FOCUSED SITE ASSESSMENT REPORT

FORMER GEDDES MARINA PROPERTY
MARYSVILLE, WASHINGTON

Prepared for

CITY OF MARYSVILLE
MARYSVILLE, WASHINGTON
October 28, 2015
Project No. 0689.01.03

Prepared by
Maul Foster & Alongi, Inc.
1329 N State Street, Suite 301, Bellingham WA 98225

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The material and data in this report were prepared under the supervision and direction of the undersigned.

MAUL FOSTER & ALONGI, INC.

Madi Novak

Madi Novak
Principal Environmental Scientist

Justin Clary

Justin L. Clary, PE
Principal Engineer

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ACRONYMS AND ABBREVIATIONS

AESI	Associated Earth Sciences, Inc.
AOC	area of concern
ARAR	applicable or relevant and appropriate requirement
ARI	Analytical Resources, Inc.
bgs	below ground surface
bml	below mudline
BMP	best management practice
BTEX	benzene, toluene, ethylbenzene, and total xylenes
the City	City of Marysville
COI	chemical of interest
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CSL	Cleanup Screening Level
CSM	conceptual site model
CUL	cleanup level
Ecology	Washington State Department of Ecology
EIC	ecological indicator concentration
ENR	enhanced natural recovery
ESA	environmental site assessment
FRTR	Federal Remediation Technology Roundtable
FSA	focused site assessment
HASP	health and safety plan
IHS	indicator hazardous substance
MFA	Maul Foster & Alongi, Inc.
mg/kg	milligrams per kilogram
MNA	monitored natural attenuation
MNR	monitored natural recovery
MTCA	Model Toxics Control Act
NWTPH	Northwest Total Petroleum Hydrocarbons
O&M	operation and maintenance
OnSite	OnSite Environmental, Inc.
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
POC	point of compliance
the Property	former Geddes Marina property
RCRA	Resource Conservation and Recovery Act
The Riley Group	The Riley Group, Inc.
SAP	sampling and analysis plan
SCO	Sediment Cleanup Objective
Shannon & Wilson	Shannon & Wilson, Inc.
SIM	selective ion monitoring
SMS	Sediment Management Standards

ACRONYMS AND ABBREVIATIONS (CONTINUED)

SVOC	semivolatile organic compound
SWPPP	stormwater pollution prevention plan
TEE	terrestrial ecological evaluation
TLC	thin-layer capping
TPH	total petroleum hydrocarbons
ug/L	micrograms per liter
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
WAC	Washington Administrative Code

1 INTRODUCTION

On behalf of the City of Marysville (the City), Maul Foster & Alongi, Inc. (MFA) has prepared this focused site assessment (FSA) report for the former Geddes Marina property (the Property) at 1326 First Street in Marysville, Washington (see Figure 1). Historically, the Property was used for timber industry- and marine-related operations, including a marina and boat launch. The Property currently contains a marine supply store, marine maintenance facilities, and several upland and in-water boat shelters. The scope of work for completing the FSA was developed in cooperation with the Washington State Department of Ecology (Ecology) and was described in the final FSA work plan (MFA, 2014).

1.1 Regulatory Framework

The City received Integrated Planning Grant G1400515 from Ecology and a Brownfield Cleanup Grant (Grant Number [FAIN]: 00J77201) from the U.S. Environmental Protection Agency (USEPA) to support characterizing and cleaning up the Property, and for the development of a community-based plan to transform the Property into a revitalized asset for the community. The FSA was conducted to complete further assessment of the nature and extent of contamination at the Property, evaluate potential risk to human health, and screen potential cleanup alternatives. The FSA was conducted in general accordance with guidance put forth in the Model Toxics Control Act (MTCA) (Washington Administrative Code [WAC] 173-340) and the Sediment Management Standards (SMS) stipulated in WAC 173-204. The cleanup alternatives analysis portion of this document was developed in accordance with the USEPA's requirements for an Analysis of Brownfields Cleanup Alternatives report.

1.2 Purpose and Objectives

The purpose of the FSA was to further characterize the nature and extent of contaminants in soil, groundwater, and marine sediment at the Property to allow for risk screening and to support an evaluation of potential cleanup actions. Site assessment objectives included the following:

- Develop a conceptual site model (CSM) and data quality objectives for site characterization.
- Further characterize the nature and extent of hazardous substances in environmental media above MTCA cleanup levels (CULs) and identify potential sources of contamination.
- Evaluate potential risk to current or reasonably likely future human and ecological receptors on the Property.
- Identify and evaluate potential cleanup options for impacted media at the Property.

2 BACKGROUND

This section describes the physical location and characteristics of the Property, including geology and hydrogeology, and summarizes the site history, including previous investigations.

2.1 Site Description

The Property is located in section 33 of township 30 north and range 5 east of the Willamette Meridian (Figure 1). The approximately 5-acre Property is generally flat and contains a roughly rectangular lagoon with inlets that are connected to the municipal stormwater system to the north and the Snohomish River by Ebey Slough to the south. The Property is a few feet above sea level.

The physical address for the Property is 1326 First Street in Marysville, Washington. The Property is bordered by First Street and the Town Center retail mall to the north, Ebey Slough to the south, Ebey Waterfront Park and Boat Launch Facility to the east, and a Burlington Northern and Santa Fe railroad embankment and former lumber mill operation (the Welco Lumber Company site) to the west. The Property is accessed from First Street, adjacent to the north of the Property. The Property is zoned Downtown Commercial with a Waterfront Overlay.

The Property currently contains several warehouses, upland and in-water boat shelters, marine repair facilities, and a marine supply store along the northeast and east boundaries of the lagoon (Figure 2). A boat launch and several in-water boat shelters are located along the southern edge of the Property in Ebey Slough. Minor vegetation is present around the lagoon and Ebey Slough, with partially paved surfaces and gravel dominating the ground surface along the boundaries of the Property.

2.2 Site History

The Property has been the location of timber industry- and marine-related operations since the 1800s. In the early 1990s, the Property was converted for use as a marina and boat launch; property uses included boat repair services. In 2010, the City purchased the Property in settlement of a lawsuit, filed by the previous owner, associated with discharge of the City's stormwater management system to the lagoon; and to help revitalize the waterfront near downtown Marysville. The City has since demolished 18 boat shelters on the Property. Former mill operations were located adjacent to the west and east of the Property (see Appendix B of MFA, 2014).

2.3 Previous Investigations

The Riley Group, Inc. (The Riley Group) conducted an assessment of an abandoned 500-gallon underground storage tank (UST) at the Property in April 2000. The UST was located adjacent northwest to CJ's Marine Supply Store, a boat parts retail store located in the northeastern area of the Property. The Riley Group verified that the UST was closed-in-place and filled with slurry. A former gasoline pump island foundation and associated product lines were also identified by The Riley Group. Laboratory analytical results of soil samples collected by hand auger to depths ranging from 5 to 6 feet below ground surface (bgs) identified the petroleum fuel impact as gasoline-range hydrocarbons. Elevated concentrations of gasoline-range total petroleum hydrocarbons (TPH) and associated volatile organic compounds (VOCs) (i.e., benzene, toluene, ethylbenzene, and total xylenes [BTEX]), at levels above Ecology MTCA Method A CULs, were reported in soil and groundwater samples. The Riley Group reported that moderate to heavy petroleum sheens were observed in soil samples and concluded that the "UST has released petroleum hydrocarbons to the subsurface" (see Appendix B of MFA, 2014).

Shannon & Wilson, Inc. (Shannon & Wilson) conducted supplemental soil sampling at this UST in conjunction with its removal in July 2000. Soil samples were collected from the sidewalls and bottom of an open UST excavation pit. A sample was also collected from groundwater that had seeped into the excavation pit. Laboratory analytical results indicated detections of gasoline-range TPH and benzene in soil samples; however, these concentrations were below the MTCA Method A CULs at that time (note: MTCA Method A CULs were updated in 2001). Shannon & Wilson reported that the groundwater sample was not submitted for laboratory analysis, based on direction from the Ecology UST site inspector. Shannon & Wilson concluded that "evidence of a release is not present at the site" (see Appendix B of MFA, 2014).

Associated Earth Sciences, Inc. (AESI) completed Phase I and Phase II environmental site assessments (ESAs) in June 2010 (see Appendix B of MFA, 2014). The Phase II ESA was conducted in 2008 to assess the Property sediment, soil, and groundwater conditions based on environmental concerns identified in the Phase I ESA. Fourteen soil samples were collected by hand auger (0.5 to 1 foot bgs), and seven soil samples were collected by a direct-push probe drilling rig (up to 5 feet bgs). Figure 3 presents locations of previous investigations conducted by AESI. Samples were analyzed for TPH and BTEX, polycyclic aromatic hydrocarbons (PAHs), and metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc). Elevated concentrations of carcinogenic PAHs (cPAHs) and metals (arsenic, lead, and cadmium) were identified in shallow soil samples collected primarily at 0.5 to 1 foot bgs. Similarly, arsenic, lead, cadmium, chromium, and diesel-range TPH were also identified at elevated concentrations in groundwater. Soil and groundwater samples were not collected adjacent to or near the former location of the removed UST. Sediment samples were collected from eight locations (18 to 30 inches below mudline [bml]) in the lagoon. In sediment samples, mercury and zinc exceeded the Marine Sediment Cleanup Objectives (SCOs) but were below the Marine Sediment Cleanup Screening Levels (CSLs) (sediment samples were analyzed for arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc). Diesel- and heavy-oil-range TPH were detected at elevated concentrations; while no marine SMS criteria are available for TPH, some concentrations were above the freshwater SCOs and CSLs (173-204 WAC) (MFA, 2014 [see Appendix B]).

2.4 Preliminary Areas of Concern

Based on documented historical uses described by AESI during the previous subsurface investigation of the Property and on data obtained from prior subsurface investigations, the following areas were identified as most likely to have resulted in contaminant releases to the surface, surface water, subsurface soil, groundwater, and sediments at the Property:

- Leaking fuel UST formerly on the Property

- Former mill operations on and adjacent to the Property
- Foundry machine and ironworks shop formerly on the Property
- Municipal stormwater discharge into the lagoon on the Property
- Auto and marine repair shops currently and formerly on the Property
- Auto repair shops currently and formerly adjacent northeast of the Property

Several current and former features at the Property that are potential contaminant sources had not been investigated prior to development of the investigation scope presented in the final FSA work plan (MFA, 2014). Therefore, the following areas were identified for further investigation in the final FSA work plan (Figure 4):

- Area adjacent to and inferred downgradient generally to the south (southeast and southwest) of the former UST location at the northeast area of the Property

- Areas throughout the Property associated with the boat parts and outboard repair shop (northeast area of the Property), boat shop (east side of Property), and prop shop (southeast area of the Property)

- Areas near the eastern and western perimeters of the Property, to assess potential impacts from adjoining properties with historical and/or current operations, including former mill and auto repair facilities, which may pose environmental concerns to the Property

- The northern reaches of the lagoon at the Property, adjacent and downgradient of the former UST location and the stormwater outfall, and near historical sediment sample S-3, where the highest concentrations of TPH and zinc were reported

- Offshore of the current outboard repair shop

- Near shore in areas not previously sampled because of the presence of historical structures (e.g., boathouses and docks)

2.5 Geology

The Property is located in the Snohomish River valley, which was formerly an arm of Puget Sound and was gradually filled over the past 10,000 years as a delta front moved down the valley to its present location (Century West, 2000). In this valley is the Marysville Trough, which is an expansive, nearly flat, alluvial plain. According to the Geologic Map of the Marysville quadrangle, the Property and vicinity are underlain by Quaternary younger alluvial and estuarine deposits. These deposits consist of "stream-laid stratified sediment containing sand, silt, and clay with considerable amounts of organic matter" (Minard, 1985). Development in the valley required that fill materials be imported to raise grades above flood and tide levels.

AESI reported the presence of fill comprising silt, sand, gravel, and crushed shells with organic peat materials and wood debris to approximately 12 feet bgs. These deposits were underlain by silty clay and peat deposits logged as estuarine/alluvial deposits to the maximum depth explored, 16 feet bgs.

Groundwater was encountered between 4 and 5 feet bgs (see Appendix B of MFA, 2014).

Soil observations from borings advanced during MFA's investigation indicated that the geology at the Property generally consists of fill comprising silt, silty sand, and wood debris with lenses of fine gravel up to the maximum advanced depth of 15 feet bgs. A unit of gray, poorly-graded, fine- to medium-grained sand was encountered in GM-2, GM-3, GM-4, and GM-10 between 10 to 15 feet bgs.

2.6 Hydrogeology

Shallow groundwater underlying the Property is an unconfined aquifer within the fill and valley alluvium. Groundwater elevations are tidally influenced by Ebey Slough, a tidal distributary of the Snohomish River that bounds the Property to the south. Groundwater elevations also fluctuate in response to regional aquifer conditions. In this area, the shallow groundwater impacts surface water conditions. The groundwater table rises to the ground surface during rainy seasons, restricting infiltration of rainwater, and may result in local flooding (Otak, 2009).

Groundwater flow directions at the Property have not been well defined to date. However, it is likely that groundwater flow is generally south and southwesterly, subparallel to the net flow in the slough (Parametrix, 2002).

Groundwater was encountered in each of the ten borings advanced on the Property. Static water levels measured from nine of the ten borings identified groundwater between 1 to 6 feet bgs. One boring location, GM-6, encountered groundwater at approximately 8 feet bgs. This water level may have been result of the large unit of silt encountered at this boring, resulting in a slower recharge of water in the temporary boring and a lower water table measurement.

3 FIELD AND ANALYTICAL METHODS

An environmental investigation was conducted in general accordance with the final FSA work plan (MFA, 2014) between February 2 and 4, 2015, and included upland and in-water portions of the Property. The investigation included soil, groundwater, and sediment sample collection from temporary boreholes; monitoring wells installed during the investigation and from the lagoon; analysis for potential chemicals of interest (COIs); field observations of physical conditions; measurement of groundwater levels; and measurement of field water quality parameters. Sample locations, depths, and chemical analyses associated with the February 2015 investigation are summarized in Table 1.

The upland investigation included collection of groundwater and soil samples at the following locations (see Figure 4):

- **GM-1, GM-2, and GM-3:** Collected to evaluate the area around and downgradient (inferred) of the former UST location.

- **GM-4:** Collected to evaluate the area downgradient (inferred) of the former UST and maintenance shop locations.
- **GM-5 and GM-6:** Collected to evaluate the area downgradient (inferred) of the former UST location and area in the vicinity of the boat shop.
- **GM-7:** Collected to evaluate the vicinity of the prop shop and prior-investigation-confirmed contamination of TPH and metals in shallow groundwater.
- **GM-8:** Collected to evaluate the central-south area of the Property and downgradient (inferred) of the marina area.
- **GM-9:** Collected to evaluate the western area of the Property.
- **GM-10:** Collected to evaluate the northern area of the Property.

Groundwater samples from GM-1, GM-3, and GM-7 were also collected to evaluate the potential for biodegradation processes at the Property. Monitoring wells were installed at GM-1, GM-2, GM-3, GM-5, GM-7, and GM-9.

Sediment samples were collected from the lagoon at the following locations (see Figure 4):

- **S-09, S-10, S-11, and S-12:** Collected to evaluate the northern reaches of the lagoon, adjacent to and downgradient (inferred) of the area of former UST location, the stormwater outfall, and areas of historically elevated detections of contamination.
- **S-13:** Collected to evaluate downgradient (inferred) of the current repair shop.

All environmental sampling, measurement, and quality control measures were conducted in accordance with industry standard operating procedures as described in the sampling and analysis plan (SAP, included as an appendix to the work plan [MFA, 2014]).

3.1 Soil Sampling

A summary of soil sample locations, depth, and date collected and associated analyses is presented in Table 1. A Geoprobe™ direct-push drill rig was used to advance continuous soil cores at ten boring locations (GM-1 through GM-10) from the ground surface to a maximum depth of 15 feet bgs (see Figure 4). Boring logs are provided in Appendix A. Eleven soil samples were collected from the ten borings, including one field duplicate sample collected at GM-1. Soil conditions were described and visual and olfactory observations were recorded during drilling. Soil olfactory indications of contamination (e.g., hydrocarbon-like odors) were screened with a photoionization detector (PID). Geographic coordinates for the boring locations were recorded using a hand-held global positioning system device.

Samples were submitted to OnSite Environmental, Inc. (OnSite) of Redmond, Washington, for analysis under standard chain-of-custody procedures. Soil samples were selected for analysis, based on observed impacts, elevated head-space readings collected with the PID, and/or location within the capillary fringe. All of the soil samples were collected between 2 and 6.5 feet bgs, with the exception of GM-1 and GM-4, in which samples were collected from approximately 12 to 12.5 feet bgs. Because of the large amount of woody debris and tight soils encountered during field activities, sample collection depths were primarily driven by the depth within a given boring at which there was sufficient soil volume to meet analytical method collection volume requirements. Samples from GM-1 and GM-4 were collected at greater depths because minimal soil volume was available for collection in the soil core at depths less than 12 feet bgs.

Soil samples submitted for analysis and the specific chemical analyses performed are summarized in Table 1. Soil samples were analyzed for chemicals by the following methods, depending on the sampling location at the Property:

- Diesel-range TPH and residual-range TPH by Northwest Total Petroleum Hydrocarbons (NWTPH)-Dx Extended Method with USEPA 5035 sample preparation
- Gasoline-range TPH by NWTPH-Gx Method
- VOCs associated with petroleum fuel, specifically BTEX, by USEPA Method 8021B with USEPA Method 5035 sample preparation
- VOCs associated with shop repair services by USEPA Method 8260C
- PAHs by USEPA Method 8270 selective ion monitoring (SIM)
- Metals specific to gasoline, boatyard operations, and site-specific former uses (antimony, arsenic, cadmium, copper, lead, mercury, tin, and zinc) by USEPA Method 6020 series

3.2 Groundwater Sampling

Temporary well screens were set in four temporary boreholes (GM-4, GM-6, GM-8, and GM-10) for collection of reconnaissance groundwater samples. Six monitoring wells were installed in the remaining borings advanced at the Property (GM-1, GM-2, GM-3, GM-5, GM-7, and GM-9). Monitoring and temporary well screen depths were determined based on field conditions and are described in Table 1. Field water quality parameters were measured before sample collection and recorded on field sampling data sheets, which are included as Appendix B. Groundwater sampling was conducted in accordance with the methods and protocols outlined in the SAP provided as an appendix to the work plan (MFA, 2014).

Groundwater samples were submitted to OnSite for analysis under standard chain-of-custody procedures. Specific chemical analyses were chosen for each location, based on the COIs identified in the work plan (MFA, 2014), and are summarized in Table 1. Groundwater samples were analyzed for the following, depending on sampling location and associated area of concern (AOC):

- Diesel- and residual-range TPH by NWTPH-Dx Extended Method
- Gasoline-range TPH by NWTPH-Gx Method
- VOCs associated with petroleum fuel, specifically BTEX, by USEPA Method 8021B
- VOCs associated with shop repair services by USEPA Method 8260C

- PAHs by USEPA Method 8270 SIM
- Metals specific to gasoline, boatyard operations, and site-specific former uses (antimony, arsenic, cadmium, copper, lead, mercury, tin, and zinc) by USEPA Method 6020 series

To evaluate the potential for biodegradation processes at the Property, groundwater samples from GM-1, GM-3, and GM-7 (see Table 1 and Figure 4) were also analyzed for the following geochemical parameters to prescreen for the presence of electron acceptors:

- Nitrate by USEPA Method 353.2
- Manganese by USEPA Method 6020A
- Ferrous iron by USEPA Method ApplEnvMic7-87-1536
- Sulfate by ASTM D516-02
- Methane by RSK 175

3.3 Sediment Sampling

Ten discrete sediment samples were collected from the mudline to a maximum depth of 2.3 feet bml (S-09, S-10, S-11, S-12 and S-13; see Figure 4 and Tables 1 and 2). Surface sediment samples (from the mudline to 0.33 feet bml) were collected using a small grab sampler (i.e., Ponar) from a small boat. Before sampling, the grab sampler was decontaminated consistent with industry standard methods. Subsurface sediment samples (depths greater than 0.33 feet bml) were collected using a manually advanced, thin-walled sediment-coring device (Shelby tube). MFA personnel advanced the coring device from a small boat until refusal was encountered, and a one-way valve within the device was triggered to retain sediment in the core tube upon removal. Upon retrieval on the boat, a tape measure was used to determine material length within the core tube, which represents the total sediment collection depth (see Table 2). Refusal was generally encountered between 1 and 2 feet bml. As a result, some of the proposed Tier 2 samples (i.e., 2.5 to 5 feet bml) were not collected during this sampling event.

Before collection of each sample, sampling equipment was decontaminated consistent with industry standard methods. Samples were transferred from either the Ponar grab sampler or the Shelby tube to a decontaminated, stainless steel sampling bowl, and the extracted sediments were homogenized. Sediments were then transferred into laboratory-supplied sampling containers before being placed on ice for shipment to Analytical Resources, Inc. (ARI) in Tukwila, Washington, following standard chain-of-custody procedures.

The Tier 1 sediment samples were analyzed for marine SMS COIs defined in WAC 173-204, as well as for total organic carbon, diesel- and heavy-oil-range organics, dioxins, and organotins. Three Tier 2 sediment samples (S-09-1.2, S-11-2.0, and S-13-0.33) were also analyzed after Tier 1 results were received to provide additional information on the lateral and vertical extent of impacts and to help guide cleanup actions. The other Tier 2 samples remain archived at ARI for potential future analysis (see Table 1).

4 PRELIMINARY CONCEPTUAL SITE MODEL AND SCREENING LEVELS

The CSM describes potential chemical sources, release mechanisms, environmental transport processes, exposure routes, and receptors. The primary purpose of the CSM is to describe pathways by which human and ecological receptors could be exposed to site-related chemicals. A complete exposure pathway consists of four necessary elements: (1) a source and mechanism of chemical release to the environment, (2) an environmental transport medium for a released chemical, (3) a point of potential contact with the impacted medium (referred to as the exposure point), and (4) an exposure route (e.g., soil ingestion) at the exposure point. Elements of potentially complete exposure scenarios for human health and ecological receptors are discussed below and are presented in Figure 5.

4.1 Source Characterization

Potential contaminant source areas associated with historical and current operations were identified during the environmental due diligence activities conducted as part of the work plan (MFA, 2014), as discussed in Section 2.4 and listed in Table 1. The Property has been the location of timber industry- and marine-related operations since the 1800s. The COIs in the upland portion of the Property include petroleum hydrocarbons, metals, PAHs, and VOCs. Based on previous investigations, the sources of contaminants are most likely from surface releases from former and current repair operations, unregulated dumping of materials in the lagoon, subsurface releases from the former UST system, and adjacent off-property impacts from former saw mill operations.

4.2 Fate and Transport of Contaminants

The primary mechanisms likely to influence the fate and transport of chemicals at the Property include natural biodegradation of organic chemicals, sorption to soil, advection and dispersion in groundwater, erosion of contaminated soil into the lagoon, volatilization from soil or groundwater to air, leaching of chemicals from soil to groundwater, leaching of chemicals from groundwater to sediment, groundwater discharge to surface water, and leaching of chemicals from sediment to surface water. The relative importance of these processes will vary, depending on the chemical and physical properties of a released contaminant. The properties of soil and the dynamics of groundwater flow also affect contaminant fate and transport.

Most of the Property is unpaved, with some pavement around the former and current marine maintenance and repair operations along the eastern portion of the Property. Contaminant releases to surface soil have the potential to be mobilized by stormwater and migrate downgradient to the lagoon, or leach and migrate vertically downward to the water table. Downward migration may result in impacts to subsurface soil and/or shallow groundwater beneath the Property. Dissolved-phase contamination in groundwater also has the potential to migrate downgradient, potentially discharging to the lagoon and Ebey Slough. Aquatic receptors exposed to chemicals and metals in surface water or sediment may accumulate contaminants in tissue. Finally, any volatile contaminants in groundwater or vadose-zone soil also have the potential to partition to the vapor phase and migrate into buildings, if present.

4.3 Potential Exposure Receptors and Scenarios

Potential human and ecological exposure pathways are shown in Figure 5.

The Property is currently occupied by several boathouses, a marine supply store, and several boat storage facilities. Future use of the Property is anticipated to be commercial; however, the lagoon provides a habitat for terrestrial and aquatic receptors that may attract fishers to the Property. Therefore, it is assumed that occupational workers, the general public, fishers, and terrestrial and aquatic ecological receptors will occupy the Property at some time in the foreseeable future.

Shallow groundwater was encountered between 0.8 and 8 feet bgs and is assumed to discharge into the lagoon and Ebey Slough. Groundwater beneath the Property is not currently used as a drinking water source, nor is it likely to be in the foreseeable future, given that water is currently supplied by the City to the businesses adjacent to the Property. However, for this preliminary evaluation it is considered potable and available for use unless an environmental covenant is established for groundwater at the Property.

Potentially complete human health exposure pathways are discussed below for the receptors identified for the Property.

General public—Occupational workers currently occupy the Property and are likely to occupy the Property in the future if it is redeveloped for commercial use. It is assumed that, if the Property continues to be used for commercial purposes, the general public will have access to the Property as well. It is assumed that future workers or the general public could contact chemicals in the top 15 feet of the current ground surface. The pathways by which future workers could potentially be exposed to chemicals at the Property include:

- Direct skin contact with, incidental ingestion of, and inhalation of wind-borne particulates from chemically impacted soil
- Inhalation of indoor air vapors emanating from soil or groundwater with volatile chemical impacts
- Direct skin contact with or ingestion of chemically impacted groundwater, if potable.

Terrestrial ecological receptors—Terrestrial receptors such as birds and mammals have the potential to come into direct contact with contaminants present in soil between 0 and 6 feet bgs.

Fishers—The lagoon may contain aquatic life that could attract fishers to the Property; therefore, fishers have the potential to be exposed to Property-related chemicals by ingesting fish or shellfish that have accumulated contaminants in their tissue.

Aquatic ecological receptors—The Property contains a lagoon connected to Ebey Slough, a tidal distributary of the Snohomish River. The following aquatic receptors are included in this evaluation: aquatic plants, benthos, fish, and piscivorous birds and mammals. Aquatic ecological receptors may be exposed to chemicals at the Property in surface water, sediment, and/or fish tissue by the following pathways:

- Direct contact with and ingestion of surface water or sediment in the lagoon that has been chemically impacted
- Ingestion of chemicals accumulated in the tissue of fish or shellfish from chemically impacted surface water or sediment

Shallow groundwater beneath the Property is not currently used as a drinking water source; however, it is considered potable and available for use unless an environmental covenant restricting the use of groundwater at the Property is established. Therefore, scenarios involving exposure to contaminated groundwater as drinking water are considered potentially complete.

4.4 Screening Levels for Soil and Groundwater

According to MTCA, the cleanup standards for a particular site have two primary components: chemical-specific CULs and points of compliance (POCs). The CUL is the concentration of a chemical in a specific environmental medium that will not pose unacceptable risks to human health or the environment. The POC is the location where the CUL must be met.

MTCA provides three different options for establishing CULs for human health: Method A, Method B, and Method C. MTCA Method A is designed for cleanups at relatively simple sites, such as small sites that have only a few hazardous substances. Method B can be used at any site. Method C is used primarily for industrial sites.

For protection of the environment, MTCA provides for a terrestrial ecological evaluation (TEE) involving assessment of site impacts relative to ecological indicator concentrations (EICs).

This section describes screening levels selected for the evaluation of upland soil and groundwater data. Final CULs appropriate for the site are selected in Section 6.

4.4.1 Soil Screening Levels

Relatively few contaminants were detected in soil at the Property. The Property historically has been used for commercial and industrial purposes and it is anticipated to be used for commercial use in the future. Therefore, soil was evaluated relative to MTCA Method A CULs for unrestricted land use. The Method A values are for protection of human health via the direct-contact or ingestion pathways and protection of groundwater via the leaching-to-groundwater pathway, and accommodate natural background conditions.

For certain constituents, MTCA Method A CULs are not available and Method B CULs were applied. Method B CULs are calculated concentrations that are estimated to result in no acute or chronic toxic effects on human health for noncarcinogens, and concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in one million (1 x 10^{-6}) for carcinogens.

Soil concentrations in soil were also screened to EICs, to evaluate whether terrestrial species may be adversely affected if exposed to site-related contamination.

Soil CULs for the protection of potable groundwater (leaching-to-groundwater pathway) are not currently recommended as potential cleanup targets for soil on the Property. The leaching-to groundwater criteria are helpful in providing an initial screening of soil data to assess the potential for impacts to groundwater. However, because empirical groundwater data are available, they are used to evaluate groundwater conditions.

Soil CULs and EICs are summarized in Table 3.

4.4.1.1 Points of Compliance in Soil

The soil POC is the depth bgs at which soil CULs shall be attained. The standard POC for Method A is soil within 15 feet of the ground surface. The standard POC for EICs is also soil within 15 feet of the ground surface. For sites with institutional controls to prevent excavation of deeper soil, a conditional point of compliance may be set at the biologically active soil zone. This zone is assumed to extend to a depth of six feet (WAC 173-340-7490(4)(a)).

4.4.2 Groundwater Screening Levels

Groundwater was screened to relevant MTCA Method A CULs and marine surface water criteria. For certain constituents, Method A CULs were not available and Method B CULs were used. The minimum concentration of the state and federal aquatic life and human health marine water quality standards were selected as the surface water criteria. These criteria are for protection of aquatic species that may directly contact surface water potentially impacted by discharges of chemically impacted groundwater. Groundwater CULs and surface water criteria are summarized in Table 4.

4.4.2.1 Points of Compliance in Groundwater

For groundwater, the POC is the point or points where the groundwater CULs must be attained for a site to be in compliance with the cleanup standards. Groundwater CULs shall be attained in all groundwater from the POC to the outer boundary of the hazardous-substance plume. A conditional POC may be established if it is not practicable to meet the CULs throughout the site within a reasonable restoration time frame (WAC 173-340-720(8)(c)). A conditional POC for groundwater is not proposed at this time.

4.5 Sediment Screening Levels

Sediment analytical data were compared to numerical marine screening criteria presented in the SMS.[1] Data were normalized to organic carbon where appropriate for comparison with screening criteria. Two screening levels are presented in Table III of the SMS: a lower no apparent adverse effects level called the SCO, and a higher minor adverse effects screening level called the CSL. To put results into toxicological context, both the SCOs and CSLs are included in the data screening presented in Table 5. Note that the SCOs and CSLs are criteria protective of aquatic receptors that are directly exposed to contaminants.

Ecology has not generated criteria protecting against the accumulation of chemicals in tissue and subsequent ingestion by higher trophic levels (some fish, birds, mammals, and people); instead, the SMS indicate that an evaluation of bioaccumulative chemicals is conducted on a site-specific basis. Site-specific bioaccumulation screening levels have not been generated for this Property; therefore, detections of bioaccumulative chemicals are discussed relative to generally understood background conditions in the Puget Sound.

4.5.1.1 Points of Compliance in Sediment

The POC for the SCOs and CSLs is the top 10 centimeters of sediment.

5 ANALYTICAL RESULTS

Laboratory analytical reports are provided as Appendix C. Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they meet project-specific data quality objectives. This review was performed consistent with accepted USEPA procedures for evaluating laboratory analytical data (USEPA, 2004, 2008) and appropriate laboratory and method-specific guidelines (ARI, 2012; OnSite, 2012). Data validation memorandums summarizing data evaluation procedures, data usability, and deviations from specific field and/or laboratory methods for the February 2015 investigation data are included as Appendix D. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned. All analytical data associated with the February 2015 investigation, as well as all data associated with the 2008 AESI site assessment, have been uploaded to Ecology's Environmental Information Management database (Study ID: G1400515 and Study Name: Geddes Marina).

5.1 Upland

Soil and groundwater data are evaluated relative to the screening levels identified in Section 4.4.

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[1] Because SMS marine criteria are not available for nickel, selenium, butyltins, and diesel- and motor-oil-range petroleum hydrocarbons, freshwater criteria are used for comparison with site concentrations.

5.1.1 Soil

Table 3 shows current and historical analytical results relative to screening criteria; Figure 6 shows the spatial distribution of contaminants that exceeded criteria. Only metals (arsenic, cadmium, copper, lead, mercury, and zinc) exceeded screening levels. Exceedances are discussed below.

- Arsenic concentrations exceeded the MTCA Method A CUL of 20 milligrams per kilogram (mg/kg) in six of 24 samples collected. In an additional 11 samples, arsenic concentrations were above EICs for plants and wildlife of 10 mg/kg and 7 mg/kg, respectively. Note that arsenic occurs naturally in the environment at about 7 mg/kg in the Puget Sound area (Ecology, 1994). Concentrations ranged across the Property from 2.42 mg/kg to 56.9 mg/kg with an average concentration of 15.2 mg/kg and a median concentration of 14.2 mg/kg. The highest concentration, 56.9 mg/kg, was detected at 1 foot bgs at HA-7, on the west bank of the lagoon. The next highest concentrations were marginally above the MTCA Method A CUL of 20 mg/kg at EB-3 (22.3 mg/kg), HA-2 (22 mg/kg), HA-8 (21.2 mg/kg), HA-10 (23.5 mg/kg), and HA-13 (25.8 mg/kg). All of the arsenic concentrations above the MTCA Method A CUL were near the bank of the lagoon; concentrations generally decreased with distance from the lagoon.

- Cadmium concentrations exceeded the MTCA Method A CUL of 2 mg/kg in three locations: HA-1 (60.5 mg/kg), HA-4 (3.42 mg/kg), and HA-13 (4.09 mg/kg). Two of these concentrations also exceeded the plant EIC of 4 mg/kg, and the HA-1 sample also exceeded the wildlife and soil biota EICs of 14 mg/kg and 20 mg/kg, respectively. The most elevated concentration (HA-1) was in the southeast corner of the site, while the marginal exceedances were in the northeast portion of the site. The remaining cadmium concentrations were low-level to non-detect.

- Copper concentrations did not exceed the MTCA Method B CUL (no MTCA Method A CUL is available for copper); however, concentrations did exceed the plant and/or soil biota EICs of 100 mg/kg and 50 mg/kg, respectively, in seven of 24 samples. Copper concentrations appear to be somewhat randomly distributed across the Property.

- Lead concentrations exceeded the MTCA Method A CUL of 250 mg/kg in two of 25 samples at GM-8 (440 mg/kg) and HA-10 (544 mg/kg). Both of these samples were collected near the southwest bank of the lagoon and near the lagoon's southern outlet to Ebey Slough. These same sample locations exceeded the wildlife EIC of 118 mg/kg; HA-10 also exceeded the soil biota EIC of 500 mg/kg. An additional six samples in various locations across the Property exceeded the plant EIC of 50 mg/kg in the top 1 foot of soil.

- Mercury concentrations did not exceed the MTCA Method A CUL; however, the EIC for soil biota of 0.1 mg/kg was exceeded marginally in three locations: HA-2 (0.21 mg/kg), HA-4 (0.29 mg/kg), and HA-10 (0.22 mg/kg). All other samples were non-detect for mercury.

- Zinc concentrations did not exceed the MTCA Method B CUL (no MTCA Method A CUL is available for zinc); however, the EICs for plants (86 mg/kg), soil biota (200 mg/kg), and/or wildlife (360 mg/kg) were exceeded at seven locations. The spatial distribution of zinc concentrations is similar to that of arsenic and cadmium, with elevated concentrations near the bank of the lagoon and generally decreasing farther from the lagoon.

In summary, only arsenic, cadmium, and lead exceeded human health CULs, while arsenic, cadmium, copper, lead, mercury, and zinc exceeded EICs. The spatial distributions of arsenic, copper, and zinc are generally similar, with the highest concentrations close to the bank of the lagoon. Cadmium concentrations were most elevated in the southeast and northeast corners of the Property, and lead is elevated in only one discrete area, on the southwest bank of the lagoon near the lagoon's outlet to Ebey Slough.

5.1.2 Groundwater

Table 4 shows current and historical analytical results. Indicators of degradation (i.e., nitrate, manganese, ferrous iron, sulfate, and methane) were analyzed to establish baseline conditions. If additional groundwater data are collected, the concentration trends of these parameters over time will be evaluated.

Of the COIs, only metals and diesel- and heavy-oil-range organics exceeded screening levels. Exceedances are discussed below.

Metals

Multiple metals (antimony, arsenic, cadmium, copper, lead, manganese, and mercury) exceeded their respective MTCA CULs.

The highest total metals concentrations were in historical sample EB-6, collected between 2 and 3 feet bgs; neighboring EB borings also had elevated total metals concentrations. Monitoring well GM-7 was installed nearby during the 2015 investigation, and samples were collected at 9 feet bgs. The total metals concentrations were considerably lower at GM-7; further, dissolved concentrations of the same metals were non-detect except for zinc and manganese. The elevated total metals concentrations in the EB borings likely are due to the presence of suspended soil particles containing metals in groundwater. Therefore, the dissolved-fraction metals results collected from GM-7 are considered more representative of water quality. Dissolved zinc was below the criterion; however, manganese was above the MTCA B CUL of 2,240 mg/kg and the surface water criterion of 100 mg/kg at 2,600 mg/kg. Manganese appears to be the only metal in this area that has the potential to cause adverse effects to ecological receptors or human health, provided that there is a complete exposure pathway.

Total arsenic concentrations were above the MTCA Method A CUL of 5 micrograms per liter (ug/L) and the surface water criterion of 0.14 ug/L at GM-6 (13 ug/L) and GM-9 (7.6 ug/L). Copper also exceeded the surface water criterion at GM-6 of 2.4 at 26 ug/L. As discussed above, total metals concentrations are likely to be biased high because of the presence of soil particles in groundwater. Dissolved concentrations are not available at these locations; however, it is highly likely that dissolved arsenic and copper concentrations are significantly lower than total concentrations, as demonstrated in the GM-7 analysis, discussed above. Further, note that the

MTCA Method A CUL of 5 ug/L is based on background concentrations of arsenic throughout Washington State. The mean and median natural arsenic groundwater concentrations in the U.S. are 8 ug/L and 13.0 ug/L, respectively (Langmuir et al., 2005). Therefore, the surface water criterion for arsenic of 0.14 ug/L likely is not achievable in groundwater.

Total manganese concentrations were above the surface water criterion of 100 ug/L in GM-1 and GM-3 at 1,600 ug/L and 490 ug/L, respectively. The MTCA Method B CUL of 2,240 ug/L was exceeded in GM-7, with a total manganese concentration of 2,270 ug/L and a dissolved-manganese concentration of 2,600 ug/L. Note that manganese concentrations in groundwater can be naturally elevated. The glacial aquifers of the Puget Sound lowlands have been found to contain natural concentrations of dissolved manganese as high as 650 ug/L in groundwater (USGS, 1998).

The spatial distribution of metals most representative of groundwater conditions that exceed screening levels (i.e., antimony, arsenic, copper, manganese) is shown in Figure 7.

Diesel- and Heavy-Oil Petroleum Hydrocarbons

Diesel- and/or heavy-oil-range petroleum hydrocarbons were identified in groundwater above MTCA Method A CULs along the eastern perimeter of the Property near former and current boat repair and maintenance operations (GM-4, GM-5, and GM-7) and along the southern boundary of the Property, downgradient (inferred) of the lagoon and marina operations (GM-8). The highest detection of lube oil was identified at GM-8.

The spatial distribution of petroleum hydrocarbons in groundwater that exceed screening levels is shown in Figure 7.

5.2 Lagoon

Grain size analysis was conducted at the four surface sediment samples (S-09, S-10, S-11, and S-12; see Table 6). High percentages of fines were identified in S-11 and S-12 at 71.2 percent and 87.7 percent, respectively. At S-09 and S-10, medium sand was the most prevalent grain size at 24.5 percent and 36.7 percent, respectively. The total organic carbon present at the four surface sediment samples was relatively high and ranged between 6.31 percent and 16.3 percent. Elevated concentrations of total organic carbon are typical of fine-grain environments, as observed at S-11 and S-12. The higher percentage of coarser-grained soils at S-10 similarly corresponds with a lower total organic carbon content.

The chemicals and metals detected and their respective concentrations were generally consistent across the four surface sample locations (i.e., no significant concentration gradients were apparent), but the full extent of contaminants remains unknown. Since concentrations of detected contaminants were consistent between locations, a station cluster analysis conducted consistent with SMS criteria would result in conclusions similar to those drawn from the discrete data and was therefore not performed.

Table 5 shows current and historical analytical results relative to screening criteria; Figure 8 shows concentrations of bioaccumulative chemicals and the spatial distribution of contaminants that exceeded criteria. AESI collected sediment samples between 1.5 and 2.5 feet bml as described in their field sampling methodology (MFA, 2014 [see Appendix B]). Sediment data are summarized below:

- Zinc, nickel, and mercury exceeded the SMS marine SCO criteria. Zinc exceeded the criterion in the samples collected nearest the municipal stormwater outfall at the northern extent of the lagoon. Nickel exceeded the SMS marine SCO criterion in all samples, and concentrations were generally consistent throughout the lagoon. Mercury only marginally exceeded the criterion, and in only one sample.
- Phenolics, benzoates, and bis(2-ethylhexyl)phthalate exceeded the SMS marine SCO and/or CSL in all four surface sediment sample locations; concentrations appeared to decrease somewhat for most constituents in the deeper samples collected up to 2 feet bml, in particular for bis(2-ethylhexyl)phthalate (see Table 5).
- Polychlorinated biphenyl (PCB) detections of Aroclor 1254 and/or 1260 occurred at all seven sediment sample locations. PCB concentrations did not exceed SMS marine numerical screening criteria, but are above what is generally considered background levels in the Puget Sound Region.
- Concentrations of dioxins and furans were consistent across the four sediment sample locations in the northern portion of the lagoon and decreased somewhat at S-13 and in deeper samples collected at S-09 and S-11. Concentrations are above what are generally considered background levels in Port Gardner Bay region (Ecology, 2014) in all but the deeper S-11 sample, with a dioxin toxic equivalency quotient concentration of 4.1 nanograms per kilogram.
- Butyltins were detected at all seven sediment sample locations. Since SMS marine criteria are not available for the butyltins, the SMS freshwater screening criteria are included in Table 5 for comparison purposes. Butyltins were below their respective SCOs.
- Diesel- and motor-oil-range petroleum hydrocarbons were detected at all seven sediment sample locations. SMS marine criteria are not available for petroleum hydrocarbons; therefore, the SMS freshwater screening criteria are included in Table 5 for comparison purposes. Diesel- and motor-oil-range petroleum hydrocarbon concentrations exceeded the criteria at all locations.
- Several detected PAHs, PCBs, and dioxins listed in WAC 173-333-310 have been identified by the State of Washington as having a high potential to bioaccumulate. The SMS criteria are not necessarily protective of bioaccumulative effects; therefore, additional risk analysis or evaluation relative to background conditions may be warranted.

In summary, multiple chemicals in sediment exceeded SMS criteria and/or appeared to be well above assumed background conditions. Concentrations of most chemicals in sediment were generally consistent at the locations sampled, suggesting that the source(s) of impacts to sediment are not localized and may extend throughout the lagoon. The exception is zinc; the spatial distribution of this metal suggests that the source of impacts may be related to the stormwater outfall at the northern extent of the lagoon. Surface releases from historical and current site operations may have discharged into the lagoon. Overwater releases from the former and current boathouses and along the docks in the lagoon may also have resulted in the impacts to sediment.

6 INDICATOR HAZARDOUS SUBSTANCES AND CLEANUP LEVELS

This section identifies indicator hazardous substances (IHSs) and site-specific CULs. IHSs are those compounds that are included for further consideration during the development of the cleanup approach because of their frequency, mobility, persistence in the environment, or toxicity. Compounds can be eliminated from further consideration on a site-specific basis, using the following evaluation factors outlined in WAC 173-340-703:

- The toxicological characteristics of the hazardous substance relative to the concentration of the hazardous substance at the site
- The chemical and physical characteristics of the hazardous substance that govern its tendency to persist in the environment
- The chemical and physical characteristics of the hazardous substance that govern its tendency to move into and through environmental media
- The natural background concentrations of the hazardous substance
- The thoroughness of testing for the hazardous substance at the site
- The frequency at which the hazardous substance has been detected at the site
- Degradation by-products of the hazardous substance

The selection of IHSs is described in Section 6.1.

The CUL is the concentration of an IHS in a site matrix that is determined to be protective of human health and the environment under specified exposure conditions. CULs, in combination with POCs, typically define the area or volume of soil, water, air, or sediment at a site that must be addressed by the cleanup action (WAC 173-340-700 through 173-340-760). Cleanup standards must also incorporate other state and federal regulatory requirements applicable to the cleanup action and/or its location. POCs are identified in accordance with standard MTCA protocols for soil and groundwater, and consistent with the SMS for affected sediments.

6.1 Indicator Hazardous Substances

As described in Sections 4.4 and 4.5, concentrations were compared with CULs, TEE EICs, surface water criteria, SCOs, and/or CSLs to evaluate the data. Sample results were also compared to background conditions in some cases. IHSs are identified below.

The following metals were detected above screening levels in soil and were selected as IHSs for soil:

- Arsenic
- Lead
- Cadmium
- Copper
- Mercury
- Zinc

The following metals and chemicals are identified as groundwater IHSs:

- Arsenic
- Copper
- Manganese
- Diesel
- Lube oil

Antimony, cadmium, lead, mercury, and zinc total concentrations in the southeast corner of the site were above criteria, and as further discussed in Section 5.1.2, these concentrations are highly unlikely to be representative of groundwater conditions and more representative data are available from a recently installed groundwater monitoring well GM-7; therefore, these metals are not identified as IHSs.

The following chemicals were selected as IHSs for sediment:

- Zinc
- Nickel
- Phenolics
- Benzoates
- Bis(2-ethylhexyl)phthalate
- Dioxins and furans
- Diesel- and motor-oil-range petroleum hydrocarbons
- PCBs

6.2 Cleanup Levels

Conservative CULs that allow for the greatest flexibility for future site development were selected. The lowest of the human health CULs and EICs were selected to provide for the possibility that the Property will be redeveloped such that human and ecological receptors may be exposed to contaminants in soil, groundwater, surface water, and sediment at the Property. Table 7 summarizes the CULs and the selection rationale. Note that it may be possible to clean up to less conservative levels, depending on the future land use of the property.

7 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

This section identifies potential applicable or relevant and appropriate requirements (ARARs) to be used in assessing and implementing remedial actions at the Property. The potential ARARs focus on federal or state statutes, regulations, criteria, and guidelines. The specific types of potential ARARs evaluated include contaminant-, location-, and action-specific ARARs.

In general, only the substantive requirements of ARARs are applied to MTCA cleanups being conducted under a legally binding agreement with Ecology (WAC 173-340-710(9)(b)). Thus, cleanup actions under a formal agreement with Ecology are exempt from the administrative and procedural requirements specified in state and local laws. The City has not officially chosen to enter into a formal cleanup agreement with Ecology to-date; should it pursue cleanup through Ecology's Voluntary Cleanup Program, compliance with state and local regulations would be required.

7.1 Contaminant-Specific ARARs

Contaminant-specific ARARs are usually health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of numerical contaminant values that are generally recognized by the regulatory agencies as allowable to protect human health and the environment.

7.2 Action-Specific ARARs

Action-specific ARARs are pertinent to particular remediation methods and technologies, and to actions conducted to support cleanup. Action-specific ARARs are requirements for the performance of specific remedial actions because they prescribe how certain activities (e.g., treatment and disposal practices, media monitoring programs) must be conducted. Typically, action-specific ARARs are not fully defined until a preferred response action has been selected and the corresponding remedial action can be more completely refined. However, preliminary consideration of the range of potential action-specific ARARs may help focus the process of selecting a preferred remedial action alternative.

7.3 Location-Specific ARARs

Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in a specific location. Examples of special locations include floodplains, wetlands, historic sites, and sensitive ecosystems or habitats.

7.4 Refined Area of Concern

Several locations across the Property fall under the definition of the AOC. These areas comprise soils, shallow groundwater, and/or sediments containing IHSs above the CULs selected for the Property. The exceedance locations are based on the results of remedial investigations conducted in 2008 (by AESI; see Appendix B of MFA, 2014) and 2015 (by MFA), which identified several sample locations that exceeded CULs. This cleanup alternatives analysis is limited to the Property and does not include adjacent properties or the aquatic environment outside the lagoon.

The AOCs were identified based on the known or inferred extent of contaminated media following review of historical and recent analytical data summarized in Sections 4 and 5, and are presented on Figure E-1 (Appendix E). Some uncertainty remains regarding the overall depth and areal limits of contamination in both the upland and marine areas. This uncertainty is due to the constraints on the number and locations of soil and sediment samples that have been collected and analyzed. Limited detailed historical information is available to help describe contaminant sources and migration mechanisms.

For these reasons, a number of working assumptions were used to provide a practical means of delineating remediation areas for the purposes of this cleanup alternatives analysis.

7.4.1 Criteria for Defining Soil Remediation Areas

Most of the soil sampling focused on depths between about 1 and 6 feet bgs, which was believed to be the most likely contaminated, based on historical information and previous field observations. Not all IHSs are equally represented in all samples or at all locations and depths. For these reasons the areal extent, depths, and estimated volumes of contaminated soil requiring remediation were estimated as follows.

- Contaminant areas were defined based on soil sampling locations with consistent exceedances. Additionally, the "midway rule" was applied to define the extent of contamination between two sampling locations. This rule assumes that the midpoint between a "clean" sample and a "dirty" sampling location is the extent of contamination.
- AOCs are also delineated based on the maximum estimated depth of contamination. Historical and recent soil samples were used to estimate volume and develop remedial alternatives. Analytical results for exceedances in upland soils are shown on Figure 6.
- Limited soil-quality data exist more than 6 feet bgs. Although the human health POC for soils for the direct-contact pathway is 15 feet bgs, the estimated soil volumes for remediation developed by this analysis do not consider soil depths below 6 feet, as there is currently no basis for identifying deeper zones of contamination.

7.4.2 Groundwater

As described in Section 6.1, analytical results associated with the February 2015 site assessment activities indicate that lube oil, diesel, and metals (arsenic, copper, and manganese) are present (in exceedance of IHSs) in groundwater beneath the Property. The site hydrogeology consists of shallow groundwater across most of the site. Additionally, tidal influence of groundwater is suspected. Other than areas associated with former and current repair shops, there are no known sources for contaminated groundwater; therefore, the remediation of contaminated soils is anticipated to eliminate the soil-to-groundwater pathway and allow the concentration of IHSs in groundwater to return to background levels within a reasonable restoration time frame.

7.4.3 Marine Sediment Management Areas

The marine sediment management area for the Property consists of the lagoon. As described in Section 5.2, the source of contamination in the lagoon is unknown, but believed to be surface releases from historical and current site operations. Overwater releases from the former and current boathouses and along the docks in the lagoon may also have resulted in the observed impacts to sediment. Additionally, municipal stormwater that discharges into the north end of the lagoon may be a source of contamination. Exceedances of TPH, metals (nickel and zinc), and semivolatile organic compounds (SVOCs) were identified in the sediment management area.

8 DEVELOPMENT OF REMEDIATION ALTERNATIVES

The remediation alternatives developed in this cleanup alternatives analysis combine technologies that are applicable to upland soils, shallow groundwater, and sediments impacted by metals, TPH, and SVOCs at the Property. This section provides a general discussion of the technologies from which the remediation alternatives were developed, followed by detailed descriptions of the alternatives.

8.1 Remediation Technologies and Alternative Development

The options considered for development of remediation alternatives consist of accepted technologies for managing soils, sediments, and groundwater containing IHSs; they include containment by capping, sediment and soil removal, and off-site landfill disposal. Institutional controls are included in the alternatives where appropriate to further reduce risk to human health and the environment.

Overall, effective remedial options for cleanup of contaminated soils, sediments, and fill material are limited. Options are further limited when the specific conditions of the AOCs are considered. The AOCs are relatively small areas with impacts limited to near-surface soil and shallow groundwater and is constrained by limited accessibility. The horizontal extent of the AOCs are shown on Figure E-1 (Appendix E). To the greatest extent possible, while still meeting the MTCA threshold criteria, the remediation alternatives were developed to avoid the removal of or impediment to adjacent buildings, structures, and vegetation.

8.1.1 Remedial Technology Screening

Candidate remedial technologies were identified and screened to develop potential cleanup alternatives for further evaluation. Candidate technologies applicable to impacted groundwater and soil are identified in many sources, including compilations such as those discussed in the Web-based Federal Remediation Technology Roundtable (FRTR). Screening technologies for sediment include methods described in USEPA's Assessment and Remediation of Contaminated Sediments Guidance Document (USEPA, 1994), Contaminated Sediment Remediation Guidance for Hazardous Waste Sites (USEPA, 2005), and the FRTR.

The screening of technologies applicable to impacted groundwater, soil, and sediment remediation included consideration of available methodologies to address contaminants in the various media, based on the methodologies' expected implementability, reliability, and relative cost. Physical conditions at the Property that limit or support particular technologies, and contaminant characteristics that limit the effectiveness or feasibility of a technology, were considered. Site conditions and IHS characteristics that were considered in the screening are described above in Section 6. Screening was consistent with MTCA evaluation criteria described further below for the remedial alternatives evaluation. Screening also considered modifying criteria associated with upland and aquatic land uses and avoidance of impacts to habitat resources.

The implementability (i.e., the relative ease of installation and the time required to achieve a given level of performance) of a technology is assessed based on site conditions. Implementability considers: (1) the technology's constructability (i.e., ability to build, construct, or implement the technology under actual site conditions); (2) the time required to achieve the required level of performance as defined by the CULs and POCs; (3) whether the technology can be permitted; (4) the availability of the technology; and (5) other technology-specific factors.

The USEPA states that, to assess the reliability of prospective technologies, an evaluator should identify the level of technology development; its performance record; and the inherent construction, operation, and maintenance problems of each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated should be eliminated (USEPA, 1988).

The remedial technologies that were identified and screened for the Property are briefly summarized below.

- **Upland Soil.** The remedial technologies considered for impacted soil include: engineered capping, removal, and off-site disposal. Other technologies, such as bioremediation, soil vapor extraction, thermal treatment, soil flushing, and chemical treatment, were considered but not retained for further evaluation due to difficult implementability and/or high maintenance requirements and costs.
- **Groundwater.** The remedial technologies considered for impacted groundwater include: containment (e.g., capping, hydraulic barriers) and monitored natural attenuation (MNA). Other technologies, such as in situ and ex situ treatment options, were considered but not retained for further evaluation due to potential low effectiveness, difficulty to implement, and/or cost effectiveness.

- **Sediment.** The remedial technologies considered for impacted sediment in the lagoon include: monitored natural recovery (MNR, i.e., chemical and biological processes); enhanced natural recovery (ENR, i.e., thin-layer capping [TLC]); engineered capping; and dredging and removal of contaminated sediment. MNR is judged not to be an effective stand-alone remedial technology for sediment application at the site and was not retained for further evaluation.

The remediation technologies that have been retained for development of remediation alternatives include soil removal, off-site landfill disposal, containment via capping, sediment removal via dredging, and institutional controls. These technologies are assembled into the following four remediation alternatives:

- Alternative 1a—Capping, MNA, ENR (TLC for sediment), and institutional controls.
- Alternative 1b—Capping, MNA, ENR (TLC for sediment), and institutional controls. This is similar to 1a but with an asphalt cap replacing portions of the soil cap.
- Alternative 2—Surface soil excavation, off-site disposal, MNA, engineered cap for sediment (1 foot thick), and institutional controls.
- Alternative 3—Combined excavation (to depth of contamination in soils); off-site disposal; limited asphalt capping; and dredging sediments, with dewatering and off-site disposal.

These remediation alternatives are described in the following sections.

8.2 Remediation Alternatives Descriptions

The components of remediation Alternatives 1a, 1b, 2, and 3 that have been developed for the AOCs are described below. AOCs addressed by the remedial alternatives are presented on Figure E-1. The conceptual layout and components of Alternatives 1a through 3 are presented on Figures E-2 through E-5, respectively, of Appendix E. These alternatives were developed and based upon breaking the exposure route of contamination to human and ecological receptors. Potential redevelopment options, such as filling in the lagoon and turning the Property into a park, are not addressed within this document. While the remedial action alternatives presented within this document may not fully align with future redevelopment considerations, the alternatives have been developed in a manner that integrates, to the extent feasible, with future land uses.

As described in Section 2, the Property is adjacent to Ebey Slough and contains a lagoon to which municipal stormwater is discharged before the lagoon discharges into Ebey Slough. Therefore, additional permitting and planning requirements apply to each remediation alternative.

For the purposes of this analysis, some excavation was assumed below the ordinary high water mark of the lagoon that discharges into the Ebey Slough channel; therefore, a U.S. Army Corps of Engineers (USACE) Clean Water Act permit may be required. However, it is recommended that requirements of pursuing this permit be discussed in a preapplication meeting between the City and the USACE in advance of the City pursuing any alternatives anticipated to require a Clean Water Act permit. Additional permits and planning measures may also be required, including but not limited to:

- Critical areas review and approval.
- Clearing and grading permit (including a grading plan and a drainage and erosion-control plan).

Once the concept of the design of the remediation has been determined, a preapplication meeting with the City planning department should be conducted to determine exactly what permits will be required and what mitigation measures may be required. Additional measures, such as complying with stormwater regulations under a future redevelopment scenario, and the associated costs are not included in this analysis.

8.2.1 Description of Alternative 1a

The components of Alternative 1a consist of containment via capping and institutional controls. It is assumed that little to no excavation of contaminated soil would be required under this alternative. A TLC would be applied over the contaminated sediments.

The cap would prevent human exposure to contaminated soil and protect against or prevent direct contact with rainfall runoff, and would not allow weathering or erosion of the contaminated soil beneath the cap. It is assumed that little to no excavation of contaminated soil would be required under this alternative. See Figure E-2 for details.

Capping. Surface areas within the AOCs would be capped with clean soil material (81,831 square feet, 1,515 cubic yards) and a TLC over the sediments (72,561 square feet, 1,344 cubic yards). Upland AOCs would be capped with 6 inches of clean soil material and seeded upon completion. The sediment capping (TLC) is described below.

The soil cover would be graded such that stormwater would run off the capped area rather than infiltrate. The top and sides of the capped area would be sloped to convey runoff water to the lagoon that drains to Ebey Slough.

Enhanced Natural Recovery. TLCs are commonly used at sediment remediation sites to augment natural physical, biological, and chemical processes promoting ENR. Although TLC is not intended to isolate and stabilize underlying contaminated sediments, layers of only (approximately) 2 to 6 inches generally suffice to isolate the bulk of contaminants from the benthic macroinvertebrates that inhabit surface sediments (National Research Council, 2003). The TLC would be a 6-inch-deep layer of a clean sandy material and would cover the entire lagoon bottom to isolate contaminants and promote recovery. For comparison purposes, this alternative assumes a recovery time of approximately ten years.

Institutional Controls. Because impacted soil would be left in place, institutional controls would be required under this alternative. As described in the MTCA regulations (WAC 173-340-440), institutional controls are intended to limit or prohibit activities that may interfere with the integrity of a cleanup action and that would result in risk of exposure to contaminated soil at the Property. These institutional controls may include on-site features (such as signs), educational programs (such as worker training and public notices), legal mechanisms (such as land use restrictions, environmental covenant, zoning designations, and building permit requirements), maintenance requirements for engineered controls (such as containment caps), and financial assurances.

For costing purposes of this alternative, an environmental covenant was assumed to be recorded against the Property, worker training would be implemented, and two large signs warning of potentially hazardous materials beneath soil and sediment would be installed. Because the Property is located adjacent to Ebey Slough, a portion of it lies within the 100-year floodplain; extra care will be required to maintain and repair the soil cap as necessary.

Compliance Monitoring and Maintenance. Under MTCA, all cleanup actions require compliance monitoring. Compliance monitoring includes protection monitoring, performance monitoring, and confirmational monitoring.

Confirmational monitoring would include monitoring the integrity of the cap with annual inspections. A long-term monitoring plan would be used to document long-term effectiveness and would conform to the general requirements of MTCA regulations (WAC 173-340-410). Maintenance and/or repairs would be conducted as necessary to maintain the integrity of the cap, as determined through the annual inspections.

8.2.2 Description of Alternative 1b

Alternative 1b consists of the same on-site components as Alternative 1a, but considers use of an asphalt cap area in addition to a clean soil cap (rather than an all soil cap). The asphalt cap area would be constructed over the existing gravel drive on the west side of the Property and includes 19,207 square feet (2,134 square yards) of asphalt. The soil cap covers 10,440 square feet (1,160 square yards). The sediment cap remains the same. This increased asphalt cap area is included because it could provide improved access to Ebey Slough, depending upon future land use. See Figure E-3 of Appendix E for details.

8.2.3 Description of Alternative 2

The components of Alternative 2 include a combination of excavation and capping with institutional controls. As discussed above in Section 2, historical operations are suspected as a potential contaminant source for soil and may have caused surface deposition of the contaminants from emissions or spills. Several soil samples collected at the Property indicate that, in certain areas of the Property, near-surface soil (and some deeper soil) is contaminated. However, because of limited historical data and the budgetary constraints associated with the investigation phase of this project, a limited number of soil samples was collected at depth. Therefore, the vertical extent of this contamination has not been fully delineated. Since the IHSs are mostly immobile in soil, it was assumed that it is primarily the near-surface soil that is contaminated (i.e., the top 1 foot) and that deeper soil layers are less impacted.

Following the above assumptions and after reviewing soil data, Alternative 2 includes excavation of the surface soil layer (top 1 foot), followed by capping the area with asphalt (or clean soil material) to contain any residual soil contamination. The combination of surface soil excavation and capping will prevent direct human contact as well as preventing surface water from infiltrating the site. Any residual contamination not removed by excavation may naturally attenuate over time beneath the cap. See Figure E-4 of Appendix E for details.

Excavation. The top 1 foot of soil would be excavated at the identified hot spots in the AOCs (approximately 3,017 cubic yards of soil). Excavation and staging of the soil would be conducted using best management practices (BMPs), including sedimentation-control and erosion-prevention practices, such as installing silt fences at the perimeter of the work area and using a stabilized construction entrance and exit. Additionally, dust-suppression measures (such as wetting soil) would be implemented during construction activities to minimize any airborne transport of contaminated soil particulates from the site.

Off-Site Disposal. Excavated contaminated soil would be disposed of in a Resource Conservation and Recovery Act (RCRA) Subtitle D landfill as nonhazardous waste. The nearest RCRA Subtitle D municipal solid waste disposal facility that accepts metal-, TPH-, and SVOC-contaminated soil is the Roosevelt Regional Landfill, which is approximately 290 miles from the Property, in Roosevelt, Washington. However, contaminated materials would be hauled to an Arlington, Washington, waste yard (20 miles from the Property), loaded onto railcars, and transported to the Roosevelt facility.

Demarcation Layer. Following excavation of the AOC, a continuous demarcation layer would be placed over the excavation floor before capping. This alternative assumes that, after excavation of surface contaminants, the contaminants in the subsoil may be left in place without harm to the surrounding environment. However, if contaminated soil is to be left in place, a visual barrier should be installed to provide a warning to future workers that potentially contaminated soil remains beneath the barrier, in the event that work requires penetration of the ground surface in the AOC. It is assumed that an orange geotextile fabric would be an appropriate demarcation layer. The geotextile liner would allow for easy placement without installation damage by heavy equipment, and it is permeable.

Backfilling. Following excavation and demarcation-layer placement, the area would be backfilled with clean fill material and subsequently restored as described below.

Site Restoration. Once excavation and backfilling have been completed, site restoration and slope stabilization would be completed. This would include implementing temporary and long-term erosion-control measures such as hydroseeding (lagoon banks and other vegetated areas) until the vegetative cover is sufficiently established to control erosion. The AOC would be returned to a grade that is similar to current conditions. It is assumed that the banks of the lagoon would be hydroseeded to prevent erosion of the soil cap material.

Compliance Monitoring and Maintenance and Institutional Controls. Compliance monitoring, maintenance, and institutional controls would also apply as described in Alternative 1.

8.2.4 Description of Alternative 3

The components of Alternative 3 include excavating soil containing IHSs above the CUL, removal of contaminated sediments through dredging, and off-site disposal. This alternative assumes the vertical extent of the contaminated soil varies as shown on Figure E-4 of Appendix E and reaches a maximum of 6 feet bgs. Several hand-auger soil samples, as well as a few soil boring samples, were collected by AESI during the investigation phase. The extent of contamination was further delineated during the 2015 investigation by collecting additional surface and deeper soil samples. Two of these deeper samples (EB-3-5 and GM-8) indicated metals concentrations above the associated MTCA Method A CULs. Therefore, it is conservatively assumed that deeper soil in the AOC may also be contaminated and should be addressed.

The contaminated sediment in the lagoon will be dredged, dewatered, and disposed of off-site. Sediment samples S-1 through S-8, collected by AESI during the investigation phase, indicated elevated levels of TPH (diesel and oil) and metals (zinc and mercury). These samples were collected from 18 and 30 inches bml. Sediment samples S-09 through S-13 were collected during the 2015 investigation from the top two feet of sediment. These samples also indicated concentrations above SMS screening levels for metals (nickel and zinc), SVOCs, and TPH. Therefore, for the purpose of this analysis, it is assumed that the lagoon will be dredged to a depth of 4 feet bml. See Figure E-5 of Appendix E for details.

Excavation. Soil would be excavated to depths as shown on Figure E-5 of Appendix E. These depths are based on soil and groundwater sample analytical results. Depths have been assumed in other areas where only limited data is available. Heavy equipment sized to accommodate the constraints and accessibility would be used to excavate the soil. Based on the AOC delineations and approximate hot spot locations, approximately 7,366 cubic yards of impacted material (about 11,049 tons) would be excavated and disposed of under Alternative 3. Excavation and staging of the soil would be conducted using BMPs, including sedimentation-control and erosion-prevention practices, such as installing silt fences at the perimeter of the work area and using a stabilized construction entrance and exit. Additionally, dust-suppression measures (such as wetting soil) would be implemented throughout construction activities to minimize any airborne transport of contaminated soil particulates. Areas that are excavated would be restored with the finished surface paved with asphalt.

Performance monitoring, consisting of soil sample collection and laboratory analysis for metals would be conducted at the limits of excavation to verify that the contaminated material has been removed.

Dredging. In the nearshore environment, sediment would be excavated in a strip extending about 50 feet toward the center of the lagoon, using land-based equipment to reach the target excavation depth. To access the nearshore excavation locations and to limit the amount of wet soil work, excavation would be conducted during periods of low tide, working in successive plots sized so that they can be excavated and backfilled during the low-tide window, thus minimizing inundation of the open excavation and release of turbidity to surface water.

Offshore dredging would be performed using water-based equipment near the center of the lagoon and outside the reach of the nearshore excavation equipment. Work would be limited to periods when the water depth is sufficient to accommodate the draft of the floating equipment. It is assumed that conventional clamshell dredging with an environmental bucket and barge dewatering would be conducted for the purposes of alternatives analysis. For the purposes of this feasibility study, it is assumed that a depth of 4 feet bml will sufficiently remove all contaminated sediment. With the assumed dredging depth of 4 feet across the entire lagoon, approximately 10,750 cubic yards of sediment will be removed for dewatering and off-site disposal.

Dewatering. Alternative 3 will require dewatering for all dredged sediment and any soils excavated in wet conditions (i.e., at depths of 5 feet or greater bgs). It is assumed that any dewatering of soil and sediment will require treatment and off-site disposal. The assumed 0.3 porosity of total excavated sediment volume and 0.1 porosity of total soil excavated (from depths 5 feet or greater bgs) volume will require approximately 723,000 gallons of dewatering. It is also assumed that solids will be disposed of with excavated material.

Off-Site Disposal. Off-site disposal of contaminated soil and sediment would be included as described in Alternative 2.

Backfilling. Following upland area excavation and verification soil sampling and analysis, the area would be backfilled with clean fill material and then restored as described below.

Site Restoration. After completion of excavation, verification soil sampling and analysis, and backfilling, site restoration and slope stabilization would be completed. This would include implementing temporary and long-term erosion-control measures such as hydroseeding until the vegetative cover is sufficiently established to control erosion. The site would be returned to a grade that is similar to current conditions. For the purposes of this analysis, it is assumed that six trees would be replanted to mitigate conditions caused by the removal of the six trees in the AOC.

Stormwater Management. The excavation work would be conducted in accordance with the substantive requirements of the National Pollutant Discharge Elimination System for stormwater discharges from construction areas to minimize erosion and to prevent enhanced sediment loading to stream drainages or Ebey Slough. A stormwater pollution prevention plan (SWPPP) that stipulates erosion-prevention, slope-stabilization, and drainage-collection measures would be developed and implemented. The SWPPP would also provide measures to protect the surface waters of Ebey Slough, and must be in place before construction begins.

Compliance Monitoring and Maintenance. Under MTCA, all cleanup actions require compliance monitoring. Compliance monitoring includes protection monitoring, performance monitoring, and confirmational monitoring.

Protection monitoring consists of monitoring to confirm that human health and the environment are protected during construction, operation, and maintenance, and would be addressed in a construction health and safety plan (HASP).

Performance monitoring would consist of documenting that the full extent of the impacted soil has been removed from the Property. This would include inspecting and collecting samples at the limits of the excavation to verify that no impacted soil remains, as well as sampling the underlying soil to verify that the CUL has been met.

Confirmational monitoring, which consists of monitoring to confirm long-term effectiveness of the cleanup action once cleanup standards have been attained, would not be required for this alternative because all of the material exceeding the soil CULs and sediment screening levels would be removed from the Property.

9 MTCA EVALUATION CRITERIA

Criteria that should be used to evaluate remediation alternatives are defined in the MTCA regulation (WAC 173-340-360). The purpose of the evaluation is to identify the advantages and disadvantages of each alternative as part of the decision-making process. The criteria are applied to Alternatives 1a through 3 presented in Section 8. The specific criteria are all considered important, but they are grouped into three sets of criteria in the decision-making process. These criteria are as follows:

- Threshold requirements:
  - Protect human health and the environment.
  - Comply with cleanup standards (WAC 173-340-700 through 173 340 760).
  - Comply with applicable state and federal laws (WAC 173-340-710).
  - Provide for compliance monitoring (WAC 173-340-410 and 173-340-720 through 173-340-760).
- Other requirements:
  - Use permanent solutions to the maximum practicable extent. If a disproportionate cost analysis is used, then evaluate:
    - Protectiveness
    - Permanence
    - Cost
    - Effectiveness over the long term
    - Management of short-term risks
    - Technical and administrative implementability
  - Consideration of public concerns.
- Restoration time frame.

Alternatives 1a, 1b, and 2 include institutional controls and compliance monitoring. Institutional controls may include on-site features such as signs, and legal mechanisms such as lease restrictions, deed restrictions, land use and zoning designations, and building permit requirements. Compliance monitoring is described in Section 9.1 below. Alternative 3 removes all contaminated material from the Property, so institutional controls would not be required, but compliance monitoring would still be required.

An alternative must meet the threshold criteria to be eligible for selection as a remedy. The expected performance of each alternative is assessed to identify its ability to comply with cleanup standards and applicable state and federal laws. If the alternative is deemed to comply, the subsequent evaluation of the alternative will be based on the remaining nine evaluation factors. The alternative that most closely satisfies these criteria will be the preferred alternative for the site.

9.1 Threshold Requirements

Overall Protection of Human Health and the Environment

This evaluation criterion (WAC 173-340-360(3)(f)(i)) assesses the degree to which existing risks are reduced, the time required to reduce risks at the site and attain cleanup standards, on- and off-site risks resulting from implementing the alternative, and improvement of overall environmental quality.

Comply with Cleanup Standards

The remediation alternatives presented in this analysis are assessed to determine whether they comply with MTCA cleanup standards (WAC 173-340-700 through WAC 173-340-760).

Comply with Applicable State and Federal Laws

The remediation alternatives presented herein are assessed to determine whether they comply with other applicable state and federal laws (WAC 173-340-710).

Provide for Compliance Monitoring

Compliance monitoring requirements are defined in WAC 173-340-410 and WAC 173-340-720 through WAC 173-340-760.

The institutional controls and long-term performance monitoring associated with each alternative vary slightly. Therefore, the cost associated with institutional controls and compliance monitoring is included in the conceptual-level cost estimate prepared for each alternative.

9.2 Other Requirements

Other requirements for remedial alternatives that must be evaluated once they meet threshold requirements are defined in WAC 173-340-360(2)(b) to include the use of permanent solutions to the maximum extent practicable (WAC 173-340-360(3)) and the provision of a reasonable restoration time frame (WAC 173-340-360(4)).

9.2.1 Use of Permanent Solutions to the Maximum Extent Practicable

The use of permanent solutions to the maximum extent practicable is a primary evaluation criterion for the remedial alternatives being considered for near-surface soil. The specific criteria that must be evaluated are specified in WAC 173-340-360(3)(f) and are discussed below.

Protectiveness. The overall protectiveness provided by the alternative to human health and the environment, including the degree to which existing risks are reduced, the time required to reduce risk at the site and attain cleanup standards, the on-site and off-site risks resulting from implementing the alternative, and the improvement of the overall environmental quality provided by the alternative, are evaluated by this criterion.

Permanence. This criterion evaluates the degree to which the alternative permanently reduces the toxicity, mobility, or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous-substance releases and sources of releases, the degree of irreversibility of waste-treatment processes, and the characteristics and quantity of treatment residuals generated.

Cost. This criterion evaluates the costs associated with the alternative, including direct capital costs (e.g., construction, equipment, land, services), indirect capital costs (e.g., engineering, supplies, contingency), long-term monitoring costs, operation and maintenance (O&M) costs, and periodic costs. To evaluate the relative cost for the remedial alternatives, various cost-estimating resources were used. This is necessary so that the relative cost of each alternative can be evaluated to help identify the most practicable cleanup alternative using the disproportionate-cost analysis procedures presented in WAC 173-340-360(3)(e) and summarized below.

One of the primary goals in developing cost estimates for alternative evaluation is to ensure that costing procedures and assumptions are consistent between alternatives to reduce the potential for bias in one alternative assumption compared to other alternative assumptions. This approach presents a level playing field in evaluating the relative costs of multiple alternatives. This cost-estimating approach is appropriate for cleanup alternative analysis costs. However, because of the conservative approach to estimating mass and area, the cost estimates are not appropriate for use in other applications. Cost estimates that are more accurate will be developed during remedial design as part of the bidding and contractor-selection process.

Effectiveness over the Long Term. Long-term effectiveness includes the degree of certainty that the alternative will be successful, the reliability of the alternative during the period of time that hazardous substances are expected to remain on site at concentrations that exceed CULs, the magnitude of residual risk with the alternative in place, and the effectiveness of controls required to manage treatment residues or remaining wastes. The following types of cleanup action components can be used as a guide, in descending order, when assessing the relative degree of long-term effectiveness: reuse or recycling; destruction or detoxification; immobilization or stabilization; on-site or off-site disposal in an engineered, lined and monitored facility; on-site isolation or containment with attendant engineering controls; and institutional controls and monitoring.

Management of Short-Term Risks. This criterion evaluates the risk to human health and the environment associated with the alternative during construction, and the effectiveness of measures taken to manage such risks.

Technical and Administrative Implementability. This criterion assesses whether and how practically the alternative can be implemented, including consideration of whether the alternative is technically possible; availability of necessary off-site facilities, services, and materials; administrative and regulatory requirements; scheduling; size; complexity; monitoring requirements; access for construction operations and monitoring; and integration with existing site operations and other current or potential remedial actions.

The Disproportionate-Cost Analysis Procedure

Alternatives that meet threshold requirements for cleanup actions are assessed to determine which provide permanent solutions to the maximum extent practicable, consistent with WAC 173-340-360(3). This assessment is based on a disproportionate-cost analysis.

In the disproportionate-cost analysis, the alternatives are ranked from greatest to least degree of permanence. The cleanup action alternative evaluated in this feasibility study, as described in Sections 7 through 11 of this document, that provides the greatest degree of permanence shall be the baseline cleanup action alternative (WAC 173-340-360(3)(e)(ii)(B)). For the purposes of this analysis, Alternative 3 was identified as the cleanup action with the greatest degree of theoretical permanence (as defined in WAC 173-340-200 for permanent cleanup actions). Alternatives 2, 1b, and 1a have the next greatest degrees of permanency, in descending order.

The alternatives are compared by evaluating six cost/benefit criteria: protectiveness; permanence; cost; effectiveness over the long term; management of short-term risks; and technical and administrative implementability. These evaluation criteria were defined above (Section 9.2.1). The regulation gives a general discussion of the types of factors to consider when evaluating each criterion.

When assessing whether a cleanup action uses permanent solutions to the maximum extent practicable, the test used (WAC 173-340-360(3)(e)(i)) is as follows:

> Costs are disproportionate to benefits if the incremental costs of the alternative over that of a lower cost alternative exceed the incremental degree of benefits achieved by the alternative over that of the other lower cost alternative.

As stated in WAC 173-340-360(3)(3)(ii)(C):

> The comparison of benefits and costs may be quantitative, but will often be qualitative and require the use of best professional judgment. In particular, the department has the discretion to favor or disfavor qualitative benefits and use that information in selecting a cleanup action. Where two or more alternatives are equal in benefits, the department shall select the less costly alternative provided the requirements of subsection (2) of this section are met.

Quantitative measures of costs and benefits, if performed, must be made in units that are common among the alternatives so that the comparison can be meaningful. It is best if the units of costs and the units of benefits can be the same, such as dollars. This is rarely possible at environmental cleanup sites. Costs are estimated in dollars, but quantitative measures of benefits are usually available only in terms of mass or volume of contaminant removed or some other physical, nonmonetary measure.

One quantitative measure of benefits that can be assessed is the number of IHS-receptor pathways that are present before and after a remedial alternative is implemented. Where benefits cannot be quantified in common units, they will be assessed qualitatively.

9.2.2 Restoration Timeframe

Cleanup actions must provide for a reasonable restoration time frame. The process used to determine whether an alternative provides for a reasonable restoration time frame is outlined in WAC 173-340-360(4). The factors that are considered include:

- The potential risks posed by the site to human health and the environment
- The practicability of achieving a shorter restoration time frame
- Current uses of the site and surrounding areas, and associated resources that are or may be affected by releases from the site
- Potential future uses of the site and surrounding areas, and associated resources that are or may be affected by releases from the site
- Availability of alternative water supplies
- Likely effectiveness and reliability of institutional controls
- Ability to control and monitor migration of hazardous substances from the site
- Toxicity of the hazardous substances
- Natural processes that reduce concentrations of hazardous substances and that have been documented as occurring at the site or under similar site conditions

10 EVALUATION OF REMEDIATION ALTERNATIVES

The four remediation alternatives considered are evaluated per MTCA criteria in this section. Descriptions of the evaluation criteria used to evaluate the alternatives are provided in Section 8. Subsequent sections present evaluations of the four remediation alternatives as follows:

- Alternative 1a—Soil Capping, MNA, ENR (TLC for sediment, 0.5 foot thick), and institutional controls.

- Alternative 1b—Soil and Asphalt Capping, MNA, ENR (TLC for sediment, 0.5 foot thick), and institutional controls. This is similar to 1a but with an asphalt cap replacing portions of the soil cap presented under Alternative 1a.
- Alternative 2—Surface soil excavation, off-site disposal, MNA, engineered cap for sediment (1 foot thick), and institutional controls.
- Alternative 3—Combined excavation (to depth of contamination in soils) and dredging sediments, with dewatering and off-site disposal.

The remediation alternatives are evaluated through comparative analysis in this section. The comparative analysis assesses the relative capability of the alternatives, as applicable to the IHSs identified for the Property, to meet threshold requirements, to use permanent solutions to the maximum extent practicable, and to provide a reasonable restoration time frame. A disproportionate-cost analysis is used to determine whether the cleanup action uses permanent solutions to the maximum practicable extent. The procedure for disproportionate-cost analysis is summarized in Section 9.2.1. The factors assessed to determine whether the restoration time frame is reasonable are summarized in Section 9.2.2. The outcome of this assessment is summarized in Tables E-7 and E-8 contained in Appendix E.

10.1 Comparative Analysis of Alternatives

The relative capability of Alternatives 1a, 1b, 2, and 3 to meet threshold requirements, an assessment of whether they use permanent solutions to the maximum practicable extent (disproportionate-cost analysis), and an assessment of whether the restoration time frames the alternatives achieve are reasonable are presented below as applicable to the site.

10.1.1 Threshold Requirements

Threshold requirements required for cleanup actions are defined in WAC 173-340-360(2). Requirements include protection of human health and the environment, compliance with MTCA cleanup standards and applicable state and federal laws, and provisions for compliance monitoring. Since protection and performance monitoring are a part of each of the alternatives in this FSA, they are equal in this regard, as shown below.

Protect Human Health and the Environment

Alternatives 1a, 1b, 2, and 3 will eliminate or mitigate the risk associated with the direct contact by site workers and the public with IHSs in near-surface soil and sediments. The alternatives reduce this risk by removing contaminated soil and sediment through excavation, dredging, and/or containing the contaminated area by capping. Alternatives 1a and 1b do not include excavation of the contaminated soil or sediment, but rather place a cap on AOCs; however, all four alternatives are protective of human health and the environment.

The four alternatives will break the pathways by which IHSs can reach human receptors. Based on the definition of a permanent cleanup action in WAC 173-340-200, Alternative 3 is judged to provide a greater degree of theoretical permanence and a greater degree of protection of human health and the environment than the other three alternatives.

Comply with MTCA Cleanup Standards and Applicable State and Federal Laws

The CULs for the site are based on the requirements of the SMS and MTCA Methods A and B. The CULs are currently exceeded in the AOCs (see Figures 6 through 8).

Alternatives 2 and 3 include excavation of contaminated soil to attain the CULs. Alternative 3 also includes dredging of contaminated sediments in the lagoon to attain CULs. Alternatives 1a and 1b will break the exposure pathway by capping the AOCs; since the site constituents are mostly immobile in soil, IHS concentrations are not expected to become an issue over time. Although Alternatives 1a and 1b are not expected to directly reduce the concentration of IHSs, they will provide the protection through containment as a risk-reduction measure. Alternative 2 will reduce some of the soil impacts by excavating the top 1 foot of soil, and then capping the upland and sediment AOCs.

Since Alternative 3 is assumed to remove all of the contaminated soil and sediments, this alternative is expected to meet the CULs that have been established for site IHSs. Alternative 2 may leave some contaminated material beneath surface soils, but will remove most contaminated soil in the upland AOCs. Additionally, Alternatives 1a and 1b include placing a cap over impacted soil and sediments to eliminate the direct-contact exposure pathway. Alternatives 1a, 1b, and 2 will employ institutional controls, as needed, to mitigate the risk from any contaminated soil remaining in place. Thus, the four alternatives comply with applicable laws.

10.1.2 Disproportionate-Cost Analysis

The disproportionate-cost analysis assesses whether Alternative 1a, 1b, 2, and 3 provide permanent solutions to the maximum extent practicable.

Protectiveness

Each alternative includes physical and administrative controls and BMPs that will reduce the potential for human exposure to IHSs. Alternative 3 breaks the direct-contact exposure pathway in the AOCs through excavation, dredging, and off-site management of impacted soil and sediment. Alternatives 1a and 1b do not include excavation of contaminated soil or dredging of contaminated sediment, but rather place engineered caps on the AOCs to break the direct-contact exposure pathway. Alternative 2 combines excavation and capping to reduce risk. All four alternatives are protective. Alternative 3 is judged to provide greater protectiveness than the other alternatives because it completely removes the direct-contact exposure risk. Alternative 2 provides greater protectiveness than Alternatives 1a and 1b, but less than Alternative 3.

Permanence

Alternative 3 will permanently reduce contaminant mass in the AOCs by excavating impacted soil and dredging impacted sediment. Alternative 2 will permanently reduce most of the contaminant mass in the AOCs by excavating some of the impacted soil, but will leave the impacted sediment beneath the engineered cap in the lagoon. Capping will reduce the potential for workers or visitors to contact IHSs in near-surface soil in Alternatives 1a and 1b, but all of the contaminant mass will remain in these alternatives.

Alternatives 2 and 3 are judged to provide a greater degree of theoretical permanence than Alternatives 1a and 1b, since they involve removal of contaminated media from the AOCs. Alternative 3 also provides removal of contaminated sediments from the lagoon and, therefore, provides the greatest permanence of all the alternatives. Alternative 2 is judged to provide a greater degree of permanence for the contaminated soil and sediment than Alternatives 1a and 1b, since Alternative 2 includes excavation of contaminated soil to 1 foot bgs and includes a thicker engineered cap for sediments. Alternatives 1a and 1b are equivalent in regard to containment by capping.

Cost

The costs of implementing Alternatives 1a, 1b, 2, and 3 over ten years are estimated to total approximately $913,000, $1,161,000, $2,890,000, and $5,956,000, respectively, assuming a standard feasibility study accuracy range of -35 to +50 percent (USEPA, 2000). Because Alternative 3 is technically the most permanent alternative, it serves as the baseline against which other alternatives are compared. The estimated cost of implementing Alternative 1a is 6.5 times less expensive than Alternative 3. Alternative 1b is roughly 1.3 times more expensive than Alternative 1a and 5 times less expensive than Alternatives 3. Alternative 2 is half the cost of Alternative 3. The components of these costs and the assumptions used in the estimates are provided in Tables E-1 through E-6 of Appendix E.

Alternatives 2 and 3 permanently remove contaminated soil in the AOCs (although Alternative 2 removes only the upper 1 foot of contaminated soil). Alternative 3 also permanently removes contaminated sediments in the lagoon, while the other three alternatives provide a cap. All four alternatives prevent direct contact between contaminants and receptors. However, Alternatives 2 and 3 are much more costly. Because of this large incremental cost difference with negligible increase in risk-reduction benefit, and the fact that the four alternatives reduce risks to possible receptors, Alternatives 1a and 1b are judged to be more cost-effective than the other alternatives. Alternative 1a is judged to be the most cost-effective alternative.

Cost Estimate Period of Analysis. The cost estimates assume a ten-year O&M period for each alternative. According to USEPA guidance, the period of analysis for a feasibility study cost estimate typically should be equivalent to the project duration for implementing the remedial action through project completion (commonly referred to as the project life cycle) (USEPA, 2000). For most of the Property remediation alternatives, however, the project duration necessary for reducing contaminant concentrations below the CUL, as represented by the restoration time frame (Section 10.1.3), is uncertain because of the persistent nature of metals, hydrocarbons, and SVOCs in the subsurface. It is assumed that this uncertainty applies to all of the alternatives evaluated where some quantity of impacted soil and/or sediment may potentially remain in place (either under a containment cap or a TLC cap).

As a simplifying assumption, a ten-year O&M period was assumed in estimating costs for the remediation alternatives. The O&M period begins after construction of the remedy and consists of monitoring and maintenance activities to ensure the integrity of the constructed remedy and institutional controls. The assumed ten-year O&M period represents one repeating cycle of annual and periodic costs in a potentially longer total project life cycle. This ten-year cycle is based on the least frequent periodic cost item (refurbishing/replacing caps every ten years in Alternatives 1a, 1b, and 2). Since all of the alternatives involve long-term O&M activities, the ten-year O&M period was applied to each to facilitate an equal comparison of costs.

Effectiveness over Long Term

Alternatives 2 and 3 would provide for long-term IHS concentration reduction by permanently removing IHS mass in soil (and sediment under Alternative 3), and the four remediation alternatives are effective over the long-term in preventing human exposure by direct contact.

The four alternatives will protect workers from direct contact with IHSs. Alternative 2 will meet the upland CULs by excavating the contaminated soil. Alternative 3 will meet upland and marine sediment CULs by excavating and dredging contaminated soil and sediment. Thus, Alternative 3 is judged to be the most effective over the long term, followed by Alternative 2.

Management of Short-Term Risks

The four alternatives will use existing procedures to implement institutional controls and BMPs. Short-term risks to construction workers during the installation of the containment surfaces (capping) and during excavating and/or dredging could be reduced by adherence to a HASP prepared specifically for the planned work and expected conditions at the site. The procedures contained in a HASP have been shown to effectively manage the limited risk associated with these activities.

The remediation alternatives employ relatively common, on-site construction activities with similar short-term risks. However, the handling and off-site transport of contaminated soil and/or sediments poses additional short-term risks, such as potential direct-contact exposure risk to the transport personnel and risk of cross-contamination in the event of material loss or spillage during transport. For these reasons, Alternative 3 is judged to have greater short-term risks than Alternative 2, which involves off-site transport of less waste material. Alternatives 1a and 1b present the least short-term risk.

Technical and Administrative Implementability

The technologies employed by each of the alternatives are common to the construction industry, and, with controls in place to prevent worker exposure, can be readily implemented. The Property is located in an industrial waterfront area with a marina, railroad embankment, and nearby park. Nearby access to services, materials, supplies, and skilled labor should be readily available.

The excavation and hauling required for Alternatives 2 and 3 may be staged to limit disruptions to the local infrastructure to the extent practicable, but some minor business and traffic disruptions are likely to occur. Alternative 2 would have fewer disruptions than Alternative 3. Alternatives 1a and 1b likely would present the fewest disruptions due to construction.

Alternative 3 would have to overcome greater technical obstacles during excavation and dredging activities, in comparison to Alternatives 1a, 1b, and 2. Alternatives 2 and 3 would require characterization and acceptance of the contaminated soil (and/or sediment) waste by the disposal facility. Alternatives 1a, 1b and, potentially, Alternative 2 would require obtaining an environmental covenant for the remaining IHSs in the soil and sediment. Alternative 3 likely would not require an environmental covenant, since it is assumed that all of the contaminated soil and sediment in the AOCs will be removed. The four alternatives are technically implementable, but all would require permitting coordination with the City and the USACE for in-water work. USACE permits are necessary for any work, including dredging and construction, in navigable waters. Alternatives 1a and 1b may be more implementable than the other alternatives, since they require less disturbance of the subsurface. Therefore, all alternatives are judged to be administratively implementable, but Alternatives 1a and 1b may be more administratively implementable than Alternatives 2 and 3.

Summary of Disproportionate Cost Analysis

The total costs to implement Alternatives 1a, 1b, 2, and 3 are estimated at approximately $913,000, $1,161,000, $2,890,000, and $5,956,000 (-35 to +50 percent), respectively. The alternatives assume a ten-year O&M period, as discussed above. Cost estimate details are provided in Appendix E.

Alternatives 2 and 3 are estimated to cost approximately $2,890,000 and $5,956,000, respectively. These costs do provide greater reduction in current risk (to receptors) and potentially greater future risk reduction than Alternatives 1a and 1b, which cost approximately $913,000 and $1,161,000, respectively. The four alternatives break the exposure pathways by which IHSs in contaminated soil and sediment can reach potential receptors.

Alternatives 2 and 3 are judged to provide greater permanence and long-term effectiveness than Alternatives 1a and 1b. Alternatives 2 and 3 have greater short-term risks than Alternatives 1a and 1b. Alternatives 1a and 1b present the fewest short-term risks. The alternatives have comparable overall implementability, although, as described above, Alternatives 1a and 1b may be more administratively implementable than Alternatives 2 and 3. All four alternatives use routine technologies. According to this analysis, Alternatives 2 and 3 are judged to use permanent solutions to a greater extent than Alternatives 1a and 1b. However, Alternative 2 is over three times more costly than Alternative 1a (an incremental cost difference of approximately $1,977,000) and Alternative 3 is over six times the cost of Alternative 1a (an incremental cost difference of approximately $5,043,000). Thus, of the four remediation alternatives evaluated, Alternative 1a uses permanent solutions to the greatest practicable extent.

10.1.3 Restoration Time Frame Evaluation

Remedial alternatives must provide for a reasonable restoration time frame, consistent with WAC 173-340-360(2)(b)(ii). A number of factors are considered to determine whether an alternative provides for a reasonable restoration time frame (WAC 173-340-360(4)(b)), as summarized in Section 9.2.2. This section evaluates the restoration time frames potentially achieved by Alternatives 1a, 1b, 2, and 3.

The four remediation alternatives can successfully address the exposure risk posed by the IHSs in the AOCs, although Alternatives 2 and 3 provide more permanent remedies than Alternatives 1a and 1b, which leave some quantity of contaminated soil/sediment in place but contained beneath a cap (asphalt, soil, and sediment caps). Alternative 3 is assumed to remove all of the contaminated soil from the AOCs. Alternative 2 is assumed to remove most of the contaminated soil from the upland AOCs, but will cap contaminated sediments. In Alternatives 2 and 3, the removed soil is contained off site in a controlled landfill facility.

Alternatives 1a and 1b do not directly reduce the toxicity or volume of the IHSs contained in soil or sediment, but do reduce potential migration of impacted soil and sediment from the AOCs and prevent direct contact through capping containment. The time needed for the low concentrations of contaminants to fall below the CUL is expected to be much longer in Alternatives 1a and 1b than in Alternatives 2 and 3, since there is no active removal in Alternatives 1a or 1b, whereas Alternatives 2 and 3 remove contaminated soil from the upland AOCs. A portion of the contaminated soil will be removed in Alternative 2, leaving less contaminant mass in place than in Alternatives 1a and 1b, which may require a shorter restoration time frame. The restoration time needed in Alternatives 1a and 1b would still be much longer than in Alternatives 2 and 3. However, it would not be practicable to try to achieve a shorter restoration time frame by using in situ treatment technologies to destroy contaminant mass in place.

The construction work in the four alternatives may disrupt other site operations and potentially expose workers and site visitors to uncovered or excavated contaminated soil. However, such disruptions would be limited to the short construction period needed to implement the remediation alternatives. BMPs would be employed during construction to control potential risks and disruptions associated with the work.

The current use of the Property is primarily for marine maintenance operations. The assumed future use, based on existing City planning documents, is public open space with potential mixed-use development. As the City proceeds with analysis of redevelopment options, consideration of how future redevelopment could integrate with cleanup is encouraged. Because of the limited extent and small amount of contamination in the AOCs, there is little potential for surrounding areas and associated resources to be affected by releases at the Property. In the four alternatives, future releases are prevented by either removing the contaminant mass from the AOCs or containing it in place. Where contaminant mass is contained in place, institutional controls would be implemented, which would include the filing of an environmental covenant for the property, installing warning signage, and educating site personnel on the condition of the AOCs and associated risks. These types of institutional controls are commonly applied and have been shown to be effective and reliable.

11 PREFERRED REMEDIATION ALTERNATIVE

The remediation alternative that most closely satisfies the threshold criteria and other MTCA requirements discussed in Sections 8.1 and 8.2 is the preferred alternative for the Property. Based on the evaluation of alternatives presented in Section 10, the preferred remediation alternative is Alternative 1a, which includes capping the impacted upland portions of the Property and placing a

TLC cap over the contaminated sediments. This section discusses the rationale for selecting the preferred alternative.

All four alternatives comply with the MTCA threshold requirements for consideration as a cleanup action and provide for a reasonable restoration time frame. Aside from estimated costs, the main differences between the alternatives are how they fulfill the MTCA requirement that cleanup actions be permanent to the maximum extent practicable (that is, the tradeoffs between the alternatives in terms of how they address the disproportionate-cost analysis criteria). Under MTCA, the most practicable permanent solution is to be used as the baseline against which other alternatives are compared.

Although Alternatives 2 and 3 are the most permanent, these alternatives cost significantly more than Alternative 1a. All four alternatives reduce risk through eliminating the exposure routes. However, Alternative 1a is judged to use permanent solutions to the maximum extent practicable. Alternative 1b has significantly larger costs than Alternative 1a but does not provide much more protectiveness. Alternatives 2 and 3 also have significantly higher costs (although they do offer an increase in protectiveness). Based on this large incremental cost difference, and the fact that all four alternatives adequately address risks to possible receptors, Alternative 1a is the preferred alternative. When compared to the other alternatives, Alternative 1a is:

- Equally or more technically and administratively implementable
- Equally or more financially implementable

The conceptual-level (-35 to +50 percent) total cost for implementing Alternative 1a is estimated to be approximately $913,000.

LIMITATIONS

The services undertaken in completing 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.

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, or the use of segregated portions of this report.

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TABLES

Table 1
Sample and Analysis Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Sample Location	Potential Source Area[a]	Sample Type	Well Screen Depth (feet bgs)	Sample Matrix	Number of Samples	Sample Collection Depth (feet bgs[b])	Analyses
GM-1	Former UST—further characterization of UST and downgradient area. Known TPH soil contamination.	Boring completed as monitoring well	4 to 14	Soil	2 (one field duplicate)	12	Table 830-1 GRO suite[c], TPH-Dx, and lead
				Groundwater	1	9	Table 830-1 GRO suite[c], TPH-Dx, lead, nitrate, manganese, iron II, sulfate, and methane
GM-2	Former UST—further characterization of UST and downgradient area. Known TPH soil contamination.	Boring completed as monitoring well	5 to 15	Soil	1	6.5	Table 830-1 GRO suite[c], TPH-Dx, and SS metals[d]
				Groundwater	1	9	Table 830-1 GRO suite[c], TPH-Dx, and SS metals[d]
GM-3	Former UST—further characterization of UST and downgradient area. Known TPH and cPAH soil contamination.	Boring completed as monitoring well	5 to 15	Soil	1	6	Table 830-1 GRO suite[c], TPH-Dx, cPAHs, HVOCs, BY metals[e]
				Groundwater	1	9	Table 830-1 GRO suite[c], TPH-Dx, cPAHs, HVOCs, BY metals[e], nitrate, manganese, iron II, sulfate, and methane
GM-4	Downgradient of former UST and maintenance shop—further characterization of downgradient area.	Boring	4 to 14	Soil	1	12.5	HVOCs, TPH-Gx, and TPH-Dx
				Groundwater	1	9	HVOCs, TPH-Gx, and TPH-Dx
GM-5	Downgradient of former UST; in vicinity of boat shop.	Boring completed as monitoring well	3.5 to 13.5	Soil	1	4	TPH-Gx, TPH-Dx, BTEX
				Groundwater	1	8	TPH-Gx, TPH-Dx, BTEX
GM-6	Downgradient of former UST; in vicinity of boat shop.	Boring	8.5 to 13.5	Soil	1	4	HVOCs, TPH-Gx, TPH-Dx, SS metals[d]
				Groundwater	1	11	HVOCs, TPH-Gx, TPH-Dx, SS metals[d]
GM-7	In vicinity of prop shop at southeast area of site. Known shallow groundwater contamination by TPH and metals.	Boring completed as monitoring well	5 to 15	Soil	1	3	TPH-Gx, TPH-Dx, HVOCs, BY metals[e], and cPAHs
				Groundwater	1	9	TPH-Gx, TPH-Dx, HVOCs, BY metals[e], cPAHs, nitrate, manganese, iron II, sulfate, and methane
GM-8	Central-south area of property. Downgradient of marina area.	Boring	5 to 15	Soil	1	4.5	TPH-Gx, TPH-Dx, and BTEX
				Groundwater	1	10	TPH-Gx, TPH-Dx, and BTEX
GM-9	Western area of property.	Boring completed as monitoring well	3.5 to 13	Soil	1	2	TPH-Gx, TPH-Dx, BTEX, and SS metals[d]
				Groundwater	1	9	TPH-Gx, TPH-Dx, BTEX, and SS metals[d]
GM-10	Northern area of property.	Boring	4 to 14	Soil	1	4	TPH-Gx, TPH-Dx, and BTEX
				Groundwater	1	9	TPH-Gx, TPH-Dx, and BTEX
S-09	Northern reaches of lagoon, adjacent and downgradient of former UST, stormwater outfall, and historically elevated detections.	Sediment (Tier 1)	NA	Sediment	1	0 to 0.33	SMS Marine COIs, TPH-Dx, dioxins, and organotins
		Sediment (Tier 2)	NA	Sediment	1	0.33 to 1.2	
S-10		Sediment (Tier 1)	NA	Sediment	1	0 to 0.33	
		Sediment (Tier 2)	NA	Sediment	1	0.33 to 1.8 (archived)	
S-11		Sediment (Tier 1)	NA	Sediment	1	0 to 0.33	
		Sediment (Tier 2)	NA	Sediment	1	0.33 to 2.0	
S-12		Sediment (Tier 1)	NA	Sediment	1	0 to 0.33	
		Sediment (Tier 2)	NA	Sediment	1	1.2 to 2.3 (archived)	
S-13	Downgradient of current repair shop.	Sediment (Tier 2)	NA	Sediment	1	0 to 0.33	SMS Marine COIs, TPH-Dx, dioxins, and organotins
		Sediment (Tier 2)	NA	Sediment	1	0.33 to 1.2 (archived)	

NOTES:

bgs = below ground surface.

BTEX = benzene, toluene, ethylbenzene, and total xylenes.

BY = boatyard (metals).

cPAH = carcinogenic polycyclic aromatic hydrocarbon.

EDB = 1,2-dibromoethane.

EDC = 1,2-dichloroethane.

GRO = gasoline-range organics.

HVOC = halogenated volatile organic compound.

MTBE = methyl tert-butyl ether.

NA = not applicable.

SMS Marine COIs = Marine Sediment Management Standards Chemicals of Interest List.

SS = site-specific (metals).

TPH = total petroleum hydrocarbons.

TPH-Dx = total petroleum hydrocarbons—diesel- and lube-oil range.

TPH-Gx = total petroleum hydrocarbons—gasoline-range.

UST = underground storage tank.

[a] Specified geochemical parameters (nitrate, iron II, sulfate, sulfide, chloride, and methane) to be analyzed at selected borings.

[b] For sediment samples, refers to depth below mudline.

[c] Ecology Table 830-1 GRO suite includes TPH-Gx, BTEX, n-hexane, EDB, EDC, MTBE, naphthalenes, and total lead.

[d] Site-specific (SS) metals include metals confirmed as present at or above cleanup levels at site—arsenic, lead, and cadmium. Related metals of concern are copper and mercury.

[e] Potential metals of concern for BY antifouling painting use include lead, zinc, copper, arsenic, and mercury; additional metals of concern due to historical operations at adjoining area include cadmium, tin, and antimony.

Table 2
Sediment Sample Location Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Sample Location	Water Depth (feet)	Sample Name	Sample Depth Range (feet below mudline)	Observations
S-09	4	S-09-0.33	0.0-0.33	Organic debris, loose black silt with fine sand, sheen, and hydrocarbon-like odor.
		S-09-1.2	0.33-1.2	Black to dark brown, poorly graded, fine sand; 20% fines; trace organic debris; sheen.
S-10	3.5	S-10-0.33	0.0-0.33	Black, loose silt with organic debris; 30% wood chips/sawdust; sheen; hydrocarbon-like odor.
		S-10-1.8	0.33-1.8	Black, loose silt with organic debris; 30% wood chips/sawdust; sheen; hydrocarbon-like odor.
S-11	3.2	S-11-0.33	0.0-0.33	Black, silt with fine sand, loose, wet organic debris, sheen, organic and hydrocarbon-like odor.
		S-11-2.0	0.33-2.0	Gray medium sand with tan sawdust and organic debris.
S-12	3.7	S-12-0.33	0.0-0.33	Black silt with fine sand, some organic debris, sheen, organic odor.
		S-12-2.3	0.33-1.0	No recovery.
			1.0-2.3	Brown silt with woody debris, firm, wet, slight sheen.
S-13	3.8	S-13-0.33	0.0-0.1	Tannish--gray silt.
			0.1-0.33	Black silt, no sheen, organic odor.
		S-13-1.2	0.33-1.2	Gray to black sandy silt, little woody debris.

NOTE:

Samples were collected on February 4, 2015.

Table 3
Soil Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:							GM1	GM1	GM2	GM3	GM4	GM5	GM6	GM7	GM8	GM9	GM10
Sample Name:							GM1-S-12.0	GMDUP-S-12.0	GM2-S-6.5	GM3-S-6.0	GM4-S-12.5	GM5-S-4.0	GM6-S-4.0	GM7-S-3.0	GM8-S-4.5	GM9-S-2.0	GM10-S-4.0
Collection Date:							02/03/2015	02/03/2015	02/03/2015	02/02/2015	02/03/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/03/2015
Collection Depth (ft bgs):							12	12	6.5	6	12.5	4	4	3	4.5	2	4
	MTCA A	MTCA B	Ecological Indicator Concentration[a]			Natural Background Metals[b]											
			Plants	Soil Biota	Wildlife												
Metals (mg/kg)																	
Antimony	NV	32	5	NV	NV	NV	--	--	--	17 U	--	--	--	6.7 U	--	--	--
Arsenic[c]	20	0.67	10	60	7	7	--	--	7.1 U	**18**	--	--	**20**	**8.3**	**11**	**12**	--
Cadmium	2	80	4	20	14	1	--	--	0.71 U	1.7 U	--	--	0.9 U	0.67 U	0.95 U	0.86 U	--
Copper	NV	3200	100	50	217	36	--	--	**15**	**39**	--	--	**41**	**19**	**110**	**44**	--
Lead	250	NV	50	500	118	24	7.6 UJ	**24** J	**36**	**28**	--	--	**25**	**20**	**440**	8.6 U	--
Mercury[d]	2	NV	0.3	0.1	5.5	0.07	--	--	0.35 U	0.87 U	--	--	0.45 U	0.34 U	0.48 U	0.43 U	--
Tin	NV	48000	50	NV	NV	NV	--	--	--	17 U	--	--	--	6.7 U	--	--	--
Zinc	NV	24000	86	200	360	85	--	--	--	**79**	--	--	--	**61**	--	--	--
VOCs (mg/kg)																	
1,1,1,2-Tetrachloroethane	NV	38	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
1,1,1-Trichloroethane	2	160000	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
1,1,2,2-Tetrachloroethane	NV	5	NV	NV	NV	NA	--	--	--	0.31 U	0.00097 U	--	0.14 U	0.0011 U	--	--	--
1,1,2-Trichloroethane	NV	18	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
1,1-Dichloroethane	NV	180	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
1,1-Dichloroethene	NV	4000	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
1,1-Dichloropropene	NV	NV	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
1,2,3-Trichlorobenzene	NV	NV	NV	20	NV	NA	--	--	--	0.31 U	0.00097 U	--	0.14 U	0.0011 U	--	--	--
1,2,3-Trichloropropane	NV	0.033	NV	NV	NV	NA	--	--	--	0.31 U	0.00097 U	--	0.14 U	0.0011 U	--	--	--
1,2,4-Trichlorobenzene	NV	34	NV	20	NV	NA	--	--	--	0.31 U	0.00097 U	--	0.14 U	0.0011 U	--	--	--
1,2-Dibromo-3-chloropropane	NV	1.3	NV	NV	NV	NA	--	--	--	1.6 U	0.0048 U	--	0.68 U	0.0056 U	--	--	--
1,2-Dibromoethane	0.005	0.5	NV	NV	NV	NA	0.0016 U	0.0062 U	0.0011 U	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
1,2-Dichlorobenzene	NV	7200	NV	NV	NV	NA	--	--	--	0.31 U	0.00097 U	--	0.14 U	0.0011 U	--	--	--
1,2-Dichloroethane	NV	11	NV	NV	NV	NA	0.0016 U	0.0062 U	0.0011 U	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
1,2-Dichloropropane	NV	28	NV	700	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
1,3-Dichlorobenzene	NV	NV	NV	NV	NV	NA	--	--	--	0.31 U	0.00097 U	--	0.14 U	0.0011 U	--	--	--
1,3-Dichloropropane	NV	NV	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
1,4-Dichlorobenzene	NV	185	NV	20	NV	NA	--	--	--	0.31 U	0.00097 U	--	0.14 U	0.0011 U	--	--	--
2,2-Dichloropropane	NV	NV	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
2-Chloroethylvinyl ether	NV	NV	NV	NV	NV	NA	--	--	--	0.012 U	0.0048 U	--	0.0091 U	0.0056 U	--	--	--
2-Chlorotoluene	NV	1600	NV	NV	NV	NA	--	--	--	0.31 U	0.00097 U	--	0.14 U	0.0011 U	--	--	--
4-Chlorotoluene	NV	NV	NV	NV	NV	NA	--	--	--	0.31 U	0.00097 U	--	0.14 U	0.0011 U	--	--	--
Benzene	0.03	18	NV	NV	NV	NA	**0.0021**	0.0062 U	0.0011 U	0.0025 U	--	0.00094 U	--	--	0.0017 U	0.0019 U	0.0051 U
Bromobenzene	NV	NV	NV	NV	NV	NA	--	--	--	0.31 U	0.00097 U	--	0.14 U	0.0011 U	--	--	--
Bromodichloromethane	NV	16	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Bromoform	NV	127	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Bromomethane	NV	112	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Carbon tetrachloride	NV	14	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Chlorobenzene	NV	1600	NV	40	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--

Location:							GM1	GM1	GM2	GM3	GM4	GM5	GM6	GM7	GM8	GM9	GM10
Sample Name:							GM1-S-12.0	GMDUP-S-12.0	GM2-S-6.5	GM3-S-6.0	GM4-S-12.5	GM5-S-4.0	GM6-S-4.0	GM7-S-3.0	GM8-S-4.5	GM9-S-2.0	GM10-S-4.0
Collection Date:							02/03/2015	02/03/2015	02/03/2015	02/02/2015	02/03/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/02/2015	02/03/2015
Collection Depth (ft bgs):							12	12	6.5	6	12.5	4	4	3	4.5	2	4
	MTCA A	MTCA B	Ecological Indicator Concentration[a]			Natural Background Metals[b]											
			Plants	Soil Biota	Wildlife												
Chlorobromomethane	NV	NV	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Chloroethane	NV	NV	NV	NV	NV	NA	--	--	--	0.012 U	0.0048 U	--	0.0091 U	0.0056 U	--	--	--
Chloroform	NV	32	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Chloromethane	NV	NV	NV	NV	NV	NA	--	--	--	0.012 U	0.0048 U	--	0.0091 U	0.0056 U	--	--	--
cis-1,2-Dichloroethene	NV	160	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
cis-1,3-Dichloropropene	NV	NV	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Dibromochloromethane	NV	12	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Dibromomethane	NV	800	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Dichlorodifluoromethane	NV	16000	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Ethylbenzene	6	8000	NV	NV	NV	NA	0.0016 U	0.0062 U	0.0011 U	0.0025 U	--	0.00094 U	--	--	0.0017 U	0.0019 U	0.0051 U
Hexachlorobutadiene	NV	13	NV	NV	NV	NA	--	--	--	1.6 U	0.0048 U	--	0.68 U	0.0056 U	--	--	--
m,p-Xylene	NV	NV	NV	NV	NV	NA	**0.013**	0.012 U	0.0022 U	0.005 U	--	0.0019 U	--	--	0.0035 U	0.0039 U	0.01 U
Methyl iodide	NV	NV	NV	NV	NV	NA	--	--	--	0.012 U	0.0048 U	--	0.0091 U	0.0056 U	--	--	--
Methyl tert-butyl ether	0.1	556	NV	NV	NV	NA	0.0016 U	0.0062 U	0.0011 U	0.0025 U	--	--	--	--	--	--	--
Methylene chloride	0.02	480	NV	NV	NV	NA	--	--	--	0.012 U	0.0048 U	--	0.0091 U	0.0056 U	--	--	--
n-Hexane	NV	4800	NV	NV	NV	NA	0.099 U	0.35 U	0.084 U	0.27 U	--	--	--	--	--	--	--
o-Xylene	NV	16000	NV	NV	NV	NA	**0.0033**	0.0062 U	0.0011 U	0.0025 U	--	0.00094 U	--	--	0.0017 U	0.0019 U	0.0051 U
Tetrachloroethene	0.05	476	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Toluene	7	6400	200	NV	NV	NA	0.008 U	0.031 U	0.0056 U	0.012 U	--	0.0047 U	--	--	0.0087 U	0.0096 U	0.025 U
trans-1,2-dichloroethene	NV	1600	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
trans-1,3-Dichloropropene	NV	NV	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Trichloroethene	0.03	12	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Trichlorofluoromethane	NV	24000	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Vinyl chloride	NV	240	NV	NV	NV	NA	--	--	--	0.0025 U	0.00097 U	--	0.0018 U	0.0011 U	--	--	--
Xylenes, total[e]	9	16000	NV	NV	NV	NA	**0.0163**	0.0091 U	0.00165 U	0.00375 U	--	0.00142 U	--	--	0.0026 U	0.0029 U	0.00755 U
PAHs (mg/kg)																	
Benzo(a)anthracene	NV	1.4	NV	NV	NV	NA	--	--	--	0.023 U	--	--	--	0.009 U	--	--	--
Benzo(a)pyrene	0.1	0.14	NV	NV	12	NA	--	--	--	0.023 U	--	--	--	0.009 U	--	--	--
Benzo(b)fluoranthene	NV	1.4	NV	NV	NV	NA	--	--	--	0.023 U	--	--	--	0.009 U	--	--	--
Benzo(j+k)fluoranthene	NV	14	NV	NV	NV	NA	--	--	--	0.023 U	--	--	--	0.009 U	--	--	--
Chrysene	NV	140	NV	NV	NV	NA	--	--	--	**0.046**	--	--	--	0.009 U	--	--	--
Dibenzo(a,h)anthracene	NV	0.14	NV	NV	NV	NA	--	--	--	0.023 U	--	--	--	0.009 U	--	--	--
Indeno(1,2,3-cd)pyrene	NV	1.4	NV	NV	NV	NA	--	--	--	0.023 U	--	--	--	0.009 U	--	--	--
Naphthalene	5	1600	NV	NV	NV	NA	0.01 U	0.022 U	0.0095 U	**0.042**	--	--	--	--	--	--	--
PAH TEQ	0.1	0.14	NV	NV	NV	NA	--	--	--	**0.018**	--	--	--	ND	--	--	--
TPH (mg/kg)																	
Gasoline	30[f]	NV	NV	100	5000	NA	**12**	35 U	8.4 U	27 U	5.8 U	6.3 U	14 U	8 U	15 U	13 U	28 U
Diesel	2000	NV	NV	200	6000	NA	38 U	84 U	35 U	140 U	30 U	33 U	45 U	34 U	48 U	43 U	**130**
Lube Oil	2000	NV	NV	NV	NV	NA	76 UJ	**400** J	71 U	**1100**	60 U	**140**	90 U	**140**	95 U	**260**	**760**

Table 3
Soil Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:							EB-1	EB-2	EB-3	EB-4	EB-5	EB-6	EB-7	HA-1	HA-2	HA-3	HA-4
Sample Name:							EB-1 - 5'	EB-2 - 3'	EB-3 - 5'	EB-4 - 5.5	EB-5 - 6'	EB-6 - 5.5'	EB-7 - 5'	HA-1 - 1'	HA-2 - 1'	HA-3 - 1'	HA-4 - 1'
Collection Date:							8/19/2008	8/19/2008	8/19/2008	9/12/2008	9/12/2008	9/12/2008	9/12/2008	8/19/2008	8/19/2008	8/19/2008	8/19/2008
Collection Depth (ft bgs):							5	3	5	5.5	6	5.5	5	1	1	1	1
	MTCA A	MTCA B	Ecological Indicator Concentration[a]			Natural Background Metals[b]											
			Plants	Soil Biota	Wildlife												
Metals (mg/kg)																	
Antimony	NV	32	5	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Arsenic[c]	20	0.67	10	60	7	7	**5.04**	**3.5**	**22.3**	--	**15**	--	--	**9.28**	**22**	**19.5**	**13.5**
Cadmium	2	80	4	20	14	1	1 U	1 U	1 U	--	1 U	--	--	**60.5**	1 U	1 U	**3.42**
Copper	NV	3200	100	50	217	36	**11.9**	**10.1**	**41.1**	--	**45**	--	--	**204**	**98.9**	**41.3**	**124**
Lead	250	NV	50	500	118	24	**5.72**	**4.89**	**27.2**	--	**43.5**	--	--	**95**	**63.2**	**10.7**	**117**
Mercury[d]	2	NV	0.3	0.1	5.5	0.07	ND	ND	ND	--	--	--	--	ND	**0.21**	ND	**0.29**
Tin	NV	48000	50	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Zinc	NV	24000	86	200	360	85	**19.5**	**17.8**	**49.8**	--	**42.1**	--	--	**848**	**179**	**39.4**	**897**
VOCs (mg/kg)																	
1,1,1,2-Tetrachloroethane	NV	38	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	2	160000	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	NV	5	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	NV	18	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	NV	180	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	NV	4000	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloropropene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NV	NV	NV	20	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NV	0.033	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	NV	34	NV	20	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	NV	1.3	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	0.005	0.5	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	NV	7200	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	NV	11	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	NV	28	NV	700	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropane	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	NV	185	NV	20	NV	NA	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethylvinyl ether	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NV	1600	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Benzene	0.03	18	NV	NV	NV	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	NV	16	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Bromoform	NV	127	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	NV	112	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	NV	14	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	NV	1600	NV	40	NV	NA	--	--	--	--	--	--	--	--	--	--	--

Table 3
Soil Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:							EB-1	EB-2	EB-3	EB-4	EB-5	EB-6	EB-7	HA-1	HA-2	HA-3	HA-4
Sample Name:							EB-1 - 5'	EB-2 - 3'	EB-3 - 5'	EB-4 - 5.5	EB-5 - 6'	EB-6 - 5.5'	EB-7 - 5'	HA-1 - 1'	HA-2 - 1'	HA-3 - 1'	HA-4 - 1'
Collection Date:							8/19/2008	8/19/2008	8/19/2008	9/12/2008	9/12/2008	9/12/2008	9/12/2008	8/19/2008	8/19/2008	8/19/2008	8/19/2008
Collection Depth (ft bgs):							5	3	5	5.5	6	5.5	5	1	1	1	1
	MTCA A	MTCA B	Ecological Indicator Concentration[a]			Natural Background Metals[b]											
			Plants	Soil Biota	Wildlife												
Chlorobromomethane	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Chloroform	NV	32	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	NV	160	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	NV	12	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Dibromomethane	NV	800	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	NV	16000	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	6	8000	NV	NV	NV	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NV	13	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl iodide	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether	0.1	556	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	0.02	480	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
n-Hexane	NV	4800	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	NV	16000	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	0.05	476	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Toluene	7	6400	200	NV	NV	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-dichloroethene	NV	1600	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene	0.03	12	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	NV	24000	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	NV	240	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total[e]	9	16000	NV	NV	NV	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAHs (mg/kg)																	
Benzo(a)anthracene	NV	1.4	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.1	0.14	NV	NV	12	NA	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NV	1.4	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Benzo(j+k)fluoranthene	NV	14	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Chrysene	NV	140	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	NV	0.14	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NV	1.4	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	5	1600	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
PAH TEQ	0.1	0.14	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--	--
TPH (mg/kg)																	
Gasoline	30[f]	NV	NV	100	5000	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diesel	2000	NV	NV	200	6000	NA	**590**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**84**	50 U	50 U
Lube Oil	2000	NV	NV	NV	NV	NA	250 U	250 U	250 U	250 U	250 U	**750**	250 U	250 U	250 U	250 U	250 U

Table 3
Soil Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:							HA-5	HA-6	HA-7	HA-8	HA-9	HA-10	HA-11	HA-12	HA-13	HA-14
Sample Name:							HA-5 - 1'	HA-6 - 1'	HA-7 - 1'	HA-8 - 1'	HA-9 - 1'	HA-10 - 1'	HA-11 - 0.5'	HA-12 - 0.5'	HA-13 - 0.5'	HA-14 - 0.5'
Collection Date:							8/19/2008	8/19/2008	8/19/2008	8/19/2008	8/19/2008	8/19/2008	9/12/2008	9/12/2008	9/12/2008	9/12/2008
Collection Depth (ft bgs):							1	1	1	1	1	1	0.5	0.5	0.5	0.5
	MTCA A	MTCA B	Ecological Indicator Concentration[a]			Natural Background Metals[b]										
			Plants	Soil Biota	Wildlife											
Metals (mg/kg)																
Antimony	NV	32	5	NV	NV	NV	--	--	--	--	--	--	--	--	--	--
Arsenic[c]	20	0.67	10	60	7	7	**6.29**	**2.42**	**56.9**	**21.1**	**16.3**	**23.5**	**14.8**	**3.45**	**25.8**	**7.48**
Cadmium	2	80	4	20	14	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**1.97**	**4.09**	**1.09**
Copper	NV	3200	100	50	217	36	**47**	**14.5**	**111**	**47.2**	**42.9**	**132**	**27.1**	**35.9**	**37.5**	**75.7**
Lead	250	NV	50	500	118	24	**105**	**14.8**	**101**	**16.9**	**30.9**	**544**	**26.4**	**17.4**	**41.7**	**66.8**
Mercury[d]	2	NV	0.3	0.1	5.5	0.07	ND	ND	ND	ND	ND	**0.22**	ND	ND	ND	ND
Tin	NV	48000	50	NV	NV	NV	--	--	--	--	--	--	--	--	--	--
Zinc	NV	24000	86	200	360	85	**29.5**	**26.6**	**73.6**	**40.5**	**46.9**	**243**	**271**	**135**	**61.7**	**133**
VOCs (mg/kg)																
1,1,1,2-Tetrachloroethane	NV	38	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	2	160000	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	NV	5	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	NV	18	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	NV	180	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	NV	4000	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,1-Dichloropropene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NV	NV	NV	20	NV	NA	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NV	0.033	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	NV	34	NV	20	NV	NA	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	NV	1.3	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	0.005	0.5	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	NV	7200	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	NV	11	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	NV	28	NV	700	NV	NA	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropane	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	NV	185	NV	20	NV	NA	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
2-Chloroethylvinyl ether	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NV	1600	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Benzene	0.03	18	NV	NV	NV	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	NV	16	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Bromoform	NV	127	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Bromomethane	NV	112	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	NV	14	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	NV	1600	NV	40	NV	NA	--	--	--	--	--	--	--	--	--	--

Table 3
Soil Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:							HA-5	HA-6	HA-7	HA-8	HA-9	HA-10	HA-11	HA-12	HA-13	HA-14
Sample Name:							HA-5 - 1'	HA-6 - 1'	HA-7 - 1'	HA-8 - 1'	HA-9 - 1'	HA-10 - 1'	HA-11 - 0.5'	HA-12 - 0.5'	HA-13 - 0.5'	HA-14 - 0.5'
Collection Date:							8/19/2008	8/19/2008	8/19/2008	8/19/2008	8/19/2008	8/19/2008	9/12/2008	9/12/2008	9/12/2008	9/12/2008
Collection Depth (ft bgs):							1	1	1	1	1	1	0.5	0.5	0.5	0.5
	MTCA A	MTCA B	Ecological Indicator Concentration[a]			Natural Background Metals[b]										
			Plants	Soil Biota	Wildlife											
Chlorobromomethane	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Chloroform	NV	32	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	NV	160	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	NV	12	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Dibromomethane	NV	800	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	NV	16000	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	6	8000	NV	NV	NV	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NV	13	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
m,p-Xylene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Methyl iodide	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether	0.1	556	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Methylene chloride	0.02	480	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
n-Hexane	NV	4800	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
o-Xylene	NV	16000	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	0.05	476	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Toluene	7	6400	200	NV	NV	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-dichloroethene	NV	1600	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	NV	NV	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Trichloroethene	0.03	12	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	NV	24000	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	NV	240	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Xylenes, total[e]	9	16000	NV	NV	NV	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAHs (mg/kg)																
Benzo(a)anthracene	NV	1.4	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.1	0.14	NV	NV	12	NA	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NV	1.4	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Benzo(j+k)fluoranthene	NV	14	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Chrysene	NV	140	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	NV	0.14	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NV	1.4	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
Naphthalene	5	1600	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
PAH TEQ	0.1	0.14	NV	NV	NV	NA	--	--	--	--	--	--	--	--	--	--
TPH (mg/kg)																
Gasoline	30[f]	NV	NV	100	5000	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diesel	2000	NV	NV	200	6000	NA	50 U	50 U	50 U	50 U	**57**	50 U	50 U	50 U	50 U	50 U
Lube Oil	2000	NV	NV	NV	NV	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	150 U	150 U

Table 3
Soil Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

NOTES:

Detected results are in bold font.

Ecological indicator concentration exceedances are highlighted below as follows:

- 🟩 Plant
- 🟪 Soil Biota
- 🟦 Wildlife

Exceedances of the lowest screening levels are shaded the color of the lowest screening level that is being exceeded.

MTCA Method A CUL exceedances are shaded.

Non-detect results are not evaluated against MTCA or ecological screening criteria.

-- = not analyzed.

ft bgs = feet below ground surface.

J = Result is an estimated value.

mg/kg = milligrams per kilogram (parts per million).

MTCA A = Model Toxics Control Act Method A, unrestricted land use.

MTCA B = Model Toxics Control Act Method B, lower of carcinogen or noncarcinogen.

NA = not available.

ND = non-detect.

NV = no value.

PAH =polycyclic aromatic hydrocarbon.

TEQ = toxic equivalent.

TPH = total petroleum hydrocarbons.

U = Analyte not detected at or above method reporting limit.

VOC = volatile organic compound.

[a] Ecological indicator concentrations were obtained from Model Toxics Control Act Table 749-3.

[b] Natural background metals concentrations in soil are the Washington State, Puget Sound 90th percentile concentrations obtained from Washington State Department of Ecology, 1994.

[c] Plants and soil biota screening levels are for arsenic V, and the wildlife screening level is for arsenic III. Reported results are for total arsenic.

[d] Inorganic mercury screening level.

[e] Total xylenes calculated as sum of m,p-xylene and o-xylene.

[f] MTCA cleanup level is for gasoline-range organics with benzene present.

Table 4
Groundwater Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

			Location:	GM1	GM2	GM3	GM4	GM5	GM6	GM7	GM8	GM9	GM10	EB-1	EB-2	EB-3	EB-4	EB-5	EB-6	EB-7
			Sample Name:	GM1-W-9.0	GM2-W-9.0	GM3-W-9.0	GM4-W-9.0	GM5-W-8.0	GM6-W-11.0	GM7-W-9.0	GM8-W-10.0	GM9-W-9.0	GM10-W-9.0	EB-1 - 5'	EB-2 - 5'	EB-3 - 5'	EB-4 - 2-3'	EB-5 - 2-3'	EB-6 - 2-3	EB-7 - 2-3'
			Collection Date:	02/04/2015	02/04/2015	02/04/2015	02/03/2015	02/04/2015	02/02/2015	02/04/2015	02/02/2015	02/04/2015	02/03/2015	8/19/2008	8/19/2008	8/19/2008	9/12/2008	9/12/2008	9/12/2008	9/12/2008
			Collection Depth (ft bgs):	9	9	9	9	8	11	9	10	9	9	5	5	5	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
	MTCA A	MTCA B	Surface Water Criteria																	
Total Metals (ug/L)																				
Antimony	NV	6.4	640	--	--	5.6 U	--	--	--	**6.5**	--	--	--	--	--	--	--	--	--	--
Arsenic	5	0.058	0.14	--	3.3 U	3.3 U	--	--	**13**	**3.9**	--	**7.6**	--	**10.7**	**23.5**	**62**	**33.8**	**77.9**	**178**	**44.2**
Cadmium	5	8	--	--	4.4 U	4.4 U	--	--	4.4 U	4.4 U	--	4.4 U	--	1 U	1 U	1 U	5 U	5 U	**19**	10 U
Copper	NV	320	2.4	--	11 U	11 U	--	--	**26**	**15**	--	11 U	--	**16.5**	**16.7**	**49.5**	**65.7**	**258**	**1050**	**118**
Ferrous Iron	NV	NV	NV	**9000**	--	**6140**	--	--	--	**41900**	--	--	--	--	--	--	--	--	--	--
Lead	15	NV	8.1	**3.5**	1.1 U	1.1 U	--	--	**7.1**	**13**	--	**2.3**	--	**26.2**	**8.52**	**9.27**	**79.9**	**188**	**2030**	**3040**
Manganese	NV	2240	100	**1600**	--	**490**	--	--	--	**2700**	--	--	--	--	--	--	--	--	--	--
Mercury	2	NV	--	--	0.5 U	0.5 U	--	--	0.5 U	0.5 U	--	0.5 U	--	NA	NA	NA	**0.2**	**0.29**	**3**	**0.26**
Tin	NV	9600	--	--	--	28 U	--	--	--	28 U	--	--	--	--	--	--	--	--	--	--
Zinc	NV	4800	81	--	--	28 U	--	--	--	**66**	--	--	--	**35**	**17.6**	**47.6**	**79.3**	**271**	**1940**	**253**
Dissolved Metals (ug/L)																				
Antimony	NV	6.4	--	--	--	--	--	--	--	5 U	--	--	--	--	--	--	--	--	--	--
Arsenic	5	0.058	--	--	--	--	--	--	--	3 U	--	--	--	--	--	--	--	--	--	--
Cadmium	5	8	--	--	--	--	--	--	--	4 U	--	--	--	--	--	--	--	--	--	--
Copper	NV	320	--	--	--	--	--	--	--	10 U	--	--	--	--	--	--	--	--	--	--
Lead	15	NV	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--	--
Manganese	NV	2240	100	--	--	--	--	--	--	**2600**	--	--	--	--	--	--	--	--	--	--
Tin	NV	9600	--	--	--	--	--	--	--	25 U	--	--	--	--	--	--	--	--	--	--
Zinc	NV	4800	81	--	--	--	--	--	--	**51**	--	--	--	--	--	--	--	--	--	--
VOCs (ug/L)																				
1,1,1,2-Tetrachloroethane	NV	1.7	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,1,1-Trichloroethane	200	16000	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	NV	0.22	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,1,2-Trichloroethane	NV	0.77	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,1-Dichloroethane	NV	7.7	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,1-Dichloroethene	NV	400	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,1-Dichloropropene	NV	NV	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NV	NV	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NV	0.0015	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	NV	1.5	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	NV	0.055	--	--	--	1 U	--	--	1 U	1 U	--	--	1 U	--	--	--	--	--	--	--
1,2-Dibromoethane	0.01	0.022	--	0.0097 U	0.0097 U	0.0097 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,2-Dichlorobenzene	NV	720	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,2-Dichloroethane	5	0.48	--	0.2 U	0.2 U	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,2-Dichloropropane	NV	1.2	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,3-Dichlorobenzene	NV	NV	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,3-Dichloropropane	NV	NV	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
1,4-Dichlorobenzene	NV	8.1	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
2,2-Dichloropropane	NV	NV	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--

Table 4
Groundwater Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:				GM1	GM2	GM3	GM4	GM5	GM6	GM7	GM8	GM9	GM10	EB-1	EB-2	EB-3	EB-4	EB-5	EB-6	EB-7
Sample Name:				GM1-W-9.0	GM2-W-9.0	GM3-W-9.0	GM4-W-9.0	GM5-W-8.0	GM6-W-11.0	GM7-W-9.0	GM8-W-10.0	GM9-W-9.0	GM10-W-9.0	EB-1 - 5'	EB-2 - 5'	EB-3 - 5'	EB-4 - 2-3'	EB-5 - 2-3'	EB-6 - 2-3	EB-7 - 2-3'
Collection Date:				02/04/2015	02/04/2015	02/04/2015	02/03/2015	02/04/2015	02/02/2015	02/04/2015	02/02/2015	02/04/2015	02/03/2015	8/19/2008	8/19/2008	8/19/2008	9/12/2008	9/12/2008	9/12/2008	9/12/2008
Collection Depth (ft bgs):				9	9	9	9	8	11	9	10	9	9	5	5	5	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
	MTCA A	MTCA B	Surface Water Criteria																	
2-Chloroethylvinyl ether	NV	NV	--	--	--	1 U	--	--	1 U	1 U	--	--	1 U	--	--	--	--	--	--	--
2-Chlorotoluene	NV	160	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
4-Chlorotoluene	NV	NV	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Benzene	5	0.8	51	0.2 U	0.2 U	0.2 U	--	0.2 U	--	--	**0.22**	0.2 U	0.2 U	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	NV	NV	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Bromodichloromethane	NV	0.71	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Bromoform	NV	5.5	--	--	--	1 U	--	--	1 U	1 U	--	--	1 U	--	--	--	--	--	--	--
Bromomethane	NV	11.2	--	--	--	0.43 U	--	--	0.43 U	0.43 U	--	--	0.43 U	--	--	--	--	--	--	--
Carbon tetrachloride	NV	0.63	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Chlorobenzene	NV	160	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Chlorobromomethane	NV	NV	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Chloroethane	NV	NV	--	--	--	1 U	--	--	1 U	1 U	--	--	1 U	--	--	--	--	--	--	--
Chloroform	NV	1.4	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Chloromethane	NV	NV	--	--	--	1 U	--	--	1 U	1 U	--	--	1 U	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	NV	16	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	NV	NV	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Dibromochloromethane	NV	0.52	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Dibromomethane	NV	80	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Dichlorodifluoromethane	NV	1600	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Ethylbenzene	700	800	--	0.2 U	0.2 U	0.2 U	--	0.2 U	--	--	0.2 U	0.2 U	0.2 U	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NV	0.56	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
m,p-Xylene	NV	NV	--	0.4 U	0.4 U	0.4 U	--	0.4 U	--	--	0.4 U	0.4 U	0.4 U	--	--	--	--	--	--	--
Methyl iodide	NV	NV	--	--	--	1.9 U	--	--	1.9 U	1.9 U			1.9 U	--	--	--	--	--	--	--
Methyl tert-butyl ether	20	24	NV	0.2 U	**0.46**	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	5	22	--	--	--	1 U	--	--	1 U	1 U	--	--	1 U	--	--	--	--	--	--	--
n-Hexane	NV	480	--	1 U	1 U	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	NV	1600	--	0.2 U	0.2 U	0.2 U	--	0.2 U	--	--	0.2 U	0.2 U	0.2 U	--	--	--	--	--	--	--
Tetrachloroethene	5	21	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Toluene	1000	640	--	1 U	1 U	1 U	--	1 U	--	--	1 U	1 U	1 U	ND	ND	ND	ND	ND	ND	ND
trans-1,2-dichloroethene	NV	160	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	NV	NV	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Trichloroethene	5	0.54	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Trichlorofluoromethane	NV	2400	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Vinyl chloride	0.2	24	--	--	--	0.2 U	--	--	0.2 U	0.2 U	--	--	0.2 U	--	--	--	--	--	--	--
Xylenes, total^{a}	1000	1600	--	--	--	0.3 U	--	0.3 U	--	--	0.3 U	0.3 U	0.3 U	ND	ND	ND	ND	ND	**3**	ND

Table 4
Groundwater Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:				GM1	GM2	GM3	GM4	GM5	GM6	GM7	GM8	GM9	GM10	EB-1	EB-2	EB-3	EB-4	EB-5	EB-6	EB-7
Sample Name:				GM1-W-9.0	GM2-W-9.0	GM3-W-9.0	GM4-W-9.0	GM5-W-8.0	GM6-W-11.0	GM7-W-9.0	GM8-W-10.0	GM9-W-9.0	GM10-W-9.0	EB-1 - 5'	EB-2 - 5'	EB-3 - 5'	EB-4 - 2-3'	EB-5 - 2-3'	EB-6 - 2-3	EB-7 - 2-3'
Collection Date:				02/04/2015	02/04/2015	02/04/2015	02/03/2015	02/04/2015	02/02/2015	02/04/2015	02/02/2015	02/04/2015	02/03/2015	8/19/2008	8/19/2008	8/19/2008	9/12/2008	9/12/2008	9/12/2008	9/12/2008
Collection Depth (ft bgs):				9	9	9	9	8	11	9	10	9	9	5	5	5	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
	MTCA A	MTCA B	Surface Water Criteria																	
PAHs (ug/L)																				
Benzo(a)anthracene	NV	0.12	0.018	--	--	0.0099 U	--	--	--	**0.012**	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.1	0.012	--	--	--	0.0099 U	--	--	--	0.0097 U	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NV	0.12	--	--	--	0.0099 U	--	--	--	0.0097 U	--	--	--	--	--	--	--	--	--	--
Benzo(j+k)fluoranthene	NV	1.2	--	--	--	0.0099 U	--	--	--	0.0097 U	--	--	--	--	--	--	--	--	--	--
Chrysene	NV	12	--	--	--	0.0099 U	--	--	--	0.0097 U	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	NV	0.012	--	--	--	0.0099 U	--	--	--	0.0097 U	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NV	0.12	--	--	--	0.0099 U	--	--	--	0.0097 U	--	--	--	--	--	--	--	--	--	--
Naphthalene	160	160	--	0.099 U	0.095 U	0.099 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAH TEQ	0.1	0.012	0.018	--	--	ND	--	--	--	**0.0080**	--	--	--	--	--	--	--	--	--	--
TPH (ug/L)																				
Gasoline	800^b	NV	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	ND	ND	ND	ND	ND	**160**	ND
Diesel	500	NV	NV	280 U	260 U	280 U	280 U	**410**	**260**	**530**	770 U	280 U	280 U	**920**	50 U	50 U	**78**	**7000**	**87**	**300**
Lube Oil	500	NV	NV	450 U	410 U	450 U	**510**	**540**	400 U	470 U	**1800**	450 U	440 U	270 U	250 U	250 U	290 U	**25000**	**320**	**490**
Diesel + Lube Oil^c	500	NV	NV	365 U	335 U	365 U	**650**	**950**	**460**	**765**	**2185**	365 U	360 U	**1055**	150 U	150 U	**223**	**32000**	**407**	**790**
Conventionals (mg/L)																				
Nitrate (as Nitrogen)	NV	NV	NV	**2.4**	--	**0.065**	--	--	--	**0.067**	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	NV	NV	5 U	--	5 U	--	--	--	25 U	--	--	--	--	--	--	--	--	--	--
Dissolved Gases (ug/L)																				
Methane	NV	NV	NV	**8900**	--	**8100**	--	--	--	**2700**	--	--	--	--	--	--	--	--	--	--

Table 4
Groundwater Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

NOTES:

Detected results are in bold font.

MTCA A CUL exceedances are shaded.

MTCA B CUL exceedances are highlighted.

Surface water criteria exceedances are highlighted.

Value exceeds more than one CUL.

Surface water ARARs are provided for detected constituents and are the minimum of the state and federal marine life and human health marine water quality standards.

Non-detect results are not evaluated against screening criteria.

-- = not analyzed.

ARAR = applicable or relevant and appropriate requirement.

CUL = cleanup level.

ft bgs = feet below ground surface.

mg/L = milligrams per liter.

MTCA A = Model Toxics Control Act Method A.

MTCA B = Model Toxics Control Act Method B, lower of carcinogen or noncarcinogen.

ND = non-detect.

NV = no value.

PAH = polycyclic aromatic hydrocarbon.

TEQ = toxic equivalent.

TPH = total petroleum hydrocarbons.

U = Analyte not detected at or above method reporting limit.

ug/L = micrograms per liter (parts per billion).

VOC = volatile organic compound.

[a] Total xylenes calculated as sum of m,p-xylene and o-xylene.

[b] MTCA CUL is for gasoline-range organics with benzene present.

[c] Non-detect values were summed by using half the method reporting limit value in order to calculate the sum of diesel and lube oil concentrations.

Table 5
Sediment Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:	SMS Marine Cleanup Screening Levels		Port Gardner Bay Background 90/90 UTL	S-1	S-2	S-3	S-4	S-5	S-6	S-7
Sample Name:	SQS	SIZmax, CSL, MCUL		S-1 - 5'	S-2 - 3'	S-3 - 5'	S-4 - 5.5'	S-5 - 6'	S-6 - 5.5'	S-7 - 5'
Collection Date:				09/10/2008	09/10/2008	09/10/2008	09/10/2008	09/10/2008	09/10/2008	09/10/2008
Collection Depth (ft bml)[a]:				1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5
Total Metals (mg/kg—dry)										
Arsenic	57	93	12	**6.21**	**15.5**	**17.2**	**20.7**	**19**	**17.9**	**16.2**
Cadmium	5.1	6.7	0.52	**1.3**	**1.94**	**3.73**	1 U	1 U	1 U	1 U
Chromium	260	270	NV	**26**	**36.5**	**65.9**	**35.9**	**54.1**	**42.2**	**45.2**
Copper	390	390	NV	**49.4**	**55.8**	**129**	**54.1**	**65.5**	**61.5**	**91.3**
Lead	450	530	NV	**120**	**376**	**302**	**31.3**	**99.3**	**64.7**	**110**
Mercury	0.41	0.59	0.14	0.2 U	**0.44**	**0.31**	0.2 U	0.2 U	0.2 U	**0.22**
Nickel[b]	26	110	NV	**27**	**29.5**	**50.5**	**35.4**	**42.4**	**36.4**	**36.8**
Selenium[b]	11	>20	NV	--	--	--	--	--	--	--
Silver	6.1	6.1	NV	--	--	--	--	--	--	--
Zinc	410	960	NV	**251**	**276**	**471**	**81.6**	**106**	**105**	**153**
PCBs (mg/kg—organic carbon)										
Aroclor 1016	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1221	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1232	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1242	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1248	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1254	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1260	NV	NV	NV	--	--	--	--	--	--	--
Total PCBs[c]	12	65	NV	--	--	--	--	--	--	--
SVOCs (mg/kg—organic carbon)										
1,2,4-Trichlorobenzene	0.81	1.8	NV	--	--	--	--	--	--	--
1,2-Dichlorobenzene	2.3	2.3	NV	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3.1	9	NV	--	--	--	--	--	--	--
2,4-Dimethylphenol	0.029	0.029	NV	--	--	--	--	--	--	--
2-Methylphenol	0.063	0.063	NV	--	--	--	--	--	--	--
4-Methylphenol	0.67	0.67	NV	--	--	--	--	--	--	--
Benzoic acid	0.65	0.65	NV	--	--	--	--	--	--	--
Benzyl alcohol	0.057	0.073	NV	--	--	--	--	--	--	--
Bis(2-ethylhexyl)phthalate	47	78	NV	--	--	--	--	--	--	--
Butylbenzylphthalate	4.9	6.4	NV	--	--	--	--	--	--	--
Dibenzofuran	15	58	NV	--	--	--	--	--	--	--
Diethylphthalate	61	110	NV	--	--	--	--	--	--	--
Dimethyl phthalate	53	53	NV	--	--	--	--	--	--	--
Di-n-butyl phthalate	220	1700	NV	--	--	--	--	--	--	--
Di-n-octyl phthalate	58	4500	NV	--	--	--	--	--	--	--
Hexachlorobenzene	0.38	2.3	NV	--	--	--	--	--	--	--
Hexachlorobutadiene	3.9	6.2	NV	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	11	11	NV	--	--	--	--	--	--	--
Pentachlorophenol	0.36	0.69	NV	--	--	--	--	--	--	--
Phenol	0.42	1.2	NV	--	--	--	--	--	--	--

Table 5
Sediment Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:	SMS Marine Cleanup Screening Levels		Port Gardner Bay Background 90/90 UTL	S-1	S-2	S-3	S-4	S-5	S-6	S-7
Sample Name:	SQS	SIZmax, CSL, MCUL		S-1 - 5'	S-2 - 3'	S-3 - 5'	S-4 - 5.5'	S-5 - 6'	S-6 - 5.5'	S-7 - 5'
Collection Date:				09/10/2008	09/10/2008	09/10/2008	09/10/2008	09/10/2008	09/10/2008	09/10/2008
Collection Depth (ft bml)[a]:				1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5
PAHs (mg/kg—organic carbon)										
2-Methylnaphthalene	38	64	NV	--	--	--	--	--	--	--
Acenaphthene	16	57	NV	--	--	--	--	--	--	--
Acenaphthylene	66	66	NV	--	--	--	--	--	--	--
Anthracene	220	1200	NV	--	--	--	--	--	--	--
Benzo(a)anthracene	110	270	NV	--	--	--	--	--	--	--
Benzo(a)pyrene	99	210	NV	--	--	--	--	--	--	--
Benzo(ghi)perylene	31	78	NV	--	--	--	--	--	--	--
Chrysene	110	460	NV	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	12	33	NV	--	--	--	--	--	--	--
Fluoranthene	160	1200	NV	--	--	--	--	--	--	--
Fluorene	23	79	NV	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	34	88	NV	--	--	--	--	--	--	--
Naphthalene	99	170	NV	--	--	--	--	--	--	--
Phenanthrene	100	480	NV	--	--	--	--	--	--	--
Pyrene	1000	1400	NV	--	--	--	--	--	--	--
Total Benzofluoranthenes	230	450	NV	--	--	--	--	--	--	--
Total PAHs[b]	NV	NV	NV	--	--	--	--	--	--	--
Total HPAHs	960	5300	NV	--	--	--	--	--	--	--
Total LPAHs	370	780	NV	--	--	--	--	--	--	--
PAHs (mg/kg—dry)										
cPAH TEQ	NV	NV	0.056	--	--	--	--	--	--	--

Table 5
Sediment Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:	SMS Marine Cleanup Screening Levels		Port Gardner Bay Background 90/90 UTL	S-1	S-2	S-3	S-4	S-5	S-6	S-7
Sample Name:	SQS	SIZmax, CSL, MCUL		S-1 - 5'	S-2 - 3'	S-3 - 5'	S-4 - 5.5'	S-5 - 6'	S-6 - 5.5'	S-7 - 5'
Collection Date:				09/10/2008	09/10/2008	09/10/2008	09/10/2008	09/10/2008	09/10/2008	09/10/2008
Collection Depth (ft bml)[a]:				1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5
Dioxins/Furans (pg/g—dry)										
1,2,3,4,6,7,8-HpCDD	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	NV	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	NV	--	--	--	--	--	--	--
2,3,7,8-TCDD	NV	NV	NV	--	--	--	--	--	--	--
2,3,7,8-TCDF	NV	NV	NV	--	--	--	--	--	--	--
OCDD	NV	NV	NV	--	--	--	--	--	--	--
OCDF	NV	NV	NV	--	--	--	--	--	--	--
Total HpCDDs	NV	NV	NV	--	--	--	--	--	--	--
Total HpCDFs	NV	NV	NV	--	--	--	--	--	--	--
Total HxCDDs	NV	NV	NV	--	--	--	--	--	--	--
Total HxCDFs	NV	NV	NV	--	--	--	--	--	--	--
Total PeCDDs	NV	NV	NV	--	--	--	--	--	--	--
Total PeCDFs	NV	NV	NV	--	--	--	--	--	--	--
Total TCDDs	NV	NV	NV	--	--	--	--	--	--	--
Total TCDFs	NV	NV	NV	--	--	--	--	--	--	--
Dioxin TEQ	NV	NV	3.9	--	--	--	--	--	--	--
Organotins (ug/kg—dry)										
Di-n-butyltin Cation[b]	540	>4800	NV	--	--	--	--	--	--	--
Monobutyltin[b]	910	130000	NV	--	--	--	--	--	--	--
Tetrabutyltin[b]	47	320	NV	--	--	--	--	--	--	--
Tri-n-butyltin Cation[b]	97	>97	NV	--	--	--	--	--	--	--
BTEX (mg/kg—dry)	NV	NV	NV	ND	ND	ND	ND	ND	ND	ND
NWTPH-Gx (mg/kg—dry)	NV	NV	NV	ND	ND	ND	ND	ND	ND	ND
NWTPH-Dx (mg/kg—dry)										
Diesel[b]	340	510	NV	**650**	**1600**	**4700**	**300**	**250**	**690**	**420**
Motor-Oil Range[b]	3600	4400	NV	**3100**	**5700**	**18000**	**1500**	**1300**	**3400**	**2000**
Conventionals										
Total Organic Carbon (%)	NV	NV	NV	--	--	--	--	--	--	--
Total solids (%)	NV	NV	NV	--	--	--	--	--	--	--

Table 5
Sediment Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:	SMS Marine Cleanup Screening Levels		S-8	S-09	S-09	S-10	S-11	S-11	S-12	S-13
Sample Name:			S-8 - 1'	S-09-0.33	S-09-1.2	S-10-0.33	S-11-0.33	S-11-2.0	S-12-0.33	S-13-0.33
Collection Date:	SQS	SIZmax, CSL, MCUL	09/10/2008	02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/04/2015	2/4/2015
Collection Depth (ft bml)[a]:			1	0-0.33	0.33-1.2	0-0.33	0-0.33	0.33-2.0	0-0.33	0-0.33
Total Metals (mg/kg—dry)										
Arsenic	57	93	**17.4**	20 U	**11**	10 U	20 U	10 U	20 U	10 U
Cadmium	5.1	6.7	1 U	**2**	**0.7**	**0.9**	**1.7**	**0.9**	**1.5**	**1**
Chromium	260	270	**41**	**54**	**54.4**	**44**	**69**	**73**	**73**	**67**
Copper	390	390	**49.2**	**99.8**	**29.8**	**60.8**	**129**	**56.9**	**133**	**113**
Lead	450	530	**16.5**	**184**	**109**	**53**	**98**	**31**	**86**	**37**
Mercury	0.41	0.59	0.2 U	**0.11**	**0.06**	**0.07**	**0.16**	**0.09**	**0.16**	**0.11**
Nickel[b]	26	110	**50**	**44**	**37**	**42**	**54**	**66**	**57**	**57**
Selenium[b]	11	>20	--	20 U	9 U	10 U	20 U	10 U	20 U	10 U
Silver	6.1	6.1	--	1 U	0.5 U	0.6 U	0.9 U	0.8 U	1 U	0.8 U
Zinc	410	960	**57.4**	**486**	**108**	**340**	**498**	**107**	**483**	**232**
PCBs (mg/kg—organic carbon)										
Aroclor 1016	NV	NV	--	0.12 U	0.33 U	0.29 U	0.15 U	0.27 U	0.15 U	0.64 U
Aroclor 1221	NV	NV	--	0.12 U	0.33 U	0.29 U	0.15 U	0.27 U	0.15 U	0.64 U
Aroclor 1232	NV	NV	--	0.12 U	0.33 U	0.29 U	0.15 U	0.27 U	0.15 U	0.64 U
Aroclor 1242	NV	NV	--	0.12 U	0.33 U	0.29 U	0.15 U	0.27 U	0.15 U	0.64 U
Aroclor 1248	NV	NV	--	0.12 U	**4.8** J	0.29 U	0.26 U	0.27 U	0.15 U	0.94 U
Aroclor 1254	NV	NV	--	**0.31**	**6.8**	**2.9**	**0.76**	**0.39**	**0.44**	**1.4**
Aroclor 1260	NV	NV	--	0.12 U	0.67 U	**0.68**	**0.37**	0.27 U	**0.23**	0.64 U
Total PCBs[c]	12	65	--	**0.31**	**12** J	**3.5**	**1.1**	**0.39**	**0.67**	**1.4**
SVOCs (mg/kg—organic carbon)										
1,2,4-Trichlorobenzene	0.81	1.8	--	0.35 U	0.17 U	0.44 U	0.55 U	**0.042** J	0.42 U	0.98 U
1,2-Dichlorobenzene	2.3	2.3	--	0.35 U	0.17 U	0.44 U	0.55 U	**0.049** J	0.42 U	0.98 U
1,4-Dichlorobenzene	3.1	9	--	0.35 U	0.17 U	0.44 U	0.55 U	**0.040** J	0.42 U	0.98 U
2,4-Dimethylphenol	0.029	0.029	--	1.7 U	**0.57** J	2.2 U	2.7 U	0.36 U	2.1 U	4.7 U
2-Methylphenol	0.063	0.063	--	**0.34** J	**0.53** J	0.44 U	**0.40** J	**0.14**	**0.45**	**2.4**
4-Methylphenol	0.67	0.67	--	**3.1**	**4.3**	**33**	**3.7**	**0.36**	**3.2**	**4.4**
Benzoic acid	0.65	0.65	--	**22**	**4.7** J	**21**	**22** J	**7.1** J	**18**	**26** J
Benzyl alcohol	0.057	0.073	--	**2.3**	**0.48** J	**2.1**	**2.5**	**0.27** J	**4.8**	**4.0**
Bis(2-ethylhexyl)phthalate	47	78	--	**209**	**35**	**122**	**242**	**8.0**	**129**	**98**
Butylbenzylphthalate	4.9	6.4	--	**2.3**	**0.70**	**0.9**	**3.3**	**0.28**	**0.4** J	**3.1** J
Dibenzofuran	15	58	--	1.4 U	**2.3**	1.7 U	**3.5** J	0.28 U	1.7 U	**1.4** J
Diethylphthalate	61	110	--	1.4 U	0.67 U	1.7 U	2.2 U	0.28 U	1.7 U	4.0 U
Dimethyl phthalate	53	53	--	0.35 U	0.17 U	**27**	0.55 U	**0.22** J	0.42 U	**0.94** J
Di-n-butyl phthalate	220	1700	--	1.4 U	0.67 U	1.74 U	2.2 U	0.28 U	**0.76** J	4.0 U
Di-n-octyl phthalate	58	4500	--	**4.8** J	0.67 U	1.74 U	2.2 U	0.28 U	1.7 U	4.0 U
Hexachlorobenzene	0.38	2.3	--	0.35 U	0.17 U	0.44 U	0.55 U	**0.04** J	0.42 U	0.98 U
Hexachlorobutadiene	3.9	6.2	--	0.35 U	0.17 U	0.44 U	0.55 U	**0.04** J	0.42 U	0.98 U
N-Nitrosodiphenylamine	11	11	--	0.35 U	**0.27**	0.44 U	0.55 U	0.07 U	0.42 U	0.98 U
Pentachlorophenol	0.36	0.69	--	**2.1**	3.3 U	**5.1**	**2.2** J	0.28 U	**1.4** J	4.0 U
Phenol	0.42	1.2	--	**4.2**	**1.7**	**4.8**	**3.3**	**1.0**	1.7 U	**3.1** J

Table 5
Sediment Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:	SMS Marine Cleanup Screening Levels		S-8	S-09	S-09	S-10	S-11	S-11	S-12	S-13
Sample Name:			S-8 - 1'	S-09-0.33	S-09-1.2	S-10-0.33	S-11-0.33	S-11-2.0	S-12-0.33	S-13-0.33
Collection Date:	SQS	SIZmax, CSL, MCUL	09/10/2008	02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/04/2015	2/4/2015
Collection Depth (ft bml)[a]:			1	0-0.33	0.33-1.2	0-0.33	0-0.33	0.33-2.0	0-0.33	0-0.33
PAHs (mg/kg—organic carbon)										
2-Methylnaphthalene	38	64	--	1.4 U	**2.0**	1.7 U	**1.3** J	0.28 U	1.7 U	4.0 U
Acenaphthene	16	57	--	1.4 U	**0.80**	**1.0** J	**3.5**	0.28 U	1.7 U	4.0 U
Acenaphthylene	66	66	--	1.4 U	**4.2**	1.7 U	2.2 U	0.28 U	1.7 U	4.0 U
Anthracene	220	1200	--	**2.5**	**4.0**	**5.4**	**4.2**	**0.25** J	**1.9**	**4.0**
Benzo(a)anthracene	110	270	--	**11**	**12**	**25**	**18**	**0.62**	**9.1**	**10**
Benzo(a)pyrene	99	210	--	**13**	**15**	**30**	**21**	**0.70**	**11**	**12**
Benzo(ghi)perylene	31	78	--	**8.6** J	**12**	**16** J	**11** J	**0.82**	**6.1** J	**13**
Chrysene	110	460	--	**20**	**18**	**43**	**36**	**1.2**	**19**	**20**
Dibenzo(a,h)anthracene	12	33	--	**2.3**	**3.3**	**5.5**	**3.2**	**0.27**	**1.6**	**2.9** J
Fluoranthene	160	1200	--	**32**	**28**	**68**	**57**	**1.6**	**27**	**32**
Fluorene	23	79	--	**1.1** J	**2.3**	**2.2**	**4.7**	**0.18** J	**1.3** J	**1.5** J
Indeno(1,2,3-cd)pyrene	34	88	--	**8.0** J	**11**	**16** J	**11** J	**0.56**	**6.1** J	**10**
Naphthalene	99	170	--	**3.2**	**4.8**	**2.7**	**3.2**	**0.48**	**3.1**	**2.6** J
Phenanthrene	100	480	--	**13**	**32**	**29**	**24**	**0.92**	**9.1**	**8.4**
Pyrene	1000	1400	--	**25**	**27**	**54**	**45**	**1.4**	**23**	**31**
Total Benzofluoranthenes	230	450	--	**34**	**27**	**79**	**61**	**1.8**	**33**	**37**
Total PAHs[b]	NV	NV	--	**175** J	**198**	**377** J	**305** J	**11**	**150** J	**185**
Total HPAHs	960	5300	--	**155** J	**152**	**337** J	**264** J	**9.0**	**135** J	**168**
Total LPAHs	370	780	--	**20** J	**46**	**40** J	**41** J	**1.8**	**15** J	**17**
PAHs (mg/kg—dry)										
cPAH TEQ	NV	NV	--	**3.1** J	**1.2**	**2.7** J	**4.1** J	**0.070**	**2.2** J	**0.54**

Table 5
Sediment Analytical Results
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:	SMS Marine Cleanup Screening Levels		S-8	S-09	S-09	S-10	S-11	S-11	S-12	S-13
Sample Name:			S-8 - 1'	S-09-0.33	S-09-1.2	S-10-0.33	S-11-0.33	S-11-2.0	S-12-0.33	S-13-0.33
Collection Date:	SQS	SIZmax, CSL, MCUL	09/10/2008	02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/04/2015	2/4/2015
Collection Depth (ft bml)[a]:			1	0-0.33	0.33-1.2	0-0.33	0-0.33	0.33-2.0	0-0.33	0-0.33
Dioxins/Furans (pg/g—dry)										
1,2,3,4,6,7,8-HpCDD	NV	NV	--	**4760**	**336**	**2590**	**5390**	**93.3**	**4090**	**1370**
1,2,3,4,6,7,8-HpCDF	NV	NV	--	**1120**	**73.6**	**566**	**1060**	**18.9**	**864**	**301**
1,2,3,4,7,8,9-HpCDF	NV	NV	--	**69.1**	**5.35**	**48.8**	**81**	**1.2**	**57.5**	**19**
1,2,3,4,7,8-HxCDD	NV	NV	--	**87.8**	**5.03**	**42.7**	**88.9**	**1.64**	**75.4**	**26.7**
1,2,3,4,7,8-HxCDF	NV	NV	--	**40.5**	**4.67**	**22.6**	**43.3**	**0.987** J	**33.5**	**11.4**
1,2,3,6,7,8-HxCDD	NV	NV	--	**197**	**15**	**96.4**	**204**	**4.25**	**168**	**59.4**
1,2,3,6,7,8-HxCDF	NV	NV	--	**41.1**	**4.34**	**19.8**	**39.5**	**0.905** J	**34.3**	**12**
1,2,3,7,8,9-HxCDD	NV	NV	--	**198**	**10.7**	**90.1**	**190**	**3.56**	**170**	**58.6**
1,2,3,7,8,9-HxCDF	NV	NV	--	**9.34**	**1.72**	**5.41**	**10.2**	0.313 U	**8.02**	**3.96**
1,2,3,7,8-PeCDD	NV	NV	--	**42.7**	**3.22**	**20.9**	**43.5**	**0.909** J	**39.3**	**14**
1,2,3,7,8-PeCDF	NV	NV	--	**5.83**	**1.35**	**2.86** J	**6.21**	0.244 U	**5.21**	**2.2**
2,3,4,6,7,8-HxCDF	NV	NV	--	**63.9**	**6.98**	**30.1**	**62.7**	**1.43**	**51.4**	10.9 U
2,3,4,7,8-PeCDF	NV	NV	--	**7.12**	**2.46**	**3.66**	**7.59**	**0.364** J	**6.24**	**3.05**
2,3,7,8-TCDD	NV	NV	--	**4.31**	**56.5**	**2.49**	**4.96**	0.853 U	**4.87**	**1.86**
2,3,7,8-TCDF	NV	NV	--	**4.35**	**2.77**	2.23 U	**7.3** J	0.389 U	**4.62**	**3.11**
OCDD	NV	NV	--	**36200**	**2860**	**25700**	**43800** J	**714**	**30400**	**10600** J
OCDF	NV	NV	--	**3850**	**217**	**2430**	**3600**	**56**	**2820**	**887**
Total HpCDDs	NV	NV	--	**7920**	**568**	**4340**	**8840**	**159**	**6730**	2360 U
Total HpCDFs	NV	NV	--	**2970**	**222**	1810 U	3050 U	**52.4**	2310 U	**801**
Total HxCDDs	NV	NV	--	**1250**	108 U	**614**	1270 U	29.8 U	**1090**	422 U
Total HxCDFs	NV	NV	--	1300 U	127 U	649 U	1250 U	23.6 U	1020 U	321 U
Total PeCDDs	NV	NV	--	**173**	**30.6**	**87.3**	**170**	6.5 U	**156**	**61.4**
Total PeCDFs	NV	NV	--	335 U	125 U	168 U	277 U	13.1 U	286 U	112 U
Total TCDDs	NV	NV	--	41.6 U	81.2 U	23.8 U	27.2 U	5.85 U	42 U	29.4 U
Total TCDFs	NV	NV	--	94.6 U	78.6 U	55.5 U	86.4 U	7.97 U	85.1 U	49 U
Dioxin TEQ	NV	NV	--	**185**	**71**	**96** J	**195** J	**4.1**	**161**	**55** J
Organotins (ug/kg—dry)										
Di-n-butyltin Cation[b]	540	>4800	--	**30**	**4.8** J	**5.1** J	**80**	5.3 U	**47**	**14**
Monobutyltin[b]	910	130000	--	**14**	4 U	**7.5**	**33**	3.8 U	**34**	**6.3**
Tetrabutyltin[b]	47	320	--	4.7 UR	4.9 UR	4.6 UR	4.9 UR	4.6 UR	5 UR	4.7 UR
Tri-n-butyltin Cation[b]	97	>97	--	**18**	**7.1**	**4**	**49**	**5.8**	**14**	**12**
BTEX (mg/kg—dry)	NV	NV	ND	--	--	--	--	--	--	--
NWTPH-Gx (mg/kg—dry)	NV	NV	ND	--	--	--	--	--	--	--
NWTPH-Dx (mg/kg—dry)										
Diesel[b]	340	510	50 U	**2400**	**450**	**470**	**2300**	**140**	**1600**	**570**
Motor-Oil Range[b]	3600	4400	250 U	**8500**	**1400**	**3900**	**8300**	**460**	**6000**	**2200**
Conventionals										
Total Organic Carbon (%)	NV	NV	--	**16.3**	**5.99**	**6.31**	**13.2**	**6.73**	**13.2**	**2.97**
Total solids (%)	NV	NV	--	**23.11**	**51.32**	**46.17**	**30.82**	**40.78**	**28.07**	**35.58**

NOTES:

Detections are in **bold** font.
Detections that exceed the CSL and SQS are shaded. Non-detect results are not screened against SLVs.
-- = not analyzed.
BTEX = benzene, toluene, ethylbenzene, and total xylenes by 8021B.
cPAH TEQ = carcinogenic PAH toxicity equivalence quotient.
CSL = cleanup screening level.
ft bml = feet below mudline.
HPAH = high-molecular-weight PAH.
J = Result is an estimated value.
LOQ = limit of quantitation.
LPAH = low-molecular-weight PAH.
MCUL = minimum cleanup level.
mg/kg = milligrams per kilogram.
ND = not detected.
NV = no value.
NWTPH-Dx = total petroleum hydrocarbons—diesel and motor oil.
NWTPH-Gx = total petroleum hydrocarbons—gasoline.
PAH = polycyclic aromatic hydrocarbon.
PCB = polychlorinated biphenyl.
pg/g = picograms per gram (parts per trillion).
SIZmax = Sediment Impact Zone maximum allowable concentration (WAC 173-204-420).
SLV = screening level value.
SMS = Sediment Management Standards.
SQS = Sediment Quality Standards (WAC 173-294-320).
SVOC = semivolatile organic compound. When samples were analyzed by both 8270D and 8270D SIM methods, or when samples were reanalyzed, the higher detected value or lower non-detect value was used.
Total PCBs = sum of PCB Aroclors. Non-detect results are not summed.
U = Result is non-detect at method reporting limit.
ug/kg = micrograms per kilogram.
UR = Result is non-detect at or above method reporting limit. Reported value is rejected during data validation.
USEPA = U.S. Environmental Protection Agency.
UTL = upper tolerance limit.
WAC = Washington Administrative Code.
[a]Samples depths from S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-8 were estimated based on Associated Earth Sciences, Inc. 2010 Phase II Environmental Assessment Report.
[b]Calculated value. Only detected values are summed.
[c]SMS freshwater cleanup screening level values used because marine criteria are not available.

Table 6
Sediment Physical Parameters
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:	S-09	S-10	S-11	S-12
Sample Name:	S-09-0.33	S-10-0.33	S-11-0.33	S-12-0.33
Collection Date:	02/04/2015	02/04/2015	02/04/2015	02/04/2015
Collection Depth (ft bgs):	0-0.33	0-0.33	0-0.33	0-0.33
Conventionals				
Total Organic Carbon (%)	**16.3**	**6.31**	**13.2**	**13.2**
Total solids (%)	**23.11**	**46.17**	**30.82**	**28.07**
Grain Size (%)				
Gravel	**4.5**	**3**	**2**	**2.3**
Very coarse sand	**5.9**	**5.5**	**1.9**	**1.1**
Coarse sand	**8.7**	**18**	**2.1**	**1.2**
Medium sand	**24.5**	**36.7**	**6.1**	**1.4**
Fine sand	**23**	**12.7**	**10.9**	**2.4**
Very fine sand	**6.6**	**3.9**	**6**	**3.9**
Coarse silt	**1.5**	**3.3**	**6**	**21.4**
Medium silt	**6.7**	**7.3**	**19.4**	**25**
Fine silt	**5.7**	**4.1**	**13.5**	**15.4**
Very fine silt	**4.8**	**2**	**11.8**	**12**
Coarse clay	**3.4**	**1.4**	**8.9**	**7.1**
Medium clay	**2.2**	**0.8**	**5.2**	**4.5**
Fine clay	**2.4**	**1.3**	**6.4**	**2.2**
Total fines	**26.8**	**20.2**	**71.2**	**87.7**

NOTES:

Detections are in **bold** font.

% = percent.

ft bgs = feet below ground surface.

Table 7
Cleanup Levels
Former Geddes Marina
City of Marysville
Marysville, Washington

Analyte	Screening Level	Basis	Screening Level	Basis	CUL	Basis
Soil (mg/kg)						
Arsenic	20	MTCA A (unrestricted land use).	7	EIC protective of terrestrial plants.	7	The Property may be redeveloped as open space, allowing terrestrial species to come into contact with the upland areas of the Property. All detections of arsenic are within 6 feet below ground surface, the point of compliance for ecological receptors.
Cadmium	2	MTCA A (unrestricted land use).	4	EIC protective of terrestrial plants.	2	The Property may be redeveloped as open space to allow both human and terrestrial receptors to come into contact with the upland areas of the Property. Although the EIC is above the MTCA A CUL, the most stringent CUL was selected to ensure protection of all receptors.
Copper	3200	MTCA B; MTCA A CULs were not available.	50	EIC protective of soil biota.	50	The Property may be redeveloped as open space, allowing terrestrial species to come into contact with the upland areas of the Property. All detections of copper are within 6 feet below ground surface, the point of compliance for ecological receptors.
Lead	250	MTCA A (unrestricted land use).	50	The Property may be redeveloped as open space, allowing terrestrial species to come into contact with the upland areas of the Property.	50	The Property may be redeveloped as open space, allowing terrestrial species to come into contact with the upland areas of the Property. All detections of lead are within 6 feet below ground surface, the point of compliance for ecological receptors.
Mercury	2	MTCA A (unrestricted land use).	0.1	The Property may be redeveloped as open space, allowing terrestrial species to come into contact with the upland areas of the Property.	0.1	The Property may be redeveloped as open space, allowing terrestrial species to come into contact with the upland areas of the Property. All detections of mercury are within 6 feet below ground surface, the point of compliance for ecological receptors.
Zinc	24000	MTCA B; MTCA A CULs were not available.	86	EIC protective of terrestrial plants.	86	The Property may be redeveloped as open space, allowing terrestrial species to come into contact with the upland areas of the Property. All detections of zinc are within 6 feet below ground surface, the point of compliance for ecological receptors.
Groundwater (ug/L)						
Arsenic (dissolved)	5	MTCA A.	0.14	Surface water criteria.	5	The MTCA A CUL is adjusted to account for natural background conditions in groundwater; therefore, the MTCA A CUL is selected.
Copper (dissolved)	320	MTCA B; MTCA A CULs were not available.	NA	Surface water criteria.	320	Copper is not an IHS for the groundwater-to-surface-water discharge pathway; therefore, the MTCA B CUL is selected.
Manganese (dissolved)	2240	MTCA B; MTCA A CULs were not available.	100	Surface water criteria.	2240	Natural conditions in groundwater in the Puget Sound area tend to exceed the surface water criterion of 100 ug/L; therefore, the MTCA B CUL is selected.
Diesel	500	MTCA A.	NA	Surface water criteria.	500	No surface water criteria are available for diesel-range petroleum hydrocarbons; therefore, the MTCA A CUL is selected.
Lube Oil	500	MTCA A.	NA	Surface water criteria.	500	No surface water criteria are available for lube-oil-range petroleum hydrocarbons; therefore, the MTCA A CUL is selected.
Diesel + Lube Oil	500	MTCA A.	NA	Surface water criteria.	500	No surface water criteria are available for heavy-oil-range petroleum hydrocarbons; therefore, the MTCA A CUL is selected.

Analyte	Screening Level	Basis	Screening Level	Basis	CUL	Basis
Sediment (mg/kg)						
Mercury	0.59	SMS Marine Cleanup Screening Levels for Sediment Management Standards.	NA	Background conditions.	0.59	The CUL for protection of aquatic receptors from direct exposure is selected.
Nickel	110	SMS Marine Cleanup Screening Levels for Sediment Management Standards.	NA	Background conditions.	110	The CUL for protection of aquatic receptors from direct exposure is selected.
Zinc	960	SMS Marine Cleanup Screening Levels for Sediment Management Standards.	NA	Background conditions.	960	The CUL for protection of aquatic receptors from direct exposure is selected.
2,4-Dimethylphenol[a]	0.029	SMS Marine Cleanup Screening Levels for Sediment Management Standards.	NA	Background conditions.	0.029	The CUL for protection of aquatic receptors from direct exposure is selected.
2-Methylphenol[a]	0.063	SMS Marine Cleanup Screening Levels for Sediment Management Standards.	NA	Background conditions.	0.063	The CUL for protection of aquatic receptors from direct exposure is selected.
4-Methylphenol[a]	0.67	SMS Marine Cleanup Screening Levels for Sediment Management Standards.	NA	Background conditions.	0.67	The CUL for protection of aquatic receptors from direct exposure is selected.
Benzoic Acid[a]	0.65	SMS Marine Cleanup Screening Levels for Sediment Management Standards.	NA	Background conditions.	0.65	The CUL for protection of aquatic receptors from direct exposure is selected.
Benzyl alcohol	0.057	SMS Marine Cleanup Screening Levels for Sediment Management Standards.	NA	Background conditions.	0.057	The CUL for protection of aquatic receptors from direct exposure is selected.
Bis(2-ethylhexyl) phthalate[a]	78	SMS Marine Cleanup Screening Levels for Sediment Management Standards.	NA	Background conditions.	78	The CUL for protection of aquatic receptors from direct exposure is selected.
Pentachlorophenol[a]	0.69	SMS Marine Cleanup Screening Levels for Sediment Management Standards.	NA	Background conditions.	0.69	The CUL for protection of aquatic receptors from direct exposure is selected.
Phenol[a]	1.2	SMS Marine Cleanup Screening Levels for Sediment Management Standards.	NA	Background conditions.	1.2	The CUL for protection of aquatic receptors from direct exposure is selected.
Dioxins/Furans TEQ (pg/g)	--	No value.	3.9	Background 90/90 upper tolerance limit for Port Gardner Bay.	3.9	A site-specific, risk-based protective concentration for the bioaccumulative pathway has not been developed; therefore, the background concentration is the CUL.
Diesel and motor-oil range petroleum hydrocarbons	510	SMS Marine Cleanup Screening Levels for Sediment Quality Standards.	NA	Background conditions.	510	The CUL for protection of aquatic receptors from direct exposure is selected.

Table 7
Cleanup Levels
Former Geddes Marina
City of Marysville
Marysville, Washington

Analyte	Screening Level	Basis	Screening Level	Basis	CUL	Basis
PCBs[a]	65	SMS Marine Cleanup Screening Levels for Sediment Quality Standards.	4	Background conditions in the Puget Sound region.	4	A site-specific, risk-based protective concentration for the bioaccumulative pathway has not been developed; background conditions may be below a typically-achievable practical quantitation limit; therefore, the PQL concentration is the CUL.
cPAH TEQ	--	No exceedances of SMS Marine Cleanup Screening Levels for Sediment Quality Standards.	0.056	Background 90/90 upper tolerance limit for Port Gardner Bay.	0.056	A site-specific, risk-based protective concentration for the bioaccumulative pathway has not been developed; therefore, the background concentration is the CUL.

NOTES:

cPAH = carcinogenic polycyclic aromatic hydrocarbon.

CUL = cleanup level.

EIC = ecological indicator concentration.

IHS = indicator hazardous substance.

mg/kg = milligrams per kilogram.

MTCA = Model Toxics Control Act.

NA = not available.

PCB = polychlorinated biphenyl.

pg/g = picogram per gram.

PQL = practical quantitation limit.

SMS = Sediment Management Standards.

TEQ = toxic equivalent.

ug/L = micrograms per liter (parts per billion).

[a] Normalized to organic carbon content.

FIGURES

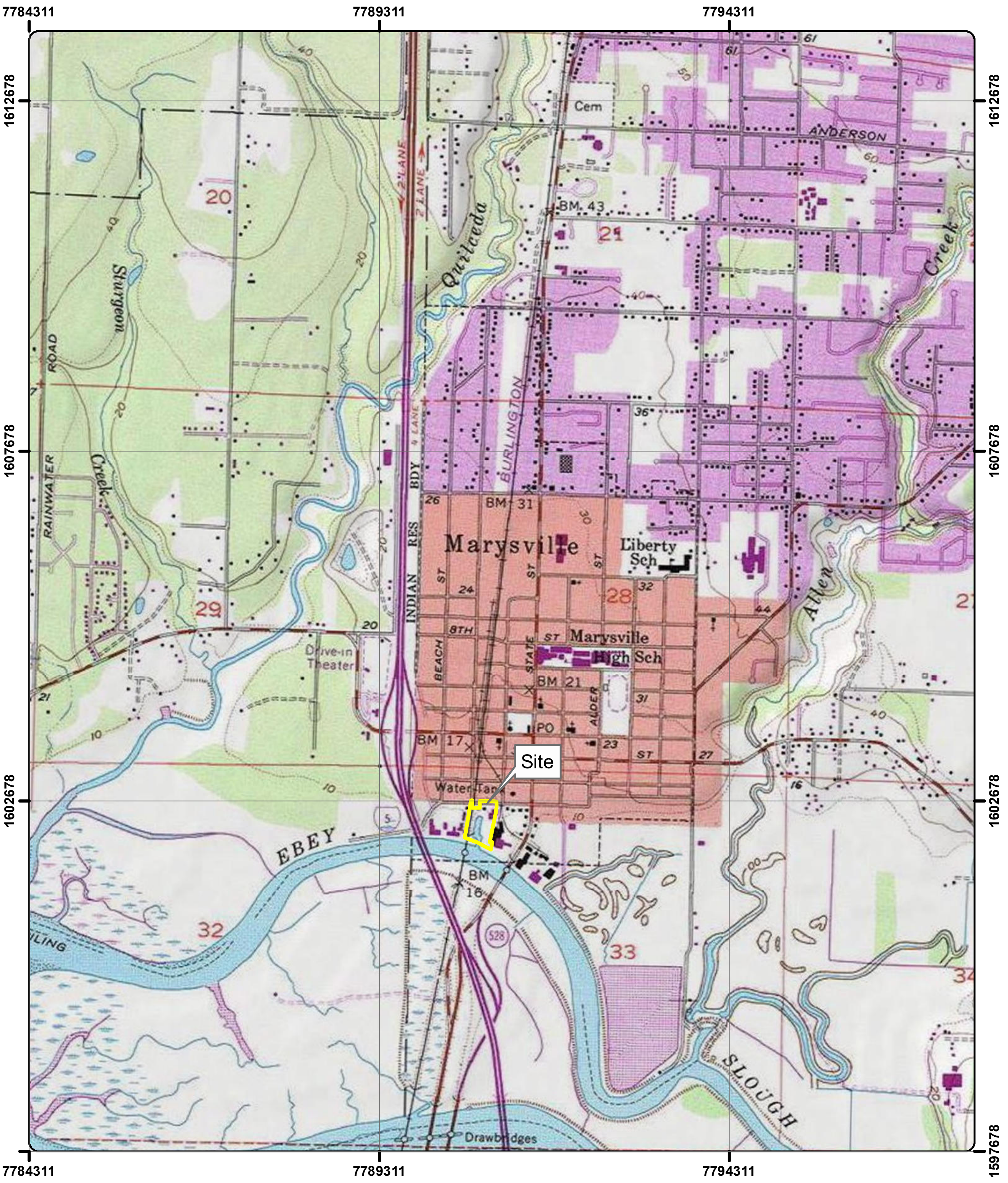
Path: X:\0689.01 City of Marysville\Projects\Fig1_Site LocationGrd.mxd

Print Date: 9/23/2015

Approved By: yvan

Produced By: jmiller

Project: 0689.01.03-01



Site Address: 1326 First Street, Marysville, Washington 98270
Source: US Geological Survey (1990) 7.5-minute topographic quadrangle: Marysville
Section 33, Township 30 North, Range 5 East

Horizontal Datum: Washington State Plane, North Zone (NAD 83/11).
Vertical Datum: NAVD 88.

Figure 1
Site Location

Former Geddes Marina Property
Marysville, Washington

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0 1,000 2,000
Feet

Source: Aerial photograph obtained from Bing Maps/Esri ArcGIS Online; taxlots obtained from Snohomish County.

Note: All site features are approximate.

Horizontal Datum: Washington State Plane, North Zone (NAD 83/11).
Vertical Datum: NAVD 88.

Legend

+—+	Railroad
🟨	Site Boundary
☐	Parcel Boundary

Figure 2
Site Features

Former Geddes Marina Property
Marysville, Washington

0 30 60
Feet

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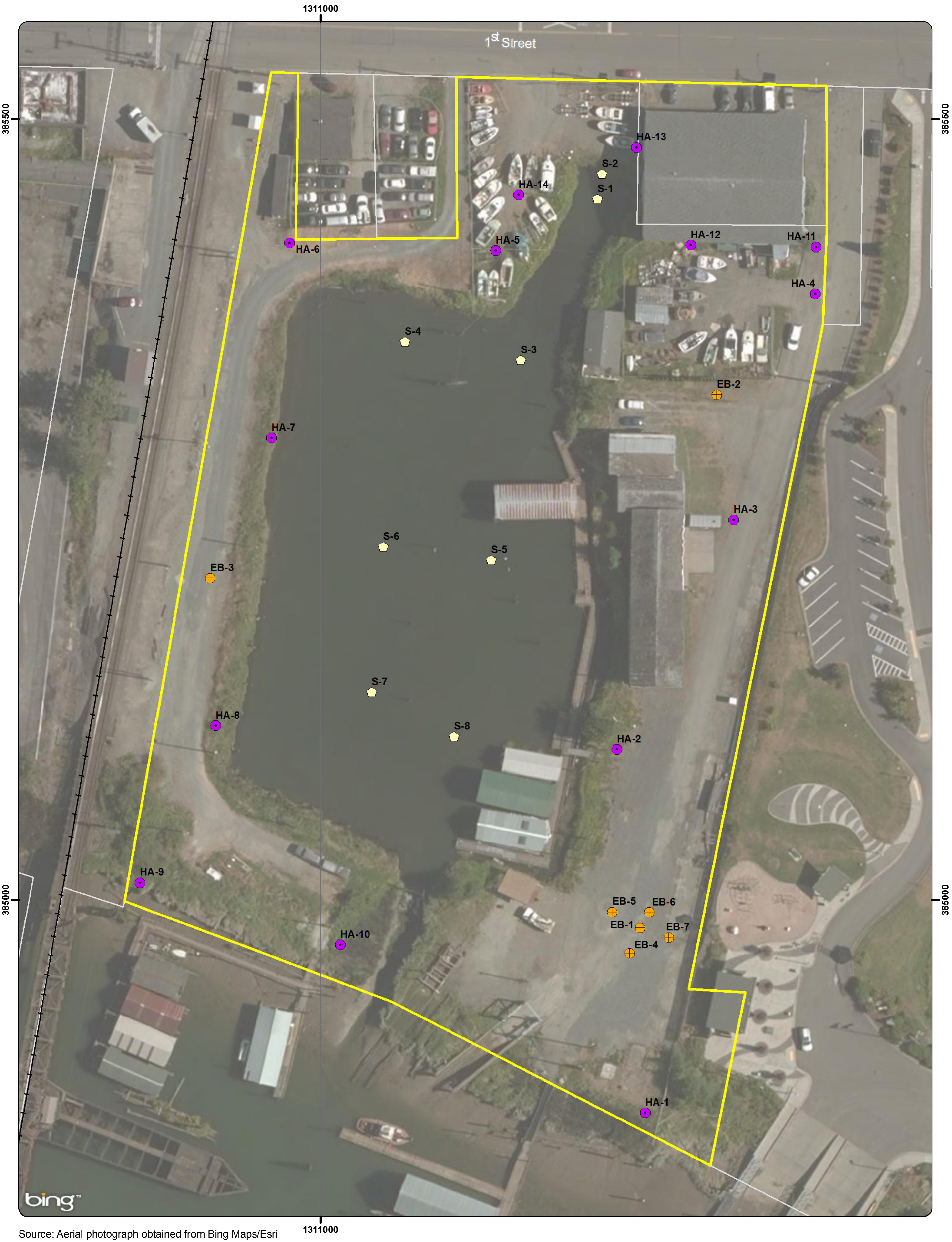
Path: X:\0689.01 City of Marysville\Projects\Fig2_Site FeaturesGrd.mxd

Print Date: 9/23/2015 Approved By: yvan Produced By: jmiller Project: 0689.01.03-01



Source: Aerial photograph obtained from Bing Maps/Esri ArcGIS Online; taxlots (2014) obtained from Snohomish County.
Note: All historical investigation locations are approximate and are based on the Site and Exploration Plan prepared by Associated Earth Sciences, Inc. (Phase II Environmental Site Assessment Report, October 2008).
AESI = Associated Earth Sciences, Inc.
Survey Reference Monument: WSDOT Monument ID 3806 (Designation GP31529-169).
Horizontal Datum: Washington State Plane, North Zone (NAD 83/11). Vertical Datum: NAVD 88.

Legend

- ⬠ Sediment Sample (AESI, 2008)
- ● Hand Auger Exploration (AESI, 2008)
- ⊕ Exploration Boring (AESI, 2008)
- +—+ Railroad
- ▭ Site Boundary
- ▭ Parcel Boundary

Figure 3
Sample Locations of Previous Environmental Investigations

Former Geddes Marina Property
Marysville, Washington

0 30 60
Feet

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Path: X:\0689.01 City of Marysville\03\Projects\Fig3_Previous Environmental InvestigationGrd.mxd
Print Date: 9/23/2015
Approved By: yvan
Produced By: jmiller
Project: 0689.01.03-01

Source: Aerial photograph obtained from Bing Maps/Esri ArcGIS Online; taxlots obtained from Snohomish County.

Note: Monitoring well locations were surveyed by Pacific Geomatic Services, Inc. All other site features are approximate.
Survey Reference Monument: WSDOT Monument ID 3806 (Designation GP31529-169).
Horizontal Datum: Washington State Plane, North Zone (NAD 83/11).
Vertical Datum: NAVD 88.

Legend

- ▲ Sediment Sample - Tier 1
- ▲ Sediment Sample - Tier 2
- ⊕ Monitoring Well
- ● Boring Location
- ▣ Stormwater Outfall
- ▭ Site Property
- ▭ Tax Lots

Figure 4
February 2015 Investigation Sample Locations

Former Geddes Marina Property
Marysville, Washington

0 30 60
Feet

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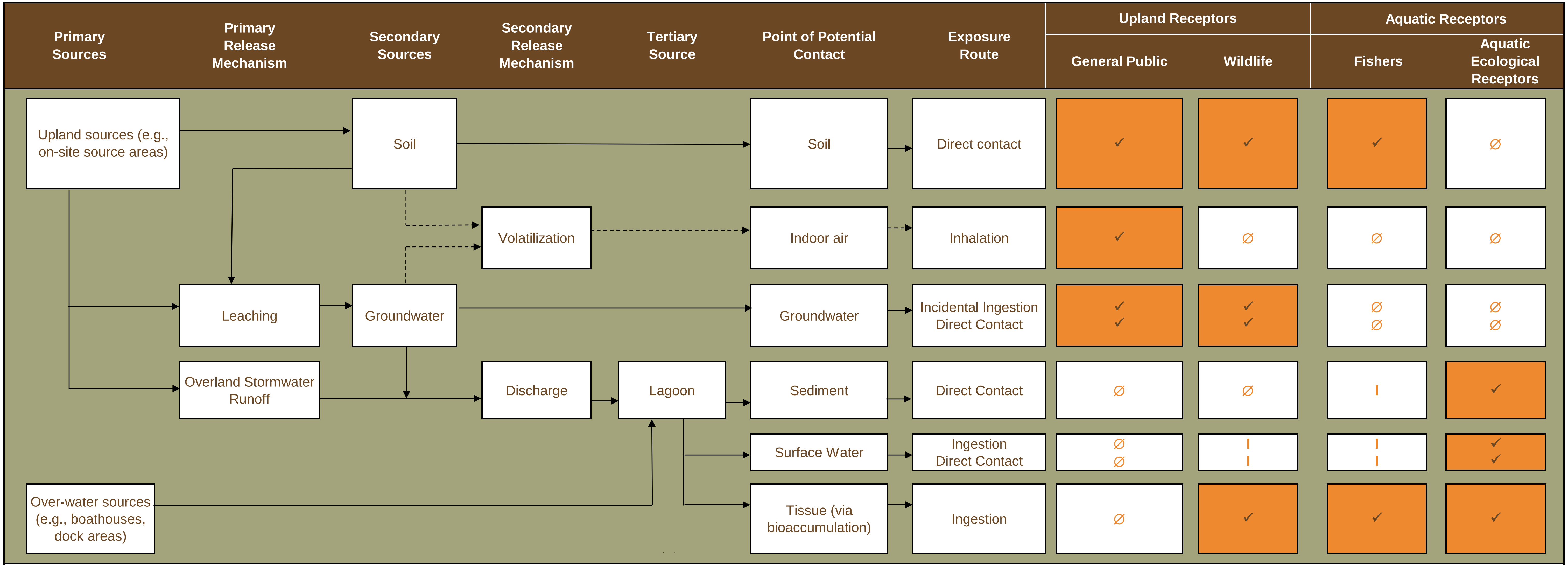
Path: X:\0689.01 City of Marysville\03\Projects\Fig4_Sample LocationsGrd.mxd
Print Date: 9/23/2015
Approved By: yvan
Produced By: jmiller
Project: 0689.01.03-01

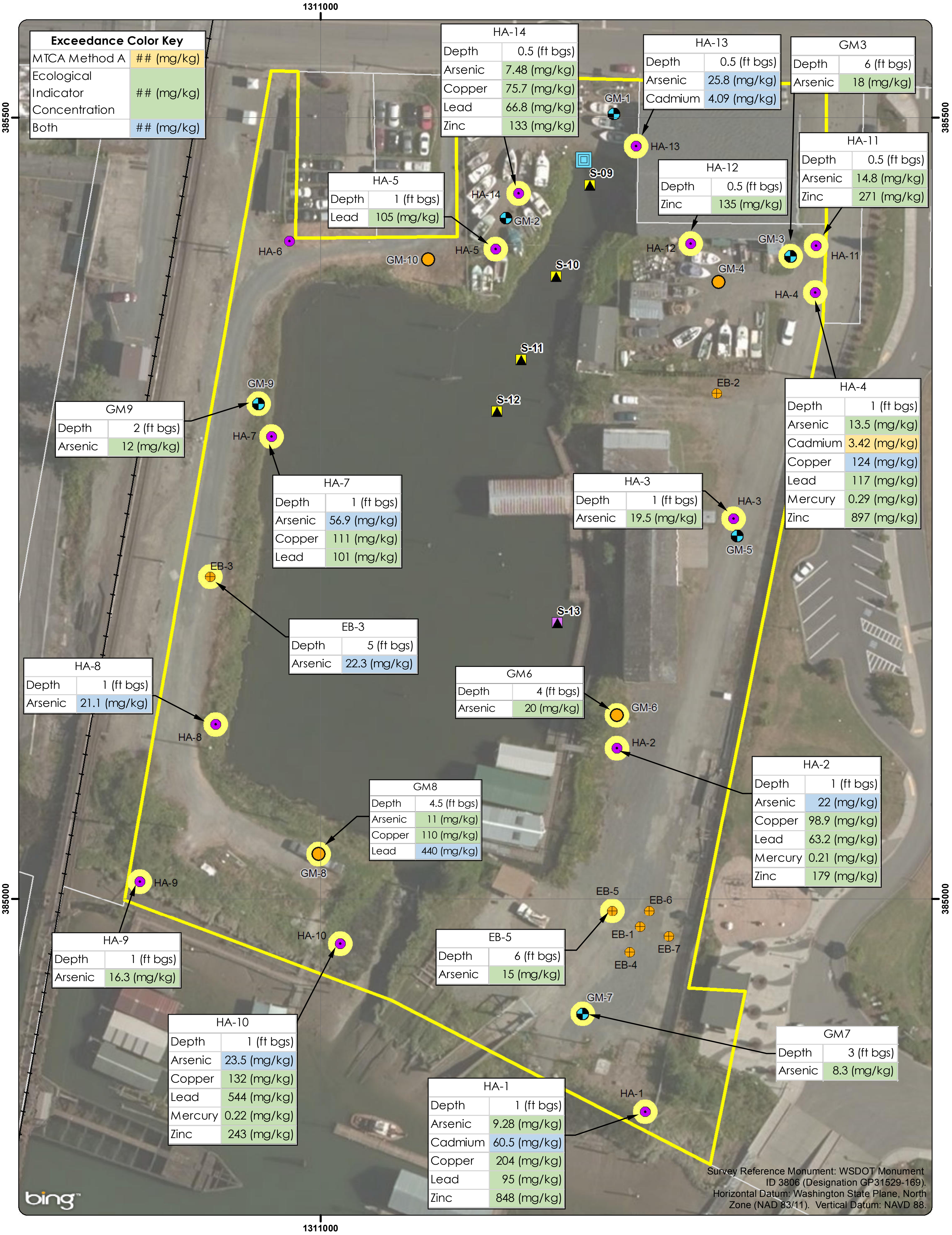
Figure 5
Preliminary Conceptual Site Model for Current and Potential Future Uses
Former Geddes Marina
City of Marysville
Marysville, Washington



		Upland Receptors		Aquatic Receptors	
Point of Potential Contact	Exposure Route	General Public	Wildlife	Fishers	Aquatic Ecological Receptors
Soil	Direct contact	✓	✓	✓	∅
Indoor air	Inhalation	✓	∅	∅	∅
Groundwater	Incidental Ingestion Direct Contact	✓ ✓	✓ ✓	∅ ∅	∅ ∅
Sediment	Direct Contact	∅	∅	I	✓
Surface Water	Ingestion Direct Contact	∅ ∅	I I	I I	✓ ✓
Tissue (via bioaccumulation)	Ingestion	∅	✓	✓	✓

Notes:
Aquatic ecological receptors include aquatic plants, benthos, fish, and piscivorous birds, shorebirds, and mammals.
Terrestrial receptors include terrestrial plants, invertebrates, and animals.

Primary pathway ⟶
Potential pathway - - →
Potentially Complete exposure route ✓
Incomplete exposure route ∅
Insignificant exposure route I



Exceedance Color Key	
MTCA Method A	## (mg/kg)
Ecological Indicator Concentration	## (mg/kg)
Both	## (mg/kg)

HA-14	
Depth	0.5 (ft bgs)
Arsenic	7.48 (mg/kg)
Copper	75.7 (mg/kg)
Lead	66.8 (mg/kg)
Zinc	133 (mg/kg)

HA-13	
Depth	0.5 (ft bgs)
Arsenic	25.8 (mg/kg)
Cadmium	4.09 (mg/kg)

GM3	
Depth	6 (ft bgs)
Arsenic	18 (mg/kg)

HA-11	
Depth	0.5 (ft bgs)
Arsenic	14.8 (mg/kg)
Zinc	271 (mg/kg)

HA-5	
Depth	1 (ft bgs)
Lead	105 (mg/kg)

HA-12	
Depth	0.5 (ft bgs)
Zinc	135 (mg/kg)

HA-4	
Depth	1 (ft bgs)
Arsenic	13.5 (mg/kg)
Cadmium	3.42 (mg/kg)
Copper	124 (mg/kg)
Lead	117 (mg/kg)
Mercury	0.29 (mg/kg)
Zinc	897 (mg/kg)

GM9	
Depth	2 (ft bgs)
Arsenic	12 (mg/kg)

HA-7	
Depth	1 (ft bgs)
Arsenic	56.9 (mg/kg)
Copper	111 (mg/kg)
Lead	101 (mg/kg)

HA-3	
Depth	1 (ft bgs)
Arsenic	19.5 (mg/kg)

EB-3	
Depth	5 (ft bgs)
Arsenic	22.3 (mg/kg)

HA-8	
Depth	1 (ft bgs)
Arsenic	21.1 (mg/kg)

GM6	
Depth	4 (ft bgs)
Arsenic	20 (mg/kg)

HA-2	
Depth	1 (ft bgs)
Arsenic	22 (mg/kg)
Copper	98.9 (mg/kg)
Lead	63.2 (mg/kg)
Mercury	0.21 (mg/kg)
Zinc	179 (mg/kg)

GM8	
Depth	4.5 (ft bgs)
Arsenic	11 (mg/kg)
Copper	110 (mg/kg)
Lead	440 (mg/kg)

HA-9	
Depth	1 (ft bgs)
Arsenic	16.3 (mg/kg)

EB-5	
Depth	6 (ft bgs)
Arsenic	15 (mg/kg)

GM7	
Depth	3 (ft bgs)
Arsenic	8.3 (mg/kg)

HA-10	
Depth	1 (ft bgs)
Arsenic	23.5 (mg/kg)
Copper	132 (mg/kg)
Lead	544 (mg/kg)
Mercury	0.22 (mg/kg)
Zinc	243 (mg/kg)

HA-1	
Depth	1 (ft bgs)
Arsenic	9.28 (mg/kg)
Cadmium	60.5 (mg/kg)
Copper	204 (mg/kg)
Lead	95 (mg/kg)
Zinc	848 (mg/kg)

Survey Reference Monument: WSDOT Monument ID 3806 (Designation GP31529-169). Horizontal Datum: Washington State Plane, North Zone (NAD 83/11). Vertical Datum: NAVD 88.

Notes: Monitoring well locations were surveyed by Pacific Geomatic Services, Inc. All other site features are approximate.
Soil cleanup levels were developed under MTCA Method A (unrestricted land use).
Soil samples were collected on February 2 and 3, 2015.
AESI = Associated Earth Sciences, Inc.
ft bgs = feet below ground surface
mg/kg = milligrams per kilogram (parts per million)
MFA = Maul Foster & Alongi, Inc.
MTCA = Model Toxics Control Act

Legend

- ◕ Monitoring Well (MFA, 2015)
- ● Boring Location (MFA, 2015)
- ▲ Sediment Sample - Tier 1 (MFA, 2015)
- ▲ Sediment Sample - Tier 2 (MFA, 2015)
- ⊙ Hand Auger Exploration (AESI, 2008)
- ⊕ Exploration Boring (AESI, 2008)
- ● Exceedances
- ▣ Stormwater Outfall
- ▭ Site Property
- ▭ Tax Lots

0 30 60
Feet

Figure 6
Soil Exceedances

Former Geddes Marina Property
Marysville, Washington

Source: Aerial photograph obtained from Bing Maps/Esri ArcGIS Online; taxlots obtained from Snohomish County.

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Path: X:\0689.01 City of Marysville\03\Projects\Fig6_Soil ExceedancesGrd.mxd
Print Date: 9/23/2015
Approved By: yvan
Produced By: jmiller
Project: 0689.01.03-01

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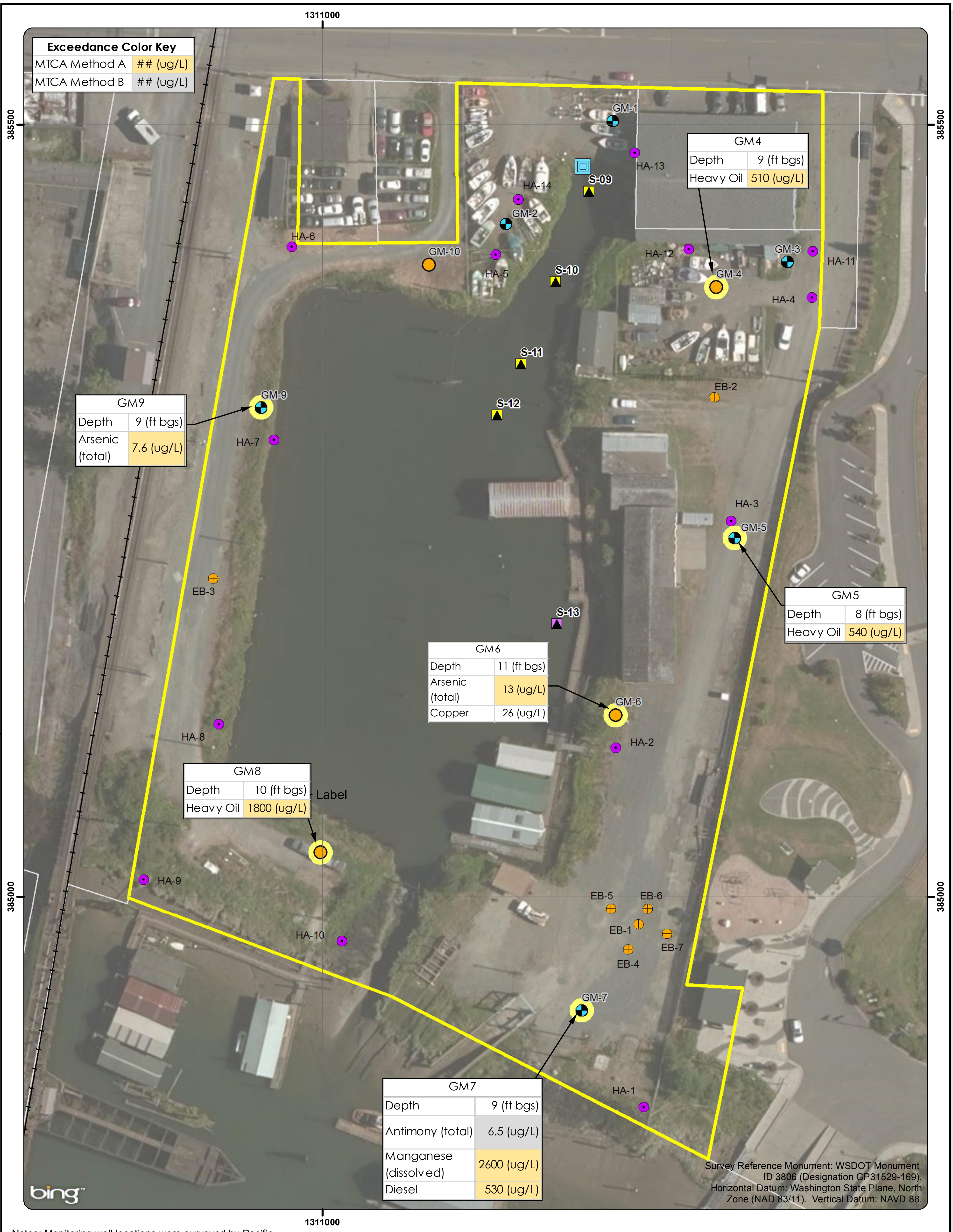

Survey Reference Monument: WSDOT Monument ID 3806 (Designation GP31529-169). Horizontal Datum: Washington State Plane, North Zone (NAD 83/11). Vertical Datum: NAVD 88.

Notes: Monitoring well locations were surveyed by Pacific Geomatic Services, Inc. All other site features are approximate.
Soil cleanup levels were developed under MTCA Method A (unrestricted land use).
Soil samples were collected on February 2 and 3, 2015.
If MTCA Method A values were not available, concentrations were compared to MTCA Method B.
AESI = Associated Earth Sciences, Inc.
ft bgs = feet below ground surface
MFA = Maul Foster & Alongi, Inc.
MTCA = Model Toxics Control Act
ug/L = micrograms per liter (parts per billion)

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Legend

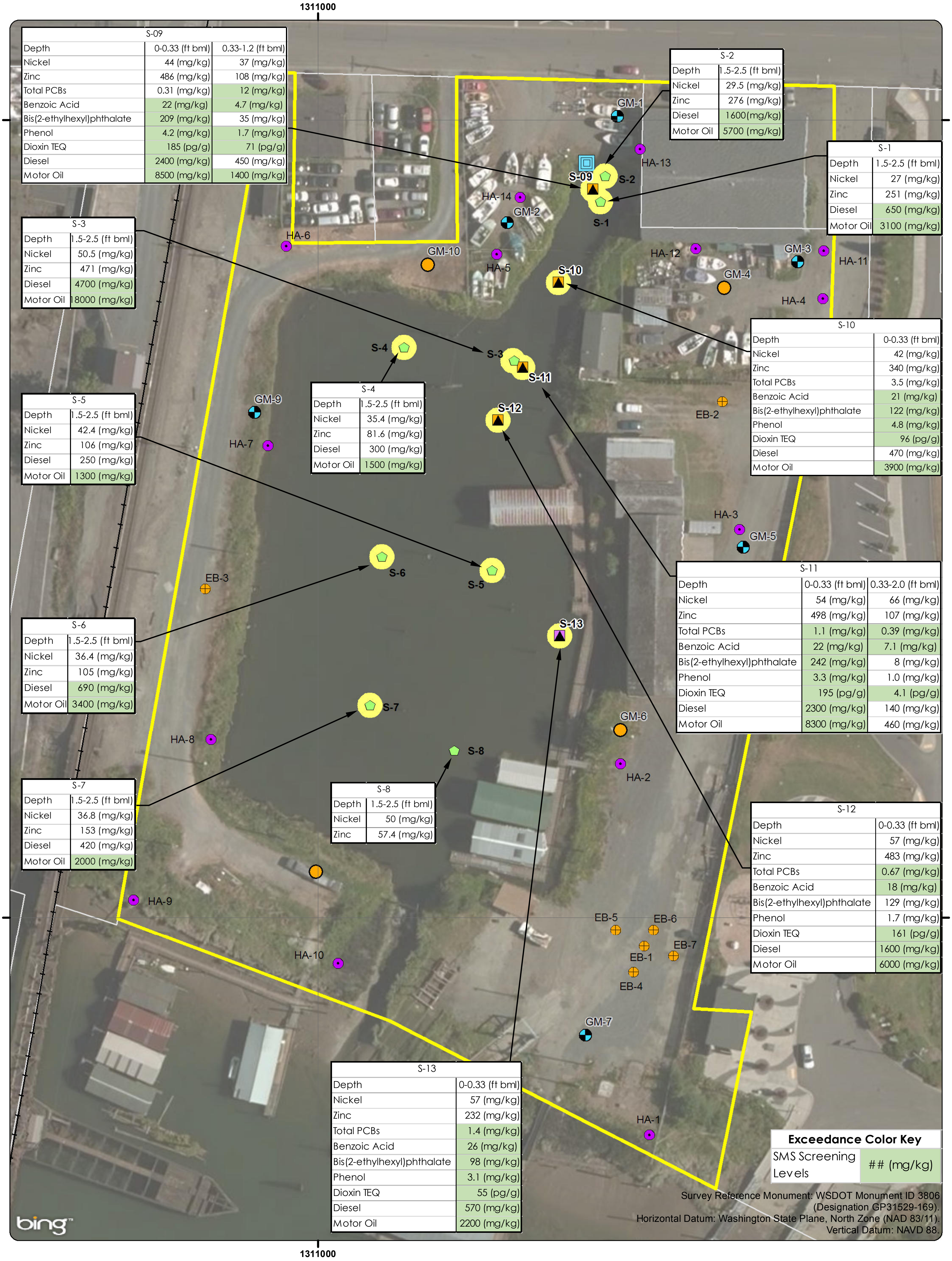
- ⊕ Monitoring Well (MFA, 2015)
- ● Boring Location (MFA, 2015)
- ▲ Sediment Sample - Tier 1 (MFA, 2015)
- ▲ Sediment Sample - Tier 2 (MFA, 2015)
- ● Hand Auger Exploration (AESI, 2008)
- ⊕ Exploration Boring (AESI, 2008)
- ● MTCA Exceedance
- ▣ Stormwater Outfall
- ☐ Site Property
- ☐ Tax Lots

0 30 60
Feet

Figure 7
Groundwater Exceedances
Former Geddes Marina Property
Marysville, Washington

Source: Aerial photograph obtained from Bing Maps/Esri ArcGIS Online; taxlots obtained from Snohomish County.

Print Date: 9/23/2015 Approved By: yvan Produced By: jmiller Project: 0689.01.03-01



S-09		
Depth	0-0.33 (ft bml)	0.33-1.2 (ft bml)
Nickel	44 (mg/kg)	37 (mg/kg)
Zinc	486 (mg/kg)	108 (mg/kg)
Total PCBs	0.31 (mg/kg)	12 (mg/kg)
Benzoic Acid	22 (mg/kg)	4.7 (mg/kg)
Bis(2-ethylhexyl)phthalate	209 (mg/kg)	35 (mg/kg)
Phenol	4.2 (mg/kg)	1.7 (mg/kg)
Dioxin TEQ	185 (pg/g)	71 (pg/g)
Diesel	2400 (mg/kg)	450 (mg/kg)
Motor Oil	8500 (mg/kg)	1400 (mg/kg)

S-2	
Depth	1.5-2.5 (ft bml)
Nickel	29.5 (mg/kg)
Zinc	276 (mg/kg)
Diesel	1600(mg/kg)
Motor Oil	5700 (mg/kg)

S-1	
Depth	1.5-2.5 (ft bml)
Nickel	27 (mg/kg)
Zinc	251 (mg/kg)
Diesel	650 (mg/kg)
Motor Oil	3100 (mg/kg)

S-3	
Depth	1.5-2.5 (ft bml)
Nickel	50.5 (mg/kg)
Zinc	471 (mg/kg)
Diesel	4700 (mg/kg)
Motor Oil	18000 (mg/kg)

S-10	
Depth	0-0.33 (ft bml)
Nickel	42 (mg/kg)
Zinc	340 (mg/kg)
Total PCBs	3.5 (mg/kg)
Benzoic Acid	21 (mg/kg)
Bis(2-ethylhexyl)phthalate	122 (mg/kg)
Phenol	4.8 (mg/kg)
Dioxin TEQ	96 (pg/g)
Diesel	470 (mg/kg)
Motor Oil	3900 (mg/kg)

S-5	
Depth	1.5-2.5 (ft bml)
Nickel	42.4 (mg/kg)
Zinc	106 (mg/kg)
Diesel	250 (mg/kg)
Motor Oil	1300 (mg/kg)

S-4	
Depth	1.5-2.5 (ft bml)
Nickel	35.4 (mg/kg)
Zinc	81.6 (mg/kg)
Diesel	300 (mg/kg)
Motor Oil	1500 (mg/kg)

S-11		
Depth	0-0.33 (ft bml)	0.33-2.0 (ft bml)
Nickel	54 (mg/kg)	66 (mg/kg)
Zinc	498 (mg/kg)	107 (mg/kg)
Total PCBs	1.1 (mg/kg)	0.39 (mg/kg)
Benzoic Acid	22 (mg/kg)	7.1 (mg/kg)
Bis(2-ethylhexyl)phthalate	242 (mg/kg)	8 (mg/kg)
Phenol	3.3 (mg/kg)	1.0 (mg/kg)
Dioxin TEQ	195 (pg/g)	4.1 (pg/g)
Diesel	2300 (mg/kg)	140 (mg/kg)
Motor Oil	8300 (mg/kg)	460 (mg/kg)

S-6	
Depth	1.5-2.5 (ft bml)
Nickel	36.4 (mg/kg)
Zinc	105 (mg/kg)
Diesel	690 (mg/kg)
Motor Oil	3400 (mg/kg)

S-7	
Depth	1.5-2.5 (ft bml)
Nickel	36.8 (mg/kg)
Zinc	153 (mg/kg)
Diesel	420 (mg/kg)
Motor Oil	2000 (mg/kg)

S-8	
Depth	1.5-2.5 (ft bml)
Nickel	50 (mg/kg)
Zinc	57.4 (mg/kg)

S-12	
Depth	0-0.33 (ft bml)
Nickel	57 (mg/kg)
Zinc	483 (mg/kg)
Total PCBs	0.67 (mg/kg)
Benzoic Acid	18 (mg/kg)
Bis(2-ethylhexyl)phthalate	129 (mg/kg)
Phenol	1.7 (mg/kg)
Dioxin TEQ	161 (pg/g)
Diesel	1600 (mg/kg)
Motor Oil	6000 (mg/kg)

S-13	
Depth	0-0.33 (ft bml)
Nickel	57 (mg/kg)
Zinc	232 (mg/kg)
Total PCBs	1.4 (mg/kg)
Benzoic Acid	26 (mg/kg)
Bis(2-ethylhexyl)phthalate	98 (mg/kg)
Phenol	3.1 (mg/kg)
Dioxin TEQ	55 (pg/g)
Diesel	570 (mg/kg)
Motor Oil	2200 (mg/kg)

Exceedance Color Key	
SMS Screening Levels	## (mg/kg)

Survey Reference Monument: WSDOT Monument ID 3806
(Designation GP31529-169).
Horizontal Datum: Washington State Plane, North Zone (NAD 83/11).
Vertical Datum: NAVD 88.

Notes: Monitoring well locations were surveyed by Pacific Geomatic Services, Inc. All other site features are approximate.
Soil cleanup levels were developed under MTCA Method A (unrestricted land use).
Sediment samples were collected on February 2 and 3, 2015.
SMS = Sediment Management Standards
AESI = Associated Earth Sciences, Inc.
ft bgs = feet below ground surface
ft bml = feet below mudline
mg/kg = milligrams per kilogram (parts per million)
MFA = Maul Foster & Alongi, Inc.
MTCA = Model Toxics Control Act
pg/g = picograms per gram (parts per trillion)

Legend

- ⬠ Sediment Sample - Previous
- ◕ Monitoring Well (MFA, 2015)
- ● Boring Location (MFA, 2015)
- ▲ Sediment Sample - Tier 1 (MFA, 2015)
- ▲ Sediment Sample - Tier 2 (MFA, 2015)
- ⊙ Hand Auger Exploration (AESI, 2008)
- ⊕ Exploration Boring (AESI, 2008)
- ● MTCA Exceedance
- ▣ Stormwater Outfall
- ☐ Site Property
- ☐ Tax Lots

Figure 8
Spatial Distribution of Representative Indicator Hazardous Substances in Sediment
Former Geddes Marina Property
Marysville, Washington

0 30 60
Feet

Source: Aerial photograph obtained from Bing Maps/Esri ArcGIS Online; taxlots obtained from Snohomish County.

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APPENDIX A

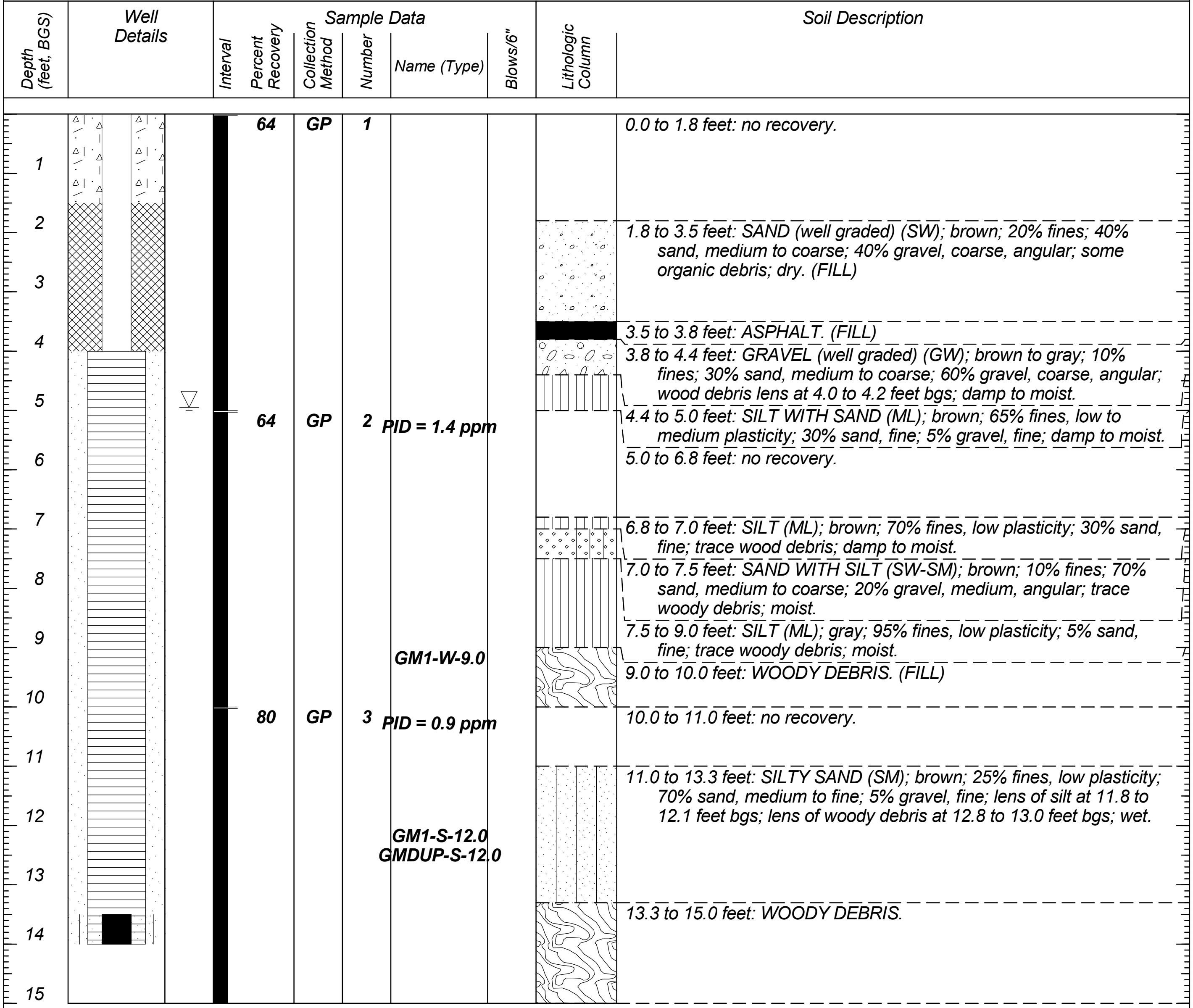
BORING LOGS

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0689.01.03	**GM-1**	**1 of 1**

Project Name	**Former Geddes Marina**	TOC Elevation (feet)	
Project Location	**Marysville, Washington**	Surface Elevation (feet)	
Start/End Date	**2/3/15 to 2/3/15**	Northing	
Driller/Equipment	**Holt Services, Inc./Geoprobe 7822DT**	Easting	
Geologist/Engineer	**M. Murray, C. Wise**	Hole Depth	**15.0-feet**
Sample Method		Outer Hole Diam	**2.0-inch**



Sample Data

Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"
	64	**GP**	**1**		
	64	**GP**	**2**	**PID = 1.4 ppm**	
				GM1-W-9.0	
	80	**GP**	**3**	**PID = 0.9 ppm**	
				GM1-S-12.0 **GMDUP-S-12.0**	

Soil Description

0.0 to 1.8 feet: no recovery.

1.8 to 3.5 feet: SAND (well graded) (SW); brown; 20% fines; 40% sand, medium to coarse; 40% gravel, coarse, angular; some organic debris; dry. (FILL)

3.5 to 3.8 feet: ASPHALT. (FILL)

3.8 to 4.4 feet: GRAVEL (well graded) (GW); brown to gray; 10% fines; 30% sand, medium to coarse; 60% gravel, coarse, angular; wood debris lens at 4.0 to 4.2 feet bgs; damp to moist.

4.4 to 5.0 feet: SILT WITH SAND (ML); brown; 65% fines, low to medium plasticity; 30% sand, fine; 5% gravel, fine; damp to moist.

5.0 to 6.8 feet: no recovery.

6.8 to 7.0 feet: SILT (ML); brown; 70% fines, low plasticity; 30% sand, fine; trace wood debris; damp to moist.

7.0 to 7.5 feet: SAND WITH SILT (SW-SM); brown; 10% fines; 70% sand, medium to coarse; 20% gravel, medium, angular; trace woody debris; moist.

7.5 to 9.0 feet: SILT (ML); gray; 95% fines, low plasticity; 5% sand, fine; trace woody debris; moist.

9.0 to 10.0 feet: WOODY DEBRIS. (FILL)

10.0 to 11.0 feet: no recovery.

11.0 to 13.3 feet: SILTY SAND (SM); brown; 25% fines, low plasticity; 70% sand, medium to fine; 5% gravel, fine; lens of silt at 11.8 to 12.1 feet bgs; lens of woody debris at 12.8 to 13.0 feet bgs; wet.

13.3 to 15.0 feet: WOODY DEBRIS.

NOTES: Field duplicate collected (GMDUP-S-12.0).
bgs = below ground surface, GP = geoprobe macrocore liner, PID = photoionization detector, ppm = parts per million

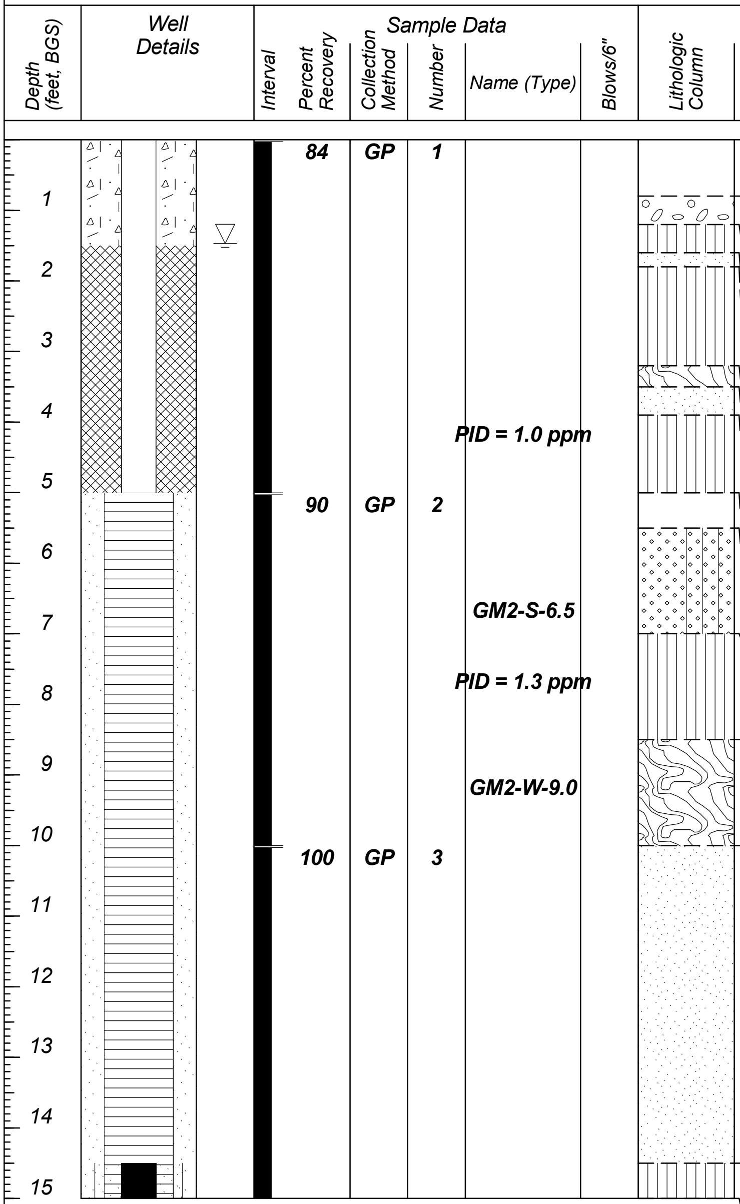
∇ **feet below ground surface.**

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0689.01.03	**GM-2**	**1 of 1**

Project Name	**Former Geddes Marina**	TOC Elevation (feet)	
Project Location	**Marysville, Washington**	Surface Elevation (feet)	
Start/End Date	**2/3/15 to 2/3/15**	Northing	
Driller/Equipment	**Holt Services, Inc./Geoprobe 7822DT**	Easting	
Geologist/Engineer	**M. Murray, C. Wise**	Hole Depth	**15.0-feet**
Sample Method		Outer Hole Diam	**2.0-inch**



Sample Data

Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"
	84	**GP**	**1**		
				PID = 1.0 ppm	
	90	**GP**	**2**		
				GM2-S-6.5	
				PID = 1.3 ppm	
				GM2-W-9.0	
	100	**GP**	**3**		

Soil Description

0.0 to 0.8 feet: no recovery.

0.8 to 1.2 feet: GRAVEL (poorly graded) (GP); brown to gray; 5% fines; 5% sand; 90% gravel, coarse, angular; dry. (FILL)

1.2 to 1.6 feet: SILT WITH SAND (ML); brown; 85% fines, low plasticity; 15% sand, fine; moist.

1.6 to 1.8 feet: SAND (poorly graded) (SP); brown; 20% fines; 80% sand, fine; moist.

1.8 to 3.2 feet: SILT (ML); gray; 95% fines, low plasticity; 5% sand, fine to medium; firm; moist.

3.2 to 3.5 feet: WOODY DEBRIS.

3.5 to 3.9 feet: SAND (poorly graded) (SP); light brown; 5% fines; 95% sand, fine to medium; trace woody debris; moist.

3.9 to 5.0 feet: SILT WITH SAND (ML); dark brown; 95% fines, low plasticity; 5% fines; very soft; trace woody debris; moist to saturated.

5.0 to 5.5 feet: no recovery.

5.5 to 7.0 feet: SAND WITH SILT (SW-SM); brown; 30% fines, low plasticity; 55% sand, fine to coarse; 15% gravel, fine, angular; very soft; trace woody debris; saturated.

7.0 to 8.5 feet: SILT (ML); brown; 95% fines, low plasticity; 5% sand; trace woody debris; wet.

8.5 to 10.0 feet: WOODY DEBRIS; remnants of burnt wood; wet.

10.0 to 14.5 feet: SAND (poorly graded) (SP); gray; 5% fines; 90% sand, fine to medium; 5% gravel; trace woody debris; lens of angular, coarse gravel at 11.0 to 11.1 feet bgs; saturated.

14.5 to 15.0 feet: SILT WITH SAND (ML); light brown; 60% fines, low plasticity; 40% sand, fine; firm; saturated.

NOTES: *bgs = below ground surface, GP = geoprobe macrocore liner, PID = photoionization detector, ppm = parts per million*

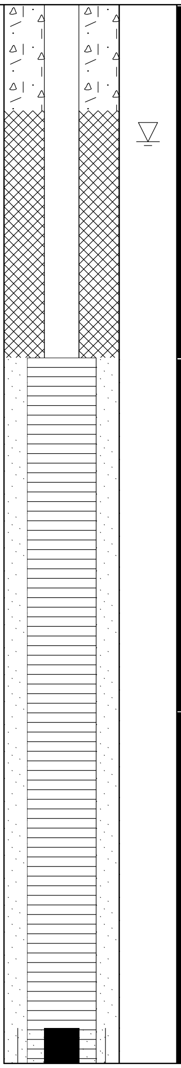
▽ **feet below ground surface.**

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

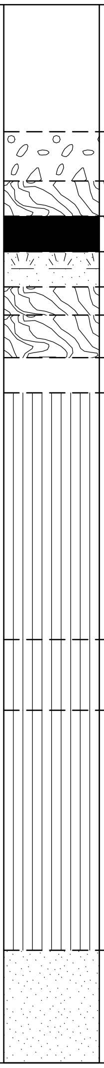
Project Number	Well Number	Sheet
0689.01.03	**GM-3**	**1 of 1**

Project Name	**Former Geddes Marina**	TOC Elevation (feet)	
Project Location	**Marysville, Washington**	Surface Elevation (feet)	
Start/End Date	**2/2/15 to 2/2/15**	Northing	
Driller/Equipment	**Holt Services, Inc./Geoprobe 7822DT**	Easting	
Geologist/Engineer	**M. Murray, C. Wise**	Hole Depth	**15.0-feet**
Sample Method		Outer Hole Diam	**2.0-inch**



Sample Data

Depth (feet, BGS)	Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"
0.0		**64**	**GP**	**1**		
3.2					**PID = 1.5 ppm**	
5.0		**90**	**GP**	**2**		
6.0					**GM3-S-6.0**	
9.0					**GM3-W-9.0**	
10.0		**100**	**GP**	**3**		
12.3					**PID = 1.4 ppm**	



Soil Description

0.0 to 1.8 feet: no recovery.
1.8 to 2.5 feet: GRAVEL (poorly graded) (GP); gray; 5% fines; 15% sand, fine to medium; 80% gravel, fine to coarse, angular; dry to moist. (FILL)
2.5 to 3.0 feet: WOODY DEBRIS; moist. (FILL)
3.0 to 3.5 feet: ASPHALT. (FILL)
3.5 to 4.0 feet: TOPSOIL; moist.
4.0 to 4.4 feet: WOODY DEBRIS; unweathered. (FILL)
4.4 to 5.0 feet: WOODY DEBRIS; weathered. (FILL)
5.0 to 5.5 feet: no recovery.
5.5 to 9.0 feet: SILT (ML); gray; 100% fines, low plasticity; some woody debris; trace redox features; saturated.
9.0 to 10.0 feet: SILT (ML); brown; 100% fines, low plasticity; some woody debris; moist to saturated.
10.0 to 13.4 feet: SILT (ML); brown; 100% fines, low plasticity; trace woody debris; loose; saturated.
13.4 to 15.0 feet: SAND (poorly graded) (SP); gray; 10% fines; 90% sand, medium; trace woody debris; saturated.

NOTES: bgs = below ground surface, GP = geoprobe macrocore liner, PID = photoionization detector, ppm = parts per million

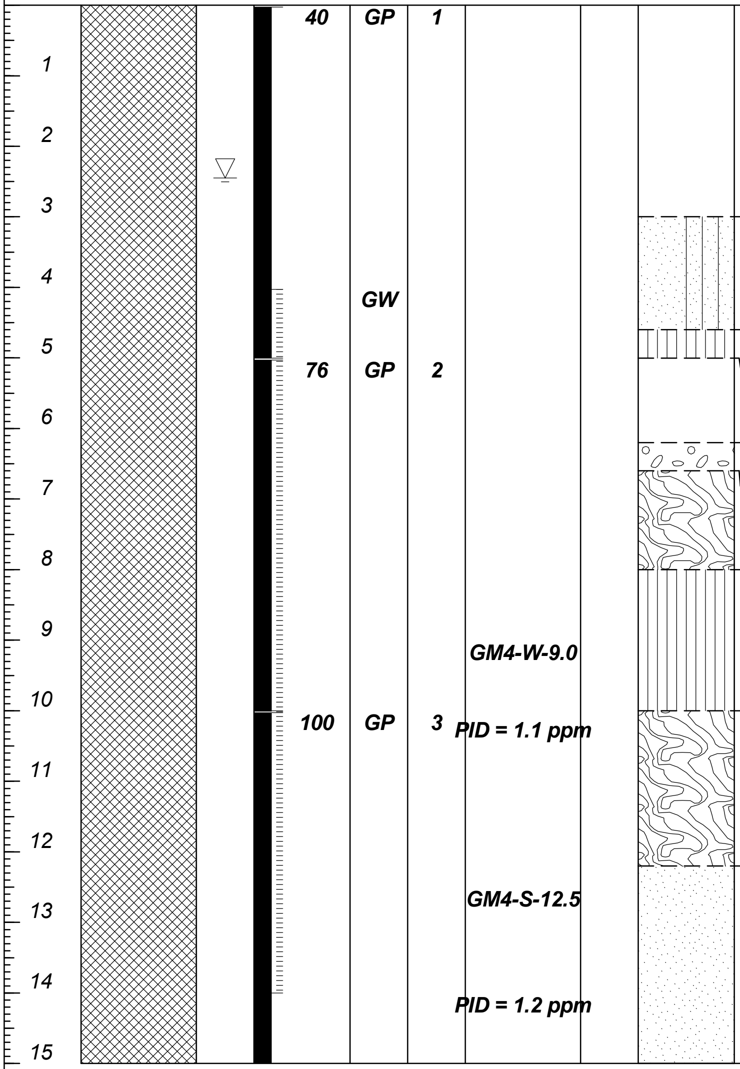
▽ **feet below ground surface.**

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0689.01.03	**GM-4**	**1 of 1**

Project Name	**Former Geddes Marina**	TOC Elevation (feet)	
Project Location	**Marysville, Washington**	Surface Elevation (feet)	
Start/End Date	**2/3/15 to 2/3/15**	Northing	
Driller/Equipment	**Holt Services, Inc./Geoprobe 7822DT**	Easting	
Geologist/Engineer	**M. Murray, C. Wise**	Hole Depth	**15.0-feet**
Sample Method		Outer Hole Diam	**2.0-inch**



Sample Data

Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"
40	GP	1		
	GW			
76	GP	2		
			GM4-W-9.0	
100	GP	3	PID = 1.1 ppm	
			GM4-S-12.5	
			PID = 1.2 ppm	

Soil Description

0.0 to 3.0 feet: no recovery.

3.0 to 4.6 feet: SAND WITH SILT (SP-SM); gray; 15% fines; 60% sand, medium; 25% gravel, medium; some organic debris; moist. (FILL)

4.6 to 5.0 feet: SILT (ML); gray; 90% fines, low plasticity; 10% sand, fine; some organics; moist to wet. (FILL)

5.0 to 6.2 feet: no recovery.

6.2 to 6.6 feet: GRAVEL (poorly graded) (GP); gray; 10% fines; 10% sand, fine; 80% gravel, coarse, angular; trace woody debris; moist. (FILL)

6.6 to 8.0 feet: WOODY DEBRIS; moist.

8.0 to 10.0 feet: SILT (ML); brown; 95% fines, low plasticity; 5% sand; trace woody debris; moist to saturated.

10.0 to 12.2 feet: WOODY DEBRIS; saturated.

12.2 to 15.0 feet: SAND (poorly graded) (SP); light gray; 15% fines; 85% sand, fine to medium; trace woody debris; saturated.

NOTES: *Temporary screen installed from 4.0 to 14.0 feet bgs. Boring decommissioned with bentonite chips.*
bgs = below ground surface, GP = geoprobe macrocore liner, GW = groundwater sample, PID = photoionization detector, ppm = parts per million

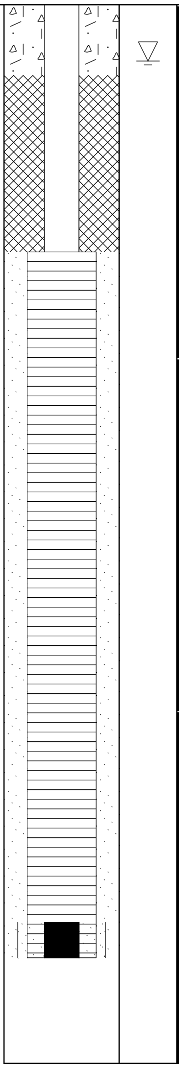
▽ **feet below ground surface.**

Maul Foster & Alongi, Inc.

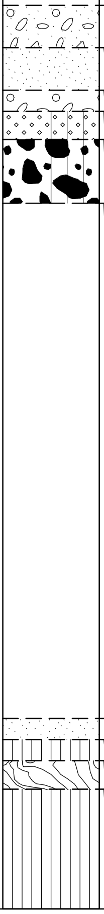
Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0689.01.03	**GM-5**	**1 of 1**

Project Name	**Former Geddes Marina**	TOC Elevation (feet)	
Project Location	**Marysville, Washington**	Surface Elevation (feet)	
Start/End Date	**2/2/15 to 2/2/15**	Northing	
Driller/Equipment	**Holt Services, Inc./Geoprobe 7822DT**	Easting	
Geologist/Engineer	**M. Murray, C. Wise**	Hole Depth	**15.0-feet**
Sample Method		Outer Hole Diam	**2.0-inch**



Depth (feet, BGS)	Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"
0		56	GP	1		
3					PID = 8.3	
4					GM5-S-4.0	
5		0	GP	2		
9					GM5-W-9.0	
10		54	GP	3		
14					PID = 13.3 ppm	



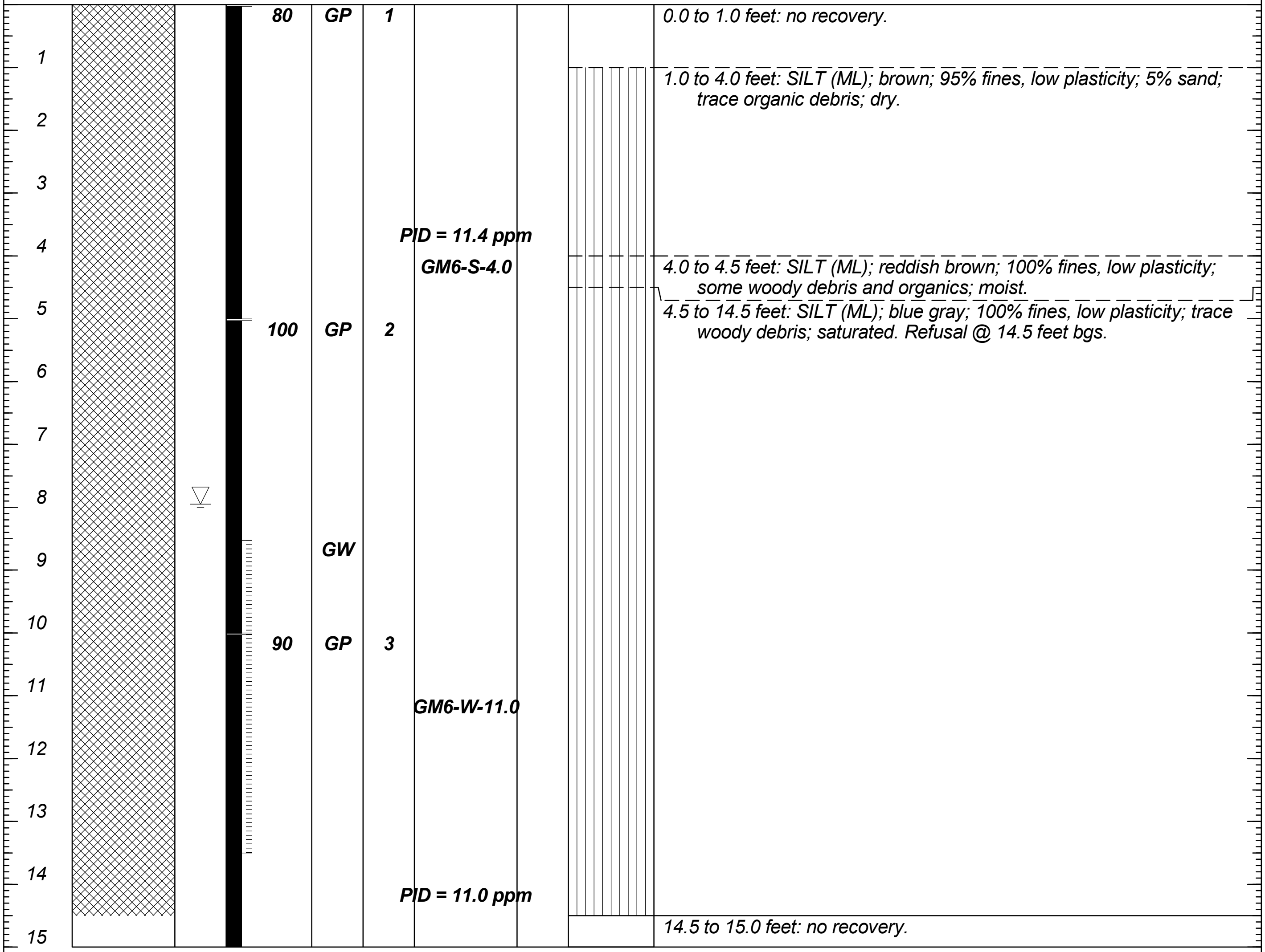
Soil Description
0.0 to 2.2 feet: no recovery.
2.2 to 2.8 feet: GRAVEL (well graded) (GW); gray; 5% fines; 25% sand, medium to coarse; 70% gravel, rounded, fine to medium; moist. (FILL)
2.8 to 3.4 feet: SAND (poorly graded) (SP); gray; 5% fines; 85% sand, coarse; 10% gravel; moist.
3.4 to 3.7 feet: GRAVEL (poorly graded) (GP); gray; 20% sand; 80% gravel, angular, fine to coarse; moist. (FILL)
3.7 to 4.1 feet: SAND WITH SILT (SW-SM); gray to brown; 10% fines; 70% sand, medium; 20% gravel, fine to medium; moist. (FILL)
4.1 to 5.0 feet: SANDY GRAVEL WITH SILT (GW-GM); 10% fines; 30% sand, coarse; 60% gravel, fine; loose; saturated.
5.0 to 12.3 feet: no recovery.
12.3 to 12.6 feet: SAND (poorly graded) (SP); gray; 5% fines; 65% sand, medium; 30% gravel; loose; saturated.
12.6 to 12.9 feet: SILT (ML); brown; 100% fines, medium plasticity; trace organic debris; moist.
12.9 to 13.3 feet: WOODY DEBRIS; brown; weathered; moist.
13.3 to 15.0 feet: SILT (ML); brown; 100% fines, medium plasticity; trace organic debris; sulfur-like odor; moist to saturated.

NOTES: bgs = below ground surface, GP = geoprobe macrocore liner, PID = photoionization detector, ppm = parts per million

▽ **feet below ground surface.**

Maul Foster & Alongi, Inc.	**Geologic Borehole Log/Well Construction**		
	Project Number	*Well Number*	*Sheet*
	0689.01.03	***GM-6***	***1 of 1***

Project Name	***Former Geddes Marina***	*TOC Elevation (feet)*	
Project Location	***Marysville, Washington***	*Surface Elevation (feet)*	
Start/End Date	***2/2/15 to 2/2/15***	*Northing*	
Driller/Equipment	***Holt Services, Inc./Geoprobe 7822DT***	*Easting*	
Geologist/Engineer	***M. Murray, C. Wise***	*Hole Depth*	***15.0-feet***
Sample Method		*Outer Hole Diam*	***2.0-inch***



Depth (feet, BGS)	*Percent Recovery*	*Collection Method*	*Number*	*Name (Type)*	*Blows/6"*
0	***80***	***GP***	***1***		
4				***PID = 11.4 ppm***	
4				***GM6-S-4.0***	
5	***100***	***GP***	***2***		
8.5		***GW***			
10	***90***	***GP***	***3***		
11				***GM6-W-11.0***	
14				***PID = 11.0 ppm***	

Soil Description

0.0 to 1.0 feet: no recovery.

1.0 to 4.0 feet: SILT (ML); brown; 95% fines, low plasticity; 5% sand; trace organic debris; dry.

4.0 to 4.5 feet: SILT (ML); reddish brown; 100% fines, low plasticity; some woody debris and organics; moist.

4.5 to 14.5 feet: SILT (ML); blue gray; 100% fines, low plasticity; trace woody debris; saturated. Refusal @ 14.5 feet bgs.

14.5 to 15.0 feet: no recovery.

NOTES: *Temporary screen installed from 8.5 to 13.5 feet bgs. Boring decommissioned with bentonite chips.*
bgs = below ground surface, GP = geoprobe macrocore liner, GW = groundwater sample, PID = photoionization detector, ppm = parts per million

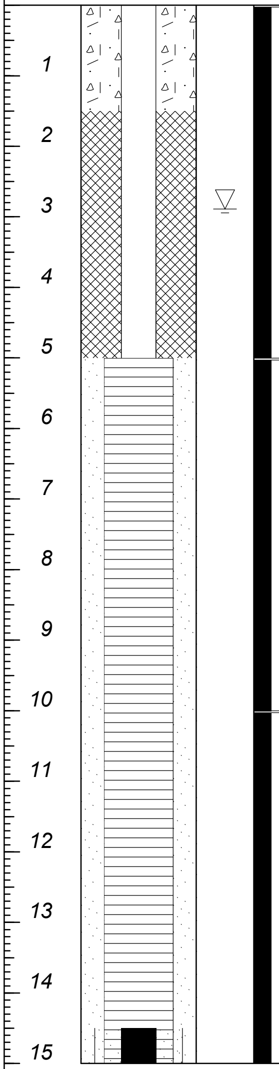
▽ ***feet below ground surface.***

Maul Foster & Alongi, Inc.

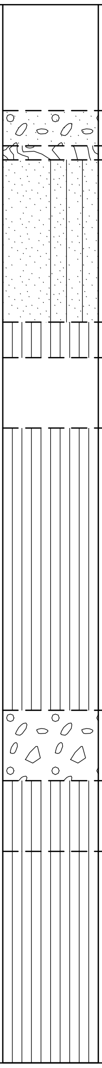
Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0689.01.03	**GM-7**	**1 of 1**

Project Name	**Former Geddes Marina**	TOC Elevation (feet)	
Project Location	**Marysville, Washington**	Surface Elevation (feet)	
Start/End Date	**2/2/15 to 2/2/15**	Northing	
Driller/Equipment	**Holt Services, Inc./Geoprobe 7822DT**	Easting	
Geologist/Engineer	**M. Murray, C. Wise**	Hole Depth	**15.0-feet**
Sample Method		Outer Hole Diam	**2.0-inch**



Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Soil Description
70	**GP**	**1**			0.0 to 1.5 feet: no recovery.
					1.5 to 2.0 feet: GRAVEL (well graded) (GW); gray; 5% fines; 20% sand; 75% gravel, angular, fine to coarse; moist. (FILL)
					2.0 to 2.2 feet: WOODY DEBRIS. (FILL)
			PID = 10.5 ppm **GM7-S-3.0**		2.2 to 4.5 feet: SAND WITH SILT (poorly graded) (SP-SM); brown; 30% fines; 70% sand, fine to medium; trace woody debris; moist.
					4.5 to 5.0 feet: SILT (ML); brown to black; 100% fines, medium plasticity; trace woody debris; moist.
80	**GP**	**2**			5.0 to 6.0 feet: no recovery.
			GM7-W-9.0 **PID = 5.0 ppm**		6.0 to 10.0 feet: SILT (ML); brown to black; 100% fines, medium plasticity; trace woody debris; moist to saturated.
90	**GP**	**3**			10.0 to 11.0 feet: GRAVEL (poorly graded); gray; 5% fines; 5% sand; 90% gravel, angular, coarse; saturated. (FILL)
					11.0 to 12.0 feet: SILT WITH SAND (ML); brown; 80% fines, medium plasticity; 20% sand; saturated.
					12.0 to 15.0 feet: SILT (ML); brown to gray; 100% fines, medium plasticity; trace woody debris; sulfur-like odor; saturated.



NOTES: bgs = below ground surface, GP = geoprobe macrocore liner, PID = photoionization detector, ppm = parts per million

▽ **feet below ground surface.**

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0689.01.03	**GM-8**	**1 of 1**

Project Name	**Former Geddes Marina**	TOC Elevation (feet)	
Project Location	**Marysville, Washington**	Surface Elevation (feet)	
Start/End Date	**2/2/15 to 2/2/15**	Northing	
Driller/Equipment	**Holt Services, Inc./Geoprobe 7822DT**	Easting	
Geologist/Engineer	**M. Murray, C. Wise**	Hole Depth	**15.0-feet**
Sample Method		Outer Hole Diam	**2.0-inch**

Sample Data

Depth (feet, BGS)	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"
0.0	**90**	**GP**	**1**	**GM8-S-4.5**	
5.0	**70**	**GP** **GW**	**2**		
10.0	**90**	**GP**	**3**	**PID = 40.7 ppm** **GM8-W-10.0**	
15.0				**PID = 14.0 ppm**	

Soil Description

0.0 to 0.5 feet: no recovery.

0.5 to 1.2 feet: GRAVEL (poorly graded) (GP); gray; 10% sand; 90% gravel, angular, coarse; dry. (FILL)

1.2 to 2.9 feet: SILT (ML); brown; 90% fines, low plasticity; 10% sand, fine; trace organic debris; moist.

2.9 to 3.1 feet: SILT (ML); black; 90% fines, low plasticity; 10% sand, fine; trace organic debris; charcoal remnants; moist.

3.1 to 5.0 feet: SILTY SAND (SM); yellowish brown; 30% fines; 60% sand, fine to coarse, angular; 10% gravel; trace woody debris; wet.

5.0 to 6.5 feet: no recovery.

6.5 to 8.0 feet: WOODY DEBRIS; moist. (FILL)

8.0 to 10.0 feet: SILT (ML); gray; 95% fines, low plasticity; 5% sand, fine; trace woody debris; sulfur-like odor; moist.

10.0 to 10.5 feet: no recovery.

10.5 to 11.0 feet: GRAVEL (poorly graded) (GP); gray; 20% fines; 20% sand, 60% gravel, coarse, angular; trace woody debris; moist to saturated.

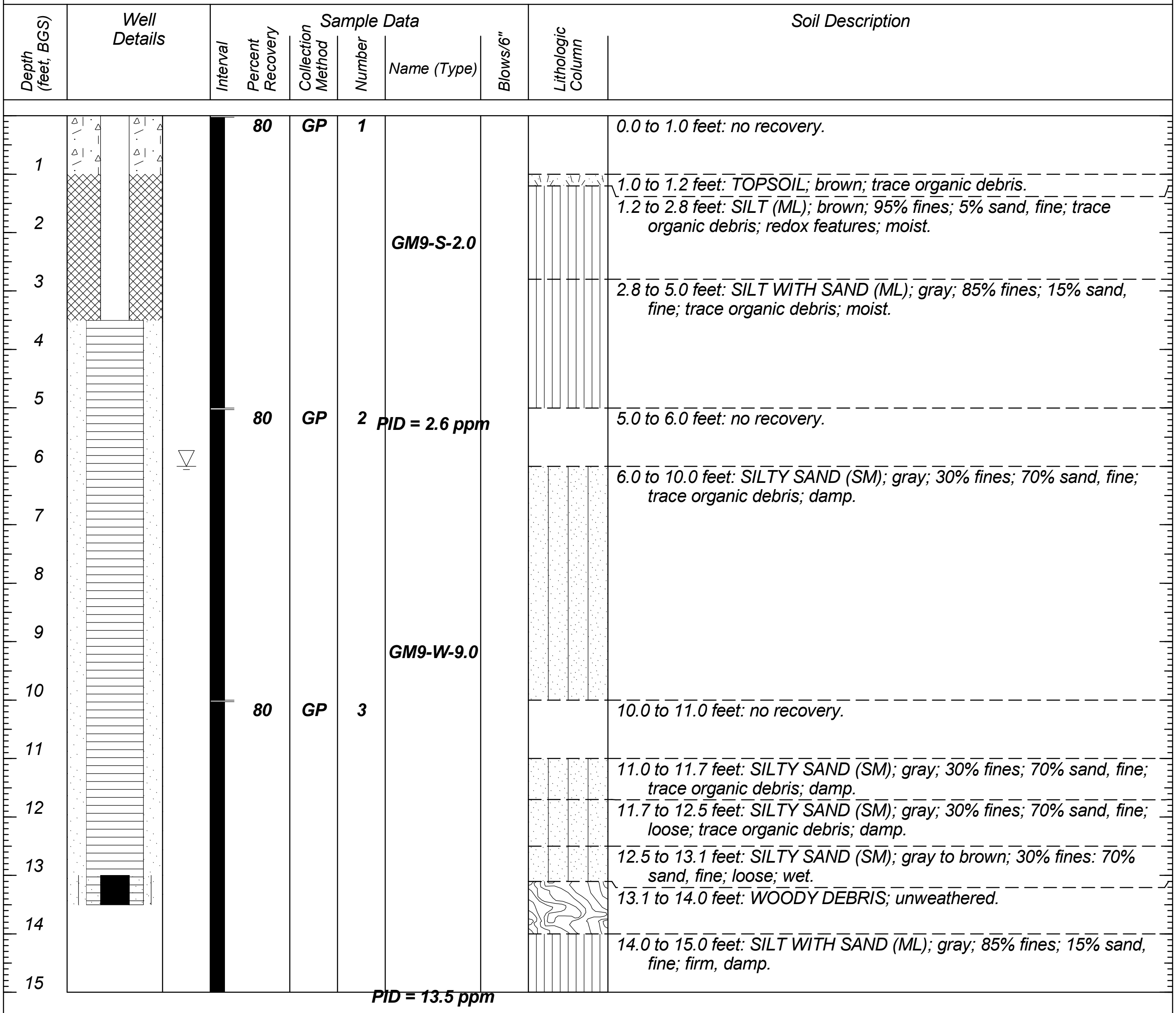
11.0 to 15.0 feet: SILT (ML); gray; 95% fines, low plasticity; 5% sand, fine; trace woody debris; saturated.

NOTES: Temporary screen installed from 5.0 to 15.0 feet bgs. Boring decommissioned with bentonite chips.
bgs = below ground surface, GP = geoprobe macrocore liner, GW = groundwater sample, PID = photoionization detector, ppm = parts per million

▽ **feet below ground surface.**

Maul Foster & Alongi, Inc.	Geologic Borehole Log/Well Construction		
	Project Number **0689.01.03**	Well Number **GM-9**	Sheet **1 of 1**

Project Name	**Former Geddes Marina**	TOC Elevation (feet)	
Project Location	**Marysville, Washington**	Surface Elevation (feet)	
Start/End Date	**2/2/15 to 2/2/15**	Northing	
Driller/Equipment	**Holt Services, Inc./Geoprobe 7822DT**	Easting	
Geologist/Engineer	**M. Murray, C. Wise**	Hole Depth	**15.0-feet**
Sample Method		Outer Hole Diam	**2.0-inch**



Depth (feet, BGS)	Well Details	Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
0–5			**80**	**GP**	**1**	**GM9-S-2.0**			0.0 to 1.0 feet: no recovery. 1.0 to 1.2 feet: TOPSOIL; brown; trace organic debris. 1.2 to 2.8 feet: SILT (ML); brown; 95% fines; 5% sand, fine; trace organic debris; redox features; moist. 2.8 to 5.0 feet: SILT WITH SAND (ML); gray; 85% fines; 15% sand, fine; trace organic debris; moist.
5–10	∇		**80**	**GP**	**2**	**PID = 2.6 ppm** **GM9-W-9.0**			5.0 to 6.0 feet: no recovery. 6.0 to 10.0 feet: SILTY SAND (SM); gray; 30% fines; 70% sand, fine; trace organic debris; damp.
10–15			**80**	**GP**	**3**	**PID = 13.5 ppm**			10.0 to 11.0 feet: no recovery. 11.0 to 11.7 feet: SILTY SAND (SM); gray; 30% fines; 70% sand, fine; trace organic debris; damp. 11.7 to 12.5 feet: SILTY SAND (SM); gray; 30% fines; 70% sand, fine; loose; trace organic debris; damp. 12.5 to 13.1 feet: SILTY SAND (SM); gray to brown; 30% fines: 70% sand, fine; loose; wet. 13.1 to 14.0 feet: WOODY DEBRIS; unweathered. 14.0 to 15.0 feet: SILT WITH SAND (ML); gray; 85% fines; 15% sand, fine; firm, damp.

NOTES: *bgs = below ground surface, GP = geoprobe macrocore liner, PID = photoionization detector, ppm = parts per million*

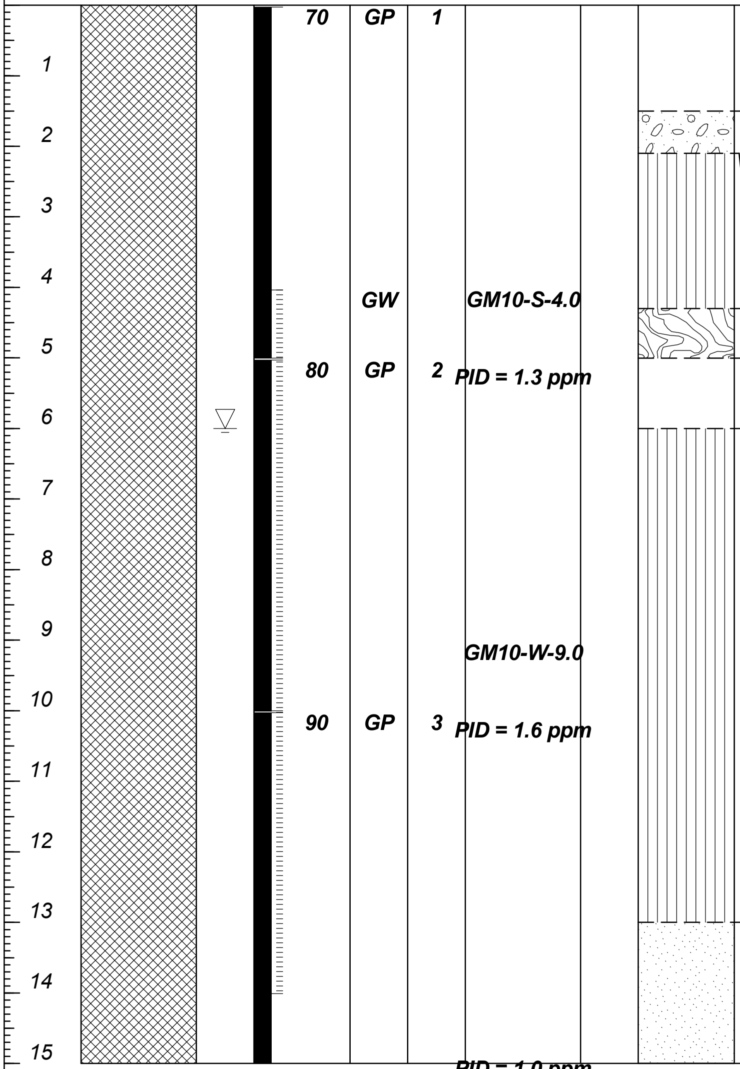
∇ **feet below ground surface.**

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0689.01.03	**GM-10**	**1 of 1**

Project Name	**Former Geddes Marina**	TOC Elevation (feet)	
Project Location	**Marysville, Washington**	Surface Elevation (feet)	
Start/End Date	**2/3/15 to 2/3/15**	Northing	
Driller/Equipment	**Holt Services, Inc./Geoprobe 7822DT**	Easting	
Geologist/Engineer	**M. Murray, C. Wise**	Hole Depth	**15.0-feet**
Sample Method		Outer Hole Diam	**2.0-inch**



Sample Data

Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"
	70	GP	1		
		GW		GM10-S-4.0	
	80	GP	2	PID = 1.3 ppm	
				GM10-W-9.0	
	90	GP	3	PID = 1.6 ppm	
				PID = 1.0 ppm	

Soil Description

0.0 to 1.5 feet: no recovery.

1.5 to 2.1 feet: GRAVEL (well graded) (GW); brown to gray; 10% fines; 40% sand; medium to fine; 50% gravel, coarse, angular; dry.

2.1 to 4.3 feet: SILT (ML); brown to gray; 95% fines, low plasticity; 5% sand, fine; firm; trace woody debris; moist.

4.3 to 5.0 feet: WOODY DEBRIS; moist.

5.0 to 6.0 feet: no recovery.

6.0 to 13.0 feet: SILT (ML); gray; 90% fines, low plasticity; 10% sand; very soft; some organic and woody debris; lens of silt without organic debris at 11.0 to 11.1 feet bgs; moist.

13.0 to 15.0 feet: SAND (poorly graded) (SP); gray; 5% fines; 90% sand, medium; 5% gravel; lens of silt at 14.4 to 14.5 feet bgs; moist to wet.

NOTES: *Temporary screen installed from 4.0 to 14.0 feet bgs. Boring decommissioned with bentonite chips.*
bgs = below ground surface, GP = geoprobe macrocore liner, GW = groundwater sample, PID = photoionization detector, ppm = parts per million

▽ ***feet below ground surface.***

APPENDIX B

GROUNDWATER FIELD SAMPLING DATA SHEETS

Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	City of Marysville	**Sample Location**	GM-1
Project #	0689.01.03	**Sampler**	CRW/MRM
Project Name	Geddes Marina	**Sampling Date**	2/4/2015
Sampling Event	February 2015	**Sample Name**	GM1-W-9.0
Sub Area		**Sample Depth**	9
FSDS QA:	R. Degens		

Easting		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/4/2015	13:20	13.65		4.95		8.7	1.41

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump	1:28:00 PM		0.2	6.68	11.8	769			14.2
	1:34:00 PM		0.2	6.62	12.1	742			16.6
Final Field Parameters	1:40:00 PM		0.2	6.66	12.2	760			16.3

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations: Clear and colorless.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	1:45:00 PM	VOA-Glass	9	No
			Amber Glass	5	No
			White Poly	1	No
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly		
			Total Bottles	16	

General Sampling Comments

Signature ______________________________

Maul Foster & Alongi, Inc.
400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	City of Marysville	**Sample Location**	GM-2
Project #	0689.01.03	**Sampler**	MRM
Project Name	Geddes Marina	**Sampling Date**	2/4/2015
Sampling Event	February 2015	**Sample Name**	GM2-W-9.0
Sub Area		**Sample Depth**	9
FSDS QA:	R. Degens	**Easting**	
		Northing	
		TOC	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/4/2015	15:30	14.85		1.47		13.38	2.18

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump	3:40:00 PM		0.2	7.7	11.7	212			23.2
	3:45:00 PM		0.2	7.26	12.4	190			10.36
Final Field Parameters	3:50:00 PM		0.2	7.24	12.3	187			9.38

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Clear and colorless.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	4:00:00 PM	VOA-Glass	7	No
			Amber Glass	4	No
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly		
			Total Bottles	12	

General Sampling Comments

Signature

Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	City of Marysville	**Sample Location**	GM-3
Project #	0689.01.03	**Sampler**	MRM
Project Name	Geddes Marina	**Sampling Date**	2/4/2015
Sampling Event	February 2015	**Sample Name**	GM3-W-9.0
Sub Area		**Sample Depth**	9
FSDS QA:	R. Degens		

Easting		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/4/2015	14:08	14.9		1.94		12.96	2.11

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump	2:15:00 PM		0.2	6.82	12.2	725			13.2
	2:20:00 PM		0.2	6.98	12.4	709			15.8
Final Field Parameters	2:25:00 PM		0.2	6.84	12.5	698			12.6

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Clear and colorless.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	2:30:00 PM	VOA-Glass	9	No
			Amber Glass	5	No
			White Poly	1	No
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly		
			Total Bottles	16	

General Sampling Comments

Signature

Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660   (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	City of Marysville	**Sample Location**	GM-4
Project #	0689.01.03	**Sampler**	MRM
Project Name	Geddes Marina	**Sampling Date**	2/3/2015
Sampling Event	February 2015	**Sample Name**	GM4-W-9.0
Sub Area		**Sample Depth**	9
FSDS QA:	R. Degens	**Easting**	

Northing		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/3/2015	10:00			2.45			

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump									
Final Field Parameters	10:00:00 AM			6.73	13	1375			

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations: Turbidity was over range.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	10:00:00 AM	VOA-Glass	5	No
			Amber Glass	2	No
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly		
			Total Bottles	7	

General Sampling Comments Reconnaissance groundwater sample. Temporary screen (1-inch PVC) set from 4-14 feet bgs.

Signature ______________________________

Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	City of Marysville	**Sample Location**	GM-5
Project #	0689.01.03	**Sampler**	MRM
Project Name	Geddes Marina	**Sampling Date**	2/4/2015
Sampling Event	February 2015	**Sample Name**	GM5-W-8.0
Sub Area		**Sample Depth**	8
FSDS QA:	R. Degens		

Easting		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/4/2015	17:40	13.45		0.8		12.65	2.06

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump	5:50:00 PM		0.2	7.43	11.4	1868			89
	5:55:00 PM		0.2	7.42	10.4	1622			92.3
Final Field Parameters	6:05:00 PM		0.2	7.5	10.5	1640			60.2

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Yellow tinge, clear.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	6:15:00 PM	VOA-Glass	5	No
			Amber Glass	2	No
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly		
			Total Bottles	7	

General Sampling Comments

Signature ______________________________

Maul Foster & Alongi, Inc.

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Water Field Sampling Data Sheet

Client Name	City of Marysville	**Sample Location**	GM-6
Project #	0689.01.03	**Sampler**	MRM
Project Name	Geddes Marina	**Sampling Date**	2/2/2015
Sampling Event	February 2015	**Sample Name**	GM6-W-11.0
Sub Area		**Sample Depth**	11
FSDS QA:	R. Degens		

Easting		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/2/2015	15:00			7.95			

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump									
Final Field Parameters	3:00:00 PM			6.55	12.2	3680			

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations: Turbidity was over range.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	3:00:00 PM	VOA-Glass	5	No
			Amber Glass	2	No
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly		
			Total Bottles	8	

General Sampling Comments: Reconnaissance sample collected using 1-inch PVC slotted screen. 5-foot temporary screen set from 13.5 to 8.5 feet bgs.

Signature ______________________________

Water Field Sampling Data Sheet

Client Name	City of Marysville	**Sample Location**	GM-7
Project #	0689.01.03	**Sampler**	MRM
Project Name	Geddes Marina	**Sampling Date**	2/4/2015
Sampling Event	February 2015	**Sample Name**	GM7-W-9.0
Sub Area		**Sample Depth**	9
FSDS QA:	R. Degens	**Easting**	
		Northing	
		TOC	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT-Product	DT-Water	(Product Thickness) DTP-DTW	(Water Column) DTB-DTW	(Gallons/ft x Water Column) Pore Volume
2/4/2015	14:44	13.71		2.89		10.82	1.76

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump	2:50:00 PM		0.2	6.74	11.4	1530			98
	3:00:00 PM		0.2	6.84	10.9	3710			101
Final Field Parameters	3:10:00 PM		0.2	6.91	11.4	3680			44

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations: Slight yellow tinge, clear.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	3:15:00 PM	VOA-Glass	9	No
			Amber Glass	5	No
			White Poly	2	No
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly		
			Total Bottles	17	

General Sampling Comments

Signature ______________________________

Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	City of Marysville	**Sample Location**	GM-8
Project #	0689.01.03	**Sampler**	MRM
Project Name	Geddes Marina	**Sampling Date**	2/2/2015
Sampling Event	February 2015	**Sample Name**	GM8-W-10.0
Sub Area		**Sample Depth**	10
FSDS QA:	R. Degens		

Easting		**Northing**		**TOC**	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT-Product	DT-Water	(Product Thickness) DTP-DTW	(Water Column) DTB-DTW	(Gallons/ft x Water Column) Pore Volume
2/2/2015	17:30			3.6			

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump									
Final Field Parameters	5:30:00 PM		0.2	6.7	11.7	3470			

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations: Turbidity over range.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	5:30:00 PM	VOA-Glass	5	No
			Amber Glass	2	No
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly		
			Total Bottles	7	

General Sampling Comments

Reconnaissance groundwater sample. Temporary 10-foot screen set from 15-5 feet bgs.

Signature ______________________________

Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	City of Marysville	**Sample Location**	GM-9
Project #	0689.01.03	**Sampler**	MRM
Project Name	Geddes Marina	**Sampling Date**	2/4/2015
Sampling Event	February 2015	**Sample Name**	GM9-W-9.0
Sub Area		**Sample Depth**	9
FSDS QA:	R. Degens		

Easting		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/4/2015	16:20	13.25		6.02		7.23	1.18

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump	4:25:00 PM		0.2	6.89	12	2830			34.2
	4:30:00 PM		0.2	6.9	12.1	2870			45.2
Final Field Parameters	4:35:00 PM		0.2	6.89	12.1	2900			41

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations: Yellow tinge, clear.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	4:45:00 PM	VOA-Glass	7	No
			Amber Glass	2	No
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	
			Red Dissolved Poly		
			Total Bottles	10	

General Sampling Comments

Signature ____________________

Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	City of Marysville	**Sample Location**	GM-10
Project #	0689.01.03	**Sampler**	MRM
Project Name	Geddes Marina	**Sampling Date**	2/3/2015
Sampling Event	February 2015	**Sample Name**	GM10-W-9.0
Sub Area		**Sample Depth**	9
FSDS QA:	R. Degens		

Easting		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/3/2015	12:30			6.01			

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump									
Final Field Parameters	1:15:00 PM		0.2	7.7	13	264			1118

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Turbid.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	1:15:00 PM	VOA-Glass	5	No
			Amber Glass	2	No
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly		
			Total Bottles	7	

General Sampling Comments

Reconnaissance groundwater sample. Set temporary 1-inch PVC screen from 14.0-4.0 feet bgs.

Signature ______________________________

APPENDIX C

ANALYTICAL LABORATORY REPORTS

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

February 17, 2015

Carolyn Wise
Maul Foster & Alongi, Inc.
1329 North State Street, Suite 301
Bellingham, WA 98225

Re:	Analytical Data for Project 0689.01.03
	Laboratory Reference No. 1502-023

Dear Carolyn:

Enclosed are the analytical results and associated quality control data for samples submitted on February 4, 2015.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

Case Narrative

Samples were collected on February 2,and 3, 2015 and received by the laboratory on February 4, 2015. They were maintained at the laboratory at a temperature of 2^oC to 6^oC.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

TOTAL METALS
EPA 6010C/7471B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-023-01					
Client ID:	**GM3-S-6.0**					
Antimony	**ND**	17	6010C	2-10-15	2-10-15	
Arsenic	**18**	17	6010C	2-9-15	2-10-15	
Cadmium	**ND**	1.7	6010C	2-9-15	2-10-15	
Copper	**39**	3.5	6010C	2-9-15	2-10-15	
Lead	**28**	17	6010C	2-9-15	2-10-15	
Mercury	**ND**	0.87	7471B	2-10-15	2-10-15	
Tin	**ND**	17	6010C	2-10-15	2-10-15	
Zinc	**79**	8.7	6010C	2-9-15	2-10-15	
Lab ID:	02-023-03					
Client ID:	**GM7-S-3.0**					
Antimony	**ND**	6.7	6010C	2-10-15	2-10-15	
Arsenic	**8.3**	6.7	6010C	2-9-15	2-10-15	
Cadmium	**ND**	0.67	6010C	2-9-15	2-10-15	
Copper	**19**	1.3	6010C	2-9-15	2-10-15	
Lead	**20**	6.7	6010C	2-9-15	2-10-15	
Mercury	**ND**	0.34	7471B	2-10-15	2-10-15	
Tin	**ND**	6.7	6010C	2-10-15	2-10-15	
Zinc	**61**	3.4	6010C	2-9-15	2-10-15	

TOTAL METALS
EPA 6010C/7471B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	**Result**	**PQL**	**EPA Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Lab ID:	02-023-04					
Client ID:	**GM6-S-4.0**					
Arsenic	**20**	9.0	6010C	2-9-15	2-10-15	
Cadmium	**ND**	0.90	6010C	2-9-15	2-10-15	
Copper	**41**	1.8	6010C	2-9-15	2-10-15	
Lead	**25**	9.0	6010C	2-9-15	2-10-15	
Mercury	**ND**	0.45	7471B	2-10-15	2-10-15	
Lab ID:	02-023-05					
Client ID:	**GM9-S-2.0**					
Arsenic	**12**	8.6	6010C	2-9-15	2-10-15	
Cadmium	**ND**	0.86	6010C	2-9-15	2-10-15	
Copper	**44**	1.7	6010C	2-9-15	2-10-15	
Lead	**ND**	8.6	6010C	2-9-15	2-10-15	
Mercury	**ND**	0.43	7471B	2-10-15	2-10-15	

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

TOTAL METALS
EPA 6010C/7471B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-023-06					
Client ID:	**GM8-S-4.5**					
Arsenic	**11**	9.5	6010C	2-9-15	2-10-15	
Cadmium	**ND**	0.95	6010C	2-9-15	2-10-15	
Copper	**110**	1.9	6010C	2-9-15	2-10-15	
Lead	**440**	9.5	6010C	2-9-15	2-10-15	
Mercury	**ND**	0.48	7471B	2-10-15	2-10-15	
Lab ID:	02-023-10					
Client ID:	**GM2-S-6.5**					
Arsenic	**ND**	7.1	6010C	2-9-15	2-10-15	
Cadmium	**ND**	0.71	6010C	2-9-15	2-10-15	
Copper	**15**	1.4	6010C	2-9-15	2-10-15	
Lead	**36**	7.1	6010C	2-9-15	2-10-15	
Mercury	**ND**	0.35	7471B	2-10-15	2-10-15	

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

TOTAL METALS
EPA 6010C

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-023-11					
Client ID:	**GM1-S-12.0**					
Lead	**ND**	7.6	6010C	2-9-15	2-10-15	
Lab ID:	02-023-12					
Client ID:	**GMDUP-S-12.0**					
Lead	**24**	17	6010C	2-9-15	2-10-15	

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

TOTAL METALS
EPA 6010C/7471B
METHOD BLANK QUALITY CONTROL

Date Extracted: 2-9&10-15
Date Analyzed: 2-10-15

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0209SM3,MB0210SH3&MB0210S2

Analyte	Method	Result	PQL
Antimony	6010C	**ND**	5.0
Arsenic	6010C	**ND**	5.0
Cadmium	6010C	**ND**	0.50
Copper	6010C	**ND**	1.0
Lead	6010C	**ND**	5.0
Mercury	7471B	**ND**	0.25
Tin	6010C	**ND**	5.0
Zinc	6010C	**ND**	2.5

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

TOTAL METALS
EPA 6010C/7471B
DUPLICATE QUALITY CONTROL

Date Extracted: 2-9&10-15
Date Analyzed: 2-10-15

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 02-045-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Antimony	**ND**	**ND**	NA	5.0	
Arsenic	**ND**	**ND**	NA	5.0	
Cadmium	**ND**	**ND**	NA	0.50	
Copper	**14.6**	**14.7**	1	1.0	
Lead	**ND**	**ND**	NA	5.0	
Mercury	**ND**	**ND**	NA	0.25	
Tin	**ND**	**ND**	NA	5.0	
Zinc	**28.7**	**29.5**	3	2.5	

TOTAL METALS
EPA 6010C/7471B
MS/MSD QUALITY CONTROL

Date Extracted: 2-9&10-15
Date Analyzed: 2-10-15

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 02-045-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Antimony	100	**93.1**	93	**94.1**	94	1	
Arsenic	100	**95.6**	96	**95.6**	96	0	
Cadmium	50.0	**47.3**	95	**47.0**	94	1	
Copper	50.0	**64.0**	99	**64.4**	100	1	
Lead	250	**237**	95	**237**	95	0	
Mercury	0.500	**0.509**	102	**0.513**	103	1	
Tin	50.0	**47.8**	96	**49.0**	98	3	
Zinc	100	**122**	93	**121**	92	1	

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

TOTAL METALS
EPA 6010C/7471B
SPIKE BLANK QUALITY CONTROL

Date Extracted: 2-9&10-15
Date Analyzed: 2-10-15

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: SB0209SM3,SB0210SH3&SB0210S2

Analyte	Method	Spike Level	SB Result	Percent Recovery
Antimony	6010C	100	**96.8**	97
Arsenic	6010C	100	**97.8**	98
Cadmium	6010C	50.0	**48.8**	98
Copper	6010C	50.0	**51.8**	104
Lead	6010C	250	**251**	101
Mercury	7471B	0.500	**0.514**	103
Tin	6010C	50.0	**51.1**	102
Zinc	6010C	100	**98.5**	99

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

TOTAL METALS
EPA 6010C/7471B
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Antimony	ICV021015P	1.00	1.02	-2.0	+/- 10%
Arsenic	ICV021015P	1.00	1.01	-1.0	+/- 10%
Cadmium	ICV021015P	1.00	1.02	-2.0	+/- 10%
Copper	ICV021015P	1.00	1.03	-3.0	+/- 10%
Lead	ICV021015P	1.00	1.05	-5.0	+/- 10%
Mercury	ICV021015Y	0.00500	0.00495	1.0	+/- 10%
Tin	ICV021015P	1.00	1.06	-6.0	+/- 10%
Zinc	ICV021015P	1.00	1.03	-3.0	+/- 10%
Antimony	LLICV1021015P	0.100	0.0959	4.1	+/- 30%
Arsenic	LLICV1021015P	0.100	0.106	-6.0	+/- 30%
Cadmium	LLICV1021015P	0.0100	0.0101	-1.0	+/- 30%
Copper	LLICV1021015P	0.0200	0.0182	9.0	+/- 30%
Lead	LLICV1021015P	0.100	0.113	-13	+/- 30%
Tin	LLICV1021015P	0.100	0.110	-10	+/- 30%
Zinc	LLICV1021015P	0.0200	0.0195	2.5	+/- 30%
Antimony	CCV1021015P	10.0	9.80	2.0	+/- 10%
Arsenic	CCV1021015P	10.0	9.80	2.0	+/- 10%
Cadmium	CCV1021015P	1.00	1.07	-7.0	+/- 10%
Copper	CCV1021015P	2.00	1.99	0.50	+/- 10%
Lead	CCV1021015P	10.0	10.1	-1.0	+/- 10%
Mercury	CCV1021015Y	0.00500	0.00490	2.0	+/- 20%
Tin	CCV1021015P	10.0	9.88	1.2	+/- 10%
Zinc	CCV1021015P	2.00	2.02	-1.0	+/- 10%
Antimony	CCV2021015P	10.0	9.84	1.6	+/- 10%
Arsenic	CCV2021015P	10.0	9.94	0.60	+/- 10%
Cadmium	CCV2021015P	1.00	1.07	-7.0	+/- 10%
Copper	CCV2021015P	2.00	2.02	-1.0	+/- 10%
Lead	CCV2021015P	10.0	10.3	-3.0	+/- 10%
Mercury	CCV2021015Y	0.00500	0.00492	1.6	+/- 20%
Tin	CCV2021015P	10.0	9.87	1.3	+/- 10%
Zinc	CCV2021015P	2.00	2.03	-1.5	+/- 10%
Antimony	LLCCV2021015P	0.100	0.0930	7.0	+/- 30%
Arsenic	LLCCV2021015P	0.100	0.104	-4.0	+/- 30%
Cadmium	LLCCV2021015P	0.0100	0.0113	-13	+/- 30%
Copper	LLCCV2021015P	0.0200	0.0175	13	+/- 30%
Lead	LLCCV2021015P	0.100	0.0948	5.2	+/- 30%
Tin	LLCCV2021015P	0.100	0.112	-12	+/- 30%
Zinc	LLCCV2021015P	0.0200	0.0189	5.5	+/- 30%

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

TOTAL METALS
EPA 6010C/7471B
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Antimony	CCV3021015P	10.0	10.0	0	+/- 10%
Arsenic	CCV3021015P	10.0	10.1	-1.0	+/- 10%
Cadmium	CCV3021015P	1.00	1.08	-8.0	+/- 10%
Copper	CCV3021015P	2.00	2.08	-4.0	+/- 10%
Lead	CCV3021015P	10.0	10.4	-4.0	+/- 10%
Mercury	CCV3021015Y	0.00500	0.00495	1.0	+/- 20%
Tin	CCV3021015P	10.0	9.99	0.10	+/- 10%
Zinc	CCV3021015P	2.00	2.07	-3.5	+/- 10%
Antimony	LLCCV3021015P	0.100	0.0994	0.60	+/- 30%
Arsenic	LLCCV3021015P	0.100	0.114	-14	+/- 30%
Cadmium	LLCCV3021015P	0.0100	0.0115	-15	+/- 30%
Copper	LLCCV3021015P	0.0200	0.0207	-3.5	+/- 30%
Lead	LLCCV3021015P	0.100	0.114	-14	+/- 30%
Tin	LLCCV3021015P	0.100	0.118	-18	+/- 30%
Zinc	LLCCV3021015P	0.0200	0.0186	7.0	+/- 30%
Antimony	CCV4021015P	10.0	9.93	0.70	+/- 10%
Mercury	CCV4021015Y	0.00500	0.00497	0.60	+/- 20%
Tin	CCV4021015P	10.0	9.86	1.4	+/- 10%
Antimony	LLCCV4021015P	0.100	0.0898	10.2	+/- 30%
Tin	LLCCV4021015P	0.100	0.0896	10.4	+/- 30%
Antimony	CCV5021015P	10.0	10.0	0	+/- 10%
Mercury	CCV5021015Y	0.00500	0.00476	4.8	+/- 20%
Tin	CCV5021015P	10.0	9.95	0.5	+/- 10%
Antimony	LLCCV5021015P	0.100	0.106	-6.0	+/- 30%
Tin	LLCCV5021015P	0.100	0.108	-8.0	+/- 30%
Antimony	CCV6021015P	10.0	10.0	0	+/- 10%
Tin	CCV6021015P	10.0	10.1	-1.0	+/- 10%
Antimony	LLCCV6021015P	0.100	0.0877	12	+/- 30%
Tin	LLCCV6021015P	0.100	0.110	-10	+/- 30%

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Project: 0689.01.03

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-023-07					
Client ID:	**GM6-W-11.0**					
Arsenic	**13**	3.3	200.8	2-10-15	2-10-15	
Cadmium	**ND**	4.4	200.8	2-10-15	2-10-15	
Copper	**26**	11	200.8	2-10-15	2-10-15	
Lead	**7.1**	1.1	200.8	2-10-15	2-10-15	
Mercury	**ND**	0.50	7470A	2-6-15	2-6-15	

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-10-15
Date Analyzed:	2-10-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0210WM1

Analyte	Method	Result	PQL
Arsenic	200.8	**ND**	3.3
Cadmium	200.8	**ND**	4.4
Copper	200.8	**ND**	11
Lead	200.8	**ND**	1.1

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TOTAL MERCURY
EPA 7470A
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-6-15
Date Analyzed:	2-6-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0206W1

Analyte	Method	Result	PQL
Mercury	7470A	**ND**	0.50

Date of Report: February 17, 2015
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Project: 0689.01.03

TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Extracted: 2-10-15
Date Analyzed: 2-10-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-055-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**ND**	NA	3.3	
Cadmium	**ND**	**ND**	NA	4.4	
Copper	**ND**	**ND**	NA	11	
Lead	**ND**	**ND**	NA	1.1	

TOTAL MERCURY
EPA 7470A
DUPLICATE QUALITY CONTROL

Date Extracted: 2-6-15
Date Analyzed: 2-6-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-008-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	**ND**	**ND**	NA	0.50	

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

TOTAL METALS
EPA 200.8
MS/MSD QUALITY CONTROL

Date Extracted: 2-10-15
Date Analyzed: 2-10-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-055-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	111	**124**	112	**125**	113	1	
Cadmium	111	**120**	108	**121**	109	1	
Copper	111	**118**	106	**115**	103	2	
Lead	111	**114**	103	**115**	103	1	

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Project: 0689.01.03

TOTAL MERCURY
EPA 7470A
MS/MSD QUALITY CONTROL

Date Extracted: 2-6-15
Date Analyzed: 2-6-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-008-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	12.5	**11.2**	90	**11.8**	94	5	

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Project: 0689.01.03

TOTAL METALS
EPA 200.8
SPIKE BLANK QUALITY CONTROL

Date Extracted: 2-10-15
Date Analyzed: 2-10-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0210WM1

Analyte	Method	Spike Level	SB Result	Percent Recovery
Arsenic	200.8	111	**112**	101
Cadmium	200.8	111	**107**	96
Copper	200.8	111	**107**	97
Lead	200.8	111	**106**	96

Date of Report: February 17, 2015
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Project: 0689.01.03

TOTAL MERCURY
EPA 7470A
SPIKE BLANK QUALITY CONTROL

Date Extracted:	2-6-15
Date Analyzed:	2-6-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	SB0206W1

Analyte	Method	Spike Level	SB Result	Percent Recovery
Mercury	7470A	12.5	**11.9**	95

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

TOTAL METALS
EPA 200.8/7470A
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Arsenic	ICV021015X	0.0500	0.0515	-3.0	+/- 10%
Cadmium	ICV021015X	0.0500	0.0500	0	+/- 10%
Copper	ICV021015X	0.0500	0.0515	-3.0	+/- 10%
Lead	ICV021015X	0.0500	0.0493	1.4	+/- 10%
Mercury	ICV020615Y	0.00500	0.00490	2.0	+/- 10%
Arsenic	CCV1021015X	0.0400	0.0393	1.8	+/- 10%
Cadmium	CCV1021015X	0.0400	0.0395	1.3	+/- 10%
Copper	CCV1021015X	0.0400	0.0398	0.50	+/- 10%
Lead	CCV1021015X	0.0400	0.0389	2.8	+/- 10%
Mercury	CCV1020615Y	0.00500	0.00494	1.2	+/- 10%
Arsenic	CCV1021015X	0.0200	0.0193	3.5	+/- 10%
Cadmium	CCV1021015X	0.0200	0.0195	2.5	+/- 10%
Copper	CCV1021015X	0.0200	0.0191	4.5	+/- 10%
Lead	CCV1021015X	0.0200	0.0188	6.0	+/- 10%
Arsenic	CCV2021015X	0.0400	0.0411	-2.7	+/- 10%
Cadmium	CCV2021015X	0.0400	0.0392	2.0	+/- 10%
Copper	CCV2021015X	0.0400	0.0386	3.5	+/- 10%
Lead	CCV2021015X	0.0400	0.0378	5.5	+/- 10%
Mercury	CCV2020615Y	0.00500	0.00493	1.4	+/- 10%
Arsenic	CCV2021015X	0.0200	0.0208	-4.0	+/- 10%
Cadmium	CCV2021015X	0.0200	0.0199	0.50	+/- 10%
Copper	CCV2021015X	0.0200	0.0198	1.0	+/- 10%
Lead	CCV2021015X	0.0200	0.0193	3.5	+/- 10%
Arsenic	CCV3021015X	0.0400	0.0407	-1.8	+/- 10%
Cadmium	CCV3021015X	0.0400	0.0402	-0.50	+/- 10%
Copper	CCV3021015X	0.0400	0.0389	2.8	+/- 10%
Lead	CCV3021015X	0.0400	0.0369	7.8	+/- 10%
Mercury	CCV3020615Y	0.00500	0.00496	0.80	+/- 10%
Arsenic	CCV3021015X	0.0200	0.0193	3.5	+/- 10%
Cadmium	CCV3021015X	0.0200	0.0197	1.5	+/- 10%
Copper	CCV3021015X	0.0200	0.0190	5.0	+/- 10%
Lead	CCV3021015X	0.0200	0.0184	8.0	+/- 10%

TOTAL METALS
EPA 200.8/7470A
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Arsenic	CCV4021015X	0.0400	0.0407	-1.8	+/- 10%
Cadmium	CCV4021015X	0.0400	0.0403	-0.75	+/- 10%
Copper	CCV4021015X	0.0400	0.0398	0.50	+/- 10%
Lead	CCV4021015X	0.0400	0.0380	5.0	+/- 10%
Arsenic	CCV4021015X	0.0200	0.0194	3.0	+/- 10%
Cadmium	CCV4021015X	0.0200	0.0199	0.50	+/- 10%
Copper	CCV4021015X	0.0200	0.0190	5.0	+/- 10%
Lead	CCV4021015X	0.0200	0.0192	4.0	+/- 10%

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VOLATILES EPA 8260C
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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM3-S-6.0**					
Laboratory ID:	02-023-01					
Dichlorodifluoromethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Chloromethane	ND	0.012	EPA 8260C	2-6-15	2-6-15	
Vinyl Chloride	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Bromomethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Chloroethane	ND	0.012	EPA 8260C	2-6-15	2-6-15	
Trichlorofluoromethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Iodomethane	ND	0.012	EPA 8260C	2-6-15	2-6-15	
Methylene Chloride	ND	0.012	EPA 8260C	2-6-15	2-6-15	
(trans) 1,2-Dichloroethene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Methyl t-Butyl Ether	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
2,2-Dichloropropane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
(cis) 1,2-Dichloroethene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Bromochloromethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Chloroform	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
1,1,1-Trichloroethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Carbon Tetrachloride	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloropropene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Benzene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloroethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Trichloroethene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloropropane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Dibromomethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Bromodichloromethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
2-Chloroethyl Vinyl Ether	ND	0.012	EPA 8260C	2-6-15	2-6-15	
(cis) 1,3-Dichloropropene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Toluene	ND	0.012	EPA 8260C	2-6-15	2-6-15	
(trans) 1,3-Dichloropropene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM3-S-6.0**					
Laboratory ID:	02-023-01					
1,1,2-Trichloroethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Tetrachloroethene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
1,3-Dichloropropane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Dibromochloromethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromoethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Chlorobenzene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
1,1,1,2-Tetrachloroethane	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Ethylbenzene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
m,p-Xylene	ND	0.0050	EPA 8260C	2-6-15	2-6-15	
o-Xylene	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Bromoform	ND	0.0025	EPA 8260C	2-6-15	2-6-15	
Bromobenzene	ND	0.31	EPA 8260C	2-6-15	2-6-15	
1,1,2,2-Tetrachloroethane	ND	0.31	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichloropropane	ND	0.31	EPA 8260C	2-6-15	2-6-15	
2-Chlorotoluene	ND	0.31	EPA 8260C	2-6-15	2-6-15	
4-Chlorotoluene	ND	0.31	EPA 8260C	2-6-15	2-6-15	
1,3-Dichlorobenzene	ND	0.31	EPA 8260C	2-6-15	2-6-15	
1,4-Dichlorobenzene	ND	0.31	EPA 8260C	2-6-15	2-6-15	
1,2-Dichlorobenzene	ND	0.31	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromo-3-chloropropane	ND	1.6	EPA 8260C	2-6-15	2-6-15	
1,2,4-Trichlorobenzene	ND	0.31	EPA 8260C	2-6-15	2-6-15	
Hexachlorobutadiene	ND	1.6	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichlorobenzene	ND	0.31	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*117*	*76-131*				
Toluene-d8	*95*	*82-129*				
4-Bromofluorobenzene	*86*	*79-126*				

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BTEX EPA 8260C

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM5-S-4.0**					
Laboratory ID:	02-023-02					
Benzene	ND	0.00094	EPA 8260C	2-5-15	2-5-15	
Toluene	ND	0.0047	EPA 8260C	2-5-15	2-5-15	
Ethylbenzene	ND	0.00094	EPA 8260C	2-5-15	2-5-15	
m,p-Xylene	ND	0.0019	EPA 8260C	2-5-15	2-5-15	
o-Xylene	ND	0.00094	EPA 8260C	2-5-15	2-5-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*104*	*76-131*				
Toluene-d8	*106*	*82-129*				
4-Bromofluorobenzene	*112*	*79-126*				

Date of Report: February 17, 2015
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HALOGENATED VOLATILES EPA 8260C

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM7-S-3.0**					
Laboratory ID:	02-023-03					
Dichlorodifluoromethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Chloromethane	ND	0.0056	EPA 8260C	2-5-15	2-5-15	
Vinyl Chloride	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Bromomethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Chloroethane	ND	0.0056	EPA 8260C	2-5-15	2-5-15	
Trichlorofluoromethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloroethene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Iodomethane	ND	0.0056	EPA 8260C	2-5-15	2-5-15	
Methylene Chloride	ND	0.0056	EPA 8260C	2-5-15	2-5-15	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloroethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
2,2-Dichloropropane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
(cis) 1,2-Dichloroethene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Bromochloromethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Chloroform	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,1,1-Trichloroethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Carbon Tetrachloride	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloropropene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,2-Dichloroethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Trichloroethene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,2-Dichloropropane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Dibromomethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Bromodichloromethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
2-Chloroethyl Vinyl Ether	ND	0.0056	EPA 8260C	2-5-15	2-5-15	
(cis) 1,3-Dichloropropene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
(trans) 1,3-Dichloropropene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM7-S-3.0**					
Laboratory ID:	02-023-03					
1,1,2-Trichloroethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Tetrachloroethene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,3-Dichloropropane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Dibromochloromethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,2-Dibromoethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Chlorobenzene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,1,1,2-Tetrachloroethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Bromoform	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Bromobenzene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,1,2,2-Tetrachloroethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,2,3-Trichloropropane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
2-Chlorotoluene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
4-Chlorotoluene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,3-Dichlorobenzene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,4-Dichlorobenzene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,2-Dichlorobenzene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,2-Dibromo-3-chloropropane	ND	0.0056	EPA 8260C	2-5-15	2-5-15	
1,2,4-Trichlorobenzene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Hexachlorobutadiene	ND	0.0056	EPA 8260C	2-5-15	2-5-15	
1,2,3-Trichlorobenzene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*76-131*				
Toluene-d8	*107*	*82-129*				
4-Bromofluorobenzene	*111*	*79-126*				

Date of Report: February 17, 2015
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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM6-S-4.0**					
Laboratory ID:	02-023-04					
Dichlorodifluoromethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Chloromethane	ND	0.0091	EPA 8260C	2-5-15	2-5-15	
Vinyl Chloride	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Bromomethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Chloroethane	ND	0.0091	EPA 8260C	2-5-15	2-5-15	
Trichlorofluoromethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloroethene	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Iodomethane	ND	0.0091	EPA 8260C	2-5-15	2-5-15	
Methylene Chloride	ND	0.0091	EPA 8260C	2-5-15	2-5-15	
(trans) 1,2-Dichloroethene	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloroethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
2,2-Dichloropropane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
(cis) 1,2-Dichloroethene	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Bromochloromethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Chloroform	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
1,1,1-Trichloroethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Carbon Tetrachloride	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloropropene	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
1,2-Dichloroethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Trichloroethene	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
1,2-Dichloropropane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Dibromomethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Bromodichloromethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
2-Chloroethyl Vinyl Ether	ND	0.0091	EPA 8260C	2-5-15	2-5-15	
(cis) 1,3-Dichloropropene	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
(trans) 1,3-Dichloropropene	ND	0.0018	EPA 8260C	2-5-15	2-5-15	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM6-S-4.0**					
Laboratory ID:	02-023-04					
1,1,2-Trichloroethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Tetrachloroethene	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
1,3-Dichloropropane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Dibromochloromethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
1,2-Dibromoethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Chlorobenzene	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
1,1,1,2-Tetrachloroethane	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Bromoform	ND	0.0018	EPA 8260C	2-5-15	2-5-15	
Bromobenzene	ND	0.14	EPA 8260C	2-6-15	2-6-15	
1,1,2,2-Tetrachloroethane	ND	0.14	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichloropropane	ND	0.14	EPA 8260C	2-6-15	2-6-15	
2-Chlorotoluene	ND	0.14	EPA 8260C	2-6-15	2-6-15	
4-Chlorotoluene	ND	0.14	EPA 8260C	2-6-15	2-6-15	
1,3-Dichlorobenzene	ND	0.14	EPA 8260C	2-6-15	2-6-15	
1,4-Dichlorobenzene	ND	0.14	EPA 8260C	2-6-15	2-6-15	
1,2-Dichlorobenzene	ND	0.14	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromo-3-chloropropane	ND	0.68	EPA 8260C	2-6-15	2-6-15	
1,2,4-Trichlorobenzene	ND	0.14	EPA 8260C	2-6-15	2-6-15	
Hexachlorobutadiene	ND	0.68	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichlorobenzene	ND	0.14	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*76-131*				
Toluene-d8	*106*	*82-129*				
4-Bromofluorobenzene	*87*	*79-126*				

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BTEX EPA 8260C

Matrix: Soil
Units: mg/kg

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**GM9-S-2.0**					
Laboratory ID:	02-023-05					
Benzene	ND	0.0019	EPA 8260C	2-5-15	2-5-15	
Toluene	ND	0.0096	EPA 8260C	2-5-15	2-5-15	
Ethylbenzene	ND	0.0019	EPA 8260C	2-5-15	2-5-15	
m,p-Xylene	ND	0.0039	EPA 8260C	2-5-15	2-5-15	
o-Xylene	ND	0.0019	EPA 8260C	2-5-15	2-5-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*103*	*76-131*				
Toluene-d8	*104*	*82-129*				
4-Bromofluorobenzene	*96*	*79-126*				

BTEX EPA 8260C

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM8-S-4.5**					
Laboratory ID:	02-023-06					
Benzene	ND	0.0017	EPA 8260C	2-5-15	2-5-15	
Toluene	ND	0.0087	EPA 8260C	2-5-15	2-5-15	
Ethylbenzene	ND	0.0017	EPA 8260C	2-5-15	2-5-15	
m,p-Xylene	ND	0.0035	EPA 8260C	2-5-15	2-5-15	
o-Xylene	ND	0.0017	EPA 8260C	2-5-15	2-5-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*102*	*76-131*				
Toluene-d8	*104*	*82-129*				
4-Bromofluorobenzene	*104*	*79-126*				

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM4-S-12.5**					
Laboratory ID:	02-023-09					
Dichlorodifluoromethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Chloromethane	ND	0.0048	EPA 8260C	2-5-15	2-5-15	
Vinyl Chloride	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Bromomethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Chloroethane	ND	0.0048	EPA 8260C	2-5-15	2-5-15	
Trichlorofluoromethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloroethene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Iodomethane	ND	0.0048	EPA 8260C	2-5-15	2-5-15	
Methylene Chloride	ND	0.0048	EPA 8260C	2-5-15	2-5-15	
(trans) 1,2-Dichloroethene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloroethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
2,2-Dichloropropane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
(cis) 1,2-Dichloroethene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Bromochloromethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Chloroform	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,1,1-Trichloroethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Carbon Tetrachloride	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloropropene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,2-Dichloroethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Trichloroethene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,2-Dichloropropane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Dibromomethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Bromodichloromethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
2-Chloroethyl Vinyl Ether	ND	0.0048	EPA 8260C	2-5-15	2-5-15	
(cis) 1,3-Dichloropropene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
(trans) 1,3-Dichloropropene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM4-S-12.5**					
Laboratory ID:	02-023-09					
1,1,2-Trichloroethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Tetrachloroethene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,3-Dichloropropane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Dibromochloromethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,2-Dibromoethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Chlorobenzene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,1,1,2-Tetrachloroethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Bromoform	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Bromobenzene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,1,2,2-Tetrachloroethane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,2,3-Trichloropropane	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
2-Chlorotoluene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
4-Chlorotoluene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,3-Dichlorobenzene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,4-Dichlorobenzene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,2-Dichlorobenzene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
1,2-Dibromo-3-chloropropane	ND	0.0048	EPA 8260C	2-5-15	2-5-15	
1,2,4-Trichlorobenzene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Hexachlorobutadiene	ND	0.0048	EPA 8260C	2-5-15	2-5-15	
1,2,3-Trichlorobenzene	ND	0.00097	EPA 8260C	2-5-15	2-5-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*108*	*76-131*				
Toluene-d8	*108*	*82-129*				
4-Bromofluorobenzene	*111*	*79-126*				

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VOLATILES EPA 8260C

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM2-S-6.5**					
Laboratory ID:	02-023-10					
Methyl t-Butyl Ether	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Benzene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
1,2-Dichloroethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Toluene	ND	0.0056	EPA 8260C	2-5-15	2-5-15	
1,2-Dibromoethane	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Ethylbenzene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
m,p-Xylene	ND	0.0022	EPA 8260C	2-5-15	2-5-15	
o-Xylene	ND	0.0011	EPA 8260C	2-5-15	2-5-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*101*	*76-131*				
Toluene-d8	*100*	*82-129*				
4-Bromofluorobenzene	*95*	*79-126*				

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VOLATILES EPA 8260C

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM1-S-12.0**					
Laboratory ID:	02-023-11					
Methyl t-Butyl Ether	ND	0.0016	EPA 8260C	2-5-15	2-5-15	
Benzene	0.0021	0.0016	EPA 8260C	2-5-15	2-5-15	
1,2-Dichloroethane	ND	0.0016	EPA 8260C	2-5-15	2-5-15	
Toluene	ND	0.0080	EPA 8260C	2-5-15	2-5-15	
1,2-Dibromoethane	ND	0.0016	EPA 8260C	2-5-15	2-5-15	
Ethylbenzene	ND	0.0016	EPA 8260C	2-5-15	2-5-15	
m,p-Xylene	0.013	0.0032	EPA 8260C	2-5-15	2-5-15	
o-Xylene	0.0033	0.0016	EPA 8260C	2-5-15	2-5-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*76-131*				
Toluene-d8	*105*	*82-129*				
4-Bromofluorobenzene	*95*	*79-126*				

VOLATILES EPA 8260C

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GMDUP-S-12.0**					
Laboratory ID:	02-023-12					
Methyl t-Butyl Ether	ND	0.0062	EPA 8260C	2-5-15	2-5-15	
Benzene	ND	0.0062	EPA 8260C	2-5-15	2-5-15	
1,2-Dichloroethane	ND	0.0062	EPA 8260C	2-5-15	2-5-15	
Toluene	ND	0.031	EPA 8260C	2-5-15	2-5-15	
1,2-Dibromoethane	ND	0.0062	EPA 8260C	2-5-15	2-5-15	
Ethylbenzene	ND	0.0062	EPA 8260C	2-5-15	2-5-15	
m,p-Xylene	ND	0.012	EPA 8260C	2-5-15	2-5-15	
o-Xylene	ND	0.0062	EPA 8260C	2-5-15	2-5-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*99*	*76-131*				
Toluene-d8	*98*	*82-129*				
4-Bromofluorobenzene	*82*	*79-126*				

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM10-S-4.0**					
Laboratory ID:	02-023-15					
Benzene	ND	0.0051	EPA 8260C	2-5-15	2-5-15	
Toluene	ND	0.025	EPA 8260C	2-5-15	2-5-15	
Ethylbenzene	ND	0.0051	EPA 8260C	2-5-15	2-5-15	
m,p-Xylene	ND	0.010	EPA 8260C	2-5-15	2-5-15	
o-Xylene	ND	0.0051	EPA 8260C	2-5-15	2-5-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*76-131*				
Toluene-d8	*105*	*82-129*				
4-Bromofluorobenzene	*93*	*79-126*				

VOLATILES EPA 8260C
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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0205S1					
Dichlorodifluoromethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Chloromethane	ND	0.0050	EPA 8260C	2-5-15	2-5-15	
Vinyl Chloride	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Bromomethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Chloroethane	ND	0.0050	EPA 8260C	2-5-15	2-5-15	
Trichlorofluoromethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloroethene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Iodomethane	ND	0.0050	EPA 8260C	2-5-15	2-5-15	
Methylene Chloride	ND	0.0050	EPA 8260C	2-5-15	2-5-15	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Methyl t-Butyl Ether	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloroethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
2,2-Dichloropropane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Bromochloromethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Chloroform	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,1,1-Trichloroethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Carbon Tetrachloride	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,1-Dichloropropene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Benzene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,2-Dichloroethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Trichloroethene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,2-Dichloropropane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Dibromomethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Bromodichloromethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
2-Chloroethyl Vinyl Ether	ND	0.0050	EPA 8260C	2-5-15	2-5-15	
(cis) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Toluene	ND	0.0050	EPA 8260C	2-5-15	2-5-15	
(trans) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	

Date of Report: February 17, 2015
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0205S1					
1,1,2-Trichloroethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Tetrachloroethene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,3-Dichloropropane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Dibromochloromethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,2-Dibromoethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Chlorobenzene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,1,1,2-Tetrachloroethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Ethylbenzene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
m,p-Xylene	ND	0.0020	EPA 8260C	2-5-15	2-5-15	
o-Xylene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Bromoform	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Bromobenzene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,1,2,2-Tetrachloroethane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,2,3-Trichloropropane	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
2-Chlorotoluene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
4-Chlorotoluene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,3-Dichlorobenzene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,4-Dichlorobenzene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,2-Dichlorobenzene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
1,2-Dibromo-3-chloropropane	ND	0.0050	EPA 8260C	2-5-15	2-5-15	
1,2,4-Trichlorobenzene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Hexachlorobutadiene	ND	0.0050	EPA 8260C	2-5-15	2-5-15	
1,2,3-Trichlorobenzene	ND	0.0010	EPA 8260C	2-5-15	2-5-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*76-131*				
Toluene-d8	*109*	*82-129*				
4-Bromofluorobenzene	*111*	*79-126*				

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
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VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0206S1					
Dichlorodifluoromethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Chloromethane	ND	0.0050	EPA 8260C	2-6-15	2-6-15	
Vinyl Chloride	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Bromomethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Chloroethane	ND	0.0050	EPA 8260C	2-6-15	2-6-15	
Trichlorofluoromethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Iodomethane	ND	0.0050	EPA 8260C	2-6-15	2-6-15	
Methylene Chloride	ND	0.0050	EPA 8260C	2-6-15	2-6-15	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Methyl t-Butyl Ether	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
2,2-Dichloropropane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Bromochloromethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Chloroform	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,1,1-Trichloroethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Carbon Tetrachloride	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloropropene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Benzene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloroethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Trichloroethene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloropropane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Dibromomethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Bromodichloromethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
2-Chloroethyl Vinyl Ether	ND	0.0050	EPA 8260C	2-6-15	2-6-15	
(cis) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Toluene	ND	0.0050	EPA 8260C	2-6-15	2-6-15	
(trans) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	

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VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0206S1					
1,1,2-Trichloroethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Tetrachloroethene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,3-Dichloropropane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Dibromochloromethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromoethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Chlorobenzene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,1,1,2-Tetrachloroethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Ethylbenzene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
m,p-Xylene	ND	0.0020	EPA 8260C	2-6-15	2-6-15	
o-Xylene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Bromoform	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Bromobenzene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,1,2,2-Tetrachloroethane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichloropropane	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
2-Chlorotoluene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
4-Chlorotoluene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,3-Dichlorobenzene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,4-Dichlorobenzene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,2-Dichlorobenzene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromo-3-chloropropane	ND	0.0050	EPA 8260C	2-6-15	2-6-15	
1,2,4-Trichlorobenzene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Hexachlorobutadiene	ND	0.0050	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichlorobenzene	ND	0.0010	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*76-131*				
Toluene-d8	*105*	*82-129*				
4-Bromofluorobenzene	*110*	*79-126*				

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Project: 0689.01.03

VOLATILES EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Soil
Units: mg/kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0205S1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**0.0408**	**0.0404**	0.0500	0.0500	82	81	66-129	1	15	
Benzene	**0.0439**	**0.0445**	0.0500	0.0500	88	89	71-123	1	15	
Trichloroethene	**0.0453**	**0.0448**	0.0500	0.0500	91	90	75-115	1	15	
Toluene	**0.0470**	**0.0460**	0.0500	0.0500	94	92	75-120	2	15	
Chlorobenzene	**0.0459**	**0.0456**	0.0500	0.0500	92	91	75-121	1	15	
Surrogate:										
Dibromofluoromethane					*95*	*93*	*76-131*			
Toluene-d8					*95*	*92*	*82-129*			
4-Bromofluorobenzene					*100*	*98*	*79-126*			

Date of Report: February 17, 2015
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Laboratory Reference: 1502-023
Project: 0689.01.03

VOLATILES EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Soil
Units: mg/kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0206S1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**0.0519**	**0.0514**	0.0500	0.0500	104	103	66-129	1	15	
Benzene	**0.0501**	**0.0497**	0.0500	0.0500	100	99	71-123	1	15	
Trichloroethene	**0.0487**	**0.0497**	0.0500	0.0500	97	99	75-115	2	15	
Toluene	**0.0489**	**0.0504**	0.0500	0.0500	98	101	75-120	3	15	
Chlorobenzene	**0.0498**	**0.0487**	0.0500	0.0500	100	97	75-121	2	15	
Surrogate:										
Dibromofluoromethane					*98*	*97*	*76-131*			
Toluene-d8					*96*	*97*	*82-129*			
4-Bromofluorobenzene					*104*	*101*	*79-126*			

Date of Report: February 17, 2015
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HALOGENATED VOLATILES EPA 8260C

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM6-W-11.0**					
Laboratory ID:	02-023-07					
Dichlorodifluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloromethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromomethane	ND	0.43	EPA 8260C	2-6-15	2-6-15	
Chloroethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Iodomethane	ND	1.9	EPA 8260C	2-6-15	2-6-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloroform	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Trichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromomethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chloroethyl Vinyl Ether	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM6-W-11.0**					
Laboratory ID:	02-023-07					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromoform	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Bromobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Hexachlorobutadiene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*99*	*79-122*				
Toluene-d8	*99*	*80-120*				
4-Bromofluorobenzene	*100*	*80-120*				

BTEX EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM8-W-10.0**					
Laboratory ID:	02-023-08					
Benzene	0.22	0.20	EPA 8260C	2-6-15	2-6-15	
Toluene	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-6-15	2-6-15	
o-Xylene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*95*	*79-122*				
Toluene-d8	*102*	*80-120*				
4-Bromofluorobenzene	*104*	*80-120*				

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM10-W-9.0**					
Laboratory ID:	02-023-14					
Dichlorodifluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloromethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromomethane	ND	0.43	EPA 8260C	2-6-15	2-6-15	
Chloroethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Iodomethane	ND	1.9	EPA 8260C	2-6-15	2-6-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloroform	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Benzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Trichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromomethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chloroethyl Vinyl Ether	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Toluene	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM10-W-9.0**					
Laboratory ID:	02-023-14					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-6-15	2-6-15	
o-Xylene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromoform	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Bromobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Hexachlorobutadiene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*99*	*79-122*				
Toluene-d8	*103*	*80-120*				
4-Bromofluorobenzene	*102*	*80-120*				

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Trip Blanks**					
Laboratory ID:	02-023-16					
Dichlorodifluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloromethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromomethane	ND	0.43	EPA 8260C	2-6-15	2-6-15	
Chloroethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Iodomethane	ND	1.9	EPA 8260C	2-6-15	2-6-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloroform	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Benzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Trichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromomethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chloroethyl Vinyl Ether	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Toluene	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	

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Project: 0689.01.03

VOLATILES EPA 8260C
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Trip Blanks**					
Laboratory ID:	02-023-16					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-6-15	2-6-15	
o-Xylene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromoform	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Bromobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Hexachlorobutadiene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*100*	*79-122*				
Toluene-d8	*102*	*80-120*				
4-Bromofluorobenzene	*102*	*80-120*				

VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0206W1					
Dichlorodifluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloromethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromomethane	ND	0.43	EPA 8260C	2-6-15	2-6-15	
Chloroethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Iodomethane	ND	1.9	EPA 8260C	2-6-15	2-6-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloroform	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Benzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Trichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromomethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chloroethyl Vinyl Ether	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Toluene	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	

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VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0206W1					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-6-15	2-6-15	
o-Xylene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromoform	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Bromobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Hexachlorobutadiene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*98*	*79-122*				
Toluene-d8	*104*	*80-120*				
4-Bromofluorobenzene	*105*	*80-120*				

Date of Report: February 17, 2015
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Project: 0689.01.03

VOLATILES EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0206W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**7.76**	**7.94**	10.0	10.0	78	79	64-138	2	16	
Benzene	**8.71**	**9.04**	10.0	10.0	87	90	76-125	4	14	
Trichloroethene	**8.02**	**8.10**	10.0	10.0	80	81	70-125	1	16	
Toluene	**9.09**	**9.43**	10.0	10.0	91	94	75-125	4	15	
Chlorobenzene	**8.49**	**8.72**	10.0	10.0	85	87	80-140	3	15	
Surrogate:										
Dibromofluoromethane					*97*	*98*	*79-122*			
Toluene-d8					*100*	*100*	*80-120*			
4-Bromofluorobenzene					*99*	*103*	*80-120*			

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

NWTPH-Gx

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM3-S-6.0**					
Laboratory ID:	02-023-01					
Hexane	**ND**	0.27	EPA 8021B	2-6-15	2-9-15	
Gasoline	**ND**	27	NWTPH-Gx	2-6-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*121*	*68-123*				
Client ID:	**GM5-S-4.0**					
Laboratory ID:	02-023-02					
Gasoline	**ND**	6.3	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*104*	*68-123*				
Client ID:	**GM7-S-3.0**					
Laboratory ID:	02-023-03					
Gasoline	**ND**	8.0	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*68-123*				
Client ID:	**GM6-S-4.0**					
Laboratory ID:	02-023-04					
Gasoline	**ND**	14	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*91*	*68-123*				
Client ID:	**GM9-S-2.0**					
Laboratory ID:	02-023-05					
Gasoline	**ND**	13	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*103*	*68-123*				
Client ID:	**GM8-S-4.5**					
Laboratory ID:	02-023-06					
Gasoline	**ND**	15	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*92*	*68-123*				

NWTPH-Gx

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM4-S-12.5**					
Laboratory ID:	02-023-09					
Gasoline	**ND**	5.8	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*84*	*68-123*				
Client ID:	**GM2-S-6.5**					
Laboratory ID:	02-023-10					
Hexane	**ND**	0.084	EPA 8021B	2-6-15	2-6-15	
Gasoline	**ND**	8.4	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*94*	*68-123*				
Client ID:	**GM1-S-12.0**					
Laboratory ID:	02-023-11					
Hexane	**ND**	0.099	EPA 8021B	2-6-15	2-9-15	
Gasoline	**12**	9.9	NWTPH-Gx	2-6-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*97*	*68-123*				
Client ID:	**GMDUP-S-12.0**					
Laboratory ID:	02-023-12					
Hexane	**ND**	0.35	EPA 8021B	2-6-15	2-9-15	
Gasoline	**ND**	35	NWTPH-Gx	2-6-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*95*	*68-123*				
Client ID:	**GM10-S-4.0**					
Laboratory ID:	02-023-15					
Gasoline	**ND**	28	NWTPH-Gx	2-6-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*106*	*68-123*				

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NWTPH-Gx
QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0206S1					
Hexane	**ND**	0.050	EPA 8021B	2-6-15	2-6-15	
Gasoline	**ND**	5.0	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*68-123*				
Laboratory ID:	MB0206S2					
Hexane	**ND**	0.050	EPA 8021B	2-6-15	2-6-15	
Gasoline	**ND**	5.0	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*68-123*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-023-01										
	ORIG	DUP									
Hexane	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*121*	*121*	*68-123*			
Laboratory ID:	02-032-03										
	ORIG	DUP									
Hexane	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*97*	*102*	*68-123*			

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0206S1										
	SB	SBD	SB	SBD		SB	SBD				
Hexane	**1.01**	**1.02**	1.00	1.00		**101**	**102**	80-120	1	15	
Surrogate:											
Fluorobenzene						*93*	*94*	*68-123*			

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

NWTPH-Gx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
ICVD0206G-1	5.00	4.31	14	+/- 20%
CCVD0206G-1	5.00	4.64	7	+/- 20%
CCVD0209G-1	5.00	5.20	-4	+/- 20%
CCVD0209G-2	5.00	5.03	-1	+/- 20%

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Project: 0689.01.03

n-HEXANE
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Hexane	ICVD0206B-1	50.0	56.6	-13	+/- 15%
Hexane	CCVD0206B-1	50.0	48.4	3	+/- 15%
Hexane	CCVD0206B-2	50.0	49.1	2	+/- 15%
Hexane	CCVD0206B-3	50.0	49.3	1	+/- 15%
Hexane	CCVD0209B-1	50.0	54.3	-9	+/- 15%
Hexane	CCVD0209B-2	50.0	50.3	-1	+/- 15%
Hexane	CCVD0209B-3	50.0	52.3	-5	+/- 15%

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
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Project: 0689.01.03

NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM6-W-11.0**					
Laboratory ID:	02-023-07					
Gasoline	**ND**	100	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*87*	*71-113*				
Client ID:	**GM8-W-10.0**					
Laboratory ID:	02-023-08					
Gasoline	**ND**	100	NWTPH-Gx	2-9-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*71-113*				
Client ID:	**GM4-W-9.0**					
Laboratory ID:	02-023-13					
Gasoline	**ND**	100	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*71-113*				
Client ID:	**GM10-W-9.0**					
Laboratory ID:	02-023-14					
Gasoline	**ND**	100	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*71-113*				

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NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0206W1					
Gasoline	**ND**	100	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*94*	*71-113*				
Laboratory ID:	MB0209W1					
Gasoline	**ND**	100	NWTPH-Gx	2-9-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*71-113*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-034-01										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*91*	*91*	*71-113*			
Laboratory ID:	02-044-01										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*87*	*91*	*71-113*			

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NWTPH-Gx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCVH0206G-1	5.00	4.45	11	+/- 20%
CCVH0206G-2	5.00	4.45	11	+/- 20%
CCVD0209G-1	5.00	5.20	-4	+/- 20%
CCVD0209G-2	5.00	5.03	-1	+/- 20%

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Project: 0689.01.03

NWTPH-Dx

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM3-S-6.0**					
Laboratory ID:	02-023-01					
Diesel Range Organics	**ND**	140	NWTPH-Dx	2-9-15	2-10-15	U1
Lube Oil	**1100**	180	NWTPH-Dx	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*76*	*50-150*				
Client ID:	**GM5-S-4.0**					
Laboratory ID:	02-023-02					
Diesel Range Organics	**ND**	33	NWTPH-Dx	2-9-15	2-10-15	
Lube Oil	**140**	66	NWTPH-Dx	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*76*	*50-150*				
Client ID:	**GM7-S-3.0**					
Laboratory ID:	02-023-03					
Diesel Range Organics	**ND**	34	NWTPH-Dx	2-9-15	2-10-15	
Lube Oil Range Organics	**140**	67	NWTPH-Dx	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*78*	*50-150*				
Client ID:	**GM6-S-4.0**					
Laboratory ID:	02-023-04					
Diesel Range Organics	**ND**	45	NWTPH-Dx	2-9-15	2-10-15	
Lube Oil Range Organics	**ND**	90	NWTPH-Dx	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*67*	*50-150*				
Client ID:	**GM9-S-2.0**					
Laboratory ID:	02-023-05					
Diesel Range Organics	**ND**	43	NWTPH-Dx	2-9-15	2-10-15	
Lube Oil Range Organics	**260**	86	NWTPH-Dx	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*75*	*50-150*				
Client ID:	**GM8-S-4.5**					
Laboratory ID:	02-023-06					
Diesel Range Organics	**ND**	48	NWTPH-Dx	2-9-15	2-10-15	
Lube Oil Range Organics	**ND**	95	NWTPH-Dx	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*70*	*50-150*				

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NWTPH-Dx

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM4-S-12.5**					
Laboratory ID:	02-023-09					
Diesel Range Organics	**ND**	30	NWTPH-Dx	2-9-15	2-10-15	
Lube Oil Range Organics	**ND**	60	NWTPH-Dx	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*69*	*50-150*				
Client ID:	**GM2-S-6.5**					
Laboratory ID:	02-023-10					
Diesel Range Organics	**ND**	35	NWTPH-Dx	2-9-15	2-10-15	
Lube Oil Range Organics	**ND**	71	NWTPH-Dx	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*85*	*50-150*				
Client ID:	**GM1-S-12.0**					
Laboratory ID:	02-023-11					
Diesel Range Organics	**ND**	38	NWTPH-Dx	2-9-15	2-10-15	
Lube Oil Range Organics	**ND**	76	NWTPH-Dx	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*74*	*50-150*				
Client ID:	**GMDUP-S-12.0**					
Laboratory ID:	02-023-12					
Diesel Range Organics	**ND**	84	NWTPH-Dx	2-9-15	2-10-15	
Lube Oil Range Organics	**400**	170	NWTPH-Dx	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*57*	*50-150*				
Client ID:	**GM10-S-4.0**					
Laboratory ID:	02-023-15					
Diesel Range Organics	**130**	77	NWTPH-Dx	2-9-15	2-10-15	
Lube Oil	**760**	150	NWTPH-Dx	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*86*	*50-150*				

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

NWTPH-Dx
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0209S2					
Diesel Range Organics	**ND**	25	NWTPH-Dx	2-9-15	2-9-15	
Lube Oil Range Organics	**ND**	50	NWTPH-Dx	2-9-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*88*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-023-09										
	ORIG	DUP									
Diesel Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Lube Oil Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Surrogate:											
o-Terphenyl						*69*	*64*	*50-150*			
Laboratory ID:	02-057-02										
	ORIG	DUP									
Diesel Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Lube Oil	**124**	**95.2**	NA	NA		NA		NA	26	NA	
Surrogate:											
o-Terphenyl						*71*	*72*	*50-150*			
SPIKE BLANK											
Laboratory ID:	SB0209S2										
Diesel Fuel #2	**100**		100		NA	**100**		65-140	NA	NA	
Surrogate:											
o-Terphenyl						*96*		*50-150*			

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

NWTPH-Dx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCV0209F-T4	100	97.8	2.2	+/-15%
CCV0209F-T5	100	99.1	0.9	+/-15%
CCV0209R-T3	100	101	-1.0	+/-15%
CCV0209R-T4	100	102	-2.0	+/-15%
CCV0210F-V1	100	98.9	1.1	+/-15%
CCV0210F-V2	100	103	-3.0	+/-15%
CCV0210F-V3	100	105	-5.0	+/-15%
CCV0210F-V4	100	113	-13	+/-15%
CCV0210R-V1	100	99.7	0.3	+/-15%
CCV0210R-V2	100	101	-1.0	+/-15%
CCV0210R-V3	100	103	-3.0	+/-15%

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM6-W-11.0**					
Laboratory ID:	02-023-07					
Diesel Range Organics	**0.26**	0.25	NWTPH-Dx	2-6-15	2-6-15	
Lube Oil	**ND**	0.40	NWTPH-Dx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*78*	*50-150*				
Client ID:	**GM8-W-10.0**					
Laboratory ID:	02-023-08					
Diesel Range Organics	**ND**	0.77	NWTPH-Dx	2-6-15	2-6-15	U1
Lube Oil	**1.8**	0.46	NWTPH-Dx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*91*	*50-150*				
Client ID:	**GM4-W-9.0**					
Laboratory ID:	02-023-13					
Diesel Range Organics	**ND**	0.28	NWTPH-Dx	2-6-15	2-6-15	U1
Lube Oil Range Organics	**0.51**	0.40	NWTPH-Dx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*81*	*50-150*				
Client ID:	**GM10-W-9.0**					
Laboratory ID:	02-023-14					
Diesel Range Organics	**ND**	0.28	NWTPH-Dx	2-6-15	2-6-15	
Lube Oil Range Organics	**ND**	0.44	NWTPH-Dx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*81*	*50-150*				

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0206W1					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	2-6-15	2-6-15	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*79*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-056-01										
	ORIG	DUP									
Diesel Range Organics	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Lube Oil	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Surrogate:											
o-Terphenyl						*79*	*82*	*50-150*			
SPIKE BLANK											
Laboratory ID:	SB0206W1										
Diesel Fuel #2	**0.938**		1.00		NA	**94**		56-118	NA	NA	
Surrogate:											
o-Terphenyl						*84*		*50-150*			

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

NWTPH-Dx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCV0206F-T2	100	105	-5.0	+/-15%
CCV0206F-T3	100	103	-3.0	+/-15%
CCV0206R-T2	100	112	-12	+/-15%
CCV0206R-T3	100	104	-4.0	+/-15%

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

PAHs EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**GM3-S-6.0**					
Laboratory ID:	02-023-01					
Naphthalene	**0.042**	0.023	EPA 8270D/SIM	2-11-15	2-12-15	
Benzo[a]anthracene	**ND**	0.023	EPA 8270D/SIM	2-11-15	2-12-15	
Chrysene	**0.046**	0.023	EPA 8270D/SIM	2-11-15	2-12-15	
Benzo[b]fluoranthene	**ND**	0.023	EPA 8270D/SIM	2-11-15	2-12-15	
Benzo(j,k)fluoranthene	**ND**	0.023	EPA 8270D/SIM	2-11-15	2-12-15	
Benzo[a]pyrene	**ND**	0.023	EPA 8270D/SIM	2-11-15	2-12-15	
Indeno(1,2,3-c,d)pyrene	**ND**	0.023	EPA 8270D/SIM	2-11-15	2-12-15	
Dibenz[a,h]anthracene	**ND**	0.023	EPA 8270D/SIM	2-11-15	2-12-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*90*	*32 - 114*				
Pyrene-d10	*89*	*33 - 121*				
Terphenyl-d14	*81*	*31 - 116*				

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

PAHs EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**GM7-S-3.0**					
Laboratory ID:	02-023-03					
Benzo[a]anthracene	**ND**	0.0090	EPA 8270D/SIM	2-11-15	2-12-15	
Chrysene	**ND**	0.0090	EPA 8270D/SIM	2-11-15	2-12-15	
Benzo[b]fluoranthene	**ND**	0.0090	EPA 8270D/SIM	2-11-15	2-12-15	
Benzo(j,k)fluoranthene	**ND**	0.0090	EPA 8270D/SIM	2-11-15	2-12-15	
Benzo[a]pyrene	**ND**	0.0090	EPA 8270D/SIM	2-11-15	2-12-15	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0090	EPA 8270D/SIM	2-11-15	2-12-15	
Dibenz[a,h]anthracene	**ND**	0.0090	EPA 8270D/SIM	2-11-15	2-12-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*76*	*32 - 114*				
Pyrene-d10	*75*	*33 - 121*				
Terphenyl-d14	*70*	*31 - 116*				

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

PAHs EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM2-S-6.5**					
Laboratory ID:	02-023-10					
Naphthalene	**ND**	0.0095	EPA 8270D/SIM	2-11-15	2-12-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*95*	*32 - 114*				
Pyrene-d10	*91*	*33 - 121*				
Terphenyl-d14	*85*	*31 - 116*				

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

PAHs EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM1-S-12.0**					
Laboratory ID:	02-023-11					
Naphthalene	**ND**	0.010	EPA 8270D/SIM	2-11-15	2-12-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*88*	*32 - 114*				
Pyrene-d10	*87*	*33 - 121*				
Terphenyl-d14	*80*	*31 - 116*				

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

PAHs EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GMDUP-S-12.0**					
Laboratory ID:	02-023-12					
Naphthalene	**ND**	0.022	EPA 8270D/SIM	2-11-15	2-12-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*90*	*32 - 114*				
Pyrene-d10	*88*	*33 - 121*				
Terphenyl-d14	*79*	*31 - 116*				

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

PAHs EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0211S1					
Naphthalene	**ND**	0.0067	EPA 8270D/SIM	2-11-15	2-12-15	
Benzo[a]anthracene	**ND**	0.0067	EPA 8270D/SIM	2-11-15	2-12-15	
Chrysene	**ND**	0.0067	EPA 8270D/SIM	2-11-15	2-12-15	
Benzo[b]fluoranthene	**ND**	0.0067	EPA 8270D/SIM	2-11-15	2-12-15	
Benzo(j,k)fluoranthene	**ND**	0.0067	EPA 8270D/SIM	2-11-15	2-12-15	
Benzo[a]pyrene	**ND**	0.0067	EPA 8270D/SIM	2-11-15	2-12-15	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0067	EPA 8270D/SIM	2-11-15	2-12-15	
Dibenz[a,h]anthracene	**ND**	0.0067	EPA 8270D/SIM	2-11-15	2-12-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*87*	*32 - 114*				
Pyrene-d10	*87*	*33 - 121*				
Terphenyl-d14	*80*	*31 - 116*				

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

PAHs EPA 8270D/SIM
SB/SBD QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0211S1									
	SB	SBD	SB	SBD	SB	SBD				
Naphthalene	**0.0667**	**0.0665**	0.0833	0.0833	80	80	63 - 113	0	19	
Benzo[a]anthracene	**0.0722**	**0.0745**	0.0833	0.0833	87	89	60 - 128	3	15	
Chrysene	**0.0635**	**0.0677**	0.0833	0.0833	76	81	60 - 117	6	13	
Benzo[b]fluoranthene	**0.0768**	**0.0800**	0.0833	0.0833	92	96	60 - 131	4	16	
Benzo(j,k)fluoranthene	**0.0712**	**0.0730**	0.0833	0.0833	85	88	57 - 126	2	20	
Benzo[a]pyrene	**0.0728**	**0.0763**	0.0833	0.0833	87	92	62 - 136	5	16	
Indeno(1,2,3-c,d)pyrene	**0.0747**	**0.0778**	0.0833	0.0833	90	93	60 - 127	4	19	
Dibenz[a,h]anthracene	**0.0727**	**0.0760**	0.0833	0.0833	87	91	62 - 133	4	22	
Surrogate:										
2-Fluorobiphenyl					*104*	*100*	*32 - 114*			
Pyrene-d10					*100*	*98*	*33 - 121*			
Terphenyl-d14					*91*	*89*	*31 - 116*			

Date of Report: February 17, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-023
Project: 0689.01.03

% MOISTURE

Date Analyzed: 2-5-15

Client ID	Lab ID	% Moisture
GM3-S-6.0	02-023-01	71
GM5-S-4.0	02-023-02	24
GM7-S-3.0	02-023-03	26
GM6-S-4.0	02-023-04	44
GM9-S-2.0	02-023-05	42
GM8-S-4.5	02-023-06	48
GM4-S-12.5	02-023-09	16
GM2-S-6.5	02-023-10	29
GM1-S-12.0	02-023-11	34
GMDUP-S-12.0	02-023-12	70
GM10-S-4.0	02-023-15	68

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

02-023

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number:

Turn-around Requested: Standard

Page: 1 of ~~3~~ 2 DB

ARI Client Company: MFA

Phone: 360.690.5982

Date: 2/3/15

Ice Present?

Client Contact: Carolyn Wise

No. of Coolers:

Cooler Temps:

Client Project Name: Geddes

Client Project #: 0689.01.03

Samplers: C. Wise ; M. Murray

	Sample ID	Date	Time	Matrix	No. Containers	Pb by ~~6020A~~	BTEX by 8260C	n-hexane, EDB, EDC, MTBE-8260C	Naphthalene by 8270 SIM	NWTPH-Gx	NWTPH-Dx	As, Cd, Cu, Hg by 6010C/6020A	Zn, Cu, As, Hg, Cd, Sn, Sb by 6010C/6020A	cPAHs by 8270SIM	HVOCs EPA 8260	% moisture
1	GM3-S-6.0	2/2/15	1000	S	6	X	X	X	X	X	X		X	X	X	X
2	GM5-S-4.0		1130	S	6		X			X	X					X
3	GM7-S-3.0		1310	S	6	X				X	X		X	X	X	X
4	GM6-S-4.0		1440	S	6	X				X	X	X			X	X
5	GM9-S-2.0		1615	S	6	X	X			X	X	X				X
6	GM8-S-4.5		1700	S	6	X	X			X	X	X				X
7	GM6-W-11.0		1500	W	8	X				X	X	X			X	
8	GM8-W-10.0	2/2/15	1730	W	7		X		NO	X	X			do not analyze for naphthalene!		
9	GM4-S-12.5	2/3/15	0855	S	6					X	X				X	X
10	GM2-S-6.5	2/3/15	1025	S	6	X	X	X	X	X	X	X				X

Comments/Special Instructions

Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)	(Signature) Celia Forrester	(Signature) Celia Forrester	(Signature)
Printed Name: Mike Murray	Printed Name: CELIA FORRESTER	Printed Name: CELIA F.	Printed Name: [illegible]
Company: MFA	Company: SPEEDY	Company: SPEEDY	Company: OnSite
Date & Time:	Date & Time: 2/4/15 7:30	Date & Time: 2/4/15 8:30	Date & Time: 2/4/15

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

02-023

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number:
Turn-around Requested: Standard
ARI Client Company: MFA
Phone: 360.690.5982
Client Contact: Carolyn Wise
Client Project Name: Geddes
Client Project #: 0689.01.03
Samplers: C Wise + M. Murray
Page: ~~32~~ 33 of ~~32~~ 33
Date: 2/3/15
Ice Present?
No. of Coolers:
Cooler Temps:

	Sample ID	Date	Time	Matrix	No. Containers	Pb by 6020A	BTEX by 8260C	n-hexane, EDB, EDC, MTBE-8260C	Naphthalene by 8270SIM	NWTPH-Gx	NWTPH-Dx	As, Cd, Cu, Hg by 6010C/6020A	Zn, Cu, As, Hg, Cd, Sn, Sb by 6010C/6020A	% MOISTURE Notes/Comments
11	GM1-S-12.0	2/3/15	1140	S	6	X	X	X	X	X	X			X
12	GMDUP-S-12.0	2/3/15	1140	S	6	X	X	X	X	X	X			X
13	GM4-W-9.0	2/3/15	1000	W	7					X	X			
14	GM10-W-9.0	2/3/15	1315	W	7		X			X	X			+ HVOCs - EPA 8260C
15	GM10-S-4.0	2/3/15	1230	S	6		X			X	X			X
16	Trip BLANKS	-	-	W	3		X							+ HVOCS 8260

Comments/Special Instructions

Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)	(Signature) Celia F	(Signature) Celia F.	(Signature)
Printed Name: Mike Murray	Printed Name: CELIA F.	Printed Name: CELIA F.	Printed Name:
Company: MFA	Company: SPEEDY	Company: SPEEDY	Company:
Date & Time:	Date & Time: 2/4/15 7:30	Date & Time: 2/4/15 830	Date & Time: 2/4/15 830

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: *All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.*

Sample/Cooler Receipt and Acceptance Checklist

Client: MFA

Client Project Name/Number: 0689.01.03

OnSite Project Number: 02-023

Initiated by: BG/MV

Date Initiated: 2/4/15

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	[✓ No]	N/A	1 2 3 4
1.2 Were the custody seals intact?	Yes	No	[✓ N/A]	1 2 3 4
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	[✓ N/A]	1 2 3 4
1.4 Were the samples delivered on ice or blue ice?	[✓ Yes]	No		1 2 3 4
1.5 Were samples received between 0-6 degrees Celsius?	[✓ Yes]	No	Temperature: 5°, 1°, 8°C	
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	[✓ N/A]		
1.7 How were the samples delivered?	Client	[✓ Courier]	UPS/FedEx	OSE Pickup Other

2.0 Chain of Custody Verification

2.1 Was a Chain of Custody submitted with the samples?	[✓ Yes]	No	1 2 3 4
2.2 Was the COC legible and written in permanent ink?	[✓ Yes]	No	1 2 3 4
2.3 Have samples been relinquished and accepted by each custodian?	[✓ Yes]	No	1 2 3 4
2.4 Did the sample labels (ID, date, time, preservative) agree with COC?	Yes	[✓ No]	1 2 3 4
2.5 Were all of the samples listed on the COC submitted?	[✓ Yes]	No	1 2 3 4
2.6 Were any of the samples submitted omitted from the COC?	[✓ Yes]	No	1 2 3 4

3.0 Sample Verification

3.1 Were any sample containers broken or compromised?	Yes	[✓ No]		1 2 3 4
3.2 Were any sample labels missing or illegible?	Yes	[✓ No]		1 2 3 4
3.3 Have the correct containers been used for each analysis requested?	[✓ Yes]	No		1 2 3 4
3.4 Have the samples been correctly preserved?	Yes	[✓ No]	N/A	1 2 3 4
3.5 Are volatiles samples free from headspace and bubbles greater than 6mm?	[✓ Yes]	No	N/A	1 2 3 4
3.6 Is there sufficient sample submitted to perform requested analyses?	[✓ Yes]	No		1 2 3 4
3.7 Have any holding times already expired or will expire in 24 hours?	Yes	[✓ No]		1 2 3 4
3.8 Was method 5035A used?	[✓ Yes]	No	N/A	1 2 3 4
3.9 If 5035A was used, which sampling option was used (#1, 2, or 3).	#	/	N/A	1 2 3 4

Explain any discrepancies:

2.4) Sample 15) GM10-S-4.0 2/3/15 1230 on COC 1300 on labels

2.6) Sample GP9-W-7.5 2/3/15 1415 1 vial not on COC - DISREGARD

TRIP BLANK not on COC (3)

3.4) Sample 7) GM6-W-11.0 pH 3 for 1/2L amber

Sample 8) GM8-W-10.0 pH 5 for 1/2L amber

Sample 13) GM4-W-9.0 pH 3 for 1/2L amber

1 - Discuss issue in Case Narrative

2 - Process Sample As-is

3 - Client contacted to discuss problem

4 - Sample cannot be analyzed or client does not wish to proceed

OnSite
Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

February 18, 2015

Carolyn Wise
Maul Foster & Alongi, Inc.
1329 North State Street, Suite 301
Bellingham, WA 98225

Re: Analytical Data for Project 0689.01.03
Laboratory Reference No. 1502-037

Dear Carolyn:

Enclosed are the analytical results and associated quality control data for samples submitted on February 4, 2015.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

Case Narrative

Samples were collected on February 4, 2015 and received by the laboratory on February 4, 2015. They were maintained at the laboratory at a temperature of 2^{o}C to 6^{o}C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Semivolatiles EPA 8270D/SIM Analysis

Sample GM1-W-9.0 and the method blank had one surrogate recovery out of control limits. This is within allowance of our standard operating procedure as long as the recovery is above 10%.

Sulfate ASTM D516-07 Analysis

Sample GM7-W-9.0(02-037-03) PQL was increased due to sample interference

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-037-01c1					
Client ID:	**GM1-W-9.0**					
Lead	**3.5**	1.1	200.8	2-10-15	2-10-15	
Manganese	**1400**	11	200.8	2-10-15	2-10-15	E
Lab ID:	02-037-01c2					
Client ID:	**GM1-W-9.0**					
Lead	**ND**	11	200.8	2-10-15	2-10-15	
Manganese	**1600**	110	200.8	2-10-15	2-10-15	

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-037-02					
Client ID:	**GM3-W-9.0**					
Antimony	**ND**	5.6	200.8	2-10-15	2-10-15	
Arsenic	**ND**	3.3	200.8	2-10-15	2-10-15	
Cadmium	**ND**	4.4	200.8	2-10-15	2-10-15	
Copper	**ND**	11	200.8	2-10-15	2-10-15	
Lead	**ND**	1.1	200.8	2-10-15	2-10-15	
Manganese	**490**	11	200.8	2-10-15	2-10-15	
Mercury	**ND**	0.50	7470A	2-6-15	2-6-15	
Tin	**ND**	28	200.8	2-10-15	2-10-15	
Zinc	**ND**	28	200.8	2-10-15	2-10-15	

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL METALS
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Prepared	Analyzed	Flags
Lab ID:	02-037-03c1					
Client ID:	**GM7-W-9.0**					
Antimony	**6.5**	5.6	200.8	2-10-15	2-10-15	
Arsenic	**3.9**	3.3	200.8	2-10-15	2-10-15	
Cadmium	**ND**	4.4	200.8	2-10-15	2-10-15	
Copper	**15**	11	200.8	2-10-15	2-10-15	
Lead	**13**	1.1	200.8	2-10-15	2-10-15	
Manganese	**2300**	11	200.8	2-10-15	2-10-15	E
Mercury	**ND**	0.50	7470A	2-6-15	2-6-15	
Tin	**ND**	28	200.8	2-10-15	2-10-15	
Zinc	**66**	28	200.8	2-10-15	2-10-15	

Lab ID:	02-037-03c2					
Client ID:	**GM7-W-9.0**					
Antimony	**ND**	56	200.8	2-10-15	2-10-15	
Arsenic	**ND**	33	200.8	2-10-15	2-10-15	
Cadmium	**ND**	44	200.8	2-10-15	2-10-15	
Copper	**ND**	110	200.8	2-10-15	2-10-15	
Lead	**ND**	11	200.8	2-10-15	2-10-15	
Manganese	**2700**	110	200.8	2-10-15	2-10-15	
Tin	**ND**	280	200.8	2-10-15	2-10-15	
Zinc	**ND**	280	200.8	2-10-15	2-10-15	

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
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Project: 0689.01.03

TOTAL METALS
EPA 200.8

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Extracted: 2-10-15
Date Analyzed: 2-10-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0210WM1

Analyte	Method	Result	PQL
Antimony	200.8	**ND**	5.6
Arsenic	200.8	**ND**	3.3
Cadmium	200.8	**ND**	4.4
Copper	200.8	**ND**	11
Lead	200.8	**ND**	1.1
Manganese	200.8	**ND**	11
Tin	200.8	**ND**	28
Zinc	200.8	**ND**	28

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL MERCURY
EPA 7470A
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-6-15
Date Analyzed:	2-6-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0206W1

Analyte	Method	Result	PQL
Mercury	7470A	**ND**	0.50

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Extracted: 2-10-15
Date Analyzed: 2-10-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-055-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Antimony	**ND**	**ND**	NA	5.6	
Arsenic	**ND**	**ND**	NA	3.3	
Cadmium	**ND**	**ND**	NA	4.4	
Copper	**ND**	**ND**	NA	11	
Lead	**ND**	**ND**	NA	1.1	
Manganese	**ND**	**ND**	NA	11	
Tin	**ND**	**ND**	NA	28	
Zinc	**ND**	**ND**	NA	28	

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
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Project: 0689.01.03

TOTAL MERCURY
EPA 7470A
DUPLICATE QUALITY CONTROL

Date Extracted: 2-6-15
Date Analyzed: 2-6-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-008-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	**ND**	**ND**	NA	0.50	

TOTAL METALS
EPA 200.8
MS/MSD QUALITY CONTROL

Date Extracted: 2-10-15
Date Analyzed: 2-10-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-055-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Antimony	111	**121**	109	**126**	114	4	
Arsenic	111	**124**	112	**125**	113	1	
Cadmium	111	**120**	108	**121**	109	1	
Copper	111	**118**	106	**115**	103	2	
Lead	111	**114**	103	**115**	103	1	
Manganese	111	**113**	102	**115**	104	1	
Tin	111	**114**	103	**116**	104	2	
Zinc	111	**124**	111	**123**	111	1	

TOTAL MERCURY
EPA 7470A
MS/MSD QUALITY CONTROL

Date Extracted:	2-6-15
Date Analyzed:	2-6-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	02-008-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	12.5	**11.2**	90	**11.8**	94	5	

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL METALS
EPA 200.8
SPIKE BLANK QUALITY CONTROL

Date Extracted:	2-10-15
Date Analyzed:	2-10-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	SB0210WM1

Analyte	Method	Spike Level	SB Result	Percent Recovery
Antimony	200.8	111	**108**	98
Arsenic	200.8	111	**112**	101
Cadmium	200.8	111	**107**	96
Copper	200.8	111	**107**	97
Lead	200.8	111	**106**	96
Manganese	200.8	111	**111**	100
Tin	200.8	111	**108**	97
Zinc	200.8	111	**107**	97

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL MERCURY
EPA 7470A
SPIKE BLANK QUALITY CONTROL

Date Extracted:	2-6-15
Date Analyzed:	2-6-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	SB0206W1

Analyte	Method	Spike Level	SB Result	Percent Recovery
Mercury	7470A	12.5	**11.9**	95

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL METALS
EPA 200.8/7470A
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Antimony	ICV021015X	0.0500	0.0493	1.4	+/- 10%
Arsenic	ICV021015X	0.0500	0.0515	-3.0	+/- 10%
Cadmium	ICV021015X	0.0500	0.0500	0	+/- 10%
Copper	ICV021015X	0.0500	0.0515	-3.0	+/- 10%
Lead	ICV021015X	0.0500	0.0493	1.4	+/- 10%
Manganese	ICV021015X	0.0500	0.0483	3.4	+/- 10%
Mercury	ICV021015X	0.00500	0.00490	2.0	+/- 10%
Tin	ICV021015X	0.0500	0.0489	2.2	+/- 10%
Zinc	ICV021015X	0.0500	0.0510	-2.0	+/- 10%
Antimony	CCV1021015X	0.0400	0.0398	0.50	+/- 10%
Arsenic	CCV1021015X	0.0400	0.0393	1.8	+/- 10%
Cadmium	CCV1021015X	0.0400	0.0395	1.3	+/- 10%
Copper	CCV1021015X	0.0400	0.0398	0.50	+/- 10%
Lead	CCV1021015X	0.0400	0.0389	2.8	+/- 10%
Manganese	CCV1021015X	0.0400	0.0410	-2.5	+/- 10%
Mercury	CCV1021015X	0.00500	0.00494	1.2	+/- 20%
Tin	CCV1021015X	0.0400	0.0402	-0.50	+/- 10%
Zinc	CCV1021015X	0.0400	0.0400	0	+/- 10%
Antimony	CCV1021015X	0.0200	0.0199	0.50	+/- 10%
Arsenic	CCV1021015X	0.0200	0.0193	3.5	+/- 10%
Cadmium	CCV1021015X	0.0200	0.0195	2.5	+/- 10%
Copper	CCV1021015X	0.0200	0.0191	4.5	+/- 10%
Lead	CCV1021015X	0.0200	0.0188	6.0	+/- 10%
Manganese	CCV1021015X	0.0200	0.0186	7.0	+/- 10%
Tin	CCV1021015X	0.0200	0.0189	5.5	+/- 10%
Zinc	CCV1021015X	0.0200	0.0193	3.5	+/- 10%
Antimony	CCV2021015X	0.0400	0.0392	2.0	+/- 10%
Arsenic	CCV2021015X	0.0400	0.0411	-2.7	+/- 10%
Cadmium	CCV2021015X	0.0400	0.0392	2.0	+/- 10%
Copper	CCV2021015X	0.0400	0.0386	3.5	+/- 10%
Lead	CCV2021015X	0.0400	0.0378	5.5	+/- 10%
Manganese	CCV2021015X	0.0400	0.0389	2.8	+/- 10%
Mercury	CCV2021015X	0.00500	0.00493	1.4	+/- 20%
Tin	CCV2021015X	0.0400	0.0394	1.5	+/- 10%
Zinc	CCV2021015X	0.0400	0.0398	0.50	+/- 10%

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL METALS
EPA 200.8/7470A
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Antimony	CCV2021015X	0.0200	0.0198	1.0	+/- 10%
Arsenic	CCV2021015X	0.0200	0.0208	-4.0	+/- 10%
Cadmium	CCV2021015X	0.0200	0.0199	0.50	+/- 10%
Copper	CCV2021015X	0.0200	0.0198	1.0	+/- 10%
Lead	CCV2021015X	0.0200	0.0193	3.5	+/- 10%
Manganese	CCV2021015X	0.0200	0.0202	-1.0	+/- 10%
Tin	CCV2021015X	0.0200	0.0197	1.5	+/- 10%
Zinc	CCV2021015X	0.0200	0.0191	4.5	+/- 10%
Antimony	CCV3021015X	0.0400	0.0402	-0.50	+/- 10%
Arsenic	CCV3021015X	0.0400	0.0407	-1.8	+/- 10%
Cadmium	CCV3021015X	0.0400	0.0402	-0.50	+/- 10%
Copper	CCV3021015X	0.0400	0.0389	2.8	+/- 10%
Lead	CCV3021015X	0.0400	0.0369	7.8	+/- 10%
Manganese	CCV3021015X	0.0400	0.0377	5.8	+/- 10%
Mercury	CCV3021015X	0.00500	0.00496	0.80	+/- 20%
Tin	CCV3021015X	0.0400	0.0380	5.0	+/- 10%
Zinc	CCV3021015X	0.0400	0.0393	1.8	+/- 10%
Antimony	CCV3021015X	0.0200	0.0203	-1.5	+/- 10%
Arsenic	CCV3021015X	0.0200	0.0193	3.5	+/- 10%
Cadmium	CCV3021015X	0.0200	0.0197	1.5	+/- 10%
Copper	CCV3021015X	0.0200	0.0190	5.0	+/- 10%
Lead	CCV3021015X	0.0200	0.0184	8.0	+/- 10%
Manganese	CCV3021015X	0.0200	0.0183	8.5	+/- 10%
Tin	CCV3021015X	0.0200	0.0188	6.0	+/- 10%
Zinc	CCV3021015X	0.0200	0.0194	3.0	+/- 10%
Antimony	CCV4021015X	0.0400	0.0406	-1.5	+/- 10%
Arsenic	CCV4021015X	0.0400	0.0407	-1.8	+/- 10%
Cadmium	CCV4021015X	0.0400	0.0403	-0.75	+/- 10%
Copper	CCV4021015X	0.0400	0.0398	0.50	+/- 10%
Lead	CCV4021015X	0.0400	0.0380	5.0	+/- 10%
Manganese	CCV4021015X	0.0400	0.0383	4.3	+/- 10%
Tin	CCV4021015X	0.0400	0.0386	3.5	+/- 10%
Zinc	CCV4021015X	0.0400	0.0397	0.75	+/- 10%

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL METALS
EPA 200.8
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Antimony	CCV4021015X	0.0200	0.0204	-2.0	+/- 10%
Arsenic	CCV4021015X	0.0200	0.0194	3.0	+/- 10%
Cadmium	CCV4021015X	0.0200	0.0199	0.50	+/- 10%
Copper	CCV4021015X	0.0200	0.0190	5.0	+/- 10%
Lead	CCV4021015X	0.0200	0.0192	4.0	+/- 10%
Manganese	CCV4021015X	0.0200	0.0199	0.50	+/- 10%
Tin	CCV4021015X	0.0200	0.0199	0.50	+/- 10%
Zinc	CCV4021015X	0.0200	0.0190	5.0	+/- 10%
Antimony	CCV5021015X	0.0400	0.0409	-2.3	+/- 10%
Arsenic	CCV5021015X	0.0400	0.0415	-3.8	+/- 10%
Cadmium	CCV5021015X	0.0400	0.0401	-0.25	+/- 10%
Copper	CCV5021015X	0.0400	0.0388	3.0	+/- 10%
Lead	CCV5021015X	0.0400	0.0389	2.8	+/- 10%
Manganese	CCV5021015X	0.0400	0.0399	0.25	+/- 10%
Tin	CCV5021015X	0.0400	0.0397	0.75	+/- 10%
Zinc	CCV5021015X	0.0400	0.0400	0	+/- 10%
Antimony	CCV5021015X	0.0200	0.0201	-0.50	+/- 10%
Arsenic	CCV5021015X	0.0200	0.0203	-1.5	+/- 10%
Cadmium	CCV5021015X	0.0200	0.0199	0.50	+/- 10%
Copper	CCV5021015X	0.0200	0.0193	3.5	+/- 10%
Lead	CCV5021015X	0.0200	0.0190	5.0	+/- 10%
Manganese	CCV5021015X	0.0200	0.0195	2.5	+/- 10%
Tin	CCV5021015X	0.0200	0.0197	1.5	+/- 10%
Zinc	CCV5021015X	0.0200	0.0199	0.50	+/- 10%
Antimony	CCV6021015X	0.0400	0.0395	1.3	+/- 10%
Arsenic	CCV6021015X	0.0400	0.0404	-1.0	+/- 10%
Cadmium	CCV6021015X	0.0400	0.0404	-1.0	+/- 10%
Copper	CCV6021015X	0.0400	0.0393	1.8	+/- 10%
Lead	CCV6021015X	0.0400	0.0382	4.5	+/- 10%
Manganese	CCV6021015X	0.0400	0.0396	1.0	+/- 10%
Tin	CCV6021015X	0.0400	0.0398	0.50	+/- 10%
Zinc	CCV6021015X	0.0400	0.0405	-1.3	+/- 10%

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

TOTAL METALS
EPA 200.8
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Antimony	CCV6021015X	0.0200	0.0198	1.0	+/- 10%
Arsenic	CCV6021015X	0.0200	0.0203	-1.5	+/- 10%
Cadmium	CCV6021015X	0.0200	0.0201	-0.50	+/- 10%
Copper	CCV6021015X	0.0200	0.0192	4.0	+/- 10%
Lead	CCV6021015X	0.0200	0.0188	6.0	+/- 10%
Manganese	CCV6021015X	0.0200	0.0194	3.0	+/- 10%
Tin	CCV6021015X	0.0200	0.0197	1.5	+/- 10%
Zinc	CCV6021015X	0.0200	0.0199	0.50	+/- 10%

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	**Result**	**PQL**	**EPA Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Lab ID:	02-037-03d1					
Client ID:	**GM7-W-9.0**					
Antimony	**ND**	5.0	200.8	2-4-15	2-11-15	
Arsenic	**ND**	3.0	200.8	2-4-15	2-11-15	
Cadmium	**ND**	4.0	200.8	2-4-15	2-11-15	
Copper	**ND**	10	200.8	2-4-15	2-11-15	
Lead	**ND**	1.0	200.8	2-4-15	2-11-15	
Manganese	**2300**	10	200.8	2-4-15	2-11-15	E
Mercury	**ND**	0.50	7470A	2-4-15	2-9-15	
Tin	**ND**	25	200.8	2-4-15	2-11-15	
Zinc	**51**	25	200.8	2-4-15	2-11-15	
Lab ID:	02-037-03d2					
Client ID:	**GM7-W-9.0**					
Antimony	**ND**	50	200.8	2-4-15	2-11-15	
Arsenic	**ND**	30	200.8	2-4-15	2-11-15	
Cadmium	**ND**	40	200.8	2-4-15	2-11-15	
Copper	**ND**	100	200.8	2-4-15	2-11-15	
Lead	**ND**	10	200.8	2-4-15	2-11-15	
Manganese	**2600**	100	200.8	2-4-15	2-11-15	
Tin	**ND**	250	200.8	2-4-15	2-11-15	
Zinc	**ND**	250	200.8	2-4-15	2-11-15	

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
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Project: 0689.01.03

DISSOLVED METALS
EPA 200.8/7470A
METHOD BLANK QUALITY CONTROL

Date Filtered:	2-4-15
Date Analyzed:	2-9&11-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0204F1

Analyte	Method	Result	PQL
Antimony	200.8	**ND**	5.0
Arsenic	200.8	**ND**	3.0
Cadmium	200.8	**ND**	4.0
Copper	200.8	**ND**	10
Lead	200.8	**ND**	1.0
Manganese	200.8	**ND**	10
Mercury	7470A	**ND**	0.50
Tin	200.8	**ND**	25
Zinc	200.8	**ND**	25

Date of Report: February 18, 2015
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Project: 0689.01.03

DISSOLVED METALS
EPA 200.8/7470A
DUPLICATE QUALITY CONTROL

Date Filtered: 2-4-15
Date Analyzed: 2-9&11-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-037-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Antimony	**ND**	**5.31**	NA	5.0	
Arsenic	**ND**	**ND**	NA	3.0	
Cadmium	**ND**	**ND**	NA	4.0	
Copper	**ND**	**ND**	NA	10	
Lead	**ND**	**ND**	NA	1.0	
Manganese	**2590**	**2580**	0	100	
Mercury	**ND**	**ND**	NA	0.5	
Tin	**ND**	**ND**	NA	25	
Zinc	**51.4**	**47.7**	8	25	

DISSOLVED METALS
EPA 200.8/7470A
MS/MSD QUALITY CONTROL

Date Filtered: 2-4-15
Date Analyzed: 2-9&11-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-037-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Antimony	200	**199**	100	**209**	104	5	
Arsenic	200	**212**	106	**201**	100	6	
Cadmium	200	**189**	94	**191**	95	1	
Copper	200	**193**	97	**186**	93	4	
Lead	200	**180**	90	**181**	91	1	
Manganese	2000	**4460**	93	**4350**	88	2	
Mercury	12.5	**10.5**	84	**10.0**	80	5	
Tin	200	**189**	94	**192**	96	2	
Zinc	200	**251**	100	**257**	103	3	

Date of Report: February 18, 2015
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Project: 0689.01.03

DISSOLVED METALS
EPA 200.8/7470A
SPIKE BLANK QUALITY CONTROL

Date Filtered: 2-4-15
Date Analyzed: 2-9&11-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0204F1

Analyte	Method	Spike Level	SB Result	Percent Recovery
Antimony	200.8	200	**192**	96
Arsenic	200.8	200	**198**	99
Cadmium	200.8	200	**191**	96
Copper	200.8	200	**193**	96
Lead	200.8	200	**193**	96
Manganese	200.8	200	**196**	98
Mercury	7470A	12.5	**12.1**	97
Tin	200.8	200	**190**	95
Zinc	200.8	200	**191**	96

Date of Report: February 18, 2015
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DISSOLVED METALS
EPA 200.8/7470A
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Antimony	ICV021115X	0.0500	0.0495	1.0	+/- 10%
Arsenic	ICV021115X	0.0500	0.0502	-0.40	+/- 10%
Cadmium	ICV021115X	0.0500	0.0489	2.2	+/- 10%
Copper	ICV021115X	0.0500	0.0498	0.40	+/- 10%
Lead	ICV021115X	0.0500	0.0494	1.2	+/- 10%
Manganese	ICV021115X	0.0500	0.0492	1.6	+/- 10%
Mercury	ICV020615Y	0.00500	0.00500	0	+/- 10%
Tin	ICV021115X	0.0500	0.0482	3.6	+/- 10%
Zinc	ICV021115X	0.0500	0.0509	-1.8	+/- 10%
Antimony	CCV1021115X	0.0400	0.0385	3.8	+/- 10%
Arsenic	CCV1021115X	0.0400	0.0395	1.3	+/- 10%
Cadmium	CCV1021115X	0.0400	0.0382	4.5	+/- 10%
Copper	CCV1021115X	0.0400	0.0388	3.0	+/- 10%
Lead	CCV1021115X	0.0400	0.0385	3.8	+/- 10%
Manganese	CCV1021115X	0.0400	0.0392	2.0	+/- 10%
Mercury	CCV1020615Y	0.00500	0.00510	-2.0	+/- 20%
Tin	CCV1021115X	0.0400	0.0377	5.8	+/- 10%
Zinc	CCV1021115X	0.0400	0.0391	2.3	+/- 10%
Antimony	CCV1021115X	0.0200	0.0192	4.0	+/- 10%
Arsenic	CCV1021115X	0.0200	0.0197	1.5	+/- 10%
Cadmium	CCV1021115X	0.0200	0.0186	7.0	+/- 10%
Copper	CCV1021115X	0.0200	0.0191	4.5	+/- 10%
Lead	CCV1021115X	0.0200	0.0192	4.0	+/- 10%
Manganese	CCV1021115X	0.0200	0.0195	2.5	+/- 10%
Tin	CCV1021115X	0.0200	0.0189	5.5	+/- 10%
Zinc	CCV1021115X	0.0200	0.0194	3.0	+/- 10%
Antimony	CCV2021115X	0.0400	0.0391	2.3	+/- 10%
Arsenic	CCV2021115X	0.0400	0.0386	3.5	+/- 10%
Cadmium	CCV2021115X	0.0400	0.0382	4.5	+/- 10%
Copper	CCV2021115X	0.0400	0.0398	0.50	+/- 10%
Lead	CCV2021115X	0.0400	0.0387	3.3	+/- 10%
Manganese	CCV2021115X	0.0400	0.0394	1.5	+/- 10%
Mercury	CCV2020615Y	0.00500	0.00515	-3.0	+/- 20%
Tin	CCV2021115X	0.0400	0.0384	4.0	+/- 10%
Zinc	CCV2021115X	0.0400	0.0402	-0.50	+/- 10%

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DISSOLVED METALS
EPA 200.8/6010C/7470A
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Antimony	CCV2021115X	0.0200	0.0194	3.0	+/- 10%
Arsenic	CCV2021115X	0.0200	0.0199	0.50	+/- 10%
Cadmium	CCV2021115X	0.0200	0.0190	5.0	+/- 10%
Copper	CCV2021115X	0.0200	0.0196	2.0	+/- 10%
Lead	CCV2021115X	0.0200	0.0196	2.0	+/- 10%
Manganese	CCV2021115X	0.0200	0.0199	0.50	+/- 10%
Tin	CCV2021115X	0.0200	0.0191	4.5	+/- 10%
Zinc	CCV2021115X	0.0200	0.0203	-1.5	+/- 10%
Antimony	CCV3021115X	0.0400	0.0385	3.8	+/- 10%
Arsenic	CCV3021115X	0.0400	0.0404	-1.0	+/- 10%
Cadmium	CCV3021115X	0.0400	0.0390	2.5	+/- 10%
Copper	CCV3021115X	0.0400	0.0394	1.5	+/- 10%
Lead	CCV3021115X	0.0400	0.0382	4.5	+/- 10%
Manganese	CCV3021115X	0.0400	0.0386	3.5	+/- 10%
Tin	CCV3021115X	0.0400	0.0378	5.5	+/- 10%
Zinc	CCV3021115X	0.0400	0.0391	2.3	+/- 10%
Antimony	CCV3021115X	0.0200	0.0195	2.5	+/- 10%
Arsenic	CCV3021115X	0.0200	0.0199	0.50	+/- 10%
Cadmium	CCV3021115X	0.0200	0.0188	6.0	+/- 10%
Copper	CCV3021115X	0.0200	0.0193	3.5	+/- 10%
Lead	CCV3021115X	0.0200	0.0191	4.5	+/- 10%
Manganese	CCV3021115X	0.0200	0.0195	2.5	+/- 10%
Tin	CCV3021115X	0.0200	0.0190	5.0	+/- 10%
Zinc	CCV3021115X	0.0200	0.0200	0	+/- 10%

Date of Report: February 18, 2015
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VOLATILES EPA 8260C

Matrix: Water
Units: ug/L

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**GM1-W-9.0**					
Laboratory ID:	02-037-01					
Methyl t-Butyl Ether	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Benzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Toluene	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-6-15	2-6-15	
o-Xylene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*97*	*79-122*				
Toluene-d8	*98*	*80-120*				
4-Bromofluorobenzene	*99*	*80-120*				

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Project: 0689.01.03

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM3-W-9.0**					
Laboratory ID:	02-037-02					
Dichlorodifluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloromethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromomethane	ND	0.43	EPA 8260C	2-6-15	2-6-15	
Chloroethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Iodomethane	ND	1.9	EPA 8260C	2-6-15	2-6-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Methyl t-Butyl Ether	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloroform	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Benzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Trichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromomethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chloroethyl Vinyl Ether	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Toluene	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM3-W-9.0**					
Laboratory ID:	02-037-02					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-6-15	2-6-15	
o-Xylene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromoform	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Bromobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Hexachlorobutadiene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*97*	*79-122*				
Toluene-d8	*98*	*80-120*				
4-Bromofluorobenzene	*99*	*80-120*				

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Matrix: Water
Units: ug/L

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**GM7-W-9.0**					
Laboratory ID:	02-037-03					
Dichlorodifluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloromethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromomethane	ND	0.43	EPA 8260C	2-6-15	2-6-15	
Chloroethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Iodomethane	ND	1.9	EPA 8260C	2-6-15	2-6-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloroform	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Trichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromomethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chloroethyl Vinyl Ether	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM7-W-9.0**					
Laboratory ID:	02-037-03					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromoform	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Bromobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Hexachlorobutadiene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*103*	*79-122*				
Toluene-d8	*102*	*80-120*				
4-Bromofluorobenzene	*101*	*80-120*				

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Trip Blank**					
Laboratory ID:	02-037-04					
Dichlorodifluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloromethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromomethane	ND	0.43	EPA 8260C	2-6-15	2-6-15	
Chloroethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Iodomethane	ND	1.9	EPA 8260C	2-6-15	2-6-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Methyl t-Butyl Ether	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloroform	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Benzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Trichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromomethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chloroethyl Vinyl Ether	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Toluene	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	

VOLATILES EPA 8260C

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Trip Blank**					
Laboratory ID:	02-037-04					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-6-15	2-6-15	
o-Xylene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromoform	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Bromobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Hexachlorobutadiene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*99*	*79-122*				
Toluene-d8	*104*	*80-120*				
4-Bromofluorobenzene	*104*	*80-120*				

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

VOLATILES by EPA 8260C
METHOD BLANK QUALITY CONTROL
page 1 of 2

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0206W1					
Dichlorodifluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloromethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromomethane	ND	0.43	EPA 8260C	2-6-15	2-6-15	
Chloroethane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Iodomethane	ND	1.9	EPA 8260C	2-6-15	2-6-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Methyl t-Butyl Ether	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chloroform	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Benzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Trichloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromomethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chloroethyl Vinyl Ether	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Toluene	ND	1.0	EPA 8260C	2-6-15	2-6-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-6-15	2-6-15	

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

VOLATILES by EPA 8260C
METHOD BLANK QUALITY CONTROL
page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0206W1					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-6-15	2-6-15	
o-Xylene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Bromoform	ND	1.0	EPA 8260C	2-6-15	2-6-15	
Bromobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-6-15	2-6-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-6-15	2-6-15	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Hexachlorobutadiene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*98*	*79-122*				
Toluene-d8	*104*	*80-120*				
4-Bromofluorobenzene	*105*	*80-120*				

VOLATILES by EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0206W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**7.76**	**7.94**	10.0	10.0	78	79	64-138	2	16	
Benzene	**8.71**	**9.04**	10.0	10.0	87	90	76-125	4	14	
Trichloroethene	**8.02**	**8.10**	10.0	10.0	80	81	70-125	1	16	
Toluene	**9.09**	**9.43**	10.0	10.0	91	94	75-125	4	15	
Chlorobenzene	**8.49**	**8.72**	10.0	10.0	85	87	80-140	3	15	
Surrogate:										
Dibromofluoromethane					*97*	*98*	*79-122*			
Toluene-d8					*100*	*100*	*80-120*			
4-Bromofluorobenzene					*99*	*103*	*80-120*			

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

NAPHTHALENE EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM1-W-9.0**					
Laboratory ID:	02-037-01					
Naphthalene	**ND**	0.099	EPA 8270D/SIM	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*44*	*39 - 109*				
Pyrene-d10	*46*	*53 - 131*				Q
Terphenyl-d14	*44*	*44 - 104*				

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

PAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM3-W-9.0**					
Laboratory ID:	02-037-02					
Naphthalene	**ND**	0.099	EPA 8270D/SIM	2-9-15	2-10-15	
Benzo[a]anthracene	**ND**	0.0099	EPA 8270D/SIM	2-9-15	2-10-15	
Chrysene	**ND**	0.0099	EPA 8270D/SIM	2-9-15	2-10-15	
Benzo[b]fluoranthene	**ND**	0.0099	EPA 8270D/SIM	2-9-15	2-10-15	
Benzo(j,k)fluoranthene	**ND**	0.0099	EPA 8270D/SIM	2-9-15	2-10-15	
Benzo[a]pyrene	**ND**	0.0099	EPA 8270D/SIM	2-9-15	2-10-15	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0099	EPA 8270D/SIM	2-9-15	2-10-15	
Dibenz[a,h]anthracene	**ND**	0.0099	EPA 8270D/SIM	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*96*	*39 - 109*				
Pyrene-d10	*95*	*53 - 131*				
Terphenyl-d14	*104*	*44 - 104*				

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

PAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM7-W-9.0**					
Laboratory ID:	02-037-03					
Benzo[a]anthracene	**0.012**	0.0097	EPA 8270D/SIM	2-9-15	2-10-15	
Chrysene	**ND**	0.0097	EPA 8270D/SIM	2-9-15	2-10-15	
Benzo[b]fluoranthene	**ND**	0.0097	EPA 8270D/SIM	2-9-15	2-10-15	
Benzo(j,k)fluoranthene	**ND**	0.0097	EPA 8270D/SIM	2-9-15	2-10-15	
Benzo[a]pyrene	**ND**	0.0097	EPA 8270D/SIM	2-9-15	2-10-15	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0097	EPA 8270D/SIM	2-9-15	2-10-15	
Dibenz[a,h]anthracene	**ND**	0.0097	EPA 8270D/SIM	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*48*	*39 - 109*				
Pyrene-d10	*55*	*53 - 131*				
Terphenyl-d14	*58*	*44 - 104*				

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

PAHs EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Laboratory ID:	MB0209W1					
Naphthalene	**ND**	0.10	EPA 8270D/SIM	2-9-15	2-11-15	
Benzo[a]anthracene	**ND**	0.010	EPA 8270D/SIM	2-9-15	2-11-15	
Chrysene	**ND**	0.010	EPA 8270D/SIM	2-9-15	2-11-15	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270D/SIM	2-9-15	2-11-15	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270D/SIM	2-9-15	2-11-15	
Benzo[a]pyrene	**ND**	0.010	EPA 8270D/SIM	2-9-15	2-11-15	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270D/SIM	2-9-15	2-11-15	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270D/SIM	2-9-15	2-11-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*93*	*39 - 109*				
Pyrene-d10	*107*	*53 - 131*				
Terphenyl-d14	*118*	*44 - 104*				Q

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

PAHs EPA 8270D/SIM
SB/SBD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	**Result**		**Spike Level**		**Percent Recovery**		**Recovery Limits**	**RPD**	**RPD Limit**	**Flags**
SPIKE BLANKS										
Laboratory ID:	SB0209W1									
	SB	SBD	SB	SBD	SB	SBD				
Naphthalene	**0.273**	**0.342**	0.500	0.500	55	68	41 - 105	22	46	
Benzo[a]anthracene	**0.498**	**0.542**	0.500	0.500	100	108	60 - 135	8	34	
Chrysene	**0.400**	**0.424**	0.500	0.500	80	85	64 - 113	6	34	
Benzo[b]fluoranthene	**0.569**	**0.542**	0.500	0.500	114	108	66 - 126	5	37	
Benzo(j,k)fluoranthene	**0.447**	**0.506**	0.500	0.500	89	101	66 - 123	12	39	
Benzo[a]pyrene	**0.595**	**0.597**	0.500	0.500	119	119	63 - 130	0	37	
Indeno(1,2,3-c,d)pyrene	**0.522**	**0.532**	0.500	0.500	104	106	63 - 130	2	42	
Dibenz[a,h]anthracene	**0.520**	**0.533**	0.500	0.500	104	107	60 - 124	2	44	
Surrogate:										
2-Fluorobiphenyl					*72*	*93*	*39 - 109*			
Pyrene-d10					*94*	*106*	*53 - 131*			
Terphenyl-d14					*88*	*117*	*44 - 104*			

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM1-W-9.0**					
Laboratory ID:	02-037-01					
Hexane	**ND**	1.0	EPA 8021B	2-6-15	2-6-15	
Gasoline	**ND**	100	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*91*	*71-113*				
Client ID:	**GM3-W-9.0**					
Laboratory ID:	02-037-02					
Hexane	**ND**	1.0	EPA 8021B	2-6-15	2-6-15	
Gasoline	**ND**	100	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*71-113*				
Client ID:	**GM7-W-9.0**					
Laboratory ID:	02-037-03					
Gasoline	**ND**	100	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*87*	*71-113*				

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
METHOD BLANK						
Laboratory ID:	MB0206W2					
Hexane	**ND**	1.0	EPA 8021B	2-6-15	2-6-15	
Gasoline	**ND**	100	NWTPH-Gx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*84*	*71-113*				

Analyte	**Result**		**Spike Level**		**Source Result**	**Percent Recovery**		**Recovery Limits**	**RPD**	**RPD Limit**	**Flags**
DUPLICATE											
Laboratory ID:	02-037-02										
	ORIG	DUP									
Hexane	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*89*	*79*	*71-113*			
SPIKE BLANKS											
Laboratory ID:	SB0206W1										
	SB	SBD	SB	SBD		SB	SBD				
Hexane	**53.6**	**50.9**	50.0	50.0		**107**	**102**	80-120	5	15	
Surrogate:											
Fluorobenzene						*90*	*95*	*71-113*			

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

NWTPH-Gx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
ICVD0206G-1	5.00	4.31	14	+/- 20%
CCVD0206G-1	5.00	4.64	7	+/- 20%
CCVH0206G-1	5.00	4.45	11	+/- 20%
CCVH0206G-2	5.00	4.45	11	+/- 20%

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

HEXANE EPA 8021B
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Hexane	ICVD0206B-1	50.0	56.6	-13	+/- 15%
Hexane	CCVD0206B-1	50.0	48.4	3	+/- 15%
Hexane	CCVD0206B-2	50.0	49.1	2	+/- 15%
Hexane	CCVD0206B-3	50.0	49.3	1	+/- 15%

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

EDB by EPA 8011

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM1-W-9.0**					
Laboratory ID:	02-037-01					
EDB	**ND**	0.0097	EPA 8011	2-11-15	2-11-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*52*	*25-143*				
Client ID:	**GM3-W-9.0**					
Laboratory ID:	02-037-02					
EDB	**ND**	0.0097	EPA 8011	2-11-15	2-11-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*80*	*25-143*				

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

EDB by EPA 8011
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
METHOD BLANK						
Laboratory ID:	MB0211W1					
EDB	**ND**	0.010	EPA 8011	2-11-15	2-11-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*105*	*25-143*				

Analyte	**Result**		**Spike Level**		**Source Result**	**Percent Recovery**		**Recovery Limits**	**RPD**	**RPD Limit**	**Flags**
SPIKE BLANKS											
Laboratory ID:	SB0211W1										
	SB	SBD	SB	SBD		SB	SBD				
EDB	**0.104**	**0.109**	0.100	0.100	N/A	**104**	**109**	84-118	5	15	
Surrogate:											
TCMX						*112*	*110*	*25-143*			

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM1-W-9.0**					
Laboratory ID:	02-037-01					
Diesel Range Organics	**ND**	0.28	NWTPH-Dx	2-6-15	2-9-15	
Lube Oil Range Organics	**ND**	0.45	NWTPH-Dx	2-6-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*88*	*50-150*				
Client ID:	**GM3-W-9.0**					
Laboratory ID:	02-037-02					
Diesel Range Organics	**ND**	0.28	NWTPH-Dx	2-6-15	2-9-15	
Lube Oil Range Organics	**ND**	0.45	NWTPH-Dx	2-6-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*96*	*50-150*				
Client ID:	**GM7-W-9.0**					
Laboratory ID:	02-037-03					
Diesel Range Organics	**0.53**	0.29	NWTPH-Dx	2-6-15	2-9-15	
Lube Oil Range Organics	**ND**	0.47	NWTPH-Dx	2-6-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*83*	*50-150*				

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0206W1					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	2-6-15	2-6-15	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	2-6-15	2-6-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*81*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-037-01										
	ORIG	DUP									
Diesel Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Lube Oil Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Surrogate:											
o-Terphenyl						*88*	*90*	*50-150*			
SPIKE BLANK											
Laboratory ID:	SB0206W1										
Diesel Fuel #2	**0.938**		1.00		NA	**94**		56-118	NA	NA	
Surrogate:											
o-Terphenyl						*84*		*50-150*			

NWTPH-Dx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCV0206R-T2	100	112	-12	+/-15%
CCV0206R-T3	100	104	-4.0	+/-15%
CCV0209F-T3	100	98.2	1.8	+/-15%
CCV0209F-T4	100	97.8	2.2	+/-15%
CCV0209R-T1	100	103	-3.0	+/-15%
CCV0209R-T2	100	109	-9.0	+/-15%

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

NITRATE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM1-W-9.0**					
Laboratory ID:	02-037-01					
Nitrate	**2.4**	0.050	EPA 353.2	2-12-15	2-12-15	
Client ID:	**GM3-W-9.0**					
Laboratory ID:	02-037-02					
Nitrate	**0.065**	0.050	EPA 353.2	2-12-15	2-12-15	
Client ID:	**GM7-W-9.0**					
Laboratory ID:	02-037-03					
Nitrate	**0.067**	0.050	EPA 353.2	2-12-15	2-12-15	

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

NITRATE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0212W2					
Nitrate	**ND**	0.050	EPA 353.2	2-12-15	2-12-15	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-036-04								
	ORIG	DUP							
Nitrate	**0.411**	**0.404**	NA	NA	NA	NA	2	13	
MATRIX SPIKE									
Laboratory ID:	02-036-04								
	MS		MS		MS				
Nitrate	**2.66**		2.00	0.411	112	90-123	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0212W2								
	SB		SB		SB				
Nitrate	**2.27**		2.00	NA	114	88-121	NA	NA	

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

SULFATE
ASTM D516-07

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM1-W-9.0**					
Laboratory ID:	02-037-01					
Sulfate	**ND**	5.0	ASTM D516-07	2-10-15	2-10-15	
Client ID:	**GM3-W-9.0**					
Laboratory ID:	02-037-02					
Sulfate	**ND**	5.0	ASTM D516-07	2-10-15	2-10-15	
Client ID:	**GM7-W-9.0**					
Laboratory ID:	02-037-03					
Sulfate	**ND**	25	ASTM D516-07	2-10-15	2-10-15	

SULFATE
ASTM D516-07
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0210W1					
Sulfate	**ND**	5.0	ASTM D516-07	2-10-15	2-10-15	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-034-06								
	ORIG	DUP							
Sulfate	**5.29**	**5.34**	NA	NA	NA	NA	1	10	
MATRIX SPIKE									
Laboratory ID:	02-034-06								
	MS		MS		MS				
Sulfate	**16.2**		10.0	5.29	109	82-121	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0210W1								
	SB		SB		SB				
Sulfate	**10.8**		10.0	NA	108	90-114	NA	NA	

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

DISSOLVED METHANE
RSK 175

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM1-W-9.0**					
Laboratory ID:	02-037-01					
Methane	**8900**	500	RSK 175	2-10-15	2-10-15	
Client ID:	**GM3-W-9.0**					
Laboratory ID:	02-037-02					
Methane	**8100**	500	RSK 175	2-10-15	2-10-15	
Client ID:	**GM7-W-9.0**					
Laboratory ID:	02-037-03					
Methane	**2700**	500	RSK 175	2-10-15	2-10-15	

Date of Report: February 18, 2015
Samples Submitted: February 4, 2015
Laboratory Reference: 1502-037
Project: 0689.01.03

DISSOLVED METHANE
RSK 175
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0210W1					
Methane	**ND**	0.50	RSK 175	2-10-15	2-10-15	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0210W1										
	SB	SBD	SB	SBD		SB	SBD				
Methane	**4.95**	**4.61**	4.42	4.42	N/A	**112**	**104**	75-125	7	25	

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Analytical Resources, Incorporated
Analytical Chemists and Consultants

10 February 2015

David Baumeister
OnSite Environmental, Inc.
14648 NE 95th
Redmond, WA 98052

RE: Client Project: Geddes, 0689.01.03; Lab ID: 02-037
ARI Job No: ZV13

Dear David:

Please find enclosed the chain-of-custody (COC) record and the final results for the samples from the project referenced above. Analytical Resources, Inc. (ARI) accepted three water samples on February 4, 2015. The samples were analyzed for ferrous iron as requested.

These analyses proceeded without incident of note.

An electronic copy of these reports will remain on file at ARI. Should you have any questions, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures

cc: file ZV13

MDH/mdh

Ferrous Iron II (Analyzed)

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

ZV13

Chain of Custody

Page 1 of 1

Company: Maul Foster Alongi
Project Number: 0689.01.03
Project Name: Geddes
Project Manager: Carolyn Wise
Sampled by: CRW + MM

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ ________ (other)

Laboratory Number:

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Ferrous Iron II					% Moisture
	GM1-W-9.0	2/4/15	1345	W	1																	X					
	GM3-W-9.0	2/4/15	1430	W	1																	X					
	GM7-W-9.0	2/4/15	1515	W	1																	X					

	Signature	Company	Date	Time
Relinquished	Carolyn Wise	MFA	2/4/15	1533
Received		Speedy	2/4/15	1533
Relinquished		Speedy	2/4/15	1642
Received		ARI	2/4/15	1642
Relinquished				
Received				

Comments/Special Instructions
Coordinate with On-Site Environmental

Reviewed/Date

Reviewed/Date

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ ________

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Onsite ~~Maul Foster Alongi~~

Project Name: Geddes

COC No(s): ______ [✓ NA]

Delivered by: Fed-Ex UPS Courier [✓ Hand Delivered] Other: ______

Assigned ARI Job No: ZV13

Tracking No: ______ [✓ NA]

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	[✓ NO]
Were custody papers included with the cooler?	[✓ YES]	NO
Were custody papers properly filled out (ink, signed, etc.)	[✓ YES]	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 8.9

Time: 1642

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90877952

Cooler Accepted by: ______ Date: 2/4/15 Time: 1642

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	[✓ NO]

What kind of packing material was used? ... Bubble Wrap [✓ Wet Ice] Gel Packs Baggies Foam Block Paper Other ______

Was sufficient ice used (if appropriate)?	NA	YES	[✓ NO]
Were all bottles sealed in individual plastic bags?		YES	[✓ NO]
Did all bottles arrive in good condition (unbroken)?		[✓ YES]	NO
Were all bottle labels complete and legible?		[✓ YES]	NO
Did the number of containers listed on COC match with the number of containers received?		[✓ YES]	NO
Did all bottle labels and tags agree with custody papers?		[✓ YES]	NO
Were all bottles used correct for the requested analyses?		[✓ YES]	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	[✓ YES]	NO
Were all VOC vials free of air bubbles?	[✓ NA]	YES	NO
Was sufficient amount of sample sent in each bottle?		[✓ YES]	NO
Date VOC Trip Blank was made at ARI	[✓ NA]	______	

Was Sample Split by ARI : [✓ NA] YES Date/Time: ______ Equipment: ______ Split by: ______

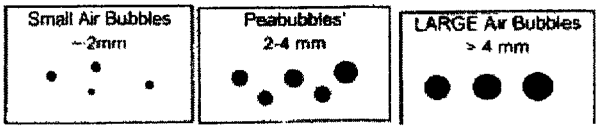
Samples Logged by: AV Date: 2/4/15 Time: 1700

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

Cooler#: 1 **Temperature(°C):** 8.9

Sample ID	**Bottle Count**	**Bottle Type**
Samples received		
above 6°C		

Cooler#: **Temperature(°C):**

Sample ID	**Bottle Count**	**Bottle Type**

Cooler#: **Temperature(°C):**

Sample ID	**Bottle Count**	**Bottle Type**

Cooler#: **Temperature(°C):**

Sample ID	**Bottle Count**	**Bottle Type**

Completed by: Date: 2/4/15 Time: 1700

PRESERVATION VERIFICATION 02/04/15

Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **ZV13**

PC: Mark
VTSR: 02/04/15

Inquiry Number: NONE
Analysis Requested: 02/05/15
Contact: Baumeister, David
Client: OnSite Environmental, Inc.
Logged by: AV
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

Project #: 0689.01.03
Project: Greddes
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
15-2005 **ZV13A**	GM1-W-9.0														*							
15-2006 **ZV13B**	GM3-W-9.0														*							
15-2007 **ZV13C**	GM7-W-9.0														*							

*Lab to determine Preservation.

Checked By ______ Date 2/4/15

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ZV13
Client: OnSite Environmental, Inc.
Project Event: 0689.01.03
Project Name: Greddes

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	GM1-W-9.0	ZV13A	15-2005	Water	02/04/15 13:45	02/04/15 16:42
2.	GM3-W-9.0	ZV13B	15-2006	Water	02/04/15 14:30	02/04/15 16:42
3.	GM7-W-9.0	ZV13C	15-2007	Water	02/04/15 15:15	02/04/15 16:42

Printed 02/04/15 Page 1 of 1

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

INORGANICS ANALYSIS DATA SHEET
Ferrous Iron by Method SM3500 FeD

ANALYTICAL RESOURCES INCORPORATED

Data Release Authorized:
Reported: 02/10/15
Date Received: 02/04/15
Page 1 of 1

QC Report No: ZV13-OnSite Environmental, Inc.
Project: Geddes
0689.01.03

Client/ ARI ID	Date Sampled	Matrix	Analysis Date & Batch	RL	Result
GM1-W-9.0 ZV13A 15-2005	02/04/15	Water	02/04/15 020415#1	0.800	9.00
GM3-W-9.0 ZV13B 15-2006	02/04/15	Water	02/04/15 020415#1	0.800	6.14
GM7-W-9.0 ZV13C 15-2007	02/04/15	Water	02/04/15 020415#1	4.00	41.9

Reported in mg/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
ZV13-OnSite Environmental, Inc.

Matrix: Water
Data Release Authorized:
Reported: 02/10/15

Project: Geddes
Event: 0689.01.03
Date Sampled: NA
Date Received: NA

Analyte	**Date/Time**	**Units**	**Blank**
Ferrous Iron	02/04/15 17:04	mg/L	< 0.040 U

LAB CONTROL RESULTS-CONVENTIONALS
ZV13-OnSite Environmental, Inc.

Matrix: Water
Data Release Authorized:
Reported: 02/10/15

Project: Geddes
Event: 0689.01.03
Date Sampled: NA
Date Received: NA

Analyte	Date/Time	Units	LCS	Spike Added	Recovery
Ferrous Iron	02/04/15 17:04	mg/L	0.501	0.500	100.2%

REPLICATE RESULTS-CONVENTIONALS
ZV13-OnSite Environmental, Inc.

Matrix: Water
Data Release Authorized:
Reported: 02/10/15

Project: Geddes
Event: 0689.01.03
Date Sampled: 02/04/15
Date Received: 02/04/15

Analyte	**Date**	**Units**	**Sample**	**Replicate(s)**	**RPD/RSD**
ARI ID: ZV13A Client ID: GM1-W-9.0					
Ferrous Iron	02/04/15	mg/L	9.00	8.88	1.3%

MS/MSD RESULTS-CONVENTIONALS
ZV13-OnSite Environmental, Inc.

ANALYTICAL
RESOURCES
INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 02/10/15

Project: Geddes
Event: 0689.01.03
Date Sampled: 02/04/15
Date Received: 02/04/15

Analyte	**Date**	**Units**	**Sample**	**Spike**	**Spike Added**	**Recovery**
ARI ID: ZV13A Client ID: GM1-W-9.0						
Ferrous Iron	02/04/15	mg/L	9.00	16.4	10.0	74.0%

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Page 1 of 1

Company: Maul Foster Alongi
Project Number: 0689.01.03
Project Name: Geddes
Project Manager: Carolyn Wise
Sampled by: Carolyn Wise + MM

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ ______ (other)

Laboratory Number: 02-037

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	~~NWTPH-HCID~~ Pb by 6020A	~~NWTPH-Gx/BTEX~~ BTEX by 8260C	~~NWTPH-Gx~~ n-hexane, EDB, EDC, MTBE - 8260C	~~NWTPH-Dx~~ Naphthalene by 8270SIM	~~Volatiles 8260C~~ NWTPH-Gx	~~Halogenated Volatiles 8260C~~ NWTPH-Dx	~~Semivolatiles 8270D/SIM (with low-level PAHs)~~ cPAHs - 8270SIM	~~PAHs 8270D/SIM (low-level)~~ HVOCs by 8260C	PCBs 8082A Nitrate	~~Organochlorine Pesticides 8081B~~ Manganese	~~Organophosphorus Pesticides 8270D/SIM~~ ~~Iron II~~ - CRW	~~Chlorinated Acid Herbicides 8151A~~ Sulfate	~~Total RCRA Metals~~ Methane	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	As, Cd, Cu, Hg by 6010C/6020A	Zn, Cu, As, Hg, Cd, Sn, Sb - 6010C 6020A		FERROUS IRON*		% Moisture
1	GM1-W-9.0	2/4/15	1345	W	15 -CRW	X	X	X	X	X	X			X	X		X	X					~~X~~		X		
2	GM3-W-9.0	2/4/15	1430	W	15	X	X	X	X	X	X	X	X	X	X		X	X					X		X		
3	GM7-W-9.0	2/4/15	1515	W	15	X				X	X	X	X	X	X		X	X					X		X		
4	TRIP BLANK	-	-	W	3		X						X														

	Signature	Company	Date	Time
Relinquished	Carolyn Wise	MFA	2/4/15	1533
Received		Speedy	2/4/15	1533
Relinquished		Speedy	2/4/15	1723
Received		OSE	2/4/15	1723
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Conduct total and dissolved analyses on metals for GM7-W-9.0 (~~dissol~~ filter in lab) CRW

*Subbed directly to ARI. DB

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ ______

Sample/Cooler Receipt and Acceptance Checklist

Client: MFA

Client Project Name/Number: 0689.01.03

OnSite Project Number: 02-037

Initiated by: MV

Date Initiated: 2/04/15

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	No	[✓ N/A]	1 2 3 4
1.2 Were the custody seals intact?	Yes	No	[✓ N/A]	1 2 3 4
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	[✓ N/A]	1 2 3 4
1.4 Were the samples delivered on ice or blue ice?	[✓ Yes]	No		1 2 3 4
1.5 Were samples received between 0-6 degrees Celsius?	[✓ Yes]	No	Temperature: 4	
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	[✓ N/A]		
1.7 How were the samples delivered?	Client	[✓ Courier]	UPS/FedEx	OSE Pickup Other

2.0 Chain of Custody Verification

2.1 Was a Chain of Custody submitted with the samples?	[✓ Yes]	No	1 2 3 4
2.2 Was the COC legible and written in permanent ink?	[✓ Yes]	No	1 2 3 4
2.3 Have samples been relinquished and accepted by each custodian?	[✓ Yes]	No	1 2 3 4
2.4 Did the sample labels (ID, date, time, preservative) agree with COC?	Yes	[✓ No]	1 2 3 4
2.5 Were all of the samples listed on the COC submitted?	[✓ Yes]	No	1 2 3 4
2.6 Were any of the samples submitted omitted from the COC?	[✓ Yes]	No	1 2 3 4

3.0 Sample Verification

3.1 Were any sample containers broken or compromised?	Yes	[✓ No]		1 2 3 4
3.2 Were any sample labels missing or illegible?	Yes	[✓ No]		1 2 3 4
3.3 Have the correct containers been used for each analysis requested?	[✓ Yes]	No		1 2 3 4
3.4 Have the samples been correctly preserved?	[✓ Yes]	No	N/A	1 2 3 4
3.5 Are volatiles samples free from headspace and bubbles greater than 6mm?	[✓ Yes]	No	N/A	1 2 3 4
3.6 Is there sufficient sample submitted to perform requested analyses?	[✓ Yes]	No		1 2 3 4
3.7 Have any holding times already expired or will expire in 24 hours?	Yes	[✓ No]		1 2 3 4
3.8 Was method 5035A used?	Yes	[✓ No]	N/A	1 2 3 4
3.9 If 5035A was used, which sampling option was used (#1, 2, or 3).	#		[✓ N/A]	1 2 3 4

Explain any discrepancies:

2.4) Sample 1) GM1-W-9.0 2/4/15 1345 on COC
— — 1345 on 1-1L amber Don't worry about
2.6) Sample 3) GM7-W-9.0 2/4/15 1515 extra poly unpreserved
TRIP BLANKS not on COC (3) - add
just an extra, ok?

1 - Discuss issue in Case Narrative

2 - Process Sample As-is

3 - Client contacted to discuss problem

4 - Sample cannot be analyzed or client does not wish to proceed

OnSite
Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

February 17, 2015

Carolyn Wise
Maul Foster & Alongi, Inc.
1329 North State Street, Suite 301
Bellingham, WA 98225

Re: Analytical Data for Project 0689.01.03
Laboratory Reference No. 1502-044

Dear Carolyn:

Enclosed are the analytical results and associated quality control data for samples submitted on February 5, 2015.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

Case Narrative

Samples were collected on February 4, 2015 and received by the laboratory on February 5, 2015. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Semivolatiles EPA 8270D/SIM Analysis

Sample GM2-W-9.0 and the method blank had one surrogate recovery out of control limits. This is within allowance of our standard operating procedure as long as the recovery is above 10%.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-044-01					
Client ID:	**GM2-W-9.0**					
Arsenic	**ND**	3.3	200.8	2-10-15	2-10-15	
Cadmium	**ND**	4.4	200.8	2-10-15	2-10-15	
Copper	**ND**	11	200.8	2-10-15	2-10-15	
Lead	**ND**	1.1	200.8	2-10-15	2-10-15	
Mercury	**ND**	0.50	7470A	2-6-15	2-6-15	
Lab ID:	02-044-02					
Client ID:	**GM9-W-9.0**					
Arsenic	**7.6**	3.3	200.8	2-10-15	2-10-15	
Cadmium	**ND**	4.4	200.8	2-10-15	2-10-15	
Copper	**ND**	11	200.8	2-10-15	2-10-15	
Lead	**2.3**	1.1	200.8	2-10-15	2-10-15	
Mercury	**ND**	0.50	7470A	2-6-15	2-6-15	

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-10-15
Date Analyzed:	2-10-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0210WM1

Analyte	Method	Result	PQL
Arsenic	200.8	**ND**	3.3
Cadmium	200.8	**ND**	4.4
Copper	200.8	**ND**	11
Lead	200.8	**ND**	1.1

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

TOTAL MERCURY
EPA 7470A
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-6-15
Date Analyzed:	2-6-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0206W1

Analyte	Method	Result	PQL
Mercury	7470A	**ND**	0.50

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Extracted: 2-10-15
Date Analyzed: 2-10-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-055-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**ND**	NA	3.3	
Cadmium	**ND**	**ND**	NA	4.4	
Copper	**ND**	**ND**	NA	11	
Lead	**ND**	**ND**	NA	1.1	

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

TOTAL MERCURY
EPA 7470A
DUPLICATE QUALITY CONTROL

Date Extracted:	2-6-15
Date Analyzed:	2-6-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	02-008-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	**ND**	**ND**	NA	0.50	

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

TOTAL METALS
EPA 200.8
MS/MSD QUALITY CONTROL

Date Extracted: 2-10-15
Date Analyzed: 2-10-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-055-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	111	**124**	112	**125**	113	1	
Cadmium	111	**120**	108	**121**	109	1	
Copper	111	**118**	106	**115**	103	2	
Lead	111	**114**	103	**115**	103	1	

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

TOTAL MERCURY
EPA 7470A
MS/MSD QUALITY CONTROL

Date Extracted: 2-6-15
Date Analyzed: 2-6-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-008-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	12.5	**11.2**	90	**11.8**	94	5	

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

TOTAL METALS
EPA 200.8
SPIKE BLANK QUALITY CONTROL

Date Extracted: 2-10-15
Date Analyzed: 2-10-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0210WM1

Analyte	Method	Spike Level	SB Result	Percent Recovery
Arsenic	200.8	111	**112**	101
Cadmium	200.8	111	**107**	96
Copper	200.8	111	**107**	97
Lead	200.8	111	**106**	96

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

TOTAL MERCURY
EPA 7470A
SPIKE BLANK QUALITY CONTROL

Date Extracted:	2-6-15
Date Analyzed:	2-6-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	SB0206W1

Analyte	Method	Spike Level	SB Result	Percent Recovery
Mercury	7470A	12.5	**11.9**	95

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

TOTAL METALS
EPA 200.8/7470A
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Arsenic	ICV021015X	0.0500	0.0515	-3.0	+/- 10%
Cadmium	ICV021015X	0.0500	0.0500	0	+/- 10%
Copper	ICV021015X	0.0500	0.0515	-3.0	+/- 10%
Lead	ICV021015X	0.0500	0.0493	1.4	+/- 10%
Mercury	ICV020615Y	0.00500	0.00490	2.0	+/- 10%
Arsenic	CCV1021015X	0.0400	0.0393	1.8	+/- 10%
Cadmium	CCV1021015X	0.0400	0.0395	1.3	+/- 10%
Copper	CCV1021015X	0.0400	0.0398	0.50	+/- 10%
Lead	CCV1021015X	0.0400	0.0389	2.8	+/- 10%
Mercury	CCV1020615Y	0.00500	0.00494	1.2	+/- 10%
Arsenic	CCV1021015X	0.0200	0.0193	3.5	+/- 10%
Cadmium	CCV1021015X	0.0200	0.0195	2.5	+/- 10%
Copper	CCV1021015X	0.0200	0.0191	4.5	+/- 10%
Lead	CCV1021015X	0.0200	0.0188	6.0	+/- 10%
Arsenic	CCV2021015X	0.0400	0.0411	-2.7	+/- 10%
Cadmium	CCV2021015X	0.0400	0.0392	2.0	+/- 10%
Copper	CCV2021015X	0.0400	0.0386	3.5	+/- 10%
Lead	CCV2021015X	0.0400	0.0378	5.5	+/- 10%
Mercury	CCV2020615Y	0.00500	0.00493	1.4	+/- 10%
Arsenic	CCV2021015X	0.0200	0.0208	-4.0	+/- 10%
Cadmium	CCV2021015X	0.0200	0.0199	0.50	+/- 10%
Copper	CCV2021015X	0.0200	0.0198	1.0	+/- 10%
Lead	CCV2021015X	0.0200	0.0193	3.5	+/- 10%
Arsenic	CCV3021015X	0.0400	0.0407	-1.8	+/- 10%
Cadmium	CCV3021015X	0.0400	0.0402	-0.50	+/- 10%
Copper	CCV3021015X	0.0400	0.0389	2.8	+/- 10%
Lead	CCV3021015X	0.0400	0.0369	7.8	+/- 10%
Mercury	CCV3020615Y	0.00500	0.00496	0.80	+/- 10%
Arsenic	CCV3021015X	0.0200	0.0193	3.5	+/- 10%
Cadmium	CCV3021015X	0.0200	0.0197	1.5	+/- 10%
Copper	CCV3021015X	0.0200	0.0190	5.0	+/- 10%
Lead	CCV3021015X	0.0200	0.0184	8.0	+/- 10%

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

TOTAL METALS
EPA 200.8/7470A
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Arsenic	CCV4021015X	0.0400	0.0407	-1.8	+/- 10%
Cadmium	CCV4021015X	0.0400	0.0403	-0.75	+/- 10%
Copper	CCV4021015X	0.0400	0.0398	0.50	+/- 10%
Lead	CCV4021015X	0.0400	0.0380	5.0	+/- 10%
Arsenic	CCV4021015X	0.0200	0.0194	3.0	+/- 10%
Cadmium	CCV4021015X	0.0200	0.0199	0.50	+/- 10%
Copper	CCV4021015X	0.0200	0.0190	5.0	+/- 10%
Lead	CCV4021015X	0.0200	0.0192	4.0	+/- 10%

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

VOLATILES EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM2-W-9.0**					
Laboratory ID:	02-044-01					
Methyl t-Butyl Ether	0.46	0.20	EPA 8260C	2-9-15	2-9-15	
Benzene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-9-15	2-9-15	
Toluene	ND	1.0	EPA 8260C	2-9-15	2-9-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-9-15	2-9-15	
o-Xylene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*79-122*				
Toluene-d8	*99*	*80-120*				
4-Bromofluorobenzene	*92*	*80-120*				

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

BTEX EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM9-W-9.0**					
Laboratory ID:	02-044-02					
Benzene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
Toluene	ND	1.0	EPA 8260C	2-9-15	2-9-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-9-15	2-9-15	
o-Xylene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*104*	*79-122*				
Toluene-d8	*101*	*80-120*				
4-Bromofluorobenzene	*94*	*80-120*				

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

BTEX EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM5-W-8.0**					
Laboratory ID:	02-044-03					
Benzene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
Toluene	ND	1.0	EPA 8260C	2-9-15	2-9-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-9-15	2-9-15	
o-Xylene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*79-122*				
Toluene-d8	*100*	*80-120*				
4-Bromofluorobenzene	*96*	*80-120*				

VOLATILES by EPA 8260C
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0209W1					
Methyl t-Butyl Ether	ND	0.20	EPA 8260C	2-9-15	2-9-15	
Benzene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-9-15	2-9-15	
Toluene	ND	1.0	EPA 8260C	2-9-15	2-9-15	
Ethylbenzene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
m,p-Xylene	ND	0.40	EPA 8260C	2-9-15	2-9-15	
o-Xylene	ND	0.20	EPA 8260C	2-9-15	2-9-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*79-122*				
Toluene-d8	*98*	*80-120*				
4-Bromofluorobenzene	*94*	*80-120*				

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0209W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**10.6**	**10.4**	10.0	10.0	106	104	64-138	2	16	
Benzene	**10.8**	**10.7**	10.0	10.0	108	107	76-125	1	14	
Trichloroethene	**9.69**	**9.49**	10.0	10.0	97	95	70-125	2	16	
Toluene	**9.91**	**10.0**	10.0	10.0	99	100	75-125	1	15	
Chlorobenzene	**9.64**	**9.55**	10.0	10.0	96	96	80-140	1	15	
Surrogate:										
Dibromofluoromethane					*103*	*106*	*79-122*			
Toluene-d8					*99*	*99*	*80-120*			
4-Bromofluorobenzene					*93*	*94*	*80-120*			

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

EDB
EPA 8011

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM2-W-9.0**					
Laboratory ID:	02-044-01					
EDB	**ND**	0.0097	EPA 8011	2-11-15	2-11-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*78*	*25-143*				

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

EDB
EPA 8011
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0211W1					
EDB	**ND**	0.010	EPA 8011	2-11-15	2-11-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
TCMX	*105*	*25-143*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0211W1										
	SB	SBD	SB	SBD		SB	SBD				
EDB	**0.104**	**0.109**	0.100	0.100	N/A	**104**	**109**	84-118	5	15	
Surrogate:											
TCMX						*112*	*110*	*25-143*			

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

NAPHTHALENE EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM2-W-9.0**					
Laboratory ID:	02-044-01					
Naphthalene	**ND**	0.095	EPA 8270D/SIM	2-9-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*116*	*39 - 109*				Q
Pyrene-d10	*105*	*53 - 131*				
Terphenyl-d14	*104*	*44 - 104*				

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

NAPHTHALENE EPA 8270D/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0209W1					
Naphthalene	**ND**	0.10	EPA 8270D/SIM	2-9-15	2-11-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*93*	*39 - 109*				
Pyrene-d10	*107*	*53 - 131*				
Terphenyl-d14	*118*	*44 - 104*				Q

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0209W1									
	SB	SBD	SB	SBD	SB	SBD				
Naphthalene	**0.273**	**0.342**	0.500	0.500	55	68	41 - 105	22	46	
Surrogate:										
2-Fluorobiphenyl					*72*	*93*	*39 - 109*			
Pyrene-d10					*94*	*106*	*53 - 131*			
Terphenyl-d14					*88*	*117*	*44 - 104*			

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM2-W-9.0**					
Laboratory ID:	02-044-01					
Hexane	**ND**	1.0	EPA 8021B	2-12-15	2-12-15	
Gasoline	**ND**	100	NWTPH-Gx	2-11-15	2-11-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*71-113*				
Client ID:	**GM9-W-9.0**					
Laboratory ID:	02-044-02					
Gasoline	**ND**	100	NWTPH-Gx	2-11-15	2-11-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*82*	*71-113*				
Client ID:	**GM5-W-8.0**					
Laboratory ID:	02-044-03					
Gasoline	**ND**	100	NWTPH-Gx	2-11-15	2-11-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*84*	*71-113*				

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0211W2					
Gasoline	**ND**	100	NWTPH-Gx	2-11-15	2-11-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*71-113*				
Laboratory ID:	MB0212W1					
Hexane	**ND**	1.0	EPA 8021B	2-12-15	2-12-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*71-113*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-044-01										
	ORIG	DUP									
Hexane	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*86*	*88*	*71-113*			
SPIKE BLANKS											
Laboratory ID:	SB0212W1										
	SB	SBD	SB	SBD		SB	SBD				
Hexane	**52.8**	**47.3**	50.0	50.0		**106**	**95**	80-120	11	15	
Surrogate:											
Fluorobenzene						*96*	*98*	*71-113*			

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

NWTPH-Gx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCVH0211G-1	5.00	4.52	10	+/- 20%
CCVH0211G-2	5.00	4.56	9	+/- 20%
CCVD0211G-1	5.00	5.21	-4	+/- 20%
CCVD0211G-2	5.00	5.01	0	+/- 20%

HEXANE EPA 8021B
CONTINUING CALIBRATION SUMMARY

Analyte	Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
Hexane	CCVD0212B-1	50.0	54.8	-10	+/- 15%
Hexane	CCVD0212B-2	50.0	53.4	-7	+/- 15%

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GM2-W-9.0**					
Laboratory ID:	02-044-01					
Diesel Range Organics	**ND**	0.26	NWTPH-Dx	2-10-15	2-10-15	
Lube Oil Range Organics	**ND**	0.41	NWTPH-Dx	2-10-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*82*	*50-150*				
Client ID:	**GM9-W-9.0**					
Laboratory ID:	02-044-02					
Diesel Range Organics	**ND**	0.28	NWTPH-Dx	2-10-15	2-10-15	
Lube Oil Range Organics	**ND**	0.45	NWTPH-Dx	2-10-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*66*	*50-150*				
Client ID:	**GM5-W-8.0**					
Laboratory ID:	02-044-03					
Diesel Range Organics	**0.41**	0.26	NWTPH-Dx	2-10-15	2-10-15	
Lube Oil Range Organics	**0.54**	0.42	NWTPH-Dx	2-10-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*80*	*50-150*				

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0210W1					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	2-10-15	2-10-15	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	2-10-15	2-10-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*81*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-044-01										
	ORIG	DUP									
Diesel Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Lube Oil Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Surrogate:											
o-Terphenyl						*82*	*82*	*50-150*			
SPIKE BLANK											
Laboratory ID:	SB0210W1										
Diesel Fuel #2	**0.977**		1.00		NA	**98**		56-118	NA	NA	
Surrogate:											
o-Terphenyl						*89*		*50-150*			

Date of Report: February 17, 2015
Samples Submitted: February 5, 2015
Laboratory Reference: 1502-044
Project: 0689.01.03

NWTPH-Dx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCV0210F-T1	100	109	-9.0	+/-15%
CCV0210F-T2	100	99.8	0.2	+/-15%
CCV0210F-T3	100	106	-6.0	+/-15%

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Page 1 of 1

Company: Maul Foster Alongi
Project Number: 0689.01.03
Project Name: Geddes
Project Manager: Carolyn Wise
Sampled by: CRW + MM

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ ________ (other)

Laboratory Number: 02-044

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	~~NWTPH-HCID~~ Pb by 6020A	~~NWTPH-Gx/BTEX~~ BTEX by 8260C	~~NWTPH-Gx~~ n-hexane, EDB, EDC, MTBE-8260C	~~NWTPH-Dx~~ Naphthalene by 8270SIM	~~Volatiles 8260C~~ NWTPH-Gx	~~Halogenated Volatiles 8260C~~ NWTPH-Dx	~~Semivolatiles 8270D/SIM (with low-level PAHs)~~ cPAHs-8270SIM	~~PAHs 8270D/SIM (low-level)~~ HVOCs-8260C	~~PCBs 8082A~~ ~~Nitrate~~ -CRW	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	As, Cd, Cu, Hg - 6010C, 6020A, 7471	Zn, Cu, As, Hg, Cd, Sn, Sb by 6010C/6020A/7471				% Moisture
1	GM2-W-9.0	2/4/15	1600	W	12	X	X	X	X	X	X											X					
2	GM9-W-9.0	2/4/15	1645	W	10	X	X			X	X											X					
3	GM5-W-8.0	2/4/15	1815	W	7		X		~~X~~ No	X	X																

	Signature	Company	Date	Time
Relinquished		MFA	2/5/15	1254
Received		OSE	2/5/15	1254
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions:

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ ________

Sample/Cooler Receipt and Acceptance Checklist

Client: MFA

Client Project Name/Number: 0689.01.03

OnSite Project Number: 02-044

Initiated by: MV

Date Initiated: 2/5/15

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	No	[✓ N/A]	1 2 3 4
1.2 Were the custody seals intact?	Yes	No	[✓ N/A]	1 2 3 4
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	[✓ N/A]	1 2 3 4
1.4 Were the samples delivered on ice or blue ice?	[✓ Yes]	No		1 2 3 4
1.5 Were samples received between 0-6 degrees Celsius?	[✓ Yes]	No	Temperature: 6	
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	[✓ N/A]		
1.7 How were the samples delivered?	[✓ Client]	Courier	UPS/FedEx	OSE Pickup Other

2.0 Chain of Custody Verification

2.1 Was a Chain of Custody submitted with the samples?	[✓ Yes]	No		1 2 3 4
2.2 Was the COC legible and written in permanent ink?	[✓ Yes]	No		1 2 3 4
2.3 Have samples been relinquished and accepted by each custodian?	[✓ Yes]	No		1 2 3 4
2.4 Did the sample labels (ID, date, time, preservative) agree with COC?	Yes	[✓ No]		1 2 3 4
2.5 Were all of the samples listed on the COC submitted?	[✓ Yes]	No		1 2 3 4
2.6 Were any of the samples submitted omitted from the COC?	Yes	[✓ No]		1 2 3 4

3.0 Sample Verification

3.1 Were any sample containers broken or compromised?	Yes	[✓ No]		1 2 3 4
3.2 Were any sample labels missing or illegible?	Yes	[✓ No]		1 2 3 4
3.3 Have the correct containers been used for each analysis requested?	[✓ Yes]	No		1 2 3 4
3.4 Have the samples been correctly preserved?	[✓ Yes]	No	N/A	1 2 3 4
3.5 Are volatiles samples free from headspace and bubbles greater than 6mm?	[✓ Yes]	No	N/A	1 2 3 4
3.6 Is there sufficient sample submitted to perform requested analyses?	[✓ Yes]	No		1 2 3 4
3.7 Have any holding times already expired or will expire in 24 hours?	Yes	[✓ No]		1 2 3 4
3.8 Was method 5035A used?	Yes	No	[✓ N/A]	1 2 3 4
3.9 If 5035A was used, which sampling option was used (#1, 2, or 3).	#		[✓ N/A]	1 2 3 4

Explain any discrepancies:

2.4) Sample 3) GMS-W-9.0 2/4/15 1815 on COC

GMS-W-8.0 " " on labels

1 - Discuss issue in Case Narrative

2 - Process Sample As-is

3 - Client contacted to discuss problem

4 - Sample cannot be analyzed or client does not wish to proceed

//SERVER\OSE\Administration\forms\cooler_checklist.xls

Analytical Resources, Incorporated
Analytical Chemists and Consultants

6 May 2015

Madi Novak
Maul. Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Geddes Marina
ARI Job No.: AEM4

Dear Madi:

Please find enclosed a copy of the original chain of custody records and the final results for the samples from the project referenced above.

These samples were originally received on February 5, 2015. Three samples were removed from archive and they were analyzed for SVOCs, TBTs, dioxins/furans, PCBs, NWTPH-Dx, grain size, TS, TOC and total metals as instructed.

Samples S-09-1.2 and S-13-0.33 were pre-diluted prior to analysis for SVOCs and SIM-SVOCs due to the dark color of the extracts. Since target compounds were detected on scale for both samples, more concentrated analyses were not performed.

The percent difference (%D) for Benzoic Acid was high for the CCAL that bracketed the 4/29/15 SVOA analyses of these samples. All positive results have been flagged with a "Q" qualifier to denote the high %D.

All samples were initially extracted for TBTs on 4/21/15 and they were analyzed on 4/24/15. The percent recoveries for the surrogates were low following the analyses of samples S-09-1.2 and S-11-2.0. These samples were re-extracted on 4/28/15 and they were re-analyzed on 4/29/15. The percent recoveries for both surrogates were within established QC limits for the re-extractions. The results for the re-extractions only have been submitted for these samples.

A matrix duplicate (MD) was prepared and analyzed for TOC in conjunction with sample S-13-0.33. The RPD was high following the analysis of the MD. Since the percent recoveries for TOC were within acceptable QC limits for the corresponding MS and SRM, it was concluded that a lack of sample homogeneity was the cause of the high RPD. No corrective actions were taken.

The remaining analyses proceeded without incident of note.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file AEM4

Enclosures

MDH/mdh

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number: ZV37
Turn-around Requested: Standard
Page: 1 of 1
ARI Client Company: Maul Foster & Alongi
Phone: 971 544-2139
Date:
Ice Present? Yes
Client Contact: Madi Novak
No. of Coolers: 1
Cooler Temps: 4.3
Client Project Name: Geddes Marina
Client Project #:
Samplers: Mike Murray

					Analysis Requested								Notes/Comments
Sample ID	Date	Time	Matrix	No Containers	SVOAs (8270)	PCBs Aroclors 8082	Metals 200.8/6010	Mercury 7471	TOC	Diesel NWTPH-Dx	Grain size (PSDP)	Archive	
S-09-0.33	2/4/15	10:15	Sed.	7	X	X	X	X	X	X	X	X	
S-10-0.33		11:00		7	X	X	X	X	X	X	X	X	
S-11-0.33		11:20		7	X	X	X	X	X	X	X	X	
S-12-0.33		12:00		7	X	X	X	X	X	X	X	X	
S-09-1.2		10:40		2								X	
S-10-1.6		11:10		2								X	
S-11-2.0		11:30		2								X	
S-12-2.3		12:15		2								X	
S-13-0.33		12:30		2								X	
S-13-1.2		1250		2								X	

Comments/Special Instructions

Relinquished by: (Signature)	Received by (Signature)	Relinquished by: (Signature)	Received by (Signature)
Printed Name Michael Murray	Printed Name Chris Atwell	Printed Name	Printed Name
Company MFA	Company ARI	Company	Company
Date & Time 2/5/15 1344	Date & Time 2-5-15 1344	Date & Time	Date & Time

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Subject: Geddes Marina - Archive Sediment Samples
From: Carolyn Wise <cwise@maulfoster.com>
Date: 4/15/2015 3:36 PM
To: "markh@arilabs.com" <markh@arilabs.com>
CC: Madi Novak <mnovak@maulfoster.com>, Justin Clary <jclary@maulfoster.com>

Hello Mark,

As I mentioned on the phone, we've decided to run three of our archived sediment samples from the Geddes Marina project. The samples were submitted to your lab on February 5, 2015 for reference.

We'd like to have the following samples run for the analyte list below:
S-09-1.2
S-11-2.0
S-13-0.33

Analyses Requested:

Diesel and Motor Oil	NWTPH-Dx
Dioxins/Furans	USEPA 1613B
Grain Size	PSEP
Organotins	USEPA 8270D SIM
Polychlorinated Biphenyls (PCBs)	USEPA 8082A
Semivolatile Organic Compounds (SVOCs)	USEPA 8270D/8270D SIM
Total Mercury	USEPA 7471A
Total Metals	USEPA 6010C
Total Organic Carbon (TOC)	Plumb, 1981
Total Solids	SM 2540G

Feel free to give me a call with any questions.

Thank you,

CAROLYN WISE, GIT | MAUL FOSTER & ALONGI, INC.
d. 360 594 6255 | c. 360 690 5982 | p. 360 594 6250 | f. 360 594 6270
1329 North State Street, Suite 301, Bellingham, WA 98225
Check out our website! www.maulfoster.com

Sample ID Cross Reference Report

ANALYTICAL
RESOURCES
INCORPORATED

ARI Job No: AEM4
Client: Maul Foster & Alongi
Project Event: N/A
Project Name: Geddes Marina

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	S-09-1.2	AEM4A	15-7603	Sediment	02/04/15 10:40	02/19/15 13:44
2.	S-11-2.0	AEM4B	15-7604	Sediment	02/04/15 11:30	02/19/15 13:44
3.	S-13-0.33	AEM4C	15-7605	Sediment	02/04/15 12:30	02/19/15 13:44

Printed 04/17/15 Page 1 of 1

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-09-1.2
SAMPLE

Lab Sample ID: AEM4A
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 21:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.05 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 2.00
Percent Moisture: 44.3%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**40**	**100 B**
106-46-7	1,4-Dichlorobenzene	40	< 40 U
100-51-6	Benzyl Alcohol	40	< 40 U
95-50-1	1,2-Dichlorobenzene	40	< 40 U
95-48-7	**2-Methylphenol**	**40**	**32 J**
106-44-5	**4-Methylphenol**	**40**	**260**
105-67-9	2,4-Dimethylphenol	200	< 200 U
65-85-0	**Benzoic Acid**	**400**	**280 JQ**
120-82-1	1,2,4-Trichlorobenzene	40	< 40 U
91-20-3	**Naphthalene**	**40**	**290**
87-68-3	Hexachlorobutadiene	40	< 40 U
91-57-6	**2-Methylnaphthalene**	**40**	**120**
131-11-3	Dimethylphthalate	40	< 40 U
208-96-8	**Acenaphthylene**	**40**	**250**
83-32-9	**Acenaphthene**	**40**	**48**
132-64-9	**Dibenzofuran**	**40**	**140**
84-66-2	Diethylphthalate	40	< 40 U
86-73-7	**Fluorene**	**40**	**140**
86-30-6	N-Nitrosodiphenylamine	40	< 40 U
118-74-1	Hexachlorobenzene	40	< 40 U
87-86-5	Pentachlorophenol	200	< 200 U
85-01-8	**Phenanthrene**	**40**	**1,900**
120-12-7	**Anthracene**	**40**	**240**
84-74-2	Di-n-Butylphthalate	40	< 40 U
206-44-0	**Fluoranthene**	**40**	**1,700**
129-00-0	**Pyrene**	**40**	**1,600**
85-68-7	Butylbenzylphthalate	40	< 40 U
56-55-3	**Benzo(a)anthracene**	**40**	**690**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**100**	**2,100 B**
218-01-9	**Chrysene**	**40**	**1,100**
117-84-0	Di-n-Octyl phthalate	40	< 40 U
50-32-8	**Benzo(a)pyrene**	**40**	**900**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**40**	**630**
53-70-3	**Dibenz(a,h)anthracene**	**40**	**170**
191-24-2	**Benzo(g,h,i)perylene**	**40**	**690**
TOTBFA	**Total Benzofluoranthenes**	**80**	**1,600**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	49.2%	2-Fluorobiphenyl	60.4%
d14-p-Terphenyl	70.8%	d4-1,2-Dichlorobenzene	42.8%
d5-Phenol	41.6%	2-Fluorophenol	38.4%
2,4,6-Tribromophenol	70.9%	d4-2-Chlorophenol	41.1%

FORM I

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-11-2.0
SAMPLE

Lab Sample ID: AEM4B
LIMS ID: 15-7604
Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 21:42
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.40 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 58.4%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**19**	**67 B**
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	Benzyl Alcohol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	**4-Methylphenol**	**19**	**24**
105-67-9	2,4-Dimethylphenol	96	< 96 U
65-85-0	**Benzoic Acid**	**190**	**480 Q**
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	**Naphthalene**	**19**	**32**
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	2-Methylnaphthalene	19	< 19 U
131-11-3	**Dimethylphthalate**	**19**	**15 J**
208-96-8	Acenaphthylene	19	< 19 U
83-32-9	Acenaphthene	19	< 19 U
132-64-9	Dibenzofuran	19	< 19 U
84-66-2	Diethylphthalate	19	< 19 U
86-73-7	**Fluorene**	**19**	**12 J**
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	96	< 96 U
85-01-8	**Phenanthrene**	**19**	**62**
120-12-7	**Anthracene**	**19**	**17 J**
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**110**
129-00-0	**Pyrene**	**19**	**97**
85-68-7	Butylbenzylphthalate	19	< 19 U
56-55-3	**Benzo(a)anthracene**	**19**	**42**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**48**	**540 B**
218-01-9	**Chrysene**	**19**	**82**
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	**Benzo(a)pyrene**	**19**	**47**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**19**	**38**
53-70-3	**Dibenz(a,h)anthracene**	**19**	**14 J**
191-24-2	**Benzo(g,h,i)perylene**	**19**	**55**
TOTBFA	**Total Benzofluoranthenes**	**38**	**120**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	51.0%	2-Fluorobiphenyl	51.8%
d14-p-Terphenyl	61.4%	d4-1,2-Dichlorobenzene	39.0%
d5-Phenol	35.5%	2-Fluorophenol	34.5%
2,4,6-Tribromophenol	60.7%	d4-2-Chlorophenol	40.0%

FORM I

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-13-0.33
SAMPLE

Lab Sample ID: AEM4C
LIMS ID: 15-7605
Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 22:19
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.33 g-dry-wt
Final Extract Volume: 2.0 mL
Dilution Factor: 3.00
Percent Moisture: 61.8%

CAS Number	Analyte	LOQ	Result	
108-95-2	**Phenol**	**120**	**93**	**J**
106-46-7	1,4-Dichlorobenzene	120	< 120	U
100-51-6	**Benzyl Alcohol**	**120**	**99**	**J**
95-50-1	1,2-Dichlorobenzene	120	< 120	U
95-48-7	2-Methylphenol	120	< 120	U
106-44-5	**4-Methylphenol**	**120**	**130**	
105-67-9	2,4-Dimethylphenol	580	< 580	U
65-85-0	**Benzoic Acid**	**1,200**	**760**	**JQ**
120-82-1	1,2,4-Trichlorobenzene	120	< 120	U
91-20-3	**Naphthalene**	**120**	**76**	**J**
87-68-3	Hexachlorobutadiene	120	< 120	U
91-57-6	2-Methylnaphthalene	120	< 120	U
131-11-3	Dimethylphthalate	120	< 120	U
208-96-8	Acenaphthylene	120	< 120	U
83-32-9	Acenaphthene	120	< 120	U
132-64-9	**Dibenzofuran**	**120**	**41**	**J**
84-66-2	Diethylphthalate	120	< 120	U
86-73-7	**Fluorene**	**120**	**46**	**J**
86-30-6	N-Nitrosodiphenylamine	120	< 120	U
118-74-1	Hexachlorobenzene	120	< 120	U
87-86-5	Pentachlorophenol	580	< 580	U
85-01-8	**Phenanthrene**	**120**	**250**	
120-12-7	**Anthracene**	**120**	**120**	
84-74-2	Di-n-Butylphthalate	120	< 120	U
206-44-0	**Fluoranthene**	**120**	**960**	
129-00-0	**Pyrene**	**120**	**910**	
85-68-7	**Butylbenzylphthalate**	**120**	**93**	**J**
56-55-3	**Benzo(a)anthracene**	**120**	**300**	
117-81-7	**bis(2-Ethylhexyl)phthalate**	**290**	**2,900**	**B**
218-01-9	**Chrysene**	**120**	**580**	
117-84-0	Di-n-Octyl phthalate	120	< 120	U
50-32-8	**Benzo(a)pyrene**	**120**	**350**	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**120**	**310**	
53-70-3	**Dibenz(a,h)anthracene**	**120**	**87**	**J**
191-24-2	**Benzo(g,h,i)perylene**	**120**	**400**	
TOTBFA	**Total Benzofluoranthenes**	**230**	**1,100**	

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	62.4%	2-Fluorobiphenyl	55.2%
d14-p-Terphenyl	67.2%	d4-1,2-Dichlorobenzene	48.0%
d5-Phenol	40.8%	2-Fluorophenol	44.8%
2,4,6-Tribromophenol	63.2%	d4-2-Chlorophenol	49.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-042115
METHOD BLANK

Lab Sample ID: MB-042115
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 17:22
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**20**	**10 J**
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**50**	**35 J**
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.6%	2-Fluorobiphenyl	65.0%
d14-p-Terphenyl	98.6%	d4-1,2-Dichlorobenzene	61.6%
d5-Phenol	49.3%	2-Fluorophenol	41.6%
2,4,6-Tribromophenol	48.8%	d4-2-Chlorophenol	51.2%

FORM I

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS
Page 1 of 2

Sample ID: LCS-042115
LAB CONTROL

Lab Sample ID: LCS-042115
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 17:59
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	**Lab Control**	**Spike Added**	**Recovery**
Phenol	334 B	500	66.8%
1,4-Dichlorobenzene	326	500	65.2%
Benzyl Alcohol	343	500	68.6%
1,2-Dichlorobenzene	297	500	59.4%
2-Methylphenol	215	500	43.0%
4-Methylphenol	282	500	56.4%
2,4-Dimethylphenol	179	1500	11.9%
Benzoic Acid	2700 Q	2750	98.2%
1,2,4-Trichlorobenzene	360	500	72.0%
Naphthalene	323	500	64.6%
Hexachlorobutadiene	375	500	75.0%
2-Methylnaphthalene	336	500	67.2%
Dimethylphthalate	340	500	68.0%
Acenaphthylene	335	500	67.0%
Acenaphthene	344	500	68.8%
Dibenzofuran	363	500	72.6%
Diethylphthalate	363	500	72.6%
Fluorene	344	500	68.8%
N-Nitrosodiphenylamine	239	500	47.8%
Hexachlorobenzene	331	500	66.2%
Pentachlorophenol	1110	1500	74.0%
Phenanthrene	386	500	77.2%
Anthracene	351	500	70.2%
Di-n-Butylphthalate	339	500	67.8%
Fluoranthene	360	500	72.0%
Pyrene	358	500	71.6%
Butylbenzylphthalate	301	500	60.2%
Benzo(a)anthracene	368	500	73.6%
bis(2-Ethylhexyl)phthalate	371 B	500	74.2%
Chrysene	381	500	76.2%
Di-n-Octyl phthalate	357	500	71.4%
Benzo(a)pyrene	343	500	68.6%
Indeno(1,2,3-cd)pyrene	407	500	81.4%
Dibenz(a,h)anthracene	426	500	85.2%

FORM III

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS
Page 2 of 2

Sample ID: LCS-042115
LAB CONTROL

Lab Sample ID: LCS-042115
LIMS ID: 15-7603
Matrix: Sediment
Date Analyzed: 04/29/15 17:59

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Analyte	**Lab Control**	**Spike Added**	**Recovery**
Benzo(g,h,i)perylene	347	500	69.4%
Total Benzofluoranthenes	802	1000	80.2%

Semivolatile Surrogate Recovery	
d5-Nitrobenzene	70.8%
2-Fluorobiphenyl	68.6%
d14-p-Terphenyl	105%
d4-1,2-Dichlorobenzene	59.0%
d5-Phenol	55.6%
2-Fluorophenol	53.6%
2,4,6-Tribromophenol	73.7%
d4-2-Chlorophenol	58.8%

Reported in µg/kg (ppb)

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Client ID	**NBZ**	**FBP**	**TPH**	**DCB**	**PHL**	**2FP**	**TBP**	**2CP**	**TOT OUT**
MB-042115	64.6%	65.0%	98.6%	61.6%	49.3%	41.6%	48.8%	51.2%	0
LCS-042115	70.8%	68.6%	105%	59.0%	55.6%	53.6%	73.7%	58.8%	0
S-09-1.2	49.2%	60.4%	70.8%	42.8%	41.6%	38.4%	70.9%	41.1%	0
S-11-2.0	51.0%	51.8%	61.4%	39.0%	35.5%	34.5%	60.7%	40.0%	0
S-13-0.33	62.4%	55.2%	67.2%	48.0%	40.8%	44.8%	63.2%	49.6%	0

	LCS/MB LIMITS	**QC LIMITS**
(NBZ) = d5-Nitrobenzene	(30-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(37-120)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(32-120)	(32-120)
(PHL) = d5-Phenol	(29-120)	(29-120)
(2FP) = 2-Fluorophenol	(27-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(24-134)	(24-134)
(2CP) = d4-2-Chlorophenol	(31-120)	(31-120)

Prep Method: SW3546
Log Number Range: 15-7603 to 15-7605

FORM-II SW8270

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: cc0429.d
Analysis Type:
Lab Sample ID: CC0429
Method: /chem1/nt10.i/20150429.b/ABN.m

Injection Date: 29-APR-2015 15:30
Init. Cal. Date(s): 24-FEB-2015 24-FEB-2015
Init. Cal. Times: 16:42 21:46
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE
$ 1 2-Fluorophenol	1.39540	1.32911	1.32911	0.010	-4.75098	20.00000	Averaged
$ 2 Phenol-d5	1.95208	1.77552	1.77552	0.010	-9.04489	20.00000	Averaged
3 Phenol	1.71260	1.58051	1.58051	0.100	-7.71295	20.00000	Averaged
$ 5 2-Chlorophenol-d4	1.48751	1.36680	1.36680	0.010	-8.11500	20.00000	Averaged
4 Bis(2-Chloroethyl)ether	1.52751	1.12275	1.12275	0.700	-26.49805	20.00000	Averaged <-
6 2-Chlorophenol	1.36059	1.23339	1.23339	0.800	-9.34902	20.00000	Averaged
7 1,3-Dichlorobenzene	1.56533	1.53044	1.53044	0.010	-2.22892	20.00000	Averaged
9 1,4-Dichlorobenzene	1.47487	1.50557	1.50557	0.010	2.08161	20.00000	Averaged
$ 10 1,2-Dichlorobenzene-d4	1.04382	1.02881	1.02881	0.010	-1.43873	20.00000	Averaged
12 1,2-Dichlorobenzene	1.45770	1.42206	1.42206	0.010	-2.44487	20.00000	Averaged
11 Benzyl alcohol	0.76922	0.72129	0.72129	0.010	-6.23190	20.00000	Averaged
14 2,2'-oxybis(1-Chloropropane	0.52155	0.47921	0.47921	0.010	-8.11873	20.00000	Averaged
13 2-Methylphenol	1.14307	1.05746	1.05746	0.700	-7.48994	20.00000	Averaged
17 Hexachloroethane	0.58202	0.54541	0.54541	0.300	-6.29166	20.00000	Averaged
16 N-Nitroso-di-n-propylamine	1.06144	0.94372	0.94372	0.500	-11.09144	20.00000	Averaged
15 4-Methylphenol	1.14583	1.10457	1.10457	0.600	-3.60066	20.00000	Averaged
$ 18 Nitrobenzene-d5	0.44224	0.48171	0.48171	0.010	8.92524	20.00000	Averaged
19 Nitrobenzene	0.39230	0.40874	0.40874	0.200	4.18958	20.00000	Averaged
20 Isophorone	0.75288	0.69887	0.69887	0.300	-7.17404	20.00000	Averaged
21 2-Nitrophenol	0.18925	0.21160	0.21160	0.100	11.80875	20.00000	Averaged
22 2,4-Dimethylphenol	0.36706	0.36617	0.36617	0.200	-0.24313	20.00000	Averaged
23 Bis(2-Chloroethoxy)methane	0.48279	0.37502	0.37502	0.050	-22.32290	20.00000	Averaged <-
24 Benzoic acid	24.42840	20.00000	0.22787	0.010	22.14199	20.00000	Quadratic <-
25 2,4-Dichlorophenol	0.32281	0.36286	0.36286	0.100	12.40734	20.00000	Averaged
26 1,2,4-Trichlorobenzene	0.38412	0.39628	0.39628	0.010	3.16654	20.00000	Averaged
28 Naphthalene	1.01174	0.97297	0.97297	0.100	-3.83153	20.00000	Averaged
29 4-Chloroaniline	0.41585	0.38688	0.38688	0.010	-6.96719	20.00000	Averaged
30 Hexachlorobutadiene	0.25424	0.27045	0.27045	0.010	6.37527	20.00000	Averaged
31 4-Chloro-3-methylphenol	0.34328	0.36059	0.36059	0.200	5.04183	20.00000	Averaged
32 2-Methylnaphthalene	0.76548	0.75698	0.75698	0.300	-1.10958	20.00000	Averaged
33 Hexachlorocyclopentadiene	0.42744	0.44240	0.44240	0.001	3.50013	20.00000	Averaged
34 2,4,6-Trichlorophenol	0.40165	0.44066	0.44066	0.200	9.71146	20.00000	Averaged
35 2,4,5-Trichlorophenol	0.41128	0.46027	0.46027	0.200	11.91092	20.00000	Averaged
$ 36 2-Fluorobiphenyl	1.56248	1.55944	1.55944	0.010	-0.19460	20.00000	Averaged
37 2-Chloronaphthalene	1.15891	1.14721	1.14721	0.700	-1.00976	20.00000	Averaged

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: cc0429.d
Analysis Type:
Lab Sample ID: CC0429
Method: /chem1/nt10.i/20150429.b/ABN.m

Injection Date: 29-APR-2015 15:30
Init. Cal. Date(s): 24-FEB-2015 24-FEB-2015
Init. Cal. Times: 16:42 21:46
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
38 2-Nitroaniline	0.33599	0.33709	0.33709	0.010	0.32845	20.00000	Averaged	
39 Dimethylphthalate	1.45321	1.44928	1.44928	0.010	-0.27069	20.00000	Averaged	
40 Acenaphthylene	1.66707	1.63366	1.63366	0.900	-2.00399	20.00000	Averaged	
41 2,6-Dinitrotoluene	0.27775	0.29503	0.29503	0.100	6.22127	20.00000	Averaged	
43 3-Nitroaniline	0.28175	0.25359	0.25359	0.010	-9.99373	20.00000	Averaged	
44 Acenaphthene	1.03542	1.00763	1.00763	0.100	-2.68450	20.00000	Averaged	
45 2,4-Dinitrophenol	23.04920	20.00000	0.18917	0.030	15.24602	20.00000	Quadratic	
46 Dibenzofuran	1.57984	1.53608	1.53608	0.800	-2.77035	20.00000	Averaged	
47 4-Nitrophenol	0.14360	0.25102	0.25102	0.010	74.81238	20.00000	Averaged	<-
48 2,4-Dinitrotoluene	0.38198	0.42183	0.42183	0.200	10.43387	20.00000	Averaged	
50 Diethylphthalate	1.35023	1.37638	1.37638	0.010	1.93662	20.00000	Averaged	
49 Fluorene	1.39767	1.29810	1.29810	0.100	-7.12415	20.00000	Averaged	
51 4-Chlorophenyl-phenylether	0.77335	0.85316	0.85316	0.100	10.31989	20.00000	Averaged	
52 4-Nitroaniline	0.29496	0.24957	0.24957	0.010	-15.38667	20.00000	Averaged	
53 4,6-Dinitro-2-methylphenol	0.13095	0.16106	0.16106	0.001	22.99682	20.00000	Averaged	<-
54 N-Nitrosodiphenylamine	0.54568	0.49813	0.49813	0.010	-8.71383	20.00000	Averaged	
$ 55 2,4,6-Tribromophenol	0.25642	0.26855	0.26855	0.010	4.73304	20.00000	Averaged	
56 4-Bromophenyl-phenylether	0.29711	0.29369	0.29369	0.100	-1.14961	20.00000	Averaged	
57 Hexachlorobenzene	0.27948	0.26386	0.26386	0.100	-5.58818	20.00000	Averaged	
58 Pentachlorophenol	9.89400	10.00000	0.12632	0.010	-1.06000	20.00000	Quadratic	
60 Phenanthrene	0.97393	0.99010	0.99010	0.700	1.65991	20.00000	Averaged	
61 Anthracene	1.02436	1.06353	1.06353	0.700	3.82373	20.00000	Averaged	
62 Carbazole	0.93142	0.67185	0.67185	0.010	-27.86836	20.00000	Averaged	<-
63 Di-n-butylphthalate	1.41265	1.40468	1.40468	0.010	-0.56358	20.00000	Averaged	
64 Fluoranthene	1.30215	1.26553	1.26553	0.600	-2.81257	20.00000	Averaged	
65 Pyrene	1.33273	1.27446	1.27446	0.600	-4.37213	20.00000	Averaged	
$ 66 Terphenyl-d14	0.79803	0.81158	0.81158	0.010	1.69834	20.00000	Averaged	
67 Butylbenzylphthalate	0.56936	0.50236	0.50236	0.010	-11.76619	20.00000	Averaged	
68 Benzo(a)anthracene	1.25015	1.20776	1.20776	0.700	-3.39062	20.00000	Averaged	
70 3,3'-Dichlorobenzidine	0.73458	0.57617	0.57617	0.010	-21.56483	20.00000	Averaged	<-
71 Chrysene	1.00704	0.98442	0.98442	0.700	-2.24615	20.00000	Averaged	
72 bis(2-Ethylhexyl)phthalate	0.55512	0.53875	0.53875	0.010	-2.94930	20.00000	Averaged	
73 Di-n-octylphthalate	1.00978	0.98657	0.98657	0.010	-2.29874	20.00000	Averaged	
74 Benzo(b)fluoranthene	1.22067	1.12147	1.12147	0.700	-8.12733	20.00000	Averaged	
75 Benzo(k)fluoranthene	1.16514	1.13179	1.13179	0.700	-2.86202	20.00000	Averaged	

Data File: /chem1/nt10.i/20150429.b/cc0429.d
Report Date: 30-Apr-2015 10:37

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: cc0429.d
Analysis Type:
Lab Sample ID: CC0429
Method: /chem1/nt10.i/20150429.b/ABN.m

Injection Date: 29-APR-2015 15:30
Init. Cal. Date(s): 24-FEB-2015 24-FEB-2015
Init. Cal. Times: 16:42 21:46
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
76 Benzo(a)pyrene	1.09946	1.02976	1.02976	0.700	-6.33969	20.00000	Averaged	
78 Indeno(1,2,3-cd)pyrene	1.30587	1.27134	1.27134	0.500	-2.64469	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.05039	1.05290	1.05290	0.400	0.23958	20.00000	Averaged	
80 Benzo(g,h,i)perylene	1.11612	1.06086	1.06086	0.500	-4.95085	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.86489	0.66527	0.66527	0.010	-23.07980	20.00000	Averaged	<-
91 Aniline	1.69977	1.41780	1.41780	0.010	-16.58897	20.00000	Averaged	
93 Benzidine	3.27910	10.00000	0.13287	0.010	-67.20904	20.00000	Quadratic	<-
103 Pyridine	1.40097	1.01307	1.01307	0.010	-27.68743	20.00000	Averaged	<-
105 1-methylnaphthalene	0.76096	0.73954	0.73954	0.010	-2.81538	20.00000	Averaged	
111 Azobenzene (1,2-DP-Hydrazin	1.20847	1.12004	1.12004	0.010	-7.31759	20.00000	Averaged	
187 Total Benzofluoranthenes	1.14346	1.07089	1.07089	0.010	-6.34628	20.00000	Averaged	
99 Perylene	1.02724	0.99665	0.99665	0.010	-2.97828	20.00000	Averaged	
98 Retene	++++	0.00030	0.00030	0.010	++++	20.00000	Averaged	<-
120 2,3,4,6-Tetrachlorophenol	0.67146	0.73121	0.73121	0.010	8.89861	20.00000	Averaged	

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-09-1.2
SAMPLE

Lab Sample ID: AEM4A
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 21:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.05 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 2.00
Percent Moisture: 44.3%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**10**	**200**
106-46-7	1,4-Dichlorobenzene	10	< 10 U
120-82-1	1,2,4-Trichlorobenzene	10	< 10 U
118-74-1	Hexachlorobenzene	10	< 10 U
87-68-3	Hexachlorobutadiene	10	< 10 U
131-11-3	Dimethylphthalate	10	< 10 U
85-68-7	**Butylbenzylphthalate**	**10**	**42**
95-48-7	**2-Methylphenol**	**10**	**25**
105-67-9	**2,4-Dimethylphenol**	**50**	**34 J**
86-30-6	**N-Nitrosodiphenylamine**	**10**	**16**
100-51-6	**Benzyl Alcohol**	**40**	**29 J**
87-86-5	Pentachlorophenol	40	< 40 U
95-50-1	1,2-Dichlorobenzene	10	< 10 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	40.8%
d14-p-Terphenyl	60.8%

FORM I

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: S-11-2.0**
Extraction Method: SW3546 **SAMPLE**
Page 1 of 1

Lab Sample ID: AEM4B
LIMS ID: 15-7604
Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 21:42
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.40 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 58.4%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.8**	**18**
106-46-7	**1,4-Dichlorobenzene**	**4.8**	**2.7 J**
120-82-1	**1,2,4-Trichlorobenzene**	**4.8**	**2.8 J**
118-74-1	**Hexachlorobenzene**	**4.8**	**2.9 J**
87-68-3	**Hexachlorobutadiene**	**4.8**	**2.4 J**
131-11-3	Dimethylphthalate	4.8	< 4.8 U
85-68-7	**Butylbenzylphthalate**	**4.8**	**19**
95-48-7	**2-Methylphenol**	**4.8**	**9.1**
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.8	< 4.8 U
100-51-6	**Benzyl Alcohol**	**19**	**18 J**
87-86-5	Pentachlorophenol	19	< 19 U
95-50-1	**1,2-Dichlorobenzene**	**4.8**	**3.3 J**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	38.5%
d14-p-Terphenyl	53.2%

FORM I

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: S-13-0.33**
Extraction Method: SW3546 **SAMPLE**
Page 1 of 1

Lab Sample ID: AEM4C
LIMS ID: 15-7605
Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 22:19
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.33 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 6.00
Percent Moisture: 61.8%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**29**	**73**
106-46-7	1,4-Dichlorobenzene	29	< 29 U
120-82-1	1,2,4-Trichlorobenzene	29	< 29 U
118-74-1	Hexachlorobenzene	29	< 29 U
87-68-3	Hexachlorobutadiene	29	< 29 U
131-11-3	**Dimethylphthalate**	**29**	**28 J**
85-68-7	**Butylbenzylphthalate**	**29**	**91**
95-48-7	**2-Methylphenol**	**29**	**70**
105-67-9	2,4-Dimethylphenol	140	< 140 U
86-30-6	N-Nitrosodiphenylamine	29	< 29 U
100-51-6	**Benzyl Alcohol**	**120**	**120**
87-86-5	Pentachlorophenol	120	< 120 U
95-50-1	1,2-Dichlorobenzene	29	< 29 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	44.0%
d14-p-Terphenyl	60.0%

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: MB-042115**
METHOD BLANK
Extraction Method: SW3546
Page 1 of 1

Lab Sample ID: MB-042115
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 17:22
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	42.5%
d14-p-Terphenyl	86.8%

FORM I

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS
Page 1 of 1

Sample ID: LCS-042115
LAB CONTROL SAMPLE

Lab Sample ID: LCS-042115
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted: 04/21/15
Date Analyzed LCS: 04/29/15 17:59
Instrument/Analyst LCS: NT10/YZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 1.0 mL
Dilution Factor LCS: 1.00

Analyte	**LCS**	**Spike Added**	**Recovery**
Dibenz(a,h)anthracene	393	500	78.6%
1,4-Dichlorobenzene	301	500	60.2%
1,2,4-Trichlorobenzene	330	500	66.0%
Hexachlorobenzene	311	500	62.2%
Hexachlorobutadiene	346	500	69.2%
Dimethylphthalate	279	500	55.8%
Butylbenzylphthalate	291	500	58.2%
2-Methylphenol	218	500	43.6%
2,4-Dimethylphenol	169	1500	11.3%
N-Nitrosodiphenylamine	242	500	48.4%
Benzyl Alcohol	426	500	85.2%
Pentachlorophenol	1130	1500	75.3%
1,2-Dichlorobenzene	303	500	60.6%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	55.3%
d14-p-Terphenyl	89.6%

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Client ID	FPH	TER	TOT OUT
MB-042115	42.5%	86.8%	0
LCS-042115	55.3%	89.6%	0
S-09-1.2	40.8%	60.8%	0
S-11-2.0	38.5%	53.2%	0
S-13-0.33	44.0%	60.0%	0

	LCS/MB LIMITS	QC LIMITS
(FPH) = 2-Fluorophenol	(32-120)	(27-120)
(TER) = d14-p-Terphenyl	(42-124)	(37-120)

Prep Method: SW3546
Log Number Range: 15-7603 to 15-7605

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-09-1.2
SAMPLE

Lab Sample ID: AEM4A
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/20/15
Date Analyzed: 04/28/15 08:29
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.03 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 44.3%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**290 P**
11097-69-1	**Aroclor 1254**	**20**	**410**
11096-82-5	Aroclor 1260	40	< 40 Y
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	81.0%
Tetrachlorometaxylene	67.8%

FORM I

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-11-2.0
SAMPLE

Lab Sample ID: AEM4B
LIMS ID: 15-7604
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/20/15
Date Analyzed: 04/28/15 08:51
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.41 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 58.4%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	18	< 18 U
53469-21-9	Aroclor 1242	18	< 18 U
12672-29-6	Aroclor 1248	18	< 18 U
11097-69-1	**Aroclor 1254**	**18**	**26**
11096-82-5	Aroclor 1260	18	< 18 U
11104-28-2	Aroclor 1221	18	< 18 U
11141-16-5	Aroclor 1232	18	< 18 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	74.8%
Tetrachlorometaxylene	66.0%

FORM I

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-13-0.33
SAMPLE

Lab Sample ID: AEM4C
LIMS ID: 15-7605
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/20/15
Date Analyzed: 04/28/15 09:12
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.36 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 61.8%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	28	< 28 Y
11097-69-1	**Aroclor 1254**	**19**	**42**
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	81.5%
Tetrachlorometaxylene	70.8%

FORM I

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-042015
METHOD BLANK

Lab Sample ID: MB-042015
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

Date Extracted: 04/20/15
Date Analyzed: 04/28/15 03:51
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	81.0%
Tetrachlorometaxylene	66.8%

FORM I

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Page 1 of 1

Sample ID: LCS-042015
LAB CONTROL

Lab Sample ID: LCS-042015
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

Date Extracted: 04/20/15
Date Analyzed: 04/28/15 04:12
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	**Lab Control**	**Spike Added**	**Recovery**
Aroclor 1016	421	500	84.2%
Aroclor 1260	420	500	84.0%

PCB Surrogate Recovery

Decachlorobiphenyl	81.8%
Tetrachlorometaxylene	71.0%

Results reported in µg/kg (ppb)

FORM III

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-042015	81.0%	40-133	66.8%	53-120	0
LCS-042015	81.8%	40-133	71.0%	53-120	0
S-09-1.2	81.0%	40-133	67.8%	53-120	0
S-11-2.0	74.8%	40-133	66.0%	53-120	0
S-13-0.33	81.5%	40-133	70.8%	53-120	0

Microwave (MARS) Control Limits PCBSMP
Prep Method: SW3546
Log Number Range: 15-7603 to 15-7605

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-09-1.2
SAMPLE

Lab Sample ID: AEM4A
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/29/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/28/15
Date Analyzed: 04/29/15 13:02
Instrument/Analyst: NT12/JLW
Silica Gel Cleanup: No

Sample Amount: 5.08 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes
Moisture: 44.3%

CAS Number	Analyte	RL	Result	Q
36643-28-4	**Tributyltin Ion**	**3.8**	**7.1**	
14488-53-0	**Dibutyltin Ion**	**5.7**	**4.8**	**J**
78763-54-9	Butyltin Ion	4.0	< 4.0	U
1461-25-2	Tetrabutyl Tin	4.9	< 4.9	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery

Tripropyl Tin Chloride	50.5%
Tripentyl Tin Chloride	58.7%

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-11-2.0
SAMPLE

Lab Sample ID: AEM4B
LIMS ID: 15-7604
Matrix: Sediment
Data Release Authorized:
Reported: 04/29/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/28/15
Date Analyzed: 04/29/15 13:15
Instrument/Analyst: NT12/JLW
Silica Gel Cleanup: No

Sample Amount: 5.44 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes
Moisture: 58.4%

CAS Number	Analyte	RL	Result	Q
36643-28-4	**Tributyltin Ion**	**3.6**	**5.8**	
14488-53-0	Dibutyltin Ion	5.3	< 5.3	U
78763-54-9	Butyltin Ion	3.8	< 3.8	U
1461-25-2	Tetrabutyl Tin	4.6	< 4.6	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery

Tripropyl Tin Chloride	54.6%
Tripentyl Tin Chloride	67.8%

FORM I

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-13-0.33
SAMPLE

Lab Sample ID: AEM4C
LIMS ID: 15-7605
Matrix: Sediment
Data Release Authorized:
Reported: 04/29/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/24/15 12:32
Instrument/Analyst: NT12/JLW
Silica Gel Cleanup: No

Sample Amount: 5.36 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes
Moisture: 61.8%

CAS Number	Analyte	RL	Result	Q
36643-28-4	**Tributyltin Ion**	**3.6**	**12**	
14488-53-0	**Dibutyltin Ion**	**5.4**	**14**	
78763-54-9	**Butyltin Ion**	**3.8**	**6.3**	
1461-25-2	Tetrabutyl Tin	4.7	< 4.7	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery	
Tripropyl Tin Chloride	43.6%
Tripentyl Tin Chloride	50.4%

FORM I

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-042115
METHOD BLANK

Lab Sample ID: MB-042115
LIMS ID: 15-7605
Matrix: Sediment
Data Release Authorized:
Reported: 04/29/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted: 04/21/15
Date Analyzed: 04/24/15 10:43
Instrument/Analyst: NT12/JLW
Silica Gel Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes

CAS Number	Analyte	RL	Result	Q
36643-28-4	Tributyltin Ion	3.9	< 3.9	U
14488-53-0	Dibutyltin Ion	5.8	< 5.8	U
78763-54-9	Butyltin Ion	4.1	< 4.1	U
1461-25-2	Tetrabutyl Tin	5.0	< 5.0	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery

Tripropyl Tin Chloride	55.5%
Tripentyl Tin Chloride	57.8%

FORM I

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Page 1 of 1

Sample ID: LCS-042115
LAB CONTROL SAMPLE

Lab Sample ID: LCS-042115
LIMS ID: 15-7605
Matrix: Sediment
Data Release Authorized:
Reported: 04/29/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

Date Extracted LCS: 04/21/15
Date Analyzed LCS: 04/24/15 10:56
Instrument/Analyst LCS: NT12/JLW
Silica Gel Cleanup: No

Sample Amount LCS: 5.00 g-dry-wt
Final Extract Volume LCS: 0.50 mL
Dilution Factor LCS: 1.00
Alumina Cleanup: Yes

Analyte	**LCS**	**Spike Added**	**Recovery**
Tributyltin Ion	31.8	44.6	71.3%
Dibutyltin Ion	23.9	38.4	62.2%
Butyltin Ion	20.8	31.2	66.7%

Reported in µg/kg (ppb)

TBT Surrogate Recovery

Tripropyl Tin Chloride	63.0%
Tripentyl Tin Chloride	66.4%

FORM III

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-042815
METHOD BLANK

Lab Sample ID: MB-042815
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/29/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted: 04/28/15
Date Analyzed: 04/29/15 12:34
Instrument/Analyst: NT12/JLW
Silica Gel Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes

CAS Number	Analyte	RL	Result	Q
36643-28-4	Tributyltin Ion	3.9	< 3.9	U
14488-53-0	Dibutyltin Ion	5.8	< 5.8	U
78763-54-9	Butyltin Ion	4.1	< 4.1	U
1461-25-2	Tetrabutyl Tin	5.0	< 5.0	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery

Tripropyl Tin Chloride	61.9%
Tripentyl Tin Chloride	75.9%

FORM I

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Page 1 of 1

Sample ID: LCS-042815
LAB CONTROL SAMPLE

Lab Sample ID: LCS-042815
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/29/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

Date Extracted LCS: 04/28/15
Date Analyzed LCS: 04/29/15 12:48
Instrument/Analyst LCS: NT12/JLW
Silica Gel Cleanup: No

Sample Amount LCS: 5.00 g-dry-wt
Final Extract Volume LCS: 0.50 mL
Dilution Factor LCS: 1.00
Alumina Cleanup: Yes

Analyte	**LCS**	**Spike Added**	**Recovery**
Tributyltin Ion	31.9	44.6	71.5%
Dibutyltin Ion	24.8	38.4	64.6%
Butyltin Ion	24.2	31.2	77.6%

Reported in µg/kg (ppb)

TBT Surrogate Recovery	
Tripropyl Tin Chloride	56.7%
Tripentyl Tin Chloride	69.8%

FORM III

TBT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
Event: NA

Client ID	TPRT	TPNT	TOT OUT
MB-042815	61.9%	75.9%	0
LCS-042815	56.7%	69.8%	0
S-09-1.2	50.5%	58.7%	0
S-11-2.0	54.6%	67.8%	0
MB-042115	55.5%	57.8%	0
LCS-042115	63.0%	66.4%	0
S-13-0.33	43.6%	50.4%	0

	QC LIMITS
(TPRT) = Tripropyl Tin Chloride	(25-120)
(TPNT) = Tripentyl Tin Chloride	(40-120)

Prep Method: SW3546
Analytical Method: TBT (Hexyl) 8270D-SIM
Log Number Range: 15-7603 to 15-7605

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-042115

Lab Sample ID: MB-042115
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 01:37
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0480	1.00	< 0.0480	U
2,3,7,8-TCDD		0.65-0.89	0.0660	1.00	< 0.0660	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0660	1.00	< 0.0660	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0680	1.00	< 0.0680	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0920	1.00	< 0.0920	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0760	1.00	< 0.0760	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0720	1.00	< 0.0720	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0740	1.00	< 0.0740	U
1,2,3,7,8,9-HxCDF		1.05-1.43	0.0920	1.00	< 0.0920	U
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0780	1.00	< 0.0780	U
1,2,3,6,7,8-HxCDD		1.05-1.43	0.0800	1.00	< 0.0800	U
1,2,3,7,8,9-HxCDD		1.05-1.43	0.0820	1.00	< 0.0820	U
1,2,3,4,6,7,8-HpCDF		0.88-1.20	0.0920	1.00	< 0.0920	U
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.134	1.00	< 0.134	U
1,2,3,4,6,7,8-HpCDD	0.94	0.88-1.20		1.00	0.868	J
OCDF		0.76-1.02	0.190	2.00	< 0.190	U
OCDD	0.94	0.76-1.02		2.00	4.80	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0480	1.00	< 0.0480	U
Total TCDD	0.0660	1.00	< 0.0660	U
Total PeCDF	0.0680	2.00	0.0599	EMPC
Total PeCDD	0.0920	1.00	< 0.0920	U
Total HxCDF	0.0920	2.00	< 0.0920	U
Total HxCDD	0.0820	2.00	0.539	EMPC
Total HpCDF	0.134	2.00	< 0.134	U
Total HpCDD		2.00	2.44	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.01

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.13

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-042115

Lab Sample ID: MB-042115
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 01:37
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.79	0.65-0.89	89.2	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	85.8	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	87.2	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	85.4	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	90.1	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	78.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	78.6	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	80.6	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	77.2	29-147	
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	83.8	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	82.0	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	71.3	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	77.6	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	80.3	23-140	
13C-OCDD	0.90	0.76-1.02	70.1	17-157	
37Cl4-2,3,7,8-TCDD			98.4	35-197	

Reported in Percent Recovery

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-042115

Lab Sample ID: OPR-042115
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 02:30
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.72	0.65-0.89	1.00	22.5
2,3,7,8-TCDD	0.79	0.65-0.89	1.00	23.1
1,2,3,7,8-PeCDF	1.51	1.32-1.78	1.00	110
2,3,4,7,8-PeCDF	1.51	1.32-1.78	1.00	112
1,2,3,7,8-PeCDD	1.55	1.32-1.78	1.00	105
1,2,3,4,7,8-HxCDF	1.20	1.05-1.43	1.00	110
1,2,3,6,7,8-HxCDF	1.19	1.05-1.43	1.00	110
2,3,4,6,7,8-HxCDF	1.20	1.05-1.43	1.00	112
1,2,3,7,8,9-HxCDF	1.19	1.05-1.43	1.00	114
1,2,3,4,7,8-HxCDD	1.24	1.05-1.43	1.00	111
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	1.00	112
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43	1.00	115
1,2,3,4,6,7,8-HpCDF	1.00	0.88-1.20	1.00	115
1,2,3,4,7,8,9-HpCDF	1.02	0.88-1.20	1.00	109
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	1.00	108
OCDF	0.86	0.76-1.02	2.00	209
OCDD	0.89	0.76-1.02	2.00	220

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	23.5	EMPC
Total TCDD		1.00	23.8	EMPC
Total PeCDF		2.00	228	EMPC
Total PeCDD		1.00	105	EMPC
Total HxCDF		2.00	447	
Total HxCDD		2.00	338	EMPC
Total HpCDF		2.00	225	
Total HpCDD		2.00	110	

Reported in pg/g

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-042115

Lab Sample ID: OPR-042115
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 02:30
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.79	0.65-0.89	96.7	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	88.5	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	92.3	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	90.6	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	95.5	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	78.3	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	78.2	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	81.6	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	82.6	29-147	
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	84.4	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	83.0	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	74.4	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	83.9	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	84.7	23-140	
13C-OCDD	0.90	0.76-1.02	74.6	17-157	
37Cl4-2,3,7,8-TCDD			100	35-197	

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-042115

Lab Sample ID: OPR-042115
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 02:30
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	22.5	20.0	112	75-158
2,3,7,8-TCDD	23.1	20.0	116	67-158
1,2,3,7,8-PeCDF	110	100	110	80-134
2,3,4,7,8-PeCDF	112	100	112	68-160
1,2,3,7,8-PeCDD	105	100	105	70-142
1,2,3,4,7,8-HxCDF	110	100	110	72-134
1,2,3,6,7,8-HxCDF	110	100	110	84-130
2,3,4,6,7,8-HxCDF	112	100	112	70-156
1,2,3,7,8,9-HxCDF	114	100	114	78-130
1,2,3,4,7,8-HxCDD	111	100	111	70-164
1,2,3,6,7,8-HxCDD	112	100	112	76-134
1,2,3,7,8,9-HxCDD	115	100	115	64-162
1,2,3,4,6,7,8-HpCDF	115	100	115	82-132
1,2,3,4,7,8,9-HpCDF	109	100	109	78-138
1,2,3,4,6,7,8-HpCDD	108	100	108	70-140
OCDF	209	200	104	63-170
OCDD	220	200	110	78-144

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: S-09-1.2

Lab Sample ID: AEM4A
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/28/15 22:56
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result
2,3,7,8-TCDF	0.70	0.65-0.89		0.996	2.77
2,3,7,8-TCDD	0.77	0.65-0.89		0.996	56.5
1,2,3,7,8-PeCDF	1.38	1.32-1.78		0.996	1.35
2,3,4,7,8-PeCDF	1.58	1.32-1.78		0.996	2.46
1,2,3,7,8-PeCDD	1.60	1.32-1.78		0.996	3.22
1,2,3,4,7,8-HxCDF	1.14	1.05-1.43		0.996	4.67
1,2,3,6,7,8-HxCDF	1.19	1.05-1.43		0.996	4.34
2,3,4,6,7,8-HxCDF	1.19	1.05-1.43		0.996	6.98
1,2,3,7,8,9-HxCDF	1.26	1.05-1.43		0.996	1.72
1,2,3,4,7,8-HxCDD	1.29	1.05-1.43		0.996	5.03
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43		0.996	15.0
1,2,3,7,8,9-HxCDD	1.29	1.05-1.43		0.996	10.7
1,2,3,4,6,7,8-HpCDF	1.01	0.88-1.20		0.996	73.6
1,2,3,4,7,8,9-HpCDF	0.95	0.88-1.20		0.996	5.35
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		0.996	336
OCDF	0.86	0.76-1.02		1.99	217
OCDD	0.89	0.76-1.02		1.99	2,860

Homologue Group	EDL	RL	Result	
Total TCDF		0.996	78.6	EMPC
Total TCDD		0.996	81.2	EMPC
Total PeCDF		1.99	125	EMPC
Total PeCDD		0.996	30.6	
Total HxCDF		1.99	127	EMPC
Total HxCDD		1.99	108	EMPC
Total HpCDF		1.99	222	
Total HpCDD		1.99	568	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 70.7

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 70.7

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: S-09-1.2

Lab Sample ID: AEM4A
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/28/15 22:56
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.79	0.65-0.89	90.9	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	88.4	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	79.4	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	82.2	21-178	
13C-1,2,3,7,8-PeCDD	1.56	1.32-1.78	85.3	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	80.3	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	75.2	26-123	
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	81.6	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	71.0	29-147	
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	87.3	32-141	
13C-1,2,3,6,7,8-HxCDD	1.27	1.05-1.43	81.2	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	71.1	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	81.2	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	80.8	23-140	
13C-OCDD	0.90	0.76-1.02	75.5	17-157	
37Cl4-2,3,7,8-TCDD			105	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: S-11-2.0

Lab Sample ID: AEM4B
LIMS ID: 15-7604
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/28/15 23:49
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.63	0.65-0.89		0.992	0.389	JEMPC
2,3,7,8-TCDD	0.60	0.65-0.89		0.992	0.853	JEMPC
1,2,3,7,8-PeCDF	1.26	1.32-1.78		0.992	0.244	JEMPC
2,3,4,7,8-PeCDF	1.57	1.32-1.78		0.992	0.364	J
1,2,3,7,8-PeCDD	1.70	1.32-1.78		0.992	0.909	J
1,2,3,4,7,8-HxCDF	1.15	1.05-1.43		0.992	0.987	J
1,2,3,6,7,8-HxCDF	1.15	1.05-1.43		0.992	0.905	J
2,3,4,6,7,8-HxCDF	1.15	1.05-1.43		0.992	1.43	
1,2,3,7,8,9-HxCDF	0.73	1.05-1.43		0.992	0.313	JEMPC
1,2,3,4,7,8-HxCDD	1.29	1.05-1.43		0.992	1.64	
1,2,3,6,7,8-HxCDD	1.22	1.05-1.43		0.992	4.25	
1,2,3,7,8,9-HxCDD	1.25	1.05-1.43		0.992	3.56	
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20		0.992	18.9	
1,2,3,4,7,8,9-HpCDF	0.99	0.88-1.20		0.992	1.20	
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		0.992	93.3	
OCDF	0.86	0.76-1.02		1.98	56.0	
OCDD	0.89	0.76-1.02		1.98	714	

Homologue Group	EDL	RL	Result	
Total TCDF		0.992	7.97	EMPC
Total TCDD		0.992	5.85	EMPC
Total PeCDF		1.98	13.1	EMPC
Total PeCDD		0.992	6.50	EMPC
Total HxCDF		1.98	23.6	EMPC
Total HxCDD		1.98	29.8	EMPC
Total HpCDF		1.98	52.4	
Total HpCDD		1.98	159	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 4.59

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 4.59

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

Sample ID: S-11-2.0

Lab Sample ID: AEM4B
LIMS ID: 15-7604
Matrix: Sediment
Data Release Authorized: MJ
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/28/15 23:49
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.79	0.65-0.89	95.5	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	90.4	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	91.3	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	92.0	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	95.9	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	81.4	26-152	
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	80.4	26-123	
13C-2,3,4,6,7,8-HxCDF	0.51	0.43-0.59	82.5	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	82.9	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	86.0	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	84.0	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	78.5	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	88.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	88.1	23-140	
13C-OCDD	0.90	0.76-1.02	83.4	17-157	
37Cl4-2,3,7,8-TCDD			104	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: S-13-0.33

Lab Sample ID: AEM4C
LIMS ID: 15-7605
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 00:43
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.66	0.65-0.89		0.997	3.11	
2,3,7,8-TCDD	0.71	0.65-0.89		0.997	1.86	
1,2,3,7,8-PeCDF	1.58	1.32-1.78		0.997	2.20	
2,3,4,7,8-PeCDF	1.40	1.32-1.78		0.997	3.05	
1,2,3,7,8-PeCDD	1.54	1.32-1.78		0.997	14.0	
1,2,3,4,7,8-HxCDF	1.23	1.05-1.43		0.997	11.4	
1,2,3,6,7,8-HxCDF	1.17	1.05-1.43		0.997	12.0	
2,3,4,6,7,8-HxCDF	1.05	1.05-1.43		0.997	10.9	EMPC
1,2,3,7,8,9-HxCDF	1.16	1.05-1.43		0.997	3.96	
1,2,3,4,7,8-HxCDD	1.29	1.05-1.43		0.997	26.7	
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43		0.997	59.4	
1,2,3,7,8,9-HxCDD	1.21	1.05-1.43		0.997	58.6	
1,2,3,4,6,7,8-HpCDF	1.01	0.88-1.20		0.997	301	
1,2,3,4,7,8,9-HpCDF	0.98	0.88-1.20		0.997	19.0	
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		0.997	1,370	
OCDF	0.86	0.76-1.02		1.99	887	
OCDD	0.89	0.76-1.02		1.99	10,600	E

Homologue Group	EDL	RL	Result	
Total TCDF		0.997	49.0	EMPC
Total TCDD		0.997	29.4	EMPC
Total PeCDF		1.99	112	EMPC
Total PeCDD		0.997	61.4	
Total HxCDF		1.99	321	EMPC
Total HxCDD		1.99	422	EMPC
Total HpCDF		1.99	801	
Total HpCDD		1.99	2,360	EMPC

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 55.8

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 55.8

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: S-13-0.33

Lab Sample ID: AEM4C
LIMS ID: 15-7605
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Date Extracted: 04/21/15
Date Analyzed: 04/29/15 00:43
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	79.4	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	79.6	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	69.2	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	68.9	21-178	
13C-1,2,3,7,8-PeCDD	1.56	1.32-1.78	71.1	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	79.3	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	74.1	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	76.2	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	71.9	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	78.0	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	75.0	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	59.0	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	63.4	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	65.4	23-140	
13C-OCDD	0.90	0.76-1.02	53.8	17-157	
37Cl4-2,3,7,8-TCDD			97.5	35-197	

Reported in Percent Recovery

ANALYTICAL
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ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Matrix: Sediment

Date Received: 02/19/15

Data Release Authorized:
Reported: 04/27/15

ARI ID	**Sample ID**	**Extraction Date**	**Analysis Date**	**EFV DL**	**Range/Surrogate**	**LOQ**	**Result**
MB-042015	Method Blank	04/20/15	04/23/15	1.00	Diesel Range	5.0	< 5.0 U
15-7603	HC ID: ---		FID4A	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		108%
AEM4A	S-09-1.2	04/20/15	04/23/15	1.00	**Diesel Range**	**89**	**450**
15-7603	HC ID: **DIESEL/MOTOR OIL**		FID4A	10	**Motor Oil Range**	**180**	**1,400**
					o-Terphenyl		57.6%
AEM4B	S-11-2.0	04/20/15	04/23/15	1.00	**Diesel Range**	**120**	**140**
15-7604	HC ID: **DRO/MOTOR OIL**		FID4A	10	**Motor Oil Range**	**240**	**460**
					o-Terphenyl		98.9%
AEM4C	S-13-0.33	04/20/15	04/23/15	4.00	**Diesel Range**	**520**	**570**
15-7605	HC ID: **DRO/MOTOR OIL**		FID4A	10	**Motor Oil Range**	**1,000**	**2,200**
					o-Terphenyl		113%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Client ID	OTER	TOT OUT
042015MB	108%	0
042015LCS	96.3%	0
042015LCSD	97.0%	0
S-09-1.2	57.6%	0
S-11-2.0	98.9%	0
S-13-0.33	113%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 15-7603 to 15-7605

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-042015
LCS/LCSD

Lab Sample ID: LCS-042015
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/27/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 04/20/15

Date Analyzed LCS: 04/23/15 05:27
LCSD: 04/23/15 05:51
Instrument/Analyst LCS: FID4A/ML
LCSD: FID4A/ML

Sample Amount LCS: 10.0 g-dry-wt
LCSD: 10.0 g-dry-wt
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	133	150	88.7%	131	150	87.3%	1.5%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	96.3%	97.0%

Results reported in mg/kg
RPD calculated using sample concentrations per SW846.

ANALYTICAL
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TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: AEM4
Project: Geddes Marina

Matrix: Sediment
Date Received: 02/19/15

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
15-7603-042015MB1	Method Blank	10.0 g	1.00 mL	-	04/20/15
15-7603-042015LCS1	Lab Control	10.0 g	1.00 mL	-	04/20/15
15-7603-042015LCSD1	Lab Control Dup	10.0 g	1.00 mL	-	04/20/15
15-7603-AEM4A	S-09-1.2	5.61 g	1.00 mL	D	04/20/15
15-7604-AEM4B	S-11-2.0	4.18 g	1.00 mL	D	04/20/15
15-7605-AEM4C	S-13-0.33	3.84 g	4.00 mL	D	04/20/15

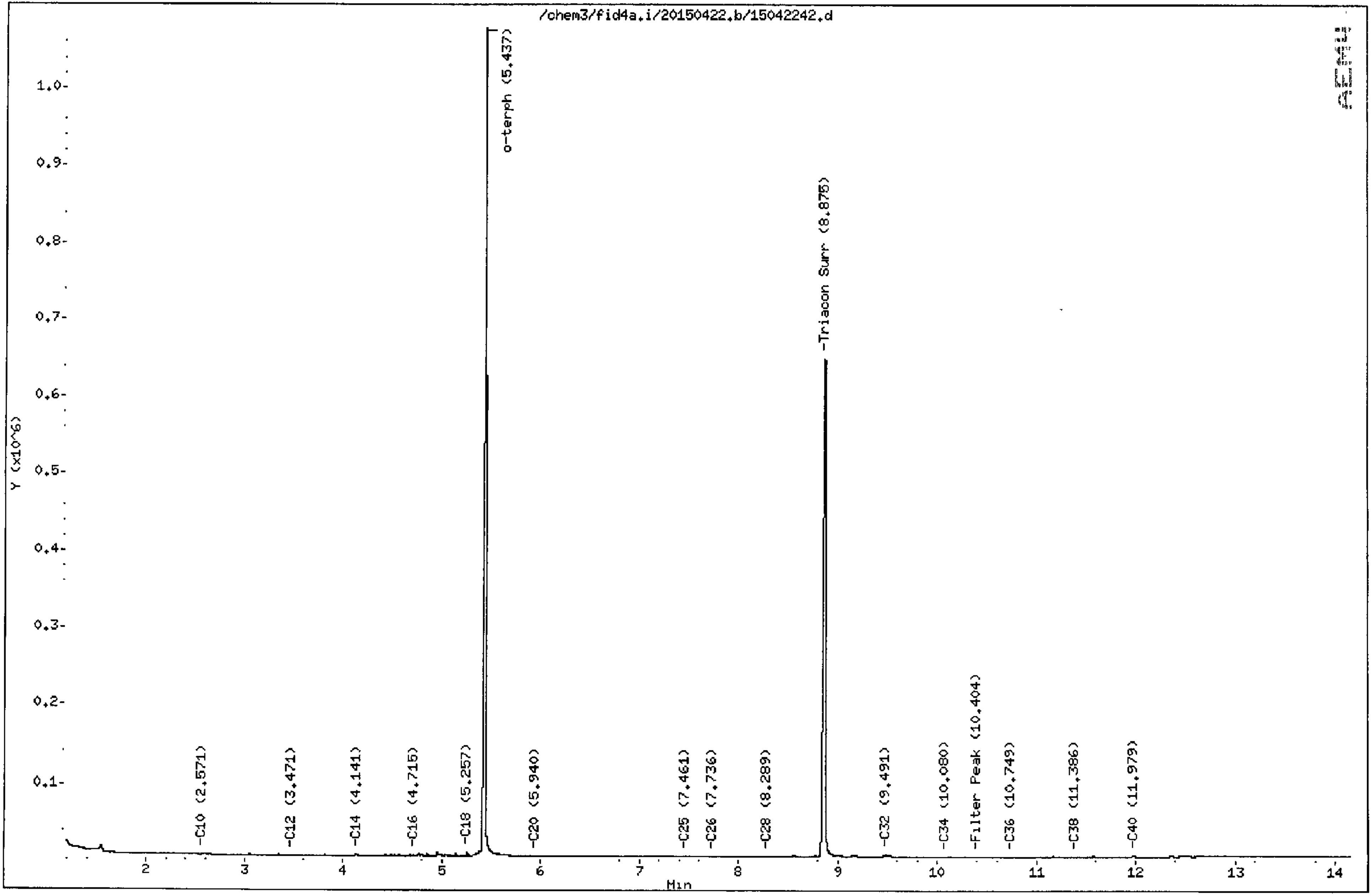
Basis: D=Dry Weight W=As Received

Data File: /chem3/fid4a.i/20150422.b/15042242.d
Date : 23-APR-2015 05:04
Client ID: AEJ3MBS1
Sample Info: AEJ3MBS1

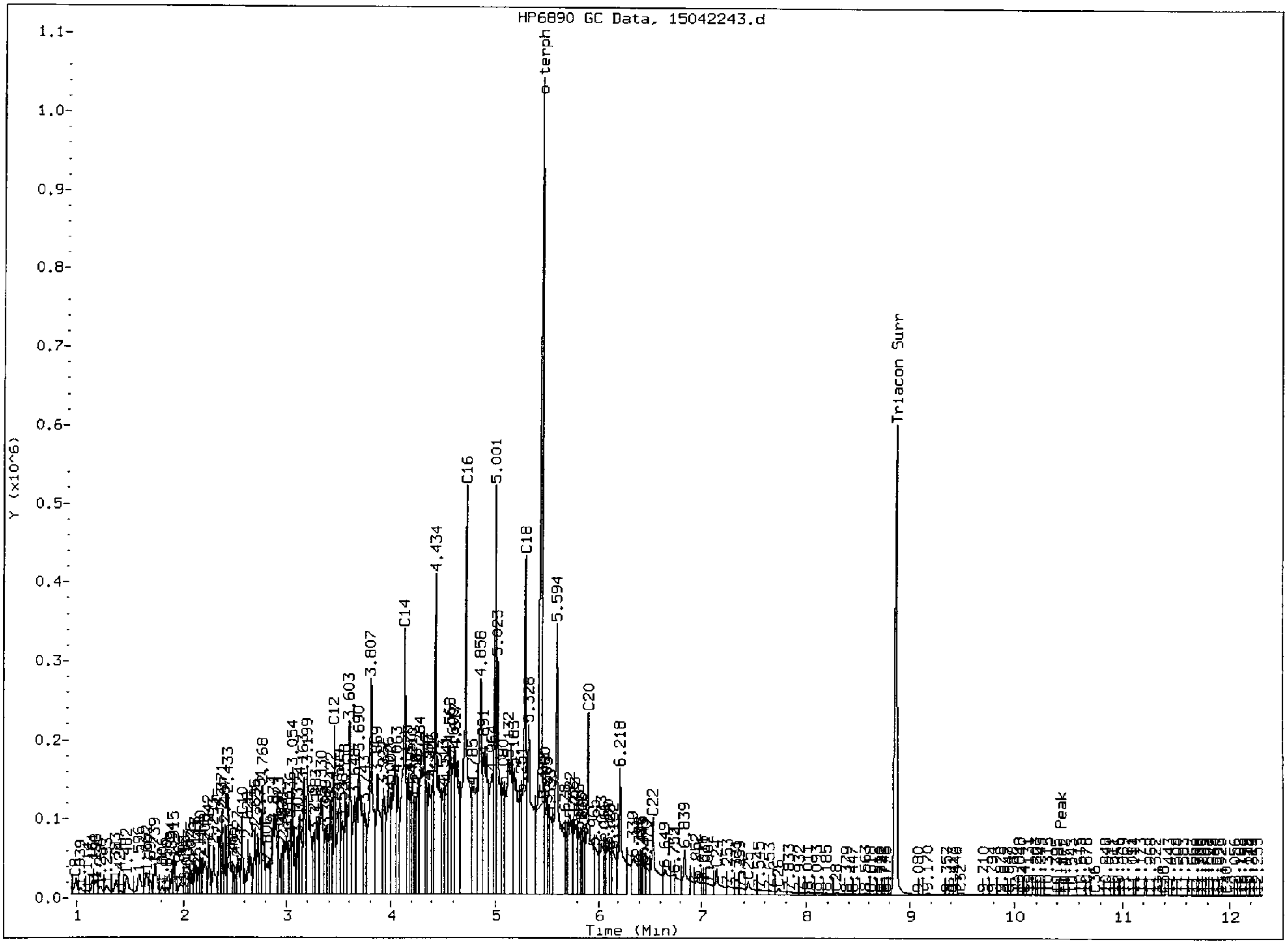
Column phase: RTX-1

Instrument: fid4a.i

Operator: ML
Column diameter: 0.25



FID:4A-2C/RTX-1 AEJ3LCSS1 FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5). Skimmed surrogate

Analyst: ML

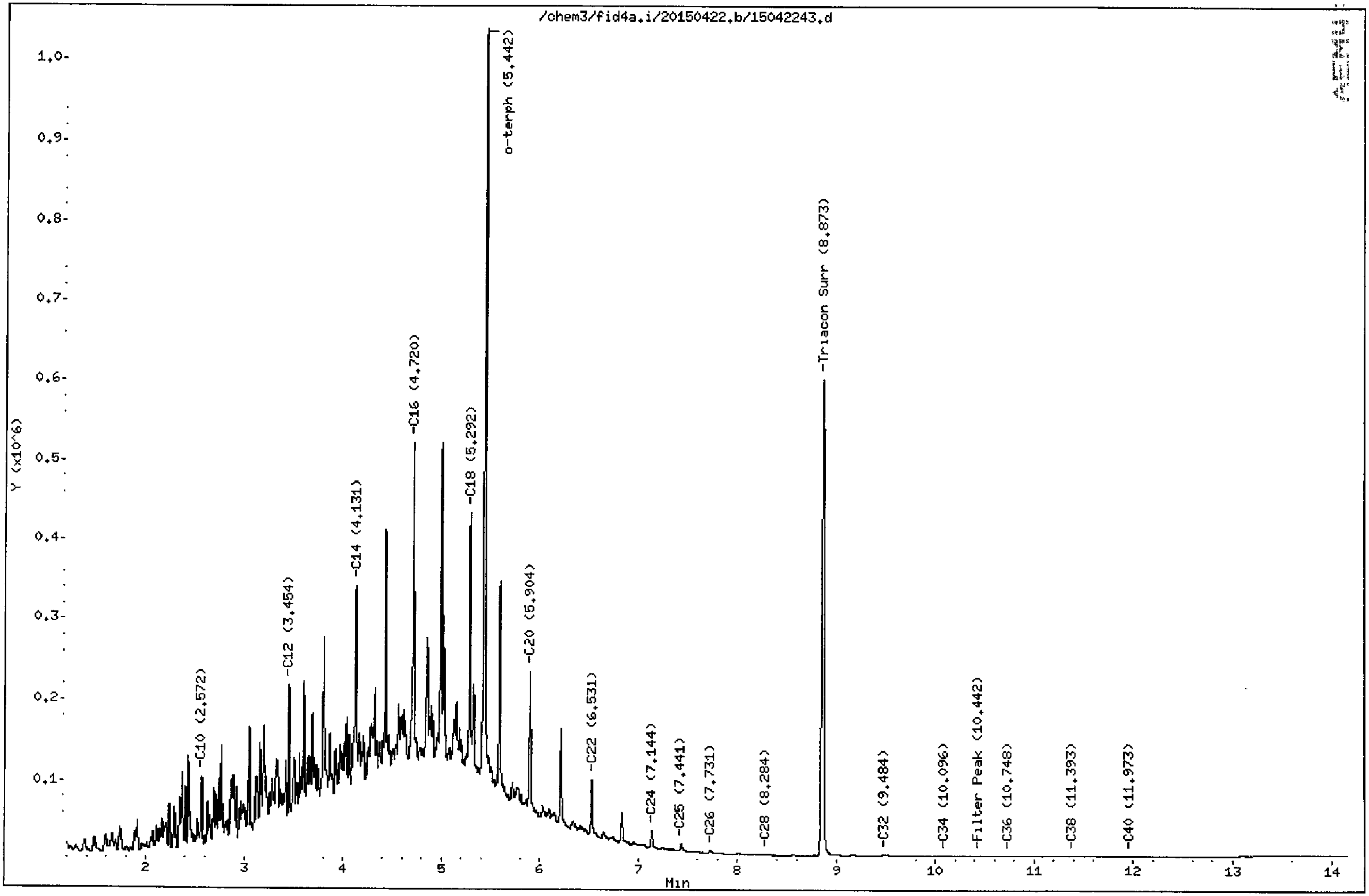
Date: 4/23/15

Data File: /chem3/fid4a.i/20150422.b/15042243.d
Date : 23-APR-2015 05:27
Client ID: AEJ3LCSS1
Sample Info: AEJ3LCSS1

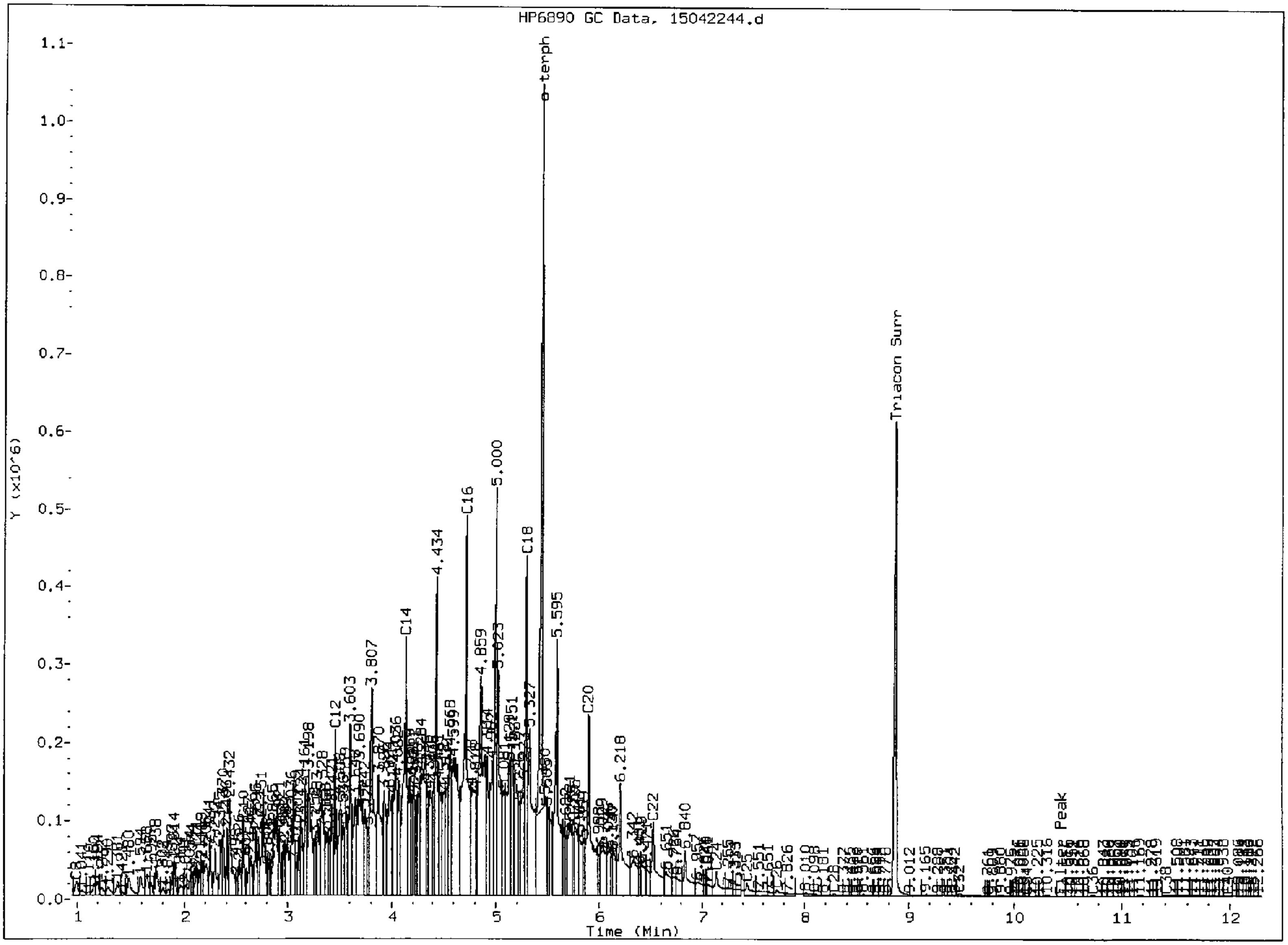
Column phase: RTX-1

Instrument: fid4a.i

Operator: ML
Column diameter: 0.25



FID:4A-2C/RTX-1 AEJ3LCSDS1 FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: ML

Date: 4/23/15

Data File: /chem3/fid4a.i/20150422.b/15042244.d

Date : 23-APR-2015 05:51

Client ID: AEJ3LCSDS1

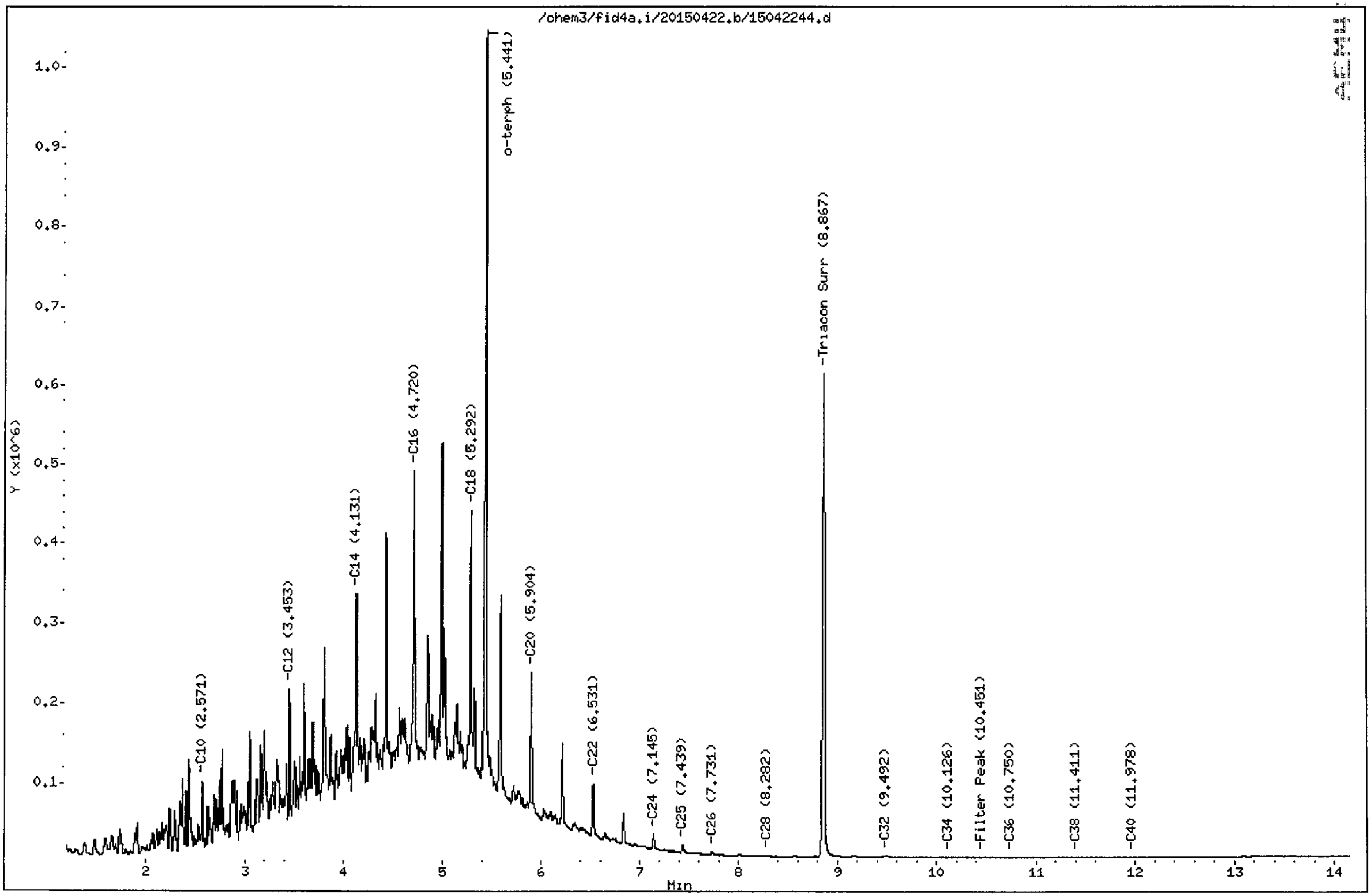
Sample Info: AEJ3LCSDS1

Column phase: RTX-1

Instrument: fid4a.i

Operator: ML

Column diameter: 0.25

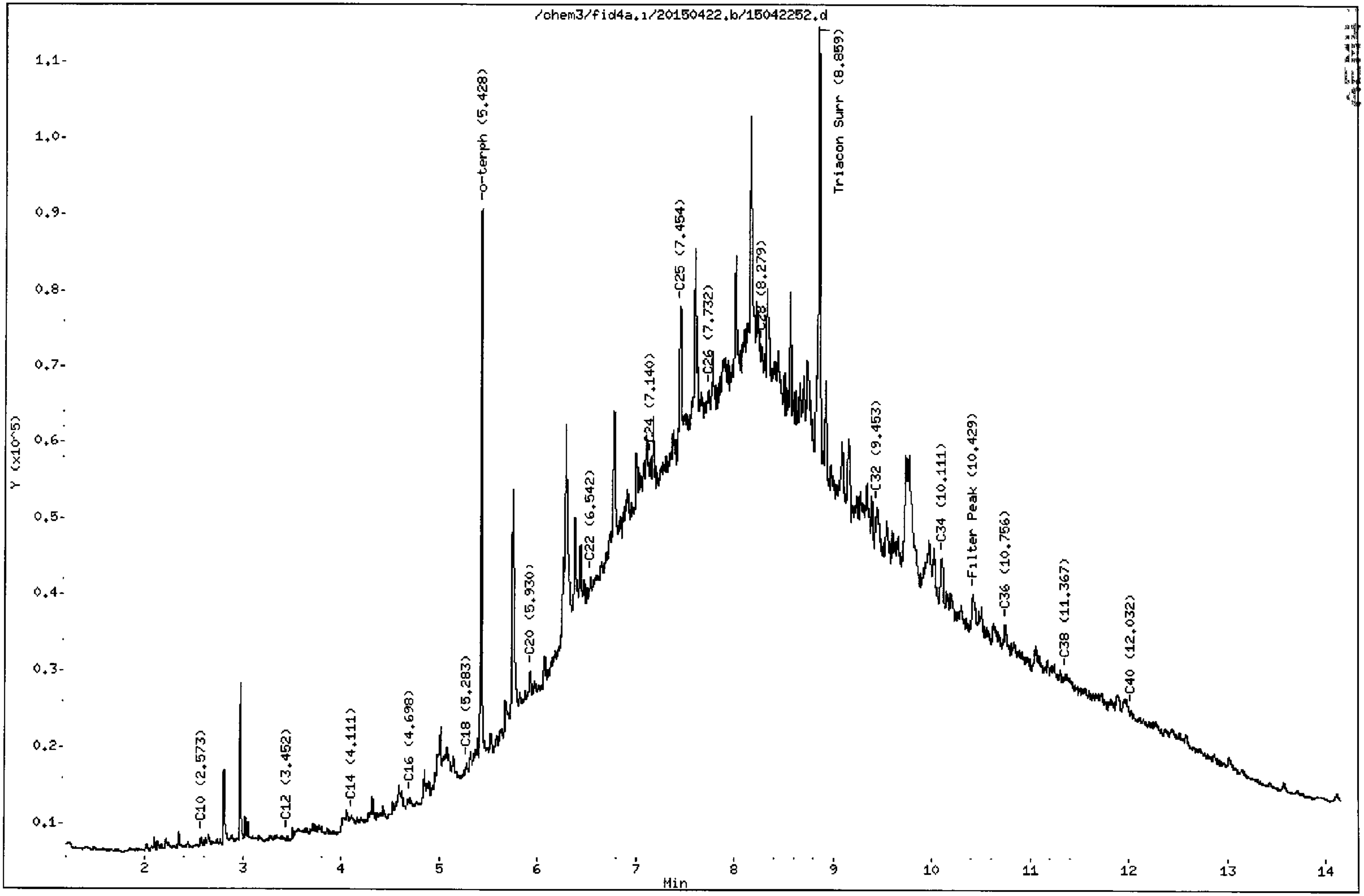


Data File: /chem3/fid4a.i/20150422.b/15042252.d
Date : 23-APR-2015 09:00
Client ID: S-09-1.2
Sample Info: AEM4A,10

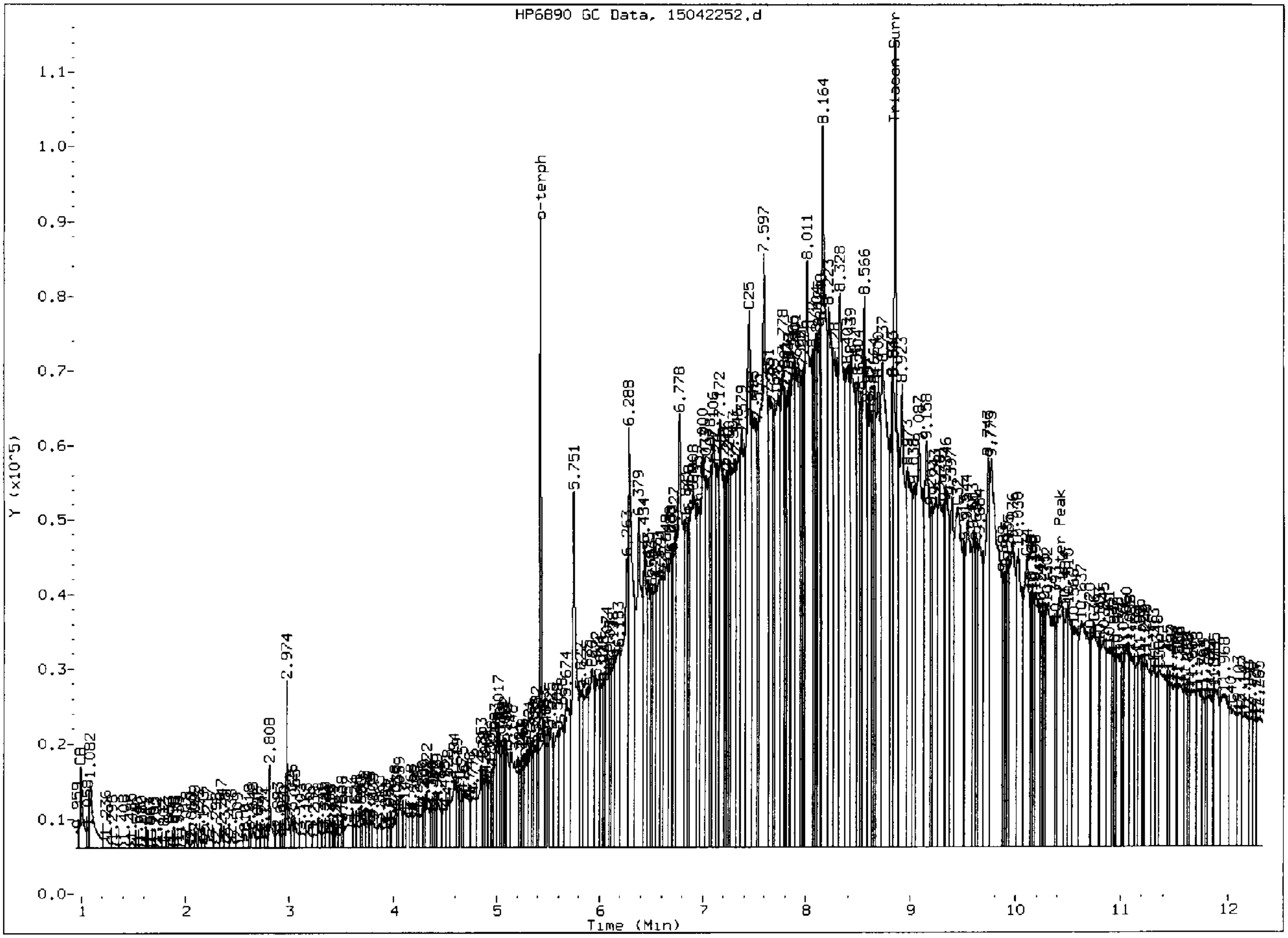
Column phase: RTX-1

Instrument: fid4a.i

Operator: ML
Column diameter: 0.25



FID:4A-2C/RTX-1 AEM4A FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: Wu Date: 4/23/15

Data File: /chem3/fid4a.i/20150422.b/15042253.d

Date : 23-APR-2015 09:25

Client ID: S-11-2.0

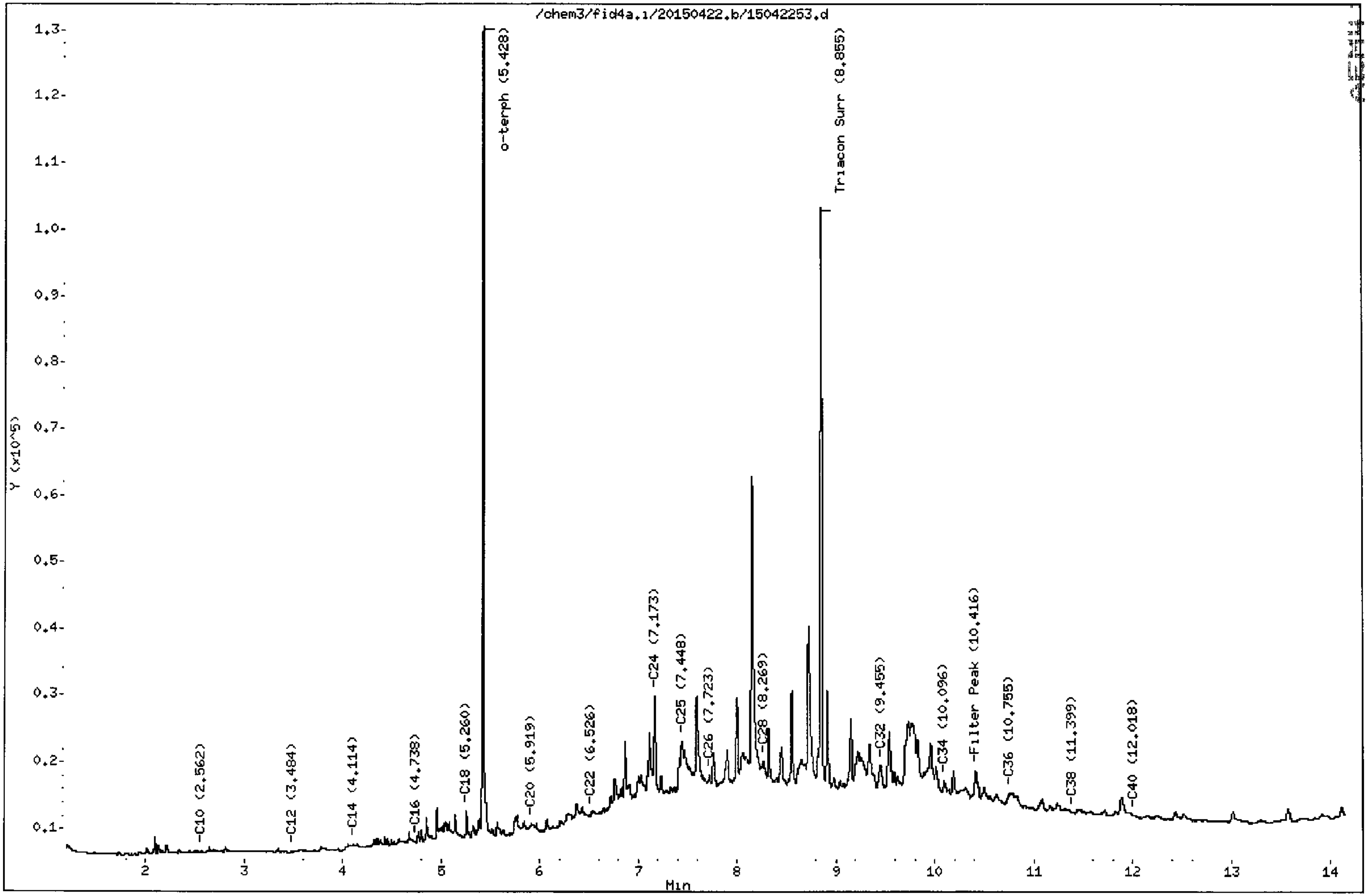
Sample Info: AEM4B,10

Column phase: RTX-1

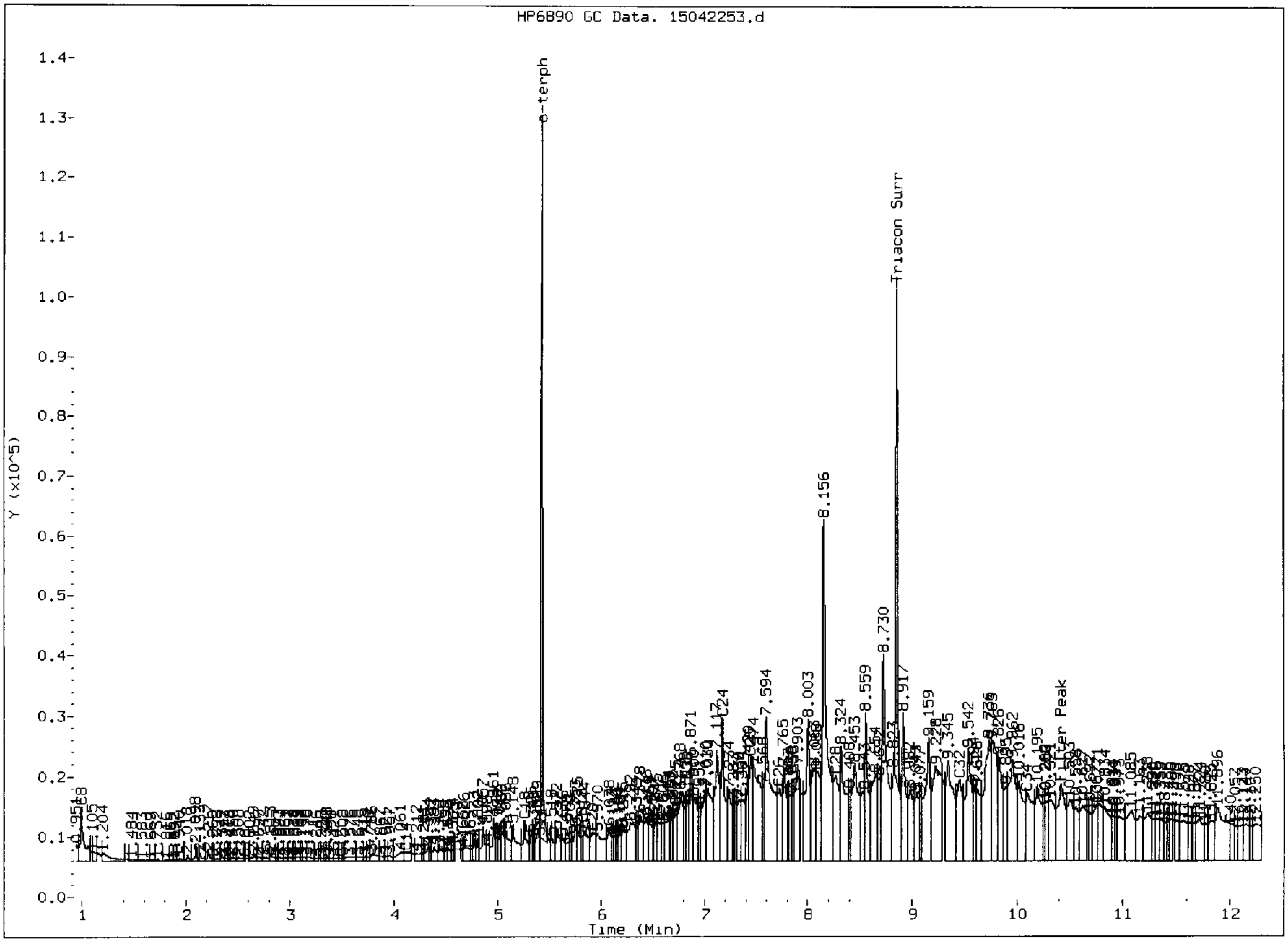
Instrument: fid4a.i

Operator: ML

Column diameter: 0.25



FID:4A-2C/RTX-1 AEM4B FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: ML Date: 4/23/15

Data File: /chem3/fid4a.i/20150422.b/15042254.d

Date : 23-APR-2015 09:49

Client ID: S-13-0.33

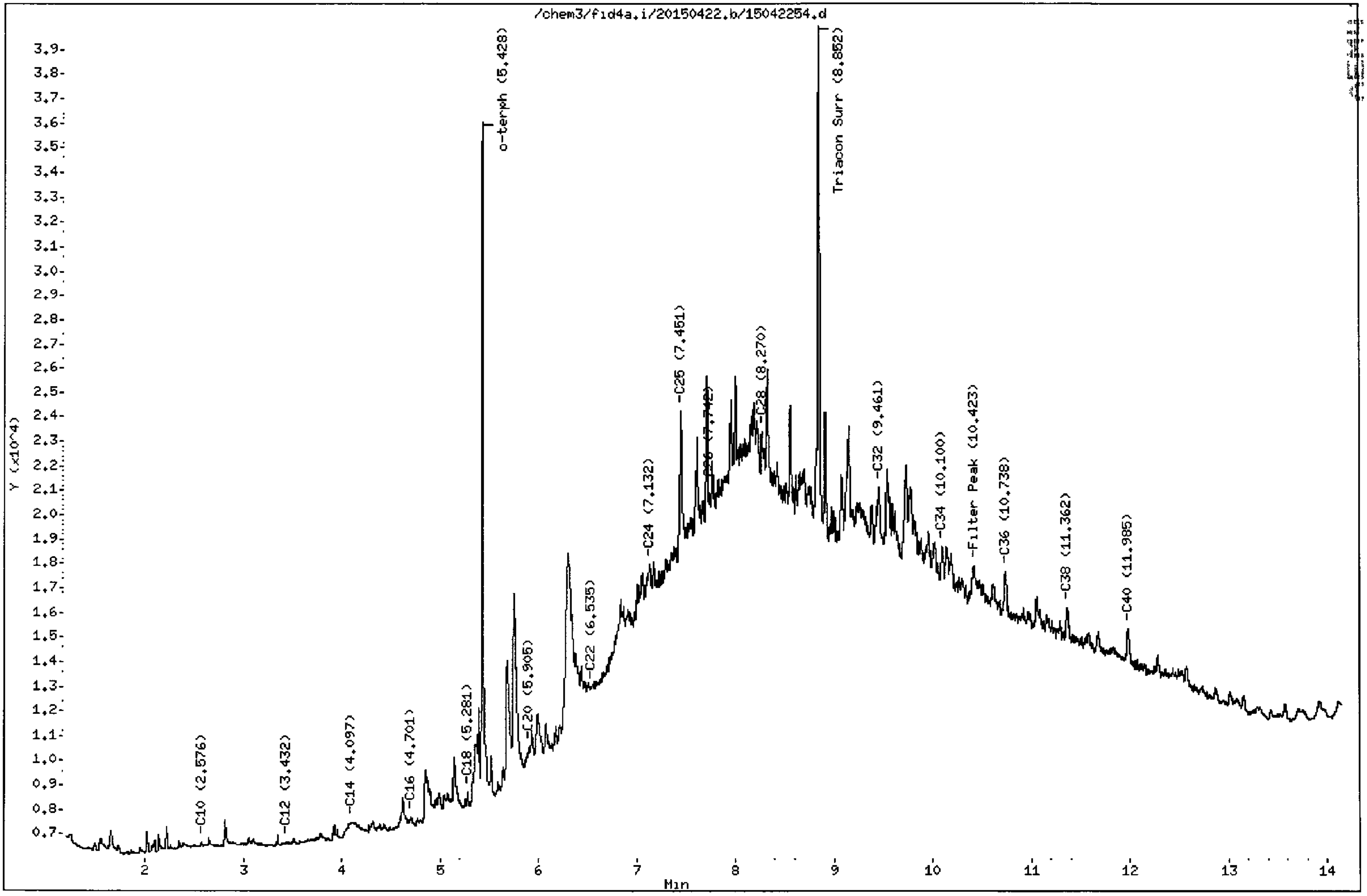
Instrument: fid4a.i

Sample Info: AEM4C,10

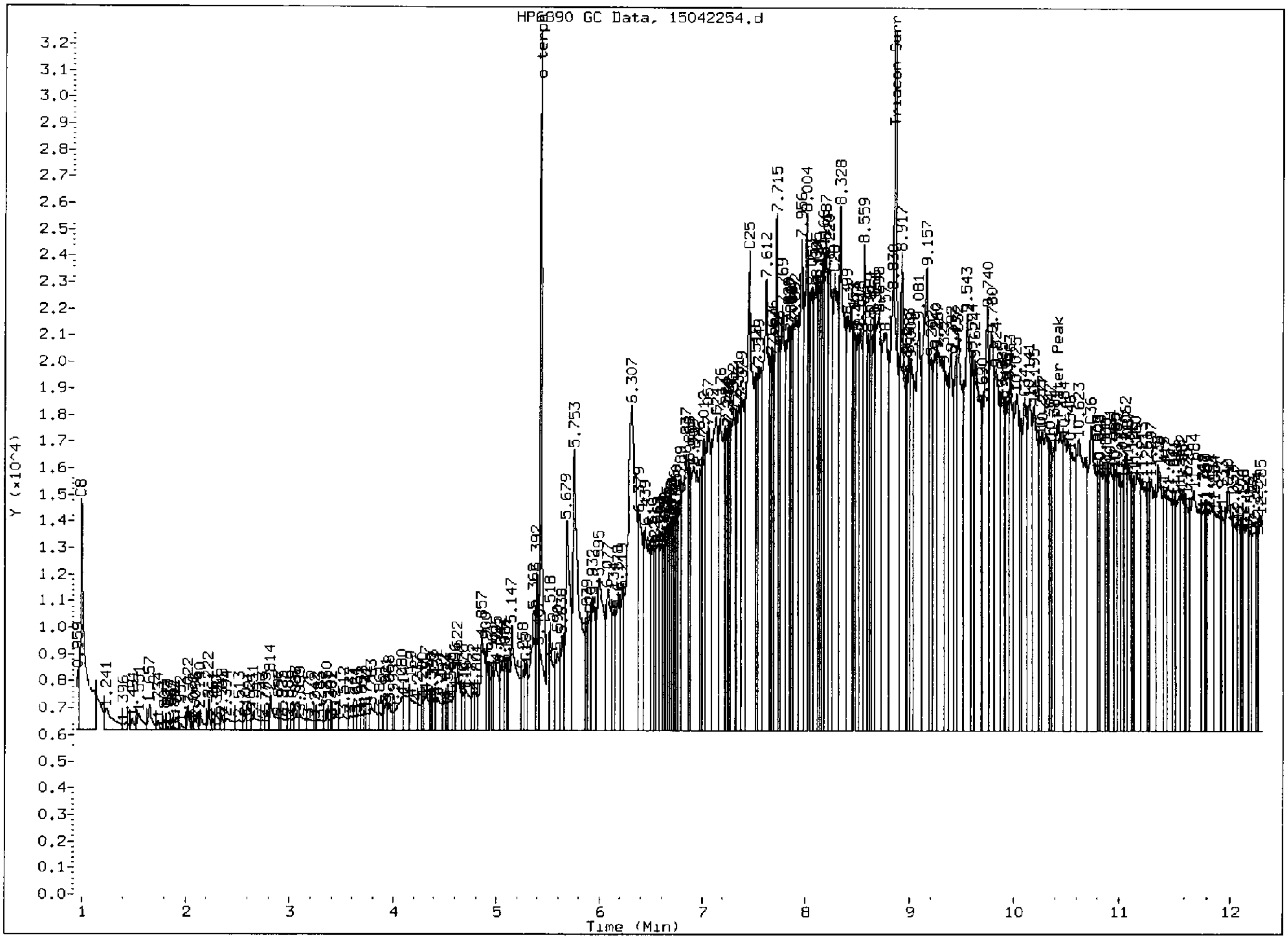
Operator: ML

Column phase: RTX-1

Column diameter: 0.25



FID:4A-2C/RTX-1 AEM4C FID:4A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: Mc Date: 4/23/15

SAMPLE RESULTS-CONVENTIONALS
AEM4-Maul Foster & Alongi

Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Client ID: S-09-1.2
ARI ID: 15-7603 AEM4A

Analyte	**Date**	**Method**	**Units**	**RL**	**Sample**
Total Solids	04/23/15 042315#1	SM2540G	Percent	0.01	51.32
Total Organic Carbon	05/01/15 050115#1	Plumb,1981	Percent	0.020	5.99

RL Analytical reporting limit
U Undetected at reported detection limit

Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Client ID: S-11-2.0
ARI ID: 15-7604 AEM4B

Analyte	**Date**	**Method**	**Units**	**RL**	**Sample**
Total Solids	04/23/15 042315#1	SM2540G	Percent	0.01	40.78
Total Organic Carbon	05/01/15 050115#1	Plumb,1981	Percent	0.020	6.73

RL	Analytical reporting limit
U	Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AEM4-Maul Foster & Alongi

Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Client ID: S-13-0.33
ARI ID: 15-7605 AEM4C

Analyte	**Date**	**Method**	**Units**	**RL**	**Sample**
Total Solids	04/23/15 042315#1	SM2540G	Percent	0.01	35.58
Total Organic Carbon	05/01/15 050115#1	Plumb,1981	Percent	0.020	2.97

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
AEM4-Maul Foster & Alongi

ANALYTICAL
RESOURCES
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Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Analyte	**Date**	**Units**	**Blank**	**QC ID**
Total Solids	04/23/15	Percent	< 0.01 U	ICB
Total Organic Carbon	05/01/15	Percent	< 0.020 U	ICB

LAB CONTROL RESULTS-CONVENTIONALS
AEM4-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 05/05/15

Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon Plumb,1981	ICVL	05/01/15	Percent	0.099	0.100	99.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
AEM4-Maul Foster & Alongi

Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST 1941B	05/01/15	Percent	3.50	2.99	117.1%

REPLICATE RESULTS-CONVENTIONALS
AEM4-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: AEM4C Client ID: S-13-0.33					
Total Solids	04/23/15	Percent	35.58	35.85 35.48	0.5%
Total Organic Carbon	05/01/15	Percent	2.97	4.32 5.42	29.0%

MS/MSD RESULTS-CONVENTIONALS
AEM4-Maul Foster & Alongi

Matrix: Sediment
Data Release Authorized:
Reported: 05/05/15

Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/19/15

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: AEM4C Client ID: S-13-0.33						
Total Organic Carbon	05/01/15	Percent	2.97	6.47	3.87	90.4%

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: S-09-1.2
SAMPLE

Lab Sample ID: AEM4A
LIMS ID: 15-7603
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/19/15

Percent Total Solids: 54.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	04/22/15	6010C	04/29/15	**7440-38-2**	**Arsenic**	9	**11**	
3050B	04/22/15	6010C	04/29/15	**7440-43-9**	**Cadmium**	0.3	**0.7**	
3050B	04/22/15	6010C	04/29/15	**7440-47-3**	**Chromium**	0.9	**54.4**	
3050B	04/22/15	6010C	04/29/15	**7440-50-8**	**Copper**	0.3	**29.8**	
3050B	04/22/15	6010C	04/29/15	**7439-92-1**	**Lead**	3	**109**	
CLP	04/23/15	7471A	04/23/15	**7439-97-6**	**Mercury**	0.04	**0.06**	
3050B	04/22/15	6010C	04/29/15	**7440-02-0**	**Nickel**	2	**37**	
3050B	04/22/15	6010C	04/29/15	7782-49-2	Selenium	9	9	U
3050B	04/22/15	6010C	04/29/15	7440-22-4	Silver	0.5	0.5	U
3050B	04/22/15	6010C	04/29/15	**7440-66-6**	**Zinc**	2	**108**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: S-11-2.0
SAMPLE

Lab Sample ID: AEM4B
LIMS ID: 15-7604
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/19/15

Percent Total Solids: 36.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	04/22/15	6010C	04/29/15	7440-38-2	Arsenic	10	10	U
3050B	04/22/15	6010C	04/29/15	**7440-43-9**	**Cadmium**	0.5	**0.9**	
3050B	04/22/15	6010C	04/29/15	**7440-47-3**	**Chromium**	1	**73**	
3050B	04/22/15	6010C	04/29/15	**7440-50-8**	**Copper**	0.5	**56.9**	
3050B	04/22/15	6010C	04/29/15	**7439-92-1**	**Lead**	5	**31**	
CLP	04/23/15	7471A	04/23/15	**7439-97-6**	**Mercury**	0.05	**0.09**	
3050B	04/22/15	6010C	04/29/15	**7440-02-0**	**Nickel**	3	**66**	
3050B	04/22/15	6010C	04/29/15	7782-49-2	Selenium	10	10	U
3050B	04/22/15	6010C	04/29/15	7440-22-4	Silver	0.8	0.8	U
3050B	04/22/15	6010C	04/29/15	**7440-66-6**	**Zinc**	3	**107**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

FORM-I

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: S-13-0.33
SAMPLE

Lab Sample ID: AEM4C
LIMS ID: 15-7605
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/19/15

Percent Total Solids: 35.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	04/22/15	6010C	04/29/15	7440-38-2	Arsenic	10	10	U
3050B	04/22/15	6010C	04/29/15	**7440-43-9**	**Cadmium**	0.5	**1.0**	
3050B	04/22/15	6010C	04/29/15	**7440-47-3**	**Chromium**	1	**67**	
3050B	04/22/15	6010C	04/29/15	**7440-50-8**	**Copper**	0.5	**113**	
3050B	04/22/15	6010C	04/29/15	**7439-92-1**	**Lead**	5	**37**	
CLP	04/23/15	7471A	04/23/15	**7439-97-6**	**Mercury**	0.07	**0.11**	
3050B	04/22/15	6010C	04/29/15	**7440-02-0**	**Nickel**	3	**57**	
3050B	04/22/15	6010C	04/29/15	7782-49-2	Selenium	10	10	U
3050B	04/22/15	6010C	04/29/15	7440-22-4	Silver	0.8	0.8	U
3050B	04/22/15	6010C	04/29/15	**7440-66-6**	**Zinc**	3	**232**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: AEM4MB
LIMS ID: 15-7605
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	04/22/15	6010C	04/29/15	7440-38-2	Arsenic	5	5	U
3050B	04/22/15	6010C	04/29/15	7440-43-9	Cadmium	0.2	0.2	U
3050B	04/22/15	6010C	04/29/15	7440-47-3	Chromium	0.5	0.5	U
3050B	04/22/15	6010C	04/29/15	7440-50-8	Copper	0.2	0.2	U
3050B	04/22/15	6010C	04/29/15	7439-92-1	Lead	2	2	U
CLP	04/23/15	7471A	04/23/15	7439-97-6	Mercury	0.02	0.02	U
3050B	04/22/15	6010C	04/29/15	7440-02-0	Nickel	1	1	U
3050B	04/22/15	6010C	04/29/15	7782-49-2	Selenium	5	5	U
3050B	04/22/15	6010C	04/29/15	7440-22-4	Silver	0.3	0.3	U
3050B	04/22/15	6010C	04/29/15	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

FORM-I

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: AEM4LCS
LIMS ID: 15-7605
Matrix: Sediment
Data Release Authorized:
Reported: 04/30/15

QC Report No: AEM4-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	201	200	100%	
Cadmium	6010C	50.4	50.0	101%	
Chromium	6010C	51.5	50.0	103%	
Copper	6010C	50.5	50.0	101%	
Lead	6010C	202	200	101%	
Mercury	7471A	0.48	0.50	96.0%	
Nickel	6010C	52	50	104%	
Selenium	6010C	198	200	99.0%	
Silver	6010C	53.7	50.0	107%	
Zinc	6010C	49	50	98.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

12 March2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Geddes Marina
ARI Job No.: ZV37

Dear Madi:

Please find enclosed the original chain of custody records and the final results for the samples from the project referenced above.

Ten sediment samples were received on February 5, 2015. Six samples were archived as instructed.

The remaining samples were analyzed for SVOCs, dioxins/furans, PCBs, NWTPH-Dx, grain size, TOC and total metals as requested.

All samples were pre-diluted prior to analysis for SVOCs due to the dark color of the extracts. Since target compounds were detected on scale for all samples, more concentrated analyses were not performed.

The percent differences (%Ds) for several compounds were high for the CCALs that bracketed the 2/12/15 SVOA and SIM-SVOA analyses of these samples. All positive results have been flagged with a "Q" qualifier to denote the high %Ds.

The percent recovery for the surrogate, tripentyl tin chloride, was slightly low following the initial TBT analysis of sample S-12-0.33. Since the percent recovery was low by 0.2%, no corrective actions were taken.

All samples were initially extracted for dioxins/furans on 2/23/15 and they were analyzed on 3/3/15. Multiple surrogates were not recovered following the analysis of sample S-11-0.33. This sample was re-extracted on 3/6/15 and it was re-analyzed on 3/10/15. The percent recovery for the surrogate, 13C-2,3,7,8-TCDF was slightly low following the re-analysis of this sample. Since the percent recovery was low by 0.2%, no corrective actions were taken.

The remaining analyses proceeded without incident of note.

Novak, Maul, Foster & Alongi
Geddes Marina
ZV37
Sediment

12 March 2015

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file ZV37

Enclosures

MDH/mdh

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number: ZV37
Turn-around Requested: Standard
Page: 1 of 1
ARI Client Company: Maul Foster & Alongi
Phone: 971544-2139
Date:
Ice Present? Yes
Client Contact: Madi Novak
No. of Coolers: 1
Cooler Temps: 4.3
Client Project Name: Geddes Marina
Client Project #:
Samplers: Mike Murray

Sample ID	Date	Time	Matrix	No Containers	SVOAs (8270)	PCBs Aroclors 8082	Metals 200.8/6010	Mercury 7471	TOC	Diesel NWTPH-Dx	Grain size (PSEP)	Archive	Notes/Comments
S-09-0.33	2/4/15	10:15	Sed.	7	X	X	X	X	X	X	X	X	
S-10-0.33		11:00		7	X	X	X	X	X	X	X	X	
S-11-0.33		11:20		7	X	X	X	X	X	X	X	X	
S-12-0.33		12:00		7	X	X	X	X	X	X	X	X	
S-09-1.2		10:40		2								X	
S-10-1.6		11:10		2								X	
S-11-2.0		11:30		2								X	
S-12-2.3		12:15		2								X	
S-13-0.33		12:30		2								X	
S-13-1.2	↓	1250	↓	2								X	

Comments/Special Instructions

Relinquished by: (Signature)	Received by (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Michael Murray	Printed Name: Chris Atwell	Printed Name	Printed Name
Company: MFA	Company: ARI	Company	Company
Date & Time: 2/5/15 1344	Date & Time: 2-5-15 1344	Date & Time	Date & Time

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Maul Foster & Alongi

Project Name: Geddes Marina

COC No(s): ______ [✓ NA]

Delivered by: Fed-Ex UPS Courier [✓ Hand Delivered] Other: ______

Assigned ARI Job No: ZV37

Tracking No: ______ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES [✓ NO]

Were custody papers included with the cooler? [✓ YES] NO

Were custody papers properly filled out (ink, signed, etc.) [✓ YES] NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.3

Time: 1344

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90877952

Cooler Accepted by: CA Date: 2-5-15 Time: 1344

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES [✓ NO]

What kind of packing material was used? ... Bubble Wrap [✓ Wet Ice] Gel Packs Baggies Foam Block Paper Other: ______

Was sufficient ice used (if appropriate)? NA [✓ YES] NO

Were all bottles sealed in individual plastic bags? YES [✓ NO]

Did all bottles arrive in good condition (unbroken)? [✓ YES] NO

Were all bottle labels complete and legible? [✓ YES] NO

Did the number of containers listed on COC match with the number of containers received? [✓ YES] NO

Did all bottle labels and tags agree with custody papers? [✓ YES] NO

Were all bottles used correct for the requested analyses? [✓ YES] NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... [✓ NA] YES NO

Were all VOC vials free of air bubbles? [✓ NA] YES NO

Was sufficient amount of sample sent in each bottle? [✓ YES] NO

Date VOC Trip Blank was made at ARI [✓ NA] ______

Was Sample Split by ARI : [✓ NA] YES Date/Time: ______ Equipment: ______ Split by: ______

Samples Logged by: JM Date: 2/6/15 Time: 853

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm ● ● ● ●	Peabubbles' 2-4 mm ● ● ● ● ●	LARGE Air Bubbles > 4 mm ● ● ●

Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ZV37
Client: Maul Foster & Alongi
Project Event: N/A
Project Name: Geddes Marina

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	S-09-0.33	ZV37A	15-2117	Sediment	02/04/15 10:15	02/05/15 13:44
2.	S-10-0.33	ZV37B	15-2118	Sediment	02/04/15 11:00	02/05/15 13:44
3.	S-11-0.33	ZV37C	15-2119	Sediment	02/04/15 11:20	02/05/15 13:44
4.	S-12-0.33	ZV37D	15-2120	Sediment	02/04/15 12:00	02/05/15 13:44
5.	S-09-1.2	ZV37E	15-2121	Sediment	02/04/15 10:40	02/05/15 13:44
6.	S-10-1.8	ZV37F	15-2122	Sediment	02/04/15 11:10	02/05/15 13:44
7.	S-11-2.0	ZV37G	15-2123	Sediment	02/04/15 11:30	02/05/15 13:44
8.	S-12-2.3	ZV37H	15-2124	Sediment	02/04/15 12:15	02/05/15 13:44
9.	S-13-0.33	ZV37I	15-2125	Sediment	02/04/15 12:30	02/05/15 13:44
10.	S-13-1.2	ZV37J	15-2126	Sediment	02/04/15 12:50	02/05/15 13:44

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: Maul Foster & Alongi

ARI Job No.: ZV37

Client Project: Geddes Marina

Case Narrative

1. Four samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology on February 5, 2015.
2. The samples were run in a single batch and one sample from another job was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. The samples contained woody or other organic matter which may have broken down during the sieving process.
4. The data is provided in summary tables and plots.
5. There were no other noted anomalies in this project.

Released by: ______________ Date: February 20, 2015
Geotechnical Laboratory Supervisor

Reviewed by: ______________ Date: 02/20/2015
Reviewer

Analytical Resources,
Incorporated
Analytical Chemists and
Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-09-0.33
SAMPLE

Lab Sample ID: ZV37A
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/09/15
Date Analyzed: 02/12/15 17:01
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 2.65 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 70.7%

CAS Number	**Analyte**	**LOQ**	**Result**
108-95-2	**Phenol**	**230**	**680**
106-46-7	1,4-Dichlorobenzene	230	< 230 U
100-51-6	**Benzyl Alcohol**	**230**	**320**
95-50-1	1,2-Dichlorobenzene	230	< 230 U
95-48-7	2-Methylphenol	230	< 230 U
106-44-5	**4-Methylphenol**	**230**	**510**
105-67-9	2,4-Dimethylphenol	1,100	< 1,100 U
65-85-0	**Benzoic Acid**	**2,300**	**3,600**
120-82-1	1,2,4-Trichlorobenzene	230	< 230 U
91-20-3	**Naphthalene**	**230**	**520**
87-68-3	Hexachlorobutadiene	230	< 230 U
91-57-6	2-Methylnaphthalene	230	< 230 U
131-11-3	Dimethylphthalate	230	< 230 U
208-96-8	Acenaphthylene	230	< 230 U
83-32-9	Acenaphthene	230	< 230 U
132-64-9	Dibenzofuran	230	< 230 U
84-66-2	Diethylphthalate	230	< 230 U
86-73-7	**Fluorene**	**230**	**180 J**
86-30-6	N-Nitrosodiphenylamine	230	< 230 U
118-74-1	Hexachlorobenzene	230	< 230 U
87-86-5	**Pentachlorophenol**	**1,100**	**360 J**
85-01-8	**Phenanthrene**	**230**	**2,200**
120-12-7	**Anthracene**	**230**	**400**
84-74-2	Di-n-Butylphthalate	230	< 230 U
206-44-0	**Fluoranthene**	**230**	**5,200**
129-00-0	**Pyrene**	**230**	**4,100**
85-68-7	**Butylbenzylphthalate**	**230**	**370 Q**
56-55-3	**Benzo(a)anthracene**	**230**	**1,800**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**570**	**35,000 E**
218-01-9	**Chrysene**	**230**	**3,300**
117-84-0	**Di-n-Octyl phthalate**	**230**	**780 Q**
50-32-8	**Benzo(a)pyrene**	**230**	**2,200**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**230**	**1,300 Q**
53-70-3	**Dibenz(a,h)anthracene**	**230**	**370 Q**
191-24-2	**Benzo(g,h,i)perylene**	**230**	**1,400 Q**
TOTBFA	**Total Benzofluoranthenes**	**450**	**5,600**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	70.8%	2-Fluorobiphenyl	67.8%
d14-p-Terphenyl	69.6%	d4-1,2-Dichlorobenzene	52.8%
d5-Phenol	56.0%	2-Fluorophenol	51.2%
2,4,6-Tribromophenol	93.2%	d4-2-Chlorophenol	56.4%

FORM I

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-09-0.33
DILUTION

Lab Sample ID: ZV37A
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/09/15
Date Analyzed: 02/14/15 16:24
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 2.65 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 6.00
Percent Moisture: 70.7%

CAS Number	Analyte	LOQ	Result	
108-95-2	**Phenol**	**450**	**630**	
106-46-7	1,4-Dichlorobenzene	450	< 450	U
100-51-6	Benzyl Alcohol	450	< 450	U
95-50-1	1,2-Dichlorobenzene	450	< 450	U
95-48-7	2-Methylphenol	450	< 450	U
106-44-5	**4-Methylphenol**	**450**	**500**	**Q**
105-67-9	2,4-Dimethylphenol	2,300	< 2,300	U
65-85-0	**Benzoic Acid**	**4,500**	**5,000**	
120-82-1	1,2,4-Trichlorobenzene	450	< 450	U
91-20-3	**Naphthalene**	**450**	**500**	
87-68-3	Hexachlorobutadiene	450	< 450	U
91-57-6	2-Methylnaphthalene	450	< 450	U
131-11-3	Dimethylphthalate	450	< 450	U
208-96-8	Acenaphthylene	450	< 450	U
83-32-9	Acenaphthene	450	< 450	U
132-64-9	Dibenzofuran	450	< 450	U
84-66-2	Diethylphthalate	450	< 450	U
86-73-7	Fluorene	450	< 450	U
86-30-6	N-Nitrosodiphenylamine	450	< 450	U
118-74-1	Hexachlorobenzene	450	< 450	U
87-86-5	**Pentachlorophenol**	**2,300**	**1,300**	**J**
85-01-8	**Phenanthrene**	**450**	**2,100**	
120-12-7	**Anthracene**	**450**	**360**	**J**
84-74-2	Di-n-Butylphthalate	450	< 450	U
206-44-0	**Fluoranthene**	**450**	**5,300**	
129-00-0	**Pyrene**	**450**	**4,400**	
85-68-7	**Butylbenzylphthalate**	**450**	**380**	**J**
56-55-3	**Benzo(a)anthracene**	**450**	**1,800**	
117-81-7	**bis(2-Ethylhexyl)phthalate**	**1,100**	**34,000**	
218-01-9	**Chrysene**	**450**	**3,200**	
117-84-0	**Di-n-Octyl phthalate**	**450**	**820**	**Q**
50-32-8	**Benzo(a)pyrene**	**450**	**2,100**	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**450**	**1,600**	
53-70-3	**Dibenz(a,h)anthracene**	**450**	**500**	
191-24-2	**Benzo(g,h,i)perylene**	**450**	**2,000**	
TOTBFA	**Total Benzofluoranthenes**	**910**	**5,200**	

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.2%	2-Fluorobiphenyl	67.2%
d14-p-Terphenyl	72.0%	d4-1,2-Dichlorobenzene	52.8%
d5-Phenol	55.2%	2-Fluorophenol	48.0%
2,4,6-Tribromophenol	111%	d4-2-Chlorophenol	52.8%

FORM I

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-10-0.33
SAMPLE

Lab Sample ID: ZV37B
LIMS ID: 15-2118
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/09/15
Date Analyzed: 02/12/15 17:37
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 5.45 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 45.7%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**110**	**300**
106-46-7	1,4-Dichlorobenzene	110	< 110 U
100-51-6	**Benzyl Alcohol**	**110**	**120**
95-50-1	1,2-Dichlorobenzene	110	< 110 U
95-48-7	2-Methylphenol	110	< 110 U
106-44-5	**4-Methylphenol**	**110**	**2,100**
105-67-9	2,4-Dimethylphenol	550	< 550 U
65-85-0	**Benzoic Acid**	**1,100**	**1,300**
120-82-1	1,2,4-Trichlorobenzene	110	< 110 U
91-20-3	**Naphthalene**	**110**	**170**
87-68-3	Hexachlorobutadiene	110	< 110 U
91-57-6	2-Methylnaphthalene	110	< 110 U
131-11-3	**Dimethylphthalate**	**110**	**1,700**
208-96-8	Acenaphthylene	110	< 110 U
83-32-9	**Acenaphthene**	**110**	**66 J**
132-64-9	Dibenzofuran	110	< 110 U
84-66-2	Diethylphthalate	110	< 110 U
86-73-7	**Fluorene**	**110**	**140**
86-30-6	N-Nitrosodiphenylamine	110	< 110 U
118-74-1	Hexachlorobenzene	110	< 110 U
87-86-5	**Pentachlorophenol**	**550**	**290 J**
85-01-8	**Phenanthrene**	**110**	**1,800**
120-12-7	**Anthracene**	**110**	**340**
84-74-2	Di-n-Butylphthalate	110	< 110 U
206-44-0	**Fluoranthene**	**110**	**4,300**
129-00-0	**Pyrene**	**110**	**3,400**
85-68-7	Butylbenzylphthalate	110	< 110 U
56-55-3	**Benzo(a)anthracene**	**110**	**1,600**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**280**	**7,700**
218-01-9	**Chrysene**	**110**	**2,700**
117-84-0	Di-n-Octyl phthalate	110	< 110 U
50-32-8	**Benzo(a)pyrene**	**110**	**1,900**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**110**	**1,000 Q**
53-70-3	**Dibenz(a,h)anthracene**	**110**	**320 Q**
191-24-2	**Benzo(g,h,i)perylene**	**110**	**1,000 Q**
TOTBFA	**Total Benzofluoranthenes**	**220**	**5,000**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.8%	2-Fluorobiphenyl	69.0%
d14-p-Terphenyl	69.6%	d4-1,2-Dichlorobenzene	54.0%
d5-Phenol	53.6%	2-Fluorophenol	49.2%
2,4,6-Tribromophenol	97.6%	d4-2-Chlorophenol	51.2%

FORM I

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-11-0.33
SAMPLE

Lab Sample ID: ZV37C
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/09/15
Date Analyzed: 02/12/15 18:13
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 2.08 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 70.3%

CAS Number	Analyte	LOQ	Result	
108-95-2	**Phenol**	**290**	**430**	
106-46-7	1,4-Dichlorobenzene	290	< 290	U
100-51-6	**Benzyl Alcohol**	**290**	**240**	**J**
95-50-1	1,2-Dichlorobenzene	290	< 290	U
95-48-7	2-Methylphenol	290	< 290	U
106-44-5	**4-Methylphenol**	**290**	**490**	
105-67-9	2,4-Dimethylphenol	1,400	< 1,400	U
65-85-0	**Benzoic Acid**	**2,900**	**2,900**	**J**
120-82-1	1,2,4-Trichlorobenzene	290	< 290	U
91-20-3	**Naphthalene**	**290**	**420**	
87-68-3	Hexachlorobutadiene	290	< 290	U
91-57-6	**2-Methylnaphthalene**	**290**	**170**	**J**
131-11-3	Dimethylphthalate	290	< 290	U
208-96-8	Acenaphthylene	290	< 290	U
83-32-9	**Acenaphthene**	**290**	**460**	
132-64-9	**Dibenzofuran**	**290**	**400**	**JM**
84-66-2	Diethylphthalate	290	< 290	U
86-73-7	**Fluorene**	**290**	**620**	
86-30-6	N-Nitrosodiphenylamine	290	< 290	U
118-74-1	Hexachlorobenzene	290	< 290	U
87-86-5	Pentachlorophenol	1,400	< 1,400	U
85-01-8	**Phenanthrene**	**290**	**3,200**	
120-12-7	**Anthracene**	**290**	**550**	
84-74-2	Di-n-Butylphthalate	290	< 290	U
206-44-0	**Fluoranthene**	**290**	**7,500**	
129-00-0	**Pyrene**	**290**	**5,900**	
85-68-7	**Butylbenzylphthalate**	**290**	**390**	**Q**
56-55-3	**Benzo(a)anthracene**	**290**	**2,400**	
117-81-7	**bis(2-Ethylhexyl)phthalate**	**720**	**31,000**	**E**
218-01-9	**Chrysene**	**290**	**4,800**	
117-84-0	Di-n-Octyl phthalate	290	< 290	U
50-32-8	**Benzo(a)pyrene**	**290**	**2,800**	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**290**	**1,500**	**Q**
53-70-3	**Dibenz(a,h)anthracene**	**290**	**480**	**Q**
191-24-2	**Benzo(g,h,i)perylene**	**290**	**1,500**	**Q**
TOTBFA	**Total Benzofluoranthenes**	**580**	**8,000**	

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	59.4%	2-Fluorobiphenyl	57.0%
d14-p-Terphenyl	61.2%	d4-1,2-Dichlorobenzene	47.4%
d5-Phenol	45.2%	2-Fluorophenol	42.0%
2,4,6-Tribromophenol	89.6%	d4-2-Chlorophenol	44.0%

FORM I

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-11-0.33
DILUTION

Lab Sample ID: ZV37C
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/09/15
Date Analyzed: 02/14/15 17:00
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 2.08 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 6.00
Percent Moisture: 70.3%

CAS Number	Analyte	LOQ	Result	
108-95-2	**Phenol**	**580**	**430**	**J**
106-46-7	1,4-Dichlorobenzene	580	< 580	U
100-51-6	Benzyl Alcohol	580	< 580	U
95-50-1	1,2-Dichlorobenzene	580	< 580	U
95-48-7	2-Methylphenol	580	< 580	U
106-44-5	**4-Methylphenol**	**580**	**490**	**J**
105-67-9	2,4-Dimethylphenol	2,900	< 2,900	U
65-85-0	**Benzoic Acid**	**5,800**	**3,100**	**J**
120-82-1	1,2,4-Trichlorobenzene	580	< 580	U
91-20-3	**Naphthalene**	**580**	**460**	**J**
87-68-3	Hexachlorobutadiene	580	< 580	U
91-57-6	2-Methylnaphthalene	580	< 580	U
131-11-3	Dimethylphthalate	580	< 580	U
208-96-8	Acenaphthylene	580	< 580	U
83-32-9	**Acenaphthene**	**580**	**430**	**J**
132-64-9	**Dibenzofuran**	**580**	**460**	**J**
84-66-2	Diethylphthalate	580	< 580	U
86-73-7	**Fluorene**	**580**	**640**	
86-30-6	N-Nitrosodiphenylamine	580	< 580	U
118-74-1	Hexachlorobenzene	580	< 580	U
87-86-5	Pentachlorophenol	2,900	< 2,900	U
85-01-8	**Phenanthrene**	**580**	**3,100**	
120-12-7	**Anthracene**	**580**	**550**	**J**
84-74-2	Di-n-Butylphthalate	580	< 580	U
206-44-0	**Fluoranthene**	**580**	**7,600**	
129-00-0	**Pyrene**	**580**	**6,000**	
85-68-7	**Butylbenzylphthalate**	**580**	**400**	**J**
56-55-3	**Benzo(a)anthracene**	**580**	**2,400**	
117-81-7	**bis(2-Ethylhexyl)phthalate**	**1,400**	**32,000**	
218-01-9	**Chrysene**	**580**	**4,600**	
117-84-0	Di-n-Octyl phthalate	580	< 580	U
50-32-8	**Benzo(a)pyrene**	**580**	**2,900**	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**580**	**2,200**	
53-70-3	**Dibenz(a,h)anthracene**	**580**	**720**	
191-24-2	**Benzo(g,h,i)perylene**	**580**	**2,600**	
TOTBFA	**Total Benzofluoranthenes**	**1,200**	**7,500**	

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	54.0%	2-Fluorobiphenyl	58.8%
d14-p-Terphenyl	62.4%	d4-1,2-Dichlorobenzene	49.2%
d5-Phenol	48.0%	2-Fluorophenol	44.0%
2,4,6-Tribromophenol	93.6%	d4-2-Chlorophenol	45.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-12-0.33
SAMPLE

Lab Sample ID: ZV37D
LIMS ID: 15-2120
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/09/15
Date Analyzed: 02/12/15 18:49
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 2.66 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 70.5%

CAS Number	Analyte	LOQ	Result	
108-95-2	Phenol	230	< 230	U
106-46-7	1,4-Dichlorobenzene	230	< 230	U
100-51-6	**Benzyl Alcohol**	**230**	**520**	
95-50-1	1,2-Dichlorobenzene	230	< 230	U
95-48-7	2-Methylphenol	230	< 230	U
106-44-5	**4-Methylphenol**	**230**	**420**	
105-67-9	2,4-Dimethylphenol	1,100	< 1,100	U
65-85-0	**Benzoic Acid**	**2,300**	**2,400**	
120-82-1	1,2,4-Trichlorobenzene	230	< 230	U
91-20-3	**Naphthalene**	**230**	**410**	
87-68-3	Hexachlorobutadiene	230	< 230	U
91-57-6	2-Methylnaphthalene	230	< 230	U
131-11-3	Dimethylphthalate	230	< 230	U
208-96-8	Acenaphthylene	230	< 230	U
83-32-9	Acenaphthene	230	< 230	U
132-64-9	Dibenzofuran	230	< 230	U
84-66-2	Diethylphthalate	230	< 230	U
86-73-7	**Fluorene**	**230**	**170**	**J**
86-30-6	N-Nitrosodiphenylamine	230	< 230	U
118-74-1	Hexachlorobenzene	230	< 230	U
87-86-5	Pentachlorophenol	1,100	< 1,100	U
85-01-8	**Phenanthrene**	**230**	**1,200**	
120-12-7	**Anthracene**	**230**	**250**	
84-74-2	**Di-n-Butylphthalate**	**230**	**100**	**J**
206-44-0	**Fluoranthene**	**230**	**3,500**	
129-00-0	**Pyrene**	**230**	**3,000**	
85-68-7	**Butylbenzylphthalate**	**230**	**500**	**Q**
56-55-3	**Benzo(a)anthracene**	**230**	**1,200**	
117-81-7	**bis(2-Ethylhexyl)phthalate**	**560**	**17,000**	
218-01-9	**Chrysene**	**230**	**2,500**	
117-84-0	Di-n-Octyl phthalate	230	< 230	U
50-32-8	**Benzo(a)pyrene**	**230**	**1,500**	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**230**	**800**	**Q**
53-70-3	**Dibenz(a,h)anthracene**	**230**	**240**	**Q**
191-24-2	**Benzo(g,h,i)perylene**	**230**	**810**	**Q**
TOTBFA	**Total Benzofluoranthenes**	**450**	**4,300**	

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	54.0%	2-Fluorobiphenyl	59.4%
d14-p-Terphenyl	61.2%	d4-1,2-Dichlorobenzene	48.0%
d5-Phenol	43.6%	2-Fluorophenol	44.8%
2,4,6-Tribromophenol	79.2%	d4-2-Chlorophenol	45.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-020915
METHOD BLANK

Lab Sample ID: MB-020915
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 02/09/15
Date Analyzed: 02/12/15 15:49
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	72.4%	2-Fluorobiphenyl	69.6%
d14-p-Terphenyl	80.0%	d4-1,2-Dichlorobenzene	65.4%
d5-Phenol	58.0%	2-Fluorophenol	54.4%
2,4,6-Tribromophenol	96.9%	d4-2-Chlorophenol	59.9%

FORM I

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS
Page 1 of 2

Sample ID: LCS-020915
LAB CONTROL

Lab Sample ID: LCS-020915
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/09/15
Date Analyzed: 02/12/15 16:25
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	**Lab Control**		**Spike Added**	**Recovery**
Phenol	418		500	83.6%
1,4-Dichlorobenzene	361		500	72.2%
Benzyl Alcohol	364		500	72.8%
1,2-Dichlorobenzene	362		500	72.4%
2-Methylphenol	344		500	68.8%
4-Methylphenol	384		500	76.8%
2,4-Dimethylphenol	1100		1500	73.3%
Benzoic Acid	2120		2750	77.1%
1,2,4-Trichlorobenzene	454		500	90.8%
Naphthalene	397		500	79.4%
Hexachlorobutadiene	592	Q	500	118%
2-Methylnaphthalene	424		500	84.8%
Dimethylphthalate	378		500	75.6%
Acenaphthylene	367		500	73.4%
Acenaphthene	402		500	80.4%
Dibenzofuran	415		500	83.0%
Diethylphthalate	381		500	76.2%
Fluorene	401		500	80.2%
N-Nitrosodiphenylamine	359		500	71.8%
Hexachlorobenzene	489		500	97.8%
Pentachlorophenol	1330		1500	88.7%
Phenanthrene	423		500	84.6%
Anthracene	409		500	81.8%
Di-n-Butylphthalate	382		500	76.4%
Fluoranthene	425		500	85.0%
Pyrene	422		500	84.4%
Butylbenzylphthalate	333	Q	500	66.6%
Benzo(a)anthracene	458		500	91.6%
bis(2-Ethylhexyl)phthalate	382		500	76.4%
Chrysene	436		500	87.2%
Di-n-Octyl phthalate	361	Q	500	72.2%
Benzo(a)pyrene	438		500	87.6%
Indeno(1,2,3-cd)pyrene	410	Q	500	82.0%
Dibenz(a,h)anthracene	360	Q	500	72.0%

FORM III

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS
Page 2 of 2

Sample ID: LCS-020915
LAB CONTROL

Lab Sample ID: LCS-020915
LIMS ID: 15-2117
Matrix: Sediment
Date Analyzed: 02/12/15 16:25

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Analyte	Lab Control	Spike Added	Recovery
Benzo(g,h,i)perylene	370 Q	500	74.0%
Total Benzofluoranthenes	911	1000	91.1%

Semivolatile Surrogate Recovery	
d5-Nitrobenzene	79.8%
2-Fluorobiphenyl	75.2%
d14-p-Terphenyl	83.2%
d4-1,2-Dichlorobenzene	66.8%
d5-Phenol	68.3%
2-Fluorophenol	62.3%
2,4,6-Tribromophenol	112%
d4-2-Chlorophenol	63.7%

Reported in µg/kg (ppb)

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-020915	72.4%	69.6%	80.0%	65.4%	58.0%	54.4%	96.9%	59.9%	0
LCS-020915	79.8%	75.2%	83.2%	66.8%	68.3%	62.3%	112%	63.7%	0
S-09-0.33	70.8%	67.8%	69.6%	52.8%	56.0%	51.2%	93.2%	56.4%	0
S-09-0.33 DL	67.2%	67.2%	72.0%	52.8%	55.2%	48.0%	111%	52.8%	0
S-10-0.33	61.8%	69.0%	69.6%	54.0%	53.6%	49.2%	97.6%	51.2%	0
S-11-0.33	59.4%	57.0%	61.2%	47.4%	45.2%	42.0%	89.6%	44.0%	0
S-11-0.33 DL	54.0%	58.8%	62.4%	49.2%	48.0%	44.0%	93.6%	45.6%	0
S-12-0.33	54.0%	59.4%	61.2%	48.0%	43.6%	44.8%	79.2%	45.6%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(30-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(37-120)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(32-120)	(32-120)
(PHL) = d5-Phenol	(29-120)	(29-120)
(2FP) = 2-Fluorophenol	(27-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(24-134)	(24-134)
(2CP) = d4-2-Chlorophenol	(31-120)	(31-120)

Prep Method: SW3546
Log Number Range: 15-2117 to 15-2120

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: cc0212.d
Analysis Type:
Lab Sample ID: CC0212
Method: /chem1/nt10.i/20150212.b/ABN.m

Injection Date: 12-FEB-2015 12:11
Init. Cal. Date(s): 13-OCT-2014 13-OCT-2014
Init. Cal. Times: 14:18 19:12
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE
$ 1 2-Fluorophenol	1.41588	1.20842	1.20842	0.010	-14.65249	20.00000	Averaged
$ 2 Phenol-d5	1.77673	1.60984	1.60984	0.010	-9.39315	20.00000	Averaged
3 Phenol	1.68431	1.47971	1.47971	0.100	-12.14766	20.00000	Averaged
$ 5 2-Chlorophenol-d4	1.54071	1.26839	1.26839	0.010	-17.67469	20.00000	Averaged
4 Bis(2-Chloroethyl)ether	1.46464	1.18013	1.18013	0.700	-19.42550	20.00000	Averaged
6 2-Chlorophenol	1.40549	1.06218	1.06218	0.800	-24.42654	20.00000	Averaged <-
7 1,3-Dichlorobenzene	1.51511	1.31517	1.31517	0.010	-13.19650	20.00000	Averaged
9 1,4-Dichlorobenzene	1.46067	1.26423	1.26423	0.010	-13.44832	20.00000	Averaged
$ 10 1,2-Dichlorobenzene-d4	1.00119	0.89628	0.89628	0.010	-10.47807	20.00000	Averaged
12 1,2-Dichlorobenzene	1.41943	1.24464	1.24464	0.010	-12.31454	20.00000	Averaged
11 Benzyl alcohol	0.83596	0.69518	0.69518	0.010	-16.83975	20.00000	Averaged
14 2,2'-oxybis(1-Chloropropane	0.52047	0.41581	0.41581	0.010	-20.10869	20.00000	Averaged <-
13 2-Methylphenol	1.15498	0.93830	0.93830	0.700	-18.76085	20.00000	Averaged
17 Hexachloroethane	0.58704	0.51085	0.51085	0.300	-12.97946	20.00000	Averaged
16 N-Nitroso-di-n-propylamine	0.99169	0.91100	0.91100	0.500	-8.13617	20.00000	Averaged
15 4-Methylphenol	1.16774	0.94789	0.94789	0.600	-18.82740	20.00000	Averaged
$ 18 Nitrobenzene-d5	0.38479	0.37591	0.37591	0.010	-2.30737	20.00000	Averaged
19 Nitrobenzene	0.35037	0.33796	0.33796	0.200	-3.54288	20.00000	Averaged
20 Isophorone	0.62085	0.60203	0.60203	0.300	-3.03263	20.00000	Averaged
21 2-Nitrophenol	0.20052	0.18049	0.18049	0.100	-9.98910	20.00000	Averaged
22 2,4-Dimethylphenol	0.32677	0.31341	0.31341	0.200	-4.08717	20.00000	Averaged
23 Bis(2-Chloroethoxy)methane	0.42738	0.38928	0.38928	0.050	-8.91393	20.00000	Averaged
24 Benzoic acid	0.24736	0.21020	0.21020	0.010	-15.02259	20.00000	Averaged
25 2,4-Dichlorophenol	0.29492	0.29051	0.29051	0.100	-1.49459	20.00000	Averaged
26 1,2,4-Trichlorobenzene	0.31358	0.31013	0.31013	0.010	-1.09904	20.00000	Averaged
28 Naphthalene	0.92463	0.80851	0.80851	0.100	-12.55892	20.00000	Averaged
29 4-Chloroaniline	0.39749	0.33709	0.33709	0.010	-15.19510	20.00000	Averaged
30 Hexachlorobutadiene	0.17204	0.21719	0.21719	0.010	26.24753	20.00000	Averaged <-
31 4-Chloro-3-methylphenol	0.30010	0.27628	0.27628	0.200	-7.93533	20.00000	Averaged
32 2-Methylnaphthalene	0.68374	0.63985	0.63985	0.300	-6.41987	20.00000	Averaged
33 Hexachlorocyclopentadiene	0.39966	0.37463	0.37463	0.001	-6.26192	20.00000	Averaged
34 2,4,6-Trichlorophenol	0.39373	0.35947	0.35947	0.200	-8.70147	20.00000	Averaged
35 2,4,5-Trichlorophenol	0.41343	0.37017	0.37017	0.200	-10.46353	20.00000	Averaged
$ 36 2-Fluorobiphenyl	1.37749	1.28678	1.28678	0.010	-6.58540	20.00000	Averaged
37 2-Chloronaphthalene	1.12913	0.99452	0.99452	0.700	-11.92121	20.00000	Averaged

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: cc0212.d
Analysis Type:
Lab Sample ID: CC0212
Method: /chem1/nt10.i/20150212.b/ABN.m

Injection Date: 12-FEB-2015 12:11
Init. Cal. Date(s): 13-OCT-2014 13-OCT-2014
Init. Cal. Times: 14:18 19:12
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE
38 2-Nitroaniline	0.34302	0.31780	0.31780	0.010	-7.35376	20.00000	Averaged
39 Dimethylphthalate	1.35212	1.21900	1.21900	0.010	-9.84543	20.00000	Averaged
40 Acenaphthylene	1.71540	1.37626	1.37626	0.900	-19.77033	20.00000	Averaged
41 2,6-Dinitrotoluene	0.26964	0.24725	0.24725	0.100	-8.30125	20.00000	Averaged
43 3-Nitroaniline	0.31662	0.23142	0.23142	0.010	-26.90860	20.00000	Averaged <-
44 Acenaphthene	0.99968	0.87979	0.87979	0.100	-11.99285	20.00000	Averaged
45 2,4-Dinitrophenol	14.31379	20.00000	0.14979	0.030	-28.43103	20.00000	Linear <-
46 Dibenzofuran	1.51981	1.35607	1.35607	0.800	-10.77352	20.00000	Averaged
47 4-Nitrophenol	0.16352	0.14681	0.14681	0.010	-10.21686	20.00000	Averaged
48 2,4-Dinitrotoluene	0.36919	0.34522	0.34522	0.200	-6.49175	20.00000	Averaged
50 Diethylphthalate	1.33242	1.17125	1.17125	0.010	-12.09638	20.00000	Averaged
49 Fluorene	1.20100	1.03678	1.03678	0.100	-13.67355	20.00000	Averaged
51 4-Chlorophenyl-phenylether	0.67203	0.65891	0.65891	0.100	-1.95272	20.00000	Averaged
52 4-Nitroaniline	0.28535	0.24199	0.24199	0.010	-15.19663	20.00000	Averaged
53 4,6-Dinitro-2-methylphenol	0.13280	0.12534	0.12534	0.001	-5.61691	20.00000	Averaged
54 N-Nitrosodiphenylamine	0.52196	0.42596	0.42596	0.010	-18.39338	20.00000	Averaged
$ 55 2,4,6-Tribromophenol	0.19365	0.22550	0.22550	0.010	16.44835	20.00000	Averaged
56 4-Bromophenyl-phenylether	0.23056	0.24267	0.24267	0.100	5.24959	20.00000	Averaged
57 Hexachlorobenzene	0.22378	0.22969	0.22969	0.100	2.64476	20.00000	Averaged
58 Pentachlorophenol	0.15456	0.13593	0.13593	0.010	-12.05236	20.00000	Averaged
60 Phenanthrene	0.94797	0.82082	0.82082	0.700	-13.41285	20.00000	Averaged
61 Anthracene	0.99306	0.86168	0.86168	0.700	-13.23035	20.00000	Averaged
62 Carbazole	0.83609	0.58876	0.58876	0.010	-29.58200	20.00000	Averaged <-
63 Di-n-butylphthalate	1.43046	1.23187	1.23187	0.010	-13.88248	20.00000	Averaged
64 Fluoranthene	1.16501	0.97837	0.97837	0.600	-16.01994	20.00000	Averaged
65 Pyrene	1.22911	1.00731	1.00731	0.600	-18.04581	20.00000	Averaged
$ 66 Terphenyl-d14	0.69617	0.59960	0.59960	0.010	-13.87245	20.00000	Averaged
67 Butylbenzylphthalate	0.61201	0.44007	0.44007	0.010	-28.09466	20.00000	Averaged <-
68 Benzo(a)anthracene	1.14186	1.01625	1.01625	0.700	-11.00006	20.00000	Averaged
70 3,3'-Dichlorobenzidine	0.54582	0.47486	0.47486	0.010	-13.00161	20.00000	Averaged
71 Chrysene	0.95496	0.80489	0.80489	0.700	-15.71473	20.00000	Averaged
72 bis(2-Ethylhexyl)phthalate	0.53710	0.45403	0.45403	0.010	-15.46541	20.00000	Averaged
73 Di-n-octylphthalate	1.04327	0.81601	0.81601	0.010	-21.78365	20.00000	Averaged <-
74 Benzo(b)fluoranthene	1.11482	0.96309	0.96309	0.700	-13.60970	20.00000	Averaged
75 Benzo(k)fluoranthene	1.12675	1.04808	1.04808	0.700	-6.98240	20.00000	Averaged

Data File: /chem1/nt10.i/20150212.b/cc0212.d
Report Date: 16-Feb-2015 10:54

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: cc0212.d
Analysis Type:
Lab Sample ID: CC0212
Method: /chem1/nt10.i/20150212.b/ABN.m

Injection Date: 12-FEB-2015 12:11
Init. Cal. Date(s): 13-OCT-2014 13-OCT-2014
Init. Cal. Times: 14:18 19:12
Quant Type: ISTD

			CCAL	MIN		MAX		
COMPOUND	RRF / AMOUNT	RF5	RRF5	RRF	%D / %DRIFT	%D / %DRIFT	CURVE TYPE	
76 Benzo(a)pyrene	1.01590	0.88429	0.88429	0.700	-12.95531	20.00000	Averaged	
78 Indeno(1,2,3-cd)pyrene	1.15452	0.91377	0.91377	0.500	-20.85284	20.00000	Averaged	<-
79 Dibenzo(a,h)anthracene	0.93635	0.70670	0.70670	0.400	-24.52624	20.00000	Averaged	<-
80 Benzo(g,h,i)perylene	1.01228	0.77081	0.77081	0.500	-23.85465	20.00000	Averaged	<-
90 N-Nitrosodimethylamine	0.90065	0.67685	0.67685	0.010	-24.84920	20.00000	Averaged	<-
91 Aniline	1.70335	1.39492	1.39492	0.010	-18.10707	20.00000	Averaged	
93 Benzidine	1.92927	10.00000	0.09214	0.010	-80.70731	20.00000	Linear	<-
103 Pyridine	1.39368	1.02881	1.02881	0.010	-26.17991	20.00000	Averaged	<-
105 1-methylnaphthalene	0.68737	0.64541	0.64541	0.010	-6.10415	20.00000	Averaged	
111 Azobenzene (1,2-DP-Hydrazin	1.18740	0.97650	0.97650	0.010	-17.76087	20.00000	Averaged	
187 Total Benzofluoranthenes	1.07694	0.94477	0.94477	0.010	-12.27294	20.00000	Averaged	
99 Perylene	0.97948	0.83476	0.83476	0.010	-14.77581	20.00000	Averaged	
98 Retene	0.51823	0.43172	0.43172	0.010	-16.69458	20.00000	Averaged	
120 2,3,4,6-Tetrachlorophenol	0.63533	0.68206	0.68206	0.010	7.35640	20.00000	Averaged	

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: S-09-0.33**
Extraction Method: SW3546 **SAMPLE**
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Lab Sample ID: ZV37A
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/09/15
Date Analyzed: 02/12/15 17:01
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 2.65 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 70.7%

CAS Number	Analyte	LOQ	Result	
53-70-3	**Dibenz(a,h)anthracene**	**57**	**380**	
106-46-7	1,4-Dichlorobenzene	57	< 57	U
120-82-1	1,2,4-Trichlorobenzene	57	< 57	U
118-74-1	Hexachlorobenzene	57	< 57	U
87-68-3	Hexachlorobutadiene	57	< 57	U
131-11-3	Dimethylphthalate	57	< 57	U
85-68-7	**Butylbenzylphthalate**	**57**	**380**	
95-48-7	**2-Methylphenol**	**57**	**56**	**J**
105-67-9	2,4-Dimethylphenol	280	< 280	U
86-30-6	N-Nitrosodiphenylamine	57	< 57	U
100-51-6	**Benzyl Alcohol**	**230**	**380**	
87-86-5	**Pentachlorophenol**	**230**	**350**	
95-50-1	1,2-Dichlorobenzene	57	< 57	U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	48.4%
d14-p-Terphenyl	55.2%

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ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-10-0.33
SAMPLE

Lab Sample ID: ZV37B
LIMS ID: 15-2118
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/09/15
Date Analyzed: 02/12/15 17:37
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 5.45 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 45.7%

CAS Number	Analyte	LOQ	Result	
53-70-3	**Dibenz(a,h)anthracene**	**28**	**350**	
106-46-7	1,4-Dichlorobenzene	28	< 28	U
120-82-1	1,2,4-Trichlorobenzene	28	< 28	U
118-74-1	Hexachlorobenzene	28	< 28	U
87-68-3	Hexachlorobutadiene	28	< 28	U
131-11-3	**Dimethylphthalate**	**28**	**1,700**	
85-68-7	**Butylbenzylphthalate**	**28**	**57**	
95-48-7	2-Methylphenol	28	< 28	U
105-67-9	2,4-Dimethylphenol	140	< 140	U
86-30-6	N-Nitrosodiphenylamine	28	< 28	U
100-51-6	**Benzyl Alcohol**	**110**	**130**	
87-86-5	**Pentachlorophenol**	**110**	**320**	
95-50-1	1,2-Dichlorobenzene	28	< 28	U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	46.0%
d14-p-Terphenyl	54.0%

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ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-11-0.33
SAMPLE

Lab Sample ID: ZV37C
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/09/15
Date Analyzed: 02/12/15 18:13
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 2.08 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 70.3%

CAS Number	Analyte	LOQ	Result	
53-70-3	**Dibenz(a,h)anthracene**	**72**	**420**	
106-46-7	1,4-Dichlorobenzene	72	< 72	U
120-82-1	1,2,4-Trichlorobenzene	72	< 72	U
118-74-1	Hexachlorobenzene	72	< 72	U
87-68-3	Hexachlorobutadiene	72	< 72	U
131-11-3	Dimethylphthalate	72	< 72	U
85-68-7	**Butylbenzylphthalate**	**72**	**430**	
95-48-7	**2-Methylphenol**	**72**	**53**	**J**
105-67-9	2,4-Dimethylphenol	360	< 360	U
86-30-6	N-Nitrosodiphenylamine	72	< 72	U
100-51-6	**Benzyl Alcohol**	**290**	**330**	
87-86-5	**Pentachlorophenol**	**290**	**290**	**J**
95-50-1	1,2-Dichlorobenzene	72	< 72	U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	40.4%
d14-p-Terphenyl	47.4%

FORM I

ANALYTICAL
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ORGANICS ANALYSIS DATA SHEET

Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: S-12-0.33**
Extraction Method: SW3546 **SAMPLE**
Page 1 of 1

Lab Sample ID: ZV37D
LIMS ID: 15-2120
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/09/15
Date Analyzed: 02/12/15 18:49
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 2.66 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: 70.5%

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**56**	**210**
106-46-7	1,4-Dichlorobenzene	56	< 56 U
120-82-1	1,2,4-Trichlorobenzene	56	< 56 U
118-74-1	Hexachlorobenzene	56	< 56 U
87-68-3	Hexachlorobutadiene	56	< 56 U
131-11-3	Dimethylphthalate	56	< 56 U
85-68-7	**Butylbenzylphthalate**	**56**	**50 J**
95-48-7	**2-Methylphenol**	**56**	**60**
105-67-9	2,4-Dimethylphenol	280	< 280 U
86-30-6	N-Nitrosodiphenylamine	56	< 56 U
100-51-6	**Benzyl Alcohol**	**230**	**630**
87-86-5	**Pentachlorophenol**	**230**	**190 J**
95-50-1	1,2-Dichlorobenzene	56	< 56 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	42.4%
d14-p-Terphenyl	48.6%

ANALYTICAL
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ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: MB-020915**
Extraction Method: SW3546 **METHOD BLANK**
Page 1 of 1

Lab Sample ID: MB-020915
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted: 02/09/15
Date Analyzed: 02/12/15 15:49
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	**Analyte**	**LOQ**	**Result**
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	52.3%
d14-p-Terphenyl	62.4%

ANALYTICAL
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ORGANICS ANALYSIS DATA SHEET

Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: LCS-020915**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-020915
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted: 02/09/15
Date Analyzed LCS: 02/12/15 16:25
Instrument/Analyst LCS: NT10/YZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 1.0 mL
Dilution Factor LCS: 1.00

Analyte	**LCS**	**Spike Added**	**Recovery**
Dibenz(a,h)anthracene	358	500	71.6%
1,4-Dichlorobenzene	346	500	69.2%
1,2,4-Trichlorobenzene	398	500	79.6%
Hexachlorobenzene	447	500	89.4%
Hexachlorobutadiene	565 Q	500	113%
Dimethylphthalate	374	500	74.8%
Butylbenzylphthalate	334	500	66.8%
2-Methylphenol	321	500	64.2%
2,4-Dimethylphenol	947	1500	63.1%
N-Nitrosodiphenylamine	361	500	72.2%
Benzyl Alcohol	348	500	69.6%
Pentachlorophenol	1520	1500	101%
1,2-Dichlorobenzene	353	500	70.6%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	60.4%
d14-p-Terphenyl	65.8%

FORM III

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Client ID	FPH	TER	TOT OUT
MB-020915	52.3%	62.4%	0
LCS-020915	60.4%	65.8%	0
S-09-0.33	48.4%	55.2%	0
S-10-0.33	46.0%	54.0%	0
S-11-0.33	40.4%	47.4%	0
S-12-0.33	42.4%	48.6%	0

	LCS/MB LIMITS	QC LIMITS
(FPH) = 2-Fluorophenol	(32-120)	(27-120)
(TER) = d14-p-Terphenyl	(42-124)	(37-120)

Prep Method: SW3546
Log Number Range: 15-2117 to 15-2120

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i Injection Date: 12-FEB-2015 12:48
Lab File ID: cc0212a.d Init. Cal. Date(s): 13-OCT-2014 13-OCT-2014
Analysis Type: Init. Cal. Times: 14:18 19:12
Lab Sample ID: CC0212A Quant Type: ISTD
Method: /chem1/nt10.i/20150212.b/SIM.b/SIMABN2.m

			MIN		MAX	
COMPOUND	RRF / AMOUNT	RF1	RRF	%D / %DRIFT	%D / %DRIFT	CURVE TYPE
$ 1 2-Fluorophenol	1.41250	1.34716	0.010	-4.62565	20.00000	Averaged
3 Phenol	1.67007	1.72741	0.010	3.43363	20.00000	Averaged
7 1,3-Dichlorobenzene	1.61041	1.64395	0.010	2.08277	20.00000	Averaged
9 1,4-Dichlorobenzene	1.54812	1.61840	0.010	4.53966	20.00000	Averaged
11 Benzyl alcohol	0.97060	0.92971	0.010	-4.21287	20.00000	Averaged
12 1,2-Dichlorobenzene	1.49468	1.56489	0.010	4.69766	20.00000	Averaged
13 2-Methylphenol	1.14363	1.02995	0.010	-9.94045	20.00000	Averaged
15 4-Methylphenol	1.15578	1.01839	0.010	-11.88700	20.00000	Averaged
16 N-Nitroso-di-n-propylamine	0.92916	0.93390	0.050	0.51079	20.00000	Averaged
22 2,4-Dimethylphenol	0.34246	0.34082	0.010	-0.47779	20.00000	Averaged
26 1,2,4-Trichlorobenzene	0.34374	0.38687	0.010	12.54734	20.00000	Averaged
30 Hexachlorobutadiene	0.19212	0.29186	0.010	51.91522	20.00000	Averaged <-
39 Dimethylphthalate	1.44469	1.54889	0.010	7.21219	20.00000	Averaged
50 Diethylphthalate	1.52988	1.38871	0.010	-9.22727	20.00000	Averaged
54 N-Nitrosodiphenylamine	0.55328	0.58290	0.010	5.35261	20.00000	Averaged
57 Hexachlorobenzene	0.25317	0.29024	0.010	14.64087	20.00000	Averaged
58 Pentachlorophenol	0.15112	0.15857	0.005	4.93274	20.00000	Averaged
$ 66 Terphenyl-d14	0.55597	0.47977	0.010	-13.70557	20.00000	Averaged
67 Butylbenzylphthalate	0.56952	0.52533	0.010	-7.75884	20.00000	Averaged
79 Dibenzo(a,h)anthracene	0.92429	0.95368	0.010	3.18048	20.00000	Averaged
90 N-Nitrosodimethylamine	0.87839	0.73166	0.010	-16.70453	20.00000	Averaged

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ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-021115
METHOD BLANK

Lab Sample ID: MB-021115
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted: 02/11/15
Date Analyzed: 02/14/15 14:53
Instrument/Analyst: NT12/VTS
Silica Gel Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes

CAS Number	Analyte	RL	Result	Q
36643-28-4	Tributyltin Ion	3.9	< 3.9	U
14488-53-0	Dibutyltin Ion	5.8	< 5.8	U
78763-54-9	Butyltin Ion	4.1	< 4.1	U
1461-25-2	Tetrabutyl Tin	5.0	< 5.0	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery	
Tripropyl Tin Chloride	51.4%
Tripentyl Tin Chloride	62.4%

FORM I

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-09-0.33
SAMPLE

Lab Sample ID: ZV37A
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/11/15
Date Analyzed: 02/14/15 15:20
Instrument/Analyst: NT12/VTS
Silica Gel Cleanup: No

Sample Amount: 5.30 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes
Moisture: 70.7%

CAS Number	Analyte	RL	Result	Q
36643-28-4	Tributyltin Ion	3.6	18	
14488-53-0	Dibutyltin Ion	5.4	30	
78763-54-9	Butyltin Ion	3.8	14	
1461-25-2	Tetrabutyl Tin	4.7	< 4.7	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery	
Tripropyl Tin Chloride	42.4%
Tripentyl Tin Chloride	54.6%

FORM I

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-10-0.33
SAMPLE

Lab Sample ID: ZV37B
LIMS ID: 15-2118
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/11/15
Date Analyzed: 02/14/15 15:34
Instrument/Analyst: NT12/VTS
Silica Gel Cleanup: No

Sample Amount: 5.45 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes
Moisture: 45.7%

CAS Number	Analyte	RL	Result	Q
36643-28-4	Tributyltin Ion	3.6	4.0	
14488-53-0	Dibutyltin Ion	5.3	5.1	J
78763-54-9	Butyltin Ion	3.7	7.5	
1461-25-2	Tetrabutyl Tin	4.6	< 4.6	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery	
Tripropyl Tin Chloride	48.7%
Tripentyl Tin Chloride	89.5%

FORM I

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-11-0.33
SAMPLE

Lab Sample ID: ZV37C
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/11/15
Date Analyzed: 02/14/15 15:48
Instrument/Analyst: NT12/VTS
Silica Gel Cleanup: No

Sample Amount: 5.08 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes
Moisture: 70.3%

CAS Number	Analyte	RL	Result	Q
36643-28-4	Tributyltin Ion	3.8	49	
14488-53-0	Dibutyltin Ion	5.7	80	
78763-54-9	Butyltin Ion	4.0	33	
1461-25-2	Tetrabutyl Tin	4.9	< 4.9	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery	
Tripropyl Tin Chloride	37.8%
Tripentyl Tin Chloride	66.8%

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-12-0.33
SAMPLE

Lab Sample ID: ZV37D
LIMS ID: 15-2120
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/11/15
Date Analyzed: 02/14/15 16:01
Instrument/Analyst: NT12/VTS
Silica Gel Cleanup: No

Sample Amount: 5.03 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes
Moisture: 70.5%

CAS Number	Analyte	RL	Result	Q
36643-28-4	**Tributyltin Ion**	**3.8**	**14**	
14488-53-0	**Dibutyltin Ion**	**5.8**	**47**	
78763-54-9	**Butyltin Ion**	**4.1**	**34**	
1461-25-2	Tetrabutyl Tin	5.0	< 5.0	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery	
Tripropyl Tin Chloride	28.2%
Tripentyl Tin Chloride	39.8%

FORM I

TBT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
Event: NA

Client ID	TPRT	TPNT	TOT OUT
MB-021115	51.4%	62.4%	0
LCS-021115	58.4%	69.1%	0
S-09-0.33	42.4%	54.6%	0
S-10-0.33	48.7%	89.5%	0
S-11-0.33	37.8%	66.8%	0
S-12-0.33	28.2%	39.8%*	1

	QC LIMITS
(TPRT) = Tripropyl Tin Chloride	(25-120)
(TPNT) = Tripentyl Tin Chloride	(40-120)

Prep Method: SW3546
Analytical Method: TBT (Hexyl) 8270D-SIM
Log Number Range: 15-2117 to 15-2120

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by SW8270D-SIM GC/MS
Page 1 of 1

Sample ID: LCS-021115
LAB CONTROL SAMPLE

Lab Sample ID: LCS-021115
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/17/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

Date Extracted LCS: 02/11/15
Date Analyzed LCS: 02/14/15 15:07
Instrument/Analyst LCS: NT12/VTS
Silica Gel Cleanup: No

Sample Amount LCS: 5.00 g-dry-wt
Final Extract Volume LCS: 0.50 mL
Dilution Factor LCS: 1.00
Alumina Cleanup: Yes

Analyte	**LCS**	**Spike Added**	**Recovery**
Tributyltin Ion	30.1	44.6	67.5%
Dibutyltin Ion	24.8	38.4	64.6%
Butyltin Ion	20.9	31.2	67.0%

Reported in µg/kg (ppb)

TBT Surrogate Recovery	
Tripropyl Tin Chloride	58.4%
Tripentyl Tin Chloride	69.1%

FORM III

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-022315

Lab Sample ID: MB-022315
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 02/23/15
Date Analyzed: 03/03/15 17:59
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0480	1.00	< 0.0480	U
2,3,7,8-TCDD		0.65-0.89	0.0560	1.00	< 0.0560	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0480	1.00	< 0.0480	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0480	1.00	< 0.0480	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0580	1.00	< 0.0580	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0520	1.00	< 0.0520	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0520	1.00	< 0.0520	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0540	1.00	< 0.0540	U
1,2,3,7,8,9-HxCDF		1.05-1.43	0.0640	1.00	< 0.0640	U
1,2,3,4,7,8-HxCDD	0.47	1.05-1.43		1.00	0.0880	JEMPC
1,2,3,6,7,8-HxCDD	1.00	1.05-1.43		1.00	0.0920	JEMPC
1,2,3,7,8,9-HxCDD	0.90	1.05-1.43		1.00	0.120	JEMPC
1,2,3,4,6,7,8-HpCDF	1.01	0.88-1.20		1.00	0.206	J
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.0760	1.00	< 0.0760	U
1,2,3,4,6,7,8-HpCDD	1.10	0.88-1.20		1.00	2.35	
OCDF	0.89	0.76-1.02		2.00	0.506	J
OCDD	0.94	0.76-1.02		2.00	12.5	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0480	1.00	< 0.0480	U
Total TCDD	0.0560	1.00	< 0.0560	U
Total PeCDF	0.0480	2.00	< 0.0480	U
Total PeCDD	0.0580	1.00	0.0678	EMPC
Total HxCDF	0.0640	2.00	0.177	EMPC
Total HxCDD		2.00	1.63	EMPC
Total HpCDF		2.00	0.590	EMPC
Total HpCDD		2.00	5.60	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.06

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.14

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-022315

Lab Sample ID: MB-022315
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 02/23/15
Date Analyzed: 03/03/15 17:59
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	86.7	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	89.3	25-164	
13C-1,2,3,7,8-PeCDF	1.59	1.32-1.78	98.2	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	96.3	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	102	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	93.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	95.6	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	92.2	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	87.2	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	97.2	32-141	
13C-1,2,3,6,7,8-HxCDD	1.27	1.05-1.43	93.6	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	83.0	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	91.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	94.6	23-140	
13C-OCDD	0.90	0.76-1.02	79.5	17-157	
37Cl4-2,3,7,8-TCDD			102	35-197	

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: OPR-022315

Lab Sample ID: OPR-022315
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 02/23/15
Date Analyzed: 03/03/15 18:53
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.73	0.65-0.89	1.00	22.5
2,3,7,8-TCDD	0.79	0.65-0.89	1.00	23.1
1,2,3,7,8-PeCDF	1.44	1.32-1.78	1.00	109
2,3,4,7,8-PeCDF	1.45	1.32-1.78	1.00	110
1,2,3,7,8-PeCDD	1.57	1.32-1.78	1.00	103
1,2,3,4,7,8-HxCDF	1.17	1.05-1.43	1.00	110
1,2,3,6,7,8-HxCDF	1.15	1.05-1.43	1.00	110
2,3,4,6,7,8-HxCDF	1.16	1.05-1.43	1.00	112
1,2,3,7,8,9-HxCDF	1.15	1.05-1.43	1.00	112
1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	1.00	108
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	1.00	108
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43	1.00	108
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20	1.00	120
1,2,3,4,7,8,9-HpCDF	1.00	0.88-1.20	1.00	111
1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	1.00	113
OCDF	0.86	0.76-1.02	2.00	210
OCDD	0.89	0.76-1.02	2.00	228

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	23.6	EMPC
Total TCDD		1.00	23.8	EMPC
Total PeCDF		2.00	224	EMPC
Total PeCDD		1.00	104	EMPC
Total HxCDF		2.00	446	EMPC
Total HxCDD		2.00	326	EMPC
Total HpCDF		2.00	232	EMPC
Total HpCDD		2.00	117	

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-022315

Lab Sample ID: OPR-022315
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 02/23/15
Date Analyzed: 03/03/15 18:53
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	61.8	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	74.2	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	98.0	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	95.4	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	102	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	89.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	91.0	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	90.7	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	89.6	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	95.4	32-141	
13C-1,2,3,6,7,8-HxCDD	1.27	1.05-1.43	93.6	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	84.8	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	91.0	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	94.0	23-140	
13C-OCDD	0.90	0.76-1.02	77.6	17-157	
37Cl4-2,3,7,8-TCDD			86.2	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

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Sample ID: OPR-022315

Lab Sample ID: OPR-022315
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 02/23/15
Date Analyzed: 03/03/15 18:53
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	22.5	20.0	112	75-158
2,3,7,8-TCDD	23.1	20.0	116	67-158
1,2,3,7,8-PeCDF	109	100	109	80-134
2,3,4,7,8-PeCDF	110	100	110	68-160
1,2,3,7,8-PeCDD	103	100	103	70-142
1,2,3,4,7,8-HxCDF	110	100	110	72-134
1,2,3,6,7,8-HxCDF	110	100	110	84-130
2,3,4,6,7,8-HxCDF	112	100	112	70-156
1,2,3,7,8,9-HxCDF	112	100	112	78-130
1,2,3,4,7,8-HxCDD	108	100	108	70-164
1,2,3,6,7,8-HxCDD	108	100	108	76-134
1,2,3,7,8,9-HxCDD	108	100	108	64-162
1,2,3,4,6,7,8-HpCDF	120	100	120	82-132
1,2,3,4,7,8,9-HpCDF	111	100	111	78-138
1,2,3,4,6,7,8-HpCDD	113	100	113	70-140
OCDF	210	200	105	63-170
OCDD	228	200	114	78-144

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-030615

Lab Sample ID: MB-030615
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 03/06/15
Date Analyzed: 03/10/15 13:55
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0360	1.00	< 0.0360	U
2,3,7,8-TCDD	0.11	0.65-0.89		1.00	0.142	JEMPC
1,2,3,7,8-PeCDF	1.39	1.32-1.78		1.00	0.0740	J
2,3,4,7,8-PeCDF		1.32-1.78	0.0420	1.00	< 0.0420	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0500	1.00	< 0.0500	U
1,2,3,4,7,8-HxCDF	0.70	1.05-1.43		1.00	0.0720	JEMPC
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0500	1.00	< 0.0500	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0540	1.00	< 0.0540	U
1,2,3,7,8,9-HxCDF	1.48	1.05-1.43		1.00	0.0720	JEMPC
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0560	1.00	< 0.0560	U
1,2,3,6,7,8-HxCDD		1.05-1.43	0.0580	1.00	< 0.0580	U
1,2,3,7,8,9-HxCDD		1.05-1.43	0.0600	1.00	< 0.0600	U
1,2,3,4,6,7,8-HpCDF	0.76	0.88-1.20		1.00	0.222	JEMPC
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.0640	1.00	< 0.0640	U
1,2,3,4,6,7,8-HpCDD	0.83	0.88-1.20		1.00	1.14	EMPC
OCDF	0.60	0.76-1.02		2.00	0.354	JEMPC
OCDD	0.90	0.76-1.02		2.00	6.82	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0360	1.00	0.0390	EMPC
Total TCDD		1.00	0.141	EMPC
Total PeCDF		2.00	0.315	EMPC
Total PeCDD	0.0500	1.00	< 0.0500	U
Total HxCDF		2.00	0.321	EMPC
Total HxCDD	0.0600	2.00	0.319	
Total HpCDF		2.00	0.493	EMPC
Total HpCDD		2.00	2.40	EMPC

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.17

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.22

Reported in pg/g

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ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-030615

Lab Sample ID: MB-030615
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 03/06/15
Date Analyzed: 03/10/15 13:55
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.79	0.65-0.89	101	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	99.0	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	103	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	101	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	107	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	103	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	108	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	99.4	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	94.0	29-147	
13C-1,2,3,4,7,8-HxCDD	1.29	1.05-1.43	106	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	105	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	89.2	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	98.1	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	104	23-140	
13C-OCDD	0.89	0.76-1.02	90.0	17-157	
37Cl4-2,3,7,8-TCDD			121	35-197	

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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ANALYTICAL RESOURCES INCORPORATED

Sample ID: OPR-030615

Lab Sample ID: OPR-030615
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized: MW
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 03/06/15
Date Analyzed: 03/10/15 14:49
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.70	0.65-0.89	1.00	22.2
2,3,7,8-TCDD	0.81	0.65-0.89	1.00	22.9
1,2,3,7,8-PeCDF	1.44	1.32-1.78	1.00	111
2,3,4,7,8-PeCDF	1.45	1.32-1.78	1.00	111
1,2,3,7,8-PeCDD	1.56	1.32-1.78	1.00	105
1,2,3,4,7,8-HxCDF	1.17	1.05-1.43	1.00	112
1,2,3,6,7,8-HxCDF	1.18	1.05-1.43	1.00	110
2,3,4,6,7,8-HxCDF	1.18	1.05-1.43	1.00	112
1,2,3,7,8,9-HxCDF	1.18	1.05-1.43	1.00	115
1,2,3,4,7,8-HxCDD	1.25	1.05-1.43	1.00	109
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	1.00	110
1,2,3,7,8,9-HxCDD	1.26	1.05-1.43	1.00	113
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20	1.00	120
1,2,3,4,7,8,9-HpCDF	0.98	0.88-1.20	1.00	111
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	1.00	113
OCDF	0.86	0.76-1.02	2.00	200
OCDD	0.90	0.76-1.02	2.00	220

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	23.3	EMPC
Total TCDD		1.00	23.6	
Total PeCDF		2.00	227	EMPC
Total PeCDD		1.00	106	EMPC
Total HxCDF		2.00	451	EMPC
Total HxCDD		2.00	333	EMPC
Total HpCDF		2.00	231	
Total HpCDD		2.00	116	

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: OPR-030615

Lab Sample ID: OPR-030615
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 03/06/15
Date Analyzed: 03/10/15 14:49
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	79.6	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	85.4	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	95.4	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	96.2	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	99.5	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	82.4	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	85.2	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	84.2	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	82.8	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	87.4	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	87.1	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	78.1	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	79.7	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	86.3	23-140	
13C-OCDD	0.90	0.76-1.02	72.0	17-157	
37Cl4-2,3,7,8-TCDD			101	35-197	

Reported in Percent Recovery

ANALYTICAL
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ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: OPR-030615

Lab Sample ID: OPR-030615
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 03/06/15
Date Analyzed: 03/10/15 14:49
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	22.2	20.0	111	75-158
2,3,7,8-TCDD	22.9	20.0	114	67-158
1,2,3,7,8-PeCDF	111	100	111	80-134
2,3,4,7,8-PeCDF	111	100	111	68-160
1,2,3,7,8-PeCDD	105	100	105	70-142
1,2,3,4,7,8-HxCDF	112	100	112	72-134
1,2,3,6,7,8-HxCDF	110	100	110	84-130
2,3,4,6,7,8-HxCDF	112	100	112	70-156
1,2,3,7,8,9-HxCDF	115	100	115	78-130
1,2,3,4,7,8-HxCDD	109	100	109	70-164
1,2,3,6,7,8-HxCDD	110	100	110	76-134
1,2,3,7,8,9-HxCDD	113	100	113	64-162
1,2,3,4,6,7,8-HpCDF	120	100	120	82-132
1,2,3,4,7,8,9-HpCDF	111	100	111	78-138
1,2,3,4,6,7,8-HpCDD	113	100	113	70-140
OCDF	200	200	100	63-170
OCDD	220	200	110	78-144

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: S-09-0.33

Lab Sample ID: ZV37A
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/23/15
Date Analyzed: 03/03/15 14:26
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.74	0.65-0.89		0.992	4.35	
2,3,7,8-TCDD	0.72	0.65-0.89		0.992	4.31	
1,2,3,7,8-PeCDF	1.51	1.32-1.78		0.992	5.83	
2,3,4,7,8-PeCDF	1.33	1.32-1.78		0.992	7.12	
1,2,3,7,8-PeCDD	1.59	1.32-1.78		0.992	42.7	
1,2,3,4,7,8-HxCDF	1.17	1.05-1.43		0.992	40.5	
1,2,3,6,7,8-HxCDF	1.15	1.05-1.43		0.992	41.1	
2,3,4,6,7,8-HxCDF	1.15	1.05-1.43		0.992	63.9	
1,2,3,7,8,9-HxCDF	1.11	1.05-1.43		0.992	9.34	
1,2,3,4,7,8-HxCDD	1.28	1.05-1.43		0.992	87.8	
1,2,3,6,7,8-HxCDD	1.23	1.05-1.43		0.992	197	
1,2,3,7,8,9-HxCDD	1.26	1.05-1.43		0.992	198	
1,2,3,4,6,7,8-HpCDF	1.00	0.88-1.20		0.992	1,120	
1,2,3,4,7,8,9-HpCDF	0.95	0.88-1.20		0.992	69.1	
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		9.92	4,760	#
OCDF	0.85	0.76-1.02		1.98	3,850	
OCDD	0.89	0.76-1.02		19.8	36,200	#

Homologue Group	EDL	RL	Result	
Total TCDF		0.992	94.6	EMPC
Total TCDD		0.992	41.6	EMPC
Total PeCDF		1.98	335	EMPC
Total PeCDD		0.992	173	
Total HxCDF		1.98	1,300	EMPC
Total HxCDD		1.98	1,250	
Total HpCDF		1.98	2,970	
Total HpCDD		1.98	7,920	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 185

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 185

#-Result from diluted secondary analysis.

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

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Dioxins/Furans by EPA 1613B
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Sample ID: S-09-0.33

Lab Sample ID: ZV37A
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/23/15
Date Analyzed: 03/03/15 14:26
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	50.2	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	47.6	25-164	
13C-1,2,3,7,8-PeCDF	1.59	1.32-1.78	46.0	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	45.7	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	48.5	25-181	
13C-1,2,3,4,7,8-HxCDF	0.50	0.43-0.59	46.6	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	47.4	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	47.0	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	46.2	29-147	
13C-1,2,3,4,7,8-HxCDD	1.30	1.05-1.43	48.6	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	49.3	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	41.9	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	45.2	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	47.0	23-140	
13C-OCDD	0.89	0.76-1.02	44.3	17-157	
37Cl4-2,3,7,8-TCDD			86.6	35-197	

Reported in Percent Recovery

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: S-09-0.33
DILUTION

Lab Sample ID: ZV37A
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/23/15
Date Analyzed: 03/05/15 11:43
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 10.0

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20	55.5	23-140	
13C-OCDD	0.88	0.76-1.02	50.5	17-157	
37Cl4-2,3,7,8-TCDD			99.1	35-197	

Reported in Percent Recovery

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: S-10-0.33

Lab Sample ID: ZV37B
LIMS ID: 15-2118
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/23/15
Date Analyzed: 03/03/15 15:18
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.65	0.65-0.89		0.984	2.23	EMPC
2,3,7,8-TCDD	0.79	0.65-0.89		0.984	2.49	
1,2,3,7,8-PeCDF	1.40	1.32-1.78		0.984	2.86	X
2,3,4,7,8-PeCDF	1.49	1.32-1.78		0.984	3.66	
1,2,3,7,8-PeCDD	1.56	1.32-1.78		0.984	20.9	
1,2,3,4,7,8-HxCDF	1.14	1.05-1.43		0.984	22.6	
1,2,3,6,7,8-HxCDF	1.13	1.05-1.43		0.984	19.8	
2,3,4,6,7,8-HxCDF	1.20	1.05-1.43		0.984	30.1	
1,2,3,7,8,9-HxCDF	1.16	1.05-1.43		0.984	5.41	
1,2,3,4,7,8-HxCDD	1.25	1.05-1.43		0.984	42.7	
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43		0.984	96.4	
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43		0.984	90.1	
1,2,3,4,6,7,8-HpCDF	0.99	0.88-1.20		0.984	566	
1,2,3,4,7,8,9-HpCDF	0.98	0.88-1.20		0.984	48.8	
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		9.84	2,590	#
OCDF	0.85	0.76-1.02		1.97	2,430	
OCDD	0.89	0.76-1.02		19.7	25,700	#

Homologue Group	EDL	RL	Result	
Total TCDF		0.984	55.5	EMPC
Total TCDD		0.984	23.8	EMPC
Total PeCDF		1.97	168	EMPC
Total PeCDD		0.984	87.3	
Total HxCDF		1.97	649	EMPC
Total HxCDD		1.97	614	
Total HpCDF		1.97	1,810	EMPC
Total HpCDD		1.97	4,340	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 96.0

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 96.0

#-Result from diluted secondary analysis.

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: S-10-0.33

Lab Sample ID: ZV37B
LIMS ID: 15-2118
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/23/15
Date Analyzed: 03/03/15 15:18
Instrument/Analyst: AS1/PK

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	85.8	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	79.0	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	76.5	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	76.7	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	81.9	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	81.1	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	80.9	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	78.6	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	74.3	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	86.1	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	81.9	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	71.6	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	75.5	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	78.3	23-140	
13C-OCDD	0.91	0.76-1.02	65.1	17-157	
37Cl4-2,3,7,8-TCDD			104	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: S-10-0.33
DILUTION

Lab Sample ID: ZV37B
LIMS ID: 15-2118
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/23/15
Date Analyzed: 03/05/15 13:28
Instrument/Analyst: AS1/PK

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 10.0

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	81.6	23-140	
13C-OCDD	0.91	0.76-1.02	72.1	17-157	
37Cl4-2,3,7,8-TCDD			105	35-197	

Reported in Percent Recovery

ANALYTICAL
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ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: S-11-0.33

Lab Sample ID: ZV37C
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 03/06/15
Date Analyzed: 03/10/15 13:03
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result		
2,3,7,8-TCDF	0.72	0.65-0.89		0.998	7.30		
2,3,7,8-TCDD	0.81	0.65-0.89		0.998	4.96		
1,2,3,7,8-PeCDF	1.52	1.32-1.78		0.998	6.21		
2,3,4,7,8-PeCDF	1.53	1.32-1.78		0.998	7.59		
1,2,3,7,8-PeCDD	1.61	1.32-1.78		0.998	43.5		
1,2,3,4,7,8-HxCDF	1.18	1.05-1.43		0.998	43.3		
1,2,3,6,7,8-HxCDF	1.14	1.05-1.43		0.998	39.5		
2,3,4,6,7,8-HxCDF	1.17	1.05-1.43		0.998	62.7		
1,2,3,7,8,9-HxCDF	1.17	1.05-1.43		0.998	10.2		
1,2,3,4,7,8-HxCDD	1.23	1.05-1.43		0.998	88.9		
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43		0.998	204		
1,2,3,7,8,9-HxCDD	1.25	1.05-1.43		0.998	190		
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20		0.998	1,060		
1,2,3,4,7,8,9-HpCDF	0.99	0.88-1.20		0.998	81.0		
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		9.98	5,390		#
OCDF	0.85	0.76-1.02		2.00	3,600		
OCDD	0.89	0.76-1.02		20.0	43,800	E	#

Homologue Group	EDL	RL	Result	
Total TCDF		0.998	86.4	EMPC
Total TCDD		0.998	27.2	EMPC
Total PeCDF		2.00	277	EMPC
Total PeCDD		0.998	170	
Total HxCDF		2.00	1,250	EMPC
Total HxCDD		2.00	1,270	EMPC
Total HpCDF		2.00	3,050	EMPC
Total HpCDD		2.00	8,840	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 195

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 195

#-Result from diluted secondary analysis.

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: S-11-0.33

Lab Sample ID: ZV37C
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 03/06/15
Date Analyzed: 03/10/15 13:03
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	23.8	24-169	*
13C-2,3,7,8-TCDD	0.76	0.65-0.89	49.2	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	72.6	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	73.1	21-178	
13C-1,2,3,7,8-PeCDD	1.60	1.32-1.78	80.4	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	78.9	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	79.2	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	77.7	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	77.0	29-147	
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	84.4	32-141	
13C-1,2,3,6,7,8-HxCDD	1.27	1.05-1.43	83.7	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	68.1	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.43	0.37-0.51	71.2	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	75.2	23-140	
13C-OCDD	0.91	0.76-1.02	67.3	17-157	
37Cl4-2,3,7,8-TCDD			63.0	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: S-11-0.33
DILUTION

Lab Sample ID: ZV37C
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized: MW
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 03/06/15
Date Analyzed: 03/10/15 19:16
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 10.0

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	80.9	23-140	
13C-OCDD	0.92	0.76-1.02	74.9	17-157	
37Cl4-2,3,7,8-TCDD			59.8	35-197	

Reported in Percent Recovery

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: S-12-0.33

Lab Sample ID: ZV37D
LIMS ID: 15-2120
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/23/15
Date Analyzed: 03/03/15 17:05
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.68	0.65-0.89		0.999	4.62	
2,3,7,8-TCDD	0.79	0.65-0.89		0.999	4.87	
1,2,3,7,8-PeCDF	1.47	1.32-1.78		0.999	5.21	
2,3,4,7,8-PeCDF	1.56	1.32-1.78		0.999	6.24	
1,2,3,7,8-PeCDD	1.56	1.32-1.78		0.999	39.3	
1,2,3,4,7,8-HxCDF	1.13	1.05-1.43		0.999	33.5	
1,2,3,6,7,8-HxCDF	1.18	1.05-1.43		0.999	34.3	
2,3,4,6,7,8-HxCDF	1.17	1.05-1.43		0.999	51.4	
1,2,3,7,8,9-HxCDF	1.12	1.05-1.43		0.999	8.02	
1,2,3,4,7,8-HxCDD	1.25	1.05-1.43		0.999	75.4	
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43		0.999	168	
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43		0.999	170	
1,2,3,4,6,7,8-HpCDF	0.99	0.88-1.20		0.999	864	
1,2,3,4,7,8,9-HpCDF	0.95	0.88-1.20		0.999	57.5	
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		9.99	4,090	#
OCDF	0.85	0.76-1.02		2.00	2,820	
OCDD	0.89	0.76-1.02		20.0	30,400	#

Homologue Group	EDL	RL	Result	
Total TCDF		0.999	85.1	EMPC
Total TCDD		0.999	42.0	EMPC
Total PeCDF		2.00	286	EMPC
Total PeCDD		0.999	156	
Total HxCDF		2.00	1,020	EMPC
Total HxCDD		2.00	1,090	
Total HpCDF		2.00	2,310	EMPC
Total HpCDD		2.00	6,730	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 161

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 161

#-Result from diluted secondary analysis.

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: S-12-0.33

Lab Sample ID: ZV37D
LIMS ID: 15-2120
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/23/15
Date Analyzed: 03/03/15 17:05
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	46.1	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	48.0	25-164	
13C-1,2,3,7,8-PeCDF	1.59	1.32-1.78	48.3	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	48.5	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	52.1	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	47.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	47.0	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	46.7	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	45.2	29-147	
13C-1,2,3,4,7,8-HxCDD	1.29	1.05-1.43	50.5	32-141	
13C-1,2,3,6,7,8-HxCDD	1.28	1.05-1.43	48.1	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	42.1	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	46.4	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20	47.3	23-140	
13C-OCDD	0.90	0.76-1.02	42.2	17-157	
37Cl4-2,3,7,8-TCDD			97.0	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: S-12-0.33
DILUTION

Lab Sample ID: ZV37D
LIMS ID: 15-2120
Matrix: Sediment
Data Release Authorized:
Reported: 03/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina
NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/23/15
Date Analyzed: 03/05/15 12:34
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 10.0

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20	50.9	23-140	
13C-OCDD	0.89	0.76-1.02	44.4	17-157	
37Cl4-2,3,7,8-TCDD			100	35-197	

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-021015
METHOD BLANK

Lab Sample ID: MB-021015
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/16/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

Date Extracted: 02/10/15
Date Analyzed: 02/14/15 05:11
Instrument/Analyst: ECD7/PK
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	98.0%
Tetrachlorometaxylene	75.8%

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-09-0.33
SAMPLE

Lab Sample ID: ZV37A
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized: mw
Reported: 02/16/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/10/15
Date Analyzed: 02/14/15 06:16
Instrument/Analyst: ECD7/PK
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.28 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 70.7%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	**Aroclor 1254**	**19**	**51**
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	90.2%
Tetrachlorometaxylene	63.2%

ANALYTICAL
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INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-10-0.33
SAMPLE

Lab Sample ID: ZV37B
LIMS ID: 15-2118
Matrix: Sediment
Data Release Authorized:
Reported: 02/16/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/10/15
Date Analyzed: 02/14/15 06:37
Instrument/Analyst: ECD7/PK
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.45 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 45.7%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	18	< 18 U
53469-21-9	Aroclor 1242	18	< 18 U
12672-29-6	Aroclor 1248	18	< 18 U
11097-69-1	**Aroclor 1254**	**18**	**180**
11096-82-5	**Aroclor 1260**	**18**	**43**
11104-28-2	Aroclor 1221	18	< 18 U
11141-16-5	Aroclor 1232	18	< 18 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	97.2%
Tetrachlorometaxylene	74.0%

FORM I

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-11-0.33
SAMPLE

Lab Sample ID: ZV37C
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 02/16/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/10/15
Date Analyzed: 02/14/15 06:59
Instrument/Analyst: ECD7/PK
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.08 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 70.3%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	34	< 34 Y
11097-69-1	**Aroclor 1254**	**20**	**100**
11096-82-5	**Aroclor 1260**	**20**	**49**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	93.2%
Tetrachlorometaxylene	63.2%

FORM I

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: S-12-0.33
SAMPLE

Lab Sample ID: ZV37D
LIMS ID: 15-2120
Matrix: Sediment
Data Release Authorized:
Reported: 02/16/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/05/15

Date Extracted: 02/10/15
Date Analyzed: 02/14/15 07:20
Instrument/Analyst: ECD7/PK
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.02 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 70.5%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**58**
11096-82-5	**Aroclor 1260**	**20**	**30**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	90.8%
Tetrachlorometaxylene	71.8%

FORM I

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-021015	98.0%	40-133	75.8%	53-120	0
LCS-021015	92.5%	40-133	71.0%	53-120	0
S-09-0.33	90.2%	40-133	63.2%	53-120	0
S-10-0.33	97.2%	40-133	74.0%	53-120	0
S-11-0.33	93.2%	40-133	63.2%	53-120	0
S-12-0.33	90.8%	40-133	71.8%	53-120	0

Microwave (MARS) Control Limits PCBSMP
Prep Method: SW3546
Log Number Range: 15-2117 to 15-2120

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Page 1 of 1

Sample ID: LCS-021015
LAB CONTROL

Lab Sample ID: LCS-021015
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/16/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

Date Extracted: 02/10/15
Date Analyzed: 02/14/15 05:33
Instrument/Analyst: ECD7/PK
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	**Lab Control**	**Spike Added**	**Recovery**
Aroclor 1016	418	500	83.6%
Aroclor 1260	417	500	83.4%

PCB Surrogate Recovery

Decachlorobiphenyl	92.5%
Tetrachlorometaxylene	71.0%

Results reported in µg/kg (ppb)

FORM III

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Matrix: Sediment

Date Received: 02/05/15

Data Release Authorized:
Reported: 02/11/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
MB-020915	Method Blank	02/09/15	02/10/15	10.0	Diesel Range	50	< 50 U
15-2117	HC ID: ---		FID3B	1.0	Motor Oil Range	100	< 100 U
					o-Terphenyl		85.7%
ZV37A	S-09-0.33	02/09/15	02/10/15	10.0	**Diesel Range**	170	2,400
15-2117	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	340	8,500
					o-Terphenyl		75.3%
ZV37B	S-10-0.33	02/09/15	02/10/15	10.0	**Diesel Range**	92	470
15-2118	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	180	3,900
					o-Terphenyl		78.1%
ZV37C	S-11-0.33	02/09/15	02/10/15	10.0	**Diesel Range**	170	2,300
15-2119	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	340	8,300
					o-Terphenyl		79.4%
ZV37D	S-12-0.33	02/09/15	02/10/15	10.0	**Diesel Range**	170	1,600
15-2120	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	340	6,000
					o-Terphenyl		76.5%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Client ID	OTER	TOT OUT
020915MBS	85.7%	0
020915LCS	81.1%	0
S-09-0.33	75.3%	0
S-10-0.33	78.1%	0
S-11-0.33	79.4%	0
S-12-0.33	76.5%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 15-2117 to 15-2120

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-020915
LAB CONTROL

Lab Sample ID: LCS-020915
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/11/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

Date Extracted: 02/09/15
Date Analyzed: 02/10/15 20:32
Instrument/Analyst: FID3B/ML

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 10 mL
Dilution Factor: 1.00

Range	**Lab Control**	**Spike Added**	**Recovery**
Diesel	1,150	1,500	76.7%

TPHD Surrogate Recovery	
o-Terphenyl	81.1%

Results reported in mg/kg

FORM III

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: ZV37
Project: Geddes Marina

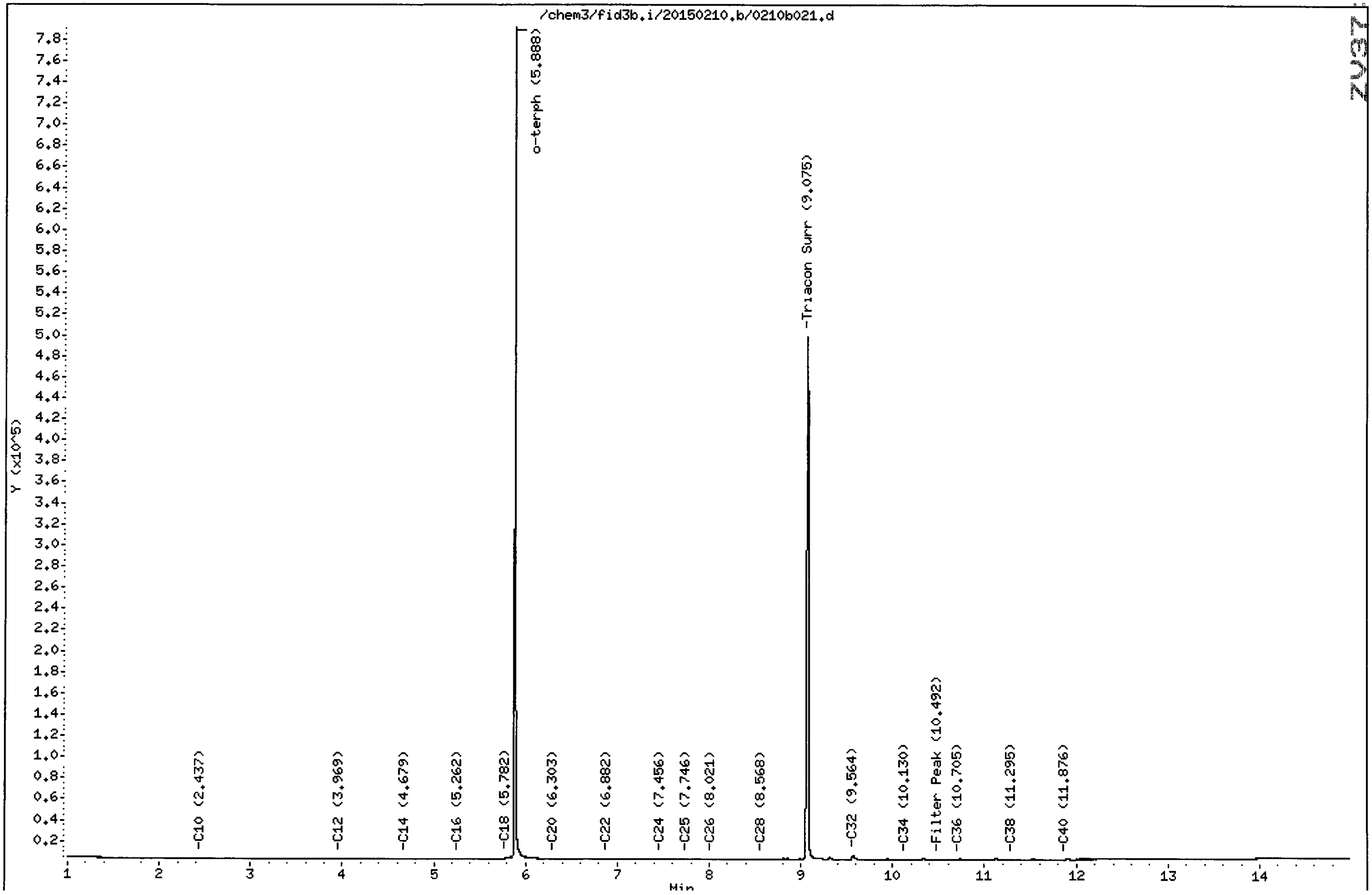
Matrix: Sediment
Date Received: 02/05/15

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
15-2117-020915MB1	Method Blank	10.0 g	10.0 mL	-	02/09/15
15-2117-020915LCS1	Lab Control	10.0 g	10.0 mL	-	02/09/15
15-2117-ZV37A	S-09-0.33	2.94 g	10.0 mL	D	02/09/15
15-2118-ZV37B	S-10-0.33	5.43 g	10.0 mL	D	02/09/15
15-2119-ZV37C	S-11-0.33	2.98 g	10.0 mL	D	02/09/15
15-2120-ZV37D	S-12-0.33	2.96 g	10.0 mL	D	02/09/15

Basis: D=Dry Weight W=As Received

Data File: /chem3/fid3b.i/20150210.b/0210b021.d
Date : 10-FEB-2015 20:07
Client ID: ZV29MBS1
Sample Info: ZV29MBS1
Column phase: RTX-1

Instrument: fid3b.i
Operator: ML
Column diameter: 0.25

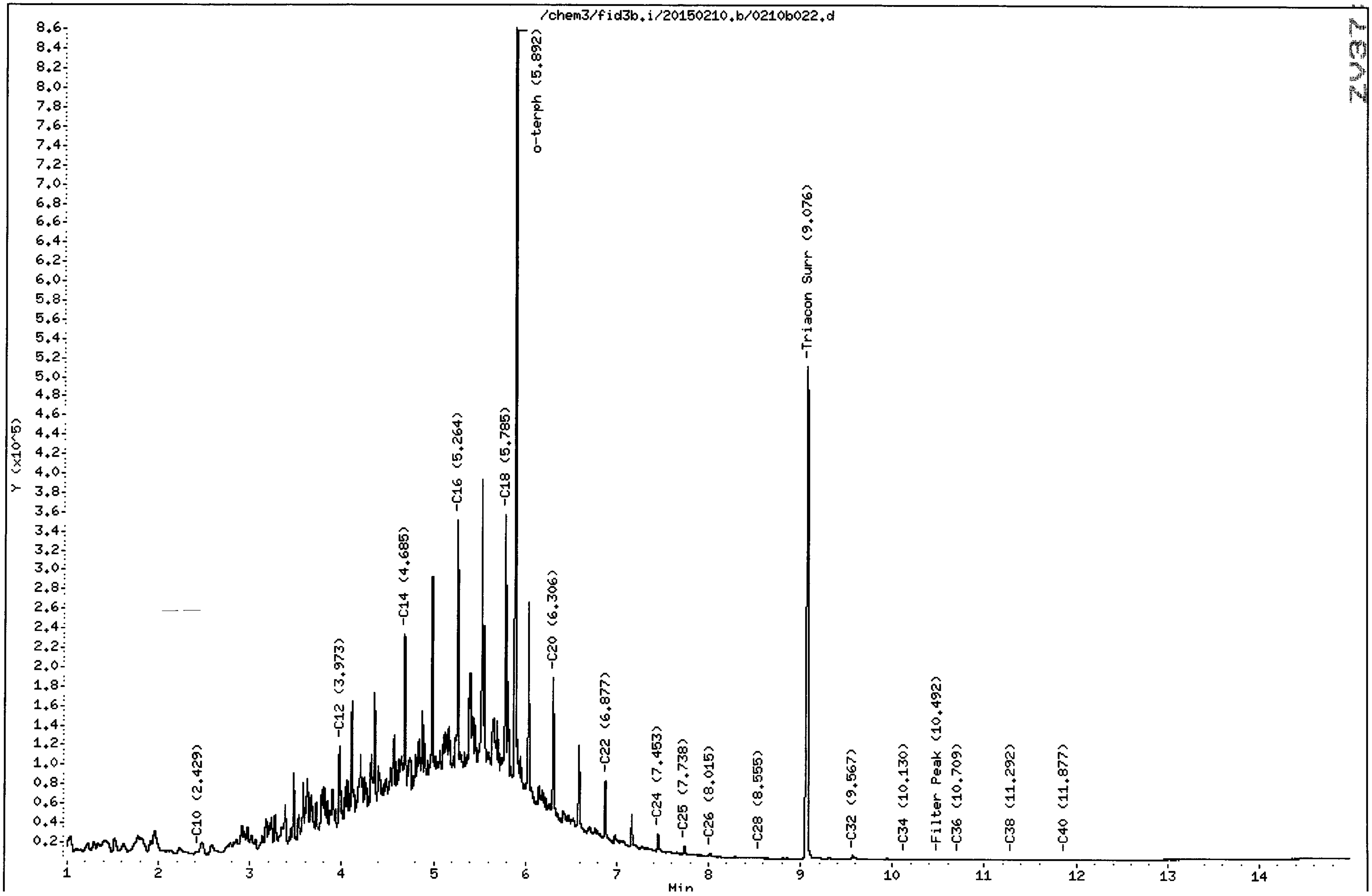


Data File: /chem3/fid3b.i/20150210.b/0210b022.d
Date : 10-FEB-2015 20:32
Client ID: ZV29LCSS1
Sample Info: ZV29LCSS1

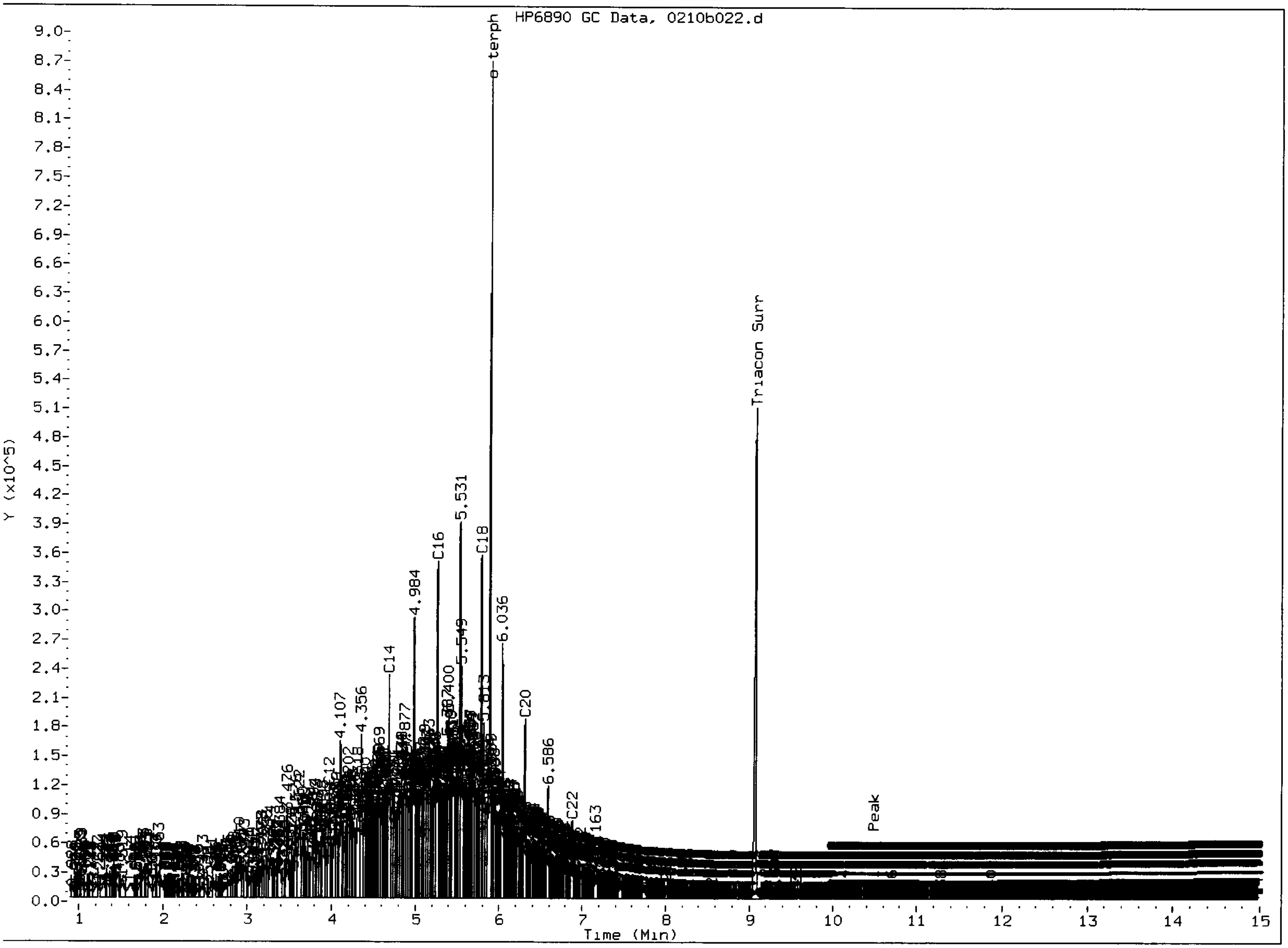
Column phase: RTX-1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25



FID:3B-2C/RTX-1 ZV29LCSS1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
⑤ Skimmed surrogate

Analyst: ML

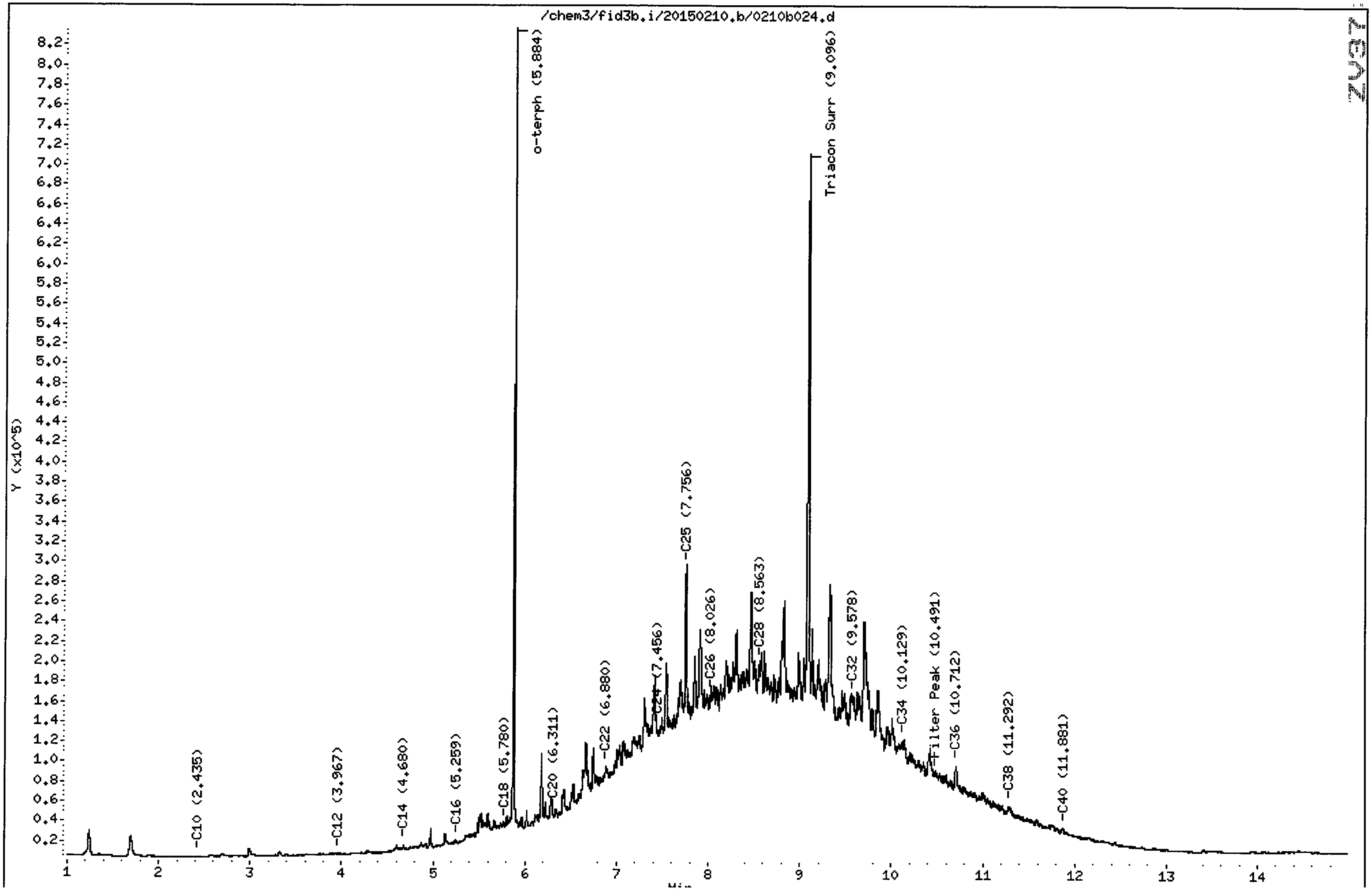
Date: 2/11/15

Data File: /chem3/fid3b.i/20150210.b/0210b024.d
Date : 10-FEB-2015 21:22
Client ID: S-09-0.33
Sample Info: ZV37A

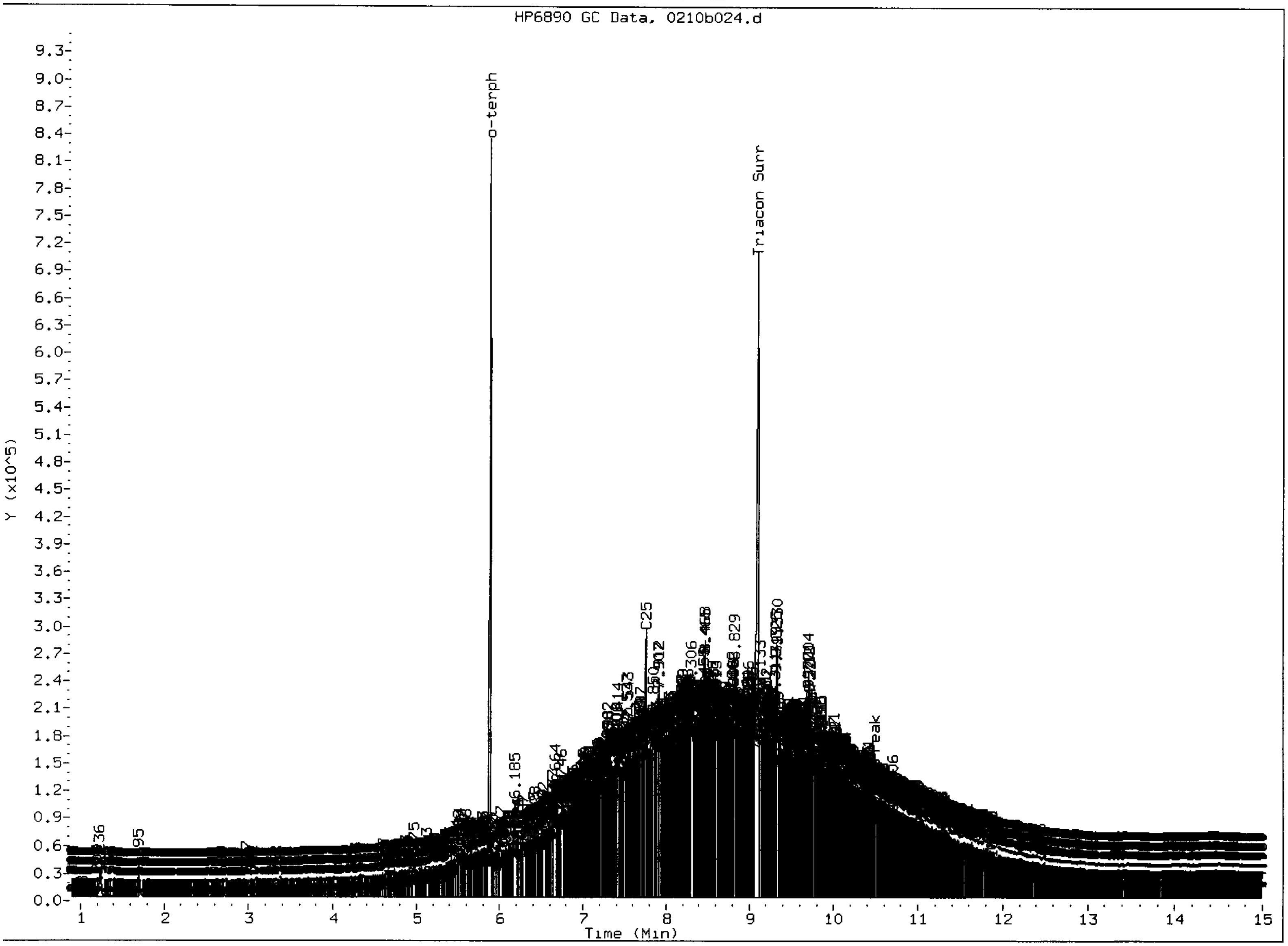
Column phase: RTX-1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25



FID:3B-2C/RTX-1 ZV37A FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
⑤ Skimmed surrogate

Analyst: ML Date: 2/11/15

Data File: /chem3/fid3b.i/20150210.b/0210b025.d
Date : 10-FEB-2015 21:47
Client ID: S-10-0.33
Sample Info: ZV37B

Column phase: RTX-1

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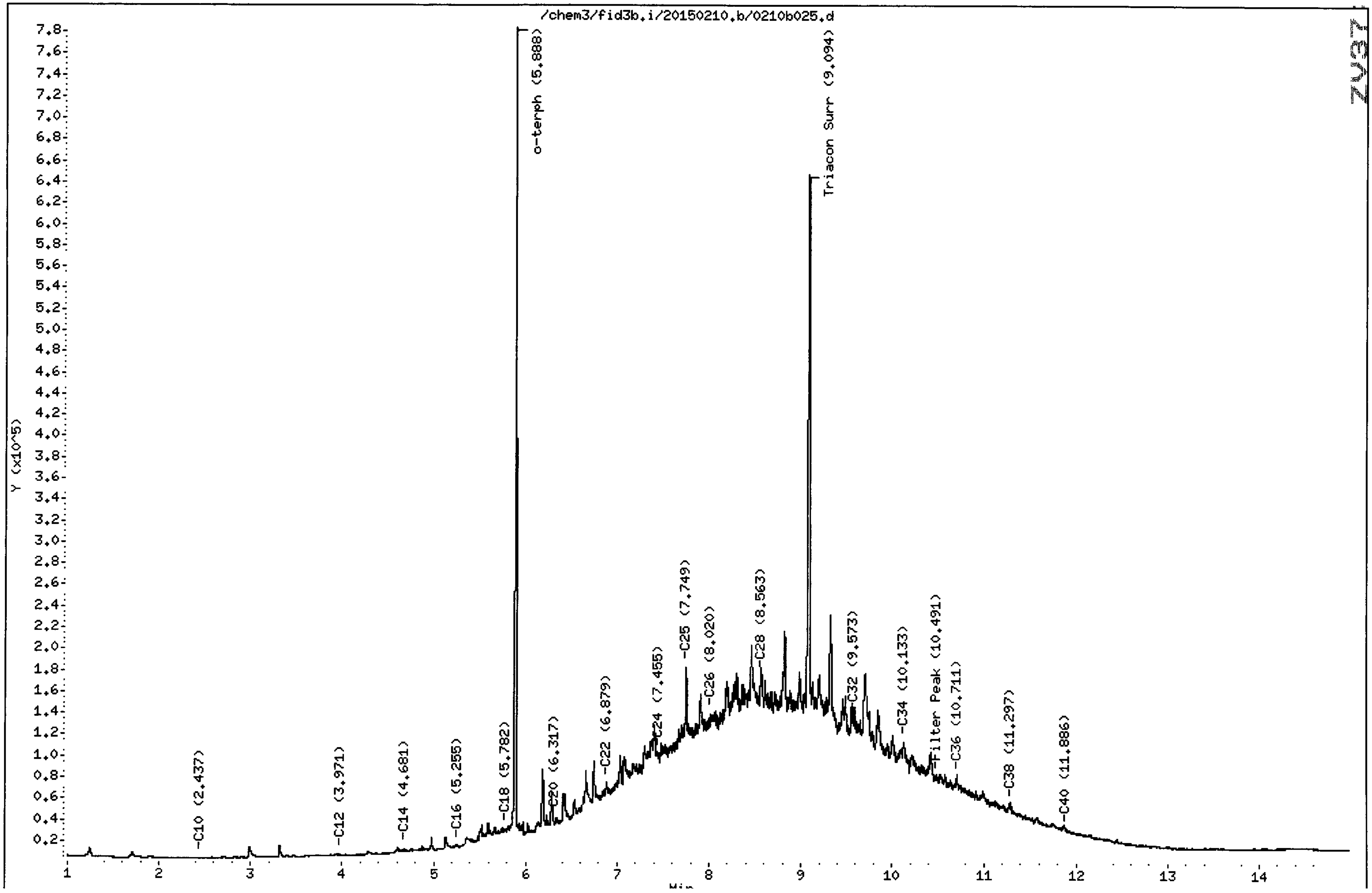
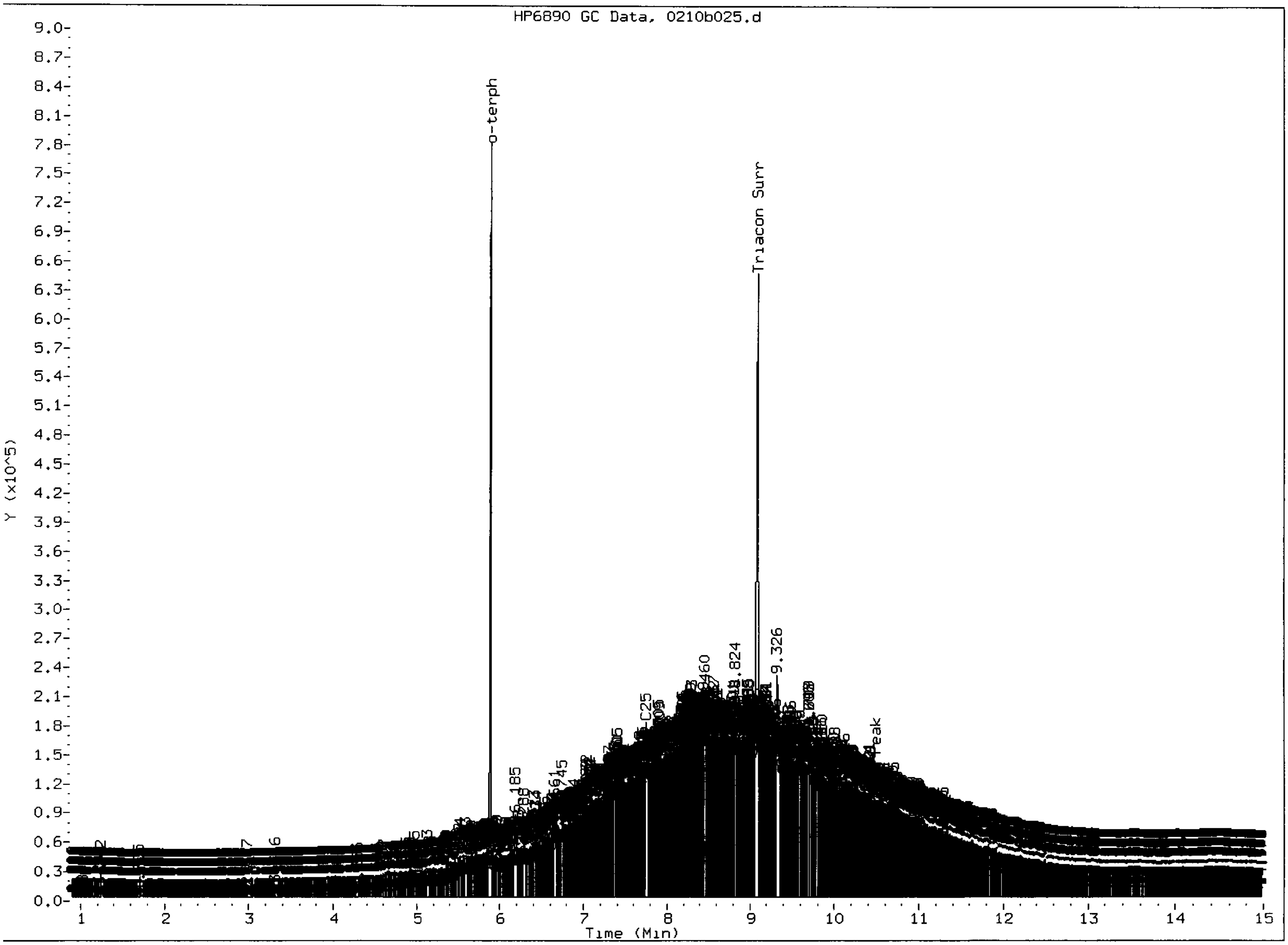
Instrument: fid3b.i

Operator: ML
Column diameter: 0.25



FID:3B-2C/RTX-1 ZV37B FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
[✓ 5.] Skimmed surrogate

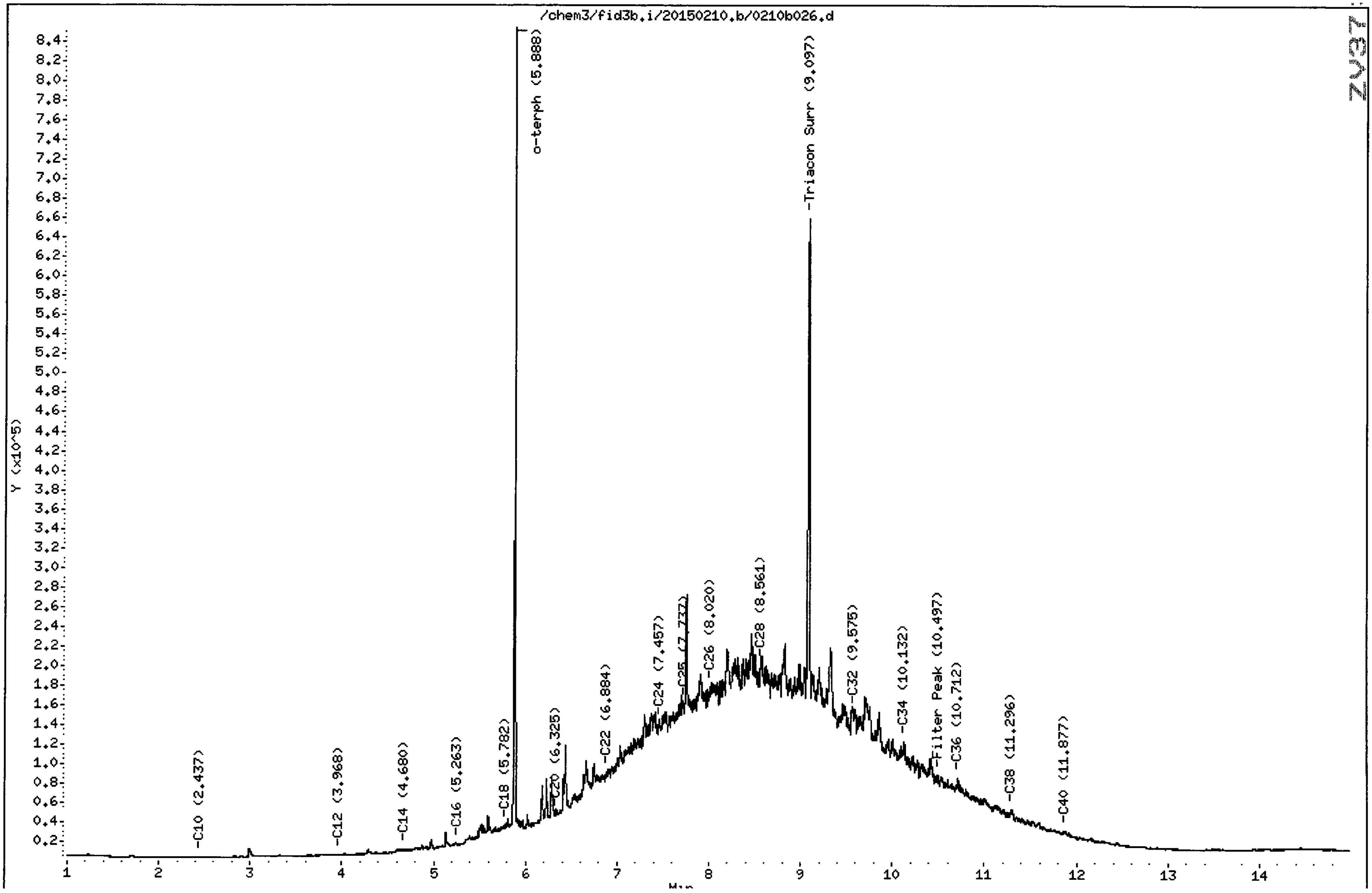
Analyst: ML Date: 2/11/15

Data File: /chem3/fid3b.i/20150210.b/0210b026.d
Date : 10-FEB-2015 22:12
Client ID: S-11-0.33
Sample Info: ZV37C

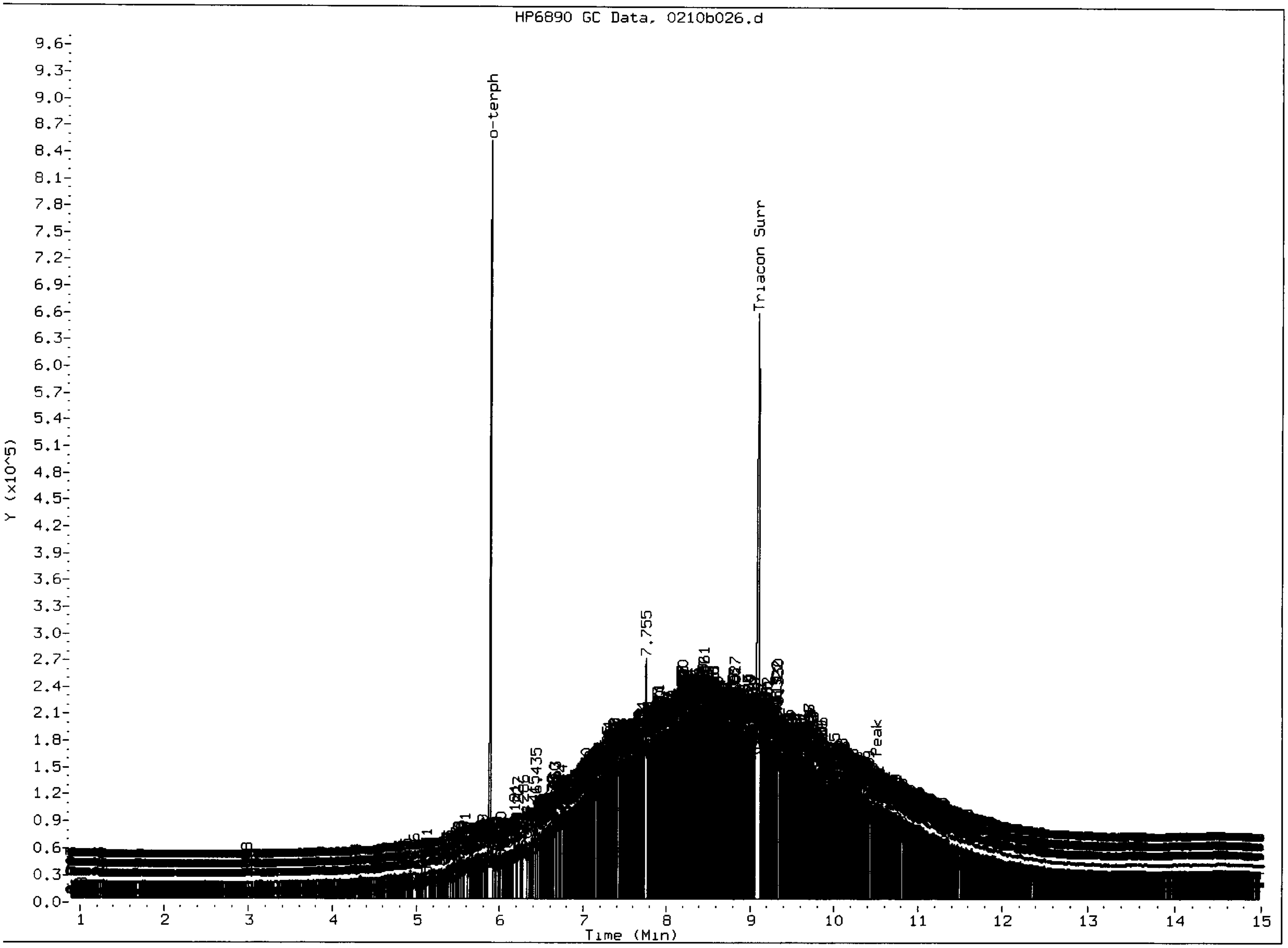
Column phase: RTX-1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25



FID:3B-2C/RTX-1 ZV37C FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
[✓ 5] Skimmed surrogate

Analyst: ml

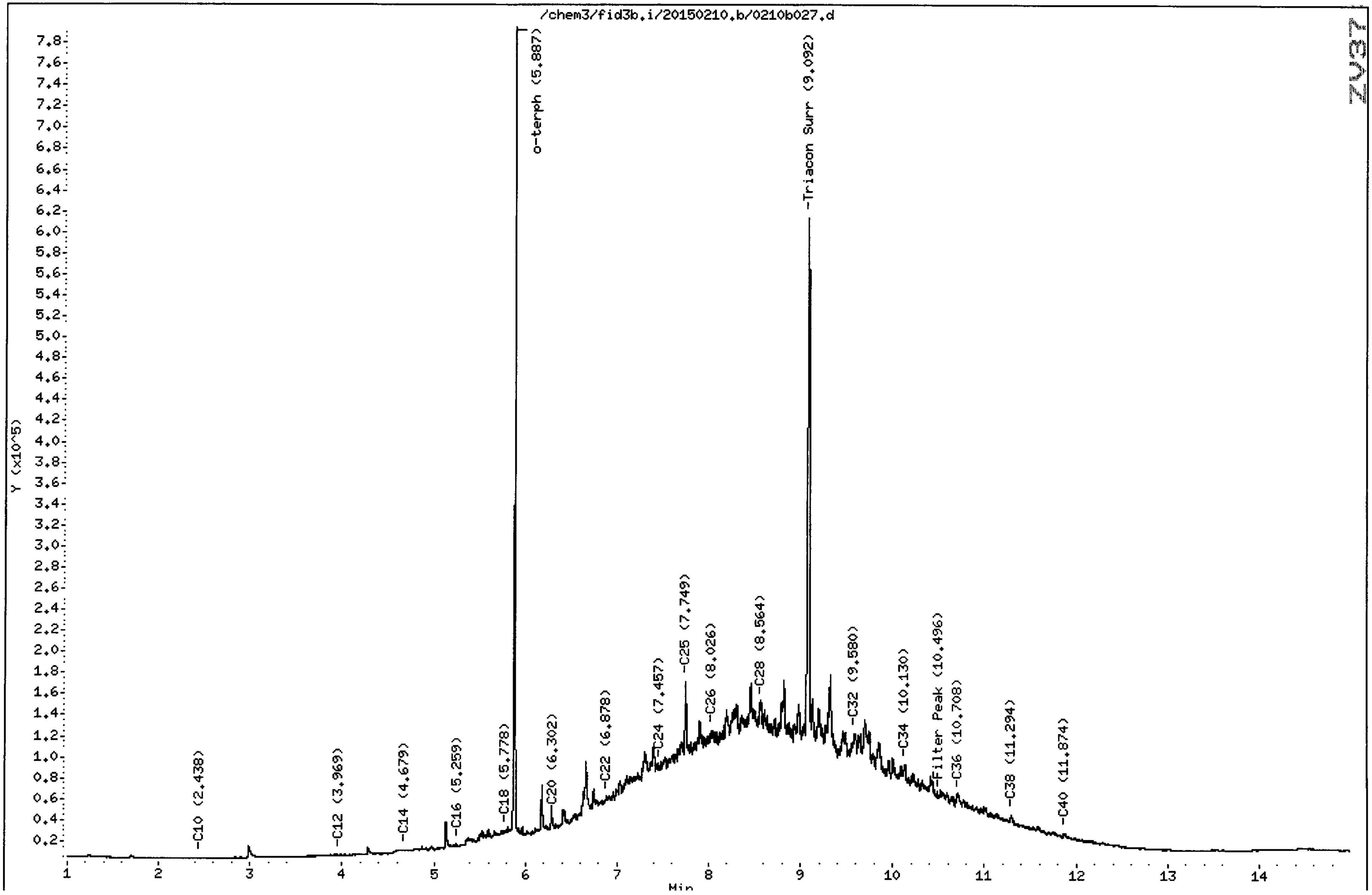
Date: 2/11/15

Data File: /chem3/fid3b.i/20150210.b/0210b027.d
Date : 10-FEB-2015 22:36
Client ID: S-12-0.33
Sample Info: ZV37D

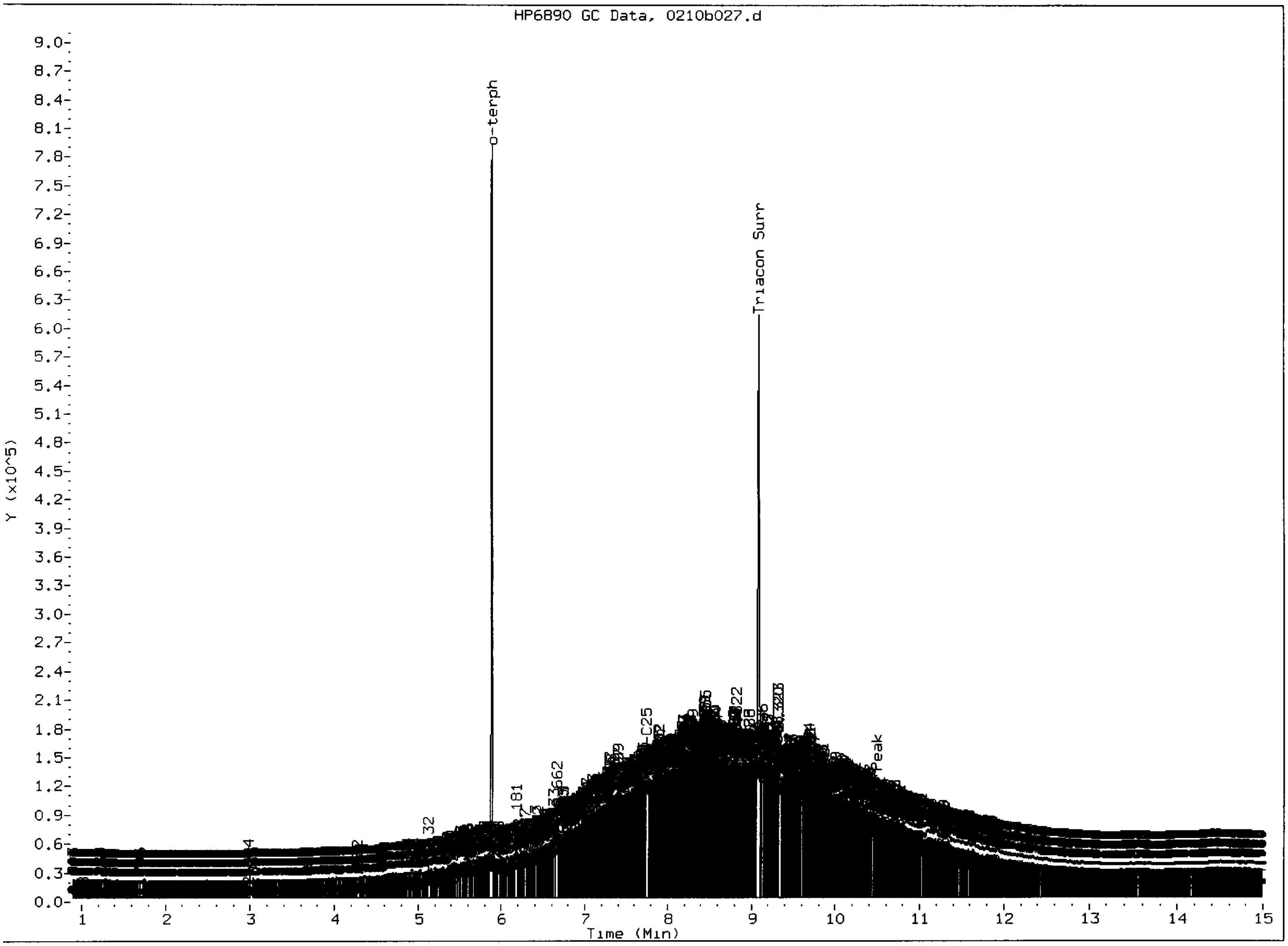
Column phase: RTX-1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25



FID:3B-2C/RTX-1 ZV37D FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
[✓ 5.] Skimmed surrogate

Analyst: ML

Date: 2/11/15

SAMPLE RESULTS-CONVENTIONALS
ZV37-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/16/15

Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Client ID: S-09-0.33
ARI ID: 15-2117 ZV37A

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/09/15 020915#1	SM2540G	Percent	0.01	23.11
Total Organic Carbon	02/13/15 021315#1	Plumb,1981	Percent	0.020	16.3

RL	Analytical reporting limit
U	Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ZV37-Maul Foster & Alongi

Matrix: Sediment
Data Release Authorized:
Reported: 02/16/15

Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Client ID: S-10-0.33
ARI ID: 15-2118 ZV37B

Analyte	**Date**	**Method**	**Units**	**RL**	**Sample**
Total Solids	02/09/15 020915#1	SM2540G	Percent	0.01	46.17
Total Organic Carbon	02/13/15 021315#1	Plumb,1981	Percent	0.020	6.31

RL	Analytical reporting limit
U	Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ZV37-Maul Foster & Alongi

Matrix: Sediment
Data Release Authorized:
Reported: 02/16/15

Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Client ID: S-11-0.33
ARI ID: 15-2119 ZV37C

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/09/15 020915#1	SM2540G	Percent	0.01	30.82
Total Organic Carbon	02/13/15 021315#1	Plumb,1981	Percent	0.020	13.2

RL	Analytical reporting limit
U	Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ZV37-Maul Foster & Alongi

Matrix: Sediment
Data Release Authorized
Reported: 02/16/15

Project: Geddes Marina
Event: NA
Date Sampled: 02/04/15
Date Received: 02/05/15

Client ID: S-12-0.33
ARI ID: 15-2120 ZV37D

Analyte	**Date**	**Method**	**Units**	**RL**	**Sample**
Total Solids	02/09/15 020915#1	SM2540G	Percent	0.01	28.07
Total Organic Carbon	02/13/15 021315#1	Plumb,1981	Percent	0.020	13.2

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
ZV37-Maul Foster & Alongi

Matrix: Sediment
Data Release Authorized:
Reported: 02/16/15

Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Analyte	**Date**	**Units**	**Blank**	**QC ID**
Total Solids	02/09/15	Percent	< 0.01 U	ICB
Total Organic Carbon	02/13/15	Percent	< 0.020 U	ICB

LAB CONTROL RESULTS-CONVENTIONALS
ZV37-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/16/15

Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon Plumb,1981	ICVL	02/13/15	Percent	0.104	0.100	104.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
ZV37-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/16/15

Project: Geddes Marina
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	**Date**	**Units**	**SRM**	**True Value**	**Recovery**
Total Organic Carbon NIST 1941B	02/13/15	Percent	2.46	2.99	82.3%

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: S-09-0.33
SAMPLE

Lab Sample ID: ZV37A
LIMS ID: 15-2117
Matrix: Sediment
Data Release Authorized:
Reported: 02/13/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/05/15

Percent Total Solids: 29.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	02/10/15	6010C	02/12/15	7440-38-2	Arsenic	20	20	U
3050B	02/10/15	6010C	02/12/15	**7440-43-9**	**Cadmium**	0.6	**2.0**	
3050B	02/10/15	6010C	02/12/15	**7440-47-3**	**Chromium**	2	**54**	
3050B	02/10/15	6010C	02/12/15	**7440-50-8**	**Copper**	0.6	**99.8**	
3050B	02/10/15	6010C	02/12/15	**7439-92-1**	**Lead**	6	**184**	
CLP	02/10/15	7471A	02/12/15	**7439-97-6**	**Mercury**	0.07	**0.11**	
3050B	02/10/15	6010C	02/12/15	**7440-02-0**	**Nickel**	3	**44**	
3050B	02/10/15	6010C	02/12/15	7782-49-2	Selenium	20	20	U
3050B	02/10/15	6010C	02/12/15	7440-22-4	Silver	1	1	U
3050B	02/10/15	6010C	02/12/15	**7440-66-6**	**Zinc**	3	**486**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: S-10-0.33
SAMPLE

Lab Sample ID: ZV37B
LIMS ID: 15-2118
Matrix: Sediment
Data Release Authorized:
Reported: 02/13/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/05/15

Percent Total Solids: 45.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	02/10/15	6010C	02/12/15	7440-38-2	Arsenic	10	10	U
3050B	02/10/15	6010C	02/12/15	**7440-43-9**	**Cadmium**	0.4	**0.9**	
3050B	02/10/15	6010C	02/12/15	**7440-47-3**	**Chromium**	1	**44**	
3050B	02/10/15	6010C	02/12/15	**7440-50-8**	**Copper**	0.4	**60.8**	
3050B	02/10/15	6010C	02/12/15	**7439-92-1**	**Lead**	4	**53**	
CLP	02/10/15	7471A	02/12/15	**7439-97-6**	**Mercury**	0.04	**0.07**	
3050B	02/10/15	6010C	02/12/15	**7440-02-0**	**Nickel**	2	**42**	
3050B	02/10/15	6010C	02/12/15	7782-49-2	Selenium	10	10	U
3050B	02/10/15	6010C	02/12/15	7440-22-4	Silver	0.6	0.6	U
3050B	02/10/15	6010C	02/12/15	**7440-66-6**	**Zinc**	2	**340**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

FORM-I

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: S-11-0.33
SAMPLE

Lab Sample ID: ZV37C
LIMS ID: 15-2119
Matrix: Sediment
Data Release Authorized:
Reported: 02/13/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/05/15

Percent Total Solids: 30.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	02/10/15	6010C	02/12/15	7440-38-2	Arsenic	20	20	U
3050B	02/10/15	6010C	02/12/15	**7440-43-9**	**Cadmium**	0.6	**1.7**	
3050B	02/10/15	6010C	02/12/15	**7440-47-3**	**Chromium**	2	**69**	
3050B	02/10/15	6010C	02/12/15	**7440-50-8**	**Copper**	0.6	**129**	
3050B	02/10/15	6010C	02/12/15	**7439-92-1**	**Lead**	6	**98**	
CLP	02/10/15	7471A	02/12/15	**7439-97-6**	**Mercury**	0.08	**0.16**	
3050B	02/10/15	6010C	02/12/15	**7440-02-0**	**Nickel**	3	**54**	
3050B	02/10/15	6010C	02/12/15	7782-49-2	Selenium	20	20	U
3050B	02/10/15	6010C	02/12/15	7440-22-4	Silver	0.9	0.9	U
3050B	02/10/15	6010C	02/12/15	**7440-66-6**	**Zinc**	3	**498**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: S-12-0.33
SAMPLE

Lab Sample ID: ZV37D
LIMS ID: 15-2120
Matrix: Sediment
Data Release Authorized:
Reported: 02/13/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: 02/04/15
Date Received: 02/05/15

Percent Total Solids: 28.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	02/10/15	6010C	02/12/15	7440-38-2	Arsenic	20	20	U
3050B	02/10/15	6010C	02/12/15	**7440-43-9**	**Cadmium**	0.7	**1.5**	
3050B	02/10/15	6010C	02/12/15	**7440-47-3**	**Chromium**	2	**73**	
3050B	02/10/15	6010C	02/12/15	**7440-50-8**	**Copper**	0.7	**133**	
3050B	02/10/15	6010C	02/12/15	**7439-92-1**	**Lead**	7	**86**	
CLP	02/10/15	7471A	02/12/15	**7439-97-6**	**Mercury**	0.09	**0.16**	
3050B	02/10/15	6010C	02/12/15	**7440-02-0**	**Nickel**	3	**57**	
3050B	02/10/15	6010C	02/12/15	7782-49-2	Selenium	20	20	U
3050B	02/10/15	6010C	02/12/15	7440-22-4	Silver	1	1	U
3050B	02/10/15	6010C	02/12/15	**7440-66-6**	**Zinc**	3	**483**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: ZV37MB
LIMS ID: 15-2120
Matrix: Sediment
Data Release Authorized:
Reported: 02/13/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	02/10/15	6010C	02/12/15	7440-38-2	Arsenic	5	5	U
3050B	02/10/15	6010C	02/12/15	7440-43-9	Cadmium	0.2	0.2	U
3050B	02/10/15	6010C	02/12/15	7440-47-3	Chromium	0.5	0.5	U
3050B	02/10/15	6010C	02/12/15	7440-50-8	Copper	0.2	0.2	U
3050B	02/10/15	6010C	02/12/15	7439-92-1	Lead	2	2	U
CLP	02/10/15	7471A	02/12/15	7439-97-6	Mercury	0.02	0.02	U
3050B	02/10/15	6010C	02/12/15	7440-02-0	Nickel	1	1	U
3050B	02/10/15	6010C	02/12/15	7782-49-2	Selenium	5	5	U
3050B	02/10/15	6010C	02/12/15	7440-22-4	Silver	0.3	0.3	U
3050B	02/10/15	6010C	02/12/15	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: ZV37LCS
LIMS ID: 15-2120
Matrix: Sediment
Data Release Authorized:
Reported: 02/13/15

QC Report No: ZV37-Maul Foster & Alongi
Project: Geddes Marina

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	202	200	101%	
Cadmium	6010C	51.3	50.0	103%	
Chromium	6010C	52.3	50.0	105%	
Copper	6010C	50.9	50.0	102%	
Lead	6010C	204	200	102%	
Mercury	7471A	0.51	0.50	102%	
Nickel	6010C	51	50	102%	
Selenium	6010C	201	200	100%	
Silver	6010C	53.5	50.0	107%	
Zinc	6010C	49	50	98.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

Maul Foster & Alongi
Geddes Marina

Apparent Grain Size Distribution Summary
Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
Phi Size	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (63)	31.00	15.60	7.80	3.90	2.00	1.00
ZP61A	100.0	99.5	98.7	97.9	97.1	95.7	80.4	47.8	38.5	32.0	24.7	19.3	14.7	9.5
	100.0	100.0	99.3	98.4	97.7	96.5	82.9	50.3	39.2	33.5	26.2	20.6	15.7	10.2
	100.0	100.0	99.4	98.8	98.1	96.9	82.4	50.6	40.8	33.8	25.9	20.5	15.5	10.3
S-09-0.33	100.0	98.6	95.5	89.6	80.9	56.4	33.4	26.8	25.3	18.6	12.9	8.1	4.7	2.4
S-10-0.33	100.0	99.8	97.0	91.4	73.4	36.8	24.0	20.2	16.9	9.6	5.5	3.6	2.1	1.3
S-11-0.33	100.0	99.7	98.0	96.2	94.1	88.0	77.1	71.2	65.2	45.8	32.3	20.5	11.6	6.4
S-12-0.33	100.0	99.0	97.7	96.6	95.3	93.9	91.6	87.7	66.3	41.2	25.8	13.8	6.7	2.2

Notes to the Testing:

1. Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

Maul Foster & Alongi
Geddes Marina

Apparent Grain Size Distribution Summary
Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	< -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	> 10	> 4
Sieve Size (microns)	> #10 (2000)	10 to 18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15 6	15.6-7.8	7 8-3.9	3 9-2.0	2.0-1.0	<1 0	<230 (<62)
ZP61A	1.3	0.8	0.8	1.5	15.3	32.6	9.3	6.5	7.3	5.4	4.6	5.2	9.5	47.8
	0.7	0.9	0.7	1.2	13.6	32.7	11.0	5.7	7.4	5.6	4.9	5.5	10.2	50.3
	0.6	0.6	0.7	1.2	14.4	31.9	9.8	7.0	7.9	5.4	5.1	5.1	10.3	50.6
S-09-0.33	4.5	5.9	8.7	24.5	23.0	6.6	1.5	6.7	5.7	4.8	3.4	2.2	2.4	26.8
S-10-0.33	3.0	5.5	18.0	36.7	12.7	3.9	3.3	7.3	4.1	2.0	1.4	0.8	1.3	20.2
S-11-0.33	2.0	1.9	2.1	6.1	10.9	6.0	6.0	19.4	13.5	11.8	8.9	5.2	6.4	71.2
S-12-0.33	2.3	1.1	1.2	1.4	2.4	3.9	21.4	25.0	15.4	12.0	7.1	4.5	2.2	87.7

Notes to the Testing:

1. Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

QA SUMMARY

Client.	Maul Foster & Alongi	Client Project	Geddes Marina
ARI Trip. Sample ID:	ZP61A		

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
ZP61A	100 0	99.5	98.7	97.9	97.1	95.7	80 4	47.8	38.5	32 0	24.7	19.3	14.7	9.5
	100.0	100.0	99.3	98.4	97.7	96.5	82.9	50.3	39.2	33 5	26.2	20 6	15 7	10 2
	100.0	100 0	99.4	98.8	98.1	96.9	82 4	50 6	40.8	33.8	25.9	20.5	15.5	10.3
AVE	100.0	99.8	99.1	98.4	97.6	96.3	81.9	49.5	39.5	33.1	25.6	20.1	15 3	10.0
STDEV	0.0	0 2	0.3	0.4	0.4	0.5	1.1	1.2	1 0	0.8	0.7	0.6	0.4	0.4
%RSD	0.0	0.2	0.3	0 4	0.4	0 5	1.3	2.5	2.5	2.5	2.6	3.0	2.9	3 6

The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25 0g)
ZP61A	12/15/2014	12/22/2014	12/27/2014	99 8		8 2
	12/15/2014	12/22/2014	12/27/2014	100.1		8.4
	12/15/2014	12/22/2014	12/27/2014	100.3		9 0
S-09-0.33	2/4/2015	2/9/2015	2/17/2015	96 9		6.0
S-10-0.33	2/4/2015	2/9/2015	2/17/2015	100.5		8 2
S-11-0.33	2/4/2015	2/9/2015	2/17/2015	96.9		9.1
S-12-0.33	2/4/2015	2/9/2015	2/17/2015	99.8		11 8

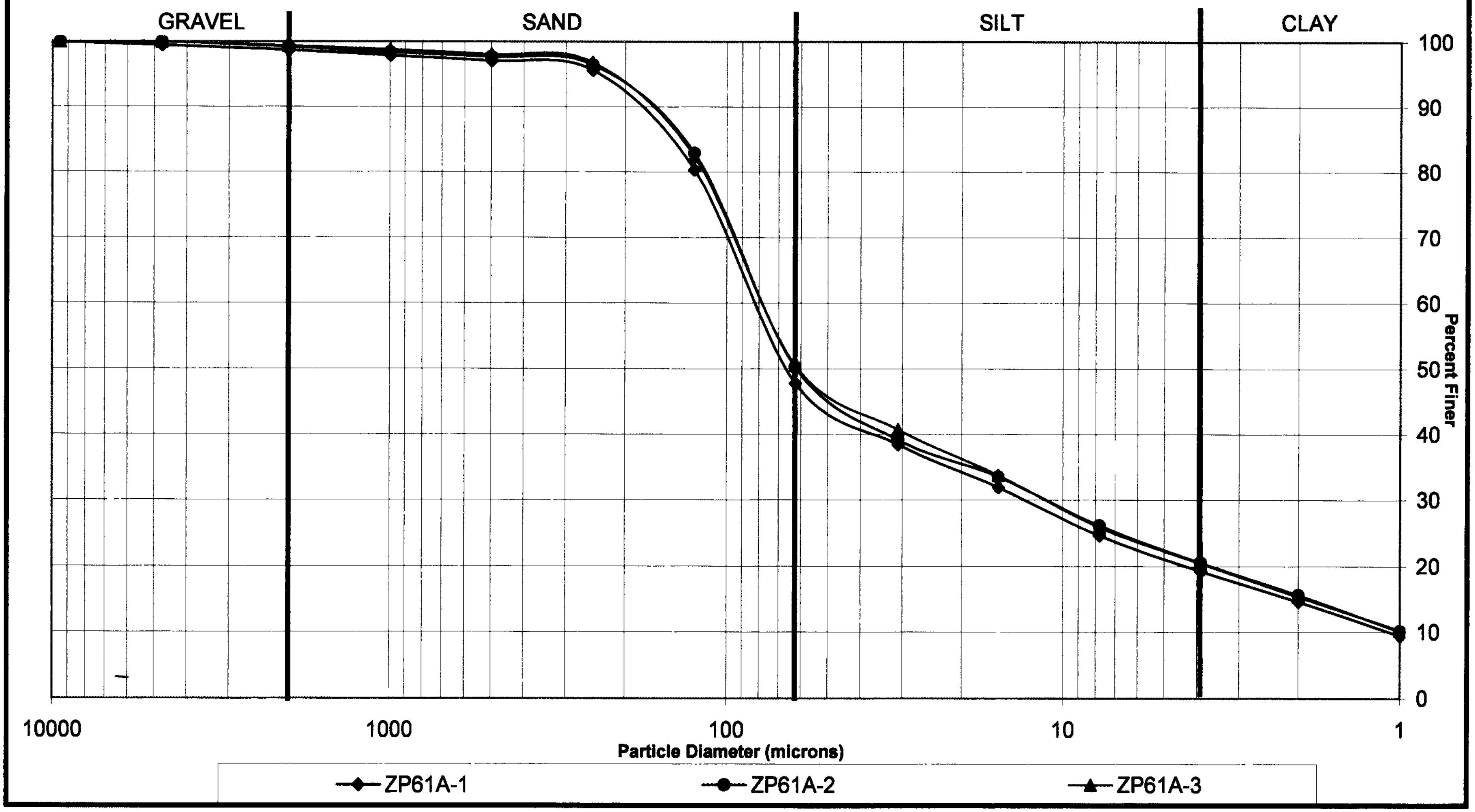
* ARI Internal QA limits = 95-105%

Notes to the Testing:

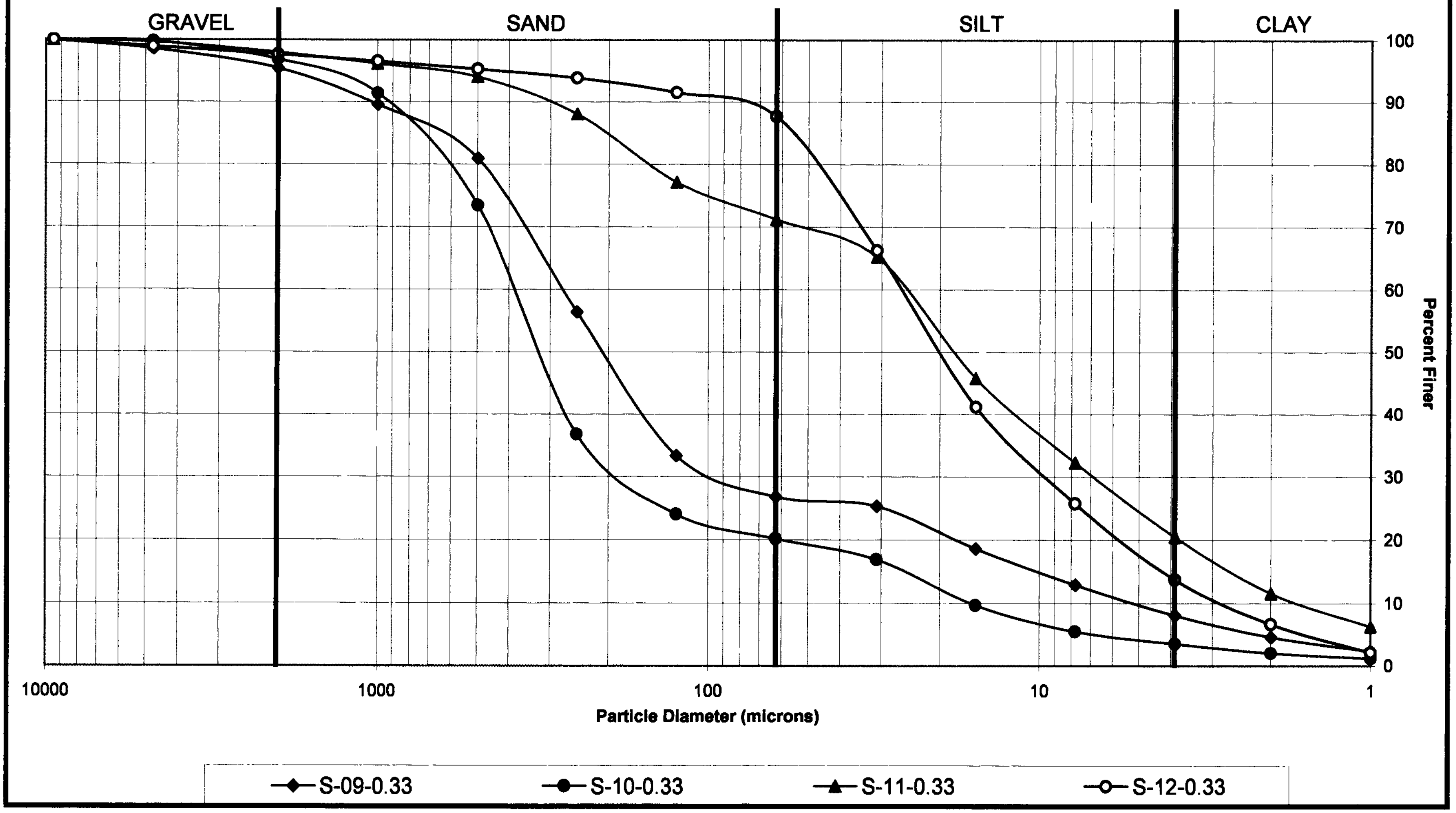
1. Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing

PSEP Grain Size Distribution

Triplicate Sample Plot



PSEP Grain Size Distribution



APPENDIX D

DATA VALIDATION MEMORANDUMS

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 0689.01.03 | MAY 10, 2015 | CITY OF MARYSVILLE

This report reviews the analytical results for sediment samples collected by the Maul Foster & Alongi, Inc. project team on the former Geddes Marina property located at 1326 First Street in Marysville, Washington. The samples were collected in February 2015 and archived at -18 degrees Celsius to extend analytical holding times.

Analytical Resources, Inc. (ARI) performed the analyses. ARI report number AEM4 was reviewed. The analyses performed and samples analyzed are listed below. Some analyses may not have been performed on all samples.

Analysis	Reference
Diesel and Motor Oil	NWTPH-Dx
Dioxins/Furans	USEPA 1613B
Organotins	USEPA 8270D SIM
Polychlorinated Biphenyls	USEPA 8082A
SVOCs	USEPA 8270D/8270D SIM
Total Mercury	USEPA 7471A
Total Metals	USEPA 6010C
TOC	Plumb, 1981
Total Solids	SM 2540G

NWTPH = Northwest Total Petroleum Hydrocarbons.
SIM = selective ion monitoring.
SM = Standard Methods for the Examination of Water and Wastewater.
SVOC = semivolatile organic compound
TOC = total organic carbon.
USEPA = U.S. Environmental Protection Agency.

Samples Analyzed
Report AEM4
S-09-1.2
S-11-2.0
S-13-0.33

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2011, 2014a,b,c) and appropriate laboratory and method-specific guidelines (ARI, 2014; USEPA, 1986).

Data validation procedures were modified, as appropriate, to accommodate quality-control requirements for methods not specifically addressed by the USEPA procedures (e.g., NWTPH-Dx analysis).

The USEPA Method 8082A was flagged by ARI because of significant difference between the primary and confirmation analyses. The result has been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (ug/kg)	Confirmation Result (ug/kg)
AEM4	S-09.1.2	Aroclor 1248	290	290 J

ug/kg = micrograms per kilogram.

USEPA Method 8270D SIM organotin batch quality control did not include results for tetrabutyltin. The reviewer confirmed with ARI that tetrabutyltin was not included in quality control assessment because of historically poor response. The results have been qualified by the reviewer as rejected.

Report	Sample	Component	Original Result (ug/kg)	Confirmation Result (ug/kg)
AEM4	S-09-1.2	Tetrabutyltin	4.9 U	4.9 UR
AEM4	S-11-2.0	Tetrabutyltin	4.6 U	4.6 UR
AEM4	S-13-0.33	Tetrabutyltin	4.7 U	4.7 UR

U = Result is non-detect.
UR = Result is non-detect and rejected.

The reviewer confirmed that the analytical column used for USEPA Method 1613B analysis met requirements for 2,3,7,8-TCDD and 2,3,7,8-TCDF isomer specificity.

The USEPA Method 1613B OCDD result for sample S-13-0.33 exceeded the instrument calibration range. The result has been qualified by the reviewer as estimated.

Report	Sample	Component	Original Result (pg/g)	Confirmation Result (pg/g)
AEM4	S-13-0.33	OCDD	10600	10600 J

pg/g = picograms per gram.

USEPA Method 1613B-detected results that were reported as an estimated maximum potential concentration (EMPC) were assigned in the table below with a "U" qualifier (non-detect) at the reported EMPC value.

Report	Sample	Component	Original Result (pg/g)	Confirmation Result (pg/g)
AEM4	S-09-1.2	Total TCDF	78.6	78.6 U
AEM4	S-09-1.2	Total TCDD	81.2	81.2 U
AEM4	S-09-1.2	Total PeCDF	125	125 U
AEM4	S-09-1.2	Total HxCDF	127	127 U
AEM4	S-09-1.2	Total HxCDD	108	108 U
AEM4	S-11-2.0	2,3,7,8-TCDF	0.389 J	0.389 U
AEM4	S-11-2.0	2,3,7,8-TCDD	0.853 J	0.853 U
AEM4	S-11-2.0	1,2,3,7,8-PeCDF	0.244 J	0.244 U
AEM4	S-11-2.0	1,2,3,7,8,9-HxCDF	0.313 J	0.313 U
AEM4	S-11-2.0	Total TCDF	7.97	7.97 U
AEM4	S-11-2.0	Total TCDD	5.85	5.85 U
AEM4	S-11-2.0	Total PeCDF	13.1	13.1 U
AEM4	S-11-2.0	Total PeCDD	6.50	6.50 U
AEM4	S-11-2.0	Total HxCDF	23.6	23.6 U
AEM4	S-11-2.0	Total HxCDD	29.8	29.8 U
AEM4	S-13-0.33	2,3,4,6,7,8-HxCDF	10.9	10.9 U
AEM4	S-13-0.33	Total TCDF	49.0	49.0 U
AEM4	S-13-0.33	Total TCDD	29.4	29.4 U
AEM4	S-13-0.33	Total PeCDF	112	112 U
AEM4	S-13-0.33	Total HxCDF	321	321 U
AEM4	S-13-0.33	Total HxCDD	422	422 U
AEM4	S-13-0.33	Total HpCDD	2360	2360 U

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

Extractions and analyses were performed within the recommended holding time criteria. Samples were archived upon receipt at the laboratory and removed from archive upon request for analysis on April 19, 2015.

Preservation and Sample Storage

The samples were preserved and stored appropriately.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch.

In report AEM4, the USEPA Method 8270 method blank (MB-042115) had detections below the method reporting limit (MRL) for phenol and bis(2-ethylhexyl)phthalate. Associated sample results had detections above the MRL that were also more than five times the reported method blank concentration; thus, no results were qualified.

In report AEM4, the USEPA Method 1613B method blank exhibited detections between the estimated detection limit (EDL) and the reporting limit (RL) for various compounds and above the RL for OCDD. No actions were taken because all associated sample results were above the MRL and more than five times the blank results.

All remaining laboratory method blanks were non-detect.

Trip Blanks

Trip blanks were not required for this sampling event because samples were not analyzed for volatile organic compounds.

Equipment Rinsate Blanks

Equipment rinsate blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. The laboratory appropriately documented and qualified surrogate outliers. For samples with surrogate outliers, associated batch quality assurance/quality control were within acceptance limits.

All surrogate recoveries were within acceptance limits.

LABELED ANALOG RECOVERY RESULTS

USEPA Method 1613B samples were spiked with carbon-13 (C13) labeled standards to quantify the relative response of analytes in each sample. All C13 labeled analog standard recoveries were within acceptance limits.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy.

All MS/MSD results met acceptance limits for percent recovery and relative percent difference (RPD).

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision.

In report AEM4, the method Plumb, 1981 TOC laboratory duplicate exceeded RPD control limits, at 29.0%. Remaining batch quality control met acceptance criteria. The RPD exceedance was minor; thus, no results were qualified.

The remaining laboratory duplicate reported in AEM4 met the RPD acceptance limit.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency, with the following exceptions.

The USEPA Method 8270D SIM organotin LCS was not spiked with tetrabutyltin. The samples have been qualified by the reviewer in the data qualifications section above.

The reviewer confirmed with ARI that USEPA Method 8270D and 8270D SIM LCS results met control limits. No results were qualified.

All LCS/LCSD analyte results were within acceptance limits for percent recovery and RPD.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. Field duplicate samples were not submitted for analysis.

CONTINUING CALIBRATION VERIFICATION RESULTS

Continuing calibration verification (CCV) results are used to demonstrate instrument precision and accuracy through the end of the sample batch.

The National Functional Guidelines for semivolatile data review (USEPA, 2014b) state that results associated with CCV percent drift exceedances are qualified as estimated with “J” for detected results and “UJ” for non-detect results. USEPA Method 8270D states that when CCV percent drift acceptance criteria are met for at least 80 percent of the compounds, non-detect results may be reported for compounds that exceed acceptance limits if the laboratory demonstrates that quantitation limit sensitivity can still be achieved. Detected compounds associated with CCV percent drift exceedances may be reported as estimated values.

In report AEM4, the USEPA Method 8270D SVOC CCV analyzed on April 29, 2015, exceeded percent drift acceptance criteria for benzoic acid. The reviewer confirmed with the laboratory that quantitation limit sensitivity had been demonstrated. Results below the MRL are already considered estimated and were not additionally qualified. The following detected results were qualified by the reviewer as estimated.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
AEM4	S-11-2.0	Benzoic acid	480	480 J

Based on available information, all other CCVs were within acceptance limits for percent recovery.

REPORTING LIMITS

ARI evaluated USEPA Method 8270D and 8270D SIM results to method detection limits (MDLs). USEPA Method 1613B results were evaluated to EDLs. Non-detect USEPA Method 8270D and 8270D SIM results were reported at the RL or limit of quantitation. Remaining results were evaluated and reported to RLs. Samples requiring dilutions because of high analyte concentrations and/or matrix interferences had elevated EDLs, MDLs, and/or RLs. Some RLs were also raised because of chromatographic interference.

Results reported between the MDL and RL, and USEPA Method 1613B results reported between the MRL and the EDL, were qualified by the laboratory with "J," as estimated.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies. Requested analyses are indicated in an e-mail communication attached to the report.

The date received indicated for each sample is the date on which samples were removed from archive storage.

No additional issues were found.

REFERENCES

ARI. 2014. Quality assurance plan. Eurofins Analytical Resources, Inc., Tukwila, Washington.

Plumb, R. H., Jr. 1981. Procedures for handling and chemical analysis of sediment and water samples. Technical report EPA/CE-81-1. U.S. Army Engineering Waterways Experiment Station, Vicksburg, MS. May.

USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 6, February 2007).

USEPA. 2011. USEPA contract laboratory program, national functional guidelines for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) data review. EPA-540-R-11-016. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. September.

USEPA. 2014a. R10 data validation and review guidelines for polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran data (PCDD/PCDF) using Method 1613B and SW846 Method 8290A. EPA-910-R-14-003. U.S. Environmental Protection Agency, Office of Environmental Assessment. May.

USEPA. 2014b. USEPA contract laboratory program, national functional guidelines for inorganic superfund data review. EPA 540/R-013/001. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. August.

USEPA. 2014c. USEPA contract laboratory program, national functional guidelines for Superfund organic methods data review. EPA 540/R-014/002. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. August.

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 0689.01.03 | MARCH 18, 2015 | CITY OF MARYSVILLE

This report reviews the analytical results for sediment samples collected by the Maul Foster & Alongi, Inc. project team on the former Geddes Marina property located at 1326 First Street in Marysville, Washington. The samples were collected in February 2015.

Analytical Resources, Inc. (ARI) performed the analyses. ARI report number ZV37 was reviewed. The analyses performed and samples analyzed are listed below. Some analyses may not have been performed on all samples.

Analysis	Reference
Diesel and Motor Oil	NWTPH-Dx
Dioxins/Furans	USEPA 1613B
Grain Size	PSEP
Organotins	USEPA 8270D SIM
PCBs	USEPA 8082A
SVOCs	USEPA 8270D/8270D SIM
Total Mercury	USEPA 7471A
Total Metals	USEPA 6010C
TOC	Plumb, 1981
Total Solids	SM 2540G

NWTPH = Northwest Total Petroleum Hydrocarbons.
PCB = polychlorinated biphenyl.
PSEP = Puget Sound Estuary Protocols (PSEP, 1997).
SIM = selective ion monitoring.
SM = Standard Methods for the Examination of Water and Wastewater.
SVOC = semivolatile organic compound.
TOC = total organic carbon.
USEPA = U.S. Environmental Protection Agency.

Samples Analyzed
Report ZV37
S-09-0.33
S-10-0.33
S-11-0.33
S-12-0.33
S-09-1.2
S-10-1.8
S-11-2.0
S-12-2.3
S-13-0.33
S-13-1.2

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2011, 2014a,b,c) and appropriate laboratory and method-specific guidelines (ARI, 2014; USEPA, 1986).

Data validation procedures were modified, as appropriate, to accommodate quality-control requirements for methods not specifically addressed by the USEPA procedures (e.g., NWTPH-Dx analysis).

The USEPA Method 8270D dibenzofuran result for sample S-11-0.33 was flagged by the laboratory because of a low spectral match during the analysis. The sample was diluted and reanalyzed by the laboratory and results from the 6x dilution analyzed on February 14, 2015, 17:00 will be used.

USEPA Method 8270D SIM organotin batch quality control did not include results for tetrabutyltin. The reviewer confirmed with ARI that tetrabutyltin was not included in quality control assessment because of historically poor response. The results have been qualified by the reviewer as rejected.

Report	Sample	Component	Original Result (ug/kg)	Confirmation Result (ug/kg)
ZV37	S-09-0.33	Tetrabutyltin	4.7 U	4.7 UR
ZV37	S-10-0.33	Tetrabutyltin	4.6 U	4.6 UR
ZV37	S-11-0.33	Tetrabutyltin	4.9 U	4.9 UR
ZV37	S-12-0.33	Tetrabutyltin	5.0 U	5.0 UR

ug/kg = micrograms per kilogram.
U = Result is non-detect.
UR = Result is non-detect and rejected.

The reviewer confirmed that the analytical column used for USEPA Method 1613B analysis met requirements for 2,3,7,8-TCDD and 2,3,7,8-TCDF isomer specificity.

The case narrative indicates that samples analyzed for grain size by PSEP contained woody or organic matter that may have broken down during the sieving process.

USEPA Method 1613B results have been qualified in the table below, based on polychlorinated diphenyl ether interference.

Report	Sample	Component	Original Result (pg/g)	Confirmation Result (pg/g)
ZV37	S-10-0.33	1,2,3,7,8-PeCDF	2.86 X	2.86 J

J = Result is an estimated value.
PeCDF = pentachloro dibenzofuran.
pg/g = picograms per gram.
X = PCDE interference.

The USEPA Method 1613B OCDD result for sample S-11-0.3 exceeded the instrument calibration range. The result has been qualified by the reviewer as estimated.

Report	Sample	Component	Original Result (pg/g)	Confirmation Result (pg/g)
ZV37	S-11-0.33	OCDD	43800	43800 J

In the table below, USEPA Method 1613B detected results that were reported as an estimated maximum potential concentration (EMPC) were assigned a "U" qualifier (non-detect) at the reported EMPC value.

Report	Sample	Component	Original Result (pg/g)	Confirmation Result (pg/g)
ZV37	S-09-0.33	Total TCDF	94.6	94.6 U
ZV37	S-09-0.33	Total TCDD	41.6	41.6 U
ZV37	S-09-0.33	Total PeCDF	335	335 U
ZV37	S-09-0.33	Total HxCDF	1300	1300 U
ZV37	S-10-0.33	2,3,7,8-TCDF	2.23	2.23 U
ZV37	S-10-0.33	Total TCDF	55.5	55.5 U
ZV37	S-10-0.33	Total TCDD	23.8	23.8 U
ZV37	S-10-0.33	Total PeCDF	168	168 U
ZV37	S-10-0.33	Total HxCDF	649	649 U
ZV37	S-10-0.33	Total HpCDF	1810	1810 U
ZV37	S-11-0.33	Total TCDF	86.4	86.4 U
ZV37	S-11-0.33	Total TCDD	27.2	27.2 U
ZV37	S-11-0.33	Total PeCDF	277	277 U
ZV37	S-11-0.33	Total HxCDF	1250	1250 U
ZV37	S-11-0.33	Total HxCDD	1270	1270 U
ZV37	S-11-0.33	HpCDF	3050	3050 U
ZV37	S-12-0.33	Total TCDF	85.1	85.1 U
ZV37	S-12-0.33	Total TCDD	42.0	42.0 U
ZV37	S-12-0.33	Total PeCDF	286	286 U
ZV37	S-12-0.33	Total HxCDF	1020	1020 U
ZV37	S-12-0.33	Total HpCDD	2310	2310 U

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

Extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

The samples were preserved and stored appropriately.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch.

The method blanks associated with the USEPA Method 1613B dioxin/furan analyses exhibited detections between the estimated detection limit (EDL) and the reporting limit (RL) for various compounds. No actions were taken because all associated sample results were more than five times the blank results.

All remaining laboratory method blanks were non-detect.

Trip Blanks

Trip blanks were not required for this sampling event because samples were not analyzed for volatile organic compounds.

Equipment Rinsate Blanks

Equipment rinsate blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. The laboratory appropriately documented and qualified surrogate outliers. For samples with surrogate outliers, associated batch quality assurance/quality control were within acceptance limits.

The USEPA Method 8270D SVOC surrogate 1,2-dichloroethene-d4 exceeded upper percent recovery acceptance limits for samples MW29-W-12.5 and MW8-W-9.5. Sample MW29-W-12.5 was non-detect for all target analytes; thus, no results were qualified. Sample MW8-W-9.5 was reanalyzed by the laboratory, with consistent surrogate results. The remaining surrogate percent recoveries for MW8-W-9.5 met acceptance criteria; thus, no results were qualified.

The USEPA Method 8270D organotin surrogate tripentyl tin chloride result for sample S-12-0.33 was below the lower percent recovery limit of 40 percent, at 39.8 percent. The exceedance was minor and the remaining surrogate met percent recovery acceptance limits; thus, no results were qualified.

All remaining surrogate recoveries were within acceptance limits.

LABELED ANALOG RECOVERY RESULTS

USEPA Method 1613B samples were spiked with carbon-13 (C13) labeled standards to quantify the relative response of analytes in each sample. All C13 labeled analog standard recoveries were within acceptance limits, with the following exception. Sample S-11-0.33 2,3,7,8-TCDF-C13 percent recovery was below the lower acceptance limit of 24, at 23.8 percent. The associated results were qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (pg/g)	Qualified Result (pg/g)
ZV37	S-11-0.33	2,3,7,8-TCDF	7.30	7.30 J

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. MS/MSD were not reported. The reviewer confirmed with ARI that MS/MSD were prepared for the USEPA Method 8270D organotin analysis and that batch precision criteria were met.

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. Laboratory duplicate results were not reported in ZX99 or ZY29.

The reviewer confirmed with ARI that laboratory duplicates were prepared for Plumb method TOC and USEPA Method 1613B dioxin/furan analyses. Laboratory duplicates were prepared with samples from unrelated projects. At least one laboratory duplicate in each batch met relative percent difference MS/MSD control limit criteria; thus, no results were qualified.

Remaining analyses (USEPA Method 8270D/8270D SIM SVOC, 8082A PCB Aroclors, 6010C metals, 7471A mercury, and NWTPH-Dx) did not include laboratory duplicates in the analytical batches. Batch precision could not be assessed for these analyses.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency, with the following exceptions.

The USEPA Method 8270D organotin LCS was not spiked with tetrabutyltin. The samples were all non-detect for tetrabutyltin; thus, no results were qualified.

All LCS analyte results were within acceptance limits for percent recovery. No LCSD analysis was performed.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. Field duplicate samples were not submitted for analysis.

CONTINUING CALIBRATION VERIFICATION RESULTS

Continuing calibration verification (CCV) results are used to demonstrate instrument precision and accuracy through the end of the sample batch.

National Functional Guidelines for semivolatile data review (USEPA, 2014b) state that results associated with CCV percent drift exceedances are qualified as estimated with "J" for detected results and "UJ" for non-detect results. USEPA Method 8270D states that when CCV percent drift acceptance criteria are met for at least 80 percent of the compounds, non-detect results may be reported for compounds that exceed acceptance limits if the laboratory demonstrates that quantitation limit sensitivity can still be achieved. Detected compounds associated with CCV percent drift exceedances may be reported as estimated values.

In report ZV37, the USEPA Method 8270D SVOC CCV exceeded percent drift acceptance criteria for butylbenzylphthalate, di-n-octyl phthalate, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene. The USEPA Method 8270D SIM CCV exceeded percent drift criteria for hexachlorobutadiene. The reviewer confirmed with the laboratory that quantitation limit sensitivity had been demonstrated. The following detected results were qualified by the reviewer as estimated.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
ZV37	S-09-0.33	Butylbenzylphthalate	370	370 J
ZV37	S-09-0.33	Di-n-Octyl Phthalate	780	780 J
ZV37	S-09-0.33	Indeno(1,2,3-cd)pyrene	1300	1300 J
ZV37	S-09-0.33	Dibenz(a,h)anthracene	370	370 J
ZV37	S-09-0.33	Benzo(g,h,i)perylene	1400	1400 J
ZV37	S-10-0.33	Indeno(1,2,3-cd)pyrene	1000	1000 J
ZV37	S-10-0.33	Dibenz(a,h)anthracene	320	320 J
ZV37	S-10-0.33	Benzo(g,h,i)perylene	1000	1000 J
ZV37	S-11-0.33	Butylbenzylphthalate	390	390 J
ZV37	S-11-0.33	Indeno(1,2,3-cd)pyrene	1500	1500 J
ZV37	S-11-0.33	Dibenz(a,h)anthracene	480	480 J
ZV37	S-11-0.33	Benzo(g,h,i)perylene	1500	1500 J
ZV37	S-12-0.33	Butylbenzylphthalate	500	500 J
ZV37	S-12-0.33	Indeno(1,2,3-cd)pyrene	800	800 J
ZV37	S-12-0.33	Dibenz(a,h)anthracene	240	240 J
ZV37	S-12-0.33	Benzo(g,h,i)perylene	810	810 J

Based on available information, all other CCVs were within acceptance limits for percent recovery.

REPORTING LIMITS

ARI evaluated USEPA Method 8270D and 8270D SIM results to method detection limits (MDLs). USEPA Method 1613B results were evaluated to EDLs. Non-detect USEPA Method 8270D/8270D SIM results were reported at the RL or limit of quantitation. There were no non-detect USEPA Method 1613B results. Remaining results were evaluated and reported to RLs. Samples requiring dilutions because of high analyte concentrations and/or matrix interferences had elevated EDLs, MDLs, and/or RLs.

Results reported between the MDL and RL, and USEPA Method 1613B results reported between the method reporting limit and the EDL, were qualified by the laboratory with "J," as estimated.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies. USEPA Method 1613B analysis was added after samples were received by the laboratory; the analysis request does not appear on the chain of custody.

No additional issues were found.

ARI. 2014. Quality assurance plan. Analytical Resources, Inc., Tukwila, Washington.

Plumb, R. H., Jr. 1981. Procedures for handling and chemical analysis of sediment and water samples. Technical report EPA/CE-81-1. U.S. Army Engineering Waterways Experiment Station, Vicksburg, MS. May.

PSEP. 1997. Recommended guidelines for sampling marine sediment, water column, and tissue in Puget Sound. Puget Sound Estuary Protocols. Prepared for U.S. Environmental Protection Agency, Region 10, Office of Puget Sound, Seattle, WA and Puget Sound Water Quality Authority, Olympia, WA. April.

USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 6, February 2007).

USEPA. 2011. USEPA contract laboratory program, national functional guidelines for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) data review. EPA-540-R-11-016. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. September.

USEPA. 2014a. R10 data validation and review guidelines for polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran data (PCDD/PCDF) using method 1613B and SW846 Method 8290A. EPA-910-R-14-003. U.S. Environmental Protection Agency, Office of Environmental Assessment. May.

USEPA. 2014b. USEPA contract laboratory program, national functional guidelines for inorganic superfund data review. EPA 540/R-013/001. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. August.

USEPA. 2014c. USEPA contract laboratory program, national functional guidelines for Superfund organic methods data review. EPA 540/R-014/002. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. August.

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 0689.01.03 | FEBRUARY 26, 2015 | CITY OF MARYSVILLE

This report reviews the analytical results for groundwater and samples collected by the Maul Foster & Alongi, Inc. (MFA) project team on the former Geddes Marina property located at 1326 First Street in Marysville, Washington. The samples were collected in February 2015.

OnSite Environmental, Inc. (OE) and Analytical Resources, Inc. (ARI), performed the analyses. OE reports 1502-023, 1502-037, and 1502-044 were reviewed. Portions of 1502-037 were subcontracted to ARI and are appended to 1502-037. The analyses performed and samples analyzed are listed below. Some analyses may not have been performed on all samples. Data validation tracking sheets associated with the analyses, documenting data review, are attached.

Analysis	Reference
Diesel- and Lube-Oil-Range Total Petroleum Hydrocarbons	NWTPH-Dx
Dissolved Methane	RSKSOP 175
Ethylene dibromide	USEPA 8011
Ferrous Iron	SM 3500 FeD
Gasoline and Hexane	NWTPH-Gx
Nitrate	USEPA 353.2
Semivolatile Organic Compounds	USEPA 8270D SIM
Sulfate	ASTM D516-07
Total Mercury	USEPA 7470A/7471B
Total Metals	USEPA 200.8/6010C
Volatile Organic Compounds	USEPA 8260C

ASTM = American Society for Testing and Materials.
NWTPH = Northwest Total Petroleum Hydrocarbons.
RSKSOP = USEPA Robert S. Kerr Laboratory standard operating procedure.
SIM = selective ion monitoring.
USEPA = U.S. Environmental Protection Agency.

Samples Analyzed		
Report 1502-023	**Report 1502-037**	**Report 1502-044**
GM3-S-6.0	GM1-W-9.0	GM2-W-9.0
GM5-S-4.0	GM3-W-9.0	GM9-W-9.0
GM7-S-3.0	GM7-W-9.0	GM5-W-9.0
GM6-S-4.0	Trip Blank	-
GM9-S-2.0	-	-
GM8-S-4.5	-	-
GM6-W-11.0	-	-

Samples Analyzed		
GM8-W-10.0	-	-
GM4-S-12.5	-	-
GM2-S-6.5	-	-
GM1-S-12.0	-	-
GMDUP-S-12.0	-	-
GM4-W-9.0	-	-
GM10-W-9.0	-	-
GM10-S-4.0	-	-
Trip Blanks	-	-

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2014a,b) and appropriate laboratory and method-specific guidelines (ARI, 2014; OE, 2012; USEPA, 1986).

Data validation procedures were modified, as appropriate, to accommodate quality-control requirements for methods not specifically addressed by the USEPA procedures (i.e., NWTPH analyses).

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

Extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

In report 1502-023, OE indicated that amber bottles submitted for NWTPH-Dx analysis for samples GM6-W-11.0, GM8-W-10.0, and GM4-W-9.0 were received at pH 3, 5, and 3, respectively. The samples were extracted within holding time; thus, no results were qualified.

The remaining samples were preserved and stored appropriately.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. All laboratory method blanks were non-detect.

Trip Blanks

Trip blanks were submitted with sample delivery 1502-023 and 1502-037 for USEPA Method 8260C analysis. The trip blanks were non-detect for all reported analytes.

A trip blank was not submitted with 1502-044; thus, associated USEPA Method 8260C results could not be evaluated for potential contamination.

Equipment Rinsate Blanks

Equipment rinsate blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. The laboratory appropriately documented and qualified surrogate outliers. The reviewer took no action based on minor surrogate outliers or surrogate percent recoveries that were outside acceptance limits because of dilutions necessary to quantify high concentrations of target analytes present in the samples. For samples with surrogate outliers, associated batch quality assurance/quality control were within acceptance limits.

In report 1502-037, the USEPA Method 8270D SIM surrogate pyrene-d10 result for sample GM1-W-9.0 was below the lower percent recovery acceptance limit, at 46 percent. The batch method blank surrogate terphenyl-d14 was above the upper percent recovery acceptance limit, at 118 percent. Remaining surrogate percent recoveries met acceptance criteria; thus, no results were qualified.

In report 1502-044, the USEPA Method 8270D SIM surrogate 2-fluorobiphenyl result for sample GM2-W-9.0 was above the upper percent recovery acceptance limit, at 116 percent. The sample was non-detect and remaining surrogate percent recoveries met acceptance criteria; thus, no results were qualified.

All remaining surrogate recoveries were within acceptance limits.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. All MS/MSD samples were extracted and analyzed at the required frequency. All MS/MSD results were within acceptance limits for percent recovery and relative percent difference (RPD).

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All laboratory duplicate samples were extracted and analyzed at the required frequency. All laboratory duplicate RPDs were within acceptance limits.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency. All LCS/LCSD results were within acceptance limits for percent recovery and RPD.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. One field duplicate was submitted for analysis (GM1-S-12.0/GMDUP-S-12.0). MFA uses acceptance criteria of 100 percent RPD for results that are less than five times the method reporting limit (MRL), or 50 percent RPD for results that are greater than five times the MRL. Non-detect data are not used in the evaluation of field duplicate results, with the exception of significant results detected in one of the duplicate pairs. Field duplicate sample GMDUP-S-12.0 had significantly higher percent moisture (70%) compared to the field sample GM1-S-12.0 (34%), which was confirmed by the laboratory. The higher percent moisture resulted in significantly different dry-weight adjusted results. Analytes were within the acceptance criteria, with the exceptions shown in the following table. Field duplicate results that exceeded the acceptance criteria were qualified with a "J," as estimated.

Field Sample	Field Duplicate	Component	Field Sample Result (mg/kg)	Field Duplicate Result (mg/kg)	% RPD	Final Field Sample Result (mg/kg)	Final Field Duplicate Result (mg/kg)
GM1-S-12.0	GMDUP-S-12.0	Lead	7.6 U	24	NA	7.6 UJ	24 J
GM1-S-12.0	GMDUP-S-12.0	Lube Oil	76 U	400	NA	76 UJ	400 J

mg/kg = milligrams per kilogram.

CONTINUING CALIBRATION VERIFICATION RESULTS

Continuing calibration verification (CCV) results are used to demonstrate instrument precision and accuracy through the end of the sample batch. All CCVs were within acceptance limits for percent recovery.

REPORTING LIMITS

ARI and OE used routine reporting limits for non-detect results, except when samples required dilutions because of high analyte concentrations and/or matrix interferences.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

In report 1502-023, OE indicated on the sample receipt checklist that sample GM10-S-4.0 collection time was 12:30 on the chain of custody (COC) and 13:00 on the sample labels.

The reviewer confirmed with the project field notes and boring logs that the correct sample collection time is 12:30.

In reports 1502-023 and 1502-037, the laboratory noted on the sample receipt checklist that the trip blank was not recorded on the COC.

In reports 1502-023, 1502-037, and 1502-044, total and/or dissolved metals in water matrix were requested by USEPA Method 6010C/6020A, but were reported by USEPA 200.8. Additionally, n-hexane analysis was requested by USEPA Method 8260C, but analysis was by NWTPH-Gx.

In report 1502-044, sample GM5-W-8.0 was submitted to the laboratory with “GM5-W-9.0” incorrectly recorded on the COC. The sample name was corrected after receipt by the laboratory and is reported correctly.

No additional issues were found.

ARI. 2014. Quality assurance plan. Analytical Resources, Inc., Tukwila, Washington. April 7.

OE. 2012. Quality assurance manual. Rev. 9.3. OnSite Environmental, Inc. Redmond, Washington. August 3.

USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 6, February 2007).

USEPA. 2014a. USEPA contract laboratory program, national functional guidelines for inorganic superfund data review. EPA 540/R-013/001. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. August.

USEPA. 2014b. USEPA contract laboratory program, national functional guidelines for Superfund organic methods data review. EPA 540/R-014/002. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. August.

ATTACHMENT

DATA VALIDATION TRACKING

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-023
Analysis/Method	USEPA 6010C /7471B (soil)
Batch Number(s)	0209SM3, 0210SH3, 0210S2

Reviewer	MEB
Date	2/25/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	No	Parent Pb is ND, dup Pb is 24 mg/kg.	J
Calibr.	CCB	NR		
	ICV	NR		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NR		
	Lab Dup RPD	Yes		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	NA		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):

GM3-S-6.0	**GM9-S-2.0**	GM4-S-12.5	GM4-W-9.0
GM5-S-4.0	**GM8-S-4.5**	**GM2-S-6.5**	GM10-W-9.0
GM7-S-3.0	GM6-W-11.0	**GM1-S-12.0**	GM10-S-4.0
GM6-S-4.0	GM8-W-10.0	**GMDUP-S-12.0**	Trip Blanks

Notes:

Definitions:

Calibr. = calibration.
CCB = continuing calibration blank.
EMPC = estimated maximum potential concentration.
MDL = method detection limit.
ND = non-detect
NA = not applicable.
NR = not reported.
Pb = lead.
Q = qualifier.

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-023/1502-037/1502-044
Analysis/Method	USEPA 200.8 / 7470A (total metals, water)
Batch Number(s)	0210WM1 (200.8)/0206W1(7470A)

Reviewer	MEB
Date	2/26/2015

	Validation Area	**Acceptable Yes/No/NA/NR**	**Comments**	**Q**
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NR		
	Lab Dup RPD	Yes		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	NA		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font): Report 1502-023			
GM3-S-6.0	GM9-S-2.0	GM4-S-12.5	GM4-W-9.0
GM5-S-4.0	GM8-S-4.5	GM2-S-6.5	GM10-W-9.0
GM7-S-3.0	**GM6-W-11.0**	GM1-S-12.0	GM10-S-4.0
GM6-S-4.0	GM8-W-10.0	GMDUP-S-12.0	Trip Blanks
Report 1502-037			
GM1-W-9.0	**GM3-W-9.0**	**GM7-W-9.0**	TRIP BLANK
Report 1502-044			
GM2-W-9.0	**GM9-W-9.0**	GM5-W-8.0	

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-037
Analysis/Method	USEPA 200.8 / 7470A (dissolved metals, water)
Batch Number(s)	

Reviewer	MEB
Date	2/26/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NR		
	Lab Dup RPD	Yes		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	NA		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font): Report 1502-037			
GM1-W-9.0	GM3-W-9.0	**GM7-W-9.0**	TRIP BLANK

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-023
Analysis/Method	USEPA 8260C (soil)
Batch Number(s)	0205S1, 0206S1

Reviewer	MEB
Date	2/25/2015

	Validation Area	**Acceptable Yes/No/NA/NR**	**Comments**	**Q**
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NR		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):

GM3-S-6.0	**GM9-S-2.0**	**GM4-S-12.5**	**GM4-W-9.0**
GM5-S-4.0	**GM8-S-4.5**	**GM2-S-6.5**	GM10-W-9.0
GM7-S-3.0	GM6-W-11.0	**GM1-S-12.0**	GM10-S-4.0
GM6-S-4.0	GM8-W-10.0	**GMDUP-S-12.0**	Trip Blanks

Notes:

GMDUP-S-12.0 is ND for all USEPA 8260C reported analytes. Field sample GM1-S-12.0 detections are all less than 5 times the reporting limit, so no qualifications are necessary.

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-023/1502-037
Analysis/Method	USEPA 8260C (water)
Batch Number(s)	0206W1/0209W1

Reviewer	MEB
Date	2/25/2015

	Validation Area	**Acceptable Yes/No/NA/NR**	**Comments**	**Q**
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NR		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font): Report 1502-023			
GM3-S-6.0	GM9-S-2.0	GM4-W-12.5	GM4-W-9.0
GM5-S-4.0	GM8-S-4.5	GM2-S-6.5	**GM10-W-9.0**
GM7-S-3.0	**GM6-W-11.0**	GM1-S-12.0	GM10-S-4.0
GM6-S-4.0	**GM8-W-10.0**	GMDUP-S-12.0	**Trip Blanks**
Report 1502-037			
GM1-W-9.0	**GM3-W-9.0**	**GM7-W-9.0**	**TRIP BLANK**
Report 1502-044			
GM2-W-9.0	**GM9-W-9.0**	**GM5-W-8.0**	

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-023
Analysis/Method	NWTPH-Gx (soil)
Batch Number(s)	0206S1, 0206S2

Reviewer	MEB
Date	2/25/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes	LCS/LCSD for 0206S1 only.	
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	Yes		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):

GM3-S-6.0	**GM9-S-2.0**	**GM4-S-12.5**	GM4-W-9.0
GM5-S-4.0	**GM8-S-4.5**	**GM2-S-6.5**	GM10-W-9.0
GM7-S-3.0	GM6-W-11.0	**GM1-S-12.0**	**GM10-S-4.0**
GM6-S-4.0	GM8-W-10.0	**GMDUP-S-12.0**	Trip Blanks

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-023/1502-037/1502-044
Analysis/Method	NWTPH-Gx (water)
Batch Number(s)	0206W1/0206W2/0211W2

Reviewer	MEB
Date	2/26/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	Yes		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GM3-S-6.0	GM9-S-2.0	GM4-S-12.5	**GM4-W-9.0**
GM5-S-4.0	GM8-S-4.5	GM2-S-6.5	**GM10-W-9.0**
GM7-S-3.0	**GM6-W-11.0**	GM1-S-12.0	GM10-S-4.0
GM6-S-4.0	**GM8-W-10.0**	GMDUP-S-12.0	Trip Blanks
Report 1502-037			
GM1-W-9.0	**GM3-W-9.0**	**GM7-W-9.0**	TRIP BLANK
Report 1502-044			
GM2-W-9.0	**GM9-W-9.0**	**GM5-W-8.0**	

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-023
Analysis/Method	NWTPH-Dx (soil)
Batch Number(s)	0209S2

Reviewer	MEB
Date	2/25/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	Yes		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):

GM3-S-6.0	**GM9-S-2.0**	**GM4-S-12.5**	GM4-W-9.0
GM5-S-4.0	**GM8-S-4.5**	**GM2-S-6.5**	GM10-W-9.0
GM7-S-3.0	GM6-W-11.0	**GM1-S-12.0**	**GM10-S-4.0**
GM6-S-4.0	GM8-W-10.0	**GMDUP-S-12.0**	Trip Blanks

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-023/1502-037/1502-044
Analysis/Method	NWTPH-Dx (water)
Batch Number(s)	0206W1/0210W1

Reviewer	MEB
Date	2/26/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	Yes		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GM3-S-6.0	GM9-S-2.0	GM4-S-12.5	**GM4-W-9.0**
GM5-S-4.0	GM8-S-4.5	GM2-S-6.5	**GM10-W-9.0**
GM7-S-3.0	**GM6-W-11.0**	GM1-S-12.0	GM10-S-4.0
GM6-S-4.0	**GM8-W-10.0**	GMDUP-S-12.0	Trip Blanks
Report 1502-037			
GM1-W-9.0	**GM3-W-9.0**	**GM7-W-9.0**	TRIP BLANK
Report 1502-044			
GM2-W-9.0	**GM9-W-9.0**	**GM5-W-8.0**	

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-023
Analysis/Method	USEPA Method 8270D SIM (soil)
Batch Number(s)	

Reviewer	MEB
Date	2/25/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NR		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):

GM3-S-6.0	GM9-S-2.0	GM4-S-12.5	GM4-W-9.0
GM5-S-4.0	GM8-S-4.5	**GM2-S-6.5**	GM10-W-9.0
GM7-S-3.0	GM6-W-11.0	**GM1-S-12.0**	GM10-S-4.0
GM6-S-4.0	GM8-W-10.0	**GMDUP-S-12.0**	Trip Blanks

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-037
Analysis/Method	USEPA 8270D SIM (water)
Batch Number(s)	0209W1

Reviewer	MEB
Date	2/26/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NR		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	No	See comments.	
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font): Report 1502-037			
GM1-W-9.0	**GM3-W-9.0**	**GM7-W-9.0**	TRIP BLANK
Report 1502-044			
GM2-W-9.0	GM9-W-9.0	GM5-W-8.0	

Notes:

1502-037: GM1-W-9.0 pyrene-d10 46% (limit 53-131%). Remaining surrogates are low but passing, so no results are qualified.
Method blank terphenyl-d14 surrogate is high, at 118%, (limit 44-104). Remaining surrogates are passing, so no results are qualified.
1502-044: GM2-W-9.0 2-fluorobiphenyl surrogate is high, at 116%. Sample is ND and remaining surrogates are passing, so no results are qualified.

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-037/1502-044
Analysis/Method	USEPA 8011 (water)
Batch Number(s)	0211W1

Reviewer	MEB
Date	2/26/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NR		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font): Report 1502-037			
GM1-W-9.0	**GM3-W-9.0**	GM7-W-9.0	TRIP BLANK
Report 1502-044			
GM2-W-9.0	GM9-W-9.0	GM5-W-8.0	

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-037
Analysis/Method	USEPA 353.2 nitrate (water)
Batch Number(s)	

Reviewer	MEB
Date	2/26/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes	See comments	
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	Yes		
	MS/MSD %	Yes		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font): Report 1502-037

GM1-W-9.0	**GM3-W-9.0**	**GM7-W-9.0**	TRIP BLANK

Notes:

Nitrate as Nitrogen calculated as difference between Nitrate+Nitrite Nitrogen and Nitrite as Nitrogen. Confirmed that nitrite analysis was performed within 48 hours of collection. Samples were preserved with sulfuric. Analysis date that is reported is that of nitrate+nitrite. Holding time is acceptable.

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-037
Analysis/Method	ASTM D516-07 sulfate (water)
Batch Number(s)	0210W1

Reviewer	MEB
Date	2/26/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	Yes		
	MS/MSD %	Yes		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font): Report 1502-037			
GM1-W-9.0	**GM3-W-9.0**	**GM7-W-9.0**	TRIP BLANK

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-037
Analysis/Method	RSK 175 Dissolved Methane (water)
Batch Number(s)	0210W1

Reviewer	MEB
Date	2/26/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NR		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font): Report 1502-037

GM1-W-9.0	**GM3-W-9.0**	**GM7-W-9.0**	TRIP BLANK

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1502-037
Analysis/Method	ASTM D3500-Fe D Ferrous Iron
Batch Number(s)	

Reviewer	MEB
Date	2/26/2015

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NR		
	Lab Dup RPD	Yes		
	MS/MSD %	Yes		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font): Report 1502-037

GM1-W-9.0	**GM3-W-9.0**	**GM7-W-9.0**	TRIP BLANK

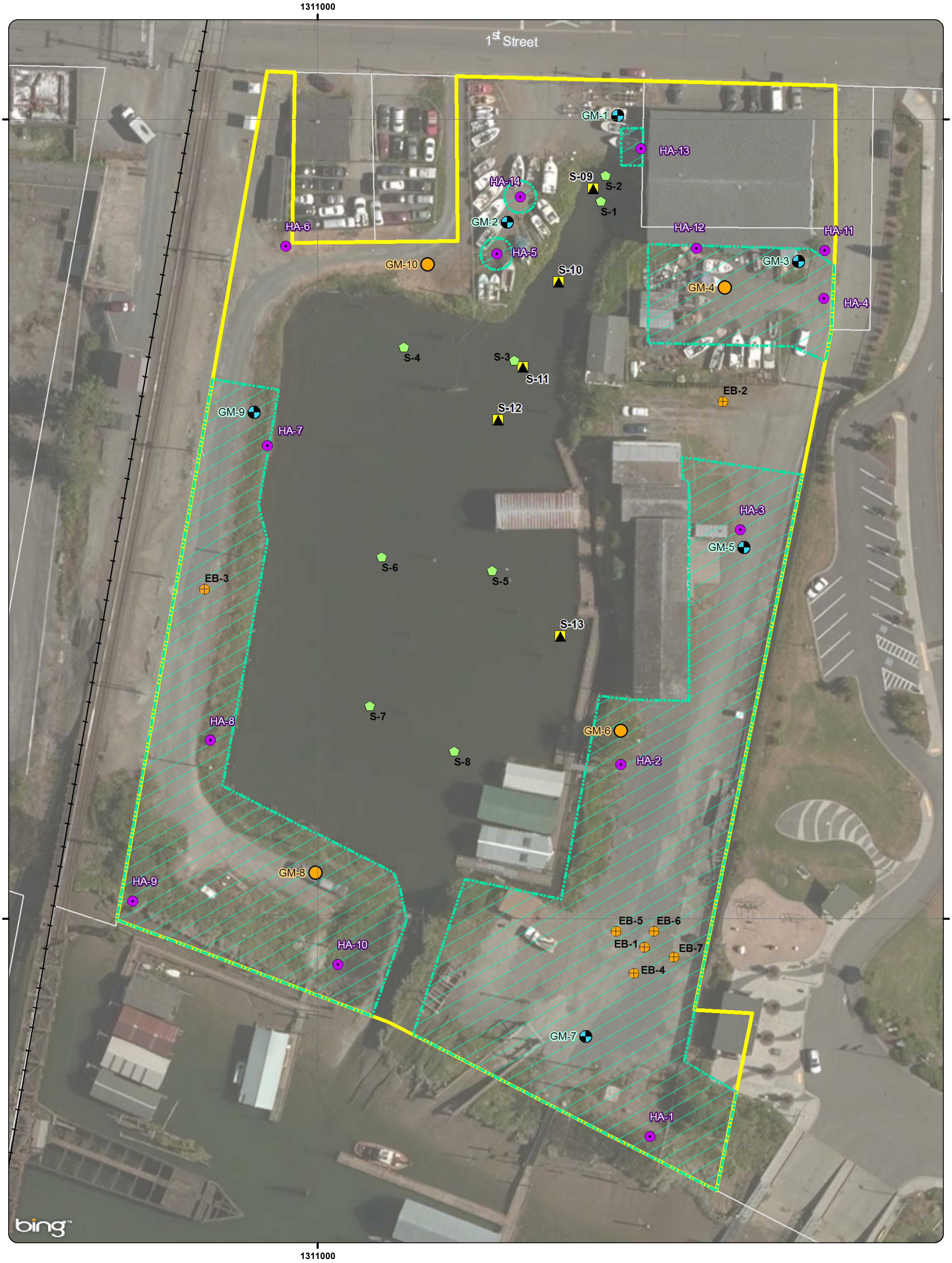
Notes:

Definitions:

APPENDIX E

FEASIBILITY STUDY FIGURES AND COST TABLES

Path: X:\0689.01 City of Marysville\03\Projects\FigE1_AreaOfConcernGrid.mxd



Print Date: 9/22/2015
Approved By: yvan
Produced By: jmiller
Project: 0689.01.03-01

Source: Aerial photograph obtained from Bing Maps/Esri ArcGIS Online; taxlots (2014) obtained from Snohomish County.
Survey Reference Monument: WSDOT Monument ID 3806 (Designation GP31529□169).
Horizontal Datum: Washington State Plane, North Zone (NAD 83/11)
Vertical Datum: NAVD 88
Note: All historical investigation locations are approximate and are based on the Site and Exploration Plan prepared by Associated Earth Sciences, Inc. (Phase II Environmental Site Assessment Report, October 2008).

Legend

⬟	Sediment Sample - Previous	▲	Sediment Sample
●	Hand Auger Exploration	┼	Railroad
⊕	Exploration Boring	▭	Site Boundary
◑	Monitoring Well	⬚	Area of Concern
●	Boring Location		

Figure E-1
Areas of Concern

Former Geddes Marina Property
Marysville, Washington

0 30 60
Feet

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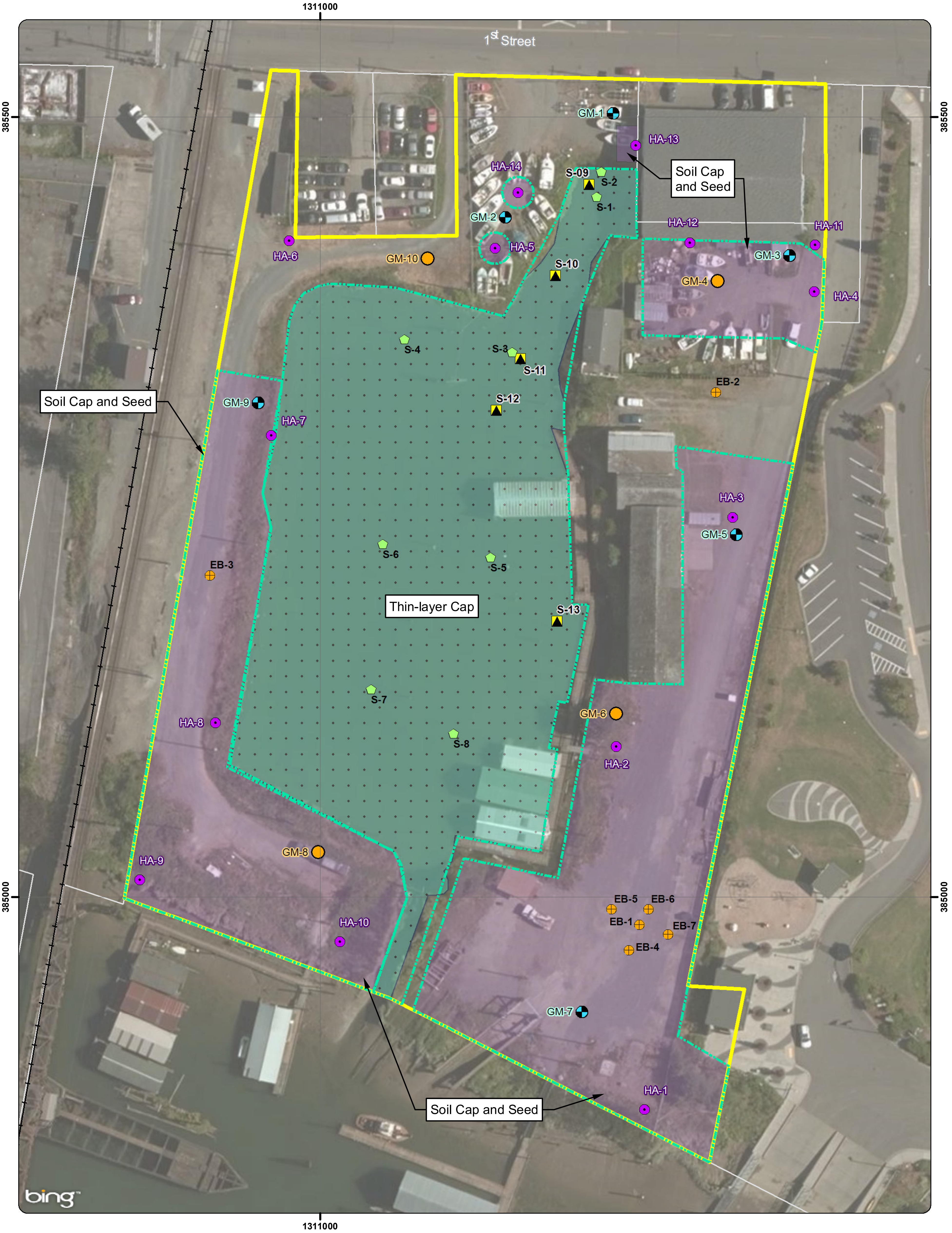
Path: X:\0689.01 City of Marysville\03\Projects\FigE2_FS Alternative 1aGrid.mxd



Source: Aerial photograph obtained from Bing Maps/Esri ArcGIS Online; taxlots (2014) obtained from Snohomish County.
Survey Reference Monument: WSDOT Monument ID 3806 (Designation GP31529□169).
Horizontal Datum: Washington State Plane, North Zone (NAD 83/11).
Vertical Datum: NAVD 88.
Note: All historical investigation locations are approximate and are based on the Site and Exploration Plan prepared by Associated Earth Sciences, Inc. (Phase II Environmental Site Assessment Report, October 2008).

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Legend

⬠ Sediment Sample - Previous
● Hand Auger Exploration
⊕ Exploration Boring
◐ Monitoring Well
● Boring Location
▲ Sediment Sample
+ Railroad

▭ Site Boundary
▭ Area of Concern

Alternative 1a Elements

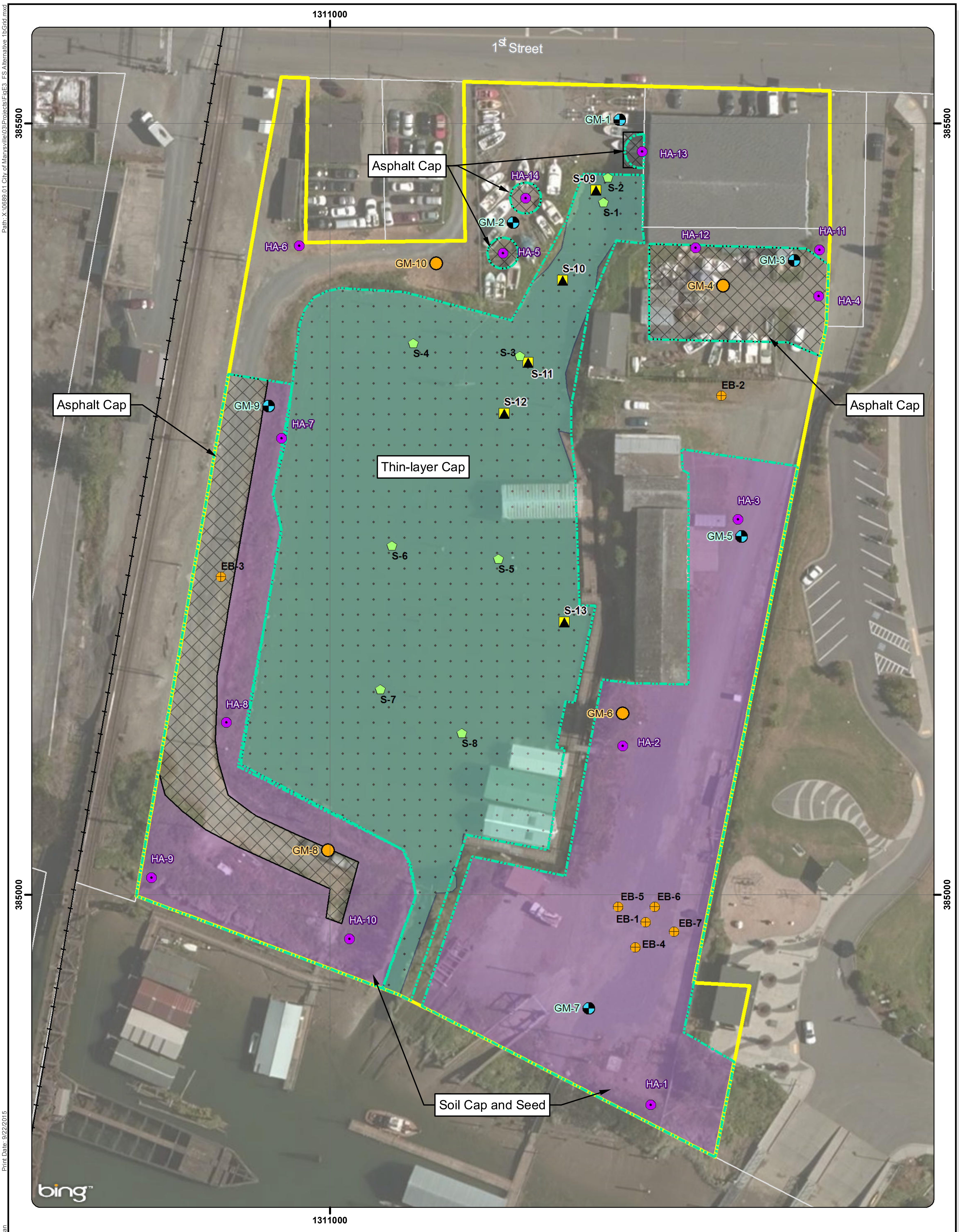
▨ Thin-layer cap (0.5 ft thick)
▨ Clear, grade, prepare surface, lay soil cap and seed

0 30 60
Feet

Figure E-2
Cleanup Alternative 1a:
Soil Capping and Institutional Controls

Former Geddes Marina Property
Marysville, Washington

Print Date: 9/22/2015
Approved By: yvan
Produced By: jmiller
Project: 0689.01.03-01



Source: Aerial photograph obtained from Bing Maps/Esri ArcGIS Online; taxlots (2014) obtained from Snohomish County.
Survey Reference Monument: WSDOT Monument ID 3806 (Designation GP31529□169).
Horizontal Datum: Washington State Plane, North Zone (NAD 83/11).
Vertical Datum: NAVD 88.
Note: All historical investigation locations are approximate and are based on the Site and Exploration Plan prepared by Associated Earth Sciences, Inc. (Phase II Environmental Site Assessment Report, October 2008).

Legend

- ⬠ Sediment Sample - Previous
- ● Hand Auger Exploration
- ⊕ Exploration Boring
- ◐ Monitoring Well
- ● Boring Location
- ▲ Sediment Sample
- ┼ Railroad
- ▭ Site Boundary
- ⬭ Area of Concern

Alternative 1b Elements

- ▨ Thin-layer cap (0.5 ft thick)
- ▨ Clear, grade, repair surface, lay soil cap and seed
- ▨ Prepare surface and lay asphalt cap

Figure E-3
Cleanup Alternative 1b: Soil and Asphalt Capping and Institutional Controls

Former Geddes Marina Property
Marysville, Washington

0 30 60
Feet

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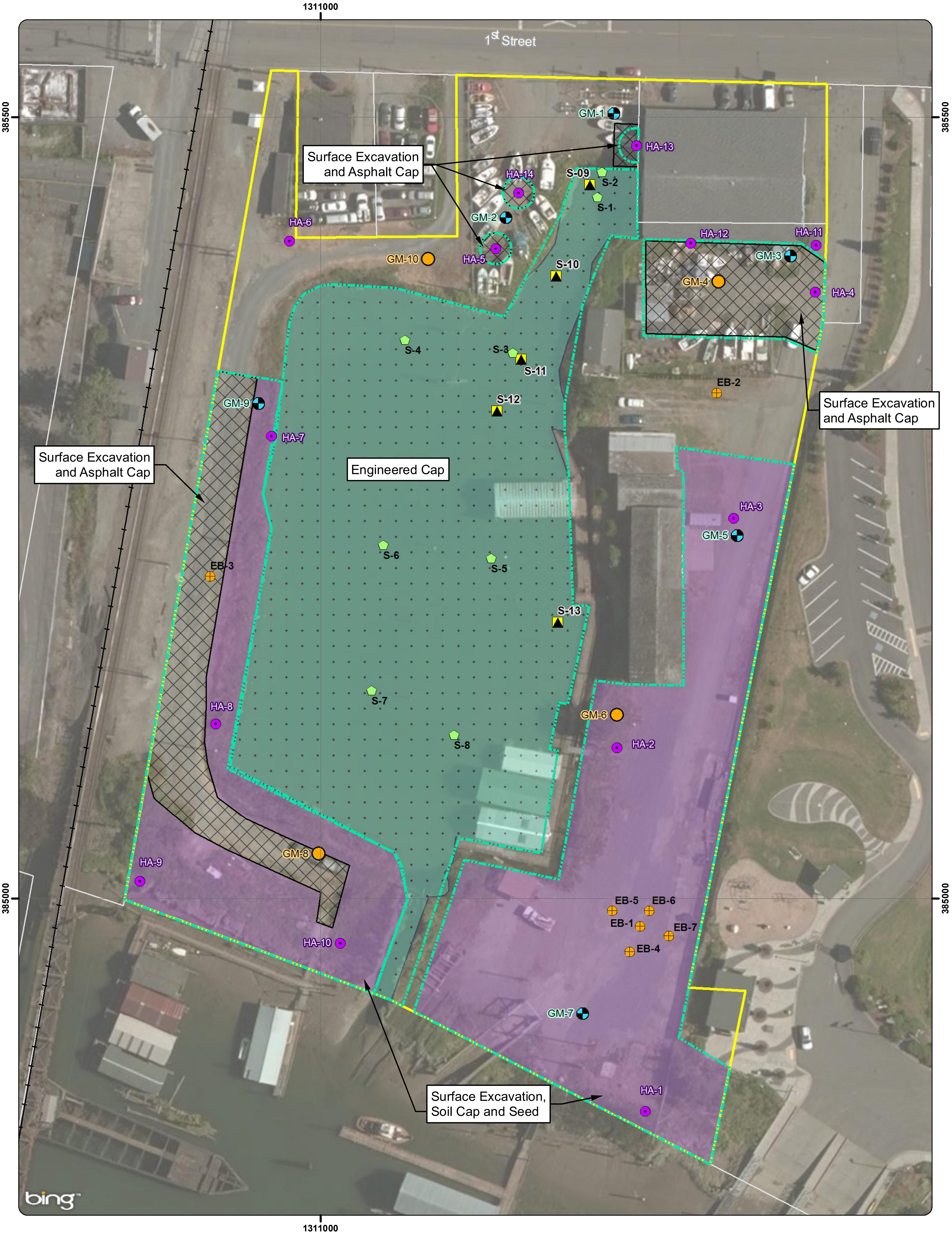
Path: X:\0689.01 City of Marysville\03\Projects\FigE3_FS Alternative 1bGrid.mxd
Print Date: 9/22/2015
Approved By: yvan
Produced By: jmiller
Project: 0689.01.03-01



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Print Date: 9/22/2015

Approved By: yvan

Produced By: jmiller

Project: 0689.01.03-01

Source: Aerial photograph obtained from Bing Maps/Esri ArcGIS Online; taxlots (2014) obtained from Snohomish County.
Survey Reference Monument: WSDOT Monument ID 3806 (Designation GP31529□169).
Horizontal Datum: Washington State Plane, North Zone (NAD 83/11).
Vertical Datum: NAVD 88.
Note: All historical investigation locations are approximate and are based on the Site and Exploration Plan prepared by Associated Earth Sciences, Inc. (Phase II Environmental Site Assessment Report, October 2008).

Legend

- ⬠ Sediment Sample - Previous
- ● Hand Auger Exploration
- ⊕ Exploration Boring
- ◑ Monitoring Well
- ● Boring Location
- ▲ Sediment Sample
- ┼ Railroad
- ▭ Site Boundary
- ◌ Area of Concern

Alternative 2 Elements

- ▨ Place engineered sediment cap (1 ft thick)
- ▨ Excavate (1 ft bgs), lay demarcation layer, grade, place soil cap and seed
- ▨ Excavate (1 ft bgs), lay demarcation layer and cap with asphalt

0 30 60
Feet

Figure E-4
Cleanup Alternative 2: Limited Excavation, Capping, and Institutional Controls

Former Geddes Marina Property
Marysville, Washington

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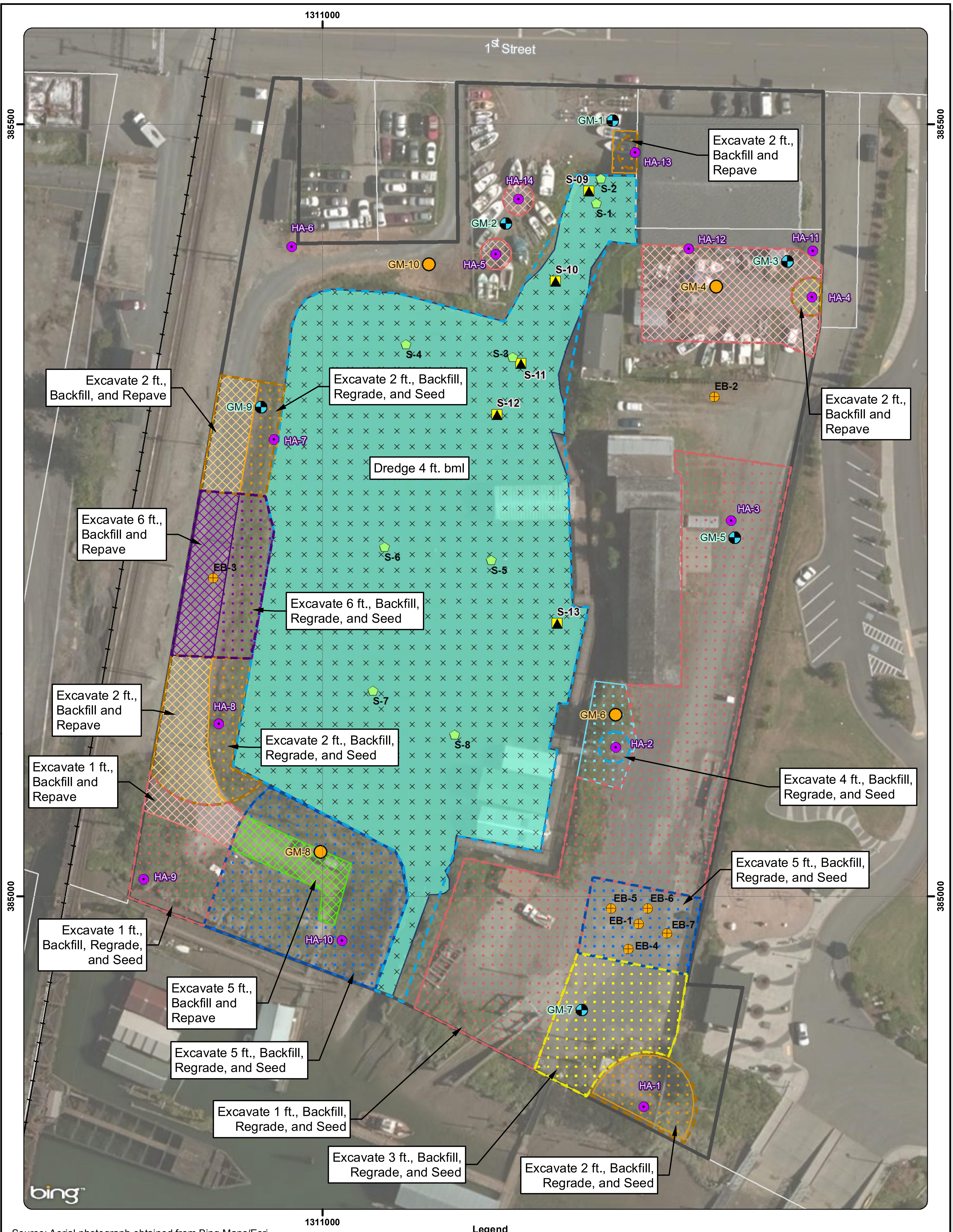

Source: Aerial photograph obtained from Bing Maps/Esri ArcGIS Online; taxlots (2014) obtained from Snohomish County.
Survey Reference Monument: WSDOT Monument ID 3806
(Designation GP31529□169).
Horizontal Datum: Washington State Plane, North Zone (NAD 83/11).
Vertical Datum: NAVD 88.
Note: All historical investigation locations are approximate and are based on the Site and Exploration Plan prepared by Associated Earth Sciences, Inc. (Phase II Environmental Site Assessment Report, October 2008).
bgs = below ground surface
bml = below mudline

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Legend

- ⬟ Sediment Sample - Previous
- ● Hand Auger Exploration
- ⊕ Exploration Boring
- ◑ Monitoring Well
- ● Boring Location
- ▲ Sediment Sample
- ▭ Site Boundary

Area of Concern
- ▭ 1 ft. bgs
- ▭ 2 ft. bgs
- ▭ 3 ft. bgs
- ▭ 4 ft. bgs
- ▭ 5 ft. bgs
- ▭ 6 ft. bgs

Alternative 3 Elements
- ▨ Dredge sediment 4 ft bml

Backfill, Regrade, and Seed
- ▭ Excavate 1 bgs
- ▭ Excavate 2 bgs
- ▭ Excavate 3 bgs
- ▭ Excavate 4 bgs
- ▭ Excavate 5 bgs
- ▭ Excavate 6 bgs

Backfill, and Repave
- ▨ Excavate 1 ft bgs
- ▨ Excavate 2 ft bgs
- ▨ Excavate 5 ft bgs
- ▨ Excavate 6 ft bgs

Figure E-5
Cleanup Alternative 3: Excavation and Dredging

Former Geddes Marina Property
Marysville, Washington

0 30 60
Feet

Table E-1
Summary of Remediation Alternative Estimated Costs
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:	Geddes Marina Marysville, WA	**Description:** Cost comparison of the total costs of Alternatives 1 through 3.
Phase:	Feasibility Study (-35% to +50%)	
Base Year:	2015	
Date:	August 2015	

DESCRIPTION	TOTAL NET PRESENT VALUE	INCREMENTAL COST	COST TABLE REFERENCE
Alternative 1a	$913,000	-$5,043,000	Table E-2
Alternative 1b	$1,161,000	-$4,795,000	Table E-3
Alternative 2	$2,890,000	-$3,066,000	Table E-4
Alternative 3	$5,956,000	Baseline Cost	Table E-5

Table E-2
Remediation Alternative 1a Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:	Geddes Marina Marysville, WA	**Description:** Alternative 1a involves containment of contaminated soil via capping, monitored natural attenuation of contaminated groundwater, enhanced natural recovery of contaminated sediments (thin-layer cap), and institutional controls. Little excavation is required under this alternative (some soil may be removed to accommodate cap installation). — AOCs will be capped with clean soil to promote redevelopment as a park while breaking direct-contact pathway. — The lagoon sediment will be capped with a clean sand material (6 inches thick). — The caps will be monitored and maintained for the length of the remedy (ten years). — This alternative assumes that an environmental covenant will be implemented.
Phase:	Feasibility Study (-35% to +50%)	
Base Year:	2015	
Date:	August 2015	

CAPITAL COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Site Preparation					
Mobilization/Demobilization	1	LS	$ 20,000	$ 20,000	Engineer's estimate.
Temp. Erosion & Sedimentation Control Measures	1	LS	$ 3,000	$ 3,000	Engineer's estimate.
Clearing and Grading Cap Area	9,092	SY	$ 5	$ 45,069	Grade subgrade for base course, small irregular areas. 2015 RSMeans 31 22 16.10 1050.
Site Preparation Subtotal				**$ 68,069**	
Capping, Restoration, and Revegetation					
Soil Cap Material	1,515	CY	$ 30	$ 45,462	Weed-free topsoil for cap material.
Hauling Soil Material	76	HR	$ 169	$ 12,839	Hauling, 20 CY truck, small project hourly rate. 2015 RSMeans 31 23 23.20 2200.
Place Soil Cap Material	1,515	CY	$ 2	$ 3,743	Place soil cover, spread dumped material by dozer, no compaction. 2015 RSMeans 31 23 23.17 0400. 0.5' thick cover.

Table E-2
Remediation Alternative 1a Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Grading & Seeding	3,031	SY	$ 4.00	$ 12,123	Fine grading and seeding, incl. lime, fertilizer and seed, with equipment. 2015 RSMeans 32 91 19.13 1000.
Sediment Cap (TLC)	1,344	CY	$ 43	$ 57,780	Purchase, transport, and place TLC material. Engineer's estimate.
Bathymetric Surveys	2	EA	$ 15,000	$ 30,000	Pre- and post-capping record surveys.
Capping, Restoration and Revegetation Subtotal				**$ 161,947**	
Contingency	15%	--	--	**$ 34,502**	Scope and bid contingency. Percentage of capital costs.
Permitting					
Pre-Application Meeting with City of Marysville & USACE	1	LS	$ 10,000	$ 10,000	Engineer's estimate.
Biological Evaluation Survey	1	LS	$ 10,000	$ 10,000	Engineer's estimate.
USACE Permits	1	LS	$ 60,000	$ 60,000	Hydraulic Project Approval Permit, Joint Aquatic Resources Permit , Nationwide Permits, etc. Engineer's estimate.
Critical Areas Review Permit Application	1	LS	$ 3,000	$ 3,000	Engineer's estimate.
Clearing and Grading Permit Application	1	LS	$ 500	$ 500	Engineer's estimate.
Planning Documents	1	LS	$ 9,000	$ 9,000	Drainage/erosion-control plans, mitigation planting plan, monitoring plan. Engineer's estimate.
Permitting Subtotal				**$ 92,500**	
Professional/Technical Services					
Project Management	6%	--	--	$ 15,871	Percentage of capital cost + contingency. EPA 540-R-00-002.
Remedial Design	12%	--	--	$ 31,742	Percentage of capital cost + contingency. EPA 540-R-00-002.
Construction Management	8%	--	--	$ 21,161	Percentage of capital cost + contingency. EPA 540-R-00-002.
Professional/Technical Services Subtotal				**$ 68,775**	

Table E-2
Remediation Alternative 1a Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Institutional Controls					
Preparation of Environmental Covenant	1	EA	$ 10,000	$ 10,000	Engineer's estimate.
Protective signage	2	EA	$200	$ 400	Engineer's estimate.
Institutional Controls Subtotal				**$10,400**	
TOTAL CAPITAL COST				**$ 436,193**	
ANNUAL O&M COSTS					
DESCRIPTION	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**	**NOTES**
Annual O&M					
Site Inspections	1	YR	$ 500	$ 500	Engineer's estimate.
Site Maintenance	1	YR	$ 23,002	$ 23,002	10% of construction costs.
Compliance Monitoring	1	YR	$ 4,515	$ 4,515	Groundwater monitoring event. Includes mob/demob and analytical costs.
Annual O&M Subtotal				**$ 28,017**	
Contingency	15%	--	--	**$ 4,202**	Scope and bid contingency. Percentage of O&M costs.
Professional/Technical Services					
Project Management	10%	--	--	$ 3,222	Percentage of O&M costs + contingency. EPA 540-R-00-
Technical Support	10%	--	--	$ 3,222	Percentage of O&M costs + contingency. EPA 540-R-00-002.
Reporting	1	YR	$ 1,000	$ 1,000	Engineer's estimate.
Professional/Technical Services Subtotal				**$ 7,444**	
TOTAL ANNUAL O&M COST				**$ 39,663**	

Table E-2
Remediation Alternative 1a Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

PERIODIC COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Site Maintenance					
Cap Replacement/Repair	1	EA	$ 80,974	$ 80,974	50% of capping capital costs. Year 10.
Contingency	10%	--	--	$ 8,097	Scope and bid contingency. Percentage of periodic cost.
Project Management	10%	--	--	$ 8,907	Percentage of O&M costs + contingency. EPA 540-R-00-002.
Site Maintenance Subtotal				**$ 97,978**	
Professional/Technical Services					
5-Year Reviews & Reporting	1	EA	$ 5,000	$ 5,000	Engineer's estimate. Years 5 and 10.
Professional/Technical Services Subtotal				**$ 5,000**	

PRESENT VALUE ANALYSIS

Discount Rate	0.9%
Total Years	10

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR	NET PRESENT VALUE	NOTES
Capital	0	$ 436,193	$ 436,193	1.000	$ 436,193	
Annual O&M	1 - 10	$ 396,629	$ 39,663	9.522	$ 377,682	
Periodic	5	$ 5,000	$ 5,000	0.956	$ 4,781	
Periodic	10	$ 102,978	$ 102,978	0.914	$ 94,153	
		$ 940,800			$ 912,809	
TOTAL NET PRESENT VALUE OF ALTERNATIVE 1a					**$ 912,809**	

NOTES:

Cost estimate does not include sales tax.

Present value analysis uses a 10-year discount rate of 0.9 percent.

(http://www.whitehouse.gov/omb/circulars_a094/a94_appx-c).

Table E-3
Remediation Alternative 1b Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:	Geddes Marina Marysville, WA
Phase:	Feasibility Study (-35% to +50%)
Base Year:	2015
Date:	August 2015

Description: Alternative 1b involves the same components as Alternative 1a; however, in this alternative the a portion of the upland cap will be asphalt to match existing conditions. Some areas will be capped with clean soil. All other aspects remain the same as Alternative 1a.

CAPITAL COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Site Preparation					
Mobilization/Demobilization	1	LS	$ 20,000	$ 20,000	Engineer's estimate.
Temp. Erosion & Sedimentation Control Measures	1	LS	$ 3,000	$ 3,000	Engineer's estimate.
Clearing and Grading Cap Area	9,092	SY	$ 5	$ 45,069	Grade subgrade for base course, small irregular areas. 2015 RSMeans 31 22 16.10 1050.
Site Preparation Subtotal				**$ 68,069**	
Capping, Restoration and Revegetation					
Asphalt Cap	2,134	SY	$ 43	$ 92,170	See cost backup (Table E-6).
Soil Cap Material	1,160	CY	$ 30	$ 34,791	Weed-free topsoil for cap material.
Hauling Soil Material	58	HR	$ 169	$ 9,826	Hauling, 20 CY truck, small project hourly rate. 2015 RSMeans 31 23 23.20 2200.
Place Soil Cap Material	1,160	CY	$ 2	$ 2,864	Place soil cover, spread dumped material by dozer, no compaction. 2015 RSMeans 31 23 23.17 0400. 0.5' thick cover.
Grading & Seeding	2,319	SY	$ 4.00	$ 9,278	Fine grading and seeding, incl. lime, fertilizer and seed, with equipment. 2015 RSMeans 32 91 19.13 1000.
Sediment Cap (TLC)	1,344	CY	$ 43	$ 57,780	Purchase, transport, and place TLC material. Engineer's estimate.
Bathymetric Surveys	2	EA	$ 15,000	$ 30,000	Pre- and post-capping record surveys.
Capping, Restoration and Revegetation Subtotal				**$ 236,709**	
Contingency	15%	--	--	**$ 45,717**	Scope and bid contingency. Percentage of capital costs.

Table E-3
Remediation Alternative 1b Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Permitting					
Pre-Application Meeting with City of Marysville & USACE	1	LS	$ 10,000	$ 10,000	Engineer's estimate.
Biological Evaluation Survey	1	LS	$ 10,000	$ 10,000	Engineer's estimate.
USACE Permits	1	LS	$ 60,000	$ 60,000	Hydraulic Project Approval Permit, Joint Aquatic Resources Permit , Nationwide Permits, etc. Engineer's estimate.
Critical Areas Review Permit Application	1	LS	$ 3,000	$ 3,000	Engineer's estimate.
Clearing and Grading Permit Application	1	LS	$ 500	$ 500	Engineer's estimate.
Planning Documents	1	LS	$ 9,000	$ 9,000	Drainage/erosion-control plans, mitigation planting plan, monitoring plan. Engineer's estimate.
Permitting Subtotal				**$ 92,500**	
Professional/Technical Services					
Project Management	6%	--	--	$ 21,030	Percentage of capital cost + contingency. EPA 540-R-00-002.
Remedial Design	12%	--	--	$ 42,059	Percentage of capital cost + contingency. EPA 540-R-00-002.
Construction Management	8%	--	--	$ 28,040	Percentage of capital cost + contingency. EPA 540-R-00-002.
Professional/Technical Services Subtotal				**$ 91,128**	
Institutional Controls					
Preparation of Environmental Covenant	1	EA	$ 10,000	$ 10,000	Engineer's estimate.
Protective signage	2	EA	$200	$ 400	Engineer's estimate.
Institutional Controls Subtotal				**$10,400**	
TOTAL CAPITAL COST				**$ 544,522**	

Table E-3
Remediation Alternative 1b Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

ANNUAL O&M COSTS					
DESCRIPTION	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**	**NOTES**
Annual O&M					
Site Inspections	1	YR	$ 500	$ 500	Engineer's estimate.
Site Maintenance	1	YR	$ 30,478	$ 30,478	10% of construction costs.
Compliance Monitoring	1	YR	$ 4,515	$ 4,515	Groundwater monitoring event. Includes mob/demob and analytical costs.
Annual O&M Subtotal				**$ 35,493**	
Contingency	15%	--	--	**$ 5,324**	Scope and bid contingency. Percentage of O&M costs.
Professional/Technical Services					
Project Management	10%	--	--	$ 4,082	Percentage of O&M costs + contingency. EPA 540-R-
Technical Support	10%	--	--	$ 4,082	Percentage of O&M costs + contingency. EPA 540-R-00-002.
Reporting	1	YR	$ 1,000	$ 1,000	Engineer's estimate.
Professional/Technical Services Subtotal				**$ 9,163**	
TOTAL ANNUAL O&M COST				**$ 49,980**	

PERIODIC COSTS					
DESCRIPTION	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**	**NOTES**
Site Maintenance					
Cap Replacement/Repair	1	EA	$ 118,354	$ 118,354	50% of capping capital costs. Year 10.
Contingency	10%	--	--	$ 11,835	Scope and bid contingency. Percentage of periodic cost.
Project Management	10%	--	--	$ 13,019	Percentage of O&M costs + contingency. EPA 540-R-00-002.
Site Maintenance Subtotal				**$ 143,209**	
Professional/Technical Services					
5-Year Reviews & Reporting	1	EA	$ 5,000	$ 5,000	Engineer's estimate. Years 5 and 10.
Professional/Technical Services Subtotal				**$ 5,000**	

Table E-3
Remediation Alternative 1b Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

PRESENT VALUE ANALYSIS

Discount Rate	0.9%
Total Years	10

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR	NET PRESENT VALUE	NOTES
Capital	0	$ 544,522	$ 544,522	1.000	$ 544,522	
Annual O&M	1 - 10	$ 499,800	$ 49,980	9.522	$ 475,925	
Periodic	5	$ 5,000	$ 5,000	0.956	$ 4,781	
Periodic	10	$ 148,209	$ 148,209	0.914	$ 135,507	
		$ 1,197,531			$ 1,160,735	
TOTAL NET PRESENT VALUE OF ALTERNATIVE 1b					**$ 1,160,735**	

NOTES:

Cost estimate does not include sales tax.

Present value analysis uses a ten-year discount rate of 0.9 percent (http://www.whitehouse.gov/omb/circulars_a094/a94_appx-c).

Table E-4
Remediation Alternative 2 Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location:	Geddes Marina Marysville, WA	**Description:** Alternative 2 involves a combination of surface soil excavation and capping, with off-site disposal of soil containing IHSs above the cleanup level at a permitted, engineered, lined, and monitored landfill facility. This cost estimate assumes that the material will be disposed of at a Subtitle D landfill. — The top 1 foot of soil in the upland AOCs will be excavated. — Following excavation, a demarcation layer will be placed and the AOCs will be backfilled to grade with clean fill material and capped. — Natural attenuation of contaminated groundwater will be monitored. — The lagoon sediment will be capped (1 ft thick) with a clean sand material. — An environmental covenant may be required if impacted material remains in AOCs.
Phase:	Feasibility Study (-35% to +50%)	
Base Year:	2015	
Date:	August 2015	

CAPITAL COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Site Preparation					
Mobilization/Demobilization	1	LS	$ 40,000	$ 40,000	Engineer's estimate.
Temp. Erosion & Sedimentation Control Measures	1	LS	$ 3,000	$ 3,000	Engineer's estimate.
Clearing and Grading Cap Area	9,092	SY	$ 5	$ 45,069	Grade subgrade for base course, small irregular areas. 2015 RSMeans 31 22 16.10 1050.
Site Preparation Subtotal				**$ 88,069**	
Excavation and Disposal					
Excavation and Loading	3,017	CY	$ 31	$ 92,586	Hydraulic backhoe, 0.5 CY bucket. 2015 RSMeans 31 23 16.16 6030 and 9024.
Waste Transportation and Disposal	4,525	ton	$ 50	$ 226,261	North Snohomish County Transfer Station, Subtitle D MSW facility.
Demarcation Layer	9,050	SY	$ 1.44	$ 13,033	Orange, nonwoven geotextile. See cost backup (Table E-5).
Excavation and Disposal Subtotal				**$ 331,880**	

Table E-4
Remediation Alternative 2 Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Capping, Restoration and Revegetation					
Asphalt Cap	2,134	SY	$ 45	$ 95,174	See cost backup (Table E-6).
Backfilling	3,017	CY	$ 51	$ 153,858	Includes compaction in 12" layers, vibrating plate. 2015 RSMeans 31 23 23.13 1100.
Soil Cap Material	2,319	CY	$ 30	$ 69,582	Weed-free topsoil for cap material.
Hauling Soil Material	116	HR	$ 169	$ 19,651	Hauling, 20 CY truck, small project hourly rate. 2015 RSMeans 31 23 23.20 2200.
Place Soil Cover Material	2,319	CY	$ 2	$ 5,729	Place soil cover, spread dumped material by dozer, no compaction. 2015 RSMeans 31 23 23.17 0400. 0.5' thick cover.
Grading & Seeding	2,319	SY	$ 4.00	$ 9,278	Fine grading and seeding, incl. lime, fertilizer & seed, with equipment. 2015 RSMeans 32 91 19.13 1000.
Sediment Cap (1' thick)	2,687	CY	$ 43	$ 115,561	Purchase, transport, and place TLC material. Engineer's estimate.
Bathymetric Surveys	2	EA	$ 15,000	$ 30,000	Pre- and post-capping record surveys.
Capping, Restoration and Revegetation Subtotal				**$ 498,833**	
Contingency	25%	--	--	**$ 229,695**	Scope and bid contingency. Percentage of capital costs.
Permitting					
Pre-Application Meeting with City of Marysville & USACE	1	LS	$ 10,000	$ 10,000	Engineer's estimate.
Biological Evaluation Survey	1	LS	$ 10,000	$ 10,000	Engineer's estimate.
USACE Permits	1	LS	$ 60,000	$ 60,000	Hydraulic Project Approval Permit, Joint Aquatic Resources Permit , Nationwide Permits, etc. Engineer's estimate.
Critical Areas Review Permit Application	1	LS	$ 3,000	$ 3,000	Engineer's estimate.
Clearing and Grading Permit Application	1	LS	$ 500	$ 500	Engineer's estimate.
Planning Documents	1	LS	$ 9,000	$ 9,000	Drainage/erosion-control plans, mitigation planting plan, monitoring plan. Engineer's estimate.
Permitting Subtotal				**$ 92,500**	

Table E-4
Remediation Alternative 2 Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Professional/Technical Services					
Project Management	6%	--	--	$ 68,909	Percentage of capital cost + contingency. EPA 540-R-00-002.
Remedial Design	12%	--	--	$ 137,817	Percentage of capital cost + contingency. EPA 540-R-00-002.
Construction Management	8%	--	--	$ 91,878	Percentage of capital cost + contingency. EPA 540-R-00-002.
Professional/Technical Services Subtotal				**$ 298,604**	
Institutional Controls					
Preparation of Environmental Covenant	1	EA	$ 10,000	$ 10,000	Engineer's estimate.
Protective signage	2	EA	$ 200	$ 400	Engineer's estimate.
Institutional Controls Subtotal				**$10,400**	
TOTAL CAPITAL COST				**$ 1,549,980**	
ANNUAL O&M COSTS					
DESCRIPTION	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**	**NOTES**
Site Restoration Monitoring					
Site Inspections	1	YR	$ 500	$ 500	Engineer's estimate.
Site Maintenance	1	YR	$ 83,071	$ 83,071	10% of construction costs.
Compliance Monitoring	1	YR	$ 4,515	$ 4,515	Groundwater monitoring event. Includes mob/demob and analytical costs.
Site Restoration Monitoring Subtotal				**$ 83,571**	
Contingency	10%	--	--	**$ 8,357**	Scope and bid contingency. Percentage of annual costs.
Professional/Technical Services					
Project Management	10%	--	--	$ 9,193	Percentage of O&M costs + contingency. EPA 540-R-00-002.
Technical Support	10%	--	--	$ 9,193	Percentage of O&M costs + contingency. EPA 540-R-00-002.
Reporting	1	EA	$ 500	$ 500	Engineer's estimate.
Professional/Technical Services Subtotal				**$ 18,886**	
TOTAL ANNUAL O&M COST				**$ 110,814**	

Table E-4
Remediation Alternative 2 Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

PERIODIC COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Site Maintenance					
Cap Replacement/Repair	1	EA	$ 249,416	$ 249,416	50% of capping capital costs. Year 10.
Contingency	10%	--	--	$ 24,942	Scope and bid contingency. Percentage of periodic cost.
Project Management	10%	--	--	$ 27,436	Percentage of O&M costs + contingency. EPA 540-R-00-002.
Site Maintenance Subtotal				**$ 301,794**	
Professional/Technical Services					
5-Year Reviews & Reporting	1	EA	$ 5,000	$ 5,000	Engineer's estimate. Years 5 and 10.
Professional/Technical Services Subtotal				**$ 5,000**	

PRESENT VALUE ANALYSIS

Discount Rate	0.9%
Total Years	10

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR	NET PRESENT VALUE	NOTES
Capital	0	$ 1,549,980	$ 1,549,980	1.000	$ 1,549,980	
Annual O&M	1 - 10	$ 1,108,141	$ 110,814	9.522	$ 1,055,206	
Periodic	5	$ 5,000	$ 5,000	0.956	$ 4,781	
Periodic	10	$ 306,794	$ 306,794	0.914	$ 280,501	
		$ 2,969,915			$ 2,890,469	
TOTAL NET PRESENT VALUE OF ALTERNATIVE 2					**$ 2,890,469**	

NOTES:

Cost estimate does not include sales tax.

Present value analysis uses a 10-year discount rate of 0.9 percent (http://www.whitehouse.gov/omb/circulars_a094/a94_appx-c).

Table E-5
Remediation Alternative 3 Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Location: Geddes Marina
Marysville, WA

Phase: Feasibility Study (-35% to +50%)

Base Year: 2015

Date: August 2015

Description: Alternative 3 involves a combination of excavation of soil containing IHSs above the cleanup level, dredging of contaminated sediments, and off-site disposal at a permitted, engineered, lined, and monitored landfill facility. This cost estimate assumes that the material will be disposed of at a Subtitle D landfill.
— Following excavation, the upland AOCs will be backfilled to grade with clean fill material.
— The contaminated sediment in the lagoon area will be removed through dredging.
— Saturated sediments will be dewatered in an upland staging area, prior to disposal off site.
— This alternative assumes the removal of all contaminated material from the site and that no institutional controls will be necessary.

CAPITAL COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Site Preparation					
Mobilization/Demobilization	1	LS	$ 50,000	$ 50,000	Engineer's estimate.
Temp. Erosion & Sedimentation Control Measures	1	LS	$ 3,000	$ 3,000	Engineer's estimate.
Clearing and Grading	9,092	SY	$ 5	$ 45,069	Grade subgrade for base course, small irregular areas. 2015 RSMeans 31 22 16.10 1050.
Site Preparation Subtotal				**$ 98,069**	
Excavation and Disposal					
Excavation and Loading	7,366	CY	$ 31	$ 226,052	Hydraulic backhoe, 0.5 CY bucket. 2015 RSMeans 31 23 16.16 6030 and 9024.
Waste Transportation and Disposal	11,049	ton	$ 50	$ 552,425	North Snohomish County Transfer Station, Subtitle D MSW facility.
Grading	4,639	SY	$ 5	$ 23,101	Finish grading area to be paved with grader, small area. 2015 RSMeans 31 22 16.10 0012.
Performance Sampling and Analysis	1	LS	$ 61,125	$ 61,125	Analytical cost only, labor assumed to be part of construction management, one sample per 1000 SF.
Excavation and Disposal Subtotal				**$ 862,704**	

Table E-5
Remediation Alternative 3 Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Dredging					
Bathymetric Surveys	2	EA	$ 15,000	$ 30,000	Pre- and post-dredging record surveys.
Sediment Dredging	10,750	CY	$ 20	$ 214,997	Hydraulic dredging, contaminated sediments. 2015 RSMeans 35 20 23.23 1000.
Sediment Dewatering	684,732	GAL	$ 0.20	$ 136,946	Assumes 0.3 porosity of total dredged sediment volume and 0.1 porosity of excavated soil volume for depths 5 ft bgs and greater. Solids disposed of with dredged material. Engineer's estimate.
Dewatering Treatment	684,732	GAL	$ 0.60	$ 410,839	Water collection, sand filter and carbon adsorption.
Off-site Transportation and Disposal	10,750	CY	$ 50	$ 537,492	Trucking dewatered sediment to a regional landfill.
Dredging Subtotal				**$ 1,330,275**	
Paving, Restoration and Revegetation					
Asphalt Cap	2,134	SY	$ 45	$ 95,174	See cost backup (Table E-6).
Backfilling	7,366	CY	$ 51	$ 375,649	Includes compaction in 12" layers, vibrating plate. 2015 RSMeans 31 23 23.13 1100
Hauling Soil Material	368	HR	$ 169	$ 62,406	Hauling, 20 CY truck, small project hourly rate. 2015 RSMeans 31 23 23.20 2200.
Place Soil Cap Material	4,639	CY	$ 2	$ 11,458	Place soil cover, spread dumped material by dozer, no compaction. 2015 RSMeans 31 23 23.17 0400. 0.5' thick cover.
Grading & Seeding	2,319	SY	$ 4	$ 9,278	Fine grading and seeding, incl. lime, fertilizer and seed, with equipment. 2015 RSMeans 32 91 19.13 1000.
Paving, Restoration and Revegetation Subtotal				**$ 553,965**	
Contingency	30%	--	--	**$ 853,503**	Scope and bid contingency. Percentage of capital costs.

Table E-5
Remediation Alternative 3 Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Permitting					
Pre-Application Meeting with City of Marysville & USACE	1	LS	$ 10,000	$ 10,000	Engineer's estimate.
Biological Evaluation Survey	1	LS	$ 10,000	$ 10,000	Engineer's estimate.
USACE Permits	1	LS	$ 60,000	$ 60,000	Hydraulic Project Approval Permit, Joint Aquatic Resources Permit , Nationwide Permits, etc. Engineer's estimate.
Critical Areas Review Permit Application	1	LS	$ 3,000	$ 3,000	Engineer's estimate.
Clearing and Grading Permit Application	1	LS	$ 500	$ 500	Engineer's estimate.
Planning Documents	1	LS	$ 9,000	$ 9,000	Drainage/erosion-control plans, mitigation planting plan, monitoring plan. Engineer's estimate.
Permitting Subtotal				**$ 92,500**	
Professional/Technical Services					
Project Management	5%	--	--	$ 184,926	Percentage of capital cost + contingency. EPA 540-R-00-002.
Remedial Design	8%	--	--	$ 295,881	Percentage of capital cost + contingency. EPA 540-R-00-002.
Construction Management	6%	--	--	$ 221,911	Percentage of capital cost + contingency. EPA 540-R-00-002.
Professional/Technical Services Subtotal				**$ 702,718**	
TOTAL CAPITAL COST				**$ 4,493,733**	
ANNUAL O&M COSTS					
DESCRIPTION	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**	**NOTES**
Annual O&M					
Site Inspections	1	YR	$ 500	$ 500	Engineer's estimate.
Site Maintenance	1	YR	$ 109,649	$ 109,649	5% of construction costs (excludes dredging).
Annual O&M Subtotal				**$ 110,149**	
Contingency	15%	--	--	**$ 16,522**	Scope and bid contingency. Percentage of annual costs.

Table E-5
Remediation Alternative 3 Estimated Cost Summary
Former Geddes Marina Property
City of Marysville
Marysville, Washington

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Professional/Technical Services					
Project Management	10%	--	--	$ 12,667	Percentage of O&M costs + contingency. EPA 540-R-00-002.
Technical Support	10%	--	--	$ 12,667	Percentage of O&M costs + contingency. EPA 540-R-00-002.
Reporting	1	YR	$ 1,000	$ 1,000	Engineer's estimate.
Professional/Technical Services Subtotal				**$ 26,334**	
TOTAL ANNUAL O&M COST				**$ 153,006**	

PERIODIC COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Professional/Technical Services					
Compliance Monitoring	1	YR	$ 4,515	$ 4,515	Groundwater monitoring event. Includes mob/demob and analytical costs. Year 2.
Reviews & Reporting	1	EA	$ 5,000	$ 5,000	Engineer's estimate. Year 2.
Professional/Technical Services Subtotal				**$ 9,515**	

PRESENT VALUE ANALYSIS

Discount Rate	0.9%
Total Years	10

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR	NET PRESENT VALUE	NOTES
Capital	0	$ 4,493,733	$ 4,493,733	1.000	$ 4,493,733	
Annual O&M	1 - 10	$ 1,530,055	$ 153,006	9.522	$ 1,456,966	
Periodic	2	$ 5,000	$ 5,000	0.982	$ 4,911	
		$ 6,028,788			$ 5,955,610	
TOTAL NET PRESENT VALUE OF ALTERNATIVE 3					**$ 5,955,610**	

NOTES:

Cost estimate does not include sales tax.

Present value analysis uses a 10-year discount rate of 0.9 percent (http://www.whitehouse.gov/omb/circulars_a094/a94_appx-c).

Table E-6
Cost Backup and Calculations
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Upland AOC soil excavation

areas starting from the north and moving clockwise:

ALT 2 Nearshore Excavation and Rehandling in Upland Staging Area for Disposal Transport

AOC #	Proposed Excavation Depth (FT)	Proposed Excavation Area (SF)	Volume (CY)	LCY	Density	Weight (TONS)
UP_E_1	1	205	7.6	8.7	1.5	11.4
UP_E_2	1	187	6.9	8.0	1.5	10.4
UP_E_3	1	272	10.1	11.6	1.5	15.1
UP_E_4	1	7,223	267.5	307.6	1.5	401.3
UP_E_5	1	44,597	1,651.7	1,899.5	1.5	2,477.6
UP_E_6	1	18,027	667.7	767.8	1.5	1,001.5
UP_E_7	1	10,943	405.3	466.1	1.5	607.9
	TOTAL	81,454	3,017	3,469		4,525

ALT 3 Nearshore Excavation and Rehandling in Upland Staging Area for Disposal Transport

AOC #	Proposed Excavation Depth (FT)	Proposed Excavation Area (SF)	Volume (CY)	LCY	Density	Weight (TONS)
UP_E_1	1	205	7.6	8.7	1.5	11.4
UP_E_2	1	187	6.9	8.0	1.5	10.4
UP_E_3	2	272	20.1	23.2	1.5	30.2
UP_E_4	1	6,740	249.6	287.1	1.5	374.4
UP_E_5	2	483	35.8	41.1	1.5	53.7
UP_E_6	4	2,274	336.9	387.4	1.5	505.3
UP_E_7	1	27,468	1,017.3	1,169.9	1.5	1,526.0
UP_E_8	5	3,271	605.7	696.6	1.5	908.6
UP_E_9	3	5,400	600.0	690.0	1.5	900.0
UP_E_10	2	6,668	493.9	568.0	1.5	740.9
UP_E_11	5	10,768	1,994.1	2,293.2	1.5	2,991.1
UP_E_12	1	3,996	148.0	170.2	1.5	222.0
UP_E_13	2	5,133	380.2	437.3	1.5	570.3
UP_E_14	6	5,624	1,249.8	1,437.2	1.5	1,874.7
UP_E_15	2	2,965	219.6	252.6	1.5	329.4
	TOTAL	81,454	7,366	8,471		11,049

Table E-6
Cost Backup and Calculations
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Backfill		**ALT 1a/b**	**ALT 2**	**ALT 3**	
	CF	0	40,727	198,873	RS Means 31 23 23.13 1100 Compaction in 12" layers, vibrating plate.
	CY	0	1,508	7,366	$51.00 per CY
Total Backfill costs		$0	$76,928.78	$375,649.00	

Upland Capping

areas starting from the north and moving clockwise:

	ALT 1a	**ALT 1b**	**ALT 2**	**ALT 3**	
Asphalt Cap Area =	-	19,207	19,207	19,207	SF
Soil Cap and Seed Area =	81,831	62,624	62,624	62,624	SF

GW Capping

AOC #	Cap Material	Proposed Cap Area (SF)
GW_C_1	Asphalt	76,763
GW_C_2	Soil	7,855

Sampling	1 sample per 1000 SF					**Analysis**	
ALT 1	0 samples	$	750	$	-	metals, TPH, SVOCs	
ALT 2	0 samples	$	750	$	-	metals, TPH, SVOCs	*since we're not removing all contaminated soil. No reason to sample.
ALT 3	82 samples	$	750	$	61,125	metals, TPH, SVOCs	

Demarcation Layer $ 1.44 per SY RSMeans 31321961550, geotextile, nonwoven 120-lb tensile strength, includes scarifying and compaction (2015 price, online, Everett)

		ALT 1	**ALT 2**	**ALT 3**
Area req'd	SY	0.0	9050.4	0.0
Total Demarcation Layer Costs		$0	$13,033	$0

Table E-6
Cost Backup and Calculations
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Capping

Soil Cap Installation

		$ 30.00	per CY	Pacific Topsoils (deluxe mix) price is $23 (wholesale price) to $26 (retail price) per CY		
Soil Cover	Weed-free topsoil					
		ALT 1a	**ALT 1b**	**ALT 2**	**ALT 3**	
	CY	1,515.4	1,159.7	2,319.4	4,638.8	Assumes a 6" thickness for Alt 1 soil capping, 1' thickness for Alt 2, and 2' thickness for Alt
Hauling material		$169.45	per HR	RS Means 31 23 23.20 200, Hauling, 20 CY truck, small project cost per hour. (2015 price, online, Everett)		

Asphalt Cap Installation

ALT 1a

No asphalt cap under Alt 1a

Table E-6
Cost Backup and Calculations
Former Geddes Marina Property
City of Marysville
Marysville, Washington

ALT 1b

Asphalt Cap Installation							
Subgrade preparation	2,134.1	SY	$	0.97	$	2,070	Prepare and roll (large areas over 2500 SY). 2015 RSMeans 32 11 23.23 8000.
Paving materials hauling	533.5	LCY	$	5.69	$	3,036	12 CY trucks, 25 MPH avg., cycle 4 mi. 2015 RSMeans 31 23 23.20 1040.
Aggregate base course	2,134.1	SY	$	4.09	$	8,729	Crushed 3/4-in. stone, compacted, 3 in. deep. 2015 RSMeans 32 11 23.23 0050.
Asphalt base layer	2,134.1	SY	$	10.04	$	21,426	Binder course, 2 in. thick. 2015 RSMeans 32 12 16.13 0120.
Asphalt intermediate layer	2,134.1	SY	$	10.04	$	21,426	Binder course, 2 in. thick. 2015 RSMeans 32 12 16.13 0120.
Asphalt wearing layer	2,134.1	SY	$	11.26	$	24,030	Wearing course, 2 in. thick. 2015 RSMeans 32 12 16.13 0380.
Sealing	2,134.1	SY	$	1.44	$	3,073	Tack coat, emulsion 0.10 gal. per SY. 2015 RSMeans 32 01 13.62 3270.
Subtotal					$	83,791	
Cap installation quality control	10%	--		--	$	8,379	Assume QC conducted to ensure appropriate impermeability.
Total					$	92,170	
Total unit cost		SY	$	43.19			

ALT 2

Asphalt Cap Installation							
Subgrade preparation	2,134.1	SY	$	2.25	$	4,802	Prepare and roll (small areas to 2500 SY). 2015 RSMeans 32 11 23.23 7000.
Paving materials hauling	533.5	LCY	$	5.69	$	3,036	12 CY trucks, 25 MPH avg., cycle 4 mi. 2015 RSMeans 31 23 23.20 1040.
Aggregate base course	2,134.1	SY	$	4.09	$	8,729	Crushed 3/4-in. stone, compacted, 3 in. deep. 2015 RSMeans 32 11 23.23 0050.
Asphalt base layer	2,134.1	SY	$	10.04	$	21,426	Binder course, 2 in. thick. 2015 RSMeans 32 12 16.13 0120.
Asphalt intermediate layer	2,134.1	SY	$	10.04	$	21,426	Binder course, 2 in. thick. 2015 RSMeans 32 12 16.13 0120.
Asphalt wearing layer	2,134.1	SY	$	11.26	$	24,030	Wearing course, 2 in. thick. 2015 RSMeans 32 12 16.13 0380.
Sealing	2,134.1	SY	$	1.44	$	3,073	Tack coat, emulsion 0.10 gal. per SY. 2015 RSMeans 32 01 13.62 3270.
Subtotal					$	86,522	
Cap installation quality control	10%	--		--	$	8,652	Assume QC conducted to ensure appropriate impermeability.
Total					$	95,174	
Total unit cost		SY	$	44.60			

Table E-6
Cost Backup and Calculations
Former Geddes Marina Property
City of Marysville
Marysville, Washington

ALT 3

Asphalt Cap Installation					
Subgrade preparation	2,134.1	SY	$ 2.25	$ 4,802	Prepare and roll (small areas to 2500 SY). 2015 RSMeans 32 11 23.23 7000.
Paving materials hauling	533.5	LCY	$ 5.69	$ 3,036	12 CY trucks, 25 MPH avg., cycle 4 mi. 2015 RSMeans 31 23 23.20 1040.
Aggregate base course	2,134.1	SY	$ 4.09	$ 8,729	Crushed 3/4-in. stone, compacted, 3 in. deep. 2015 RSMeans 32 11 23.23 0050.
Asphalt base layer	2,134.1	SY	$ 10.04	$ 21,426	Binder course, 2 in. thick. 2015 RSMeans 32 12 16.13 0120.
Asphalt intermediate layer	2,134.1	SY	$ 10.04	$ 21,426	Binder course, 2 in. thick. 2015 RSMeans 32 12 16.13 0120.
Asphalt wearing layer	2,134.1	SY	$ 11.26	$ 24,030	Wearing course, 2 in. thick. 2015 RSMeans 32 12 16.13 0380.
Sealing	2,134.1	SY	$ 1.44	$ 3,073	Tack coat, emulsion 0.10 gal. per SY. 2015 RSMeans 32 01 13.62 3270.
Subtotal				$ 86,522	
Cap installation quality control	10%	--	--	$ 8,652	Assume QC conducted to ensure appropriate impermeability.
Total				$ 95,174	
Total unit cost		SY	$ 44.60		

Sediment Capping

AOC	Area (SF)	Cap Thickness (FT)	Volume (CY)	Purchase, Transport, and Place Cap Material	Cost	
ENR Thin-Layer	72,561	0.5	1,344	$ 43	57,780	Past project experience.
1-ft-Thick Cap	72,561	1	2,687	$ 43	115,561	Past project experience.

Bathymetric Surveys 2 each $15,000 ($30,000) Pre- and post-capping record surveys.

Sediment Dredging

Hydraulic dredging, pumped 1000' to shore dump, and Rehandling in Upland Staging Area for Disposal Transport

AOC	Area (SF)	Depth (FT)	Volume (CY)
lagoon	72,561	4	10,750

Cost per BCY $20.00 Increased cost from RSMeans (35 20 23.23 1100. Hydraulic dredging, pumped 1000' to shore dump, hydraulic method) for contaminated sediment.

Table E-6
Cost Backup and Calculations
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Soil/Sediment Dewatering

Assumes all excavation will need dewatering because of shallow GW. Also includes dredging material.

Assumes 0.3 porosity of total dredged sediment volume and 0.1 porosity for excavated soil in wet conditions (5-6 ft bgs).

Preliminary unit cost estimate. Solids disposed of with dredged material.

ALT 1a/b	ALT 2	ALT 3			
				$0.20	per gallon
0	0	684,731.80	gal		

Disposal

Transportation to disposal site	$	5.94	per mile	Per truck average of min/max cost per mile, 2015 RSMeans 02 81 20.10 1220.
Miles to disposal site		20	miles	North Snohomish County Transfer Station, 19600 63rd Ave, NE, Arlington. Waste will be loaded and transported by rail to landfill.
Cost per truck	$	237.60	per truck	Round trip to disposal facility.
Transportation cost per ton	$	13.20	per ton	Assumes that one truckload holds 18 tons.
Disposal costs	$	25.00	per ton	Vendor quote (previous project). Assumes all material is nonhazardous.
Total transport and disposal cost	$	50.00	per ton	$50/ton for disposal and local transport (Republic Services)

Monitoring

All alternatives require an annual inspection (site walk). This is assumed to cost approximately $500 per year.

GW Monitoring for MNA (Alt. 1 and 2)

MW Sampling (5 monitoring wells)	1 day field staff	12 hrs	(includes mob/demob) =	$	1,440	project level
	Analytical	5 samples each run for metals, TPH, SVOCs =		$	3,075	
			Total:	$	4,515	

Institutional Controls

ALT 1a/b, ALT 2			
Preparation of environmental covenant	$	10,000	Engineer's estimate.
Signage to warn of hazardous materials		$200	Engineer's estimate.

ALT 3
No environmental covenant

Table E-6
Cost Backup and Calculations
Former Geddes Marina Property
City of Marysville
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Permitting Costs—All Alternatives

A pre-application meeting with the City of Marysville & USACE	$	10,000	Engineer's estimate.
Biological Opinion Survey	$	10,000	Engineer's estimate.
USACE Permits (HPA, DNR, JARPA, NWPs, etc.)	$	60,000	Engineer's estimate. Assumes there are not ESA-listed species in the lagoon and therefore NMFS biological opinion is not required.
Critical areas review permit application	$	3,000	Engineer's estimate.
Clearing and grading permit review & application	$	500	Engineer's estimate.
Developing drainage/erosion-control plans, mitigation planting plan and monitoring plan	$	9,000	Engineer's estimate.

Table E-7
Remediation Alternative Evaluation
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Selection Criteria	Alternative 1a: Soil Capping and Institutional Controls	Alternative 1b: Soil and Asphalt Capping and Institutional Controls	Alternative 2: Limited Excavation and Off-Site Disposal, Capping, and Institutional Controls	Alternative 3: Excavation, Dredging and Off-site Disposal
Threshold Requirements: WAC 173-340-360(2)(a)				
Protect Human Health and the Environment	Protective. Capping prevents direct-contact risk to human receptors.	Protective. Capping prevents direct-contact risk to human receptors.	Protective. Removal of contaminated material in the top 1 foot of soil eliminates direct-contact risk in the hotspot areas of concern (AOCs). Removes approximately 3,017 CY of impacted soil from the AOC for disposal at an off-site Subtitle D landfill facility. Following excavation, remaining impacted material in the AOC will be contained in place via capping.	Protective. Removal of contaminated material eliminates direct-contact risk to human receptors. Approximately 7,366 CY of soil and 10,750 CY of sediment material will be removed under this alternative and disposed of off-site at a Subtitle D landfill facility.
Comply with Cleanup Standards	Complies. The material left in place above the cleanup level will be contained via capping. Cleanup actions that involve containment can be deemed to meet cleanup standards if requirements set out in WAC 173-340-740(6)(f) are met.	Complies. The material left in place above the cleanup level will be contained via capping. Cleanup actions that involve containment can be deemed to meet cleanup standards if requirements set out in WAC 173-340-740(6)(f) are met.	Complies. Following removal, only some source material will be left in place. The material left in place above the cleanup level will be contained via capping. Cleanup actions that involve containment can be deemed to meet cleanup standards if requirements set out in WAC 173-340-740(6)(f) are met.	Complies. Following removal, no contaminated soil or sediment exceeding the cleanup levels would remain in the AOC.
Comply with Applicable State and Federal Laws	Complies. ARARs are judged to be attainable and do not affect the alternative selection process.	Complies. ARARs are judged to be attainable and do not affect the alternative selection process.	Complies. ARARs are judged to be attainable and do not affect the alternative selection process.	Complies. ARARs are judged to be attainable and do not affect the alternative selection process.
Provide for Compliance Monitoring	Provides for compliance monitoring in accordance with WAC 173-340-410 as described in Section 9.	Provides for compliance monitoring in accordance with WAC 173-340-410 as described in Section 9.	Provides for compliance monitoring in accordance with WAC 173-340-410 as described in Section 9.	Provides for compliance monitoring in accordance with WAC 173-340-410 as described in Section 9.
Other Requirements: WAC 173-340-360(2)(b)				
Use Permanent Solutions to the Maximum Extent Practicable	Does not use permanent solutions to the extent provided in Alternative 3, as described in Section 9.2.1 and Table E-8.	Does not use permanent solutions to the extent provided in Alternative 3, as described in Section 9.2.1 and Table E-8.	Does not use permanent solutions to the extent provided in Alternative 3, as described in Section 9.2.1 and Table E-8. Provides more permanence than Alternatives 1a and 1b.	Uses permanent solutions to the maximum extent practicable, as described in Section 9.2.1 and Table E-8.
Provide for a Reasonable Restoration Time Frame	Provides a reasonable restoration time frame to mitigate direct-contact exposure risk to receptors. However, contaminated soil and sediment will remain contained within the AOC. The work could be completed within one construction season.	Provides a reasonable restoration time frame to mitigate direct-contact exposure risk to receptors. However, contaminated soil and sediment will remain contained within the AOC. The work could be completed within one construction season.	Provides a reasonable restoration time frame to mitigate direct-contact exposure risk to receptors. However, some contaminated soil and sediment will remain contained within the AOC. The work could be completed within one construction season.	Provides a reasonable restoration time frame. The work could be completed within one construction season.
Consider Public Concerns	This criterion will be addressed during the public comment period for the FS and Draft Cleanup Action Plan.			

Table E-7
Remediation Alternative Evaluation
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Selection Criteria	Alternative 1a: Soil Capping and Institutional Controls	Alternative 1b: Soil and Asphalt Capping and Institutional Controls	Alternative 2: Limited Excavation and Off-Site Disposal, Capping, and Institutional Controls	Alternative 3: Excavation, Dredging and Off-site Disposal
Action-Specific Requirements: WAC 173-340-360(2)(c) through (h)				
Groundwater Cleanup Actions, WAC 173-340-360(2)(c)	Complies. Although Alternative 1a does not remove source material, it does meet the requirement to achieve cleanup levels at the point(s) of compliance. Alternative 1a meets the requirement because direct contact is prevented and further groundwater contamination is prevented through use of the cap.	Complies. Although Alternative 1b does not remove source material, it does meet the requirement to achieve cleanup levels at the point(s) of compliance. Alternative 1b meets the requirement because direct contact is prevented and further groundwater contamination is prevented through use of the cap.	Complies. Alternative 2 meets the requirement because (some) source material impacting the groundwater is removed. A cap is also placed to prevent infiltration through source areas on site and further contamination of groundwater.	Complies. Alternative 3 meets the requirement because all source material impacting the groundwater is removed.
Cleanup Actions for Soil at Current or Potential Future Residential Areas and for Soil at Schools and Child Care Centers, WAC 173-340-360(2)(d)	Complies. Alternative 1a meets the requirement because soil exceeding the cleanup level will be contained in place.	Complies. Alternative 1b meets the requirement because soil exceeding the cleanup level will be contained in place.	Complies. Alternative 2 meets the requirement because soil exceeding the cleanup level will either be removed or contained in place.	Complies. Alternative 3 meets the requirement because soil exceeding the cleanup level will be removed.
Institutional Controls WAC 173-340-360(2)(e)	Complies. Alternative 1a uses institutional controls only to maintain the protectiveness of the cap; it does not rely primarily on institutional controls and monitoring.	Complies. Alternative 1b uses institutional controls only to maintain the protectiveness of the cap; it does not rely primarily on institutional controls and monitoring.	Complies. Alternative 2 uses institutional controls only to maintain the protectiveness of the cap; it does not rely primarily on institutional controls and monitoring.	Complies. Alternative 3 does not rely primarily on institutional controls and monitoring.
Releases and Migration WAC 173-340-360(2)(f)	Complies. Alternative 1a contains IHSs in place through capping. However, since IHSs are relatively immobile in soil beneath the cap, their migration is not a concern.	Complies. Alternative 1b contains IHSs in place through capping. However, since IHSs are relatively immobile in soil beneath the cap, their migration is not a concern.	Complies. Alternative 2 minimizes releases and migration of IHSs through the use of surface soil excavation to remove contaminated material and capping to contain remaining contaminated material in place.	Complies. Alternative 3 eliminates releases and migration of IHSs from the Property by excavation, dredging, and disposal.
Dilution and Dispersion WAC 173-340-360(2)(g)	Complies. Alternative 1a does not rely on dilution and dispersion.	Complies. Alternative 1b does not rely on dilution and dispersion.	Complies. Alternative 2 does not rely on dilution and dispersion.	Complies. Alternative 3 does not rely on dilution and dispersion.
Remediation Levels WAC 173-340-360(2)(h)	Not applicable. The alternatives do not involve remediation levels.			

Table E-8
Disproportionate Cost Analysis
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Evaluation Criteria	Alternative 1a: Soil Capping and Institutional Controls	Alternative 1b: Soil and Asphalt Capping and Institutional Controls	Alternative 2: Limited Excavation and Off-Site Disposal, Capping, and Institutional Controls	Alternative 3: Excavation, Dredging and Off-Site Disposal
Protectiveness	Capping would prevent direct-contact risk to human and ecological receptors. Protectiveness would be achieved immediately upon completion of remedy. Alternative 1a is considered less protective than Alternatives 2 and 3, since contaminated material will be contained in place in the AOCs.	Capping would prevent direct-contact risk to human and ecological receptors. Protectiveness would be achieved immediately upon completion of remedy. Alternative 1b is considered less protective than Alternatives 2 and 3, since contaminated material will be contained in place in the AOCs.	Removal of hazardous substances in surface soil and capping would eliminate direct-contact risk to human receptors. Protectiveness would be achieved immediately upon completion of remedy. Alternative 2 is considered more protective than Alternatives 1a and 1b, but less protective than Alternative 3.	Removal of hazardous substances would eliminate direct-contact risk to human receptors. Protectiveness would be achieved immediately upon completion of remedy. Alternative 3 is judged to provide greater protectiveness than the other alternatives because it removes the contaminated material from the soil and sediment AOCs.
Permanence	Capping provides less permanence than the soil/sediment removal alternatives but controls mobility of contaminants in the AOCs. Long-term monitoring, maintenance, and institutional controls are required to maintain the integrity of the remedial action. Alternative 1a is considered as permanent as 1b, but less permanent than Alternatives 2 and 3.	Capping provides less permanence than the soil/sediment removal alternatives but controls mobility of contaminants in the AOCs. Long-term monitoring, maintenance, and institutional controls are required to maintain the integrity of the remedial action. Alternative 1b is considered as permanent as 1a, but less permanent than Alternatives 2 and 3.	Provides some reduction in toxicity and volume of contaminants. Risk of contaminant mobility would be greatly reduced by removing the surface layer of contaminated soil and placing it in an off-site engineered, lined, and monitored landfill facility. Capping controls the mobility of contaminants remaining in place in the AOC. Long-term monitoring, maintenance, and institutional controls are required to maintain the integrity of the remedial action. Alternative 2 is considered less permanent than Alternative 3 and more permanent than Alternatives 1a and 1b.	Provides reduction in toxicity and volume of contaminants in the AOCs. Risk of contaminant mobility would be eliminated by removing the contaminated soil and sediments and placing them in an off-site engineered, lined, and monitored landfill facility. For remediation of the AOCs, Alternative 3 is considered the most permanent.
Cost	$913,000	$1,161,000	$2,890,000	$5,956,000
Effectiveness over the Long Term	All four alternatives are effective over the long-term. Capping is a proven technology that is expected to be effective over the long term for containing contaminated material in place. However, long-term effectiveness of the remedy relies on maintenance, monitoring, and institutional controls. Alternatives 1a and 1b are considered less effective over the long term Alternatives 2 and 3.	All four alternatives are effective over the long-term. Capping is a proven technology that is expected to be effective over the long term for containing contaminated material in place. However, long-term effectiveness of the remedy relies on maintenance, monitoring, and institutional controls. Alternatives 1a and 1b are considered less effective over the long term Alternatives 2 and 3.	All four alternatives are effective over the long-term. Alternative 2 is considered more effective over the long term than Alternatives 1a and 1b, but less effective than Alternative 3. Subtitle D landfills are proven and expected to be highly effective over the long term. Capping is a proven technology that is expected to be effective over the long term for containing remaining contamination in place in the AOCs. However, long-term effectiveness relies on maintenance, monitoring, and institutional controls.	All four alternatives are effective over the long-term. Alternative 3 is considered the most effective over the long term when compared to the other alternatives. Removal of contaminated soil and sediments from the AOCs is very effective over the long term, since direct-contact exposure risk will be eliminated. Subtitle D landfills are proven and expected to be highly effective over the long term.

Table E-8
Disproportionate Cost Analysis
Former Geddes Marina Property
City of Marysville
Marysville, Washington

Evaluation Criteria	Alternative 1a: Soil Capping and Institutional Controls	Alternative 1b: Soil and Asphalt Capping and Institutional Controls	Alternative 2: Limited Excavation and Off-Site Disposal, Capping, and Institutional Controls	Alternative 3: Excavation, Dredging and Off-Site Disposal
Management of Short-Term Risks	All of the remediation alternatives employ relatively common on-site construction activities with similar short-term risks. However, in Alternatives 1a and 1b, contaminated soil and sediment will be contained in place, and no material will be removed and transported off site. For this reason, Alternatives 1a and 1b present less short-term risk than Alternatives 2 and 3.	All of the remediation alternatives employ relatively common on-site construction activities with similar short-term risks. However, in Alternatives 1b and 1a, contaminated soil and sediment will be contained in place, and no material will be removed and transported off site. For this reason, Alternatives 1a and 1b present less short-term risk than Alternatives 2 and 3.	All of the remediation alternatives employ relatively common on-site construction activities with similar short-term risks. Alternative 2 includes limited excavation and off-site transport and disposal, which pose additional short-term risks, but to a lesser extent than in Alternative 3. Alternative 2 is judged to have greater short-term risks than Alternatives 1a and 1b, but less than Alternative 3.	All of the remediation alternatives employ relatively common on-site construction activities with similar short-term risks. However, handling and off-site transport of contaminated soil and sediment pose additional short-term risks, such as potential direct-contact exposure risk to the transport personnel and risk of cross-contamination in the event of material loss or spillage during transport. For these reasons, Alternative 3 is judged to have greater short-term risks than the other three alternatives (one of which also involves off-site transport of waste material but a smaller quantity).
Technical and Administrative Implementability	Alternative 1a likely would present an amount of disruption during construction comparable to that of Alternative 1b and fewer disruptions during construction than Alternatives 2 or 3. Alternative 1a would have to overcome fewer technical obstacles during construction within the AOCs, such as having to avoid subsurface impacts. Alternative 1a would require obtaining an environmental covenant for the contaminated soil and sediment contained beneath the caps. The four alternatives are technically implementable, but Alternative 1a would be more implementable than the other alternatives since it requires less disturbance of the subsurface. Alternative 1a is judged to be as administratively implementable as Alternative 1b, but more administratively implementable than Alternatives 2 and 3.	Alternative 1b likely would present an amount of disruption during construction comparable to that of Alternative 1a and fewer disruptions during construction than Alternatives 2 or 3. Alternative 1b would have to overcome technical obstacles during construction similar to those of Alternative 1a. It would also require obtaining an environmental covenant for the contaminated soil and sediment contained beneath the caps. The four alternatives are technically implementable, but Alternative 1b would be more implementable than Alternatives 2 and 3, since it requires less disturbance of the subsurface. Alternative 1b is judged to be as administratively implementable as Alternative 1a, and more administratively implementable than Alternatives 2 and 3.	The excavation and hauling required for Alternative 2 may be staged to limit disruptions to the local infrastructure to the extent practicable, but some minor amount of business and traffic disruption is likely to occur. Alternative 2 would have fewer disruptions than Alternatives 3, but more than Alternatives 1a and 1b. Alternative 2 would have to overcome greater technical obstacles to subsurface impacts when excavation activities are being conducted in the AOCs, in comparison to Alternatives 1a and1b. Both Alternatives 2 and 3 would require characterization and acceptance of the excavated contaminated soil waste by the disposal facility. Alternatives 1a, 1b, and 2 would require obtaining an environmental covenant for the contaminated soil contained beneath the caps. The four alternatives are technically implementable, but Alternative 2 may pose greater technical challenges than Alternatives 1a and 1b, but less than Alternative 3. Alternative 2 is judged to be the lest administratively implementable of the four alternatives, since it will require off-site waste management and the filing of an environmental covenant.	The excavation, dredging, and hauling required for Alternative 3 may be staged to limit disruptions to the local infrastructure to the extent practicable, but some minor amount of business and traffic disruption is likely to occur. Alternative 3 would have more disruptions than the other alternatives. However, since no contaminated soil or sediment would remain on site, institutional controls would not be required.
Consideration of Public Concerns	This criterion will be addressed during the public comment period for the Cleanup Action Plan.			