-116	0	20
Benzene	0.0408	0.0415	0.050	ND	82	83	63-137	1.86	20
t-Butyl alcohol (TBA)	0.126	0.130	0.20	ND	63	65	41-135	2.60	20
Chlorobenzene	0.0401	0.0406	0.050	ND	80	81	77-121	1.20	20
1,2-Dibromoethane (EDB)	0.0380	0.0381	0.050	ND	76	76	67-119	0	20
1,2-Dichloroethane (1,2-DCA)	0.0374	0.0384	0.050	ND	75	77	58-135	2.52	20
1,1-Dichloroethene	0.0419	0.0430	0.050	ND	84	86	42-145	2.51	20
Diisopropyl ether (DIPE)	0.0394	0.0401	0.050	ND	79	80	52-129	1.61	20
Ethyl tert-butyl ether (ETBE)	0.0378	0.0383	0.050	ND	76	77	53-125	1.42	20
Methyl-t-butyl ether (MTBE)	0.0360	0.0365	0.050	ND	72	73	58-122	1.37	20
Toluene	0.0429	0.0436	0.050	ND	86	87	76-130	1.75	20
Trichloroethene	0.0420	0.0430	0.050	ND	84	86	72-132	2.36	20

Surrogate Recovery									
Dibromofluoromethane	0.108	0.108	0.12		87	86	70-130	0.491	20
Toluene-d8	0.133	0.133	0.12		107	106	70-130	0.252	20
4-BFB	0.00990	0.00980	0.012		79	78	70-130	0.992	20
Benzene-d6	0.0832	0.0847	0.10		83	85	60-140	1.68	20
Ethylbenzene-d10	0.112	0.112	0.10		112	112	60-140	0	20
1,2-DCB-d4	0.0772	0.0766	0.10		77	77	60-140	0	20



Quality Control Report

Client: Langan
Date Prepared: 3/31/17
Date Analyzed: 4/1/17
Instrument: GC10
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136565
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-136565

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	0.10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.0403	0.0050	0.050	-	81	53-116
Benzene	ND	0.0470	0.0050	0.050	-	94	63-137
Bromobenzene	ND	-	0.0050	-	-	-	-
Bromochloromethane	ND	-	0.0050	-	-	-	-
Bromodichloromethane	ND	-	0.0050	-	-	-	-
Bromoform	ND	-	0.0050	-	-	-	-
Bromomethane	ND	-	0.0050	-	-	-	-
2-Butanone (MEK)	ND	-	0.020	-	-	-	-
t-Butyl alcohol (TBA)	ND	0.162	0.050	0.20	-	81	41-135
n-Butyl benzene	ND	-	0.0050	-	-	-	-
sec-Butyl benzene	ND	-	0.0050	-	-	-	-
tert-Butyl benzene	ND	-	0.0050	-	-	-	-
Carbon Disulfide	ND	-	0.0050	-	-	-	-
Carbon Tetrachloride	ND	-	0.0050	-	-	-	-
Chlorobenzene	ND	0.0473	0.0050	0.050	-	95	77-121
Chloroethane	ND	-	0.0050	-	-	-	-
Chloroform	ND	-	0.0050	-	-	-	-
Chloromethane	ND	-	0.0050	-	-	-	-
2-Chlorotoluene	ND	-	0.0050	-	-	-	-
4-Chlorotoluene	ND	-	0.0050	-	-	-	-
Dibromochloromethane	ND	-	0.0050	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.0040	-	-	-	-
1,2-Dibromoethane (EDB)	ND	0.0457	0.0040	0.050	-	91	67-119
Dibromomethane	ND	-	0.0050	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.0050	-	-	-	-
Dichlorodifluoromethane	ND	-	0.0050	-	-	-	-
1,1-Dichloroethane	ND	-	0.0050	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.0407	0.0040	0.050	-	81	58-135
1,1-Dichloroethene	ND	0.0475	0.0050	0.050	-	95	42-145
cis-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
1,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,3-Dichloropropane	ND	-	0.0050	-	-	-	-
2,2-Dichloropropane	ND	-	0.0050	-	-	-	-

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NELAP 4033ORELAP

 QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 3/31/17
Date Analyzed: 4/1/17
Instrument: GC10
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136565
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-136565

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1-Dichloropropene	ND	-	0.0050	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
Diisopropyl ether (DIPE)	ND	0.0458	0.0050	0.050	-	92	52-129
Ethylbenzene	ND	-	0.0050	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.0426	0.0050	0.050	-	85	53-125
Freon 113	ND	-	0.0050	-	-	-	-
Hexachlorobutadiene	ND	-	0.0050	-	-	-	-
Hexachloroethane	ND	-	0.0050	-	-	-	-
2-Hexanone	ND	-	0.0050	-	-	-	-
Isopropylbenzene	ND	-	0.0050	-	-	-	-
4-Isopropyl toluene	ND	-	0.0050	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.0418	0.0050	0.050	-	84	58-122
Methylene chloride	ND	-	0.0050	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.0050	-	-	-	-
Naphthalene	ND	-	0.0050	-	-	-	-
n-Propyl benzene	ND	-	0.0050	-	-	-	-
Styrene	ND	-	0.0050	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
Tetrachloroethene	ND	-	0.0050	-	-	-	-
Toluene	ND	0.0518	0.0050	0.050	-	104	76-130
1,2,3-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.0050	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.0050	-	-	-	-
Trichloroethene	ND	0.0456	0.0050	0.050	-	91	72-132
Trichlorofluoromethane	ND	-	0.0050	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.0050	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.0050	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.0050	-	-	-	-
Vinyl Chloride	ND	-	0.0050	-	-	-	-
Xylenes, Total	ND	-	0.0050	-	-	-	-



Quality Control Report

Client: Langan
Date Prepared: 3/31/17
Date Analyzed: 4/1/17
Instrument: GC10
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136565
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-136565

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Surrogate Recovery							
Dibromofluoromethane	0.1068	0.107		0.12	85	86	70-130
Toluene-d8	0.1352	0.139		0.12	108	111	70-130
4-BFB	0.01029	0.0113		0.012	82	91	70-130
Benzene-d6	0.08651	0.101		0.10	87	101	60-140
Ethylbenzene-d10	0.1059	0.126		0.10	106	126	60-140
1,2-DCB-d4	0.076	0.0863		0.10	76	86	60-140



Quality Control Report

Client: Langan
Date Prepared: 3/30/17
Date Analyzed: 3/30/17
Instrument: GC16
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136542
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-136542

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	9.60	0.50	10	-	96	54-140
Benzene	ND	9.99	0.50	10	-	100	47-158
Bromobenzene	ND	-	0.50	-	-	-	-
Bromochloromethane	ND	-	0.50	-	-	-	-
Bromodichloromethane	ND	-	0.50	-	-	-	-
Bromoform	ND	-	0.50	-	-	-	-
Bromomethane	ND	-	0.50	-	-	-	-
2-Butanone (MEK)	ND	-	2.0	-	-	-	-
t-Butyl alcohol (TBA)	ND	36.1	2.0	40	-	90	42-140
n-Butyl benzene	ND	-	0.50	-	-	-	-
sec-Butyl benzene	ND	-	0.50	-	-	-	-
tert-Butyl benzene	ND	-	0.50	-	-	-	-
Carbon Disulfide	ND	-	0.50	-	-	-	-
Carbon Tetrachloride	ND	-	0.50	-	-	-	-
Chlorobenzene	ND	9.03	0.50	10	-	90	43-157
Chloroethane	ND	-	0.50	-	-	-	-
Chloroform	ND	-	0.50	-	-	-	-
Chloromethane	ND	-	0.50	-	-	-	-
2-Chlorotoluene	ND	-	0.50	-	-	-	-
4-Chlorotoluene	ND	-	0.50	-	-	-	-
Dibromochloromethane	ND	-	0.50	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.20	-	-	-	-
1,2-Dibromoethane (EDB)	ND	9.60	0.50	10	-	96	44-155
Dibromomethane	ND	-	0.50	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.50	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.50	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.50	-	-	-	-
Dichlorodifluoromethane	ND	-	0.50	-	-	-	-
1,1-Dichloroethane	ND	-	0.50	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	9.37	0.50	10	-	94	66-125
1,1-Dichloroethene	ND	9.73	0.50	10	-	97	47-149
cis-1,2-Dichloroethene	ND	-	0.50	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.50	-	-	-	-
1,2-Dichloropropane	ND	-	0.50	-	-	-	-
1,3-Dichloropropane	ND	-	0.50	-	-	-	-
2,2-Dichloropropane	ND	-	0.50	-	-	-	-

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NELAP 4033ORELAP

 QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 3/30/17
Date Analyzed: 3/30/17
Instrument: GC16
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136542
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-136542

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1-Dichloropropene	ND	-	0.50	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.50	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.50	-	-	-	-
Diisopropyl ether (DIPE)	ND	10.4	0.50	10	-	104	57-136
Ethylbenzene	ND	-	0.50	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	9.95	0.50	10	-	99	55-137
Freon 113	ND	-	0.50	-	-	-	-
Hexachlorobutadiene	ND	-	0.50	-	-	-	-
Hexachloroethane	ND	-	0.50	-	-	-	-
2-Hexanone	ND	-	0.50	-	-	-	-
Isopropylbenzene	ND	-	0.50	-	-	-	-
4-Isopropyl toluene	ND	-	0.50	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	9.28	0.50	10	-	93	53-139
Methylene chloride	ND	-	0.50	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.50	-	-	-	-
Naphthalene	ND	-	0.50	-	-	-	-
n-Propyl benzene	ND	-	0.50	-	-	-	-
Styrene	ND	-	0.50	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.50	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.50	-	-	-	-
Tetrachloroethene	ND	-	0.50	-	-	-	-
Toluene	ND	9.49	0.50	10	-	95	52-137
1,2,3-Trichlorobenzene	ND	-	0.50	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.50	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.50	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.50	-	-	-	-
Trichloroethene	ND	8.90	0.50	10	-	89	43-157
Trichlorofluoromethane	ND	-	0.50	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.50	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.50	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.50	-	-	-	-
Vinyl Chloride	ND	-	0.50	-	-	-	-
Xylenes, Total	ND	-	0.50	-	-	-	-



Quality Control Report

Client: Langan
Date Prepared: 3/30/17
Date Analyzed: 3/30/17
Instrument: GC16
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136542
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-136542

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Surrogate Recovery							
Dibromofluoromethane	23.09	22.7		25	92	91	70-130
Toluene-d8	24	24.5		25	96	98	70-130
4-BFB	2.927	2.80		2.5	117	112	70-130



Quality Control Report

Client: Langan
Date Prepared: 4/4/17
Date Analyzed: 4/4/17
Instrument: HPLC4
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136711
Extraction Method: SW3510C
Analytical Method: SW8310
Unit: µg/L
Sample ID: MB/LCS-136711

QC Summary Report for SW8310

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acenaphthene	ND	-	0.0500	-	-	-	-
Acenaphthylene	ND	-	0.0500	-	-	-	-
Anthracene	ND	-	0.0500	-	-	-	-
Benzo (a) anthracene	ND	0.933	0.0250	0.75	-	124	70-130
Benzo (a) pyrene	ND	0.901	0.0500	0.75	-	120	70-130
Benzo (b) fluoranthene	ND	-	0.0250	-	-	-	-
Benzo (k) fluoranthene	ND	-	0.0250	-	-	-	-
Benzo (g,h,i) perylene	ND	-	0.0500	-	-	-	-
Chrysene	ND	0.985	0.0500	0.75	-	131, F2	70-130
Dibenzo (a,h) anthracene	ND	-	0.0500	-	-	-	-
Fluoranthene	ND	-	0.0500	-	-	-	-
Fluorene	ND	-	0.0500	-	-	-	-
Indeno (1,2,3-cd) pyrene	ND	-	0.0250	-	-	-	-
1-Methylnaphthalene	ND	0.929	0.0500	0.75	-	124	70-130
2-Methylnaphthalene	ND	0.904	0.0500	0.75	-	121	70-130
Naphthalene	ND	-	0.0500	-	-	-	-
Phenanthrene	ND	0.927	0.0500	0.75	-	124	70-130
Pyrene	ND	0.932	0.0500	0.75	-	124	70-130
Surrogate Recovery							
Decafluorobiphenyl	57.09	62.7		50	114	125	70-130
4,4-Dichlorobiphenyl	28.98	31.8		25	116	127	70-130



Quality Control Report

Client: Langan
Date Prepared: 3/29/17
Date Analyzed: 3/30/17
Instrument: GC19
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136448
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg
Sample ID: MB/LCS-136448
 1703F37-031AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	0.596	0.40	0.60	-	99	82-118
MTBE	ND	0.0884	0.050	0.10	-	88	61-119
Benzene	ND	0.112	0.0050	0.10	-	111	77-128
Toluene	ND	0.121	0.0050	0.10	-	121	74-132
Ethylbenzene	ND	0.122	0.0050	0.10	-	122	84-127
Xylenes	ND	0.342	0.015	0.30	-	114	86-129
Surrogate Recovery							
2-Fluorotoluene	0.09521	0.102		0.10	95	102	75-134

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	NR	NR		1300	NR	NR	-	NR	-
MTBE	NR	NR		ND<10	NR	NR	-	NR	-
Benzene	NR	NR		7	NR	NR	-	NR	-
Toluene	NR	NR		21	NR	NR	-	NR	-
Ethylbenzene	NR	NR		27	NR	NR	-	NR	-
Xylenes	NR	NR		120	NR	NR	-	NR	-
Surrogate Recovery									
2-Fluorotoluene	NR	NR			NR	NR	-	NR	-



Quality Control Report

Client: Langan
Date Prepared: 3/30/17
Date Analyzed: 3/31/17
Instrument: GC19
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136521
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg
Sample ID: MB/LCS-136521
 1703F87-008AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	0.574	0.40	0.60	-	96	82-118
MTBE	ND	0.100	0.050	0.10	-	100	61-119
Benzene	ND	0.122	0.0050	0.10	-	122	77-128
Toluene	ND	0.125	0.0050	0.10	-	125	74-132
Ethylbenzene	ND	0.123	0.0050	0.10	-	123	84-127
Xylenes	ND	0.338	0.015	0.30	-	113	86-129
Surrogate Recovery							
2-Fluorotoluene	0.095	0.104		0.10	95	104	75-134

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	0.532	0.529	0.60	ND	89	88	58-129	0.692	20
MTBE	0.0805	0.0866	0.10	ND	73	79	47-118	7.39	20
Benzene	0.0980	0.103	0.10	ND	98	103	55-129	5.31	20
Toluene	0.103	0.109	0.10	ND	103	109	56-130	5.56	20
Ethylbenzene	0.104	0.110	0.10	ND	104	110	63-129	5.81	20
Xylenes	0.291	0.308	0.30	ND	97	103	64-131	5.67	20
Surrogate Recovery									
2-Fluorotoluene	0.0856	0.0909	0.10		86	91	62-126	5.97	20



Quality Control Report

Client: Langan
Date Prepared: 3/30/17
Date Analyzed: 3/30/17
Instrument: GC3
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136613
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: µg/L
Sample ID: MB/LCS-136613
 1703F26-004AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	57.3	40	60	-	96	78-116
MTBE	ND	9.90	5.0	10	-	99	72-122
Benzene	ND	9.13	0.50	10	-	91	81-123
Toluene	ND	9.49	0.50	10	-	95	83-129
Ethylbenzene	ND	9.97	0.50	10	-	100	88-126
Xylenes	ND	31.2	1.5	30	-	104	87-131
Surrogate Recovery							
aaa-TFT	9.957	9.86		10	100	99	89-116

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	59.2	57.4	60	ND	99	96	63-133	2.99	20
MTBE	9.56	9.38	10	ND	96	94	69-122	1.91	20
Benzene	9.14	9.11	10	ND	91	91	84-125	0	20
Toluene	9.58	9.54	10	ND	96	95	87-131	0.401	20
Ethylbenzene	10.0	9.63	10	ND	101	96	92-126	4.28	20
Xylenes	31.3	29.6	30	ND	104	98	88-132	5.87	20
Surrogate Recovery									
aaa-TFT	9.90	9.93	10		99	99	90-117	0	20



Quality Control Report

Client: Langan
Date Prepared: 3/31/17
Date Analyzed: 3/31/17
Instrument: GC3
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136723
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: µg/L
Sample ID: MB/LCS-136723
 1703G10-047AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	59.6	40	60	-	99	78-116
MTBE	ND	9.85	5.0	10	-	99	72-122
Benzene	ND	9.08	0.50	10	-	91	81-123
Toluene	ND	9.58	0.50	10	-	96	83-129
Ethylbenzene	ND	9.95	0.50	10	-	99	88-126
Xylenes	ND	31.2	1.5	30	-	104	87-131
Surrogate Recovery							
aaa-TFT	10.15	10.0		10	102	100	89-116

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	58.2	59.3	60	ND	97	99	63-133	1.83	20
MTBE	9.65	9.67	10	ND	97	97	69-122	0	20
Benzene	9.05	9.46	10	ND	90	95	84-125	4.45	20
Toluene	9.50	9.92	10	ND	92	96	87-131	4.29	20
Ethylbenzene	9.90	9.86	10	ND	99	99	92-126	0	20
Xylenes	31.0	30.2	30	ND	103	100	88-132	2.54	20
Surrogate Recovery									
aaa-TFT	10.0	10.2	10		100	102	90-117	1.39	20



Quality Control Report

Client: Langan
Date Prepared: 3/29/17
Date Analyzed: 3/30/17
Instrument: GC9b
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136449
Extraction Method: SW3550B
Analytical Method: SW8015B
Unit: mg/Kg
Sample ID: MB/LCS-136449

QC Report for SW8015B w/out SG Clean-Up

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH-Diesel (C10-C23)	ND	40.8	1.0	40	-	102	79-133
TPH-Motor Oil (C18-C36)	ND	-	5.0	-	-	-	-
Surrogate Recovery							
C9	25.29	25.4		25	101	102	77-109



Quality Control Report

Client: Langan
Date Prepared: 3/30/17
Date Analyzed: 3/31/17
Instrument: GC9a
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136519
Extraction Method: SW3550B
Analytical Method: SW8015B
Unit: mg/Kg
Sample ID: MB/LCS-136519
 1703F87-016AMS/MSD

QC Report for SW8015B w/out SG Clean-Up

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH-Diesel (C10-C23)	ND	37.7	1.0	40	-	94	79-133
TPH-Motor Oil (C18-C36)	ND	-	5.0	-	-	-	-
Surrogate Recovery							
C9	26.01	26.3		25	104	105	77-109

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	38.4	38.6	40	1.453	92	93	59-150	0.441	30
Surrogate Recovery									
C9	26.4	26.3	25		105	105	78-109	0	30



Quality Control Report

Client: Langan
Date Prepared: 3/30/17
Date Analyzed: 3/30/17
Instrument: GC9a
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1703F87
BatchID: 136511
Extraction Method: SW3510C
Analytical Method: SW8015B
Unit: µg/L
Sample ID: MB/LCS/LCSD-136511

QC Report for SW8015B w/out SG Clean-Up

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
TPH-Diesel (C10-C23)	ND	50	-	-	-
TPH-Motor Oil (C18-C36)	ND	250	-	-	-
Surrogate Recovery					
C9	657.6		625	105	79-111

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	1100	1230	1000	110	123	88-134	11.0	30
Surrogate Recovery								
C9	655	660	625	105	106	79-111	0.865	30



1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1703F87

ClientCode: TWRK

WaterTrax WriteOn EDF Excel EQuIS Email HardCopy ThirdParty J-flag

Report to:

Josh Graber
Langan
501 14th Street, 3rd Floor
Oakland, CA 94612
(415) 955-9040 FAX: (415) 955-9041

Email: jdgrabber@treadwellrollo.com
cc/3rd Party: kstaehlin@langan.com;
PO:
ProjectNo: 750635603; 260 30th Street

Bill to:

Accounts Payable
Langan
555 Montgomery St., Suite 1300
San Francisco, CA 94111
Langan_InvoiceCapture@concur.solutio

Requested TATs: 3 days;
4 days;

Date Received: 03/30/2017
Date Logged: 03/30/2017

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1703F87-002	B-31-12.5	Soil	3/29/2017 11:55	<input type="checkbox"/>	A			A		A						
1703F87-003	B-31-15.0	Soil	3/29/2017 12:00	<input type="checkbox"/>	A			A		A						
1703F87-006	B-32-10.0	Soil	3/29/2017 08:10	<input type="checkbox"/>	A			A		A						
1703F87-007	B-32-12.5	Soil	3/29/2017 08:30	<input type="checkbox"/>	A			A		A						
1703F87-008	B-32-15.0	Soil	3/29/2017 08:35	<input type="checkbox"/>	A			A		A						
1703F87-011	B-34-8.0	Soil	3/29/2017 09:11	<input type="checkbox"/>	A			A		A						
1703F87-012	B-34-12.5	Soil	3/29/2017 09:20	<input type="checkbox"/>	A			A		A						
1703F87-013	B-34-15.0	Soil	3/29/2017 09:25	<input type="checkbox"/>	A			A		A						
1703F87-016	B-35-10.0	Soil	3/29/2017 10:12	<input type="checkbox"/>	A			A		A						
1703F87-020	B-31-GW	Water	3/29/2017 15:05	<input type="checkbox"/>		B	C		A		A					
1703F87-021	B-34-GW	Water	3/29/2017 14:50	<input type="checkbox"/>		B	C		A		A					
1703F87-022	B-35-GW	Water	3/29/2017 14:40	<input type="checkbox"/>		B	C		A		A					

Test Legend:

1	8260B_S	2	8260B_W	3	8310_W	4	G-MBTX_S
5	G-MBTX_W	6	TPH(DMO)_S	7	TPH(DMO)_W	8	
9		10		11		12	

Prepared by: Alexandra Iniguez

The following SampIDs: 002A, 003A, 006A, 007A, 008A, 011A, 012A, 013A, 016A contain testgroup Multi Range_S.; The following SampIDs: 020A, 021A, 022A contain testgroup Multi Range_W.

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.



WORK ORDER SUMMARY

Client Name: LANGAN
Client Contact: Josh Graber
Contact's Email: jdgraber@treadwellrollo.com

Project: 750635603; 260 30th Street

Comments:

Work Order: 1703F87
QC Level: LEVEL 2
Date Logged: 3/30/2017

WaterTrax WriteOn EDF Excel Fax Email HardCopy ThirdParty J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1703F87-001A	B-31-5.0	Soil		1	Acetate Liner	<input type="checkbox"/>	3/29/2017 11:38			<input checked="" type="checkbox"/>	
1703F87-002A	B-31-12.5	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	3/29/2017 11:55	3 days		<input type="checkbox"/>	
						<input type="checkbox"/>		3 days		<input type="checkbox"/>	
1703F87-003A	B-31-15.0	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	3/29/2017 12:00	3 days		<input type="checkbox"/>	
						<input type="checkbox"/>		3 days		<input type="checkbox"/>	
1703F87-004A	B-31-20.0	Soil		1	Acetate Liner	<input type="checkbox"/>	3/29/2017 12:14			<input checked="" type="checkbox"/>	
1703F87-005A	B-32-8.0	Soil		1	Acetate Liner	<input type="checkbox"/>	3/29/2017 8:06			<input checked="" type="checkbox"/>	
1703F87-006A	B-32-10.0	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	3/29/2017 8:10	3 days		<input type="checkbox"/>	
						<input type="checkbox"/>		3 days		<input type="checkbox"/>	
1703F87-007A	B-32-12.5	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	3/29/2017 8:30	3 days		<input type="checkbox"/>	
						<input type="checkbox"/>		3 days		<input type="checkbox"/>	
1703F87-008A	B-32-15.0	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	3/29/2017 8:35	3 days		<input type="checkbox"/>	
						<input type="checkbox"/>		3 days		<input type="checkbox"/>	
1703F87-009A	B-32-20.0	Soil		1	Acetate Liner	<input type="checkbox"/>	3/29/2017 8:48			<input checked="" type="checkbox"/>	
1703F87-010A	B-34-5.0	Soil		1	Acetate Liner	<input type="checkbox"/>	3/29/2017 9:00			<input checked="" type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



WORK ORDER SUMMARY

Client Name: LANGAN
Client Contact: Josh Graber
Contact's Email: jdgraber@treadwellrollo.com

Project: 750635603; 260 30th Street

Comments:

Work Order: 1703F87
QC Level: LEVEL 2
Date Logged: 3/30/2017

WaterTrax WriteOn EDF Excel Fax Email HardCopy ThirdParty J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1703F87-011A	B-34-8.0	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	3/29/2017 9:11	3 days		<input type="checkbox"/>	
1703F87-012A	B-34-12.5	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	3/29/2017 9:20	3 days		<input type="checkbox"/>	
1703F87-013A	B-34-15.0	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	3/29/2017 9:25	3 days		<input type="checkbox"/>	
1703F87-014A	B-34-20.0	Soil		1	Acetate Liner	<input type="checkbox"/>	3/29/2017 9:34			<input checked="" type="checkbox"/>	
1703F87-015A	B-35-8.0	Soil		1	Acetate Liner	<input type="checkbox"/>	3/29/2017 10:08			<input checked="" type="checkbox"/>	
1703F87-016A	B-35-10.0	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	3/29/2017 10:12	3 days		<input type="checkbox"/>	
1703F87-017A	B-35-12.5	Soil		1	Acetate Liner	<input type="checkbox"/>	3/29/2017 10:19			<input checked="" type="checkbox"/>	
1703F87-018A	B-35-15.0	Soil		1	Acetate Liner	<input type="checkbox"/>	3/29/2017 10:29			<input checked="" type="checkbox"/>	
1703F87-019A	B-35-20.0	Soil		1	Acetate Liner	<input type="checkbox"/>	3/29/2017 10:36			<input checked="" type="checkbox"/>	
1703F87-020A	B-31-GW	Water	Multi-Range TPH(g,d,mo) by EPA 8015Bm	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	<input type="checkbox"/>	3/29/2017 15:05	3 days	5%+	<input type="checkbox"/>	
1703F87-020B	B-31-GW	Water	SW8260B (VOCs)	2	VOA w/ HCl	<input type="checkbox"/>	3/29/2017 15:05	3 days	5%+	<input type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



WORK ORDER SUMMARY

Client Name: LANGAN
Client Contact: Josh Graber
Contact's Email: jdgraber@treadwellrollo.com

Project: 750635603; 260 30th Street

Comments:

Work Order: 1703F87
QC Level: LEVEL 2
Date Logged: 3/30/2017

WaterTrax WriteOn EDF Excel Fax Email HardCopy ThirdParty J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1703F87-020C	B-31-GW	Water	SW8310 (PAHs/PNAs)	1	1LA w/ HCl	<input type="checkbox"/>	3/29/2017 15:05	4 days	5%+	<input type="checkbox"/>	
1703F87-021A	B-34-GW	Water	Multi-Range TPH(g,d,mo) by EPA 8015Bm	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	<input type="checkbox"/>	3/29/2017 14:50	3 days	5%+	<input type="checkbox"/>	
1703F87-021B	B-34-GW	Water	SW8260B (VOCs)	2	VOA w/ HCl	<input type="checkbox"/>	3/29/2017 14:50	3 days	5%+	<input type="checkbox"/>	
1703F87-021C	B-34-GW	Water	SW8310 (PAHs/PNAs)	1	1LA w/ HCl	<input type="checkbox"/>	3/29/2017 14:50	4 days	5%+	<input type="checkbox"/>	
1703F87-022A	B-35-GW	Water	Multi-Range TPH(g,d,mo) by EPA 8015Bm	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	<input type="checkbox"/>	3/29/2017 14:40	3 days	5%+	<input type="checkbox"/>	
1703F87-022B	B-35-GW	Water	SW8260B (VOCs)	2	VOA w/ HCl	<input type="checkbox"/>	3/29/2017 14:40	3 days	5%+	<input type="checkbox"/>	
1703F87-022C	B-35-GW	Water	SW8310 (PAHs/PNAs)	1	1LA w/ HCl	<input type="checkbox"/>	3/29/2017 14:40	4 days	5%+	<input type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).
- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

LANGAN

RUSH

CHAIN OF CUSTODY RECORD

1703787

10434

- 555 Montgomery Street, Suite 1300, San Francisco, CA 94111
- 501 14th Street, Third Floor, Oakland CA 94612
- 3320 Data Drive, Suite 350, Rancho Cordova, CA 95670-7982
- 4030 Moorpark Ave. Suite 210, San Jose, CA 95117-1849

Site Name: 260 30TH STREET
 Job Number: 750635603
 Project Manager/Contact: JOSH GRABER
 Samplers: KSS
 Recorder (Signature Required): [Signature]

Turnaround Time
72-Hour

Field Sample Identification No.	Date	Time	Lab Sample No.	Matrix & Preservative							Analysis Requested		Silica gel clean-up	Hold	Remarks		
				Soil	Water	Air	Other	HCL	H ₂ SO ₄	HNO ₃	Ice	TPH g/d, mo				VOCs	PAHs (8310)
B-35-8.0	3/29/17	1008		X													
B-35-10.0		1012		X													
B-35-12.5		1019		X													
B-35-15.0		1029		X													
B-35-20.0		1036		X													
B-31-GW		1505			X			5			2		X	X			
B-34-GW		1450			X			5			2		X	X			
B-35-GW	3/29/17	1440			X			5			2		X	X			

Relinquished by: (Signature) <u>[Signature]</u>	Date: <u>3-30-17</u>	Time: <u>1420</u>	Received by: (Signature) <u>[Signature]</u>	Date: <u>3-30-17</u>	Time: <u>1235</u>
Relinquished by: (Signature) <u>[Signature]</u>	Date: <u>3-30-17</u>	Time: <u>1420</u>	Received by: (Signature) <u>[Signature]</u>	Date: <u>3/30/17</u>	Time: <u>1420</u>
Relinquished by: (Signature) <u>[Signature]</u>	Date:	Time:	Received by Lab: (Signature)	Date:	Time:

Sent to Laboratory (Name): MCCAMPBELL ANALYTICAL
 Laboratory Comments/Notes:
 Method of Shipment: Lab courier Fed Ex Airborne UPS
 Hand Carried Private Courier (Co. Name)



Sample Receipt Checklist

Client Name: Langan
Project Name: 750635603; 260 30th Street

Date and Time Received: 3/30/2017 14:20
Date Logged: 3/30/2017
Received by: Alexandra Iniguez
Logged by: Alexandra Iniguez

WorkOrder No: 1703F87 Matrix: Soil/Water
Carrier: Bernie Cummins (MAI Courier)

Chain of Custody (COC) Information

- Chain of custody present? Yes [checked] No []
- Chain of custody signed when relinquished and received? Yes [checked] No []
- Chain of custody agrees with sample labels? Yes [checked] No []
- Sample IDs noted by Client on COC? Yes [checked] No []
- Date and Time of collection noted by Client on COC? Yes [checked] No []
- Sampler's name noted on COC? Yes [checked] No []

Sample Receipt Information

- Custody seals intact on shipping container/cooler? Yes [checked] No [] NA []
- Shipping container/cooler in good condition? Yes [checked] No []
- Samples in proper containers/bottles? Yes [checked] No []
- Sample containers intact? Yes [checked] No []
- Sufficient sample volume for indicated test? Yes [checked] No []

Sample Preservation and Hold Time (HT) Information

- All samples received within holding time? Yes [checked] No [] NA []
- Sample/Temp Blank temperature Temp: 5.2°C NA []
- Water - VOA vials have zero headspace / no bubbles? Yes [checked] No [] NA []
- Sample labels checked for correct preservation? Yes [checked] No []
- pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)? Yes [] No [] NA [checked]
- Samples Received on Ice? Yes [checked] No []

(Ice Type: WET ICE)

UCMR3 Samples:

- Total Chlorine tested and acceptable upon receipt for EPA 522? Yes [] No [] NA [checked]
- Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539? Yes [] No [] NA [checked]

Comments:



McC Campbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1703G69

Report Created for: Langan

501 14th Street, 3rd Floor
Oakland, CA 94612

Project Contact: Josh Graber

Project P.O.:

Project Name: 750635603; 260 30th St

Project Received: 03/31/2017

Analytical Report reviewed & approved for release on 04/04/2017 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.





Glossary of Terms & Qualifier Definitions

Client: Langan
Project: 750635603; 260 30th St
WorkOrder: 1703G69

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

Analytical Qualifiers

e2	diesel range compounds are significant; no recognizable pattern
e7	oil range compounds are significant



Analytical Report

Client: Langan
Date Received: 3/31/17 16:30
Date Prepared: 4/1/17
Project: 750635603; 260 30th St

WorkOrder: 1703G69
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GGW-2	1703G69-001B	Water	03/30/2017 11:20	GC18	136618

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	10	1	04/01/2017 14:50
tert-Amyl methyl ether (TAME)	ND	0.50	1	04/01/2017 14:50
Benzene	ND	0.50	1	04/01/2017 14:50
Bromobenzene	ND	0.50	1	04/01/2017 14:50
Bromochloromethane	ND	0.50	1	04/01/2017 14:50
Bromodichloromethane	ND	0.50	1	04/01/2017 14:50
Bromoform	ND	0.50	1	04/01/2017 14:50
Bromomethane	ND	0.50	1	04/01/2017 14:50
2-Butanone (MEK)	ND	2.0	1	04/01/2017 14:50
t-Butyl alcohol (TBA)	ND	2.0	1	04/01/2017 14:50
n-Butyl benzene	ND	0.50	1	04/01/2017 14:50
sec-Butyl benzene	ND	0.50	1	04/01/2017 14:50
tert-Butyl benzene	ND	0.50	1	04/01/2017 14:50
Carbon Disulfide	ND	0.50	1	04/01/2017 14:50
Carbon Tetrachloride	ND	0.50	1	04/01/2017 14:50
Chlorobenzene	ND	0.50	1	04/01/2017 14:50
Chloroethane	ND	0.50	1	04/01/2017 14:50
Chloroform	ND	0.50	1	04/01/2017 14:50
Chloromethane	ND	0.50	1	04/01/2017 14:50
2-Chlorotoluene	ND	0.50	1	04/01/2017 14:50
4-Chlorotoluene	ND	0.50	1	04/01/2017 14:50
Dibromochloromethane	ND	0.50	1	04/01/2017 14:50
1,2-Dibromo-3-chloropropane	ND	0.20	1	04/01/2017 14:50
1,2-Dibromoethane (EDB)	ND	0.50	1	04/01/2017 14:50
Dibromomethane	ND	0.50	1	04/01/2017 14:50
1,2-Dichlorobenzene	ND	0.50	1	04/01/2017 14:50
1,3-Dichlorobenzene	ND	0.50	1	04/01/2017 14:50
1,4-Dichlorobenzene	ND	0.50	1	04/01/2017 14:50
Dichlorodifluoromethane	ND	0.50	1	04/01/2017 14:50
1,1-Dichloroethane	ND	0.50	1	04/01/2017 14:50
1,2-Dichloroethane (1,2-DCA)	ND	0.50	1	04/01/2017 14:50
1,1-Dichloroethene	ND	0.50	1	04/01/2017 14:50
cis-1,2-Dichloroethene	ND	0.50	1	04/01/2017 14:50
trans-1,2-Dichloroethene	ND	0.50	1	04/01/2017 14:50
1,2-Dichloropropane	ND	0.50	1	04/01/2017 14:50
1,3-Dichloropropane	ND	0.50	1	04/01/2017 14:50
2,2-Dichloropropane	ND	0.50	1	04/01/2017 14:50

(Cont.)



Analytical Report

Client: Langan
Date Received: 3/31/17 16:30
Date Prepared: 4/1/17
Project: 750635603; 260 30th St

WorkOrder: 1703G69
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GGW-2	1703G69-001B	Water	03/30/2017 11:20	GC18	136618

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	1	04/01/2017 14:50
cis-1,3-Dichloropropene	ND	0.50	1	04/01/2017 14:50
trans-1,3-Dichloropropene	ND	0.50	1	04/01/2017 14:50
Diisopropyl ether (DIPE)	ND	0.50	1	04/01/2017 14:50
Ethylbenzene	ND	0.50	1	04/01/2017 14:50
Ethyl tert-butyl ether (ETBE)	ND	0.50	1	04/01/2017 14:50
Freon 113	ND	0.50	1	04/01/2017 14:50
Hexachlorobutadiene	ND	0.50	1	04/01/2017 14:50
Hexachloroethane	ND	0.50	1	04/01/2017 14:50
2-Hexanone	ND	0.50	1	04/01/2017 14:50
Isopropylbenzene	ND	0.50	1	04/01/2017 14:50
4-Isopropyl toluene	ND	0.50	1	04/01/2017 14:50
Methyl-t-butyl ether (MTBE)	ND	0.50	1	04/01/2017 14:50
Methylene chloride	ND	0.50	1	04/01/2017 14:50
4-Methyl-2-pentanone (MIBK)	ND	0.50	1	04/01/2017 14:50
Naphthalene	ND	0.50	1	04/01/2017 14:50
n-Propyl benzene	ND	0.50	1	04/01/2017 14:50
Styrene	ND	0.50	1	04/01/2017 14:50
1,1,1,2-Tetrachloroethane	ND	0.50	1	04/01/2017 14:50
1,1,2,2-Tetrachloroethane	ND	0.50	1	04/01/2017 14:50
Tetrachloroethene	ND	0.50	1	04/01/2017 14:50
Toluene	ND	0.50	1	04/01/2017 14:50
1,2,3-Trichlorobenzene	ND	0.50	1	04/01/2017 14:50
1,2,4-Trichlorobenzene	ND	0.50	1	04/01/2017 14:50
1,1,1-Trichloroethane	ND	0.50	1	04/01/2017 14:50
1,1,2-Trichloroethane	ND	0.50	1	04/01/2017 14:50
Trichloroethene	5.2	0.50	1	04/01/2017 14:50
Trichlorofluoromethane	ND	0.50	1	04/01/2017 14:50
1,2,3-Trichloropropane	ND	0.50	1	04/01/2017 14:50
1,2,4-Trimethylbenzene	ND	0.50	1	04/01/2017 14:50
1,3,5-Trimethylbenzene	ND	0.50	1	04/01/2017 14:50
Vinyl Chloride	ND	0.50	1	04/01/2017 14:50
Xylenes, Total	ND	0.50	1	04/01/2017 14:50

(Cont.)

NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 3/31/17 16:30
Date Prepared: 4/1/17
Project: 750635603; 260 30th St

WorkOrder: 1703G69
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GGW-2	1703G69-001B	Water	03/30/2017 11:20	GC18	136618

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	104	70-130		04/01/2017 14:50
Toluene-d8	96	70-130		04/01/2017 14:50
4-BFB	90	70-130		04/01/2017 14:50

Analyst(s): KF



Analytical Report

Client: Langan
Date Received: 3/31/17 16:30
Date Prepared: 4/3/17
Project: 750635603; 260 30th St

WorkOrder: 1703G69
Extraction Method: SW3510C
Analytical Method: SW8270C-SIM
Unit: µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) using SIM Mode

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GGW-2	1703G69-001C	Water	03/30/2017 11:20	GC35	136647

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.50	1	04/04/2017 12:37
Acenaphthylene	ND	0.50	1	04/04/2017 12:37
Anthracene	ND	0.50	1	04/04/2017 12:37
Benzo (a) anthracene	ND	0.50	1	04/04/2017 12:37
Benzo (a) pyrene	ND	0.50	1	04/04/2017 12:37
Benzo (b) fluoranthene	ND	0.50	1	04/04/2017 12:37
Benzo (g,h,i) perylene	ND	0.50	1	04/04/2017 12:37
Benzo (k) fluoranthene	ND	0.50	1	04/04/2017 12:37
Chrysene	ND	0.50	1	04/04/2017 12:37
Dibenzo (a,h) anthracene	ND	0.50	1	04/04/2017 12:37
Fluoranthene	ND	0.50	1	04/04/2017 12:37
Fluorene	ND	0.50	1	04/04/2017 12:37
Indeno (1,2,3-cd) pyrene	ND	0.50	1	04/04/2017 12:37
1-Methylnaphthalene	ND	0.50	1	04/04/2017 12:37
2-Methylnaphthalene	ND	0.50	1	04/04/2017 12:37
Naphthalene	ND	0.50	1	04/04/2017 12:37
Phenanthrene	ND	0.50	1	04/04/2017 12:37
Pyrene	ND	0.50	1	04/04/2017 12:37

Surrogates	REC (%)	Limits	Date Analyzed
1-Fluoronaphthalene	71	30-130	04/04/2017 12:37
2-Fluorobiphenyl	57	30-130	04/04/2017 12:37

Analyst(s): REB



Analytical Report

Client: Langan
Date Received: 3/31/17 16:30
Date Prepared: 4/1/17
Project: 750635603; 260 30th St

WorkOrder: 1703G69
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: µg/L

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GGW-2	1703G69-001A	Water	03/30/2017 11:20	GC3	136615

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	50	1	04/01/2017 17:46
MTBE	---	5.0	1	04/01/2017 17:46
Benzene	---	0.50	1	04/01/2017 17:46
Toluene	---	0.50	1	04/01/2017 17:46
Ethylbenzene	---	0.50	1	04/01/2017 17:46
Xylenes	---	1.5	1	04/01/2017 17:46

Surrogates	REC (%)	Limits	
aaa-TFT	115	70-130	04/01/2017 17:46

Analyst(s): LT



Analytical Report

Client: Langan
Date Received: 3/31/17 16:30
Date Prepared: 3/31/17
Project: 750635603; 260 30th St

WorkOrder: 1703G69
Extraction Method: SW3510C
Analytical Method: SW8015B
Unit: µg/L

Total Extractable Petroleum Hydrocarbons w/out SG Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GGW-2	1703G69-001A	Water	03/30/2017 11:20	GC11A	136586

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	150	50	1	04/01/2017 10:17
TPH-Motor Oil (C18-C36)	420	250	1	04/01/2017 10:17

Surrogates	REC (%)	Limits	Date Analyzed
C9	103	66-138	04/01/2017 10:17

Analyst(s): TK **Analytical Comments:** e7,e2



Quality Control Report

Client: Langan
Date Prepared: 4/1/17
Date Analyzed: 4/1/17
Instrument: GC18
Matrix: Water
Project: 750635603; 260 30th St

WorkOrder: 1703G69
BatchID: 136618
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-136618
 1703E95-001CMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	8.84	0.50	10	-	88	54-140
Benzene	ND	10.3	0.50	10	-	103	47-158
Bromobenzene	ND	-	0.50	-	-	-	-
Bromochloromethane	ND	-	0.50	-	-	-	-
Bromodichloromethane	ND	-	0.50	-	-	-	-
Bromoform	ND	-	0.50	-	-	-	-
Bromomethane	ND	-	0.50	-	-	-	-
2-Butanone (MEK)	ND	-	2.0	-	-	-	-
t-Butyl alcohol (TBA)	ND	25.6	2.0	40	-	64	42-140
n-Butyl benzene	ND	-	0.50	-	-	-	-
sec-Butyl benzene	ND	-	0.50	-	-	-	-
tert-Butyl benzene	ND	-	0.50	-	-	-	-
Carbon Disulfide	ND	-	0.50	-	-	-	-
Carbon Tetrachloride	ND	-	0.50	-	-	-	-
Chlorobenzene	ND	10.2	0.50	10	-	102	43-157
Chloroethane	ND	-	0.50	-	-	-	-
Chloroform	ND	-	0.50	-	-	-	-
Chloromethane	ND	-	0.50	-	-	-	-
2-Chlorotoluene	ND	-	0.50	-	-	-	-
4-Chlorotoluene	ND	-	0.50	-	-	-	-
Dibromochloromethane	ND	-	0.50	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.20	-	-	-	-
1,2-Dibromoethane (EDB)	ND	9.33	0.50	10	-	93	44-155
Dibromomethane	ND	-	0.50	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.50	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.50	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.50	-	-	-	-
Dichlorodifluoromethane	ND	-	0.50	-	-	-	-
1,1-Dichloroethane	ND	-	0.50	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	9.63	0.50	10	-	96	66-125
1,1-Dichloroethene	ND	9.87	0.50	10	-	99	47-149
cis-1,2-Dichloroethene	ND	-	0.50	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.50	-	-	-	-
1,2-Dichloropropane	ND	-	0.50	-	-	-	-
1,3-Dichloropropane	ND	-	0.50	-	-	-	-
2,2-Dichloropropane	ND	-	0.50	-	-	-	-

(Cont.)

NELAP 4033ORELAP

 QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 4/1/17
Date Analyzed: 4/1/17
Instrument: GC18
Matrix: Water
Project: 750635603; 260 30th St

WorkOrder: 1703G69
BatchID: 136618
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-136618
 1703E95-001CMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1-Dichloropropene	ND	-	0.50	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.50	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.50	-	-	-	-
Diisopropyl ether (DIPE)	ND	10.1	0.50	10	-	101	57-136
Ethylbenzene	ND	-	0.50	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	9.65	0.50	10	-	97	55-137
Freon 113	ND	-	0.50	-	-	-	-
Hexachlorobutadiene	ND	-	0.50	-	-	-	-
Hexachloroethane	ND	-	0.50	-	-	-	-
2-Hexanone	ND	-	0.50	-	-	-	-
Isopropylbenzene	ND	-	0.50	-	-	-	-
4-Isopropyl toluene	ND	-	0.50	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	8.93	0.50	10	-	89	53-139
Methylene chloride	ND	-	0.50	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.50	-	-	-	-
Naphthalene	ND	-	0.50	-	-	-	-
n-Propyl benzene	ND	-	0.50	-	-	-	-
Styrene	ND	-	0.50	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.50	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.50	-	-	-	-
Tetrachloroethene	ND	-	0.50	-	-	-	-
Toluene	ND	9.84	0.50	10	-	98	52-137
1,2,3-Trichlorobenzene	ND	-	0.50	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.50	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.50	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.50	-	-	-	-
Trichloroethene	ND	10.4	0.50	10	-	103	43-157
Trichlorofluoromethane	ND	-	0.50	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.50	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.50	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.50	-	-	-	-
Vinyl Chloride	ND	-	0.50	-	-	-	-
Xylenes, Total	ND	-	0.50	-	-	-	-



Quality Control Report

Client: Langan
Date Prepared: 4/1/17
Date Analyzed: 4/1/17
Instrument: GC18
Matrix: Water
Project: 750635603; 260 30th St

WorkOrder: 1703G69
BatchID: 136618
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-136618
 1703E95-001CMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Surrogate Recovery							
Dibromofluoromethane	25.59	25.4		25	102	102	70-130
Toluene-d8	24.28	24.8		25	97	99	70-130
4-BFB	2.154	2.24		2.5	86	90	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
tert-Amyl methyl ether (TAME)	9.81	10.3	10	ND	98	103	69-139	4.72	20
Benzene	10.2	10.8	10	ND	101	107	69-141	5.72	20
t-Butyl alcohol (TBA)	36.1	34.6	40	ND	90	86	41-152	4.36	20
Chlorobenzene	10.1	10.7	10	ND	101	107	77-120	5.99	20
1,2-Dibromoethane (EDB)	10.1	10.6	10	ND	101	106	76-135	3.98	20
1,2-Dichloroethane (1,2-DCA)	10.3	10.7	10	ND	103	107	73-139	4.00	20
1,1-Dichloroethene	9.46	10.2	10	ND	95	102	59-140	7.53	20
Diisopropyl ether (DIPE)	10.6	11.0	10	ND	106	110	72-140	3.73	20
Ethyl tert-butyl ether (ETBE)	10.4	10.9	10	ND	104	109	71-140	4.64	20
Methyl-t-butyl ether (MTBE)	10.0	10.4	10	ND	100	104	73-139	3.86	20
Toluene	9.53	10.1	10	ND	94	100	71-128	5.74	20
Trichloroethene	10.2	10.8	10	ND	102	108	64-132	6.27	20
Surrogate Recovery									
Dibromofluoromethane	26.0	26.0	25		104	104	73-131	0	20
Toluene-d8	24.4	24.2	25		97	97	72-117	0	20
4-BFB	2.24	2.32	2.5		90	93	74-116	3.41	20



Quality Control Report

Client: Langan
Date Prepared: 4/3/17
Date Analyzed: 4/4/17
Instrument: GC35
Matrix: Water
Project: 750635603; 260 30th St

WorkOrder: 1703G69
BatchID: 136647
Extraction Method: SW3510C
Analytical Method: SW8270C-SIM
Unit: µg/L
Sample ID: MB/LCS/LCSD-136647

QC Summary Report for SW8270C

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
Acenaphthene	ND	0.50	-	-	-
Acenaphthylene	ND	0.50	-	-	-
Anthracene	ND	0.50	-	-	-
Benzo (a) anthracene	ND	0.50	-	-	-
Benzo (a) pyrene	ND	0.50	-	-	-
Benzo (b) fluoranthene	ND	0.50	-	-	-
Benzo (g,h,i) perylene	ND	0.50	-	-	-
Benzo (k) fluoranthene	ND	0.50	-	-	-
Chrysene	ND	0.50	-	-	-
Dibenzo (a,h) anthracene	ND	0.50	-	-	-
Fluoranthene	ND	0.50	-	-	-
Fluorene	ND	0.50	-	-	-
Indeno (1,2,3-cd) pyrene	ND	0.50	-	-	-
1-Methylnaphthalene	ND	0.50	-	-	-
2-Methylnaphthalene	ND	0.50	-	-	-
Naphthalene	ND	0.50	-	-	-
Phenanthrene	ND	0.50	-	-	-
Pyrene	ND	0.50	-	-	-

Surrogate Recovery

1-Fluoronaphthalene	14.51		25	58	30-130
2-Fluorobiphenyl	13.83		25	55	30-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Benzo (a) pyrene	7.64	6.83	10	76	68	12-152	11.2	25
Chrysene	5.92	5.40	10	59	54	28-116	9.06	25
1-Methylnaphthalene	8.77	8.26	10	88	83	48-125	6.00	25
2-Methylnaphthalene	8.12	7.65	10	81	77	41-124	6.00	25
Phenanthrene	7.31	6.82	10	73	68	36-123	6.95	25
Pyrene	8.22	7.50	10	82	75	29-118	9.10	25

Surrogate Recovery

1-Fluoronaphthalene	15.2	14.3	25	61	57	45-129	5.88	25
2-Fluorobiphenyl	14.5	13.4	25	58	54	47-125	7.88	25



Quality Control Report

Client: Langan
Date Prepared: 4/1/17
Date Analyzed: 4/1/17
Instrument: GC3
Matrix: Water
Project: 750635603; 260 30th St

WorkOrder: 1703G69
BatchID: 136615
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: µg/L
Sample ID: MB/LCS-136615
 1703G94-002BMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	59.6	40	60	-	99	78-116
MTBE	ND	9.39	5.0	10	-	94	72-122
Benzene	ND	9.49	0.50	10	-	95	81-123
Toluene	ND	9.93	0.50	10	-	99	83-129
Ethylbenzene	ND	10.3	0.50	10	-	103	88-126
Xylenes	ND	32.1	1.5	30	-	107	87-131
Surrogate Recovery							
aaa-TFT	10.78	10.4		10	108	104	89-116

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	59.2	59.9	60	ND	99	100	63-133	1.29	20
MTBE	9.86	10.1	10	ND	99	101	69-122	1.96	20
Benzene	9.24	9.62	10	ND	92	96	84-125	4.09	20
Toluene	9.75	10.1	10	ND	98	101	87-131	3.32	20
Ethylbenzene	10.1	10.5	10	ND	101	105	92-126	4.19	20
Xylenes	31.6	32.8	30	ND	105	109	88-132	3.94	20
Surrogate Recovery									
aaa-TFT	9.98	10.5	10		100	105	90-117	5.05	20



Quality Control Report

Client: Langan
Date Prepared: 3/31/17
Date Analyzed: 4/1/17
Instrument: GC6B
Matrix: Water
Project: 750635603; 260 30th St

WorkOrder: 1703G69
BatchID: 136586
Extraction Method: SW3510C
Analytical Method: SW8015B
Unit: µg/L
Sample ID: MB/LCS/LCSD-136586

QC Report for SW8015B w/out SG Clean-Up

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
TPH-Diesel (C10-C23)	ND	50	-	-	-
TPH-Motor Oil (C18-C36)	ND	250	-	-	-
Surrogate Recovery					
C9	605.4		625	97	79-111

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	1070	1040	1000	107	104	88-134	2.92	30
Surrogate Recovery								
C9	609	622	625	97	100	79-111	2.15	30



1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1703G69

ClientCode: TWRK

WaterTrax
 WriteOn
 EDF
 Excel
 EQuIS
 Email
 HardCopy
 ThirdParty
 J-flag

Report to:

Josh Graber
 Langan
 501 14th Street, 3rd Floor
 Oakland, CA 94612
 (415) 955-9040 FAX: (415) 955-9041

Email: jdgraber@treadwellrollo.com
 cc/3rd Party:
 PO:
 ProjectNo: 750635603; 260 30th St

Bill to:

Accounts Payable
 Langan
 555 Montgomery St., Suite 1300
 San Francisco, CA 94111
 Langan_InvoiceCapture@concur.soluio

Requested TAT: 3 days;

Date Received: 03/31/2017

Date Logged: 03/31/2017

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)												
					1	2	3	4	5	6	7	8	9	10	11	12	
1703G69-001	GGW-2	Water	3/30/2017 11:20	<input type="checkbox"/>	B	C	A	A									

Test Legend:

1	8260B_W	2	8270_PNA_W	3	G-MBTEX_W	4	TPH(DMO)_W
5		6		7		8	
9		10		11		12	

Prepared by: Alexandra Iniguez

The following SampID: 001A contains testgroup Multi Range_W.

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



WORK ORDER SUMMARY

Client Name: LANGAN
Client Contact: Josh Graber
Contact's Email: jdgraber@treadwellrollo.com

Project: 750635603; 260 30th St

Work Order: 1703G69
QC Level: LEVEL 2
Date Logged: 3/31/2017

Comments:

WaterTrax WriteOn EDF Excel Fax Email HardCopy ThirdParty J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1703G69-001A	GGW-2	Water	Multi-Range TPH(g,d,mo) by EPA 8015Bm	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	<input type="checkbox"/>	3/30/2017 11:20	3 days	Trace	<input type="checkbox"/>	
1703G69-001B	GGW-2	Water	SW8260B (VOCs)	2	VOA w/ HCl	<input type="checkbox"/>	3/30/2017 11:20	3 days	Trace	<input type="checkbox"/>	
1703G69-001C	GGW-2	Water	SW8270C (PAHs/PNAs)	1	1LA	<input type="checkbox"/>	3/30/2017 11:20	3 days	Trace	<input type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).
- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



Sample Receipt Checklist

Client Name: **Langan**
 Project Name: **750635603; 260 30th St**

Date and Time Received: **3/31/2017 16:30**
 Date Logged: **3/31/2017**
 Received by: **Alexandra Iniguez**
 Logged by: **Alexandra Iniguez**

WorkOrder No: **1703G69** Matrix: Water
 Carrier: Bernie Cummins (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present? Yes No
 Chain of custody signed when relinquished and received? Yes No
 Chain of custody agrees with sample labels? Yes No
 Sample IDs noted by Client on COC? Yes No
 Date and Time of collection noted by Client on COC? Yes No
 Sampler's name noted on COC? Yes No

Sample Receipt Information

Custody seals intact on shipping container/cooler? Yes No NA
 Shipping container/cooler in good condition? Yes No
 Samples in proper containers/bottles? Yes No
 Sample containers intact? Yes No
 Sufficient sample volume for indicated test? Yes No

Sample Preservation and Hold Time (HT) Information

All samples received within holding time? Yes No NA
 Sample/Temp Blank temperature Temp: 5.6°C NA
 Water - VOA vials have zero headspace / no bubbles? Yes No NA
 Sample labels checked for correct preservation? Yes No
 pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)? Yes No NA
 Samples Received on Ice? Yes No
 (Ice Type: WET ICE)

UCMR3 Samples:

Total Chlorine tested and acceptable upon receipt for EPA 522? Yes No NA
 Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539? Yes No NA

Comments:

K PRIME, Inc.

CONSULTING ANALYTICAL CHEMISTS

3621 Westwind Blvd.
Santa Rosa CA 95403
Phone: 707 527 7574
FAX: 707 527 7879

TRANSMITTAL

DATE: 4/21/2017

TO: MS. ANNIE STAEHLIN
LANGAN TREADWELL ROLLO
555 MONTGOMERY STREET, STE. 1300
SAN FRANCISCO, CA 94111

Phone: 415-955-9041
Email: kstaehlin@langan.com

ACCT: 4841
PROJ: 750635603

FROM: Richard A. Kage1, Ph.D. *AMC 4/21/2017*
Laboratory Director

SUBJECT: LABORATORY RESULTS FOR YOUR PROJECT 750635603

Enclosed please find K Prime's laboratory reports for the following samples:

SAMPLE ID	TYPE	DATE	TIME	KPI LAB #
SV-2	AIR	04/11/17	12:18	153776
SV-1	AIR	04/11/17	13:07	153777

The above listed sample group was received on 04/12/17 and tested as requested on the chain of custody document.

Please call me if you have any questions or need further information.
Thank you for this opportunity to be of service.

K PRIME, INC.
LABORATORY REPORT

K PRIME PROJECT: 4841
CLIENT PROJECT: 750635603

METHOD: VOC'S IN AIR
REFERENCE: EPA METHOD TO 15 (GC-MS-SCAN)

SAMPLE ID: SV-1
LAB NO: 153777
SAMPLE TYPE: AIR
DATE SAMPLED: 04/11/2017
TIME SAMPLED: 13:07
BATCH ID: 040317A1
DATE ANALYZED: 04/13/2017

COMPOUND NAME	CAS NO.	PPB (V/V)		µg/cu. m	
		RL	SAMPLE CONC	RL	SAMPLE CONC
DICHLORODIFLUOROMETHANE	75-71-8	1.00	ND	4.95	ND
CHLOROMETHANE	74-87-3	1.00	ND	2.07	ND
DICHLOROTETRAFLUROETHANE	76-14-2	1.00	ND	6.99	ND
VINYL CHLORIDE	75-01-4	1.00	ND	2.56	ND
BROMOMETHANE	74-83-9	1.00	ND	3.88	ND
CHLOROETHANE	75-00-3	1.00	ND	2.64	ND
TRICHLOROFLUOROMETHANE	75-69-4	1.00	ND	5.62	ND
1,1-DICHLOROETHENE	75-35-4	1.00	ND	3.97	ND
TRICHLOROTRIFLUOROETHANE	76-13-1	1.00	ND	7.66	ND
METHYLENE CHLORIDE	75-09-2	1.00	ND	3.47	ND
1,1-DICHLOROETHANE	75-34-3	1.00	ND	4.05	ND
CIS-1,2-DICHLOROETHENE	159-59-2	1.00	ND	3.97	ND
CHLOROFORM	67-66-3	1.00	ND	4.88	ND
1,1,1-TRICHLOROETHANE	71-55-6	1.00	ND	5.46	ND
1,2-DICHLOROETHANE	107-06-2	1.00	ND	4.05	ND
BENZENE	71-43-2	1.00	7.08	3.19	22.6
CARBON TETRACHLORIDE	56-23-5	1.00	ND	6.29	ND
1,2-DICHLOROPROPANE	78-87-5	1.00	ND	4.62	ND
TRICHLOROETHENE	79-01-6	1.00	ND	5.37	ND
CIS-1,3-DICHLOROPROPENE	10061-01-5	1.00	ND	4.54	ND
TRANS-1,3-DICHLOROPROPENE	10061-02-6	1.00	ND	4.54	ND
TOLUENE	108-88-3	1.00	5.96	3.77	22.5
1,1,2-TRICHLOROETHANE	79-00-5	1.00	ND	5.46	ND
1,2-DIBROMOETHANE	106-93-4	1.00	ND	7.68	ND
TETRACHLOROETHENE	127-18-4	1.00	ND	6.78	ND
CHLOROBENZENE	108-90-7	1.00	ND	4.60	ND
ETHYLBENZENE	100-41-4	1.00	ND	4.34	ND
XYLENE (M+P)	179601-23-1	2.00	ND	8.68	ND
STYRENE	100-42-5	1.00	ND	4.26	ND
XYLENE (O)	95-47-6	1.00	ND	4.34	ND
1,1,2,2-TETRACHLOROETHANE	79-34-5	1.00	ND	6.87	ND
1,3,5-TRIMETHYLBENZENE	108-67-8	1.00	ND	4.92	ND
1,2,4-TRIMETHYLBENZENE	95-63-6	1.00	ND	4.92	ND
1,3-DICHLOROBENZENE	541-73-1	1.00	ND	6.01	ND
1,4-DICHLOROBENZENE	106-46-7	1.00	ND	6.01	ND
1,2-DICHLOROBENZENE	95-50-1	1.00	ND	6.01	ND
1,2,4-TRICHLOROBENZENE	120-82-1	1.00	ND	7.42	ND
HEXACHLOROBUTADIENE	87-68-3	1.00	ND	10.7	ND
ACETONE	67-64-1	2.00	19.7	4.74	46.8
2-BUTANONE	78-93-3	2.00	4.75	5.90	14.0
NAPHTHALENE	91-20-3	1.00	ND	5.24	ND

NOTES:

ND - NOT DETECTED AT OR ABOVE THE STATED REPORTING LIMIT
RL - REPORTING LIMIT
NA - NOT APPLICABLE OR AVAILABLE
µg/cu. m VALUES ARE CALCULATED FROM PPB RESULTS USING NORMAL TEMPERATURE AND PRESSURE (NPT).

APPROVED BY:
DATE: 4/21/17

K PRIME, INC.
LABORATORY METHOD BLANK REPORT

METHOD BLANK ID: B040317A1
SAMPLE TYPE: AIR

METHOD: VOC'S IN AIR
REFERENCE: EPA METHOD TO 15 (GC-MS-SCAN)

BATCH ID: 040317A1
DATE ANALYZED: 04/03/2017

COMPOUND NAME	CAS NO.	PPB (V/V)		µg/cu. m	
		RL	SAMPLE CONC	RL	SAMPLE CONC
DICHLORODIFLUOROMETHANE	75-71-8	0.500	ND	2.47	ND
CHLOROMETHANE	74-87-3	0.500	ND	1.03	ND
DICHLOROTETRAFLUROETHANE	76-14-2	0.500	ND	3.50	ND
VINYL CHLORIDE	75-01-4	0.500	ND	1.28	ND
BROMOMETHANE	74-83-9	0.500	ND	1.94	ND
CHLOROETHANE	75-00-3	0.500	ND	1.32	ND
TRICHLOROFLUOROMETHANE	75-69-4	0.500	ND	2.81	ND
1,1-DICHLOROETHENE	75-35-4	0.500	ND	1.98	ND
TRICHLOROTRIFLUOROETHANE	76-13-1	0.500	ND	3.83	ND
METHYLENE CHLORIDE	75-09-2	0.500	ND	1.74	ND
1,1-DICHLOROETHANE	75-34-3	0.500	ND	2.02	ND
CIS-1,2-DICHLOROETHENE	159-59-2	0.500	ND	1.98	ND
CHLOROFORM	67-66-3	0.500	ND	2.44	ND
1,1,1-TRICHLOROETHANE	71-55-6	0.500	ND	2.73	ND
1,2-DICHLOROETHANE	107-06-2	0.500	ND	2.02	ND
BENZENE	71-43-2	0.500	ND	1.60	ND
CARBON TETRACHLORIDE	56-23-5	0.500	ND	3.15	ND
1,2-DICHLOROPROPANE	78-87-5	0.500	ND	2.31	ND
TRICHLOROETHENE	79-01-6	0.500	ND	2.69	ND
CIS-1,3-DICHLOROPROPENE	10061-01-5	0.500	ND	2.27	ND
TRANS-1,3-DICHLOROPROPENE	10061-02-6	0.500	ND	2.27	ND
TOLUENE	108-88-3	0.500	ND	1.88	ND
1,1,2-TRICHLOROETHANE	79-00-5	0.500	ND	2.73	ND
1,2-DIBROMOETHANE	106-93-4	0.500	ND	3.84	ND
TETRACHLOROETHENE	127-18-4	0.500	ND	3.39	ND
CHLOROBENZENE	108-90-7	0.500	ND	2.30	ND
ETHYLBENZENE	100-41-4	0.500	ND	2.17	ND
XYLENE (M+P)	179601-23-1	1.00	ND	4.34	ND
STYRENE	100-42-5	0.500	ND	2.13	ND
XYLENE (O)	95-47-6	0.500	ND	2.17	ND
1,1,2,2-TETRACHLOROETHANE	79-34-5	0.500	ND	3.43	ND
1,3,5-TRIMETHYLBENZENE	108-67-8	0.500	ND	2.46	ND
1,2,4-TRIMETHYLBENZENE	95-63-6	0.500	ND	2.46	ND
1,3-DICHLOROBENZENE	541-73-1	0.500	ND	3.01	ND
1,4-DICHLOROBENZENE	106-46-7	0.500	ND	3.01	ND
1,2-DICHLOROBENZENE	95-50-1	0.500	ND	3.01	ND
1,2,4-TRICHLOROBENZENE	120-82-1	0.500	ND	3.71	ND
HEXACHLOROBUTADIENE	87-68-3	0.500	ND	5.33	ND
METHYL METHACRYLATE	80-62-6	0.500	ND	2.05	ND
ACETONE	67-64-1	1.00	ND	2.37	ND
2-BUTANONE	78-93-3	1.00	ND	2.95	ND
NAPHTHALENE	91-20-3	0.500	ND	2.62	ND

NOTES:

ND - NOT DETECTED AT OR ABOVE THE STATED REPORTING LIMIT
MRL - METHOD REPORTING LIMIT
NA - NOT APPLICABLE OR AVAILABLE
µg/cu. m VALUES ARE CALCULATED FROM PPB RESULTS USING NORMAL TEMPERATURE AND PRESSURE (NPT).

K PRIME, INC.
LABORATORY QUALITY CONTROL REPORT

LAB CONTROL ID: L040317A1
LAB CONTROL DUPLICATE ID: D040317A1

SAMPLE TYPE: AIR
BATCH ID: 040317A1
DATE ANALYZED: 04/03/2017

METHOD: VOC'S IN AIR
REFERENCE: EPA METHOD TO 15 (GC-MS-SCAN)

COMPOUND NAME	SPIKE ADDED (PPB)	REPORTING LIMIT (PPB)	SAMPLE CONC (PPB)	SPIKE CONC (PPB)	SPIKE REC (%)	REC LIMITS (%)
1,1-DICHLOROETHENE	10.0	0.500	ND	9.75	98	60 - 140
BENZENE	10.0	0.500	ND	8.62	86	60 - 140
TRICHLOROETHENE	10.0	0.500	ND	10.5	105	60 - 140
TOLUENE	10.0	0.500	ND	10.3	103	60 - 140
TETRACHLOROETHENE	10.0	0.500	ND	10.6	106	60 - 140

COMPOUND NAME	SPIKE ADDED (PPB)	SPIKE DUP CONC (PPB)	SPIKE DUP REC (%)	RPD (%)	QC LIMITS	
					RPD (%)	REC (%)
1,1-DICHLOROETHENE	10.0	10.1	101	3.9	25	60 - 140
BENZENE	10.0	8.86	89	2.7	25	60 - 140
TRICHLOROETHENE	10.0	10.3	103	2.1	25	60 - 140
TOLUENE	10.0	10.2	102	1.1	25	60 - 140
TETRACHLOROETHENE	10.0	10.5	105	1.1	25	60 - 140

NOTES:

NA - NOT APPLICABLE OR AVAILABLE

ND - NOT DETECTED AT OR ABOVE THE STATED REPORTING LIMIT



SUMMA CANISTER CHAIN OF CUSTODY

K Prime, Inc. Laboratory
 3621 Westwind Blvd.
 Santa Rosa, CA 95403-1067
 (707) 527-7574
 clientservice@kprimeinc.com

K PRIME INC.

EDF Log Code: _____

Global ID: _____

Client Company: LANGAN ENGINEERING & ENV. SERVICES, INC.
 Contact: KARRIANNE STAEBLIN
 Phone: (415) 955-5264
 Email: KSTAEBLIN@LANGAN.COM
 Client Project ID: 750635603

KPI Project Number

Analyses

TO-15
 HELIUM
 METHANE
 Turnaround Time

	KPI LAB NO.	SAMPLE I.D. (Location)	Collection:		Canister I.D.	Controller I.D.	Pressure:		TO-15	HELIUM	METHANE	Turnaround Time	Notes
			Date	Time			Initial	Final					
1	153776	SV-2	4/11/17	12:18	S-295	683	-28	-11	↓	↓	↓	STD	END TIME: 12:51
2	153777	SV-1	4/11/17	13:07	S-435	684	-30	-3	↓	↓	↓	STD	: 13:27
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

"MANIFOLD"

* PLEASE PROVIDE ANALYTICAL DATA FOR ALL VOCs DETECTED ABOVE THESE LAB REPORTING / DETECTION LIMITS

Relinquished by: (Signature) <u>[Signature]</u>	Received by: (Signature) _____	Date: _____	Time: _____
Relinquished by: (Signature) <u>Golden State Overnight</u>	Received by: (Signature) <u>[Signature]</u>	Date: <u>4/12/17</u>	Time: <u>12:27</u>
Relinquished by: (Signature) <u>535712647</u>	Received by: (Signature) _____	Date: _____	Time: _____



McC Campbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1704230

Report Created for: Langan

555 Montgomery St., Suite 1300
San Francisco, CA 94111

Project Contact: Josh Graber

Project P.O.: 750635603

Project Name: 260 30th Street

Project Received: 04/06/2017

Analytical Report reviewed & approved for release on 04/11/2017 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.





Glossary of Terms & Qualifier Definitions

Client: Langan
Project: 260 30th Street
WorkOrder: 1704230

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



Glossary of Terms & Qualifier Definitions

Client: Langan
Project: 260 30th Street
WorkOrder: 1704230

Analytical Qualifiers

H samples were analyzed out of holding time
S surrogate spike recovery outside accepted recovery limits
a28 reporting limit raised due to cluttered chromatogram
c1 surrogate recovery outside of the control limits due to the dilution of the sample.
c4 surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
d6 one to a few isolated non-target peaks present in the TPH(g) chromatogram
e2 diesel range compounds are significant; no recognizable pattern

Quality Control Qualifiers

F1 MS/MSD recovery and/or RPD is out of acceptance criteria; LCS validates the prep batch.
F10 MS/MSD outside control limits. Physical or chemical interferences exist due to sample matrix.



Case Narrative

Client: Langan
Project: 260 30th Street

Work Order: 1704230
April 11, 2017

RE: Ferric Iron/ Iron (III) Result.

Please note that Iron (III) concentration is obtained by subtracting [Iron (II)] from [Total Iron].

The Iron (III) concentration for sample MAI Lab ID: 1704230-001D = 280 ug/L.

The Iron (III) concentration for sample MAI Lab ID: 1704230-002D = 74 ug/L.



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/10/17-4/11/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: E300.1
Analytical Method: E300.1
Unit: mg/L

Sulfite by IC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001I	Water	04/05/2017 10:12	IC1	137110

Analytes	Result	RL	DF	Date Analyzed
Sulfite	ND	1.0	10	04/11/2017 02:24

Analyst(s): AO

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002I	Water	04/05/2017 11:42	IC1	137110

Analytes	Result	RL	DF	Date Analyzed
Sulfite	ND	0.10	1	04/10/2017 23:45

Analyst(s): AO



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/6/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: E300.1
Analytical Method: E300.1
Unit: mg/L

Inorganic Anions by IC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001G	Water	04/05/2017 10:12	IC3	136905

Analytes	Result	RL	DF	Date Analyzed
Chloride	65	2.0	20	04/06/2017 21:30
Nitrate as N	13	2.0	20	04/06/2017 21:30
Nitrate as NO ₃ ⁻	59	8.8	20	04/06/2017 21:30
Nitrite as N	ND	0.10	1	04/06/2017 20:53
Nitrite as NO ₂ ⁻	ND	0.33	1	04/06/2017 20:53
Nitrate & Nitrite as N	13	2.0	20	04/06/2017 21:30
Sulfate	72	2.0	20	04/06/2017 21:30

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Formate	60	S	85-115	04/06/2017 21:30

Analyst(s): AO Analytical Comments: c1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002G	Water	04/05/2017 11:42	IC3	136905

Analytes	Result	RL	DF	Date Analyzed
Chloride	59	2.0	20	04/06/2017 21:49
Nitrate as N	12	2.0	20	04/06/2017 21:49
Nitrate as NO ₃ ⁻	54	8.8	20	04/06/2017 21:49
Nitrite as N	ND	0.10	1	04/06/2017 21:11
Nitrite as NO ₂ ⁻	ND	0.33	1	04/06/2017 21:11
Nitrate & Nitrite as N	12	2.0	20	04/06/2017 21:49
Sulfate	73	2.0	20	04/06/2017 21:49

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Formate	59	S	85-115	04/06/2017 21:49

Analyst(s): AO Analytical Comments: c1



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/8/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001B	Water	04/05/2017 10:12	GC16	137024

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	500	50	04/08/2017 13:42
tert-Amyl methyl ether (TAME)	ND	25	50	04/08/2017 13:42
Benzene	ND	25	50	04/08/2017 13:42
Bromobenzene	ND	25	50	04/08/2017 13:42
Bromochloromethane	ND	25	50	04/08/2017 13:42
Bromodichloromethane	ND	25	50	04/08/2017 13:42
Bromoform	ND	25	50	04/08/2017 13:42
Bromomethane	ND	25	50	04/08/2017 13:42
2-Butanone (MEK)	ND	100	50	04/08/2017 13:42
t-Butyl alcohol (TBA)	ND	100	50	04/08/2017 13:42
n-Butyl benzene	ND	25	50	04/08/2017 13:42
sec-Butyl benzene	ND	25	50	04/08/2017 13:42
tert-Butyl benzene	ND	25	50	04/08/2017 13:42
Carbon Disulfide	ND	25	50	04/08/2017 13:42
Carbon Tetrachloride	ND	25	50	04/08/2017 13:42
Chlorobenzene	ND	25	50	04/08/2017 13:42
Chloroethane	ND	25	50	04/08/2017 13:42
Chloroform	ND	25	50	04/08/2017 13:42
Chloromethane	ND	25	50	04/08/2017 13:42
2-Chlorotoluene	ND	25	50	04/08/2017 13:42
4-Chlorotoluene	ND	25	50	04/08/2017 13:42
Dibromochloromethane	ND	25	50	04/08/2017 13:42
1,2-Dibromo-3-chloropropane	ND	10	50	04/08/2017 13:42
1,2-Dibromoethane (EDB)	ND	25	50	04/08/2017 13:42
Dibromomethane	ND	25	50	04/08/2017 13:42
1,2-Dichlorobenzene	ND	25	50	04/08/2017 13:42
1,3-Dichlorobenzene	ND	25	50	04/08/2017 13:42
1,4-Dichlorobenzene	ND	25	50	04/08/2017 13:42
Dichlorodifluoromethane	ND	25	50	04/08/2017 13:42
1,1-Dichloroethane	ND	25	50	04/08/2017 13:42
1,2-Dichloroethane (1,2-DCA)	ND	25	50	04/08/2017 13:42
1,1-Dichloroethene	ND	25	50	04/08/2017 13:42
cis-1,2-Dichloroethene	170	25	50	04/08/2017 13:42
trans-1,2-Dichloroethene	ND	25	50	04/08/2017 13:42
1,2-Dichloropropane	ND	25	50	04/08/2017 13:42
1,3-Dichloropropane	ND	25	50	04/08/2017 13:42
2,2-Dichloropropane	ND	25	50	04/08/2017 13:42

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Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/8/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001B	Water	04/05/2017 10:12	GC16	137024

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	25	50	04/08/2017 13:42
cis-1,3-Dichloropropene	ND	25	50	04/08/2017 13:42
trans-1,3-Dichloropropene	ND	25	50	04/08/2017 13:42
Diisopropyl ether (DIPE)	ND	25	50	04/08/2017 13:42
Ethylbenzene	ND	25	50	04/08/2017 13:42
Ethyl tert-butyl ether (ETBE)	ND	25	50	04/08/2017 13:42
Freon 113	ND	25	50	04/08/2017 13:42
Hexachlorobutadiene	ND	25	50	04/08/2017 13:42
Hexachloroethane	ND	25	50	04/08/2017 13:42
2-Hexanone	ND	25	50	04/08/2017 13:42
Isopropylbenzene	ND	25	50	04/08/2017 13:42
4-Isopropyl toluene	ND	25	50	04/08/2017 13:42
Methyl-t-butyl ether (MTBE)	ND	25	50	04/08/2017 13:42
Methylene chloride	ND	25	50	04/08/2017 13:42
4-Methyl-2-pentanone (MIBK)	ND	25	50	04/08/2017 13:42
Naphthalene	ND	25	50	04/08/2017 13:42
n-Propyl benzene	ND	25	50	04/08/2017 13:42
Styrene	ND	25	50	04/08/2017 13:42
1,1,1,2-Tetrachloroethane	ND	25	50	04/08/2017 13:42
1,1,2,2-Tetrachloroethane	ND	25	50	04/08/2017 13:42
Tetrachloroethene	ND	25	50	04/08/2017 13:42
Toluene	ND	25	50	04/08/2017 13:42
1,2,3-Trichlorobenzene	ND	25	50	04/08/2017 13:42
1,2,4-Trichlorobenzene	ND	25	50	04/08/2017 13:42
1,1,1-Trichloroethane	ND	25	50	04/08/2017 13:42
1,1,2-Trichloroethane	ND	25	50	04/08/2017 13:42
Trichloroethene	1200	25	50	04/08/2017 13:42
Trichlorofluoromethane	ND	25	50	04/08/2017 13:42
1,2,3-Trichloropropane	ND	25	50	04/08/2017 13:42
1,2,4-Trimethylbenzene	ND	25	50	04/08/2017 13:42
1,3,5-Trimethylbenzene	ND	25	50	04/08/2017 13:42
Vinyl Chloride	ND	25	50	04/08/2017 13:42
Xylenes, Total	ND	25	50	04/08/2017 13:42

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/8/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001B	Water	04/05/2017 10:12	GC16	137024

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	86		70-130	04/08/2017 13:42
Toluene-d8	96		70-130	04/08/2017 13:42
4-BFB	92		70-130	04/08/2017 13:42

Analyst(s): AK



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/8/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002B	Water	04/05/2017 11:42	GC16	136954

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	1000	100	04/08/2017 14:21
tert-Amyl methyl ether (TAME)	ND	50	100	04/08/2017 14:21
Benzene	ND	50	100	04/08/2017 14:21
Bromobenzene	ND	50	100	04/08/2017 14:21
Bromochloromethane	ND	50	100	04/08/2017 14:21
Bromodichloromethane	ND	50	100	04/08/2017 14:21
Bromoform	ND	50	100	04/08/2017 14:21
Bromomethane	ND	50	100	04/08/2017 14:21
2-Butanone (MEK)	ND	200	100	04/08/2017 14:21
t-Butyl alcohol (TBA)	ND	200	100	04/08/2017 14:21
n-Butyl benzene	ND	50	100	04/08/2017 14:21
sec-Butyl benzene	ND	50	100	04/08/2017 14:21
tert-Butyl benzene	ND	50	100	04/08/2017 14:21
Carbon Disulfide	ND	50	100	04/08/2017 14:21
Carbon Tetrachloride	ND	50	100	04/08/2017 14:21
Chlorobenzene	ND	50	100	04/08/2017 14:21
Chloroethane	ND	50	100	04/08/2017 14:21
Chloroform	ND	50	100	04/08/2017 14:21
Chloromethane	ND	50	100	04/08/2017 14:21
2-Chlorotoluene	ND	50	100	04/08/2017 14:21
4-Chlorotoluene	ND	50	100	04/08/2017 14:21
Dibromochloromethane	ND	50	100	04/08/2017 14:21
1,2-Dibromo-3-chloropropane	ND	20	100	04/08/2017 14:21
1,2-Dibromoethane (EDB)	ND	50	100	04/08/2017 14:21
Dibromomethane	ND	50	100	04/08/2017 14:21
1,2-Dichlorobenzene	ND	50	100	04/08/2017 14:21
1,3-Dichlorobenzene	ND	50	100	04/08/2017 14:21
1,4-Dichlorobenzene	ND	50	100	04/08/2017 14:21
Dichlorodifluoromethane	ND	50	100	04/08/2017 14:21
1,1-Dichloroethane	ND	50	100	04/08/2017 14:21
1,2-Dichloroethane (1,2-DCA)	ND	50	100	04/08/2017 14:21
1,1-Dichloroethene	ND	50	100	04/08/2017 14:21
cis-1,2-Dichloroethene	300	50	100	04/08/2017 14:21
trans-1,2-Dichloroethene	ND	50	100	04/08/2017 14:21
1,2-Dichloropropane	ND	50	100	04/08/2017 14:21
1,3-Dichloropropane	ND	50	100	04/08/2017 14:21
2,2-Dichloropropane	ND	50	100	04/08/2017 14:21

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Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/8/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002B	Water	04/05/2017 11:42	GC16	136954

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	50	100	04/08/2017 14:21
cis-1,3-Dichloropropene	ND	50	100	04/08/2017 14:21
trans-1,3-Dichloropropene	ND	50	100	04/08/2017 14:21
Diisopropyl ether (DIPE)	ND	50	100	04/08/2017 14:21
Ethylbenzene	ND	50	100	04/08/2017 14:21
Ethyl tert-butyl ether (ETBE)	ND	50	100	04/08/2017 14:21
Freon 113	ND	50	100	04/08/2017 14:21
Hexachlorobutadiene	ND	50	100	04/08/2017 14:21
Hexachloroethane	ND	50	100	04/08/2017 14:21
2-Hexanone	ND	50	100	04/08/2017 14:21
Isopropylbenzene	ND	50	100	04/08/2017 14:21
4-Isopropyl toluene	ND	50	100	04/08/2017 14:21
Methyl-t-butyl ether (MTBE)	ND	50	100	04/08/2017 14:21
Methylene chloride	ND	50	100	04/08/2017 14:21
4-Methyl-2-pentanone (MIBK)	ND	50	100	04/08/2017 14:21
Naphthalene	ND	50	100	04/08/2017 14:21
n-Propyl benzene	ND	50	100	04/08/2017 14:21
Styrene	ND	50	100	04/08/2017 14:21
1,1,1,2-Tetrachloroethane	ND	50	100	04/08/2017 14:21
1,1,2,2-Tetrachloroethane	ND	50	100	04/08/2017 14:21
Tetrachloroethene	ND	50	100	04/08/2017 14:21
Toluene	ND	50	100	04/08/2017 14:21
1,2,3-Trichlorobenzene	ND	50	100	04/08/2017 14:21
1,2,4-Trichlorobenzene	ND	50	100	04/08/2017 14:21
1,1,1-Trichloroethane	ND	50	100	04/08/2017 14:21
1,1,2-Trichloroethane	ND	50	100	04/08/2017 14:21
Trichloroethene	2400	50	100	04/08/2017 14:21
Trichlorofluoromethane	ND	50	100	04/08/2017 14:21
1,2,3-Trichloropropane	ND	50	100	04/08/2017 14:21
1,2,4-Trimethylbenzene	ND	50	100	04/08/2017 14:21
1,3,5-Trimethylbenzene	ND	50	100	04/08/2017 14:21
Vinyl Chloride	ND	50	100	04/08/2017 14:21
Xylenes, Total	ND	50	100	04/08/2017 14:21

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/8/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002B	Water	04/05/2017 11:42	GC16	136954

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	87		70-130	04/08/2017 14:21
Toluene-d8	96		70-130	04/08/2017 14:21
4-BFB	89		70-130	04/08/2017 14:21

Analyst(s): AK



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/7/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SW3510C
Analytical Method: SW8310
Unit: µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) by HPLC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001C	Water	04/05/2017 10:12	HPLC4	136951

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.0500	1	04/10/2017 23:06
Acenaphthylene	ND	0.0500	1	04/10/2017 23:06
Anthracene	ND	0.0500	1	04/10/2017 23:06
Benzo (a) anthracene	ND	0.0250	1	04/10/2017 23:06
Benzo (a) pyrene	ND	0.0500	1	04/10/2017 23:06
Benzo (b) fluoranthene	ND	0.0250	1	04/10/2017 23:06
Benzo (k) fluoranthene	ND	0.0250	1	04/10/2017 23:06
Benzo (g,h,i) perylene	ND	0.0500	1	04/10/2017 23:06
Chrysene	ND	0.0500	1	04/10/2017 23:06
Dibenzo (a,h) anthracene	ND	0.0500	1	04/10/2017 23:06
Fluoranthene	ND	0.0500	1	04/10/2017 23:06
Fluorene	ND	0.0500	1	04/10/2017 23:06
Indeno (1,2,3-cd) pyrene	ND	0.0250	1	04/10/2017 23:06
1-Methylnaphthalene	ND	0.0500	1	04/10/2017 23:06
2-Methylnaphthalene	ND	0.0500	1	04/10/2017 23:06
Naphthalene	ND	0.0590	1	04/10/2017 23:06
Phenanthrene	ND	0.0500	1	04/10/2017 23:06
Pyrene	ND	0.0500	1	04/10/2017 23:06
<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>		
Decafluorobiphenyl	88	70-130		04/10/2017 23:06
4,4-Dichlorobiphenyl	91	70-130		04/10/2017 23:06

Analyst(s): BBO

Analytical Comments: a28



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/7/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SW3510C
Analytical Method: SW8310
Unit: µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) by HPLC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002C	Water	04/05/2017 11:42	HPLC4	136951

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.0500	1	04/10/2017 23:50
Acenaphthylene	ND	0.0500	1	04/10/2017 23:50
Anthracene	ND	0.0500	1	04/10/2017 23:50
Benzo (a) anthracene	ND	0.0250	1	04/10/2017 23:50
Benzo (a) pyrene	ND	0.0500	1	04/10/2017 23:50
Benzo (b) fluoranthene	ND	0.0250	1	04/10/2017 23:50
Benzo (k) fluoranthene	ND	0.0250	1	04/10/2017 23:50
Benzo (g,h,i) perylene	ND	0.0500	1	04/10/2017 23:50
Chrysene	ND	0.0500	1	04/10/2017 23:50
Dibenzo (a,h) anthracene	ND	0.0500	1	04/10/2017 23:50
Fluoranthene	ND	0.0500	1	04/10/2017 23:50
Fluorene	ND	0.0500	1	04/10/2017 23:50
Indeno (1,2,3-cd) pyrene	ND	0.0250	1	04/10/2017 23:50
1-Methylnaphthalene	ND	0.0500	1	04/10/2017 23:50
2-Methylnaphthalene	ND	0.0500	1	04/10/2017 23:50
Naphthalene	ND	0.0500	1	04/10/2017 23:50
Phenanthrene	ND	0.0500	1	04/10/2017 23:50
Pyrene	ND	0.0500	1	04/10/2017 23:50
Surrogates	REC (%)	Limits		
Decafluorobiphenyl	79	70-130		04/10/2017 23:50
4,4-Dichlorobiphenyl	80	70-130		04/10/2017 23:50

Analyst(s): BBO



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/10/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SM2320 B-1997
Analytical Method: SM2320 B
Unit: mg CaCO₃/L

Total & Speciated Alkalinity as Calcium Carbonate

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001E	Water	04/05/2017 10:12	Titrimo	137043

Analytes	Result	RL	DF	Date Analyzed
Total Alkalinity	193	1.00	1	04/10/2017 12:57
Carbonate	ND	1.00	1	04/10/2017 12:57
Bicarbonate	193	1.00	1	04/10/2017 12:57
Hydroxide	ND	1.00	1	04/10/2017 12:57

Analyst(s): HN

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002E	Water	04/05/2017 11:42	Titrimo	137043

Analytes	Result	RL	DF	Date Analyzed
Total Alkalinity	194	1.00	1	04/10/2017 13:08
Carbonate	ND	1.00	1	04/10/2017 13:08
Bicarbonate	194	1.00	1	04/10/2017 13:08
Hydroxide	ND	1.00	1	04/10/2017 13:08

Analyst(s): HN



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/6/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: E200.8
Analytical Method: E200.8
Unit: µg/L

CAM / CCR 17 Metals + Misc. Elements

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001D	Water	04/05/2017 10:12	ICP-MS1	136878

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	0.50	1	04/07/2017 12:01
Arsenic	3.1	0.50	1	04/07/2017 12:01
Barium	55	5.0	1	04/07/2017 12:01
Beryllium	ND	0.50	1	04/07/2017 12:01
Cadmium	ND	0.25	1	04/07/2017 12:01
Chromium	3.1	0.50	1	04/07/2017 12:01
Cobalt	0.65	0.50	1	04/07/2017 12:01
Copper	ND	2.0	1	04/07/2017 12:01
Iron	280	20	1	04/07/2017 12:01
Lead	ND	0.50	1	04/07/2017 12:01
Mercury	ND	0.050	1	04/07/2017 12:01
Molybdenum	0.59	0.50	1	04/07/2017 12:01
Nickel	3.1	0.50	1	04/07/2017 12:01
Selenium	ND	0.50	1	04/07/2017 12:01
Silver	ND	0.19	1	04/07/2017 12:01
Thallium	ND	0.50	1	04/07/2017 12:01
Vanadium	4.7	0.50	1	04/07/2017 12:01
Zinc	ND	15	1	04/07/2017 12:01

Surrogates	REC (%)	Limits	
Terbium	111	70-130	04/07/2017 12:01

Analyst(s): DVH



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/6/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: E200.8
Analytical Method: E200.8
Unit: µg/L

CAM / CCR 17 Metals + Misc. Elements

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002D	Water	04/05/2017 11:42	ICP-MS1	136878

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	0.50	1	04/07/2017 12:14
Arsenic	4.1	0.50	1	04/07/2017 12:14
Barium	22	5.0	1	04/07/2017 12:14
Beryllium	ND	0.50	1	04/07/2017 12:14
Cadmium	ND	0.25	1	04/07/2017 12:14
Chromium	3.5	0.50	1	04/07/2017 12:14
Cobalt	ND	0.50	1	04/07/2017 12:14
Copper	ND	2.0	1	04/07/2017 12:14
Iron	74	20	1	04/07/2017 12:14
Lead	ND	0.50	1	04/07/2017 12:14
Mercury	ND	0.050	1	04/07/2017 12:14
Molybdenum	2.1	0.50	1	04/07/2017 12:14
Nickel	1.6	0.50	1	04/07/2017 12:14
Selenium	0.83	0.50	1	04/07/2017 12:14
Silver	ND	0.19	1	04/07/2017 12:14
Thallium	ND	0.50	1	04/07/2017 12:14
Vanadium	4.8	0.50	1	04/07/2017 12:14
Zinc	ND	15	1	04/07/2017 12:14

Surrogates	REC (%)	Limits	
Terbium	113	70-130	04/07/2017 12:14

Analyst(s): DVH

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/6/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SM5220 D-1997
Analytical Method: SM5220 D-1997
Unit: mg/L

Chemical Oxygen Demand (COD) as mg O₂ /L

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001F	Water	04/05/2017 10:12	SPECTROPHOTOMETER	136869

Analytes	Result	RL	DF	Date Analyzed
COD	ND	10	1	04/06/2017 18:11

Analyst(s): RB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002F	Water	04/05/2017 11:42	SPECTROPHOTOMETER	136869

Analytes	Result	RL	DF	Date Analyzed
COD	ND	10	1	04/06/2017 18:12

Analyst(s): RB



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/6/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SM3500-Fe B4c
Analytical Method: SM3500-Fe B4c
Unit: µg/L

Ferrous Iron

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001J	Water	04/05/2017 10:12	SPECTROPHOTOMETER	136974

Analytes	Result	RL	DF	Date Analyzed
Ferrous Iron	ND	50	1	04/06/2017 16:20

Analyst(s): RB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002J	Water	04/05/2017 11:42	SPECTROPHOTOMETER	136974

Analytes	Result	RL	DF	Date Analyzed
Ferrous Iron	ND	50	1	04/06/2017 16:29

Analyst(s): RB

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/7/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: µg/L

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001A	Water	04/05/2017 10:12	GC3	136959

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	67	50	1	04/07/2017 06:57
MTBE	---	5.0	1	04/07/2017 06:57
Benzene	---	0.50	1	04/07/2017 06:57
Toluene	---	0.50	1	04/07/2017 06:57
Ethylbenzene	---	0.50	1	04/07/2017 06:57
Xylenes	---	1.5	1	04/07/2017 06:57

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
aaa-TFT	1607	S	89-115	04/07/2017 06:57

Analyst(s): TD

Analytical Comments: d6,c4

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002A	Water	04/05/2017 11:42	GC3	136959

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	130	50	1	04/07/2017 06:27
MTBE	---	5.0	1	04/07/2017 06:27
Benzene	---	0.50	1	04/07/2017 06:27
Toluene	---	0.50	1	04/07/2017 06:27
Ethylbenzene	---	0.50	1	04/07/2017 06:27
Xylenes	---	1.5	1	04/07/2017 06:27

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
aaa-TFT	2094	S	89-115	04/07/2017 06:27

Analyst(s): TD

Analytical Comments: d6,c4



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/6/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SM4500H+B-2000
Analytical Method: SM4500H+B
Unit: pH units @ 25°C

pH

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001H	Water	04/05/2017 10:12	WetChem	136936

Analytes	Result	Qualifiers	Accuracy	DF	Date Analyzed
pH	6.72	H	±0.05	1	04/06/2017 22:26

Analyst(s): RB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002H	Water	04/05/2017 11:42	WetChem	136936

Analytes	Result	Qualifiers	Accuracy	DF	Date Analyzed
pH	6.95	H	±0.05	1	04/06/2017 22:29

Analyst(s): RB



Analytical Report

Client: Langan
Date Received: 4/6/17 15:15
Date Prepared: 4/6/17
Project: 260 30th Street

WorkOrder: 1704230
Extraction Method: SW3510C
Analytical Method: SW8015B
Unit: µg/L

Total Extractable Petroleum Hydrocarbons w/out SG Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-1	1704230-001A	Water	04/05/2017 10:12	GC9b	136845

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	ND	50	1	04/07/2017 08:33
TPH-Motor Oil (C18-C36)	ND	250	1	04/07/2017 08:33

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	<u>Date Analyzed</u>
C9	100	66-138	04/07/2017 08:33

Analyst(s): TK

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
GW-2	1704230-002A	Water	04/05/2017 11:42	GC9b	136845

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	56	50	1	04/07/2017 09:12
TPH-Motor Oil (C18-C36)	ND	250	1	04/07/2017 09:12

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	<u>Date Analyzed</u>
C9	101	66-138	04/07/2017 09:12

Analyst(s): TK

Analytical Comments: e2



Quality Control Report

Client: Langan
Date Prepared: 4/10/17
Date Analyzed: 4/10/17
Instrument: IC1
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 137110
Extraction Method: E300.1
Analytical Method: E300.1
Unit: mg/L
Sample ID: MB/LCS/LCSD-137110

QC Summary Report for E300.1

Analyte	MB Result	RL
Sulfite	ND	0.10 - - -

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Sulfite	0.920	0.929	1	92	93	80-120	1.01	20



Quality Control Report

Client: Langan
Date Prepared: 4/7/17
Date Analyzed: 4/7/17
Instrument: IC3
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 136905
Extraction Method: E300.1
Analytical Method: E300.1
Unit: mg/L
Sample ID: MB/LCS-136905
 1704230-001GMS/MSD

QC Summary Report for E300.1

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Chloride	ND	0.952	0.10	1	-	95	85-115
Nitrate as N	ND	0.952	0.10	1	-	95	85-115
Nitrate as NO3 ⁻	ND	4.22	0.44	4.4	-	96	85-115
Nitrite as N	ND	0.991	0.10	1	-	99	85-115
Nitrite as NO2 ⁻	ND	3.26	0.33	3.3	-	99	85-115
Sulfate	ND	0.986	0.10	1	-	99	85-115
Surrogate Recovery							
Formate	0.09735	0.0966		0.10	97	97	85-115

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Chloride	78.7	78.7	1	77	124,F1	124,F1	85-115	0	15
Nitrate as N	16.9	16.9	1	16	123,F1	123,F1	85-115	0	15
Nitrate as NO3 ⁻	74.7	74.7	4.4	69	124,F1	124,F1	85-115	0	15
Nitrite as N	0.993	0.997	1	ND	99	100	85-115	0.413	15
Nitrite as NO2 ⁻	3.26	3.28	3.3	ND	99	99	85-115	0	15
Sulfate	94.4	94.3	1	93	159,F1	154,F1	85-115	0.0594	15
Surrogate Recovery									
Formate	0.0989	0.0996	0.10		99	100	85-115	0.738	10



Quality Control Report

Client: Langan
Date Prepared: 4/7/17
Date Analyzed: 4/7/17
Instrument: GC18
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 136954
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-136954
 1703H01-008CMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	8.58	0.50	10	-	86	54-140
Benzene	ND	9.48	0.50	10	-	95	47-158
Bromobenzene	ND	-	0.50	-	-	-	-
Bromochloromethane	ND	-	0.50	-	-	-	-
Bromodichloromethane	ND	-	0.50	-	-	-	-
Bromoform	ND	-	0.50	-	-	-	-
Bromomethane	ND	-	0.50	-	-	-	-
2-Butanone (MEK)	ND	-	2.0	-	-	-	-
t-Butyl alcohol (TBA)	ND	27.6	2.0	40	-	69	42-140
n-Butyl benzene	ND	-	0.50	-	-	-	-
sec-Butyl benzene	ND	-	0.50	-	-	-	-
tert-Butyl benzene	ND	-	0.50	-	-	-	-
Carbon Disulfide	ND	-	0.50	-	-	-	-
Carbon Tetrachloride	ND	-	0.50	-	-	-	-
Chlorobenzene	ND	9.72	0.50	10	-	97	43-157
Chloroethane	ND	-	0.50	-	-	-	-
Chloroform	ND	-	0.50	-	-	-	-
Chloromethane	ND	-	0.50	-	-	-	-
2-Chlorotoluene	ND	-	0.50	-	-	-	-
4-Chlorotoluene	ND	-	0.50	-	-	-	-
Dibromochloromethane	ND	-	0.50	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.20	-	-	-	-
1,2-Dibromoethane (EDB)	ND	9.09	0.50	10	-	91	44-155
Dibromomethane	ND	-	0.50	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.50	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.50	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.50	-	-	-	-
Dichlorodifluoromethane	ND	-	0.50	-	-	-	-
1,1-Dichloroethane	ND	-	0.50	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	9.15	0.50	10	-	91	66-125
1,1-Dichloroethene	ND	9.14	0.50	10	-	91	47-149
cis-1,2-Dichloroethene	ND	-	0.50	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.50	-	-	-	-
1,2-Dichloropropane	ND	-	0.50	-	-	-	-
1,3-Dichloropropane	ND	-	0.50	-	-	-	-
2,2-Dichloropropane	ND	-	0.50	-	-	-	-

(Cont.)

NELAP 4033ORELAP

QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 4/7/17
Date Analyzed: 4/7/17
Instrument: GC18
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 136954
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-136954
 1703H01-008CMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1-Dichloropropene	ND	-	0.50	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.50	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.50	-	-	-	-
Diisopropyl ether (DIPE)	ND	8.98	0.50	10	-	90	57-136
Ethylbenzene	ND	-	0.50	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	9.00	0.50	10	-	90	55-137
Freon 113	ND	-	0.50	-	-	-	-
Hexachlorobutadiene	ND	-	0.50	-	-	-	-
Hexachloroethane	ND	-	0.50	-	-	-	-
2-Hexanone	ND	-	0.50	-	-	-	-
Isopropylbenzene	ND	-	0.50	-	-	-	-
4-Isopropyl toluene	ND	-	0.50	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	8.67	0.50	10	-	87	53-139
Methylene chloride	ND	-	0.50	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.50	-	-	-	-
Naphthalene	ND	-	0.50	-	-	-	-
n-Propyl benzene	ND	-	0.50	-	-	-	-
Styrene	ND	-	0.50	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.50	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.50	-	-	-	-
Tetrachloroethene	ND	-	0.50	-	-	-	-
Toluene	ND	9.06	0.50	10	-	91	52-137
1,2,3-Trichlorobenzene	ND	-	0.50	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.50	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.50	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.50	-	-	-	-
Trichloroethene	ND	9.69	0.50	10	-	97	43-157
Trichlorofluoromethane	ND	-	0.50	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.50	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.50	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.50	-	-	-	-
Vinyl Chloride	ND	-	0.50	-	-	-	-
Xylenes, Total	ND	-	0.50	-	-	-	-

(Cont.)

NELAP 4033ORELAP

QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 4/7/17
Date Analyzed: 4/7/17
Instrument: GC18
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 136954
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-136954
 1703H01-008CMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Surrogate Recovery							
Dibromofluoromethane	26.29	25.4		25	105	102	70-130
Toluene-d8	22.97	23.8		25	92	95	70-130
4-BFB	2.354	2.50		2.5	94	100	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
tert-Amyl methyl ether (TAME)	9.06	9.45	10	ND	91	95	69-139	4.25	20
Benzene	9.10	9.85	10	ND	91	98	69-141	7.84	20
t-Butyl alcohol (TBA)	32.4	33.5	40	ND	81	84	41-152	3.23	20
Chlorobenzene	9.37	10.0	10	ND	94	100	77-120	6.57	20
1,2-Dibromoethane (EDB)	9.77	10.0	10	ND	98	100	76-135	2.81	20
1,2-Dichloroethane (1,2-DCA)	9.44	9.91	10	ND	93	98	73-139	4.89	20
1,1-Dichloroethene	8.74	9.45	10	ND	87	95	59-140	7.83	20
Diisopropyl ether (DIPE)	9.17	9.71	10	ND	92	97	72-140	5.75	20
Ethyl tert-butyl ether (ETBE)	9.37	9.84	10	ND	94	98	71-140	4.86	20
Methyl-t-butyl ether (MTBE)	9.39	9.68	10	ND	94	97	73-139	3.04	20
Toluene	8.56	9.33	10	ND	85	92	71-128	8.61	20
Trichloroethene	9.19	10.0	10	ND	89	97	64-132	8.42	20
Surrogate Recovery									
Dibromofluoromethane	25.4	25.6	25		102	102	73-131	0	20
Toluene-d8	23.9	23.8	25		95	95	72-117	0	20
4-BFB	2.47	2.48	2.5		99	99	74-116	0	20



Quality Control Report

Client: Langan
Date Prepared: 4/7/17
Date Analyzed: 4/7/17
Instrument: GC16
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 137024
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-137024

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	8.60	0.50	10	-	86	54-140
Benzene	ND	8.80	0.50	10	-	88	47-158
Bromobenzene	ND	-	0.50	-	-	-	-
Bromochloromethane	ND	-	0.50	-	-	-	-
Bromodichloromethane	ND	-	0.50	-	-	-	-
Bromoform	ND	-	0.50	-	-	-	-
Bromomethane	ND	-	0.50	-	-	-	-
2-Butanone (MEK)	ND	-	2.0	-	-	-	-
t-Butyl alcohol (TBA)	ND	27.5	2.0	40	-	69	42-140
n-Butyl benzene	ND	-	0.50	-	-	-	-
sec-Butyl benzene	ND	-	0.50	-	-	-	-
tert-Butyl benzene	ND	-	0.50	-	-	-	-
Carbon Disulfide	ND	-	0.50	-	-	-	-
Carbon Tetrachloride	ND	-	0.50	-	-	-	-
Chlorobenzene	ND	8.88	0.50	10	-	89	43-157
Chloroethane	ND	-	0.50	-	-	-	-
Chloroform	ND	-	0.50	-	-	-	-
Chloromethane	ND	-	0.50	-	-	-	-
2-Chlorotoluene	ND	-	0.50	-	-	-	-
4-Chlorotoluene	ND	-	0.50	-	-	-	-
Dibromochloromethane	ND	-	0.50	-	-	-	-
1,2-Dibromo-3-chloropropane	0.5629	-	0.20	-	-	-	-
1,2-Dibromoethane (EDB)	ND	8.75	0.50	10	-	88	44-155
Dibromomethane	ND	-	0.50	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.50	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.50	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.50	-	-	-	-
Dichlorodifluoromethane	ND	-	0.50	-	-	-	-
1,1-Dichloroethane	ND	-	0.50	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	9.20	0.50	10	-	92	66-125
1,1-Dichloroethene	ND	8.78	0.50	10	-	88	47-149
cis-1,2-Dichloroethene	ND	-	0.50	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.50	-	-	-	-
1,2-Dichloropropane	ND	-	0.50	-	-	-	-
1,3-Dichloropropane	ND	-	0.50	-	-	-	-
2,2-Dichloropropane	ND	-	0.50	-	-	-	-

(Cont.)

NELAP 4033ORELAP

QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 4/7/17
Date Analyzed: 4/7/17
Instrument: GC16
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 137024
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-137024

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1-Dichloropropene	ND	-	0.50	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.50	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.50	-	-	-	-
Diisopropyl ether (DIPE)	ND	9.45	0.50	10	-	95	57-136
Ethylbenzene	ND	-	0.50	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	9.19	0.50	10	-	92	55-137
Freon 113	ND	-	0.50	-	-	-	-
Hexachlorobutadiene	ND	-	0.50	-	-	-	-
Hexachloroethane	ND	-	0.50	-	-	-	-
2-Hexanone	ND	-	0.50	-	-	-	-
Isopropylbenzene	ND	-	0.50	-	-	-	-
4-Isopropyl toluene	ND	-	0.50	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	8.45	0.50	10	-	84	53-139
Methylene chloride	ND	-	0.50	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.50	-	-	-	-
Naphthalene	ND	-	0.50	-	-	-	-
n-Propyl benzene	ND	-	0.50	-	-	-	-
Styrene	ND	-	0.50	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.50	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.50	-	-	-	-
Tetrachloroethene	ND	-	0.50	-	-	-	-
Toluene	ND	8.85	0.50	10	-	89	52-137
1,2,3-Trichlorobenzene	ND	-	0.50	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.50	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.50	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.50	-	-	-	-
Trichloroethene	ND	8.78	0.50	10	-	88	43-157
Trichlorofluoromethane	ND	-	0.50	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.50	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.50	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.50	-	-	-	-
Vinyl Chloride	ND	-	0.50	-	-	-	-
Xylenes, Total	ND	-	0.50	-	-	-	-



Quality Control Report

Client: Langan
Date Prepared: 4/7/17
Date Analyzed: 4/7/17
Instrument: GC16
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 137024
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS-137024

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Surrogate Recovery							
Dibromofluoromethane	23.21	22.5		25	93	90	70-130
Toluene-d8	23.73	25.0		25	95	100	70-130
4-BFB	2.421	2.60		2.5	97	104	70-130



Quality Control Report

Client: Langan
Date Prepared: 4/7/17
Date Analyzed: 4/10/17
Instrument: HPLC4
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 136951
Extraction Method: SW3510C
Analytical Method: SW8310
Unit: µg/L
Sample ID: MB/LCS/LCSD-136951

QC Summary Report for SW8310

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
Acenaphthene	ND	0.0500	-	-	-
Acenaphthylene	ND	0.0500	-	-	-
Anthracene	ND	0.0500	-	-	-
Benzo (a) anthracene	ND	0.0250	-	-	-
Benzo (a) pyrene	ND	0.0500	-	-	-
Benzo (b) fluoranthene	ND	0.0250	-	-	-
Benzo (k) fluoranthene	ND	0.0250	-	-	-
Benzo (g,h,i) perylene	ND	0.0500	-	-	-
Chrysene	ND	0.0500	-	-	-
Dibenzo (a,h) anthracene	ND	0.0500	-	-	-
Fluoranthene	ND	0.0500	-	-	-
Fluorene	ND	0.0500	-	-	-
Indeno (1,2,3-cd) pyrene	ND	0.0250	-	-	-
1-Methylnaphthalene	ND	0.0500	-	-	-
2-Methylnaphthalene	ND	0.0500	-	-	-
Naphthalene	ND	0.0500	-	-	-
Phenanthrene	ND	0.0500	-	-	-
Pyrene	ND	0.0500	-	-	-

Surrogate Recovery

Decafluorobiphenyl	41.08		50	82	70-130
4,4-Dichlorobiphenyl	23.56		25	94	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Benzo (a) anthracene	0.703	0.671	0.75	94	89	70-130	4.57	20
Benzo (a) pyrene	0.574	0.565	0.75	77	75	70-130	1.61	20
Chrysene	0.711	0.676	0.75	95	90	70-130	4.99	20
1-Methylnaphthalene	0.735	0.687	0.75	98	92	70-130	6.76	20
2-Methylnaphthalene	0.718	0.672	0.75	96	90	70-130	6.65	20
Phenanthrene	0.714	0.660	0.75	95	88	70-130	7.85	20
Pyrene	0.796	0.753	0.75	106	100	70-130	5.55	20

Surrogate Recovery

Decafluorobiphenyl	47.3	43.4	50	95	87	70-130	8.51	20
4,4-Dichlorobiphenyl	25.0	24.7	25	100	99	70-130	1.33	20



Quality Control Report

Client: Langan
Date Prepared: 4/10/17
Date Analyzed: 4/10/17
Instrument: Titrino
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 137043
Extraction Method: SM2320 B-1997
Analytical Method: SM2320 B
Unit: mg CaCO₃/L

QC Summary Report for Alkalinity

SampleID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	RPD	Acceptance Criteria (%)
1704230-001E	193	1	194	1	0.67	<20



Quality Control Report

Client: Langan
Date Prepared: 4/6/17
Date Analyzed: 4/7/17
Instrument: ICP-MS1, ICP-MS3
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 136878
Extraction Method: E200.8
Analytical Method: E200.8
Unit: µg/L
Sample ID: MB/LCS-136878
 1704167-001DMS/MSD

QC Summary Report for Metals

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Antimony	ND	51.1	0.50	50	-	102	85-115
Arsenic	ND	53.1	0.50	50	-	106	85-115
Barium	ND	528	5.0	500	-	106	85-115
Beryllium	ND	52.2	0.50	50	-	104	85-115
Cadmium	ND	51.5	0.25	50	-	103	85-115
Chromium	ND	51.3	0.50	50	-	103	85-115
Cobalt	ND	51.2	0.50	50	-	102	85-115
Copper	ND	50.8	2.0	50	-	102	85-115
Iron	ND	5110	20	5000	-	102	85-115
Lead	ND	51.8	0.50	50	-	104	85-115
Mercury	ND	1.24	0.050	1.25	-	99	85-115
Molybdenum	ND	51.5	0.50	50	-	103	85-115
Nickel	ND	51.0	0.50	50	-	102	85-115
Selenium	ND	51.9	0.50	50	-	104	85-115
Silver	ND	50.8	0.19	50	-	102	85-115
Thallium	ND	50.7	0.50	50	-	101	85-115
Vanadium	ND	51.8	0.50	50	-	104	85-115
Zinc	ND	514	15	500	-	103	85-115
Surrogate Recovery							
Terbium	750.4	781		750	100	104	70-130



Quality Control Report

Client: Langan
Date Prepared: 4/6/17
Date Analyzed: 4/7/17
Instrument: ICP-MS1, ICP-MS3
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 136878
Extraction Method: E200.8
Analytical Method: E200.8
Unit: µg/L
Sample ID: MB/LCS-136878
 1704167-001DMS/MSD

QC Summary Report for Metals

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Antimony	56.9	54.0	50	ND<10	114	108	75-125	5.23	20
Arsenic	60.6	61.5	50	ND<10	103	105	75-125	1.41	20
Barium	557	529	500	ND<100	104	98	75-125	5.08	20
Beryllium	49.5	48.0	50	ND<10	99	96	75-125	3.12	20
Cadmium	53.9	52.1	50	ND<5.0	108	104	75-125	3.28	20
Chromium	53.6	49.7	50	ND<10	107	99	75-125	7.47	20
Cobalt	51.5	49.9	50	ND<10	101	98	75-125	3.20	20
Copper	55.5	54.4	50	ND<40	103	101	75-125	1.93	20
Iron	6120	5940	5000	820	106	103	75-125	2.95	20
Lead	48.0	45.3	50	ND<10	96	91	75-125	5.75	20
Mercury	1.60	1.45	1.25	ND<1.0	128,F10	116	75-125	9.59	20
Molybdenum	77.7	75.6	50	23	109	105	75-125	2.82	20
Nickel	56.9	55.8	50	ND<10	104	102	75-125	1.92	20
Selenium	59.7	60.4	50	ND<10	110	112	75-125	1.13	20
Silver	51.5	49.2	50	ND<3.8	103	98	75-125	4.57	20
Thallium	49.5	47.7	50	ND<10	99	95	75-125	3.66	20
Vanadium	63.6	61.9	50	ND<10	109	106	75-125	2.68	20
Zinc	532	510	500	ND<300	106	102	75-125	4.22	20

Surrogate Recovery

Terbium	805	773	750		107	103	70-130	4.01	20
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Analyte	DLT Result	DLTRef Val	%D	%D Limit
Antimony	ND<50	ND<10	-	-
Arsenic	ND<50	ND<10	-	-
Barium	ND<500	ND<100	-	-
Beryllium	ND<50	ND<10	-	-
Cadmium	ND<25	ND<5.0	-	-
Chromium	ND<50	ND<10	-	-
Cobalt	ND<50	ND<10	-	-
Copper	ND<200	ND<40	-	-
Iron	ND<2000	820	-	-
Lead	ND<50	ND<10	-	-
Mercury	ND<5.0	ND<1.0	-	-
Molybdenum	ND<50	23	-	-

(Cont.)

QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 4/6/17
Date Analyzed: 4/7/17
Instrument: ICP-MS1, ICP-MS3
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 136878
Extraction Method: E200.8
Analytical Method: E200.8
Unit: µg/L
Sample ID: MB/LCS-136878
 1704167-001DMS/MSD

QC Summary Report for Metals

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Nickel	ND<50	ND<10	-	-
Selenium	ND<50	ND<10	-	-
Silver	ND<19	ND<3.8	-	-
Thallium	ND<50	ND<10	-	-
Vanadium	ND<50	ND<10	-	-
Zinc	ND<1500	ND<300	-	-

%D Control Limit applied to analytes with concentrations greater than 25 times the reporting limits.

QA/QC Officer



Quality Control Report

Client: Langan	WorkOrder: 1704230
Date Prepared: 4/6/17	BatchID: 136869
Date Analyzed: 4/6/17	Extraction Method: SM5220 D-1997
Instrument: SPECTROPHOTOMETER	Analytical Method: SM5220 D-1997
Matrix: Water	Unit: mg/L
Project: 260 30th Street	Sample ID: MB/LCS-136869 1704120-001KMS/MSD

QC Summary Report for COD

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
COD	ND	95.0	10	100	-	95	90-110

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
COD	112	110	100	ND	112	110	80-120	1.80	20



Quality Control Report

Client:	Langan	WorkOrder:	1704230
Date Prepared:	4/6/17	BatchID:	136974
Date Analyzed:	4/6/17	Extraction Method:	SM3500-Fe B4c
Instrument:	SPECTROPHOTOMETER	Analytical Method:	SM3500-Fe B4c
Matrix:	Water	Unit:	µg/L
Project:	260 30th Street	Sample ID:	MB/LCS-136974 1704230-001JMS/MSD

QC Summary Report for Ferrous Iron

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Ferrous Iron	ND	199	50	200	-	99	90-110

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Ferrous Iron	196	197	200	ND	98	98	90-110	0	20

QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 4/6/17 - 4/7/17
Date Analyzed: 4/6/17 - 4/7/17
Instrument: GC3
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 136959
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: µg/L
Sample ID: MB/LCS-136959
 1704199-012AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	60.2	40	60	-	100	78-116
MTBE	ND	9.50	5.0	10	-	95	72-122
Benzene	ND	9.25	0.50	10	-	93	81-123
Toluene	ND	9.70	0.50	10	-	97	83-129
Ethylbenzene	ND	10.1	0.50	10	-	101	88-126
Xylenes	ND	31.8	1.5	30	-	106	87-131
Surrogate Recovery							
aaa-TFT	10.22	10.6		10	102	106	89-116

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	60.0	59.2	60	ND	100	99	63-133	1.27	20
MTBE	9.37	9.22	10	ND	94	92	69-122	1.65	20
Benzene	9.55	9.08	10	ND	96	91	84-125	5.03	20
Toluene	10.0	9.44	10	ND	100	94	87-131	5.68	20
Ethylbenzene	10.5	9.66	10	ND	105	97	92-126	7.89	20
Xylenes	32.6	30.1	30	ND	109	100	88-132	7.95	20
Surrogate Recovery									
aaa-TFT	11.6	10.1	10		116	101	90-117	14.4	20



Quality Control Report

Client: Langan
Date Prepared: 4/6/17
Date Analyzed: 4/6/17
Instrument: WetChem
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 136936
Extraction Method: SM4500H+B-2000
Analytical Method: SM4500H+B
Unit: pH units @ 25°C

QC Summary Report for pH

SampleID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	Precision	Acceptance Criteria
1704204-001C	7.80	1	7.80	1	0	0.1



Quality Control Report

Client: Langan
Date Prepared: 4/5/17
Date Analyzed: 4/6/17
Instrument: GC9a
Matrix: Water
Project: 260 30th Street

WorkOrder: 1704230
BatchID: 136845
Extraction Method: SW3510C
Analytical Method: SW8015B
Unit: µg/L
Sample ID: MB/LCS/LCSD-136845

QC Report for SW8015B w/out SG Clean-Up

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
TPH-Diesel (C10-C23)	ND	50	-	-	-
TPH-Motor Oil (C18-C36)	ND	250	-	-	-
Surrogate Recovery					
C9	640.4		625	102	79-111

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	1060	993	1000	106	99	88-134	6.07	30
Surrogate Recovery								
C9	655	649	625	105	104	79-111	0.988	30



1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1704230

ClientCode: TWRF

WaterTrax
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 EDF
 Excel
 EQulS
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Report to:

Josh Graber
 Langan
 555 Montgomery St., Suite 1300
 San Francisco, CA 94111
 (415) 955-5244 FAX: (415) 955-9041

Email: jdgraber@treadwellrollo.com
 cc/3rd Party: kstaehlin@langan.com;
 PO: 750635603
 ProjectNo: 260 30th Street

Bill to:

Accounts Payable
 Langan
 555 Montgomery St., Suite 1300
 San Francisco, CA 94111
 Langan_InvoiceCapture@concur.soluio

Requested TAT: 3 days;

Date Received: 04/06/2017

Date Logged: 04/06/2017

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1704230-001	GW-1	Water	4/5/2017 10:12	<input type="checkbox"/>	I	G	B	C	E	D	F	J	D	A	H	A
1704230-002	GW-2	Water	4/5/2017 11:42	<input type="checkbox"/>	I	G	B	C	E	D	F	J	D	A	H	A

Test Legend:

1	300_1_Sulfite_W	2	300_1_W	3	8260B_W	4	8310_W
5	Alk_W	6	CAMMETMS_TTLC_W	7	COD_W	8	FE2_W
9	Fe3calc_W [N]	10	G-MBTEX_W	11	PH_W	12	TPH(DMO)_W

Prepared by: Briana Cutino

The following SampIDs: 001A, 002A contain testgroup Multi Range_W.

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



WORK ORDER SUMMARY

Client Name: LANGAN
Client Contact: Josh Graber
Contact's Email: jdgraber@treadwellrollo.com

Project: 260 30th Street

Comments:

Work Order: 1704230
QC Level: LEVEL 2
Date Logged: 4/6/2017

WaterTrax WriteOn EDF Excel Fax Email HardCopy ThirdParty J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1704230-001A	GW-1	Water	Multi-Range TPH(g,d,mo) by EPA 8015Bm	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	<input type="checkbox"/>	4/5/2017 10:12	3 days	Trace	<input type="checkbox"/>	
1704230-001B	GW-1	Water	SW8260B (VOCs)	2	VOA w/ HCL	<input type="checkbox"/>	4/5/2017 10:12	3 days	Trace	<input type="checkbox"/>	
1704230-001C	GW-1	Water	SW8310 (PAHs/PNAs)	1	1LA w/ HCL	<input type="checkbox"/>	4/5/2017 10:12	3 days	Trace	<input type="checkbox"/>	
1704230-001D	GW-1	Water	SW6010B/SM3500-FeB4c (Ferric Iron)	1	250mL HDPE w/ HNO3	<input type="checkbox"/>	4/5/2017 10:12	3 days	Trace	<input type="checkbox"/>	
			E200.8 (Metals) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc>			<input type="checkbox"/>		3 days	Trace	<input type="checkbox"/>	
1704230-001E	GW-1	Water	SM2320B (Alkalinity)	1	500mL HDPE, unprsv.	<input type="checkbox"/>	4/5/2017 10:12	3 days	Trace	<input type="checkbox"/>	
1704230-001F	GW-1	Water	SM5220D (COD)	2	aVOA w/ H2SO4	<input type="checkbox"/>	4/5/2017 10:12	3 days	Trace	<input type="checkbox"/>	
1704230-001G	GW-1	Water	E300.1 (Inorganic Anions) <Chloride, Nitrate & Nitrite as N, Nitrate as N, Nitrate as NO3 ⁻ , Nitrite as N, Nitrite as NO2 ⁻ , Sulfate>	1	125mL HDPE, unprsv.	<input type="checkbox"/>	4/5/2017 10:12	3 days	Trace	<input type="checkbox"/>	
1704230-001H	GW-1	Water	SM4500H+B (pH)	1	125mL HDPE, unprsv.	<input type="checkbox"/>	4/5/2017 10:12	3 days	Trace	<input type="checkbox"/>	
1704230-001I	GW-1	Water	E300.1 (Sulfite)	1	125mL AG w/ACETONE	<input type="checkbox"/>	4/5/2017 10:12	3 days	Trace	<input type="checkbox"/>	
1704230-001J	GW-1	Water	SM3500 Fe B4c (Ferrous Iron)	1	VOA w/ HCL	<input type="checkbox"/>	4/5/2017 10:12	3 days	Trace	<input type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



WORK ORDER SUMMARY

Client Name: LANGAN
Client Contact: Josh Graber
Contact's Email: jdgraber@treadwellrollo.com

Project: 260 30th Street

Comments:

Work Order: 1704230
QC Level: LEVEL 2
Date Logged: 4/6/2017

WaterTrax WriteOn EDF Excel Fax Email HardCopy ThirdParty J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1704230-002A	GW-2	Water	Multi-Range TPH(g,d,mo) by EPA 8015Bm	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	<input type="checkbox"/>	4/5/2017 11:42	3 days	Trace	<input type="checkbox"/>	
1704230-002B	GW-2	Water	SW8260B (VOCs)	2	VOA w/ HCL	<input type="checkbox"/>	4/5/2017 11:42	3 days	Trace	<input type="checkbox"/>	
1704230-002C	GW-2	Water	SW8310 (PAHs/PNAs)	1	1LA w/ HCL	<input type="checkbox"/>	4/5/2017 11:42	3 days	Trace	<input type="checkbox"/>	
1704230-002D	GW-2	Water	SW6010B/SM3500-FeB4c (Ferric Iron)	1	250mL HDPE w/ HNO3	<input type="checkbox"/>	4/5/2017 11:42	3 days	Trace	<input type="checkbox"/>	
			E200.8 (Metals) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc>			<input type="checkbox"/>		3 days	Trace	<input type="checkbox"/>	
1704230-002E	GW-2	Water	SM2320B (Alkalinity)	1	500mL HDPE, unprsv.	<input type="checkbox"/>	4/5/2017 11:42	3 days	Trace	<input type="checkbox"/>	
1704230-002F	GW-2	Water	SM5220D (COD)	2	aVOA w/ H2SO4	<input type="checkbox"/>	4/5/2017 11:42	3 days	Trace	<input type="checkbox"/>	
1704230-002G	GW-2	Water	E300.1 (Inorganic Anions) <Chloride, Nitrate & Nitrite as N, Nitrate as N, Nitrate as NO3 ⁻ , Nitrite as N, Nitrite as NO2 ⁻ , Sulfate>	1	125mL HDPE, unprsv.	<input type="checkbox"/>	4/5/2017 11:42	3 days	Trace	<input type="checkbox"/>	
1704230-002H	GW-2	Water	SM4500H+B (pH)	1	125mL HDPE, unprsv.	<input type="checkbox"/>	4/5/2017 11:42	3 days	Trace	<input type="checkbox"/>	
1704230-002I	GW-2	Water	E300.1 (Sulfite)	1	125mL AG w/ACETONE	<input type="checkbox"/>	4/5/2017 11:42	3 days	Trace	<input type="checkbox"/>	
1704230-002J	GW-2	Water	SM3500 Fe B4c (Ferrous Iron)	1	VOA w/ HCL	<input type="checkbox"/>	4/5/2017 11:42	3 days	Trace	<input type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



Sample Receipt Checklist

Client Name: **Langan**
 Project Name: **260 30th Street**

Date and Time Received: **4/6/2017 15:15**
 Date Logged: **4/6/2017**
 Received by: **Briana Cutino**
 Logged by: **Briana Cutino**

WorkOrder No: **1704230** Matrix: Water
 Carrier: Bernie Cummins (MAI Courier)

Chain of Custody (COC) Information

- Chain of custody present? Yes No
- Chain of custody signed when relinquished and received? Yes No
- Chain of custody agrees with sample labels? Yes No
- Sample IDs noted by Client on COC? Yes No
- Date and Time of collection noted by Client on COC? Yes No
- Sampler's name noted on COC? Yes No

Sample Receipt Information

- Custody seals intact on shipping container/cooler? Yes No NA
- Shipping container/cooler in good condition? Yes No
- Samples in proper containers/bottles? Yes No
- Sample containers intact? Yes No
- Sufficient sample volume for indicated test? Yes No

Sample Preservation and Hold Time (HT) Information

- All samples received within holding time? Yes No NA
 - Sample/Temp Blank temperature Temp: 3.4°C NA
 - Water - VOA vials have zero headspace / no bubbles? Yes No NA
 - Sample labels checked for correct preservation? Yes No
 - pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)? Yes No NA
 - Samples Received on Ice? Yes No
- (Ice Type: WET ICE)

UCMR3 Samples:

- Total Chlorine tested and acceptable upon receipt for EPA 522? Yes No NA
- Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539? Yes No NA

Comments: Method SM4500H+B (pH) was received past its 0.01-day holding time.



McC Campbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1704402

Report Created for: Langan

501 14th Street, 3rd Floor
Oakland, CA 94612

Project Contact: Josh Graber

Project P.O.:

Project Name: 750635603; 260 30th Street

Project Received: 04/11/2017

Analytical Report reviewed & approved for release on 04/14/2017 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.





Glossary of Terms & Qualifier Definitions

Client: Langan
Project: 750635603; 260 30th Street
WorkOrder: 1704402

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



Glossary of Terms & Qualifier Definitions

Client: Langan
Project: 750635603; 260 30th Street
WorkOrder: 1704402

Analytical Qualifiers

S surrogate spike recovery outside accepted recovery limits
a4 reporting limits raised due to the sample's matrix prohibiting a full volume extraction.
b1 aqueous sample that contains greater than ~1 vol. % sediment
c2 surrogate recovery outside of the control limits due to matrix interference.
c4 surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
e2 diesel range compounds are significant; no recognizable pattern
e7 oil range compounds are significant

Quality Control Qualifiers

F2 LCS/LCSD recovery and/or RPD is out of acceptance criteria.



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-2.5	1704402-001A	Soil	04/11/2017 08:19	GC18	137102

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	04/13/2017 04:23
tert-Amyl methyl ether (TAME)	ND	0.0050	1	04/13/2017 04:23
Benzene	ND	0.0050	1	04/13/2017 04:23
Bromobenzene	ND	0.0050	1	04/13/2017 04:23
Bromochloromethane	ND	0.0050	1	04/13/2017 04:23
Bromodichloromethane	ND	0.0050	1	04/13/2017 04:23
Bromoform	ND	0.0050	1	04/13/2017 04:23
Bromomethane	ND	0.0050	1	04/13/2017 04:23
2-Butanone (MEK)	ND	0.020	1	04/13/2017 04:23
t-Butyl alcohol (TBA)	ND	0.050	1	04/13/2017 04:23
n-Butyl benzene	ND	0.0050	1	04/13/2017 04:23
sec-Butyl benzene	ND	0.0050	1	04/13/2017 04:23
tert-Butyl benzene	ND	0.0050	1	04/13/2017 04:23
Carbon Disulfide	ND	0.0050	1	04/13/2017 04:23
Carbon Tetrachloride	ND	0.0050	1	04/13/2017 04:23
Chlorobenzene	ND	0.0050	1	04/13/2017 04:23
Chloroethane	ND	0.0050	1	04/13/2017 04:23
Chloroform	ND	0.0050	1	04/13/2017 04:23
Chloromethane	ND	0.0050	1	04/13/2017 04:23
2-Chlorotoluene	ND	0.0050	1	04/13/2017 04:23
4-Chlorotoluene	ND	0.0050	1	04/13/2017 04:23
Dibromochloromethane	ND	0.0050	1	04/13/2017 04:23
1,2-Dibromo-3-chloropropane	ND	0.0040	1	04/13/2017 04:23
1,2-Dibromoethane (EDB)	ND	0.0040	1	04/13/2017 04:23
Dibromomethane	ND	0.0050	1	04/13/2017 04:23
1,2-Dichlorobenzene	ND	0.0050	1	04/13/2017 04:23
1,3-Dichlorobenzene	ND	0.0050	1	04/13/2017 04:23
1,4-Dichlorobenzene	ND	0.0050	1	04/13/2017 04:23
Dichlorodifluoromethane	ND	0.0050	1	04/13/2017 04:23
1,1-Dichloroethane	ND	0.0050	1	04/13/2017 04:23
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	04/13/2017 04:23
1,1-Dichloroethene	ND	0.0050	1	04/13/2017 04:23
cis-1,2-Dichloroethene	ND	0.0050	1	04/13/2017 04:23
trans-1,2-Dichloroethene	ND	0.0050	1	04/13/2017 04:23
1,2-Dichloropropane	ND	0.0050	1	04/13/2017 04:23
1,3-Dichloropropane	ND	0.0050	1	04/13/2017 04:23
2,2-Dichloropropane	ND	0.0050	1	04/13/2017 04:23

(Cont.)



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-2.5	1704402-001A	Soil	04/11/2017 08:19	GC18	137102

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.0050	1	04/13/2017 04:23
cis-1,3-Dichloropropene	ND	0.0050	1	04/13/2017 04:23
trans-1,3-Dichloropropene	ND	0.0050	1	04/13/2017 04:23
Diisopropyl ether (DIPE)	ND	0.0050	1	04/13/2017 04:23
Ethylbenzene	ND	0.0050	1	04/13/2017 04:23
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	04/13/2017 04:23
Freon 113	ND	0.0050	1	04/13/2017 04:23
Hexachlorobutadiene	ND	0.0050	1	04/13/2017 04:23
Hexachloroethane	ND	0.0050	1	04/13/2017 04:23
2-Hexanone	ND	0.0050	1	04/13/2017 04:23
Isopropylbenzene	ND	0.0050	1	04/13/2017 04:23
4-Isopropyl toluene	ND	0.0050	1	04/13/2017 04:23
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	04/13/2017 04:23
Methylene chloride	ND	0.0050	1	04/13/2017 04:23
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	04/13/2017 04:23
Naphthalene	ND	0.0050	1	04/13/2017 04:23
n-Propyl benzene	ND	0.0050	1	04/13/2017 04:23
Styrene	ND	0.0050	1	04/13/2017 04:23
1,1,1,2-Tetrachloroethane	ND	0.0050	1	04/13/2017 04:23
1,1,2,2-Tetrachloroethane	ND	0.0050	1	04/13/2017 04:23
Tetrachloroethene	ND	0.0050	1	04/13/2017 04:23
Toluene	ND	0.0050	1	04/13/2017 04:23
1,2,3-Trichlorobenzene	ND	0.0050	1	04/13/2017 04:23
1,2,4-Trichlorobenzene	ND	0.0050	1	04/13/2017 04:23
1,1,1-Trichloroethane	ND	0.0050	1	04/13/2017 04:23
1,1,2-Trichloroethane	ND	0.0050	1	04/13/2017 04:23
Trichloroethene	ND	0.0050	1	04/13/2017 04:23
Trichlorofluoromethane	ND	0.0050	1	04/13/2017 04:23
1,2,3-Trichloropropane	ND	0.0050	1	04/13/2017 04:23
1,2,4-Trimethylbenzene	ND	0.0050	1	04/13/2017 04:23
1,3,5-Trimethylbenzene	ND	0.0050	1	04/13/2017 04:23
Vinyl Chloride	ND	0.0050	1	04/13/2017 04:23
Xylenes, Total	ND	0.0050	1	04/13/2017 04:23

(Cont.)

NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-2.5	1704402-001A	Soil	04/11/2017 08:19	GC18	137102

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	99		70-130	04/13/2017 04:23
Toluene-d8	104		70-130	04/13/2017 04:23
4-BFB	95		70-130	04/13/2017 04:23
Benzene-d6	83		60-140	04/13/2017 04:23
Ethylbenzene-d10	93		60-140	04/13/2017 04:23
1,2-DCB-d4	72		60-140	04/13/2017 04:23

Analyst(s): AK



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-8.0	1704402-002A	Soil	04/11/2017 08:23	GC18	137102

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	04/13/2017 05:02
tert-Amyl methyl ether (TAME)	ND	0.0050	1	04/13/2017 05:02
Benzene	ND	0.0050	1	04/13/2017 05:02
Bromobenzene	ND	0.0050	1	04/13/2017 05:02
Bromochloromethane	ND	0.0050	1	04/13/2017 05:02
Bromodichloromethane	ND	0.0050	1	04/13/2017 05:02
Bromoform	ND	0.0050	1	04/13/2017 05:02
Bromomethane	ND	0.0050	1	04/13/2017 05:02
2-Butanone (MEK)	ND	0.020	1	04/13/2017 05:02
t-Butyl alcohol (TBA)	ND	0.050	1	04/13/2017 05:02
n-Butyl benzene	ND	0.0050	1	04/13/2017 05:02
sec-Butyl benzene	ND	0.0050	1	04/13/2017 05:02
tert-Butyl benzene	ND	0.0050	1	04/13/2017 05:02
Carbon Disulfide	ND	0.0050	1	04/13/2017 05:02
Carbon Tetrachloride	ND	0.0050	1	04/13/2017 05:02
Chlorobenzene	ND	0.0050	1	04/13/2017 05:02
Chloroethane	ND	0.0050	1	04/13/2017 05:02
Chloroform	ND	0.0050	1	04/13/2017 05:02
Chloromethane	ND	0.0050	1	04/13/2017 05:02
2-Chlorotoluene	ND	0.0050	1	04/13/2017 05:02
4-Chlorotoluene	ND	0.0050	1	04/13/2017 05:02
Dibromochloromethane	ND	0.0050	1	04/13/2017 05:02
1,2-Dibromo-3-chloropropane	ND	0.0040	1	04/13/2017 05:02
1,2-Dibromoethane (EDB)	ND	0.0040	1	04/13/2017 05:02
Dibromomethane	ND	0.0050	1	04/13/2017 05:02
1,2-Dichlorobenzene	ND	0.0050	1	04/13/2017 05:02
1,3-Dichlorobenzene	ND	0.0050	1	04/13/2017 05:02
1,4-Dichlorobenzene	ND	0.0050	1	04/13/2017 05:02
Dichlorodifluoromethane	ND	0.0050	1	04/13/2017 05:02
1,1-Dichloroethane	ND	0.0050	1	04/13/2017 05:02
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	04/13/2017 05:02
1,1-Dichloroethene	ND	0.0050	1	04/13/2017 05:02
cis-1,2-Dichloroethene	ND	0.0050	1	04/13/2017 05:02
trans-1,2-Dichloroethene	ND	0.0050	1	04/13/2017 05:02
1,2-Dichloropropane	ND	0.0050	1	04/13/2017 05:02
1,3-Dichloropropane	ND	0.0050	1	04/13/2017 05:02
2,2-Dichloropropane	ND	0.0050	1	04/13/2017 05:02

(Cont.)



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-8.0	1704402-002A	Soil	04/11/2017 08:23	GC18	137102

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.0050	1	04/13/2017 05:02
cis-1,3-Dichloropropene	ND	0.0050	1	04/13/2017 05:02
trans-1,3-Dichloropropene	ND	0.0050	1	04/13/2017 05:02
Diisopropyl ether (DIPE)	ND	0.0050	1	04/13/2017 05:02
Ethylbenzene	ND	0.0050	1	04/13/2017 05:02
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	04/13/2017 05:02
Freon 113	ND	0.0050	1	04/13/2017 05:02
Hexachlorobutadiene	ND	0.0050	1	04/13/2017 05:02
Hexachloroethane	ND	0.0050	1	04/13/2017 05:02
2-Hexanone	ND	0.0050	1	04/13/2017 05:02
Isopropylbenzene	ND	0.0050	1	04/13/2017 05:02
4-Isopropyl toluene	ND	0.0050	1	04/13/2017 05:02
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	04/13/2017 05:02
Methylene chloride	ND	0.0050	1	04/13/2017 05:02
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	04/13/2017 05:02
Naphthalene	ND	0.0050	1	04/13/2017 05:02
n-Propyl benzene	ND	0.0050	1	04/13/2017 05:02
Styrene	ND	0.0050	1	04/13/2017 05:02
1,1,1,2-Tetrachloroethane	ND	0.0050	1	04/13/2017 05:02
1,1,2,2-Tetrachloroethane	ND	0.0050	1	04/13/2017 05:02
Tetrachloroethene	ND	0.0050	1	04/13/2017 05:02
Toluene	ND	0.0050	1	04/13/2017 05:02
1,2,3-Trichlorobenzene	ND	0.0050	1	04/13/2017 05:02
1,2,4-Trichlorobenzene	ND	0.0050	1	04/13/2017 05:02
1,1,1-Trichloroethane	ND	0.0050	1	04/13/2017 05:02
1,1,2-Trichloroethane	ND	0.0050	1	04/13/2017 05:02
Trichloroethene	ND	0.0050	1	04/13/2017 05:02
Trichlorofluoromethane	ND	0.0050	1	04/13/2017 05:02
1,2,3-Trichloropropane	ND	0.0050	1	04/13/2017 05:02
1,2,4-Trimethylbenzene	ND	0.0050	1	04/13/2017 05:02
1,3,5-Trimethylbenzene	ND	0.0050	1	04/13/2017 05:02
Vinyl Chloride	ND	0.0050	1	04/13/2017 05:02
Xylenes, Total	ND	0.0050	1	04/13/2017 05:02

(Cont.)

NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-8.0	1704402-002A	Soil	04/11/2017 08:23	GC18	137102

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	99		70-130	04/13/2017 05:02
Toluene-d8	105		70-130	04/13/2017 05:02
4-BFB	95		70-130	04/13/2017 05:02
Benzene-d6	85		60-140	04/13/2017 05:02
Ethylbenzene-d10	98		60-140	04/13/2017 05:02
1,2-DCB-d4	75		60-140	04/13/2017 05:02

Analyst(s): AK



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-12.0	1704402-004A	Soil	04/11/2017 08:41	GC18	137102

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	04/13/2017 05:40
tert-Amyl methyl ether (TAME)	ND	0.0050	1	04/13/2017 05:40
Benzene	ND	0.0050	1	04/13/2017 05:40
Bromobenzene	ND	0.0050	1	04/13/2017 05:40
Bromochloromethane	ND	0.0050	1	04/13/2017 05:40
Bromodichloromethane	ND	0.0050	1	04/13/2017 05:40
Bromoform	ND	0.0050	1	04/13/2017 05:40
Bromomethane	ND	0.0050	1	04/13/2017 05:40
2-Butanone (MEK)	ND	0.020	1	04/13/2017 05:40
t-Butyl alcohol (TBA)	ND	0.050	1	04/13/2017 05:40
n-Butyl benzene	ND	0.0050	1	04/13/2017 05:40
sec-Butyl benzene	ND	0.0050	1	04/13/2017 05:40
tert-Butyl benzene	ND	0.0050	1	04/13/2017 05:40
Carbon Disulfide	ND	0.0050	1	04/13/2017 05:40
Carbon Tetrachloride	ND	0.0050	1	04/13/2017 05:40
Chlorobenzene	ND	0.0050	1	04/13/2017 05:40
Chloroethane	ND	0.0050	1	04/13/2017 05:40
Chloroform	ND	0.0050	1	04/13/2017 05:40
Chloromethane	ND	0.0050	1	04/13/2017 05:40
2-Chlorotoluene	ND	0.0050	1	04/13/2017 05:40
4-Chlorotoluene	ND	0.0050	1	04/13/2017 05:40
Dibromochloromethane	ND	0.0050	1	04/13/2017 05:40
1,2-Dibromo-3-chloropropane	ND	0.0040	1	04/13/2017 05:40
1,2-Dibromoethane (EDB)	ND	0.0040	1	04/13/2017 05:40
Dibromomethane	ND	0.0050	1	04/13/2017 05:40
1,2-Dichlorobenzene	ND	0.0050	1	04/13/2017 05:40
1,3-Dichlorobenzene	ND	0.0050	1	04/13/2017 05:40
1,4-Dichlorobenzene	ND	0.0050	1	04/13/2017 05:40
Dichlorodifluoromethane	ND	0.0050	1	04/13/2017 05:40
1,1-Dichloroethane	ND	0.0050	1	04/13/2017 05:40
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	04/13/2017 05:40
1,1-Dichloroethene	ND	0.0050	1	04/13/2017 05:40
cis-1,2-Dichloroethene	ND	0.0050	1	04/13/2017 05:40
trans-1,2-Dichloroethene	ND	0.0050	1	04/13/2017 05:40
1,2-Dichloropropane	ND	0.0050	1	04/13/2017 05:40
1,3-Dichloropropane	ND	0.0050	1	04/13/2017 05:40
2,2-Dichloropropane	ND	0.0050	1	04/13/2017 05:40

(Cont.)



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-12.0	1704402-004A	Soil	04/11/2017 08:41	GC18	137102

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.0050	1	04/13/2017 05:40
cis-1,3-Dichloropropene	ND	0.0050	1	04/13/2017 05:40
trans-1,3-Dichloropropene	ND	0.0050	1	04/13/2017 05:40
Diisopropyl ether (DIPE)	ND	0.0050	1	04/13/2017 05:40
Ethylbenzene	ND	0.0050	1	04/13/2017 05:40
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	04/13/2017 05:40
Freon 113	ND	0.0050	1	04/13/2017 05:40
Hexachlorobutadiene	ND	0.0050	1	04/13/2017 05:40
Hexachloroethane	ND	0.0050	1	04/13/2017 05:40
2-Hexanone	ND	0.0050	1	04/13/2017 05:40
Isopropylbenzene	ND	0.0050	1	04/13/2017 05:40
4-Isopropyl toluene	ND	0.0050	1	04/13/2017 05:40
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	04/13/2017 05:40
Methylene chloride	ND	0.0050	1	04/13/2017 05:40
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	04/13/2017 05:40
Naphthalene	ND	0.0050	1	04/13/2017 05:40
n-Propyl benzene	ND	0.0050	1	04/13/2017 05:40
Styrene	ND	0.0050	1	04/13/2017 05:40
1,1,1,2-Tetrachloroethane	ND	0.0050	1	04/13/2017 05:40
1,1,2,2-Tetrachloroethane	ND	0.0050	1	04/13/2017 05:40
Tetrachloroethene	ND	0.0050	1	04/13/2017 05:40
Toluene	ND	0.0050	1	04/13/2017 05:40
1,2,3-Trichlorobenzene	ND	0.0050	1	04/13/2017 05:40
1,2,4-Trichlorobenzene	ND	0.0050	1	04/13/2017 05:40
1,1,1-Trichloroethane	ND	0.0050	1	04/13/2017 05:40
1,1,2-Trichloroethane	ND	0.0050	1	04/13/2017 05:40
Trichloroethene	ND	0.0050	1	04/13/2017 05:40
Trichlorofluoromethane	ND	0.0050	1	04/13/2017 05:40
1,2,3-Trichloropropane	ND	0.0050	1	04/13/2017 05:40
1,2,4-Trimethylbenzene	ND	0.0050	1	04/13/2017 05:40
1,3,5-Trimethylbenzene	ND	0.0050	1	04/13/2017 05:40
Vinyl Chloride	ND	0.0050	1	04/13/2017 05:40
Xylenes, Total	ND	0.0050	1	04/13/2017 05:40

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NELAP 4033ORELAP

 Angela Rydelius, Lab Manager



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-12.0	1704402-004A	Soil	04/11/2017 08:41	GC18	137102

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	99		70-130	04/13/2017 05:40
Toluene-d8	104		70-130	04/13/2017 05:40
4-BFB	94		70-130	04/13/2017 05:40
Benzene-d6	80		60-140	04/13/2017 05:40
Ethylbenzene-d10	91		60-140	04/13/2017 05:40
1,2-DCB-d4	72		60-140	04/13/2017 05:40

Analyst(s): AK



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/12/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-GW	1704402-006B	Water	04/11/2017 10:15	GC16	137252

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	10	1	04/12/2017 17:45
tert-Amyl methyl ether (TAME)	ND	0.50	1	04/12/2017 17:45
Benzene	ND	0.50	1	04/12/2017 17:45
Bromobenzene	ND	0.50	1	04/12/2017 17:45
Bromochloromethane	ND	0.50	1	04/12/2017 17:45
Bromodichloromethane	ND	0.50	1	04/12/2017 17:45
Bromoform	ND	0.50	1	04/12/2017 17:45
Bromomethane	ND	0.50	1	04/12/2017 17:45
2-Butanone (MEK)	ND	2.0	1	04/12/2017 17:45
t-Butyl alcohol (TBA)	ND	2.0	1	04/12/2017 17:45
n-Butyl benzene	ND	0.50	1	04/12/2017 17:45
sec-Butyl benzene	ND	0.50	1	04/12/2017 17:45
tert-Butyl benzene	ND	0.50	1	04/12/2017 17:45
Carbon Disulfide	ND	0.50	1	04/12/2017 17:45
Carbon Tetrachloride	ND	0.50	1	04/12/2017 17:45
Chlorobenzene	ND	0.50	1	04/12/2017 17:45
Chloroethane	ND	0.50	1	04/12/2017 17:45
Chloroform	ND	0.50	1	04/12/2017 17:45
Chloromethane	ND	0.50	1	04/12/2017 17:45
2-Chlorotoluene	ND	0.50	1	04/12/2017 17:45
4-Chlorotoluene	ND	0.50	1	04/12/2017 17:45
Dibromochloromethane	ND	0.50	1	04/12/2017 17:45
1,2-Dibromo-3-chloropropane	ND	0.20	1	04/12/2017 17:45
1,2-Dibromoethane (EDB)	ND	0.50	1	04/12/2017 17:45
Dibromomethane	ND	0.50	1	04/12/2017 17:45
1,2-Dichlorobenzene	ND	0.50	1	04/12/2017 17:45
1,3-Dichlorobenzene	ND	0.50	1	04/12/2017 17:45
1,4-Dichlorobenzene	ND	0.50	1	04/12/2017 17:45
Dichlorodifluoromethane	ND	0.50	1	04/12/2017 17:45
1,1-Dichloroethane	ND	0.50	1	04/12/2017 17:45
1,2-Dichloroethane (1,2-DCA)	ND	0.50	1	04/12/2017 17:45
1,1-Dichloroethene	ND	0.50	1	04/12/2017 17:45
cis-1,2-Dichloroethene	4.7	0.50	1	04/12/2017 17:45
trans-1,2-Dichloroethene	ND	0.50	1	04/12/2017 17:45
1,2-Dichloropropane	ND	0.50	1	04/12/2017 17:45
1,3-Dichloropropane	ND	0.50	1	04/12/2017 17:45
2,2-Dichloropropane	ND	0.50	1	04/12/2017 17:45

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Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/12/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-GW	1704402-006B	Water	04/11/2017 10:15	GC16	137252

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	1	04/12/2017 17:45
cis-1,3-Dichloropropene	ND	0.50	1	04/12/2017 17:45
trans-1,3-Dichloropropene	ND	0.50	1	04/12/2017 17:45
Diisopropyl ether (DIPE)	ND	0.50	1	04/12/2017 17:45
Ethylbenzene	ND	0.50	1	04/12/2017 17:45
Ethyl tert-butyl ether (ETBE)	ND	0.50	1	04/12/2017 17:45
Freon 113	ND	0.50	1	04/12/2017 17:45
Hexachlorobutadiene	ND	0.50	1	04/12/2017 17:45
Hexachloroethane	ND	0.50	1	04/12/2017 17:45
2-Hexanone	ND	0.50	1	04/12/2017 17:45
Isopropylbenzene	ND	0.50	1	04/12/2017 17:45
4-Isopropyl toluene	ND	0.50	1	04/12/2017 17:45
Methyl-t-butyl ether (MTBE)	1.6	0.50	1	04/12/2017 17:45
Methylene chloride	ND	0.50	1	04/12/2017 17:45
4-Methyl-2-pentanone (MIBK)	ND	0.50	1	04/12/2017 17:45
Naphthalene	ND	0.50	1	04/12/2017 17:45
n-Propyl benzene	ND	0.50	1	04/12/2017 17:45
Styrene	ND	0.50	1	04/12/2017 17:45
1,1,1,2-Tetrachloroethane	ND	0.50	1	04/12/2017 17:45
1,1,2,2-Tetrachloroethane	ND	0.50	1	04/12/2017 17:45
Tetrachloroethene	ND	0.50	1	04/12/2017 17:45
Toluene	ND	0.50	1	04/12/2017 17:45
1,2,3-Trichlorobenzene	ND	0.50	1	04/12/2017 17:45
1,2,4-Trichlorobenzene	ND	0.50	1	04/12/2017 17:45
1,1,1-Trichloroethane	ND	0.50	1	04/12/2017 17:45
1,1,2-Trichloroethane	ND	0.50	1	04/12/2017 17:45
Trichloroethene	28	0.50	1	04/12/2017 17:45
Trichlorofluoromethane	ND	0.50	1	04/12/2017 17:45
1,2,3-Trichloropropane	ND	0.50	1	04/12/2017 17:45
1,2,4-Trimethylbenzene	ND	0.50	1	04/12/2017 17:45
1,3,5-Trimethylbenzene	ND	0.50	1	04/12/2017 17:45
Vinyl Chloride	ND	0.50	1	04/12/2017 17:45
Xylenes, Total	ND	0.50	1	04/12/2017 17:45

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Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/12/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-GW	1704402-006B	Water	04/11/2017 10:15	GC16	137252

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	90		70-130	04/12/2017 17:45
Toluene-d8	97		70-130	04/12/2017 17:45
4-BFB	94		70-130	04/12/2017 17:45
<u>Analyst(s):</u> HK			<u>Analytical Comments:</u> b1	



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/12/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW3510C
Analytical Method: SW8310
Unit: µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) by HPLC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-GW	1704402-006C	Water	04/11/2017 10:15	HPLC4	137120

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.500	10	04/13/2017 04:24
Acenaphthylene	ND	0.500	10	04/13/2017 04:24
Anthracene	ND	0.500	10	04/13/2017 04:24
Benzo (a) anthracene	ND	0.250	10	04/13/2017 04:24
Benzo (a) pyrene	ND	0.500	10	04/13/2017 04:24
Benzo (b) fluoranthene	ND	0.250	10	04/13/2017 04:24
Benzo (k) fluoranthene	ND	0.250	10	04/13/2017 04:24
Benzo (g,h,i) perylene	ND	0.500	10	04/13/2017 04:24
Chrysene	ND	0.500	10	04/13/2017 04:24
Dibenzo (a,h) anthracene	ND	0.500	10	04/13/2017 04:24
Fluoranthene	ND	0.500	10	04/13/2017 04:24
Fluorene	ND	0.500	10	04/13/2017 04:24
Indeno (1,2,3-cd) pyrene	ND	0.250	10	04/13/2017 04:24
1-Methylnaphthalene	ND	0.500	10	04/13/2017 04:24
2-Methylnaphthalene	ND	0.500	10	04/13/2017 04:24
Naphthalene	ND	0.500	10	04/13/2017 04:24
Phenanthrene	ND	0.500	10	04/13/2017 04:24
Pyrene	ND	0.500	10	04/13/2017 04:24

Surrogates	REC (%)	Limits	Date Analyzed
Decafluorobiphenyl	110	70-130	04/13/2017 04:24
4,4-Dichlorobiphenyl	111	70-130	04/13/2017 04:24

Analyst(s): BBO

Analytical Comments: a4,b1



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-2.5	1704402-001A	Soil	04/11/2017 08:19	GC19	137101

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	04/12/2017 13:31
MTBE	---	0.050	1	04/12/2017 13:31
Benzene	---	0.0050	1	04/12/2017 13:31
Toluene	---	0.0050	1	04/12/2017 13:31
Ethylbenzene	---	0.0050	1	04/12/2017 13:31
Xylenes	---	0.015	1	04/12/2017 13:31

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	88	62-126	04/12/2017 13:31

Analyst(s): LT Analytical Comments: c2

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-8.0	1704402-002A	Soil	04/11/2017 08:23	GC19	137101

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	04/12/2017 11:59
MTBE	---	0.050	1	04/12/2017 11:59
Benzene	---	0.0050	1	04/12/2017 11:59
Toluene	---	0.0050	1	04/12/2017 11:59
Ethylbenzene	---	0.0050	1	04/12/2017 11:59
Xylenes	---	0.015	1	04/12/2017 11:59

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	95	62-126	04/12/2017 11:59

Analyst(s): IA



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-12.0	1704402-004A	Soil	04/11/2017 08:41	GC19	137101

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	1.0	1	04/12/2017 12:30
MTBE	---	0.050	1	04/12/2017 12:30
Benzene	---	0.0050	1	04/12/2017 12:30
Toluene	---	0.0050	1	04/12/2017 12:30
Ethylbenzene	---	0.0050	1	04/12/2017 12:30
Xylenes	---	0.015	1	04/12/2017 12:30

Surrogates	REC (%)	Limits	
2-Fluorotoluene	95	62-126	04/12/2017 12:30

Analyst(s): IA



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/12/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: µg/L

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-GW	1704402-006A	Water	04/11/2017 10:15	GC3	137262

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	50	1	04/12/2017 18:47
MTBE	---	5.0	1	04/12/2017 18:47
Benzene	---	0.50	1	04/12/2017 18:47
Toluene	---	0.50	1	04/12/2017 18:47
Ethylbenzene	---	0.50	1	04/12/2017 18:47
Xylenes	---	1.5	1	04/12/2017 18:47

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
aaa-TFT	380	S	89-115	04/12/2017 18:47

Analyst(s): IA

Analytical Comments: c4,b1



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW3550B
Analytical Method: SW8015B
Unit: mg/Kg

Total Extractable Petroleum Hydrocarbons w/out SG Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-2.5	1704402-001A	Soil	04/11/2017 08:19	GC6A	137100

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	1.0	1	04/12/2017 10:05
TPH-Motor Oil (C18-C36)	ND	5.0	1	04/12/2017 10:05

Surrogates	REC (%)	Limits	Date Analyzed
C9	90	78-109	04/12/2017 10:05

Analyst(s): TK

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-8.0	1704402-002A	Soil	04/11/2017 08:23	GC9a	137100

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	1.0	1	04/12/2017 08:13
TPH-Motor Oil (C18-C36)	ND	5.0	1	04/12/2017 08:13

Surrogates	REC (%)	Limits	Date Analyzed
C9	105	78-109	04/12/2017 08:13

Analyst(s): TK

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-12.0	1704402-004A	Soil	04/11/2017 08:41	GC6A	137100

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	1.0	1	04/12/2017 04:15
TPH-Motor Oil (C18-C36)	ND	5.0	1	04/12/2017 04:15

Surrogates	REC (%)	Limits	Date Analyzed
C9	88	78-109	04/12/2017 04:15

Analyst(s): TK



Analytical Report

Client: Langan
Date Received: 4/11/17 14:15
Date Prepared: 4/11/17
Project: 750635603; 260 30th Street

WorkOrder: 1704402
Extraction Method: SW3510C
Analytical Method: SW8015B
Unit: µg/L

Total Extractable Petroleum Hydrocarbons w/out SG Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
B-36-GW	1704402-006A	Water	04/11/2017 10:15	GC9b	137144

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	120	50	1	04/12/2017 07:35
TPH-Motor Oil (C18-C36)	580	250	1	04/12/2017 07:35

Surrogates	REC (%)	Limits	Date Analyzed
C9	100	66-138	04/12/2017 07:35

Analyst(s): TK **Analytical Comments:** e7,e2,b1



Quality Control Report

Client: Langan
Date Prepared: 4/11/17
Date Analyzed: 4/12/17
Instrument: GC16, GC18
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1704402
BatchID: 137102
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-137102

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	0.10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.0390	0.0050	0.050	-	78	53-116
Benzene	ND	0.0494	0.0050	0.050	-	99	63-137
Bromobenzene	ND	-	0.0050	-	-	-	-
Bromochloromethane	ND	-	0.0050	-	-	-	-
Bromodichloromethane	ND	-	0.0050	-	-	-	-
Bromoform	ND	-	0.0050	-	-	-	-
Bromomethane	ND	-	0.0050	-	-	-	-
2-Butanone (MEK)	ND	-	0.020	-	-	-	-
t-Butyl alcohol (TBA)	ND	0.143	0.050	0.20	-	71	41-135
n-Butyl benzene	ND	-	0.0050	-	-	-	-
sec-Butyl benzene	ND	-	0.0050	-	-	-	-
tert-Butyl benzene	ND	-	0.0050	-	-	-	-
Carbon Disulfide	ND	-	0.0050	-	-	-	-
Carbon Tetrachloride	ND	-	0.0050	-	-	-	-
Chlorobenzene	ND	0.0485	0.0050	0.050	-	97	77-121
Chloroethane	ND	-	0.0050	-	-	-	-
Chloroform	ND	-	0.0050	-	-	-	-
Chloromethane	ND	-	0.0050	-	-	-	-
2-Chlorotoluene	ND	-	0.0050	-	-	-	-
4-Chlorotoluene	ND	-	0.0050	-	-	-	-
Dibromochloromethane	ND	-	0.0050	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.0040	-	-	-	-
1,2-Dibromoethane (EDB)	ND	0.0440	0.0040	0.050	-	88	67-119
Dibromomethane	ND	-	0.0050	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.0050	-	-	-	-
Dichlorodifluoromethane	ND	-	0.0050	-	-	-	-
1,1-Dichloroethane	ND	-	0.0050	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.0449	0.0040	0.050	-	90	58-135
1,1-Dichloroethene	ND	0.0483	0.0050	0.050	-	97	42-145
cis-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
1,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,3-Dichloropropane	ND	-	0.0050	-	-	-	-
2,2-Dichloropropane	ND	-	0.0050	-	-	-	-

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NELAP 4033ORELAP

QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 4/11/17
Date Analyzed: 4/12/17
Instrument: GC16, GC18
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1704402
BatchID: 137102
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-137102

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1-Dichloropropene	ND	-	0.0050	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
Diisopropyl ether (DIPE)	ND	0.0459	0.0050	0.050	-	92	52-129
Ethylbenzene	ND	-	0.0050	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.0438	0.0050	0.050	-	88	53-125
Freon 113	ND	-	0.0050	-	-	-	-
Hexachlorobutadiene	ND	-	0.0050	-	-	-	-
Hexachloroethane	ND	-	0.0050	-	-	-	-
2-Hexanone	ND	-	0.0050	-	-	-	-
Isopropylbenzene	ND	-	0.0050	-	-	-	-
4-Isopropyl toluene	ND	-	0.0050	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.0427	0.0050	0.050	-	85	58-122
Methylene chloride	ND	-	0.0050	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.0050	-	-	-	-
Naphthalene	ND	-	0.0050	-	-	-	-
n-Propyl benzene	ND	-	0.0050	-	-	-	-
Styrene	ND	-	0.0050	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
Tetrachloroethene	ND	-	0.0050	-	-	-	-
Toluene	ND	0.0492	0.0050	0.050	-	98	76-130
1,2,3-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.0050	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.0050	-	-	-	-
Trichloroethene	ND	0.0519	0.0050	0.050	-	104	72-132
Trichlorofluoromethane	ND	-	0.0050	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.0050	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.0050	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.0050	-	-	-	-
Vinyl Chloride	ND	-	0.0050	-	-	-	-
Xylenes, Total	ND	-	0.0050	-	-	-	-



Quality Control Report

Client: Langan
Date Prepared: 4/11/17
Date Analyzed: 4/12/17
Instrument: GC16, GC18
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1704402
BatchID: 137102
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg
Sample ID: MB/LCS-137102

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Surrogate Recovery							
Dibromofluoromethane	0.109	0.125		0.12	87	100	70-130
Toluene-d8	0.1338	0.130		0.12	107	104	70-130
4-BFB	0.01292	0.0133		0.012	103	106	70-130
Benzene-d6	0.0918	0.0947		0.10	92	95	60-140
Ethylbenzene-d10	0.1075	0.108		0.10	107	108	60-140
1,2-DCB-d4	0.07289	0.0836		0.10	73	84	60-140



Quality Control Report

Client: Langan
Date Prepared: 4/12/17
Date Analyzed: 4/12/17
Instrument: GC16
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1704402
BatchID: 137252
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS/LCSD-137252

QC Summary Report for SW8260B

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
Acetone	ND	10	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.50	-	-	-
Benzene	ND	0.50	-	-	-
Bromobenzene	ND	0.50	-	-	-
Bromochloromethane	ND	0.50	-	-	-
Bromodichloromethane	ND	0.50	-	-	-
Bromoform	ND	0.50	-	-	-
Bromomethane	ND	0.50	-	-	-
2-Butanone (MEK)	ND	2.0	-	-	-
t-Butyl alcohol (TBA)	ND	2.0	-	-	-
n-Butyl benzene	ND	0.50	-	-	-
sec-Butyl benzene	ND	0.50	-	-	-
tert-Butyl benzene	ND	0.50	-	-	-
Carbon Disulfide	ND	0.50	-	-	-
Carbon Tetrachloride	ND	0.50	-	-	-
Chlorobenzene	ND	0.50	-	-	-
Chloroethane	ND	0.50	-	-	-
Chloroform	ND	0.50	-	-	-
Chloromethane	ND	0.50	-	-	-
2-Chlorotoluene	ND	0.50	-	-	-
4-Chlorotoluene	ND	0.50	-	-	-
Dibromochloromethane	ND	0.50	-	-	-
1,2-Dibromo-3-chloropropane	ND	0.20	-	-	-
1,2-Dibromoethane (EDB)	ND	0.50	-	-	-
Dibromomethane	ND	0.50	-	-	-
1,2-Dichlorobenzene	ND	0.50	-	-	-
1,3-Dichlorobenzene	ND	0.50	-	-	-
1,4-Dichlorobenzene	ND	0.50	-	-	-
Dichlorodifluoromethane	ND	0.50	-	-	-
1,1-Dichloroethane	ND	0.50	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.50	-	-	-
1,1-Dichloroethene	ND	0.50	-	-	-
cis-1,2-Dichloroethene	ND	0.50	-	-	-
trans-1,2-Dichloroethene	ND	0.50	-	-	-
1,2-Dichloropropane	ND	0.50	-	-	-
1,3-Dichloropropane	ND	0.50	-	-	-
2,2-Dichloropropane	ND	0.50	-	-	-
1,1-Dichloropropene	ND	0.50	-	-	-
cis-1,3-Dichloropropene	ND	0.50	-	-	-

(Cont.)

NELAP 4033ORELAP

QA/QC Officer



Quality Control Report

Client: Langan
Date Prepared: 4/12/17
Date Analyzed: 4/12/17
Instrument: GC16
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1704402
BatchID: 137252
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS/LCSD-137252

QC Summary Report for SW8260B

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
trans-1,3-Dichloropropene	ND	0.50	-	-	-
Diisopropyl ether (DIPE)	ND	0.50	-	-	-
Ethylbenzene	ND	0.50	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.50	-	-	-
Freon 113	ND	0.50	-	-	-
Hexachlorobutadiene	ND	0.50	-	-	-
Hexachloroethane	ND	0.50	-	-	-
2-Hexanone	ND	0.50	-	-	-
Isopropylbenzene	ND	0.50	-	-	-
4-Isopropyl toluene	ND	0.50	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.50	-	-	-
Methylene chloride	ND	0.50	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	0.50	-	-	-
Naphthalene	ND	0.50	-	-	-
n-Propyl benzene	ND	0.50	-	-	-
Styrene	ND	0.50	-	-	-
1,1,1,2-Tetrachloroethane	ND	0.50	-	-	-
1,1,2,2-Tetrachloroethane	ND	0.50	-	-	-
Tetrachloroethene	ND	0.50	-	-	-
Toluene	ND	0.50	-	-	-
1,2,3-Trichlorobenzene	ND	0.50	-	-	-
1,2,4-Trichlorobenzene	ND	0.50	-	-	-
1,1,1-Trichloroethane	ND	0.50	-	-	-
1,1,2-Trichloroethane	ND	0.50	-	-	-
Trichloroethene	ND	0.50	-	-	-
Trichlorofluoromethane	ND	0.50	-	-	-
1,2,3-Trichloropropane	ND	0.50	-	-	-
1,2,4-Trimethylbenzene	ND	0.50	-	-	-
1,3,5-Trimethylbenzene	ND	0.50	-	-	-
Vinyl Chloride	ND	0.50	-	-	-
Xylenes, Total	ND	0.50	-	-	-

Surrogate Recovery

Dibromofluoromethane	22.74		25	91	70-130
Toluene-d8	24.63		25	99	70-130
4-BFB	2.464		2.5	99	70-130



Quality Control Report

Client: Langan
Date Prepared: 4/12/17
Date Analyzed: 4/12/17
Instrument: GC16
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1704402
BatchID: 137252
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS/LCSD-137252

QC Summary Report for SW8260B

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
tert-Amyl methyl ether (TAME)	8.86	9.35	10	89	94	54-140	5.37	20
Benzene	9.12	9.31	10	91	93	47-158	2.01	20
t-Butyl alcohol (TBA)	32.3	35.9	40	81	90	42-140	10.5	20
Chlorobenzene	9.17	9.20	10	92	92	43-157	0	20
1,2-Dibromoethane (EDB)	9.47	9.91	10	95	99	44-155	4.57	20
1,2-Dichloroethane (1,2-DCA)	9.33	9.57	10	93	96	66-125	2.57	20
1,1-Dichloroethene	8.93	9.48	10	89	95	47-149	5.97	20
Diisopropyl ether (DIPE)	9.63	10.0	10	96	100	57-136	4.11	20
Ethyl tert-butyl ether (ETBE)	9.31	9.78	10	93	98	55-137	4.88	20
Methyl-t-butyl ether (MTBE)	8.78	9.32	10	88	93	53-139	5.90	20
Toluene	9.04	8.86	10	90	89	52-137	2.03	20
Trichloroethene	8.93	9.25	10	89	93	43-157	3.52	20
Surrogate Recovery								
Dibromofluoromethane	22.7	22.6	25	91	91	70-130	0	20
Toluene-d8	25.2	24.2	25	101	97	70-130	3.74	20
4-BFB	2.47	2.29	2.5	99	92	70-130	7.41	20



Quality Control Report

Client: Langan
Date Prepared: 4/11/17
Date Analyzed: 4/13/17
Instrument: HPLC4
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1704402
BatchID: 137120
Extraction Method: SW3510C
Analytical Method: SW8310
Unit: µg/L
Sample ID: MB/LCS/LCSD-137120

QC Summary Report for SW8310

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
Acenaphthene	ND	0.0500	-	-	-
Acenaphthylene	ND	0.0500	-	-	-
Anthracene	ND	0.0500	-	-	-
Benzo (a) anthracene	ND	0.0250	-	-	-
Benzo (a) pyrene	ND	0.0500	-	-	-
Benzo (a) pyrene	ND	0.0500	-	-	-
Benzo (b) fluoranthene	ND	0.0250	-	-	-
Benzo (k) fluoranthene	ND	0.0250	-	-	-
Benzo (g,h,i) perylene	ND	0.0500	-	-	-
Chrysene	ND	0.0500	-	-	-
Dibenzo (a,h) anthracene	ND	0.0500	-	-	-
Fluoranthene	ND	0.0500	-	-	-
Fluorene	ND	0.0500	-	-	-
Indeno (1,2,3-cd) pyrene	ND	0.0250	-	-	-
1-Methylnaphthalene	ND	0.0500	-	-	-
2-Methylnaphthalene	ND	0.0500	-	-	-
Naphthalene	ND	0.0500	-	-	-
Phenanthrene	ND	0.0500	-	-	-
Pyrene	ND	0.0500	-	-	-

Surrogate Recovery

Decafluorobiphenyl	54.24		50	108	70-130
4,4-Dichlorobiphenyl	29.05		25	116	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Benzo (a) anthracene	0.864	0.824	0.75	115	110	70-130	4.78	20
Benzo (a) pyrene	0.847	0.884	0.75	113	118	70-130	4.27	20
Chrysene	0.917	0.860	0.75	122	115	70-130	6.51	20
1-Methylnaphthalene	0.728	0.868	0.75	97	116	70-130	17.6	20
2-Methylnaphthalene	0.776	0.906	0.75	103	121	70-130	15.5	20
Phenanthrene	0.775	0.878	0.75	103	117	70-130	12.5	20
Pyrene	0.853	0.867	0.75	114	116	70-130	1.68	20

Surrogate Recovery

Decafluorobiphenyl	45.7	56.0	50	91	112	70-130	20.2,F2	20
4,4-Dichlorobiphenyl	26.8	29.1	25	107	116	70-130	8.40	20



Quality Control Report

Client: Langan
Date Prepared: 4/11/17
Date Analyzed: 4/12/17
Instrument: GC7
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1704402
BatchID: 137101
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg
Sample ID: MB/LCS-137101

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	0.525	0.40	0.60	-	87	82-118
MTBE	ND	0.0877	0.050	0.10	-	88	61-119
Benzene	ND	0.104	0.0050	0.10	-	104	77-128
Toluene	ND	0.0996	0.0050	0.10	-	100	74-132
Ethylbenzene	ND	0.112	0.0050	0.10	-	112	84-127
Xylenes	ND	0.326	0.015	0.30	-	109	86-129
Surrogate Recovery							
2-Fluorotoluene	0.09513	0.0934		0.10	95	93	75-134



Quality Control Report

Client: Langan
Date Prepared: 4/12/17
Date Analyzed: 4/12/17
Instrument: GC3
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1704402
BatchID: 137262
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: µg/L
Sample ID: MB/LCS-137262
 1704332-007AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	59.5	40	60	-	99	78-116
MTBE	ND	9.55	5.0	10	-	96	72-122
Benzene	ND	9.35	0.50	10	-	93	81-123
Toluene	ND	9.86	0.50	10	-	99	83-129
Ethylbenzene	ND	10.2	0.50	10	-	102	88-126
Xylenes	ND	32.0	1.5	30	-	107	87-131
Surrogate Recovery							
aaa-TFT	10.06	10.2		10	101	102	89-116

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	59.9	58.9	60	ND	100	98	63-133	1.68	20
MTBE	9.71	9.78	10	ND	97	98	69-122	0.741	20
Benzene	9.39	9.29	10	ND	94	93	84-125	1.05	20
Toluene	9.90	9.71	10	ND	99	97	87-131	1.87	20
Ethylbenzene	10.4	10.1	10	ND	104	101	92-126	3.05	20
Xylenes	32.8	31.6	30	ND	109	105	88-132	3.78	20
Surrogate Recovery									
aaa-TFT	10.0	9.92	10		100	99	90-117	1.27	20



Quality Control Report

Client: Langan
Date Prepared: 4/11/17
Date Analyzed: 4/11/17
Instrument: GC9a
Matrix: Soil
Project: 750635603; 260 30th Street

WorkOrder: 1704402
BatchID: 137100
Extraction Method: SW3550B
Analytical Method: SW8015B
Unit: mg/Kg
Sample ID: MB/LCS-137100
 1704362-001AMS/MSD

QC Report for SW8015B w/out SG Clean-Up

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH-Diesel (C10-C23)	ND	38.2	1.0	40	-	95	79-133
TPH-Motor Oil (C18-C36)	ND	-	5.0	-	-	-	-
Surrogate Recovery							
C9	25.82	25.9		25	103	104	77-109

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	39.8	39.4	40	3.878	90	89	59-150	1.08	30
Surrogate Recovery									
C9	28.0	26.0	25		112	104	78-109	7.69	30



Quality Control Report

Client: Langan
Date Prepared: 4/11/17
Date Analyzed: 4/12/17
Instrument: GC9b
Matrix: Water
Project: 750635603; 260 30th Street

WorkOrder: 1704402
BatchID: 137144
Extraction Method: SW3510C
Analytical Method: SW8015B
Unit: µg/L
Sample ID: MB/LCS/LCSD-137144

QC Report for SW8015B w/out SG Clean-Up

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
TPH-Diesel (C10-C23)	ND	50	-	-	-
TPH-Motor Oil (C18-C36)	ND	250	-	-	-
Surrogate Recovery					
C9	627.2		625	100	79-111

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	996	1040	1000	100	104	88-134	3.99	30
Surrogate Recovery								
C9	624	625	625	100	100	79-111	0	30



1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1704402

ClientCode: TWRK

WaterTrax
 WriteOn
 EDF
 Excel
 EQulS
 Email
 HardCopy
 ThirdParty
 J-flag

Report to:

Josh Graber
 Langan
 501 14th Street, 3rd Floor
 Oakland, CA 94612
 (415) 955-9040 FAX: (415) 955-9041

Email: jdgraber@treadwellrollo.com
 cc/3rd Party: kstaehlin@langan.com;
 PO:
 ProjectNo: 750635603; 260 30th Street

Bill to:

Accounts Payable
 Langan
 555 Montgomery St., Suite 1300
 San Francisco, CA 94111
 Langan_InvoiceCapture@concursoft.com

Requested TAT: 3 days;

Date Received: 04/11/2017

Date Logged: 04/11/2017

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1704402-001	B-36-2.5	Soil	4/11/2017 08:19	<input type="checkbox"/>	A			A		A						
1704402-002	B-36-8.0	Soil	4/11/2017 08:23	<input type="checkbox"/>	A			A		A						
1704402-004	B-36-12.0	Soil	4/11/2017 08:41	<input type="checkbox"/>	A			A		A						
1704402-006	B-36-GW	Water	4/11/2017 10:15	<input type="checkbox"/>		B	C		A		A					

Test Legend:

1	8260B_S	2	8260B_W	3	8310_W	4	G-MBTEX_S
5	G-MBTEX_W	6	TPH(DMO)_S	7	TPH(DMO)_W	8	
9		10		11		12	

Prepared by: Agustina Venegas

The following SampIDs: 001A, 002A, 004A contain testgroup Multi Range_S.; The following SampID: 006A contains testgroup Multi Range_W.

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



WORK ORDER SUMMARY

Client Name: LANGAN
Client Contact: Josh Graber
Contact's Email: jdgraber@treadwellrollo.com

Project: 750635603; 260 30th Street

Work Order: 1704402
QC Level: LEVEL 2
Date Logged: 4/11/2017

Comments:

WaterTrax WriteOn EDF Excel Fax Email HardCopy ThirdParty J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1704402-001A	B-36-2.5	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	4/11/2017 8:19	3 days		<input type="checkbox"/>	
1704402-002A	B-36-8.0	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	4/11/2017 8:23	3 days		<input type="checkbox"/>	
1704402-003A	B-36-10.0	Soil		1	Acetate Liner	<input type="checkbox"/>	4/11/2017 8:32			<input checked="" type="checkbox"/>	
1704402-004A	B-36-12.0	Soil	Multi-Range TPH(g,d,mo) by EPA 8015Bm SW8260B (VOCs)	1	Acetate Liner	<input type="checkbox"/>	4/11/2017 8:41	3 days		<input type="checkbox"/>	
1704402-005A	B-36-16.0	Soil		1	Acetate Liner	<input type="checkbox"/>	4/11/2017 8:56			<input checked="" type="checkbox"/>	
1704402-006A	B-36-GW	Water	Multi-Range TPH(g,d,mo) by EPA 8015Bm	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	<input type="checkbox"/>	4/11/2017 10:15	3 days	30%+	<input type="checkbox"/>	
1704402-006B	B-36-GW	Water	SW8260B (VOCs)	2	VOA w/ HCl	<input type="checkbox"/>	4/11/2017 10:15	3 days	30%+	<input type="checkbox"/>	
1704402-006C	B-36-GW	Water	SW8310 (PAHs/PNAs)	1	ILA w/ HCl	<input type="checkbox"/>	4/11/2017 10:15	3 days	30%+	<input type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).
 - MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

1704402

* PLEASE RUSH C.C. ANNIE S. AT KSTAEHLIN@LANGAN.COM * 10435

LANGAN

CHAIN OF CUSTODY RECORD

Page 1 of 1

- 555 Montgomery Street, Suite 1300, San Francisco, CA 94111
- 501 14th Street, Third Floor, Oakland CA 94612
- 3320 Data Drive, Suite 350, Rancho Cordova, CA 95670-7982
- 4030 Moorpark Ave. Suite 210, San Jose, CA 95117-1849

Site Name: 260 30TH STREET
 Job Number: 750635603
 Project Manager/Contact: JOSH GRABER
 Samplers: KARIANNE STAEHLIN
 Recorder (Signature Required): [Signature]

Turnaround
 Time
72-Hour

Analysis Requested

No. Containers & Preservative

Field Sample Identification No.	Date	Time	Lab Sample No.	Matrix				No. Containers & Preservative				Analysis Requested		Silica gel clean-up	Hold	Remarks	
				Soil	Water	Air	Other	HCL	H ₂ SO ₄	HNO ₃	Ice	TPH (g./g. mo)	VOCs				PAHs (g/g)
B-36-8.0	4/11/17	0823		X													
B-36-10.0	↙	0832		X													
B-36-12.0	↘	0841		X													
B-36-16.0	4/11/17	0854		X													
B-36-2.5	4/11/17	0819		X													
B-36-GW	4/11/17	1015			X			5			2						

+30

Relinquished by: (Signature) <u>[Signature]</u>	Date: <u>4-11-17</u>	Time: <u>1415</u>	Received by: (Signature) <u>[Signature]</u>	Date: <u>4-11-17</u>	Time: <u>1130</u>
Relinquished by: (Signature) <u>[Signature]</u>	Date: <u>4-11-17</u>	Time: <u>1415</u>	Received by: (Signature) <u>[Signature]</u>	Date: <u>4/11</u>	Time: <u>1415</u>

Sent to Laboratory (Name): McCAMPBELL ANALYTICAL
 Laboratory Comments/Notes: _____
 Method of Shipment: Lab courier Fed Ex Airborne UPS
 Hand Carried Private Courier (Co. Name) _____

White Copy - Original

Yellow Copy - Laboratory

Pink Copy - Field

COC Number:

5.4



Sample Receipt Checklist

Client Name: **Langan**
 Project Name: **750635603; 260 30th Street**

Date and Time Received: **4/11/2017 14:15**
 Date Logged: **4/11/2017**
 Received by: **Agustina Venegas**
 Logged by: **Agustina Venegas**

WorkOrder No: **1704402** Matrix: Soil/Water
 Carrier: Bernie Cummins (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present? Yes No
 Chain of custody signed when relinquished and received? Yes No
 Chain of custody agrees with sample labels? Yes No
 Sample IDs noted by Client on COC? Yes No
 Date and Time of collection noted by Client on COC? Yes No
 Sampler's name noted on COC? Yes No

Sample Receipt Information

Custody seals intact on shipping container/cooler? Yes No NA
 Shipping container/cooler in good condition? Yes No
 Samples in proper containers/bottles? Yes No
 Sample containers intact? Yes No
 Sufficient sample volume for indicated test? Yes No

Sample Preservation and Hold Time (HT) Information

All samples received within holding time? Yes No NA
 Sample/Temp Blank temperature Temp: 5.6°C NA
 Water - VOA vials have zero headspace / no bubbles? Yes No NA
 Sample labels checked for correct preservation? Yes No
 pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)? Yes No NA
 Samples Received on Ice? Yes No
 (Ice Type: WET ICE)

UCMR3 Samples:

Total Chlorine tested and acceptable upon receipt for EPA 522? Yes No NA
 Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539? Yes No NA

Comments: