Groundwater Monitoring Report, 2015 Annual Event

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Sign-off Sheet

This document entitled, ***Groundwater Monitoring Report, 2015 Annual Event***, was prepared by **Stantec Consulting Services Inc. (Stantec)** on behalf of **TOC Holdings Co. (TOC)** for specific application to TOC Facility No. 01-176 in Mountlake Terrace, Washington. Services conducted by Stantec for this project were conducted in accordance with the Environmental Services Contract between **HydroCon Environmental, LLC (HydroCon)** and Stantec. Any reliance on this document by a third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and HydroCon. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

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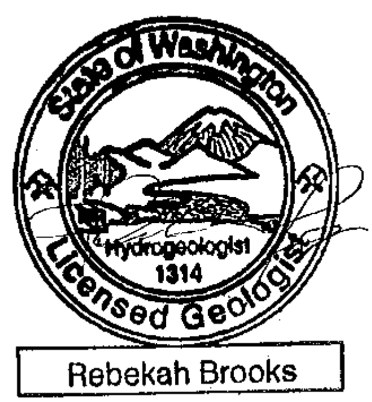

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Table of Contents

Table of Contents

List of Tables

List of Figures

Table of Contents

List of Appendices

Acronyms & Abbreviations

µg/L	micrograms per Liter
1Q2015	First Quarter 2015
2Q2014	Second Quarter 2014
2Q2015	Second Quarter 2015
AO	Agreed Order
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and total xylenes
CSM	conceptual site model
DPE	dual-phase extraction
DRPH	diesel-range petroleum hydrocarbons
DTW/DTP	depth-to-groundwater / depth-to-product
Ecology	Washington State Department of Ecology
EDB	ethylene dibromide (1,2-dibromoethane)
EDC	ethylene dichloride (1,2-dichloroethane)
EPA	U.S. Environmental Protection Agency
Friedman & Bruya	Friedman & Bruya, Inc.
GRPH	gasoline-range petroleum hydrocarbons
HydroCon	HydroCon Environmental, LLC
ID	identification
IRAWP	Interim Remedial Action Work Plan
LNAPL	light non-aqueous phase liquid
MDL	method detection limit
MPE	multi-phase extraction
MRL	method reporting limit
MTBE	methyl tert-butyl ether
MTCA	Model Toxics Control Act
NWTPH-Dx	Northwest Total Petroleum Hydrocarbon – Diesel-Range Organics
NWTPH-Gx	Northwest Total Petroleum Hydrocarbon – Gasoline-Range Organics
ORPH	motor oil-range petroleum hydrocarbons
PACE	PACE Engineers, Inc.
PAH	polycyclic aromatic hydrocarbons
QA/QC	quality assurance / quality control
RI	remedial investigation
ROW	right-of-way
RW	remediation well
SES	SoundEarth Strategies, Inc.
Stantec	Stantec Consulting Services Inc.
SVE	soil vapor extraction
TOC	TOC Holdings Co.
UST	underground storage tank
VOC	volatile organic compound

List of Properties – TOC Site

TOC Property	24205 56th Avenue West, Mountlake Terrace, WA
TOC/Farmasonis Property	24225 56th Avenue West, Mountlake Terrace, WA
Drake Property	24309 56th Avenue West, Mountlake Terrace, WA
56th Avenue West ROW	Right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties

List of Properties – Adjacent to TOC Site

Herman Property	24311 56th Avenue West, Mountlake Terrace, WA
Shin/Choi Property	24325 56th Avenue West, Mountlake Terrace, WA
242nd Street Southwest ROW	Right-of-way adjacent to TOC Property

Executive Summary

This report documents the field activities and groundwater quality results for the 2015 annual groundwater performance monitoring event associated with interim remedial actions at the TOC Holdings Co. (TOC) Facility No. 01-176 located in Mountlake Terrace, Snohomish County, Washington. Field activities were performed by Stantec Consulting Services Inc. (Stantec) as a subconsultant to HydroCon Environmental, LLC (HydroCon) on behalf of TOC. Ongoing groundwater monitoring is conducted under Agreed Order (AO) No. DE 8661, entered in October 2011 between TOC and the Washington State Department of Ecology (Ecology 2011). As specified in the AO, the Site encompasses the following four properties (collectively referred to as the “TOC Site”) located in Mountlake Terrace, Washington:

- **TOC Property:** 24205 56th Avenue West;
- **TOC/Farmasonis Property**: 24225 56th Avenue West;
- **Drake Property:** 24309 56th Avenue West; and
- **56th Avenue West Right-of-Way (ROW):** adjacent to the three properties identified above.

The groundwater monitoring scope of work defined in the IRAWP encompasses the four properties identified above as the “TOC Site” as well as the following two adjacent properties:

- **Shin/Choi Property:** 24325 56th Avenue West (south of the TOC Site) and
- **242nd Street Southwest ROW:** adjacent to the TOC Property (north of the TOC Site).

Following completion of the IRAWP, monitoring wells were also installed on the following property between June 2013 and June 2015:

- **Herman Property:** 24311 56th Avenue West (directly south of the TOC Site).

Groundwater monitoring for the 2015 annual event conducted from March 11 through 20, 2015 included measuring depth-to-groundwater/depth-to-product (DTW/DTP) levels and collecting groundwater samples at all active wells.

DTW/DTP levels were measured at 89 well locations and groundwater samples were collected from 82 well locations. Of the 97 wells scheduled for groundwater performance monitoring, 12 could not be gauged due to insufficient groundwater in monitoring wells or because the top of pump was encountered in remediation wells at a depth above the groundwater level and access past the pump was not possible. In addition, 15 wells could not be sampled due to insufficient groundwater sample volume and one well was not sampled due to the presence of light non-aqueous liquid (LNAPL) in the well.

Laboratory analyses for selected petroleum-related constituents included:

- gasoline-, motor oil- and diesel-range petroleum hydrocarbons (GRPH, ORPH and DRP);
- benzene, toluene, ethylbenzene, and xylenes BTEX); and
- polycyclic aromatic hydrocarbons (PAHs).

Laboratory analyses for selected fuel additives and blending compounds included:

- methyl tert-butyl ether (MTBE);
- ethylene dibromide (EDB; 1,2-dibromoethane);
- ethylene dichloride (EDC; 1,2-dichloroethane); and
- total and dissolved lead.

Executive Summary

Data collected during the 2015 annual event confirmed the presence of three interconnected groundwater zones in the heterogeneous, glacial deposits found at the TOC Site. The three groundwater zones include:

- **Shallow Zone:** shallow, perched water-bearing zone encountered at approximately 5 to 20 feet below ground surface (bgs);
- **Intermediate Zone:** an unconfined, intermediate water-bearing zone ranging in depth between approximately 20 and 60 feet bgs; and
- **Deep Zone:** a deep zone that appears to be interconnected with the intermediate zone at depths (based on well screens) greater than 60 feet bgs.

Additionally, 16 wells (one of which was decommissioned) appear to have screen intervals that intersect multiple groundwater zones (either Shallow and Intermediate Zones, or Intermediate and Deep Zones) and may not represent the individual hydrogeological conditions of either zone. For discussion purposes, these monitoring and remediation wells are placed into five categories based on well screen intervals and intersected groundwater zones and include: 1) Shallow Zone; 2) Intermediate Zone; 3) Deep Zone; 4) Wells intersecting Shallow-Intermediate Zones; and 5) Well intersecting Intermediate-Deep Zones.

Groundwater contamination on the TOC, TOC/Farmasonis and Drake properties appears to have originated from historical gasoline releases on the TOC Property. As evidenced by downward vertical gradients and the resulting contaminant distribution, gasoline-related petroleum constituents appear to have migrated downward from the shallow to the intermediate groundwater zones below the TOC Property over time and then migrated downgradient onto the TOC/Farmasonis and Drake Properties to the south with groundwater flow. Minimal residual groundwater contamination remains in the shallow zone likely due to remediation in this zone between 1996 and 2005. Based on an evaluation of trends in the predominant contaminant concentrations (e.g., GRPH, benzene, and to a lesser extent, lead), concentrations of petroleum constituents in the intermediate groundwater zone appear to have decreased over time and only remain at a few locations on the TOC Property, on the southwestern side of the TOC/Farmasonis Property, and one location on the Drake Property. The reduction in groundwater concentrations can likely be attributed to operation of three remediation systems: one for the TOC Property (Unit 1), one for the TOC/Farmasonis Property (Unit 2), and one for the Drake Property (Unit 3). Both Units 2 and 3 are located within a single compound on the TOC/Farmasonis Property. Comparison of contaminant concentrations with groundwater levels over time indicate that an inverse relationship appears to occur, such that dissolved groundwater concentrations increase with decreasing groundwater levels. These trends imply that residual contamination in the soil is liberated when groundwater levels decrease during seasonal low periods. Vertical upward gradients between the deep and intermediate zones downgradient of the TOC Property appear to be effective in inhibiting further downward migration of contamination and effectively bounding the extent of vertical contamination.

Based on data collected at the downgradient boundary of the TOC Site, historical data from the adjacent properties to the south, and the presence of historical and potentially current underground storage tanks (USTs), groundwater contamination on the Herman and Shin/Choi Properties to the south appears to have originated from historical petroleum-related activities at those properties.

1.0 INTRODUCTION

This report presents the results of the 2015 annual groundwater performance monitoring event (2015 annual event) for the interim remedial actions at the TOC Holdings Co. (TOC) Facility No. 01-176 located in Mountlake Terrace, Snohomish County, Washington. Field activities were performed by Stantec Consulting Services Inc. (Stantec) as a subconsultant to HydroCon Environmental, LLC (HydroCon) on behalf of TOC.

1.1 Groundwater Monitoring Scope of Work

Ongoing groundwater monitoring is conducted under Agreed Order (AO) No. DE 8661, entered in October 2011 between TOC and the Washington State Department of Ecology (Ecology 2011). The scope of work is defined in the *Interim Remedial Action Work Plan* (IRAWP; SoundEarth Strategies, Inc. [SES], 2011) and is included as Exhibit C of the AO. Per the requirements of the IRAWP, the groundwater monitoring scope of work includes one annual field event (performed during the first quarter of each year) and three quarterly field events (performed during the second, third and fourth quarters of each year). As specified in the AO, the Site encompasses the following four properties (collectively referred to as the "TOC Site") located in Mountlake Terrace, Washington:

- **TOC Property:** 24205 56th Avenue West;
- **TOC/Farmasonis Property**: 24225 56th Avenue West;
- **Drake Property:** 24309 56th Avenue West; and
- **56th Avenue West Right-of-Way (ROW):** adjacent to the three properties identified above.

The groundwater monitoring scope of work defined in the IRAWP encompasses the four properties identified above as the "TOC Site" as well as the following two adjacent properties:

- **Shin/Choi Property:** 24325 56th Avenue West (south of the TOC Site) and
- **242nd Street Southwest ROW:** adjacent to the TOC Property (north of the TOC Site).

Following completion of the IRAWP, monitoring wells were also installed on the following property between June 2013 and June 2015:

- **Herman Property:** 24311 56th Avenue West (directly south of the TOC Site).

Groundwater monitoring is conducted to monitor and evaluate the performance and efficacy of three multi-phase extraction (MPE) remediation systems (described in **Sections 2.0 and 5.0**) located on the TOC Site and their effect on groundwater quality.

Initially, the scope of work defined in the IRAWP for the annual groundwater monitoring event included measuring depth-to-groundwater/depth-to-product (DTW/DTP) levels and collecting groundwater samples from 81 active monitoring and remediation wells located on five properties (TOC, TOC/Farmasonis, Drake, and the 56th Avenue and 242nd Street ROWs). The IRAWP scope of work for the annual event did not include monitoring of the four wells located on the Shin/Choi Property (south of the TOC Site) and the four decommissioned wells (SES 2011).

The scope of work defined in the IRAWP for the quarterly groundwater monitoring events included collecting DTW/DTP level measurements for all active monitoring and remediation wells (excluding monitoring wells located on the Shin/Choi Property and MW75 located in the 56th Ave ROW) and collecting groundwater samples from 31 active wells installed on the TOC Site. Following completion of the IRAWP in 2011, one of the wells scheduled for quarterly sampling (MW21 located on the TOC Property) was decommissioned in 2012. Therefore, 30 active wells were selected for quarterly sampling.

Following completion of the IRAWP in July 2011, two additional monitoring wells were decommissioned and 18 new monitoring and remediation wells were installed at the locations identified in the table below.

Newly Installed Monitoring & Remediation Wells

Property Name	Well ID		
	Newly Installed Wells [1]		Decommissioned Wells
TOC	• MW90 (4" RW)	• MW91 (4" RW)	• MW21
TOC/Farmasonis	• MW92 (4" RW) • MW93 (4" RW)	• MW94 (4" RW) • MW100	• MW83
Drake	• MW95 (4" RW) • MW96 (4" RW) • MW97 (4" RW)	• MW98 (4" RW) • MW99 (4" RW) • MW101 (4" RW)	*None*
Herman	• MW102 • MW103 • MW104	• MW105 • MW106 • MW107	*None*

Notes:
[1] *Remediation wells (identified as "RW") are either 2 or 4 inches in diameter.*

At the time of the 2015 annual field event, 103 active monitoring and remediation wells were located on seven properties (the TOC, TOC/Farmasonis, Drake, Shin/Choi and Herman properties and the 56th Avenue and 242nd Street ROWs) and six wells have been decommissioned.

Following installation of the new wells on the TOC Site and Herman Property, the scope of work defined in the IRAWP was revised by Stantec for the annual and quarterly groundwater level measurement events to collect a more comprehensive data set in areas where additional data needs were identified. In addition to measuring DTW/DTP levels in the 77 wells identified in the IRAWP, the updated scope of work includes measuring DTW/DTP levels in the 12 new wells installed on the TOC Site during annual and quarterly field events and measuring DTW/DTP levels in the six new wells installed on the Herman Property during the annual field event only.

In addition to sampling the wells identified in the IRAWP, the groundwater sampling scope of work was revised by Stantec for the annual field event to include sampling of all 18 newly installed wells as well as the four wells located Shin/Choi Property for a total of 101 total wells. The wells located on the Shin/Choi Property are included in the annual event scope of work for the purpose of obtaining additional information regarding contaminant distribution. The groundwater sampling scope of work for the quarterly field events did not change.

1.2 2015 Annual Event Groundwater Monitoring Activities

This report presents a description of groundwater monitoring activities performed by Stantec for the 2015 annual event from March 11 to 20, 2015 and an evaluation of the field data and analytical results. Groundwater monitoring activities included collecting DTW/DTP level measurements and groundwater samples in accordance with the IRAWP and the modifications as described above. In addition to sampling the required wells, Stantec also collected samples from three of the four wells located on the Shin/Choi Property (MW72, MW73 and MW74) for the purpose of obtaining additional information regarding contaminant distribution but did not collect a groundwater sample from MW71 due to the presence of LNAPL in the well.

Sections 6.0 and 7.0 describe the groundwater monitoring scope of work and methodology and groundwater quality results for the 2015 annual event. **Section 8.0** describes the overall groundwater flow characteristics and groundwater contaminant and distribution trends.

2.0 DESCRIPTION & BACKGROUND

2.1 Description of TOC Site

As described in **Section 1.0,** the TOC Site is located in the City of Mountlake Terrace in Snohomish County, Washington (**Figure 1**), and encompasses three adjacent properties and a portion of the 56th Avenue West ROW (**Figure 2**). The TOC Site is located in a mixed residential and commercial area and surface topography slopes gently toward the south. The TOC Site is bordered by 242nd Street Southwest and commercial properties to the north; by residential properties to the east and west; and by the Herman Property and then vacant Mountlake Senior Property to the south. A description of each property included within the TOC Site is provided below.

- **TOC Property:** The vacant TOC Property consists of vegetated land with the exception of an asphalt area and graveled and fenced area housing a MPE remediation system (described in **Section 5.0**).
- **TOC/Farmasonis Property:** The TOC/Farmasonis Property consists of one commercial building (previously operating as a restaurant and currently vacant), an asphalt parking area, vegetated land, and a graveled and fenced area housing two MPE remediation systems (described in **Section 5.0**).
- **Drake Property:** The Drake Property consists of one commercial building (currently occupied by Getaway Tavern) and asphalt and gravel parking areas.
- **56th Avenue West ROW:** The portion of the 56th Avenue ROW included in the TOC Site borders the TOC, TOC/Farmasonis and Drake properties directly to the west.

2.2 Description of Adjacent Properties

In addition to the TOC Site, the scope of work (described in **Section 1.0**) includes a portion of the 242nd Street ROW (located directly north of the TOC Site) and two properties (the Herman and Shin/Choi properties) located directly south of the TOC Site. As shown on **Figure 2**, the Herman Property is bordered by the TOC Site to the north, and the Shin/Choi Property is directly south of the Herman Property. The Snohomish County boundary (located south of the Shin/Choi Property) is defined by 244th Street and the King County boundary is defined by 205th Street.

A description of the properties adjacent to the TOC Site and included in the current scope of work for groundwater monitoring is provided below.

- **Herman Property:** The Herman Property consists of one commercial building (occupied by Dave's Auto Service), an asphalt parking area and vegetated land.
- **Shin/Choi Property:** The Shin/Choi Property consists of one building (occupied by the EZ Corner Mart) and an asphalt parking area.
- **242nd Street Southwest ROW:** The portion of the 242nd Avenue ROW included in the scope of work is adjacent to the north boundary of the TOC Property.

2.3 Site Background

TOC operated a retail gasoline station on the TOC Property between 1968 and 1990. The facility included three underground storage tanks (USTs), six fuel dispensers and associated product delivery lines. One 8,000-gallon and two 6,000-gallon USTs and ancillary equipment were removed from the TOC Property in 1991 and petroleum constituents including gasoline-range petroleum hydrocarbons (GRPH), benzene, and total xylenes were observed in soil and groundwater in excess of the applicable Model Toxics Control Act (MTCA) Method A Cleanup Levels (Ecology 2007). Between 1992 and March 2015, site investigations were conducted to determine the extent of petroleum contamination and 107 monitoring and remediation wells (six of which have been decommissioned) were installed in three groundwater zones (defined as Shallow, Intermediate, and Deep and further described in **Section 4.0**) on the TOC Site and three adjacent properties (described in **Sections 2.1 and 2.2**).

In 1996, a dual-phase extraction (DPE) remediation system was installed at the TOC Property to remediate Shallow Zone groundwater impacted by petroleum hydrocarbons and remove LNAPL. The DPE system operated from February 1997 to June 2005 and was later removed following confirmation that the system effectively remediated Shallow Zone groundwater (SES 2013). In 2006, groundwater monitoring results collected by SES confirmed gasoline-related contamination extended directly downgradient of the TOC Property to the south and west.

In accordance with the AO, a remedial investigation (RI) was initiated at the TOC Site (SES 2013) and three MPE remediation systems (further discussed in **Section 5.0**) were installed between November 2011 and August 2012 to remediate residual petroleum-contaminated groundwater, soil vapor and LNAPL (if present) in the Intermediate Zone beneath and downgradient of the TOC Site. As shown on **Figure 3**, the MPE remediation systems are located within fenced enclosures on the TOC Property and TOC/Farmasonis Property and are served by remediation wells installed on the TOC, TOC/Farmasonis and Drake properties.

Available information regarding historical operations on the TOC/Farmasonis and Drake properties do not indicate the presence of USTs. Historical operations on the downgradient Herman and Shin/Choi properties indicate three USTs were removed from the Shin/Choi Property in 1991 and two USTs were removed from the Herman Property in 2001; however five additional USTs may still exist on the Herman Property. Available information on the locations of historical or current USTs and associated equipment downgradient properties is shown on **Figure 3.**

3.0 GEOLOGIC FRAMEWORK

The TOC Site is situated on the glacial upland plateau between Seattle and Everett, Washington, known as the Intercity Plateau (SES 2013). The regional geology of the TOC Site area consists of Pleistocene-age glacial till locally overlain by pockets of glacial recessional outwash sand.

The recessional outwash sand, which ranges in thickness from approximately 25 to 300 feet, is generally loose to medium dense sand and gravel with little or no fines, and may include ice contact deposits and ablation till. The glacial till, which represents the ground moraine of the Vashon glaciations, ranges from a few feet to over 50 feet thick and consists of dense to very dense gravelly, sandy silt to silty sand with variable amounts of clay, cobbles, and boulders. Groundwater is perched above and within the glacial till layer. Bedrock underlying the area consists of Tertiary sediment rocks (sandstone, shale, or conglomerate) over 900 feet deep beneath the TOC Site; therefore, bedrock is not relevant for the TOC Site characterization.

Based on the results of previous investigations conducted between 1991 and 2013, subsurface soil beneath the TOC Site consists primarily of local anthropogenic fill overlying Vashon-age glacial deposits. As reported in the *Draft RI Report* (SES 2013), the subsurface soil beneath the TOC Site is interpreted to consist of the following geologic units, from youngest to oldest: artificial (anthropogenic) fill, Vashon recessional outwash deposits, Vashon glacial till and Vashon outwash deposits.

4.0 HYDROGEOLOGIC FRAMEWORK

In the *Draft RI Report* (SES 2013), three separate groundwater zones were identified at the TOC Site, based on the lithology, well screen intervals and groundwater level measurements. Stantec evaluated the data as part of updates and revisions to the Conceptual Site Model (CSM), as required by Ecology, based on comments provided to SES from Ecology on the *Draft RI Report* (Ecology 2014). The results of the revised CSM will be provided to Ecology in a separate deliverable and will be incorporated into the final RI report prepared by Stantec.

Stantec agrees that three groundwater zones can be identified at the TOC Site; however, these zones do not appear to be separate, but are interconnected, as evidenced by the geology, groundwater elevations and contaminant distribution data. Also, the groundwater zones do not appear to be separated by distinct confining units defined by lower permeability lithology. Stantec's conceptualization of the hydrogeology is based on geologic field interpretations (e.g., boring logs) provided by SES and other consultants that previously managed the project, but will be supplemented by future investigations. Based on evaluation of the available data by Stantec, the three groundwater zones are defined in the following sections.

4.1 Shallow Water-Bearing Zone (Shallow Zone)

The Shallow Zone is a perched zone in the artificial fill or upper portion of the glacial till, at depths between approximately 5 to 20 feet below ground surface (bgs) throughout the TOC Site, depending on seasonal fluctuations of the water table. The saturation in these horizons can be seasonally discontinuous, as evidenced by some monitoring wells that are seasonally dry (e.g., MW04 during the December 2012 event), while other Shallow Zone wells monitored during the same season contain water. The primary source of recharge to the Shallow Zone is infiltration of natural precipitation through emplaced fill and native soil in unpaved areas. Other potential sources of recharge to the Shallow Zone reportedly included a former topographically closed depression, where surface runoff previously ponded, and a former stormwater infiltration pit, both of which were located in the southeast portion of the TOC Property (**Figure 3**). According to a 1975 TOC blueprint, the stormwater infiltration pit is located in proximity to MW18 and MW33; measures 10 feet square by 4 feet deep; and was backfilled with coarse gravel (Time Oil Co. 1975). Surface runoff intercepted by a catch basin located near the southeast corner of the paved asphalt area formerly discharged into the stormwater infiltration pit via a 6-inch-diameter drain pipe, which has been capped. Stantec was unable to confirm the location of the closed depression or the stormwater infiltration pit on the TOC Property during March 2014 site work.

4.2 Intermediate Water-Bearing Zone (Intermediate Zone)

The Intermediate Zone is an unconfined groundwater zone that is observed at depths between approximately 20 and 60 feet bgs. As reported by SES (2013), this zone consists of glacial till deposits between approximately 20 and 40 feet bgs and discontinuous sand and/or gravel-rich glacial deposits within the lower portion of the glacial till between approximately 40 and 60 feet bgs. As discussed further in **Section 7.1**, groundwater elevations in the Intermediate Zone of the TOC Property appear to be mounded such that the upper boundary of the Intermediate Zone appears closer to the base of the Shallow Zone in the vicinity of the UST excavation fill area and former stormwater infiltration pit. Explanations for the observed groundwater mounding are likely related to artificial recharge within the backfill of the former UST cavity, depression, and infiltration pit; the presence of low permeability deposits near the downgradient edge of the property; and/or from localized influence of the vacuum from the soil vapor extraction (SVE) system for the remediation system located on the TOC Property (see **Section 5.0**). The low permeability deposits in the upper portion of the intermediate groundwater bearing zone impede the vertical percolation of water into the deeper groundwater zones and decrease the horizontal flux of the groundwater in the immediate vicinity. The prevalence of low permeability deposits correlates with the location of steeper horizontal hydraulic gradients in this area (see **Section 7.1**). In downgradient areas where the Intermediate Zone consists primarily of higher permeability units (i.e., sands and gravels), the thickness of unsaturated materials and the distance between the Shallow and Intermediate Zones increase. The higher permeability deposits contribute to a flattening of the horizontal hydraulic gradient. The Intermediate Zone appears to receive recharge from natural precipitation via the Shallow Zone. A comparison of groundwater elevations and analytical data suggests that the Intermediate Zone is considered to be the current primary contaminant transport pathway at the TOC Site.

4.3 Deep Water-Bearing Zone (Deep Zone)

The Deep Zone consists of glacial sand and gravel located at depths greater than 60 feet bgs, based on deep well screen intervals. Within the vicinity of the artificial recharge area on the TOC Property, the groundwater elevation data indicate that downward vertical gradients appear to exist between all three zones. In downgradient areas, the groundwater elevation data suggest that vertical gradients shift from downward (between the Shallow and Intermediate Zones) to neutral or slightly upward (between the Intermediate and Deep Zones). Based on these observations and the presence of fully saturated well screens, these groundwater level conditions could be a reflection of a higher permeability zone at the base of a single groundwater unit that includes both the Intermediate and Deep Zones or could represent semi-confined conditions in a separate, but interconnected groundwater zone; however, the presence of a low permeability confining unit between the two zones is not obvious in the available data. The presence of upward vertical gradients between the Deep and Intermediate Zones appear to be effective in inhibiting downward migration of contamination in downgradient areas and effectively bounding the extent of vertical contamination.

4.4 Well Screen Intervals Intersecting Multiple Water-Bearing Zones

Additionally, based on evaluation of available SES data by Stantec, 16 wells (one of which was decommissioned) appear to have screen intervals that intersect multiple groundwater zones (either Shallow and Intermediate Zones, or Intermediate and Deep Zones) and may not represent the individual hydrogeological conditions of either zone. Because shallow zone contamination in the area where these wells are located has been remediated, there is no potential for cross-contamination between groundwater zones. For discussion purposes, monitoring and remediation wells are placed into five categories based on well screen intervals and intersected groundwater zones, including: 1) Shallow Zone; 2) Intermediate Zone; 3) Deep Zone; 4) Wells intersecting Shallow-Intermediate Zones; and 5) Well intersecting Intermediate-Deep Zones. These five categories are defined in **Section 7.0**.

5.0 REMEDIATION SYSTEM STATUS

In accordance with the AO, three MPE remediation systems were installed between November 2011 and August 2012 to remediate residual petroleum-contaminated groundwater, soil vapor and LNAPL (if present) in the Intermediate Zone beneath and downgradient of the TOC Site. As shown on **Figure 3**, the MPE remediation systems are located within fenced enclosures on the TOC Property and TOC/Farmasonis Property and are served by remediation wells installed on the TOC, TOC/Farmasonis and Drake properties.

At the time of the 2015 annual field event, 22 of 23 remediation wells were actively serving the MPE remediation systems. The table below identifies the remediation wells connected to each system and their location. Operation of all three MPE remediation systems is ongoing.

<u>Wells Serving MPE Remediation Systems</u>

System ID	System Location	Remediation Well ID	Remediation Well Location
Unit 1	TOC Property	• MW11 • MW15* • MW18 • MW24 • MW27 • MW29 • MW32 • MW90 • MW91	TOC Property
Unit 2	TOC/Farmasonis Property	• MW31 • MW41 • MW57 • MW92 • MW93 • MW94	TOC/Farmasonis Property
Unit 3	TOC/Farmasonis Property	• MW69 • MW70 • MW95 • MW96 • MW97 • MW98 • MW99 • MW101	Drake Property

<u>Notes:</u>
**MW15 was operating as a remediation well at the time of the 2Q2014 field event. Due to the consistent presence of biological buildup in the well, the remediation pump was removed on December 16, 2014 and MW15 is currently operating as a monitoring well.*

During the past year (from 2Q2014 through 1Q2015) the MPE remediation systems have operated nearly continuously with the exception of maintenance for the blower at Unit 2. However, groundwater extraction and treatment at Unit 2 continued during vapor extraction down-time associated with blower maintenance. A summary of performance activities is provided below. Additional information describing the performance of the MPE remediation systems is provided in the *Operation and Maintenance Report, First Quarter 2015* (Stantec 2015).

- From 2Q2014 through 1Q2015, a combined total of 260.4 pounds of vapor-phase hydrocarbons were removed from Units 1, 2 and 3. As of 1Q2015, a cumulative total of approximately 3,050 pounds of vapor-phase hydrocarbons have been removed since startup of the three MPE systems in October 2012.
- From 2Q2014 through 1Q2015, a combined total volume of approximately 1.63 million gallons of groundwater was extracted, treated and discharged from Units 1, 2 and 3. As of 1Q2015, the total volume of water processed since startup of the three MPE systems in October 2012 is approximately 2.87 million gallons.

Generally, there are reductions in groundwater concentrations in areas influenced by the remediation system. In some monitoring wells (e.g., MW27 & MW48) an increase in some contaminant concentrations was observed for the 1Q2015 (see Sections 7.2.2 and 8.3), with this likely attributed to high seasonal groundwater. Overall, the reduction in groundwater concentrations (over time) can likely be attributed to operation of the three MPE remediation systems.

Stantec conducted a comparison of groundwater elevations measured during system operation with those measured during system shut-down in the vicinity of MW48 located on the Drake Property where GRPH and benzene concentrations continue to be elevated above MTCA Method A levels, as shown in the table below.

Groundwater Elevations for Selected Wells

Well ID	Groundwater Elevation (feet)		Notes/Observations
	System Off	System On	
MW44	Dry	Dry	Unable to measure DTW due to insufficient groundwater level.
MW45	318.42	318.38	
MW48	314.75	313.96	trace (<0.01) product in well
MW49	314.98	314.31	
MW57	314.74	Dry	
MW63	314.40	313.71	
MW96 (4” RW)	314.78	317.49	

The purpose of the comparison was to evaluate whether the active remediation wells located in the vicinity of MW48 (MW57 and MW96) were adequately lowering the groundwater elevations in this area so that remediation was progressing. To better facilitate lowering of groundwater elevations in this area, bottom-loading extraction pumps were also installed in these remediation wells in February 2015. The evaluation indicated that groundwater levels decreased at MW48 during this measurement event by about 0.8 feet during pumping in comparison to 2.7 feet at the downgradient remediation well (MW96). These data and the data from the other wells in the vicinity (see table above) indicate that contamination migration near MW48 is being adequately contained. As presented in **Section 8.3.2**, the concentration of GRPH in well MW48 decreased to 12,000 µg/L in March 2015 from 33,000 µg/L in March 2014, indicating that the remediation system appears to be successful in reducing concentrations in this area; however, concentrations at this location have been variable over time. Success of the remediation system at this location will continue to be assessed during future monitoring events.

6.0 GROUNDWATER MONITORING SCOPE OF WORK & METHODOLOGY

The 2015 annual groundwater monitoring event was conducted by Stantec from March 11 to 20, 2015. The sections below summarize the monitoring locations, field methods and protocols used by Stantec and any deviations from the scope of work defined in the IRAWP (described in **Section 1.1**). Additional information regarding field and laboratory methodology is provided in the *Groundwater Monitoring Plan* provided as **Appendix A**.

6.1 Depth-to-Groundwater/Depth-to-Product Level Measurements

Stantec measured DTW/DTP levels while the remediation systems were off on March 17, 2015 for the active monitoring and remediation wells located on the TOC Site and adjacent properties. The measurements were collected after turning off the remediation systems for 5 days and allowing groundwater levels to equilibrate. Stantec also measured DTW/DTP levels for several wells located in the Intermediate Zone (MW44, MW45, MW48, MW49, MW57, MW63 and MW96) while the remediation systems were operating to assess how pumping was influencing groundwater flow and to assess performance of the remediation systems (see **Section 5.0**). Groundwater levels were permitted to equilibrate with atmospheric pressure prior to recording the measurements.

Stantec measured DTW/DTP levels relative to the top of the well casings to an accuracy of 0.01 feet using an electronic water level meter. Where LNAPL was previously observed or expected to occur, an oil/water interface probe was used to check for the presence of LNAPL and measure the DTW. When more than one water level meter is selected for a field event, Stantec collects a baseline measurement using each instrument at one well location to check for consistency between the instruments. Any differences between measurements were then used to calibrate the instruments and correct the groundwater elevations, if necessary.

As shown on **Table 1-1,** 89 wells were successfully gauged for DTW/DTP levels during the annual 2015 annual event. The wells identified in the table below were included in the annual groundwater monitoring event scope of work but could not be gauged due to insufficient groundwater in monitoring wells or because the top of pump was encountered in remediation wells at a depth above the groundwater level and access past the pump was not possible.

Wells not Gauged during Field Event

Well ID*	Property	Well ID*	Property	Well ID*	Property
MW13	56th Ave ROW	**MW31 (2" RW)**	TOC/Farmasonis	**MW44**	56th Ave ROW
MW18 (4" RW)	TOC	**MW35**	TOC	**MW70 (2" RW)**	Drake
MW27 (2" RW)	TOC	**MW41 (2" RW)**	TOC/Farmasonis	**MW94 (4" RW)**	TOC/Farmasonis
MW29 (2" RW)	TOC	**MW42**	TOC/Farmasonis	**MW99 (4" RW)**	Drake

Notes:
**Remediation wells (identified as "RW") are 2 or 4 inches in diameter. 2-inch remediation wells with groundwater levels below the pump could not be gauged because the diameter of water probe was too large to fit past the pump tubing.*

DTW/DTP level and groundwater elevation results are presented in **Section 7.1**.

6.2 Groundwater Sample Collection

Stantec attempted to collect groundwater samples from the locations selected for the annual monitoring event (see **Section 1.1**) between March 11 and 20, 2015. Of the 97 active wells scheduled for sampling at the time of the 2015 annual event, 15 could not be sampled due to insufficient groundwater sample volume and one well (MW102 on the Herman Property) was not sampled due to the presence of LNAPL in the well. Wells that could not be sampled due to insufficient groundwater volume are identified in the table below.

In addition to the 97 wells scheduled for sampling, Stantec also scheduled sampling of the four wells located on the Shin/Choi Property for the purpose of obtaining additional contaminant distribution information. One of these wells (MW71) was not sampled due to the presence of LNAPL in the well.

Wells not Sampled during Field Event (due to insufficient groundwater volume)

Sample Location/ Well ID*	Property	Sample Location/ Well ID*	Property	Sample Location/ Well ID*	Property
MW13	56th Ave ROW	**MW33**	TOC	**MW44**	56th Ave ROW
MW15 (4" RW)	TOC	**MW35**	TOC	**MW45**	56th Ave ROW
MW18 (4" RW)	TOC	**MW36**	TOC	**MW46**	56th Ave ROW
MW23	TOC	**MW41 (2" RW)**	TOC/Farmasonis	**MW47**	56th Ave ROW
MW31 (2" RW)	TOC/Farmasonis	**MW42**	56th Ave ROW	**MW94 (4" RW)**	TOC/Farmasonis
Notes: *Remediation wells (identified as "RW") are 2 or 4 inches in diameter.*					

Groundwater quality results are presented in **Section 7.0**. LNAPL samples were not collected during the 2015 annual event and measurable LNAPL was not present in wells located on the TOC Site. Only wells located on the Herman and Shin/Choi properties (MW102 and MW71, respectively) contained LNAPL.

6.2.1 Groundwater Sampling Methods & Procedures

The groundwater sampling methods used by Stantec for the 2015 annual event are identified below. The sampling method used to collect each sample is identified on **Tables 2-1 through 6-2**.

- **Pneumatic Pump:** For wells connected to a MPE remediation system, Stantec collected groundwater samples using a dedicated downhole pneumatic pump. The pneumatic pumps deliver a pulse of groundwater to the wellhead whenever the groundwater table rises above the pump intake. One set of field parameters was collected from the pneumatic pumps for the remediation wells sampled. Groundwater samples were collected from the pneumatic pump directly into laboratory-prepared sample containers using disposable polyethylene tubing.
- **Peristaltic Pump:** Stantec collected groundwater samples using a peristaltic pump in accordance with low-flow protocols (EPA 1996) for monitoring wells with DTW levels less than 31 feet bgs, (due to the inability of the pump to lift the water for sampling from greater depths). Purging and sampling with a peristaltic pump was performed using disposable polyethylene tubing dedicated to each well at flow rates of 0.1 liters per minute.

- **Submersible Pump:** For monitoring wells with DTW levels greater than 31 feet bgs (in which a peristaltic pump could not be used), Stantec collected samples using a submersible pump in accordance with low-flow protocols (EPA 2010). Submersible pumps were used in wells that had insufficient groundwater recharge rates and/or insufficient water column heights. Purging and sampling with a submersible pump was performed using disposable polyethylene tubing at flow rates ranging from 0.1 to 0.5 liters per minute. If the water table was above the top of the screen and, hence, the well screen was saturated, the intake tubing of the submersible pump was placed approximately in the middle of the screen. If however the groundwater table was below the top of the screen and, hence, the well screen was not fully-saturated, the intake tubing of the submersible pump was placed near the middle of the water column in the well.
- **Bailer:** For monitoring wells with DTW levels greater than 31 feet bgs that could not be sampled using a submersible pump, a disposable polyethylene bailer was used in accordance with low-flow protocols (EPA 1996). The bailer sampling method was the last selected method and was only used under the following circumstances:
    - Historical analytical results indicated that elevated turbidity associated with bailing likely would not result in detectable concentrations of petroleum hydrocarbons in groundwater samples.
    - Historical water columns are less than five feet and recharge makes sampling with a submersible pump problematic.

  Well purging and groundwater sampling with disposable bailers required the removal of at least three well volumes from each monitoring well prior to sampling. Upon removal of at least three well volumes of groundwater, water samples were collected from the bailer directly into laboratory-prepared sample containers. If purging of three well volumes from the well was not possible due to slow recharge, the wells were allowed to recharge several hours or overnight before samples were collected.
- **QA/QC Sampling Methods:** Stantec collected blind field duplicate samples from seven locations (MW02, MW09, MW20, MW28, MW65, MW86 and MW104). The duplicate was collected by the same sampling method used to collect the primary sample. The results of the QA/QC samples are discussed in **Section 6.4**.

When purging and sampling in accordance with low-flow protocols (EPA 2010), Stantec monitored groundwater field parameters using a YSI Inc. water quality field meter equipped with a flow-through cell (except when sampling groundwater using a bailer). Field parameters, including temperature, pH, specific conductance, dissolved oxygen, turbidity, and oxidation-reduction potential were monitored and recorded.

Following purging and stabilization of the field parameters, groundwater samples were collected from the pump outlet tubing located upstream of the flow-through cell and placed directly into laboratory-prepared sample containers. Purge water generated during this sampling event was placed in labeled 55-gallon steel drums and temporarily stored on the TOC Property for transfer to the remediation systems for treatment and permitted discharge to the sanitary sewer.

Each set of sample containers was labeled with a unique sample identification number, placed on ice in a cooler and transported to licensed analytical laboratory, Friedman & Bruya, Inc. (Friedman & Bruya) located in Seattle, under standard chain-of-custody protocols for laboratory analysis.

6.3 Laboratory Analyses

6.3.1 Groundwater Samples

The types of laboratory analyses performed by Friedman & Bruya for groundwater samples collected during the quarterly field event are identified in the table below. The data were validated by Stantec and, in some cases, qualifiers were assigned. Results are reported between the method detection limits (MDLs) and the method reporting limits (MRLs) for all data packages. These results are typically reported as "not detected" when below the MRLs. In cases where the MRLs were not below MTCA Method A Cleanup Levels for groundwater, the results between the MDL and MRL are reported, but are considered estimates that are used for informational purposes only.

Laboratory Analyses for Groundwater Samples

Hazardous Substance	Method of Analysis	Sample Location / Well ID
Gasoline-Range Petroleum Hydrocarbons (GRPH)	NWTPH-Gx	*Analyses performed for all groundwater samples collected during field event.*
Oil-Range Petroleum Hydrocarbons (ORPH)	NWTPH-Dx	• MW20 • MW73 • MW91 • MW105 • MW66 • MW74 • MW103 • MW106 • MW72 • MW86 • MW104 • MW107
Diesel-Range Petroleum Hydrocarbons (DRPH)	NWTPH-Dx	*Samples collected from locations listed for ORPH analyses were also analyzed for DRPH.*
Benzene, Toluene, Ethylbenzene, & Total Xylenes (BTEX)	EPA Method 8021B or EPA Method 8260C	*Analyses performed for all groundwater samples collected during field event.*
Methyl Tertiary-Butyl Ether (MTBE)	EPA Method 8260C	• MW20 • MW73 • MW87 • MW99 • MW65 • MW74 • MW88 • MW101 • MW66 • MW76 • MW89 • MW103 • MW67 • MW77 • MW91 • MW104 • MW68 • MW78 • MW95 • MW105 • MW69 • MW84 • MW96 • MW106 • MW70 • MW85 • MW97 • MW107 • MW72 • MW86 • MW98
1,2-Dicholoroethane/ Ethylene Dichloride (EDC)	EPA Method 8260C	• MW72 • MW86 • MW104 • MW106 • MW73 • MW103 • MW105 • MW107 • MW74
1,2-Dibromoethane/ Ethylene Dibromide (EDB)	EPA Method 8011M	*See list provided for EDC analysis.*
Lead (total & dissolved)	EPA Method 200.8	• MW32 • MW74 • MW101 • MW106 • MW48 • MW86 • MW103 • MW107 • MW72 • MW90 • MW104 • MW73 • MW91 • MW105

6.4 QA/QC Sampling Methods & Data Quality Review

The scope of work for all groundwater monitoring events included collection and laboratory analyses of groundwater samples for QA/QC purposes. QA/QC samples collected for the 2015 annual groundwater monitoring event are described below. Analytical laboratory reports are provided as **Appendix B.**

- **Field Blank Samples:** Field blank samples collected during this event are described in the table below.

Sample Type	Sample ID	Description
Water Blank	▪ WB-031815	One water blank was collected from clean water used to rinse and decontaminate field equipment.
Equipment/Rinsate Blanks	▪ EB-031315 ▪ EB-031415 ▪ EB-031615 ▪ EB-031815 ▪ EB-031915 ▪ EB-032015	Equipment/rinsate blanks were collected from water poured through submersible pumps.

- **Field Duplicates:** Blind field duplicate samples were collected using the same sampling equipment methods from the locations identified in the table below.

Sample Location/Well ID	Sampling Method	Primary Sample ID	Duplicate Sample ID
MW02 (TOC Property)	Peristaltic Pump	MW02	MLT-01
MW09 (TOC Property)	Peristaltic Pump	MW09	MLT-02
MW20 (TOC Property)	Submersible Pump	MW20	MLT-03
MW28 (TOC)	Submersible Pump	MW28	MLT-04
MW65 (Drake Property)	Submersible Pump	MW65	MLT-05
MW86 (Drake Property)	Submersible Pump	MW86	MLT-06
MW104 (Herman Property)	Peristaltic Pump	MW104	MLT-07

7.0 GROUNDWATER MONITORING RESULTS

Groundwater monitoring results for the 2015 annual groundwater monitoring event are organized by monitoring well categories based on groundwater zone, well screen intervals, and intersected groundwater zones (see discussion in **Section 4.0**). The five monitoring well categories include:

1. Shallow Zone Wells,
2. Intermediate Zone Wells,
3. Deep Zone Wells,
4. Shallow-Intermediate Zone Intersect Wells, and
5. Intermediate-Deep Zone Intersect Wells.

7.1 Groundwater Elevations

Groundwater elevations based on DTW/DTP data collected during the 2015 annual event were contoured by Stantec and used to identify groundwater flow direction and hydraulic gradients (**Figures 4 through 6**). The DTW/DTP level measurements and groundwater elevations are summarized in the following sections and provided on **Table 1-1**.

The groundwater elevations provided on **Table 1-1** are based on a survey performed by PACE Engineers, Inc. (PACE) in April and May 2014. It should be noted that DTW/DTP level measurements were collected by Stantec when the remediation systems were turned off to better represent baseline (i.e., non-pumping) groundwater flow patterns. The systems were turned off on March 12, 2015, and groundwater levels were allowed to recharge for several days prior to the DTW/DTP measurement event on March 17, 2015. As mentioned in **Section 6.1**, Stantec also measured DTW/DTP levels at selected wells while the remediation systems were operating for comparison of groundwater conditions during pumping and non-pumping periods.

DTW level measurements during non-pumping conditions ranged from 8.88 feet bgs for MW61 (located within the 56th Avenue ROW in the Shallow Zone) to 45.77 feet bgs for MW26 (located on the TOC Property in the Deep Zone). Measurable LNAPL was observed in MW71 (located on the Shin/Choi Property) and MW102 (located on the Herman Property) and is discussed in **Section 8.5**.

As discussed in **Section 4.0**, the groundwater zones at the TOC Site appear to be interconnected. Within and in the vicinity of the artificial recharge area on the TOC Property, the groundwater elevation data indicate that downward vertical gradients appear to exist between all three zones, as shown on **Figure 7** for wells MW62 (Shallow Zone), wells MW20 and MW32 (Intermediate Zone) and MW53 (Deep Zone). Downgradient of this area, the groundwater elevation data appear to indicate that the downward vertical gradient increases between the shallow and intermediate zones, but shifts to a slightly upward gradient between the intermediate and deep zones, as shown on **Figure 8.** Groundwater elevations between the intermediate and deep zones are similar, but the deep zone elevations are typically slightly elevated above the intermediate zone. The presence of upward vertical gradients between the deep and intermediate zones downgradient of the TOC Property appear to be effective in inhibiting downward vertical flow of groundwater and migration of contamination in downgradient areas and effectively bounding the extent of vertical contamination.

A summary of groundwater elevations for each well network is provided in the following sections.

7.1.1 Shallow Zone

Consistent with groundwater elevation data collected during previous events, groundwater flow in the Shallow Zone appears to be predominantly to the south-southeast, as shown on **Figure 4**. A relatively consistent horizontal hydraulic gradient ranging from approximately 0.02 to 0.05 feet/feet is present across the southern portion of the TOC Site (i.e., TOC/Farmasonis and Drake Properties); however, in the northern area of the TOC Site (in the southern portion of the TOC Property), steepening of the gradient to about 0.1 feet/feet occurs. As discussed in **Section 4.1**, this steepening could be related to increased infiltration in this area through emplaced fill from the UST excavation or from the former topographically closed depression, where surface runoff previously ponded, and the former stormwater infiltration pit.

7.1.2 Intermediate Zone

Similar to the Shallow Zone, groundwater flow in the Intermediate Zone appears to be generally to the south-southeast based on previous groundwater elevations and those measured during this field event, as shown on **Figure 5**. Horizontal hydraulic gradients ranging from approximately 0.05 to 0.8 feet/feet occur across the TOC Site. As discussed in **Section 4.2** and shown on **Figure 5**, steepening in the slope of the horizontal gradient is apparent in the vicinity of the TOC Property's southern boundary and is thought to be related to mounding of groundwater in the area of the TOC Property. This mounding could reflect the combined influences of the following: artificial recharge associated with emplaced fill in the former UST area and stormwater infiltration pit and depression; and/or the apparent presence of low permeability material restricting groundwater flow in that area. Also, localized mounding effects appear to be present in direct vicinity to some of the remediation wells (MW15, MW32 and MW91), likely associated with vacuum effects from the SVE components of the remediation systems. As groundwater moves downgradient and encounters higher permeability layers (e.g., gravels and sands), the horizontal hydraulic gradient flattens significantly as is evident from the potentiometric surface on **Figure 5**. The areas of depressed groundwater elevations on the TOC/Farmasonis Property and Drake Property at MW96 are likely related to influence of the remediation systems (Units 2 and 3, respectively) when operating.

7.1.3 Deep Zone

Groundwater flow in the Deep Zone appears to be generally to the southeast based on groundwater elevations measured during previous events and this field event, as shown on **Figure 6**. The horizontal hydraulic gradient is relatively flat at an average of approximately 0.006 feet/feet likely because the wells are screened in high permeability material.

7.1.4 Well Screens Intersecting Multiple Zones

As previously mentioned, the well screens in 16 monitoring and remediation wells appear to intersect conditions of multiple groundwater zones. Since the groundwater level elevations for these wells do not correlate with a single groundwater zone, they appear anomalous when included with groundwater elevations representing a single groundwater zone, as shown on **Figure 5**; therefore, the data from these wells were not used for groundwater contouring. The groundwater elevation data collected from the wells intersecting two groundwater zones are described below.

7.1.4.1 Shallow-Intermediate Zone Intersect Wells

Fifteen monitoring and remediation wells appear to have screened intervals that intersect both Shallow and Intermediate Zone conditions (MW08, MW09, MW18, MW22, MW24, MW27, MW28, MW29, MW37, MW38, MW43, MW82, MW83, MW88 and MW100). Groundwater elevations for these wells are typically lower than Shallow Zone wells but higher than Intermediate Zone wells due to influence of groundwater conditions from both the Shallow and Intermediate Zones.

7.1.4.2 Intermediate-Deep Zone Intersect Wells

One monitoring well (MW16) appears to have a screened interval that intersects both Intermediate and Deep Zone conditions. The well has been dry during many sampling events but, when measured, the groundwater elevations are typically lower than other Intermediate Zone wells due to influence from the Deep Zone.

7.2 Groundwater Quality Results

Tables 2-1 through 6-2 summarize analytical results for the wells sampled during the 2015 annual field event. The types of laboratory analyses performed by Friedman & Bruya for the groundwater samples collected during the quarterly event are identified on the table in **Section 7.3** and laboratory reports are provided in **Appendix B**. As shown on the attached tables, the analytical results indicate several constituents were detected in groundwater samples at concentrations above the MRLs (i.e., detected concentrations) and above MTCA Method A Cleanup Levels.

A summary of the analytical results that exceed the MTCA Method A Cleanup Levels for each well network is provided in the following sections.

7.2.1 Shallow Zone

The Shallow Zone well network includes 20 active monitoring wells. The scope of work defined in the IRAWP for the annual field event requires groundwater sampling of all Shallow Zone wells excluding MW71 and MW72 installed on the Shin/Choi Property. However, as discussed in **Section 1.1**, Stantec collected a sample from MW72 for the purpose of obtaining additional information regarding contaminant distribution. MW71 and MW102 were not sampled due to the presence of LNAPL.

The table on the following page identifies groundwater samples exceeding MTCA Method A Cleanup Levels for Shallow Zone wells. **Tables 2-1 and 2-2** summarize the analytical results for all groundwater samples collected from Shallow Zone wells. Concentration distribution maps for GRPH and benzene in groundwater within the Shallow Zone during the annual 2015 event are provided as **Figures 9 and 10**, respectively.

Analytical Results for Groundwater Samples Exceeding Cleanup Levels (Shallow Zone Wells)

Analyte	MTCA Method A Cleanup Level (µg/L)	Sample Location/ Well ID	Property	Analytical Results (µg/L)
GRPH	**1,000 or 800 when benzene is present**	MW71 MW72 MW102 MW104**	Shin/Choi Herman	LNAPL* 130,000 LNAPL* 15,000
ORPH	**500**	MW104**	Herman	730
DRPH	**500**	MW72 MW104**	Shin/Choi Herman	15,000 11,000
Benzene	**5**	MW72	Shin/Choi	1,400
Toluene	**1,000**	MW72	Shin/Choi	15,000
Ethyl-Benzene	**700**	MW72	Shin/Choi	2,300
Total Xylenes	**1,000**	MW72 MW104**	Shin/Choi Herman	18,000 2,460
EDB	**0.01**	MW72	Shin/Choi	0.37

Notes:

*Indicates groundwater sample was not collected due to presence of LNAPL in the well. However, because LNAPL is present, GRPH concentrations are considered to exceed the MTCA Method A cleanup level.

**Indicates duplicate sample was collected for QA/QC purposes. The analytical results reflect the highest concentration of the two samples collected.

As the results from the 2015 annual event indicate, Shallow Zone groundwater at the TOC Site does not contain contaminants that exceed MTCA A Cleanup Levels. Based on historical distribution of contaminants in the Shallow Zone that indicate that shallow contamination did not extend as far south as the Drake Property, the Shallow Zone contamination that is observed on the Herman and Shin/Choi properties appears to be associated with the current or former presence of underground storage tanks (USTs) at those properties.

7.2.2 Intermediate Zone

At the time of the 2015 annual event, the Intermediate Zone monitoring well network included 60 active monitoring and remediation wells (18 of which are currently used as remediation wells). The scope of work defined in the IRAWP for the annual field event requires groundwater sampling of all Intermediate Zone wells excluding MW73 and MW74 installed on the Shin/Choi Property. However, as discussed in **Section 1.1**, Stantec collected samples from MW73 and MW74 for the purpose of obtaining additional information regarding contaminant distribution.

The table on the following page identifies groundwater samples exceeding MTCA Method A Cleanup Levels for Intermediate Zone wells. **Tables 3-1 and 3-2** summarize the analytical results for the groundwater samples collected from Intermediate Zone wells. Concentration distribution maps for benzene and GRPH in groundwater within the Intermediate Zone are provided as **Figures 11 and 12**, respectively

Analytical Results for Groundwater Samples Exceeding Cleanup Levels (Intermediate Zone Wells)

Analyte	MTCA Method A Cleanup Level (µg/L)	Sample Location/ Well ID	Property	Analytical Results (µg/L)
GRPH	**1,000 or 800 when benzene is present**	MW48 MW69 MW73 MW74 MW90	56th Ave ROW Drake Shin/Choi Shin/Choi TOC	12,000 2,700 70,000 11,000 3,100
DRPH	**500**	MW73 MW74	Shin/Choi Shin/Choi	3,100 1,100
Benzene	**5**	MW48 MW73 MW74 MW103 MW107	56th Ave ROW Shin/Choi Shin/Choi Herman Herman	120 14,000 3,100 34 8
Toluene	**1,000**	MW73	Shin/Choi	2,300
Ethyl-Benzene	**700**	MW73	Shin/Choi	1,800
Total Xylenes	**1,000**	MW48 MW73	56th Ave ROW Shin/Choi	1,900 9,300
MTBE	**20**	MW74	Shin/Choi	400
EDC	**5**	MW74	Shin/Choi	64
EDB	**0.01**	MW73 MW74	Shin/Choi Shin/Choi	0.64 0.013
Total Lead	**15**	MW32	TOC	28

As shown in the above table and on **Figures 11 and 12**, GRPH concentrations exceeding MTCA Method A Cleanup Levels are focused in the following three areas on the TOC Site:

- in the vicinity of MW90 in the northwestern corner of the TOC Property (in the historic UST excavation area);
- in the vicinity of MW48 near the western corner of the TOC/Farmasonis and Drake property line (the benzene concentration at this location also exceeds the MTCA Method A Cleanup Level); and
- in the vicinity of MW69 in the southwestern area of the Drake Property.

GRPH concentrations also exceeded MTCA A Cleanup Levels at MW73 and MW74 located on the Shin/Choi Property (**Figure 11**).

GRPH concentrations at MW103, MW105 and MW107 located on the Herman Property (immediately south of the TOC Site) and the Shin/Choi Property (immediately south of the Herman Property) were non-detect or significantly less that the MTCA A Cleanup Level (MW103 at 120 µg/L). This distribution indicates that the source of the GRPH contamination appears to be separate from the source for the TOC Site.

Benzene concentrations exceeded MTCA A Cleanup Levels at three of the well locations described above (MW48 on the TOC Property and MW73 and MW74 on the Shin/Choi Property) as well as MW103 and MW107 near the southern boundary of the Herman Property (**Figure 12**).

7.2.3 Deep Zone

The Deep Zone monitoring well network includes six active monitoring wells. As required by the scope of work defined in the IRAWP, groundwater samples were collected from all six active wells in this zone during the 2015 annual field event. As shown on **Tables 4-1 and 4-2**, the analytical results of the samples collected from the Deep Zone did not exceed MTCA Method A Cleanup Levels during this sample event, as was the case during all previous sampling events, indicating that groundwater contamination associated with the TOC Site has not migrated into the Deep Zone.

7.2.4 Well Screens Intersecting Multiple Zones

As described in the opening paragraph of **Section 7.0**, 16 monitoring wells appear to have wells screens that intersect conditions of multiple groundwater zones. The groundwater quality results for monitoring wells in these zones are discussed in the following sections.

7.2.4.1 Shallow-Intermediate Zone Intersect Wells

The Shallow-Intermediate Zone intersect includes 14 active wells (four of which are currently used as remediation wells) and one decommissioned well. The scope of work defined in the IRAWP requires groundwater sampling of all active wells in this zone during the 2015 annual field event.

The table below identifies groundwater samples exceeding MTCA Method A Cleanup Levels for Shallow-Intermediate Zone Intersect wells. As shown on **Tables 5-1 and 5-2**, the analytical results of the samples collected did not exceed MTCA Method A Cleanup Levels. GRPH and benzene concentrations for wells screened across multiple zones are included on the Intermediate Water-Bearing Zone figures (**Figures 11 and 12**, respectively).

Analytical Results for Groundwater Samples Exceeding Cleanup Levels (Shallow-Intermediate Zone Intersect Wells)

Analyte	MTCA Method A Cleanup Level (µg/L)	Sample Location/ Well ID	Property	Analytical Results (µg/L)
Total Lead	**15**	MW29	TOC	119

7.2.4.2 Intermediate-Deep Zone Intersect Wells

The Intermediate-Deep Intersect Zone intersect includes one active monitoring well (MW16 located within the 242nd Street ROW). The scope of work defined in the IRAWP requires groundwater sampling of MW16 during the annual field event only. As shown on **Tables 6-1 and 6-2**, the analytical results of the samples collected did not exceed MTCA Method A Cleanup Levels. GRPH and benzene concentrations for wells screened across multiple zones are included on the Intermediate Water-Bearing Zone figures (**Figures 11 and 12**, respectively).

7.3 LNAPL Results

As mentioned in **Section 7.2**, trace and measurable LNAPL was observed in Shallow and Intermediate Zone monitoring wells during the 1Q2015 field event. The table below identifies LNAPL thickness measured at these locations. LNAPL samples were not collected from these locations during the 1Q2015 field event. The table below summarizes the LNAPL observations and measurements provided on **Table 1-1**.

LNAPL Observations & Measurements

Location/Well ID	Property	Groundwater Zone	LNAPL Thickness (feet)
MW11 (4" RW)	TOC	Intermediate	Observed Sheen
MW48	56th Ave ROW	Intermediate	<0.01 (Trace)
MW56	TOC/Farmasonis	Intermediate	Observed Sheen
MW71	Shin/Choi	Shallow	0.47
MW102	Herman	Shallow	0.97

7.4 QA/QC & Data Quality Results

As described in **Section 6.4**, the scope of work for the groundwater monitoring events included collection and laboratory analyses of groundwater samples for QA/QC purposes. Stantec performed a QA/QC review of the analytical results, which included a review of accuracy and precision of data supplied by the laboratory. Analytical results for field duplicates and method duplicates are provided on **Tables 2-1 through 5-2**. Analytical results for all other QA/QC samples, including water blanks and equipment/rinsate blanks are provided in the laboratory reports included as **Appendix B**.

8.0 GROUNDWATER TRENDS

The following sections present a summary of historical and current groundwater elevation and contaminant distribution trends at selected monitoring and remediation wells installed in the Shallow and Intermediate Water-Bearing Zones. Data collected over the last year (2Q2014 through 1Q2015) are provided in **Tables 1-1 through 6-2**. Data collected prior to this period are included in previous annual groundwater monitoring reports. Because contaminant concentrations at the deep wells have been consistently non-detect, a discussion of groundwater trends at these wells is not included.

Based on contaminant presence and distribution and exceedance of MTCA Method A Cleanup Levels, the primary contaminants of concern include GRPH and benzene for purposes of this discussion. Concentrations of total and dissolved lead were also evaluated for select wells where data were available.

Section 8.1 describes groundwater elevation trends. **Sections 8.2 through 8.4** describe GRPH, benzene, and lead concentration trends over time in the three groundwater zones and **Section 8.5** discusses the historical presence of LNAPL in Shallow and Intermediate Zone monitoring wells. Groundwater level and contaminant distribution trends will continue to be evaluated and discussed as part of future annual monitoring events.

8.1 Groundwater Elevation Trends

Groundwater elevation trends were evaluated by generating time versus groundwater elevation plots using available data from historical and recent monitoring events (February 1992 through March 2015, as available). More frequent data are available between 2012 and 2015 after the Intermediate Zone remediation systems were installed at the Site. As shown on **Figures 7 and 8**, groundwater elevations vary seasonally with high seasonal levels typically observed in winter (February-March) and low seasonal levels observed in late fall (November-December). An exception during this period was in 2014 when the high seasonal levels were observed in June 2014. Seasonal trends are similar between the three zones further indicating interconnection between the zones across the TOC Site.

Figure 7 illustrates groundwater elevation differences in the three groundwater zones on the TOC Property. In this area where horizontal hydraulic gradients in each of the zones are greater, groundwater elevations can vary seasonally to more than 10 feet in the Shallow Zone, 15 feet in the Intermediate Zone, but typically only show 5 feet or less in the Deep Zone. As shown on Figure 8, downgradient groundwater elevations on the Drake Property are in an area where horizontal hydraulic gradients are much flatter, and seasonal groundwater elevation variability is slightly less in the Shallow Zone (less than 10 feet), is about the same in the Deep Zone, but is much less in the Intermediate Zone (less than 5 feet). The reduction in variability in the Intermediate Zone wells may reflect the greater depth between the Shallow and Intermediate Zone wells in this area and the less influence by surficial recharge.

As previously discussed in **Section 7.1, Figure 7** illustrates the downward vertical gradients between the Shallow and Intermediate Zones and between the Intermediate and Deep Zones in upgradient areas at the TOC Property where horizontal hydraulic gradients are steeper and are thought to be influenced by artificial recharge in this area. As shown on **Figure 8**, in downgradient areas on the Drake Property where horizontal hydraulic gradients flatten, vertical gradients between the Shallow and the Intermediate and Deep Zones are still downward; however, the vertical gradients between the Intermediate and Deep Zones are slightly upward, and appear to be effective in inhibiting downward vertical flow of groundwater and migration of contamination in downgradient areas and effectively bounding the extent of vertical contamination.

8.2 Shallow Zone Contaminant Distribution

Contaminant trends in the Shallow Zone were evaluated by generating time versus groundwater elevation and time versus concentration plots for GRPH and benzene for the period covered by the previous quarterly or other sampling events (February 1992 through March 2015, as available). Also, any changes in contamination distribution over the past year were evaluated by comparing the GRPH plume in the Shallow Zone for the 2014 annual event with the plume for the 2015 annual event. For the concentration trend plots, MW02, MW04 and MW12 (located on the TOC Property, 56th Avenue West ROW and TOC/Farmasonis Property, respectively) were selected for evaluation because they represent Shallow Zone monitoring locations within or downgradient of the source area for the TOC Site or where the majority of Shallow Zone contamination has been observed historically (at MW02). Note that groundwater concentrations in most of the Shallow Zone wells have been non-detect since late 2005 (if not earlier). This is likely resulting from the operation of the former DPE system (described in **Section 2.3**) that operated between 1996 and 2005. Below is a list of figures used for the contamination trend evaluation in the Shallow Zone.

- **Figure 13:** Benzene concentrations versus time for MW02, MW04 and MW12.
- **Figure 14:** GRPH concentrations versus time for MW02, MW04 and MW12.
- **Figure 15:** Groundwater elevations and GRPH concentrations versus time for MW02.

8.2.1 Benzene

As shown on **Figure 13**, the benzene concentrations in the selected shallow zone wells (MW02, MW04 and MW12) show variable concentration trends over time, but concentrations have been primarily non-detect over the past 13 years. A summary of benzene concentration trends at MW02, MW04 and MW12 is provided below.

- **MW02 (TOC Property):** The concentration of benzene in MW02 peaked at 4,600 μg/L in January 1994, but decreased over time to non-detect by September 2002, and has remained non-detect since then. MW02 is located downgradient (to the south) of the former UST complex on the TOC Property.
- **MW04 (56th Avenue West ROW):** The benzene concentration in MW04 was at a maximum of 470 μg/L in July 1992, but dropped significantly between July 1992 and September 1996 to a concentration of 77 μg/L. Benzene concentrations dropped to non-detect by March 2003 and have remained non-detect since then.
- **MW12 (TOC/Farmasonis Property):** Benzene concentrations in MW12 have been non-detect since the first sampling event at that well in October 2001 through the most recent groundwater sampling event in March 2015. MW12 is located on the TOC/Farmasonis Property, downgradient (to the south) of the former UST complex on the TOC Property.

Benzene has consistently been non-detect in groundwater samples collected from wells immediately downgradient of MW02 and MW04 and in wells on the TOC/Farmasonis and Drake Properties, indicating that Shallow Zone contamination did not extend very far downgradient from the TOC Property boundary.

8.2.2 Gasoline-Range Petroleum Hydrocarbons

As shown on **Figure 14,** GRPH concentrations in MW02, MW04 and MW12 follow the same general trend as the benzene concentrations shown on **Figure 13**. A summary of GRPH concentration trends at MW02, MW04 and MW12 is provided below.

- **MW02 (TOC Property):** GRPH concentrations in MW02 reached a maximum of 50,000 µg/L in January 1994 followed by a steady decrease to 1,400 µg/L in March 2005. The GRPH concentrations dropped to non-detect during the following sampling event in December 2005, and have remained non-detect through the annual sampling event in March 2015, as shown on **Figure 15.**
- **MW04 (56th Avenue West ROW):** GRPH concentrations in MW04 have decreased from a maximum of 100,000 µg/L in July 1992, then fluctuating between 1,000 µg/L and 38,100 µg/L between September 1996 to October 2003, and since March 2005 to the present, have been non-detect.
- **MW12 (TOC/Farmasonis Property):** GRPH in MW12 has not been detected since the first sampling event in October 2001 through the most recent sampling event in March 2015.

The distribution of GRPH concentrations in the Shallow Zone has likely not changed significantly over this past year. Samples were not collected on the Shin/Choi Property during the March 2014 event, per the requirements of the IRAWP. However, the presence of LNAPL or significantly elevated concentrations of GRPH in these wells during sampling events during 2008-2010 and then again in March 2015 indicate that contamination has been historically present and is still present in these areas. As stated earlier, based on historical distribution of contaminants in the Shallow Zone that indicate that shallow contamination did not extend as far south as the Drake Property, the Shallow Zone contamination that is observed on the Herman and Shin/Choi properties appears to be associated with the current or former presence of underground storage tanks (USTs) at those properties.

8.2.3 Other Constituents

Total and dissolved lead concentrations have been detected in Shallow Zone wells since 2005; however there are not enough historical data to analyze trends. As summarized below, only two Shallow Zone wells (MW34 and MW102) and one Shallow-Intermediate Zone Intersect well (MW100) have historical concentrations of total lead exceeding the MTCA Method A Cleanup Level of 15 µg/L.

- **MW34 (TOC Property):** The concentration of lead in MW34 decreased from 23.7 µg/L in January 2006 to 2.45 µg/L in March/April 2014. Groundwater samples collected from MW34 in March 2015 were not analyzed for total or dissolved lead.

- **MW100 (TOC/Farmasonis Property):** The concentration of lead in MW100 decreased from 23.7 µg/L in March 2012 to less than 1 µg/L in March 2015.
- **MW102 (Herman Property):** The concentration of lead in MW102 was 15.6 µg/L in March/April 2014. Due to the presence of LNAPL in the well, MW102 was not sampled during the 1Q2015 field event.

8.3 Intermediate Zone Contaminant Trends

Contaminant trends in the Intermediate Zone were evaluated by generating time versus groundwater elevation and time versus concentration plots for benzene and GRPH for the period covered by the quarterly sampling events (September 2005, or first available, through the annual 2015 sampling event). Also, any changes in contamination distribution over the past year were evaluated by comparing the GRPH plume in the Intermediate Zone for the 2014 annual event with the plume for the 2015 annual event. For the concentration trend plots, the selected wells include monitoring and remediation wells installed on the TOC Property (MW09, MW11, MW18, MW25, MW32 and MW91), the TOC/Farmasonis Property (MW31 and MW57), the 56th Avenue West ROW (MW45, MW48, MW49, and MW63), and the Drake Property (MW69, MW86, MW95, MW96 and MW98). Below is a list of figures used for the contamination trend evaluation in the Intermediate Zone.

- **Figure 16:** Benzene concentrations versus time for selected wells (MW09, MW11, MW18, MW25, MW31, MW32, MW45, MW48, MW49, MW57, MW69, and MW86).
- **Figure 17:** Benzene concentrations and groundwater elevations versus time for MW48 and benzene concentrations versus time for selected wells in the vicinity of MW48 (MW57, MW63, MW95, MW96 and MW98).
- **Figure 18:** GRPH concentrations versus time for the same selected wells shown on **Figure 16**.
- **Figure 19:** GRPH concentrations and groundwater elevations versus time for the same selected wells shown on **Figure 17**.
- **Figure 20:** Total lead concentrations and groundwater elevations versus time for MW31, MW32 and MW91**.**
- **Figure 21:** Comparison of GRPH plumes in the Intermediate Zone for the 2014 annual event and 2015 annual event.

8.3.1 Benzene

As shown on **Figure 16**, the benzene concentrations in the selected Intermediate Zone wells listed above show variable concentrations over time, with the overall trend showing a decrease in concentrations over time. Benzene concentrations were highest prior to February 2008 and have shown a gradual decrease through March 2015.

Benzene concentrations at MW48 (located in the 56th Avenue West ROW) have been variable over the course of the historical sampling period and have fluctuated between a high of 300 µg/L in September 2012 to non-detect in June 2012 and June 2013. The most recent sampling event in March 2015 showed a benzene concentration in MW48 at 120 µg/L, which is slightly higher than the March/April 2014 concentration of 82 µg/L.

Figure 17 shows benzene concentration trends for MW48 and nearby wells. MW48 has consistently contained benzene concentrations greater than MTCA Method A Cleanup Levels since the well was installed in 2012. Benzene concentrations and groundwater elevation trends observed in MW48 fluctuated inversely until July 2014, after which time a more direct relationship appears to occur. Benzene concentrations in the nearby wells MW57, MW63, MW95, MW96 and MW98 do not appear to correlate to the trend observed in MW48, although sampling frequency is less in these wells. A slight increase in benzene concentration was observed in MW57 in March 2013; however, concentrations have decreased since that time and benzene was non-detect in March 2015. Benzene concentrations at the other wells located near MW48 have been mostly non-detect since the wells were installed in 2012.

With the exception of MW48, the concentrations of benzene in groundwater at the TOC Site show a general overall decreasing trend in the Intermediate Zone, likely due to operation of the MPE remediation systems since 2012.

8.3.2 Gasoline-Range Petroleum Hydrocarbons

Figure 18 shows GRPH concentrations in the selected Intermediate Zone wells (MW09, MW11, MW18, MW25, MW31, MW32, MW45, MW48, MW49, MW57, MW69 and MW86) follow a similar overall decreasing trend as the benzene concentrations. The highest GRPH concentrations generally occurred prior to February 2008 and have steadily decreased over time. Exceptions to this trend occur at the three wells discussed below.

- **MW32 (TOC Property):** The GRPH concentration was 120 µg/L in March 2012, but within 6 months the concentration increased significantly up to 16,000 µg/L. After December 2012, the concentrations have shown a consistent decreasing trend with a slight increase during the March/April 2014 event (4,800 µg/L). The concentration of GRPH in March 2015 was reported to be 680 µg/L, much lower than the March/April 2014 concentration.
- **MW45 (56th Avenue West ROW):** MW45 has shown an overall decreasing trend over time; however, in February 2013 the concentration of GRPH increased to 19,000 µg/L from 4,700 µg/L in September 2012. The following sampling event in June 2013 showed a decrease in GRPH concentrations to 8,300 µg/L. MW45 has not been sampled since June 2013 due to insufficient groundwater volume for sample collection.
- **MW48 (56th Avenue West ROW):** GRPH concentrations in MW48 seemed to follow a similar variable trend as the benzene concentrations. The GRPH concentrations have fluctuated between a high of 37,000 µg/L in March 2012 and a low of 7,700 µg/L in December 2014. The concentration of GRPH decreased to 12,000 µg/L in March 2015 from 33,000 µg/L in March/April 2014. However, MW48 continues to exhibit the highest concentration of GRPH in groundwater at the TOC Site.

As shown on **Figure 19**, GRPH concentration and groundwater elevation trends observed in MW48 fluctuated inversely until July 2014, after which time a more direct relationship appear between the GRPH concentration and the groundwater elevation. Similar to what is observed with benzene, there does not appear to be a direct correlation between the GRPH trends in MW48 and those observed in the nearby wells (MW57, MW63, MW95, MW96 and MW98). MW57 showed a slight increase in GRPH concentrations between March 2013 and December 2014; however, the concentration in the sample collected in March 2015 showed a decrease to less than March 2013 concentrations. Similar to benzene, GRPH concentrations at the other wells located near MW48 have been mostly non-detect since the wells were installed in 2012.

In general, the concentrations of GRPH in groundwater show an overall decreasing trend in the Intermediate Zone, again likely due to the operation of the MPE remediation systems since 2012 (described in **Section 5.0**). A comparison of GRPH plumes in the Intermediate Zone for the 2014 annual event and 2015 annual event is provided as **Figure 21**. As shown, the distribution of GRPH concentrations in the Intermediate Zone indicate that areas with concentrations exceeding the MTCA Method A cleanup levels have decreased in size during this time period on the TOC Property and at the southwest corner of the TOC/Farmasonis Property. An additional area with elevated concentrations was identified at MW69 on the Drake Property where samples have not been collected over the past year because of issues with the pump (the pump was replaced prior to this event); however, historical concentrations at this well between May 2008 and February 2013 consistently showed concentrations exceeding the MTCA Method A level. Another plume area was identified on the Shin/Choi Property during the March 2015 event. Similar to the Shallow Zone data in this area (discussed in Section 8.2), this plume was not identified in 2014 because samples were not collected from the Shin/Choi Property wells per IRAWP requirements; however, historical concentrations observed in these wells between 2008-2010 indicate elevated concentrations.

8.3.3 Other Constituents

Total and dissolved lead concentrations have been detected in Intermediate Zone wells since 2005. **Figure 20** shows total lead concentrations in groundwater in MW31 (located on the TOC Property), MW32 and MW91 (both located on the TOC/Farmasonis Property). These wells were selected because they were the only wells located in the Intermediation Zone with enough available data to assess trends; however, data are still limited. As summarized below, these wells show fluctuating concentrations of total lead.

- **MW31 (TOC/Farmasonis Property):** MW31 shows total lead concentrations fluctuating between a high of 44.4 µg/L in February 2008 and a low of 3.51 µg/L in May 2006. The total lead concentration decreased from 19.9 µg/L in June 2013 to 11.4 µg/L in March/April 2014. MW31 was noted as dry in March 2015 and, therefore, could not be sampled due to insufficient groundwater volume.
- **MW32 (TOC Property):** MW32 shows total lead concentrations decreasing from 45.2 µg/L in March/April 2014 to 28 µg/L in March 2015, which exceeds the MTCA Method A Cleanup Level of 15 µg/L.
- **MW91 (TOC Property):** MW91 shows total lead concentrations slightly increasing from 5.35 µg/L in March/April 2014 to 6.3 µg/L in March 2015. However, the March 2015 concentration is still lower than the highest reported concentration of 15.9 µg/L in March 2012.

Historically, total lead concentrations in the Intermediate Zone ranged from 1.07 µg/L in MW09 (December 2005) to 193 µg/L in MW36 (June 2006). Wells that historically contained groundwater with total lead concentrations exceeding the MTCA Method A Cleanup Level include MW29, MW31, MW32, MW35, MW36, MW41, MW45, MW48, MW60, MW75, MW91 and MW101. The overall trend for total lead in groundwater for wells MW32 and MW91 is decreasing over time. The total lead concentrations in MW31 are still above the MTCA Method A Cleanup Level and appear to remain variable.

8.4 Deep Zone Contaminant Trends

Petroleum hydrocarbons, VOCs and lead were not detected in the six monitoring wells installed in the Deep Zone; therefore, a discussion regarding groundwater trends for this Zone is not provided.

8.5 Light Non-Aqueous Phase Liquid Trends

Since 1995, LNAPL has been historically reported in several Shallow and Intermediate Zone wells, including MW03, MW09, MW10, MW11, MW15, MW18, MW20, MW27, MW28, MW29, MW32, MW48, MW71, MW72, MW90, MW91 and MW102. As discussed in **Section 7.3**, measurable LNAPL was only encountered in two Shallow Zone wells (MW71 and MW102 located on the Shin/Choi and Herman properties, respectively) during the 2015 annual field event. LNAPL trends for these two wells and other select wells located on the TOC Site (MW29 and MW48) are summarized below. These wells were selected for trend analyses due to the availability of historical data and the historical presence of LNAPL at these locations.

- **MW29 (TOC Property):** MW29 contained LNAPL between December 2005 and February 2007. LNAPL has not been encountered in MW29 since May 2007 as shown on **Figure 22.**
- **MW71 (Shin/Choi Property):** LNAPL thickness has decreased significantly from a high of 1.36 feet in July 2009 to 0.47 feet in March 2015, as shown on **Figure 22**.
- **MW102 (Herman Property):** MW102 was installed in 2013 and has little historical data to assess trends over time. LNAPL thickness has only been measured twice at this location and has decreased from 1.63 feet in March 2014 (Stantec 2014) to 0.97 feet in March 2015.
- **MW48 (56th Avenue West ROW):** MW48 has historically contained the largest occurrence of measurable LNAPL. As shown on **Figure 23**, LNAPL in MW48 ranged from a high of 1.86 feet in May 2007 to 0.01 feet in June 2009. **Figure 23** shows an inverse relationship between groundwater elevations and past LNAPL thicknesses. LNAPL has not been encountered in MW48 since January 2011. As of March 2015, no wells installed in the Intermediate Zone on TOC Site contain measurable LNAPL.

In summary, LNAPL thicknesses and groundwater elevations appear to be somewhat inversely related at well MW48, although there is some variability. This is also the case for LNAPL trends at MW29 when LNAPL was observed in this well in 2007. Not enough data are available to assess a comparison of these trends in well MW71. This inverse trend could be related to the liberation of residual LNAPL within partially saturated soil pore spaces as the groundwater level decreases.

Based on historical information, the presence of greater LNAPL thicknesses on the Herman and Shin/Choi Properties than has ever been observed at the TOC Site, and the current lack of measurable LNAPL in wells on the TOC, TOC/Farmasonis and Drake Properties, the source of the free product in MW71 and MW102 appears to originate from the former USTs historically located on the Herman and Shin/Choi properties. The source of the LNAPL historically measured in the ROW well MW48 is unknown. There are no known sources of petroleum hydrocarbons associated with the southwest corner of the TOC/Farmasonis Property or northwest corner of the Drake Property, near the location of MW48. Due to the location of MW48 near the utilities corridor, it is suspected that the occurrence of LNAPL may have been associated with the utilities corridor acting as a preferential pathway from an upgradient source.

9.0 FUTURE GROUNDWATER TASKS

On June 15 and 16, 2015, TOC installed two additional monitoring wells on the Herman Property in the Intermediate Water-Bearing Zone. Per Ecology's request, these two wells (identified as MW108 and MW109) were installed near the northern boundary of the Herman Property, south of MW84 and MW86 located on the Drake Property. MW108 and MW109 were installed for the purpose of obtaining data directly downgradient of TOC Site in order to bound the GRPH plume to the south. The new monitoring wells were sampled as part of groundwater monitoring activities for the second quarter field event in June 2015 (2Q2015). Groundwater quality results for the 2Q2015 sampling event and additional details regarding the two new wells will be provided to Ecology in the *Groundwater Monitoring Report, Second Quarter 2015.*

10.0 REFERENCES

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Tables

TABLE 1-1
Depth-to-Groundwater/Depth-to-Product Level Measurements
First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, Washington

Well (a)	Property	Measurement Date	Measurement Time (24:00)	Reference Elevation (feet) (b)	DTW (feet) (c)	Groundwater Elevation (feet) (d, e)	LNAPL Thickness (feet)	Notes / Observations
MW01	TOC	NA	NA	NA	NA	NA	NA	**WELL DECOMMISSIONED 10/02/2009**
MW02	TOC	06/18/2014	11:01	358.71	11.80	346.91	--	
MW02	TOC	09/24/2014	14:32	358.71	15.39	343.32	--	
MW02	TOC	12/16/2014	10:34	358.71	12.67	346.04	--	
MW02	TOC	03/17/2015	11:05	358.71	10.88	347.83	--	
MW03	TOC	06/18/2014	11:18	361.85	13.09	348.76	--	
MW03	TOC	09/24/2014	14:55	361.85	DRY	DRY	DRY	
MW03	TOC	12/16/2014	10:40	361.85	14.37	347.48	--	
MW03	TOC	03/17/2015	10:48	361.85	11.64	350.21	--	
MW04	56th Ave ROW	06/18/2014	11:32	361.96	11.62	350.34	--	
MW04	56th Ave ROW	09/24/2014	11:53	361.96	DRY	DRY	DRY	
MW04	56th Ave ROW	12/16/2014	10:41	361.96	DRY	DRY	DRY	
MW04	56th Ave ROW	03/17/2015	11:29	361.96	10.57	351.39	--	
MW05	242nd St ROW	06/18/2014	11:27	363.70	11.42	352.28	--	
MW05	242nd St ROW	09/24/2014	11:49	363.70	DRY	DRY	DRY	
MW05	242nd St ROW	12/16/2014	10:44	363.70	DRY	DRY	DRY	
MW05	242nd St ROW	03/17/2015	11:25	363.70	9.80	353.90	--	
MW06	TOC	06/18/2014	10:46	358.98	13.17	345.81	--	
MW06	TOC	09/24/2014	12:00	358.98	DRY	DRY	DRY	
MW06	TOC	12/16/2014	10:20	358.98	DRY	DRY	DRY	
MW06	TOC	03/17/2015	9:53	358.98	11.24	347.74	--	
MW07	TOC/Farmasonis	NA	NA	NA	NA	NA	NA	**WELL DECOMMISSIONED 11/29/2004**
MW08	56th Ave ROW	06/18/2014	11:36	360.34	21.51	338.83	--	
MW08	56th Ave ROW	09/24/2014	10:59	360.34	DRY	DRY	DRY	
MW08	56th Ave ROW	12/16/2014	12:23	360.34	23.34	337.00	--	
MW08	56th Ave ROW	03/17/2015	13:46	360.34	17.90	342.44	--	
MW09	TOC	06/18/2014	11:06	360.32	26.25	334.07	Sheen	
MW09	TOC	09/24/2014	14:39	360.32	38.09	322.23	--	
MW09	TOC	12/16/2014	10:37	360.32	29.58	330.74	--	
MW09	TOC	03/17/2015	10:35	360.32	24.26	336.06	--	
MW10	TOC	06/18/2014	10:58	357.91	33.55	324.36	--	
MW10	TOC	09/24/2014	14:24	357.91	DRY	DRY	DRY	
MW10	TOC	12/16/2014	10:32	357.91	36.39	321.52	--	
MW10	TOC	03/17/2015	10:17	357.91	30.21	327.70	--	
MW11 (4" RW)	TOC	06/18/2014	11:22	362.34	24.25	338.09	--	
MW11 (4" RW)	TOC	09/24/2014	15:00	362.34	28.04	334.30	--	
MW11 (4" RW)	TOC	12/16/2014	9:22	362.34	25.70	336.64	--	
MW11 (4" RW)	TOC	03/17/2015	9:39	362.34	22.01	340.33	Sheen	
MW12	56th Ave ROW	06/18/2014	9:37	357.65	10.77	346.88	--	
MW12	56th Ave ROW	09/24/2014	13:20	357.65	14.46	343.19	--	
MW12	56th Ave ROW	12/16/2014	11:26	357.65	12.30	345.35	--	
MW12	56th Ave ROW	03/17/2015	12:26	357.65	9.66	347.99	--	
MW13	56th Ave ROW	06/18/2014	9:36	357.34	40.59	316.75	--	
MW13	56th Ave ROW	09/24/2014	13:22	357.34	DRY	DRY	DRY	
MW13	56th Ave ROW	12/16/2014	11:25	357.34	DRY	DRY	DRY	
MW13	56th Ave ROW	03/17/2015	12:27	357.34	DRY	DRY	DRY	
MW14	TOC/Farmasonis	NA	NA	NA	NA	NA	NA	**WELL DECOMMISSIONED 11/29/2004**
MW15 (4" RW)	TOC	06/18/2014	10:35	357.56	NM	NM	NM	Abundant bio buildup on top of water.
MW15 (4" RW)	TOC	09/24/2014	14:20	357.56	NM	NM	NM	Well full of mud and could not be measured (measuring point changed).
MW15 (4" RW)	TOC	12/16/2014	9:28	357.56	40.80	316.76	--	Removed pump from well on 12/16/2014.
MW15 (4" RW)	TOC	03/17/2015	10:03	357.56	33.00	324.56	--	Former RW (pump removed 12/16/2014). Measurement may not represent groundwater level due to abundant biological buildup in well.
MW16	242nd St ROW	06/18/2014	11:29	365.18	45.95	319.23	--	
MW16	242nd St ROW	09/24/2014	11:48	365.18	DRY	DRY	DRY	
MW16	242nd St ROW	12/16/2014	10:46	365.18	DRY	DRY	DRY	
MW16	242nd St ROW	03/17/2015	11:28	365.18	45.58	319.60	--	
MW17	TOC/Farmasonis	NA	NA	NA	NA	NA	NA	**WELL DECOMMISSIONED 11/29/2004**
MW18 (4" RW)	TOC	06/18/2014	10:51	357.91	DRY	DRY	DRY	
MW18 (4" RW)	TOC	09/24/2014	14:23	357.91	NM	NM	NM	unable to measure (vault full of water)
MW18 (4" RW)	TOC	12/16/2014	9:08	357.91	DRY	DRY	DRY	
MW18 (4" RW)	TOC	03/17/2015	9:58	357.91	DRY	DRY	DRY	
MW19	TOC	06/18/2014	10:54	358.86	13.82	345.04	--	
MW19	TOC	09/24/2014	11:56	358.86	DRY	DRY	DRY	Poor seal on well cap.
MW19	TOC	12/16/2014	10:30	358.86	14.53	344.33	--	
MW19	TOC	03/17/2015	10:09	358.86	12.87	345.99	--	

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First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, Washington

Well (a)	Property	Measurement Date	Measurement Time (24:00)	Reference Elevation (feet) (b)	DTW (feet) (c)	Groundwater Elevation (feet) (d, e)	LNAPL Thickness (feet)	Notes / Observations
MW20	TOC	06/18/2014	11:01	359.93	35.29	324.64	--	
MW20	TOC	09/24/2014	11:54	359.93	38.48	321.45	--	
MW20	TOC	12/16/2014	10:35	359.93	37.91	322.02	--	
MW20	TOC	03/17/2015	10:05	359.93	31.45	328.48	--	
MW21	TOC	NA	NA	NA	NA	NA	NA	**WELL DECOMMISSIONED 04/16/2012**
MW22	TOC	06/18/2014	11:00	358.52	29.08	329.44	--	
MW22	TOC	09/24/2014	14:27	358.52	DRY	DRY	DRY	
MW22	TOC	12/16/2014	10:31	358.52	28.95	329.57	--	
MW22	TOC	03/17/2015	11:10	358.52	28.65	329.87	--	
MW23	TOC	06/18/2014	10:33	357.08	39.03	318.05	--	
MW23	TOC	09/24/2014	12:04	357.08	DRY	DRY	DRY	
MW23	TOC	12/16/2014	10:14	357.08	DRY	DRY	DRY	
MW23	TOC	03/17/2015	9:27	357.08	38.85	318.23	--	
MW24 (4" RW)	TOC	06/18/2014	11:09	361.97	24.46	337.51	Sheen	Abundant bio building on top of water.
MW24 (4" RW)	TOC	09/24/2014	12:47	361.97	DRY	DRY	DRY	
MW24 (4" RW)	TOC	12/16/2014	9:14	361.97	32.81	DRY	DRY	
MW24 (4" RW)	TOC	03/17/2015	9:45	361.97	17.28	344.69	--	
MW25	TOC	06/18/2014	11:04	358.70	31.66	327.04	--	
MW25	TOC	09/24/2014	14:37	358.70	37.23	321.47	--	
MW25	TOC	12/16/2014	10:37	358.70	35.54	323.16	--	
MW25	TOC	03/17/2015	11:06	358.70	27.64	331.06	--	
MW26	TOC	06/18/2014	11:30	363.81	45.64	318.17	--	
MW26	TOC	09/24/2014	11:50	363.81	47.41	316.40	--	
MW26	TOC	12/16/2014	10:43	363.81	48.38	315.43	--	
MW26	TOC	03/17/2015	10:55	363.81	45.77	318.04	--	
MW27 (2" RW)	TOC	06/18/2014	NM	362.51	NM	NM	NM	
MW27 (2" RW)	TOC	09/24/2014	NM	362.51	NM	NM	NM	
MW27 (2" RW)	TOC	12/16/2014	9:21	362.51	NM	NM	NM	
MW27 (2" RW)	TOC	03/17/2015	NM	362.51	NM	NM	NM	
MW28	TOC	06/18/2014	10:49	358.41	28.17	330.24	--	
MW28	TOC	09/24/2014	11:57	358.41	DRY	DRY	DRY	
MW28	TOC	12/16/2014	10:29	358.41	29.03	329.38	--	
MW28	TOC	03/17/2015	11:13	358.41	26.91	331.50	--	
MW29 (2" RW)	TOC	06/18/2014	NM	358.93	NM	NM	NM	
MW29 (2" RW)	TOC	09/24/2014	NM	358.93	NM	NM	NM	
MW29 (2" RW)	TOC	12/16/2014	9:10	358.93	NM	NM	NM	
MW29 (2" RW)	TOC	03/17/2015	NM	358.93	NM	NM	NM	
MW30	TOC/Farmasonis	06/18/2014	NM	356.46	39.28	317.18	--	
MW30	TOC/Farmasonis	09/24/2014	12:04	356.46	41.68	314.78	--	
MW30	TOC/Farmasonis	12/16/2014	11:10	356.46	41.61	314.85	--	
MW30	TOC/Farmasonis	03/17/2015	11:34	356.46	38.66	317.80	--	
MW31 (2" RW)	TOC/Farmasonis	06/18/2014	NM	357.08	NM	NM	NM	
MW31 (2" RW)	TOC/Farmasonis	09/24/2014	NM	357.08	NM	NM	NM	
MW31 (2" RW)	TOC/Farmasonis	12/16/2014	9:37	357.08	NM	NM	NM	
MW31 (2" RW)	TOC/Farmasonis	03/17/2015	NM	357.08	NM	NM	NM	
MW32 (2" RW)	TOC	06/18/2014	11:02	359.95	23.14	336.81	--	Abundant bio buildup on top of water.
MW32 (2" RW)	TOC	09/24/2014	12:34	359.95	26.84	333.11	--	
MW32 (2" RW)	TOC	12/16/2014	9:17	359.95	24.78	335.17	--	
MW32 (2" RW)	TOC	03/17/2015	9:51	359.95	21.50	338.45	--	
MW33	TOC	06/18/2014	10:56	358.24	DRY	DRY	DRY	
MW33	TOC	09/24/2014	11:56	358.24	DRY	DRY	DRY	
MW33	TOC	12/16/2014	10:24	358.24	DRY	DRY	DRY	
MW33	TOC	03/17/2015	10:14	358.24	34.30	323.94	--	
MW34	TOC	06/18/2014	10:42	357.88	12.64	345.24	--	
MW34	TOC	09/24/2014	12:04	357.88	DRY	DRY	DRY	
MW34	TOC	12/16/2014	10:18	357.88	11.21	346.67	--	
MW34	TOC	03/17/2015	9:30	357.88	10.26	347.62	--	
MW35	TOC	06/18/2014	10:43	358.46	39.39	319.07	--	
MW35	TOC	09/24/2014	12:03	358.46	DRY	DRY	DRY	
MW35	TOC	12/16/2014	10:19	358.46	DRY	DRY	DRY	
MW35	TOC	03/17/2015	9:38	358.46	DRY	DRY	DRY	
MW36	TOC	06/18/2014	10:45	357.98	41.67	316.31	--	
MW36	TOC	09/24/2014	12:01	357.98	DRY	DRY	DRY	
MW36	TOC	12/16/2014	NM	357.98	42.40	315.58	--	
MW36	TOC	03/17/2015	9:47	357.98	42.05	315.93	--	
MW37	TOC	06/18/2014	10:47	358.90	21.15	337.75	--	

TABLE 1-1
Depth-to-Groundwater/Depth-to-Product Level Measurements
First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, Washington

Well (a)	Property	Measurement Date	Measurement Time (24:00)	Reference Elevation (feet) (b)	DTW (feet) (c)	Groundwater Elevation (feet) (d, e)	LNAPL Thickness (feet)	Notes / Observations
MW37	TOC	09/24/2014	11:58	358.90	31.55	327.35	--	
MW37	TOC	12/16/2014	10:21	358.90	22.79	336.11	--	
MW37	TOC	03/17/2015	9:56	358.90	16.63	342.27	--	
MW38	TOC	06/18/2014	11:26	364.42	19.80	344.62	--	
MW38	TOC	09/24/2014	11:50	364.42	25.29	339.13	--	
MW38	TOC	12/16/2014	10:47	364.42	21.67	342.75	--	
MW38	TOC	03/17/2015	11:19	364.42	16.60	347.82	--	
MW39	TOC/Farmasonis	06/18/2014	10:00	355.88	39.32	316.56	--	
MW39	TOC/Farmasonis	09/24/2014	12:09	355.88	41.74	314.14	--	
MW39	TOC/Farmasonis	12/16/2014	11:08	355.88	41.53	314.35	--	
MW39	TOC/Farmasonis	03/17/2015	11:48	355.88	38.72	317.16	--	
MW40	TOC/Farmasonis	06/18/2014	9:46	356.32	39.30	317.02	--	
MW40	TOC/Farmasonis	09/24/2014	13:36	356.32	41.70	314.62	--	
MW40	TOC/Farmasonis	12/16/2014	11:18	356.32	41.65	314.67	--	
MW40	TOC/Farmasonis	03/17/2015	11:03	356.32	38.68	317.64	--	
MW41 (2" RW)	TOC/Farmasonis	06/18/2014	NM	356.14	NM	NM	NM	
MW41 (2" RW)	TOC/Farmasonis	09/24/2014	NM	356.14	NM	NM	NM	
MW41 (2" RW)	TOC/Farmasonis	12/16/2014	9:42	356.14	NM	NM	NM	
MW41 (2" RW)	TOC/Farmasonis	03/17/2015	NM	356.14	NM	NM	NM	
MW42	TOC/Farmasonis	06/18/2014	9:16	356.43	DRY	DRY	DRY	
MW42	TOC/Farmasonis	09/24/2014	13:34	356.43	DRY	DRY	DRY	
MW42	TOC/Farmasonis	12/16/2014	11:20	356.43	DRY	DRY	DRY	
MW42	TOC/Farmasonis	03/17/2015	12:32	356.43	DRY	DRY	DRY	
MW43	56th Ave ROW	06/18/2014	11:41	358.84	35.81	323.03	--	
MW43	56th Ave ROW	09/24/2014	10:55	358.84	DRY	DRY	DRY	
MW43	56th Ave ROW	12/16/2014	12:27	358.84	34.90	323.94	--	
MW43	56th Ave ROW	03/17/2015	13:51	358.84	34.30	324.54	--	
MW44	56th Ave ROW	06/18/2014	8:39	354.93	DRY	DRY	DRY	
MW44	56th Ave ROW	09/24/2014	9:51	354.93	DRY	DRY	DRY	
MW44	56th Ave ROW	12/16/2014	11:44	354.93	DRY	DRY	DRY	
MW44	56th Ave ROW	03/17/2015	12:48	354.93	DRY	DRY	DRY	
MW45	56th Ave ROW	06/18/2014	9:24	356.49	DRY	DRY	DRY	
MW45	56th Ave ROW	09/24/2014	12:23	356.49	DRY	DRY	DRY	
MW45	56th Ave ROW	12/16/2014	11:24	356.49	DRY	DRY	DRY	
MW45	56th Ave ROW	03/17/2015	12:29	356.49	38.07	318.42	--	
MW46	56th Ave ROW	06/18/2014	11:45	357.00	40.97	316.03	--	
MW46	56th Ave ROW	09/24/2014	10:50	357.00	DRY	DRY	DRY	
MW46	56th Ave ROW	12/16/2014	12:32	357.00	DRY	DRY	DRY	
MW46	56th Ave ROW	03/17/2015	13:58	357.00	41.59	315.41	--	
MW47	56th Ave ROW	06/18/2014	11:48	355.47	40.86	314.61	--	
MW47	56th Ave ROW	09/24/2014	10:46	355.47	DRY	DRY	DRY	
MW47	56th Ave ROW	12/16/2014	12:35	355.47	DRY	DRY	DRY	
MW47	56th Ave ROW	03/17/2015	14:02	355.47	41.20	314.27	--	
MW48	56th Ave ROW	06/18/2014	8:34	355.41	39.99	315.42	--	
MW48	56th Ave ROW	09/24/2014	9:47	355.41	42.79	312.62	--	
MW48	56th Ave ROW	12/16/2014	11:38	355.41	43.25	312.16	--	
MW48	56th Ave ROW	03/17/2015	12:40	355.41	40.66	314.75	Trace	
MW49	56th Ave ROW	06/18/2014	9:25	356.44	40.84	315.60	--	
MW49	56th Ave ROW	09/24/2014	13:32	356.44	43.22	313.22	--	
MW49	56th Ave ROW	12/16/2014	NM	356.44	43.78	312.66	--	
MW49	56th Ave ROW	03/17/2015	12:30	356.44	41.46	314.98	--	
MW50	56th Ave ROW	06/18/2014	11:34	361.99	35.61	326.38	--	
MW50	56th Ave ROW	09/24/2014	11:00	361.99	DRY	DRY	DRY	
MW50	56th Ave ROW	12/16/2014	12:21	361.99	DRY	DRY	DRY	
MW50	56th Ave ROW	03/17/2015	13:38	361.99	34.17	327.82	--	
MW51	56th Ave ROW	06/18/2014	8:15	352.66	39.44	313.22	--	
MW51	56th Ave ROW	09/24/2014	10:06	352.66	41.56	311.10	--	
MW51	56th Ave ROW	12/16/2014	12:38	352.66	41.79	310.87	--	
MW51	56th Ave ROW	03/17/2015	14:04	352.66	39.54	313.12	--	
MW52	56th Ave ROW	06/18/2014	11:49	355.61	41.04	314.57	--	
MW52	56th Ave ROW	09/24/2014	10:44	355.61	43.60	312.01	--	
MW52	56th Ave ROW	12/16/2014	12:36	355.61	DRY	DRY	DRY	
MW52	56th Ave ROW	03/17/2015	14:01	355.61	41.50	314.11	--	
MW53	56th Ave ROW	06/18/2014	11:40	359.85	41.75	318.10	--	
MW53	56th Ave ROW	09/24/2014	10:56	359.85	43.95	315.90	--	
MW53	56th Ave ROW	12/16/2014	12:25	359.85	44.24	315.61	--	

TABLE 1-1
Depth-to-Groundwater/Depth-to-Product Level Measurements
First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, Washington

Well (a)	Property	Measurement Date	Measurement Time (24:00)	Reference Elevation (feet) (b)	DTW (feet) (c)	Groundwater Elevation (feet) (d, e)	LNAPL Thickness (feet)	Notes / Observations
MW53	56th Ave ROW	03/17/2015	13:47	359.85	41.00	318.85	--	
MW54	TOC/Farmasonis	06/18/2014	9:43	357.93	11.65	346.28	--	
MW54	TOC/Farmasonis	09/24/2014	13:18	357.93	15.21	342.72	--	
MW54	TOC/Farmasonis	12/16/2014	11:17	357.93	13.25	344.68	--	
MW54	TOC/Farmasonis	03/17/2015	12:16	357.93	10.77	347.16	--	
MW55	56th Ave ROW	06/18/2014	11:46	356.50	40.79	315.71	--	
MW55	56th Ave ROW	09/24/2014	10:48	356.50	43.78	312.72	--	
MW55	56th Ave ROW	12/16/2014	12:34	356.50	44.29	312.21	--	
MW55	56th Ave ROW	03/17/2015	13:59	356.50	41.12	315.38	--	
MW56	TOC/Farmasonis	06/18/2014	9:44	357.49	42.18	315.31	--	
MW56	TOC/Farmasonis	09/24/2014	13:17	357.49	44.30	313.19	--	
MW56	TOC/Farmasonis	12/16/2014	11:16	357.49	44.55	312.94	--	
MW56	TOC/Farmasonis	03/17/2015	12:17	357.49	42.04	315.45	Sheen	
MW57 (4" RW)	TOC/Farmasonis	06/18/2014	9:18	356.42	41.20	315.22	--	
MW57 (4" RW)	TOC/Farmasonis	09/24/2014	15:35	356.42	DRY	DRY	DRY	
MW57 (4" RW)	TOC/Farmasonis	12/16/2014	9:44	356.42	DRY	DRY	DRY	
MW57 (4" RW)	TOC/Farmasonis	03/17/2015	10:20	356.42	41.68	314.74	--	
MW58	TOC/Farmasonis	06/18/2014	9:14	355.40	40.55	314.85	--	
MW58	TOC/Farmasonis	09/24/2014	13:35	355.40	43.35	312.05	--	
MW58	TOC/Farmasonis	12/16/2014	11:20	355.40	43.68	311.72	--	
MW58	TOC/Farmasonis	03/17/2015	12:21	355.40	41.04	314.36	--	
MW59	TOC/Farmasonis	06/18/2014	9:49	356.51	41.17	315.34	--	
MW59	TOC/Farmasonis	09/24/2014	13:16	356.51	43.35	313.16	--	
MW59	TOC/Farmasonis	12/16/2014	11:15	356.51	43.64	312.87	--	
MW59	TOC/Farmasonis	03/17/2015	12:02	356.51	41.08	315.43	--	
MW60	56th Ave ROW	06/18/2014	11:42	358.58	41.61	316.97	--	
MW60	56th Ave ROW	09/24/2014	10:53	358.58	43.76	314.82	--	
MW60	56th Ave ROW	12/16/2014	12:29	358.58	44.23	314.35	--	
MW60	56th Ave ROW	03/17/2015	13:53	358.58	41.61	316.97	--	
MW61	56th Ave ROW	06/18/2014	11:44	357.17	10.67	346.50	--	
MW61	56th Ave ROW	09/24/2014	10:51	357.17	14.78	342.39	--	
MW61	56th Ave ROW	12/16/2014	12:31	357.17	10.40	346.77	--	
MW61	56th Ave ROW	03/17/2015	13:55	357.17	8.88	348.29	--	
MW62	56th Ave ROW	06/18/2014	11:38	360.50	12.00	348.50	--	
MW62	56th Ave ROW	09/24/2014	10:58	360.50	DRY	DRY	DRY	
MW62	56th Ave ROW	12/16/2014	12:23	360.50	11.96	348.54	--	
MW62	56th Ave ROW	03/17/2015	13:45	360.50	9.55	350.95	--	
MW63	56th Ave ROW	06/18/2014	8:37	355.11	40.71	314.40	--	
MW63	56th Ave ROW	09/24/2014	9:50	355.11	43.08	312.03	--	
MW63	56th Ave ROW	12/16/2014	11:39	355.11	43.32	311.79	--	
MW63	56th Ave ROW	03/17/2015	12:42	355.11	40.71	314.40	--	
MW64	56th Ave ROW	06/18/2014	8:36	355.18	38.76	316.42	--	
MW64	56th Ave ROW	09/24/2014	9:49	355.18	41.16	314.02	--	
MW64	56th Ave ROW	12/16/2014	11:39	355.18	41.12	314.06	--	
MW64	56th Ave ROW	03/17/2015	12:50	355.18	38.16	317.02	--	
MW65	Drake	06/18/2014	8:48	353.08	39.38	313.70	Sheen	
MW65	Drake	09/24/2014	9:29	353.08	41.89	311.19	--	
MW65	Drake	12/16/2014	11:52	353.08	42.00	311.08	--	
MW65	Drake	03/17/2015	13:35	353.08	39.40	313.68	--	
MW66	TOC/Farmasonis	06/18/2014	9:54	355.75	40.25	315.50	--	
MW66	TOC/Farmasonis	09/24/2014	12:08	355.75	NM	NM	NM	wellhead inaccessible (under surface water)
MW66	TOC/Farmasonis	12/16/2014	11:11	355.75	42.83	312.92	NM	wellhead inaccessible (under surface water)
MW66	TOC/Farmasonis	03/17/2015	11:53	355.75	40.02	315.73	--	
MW67	Drake	06/18/2014	8:30	355.73	12.51	343.22	--	
MW67	Drake	09/24/2014	9:42	355.73	16.89	338.84	--	
MW67	Drake	12/16/2014	11:45	355.73	14.96	340.77	--	
MW67	Drake	03/17/2015	12:51	355.73	12.03	343.70	--	
MW68	Drake	06/18/2014	8:40	355.11	12.19	342.92	--	
MW68	Drake	09/24/2014	9:39	355.11	16.51	338.60	--	
MW68	Drake	12/16/2014	11:49	355.11	14.51	340.60	--	
MW68	Drake	03/17/2015	12:52	355.11	11.70	343.41	--	
MW69 (2" RW)	Drake	06/18/2014	NM	353.76	NM	NM	NM	
MW69 (2" RW)	Drake	09/24/2014	NM	353.76	NM	NM	NM	
MW69 (2" RW)	Drake	12/16/2014	9:50	353.76	NM	NM	NM	
MW69 (2" RW)	Drake	03/17/2015	9:15	353.76	41.08	312.68	--	
MW70 (2" RW)	Drake	06/18/2014	NM	354.17	NM	NM	NM	

TABLE 1-1
Depth-to-Groundwater/Depth-to-Product Level Measurements
First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, Washington

Well (a)	Property	Measurement Date	Measurement Time (24:00)	Reference Elevation (feet) (b)	DTW (feet) (c)	Groundwater Elevation (feet) (d, e)	LNAPL Thickness (feet)	Notes / Observations
MW70 (2" RW)	Drake	09/24/2014	NM	354.17	NM	NM	NM	
MW70 (2" RW)	Drake	12/16/2014	9:58	354.17	NM	NM	NM	
MW70 (2" RW)	Drake	03/17/2015	NM	354.17	NM	NM	NM	
MW71	Shin/Choi	06/18/2014	8:00	347.92	12.22	336.07	0.46	
MW71	Shin/Choi	09/24/2014	10:19	347.92	16.10	332.80	1.23	
MW71	Shin/Choi	12/16/2014	13:01	347.92	15.27	333.60	1.19	
MW71	Shin/Choi	03/17/2015	14:33	347.92	12.12	336.18	0.47	
MW72	Shin/Choi	06/18/2014	8:05	347.38	14.69	333.03	0.43	
MW72	Shin/Choi	09/24/2014	10:23	347.38	17.88	329.85	0.44	
MW72	Shin/Choi	12/16/2014	12:58	347.38	17.37	330.13	0.15	
MW72	Shin/Choi	03/17/2015	14:50	347.38	14.09	333.29	--	
MW73	Shin/Choi	06/18/2014	8:07	347.33	37.26	310.07	--	
MW73	Shin/Choi	09/24/2014	10:26	347.33	39.11	308.22	--	
MW73	Shin/Choi	12/16/2014	12:55	347.33	39.61	307.72	--	
MW73	Shin/Choi	03/17/2015	14:41	347.33	38.04	309.29	--	
MW74	Shin/Choi	06/18/2014	8:02	347.94	36.59	311.35	--	
MW74	Shin/Choi	09/24/2014	10:16	347.94	38.92	309.02	--	
MW74	Shin/Choi	12/16/2014	12:53	347.94	DRY	DRY	DRY	
MW74	Shin/Choi	03/17/2015	14:38	347.94	37.08	310.86	--	
MW75	56th Ave ROW	06/18/2014	NM	354.78	NM	NM	NM	Not included in SOW for quarterly events.
MW75	56th Ave ROW	09/24/2014	NM	354.78	NM	NM	NM	Not included in SOW for quarterly events.
MW75	56th Ave ROW	12/16/2014	NM	354.78	NM	NM	NM	Not included in SOW for quarterly events.
MW75	56th Ave ROW	03/19/2015	9:50	354.78	41.48	313.30	--	
MW76	Drake	06/18/2014	9:09	351.69	37.37	314.32	--	
MW76	Drake	09/24/2014	9:23	351.69	40.30	311.39	--	
MW76	Drake	12/16/2014	12:05	351.69	40.16	311.53	--	
MW76	Drake	03/17/2015	13:13	351.69	37.34	314.35	--	
MW77	Drake	06/18/2014	8:58	349.95	36.69	313.26	--	
MW77	Drake	09/24/2014	9:14	349.95	39.18	310.77	--	screwdriver in well
MW77	Drake	12/16/2014	11:59	349.95	39.19	310.76	--	
MW77	Drake	03/17/2015	13:28	349.95	36.55	313.40	--	
MW78	Drake	06/18/2014	9:00	349.90	35.15	314.75	--	
MW78	Drake	09/24/2014	9:16	349.90	37.60	312.30	--	
MW78	Drake	12/16/2014	12:01	349.90	37.12	312.78	--	
MW78	Drake	03/17/2015	NM	349.90	NM	NM	--	wellhead inaccessible (construction box on top of well)
MW79	TOC/Farmasonis	06/18/2014	10:10	353.98	13.78	340.20	--	
MW79	TOC/Farmasonis	09/24/2014	12:17	353.98	DRY	DRY	DRY	
MW79	TOC/Farmasonis	12/16/2014	11:04	353.98	14.70	339.28	--	
MW79	TOC/Farmasonis	03/17/2015	11:35	353.98	12.22	341.76	--	
MW80	TOC/Farmasonis	06/18/2014	10:08	353.83	14.13	339.70	--	
MW80	TOC/Farmasonis	09/24/2014	12:16	353.83	19.20	334.63	--	
MW80	TOC/Farmasonis	12/16/2014	11:05	353.83	16.40	337.43	--	
MW80	TOC/Farmasonis	03/17/2015	11:40	353.83	12.98	340.85	--	Silt on bottom of well.
MW81	TOC/Farmasonis	06/18/2014	10:04	355.60	40.46	315.14	--	
MW81	TOC/Farmasonis	09/24/2014	12:13	355.60	42.89	312.71	--	
MW81	TOC/Farmasonis	12/16/2014	11:29	355.60	43.02	312.58	--	
MW81	TOC/Farmasonis	03/17/2015	11:52	355.60	40.67	314.93	--	
MW82	TOC/Farmasonis	06/18/2014	10:06	355.59	28.44	327.15	--	
MW82	TOC/Farmasonis	09/24/2014	12:16	355.59	DRY	DRY	DRY	
MW82	TOC/Farmasonis	12/16/2014	11:03	355.59	27.43	328.16	--	
MW82	TOC/Farmasonis	03/17/2015	11:42	355.59	28.95	326.64	--	
MW83	TOC/Farmasonis	NA	NA	NA	NA	NA	NA	**WELL DECOMMISSIONED 11/21/2011 (REPLACED WITH MW100)**
MW84	Drake	06/18/2014	8:20	353.75	40.07	313.68	--	Former RW (pump removed 09/17/2013)
MW84	Drake	09/23/2014	9:00	353.75	42.47	311.28	--	Wellhead inaccessible during measurement event 09/24/2014 (car parked on top). Data represents measurement taken at time of sample collection.
MW84	Drake	12/16/2014	9:52	353.75	42.90	310.85	--	
MW84	Drake	03/17/2015	10:40	353.75	40.19	313.56	--	
MW85	Drake	06/18/2014	8:55	351.28	37.81	313.47	--	
MW85	Drake	09/24/2014	9:06	351.28	40.30	310.98	--	
MW85	Drake	12/16/2014	11:57	351.28	40.51	310.77	--	
MW85	Drake	03/17/2015	13:02	351.28	37.82	313.46	--	
MW86	Drake	06/18/2014	8:53	352.72	39.18	313.54	--	
MW86	Drake	09/24/2014	8:50	352.72	41.70	311.02	--	
MW86	Drake	12/16/2014	11:54	352.72	42.00	310.72	--	
MW86	Drake	03/17/2015	13:05	352.72	39.33	313.39	--	
MW87	Drake	06/18/2014	9:06	349.72	36.68	313.04	--	

TABLE 1-1
Depth-to-Groundwater/Depth-to-Product Level Measurements
First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, Washington

Well (a)	Property	Measurement Date	Measurement Time (24:00)	Reference Elevation (feet) (b)	DTW (feet) (c)	Groundwater Elevation (feet) (d, e)	LNAPL Thickness (feet)	Notes / Observations
MW87	Drake	09/24/2014	9:20	349.72	39.19	310.53	--	
MW87	Drake	12/16/2014	12:02	349.72	38.92	310.80	--	
MW87	Drake	03/17/2015	13:27	349.72	36.40	313.32	--	
MW88	Drake	06/18/2014	9:11	351.63	15.99	335.64	--	
MW88	Drake	09/24/2014	9:26	351.63	21.25	330.38	--	
MW88	Drake	12/16/2014	12:06	351.63	22.30	329.33	--	
MW88	Drake	03/17/2015	13:12	351.63	14.95	336.68	--	
MW89	Drake	06/18/2014	8:17	353.86	39.98	313.88	--	
MW89	Drake	09/24/2014	9:56	353.86	42.58	311.28	--	
MW89	Drake	12/16/2014	11:47	353.86	42.93	310.93	--	
MW89	Drake	03/17/2015	12:57	353.86	40.25	313.61	--	
MW90 (4" RW)	TOC	06/18/2014	11:24	362.87	24.95	337.92	--	
MW90 (4" RW)	TOC	09/24/2014	14:58	362.87	30.17	332.70	--	
MW90 (4" RW)	TOC	12/16/2014	9:25	362.87	26.80	336.07	--	
MW90 (4" RW)	TOC	03/17/2015	9:36	362.87	22.72	340.15	--	
MW91 (4" RW)	TOC	06/18/2014	11:20	362.67	25.20	337.47	--	
MW91 (4" RW)	TOC	09/24/2014	12:51	362.67	28.63	334.04	--	
MW91 (4" RW)	TOC	12/16/2014	9:19	362.67	26.70	335.97	--	
MW91 (4" RW)	TOC	03/17/2015	9:40	362.67	23.29	339.38	--	
MW92 (4" RW)	TOC/Farmasonis	06/18/2014	9:33	357.91	42.08	315.83	--	
MW92 (4" RW)	TOC/Farmasonis	09/24/2014	15:32	357.91	44.69	313.22	--	
MW92 (4" RW)	TOC/Farmasonis	12/16/2014	9:41	357.91	44.91	313.00	--	
MW92 (4" RW)	TOC/Farmasonis	03/17/2015	10:16	357.91	42.31	315.60	--	
MW93 (4" RW)	TOC/Farmasonis	06/18/2014	9:51	355.97	40.31	315.66	--	
MW93 (4" RW)	TOC/Farmasonis	09/24/2014	15:27	355.97	DRY	DRY	DRY	
MW93 (4" RW)	TOC/Farmasonis	12/16/2014	9:35	355.97	DRY	DRY	DRY	
MW93 (4" RW)	TOC/Farmasonis	03/17/2015	10:08	355.97	40.48	315.49	--	
MW94 (4" RW)	TOC/Farmasonis	06/18/2014	9:14	357.94	DRY	DRY	DRY	
MW94 (4" RW)	TOC/Farmasonis	09/24/2014	15:30	357.94	DRY	DRY	DRY	
MW94 (4" RW)	TOC/Farmasonis	12/16/2014	9:38	357.94	DRY	DRY	DRY	
MW94 (4" RW)	TOC/Farmasonis	03/17/2015	10:12	357.94	DRY	DRY	DRY	
MW95 (4" RW)	Drake	06/18/2014	8:22	354.67	40.34	314.33	--	
MW95 (4" RW)	Drake	09/24/2014	9:52	354.67	42.84	311.83	--	
MW95 (4" RW)	Drake	12/16/2014	9:49	354.67	43.08	311.59	--	
MW95 (4" RW)	Drake	03/17/2015	10:35	354.67	40.37	314.30	--	
MW96 (4" RW)	Drake	06/18/2014	8:32	356.00	41.17	314.83	--	
MW96 (4" RW)	Drake	09/24/2014	9:43	356.00	43.60	312.40	--	
MW96 (4" RW)	Drake	12/16/2014	9:46	356.00	43.92	312.08	--	
MW96 (4" RW)	Drake	03/17/2015	10:30	356.00	41.22	314.78	--	
MW97 (4" RW)	Drake	06/18/2014	8:41	354.29	39.98	314.31	--	
MW97 (4" RW)	Drake	09/24/2014	9:35	354.29	42.49	311.80	--	
MW97 (4" RW)	Drake	12/16/2014	9:57	354.29	42.74	311.55	--	
MW97 (4" RW)	Drake	03/17/2015	10:50	354.29	40.09	314.20	--	
MW98 (4" RW)	Drake	06/18/2014	8:28	354.75	DRY	DRY	DRY	
MW98 (4" RW)	Drake	09/24/2014	NM	354.75	NM	NM	NM	wellhead inaccessible (car parked on top)
MW98 (4" RW)	Drake	12/16/2014	9:54	354.75	43.27	311.48	--	
MW98 (4" RW)	Drake	03/17/2015	10:45	354.75	40.81	313.94	--	
MW99 (4" RW)	Drake	06/18/2014	8:44	353.58	DRY	DRY	DRY	
MW99 (4" RW)	Drake	09/24/2014	9:33	353.58	DRY	DRY	DRY	
MW99 (4" RW)	Drake	12/16/2014	10:00	353.58	DRY	DRY	DRY	
MW99 (4" RW)	Drake	03/17/2015	10:54	353.58	DRY	DRY	DRY	
MW100	TOC/Farmasonis	06/18/2014	10:02	355.75	16.51	339.24	--	
MW100	TOC/Farmasonis	09/24/2014	12:12	355.75	20.49	335.26	--	
MW100	TOC/Farmasonis	12/16/2014	11:30	355.75	17.90	337.85	--	
MW100	TOC/Farmasonis	03/17/2015	11:49	355.75	14.40	341.35	--	
MW101 (4" RW)	Drake	06/18/2014	8:50	352.05	38.54	313.51	Sheen	
MW101 (4" RW)	Drake	09/24/2014	NM	352.05	NM	NM	NM	wellhead inaccessible (car parked on top)
MW101 (4" RW)	Drake	12/16/2014	10:03	352.05	41.13	310.92	--	
MW101 (4" RW)	Drake	03/17/2015	10:57	352.05	38.46	313.59	--	
MW102	Herman	06/18/2014	NM	352.39	NM	NM	NM	wellhead inaccessible (car parked on top)
MW102	Herman	09/24/2014	10:32	352.39	16.84	335.55	0.19	
MW102	Herman	12/13/2014	14:45	352.39	44.15	308.24	--	Wellhead inaccessible during measurement event 12/16/2014 (car parked on top). Data represents measurement taken at time of sample collection.
MW102	Herman	03/17/2015	14:18	352.39	15.28	337.89	0.97	
MW103	Herman	06/19/2014	9:30	352.39	14.90	337.49	0.96	Wellhead inaccessible during measurement event 06/18/2014 (car parked on top). Data represents measurement taken at time of sample collection.

TABLE 1-1

Depth-to-Groundwater/Depth-to-Product Level Measurements

First Quarter 2015

TOC Facility #01-176; Mountlake Terrace, Washington

Well (a)	Property	Measurement Date	Measurement Time (24:00)	Reference Elevation (feet) (b)	DTW (feet) (c)	Groundwater Elevation (feet) (d, e)	LNAPL Thickness (feet)	Notes / Observations
MW103	Herman	09/24/2014	10:30	352.21	33.32	318.89	--	
MW103	Herman	12/16/2014	12:47	352.21	43.82	308.39	--	
MW103	Herman	03/17/2015	14:23	352.21	41.00	311.21	--	
MW104	Herman	06/18/2014	7:53	353.00	11.18	341.82	Sheen	
MW104	Herman	09/24/2014	10:08	353.00	16.18	336.82	--	
MW104	Herman	12/16/2014	12:44	353.00	13.94	339.06	--	
MW104	Herman	03/17/2015	14:10	353.00	11.93	341.07	--	
MW105	Herman	06/18/2014	7:55	353.05	39.76	313.29	--	
MW105	Herman	09/24/2014	10:10	353.05	DRY	DRY	DRY	
MW105	Herman	12/16/2014	12:43	353.05	DRY	DRY	DRY	
MW105	Herman	03/17/2015	14:11	353.05	40.47	312.58	--	
MW106	Herman	06/18/2014	13:50	349.24	13.25	335.99	--	
MW106	Herman	09/24/2014	10:13	349.24	18.19	331.05	--	
MW106	Herman	12/16/2014	12:50	349.24	12.07	337.17	--	
MW106	Herman	03/17/2015	14:25	349.24	11.04	338.20	--	
MW107	Herman	06/18/2014	15:10	349.56	37.47	312.09	--	
MW107	Herman	09/24/2014	10:11	349.56	39.75	309.81	--	
MW107	Herman	12/16/2014	12:49	349.56	39.75	309.81	--	
MW107	Herman	03/17/2015	14:35	349.56	37.11	312.45	--	

Notes:

(a) Remediation wells (identified as "RW") are connected to a multi-phase extraction system and are 2 or 4 inches in diameter.

(b) Reference elevation is the north side of the top of the well casing (except for MW25 where the reference elevation is the high point on the PVC casing and for MW99 where the reference elevation is the top of the well cap). Elevations are measured in feet above mean sea level (North American Vertical Datum of 1988 [NAVD88]). Referenece elevations surveys were conducted by PACE Engineers, Inc., in April and May 2014.

(c) DTW/DTP was measured from surveyed reference elevation [see note (b)].

(d) Where LNAPL thickness was measured, groundwater elevation was adjusted to account for the presence of LNAPL using the method from "Estimation of Free Hydrocrabon Volume from Fluid Levels in Monitoring Wells" (Lenhard & Parker).

(e) Groundwater elevation represents "system off" data (i.e., natural site conditions).

Definitions:

-- = No measurable product or odor observed.

DRY = Unable to measure DTW due to insufficient groundwater (in monitoring well) or groundwater level was below the top of pump (in remediation well).

Trace = Groundwater has <0.01 of measureable LNAPL.

Sheen = Iridescence on surface of groundwater that is indicative of LNAPL.

Acronyms:

DTP = depth-to-product

DTW = depth-to-groundwater

LNAPL = liquid non-aqueous phase liquid

NA = not available

NM = not measured

RW = remediation well

List of Properties:

TOC = 24205 56th Avenue West, Mountlake Terrace WA

TOC/Farmasonis = 24225 56th Avenue West, Mountlake Terrace WA

Drake = 24309 56th Avenue West, Mountlake Terrace WA

Herman = 24311 56th Avenue West, Mountlake Terrace WA

Shin/Choi = 24325 56th Avenue West, Mountlake Terrace WA

56th Ave ROW = right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties

242nd St ROW = portion of right-of-way adjacent to TOC Property

References:

Lenhard, R. J. & Parker, J. C. Estimation of Free Hydrocarbon Volume from Fluid Levels in Monitoring Wells. Groundwater, 28: 57–67. doi: 10.1111/j.1745-6584.1990.tb02229.x. January 1990.

TABLE 2-1
Groundwater Quality Results for Selected Constituents
Shallow Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)								
					Total Petroleum Hydrocarbons			Volatile Organic Compounds					
					Method NWTPH-Gx	Method NWTPH-Dx		Method SW8021B / SW8260C[1]					
					Gasoline-Range (GRPH)	Motor Oil-Range (ORPH)	Diesel-Range (DRPH)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	m, p-Xylene	o-Xylene
MTCA Method A Cleanup Level (µg/L)[2]					**1,000/800[3]**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**NE[4]**	**NE[4]**
MW02	TOC	12/10/2014	MW02	Peristaltic Pump	100U	NA	NA	1U[a]	1U[a]	1U[a]	3U	NA	NA
		3/14/2015	MW02	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/14/2015	MLT-01*	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW03	TOC	12/10/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/14/2015	MW03	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW04	56th Ave ROW	3/14/2015	MW04	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW05	242nd St ROW	3/18/2015	MW05	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW06	TOC	3/13/2015	MW06	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW-12	56th Ave ROW	12/10/2014	MW12	Peristaltic Pump	100U	NA	NA	1U[a]	1U[a]	1U[a]	3U	NA	NA
		3/12/2015	MW12	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW19	TOC	12/11/2014	MW19	Peristaltic Pump	100U	NA	NA	1U[a]	1U[a]	1U[a]	3U	NA	NA
		3/14/2015	MW19	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW34	TOC	3/13/2015	MW34	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW54	TOC/Farmasonis	6/12/2014	MW54	Peristaltic Pump	100U	250U	50U	1U	1U	1U	3U	NA	NA
		9/18/2014	MW54	Peristaltic Pump	100U	250U	50U	1U	1U	1U	3U	NA	NA
		12/11/2014	MW54	Bailer	100U	NA	NA	0.35U	1U	1U	2U[b]	2U	1U
		3/12/2015	MW54	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW61	56th Ave ROW	3/13/2015	MW61	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW62	56th Ave ROW	3/13/2015	MW62	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW67	Drake	6/17/2014	MW67	Peristaltic Pump	100U	250U	50U	1U	1U	1U	3U	NA	NA
		9/20/2014	MW67	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		12/11/2014	MW67	Peristaltic Pump	100U	NA	NA	0.35U	1U	1U	2U[b]	2U	1U
		3/16/2015	MW67	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW68	Drake	6/17/2014	MW68	Peristaltic Pump	100U	250U	50U	1U	1U	1U	3U	NA	NA
		9/20/2014	MW68	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		12/17/2014	MW68	Peristaltic Pump	100U	NA	NA	0.35U	1U	1U	2U[b]	2U	1U
		3/16/2015	MW68	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW71	Shin/Choi	6/13/2014	MW71-P**	Peristaltic Pump	NA	NA	NA	NA	NA	NA	NA	NA	NA
		12/16/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/17/2015	*Not Sampled****	*Not Sampled****	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW72	Shin/Choi	6/13/2014	MW72-P**	Peristaltic Pump	NA	NA	NA	NA	NA	NA	NA	NA	NA
		12/16/2014	*Not Sampled****	*Not Sampled****	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/19/2015	MW72	Bailer	**130,000**	500U	**15,000**	**1,400**	**15,000**	**2,300**	**18,000**	NA	NA
MW79	TOC/Farmasonis	3/12/2015	MW79	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW80	TOC/Farmasonis	3/12/2015	MW80	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW102	Herman	6/19/2014	MW102-P**	Peristaltic Pump	NA	NA	NA	NA	NA	NA	NA	NA	NA
		12/17/2014	*Not Sampled****	*Not Sampled****	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/17/2015	*Not Sampled****	*Not Sampled****	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW104	Herman	6/17/2014	MW104	Peristaltic Pump	**2,400**	**260JL**	**1,700JL**	1U	**10**	**57**	**210**	NA	NA
		9/23/2014	MW104	Peristaltic Pump	**45,000**	**370**	**7,500**	**35[a]**	**6,700[a]**	**2,000[a]**	**7,300[b]**	**5,200**	**2,100**
		9/23/2014	MLT-02*	Peristaltic Pump	**47,000**	**400**	**8,300**	**32[a]**	**6,000[a]**	**1,700[a]**	**6,400[b]**	**4,600**	**1,800**
		12/17/2014	MW-104	Peristaltic Pump	**52,000**	**740**	**11,000**	**71**	**6,300**	**1,700**	**7,400[b]**	**5,200**	**2,200**
		12/17/2014	MLT-03*	Peristaltic Pump	**54,000**	**730**	**10,000**	**69**	**6,300**	**1,700**	**7,400[b]**	**5,200**	**2,200**
		3/16/2015	MW104	Peristaltic Pump	**14,000**	**730**	**11,000**	**0.84**	**63**	**560**	**2,460**	NA	NA
		3/16/2015	MLT-07*	Peristaltic Pump	**15,000**	**750**	**11,000**	**0.92**	**67**	**540**	**2,450**	NA	NA
MW106	Herman	6/18/2014	MW106	Peristaltic Pump	100U	250U	**320JL**	1U	1U	1U	3U	NA	NA
		9/21/2014	MW106	Peristaltic Pump	100U	250U	**400**	1U	1U	1U	3U	NA	NA
		12/15/2014	MW106	Peristaltic Pump	100U	250U	**130**	0.35U	1U	**2.2**	2U[b]	2U	1U
		3/19/2015	MW106	Peristaltic Pump	100U	500U	**160**	1U	1U	1U	3U	NA	NA

TABLE 2-1
Groundwater Quality Results for Selected Constituents
Shallow Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

NOTES & DEFINITIONS:

Shallow Zone wells are <20 feet below ground surface.

Groundwater quality results are provided for the Second, Third and Fourth Quarter 2014 field events and the First Quarter 2015 field event.

Groundwater samples were analyzed by Friedman & Bruya, Inc. The analytical laboratory reports are included as **Appendix B.**

Groundwater quality results for selected constituents are presented based on exceedance of MTCA Method A Cleanup Levels.

Red denotes sample concentration exceeds MTCA Method A Cleanup Levels for groundwater.

Black denotes sample concentration was detected but does not exceed MTCA Method A Cleanup Levels for groundwater.

(1) If samples were analyzed by two methods, the maximum concentration of the two analyses is reported.

(2) MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised October 12, 2007.

(3) Cleanup level is 1,000 µg/L when benzene is not present and 800 µg/L when benzene is present.

(4) Cleanup level for individual xylenes has not been established.

(a) Represents the maximum concentration for the two analytical methods.

(b) Calculated concentration based on the sum of the detected concentrations for m,p-xylene and o-xylene.

* = Indicates blind field duplicate sample was collected for quality assurance/quality control purposes.

** = Indicates product (LNAPL) sample was collected.

*** = Well was not sampled due to the presence of product (LNAPL) in the well.

DRY = Indicates well could not be sampled due to insufficient groundwater sample volume.

NA = Indicates the compound was not analyzed.

NE = Indicates MTCA Method A Cleanup Level has not been established.

NS = Indicates well was not sampled.

LABORATORY NOTES:

JL = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. Qualifier was assigned by the laboratory based on their quality control protocol.

U = Indicates the compound was undetected at the method reporting limit.

ACRONYMS:

µg/L = micrograms per liter

LNAPL = liquid non-aqueous phase liquid

MTCA = Model Toxics Control Act

NWTPH-Dx = Northwest Total Petroleum Hydrocarbon - diesel-range organics

NWTPH-Gx = Northwest Total Petroleum Hydrocarbon - gasoline-range organics

LIST OF PROPERTIES:

TOC = 24205 56th Avenue West, Mountlake Terrace WA

TOC/Farmasonis = 24225 56th Avenue West, Mountlake Terrace WA

Drake = 24309 56th Avenue West, Mountlake Terrace WA

Herman = 24311 56th Avenue West, Mountlake Terrace WA

Shin/Choi = 24325 56th Avenue West, Mountlake Terrace WA

56th Ave ROW = portion of right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties

242nd St ROW = portion of right-of-way adjacent to TOC Property

TABLE 2-2
Groundwater Quality Results for Common Fuel Additives
Shallow Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)				
					Volatile Organic Compounds			Metals	
					Method SW8260C		Method 8011M	Method 200.8	
					Methyl t-butyl ether (MTBE)	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Dissolved Lead	Total Lead
MTCA Method A Cleanup Level (µg/L)[1]					20	5	0.01	15	15
MW02	TOC	12/10/2014	MW02	Peristaltic Pump	NA	NA	NA	NA	NA
		3/14/2015	MW02	Peristaltic Pump	NA	NA	NA	NA	NA
		3/14/2015	MLT-01*	Peristaltic Pump	NA	NA	NA	NA	NA
MW03	TOC	12/10/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/14/2015	MW03	Peristaltic Pump	NA	NA	NA	NA	NA
MW04	56th Ave ROW	3/14/2015	MW04	Peristaltic Pump	NA	NA	NA	NA	NA
MW05	242nd St ROW	3/18/2015	MW05	Peristaltic Pump	NA	NA	NA	NA	NA
MW06	TOC	3/13/2015	MW06	Peristaltic Pump	NA	NA	NA	NA	NA
MW-12	56th Ave ROW	12/10/2014	MW12	Peristaltic Pump	NA	NA	NA	NA	NA
		3/12/2015	MW12	Peristaltic Pump	NA	NA	NA	NA	NA
MW19	TOC	12/11/2014	MW19	Peristaltic Pump	NA	NA	NA	NA	NA
		3/14/2015	MW19	Peristaltic Pump	NA	NA	NA	NA	NA
MW34	TOC	3/13/2015	MW34	Peristaltic Pump	NA	NA	NA	NA	NA
MW54	TOC/Farmasonis	6/12/2014	MW54	Peristaltic Pump	1U	NA	NA	NA	NA
		9/18/2014	MW54	Peristaltic Pump	1U	NA	NA	NA	NA
		12/11/2014	MW54	Bailer	1U	NA	NA	NA	NA
		3/12/2015	MW54	Peristaltic Pump	NA	NA	NA	NA	NA
MW61	56th Ave ROW	3/13/2015	MW61	Bailer	NA	NA	NA	NA	NA
MW62	56th Ave ROW	3/13/2015	MW62	Peristaltic Pump	NA	NA	NA	NA	NA
MW67	Drake	6/17/2014	MW67	Peristaltic Pump	1U	NA	NA	NA	NA
		9/20/2014	MW67	Peristaltic Pump	1U	NA	NA	NA	NA
		12/11/2014	MW67	Peristaltic Pump	1U	NA	NA	NA	NA
		3/16/2015	MW67	Peristaltic Pump	1U	NA	NA	NA	NA
MW68	Drake	6/17/2014	MW68	Peristaltic Pump	1U	NA	NA	NA	NA
		9/20/2014	MW68	Peristaltic Pump	1U	NA	NA	NA	NA
		12/17/2014	MW68	Peristaltic Pump	1U	NA	NA	NA	NA
		3/16/2015	MW68	Peristaltic Pump	1U	NA	NA	NA	NA
MW71	Shin/Choi	6/13/2014	MW71-P**	Peristaltic Pump	NA	NA	NA	NA	NA
		12/16/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/17/2015	*Not Sampled****	*Not Sampled****	NS	NS	NS	NS	NS
MW72	Shin/Choi	6/13/2014	MW72-P**	Peristaltic Pump	NA	NA	NA	NA	NA
		12/16/2014	*Not Sampled****	*Not Sampled****	NS	NS	NS	NS	NS
		3/19/2015	MW72	Bailer	1U	1U	**0.37**	**4.15**	**7.62**
MW79	TOC/Farmasonis	3/12/2015	MW79	Peristaltic Pump	NA	NA	NA	NA	NA
MW80	TOC/Farmasonis	3/12/2015	MW80	Peristaltic Pump	NA	NA	NA	NA	NA
MW102	Herman	6/19/2014	MW102-P**	Peristaltic Pump	NA	NA	NA	NA	NA
		12/17/2014	*Not Sampled****	*Not Sampled****	NS	NS	NS	NS	NS
		3/17/2015	*Not Sampled****	*Not Sampled****	NS	NS	NS	NS	NS

TABLE 2-2
Groundwater Quality Results for Common Fuel Additives
Shallow Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)				
					Volatile Organic Compounds			Metals	
					Method SW8260C		Method 8011M	Method 200.8	
					Methyl t-butyl ether (MTBE)	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Dissolved Lead	Total Lead
MTCA Method A Cleanup Level (µg/L)[(1)]					20	5	0.01	15	15
MW104	Herman	6/17/2014	MW104	Peristaltic Pump	1U	1U	0.01U	1U	1U
		9/23/2014	MW104	Peristaltic Pump	10U	10U	**0.13**	1U	1U
		9/23/2014	MLT-02*	Peristaltic Pump	10U	10U	**0.13**	1U	1U
		12/17/2014	MW-104	Peristaltic Pump	1U	NA	NA	1U	1U
		12/17/2014	MLT-03*	Peristaltic Pump	1U	NA	NA	1U	1U
		3/16/2015	MW104	Peristaltic Pump	1U	1U	0.01U	1U	1U
		3/16/2015	MLT-07*	Peristaltic Pump	1U	1U	0.01U	1U	1U
MW106	Herman	6/18/2014	MW106	Peristaltic Pump	1U	1U	0.01U	1U	1U
		9/21/2014	MW106	Peristaltic Pump	1U	1U	0.01U	1U	1U
		12/15/2014	MW106	Peristaltic Pump	1U	NA	NA	1U	1U
		3/19/2015	MW106	Peristaltic Pump	1U	1U	0.01U	1U	1U

NOTES & DEFINITIONS:

Shallow Zone wells are <20 feet below ground surface.
Groundwater quality results are provided for the Second, Third and Fourth Quarter 2014 field events and the First Quarter 2015 field event.
Groundwater samples were analyzed by Friedman & Bruya, Inc. The analytical laboratory reports are included as **Appendix B.**
Groundwater quality results for selected constituents are presented based on exceedance of MTCA Method A Cleanup Levels.
Red denotes sample concentration exceeds MTCA Method A Cleanup Levels for groundwater.
Black denotes sample concentration was detected but does not exceed MTCA Method A Cleanup Levels for groundwater.
[(1)] MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised October 12, 2007.
* = Indicates blind field duplicate sample was collected for quality assurance/quality control purposes.
** = Indicates product (LNAPL) sample was collected.
*** = Well was not sampled due to the presence of product (LNAPL) in the well.
DRY = Indicates well could not be sampled due to insufficient groundwater sample volume.
NA = Indicates the compound was not analyzed.
NS = Indicates well was not sampled.

ACRONYMS:

µg/L = micrograms per liter
LNAPL = liquid non-aqueous phase liquid
MTCA = Model Toxics Control Act

LABORATORY NOTES:

U = Indicates the compound was undetected at the method reporting limit.

LIST OF PROPERTIES:

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TOC/Farmasonis = 24225 56th Avenue West, Mountlake Terrace WA
Drake = 24309 56th Avenue West, Mountlake Terrace WA
Herman = 24311 56th Avenue West, Mountlake Terrace WA
Shin/Choi = 24325 56th Avenue West, Mountlake Terrace WA
56th Ave ROW = portion of right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties
242nd St ROW = portion of right-of-way adjacent to TOC Property

TABLE 3-1
Groundwater Quality Results for Selected Constituents
Intermediate Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

					Analytical Results (µg/L)								
					Total Petroleum Hydrocarbons			Volatile Organic Compounds					
					Method NWTPH-Gx	Method NWTPH-Dx		Method SW8021B / SW8260C[2]					
Well[1]	Property	Sample Date	Sample Identifier	Sample Method	Gasoline-Range (GRPH)	Motor Oil-Range (ORPH)	Diesel-Range (DRPH)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	m, p-Xylene	o-Xylene
MTCA Method A Cleanup Level (µg/L)[3]					**1,000/800[4]**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**NE[5]**	**NE[5]**
MW10	TOC	6/16/2014	MW10	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/20/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		#########	MW10	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/19/2015	MW10	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW11 (4" RW)	TOC	3/11/2015	MW11	Pneumatic Pump	**190**	NA	NA	1U	1U	**3.8**	**3.1**	NA	NA
MW13	56th Ave ROW	3/13/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW15	TOC	6/11/2014	MW15	Pneumatic Pump	**270**	NA	NA	1U	1U	**2.2**	**7.3**	NA	NA
		9/18/2014	MW15	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/12/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW20	TOC	6/13/2014	MW20	Submersible Pump	**110**	250U	**170J**	**12J**	**5.8J**	**1.8**	**5.8**	NA	NA
		6/13/2014	MLT-02*	Submersible Pump	**110**	250U	**230J**	**12J**	**6J**	**1.8**	**6.3**	NA	NA
		9/22/2014	MW20	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/22/2014	MLT-01*	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/14/2015	MW20	Submersible Pump	100U	500U	**140J**	1U	1U	1U	3U	NA	NA
		3/14/2015	MLT-03*	Submersible Pump	100U	500U	100UJ	1U	1U	1U	3U	NA	NA
MW23	TOC	3/12/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW25	TOC	3/20/2015	MW25	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW31 (2" RW)	TOC/Farmasonis	6/11/2014	MW31	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/18/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		#########	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/11/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW32 (4" RW)	TOC	6/10/2014	MW32	Pneumatic Pump	**2,100**	NA	NA	**2.6**	**30**	**32**	**180**	NA	NA
		9/18/2014	MW32	Pneumatic Pump	**450**	NA	NA	**2.9**	**4.7**	**15**	**26**	NA	NA
		#########	MW32	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/11/2015	MW32	Pneumatic Pump	**680**	NA	NA	**1.7**	**7.8**	**16**	**62**	NA	NA
MW33	TOC	6/11/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/18/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		#########	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/13/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW35	TOC	3/12/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW36	TOC	3/12/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW41	TOC/Farmasonis	3/11/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW42	TOC/Farmasonis	3/13/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW44	56th Ave ROW	3/20/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW45	56th Ave ROW	6/13/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/18/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		#########	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/20/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW46	56th Ave ROW	3/13/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW47	56th Ave ROW	3/20/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW48	56th Ave ROW	6/12/2014	MW48	Bailer	**10,000**	NA	NA	1U	**11**	**37**	**610**	NA	NA
		9/18/2014	MW48	Bailer	**8,500**	NA	NA	5U	**12**	5U	**100**	NA	NA
		#########	MW48	Bailer	**7,700**	NA	NA	**67**	**21**	20U	**440**	NA	NA
		3/20/2015	MW48	Bailer	**12,000**	NA	NA	**120**	**52**	40U	**1,900**	NA	NA
MW49	56th Ave ROW	6/14/2014	MW49	Submersible Pump	100U	NA	NA	**1.5**	**1.6**	1U	3U	NA	NA
		9/22/2014	MW49	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW49	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/16/2015	MW49	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW50	56th Ave ROW	6/13/2014	MW50	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/19/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		#########	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/20/2015	MW50	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA

TABLE 3-1
Groundwater Quality Results for Selected Constituents
Intermediate Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well[1]	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)								
					Total Petroleum Hydrocarbons			Volatile Organic Compounds					
					Method NWTPH-Gx	Method NWTPH-Dx		Method SW8021B / SW8260C[2]					
					Gasoline-Range (GRPH)	Motor Oil-Range (ORPH)	Diesel-Range (DRPH)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	m, p-Xylene	o-Xylene
MTCA Method A Cleanup Level (µg/L)[3]					**1,000/800[4]**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**NE[5]**	**NE[5]**
MW51	56th Ave ROW	6/17/2014	MW51	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/20/2014	MW51	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW51	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/20/2015	MW51	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW52	56th Ave ROW	6/13/2014	MW52	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/20/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		#########	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/20/2015	MW52	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW53	56th Ave ROW	6/19/2014	MW53	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/24/2014	MW53	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW53	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/13/2015	MW53	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW55	56th Ave ROW	6/19/2014	MW55	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/24/2014	MW55	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW55	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/13/2015	MW55	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW56	TOC/Farmasonis	6/14/2014	MW56	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/22/2014	MW56	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW56	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/14/2015	MW56	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW57 (4" RW)	TOC/Farmasonis	#########	MW57	Pneumatic Pump	**4,700**	NA	NA	**2.2**	**2.8**	**62**	**416[b]**	**400**	**16**
		3/11/2015	MW57	Pneumatic Pump	**110**	NA	NA	1U	1U	**2**	**11**	NA	NA
MW58	TOC/Farmasonis	6/14/2014	MW58	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/22/2014	MW58	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW58	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/16/2015	MW58	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW59	TOC/Farmasonis	6/14/2014	MW59	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/22/2014	MW59	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW59	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/14/2015	MW59	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW60	56th Ave ROW	6/19/2014	MW60	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/25/2014	MW60	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW60	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/13/2015	MW60	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW63	56th Ave ROW	6/19/2014	MW63	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/23/2014	MW63	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW63	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/20/2015	MW63	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW65	Drake	6/17/2014	MW65	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/23/2014	MW65	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW65	Bailer	100U	NA	NA	0.35U	1U	1U	2U[b]	2U	1U
		3/18/2015	MW65	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/18/2015	MLT-05*	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW66	TOC/Farmasonis	6/11/2014	MW66	Bailer	100U	250U	50U	1U	1U	1U	3U	NA	NA
		9/20/2014	MW66	Bailer	100U	250U	50U	1U	1U	1U	3U	NA	NA
		#########	MW66	Bailer	100U	250U	**190**	0.35U	1U	1U	2U[b]	2U	1U
		3/20/2015	MW66	Bailer	100U	500U	**120**	1U	1U	1U	3U	NA	NA
MW69 (2" RW)	Drake	6/19/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		9/23/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		#########	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/20/2015	MW69	Pneumatic Pump	**2,700**	NA	NA	1U	**1.9**	**32**	**140[b]**	NA	NA
MW70 (2" RW)	Drake	6/20/2014	MW70	Pneumatic Pump	100U	300U	**85JL**	1U	1U	1U	3U	NA	NA
		9/19/2014	MW70	Pneumatic Pump	100U	250U	**110**	1U	1U	1U	3U	NA	NA
		#########	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/11/2015	MW70	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA

TABLE 3-1
Groundwater Quality Results for Selected Constituents
Intermediate Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well[(1)]	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)								
					Total Petroleum Hydrocarbons			Volatile Organic Compounds					
					Method NWTPH-Gx	Method NWTPH-Dx		Method SW8021B / SW8260C[(2)]					
					Gasoline-Range (GRPH)	Motor Oil-Range (ORPH)	Diesel-Range (DRPH)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	m, p-Xylene	o-Xylene
MTCA Method A Cleanup Level (µg/L)[(3)]					1,000/800[(4)]	500	500	5	1,000	700	1,000	NE[(5)]	NE[(5)]
MW73	Shin/Choi	6/13/2014	MW73	Submersible Pump	87,000	300U	5,900JL	2,100	4,100	840	NA	6,400	3,300
		9/21/2014	MW73	Submersible Pump	81,000	250U	4,600	15,000	3,600	1,900	9,200	NA	NA
		#########	MW73	Bailer	69,000	250U	4,300	13,000	920	1,600	7,900[(b)]	5,400	2,500
		3/19/2015	MW73	Submersible Pump	70,000	500U	3,100	14,000	2,300	1,800	9,300	NA	NA
MW74	Shin/Choi	6/13/2014	MW74	Submersible Pump	66,000	250U	4,200JL	1,800	7,600	690	NA	2,100	600
		9/22/2014	MW74	Bailer	7,100	390	3,000	1,700	310	67	290	NA	NA
		#########	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/19/2015	MW74	Bailer	11,000	500U	1,100	3,100	210	30	100	NA	NA
MW75	56th Ave ROW	3/19/2015	MW75	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW76	Drake	3/18/2015	MW76	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW77	Drake	6/17/2014	MW77	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/23/2014	MW77	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW77	Bailer	100U	NA	NA	0.35U	1U	1U	2U[(b)]	2U	1U
		3/18/2015	MW77	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW81	TOC/Farmasonis	3/13/2015	MW81	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW84	Drake	6/20/2014	MW84	Submersible Pump	960	NA	NA	1U	1U	5.9	17	NA	NA
		9/23/2014	MW84	Submersible Pump	780	NA	NA	1U	1U	4.9	15	NA	NA
		#########	MW84	Submersible Pump	620	NA	NA	0.35U	1U	2.3	8.7[(b)]	8.7	1U
		3/16/2015	MW84	Submersible Pump	630	NA	NA	1U	1U	4.8	12	NA	NA
MW85	Drake	6/20/2014	MW85	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/24/2014	MW85	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW85	Submersible Pump	100U	NA	NA	0.35U	1U	1U	2U[(b)]	2U	1U
		3/18/2015	MW85	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW86	Drake	6/20/2014	MW86	Submersible Pump	100U	250U	50U	1U	1U	1U	3U	NA	NA
		6/20/2014	MLT-03*	Submersible Pump	100U	250U	50U	1U	1U	1U	3U	NA	NA
		9/24/2014	MW86	Submersible Pump	1,000	250U	180J	1.8	1.9	1.2	3U	NA	NA
		9/24/2014	MLT-03*	Submersible Pump	930	250U	140J	1.8	1.9	1.2	3.1	NA	NA
		#########	MW86	Submersible Pump	100U	250U	50U	0.35U	1U	1U	2U[(b)]	2U	1U
		#########	MLT-02*	Submersible Pump	100U	250U	50U	0.35U	1U	1U	2U[(b)]	2U	1U
		3/18/2015	MW86	Submersible Pump	100U	500U	100U	1U	1U	1U	3U	NA	NA
		3/18/2015	MLT-06*	Submersible Pump	100U	500U	100U	1U	1U	1U	3U	NA	NA
MW87	Drake	3/18/2015	MW87	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW89	Drake	6/20/2014	MW89	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		9/23/2014	MW89	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		#########	MW89	Submersible Pump	100U	NA	NA	0.35U	1U	1U	2U[(b)]	2U	1U
		3/18/2015	MW89	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW90 (4" RW)	TOC	3/12/2015	MW90	Pneumatic Pump	3,100	NA	NA	1U	54	1U	590	NA	NA
MW91 (4" RW)	TOC	3/11/2015	MW91	Pneumatic Pump	160	300U	120	1U	1.2	1.2	3.4	NA	NA
MW92 (4" RW)	TOC/Farmasonis	3/11/2015	MW92	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW93 (4" RW)	TOC/Farmasonis	3/11/2015	MW93	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW94 (4" RW)	TOC/Farmasonis	3/11/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW95 (4" RW)	Drake	3/11/2015	MW95	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3.7	NA	NA
MW96 (4" RW)	Drake	#########	MW96	Pneumatic Pump	100U	NA	NA	0.35U	1U	1U	3[(b)]	3	1U
		3/11/2015	MW96	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/12/2015	MLT-10[(a)]	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW97 (4" RW)	Drake	3/11/2015	MW97	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW98 (4" RW)	Drake	3/11/2015	MW98	Pneumatic Pump	600	NA	NA	4.5	2.3	11	43	NA	NA
MW99 (4" RW)	Drake	3/11/2015	MW99	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW101 (4" RW)	Drake	3/11/2015	MW101	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW103	Herman	6/18/2014	MW103	Submersible Pump	100U	250U	120JL	3	1.3	1U	3U	NA	NA
		9/21/2014	MW103	Bailer	100U	300U	170	1U	1U	1U	3U	NA	NA
		#########	MW103	Bailer	100U	250U	50U	1.3	1U	1U	2U[(b)]	2U	1U
		3/19/2015	MW103	Bailer	120	500U	170	34	1.7	1U	3U	NA	NA

Stantec

TABLE 3-1
Groundwater Quality Results for Selected Constituents
Intermediate Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well[1]	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)								
					Total Petroleum Hydrocarbons			Volatile Organic Compounds					
					Method NWTPH-Gx	Method NWTPH-Dx		Method SW8021B / SW8260C[2]					
					Gasoline-Range (GRPH)	Motor Oil-Range (ORPH)	Diesel-Range (DRPH)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	m, p-Xylene	o-Xylene
MTCA Method A Cleanup Level (µg/L)[3]					1,000/800[4]	500	500	5	1,000	700	1,000	NE[5]	NE[5]
MW105	Herman	6/18/2014	MW105	Submersible Pump	100U	250U	50U	1U	1U	1U	3U	NA	NA
		9/22/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		#########	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		3/16/2015	MW105	Bailer	100U	500U	**230**	1U	1U	1U	3U	NA	NA
MW107	Herman	6/19/2014	MW107	Submersible Pump	100U	250U	**59JL**	1U	1U	1U	3U	NA	NA
		9/21/2014	MW107	Submersible Pump	100U	250U	**66**	**5.3J**	**2.1**	1U	**4**	NA	NA
		#########	MW107	Submersible Pump	100U	250U	50U	0.35U	1U	1U	2U[b]	2U	1U
		3/19/2015	MW107	Submersible Pump	100U	500U	**110**	**8**	**3**	**1.5**	**7.9**	NA	NA

NOTES & DEFINITIONS:

Intermediate Zone wells are 20 to 60 feet below ground surface.

Groundwater quality results are provided for the Second, Third and Fourth Quarter 2014 field events and the First Quarter 2015 field event.

Groundwater samples were analyzed by Friedman & Bruya, Inc. The analytical laboratory reports are included as **Appendix B.**

Groundwater quality results for selected constituents are presented based on exceedance of MTCA Method A Cleanup Levels.

Red denotes sample concentration exceeds MTCA Method A Cleanup Levels for groundwater.

Black denotes sample concentration was detected but does not exceed MTCA Method A Cleanup Levels for groundwater.

(1) Remediation wells (identified as "RW") are connected to a multi-phase extraction system.

(2) If samples were analyzed by two methods, the maximum concentration of the two analyses is reported.

(3) MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised October 12, 2007.

(4) Cleanup level is 1,000 µg/L when benzene is not present and 800 µg/L when benzene is present.

(5) Cleanup level for individual xylenes has not been established.

(a) Due to air turbulence encountered in the first sample collected from MW96 on 3/11/2015, a second sample was collected on 3/12/2015 to evaluate the . impact of turbulence on analytical results

(b) Calculated concentration based on the sum of the detected concentrations for m,p-xylene and o-xylene.

* = Indicates blind field duplicate sample was collected for quality assurance/quality control purposes.

DRY = Indicates well could not be sampled due to insufficient groundwater sample volume.

NA = Indicates the compound was not analyzed.

NE = Indicates MTCA Method A Cleanup Level has not been established.

NS = Indicates well was not sampled.

LABORATORY NOTES:

J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. Qualifier was assigned based on data validation protocol.

JL = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. Qualifier was assigned by the laboratory based on their quality control protocol.

U = Indicates the compound was undetected at the reported concentration.

ACRONYMS:

µg/L = micrograms per liter

MTCA = Model Toxics Control Act

NWTPH-Dx = Northwest Total Petroleum Hydrocarbon - diesel-range organics

NWTPH-Gx = Northwest Total Petroleum Hydrocarbon - gasoline-range organics

LIST OF PROPERTIES:

TOC = 24205 56th Avenue West, Mountlake Terrace WA

TOC/Farmasonis = 24225 56th Avenue West, Mountlake Terrace WA

Drake = 24309 56th Avenue West, Mountlake Terrace WA

Herman = 24311 56th Avenue West, Mountlake Terrace WA

Shin/Choi = 24325 56th Avenue West, Mountlake Terrace WA

56th Ave ROW = right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties

TABLE 3-2
Groundwater Quality Results for Common Fuel Additives
Intermediate Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well[1]	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)				
					Volatile Organic Compounds			Metals	
					Method SW8260C		Method 8011M	Method 200.8	
					Methyl t-butyl ether (MTBE)	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Dissolved Lead	Total Lead
MTCA Method A Cleanup Level (µg/L) [2]					**20**	**5**	**0.01**	**15**	**15**
MW10	TOC	6/16/2014	MW10	Bailer	NA	NA	NA	NA	NA
		9/20/2014	DRY	DRY	NA	NA	NA	NA	NA
		12/11/2014	MW10	Bailer	NA	NA	NA	NA	NA
		3/19/2015	MW10	Bailer	NA	NA	NA	NA	NA
MW11 (4" RW)	TOC	3/11/2015	MW11	Pneumatic Pump	NA	NA	NA	NA	NA
MW13	56th Ave ROW	3/13/2015	DRY	DRY	NS	NS	NS	NS	NS
MW15	TOC	6/11/2014	MW15	Pneumatic Pump	NA	NA	NA	NA	NA
		9/18/2014	MW15	Pneumatic Pump	NA	NA	NA	NA	NA
		12/15/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/12/2015	DRY	DRY	NS	NS	NS	NS	NS
MW20	TOC	6/13/2014	MW20	Submersible Pump	1U	NA	NA	NA	NA
		6/13/2014	MLT-02*	Submersible Pump	1U	NA	NA	NA	NA
		9/22/2014	MW20	Bailer	1U	NA	NA	NA	NA
		9/22/2014	MLT-01*	Bailer	1U	NA	NA	NA	NA
		12/11/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/14/2015	MW20	Submersible Pump	1U	NA	NA	NA	NA
		3/14/2015	MLT-03*	Submersible Pump	1U	NA	NA	NA	NA
MW23	TOC	3/12/2015	DRY	DRY	NS	NS	NS	NS	NS
MW25	TOC	3/20/2015	MW25	Submersible Pump	NA	NA	NA	NA	NA
MW31 (2" RW)	TOC/Farmasonis	6/11/2014	MW31	Submersible Pump	NA	NA	NA	**9.67**	**11.4**
		9/18/2014	DRY	DRY	NS	NS	NS	NS	NS
		12/11/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/11/2015	DRY	DRY	NS	NS	NS	NS	NS
MW32 (4" RW)	TOC	6/10/2014	MW32	Pneumatic Pump	NA	NA	NA	**2.97**	**4.03**
		9/18/2014	MW32	Pneumatic Pump	NA	NA	NA	**50.8**	**62.2**
		12/11/2014	MW32	Pneumatic Pump	NA	NA	NA	NA	**14.9**
		3/11/2015	MW32	Pneumatic Pump	NA	NA	NA	**1.04**	**28**
MW33	TOC	6/11/2014	DRY	DRY	NS	NS	NS	NS	NS
		9/18/2014	DRY	DRY	NS	NS	NS	NS	NS
		12/11/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/13/2015	DRY	DRY	NS	NS	NS	NS	NS
MW35	TOC	3/12/2015	DRY	DRY	NS	NS	NS	NS	NS
MW36	TOC	3/12/2015	DRY	DRY	NS	NS	NS	NS	NS
MW41	TOC/Farmasonis	3/11/2015	DRY	DRY	NS	NS	NS	NS	NS
MW42	TOC/Farmasonis	3/13/2015	DRY	DRY	NS	NS	NS	NS	NS
MW44	56th Ave ROW	3/20/2015	DRY	DRY	NS	NS	NS	NS	NS
MW45	56th Ave ROW	6/13/2014	DRY	DRY	NS	NS	NS	NS	NS
		9/18/2014	DRY	DRY	NS	NS	NS	NS	NS
		12/11/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/20/2015	DRY	DRY	NS	NS	NS	NS	NS

TABLE 3-2
Groundwater Quality Results for Common Fuel Additives
Intermediate Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well[1]	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)				
					Volatile Organic Compounds			Metals	
					Method SW8260C		Method 8011M	Method 200.8	
					Methyl t-butyl ether (MTBE)	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Dissolved Lead	Total Lead
MTCA Method A Cleanup Level (µg/L) [2]					**20**	**5**	**0.01**	**15**	**15**
MW46	56th Ave ROW	3/13/2015	DRY	DRY	NS	NS	NS	NS	NS
MW47	56th Ave ROW	3/20/2015	DRY	DRY	NS	NS	NS	NS	NS
MW48	56th Ave ROW	6/12/2014	MW48	Bailer	NA	NA	NA	**2.46**	**3.91**
		9/18/2014	MW48	Bailer	NA	NA	NA	**3.13**	**10.2**
		12/11/2014	MW48	Bailer	NA	NA	NA	**8.14**	**10.5**
		3/20/2015	MW48	Bailer	NA	NA	NA	**12.8**	**14.6**
MW49	56th Ave ROW	6/14/2014	MW49	Submersible Pump	NA	NA	NA	NA	NA
		9/22/2014	MW49	Submersible Pump	NA	NA	NA	NA	NA
		12/15/2014	MW49	Bailer	NA	NA	NA	NA	NA
		3/16/2015	MW49	Submersible Pump	NA	NA	NA	NA	NA
MW50	56th Ave ROW	6/13/2014	MW50	Bailer	NA	NA	NA	NA	NA
		9/19/2014	DRY	DRY	NS	NS	NS	NS	NS
		12/12/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/20/2015	MW50	Bailer	NA	NA	NA	NA	NA
MW51	56th Ave ROW	6/17/2014	MW51	Bailer	NA	NA	NA	NA	NA
		9/20/2014	MW51	Bailer	NA	NA	NA	NA	NA
		12/12/2014	MW51	Bailer	NA	NA	NA	NA	NA
		3/20/2015	MW51	Bailer	NA	NA	NA	NA	NA
MW52	56th Ave ROW	6/13/2014	MW52	Bailer	NA	NA	NA	NA	NA
		9/20/2014	DRY	DRY	NS	NS	NS	NS	NS
		12/12/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/20/2015	MW52	Bailer	NA	NA	NA	NA	NA
MW53	56th Ave ROW	6/19/2014	MW53	Submersible Pump	NA	NA	NA	NA	NA
		9/24/2014	MW53	Submersible Pump	NA	NA	NA	NA	NA
		12/15/2014	MW53	Bailer	NA	NA	NA	NA	NA
		3/13/2015	MW53	Submersible Pump	NA	NA	NA	NA	NA
MW55	56th Ave ROW	6/19/2014	MW55	Submersible Pump	NA	NA	NA	NA	NA
		9/24/2014	MW55	Submersible Pump	NA	NA	NA	NA	NA
		12/16/2014	MW55	Bailer	NA	NA	NA	NA	NA
		3/13/2015	MW55	Submersible Pump	NA	NA	NA	NA	NA
MW56	TOC/Farmasonis	6/14/2014	MW56	Submersible Pump	NA	NA	NA	NA	NA
		9/22/2014	MW56	Submersible Pump	NA	NA	NA	NA	NA
		12/13/2014	MW56	Submersible Pump	NA	NA	NA	NA	NA
		3/14/2015	MW56	Submersible Pump	NA	NA	NA	NA	NA
MW57 (4" RW)	TOC/Farmasonis	12/11/2014	MW57	Pneumatic Pump	1U	NA	NA	NA	NA
		3/11/2015	MW57	Pneumatic Pump	NA	NA	NA	NA	NA
MW58	TOC/Farmasonis	6/14/2014	MW58	Submersible Pump	NA	NA	NA	NA	NA
		9/22/2014	MW58	Submersible Pump	NA	NA	NA	NA	NA
		12/16/2014	MW58	Submersible Pump	NA	NA	NA	NA	NA
		3/16/2015	MW58	Submersible Pump	NA	NA	NA	NA	NA

TABLE 3-2
Groundwater Quality Results for Common Fuel Additives
Intermediate Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well[1]	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)				
					Volatile Organic Compounds			Metals	
					Method SW8260C		Method 8011M	Method 200.8	
					Methyl t-butyl ether (MTBE)	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Dissolved Lead	Total Lead
MTCA Method A Cleanup Level (µg/L) [2]					**20**	**5**	**0.01**	**15**	**15**
MW59	TOC/Farmasonis	6/14/2014	MW59	Submersible Pump	NA	NA	NA	NA	NA
		9/22/2014	MW59	Submersible Pump	NA	NA	NA	NA	NA
		12/13/2014	MW59	Submersible Pump	NA	NA	NA	NA	NA
		3/14/2015	MW59	Submersible Pump	NA	NA	NA	NA	NA
MW60	56th Ave ROW	6/19/2014	MW60	Submersible Pump	NA	NA	NA	NA	NA
		9/25/2014	MW60	Bailer	NA	NA	NA	NA	NA
		12/16/2014	MW60	Submersible Pump	NA	NA	NA	NA	NA
		3/13/2015	MW60	Submersible Pump	NA	NA	NA	NA	NA
MW63	56th Ave ROW	6/19/2014	MW63	Submersible Pump	NA	NA	NA	NA	NA
		9/23/2014	MW63	Submersible Pump	NA	NA	NA	NA	NA
		12/17/2014	MW63	Submersible Pump	NA	NA	NA	NA	NA
		3/20/2015	MW63	Submersible Pump	NA	NA	NA	NA	NA
MW65	Drake	6/17/2014	MW65	Bailer	1U	NA	NA	NA	NA
		9/23/2014	MW65	Submersible Pump	1U	NA	NA	NA	NA
		12/17/2014	MW65	Bailer	1U	NA	NA	NA	NA
		3/18/2015	MW65	Submersible Pump	1U	NA	NA	NA	NA
		3/18/2015	MLT-05*	Submersible Pump	1U	NA	NA	NA	NA
MW66	TOC/Farmasonis	6/11/2014	MW66	Bailer	1U	NA	NA	NA	NA
		9/20/2014	MW66	Bailer	1U	NA	NA	NA	NA
		12/15/2014	MW66	Bailer	1U	NA	NA	NA	NA
		3/20/2015	MW66	Bailer	1U	NA	NA	NA	NA
MW69 (2" RW)	Drake	6/19/2014	DRY	DRY	NS	NS	NS	NS	NS
		9/23/2014	DRY	DRY	NS	NS	NS	NS	NS
		12/11/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/20/2015	MW69	Pneumatic Pump	1U	NA	NA	NA	NA
MW70 (2" RW)	Drake	6/20/2014	MW70	Pneumatic Pump	1U	1U	0.01U	1U	**2.48**
		9/19/2014	MW70	Pneumatic Pump	1U	1U	0.01U	1U	1U
		12/11/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/11/2015	MW70	Pneumatic Pump	1U	NA	NA	NA	NA
MW73	Shin/Choi	6/13/2014	MW73	Submersible Pump	200U	200U	**1.8**	1U	**4.3**
		9/21/2014	MW73	Submersible Pump	1U	1U	**0.41**	1U	1U
		12/15/2014	MW73	Bailer	**90**	NA	NA	1U	**2.18**
		3/19/2015	MW73	Submersible Pump	**17**	1U	**0.64**	1U	1U
MW74	Shin/Choi	6/13/2014	MW74	Submersible Pump	**610**	200U	**1.7**	**5.88**	**7.39**
		9/22/2014	MW74	Bailer	**580**	NA	NA	NA	NA
		12/15/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/19/2015	MW74	Bailer	**400**	**64**	**0.013**	1U	**4.8**
MW75	56th Ave ROW	3/19/2015	MW75	Submersible Pump	NA	NA	NA	NA	NA
MW76	Drake	3/18/2015	MW76	Bailer	1U	NA	NA	NA	NA

TABLE 3-2
Groundwater Quality Results for Common Fuel Additives
Intermediate Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well[1]	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)				
					Volatile Organic Compounds			Metals	
					Method SW8260C		Method 8011M	Method 200.8	
					Methyl t-butyl ether (MTBE)	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Dissolved Lead	Total Lead
MTCA Method A Cleanup Level (µg/L) [2]					**20**	**5**	**0.01**	**15**	**15**
MW77	Drake	6/17/2014	MW77	Bailer	1U	NA	NA	NA	NA
		9/23/2014	MW77	Submersible Pump	1U	NA	NA	NA	NA
		12/17/2014	MW77	Bailer	1U	NA	NA	NA	NA
		3/18/2015	MW77	Bailer	1U	NA	NA	NA	NA
MW81	TOC/Farmasonis	3/13/2015	MW81	Bailer	NA	NA	NA	NA	NA
MW84	Drake	6/20/2014	MW84	Submersible Pump	1U	NA	NA	NA	NA
		9/23/2014	MW84	Submersible Pump	1U	NA	NA	NA	NA
		12/17/2014	MW84	Submersible Pump	1U	NA	NA	NA	NA
		3/16/2015	MW84	Submersible Pump	1U	NA	NA	NA	NA
MW85	Drake	6/20/2014	MW85	Submersible Pump	1U	NA	NA	NA	NA
		9/24/2014	MW85	Submersible Pump	1U	NA	NA	NA	NA
		12/15/2014	MW85	Submersible Pump	1U	NA	NA	NA	NA
		3/18/2015	MW85	Submersible Pump	1U	NA	NA	NA	NA
MW86	Drake	6/20/2014	MW86	Submersible Pump	1U	1U	0.01U	1U	1U
		6/20/2014	MLT-03*	Submersible Pump	1U	1U	0.01U	1U	1U
		9/24/2014	MW86	Submersible Pump	1U	1U	0.01U	1U	1U
		9/24/2014	MLT-03*	Submersible Pump	1U	1U	0.01U	1U	1U
		12/15/2014	MW86	Submersible Pump	1U	NA	NA	1U	1U
		12/15/2014	MLT-02*	Submersible Pump	1U	NA	NA	1U	1U
		3/18/2015	MW86	Submersible Pump	1U	1U	0.01U	1U	R
		3/18/2015	MLT-06*	Submersible Pump	1U	1U	0.01U	1U	1U
MW87	Drake	3/18/2015	MW87	Bailer	1U	NA	NA	NA	NA
MW89	Drake	6/20/2014	MW89	Submersible Pump	1U	NA	NA	NA	NA
		9/23/2014	MW89	Submersible Pump	1U	NA	NA	NA	NA
		12/17/2014	MW89	Submersible Pump	1U	NA	NA	NA	NA
		3/18/2015	MW89	Submersible Pump	1U	NA	NA	NA	NA
MW90 (4" RW)	TOC	3/12/2015	MW90	Pneumatic Pump	NA	NA	NA	1U	**2.03**
MW91 (4" RW)	TOC	3/11/2015	MW91	Pneumatic Pump	1U	NA	NA	**1.73**	**6.3**
MW92 (4" RW)	TOC/Farmasonis	3/11/2015	MW92	Pneumatic Pump	NA	NA	NA	NA	NA
MW93 (4" RW)	TOC/Farmasonis	3/11/2015	MW93	Pneumatic Pump	NA	NA	NA	NA	NA
MW94 (4" RW)	TOC/Farmasonis	3/11/2015	DRY	DRY	NS	NS	NS	NS	NS
MW95 (4" RW)	Drake	3/11/2015	MW95	Pneumatic Pump	1U	NA	NA	NA	NA
MW96 (4" RW)	Drake	12/11/2014	MW96	Pneumatic Pump	1U	NA	NA	NA	NA
		3/11/2015	MW96	Pneumatic Pump	NA	NA	NA	NA	NA
		3/12/2015	MLT-10[a]	Pneumatic Pump	1U	NA	NA	NA	NA
MW97 (4" RW)	Drake	3/11/2015	MW97	Pneumatic Pump	1U	NA	NA	NA	NA
MW98 (4" RW)	Drake	3/11/2015	MW98	Pneumatic Pump	1U	NA	NA	NA	NA
MW99 (4" RW)	Drake	3/11/2015	MW99	Pneumatic Pump	1U	NA	NA	NA	NA
MW101 (4" RW)	Drake	3/11/2015	MW101	Pneumatic Pump	1U	NA	NA	1U	1U

TABLE 3-2
Groundwater Quality Results for Common Fuel Additives
Intermediate Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well[1]	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)				
					Volatile Organic Compounds			Metals	
					Method SW8260C		Method 8011M	Method 200.8	
					Methyl t-butyl ether (MTBE)	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Dissolved Lead	Total Lead
MTCA Method A Cleanup Level (µg/L) [2]					**20**	**5**	**0.01**	**15**	**15**
MW103	Herman	6/18/2014	MW103	Submersible Pump	**170**	1U	0.01U	**3.84**	**4.69**
		9/21/2014	MW103	Bailer	**10**	1U	0.01U	1U	**2.64**
		12/13/2014	MW103	Bailer	**9.1**	NA	NA	1U	**2.7**
		3/19/2015	MW103	Bailer	**8.4**	1U	0.01U	1U	**1.82**
MW105	Herman	6/18/2014	MW105	Submersible Pump	1U	1U	0.01U	1U	**1.21**
		9/22/2014	DRY	DRY	NS	NS	NS	NS	NS
		12/16/2014	DRY	DRY	NS	NS	NS	NS	NS
		3/16/2015	MW105	Bailer	1U	1U	0.01U	**1.28**	**3.24**
MW107	Herman	6/19/2014	MW107	Submersible Pump	1U	1U	0.01U	1U	1U
		9/21/2014	MW107	Submersible Pump	1U	1U	0.01U	1U	1U
		12/15/2014	MW107	Submersible Pump	1U	NA	NA	1U	1U
		3/19/2015	MW107	Submersible Pump	1U	1U	0.01U	1U	**8.86**

NOTES & DEFINITIONS:

Intermediate Zone wells are 20 to 60 feet below ground surface.

Groundwater quality results are provided for the Second, Third and Fourth Quarter 2014 field events and the First Quarter 2015 field event.

Groundwater samples were analyzed by Friedman & Bruya, Inc. The analytical laboratory reports are included as **Appendix B.**

Groundwater quality results for selected constituents are presented based on exceedance of MTCA Method A Cleanup Levels.

Red denotes sample concentration exceeds MTCA Method A Cleanup Levels for groundwater.

Black denotes sample concentration was detected but does not exceed MTCA Method A Cleanup Levels for groundwater.

[1] Remediation wells (identified as "RW") are connected to a multi-phase extraction system.

[2] MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised October 12, 2007.

[a] Due to air turbulence encountered in the first groundwater sample collected from MW96 on 3/11/2015, a second sample was collected on 3/12/2015 to evaluate the impact of turbulence on analytical results.

* = Indicates blind field duplicate sample was collected for quality assurance/quality control purposes.

DRY = Indicates well could not be sampled due to insufficient groundwater sample volume.

NA = Indicates the compound was not analyzed.

NS = Indicates well was not sampled.

ACRONYMS:

µg/L = micrograms per liter

MTCA = Model Toxics Control Act

LABORATORY NOTES:

R = Indicates data was rejected.

U = Indicates the compound was undetected at the reported concentration.

LIST OF PROPERTIES:

TOC = 24205 56th Avenue West, Mountlake Terrace WA

TOC/Farmasonis = 24225 56th Avenue West, Mountlake Terrace WA

Drake = 24309 56th Avenue West, Mountlake Terrace WA

Herman = 24311 56th Avenue West, Mountlake Terrace WA

Shin/Choi = 24325 56th Avenue West, Mountlake Terrace WA

56th Ave ROW = right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties

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TABLE 4-1
Groundwater Quality Results for Selected Analytical Constituents
Deep Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)								
					Total Petroleum Hydrocarbons			Volatile Organic Compounds					
					Method NWTPH-Gx	Method NWTPH-Dx		Method SW8021B / SW8260C(1)					
					Gasoline-Range (GRPH)	Motor Oil-Range (ORPH)	Diesel-Range (DRPH)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	m, p-Xylene	o-Xylene
MTCA Method A Cleanup Level (µg/L)(2)					**1,000/800(3)**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**NE(4)**	**NE(4)**
MW26	TOC	3/19/2015	MW26	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW30	TOC/Farmasonis	3/14/2015	MW30	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW39	TOC/Farmasonis	3/14/2015	MW39	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW40	TOC/Farmasonis	3/20/2015	MW40	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW64	56th Ave ROW	3/20/2015	MW64	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW78	Drake	3/18/2015	MW78	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA

NOTES & DEFINITIONS:

Deep Zone wells are >60 feet below ground surface.

Groundwater quality results are provided for the Second, Third and Fourth Quarter 2014 field events and the First Quarter 2015 field event.

Groundwater samples were analyzed by Friedman & Bruya, Inc. The analytical laboratory reports are included as **Appendix B.**

Groundwater quality results for selected constituents are presented based on exceedance of MTCA Method A Cleanup Levels.

Red denotes sample concentration exceeds MTCA Method A Cleanup Levels for groundwater.

Black denotes sample concentration was detected but does not exceed MTCA Method A Cleanup Levels for groundwater.

(1) If samples were analyzed by two methods, the maximum concentration of the two analyses is reported.

(2) MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised October 12, 2007.

(3) Cleanup level is 1,000 µg/L when benzene is not present and 800 µg/L when benzene is present.

(4) Cleanup level for individual xylenes has not been established.

NA = Indicates the compound was not analyzed.

NE = Indicates MTCA Method A Cleanup Level has not been established.

LABORATORY NOTES:

U = Indicates the compound was undetected at the method reporting limit.

ACRONYMS:

µg/L = micrograms per liter

MTCA = Model Toxics Control Act

NWTPH-Dx = Northwest Total Petroleum Hydrocarbon - diesel-range organics

NWTPH-Gx = Northwest Total Petroleum Hydrocarbon - gasoline-range organics

LIST OF PROPERTIES:

TOC = 24205 56th Avenue West, Mountlake Terrace WA

TOC/Farmasonis = 24225 56th Avenue West, Mountlake Terrace WA

Drake = 24309 56th Avenue West, Mountlake Terrace WA

56th Ave ROW = portion of right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties

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TABLE 4-2
Groundwater Quality Results for Common Fuel Additives
Deep Zone Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176; Mountlake Terrace, WA

Well	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)				
					Volatile Organic Compounds			Metals	
					Method SW8260C		Method 8011M	Method 200.8	
					Methyl t-butyl ether (MTBE)	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Dissolved Lead	Total Lead
MTCA Method A Cleanup Level (µg/L)[1]					**20**	**5**	**0.01**	**15**	**15**
MW26	TOC	3/19/2015	MW26	Bailer	NA	NA	NA	NA	NA
MW30	TOC/Farmasonis	3/14/2015	MW30	Submersible Pump	NA	NA	NA	NA	NA
MW39	TOC/Farmasonis	3/14/2015	MW39	Submersible Pump	NA	NA	NA	NA	NA
MW40	TOC/Farmasonis	3/20/2015	MW40	Submersible Pump	NA	NA	NA	NA	NA
MW64	56th Ave ROW	3/20/2015	MW64	Submersible Pump	NA	NA	NA	NA	NA
MW78	Drake	3/18/2015	MW78	Submersible Pump	1U	NA	NA	NA	NA

NOTES & DEFINITIONS:

Deep Zone wells are >60 feet below ground surface.

Groundwater quality results are provided for the Second, Third and Fourth Quarter 2014 field events and the First Quarter 2015 field event.

Groundwater samples were analyzed by Friedman & Bruya, Inc. The analytical laboratory reports are included as **Appendix B.**

Groundwater quality results for selected constituents are presented based on exceedance of MTCA Method A Cleanup Levels.

Red denotes sample concentration exceeds MTCA Method A Cleanup Levels for groundwater.

Black denotes sample concentration was detected but does not exceed MTCA Method A Cleanup Levels for groundwater.

(11 MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised October 12, 2007.

NA = Indicates the compound was not analyzed.

LABORATORY NOTES:

U = Indicates the compound was undetected at the method reporting limit.

ACRONYMS:

µg/L = micrograms per liter

MTCA = Model Toxics Control Act

LIST OF PROPERTIES:

TOC = 24205 56th Avenue West, Mountlake Terrace WA

TOC/Farmasonis = 24225 56th Avenue West, Mountlake Terrace WA

Drake = 24309 56th Avenue West, Mountlake Terrace WA

56th Ave ROW = portion of right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties

TABLE 5-1
Groundwater Quality Results for Selected Constituents
Shallow-Intermediate Zone Intersect Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176

Well[(1)]	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)								
					Total Petroleum Hydrocarbons			Volatile Organic Compounds					
					Method NWTPH-Gx	Method NWTPH-Dx		Method SW8021B / SW8260C[(2)]					
					Gasoline-Range (GRPH)	Motor Oil-Range (ORPH)	Diesel-Range (DRPH)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	m, p-Xylene	o-Xylene
MTCA Method A Cleanup Level (µg/L)[(3)]					**1,000/800[(4)]**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**NE[(5)]**	**NE[(5)]**
MW08	56th Ave ROW	3/13/2015	MW08	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW09	TOC	6/13/2014	MW09(Peri)	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		6/13/2014	MLT-01(Peri)*	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		6/13/2014	MW09(Bailer)	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
		6/13/2014	MW09(Submersible)	Submersible Pump	100U	NA	NA	**3.4J**	**2.9J**	1U	**4.6**	NA	NA
		9/22/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/13/2014	MW09-SUB	Submersible Pump	**210**	NA	NA	1U	1U	1U	3U	NA	NA
		12/13/2014	MLT-1*	Submersible Pump	**160**	NA	NA	1U	1U	1U	3U	NA	NA
		3/18/2015	MW09	Peristaltic Pump	**120**	NA	NA	1UJ	1U	**2.5**	**15**	NA	NA
		3/18/2015	MLT-02*	Peristaltic Pump	**140**	NA	NA	**2.1J**	**1**	**2.6**	**17**	NA	NA
MW18	TOC	3/11/2015	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW22	TOC	3/14/2015	MW22	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW24 (4" RW)	TOC	3/11/2015	MW24	Pneumatic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW27 (2" RW)	TOC	6/19/2014	MW27	Pneumatic Pump	**390**	NA	NA	1U	**1.6**	**7.1**	**44**	NA	NA
		9/18/2014	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS
		12/11/2014	MW27	Pneumatic Pump	100U	NA	NA	1U	1U	1U	**4.2**	NA	NA
		3/11/2015	MW27	Pneumatic Pump	**320**	NA	NA	1U	**2.3**	**7.5**	**39**	NA	NA
MW28	TOC	3/20/2015	MW28	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
		3/20/2015	MTL-04*	Submersible Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW29 (2" RW)	TOC	3/11/2015	MW29	Pneumatic Pump	**790**	NA	NA	1U	**1**	1U	**29**	NA	NA
MW37	TOC	3/12/2015	MW37	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW38	TOC	3/18/2015	MW38	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW43	56th Ave ROW	3/20/2015	MW43	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW82	TOC/Farmasonis	3/13/2015	MW82	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW88	Drake	3/18/2015	MW88**	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA
MW100	TOC/Farmasonis	3/13/2015	MW100	Peristaltic Pump	100U	NA	NA	1U	1U	1U	3U	NA	NA

NOTES & DEFINITIONS:

All of the wells identified on this table have screened intervals that intersect both Shallow Zone and Intermediate Zone conditions.

Groundwater quality results are provided for the Second, Third and Fourth Quarter 2014 field events and the First Quarter 2015 field event.

Groundwater samples were analyzed by Friedman & Bruya, Inc. The analytical laboratory reports are included as **Appendix B.**

Groundwater quality results for selected constituents are presented based on exceedance of MTCA Method A Cleanup Levels.

Red denotes sample concentration exceeds MTCA Method A Cleanup Levels for groundwater.

Black denotes sample concentration was detected but does not exceed MTCA Method A Cleanup Levels for groundwater.

(1) Remediation wells (identified as "RW") are connected to a multi-phase extraction system.

(2) If samples were analyzed by two methods, the maximum concentration of the two analyses is reported.

(3) MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised October 12, 2007.

(4) Cleanup level is 1,000 µg/L when benzene is not present and 800 µg/L when benzene is present.

(5) Cleanup level for individual xylenes has not been established.

* = Indicates blind field duplicate sample was collected for quality assurance/quality control purposes.

DRY = Indicates well could not be sampled due to insufficient groundwater sample volume.

NA = Indicates the compound was not analyzed.

NE = Indicates MTCA Method A Cleanup Level has not been established.

NS = Indicates well was not sampled.

LABORATORY NOTES:

J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
Qualifier was assigned based on data validation protocol.

U = Indicates the compound was undetected at the method reporting limit.

ACRONYMS:

µg/L = micrograms per liter

MTCA = Model Toxics Control Act

NWTPH-Dx = Northwest Total Petroleum Hydrocarbon - diesel-range organics

NWTPH-Gx = Northwest Total Petroleum Hydrocarbon - gasoline-range organics

LIST OF PROPERTIES:

TOC = 24205 56th Avenue West, Mountlake Terrace WA

TOC/Farmasonis = 24225 56th Avenue West, Mountlake Terrace WA

Drake = 24309 56th Avenue West, Mountlake Terrace WA

56th Ave ROW = portion of right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties

TABLE 5-2
Groundwater Quality Results for Common Fuel Additives
Shallow-Intermediate Zone Intersect Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176

Well[1]	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)				
					Volatile Organic Compounds			Metals	
					Method SW8260C		Method 8011M	Method 200.8	
					Methyl t-butyl ether (MTBE)	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Dissolved Lead	Total Lead
MTCA Method A Cleanup Level (µg/L)[2]					20	5	0.01	15	15
MW08	56th Ave ROW	3/13/2015	MW08	Peristaltic Pump	NA	NA	NA	NA	NA
MW09	TOC	6/13/2014	MW09(Peri)	Peristaltic Pump	NA	NA	NA	NA	NA
		6/13/2014	MLT-01(Peri)*	Peristaltic Pump	NA	NA	NA	NA	NA
		6/13/2014	MW09(Bailer)	Bailer	NA	NA	NA	NA	NA
		6/13/2014	MW09(Submersible)	Submersible Pump	NA	NA	NA	NA	NA
		9/22/2014	DRY	DRY	NS	NS	NS	NS	NS
		12/13/2014	MW09-SUB	Submersible Pump	NA	NA	NA	NA	NA
		12/13/2014	MLT-1*	Submersible Pump	NA	NA	NA	NA	NA
		3/18/2015	MW09	Peristaltic Pump	NA	NA	NA	NA	NA
		3/18/2015	MLT-02*	Peristaltic Pump	NA	NA	NA	NA	NA
MW18	TOC	3/11/2015	DRY	DRY	NS	NS	NS	NS	NS
MW22	TOC	3/14/2015	MW22	Peristaltic Pump	NA	NA	NA	NA	NA
MW24 (4" RW)	TOC	3/11/2015	MW24	Pneumatic Pump	NA	NA	NA	NA	NA
MW27 (2" RW)	TOC	6/19/2014	MW27	Pneumatic Pump	NA	NA	NA	NA	NA
		9/18/2014	DRY	DRY	NS	NS	NS	NS	NS
		12/11/2014	MW27	Pneumatic Pump	NA	NA	NA	NA	NA
		3/11/2015	MW27	Pneumatic Pump	NA	NA	NA	NA	NA
MW28	TOC	3/20/2015	MW28	Submersible Pump	NA	NA	NA	NA	NA
		3/20/2015	MTL-04*	Submersible Pump	NA	NA	NA	NA	NA
MW29 (2" RW)	TOC	3/11/2015	MW29	Pneumatic Pump	NA	NA	NA	2.91	119
MW37	TOC	3/12/2015	MW37	Peristaltic Pump	NA	NA	NA	NA	NA
MW38	TOC	3/18/2015	MW38	Peristaltic Pump	NA	NA	NA	NA	NA
MW43	56th Ave ROW	3/20/2015	MW43	Bailer	NA	NA	NA	NA	NA
MW82	TOC/Farmasonis	3/13/2015	MW82	Bailer	NA	NA	NA	NA	NA
MW88	Drake	3/18/2015	MW88**	Peristaltic Pump	1U	NA	NA	NA	NA
MW100	TOC/Farmasonis	3/13/2015	MW100	Peristaltic Pump	NA	NA	NA	1U	1U

NOTES & DEFINITIONS:

All of the wells identified on this table have screened intervals that intersect both Shallow Zone and Intermediate Zone conditions.

Groundwater quality results are provided for the Second, Third and Fourth Quarter 2014 field events and the First Quarter 2015 field event.

Groundwater samples were analyzed by Friedman & Bruya, Inc. The analytical laboratory reports are included as **Appendix B.**

Groundwater quality results for selected constituents are presented based on exceedance of MTCA Method A Cleanup Levels.

Red denotes sample concentration exceeds MTCA Method A Cleanup Levels for groundwater.

Black denotes sample concentration was detected but does not exceed MTCA Method A Cleanup Levels for groundwater.

(1) MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised October 12, 2007.

* = Indicates blind field duplicate sample was collected for quality assurance/quality control purposes.

DRY = Indicates well could not be sampled due to insufficient groundwater sample volume.

NA = Indicates the compound was not analyzed.

NS = Indicates well was not sampled.

LABORATORY NOTES:

U = Indicates the compound was undetected at the method reporting limit.

ACRONYMS & ABBREVIATIONS:

µg/L = micrograms per liter

MTCA = Model Toxics Control Act

LIST OF PROPERTIES:

TOC = 24205 56th Avenue West, Mountlake Terrace WA

TOC/Farmasonis = 24225 56th Avenue West, Mountlake Terrace WA

Drake = 24309 56th Avenue West, Mountlake Terrace WA

56th Ave ROW = portion of right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties

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TABLE 6-1
Groundwater Quality Results for Selected Constituents
Intermediate-Deep Zone Intersect Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176

Well ID	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)								
					Total Petroleum Hydrocarbons			Volatile Organic Compounds					
					Method NWTPH-Gx	Method NWTPH-Dx		Method SW8021B					
					Gasoline-Range (GRPH)	Motor Oil-Range (ORPH)	Diesel-Range (DRPH)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	m, p-Xylene	o-Xylene
MTCA Method A Cleanup Level (µg/L)[1]					**1,000/800[2]**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**NE[3]**	**NE[3]**
MW16	242nd St ROW	3/19/2015	MW16	Bailer	100U	NA	NA	1U	1U	1U	3U	NA	NA

NOTES & DEFINITIONS:

MW16 is the only well that has screened intervals intersecting both Intermediate Zone and Deep Zone conditions.

Groundwater samples were analyzed by Friedman & Bruya, Inc. The analytical laboratory reports are included as **Appendix B.**

Groundwater quality results for selected constituents are presented based on exceedance of MTCA Method A Cleanup Levels.

Red denotes sample concentration exceeds MTCA Method A Cleanup Levels for groundwater.

Black denotes sample concentration was detected but does not exceed MTCA Method A Cleanup Levels for groundwater.

(1) MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised October 12, 2007.

(2) Cleanup level is 1,000 µg/L when benzene is not present and 800 µg/L when benzene is present.

(3) Cleanup level for individual xylenes has not been established.

NA = Indicates the compound was not analyzed.

NE = Indicates MTCA Method A Cleanup Level has not been established.

LABORATORY NOTES:

U = Indicates the compound was undetected at the method reporting limit.

ACRONYMS:

µg/L = micrograms per liter

MTCA = Model Toxics Control Act

LIST OF PROPERTIES:

242nd St ROW = portion of right-of-way adjacent to TOC Property

TABLE 6-2
Groundwater Quality Results for Common Fuel Additives
Intermediate-Deep Zone Intersect Wells
Second Quarter 2014 - First Quarter 2015
TOC Facility #01-176

Well ID	Property	Sample Date	Sample Identifier	Sample Method	Analytical Results (µg/L)				
					Volatile Organic Compounds			Metals	
					Method SW8260C		Method 8011M	Method 200.8	
					Methyl t-butyl ether (MTBE)	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Dissolved Lead	Total Lead
MTCA Method A Cleanup Level (µg/L)[1]					**20**	**5**	**0.01**	**15**	**15**
MW16	242nd St ROW	3/19/2015	MW16	Bailer	NA	NA	NA	NA	NA

NOTES & DEFINITIONS:

MW16 is the only well that has screened intervals intersecting both Intermediate Zone and Deep Zone conditions.

Groundwater samples were analyzed by Friedman & Bruya, Inc. The analytical laboratory reports are included as **Appendix B.**

Groundwater quality results for selected constituents are presented based on exceedance of MTCA Method A Cleanup Levels.

Red denotes sample concentration exceeds MTCA Method A Cleanup Levels for groundwater.

Black denotes sample concentration was detected but does not exceed MTCA Method A Cleanup Levels for groundwater.

(1) MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised October 12, 2007.

NA = Indicates the compound was not analyzed.

ACRONYMS:

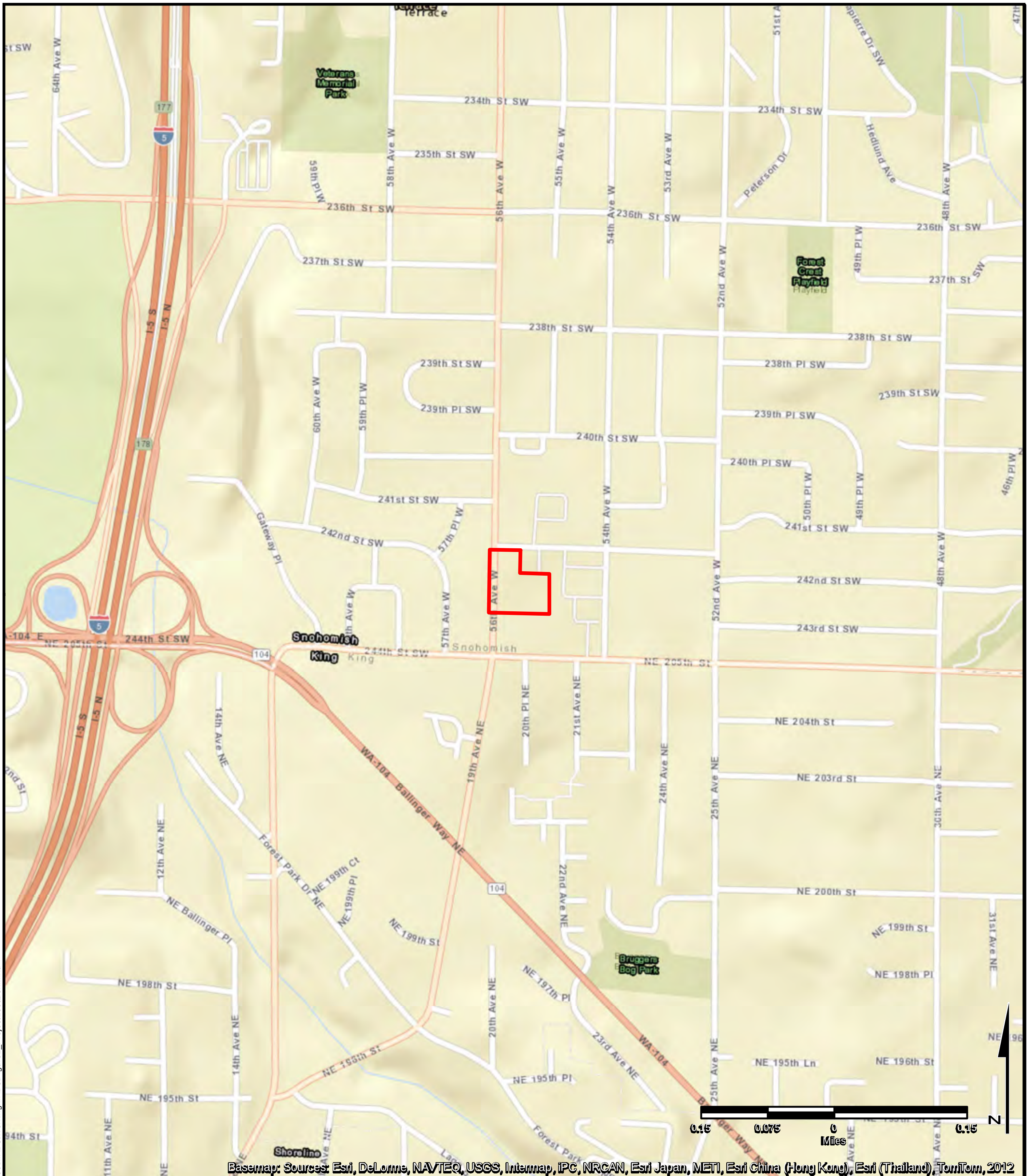
µg/L = micrograms per liter

MTCA = Model Toxics Control Act

LIST OF PROPERTIES:

242nd St ROW = portion of right-of-way adjacent to TOC Property

Figures



Legend

Site Boundary

TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 1: PROJECT LOCATION

Stantec

DRAWN BY	D.H.
DATE DRAWN	1/21/2015
SCALE	1 in = 0.16 miles
PROJECT	203714085

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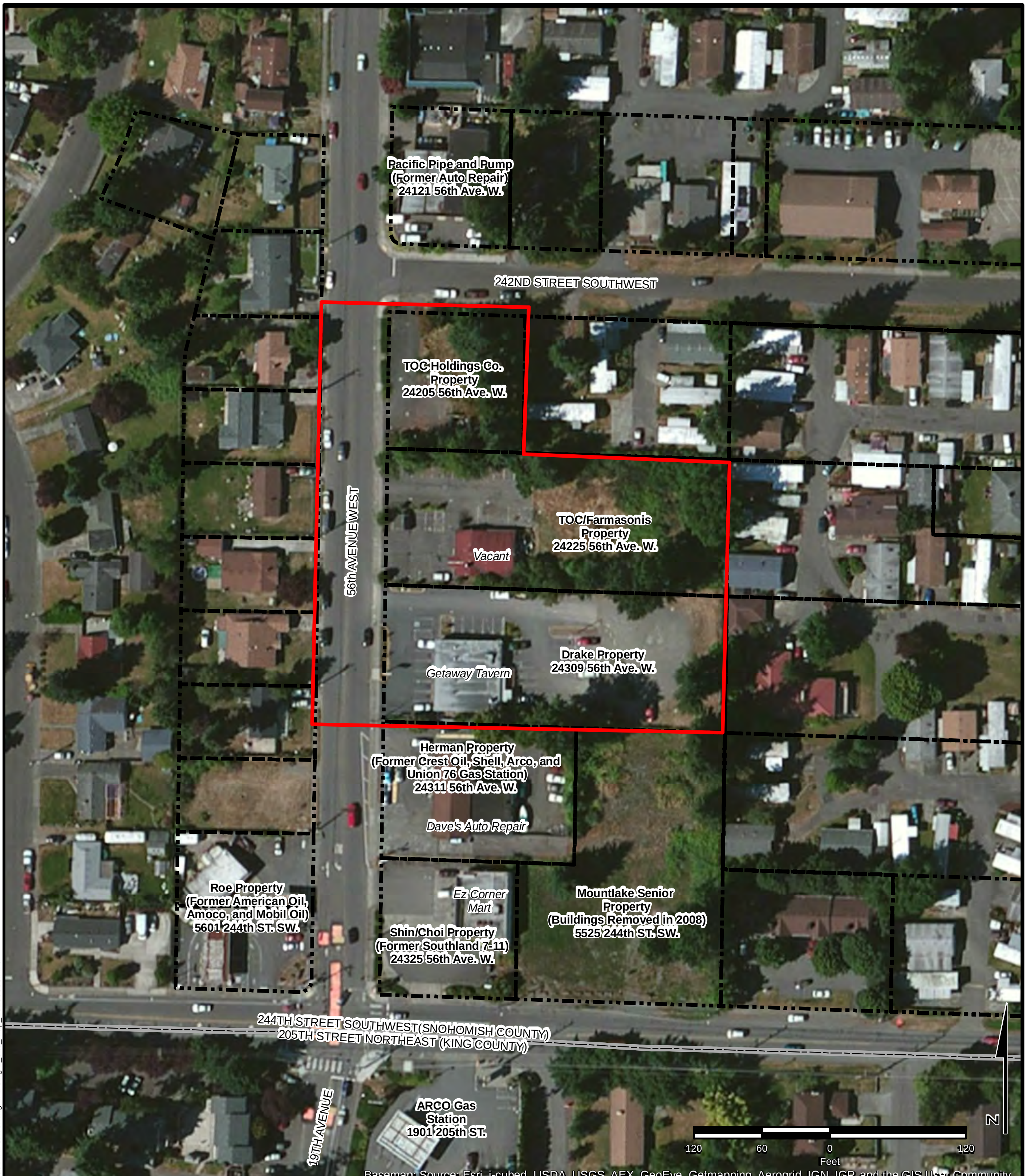

Legend

Site Boundary

PARCELS

TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 2: SITE MAP

Stantec

DRAWN BY	D.H.	DATE DRAWN	5/8/2015
SCALE	1 in = 120 feet		
PROJECT	203714085		

X:\WA\Clients\Time_Oil\TOC-MountlakeTerrace_BA1402800\MXDs\WorkingMXDs\fig-2_site_map_20150508.mxd

Legend

- Site Boundary
- Historic Pump Islands (Removed)
- Parcels
- Remediation System Piping
- Compound Fence
- Historic Excavation
- Historic UST Location
- System Compound
- Abandoned Well
- Deep Well
- Intermediate Well
- Shallow Well
- Mix Zone Well
- Stormwater Infiltration Pit

TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 3: LOCATIONS OF WELLS AND REMEDIATION SYSTEMS

Stantec

DRAWN BY	D.H.	DATE DRAWN	4/9/2015
SCALE	1 in = 50 ft		
PROJECT	203714085		

Path: X:\WA\Clients\Time_Oil\TOC-MountlakeTerrace_BA1402800\MXDs\WorkingMXDs\Figure3_SiteMap With Well Locations(11x17).mxd

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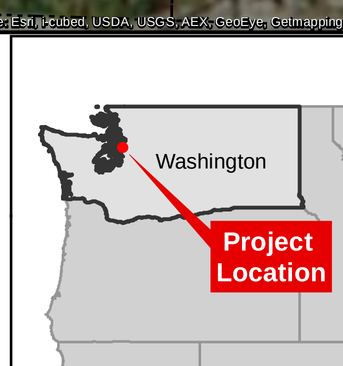
Legend

Parcels	Site Boundary
MW72 343.04 Groundwater Sample Location Identifier and Groundwater Elevation (ft, MSL) (NM = Not Measured)	Compound Fence
343 Estimated Groundwater Elevation Contour (ft, MSL)	System Compound
	Equipment Shed
	Historic Excavation



TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 4: GROUNDWATER ELEVATION CONTOURS, SHALLOW ZONE, MARCH 17, 2015 (SYSTEM OFF)

Stantec

DRAWN BY	D.H.	DATE DRAWN	5/27/2015
SCALE	1 in = 50 feet		
PROJECT	203700102		

X:\WA\Clients\Time_Oil\TOC-Mountlake Terrace_BA140280\MXDs\WorkingMXDs\1Q15 Annual GW Report\fig-4_1q15_gwe_uz_map_20150507.mxd

Note:

1. DTW Measurements displayed in red indicate wells that are screened in both the shallow and intermediate aquifers, and were not used to create contours.
2. Dry/TP indicates that the top of the pump was encountered prior to the water surface.
3. MW45 was not used in contouring due to anomalous results. Water level is believed to be standing water in well cap.

Legend

- Parcels
- MW88 — Well Location Where Screen Intersects Multiple Groundwater Zones
- MW73 — Intermediate Groundwater Zone Well Location
- 343.04 — Groundwater Elevation (ft, MSL) (NM = Not Measured)
- 343 — Estimated Groundwater Elevation Contour (ft, MSL)
- Site Boundary
- Compound Fence
- Equipment Shed
- System Compound
- Historic Excavation

Washington

Project Location

TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 5: GROUNDWATER ELEVATION CONTOURS, INTERMEDIATE ZONE, MARCH 17, 2015 (SYSTEM OFF)

Stantec

DRAWN BY	D.H.	DATE DRAWN	5/27/2015
SCALE	1 in = 50 feet		
PROJECT	203700102		

X:\WA\Clients\Time_Oil\TOC-MountlakeTerrace_BA140280\MXDs\WorkingMXDs\1Q15 Annual GW Report\fig-5_1q15_gwe_iz_map_20150507.mxd

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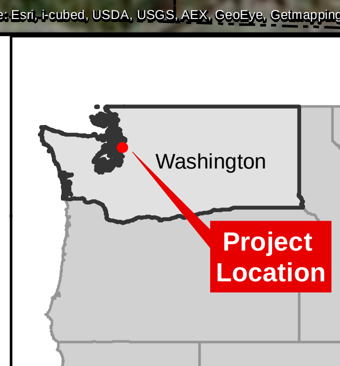
Legend

	Parcels		Site Boundary
343.04	Groundwater Sample Location Identifier and Groundwater Elevation (ft, MSL) (NM = Not Measured)	× — ×	Compound Fence
			Equipment Shed
			System Compound
315.0	Estimated Groundwater Elevation Contour (ft, MSL)		Historic Excavation



TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 6: GROUNDWATER ELEVATION CONTOURS, DEEP ZONE, MARCH 17, 2015 (SYSTEM OFF)

Stantec

DRAWN BY	D.H.	DATE DRAWN	6/4/2015
SCALE	1 in = 50 feet		
PROJECT	203700102		

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FIGURE 7

Shallow (MW62), Intermediate (MW20 and MW32) and Deep (MW53) Zone Groundwater Elevations

December 2006 - March 2015

TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA

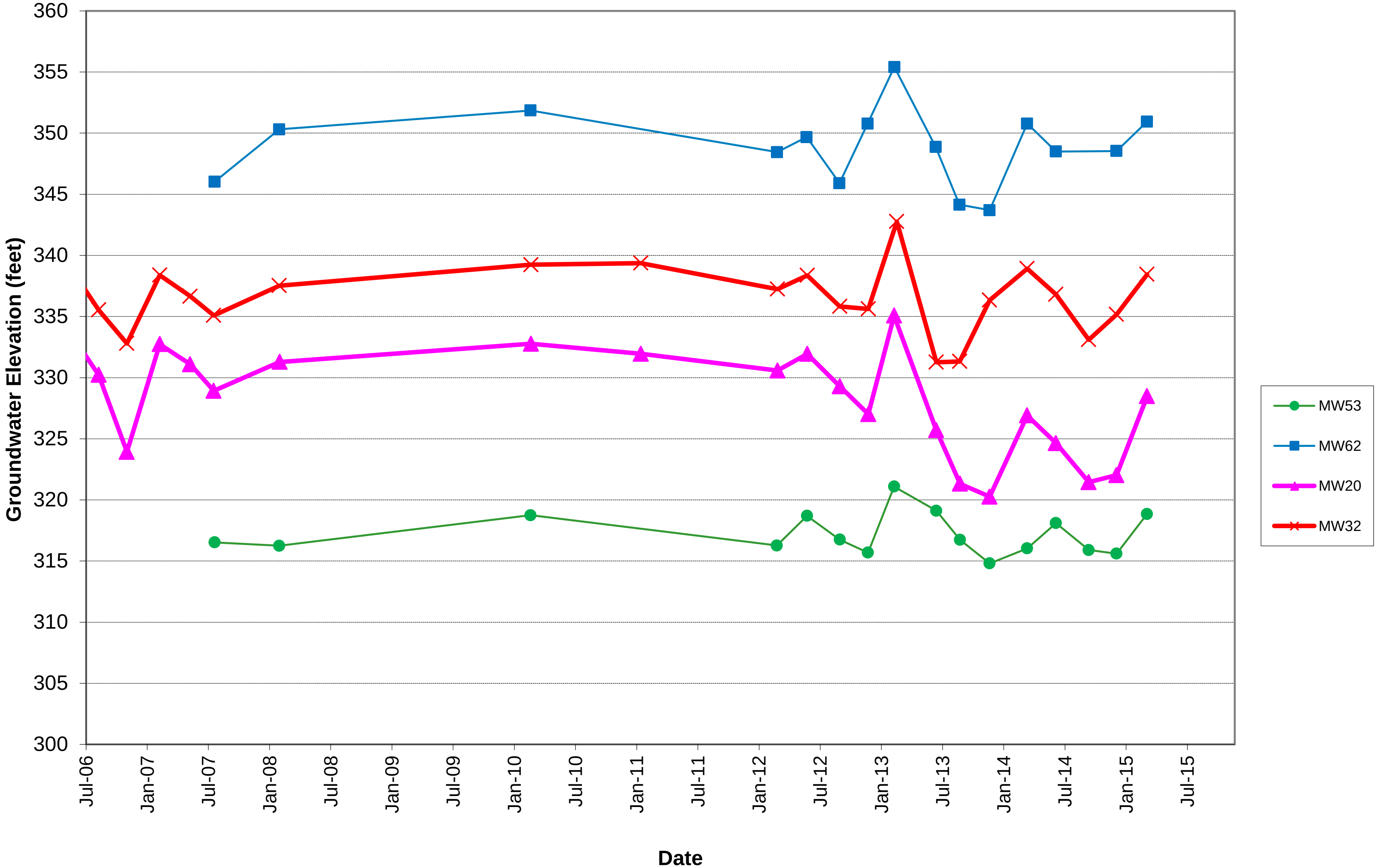
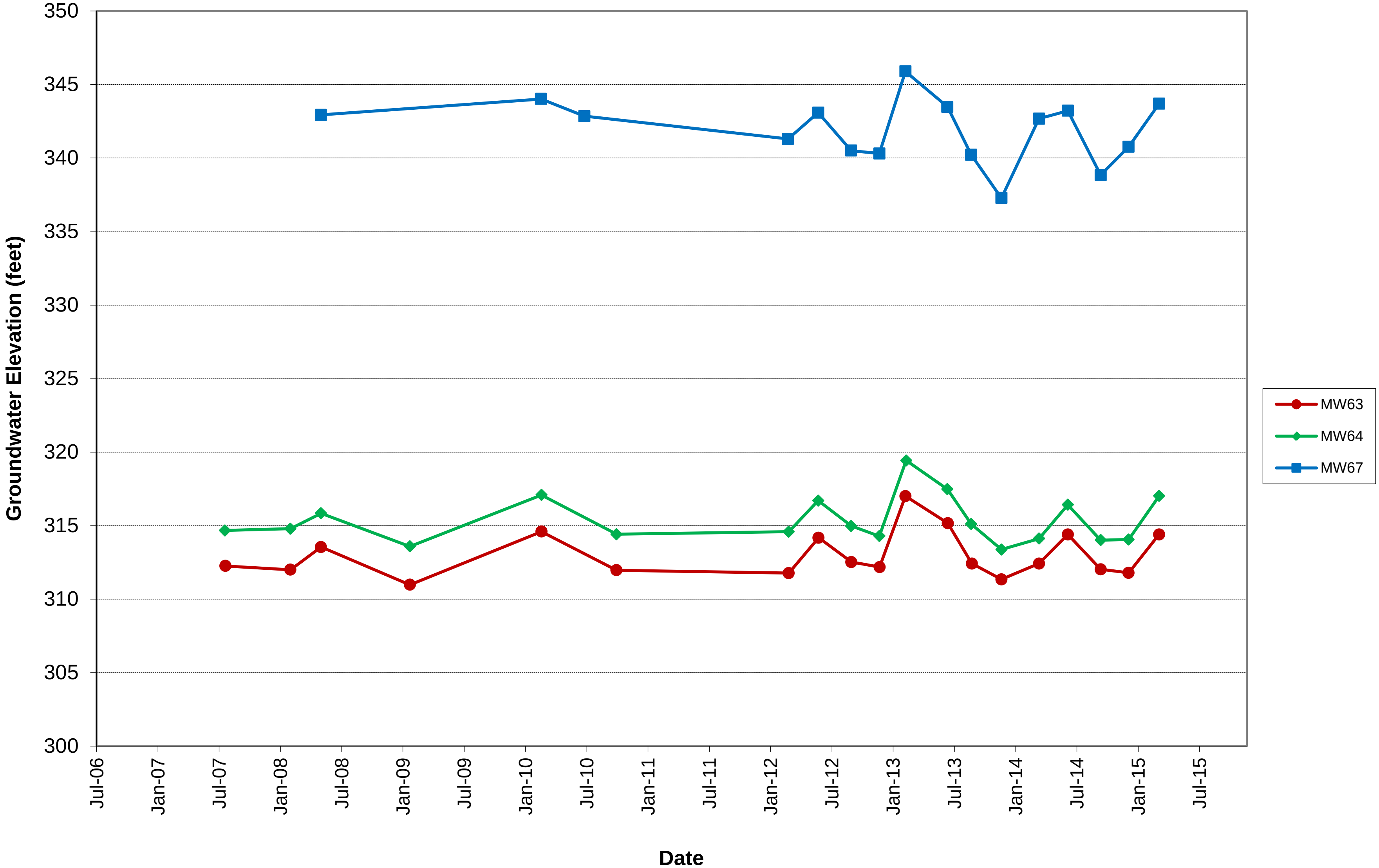


FIGURE 8

Shallow (MW67), Intermediate (MW63) and Deep (MW64) Zone Groundwater Elevations
December 2006 - March 2015
TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA



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Notes:

1. ND = Not Detected
   NS = Well Not Sampled
   NA = Constituent Not Analyzed
   LNAPL = Well not sampled due to presence of product (LNAPL) in the well
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation
3. If a duplicate sample was collected, the higher result between the original and the duplicate is shown.

Legend

- Parcels
- MW72 / 800 — Groundwater Sample Location Identifier and GRPH Concentration (µg/L)
- Estimated area where concentration exceeds minimum MTCA Method A Cleanup Level for Groundwater (800 ug/L when benzene is present)
- Site Boundary
- Compound Fence
- System Compound
- Equipment Shed
- Historic Excavation

TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 9: GRPH CONCENTRATIONS IN GROUNDWATER, SHALLOW ZONE, MARCH 2015

Stantec

DRAWN BY	D.H.	DATE DRAWN	7/30/2015
SCALE	1 in = 50 feet		
PROJECT	203714085		

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X:\WA\Clients\Time_Oil\TOC-Mountlake Terrace_BA140280\MXDs\Working\MXDs\1Q15 Annual GW Report\fig-9_1q15_grph_uz_map_20150507_v2.mxd

Legend

Parcels	Site Boundary
MW72 / 10 — Groundwater Sample Location Identifier and Benzene Concentration (µg/L)	Compound Fence
Estimated area where concentration exceeds minimum MTCA Method A Cleanup Level for Groundwater (800 ug/L when benzene is present)	System Compound
	Equipment Shed
	Historic Excavation

TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 10: BENZENE CONCENTRATIONS IN GROUNDWATER, SHALLOW ZONE, MARCH 2015

Stantec

DRAWN BY	D.H.	DATE DRAWN	7/30/2015
SCALE	1 in = 50 feet		
PROJECT	203700102		

X:\WA\Clients\Time_Oil\TOC-Mountlake Terrace_BA140280\MXDs\Working\MXDs\1Q15 Annual GW Reporting\fig-10_1q15_benzene_uz_map_20150507.mxd

Legend

- Parcels
- MW88 — Well Location Where Screen Intersects Multiple Groundwater Zones
- MW73 — Intermediate Groundwater Zone Well Location
- 343.04 — GRPH Concentration (µg/L)
- Estimated area where concentration exceeds minimum MTCA Method A Cleanup Level for Groundwater (800 ug/L when benzene is present)
- Site Boundary
- Compound Fence
- Equipment Shed
- System Compound
- System Piping
- Historic Excavation

TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 11: GRPH CONCENTRATIONS IN GROUNDWATER, INTERMEDIATE ZONE, MARCH 2015

Stantec

DRAWN BY	D.H.	DATE DRAWN	7/30/2015
SCALE	1 in = 50 feet		
PROJECT	203700102		

X:\WA\Clients\Time_Oil\TOC-MountlakeTerrace_BA1402800\MXDs\WorkingMXDs\1Q15 Annual GW Report\fig-11_1q15_grph_iz_map_20150507.mxd

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Notes:

1. ND = Not Detected
   NS = Well Not Sampled
   NA = Constituent Not Analyzed
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation
3. If a duplicate sample was collected, the higher result between the original and the duplicate is shown.
4. Well symbols displayed in purple indicate wells that are screened across multiple zones.

X:\WA\Clients\Time_Oil\TOC-MountlakeTerrace_BA14028\00MXDs\Working\MXDs\1Q15 Annual GW Report\fig-12_1q15_benzene_iz_map_20150507.mxd

Legend

- Parcels
- MW88 — Well Location Where Screen Intersects Multiple Groundwater Zones
- MW73 — Intermediate Groundwater Zone Well Location
- 343.04 — Benzene Concentration (µg/L)
- Estimated area where concentration exceeds minimum MTCA Method A Cleanup Level for Groundwater (800 ug/L when benzene is present)
- Site Boundary
- Compound Fence
- Equipment Shed
- System Compound
- System Piping
- Historic Excavation

TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 12: BENZENE CONCENTRATIONS IN GROUNDWATER, INTERMEDIATE ZONE, MARCH 2015

Stantec

DRAWN BY	D.H.	DATE DRAWN	7/30/2015
SCALE	1 in = 50 feet		
PROJECT	203700102		

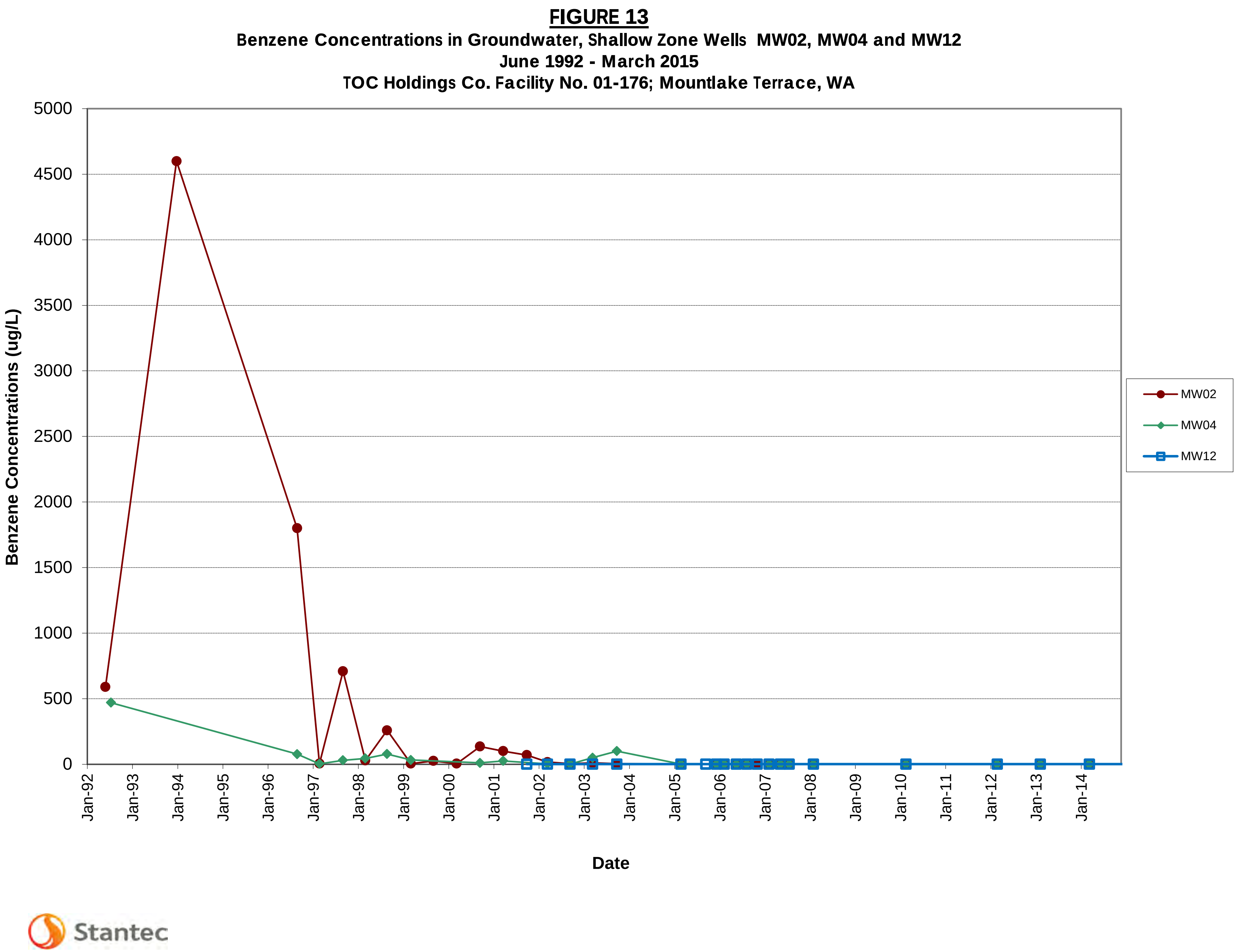
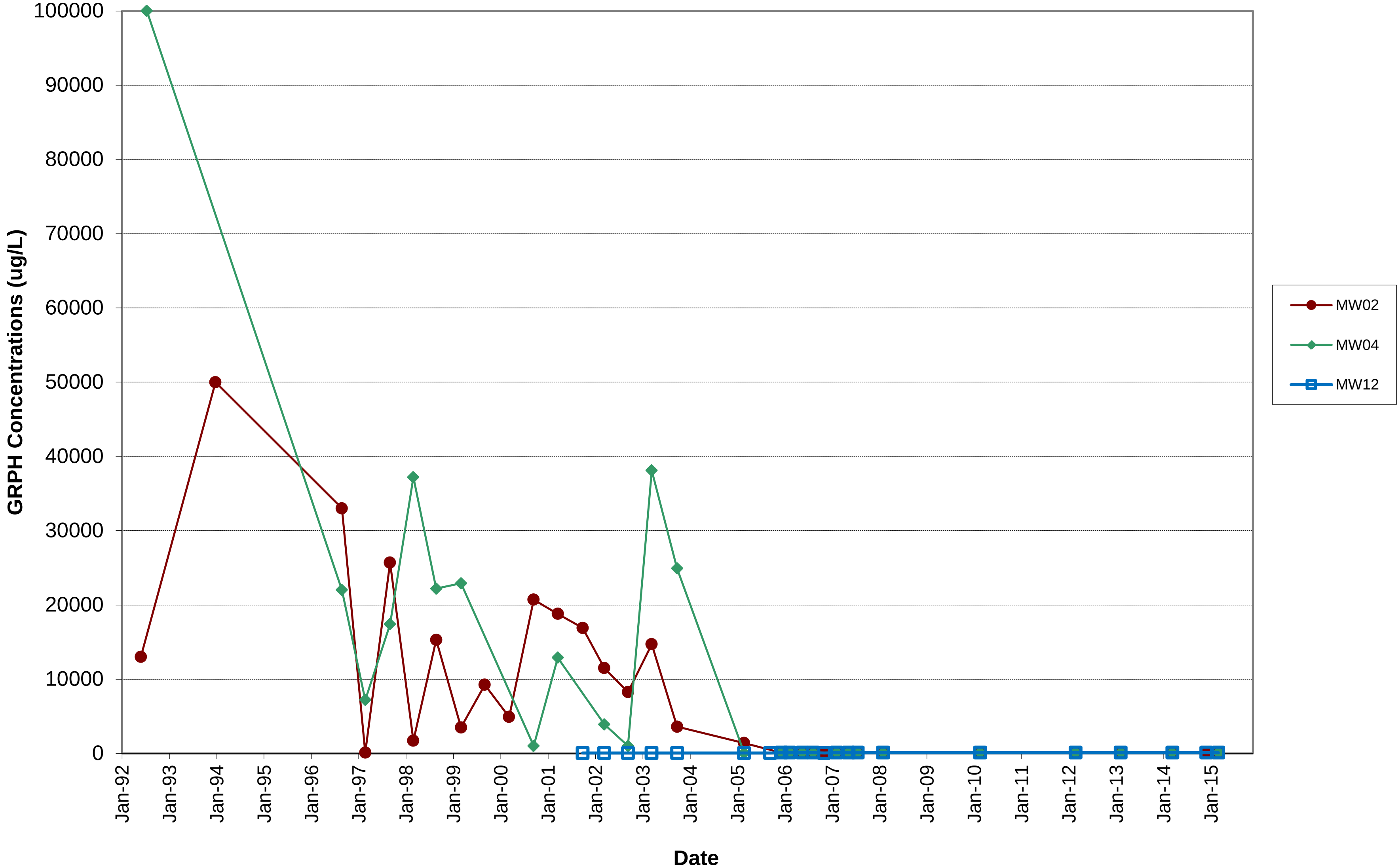


FIGURE 13
Benzene Concentrations in Groundwater, Shallow Zone Wells MW02, MW04 and MW12
June 1992 - March 2015
TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA
Benzene Concentrations (ug/L)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Date
MW02
MW04
MW12
Stantec

FIGURE 14

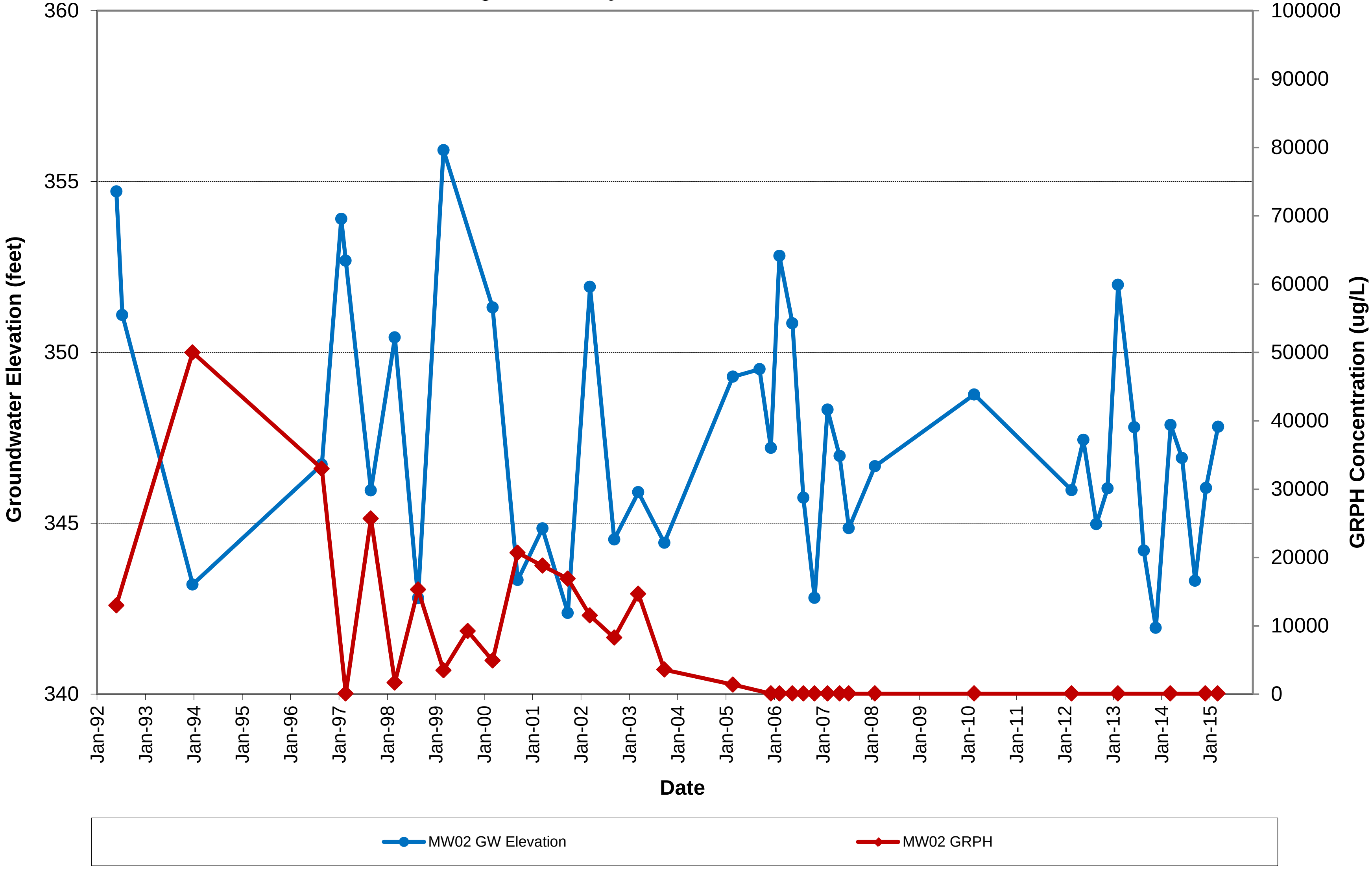
GRPH Concentrations in Groundwater, Shallow Zone Wells MW02, MW04 and MW12
June 1992 - March 2015
TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA



Stantec

FIGURE 15

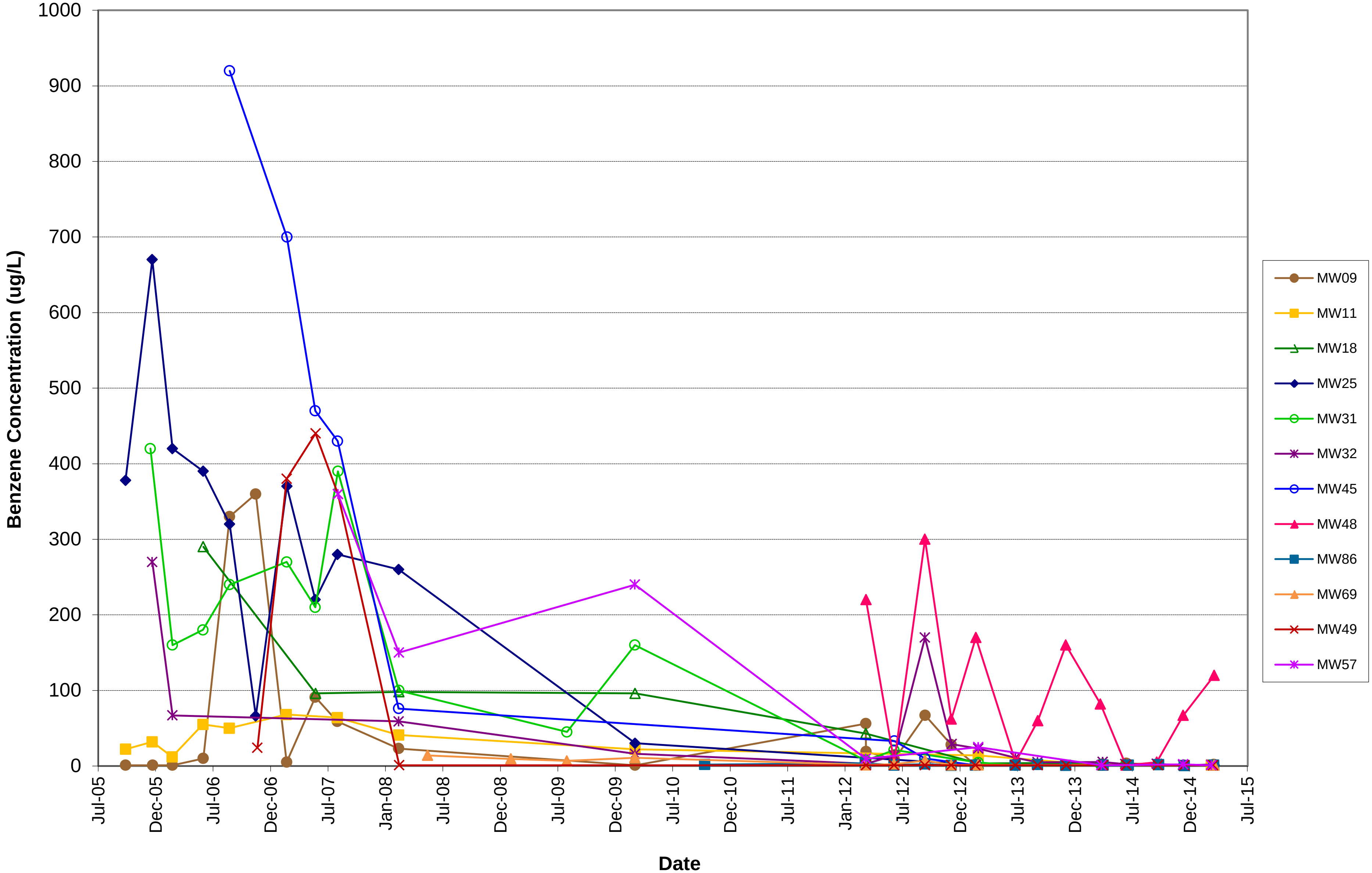
Groundwater Elevation and GRPH Concentrations in Groundwater, Shallow Zone Well MW02
June 1992 - March 2015
TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA



Stantec

FIGURE 16

Benzene Concentrations in Groundwater, Selected Intermediate Zone Wells
September 2005 - March 2015
TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA



Stantec

FIGURE 17

Groundwater Elevation and Benzene Concentrations in Groundwater, Intermediate Zone Well MW48 and Benzene Concentrations in Wells Near MW48

December 2006 - March 2015

TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA

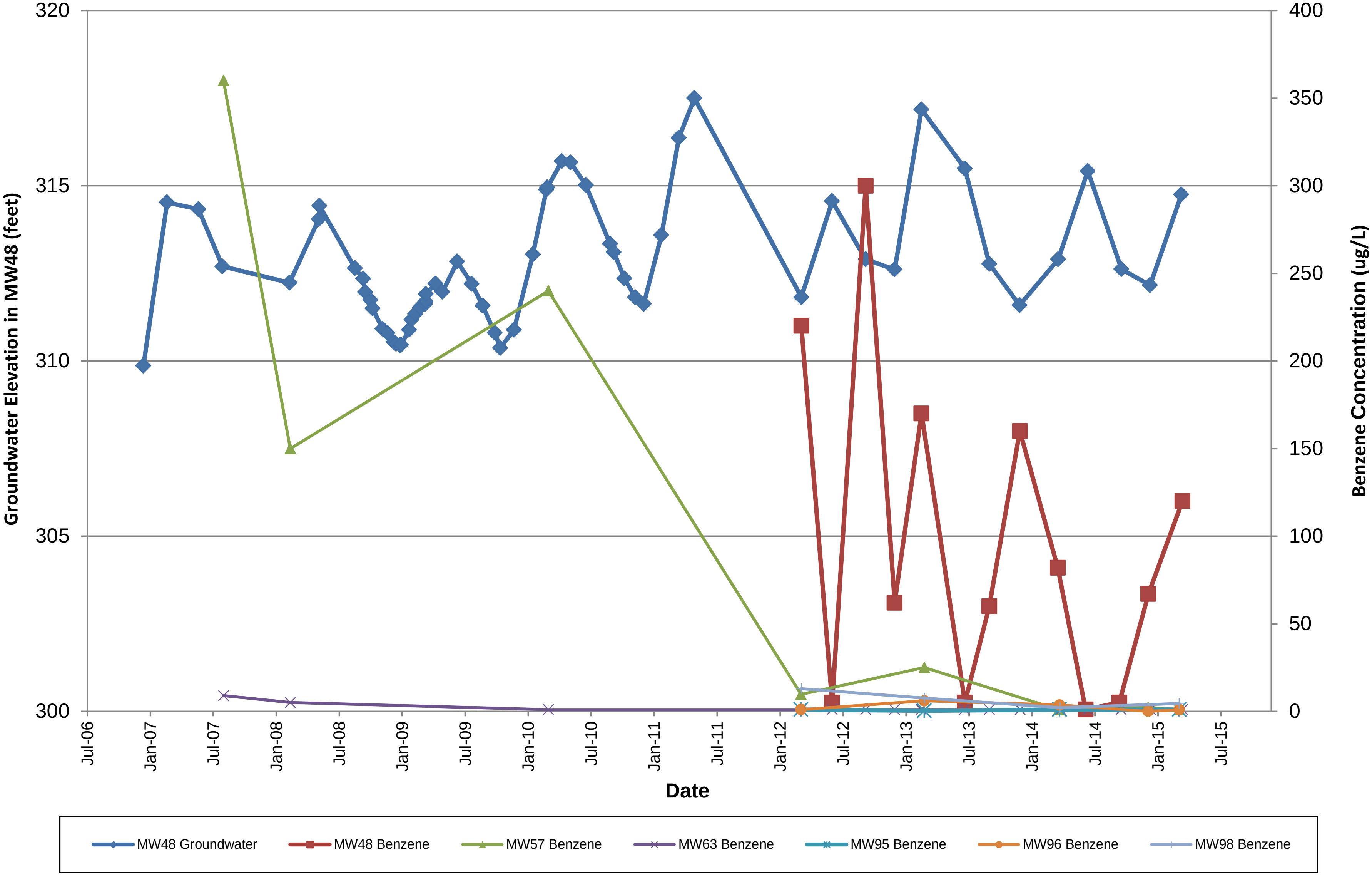
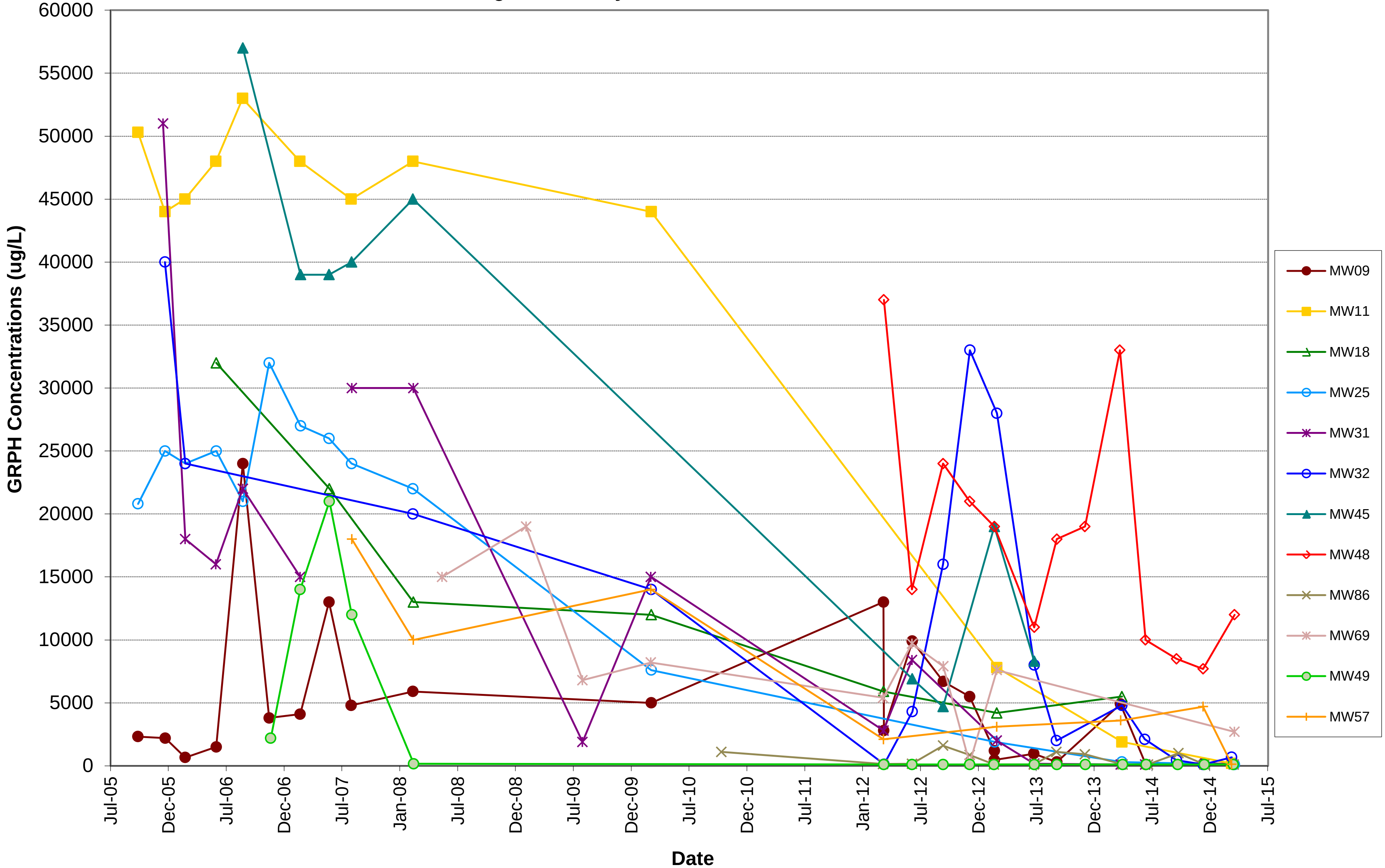


FIGURE 18

GRPH Concentrations in Groundwater, Selected Intermediate Zone Wells

September 2005 - March 2015

TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA



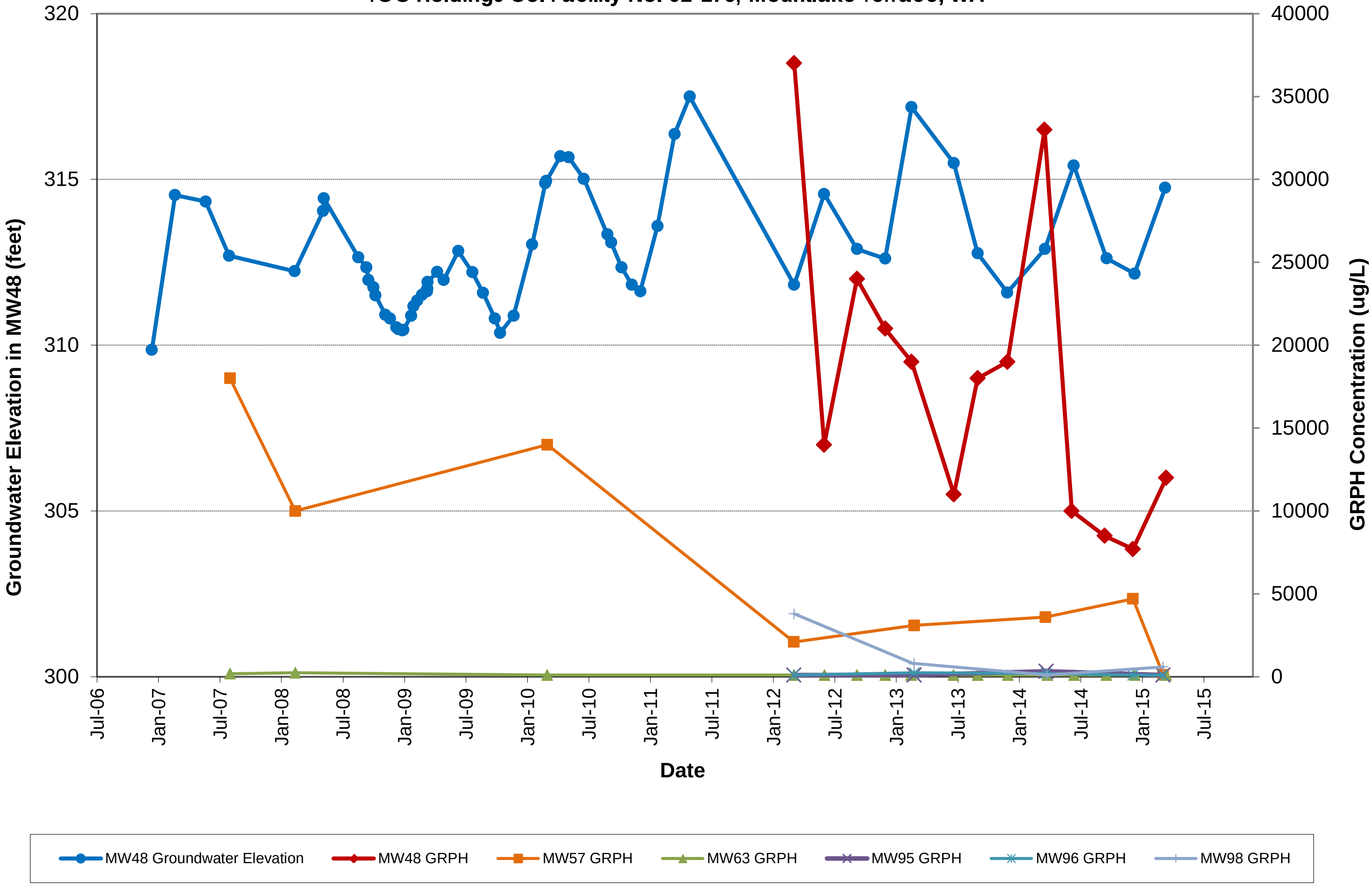
Stantec

FIGURE 19

Groundwater Elevation and GRPH Concentrations in Groundwater, Intermediate Zone Well MW48 and GRPH Concentrations in Wells Near MW48

December 2006 - March 2015

TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA



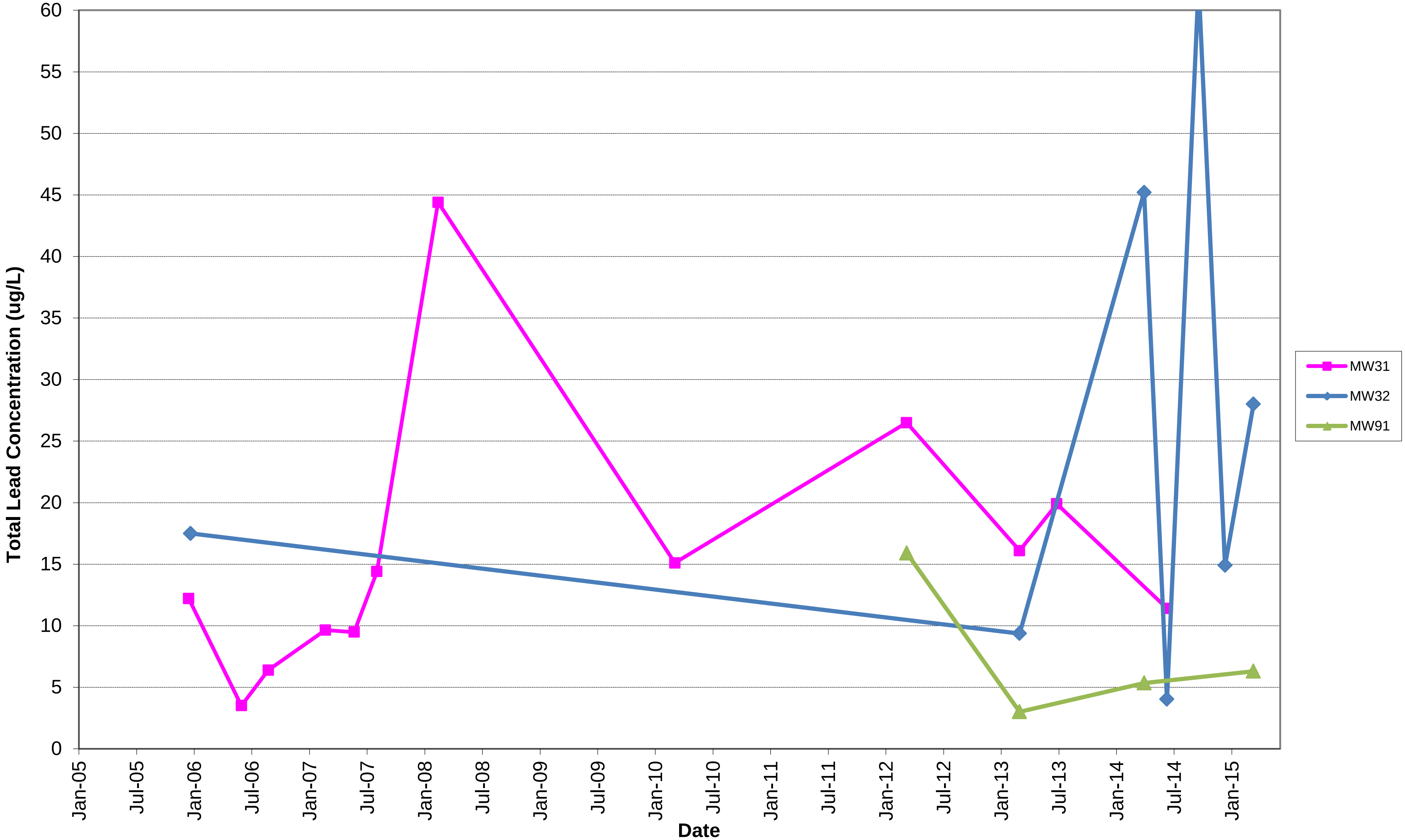
Stantec

FIGURE 20

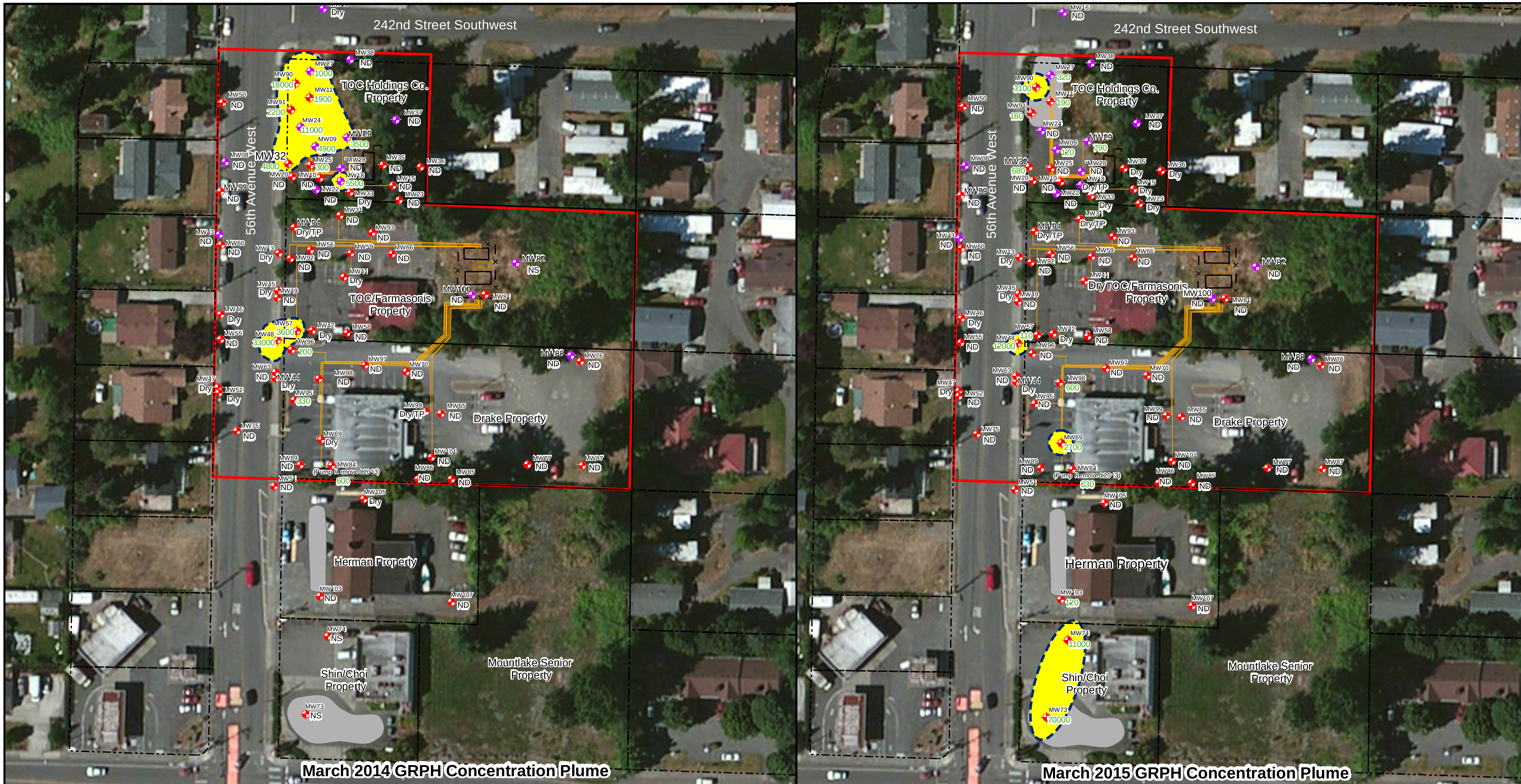
Total Lead Concentrations in Groundwater, Intermediate Zone Wells MW31, MW32 and MW91

December 2005 - March 2015

TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA



Stantec



Notes:

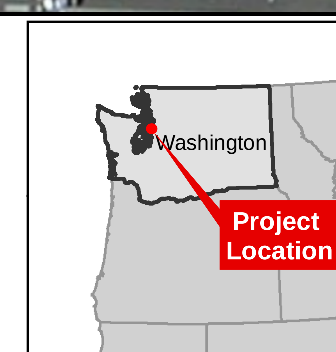
1. ND = Not Detected
NS = Well Not Sampled
NA = Constituent Not Analyzed
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation
3. If a duplicate sample was collected, the higher result between the original and the duplicate is shown.
4. Well symbols displayed in purple indicate wells that are screened across multiple zones.

Legend

- Parcels
- MW88 — Well Location Where Screen Intersects Multiple Groundwater Zones
- MW73 — Intermediate Groundwater Zone Well Location
- 343.04 — GRPH Concentration (µg/L)
- Estimated area where concentration exceeds minimum MTCA Method A Cleanup Level for Groundwater (800 ug/L when benzene is present)
- Site Boundary
- Compound Fence
- Equipment Shed
- System Compound
- System Piping
- Historic Excavation

N

80 40 0 80
Feet



TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 21: GRPH PLUME COMPARISON, INTERMEDIATE ZONE, MARCH 2014 & 2015

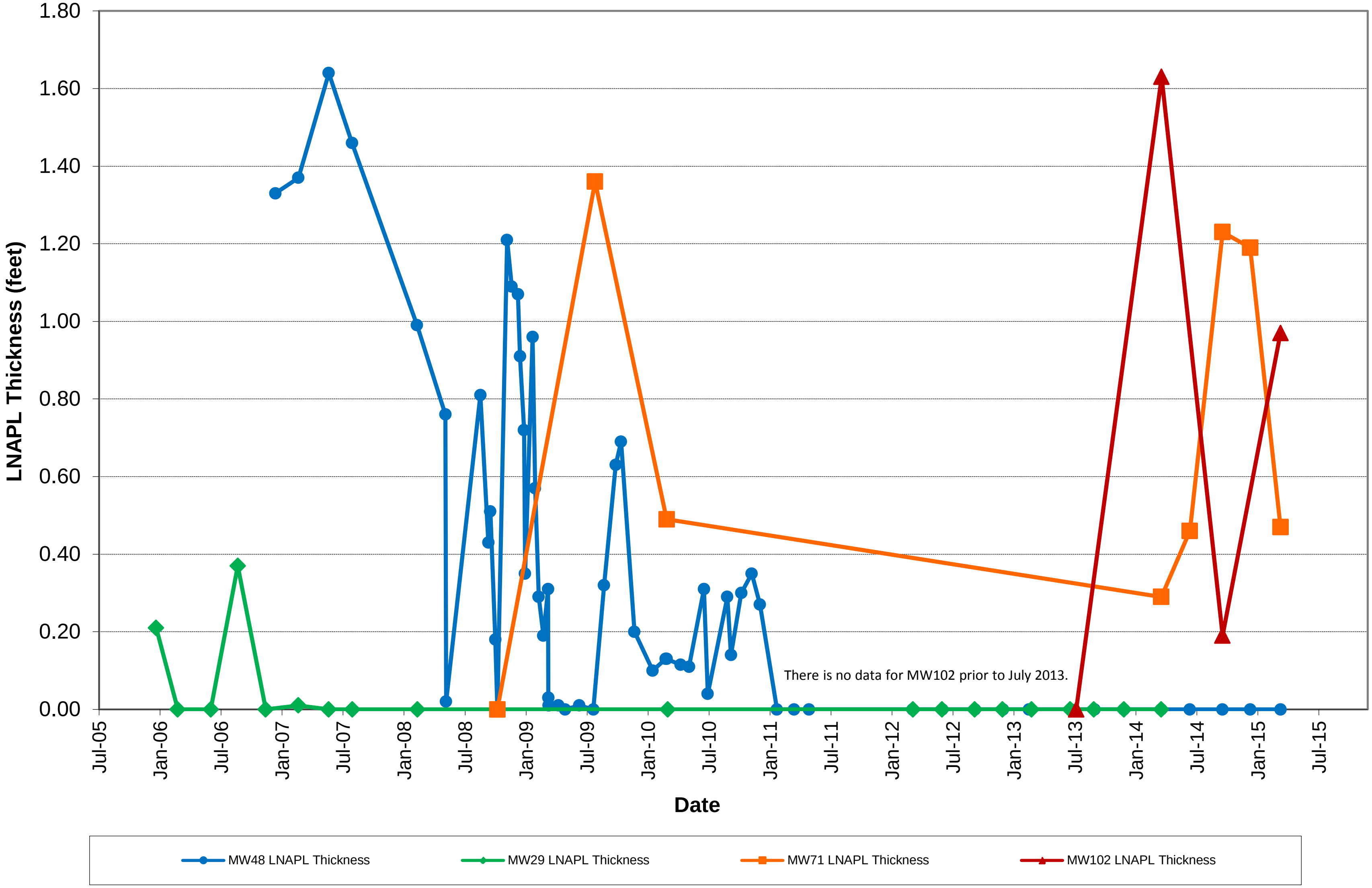
Stantec

DRAWN BY	D.H.	DATE DRAWN	7/30/2015
SCALE	1 in = 83 feet		
PROJECT	203700102		

X:\WA\Clients\Time_Oil\TOC-MountlakeTerrace_BA140280\MXDs\Working\MXDs\1Q15 Annual GW Report\fig-21_1q15dual_grph_iz_map_20150507.mxd

FIGURE 22

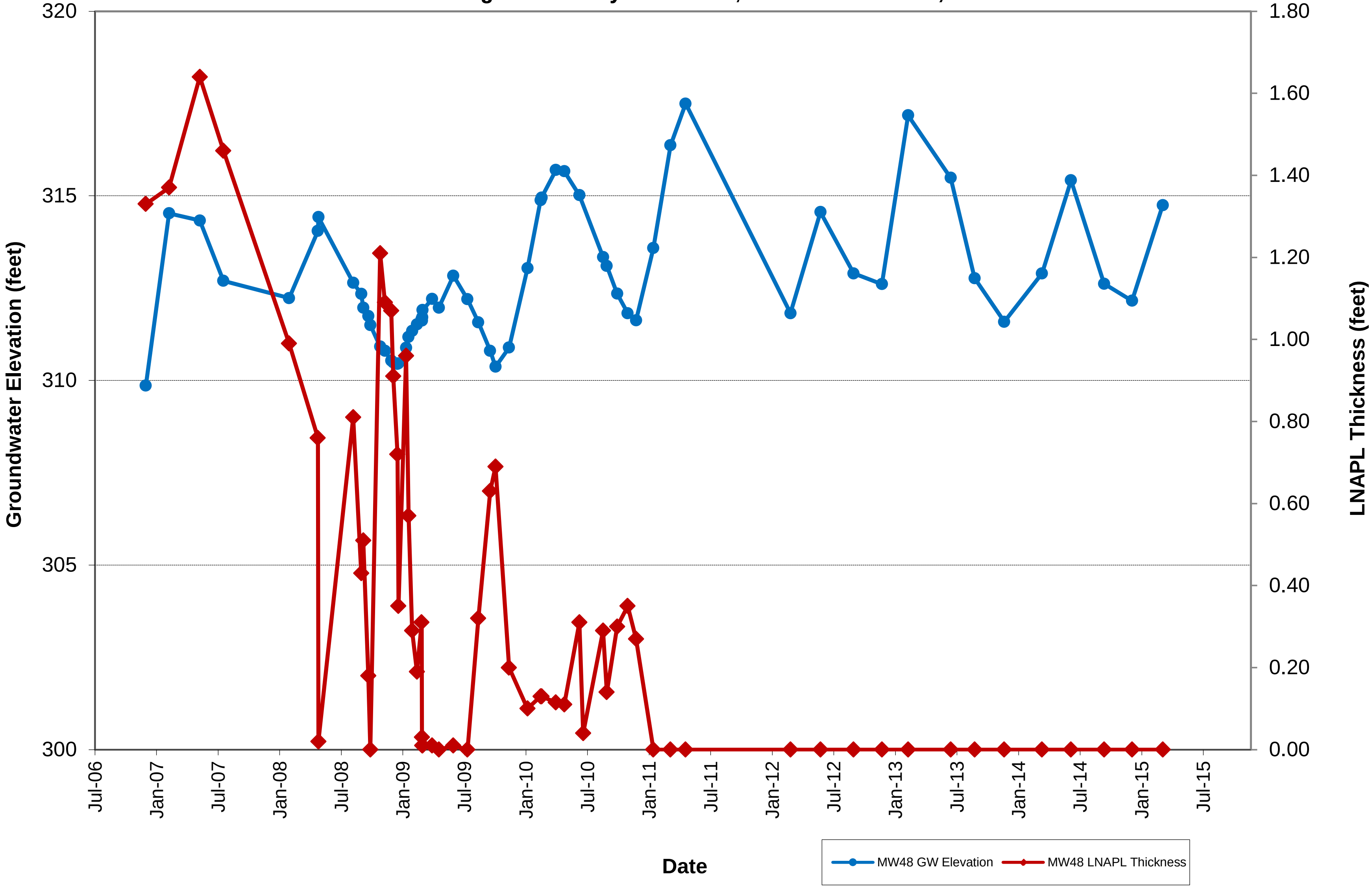
LNAPL Thickness, Shallow Zone Wells MW29, MW71 and MW102 and Intermediate Well MW48
December 2005 - March 2015
TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA



Stantec

FIGURE 23

Groundwater Elevation and LNAPL Thickness, Intermediate Zone Well MW48
December 2006 - March 2015
TOC Holdings Co. Facility No. 01-176; Mountlake Terrace, WA



Stantec

Appendix A

Groundwater Monitoring Plan

Groundwater Monitoring Plan

TOC Holdings Co.
Facility No. 01-176
24205 56th Avenue West
Mountlake Terrace, WA 98043

Prepared for:
TOC Holdings Co.
2737 West Commodore Way
Seattle, WA 98199

Prepared by:
Stantec Consulting Services Inc.
19101 36th Avenue West, Ste. 203
Lynnwood, WA 98036
Phone: 425.977.4994

v.2

Sign-off Sheet

This document entitled, ***Groundwater Monitoring Plan***, was prepared by **Stantec Consulting Services Inc. (Stantec)** on behalf of **TOC Holdings Co. (TOC)** for specific application to TOC Facility No. 01-176 in Mountlake Terrace, Washington. Services conducted by Stantec for this project were conducted in accordance with the Environmental Services Contract between **HydroCon Environmental, LLC (HydroCon)** and Stantec. Any reliance on this document by a third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and HydroCon. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

This document was prepared under the supervision and direction of the key staff identified below.

Dana Hutchins

Prepared by: **Dana Hutchins, GIT**
Project Specialist, Geology

Andrea Pedersen

Prepared by: **Andrea Pedersen**
Senior Project Coordinator

Rebekah Brooks

Reviewed by: **Rebekah Brooks, LG, LHg**
Project Manager
Senior Associate, Hydrogeology

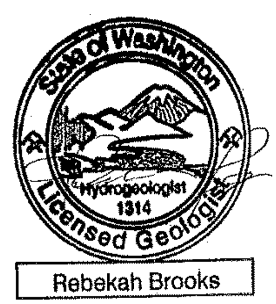


Table of Contents

LIST OF TABLES

ATTACHMENT 1: FIELD FORMS

Acronyms & Abbreviations

bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and total xylenes
CFR	Code of Federal Regulations
COC	chain of custody
DOT	U.S. Department of Transportation
DRPH	diesel-range petroleum hydrocarbons
DTP	depth to product
DTW	depth to water
EDB	ethylene dibromide (1,2-dibromoethane)
EDC	ethylene dichloride (1,2-dicholoroethane)
EPA	U.S. Environmental Protection Agency
FSDS	Field Sample Data Sheet
GRPH	gasoline-range petroleum hydrocarbons
HASP	Health and Safety Plan
HCl	hydrochloric acid
HNO_3	nitric acid
HydroCon	HydroCon Environmental, LLC
IRAWP	Interim Remedial Action Work Plan
L	liter
LNAPL	light non-aqueous phase liquid
mL	milliliters
MTBE	methyl tertiary-butyl ether
MW	monitoring well
NTU	Nephelometric Turbidity Unit
NWTPH-Dx	Northwest Total Petroleum Hydrocarbon for diesel-range organics
NWTPH-Gx	Northwest Total Petroleum Hydrocarbon for gasoline-range organics
OSHA	Occupational Safety and Health Administration
OWS	oil-water separator
PAH	polycyclic aromatic hydrocarbons
QA/QC	Quality Assurance / Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
RW	remediation well
Stantec	Stantec Consulting Services Inc.
TOC	TOC Holdings Co.
USGS	U.S. Geology Survey
VOA	volatile organic analysis
VOC	volatile organic compound

List of Properties – TOC Site

TOC Property	24205 56th Avenue West, Mountlake Terrace, WA
TOC/Farmasonis Property	24225 56th Avenue West, Mountlake Terrace, WA
Drake Property	24309 56th Avenue West, Mountlake Terrace, WA
56th Avenue West ROW	Right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties

List of Properties – Adjacent to TOC Site

Herman Property	24311 56th Avenue West, Mountlake Terrace, WA
Shin/Choi Property	24325 56th Avenue West, Mountlake Terrace, WA
242nd Street Southwest ROW	Right-of-way adjacent to TOC Property

1.0 INTRODUCTION

This *Groundwater Monitoring Plan* presents the field procedures and protocol to be followed during field events associated with the interim remedial action at the TOC Holdings Co. (TOC) Facility No. 01-176 located in Mountlake Terrace, Snohomish County, Washington. The procedures presented herein are intended to be general in nature and, as the work progresses and, when warranted, appropriate revisions may be made based on current site conditions. Field activities will be performed by Stantec Consulting Services Inc. (Stantec) as a subconsultant to HydroCon Environmental, LLC (HydroCon) on behalf of TOC.

2.0 HEALTH AND SAFETY

A site-specific Health and Safety Plan (HASP) has been prepared in accordance with the Occupational Safety and Health Administration (OSHA) Code of Federal Regulation (CFR) 1910.120. The HASP includes a Site description and background, a chemical and physical hazard evaluation, operations plan, safety equipment and procedures, and emergency procedures. The site-specific HASP encompasses health and safety protocols to be used by Stantec personnel during performance of groundwater monitoring and other field activities. The HASP will also be used to inform Stantec field personnel of the site hazards and appropriate safety measures to be undertaken when working on the site.

All Stantec personnel that perform field activities must read and understand the contents of the site-specific HASP and sign the signature page prior to conducting field work. A recent HASP must be in the possession of Stantec staff when in the field. In addition, Stantec personnel must complete a RMS-02 – Field Risk Assessment (Fit for Duty) Form (provided in **Attachment 1**) on the first day of each field event and update each day during the event. In compliance with requirements on the RMS-02, the Stantec field crew lead will hold an onsite safety meeting at the beginning (and end, if necessary) of each workday to include all Stantec field personnel and any other personnel to be at the Site at the time of groundwater monitoring for coordination purposes. Safety meetings will be documented on the RMS-02 Form.

In the case of a safety Incident involving injury, potential injury, or report of pain, soreness, or discomfort, Stantec personnel must report immediately (within one hour) to their project manager or supervisor. Supervisors will then immediately contact their HSE representative to develop a plan for assessment and care. Any safety incidents must be documented on Stantec's RMS-03 Incident Report Form (see Attachment A) <u>within 24 hours</u> of any incident. The form should be submitted to by email to hse@stantec.com or fax at (780) 969-2030, with or without signatures. Once signed, the forms will be placed into the project files.

3.0 GROUNDWATER MONITORING METHODS & PROCEDURES

The methods and procedures described in this plan were developed primarily from the U.S. Environmental Protection Agency (EPA) and U.S. Geological Survey (USGS) sources identified below.

- *Standard Operating Procedure for the Standard/Well-Volume Method for Collecting a Ground-Water Sample from Monitoring Wells for Site Characterization* (EPA, Region 9)
- *Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells* (EPA 2010)
- *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers. Ground Water Forum Issue Paper* (EPA 2002)
- *National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations*, Book 9, Chapters A1-A9 (USGS, Various Dates)

The following sections summarize the methods and protocols that will be used by Stantec for the quarterly and annual groundwater performance monitoring events.

3.1 Depth-to-Water/Depth-to-Product Measurements

In accordance with the scope of work defined in the IRAWP, depth-to-water/depth-to-product (DTW/DTP) levels are measured during each field event to determine groundwater flow characteristics and contaminant distribution. For the TOC project, DTW/DTP measurements will be collected from active monitoring and remediation wells using the following schedule:

1) “System On” Measurements: At the beginning of each groundwater monitoring event, DTW/DTP level measurements will be collected from selected wells while the MPE remediation systems are operating. Measurements will be used to assess how pumping is influencing groundwater flow and to assess performance of the remediation systems. All measurements will be collected on the same day.

2) “System Off” Measurements: Following completion of the system on measurement event, the MPE remediation systems will be turned off for several days (typically 5 days) to allow groundwater levels to equilibrate prior to collecting system off measurements. System off measurements will be used to assess natural groundwater conditions (i.e., without influence of the remediation systems). All measurements will be collected on the same day.

3) DTW/DTP measurements will also be collected from each well prior to sampling. Samples will be collected between the system on and system off DTW/DTP measurement events.

3.1.1 Materials & Equipment

Materials and equipment required for DTW/DTP level measurements are described below.

- **Project Records:**
  - Well Construction Records and Previous DTW/DTP Measurements:
  - HASP or completed RMS-01 form (provided in **Attachment 1**)
  - *Groundwater Monitoring Plan*
  - Sampling Schedule (provided as **Table A-1**)
- **Field Notebook and Forms** (provided in **Attachment 1**)
  - Field Report Forms
  - DTW/DTP Level Measurement Form
  - Health and Safety Forms (RMS-02 and RMS-03)
- **Electronic Probes:** An electronic probe consists of a contact electrode attached to the end of an insulated electrical cable marked with length indicators, and a reel which houses an ammeter, buzzer or other closed circuit indicator. The indicator shows a closed circuit and flow of current when the electrode touches a water or light non-aqueous phase liquid (LNAPL) surface. At locations where LNAPL is not present, DTW levels will be measured with an electronic water level probe to an accuracy of 0.01 feet. Where LNAPL is present (or was previously observed or is expected to occur), an oil/water interface probe will be used to check for the presence of LNAPL and measure the DTP and DTW.

3.1.2 Equipment Calibration

The electronic probes used for DTW/DTP measurements will be calibrated at least annually (as part of regular maintenance) by comparing the position of the electrode relative to the marked graduations on the cable to those on a steel surveyors tape. The electronic probes will be calibrated more frequently if there is reason to suspect the probe was stretched (e.g., it was stuck in a well and pulled vigorously for retrieval or if the probe requires repair that could have affected the length of the cable).

If more than one electronic probe will be used for the measurement event, a baseline measurement from one well location will be collected using each probe to check for consistency between the instruments. Any differences between measurements will then be used to calibrate the instruments and correct the groundwater elevations, if necessary. The serial number of the electronic probe(s) selected for the measurement event will be recorded on the DTW/DTP Form and/or in the designated field notebook. If an instrument cannot be calibrated, it will be removed from service and labeled as needing repair.

3.1.3 Measuring Point Locations

A measuring point has been established and marked at the top of the inner casing of each well where DTW/DTW measurements are made. The measuring point is based on the reference point used for the topographic survey conducted by a licensed surveyor following well installation or following any modification of the well casing or previously established measuring point. Generally, this point is the top of the well casing on the north side. The measuring point is permanently marked using an indelible marker or a notch cut into the casing. When a monitoring well is surveyed, the licensed surveyor will reference the measuring point elevation relative to the local datum for location and elevation.

3.1.4 Measuring Procedures

As described in **Section 3.1.1**, DTW/DTP measurements will be collected using an electronic water level probe or an electronic oil-water interface probe.

The procedures summarized below will be used by Stantec field staff for each DTW/DTP measurement event.

- During preparation for the field event, check the electronic probes to confirm the battery is fully charged.
- Prior to collecting DTW/DTP measurements, review well construction details and previously collected measurements at each well location to gain insight on expected measurement values and to be alerted to any anomalous readings.
- Prior to collecting measurements, open each well casing for a minimum of 15 minutes to allow groundwater levels to equilibrate with atmospheric pressure.
- Select the appropriate electronic probe for each measurement location. (As described in **Section 3.1.1**, where LNAPL was previously observed or is expected to occur, an electronic oil/water interface probe will be used to check for the presence of LNAPL and measure the DTP and DTW.)
- To avoid cross contamination between wells, rinse the indicator probes and affected cables with deionized or tap water prior to the first measurement location, between each measurement location, and following the last measurement location.
- Lower the selected probe into the well until the ammeter or buzzer indicates a closed circuit. Raise and lower the probe slightly until the shortest length of cable that gives the maximum response on the indicator is found.
- With the cable in this fixed position, measure the DTW/DTP levels relative to the measuring point at the top of the well casing (see **Section 4.1.3**) to an accuracy of 0.01 feet. In the event LNAPL is encountered in the well, the DTP level will be recorded first and the DTW level will be recorded second. The probe(s) will identify the DTP level with a solid, continuous buzzer sound and will identify the DTW level with a pulsating buzzer sound.
- The measurement procedures will be repeated as many times as necessary until two identical DTW/DTP measurements are obtained at each well location.

- System on and system off measurements will be recorded on the DTW/DTP Level Measurement Form along with the date and time of each measurement and any notable observations. Measurements collected at the time of sampling will be recorded on the FSDS. Field forms are provided in **Attachment 1**.

Groundwater elevations will be calculated from the DTW measurement and the surveyed measuring point elevation at each well. If LNAPL is identified in the well, the LNAPL thickness will be determined by subtracting the DTP from the DTW measurement. LNAPL is lighter than water and slightly depresses the groundwater table as a function of the specific gravity difference between the two media. If LNAPL is measured in any monitoring wells, the reported groundwater elevations will be normalized using the industry-standard specific gravity estimate of the LNAPL (gasoline at the TOC site) relative to a specific gravity of 1.0 for water. The following equation and associated values will be used to obtain the normalized groundwater elevation:

Normalized Groundwater Elevation (feet) $= [(H_{TOC} - H_W) * 1.0] + [(H_W - H_{LNAPL}) * SG]$	
H_{TOC} = top of well casing elevation	H_{LNAPL} = DTP level below the top of well casing
H_W = DTW level below the top of well casing	**SG** = specific gravity of LNAPL

3.1.5 Total Well Casing Depth Measurement Procedures

To confirm the total depth of an existing well casing (if needed), the total depth of a well casing will be measured immediately after construction or at any time when conditions of the well may have changed or are in question. The total well depth is measured by sounding the bottom of the well with a weighted steel surveyors' tape or other graduated and weighted steel or fiberglass measuring tape. The electronic water level probe may also be used as a measuring device, if weighted.

To measure the total depth of the well, the weighted measuring tape or probe will be lowered into the well until there is slack in the tape or until there is a noticeable decrease in weight, which indicates the instrument has reached the bottom of the well. The tape will be lowered slowly to avoid damaging the bottom of the well with the additional weight. The tape will be raised slowly until it just becomes taut. With the tape in this fixed position, the tape reading opposite the measuring point at the top of the casing (or on the north side of the casing, if the well has not yet been surveyed) will be recorded to the nearest 0.1 feet.

3.2 Groundwater Sample Collection

Groundwater samples are collected to monitor contaminant concentrations and distribution and to evaluate the performance and efficacy of the remediation systems located on the TOC Site and their effect on groundwater quality.

The groundwater sampling method selected for each well location depends upon the function of the well (i.e., monitoring or remediation) and the volume of groundwater available for sample collection.

3.2.1 Materials & Equipment

Materials and equipment required for groundwater sampling are listed below.

- **Project Records:**
    - Well Construction Records
    - HASP or completed RMS-01 Form (provided in **Attachment 1**)
    - *Groundwater Monitoring Plan*
    - Sampling Schedule (see **Table A-1**)
- **Field Notebook and Forms** (provided in **Attachment 1**)
    - Field Report Forms
    - FSDS
    - Chain of Custody (COC) Form (provided by analytical laboratory)
    - Health and Safety Forms (RMS-02 and RMS-03)
- **Groundwater Sampling Equipment:**
    - Pneumatic Pump
    - Peristaltic Pump
    - Submersible Pump
    - Bailers
    - Field Parameter Meters
    - Flow-through Cells and Filters
    - Sample Containers and Insulated Coolers (provided by analytical laboratory)
    - Ice for Coolers

3.2.2 Sample Containers & Volumes

Groundwater samples will be collected into sample containers appropriate for the analytical method, and will be obtained from the licensed analytical laboratory performing the analyses (Friedman & Bruya, Inc. [Friedman & Bruya]). Different containers will be required for specific groups of analytes in accordance with applicable EPA Methods. **Table A-1** (subject to change and approved with the project manager prior to the field events) provides the quarterly sampling schedule and analyses for each well, per the requirements of the IRAWP (SES 2011). Stantec field personnel will coordinate with Friedman & Bruya to confirm the appropriate containers and preservatives are provided prior to each sampling event. The table on the following page summarizes the types of analyses and associated sample containers and preservatives that will be provided for each well location scheduled for sampling.

Quantity of Sample Containers per Sample Location & Laboratory Analyses

Laboratory Analyses & Method	Quantity of Sample Containers Required per Sampling Location		
	40mL VOA Glass Vials (preserved with HCl)	250mL Plastic Bottle (preserved with HNO_3)	500mL Amber Glass Bottle (unpreserved)
GRPH (NWTPH-Gx) BTEX (EPA Method 8260B)	3		
MTBE (EPA Method 8260C)	1		
EDB (EPA Method 8260C) EDC(EPA Method 8011M) Dissolved Lead (EPA Method 200.8)* Total Lead (EPA Method 200.8)		2	
DRPH & ORPH (NWTPH-Dx) PAH (EPA Method SW8270DSIM)			1

*Groundwater samples for this analysis will typically be field-filtered using the procedure described in Section 2.2.4.

Definitions:

BTEX = Benzene, Toluene, Ethylbenzene, and Total Xylenes
DRPH = diesel-range petroleum hydrocarbons
EDB = ethylene dibromide; 1,2-dibromoethane
EDC = ethylene dichloride; 1,2-dicholoroethane
EPA = U.S. Environmental Protection Agency
GRPH = gasoline-range petroleum hydrocarbons
HCl = hydrochloric acid
HNO_3 = nitric acid
mL = milliliter
MTBE = Methyl Tertiary-Butyl Ether
NWTPH-Dx = Northwest Total Petroleum Hydrocarbon for Diesel-Range Organics
NWTPH-Gx = Northwest Total Petroleum Hydrocarbon for Gasoline-Range Organics
ORPH = oil-range petroleum hydrocarbons
PAH = Polycyclic Aromatic Hydrocarbons
VOA = volatile organic analysis

3.2.3 Sample Container Labeling

Prior to groundwater sampling, Stantec staff will label each sample container that will be used for groundwater collection. Each sample container will include a self-adhesive label with the information described below written in waterproof ink.

- Project Identifier (ID)
- Unique Sample ID: Groundwater samples will be assigned a unique ID that corresponds to the well location from which the sample was collected (e.g., a sample collected from MW02 will be given the sample ID MW02).
- Blind Duplicates (described in **Section 4.1.1**): Samples collected as blind field duplicates will be given a unique ID (e.g., MLT-01, MLT-02, MLT-03, etc.). The sample ID will not identify the well location from which the sample was collected. The primary sample ID and blind duplicate sample ID will be identified on the FSDS sheet will not be identified on the COC Form.
- Field Blanks (described in **Section 4.1.2**): Samples collected as field blanks (water blanks and equipment/rinsate blanks) will include two letters identifying the type of sample collected (e.g., WB = water blank and EB = equipment blank) followed by the sample date (e.g., WB-031815 and EB-031815).
- Date and Time: The date and time of sample collection will be identified on each label.
- Treatment: If the sample is field-filtered during collection or if preservatives are added, it will be noted on the label COC Form.

3.2.4 Equipment Calibration

Prior to the beginning of groundwater sampling, field parameter meters will be calibrated by Stantec field personnel in accordance with the manufacturer's instructions. Calibration checks for all instruments will be performed and documented in the field notebook or on the Field Report Forms on each sampling day. Calibration will occur at a minimum at the beginning at each sampling day and whenever drift in the meter readings is observed. If an instrument cannot be calibrated, it will be removed from service and labeled as needing repair.

3.2.5 Groundwater Sampling Methods & Procedures

Stantec will use the following four groundwater sampling methods: pneumatic pump, peristaltic pump, submersible pump and bailer. Purging and sampling will be performed in accordance with low-flow protocols (EPA 2010a), except when using a bailer. The rational for using each method is described below.

- **Pneumatic Pump:** For remediation wells connected to a remediation system, Stantec will collect groundwater samples using a dedicated downhole pneumatic pump. The pneumatic pumps deliver a pulse of groundwater to the wellhead whenever the groundwater table rises above the pump intake, or when the float switch connected to the oil-water separator (OWS) for the associated remediation system turns the pump on when the OWS is empty or off when full. One set of field parameters will be collected from the pneumatic pumps for the remediation wells sampled. Groundwater samples will be collected from the pneumatic pump directly into laboratory-prepared sample containers using disposable polyethylene tubing or tubing dedicated to each well.
- **Peristaltic Pump:** Stantec will collect groundwater samples using a peristaltic pump in accordance with low-flow protocols (EPA 2010a) for monitoring wells with DTW levels less than 31 feet bgs (due to the inability of the pump to lift the water for sampling from greater depths). Purging and sampling with a peristaltic pump will be performed using disposable polyethylene tubing or tubing dedicated to each well at flow rates of 0.1 liters per minute.
- **Submersible Pump:** For monitoring wells with DTW levels greater than 31feet bgs, Stantec will collect groundwater samples using a submersible pump in accordance with low-flow protocols (EPA 2010a). Submersible pumps will be used in wells with insufficient groundwater recharge rates and/or insufficient water column heights. Purging and sampling with a submersible pump will be performed using disposable or dedicated polyethylene tubing at flow rates ranging from 0.1 to 0.5 liters per minute. If the groundwater table is above the top of the screen and, hence, the well screen is saturated, the intake tubing or the submersible pump will be placed approximately in the middle of the screen. If however the groundwater table is below the top of the screen and, hence, the well screen is not fully-saturated, the intake tubing of the submersible pump will be placed near the middle of the water column in the well.
- **Bailer:** For monitoring wells with DTW levels greater than 31 feet bgs that cannot be sampled using a submersible pump, a disposable polyethylene bailer will be used in accordance with low-flow protocols (EPA 2010a). Well purging and groundwater sampling with disposable bailers will require removal of at least three well volumes from each monitoring well prior to sampling. After purging, groundwater samples will be collected from the bailer directly into laboratory-prepared

sample containers. If purging of three well volumes is not possible due to slow recharge, the wells will be allowed to recharge several hours or overnight before re-attempting sample collection. The bailer sampling method will be the last selected method and will only be used under the following circumstances:

- Historical results indicated that elevated turbidity associated with bailing would likely not result in detectable concentrations of petroleum hydrocarbons in samples.
- Historical water columns are less than five feet and slow recharge rates make sampling with a submersible pump problematic.

3.2.5.1 Field Parameters

Stantec will monitor groundwater field parameters using a YSI Inc. water quality field meter equipped with a flow-through cell during well purging and at the time of groundwater sampling. Use of flow-through cell is not is not possible when sampling using a bailer. Field parameters and stabilization criteria that will be monitored and recorded are identified in the table below. Stabilization criteria will be met prior to sampling using three field readings recorded approximately five minutes apart.

Field Parameters & Stabilization Criteria

Field Parameters	Stabilization Criteria
Temperature	Readings are within 3% of each other
pH	Readings are within +/- 0.1 units of each other
Specific Conductance	Readings are within 3% of each other
Dissolved Oxygen	Readings are within 10% of each other
Turbidity	10% for values greater than 5 Nephelometric Turbidity Unit (NTU; if three turbidity values are less than 5 NTU, the values are considered stabilized)
Oxidation-Reduction Potential	Readings are within +/- 10 millivolts of each other

Data obtained from the field parameter measurements will be recorded on the FSDS. Separate aliquots of water will be used for taking field measurements (i.e., sample containers for laboratory analysis will not be reopened). If the parameters have not stabilized after collecting three field readings or three well volumes, the field instruments will be checked to determine if they are operating correctly and are still calibrated. If needed, the instruments will be recalibrated.

3.2.6 Groundwater Sampling

Following purging and stabilization of the field parameters, groundwater samples will be collected from the pump outlet tubing located upstream of the flow-through cell or directly from the bailer, and placed directly into laboratory-prepared sample containers that have been pre-labeled by Stantec staff (see **Section 3.2.3**). Clean gloves will be worn by field personnel when collecting each sample to avoid cross-contamination. The groundwater samples will be discharged or poured slowly and carefully into the sample containers to minimize aeration. Groundwater samples collected for Volatile Organic Compound (VOC) analyses will be collected in vials and completely filled so no head space remains. Following groundwater collection, VOC sample containers will be checked for air bubbles. If air bubbles are observed, the container will be emptied and a new container will be used. Following collection, the groundwater samples will be stored in coolers or a refrigerator until transported to the analytical laboratory.

Purge water generated during the sampling event will be placed in 55-gallon steel drums that will be labeled and temporarily stored on the TOC Property for transfer to the remediation systems for treatment and permitted discharge to the sanitary sewer.

3.2.7 Sample Filtration

Groundwater samples collected for dissolved parameters (e.g., metals) will be field-filtered using a disposable in-line, 0.45 micron filter. The groundwater sample will be pumped through the filter attached directly to the discharge tubing of the groundwater pumping system (in accordance with low-flow sampling procedures) or a peristaltic pump and a section of Tygon (polyvinylchloride) tubing or other appropriate method may be used if the sample is first collected in a clean container (volume based sampling). The filter cartridge will be rinsed with an aliquot of sample prior to collection of sample in the containers or as recommended by the filter manufacturer. A new filter and tubing will be used for each sample. A note will be made on the sample label, FSDS, and COC form to indicate the sample has been field filtered.

3.2.8 Sample Documentation

The information listed below will be documented on the FSDS for each groundwater sample.

- Project ID
- Sample location (well ID and property location)
- Sample ID (including duplicate sample ID[s] if applicable)
- Sample method (i.e., bailer, submersible pump, peristaltic pump or pneumatic pump)
- Sampling date and time
- Make, model and serial number of field instruments and equipment
- DTW/DTP level measurements (obtained at time of sampling)
- Well screen interval
- Total well depth
- Purging and sampling methods
- Sampling depth
- Sample container inventory (i.e., container type and volume, quantity, and any preservatives or filters)
- Total purge volume
- Field parameter measurements (e.g., time and cumulative purge volume, temperature, pH, specific conductance, turbidity, dissolved oxygen, oxidation-reduction potential, and purge rate)
- Notable observations
- Field personnel name and signature

If required, other notable field observations will be recorded in a field notebook and/or field photographs. Following completion of the sampling event, a quality assurance/quality control (QA/QC) review of the field records will be completed by the Project Manager (or his/her designee), and the original record will be placed in the project file.

3.2.9 Sample Packaging, Preservation & Shipping

Samples will be packaged and transported in a manner that will protect the integrity of the sample and prevent detrimental effects due to the possible hazardous nature of the samples. Regulations for packaging, marking, labeling and shipping hazardous materials are promulgated in the Code of Federal Regulations (CFR) by the U.S. Department of Transportation (DOT), 49 CFR 171 through 177. The sample containers will be packaged carefully to avoid breakage or cross contamination using sufficient packing material.

If required by the analytical method, groundwater samples will be placed on ice inside an insulated cooler (at an approximate cooler temperature of 4 ºC [39.2 ºF]) immediately after collection or in a refrigerator until packaged for transport to the laboratory. This approximate temperature will be maintained until delivery to the analytical laboratory.

3.2.10 Sample Custody

The primary objective of sample custody is to create an accurate record that can be used to trace the possession and handling of samples so that their quality and integrity can be documented and maintained from collection until completion of all required analyses. Sample custody will be achieved by filling out a COC Form. The COC form is initially completed by Stantec field personnel collecting the sample, and thereafter signed by each individual accepting custody of the sample. A sample will be considered to be in custody under the following conditions:

- field or laboratory personnel have the sample in physical possession;
- field or laboratory personnel have the sample in view;
- the sample is locked or secured in a locked container or otherwise sealed so that tampering is evident; and/or
- the sample is kept in a secured area that is restricted to authorized personnel only.

When samples are transferred to another entity, the personnel receiving the samples will sign the COC Form and document the date and time of transfer. Laboratory personnel accepting custody will sign and document the date and time transfer on the COC Form. Laboratory personnel will also note any integrity issues on the COC Form and will maintain sample security and custody through the analytical process.

The coolers in which the samples are packaged will be accompanied by the COC Form(s) identifying their contents. If coolers are shipped via commercial courier, the COC Form will be sealed in plastic bags and placed inside the coolers secured with custody seals.

3.2.11 Equipment Decontamination Procedures

Decontamination procedures for groundwater sampling equipment will be used to minimize the possibility of cross-contaminating samples. Sampling equipment that will be used to sample multiple locations will be cleaned prior to sampling a different location. Sampling equipment that comes in contact with potentially contaminated material will be decontaminated before and after each use. Equipment cleaning methods will be recorded in the field records.

Steel surveyors' tape, electrical probes and other measuring tapes will be cleaned before and after each measurement location. Cleaning will be accomplished by washing off visible contamination with a laboratory-grade detergent/water solution and rinsing with clean, potable, municipal water followed by rinsing with distilled or deionized water. If equipment is potentially contaminated by LNAPL, it should be rinsed with a weak hexane solution or warm, soapy water before the final distilled or deionized water rinse. After cleaning, equipment will be handled carefully to minimize contact with contaminants.

Sample bottles and bottle caps will be cleaned and prepared by the analytical laboratory (or their supplier) using standard EPA-approved protocols. Sample bottles and bottle caps will be protected from contamination between time of receipt by the sampler(s) and time of actual usage.

4.0 QA/QC METHODS & PROCEDURES

The objective of the QA/QC procedures described below is to confirm that project data are of known and appropriate quality and integrity, and sufficient to support their intended use. QA/QC will be accomplished by collecting field QA/QC samples or measurements at specific well locations in the field or specific samples in the laboratory. The results of the QA/QC samples will be used to evaluate precision, accuracy, representativeness, completeness and comparability of the analytical results.

4.1 Field QA/QC Samples

4.1.1 Blind Field Duplicate Samples

Blind field duplicate samples will be used to evaluate precision and accuracy. and will be collected during groundwater monitoring events to evaluate whether sample collection methods are reproducible. In general, for every 10 groundwater samples collected, one duplicate sample will be collected, or one duplicate sample will be collected per day. The relative percent difference (RPD) between the original and duplicate sample result should be less than 20 percent. Duplicate samples will be collected from the same well location and at the same time as the original sample and placed in different bottles than the primary sample. The bottles will be labeled such that the laboratory cannot determine the sample location (i.e., well ID). Samples will be collected by alternately filling sample containers for both the original and corresponding duplicate sample to decrease variability between samples, except for samples collected for VOC analysis.

4.1.2 Field Blanks

Field blanks will be used to evaluate precision and accuracy . The QA/QC samples described below will be collected for all groundwater monitoring events.

- **Water Blanks**: A water blank sample will be collected in the field to evaluate the potential presence of contamination originating from sources not associated with sample collection procedures. Each sample container is filled with deionized or distilled water in the field, preserved as required, and returned to the laboratory for analysis along with the other samples. In general, one water blank sample will be collected for every 20 original samples.
- **Equipment/Rinsate Blanks**: Following the last equipment decontamination of each sampling day, a distilled water rinse of the down hole equipment used to collect groundwater samples at multiple locations will be collected, preserved as required, and returned to the laboratory for analysis along with the other samples. Equipment rinsate samples for this project will only be collected on days that a submersible pump was used.
- **Trip Blanks**: A blank sample set is prepared by the laboratory to evaluate the presence of contamination (volatiles) during transit, from sample bottles, or from laboratory conditions. Each blank bottle is filled with deionized or distilled water in the laboratory, preserved as required, and returned to the laboratory for analysis along with the other samples. In general, one trip blank sample will be included in each shipping container. There should be no analytes detected in the trip blank.

4.2 Laboratory QA/QC Samples

The following samples will be used to evaluate laboratory QA/QC:

- **Laboratory Duplicates:** Laboratory matrix spike duplicate samples are prepared by the laboratory to assess laboratory precision. One laboratory duplicate sample is analyzed per batch of 20 groundwater samples. The RPD between the original and duplicate sample should be within the laboratory method requirements.
- **Laboratory Method Blanks:** Laboratory method blanks are samples prepared in the laboratory to identify any potential contamination introduced within the laboratory. One method blank will be analyzed per batch of 20 samples. Analytes should not be detected in the laboratory method blank.
- **Laboratory Matrix Spikes:** Laboratory matrix spikes are used to evaluate potential matrix effects on sample analysis for inorganic parameters. One matrix spike and one matrix spike duplicate sample (generally run as a pair) will be included with analyses per batch of 20, (at a minimum of one per sampling event). The percent recoveries of target analytes from the matrix spike sample should be within the laboratory method requirements. As described, above, the matrix spike duplicate evaluates precision and the RPD should be within the laboratory method requirements.
- **Laboratory Control Samples:** A laboratory control sample is a sample of known analyte concentrations that is similar to the field sample matrix and is analyzed identically with the field samples in a sample batch. The laboratory control sample demonstrates that the analytical method and instrumentation are within specified control limits for acceptability. One laboratory control sample and one laboratory control sample duplicate (generally run as a pair) will be analyzed per batch of 20 samples (at a minimum of one per sampling event). The percent recoveries of analytes from the laboratory control sample should be within the laboratory method requirements. The laboratory control sample duplicate evaluates precision and the RPD should be within the laboratory method requirements.

4.3 Data Validation

Both field and laboratory QA/QC results will be evaluated to ensure sample integrity and data of known quality. Analytical reports from the laboratory will be accompanied by QA/QC results necessary to enable data reviewers to determine the quality of the data. The data validation process will identify QA/QC problems and potential limitations on the use of the data, if any. Results of samples that are outside of the laboratory or field QA/QC requirements will be marked with qualifiers (flags). Data validation will be conducted using the appropriate EPA guidelines for inorganics and organics (EPA 2008 and EPA 2010b). The QA/QC review will include evaluation of the following components:

- COC Forms;
- laboratory data completeness;
- laboratory sample integrity and holding times;
- field and method duplicate samples;
- water and equipment/rinsate blank samples;
- laboratory duplicate and blank samples;

- laboratory accuracy and precision;
- field sampling and analysis precision;
- field comparability (e.g., similar site conditions, collection techniques, measurement procedures, and methods and reporting); and
- sample representativeness.

Copies of the evaluations conducted for the data validation will be maintained in Stantec's project files. Any data qualifiers applied to the data will be documented on the groundwater quality results tables attached to each groundwater monitoring report prepared by Stantec.

5.0 LIMITATIONS

This document, ***Groundwater Monitoring Plan***, was prepared by Stantec Consulting Services Inc. (as a subconsultant to HydroCon Environmental, LLC) on behalf of TOC Holdings Co. The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

The material presented reflects Stantec's best judgment in light of the information available to it at the time of preparation. Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

Any use which a third party makes of this document, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Stantec Consulting Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

6.0 REFERENCES

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EPA 2002. *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers.* EPA 542-S-02-001. May 2002.

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USGS. various dates. *National field manual for the collection of water quality data: U.S. Geological Survey Techniques of Water-Resources Investigations*, Book 9, Chapters A1-A9, available online at http://pubs.water.usgs.gov/twri9A.

Table A-1: Groundwater Sampling Schedule

Table 1: 2015 Groundwater Sampling Schedule

TOC Holdings Co. Facility #01-176

Mountlake Terrace, Washington

Sample Location			Laboratory Analyses for Groundwater Samples[1]				40mL VOA				250mL HNO_3				500mL UN-P Amber			
Well ID	**Property**	**Current Well Use**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**
MW01	TOC	Decommissioned (10/01/2009)	NS	NS	NS	NS												
MW02	TOC	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW03	TOC	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW04	56th Ave ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW05	242nd St ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW06	TOC	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW07	TOC/Farmasonis	Decommissioned (11/29/2004)	NS	NS	NS	NS												
MW08	56th Ave W ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW09*	TOC	Monitoring Well	Gx, BTEX, **(QA/QC)**	Gx, BTEX, **(QA/QC)**	Gx, BTEX, **(QA/QC)**	Gx, BTEX, **(QA/QC)**	6	6	6	6								
MW10*	TOC	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW11	TOC	4" Remediation Well	Gx, BTEX	NS	NS	NS	3											
MW12	56th Ave ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW13	56th Ave ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW14	TOC/Farmasonis	Decommissioned (11/29/2004)	NS	NS	NS	NS												
MW15*	TOC	4" Remediation Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW16	242nd St ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW17	TOC/Farmasonis	Decommissioned (11/29/2004)	NS	NS	NS	NS												
MW18	TOC	4" Remediation Well	Gx, BTEX	NS	NS	NS	3											
MW19	TOC	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW20*	TOC	Monitoring Well	Gx, Dx, PAH, BTEX, MTBE, **(QA/QC)**	Gx, Dx, PAH, BTEX, MTBE, **(QA/QC)**	Gx, Dx, PAH, BTEX, MTBE, **(QA/QC)**	Gx, Dx, PAH, BTEX, MTBE, **(QA/QC)**	8	8	8	8					2	2	2	2
MW21*	TOC	Decommissioned (04/16/2012)	NS	NS	NS	NS												
MW22	TOC	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3											
MW23	TOC	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW24	TOC	4" Remediation Well	Gx, BTEX	NS	NS	NS	3											
MW25	TOC	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW26	242nd St ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW27*	TOC	2" Remediation Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW28	TOC	Monitoring	Gx, BTEX, **(QA/QC)**	NS	NS	NS	6											
MW29	TOC	2" Remediation Well	Gx, BTEX, T/D Pb	NS	NS	NS	3				2							
MW30	TOC/Farmasonis	Monitoring	Gx, BTEX	NS	NS	NS	3											
MW31*	TOC/Farmasonis	2" Remediation Well	Gx, BTEX, T/D Pb	Gx, BTEX, T/D Pb	Gx, BTEX, T/D Pb	Gx, BTEX, T/D Pb	3	3	3	3	2	2	2	2				
MW32*	TOC	4" Remediation Well	Gx, BTEX, T/D Pb	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3	2							
MW33*	TOC	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW34	TOC	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW35	TOC	Monitoring Well	Gx, BTEX, T/D Pb	NS	NS	NS	3				2							
MW36	TOC	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW37	TOC	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW38	242nd St ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW39	TOC/Farmasonis	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW40	TOC/Farmasonis	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW41	TOC/Farmasonis	2" Remediation Well	Gx, BTEX, T/D Pb	NS	NS	NS	3				2							
MW42	TOC/Farmasonis	Monitoring Well (Dry)**	NS	NS	NS	NS												
MW43	56th Ave ROW	Monitoring Well (Dry)**	NS	NS	NS	NS												
MW44	56th Ave ROW	Monitoring Well (Dry)**	NS	NS	NS	NS												
MW45*	56th Ave ROW	Monitoring Well	Gx, BTEX, T/D Pb	Gx, BTEX, T/D Pb	Gx, BTEX, T/D Pb	Gx, BTEX, T/D Pb	3	3	3	3	2	2	2	2				
MW46	56th Ave ROW	Monitoring Well	Gx, BTEX, T/D Pb	NS	NS	NS	3				2							
MW47	56th Ave ROW	Monitoring Well	Gx, BTEX, T/D Pb	NS	NS	NS	3				2							
MW48*	56th Ave ROW	Monitoring Well	Gx, BTEX, T/D Pb	Gx, BTEX, T/D Pb	Gx, BTEX, T/D Pb	Gx, BTEX, T/D Pb	3	3	3	3	2	2	2	2				
MW49*	56th Ave ROW	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW50*	56th Ave ROW	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW51*	56th Ave ROW	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW52*	56th Ave ROW	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW53*	56th Ave ROW	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								

Table 1: 2015 Groundwater Sampling Schedule
TOC Holdings Co. Facility #01-176
Mountlake Terrace, Washington

Sample Location			Laboratory Analyses for Groundwater Samples[1]				40mL VOA				250mL HNO_3				500mL UN-P Amber			
Well ID	**Property**	**Current Well Use**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**
MW54	TOC/Farmasonis	Monitoring Well	Gx, Dx, PAH, BTEX, MTBE	Gx, Dx, PAH, BTEX, MTBE	Gx, Dx, PAH, BTEX, MTBE	Gx, Dx, PAH, BTEX, MTBE	4	4	4	4					1	3	3	3
MW55*	56th Ave ROW	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW56*	TOC/Farmasonis	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW57	TOC/Farmasonis	4" Remediation Well	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	4			4								
MW58*	TOC/Farmasonis	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW59*	TOC/Farmasonis	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW60*	56th Ave ROW	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW61	56th Ave ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW62	56th Ave ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW63*	56th Ave ROW	Monitoring Well	Gx, BTEX	Gx, BTEX	Gx, BTEX	Gx, BTEX	3	3	3	3								
MW64	56th Ave ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW65*	Drake	Monitoring Well	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	4	4	4	4								
MW66*	TOC/Farmasonis	Monitoring Well	Gx, Dx, PAH, BTEX, MTBE	Gx, Dx, PAH, BTEX, MTBE	Gx, Dx, PAH, BTEX, MTBE	Gx, Dx, PAH, BTEX, MTBE	4	4	4	4					1	1	1	1
MW67	Drake	Monitoring Well	Gx, BTEX	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	3	4	4	4								
MW68	Drake	Monitoring Well	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	4	4	4	4								
MW69*	Drake	2" Remediation Well	Gx, Dx, PAH, BTEX, MTBE	Gx, Dx, PAH, BTEX, MTBE	Gx, Dx, PAH, BTEX, MTBE	Gx, Dx, PAH, BTEX, MTBE	4	4	4	4					1	1	1	1
MW70*	Drake	2" Remediation Well	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	4	4	4	4	2	2	2	2	1	1	1	1
MW71	Shin/Choi	Monitoring Well (Product)***	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	NS	NS	NS	4				2				1			
MW72	Shin/Choi	Monitoring Well (Product)***	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	NS	NS	NS	4				2				1			
MW73	Shin/Choi	Monitoring Well	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	NS	NS	NS	4				2				1			
MW74	Shin/Choi	Monitoring Well	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	NS	NS	NS	4				2				1			
MW75	56th Ave ROW	Monitoring Well	Gx, BTEX	NS	NS	NS	3				2							
MW76	Drake	Monitoring Well	Gx, BTEX, MTBE	NS	NS	NS	4											
MW77*	Drake	Monitoring Well	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	4	4	4	4								
MW78	Drake	Monitoring Well	Gx, BTEX, MTBE	NS	NS	NS	4											
MW79	TOC/Farmasonis	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW80	TOC/Farmasonis	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW81	TOC/Farmasonis	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW82	TOC/Farmasonis	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW83	TOC/Farmasonis	Decommissioned (11/21/2011)	NS	NS	NS	NS												
MW84*	Drake	Monitoring Well	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	4	4	4	4								
MW85*	Drake	Monitoring Well (repaired on 11/28/2011)	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	4	4	4	4								
MW86*	Drake	Monitoring Well	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb, **(QA/QC)**	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb, **(QA/QC)**	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb, **(QA/QC)**	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb, **(QA/QC)**	8	8	8	8	4	4	4	4	2	2	2	2
MW87	Drake	Monitoring Well	Gx, BTEX, MTBE	NS	NS	NS	4											
MW88	Drake	Monitoring Well	Gx, BTEX	NS	NS	NS	3											
MW89*	Drake	Monitoring Well	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	4	4	4	4								
MW90	TOC	4" Remediation Well	Gx, BTEX, T/D Pb	NS	NS	NS	3				2							
MW91	TOC	4" Remediation Well	Gx, BTEX, T/D Pb	NS	NS	NS	3				2							
MW92	TOC/Farmasonis	4" Remediation Well	Gx, BTEX	NS	NS	NS	3											
MW93	TOC/Farmasonis	4" Remediation Well	Gx, BTEX	NS	NS	NS	3											
MW94	TOC/Farmasonis	4" Remediation Well	Gx, BTEX	NS	NS	NS	3											
MW95	Drake	4" Remediation Well	Gx, BTEX, MTBE	NS	NS	NS	4											
MW96	Drake	4" Remediation Well	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	Gx, BTEX, MTBE	4			4								
MW97	Drake	4" Remediation Well	Gx, BTEX, MTBE	NS	NS	NS	4											

Table 1: 2015 Groundwater Sampling Schedule

TOC Holdings Co. Facility #01-176

Mountlake Terrace, Washington

Sample Location			Laboratory Analyses for Groundwater Samples[1]				40mL VOA				250mL HNO_3				500mL UN-P Amber			
Well ID	**Property**	**Current Well Use**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**
MW98	Drake	4" Remediation Well	Gx, BTEX, MTBE	NS	NS	NS	4											
MW99	Drake	4" Remediation Well	Gx, BTEX, MTBE	NS	NS	NS	4											
MW100	TOC/Farmasonis	Monitoring Well	Gx, BTEX, T/D Pb	NS	NS	NS	3				2							
MW101	Drake	4" Remediation Well	Gx, BTEX, MTBE, T/D Pb	NS	NS	NS	4				2							
MW102	Herman	Monitoring Well (Product)**	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	4	4	4	4	2	2	2	2	1	1	1	1
MW103	Herman	Monitoring Well	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	4	4	4	4	2	2	2	2	1	1	1	1
MW104	Herman	Monitoring Well (Product)**	Gx, Dx, BTEX, MTBE, EDC, EDB, T/D Pb, **(QA/QC)**	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	8	4	4	4	4	2	2	2	1	1	1	1
MW105	Herman	Monitoring Well	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	4	4	4	4	2	2	2	2	1	1	1	1
MW106	Herman	Monitoring Well	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	4	4	4	4	2	2	2	2	1	1	1	1
MW107	Herman	Monitoring Well	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	Gx, Dx, PAH, BTEX, MTBE, EDC, EDB, T/D Pb	4	4	4	4	2	2	2	2	1	1	1	1
Equipment/Rinsate Blank x4			As needed/All	As needed/All	As needed/All	As needed/All	16	16	16	16	8	8	8	8	4	4	4	4
Water Blank x2			As needed/All	As needed/All	As needed/All	As needed/All	8	8	8	8	4	4	4	4	2	2	2	2
						Sample Bottle Totals	**368**	**171**	**171**	**179**	**68**	**36**	**36**	**36**	**24**	**22**	**22**	**22**

NOTES:

(1) QA/QC = blind field duplicate samples are collected.

*Well is sampled quarterly (per the requirements of the *Interim Redial Action Work Plan* attached to the Agreed Order).

**Well is typically dry.

***Do not sample if well contains product.

ACRONYMS:

BTEX = benzene, toluene, ethylbenzene and total xylenes
Dx = diesel- and motor oil-range petroleum hydrocarbons
EDB = ethylene dibromide (1,2-dibromoethane)
EDC = ethylene dichloride (1,2-dicholoroethane)
Gx = gasoline-range petroleum hydrocarbons
HNO_3 = nitric acid
mL = milliLiter
MTBE = methyl tertiary-butyl ether
MW = monitoring well
NS = not sampled
PAH = polycyclic aromatic hydrocarbons
QA/QC = quality assurance / quality control
ROW = right-of-way
RW = remediation well
T/D Pb = total and dissolved lead
UN-P = unpreserved
VOA = volatile organic analysis

LIST OF PROPERTIES:

TOC = 24205 56th Avenue West, Mountlake Terrace WA
TOC/Farmasonis = 24225 56th Avenue West, Mountlake Terrace WA
Drake = 24309 56th Avenue West, Mountlake Terrace WA
Herman = 24311 56th Avenue West, Mountlake Terrace WA
Shin/Choi = 24325 56th Avenue West, Mountlake Terrace WA
56th Ave ROW = right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties
242nd St ROW = portion of right-of-way adjacent to TOC Property

Attachment 1: Field Forms

Field Report Form

Field Sampling Data Sheet

DTW/DTP Level Measurement Form

Chain-of-Custody Form

RMS-01: Risk Management Strategy

RMS-02: Field Level Risk Assessment (Fit for Duty), 5-Day

RMS-03: Incident Report

Stantec Consulting Services Inc.
19101 36th Avenue West, Suite 203
Lynnwood, WA 98036-5759
Tel: (425) 977-4994
Fax: (425) 977-4995

Field Report

TOC Facility #01-176; Mountlake Terrace, WA

GENERAL INFO			
Client Name: HydroCon **Owner Name:** TOC Holdings Co.	**Site Address:** 24225 56th Avenue West Mountlake Terrace, WA 98043	**Project Number:** 203700102	**Date:**
Author Name:	**Report Attachments:**	**Arrival & Departure Times (24:00):** ________ (on-site) ________ (off-site)	
Purpose of Visit or Phase/Task #:	**Safety Incidents:**	**Weather:** ☐Sunny ☐Cloudy ☐Rain ☐Other: ________ **Temp:** ______ °F ______ °C	

SITE MEETING		
Meeting Time (24:00):	**Topics/Issues Discussed:**	**Attendees:**

PERSONNEL ON-SITE *(Include firm/agency name and contact name for non-Stantec personnel.)*		
Stantec Personnel:	**Contractor Personnel:**	**Other Personnel:**

WORK PERFORMED

Time (24:00)	Description

Author Signature: ______________________________

Stantec

Property: ☐ TOC ☐ TOC/Farmasonis ☐ Drake ☐ 56th ROW ☐ Herman ☐ Shin/Choi ☐ 242nd ROW

Well ID: ____________

Sample ID: ____________________ **Duplicate Sample ID:** ______________________

Field Sampling Data Sheet

TOC Facility #01-176; Mountlake Terrace, WA

PROJECT INFO	WEATHER	SAMPLE INFO	
Client Name: HydroCon	☐Sunny ☐Cloudy ☐Rain	**Sample Date:**	
Owner Name: TOC Holdings Co.	☐Other: __________________	**Sample Time (24:00):**	
Project No: 203700102	**Temp:** ______ ◦F ______ ◦C	**Duplicate Sample Time (24:00):**	

EQUIPMENT			
Type	**Make**	**Model**	**Serial No.**
Water Meter			
Multimeter			
Turbidity			
Pump Controller			

SAMPLE METHOD	☐ Bailer ☐ Submersible Pump ☐ Peristaltic Pump ☐ Pneumatic Pump ☐ Other: __________________

DTP/DTW LEVEL MEASUREMENTS							
Date	**Time (24:00)**	**DTP (feet)**	**DTW (feet)**	**DTB (feet)**	**Casing Diam. (Inches)**	**Screen Interval (feet)**	**Pump Intake (feet)**
Purge Volume (3 Volumes)	**Casing Diameter Volume Conversion Factor (VC)**						
_____ **gal = water column (feet)*VC*3**	**1" = 0.041**	**2" = 0.163**	**3" = 0.367**	**4" = 0.653**	**6" = 1.469**	**10" = 4.080**	**12" = 5.875**

SAMPLE DATA								
Time (5 min. intervals)	**DTW (feet)**	**Liters Pumped**	**pH**	**Temp. (◦C)**	**DO (mg/L)**	**Spec. Cond. (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**
Stabilization Criteria			±0.1	3%	10%	3%	±10mV	10%
Flow Rate Range			0.1-0.5 L/min; Optimal Total Drawdown <0.3'					

SAMPLE BOTTLES						
Bottle Type	√	**Quantity**	**Volume**	**Preservative**	**Filter**	**Other**
VOA Glass			40 mL	HCL	No	
Poly			500 mL	HNO_3	No	
Poly			500 mL	HNO_3	Yes	
Total Bottles:						

OBSERVATIONS (describe in notes)	☐ Odor ☐ Biological Growth/Organic Matter ☐ Sheen (iridescence on water surface) ☐ Product (>0.01 feet measurable LNAPL) ☐ Trace (>0.01 feet measurable LNAPL)

NOTES

Sampled By: ______________________________ **Signature:** ______________________________ Page ____ of ____

System On Measurement Date:
System Off Measurement Date:
Meter Serial Number(s):
Field Personnel:

DTW/DTP Level Measurements

TOC Holdings Facility #01-176; Mountlake Terrace, WA

MEASUREMENT LOCATION		DTP / DTW LEVEL MEASUREMENTS (feet bgs)						NOTES / OBSERVATIONS
WELL ID[1]	PROPERTY[2]	PREVIOUS DTP/DTW LEVEL SYSTEM OFF (3/24/14)	PREVIOUS DTP/DTW LEVEL SYSTEM ON (4/3/14)	DTP/DTW LEVEL SYSTEM OFF	TIME (24:00)	DTP/DTW LEVEL SYSTEM ON	TIME (24:00)	Trace = <0.01 measurable LNAPL Sheen = Iridescencee on water surface
TOC PROPERTY WELLS								
MW02	TOC	10.83	10.66					
MW03	TOC	11.00	11.61					
MW06	TOC	8.68	9.18					
MW09	TOC	22.44	27.43					
MW10	TOC	30.78	Dry					
MW11 (4" RW)	TOC	21.31	33.00					
MW15 (4" RW)	TOC	36.70	29.40					Former RW (pump removed 12/16/2014)
MW18 (4" RW)	TOC	Dry	Dry					TOP = 27.85 feet bgs
MW19	TOC	12.09	12.11					
MW20	TOC	33.03	36.30					
MW22	TOC	27.92	29.41					
MW23	TOC	38.86	38.56					
MW24 (4" RW)	TOC	14.10	Dry					TOP = 31.75 feet bgs
MW25	TOC	27.64	32.82					
MW26	TOC	48.34	47.77					
MW27 (2" RW)	TOC	NM	NM					
MW28	TOC	26.99	28.50					
MW29 (2" RW)	TOC	NM	NM					
MW30	TOC	41.15	41.29					
MW32 (4" RW)	TOC	21.03	28.95					
MW33	TOC	34.51	33.98					
MW34	TOC	8.78	9.26					
MW35	TOC	39.36	39.64					
MW36	TOC	42.28	42.41					
MW37	TOC	14.97	15.91					
MW38	TOC	16.15	18.44					
MW90 (4" RW)	TOC	23.19	34.94					
MW91 (4" RW)	TOC	22.64	32.60					
MW04	56th Ave ROW	11.51	10.87					
MW08	56th Ave ROW	17.49	23.32					
MW50	56th Ave ROW	35.72	35.88					

DTW/DTP Level Measurements

TOC Holdings Facility #01-176; Mountlake Terrace, WA

MEASUREMENT LOCATION		DTP / DTW LEVEL MEASUREMENTS (feet bgs)						NOTES / OBSERVATIONS
WELL ID[1]	PROPERTY[2]	PREVIOUS DTP/DTW LEVEL SYSTEM OFF (3/24/14)	PREVIOUS DTP/DTW LEVEL SYSTEM ON (4/3/14)	DTP/DTW LEVEL SYSTEM OFF	TIME (24:00)	DTP/DTW LEVEL SYSTEM ON	TIME (24:00)	Trace = <0.01 measurable LNAPL Sheen = Iridescencee on water surface
MW53	56th Ave ROW	43.81	44.00					
MW62	56th Ave ROW	9.72	9.56					
MW05	242nd St ROW	11.50	10.73					
MW16	242nd St ROW	Dry	Dry					
TOC / FARMASONIS PROPERTY WELLS								
MW31 (2" RW)	TOC / Farmasonis	NM	NM					
MW39	TOC / Farmasonis	41.00	41.19					
MW40	TOC / Farmasonis	41.22	41.34					
MW41 (2" RW)	TOC / Farmasonis	NM	NM					
MW42	TOC / Farmasonis	Dry	Dry					
MW54	TOC / Farmasonis	10.92	10.53					
MW56	TOC / Farmasonis	44.00	45.55					
MW57 (4" RW)	TOC / Farmasonis	Dry	NM [1]					
MW58	TOC / Farmasonis	FSDS is 44.15 (03/26/14)	44.89					
MW59	TOC / Farmasonis	42.12	45.14					
MW66	TOC / Farmasonis	42.30	43.78					
MW79	TOC / Farmasonis	10.53	10.50					
MW80	TOC / Farmasonis	11.70	11.58					
MW81	TOC / Farmasonis	42.45	44.14					
MW82	TOC / Farmasonis	26.30	28.96					
MW92 (4" RW)	TOC / Farmasonis	44.30	44.80					
MW93 (4" RW)	TOC / Farmasonis	Dry	42.15					
MW94 (4" RW)	TOC / Farmasonis	Dry	Dry					TOP = 40.44 feet bgs
MW100	TOC / Farmasonis	14.05	13.94					
MW12	59th Ave ROW	10.00	9.60					
MW13	59th Ave ROW	Dry	Dry					
MW43	59th Ave ROW	34.71	34.72					
MW45	59th Ave ROW	Dry	Dry					
MW46	59th Ave ROW	Dry	43.40 [2]					
MW49	59th Ave ROW	42.97	44.74					
MW60	59th Ave ROW	43.88	44.87					
MW61	59th Ave ROW	8.29	8.38					

DTW/DTP Level Measurements
TOC Holdings Facility #01-176; Mountlake Terrace, WA

MEASUREMENT LOCATION		DTP / DTW LEVEL MEASUREMENTS (feet bgs)						NOTES / OBSERVATIONS
WELL ID[1]	PROPERTY[2]	PREVIOUS DTP/DTW LEVEL SYSTEM OFF (3/24/14)	PREVIOUS DTP/DTW LEVEL SYSTEM ON (4/3/14)	DTP/DTW LEVEL SYSTEM OFF	TIME (24:00)	DTP/DTW LEVEL SYSTEM ON	TIME (24:00)	Trace = <0.01 measurable LNAPL Sheen = Iridescencee on water surface
DRAKE PROPERTY WELLS								
MW65	Drake	41.19	41.82					
MW67	Drake	13.05	12.34					
MW68	Drake	12.42	11.65					
MW69 (2" RW)	Drake	Dry	NM [1]					
MW70 (2" RW)	Drake	NM	NM					
MW76	Drake	39.01	40.57					
MW77	Drake	38.54	39.73					
MW78	Drake	36.33	36.72					
MW84	Drake	NM [1]	NM [1]					Former RW (pump removed 09/17/2013)
MW85	Drake	39.87	40.95					
MW86	Drake	41.22	42.41					
MW87	Drake	38.17	39.26					
MW88	Drake	18.54	12.00					
MW89	Drake	42.07	44.00					
MW95 (4" RW)	Drake	43.35	45.55					
MW96 (4" RW)	Drake	43.25	Dry					TOP = 47.5 feet bgs
MW97 (4" RW)	Drake	42.35	Dry					TOP = 42.77 feet bgs
MW98 (4" RW)	Drake	42.46	NM [1]					
MW99 (4" RW)	Drake	Dry	Dry					TOP = 38.55 feet bgs
MW101 (4" RW)	Drake	40.36	Dry					TOP = 42.35 feet bgs
MW44	56th Ave ROW	Dry	Dry					
MW47	56th Ave ROW	44.63 [2]	Dry					
MW48	56th Ave ROW	42.51	42.19					
MW52	56th Ave ROW	43.30	43.45					
MW55	56th Ave ROW	43.63	43.78					
MW63	56th Ave ROW	42.69	42.68					
MW64	56th Ave ROW	41.06	41.19					
MW75	56th Ave ROW	NM	43.91					Well located in roadway and subject to Traffic Control Plan.

DTW/DTP Level Measurements

TOC Holdings Facility #01-176; Mountlake Terrace, WA

MEASUREMENT LOCATION		DTP / DTW LEVEL MEASUREMENTS (feet bgs)						NOTES / OBSERVATIONS
WELL ID[1]	PROPERTY[2]	PREVIOUS DTP/DTW LEVEL SYSTEM OFF (3/24/14)	PREVIOUS DTP/DTW LEVEL SYSTEM ON (4/3/14)	DTP/DTW LEVEL SYSTEM OFF	TIME (24:00)	DTP/DTW LEVEL SYSTEM ON	TIME (24:00)	Trace = <0.01 measurable LNAPL Sheen = Iridescencee on water surface
HERMAN PROPERTY WELLS								
MW102	Herman	15.29/16.92	14.78/16.26					
MW103	Herman	43.27	43.55					
MW104	Herman	10.84	10.31					
MW105	Herman	42.26 (2)	Dry					
MW106	Herman	8.64	9.02					
MW107	Herman	39.16	39.89					
MW108	Herman	not available	not available					
MW109	Herman	not available	not available					
MW51	56th Ave ROW	41.27	41.88					
SHIN/CHOI PROPERTY WELLS								
MW71	Shin/Choi	12.70/12.99	11.91/12.16					
MW72	Shin/Choi	15.69/16.18	14.67/14.96					
MW73	Shin/Choi	38.60	38.90					
MW74	Shin/Choi	39.10	39.10					
DECOMMISSIONED WELLS								
MW01	*Decommissioned*							
MW07	*Decommissioned*							
MW14	*Decommissioned*							
MW17	*Decommissioned*							
MW21	*Decommissioned*							
MW83	*Decommissioned*							

NOTES & DEFINITIONS:

(1) Remediation wells (identified as "RW") are connected to a multi-phase extraction system and are 2 or 4 inches in diameter.

(2) Wells located in ROW are included under property they are nearest to.

*Well could not be measured due to inaccessible wellhead (vehicle parked over wellhead).

**Unclear if well was dry or if water was in end cap of well.

Dry = Indicates well could not be sampled due to insufficient groundwater sample volume.

ACRONYMS:

bgs = below ground surface
DTP = depth-to-product
DTW = depth-to-water
FSDS = field sampling data sheet
MW = monitoring well
NM = not measured
ROW= right-of-way
RW = remediation well
TOP = top of pump

LIST OF PROPERTIES:

TOC = 24205 56th Avenue West, Mountlake Terrace WA
TOC/Farmasonis = 24225 56th Avenue West, Mountlake Terrace WA
Drake = 24309 56th Avenue West, Mountlake Terrace WA
Herman = 24311 56th Avenue West, Mountlake Terrace WA
Shin/Choi = 24325 56th Avenue West, Mountlake Terrace WA
56th Ave ROW = portion of right-of-way adjacent to TOC, TOC/Farmasonis & Drake properties
242nd St ROW = portion of right-of-way adjacent to TOC Property

SAMPLE CHAIN OF CUSTODY

Send Report To Kim Vik & Rebekah Brooks

Company Stantec Consulting Services Inc.

Address 19101 36th Ave W, Suite 203

City, State, ZIP Lynnwood, WA 98036

Phone # 425-977-4994 Fax # 425-449-4097

SAMPLERS (signature)

PROJECT NAME/NO.
TOC Site 01-176; #203700102

PO #
(check one)
☐ 201.A-Ann Event
☐ 201.B-Qtr Event

PROJECT ADDRESS (check applicable property)
☐ TOC
☐ TOC/Farmasonis
☐ Drake
☐ Herman
☐ Shin/Choi
☐ 56th Ave ROW
☐ 242nd St ROW

Page # ________ of ________

TURNAROUND TIME
☐ Standard (2 Weeks)
☐ RUSH________
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED: TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS							Notes

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

RISK MANAGEMENT STRATEGY – RMS 1

Project:
Client:
Location:

File No.
Project No:

- **Where a project with fieldwork does not require a Health and Safety Plan (HASP), a Risk Management Strategy (RMS1) must be completed.**
- **If the scope of work for a project that originally did not involve field work changes to include field work, an RMS1 form must be completed and reviewed with employees before field work begins.**
- **Although the RMS1 is intended to be part of the desktop planning process for a project, please be aware that the RMS1 can be carried as a field resource as well, to complement use of the RMS2 – Field Level Risk Assessment.**

1. PROJECT SUMMARY:

Description of the work:

General

Does a Prime Contractor (Constructor) or Client HSE Program apply? ☐ Yes ☐ No

If yes, please identify.

If Client, Prime Contractor or Constructor provides Orientation and/or Training, attach a copy of the training record to the project file and provide a copy to the OSEC.

Does this project involve work outside of North America (International) ☐ Yes ☐ No

(If yes, you must contact international@stantec.com)

2. HAZARD RECOGNITION

Health Hazard (Check all appropriate categories)

Is this work where MSDSs are required? ☐ Yes ☐ No

If yes, copies of MSDSs must be available at project site and attached to this document.

Chemical

- ☐ Acids or Caustics
- ☐ Asbestos
- ☐ H_2S
- ☐ Halogenated Organic Compounds
- ☐ Heavy Metals
- ☐ Metals
- ☐ PCBs
- ☐ Pesticides / Herbicides
- ☐ Petroleum Hydrocarbons
- ☐ Poisonous Materials
- ☐ Solvents/Flammables
- ☐ Other – specify:

Physical

- ☐ Cold Stress/Frostbite
- ☐ Confined Space
- ☐ Driver Fatigue
- ☐ Dust / Dusty environments
- ☐ Flora or Fauna (type):
- ☐ Heat Stress / Sunburn
- ☐ Noise
- ☐ Radiation (type):
- ☐ Remote Location
- ☐ Rough Terrain/Heavy Brush
- ☐ Road / Trail Conditions
- ☐ Vibration
- ☐ Water
- ☐ Wildlife
- ☐ Working at Heights
- ☐ Other – specify:

Ergonomic

- ☐ Force
- ☐ Posture
- ☐ Repetitive Motion
- ☐ Tools
- ☐ Workplace Design
- ☐ Other – specify:

Biological

- ☐ Bacterial Control Cultures
- ☐ Domestic Waste
- ☐ Medical Waste
- ☐ Sewage / Wastewater
- ☐ Other – specify:

☐ **Not Applicable**

Safety Hazards (Check all appropriate categories)

Machine

- ☐ ATV
- ☐ Automobile
- ☐ Blades
- ☐ Chains / Cables / Ropes
- ☐ Crush Points
- ☐ Cutting Edges
- ☐ Free-Wheeling Point
- ☐ Heavy Equipment
- ☐ Helicopter
- ☐ Hydraulic Systems
- ☐ Levers
- ☐ Moving Parts
- ☐ Pinch Points
- ☐ Rotating Parts (i.e. auger)

Machine

- ☐ Shear Points
- ☐ Springs
- ☐ Wrap Points
- ☐ Other – specify:

Energy

- ☐ Chemical
- ☐ Electrical
- ☐ Hydraulic
- ☐ Mechanical
- ☐ Pneumatic
- ☐ Potential
- ☐ Thermal
- ☐ Other – specify:

Material Handling & Task Completion

- ☐ Bending
- ☐ Falling/Flying Objects
- ☐ Fatigue
- ☐ Heavy Load (> 50 pounds)
- ☐ Load (< 50 pounds)
- ☐ Repetitive
- ☐ Sharp/Rough Surface
- ☐ Twisting
- ☐ Other – specify:

Work Practices

- ☐ Deviation of SWP
- ☐ **Not Applicable**

3. HAZARD ASSESSMENT

Check off all SWPs that apply to job

- **Unless required by client, printing SWPs is not required. However, review of all applicable SWPs before commencing work is mandatory. The most current version of each below is hyperlinked to allow review, and printing where desired.**

100 Series – General HSE

- ☐ 102 – Workplace Violence Prevention Program
- ☐ 103 – Workplace Hazardous Materials Information System (WHMIS)
- ☐ 104 - Hazard Communication
- ☐ 105 – Personal Protective Equipment (PPE)
- ☐ 107 – First Aid
- ☐ 108 – Bloodborne Pathogens
- ☐ 111 – Medical Surveillance
- ☐ 113 – Heat Stress
- ☐ 114 – Working in Cold Environments
- ☐ 115 – Material Handling and Safe Lifting
- ☐ 116 – Office Safety
- ☐ 118 – Working Alone in the Field
- ☐ 124 – Safe Driving
- ☐ 125 – Workstation Ergonomics
- ☐ 126 – Using a Chainsaw
- ☐ 130 – Rail Safety

200 Series – Construction HSE

- ☐ 201 – Fall Protection/Working from Heights
- ☐ 202 – Ladder Safety
- ☐ 203 – Aerial Work Platforms
- ☐ 205 –Scaffold Safety
- ☐ 206 – Hand and Portable Power Tools
- ☐ 208 – Hoisting and Lifting
- ☐ 213 – Utility Clearance
- ☐ 214 – Entering Excavations and Trenches
- ☐ 215 – Supervision of Hydro-Excavation Activities
- ☐ 216 – Working Near Mobile Equipment
- ☐ 217 – Forklift Operation

300 Series – Hazardous Materials

- ☐ 304 – Asbestos Safety
- ☐ 305 – Benzene Safety
- ☐ 308 – Working in Geotechnical and Materials Laboratories
- ☐ 310 – Compressed Gas Cylinders

300 Series – Hazardous Materials

- ☐ 311 – Working in Environmental Laboratories
- ☐ 312 – Fueling Gasoline Engines
- ☐ 314 - Working Around Hazardous Waste and Wastewater

400 Series – Program Specific

- ☐ 406 – Electrical Safety Program
- ☐ 407 - Traffic Control and Protection Planning
- ☐ 408 – Lock, Tag & Try (LTT)
- ☐ 409 Respiratory Protection
- ☐ 411 – Confined Space Entry
- ☐ 414 – Hot Work
- ☐ 416 – Supervision of Contracted Drilling Activities

500 – PA/PC/Region Specific Programs

- ☐ 501 - Using the Spot Messenger System
- ☐ 502 - Use and Handling of Nuclear Density Gauges
- ☐ 504 - Backpack and Boat

500 – PA/PC/Region Specific Programs	500 – PA/PC/Region Specific Programs	Other SWPs not listed
Mounted Electro-fishing	☐ 510 – Working in Abandoned Buildings	• Select and list others here
☐ 507 – Aircraft Safety	☐ 513 – Boat and Water Safety	
☐ 508 – Wildlife Encounters	☐ 514 – Working On or Near Ice	
☐ 509 - Guideline for 2-way Radio Use on Radio Controlled Roads in BC	☐ 516 – Radiation Safety (US)	
	☐ 517 – Safe Machete Use	

☐ SWP for this task being performed is not available – Quantified Hazard Assessment (RMS7) must be performed, please speak with Regional Safety Environment Coordinator (RSEC) for assistance.

4. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Based on hazard recognition and assessment as identified in the documents above, identify required PPE.

☐ Head Protection (CSA or ANSI) – Type:

☐ Hearing Protection – Type:

☐ Work Boots (CSA or ANSI) – Type:

☐ Respiratory Protection – Type:

☐ Eye/Face Protection – Type:

☐ Coveralls – Type:

☐ High Visibility Vest – Type:

☐ Fall Protection – Type:

☐ Gloves – Type:

☐ Other -

5. JOB ADMINISTRATION

Training

Is there any training required outside that identified in the applicable SWPs? ☐ Yes ☐ No
If yes, please identify:

Do workers require site-specific orientation? ☐ Yes ☐ No

Emergency Planning

It is the responsibility of the Project Manager to prepare and communicate an Emergency Preparedness and Response plan to all field staff.

Site Emergency #

Fire Dept.

Ambulance

Police

OSEC

Environment Dept.

Regional HR

Stantec Corporate HSE Representative: Right-click and pick from list based on your location

Stantec Public Relations/Media Contact*: Pick from list...

** Employees who are not authorized to speak on Stantec's behalf must not respond to inquiries from the investment community or media unless specifically asked to do so by an authorized spokesperson. All such inquiries shall be referred to Public Relations.*

Project Contact Information:

Title	Name	Company	Phone Number
Stantec Office			
Project Manager			
Project Site Safety			
Client or Owner			
Stantec After-Hours Number			
Other (specify):			
Other (specify):			

First Aid facilities are located:	
First Aiders on site are:	
Fire extinguishers are located:	
Fire alarms are located:	
MSDSs are located:	
Eyewash station is located:	
Spill response equipment is:	
The nearest phone is:	
Medical Assistance (Contact to discuss non-emergency signs or symptoms of work-related injury or illness):	Pick from list... If other, specify here or just delete

Record site-specific information below (evacuation signal, muster points, routes/map to clinic/hospital, etc.):

For any injury, the employee shall:

1. Initiate necessary first aid or medical treatment.
2. Immediately notify their supervisor.

6. REVIEW, APPROVAL AND DISTRIBUTION

Employee Review

All employees conducting field work on this project will review the Risk Management Strategy (RMS1) and sign below acknowledging that they have been advised of the hazards, controls, PPE, and other safety equipment required, and have reviewed the applicable SWPs. Employees in the field who identify additional hazards not listed above shall notify the project manager of the hazard, and prior to proceeding, will confirm the controls that will be used. Document any on-site changes and communications using the RMS2 as appropriate; see section 2.4 of the HSE Program Manual on Management of Change.

Please designate Team Lead for field activities below.

SELECT AND DELETE THESE INSTRUCTIONS BEFORE PRINTING: To insert extra signing rows for more staff position mouse cursor at beginning of a signature row, type <u>signrows</u> and hit the F3 button to insert more as needed. This will insert three at a time.

Reviewed by:	Print Name (Team Lead Field)	Signature	Date
	Print Name	Signature	Date
	Print Name	Signature	Date
	Print Name	Signature	Date
	Print Name	Signature	Date

Approvals

By signing this approval, the Project Manager is acknowledging that (s)he has communicated the hazards, controls, required PPE and applicable SWPs to the employees working on this project. It also indicates that the Project Manager has verified that employees have all the equipment required to work safely, that the equipment is in working order, and that the employees have the knowledge required to operate/use this equipment.

Prepared by:	Print Name	Signature	Date
Approved by:	Print Name (Project Manager)	Signature (Project Manager)	Date

Distribution: **Original: Project File**
Copies: Field Staff

Stantec

FIELD LEVEL RISK ASSESSMENT (FIT FOR DUTY), 5 DAY – RMS 2

Project: ______________________ Project No: ______________

Client: ______________________

Location: ______________________

Start Date: ______________________

Documentation and Procedure Review

1. Risk Management Strategy (RMS1) form and/or Site Specific Health and Safety Plan signed and reviewed? ☐ Yes ☐ **No***
2. Emergency Response Plan reviewed? ☐ Yes ☐ **No*** ☐ N/A
3. Tested two-way communications (cell phone, satellite phone) and security measures? ☐ Yes ☐ **No***
4. Attended Client Site Health and Safety meeting? ☐ Yes ☐ **No*** ☐ N/A
5. Conducted Stantec site safety meeting with all workforces? ☐ Yes ☐ **No*** ☐ N/A
6. Are there any new or unexpected hazards not identified in the RMS1/HASP? ☐ Yes ☐ No
   If yes, include in the Job Safety Analysis (JSA).
7. Working alone or remote work? ☐ Yes ☐ No
   If yes, complete call in/out process – Safe Work form must be completed.

Notifications and Permits

8. Are work permits required for this site? ☐ Yes ☐ No
   If yes, have they been completed and submitted as required? ☐ Yes ☐ **No***
9. Are utility locates required for this site? ☐ Yes ☐ No
   If yes, have they been completed and reviewed? ☐ Yes ☐ **No***
10. Does the Client require any notification prior to starting the work? ☐ Yes ☐ No
    If yes, has the notification been provided? ☐ Yes ☐ **No***

***Contact your Project Manager immediately.**

Work Description

Provide a general description of the work to be conducted.

Personal Protective Equipment

List specific PPE as needed. Verify type and inspect condition.

☐ Head Protection Type: ____	☐ Hearing Protection: ____	☐ Gloves Type: ____
☐ Foot Protection Type: ____	☐ Respiratory Protection: ____	☐ Water Safety Gear: ____
☐ Eye Protection Type: ____	☐ Fire Retardant Coveralls: ____	☐ ____
☐ High Visibility Vest: ____	☐ Fall Protection: ____	☐ ____

Tools and Equipment

List specific equipment to be used. Verify type and inspect condition.

☐	☐	☐
☐	☐	☐

Daily Tailgate Discussions/Subcontractor Input

Date:		**Time:**	**Weather:**
Start			
Mid-Day			
Post-Day			
Date:		**Time:**	**Weather:**
Start			
Mid-Day			
Post-Day			
Date:		**Time:**	**Weather:**
Start			
Mid-Day			
Post-Day			
Date:		**Time:**	**Weather:**
Start			
Mid-Day			
Post-Day			
Date:		**Time:**	**Weather:**
Start			
Mid-Day			
Post-Day			

FIELD LEVEL RISK ASSESSMENT (FIT FOR DUTY), 5 DAY – RMS 2

<u>I know the hazards:</u>

By signing here, you are stating the following:

1. I have been involved in the Job Safety Analysis (JSA) and understand the hazards and risk control actions associated with each task I am about to perform.
2. I understand the permit to work requirements applicable to the work I am about to perform (if it includes permitted activities).
3. I am aware that work that has not been risk–assessed must not be performed.
4. I am aware of my ability and obligation to **Stop Work** (*See below).*

<u>I arrived and departed fit for duty (see Fit for Duty card for further information):</u>

5. I am physically and mentally fit for duty.
6. I am not under the influence of any type of medication, drugs or alcohol that could affect my ability to work safely.
7. I am aware of my responsibility to bring any illness, injury (regardless of where or when it occurred), symptoms of soreness or discomfort, or fatigue issue I may have to the attention of the Crew Lead or Supervisor.
8. I sign out uninjured unless I have otherwise informed the Crew Lead or Supervisor.

Insert fitness level under corresponding time column: Fit for Duty = F Alternate Plan = AP **Team Lead to contact Project Manager for any personnel identified as AP**															
Individual Name/Company Name/Signature	**Date:**			**Date:**			**Date:**			**Date:**			**Date:**		
	Time:	**Time:**	**Time:**	**Time:**	**Time:**	**Time:**	**Time:**	**Time:**	**Time:**	**Time:**	**Time:**	**Time:**	**Time:**	**Time:**	**Time:**

I will STOP WORK any time anyone is concerned or uncertain about safety. **I will STOP WORK** if anyone identifies a hazard or additional mitigation not recorded. **I will** be alert to any changes in personnel or their fitness level (AP), conditions at the work site or hazards. If it is necessary to **STOP WORK**, I will reassess the task, hazards and mitigations; and then proceed only when safe to do so.

Conclusion of day: I certify that the planned work activities are completed for the day and all injuries and first aids have been reported via RMS3.

Signature of Crew Lead: ______________________ **Date:** ____________

Signature of Crew Lead: ______________________ **Date:** ____________

Signature of Crew Lead: ______________________ **Date:** ____________

Signature of Crew Lead: ______________________ **Date:** ____________

Signature of Crew Lead: ______________________ **Date:** ____________

Remember to
1. Stop and think
2. Look around
3. Assess risk
4. Control risks
5. Begin/resume work

FIELD LEVEL RISK ASSESSMENT (FIT FOR DUTY), 5 DAY – RMS 2

Job Safety Analysis (JSA) **Must be completed for all field activities.**

Basic Job Steps	Potential Hazards	Controls to Reduce or Eliminate Hazard	Person Responsible

Review the hazard categories below and check the mitigation measures applicable to the identified scope of work.

Environmental Hazards

1. Work area clean ☐
2. Material storage identified ☐
3. Dust/Mist/Fume ☐
4. Noise in area ☐
5. Extreme temperatures ☐
6. Spill potential ☐
7. Waste containers needed ☐
8. Waste properly disposed ☐
9. Waste plan identified ☐
10. Excavation permit required ☐
11. Other workers in area ☐
12. Weather conditions ☐
13. MSDS reviewed ☐

Ergonomic Hazards

14. Awkward body position ☐
15. Over extension ☐
16. Prolonged twisting/bending motion ☐
17. Working in a tight area ☐
18. Lift too heavy/awkward to lift ☐
19. Parts of body in line of fire ☐
20. Repetitive motion ☐
21. Hands not in line of sight ☐
22. Working above your head ☐

Access/Egress Hazards

23. Aerial life/Man basket (inspected & tagged) ☐
24. Scaffold (inspected & tagged) ☐
25. Ladders (tied off) ☐
26. Slips & trips ☐
27. Hoisting (tools, equipment) ☐
28. Evacuation (alarms, routes, ph. #) ☐
29. Confined space entry permit required ☐

Overhead Hazards

30. Barricades & signs in place ☐
31. Hole coverings identified ☐
32. Harness/lanyard inspected ☐
33. 100% Tie-off with harness ☐
34. Tie off points identified ☐
35. Falling items ☐
36. Foreign bodies in eyes ☐
37. Hoisting or moving loads overhead ☐

Rigging & Hoisting Hazards

38. Lift study required ☐
39. Proper tools used ☐
40. Tools inspected ☐
41. Equipment inspected ☐
42. Slings inspected ☐
43. Others working overhead/below ☐
44. Critical lift permit ☐

Electrical Hazards

45. GFI test ☐
46. Lighting levels too low ☐
47. Working on/near energized equipment ☐
48. Electrical cords condition ☐
49. Electrical tools condition ☐
50. Fire extinguisher ☐
51. Hot work or electrical permit required ☐

Personal Limitations/Hazards

52. Procedure not available for task ☐
53. Confusing instructions ☐
54. No training for task or tools to be used ☐
55. First time performing the task ☐
56. Micro break (stretching/flexing) ☐
57. Report **all injuries** to your supervisor ☐

It is important that all relevant hazards have plans in place to reduce risk.
Be sure that all associated permits are closed off at the end of the job.
Remember: Stop and Think

Reviewed by Name and Signature: ____________________________________

INCIDENT REPORT – RMS 3

Incidents involving injury, potential injury, or report of pain, soreness, or discomfort must be reported immediately (within one hour) to a supervisor. Supervisors will then immediately contact ***their HSE representative to develop a plan for assessment and care***. This form must be completed and **submitted within 24 hours** of any incident. Do not delay submission waiting for signatures. **Email to hse@stantec.com or fax unsigned report to (780) 969-2030** and file locally in compliance with the corporate records retention policy and practices once all signatures have been obtained.

This document contains privileged and confidential information prepared at the request of Stantec's Legal Counsel. The contents of this report are restricted to HR personnel, Risk Management Representatives, Project Manager and BC Leader, and Stantec's Insurer, Adjuster and Legal Counsel. Information collected will be used solely for the purpose of meeting the requirements of Stantec's HSE and insurance programs, complying with applicable legislation, and will be used in accordance with any governing privacy legislation. The information collected will be maintained electronically and may be included in required reports.

SECTION 1: GENERAL INFORMATION			
Office location:		BC number:	
Location of incident:			
Incident date and time:		Date and time reported:	
Project name:		Project number:	
Client Name:			
Person in charge:		Person in Charge Phone:	

SECTION 2: STANTEC EMPLOYEE INFORMATION (if more than one identify extras in incident details below)			
Name:		Phone:	
Job position:		Group name:	
Time employee began work:		Job Experience (in years)	
Type of employment:	Full Time ☐ ; Visitor ☐ ; Contract ☐ ; Volunteer ☐ ; Seasonal ☐		
Supervisor:		Supervisor Phone:	

SECTION 3: INCIDENT DETAILS

Type of Incident: *incident types marked with an asterisk, please complete pages 1 and signature page only
See StanNet for a list of Incident Type Definitions

☐ *****_Report Only_	☐ First Aid	☐ Motor Vehicle Incident	☐ 3rd Party Incident (i.e., Public)
☐ *****_Hazard Identification_	☐ Medical Aid – No Lost Time	☐ Property Damage - Vehicle	☐ Spill or Release
☐ *****_Near Miss_	☐ Restricted Work	☐ Property Damage - Other	☐ Utility Strike
☐ *****_Safety Opportunity_	☐ Lost Time	☐ Theft	☐ Fire/Explosion/Flood
	☐ Fatality	☐ Contractor Recordable Incident	☐ Stop Work Authority
	☐ Violence or Harassment	☐ Non-compliance	

Describe incident in detail: (include any issues related to people, equipment, materials, environment, and processes)

Immediate corrective actions taken:

SECTION 4: MEDICAL INFORMATION	
Name of first aid attendant:	Injury recorded in first aid log? Yes ☐ No ☐ N/A ☐
Description of first aid or medical treatment administered:	
Clinic/hospital sent to:	
Attending physician/paramedic (if known):	

Area of Injury – Please check all that apply:

			Left		Right	Left		Right	Left		Right	Left		Right
☐ Head	☐ Teeth	☐ Upper back	☐	Shoulder	☐	☐	Wrist	☐	☐	Hip	☐	☐	Ankle	☐
☐ Face	☐ Neck	☐ Lower back	☐	Arm	☐	☐	Hand	☐	☐	Thigh	☐	☐	Foot	☐
☐ Eye(s)	☐ Chest	☐ Abdomen	☐	Elbow	☐	☐	Finger(s)	☐	☐	Knee	☐	☐	Toe(s)	☐
☐ Ear(s)		☐ Pelvis	☐	Forearm	☐				☐	Lower Leg	☐			
☐ Other	Specify													

Has the injured employee had a previous similar injury or disability?	Yes ☐	No ☐

SECTION 5: PROPERTY OR VEHICLE DAMAGE: STANTEC			
Ownership Details (choose one):	☐ Rented (attach rental agreement)	☐ Stantec Owned	☐ Personal (employee vehicle)
Year, Make, and Model of Vehicle:		Vehicle ID # (VIN)	
Nature of damage:		Estimated cost of damage:	$
Description of damaged property:			
Attending police officer (if known):		Badge #:	
Copy of police report received	Yes ☐ No ☐ If yes, file number:	(attach copy of police report)	

PROPERTY OR VEHICLE DAMAGE: 3RD PARTY			
Name of owner and contact number:			
Year, Make, and Model of Vehicle:		License Plate Number:	
Insurer and Policy Number:			
Injured parties? Yes ☐ No ☐	If yes, describe Injuries:		
Diagram or photographs attached?	Yes ☐ No ☐		

WITNESS INFORMATION - #1			
Name:		Phone Number:	
Witness statement provided?	Yes (attached) ☐	No ☐	

WITNESS INFORMATION - #2			
Name:		Phone Number:	
Witness statement provided?	Yes (attached) ☐	No ☐	

SECTION 6: SPILL OR RELEASE			
Substance:			
Quantity:		Employee(s) exposed via:	☐ Inhalation ☐ Contact ☐ Ingestion ☐ n/a
Off-site impacts observed or anticipated?		Yes ☐ No ☐ If yes, describe:	
Name of regulatory agencies contacted:			
Contact name, number, date and time of call:			

SECTION 7: ANALYSIS

IMMEDIATE/DIRECT CAUSES

A. **UNSAFE ACTIONS** (check off as many as necessary)

☐ Operating equipment without authority	☐ Failing to use personal protective equipment properly	☐ Failure to identify hazard or risk
☐ Failure to warn	☐ Improper loading	☐ Inattention
☐ Failure to secure	☐ Improper placement	☐ Failure to communicate
☐ Operating at improper speed	☐ Improper lifting or handling	☐ Other: Specify
☐ Making safety devices inoperative	☐ Improper position for a task	
☐ Removing safety devices	☐ Servicing equipment in operation	
☐ Using defective/improper equipment	☐ Horseplay	
☐ Using equipment improperly	☐ Failure to follow procedure, policy or practice	

B. **UNSAFE CONDITIONS** (check off as many as necessary)

☐ Inadequate guards/barriers	☐ Radiation exposure	☐ Inadequate information/data
☐ Improper/inadequate PPE	☐ High or low temperature exposures	☐ Inadequate preparation/planning
☐ Defective tools or equipment	☐ Inadequate or excess illumination	☐ Inadequate support/assistance
☐ Congested work area	☐ Inadequate ventilation	☐ Road conditions
☐ Inadequate warning system	☐ Presence of harmful materials	☐ Weather conditions
☐ Fire and explosion hazards	☐ Inadequate instructions/procedures	☐ Other: Specify
☐ Poor housekeeping; disorder	☐ Hazardous environmental conditions; gases, dusts, smokes, fumes, vapours	
☐ Noise exposure		

BASIC/ROOT CAUSES

C. **PERSONAL FACTORS (check off as many as necessary)**

☐ Inadequate physical capability	☐ Mental stress	☐ Lack of knowledge
☐ Physical stress	☐ Lack of skill	☐ Other: Specify

D. **JOB FACTORS (check off as many as necessary)**

☐ Inadequate leadership or supervision	☐ Inadequate maintenance (scheduled or preventative)	☐ Excessive wear and tear
☐ Inadequate engineering	☐ Inadequate tools or equipment	☐ Inadequate communications
☐ Inadequate purchasing	☐ Inadequate work standards	☐ Improper motivation
☐ Abuse or misuse	☐ Other: Specify	

SECTION 8: FOLLOW-UP				
Short-term:	Corrective Action	Assigned To	Target Date	Completion Date
Long-term:	Corrective Action	Assigned To	Target Date	Completion Date

REVIEW COMMENTS		
Involved Employee Comments:		
Signature:	Print Name:	Date:
Job Title:		
Lead Investigator Comments:		
Signature:	Print Name:	Date:
Job Title:		
Supervisor/Project Manager:		
Signature:	Print Name:	Date:
Job Title:		
HSE Representative (OSEC/JH&S Committee/RSEC/HSE Manager):		
Signature:	Print Name:	Date:
Job Title:		
Management Review:		
Signature:	Print Name:	Date:
Job Title:		

Client Review (if required):   Signature: Print Name: Date: Job Title:
Additional Comments:

Appendix B

Analytical Laboratory Reports

TOC Site & 242nd Avenue ROW Groundwater Samples

Stantec

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 24, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 12, 2015 from the TOC_01-176, WORFDB8 F&BI 503225 project. There are 25 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0324R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 12, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503225 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503225 -01	MW93
503225 -02	MW92
503225 -03	MW57
503225 -04	MW29
503225 -05	MW32
503225 -06	MW24
503225 -07	MW27
503225 -08	MW91
503225 -09	MW11
503225 -10	MW90
503225 -11	MW54
503225 -12	TB-021215-2

All quality control requirements were acceptable.

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503225
Date Extracted: 03/16/15 and 03/18/15
Date Analyzed: 03/16/15 and 03/18/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW93 503225-01	<1	<1	<1	<3	<100	99
MW92 503225-02	<1	<1	<1	<3	<100	96
MW57 503225-03	<1	<1	2.0	11	110	97
MW29 503225-04	<1	1.0	<1	29	790	103
MW32 503225-05	1.7	7.8	16	62	680	106
MW24 503225-06	<1	<1	<1	<3	<100	94
MW27 503225-07	<1	2.3	7.5	39	320	96
MW91 503225-08	<1	1.2	1.2	3.4	160	101
MW11 503225-09	<1	<1	3.8	3.1	190	97
MW90 503225-10	<1	54	<1	590	3,100	112

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503225
Date Extracted: 03/16/15 and 03/18/15
Date Analyzed: 03/16/15 and 03/18/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW54 503225-11	<1	<1	<1	<3	<100	96
TB-021215-2 503225-12	<1	<1	<1	<3	<100	91
Method Blank 05-514 MB	<1	<1	<1	<3	<100	91

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503225
Date Extracted: 03/16/15
Date Analyzed: 03/16/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW91 503225-08 1/1.2	120 x	<300	104
Method Blank 05-537 MB	<50	<250	97

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW29	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/20/15	Lab ID:	503225-04
Date Analyzed:	03/20/15	Data File:	503225-04.046
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	90	60	125

Analyte:	Concentration ug/L (ppb)
Lead	2.91

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW32	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/20/15	Lab ID:	503225-05
Date Analyzed:	03/20/15	Data File:	503225-05.049
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	91	60	125

Analyte:	Concentration ug/L (ppb)
Lead	1.04

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW91	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/20/15	Lab ID:	503225-08
Date Analyzed:	03/20/15	Data File:	503225-08.050
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	89	60	125

Analyte:	Concentration ug/L (ppb)
Lead	1.73

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW90	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/20/15	Lab ID:	503225-10
Date Analyzed:	03/20/15	Data File:	503225-10.051
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	89	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/20/15	Lab ID:	I5-167 mb
Date Analyzed:	03/20/15	Data File:	I5-167 mb.044
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	95	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW29	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/18/15	Lab ID:	503225-04
Date Analyzed:	03/19/15	Data File:	503225-04.048
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	92	60	125

Analyte:	Concentration ug/L (ppb)
Lead	119

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW32	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/18/15	Lab ID:	503225-05
Date Analyzed:	03/19/15	Data File:	503225-05.049
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	95	60	125

Analyte:	Concentration ug/L (ppb)
Lead	28.0

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW91	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/18/15	Lab ID:	503225-08
Date Analyzed:	03/19/15	Data File:	503225-08.050
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	97	60	125

Analyte:	Concentration ug/L (ppb)
Lead	6.30

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW90	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/18/15	Lab ID:	503225-10
Date Analyzed:	03/19/15	Data File:	503225-10.051
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	97	60	125

Analyte:	Concentration ug/L (ppb)
Lead	2.03

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/18/15	Lab ID:	I5-163 mb
Date Analyzed:	03/19/15	Data File:	I5-163 mb.021
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	98	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW91	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/13/15	Lab ID:	503225-08
Date Analyzed:	03/13/15	Data File:	031324.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	85	117
Toluene-d8	97	91	108
4-Bromofluorobenzene	98	76	126

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/13/15	Lab ID:	05-0494 mb
Date Analyzed:	03/13/15	Data File:	031307.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	85	117
Toluene-d8	97	91	108
4-Bromofluorobenzene	97	76	126

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW91	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/17/15	Lab ID:	503225-08 1/2
Date Analyzed:	03/18/15	Data File:	031818.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	144	25	160
Benzo(a)anthracene-d12	67	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503225
Date Extracted:	03/17/15	Lab ID:	05-535 mb2 1/2
Date Analyzed:	03/18/15	Data File:	031809.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	108	25	160
Benzo(a)anthracene-d12	117	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503225

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503225-11 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benzene	ug/L (ppb)	50	<1	93	94	50-150	1
Toluene	ug/L (ppb)	50	<1	94	95	50-150	1
Ethylbenzene	ug/L (ppb)	50	<1	95	98	50-150	3
Xylenes	ug/L (ppb)	150	<3	94	95	50-150	1
Gasoline	ug/L (ppb)	1,000	<100	95	96	53-117	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	96	65-118
Toluene	ug/L (ppb)	50	96	72-122
Ethylbenzene	ug/L (ppb)	50	97	73-126
Xylenes	ug/L (ppb)	150	94	74-118
Gasoline	ug/L (ppb)	1,000	98	69-134

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503225

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	101	103	63-142	2

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503225

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 200.8

Laboratory Code: 503225-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	2.91	100	101	79-121	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	103	83-115

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503225

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: 503281-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	<1	110	117	79-121	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	106	83-115

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503225

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503225-08 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	96	68-125

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	108	101	70-122	7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503225

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample 1/0.25

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	0.25	85	91	70-130	7
Acenaphthylene	ug/L (ppb)	0.25	82	88	70-130	7
Acenaphthene	ug/L (ppb)	0.25	84	92	70-130	9
Fluorene	ug/L (ppb)	0.25	82	88	70-130	7
Phenanthrene	ug/L (ppb)	0.25	89	95	70-130	7
Anthracene	ug/L (ppb)	0.25	87	94	70-130	8
Fluoranthene	ug/L (ppb)	0.25	87	93	70-130	7
Pyrene	ug/L (ppb)	0.25	94	103	70-130	9
Benz(a)anthracene	ug/L (ppb)	0.25	93	102	70-130	9
Chrysene	ug/L (ppb)	0.25	101	107	70-130	6
Benzo(b)fluoranthene	ug/L (ppb)	0.25	99	99	59-130	0
Benzo(k)fluoranthene	ug/L (ppb)	0.25	93	104	65-120	11
Benzo(a)pyrene	ug/L (ppb)	0.25	93	102	60-125	9
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	0.25	85	95	42-135	11
Dibenz(a,h)anthracene	ug/L (ppb)	0.25	79	85	37-125	7
Benzo(g,h,i)perylene	ug/L (ppb)	0.25	86	93	45-123	8

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503225

SAMPLE CHAIN OF CUSTODY ME 03/12/15

TOC/ROMIOs V3/BT4

Page # 1 of 2

Send Report To: Rebekah Brooks
Company: Stantec
Address: 19101 W 36th Ave
City, State, ZIP: Lynnwood WA 98036
Phone #: 425-477-4994 Fax #:

SAMPLERS (signature): AVadon
PROJECT NAME/NO.: TOC MLT / 203700102
PO#:
REMARKS: Bottles for dissolved Pb analysis are labeled "dissolved" and are filtered.

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	TOTAL Pb	DISSOLVED Pb	MTBE	PAHs			Notes
MW93	01 A-C	03-11-15 ~~1017~~	1017	W	3		X	X										
MW92	02	03-11-15	1101	W	3		X	X										
MW57	03	03-11-15	1156	W	3		X	X										
MW29	04 A-E	03-11-15	1400	W	5		X	X				X	X					
MW32	05	03-11-15	1415	W	5		X	X				X	X					
MW24	06 A-C	03-11-15	1445	W	3		X	X										
MW27	07	03-11-15	1448	W	3		X	X										
MW91	08 A-G	03-11-15	1450	W	7	X	X	X				X	X	X	X			
MW11	09 A-C	03-11-15	1510	W	3		X	X										
MW90	10 A-E	03-12-15	0910	W	5		X	X				X	X					

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	AVadon	Antonelo Vadon	Stantec	03-12-15	1500
Received by:	[signature]	Nhan Phan	FeBI	03-12-15	1500
Relinquished by:					
Received by:			Samples received at 2 °C		

FORMS\COC\COC.DOC

503225

SAMPLE CHAIN OF CUSTODY ME 03/12/15 TOC / Romio's

V3/ BT4

Page # 2 of 2

Send Report To Rebekah Brooks

Company Stantec

Address 19101 W 36th Ave #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4994 Fax # ____

SAMPLERS (signature) AVadon

PROJECT NAME/NO. TOC MLT / 203700102

PO#

REMARKS

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH ____

Rush charges authorized by ____

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS						Notes
MW54	11 A-I	03-12-15	1100	W	9		X	X									MS/MSD
TB-031215-2	12			W	1		X	X									

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: AVadon	Antonela Vadon	Stantec	03-12-15	1500
Received by: [signature]	Nhan Phan	FeBI	03-12-15	1500
Relinquished by:				
Received by:		**Samples received at** 2 °C		

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 24, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 12, 2015 from the TOC_01-176, WORFDB8 F&BI 503226 project. There are 19 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0324R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 12, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503226 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503226 -01	MW95
503226 -02	MW96
503226 -03	MW70
503226 -04	MW97
503226 -05	MW101
503226 -06	MW99
503226 -07	MW98
503226 -08	MLT-10
503226 -09	TB-031215-1

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503226
Date Extracted: 03/17/15
Date Analyzed: 03/17/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
MW95 503226-01	<1	<1	<1	3.7	<100	94
MW96 503226-02	<1	<1	<1	<3	<100	93
MW70 503226-03	<1	<1	<1	<3	<100	81
MW97 503226-04	<1	<1	<1	<3	<100	93
MW101 503226-05	<1	<1	<1	<3	<100	93
MW99 503226-06	<1	<1	<1	<3	<100	93
MW98 503226-07	4.5	2.3	11	43	600	98
MLT-10 503226-08	<1	<1	<1	<3	<100	94
TB-031215-1 503226-09	<1	<1	<1	<3	<100	81
Method Blank 05-517 MB	<1	<1	<1	<3	<100	93

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW101	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/20/15	Lab ID:	503226-05
Date Analyzed:	03/20/15	Data File:	503226-05.052
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	91	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/20/15	Lab ID:	I5-167 mb
Date Analyzed:	03/20/15	Data File:	I5-167 mb.044
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	95	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW101	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/18/15	Lab ID:	503226-05
Date Analyzed:	03/19/15	Data File:	503226-05.047
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	92	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/18/15	Lab ID:	I5-163 mb
Date Analyzed:	03/19/15	Data File:	I5-163 mb.021
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	98	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW95	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/13/15	Lab ID:	503226-01
Date Analyzed:	03/14/15	Data File:	031343.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	94	108
Toluene-d8	99	91	107
4-Bromofluorobenzene	97	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW70	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/13/15	Lab ID:	503226-03
Date Analyzed:	03/14/15	Data File:	031344.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	94	108
Toluene-d8	99	91	107
4-Bromofluorobenzene	97	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW97	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/13/15	Lab ID:	503226-04
Date Analyzed:	03/14/15	Data File:	031345.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	98	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW101	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/13/15	Lab ID:	503226-05
Date Analyzed:	03/14/15	Data File:	031346.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	96	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW99	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/13/15	Lab ID:	503226-06
Date Analyzed:	03/14/15	Data File:	031347.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	94	108
Toluene-d8	101	91	107
4-Bromofluorobenzene	99	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW98	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/13/15	Lab ID:	503226-07
Date Analyzed:	03/14/15	Data File:	031348.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	94	108
Toluene-d8	101	91	107
4-Bromofluorobenzene	98	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MLT-10	Client:	Stantec
Date Received:	03/12/15	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/13/15	Lab ID:	503226-08
Date Analyzed:	03/16/15	Data File:	031606.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	99	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503226
Date Extracted:	03/16/15	Lab ID:	05-0495 mb
Date Analyzed:	03/13/15	Data File:	031309.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	94	108
Toluene-d8	99	91	107
4-Bromofluorobenzene	101	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503226

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503226-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	3.7	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	97	72-119
Toluene	ug/L (ppb)	50	100	71-113
Ethylbenzene	ug/L (ppb)	50	99	72-114
Xylenes	ug/L (ppb)	150	86	72-113
Gasoline	ug/L (ppb)	1,000	97	70-119

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503226

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 200.8

Laboratory Code: 503225-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	2.91	100	101	79-121	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	103	83-115

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503226

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 503281-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	<1	110	117	79-121	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	106	83-115

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503226

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503224-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	111	79-118

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	96	106	81-118	10

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503226

SAMPLE CHAIN OF CUSTODY ME 03/12/15

DRAKE PROPER

Page # 1 of 1 V3

Send Report To Rebekah Brooks
Company Stantec
Address 19101 W 36th Ave. #203
City, State, ZIP Lynnwood WA 98036
Phone # 425-477-4994 Fax #

SAMPLERS (signature) AVadon

PROJECT NAME/NO. TOC MLT / 203700102

PO#

REMARKS
Bottles for dissolved Pb analysis are labeled "dissolved" and are filtered.

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	MTBE (8260C)	TOTAL Pb	DISSOLVED Pb				Notes
MW95	01 A-D	03-11-15	1237	W	4		X	X				X						
MW96	02 A-C	03-11-15	1240	W	3		X	X										
MW70	03 A-D	03-11-15	1255	W	4		X	X				X						
MW97	04	03-11-15	1300	W	4		X	X				X						
MW101	05 A-F	03-11-15	1310	W	6		X	X				X	X	X				
MW99	06 A-D	03-11-15	1515	W	4		X	X				X						
MW98	07	03-11-15	1414	W	4		X	X				X						
MLT-10	08	03-12-15	0950	W	4		X	X				X						MW96 -A
TB-031215-1	09	—	—	W	1		X	X										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	AVadon	Antonela Vadon	Stantec	3-12-15	1500
Received by:	[signature]	Nhan Phan	F&BI	3-12-15	1500
Relinquished by:					
Received by:			Samples received at 2 °C		

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 18, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 12, 2015 from the TOC_01-176, WORFDB8 F&BI 503227 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0318R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 12, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503227 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503227 -01	MW12

All quality control requirements were acceptable.

Date of Report: 03/18/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503227
Date Extracted: 03/13/15
Date Analyzed: 03/13/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW12 503227-01	<1	<1	<1	<3	<100	94
Method Blank 05-512 MB	<1	<1	<1	<3	<100	96

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/18/15
Date Received: 03/12/15
Project: TOC_01-176, WORFDB8 F&BI 503227

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503220-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	96	65-118
Toluene	ug/L (ppb)	50	97	72-122
Ethylbenzene	ug/L (ppb)	50	98	73-126
Xylenes	ug/L (ppb)	150	96	74-118
Gasoline	ug/L (ppb)	1,000	94	69-134

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503227

SAMPLE CHAIN OF COUSTODY

ME 03-12-15

ROW

V1

Page # 1 of 1

Send Report To Rebekah Brooks

Company Stantec

Address 19101 W 36th Ave #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4994 Fax # ______

SAMPLERS (signature) Avadon	
PROJECT NAME/NO. TOC MLT 1203700102	PO#
REMARKS	

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH ______

Rush charges authorized by ______

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

						ANALYSES REQUESTED												
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS							Notes
~~2#~~ MW12	01 A-C	03-12-15	1230	W	3		X	X										

Samples received at 2 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Avadon	Antoinette Vadon	Stantec	3-12-15	1500
Received by:	[signature]	Nhan Phan	FeBI	3-12-15	1500
Relinquished by:					
Received by:					

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 20, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 16, 2015 from the TOC_01-176, WORFDB8 F&BI 503278 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0320R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 16, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503278 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503278 -01	MW53
503278 -02	MW62
503278 -03	MW08
503278 -04	MW60
503278 -05	MW61
503278 -06	MW55
503278 -07	MW04
503278 -08	MW49

All quality control requirements were acceptable.

Date of Report: 03/20/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503278
Date Extracted: 03/17/15
Date Analyzed: 03/17/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
MW53 503278-01	<1	<1	<1	<3	<100	94
MW62 503278-02	<1	<1	<1	<3	<100	95
MW08 503278-03	<1	<1	<1	<3	<100	94
MW60 503278-04	<1	<1	<1	<3	<100	94
MW61 503278-05	<1	<1	<1	<3	<100	82
MW55 503278-06	<1	<1	<1	<3	<100	93
MW04 503278-07	<1	<1	<1	<3	<100	94
MW49 503278-08	<1	<1	<1	<3	<100	94
Method Blank 05-517 MB	<1	<1	<1	<3	<100	93

Date of Report: 03/20/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503278

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503226-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	3.7	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	97	72-119
Toluene	ug/L (ppb)	50	100	71-113
Ethylbenzene	ug/L (ppb)	50	99	72-114
Xylenes	ug/L (ppb)	150	86	72-113
Gasoline	ug/L (ppb)	1,000	97	70-119

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503278

SAMPLE CHAIN OF CUSTODY ME 03-16-15

ROW

Page # 1 of 1V2

Send Report To Rebekah Brooks

Company Stantec

Address 1901 W 36th Ave. #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4994 Fax #

SAMPLERS (signature) Avadon	
PROJECT NAME/NO. TOC MLT / 203700102	PO#
REMARKS	

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
Rush charges authorized by

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS								Notes
MW53	01 A-C	03-13-15	1020	W	3		X	X											
MW62	02	03-13-15	1030	W	3		X	X											
MW08	03	03-13-15	1135	W	3		X	X											
MW60	04	03-13-15	1145	W	3		X	X											
MW61	05	03-13-15	1330	W	3		X	X											
MW55	06	03-13-15	1345	W	3		X	X											
MW04	07	03-14-15	1215	W	3		X	X											
~~MW5~~ MW49	08	03-16-15	1100	W	3		X	X											

Samples received at 3 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Avadon	Antonela Vadon	Stantec	03-16-15	1400
Received by:	[signature]	Nhan Phan	FeBT	3-16-15	1400
Relinquished by:					
Received by:					

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 20, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 16, 2015 from the TOC_01-176, WORFDB8 F&BI 503279 project. There are 9 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0320R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 16, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503279 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503279 -01	MW67
503279 -02	MW68
503279 -03	MW84
503279 -04	TB-031615-1
503279 -05	TB-031615-2

All quality control requirements were acceptable.

Date of Report: 03/20/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503279
Date Extracted: 03/17/15
Date Analyzed: 03/17/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW67 503279-01	<1	<1	<1	<3	<100	95
MW68 503279-02	<1	<1	<1	<3	<100	95
MW84 503279-03	<1	<1	4.8	12	630	100
TB-031615-1 503279-04	<1	<1	<1	<3	<100	91
TB-031615-2 503279-05	<1	<1	<1	<3	<100	91
Method Blank 05-516 MB	<1	<1	<1	<3	<100	95

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW67	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503279
Date Extracted:	03/16/15	Lab ID:	503279-01
Date Analyzed:	03/16/15	Data File:	031625.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW68	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503279
Date Extracted:	03/16/15	Lab ID:	503279-02
Date Analyzed:	03/16/15	Data File:	031626.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	57	121
Toluene-d8	103	63	127
4-Bromofluorobenzene	99	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW84	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503279
Date Extracted:	03/16/15	Lab ID:	503279-03
Date Analyzed:	03/16/15	Data File:	031627.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503279
Date Extracted:	03/16/15	Lab ID:	05-0541 mb
Date Analyzed:	03/16/15	Data File:	031620.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Date of Report: 03/20/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503279

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503264-02 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	94	65-118
Toluene	ug/L (ppb)	50	95	72-122
Ethylbenzene	ug/L (ppb)	50	96	73-126
Xylenes	ug/L (ppb)	150	95	74-118
Gasoline	ug/L (ppb)	1,000	96	69-134

Date of Report: 03/20/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503279

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503280-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	101	74-127

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	105	101	64-147	4

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503279

SAMPLE CHAIN OF CUSTODY ME 03-16-15

DRAKE

Page # 1 of 1 V3

Send Report To Rebekah Brooks

Company Stantec

Address 1901 W 36th Ave #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4994 Fax # ____

SAMPLERS (*signature*) A Vadon

PROJECT NAME/NO. TOC MLT/203700102

PO#

REMARKS

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH ____

Rush charges authorized by ____

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE						Notes
MW67	01 A-D	03.16.15	1005	W	4		X	X				X						
MW68	02	03.16.15	1055	W	4		X	X				X						
MW84	03	03.16.15	1215	W	4		X	X				X						
TB-031615-1	04	—	—	W	1		X	X										
TB-031615-2	05	—	—	W	1		X	X										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	A Vadon	Antonello Vadon	Stantec	03.16.15	1400
Received by:	[signature]	Nhan Phan	FeBT	03-16-15	1400
Relinquished by:					
Received by:			Samples received at 3 °C		

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 7, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 16, 2015 from the TOC_01-176, WORFDB8 F&BI 503281 project. There are 25 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0407R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 16, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503281 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503281 -01	MW37
503281 -02	MW79
503281 -03	MW80
503281 -04	MW34
503281 -05	MW06
503281 -06	MW82
503281 -07	MW100
503281 -08	MW81
503281 -09	EB-031315
503281 -10	MW39
503281 -11	MW02
503281 -12	MW20
503281 -13	MLT-03
503281 -14	MLT-01
503281 -15	MW30
503281 -16	MW22
503281 -17	MW56
503281 -18	MW19
503281 -19	MW59
503281 -20	MW03
503281 -21	EB-031415
503281 -22	MW58

The 8270D surrogate anthracene-d10 exceeded the acceptance criteria. No PAHs were detected, therefore the data were acceptable.

All other quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/07/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503281
Date Extracted: 03/18/15
Date Analyzed: 03/18/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW37 503281-01	<1	<1	<1	<3	<100	97
MW79 503281-02	<1	<1	<1	<3	<100	94
MW80 503281-03	<1	<1	<1	<3	<100	93
MW34 503281-04	<1	<1	<1	<3	<100	89
MW06 503281-05	<1	<1	<1	<3	<100	97
MW82 503281-06	<1	<1	<1	<3	<100	91
MW100 503281-07	<1	<1	<1	<3	<100	96
MW81 503281-08	<1	<1	<1	<3	<100	95
EB-031315 503281-09	<1	<1	<1	<3	<100	94
MW39 503281-10	<1	<1	<1	<3	<100	96
MW02 503281-11	<1	<1	<1	<3	<100	99

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/07/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503281
Date Extracted: 03/18/15
Date Analyzed: 03/18/15

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW20 503281-12	<1	<1	<1	<3	<100	91
MLT-03 503281-13	<1	<1	<1	<3	<100	95
MLT-01 503281-14	<1	<1	<1	<3	<100	100
MW30 503281-15	<1	<1	<1	<3	<100	96
MW22 503281-16	<1	<1	<1	<3	<100	94
MW56 503281-17	<1	<1	<1	<3	<100	97
MW19 503281-18	<1	<1	<1	<3	<100	96
MW59 503281-19	<1	<1	<1	<3	<100	91
MW03 503281-20	<1	<1	<1	<3	<100	88
EB-031415 503281-21	<1	<1	<1	<3	<100	94

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/07/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503281
Date Extracted: 03/18/15
Date Analyzed: 03/18/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW58 503281-22	<1	<1	<1	<3	<100	95
Method Blank 05-518 MB	<1	<1	<1	<3	<100	90
Method Blank 05-0558 MB	<1	<1	<1	<3	<100	93

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/07/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503281
Date Extracted: 03/17/15
Date Analyzed: 03/20/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW20 503281-12 1/2	140 x	<500	103
MLT-03 503281-13 1/2	<100	<500	109
EB-031415 503281-21 1/2	<100	<500	107
Method Blank 05-537 MB2	<50	<250	98

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW100	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/20/15	Lab ID:	503281-07
Date Analyzed:	03/20/15	Data File:	503281-07.056
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	92	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/20/15	Lab ID:	I5-167 mb
Date Analyzed:	03/20/15	Data File:	I5-167 mb.044
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	95	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW100	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/18/15	Lab ID:	503281-07
Date Analyzed:	03/19/15	Data File:	503281-07.022
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	90	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/18/15	Lab ID:	I5-163 mb
Date Analyzed:	03/19/15	Data File:	I5-163 mb.021
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	98	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW20	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/16/15	Lab ID:	503281-12
Date Analyzed:	03/16/15	Data File:	031622.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MLT-03	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/16/15	Lab ID:	503281-13
Date Analyzed:	03/16/15	Data File:	031623.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EB-031415	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/16/15	Lab ID:	503281-21
Date Analyzed:	03/16/15	Data File:	031624.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	95	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/16/15	Lab ID:	05-0541 mb
Date Analyzed:	03/16/15	Data File:	031620.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW20	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/17/15	Lab ID:	503281-12 1/2
Date Analyzed:	03/18/15	Data File:	031821.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	144	25	160
Benzo(a)anthracene-d12	72	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MLT-03	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/17/15	Lab ID:	503281-13 1/2
Date Analyzed:	03/18/15	Data File:	031822.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	164 vo	25	160
Benzo(a)anthracene-d12	72	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	EB-031415	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/17/15	Lab ID:	503281-21 1/2
Date Analyzed:	03/18/15	Data File:	031823.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	162 vo	25	160
Benzo(a)anthracene-d12	82	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503281
Date Extracted:	03/17/15	Lab ID:	05-535 mb2 1/2
Date Analyzed:	03/18/15	Data File:	031809.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	108	25	160
Benzo(a)anthracene-d12	117	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Date of Report: 04/07/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503281

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503281-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	92	65-118
Toluene	ug/L (ppb)	50	92	72-122
Ethylbenzene	ug/L (ppb)	50	91	73-126
Xylenes	ug/L (ppb)	150	91	74-118
Gasoline	ug/L (ppb)	1,000	97	69-134

Date of Report: 04/07/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503281

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503281-18 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	96	65-118
Toluene	ug/L (ppb)	50	97	72-122
Ethylbenzene	ug/L (ppb)	50	99	73-126
Xylenes	ug/L (ppb)	150	96	74-118
Gasoline	ug/L (ppb)	1,000	101	69-134

Date of Report: 04/07/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503281

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	101	103	63-142	2

Date of Report: 04/07/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503281

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 200.8

Laboratory Code: 503225-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	2.91	100	101	79-121	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	103	83-115

Date of Report: 04/07/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503281

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 503281-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	<1	110	117	79-121	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	106	83-115

Date of Report: 04/07/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503281

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503280-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	101	74-127

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	105	101	64-147	4

Date of Report: 04/07/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503281

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample 1/0.25

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	0.25	85	91	70-130	7
Acenaphthylene	ug/L (ppb)	0.25	82	88	70-130	7
Acenaphthene	ug/L (ppb)	0.25	84	92	70-130	9
Fluorene	ug/L (ppb)	0.25	82	88	70-130	7
Phenanthrene	ug/L (ppb)	0.25	89	95	70-130	7
Anthracene	ug/L (ppb)	0.25	87	94	70-130	8
Fluoranthene	ug/L (ppb)	0.25	87	93	70-130	7
Pyrene	ug/L (ppb)	0.25	94	103	70-130	9
Benz(a)anthracene	ug/L (ppb)	0.25	93	102	70-130	9
Chrysene	ug/L (ppb)	0.25	101	107	70-130	6
Benzo(b)fluoranthene	ug/L (ppb)	0.25	99	99	59-130	0
Benzo(k)fluoranthene	ug/L (ppb)	0.25	93	104	65-120	11
Benzo(a)pyrene	ug/L (ppb)	0.25	93	102	60-125	9
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	0.25	85	95	42-135	11
Dibenz(a,h)anthracene	ug/L (ppb)	0.25	79	85	37-125	7
Benzo(g,h,i)perylene	ug/L (ppb)	0.25	86	93	45-123	8

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503281

SAMPLE CHAIN OF CUSTODY ME 03/16/15

TOC/Romio's

Page # 1 of 3 V4 AOS AI 3

Send Report To Rebekah Brooks

Company Stantec

Address 19101 W 36th Ave #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4994 Fax #

SAMPLERS (*signature*) AVadan

PROJECT NAME/NO. TOC MLT /205700102

PO#

REMARKS
Bottles for dissolved Pb analysis are labeled "dissolved" and are filtered

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	TOTAL Pb	DISSOLVED Pb					Notes
MW37	01 A-C	03-12-15	1440	W	3		X	X										
MW79	02	03-12-15	1550	W	3		X	X										
MW80	03	03-12-15	1630	W	3		X	X										
MW34	04	03-13-15	1025	W	3		X	X										
MW06	05	03-13-15	1118	W	3		X	X										
MW82	06	03-13-15	1440	W	3		X	X										
MW100	07 A-E	03-13-15	1445	W	5		X	X				X	X					
MW81	08 A-C	03-13-15	1536	W	3		X	X										
EB-031315	09	03-13-15	1540	W	3		X	X										
MW39	10	03-14-15	1000	W	3		X	X										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: AVadan	Antonela Vadan	Stantec	03-16-15	1400
Received by: [signature]	Nhan Phan	FeBI	03-16-15	1400
Relinquished by:				
Received by:		Samples received at 3 °C		

FORMS\COC\COC.DOC

503281

SAMPLE CHAIN OF CUSTODY ME 03/16/15

TOC/Romios

Page # 2 of 3 V4

Send Report To Rebekah Brooks

Company Stantec

Address 19101 W 36th Ave #203

City, State, ZIP Lynnwood, WA 98036

Phone # 425-477-4994 Fax #

SAMPLERS (signature) A Vadon	
PROJECT NAME/NO.	PO#
TOC MLT / 203700102	
REMARKS	

TURNAROUND TIME A13
- [x] Standard (2 Weeks)
- [ ] RUSH
Rush charges authorized by A05

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE	PAH					Notes
MW02	11 A-C	03-14-15	1110	W	3		X	X										
MW20	12 A-E	03-14-15	1130	W	5	X	X	X				X	X					
MLT-03	13 A-E	03-14-15	1145	W	5	X	X	X				X	X					
MLT-01	14 A-C	03-14-15	1150	W	3		X	X										
MW30	15	03-14-15	1220	W	3		X	X										
~~MW20~~ MW22	16	03-14-15	1325	W	3		X	X										
MW56	17	03-14-15	1410	W	3		X	X										
MW19	18	03-14-15	1425	W	3		X	X										
MW59	19	03-14-15	1515	W	3		X	X										
MW03	20	03-14-15	1515	W	3		X	X										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE		PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	AVadon	Antonela Vadon	Stantec	03-16-15	1400
Received by:	[illegible]	Nhan Phan	FeBI	03-16-15	1400
Relinquished by:					
Received by:			Samples received at 7 °C		

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503281

SAMPLE CHAIN OF CUSTODY ME 03/16/15

TOC | ROMIO'S

Page # 3 of 3 V4 A1 3 A05

Send Report To Rebekah Brooks

Company Stantec

Address 19101 W36th Ave #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4994 Fax #

SAMPLERS (*signature*) AVadon

PROJECT NAME/NO. TOC MLT/203700102

PO#

REMARKS

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
Rush charges authorized by

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE	PAH					Notes
EB-031415	21 A-E	03.14.15	1600	W	~~4~~5	X	X	X				X	X					
MW58	22 A-C	03.16.15	1005	W	3		X	X										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	AVadon	Antonela Vadon	Stantec	03.16.15	1400
Received by:	[signature]	Nhan Phan	FeBI	03-16-15	1400
Relinquished by:					
Received by:			Samples received at 3 °C		

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 25, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 19, 2015 from the TOC_01-176, WORFDB8 F&BI 503371 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0325R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 19, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503371 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503371 -01	MW05
503371 -02	MW75

All quality control requirements were acceptable.

Date of Report: 03/25/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503371
Date Extracted: 03/20/15
Date Analyzed: 03/20/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW05 503371-01	<1	<1	<1	<3	<100	88
MW75 503371-02	<1	<1	<1	<3	<100	89
Method Blank 05-561 MB	<1	<1	<1	<3	<100	88

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/25/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503371

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503368-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	91	65-118
Toluene	ug/L (ppb)	50	92	72-122
Ethylbenzene	ug/L (ppb)	50	92	73-126
Xylenes	ug/L (ppb)	150	91	74-118
Gasoline	ug/L (ppb)	1,000	95	69-134

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503371 **SAMPLE CHAIN OF CUSTODY** ME 03/19/15 ROW V2

[redacted]

Send Report To Rebekah Brooks

Company Stantec

Address 19101 W 36th Ave #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4995 Fax #

SAMPLERS (signature) A Vadan	
PROJECT NAME/NO. TOC MLT / 203700102	PO#
REMARKS	

[redacted] Page # 1 of 1

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS							Notes
MW05	01 A-C	03-18-15	1445	W	3		X	X										
MW75	02 ↓	03-19-15	1045	W	3		X	X										

Samples received at 2 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: A Vadan	Antonela Vadan	Stantec	03-19-15	1500
Received by: [illegible]	Nhan Phan	FeBI	3/19/15	15[illegible]
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 25, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

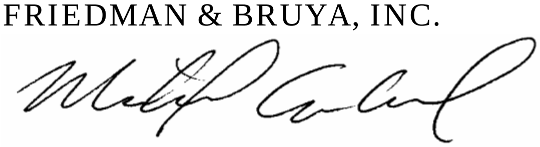
Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 19, 2015 from the TOC_01-176, WORFDB8 F&BI 503372 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0325R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 19, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503372 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503372 -01	MW09
503372 -02	MLT-02
503372 -03	MW38
503372 -04	MW26
503372 -05	MW10

All quality control requirements were acceptable.

Date of Report: 03/25/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503372
Date Extracted: 03/20/15
Date Analyzed: 03/20/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW09 503372-01	<1	<1	2.5	15	120	88
MLT-02 503372-02	2.1	1.0	2.6	17	140	92
MW38 503372-03	<1	<1	<1	<3	<100	87
MW26 503372-04	<1	<1	<1	<3	<100	86
MW10 503372-05	<1	<1	<1	<3	<100	87
Method Blank 05-561 MB	<1	<1	<1	<3	<100	88

Date of Report: 03/25/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503372

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503368-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	91	65-118
Toluene	ug/L (ppb)	50	92	72-122
Ethylbenzene	ug/L (ppb)	50	92	73-126
Xylenes	ug/L (ppb)	150	91	74-118
Gasoline	ug/L (ppb)	1,000	95	69-134

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503372 [redacted]

SAMPLE CHAIN OF CUSTODY ME 03/19/15 [redacted] TOC

Page # 1 of 1 V2

Send Report To Rebekah Brooks

Company Stantec

Address 19101 W 36th Ave #203

City, State, ZIP Lynnwood, WA 98036

Phone # 425-477-4225 Fax # ____

SAMPLERS (signature) AVadon	
PROJECT NAME/NO.	PO#
TOC MLT / 203700102	
REMARKS	

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH____
- Rush charges authorized by ____

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS							Notes
MW09	01 A-C	03-18-15	1220	W	3		X	X										
MLT-02	02	03-18-15	1300	W	3		X	X										
MW38	03	03-18-15	1345	W	3		X	X										
MW26	04	03-19-15	1110	W	3		X	X										
MW10	05	03-19-15	1110	W	3		X	X										

Samples received at 2 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: AVadon	Antonela Vadon	Stantec	03-19-15	1500
Received by: [illegible]	Nhan Phan	FeBI	03-19-15	1500
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 27, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 19, 2015 from the TOC_01-176, WORFDB8 F&BI 503374 project. There are 43 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0327R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 19, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503374 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503374-01	MW88
503374-02	MW89
503374-03	MW76
503374-04	MW65
503374-05	MLT-05
503374-06	MW87
503374-07	MW86
503374-08	MLT-06
503374-09	MW77
503374-10	MW85
503374-11	MW78
503374-	12 EB-031815
503374-13	WB-031815
503374-14	TB-031915

MTBE in the 8260C matrix spike and laboratory control sample duplicate exceeded the acceptance criteria. The analyte was not detected in the sample, therefore the data were acceptable.

All other quality control requirements were acceptable.

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374
Date Extracted: 03/23/15
Date Analyzed: 03/23/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW88 503374-01	<1	<1	<1	<3	<100	93
MW89 503374-02	<1	<1	<1	<3	<100	90
MW76 503374-03	<1	<1	<1	<3	<100	93
MW65 503374-04	<1	<1	<1	<3	<100	92
MLT-05 503374-05	<1	<1	<1	<3	<100	96
MW87 503374-06	<1	<1	<1	<3	<100	89
MW86 503374-07	<1	<1	<1	<3	<100	92
MLT-06 503374-08	<1	<1	<1	<3	<100	93
MW77 503374-09	<1	<1	<1	<3	<100	94
MW85 503374-10	<1	<1	<1	<3	<100	96

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374
Date Extracted: 03/23/15
Date Analyzed: 03/23/15

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW78 503374-11	<1	<1	<1	<3	<100	94
EB-031815 503374-12	<1	<1	<1	<3	<100	93
WB-031815 503374-13	<1	<1	<1	<3	<100	92
TB-031915 503374-14	<1	<1	<1	<3	<100	88
Method Blank 05-564 MB	<1	<1	<1	<3	<100	86

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374
Date Extracted: 03/20/15
Date Analyzed: 03/20/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 47-140)
MW86 503374-07 1/2	<100	<500	96
MLT-06 503374-08 1/2	<100	<500	97
EB-031815 503374-12 1/2	<100	<500	96
WB-031815 503374-13 1/2	<100	<500	102
Method Blank 05-583 MB	<50	<250	105

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW86	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-07
Date Analyzed:	03/20/15	Data File:	503374-07.059
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	90	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MLT-06	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-08
Date Analyzed:	03/20/15	Data File:	503374-08.060
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	89	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	EB-031815	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-12
Date Analyzed:	03/20/15	Data File:	503374-12.061
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	93	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	WB-031815	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-13
Date Analyzed:	03/20/15	Data File:	503374-13.062
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	92	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	I5-167 mb
Date Analyzed:	03/20/15	Data File:	I5-167 mb.044
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	95	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW86	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/23/15	Lab ID:	503374-07
Date Analyzed:	03/24/15	Data File:	503374-07.047
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	90	60	125

Analyte:	Concentration ug/L (ppb)
Lead	5.50

Analysis For Total Metals By EPA Method 200.8

Client ID:	MLT-06	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/23/15	Lab ID:	503374-08
Date Analyzed:	03/24/15	Data File:	503374-08.048
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	85	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	EB-031815	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/23/15	Lab ID:	503374-12
Date Analyzed:	03/24/15	Data File:	503374-12.049
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	92	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	WB-031815	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/23/15	Lab ID:	503374-13
Date Analyzed:	03/24/15	Data File:	503374-13.051
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	95	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/23/15	Lab ID:	I5-170 mb
Date Analyzed:	03/24/15	Data File:	I5-170 mb.018
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	87	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW86	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-07 1/2
Date Analyzed:	03/20/15	Data File:	032022.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	90	31	160
Benzo(a)anthracene-d12	100	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MLT-06	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-08 1/2
Date Analyzed:	03/20/15	Data File:	032023.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	91	31	160
Benzo(a)anthracene-d12	97	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	EB-031815	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-12 1/2
Date Analyzed:	03/20/15	Data File:	032024.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	94	31	160
Benzo(a)anthracene-d12	101	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	WB-031815	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-13 1/2
Date Analyzed:	03/20/15	Data File:	032025.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	93	31	160
Benzo(a)anthracene-d12	99	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	05-577 mb2 1/2
Date Analyzed:	03/20/15	Data File:	032021.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	91	31	160
Benzo(a)anthracene-d12	99	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW89	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-02
Date Analyzed:	03/20/15	Data File:	032008.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	94	108
Toluene-d8	99	91	107
4-Bromofluorobenzene	97	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW76	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-03
Date Analyzed:	03/20/15	Data File:	032009.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	94	108
Toluene-d8	101	91	107
4-Bromofluorobenzene	97	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW65	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-04
Date Analyzed:	03/20/15	Data File:	032010.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	94	108
Toluene-d8	101	91	107
4-Bromofluorobenzene	97	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MLT-05	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-05
Date Analyzed:	03/20/15	Data File:	032011.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	95	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW87	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-06
Date Analyzed:	03/20/15	Data File:	032012.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	96	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW86	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-07
Date Analyzed:	03/20/15	Data File:	032013.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	98	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MLT-06	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-08
Date Analyzed:	03/20/15	Data File:	032014.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	96	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW77	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-09
Date Analyzed:	03/20/15	Data File:	032015.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	94	108
Toluene-d8	102	91	107
4-Bromofluorobenzene	97	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW85	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-10
Date Analyzed:	03/20/15	Data File:	032016.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	95	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW78	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-11
Date Analyzed:	03/20/15	Data File:	032017.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	95	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EB-031815	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-12
Date Analyzed:	03/20/15	Data File:	032018.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	94	108
Toluene-d8	99	91	107
4-Bromofluorobenzene	95	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	WB-031815	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	503374-13
Date Analyzed:	03/20/15	Data File:	032019.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	95	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	05-0547 mb
Date Analyzed:	03/20/15	Data File:	032007.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	96	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503374
Date Extracted:	03/20/15	Lab ID:	05-0547 mb
Date Analyzed:	03/20/15	Data File:	032007.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	96	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374
Date Extracted: 03/23/15
Date Analyzed: 03/23/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR 1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED
Results Reported as µg/L (ppb)

Sample ID Laboratory ID	EDB
MW86 503374-07	<0.01
MLT-06 503374-08	<0.01
EB-031815 503374-12	<0.01
WB-031815 503374-13	<0.01
Method Blank	<0.01

EDB 1,2-Dibromoethane

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503389-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	91	65-118
Toluene	ug/L (ppb)	50	91	72-122
Ethylbenzene	ug/L (ppb)	50	90	73-126
Xylenes	ug/L (ppb)	150	89	74-118
Gasoline	ug/L (ppb)	1,000	97	69-134

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	90	98	63-142	9

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 200.8

Laboratory Code: 503225-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	2.91	100	101	79-121	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	103	83-115

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	4.86	101	108	79-121	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	106	83-115

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	92	94	67-116	2
Acenaphthylene	ug/L (ppb)	1	89	92	65-119	3
Acenaphthene	ug/L (ppb)	1	92	95	66-118	3
Fluorene	ug/L (ppb)	1	95	95	64-125	0
Phenanthrene	ug/L (ppb)	1	94	95	67-120	1
Anthracene	ug/L (ppb)	1	95	96	65-122	1
Fluoranthene	ug/L (ppb)	1	95	93	65-127	2
Pyrene	ug/L (ppb)	1	93	100	62-130	7
Benz(a)anthracene	ug/L (ppb)	1	94	94	60-118	0
Chrysene	ug/L (ppb)	1	96	97	66-125	1
Benzo(b)fluoranthene	ug/L (ppb)	1	107	106	55-135	1
Benzo(k)fluoranthene	ug/L (ppb)	1	106	108	62-125	2
Benzo(a)pyrene	ug/L (ppb)	1	105	104	58-127	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	105	97	36-142	8
Dibenz(a,h)anthracene	ug/L (ppb)	1	101	85	37-133	17
Benzo(g,h,i)perylene	ug/L (ppb)	1	101	92	34-135	9

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ENVIRONMENTAL CHEMISTS

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503374-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	119 vo	79-118
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	100	79-115

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	118	121 vo	81-118	3
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	106	105	78-117	1

Date of Report: 03/27/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503374

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR 1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED

Laboratory Code: 503392-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 10)
1,2-Dibromoethane	ug/L (ppb)	<0.01	<0.01	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
1,2-Dibromoethane	ug/L (ppb)	0.10	98	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503374

SAMPLE CHAIN OF CUSTODY ME 03/19/15

(DRAKE) V4

Page # 1 of 2 BOS

Send Report To Rebekah Brooks

Company Stantec

Address 19101 W 36th Ave # 203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4225 Fax #

SAMPLERS (*signature*) AVadon

PROJECT NAME/NO. TOC MLT / 203700102

PO#

REMARKS Bottles for dissolved Pb are (labeled "dissolved" and are filtered

TURNAROUND TIME AI6
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

						ANALYSES REQUESTED												
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE	EDB	EDC	Total Pb	Dissolved Pb	PAHs	Notes
mw88	01 A-C	03-18-15	0940	W	3		X	X										
MW 89	02 A-D	03-18-15	1010	W	4		X	X				X						
MW 76	03	03-18-15	1030	W	4		X	X				X						
MW 65	04	03-18-15	1110	W	4		X	X				X						
MLT-05	05	03-18-15	1130	W	4		X	X				X						
[redacted] MW87	06	03-18-15	1300	W	4		X	X				X						
MW89	07 A-G	03-18-15	1300	W	7	X	X	X				X	X	X	X	X	X	
MLT-06	08	03-18-15	1330	W	7	X	X	X				X	X	X	X	X	X	
MW77	09 A-D	03-18-15	1440	W	4		X	X				X						
MW 85	10 A-D	03-18-15	1440	W	4		X	X				X						

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: AVadon	Antonelo Vadon	Stantec	3-19-15	1500
Received by: m laplaw	Nhan Phan	Fe B I	3-19-15	1500
Relinquished by:				
Received by:		Samples received at 2 °C		

503374

SAMPLE CHAIN OF CUSTODY

ME 03/19/15

V4 B05 AE6

Page # 2 of 2

Send Report To Rebekah Brooks

Company Stantec

Address 19101 W 36th Ave #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-977-4225 Fax #

SAMPLERS (signature) AVadon

PROJECT NAME/NO. TOC MLT/2037 0002

PO#

REMARKS

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE	EDB	EDC	Total Pb	Dissolved Pb	PAHs	Notes
MW78	11 A-D	03-18-15	1610	W	4		X	X				X						
EB-031815	12 A-G	03-18-15	1645	W	7	X	X	X				X	X	X	X	X	X	
WB-031815	13 A-G	03-18-15	1700	W	7	X	X	X				X	X	X	X	X	X	
TB ~~EB~~-031915	14	—	—	W			X	X										

NR 3/19

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	AVadon	Antonela Vadon	Stantec	03-19-15	1500
Received by:	[signature]	Nhan Phan	FeBI	3-19-15	1500
Relinquished by:					
Received by:			Samples received at 2 °C		

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 7, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 20, 2015 from the TOC_01-176, WORFDB8 F&BI 503399 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0407R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 20, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503399 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503399 -01	MW16
503399 -02	MW48
503399 -03	MW63
503399 -04	MW64
503399 -05	MW50
503399 -06	MW51
503399 -07	MW43
503399 -08	MW52
503399 -09	EB-032015
503399 -10	TB-032015-1

All quality control requirements were acceptable.

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503399
Date Extracted: 03/24/15
Date Analyzed: 03/24/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW16 503399-01	<1	<1	<1	<3	<100	88
MW48 503399-02 1/40	120	52	<40	1,900	12,000	92
MW63 503399-03	<1	<1	<1	<3	<100	94
MW64 503399-04	<1	<1	<1	<3	<100	88
MW50 503399-05	<1	<1	<1	<3	<100	87
MW51 503399-06	<1	<1	<1	<3	<100	88
MW43 503399-07	<1	<1	<1	<3	<100	89
MW52 cf 503399-08	<1	<1	<1	<3	<100	92
EB-032015 503399-09	<1	<1	<1	<3	<100	92
TB-032015-1 503399-10	<1	<1	<1	<3	<100	92
Method Blank 05-0594 MB	<1	<1	<1	<3	<100	94

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW48	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503399
Date Extracted:	03/31/15	Lab ID:	503399-02
Date Analyzed:	04/01/15	Data File:	503399-02.080
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	96	60	125

Analyte:	Concentration ug/L (ppb)
Lead	12.8

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503399
Date Extracted:	03/31/15	Lab ID:	I5-188 mb
Date Analyzed:	04/01/15	Data File:	I5-188 mb.060
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	100	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW48	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503399
Date Extracted:	03/23/15	Lab ID:	503399-02
Date Analyzed:	03/24/15	Data File:	503399-02.054
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	90	60	125

Analyte:	Concentration ug/L (ppb)
Lead	14.6

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503399
Date Extracted:	03/23/15	Lab ID:	I5-170 mb
Date Analyzed:	03/24/15	Data File:	I5-170 mb.018
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	87	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503399

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503399-03 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	90	65-118
Toluene	ug/L (ppb)	50	92	72-122
Ethylbenzene	ug/L (ppb)	50	95	73-126
Xylenes	ug/L (ppb)	150	92	74-118
Gasoline	ug/L (ppb)	1,000	96	69-134

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503399

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 200.8**

Laboratory Code: 503424-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	<1	97	96	79-121	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	107	83-115

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503399

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	4.86	101	108	79-121	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	106	83-115

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503399

SAMPLE CHAIN OF CUSTODY ME 03-20-15

(ROW) AB/V3

Page # 1 of 1

Send Report To Rebekah Brooks and Kim Vik

Company Stantec

Address 19101 W 36th Ave #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4225 Fax #

SAMPLERS (*signature*) AVadon

PROJECT NAME/NO. TOC MLT / 203700103

PO#

REMARKS Bottles for dissolved Pb are labeled "dissolved" and are filtered

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	Total Pb	Dissolved Pb	Notes
MW16	01 A-D	03-19-15	1515	W	~~3~~ 4		X	X						
MW48	02 A-E	03-20-15	1020	W	5		X	X				X	X	
MW63	03 A-C	03-20-15	1000	W	3		X	X						
MW64	04	03-20-15	11:30	W	3		X	X						
MW50	05	03-20-15	1150	W	3		X	X						
MW51	06	03-20-15	1150	W	3		X	X						
MW43	07	03-20-15	1335	W	3		X	X						
MW52	08	03-20-15	1350	W	3		X	X						*High turbidity Let the sediment settle before analyzing
EB-032015	09	03-20-15	1445	W	3		X	X						
TB-032015-1	10	—	—	W	1		X	X						

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: AVadon	Antonela Vadon	Stantec	3-20-15	1500
Received by: [illegible]	David	FeBI	11	17:00
Relinquished by:				
Received by:		Samples received at 2 °C		

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 27, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 20, 2015 from the TOC_01-176, WORFDB8 F&BI 503402 project. There are 9 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0327R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 20, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503402 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503402 -01	MW69
503402 -02	MW88

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/27/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503402
Date Extracted: 03/24/15
Date Analyzed: 03/24/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW69 503402-01	<1	1.9	32	140	2,700	108
Method Blank 05-566 MB	<1	<1	<1	<3	<100	90

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW69	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503402
Date Extracted:	03/23/15	Lab ID:	503402-01
Date Analyzed:	03/23/15	Data File:	032322.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	57	121
Toluene-d8	107	63	127
4-Bromofluorobenzene	96	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW88	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503402
Date Extracted:	03/23/15	Lab ID:	503402-02
Date Analyzed:	03/23/15	Data File:	032321.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	105	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503402
Date Extracted:	03/23/15	Lab ID:	05-0548 mb
Date Analyzed:	03/23/15	Data File:	032308.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	57	121
Toluene-d8	106	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Date of Report: 03/27/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503402

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503418-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	91	65-118
Toluene	ug/L (ppb)	50	91	72-122
Ethylbenzene	ug/L (ppb)	50	92	73-126
Xylenes	ug/L (ppb)	150	91	74-118
Gasoline	ug/L (ppb)	1,000	100	69-134

Date of Report: 03/27/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503402

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	108	74-127

Date of Report: 03/27/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503402

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	108	109	64-147	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503402

SAMPLE CHAIN OF CUSTODY ME 3/20/15 V1

(DRAKE)

Page # 1 of 1

Send Report To Rebekah Brooks and Kim Vik

Company Stantec

Address 19101 W 36th Ave #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4225 Fax #

SAMPLERS (*signature*)	Avadon
PROJECT NAME/NO.	PO#
TCC MET / 203700102	
REMARKS	

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE						Notes
MW-69	01 A-D	03-20-15	0900	W	4		X	X				X						
MW-88	02	03-20-15	1320	W	1							X						Also sampled for Gx+BTEX primary

Samples received at 2 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Avadon	Antonela Vadon	Stantec	03-20-15	1500
Received by: Duo	DO VO	F&BI	11	17:00
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 3, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 20, 2015 from the TOC_01-176, WORFDB8 F&BI 503403 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0403R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 20, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503403 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503403 -01	MW66
503403 -02	MW40
503403 -03	MW28
503403 -04	MTL-04
503403 -05	MW25
503403 -06	TB-032015-2

All quality control requirements were acceptable.

Date of Report: 04/03/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503403
Date Extracted: 03/24/15
Date Analyzed: 03/24/15 and 03/25/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW66 503403-01	<1	<1	<1	<3	<100	93
MW40 503403-02	<1	<1	<1	<3	<100	89
MW28 503403-03	<1	<1	<1	<3	<100	91
MTL-04 503403-04	<1	<1	<1	<3	<100	87
MW25 503403-05	<1	<1	<1	<3	<100	90
TB-032015-2 503403-06	<1	<1	<1	<3	<100	91
Method Blank 05-0594 MB	<1	<1	<1	<3	<100	94

Date of Report: 04/03/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503403
Date Extracted: 03/24/15
Date Analyzed: 03/24/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW66 503403-01 1/2	120 x	<500	93
Method Blank 05-588 MB2	<50	<250	84

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW66	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503403
Date Extracted:	03/23/15	Lab ID:	503403-01
Date Analyzed:	03/23/15	Data File:	032323.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	57	121
Toluene-d8	104	63	127
4-Bromofluorobenzene	95	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503403
Date Extracted:	03/23/15	Lab ID:	05-0548 mb
Date Analyzed:	03/23/15	Data File:	032308.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	57	121
Toluene-d8	106	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW66	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503403
Date Extracted:	03/24/15	Lab ID:	503403-01 1/2
Date Analyzed:	03/25/15	Data File:	032514.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	100	25	160
Benzo(a)anthracene-d12	86	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503403
Date Extracted:	03/24/15	Lab ID:	05-589 mb2 1/2
Date Analyzed:	03/25/15	Data File:	032504.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	96	25	160
Benzo(a)anthracene-d12	103	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/03/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503403

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503399-03 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	90	65-118
Toluene	ug/L (ppb)	50	92	72-122
Ethylbenzene	ug/L (ppb)	50	95	73-126
Xylenes	ug/L (ppb)	150	92	74-118
Gasoline	ug/L (ppb)	1,000	96	69-134

Date of Report: 04/03/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503403

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	86	86	61-133	0

Date of Report: 04/03/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503403

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	108	74-127

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	108	109	64-147	1

Date of Report: 04/03/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503403

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	89	91	70-130	2
Acenaphthylene	ug/L (ppb)	1	86	87	70-130	1
Acenaphthene	ug/L (ppb)	1	90	89	70-130	1
Fluorene	ug/L (ppb)	1	86	87	70-130	1
Phenanthrene	ug/L (ppb)	1	92	94	70-130	2
Anthracene	ug/L (ppb)	1	90	93	70-130	3
Fluoranthene	ug/L (ppb)	1	88	93	70-130	6
Pyrene	ug/L (ppb)	1	101	102	70-130	1
Benz(a)anthracene	ug/L (ppb)	1	94	98	70-130	4
Chrysene	ug/L (ppb)	1	103	104	70-130	1
Benzo(b)fluoranthene	ug/L (ppb)	1	95	104	59-130	9
Benzo(k)fluoranthene	ug/L (ppb)	1	102	98	65-120	4
Benzo(a)pyrene	ug/L (ppb)	1	98	101	60-125	3
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	93	101	42-135	8
Dibenz(a,h)anthracene	ug/L (ppb)	1	83	94	37-125	12
Benzo(g,h,i)perylene	ug/L (ppb)	1	88	97	45-123	10

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503403
[redacted]

SAMPLE CHAIN OF CUSTODY ME 3/20/15 V2/B04 (TOC + Romios)

[redacted] of 1

Send Report To Rebekah Brooks & Kim Vik
Company Stantec
Address 19101 W 36th Ave #203
City, State, ZIP Lynnwood, WA 98036
Phone # 425-477-4225 Fax #

SAMPLERS (*signature*) AVadon

PROJECT NAME/NO. TOC MLT / 2037700102

PO#

REMARKS

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE	PAHs					Notes
MW66	01 A-E	03-20-15	1100	W	5	X	X	X				X	X					
MW40	02 A-C	03-20-15	1300	W	3		X	X										
MW28	03 A-C	03-20-15	1300	W	3		X	X										
MLT-04	04 A-C	03-20-15	1330	W	3		X	X										
MW65	05 A-C	03-20-15	1400	W	3		X	X										
TB-032015-2	06	03-20-15	-	W	1		X	X										

Samples received at 02 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	AVadon	Antonela Vadon	Stantec	03-20-15	1700
Received by:	[illegible]	[illegible]	F&BI	"	17:00
Relinquished by:					
Received by:					

FORMS\COC\COC.DOC

Herman Property Groundwater Samples

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 24, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 16, 2015 from the TOC_01-176, WORFDB8 F&BI 503280 project. There are 29 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0324R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 16, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503280 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503280 -01	MW104
503280 -02	MLT-07

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503280
Date Extracted: 03/17/15
Date Analyzed: 03/17/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
MW104 503280-01 1/20	14,000	108
MLT-07 503280-02 1/20	15,000	108
Method Blank 05-517 MB	<100	104

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503280
Date Extracted: 03/17/15
Date Analyzed: 03/18/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW104 503280-01	11,000 x	730 x	114
MLT-07 503280-02	11,000 x	750 x	127
Method Blank 05-551 MB	<50	<250	101

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW104	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/20/15	Lab ID:	503280-01
Date Analyzed:	03/20/15	Data File:	503280-01.054
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	93	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MLT-07	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/20/15	Lab ID:	503280-02
Date Analyzed:	03/20/15	Data File:	503280-02.055
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	93	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/20/15	Lab ID:	I5-167 mb
Date Analyzed:	03/20/15	Data File:	I5-167 mb.044
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	95	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW104	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/18/15	Lab ID:	503280-01
Date Analyzed:	03/19/15	Data File:	503280-01.045
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	94	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MLT-07	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/18/15	Lab ID:	503280-02
Date Analyzed:	03/19/15	Data File:	503280-02.046
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	97	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/18/15	Lab ID:	I5-163 mb
Date Analyzed:	03/19/15	Data File:	I5-163 mb.021
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	98	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW104	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/17/15	Lab ID:	503280-01 1/2
Date Analyzed:	03/18/15	Data File:	031819.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	95	25	160
Benzo(a)anthracene-d12	80	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	240 ve
Acenaphthylene	<0.1
Acenaphthene	0.13
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW104	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/17/15	Lab ID:	503280-01 1/200
Date Analyzed:	03/19/15	Data File:	031905.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	94 d	25	160
Benzo(a)anthracene-d12	77 d	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	450
Acenaphthylene	<10
Acenaphthene	<10
Fluorene	<10
Phenanthrene	<10
Anthracene	<10
Fluoranthene	<10
Pyrene	<10
Benz(a)anthracene	<10
Chrysene	<10
Benzo(a)pyrene	<10
Benzo(b)fluoranthene	<10
Benzo(k)fluoranthene	<10
Indeno(1,2,3-cd)pyrene	<10
Dibenz(a,h)anthracene	<10
Benzo(g,h,i)perylene	<10

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MLT-07	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/17/15	Lab ID:	503280-02 1/2
Date Analyzed:	03/18/15	Data File:	031820.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	96	25	160
Benzo(a)anthracene-d12	89	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	250 ve
Acenaphthylene	<0.1
Acenaphthene	0.13
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MLT-07	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/17/15	Lab ID:	503280-02 1/200
Date Analyzed:	03/19/15	Data File:	031906.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	82 d	25	160
Benzo(a)anthracene-d12	78 d	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	430
Acenaphthylene	<10
Acenaphthene	<10
Fluorene	<10
Phenanthrene	<10
Anthracene	<10
Fluoranthene	<10
Pyrene	<10
Benz(a)anthracene	<10
Chrysene	<10
Benzo(a)pyrene	<10
Benzo(b)fluoranthene	<10
Benzo(k)fluoranthene	<10
Indeno(1,2,3-cd)pyrene	<10
Dibenz(a,h)anthracene	<10
Benzo(g,h,i)perylene	<10

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/17/15	Lab ID:	05-535 mb2
Date Analyzed:	03/18/15	Data File:	031809.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	108	25	160
Benzo(a)anthracene-d12	117	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	<0.05
Anthracene	<0.05
Fluoranthene	<0.05
Pyrene	<0.05
Benz(a)anthracene	<0.05
Chrysene	<0.05
Benzo(a)pyrene	<0.05
Benzo(b)fluoranthene	<0.05
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW104	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/16/15	Lab ID:	503280-01
Date Analyzed:	03/16/15	Data File:	031628.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	105	63	127
4-Bromofluorobenzene	110	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
Benzene	0.84
Toluene	63
Ethylbenzene	430 ve
m,p-Xylene	1,400 ve
o-Xylene	330 ve

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW104	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/16/15	Lab ID:	503280-01 1/20
Date Analyzed:	03/17/15	Data File:	031712.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	57	121
Toluene-d8	103	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<20
1,2-Dichloroethane (EDC)	<20
Benzene	<7
Toluene	74
Ethylbenzene	560
m,p-Xylene	2,100
o-Xylene	360

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MLT-07	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/16/15	Lab ID:	503280-02
Date Analyzed:	03/16/15	Data File:	031629.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	106	63	127
4-Bromofluorobenzene	109	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
Benzene	0.92
Toluene	67
Ethylbenzene	420 ve
m,p-Xylene	1,400 ve
o-Xylene	330 ve

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MLT-07	Client:	Stantec
Date Received:	03/16/15	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/16/15	Lab ID:	503280-02 1/20
Date Analyzed:	03/17/15	Data File:	031713.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	96	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<20
1,2-Dichloroethane (EDC)	<20
Benzene	<7
Toluene	71
Ethylbenzene	540
m,p-Xylene	2,100
o-Xylene	350

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503280
Date Extracted:	03/16/15	Lab ID:	05-0541 mb
Date Analyzed:	03/16/15	Data File:	031620.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503280
Date Extracted: 03/18/15
Date Analyzed: 03/18/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR 1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED

Results Reported as µg/L (ppb)

Sample ID Laboratory ID	EDB
MW104 503280-01	<0.01
MLT-07 503280-02	<0.01
Method Blank	<0.01

EDB 1,2-Dibromoethane

Date of Report: 03/24/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503280

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 503226-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	97	70-119

Date of Report: 03/24/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503280

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	108	110	63-142	2

Date of Report: 03/24/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503280

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 200.8

Laboratory Code: 503225-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	2.91	100	101	79-121	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	103	83-115

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503280

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 503281-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	<1	110	117	79-121	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	106	83-115

Date of Report: 03/24/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503280

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample 1/0.25

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	0.25	85	91	70-130	7
Acenaphthylene	ug/L (ppb)	0.25	82	88	70-130	7
Acenaphthene	ug/L (ppb)	0.25	84	92	70-130	9
Fluorene	ug/L (ppb)	0.25	82	88	70-130	7
Phenanthrene	ug/L (ppb)	0.25	89	95	70-130	7
Anthracene	ug/L (ppb)	0.25	87	94	70-130	8
Fluoranthene	ug/L (ppb)	0.25	87	93	70-130	7
Pyrene	ug/L (ppb)	0.25	94	103	70-130	9
Benz(a)anthracene	ug/L (ppb)	0.25	93	102	70-130	9
Chrysene	ug/L (ppb)	0.25	101	107	70-130	6
Benzo(b)fluoranthene	ug/L (ppb)	0.25	99	99	59-130	0
Benzo(k)fluoranthene	ug/L (ppb)	0.25	93	104	65-120	11
Benzo(a)pyrene	ug/L (ppb)	0.25	93	102	60-125	9
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	0.25	85	95	42-135	11
Dibenz(a,h)anthracene	ug/L (ppb)	0.25	79	85	37-125	7
Benzo(g,h,i)perylene	ug/L (ppb)	0.25	86	93	45-123	8

Date of Report: 03/24/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503280

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503280-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	101	74-127
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	103	69-133
Benzene	ug/L (ppb)	50	0.84	103	76-125
Toluene	ug/L (ppb)	50	63	107 b	76-122
Ethylbenzene	ug/L (ppb)	50	430	3 b	69-135
m,p-Xylene	ug/L (ppb)	100	1,400	0 b	69-135
o-Xylene	ug/L (ppb)	50	330	83 b	60-140

Date of Report: 03/24/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503280

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	105	101	64-147	4
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	107	104	73-132	3
Benzene	ug/L (ppb)	50	104	102	69-134	2
Toluene	ug/L (ppb)	50	102	101	72-122	1
Ethylbenzene	ug/L (ppb)	50	101	100	77-124	1
m,p-Xylene	ug/L (ppb)	100	101	100	83-125	1
o-Xylene	ug/L (ppb)	50	101	100	81-121	1

Date of Report: 03/24/15
Date Received: 03/16/15
Project: TOC_01-176, WORFDB8 F&BI 503280

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR 1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED

Laboratory Code: 503280-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 10)
1,2-Dibromoethane	ug/L (ppb)	<0.01	<0.01	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
1,2-Dibromoethane	ug/L (ppb)	0.10	73	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503280

[redacted]

SAMPLE CHAIN OF CUSTODY ME 03-16-15

Herman

Send Report To Rebekah Brooks

Company Stantec

Address 19101 W 36th Ave #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4644 Fax # ______

SAMPLERS (signature) AVadon [redacted]

PROJECT NAME/NO. TOC MLT / 203700102

PO#

REMARKS Bottles for dissolved Pb analysis are labeled "dissolved" and are filtered

Page # 1 of 1 V3/AT3/AO

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH ______
Rush charges authorized by ______

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

						ANALYSES REQUESTED												
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE	PAHs	EDC	EDB	TOTAL Pb	Dissolved Pb	Notes
MW104	01 A-G	03.16.15	1200	W	7	X	X	X				X	X	X	X	X	X	
MLT-07	02 A-G	03.16.15	1300	W	7	X	X	X				X	X	X	X	X	X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: AVadon	Antonela Vadon	Stantec	0316.15	1400
Received by: [signature]	Nhan Phan	FeB I	03-16-15	1400
Relinquished by:				
Received by:		Samples received at 3 °C		

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 7, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 19, 2015 from the TOC_01-176, WORFDB8 F&BI 503397 project. There are 25 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0407R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 19, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503397 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503397 -01	MW105
503397 -02	EB-031615
503397 -03	MW103

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/07/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503397
Date Extracted: 03/23/15
Date Analyzed: 03/23/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW105 503397-01	<1	<1	<1	<3	<100	92
EB-031615 503397-02	<1	<1	<1	<3	<100	90
MW103 503397-03	34	1.7	<1	<3	120	85
Method Blank 05-564 MB	<1	<1	<1	<3	<100	86

Date of Report: 04/07/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503397
Date Extracted: 03/23/15
Date Analyzed: 03/23/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 47-140)
MW105 503397-01	230 x	<500	85
MW103 503397-03	170 x	<500	98
Method Blank 05-588 MB	<50	<250	99

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW105	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/31/15	Lab ID:	503397-01
Date Analyzed:	04/01/15	Data File:	503397-01.078
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	96	60	125

Analyte:	Concentration ug/L (ppb)
Lead	1.28

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW103	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/31/15	Lab ID:	503397-03
Date Analyzed:	04/01/15	Data File:	503397-03.079
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	97	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/31/15	Lab ID:	I5-188 mb
Date Analyzed:	04/01/15	Data File:	I5-188 mb.060
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	100	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW105	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/23/15	Lab ID:	503397-01
Date Analyzed:	03/24/15	Data File:	503397-01.052
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	91	60	125

Analyte:	Concentration ug/L (ppb)
Lead	3.24

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW103	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/23/15	Lab ID:	503397-03
Date Analyzed:	03/24/15	Data File:	503397-03.053
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	91	60	125

Analyte:	Concentration ug/L (ppb)
Lead	1.82

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/23/15	Lab ID:	I5-170 mb
Date Analyzed:	03/24/15	Data File:	I5-170 mb.018
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	87	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW105	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/23/15	Lab ID:	503397-01
Date Analyzed:	03/23/15	Data File:	032332.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	57	121
Toluene-d8	105	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EB-031615	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/23/15	Lab ID:	503397-02
Date Analyzed:	03/23/15	Data File:	032333.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	57	121
Toluene-d8	106	63	127
4-Bromofluorobenzene	95	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW103	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/23/15	Lab ID:	503397-03
Date Analyzed:	03/23/15	Data File:	032334.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	104	63	127
4-Bromofluorobenzene	95	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	8.4
1,2-Dichloroethane (EDC)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/23/15	Lab ID:	05-0548 mb
Date Analyzed:	03/23/15	Data File:	032308.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	57	121
Toluene-d8	106	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW105	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/23/15	Lab ID:	503397-01 1/2
Date Analyzed:	03/24/15	Data File:	032412.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	101	25	160
Benzo(a)anthracene-d12	88	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW103	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/23/15	Lab ID:	503397-03 1/2
Date Analyzed:	03/24/15	Data File:	032413.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	99	25	160
Benzo(a)anthracene-d12	79	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503397
Date Extracted:	03/23/15	Lab ID:	05-589 mb 1/2
Date Analyzed:	03/24/15	Data File:	032411.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	99	25	160
Benzo(a)anthracene-d12	94	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Date of Report: 04/07/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503397
Date Extracted: 03/23/15
Date Analyzed: 03/23/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR 1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED
Results Reported as µg/L (ppb)

Sample ID Laboratory ID	EDB
MW105 503397-01	<0.01
MW103 503397-03	<0.01
Method Blank	<0.01

EDB 1,2-Dibromoethane

Date of Report: 04/07/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503397

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503389-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	91	65-118
Toluene	ug/L (ppb)	50	91	72-122
Ethylbenzene	ug/L (ppb)	50	90	73-126
Xylenes	ug/L (ppb)	150	89	74-118
Gasoline	ug/L (ppb)	1,000	97	69-134

Date of Report: 04/07/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503397

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	86	86	61-133	0

Date of Report: 04/07/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503397

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 200.8

Laboratory Code: 503424-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	<1	97	96	79-121	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	107	83-115

Date of Report: 04/07/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503397

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	4.86	101	108	79-121	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	106	83-115

Date of Report: 04/07/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503397

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	108	74-127
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	106	69-133

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	108	109	64-147	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	104	103	73-132	1

Date of Report: 04/07/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503397

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	89	91	70-130	2
Acenaphthylene	ug/L (ppb)	1	86	87	70-130	1
Acenaphthene	ug/L (ppb)	1	90	89	70-130	1
Fluorene	ug/L (ppb)	1	86	87	70-130	1
Phenanthrene	ug/L (ppb)	1	92	94	70-130	2
Anthracene	ug/L (ppb)	1	90	93	70-130	3
Fluoranthene	ug/L (ppb)	1	88	93	70-130	6
Pyrene	ug/L (ppb)	1	101	102	70-130	1
Benz(a)anthracene	ug/L (ppb)	1	94	98	70-130	4
Chrysene	ug/L (ppb)	1	103	104	70-130	1
Benzo(b)fluoranthene	ug/L (ppb)	1	95	104	59-130	9
Benzo(k)fluoranthene	ug/L (ppb)	1	102	98	65-120	4
Benzo(a)pyrene	ug/L (ppb)	1	98	101	60-125	3
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	93	101	42-135	8
Dibenz(a,h)anthracene	ug/L (ppb)	1	83	94	37-125	12
Benzo(g,h,i)perylene	ug/L (ppb)	1	88	97	45-123	10

Date of Report: 04/07/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503397

**QUALITY ASSURANCE RESULTS
FROM THE ANALYSIS OF WATER SAMPLES FOR
1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED**

Laboratory Code: 503392-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 10)
1,2-Dibromoethane	ug/L (ppb)	<0.01	<0.01	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
1,2-Dibromoethane	ug/L (ppb)	0.10	98	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503397

SAMPLE CHAIN OF CUSTODY

ME 3/19/15 V2/AI4 HERMAN / 1304

Send Report To: Rebekah Brooks
Company: Stantec
Address: 19101 N 36th Ave #203
City, State, ZIP: Lynnwood, WA 98036
Phone #: 425-477-4225 Fax #:

SAMPLERS (signature): AVaden

PROJECT NAME/NO.: TCC MLT / 203700102 PO#:

REMARKS: bottles for dissolved Pb analysis are labeled "dissolved" & are filtered.

Page # ___ of ___

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE	EDB	EDC	Total Pb	Dissolved Pb	PAHs	Notes
MW105	01AG	03-16-15	1300	W	7	X	X	X				X	X	X	X	X	X	
EB-031615	02AD	031615	1415	W	4		X	X				X						
MW103	03AG	03-19-15	1240	W	7	X	X	X				X	X	X	X	X	X	

Samples received at 2 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE		PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	AVaden	Antonello Vaden	Stantec	031915	1500
Received by:	[signature]	HONG NGUYEN	FBI	✓	✓
Relinquished by:					
Received by:					

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 7, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 20, 2015 from the TOC_01-176, WORFDB8 F&BI 503401 project. There are 28 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0407R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 20, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503401 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503401 -01	MW106
503401 -02	MW107
503401 -03	EB-031915

All quality control requirements were acceptable.

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503401
Date Extracted: 03/24/15
Date Analyzed: 03/24/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW106 503401-01	<1	<1	<1	<3	<100	90
MW107 503401-02	8.0	3.0	1.5	7.9	<100	87
EB-031915 503401-03	<1	<1	<1	<3	<100	91
Method Blank 05-566 MB	<1	<1	<1	<3	<100	90

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503401
Date Extracted: 03/24/15
Date Analyzed: 03/24/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW106 503401-01 1/2	160 x	<500	88
MW107 503401-02 1/2	110 x	<500	87
EB-031915 503401-03 1/2	<100	<500	91
Method Blank 05-588 MB2	<50	<250	84

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW106	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/31/15	Lab ID:	503401-01
Date Analyzed:	04/01/15	Data File:	503401-01.082
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	99	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW107	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/31/15	Lab ID:	503401-02
Date Analyzed:	04/01/15	Data File:	503401-02.083
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	96	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	EB-031915	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/31/15	Lab ID:	503401-03
Date Analyzed:	04/01/15	Data File:	503401-03.084
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	99	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/31/15	Lab ID:	I5-188 mb
Date Analyzed:	04/01/15	Data File:	I5-188 mb.060
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	100	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW106	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/23/15	Lab ID:	503401-01
Date Analyzed:	03/24/15	Data File:	503401-01.056
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	95	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW107	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/23/15	Lab ID:	503401-02
Date Analyzed:	03/24/15	Data File:	503401-02.057
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	91	60	125

Analyte:	Concentration ug/L (ppb)
Lead	8.86

Analysis For Total Metals By EPA Method 200.8

Client ID:	EB-031915	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/23/15	Lab ID:	503401-03
Date Analyzed:	03/24/15	Data File:	503401-03.058
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	94	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/23/15	Lab ID:	I5-170 mb
Date Analyzed:	03/24/15	Data File:	I5-170 mb.018
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	87	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW106	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/23/15	Lab ID:	503401-01
Date Analyzed:	03/23/15	Data File:	032335.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	105	63	127
4-Bromofluorobenzene	95	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW107	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/23/15	Lab ID:	503401-02
Date Analyzed:	03/24/15	Data File:	032336.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	105	63	127
4-Bromofluorobenzene	95	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EB-031915	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/23/15	Lab ID:	503401-03
Date Analyzed:	03/24/15	Data File:	032337.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	103	63	127
4-Bromofluorobenzene	96	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/23/15	Lab ID:	05-0548 mb
Date Analyzed:	03/23/15	Data File:	032308.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	57	121
Toluene-d8	106	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503401
Date Extracted: 03/23/15
Date Analyzed: 03/23/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR 1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED
Results Reported as µg/L (ppb)

Sample ID Laboratory ID	EDB
MW106 503401-01	<0.01
MW107 503401-02	<0.01
EB-031915 503401-03	<0.01
Method Blank	<0.01

EDB 1,2-Dibromoethane

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW106	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/24/15	Lab ID:	503401-01 1/2
Date Analyzed:	03/25/15	Data File:	032511.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	102	25	160
Benzo(a)anthracene-d12	98	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW107	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/24/15	Lab ID:	503401-02 1/2
Date Analyzed:	03/25/15	Data File:	032512.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	102	25	160
Benzo(a)anthracene-d12	94	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	0.22
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	EB-031915	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/24/15	Lab ID:	503401-03 1/2
Date Analyzed:	03/25/15	Data File:	032513.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	102	25	160
Benzo(a)anthracene-d12	96	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503401
Date Extracted:	03/24/15	Lab ID:	05-589 mb2 1/2
Date Analyzed:	03/25/15	Data File:	032504.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	96	25	160
Benzo(a)anthracene-d12	103	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503401

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503418-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	91	65-118
Toluene	ug/L (ppb)	50	91	72-122
Ethylbenzene	ug/L (ppb)	50	92	73-126
Xylenes	ug/L (ppb)	150	91	74-118
Gasoline	ug/L (ppb)	1,000	100	69-134

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503401

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	86	86	61-133	0

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503401

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 200.8

Laboratory Code: 503424-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	<1	97	96	79-121	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	107	83-115

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503401

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	4.86	101	108	79-121	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	106	83-115

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503401

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	108	74-127
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	106	69-133

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	108	109	64-147	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	104	103	73-132	1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503401

QUALITY ASSURANCE RESULTS
FROM THE ANALYSIS OF WATER SAMPLES FOR
1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED

Laboratory Code: 503392-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 10)
1,2-Dibromoethane	ug/L (ppb)	<0.01	<0.01	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
1,2-Dibromoethane	ug/L (ppb)	0.10	98	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503401

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	89	91	70-130	2
Acenaphthylene	ug/L (ppb)	1	86	87	70-130	1
Acenaphthene	ug/L (ppb)	1	90	89	70-130	1
Fluorene	ug/L (ppb)	1	86	87	70-130	1
Phenanthrene	ug/L (ppb)	1	92	94	70-130	2
Anthracene	ug/L (ppb)	1	90	93	70-130	3
Fluoranthene	ug/L (ppb)	1	88	93	70-130	6
Pyrene	ug/L (ppb)	1	101	102	70-130	1
Benz(a)anthracene	ug/L (ppb)	1	94	98	70-130	4
Chrysene	ug/L (ppb)	1	103	104	70-130	1
Benzo(b)fluoranthene	ug/L (ppb)	1	95	104	59-130	9
Benzo(k)fluoranthene	ug/L (ppb)	1	102	98	65-120	4
Benzo(a)pyrene	ug/L (ppb)	1	98	101	60-125	3
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	93	101	42-135	8
Dibenz(a,h)anthracene	ug/L (ppb)	1	83	94	37-125	12
Benzo(g,h,i)perylene	ug/L (ppb)	1	88	97	45-123	10

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503401

SAMPLE CHAIN OF CUSTODY ME 03-20-15 (Herman) B05/V2/AE3

Send Report To Rebekah Brooks and Kim Vik

Company Stantec

Address 19101 W 36th Ave #203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4225 Fax #

SAMPLERS (signature) Nadon

PROJECT NAME/NO. TOC MLT / 203700102

PO#

REMARKS Bottles for dissolved Pb analysis are labeled "dissolved" and are filtered

Page # 1 of 1

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE	EDB	EDC	PAHs	Total Pb	Dissolved Pb	Notes
MW106	01 A-G	03-19-15	1440	W	7	X	X	X				X	X	X	X	X	X	
MW107	02	03-19-15	1500	W	7	X	X	X				X	X	X	X	X	X	
EB-031915	03	03-19-15	1600	W	7	X	X	X				X	X	X	X	X	X	

Samples received at 2 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Nadon	Antonela Nadon	Stantec	03-20-15	1500
Received by: Dave	Dd vo	FeBI	〃	17:00
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

Shin/Choi Property Groundwater Samples

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 3, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 19, 2015 from the TOC_01-176, WORFDB8 F&BI 503373 project. There are 29 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0403R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 19, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503373 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503373 -01	MW72
503373 -02	MW73

The full concentration analysis of MW73 for MTBE was qualified due to a failing laboratory control sample. The sample was reanalyzed at a dilution and unqualified results were included.

EDB was detected in the 8011 analysis. The results could not be confirmed by 8260C and may be due to matrix interferences.

All other quality control requirements were acceptable.

Date of Report: 04/03/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503373
Date Extracted: 03/20/15 and 03/23/15
Date Analyzed: 03/20/15 and 03/23/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW72 503373-01 1/1000	1,400	15,000	2,300	18,000	130,000	92
MW73 503373-02 1/1000	14,000	2,300	1,800	9,300	70,000	90
Method Blank 05-561 MB	<1	<1	<1	<3	<100	88

Date of Report: 04/03/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503373
Date Extracted: 03/20/15
Date Analyzed: 03/20/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 47-140)
MW72 503373-01 1/2	15,000 x	<500	94
MW73 503373-02 1/2	3,100 x	<500	86
Method Blank 05-583 MB	<50	<250	105

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW72	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/23/15	Lab ID:	503373-01
Date Analyzed:	03/24/15	Data File:	503373-01.045
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	90	60	125

Analyte:	Concentration ug/L (ppb)
Lead	7.62

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW73	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/23/15	Lab ID:	503373-02
Date Analyzed:	03/24/15	Data File:	503373-02.046
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	90	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/23/15	Lab ID:	I5-170 mb
Date Analyzed:	03/24/15	Data File:	I5-170 mb.018
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	87	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW72	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/20/15	Lab ID:	503373-01
Date Analyzed:	03/20/15	Data File:	503373-01.057
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	88	60	125

Analyte:	Concentration ug/L (ppb)
Lead	4.15

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW73	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/20/15	Lab ID:	503373-02
Date Analyzed:	03/20/15	Data File:	503373-02.058
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	90	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/20/15	Lab ID:	I5-167 mb
Date Analyzed:	03/20/15	Data File:	I5-167 mb.044
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	95	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW72	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/20/15	Lab ID:	503373-01
Date Analyzed:	03/20/15	Data File:	032026.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	94	108
Toluene-d8	103	91	107
4-Bromofluorobenzene	101	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW73	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/20/15	Lab ID:	503373-02
Date Analyzed:	03/20/15	Data File:	032025.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	94	108
Toluene-d8	102	91	107
4-Bromofluorobenzene	99	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	17 jl
1,2-Dichloroethane (EDC)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW73	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/23/15	Lab ID:	503373-02 1/10
Date Analyzed:	03/23/15	Data File:	032311A.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	107	63	127
4-Bromofluorobenzene	96	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	17
1,2-Dichloroethane (EDC)	<10

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/20/15	Lab ID:	05-0547 mb
Date Analyzed:	03/20/15	Data File:	032007.D
Matrix:	Water	Instrument:	GCMS7
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	94	108
Toluene-d8	100	91	107
4-Bromofluorobenzene	96	91	110

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/23/15	Lab ID:	05-0548 mb
Date Analyzed:	03/23/15	Data File:	032308.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	57	121
Toluene-d8	106	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

Date of Report: 04/03/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503373
Date Extracted: 03/23/15
Date Analyzed: 03/23/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR 1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED
Results Reported as µg/L (ppb)

Sample ID Laboratory ID	EDB
MW72 503373-01 1/5	0.37
MW73 503373-02 1/5	0.64
Method Blank	<0.01

EDB 1,2-Dibromoethane

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW72	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/20/15	Lab ID:	503373-01 1/2
Date Analyzed:	03/20/15	Data File:	032032.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	93	31	160
Benzo(a)anthracene-d12	99	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	530 ve
Acenaphthylene	<0.1
Acenaphthene	1.3
Fluorene	2.8
Phenanthrene	1.1
Anthracene	0.19
Fluoranthene	<0.1
Pyrene	0.15
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW72	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/20/15	Lab ID:	503373-01 1/200
Date Analyzed:	03/23/15	Data File:	032303.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	93 d	31	160
Benzo(a)anthracene-d12	107 d	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	790
Acenaphthylene	<10
Acenaphthene	<10
Fluorene	<10
Phenanthrene	<10
Anthracene	<10
Fluoranthene	<10
Pyrene	<10
Benz(a)anthracene	<10
Chrysene	<10
Benzo(a)pyrene	<10
Benzo(b)fluoranthene	<10
Benzo(k)fluoranthene	<10
Indeno(1,2,3-cd)pyrene	<10
Dibenz(a,h)anthracene	<10
Benzo(g,h,i)perylene	<10

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW73	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/20/15	Lab ID:	503373-02 1/2
Date Analyzed:	03/20/15	Data File:	032033.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	95	31	160
Benzo(a)anthracene-d12	106	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	270 ve
Acenaphthylene	<0.1
Acenaphthene	0.13
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW73	Client:	Stantec
Date Received:	03/19/15	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/20/15	Lab ID:	503373-02 1/200
Date Analyzed:	03/23/15	Data File:	032304.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	124 d	31	160
Benzo(a)anthracene-d12	113 d	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	350
Acenaphthylene	<10
Acenaphthene	<10
Fluorene	<10
Phenanthrene	<10
Anthracene	<10
Fluoranthene	<10
Pyrene	<10
Benz(a)anthracene	<10
Chrysene	<10
Benzo(a)pyrene	<10
Benzo(b)fluoranthene	<10
Benzo(k)fluoranthene	<10
Indeno(1,2,3-cd)pyrene	<10
Dibenz(a,h)anthracene	<10
Benzo(g,h,i)perylene	<10

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503373
Date Extracted:	03/20/15	Lab ID:	05-577 mb2 1/2
Date Analyzed:	03/20/15	Data File:	032021.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	91	31	160
Benzo(a)anthracene-d12	99	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Date of Report: 04/03/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503373

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503368-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	91	65-118
Toluene	ug/L (ppb)	50	92	72-122
Ethylbenzene	ug/L (ppb)	50	92	73-126
Xylenes	ug/L (ppb)	150	91	74-118
Gasoline	ug/L (ppb)	1,000	95	69-134

Date of Report: 04/03/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503373

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	90	98	63-142	9

Date of Report: 04/03/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503373

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	4.86	101	108	79-121	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	106	83-115

Date of Report: 04/03/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503373

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 200.8

Laboratory Code: 503225-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	2.91	100	101	79-121	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	103	83-115

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/03/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503373

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503374-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	119 vo	79-118
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	100	79-115

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	118	121 vo	81-118	3
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	106	105	78-117	1

Date of Report: 04/03/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503373

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	108	74-127
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	106	69-133

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	108	109	64-147	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	104	103	73-132	1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/03/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503373

**QUALITY ASSURANCE RESULTS
FROM THE ANALYSIS OF WATER SAMPLES FOR
1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED**

Laboratory Code: 503392-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 10)
1,2-Dibromoethane	ug/L (ppb)	<0.01	<0.01	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
1,2-Dibromoethane	ug/L (ppb)	0.10	98	70-130

Date of Report: 04/03/15
Date Received: 03/19/15
Project: TOC_01-176, WORFDB8 F&BI 503373

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	92	94	67-116	2
Acenaphthylene	ug/L (ppb)	1	89	92	65-119	3
Acenaphthene	ug/L (ppb)	1	92	95	66-118	3
Fluorene	ug/L (ppb)	1	95	95	64-125	0
Phenanthrene	ug/L (ppb)	1	94	95	67-120	1
Anthracene	ug/L (ppb)	1	95	96	65-122	1
Fluoranthene	ug/L (ppb)	1	95	93	65-127	2
Pyrene	ug/L (ppb)	1	93	100	62-130	7
Benz(a)anthracene	ug/L (ppb)	1	94	94	60-118	0
Chrysene	ug/L (ppb)	1	96	97	66-125	1
Benzo(b)fluoranthene	ug/L (ppb)	1	107	106	55-135	1
Benzo(k)fluoranthene	ug/L (ppb)	1	106	108	62-125	2
Benzo(a)pyrene	ug/L (ppb)	1	105	104	58-127	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	105	97	36-142	8
Dibenz(a,h)anthracene	ug/L (ppb)	1	101	85	37-133	17
Benzo(g,h,i)perylene	ug/L (ppb)	1	101	92	34-135	9

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503373

SAMPLE CHAIN OF CUSTODY

ME [redacted] 03/19/15 [redacted]

Shin/Chai

Page # 1 of 1 ½/Box

AI

[redacted]

Send Report To Rebekah Brooks

Company Stantec

Address 19101 W 36th Ave # 203

City, State, ZIP Lynnwood WA 98036

Phone # 425-477-4995 Fax # ______

SAMPLERS (signature) AVadon

PROJECT NAME/NO. TOC MLT /203700102

PO#

REMARKS Bottles for dissolved Pb analysis are labeled "dissolved" and are filtered.

TURNAROUND TIME
- ☑ Standard (2 Weeks)
- ☐ RUSH ______

Rush charges authorized by ______

SAMPLE DISPOSAL
- ☑ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE	EDB	EDC	TOTAL Pb	Dissolved Pb	PAHs	Notes
MW72	01 A-G	03-19-15	1230	W	7	X	X	X				X	X	X	X	X	X	
MW73	02 A-G	03-19-15	1250	W	7	X	X	X				X	X	X	X	X	X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE		PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	AVadon	Antonda Vadon	Stantec	3-19-15	1500
Received by:	[signature]	Nhan Phan	FeBI	3-19-15	1500
Relinquished by:					
Received by:			Samples received at 2 °C		

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 7, 2015

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on March 20, 2015 from the TOC_01-176, WORFDB8 F&BI 503400 project. There are 20 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0407R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 20, 2015 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 503400 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Stantec
503400 -01	MW74

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503400
Date Extracted: 03/24/15
Date Analyzed: 03/24/15 and 03/25/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW74 503400-01 1/100	3,100	210	30	100	11,000	90
Method Blank 05-566 MB	<1	<1	<1	<3	<100	90

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503400
Date Extracted: 03/24/15
Date Analyzed: 03/24/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW74 503400-01 1/2	1,100 x	<500	83
Method Blank 05-588 MB2	<50	<250	84

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW74	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503400
Date Extracted:	03/31/15	Lab ID:	503400-01
Date Analyzed:	04/01/15	Data File:	503400-01.081
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	94	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503400
Date Extracted:	03/31/15	Lab ID:	I5-188 mb
Date Analyzed:	04/01/15	Data File:	I5-188 mb.060
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	100	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW74	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503400
Date Extracted:	03/23/15	Lab ID:	503400-01
Date Analyzed:	03/24/15	Data File:	503400-01.055
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	88	60	125

Analyte:	Concentration ug/L (ppb)
Lead	4.80

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Stantec
Date Received:	NA	Project:	TOC_01-176, WORFDB8 F&BI 503400
Date Extracted:	03/23/15	Lab ID:	I5-170 mb
Date Analyzed:	03/24/15	Data File:	I5-170 mb.018
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	ML

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	87	60	125

Analyte:	Concentration ug/L (ppb)
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW74	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503400
Date Extracted:	03/23/15	Lab ID:	503400-01 1/10
Date Analyzed:	03/25/15	Data File:	032516.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	97	63	127
4-Bromofluorobenzene	95	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	400
1,2-Dichloroethane (EDC)	64

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503400
Date Extracted:	03/23/15	Lab ID:	05-0548 mb
Date Analyzed:	03/23/15	Data File:	032308.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	57	121
Toluene-d8	106	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503400
Date Extracted: 03/23/15
Date Analyzed: 03/23/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR 1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED
Results Reported as µg/L (ppb)

Sample ID Laboratory ID	EDB
MW74 503400-01	0.013
Method Blank	<0.01

EDB 1,2-Dibromoethane

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW74	Client:	Stantec
Date Received:	03/20/15	Project:	TOC_01-176, WORFDB8 F&BI 503400
Date Extracted:	03/24/15	Lab ID:	503400-01 1/2
Date Analyzed:	03/25/15	Data File:	032510.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	99	25	160
Benzo(a)anthracene-d12	88	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	6.3
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Stantec
Date Received:	Not Applicable	Project:	TOC_01-176, WORFDB8 F&BI 503400
Date Extracted:	03/24/15	Lab ID:	05-589 mb2 1/2
Date Analyzed:	03/25/15	Data File:	032504.D
Matrix:	Water	Instrument:	GCMS10
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	96	25	160
Benzo(a)anthracene-d12	103	36	162

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.1
Acenaphthylene	<0.1
Acenaphthene	<0.1
Fluorene	<0.1
Phenanthrene	<0.1
Anthracene	<0.1
Fluoranthene	<0.1
Pyrene	<0.1
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	<0.1
Benzo(b)fluoranthene	<0.1
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1
Benzo(g,h,i)perylene	<0.1

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503400

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 503418-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	91	65-118
Toluene	ug/L (ppb)	50	91	72-122
Ethylbenzene	ug/L (ppb)	50	92	73-126
Xylenes	ug/L (ppb)	150	91	74-118
Gasoline	ug/L (ppb)	1,000	100	69-134

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503400

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	86	86	61-133	0

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503400

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 200.8

Laboratory Code: 503424-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	<1	97	96	79-121	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	107	83-115

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503400

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	4.86	101	108	79-121	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	106	83-115

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503400

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 503392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	108	74-127
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	106	69-133

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	108	109	64-147	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	104	103	73-132	1

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503400

QUALITY ASSURANCE RESULTS
FROM THE ANALYSIS OF WATER SAMPLES FOR
1,2-DIBROMOETHANE BY EPA METHOD 8011 MODIFIED

Laboratory Code: 503392-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 10)
1,2-Dibromoethane	ug/L (ppb)	<0.01	<0.01	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
1,2-Dibromoethane	ug/L (ppb)	0.10	98	70-130

Date of Report: 04/07/15
Date Received: 03/20/15
Project: TOC_01-176, WORFDB8 F&BI 503400

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	89	91	70-130	2
Acenaphthylene	ug/L (ppb)	1	86	87	70-130	1
Acenaphthene	ug/L (ppb)	1	90	89	70-130	1
Fluorene	ug/L (ppb)	1	86	87	70-130	1
Phenanthrene	ug/L (ppb)	1	92	94	70-130	2
Anthracene	ug/L (ppb)	1	90	93	70-130	3
Fluoranthene	ug/L (ppb)	1	88	93	70-130	6
Pyrene	ug/L (ppb)	1	101	102	70-130	1
Benz(a)anthracene	ug/L (ppb)	1	94	98	70-130	4
Chrysene	ug/L (ppb)	1	103	104	70-130	1
Benzo(b)fluoranthene	ug/L (ppb)	1	95	104	59-130	9
Benzo(k)fluoranthene	ug/L (ppb)	1	102	98	65-120	4
Benzo(a)pyrene	ug/L (ppb)	1	98	101	60-125	3
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	93	101	42-135	8
Dibenz(a,h)anthracene	ug/L (ppb)	1	83	94	37-125	12
Benzo(g,h,i)perylene	ug/L (ppb)	1	88	97	45-123	10

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

503400

SAMPLE CHAIN OF CUSTODY ME 3/20/15 VI/AI5 (Shin/Choi)

Page # B04 of 1

Send Report To: Rebekah Brooks and Kim Vik
Company: Stantec
Address: 19101 W 36th Ave #203
City, State, ZIP: Lynnwood
Phone #: 425-477-4225 Fax #:

SAMPLERS (signature)	Avador
PROJECT NAME/NO.	PO#
TOC MLT / 203700162	
REMARKS	Bottles for dissolved pb analysis are labeled "dissolved" and are filtered

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	MTBE	EDB	EDC	PAHs	Total Pb	Dissolved Pb	Notes
MW74	01 A-G	3-19-15	1350	W	7	/	/	/				/	/	/	/	X	/	

Samples received at 2 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: AVador	Antonela Vador	Stantec	3-20-15	1500
Received by: DVO	DO VO	F&BI	"	17:00
Relinquished by:				
Received by:				

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