Interim Action Completion Report

RG Haley Site
Bellingham, Washington

for
City of Bellingham

February 12, 2014

GeoEngineers
Earth Science + Technology

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File No. 0356-114-06

February 12, 2014

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Description
AO	Agreed Order NO. DE 2186
ARI	Analytical Resources, Inc.
BMC	Bellingham Municipal Code
City	City of Bellingham
DNS	Determination of Nonsignificance
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
GMD	Glaciomarine Drift
HPA	Hydraulic Project Approval
IA	Interim Action
JARPA	Joint Aquatic Resources Permit Application
LNAPL	light nonaqueous phase liquid
mg/kg	milligram per kilogram
MHHW	mean higher high water
MLLW	mean lower low water
MTCA	Model Toxics Control Act (Chapter 173-340 WAC)
NMFS	National Marine Fisheries Service
PAHs	polycyclic aromatic hydrocarbons
PCP	pentachlorophenol
PSE	Pacific Surveying & Engineering, Inc.
RCW	Revised Code of Washington
RI/FS	remedial investigation/feasibility study
SEPA	State Environmental Policy Act

Site	RG Haley Site
SMP	Sediment Management Plan
SMS	Sediment Management Standards
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Services
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
Work Plan	Interim Action Work Plan

1.0 INTRODUCTION

This Interim Action (IA) Completion Report has been prepared to document the IA activities completed by the City of Bellingham (City) at the RG Haley Site (Site). The Site is generally located at 500 Cornwall Avenue in Bellingham, Whatcom County, Washington (Figure 1) and includes portions of approximately 6 acres of upland property and adjacent aquatic lands in Bellingham Bay. The IA was completed at the Site by the City pursuant to the Agreed Order No. DE 2186 (AO) (Ecology, 2005) as amended (Ecology, 2010 and 2013) between the City and the Washington State Department of Ecology (Ecology) and the Model Toxics Control Act (MTCA) [Chapter 173-340 Washington Administrative Code (WAC)]. The Site is formally referenced in the Ecology database as the "RG Haley Intl Corp" (Ecology Facility ID No. 2870, Cleanup Site ID No. 3928).

IA construction activities were completed as specified in the Ecology approved Interim Action Work Plan (Work Plan; GeoEngineers, 2013). The purpose of the IA is to contain light nonaqueous phase liquid (LNAPL) petroleum hydrocarbons observed to be emerging from the southern[1] portion of the Site shoreline while the City completes a Remedial Investigation and Feasibility Study (RI/FS) to select a final cleanup action for the Site including the IA area. Locations of LNAPL emergence and the IA area are shown relative to the Site on Figure 2.

The IA Completion Report is organized into the following sections:

- Section 1: Introduction
- Section 2: Background
- Section 3: Interim Action Goals and Remediation Levels
- Section 4: Applicable Permits and Substantive Requirements
- Section 5: Interim Action Construction

2.0 BACKGROUND

2.1. Site History

The RG Haley property and surrounding waterfront industrial properties were originally developed starting in the 1880s as part of lumber mill operations. Historical activities conducted between the 1880s and mid-1900s were primarily related to sawmill and wharf operations. Wood treatment operations were conducted on the former Haley property between approximately 1948 and 1985. Wood treatment activities performed at the Site included treating lumber with pentachlorophenol (PCP) contained in carrier oil.

Fill was historically placed along the Bellingham Bay shoreline to produce the upland portion of the RG Haley property. The nature of the fill beneath the Haley property is variable and generally includes wood debris from historic waterfront mill operations, silts and sands possibly originating

[1] Directions in this report are referenced relative to the "project north" shown in the figures.

from dredging activities, and construction/demolition debris generally comprised of brick, concrete, and gravel. Municipal solid waste associated with the adjacent Cornwall Avenue Landfill also extends onto the Haley property.

Fill beneath the Haley property is generally thickest at the shoreline. The fill extends into the intertidal and subtidal zones offshore of the Haley shoreline. The fill is underlain by bedrock comprised of the Chuckanut Formation. Glaciomarine Drift (GMD), comprised of hard silt and clay, is locally present between the Chuckanut and overlying fill.

Multiple investigations and cleanup actions have been performed at the Site between 1985 and 2012. Hazardous substances identified at the Site are related to the wood treatment process and include petroleum hydrocarbons, PCP, polycyclic aromatic hydrocarbons (PAHs), and dioxins and furans. These hazardous substances have impacted soil, groundwater and sediment at the Site. Isolated cleanup actions have previously been completed at the Haley Site including the excavation of soil from a seepage pit, installation of a containment barrier (sheet pile wall) (GeoEngineers, 2002), removal of petroleum-contaminated sediment, and installation and operation of an oil recovery system.

2.2. Contamination within the Interim Action Area

Observations made on December 12, 2012 as part of City's quarterly monitoring activities indicated the presence of LNAPL sheen on surface water adjacent to the shoreline on the southern portion of the Site. A containment boom and oil-sorbent materials were deployed and maintained at the Site to contain the sheen and capture LNAPL prior to implementation of the IA. Approximate areas where LNAPL was observed to emerge from sediment are shown on Figure 2. Regular monitoring performed prior to the IA identified the intermittent occurrence of LNAPL sheen on surface water in the general areas shown on Figure 2 between December 2012 and March 2013.

Based on past investigations, intertidal zone sediment in the vicinity of the areas with LNAPL emergence have exhibited petroleum-related sheens to depths of 2 feet or greater. Petroleum hydrocarbons have been detected in the sediment at concentrations up to 50,000 milligrams per kilogram (mg/kg). Sediment impacts in the intertidal zone appear to be the result of historical petroleum releases in upland portions of the Site. The Work Plan (GeoEngineers, 2013) provides a summary of the source of contamination and the results of past investigations within the IA area. The IA was implemented to cap and contain LNAPL emerging from the sediment.

2.3. Pre-Construction Conditions in the Interim Action Area

Prior to implementation of the IA, the IA area was bounded to the east by a steep shoreline bank. The shoreline bank was armored with riprap rock in localized areas. A vertical sheet pile wall, installed in 2000 as part of a previous cleanup action to contain LNAPL, is located north of the IA area. The IA area extended from the steep shoreline bank to approximately Mean Lower Low Water (MLLW). Below the shoreline bank, the sediment surface sloped approximately 7 feet horizontally to 1 foot vertically (7H:1V) towards Bellingham Bay. The sediment in the IA area consists of sand and gravel mixed with debris (i.e., brick, concrete, metal, wood debris, glass fragments, etc.). Multiple untreated, derelict, vertical wood piling were present in the IA area. The height of the piling ranged from at or near the sediment surface to approximately 7 feet above the sediment surface. Pre-construction physical conditions in the IA area are shown on Figure 3.

Selected photographs documenting the pre-construction conditions in the IA area are presented in Appendix A.

The intertidal zone within and adjacent to the IA area is comprised of fill overlying native sediment deposits. Fill has generally been observed to be between approximately 10 to 20 feet thick in the upper intertidal zone during previous investigations. The fill was observed to consist of layers of wood debris comprised of sawdust, chips, and dimensional lumber, and layers of silty sand to sandy silt.

2.4. Coordination with Final Cleanup Action

The City is currently preparing an RI/FS for the RG Haley Site in accordance with AO No. DE 2186 (Ecology, 2005) as amended (Ecology 2010), MTCA (Chapter 173-340 WAC), and the Washington State Sediment Management Standards (SMS) (Chapter 173-204 WAC) to identify the appropriate final cleanup action for the Site. The RI/FS is currently scheduled to be completed in 2014.

The second amendment to the AO (Ecology, 2013) required the City to complete an IA to contain LNAPL emerging from the southern portion of the shoreline to reduce the potential threat to human health and the environment while the RI/FS is being prepared to select the final cleanup action. The IA was implemented in advance of selecting the final cleanup action for the Site. However, the IA does not preclude reasonable alternatives for the final cleanup action (WAC 173-340-430(3)(b)). The IA is considered temporary and will be in place until the final cleanup action is implemented. The final cleanup action will include implementation of an appropriate cleanup remedy for the Site including the IA area including a final sediment surface that supports aquatic habitat development.

3.0 INTERIM ACTION GOALS AND REMEDIATION LEVELS

3.1. Interim Action Goals

As described in the Work Plan, the goals of the IA include the following:

- Reduce the potential threat to human health and the environment by containing LNAPL that has been intermittently discharging from sediment in the southern portion of the Haley shoreline.
- Provide a temporary, interim remedy that does not preclude the evaluation or selection of alternatives for the final cleanup action.

3.2. Remediation Level for the Interim Action

As also described in the Work Plan, the remediation level for the IA is not based on a petroleum concentration, but rather, is based on the location where LNAPL has been observed to be discharging from the shoreline. This includes the location on the southern shoreline where LNAPL has caused an intermittent sheen between December 2012 and March 2013. It also includes surficial sediment that exhibited petroleum sheen upon agitation using field screening techniques during previous investigations. Sediment that exceeded the remediation level defined the limits of the IA area.

4.0 APPLICABLE PERMITS AND SUBSTANTIVE REQUIREMENTS

The IA was completed under the Agreed Order No. DE 2186 (AO) (Ecology, 2005) as amended (Ecology, 2010 and 2013) with Ecology. As specified in the second amendment to the AO (Ecology, 2013), the IA was required to be performed in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits, except as provided in Chapter 70.105D.090 of the Revised Code of Washington (RCW). As specified in Chapter 70.105D.090 of the RCW and the second amendment to the AO, the IA was exempt from the procedural requirements of Chapters 70.94, 70.95, 70.105, 77.55, 90.48, and 90.58 of the RCW and of any laws requiring or authorizing local government permits or approvals when performing the IA. However, the IA was required to be performed in accordance with the substantive requirements of such permits or approvals. As required in the second amendment to the AO, the applicable and exempt permits or approvals and the applicable substantive requirements of those permits or approvals were identified in the Work Plan (GeoEngineers, 2013).

As per the requirements of the AO and as specified in the Work Plan, the following permitting requirements were fulfilled by the City for the IA:

- U.S. Army Corps of Engineers (USACE) Nationwide Permit (NWP) 38: A Joint Aquatic Resources Permit Application (JARPA) was prepared and submitted to the USACE to meet the requirements of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbor Act. Following consultation with U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) and review of the project pursuant to the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management Act and the National Historic Preservation Act, the USACE issued a letter acknowledging coverage under NWP 38 (Permit No. NWS-2013-726) on July 26, 2013.
- State Environmental Policy Act (SEPA): Compliance with the SEPA, Chapter 43.21C RCW, was achieved by conducting SEPA review in accordance with applicable regulatory requirements, including WAC 197-11-268, and Ecology guidance as presented in Ecology Policy 130A. The City, acting as the SEPA lead agency, issued a Determination of Nonsignificance (DNS) on June 12, 2013.
- Department of Natural Resources (DNRs) Right of Entry Authorization: As part of the JARPA application, a request was made to the DNR for an aquatic use authorization of DNR-managed land. The DNR issued the City an Aquatic Lands Sediment Remediation Easement on October 15, 2013.
- City of Bellingham Stormwater Permit: Prior to implementation of IA construction, the contractor completed the City of Bellingham's Stormwater Permit Application and Stormwater Management Requirement Checklist. The City issued the permit (No. STM2013-00379) on October 10, 2013.

In addition to the permitting requirements listed above, the following substantive requirements of applicable State and local laws were followed during implementation of the IA activities:

- Washington Department of Fish and Wildlife Hydraulic Project Approval under WAC 220-110 (Washington Hydraulic Code) and Chapter 77.55 RCW (Construction Projects in States Waters).

- City of Bellingham Shoreline Substantial Development Permit pursuant to City's Shoreline Master Program (SMP; Bellingham Municipal Code [BMC Title 22]).

5.0 INTERIM ACTION CONSTRUCTION

The IA consisted of placing a cap capable of absorbing petroleum hydrocarbons in the form of NAPL and dissolved-phase constituents over the area where LNAPL was observed to be emerging from sediment on the southern portion of the Site shoreline and providing necessary erosion protection to the cap material from tidal and wave action.

The following sections summarize the IA project organization, management, and schedule and IA construction activities including Site preparation and cap placement.

5.1. Project Organization and Management

5.1.1. Key Participants

Key participants and project roles included the following:

- **Ecology –** Provided regulatory oversight for the IA.
- **City –** Contracted, managed, and provided oversight of the IA.
- **GeoEngineers, Inc. –** Prepared IA Work Plan and permit submittals, provided environmental engineering including project plans and specifications, performed construction observation and documentation for the City and provided technical assistance and engineering support during IA construction.
- **Interwest Construction Company (Interwest) –** Contractor for the City that provided the personnel, equipment, and supplies necessary to implement and construct the IA.
- **Pacific Surveying & Engineering, Inc. (PSE) –** Surveying contractor for the City that provided surveying support for the IA and prepared the as-built survey for the completed IA.

5.2. Project Schedule

IA construction activities were performed between October 28 and November 15, 2013. Completion of an as-built survey and initiation of compliance monitoring was performed in December 2013 subsequent to construction of the IA. The following table provides the schedule of IA activities.

IA Activity	Date(s) Performed
Interwest mobilization, establishment of temporary site controls, preparation/construction of equipment staging and temporary import material stockpile areas, and importing and stockpiling of cap material at the Site.	October 28 – November 1, 2013
Removal of derelict wood piling, debris, and rocks to prepare the IA area for cap placement.	November 4 – November 7, 2013
Placement of IA capping material including amended cap material, cap armor, and containment berm.	November 5 – November 8, 2013
Placement of riprap for IA area shoreline bank protection.	November 11 – November 12, 2013
Interwest demobilization	November 12 – November 15, 2013
As-built survey	December 2 – December 26, 2013
Post-construction compliance monitoring	November 13– ongoing

5.3. Site Preparation

5.3.1. Staking of the Interim Action Area

Prior to commencing IA construction activities, PSE surveyed and staked limits of the IA area in the field.

5.3.2. Temporary Site Controls

Temporary site controls including Site access controls, temporary sediment and erosion controls (TESC), and marine environmental controls were implemented in general accordance with the Work Plan and project plans and specifications. Site access controls included maintenance and securing of Site fencing throughout IA construction. Straw wattles were installed along the western perimeter of the areas used for equipment staging prior to and were maintained during cap placement activities to provide temporary erosion and sedimentation controls. A floating debris boom with a silt curtain and an oil-absorbent boom were also deployed around the IA area prior to and was maintained during construction activities. The western limits of the debris and oil-absorbent boom were anchored such that it remained floating and did not ground during periods of low tide. Approximate alignment of the booms relative to the IA area is shown on Figure 4. The straw wattles and debris and oil-absorbent boom installed as part of IA temporary Site controls were removed following the completion of IA construction activities. The straw wattles used for temporary erosion and sediment controls were stockpiled with the wood piles and debris removed from the IA area (Figure 4). Areas used for equipment staging during cap placement activities were stabilized using mulch following the completion of IA construction activities.

5.3.3. Existing Piles, Debris, and Rock Removal

Existing derelict wood piles, debris, and rock removal activities were conducted in accordance with the Work Plan and project plans and specifications to prepare the IA area for placement of cap materials. Existing derelict wood piles within the IA area, shown on Figure 3, were cut off at the mudline using a hand-held electric chainsaw. Debris (i.e. concrete, bricks, metal, wood, etc.) and rocks that were greater than approximately 3 inches in height above the mudline and not imbedded in the sediment were removed. Additionally, oil-absorbent material that was previously deployed at the Site to absorb LNAPL was also removed.

Removal activities were completed in the manner such that disturbance of the surface sediment was minimized in order to reduce the potential for release of LNAPL. Removed piles and debris were stockpiled in the upland portion of the Site (Figure 4) awaiting transport off site for disposal. Large rocks that were removed were temporarily stockpiled in the upland portion of the Site and were reused for construction of riprap shoreline armoring (see Section 5.5). Selected photographs documenting wood piles, debris and rock removal activities are presented in Appendix A.

5.3.4. Staging, Haul Routes and Import Material Stockpiling Areas

Equipment used for cap placement, including a long-reach excavator and conveyor, were staged in the upland portion of the Site immediately east of the IA area during cap placement activities. Other support equipment as well as capping equipment when not in use was stored on paved surfaces within the fenced, upland portion of the Site. Haul routes to transport material and equipment to and from the IA area were also located on the paved surfaces within the upland portion of the Site. Areas used for equipment staging during cap placement activities and construction haul routes are shown on Figure 4.

Material imported by the contractor for cap placement activities including sand, cap armor and containment berm rock, and riprap rock for IA area shoreline bank protection were temporarily stockpiled in the upland portion of the Site prior to placement in the IA area. Areas on the Site used for temporary stockpiling of import material are shown on Figure 4. Temporary stockpile containment areas were constructed using City-supplied ecology-blocks and were lined and covered with visqueen in general accordance with the project plans and specifications. Minor clearing activities to remove vegetation (i.e., brush) were also performed in general accordance with the project plans and specifications to prepare equipment staging and temporary stockpile areas.

5.3.5. Monitoring Wells and Tree Protection

Existing monitoring wells and trees in the vicinity of the IA area shown on Figure 4 were protected during IA construction activities in accordance with the Work Plan and project plans and specifications. A fir tree located on the shoreline bank adjacent to the IA area and in the area where shoreline armoring was subsequently placed was observed to have been removed prior to IA construction activities. Broken off portions of the fir tree were removed as part of Site preparation activities. The approximate location of this fir tree is identified on Figure 4.

5.4. Amended Cap Material, Cap Armoring, and Containment Berm Placement

IA activities were conducted in general accordance with the Work Plan and project plans and specifications to cap the area where surface sediment exceeded the remediation level based on visual observations of LNAPL emerging from the sediment and where field screening results from previous investigations exhibited sheens in surface sediment. Sediment cap placement activities were completed in the IA area from the base of the pre-existing steep shoreline bank to an elevation of approximately 0 feet MLLW that measured approximately 75 feet long (east-west direction) by approximately 65 feet wide (north-south direction) following Site preparation activities including preparation of the sediment surface (Section 5.3.3).

The IA sediment cap consists of approximately 6 inches of fined grained, amended cap material capable of absorbing organic contaminants overlain by approximately 12 inches of cap armor rock consisting of 4-inch to 8-inch angular rock to prevent erosion of the cap. Geotextile fabric was placed on top of the amended cap material prior to placing cap armor rock and was extended approximately 2 feet beyond the north, west and south edges of the amended cap material and beneath the cap containment berm. Containment berm rock consisting of 4-inch to 18-inch angular rock were placed to an approximate height of 18 inches to secure the edges of geotextile fabric as well as the cap armor layer. The geotextile fabric is intended to prevent the loss of fine-grained amended cap material through the interstices of the larger diameter armor and containment berm rock. The approximate limits of the IA sediment cap including limits of amended cap, cap armor and containment berm are shown on Figure 5. Typical details of the cap construction are shown on Figure 6. The as-built survey of the IA cap is provided in Appendix B.

The amended cap material consists of sand amended with granulated organoclay. Granulated organoclay was procured by the City from a vendor (CETCO) and was supplied to the Site in 1,000 pound super sacks. The amended cap material was prepared by mixing equal volumes of organoclay and sand to achieve a 50/50 mix (i.e., 50 percent sand and 50 percent organoclay). Mixing of the sand and organoclay was performed by Interwest in the upland portion of the Site in a metal bedding box using a backhoe. Upon completion of mixing, amended cap material was transferred from the metal bedding box to the import material stockpile area (Figure 4) for temporary stockpiling prior to placement in the IA area. Prepared, amended cap material was observed by a GeoEngineers field engineer to confirm an approximate 50/50 mix. A total of approximately 84 cubic yards (42 cubic yards of sand mixed with 42 cubic yards of granulated organoclay) of amended cap material was utilized for capping the IA area.

Sand used for preparation of the amended cap material was imported from a Washington State Department of Transportation (WSDOT) certified source, the Van Buren Pit, in Emerson, Washington owned by Aggregate West. Prior to importing the sand used for the sediment cap, a sample representative of the sand was collected by a GeoEngineers field engineer and submitted for chemical analyses to verify compliance with criteria established in Work Plan. Chemical analyses were performed by Analytical Resources, Inc. (ARI) of Tukwila, Washington. The chemical analytical results for the sample of imported sand met the criteria specified in the Work Plan. The chemical analytical results were sent to Ecology for review and approval. Approval of the sand by Ecology was communicated in an email from Mark Adams, Ecology Site Manager on October 29, 2013. The chemical analytical results for the sand are presented in Table 1. The analytical laboratory report is presented in Appendix C. Chemical analytical data validation reports are presented in Appendix D.

Cap armor and containment berm rock were imported from a WSDOT certified source, the Siper Pit, in Emerson, Washington owned by Concrete Nor'West. A total of 285.61 tons of cap armor rock and 28.97 tons of containment berm rock were imported and utilized for sediment capping activities.

IA cap placement activities were performed "in the dry" during periods of low tide. Cap placement activities were monitored by a City inspector and a GeoEngineers representative. Amended cap material was placed by Interwest using a long-reach excavator and/or a conveyor aggregate

delivery (CAD) truck on the prepared mudline within the IA area. The thickness of the amended cap material was confirmed to be 6 inches using grade stakes that were installed at regular distances within the IA area and marked at 6 inches above the sediment surface prior to placement of the amended cap material. The grade stakes were removed following the confirmation of the thickness of amended cap material (i.e., observation that the amended cap material was at or above the 6-inch markings on the grade stakes) and prior to placement of geotextile fabric. Geotextile fabric was placed on top of amended cap material. The individual sections of the geotextile fabric were overlapped a minimum of 2 feet. Cap armor and containment berm rocks were placed on top of geotextile fabric using a long-reach excavator and wheelbarrows. Wheelbarrows were used to place cap armor and containment berm rock in areas beyond the reach of the long-reach excavator that included an approximately 20- to 30-foot wide section in the western-most portion of the IA area furthest from the top of the shoreline bank where the excavator was positioned. Confirmation that the thickness of cap armor and containment berm rock met the requirements of the project plans and specifications were verified using direct measurements with a tape measure. Selected photographs documenting cap placement activities are presented in Appendix A.

5.5. Riprap Armoring Placement for Shoreline Bank Protection

Prior to the construction of the IA, the shoreline bank within the IA area consisted of locations where riprap was absent and the bank was nearly vertical as a result of shoreline erosion. In the locations within the IA area where riprap armoring was absent, the amended cap material and cap armor rock were placed to the base of the shoreline bank. Geotextile material was placed over the shoreline bank and riprap was placed from the top of the cap armor to the top of the shoreline bank to protect the bank from further erosion. The face of the riprap was constructed at a minimum slope of 1H:1V in accordance with the requirements of the Work Plan and project plans and specifications. The approximate limit of riprap placed during the IA is shown on Figure 5. The typical detail for riprap shoreline protection armoring is shown on Figure 6.

Riprap rock placement for shoreline bank protection was not performed in the locations where riprap was present prior to IA in accordance with the Work Plan and project plans and specifications. In the areas where riprap was already present, the amended cap material and cap armor layer was placed up to/onto the existing riprap as shown on Figure 6.

6.0 COMPLIANCE MONITORING

Compliance monitoring activities have been completed in accordance with the requirements of the Work Plan. Protection monitoring was completed by adhering to the requirements of the site-specific health and safety plan during IA construction. Performance monitoring activities identified in the Work Plan including; sampling and analysis of the sand used in the amended cap material to confirm compliance with the criteria in the Work Plan; inspection of the blended, amended cap material to confirm an approximate 50/50 percent mix of sand and organoclay; and observation of cap placement to confirm that the thickness of cap materials met the requirements, was completed in accordance with Work Plan and project plans and specifications. The performance monitoring activities are summarized in Section 5.4.

Following completion of IA construction, as per the requirement of the Work Plan, confirmational monitoring activities were performed weekly for the first month to inspect the integrity of the cap and to observe any presence of sheen in the IA capping area. Inspections for the presence of sheen were conducted during similar tidal conditions that resulted in the sheens within the IA area prior to implementation of the IA. Integrity of the cap was inspected during the periods of low tides to facilitate inspection of the entire limits of the IA cap. Integrity of sediment cap including amended cap, cap armor and containment berm was observed to be intact during weekly inspections. Additionally, no sheen was observed within the IA area. Additional confirmational monitoring activities will be performed as per requirements of the Work Plan.

7.0 LIMITATIONS

We have prepared this report for use by the City of Bellingham for the RG Haley Site in Bellingham, Washington.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

8.0 REFERENCES

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GeoEngineers, 2002. Interim Cleanup Action Report. Former R.G. Haley International Wood Treating/DNR Property Site. Prepared for Perkins Coie LLP by GeoEngineers, Inc. May 20, 2002.

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Table 1

Summary of Import Material Chemical Analytical Data

R.G. Haley Site - Interim Action

Bellingham, Washington

Analyte	Units	SQS/LAET[1]	CSL/2LAET[1]	Location: Van Buren Pit Sample ID: VANBURENPIT-100713 Sample Date: 10/7/2013 Sample Depth (feet): 0 to 0.5
Conventional Parameters				
Total Solids	Percent	NE	NE	94.06
Total Organic Carbon	Percent	NE	NE	0.118
Petroleum Hydrocarbons (Dry Weight)				
Diesel-Range hydrocarbons	mg/kg	NE	NE	5.3 U
Oil-Range Hydrocarbons	mg/kg	NE	NE	11 U
Total Petroleum Hydrocarbons	mg/kg	260	NE	11 U
Metals (Dry Weight)				
Arsenic	mg/kg	57	93	5 U
Cadmium	mg/kg	5.1	6.7	0.2 U
Chromium	mg/kg	260	270	**29.8**
Copper	mg/kg	390	390	**23.2**
Lead	mg/kg	450	530	2 U
Mercury	mg/kg	0.41	0.59	0.02 U
Silver	mg/kg	6.1	6.1	0.3 U
Zinc	mg/kg	410	960	**36**
Polychlorinated Biphenyls (Dry Weight)				
Total PCBs	mg/kg	0.13	1	0.0088 U
Aroclor 1016	mg/kg	NA	NA	0.0088 U
Aroclor 1242	mg/kg	NA	NA	0.0088 U
Aroclor 1248	mg/kg	NA	NA	0.0088 U
Aroclor 1254	mg/kg	NA	NA	0.0088 U
Aroclor 1260	mg/kg	NA	NA	0.0088 U
Aroclor 1221	mg/kg	NA	NA	0.0088 U
Aroclor 1232	mg/kg	NA	NA	0.0088 U
Dioxin/Furans (Dry Weight)				
2,3,7,8-TCDF	ng/kg	NE	NE	0.0419 U
2,3,7,8-TCDD	ng/kg	NE	NE	0.0479 U
1,2,3,7,8-PeCDF	ng/kg	NE	NE	0.0778 U
2,3,4,7,8-PeCDF	ng/kg	NE	NE	0.0878 U
1,2,3,7,8-PeCDD	ng/kg	NE	NE	0.0818 U
1,2,3,4,7,8-HxCDF	ng/kg	NE	NE	0.102 U
1,2,3,6,7,8-HxCDF	ng/kg	NE	NE	0.0858 U
2,3,4,6,7,8-HxCDF	ng/kg	NE	NE	0.0978 U
1,2,3,7,8,9-HxCDF	ng/kg	NE	NE	0.122 U
1,2,3,4,7,8-HxCDD	ng/kg	NE	NE	0.0595 U
1,2,3,6,7,8-HxCDD	ng/kg	NE	NE	0.196 U
1,2,3,7,8,9-HxCDD	ng/kg	NE	NE	0.0758 U
1,2,3,4,6,7,8-HpCDF	ng/kg	NE	NE	**1.99 J**
1,2,3,4,7,8,9-HpCDF	ng/kg	NE	NE	0.0978 U
1,2,3,4,6,7,8-HpCDD	ng/kg	NE	NE	**5.98** U
OCDF	ng/kg	NE	NE	**5.9**
OCDD	ng/kg	NE	NE	**72.7**
Dioxin/Furan TEQ (ND=0)[2]	ng/Kg	NE	NE	**0.13**
Dioxin/Furan TEQ (ND=1/2 DL)[2]	ng/Kg	NE	NE	**0.23**
LPAH (Dry Weight)				
2-Methylnaphthalene	µg/kg	670	1,400	19 U
Acenaphthene	µg/kg	500	730	19 U
Acenaphthylene	µg/kg	1,300	1,300	19 U
Anthracene	µg/kg	960	4,400	19 U
Fluorene	µg/kg	540	1,000	19 U
Naphthalene	µg/kg	2,100	2,400	19 U
Phenanthrene	µg/kg	1,500	5,400	19 U
Total LPAH	µg/kg	52,000	61,000	19 U
HPAH (Dry Weight)				
Benzo(a)anthracene	µg/kg	1,300	1,600	19 U
Benzo(a)pyrene	µg/kg	1,600	3,000	19 U
Total Benzofluoranthenes	µg/kg	3,200	3,600	38 U
Benzo(ghi)perylene	µg/kg	670	720	19 U
Chrysene	µg/kg	1,400	2,800	19 U
Dibenzo(a,h)anthracene	µg/kg	230	540	4.8 UJ
Fluoranthene	µg/kg	1,700	2,500	19 U
Indeno(1,2,3-cd)pyrene	µg/kg	600	690	19 U
Pyrene	µg/kg	2,600	3,300	19 U
Total HPAH	µg/kg	12,000	17,000	38 U
Chlorinated Organics (Dry Weight)				
1,2,4-Trichlorobenzene	µg/kg	31	51	4.8 U
1,2-Dichlorobenzene	µg/kg	35	50	4.8 U
1,4-Dichlorobenzene	µg/kg	110	120	4.8 U
Hexachlorobenzene	µg/kg	70	130	0.94 U
Phthalates (Dry Weight)				
Bis(2-Ethylhexyl) Phthalate	µg/kg	1,300	3,100	48 U
Butyl benzyl phthalate	µg/kg	63	900	4.8 U
Dibutyl phthalate	µg/kg	1,400	5,100	19 U
Diethyl phthalate[3]	µg/kg	200	1,200	**17 J**
Dimethyl phthalate	µg/kg	71	160	4.8 U
Di-N-Octyl Phthalate	µg/kg	5,200	6,200	19 U

Analyte	Units	SQS/LAET[1]	CSL/2LAET[1]	Location: Van Buren Pit Sample ID: VANBURENPIT-100713 Sample Date: 10/7/2013 Sample Depth (feet): 0 to 0.5
Miscellaneous Extractables (Dry Weight)				
Dibenzofuran	µg/kg	540	700	19 U
Hexachlorobutadiene	µg/kg	11	120	0.94 U
N-Nitrosodiphenylamine	µg/kg	28	40	4.8 U
Benzoic Acid[4]	µg/kg	650	650	**75 J**
Benzyl Alcohol	µg/kg	57	73	19 UJ
Phenol (Dry Weight)				
2,4-Dimethylphenol	µg/kg	29	29	24 U
o-Cresol (2-methylphenol)	µg/kg	63	63	4.8 U
p-Cresol (4-methylphenol)	µg/kg	670	670	4.8 U
Pentachlorophenol	µg/kg	360	690	19 U
Phenol	µg/kg	420	1,200	19 U

Notes:

[1] The screening levels provided are the Sediment Management Standards (SMS) Sediment Quality Standards (SQS) and Cleanup Screening Levels (CSL) and/or the Lowest Apparent Effects Threshold (LAET) and 2nd Lowest Apparent Effects Threshold (2LAET) values except for petroleum hydrocarbons and dioxins/furans. SMS criteria have not been established for petroleum hydrocarbons. Therefore, the petroleum hydrocarbon screening level is based on the results of bioassay testing and petroleum hydrocarbon analyses performed as part of the supplemental investigation of the RG Haley Site. A screening level is not currently available for dioxins/furans as a background concentration has not been identified for the project area. LAET and 2LAET values are provided for comparison to dry weight concentrations for LPAHs, HPAHs, chlorinated organics, phthalates, and miscellaneous extractables as the total organic carbon concentration for the sample is less than 0.5 percent.

[2] TEQ reported by the laboratory calculated based on World Health Organization (WHO) 2005 toxic equivalency factors (TEFs).

[3] Diethyl phthalate is a common laboratory contaminant.

[4] Benzoic acid is a naturally occurring compound.

Bold indicates that the analyte was detected.

mg/kg = milligrams per kilogram

ng/kg = nanograms per kilogram

µg/kg = micrograms per kilogram

J = Estimated value

U = Not detected at or above identified detection limit

NE = A criteria has not been established for the identified analyte

TEQ = Toxic equivalent (TEQ) concentration.

SMS = Sediment Management Standards

SQS = Sediment Management Standards Sediment Quality Standard (Chapter 173-204-320)

CSL = Sediment Management Standards Cleanup Screening Level (Chapter 173-204-520)

LAET = Lowest Apparent Effects Threshold (LAET). The LAET (expressed on a dry-weight basis) is analogous to the SMS SQS value and is used as the screening level for samples when the total organic carbon concentration is less than 0.5 percent or greater than 3.5 percent.

2LAET = 2nd Lowest Apparent Effects Threshold (2LAET). The 2LAET (expressed on a dry-weight basis) is analogous to the SMS CSL value and is used as the screening level for samples when the total organic carbon concentration is less than 0.5 percent or greater than 3.5 percent.

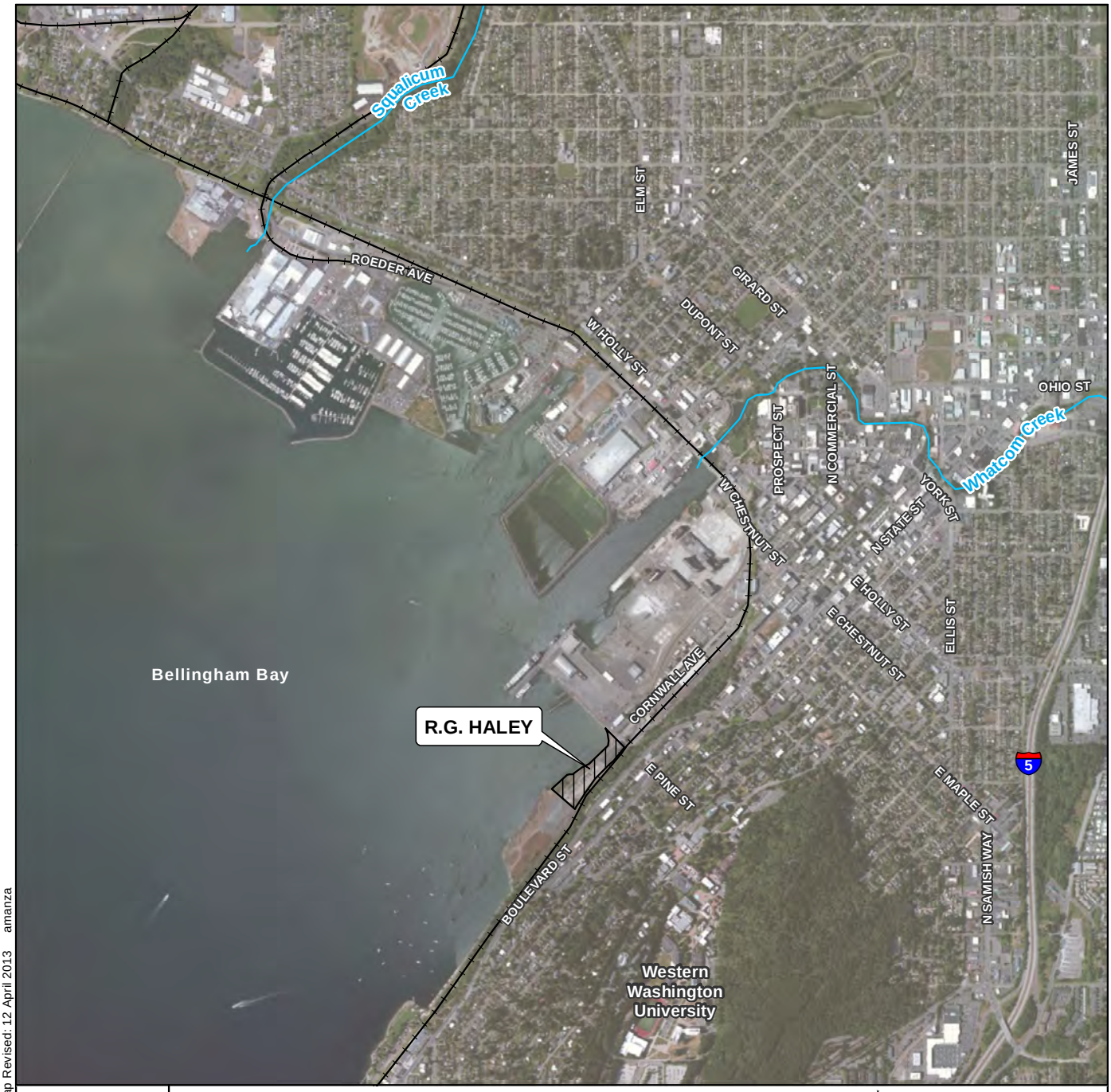
LPAH = Low molecular weight polycyclic aromatic hydrocarbons (PAHs)

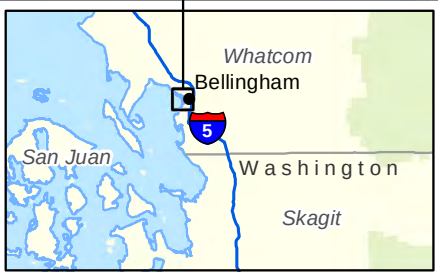
HPAH = High molecular weight polycyclic aromatic hydrocarbons (PAHs)

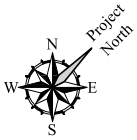
Total LPAH is the total of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene and anthracene. 2-Methylnapthalene is not included in the total for LPAHs.

Total HPAH is the total of fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b+k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3-c-d)pyrene, dibenzo(a,h)anthracene and benzo(g,h,i)perylene.

The totals for LPAH and HPAH are the sum of all detected results. If no LPAHs or HPAHs were detected, the highest detection limit value is reported as the total.







2,000 0 2,000

Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Reference: Whatcom County GIS, City of Bellingham GIS, Esri World Imagery.

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

R.G. Haley Site
Bellingham, Washington

GeoEngineers

Figure 1

Path: \\seaProjects\0035611\4\GIS\0035611406_T2600_VicinityMap.mxd Map Revised: 12 April 2013 amanza

W True North S N Project North E

0 100 200

Feet

Reference: Aerial from Google Earth, August 2011. Survey performed by City of Bellingham Public Works Department (ENgineering Division) dated May 8, 2013.

Notes:
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2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Legend

- City Owned, R.G. Haley Property
- Tideland Lease Area
- Approximate Boundary of Interim Action Area
- MHHW *Mean Higher High Water (MHHW) (8.04 ft NAVD88)*
- Approximate Area with Light Nonaqueous Phase Liquid (LNAPL) Emerging from Sediment (Observed in 2012/2013 prior to Interim Action)

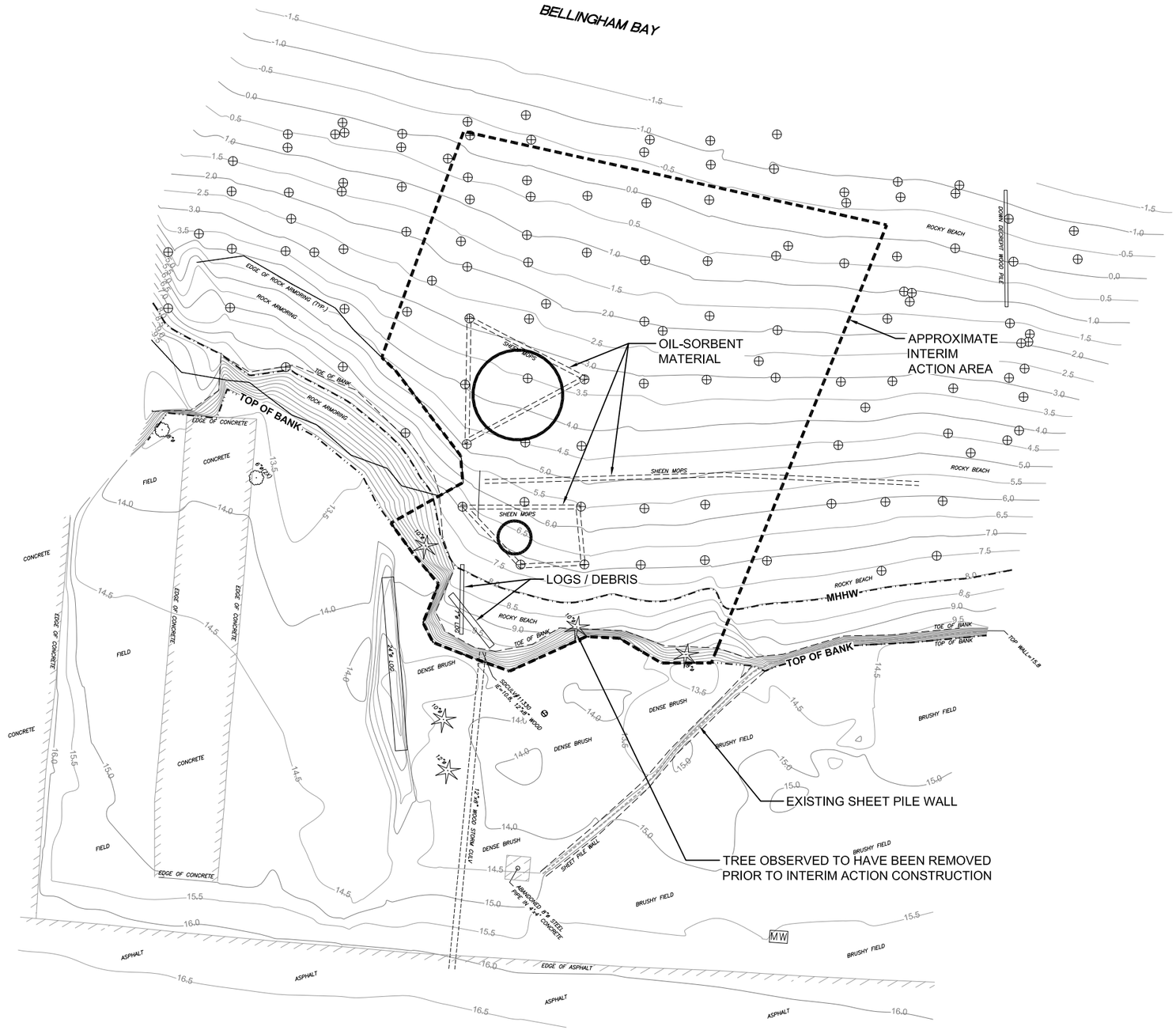
Site Layout and Interim Action Area

R.G. Haley Site
Bellingham, Washington

GeoEngineers

Figure 2

Path: \\seal\projects\0\035611\4\GIS\035611406_T300_Site_Layout_Interim_Action_Area.mxd Map Revised: 07 January 2014 maugust



LEGEND

- TOP OF BANK — SURVEYED TOP OF BANK
- MHHW — MEAN HIGHER HIGH WATER (MHHW) (APPROXIMATELY 8.51 FEET MLLW) 8.04 FEET ELEVATION (NAVD 88)
- 4.0 — EXISTING ELEVATION CONTOUR (NAVD 88)
- APPROXIMATE INTERIM ACTION AREA
- EXISTING DERELICT WOOD PILE
- 12"ø — EXISTING FIR TREE WITH DIAMETER
- 12"ø — EXISTING ALDER TREE WITH DIAMETER
- MW — EXISTING 4'x4' VAULT (PURPOSE UNKNOWN)
- APPROXIMATE AREAS WITH LIGHT NON AQUEOUS PHASE LIQUID (LNAPL) EMERGING FROM SEDIMENT (OBSERVED IN 2012/2013 PRIOR TO INTERIM ACTION)

W True North, S, E, N Project North

20 0 20
Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

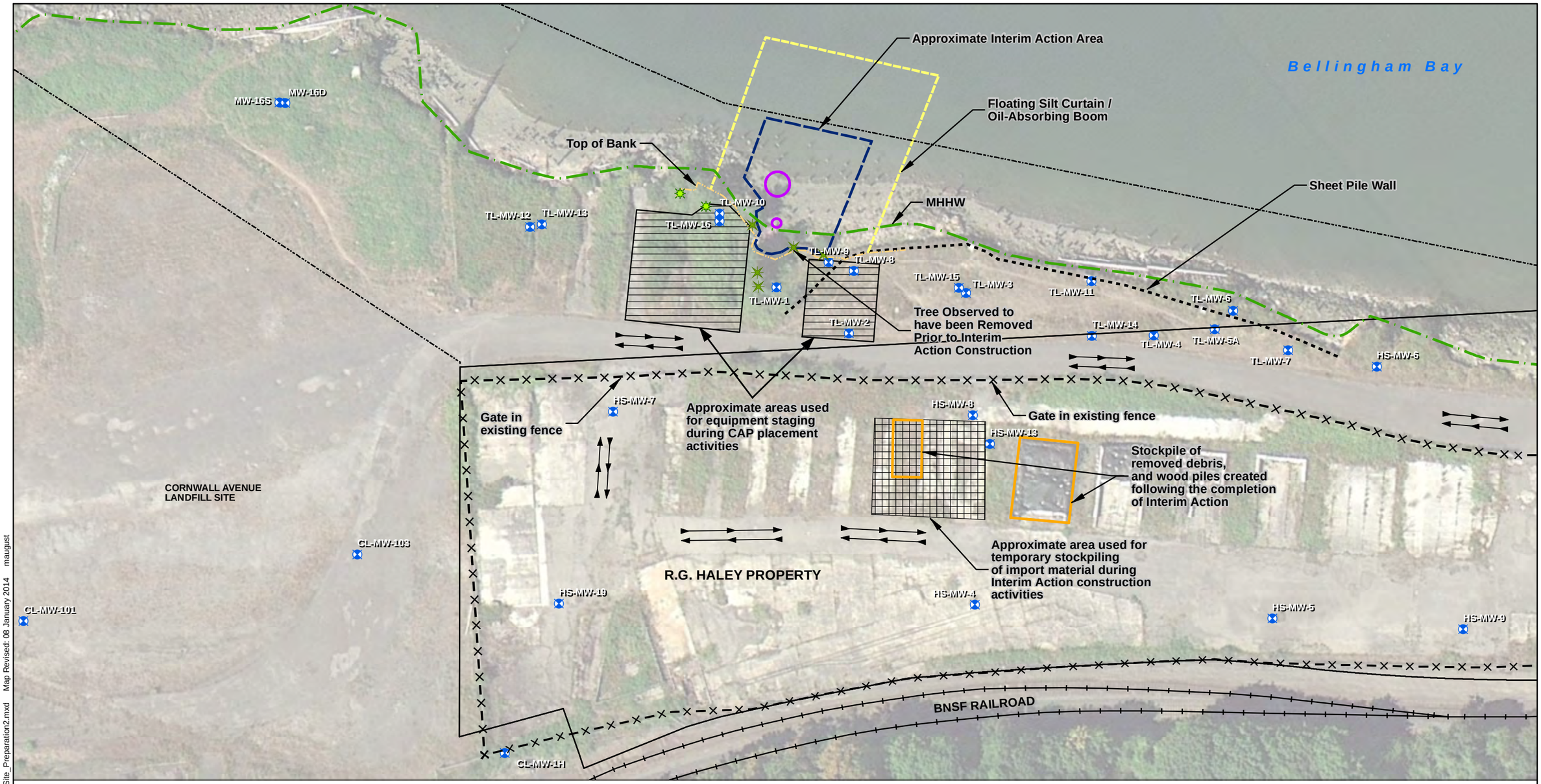
Reference: Topography/bathymetry and site features shown on this figure are based on survey performed by City of Bellingham Public Works Department (Engineering Division) dated May8, 2013.

Pre-Construction Conditions

R.G. Haley Site
Bellingham, Washington

GeoEngineers

Figure 3



Reference: Aerial from Google Earth, August 2011. Survey performed by City of Bellingham Public Works Department (ENgineering Division) dated May 8, 2013.

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Legend

- Mean Higher High Water (MHHW) (8.04 ft NAVD88)
- Top of Bank in Interim Action Area
- Floating Silt Curtain / Oil-absorbing Boom
- Existing Fence
- Approximate Interim Action Area
- Approximate Area with Light Nonaqueous Phase Liquid (LNAPL) Emerging from Sediment (Observed in 2012/2013 prior to Interim Action)
- City Owned, R.G. Haley Property
- Tideland Lease Area
- Existing Sheet Pile Wall (Protected During Construction)
- Existing Monitoring Well (Protected During Construction)
- Existing Fir Trees (Protected During Construction)
- Existing Alder Trees (Protected During Construction)
- Construction Haul Road

Interim Action Site Preparation

R.G. Haley Site
Bellingham, Washington

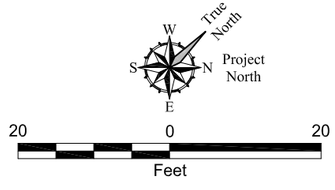
GeoEngineers

Figure 4

Path: \\sea\projects\0\035611406\GIS\035611406_T300_Site_Preparation2.mxd Map Revised: 08 January 2014 maugust

LEGEND

- SURVEYED TOP OF BANK
- MEAN HIGHER HIGH WATER (MHHW) (APPROXIMATELY 8.51 FEET MLLW) 8.04 FEET ELEVATION (NAVD 88)
- AS-BUILT ELEVATION CONTOUR (NAVD 88)
- EXISTING ELEVATION CONTOUR (NAVD 88)
- APPROXIMATE INTERIM ACTION AREA
- APPROXIMATE LIMITS OF CONTAINMENT BERM (SEE FIGURE 6 FOR TYPICAL DETAIL)
- APPROXIMATE LIMITS OF SEDIMENT CAP (SEE FIGURE 6 FOR TYPICAL DETAIL)
- APPROXIMATE LIMITS OF RIPRAP (SEE FIGURE 6 FOR TYPICAL DETAIL)
- EXISTING DERELICT WOOD PILE
- EXISTING FIR TREE WITH DIAMETER (PROTECTED DURING CONSTRUCTION)
- EXISTING ALDER TREE WITH DIAMETER (PROTECTED DURING CONSTRUCTION)
- EXISTING 4'x4' VAULT (PURPOSE UNKNOWN)



Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

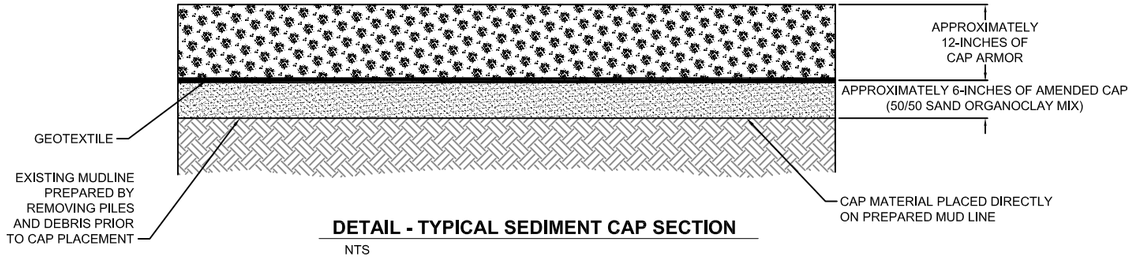
Reference: Topography/bathymetry, site features, and limits of cap, containment berm and riprap shown on this figure are based on survey performed by City of Bellingham Public Works Department (Engineering Division) dated December 5, 2013.

As-Built Cap Layout

R.G. Haley Site
Bellingham, Washington

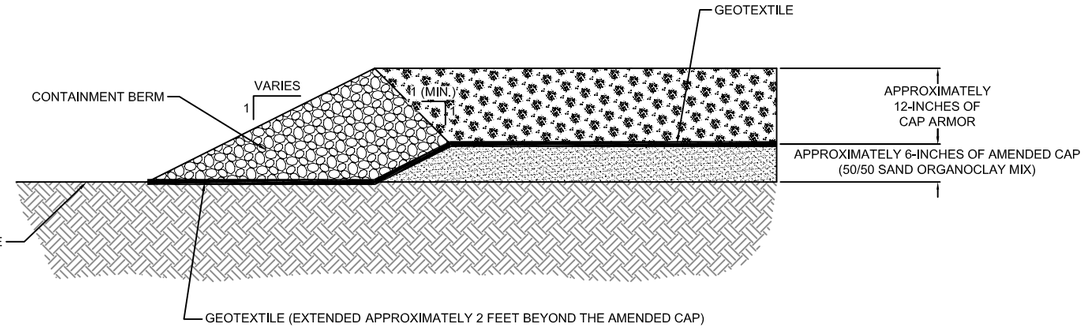
GeoEngineers

Figure 5



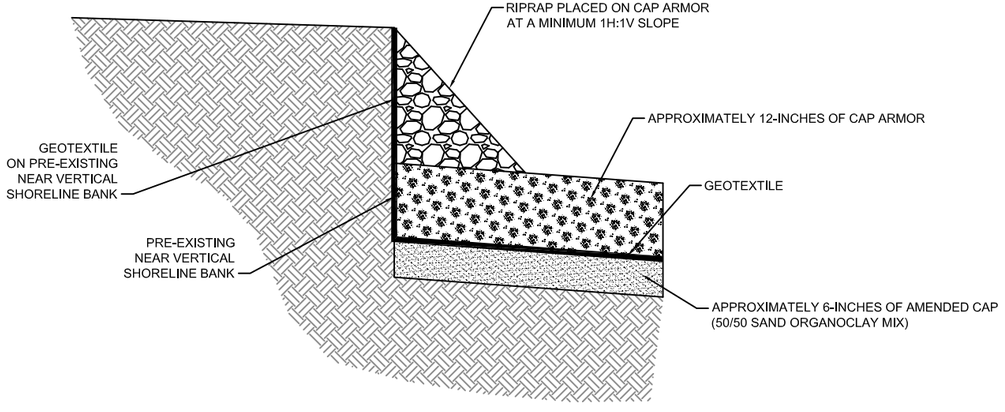
DETAIL - TYPICAL SEDIMENT CAP SECTION

NTS



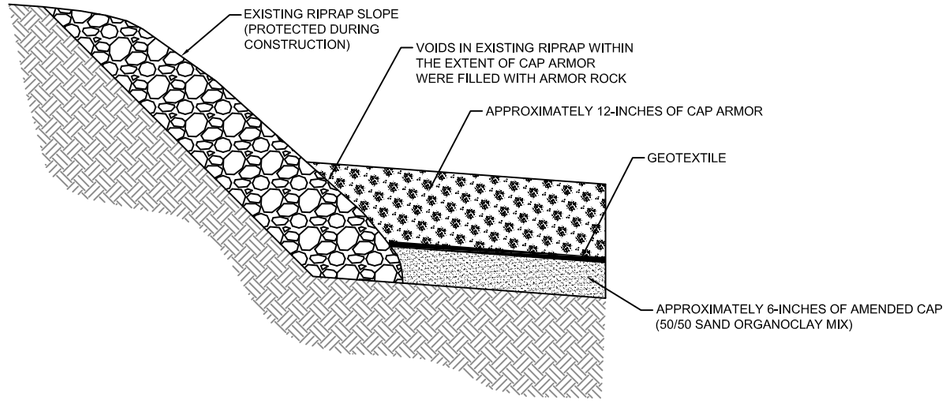
DETAIL - TYPICAL CONTAINMENT BERM SECTION

NTS



DETAIL - TYPICAL SEDIMENT CAP SECTION AT EXISTING STEEP BANK

NTS



DETAIL - TYPICAL SEDIMENT CAP SECTION AT EXISTING RIPRAP SLOPE

NTS

Reference: Drawing created from sketch provided by GeoEngineers' personnel.

As-Built Cap Detail

R.G. Haley Site
Bellingham, Washington

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Figure 6

APPENDIX A
Interim Action Photographs

Photo 1: Pre-Construction Condition of the Interim Action Area

Photo 2: Saw-Cutting of derelict wood piles

0356-114-00

GeoEngineers

Interim Action Photographs

Figure A-1

Photo 3: Removal of derelict wood piles from the Interim Action Area to prepare mudline for cap placement

Photo 4: Removal of debris and large rocks from the Interim Action Area to prepare mudline for cap placement

Photo 5: Mixing sand and organoclay on site to prepare amended cap (50/50 sand organoclay mix)

Photo 6: Placement of amended cap (50/50 sand organoclay mix) on prepared mudline

Photo 7: Placement of amended cap (50/50 sand organoclay mix) on prepared mudline

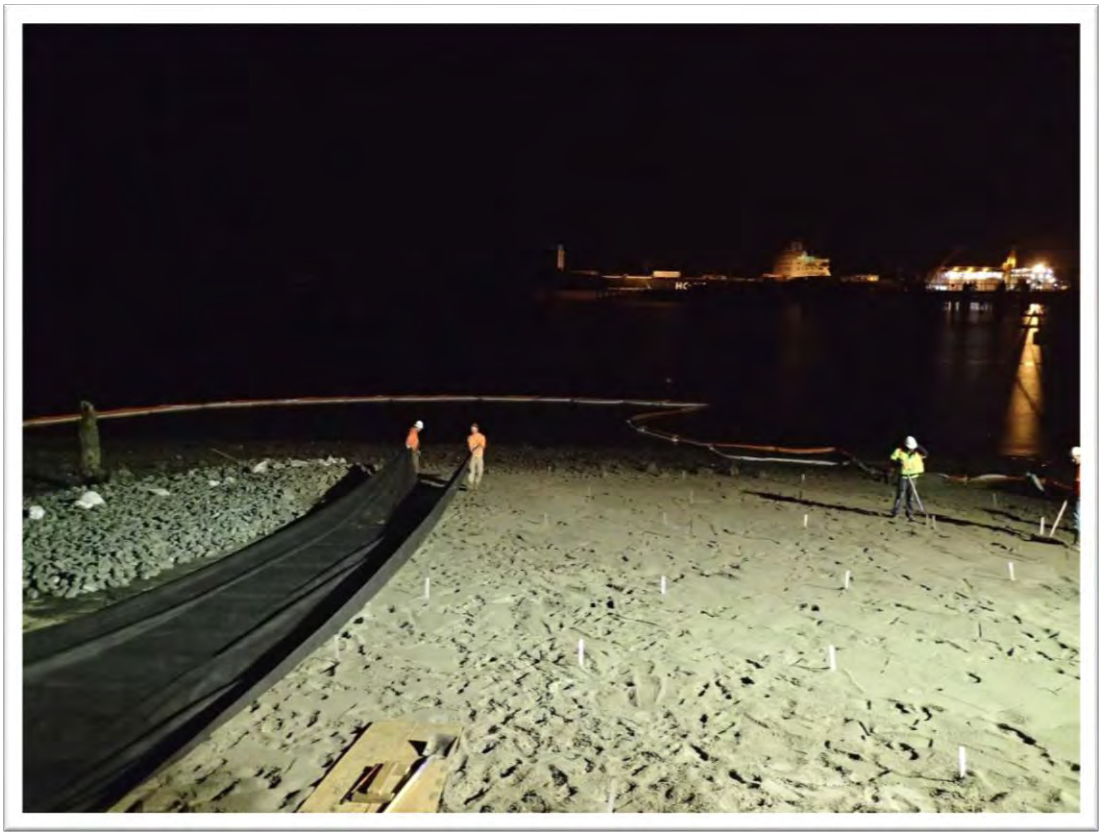

Photo 8: Placement of geotextile fabric on top of amended cap

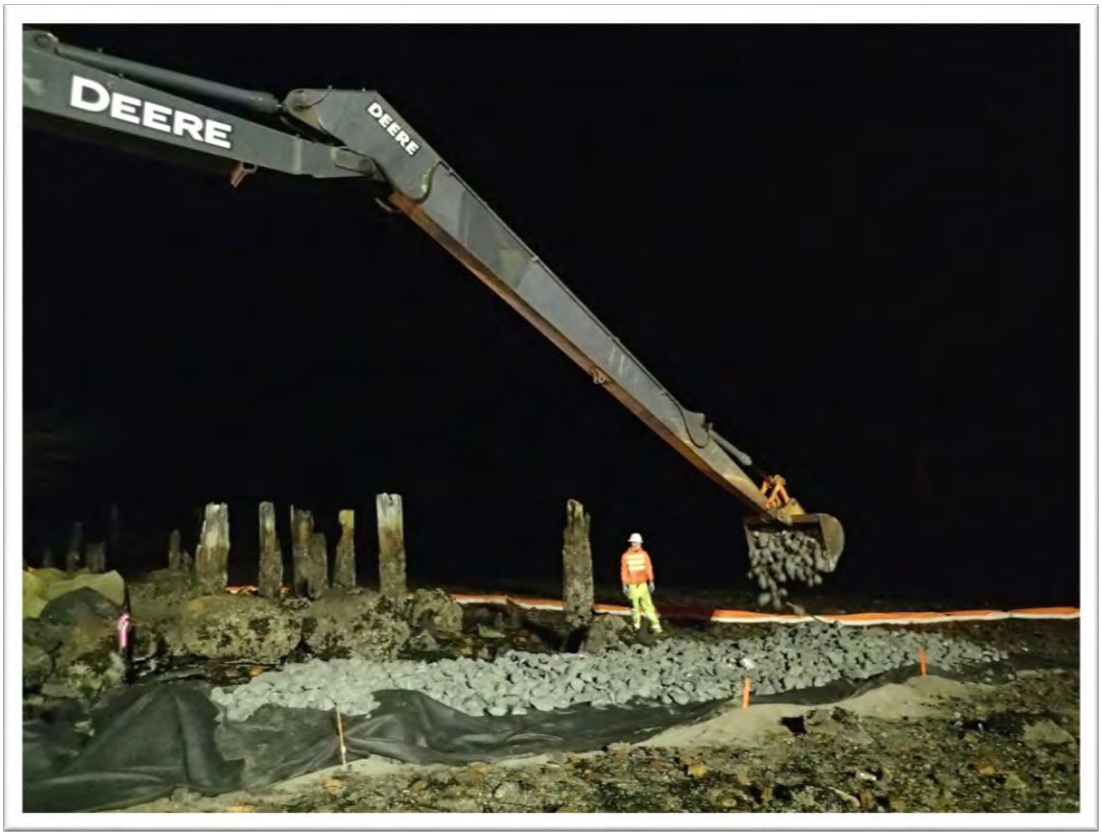

Photo 9: Placement of containment berm

Photo 10: Placement of cap armor

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Interim Action Photographs

Figure A-5

Photo 11: Placement of cap armor

Photo 12: As-Built conditions of sediment cap and riprap placed during the Interim Action

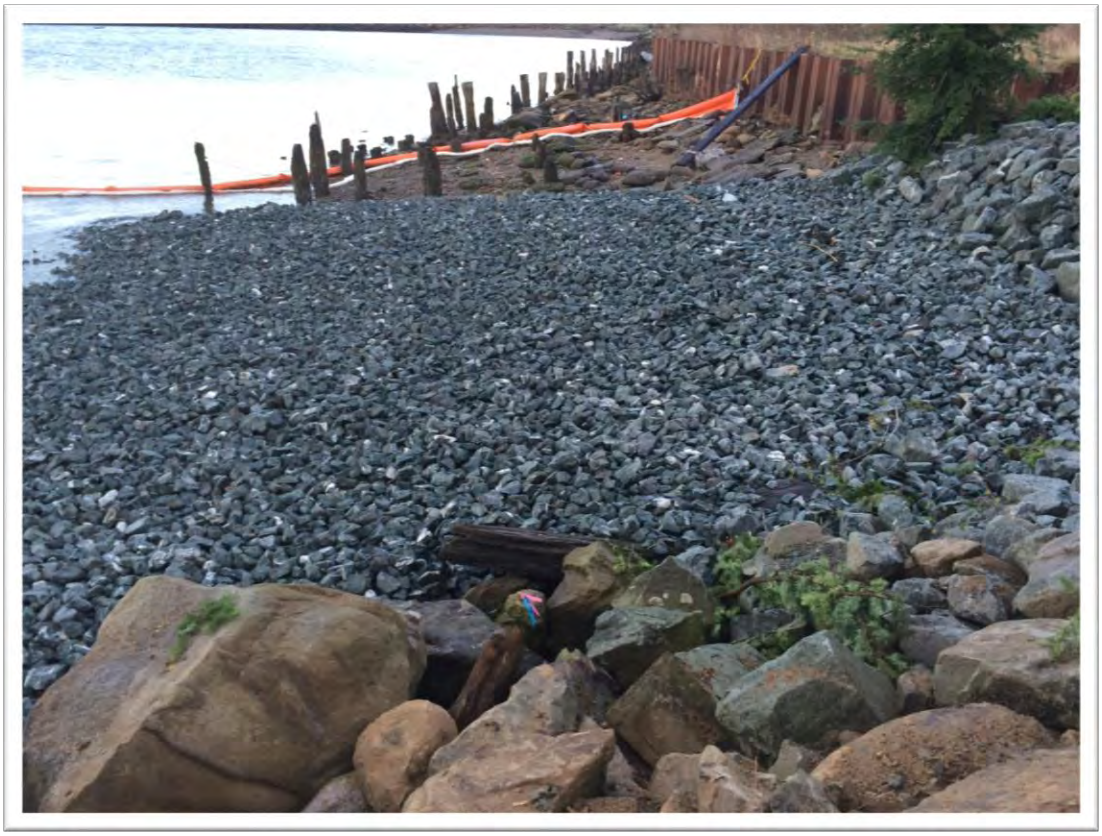


Photo 13: As-Built conditions of the sediment cap placed during the Interim Action

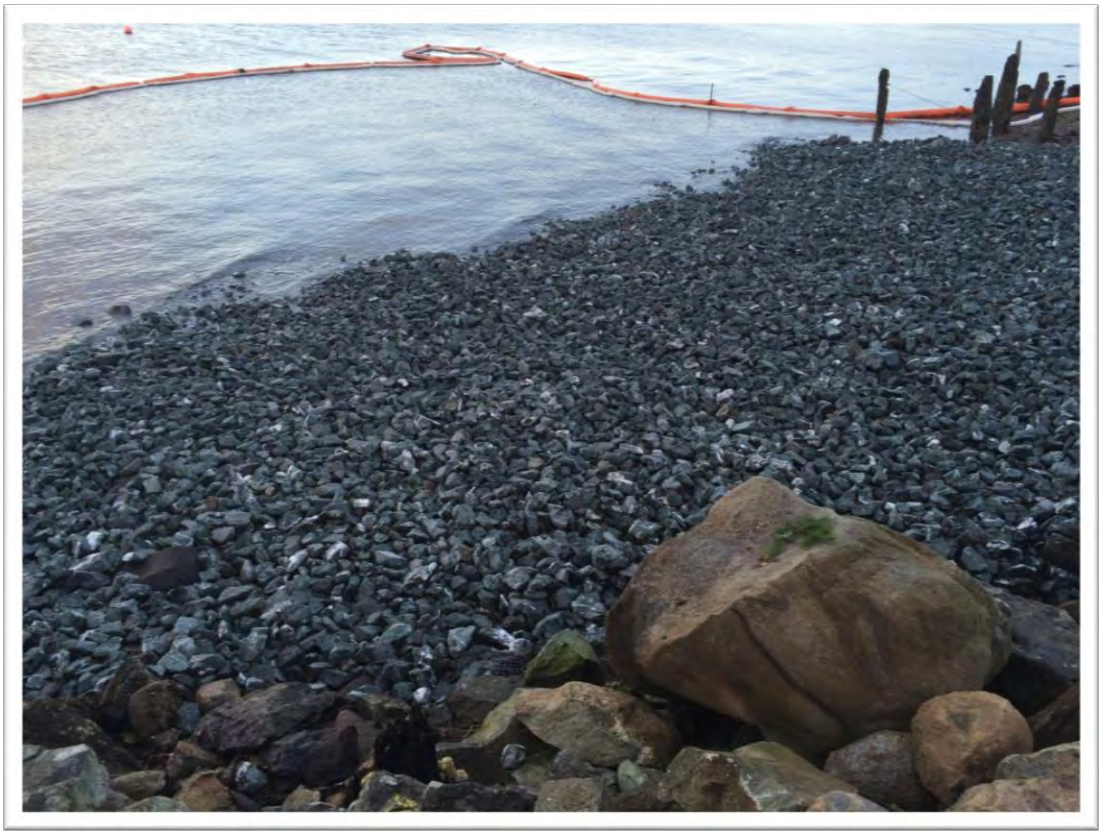
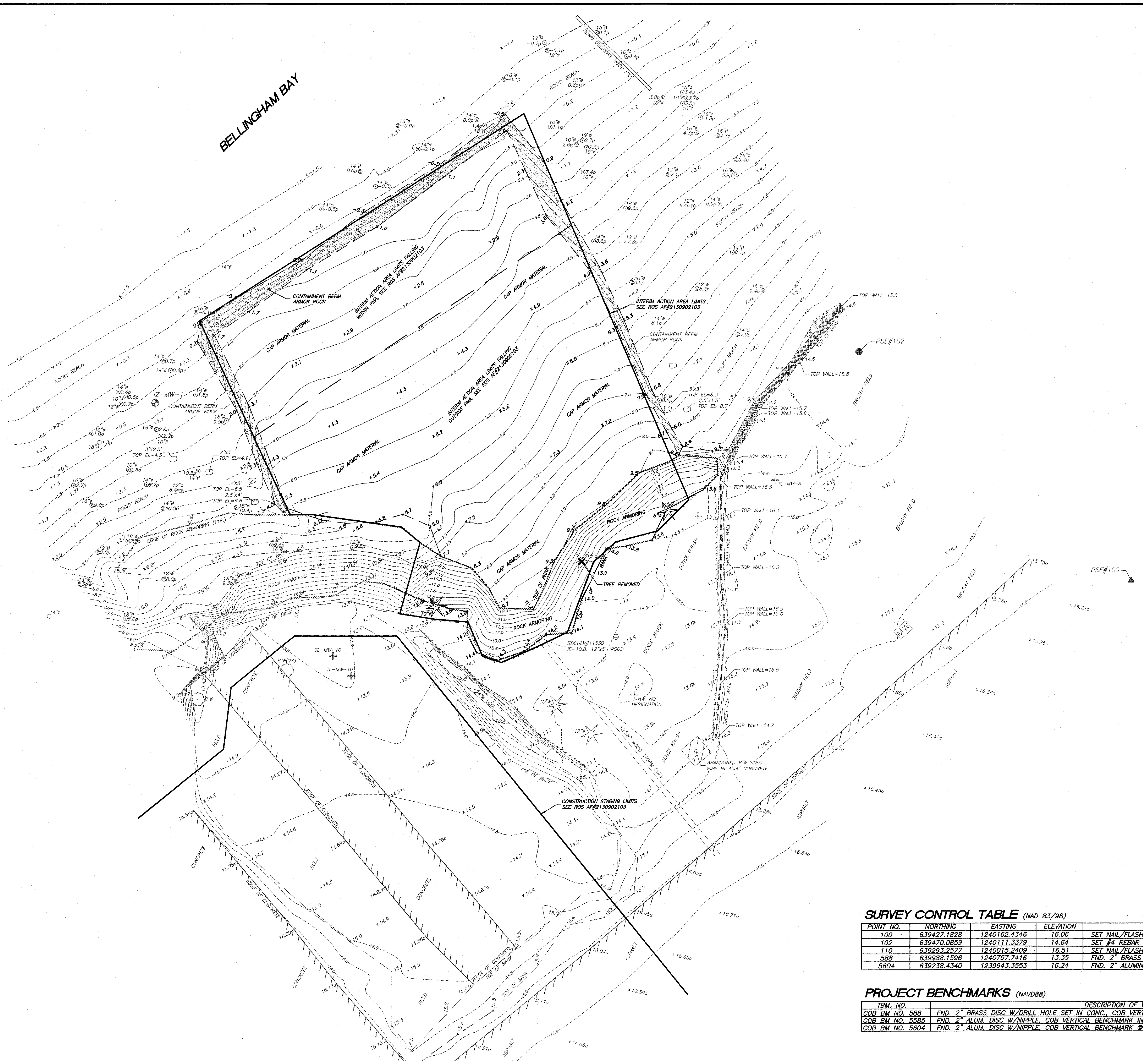
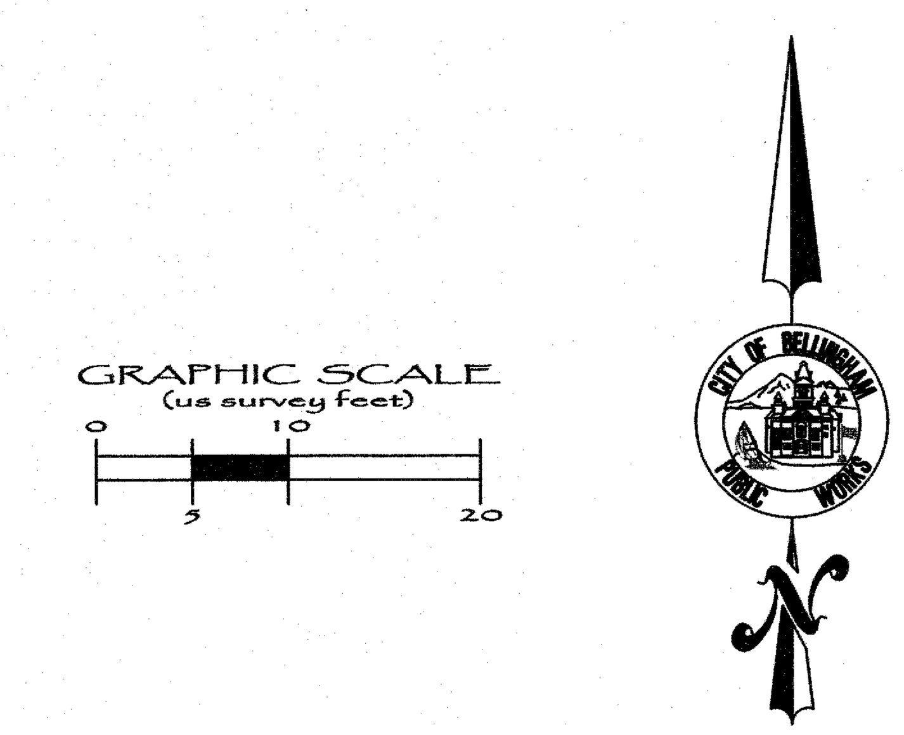


Photo 14: As-Built conditions of the sediment cap placed during the Interim Action

APPENDIX B
Final As-Built Survey





SURVEY NOTES

1) ORIGINAL EXISTING CONDITIONS SURVEY (OUTSIDE OF INTERIM AREA CONSTRUCTION LIMITS) WAS PERFORMED IN APRIL OF 2013 UTILIZING ELECTRONIC DATA COLLECTION.

2) EQUIPMENT USED INCLUDED A LEICA TCRP 1203+ TOTAL STATION (THEOMAT 00.01.5, EDM +/- 2 PPM), & LEICA DNA 03 DIGITAL LEVEL.

3) HORIZONTAL DATUM: NAD 83/98, WASHINGTON STATE PLANE NORTH ZONE (PER ROS AF#2080302393, ON-SITE HORIZONTAL CONTROL POINTS ARE AS SHOWN HEREON).

4) VERTICAL DATUM: NAVD 88 (PER ROS AF#2080302393, ON-SITE VERTICAL CONTROL POINTS ARE AS SHOWN HEREON). ADD 0.47' TO PROVIDED NAVD 88 VALUES TO ACHIEVE MLLW TIDAL VERTICAL DATUM (1983-2001 EPOCH).

DIFFERENTIAL LEVELS WERE RUN THROUGH PRIMARY CONTROL POINTS, AND SITE BENCHMARK SHOWN HEREON. (SEE VERT. BENCHMARK TABLE)

5) EXISTING GROUND CONTOUR INTERVALS ARE 0.5' & ARE COMPUTER GENERATED FROM FIELD SURVEY DATA. SPOT ELEVATIONS DEPICT GRADES AT TOP OF ARMORING, TOP OF ROCKS, TOP OF SHEET PILE WALL, TOP OF DECREPIT WOOD PILES, ETC. (AS LABELED HEREON)

6) PURPOSE OF SURVEY TO AS-BUILT POST CONSTRUCTION INTERIM ACTION SEDIMENT CAP, ARMORING AND CONTAINMENT BERM. AS-BUILT SURVEY PERFORMED IN DECEMBER OF 2013.

EXISTING FEATURE SYMBOL LEGEND (DECEMBER 2013)

x4.3 = EXISTING SPOT ELEVATION ON GROUND

EXISTING FEATURE SYMBOL LEGEND (APRIL 2013)

= EXISTING 2" ALUMINUM DISC W/NIPPLE SET IN CONC. (FLUSH) (REF. COB MON NO.5604) - OFFSITE
= SET TRAVERSE #4 REBAR W/ PLASTIC CAP
= SET TRAVERSE NAIL WITH FLASHER
= SET #4 REBAR W/ ORANGE PLASTIC CAP AT DEFINED INTERIM AREA LIMITS
= SET #4 REBAR W/ ORANGE PLASTIC CAP AT SEDIMENT SAMPLE LOCATIONS
= EXISTING DEEP MONITORING WELL
= EXISTING SHALLOW MONITORING WELL
12"ø = EXISTING DECREPIT WOOD PILE WITH DIAMETER
= EXISTING LARGE ROCK/BOULDER, SIZE AND TOP ELEVATION NOTED AT EACH LOCATION
12"ø = EXISTING FIR TREE WITH DIAMETER
12"ø = EXISTING ALDER TREE WITH DIAMETER
MW = EXISTING 4'x4' VAULT (PURPOSE UNKNOWN)
x1.5 = EXISTING SPOT ELEVATION ON GROUND
x1.5r = EXISTING SPOT ELEVATION ON TOP OF ROCK ARMORING
x1.5c = EXISTING SPOT ELEVATION ON CONCRETE
x1.5a = EXISTING SPOT ELEVATION ON ASPHALT
x1.5p = EXISTING SPOT ELEVATION ON TOP OF DECREPIT WOOD PILE

SURVEY CONTROL TABLE (NAD 83/98)

POINT NO.	NORTHING	EASTING	ELEVATION	MONUMENT DESCRIPTION
100	639427.1828	1240162.4346	16.06	SET NAIL/FLASHER IN ASPHALT (RANDOM CONTROL)
102	639470.0859	1240111.3379	14.64	SET #4 REBAR AND TRAV. CAP (RANDOM CONTROL)
110	639293.2577	1240015.2409	16.51	SET NAIL/FLASHER IN ASPHALT (RANDOM CONTROL)
588	639988.1596	1240757.7416	13.35	FND. 2" BRASS DISC W/DRILL HOLE SET IN CONC. @ S.I. PINE ST. & CORNWALL AVE. (COB MON NO. 588)
5604	639238.4340	1239943.3553	16.24	FND. 2" ALUMINUM DISC W/NIPPLE SET IN CONC. (COB MON NO. 5604)

PROJECT BENCHMARKS (NAVD88)

TBM. NO.	DESCRIPTION OF VERTICAL BENCHMARK	ELEVATION
COB BM NO. 588	FND. 2" BRASS DISC W/DRILL HOLE SET IN CONC., COB VERTICAL BENCHMARK @ SI PINE ST. & CORNWALL AVE.	13.35
COB BM NO. 5585	FND. 2" ALUM. DISC W/NIPPLE, COB VERTICAL BENCHMARK IN CONC. WALK ON EAST SIDE OF CORNWALL AVE.	19.26
COB BM NO. 5604	FND. 2" ALUM. DISC W/NIPPLE, COB VERTICAL BENCHMARK @ S. END OF CORNWALL AVE @ END OF PAVED ROADWAY	16.24

ADAM J NELSON — STATE OF WASHINGTON — REGISTERED PROFESSIONAL LAND SURVEYOR — 42962

12/13/13

Date	No	Revision	By
	4		
	3		
	2		
	1		

PROJECT ENGINEER ____
DESIGNED/DRAWN AJN/RMT
INSPECTOR ____

DIR. PUBLIC WORKS ____
CITY ENGINEER ____
OPER. ENGINEER ____

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"=10'
Vert. N/A

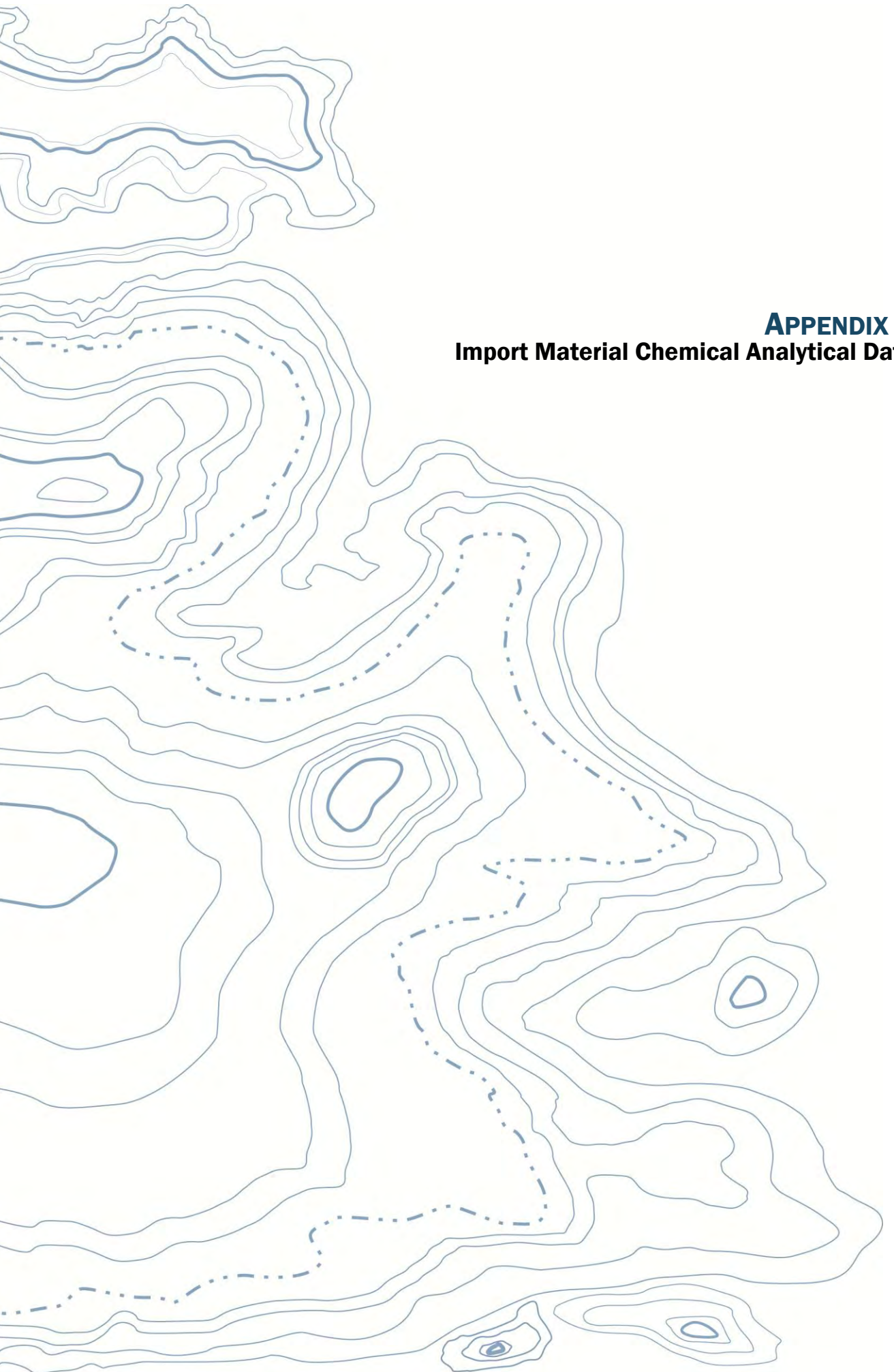
DATUM
NAVD 88

Job. No. EC-0018
Date 12/12/13
Field Bk. 974-1

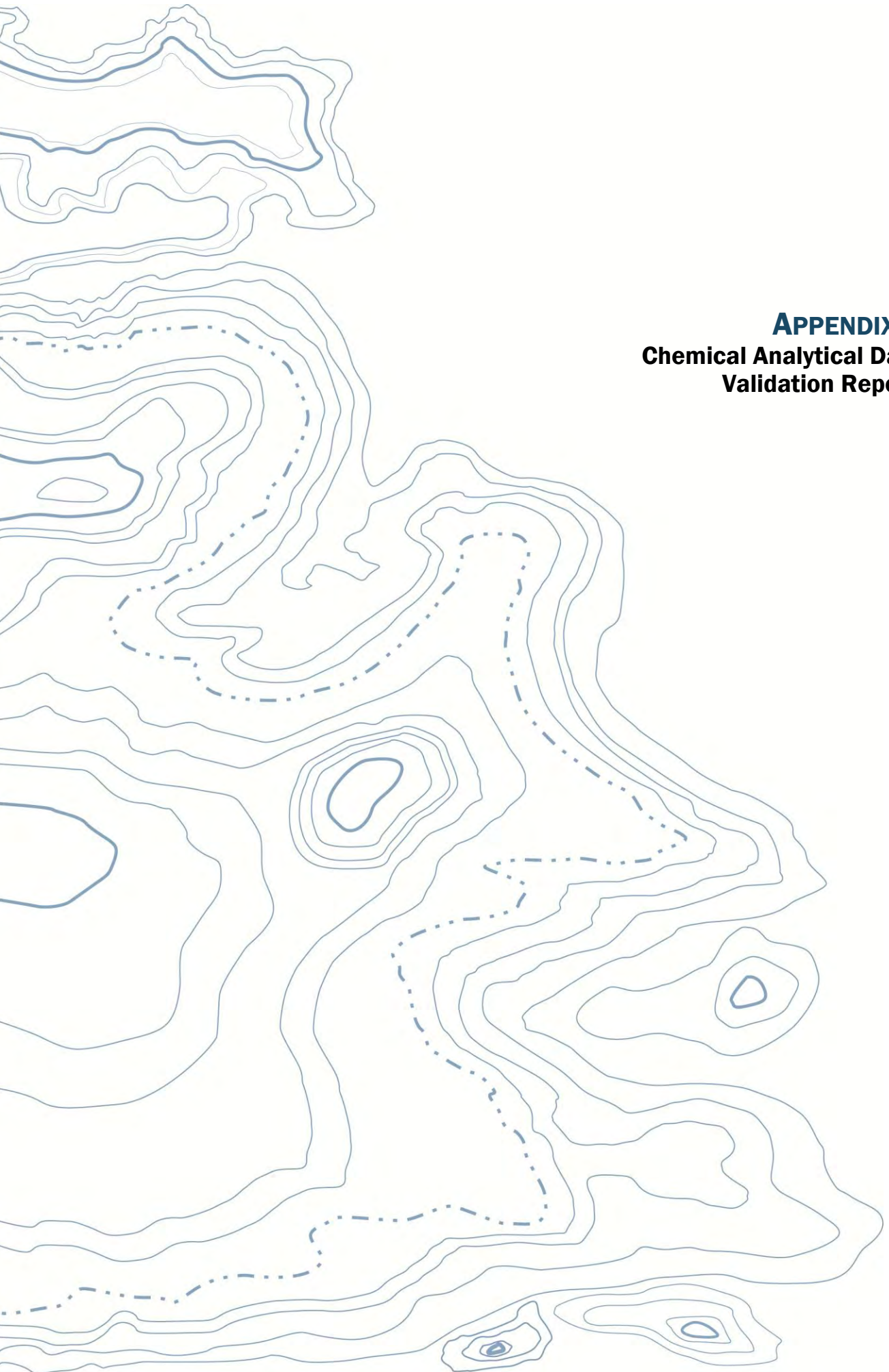
EC-0018, RG HALEY SITE
INTERIM ACTION AREA SEDIMENT CAP AS-BUILT

SHEET 1 OF 1

CONTACT PERSON: ____, PROJECT ENGINEER AT 676-6961



APPENDIX C
Import Material Chemical Analytical Data



APPENDIX D
Chemical Analytical Data Validation Reports

December 4, 2013

Mr. Iain Wingard
GeoEngineers
1101 S. Fawcett Avenue, Suite 200
Tacoma, WA 98402

Re: Data Package Review Report – Analytical Resources, Incorporated Lab No. X187 – Metals in Soil

Dear Mr. Wingard:

The evaluation of metals analysis data prepared by Analytical Resources, Incorporated (ARI), Tukwila, WA, for one soil sample from the R.G. Haley Site, which was reported in a single data package under Lab ID. X187 has been completed. The following sample was reported:

VANBURENPIT-100713

Analyses were performed according to EPA SW846 Methods 6010C and 7471A. The evaluation was based on the specifications of the project-specific Quality Assurance Project Plan (QAPP, February 23, 2012), the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Inorganic Data Review (October 2004)". Professional judgment was applied as necessary and appropriate. Qualifiers consistent with those defined in the National Functional Guidelines were applied as necessary and appropriate.

Based on the evaluation effort, no qualification of data was made. Data summary forms are included as Attachment A to this report. A copy of the chain of custody record is provided in Attachment B.

Specific details regarding the review and evaluation of these data are discussed below:

Holding Times, Preservation, and Sample Integrity: A copy of the applicable chain of custody (COC) record was included in the data package, documenting a sample collection date of October 7, 2013. The sample was delivered to the laboratory on October 8, 2013. The temperature of the cooler on receipt at the laboratory was acceptable (0.8 ^{o}C). The sample was analyzed on October 10, 2013, well within the method specified hold times.

Calibrations: Based on the Analysis Run Logs provided for the analysis date, initial and continuing calibration verification (ICV/CCV) standards were run at the appropriate frequencies throughout the reported inductively coupled plasma (ICP) analysis series. All

ICV/CCV recoveries documented on the accompanying Initial and Continuing Calibration Verification Reports were acceptable (QC 90-110%).

Blanks: Initial and continuing calibration blanks (ICB/CCBs) and preparation blanks were prepared and run at the appropriate frequencies throughout the reported sample analysis series. Positive and negative blank values were reported in the method blank and continuing calibration blanks (CCBs). However, the reported blank results were at concentrations such that none of the sample results would be affected.

Interference Check Sample: Interference check sample results were reported in the data package. All recoveries were within the acceptance limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): MS/MSD analyses were performed on VANBURENPIT-100713. All percent recoveries (%Rs) and relative percent differences (RPDs) were within acceptance limits.

Laboratory Control Sample (LCS): All LCS recoveries were within acceptance limits.

ICP Serial Dilution: A serial dilution was not performed.

Sample Results: Results less than the Limit of Quantitation (LOQ) were not reported for individual analytes in the sample. The LOD for mercury was below the sediment screening criteria as identified in Table 3 of the site specific QAPP. No sediment screening criteria were identified for the remaining elements.

Field Duplicates: A field duplicate was not submitted with this sample set.

Documentation: No documentation issues were observed during the data review effort:

Please feel free to contact me if you have any questions regarding this data package review report.

Sincerely,

Jeri Rossi
Sr. Environmental Chemist

Enclosures

ATTACHMENT A

DATA SUMMARY FORMS
Laboratory Job # X187

DATA SUMMARY FORM: Metals
SOIL SAMPLES
(mg/kg)

Site Name: R.G. Haley

Sampling Date: October 7, 2013

Job No. X187

ddms Project No. 2056-0002

Sample Location		VANBURENPIT-100713							
Lab Sample ID		X187A							
Dilution Factor		1							
LOQ									
5	Arsenic								
0.2	Cadmium								
0.5	Chromium	29.8							
0.2	Copper	23.2							
2	Lead								
0.02	Mercury								
0.3	Silver								
1	Zinc	36							

ATTACHMENT B

CHAIN OF CUSTODY RECORD
Laboratory Job # X187

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XIS7	Turn-around Requested: STD	Page: 1 of 1	
ARI Client Company: GeoEngineers, Inc.	Phone: 206-728-2674	Date: 10/07/13	Ice Present?
Client Contact: ABHIJIT JOSHI / IAIN WINGARD		No. of Coolers:	Cooler Temps:
Client Project Name: R.G. HALEY SITE INTERIM ACTION			
Client Project #: 0356-114-06 T2600	Samplers: ABHIJIT JOSHI		

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

Sample ID	Date	Time	Matrix	No Containers	NWTPH-Dx w/ silica gel cleanup	Dioxin AND Furans BY EPA 1613 Modified	SVOCs BY EPA 8270D	Metals (CSMS)	PCBs by EPA 8082B				Notes/Comments
					Analysis Requested								
VANBURENPIT-100713	10/07/13	1155	SOIL	3~~4~~	X	X	X	X	X				PLEASE PROVIDE PRELIM RESULTS AS SOON AS POSSIBLE

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	ABHIJIT			
	Printed Name: ABHIJIT JOSHI	Printed Name: Rick Hudson	Printed Name	Printed Name
	Company: GeoEngineers, Inc.	Company: ARI	Company	Company
	Date & Time: 10/08/13 1050	Date & Time: 10/8/13 1050	Date & Time	Date & Time

XIS7:COC

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.

December 3, 2013

Mr. Iain Wingard
GeoEngineers
1101 S. Fawcett Avenue, Suite 200
Tacoma, WA 98402

Re: Data Package Review Report – Analytical Resources, Incorporated Lab No. X187 – PCBs in Soil

Dear Mr. Wingard:

The evaluation of PCB analysis data prepared by Analytical Resources, Incorporated (ARI), Tukwila, WA, for one soil sample from the R.G. Haley Site, which was reported in a single data package under Lab ID. X187 has been completed. The following sample was reported:

VANBURENPIT-100713

Analyses were performed according to EPA SW846 Method 8082A. The evaluation was based on the specifications of the project-specific Quality Assurance Project Plan (QAPP, February 23, 2012), the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review (EPA-540-R-08-01, June 2008)". Professional judgment was applied as necessary and appropriate. Qualifiers consistent with those defined in the National Functional Guidelines were applied as necessary and appropriate.

Based on the evaluation effort, no qualification of data was made. Data summary forms are included as Attachment A to this report. A copy of the chain of custody record is provided in Attachment B.

Specific details regarding the review and evaluation of these data are discussed below:

Holding Times, Preservation, and Sample Integrity: A copy of the applicable chain of custody (COC) record was included in the data package, documenting a sample collection date of October 7, 2013. The sample was delivered to the laboratory on October 8, 2013. The temperature of the cooler on receipt at the laboratory was acceptable (0.8 ^{o}C). The sample was extracted on October 11, 2013, and analyzed on October 14, 2013, within the method specified hold times.

Calibration: Summary results for one initial calibration (IC) were reported in support of sample analysis. The laboratory used four peaks for quantitation of Aroclor 1016 in the IC. Method 8082A requires the use of at least five peaks for Aroclors 1016 and 1260. PCBs were not detected in the sample; therefore, no qualification of data was made. Percent relative standard deviations (%RSDs) were acceptable (< 20%).

Continuing calibration (CC) standards were run at the appropriate frequency. Reported %D were acceptable (<20%).

Blanks: Results for one method blank associated with the site sample analysis was provided by the laboratory. No target analytes were detected above the laboratory specified reporting limits (RLs).

Surrogates: Reported recoveries were acceptable for all sample and quality control analyses.

Internal Standards*:* Internal standard areas (-50% to +100%) and retention times (±0.5 minutes) for the CC, all samples and the related quality control analyses were within acceptance limits.

Laboratory Control Samples (LCS/LCSD): LCS and LCS duplicate (LCSD) recoveries and relative percent differences (RPDs) were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): MS/MSD analysis was not performed on sample VANBURENPIT-100713

Field Duplicate Samples: A field duplicate was not submitted with this sample.

Documentation: The data summary forms do not indicate which column the sample and QC results are reported from. No target analytes were detected in VANBURENPIT-100713; therefore, no action was warranted.

Please feel free to contact me if you have any questions regarding this data package review report.

Sincerely,

Jeri Rossi
Sr. Environmental Chemist

enc.

ATTACHMENT A

DATA SUMMARY FORMS
Laboratory Job No. X187

DATA SUMMARY FORM: PCB
SOIL SAMPLES
(ug/kg)

Site Name: R.G. Haley

Sampling Date: October 7, 2013

Job No. X187

ddms Project No. 2056-0002

Sample Location		VANBURENPIT-100713							
Lab Sample ID		X187A							
Dilution Factor		1							
RL									
10	Aroclor 1016								
10	Aroclor 1242								
10	Aroclor 1248								
10	Aroclor 1254								
10	Aroclor 1260								
10	Aroclor 1221								
10	Aroclor 1232								

ATTACHMENT B

CHAIN OF CUSTODY RECORD
Laboratory Job No. X187

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XIS7	Turn-around Requested: STD	Page: 1 of 1	
ARI Client Company: GeoEngineers, Inc.	Phone: 206-728-2674	Date: 10/07/13	Ice Present?
Client Contact: ABHIJIT JOSHI / IAIN WINGARD		No. of Coolers:	Cooler Temps:
Client Project Name: R.G. HALEY SITE INTERIM ACTION			
Client Project #: 0356-114-06 T2600	Samplers: ABHIJIT JOSHI		

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

Sample ID	Date	Time	Matrix	No Containers	NWTPH-Dx w/ silica gel cleanup	Dioxin AND Furans BY EPA 1613 Modified	SVOCs BY EPA 8270D	Metals (CSMS)	PCBs by EPA 8082B				Notes/Comments
					Analysis Requested								
VANBURENPIT-100713	10/07/13	1155	SOIL	3~~4~~	X	X	X	X	X				PLEASE PROVIDE PRELIM RESULTS AS SOON AS POSSIBLE

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	ABHIJIT			
	Printed Name: ABHIJIT JOSHI	Printed Name: Rick Hudson	Printed Name	Printed Name
	Company: GeoEngineers, Inc.	Company: ARI	Company	Company
	Date & Time: 10/08/13 1050	Date & Time: 10/8/13 1050	Date & Time	Date & Time

XIS7:COC

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.

December 3, 2013

Mr. Iain Wingard
GeoEngineers
1101 S. Fawcett Avenue, Suite 200
Tacoma, WA 98402

Re: Data Package Review Report – Analytical Resources, Incorporated Lab No. X187 – Pesticides in Soil

Dear Mr. Wingard:

The evaluation of pesticide analysis data prepared by Analytical Resources, Incorporated (ARI), Tukwila, WA, for one soil sample from the R.G. Haley Site, which was reported in a single data package under Lab ID. X187 has been completed. The following sample was reported:

VANBURENPIT-100713

Analyses were performed according to EPA SW846 Method 8081B. The evaluation was based on the specifications of the project-specific Quality Assurance Project Plan (QAPP, February 23, 2012), the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review (EPA-540-R-08-01, June 2008)". Professional judgment was applied as necessary and appropriate. Qualifiers consistent with those defined in the National Functional Guidelines were applied as necessary and appropriate.

Based on the evaluation effort, no qualification of data was made. Data summary forms are included as Attachment A to this report. A copy of the chain of custody record is provided in Attachment B.

Specific details regarding the review and evaluation of these data are discussed below:

Holding Times, Preservation, and Sample Integrity: A copy of the applicable chain of custody (COC) record was included in the data package, documenting a sample collection date of October 7, 2013. The sample was delivered to the laboratory on October 8, 2013. The temperature of the cooler on receipt at the laboratory was acceptable (0.8 ^{o}C). The sample was extracted on October 11, 2013, and analyzed on October 14, 2013, within the method specified hold times.

Calibration: Summary results for one initial calibration (IC) were reported in support of sample analysis. Percent relative standard deviations (%RSDs) were acceptable (< 20%).

Continuing calibration (CC) standards were run at the appropriate frequency. Reported %D were acceptable (<20%).

Blanks: Results for one method blank associated with the site sample analysis was provided by the laboratory. No target analytes were detected above the laboratory specified reporting limits (RLs).

Surrogates: Reported recoveries were acceptable for all sample and quality control analyses.

Internal Standards*:* Internal standard areas (-50% to +100%) and retention times (±0.5 minutes) for the CC, all samples and the related quality control analyses were within acceptance limits.

Laboratory Control Samples (LCS/LCSD): LCS and LCS duplicate (LCSD) recoveries and relative percent differences (RPDs) were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): MS/MSD analysis was not performed on sample VANBURENPIT-100713

Field Duplicate Samples: A field duplicate was not submitted with this sample.

Documentation: The data summary forms do not indicate which column the sample and QC results are reported from. No target analytes were detected in VANBURENPIT-100713; therefore, no action was warranted.

Please feel free to contact me if you have any questions regarding this data package review report.

Sincerely,

Jeri Rossi
Sr. Environmental Chemist

enc.

ATTACHMENT A

DATA SUMMARY FORMS
Laboratory Job No. X187

DATA SUMMARY FORM: Pesticides
SOIL SAMPLES
(ug/kg)

Site Name: R.G. Haley

Sampling Date: October 7, 2013

Job No. X187

ddms Project No. 2056-0002

Sample Location		VANBURENPIT-100713							
Lab Sample ID		X187A							
Dilution Factor		1							
RL									
1.0	Hexachlorobenzene								
1.0	Hexachlorobutadiene								

ATTACHMENT B

CHAIN OF CUSTODY RECORD
Laboratory Job No. X187

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XIS7	Turn-around Requested: STD	Page: 1 of 1	
ARI Client Company: GeoEngineers, Inc.	Phone: 206-728-2674	Date: 10/07/13	Ice Present?
Client Contact: ABHIJIT JOSHI / IAIN WINGARD		No. of Coolers:	Cooler Temps:
Client Project Name: R.G. HALEY SITE INTERIM ACTION			
Client Project #: 0356-114-06 T2600	Samplers: ABHIJIT JOSHI		

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

Sample ID	Date	Time	Matrix	No Containers	NWTPH-Dx w/ silica gel cleanup	Dioxin AND Furans BY EPA 1613 Modified	SVOCs BY EPA 8270D	Metals (CSMS)	PCBs by EPA 8082B				Notes/Comments
					Analysis Requested								
VANBURENPIT-100713	10/07/13	1155	SOIL	3~~4~~	X	X	X	X	X				PLEASE PROVIDE PRELIM RESULTS AS SOON AS POSSIBLE

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	ABHIJIT			
	Printed Name: ABHIJIT JOSHI	Printed Name: Rick Hudson	Printed Name	Printed Name
	Company: GeoEngineers, Inc.	Company: ARI	Company	Company
	Date & Time: 10/08/13 1050	Date & Time: 10/8/13 1050	Date & Time	Date & Time

XIS7:COC

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.

December 3, 2013

Mr. Iain Wingard
GeoEngineers
1101 S. Fawcett Avenue, Suite 200
Tacoma, WA 98402

Re: Data Package Review Report – Analytical Resources, Incorporated Lab No. X187 - SVOAs in Soil

Dear Mr. Wingard:

The evaluation of the semi-volatile organics analysis data prepared by Analytical Resources, Incorporated (ARI), Tukwila, WA, for one soil sample from the R.G. Haley Site, which was reported in a single data package under Lab ID. X187 has been completed. The following sample was reported:

VANBURENPIT-100713

Analyses were performed according to EPA SW846 Method 8270D. The validation was based on the specifications of the project-specific Quality Assurance Project Plan (QAPP, February 23, 2012), the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review (EPA-540-R-08-01, June 2008)". Professional judgment was applied as necessary and appropriate. Qualifiers consistent with those defined in the National Functional Guidelines were applied as necessary and appropriate.

Based on the evaluation effort the following qualifiers were applied:

- The results for benzyl alcohol in both the full scan and SIM analyses in VANBURENPIT-100713 were qualified as estimated (UJ) due to low recovery in the LCS/ LCSD and high relative percent difference (RPD).

- The results for dibenz (a,h) anthracene in both the full scan and SIM analyses in VANBURENPIT-100713 were qualified as estimated (UJ) due to low LCS recovery.

Please note that when more than one qualifier code has been applied to a result, the one providing the highest level of qualification takes precedence.

All qualifiers are reflected on the data summary forms included as Attachment A to this report. A copy of the chain of custody record is provided in Attachment B.

Specific details regarding the review and evaluation of these data are discussed below:

Holding Times, Preservation, and Sample Integrity: A copy of the applicable chain of custody (COC) record was included in the data package, documenting a sample collection date of October 7, 2013. The sample was hand delivered to the laboratory on October 8, 2013. The temperature of the cooler on receipt at the laboratory was acceptable (0.8 ^{o}C). The sample was extracted on October 11, 2013, and analysis was performed on October 14, 2013, within the method specified hold times.

GC/MS Instrument Performance Check: Summary forms were provided for two Decafluortriphenylphosphine (DFTPP) instrument performance checks run on instrument "NT10" reflecting each analytical period during which samples, calibrations standards, and associated quality control samples were analyzed. Reported relative abundances for each of the performance checks were acceptable.

Calibration: Summary results for one initial calibration (IC) using method 8270D were reported in support of all sample analyses. Although the standards included more compounds than were specifically applicable to these analyses, only project-specified target analytes were reviewed. Summary results for one IC using method 8270D SIM (Selected Ion Monitoring) were also reported in support of all sample analyses. For the relevant target analytes analyzed, the reported average relative response factors (RRFs) were greater than the evaluation criterion (0.05). Percent relative standard deviations (%RSDs) were below the evaluation acceptance criterion of 20% for all target analytes with the exception of benzoic acid in the full scan analysis and pentachlorophenol in the SIM analyses. A second order curve was used with reported correlation coefficients of 0.998 and 0.999, respectively. Summary forms were provided for two continuing calibration (CC) standards run on October 14, 2013. Reported RRFs were acceptable (greater than 0.05). Reported % differences and % drifts from the applicable IC were less than the evaluation acceptance criterion (20%D) for all analytes.

Blanks: Results for one method blank associated with the site sample analyses were provided by the laboratory. No target analytes were detected above the laboratory specified reporting limits (RLs) for full scan analysis or Limit of Quantitation (LOQ) for SIM analysis.

Surrogates: Reported recoveries were acceptable for all samples and quality control analyses.

Laboratory Control Samples (LCS/LCSD): One LCS and LCS duplicate (LCSD) was associated with both the full scan and SIM analysis. The recoveries of benzyl alcohol and dibenz (a,h)anthracene in the LCS are within the laboratory acceptance limits. However, these limits are excessively wide. Based on professional judgment, the results for benzyl alcohol and dibenz (a,h)anthracene were qualified as estimated (UJ) due to low recovery of these compounds in the LCS and/or LCSD and/or high relative percent difference (RPD). Results may be biased low. Recoveries are detailed below:

Compound	Full Scan			SIM		
	% Recovery	RPD	Limits	% Recovery	RPD	Limits
Benzyl alcohol	60.0 / 12.4	131	19-120/30	72.2 / 41.2	54.7	25-123/30
Dibenz (a,h)anthracene	64.0 / 75.6	16.6	30-133/30	61.8 / 71.4	14.4	28-125/30

The recovery of n-nitrosodiphenylamine (137%) is outside laboratory generated limits in the LCSD. No qualification of sample results was made because the recovery is biased high and this compound was not detected in the sample.

As noted above, one LCS/LCSD was associated with both the full scan and SIM analysis. While the concentrations spiked (500 and 1000 ppm) in the LCS/LCSD are within the linear calibration range in the full scan analysis, the concentrations are at the endpoint of (500ppm) and exceed (1000ppm) the calibration in the SIM analysis. The laboratory appropriately flagged ("E") those analytes where the calculated concentration exceeds the linear range of the calibration curve. The LCS is intended to show that the analytical method is within control and whether the laboratory is capable of performing the method. The evaluation and subsequent qualification of sample results was made based on the recoveries in the full scan analysis. The results for benzyl alcohol and dibenz (a,h) anthracene were qualified as estimated (UJ) in both the full scan and SIM analysis on this basis.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): MS/MSD analysis was not performed on sample VANBURENPIT-100713

Field Duplicate Samples: A field duplicate was not submitted with this sample.

Internal Standard Responses: Internal standard areas and retention times reported in this data set and the related quality control analyses were within acceptable limits as reported on the summary form.

Sample Results: Benzoic acid was the only target analyte detected in the field sample. The laboratory did not provide the mass spectrum, therefore, correct identification could not be verified. The RL and LOD for all target analytes are below the sediment screening criteria as identified in Table 3 of the site specific QAPP.

Documentation:

Please feel free to contact me if you have any questions regarding this data package review report.

Sincerely,

Jeri Rossi
Sr. Environmental Chemist

enc.

ATTACHMENT A

DATA SUMMARY FORMS
Laboratory Job No. X187

DATA SUMMARY FORM: SEMI-VOLATILE ORGANICS (Full Scan)
SOIL SAMPLES
(ug/kg)

Site Name: R.G. Haley

Sampling Date: October 7, 2013

Job No. X187

ddms Project No. 2056-0002

Sample Location		VANBURENPIT-100713							
Lab Sample ID		X187A							
Dilution Factor		1							
RL									
20	Phenol								
20	1,4-Dichlorobenzene								
20	Benzyl alcohol		UJ						
20	1,2-Dichlorobenzene								
20	2-Methylphenol								
20	4-Methylphenol								
100	2,4-Dimethylphenol								
200	Benzoic Acid	66	J						
20	1,2,4-Trichlorobenzene								
20	Naphthalene								
20	Hexachlorobutadiene								
20	2-Methylnaphthalene								
20	Dimethylphthalate								
20	Acenaphthylene								
20	Acenaphthene								
20	Dibenzofuran								
20	Diethylphthalate								
20	Fluorene								
20	n-Nitrosodiphenylamine								
20	Hexachlorobenzene								
100	Pentachlorophenol								
20	Phenanthrene								
20	Anthracene								
20	Di-n-butylphthalate								
20	Fluoranthene								
20	Pyrene								
20	Butylbenzylphthalate								
20	Benzo(a)anthracene								
50	bis (2-ethylhexyl) phthalate								
20	Chrysene								
20	Di-n-octylphthalate								
20	Benzo(a)pyrene								
20	Indeno (1,2,3-c,d) pyrene								
20	Dibenz (a,h) anthracene		UJ						
20	Benzo (g,h,i) perylene								
40	Total Benzofluoranthenes								

ATTACHMENT B

CHAIN OF CUSTODY RECORD
Laboratory Job No. X187

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XIS7	Turn-around Requested: STD	Page: 1 of 1	
ARI Client Company: GeoEngineers, Inc.	Phone: 206-728-2674	Date: 10/07/13	Ice Present?
Client Contact: ABHIJIT JOSHI / IAIN WINGARD		No. of Coolers:	Cooler Temps:
Client Project Name: R.G. HALEY SITE INTERIM ACTION			
Client Project #: 0356-114-06 T2600	Samplers: ABHIJIT JOSHI		

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

Sample ID	Date	Time	Matrix	No Containers	NWTPH-Dx w/ silica gel cleanup	Dioxin AND Furans BY EPA 1613 Modified	SVOCs BY EPA 8270D	Metals (CSMS)	PCBs by EPA 8082B				Notes/Comments
					Analysis Requested								
VANBURENPIT-100713	10/07/13	1155	SOIL	3~~4~~	X	X	X	X	X				PLEASE PROVIDE PRELIM RESULTS AS SOON AS POSSIBLE

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	ABHIJIT			
	Printed Name: ABHIJIT JOSHI	Printed Name: Rick Hudson	Printed Name	Printed Name
	Company: GeoEngineers, Inc.	Company: ARI	Company	Company
	Date & Time: 10/08/13 1050	Date & Time: 10/8/13 1050	Date & Time	Date & Time

XIS7:COC

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.

December 6, 2013

Mr. Iain Wingard
GeoEngineers
1101 S. Fawcett Avenue, Suite 200
Tacoma, WA 98402

Re: Data Package Review Report – Analytical Resources, Incorporated Lab No. X187 – Dioxins and Furans in Soil

Dear Mr. Wingard:

The evaluation of the dioxin and furan analysis data prepared by Analytical Resources, Incorporated (ARI), Tukwila, WA, for one soil sample from the R.G. Haley Site, which was reported in a single data package under Lab ID. X187 has been completed. The following sample was reported:

VANBURENPIT-100713

Analyses were performed according to EPA Method 1613B. The validation was based on the specifications of the project-specific Quality Assurance Project Plan (QAPP, February 23, 2012), the "USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Chlorinated Dioxin/Furan Data Review, January 2010". Professional judgment was applied as necessary and appropriate. Qualifiers consistent with those defined in the National Functional Guidelines were applied as necessary and appropriate.

Based on the evaluation effort the following qualifiers were applied:

- The results for 1,2,3,4,7,8-HxcDD, 1,2,3,6,7,8-HxCDD and 1,2,3,4,6,7,8-HpCDD in VANBURENPIT-100713 were qualified as not detected (U) at the reporting limit (RL) due to method blank contamination.

- The results for 1,2,3,4,6,7,8 -HpCDF in VANBURENPIT were qualified as estimated (J) due to high recovery in the laboratory control sample (LCS).

Please note that when more than one qualifier code has been applied to a result, the one providing the highest level of qualification takes precedence.

All qualifiers are reflected on the data summary forms included as Attachment A to this report. A copy of the chain of custody record is provided in Attachment B.

Specific details regarding the review and evaluation of these data are discussed below:

Holding Times, Preservation, and Sample Integrity: A copy of the applicable chain of custody (COC) record was included in the data package, documenting a sample collection date of October 7, 2013. The sample was hand delivered to the laboratory on

October 8, 2013. The temperature of the cooler on receipt at the laboratory was acceptable (0.8 ºC). The sample was extracted on October 10, 2013, and analysis was performed on October 18, 2013, within the method specified hold times.

Instrument Performance Checks: Summary forms were provided for retention time windows and chromatographic resolution checks for analyses performed on October 17, 2013; however the summary forms for analyses performed on October 18, 2013 were omitted. Additionally, documentation supporting the static resolving power was not included in the data package. The laboratory was contacted and provided missing documentation. All instrument performance checks were acceptable.

Calibration: Summary results for one initial calibration (IC) were reported in support of the sample analysis. Percent relative standard deviations (%RSD) and ion abundance ratios were acceptable. Summary results for two continuing calibrations (CCs) were reported in support of the sample analysis. Response factors, retention times and percent differences (%D) all met acceptance criteria.

Blanks: Results for one method blank associated with the site sample analyses were provided by the laboratory. 2,3,7,8-TCDD (0.124 pg/g empc), 1,2,3,7,8-PeCDF (0.0300 pg/g empc), 1,2,3,4,7,8-PeCDD (0.0660 pg/g), 1,2,3,4,7,8-HxCDF (0.0200 pg/g empc), 1,2,3,4,7,8-HxCDD (0.0860 pg/g), 1,2,3,6,7,8-HxCDD (0.102 pg/g empc), 1,2,3,7,8,9-HxCDD (0.160 pg/g), 1,2,3,4,6,7,8-HpCDF (0.0800 pg/g empc), 1,2,3,4,6,7,8-HpCDD (1.68 pg/g) and OCDD (8.89 pg/g) were detected in the method blank. The results for 1,2,3,4,7,8-HxcDD, 1,2,3,6,7,8-HxCDD and 1,2,3,4,6,7,8-HpCDD in VANBURENPIT-100713 were qualified as not detected (U) at the reporting limit (RL) on this basis. The "B" qualifier was removed from 1,2,3,4,6,7,8 -HpCDD because the sample concentration is more than five times the concentration in the method blank. The remaining analytes were not detected in the sample.

Laboratory Control Sample (LCS): One LCS was reported with this sample analysis. The recoveries of all target analytes were within reported acceptance limits with the exception of 1,2,3,4,6,7,8 -HpCDF (142%R). The results for 1,2,3,4,6,7,8 -HpCDF in VANBURENPIT were qualified as estimated (J). Results may be biased high.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): MS/MSD analysis was not performed on sample VANBURENPIT-100713

Field Duplicate Samples: A field duplicate was not submitted with this sample.

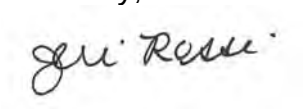
Internal Standard Responses: All internal standard recoveries were within acceptance criteria.

Sample Results: The RL for all target analytes are below the sediment screening criteria as identified in Table 3 of the site specific QAPP.

Documentation: The summary forms for the retention time windows and chromatographic resolution checks analyzed on October 17, 2013 and documentation supporting the static resolving power was not included in the data package. The laboratory was contacted and provided missing documentation. At the discretion of the data user, the laboratory may be contacted to reissue a corrected report.

Please feel free to contact me if you have any questions regarding this data package review report.

Sincerely,



Jeri Rossi
Sr. Environmental Chemist

enc.

ATTACHMENT A

DATA SUMMARY FORMS
Laboratory Job No. X187

DATA SUMMARY FORM: Dioxins and Furans
SOIL SAMPLES
(pg/g)

Site Name: R.G. Haley

Sampling Date: October 7, 2013

Job No. X187

ddms Project No. 2056-0002

Sample Location		VANBURENPIT-100713							
Lab Sample ID		X187A							
Dilution Factor		1							
RL									
1.00	2,3,7,8-TCDF								
1.00	2,3,7,8-TCDD								
1.00	1,2,3,7,8-PeCDF								
1.00	2,3,4,7,8-PeCDF								
1.00	1,2,3,7,8-PeCDD								
1.00	1,2,3,4,7,8-HxCDF								
1.00	1,2,3,6,7,8-HxCDF								
1.00	2,3,4,6,7,8-HxCDF								
1.00	1,2,3,7,8,9-HxCDF								
1.00	1,2,3,4,7,8-HxCDD		U						
1.00	1,2,3,6,7,8-HxCDD		U						
1.00	1,2,3,7,8,9-HxCDD								
1.00	1,2,3,4,6,7,8-HpCDF	1.99	J						
1.00	1,2,3,4,7,8,9-HpCDF								
1.00	1,2,3,4,6,7,8-HpCDD		U						
2.00	OCDF	5.90							
2.00	OCDD	72.7							
1.00	Total TCDF	0.0671*							
1.00	Total TCDD	0.0910*							
2.00	Total PeCDF	0.183							
1.00	Total PeCDD	0.0970*							
2.00	Total HxCDF	1.34							
2.00	Total HxCDD	1.79*							
2.00	Total HpCDF	5.75							
2.00	Total HpCDD	16.2*							
	*-EMPC								

ATTACHMENT B

CHAIN OF CUSTODY RECORD
Laboratory Job No. X187

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XIS7	Turn-around Requested: STD	Page: 1 of 1	
ARI Client Company: GeoEngineers, Inc.	Phone: 206-728-2674	Date: 10/07/13	Ice Present?
Client Contact: ABHIJIT JOSHI / IAIN WINGARD		No. of Coolers:	Cooler Temps:
Client Project Name: R.G. HALEY SITE INTERIM ACTION			
Client Project #: 0356-114-06 T2600	Samplers: ABHIJIT JOSHI		

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

Sample ID	Date	Time	Matrix	No Containers	NWTPH-Dx w/ silica gel cleanup	Dioxin AND Furans BY EPA 1613 Modified	SVOCs BY EPA 8270D	Metals (CSMS)	PCBs by EPA 8082B				Notes/Comments
					Analysis Requested								
VANBURENPIT-100713	10/07/13	1155	SOIL	3~~4~~	X	X	X	X	X				PLEASE PROVIDE PRELIM RESULTS AS SOON AS POSSIBLE

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	ABHIJIT			
	Printed Name: ABHIJIT JOSHI	Printed Name: Rick Hudson	Printed Name	Printed Name
	Company: GeoEngineers, Inc.	Company: ARI	Company	Company
	Date & Time: 10/08/13 1050	Date & Time: 10/8/13 1050	Date & Time	Date & Time

XIS7:COC

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.

December 3, 2013

Mr. Iain Wingard
GeoEngineers
1101 S. Fawcett Avenue, Suite 200
Tacoma, WA 98402

Re: Data Package Review Report – Analytical Resources, Incorporated Lab No. X187 – Petroleum Hydrocarbons in Soil

Dear Mr. Wingard:

The evaluation of petroleum hydrocarbon analysis data prepared by Analytical Resources, Incorporated (ARI), Tukwila, WA, for one soil sample from the R.G. Haley Site, which was reported in a single data package under Lab ID. X187 has been completed. The following sample was reported:

VANBURENPIT-100713

Analyses were performed according to method "NWTPH-Dx: Semi-Volatile Petroleum Products Method for Soil and Water." The evaluation was based on the specifications in the method and the project-specific Quality Assurance Project Plan (QAPP, February 23, 2012. Professional judgment was applied as necessary and appropriate. Qualifiers consistent with those defined in the National Functional Guidelines were applied as necessary and appropriate.

Based on the evaluation effort, no qualification of data was made. Data summary forms are included as Attachment A to this report. A copy of the chain of custody record is provided in Attachment B.

Specific details regarding the review and evaluation of these data are discussed below:

Holding Times, Preservation, and Sample Integrity: A copy of the applicable chain of custody (COC) record was included in the data package, documenting sample collection date of October 7, 2013. The sample was delivered to the laboratory on October 8, 2013. The temperature of the cooler on receipt at the laboratory was acceptable (0.8 ^{o}C). The sample was extracted and analyzed on October 11, 2013 within the method specified hold times.

Calibration: Summary results for one diesel range (October 4, 2103) and one motor oil range (September 9, 2013) initial calibration (IC) were reported in support of sample analysis. Percent relative standard deviations (%RSDs) were acceptable (< 20%).

Continuing calibration (CC) standards were run at the appropriate frequency. Reported %D were acceptable (<15%).

Blanks: Results for one method blank associated with the site sample analysis was provided by the laboratory. No target analytes were detected above the laboratory specified reporting limits (RLs).

Surrogates: Reported recoveries were acceptable for all samples and quality control analyses.

Laboratory Control Samples (LCS/LCSD): LCS and LCS duplicate (LCSD) recoveries and relative percent differences (RPDs) were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): MS/MSD analysis was not performed on sample VANBURENPIT-100713

Field Duplicate Samples: A field duplicate was not submitted with this sample.

Documentation: No documentation issues were observed during the evaluation effort.

Please feel free to contact me if you have any questions regarding this data package review report.

Sincerely,

Jeri Rossi
Sr. Environmental Chemist

enc.

ATTACHMENT A

DATA SUMMARY FORMS
Laboratory Job No. X187

DATA SUMMARY FORM: Petroleum Hydrocarbons
SOIL SAMPLES
(mg/kg)

Site Name: R.G. Haley

Sampling Date: October 7, 2013

Job No. X187

ddms Project No. 2056-0002

Sample Location		VANBURENPIT-100713							
Lab Sample ID		X187A							
Dilution Factor		1							
RL									
5.0	Diesel Range								
10	Motor Oil Range								

ATTACHMENT B

CHAIN OF CUSTODY RECORD
Laboratory Job No. X187

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XIS7	Turn-around Requested: STD	Page: 1 of 1	
ARI Client Company: GeoEngineers, Inc.	Phone: 206-728-2674	Date: 10/07/13	Ice Present?
Client Contact: ABHIJIT JOSHI / IAIN WINGARD		No. of Coolers:	Cooler Temps:
Client Project Name: R.G. HALEY SITE INTERIM ACTION			
Client Project #: 0356-114-06 T2600	Samplers: ABHIJIT JOSHI		

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

Sample ID	Date	Time	Matrix	No Containers	NWTPH-Dx w/ silica gel cleanup	Dioxin AND Furans BY EPA 1613 Modified	SVOCs BY EPA 8270D	Metals (CSMS)	PCBs by EPA 8082B				Notes/Comments
					Analysis Requested								
VANBURENPIT-100713	10/07/13	1155	SOIL	3~~4~~	X	X	X	X	X				PLEASE PROVIDE PRELIM RESULTS AS SOON AS POSSIBLE

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	ABHIJIT			
	Printed Name: ABHIJIT JOSHI	Printed Name: Rick Hudson	Printed Name	Printed Name
	Company: GeoEngineers, Inc.	Company: ARI	Company	Company
	Date & Time: 10/08/13 1050	Date & Time: 10/8/13 1050	Date & Time	Date & Time

XIS7:COC

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.

December 4, 2013

Mr. Iain Wingard
GeoEngineers
1101 S. Fawcett Avenue, Suite 200
Tacoma, WA 98402

Re: Data Package Review Report – Analytical Resources, Incorporated Lab No. X187 – TOC in Soil

Dear Mr. Wingard:

The evaluation of total organic carbon (TOC) analysis data prepared by Analytical Resources, Incorporated (ARI), Tukwila, WA, for one soil sample from the R.G. Haley Site, which was reported in a single data package under Lab ID. X187 has been completed. The following sample was reported:

VANBURENPIT-100713

Analyses were performed according to ARI Standard Operating Procedure (SOP): "Total Organic carbon is Soil and Sediment. The procedure used by ARI is high temperature combustion with IR detection of evolved carbon dioxide (CO2) using components of procedures specified by Plumb (1981), PSEP (1986, 1993), Lloyd Kahn (1988) and EPA, LG601 (2005). The evaluation was based on the specifications of the laboratory SOP, the project-specific Quality Assurance Project Plan (QAPP, February 23, 2012), the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Inorganic Data Review (October 2004)". Professional judgment was applied as necessary and appropriate. Qualifiers consistent with those defined in the National Functional Guidelines were applied as necessary and appropriate.

Based on the evaluation effort, no qualification of data was made. Data summary forms are included as Attachment A to this report. A copy of the chain of custody record is provided in Attachment B.

Specific details regarding the review and evaluation of these data are discussed below:

Holding Times, Preservation, and Sample Integrity: A copy of the applicable chain of custody (COC) record was included in the data package, documenting a sample collection date of October 7, 2013. The sample was delivered to the laboratory on October 8, 2013. The temperature of the cooler on receipt at the laboratory was acceptable (0.8 ^{o}C). The sample was analyzed on October 16, 2013, within the method specified hold times.

Calibrations: One calibration curve for total organic carbon, incorporating a blank and

four standards, was run. A correlation coefficient of 0.998 was reported. Based on the run logs, initial and continuing calibration standards were run at the appropriate frequencies throughout the analyses series and were acceptable.

Based on the Analysis Run Logs provided for the analysis date, initial and continuing calibration verification (ICV/CCV) standards were run at the appropriate frequencies throughout the reported inductively coupled plasma (ICP) analysis series. All ICV/CCV recoveries documented on the accompanying Initial and Continuing Calibration Verification Reports were acceptable (QC 90-110%).

Blanks: Initial and continuing calibration blanks (ICB/CCBs) were run at the appropriate frequencies throughout the reported sample analysis series. TOC was not detected in the associated blank above the reporting limit (RL).

Matrix Spike/Spike Duplicate (MS/MSD): Matrix spike analysis was performed on VANBURENPIT-100713. The recovery of TOC was within acceptance limits.

Duplicates: A duplicate analysis was performed on VANBURENPIT-100713. Precision between duplicate analyses was acceptable.

Laboratory Control Sample (LCS): The laboratory analyzed a NIST reference sample. TOC %R was within acceptance limits.

Sample Results: The sample was analyzed in quadruplicate, however, the laboratory did not report the initial TOC analysis. The laboratory was contacted regarding the omission and replied that the deletion indicates that the wrong injection was used. No qualification of sample result was made.

Documentation: No documentation issues were observed during the data review effort:

Please feel free to contact me if you have any questions regarding this data package review report.

Sincerely,

Jeri Rossi
Sr. Environmental Chemist

Enclosures

ATTACHMENT A

DATA SUMMARY FORMS
Laboratory Job # X187

DATA SUMMARY FORM: TOTAL ORGANIC CARBON
SOIL SAMPLES
(percent)

Site Name: R.G. Haley

Sampling Date: October 7, 2013

Job No. X187

ddms Project No. 2056-0002

Sample Location		VANBURENPIT-100713							
Lab Sample ID		X187A							
Dilution Factor		1							
RL									
0.020	TOC	0.118							

ATTACHMENT B

CHAIN OF CUSTODY RECORD
Laboratory Job # X187

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XIS7	Turn-around Requested: STD	Page: 1 of 1	
ARI Client Company: GeoEngineers, Inc.	Phone: 206-728-2674	Date: 10/07/13	Ice Present?
Client Contact: ABHIJIT JOSHI / IAIN WINGARD		No. of Coolers:	Cooler Temps:
Client Project Name: R.G. HALEY SITE INTERIM ACTION			
Client Project #: 0356-114-06 T2600	Samplers: ABHIJIT JOSHI		

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

Sample ID	Date	Time	Matrix	No Containers	NWTPH-Dx w/ silica gel cleanup	Dioxin AND Furans BY EPA 1613 Modified	SVOCs BY EPA 8270D	Metals (CSMS)	PCBs by EPA 8082B				Notes/Comments
					Analysis Requested								
VANBURENPIT-100713	10/07/13	1155	SOIL	3~~4~~	X	X	X	X	X				PLEASE PROVIDE PRELIM RESULTS AS SOON AS POSSIBLE

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	ABHIJIT			
	Printed Name: ABHIJIT JOSHI	Printed Name: Rick Hudson	Printed Name	Printed Name
	Company: GeoEngineers, Inc.	Company: ARI	Company	Company
	Date & Time: 10/08/13 1050	Date & Time: 10/8/13 1050	Date & Time	Date & Time

XIS7:COC

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.