

CARTY LAKE CONSTRUCTION COMPLETION REPORT

CARTY LAKE REMEDIAL ACTION
111 W DIVISION STREET
RIDGEFIELD, WASHINGTON



MAUL
FOSTER
ALONGI

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*The material and data in this report were prepared
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ACRONYMS AND ABBREVIATIONS

BMP	best management practice
CAP	cleanup action plan
COE	U.S. Army Corps of Engineers
CQA	construction quality assurance
CSBC	crushed surfacing base course
dioxins	chlorinated dibenzo-p-dioxins and dibenzofurans
Ecology	Washington State Department of Ecology
EDR	engineering design report for Carty Lake
GeoDesign	GeoDesign, Inc.
GPS	global positioning system
IDP	Inadvertent Discovery Plan
LRIS	Lake River Industrial Site
MFA	Maul Foster & Alongi, Inc.
MGS	Minister-Glaeser Surveying, Inc.
MHA	materials-handling area
MTCA	Model Toxics Control Act
ng/kg	nanograms per kilogram
NGVD	National Geodetic Vertical Datum of 1929/1947
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit(s)
OHWM	ordinary high-water mark
PBI	Paul Brothers, Inc.
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
Port	Port of Ridgefield
PWT	Pacific Wood Treating Co.
REL	remediation level
RI/FS	remedial investigation and feasibility study
Storedahl	J.L. Storedahl & Sons
Strider	Strider Construction Company, Inc.
TRM	turf reinforcement mat
ug/kg	micrograms per kilogram
ug/L	micrograms per liter
USFWS	U.S. Fish and Wildlife Service
WillametteCRA	Willamette Cultural Resources Associates, Ltd.
WSDOT	Washington State Department of Transportation

1 INTRODUCTION

Maul Foster & Alongi, Inc. (MFA) has prepared this report on behalf of the Port of Ridgefield (Port) describing the completion of remedial actions at Carty Lake adjacent to the former Pacific Wood Treating Co. (PWT) site in Ridgefield, Washington (see Figure 1-1). This document has been prepared under the authority of Consent Decree No. 13-2-03830-1 (Washington State Department of Ecology [Ecology], 2013b) between the Port and Ecology to satisfy the requirements of the Model Toxics Control Act (MTCA) and sediment management standards.

This report fulfills Ecology's requirement for a cleanup action report detailing cleanup activities and documenting adherence to or variance from goals set out in the cleanup action plan (CAP) (Ecology, 2013a). The requirement for a cleanup action report is specified in the CAP, and additional details regarding completion reporting are included in the Ecology-approved engineering design report for Carty Lake (EDR) (MFA, 2014a).

The goals set out in the CAP for the Carty Lake Remedial Action are described in detail in Section 1.2, and generally consist of the excavation and disposal of contaminated sediments from Carty Lake and placement of a clean layer of sand to stabilize disturbed sediments and manage potentially-contaminated residuals generated by the excavation process. The project included the planting of vegetation to restore areas disturbed by construction. The work was completed under two separate construction contracts. Strider Construction Company, Inc. (Strider) of Bellingham, Washington, performed the earthwork-related remedial action tasks, including sediment excavation and disposal; placement of clean sand; and construction of the bulkhead-stabilization embankments. Paul Brothers, Inc. (PBI) of Boring, Oregon, performed the landscaping portion of the work, including the restoration and planting of the disturbed area. Construction quality assurance (CQA) was provided by MFA. The remedial action is complete and was performed in full accordance with the requirements of the CAP (Ecology, 2013a) and the EDR (MFA, 2014a).

1.1 Site Location and History

Carty Lake is a 52-acre, ponded wetland in the Ridgefield National Wildlife Refuge Carty Unit "lowlands" immediately north and west of the approximately 40-acre Lake River Industrial Site (LRIS). The Carty Unit is bordered by Lake River to the west; privately owned farmland and natural areas to the north; Burlington Northern-Santa Fe railroad tracks and the north pole yard of the former PWT facility to the east; and the Port's property to the south. Additional information regarding the hydraulic, hydrologic, and ecological settings of Carty Lake is included in the EDR (MFA, 2014a).

PWT operated a wood-treating facility at the LRIS from 1964 to 1993. PWT filed for bankruptcy in 1993 and abandoned the LRIS. PWT's operations involved pressure-treating wood products with oil-based treatment solutions containing creosote and pentachlorophenol (PCP), and water-based mixtures of copper, chromium, arsenic, and/or zinc. A prior remedial action was completed by the Port on the uplands portion of the property, consistent with the remedy selected in the CAP.

Upland pathways and sources of contamination to Carty Lake have been removed and an upland soil cap has been installed.

1.2 Project Purpose and Scope

On September 24, 2001, the Port entered into an agreement with Ecology to conduct a remedial investigation and feasibility study (RI/FS) at the site. The RI/FS was finalized in July 2013 (MFA, 2013). The remedial action was selected by Ecology in accordance with MTCA, Washington Administrative Code 173-340-380. The remedy selected by Ecology, and documented in the CAP, is based on the findings of the final RI/FS report.

The purpose of this remedial action was to address the presence of chlorinated dibenzo-p-dioxins and dibenzofurans (dioxins), the identified indicator hazardous substance, above remediation levels (RELs) in sediments in the southern portion of Carty Lake. The RELs were established at levels protective of ecological receptors, as described in the CAP.

The remedial action identified in the CAP and implemented at Carty Lake included:

- Removal and disposal of sediment with concentrations of dioxins above RELs and other contaminants exceeding screening levels (i.e., PCP, arsenic, and chromium)
- Management of low-level residual concentrations of dioxins through the placement of a clean sand layer
- Functional replacement of the existing bulkhead on the southern end of Carty Lake, through construction of an earthen embankment against the bulkhead
- Repair and rehabilitation of the wetland impacted by access, staging, and/or excavation (i.e., planting of native wetland, transitional, and upland plant communities)

In addition to the above actions, the contract contained ancillary components, including:

- Construction of the materials-handling area (MHA) in Cell 3 of the LRIS, which was not used during the Carty Lake contract but was utilized for the subsequent Lake River Remedial Action performed in 2014 and 2015
- Construction of access improvements and erosion and sediment controls, including a dewatering and water treatment system, necessary to implement the remedial action.

1.3 Permits, Review, and Substantive Requirements for Sediment Remedial Action

Detailed information on the approvals, reviews, and permits obtained before work began is available in the EDR. A brief list of the required agency approvals and permits is provided below:

- Demonstration of substantive compliance with the Clean Water Act Section 401 Water Quality Certification—Ecology

- Nationwide Permit 38—U.S. Army Corps of Engineers (COE)
- National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit—Ecology
- Clean Water Act Section 404 permit and Section 10 of the Rivers and Harbors Act of 1899—COE
- National Environmental Policy Act—U.S. Fish and Wildlife Service (USFWS)
- Endangered Species Act—USFWS
- Demonstration of compliance with Section 106 of the National Historic Preservation Act—USFWS
- Special Use Permit—USFWS
- Demonstration of substantive compliance with the requirements of the Hydraulic Project Approval process—Washington State Department of Fish and Wildlife
- Demonstration of substantive compliance with City of Ridgefield code
- State Environmental Policy Act—Ecology

Mitigation bank credits were purchased prior to construction, as required by the COE permit. Documentation of this purchase is provided in Appendix A.

1.4 Completion Report Objectives

This report is being submitted to provide a description of the work completed, summarize the CQA program implemented to ensure that the project was constructed in compliance with the approved design and describe any issues that arose and the subsequent resolutions and changes to the design. The following information is also included as appendices:

- Documentation of purchase of mitigation bank credits (Appendix A)
- Sample daily reports and CQA forms used during construction to document progress and carry out the project-specific CQA program (Appendix B)
- Construction progress photograph array (Appendix C)
- Data validation memorandum for analytical results for import materials used as fill (Appendix D)
- Laboratory reports and chain-of-custody documentation for import materials used as fill (Appendix E) and treated water discharged to Carty Lake (Appendix F)

- Geotechnical compaction reports verifying that structural fill was compacted in accordance with the specifications (Appendix G)
- Archaeological monitoring technical memorandum and documentation of curation of collected artifacts (Appendix H)
- Ecology approval of imported fill material (Appendix I)

2 PROJECT TEAM AND ORGANIZATION

2.1 Project Team

The construction project team consisted of the following members:

- Owner—Port. Ms. Laurie Olin served as the Port’s project manager.
- Engineer and Construction Oversight—MFA. Responsible for project design and overall project conformance to the approved design. Mr. Joshua Elliott, PE, served as MFA’s design lead and construction project manager, and Mr. Michael Reiter, EIT, served as MFA’s CQA officer.
- Geotechnical Construction Oversight—GeoDesign, Inc. (GeoDesign). Responsible for CQA of fill compaction. Mr. Nick Paveglio, PE, served as GeoDesign’s project manager and lead inspector.
- Earthwork Contractor—Strider. Responsible for construction project management and the earthwork-related portions of the work. Mr. Nathan Cutler, PE, served as construction project manager, and Mr. Steve McCauley served as lead construction superintendent.
- Landscape Contractor—PBI. Responsible for construction project management and the landscaping-related portions of the work. Mr. Scott Paul served as construction project manager and Mr. Bill Kitchens served as lead construction superintendent.
- Subcontractors—R Transport (transport and disposal of sediment) and Rain-for-Rent (water treatment system).
- Surveying—Minister-Glaeser Surveying, Inc. (MGS) and San Poil Surveying.
- Archaeological Monitoring for Cultural Resources—Willamette Cultural Resources Associates, LTD (WillametteCRA).

2.2 Project Schedule

On June 10, 2014, The Port solicited bids from qualified contractors to complete the earthwork component of the work, and the contract was awarded to Strider in July. Strider began mobilizing

construction equipment to the site and broke ground on August 11, 2014. Construction of the earthwork components of the work was completed in October 2014.

Bid solicitation for the landscaping component of the work began on July 10, 2014, and the contract was awarded to PBI in August. PBI mobilized to the site in September 2014, and completed landscape planting in September 2015.

3 CONSTRUCTION QUALITY ASSURANCE

A robust, project-specific CQA program was implemented during construction to verify that the work was constructed to the performance standards detailed in the construction drawings and described in the technical specifications, which, in turn, fulfill the requirements of the remedial action prescribed by the CAP. The scope of the CQA program and individual CQA procedures are described in detail in the project's construction quality assurance plan (MFA, 2014b). Primary components of the CQA program are summarized below.

3.1 Construction Submittals

Technical submittals were provided by the contractor (Strider or PBI) before and during construction, consistent with the project specifications. Submittals were received and reviewed by the engineer (MFA) for conformance with the technical specifications and/or construction details.

An approval-for-use determination was returned to the contractor for submittals not requiring corrective action. Submittals that were not in compliance with the specifications were notated regarding deficiencies and returned for revision and resubmittal by the contractor. Submittal documents are kept on file by the engineer.

3.2 Construction Meetings

Weekly coordination meetings were held on site; attendees included the contractor, the engineer, and the owner (the Port). The meetings were held to discuss the schedule, outstanding issues, and other topics raised by attendees.

3.3 Construction Daily Reports and Construction Quality Assurance Forms

Construction activity reports and CQA forms for individual work components were completed daily by the engineer during the earthwork components of the work. Reports were made to note site conditions, contractor activities, construction issues, and construction progress. The CQA forms were completed daily in conjunction with CQA tasks (e.g., measuring depths of material with a handheld tape, visually verifying proper handling of contaminated sediment, verifying slopes and grades with a handheld electronic level) for distinct components of the work (e.g., sediment

excavation, clean sand placement) to verify that the work was performed in accordance with the plans and specifications. Each daily report includes two photographs of the day's construction activities.

The construction daily reports and CQA forms are kept on file by the engineer. Examples of construction daily reports and CQA forms are provided in Appendix B. An array of photographs documenting construction progress is provided in Appendix C. A description of CQA tasks for each component of the work is provided in Section 4.

3.4 Geotechnical Testing and Oversight

GeoDesign, Inc., provided CQA of fill compaction for the project. The following fill compaction testing was performed:

- Compaction testing of common borrow and crushed surfacing base course (CSBC) for construction of the permanent access road.
- Compaction testing of CSBC and common borrow for the stabilization embankments.
- Compaction testing of CSBC for the Cell 2 hard trail.

Compaction testing results and observations are provided in Appendix G.

3.5 Archaeological Monitoring for Cultural Resources

Archaeological monitoring was provided by Willamette CRA. An archaeological monitor was present to observe all clearing and grubbing and sediment excavation. An archaeological monitoring technical memorandum and documentation of curation of collected artifacts is provided in Appendix H.

3.6 Water Quality Monitoring

The CQA officer conducted visual turbidity monitoring and daily sampling of the treated water discharge for turbidity in accordance with the project water quality plan (Chapter 5 of the EDR). The following monitoring tasks were performed:

- Visual monitoring at the temporary isolation barrier every four hours to identify any visible turbidity emanating from the work area and entering the main body of Carty Lake.
- Daily sampling of the treated water discharge for turbidity (maximum 25 nephelometric turbidity units [NTU] allowable) and pH (between 6.5 and 8.5).
- Initial sampling of two batches of discharge from the water treatment system before allowing discharge back into Carty Lake.

The two batch samples of treated water were collected by the CQA officer and analyzed for benzo(a)pyrene (maximum 1 microgram per liter [ug/L] allowable) and PCP (maximum 13 ug/L allowable) by Specialty Analytical Laboratories. Results were reviewed by MFA and Ecology and found to be in compliance with the water quality plan and the specifications (Ecology, 2014a,b). Analytical results for these two batches are provided in Table 4-1; laboratory reports and chain-of-custody documentation are provided in Appendix F.

3.7 Import Material Analytical Testing

In accordance with the project specifications, sand and topsoil were sampled and analyzed for chemical constituents prior to the import of material to the site. Samples were collected by the CQA officer; analyses were performed by Specialty Analytical Laboratories and Pace Analytical Services, Inc. MFA reviewed the results for conformance with the specifications; analytical results for imported sand and soil are presented in Tables 3-1 and 3-2, respectively. A data validation memorandum is provided in Appendix D; laboratory reports and chain-of custody documentation are provided in Appendix E. Analytical results for both clean sand and topsoil indicated minor exceedances of certain values set forth in the project specifications. These exceedances are discussed in additional detail in Section 6.2. Ecology approved both materials for use (see Appendix I).

4 REMEDIAL ACTION SUMMARY

4.1 Access Improvements and Staging Areas

Initial mobilization of equipment began in July 2014 and consisted of the delivery of several large pieces of earthmoving equipment, a portable office trailer, and raw materials to the site. The first component of work completed was the construction of the MHA. During the week of August 10, 2014, Strider began excavating the existing cap in the northern portion of Cell 3 of the LRIS and stockpiling it on an impermeable liner in the cell's southern portion. Strider used excavators to remove the clean soil cap to the elevation of the demarcation fabric; excavated clean soil cap material was placed in off-road haul trucks and brought to the temporary stockpile location. The excavated clean soil cap material was placed on an impermeable liner and was shaped to approximately the finished grade contours shown on the plans.

Demarcation fabric exposed by the excavation was cut away from the edges of the excavation and was loaded into on-road haul trucks for transport and disposal at the Cowlitz County Headquarters Landfill in Castle Rock, Washington. This landfill was the destination for all waste leaving the site, including the sediment excavated from Carty Lake. During removal and stockpiling of the existing cap, the CQA officer visually verified that the existing cap was removed to the horizontal extents shown on the plans and to the elevation of the existing demarcation fabric, that the existing demarcation fabric was completely cut away and disposed of in accordance with the specifications, and that material from below the demarcation fabric was completely separated from material above the demarcation fabric.

The subgrade below the demarcation fabric was regraded in accordance with the plans to provide a relatively level base for the placement of ballast rock. After subgrade elevations at the MHA were achieved, MGS conducted a survey and submitted it to MFA for review and approval. MFA verified that the intention of the grading scheme was achieved and that positive drainage was established. Ballast material was sourced from the J.L. Storedahl & Sons (Storedahl) Livingston Quarry north of Camas, Washington. Strider placed and compacted ballast to a 6-inch-minimum depth throughout the MHA. CSBC was sourced from the Storedahl Mountain Top Quarry in Yacolt, Washington. CSBC was placed and compacted to a 2-inch-minimum depth over the previously-placed ballast. The CQA officer verified that the ballast and CSBC material were placed to the minimum required depth and compacted until firm and unyielding.

A portion of the MHA (the northeast corner) was left at a “reduced section” (2 inches below design grade) until the excavation of sediment was complete, so that Strider would have a “working surface” to amend sediment, if necessary, without contaminating the finished surface. Sediment amendment was not required, and this area of reduced section was completed on September 29, 2014, resulting in substantial completion of the MHA.

Concurrent with the construction of the MHA, the permanent refuge access road was constructed west of Carty Lake. This area was first cleared and grubbed and then filter fabric was placed under the road footprint. Sand was imported from the Storedahl Owl Creek Pit in Kelso, Washington (the source for all common borrow material on the project) and was placed and compacted in two 18-inch lifts to bring the road up to subgrade elevations. CSBC was imported, placed, and compacted on the previously placed sand to a minimum depth of 8 inches. The MFA CQA officer verified that materials were placed to the minimum required depths. The CQA officer used a handheld electronic level to verify general conformance with the finished grades shown on the plans.

After construction of the permanent refuge access road, ballast was imported and placed on filter fabric directly on existing grade to construct the temporary access road to Carty Lake and the temporary equipment staging area to the west of Carty Lake. The CQA officer verified that the fabric was placed with an adequate overlap and that the ballast was placed to the minimum 6-inch required depth.

4.2 Erosion- and Sediment-Control Best Management Practices

Concurrent with the construction of the MHA and access improvements, Strider installed erosion- and sediment-control best management practices (BMPs) as required by the plans and the project NPDES permit. Silt fence was installed around the MHA, the temporary access road and equipment staging area, and downslope of the northern portion of the eastern embankment footprint. Catch basin inserts and straw wattles were installed throughout the LRIS. Stabilized construction entrances and wheel washes were installed, with minor modifications that are described in Section 5.5. An impermeable cover (10 mil low-density polyethylene sheeting) was installed over the clean soil cap stockpile in Cell 3. The cover was secured with sandbags and rope, but was repeatedly disrupted by the wind. Strider added more sandbags and rope as necessary to secure the cover as directed by MFA or the Port.

Strider constructed the temporary isolation barrier in accordance with the plans, and prior to excavation within the wetland, using bulk bags instead of smaller sand bags. A low-density polyethylene sheeting was incorporated in the cross section of the temporary isolation barrier to reduce infiltration through the barrier. The water elevation in Carty Lake was approximately 9 feet NGVD at the time of the temporary isolation barrier installation. The sediment within the delineated area of excavation was saturated; however, standing water was not present at significant depths.

4.3 Dewatering and Water Treatment

Dewatering and water treatment efforts began immediately after the installation of the temporary isolation barrier and continued throughout construction. Rain-for-Rent, as a subcontractor to Strider, provided water treatment equipment for the project. The treatment system consisted of three 21,000-gallon storage tanks, rapid sand filter pods, bag filters, and granular activated carbon filters. The treatment equipment was delivered to the temporary equipment staging area west of Carty Lake on September 2 and 3, 2014. Strider excavated two sumps south of the temporary isolation barrier; installed perforated, corrugated polyethylene pipe vertically in the sumps; and backfilled the areas with washed rock. Submersible pumps were installed in the sumps and plumbed to the water treatment system via 2-inch-diameter polyvinyl chloride pipe. Following Ecology approval of the two batch samples, Strider began discharging treated water back into Carty Lake north of the temporary isolation barrier.

As sediment excavation progressed, additional pumps were deployed to low areas and plumbed to the water treatment system to dewater the excavation area. Approximately 250,000 gallons of water were treated during construction. Turbidity and pH were analyzed daily by the CQA officer with handheld pH and turbidity meters. One turbidity exceedance was noted during construction. Additional detail regarding this exceedance is provided in Section 6.1. The CQA officer checked for visual turbidity leaving the work area at the temporary isolation barrier multiple times per day (as recorded on the daily reports); no turbid plumes emanating from the work area were observed during construction.

4.4 Sediment Excavation

Sediment excavation began on September 3, 2014, and continued through September 26, 2014. An archaeological monitor was on site to observe all excavation activities in the remedy area. The work was completed by an excavator with a full-time grade checker using a global positioning system (GPS) rover to check grade instantaneously as excavation progressed. Excavation began at the north end of the remedy area, approximately 20 feet south of the temporary isolation barrier, and proceeded to the south toward the bulkhead. Sediment was loaded into a tracked carrier by the excavator and hauled south, where it was stockpiled adjacent to the bulkhead for subsequent transport and disposal.

The stockpile of sediment at the bulkhead awaiting transport and disposal took up a significant area during sediment-excavation activities. On several occasions, excavation activities were temporarily stopped until transport and disposal activities removed enough sediment such that the stockpile

could be pulled back to expose more area to be excavated. In this way, excavation activities and transport and disposal activities took place concurrently until they were both completed.

On each day of sediment excavation, the CQA officer continuously observed activities and verified that contaminated sediment was not tracked onto finished neat line surfaces. The CQA officer also verified that the finished subgrade surface was excavated in general conformance with the lines and grades shown on the plans by periodically observing Strider's GPS rover. MGS performed periodic surveys of the sediment-excavation area as the work was completed. MFA reviewed all survey submittals for conformance with the design. In a few isolated cases, MFA directed Strider to return to certain areas and excavate further until design elevations were achieved. Through both field observation and the review of surveys submitted by Strider, MFA verified that all sediment was excavated as required by the plans and specifications.

4.5 Sediment Transport and Disposal

As excavated sediment was stockpiled in the remedy area, an excavator reached down from atop the bulkhead and loaded "truck and pup" haul trucks with sediment for disposal. The trucks (operated by R Transport as a subcontractor to Strider), hauled the material directly to the Cowlitz County Headquarters Landfill in Castle Rock, Washington (a subtitle D landfill facility) for disposal as a nonhazardous material. Since the landfill did not have operating scales during construction, all trucks leaving the site went through a private third-party scale before dumping their loads at the landfill. R Transport generally used the scales at Lakeside Industries in Longview, Washington, for this purpose. All trucks were loaded on top of the bulkhead over an impermeable low-density polyethylene liner and/or steel plates to prevent contaminated sediment from coming into contact with the clean cap in Cell 2 of the LRIS. To prevent tracking of sediments, trucks also passed over a steel rumble strip and through a stabilized construction entrance before leaving the area. In addition, bed liners were used with all loads to prevent dripping of any free liquid during transport and facilitate simple decontamination.

During these activities, the CQA officer verified that all trucks were lined with plastic bed liners, loaded over an impermeable liner, and then covered prior to leaving the site. The CQA officer verified that no sediment was tracked off site and collected all disposal tickets to verify that the material was transported to the landfill and disposed of in accordance with the specifications. Sediment disposal and transport were completed on September 26, 2014.

4.5.1 Weight and Extents of Material Disposed

By completion of construction, 8,891 tons of material (consisting of excavated sediment and strippings from the remedy area) was hauled off site and disposed of as nonhazardous waste at the Cowlitz County Headquarters Landfill in Castle Rock, Washington. Shipping documents (consisting of truck scale tickets) are kept on file by the engineer. The extent of sediment excavated from the remedy area is shown on Drawing C0.0.

4.6 Placement of Clean Sand

Placement of clean sand in the remedy area proceeded in stages following the confirmation of sediment excavation to the required depths in individual areas. On September 24, 2014, Strider began placing sand in an area already excavated, below the western end of the southern embankment. Sand was dropped from the bulkhead by a loader and was pushed out into the remedy area by a dozer. The material was fine-graded by an excavator with a full-time grade checker using a GPS rover to instantaneously check grades against the design. Dewatering efforts were ongoing during clean sand placement activities. Some excavated grades were below the existing water level in Carty Lake, so pools of water developed in the remedy area after sediment excavation was completed. Strider was able to successfully dewater these pools to allow placement of clean sand.

Clean sand was placed in an 8-inch base lift, with a final 4-inch lift of amended topsoil placed afterwards. The topsoil was amended with sand in Cell 2 by Strider before placement in the remedy area. Approximately 3,150 tons of sand and topsoil was placed into the remedy area to construct the clean sand layer.

During the placement of clean sand, the CQA officer verified that the sand was placed to the minimum 12-inch required thickness and in accordance with the extents, lines, and grades shown on the plans. MGS performed a survey of the final sand surface and MFA digitally compared the grades to the survey of the excavated surface to verify that the material was placed in accordance with the design. Placement of clean sand was substantially completed on October 6, 2014.

4.7 Bulkhead Stabilization Embankments

The bulkhead stabilization embankments were constructed both concurrent with and after sediment excavation and clean sand placement activities. Clearing and grubbing of the east and south slopes, and demolition of existing pilings, began on August 28, 2014. The embankment keyway was then excavated where the keyway did not overlap with the temporary sediment stockpile below the bulkhead. Filter fabric was placed on the cleared subgrade, and fill material was placed and compacted to bring the embankment up to subgrade elevations.

As Strider had selected Cowlitz River dredge sand to satisfy the specification requirements for structural fill, GeoDesign recommended that CSBC be used as structural fill below elevation 12 National Geodetic Vertical Datum of 1929/1947 (NGVD) (the ordinary high-water mark [OHWM]) and that sand could be used above elevation 12 NGVD. Additional detail regarding this change is provided in Section 5.1. CSBC or sand (as applicable) was placed and compacted on the east embankment each day until the slope was at grade and ready for topsoil placement. Following excavation of the keyway for the southern embankment and the hauling of all contaminated sediment from the site, filter fabric was placed on the cleared subgrade and the south embankment was brought up to grade with structural fill. Fish mix rock, imported from the Storedahl Daybreak Quarry in Battleground, Washington, was placed at the toe of the slope as shown on the plans. The fish mix placement was completed and the slope was ready for topsoil placement on October 8, 2014. Topsoil was placed on both embankments from September 30, 2014, until October 10, 2014; topsoil material was supplied by City Bark & Recycling of Vancouver, Washington. The final topsoil

surface was track-walked by a dozer prior to the installation of turf reinforcement mat (TRM) and hydroseeding by PBI.

The CQA officer verified that filter fabric was placed with the minimum allowable overlap and that all fill (including sand, CSBC, fish mix, and topsoil) was placed in general accordance with the extents, lines, and grades shown on the plans to the minimum required thicknesses on a properly prepared subgrade.

4.8 Cell 2 Hard Trail Construction

During the final weeks of construction (in late September and early October, 2014), the Cell 2 Hard Trail was shaped to design subgrade elevations and a 6-inch lift of CSBC was placed and compacted in accordance with the plans and specifications. The paving portion of the work was eliminated from the contract because of wet weather conditions, so the final surface was not paved. This change is described in additional detail in Section 5.7. The CQA officer verified that the crushed surfacing was placed to the minimum required depth and in conformance with the extents, sections, and grades shown on the plans. This trail was paved under a separate contract on July 10, 2015 by Halme Excavating Inc.

4.9 Landscaping and Site Restoration

As Strider completed their portion of the work and demobilized from the site in mid-October, PBI began mobilizing their materials and equipment to the site to complete the site restoration and all associated plantings. Both contractors were on site for several weeks in October 2014. As Strider completed the placement of topsoil on the embankments, PBI followed close behind with the installation of TRM. The TRM installation was completed in early October, and all slopes and adjacent upland areas were hydroseeded with the specified mulch and seed mix on October 13, 2014.

Installation of the submergent, emergent, and marginal vegetation, as well as the live stakes in the fish mix rock, began in mid-November 2014 and continued through the first week of December 2014. PBI coordinated with the wetland plant supplier to obtain larger plants than specified and applied additional seed in an attempt to improve the initial establishment success of the plantings. The wildlife management fencing; cross-pattern, in-water string lines; and Mylar® strips were installed following the planting effort to protect the newly placed vegetation from grazing.

Planting operations resumed in late January 2015 when PBI dug trenches for the irrigation mainline and valve boxes. In early February, PBI began planting woody vegetation on the upland areas of the southern and eastern embankments; however, planting was delayed in the scrub-shrub transitional areas because of high water in Carty Lake. Shortly after planting, the aboveground, temporary irrigation system was completed and tested to confirm head-to-head coverage; this system provided water to vegetation during summer 2015. Construction of the smooth-wire perimeter fencing and vehicular access gates began in mid-February and continued through mid-March.

When water levels dropped to a manageable level for planting in April and May 2015, PBI proceeded with installing the remaining woody vegetation in the lower transitional areas; this

completed the shrub- and tree-planting efforts. PBI maintained the planted areas during the summer months, which included irrigation, removing invasive plants, removing plant collars as the plants grew beyond the confines of these protective barriers, and making irrigation system adjustments and repairs as needed.

PBI removed the temporary isolation barrier in early September 2015; at this time, the water elevation in Carty Lake was approximately 9 feet NGVD, well below the base of the barrier. The in-water perimeter fencing and cross-pattern, in-water string lines and stakes were also removed, as the vegetation had grown large enough to sustain itself. The temporary gravel access road to Carty Lake was removed in mid-September, followed by the reseeding of all disturbed areas with the appropriate seed mixes. PBI will maintain all planted areas over the course of the next two years (through September 2017) in order to meet the required performance standards identified in the contract documents.

5 CHANGES FROM DESIGN

5.1 Structural Fill Substitution

The structural fill specified for use in the stabilization embankment was required to conform to the Washington State Department of Transportation (WSDOT) material requirements for common borrow. Strider proposed using Cowlitz River dredge sand from the Storedahl Owl Creek Pit in Kelso, Washington, as structural fill. While, technically, the sand did comply with the WSDOT material requirements for common borrow, MFA and GeoDesign had concerns regarding its use in areas of the embankment that would be frequently saturated, i.e., below the OHWM. GeoDesign recommended that the Port substitute CSBC for structural fill in the stabilization embankment below the OHWM. Strider constructed the embankment according to this recommendation, and the Port made payment on the additional CSBC as necessary.

5.2 Elimination of Monitoring Well Adjustments

The plans call for the adjustment of monitoring wells in the remedy area to finished grade elevations. In order to ensure that the well monuments remained above the water level in Carty Lake, the wells were left as-is. The sediment in the immediate vicinity of the well casings was hand-dug by Strider for disposal, to prevent damage to the wells. The Port received a credit for this change.

5.3 Elimination of Sediment Amendment

The contract included a bid item for sediment amendment to facilitate drying prior to transport and disposal, which was not required during the project. The sediment was found to contain no free liquid and was sufficiently dry to dispose of as-is. As a result, no sediment was transported to the MHA and no amendment was used. The Port received a credit for this change.

5.4 Elimination of Jersey Barriers

The plans call for perimeter jersey barriers around the MHA during the Carty Lake portion of the work, but this was eliminated from the contract during construction. MFA determined that the silt fence and perimeter grading created a barrier sufficient to prevent the public from entering the area prior to transfer of the area to the Lake River sediment remediation project contractor. The Port received a credit for this change.

5.5 Modifications to Erosion- and Sediment-Control Best Management Practices

During construction, the following changes were made to the erosion- and sediment-control BMPs called for in the plans and specifications:

- The asphalt wheel wash in the MHA was eliminated from the contract. Strider did not intend to transport any sediment into the area and, once MFA verified that sediment would not require transport to the area, the wheel wash was formally deleted from the contract. The Port received a credit for this change.
- The closed-loop, aboveground wheel wash adjacent to the remedy area was mobilized to the site, but was not made functional. Strider elected to leave the wheel wash partially constructed, with the understanding that MFA could require them to use the wheel wash at any time. Tracking of sediment was not observed during the work, so the wheel wash was never made fully functional. At the end of the project, a portion of the cost for the wheel wash was refunded to the Port.
- With MFA's approval, the stabilized construction entrance in the northeast corner of the MHA was eliminated from the contract. During the work, a separate construction project (phase II of the Port's rail overpass project) was under way on Mill Street, preventing traffic from travelling into or out of the LRIS via Mill Street. Furthermore, the Lake River sediment remediation project contractor did not intend to use Mill Street as a trucking route. The Port received a credit for this change.

5.6 Additional Clearing and Grubbing

It became apparent during construction that, although the landscape contract called for plantings in the area northwest of the excavation prism, the earthwork contract did not call for the area to be cleared and grubbed. MFA requested that Strider provide a proposal (which the Port accepted) to perform the additional clearing and grubbing. The work was performed under observation of an archaeological monitor from WillametteCRA. The strippings were disposed of with the excavated sediment. The Port made payment for the additional material disposal by the ton at the unit cost for sediment transport and disposal and paid for the additional labor on a time-and-materials basis.

5.7 Temporary Staging Area Left in Place

The contract called for the temporary access road to Carty Lake and the adjacent temporary staging area to be removed following planting installation in Carty Lake and removal of the temporary isolation barrier. USFWS requested that the temporary staging area and a portion of the temporary access road be left in place. These items were left in place as requested.

5.8 Elimination of Paving

The contract called for the surfacing of the Cell 2 Hard Trail with hot-mix asphalt pavement, but this component of the work was eliminated from the contract due to a late schedule and inclement weather conditions. The trail was not prepared for paving until mid-October when the saturated condition of the subgrade threatened the quality of the final, paved product. Paving was formally deleted from the contract with Strider and the Port received a credit for the change. As described in Section 4.8, this portion of the trail was paved under a separate contract on July 10, 2015 by Halme Excavating Inc.

5.9 Landscaping Buffer Expansion & Wood Preservative

Additional effort was required to strip areas of reed canary grass and Himalayan blackberry growing along the western edge of the in-water areas and to reseed these areas with native grasses to encourage successful establishment of a vegetative buffer to keep the invasive vegetation at bay. MFA also identified a non-toxic natural wood preservative for the smooth-wire perimeter fencing wood posts. These work items were combined in a single change order that was executed by PBI in late October 2014.

5.10 Additional Landscaping Effort

Additional work was required to complete the installation of the smooth-wire fencing. This included the construction of two pedestrian gates to allow access to the embankments for maintenance as well as supplementary clearing of invasive species within close proximity of the fence line. As the understory of invasive vegetation was removed, a section of the southern embankment west of the previously placed TRM was exposed and required stabilization. This effort involved a small amount of grading to smooth out the toe of the slope, the placement of jute matting, and hand-seeding of the area with an approved native seed mix. This work was captured in the second landscape change order, along with additional work that was coordinated with the Lake River sediment remedy landscape project in early June.

6 ISSUES ENCOUNTERED AND RESOLUTIONS

6.1 Water Quality

On September 25, 2014, there was a brief-duration exceedance of the treated-water discharge turbidity criteria. At approximately 10:00 a.m., the turbidity measured 145.7 NTU. The discharge to Carty Lake was immediately stopped and contained within a tank. The system began recirculating water through the treatment system, and MFA continued to monitor turbidity throughout the day. Potential causes of the turbidity exceedance include:

- Pumps operating above intended flowrates, pushing water through the filters too quickly
- Algae growth in Carty Lake

Rain-for-Rent came on site on several occasions over the next several days to try to decrease turbidity. Rain-for-Rent replaced several bag filter cartridges and a pump. Strider continued to recirculate water until September 30, 2014, when Ecology granted Strider permission to land-apply the treated water in the field to the west of Carty Lake (Ecology, 2014c). Strider promptly constructed a riprap splash pad in the field to the west of Carty Lake and began discharging. All treated water was land-applied for the remainder of the project and allowed to infiltrate. No additional treated water was discharged to Carty Lake. As the treated water was no longer being discharged to surface water, MFA ceased daily sampling for turbidity and pH for the rest of the project.

6.2 Clean Sand and Topsoil Analytical Results

The material used as the sand layer in the remedy area (Cowlitz River dredge sand from the Storedahl Owl Creek Pit in Kelso, Washington) was sampled and analyzed in accordance with the contract before being brought to the site. The results of one sample indicated polychlorinated biphenyls (PCBs) above the screening criteria described in the specifications—45 micrograms per kilogram (ug/kg) versus 5 ug/kg (see Table 3-1). This PCB detection appeared to be anomalous, so MFA directed the laboratory to re-extract and reanalyze the sample. The follow-up analysis showed no detection of PCBs. On September 18, 2014, Ecology provided written approval for use of the sand for construction (see Appendix I).

In addition, the analytical sampling performed on the proposed topsoil material indicated dioxin toxicity equivalence of 6.59 nanograms per kilogram (ng/kg), which is above the cleanup level of 5 ng/kg (see Table 3-2). MFA conducted an evaluation of potential risk to human health and the environment related to exposure to dioxins in the topsoil. MFA found that there were no anticipated adverse impacts to aquatic ecological receptors, upland ecological receptors, or human health. On September 25, 2014, Ecology issued written approval to proceed with use of the topsoil for construction (see Appendix I).

6.3 Cultural Resource Discoveries

Archaeological monitoring was performed by a qualified archaeologist during all excavation activities in the remedy area, in accordance with the project Inadvertent Discovery Plan (IDP) (WillametteCRA, 2014). Cultural artifacts were discovered during the course of the work, but did not negatively impact construction progress. Discovered artifacts include pieces of ceramic, a horseshoe, an insulator from a historical utility pole, and fire-cracked rocks. Upon discovery of artifacts, all appropriate agencies were contacted by the archaeological monitor, in accordance with the IDP. A memorandum prepared by WillametteCRA, documenting the archaeological monitoring effort, recovered artifacts, and notifications made, is provided in Appendix H. At the end of the project, all artifacts were curated at the Burke Museum in Seattle, Washington. A record of transmittal to the museum is also included in Appendix H.

7 FINAL INSPECTIONS

A final site walk with Strider took place on October 29, 2014. Attending the inspection were Mr. Nathan Cutler of Strider and Mr. Joshua Elliott, PE, of MFA. Mr. Elliott gave verbal notice of substantial completion of Strider's contract at the conclusion of the final site inspection.

A final site walk with PBI took place on October 01, 2015. Attending the inspection were Mr. Scott Paul of PBI and Mr. Curtis Riley, RLA, of MFA. Mr. Riley gave verbal notice of substantial completion of PBI's contract at the conclusion of the final site inspection; this does not include PBI's ongoing maintenance requirements as part of the contract.

8 CERTIFICATION STATEMENT

The construction oversight and project engineering services described in this report were performed by the engineer on behalf of the Port for the Carty Lake Remedial Action. Based on the observations made during construction, geotechnical testing results, and final product constructed on the site, it is the opinion of the engineer that the Carty Lake Remedial Action has been constructed in substantial compliance with the plans, specifications, and related documents.

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

REFERENCES

Ecology. 2013a. Cleanup action plan, former Pacific Wood Treating Co. site. Washington State Department of Ecology. November 5.

Ecology. 2013b. Consent Decree No. 13-2-03830-1, former Pacific Wood Treating Co. site. Washington State Department of Ecology. November 5.

Ecology. 2014a. Electronic mail correspondence (re: Carty Lake remedy area dewatering batch #1) to J. Elliott, Maul Foster & Alongi, Inc., from J. Mercuri, Washington State Department of Ecology. September 11.

Ecology. 2014b. Electronic mail correspondence (re: Carty Lake remedy area dewatering batch #2) to J. Elliott, Maul Foster & Alongi, Inc., from J. Mercuri, Washington State Department of Ecology. September 16.

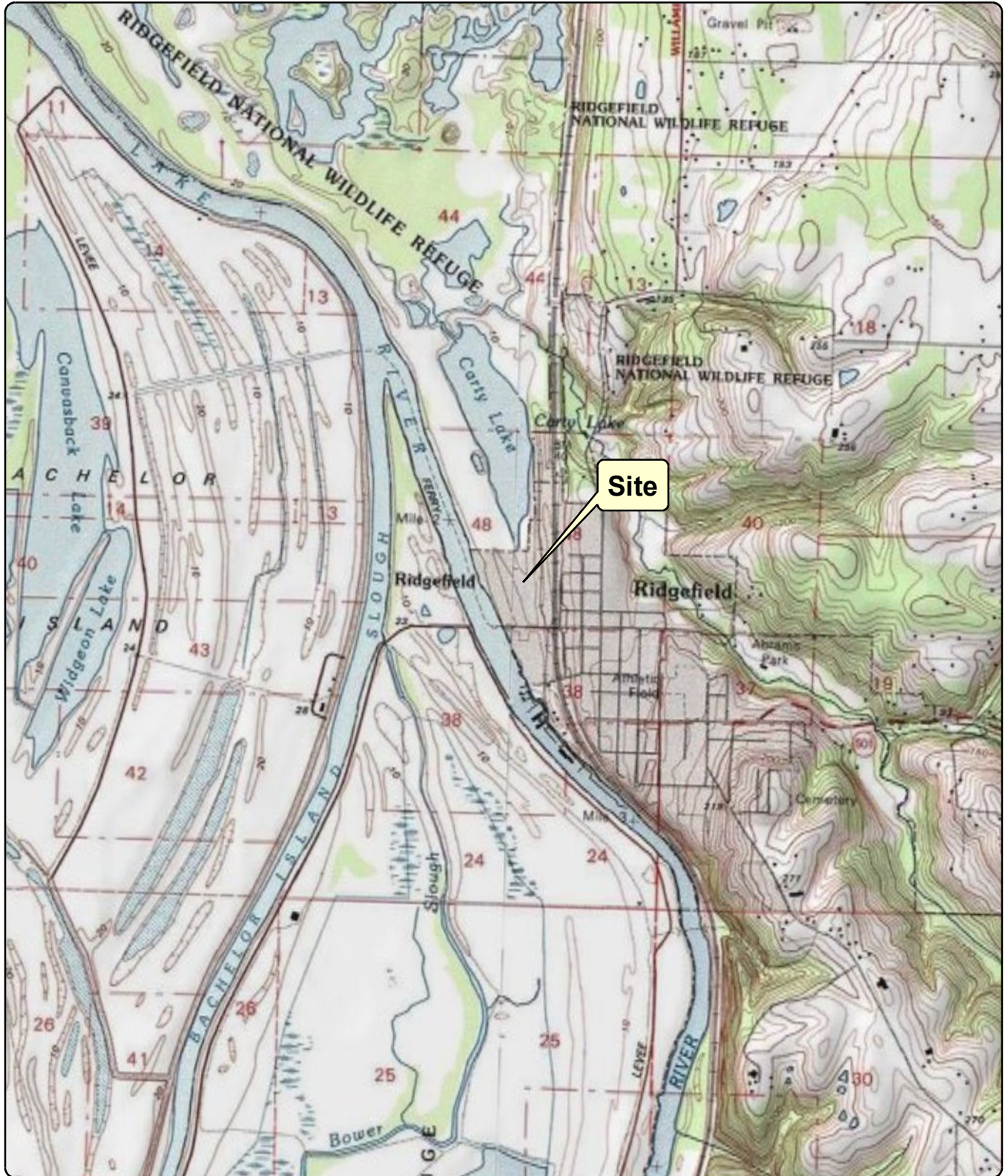
Ecology. 2014c. Electronic mail correspondence. (re: Carty Lake algae in remedy area water and lake) to J. Elliott, Maul Foster & Alongi, Inc., from J. Mercuri, Washington State Department of Ecology. September 30.

MFA. 2013. Former PWT site remedial investigation and feasibility study. Prepared for the Port of Ridgefield. Maul Foster & Alongi, Inc., Vancouver, Washington. July 1.

MFA. 2014a. Carty Lake engineering design report. Prepared for the Port of Ridgefield. Maul Foster & Alongi, Inc., Vancouver, Washington. October 22.

MFA. 2014b. Construction quality assurance plan. Prepared for the Port of Ridgefield. Maul Foster & Alongi, Inc., Vancouver, Washington. October 22.

WillametteCRA. 2014. Lake River Industrial Site final archeological monitoring and inadvertent discovery plan for the Carty Lake remedial action. Willamette Cultural Resources Associates, Ltd. November 17.



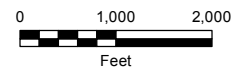
Source: Topographic Quadrangle obtained from ArcGIS Online Services/NGS-USGS TOPO! US Geological Survey (1999)
 7.5-minute topographic quadrangle: Ridgefield
 Address: Lake River Industrial Site
 111 W. Division Street, Ridgefield, WA 98642
 Section: 24 Township: 4N Range: 1W Of Willamette Meridian

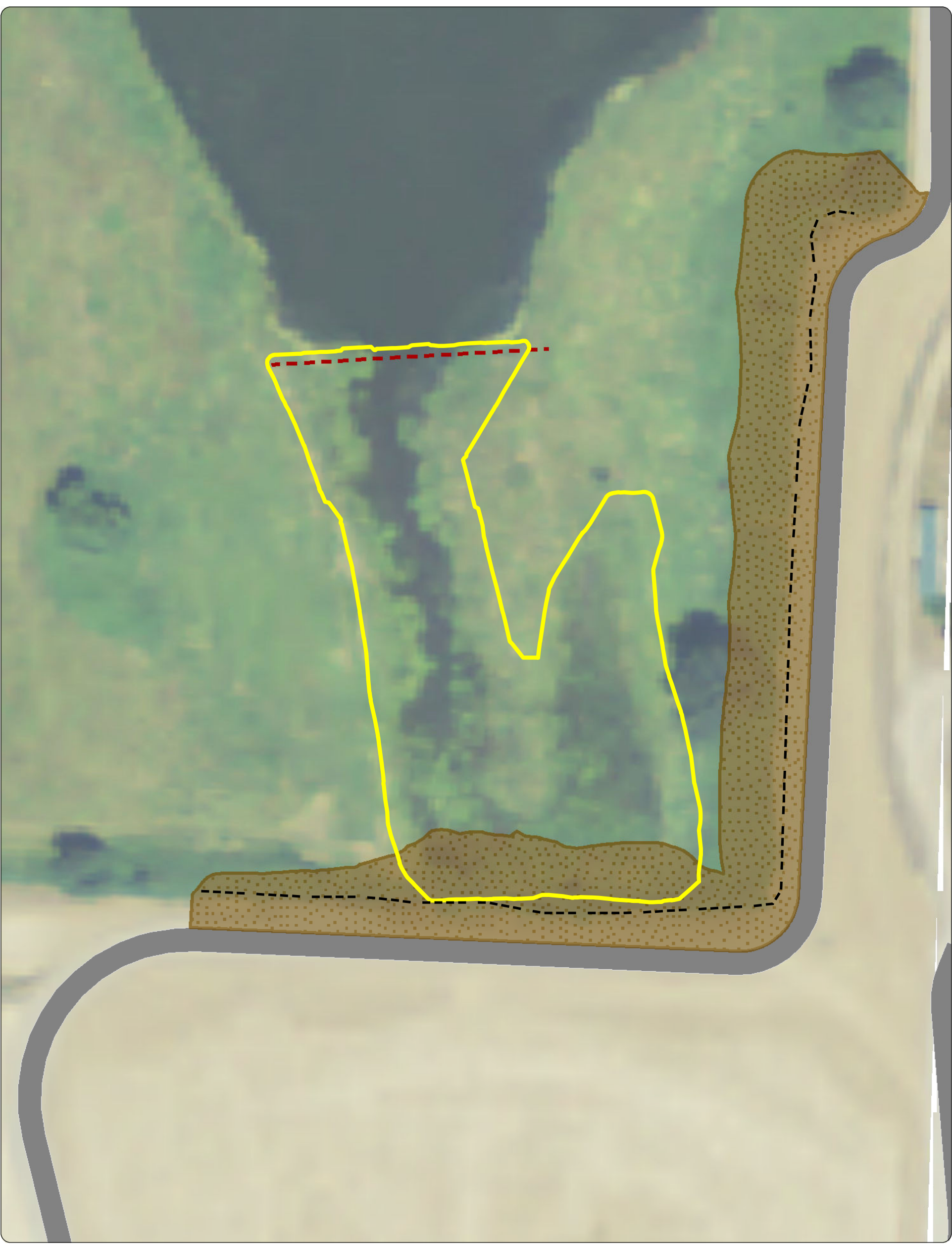
**Figure 1-1
 Site Location**

Carty Lake Remedial Action
 Port of Ridgefield
 Ridgefield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for, legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





Source: Aerial photograph (2013) obtained from the National Agriculture Imagery Program (NAIP).

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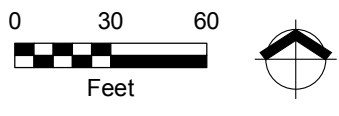
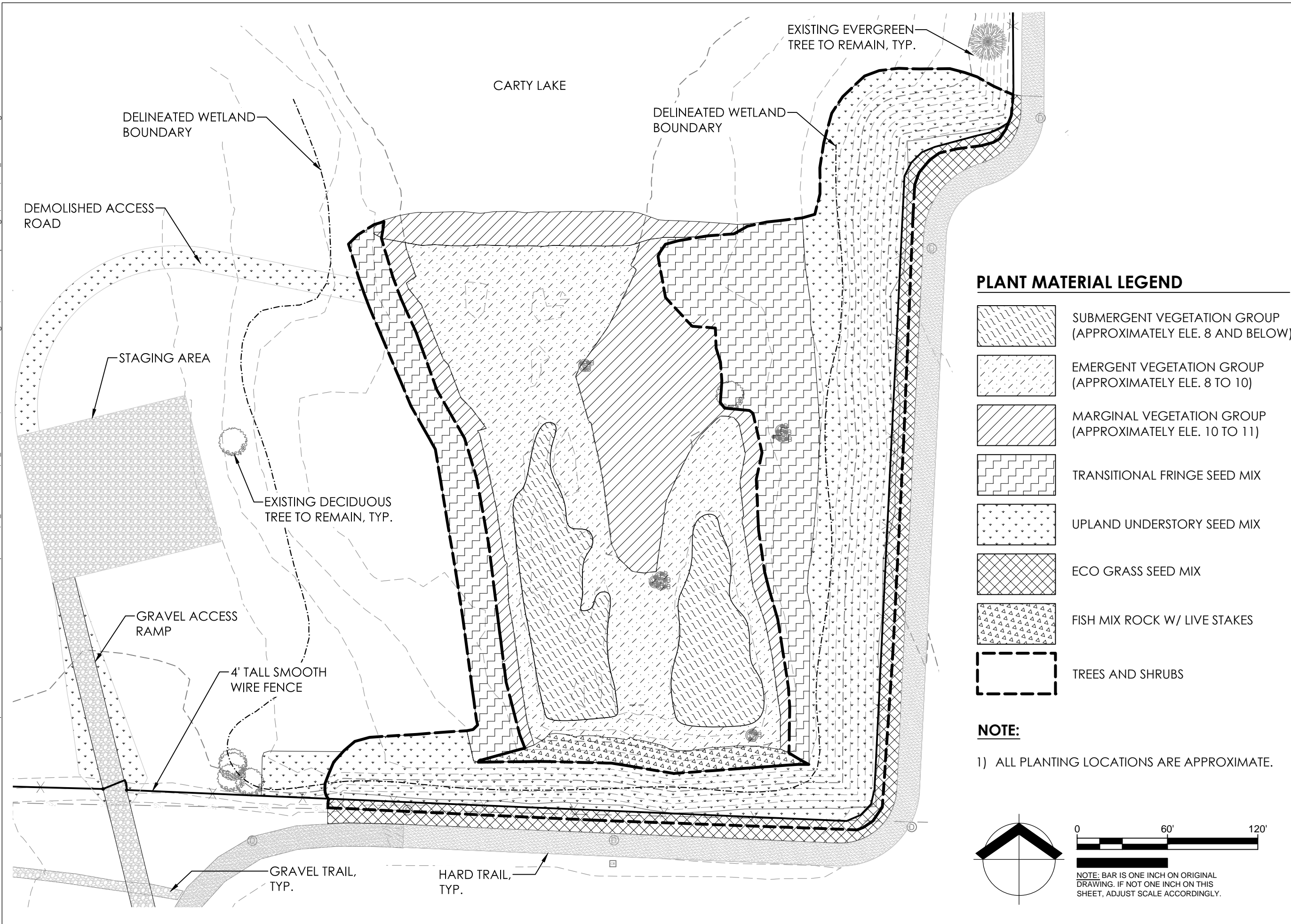

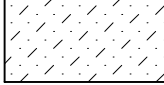

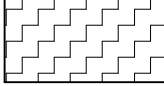




- Legend**
-  Excavation Boundary
 -  Fill Placement
 -  Road/Trail
 -  Retaining Wall
 -  Former Berm (Approximate)

Figure 1-2
Project Location
 Carty Lake Remedial Action
 Port of Ridgefield
 Ridgefield, Washington



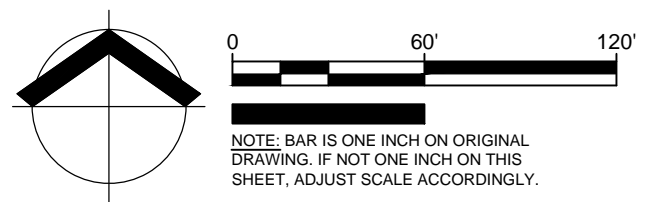


PLANT MATERIAL LEGEND

-  SUBMERGENT VEGETATION GROUP (APPROXIMATELY ELE. 8 AND BELOW)
-  EMERGENT VEGETATION GROUP (APPROXIMATELY ELE. 8 TO 10)
-  MARGINAL VEGETATION GROUP (APPROXIMATELY ELE. 10 TO 11)
-  TRANSITIONAL FRINGE SEED MIX
-  UPLAND UNDERSTORY SEED MIX
-  ECO GRASS SEED MIX
-  FISH MIX ROCK W/ LIVE STAKES
-  TREES AND SHRUBS

NOTE:

1) ALL PLANTING LOCATIONS ARE APPROXIMATE.



AS-BUILT PLANTING PLAN
CARTY LAKE LANDSCAPE REMEDY
 PORT OF RIDGEFIELD
 RIDGEFIELD, WA

FIGURE
L1

Date: 05.13.2015 Printed by: Curtis Riley Filepath: G:\00_MFA_Civil_3D\00_PROJECTS\9003.01_40 - Port of Ridgefield\Final Landscape Design\PLANS\L-CL_AS-BUILT.dwg

PLANT MATERIAL SCHEDULE

TREES AND SHRUBS

QTY	COMMON NAME	BOTANICAL NAME	SIZE	SPACING
28	PACIFIC WILLOW	SALIX LASIANDRA	36" MIN. B.R.	12'-0", O.C.
35	COLUMBIA RIVER WILLOW	SALIX FLUVIATILIS	24"-36" B.R.	12'-0", O.C.
48	SITKA WILLOW	SALIX SITCHENSIS	24"-36" B.R.	12'-0", O.C.
161	TWINBERRY	LONICERA INVOLUCRATA	24"-36" B.R.	6'-0", O.C.
131	PACIFIC NINEBARK	PHYSOCARPUS CAPITATUS	24"-36" B.R.	6'-0", O.C.
95	OCEAN SPRAY	HOLODISCUS DISCOLOR	24"-36" B.R.	6'-0", O.C.
181	RED TWIG DOGWOOD	CORNUS SERICEA	24"-36" B.R.	5'-0", O.C.
150	THIMBLEBERRY	RUBUS PARVIFLORUS	24"-36" B.R.	5'-0", O.C.
234	SNOWBERRY	SYMPHORICARPOS ALBUS	24"-36" B.R.	4'-0", O.C.
274	RED FLOWERING CURRANT	RIBES SANGUINEUM	24"-36" B.R.	4'-0", O.C.
226	TALL OREGON GRAPE	MAHONIA AQUIFOLIUM	18"-24" B.R.	4'-0", O.C.
387	DOUGLAS' SPIRAEA	SPIRAEA DOUGLASII	18"-24" B.R.	4'-0", O.C.
269	CLUSTER ROSE	ROSA PISOCARPA	12"-18" B.R.	3'-0", O.C.
283	NOOTKA ROSE	ROSA NUTKANA	12"-18" B.R.	3'-0", O.C.

LIVE STAKES

QTY	COMMON NAME	BOTANICAL NAME	SIZE	SPACING
100	PACIFIC NINEBARK	PHYSOCARPUS CAPITATUS	1/2" DIA.	3'-0", O.C.
100	RED TWIG DOGWOOD	CORNUS SERICEA	1/2" DIA.	3'-0", O.C.
100	DOUGLAS' SPIRAEA	SPIRAEA DOUGLASII	1/2" DIA.	3'-0", O.C.

SUBMERGENT, EMERGENT & MARGINAL VEGETATION

QTY	COMMON NAME	BOTANICAL NAME	SIZE	SPACING
4,200	AMERICAN WATER PLANTAIN	ALISMA PLANTAGO-AQUATICA	TUBER	18", O.C.
5,600	WAPATO	SAGITTARIA LATIFOLIA	TUBER	18", O.C.
800	WATER SMARTWEED	POLYGONUM AMPHIBIUM	RHIZOME	18", O.C.
500	FLOATING-LEAF PONDWEED	POTAMOGETON NATANS	RHIZOME	18", O.C.
2,800	BUR-REED	SPARGANIUM EMERSUM	RHIZOME	18", O.C.
800	ALKALI BULRUSH	SCIRPUS MARITIMUS	12"-18" B.R.S.	18", O.C.
800	SMALL-FRUITED BULRUSH	SCIRPUS MICROCARPUS	12"-18" B.R.S.	2'-0", O.C.
800	HARDSTEM BULRUSH	SCIRPUS ACUTUS	RHIZOME	2'-6", O.C.
1,650	COLUMBIA SEDGE	CAREX APERTA	12"-18" B.R.S.	2'-6", O.C.
150	SAWBEAK SEDGE	CAREX STIPATA	12"-18" B.R.S.	2'-6", O.C.
500	SLOUGH SEDGE	CAREX OBNUPTA	12"-18" B.R.S.	2'-6", O.C.
250	TUFTED HAIRGRASS	DESCHAMPSIA CESPITOSA	12"-18" B.R.S.	2'-6", O.C.
600	OVATE SPIKERUSH	ELEOCHARIS OVATA	RHIZOME	2'-0", O.C.
400	SOFT RUSH	JUNCUS EFFUSUS	12"-18" B.R.S.	2'-0", O.C.
400	PATH RUSH	JUNCUS TENUIS	12"-18" B.R.S.	2'-0", O.C.

SUBMERGENT VEG. GROUP

WATER PLANTAIN	20%
WAPATO	30%
WATER SMARTWEED	15%
PONDWEED	10%
BUR-REED	10%
ALKALI BULRUSH	15%

EMERGENT VEG. GROUP

WATER PLANTAIN	20%
WAPATO	25%
BUR-REED	15%
SMALL-FRUITED BULRUSH	10%
HARDSTEM BULRUSH	15%
COLUMBIA SEDGE	10%
SAWBEAK SEDGE	5%

MARGINAL VEG. GROUP

COLUMBIA SEDGE	35%
SLOUGH SEDGE	20%
TUFTED HAIRGRASS	10%
OVATE SPIKERUSH	15%
SOFT RUSH	10%
PATH RUSH	10%

SEED MIXES

TRANSITIONAL FRINGE MIX

APPLICATION RATE: 1 LB. PER 1,000 SQ. FT.

TOTAL AREA: 24,700 SQ. FT.

BLUE WILD RYE	ELYMUS GLAUCUS	35 % BY WEIGHT
MEADOW BARLEY	HORDEUM BRACHYANTHERUM	25 % BY WEIGHT
MANNAGRASS	GLYCERIA OCCIDENTALIS	15 % BY WEIGHT
NATIVE RED FESCUE	FESTUCA RUBRA RUBRA	15 % BY WEIGHT
TUFTED HAIRGRASS	DESCHAMPSIA CESPITOSA	5.5 % BY WEIGHT
SLOUGH SEDGE	CAREX OBNUPTA	4.3 % BY WEIGHT
PATH RUSH	JUNCUS TENUIS	.2 % BY WEIGHT

UPLAND UNDERSTORY MIX

APPLICATION RATE: 1 LB. PER 1,000 SQ. FT.

TOTAL AREA: 68,000 SQ. FT.

IDAHO FESCUE	FESTUCA IDAHOENSIS	30 % BY WEIGHT
BLUE WILD RYE	ELYMUS GLAUCUS	25 % BY WEIGHT
ROEMER'S FESCUE	FESTUCA ROEMERI	10 % BY WEIGHT
CALIFORNIA BROME	BROMUS CARINATUS	10 % BY WEIGHT
CALIFORNIA OATGRASS	DANTHONIA CALIFORNICA	10 % BY WEIGHT
SLENDER HAIRGRASS	DESCHAMPSIA ELONGATA	5 % BY WEIGHT
MEADOW BARLEY	HORDEUM BRACHYANTHERUM	5 % BY WEIGHT
OREGON SUNSHINE	ERIOPHYLLUM LANATUM	2 % BY WEIGHT
COMMON CAMAS	CAMASSIA QUAMASH	2% BY WEIGHT
SMALL FLOWER LUPINE	LUPINUS POLYCARPUS	1% BY WEIGHT

ECO GRASS MIX

APPLICATION RATE: 1 LB. PER 1,000 SQ. FT.

TOTAL AREA: 37,000 SQ. FT.

NATIVE RED FESCUE	FESTUCA RUBRA RUBRA	45 % BY WEIGHT
CALIFORNIA OATGRASS	DANTHONIA CALIFORNICA	25 % BY WEIGHT
SHEEP FESCUE	FESTUCA OVINA	20 % BY WEIGHT
WESTERN YARROW	ACHILLEA MILLEFOLIUM	7 % BY WEIGHT
WHITE CLOVER	TRIFOLIUM REPENS	3 % BY WEIGHT

AS-BUILT PLANTING PLAN

CARTY LAKE LANDSCAPE REMEDY

PORT OF RIDGEFIELD
RIDGEFIELD, WA

FIGURE
L2

MFA JOB #: 9003.01.40

ISSUE DATE: 09/18/2015

CHECKED: J. ELLIOT

DRAWN: C. RILEY



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Table 3-1
Imported Sand—Analytical Results
Carty Lake Sediment Remediation
Port of Ridgefield
Ridgefield, Washington

Sample Name	Design Specification Levels	IMP-1	IMP-2	IMP-3
Collection Date		08/08/2014	08/08/2014	08/08/2014
Dioxins/Furans (ng/kg)				
1,2,3,4,6,7,8-HpCDD	2.5	0.65 J	0.56 J	1.4 J
1,2,3,4,6,7,8-HpCDF	2.5	0.5 J	0.49 J	0.86 J
1,2,3,4,7,8,9-HpCDF	2.5	0.29 UJ	0.19 UJ	0.2 UJ
1,2,3,4,7,8-HxCDD	2.5	0.3 UJ	0.28 UJ	0.46 UJ
1,2,3,4,7,8-HxCDF	2.5	0.28 UJ	0.36 UJ	0.42 UJ
1,2,3,6,7,8-HxCDD	2.5	0.21 UJ	0.24 UJ	0.53 UJ
1,2,3,6,7,8-HxCDF	2.5	0.31 UJ	0.28 UJ	0.39 UJ
1,2,3,7,8,9-HxCDD	2.5	0.22 UJ	0.2 UJ	0.3 UJ
1,2,3,7,8,9-HxCDF	2.5	0.48 UJ	0.44 UJ	0.52 UJ
1,2,3,7,8-PeCDD	1	0.2 UJ	0.27 UJ	0.15 UJ
1,2,3,7,8-PeCDF	2.5	0.26 UJ	0.41 UJ	0.29 UJ
2,3,4,6,7,8-HxCDF	2.5	0.27 UJ	0.28 UJ	0.34 UJ
2,3,4,7,8-PeCDF	1	0.26 UJ	0.39 UJ	0.25 UJ
2,3,7,8-TCDD	1	0.19 UJ	0.18 UJ	0.2 UJ
2,3,7,8-TCDF	1	0.52 UJ	0.79 UJ	0.68 UJ
OCDD	5	0.48 UJ	2.9 J	11 J
OCDF	5	4.4 J	0.38 J	3.7 J
Dioxin TEQ	5	0.38	0.45	0.43
PCB Aroclors (ug/kg)				
Aroclor 1016	NV	0.334 U	0.333 U	0.334 U
Aroclor 1221	NV	0.334 U	0.333 U	0.334 U
Aroclor 1232	NV	0.334 U	0.333 U	0.334 U
Aroclor 1242	NV	0.334 U	0.333 U	0.334 U
Aroclor 1248	NV	0.334 U	0.333 U	0.334 U
Aroclor 1254	NV	0.334 U	43.5	0.334 U
Aroclor 1254—Confirmation	NV	--	0.333 ^a UJ	--
Aroclor 1260	NV	0.334 U	0.333 U	0.334 U
Aroclor 1262	NV	0.334 U	0.333 U	0.334 U
Aroclor 1268	NV	0.334 U	0.333 U	0.334 U
Total PCB Aroclors	5	0.334 U	43.5	0.334 U
Total PCB Aroclors - Confirmation	5	--	0.333 UJ	--
SVOCs (ug/kg)				
1,2,4-Trichlorobenzene	NV	33.4 U	33.3 U	33.4 U
1,2-Dichlorobenzene	NV	33.4 U	33.3 U	33.4 U
1,3-Dichlorobenzene	NV	33.4 U	33.3 U	33.4 U
1,4-Dichlorobenzene	NV	33.4 U	33.3 U	33.4 U
1-Methylnaphthalene	NV	33.4 U	33.3 U	33.4 U
2,4,5-Trichlorophenol	NV	33.4 U	33.3 U	33.4 U

Table 3-1
Imported Sand—Analytical Results
Carty Lake Sediment Remediation
Port of Ridgefield
Ridgefield, Washington

Sample Name	Design Specification	IMP-1	IMP-2	IMP-3
Collection Date	Levels	08/08/2014	08/08/2014	08/08/2014
2,4,6-Trichlorophenol	NV	33.4 U	33.3 U	33.4 U
2,4-Dichlorophenol	NV	33.4 U	33.3 U	33.4 U
2,4-Dimethylphenol	NV	33.4 U	33.3 U	33.4 U
2,4-Dinitrophenol	NV	334 U	333 U	334 U
2,4-Dinitrotoluene	NV	33.4 U	33.3 U	33.4 U
2,6-Dinitrotoluene	NV	33.4 U	33.3 U	33.4 U
2-Chloronaphthalene	NV	33.4 U	33.3 U	33.4 U
2-Chlorophenol	NV	33.4 U	33.3 U	33.4 U
2-Methylnaphthalene	NV	33.4 U	33.3 U	33.4 U
2-Methylphenol	NV	33.4 U	33.3 U	33.4 U
2-Nitroaniline	NV	33.4 U	33.3 U	33.4 U
2-Nitrophenol	NV	168 U	167 U	168 U
3- & 4-Methylphenol	260 ^b	33.4 U	33.3 U	33.4 U
3,3-Dichlorobenzidine	NV	168 U	167 U	168 U
3-Nitroaniline	NV	33.4 U	33.3 U	33.4 U
4,6-Dinitro-2-methylphenol	NV	168 U	167 U	168 U
4-Bromophenylphenyl ether	NV	33.4 U	33.3 U	33.4 U
4-Chloro-3-methylphenol	NV	33.4 U	33.3 U	33.4 U
4-Chloroaniline	NV	33.4 U	33.3 U	33.4 U
4-Chlorophenylphenyl ether	NV	33.4 U	33.3 U	33.4 U
4-Nitroaniline	NV	33.4 U	33.3 U	33.4 U
4-Nitrophenol	NV	168 U	167 U	168 U
Acenaphthene	NV	33.4 U	33.3 U	33.4 U
Acenaphthylene	NV	33.4 U	33.3 U	33.4 U
Aniline	NV	33.4 U	33.3 U	33.4 U
Anthracene	NV	33.4 U	33.3 U	33.4 U
Benzidine	NV	168 U	167 U	168 U
Benzo(a)anthracene	NV	33.4 U	33.3 U	33.4 U
Benzo(a)pyrene	NV	33.4 U	33.3 U	33.4 U
Benzo(b)fluoranthene	NV	33.4 U	33.3 U	33.4 U
Benzo(ghi)perylene	NV	33.4 U	33.3 U	33.4 U
Benzo(k)fluoranthene	NV	33.4 U	33.3 U	33.4 U
Benzoic acid	2900	669 U	667 U	669 U
Benzyl alcohol	NV	33.4 U	33.3 U	33.4 U
Bis(2-chloro-1-methylethyl)ether	NV	33.4 U	33.3 U	33.4 U
Bis(2-chloroethoxy)methane	NV	33.4 U	33.3 U	33.4 U
Bis(2-chloroethyl)ether	NV	33.4 U	33.3 U	33.4 U
Bis(2-ethylhexyl)phthalate	500	33.4 U	33.3 U	33.4 U

Table 3-1
Imported Sand—Analytical Results
Carty Lake Sediment Remediation
Port of Ridgefield
Ridgefield, Washington

Sample Name	Design Specification Levels	IMP-1	IMP-2	IMP-3
Collection Date		08/08/2014	08/08/2014	08/08/2014
Butylbenzylphthalate	NV	33.4 U	33.3 U	33.4 U
Carbazole	900	33.4 U	33.3 U	33.4 U
Chrysene	NV	33.4 U	33.3 U	33.4 U
Dibenzo(a,h)anthracene	NV	33.4 U	33.3 U	33.4 U
Dibenzofuran	200	33.4 U	33.3 U	33.4 U
Diethyl phthalate	NV	33.4 U	33.3 U	33.4 U
Dimethyl phthalate	NV	33.4 U	33.3 U	33.4 U
Di-n-butyl phthalate	380	50.2 U	50 U	50.2 U
Di-n-octyl phthalate	39	33.4 U	33.3 U	33.4 U
Fluoranthene	NV	33.4 U	33.3 U	33.4 U
Fluorene	NV	33.4 U	33.3 U	33.4 U
Hexachlorobenzene	NV	33.4 U	33.3 U	33.4 U
Hexachlorobutadiene	NV	33.4 U	33.3 U	33.4 U
Hexachlorocyclopentadiene	NV	33.4 U	33.3 U	33.4 U
Hexachloroethane	NV	33.4 U	33.3 U	33.4 U
Hydrazine, 1,2-diphenyl	NV	168 U	167 U	168 U
Indeno(1,2,3-cd)pyrene	NV	33.4 U	33.3 U	33.4 U
Isophorone	NV	33.4 U	33.3 U	33.4 U
Naphthalene	NV	33.4 U	33.3 U	33.4 U
Nitrobenzene	NV	33.4 U	33.3 U	33.4 U
N-Nitrosodimethylamine	NV	33.4 U	33.3 U	33.4 U
N-Nitrosodiphenylamine	NV	33.4 U	33.3 U	33.4 U
N-Nitrosodipropylamine	NV	33.4 U	33.3 U	33.4 U
Pentachlorophenol	200	50.2 U	50 U	50.2 U
Phenanthrene	NV	33.4 U	33.3 U	33.4 U
Phenol	120	33.4 U	33.3 U	33.4 U
Pyrene	NV	33.4 U	33.3 U	33.4 U
Pyridine	NV	168 U	167 U	168 U
PAHs (ug/kg)				
1-Methylnaphthalene	NV	6.69 U	6.67 U	6.69 U
2-Methylnaphthalene	NV	6.69 U	6.67 U	6.69 U
Acenaphthene	NV	6.69 U	6.67 U	6.69 U
Acenaphthylene	NV	6.69 U	6.67 U	6.69 U
Anthracene	NV	6.69 U	6.67 U	6.69 U
Benzo(a)anthracene	NV	6.69 U	6.67 U	6.69 U
Benzo(a)pyrene	NV	6.69 U	6.67 U	6.69 U
Benzo(b)fluoranthene	NV	6.69 U	6.67 U	6.69 U
Benzo(ghi)perylene	NV	6.69 U	6.67 U	6.69 U

Table 3-1
Imported Sand—Analytical Results
Carty Lake Sediment Remediation
Port of Ridgefield
Ridgefield, Washington

Sample Name	Design Specification	IMP-1	IMP-2	IMP-3
Collection Date	Levels	08/08/2014	08/08/2014	08/08/2014
Benzo(k)fluoranthene	NV	6.69 U	6.67 U	6.69 U
Chrysene	NV	6.69 U	6.67 U	6.69 U
Dibenzo(a,h)anthracene	NV	6.69 U	6.67 U	6.69 U
Fluoranthene	NV	6.69 U	6.67 U	6.69 U
Fluorene	NV	6.69 U	6.67 U	6.69 U
Indeno(1,2,3-cd)pyrene	NV	6.69 U	6.67 U	6.69 U
Naphthalene	NV	6.69 U	6.67 U	6.69 U
Phenanthrene	NV	6.69 U	6.67 U	6.69 U
Pyrene	NV	6.69 U	6.67 U	6.69 U
Total PAHs	17000	6.69 U	6.67 U	6.69 U
Organochlorine Pesticides (ug/kg)				
4,4'-DDD	310	0.335 UJ	0.333 UJ	0.334 U
4,4'-DDE	100	0.335 UJ	0.333 UJ	0.334 U
4,4'-DDT	21	0.335 UJ	0.333 UJ	0.334 U
Aldrin	NV	0.335 UJ	0.333 UJ	0.334 U
alpha-BHC	NV	0.335 UJ	0.333 UJ	0.334 U
alpha-Chlordane	NV	0.335 UJ	0.333 UJ	0.334 U
beta-BHC	7.2	0.335 UJ	0.333 UJ	0.334 U
Chlordane	NV	6.69 UJ	6.67 UJ	6.69 U
delta-BHC	NV	0.335 UJ	0.333 UJ	0.334 U
Dieldrin	4.9	0.335 UJ	0.333 UJ	0.334 U
Endosulfan I	NV	0.335 UJ	0.333 UJ	0.334 U
Endosulfan II	NV	0.335 UJ	0.333 UJ	0.334 U
Endosulfan sulfate	NV	0.335 UJ	0.333 UJ	0.334 U
Endrin	NV	0.335 UJ	0.333 UJ	0.334 U
Endrin aldehyde	NV	0.335 UJ	0.333 UJ	0.334 U
Endrin ketone	8.5	0.335 UJ	0.333 UJ	0.334 U
Gamma-Chlordane	NV	0.335 UJ	0.333 UJ	0.334 U
Heptachlor	NV	0.335 UJ	0.333 UJ	0.334 U
Heptachlor epoxide	NV	0.335 UJ	0.333 UJ	0.334 U
Lindane	NV	0.335 UJ	0.333 UJ	0.334 U
Methoxychlor	NV	0.335 UJ	0.333 UJ	0.334 U
Toxaphene	NV	6.69 UJ	6.67 UJ	6.69 U
TPH (mg/kg)				
Diesel	340	15.1 U	15 U	15.1 U
Lube-Oil-Range Hydrocarbons	3600	50.2 U	50 U	50.2 U

Table 3-1
Imported Sand—Analytical Results
Carty Lake Sediment Remediation
Port of Ridgefield
Ridgefield, Washington

NOTES:

Bold values indicate exceedance of design specification levels.

-- = not analyzed.

J = Result is an estimated value.

mg/kg = milligrams per kilogram.

ng/kg = nanograms per kilogram.

NV = no value.

PAH = polycyclic aromatic hydrocarbon.

PCB = polychlorinated biphenyl.

SVOC = semivolatile organic compound.

TEQ = toxicity equivalence.

Total PAHs = Sum of all detected PAHs. When all PAHs are non-detect, the highest reporting limit is used.

Total PCB Aroclors = Sum of all detected PCB Aroclors. When all Aroclors are non-detect, the highest reporting limit is used.

TPH = total petroleum hydrocarbons.

U = Result is non-detect.

ug/kg = micrograms per kilogram.

UJ = Result is non-detect and an estimated value.

^aSample reextracted on September 5 and reanalyzed on September 9, 2014.

^bValue is for 4-methylphenol.

Table 3-2
Imported Soil—Analytical Results
Carty Lake Sediment Remediation
Port of Ridgefield
Ridgefield, Washington

Sample Name	Sediment Remediation Levels	Clean Fill Criteria	Natural Background Concentrations, Clark County	80/20 SOIL
Collection Date				09/04/2014
Metals (mg/kg)				
Arsenic	NA	5.81	5.81	1.8 U
Cadmium	NA	0.93	0.93	0.13 J
Chromium	NA	72	26.57	17.3
Copper	NA	400	34.43	26.6
Lead	NA	24.02	24.02	23.5
Mercury	NA	0.04	0.04	0.033
Nickel	NA	26	21.04	14.8
Selenium	NA	11	NV	2.1 U
Silver	NA	0.57	NV	3.0 U
Zinc	NA	3200	95.52	102
Dioxins/Furans (ng/kg)				
1,2,3,4,6,7,8-HpCDD	310000	2.5	NV	160
1,2,3,4,6,7,8-HpCDF	250000	2.5	NV	27
1,2,3,4,7,8,9-HpCDF	250000	2.5	NV	2.1 J
1,2,3,4,7,8-HxCDD	200	2.5	NV	1.2 J
1,2,3,4,7,8-HxCDF	980	2.5	NV	2.7 J
1,2,3,6,7,8-HxCDD	1200	2.5	NV	5.6
1,2,3,6,7,8-HxCDF	980	2.5	NV	1.2 J
1,2,3,7,8,9-HxCDD	1200	2.5	NV	2.7 J
1,2,3,7,8,9-HxCDF	980	2.5	NV	0.82 J
1,2,3,7,8-PeCDD	98	1.0	NV	0.69 J
1,2,3,7,8-PeCDF	550	2.5	NV	0.48 J
2,3,4,6,7,8-HxCDF	980	2.5	NV	2.0 J
2,3,4,7,8-PeCDF	6.5	1.0	NV	1.9 J
2,3,7,8-TCDD	3.3	1.0	NV	1.1
2,3,7,8-TCDF	86	1.0	NV	0.68 J
OCDD	10000000	5.0	NV	1700
OCDF	10000000	5.0	NV	73
Dioxin/Furan TEQ (1/2 EDL)	NA	5	NV	6.5
Dioxin TEQ (1/2 EDL) (Ecological)	NA	5	NV	4.9
Furan TEQ (1/2 EDL) (Ecological)	NA	5	NV	3.6
PCB Aroclors (ug/kg)				
Aroclor 1016	NV	NV	NV	18.3 U
Aroclor 1221	NV	NV	NV	6.1 U
Aroclor 1232	NV	NV	NV	9.7 U

Table 3-2
Imported Soil—Analytical Results
Carty Lake Sediment Remediation
Port of Ridgefield
Ridgefield, Washington

Sample Name	Sediment Remediation Levels	Clean Fill Criteria	Natural Background Concentrations, Clark County	80/20 SOIL
Collection Date				09/04/2014
Aroclor 1242	NV	NV	NV	7.3 U
Aroclor 1248	NV	NV	NV	8.5 U
Aroclor 1254	NV	NV	NV	8.5 U
Aroclor 1260	NV	NV	NV	18.3 U
Aroclor 1262	NV	NV	NV	7.3 U
Aroclor 1268	NV	NV	NV	6.1 U
Total PCB Aroclors ^a	NV	5	NV	18.3 U
SVOCs (ug/kg)				
3- & 4-Methylphenol	NV	260 ^p	NV	70.6
Benzoic acid	NV	2900	NV	799 U
Bis(2-ethylhexyl)phthalate	NV	500	NV	160
Dibenzofuran	NV	200	NV	39.9 U
Di-n-butyl phthalate	NV	380	NV	59.9 U
Di-n-octyl phthalate	NV	39	NV	39.9 U
Pentachlorophenol	NV	200	NV	59.9 U
Phenol	NV	120	NV	39.9 U
PAHs (ug/kg)				
Acenaphthene	NV	NV	NV	201 U
Acenaphthylene	NV	NV	NV	78.5 U
Anthracene	NV	NV	NV	201 U
Benzo(a)anthracene	NV	NV	NV	201 U
Benzo(a)pyrene	NV	NV	NV	201 U
Benzo(b)fluoranthene	NV	NV	NV	50.9 U
Benzo(ghi)perylene	NV	NV	NV	48.8 U
Benzo(k)fluoranthene	NV	NV	NV	201 U
Carbazole	NV	NV	NV	201 U
Chrysene	NV	NV	NV	54.0 U
Dibenzo(a,h)anthracene	NV	NV	NV	201 U
Fluoranthene	NV	NV	NV	201 U
Fluorene	NV	NV	NV	201 U
Indeno(1,2,3-cd)pyrene	NV	NV	NV	201 U
Naphthalene	NV	NV	NV	28.7 U
Phenanthrene	NV	NV	NV	57.4 U
Pyrene	NV	NV	NV	50.7 U
Total PAHs ^a	NV	17000	NV	201 U

**Table 3-2
Imported Soil—Analytical Results
Carty Lake Sediment Remediation
Port of Ridgefield
Ridgefield, Washington**

Sample Name	Sediment Remediation Levels	Clean Fill Criteria	Natural Background Concentrations, Clark County	80/20 SOIL
Collection Date				09/04/2014
Organochlorine Pesticides (ug/kg)				
4,4'-DDD	NV	310	NV	4.9 U
4,4'-DDE	NV	100	NV	7.0 J
4,4'-DDT	NV	21	NV	7.6 J
Dieldrin	NV	4.9	NV	3.7 U
Endrin ketone	NV	8.5	NV	5.8 J
Lindane (gamma-BHC)	NV	7.2	NV	2.0 U
TPH (mg/kg)				
Diesel	NV	340	NV	89.8
Lube-Oil-Range Hydrocarbons	NV	3600	NV	417 J
<p>NOTES:</p> <p>Detected results are in bold font. Non-detect results are not evaluated against screening criteria.</p> <p>EDL = estimated detection limit.</p> <p>J = Result is an estimated value.</p> <p>mg/kg = milligrams per kilogram.</p> <p>NA = not applicable.</p> <p>ng/kg = nanograms per kilogram.</p> <p>NV = no value.</p> <p>PAH = polycyclic aromatic hydrocarbon.</p> <p>PCB = polychlorinated biphenyl.</p> <p>SVOC = semivolatile organic compound.</p> <p>TEQ = toxicity equivalence.</p> <p>TPH = total petroleum hydrocarbon.</p> <p>U = Result is non-detect.</p> <p>ug/kg = micrograms per kilogram.</p> <p>^aWhen all results for a summed result are non-detect, the highest reporting limit is used.</p> <p>^bValue is for 4-methylphenol.</p>				

Table 4-1
Analytical Results for Batches of Treated Dewatering Water
Carty Lake Sediment Remediation
Port of Ridgefield
Ridgefield, Washington

Location	Water Quality Criteria ^a	Carty Lake	
Sample ID		CLSR-Batch-1	CLSR-Batch-2
Date Collected		09/09/2014	09/11/2014
PAHs (ug/L)			
Benzo(a)pyrene	1	0.0476 U	0.0474 U
Acid Fraction SVOCs (ug/L)			
Pentachlorophenol	13	0.477 U	0.481 U
Conventional Parameters			
pH	6.5-8.5	8.37	8.33
Turbidity (NTU)	25	10.55	10.98
NOTES: CLSR = Carty Lake Sediment Remediation. NTU = nephelometric turbidity unit. PAH = polycyclic aromatic hydrocarbon. SVOC = semivolatile organic compound. U = analyte not detected at or above method reporting limit (MRL). MRL value is posted. ug/L = micrograms per liter. ^a Water Quality Criteria from Washington State Department of Ecology-approved Water Quality Plan.			

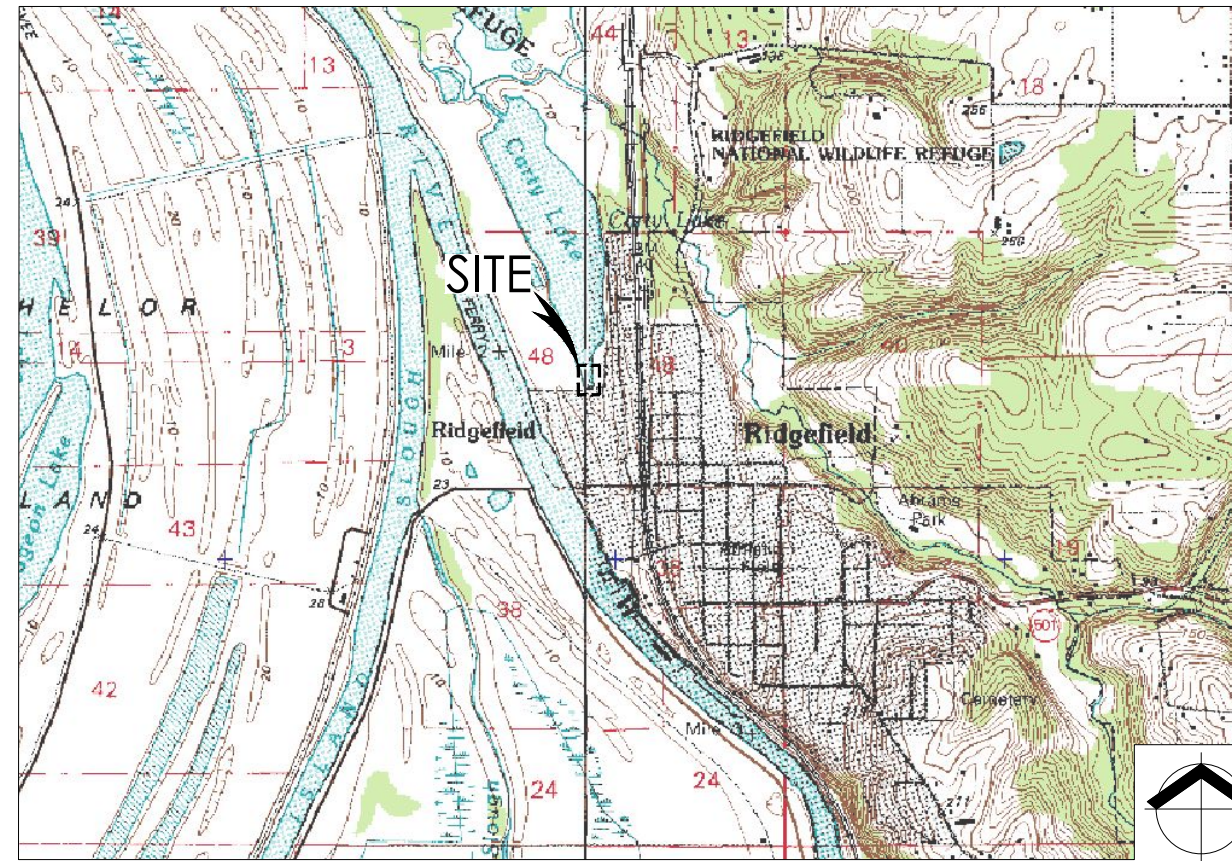
CARTY LAKE REMEDIAL ACTION RECORD DRAWINGS

PREPARED FOR:

PORT OF RIDGEFIELD

FORMER PACIFIC WOOD TREATING CO. SITE - RIDGEFIELD, WASHINGTON

MAUL FOSTER & ALONGI
400 EAST MILL PLAIN BLVD, SUITE 400
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www.maulfooster.com



VICINITY MAP

NOT TO SCALE

SHEET INDEX

--	COVER SHEET
C0.0	POST-REMEDIAL ACTION CONDITIONS PLAN
C1.0.0	SOUTH EMBANKMENT STATIONING
C1.0.1	SOUTH EMBANKMENT SECTIONS 1
C1.0.2	SOUTH EMBANKMENT SECTIONS 2
C1.1.0	EAST EMBANKMENT STATIONING
C1.1.1	EAST EMBANKMENT SECTIONS 1
C1.1.2	EAST EMBANKMENT SECTIONS 2

11-17-2015

CARTY LAKE RECORD DRAWINGS
PORT OF RIDGEFIELD
RIDGEFIELD, WASHINGTON

GENERAL NOTES

- HORIZONTAL DATUM: WASHINGTON STATE PLANE COORDINATE SYSTEM SOUTH ZONE, NAD 83/91.
- ELEVATION DATUM: CLARK COUNTY, NGVD 29/47
- THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, BASED UPON INFORMATION FURNISHED BY OTHERS, WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THIS RECORD DRAWING OR FOR ANY ERRORS OR OMISSIONS THAT MAY HAVE BEEN INCORPORATED INTO IT AS A RESULT OF INCORRECT INFORMATION PROVIDED TO THE ENGINEER. THOSE RELYING ON THIS RECORD DOCUMENT ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY.

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ABBREVIATIONS

APPROX	APPROXIMATE
AVE	AVENUE
CB	CATCH BASIN
E	EAST, EASTING
EL	ELEVATION
EX	EXISTING
FT	FOOT
HDPE	HIGH-DENSITY POLYETHYLENE
MH	MANHOLE
MW	MONITORING WELL
N	NORTH, NORTHING
NTS	NOT TO SCALE
OF	OUTFALL
PVC	POLYVINYL CHLORIDE
SS	SANITARY SEWER
ST	STORM
WWTP	WASTEWATER TREATMENT PLANT

ISSUE	DATE	DESCRIPTION

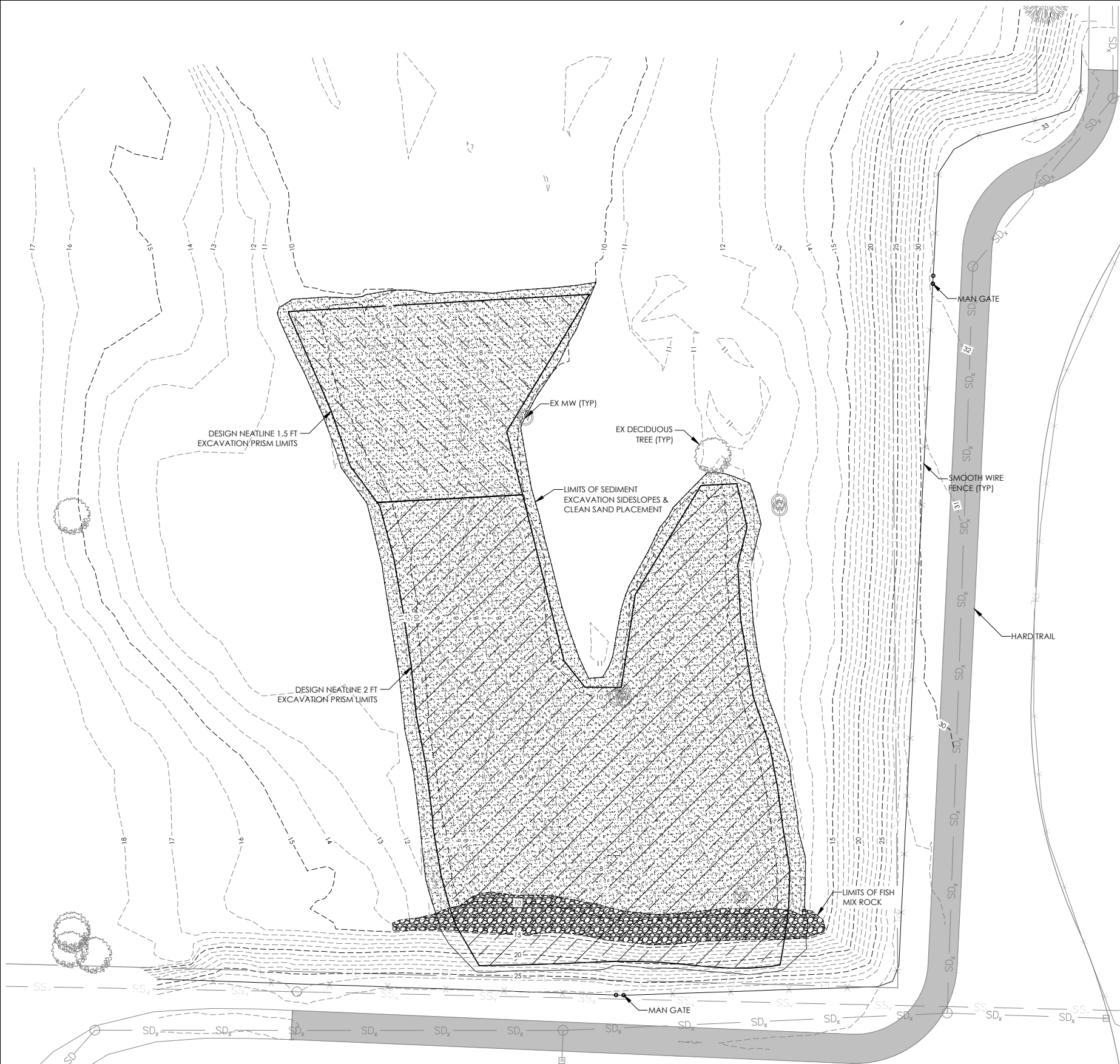
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DESIGNED: N/A
DRAWN: J. ELLIOTT
CHECKED: ---
SCALE

SCALE AS NOTED
NOTE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

SHEET TITLE
COVER

SHEET

PLOTTED ON: 2015-11-14 2:28 PM
 PLOTTED BY: John Blott
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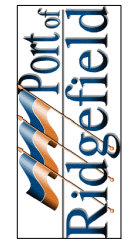


POST-REMEDIAL ACTION CONDITIONS PLAN

LEGEND:

- 5 ----- MAJOR (5 FT) CONTOUR ELEVATION LINE
- 1 ----- MINOR (1 FT) CONTOUR ELEVATION LINE
- FISH MIX ROCK LIMITS
- CLEAN SAND & SOIL BLEND LIMITS
- EXCAVATION PRISM LIMITS (NOT INCLUDING SIDESLOPES)
- EX ST PIPE
- EX SS OUTFALL PIPE
- EDGE OF ROADWAY/EDGE OF PAVEMENT
- NEW SMOOTH-WIRE FENCE
- EX FENCE
- EX CB
- EX MW
- EX SS MH
- EX ST MH
- 1.5 FT EXCAVATION PRISM
- 2 FT EXCAVATION PRISM
- CLEAN SAND & SOIL BLEND
- FISH MIX ROCK
- NEW ASPHALT PAVING
- EX DECIDUOUS TREE
- EX CONIFEROUS TREE

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 PHONE: 360.694.2691
 www.maulfooster.com



11-17-2015

CARTY LAKE RECORD DRAWINGS
 PORT OF RIDGEFIELD
 RIDGEFIELD, WASHINGTON

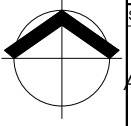
ISSUE	DATE	DESCRIPTION

PROJECT: 9003.01.40
 DESIGNED: N/A
 DRAWN: J. ELLIOTT
 CHECKED: ---
 SCALE

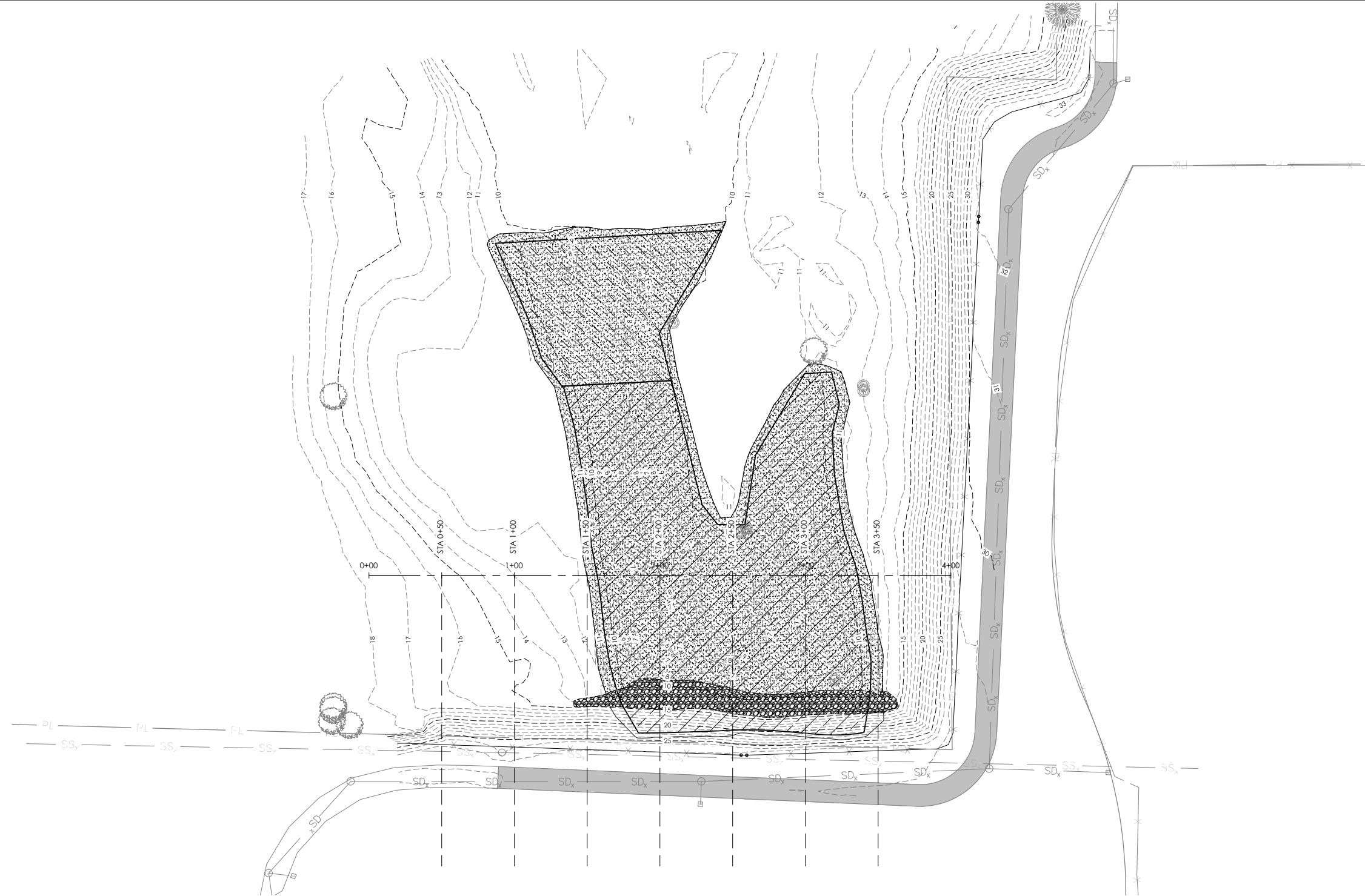
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SHEET TITLE
POST-REMEDIAL ACTION CONDITIONS PLAN

SHEET
 C0.0

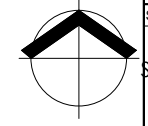


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 PLOTTED BY: John Blott FILENAME: G:\00_MIA_OIA_30\03_PNO\ECTS\003\01_40_Prd of Ridgefield\Comp Lake Construction\PLANS\Station NS.dwg



SOUTH EMBANKMENT STATIONING LEGEND:

- 5 --- MAJOR CONTOUR (5' INTERVAL)
- 1 --- MINOR CONTOUR (1' INTERVAL)
- - - - - FISH MIX LIMITS
- — — — — SEDIMENT EXCAVATION LIMITS
- — — — — DESIGN REMOVAL MINIMUM EXTENTS
- [Diagonal Hatching] CLEAN SAND & SOIL BLEND
- [Brick Pattern] FISH MIX ROCK
- [Solid Grey] NEW ASPHALT PAVING



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CARTY LAKE RECORD DRAWINGS
 PORT OF RIDGEFIELD
 RIDGEFIELD, WASHINGTON

ISSUE	DATE	DESCRIPTION

PROJECT: 9003.01.40
 DESIGNED: N/A
 DRAWN: J. ELLIOTT
 CHECKED: ---
 SCALE: ---



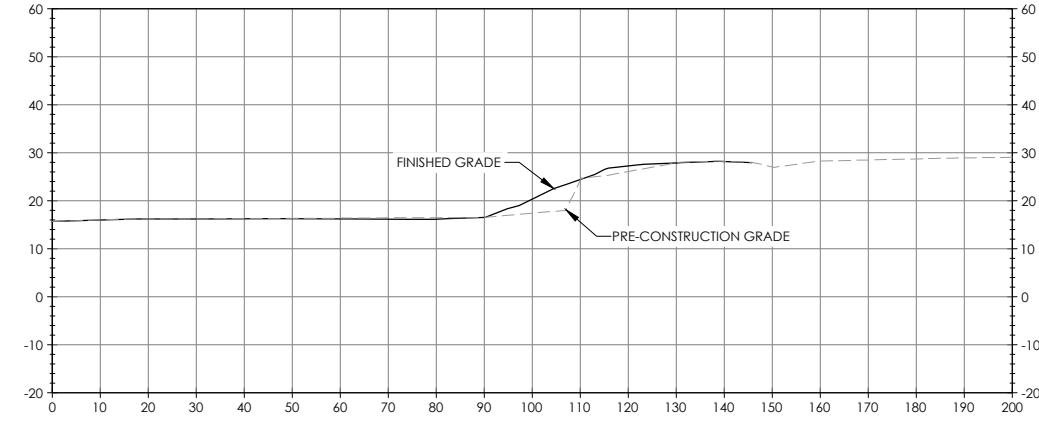
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SHEET TITLE
SOUTH EMBANKMENT STATIONING

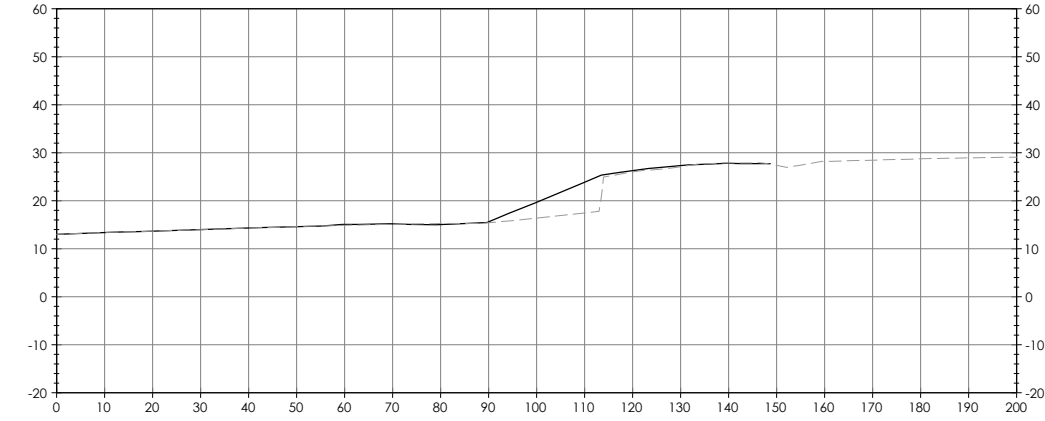
SHEET
 C1.0.0

PLOTTED ON: 2015-11-14 3:27 PM
 PLOTTED BY: John Bort
 FILENAME: C:\03_000\03_000\PROJECTS\9003.01_40_Port of Ridgefield\Comp Lake Construction\PLANS\Sections NS.dwg

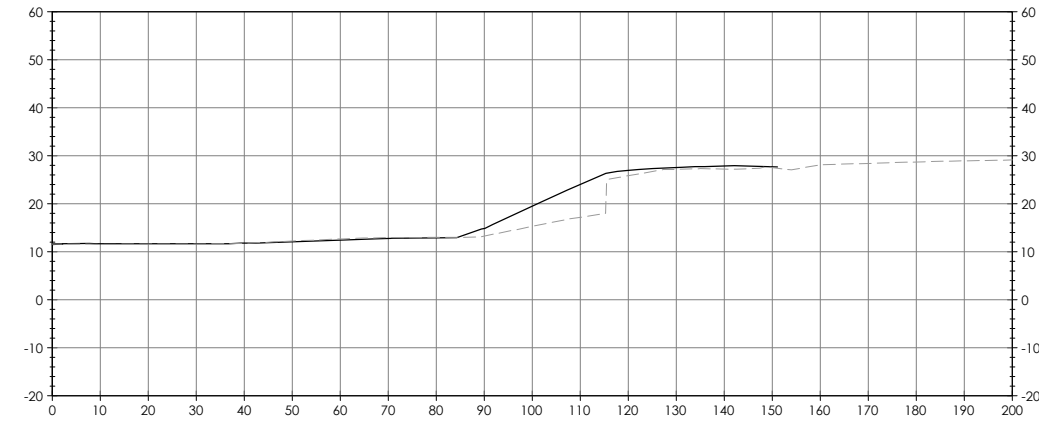
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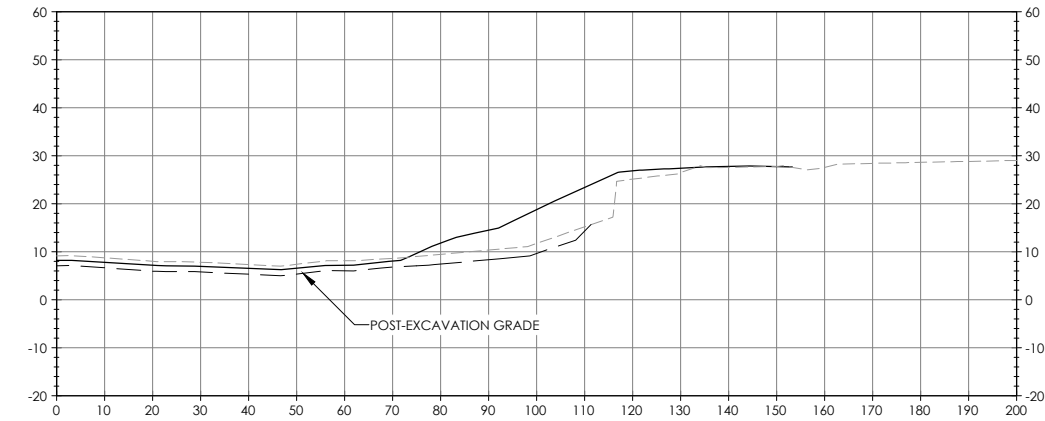
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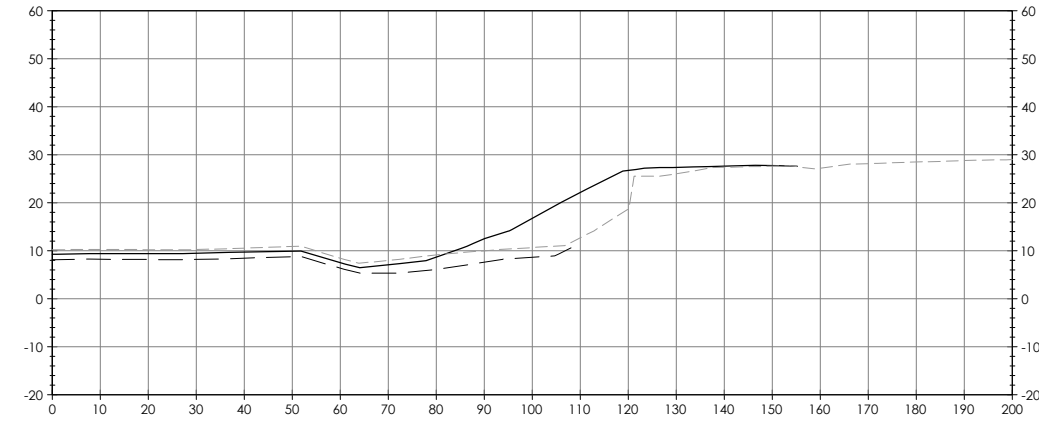
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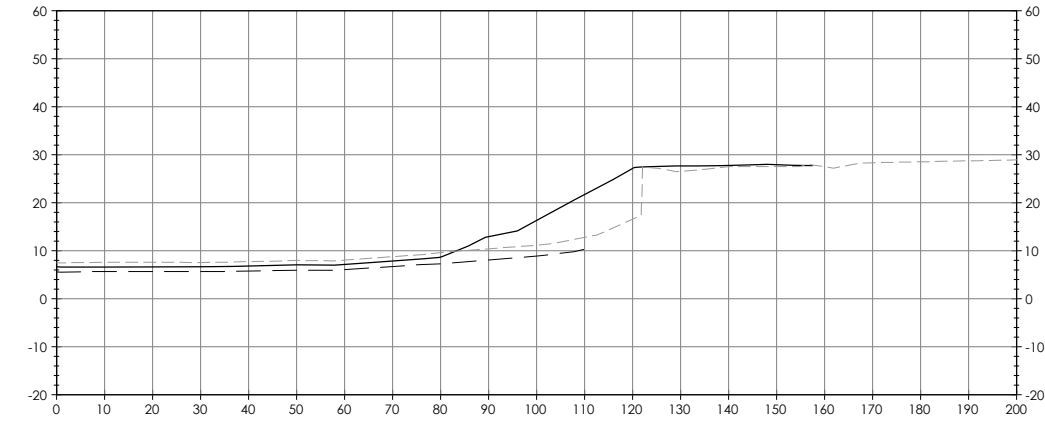
STA: 2+00



STA: 2+50



STA: 3+00



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11-17-2015

CARTY LAKE RECORD DRAWINGS
 PORT OF RIDGEFIELD
 RIDGEFIELD, WASHINGTON

ISSUE	DATE	DESCRIPTION

PROJECT: 9003.01.40
 DESIGNED: N/A
 DRAWN: J. ELLIOTT
 CHECKED: ---
 SCALE

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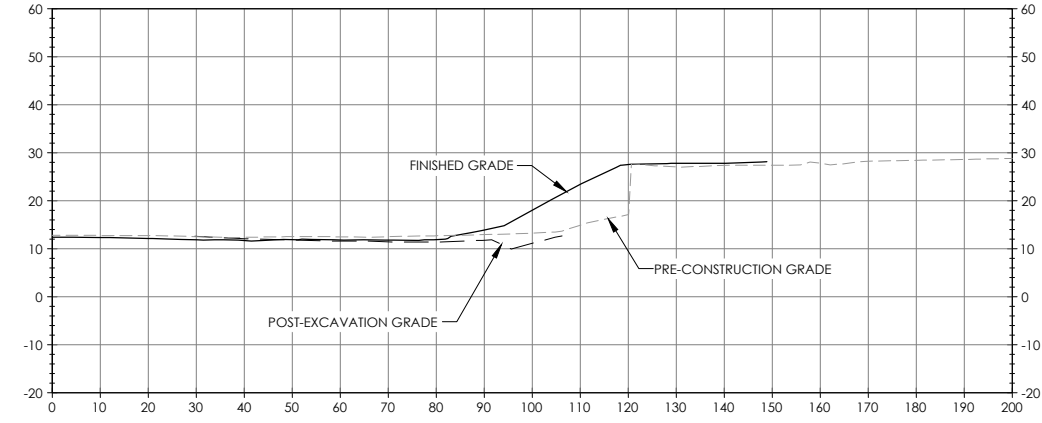
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SHEET

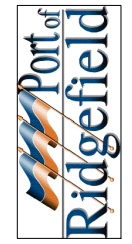
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STA: 3+50



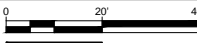

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CARTY LAKE RECORD DRAWINGS
 PORT OF RIDGEFIELD
 RIDGEFIELD, WASHINGTON

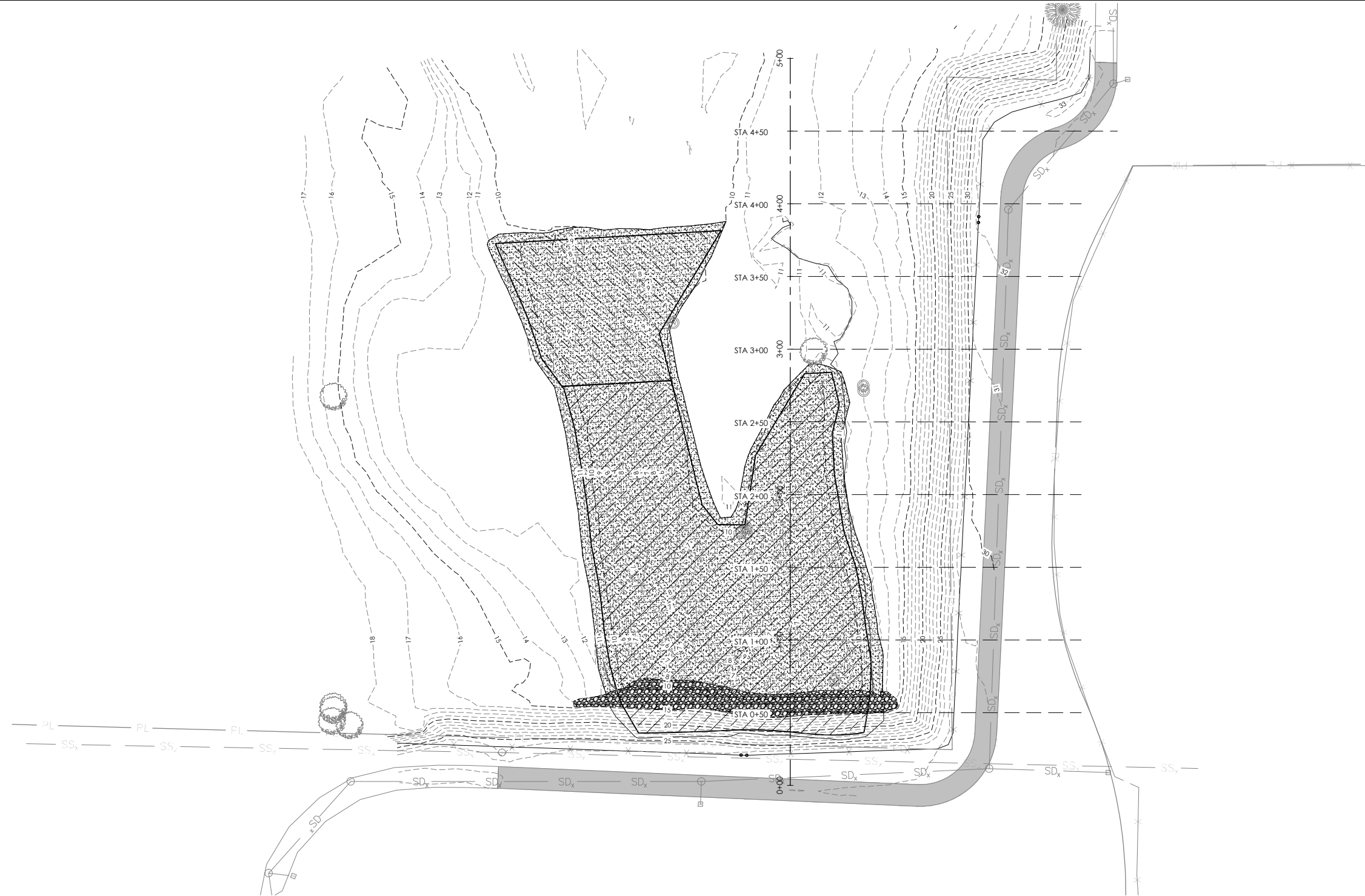
ISSUE	DATE	DESCRIPTION

PROJECT: 9003.01.40
 DESIGNED: N/A
 DRAWN: J. ELLIOTT
 CHECKED: ---
 SCALE

NOTE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

SHEET TITLE
SOUTH EMBANKMENT SECTIONS 2

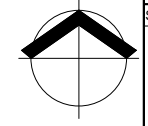
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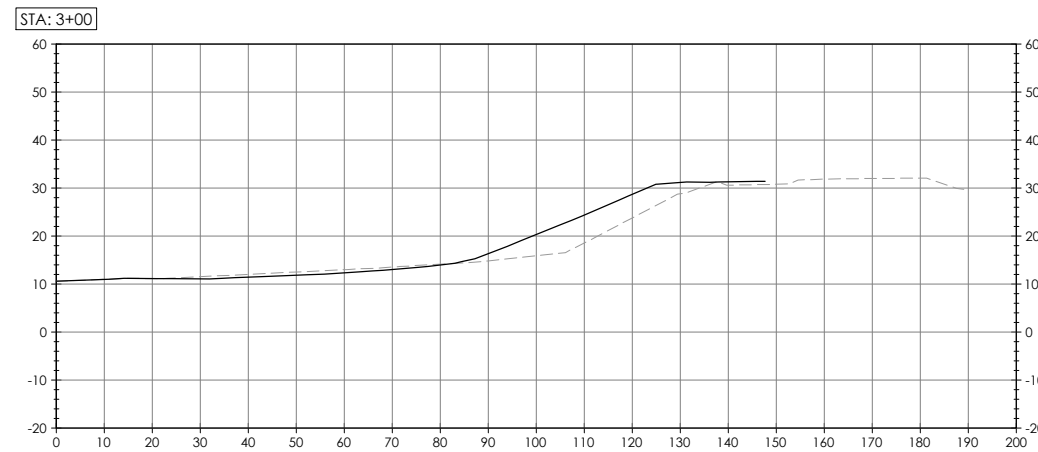
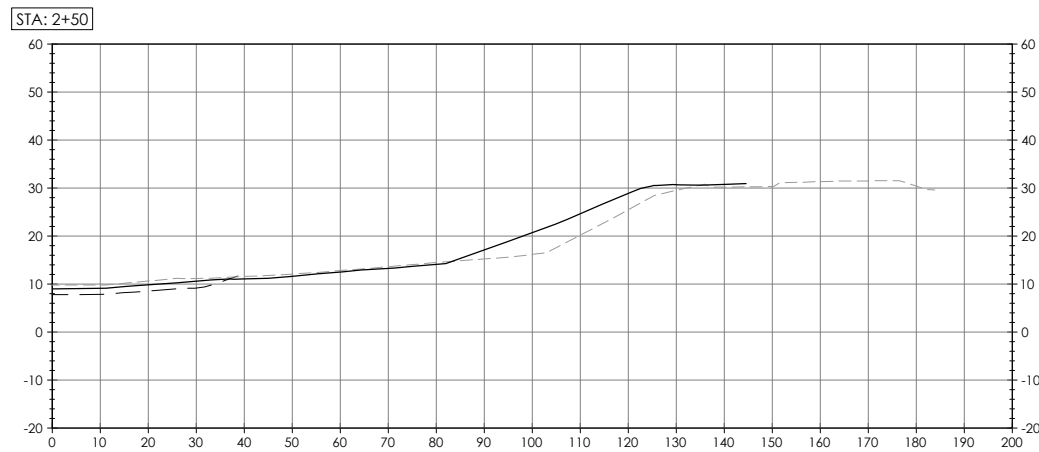
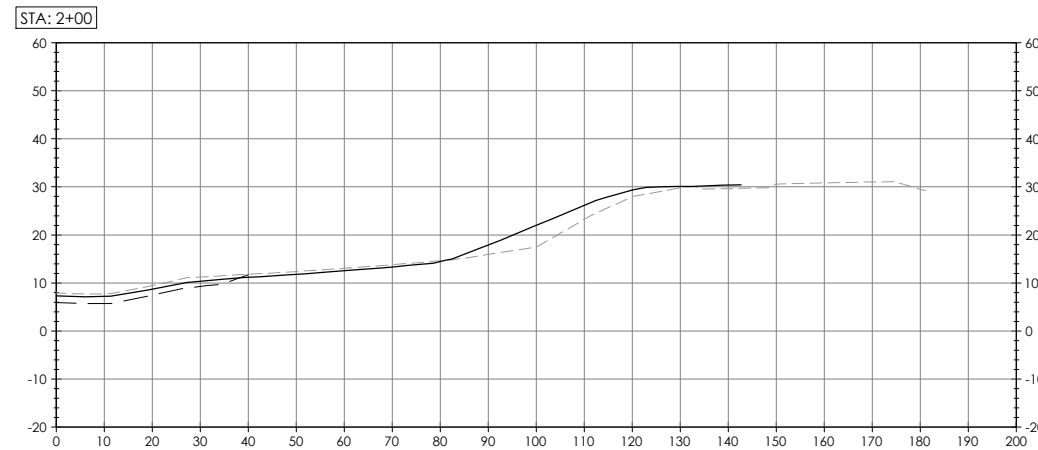
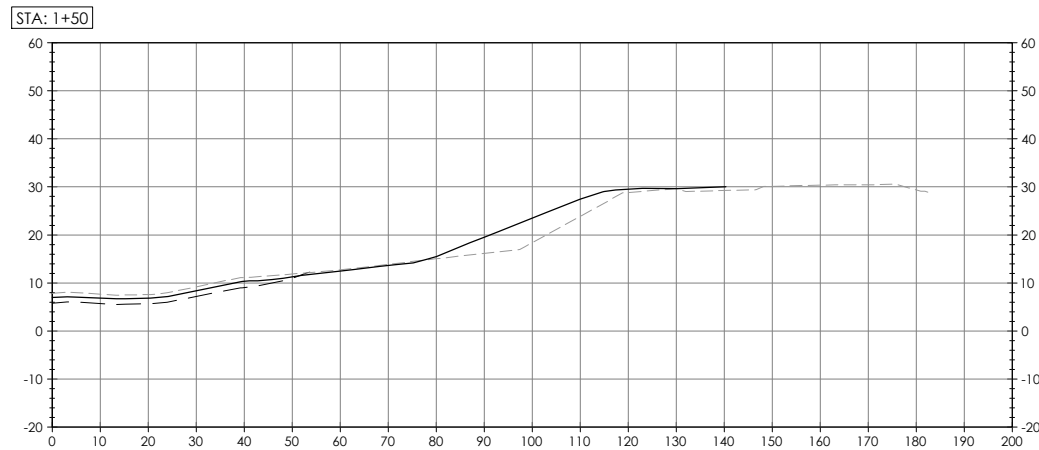
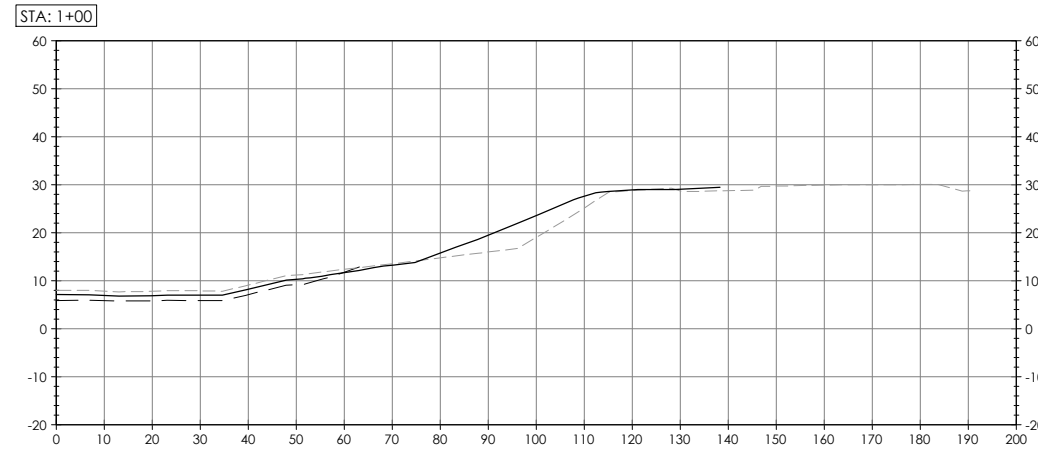
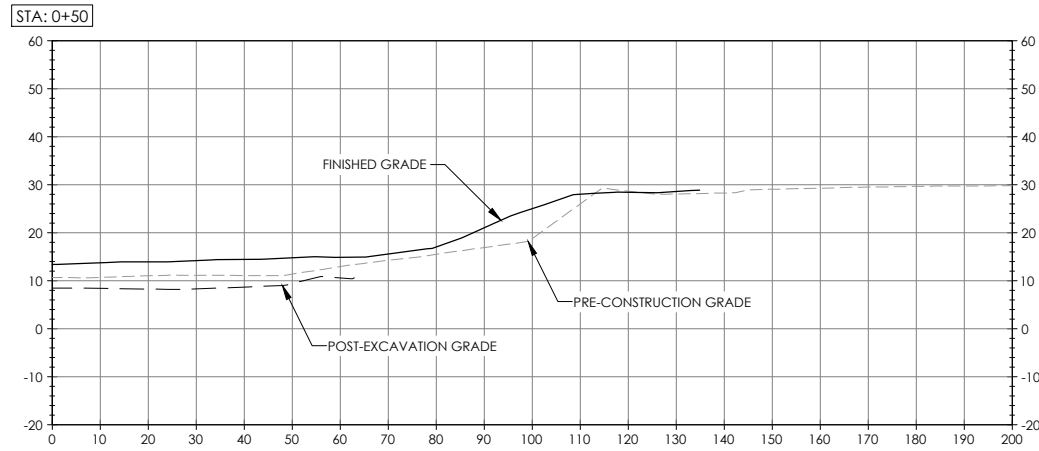
EAST EMBANKMENT STATIONING LEGEND:

- MAJOR CONTOUR (5' INTERVAL)
- MINOR CONTOUR (1' INTERVAL)
- FISH MIX LIMITS
- SEDIMENT EXCAVATION LIMITS
- DESIGN SEDIMENT REMOVAL MINIMUM EXTENTS
- CLEAN SAND
- FISH MIX ROCK
- ASPHALT PAVING



 MAUL FOSTER A LONGI 400 EAST MILL PLAIN BLVD. SUITE 400 VANCOUVER, WA 98660 PHONE: 360.694.2691 www.maulfooster.com																																		
 Port of Ridgefield																																		
11-17-2015																																		
CARTY LAKE RECORD DRAWINGS PORT OF RIDGEFIELD RIDGEFIELD, WASHINGTON																																		
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">ISSUE</th> <th style="width: 10%;">DATE</th> <th style="width: 85%;">DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	ISSUE	DATE	DESCRIPTION																														
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PROJECT: 9003.01.40 DESIGNED: N/A DRAWN: J. ELLIOTT CHECKED: --- SCALE: ---																																		
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SHEET TITLE EAST EMBANKMENT STATIONING																																		
SHEET C1.1.0																																		

PLOTTED ON: 2015-11-14 2:31 PM PLOTTED BY: John Bort FILENAME: S:\00_MVA_OIA_2015\PROJECTS\0003\01_40_Port of Ridgefield\Com_Lake Construction\PLANS\Sections We.dwg



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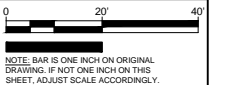


11-17-2015

CARTY LAKE RECORD DRAWINGS
 PORT OF RIDGEFIELD
 RIDGEFIELD, WASHINGTON

ISSUE	DATE	DESCRIPTION

PROJECT: 9003.01.40
 DESIGNED: JCE
 DRAWN: JCE
 CHECKED: ---
 SCALE



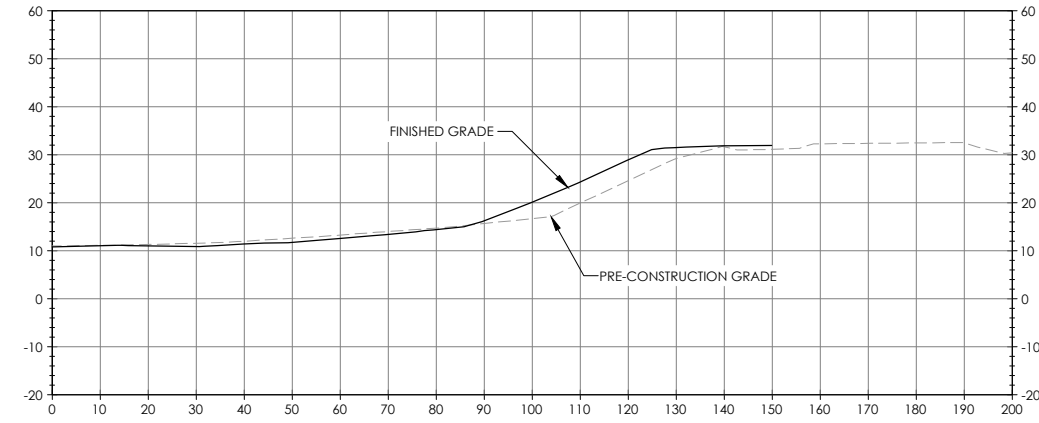
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SHEET TITLE
EAST EMBANKMENT SECTIONS 1

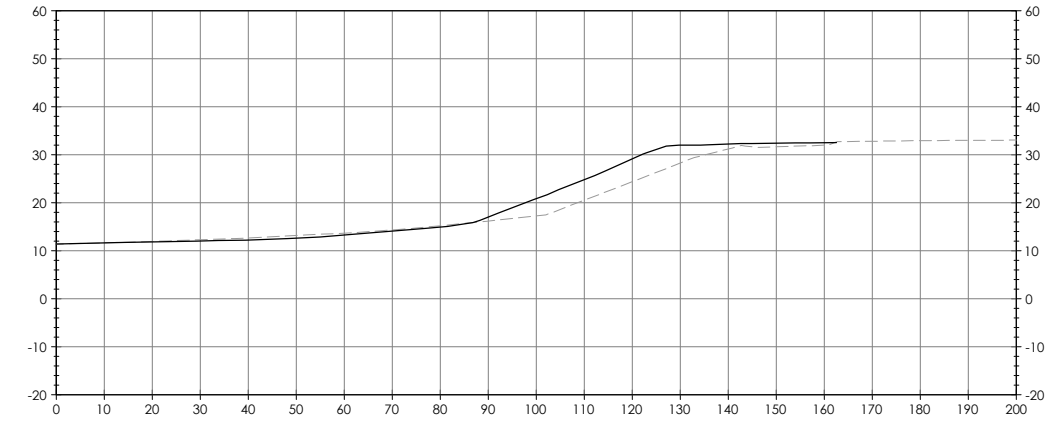
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C1.1.1

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 PLOTTED BY: John Bort
 FILENAME: S:\00_MVA_Civil\03_PNO\PROJECTS\0003\01_40_Prd of Ridgefield\Comp Lake Construction\PLANS\Sections We.dwg

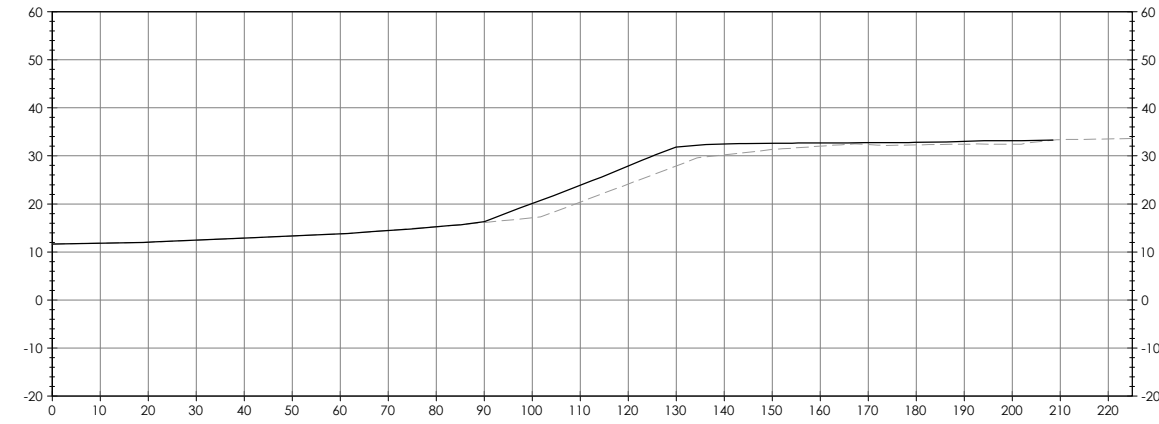
STA: 3+50



STA: 4+00



STA: 4+50



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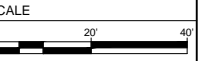


11-17-2015

CARTY LAKE RECORD DRAWINGS
 PORT OF RIDGEFIELD
 RIDGEFIELD, WASHINGTON

ISSUE	DATE	DESCRIPTION

PROJECT: 9003.01.40
 DESIGNED: JCE
 DRAWN: JCE
 CHECKED: ---



NOTE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

SHEET TITLE

EAST EMBANKMENT
 SECTIONS 2

SHEET

C1.1.2



CLARK COUNTY
MITIGATION PARTNERS

RECEIVED
AUG 27 2014

BY:

US Army Corps of Engineers
Mitigation Banking Specialist
Regulatory Branch
PO BOX 3755
Seattle, WA 98124-3755

WA Dept. of Ecology
Mitigation Banking Specialist
Shorelands and Environment Program
PO BOX 47600
Olympia, WA 98504-7600

US EPA
Aquatic Resources Unit
ETPA-083
1200 Sixth Ave
Seattle WA 98101

City of Vancouver
Community Planning
PO Box 1995
Vancouver, WA 98668-1995

Brent Grening
Port of Ridgefield
PO Box 55
Ridgefield, WA 98642

Notice is hereby given that on August 25, 2013 the Columbia River Wetland Mitigation Bank has transferred 0.276 wetland credits to The Port of Ridgefield.

These credits are to be applied to the following permits:


Issuing Regulatory Agency	Permit #	Issue Date
USACOE	NWS-2013-1209	August 19, 2014

Notice will be filed on the property title with the Clark County Auditor per the Mitigation Banking Agreement. The bank credit ledger has been updated.

Sincerely,



Victor Woodward
Manager
Columbia River Wetland Mitigation Bank

Daily Report Number:	CLSR-0911-MBR			 MAUL FOSTER ALONGI 400 E. Mill Plain Boulevard, Ste. 400 Vancouver, WA 98665 360-694-2691		
Date:	9/11/2014					
Weather:	AM:	Sunny				
	PM:	Sunny				
Temperature:	Min:	50 °F				
	Max:	75 °F				
24hr Precipitation:	None			Dust Conditions:	Moderate	
Completed by:	Mike Reiter, EIT			Number of Contractor Employees		
Contractor:	Strider Construction Co., Inc.			Supervisory	Operators	Laborers
				1	2	2
Work Performed Today						
Location	Sub Location	Description of Work	Time Started	Time Ended		
Remedy Area	Carty Lake	Sediment Excavation and Handling	7:15	18:00		
Remedy Area	Stabilization Embankment	Sediment Transport and Disposal	7:15	18:00		
CQA Officers on site:				MBR		
Additional Remarks:						
MBR onsite at 7:05. High winds today. Strider began trucking sediment to the landfill immediately in the morning. Six trucks ran all day. Each truck took approximately 13-15 loads to the landfill. Strider sent two members of the crew to another job today. The tracked carrier will no longer be used. The rest of the east finger and southwest corner of the excavation prism were excavated today. The only areas remaining to be excavated are covered up by the footprint of the sediment stockpile awaiting disposal. As the stockpile is loaded and pulled back, excavation will continue towards the bulkhead. Strider placed a few rolls of fabric on the east embankment today and dropped some sand to secure it. Matt Goodwin (WillametteCRA) discovered a glass electrical insulator today in the excavation prism. He does not see the need to stop work at this time. MBR offsite 12:30, (lunch), onsite 13:00. Minimal dewatering occurred today. In the late afternoon, MBR conducted sampling of the second batch of treated water today. MBR offsite at 17:40.						
Time	Turbidity Conditions		Remarks			
8:00	No plumes visible		None			
12:00	No plumes visible		None			
14:00	No plumes visible		None			
Inspections and Tests						
Inspection/Test Type	Location			Form No.		
Sediment Excavation Inspection	Carty Lake			DSE-091014-MBR		
Water Quality Monitoring	Temporary Equipment Staging Area			N/A		
Additional Remarks:						
MBR conducted sampling of treated water at approximately 5:15. Turbidity = 10.98 NTU. Samples were taken for benzo(a)pyrene and pentachlorophenol. The lab will pick them up as soon as possible.						

Daily Report Number: CLSR-0911-MBR			
Date: 9/11/2014	Completed by: Mike Reiter, EIT		
Subcontractors Onsite			
Company Name:	Work Area		
R Transport	Stabilization Embankment		
	6		
Additional Remarks: R Transport supplied transport trucks that hauled sediment to the landfill today. Six trucks ran today.			
Visitors			
Time	Name(s)	Agency/Company	Remarks
7:00	Matthew Goodwin, B.S.	WillametteCRA	See below.
Additional Remarks: M. Goodwin from WillametteCRA observed earthwork in Carty Lake all day. He discovered one glass electrical insulator and made the required notifications. Work is not anticipated to be affected.			
Verbal Communications with Contractor			
Time	Name(s)	Remarks	Action Item?
16:45	Steve	Strider to fix stockpile tomorrow. Wind has blown off cover.	No
Additional Remarks:			

CONSTRUCTION DAILY REPORT
Carty Lake Sediment Remedy Project

Daily Report Number: CLSR-0911-MBR				
Date:	9/11/2014	Completed by:	Mike Reiter, EIT	
Equipment Onsite				
Contractor	Equipment	Quantity	Used Today?	Hours Used
Strider Construction	Loader	1	No	
Strider Construction	450 Excavator	1	Yes	11
Strider Construction	Hitachi Excavator	1	Yes	11
Strider Construction	Mini Excavator	1	No	
Strider Construction	Haul Truck	1	Yes	11
Strider Construction	Dozer	1	No	
Strider Construction	Roller/Compactor	1	No	
Strider Construction	Road Grader	1	No	
Strider Construction	Water Truck	1	Yes	4
Strider Construction	Tracked Carrier	1	Yes	11
Construction Issues Tracking				
Location	Description	Resolution		Action Item?
Additional Remarks:				
CQA Officer Signature		Date	Project Manager Review	
MBR		9/11/2014	JCE	

Daily Report Number:	CLSR-0911-MBR		
Date:	9/11/2014	Completed by:	Mike Reiter, EIT

Photos



Photo 1: Looking north at a truck getting loaded with sediment for disposal.
Note the steel plates, visqueen, and rumble strip.



Photo 2: Looking west at the stockpile of contaminated sediment awaiting transport and disposal.

Carty Lake Sediment Remedy CQA



**MAUL
FOSTER
ALONGI**

Daily Sediment Excavation Inspection CQA Form

Form Number: DSE-091114-MBR

Date: 9/11/2014

Weather: Sunny

CQA Official: Mike Reiter, EIT

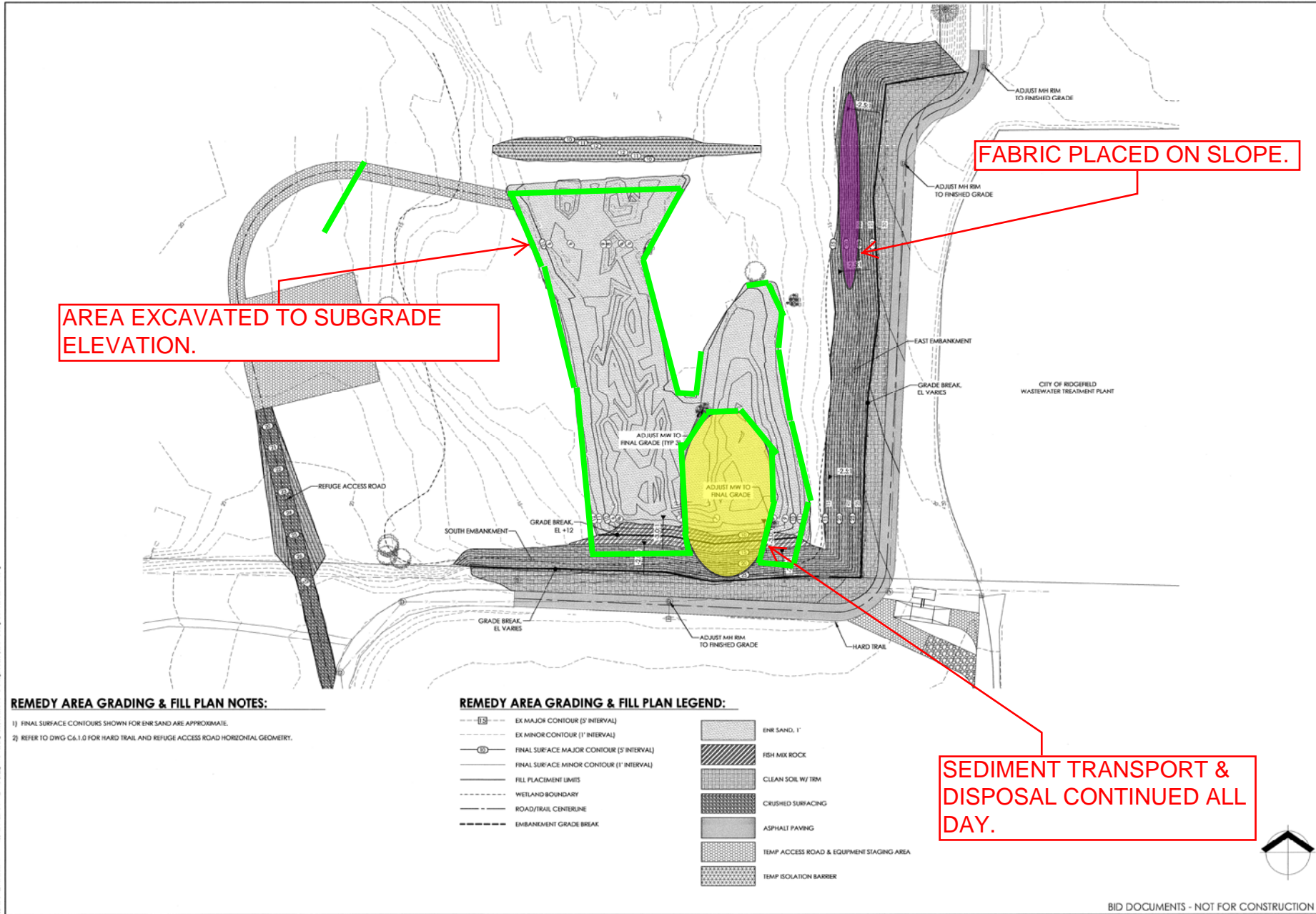
South Embankment Approximate Stationing:

East Embankment Approximate Stationing:

Procedure	Task	Verification
Monitoring	Has any contaminated sediment been tracked onto finished neat line surfaces?	No
	Is the subgrade surface in general conformance with the lines and grades shown on the plans?	Yes
	Is the subgrade surface smooth and free from protrusions, mounds, or dips?	Yes
	Has all excavated sediment been loaded over a plastic liner into a lined truck bed and disposed of at an approved, Subtitle D landfill facility or transported to the sediment-handling area for disposal at a later date, or temporarily stockpiled in the excavation area with MFA's approval?	Yes

Comments:

Strider excavated contaminated sediment all day. Strider ceased using the tracked carrier today and sidecast material directly from the excavator to the stockpile. It is loaded on a truck and will be returned to the shop tomorrow morning. The Hitachi excavator continued to excavate the east finger down to finished subgrade while the grade checker provided continuous QC. In the late afternoon, once the excavator reached the stockpile and could excavate no further, it moved over to the final area in the southwest corner of the excavation prism. The only areas remaining that need to be excavated are underneath the stockpile of contaminated sediment. As the stockpile is loaded into trucks and pulled back to the south, the final portions of the excavation prism will be excavated to finished subgrade elevation. MBR periodically checked the elevations on Strider's GPS rover to verify that the design grades are being achieved. MBR verified visually throughout the day that no contaminated sediment was tracked onto finished subgrade surfaces. All material was stockpiled in the remedy area.




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 400 EAST MILL PLAIN BLVD
 SUITE 400
 VANCOUVER, WA 98660
 PHONE (360) 344-2139
 WWW.MFLONGI.COM



CARTY LAKE SEDIMENT REMEDY
 PORT OF RIDGEFIELD
 RIDGEFIELD, WASHINGTON

NO.	DATE	DESCRIPTION

PROJECT: 003.01.00
 DESIGNED: J. ELLIOTT
 DRAWN: J. ELLIOTT
 CHECKED: E. SANKOMA
 SCALE: 1" = 40'
 SHEET TITLE: REMEDY AREA GRADING & FILL PLAN
 SHEET: C6.0

Daily Report Number:	CLSR-0923-MBR		 MAUL FOSTER ALONGI 400 E. Mill Plain Boulevard, Ste. 400 Vancouver, WA 98665 360-694-2691		
Date:	9/23/2014				
Weather:	AM:	Overcast			
	PM:	Showers			
Temperature:	Min:	61 °F			
	Max:	67 °F			
24hr Precipitation:	0.6"	Dust Conditions:	N/A		
Completed by:	Mike Reiter, EIT		Number of Contractor Employees		
Contractor:	Strider Construction Co., Inc.		Supervisory	Operators	Laborers
			1	2	5
Work Performed Today					
Location	Sub Location	Description of Work	Time Started	Time Ended	
Remedy Area	Stabilization Embankment	Sediment Transport and Disposal	7:00	18:00	
Remedy Area	Existing Gravel Trail	Placement of Crushed Surfacing	15:00	18:00	
Remedy Area	Carty Lake	Sediment Excavation and Handling	8:00	12:00	
CQA Officers on site:			MBR		
Additional Remarks:					
MBR onsite at 7:10. Strider immediately began loading trucks with sediment for transport to the landfill. Five trucks ran today from R Transport. Each truck made four loads. In the morning the Hitachi excavator, grade checker, and Strider solo truck excavated the final "row" of sediment from the north end of the remedy area and hauled it to the stockpile for disposal. Operations were conducted on steel sheets and observed continuously by MBR to confirm cleanliness. In the afternoon the crew returned to the base of the stockpile and excavated around the footprint as the pile was pulled back and loaded into trucks. The grader, loader, and vibratory roller placed crushed surfacing on the east end of the hard trail in the afternoon. Strider cut down the pilings on the west side of the south embankment today and loaded them into the stockpile for disposal. Some sand was dropped down onto the south embankment but it was not placed or compacted. Dewatering was conducted all day and treated water was continuously discharged. Dewatering efforts made a negligible impact on the water ponded in the remedy area. MBR offsite 1:20 (lunch), onsite 1:40. MBR offsite 17:45.					
Time	Turbidity Conditions	Remarks			
8:00	No plumes visible	None			
12:00	No plumes visible	None			
16:00	No plumes visible	None			
Inspections and Tests					
Inspection/Test Type	Location	Form No.			
Structural Fill Placement Verification	Stabilization Embankment	SFP-092314-MBR			
Turbidity Monitoring	Temporary Equipment Staging Area	N/A			
Additional Remarks:					
MBR conducted a turbidity and pH analysis on treated dewatering water at approximately 11:05. Turbidity = 8.10 NTU. pH = 7.98.					

Daily Report Number: CLSR-0923-MBR			
Date: 9/23/2014	Completed by: Mike Reiter, EIT		
Subcontractors Onsite			
Company Name:	Work Area		
R Transport	Stabilization Embankment		
	5		
Additional Remarks: R Transport supplied transport trucks that hauled sediment to the landfill today. Five trucks ran all day. The Strider truck delivered a couple loads to the landfill in the afternoon, as well.			
Visitors			
Time	Name(s)	Agency/Company	Remarks
14:30	Jon Nasr	GeoDesign	Last lift of sand placed yesterday on S. Embankment passed.
7:45	Kanani Paraso	WillametteCRA	None.
Additional Remarks: Kanani from WillametteCRA observed sediment excavation activities all day. Jon of GeoDesign performed nuclear density testing on the uppermost lift of sand placed on the south embankment yesterday. All fill materials placed to date passed testing.			
Verbal Communications with Contractor			
Time	Name(s)	Remarks	Action Item?
10:15	Steve and Nathan	Strider to set up wheel wash.	Yes
15:00	Steve and Truckers	Moving forward, every truck to back onto loading area (no driving on cap) and all loads must be covered.	No
Additional Remarks:			

Daily Report Number:	CLSR-0923-MBR		
Date:	9/23/2014	Completed by:	Mike Reiter, EIT

Photos



Photo 1: Looking southeast at the crushed surfacing placed on the hard trail.



Photo 2: Looking southeast at the sediment stockpile.

Carty Lake Sediment Remedy CQA



**MAUL
FOSTER
ALONGI**

Daily Sediment Excavation Inspection CQA Form

Form Number: DSE-092314-MBR

Date: 9/23/2014

Weather: Partly Cloudy

CQA Official: Mike Reiter, EIT

South Embankment Approximate Stationing: STA 1+75

East Embankment Approximate Stationing: STA 13+75

Procedure	Task	Verification
Monitoring	Has any contaminated sediment been tracked onto finished neat line surfaces?	No
	Is the subgrade surface in general conformance with the lines and grades shown on the plans?	Yes
	Is the subgrade surface smooth and free from protrusions, mounds, or dips?	Yes
	Has all excavated sediment been loaded over a plastic liner into a lined truck bed and disposed of at an approved, Subtitle D landfill facility or transported to the sediment-handling area for disposal at a later date, or temporarily stockpiled in the excavation area with MFA's approval?	Yes

Comments:

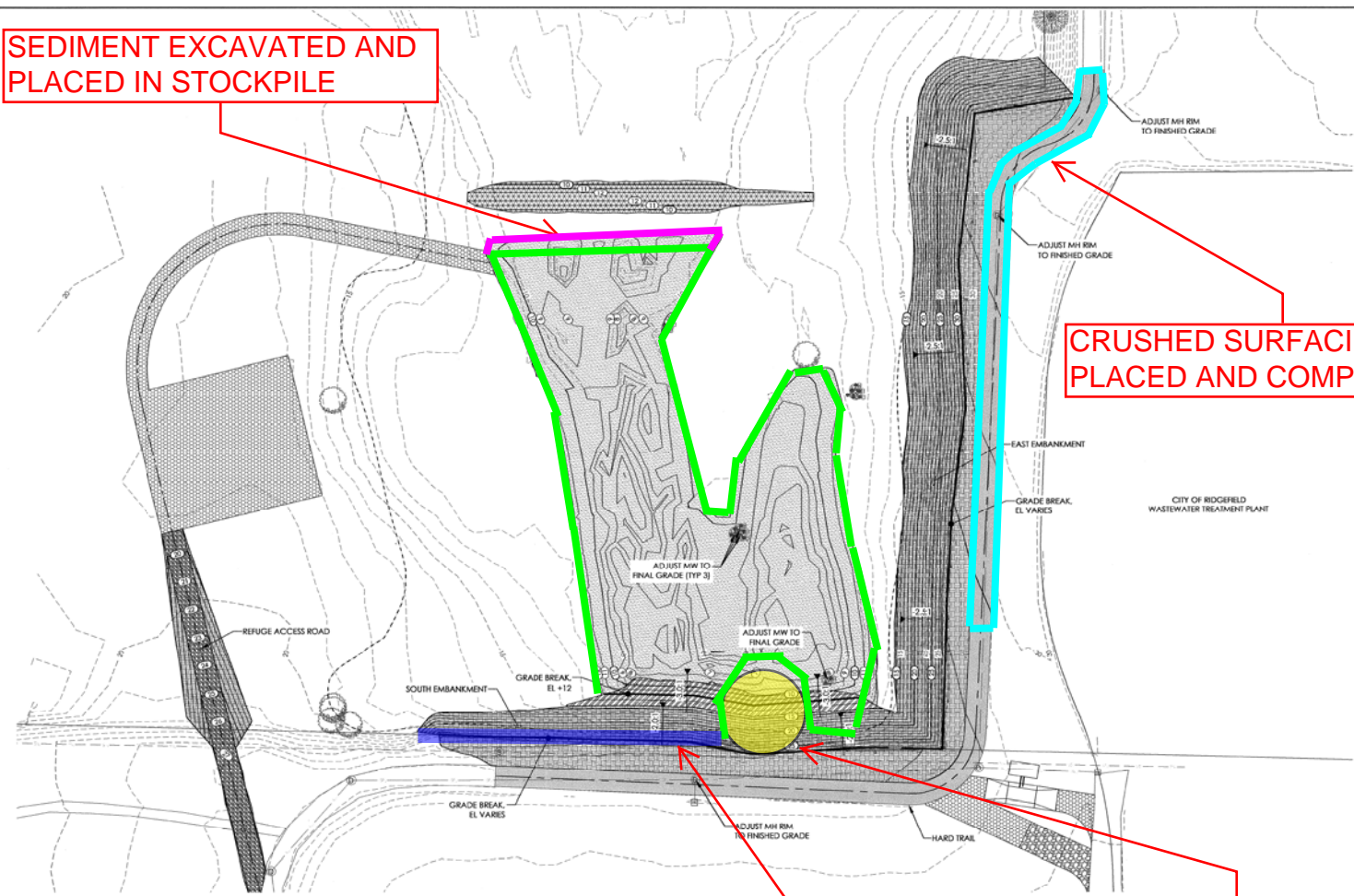
This morning Strider excavated the final "row" of sediment at the north end of the remedy area. This sediment was previously left in place, with MFA's approval, to hold back water that might rush into the excavation prism. The Hitachi excavator excavated the material from east to west, while sitting on steel plates, and loaded it into Strider's solo haul truck. The material was driven up to the bulkhead and dumped into the existing stockpile for disposal. MBR visually observed operations and verified that operations were conducted cleanly. MBR visually observed Strider's GPS rover to verify that grades are within the allowable tolerances. The archeological monitor was onsite and observed excavation. This sediment excavation was completed in the afternoon, and Strider moved down to the base of the sediment stockpile and began excavating to grades around the footprint of the stockpile as it was loaded out. Moving forward, sediment excavation activities will be limited, as only a small portion of the remedy area remains to be excavated (underneath the footprint of the stockpile).

SEDIMENT EXCAVATED AND PLACED IN STOCKPILE

CRUSHED SURFACING PLACED AND COMPACTED

SEDIMENT TRANSPORT AND DISPOSAL CONTINUED ALL DAY.

PILINGS CUT TO GRADE



REMEDY AREA GRADING & FILL PLAN NOTES:

- 1) FINAL SURFACE CONTOURS SHOWN FOR ENR SAND ARE APPROXIMATE.
- 2) REFER TO DWG C6.1.0 FOR HARD TRAIL AND REFUGE ACCESS ROAD HORIZONTAL GEOMETRY.

REMEDY AREA GRADING & FILL PLAN LEGEND:

- 5' --- EX MAJOR CONTOUR (5' INTERVAL)
- 1' --- EX MINOR CONTOUR (1' INTERVAL)
- 5' --- FINAL SURFACE MAJOR CONTOUR (5' INTERVAL)
- 1' --- FINAL SURFACE MINOR CONTOUR (1' INTERVAL)
- FILL PLACEMENT LIMITS
- WETLAND BOUNDARY
- ROAD/TRAIL CENTERLINE
- EMBANKMENT GRADE BREAK
- ENR SAND, 1"
- FISH HAWK ROCK
- CLEAN SOIL/TBM
- CRUSHED SURFACING
- TEMP ACCESS ROAD & EQUIPMENT STAGING AREA
- TEMP ISOLATION BARRIER

MAUL FOSTER ALONGI
400 EAST MILL PLAIN BLVD
SUITE 400
VANCOUVER, WA 98660
PHONE (377) 344-2139
WWW.MFAALONGI.COM



CARTY LAKE SEDIMENT REMEDY
PORT OF RIDGEFIELD
RIDGEFIELD, WASHINGTON

NO.	DATE	DESCRIPTION

PROJECT: 9003.01.00
DESIGNED: J. ELLIOTT
DRAWN: J. ELLIOTT
CHECKED: E. SANKOMA

SCALE
0 40 80

SHEET TITLE
REMEDY AREA GRADING & FILL PLAN

SHEET C6.0



Clean soil cap removal.



Clean soil cap stockpiled on liner



Clean soil cap removal.



Clean soil cap removal.



Clean soil cap removal.



Clean soil cap removal.



Dressing clean soil stockpile.



Filter fabric rolls.



Looking northeast at grading of the sediment handling area.



Stockpiled demarcation material, awaiting disposal.



Looking southwest at grader and roller grading out the subgrade.



Looking south at roller compacting recently placed ballast.



Looking southwest at stockpiled clean sand and Carty lake.



Looking south at grader grading ballast and truck delivering crushed surfacing



Looking southwest at crushed surfacing placed on ballast in the sediment handling area. Minor grading still required.



Looking north at the nearly completed upland sediment handling area.



Looking north at the placement of ballast for the temporary equipment staging area.



Looking southwest at the covering of the clean soil cap stockpile.



Looking west at the first bulk bag being placed in Carty Lake.



Looking east at the temporary isolation barrier, before the final wrap with visqueen.



Looking northeast at Carty Lake, before sediment excavation begins. Note the demolished trees on the east embankment.



Looking east at Carty Lake from the temporary equipment laydown; note the cleared bulkhead and east embankment.



Looking northeast at the 450 excavator removing a stump on the east embankment.



Looking east at the 450 excavating the keyway on the east embankment.



Looking east at the beginning of sediment excavation activities.



Looking north at sediment excavation activities.



Looking south at the east embankment being cleaned up to prepare for fill placement.



Looking north at extent of completed sediment excavation. Note equipment fueling up from bulkhead.



Looking north at extent of completed sediment excavation. Note equipment fueling up from bulkhead.



Looking north at sediment excavation operations.



Looking west at the placement of sand on fabric at the westernmost extent of the stabilization embankment.



Looking north at sediment excavation operations from the sand stockpile.



Looking west at the placement of sand on fabric on the east stabilization embankment.



Looking north at the first truck getting loaded with sediment for disposal.



Looking northeast at sediment excavation activities and east embankment construction.



Looking north at a truck getting loaded with sediment for disposal. Note the steel plates, visqueen, and rumble strip.



Looking west at the stockpile of contaminated sediment awaiting transport and disposal.



Looking west at a truck getting loaded with sediment for disposal.



Looking south at the western portion of the remedy area with the sediment stockpile and bulkhead in the background.



Looking east at the sediment stockpile with the southern portion of the east embankment in the background.



Looking west at filter fabric installation within the footprint of the northern terminus of the east embankment.



Looking north at compactive efforts on the east embankment.



Looking west at Strider dumping the fabric from the upland staging and sediment handling area on the sediment stockpile for disposal.



Looking south at the placement of filter fabric on the embankment and keyway subgrade on the south embankment.



Looking northeast from the bulkhead at the crushed surfacing placed on the south embankment to date. Note Strider staking grade for the embankment cross section with the GPS rover.



Looking north at the excavator dressing the slope of the east embankment. Note the tracks from the roller passes on the top lift.



Looking northeast from the bulkhead at the compaction of hard trail subgrade.



Looking southwest at sediment load-out operations and fill placement for the south embankment. Note the transition from crushed rock to sand at Elev. 12'.



Looking south at crushed surfacing base course placed on the hard trail subgrade for placement and compaction.



Looking southeast at the crushed surfacing placed on the hard trail.



Looking southeast at the sediment stockpile.



Looking southwest at the progress on the stockpile and the sand "road" to the remedy area.



Looking southwest at the progress on the stockpile.



Looking south at the extent of sand placed to date in Carty Lake.



Looking west at the last bit of sediment being loaded into trucks.



Looking west at scraping of reed canary grass.



Looking south at the completion of the upland staging and sediment handling area.



Looking north at the extents of clearing and grubbing completed.



Looking north at the sand placed to date in Carty Lake.



Looking southeast at the north corner of the east embankment, at the placement of the topsoil overlay.



Looking northeast at the remedy area progress. Note the extent of topsoil placed on the east embankment and amended sand placed in the lake.



Looking north at the Hitachi cleaning up amended sand from the "access ramp." Note the dewatered remedy area.



Looking northeast at the east embankment progress. Note the topsoil placement completed to date.



Looking southwest at the ramp and structural fill placed on fabric on the south embankment. The last area is awaiting survey.



Looking southeast at progress to date from a helicopter.



Looking north at progress to date from a helicopter.



Looking west at the south embankment being constructed.



Looking west from the east embankment at the remedy area.



Looking southwest at the extent of structural fill and fish mix rock placed on the south embankment today.



Looking northwest at the substantially completed clean sand placement.



Looking southwest at the extent of structural fill and topsoil placed on the south embankment today.



Looking north at the placement of TRM by Paul Bros. on the east embankment.



Looking southwest at the extent of topsoil placed on the south embankment by mid-day. Note the two grade breaks on the embankment.



Looking south from the isolation barrier at the site (panorama).



Looking south at the completed project.



Looking east at the straw placed on the disturbed soils.



Looking north at hydroseeding of east embankment 10/13/14



Looking southwest at hydroseeded south embankment. 10/13/14



Looking northeast at planted east embankment, above ground irrigation and temporary in-water fencing. 3/28/15



Looking west at planted south and west embankment. 4/17/15



Looking northeast at live stakes at foot of south embankment. 5/11/15



Looking west at in-water vegetation. 5/11/15



Looking southeast at established in-water vegetation. 10/1/15



Looking southwest at established transitional vegetation adjacent to deep in-water areas. 10/1/15

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9003.01.40 | SEPTEMBER 25, 2014 | PORT OF RIDGEFIELD

This report reviews the analytical results for soil samples collected from imported fill by the Maul Foster & Alongi, Inc. (MFA) project team on the Carty Lake site near the Lake River Industrial Site in Ridgefield, Washington. The samples were collected on August 8 and September 12, 2014.

Specialty Analytical, Inc. (SA) and Pace Analytical (PA) performed the analyses. SA report numbers 1408056rev1 and 1409082, and PA report numbers 10278529_1613B (10278529), 10281039_1613B_dfr (10281039), and 10280382_frc (10280382) were reviewed. The analyses performed and samples analyzed are listed below. Some analyses may not have been performed on all samples. Data validation tracking sheets associated with the analyses, documenting data review, are attached.

Analysis	Reference
Diesel and Lube Oil/Motor Oil	NWTPH-Dx
Dioxins/Furans	USEPA 1613B
Mercury	USEPA 7471
Metals	USEPA 6010
Organochlorine Pesticides	USEPA 8081B
PCB Aroclors	USEPA 8082A
PAHs	USEPA 8270D
SVOCs	USEPA 8270D

NWTPH = Northwest Total Petroleum Hydrocarbons.
 PAH = polycyclic aromatic hydrocarbon.
 PCB = polychlorinated biphenyl.
 SVOC = semivolatile organic compound.
 USEPA = U.S. Environmental Protection Agency.

Samples Analyzed				
Report 1408056rev1	Report 10278529	Report 1409082	Report 10281039	Report 10280382
IMP-1	1408057-001 (IMP-1)	80/20/ SOIL	80/20/ SOIL	80/20/ SOIL
IMP-2	1408057-002 (IMP-2)	-	-	-
IMP-3	1408057-003 (IMP-3)	-	-	-

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2008, 2010, 2011), appropriate laboratory and method-specific guidelines (PA, 2014; SA, 2014; USEPA, 1986), and the dioxin rules memorandum developed by MFA and approved by the Washington State Department of Ecology (MFA, 2012).

In report 10278529, USEPA Method 1613B detected results that were reported as an estimated maximum potential concentration (EMPC) were assigned a “U” qualifier (non-detect) at the reported EMPC value by the reviewer.

Report	Sample	Component	Original Result (ng/kg)	Qualified Result (ng/kg)
10278529	1408057-001 (IMP-1)	OCDF	0.48 IJ	0.48 U

IJ = Interference present. Result is an estimated value.
 ng/kg = nanograms per kilogram.

In report 10280382, the laboratory noted that the USEPA Method 8081 confirmation column had a continuing calibration verification (CCV) result for endrin ketone below the lower percent recovery acceptance limit. The result reported for endrin ketone was below the reporting limit (RL) and was qualified by the laboratory as estimated (J). No additional qualification was required.

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

Extractions and analyses were performed within the recommended holding time criteria, with the following exception. In report 1408056rev1, sample IMP-2 was reextracted for USEPA Method 8082A 14 days after the 14-day holding time in order to confirm the results. PCB Aroclors are relatively stable in solid matrices. The results were non-detect, and have been qualified with “UJ” as estimated.

Laboratory Report 1408056rev1 Hold Time Qualifications			
Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
IMP-2	Aroclor 1016	0.333 U	0.333 UJ
IMP-2	Aroclor 1221	0.333 U	0.333 UJ
IMP-2	Aroclor 1232	0.333 U	0.333 UJ
IMP-2	Aroclor 1242	0.333 U	0.333 UJ
IMP-2	Aroclor 1248	0.333 U	0.333 UJ
IMP-2	Aroclor 1254	0.333 U	0.333 UJ
IMP-2	Aroclor 1260	0.333 U	0.333 UJ
IMP-2	Aroclor 1262	0.333 U	0.333 UJ
IMP-2	Aroclor 1268	0.333 U	0.333 UJ

ug/kg = micrograms per kilogram.

Preservation and Sample Storage

The samples submitted to PA for USEPA Method 1613B analysis were received at the laboratory above the upper recommended storage temperature limit of 6 degrees Celsius

(°C), at 14.2°C. USEPA national functional guidelines for dioxins data review (USEPA, 2011) recommend qualification of results as estimated, with “UJ” for non-detect results and “J” for detected results. All associated USEPA Method 1613B results have been qualified as estimated. Results below the RL were already flagged by the laboratory as estimated and were not additionally qualified by the reviewer.

The samples were preserved and stored appropriately.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch.

In report 10281039, the USEPA Method 1613B method blank had detections below the RL for 2,3,7,8-TCDF, total TCDF, and OCDD, at 0.048, 0.048, and 0.380 ng/kg, respectively. The associated sample results were more than ten times the method blank detections; thus, no results were qualified.

In report 10280382, the USEPA Method 6010 method blank had detections below the RL for silver and zinc, at 0.13 and 0.80 milligram per kilogram (mg/kg), respectively. The associated sample had detections for silver below the RL, at 0.31 mg/kg, and for zinc above the RL, at 102 mg/kg. The result for zinc was sufficiently higher than the method blank detection and was not qualified. The result for silver was qualified as “U” at the RL.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
10280382	80/20 SOIL	Silver	0.31 J	3.0 U

In report 10280382, the NWTPH-Dx method blank had detections for diesel and motor oil below the RL. The associated sample had detections for diesel and motor oil that were significantly higher than the RL; thus, no results were qualified.

All remaining laboratory method blanks were non-detect.

Continuing Calibration Blanks

Continuing calibration blanks (CCBs) were provided for some analyses. All CCBs were non-detect.

Trip Blanks

Trip blanks were not required for this sampling event because samples were not analyzed for volatile organic compounds.

Equipment Rinsate Blanks

Equipment rinsate blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. The laboratory appropriately documented and qualified surrogate outliers. Associated batch quality assurance and quality control for samples with surrogate outliers were within acceptance limits. Minor surrogate percent recovery exceedances or upper percent recovery exceedances associated with non-detect results were not qualified by the reviewer.

In report 1408056rev1, USEPA Method 8270D (SVOC) batch 7474 surrogate 2-fluorobiphenyl results were below the lower percent recovery acceptance limit for sample IMP-3 and the method blank. USEPA Method 8270D (PAH) batch 7979 surrogate 2-fluorobiphenyl results were below the lower percent recovery acceptance limit for sample IMP-1. The remaining surrogates had acceptable percent recoveries; thus, no results were qualified.

In report 1408056rev1, USEPA Method 8081B surrogate tetrachloro-m-xylene results for samples IMP-1 and IMP-2 were below the lower percent recovery acceptance limit because of matrix interference. Associated sample results were non-detect and have been qualified in the table below with “UJ” as estimated.

Laboratory Report 1408056rev1 Matrix Interference Qualifications			
Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
IMP-1	4,4'-DDD	0.335 U	0.335 UJ
IMP-1	4,4'-DDE	0.335 U	0.335 UJ
IMP-1	4,4'-DDT	0.335 U	0.335 UJ
IMP-1	Aldrin	0.335 U	0.335 UJ
IMP-1	alpha-BHC	0.335 U	0.335 UJ
IMP-1	alpha-Chlordane	0.335 U	0.335 UJ
IMP-1	beta-BHC	0.335 U	0.335 UJ
IMP-1	Chlordane	6.69 U	6.69 UJ
IMP-1	delta-BHC	0.335 U	0.335 UJ
IMP-1	Dieldrin	0.335 U	0.335 UJ
IMP-1	Endosulfan I	0.335 U	0.335 UJ
IMP-1	Endosulfan II	0.335 U	0.335 UJ
IMP-1	Endosulfan Sulfate	0.335 U	0.335 UJ
IMP-1	Endrin	0.335 U	0.335 UJ
IMP-1	Endrin aldehyde	0.335 U	0.335 UJ
IMP-1	Endrin ketone	0.335 U	0.335 UJ
IMP-1	gamma-BHC	0.335 U	0.335 UJ
IMP-1	gamma-Chlordane	0.335 U	0.335 UJ

Laboratory Report 1408056rev1 Matrix Interference Qualifications			
Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
IMP-1	Heptachlor	0.335 U	0.335 UJ
IMP-1	Heptachlor epoxide	0.335 U	0.335 UJ
IMP-1	Methoxychlor	0.335 U	0.335 UJ
IMP-1	Toxaphene	6.69 U	6.69 UJ
IMP-2	4,4'-DDD	0.333 U	0.333 UJ
IMP-2	4,4'-DDE	0.333 U	0.333 UJ
IMP-2	4,4'-DDT	0.333 U	0.333 UJ
IMP-2	Aldrin	0.333 U	0.333 UJ
IMP-2	alpha-BHC	0.333 U	0.333 UJ
IMP-2	alpha-Chlordane	0.333 U	0.333 UJ
IMP-2	beta-BHC	0.333 U	0.333 UJ
IMP-2	Chlordane	6.67 U	6.67 UJ
IMP-2	delta-BHC	0.333 U	0.333 UJ
IMP-2	Dieldrin	0.333 U	0.333 UJ
IMP-2	Endosulfan I	0.333 U	0.333 UJ
IMP-2	Endosulfan II	0.333 U	0.333 UJ
IMP-2	Endosulfan Sulfate	0.333 U	0.333 UJ
IMP-2	Endrin	0.333 U	0.333 UJ
IMP-2	Endrin aldehyde	0.333 U	0.333 UJ
IMP-2	Endrin ketone	0.333 U	0.333 UJ
IMP-2	gamma-BHC	0.333 U	0.333 UJ
IMP-2	gamma-Chlordane	0.333 U	0.333 UJ
IMP-2	Heptachlor	0.333 U	0.333 UJ
IMP-2	Heptachlor epoxide	0.333 U	0.333 UJ
IMP-2	Methoxychlor	0.333 U	0.333 UJ
IMP-2	Toxaphene	6.67 U	6.67 UJ

In report 10280382, USEPA Method 8081 surrogate decachlorobiphenyl exceeded the upper percent recovery acceptance limit because of matrix interference and subsequent 1:5 dilution. All associated detected results were already qualified by the laboratory as estimated because of detection below the RL; thus, no additional qualification was required.

All remaining surrogate recoveries were within acceptance limits.

LABELED ANALOG RECOVERY RESULTS

In reports 10278529 and 10281039, USEPA Method 1613B samples and batch quality control were spiked with carbon-13 (C13) labeled standards to quantify the relative response of analytes in each sample. In report 10281039, the USEPA Method 1613B method blank labeled analog standard results were below lower percent recovery acceptance limits for several dioxin and furan compounds. The laboratory stated in the case narrative that associated sample results are quantified using labeled analog results and are automatically

adjusted for labeled analog percent recovery. Low labeled analog results indicate a potential high bias in associated sample results. The method blank results associated with low labeled analog percent recoveries were non-detect; thus, no results were qualified.

All remaining C13 labeled analog standard recoveries were within acceptance limits.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. All MS/MSD samples were extracted and analyzed at the required frequency.

In report 1408056rev1, the USEPA Method 8270 batch 7474 MS/MSD exceeded the relative percent difference (RPD) acceptance limit for 4-chloro-3-methylphenol (21.2 percent) and n-nitrosodi-n-propylamine (32.8 percent). Associated samples were non-detect; thus, no results were qualified.

In report 10280382, the USEPA 6010 MS exceeded upper percent recovery acceptance limits for zinc, at 127 percent, because of matrix interference. The exceedance was minor and the MSD had acceptable percent recovery; thus, no results were qualified.

In report 10280382, the NWTPH-Dx MSD exceeded the upper percent recovery acceptance limit and the MS/MSD exceeded the RPD acceptance limit for motor oil because of matrix interference. The associated sample result was qualified with "J" as estimated.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
10280382	80/20 SOIL	Motor-Oil Range	417	417 J

All remaining MS/MSD recoveries were within acceptance limits for percent recovery and RPDs.

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All laboratory duplicate samples were extracted and analyzed at the required frequency. All laboratory duplicate RPDs were within acceptance limits.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

In report 1408056rev1, the USEPA Method 8081B LCS result for 4,4'-DDT exceeded the upper percent recovery acceptance limit, at 135 percent. All associated samples were non-detect; thus, no results were qualified.

All remaining LCS/LCSD results were within acceptance limits for percent recovery and RPD.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. Field duplicate samples were not submitted for analysis.

CONTINUING CALIBRATION VERIFICATION AND INITIAL CALIBRATION VERIFICATION RESULTS

CCV and initial calibration verification (ICV) results are used to demonstrate instrument precision and accuracy through the end of the sample batch. All CCVs and ICVs were within acceptance limits for percent recovery.

REPORTING LIMITS

SA used routine RLs for non-detect results, except when samples required dilutions because of limited sample or extract volume and high analyte concentrations. PA used estimated detection limits (EDLs) for non-detect results. USEPA Method 1613B detections between the RL and the EDL were qualified by the laboratory as estimated (J).

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

In reports 10278529 and 10281039, the USEPA Method 1613B EDL column header in the sample results and method blank pages is labeled as "RL" instead of "EDL." The reviewer confirmed with PA that the column header should be "EDL" and cannot currently be changed by the laboratory. The reviewer also confirmed with PA that the reported values in this column are EDL values.

No additional issues were found.

REFERENCES

- PA. 2014. Quality assurance manual. Pace Analytical, Minneapolis, Minnesota.
- SA. 2014. Quality assurance manual. Specialty Analytical, Inc., Clackamas, Oregon.
- MFA. 2012. Dioxin and furan analysis, data validation, and TEQ calculation rules. Maul Foster & Alongi, Inc. December.
- USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 6, February 2007).
- USEPA. 2008. USEPA contract laboratory program, national functional guidelines for organics data review. EPA 540/R-08/01. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. June.
- USEPA. 2010. USEPA contract laboratory program national functional guidelines for inorganic superfund data review. EPA 540/R-10/011. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.
- USEPA. 2011. USEPA contract laboratory program, national functional guidelines for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) data review. EPA-540-R-11-016. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. September.

ATTACHMENT

DATA VALIDATION TRACKING



DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1408056
Analysis/Method	SVOCs/USEPA 8270D
Batch Number(s)	7474

Reviewer	MEB
Date	9/10/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	Yes		
	MS/MSD RPD	No	See notes below.	
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	No	IMP-3 and method blank 2-fluorobiphenyl low recovery. Remaining five surrogate results are OK, no qualification.	
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
IMP-1	-	-	-
IMP-2	-	-	-
IMP-3	-	-	-

<p>Notes:</p> <p>MS/MSD RPD for 4-chloro-3-methylphenol (21.2%), n-nitrosodi-n-propylamine (32.8%). Associated samples are non-detect, so no results are qualified.</p>
<p>Definitions:</p>

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1408056
Analysis/Method	PAHs/USEPA 8270D
Batch Number(s)	7979

Reviewer	MEB
Date	9/10/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	No	2-fluorobiphenyl low for IMP-1. Remaining two surrogates are acceptable; no results qualified.	
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):				
IMP-1	-	-	-	-
IMP-2	-	-	-	-
IMP-3	-	-	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1408056
Analysis/Method	Organochlorine Pesticides/USEPA 8081B
Batch Number(s)	8002

Reviewer	MEB
Date	9/10/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	No	4,4'-DDT 135%. Samples are non-detect, so no qualification.	
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	No	See notes below.	UJ
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
IMP-1	-	-	-
IMP-2	-	-	-
IMP-3	-	-	-

Notes:
Surrogate tetrachloro-m-xylene results for samples IMP-1 and IMP-2 are very low because of matrix interference. Sample results are non-detect, so qualify as estimated with "UJ."
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1408056
Analysis/Method	PCB Aroclors/USEPA 8082A
Batch Number(s)	7980

Reviewer	MEB
Date	9/10/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
IMP-1	-	-	-
IMP-2	-	-	-
IMP-3	-	-	-

<p>Notes:</p>
<p>Definitions:</p>

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	10278529_1613B_dfr
Analysis/Method	Dioxins/USEPA 1613B
Batch Number(s)	41750/41751

Reviewer	MEB
Date	9/15/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	NA		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	Yes		
	Surrogates	Yes		
Dioxins	Labeled Analog	Yes		
	EMPC	Yes	OCDF EMPC = 0.48 ng/kg for sample 1408057-001	U
	2378-TCDF	NA		

Samples reviewed (in bold font):			
1408057-001 (IMP-1)	-	-	-
1408057-002 (IMP-2)	-	-	-
1408057-003 (IMP-3)	-	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	10281039_1613B_dfr
Analysis/Method	Dioxins/USEPA 1613B
Batch Number(s)	41998

Reviewer	MEB
Date	9/23/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	NA		
Batch	Method Blank	No	See notes.	
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NA		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes	EDLs are reported under column header "RL."	
	MDL	Yes	EDLs reported in the RL column per PA project manager.	
	Surrogates	Yes	Cleanup standards and instrument standards are OK.	
Dioxins	Labeled Analog	No	Method Blank has eight labeled analogs with low recoveries.	
	EMPC	Yes		
	2378-TCDF	No	Confirmation not reported. Lab confirmed with reviewer that 2,3,7,8-TCDF was sufficiently resolved.	

Samples reviewed (in bold font):			
80/20 SOIL	-	-	-
-	-	-	-

<p>Notes:</p> <p>Method blank: 2,3,7,8-TCDF = 0.048 ng/kg, Total TCDF = 0.048 ng/kg, OCDD = 0.380 ng/kg. Results are between EDL and RL. Associated sample results are greater than ten times the method blank detection. Sample result for 2,3,7,8-TCDF is below the RL and so is an estimated value; no additional qualification is required. Sample results for total TCDF and OCDD are above the RL at 9.2 and 1,700 ng/kg, respectively. These results are significantly higher than the method blank detection; thus, no qualification is required.</p> <p>Low labeled analog internal standards for method blank: Lab states that method blank results are calculated based on internal standard recovery so that results are accurate.</p> <p>Definitions:</p>
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DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	1409082
Analysis/Method	SVOCs / USEPA 8270D
Batch Number(s)	8183

Reviewer	MEB
Date	9/23/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	Yes		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	No	See notes.	
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
80/20 SOIL	-	-	-
-	-	-	-

Notes:
Sample 2-Fluorobiphenyl = 97.0%. Minor exceedance. Remaining surrogate recoveries are acceptable. No qualification.
Method blank: Most surrogate results are above upper acceptance limits for percent recovery. Method blank is non-detect; thus, no qualification is required.
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	10280382
Analysis/Method	Organochlorine Pesticides/USEPA 8081
Batch Number(s)	

Reviewer	MEB
Date	9/25/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA	No batch dup reported with QC.	
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	Yes		
	Surrogates	No	Decachlorobiphenyl = 180%, all detected results are < RL.	
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
80/20 SOIL	-	-	-
-	-	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	10280382
Analysis/Method	PCBs /USEPA 8082
Batch Number(s)	

Reviewer	MEB
Date	9/25/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	Yes		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
80/20 SOIL	-	-	-
-	-	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	10280382
Analysis/Method	Diesel and Motor Oil/NWTPH-Dx
Batch Number(s)	

Reviewer	MEB
Date	9/25/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	NR		
Batch	Method Blank	No	Diesel/Oil detections < RL. Sample results significantly greater than RL. No qualification.	
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	No	MSD Motor Oil = 283%	J
	MS/MSD RPD	No	Motor Oil RPD = 40%	J
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	Yes		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
80/20 SOIL	-	-	-
-	-	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	10280382
Analysis/Method	Metals/USEPA 6010
Batch Number(s)	

Reviewer	MEB
Date	9/25/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	NR		
Batch	Method Blank	No	Silver = 0.13 mg/kg, zinc = 0.80 mg/kg. Raise sample MDL to RL of 3.0 mg/kg. Zinc is OK.	U
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	No	Zinc MS = 127%	
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	Yes		
	Surrogates	NA		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
80/20 SOIL	-	-	-
-	-	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	10280382
Analysis/Method	Mercury/USEPA 7471
Batch Number(s)	

Reviewer	MEB
Date	9/25/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	Yes		
	Surrogates	NA		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
80/20 SOIL	-	-	-
-	-	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	10280382
Analysis/Method	PAHs/USEPA 8270D
Batch Number(s)	

Reviewer	MEB
Date	9/25/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	NA		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NA		
	ICV	NA		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	Yes		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
80/20 SOIL	-	-	-
-	-	-	-

<p>Notes:</p>
<p>Definitions:</p>



Specialty Analytical

11711 SE Capps Road, Ste B
Clackamas, Oregon 97015
TEL: 503-607-1331 FAX: 503-607-1336
Website: www.specialtyanalytical.com

September 11, 2014

Josh Elliott
Maul Foster & Alongi
400 E. Mill Plain Blvd.
Suite 400
Vancouver, WA 98660
TEL: (360) 694-2691
FAX (360) 906-1958
RE: Carty Lake / 9003.01.40

Dear Josh Elliott:

Order No.: 1408056

Specialty Analytical received 3 sample(s) on 8/11/2014 for the analyses presented in the following report.

REVISED REPORT: Please see case narrative for information on revision.

There were no problems with the analysis and all data for associated QC met EPA or laboratory specifications, except where noted in the Case Narrative, or as qualified with flags. Results apply only to the samples analyzed. Without approval of the laboratory, the reproduction of this report is only permitted in its entirety.

If you have any questions regarding these tests, please feel free to call.

Sincerely,

A handwritten signature in black ink, appearing to read "Marty French". The signature is written in a cursive, somewhat stylized font.

Marty French
Lab Director

Case Narrative

WO#: 1408056

Date: 9/11/2014

Specialty Analytical

CLIENT: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

Report Revision 1.

At the request of the client, sample IMP-2 was re-extracted and re-analyzed for PCB's by EPA method 8082. Both results are reported in this revision.

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40
Lab ID: 1408056-001
Client Sample ID: IMP-1

Collection Date: 8/8/2014 9:15:00 AM

Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
NWTPH-DX		NWTPH-DX				Analyst: BS
Diesel	ND	15.1		mg/Kg-dry	1	8/16/2014 8:40:12 AM
Lube Oil	ND	50.2		mg/Kg-dry	1	8/16/2014 8:40:12 AM
Surr: o-Terphenyl	92.4	50-150		%REC	1	8/16/2014 8:40:12 AM
SEMIVOLATILE ORGANICS-LOW LEVEL		SW8270D				Analyst: bda
1,2,4-Trichlorobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
1,2-Dichlorobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
1,2-Diphenylhydrazine	ND	168		µg/Kg-dry	1	8/18/2014 11:49:00 AM
1,3-Dichlorobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
1,4-Dichlorobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
1-Methylnaphthalene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2,4,5-Trichlorophenol	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2,4,6-Trichlorophenol	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2,4-Dichlorophenol	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2,4-Dimethylphenol	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2,4-Dinitrophenol	ND	334		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2,4-Dinitrotoluene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2,6-Dinitrotoluene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2-Chloronaphthalene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2-Chlorophenol	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2-Methylnaphthalene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2-Methylphenol	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2-Nitroaniline	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
2-Nitrophenol	ND	168		µg/Kg-dry	1	8/18/2014 11:49:00 AM
3-&4-Methylphenol	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
3,3-Dichlorobenzidine	ND	168		µg/Kg-dry	1	8/18/2014 11:49:00 AM
3-Nitroaniline	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
4,6-Dinitro-2-methylphenol	ND	168		µg/Kg-dry	1	8/18/2014 11:49:00 AM
4-Bromophenyl phenyl ether	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
4-Chloro-3-methylphenol	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
4-Chloroaniline	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
4-Chlorophenyl phenyl ether	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
4-Nitroaniline	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
4-Nitrophenol	ND	168		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Acenaphthene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Acenaphthylene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Aniline	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Anthracene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Benz(a)anthracene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
 Project: Carty Lake / 9003.01.40
 Lab ID: 1408056-001
 Client Sample ID: IMP-1

Collection Date: 8/8/2014 9:15:00 AM
 Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
SEMIVOLATILE ORGANICS-LOW LEVEL		SW8270D		Analyst: bda		
Benzidine	ND	168		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Benzo(a)pyrene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Benzo(b)fluoranthene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Benzo(g,h,i)perylene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Benzo(k)fluoranthene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Benzoic Acid	ND	669		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Benzyl Alcohol	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Benzyl butyl phthalate	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Bis(2-chloroethoxy)methane	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Bis(2-chloroethyl)ether	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Bis(2-chloroisopropyl)ether	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Bis(2-ethylhexyl)phthalate	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Carbazole	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Chrysene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Dibenz(a,h)anthracene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Dibenzofuran	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Diethyl phthalate	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Dimethyl phthalate	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Di-n-butyl phthalate	ND	50.2		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Di-n-octyl phthalate	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Fluoranthene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Fluorene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Hexachlorobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Hexachlorobutadiene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Hexachlorocyclopentadiene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Hexachloroethane	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Indeno(1,2,3-cd)pyrene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Isophorone	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Naphthalene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Nitrobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
N-Nitrosodimethylamine	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
N-Nitrosodi-n-propylamine	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
N-Nitrosodiphenylamine	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Pentachlorophenol	ND	50.2		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Phenanthrene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Phenol	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Pyrene	ND	33.4		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Pyridine	ND	168		µg/Kg-dry	1	8/18/2014 11:49:00 AM
Surr: 2,4,6-Tribromophenol	68.1	57.8-119		%REC	1	8/18/2014 11:49:00 AM

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40
Lab ID: 1408056-001
Client Sample ID: IMP-1

Collection Date: 8/8/2014 9:15:00 AM

Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
SEMIVOLATILE ORGANICS-LOW LEVEL		SW8270D		Analyst: bda		
Surr: 2-Fluorobiphenyl	61.7	52.6-93.2		%REC	1	8/18/2014 11:49:00 AM
Surr: 2-Fluorophenol	78.6	40.7-111		%REC	1	8/18/2014 11:49:00 AM
Surr: 4-Terphenyl-d14	69.5	49.8-118		%REC	1	8/18/2014 11:49:00 AM
Surr: Nitrobenzene-d5	50.6	44.8-103		%REC	1	8/18/2014 11:49:00 AM
Surr: Phenol-d6	56.8	47.5-117		%REC	1	8/18/2014 11:49:00 AM
PAH'S BY GC/MS - LOW LEVEL		SW8270D		Analyst: bda		
1-Methylnaphthalene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
2-Methylnaphthalene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Acenaphthene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Acenaphthylene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Anthracene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Benz(a)anthracene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Benzo(a)pyrene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Benzo(b)fluoranthene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Benzo(g,h,i)perylene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Benzo(k)fluoranthene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Chrysene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Dibenz(a,h)anthracene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Fluoranthene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Fluorene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Indeno(1,2,3-cd)pyrene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Naphthalene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Phenanthrene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Pyrene	ND	6.69		µg/Kg-dry	1	8/18/2014 12:56:00 PM
Surr: 2-Fluorobiphenyl	22.9	42.6-128	S	%REC	1	8/18/2014 12:56:00 PM
Surr: Nitrobenzene-d5	29.2	21.7-155		%REC	1	8/18/2014 12:56:00 PM
Surr: p-Terphenyl-d14	55.6	44.9-155		%REC	1	8/18/2014 12:56:00 PM
ORGANOCHLORINE PESTICIDES		SW8081B		Analyst: ajr		
4,4'-DDD	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
4,4'-DDE	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
4,4'-DDT	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Aldrin	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
alpha-BHC	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
alpha-Chlordane	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
beta-BHC	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Chlordane	ND	6.69		µg/Kg-dry	1	8/20/2014 5:31:00 PM
delta-BHC	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40
Lab ID: 1408056-001
Client Sample ID: IMP-1

Collection Date: 8/8/2014 9:15:00 AM

Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES		SW8081B		Analyst: ajr		
Dieldrin	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Endosulfan I	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Endosulfan II	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Endosulfan Sulfate	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Endrin	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Endrin aldehyde	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Endrin ketone	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
gamma-BHC	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
gamma-Chlordane	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Heptachlor	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Heptachlor epoxide	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Methoxychlor	ND	0.335		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Toxaphene	ND	6.69		µg/Kg-dry	1	8/20/2014 5:31:00 PM
Surr: Decachlorobiphenyl	70.9	25.9-136		%REC	1	8/20/2014 5:31:00 PM
Surr: Tetrachloro-m-xylene	6.07	15-124	SMI	%REC	1	8/20/2014 5:31:00 PM
PCB'S IN SOLIDS		SW 8082A		Analyst: ajr		
Aroclor 1016	ND	0.334		µg/Kg-dry	1	8/14/2014 8:00:00 PM
Aroclor 1221	ND	0.334		µg/Kg-dry	1	8/14/2014 8:00:00 PM
Aroclor 1232	ND	0.334		µg/Kg-dry	1	8/14/2014 8:00:00 PM
Aroclor 1242	ND	0.334		µg/Kg-dry	1	8/14/2014 8:00:00 PM
Aroclor 1248	ND	0.334		µg/Kg-dry	1	8/14/2014 8:00:00 PM
Aroclor 1254	ND	0.334		µg/Kg-dry	1	8/14/2014 8:00:00 PM
Aroclor 1260	ND	0.334		µg/Kg-dry	1	8/14/2014 8:00:00 PM
Aroclor 1262	ND	0.334		µg/Kg-dry	1	8/14/2014 8:00:00 PM
Aroclor 1268	ND	0.334		µg/Kg-dry	1	8/14/2014 8:00:00 PM
Surr: Decachlorobiphenyl	80.0	56.5-130		%REC	1	8/14/2014 8:00:00 PM

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40
Lab ID: 1408056-002
Client Sample ID: IMP-2

Collection Date: 8/8/2014 9:21:00 AM

Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
NWTPH-DX		NWTPH-DX				Analyst: BS
Diesel	ND	15.0		mg/Kg-dry	1	8/16/2014 9:40:12 AM
Lube Oil	ND	50.0		mg/Kg-dry	1	8/16/2014 9:40:12 AM
Surr: o-Terphenyl	105	50-150		%REC	1	8/16/2014 9:40:12 AM
SEMIVOLATILE ORGANICS-LOW LEVEL		SW8270D				Analyst: bda
1,2,4-Trichlorobenzene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
1,2-Dichlorobenzene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
1,2-Diphenylhydrazine	ND	167		µg/Kg-dry	1	8/18/2014 11:19:00 AM
1,3-Dichlorobenzene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
1,4-Dichlorobenzene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
1-Methylnaphthalene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2,4,5-Trichlorophenol	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2,4,6-Trichlorophenol	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2,4-Dichlorophenol	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2,4-Dimethylphenol	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2,4-Dinitrophenol	ND	333		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2,4-Dinitrotoluene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2,6-Dinitrotoluene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2-Chloronaphthalene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2-Chlorophenol	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2-Methylnaphthalene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2-Methylphenol	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2-Nitroaniline	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
2-Nitrophenol	ND	167		µg/Kg-dry	1	8/18/2014 11:19:00 AM
3-&4-Methylphenol	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
3,3-Dichlorobenzidine	ND	167		µg/Kg-dry	1	8/18/2014 11:19:00 AM
3-Nitroaniline	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
4,6-Dinitro-2-methylphenol	ND	167		µg/Kg-dry	1	8/18/2014 11:19:00 AM
4-Bromophenyl phenyl ether	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
4-Chloro-3-methylphenol	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
4-Chloroaniline	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
4-Chlorophenyl phenyl ether	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
4-Nitroaniline	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
4-Nitrophenol	ND	167		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Acenaphthene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Acenaphthylene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Aniline	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Anthracene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Benz(a)anthracene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
 Project: Carty Lake / 9003.01.40
 Lab ID: 1408056-002
 Client Sample ID: IMP-2

Collection Date: 8/8/2014 9:21:00 AM
 Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
SEMIVOLATILE ORGANICS-LOW LEVEL		SW8270D		Analyst: bda		
Benzidine	ND	167		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Benzo(a)pyrene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Benzo(b)fluoranthene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Benzo(g,h,i)perylene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Benzo(k)fluoranthene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Benzoic Acid	ND	667		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Benzyl Alcohol	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Benzyl butyl phthalate	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Bis(2-chloroethoxy)methane	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Bis(2-chloroethyl)ether	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Bis(2-chloroisopropyl)ether	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Bis(2-ethylhexyl)phthalate	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Carbazole	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Chrysene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Dibenz(a,h)anthracene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Dibenzofuran	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Diethyl phthalate	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Dimethyl phthalate	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Di-n-butyl phthalate	ND	50.0		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Di-n-octyl phthalate	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Fluoranthene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Fluorene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Hexachlorobenzene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Hexachlorobutadiene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Hexachlorocyclopentadiene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Hexachloroethane	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Indeno(1,2,3-cd)pyrene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Isophorone	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Naphthalene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Nitrobenzene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
N-Nitrosodimethylamine	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
N-Nitrosodi-n-propylamine	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
N-Nitrosodiphenylamine	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Pentachlorophenol	ND	50.0		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Phenanthrene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Phenol	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Pyrene	ND	33.3		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Pyridine	ND	167		µg/Kg-dry	1	8/18/2014 11:19:00 AM
Surr: 2,4,6-Tribromophenol	81.2	57.8-119		%REC	1	8/18/2014 11:19:00 AM

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
 Project: Carty Lake / 9003.01.40
 Lab ID: 1408056-002
 Client Sample ID: IMP-2

Collection Date: 8/8/2014 9:21:00 AM

Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
SEMIVOLATILE ORGANICS-LOW LEVEL		SW8270D		Analyst: bda		
Surr: 2-Fluorobiphenyl	54.4	52.6-93.2		%REC	1	8/18/2014 11:19:00 AM
Surr: 2-Fluorophenol	73.3	40.7-111		%REC	1	8/18/2014 11:19:00 AM
Surr: 4-Terphenyl-d14	60.7	49.8-118		%REC	1	8/18/2014 11:19:00 AM
Surr: Nitrobenzene-d5	65.7	44.8-103		%REC	1	8/18/2014 11:19:00 AM
Surr: Phenol-d6	60.9	47.5-117		%REC	1	8/18/2014 11:19:00 AM
PAH'S BY GC/MS - LOW LEVEL		SW8270D		Analyst: bda		
1-Methylnaphthalene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
2-Methylnaphthalene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Acenaphthene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Acenaphthylene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Anthracene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Benz(a)anthracene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Benzo(a)pyrene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Benzo(b)fluoranthene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Benzo(g,h,i)perylene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Benzo(k)fluoranthene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Chrysene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Dibenz(a,h)anthracene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Fluoranthene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Fluorene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Indeno(1,2,3-cd)pyrene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Naphthalene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Phenanthrene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Pyrene	ND	6.67		µg/Kg-dry	1	8/18/2014 1:21:00 PM
Surr: 2-Fluorobiphenyl	70.3	42.6-128		%REC	1	8/18/2014 1:21:00 PM
Surr: Nitrobenzene-d5	75.6	21.7-155		%REC	1	8/18/2014 1:21:00 PM
Surr: p-Terphenyl-d14	127	44.9-155		%REC	1	8/18/2014 1:21:00 PM
ORGANOCHLORINE PESTICIDES		SW8081B		Analyst: ajr		
4,4'-DDD	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
4,4'-DDE	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
4,4'-DDT	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Aldrin	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
alpha-BHC	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
alpha-Chlordane	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
beta-BHC	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Chlordane	ND	6.67		µg/Kg-dry	1	8/20/2014 5:46:00 PM
delta-BHC	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
 Project: Carty Lake / 9003.01.40
 Lab ID: 1408056-002
 Client Sample ID: IMP-2

Collection Date: 8/8/2014 9:21:00 AM
 Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES		SW8081B		Analyst: ajr		
Dieldrin	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Endosulfan I	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Endosulfan II	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Endosulfan Sulfate	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Endrin	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Endrin aldehyde	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Endrin ketone	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
gamma-BHC	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
gamma-Chlordane	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Heptachlor	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Heptachlor epoxide	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Methoxychlor	ND	0.333		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Toxaphene	ND	6.67		µg/Kg-dry	1	8/20/2014 5:46:00 PM
Surr: Decachlorobiphenyl	89.6	25.9-136		%REC	1	8/20/2014 5:46:00 PM
Surr: Tetrachloro-m-xylene	14.3	15-124	SMI	%REC	1	8/20/2014 5:46:00 PM
PCB'S IN SOLIDS		SW 8082A		Analyst: ajr		
Aroclor 1016	ND	0.333		µg/Kg-dry	1	8/14/2014 8:17:00 PM
Aroclor 1221	ND	0.333		µg/Kg-dry	1	8/14/2014 8:17:00 PM
Aroclor 1232	ND	0.333		µg/Kg-dry	1	8/14/2014 8:17:00 PM
Aroclor 1242	ND	0.333		µg/Kg-dry	1	8/14/2014 8:17:00 PM
Aroclor 1248	ND	0.333		µg/Kg-dry	1	8/14/2014 8:17:00 PM
Aroclor 1254	43.5	0.333		µg/Kg-dry	1	8/14/2014 8:17:00 PM
Aroclor 1260	ND	0.333		µg/Kg-dry	1	8/14/2014 8:17:00 PM
Aroclor 1262	ND	0.333		µg/Kg-dry	1	8/14/2014 8:17:00 PM
Aroclor 1268	ND	0.333		µg/Kg-dry	1	8/14/2014 8:17:00 PM
Surr: Decachlorobiphenyl	74.9	56.5-130		%REC	1	8/14/2014 8:17:00 PM
PCB'S IN SOLIDS		SW 8082A		Analyst: ajr		
Aroclor 1016	ND	0.333	HT	µg/Kg-dry	1	9/8/2014 3:32:56 PM
Aroclor 1221	ND	0.333	HT	µg/Kg-dry	1	9/8/2014 3:32:56 PM
Aroclor 1232	ND	0.333	HT	µg/Kg-dry	1	9/8/2014 3:32:56 PM
Aroclor 1242	ND	0.333	HT	µg/Kg-dry	1	9/8/2014 3:32:56 PM
Aroclor 1248	ND	0.333	HT	µg/Kg-dry	1	9/8/2014 3:32:56 PM
Aroclor 1254	ND	0.333	HT	µg/Kg-dry	1	9/8/2014 3:32:56 PM
Aroclor 1260	ND	0.333	HT	µg/Kg-dry	1	9/8/2014 3:32:56 PM
Aroclor 1262	ND	0.333	HT	µg/Kg-dry	1	9/8/2014 3:32:56 PM
Aroclor 1268	ND	0.333	HT	µg/Kg-dry	1	9/8/2014 3:32:56 PM
Surr: Decachlorobiphenyl	80.7	56.5-130	HT	%REC	1	9/8/2014 3:32:56 PM

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40
Lab ID: 1408056-003
Client Sample ID: IMP-3

Collection Date: 8/8/2014 9:28:00 AM
Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
NWTPH-DX		NWTPH-DX				Analyst: BS
Diesel	ND	15.1		mg/Kg-dry	1	8/16/2014 10:10:12 AM
Lube Oil	ND	50.2		mg/Kg-dry	1	8/16/2014 10:10:12 AM
Surr: o-Terphenyl	95.5	50-150		%REC	1	8/16/2014 10:10:12 AM
SEMIVOLATILE ORGANICS-LOW LEVEL		SW8270D				Analyst: bda
1,2,4-Trichlorobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
1,2-Dichlorobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
1,2-Diphenylhydrazine	ND	168		µg/Kg-dry	1	8/18/2014 10:50:00 AM
1,3-Dichlorobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
1,4-Dichlorobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
1-Methylnaphthalene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2,4,5-Trichlorophenol	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2,4,6-Trichlorophenol	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2,4-Dichlorophenol	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2,4-Dimethylphenol	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2,4-Dinitrophenol	ND	334		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2,4-Dinitrotoluene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2,6-Dinitrotoluene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2-Chloronaphthalene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2-Chlorophenol	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2-Methylnaphthalene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2-Methylphenol	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2-Nitroaniline	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
2-Nitrophenol	ND	168		µg/Kg-dry	1	8/18/2014 10:50:00 AM
3-&4-Methylphenol	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
3,3-Dichlorobenzidine	ND	168		µg/Kg-dry	1	8/18/2014 10:50:00 AM
3-Nitroaniline	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
4,6-Dinitro-2-methylphenol	ND	168		µg/Kg-dry	1	8/18/2014 10:50:00 AM
4-Bromophenyl phenyl ether	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
4-Chloro-3-methylphenol	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
4-Chloroaniline	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
4-Chlorophenyl phenyl ether	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
4-Nitroaniline	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
4-Nitrophenol	ND	168		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Acenaphthene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Acenaphthylene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Aniline	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Anthracene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Benz(a)anthracene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
 Project: Carty Lake / 9003.01.40
 Lab ID: 1408056-003
 Client Sample ID: IMP-3

Collection Date: 8/8/2014 9:28:00 AM
 Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
SEMIVOLATILE ORGANICS-LOW LEVEL		SW8270D		Analyst: bda		
Benzidine	ND	168		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Benzo(a)pyrene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Benzo(b)fluoranthene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Benzo(g,h,i)perylene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Benzo(k)fluoranthene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Benzoic Acid	ND	669		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Benzyl Alcohol	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Benzyl butyl phthalate	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Bis(2-chloroethoxy)methane	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Bis(2-chloroethyl)ether	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Bis(2-chloroisopropyl)ether	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Bis(2-ethylhexyl)phthalate	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Carbazole	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Chrysene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Dibenz(a,h)anthracene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Dibenzofuran	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Diethyl phthalate	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Dimethyl phthalate	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Di-n-butyl phthalate	ND	50.2		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Di-n-octyl phthalate	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Fluoranthene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Fluorene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Hexachlorobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Hexachlorobutadiene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Hexachlorocyclopentadiene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Hexachloroethane	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Indeno(1,2,3-cd)pyrene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Isophorone	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Naphthalene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Nitrobenzene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
N-Nitrosodimethylamine	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
N-Nitrosodi-n-propylamine	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
N-Nitrosodiphenylamine	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Pentachlorophenol	ND	50.2		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Phenanthrene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Phenol	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Pyrene	ND	33.4		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Pyridine	ND	168		µg/Kg-dry	1	8/18/2014 10:50:00 AM
Surr: 2,4,6-Tribromophenol	68.3	57.8-119		%REC	1	8/18/2014 10:50:00 AM

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40
Lab ID: 1408056-003
Client Sample ID: IMP-3

Collection Date: 8/8/2014 9:28:00 AM

Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
SEMIVOLATILE ORGANICS-LOW LEVEL		SW8270D				Analyst: bda
Surr: 2-Fluorobiphenyl	48.3	52.6-93.2	S	%REC	1	8/18/2014 10:50:00 AM
Surr: 2-Fluorophenol	58.3	40.7-111		%REC	1	8/18/2014 10:50:00 AM
Surr: 4-Terphenyl-d14	50.0	49.8-118		%REC	1	8/18/2014 10:50:00 AM
Surr: Nitrobenzene-d5	58.0	44.8-103		%REC	1	8/18/2014 10:50:00 AM
Surr: Phenol-d6	52.3	47.5-117		%REC	1	8/18/2014 10:50:00 AM
PAH'S BY GC/MS - LOW LEVEL		SW8270D				Analyst: bda
1-Methylnaphthalene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
2-Methylnaphthalene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Acenaphthene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Acenaphthylene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Anthracene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Benz(a)anthracene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Benzo(a)pyrene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Benzo(b)fluoranthene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Benzo(g,h,i)perylene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Benzo(k)fluoranthene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Chrysene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Dibenz(a,h)anthracene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Fluoranthene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Fluorene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Indeno(1,2,3-cd)pyrene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Naphthalene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Phenanthrene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Pyrene	ND	6.69		µg/Kg-dry	1	8/18/2014 1:46:00 PM
Surr: 2-Fluorobiphenyl	48.1	42.6-128		%REC	1	8/18/2014 1:46:00 PM
Surr: Nitrobenzene-d5	46.9	21.7-155		%REC	1	8/18/2014 1:46:00 PM
Surr: p-Terphenyl-d14	93.9	44.9-155		%REC	1	8/18/2014 1:46:00 PM
ORGANOCHLORINE PESTICIDES		SW8081B				Analyst: ajr
4,4'-DDD	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
4,4'-DDE	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
4,4'-DDT	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Aldrin	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
alpha-BHC	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
alpha-Chlordane	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
beta-BHC	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Chlordane	ND	6.69		µg/Kg-dry	1	8/20/2014 6:00:00 PM
delta-BHC	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40
Lab ID: 1408056-003
Client Sample ID: IMP-3

Collection Date: 8/8/2014 9:28:00 AM

Matrix: SOLID

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES		SW8081B		Analyst: ajr		
Dieldrin	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Endosulfan I	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Endosulfan II	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Endosulfan Sulfate	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Endrin	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Endrin aldehyde	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Endrin ketone	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
gamma-BHC	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
gamma-Chlordane	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Heptachlor	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Heptachlor epoxide	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Methoxychlor	ND	0.334		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Toxaphene	ND	6.69		µg/Kg-dry	1	8/20/2014 6:00:00 PM
Surr: Decachlorobiphenyl	58.7	25.9-136		%REC	1	8/20/2014 6:00:00 PM
Surr: Tetrachloro-m-xylene	24.9	15-124		%REC	1	8/20/2014 6:00:00 PM
PCB'S IN SOLIDS		SW 8082A		Analyst: ajr		
Aroclor 1016	ND	0.334		µg/Kg-dry	1	8/14/2014 8:34:00 PM
Aroclor 1221	ND	0.334		µg/Kg-dry	1	8/14/2014 8:34:00 PM
Aroclor 1232	ND	0.334		µg/Kg-dry	1	8/14/2014 8:34:00 PM
Aroclor 1242	ND	0.334		µg/Kg-dry	1	8/14/2014 8:34:00 PM
Aroclor 1248	ND	0.334		µg/Kg-dry	1	8/14/2014 8:34:00 PM
Aroclor 1254	ND	0.334		µg/Kg-dry	1	8/14/2014 8:34:00 PM
Aroclor 1260	ND	0.334		µg/Kg-dry	1	8/14/2014 8:34:00 PM
Aroclor 1262	ND	0.334		µg/Kg-dry	1	8/14/2014 8:34:00 PM
Aroclor 1268	ND	0.334		µg/Kg-dry	1	8/14/2014 8:34:00 PM
Surr: Decachlorobiphenyl	79.6	56.5-130		%REC	1	8/14/2014 8:34:00 PM

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8081BLL_S

Sample ID: CCV 100	SampType: CCV	TestCode: 8081BLL_S	Units: µg/Kg	Prep Date:	RunNo: 16517						
Client ID: CCV	Batch ID: 8002	TestNo: SW8081B	3545_PESTL	Analysis Date: 8/20/2014	SeqNo: 217885						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	6.29	0.333	6.700	0	93.8	80	120				
4,4'-DDE	6.18	0.333	6.700	0	92.3	80	120				
4,4'-DDT	6.91	0.333	6.700	0	103	80	120				
Aldrin	6.27	0.333	6.700	0	93.6	80	120				
alpha-BHC	6.58	0.333	6.700	0	98.2	80	120				
alpha-Chlordane	6.06	0.333	6.700	0	90.4	80	120				
beta-BHC	5.85	0.333	6.700	0	87.3	80	120				
delta-BHC	5.99	0.333	6.700	0	89.4	80	120				
Dieldrin	6.11	0.333	6.700	0	91.3	80	120				
Endosulfan I	5.99	0.333	6.700	0	89.4	80	120				
Endosulfan II	5.75	0.333	6.700	0	85.8	80	120				
Endosulfan Sulfate	5.96	0.333	6.700	0	89.0	80	120				
Endrin	5.83	0.333	6.700	0	87.0	80	120				
Endrin aldehyde	6.68	0.333	6.700	0	99.7	80	120				
Endrin ketone	5.66	0.333	6.700	0	84.5	80	120				
gamma-BHC	6.41	0.333	6.700	0	95.7	80	120				
gamma-Chlordane	6.06	0.333	6.700	0	90.5	80	120				
Heptachlor	7.06	0.333	6.700	0	105	80	120				
Heptachlor epoxide	6.00	0.333	6.700	0	89.6	80	120				
Methoxychlor	5.58	0.333	6.700	0	83.2	80	120				

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8081BLL_S

Sample ID: MB-8002	SampType: MBLK	TestCode: 8081BLL_S	Units: µg/Kg	Prep Date: 8/15/2014	RunNo: 16517						
Client ID: PBS	Batch ID: 8002	TestNo: SW8081B	3545_PESTL	Analysis Date: 8/20/2014	SeqNo: 217886						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	0.333									
4,4'-DDE	ND	0.333									
4,4'-DDT	ND	0.333									
Aldrin	ND	0.333									
alpha-BHC	ND	0.333									
alpha-Chlordane	ND	0.333									
beta-BHC	ND	0.333									
Chlordane	ND	6.67									
delta-BHC	ND	0.333									
Dieldrin	ND	0.333									
Endosulfan I	ND	0.333									
Endosulfan II	ND	0.333									
Endosulfan Sulfate	ND	0.333									
Endrin	ND	0.333									
Endrin aldehyde	ND	0.333									
Endrin ketone	ND	0.333									
gamma-BHC	ND	0.333									
gamma-Chlordane	ND	0.333									
Heptachlor	ND	0.333									
Heptachlor epoxide	ND	0.333									
Methoxychlor	ND	0.333									
Toxaphene	ND	6.67									
Surr: Decachlorobiphenyl	6.76		6.700		101	53.2	136				
Surr: Tetrachloro-m-xylene	5.07		6.700		75.7	32.3	84.1				

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit Page 2 of 23
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8081BLL_S

Sample ID: LCS-8002	SampType: LCS	TestCode: 8081BLL_S	Units: µg/Kg	Prep Date: 8/15/2014	RunNo: 16517						
Client ID: LCSS	Batch ID: 8002	TestNo: SW8081B	3545_PESTL	Analysis Date: 8/20/2014	SeqNo: 217887						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	9.05	0.333	6.700	0	135	65.2	128				SO
Aldrin	6.68	0.333	6.700	0	99.7	52.9	129				
Dieldrin	6.94	0.333	6.700	0	104	52.8	136				
Endrin	7.43	0.333	6.700	0	111	53.9	150				
gamma-BHC	6.67	0.333	6.700	0	99.5	44	134				
Heptachlor	6.71	0.333	6.700	0	100	47.4	116				

Sample ID: CCV 100	SampType: CCV	TestCode: 8081BLL_S	Units: µg/Kg	Prep Date:	RunNo: 16517						
Client ID: CCV	Batch ID: 8002	TestNo: SW8081B	3545_PESTL	Analysis Date: 8/20/2014	SeqNo: 217888						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	5.48	0.333	6.700	0	81.8	80	120				
4,4'-DDE	5.66	0.333	6.700	0	84.5	80	120				
4,4'-DDT	5.60	0.333	6.700	0	83.6	80	120				
Aldrin	5.40	0.333	6.700	0	80.6	80	120				
alpha-BHC	5.67	0.333	6.700	0	84.6	80	120				
alpha-Chlordane	5.39	0.333	6.700	0	80.4	80	120				
beta-BHC	5.42	0.333	6.700	0	80.9	80	120				
delta-BHC	5.72	0.333	6.700	0	85.4	80	120				
Dieldrin	5.75	0.333	6.700	0	85.8	80	120				
Endosulfan I	5.74	0.333	6.700	0	85.6	80	120				
Endosulfan II	6.14	0.333	6.700	0	91.7	80	120				
Endosulfan Sulfate	5.93	0.333	6.700	0	88.4	80	120				
Endrin	5.66	0.333	6.700	0	84.5	80	120				

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit Page 3 of 23
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8081BLL_S

Sample ID: CCV 100	SampType: CCV	TestCode: 8081BLL_S	Units: µg/Kg	Prep Date:	RunNo: 16517						
Client ID: CCV	Batch ID: 8002	TestNo: SW8081B	3545_PESTL	Analysis Date: 8/20/2014	SeqNo: 217888						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Endrin aldehyde	6.26	0.333	6.700	0	93.4	80	120				
Endrin ketone	6.36	0.333	6.700	0	94.9	80	120				
gamma-BHC	5.78	0.333	6.700	0	86.3	80	120				
gamma-Chlordane	5.42	0.333	6.700	0	80.9	80	120				
Heptachlor	6.27	0.333	6.700	0	93.6	80	120				
Heptachlor epoxide	5.41	0.333	6.700	0	80.7	80	120				
Methoxychlor	6.15	0.333	6.700	0	91.8	80	120				

Sample ID: 1408056-003AMS	SampType: MS	TestCode: 8081BLL_S	Units: µg/Kg-dry	Prep Date: 8/15/2014	RunNo: 16517						
Client ID: IMP-3	Batch ID: 8002	TestNo: SW8081B	3545_PESTL	Analysis Date: 8/20/2014	SeqNo: 219749						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	2.83	0.334	6.723	0	42.1	36.6	123				
Aldrin	3.94	0.334	6.723	0	58.6	41.9	100				
Dieldrin	4.34	0.334	6.723	0	64.5	44.3	108				
Endrin	2.23	0.334	6.723	0	33.2	32.1	103				
gamma-BHC	3.88	0.334	6.723	0	57.8	42	102				
Heptachlor	3.50	0.334	6.723	0	52.0	45.7	98.9				

Sample ID: 1408056-003AMSD	SampType: MSD	TestCode: 8081BLL_S	Units: µg/Kg-dry	Prep Date: 8/15/2014	RunNo: 16517						
Client ID: IMP-3	Batch ID: 8002	TestNo: SW8081B	3545_PESTL	Analysis Date: 8/20/2014	SeqNo: 219750						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:	B Analyte detected in the associated Method Blank O RSD is greater than RSDlimit	H Holding times for preparation or analysis exceeded R RPD outside accepted recovery limits	ND Not Detected at the Reporting Limit S Spike Recovery outside accepted reco	Page 4 of 23
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QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8081BLL_S

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	2.75	0.334	6.723	0	40.9	36.6	123	2.832	3.07	20	
Aldrin	3.86	0.334	6.723	0	57.5	41.9	100	3.939	1.93	20	
Dieldrin	4.97	0.334	6.723	0	73.9	44.3	108	4.337	13.6	20	
Endrin	2.66	0.334	6.723	0	39.6	32.1	103	2.232	17.7	20	
gamma-BHC	3.24	0.334	6.723	0	48.2	42	102	3.885	18.1	20	
Heptachlor	3.80	0.334	6.723	0	56.5	45.7	98.9	3.498	8.25	20	

Qualifiers: B Analyte detected in the associated Method Blank
 O RSD is greater than RSDlimit

H Holding times for preparation or analysis exceeded
 R RPD outside accepted recovery limits

ND Not Detected at the Reporting Limit
 S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8082LL_S

Sample ID: 1016/1260 CCV	SampType: CCV	TestCode: 8082LL_S	Units: µg/Kg	Prep Date:	RunNo: 16408						
Client ID: CCV	Batch ID: 7980	TestNo: SW 8082A	3545_8082LL	Analysis Date: 8/14/2014	SeqNo: 216516						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016/1260	61.3	0.333	66.67	0	91.9	85	115				
Aroclor 1260	71.9	0.333	66.67	0	108	85	115				

Sample ID: MB-7980	SampType: MBLK	TestCode: 8082LL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16408						
Client ID: PBS	Batch ID: 7980	TestNo: SW 8082A	3545_8082LL	Analysis Date: 8/14/2014	SeqNo: 216517						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.333									
Aroclor 1221	ND	0.333									
Aroclor 1232	ND	0.333									
Aroclor 1242	ND	0.333									
Aroclor 1248	ND	0.333									
Aroclor 1254	ND	0.333									
Aroclor 1260	ND	0.333									
Aroclor 1262	ND	0.333									
Aroclor 1268	ND	0.333									
Surr: Decachlorobiphenyl	5260		6667		78.9	56.5	130				

Sample ID: LCS-7980	SampType: LCS	TestCode: 8082LL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16408						
Client ID: LCSS	Batch ID: 7980	TestNo: SW 8082A	3545_8082LL	Analysis Date: 8/14/2014	SeqNo: 216518						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016/1260	53.2	0.333	66.67	0	79.8	44.3	137				

Qualifiers:	B Analyte detected in the associated Method Blank O RSD is greater than RSDlimit	H Holding times for preparation or analysis exceeded R RPD outside accepted recovery limits	ND Not Detected at the Reporting Limit S Spike Recovery outside accepted reco	Page 6 of 23
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QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8082LL_S

Sample ID: LCS-7980	SampType: LCS	TestCode: 8082LL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16408						
Client ID: LCSS	Batch ID: 7980	TestNo: SW 8082A	3545_8082LL	Analysis Date: 8/14/2014	SeqNo: 216518						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 1408056-001AMS	SampType: MS	TestCode: 8082LL_S	Units: µg/Kg-dry	Prep Date: 8/14/2014	RunNo: 16408						
Client ID: IMP-1	Batch ID: 7980	TestNo: SW 8082A	3545_8082LL	Analysis Date: 8/14/2014	SeqNo: 216599						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016/1260	64.0	0.334	66.91	0	95.6	56.6	123				

Sample ID: 1408056-001AMSD	SampType: MSD	TestCode: 8082LL_S	Units: µg/Kg-dry	Prep Date: 8/14/2014	RunNo: 16408						
Client ID: IMP-1	Batch ID: 7980	TestNo: SW 8082A	3545_8082LL	Analysis Date: 8/14/2014	SeqNo: 216600						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016/1260	62.1	0.334	66.91	0	92.8	56.6	123	0	0	20	

Sample ID: 1254 CCV	SampType: CCV	TestCode: 8082LL_S	Units: µg/Kg	Prep Date:	RunNo: 16408						
Client ID: CCV	Batch ID: 7980	TestNo: SW 8082A	3545_8082LL	Analysis Date: 8/14/2014	SeqNo: 216794						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1254	63.2	0.333	66.67	0	94.8	85	115				

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8082LL_S

Sample ID: MB-8126	SampType: MBLK	TestCode: 8082LL_S	Units: µg/Kg	Prep Date: 9/5/2014	RunNo: 16731						
Client ID: PBS	Batch ID: 8126	TestNo: SW 8082A	3545_8082LL	Analysis Date: 9/8/2014	SeqNo: 221016						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.333									
Aroclor 1221	ND	0.333									
Aroclor 1232	ND	0.333									
Aroclor 1242	ND	0.333									
Aroclor 1248	ND	0.333									
Aroclor 1254	ND	0.333									
Aroclor 1260	ND	0.333									
Aroclor 1262	ND	0.333									
Aroclor 1268	ND	0.333									
Surr: Decachlorobiphenyl	6460		6667		96.9	56.5	130				

Sample ID: LCS-8126	SampType: LCS	TestCode: 8082LL_S	Units: µg/Kg	Prep Date: 9/5/2014	RunNo: 16731						
Client ID: LCSS	Batch ID: 8126	TestNo: SW 8082A	3545_8082LL	Analysis Date: 9/8/2014	SeqNo: 221017						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016/1260	50.6	0.333	66.67	0	75.9	44.3	137				

Sample ID: 1016/1260 CCV	SampType: CCV	TestCode: 8082LL_S	Units: µg/Kg	Prep Date:	RunNo: 16731						
Client ID: CCV	Batch ID: 8126	TestNo: SW 8082A	3545_8082LL	Analysis Date: 9/8/2014	SeqNo: 221020						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016/1260	70.8	0.333	66.67	0	106	85	115				

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8082LL_S

Sample ID: 1016/1260 CCV	SampType: CCV	TestCode: 8082LL_S	Units: µg/Kg	Prep Date:	RunNo: 16731						
Client ID: CCV	Batch ID: 8126	TestNo: SW 8082A	3545_8082LL	Analysis Date: 9/9/2014	SeqNo: 221147						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Aroclor 1016/1260 66.4 0.333 66.67 0 99.6 85 115

Sample ID: 1409030-006AMS	SampType: MS	TestCode: 8082LL_S	Units: µg/Kg	Prep Date: 9/5/2014	RunNo: 16731						
Client ID: ZZZZZZ	Batch ID: 8126	TestNo: SW 8082A	3545_8082LL	Analysis Date: 9/9/2014	SeqNo: 221204						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Aroclor 1016/1260 46.1 0.333 66.67 0 69.1 56.6 123

Sample ID: 1409030-006AMSD	SampType: MSD	TestCode: 8082LL_S	Units: µg/Kg	Prep Date: 9/5/2014	RunNo: 16731						
Client ID: ZZZZZZ	Batch ID: 8126	TestNo: SW 8082A	3545_8082LL	Analysis Date: 9/9/2014	SeqNo: 221205						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Aroclor 1016/1260 43.2 0.333 66.67 0 64.8 56.6 123 46.08 6.47 20

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8270LL_S

Sample ID: LCS-7974	SampType: LCS	TestCode: 8270LL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16432						
Client ID: LCSS	Batch ID: 7974	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216825						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	932	33.3	1666	0	55.9	30.9	106				
1,4-Dichlorobenzene	807	33.3	1666	0	48.4	31.4	98.2				
2,4-Dinitrotoluene	1100	33.3	1666	0	65.7	59.7	111				
2-Chlorophenol	873	33.3	1666	0	52.4	46.2	105				
4-Chloro-3-methylphenol	970	33.3	1666	0	58.2	47.4	114				
4-Nitrophenol	890	167	1666	0	53.4	45.3	114				
Acenaphthene	811	33.3	1666	0	48.7	48.2	105				
N-Nitrosodi-n-propylamine	811	33.3	1666	0	48.7	42.4	101				
Pentachlorophenol	855	50.0	1666	0	51.3	46.8	120				
Phenol	1030	33.3	1666	0	62.0	51.1	103				
Pyrene	998	33.3	1666	0	59.9	56.7	130				

Sample ID: MB-7974	SampType: MBLK	TestCode: 8270LL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16432						
Client ID: PBS	Batch ID: 7974	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216826						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	33.3									
1,2-Dichlorobenzene	ND	33.3									
1,2-Diphenylhydrazine	ND	167									
1,3-Dichlorobenzene	ND	33.3									
1,4-Dichlorobenzene	ND	33.3									
1-Methylnaphthalene	ND	33.3									
2,4,5-Trichlorophenol	ND	33.3									
2,4,6-Trichlorophenol	ND	33.3									

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit Page 10 of 23
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8270LL_S

Sample ID: MB-7974	SampType: MBLK	TestCode: 8270LL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16432						
Client ID: PBS	Batch ID: 7974	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216826						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2,4-Dichlorophenol	ND	33.3									
2,4-Dimethylphenol	ND	33.3									
2,4-Dinitrophenol	ND	333									
2,4-Dinitrotoluene	ND	33.3									
2,6-Dinitrotoluene	ND	33.3									
2-Chloronaphthalene	ND	33.3									
2-Chlorophenol	ND	33.3									
2-Methylnaphthalene	ND	33.3									
2-Methylphenol	ND	33.3									
2-Nitroaniline	ND	33.3									
2-Nitrophenol	ND	167									
3-&4-Methylphenol	ND	33.3									
3,3-Dichlorobenzidine	ND	167									
3-Nitroaniline	ND	33.3									
4,6-Dinitro-2-methylphenol	ND	167									
4-Bromophenyl phenyl ether	ND	33.3									
4-Chloro-3-methylphenol	ND	33.3									
4-Chloroaniline	ND	33.3									
4-Chlorophenyl phenyl ether	ND	33.3									
4-Nitroaniline	ND	33.3									
4-Nitrophenol	ND	167									
Acenaphthene	ND	33.3									
Acenaphthylene	ND	33.3									
Aniline	ND	33.3									
Anthracene	ND	33.3									
Benz(a)anthracene	ND	33.3									

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8270LL_S

Sample ID: MB-7974	SampType: MBLK	TestCode: 8270LL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16432						
Client ID: PBS	Batch ID: 7974	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216826						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine	ND	167									
Benzo(a)pyrene	ND	33.3									
Benzo(b)fluoranthene	ND	33.3									
Benzo(g,h,i)perylene	ND	33.3									
Benzo(k)fluoranthene	ND	33.3									
Benzoic Acid	ND	667									
Benzyl Alcohol	ND	33.3									
Benzyl butyl phthalate	ND	33.3									
Bis(2-chloroethoxy)methane	ND	33.3									
Bis(2-chloroethyl)ether	ND	33.3									
Bis(2-chloroisopropyl)ether	ND	33.3									
Bis(2-ethylhexyl)phthalate	ND	33.3									
Carbazole	ND	33.3									
Chrysene	ND	33.3									
Dibenz(a,h)anthracene	ND	33.3									
Dibenzofuran	ND	33.3									
Diethyl phthalate	ND	33.3									
Dimethyl phthalate	ND	33.3									
Di-n-butyl phthalate	ND	50.0									
Di-n-octyl phthalate	ND	33.3									
Fluoranthene	ND	33.3									
Fluorene	ND	33.3									
Hexachlorobenzene	ND	33.3									
Hexachlorobutadiene	ND	33.3									
Hexachlorocyclopentadiene	ND	33.3									
Hexachloroethane	ND	33.3									

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8270LL_S

Sample ID: MB-7974	SampType: MBLK	TestCode: 8270LL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16432						
Client ID: PBS	Batch ID: 7974	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216826						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	ND	33.3									
Isophorone	ND	33.3									
Naphthalene	ND	33.3									
Nitrobenzene	ND	33.3									
N-Nitrosodimethylamine	ND	33.3									
N-Nitrosodi-n-propylamine	ND	33.3									
N-Nitrosodiphenylamine	ND	33.3									
Pentachlorophenol	ND	50.0									
Phenanthrene	ND	33.3									
Phenol	ND	33.3									
Pyrene	ND	33.3									
Pyridine	ND	167									
Surr: 2,4,6-Tribromophenol	2720		3333		81.6	57.8	119				
Surr: 2-Fluorobiphenyl	1620		3333		48.5	52.6	93.2				S
Surr: 2-Fluorophenol	1890		3333		56.7	40.7	111				
Surr: 4-Terphenyl-d14	1790		3333		53.6	49.8	118				
Surr: Nitrobenzene-d5	2630		3333		78.8	44.8	103				
Surr: Phenol-d6	1590		3333		47.7	47.5	117				

Sample ID: 1408056-002AMS	SampType: MS	TestCode: 8270LL_S	Units: µg/Kg-dry	Prep Date: 8/13/2014	RunNo: 16432						
Client ID: IMP-2	Batch ID: 7974	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216830						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	1010	33.3	1666	0	60.5	31.1	92.7				

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8270LL_S

Sample ID: 1408056-002AMS	SampType: MS	TestCode: 8270LL_S	Units: µg/Kg-dry	Prep Date: 8/13/2014	RunNo: 16432						
Client ID: IMP-2	Batch ID: 7974	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216830						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,4-Dichlorobenzene	852	33.3	1666	0	51.1	16.5	85.6				
2,4-Dinitrotoluene	1130	33.3	1666	0	68.0	43.4	118				
2-Chlorophenol	925	33.3	1666	0	55.5	36.8	103				
4-Chloro-3-methylphenol	882	33.3	1666	0	52.9	49.5	119				
4-Nitrophenol	893	167	1666	0	53.6	45	111				
Acenaphthene	833	33.3	1666	0	50.0	45.1	102				
N-Nitrosodi-n-propylamine	841	33.3	1666	0	50.4	45.6	94.1				
Pentachlorophenol	856	50.0	1666	0	51.4	36.6	112				
Phenol	849	33.3	1666	0	50.9	37.7	107				
Pyrene	795	33.3	1666	0	47.7	42.4	131				

Sample ID: 1408056-002AMS	SampType: MSD	TestCode: 8270LL_S	Units: µg/Kg-dry	Prep Date: 8/13/2014	RunNo: 16432						
Client ID: IMP-2	Batch ID: 7974	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216831						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	1000	33.3	1666	0	60.1	31.1	92.7	1008	0.564	20	
1,4-Dichlorobenzene	904	33.3	1666	0	54.2	16.5	85.6	852.0	5.92	20	
2,4-Dinitrotoluene	1290	33.3	1666	0	77.5	43.4	118	1134	13.1	20	
2-Chlorophenol	963	33.3	1666	0	57.8	36.8	103	925.0	4.06	20	
4-Chloro-3-methylphenol	1090	33.3	1666	0	65.5	49.5	119	881.7	21.2	20	R
4-Nitrophenol	885	167	1666	0	53.1	45	111	893.3	0.975	20	
Acenaphthene	962	33.3	1666	0	57.7	45.1	102	832.7	14.4	20	
N-Nitrosodi-n-propylamine	1170	33.3	1666	0	70.3	45.6	94.1	840.7	32.8	20	R
Pentachlorophenol	902	50.0	1666	0	54.1	36.6	112	856.0	5.20	20	

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8270LL_S

Sample ID: 1408056-002AMSD	SampType: MSD	TestCode: 8270LL_S	Units: µg/Kg-dry	Prep Date: 8/13/2014	RunNo: 16432						
Client ID: IMP-2	Batch ID: 7974	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216831						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phenol	878	33.3	1666	0	52.7	37.7	107	849.0	3.32	20	
Pyrene	970	33.3	1666	0	58.2	42.4	131	795.3	19.8	20	

Sample ID: CCV-7974	SampType: CCV	TestCode: 8270LL_S	Units: µg/Kg	Prep Date:	RunNo: 16432						
Client ID: CCV	Batch ID: 7974	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216832						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,4-Dichlorobenzene	1260	33.3	1333	0	94.2	80	120				
2,4,6-Trichlorophenol	1350	33.3	1333	0	101	80	120				
2,4-Dichlorophenol	1540	33.3	1333	0	116	80	120				
2-Nitrophenol	1510	167	1333	0	113	80	120				
4-Chloro-3-methylphenol	1160	33.3	1333	0	87.2	80	120				
Acenaphthene	1150	33.3	1333	0	86.6	80	120				
Benzo(a)pyrene	1330	33.3	1333	0	99.8	80	120				
Di-n-octyl phthalate	1260	33.3	1333	0	94.6	80	120				
Fluoranthene	1070	33.3	1333	0	80.2	80	120				
Hexachlorobutadiene	1290	33.3	1333	0	96.7	80	120				
N-Nitrosodiphenylamine	1330	33.3	1333	0	99.9	80	120				
Pentachlorophenol	1530	50.0	1333	0	115	80	120				
Phenol	1550	33.3	1333	0	117	80	120				

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit Page 15 of 23
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: NWTPHDX_S

Sample ID: 1408047-016ADUP	SampType: DUP	TestCode: NWTPHDX_S	Units: mg/Kg-dry	Prep Date: 8/13/2014	RunNo: 16418						
Client ID: ZZZZZZ	Batch ID: 7985	TestNo: NWTPH-Dx	SW3545A	Analysis Date: 8/16/2014	SeqNo: 216643						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel	ND	18.6						0	0	20	
Lube Oil	ND	62.1						0	0	20	

Sample ID: CCV	SampType: CCV	TestCode: NWTPHDX_S	Units: mg/Kg	Prep Date:	RunNo: 16418						
Client ID: CCV	Batch ID: 7985	TestNo: NWTPH-Dx	SW3545A	Analysis Date: 8/16/2014	SeqNo: 216648						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel	971	15.0	999.0	0	97.2	85	115				
Lube Oil	434	50.0	499.5	0	86.9	85	115				

Sample ID: CCB	SampType: CCB	TestCode: NWTPHDX_S	Units: mg/Kg	Prep Date:	RunNo: 16418						
Client ID: CCB	Batch ID: 7985	TestNo: NWTPH-Dx	SW3545A	Analysis Date: 8/16/2014	SeqNo: 216649						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel	ND	15.0									
Lube Oil	ND	50.0									
Surr: o-Terphenyl	35.8		33.30		108	50	150				

Sample ID: 1408056-001ADUP	SampType: DUP	TestCode: NWTPHDX_S	Units: mg/Kg-dry	Prep Date: 8/13/2014	RunNo: 16418						
Client ID: IMP-1	Batch ID: 7985	TestNo: NWTPH-Dx	SW3545A	Analysis Date: 8/16/2014	SeqNo: 216653						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: NWTPHDX_S

Sample ID: 1408056-001ADUP	SampType: DUP	TestCode: NWTPHDX_S	Units: mg/Kg-dry	Prep Date: 8/13/2014	RunNo: 16418						
Client ID: IMP-1	Batch ID: 7985	TestNo: NWTPH-Dx	SW3545A	Analysis Date: 8/16/2014	SeqNo: 216653						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel	ND	15.1						0	0	20	
Lube Oil	ND	50.2						0	0	20	

Sample ID: CCV	SampType: CCV	TestCode: NWTPHDX_S	Units: mg/Kg	Prep Date:	RunNo: 16418						
Client ID: CCV	Batch ID: 7985	TestNo: NWTPH-Dx	SW3545A	Analysis Date: 8/16/2014	SeqNo: 216657						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel	1470	15.0	1332	0	111	85	115				
Lube Oil	751	50.0	666.0	0	113	85	115				

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: PAHLL_S

Sample ID: CCV-7979	SampType: CCV	TestCode: PAHLL_S	Units: µg/Kg	Prep Date:	RunNo: 16438						
Client ID: CCV	Batch ID: 7979	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216900						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	122	6.67	133.3	0	91.4	80	120				
Acenaphthylene	120	6.67	133.3	0	90.1	80	120				
Anthracene	130	6.67	133.3	0	97.3	80	120				
Benz(a)anthracene	115	6.67	133.3	0	86.5	80	120				
Benzo(a)pyrene	114	6.67	133.3	0	85.7	80	120				
Benzo(b)fluoranthene	139	6.67	133.3	0	104	80	120				
Benzo(g,h,i)perylene	137	6.67	133.3	0	102	80	120				
Benzo(k)fluoranthene	130	6.67	133.3	0	97.7	80	120				
Chrysene	120	6.67	133.3	0	89.8	80	120				
Dibenz(a,h)anthracene	138	6.67	133.3	0	103	80	120				
Fluoranthene	132	6.67	133.3	0	98.7	80	120				
Fluorene	126	6.67	133.3	0	94.6	80	120				
Indeno(1,2,3-cd)pyrene	131	6.67	133.3	0	98.5	80	120				
Naphthalene	122	6.67	133.3	0	91.8	80	120				
Phenanthrene	127	6.67	133.3	0	95.5	80	120				
Pyrene	111	6.67	133.3	0	83.3	80	120				

Sample ID: LCS-7979	SampType: LCS	TestCode: PAHLL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16438						
Client ID: LCSS	Batch ID: 7979	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216901						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	202	6.67	333.3	0	60.5	39.6	107				
Acenaphthylene	211	6.67	333.3	0	63.2	38.9	102				
Anthracene	237	6.67	333.3	0	71.1	43.4	119				

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit Page 19 of 23
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: PAHLL_S

Sample ID: LCS-7979	SampType: LCS	TestCode: PAHLL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16438						
Client ID: LCSS	Batch ID: 7979	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216901						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	226	6.67	333.3	0	67.9	48.4	121				
Benzo(a)pyrene	210	6.67	333.3	0	63.1	37.7	137				
Benzo(b)fluoranthene	238	6.67	333.3	0	71.3	58.6	117				
Benzo(g,h,i)perylene	234	6.67	333.3	0	70.3	49.7	135				
Benzo(k)fluoranthene	244	6.67	333.3	0	73.1	46.1	124				
Chrysene	225	6.67	333.3	0	67.4	57.1	130				
Dibenz(a,h)anthracene	240	6.67	333.3	0	72.1	44.2	124				
Fluoranthene	261	6.67	333.3	0	78.3	53.4	113				
Fluorene	214	6.67	333.3	0	64.1	37.1	114				
Indeno(1,2,3-cd)pyrene	233	6.67	333.3	0	69.8	47.9	121				
Naphthalene	188	6.67	333.3	0	56.4	29.1	109				
Phenanthrene	236	6.67	333.3	0	70.7	48.4	115				
Pyrene	210	6.67	333.3	0	62.9	47.2	134				

Sample ID: MB-7979	SampType: MBLK	TestCode: PAHLL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16438						
Client ID: PBS	Batch ID: 7979	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216902						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	ND	6.67									
Acenaphthylene	ND	6.67									
Anthracene	ND	6.67									
Benz(a)anthracene	ND	6.67									
Benzo(a)pyrene	ND	6.67									
Benzo(b)fluoranthene	ND	6.67									

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: PAHLL_S

Sample ID: MB-7979	SampType: MBLK	TestCode: PAHLL_S	Units: µg/Kg	Prep Date: 8/13/2014	RunNo: 16438						
Client ID: PBS	Batch ID: 7979	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216902						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(g,h,i)perylene	ND	6.67									
Benzo(k)fluoranthene	ND	6.67									
Chrysene	ND	6.67									
Dibenz(a,h)anthracene	ND	6.67									
Fluoranthene	ND	6.67									
Fluorene	ND	6.67									
Indeno(1,2,3-cd)pyrene	ND	6.67									
Naphthalene	ND	6.67									
Phenanthrene	ND	6.67									
Pyrene	ND	6.67									
Surr: 2-Fluorobiphenyl	4.27		6.667		64.1	42.6	128				
Surr: Nitrobenzene-d5	4.10		6.667		61.6	21.7	155				
Surr: p-Terphenyl-d14	8.36		6.667		125	44.9	155				

Sample ID: 1408056-003AMSD	SampType: MSD	TestCode: PAHLL_S	Units: µg/Kg	Prep Date: 8/14/2014	RunNo: 16438						
Client ID: IMP-3	Batch ID: 7979	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216916						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	227	6.67	333.3	0	68.0	33.7	111	225.7	0.400	20	
Acenaphthylene	217	6.67	333.3	0	65.2	32.3	125	221.8	2.06	20	
Anthracene	261	6.67	333.3	0	78.3	42.7	121	258.5	0.956	20	
Benz(a)anthracene	243	6.67	333.3	0.9782	72.6	63.4	121	238.8	1.78	20	
Benzo(a)pyrene	233	6.67	333.3	0.2573	69.9	64.6	110	231.8	0.669	20	
Benzo(b)fluoranthene	283	6.67	333.3	0	85.0	41.6	172	243.0	15.3	20	

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: PAHLL_S

Sample ID: 1408056-003AMSD	SampType: MSD	TestCode: PAHLL_S	Units: µg/Kg	Prep Date: 8/14/2014	RunNo: 16438						
Client ID: IMP-3	Batch ID: 7979	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216916						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(g,h,i)perylene	247	6.67	333.3	0	74.1	15	128	244.1	1.17	20	
Benzo(k)fluoranthene	242	6.67	333.3	0	72.6	47.9	140	282.6	15.5	20	
Chrysene	254	6.67	333.3	0	76.3	37.5	125	259.4	1.91	20	
Dibenz(a,h)anthracene	251	6.67	333.3	0	75.3	23.6	125	248.3	1.05	20	
Fluoranthene	287	6.67	333.3	0	86.1	56.8	141	289.5	0.883	20	
Fluorene	249	6.67	333.3	0	74.6	48.6	117	245.7	1.18	20	
Indeno(1,2,3-cd)pyrene	248	6.67	333.3	0	74.5	26.8	133	244.5	1.53	20	
Naphthalene	193	6.67	333.3	0.4951	57.7	27.7	108	178.3	7.82	20	
Phenanthrene	267	6.67	333.3	0	80.0	20.2	139	266.8	0.0166	20	
Pyrene	235	6.67	333.3	0	70.5	26.8	142	238.5	1.41	20	

Sample ID: 1408056-003AMS	SampType: MS	TestCode: PAHLL_S	Units: µg/Kg	Prep Date: 8/14/2014	RunNo: 16438						
Client ID: IMP-3	Batch ID: 7979	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216917						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	226	6.67	333.3	0	67.7	33.7	111				
Acenaphthylene	222	6.67	333.3	0	66.5	32.3	125				
Anthracene	258	6.67	333.3	0	77.5	42.7	121				
Benz(a)anthracene	239	6.67	333.3	0.9782	71.3	63.4	121				
Benzo(a)pyrene	232	6.67	333.3	0.2573	69.4	64.6	110				
Benzo(b)fluoranthene	243	6.67	333.3	0	72.9	41.6	172				
Benzo(g,h,i)perylene	244	6.67	333.3	0	73.2	15	128				
Benzo(k)fluoranthene	283	6.67	333.3	0	84.8	47.9	140				
Chrysene	259	6.67	333.3	0	77.8	37.5	125				

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit Page 22 of 23
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

QC SUMMARY REPORT

WO#: 1408056

11-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: PAHLL_S

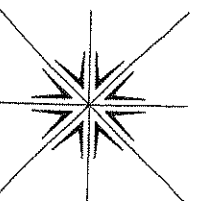
Sample ID: 1408056-003AMS	SampType: MS	TestCode: PAHLL_S	Units: µg/Kg	Prep Date: 8/14/2014	RunNo: 16438						
Client ID: IMP-3	Batch ID: 7979	TestNo: SW8270D	SW 3545A	Analysis Date: 8/18/2014	SeqNo: 216917						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dibenz(a,h)anthracene	248	6.67	333.3	0	74.5	23.6	125				
Fluoranthene	289	6.67	333.3	0	86.8	56.8	141				
Fluorene	246	6.67	333.3	0	73.7	48.6	117				
Indeno(1,2,3-cd)pyrene	244	6.67	333.3	0	73.3	26.8	133				
Naphthalene	178	6.67	333.3	0.4951	53.3	27.7	108				
Phenanthrene	267	6.67	333.3	0	80.0	20.2	139				
Pyrene	238	6.67	333.3	0	71.5	26.8	142				

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted reco

KEY TO FLAGS

Rev. May 12, 2010

- A This sample contains a Gasoline Range Organic not identified as a specific hydrocarbon product. The result was quantified against gasoline calibration standards
- A1 This sample contains a Diesel Range Organic not identified as a specific hydrocarbon product. The result was quantified against diesel calibration standards.
- A2 This sample contains a Lube Oil Range Organic not identified as a specific hydrocarbon product. The result was quantified against a lube oil calibration standard.
- A3 The result was determined to be Non-Detect based on hydrocarbon pattern recognition. The product was carry-over from another hydrocarbon type.
- A4 The product appears to be aged or degraded diesel.
- B The blank exhibited a positive result great than the reporting limit for this compound.
- CN See Case Narrative.
- D Result is based from a dilution.
- E Result exceeds the calibration range for this compound. The result should be considered as estimate.
- F The positive result for this hydrocarbon is due to single component contamination. The product does not match any hydrocarbon in the fuels library.
- G Result may be biased high due to biogenic interferences. Clean up is recommended.
- H Sample was analyzed outside recommended holding time.
- HT At clients request, samples was analyzed outside of recommended holding time.
- J The result for this analyte is between the MDL and the PQL and should be considered as estimated concentration.
- K Diesel result is biased high due to amount of Oil contained in the sample.
- L Diesel result is biased high due to amount of Gasoline contained in the sample.
- M Oil result is biased high due to amount of Diesel contained in the sample.
- MC Sample concentration is greater than 4x the spiked value, the spiked value is considered insignificant.
- MI Result is outside control limits due to matrix interference.
- MSA Value determined by Method of Standard Addition.
- O Laboratory Control Standard (LCS) exceeded laboratory control limits, but meets CCV criteria. Data meets EPA requirements.
- Q Detection levels elevated due to sample matrix.
- R RPD control limits were exceeded.
- RF Duplicate failed due to result being at or near the method-reporting limit.
- RP Matrix spike values exceed established QC limits; post digestion spike is in control.
- S Recovery is outside control limits.
- SC Closing CCV or LCS exceeded high recovery control limits, but associated samples are non-detect. Data meets EPA requirements.
- * The result for this parameter was greater than the maximum contaminant level of the TCLP regulatory limit.



Specialty Analytical

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Contact Person/Project Manager Josh Elliott / Mary Benzinger
Company MFA
Address 2001 NW 19th AVE
Portland, OR
Phone (503) 501-5236 Fax
Project No. 9003.01.40 Project Name Carty Lake
Project Site Location OR WA X Other
Invoice To Carty Lake Sediment Remedy P.O. No. _____

Collected By: _____
Signature: _____
Printed: MIKE BAKER, F.I.T.

Signature: _____
Printed: _____

Turn Around Time
 Normal 5-7 Business Days
 Rush _____
Specify _____

Rush Analyses Must Be Scheduled With The Lab In Advance

Date	Time	Sample I.D.	Matrix
8/8/14	9:15	IMP-1	S
8/8/14	9:21	IMP-2	S
8/8/14	9:28	IMP-3	S

No. of Containers	SVOCs - EPA 8270 D	PAH - EPA 8270 D	Pesticides - EPA 8081 B	PCBs - 8082 A	Dioxins/Furans	TPH	Analyses		For Laboratory Use		
							X	X	Lab Job No.	Shipped Via	Air Bill No.
5	X	X	X	X	X	X	X	X	9003.01.40	Specialty	
									Temperature On Receipt	2 °C	
									Specialty Analytical Containers?	Y/N	
									Specialty Analytical Trip Blanks?	Y/N	
									Comments	Lab I.D.	
									see attached table		
									for all analyses		
									email work order		
									summary after log-in		
									*** subcontract to		
									Trace Analytical		
									TRACE B/B/14		

Relinquished By: _____ Date: 8/11/14 Time: 15:15
Company: MFA

Received By: _____ Date: 8/11/14 Time: 15:15
Company: MFA

Relinquished For Lab By: _____ Date: 8/11/14 Time: 15:15
Company: MFA

Unless Reclaimed, Samples Will Be Disposed of 60 Days After Receipt.
Samples held beyond 60 days subject to storage fees(s)



Specialty Analytical

11711 SE Capps Road, Ste B
Clackamas, Oregon 97015
TEL: 503-607-1331 FAX: 503-607-1336
Website: www.specialtyanalytical.com

September 18, 2014

Josh Elliott
Maul Foster & Alongi
400 E. Mill Plain Blvd.
Suite 400
Vancouver, WA 98660
TEL: (360) 694-2691
FAX (360) 906-1958
RE: Carty Lake / 9003.01.40

Dear Josh Elliott:

Order No.: 1409082

Specialty Analytical received 1 sample(s) on 9/12/2014 for the analyses presented in the following report.

There were no problems with the analysis and all data for associated QC met EPA or laboratory specifications, except where noted in the Case Narrative, or as qualified with flags. Results apply only to the samples analyzed. Without approval of the laboratory, the reproduction of this report is only permitted in its entirety.

If you have any questions regarding these tests, please feel free to call.

Sincerely,

A handwritten signature in black ink, appearing to read "Marty French". The signature is stylized and cursive.

Marty French
Lab Director

Specialty Analytical

Date Reported: 18-Sep-14

CLIENT: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40
Lab ID: 1409082-001
Client Sample ID: 80/20 Soil

Collection Date: 9/12/2014 10:15:00 AM

Matrix: SOIL

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
SEMIVOLATILE ORGANICS-LOW LEVEL		SW8270D				Analyst: bda
3-&4-Methylphenol	70.6	39.9		µg/Kg-dry	1	9/17/2014 10:24:00 AM
Benzoic Acid	ND	799		µg/Kg-dry	1	9/17/2014 10:24:00 AM
Bis(2-ethylhexyl)phthalate	160	39.9		µg/Kg-dry	1	9/17/2014 10:24:00 AM
Dibenzofuran	ND	39.9		µg/Kg-dry	1	9/17/2014 10:24:00 AM
Di-n-butyl phthalate	ND	59.9		µg/Kg-dry	1	9/17/2014 10:24:00 AM
Di-n-octyl phthalate	ND	39.9		µg/Kg-dry	1	9/17/2014 10:24:00 AM
Pentachlorophenol	ND	59.9		µg/Kg-dry	1	9/17/2014 10:24:00 AM
Phenol	ND	39.9		µg/Kg-dry	1	9/17/2014 10:24:00 AM
Surr: 2,4,6-Tribromophenol	97.0	57.8-119		%REC	1	9/17/2014 10:24:00 AM
Surr: 2-Fluorobiphenyl	97.0	52.6-93.2	S	%REC	1	9/17/2014 10:24:00 AM
Surr: 2-Fluorophenol	53.9	40.7-111		%REC	1	9/17/2014 10:24:00 AM
Surr: 4-Terphenyl-d14	101	49.8-118		%REC	1	9/17/2014 10:24:00 AM
Surr: Nitrobenzene-d5	79.0	44.8-103		%REC	1	9/17/2014 10:24:00 AM
Surr: Phenol-d6	68.6	47.5-117		%REC	1	9/17/2014 10:24:00 AM

QC SUMMARY REPORT

WO#: 1409082

18-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8270LL_S

Sample ID: CCV-8183	SampType: CCV	TestCode: 8270LL_S	Units: µg/Kg	Prep Date:	RunNo: 16847						
Client ID: CCV	Batch ID: 8183	TestNo: SW8270D	SW 3545A	Analysis Date: 9/17/2014	SeqNo: 222482						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Di-n-octyl phthalate	1320	33.3	1333	0	99.4	80	120				
Pentachlorophenol	1090	50.0	1333	0	81.7	80	120				
Phenol	1190	33.3	1333	0	89.0	80	120				

Sample ID: LCS-8183	SampType: LCS	TestCode: 8270LL_S	Units: µg/Kg	Prep Date: 9/16/2014	RunNo: 16847						
Client ID: LCSS	Batch ID: 8183	TestNo: SW8270D	SW 3545A	Analysis Date: 9/17/2014	SeqNo: 222483						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Pentachlorophenol	858	50.0	1666	0	51.5	46.8	120				
Phenol	1710	33.3	1666	0	103	51.1	103				

Sample ID: MB-8183	SampType: MBLK	TestCode: 8270LL_S	Units: µg/Kg	Prep Date: 9/16/2014	RunNo: 16847						
Client ID: PBS	Batch ID: 8183	TestNo: SW8270D	SW 3545A	Analysis Date: 9/17/2014	SeqNo: 222484						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

3-&4-Methylphenol	ND	33.3									
Benzoic Acid	ND	667									
Bis(2-ethylhexyl)phthalate	ND	33.3									
Dibenzofuran	ND	33.3									
Di-n-butyl phthalate	ND	50.0									
Di-n-octyl phthalate	ND	33.3									
Pentachlorophenol	ND	50.0									
Phenol	ND	33.3									

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery

QC SUMMARY REPORT

WO#: 1409082

18-Sep-14

Specialty Analytical

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40

TestCode: 8270LL_S

Sample ID: MB-8183	SampType: MBLK	TestCode: 8270LL_S	Units: µg/Kg	Prep Date: 9/16/2014	RunNo: 16847						
Client ID: PBS	Batch ID: 8183	TestNo: SW8270D	SW 3545A	Analysis Date: 9/17/2014	SeqNo: 222484						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 2,4,6-Tribromophenol	4240		3333		127	57.8	119				S
Surr: 2-Fluorobiphenyl	3820		3333		115	52.6	93.2				S
Surr: 2-Fluorophenol	3380		3333		101	40.7	111				
Surr: 4-Terphenyl-d14	3930		3333		118	49.8	118				S
Surr: Nitrobenzene-d5	4150		3333		124	44.8	103				S
Surr: Phenol-d6	3850		3333		115	47.5	117				

Sample ID: 1409082-001AMS	SampType: MS	TestCode: 8270LL_S	Units: µg/Kg-dry	Prep Date: 9/16/2014	RunNo: 16847						
Client ID: 80/20 Soil	Batch ID: 8183	TestNo: SW8270D	SW 3545A	Analysis Date: 9/17/2014	SeqNo: 222486						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pentachlorophenol	974	59.9	1995	0	48.8	36.6	112				
Phenol	1610	39.9	1995	0	80.8	37.7	107				

Sample ID: 1409082-001AMSD	SampType: MSD	TestCode: 8270LL_S	Units: µg/Kg-dry	Prep Date: 9/16/2014	RunNo: 16847						
Client ID: 80/20 Soil	Batch ID: 8183	TestNo: SW8270D	SW 3545A	Analysis Date: 9/17/2014	SeqNo: 222487						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pentachlorophenol	896	59.9	1995	0	44.9	36.6	112	974.3	8.41	20	
Phenol	1430	39.9	1995	0	71.6	37.7	107	1613	12.0	20	

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit Page 2 of 2
O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery

KEY TO FLAGS

Rev. May 12, 2010

- A This sample contains a Gasoline Range Organic not identified as a specific hydrocarbon product. The result was quantified against gasoline calibration standards
- A1 This sample contains a Diesel Range Organic not identified as a specific hydrocarbon product. The result was quantified against diesel calibration standards.
- A2 This sample contains a Lube Oil Range Organic not identified as a specific hydrocarbon product. The result was quantified against a lube oil calibration standard.
- A3 The result was determined to be Non-Detect based on hydrocarbon pattern recognition. The product was carry-over from another hydrocarbon type.
- A4 The product appears to be aged or degraded diesel.
- B The blank exhibited a positive result great than the reporting limit for this compound.
- CN See Case Narrative.
- D Result is based from a dilution.
- E Result exceeds the calibration range for this compound. The result should be considered as estimate.
- F The positive result for this hydrocarbon is due to single component contamination. The product does not match any hydrocarbon in the fuels library.
- G Result may be biased high due to biogenic interferences. Clean up is recommended.
- H Sample was analyzed outside recommended holding time.
- HT At clients request, samples was analyzed outside of recommended holding time.
- J The result for this analyte is between the MDL and the PQL and should be considered as estimated concentration.
- K Diesel result is biased high due to amount of Oil contained in the sample.
- L Diesel result is biased high due to amount of Gasoline contained in the sample.
- M Oil result is biased high due to amount of Diesel contained in the sample.
- MC Sample concentration is greater than 4x the spiked value, the spiked value is considered insignificant.
- MI Result is outside control limits due to matrix interference.
- MSA Value determined by Method of Standard Addition.
- O Laboratory Control Standard (LCS) exceeded laboratory control limits, but meets CCV criteria. Data meets EPA requirements.
- Q Detection levels elevated due to sample matrix.
- R RPD control limits were exceeded.
- RF Duplicate failed due to result being at or near the method-reporting limit.
- RP Matrix spike values exceed established QC limits; post digestion spike is in control.
- S Recovery is outside control limits.
- SC Closing CCV or LCS exceeded high recovery control limits, but associated samples are non-detect. Data meets EPA requirements.
- * The result for this parameter was greater than the maximum contaminant level of the TCLP regulatory limit.

CHAIN OF CUSTODY RECORD

Specialty Analytical
 11711 SE Capps Road
 Clackamas, OR 97015
 Phone: 503-607-1331
 Fax: 503-607-1336

Contact Person/Project Manager Josh Elliott, Mary Benzings
 Company MFA
 Address 2001 NW 19th AVE, Portland, OR

Phone (503) 501-5236 Fax
 Project No. 9003.01.40 Project Name Carty Lake
 Project Site Location OR WA Other
 Invoice To 9003.01.40 Carty Lake Sediment Remediation P.O. No.

Collected By: _____
 Signature: _____
 Printed: Josh Elliott

Signature: _____
 Printed: _____
 Turn Around Time
 Normal 5-7 Business Days
 Rush by 09/18/2014
 Specify _____

Rush Analyses Must Be Scheduled With The Lab In Advance

Date	Time	Sample I.D.	Matrix	No. of Containers	Analyses	For Laboratory Use	
						Lab Job No.	Comments
09/12/2014	10:15	80/20 Soil	S	2	X	SVOCs - EPA 82700	Lab Job No. <u>409082</u> Shipped Via <u>Specialty</u> Air Bill No. _____ Temperature On Receipt <u>4</u> °C Specialty Analytical Containers? Y/N Specialty Analytical Trip Blanks? Y/N
							see attached list
							email work order summary after log-in
Relinquished By: _____ Company: <u>MFA</u>		Date: <u>9/12/14</u> Time: <u>12:30</u>	Received By: _____ Company: _____		Relinquished By: _____ Company: _____		Date: <u>9/12/14</u> Time: <u>1:55</u>

Unless Reclaimed, Samples Will Be Disposed of 60 Days After Receipt.
 Samples held beyond 60 days subject to storage fee(s)
 Copied: White-Original Yellow-Project File Pink-Customer Copy

Received For Lab By: _____
 Date: 9/12/14
 Time: 1:55

Report Prepared for:

Mary Benzinger
Maul Foster & Alongi
2001 NW 19th Avenue
Suite 200
Portland OR 97209

**REPORT OF
LABORATORY
ANALYSIS FOR
PCDD/PCDF**

Report Prepared Date:

September 12, 2014

Report Information:

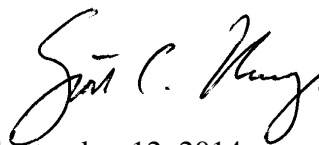
Pace Project #: 10278529
Sample Receipt Date: 08/21/2014
Client Project #: 1408057
Client Sub PO #: N/A
State Cert #: MN200001-005

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

This report has been reviewed by:



September 12, 2014

Scott Unze, Project Manager
(612) 607-6383
(612) 607-6444 (fax)
scott.unze@pacelabs.com



Report of Laboratory Analysis

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.

DISCUSSION

This report presents the results from the analyses performed on three samples submitted by a representative of Maul Foster & Alongi. The samples were analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Estimated Maximum Possible Concentration (EMPC) values were treated as positives in the toxic equivalence calculations. The samples were received above the recommended temperature range of 0-6 degrees Celsius.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 58-98%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

In one case, an interfering substance impacted the determination of a PCDF congener; the affected value was flagged "I" due to an incorrect isotope ratio. Concentrations below the calibration range were flagged "J" and should be regarded as estimates.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show that PCDDs and PCDFs were not detected.

Laboratory and matrix spike samples were also prepared with the sample batch using clean sand or sample matrix that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 90-124% with relative percent differences of 0.9-8.6%. These results indicate high degrees of accuracy and precision for these determinations.

REPORT OF LABORATORY ANALYSIS

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Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia	9952C
Maryland	322	Wisconsin	999407970
Michigan	9909	Wyoming	8TMS-Q
Minnesota	027-053-137		

REPORT OF LABORATORY ANALYSIS

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Report No.....10278529

Appendix A

Sample Management

Sample Condition Upon Receipt **Client Name:** Specialty Analytical **Project #:** _____

Courier: Fed Ex UPS USPS Client

Commercial Pace SpeedDee Other: _____

Tracking Number: 7708 7931 8983

WO# : 10278529



10278529

Custody Seal on Cooler/Box Present? Yes No **Seals Intact?** Yes No **Optional:** Proj. Due Date: _____ Proj. Name: _____

Packing Material: Bubble Wrap Bubble Bags None Other: _____ **Temp Blank?** Yes No

Thermom. Used: B88A9130516413 B88A912167504 B88A9132521491 **Type of Ice:** Wet Blue None Samples on ice, cooling process has begun

Cooler Temp Read (°C): 14.2 **Cooler Temp Corrected (°C):** 14.2 **Biological Tissue Frozen?** Yes No N/A

Temp should be above freezing to 6°C **Correction Factor:** true **Date and Initials of Person Examining Contents:** _____

					Comments:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/>	1.	
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/>	2.	
Chain of Custody Relinquished?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/>	3.	
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/>	4.	
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/>	5.	
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/>	6.	
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/>	7.	
Sufficient Volume?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/>	8.	
Correct Containers Used?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/>	9.	
-Pace Containers Used?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/>		
Containers Intact?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/>	10.	
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/>	11.	
Sample Labels Match COC?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/>	12.	<u>Sample 3 has no date or time on label</u>
-Includes Date/Time/ID/Analysis Matrix: <u>SL</u>					
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/>	13.	<input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/>		Sample #
(HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)					
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/>		Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/>	14.	
Trip Blank Present?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/>	15.	
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/>		
Pace Trip Blank Lot # (if purchased):					

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** Yes No

Person Contacted: Condy Date/Time: 08/21/14

Comments/Resolution: Waived temp.

Project Manager Review: _____ **Date:** 08/21/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- * = See Discussion

REPORT OF LABORATORY ANALYSIS

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Report No.....10278529

Appendix B

Sample Analysis Summary

Method 1613B Sample Analysis Results

Client - Maul Foster & Alongi

Client's Sample ID	1408057-001		
Lab Sample ID	10278529001		
Filename	U140906B_13		
Injected By	BAL		
Total Amount Extracted	11.1 g	Matrix	Solid
% Moisture	0.1	Dilution	NA
Dry Weight Extracted	11.1 g	Collected	08/08/2014 09:15
ICAL ID	U140826	Received	08/21/2014 10:00
CCal Filename(s)	U140906A_19	Extracted	08/25/2014 19:00
Method Blank ID	BLANK-41750	Analyzed	09/07/2014 02:18

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.52	2,3,7,8-TCDF-13C	2.00	77
Total TCDF	ND	----	0.52	2,3,7,8-TCDD-13C	2.00	85
				1,2,3,7,8-PeCDF-13C	2.00	83
2,3,7,8-TCDD	ND	----	0.19	2,3,4,7,8-PeCDF-13C	2.00	75
Total TCDD	ND	----	0.19	1,2,3,7,8-PeCDD-13C	2.00	87
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	ND	----	0.26	1,2,3,6,7,8-HxCDF-13C	2.00	82
2,3,4,7,8-PeCDF	ND	----	0.26	2,3,4,6,7,8-HxCDF-13C	2.00	81
Total PeCDF	ND	----	0.26	1,2,3,7,8,9-HxCDF-13C	2.00	76
				1,2,3,4,7,8-HxCDD-13C	2.00	78
1,2,3,7,8-PeCDD	ND	----	0.20	1,2,3,6,7,8-HxCDD-13C	2.00	69
Total PeCDD	ND	----	0.20	1,2,3,4,6,7,8-HpCDF-13C	2.00	78
				1,2,3,4,7,8,9-HpCDF-13C	2.00	68
1,2,3,4,7,8-HxCDF	ND	----	0.28	1,2,3,4,6,7,8-HpCDD-13C	2.00	70
1,2,3,6,7,8-HxCDF	ND	----	0.31	OCDD-13C	4.00	61
2,3,4,6,7,8-HxCDF	ND	----	0.27			
1,2,3,7,8,9-HxCDF	ND	----	0.48	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.33	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.30	2,3,7,8-TCDD-37Cl4	0.20	86
1,2,3,6,7,8-HxCDD	ND	----	0.21			
1,2,3,7,8,9-HxCDD	ND	----	0.22			
Total HxCDD	0.69	----	0.24 J			
1,2,3,4,6,7,8-HpCDF	0.50	----	0.15 J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.29	Equivalence: 0.016 ng/Kg		
Total HpCDF	0.50	----	0.22 J	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	0.65	----	0.24 J			
Total HpCDD	1.30	----	0.24 J			
OCDF	----	0.48	0.34 U			
OCDD	4.40	----	0.83 J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
RL = Reporting Limit.

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.
J = Estimated value
I = Interference present

REPORT OF LABORATORY ANALYSIS

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Method 1613B Sample Analysis Results

Client - Maul Foster & Alongi

Client's Sample ID	1408057-002		
Lab Sample ID	10278529002		
Filename	U140906B_14		
Injected By	BAL		
Total Amount Extracted	11.0 g	Matrix	Solid
% Moisture	0.1	Dilution	NA
Dry Weight Extracted	11.0 g	Collected	08/08/2014 09:21
ICAL ID	U140826	Received	08/21/2014 10:00
CCal Filename(s)	U140906A_19	Extracted	08/25/2014 19:00
Method Blank ID	BLANK-41750	Analyzed	09/07/2014 02:58

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.79	2,3,7,8-TCDF-13C	2.00	86
Total TCDF	ND	----	0.79	2,3,7,8-TCDD-13C	2.00	91
				1,2,3,7,8-PeCDF-13C	2.00	93
2,3,7,8-TCDD	ND	----	0.18	2,3,4,7,8-PeCDF-13C	2.00	86
Total TCDD	ND	----	0.18	1,2,3,7,8-PeCDD-13C	2.00	98
				1,2,3,4,7,8-HxCDF-13C	2.00	86
1,2,3,7,8-PeCDF	ND	----	0.41	1,2,3,6,7,8-HxCDF-13C	2.00	91
2,3,4,7,8-PeCDF	ND	----	0.39	2,3,4,6,7,8-HxCDF-13C	2.00	89
Total PeCDF	ND	----	0.40	1,2,3,7,8,9-HxCDF-13C	2.00	86
				1,2,3,4,7,8-HxCDD-13C	2.00	83
1,2,3,7,8-PeCDD	ND	----	0.27	1,2,3,6,7,8-HxCDD-13C	2.00	75
Total PeCDD	ND	----	0.27	1,2,3,4,6,7,8-HpCDF-13C	2.00	79
				1,2,3,4,7,8,9-HpCDF-13C	2.00	72
1,2,3,4,7,8-HxCDF	ND	----	0.36	1,2,3,4,6,7,8-HpCDD-13C	2.00	73
1,2,3,6,7,8-HxCDF	ND	----	0.28	OCDD-13C	4.00	62
2,3,4,6,7,8-HxCDF	ND	----	0.28			
1,2,3,7,8,9-HxCDF	ND	----	0.44	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.34	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.28	2,3,7,8-TCDD-37Cl4	0.20	96
1,2,3,6,7,8-HxCDD	ND	----	0.24			
1,2,3,7,8,9-HxCDD	ND	----	0.20			
Total HxCDD	ND	----	0.24			
1,2,3,4,6,7,8-HpCDF	0.49	----	0.15 J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.19	Equivalence: 0.014 ng/Kg		
Total HpCDF	0.49	----	0.17 J	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	0.56	----	0.15 J			
Total HpCDD	1.10	----	0.15 J			
OCDF	0.38	----	0.20 J			
OCDD	2.90	----	0.56 J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

RL = Reporting Limit.

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.

J = Estimated value

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Method 1613B Sample Analysis Results

Client - Maul Foster & Alongi

Client's Sample ID	1408057-003		
Lab Sample ID	10278529003		
Filename	U140906B_15		
Injected By	BAL		
Total Amount Extracted	11.1 g	Matrix	Solid
% Moisture	0.1	Dilution	NA
Dry Weight Extracted	11.1 g	Collected	08/08/2014 09:28
ICAL ID	U140826	Received	08/21/2014 10:00
CCal Filename(s)	U140906A_19	Extracted	08/25/2014 19:00
Method Blank ID	BLANK-41750	Analyzed	09/07/2014 03:38

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.68	2,3,7,8-TCDF-13C	2.00	78
Total TCDF	ND	----	0.68	2,3,7,8-TCDD-13C	2.00	85
				1,2,3,7,8-PeCDF-13C	2.00	86
2,3,7,8-TCDD	ND	----	0.20	2,3,4,7,8-PeCDF-13C	2.00	79
Total TCDD	ND	----	0.20	1,2,3,7,8-PeCDD-13C	2.00	89
				1,2,3,4,7,8-HxCDF-13C	2.00	81
1,2,3,7,8-PeCDF	ND	----	0.29	1,2,3,6,7,8-HxCDF-13C	2.00	84
2,3,4,7,8-PeCDF	ND	----	0.25	2,3,4,6,7,8-HxCDF-13C	2.00	82
Total PeCDF	0.45	----	0.27 J	1,2,3,7,8,9-HxCDF-13C	2.00	78
				1,2,3,4,7,8-HxCDD-13C	2.00	80
1,2,3,7,8-PeCDD	ND	----	0.15	1,2,3,6,7,8-HxCDD-13C	2.00	70
Total PeCDD	0.26	----	0.15 J	1,2,3,4,6,7,8-HpCDF-13C	2.00	72
				1,2,3,4,7,8,9-HpCDF-13C	2.00	67
1,2,3,4,7,8-HxCDF	ND	----	0.42	1,2,3,4,6,7,8-HpCDD-13C	2.00	67
1,2,3,6,7,8-HxCDF	ND	----	0.39	OCDD-13C	4.00	58
2,3,4,6,7,8-HxCDF	ND	----	0.34			
1,2,3,7,8,9-HxCDF	ND	----	0.52	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.42	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.46	2,3,7,8-TCDD-37Cl4	0.20	84
1,2,3,6,7,8-HxCDD	ND	----	0.53			
1,2,3,7,8,9-HxCDD	ND	----	0.30			
Total HxCDD	ND	----	0.43			
1,2,3,4,6,7,8-HpCDF	0.86	----	0.16 J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.20	Equivalence: 0.038 ng/Kg		
Total HpCDF	2.10	----	0.18 J	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	1.40	----	0.17 J			
Total HpCDD	2.30	----	0.17 J			
OCDF	3.70	----	0.29 J			
OCDD	11.00	----	0.21			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
RL = Reporting Limit.

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.
J = Estimated value

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Method 1613B Blank Analysis Results

Lab Sample ID	BLANK-41750	Matrix	Solid
Filename	P140907B_04	Dilution	NA
Total Amount Extracted	21.3 g	Extracted	08/25/2014 19:00
ICAL ID	P140715	Analyzed	09/07/2014 17:45
CCal Filename(s)	P140907A_13	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.120	2,3,7,8-TCDF-13C	2.00	79
Total TCDF	ND	----	0.120	2,3,7,8-TCDD-13C	2.00	86
				1,2,3,7,8-PeCDF-13C	2.00	78
2,3,7,8-TCDD	ND	----	0.170	2,3,4,7,8-PeCDF-13C	2.00	76
Total TCDD	ND	----	0.170	1,2,3,7,8-PeCDD-13C	2.00	88
				1,2,3,4,7,8-HxCDF-13C	2.00	76
1,2,3,7,8-PeCDF	ND	----	0.230	1,2,3,6,7,8-HxCDF-13C	2.00	84
2,3,4,7,8-PeCDF	ND	----	0.140	2,3,4,6,7,8-HxCDF-13C	2.00	87
Total PeCDF	ND	----	0.180	1,2,3,7,8,9-HxCDF-13C	2.00	79
				1,2,3,4,7,8-HxCDD-13C	2.00	80
1,2,3,7,8-PeCDD	ND	----	0.160	1,2,3,6,7,8-HxCDD-13C	2.00	73
Total PeCDD	ND	----	0.160	1,2,3,4,6,7,8-HpCDF-13C	2.00	82
				1,2,3,4,7,8,9-HpCDF-13C	2.00	78
1,2,3,4,7,8-HxCDF	ND	----	0.110	1,2,3,4,6,7,8-HpCDD-13C	2.00	82
1,2,3,6,7,8-HxCDF	ND	----	0.076	OCDD-13C	4.00	60
2,3,4,6,7,8-HxCDF	ND	----	0.093			
1,2,3,7,8,9-HxCDF	ND	----	0.140	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.110	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.150	2,3,7,8-TCDD-37Cl4	0.20	96
1,2,3,6,7,8-HxCDD	ND	----	0.160			
1,2,3,7,8,9-HxCDD	ND	----	0.170			
Total HxCDD	ND	----	0.160			
1,2,3,4,6,7,8-HpCDF	ND	----	0.086	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.150	Equivalence: 0.00 ng/Kg		
Total HpCDF	ND	----	0.120	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	----	0.140			
Total HpCDD	ND	----	0.140			
OCDF	ND	----	0.290			
OCDD	ND	----	0.410			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

RL = Reporting Limit

Results reported on a total weight basis and are valid to no more than 2 significant figures.

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Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-41751	Matrix	Solid
Filename	U140830B_20	Dilution	NA
Total Amount Extracted	20.5 g	Extracted	08/25/2014 19:00
ICAL ID	U140826	Analyzed	08/31/2014 03:17
CCal Filename	U140830B_05	Injected By	CVS
Method Blank ID	BLANK-41750		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	10	7.5	15.8	105
2,3,7,8-TCDD	10	9.2	6.7	15.8	92
1,2,3,7,8-PeCDF	50	51	40.0	67.0	101
2,3,4,7,8-PeCDF	50	53	34.0	80.0	105
1,2,3,7,8-PeCDD	50	48	35.0	71.0	95
1,2,3,4,7,8-HxCDF	50	54	36.0	67.0	107
1,2,3,6,7,8-HxCDF	50	52	42.0	65.0	104
2,3,4,6,7,8-HxCDF	50	50	35.0	78.0	99
1,2,3,7,8,9-HxCDF	50	53	39.0	65.0	106
1,2,3,4,7,8-HxCDD	50	56	35.0	82.0	111
1,2,3,6,7,8-HxCDD	50	53	38.0	67.0	105
1,2,3,7,8,9-HxCDD	50	57	32.0	81.0	113
1,2,3,4,6,7,8-HpCDF	50	57	41.0	61.0	114
1,2,3,4,7,8,9-HpCDF	50	49	39.0	69.0	98
1,2,3,4,6,7,8-HpCDD	50	49	35.0	70.0	99
OCDF	100	93	63.0	170.0	93
OCDD	100	110	78.0	144.0	109
2,3,7,8-TCDD-37Cl4	10	9.3	3.1	19.1	93
2,3,7,8-TCDF-13C	100	73	22.0	152.0	73
2,3,7,8-TCDD-13C	100	87	20.0	175.0	87
1,2,3,7,8-PeCDF-13C	100	77	21.0	192.0	77
2,3,4,7,8-PeCDF-13C	100	71	13.0	328.0	71
1,2,3,7,8-PeCDD-13C	100	83	21.0	227.0	83
1,2,3,4,7,8-HxCDF-13C	100	76	19.0	202.0	76
1,2,3,6,7,8-HxCDF-13C	100	79	21.0	159.0	79
2,3,4,6,7,8-HxCDF-13C	100	77	22.0	176.0	77
1,2,3,7,8,9-HxCDF-13C	100	72	17.0	205.0	72
1,2,3,4,7,8-HxCDD-13C	100	73	21.0	193.0	73
1,2,3,6,7,8-HxCDD-13C	100	71	25.0	163.0	71
1,2,3,4,6,7,8-HpCDF-13C	100	76	21.0	158.0	76
1,2,3,4,7,8,9-HpCDF-13C	100	72	20.0	186.0	72
1,2,3,4,6,7,8-HpCDD-13C	100	79	26.0	166.0	79
OCDD-13C	200	130	26.0	397.0	64

Cs = Concentration Spiked (ng/mL)
 Cr = Concentration Recovered (ng/mL)
 Rec. = Recovery (Expressed as Percent)
 Control Limit Reference: Method 1613, Table 6, 10/94 Revision
 R = Recovery outside of control limits
 Nn = Value obtained from additional analysis
 * = See Discussion

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Method 1613B Spiked Sample Report

Client - Maul Foster & Alongi

Client's Sample ID	1408057-001-MS	Matrix	Solid
Lab Sample ID	10278529001-MS	Dilution	NA
Filename	U140906B_16	Extracted	08/25/2014 19:00
Total Amount Extracted	11.5 g	Analyzed	09/07/2014 04:18
ICAL ID	U140826	Injected By	BAL
CCal Filename(s)	U140906A_19		
Method Blank ID	BLANK-41750		

Native Isomers	Qs (ng)	Qm (ng)	% Rec.	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.20	0.22	112	2,3,7,8-TCDF-13C	2.00	79
Total TCDF				2,3,7,8-TCDD-13C	2.00	86
				1,2,3,7,8-PeCDF-13C	2.00	86
2,3,7,8-TCDD	0.20	0.19	95	2,3,4,7,8-PeCDF-13C	2.00	79
Total TCDD				1,2,3,7,8-PeCDD-13C	2.00	92
				1,2,3,4,7,8-HxCDF-13C	2.00	85
1,2,3,7,8-PeCDF	1.00	1.03	103	1,2,3,6,7,8-HxCDF-13C	2.00	87
2,3,4,7,8-PeCDF	1.00	1.06	106	2,3,4,6,7,8-HxCDF-13C	2.00	85
Total PeCDF				1,2,3,7,8,9-HxCDF-13C	2.00	81
				1,2,3,4,7,8-HxCDD-13C	2.00	86
1,2,3,7,8-PeCDD	1.00	0.95	95	1,2,3,6,7,8-HxCDD-13C	2.00	72
Total PeCDD				1,2,3,4,6,7,8-HpCDF-13C	2.00	77
				1,2,3,4,7,8,9-HpCDF-13C	2.00	71
1,2,3,4,7,8-HxCDF	1.00	1.10	110	1,2,3,4,6,7,8-HpCDD-13C	2.00	71
1,2,3,6,7,8-HxCDF	1.00	1.08	108	OCDD-13C	4.00	64
2,3,4,6,7,8-HxCDF	1.00	1.04	104			
1,2,3,7,8,9-HxCDF	1.00	1.07	107	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF				1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.00	1.02	102	2,3,7,8-TCDD-37Cl4	0.20	94
1,2,3,6,7,8-HxCDD	1.00	1.24	124			
1,2,3,7,8,9-HxCDD	1.00	1.13	113			
Total HxCDD						
1,2,3,4,6,7,8-HpCDF	1.00	1.16	116			
1,2,3,4,7,8,9-HpCDF	1.00	1.06	106			
Total HpCDF						
1,2,3,4,6,7,8-HpCDD	1.00	1.09	109			
Total HpCDD						
OCDF	2.00	1.99	100			
OCDD	2.00	2.32	116			

Qs = Quantity Spiked Qm = Quantity Measured Rec. = Recovery (Expressed as Percent)
Results reported on a total weight basis and are valid to no more than 2 significant figures.

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Method 1613B Spiked Sample Report

Client - Maul Foster & Alongi

Client's Sample ID	1408057-001-MSD	Matrix	Solid
Lab Sample ID	10278529001-MSD	Dilution	NA
Filename	U140906B_17	Extracted	08/25/2014 19:00
Total Amount Extracted	11.7 g	Analyzed	09/07/2014 04:58
ICAL ID	U140826	Injected By	BAL
CCal Filename(s)	U140906A_19		
Method Blank ID	BLANK-41750		

Native Isomers	Qs (ng)	Qm (ng)	% Rec.	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.20	0.21	103	2,3,7,8-TCDF-13C	2.00	84
Total TCDF				2,3,7,8-TCDD-13C	2.00	92
				1,2,3,7,8-PeCDF-13C	2.00	91
2,3,7,8-TCDD	0.20	0.19	96	2,3,4,7,8-PeCDF-13C	2.00	87
Total TCDD				1,2,3,7,8-PeCDD-13C	2.00	101
				1,2,3,4,7,8-HxCDF-13C	2.00	88
1,2,3,7,8-PeCDF	1.00	1.02	102	1,2,3,6,7,8-HxCDF-13C	2.00	90
2,3,4,7,8-PeCDF	1.00	1.02	102	2,3,4,6,7,8-HxCDF-13C	2.00	88
Total PeCDF				1,2,3,7,8,9-HxCDF-13C	2.00	83
				1,2,3,4,7,8-HxCDD-13C	2.00	89
1,2,3,7,8-PeCDD	1.00	0.90	90	1,2,3,6,7,8-HxCDD-13C	2.00	74
Total PeCDD				1,2,3,4,6,7,8-HpCDF-13C	2.00	80
				1,2,3,4,7,8,9-HpCDF-13C	2.00	67
1,2,3,4,7,8-HxCDF	1.00	1.03	103	1,2,3,4,6,7,8-HpCDD-13C	2.00	71
1,2,3,6,7,8-HxCDF	1.00	1.02	102	OCDD-13C	4.00	61
2,3,4,6,7,8-HxCDF	1.00	0.97	97			
1,2,3,7,8,9-HxCDF	1.00	1.03	103	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF				1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.00	0.95	95	2,3,7,8-TCDD-37Cl4	0.20	93
1,2,3,6,7,8-HxCDD	1.00	1.19	119			
1,2,3,7,8,9-HxCDD	1.00	1.07	107			
Total HxCDD						
1,2,3,4,6,7,8-HpCDF	1.00	1.09	109			
1,2,3,4,7,8,9-HpCDF	1.00	1.07	107			
Total HpCDF						
1,2,3,4,6,7,8-HpCDD	1.00	1.03	103			
Total HpCDD						
OCDF	2.00	1.93	97			
OCDD	2.00	2.16	108			

Qs = Quantity Spiked Qm = Quantity Measured Rec. = Recovery (Expressed as Percent)
Results reported on a total weight basis and are valid to no more than 2 significant figures.

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Method 1613 Spike Sample Results

Client - Maul Foster & Alongi

Client Sample ID	1408057-001								
Lab Sample ID	10278529001	Sample Filename	U140906B_13	<u>Dry Weights</u>					
MS ID	10278529001-MS	MS Filename	U140906B_16	Sample Amount	11.1 g				
MSD ID	10278529001-MSD	MSD Filename	U140906B_17	MS Amount	11.5 g				
				MSD Amount	11.7 g				

Analyte	Sample Conc. ng/Kg	MS/MSD Qs (ng)	MS Qm (ng)	MSD Qm (ng)	RPD	Background Subtracted		
						MS % Rec.	MSD % Rec.	RPD
2,3,7,8-TCDF	0.000	0.20	0.22	0.21	8.6	112	103	8.6
2,3,7,8-TCDD	0.000	0.20	0.19	0.19	1.0	95	96	1.0
1,2,3,7,8-PeCDF	0.000	1.00	1.03	1.02	1.5	103	101	1.5
2,3,4,7,8-PeCDF	0.000	1.00	1.06	1.02	4.1	106	102	4.1
1,2,3,7,8-PeCDD	0.000	1.00	0.95	0.90	5.2	95	90	5.2
1,2,3,4,7,8-HxCDF	0.000	1.00	1.10	1.03	6.8	110	103	6.8
1,2,3,6,7,8-HxCDF	0.000	1.00	1.08	1.02	6.2	108	102	6.2
2,3,4,6,7,8-HxCDF	0.000	1.00	1.04	0.97	6.8	104	97	6.8
1,2,3,7,8,9-HxCDF	0.000	1.00	1.07	1.03	3.5	107	103	3.5
1,2,3,4,7,8-HxCDD	0.000	1.00	1.02	0.95	7.6	102	95	7.6
1,2,3,6,7,8-HxCDD	0.000	1.00	1.24	1.19	3.8	124	119	3.8
1,2,3,7,8,9-HxCDD	0.000	1.00	1.13	1.07	5.8	113	107	5.8
1,2,3,4,6,7,8-HpCDF	0.501	1.00	1.16	1.09	5.6	115	109	5.7
1,2,3,4,7,8,9-HpCDF	0.000	1.00	1.06	1.07	0.9	106	107	0.9
1,2,3,4,6,7,8-HpCDD	0.654	1.00	1.09	1.03	5.4	108	102	5.5
OCDF	0.000	2.00	1.99	1.93	2.9	99	96	2.9
OCDD	4.445	2.00	2.32	2.16	6.8	113	106	7.0

Definitions

MS = Matrix Spike	CDD = Chlorinated dibenzo-p-dioxin
MSD = Matrix Spike Duplicate	CDF = Chlorinated dibenzo-p-furan
Qm = Quantity Measured	T = Tetra
Qs = Quantity Spiked	Pe = Penta
% Rec. = Percent Recovery	Hx = Hexa
RPD = Relative Percent Difference	Hp = Hepta
NA = Not Applicable	O = Octa
NC = Not Calculated	

September 25, 2014

Mary Benzinger
Maul Foster and Alongi
2001 NW 19th Ave
Suite 200
Portland, OR 97209

RE: Project: 9003.01.40
Pace Project No.: 10280382

Dear Mary Benzinger:

Enclosed are the analytical results for sample(s) received by the laboratory on September 05, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Chris Bremer
chris.bremer@pacelabs.com
Project Manager

Enclosures

cc: Josh Elliot, Maul Foster and Algoni



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 9003.01.40

Pace Project No.: 10280382

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

A2LA Certification #: 2926.01

Alaska Certification #: UST-078

Alaska Certification #MN00064

Alabama Certification #40770

Alabama Certification #40770

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

Colorado Certification #Pace

Connecticut Certification #: PH-0256

EPA Region 8 Certification #: 8TMS-L

Florida/NELAP Certification #: E87605

Guam Certification #: Pace

Georgia Certification #: 959

Idaho Certification #: MN00064

Hawaii Certification #MN00064

Illinois Certification #: 200011

Indiana Certification#C-MN-01

Iowa Certification #: 368

Kansas Certification #: E-10167

Kentucky Dept of Envi. Protection - DW #90062

Kentucky Dept of Envi. Protection - WW #:90062

Louisiana DEQ Certification #: 3086

Louisiana DHH #: LA140001

Maine Certification #: 2013011

Maryland Certification #: 322

Michigan DEPH Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT0092

Nevada Certification #: MN_00064

Nebraska Certification #: Pace

New Jersey Certification #: MN-002

New Jersey Certification #: MN-002

New York Certification #: 11647

North Carolina Certification #: 530

North Carolina State Public Health #: 27700

North Dakota Certification #: R-036

Ohio EPA #: 4150

Ohio VAP Certification #: CL101

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Oregon Certification #: MN300001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Saipan (CNMI) #:MP0003

South Carolina #:74003001

Texas Certification #: T104704192

Tennessee Certification #: 02818

Utah Certification #: MN000642013-4

Virginia DGS Certification #: 251

Virginia/VELAP Certification #: Pace

Washington Certification #: C486

Wisconsin Certification #: 999407970

West Virginia Certification #: 382

West Virginia DHHR #:9952C

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 9003.01.40

Pace Project No.: 10280382

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10280382001	80/20 Soil	Solid	09/04/14 15:15	09/05/14 10:15

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 9003.01.40

Pace Project No.: 10280382

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10280382001	80/20 Soil	EPA 8081	XV1	8	PASI-M
		EPA 8082	KL1	11	PASI-M
		NWTPH-Dx	MT	4	PASI-M
		EPA 6010	IP	9	PASI-M
		EPA 7471	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270	JLR	23	PASI-M

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 9003.01.40

Pace Project No.: 10280382

Sample: 80/20 Soil **Lab ID: 10280382001** Collected: 09/04/14 15:15 Received: 09/05/14 10:15 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8081 GCS Pesticides									
Analytical Method: EPA 8081 Preparation Method: EPA 3550									
gamma-BHC (Lindane)	<2.0	ug/kg	10.2	2.0	5	09/10/14 09:07	09/18/14 03:45	58-89-9	
4,4'-DDD	<4.9	ug/kg	20.3	4.9	5	09/10/14 09:07	09/18/14 03:45	72-54-8	
4,4'-DDE	7.0J	ug/kg	20.3	5.3	5	09/10/14 09:07	09/18/14 03:45	72-55-9	
4,4'-DDT	7.6J	ug/kg	20.3	5.4	5	09/10/14 09:07	09/18/14 03:45	50-29-3	
Dieldrin	<3.7	ug/kg	20.3	3.7	5	09/10/14 09:07	09/18/14 03:45	60-57-1	
Endrin ketone	5.8J	ug/kg	20.3	4.1	5	09/10/14 09:07	09/18/14 03:45	53494-70-5	1M
Surrogates									
Tetrachloro-m-xylene (S)	102	%	30-150		5	09/10/14 09:07	09/18/14 03:45	877-09-8	
Decachlorobiphenyl (S)	180	%	30-150		5	09/10/14 09:07	09/18/14 03:45	2051-24-3	S5
8082 GCS PCB									
Analytical Method: EPA 8082 Preparation Method: EPA 3550									
PCB-1016 (Aroclor 1016)	<18.3	ug/kg	40.2	18.3	1	09/17/14 09:47	09/18/14 10:26	12674-11-2	
PCB-1221 (Aroclor 1221)	<6.1	ug/kg	40.2	6.1	1	09/17/14 09:47	09/18/14 10:26	11104-28-2	
PCB-1232 (Aroclor 1232)	<9.7	ug/kg	40.2	9.7	1	09/17/14 09:47	09/18/14 10:26	11141-16-5	
PCB-1242 (Aroclor 1242)	<7.3	ug/kg	40.2	7.3	1	09/17/14 09:47	09/18/14 10:26	53469-21-9	
PCB-1248 (Aroclor 1248)	<8.5	ug/kg	40.2	8.5	1	09/17/14 09:47	09/18/14 10:26	12672-29-6	
PCB-1254 (Aroclor 1254)	<8.5	ug/kg	40.2	8.5	1	09/17/14 09:47	09/18/14 10:26	11097-69-1	
PCB-1260 (Aroclor 1260)	<18.3	ug/kg	40.2	18.3	1	09/17/14 09:47	09/18/14 10:26	11096-82-5	
PCB-1262 (Aroclor 1262)	<7.3	ug/kg	40.2	7.3	1	09/17/14 09:47	09/18/14 10:26	37324-23-5	
PCB-1268 (Aroclor 1268)	<6.1	ug/kg	40.2	6.1	1	09/17/14 09:47	09/18/14 10:26	11100-14-4	
Surrogates									
Tetrachloro-m-xylene (S)	84	%	50-128		1	09/17/14 09:47	09/18/14 10:26	877-09-8	
Decachlorobiphenyl (S)	78	%	55-130		1	09/17/14 09:47	09/18/14 10:26	2051-24-3	
NWTPH-Dx GCS									
Analytical Method: NWTPH-Dx Preparation Method: EPA 3550 Sonication									
Diesel Fuel Range	89.8	mg/kg	18.1	1.9	1	09/10/14 12:29	09/18/14 11:11	68334-30-5	
Motor Oil Range	417	mg/kg	12.1	1.9	1	09/10/14 12:29	09/18/14 11:11		
Surrogates									
n-Triacontane (S)	61	%	50-150		1	09/10/14 12:29	09/18/14 11:11	638-68-6	
o-Terphenyl (S)	87	%	50-150		1	09/10/14 12:29	09/18/14 11:11	84-15-1	
6010 MET ICP									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	<1.8	mg/kg	6.0	1.8	5	09/17/14 09:13	09/21/14 14:40	7440-38-2	
Cadmium	0.13J	mg/kg	0.91	0.10	5	09/17/14 09:13	09/21/14 14:40	7440-43-9	
Chromium	17.3	mg/kg	3.0	0.39	5	09/17/14 09:13	09/21/14 14:40	7440-47-3	
Copper	26.6	mg/kg	3.0	1.5	5	09/17/14 09:13	09/21/14 14:40	7440-50-8	
Lead	23.5	mg/kg	6.0	0.45	5	09/17/14 09:13	09/21/14 14:40	7439-92-1	
Nickel	14.8	mg/kg	6.0	0.62	5	09/17/14 09:13	09/21/14 14:40	7440-02-0	
Selenium	<2.1	mg/kg	4.5	2.1	5	09/17/14 09:13	09/21/14 14:40	7782-49-2	
Silver	0.31J	mg/kg	3.0	0.30	5	09/17/14 09:13	09/21/14 14:40	7440-22-4	B
Zinc	102	mg/kg	6.0	2.1	5	09/17/14 09:13	09/21/14 14:40	7440-66-6	M1
7471 Mercury									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.033	mg/kg	0.024	0.0071	1	09/18/14 13:35	09/19/14 13:29	7439-97-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 9003.01.40

Pace Project No.: 10280382

Sample: 80/20 Soil **Lab ID: 10280382001** Collected: 09/04/14 15:15 Received: 09/05/14 10:15 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Dry Weight		Analytical Method: ASTM D2974							
Percent Moisture	18.1	%	0.10	0.10	1		09/15/14 09:02		
8270 MSSV		Analytical Method: EPA 8270 Preparation Method: EPA 3550							
Acenaphthene	<201	ug/kg	402	201	1	09/15/14 13:13	09/17/14 16:08	83-32-9	
Acenaphthylene	<78.5	ug/kg	402	78.5	1	09/15/14 13:13	09/17/14 16:08	208-96-8	
Anthracene	<201	ug/kg	402	201	1	09/15/14 13:13	09/17/14 16:08	120-12-7	
Benzo(a)anthracene	<201	ug/kg	402	201	1	09/15/14 13:13	09/17/14 16:08	56-55-3	
Benzo(a)pyrene	<201	ug/kg	402	201	1	09/15/14 13:13	09/17/14 16:08	50-32-8	
Benzo(b)fluoranthene	<50.9	ug/kg	402	50.9	1	09/15/14 13:13	09/17/14 16:08	205-99-2	
Benzo(g,h,i)perylene	<48.8	ug/kg	402	48.8	1	09/15/14 13:13	09/17/14 16:08	191-24-2	
Benzo(k)fluoranthene	<201	ug/kg	402	201	1	09/15/14 13:13	09/17/14 16:08	207-08-9	
Carbazole	<201	ug/kg	402	201	1	09/15/14 13:13	09/17/14 16:08	86-74-8	
Chrysene	<54.0	ug/kg	402	54.0	1	09/15/14 13:13	09/17/14 16:08	218-01-9	
Dibenz(a,h)anthracene	<201	ug/kg	402	201	1	09/15/14 13:13	09/17/14 16:08	53-70-3	
Fluoranthene	<201	ug/kg	402	201	1	09/15/14 13:13	09/17/14 16:08	206-44-0	
Fluorene	<201	ug/kg	402	201	1	09/15/14 13:13	09/17/14 16:08	86-73-7	
Indeno(1,2,3-cd)pyrene	<201	ug/kg	402	201	1	09/15/14 13:13	09/17/14 16:08	193-39-5	
Naphthalene	<28.7	ug/kg	402	28.7	1	09/15/14 13:13	09/17/14 16:08	91-20-3	
Phenanthrene	<57.4	ug/kg	402	57.4	1	09/15/14 13:13	09/17/14 16:08	85-01-8	
Pyrene	<50.7	ug/kg	402	50.7	1	09/15/14 13:13	09/17/14 16:08	129-00-0	
Surrogates									
Nitrobenzene-d5 (S)	72	%	30-125		1	09/15/14 13:13	09/17/14 16:08	4165-60-0	
2-Fluorobiphenyl (S)	74	%	46-125		1	09/15/14 13:13	09/17/14 16:08	321-60-8	
Terphenyl-d14 (S)	78	%	64-125		1	09/15/14 13:13	09/17/14 16:08	1718-51-0	
Phenol-d6 (S)	73	%	38-125		1	09/15/14 13:13	09/17/14 16:08	13127-88-3	
2-Fluorophenol (S)	69	%	31-125		1	09/15/14 13:13	09/17/14 16:08	367-12-4	
2,4,6-Tribromophenol (S)	66	%	41-125		1	09/15/14 13:13	09/17/14 16:08	118-79-6	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 9003.01.40

Pace Project No.: 10280382

QC Batch: MERP/11666

Analysis Method: EPA 7471

QC Batch Method: EPA 7471

Analysis Description: 7471 Mercury

Associated Lab Samples: 10280382001

METHOD BLANK: 1792315

Matrix: Solid

Associated Lab Samples: 10280382001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	<0.0051	0.017	09/19/14 12:52	

LABORATORY CONTROL SAMPLE: 1792316

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.45	0.45	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1792317 1792318

Parameter	Units	10280357001		1792317		1792318		% Rec Limits	RPD	Max RPD	Qual
		MS Result	MS Spike Conc.	MS Result	MS Spike Conc.	MS Result	MS Spike Conc.				
Mercury	mg/kg	ND	.55	.58	0.52	0.56	90	91	75-125	6	20

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 9003.01.40
Pace Project No.: 10280382

QC Batch: MPRP/49066 Analysis Method: EPA 6010
QC Batch Method: EPA 3050 Analysis Description: 6010 MET
Associated Lab Samples: 10280382001

METHOD BLANK: 1789539 Matrix: Solid
Associated Lab Samples: 10280382001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	<0.27	0.93	09/21/14 14:31	
Cadmium	mg/kg	<0.016	0.14	09/21/14 14:31	
Chromium	mg/kg	<0.061	0.47	09/21/14 14:31	
Copper	mg/kg	<0.23	0.47	09/21/14 14:31	
Lead	mg/kg	<0.069	0.93	09/21/14 14:31	
Nickel	mg/kg	<0.096	0.93	09/21/14 14:31	
Selenium	mg/kg	<0.32	0.70	09/21/14 14:31	
Silver	mg/kg	0.13J	0.47	09/21/14 14:31	
Zinc	mg/kg	0.80J	0.93	09/21/14 14:31	

LABORATORY CONTROL SAMPLE: 1789540

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	49	47.2	96	80-120	
Cadmium	mg/kg	49	47.6	97	80-120	
Chromium	mg/kg	49	48.1	98	80-120	
Copper	mg/kg	49	48.7	99	80-120	
Lead	mg/kg	49	43.3	88	80-120	
Nickel	mg/kg	49	46.9	96	80-120	
Selenium	mg/kg	49	46.1	94	80-120	
Silver	mg/kg	24.5	23.4	96	80-120	
Zinc	mg/kg	49	46.8	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1789541 1789542

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		10280382001 Result	Spike Conc.	Spike Conc.	MS Result							MSD Result
Arsenic	mg/kg	<1.8	59.8	61.1	61.2	65.6	102	107	75-125	7	30	
Cadmium	mg/kg	0.13J	59.8	61.1	66.7	69.6	111	114	75-125	4	30	
Chromium	mg/kg	17.3	59.8	61.1	87.1	84.4	117	110	75-125	3	30	
Copper	mg/kg	26.6	59.8	61.1	93.1	96.9	111	115	75-125	4	30	
Lead	mg/kg	23.5	59.8	61.1	86.3	87.0	105	104	75-125	1	30	
Nickel	mg/kg	14.8	59.8	61.1	79.3	79.6	108	106	75-125	0	30	
Selenium	mg/kg	<2.1	59.8	61.1	64.4	68.4	106	111	75-125	6	30	
Silver	mg/kg	0.31J	29.9	30.5	33.0	34.3	109	111	75-125	4	30	
Zinc	mg/kg	102	59.8	61.1	178	175	127	120	75-125	2	30	M1

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QUALITY CONTROL DATA

Project: 9003.01.40

Pace Project No.: 10280382

QC Batch: MPRP/49021

Analysis Method: ASTM D2974

QC Batch Method: ASTM D2974

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 10280382001

SAMPLE DUPLICATE: 1788585

Parameter	Units	10280397003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	20.4	19.6	4	30	

SAMPLE DUPLICATE: 1788610

Parameter	Units	10280666002 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	14.3	15.1	5	30	

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QUALITY CONTROL DATA

Project: 9003.01.40

Pace Project No.: 10280382

QC Batch: OEXT/26394

Analysis Method: EPA 8081

QC Batch Method: EPA 3550

Analysis Description: 8081 GCS Pesticides

Associated Lab Samples: 10280382001

METHOD BLANK: 1784610

Matrix: Solid

Associated Lab Samples: 10280382001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
4,4'-DDD	ug/kg	<0.80	3.3	09/18/14 01:55	
4,4'-DDE	ug/kg	<0.87	3.3	09/18/14 01:55	
4,4'-DDT	ug/kg	<0.88	3.3	09/18/14 01:55	
Dieldrin	ug/kg	<0.60	3.3	09/18/14 01:55	
Endrin ketone	ug/kg	<0.68	3.3	09/18/14 01:55	
gamma-BHC (Lindane)	ug/kg	<0.33	1.7	09/18/14 01:55	
Decachlorobiphenyl (S)	%.	86	30-150	09/18/14 01:55	
Tetrachloro-m-xylene (S)	%.	92	30-150	09/18/14 01:55	

LABORATORY CONTROL SAMPLE: 1784611

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
4,4'-DDD	ug/kg	33.3	28.3	85	71-125	
4,4'-DDE	ug/kg	33.3	27.4	82	63-125	
4,4'-DDT	ug/kg	33.3	26.6	80	63-125	
Dieldrin	ug/kg	33.3	27.4	82	70-130	
Endrin ketone	ug/kg	33.3	32.4	97	69-125	
gamma-BHC (Lindane)	ug/kg	16.7	13.7	82	71-125	
Decachlorobiphenyl (S)	%.			111	30-150	
Tetrachloro-m-xylene (S)	%.			93	30-150	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 9003.01.40
Pace Project No.: 10280382

QC Batch: OEXT/26495 Analysis Method: EPA 8082
QC Batch Method: EPA 3550 Analysis Description: 8082 GCS PCB
Associated Lab Samples: 10280382001

METHOD BLANK: 1791161 Matrix: Solid
Associated Lab Samples: 10280382001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	<15.0	33.0	09/18/14 09:54	
PCB-1221 (Aroclor 1221)	ug/kg	<5.0	33.0	09/18/14 09:54	
PCB-1232 (Aroclor 1232)	ug/kg	<8.0	33.0	09/18/14 09:54	
PCB-1242 (Aroclor 1242)	ug/kg	<6.0	33.0	09/18/14 09:54	
PCB-1248 (Aroclor 1248)	ug/kg	<7.0	33.0	09/18/14 09:54	
PCB-1254 (Aroclor 1254)	ug/kg	<7.0	33.0	09/18/14 09:54	
PCB-1260 (Aroclor 1260)	ug/kg	<15.0	33.0	09/18/14 09:54	
PCB-1262 (Aroclor 1262)	ug/kg	<6.0	33.0	09/18/14 09:54	
PCB-1268 (Aroclor 1268)	ug/kg	<5.0	33.0	09/18/14 09:54	
Decachlorobiphenyl (S)	%.	83	55-130	09/18/14 09:54	
Tetrachloro-m-xylene (S)	%.	88	50-128	09/18/14 09:54	

LABORATORY CONTROL SAMPLE: 1791162

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	667	603	90	62-125	
PCB-1260 (Aroclor 1260)	ug/kg	667	586	88	61-125	
Decachlorobiphenyl (S)	%.			84	55-130	
Tetrachloro-m-xylene (S)	%.			87	50-128	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1791163 1791164

Parameter	Units	10280382001		1791164		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result							MSD Result
PCB-1016 (Aroclor 1016)	ug/kg	<18.3	815	811	687	736	84	91	34-125	7	30	
PCB-1260 (Aroclor 1260)	ug/kg	<18.3	815	811	642	690	79	85	30-128	7	30	
Decachlorobiphenyl (S)	%.						77	78	55-130			
Tetrachloro-m-xylene (S)	%.						82	86	50-128			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 9003.01.40
Pace Project No.: 10280382

QC Batch: OEXT/26453 Analysis Method: EPA 8270
QC Batch Method: EPA 3550 Analysis Description: 8270 Solid MSSV
Associated Lab Samples: 10280382001

METHOD BLANK: 1789113 Matrix: Solid
Associated Lab Samples: 10280382001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acenaphthene	ug/kg	<165	330	09/17/14 09:33	
Acenaphthylene	ug/kg	<64.5	330	09/17/14 09:33	
Anthracene	ug/kg	<165	330	09/17/14 09:33	
Benzo(a)anthracene	ug/kg	<165	330	09/17/14 09:33	
Benzo(a)pyrene	ug/kg	<165	330	09/17/14 09:33	
Benzo(b)fluoranthene	ug/kg	<41.8	330	09/17/14 09:33	
Benzo(g,h,i)perylene	ug/kg	<40.1	330	09/17/14 09:33	
Benzo(k)fluoranthene	ug/kg	<165	330	09/17/14 09:33	
Carbazole	ug/kg	<165	330	09/17/14 09:33	
Chrysene	ug/kg	<44.3	330	09/17/14 09:33	
Dibenz(a,h)anthracene	ug/kg	<165	330	09/17/14 09:33	
Fluoranthene	ug/kg	<165	330	09/17/14 09:33	
Fluorene	ug/kg	<165	330	09/17/14 09:33	
Indeno(1,2,3-cd)pyrene	ug/kg	<165	330	09/17/14 09:33	
Naphthalene	ug/kg	<23.5	330	09/17/14 09:33	
Phenanthrene	ug/kg	<47.2	330	09/17/14 09:33	
Pyrene	ug/kg	<41.6	330	09/17/14 09:33	
2,4,6-Tribromophenol (S)	%	81	41-125	09/17/14 09:33	
2-Fluorobiphenyl (S)	%	66	46-125	09/17/14 09:33	
2-Fluorophenol (S)	%	63	31-125	09/17/14 09:33	
Nitrobenzene-d5 (S)	%	61	30-125	09/17/14 09:33	
Phenol-d6 (S)	%	64	38-125	09/17/14 09:33	
Terphenyl-d14 (S)	%	85	64-125	09/17/14 09:33	

LABORATORY CONTROL SAMPLE: 1789114

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acenaphthene	ug/kg	1670	1350	81	62-125	
Acenaphthylene	ug/kg	1670	1310	79	64-125	
Anthracene	ug/kg	1670	1400	84	66-125	
Benzo(a)anthracene	ug/kg	1670	1340	80	66-125	
Benzo(a)pyrene	ug/kg	1670	1340	80	66-125	
Benzo(b)fluoranthene	ug/kg	1670	1390	83	65-125	
Benzo(g,h,i)perylene	ug/kg	1670	1330	80	67-125	
Benzo(k)fluoranthene	ug/kg	1670	1330	80	66-125	
Carbazole	ug/kg	1670	1370	82	63-125	
Chrysene	ug/kg	1670	1350	81	67-125	
Dibenz(a,h)anthracene	ug/kg	1670	1340	81	67-125	
Fluoranthene	ug/kg	1670	1390	84	66-125	
Fluorene	ug/kg	1670	1360	82	64-125	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 9003.01.40

Pace Project No.: 10280382

LABORATORY CONTROL SAMPLE: 1789114

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Indeno(1,2,3-cd)pyrene	ug/kg	1670	1340	81	67-125	
Naphthalene	ug/kg	1670	1250	75	44-125	
Phenanthrene	ug/kg	1670	1390	83	66-125	
Pyrene	ug/kg	1670	1360	82	67-125	
2,4,6-Tribromophenol (S)	%			87	41-125	
2-Fluorobiphenyl (S)	%			78	46-125	
2-Fluorophenol (S)	%			73	31-125	
Nitrobenzene-d5 (S)	%			74	30-125	
Phenol-d6 (S)	%			75	38-125	
Terphenyl-d14 (S)	%			81	64-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1789115 1789116

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		10280544002 Result	Spike Conc.	Spike Conc.	MS Result						
Acenaphthene	ug/kg	ND	1780	1790	1260	1210	71	68	58-125	3	30
Acenaphthylene	ug/kg	ND	1780	1790	1300	1240	73	69	59-125	4	30
Anthracene	ug/kg	ND	1780	1790	1370	1300	74	70	54-125	6	30
Benzo(a)anthracene	ug/kg	ND	1780	1790	1470	1380	71	65	61-125	7	30
Benzo(a)pyrene	ug/kg	ND	1780	1790	1510	1370	72	64	41-129	10	30
Benzo(b)fluoranthene	ug/kg	ND	1780	1790	1570	1460	70	64	43-129	7	30
Benzo(g,h,i)perylene	ug/kg	ND	1780	1790	1380	1290	67	61	55-125	7	30
Benzo(k)fluoranthene	ug/kg	ND	1780	1790	1490	1300	77	66	53-125	13	30
Carbazole	ug/kg	ND	1780	1790	1310	1270	74	71	58-125	3	30
Chrysene	ug/kg	ND	1780	1790	1500	1400	71	65	39-133	7	30
Dibenz(a,h)anthracene	ug/kg	ND	1780	1790	1270	1220	71	68	58-125	4	30
Fluoranthene	ug/kg	416	1780	1790	1670	1510	71	61	54-125	10	30
Fluorene	ug/kg	ND	1780	1790	1300	1260	73	71	60-125	3	30
Indeno(1,2,3-cd)pyrene	ug/kg	ND	1780	1790	1350	1280	68	63	51-125	6	30
Naphthalene	ug/kg	ND	1780	1790	1210	1180	68	66	46-125	3	30
Phenanthrene	ug/kg	ND	1780	1790	1460	1360	70	64	55-125	7	30
Pyrene	ug/kg	395	1780	1790	1740	1490	76	62	43-129	15	30
2,4,6-Tribromophenol (S)	%						75	74	41-125		
2-Fluorobiphenyl (S)	%						70	66	46-125		
2-Fluorophenol (S)	%						65	63	31-125		
Nitrobenzene-d5 (S)	%						65	63	30-125		
Phenol-d6 (S)	%						67	65	38-125		
Terphenyl-d14 (S)	%						71	69	64-125		

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 9003.01.40
Pace Project No.: 10280382

QC Batch: OEXT/26402 Analysis Method: NWTPH-Dx
QC Batch Method: EPA 3550 Sonication Analysis Description: NWTPH-Dx GCS
Associated Lab Samples: 10280382001

METHOD BLANK: 1784965 Matrix: Solid
Associated Lab Samples: 10280382001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Fuel Range	mg/kg	3.4J	15.0	09/18/14 10:24	
Motor Oil Range	mg/kg	7.1J	10.0	09/18/14 10:24	
n-Triacontane (S)	%.	96	50-150	09/18/14 10:24	
o-Terphenyl (S)	%.	105	50-150	09/18/14 10:24	

LABORATORY CONTROL SAMPLE: 1784966

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diesel Fuel Range	mg/kg	50	51.0	102	50-150	
Motor Oil Range	mg/kg	50	58.4	117	50-150	
n-Triacontane (S)	%.			86	50-150	
o-Terphenyl (S)	%.			85	50-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1784967 1784968

Parameter	Units	10279790021		MSD		MS		MSD		% Rec Limits	Max RPD	Qual
		Result	MS Spike Conc.	Spike Conc.	Result	MSD Result	% Rec	MSD % Rec				
Diesel Fuel Range	mg/kg	63.6	69	69	119	139	81	109	50-150	15	30	
Motor Oil Range	mg/kg	214	69	69	272	409	84	283	50-150	40	30	M3,R2
n-Triacontane (S)	%.						77	70	50-150			
o-Terphenyl (S)	%.						81	80	50-150			

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 9003.01.40

Pace Project No.: 10280382

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

1M Confirmation column continuing calibration verification is failing low for this analyte. A j-flag detection for this analyte was reported from the primary column with this analyte passing in the continuing calibration verification.

B Analyte was detected in the associated method blank.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

M3 Matrix spike recovery was outside laboratory control limits due to matrix interferences.

R2 RPD value was outside control limits due to matrix interference

S5 Surrogate recovery outside control limits due to matrix interferences (not confirmed by re-analysis).

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 9003.01.40

Pace Project No.: 10280382

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10280382001	80/20 Soil	EPA 3550	OEXT/26394	EPA 8081	GCSV/14052
10280382001	80/20 Soil	EPA 3550	OEXT/26495	EPA 8082	GCSV/14054
10280382001	80/20 Soil	EPA 3550 Sonication	OEXT/26402	NWTPH-Dx	GCSV/14028
10280382001	80/20 Soil	EPA 3050	MPRP/49066	EPA 6010	ICP/20942
10280382001	80/20 Soil	EPA 7471	MERP/11666	EPA 7471	MERC/13447
10280382001	80/20 Soil	ASTM D2974	MPRP/49021		
10280382001	80/20 Soil	EPA 3550	OEXT/26453	EPA 8270	MSSV/11106

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

131

10290382

Section A
 Required Client Information:
 Company: **Maul Foster Alongi**
 Address: **2001 NW 19th AVE**
 Email To: **jelliott@mailfoster.com**
 Phone: **503-953-6067** Fax:
 Requested Due Date/TAT: **10-day**

Section B
 Required Project Information:
 Report To: **Josh Elliott**
 Copy To: **Mary Benzinger**
 Purchase Order No.:
 Project Name:
 Project Number: **90030140**

Section C
 Invoice Information:
 Attention:
 Company Name:
 Address:
 Pace Quote Reference:
 Pace Project Manager:
 Pace Profile #:

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER

Site Location
 STATE: **WA**

Page: **1** of **1**

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Requested Analysis Filtered (Y/N)	Pace Project No. / Lab I.D.
			COMPOSITE START	COMPOSITE END/GRAB							
1	80/20 soil				SLG	9/4/14	15:15				
2	BES soil				SLG	9/4/14	15:00				
3	3-way soil				SLG	9/4/14	15:10				
4											
5											
6											
7											
8											
9											
10											
11											
12											

↑ Analysis Test ↑
 XXX Hold for Analyte list

UNPRESERVED
 H₂SO₄
 HNO₃
 HCl
 NaOH
 Na₂O₃
 Methanol
 Other

RELINQUISHED BY / AFFILIATION: **CC mbenzinger @ mail.foster.com** DATE: **9/4/14** TIME: **16:00**
 ACCEPTED BY / AFFILIATION: **Chafke** DATE: **9/14/15** TIME: **4:24**

ADDITIONAL COMMENTS: **cc mbenzinger @ mail.foster.com**

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: **Mitchell Murray**
 SIGNATURE of SAMPLER: *[Signature]* DATE Signed (MM/DD/YY): **9/4/14**


Temp in °C
 Received on
 Custody Sealed Cooler (Y/N)
 Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Sample Condition Upon Receipt

Client Name: Maul Foster

Project #: **WO# : 10280382**



Courier: Fed Ex UPS USPS Client
 Commercial Pace Speedee Other: _____
 Tracking Number: 771052532086

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No Optional: Proj. Due Date: _____ Proj. Name: _____

Packing Material: Bubble Wrap Bubble Bags None Other: _____ Temp Blank? Yes No

Thermom. Used: B88A9130516413 B88A912167504 B88A9132521491 Type of Ice: Wet Blue None Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.9 Cooler Temp Corrected (°C): 4.0 Biological Tissue Frozen? Yes No N/A
 Temp should be above freezing to 6°C Correction Factor: +0.3 Date and Initials of Person Examining Contents: CL 9.5.14

Comments:

Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A	1.
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A	2.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	7.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A	8.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A	9.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A	
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	11.
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>SL</u>			
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	Sample # _____ Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	14.
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____			

CLIENT NOTIFICATION/RESOLUTION Field Data Required? Yes No
 Person Contacted: _____ Date/Time: _____
 Comments/Resolution: _____

Project Manager Review: CB Date: 9/10/14
 Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Report Prepared for:

Mary Benzinger
Maul Foster and Alongi
2001 NW 19th Ave
Suite 200
Portland OR 97209

**REPORT OF
LABORATORY
ANALYSIS FOR
PCDD/PCDF**

Report Prepared Date:

September 22, 2014

Report Information:

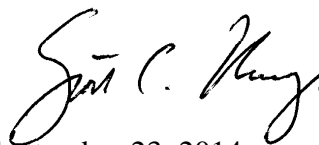
Pace Project #: 10281039
Sample Receipt Date: 09/05/2014
Client Project #: 9003.01.40
Client Sub PO #: N/A
State Cert #: C755

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

This report has been reviewed by:



September 23, 2014

Scott Unze, Project Manager
(612) 607-6383
(612) 607-6444 (fax)
scott.unze@pacelabs.com



Report of Laboratory Analysis

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The results relate only to the samples included in this report.

DISCUSSION

This report presents the results from the analysis performed on one sample submitted by a representative of Maul Foster & Alongi. The sample was analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Estimated Maximum Possible Concentration (EMPC) values were treated as positives in the toxic equivalence calculations.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extract ranged from 59-97%. Except for eight low values in the associated quality control method blank, which were flagged "R" on the results table, the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained. Concentrations below the calibration range were flagged "J" and should be regarded as estimates.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to contain trace levels of selected congeners. These were below the calibration range of the method. The levels reported for the affected congeners in the field sample were higher than the corresponding blank levels by one or more orders of magnitude. These results indicate that the sample processing steps did not contribute significantly to the levels reported for the field sample.

Laboratory spike samples were also prepared with the sample batch using clean sand that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 87-122% with relative percent differences of 0.0-10.8%. These results indicate high degrees of accuracy and precision for these determinations. Matrix spikes were prepared with the sample batch using sample material from a separate project; results from these analyses will be provided upon request.

REPORT OF LABORATORY ANALYSIS

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Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia	9952C
Maryland	322	Wisconsin	999407970
Michigan	9909	Wyoming	8TMS-Q
Minnesota	027-053-137		

REPORT OF LABORATORY ANALYSIS

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Report No.....10281039

Appendix A

Sample Management

Section A
Required Client Information:
Company: Mawl Foster Alongi
Address: 2001 NW 19th AVE
Portland, OR 97209
Email To: jelliott@mail.foster.com
Phone: 503-953-6067 Fax:
Requested Due Date/TAT: 10-day

Section B
Required Project Information:
Report To: Josh Elliott
Copy To: Mary Benzinger
Purchase Order No.:
Project Name:
Project Number: 9003.0140

Section C
Invoice Information:
Attention:
Company Name:
Address:
Pace Code Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER
Site Location STATE: WA

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER WT WASTE WATER WW PRODUCT P SOILSOLID SL OIL OL WIFE WP AIR AR OTHER OT TISSUE TS	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	# OF CONTAINERS	Preservatives Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ O ₂ Methanol Other	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
		COMPOSITE START DATE TIME	COMPOSITE END/GRAB DATE TIME							
1	80/20 soil	9/4/14 15:15	-	G	SLG	3				001
2	BES soil	9/4/14 15:00	-	G	SLG	3				002
3	3-way soil	9/4/14 15:10	-	G	SLG	3				003
4										
5										
6										
7										
8										
9										
10										
11										
12										

ADDITIONAL COMMENTS
SC mbenzinger@mail.foster.com
RELINQUISHED BY/AFFILIATION: CC MFA DATE: 9/4/14 TIME: 16:00
ACCEPTED BY/AFFILIATION: Chf Rec DATE: 9/17/15 TIME: 4:2
SAMPLE CONDITIONS: V N

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Michael Murray DATE Signed (MM/DD/YY): 9/4/14
SIGNATURE of SAMPLER: [Signature]

Temp in °C
Received on Ice (Y/N)
Custody Sealed Cooler (Y/N)
Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Scott Unze - RE: FW: Pace Project 10280382 - 10 day RUSH

From: Mary Benzinger <mbenzinger@maulfoster.com>
To: Chris Bremer <Chris.Bremer@pacelabs.com>, "Scott Unze(Scott.Unze@pacelab...
Date: 9/10/2014 2:58 PM
Subject: RE: FW: Pace Project 10280382 - 10 day RUSH
CC: Josh Elliott <jelliott@maulfoster.com>

Hi Chris,

Correct, we have not removed the other two samples from hold. Please analyze only sample "80/20 soil" on 10 day TAT and report to the method detection limit for:

- EPA 6010 metals – arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, zinc
- EPA 7471 – mercury
- EPA 8081 Organochlorine Pesticides – 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, carbazole, dieldrin, endrin ketone, beta-hexachlorocyclohexane
- EPA 8082 PCB Aroclors (standard list of PCB aroclors – you don't need to report a total; we will calculate that)
- EPA 8270D PAHs (standard list of PAHs), **plus** the following SVOCs: (if you need a list of PAHs, please let me know)
- EPA 8270D SVOCs – di-n-butylphthalate, bis(2-ethylhexyl)phthalate, di-n-octyl phthalate, phenol, 4-methyl phenol, pentachlorophenol, benzoic acid, dibenzofuran
- NWTPH-Dx – Diesel and Residual Range hydrocarbons

Please also analyze sample "80/20 soil" for the following and report to standard dioxin/furan EDLs/MDLs

- Dioxins/Furans EPA 1613B (standard list)

Is Pace able to report some results to reporting limits and others to MDLs in the same report? Just curious, because this may be a better approach for this project. For example, we don't need MDLs for TPH-Dx or 6010 metals, but do need MDLs for SVOCs by 8270D.

Can you confirm that the 10 day TAT can be achieved for this workorder?

Thanks,

Mary Benzinger | MAUL FOSTER & ALONGI, INC.

d. 503 501 5247 | p. 971 544 2139 | c. 503 319 7132 | www.maulfoster.com
2001 NW 19th Avenue, Suite 200, Portland, OR 97209

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From: Chris Bremer [mailto:Chris.Bremer@pacelabs.com]
Sent: Wednesday, September 10, 2014 11:53 AM
To: Mary Benzinger
Cc: Erica Haenggi; Marcella Hartman
Subject: RE: FW: Pace Project 10280382 - 10 day RUSH / check reporting limits

The MDL for phenol and d-n-butyl phthalate are too high to J flag for these two compounds.

The dioxin is a separate report with a specific PM, Scott Unze.

How would you like us to proceed?

Only the 80/20 sample correct, the other 2 are still on hold?

Chris

Chris Bremer
Client Services Manager/Technical Director, Mpls
Pace Analytical Services, Inc
Minnesota
612-607-6390

cell 612-247-5682

>>> Mary Benzinger <mbenzinger@maulfoster.com> 9/10/2014 12:10 PM >>>

Hi Chris,

It looks like except for some of the SVOCs, the reporting limits will be fine. Should we request an MDL report to

be able to meet our SVOC site-specific screening limits?

Who is the PM for the dioxin/furan testing? Will there be a single final report, or do dioxins get split out and reported separately?

Can the other tests (besides dioxin/furan) be performed on a 10 day TAT?

Since dioxins/furans are reported to the EDL/MDL, does that mean that all results in the report have to be reported to the MDL? Would an MDL report allow us to meet all the SVOC screening levels? (I know I'm repeating this question☺)

We would like only the specified analytes (below) reported for metals, pesticides, and PAH's SVOCs. We don't need full list of pesticides and SVOCs reported. The standard analyte lists for dioxins/furans, PAHs, PCB Aroclors, and TPH-Dx (diesel/residual range) are fine.

- EPA 6010 metals – arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, zinc
- EPA 7471 – mercury
- EPA 8081 Organochlorine Pesticides– 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, carbazole, dieldrin, endrin ketone, beta-hexachlorocyclohexane
- Dioxins/Furans EPA 1613B (standard list)
- EPA 8082 PCB Aroclors (standard list of PCB aroclors – you don't need to report a total; we will calculate that)
- EPA 8270D PAHs (standard list of PAHs), **plus** the following SVOCs: (if you need a list of PAHs, please let me know)
- EPA 8270D SVOCs – di-n-butylphthalate, bis(2-ethylhexyl)phthalate, di-n-octyl phthalate, phenol, 4-methyl phenol, pentachlorophenol, benzoic acid, dibenzofuran
- NWTPH-Dx – Diesel and Residual Range hydrocarbons

Mary Benzinger | MAUL FOSTER & ALONGI, INC.

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From: Chris Bremer [<mailto:Chris.Bremer@pacelabs.com>]
Sent: Wednesday, September 10, 2014 9:33 AM
To: Mary Benzinger; Erica Haenggi; Marcella Hartman
Subject: RE: FW: Pace Project 10280382 - 10 day RUSH / check reporting limits

Hi Mary,

Erica forwarded me your email request last evening and I have gone through your list and compared our RLs to your screening criteria. Erica is in a sales meeting this morning but I should be able to touch base with her shortly.

As you can see, we do not meet the criteria for several compounds.

Marcella Hartman is the inside sales contact for the dioxin testing. She has indicated that the standard TAT for dioxin is 15 days but she may be able to do this faster. There would be a different PM for the dioxin work. Please take a look at the attached. I did accidently omit carbazole but the RL in Mpls is 333 ug/kg.

Chris

Chris Bremer
Client Services Manager/Technical Director, Mpls
Pace Analytical Services, Inc
Minnesota
612-607-6390

cell 612-247-5682

>>> Mary Benzinger <mbenzinger@maulfoster.com> 9/10/2014 11:15 AM >>>

Hi Chris,

I need to find out if 10 day TAT can be performed on sample "80/20 soil" from workorder 10280382.

Also need to find out if the analytes listed below can be reported. The metals, pesticides, and PAHs/SVOCs have specific lists. The remaining analyte lists are standard (dioxins, pcb aroclors, diesel/residual range).

And finally, we need to meet certain screening criteria. Is this something that you can check in the attached table? I don't have access to Pace's reporting limits.

This is from my email to Danielle yesterday:

Please remove sample 80/20 soil from hold and analyze for the following: (If reporting limits are above the attached screening levels, please let me know so we can figure out our options).

- EPA 6010 metals – arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, zinc
- EPA 7471 – mercury (note: reporting limit needs to be at or below 0.04 mg/kg)
- EPA 8081 Organochlorine Pesticides– 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, carbazole, dieldrin, endrin ketone, beta-hexachlorocyclohexane
- Dioxins/Furans EPA 1613B (standard list)
- EPA 8082 PCBs – total PCB Aroclors
- EPA 8270D PAHs, plus the following SVOCs:
- EPA 8270D SVOCs – di-n-butylphthalate, bis(2-ethylhexyl)phthalate, di-n-octyl phthalate, phenol, 4-methyl phenol, pentachlorophenol, benzoic acid, dibenzofuran
- NWTPH-Dx – Diesel and Residual Range hydrocarbons

Mary Benzinger | MAUL FOSTER & ALONGI, INC.

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From: Chris Bremer [<mailto:Chris.Bremer@pacelabs.com>]
Sent: Wednesday, September 10, 2014 9:05 AM
To: Mary Benzinger; Danielle Isaacson; Erica Haenggi
Subject: Re: FW: Pace Project 10280382 - 10 day RUSH / check reporting limits

The PM for Maul Foster is Lori Castille. Lori has been temporarily reassigned to work on a specific project so I will be sitting in for her for the next few weeks.

Chris

Chris Bremer
Client Services Manager/Technical Director, Mpls
Pace Analytical Services, Inc
Minnesota
612-607-6390

cell 612-247-5682

>>> Danielle Isaacson 9/10/2014 10:57 AM >>>
Hi Mary,

Your project manager will be Chris Bremer. She is cc'ed on this email, and her phone number is 612-607-6390.

Thank you,
Danielle Isaacson

>>> Mary Benzinger <mbenzinger@maulfoster.com> 9/9/2014 6:35 PM >>>

Hi Danielle or Erica,

Could you forward me the name of the Pace project manager who will be working on 10280382? I'd like to be able to follow up tomorrow morning about whether the 10 day TAT can be met for all of the requested tests, and whether the reporting limits will be low enough for our project requirements.

Thanks,

Mary Benzinger | MAUL FOSTER & ALONGI, INC.

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From: Mary Benzinger
Sent: Tuesday, September 09, 2014 1:53 PM
To: 'Danielle Isaacson'
Cc: Josh Elliott
Subject: Pace Project 10280382 - 10 day RUSH / check reporting limits

Hi Danielle,

We received information that we were waiting for about our site, so we can add the following analyses for Pace Project 10280382. I have attached a table showing the screening levels that we need to meet.

1. Could you confirm whether the reporting limits for the requested tests/analytes will be lower than the screening levels (see attached)?
2. We would like to request a RUSH 10 day TAT for all of the following tests; can you confirm that this is possible for all of these?

Please remove sample 80/20 soil from hold and analyze for the following: (If reporting limits are above the attached screening levels, please let me know so we can figure out our options).

- EPA 6010 metals – arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, zinc
- EPA 7471 – mercury (note: reporting limit needs to be at or below 0.04 mg/kg)
- EPA 8081 Organochlorine Pesticides– 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, carbazole, dieldrin, endrin ketone, beta-hexachlorocyclohexane
- Dioxins/Furans EPA 1613B (standard list)
- EPA 8082 PCBs – total PCB Aroclors
- EPA 8270D PAHs, plus the following SVOCs:
- EPA 8270D SVOCs – di-n-butylphthalate, bis(2-ethylhexyl)phthalate, di-n-octyl phthalate, phenol, 4-methyl phenol, pentachlorophenol, benzoic acid, dibenzofuran
- NWTPH-Dx – Diesel and Residual Range hydrocarbons

Samples BES soil and 3-way soil will remain on hold.

Can you send confirmation of whether these analyses can be performed on the RUSH 10 day TAT, and whether the attached reporting limits can be met? If there is any additional information that you need, or if there are any problems, don't hesitate to email or call me at 503-501-5247.

Thank you,

Mary Benzinger | MAUL FOSTER & ALONGI, INC.

d. 503 501 5247 | p. 971 544 2139 | c. 503 319 7132 | www.maulfooster.com
2001 NW 19th Avenue, Suite 200, Portland, OR 97209

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From: Danielle Isaacson [mailto:Danielle.Isaacson@pacelabs.com]
Sent: Tuesday, September 09, 2014 12:32 PM
To: Mary Benzinger
Subject: Pace Project 10280382

Hi Mary,

We received these samples on hold on Friday, how would you like us to proceed?

Thank you,
Danielle Isaacson

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Sample Condition Upon Receipt

Client Name: Maul Foster

Project #: **WO# : 10281039**

Courier: Fed Ex UPS USPS Client Commercial Pace SpeedDee Other: _____
Tracking Number: 7710 5253 2086



Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No Optional: Proj. Due Date: _____ Proj. Name: _____

Packing Material: Bubble Wrap Bubble Bags None Other: _____ Temp Blank? Yes No

Thermom. Used: B88A9130516413 B88A912167504 B88A9132521491 Type of Ice: Wet Blue None Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.9 Cooler Temp Corrected (°C): 4.2 Biological Tissue Frozen? Yes No N/A
Temp should be above freezing to 6°C Correction Factor: 0.3 Date and Initials of Person Examining Contents: CB 9.5.14

				Comments:	
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A			1.
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A			2.
Chain of Custody Relinquished?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A			3.
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A			4.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A			5.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A			6.
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A			7.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A			8.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A			9.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A			
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A			10.
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A			11.
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A			12.
-Includes Date/Time/ID/Analysis Matrix: <u>Si</u>					
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A		<input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> NaOH <input type="checkbox"/> HCl	13.
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A		Sample # _____	
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Initial when completed: _____	Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A			14.
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A			15.
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A			
Pace Trip Blank Lot # (if purchased): _____					

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted: _____ Date/Time: _____
Comments/Resolution: _____

Project Manager Review: CB Date: 9/10/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- * = See Discussion

REPORT OF LABORATORY ANALYSIS

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Report No.....10281039

Appendix B

Sample Analysis Summary



Method 1613B Sample Analysis Results

Client - Maul Foster and Alongi

Client's Sample ID	80/20 SOIL		
Lab Sample ID	10281039001		
Filename	F140921A_16		
Injected By	BAL		
Total Amount Extracted	13.8 g	Matrix	Solid
% Moisture	17.5	Dilution	NA
Dry Weight Extracted	11.4 g	Collected	09/04/2014 15:15
ICAL ID	F140918	Received	09/05/2014 10:15
CCal Filename(s)	F140921A_01	Extracted	09/15/2014 20:00
Method Blank ID	BLANK-41998	Analyzed	09/21/2014 22:35

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.68	----	0.078	J	2,3,7,8-TCDF-13C	2.00	84
Total TCDF	9.20	----	0.078		2,3,7,8-TCDD-13C	2.00	95
					1,2,3,7,8-PeCDF-13C	2.00	70
2,3,7,8-TCDD	1.10	----	0.086		2,3,4,7,8-PeCDF-13C	2.00	64
Total TCDD	3.00	----	0.086		1,2,3,7,8-PeCDD-13C	2.00	76
					1,2,3,4,7,8-HxCDF-13C	2.00	83
1,2,3,7,8-PeCDF	0.48	----	0.088	J	1,2,3,6,7,8-HxCDF-13C	2.00	79
2,3,4,7,8-PeCDF	1.90	----	0.079	J	2,3,4,6,7,8-HxCDF-13C	2.00	83
Total PeCDF	20.00	----	0.083		1,2,3,7,8,9-HxCDF-13C	2.00	74
					1,2,3,4,7,8-HxCDD-13C	2.00	97
1,2,3,7,8-PeCDD	0.69	----	0.054	J	1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	4.70	----	0.054		1,2,3,4,6,7,8-HpCDF-13C	2.00	63
					1,2,3,4,7,8,9-HpCDF-13C	2.00	59
1,2,3,4,7,8-HxCDF	2.70	----	0.110	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	71
1,2,3,6,7,8-HxCDF	1.20	----	0.120	J	OCDD-13C	4.00	60
2,3,4,6,7,8-HxCDF	2.00	----	0.084	J			
1,2,3,7,8,9-HxCDF	0.82	----	0.076	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	39.00	----	0.099		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.20	----	0.170	J	2,3,7,8-TCDD-37Cl4	0.20	101
1,2,3,6,7,8-HxCDD	5.60	----	0.180				
1,2,3,7,8,9-HxCDD	2.70	----	0.210	J			
Total HxCDD	36.00	----	0.190				
1,2,3,4,6,7,8-HpCDF	27.00	----	0.180		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	2.10	----	0.150	J	Equivalence: 6.5 ng/Kg		
Total HpCDF	85.00	----	0.160		(Using 2005 WHO Factors - Using PRL/2 where ND)		
1,2,3,4,6,7,8-HpCDD	160.00	----	0.076				
Total HpCDD	300.00	----	0.076				
OCDF	73.00	----	0.180				
OCDD	1700.00	----	0.260				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
RL = Reporting Limit.

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.
J = Estimated value

REPORT OF LABORATORY ANALYSIS

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Method 1613B Blank Analysis Results

Lab Sample ID	BLANK-41998	Matrix	Solid
Filename	F140921A_10	Dilution	NA
Total Amount Extracted	20.3 g	Extracted	09/15/2014 20:00
ICAL ID	F140918	Analyzed	09/21/2014 18:17
CCal Filename(s)	F140921A_01	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.048	----	0.032 J	2,3,7,8-TCDF-13C	2.00	68
Total TCDF	0.048	----	0.032 J	2,3,7,8-TCDD-13C	2.00	87
				1,2,3,7,8-PeCDF-13C	2.00	43
2,3,7,8-TCDD	ND	----	0.039	2,3,4,7,8-PeCDF-13C	2.00	9 R
Total TCDD	ND	----	0.039	1,2,3,7,8-PeCDD-13C	2.00	24 R
				1,2,3,4,7,8-HxCDF-13C	2.00	13 R
1,2,3,7,8-PeCDF	ND	----	0.039	1,2,3,6,7,8-HxCDF-13C	2.00	15 R
2,3,4,7,8-PeCDF	ND	----	0.170	2,3,4,6,7,8-HxCDF-13C	2.00	25 R
Total PeCDF	ND	----	0.110	1,2,3,7,8,9-HxCDF-13C	2.00	67
				1,2,3,4,7,8-HxCDD-13C	2.00	13 R
1,2,3,7,8-PeCDD	ND	----	0.076	1,2,3,6,7,8-HxCDD-13C	2.00	13 R
Total PeCDD	ND	----	0.076	1,2,3,4,6,7,8-HpCDF-13C	2.00	19 R
				1,2,3,4,7,8,9-HpCDF-13C	2.00	45
1,2,3,4,7,8-HxCDF	ND	----	0.160	1,2,3,4,6,7,8-HpCDD-13C	2.00	32
1,2,3,6,7,8-HxCDF	ND	----	0.140	OCDD-13C	4.00	47
2,3,4,6,7,8-HxCDF	ND	----	0.098			
1,2,3,7,8,9-HxCDF	ND	----	0.037	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.110	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.210	2,3,7,8-TCDD-37Cl4	0.20	91
1,2,3,6,7,8-HxCDD	ND	----	0.190			
1,2,3,7,8,9-HxCDD	ND	----	0.210			
Total HxCDD	ND	----	0.200			
1,2,3,4,6,7,8-HpCDF	ND	----	0.190	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.092	Equivalence: 0.14 ng/Kg		
Total HpCDF	ND	----	0.140	(Using 2005 WHO Factors - Using PRL/2 where ND)		
1,2,3,4,6,7,8-HpCDD	ND	----	0.099			
Total HpCDD	ND	----	0.099			
OCDF	ND	----	0.087			
OCDD	0.380	----	0.110 J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

RL = Reporting Limit

Results reported on a total weight basis and are valid to no more than 2 significant figures.

J = Estimated value

R = Recovery outside target range

REPORT OF LABORATORY ANALYSIS

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Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-41999	Matrix	Solid
Filename	F140921A_05	Dilution	NA
Total Amount Extracted	20.2 g	Extracted	09/15/2014 20:00
ICAL ID	F140918	Analyzed	09/21/2014 14:40
CCal Filename	F140921A_01	Injected By	BAL
Method Blank ID	BLANK-41998		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	12	7.5	15.8	115
2,3,7,8-TCDD	10	9.6	6.7	15.8	96
1,2,3,7,8-PeCDF	50	55	40.0	67.0	110
2,3,4,7,8-PeCDF	50	54	34.0	80.0	107
1,2,3,7,8-PeCDD	50	46	35.0	71.0	92
1,2,3,4,7,8-HxCDF	50	55	36.0	67.0	111
1,2,3,6,7,8-HxCDF	50	52	42.0	65.0	103
2,3,4,6,7,8-HxCDF	50	49	35.0	78.0	98
1,2,3,7,8,9-HxCDF	50	51	39.0	65.0	102
1,2,3,4,7,8-HxCDD	50	48	35.0	82.0	96
1,2,3,6,7,8-HxCDD	50	61	38.0	67.0	122
1,2,3,7,8,9-HxCDD	50	51	32.0	81.0	103
1,2,3,4,6,7,8-HpCDF	50	54	41.0	61.0	108
1,2,3,4,7,8,9-HpCDF	50	48	39.0	69.0	97
1,2,3,4,6,7,8-HpCDD	50	49	35.0	70.0	99
OCDF	100	91	63.0	170.0	91
OCDD	100	110	78.0	144.0	108
2,3,7,8-TCDD-37Cl4	10	9.7	3.1	19.1	97
2,3,7,8-TCDF-13C	100	75	22.0	152.0	75
2,3,7,8-TCDD-13C	100	88	20.0	175.0	88
1,2,3,7,8-PeCDF-13C	100	66	21.0	192.0	66
2,3,4,7,8-PeCDF-13C	100	62	13.0	328.0	62
1,2,3,7,8-PeCDD-13C	100	75	21.0	227.0	75
1,2,3,4,7,8-HxCDF-13C	100	76	19.0	202.0	76
1,2,3,6,7,8-HxCDF-13C	100	77	21.0	159.0	77
2,3,4,6,7,8-HxCDF-13C	100	78	22.0	176.0	78
1,2,3,7,8,9-HxCDF-13C	100	68	17.0	205.0	68
1,2,3,4,7,8-HxCDD-13C	100	91	21.0	193.0	91
1,2,3,6,7,8-HxCDD-13C	100	65	25.0	163.0	65
1,2,3,4,6,7,8-HpCDF-13C	100	67	21.0	158.0	67
1,2,3,4,7,8,9-HpCDF-13C	100	58	20.0	186.0	58
1,2,3,4,6,7,8-HpCDD-13C	100	68	26.0	166.0	68
OCDD-13C	200	110	26.0	397.0	55

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

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Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCSD-42009	Matrix	Solid
Filename	F140921A_06	Dilution	NA
Total Amount Extracted	20.3 g	Extracted	09/15/2014 20:00
ICAL ID	F140918	Analyzed	09/21/2014 15:24
CCal Filename	F140921A_01	Injected By	BAL
Method Blank ID	BLANK-41998		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	111
2,3,7,8-TCDD	10	9.6	6.7	15.8	96
1,2,3,7,8-PeCDF	50	55	40.0	67.0	109
2,3,4,7,8-PeCDF	50	54	34.0	80.0	109
1,2,3,7,8-PeCDD	50	46	35.0	71.0	92
1,2,3,4,7,8-HxCDF	50	54	36.0	67.0	108
1,2,3,6,7,8-HxCDF	50	52	42.0	65.0	104
2,3,4,6,7,8-HxCDF	50	50	35.0	78.0	100
1,2,3,7,8,9-HxCDF	50	51	39.0	65.0	102
1,2,3,4,7,8-HxCDD	50	53	35.0	82.0	107
1,2,3,6,7,8-HxCDD	50	56	38.0	67.0	112
1,2,3,7,8,9-HxCDD	50	52	32.0	81.0	105
1,2,3,4,6,7,8-HpCDF	50	53	41.0	61.0	106
1,2,3,4,7,8,9-HpCDF	50	47	39.0	69.0	95
1,2,3,4,6,7,8-HpCDD	50	48	35.0	70.0	97
OCDF	100	87	63.0	170.0	87
OCDD	100	110	78.0	144.0	109
2,3,7,8-TCDD-37Cl4	10	4.2	3.1	19.1	42
2,3,7,8-TCDF-13C	100	33	22.0	152.0	33
2,3,7,8-TCDD-13C	100	39	20.0	175.0	39
1,2,3,7,8-PeCDF-13C	100	30	21.0	192.0	30
2,3,4,7,8-PeCDF-13C	100	28	13.0	328.0	28
1,2,3,7,8-PeCDD-13C	100	34	21.0	227.0	34
1,2,3,4,7,8-HxCDF-13C	100	35	19.0	202.0	35
1,2,3,6,7,8-HxCDF-13C	100	35	21.0	159.0	35
2,3,4,6,7,8-HxCDF-13C	100	35	22.0	176.0	35
1,2,3,7,8,9-HxCDF-13C	100	31	17.0	205.0	31
1,2,3,4,7,8-HxCDD-13C	100	38	21.0	193.0	38
1,2,3,6,7,8-HxCDD-13C	100	31	25.0	163.0	31
1,2,3,4,6,7,8-HpCDF-13C	100	32	21.0	158.0	32
1,2,3,4,7,8,9-HpCDF-13C	100	27	20.0	186.0	27
1,2,3,4,6,7,8-HpCDD-13C	100	32	26.0	166.0	32
OCDD-13C	200	49	26.0	397.0	25

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

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Method 1613B

Spike Recovery Relative Percent Difference (RPD) Results

Client Maul Foster and Alongi

Spike 1 ID LCS-41999
 Spike 1 Filename F140921A_05

Spike 2 ID LCSD-42009
 Spike 2 Filename F140921A_06

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDF	115	111	3.5
2,3,7,8-TCDD	96	96	0.0
1,2,3,7,8-PeCDF	110	109	0.9
2,3,4,7,8-PeCDF	107	109	1.9
1,2,3,7,8-PeCDD	92	92	0.0
1,2,3,4,7,8-HxCDF	111	108	2.7
1,2,3,6,7,8-HxCDF	103	104	1.0
2,3,4,6,7,8-HxCDF	98	100	2.0
1,2,3,7,8,9-HxCDF	102	102	0.0
1,2,3,4,7,8-HxCDD	96	107	10.8
1,2,3,6,7,8-HxCDD	122	112	8.5
1,2,3,7,8,9-HxCDD	103	105	1.9
1,2,3,4,6,7,8-HpCDF	108	106	1.9
1,2,3,4,7,8,9-HpCDF	97	95	2.1
1,2,3,4,6,7,8-HpCDD	99	97	2.0
OCDF	91	87	4.5
OCDD	108	109	0.9

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

REPORT OF LABORATORY ANALYSIS

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Specialty Analytical

11711 SE Capps Road, Ste B
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Website: www.specialtyanalytical.com

September 11, 2014

Josh Elliott
Maul Foster & Alongi
400 E. Mill Plain Blvd.
Suite 400
Vancouver, WA 98660
TEL: (360) 694-2691
FAX (360) 906-1958
RE: Carty Lake / 9003.01.40-06

Dear Josh Elliott:

Order No.: 1409056

Specialty Analytical received 1 sample(s) on 9/10/2014 for the analyses presented in the following report.

There were no problems with the analysis and all data for associated QC met EPA or laboratory specifications, except where noted in the Case Narrative, or as qualified with flags. Results apply only to the samples analyzed. Without approval of the laboratory, the reproduction of this report is only permitted in its entirety.

If you have any questions regarding these tests, please feel free to call.

Sincerely,

A handwritten signature in black ink, appearing to read "Marty French". The signature is stylized and somewhat cursive.

Marty French
Lab Director

Specialty Analytical

Date Reported: 11-Sep-14

CLIENT: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40-06
Lab ID: 1409056-001
Client Sample ID: CLSR-Batch-1

Collection Date: 9/9/2014 8:31:00 AM

Matrix: WATER

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
SEMI-VOLATILE COMPOUNDS - ACID FRACTIONS						Analyst: bda
Pentachlorophenol	ND	0.477		µg/L	1	9/10/2014 4:00:00 PM
Surr: 2,4,6-Tribromophenol	146	49.1-114	S	%REC	1	9/10/2014 4:00:00 PM
Surr: 2-Fluorophenol	30.0	13.4-57.1		%REC	1	9/10/2014 4:00:00 PM
Surr: Phenol-d6	30.1	10.6-38.5		%REC	1	9/10/2014 4:00:00 PM
PAH'S BY GC/MS - LOW LEVEL						Analyst: bda
Benzo(a)pyrene	ND	0.0476		µg/L	1	9/10/2014 3:09:00 PM
Surr: 2-Fluorobiphenyl	70.1	18.6-106		%REC	1	9/10/2014 3:09:00 PM
Surr: Nitrobenzene-d5	85.9	17-130		%REC	1	9/10/2014 3:09:00 PM
Surr: Terphenyl-d14	132	39.6-131	S	%REC	1	9/10/2014 3:09:00 PM



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QC SUMMARY REPORT

WO#: 1409056

11-Sep-14

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40-06

TestCode: 8270AFLL_W

Sample ID: CCV-8157	SampType: CCV	TestCode: 8270AFLL_W	Units: µg/L	Prep Date:	RunNo: 16763						
Client ID: CCV	Batch ID: 8157	TestNo: SW8270D	SW 3510C	Analysis Date: 9/10/2014	SeqNo: 221374						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Pentachlorophenol 38.0 0.500 40.00 0 95.1 80 120

Sample ID: LCS-8157	SampType: LCS	TestCode: 8270AFLL_W	Units: µg/L	Prep Date: 9/10/2014	RunNo: 16763						
Client ID: LCSW	Batch ID: 8157	TestNo: SW8270D	SW 3510C	Analysis Date: 9/10/2014	SeqNo: 221378						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Pentachlorophenol 40.9 0.500 50.00 0 81.8 43.3 113

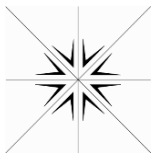
Sample ID: LCSD-8157	SampType: LCSD	TestCode: 8270AFLL_W	Units: µg/L	Prep Date: 9/10/2014	RunNo: 16763						
Client ID: LCSS02	Batch ID: 8157	TestNo: SW8270D	SW 3510C	Analysis Date: 9/10/2014	SeqNo: 221379						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Pentachlorophenol 41.0 0.500 50.00 0 82.0 43.3 113 40.90 0.244 20

Sample ID: MB-8157	SampType: MBLK	TestCode: 8270AFLL_W	Units: µg/L	Prep Date: 9/10/2014	RunNo: 16763						
Client ID: PBW	Batch ID: 8157	TestNo: SW8270D	SW 3510C	Analysis Date: 9/10/2014	SeqNo: 221380						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Pentachlorophenol ND 0.500
 Surr: 2,4,6-Tribromophenol 126 100.0 126 49.1 114 S
 Surr: 2-Fluorophenol 54.0 100.0 54.0 13.4 57.1
 Surr: Phenol-d6 40.1 100.0 40.1 10.6 38.5 S

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits



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QC SUMMARY REPORT

WO#: 1409056

11-Sep-14

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40-06

TestCode: PAHLL_W

Sample ID: CCV-8158	SampType: CCV	TestCode: PAHLL_W	Units: µg/L	Prep Date:	RunNo: 16761						
Client ID: CCV	Batch ID: 8158	TestNo: SW8270D	SW 3510C	Analysis Date: 9/10/2014	SeqNo: 221356						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzo(a)pyrene 1.74 0.0500 2.000 0 87.2 80 120

Sample ID: MB-8158	SampType: MBLK	TestCode: PAHLL_W	Units: µg/L	Prep Date: 9/10/2014	RunNo: 16761						
Client ID: PBW	Batch ID: 8158	TestNo: SW8270D	SW 3510C	Analysis Date: 9/10/2014	SeqNo: 221357						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzo(a)pyrene ND 0.0500
 Surr: 2-Fluorobiphenyl 0.0769 0.1000 76.9 18.6 106
 Surr: Nitrobenzene-d5 0.0792 0.1000 79.2 17 130
 Surr: Terphenyl-d14 0.149 0.1000 149 39.6 131 S

Sample ID: LCSD-8158	SampType: LCSD	TestCode: PAHLL_W	Units: µg/L	Prep Date: 9/10/2014	RunNo: 16761						
Client ID: LCSS02	Batch ID: 8158	TestNo: SW8270D	SW 3510C	Analysis Date: 9/10/2014	SeqNo: 221358						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzo(a)pyrene 3.55 0.0500 5.000 0 70.9 23.4 103 3.346 5.81 20

Sample ID: LCS-8158	SampType: LCS	TestCode: PAHLL_W	Units: µg/L	Prep Date: 9/10/2014	RunNo: 16761						
Client ID: LCSW	Batch ID: 8158	TestNo: SW8270D	SW 3510C	Analysis Date: 9/10/2014	SeqNo: 221359						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzo(a)pyrene 3.35 0.0500 5.000 0 66.9 23.4 103

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

KEY TO FLAGS

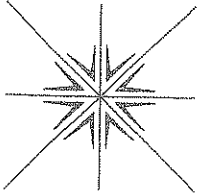
Rev. May 12, 2010

- A This sample contains a Gasoline Range Organic not identified as a specific hydrocarbon product. The result was quantified against gasoline calibration standards
- A1 This sample contains a Diesel Range Organic not identified as a specific hydrocarbon product. The result was quantified against diesel calibration standards.
- A2 This sample contains a Lube Oil Range Organic not identified as a specific hydrocarbon product. The result was quantified against a lube oil calibration standard.
- A3 The result was determined to be Non-Detect based on hydrocarbon pattern recognition. The product was carry-over from another hydrocarbon type.
- A4 The product appears to be aged or degraded diesel.
- B The blank exhibited a positive result great than the reporting limit for this compound.
- CN See Case Narrative.
- D Result is based from a dilution.
- E Result exceeds the calibration range for this compound. The result should be considered as estimate.
- F The positive result for this hydrocarbon is due to single component contamination. The product does not match any hydrocarbon in the fuels library.
- G Result may be biased high due to biogenic interferences. Clean up is recommended.
- H Sample was analyzed outside recommended holding time.
- HT At clients request, samples was analyzed outside of recommended holding time.
- J The result for this analyte is between the MDL and the PQL and should be considered as estimated concentration.
- K Diesel result is biased high due to amount of Oil contained in the sample.
- L Diesel result is biased high due to amount of Gasoline contained in the sample.
- M Oil result is biased high due to amount of Diesel contained in the sample.
- MC Sample concentration is greater than 4x the spiked value, the spiked value is considered insignificant.
- MI Result is outside control limits due to matrix interference.
- MSA Value determined by Method of Standard Addition.
- O Laboratory Control Standard (LCS) exceeded laboratory control limits, but meets CCV criteria. Data meets EPA requirements.
- Q Detection levels elevated due to sample matrix.
- R RPD control limits were exceeded.
- RF Duplicate failed due to result being at or near the method-reporting limit.
- RP Matrix spike values exceed established QC limits; post digestion spike is in control.
- S Recovery is outside control limits.
- SC Closing CCV or LCS exceeded high recovery control limits, but associated samples are non-detect. Data meets EPA requirements.
- * The result for this parameter was greater than the maximum contaminant level of the TCLP regulatory limit.

CHAIN OF CUSTODY RECORD

Specialty Analytical

11711 SE Capps Road
Clackamas, OR 97015
Phone: 503-607-1331
Fax: 503-607-1336



Contact Person/Project Manager JOSH ELLIOTT, PE
 Company MFA (J ELLIOTT @ MAIL.FOSTER.COM)
 Address 2001 NW 19th, Ste 200
Portland, OR 97209
 Phone 360-694-2691 Fax _____
 Project No. 9003.01.40-06 Project Name Carby L&L
 Project Site Location OR WA X Other _____
 Invoice To MFA P.O. No. 9003.01.40-06

Collected By: _____

Signature _____

Printed: MIKE REITER

Signature _____

Printed: _____

Turn Around Time _____

Normal 5-7 Business Days

Rush _____

Specify _____

Rush Analyses Must Be Scheduled With The Lab In Advance

Date		Time	Sample I.D.	Matrix	No. of Containers	Analyses		For Laboratory Use			
9/9/14	8:31		CLSR-BATCH-7	W	2	BENZOPYRONE USEDA 8270 PENTACHLOROPHENOL USEPP 8250	Lab Job No. <u>H09050</u> Shipped Via <u>Specialty</u> Air Bill No. _____ Temperature On Receipt <u>4</u> °C Specialty Analytical Containers? <input type="checkbox"/> Specialty Analytical Trip Blanks? <input type="checkbox"/>	Comments	Lab I.D.		
Relinquished By: _____	Date: <u>9/10/14</u>	Time: <u>1125</u>	Company: _____	Received By: _____	Date: <u>9/10/14</u>	Time: <u>1200</u>	Company: _____	Received For Lab By: _____	Date: <u>9/10/14</u>	Time: <u>1200</u>	

Unless Reclaimed, Samples Will Be Disposed of 60 Days After Receipt. Samples held beyond 60 days subject to storage fee(s)

Copies: White-Original

Yellow-Project File

Pink-Customer Copy



Specialty Analytical

11711 SE Capps Road, Ste B
Clackamas, Oregon 97015
TEL: 503-607-1331 FAX: 503-607-1336
Website: www.specialtyanalytical.com

September 16, 2014

Josh Elliott
Maul Foster & Alongi
400 E. Mill Plain Blvd.
Suite 400
Vancouver, WA 98660
TEL: (360) 694-2691
FAX (360) 906-1958
RE: Carty Lake / 9003.01.40-06

Dear Josh Elliott:

Order No.: 1409086

Specialty Analytical received 1 sample(s) on 9/15/2014 for the analyses presented in the following report.

There were no problems with the analysis and all data for associated QC met EPA or laboratory specifications, except where noted in the Case Narrative, or as qualified with flags. Results apply only to the samples analyzed. Without approval of the laboratory, the reproduction of this report is only permitted in its entirety.

If you have any questions regarding these tests, please feel free to call.

Sincerely,

A handwritten signature in black ink, appearing to read "Marty French".

Marty French
Lab Director

Specialty Analytical

Date Reported: 16-Sep-14

CLIENT: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40-06
Lab ID: 1409086-001
Client Sample ID: CLSR-Batch-2

Collection Date: 9/11/2014 5:30:00 PM

Matrix: WATER

Analyses	Result	RL	Qual	Unit	DF	Date Analyzed
SEMI-VOLATILE COMPOUNDS - ACID FRACTIONS						Analyst: bda
SW8270D						
Pentachlorophenol	ND	0.481		µg/L	1	9/15/2014 4:00:00 PM
Surr: 2,4,6-Tribromophenol	115	49.1-114	S	%REC	1	9/15/2014 4:00:00 PM
Surr: 2-Fluorophenol	43.7	13.4-57.1		%REC	1	9/15/2014 4:00:00 PM
Surr: Phenol-d6	25.8	10.6-38.5		%REC	1	9/15/2014 4:00:00 PM
PAH'S BY GC/MS - LOW LEVEL						Analyst: bda
SW8270D						
Benzo(a)pyrene	ND	0.0474		µg/L	1	9/15/2014 3:16:00 PM
Surr: 2-Fluorobiphenyl	64.9	18.6-106		%REC	1	9/15/2014 3:16:00 PM
Surr: Nitrobenzene-d5	61.2	17-130		%REC	1	9/15/2014 3:16:00 PM
Surr: Terphenyl-d14	121	39.6-131		%REC	1	9/15/2014 3:16:00 PM



Specialty Analytical
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 Clackamas, Oregon 97015
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 Website: www.specialtyanalytical.com

QC SUMMARY REPORT

WO#: 1409086

16-Sep-14

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40-06

TestCode: 8270AFLL_W

Sample ID: CCV-8178	SampType: CCV	TestCode: 8270AFLL_W	Units: µg/L	Prep Date:	RunNo: 16822						
Client ID: CCV	Batch ID: 8178	TestNo: SW8270D	SW 3510C	Analysis Date: 9/15/2014	SeqNo: 222130						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Pentachlorophenol 35.2 0.500 40.00 0 88.0 80 120

Sample ID: LCS-8178	SampType: LCS	TestCode: 8270AFLL_W	Units: µg/L	Prep Date: 9/15/2014	RunNo: 16822						
Client ID: LCSW	Batch ID: 8178	TestNo: SW8270D	SW 3510C	Analysis Date: 9/15/2014	SeqNo: 222131						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Pentachlorophenol 30.6 0.500 50.00 0 61.2 43.3 113

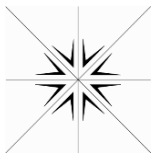
Sample ID: LCSD-8178	SampType: LCSD	TestCode: 8270AFLL_W	Units: µg/L	Prep Date: 9/15/2014	RunNo: 16822						
Client ID: LCSS02	Batch ID: 8178	TestNo: SW8270D	SW 3510C	Analysis Date: 9/15/2014	SeqNo: 222132						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Pentachlorophenol 28.4 0.500 50.00 0 56.7 43.3 113 30.61 7.60 20

Sample ID: MB-8178	SampType: MBLK	TestCode: 8270AFLL_W	Units: µg/L	Prep Date: 9/15/2014	RunNo: 16822						
Client ID: PBW	Batch ID: 8178	TestNo: SW8270D	SW 3510C	Analysis Date: 9/15/2014	SeqNo: 222133						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Pentachlorophenol ND 0.500
 Surr: 2,4,6-Tribromophenol 144 100.0 144 49.1 114 S
 Surr: 2-Fluorophenol 53.7 100.0 53.7 13.4 57.1
 Surr: Phenol-d6 31.0 100.0 31.0 10.6 38.5

Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits



Specialty Analytical
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 Clackamas, Oregon 97015
 TEL: 503-607-1331 FAX: 503-607-1336
 Website: www.specialtyanalytical.com

QC SUMMARY REPORT

WO#: 1409086

16-Sep-14

Client: Maul Foster & Alongi
Project: Carty Lake / 9003.01.40-06

TestCode: PAHLL_W

Sample ID: CCV-8177	SampType: CCV	TestCode: PAHLL_W	Units: µg/L	Prep Date:	RunNo: 16820						
Client ID: CCV	Batch ID: 8177	TestNo: SW8270D	SW 3510C	Analysis Date: 9/15/2014	SeqNo: 222112						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzo(a)pyrene 1.71 0.0500 2.000 0 85.4 80 120

Sample ID: LCSD-8177	SampType: LCSD	TestCode: PAHLL_W	Units: µg/L	Prep Date: 9/15/2014	RunNo: 16820						
Client ID: LCSS02	Batch ID: 8177	TestNo: SW8270D	SW 3510C	Analysis Date: 9/15/2014	SeqNo: 222113						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzo(a)pyrene 3.45 0.0500 5.000 0 69.1 23.4 103 3.913 12.5 20

Sample ID: LCS-8177	SampType: LCS	TestCode: PAHLL_W	Units: µg/L	Prep Date: 9/15/2014	RunNo: 16820						
Client ID: LCSW	Batch ID: 8177	TestNo: SW8270D	SW 3510C	Analysis Date: 9/15/2014	SeqNo: 222114						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzo(a)pyrene 3.91 0.0500 5.000 0 78.3 23.4 103

Sample ID: MB-8177	SampType: MBLK	TestCode: PAHLL_W	Units: µg/L	Prep Date: 9/15/2014	RunNo: 16820						
Client ID: PBW	Batch ID: 8177	TestNo: SW8270D	SW 3510C	Analysis Date: 9/15/2014	SeqNo: 222115						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzo(a)pyrene ND 0.0500
 Surr: 2-Fluorobiphenyl 0.0837 0.1000 83.7 18.6 106
 Surr: Nitrobenzene-d5 0.0817 0.1000 81.7 17 130
 Surr: Terphenyl-d14 0.155 0.1000 155 39.6 131

S

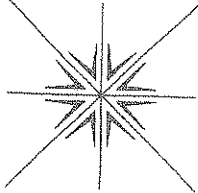
Qualifiers: B Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit
 O RSD is greater than RSDlimit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

KEY TO FLAGS

Rev. May 12, 2010

- A This sample contains a Gasoline Range Organic not identified as a specific hydrocarbon product. The result was quantified against gasoline calibration standards
- A1 This sample contains a Diesel Range Organic not identified as a specific hydrocarbon product. The result was quantified against diesel calibration standards.
- A2 This sample contains a Lube Oil Range Organic not identified as a specific hydrocarbon product. The result was quantified against a lube oil calibration standard.
- A3 The result was determined to be Non-Detect based on hydrocarbon pattern recognition. The product was carry-over from another hydrocarbon type.
- A4 The product appears to be aged or degraded diesel.
- B The blank exhibited a positive result great than the reporting limit for this compound.
- CN See Case Narrative.
- D Result is based from a dilution.
- E Result exceeds the calibration range for this compound. The result should be considered as estimate.
- F The positive result for this hydrocarbon is due to single component contamination. The product does not match any hydrocarbon in the fuels library.
- G Result may be biased high due to biogenic interferences. Clean up is recommended.
- H Sample was analyzed outside recommended holding time.
- HT At clients request, samples was analyzed outside of recommended holding time.
- J The result for this analyte is between the MDL and the PQL and should be considered as estimated concentration.
- K Diesel result is biased high due to amount of Oil contained in the sample.
- L Diesel result is biased high due to amount of Gasoline contained in the sample.
- M Oil result is biased high due to amount of Diesel contained in the sample.
- MC Sample concentration is greater than 4x the spiked value, the spiked value is considered insignificant.
- MI Result is outside control limits due to matrix interference.
- MSA Value determined by Method of Standard Addition.
- O Laboratory Control Standard (LCS) exceeded laboratory control limits, but meets CCV criteria. Data meets EPA requirements.
- Q Detection levels elevated due to sample matrix.
- R RPD control limits were exceeded.
- RF Duplicate failed due to result being at or near the method-reporting limit.
- RP Matrix spike values exceed established QC limits; post digestion spike is in control.
- S Recovery is outside control limits.
- SC Closing CCV or LCS exceeded high recovery control limits, but associated samples are non-detect. Data meets EPA requirements.
- * The result for this parameter was greater than the maximum contaminant level of the TCLP regulatory limit.

CHAIN OF CUSTODY RECORD



Specialty Analytical

11711 SE Capps Road
 Clackamas, OR 97015
 Phone: 503-607-1331
 Fax: 503-607-1336

Contact Person/Project Manager JOSE ELLIOTT, PE
 Company MEFA
 Address 2001 NW 19th Ave
Portland, OR 97209
 Phone 360-694-2691 Fax _____
 Project No. 9003.01.40-06 Project Name Carty Leak
 Project Site Location OR WA X Other _____
 Invoice To MEFA P.O. No. 9003.01.40-06

Collected By: _____
 Signature: _____
 Printed: MIKE REITER, PE

Signature: _____
 Printed: _____

Turn Around Time _____
 Normal 5-7 Business Days
 Rush _____ Specify _____
 Rush Analyses Must Be Scheduled With The Lab In Advance

No. of Containers		Analyses		For Laboratory Use							
Date	Time	Sample I.D.	Matrix	Lab Job No.	Shipped Via	Air Bill No.	Temperature On Receipt	Specialty Analytical Containers?	Specialty Analytical Trip Blanks?	Comments	Lab I.D.
9/11/14	17:30	CLSR-BATCH-2	W	2	X	X	4	<input type="checkbox"/>	<input type="checkbox"/>		
				(BENZENE) PYRENE		CAS# 8270		PENTACHLOROPHENOL		CAS# 8270	
				CAS# 8270		PENTACHLOROPHENOL		CAS# 8270		CAS# 8270	
Relinquished By: <u>Tom Silva</u> Date: <u>9/15/14</u> Time: <u>10:10</u> Company: <u>MEFA, Inc.</u> Date: <u>9/15/14</u> Time: <u>10:55</u> Reclaimed, Samples Will Be Disposed of 60 Days After Receipt. Samples held beyond 60 days subject to storage fee(s)											
Received For Lab By: <u>Nikki Buppas</u> Date: <u>9/15/14</u> Time: <u>10:55</u> Company: _____											

GDI Project:	PortRdgfld-1-01-02	Prepared By:	Nick Paveglio
Project Name:	Miller's Landing on Ridgefield Water	Date:	8/21/2014
Location:	Carty Lake	Report #:	
Arrival:	2:00 pm/4:30pm	Departure:	2:30pm/4:30pm
Weather:	Sun, 70's	Permit #:	
Purpose:	Evaluate fill WDFW Access road		

I arrived on site at the request of Josh Elliot with Maul Foster & Alongi (MFA). The purpose of my visit was to observe and evaluate fill placement for the WDFW access road to Carty Lake from the Ridgefield Waterfront . I met Mike Reiter with MFA and members of Stryder Construction upon arrival.

At the time of my arrival Stryder was placing the first lift of fill for the access road. The approximately 100-foot long access road required up to approximately 3 feet fill to meet project plans. I observed that Stryder had placed a layer of geotextile separation fabric between the native subgrade and fill prior to placing any fill. I lifted up the fabric along the access road and determined that the subgrade was adequately stripped. Additionally I evaluated the subgrade by probing with a ½-inch diameter steel foundation probe. Resulting penetrations indicated the subgrade was medium stiff to stiff and no over-excavation was required.

The fill consisted of clean, grey dredge sand from Stordahl. Based on the fill material I recommended that it be placed and compacted in two equal 18-inch lifts. At the time of my first visit Stryder had not compacted the first lift of fill and Mike requested that I return to the site at approximately 4:30 pm evaluate compaction. Prior to leaving I informed Mike and Stryder that the optimum moisture content of sand was likely in the neighborhood of 20% so copious amounts of water would be required to achieve the required densities.

When I arrived for the second visit Stryder was finishing up compaction of the first lift. I observe them placing significant amounts of water on the sand and compacting with a large smooth drum vibratory roller. I observed the compact the material for approximately 10 minutes. After this time I observed a proof roll of the sand fill by watching the back tires of the roller. I observed no pumping and minor rutting of the sand (which is normal for clean sand) which indicated that the fill was compacted according to project specifications.

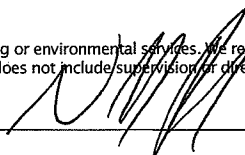
Based on observations and testing stripping beneath the access road and compaction of the first lift were in accordance with project specifications and our geotechnical recommendations.

Distribution:

Attachments: None

Reviewed by: NP

This report presents opinions formed as a result of our observation of activities relating to geotechnical engineering or environmental services. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of our representative. Our work does not include supervision or direction of the contractor, the contractor's employees or agents. Our firm is not responsible for site safety.

Signature: 

GDI Project:	PortRdgfld-1-01-02	Prepared By:	Nick Paveglio
Project Name:	Miller's Landing on Ridgefield Water	Date:	8/22/2014
Location:	Carty Lake	Report #:	
Arrival:	10:00 am	Departure:	10:30 am
Weather:	Sun, 60's	Permit #:	
Purpose:	Evaluate fill for WDFW Access road		

I arrived on site at the request of Mike Reiter with Maul Foster & Alongi (MFA). The purpose of my visit was to observe and evaluate fill placement for the WDFW access road to Carty Lake from the Ridgefield Waterfront . I met Mike and members of Stryder Construction upon arrival.

At the time of my arrival Stryder had finished placement and compaction of the second lift of fill for the access road. The fill consisted of clean, grey dredge sand from Stordahl. It was placed in a lift up to 18-inches thick, watered significantly, and compacted with a vibratory smooth drum roller.

I evaluated compaction of the fill by proof rolling using a loader with a full bucket. I observed to pumping and minor rutting (normal with clean sands) under the weight of the tires which met our compaction requirements. We understand that another layer of fabric and 8-inches of crushed rock surfacing will be placed on top of the access road. Mike said that he would contact GeoDesign to evaluate this at a later date.

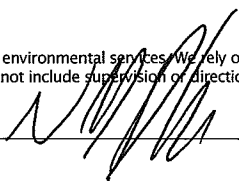
Based on observations and testing the second lift of fill for the access road was compacted in accordance with project specifications and our geotechnical recommendations.

Distribution:

Attachments: *None*

Reviewed by: *NP*

This report presents opinions formed as a result of our observation of activities relating to geotechnical engineering or environmental services. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of our representative. Our work does not include supervision or direction of the contractor, the contractor's employees or agents. Our firm is not responsible for site safety.

Signature: 

GDI Project:	PortRdgfld-1-01-04	Prepared By:	Wassim Nohad
Project Name:	Miller's Landing on Ridgefield Water	Date:	10/01/14
Location:	Carty Lake	Report #:	9
Arrival:	12:30pm	Departure:	12:50pm
Weather:	Clear, Sun, 70's	Permit #:	
Purpose:	Evaluate sand fill compaction		

I arrived on site at the request of Josh Elliot with Maul Foster & Alongi (MFA). The purpose of my visit was to evaluate fill compaction in the area shown on the attached site plan. While onsite, I met with Mike of MFA.

Upon arrival, I was informed that site visit has been postponed to a later date due to unexpected delays. Mike indicated we will be rescheduled to a later date, as needed.

Distribution:

Attachments:

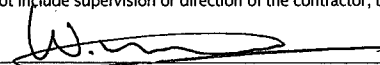
Reviewed by:



PDP/CL

This report presents opinions formed as a result of our observation of activities relating to geotechnical engineering or environmental services. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of our representative. Our work does not include supervision or direction of the contractor, the contractor's employees or agents. Our firm is not responsible for site safety.

Signature: _____



GDI Project:	PortKdyeld-1-01-04	Prepared By:	Dan Bollean
Project Name:	Miller's landing	Date:	10/2/14
Location:	Carty Lake	Report #:	58
Arrival:	1300	Departure:	1445
Weather:	Sun, 70's	Permit #:	
Purpose:	Granular Fill Compaction Observation		

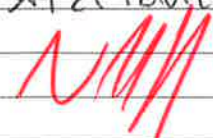
I arrived onsite as requested by Josh with Maul Foster and Alamy (MFA). The purpose of my visit was to evaluate granular fill compaction (see site plan) while onsite, I met with Mike of MFA and representatives of Strider construction.

Upon arrival, I observed Strider had placed 1'-3' of Stoveclahl (Mountain Top) 1 1/2" - 0 crushed rock in lifts and compacted it with a Sakai large single-smooth drum vibratory roller. I observed no deflection under roller weight. I used a Troxler 3430 Nuclear Density Gauge to evaluate compaction effort. Tests were compared to a field adjusted proctor of 135 pcf at 9%. Pin resistance indicated densely compacted backfill (20 blows to drive 3/4" diameter per approx 12" with 8lb. Skelge hammer), 95% of optimum compaction is recommended. Area 2 was moisture conditioned and recomacted. All areas met compaction recommendations.

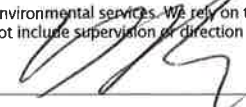
Based on observations and density testing the fill observed today is in accordance with our geotechnical recommendations.

Distribution:

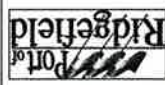
Attachments: Site Plan (1) MFDOS (1)

Reviewed by: 

This report presents opinions formed as a result of our observation of activities relating to geotechnical engineering or environmental services. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of our representative. Our work does not include supervision or direction of the contractor, the contractor's employees or agents. Our firm is not responsible for site safety.

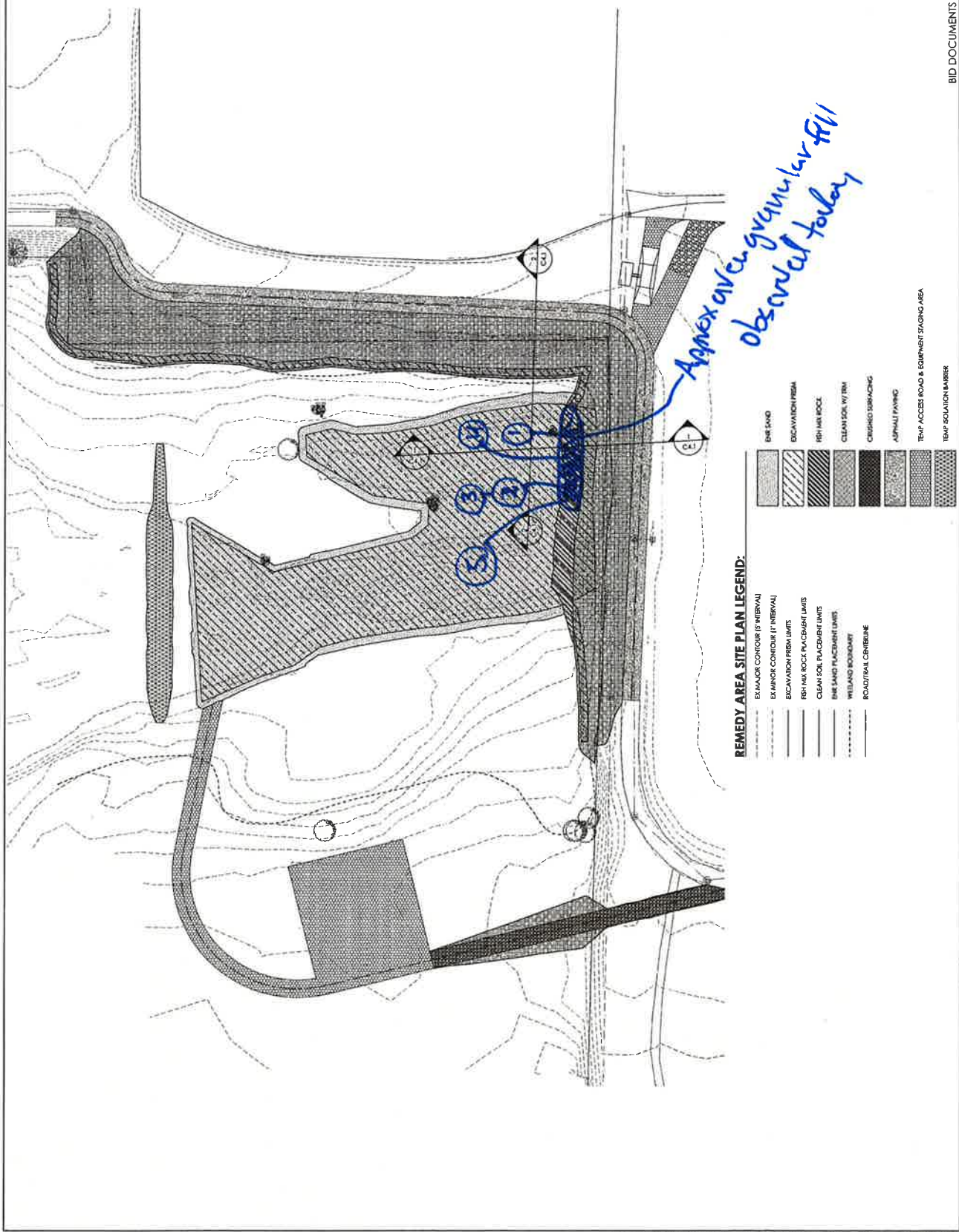
Signature: 

MAUL FOSTER ALONG
 400 EAST MILL PLAIN BLVD
 SUITE 400
 VANCOUVER, WA 98640
 PHONE: (206) 544-2139
 WWW.MFAULFOSTER.COM



CARTY LAKE SEDIMENT REMEDY
 PORT OF RIDGEFIELD
 RIDGEFIELD, WASHINGTON

PROJECT: R0340	DATE:
DESIGNED: J. BLUETT	DRAWN: J. BLUETT
CHECKED: E. MARON	SCALE:
SHEET TITLE: R0340-01-01	
SHEET NUMBER: 1 OF 1	
REMEDIATION AREA SITE PLAN	
SHEET	



BID DOCUMENTS - NOT FOR CONSTRUCTION

C4.0

GDI Project:	Port Rd by fld-1-01-041	Prepared By:	1 Dan Borlean
Project Name:	Miller's Landing	Date:	10/3/14
Location:	Certy Lake	Report #:	105
Arrival:	1030	Departure:	1230
Weather:	70's Sun	Permit #:	
Purpose:	Observe granular fill		

I arrived onsite as requested by Josh with Maul Foster and Aloung (MFA). The purpose of my visit was to observe granular fill (see site plan). While onsite, I met with MFA and Strider representatives.

Upon arrival, I observed Strider had placed between 6" and 2' of Staveland (Mountain Top) 1 1/2"-0 crushed rock in 12" lifts and compacted it using a Sakai large single smooth drum vibratory roller. I used a Troxler 3430 Nuclear Density Gauge to evaluate compaction effort. Tests were compared to a field adjusted 135pcf at 4% moisture, optimum compaction 95% of optimum is recommended. All tests met recommendations. Pen resistance indicates dense soil. No deflection under roller.

Based on observations and density testing, granular fill observed today is in accordance with our geotechnical recommendations.

Distribution:

Attachments: Site Plan (1) MDS (1)

Reviewed by:

This report presents opinions formed as a result of our observation of activities relating to geotechnical engineering or environmental services. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of our representative. Our work does not include supervision or direction of the contractor, the contractor's employees or agents. Our firm is not responsible for site safety.

Signature:

GDI Project: Port Rdg fld-1-01-04
 Tested By: DSB

Project Name: Wiley's Landfill
 Permit Number: _____

Date: 10/3/14
 Page: 1 of 1

Maximum Density: 135 pcf
 Optimum Moisture: 9%

A Material Source
Storage (Water) 1/2-061R

B _____
 C _____

Test No.	Date	Location / Explanation	Approximate Elevation	Fill Type	Compactor	Density	% Moisture	% Maximum	% Required
1	10/3	See Site Plan	±8'-9"	A	Wye's Drum	137.2	5	100+	95
2			" "			133.6	4.7	99	
3			7'-8"			130.1	7	96	
4			" "			130.2	6.1	96	

Comments: _____

GDI Project:	PortRdgfld-1-01-04	Prepared By:	Jonathan Nasr
Project Name:	Miller's Landing on Ridgefield Water	Date:	10/6/14
Location:	Carty Lake	Report #:	10
Arrival:	12:40:pm	Departure:	1:05pm
Weather:	Sunny, dry, 70's	Permit #:	
Purpose:	Evaluate fill compaction		

I arrived on site at the request of Mike Reiter with Maul Foster & Alongi (MFA). The purpose of my visit was to evaluate fill compaction in the area shown on the attached site plan. While on-site, I met with Mike and members of Strider Construction.

At the time of my arrival, Strider had finished placement of a 1' thick lift of 1.25" minus crushed rock to bring the crushed rock fill area to finished rock grade. I observed the crushed rock being compacted using a large vibratory smooth drum roller. I used a Troxler 3430 nuclear density gauge to evaluate compaction of the fill. Results were compared to a maximum density 135 pcf based on a field adjusted proctor. The crushed rock appeared well keyed and firm under foot. Both of the areas tested today met the minimum required compaction. See attached site map and density data sheet for test locations and details.

Based on our observations and density testing, it is our opinion the fill evaluated today was compacted in accordance with project specifications and our geotechnical recommendations.

Distribution:

Attachments: Site Plan (1), NDDS (1)

Reviewed by: 

This report presents opinions formed as a result of our observation of activities relating to geotechnical engineering or environmental services. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of our representative. Our work does not include supervision or direction of the contractor, the contractor's employees or agents. Our firm is not responsible for site safety.

Signature: 

GDI Project: PortRdgid-1-01-04 Project Name: Miller's Landing Date: 10/6/2014
 Sampled By: jan Project Location: Ridgefield, WA Page: 1 of 1

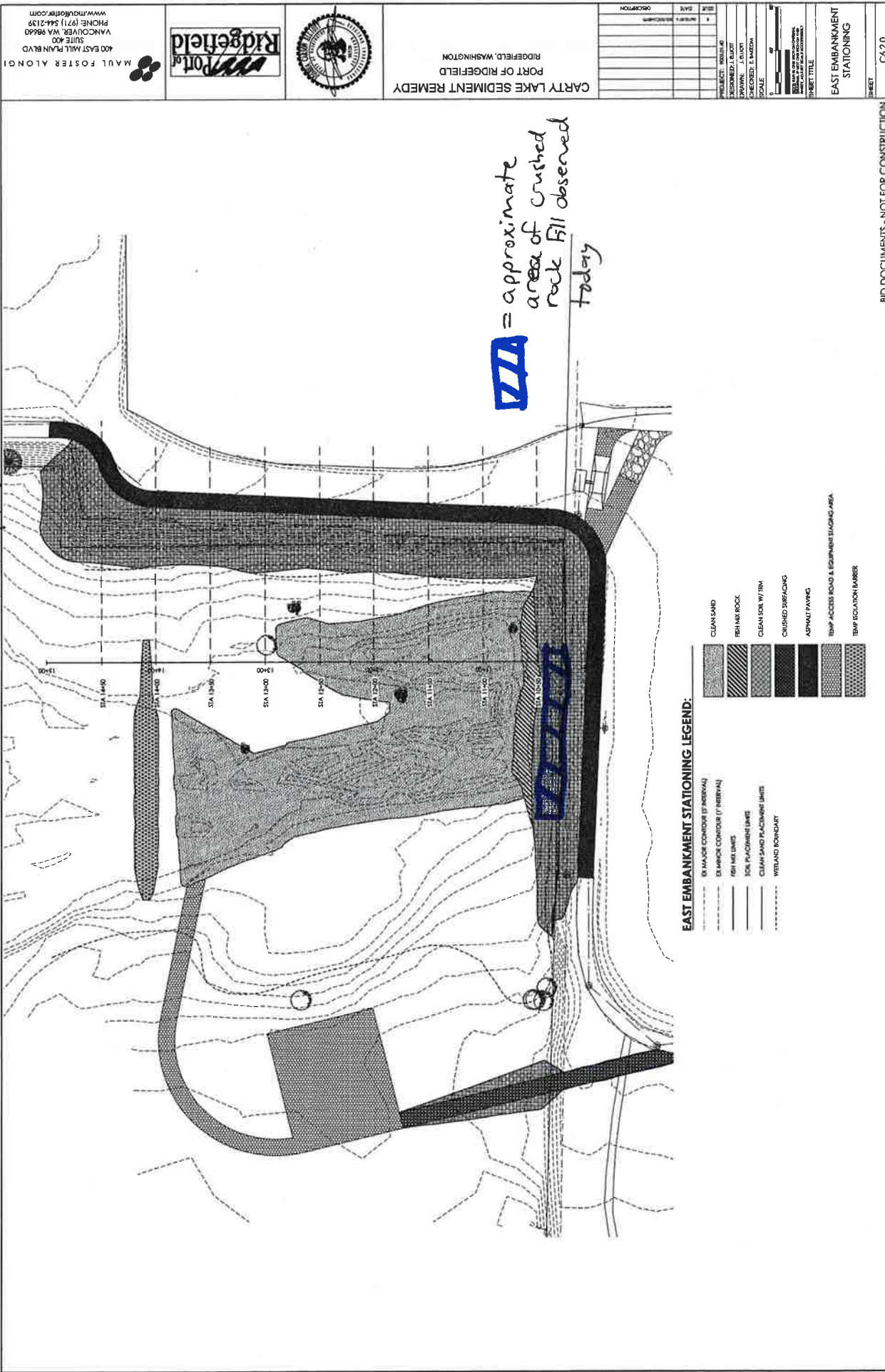
Material Source
 A 1.25"-Storedahl-Mountain Top Maximum Density:pcf (required) 135.0 pcf (required) A Optimum Moisture 9.0%
 B _____
 C _____

* = final elevation for crushed rock

Test No.	Date	Location	Elevation*	Fill Type	Compactor	Density	% Moisture	% Maximum	% Required
1	10/6	See site plan-crushed rock	0'	A	smooth drum	129.7	6.3	96%	95
2	10/6	See site plan-crushed rock	0'	A	smooth drum	132.8	6.2	98%	95

Port Rdg fld - 1-01-04

10/6/14

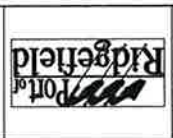


ZZA = approximate area of crushed rock fill observed today

EAST EMBANKMENT STATIONING LEGEND:

- EX HAVER CONDUIT (7" INTERVAL)
- EX MANHOLE CONDUIT (7" INTERVAL)
- FISH HOLE LIMES
- SOIL PLACEMENT LAYER
- CLEAN SAND PLACEMENT LAYER
- WETLAND BOUNDARY
- CLEAN LAND
- REINFORCED ROCK
- CLEAN SOIL W/TBM
- CRUSHED SBR/FACING
- ASPHALT PAVING
- TEMP ACCESS ROAD & EQUIPMENT STAGING AREA
- TEMP EROSION BARBER

MAUL FOSTER ALONG
 400 EAST MILL PLAIN BLVD
 SUITE 400
 YANCOUVER, WA 98660
 PHONE: (206) 544-2139
 WWW.MFALONG.COM



CARTY LAKE SEDIMENT REMEDY
 PORT OF RIDGFIELD
 RIDGFIELD, WASHINGTON

PROJECT: WELLS #2	DATE:	DATE:
DESIGNED: J. GLOTT	DATE:	DATE:
DRAWN: J. GLOTT	DATE:	DATE:
CHECKED: J. GLOTT	DATE:	DATE:
SCALE:	DATE:	DATE:
SHEET TITLE		
EAST EMBANKMENT STATIONING		
SHEET C6.20		

BID DOCUMENTS - NOT FOR CONSTRUCTION

GDI Project:	PortRdgfld-1-01-04	Prepared By:	Andreu Ferrero
Project Name:	Miller's Landing on Ridgefield Water	Date:	10/7/14
Location:	Carty Lake	Report #:	X
Arrival:	0930/1430	Departure:	1030/1700
Weather:	Sunny, dry, 70's	Permit #:	
Purpose:	Evaluate fill compaction		

I arrived on site at the request of Mike Reiter with Maul Foster & Alongi (MFA). The purpose of my visit was to evaluate fill compaction in the area shown on the attached site plan. While on-site, I met with Mike and members of Strider Construction.

At the time of my arrival, Strider had finished placement of a 1' thick lift of sand. I observed the sand being compacted using a large vibratory smooth drum roller. I used a Troxler 3430 nuclear density gauge to evaluate compaction of the fill. Results were compared to a maximum density 98 pcf based on a field adjusted proctor. Both of the areas tested today met the minimum required compaction. Most shots were recorded as over 100% of maximum dry density of the sand. See attached site map and density data sheet for test locations and details.

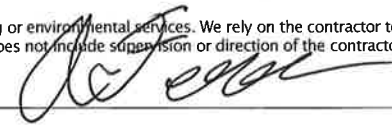
Based on our observations and density testing, it is our opinion the fill evaluated today was compacted in accordance with project specifications and our geotechnical recommendations.

Distribution:

Attachments: Site Plan (1), NDDS (1)

Reviewed by: 

This report presents opinions formed as a result of our observation of activities relating to geotechnical engineering or environmental services. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of our representative. Our work does not include supervision or direction of the contractor, the contractor's employees or agents. Our firm is not responsible for site safety.

Signature: 



NUCLEAR DENSITY GAUGE DATA

GDI Project: PortRdgid-1-01-04 Project Name: Miller's Landing Date: 10/7/2014
 Sampled By: ajf Project Location: Ridgefield, WA Page: 1 of 1

Material Source
 A Storedahl Sand Maximum Density: pcf (required) 98.0 pcf (required) A 21.0% Optimum Moisture
 B _____
 C _____

* = final elevation for crushed rock

Test No.	Date	Location	Elevation*	Fill Type	Compactor	Density	% Moisture	% Maximum	% Required
1	10/7	See site plan	18'	A	smooth drum	103.5	6.6	106%	95
2	10/7	See site plan	18'	A	smooth drum	110.0	8.9	112%	95
3	10/7	See site plan	18'	A	smooth drum	98.8	7.3	101%	95
4	10/7	See site plan	20'	A	smooth drum	96.6	4.8	99%	95
5	10/7	See site plan	20'	A	smooth drum	103.6	8.8	106%	95
6	10/7	See site plan	20'	A	smooth drum	93.1	14.2	95%	95

fGDI Project:	PortRdgfld-1-01	Prepared By:	Jared A Martinez
Project Name:	Miller's Landing on Ridgefield Water	Date:	10/9/14
Location:	Carty Lake	Report #:	13
Arrival:	1215	Departure:	1245
Weather:	Sunny, dry, 70's	Permit #:	
Purpose:	Observe proof roll		

I arrived on site at the request of Mike Reiter with Maul Foster & Alongi (MFA). The purpose of my visit was to observe a proof roll of the trail baserock in the area shown on the attached site plan. I met with Mike and members of Strider Construction onsite.

Upon arrival, Mike informed me that the baserock for the asphalt trail was ready for evaluation. I observed a ¾ full single axle water truck proof roll the trail baserock. I observed no deflection or rutting of the baserock underneath the weight of the vehicle throughout the proof roll.

While onsite, Mike informed me that the top wedged section of sand had been placed on the northern facing slope. I used a ½" diameter steel foundation probe to evaluate the compaction of the material. A gradual increase in pressure during probing indicated a medium dense material.

Based on our observations, it is our opinion the sand fill and baserock evaluated today has been prepared in general accordance with project specifications and our geotechnical recommendations.

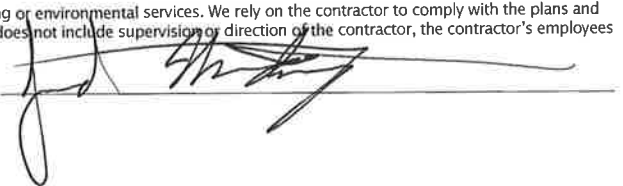
Distribution:

Attachments: Site Plan (1)

Reviewed by:

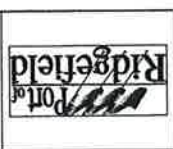
This report presents opinions formed as a result of our observation of activities relating to geotechnical engineering or environmental services. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of our representative. Our work does not include supervision or direction of the contractor, the contractor's employees or agents. Our firm is not responsible for site safety.

Signature:



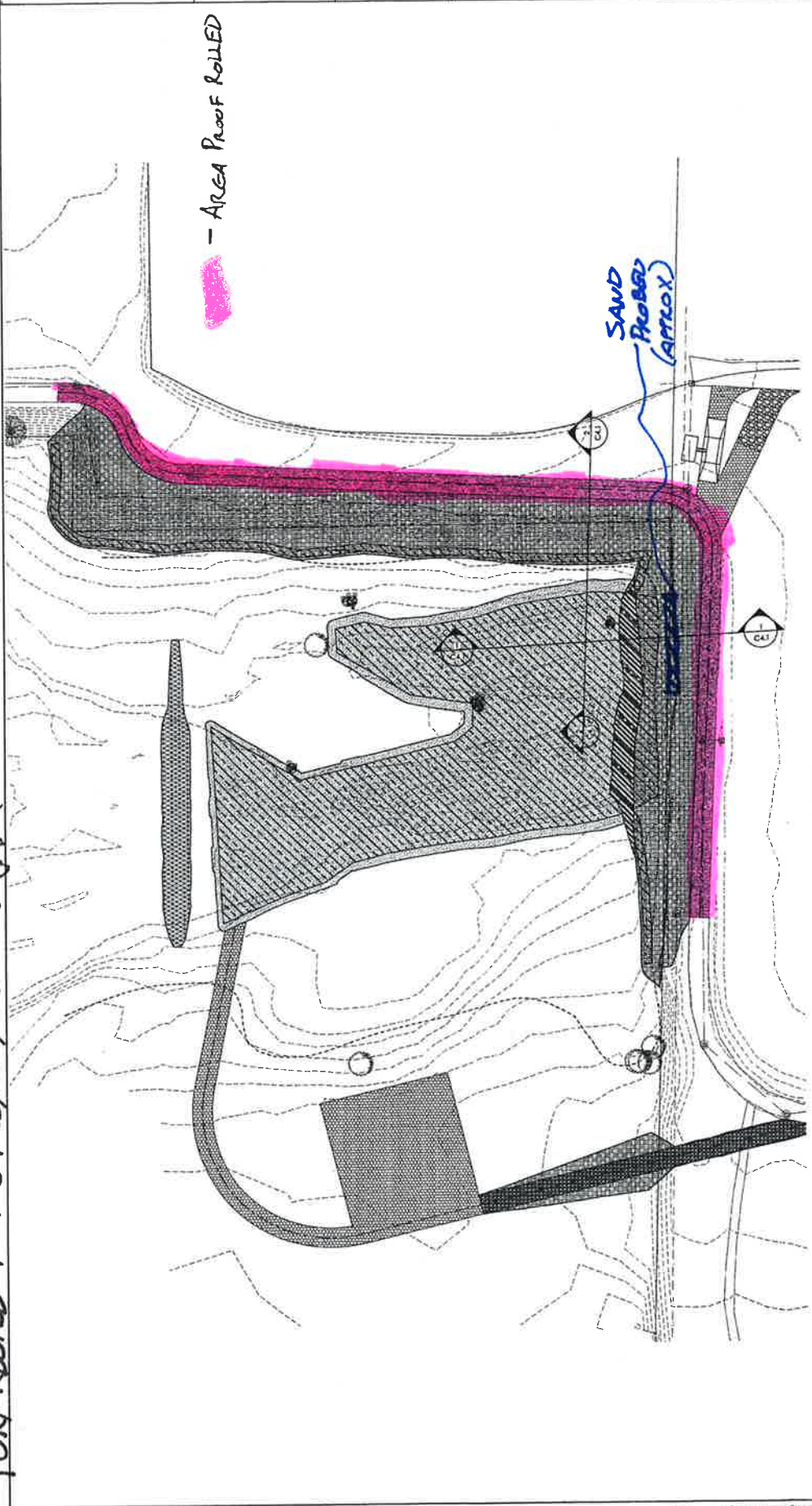
PORT RIDGEFIELD - 1-01-04 10/09/14 FR13 JAM

MAUL FOSTER ALONG
400 EAST MILL PLANN BLVD
SITE #00
VANCOUVER, WA 98660
PHONE: (360) 544-2139
WWW.MFOALONG.COM



CARTY LAKE SEDIMENT REMEDY
PORT OF RIDGEFIELD
RIDGEFIELD, WASHINGTON

NO.	DATE	DESCRIPTION
1	10/09/14	ISSUED FOR BIDDING
2	01/01/04	ISSUED FOR BIDDING
3	01/01/04	ISSUED FOR BIDDING
4	01/01/04	ISSUED FOR BIDDING
5	01/01/04	ISSUED FOR BIDDING
6	01/01/04	ISSUED FOR BIDDING
7	01/01/04	ISSUED FOR BIDDING
8	01/01/04	ISSUED FOR BIDDING
9	01/01/04	ISSUED FOR BIDDING
10	01/01/04	ISSUED FOR BIDDING



REMEDY AREA SITE PLAN LEGEND:

- EX MAJOR CONTOUR (5 INTERVAL)
- EX MINOR CONTOUR (1 INTERVAL)
- EXCAVATION PITS
- BSH MIN ROCK PLACEMENT LIMBS
- CLEAN SOIL PLACEMENT LIMBS
- BSH SAND PLACEMENT LIMBS
- W/SLAND BOUNDARY
- BOUNDARY CENTERLINE
- BR SAND
- EXCAVATION PITS
- BSH MIN ROCK
- CLEAN SOIL W/TIN
- CRUSHED SURFACING
- ASPHALT PAVING
- TRF ACCESS ROAD & EQUIPMENT STAGING AREA
- TRF ISOLATION BARRIER



BID DOCUMENTS - NOT FOR CONSTRUCTION

REMEDY AREA SITE PLAN
SHEET C40

fGDI Project:	PortRdgfld-1-01- 04	Prepared By:	Jared A Martinez
Project Name:	Miller's Landing on Ridgefield Water	Date:	10/9/14
Location:	Carty Lake	Report #:	18
Arrival:	1215	Departure:	1245
Weather:	Sunny, dry, 70's	Permit #:	
Purpose:	Observe proof roll		

I arrived on site at the request of Mike Reiter with Maul Foster & Alongi (MFA). The purpose of my visit was to observe a proof roll of the trail baserock in the area shown on the attached site plan. I met with Mike and members of Strider Construction onsite.

Upon arrival, Mike informed me that the baserock for the asphalt trail was ready for evaluation. I observed a ¾ full single axle water truck proof roll the trail baserock. I observed no deflection or rutting of the baserock underneath the weight of the vehicle throughout the proof roll.

While onsite, Mike informed me that the top wedged section of sand had been placed on the northern facing slope. I used a ½" diameter steel foundation probe to evaluate the compaction of the material. A gradual increase in pressure during probing indicated a medium dense material.

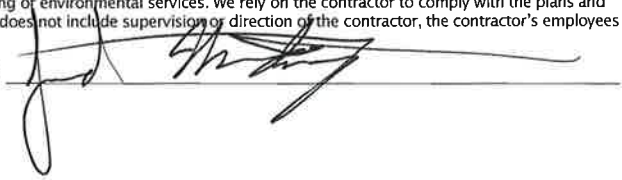
Based on our observations, it is our opinion the sand fill and baserock evaluated today has been prepared in general accordance with project specifications and our geotechnical recommendations.

Distribution:

Attachments: Site Plan (1)

Reviewed by: 

This report presents opinions formed as a result of our observation of activities relating to geotechnical engineering or environmental services. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of our representative. Our work does not include supervision or direction of the contractor, the contractor's employees or agents. Our firm is not responsible for site safety.

Signature: 

PORT RIDGEFIELD - 1-01-04 10/09/14 FR13 JAM

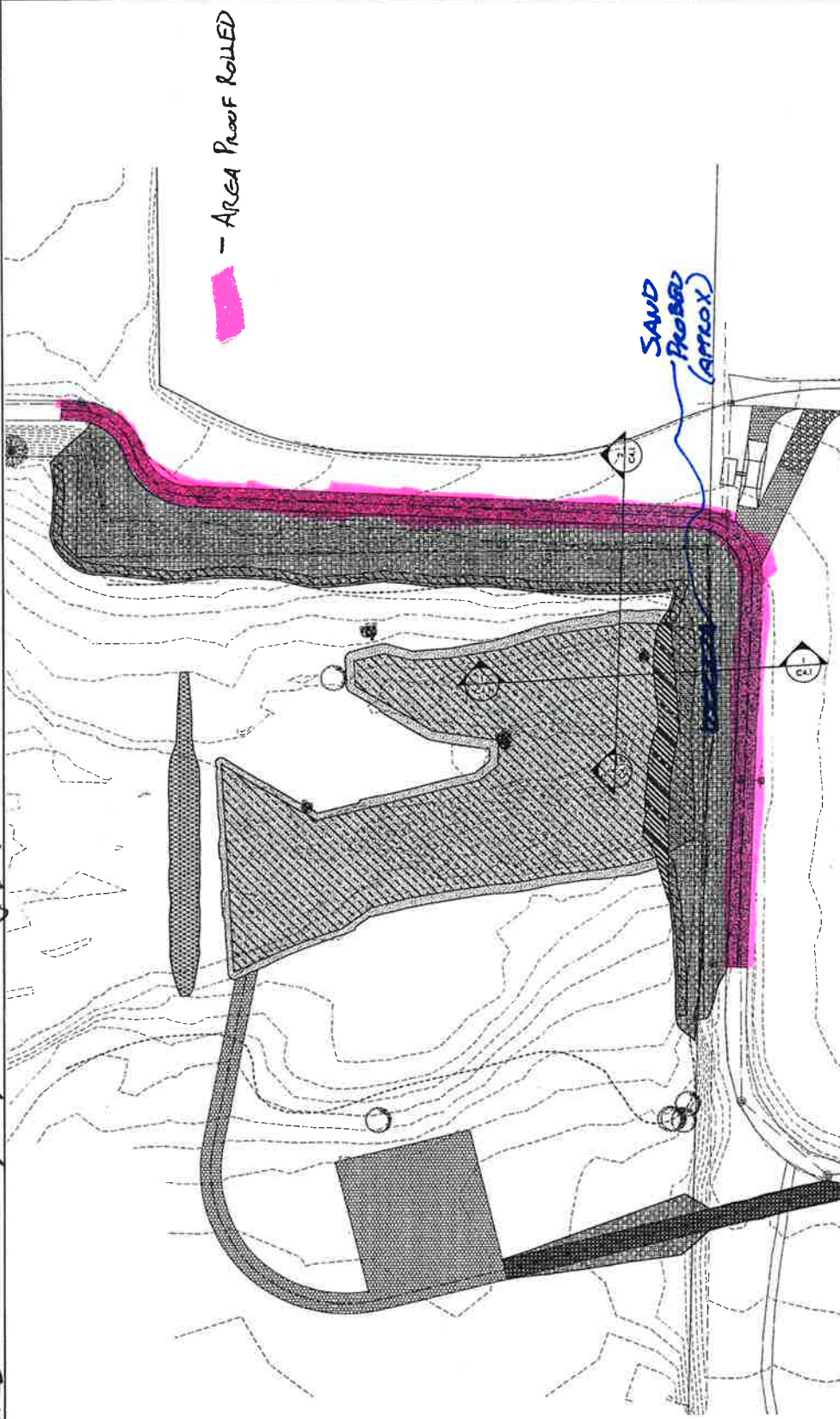
MAUL FOSTER ALONGI
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 VANCOUVER, WA 98660
 PHONE (360) 544-2139
 WWW.MFAALONGI.COM



CARTY LAKE SEDIMENT REMEDY
 PORT OF RIDGEFIELD
 RIDGEFIELD, WASHINGTON

NO.	DATE	DESCRIPTION
1		
2		
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10		

PROJECT: 200806
 DESIGNED BY: JF/DF
 CHECKED BY: JF/DF
 DRAWN BY: JF/DF
 SCALE: 1"=40'
 SHEET NO.: 1 OF 1
 SHEET TITLE: REMEDY AREA SITE PLAN



REMEDY AREA SITE PLAN LEGEND:

- EXCAVATION (1' INTERVAL)
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- EXCAVATION (99' INTERVAL)
- EXCAVATION (100' INTERVAL)



BID DOCUMENTS - NOT FOR CONSTRUCTION

C4.0

GDI Project:	PortRdgfld-1-01-04	Prepared By:	Tyler Soulek
Project Name:	Miller's Landing on Ridgefield Water	Date:	10/29/14
Location:	Carty Lake	Report #:	XX
Arrival:	0945	Departure:	0945
Weather:	Overcast, 50s	Permit #:	
Purpose:	Pavement Observations		

I arrived on site at the request of Josh Elliot with Maul Foster & Alongi (MFA). The purpose of my visit was to conduct pavement observations. While onsite, I spoke with Josh Elliot on the phone.

Upon arrival, I was informed that paving had been canceled. Josh Elliot indicated that paving will be rescheduled to a later date.

Distribution:

Attachments:

Reviewed by:



This report presents opinions formed as a result of our observation of activities relating to geotechnical engineering or environmental services. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of our representative. Our work does not include supervision or direction of the contractor, the contractor's employees or agents. Our firm is not responsible for site safety.

Signature: Tyler Soulek

Legal description: T 4N, R 1W, Sec 13, 24,
County: Clark
USGS quad: *Ridgefield, Wash.*
Project Acreage: 5.5
Acres Surveyed: n/a
Findings: +
Fieldnotes: WillametteCRA office
Curation: Burke Museum

**Archaeological Monitoring of Carty Lake Sediment
Remedy Project (NWS- 2013-1209)
Ridgefield, Washington
Technical Memorandum**

Prepared by
Matt Goodwin and Kanani Paraso

November 17, 2014

Prepared for
Maul Foster & Alongi, Inc.
Vancouver, Washington

Willamette Cultural Resources Associates, Ltd.

Portland, Oregon

WillametteCRA Report Number 12-35



TECHNICAL MEMORANDUM

Archaeological Monitoring of Carty Lake Sediment Remedy Project (NWS- 2013-1209)
Ridgefield, Washington

Prepared by:
Matt Goodwin and Kanani Paraso

November 17, 2014

Introduction

Maul Foster Alongi Inc. contracted with Willamette Cultural Resources Associates, Ltd. (WillametteCRA), to engage in archaeological monitoring of the Carty Lake Sediment Remedy Project at the Ridgefield National Wildlife Refuge in Ridgefield, Washington. The project area is located in Sections 13 and 24, Township 4 North, Range 1 West, Willamette Meridian, in Clark County, Washington (Figure 1). Carty Lake is located within the boundaries of the United States Fish and Wildlife Service's (USFWS) Ridgefield National Wildlife Refuge.

Carty Lake is located immediately north of the former location of the Pacific Wood Treatment Plant on land owned by the Port of Ridgefield (Port). The Port, in coordination with USFWS, is conducting cleanup of hazardous substances deposited into Carty Lake consistent with a Washington Department of Ecology Cleanup Action Plan. Work is permitted under the U.S. Army Corps of Engineers (USACE) Nationwide Permit 38 NWS-2013-1209 (received August 19, 2014) in consultation with USFWS. The former PWT operated a wood-treating facility from 1964 to 1993 at the Port's Lake River Industrial Site (LRIS). Operation of the facility led to deposits of hazardous substances (i.e., wood-treating-related chemicals) in nearby Lake River and Carty Lake.

The cleanup action for Carty Lake consists of mechanical excavation and a limited residuals cap in the southern portion of the lake. Prior to excavation, the southernmost portion of Carty Lake was dewatered, which involved construction of a temporary earthen dam. Upon completion of the excavation and cap placement, a berm was constructed/improved on the southern and eastern perimeter of the cleanup area. These actions required improving access to the cleanup area and development of a staging area. The locations of these actions and features are shown on Figures 2-3.

The monitoring was conducted under provisions of an Inadvertent Discovery and Archaeological Monitoring Plan developed by WillametteCRA for the Sediment Remedy Project monitoring and within the framework of USFWS ARPA Permit #13RDG002. A copy of the Inadvertent Discovery Plan is provided in Appendix B. WillametteCRA archaeologists Matt Goodwin, Kanani Paraso, and Breanne Taylor monitored construction activities from August 22, 2014, to September 29, 2014. Both prehistoric and historic cultural materials were observed, and recorded, during the course of the monitoring. WillametteCRA, in consultation with archaeologist Nick Valentine of the USFWS, determined that any potential remaining artifact-bearing sediments would be undisturbed by additional project actions and covered with clean fill sand. No further archaeological work was therefore needed.

Archaeological Background

Two previous archaeological surveys have covered the current project area. The first was conducted in 1979 by the University of Washington, which surveyed the Carty Unit of the refuge. That survey consisted only of a pedestrian survey around the southern and eastern sides of the lake and a handful of exploratory cores. The Carty Unit survey identified one archaeological site on the eastern side of the lake, 45-CL-286H. Site 45-CL-286H is an extensive scatter of historic-period debris that appears to date to the mid- to late nineteenth century. The archaeological deposits extend along the eastern edge of Carty Lake and some materials may extend into the lake itself. The site may be associated with a Carty family residence near the southeast shore of Carty Lake in the late 1800s (Abramowitz 1980:39). The site is situated over 100 m north of the current project area. In October of 2013 WillametteCRA conducted a pedestrian survey and excavated shovel probes within the Carty Lake Sediment Remedy Project area (Gilmour et al 2013). WillametteCRA surveyed 2 acres and excavated 19 shovel probes, identifying one previously unrecorded resource, a precontact lithic isolate.

A large multi-component archaeological site, 45-CL-4, also known as the Wapato Portage site, is located in close proximity to the current project on the east bank of Lake River. Excavations in and near the site have been undertaken by several researchers (Abramowitz 1980; Minor and Toepel 1985; Ross and Starkey 1975), with most work attempting to verify the site as the location of the ethnographically described village of Cathlapotle, a village visited and described by Lewis and Clark. Minor and Toepel's (1985) work was the most extensive and suggested the site consists of a series of smaller, sometimes dense, limited task sites, without house features. Relatively large-scale erosion has removed portions of the site along Lake River. Hearth features were found, with lithic debitage, tools and bone recovered from over a meter below the surface. Use began about 2,000 years ago at the downstream end and continued until the historic period in the upstream portion (Minor and Toepel 1985). Subsequent research (Ames et al. 1999) has demonstrated that Cathlapotle was located farther down Lake River from 45-CL-4 and is represented in archaeological deposits at 45-CL-1.

Given the potential for encountering additional artifacts in the excavation in Carty Lake, agencies and Tribes requested that the excavation activity be monitored by a qualified archaeologist.

Results of Construction Monitoring

WillametteCRA monitored the excavation, scraping, grubbing, and grading associated with the Carty Lake Sediment Remedy Project. Construction activity consisted of two main tasks: excavation to remove contaminated sediments from the remedy area and shape the lakebed to project design specifications (Figure 4); and the placement of clean fill material (sand) atop the newly excavated lakebed and forming a berm along the margins of the project area (see Figures 2-3). As contaminated sediments were excavated they were stockpiled at the south end of the remedy area and loaded onto dump trucks for disposal at a special landfill (Figure 5).

The construction monitoring was performed by WillametteCRA archaeologists Matt Goodwin, Kanani Paraso, and Breanne Taylor. Monitors observed all construction excavation, scraping, and grading associated with the sediment removal project, took field notes regarding the sediments observed, and photographed the excavations. Information concerning cultural material was recorded in standard field notebooks. The location of all discovered cultural material was recorded with a Trimble GPS unit and locations were also described in field notebooks and marked on construction maps. Artifacts were described, their location was recorded in a GPS unit, and all historic-period artifacts were collected and cataloged. Prehistoric artifacts, consisting solely of FCR, were left in place. Site locations are depicted in Figure 3 of this report.

The first phase of ground disturbing activity at the Carty Lake Remedy Area was the construction of the access ramp and laydown area in the northwest portion of the project area on August 22, 2014 (see Figures 2-3). WillametteCRA archaeologist Breanne Taylor was present to observe ground-disturbing activity during this portion of work, which including scraping and removing approximately 20 cm of sediment and minor grading to prepare the access ramp area and laydown areas for the placement of gravel (Figure 6). No artifacts were observed during the monitoring of access ramp and laydown area construction activity.

Excavation to remove contaminated sediments from the remedy area began on September 3, 2014, and all ground disturbing activity related to sediment removal in the remedy was completed on September 29, 2014. WillametteCRA archaeologist Matt Goodwin monitored all ground-disturbing activity from September 3 through September 19 and Kanani Paraso monitored all ground disturbing activity from September 21 through September 29.

Cultural material was identified during the first week of construction monitoring. On September 4, the WillametteCRA monitor Matt Goodwin observed historic-period artifacts during sediment removal in the northwest portion of the remedy area (Figure 7). This site, 45CL1092,

included 1 leather shoe sole, 1 complete horseshoe, 5 ironstone plate rim fragments (MNI-1), 2 milk glass cosmetic/cream jar fragments, 1 blue and white transfer-printed porcelain plate fragment, 1 white porcelain vessel base and 1 clear glass beverage bottle base. Of these, the porcelain vessel base (Figure 8) and beverage bottle base fragment provide the most informative temporal diagnostic ranges. The glass bottle base recovered has an embossed maker's mark, "F", which can be tied to several glass manufacturing companies, but is most consistent with the mark of the Fairmount Bottle and Glass Company, which operated from 1930 to 1945 (Toulouse 1971). The ceramic vessel base has a Limoges W. Guerin shield style maker's mark stamped on the base, which provides a manufacture date range between 1891 and 1932 (Cox 1970). The Washington State site record form for this site is provided in Appendix A.

Upon first observing the artifacts, Mr. Goodwin halted excavation in that portion of the remedy area and closely examined the backdirt and ground surface for further evidence of cultural material. No evidence of additional artifacts was observed and excavation was allowed to proceed.

On September 11, 2014, Mr. Goodwin observed a single historic period artifact while monitoring sediment removal in the southeast portion of the remedy area (Figure 9). The artifact, a complete aqua glass insulator, was observed near the far eastern margin of the project area and was exposed immediately below the sod layer. The insulator is a "pilgrim hat," threadless style insulator with an embossed "N.Y. & E.R.R." (Figure 10). It was manufactured for the New York and Erie Rail Road for their telegraph line in 1851 (McDougal 1990). These insulators were used in great quantities, but are regionally exclusive to the New York to Erie Railroad line. The New York and Erie Rail Road was one of the first railroad lines in the United States to coordinate train movements via telegraph. The first railroad telegraph message in the world was sent and received in Orange County in January of 1851. Unthreaded insulators of this type were produced for distribution between the 1840s and the 1870s. Most unthreaded insulators were taken out of circulation by the 1910s (National Insulator Association 2014). It is likely that this insulator was picked up from along the rail line, and brought west as a souvenir of sorts.

Upon first observing the insulator, Mr. Goodwin halted excavation in that portion of the remedy area and closely examined the backdirt and ground surface for further evidence of cultural material. No evidence of additional artifacts was observed and excavation was allowed to proceed.

WillametteCRA archaeologist Kanani Paraso identified an additional historic-period artifact in the vicinity of the glass insulator while monitoring sediment removal on September 26. The artifact, a single piece of unidentifiable whiteware tableware was observed while Mrs. Paraso was walking across the remedy to observe excavation at a different location. Due to the proximity of this artifact to the aforementioned glass insulator the two artifacts were recorded together as site 45CL1093. The Washington State site record form for this site is provided in Appendix A.

On September 26 Mrs. Paraso observed a scatter of fire-cracked rock while observing grubbing activity near the eastern margin of the remedy area. This scatter of pre-contact material, site 45CL1094, consisted of approximately 30 pieces of FCR scattered across an area approximately 5 m in diameter (Figure 11). Mrs. Paraso halted excavation in this area closely examined the backdirt and ground surface for further evidence of cultural material. No evidence of additional artifacts was observed and excavation was allowed to proceed.

On the final day of sediment removal at Carty Lake, September 29, 2014, Ms. Paraso observed a single historic-period artifact during grubbing activity. The artifact was a cobalt blue vessel glass fragment recovered just east of graded area of the work site, approximately 60 m southeast of site 45CL1092 (a historic refuse scatter), and 30 m north of site 45CL1093 (historic refuse scatter). This fragment has the word “Office” embossed on one side and is characteristic of medicinal bottles in shape and size, however its utility is unknown and the diagnostic range of cobalt glass is between the mid 1800’s and present (Society for Historical Archaeology 2014). Ms. Paraso halted excavation in this area closely examined the backdirt and ground surface for further evidence of cultural material. No evidence of additional artifacts was observed and excavation was allowed to proceed.

Conclusions and Recommendations

WillametteCRA monitored all ground-disturbing activity during the Carty Lake Sediment Remedy Project at the Ridgefield National Wildlife Refuge in Ridgefield, Washington. Monitoring was conducted by three WillametteCRA staff archaeologists over a period of approximately 6 weeks beginning August 22, 2014, and ending September 29, 2014.

During monitoring of sediment removal work at the site, WillametteCRA archaeologists recorded 3 archaeological sites and 1 isolated find within the remedy area (see Figure 2 and Appendix A). Upon initial exposure of these resources, construction activity was halted and the areas surrounding the finds were thoroughly investigated for evidence of additional resources. Additionally, notification was sent to USFWS who in turn sent notification to the appropriate Tribes, the USACE, and the DAHP. WillametteCRA, in consultation with archaeologist Nick Valentine of the USFWS, determined that any potential remaining artifact-bearing sediments at these locations would be undisturbed by additional project actions and would be covered by clean fill sand and no further archaeological work was needed. Artifacts collected by WillametteCRA during monitoring will be returned to USFWS for curation.

Should unanticipated archaeological or historical resources be encountered during any future activities at this location, all ground-disturbing activity in the vicinity of the find should be halted and USFWS and DAHP notified immediately. In the event that evidence of human skeletal remains is encountered during future work, all ground-disturbing activity in the vicinity of the discovery should be halted immediately, efforts taken to protect such evidence in place, and the State Physical

Anthropologist at the Washington DAHP, Clark County Sheriff's Office, and Clark County Coroner promptly notified to ensure compliance with RCW 27.44.040.

References Cited

Abramowitz, Alan

1980 *Cultural Resources Assessment of the Carty Unit, Ridgefield Wildlife Refuge, Clark County, Washington*. Submitted to U.S. Fish and Wildlife Service, Portland, Oregon, under contract number 14-16-0001-7917S. Office of Public Archaeology, Institute for Environmental Studies, University of Washington, Seattle.

Ames, Kenneth M., Cameron M. Smith, William L. Cornett, Elizabeth A. Sobel, Stephen C. Hamilton, John Wolf, and Doria Raetz

1999 *Archaeological Investigations at 45CL1 Cathlapotle (1991-1996), Ridgefield National Wildlife Refuge Clark County, Washington: A preliminary Report*. Submitted to U.S. Fish and Wildlife Service. Department of Anthropology Portland State University, Wapato Valley Archaeology Project Report #7, Portland, Oregon.

Cox, Warren E.

1970 *The Book of Pottery and Porcelain* Vol. 1. Crown Publishers, University of Michigan, Ann Arbor, Michigan.

McDougal, John and Carol

1990 *A History and Guide to North American Glass Pintype Insulators 1: (21-22)*. National Insulator Association.

Minor, Rick, and Kathryn Topel

1985 *Archaeological Investigations at 45-CL-4, Ridgefield National Wildlife Refuge, Ridgefield, Washington*. Submitted to U.S. Fish and Wildlife Service Portland, Oregon, under contract number FWS No. 14-16-0001-84082. Heritage Research Associates, Eugene, Oregon.

National Insulator Association (NIA)

2014 Insulator History. Electronic document, <http://www.nia.org/#tab4>, accessed October 2, 2014.

Ross, Lester A., and Judy Starkey

1975 *Archaeological Survey of Lower Lake River and Bachelor Island Slough, Clark County, Washington*. Oregon Archaeological Society. Copies available from the Department of Archaeology and Historic Preservation, Olympia, Washington.

Society for Historical Archaeology

2014 Bottle Glass/Colors. Electronic document, <http://www.sha.org/bottle/colors.htm>, accessed October 2, 2014.

Toulouse, Jillian Harrison

1971 *Bottle Makers and Their Marks*. Thomas Nelson, Inc., New York.

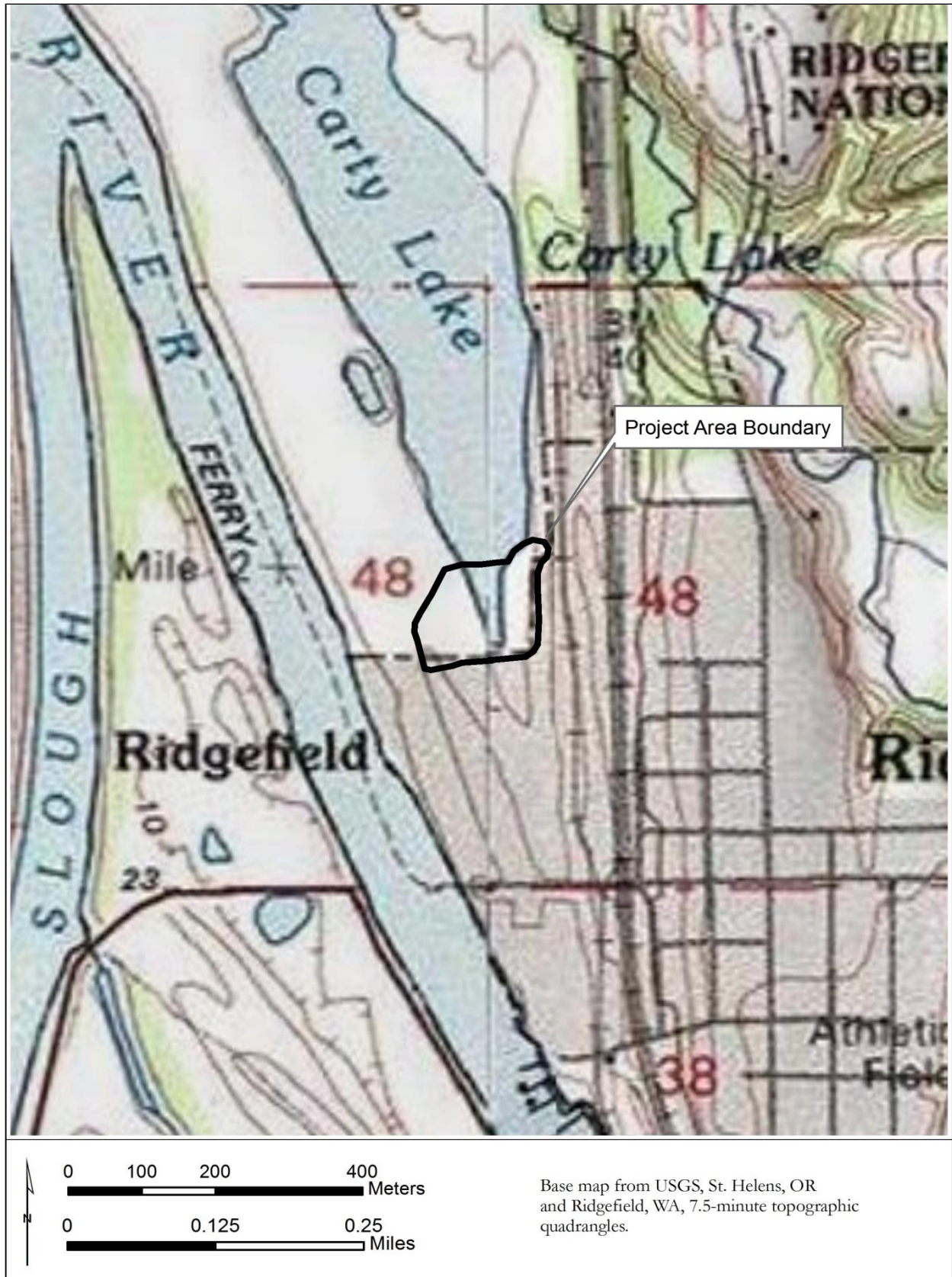


Figure 1. Carty Lake Sediment Remedy Project location map.

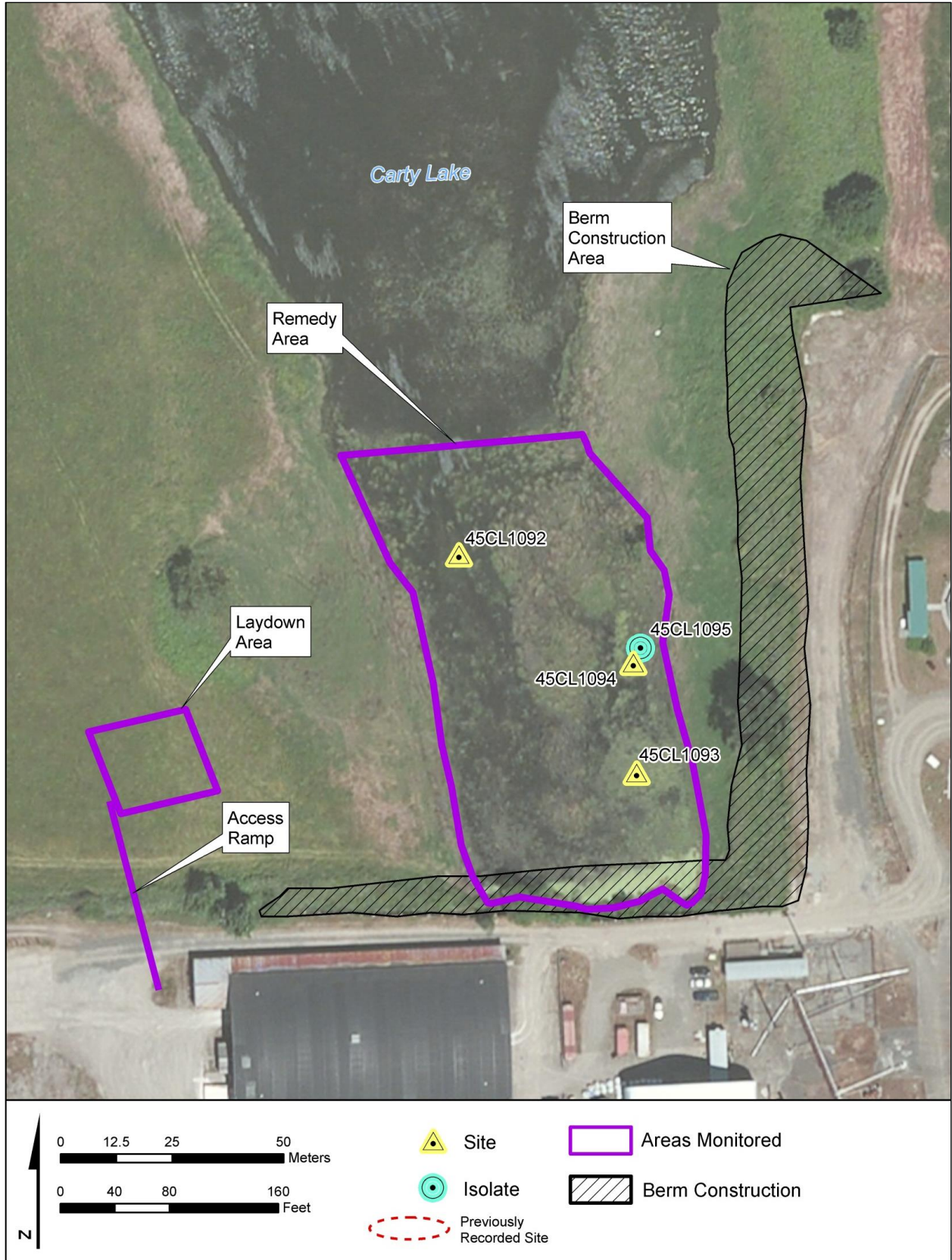


Figure 2. Configuration map depicting project elements and archaeological resources.

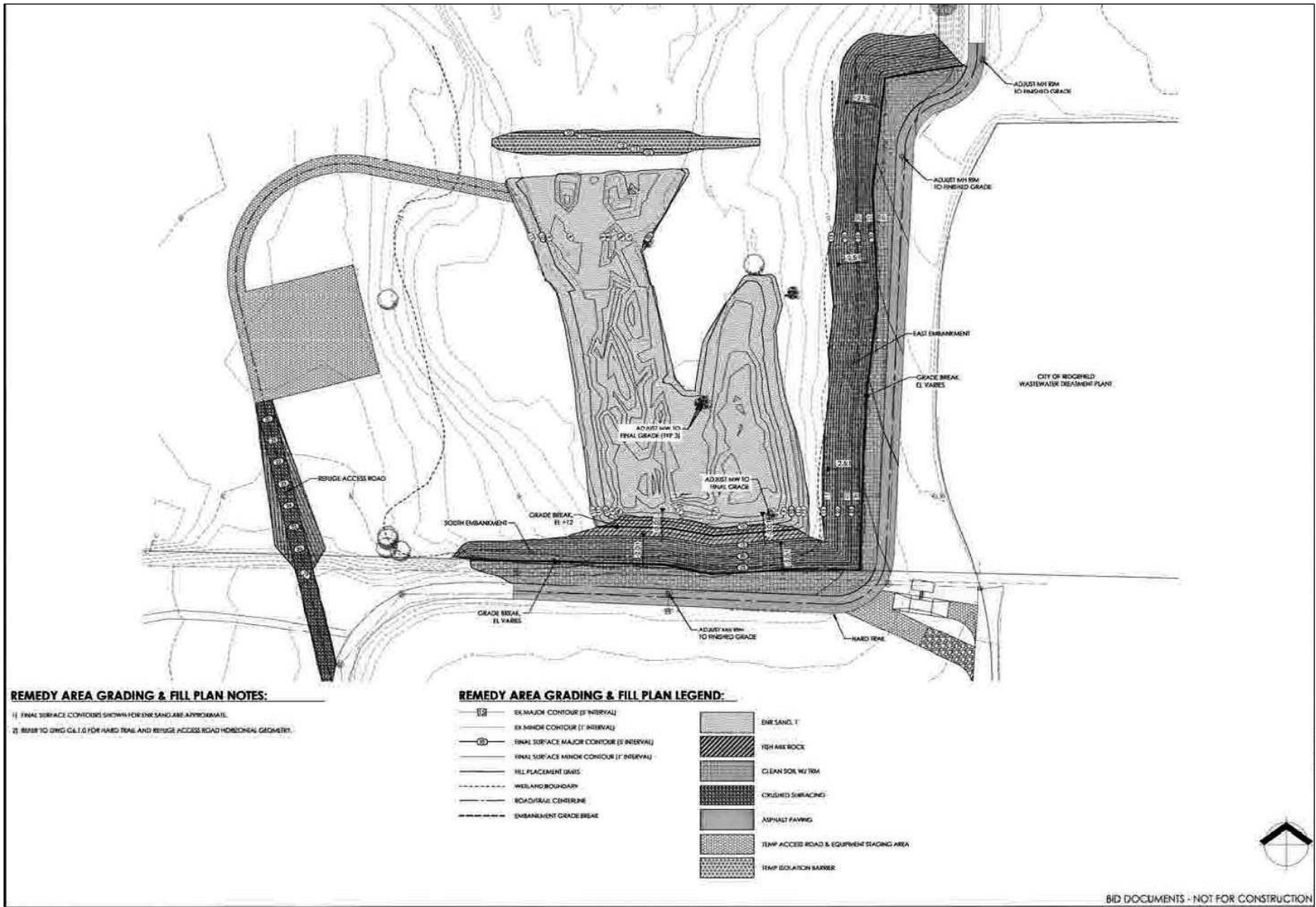


Figure 3. Construction map.



Figure 4. View of sediment removal excavation in the central portion of the remedy area on September 8, 2014, facing southeast.



Figure 5. View facing south of an excavator stockpiling sediment for removal from the site on September 12, 2014.



Figure 6. Overview of grubbing for ramp construction, facing south.



Figure 7. Location of site 45CL1092, where workers are standing, facing northeast.



Figure 8. Limoges vessel base from site 45CL1093.



Figure 9. Location of site 45CL1093, where worker is standing, facing southwest.



Figure 10. Glass insulator from site 45CL1093.



Figure 11. View of FCR scatter at site 45CL1094, facing northeast.

**Appendix A:
DAHP Site Records**



STATE OF WASHINGTON ARCHAEOLOGICAL SITE INVENTORY FORM

Smithsonian No.: 45CL1092

*County: Clark

*Date: 10/23/2014 *Compiler: Michael Daniels

Human Remains?

Location Information Restrictions (Yes/No/Unknown):

DAHP Case No.:

SITE DESIGNATION

Site Name:

Field/ Temporary ID: 12-35-1

*Site Type(s) (Refer to the DAHP Survey and Inventory Guidelines Page 19): Historic scatter

SITE LOCATION

*USGS Quad Map Name(s): Ridgefield, WA

*Legal Description: T4N R 1W Section(s): DLC 48

Quarter Section(s): NE, NE, SE

UTM: Zone 10 NAD83 Easting 519351 Northing 5074348

Latitude: Longitude: Elevation (ft/m): 0-5 ft./0-1.5 m

Other Maps: Type:

Scale: Source:

Drainage, Major: Carty Lake Drainage, Minor: Lake River River Mile: 2

Aspect: N/A Slope: N/A

*Location Description (General to Specific):

Site 12-35-1 is located west of the town of Ridgefield, WA, within the Ridgefield National Wildlife Refuge. The site is east of Lake River at the southern end of Carty Lake, a small lake near the southern boundary of the Ridgefield National Wildlife Refuge's Carty Unit.

*Directions (For Relocation Purposes):

From the intersection of Pioneer Street and Main Ave. in the town of Ridgefield, WA, drive north on N Main Ave for approximately 0.2 miles, then turn left onto Division Street. Follow Division Street westward to enter the Port of Ridgefield. Drive straight to the locked barrier at Lake River and park. Beyond the locked barrier, follow the road north until it turns east. From here, walk north

into the grassy field for approximately 40 meters (m) and then 25 m to the east. The site is on the west bank of the southern portion of Carty Lake.

SITE DESCRIPTION

***Narrative Description** (*Overall Site Observations*):

WillametteCRA identified historic site 12-35-1 while monitoring sediment removal for the Carty Lake Sediment Remedy Project. The artifacts were observed in the center of the construction work area. The site consists of 12 historic-period artifacts comprised of 1 leather shoe sole, 1 complete horseshoe, 5 ironstone plate rim fragments (MNI-1), 2 milk glass cosmetic/cream jar fragments, 1 blue and white transfer-printed porcelain plate fragment, 1 white porcelain vessel base, and 1 clear glass beverage bottle base. Of these, the porcelain vessel base and beverage bottle base fragment provide the most informative temporal diagnostic ranges. The glass bottle base recovered has an embossed maker’s mark; “F” which can be tied to several glass manufacturing companies, but is most consistent with the mark of the Fairmount Bottle and Glass Company, which operated from 1930 to 1945 (Toulouse 1971). The ceramic vessel base has a Limoges W. Guerin shield style maker’s mark stamped on the base, which provides a manufacture date range between 1891 and 1932 (Cox 1970).

***Site Dimensions** (*Overall Site Dimensions*):

***Length:** 1 m ***Direction:** n-s x ***Width:** 1 m ***Direction:** e-w

***Method of Horizontal Measurement:** GIS

***Depth:** surface *** Method of Vertical Measurement:** n/a

***Vegetation** (*On Site*): grasses, shrubs

Local: marshes, grasslands, wetland **Regional:** wetland

Landforms (*On Site*): lake, wetland

Local: wetland

Water Resources (*Type*): Carty Lake **Distance:** at south end of lake **Permanence:** perennial

CULTURAL MATERIALS AND FEATURES

***Narrative Description** *(Specific Inventory Details):*

Historic site 12-35-1 consists of a total of 12 items: 1 leather shoe sole, 1 complete horseshoe, 5 ironstone plate rim fragments (MNI-1), 2 milk glass cosmetic/cream jar fragments, 1 blue and white transfer-printed porcelain plate fragment, 1 white porcelain vessel base, and 1 clear glass beverage bottle base.

***Method of Collection:** Collected during monitoring

***Location of Artifacts** *(Temporary/Permanent):* WillametteCRA office/Artifacts will be reburied on-site following completion of the project.

SITE AGE

***Component:** Historic

***Dates** *(Overall Site Age Approximation):* 1891-1945

***Dating Method:** Historic Artifact

Phase: n/a

Basis for Phase Designation: n/a

(Only those historic sites that meet the minimum National Register (36CFR60) age threshold (50 years of age or older) will be retained as historic archaeological records and assigned Smithsonian Trinomials by DAHP.)

SITE RECORDERS

Observed by: Matt Goodwin

Address:

***Date Recorded:** 9/4/2014

***Recorded by** (*Professional Archaeologist*): Matt Goodwin

***Organization:** Willamette Cultural Resources Associates, Ltd. ***Organization Phone Number:** 503-281-4576

***Organization Address:** 623 SE Mill St., Portland, OR 97214

***Organization E-mail:** matt@willamettecra.com

Date Revisited:

Revisited By:

SITE HISTORY

***Previous Archaeological Work** (*Done at Site*):

The earliest archaeological survey of the project area was conducted in 1979 by the University of Washington's survey of the Carty Unit of the refuge. That survey consisted only of a pedestrian survey around the southern and eastern side of the lake; no subsurface probes were excavated in that area but they did excavate exploratory cores. The Carty Unit survey identified one archaeological site on the eastern side of the lake, 45CL286H. Site 45CL286H is an extensive scatter of historic-period debris that appears to date to the mid- to late nineteenth century. The archaeological deposits extend along the eastern edge of Carty Lake and some materials may extend into lake itself. The site may be associated with a Carty family residence near the southeast shore of Carty Lake in the late 1800s (Abramowitz 1980:39). The site is situated over 100 m north of the area in which the field investigations for this project were conducted.

Another nearby resource is 45CL4, known as the Wapato Portage site. Site 45CL4 is on the east bank of Lake River. Excavations in and near the site have been undertaken by several researchers (Abramowitz 1980; Minor and Toepel 1985; Ross and Starkey 1975), with most work attempting to verify the site as the location of the ethnographically described village of Cathlapotle, a village visited and described by Lewis and Clark. Minor and Toepel's work was the most extensive and suggested the site consists of a series of smaller, sometimes dense, limited task sites, without house features. Relatively large-scale erosion has removed portions of the site along Lake River. Hearth features were found, with lithic debitage, tools and bone recovered from over a meter below the surface. Use began about 2,000 years ago at the downstream end and continued until the historic period in the

upstream portion (Minor and Toepel 1985).

Although most of the proposed clean-up activity would occur approximately 80-100 m east of the eastern boundary of 45CL4 as presently defined, a proposed access ramp and staging area would be 10-20 m east of that boundary. While Abramowitz's (1980) investigation placed a series of sterile cores in between the APE for this project and Lake River, 45CL4's eastern boundary is problematic and should not be considered definitive.

WillametteCRA conducted pedestrian survey in 2013 at the southernmost end of Carty Lake and identified a single CCS flake (Gilmour et al. 2013). No other cultural resources were identified.

LAND OWNERSHIP

***Owner:** U.S. Fish and Wildlife Service

***Address:** no situs address available; Mailing address: 911 NE 11TH AVE 3W, PORTLAND OR, 97232 (Part of Ridgefield National Wildlife Refuge Complex, Mailing Address: P.O. Box 457, Ridgefield, WA, 98642, Physical Address: 28908 NW Main Avenue, Ridgefield, WA, 98642)

***Tax Lot/ Parcel No:** 68319000

RESEARCH REFERENCES

***Items/Documents Used In Research (Specify):**

Abramowitz, Alan
 1980 *Cultural Resources Assessment of the Carty Unit, Ridgefield Wildlife Refuge, Clark County, Washington*. Prepared by the Office of Public Archaeology, Institute for Environmental Studies, University of Washington, Seattle. Submitted to U.S. Fish and Wildlife Service, Sherwood, Oregon, under contract number 14-16-0001-7917S. On file, Washington DAHP, Olympia.

Cox, Warren E.
 1970 *The Book of Pottery and Porcelain Vol. 1*. Crown Publishers, University of Michigan, Ann Arbor, Michigan.

Gilmour, Daniel M., Caitlin A. Wichlacz, Michael A. Daniels, and David V. Ellis
 2013 *Cultural Resources Survey Report for the Proposed Pacific Wood Treatment Plant Remediation Project, Clark County, Washington*. Submitted to the Port of Ridgefield, Ridgefield, Washington and U.S. Fish and Wildlife Service, Sherwood, Oregon. Willamette Cultural Resources Associates, Ltd., Portland, Oregon.

Minor, Rick, and Kathryn Toepel

1985 *Archaeological Investigations at 45-CL-4, Ridgefield National Wildlife Refuge, Ridgefield, Washington*. Heritage Research Associates Report No. 37. Submitted to U.S. Fish and Wildlife Service, Sherwood, Oregon, under contract number FWS No. 14-16-0001-84082. On file, Washington DAHP, Olympia.

Toulouse, Jillian Harrison

1971 *Bottle Makers and Their Marks*. Ed. Book. Thomas Nelson, Inc., New York.

Ross, Lester A., and Judy Starkey

1975 *Archaeological Survey of Lower Lake River and Bachelor Island Slough, Clark County, Washington*. Oregon Archaeological Society. Copies available from the Department of Archaeology and Historic Preservation, Olympia, WA.

USGS MAP

*Quad Name(s): Ridgefield, WA

*Series: 7.5-minute

*Date(s): 2014

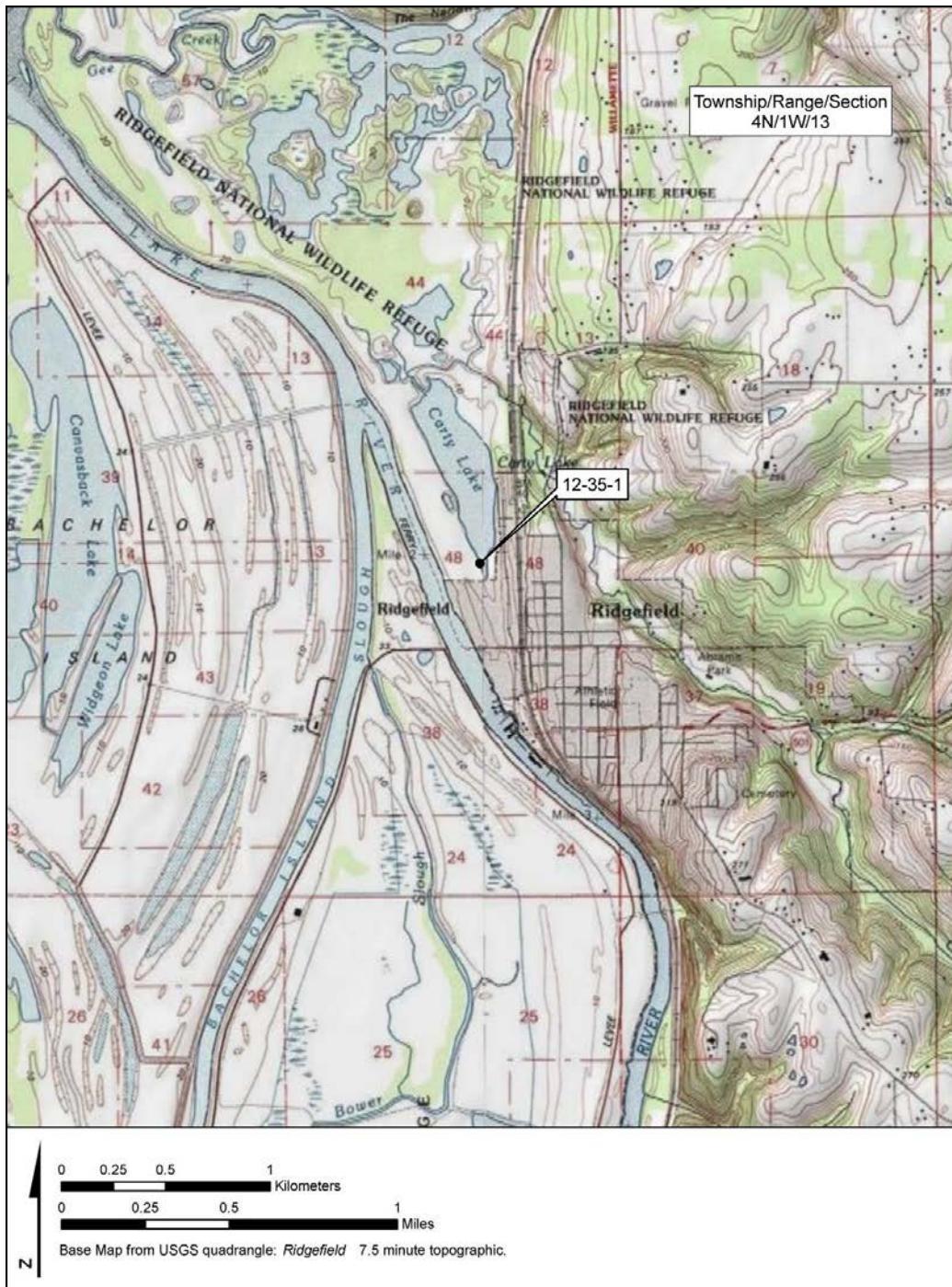


Figure 1. Site location map.

SKETCH MAP

***Sketch Map Description:**

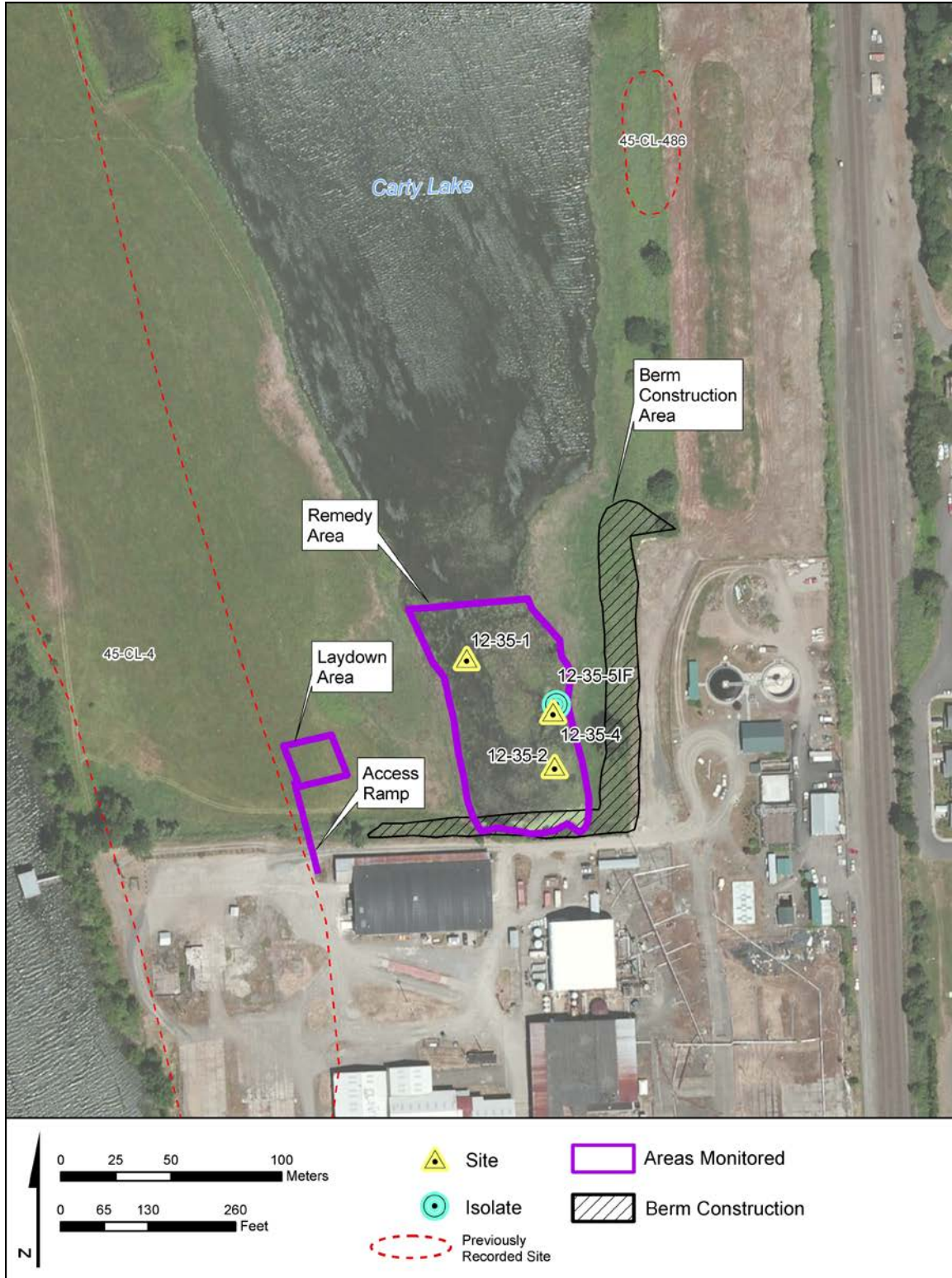


Figure 2. Project configuration map.

PHOTOGRAPH(S)

***Photograph Description(s)** *(Include a representative sample of inventoried archaeological material and features, site location overviews, etc):*



Photo 1. View of porcelain vessel base from 12-35-1.



Photo 2. Overview of area where 12-35-1 was identified, facing northeast.



Photo 3. Overview of site location, facing north. Carty Lake in background.

CONTINUATION/ ADDENDUM SHEET

*Label all additional pages by corresponding headings.
(e.g. Site Description, Site History, Research References)*



STATE OF WASHINGTON ARCHAEOLOGICAL SITE INVENTORY FORM

Smithsonian No.: 45CL1093

*County: Clark

*Date: 10/23/2014 *Compiler: Michael Daniels

Human Remains?

Location Information Restrictions (Yes/No/Unknown):

DAHP Case No.:

SITE DESIGNATION

Site Name:

Field/ Temporary ID: 12-35-2

*Site Type(s) (Refer to the DAHP Survey and Inventory Guidelines Page 19): Historic scatter

SITE LOCATION

*USGS Quad Map Name(s): Ridgefield, WA

*Legal Description: T4N R 1W Section(s): DLC 48

Quarter Section(s): NE, NE, SE

UTM: Zone 10 NAD83 Easting 519358 Northing 5074301

Latitude: Longitude: Elevation (ft/m): 0-5 ft./0-1.5 m

Other Maps: Type:

Scale: Source:

Drainage, Major: Carty Lake Drainage, Minor: Lake River River Mile: 2

Aspect: N/A Slope: N/A

*Location Description (General to Specific):

Site 12-35-2 is located west of the town of Ridgefield, WA, within the Ridgefield National Wildlife Refuge. The site is east of Lake River at the southern end of Carty Lake, a small lake near the southern boundary of the Ridgefield National Wildlife Refuge's Carty Unit.

*Directions (For Relocation Purposes):

From the intersection of Pioneer Street and Main Ave. in the town of Ridgefield, WA, drive north on N Main Ave for approximately 0.2 miles, then turn left onto Division Street. Follow Division Street westward to enter the Port of Ridgefield. Drive straight to the locked barrier at Lake River and park. Beyond the locked barrier, follow the road north until it turns east. From here, walk north

into the grassy field for approximately 40 meters (m) and then 50 m to the east. The site is approximately 20 m west of the eastern retaining wall at the southern end of Carty Lake.

SITE DESCRIPTION

***Narrative Description** *(Overall Site Observations):*

WillametteCRA identified this historic site while monitoring the Carty Lake Sediment Remedy Project during grubbing activities (clearing of vegetation). Site 12-35-2 was identified in the southeast quadrant of the project area, approximately 215 feet southeast of 12-35-1. It consists of two items, one piece of unidentifiable whiteware tableware and one complete aqua glass insulator. The insulator is a “pilgrim hat,” threadless style insulator with an embossed “N.Y. & E.R.R.” It was manufactured by the New York and Erie Rail Road for their telegraph line in 1851 (McDougald and McDougald 1990). These insulators were used in great quantities, but are regionally exclusive to the New York to Erie Railroad line. The New York and Erie Rail Road was one of the first railroad lines in the United States to coordinate train movements via telegraph. The first railroad telegraph message in the world was sent and received in Orange County in January of 1851. Unthreaded insulators of this type were produced for distribution between the 1840s and the 1870s. Most unthreaded insulators were taken out of circulation by the 1910’s (NIA 2014). It is likely that this insulator was picked up from along the rail line, and brought west as a souvenir of sorts.

***Site Dimensions** *(Overall Site Dimensions):*

***Length:** 1 m ***Direction:** n-s x ***Width:** 1 m ***Direction:** e-w

***Method of Horizontal Measurement:** GIS

***Depth:** surface *** Method of Vertical Measurement:** n/a

***Vegetation** *(On Site):* grasses, shrubs

Local: marshes, grasslands, wetland **Regional:** wetland

Landforms *(On Site):* lake, wetland

Local: wetland

Water Resources *(Type):* Carty Lake **Distance:** at south end of lake **Permanence:** perennial

CULTURAL MATERIALS AND FEATURES

***Narrative Description** *(Specific Inventory Details):*

Historic site 12-35-2 consists of two items, one piece of unidentifiable whiteware tableware and one complete aqua glass insulator.

***Method of Collection:** Collected during monitoring

***Location of Artifacts** *(Temporary/Permanent):* WillametteCRA office/Artifacts will be reburied on-site following completion of the project.

SITE AGE

***Component:** Historic ***Dates** *(Overall Site Age Approximation):* 1840s-1910

***Dating Method:** Historic Artifact **Phase:** n/a **Basis for Phase Designation:** n/a

(Only those historic sites that meet the minimum National Register (36CFR60) age threshold (50 years of age or older) will be retained as historic archaeological records and assigned Smithsonian Trinomials by DAHP.)

SITE RECORDERS

Observed by: Matt Goodwin and Kanani Paraso

Address:

***Date Recorded:** 9/26/2014

***Recorded by** (*Professional Archaeologist*): Matt Goodwin

***Organization:** Willamette Cultural Resources Associates, Ltd. ***Organization Phone Number:** 503-281-4576

***Organization Address:** 623 SE Mill St., Portland, OR 97214

***Organization E-mail:** matt@willamettecra.com

Date Revisited:

Revisited By:

SITE HISTORY

***Previous Archaeological Work** (*Done at Site*):

The earliest archaeological survey of the project area was conducted in 1979 by the University of Washington's survey of the Carty Unit of the refuge. That survey consisted only of a pedestrian survey around the southern and eastern side of the lake; no subsurface probes were excavated in that area but they did excavate exploratory cores. The Carty Unit survey identified one archaeological site on the eastern side of the lake, 45CL286H. Site 45CL286H is an extensive scatter of historic-period debris that appears to date to the mid- to late nineteenth century. The archaeological deposits extend along the eastern edge of Carty Lake and some materials may extend into lake itself. The site may be associated with a Carty family residence near the southeast shore of Carty Lake in the late 1800s (Abramowitz 1980:39). The site is situated over 100 m north of the area in which the field investigations for this project were conducted.

Another nearby resource is 45CL4, known as the Wapato Portage site. Site 45CL4 is on the east bank of Lake River. Excavations in and near the site have been undertaken by several researchers (Abramowitz 1980; Minor and Toepel 1985; Ross and Starkey 1975), with most work attempting to verify the site as the location of the ethnographically described village of Cathlapotle, a village visited and described by Lewis and Clark. Minor and Toepel's work was the most extensive and suggested the site consists of a series of smaller, sometimes dense, limited task sites, without house features. Relatively large-scale erosion has removed portions of the site along Lake River. Hearth features were found, with lithic debitage, tools and bone recovered from over a meter below the surface. Use began about 2,000 years ago at the downstream end and continued until the historic period in the

upstream portion (Minor and Toepel 1985).

Although most of the proposed clean-up activity would occur approximately 80-100 m east of the eastern boundary of 45CL4 as presently defined, a proposed access ramp and staging area would be 10-20 m east of that boundary. While Abramowitz's (1980) investigation placed a series of sterile cores in between the APE for this project and Lake River, 45CL4's eastern boundary is problematic and should not be considered definitive.

WillametteCRA conducted pedestrian survey in 2013 at the southernmost end of Carty Lake and identified a single CCS flake (Gilmour et al. 2013). No other cultural resources were identified.

LAND OWNERSHIP

***Owner:** U.S. Fish and Wildlife Service

***Address:** no situs address available; Mailing address: 911 NE 11TH AVE 3W, PORTLAND OR, 97232 (Part of Ridgefield National Wildlife Refuge Complex, Mailing Address: P.O. Box 457, Ridgefield, WA, 98642, Physical Address: 28908 NW Main Avenue, Ridgefield, WA, 98642)

***Tax Lot/ Parcel No:** 68319000

RESEARCH REFERENCES

***Items/Documents Used In Research (Specify):**

Abramowitz, Alan
 1980 *Cultural Resources Assessment of the Carty Unit, Ridgefield Wildlife Refuge, Clark County, Washington*. Prepared by the Office of Public Archaeology, Institute for Environmental Studies, University of Washington, Seattle. Submitted to U.S. Fish and Wildlife Service, Sherwood, Oregon, under contract number 14-16-0001-7917S. On file, Washington DAHP, Olympia.

Gilmour, Daniel M., Caitlin A. Wichlacz, Michael A. Daniels, and David V. Ellis
 2013 *Cultural Resources Survey Report for the Proposed Pacific Wood Treatment Plant Remediation Project, Clark County, Washington*. Submitted to the Port of Ridgefield, Ridgefield, Washington and U.S. Fish and Wildlife Service, Sherwood, Oregon. Willamette Cultural Resources Associates, Ltd., Portland, Oregon.

McDougald, John and Carol McDougald
 1990 *A History and Guide to North American Glass Pintype Insulators*. Volume 1. National Insulator Association.

Minor, Rick, and Kathryn Toepel

1985 *Archaeological Investigations at 45-CL-4, Ridgefield National Wildlife Refuge, Ridgefield, Washington*. Heritage Research Associates Report No. 37. Submitted to U.S. Fish and Wildlife Service, Sherwood, Oregon, under contract number FWS No. 14-16-0001-84082. On file, Washington DAHP, Olympia.

National Insulator Association (NIA)

2014 Insulator History. Electronic document, <http://www.nia.org/#tab4>, accessed October 2, 2014.

Ross, Lester A. and Judy Starkey

1975 *Archaeological Survey of Lower Lake River and Bachelor Island Slough, Clark County, Washington*. Oregon Archaeological Society. Copies available from the Washington DAHP, Olympia.

USGS MAP

*Quad Name(s): Ridgefield, WA

*Series: 7.5-minute

*Date(s): 2014

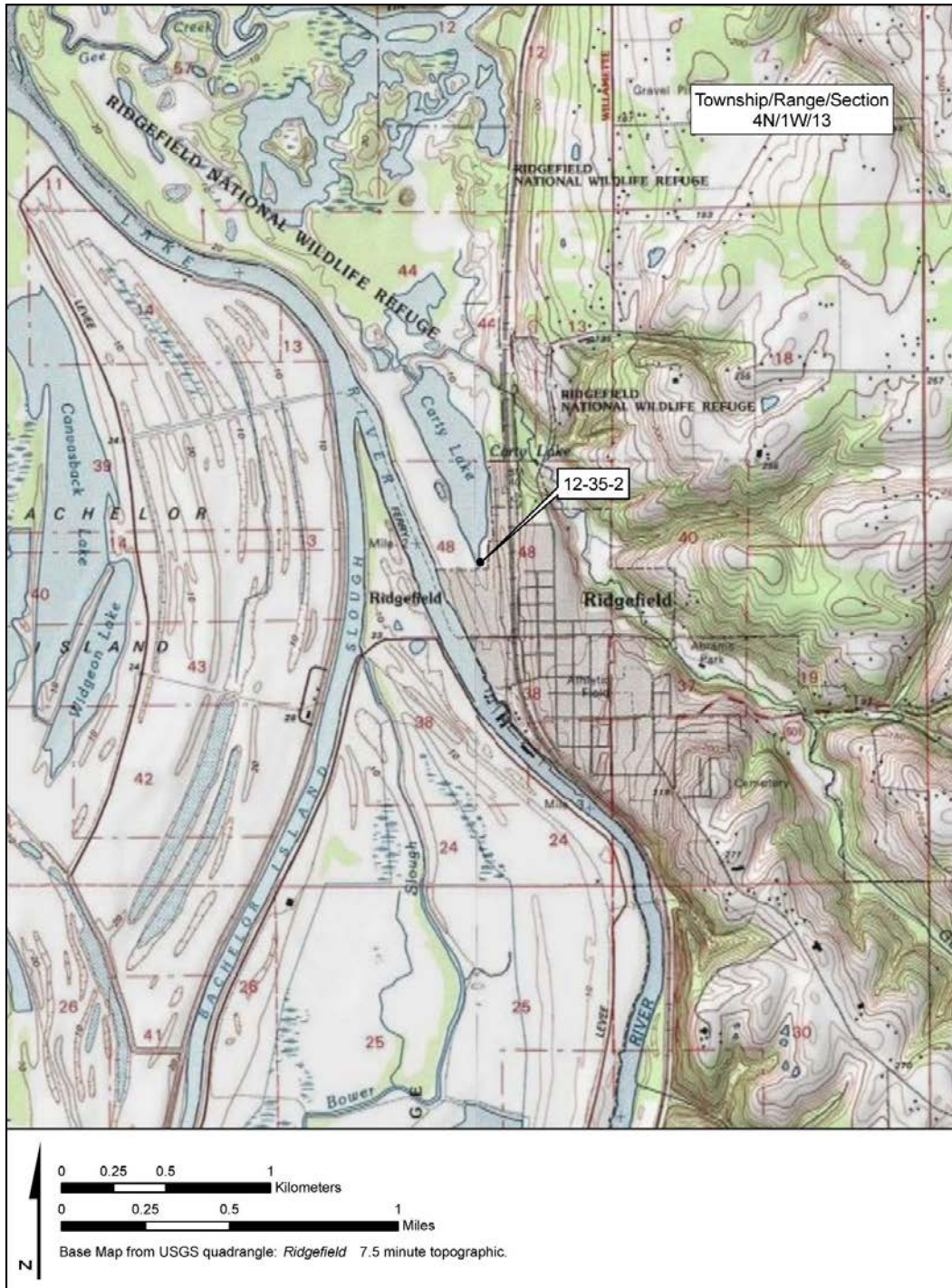


Figure 1. Site location map.

SKETCH MAP

***Sketch Map Description:**

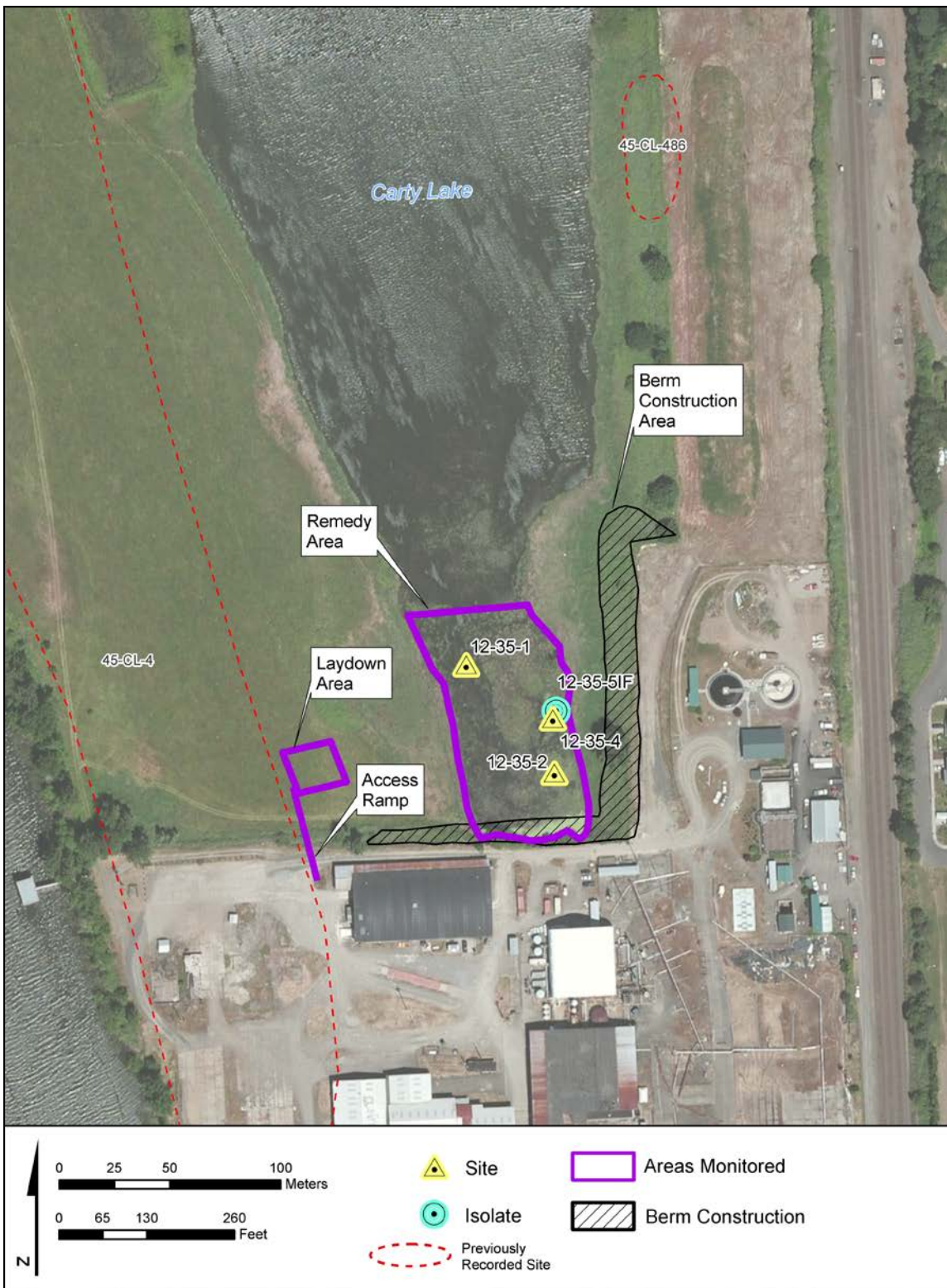


Figure 2. Project configuration map.

PHOTOGRAPH(S)

***Photograph Description(s)** *(Include a representative sample of inventoried archaeological material and features, site location overviews, etc):*



Photo 1. View of insulator collected from site 12-35-2.



Photo 2. Overview of area where 12-35-2 was identified, facing northwest.

CONTINUATION/ ADDENDUM SHEET

*Label all additional pages by corresponding headings.
(e.g. Site Description, Site History, Research References)*



STATE OF WASHINGTON ARCHAEOLOGICAL SITE INVENTORY FORM

Smithsonian No.: 45CL1094

*County: Clark

*Date: 10/23/2014 *Compiler: Michael Daniels

Human Remains?

Location Information Restrictions (Yes/No/Unknown):

DAHP Case No.:

SITE DESIGNATION

Site Name:

Field/ Temporary ID: 12-35-4

*Site Type(s) (Refer to the DAHP Survey and Inventory Guidelines Page 19): Precontact Lithic Material

SITE LOCATION

*USGS Quad Map Name(s): Ridgefield, WA

*Legal Description: T4N R 1W E/W: Section(s): DLC 48

Quarter Section(s): NE, NE, SE

UTM: Zone 10 NAD83 Easting 519356 Northing 5074324

Latitude: Longitude: Elevation (ft/m): 0-5 ft./0-1.5 m

Other Maps: Type:

Scale: Source:

Drainage, Major: Carty Lake Drainage, Minor: Lake River River Mile: 2

Aspect: N/A Slope: N/A

*Location Description (General to Specific):

Site 12-35-4 is located west of the town of Ridgefield, WA, within the Ridgefield National Wildlife Refuge. The site is east of Lake River at the southern end of Carty Lake, a small lake near the southern boundary of the Ridgefield National Wildlife Refuge's Carty Unit.

*Directions (For Relocation Purposes):

From the intersection of Pioneer Street and Main Ave. in the town of Ridgefield, WA, drive north on N Main Ave for approximately 0.2 miles, then turn left onto Division Street. Follow Division Street westward to enter the Port of Ridgefield. Drive straight to the locked barrier at Lake River

and park. Beyond the locked barrier, follow the road north until it turns east. From here, walk north into the grassy field for approximately 40 meters (m) and then 50 m to the east. The site is approximately 20 m west of the eastern retaining wall at the southern end of Carty Lake.

SITE DESCRIPTION

***Narrative Description** (*Overall Site Observations*):

WillametteCRA identified this precontact site while monitoring the Carty Lake Sediment Remedy Project. A small scatter of fire-cracked rock was exposed during grubbing activities (clearing of vegetation). No other precontact artifacts were observed in the scatter (i.e., lithic tools or debitage), however, one historic site (12-35-2) and one historic isolate (12-35-5IF) were identified in the same vicinity. No further grubbing or disturbance occurred at that location.

***Site Dimensions** (*Overall Site Dimensions*):

***Length:** 5 m ***Direction:** n-s x ***Width:** 5 m ***Direction:** e-w

***Method of Horizontal Measurement:** GIS

***Depth:** surface *** Method of Vertical Measurement:** n/a

***Vegetation** (*On Site*): grasses, shrubs

Local: marshes, grasslands, wetland **Regional:** wetland

Landforms (*On Site*): lake, wetland

Local: wetland

Water Resources (*Type*): Carty Lake **Distance:** at south end of lake **Permanence:** perennial

CULTURAL MATERIALS AND FEATURES

***Narrative Description** (*Specific Inventory Details*):

A WillametteCRA archaeological monitor observed a small scatter of fire-cracked rock (FCR) while observing grubbing activity near the eastern margin of the remedy area. This scatter of precontact material, recorded as site 12-35-4, consisted of approximately 30 pieces of FCR scattered across an area approximately 5 m in diameter. About half of the FCR exhibited reddening. The scatter does not appear to represent a hearth feature as there was no defined boundary, no burned earth, charcoal, or faunal material present. No further grubbing or disturbance occurred at that location.

***Method of Collection:** No collection

***Location of Artifacts** (*Temporary/Permanent*): n/a

SITE AGE

***Component:** Precontact ***Dates** (*Overall Site Age Approximation*): Precontact

***Dating Method:** n/a **Phase:** n/a **Basis for Phase Designation:** n/a

(Only those historic sites that meet the minimum National Register (36CFR60) age threshold (50 years of age or older) will be retained as historic archaeological records and assigned Smithsonian Trinomials by DAHP.)

SITE RECORDERS

Observed by: Kanani Paraso**Address:*****Date Recorded:** 9/26/2014***Recorded by** (*Professional Archaeologist*): Kanani Paraso***Organization:** Willamette Cultural Resources Associates, Ltd.***Organization Phone Number:** 503-281-4576***Organization Address:** 623 SE Mill St., Portland, OR 97214***Organization E-mail:** kanani@willamettecra.com**Date Revisited:****Revisited By:**

SITE HISTORY

***Previous Archaeological Work** (*Done at Site*):

The earliest archaeological survey of the project area was conducted in 1979 by the University of Washington's survey of the Carty Unit of the refuge. That survey consisted only of a pedestrian survey around the southern and eastern side of the lake; no subsurface probes were excavated in that area but they did excavate exploratory cores. The Carty Unit survey identified one archaeological site on the eastern side of the lake, 45CL286H. Site 45CL286H is an extensive scatter of historic-period debris that appears to date to the mid- to late nineteenth century. The archaeological deposits extend along the eastern edge of Carty Lake and some materials may extend into lake itself. The site may be associated with a Carty family residence near the southeast shore of Carty Lake in the late 1800s (Abramowitz 1980:39). The site is situated over 100 m north of the area in which the field investigations for this project were conducted.

The other nearby site is 45CL4, known as the Wapato Portage site. Site 45CL4 is on the east bank of Lake River. Excavations in and near the site have been undertaken by several researchers (Abramowitz 1980; Minor and Toepel 1985; Ross and Starkey 1975), with most work attempting to verify the site as the location of the ethnographically described village of Cathlapotle, a village visited and described by Lewis and Clark. Minor and Toepel's work was the most extensive and suggested the site consists of a series of smaller, sometimes dense, limited task sites, without house features. Relatively large-scale erosion has removed portions of the site along Lake River. Hearth features were found, with lithic debitage, tools and bone recovered from over a meter below the surface. Use began about 2,000 years ago at the downstream end and continued until the historic period in the

upstream portion (Minor and Toepel 1985).

Although most of the proposed clean-up activity would occur approximately 80-100 m east of the eastern boundary of 45CL4 as presently defined, a proposed access ramp and staging area would be 10-20 m east of that boundary. While Abramowitz's (1980) investigation placed a series of sterile cores in between the APE for this project and Lake River, 45CL4's eastern boundary is problematic and should not be considered definitive.

WillametteCRA conducted pedestrian survey in 2013 at the southernmost end of Carty Lake and identified a single CCS flake (Gilmour et al. 2013). No other cultural resources were identified.

LAND OWNERSHIP

***Owner:** U.S. Fish and Wildlife Service

***Address:** no situs address available; Mailing address: 911 NE 11TH AVE 3W, PORTLAND OR, 97232 (Part of Ridgefield National Wildlife Refuge Complex, Mailing Address: P.O. Box 457, Ridgefield, WA, 98642, Physical Address: 28908 NW Main Avenue, Ridgefield, WA, 98642)

***Tax Lot/ Parcel No:** 68319000

RESEARCH REFERENCES

***Items/Documents Used In Research (Specify):**

Abramowitz, Alan

1980 *Cultural Resources Assessment of the Carty Unit, Ridgefield Wildlife Refuge, Clark County, Washington*. Prepared by the Office of Public Archaeology, Institute for Environmental Studies, University of Washington, Seattle. Submitted to U.S. Fish and Wildlife Service, Sherwood, Oregon, under contract number 14-16-0001-7917S. On file, Washington DAHP, Olympia.

Gilmour, Daniel M., Caitlin A. Wichlacz, Michael A. Daniels, and David V. Ellis

2013 *Cultural Resources Survey Report for the Proposed Pacific Wood Treatment Plant Remediation Project, Clark County, Washington*. Submitted to the Port of Ridgefield, Ridgefield, Washington and U.S. Fish and Wildlife Service, Sherwood, Oregon. Willamette Cultural Resources Associates, Ltd., Portland, Oregon.

Minor, Rick, and Kathryn Toepel

1985 *Archaeological Investigations at 45-CL-4, Ridgefield National Wildlife Refuge, Ridgefield, Washington*. Heritage Research Associates Report No. 37. Submitted to U.S. Fish and Wildlife Service, Sherwood, Oregon, under contract number FWS No. 14-16-0001-84082. On file, Washington DAHP, Olympia.

Ross, Lester A. and Judy Starkey
1975 Archaeological Survey of Lower Lake River and Bachelor Island Slough, Clark County, Washington. Oregon Archaeological Society. Copies available from the Washington DAHP, Olympia.

USGS MAP

*Quad Name(s): Ridgefield, WA

*Series: 7.5-minute

*Date(s): 2014

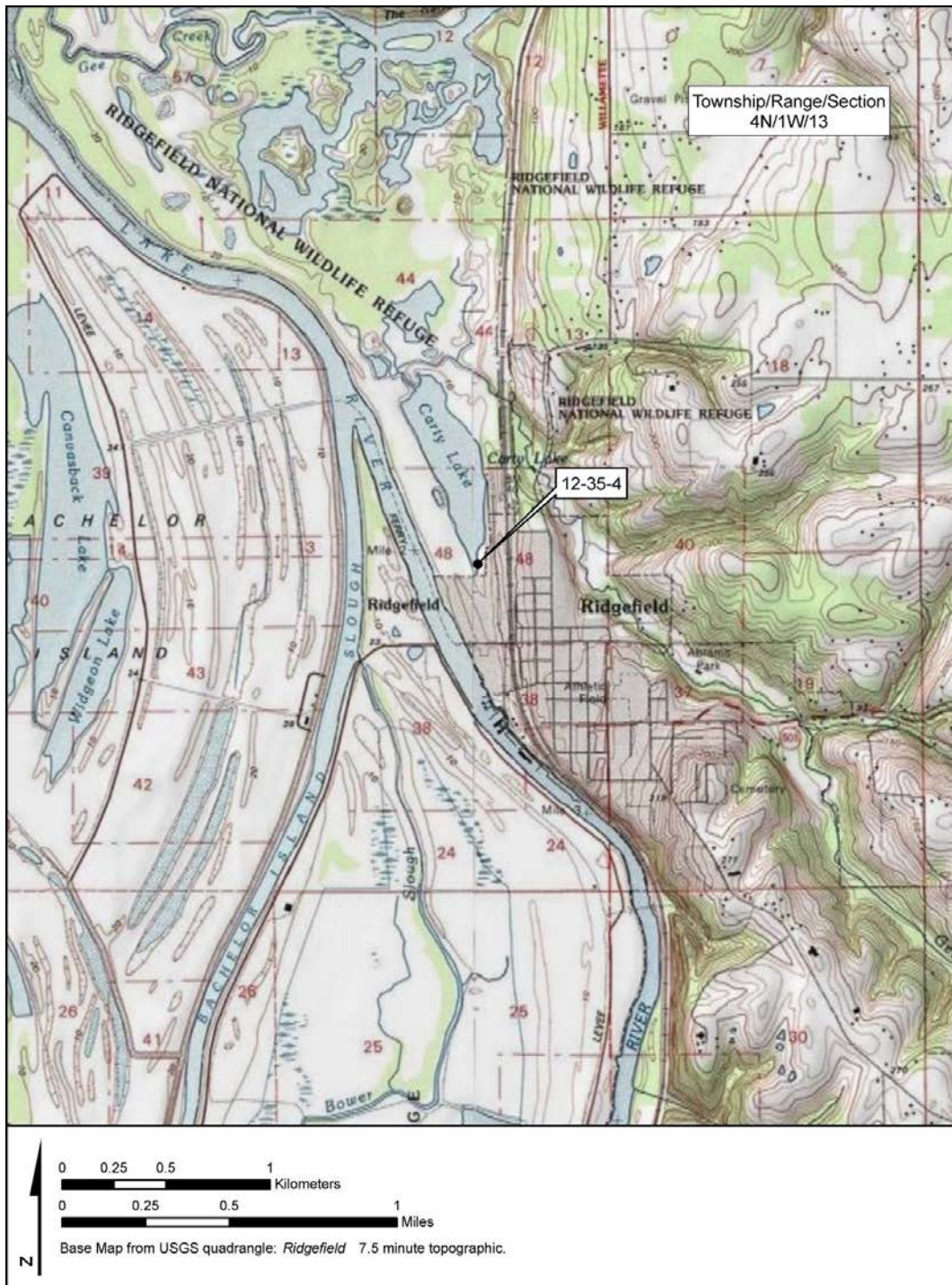


Figure 1. Site location map.

SKETCH MAP

***Sketch Map Description:**

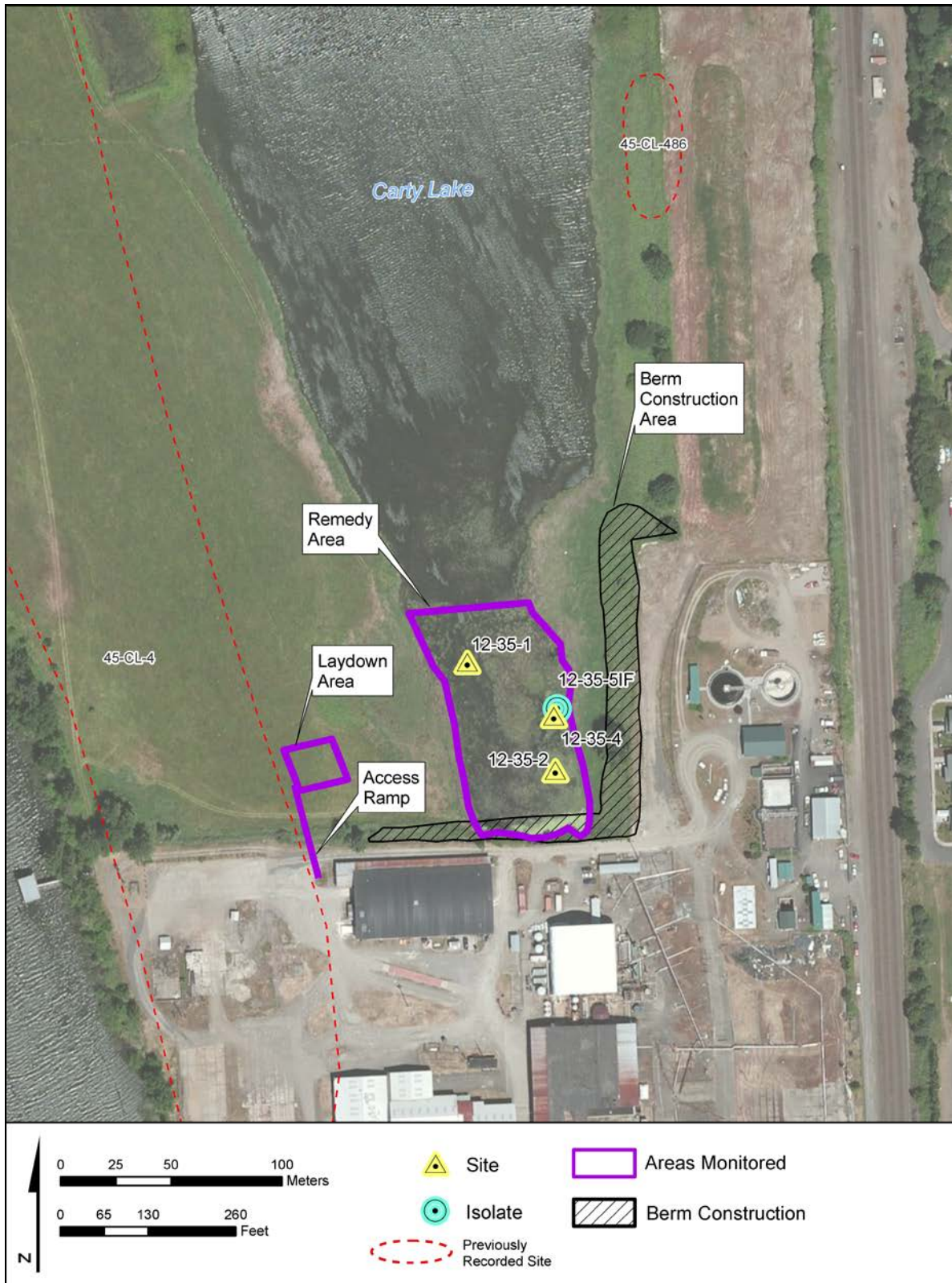


Figure 2. Project configuration map.

PHOTOGRAPH(S)

***Photograph Description(s)** *(Include a representative sample of inventoried archaeological material and features, site location overviews, etc):*



Photo 1. Overview of FCR at 12-35-4.



Photo 2. Overview of area where 12-35-4 was identified, facing northwest.

CONTINUATION/ ADDENDUM SHEET

*Label all additional pages by corresponding headings.
(e.g. Site Description, Site History, Research References)*



STATE OF WASHINGTON

ARCHAEOLOGICAL ISOLATE INVENTORY FORM

Smithsonian No.: 45CL1095

*County: Clark

*Date: 10/23/2014

*Compiler: Michael Daniels

Human Remains?

DAHP Case No.:

ISOLATE DESIGNATION

Isolate Name:

Field/ Temporary ID: 12-35-5IF

*Site Type (Refer to the DAHP Survey and Inventory Guidelines Pages 19-23): Historic Object

ISOLATE LOCATION

*USGS Quad Map Name: Ridgefield, WA

*Legal Description: T4N R 1W Section(s): DLC 48

Quarter Section(s): NE, NE, SE

*UTM: Zone 10 NAD83 Easting 519359 Northing 5074328

Latitude: Longitude: Elevation (FT/M): 0-5 ft./0-1.5 m

Other Maps: Type:

Scale: Source:

Drainage, Major: Carty Lake Drainage, Minor: Lake River River Mile: 2

Aspect: N/A Slope: N/A

*Location Description (General to Specific):

Isolate 12-35-15IF is located west of the town of Ridgefield, WA, within the Ridgefield National Wildlife Refuge. The isolate is east of Lake River at the southern end of Carty Lake, a small lake near the southern boundary of the Ridgefield National Wildlife Refuge's Carty Unit.

*Directions (For Relocation Purposes):

From the intersection of Pioneer Street and Main Ave. in the town of Ridgefield, WA, drive north on N Main Ave for approximately 0.2 miles, then turn left onto Division Street. Follow Division Street westward to enter the Port of Ridgefield. Drive straight to the locked barrier at Lake River

***Mandatory Information for Official Smithsonian Number designation.**

Revised 7/2011

and park. Beyond the locked barrier, follow the road north until it turns east. From here, walk north into the grassy field for approximately 40 meters (m) and then 50 m to the east to find the isolate's location. The isolate is approximately 20 m west of the eastern retaining wall at the southern end of Carty Lake.

ISOLATE DESCRIPTION

***Narrative Description:**

WillametteCRA identified this historic isolate while monitoring the Carty Lake Sediment Remedy Project during grubbing activities (clearing of vegetation). One, isolated cobalt blue vessel glass fragment was recovered, just east of the graded area of the work site, approximately 200 feet southeast of site 12-35-1 (a historic refuse scatter), and 100 feet north of site 12-35-2 (historic refuse scatter). This fragment has the word "Office" embossed on one side and is characteristic of medicinal bottles in shape and size, however it's utility is unknown and the diagnostic range of cobalt glass is between the mid 1800's and present (SHA 2014).

Artifacts recovered from Carty Lake monitoring activities indicate a depression-era occupation, with the assemblage consisting primarily of domestic and personal use items.

***Vegetation (On Site):** grasses, shrubs

Local: Marshes, grasslands, wetland **Regional:** wetland

Landforms (On Site): lake, wetland **Local:** wetland

Water Resources (Type): Carty Lake **Distance:** At the south end of lake

Permanence: Perennial

***Method of Collection(s):** Collected from surface during monitoring

***Location of Artifacts (Temporary/Permanent):** WillametteCRA office/Artifacts will be reburied on-site following completion of the project.

ISOLATE AGE

***Component:** Historic ***Dates:** mid 1800s-present ***Dating Method:** Historic artifact
Phase: N/A **Basis for Phase Designation:** N/A

ISOLATE RECORDERS

Observed by: Kanani Paraso **Address:**
***Date Recorded:** 9/29/2014
***Recorded by** (*Professional Archaeologist*): Kanani Paraso
***Affiliation:** Willamette Cultural Resources Associates, Ltd. ***Affiliation Phone Number:** 503-281-4576
***Affiliation Address:** 623 SE Mill St., Portland, OR 97214
***Affiliation E-mail:** kanani@willamettecra.com
Date Revisited: **Revisited By:**

ISOLATE HISTORY**Previous Work** (*Done on Area Where Isolate was Found*):

The earliest archaeological survey of the project area was conducted in 1979 by the University of Washington's survey of the Carty Unit of the refuge. That survey consisted only of a pedestrian survey around the southern and eastern side of the lake; no subsurface probes were excavated in that area but they did excavate exploratory cores. The Carty Unit survey identified one archaeological site on the eastern side of the lake, 45CL286H. Site 45CL286H is an extensive scatter of historic-period debris that appears to date to the mid- to late nineteenth century. The archaeological deposits extend along the eastern edge of Carty Lake and some materials may extend into lake itself. The site may be associated with a Carty family residence near the southeast shore of Carty Lake in the late 1800s (Abramowitz 1980:39). The site is situated over 100 m north of the area in which the field investigations for this project were conducted.

The other nearby site is 45CL4, known as the Wapato Portage site. Site 45CL4 is on the east bank of Lake River. Excavations in and near the site have been undertaken by several researchers (Abramowitz 1980; Minor and Toepel 1985; Ross and Starkey 1975), with most work attempting to verify the site as the location of the ethnographically described village of Cathlapotle, a village visited and described by Lewis and Clark. Minor and Topel's work was the most extensive and suggested

the site consists of a series of smaller, sometimes dense, limited task sites, without house features. Relatively large-scale erosion has removed portions of the site along Lake River. Hearth features were found, with lithic debitage, tools and bone recovered from over a meter below the surface. Use began about 2,000 years ago at the downstream end and continued until the historic period in the upstream portion (Minor and Toepel 1985).

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WillametteCRA conducted pedestrian survey in 2013 at the southernmost end of Carty Lake and identified a single CCS flake (Gilmour et al. 2013). No other cultural resources were identified.

LAND OWNERSHIP

***Owner:** U.S. Fish and Wildlife Service

***Address:** no situs address available; Mailing address: 911 NE 11TH AVE 3W, PORTLAND OR, 97232 (Part of Ridgefield National Wildlife Refuge Complex, Mailing Address: P.O. Box 457, Ridgefield, WA, 98642, Physical Address: 28908 NW Main Avenue, Ridgefield, WA, 98642)

***Tax Lot/ Parcel No:** 68319000

RESEARCH REFERENCES

***Items/Documents Used In Research (Specify):**

Abramowitz, Alan

1980 *Cultural Resources Assessment of the Carty Unit, Ridgefield Wildlife Refuge, Clark County, Washington*. Prepared by the Office of Public Archaeology, Institute for Environmental Studies, University of Washington, Seattle. Submitted to U.S. Fish and Wildlife Service, Sherwood, Oregon, under contract number 14-16-0001-7917S. On file, Washington DAHP, Olympia.

Gilmour, Daniel M., Caitlin A. Wichlacz, Michael A. Daniels, and David V. Ellis

2013 *Cultural Resources Survey Report for the Proposed Pacific Wood Treatment Plant Remediation Project, Clark County, Washington*. Submitted to the Port of Ridgefield, Ridgefield, Washington and U.S. Fish and Wildlife Service, Sherwood, Oregon. Willamette Cultural Resources Associates, Ltd., Portland, Oregon.

Minor, Rick, and Kathryn Toepel

1985 *Archaeological Investigations at 45-CL-4, Ridgefield National Wildlife Refuge, Ridgefield, Washington*. Heritage Research Associates Report No. 37. Submitted to U.S. Fish and Wildlife Service, Sherwood, Oregon, under contract number FWS No. 14-16-0001-84082. On file, Washington DAHP, Olympia.

Ross, Lester A. and Judy Starkey

1975 *Archaeological Survey of Lower Lake River and Bachelor Island Slough, Clark County, Washington*. Oregon Archaeological Society. Copies available from the Washington DAHP, Olympia.

Society for Historical Archaeology

2014 Bottle Glass/Colors. Electronic document, <http://www.sha.org/bottle/colors.htm>, accessed October 2, 2014.

USGS MAP

*Quad Name: Ridgefield, Washington

*Series: 7.5-minute

*Date: 2014

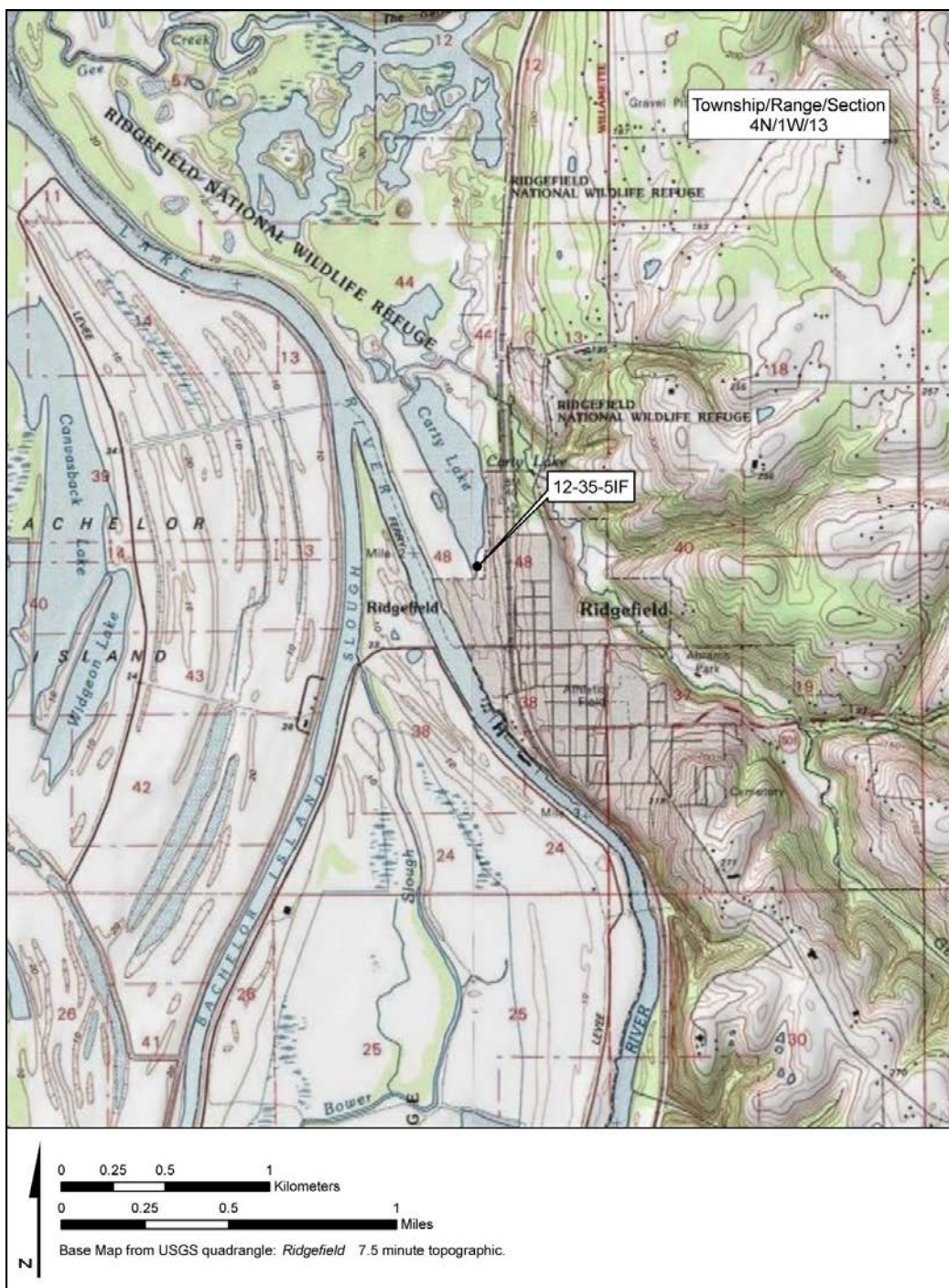


Figure 1. Isolate location map.

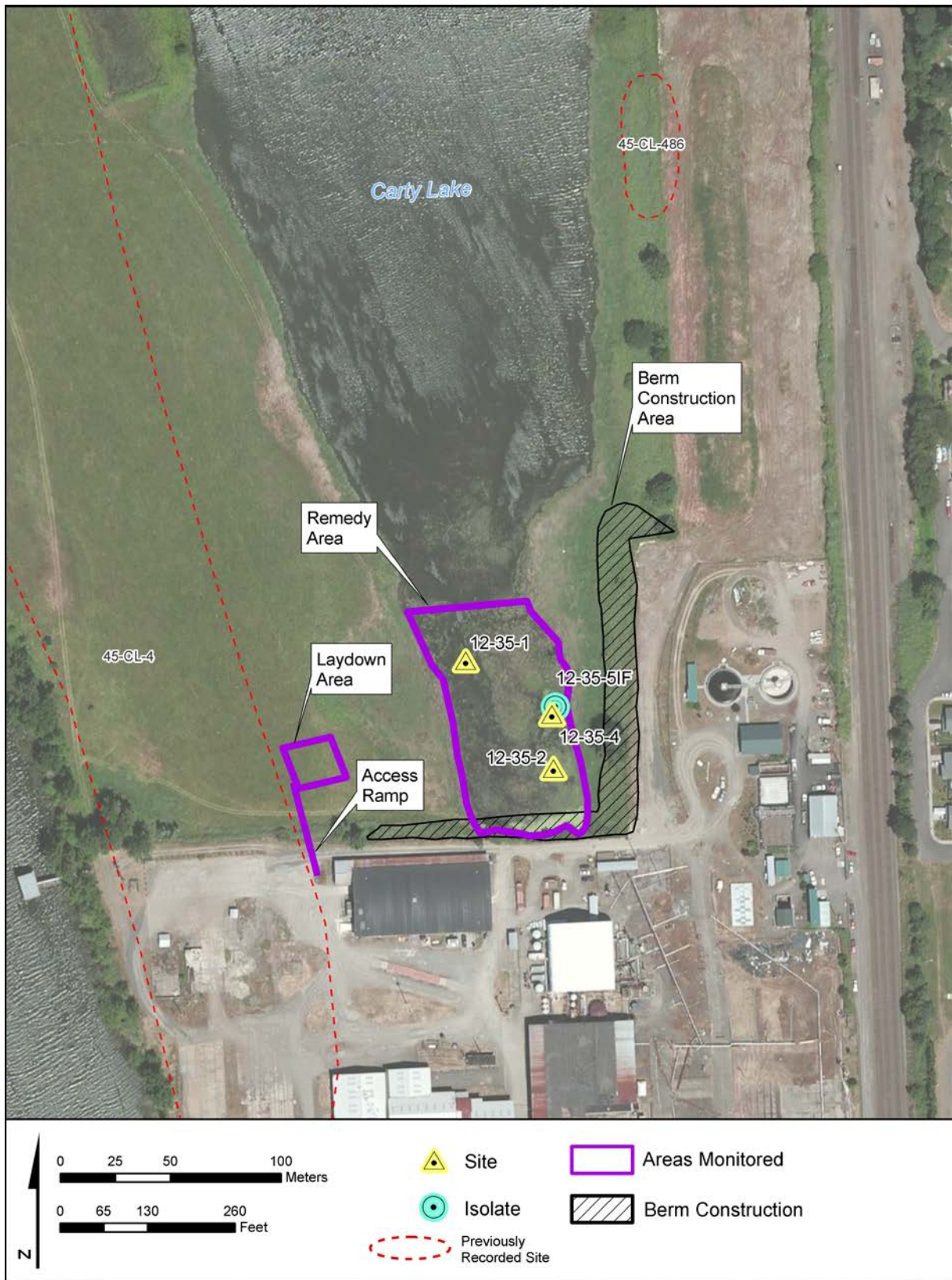


Figure 2. Project configuration map.

PHOTOGRAPH(S)

***Photograph Description(s):**



Photo 1. 12-35-51F, cobalt glass fragment.



Photo 2. Overview of area where 12-35-5IF was identified, facing northwest.

CONTINUATION/ ADDENDUM SHEET

Label all additional pages by corresponding headings.

(e.g. Isolate Description, Isolate History, Research References, etc.)

Appendix B:
WillametteCRA Inadvertent Discovery Plan

Lake River Industrial Site
Final Draft Archaeological Monitoring and Inadvertent Discovery Plan for the
Carty Lake Remedial Action

1. Introduction

The former Pacific Wood Treating Company (PWT) operated a wood-treating facility from 1964 to 1993 at the Port of Ridgefield's (Port) Lake River Industrial Site (LRIS). The LRIS location is in Sections 13 and 24, Township 4 North, Range 1 West, Willamette Meridian, in Ridgefield, Washington. Operation of the facility led to deposits of hazardous substances (i.e., wood-treating-related chemicals) in nearby Lake River and Carty Lake. The proposed cleanup action for Carty Lake consists of mechanical excavation and a limited residuals cap in the southern portion of the lake.

The proposed cleanup actions involve coordination among one state and one federal agencies. The Washington Department of Ecology (Ecology) is the lead State agency for the cleanup under the Washington Model Toxics Control Act. Carty Lake is located in the Ridgefield National Wildlife Refuge; cleanup actions in Carty Lake would therefore require approval of the U.S. Fish and Wildlife Service (USFWS) and obtaining a Section 404 permit from the U.S. Army Corps of Engineers (USACE) under the Clean Water Act. Given the involvement of the two federal agencies, the proposed cleanup actions are subject to the provisions of the National Historic Preservation Act (NHPA) and its implementing regulations (36CFR800). As Carty Lake is on federal land, it is also subject to the provisions of the Antiquities Act, the Archaeological Resources Protection Act (ARPA), and the Native American Graves and Protection Act (NAGPRA) and their implementing regulations (43 CFR 7 and 43 CFR 10, respectively for ARPA and NAGPRA). In addition, the USFWS has internal policies and procedures for addressing cultural resources on its lands (614 FW 4 and 614 FW 5). The Washington Department of Archaeology and Historic Preservation (DAHP) has the lead responsibility for ensuring compliance with State laws that protect archaeological resources and Indian graves in Washington (RCW 25-48, 27.44, 27-53, and 68.60).

The area of potential effects (PE) for the proposed cleanup actions is approximately 5.5 acres in and around the southern tip of Carty Lake. One precontact archaeological site has been identified in the immediate vicinity of the Carty Lake area, 45CL4 (Figures 1 and 2). Site 45CL4 was first recorded in 1948 (Smith and Hudziak 1948) and has been the subject several systematic field investigations since the 1970s (Abramowitz 1980:53; Bourdeau 2004:21; Minor and Toepel 1984:4, 42; Reese et al. 2012:3, 6; Ross and Starkey 1975:21; Saul 1976). Most of these studies addressed only that portion of the site that is presently situated on the Ridgefield National Wildlife Refuge. The site boundaries were extended to the south of the refuge and into the former PWT location only recently (Reese et al. 2012). Site 45CL4 has been subject in the past and continues to be subject to considerable erosion, with artifacts present on the beach at both sites.

In 2013, WillametteCRA conducted a cultural resources survey for accessible areas of the proposed Carty Lake remedy area and locations of ground disturbance associated with the proposed excavation. The area was generally characterized by very poor surface visibility. The survey therefore included excavation of 19 subsurface probes. The only cultural resource identified in the field investigation was a red cryptocrystalline silica (CCS), early core reduction flake with cortex encountered in a probe. This archaeological isolate was recommended to not be a significant resource (Gilmour et al. 2013).

1.1. Agency and Tribal Consultation and Coordination

Agency and Tribal consultation was conducted; documentation is provided in Attachment B.

1.2. Previous Archaeology

Presented below is a summary of the available information on the two sites that have been previously documented within the Carty Lake area and immediate vicinity. Figures 1 and 2 provide an overview of site locations; Figure 3 presents more details on the extent of previous archaeological studies at 45CL4.

1.2.1. Site 45CL4

Site 45CL4 was first recorded in 1948, when it was reported to have been a “large site” based primarily on informant statements but was also recommended as “not worthwhile to dig further” (Smith and Hudziak 1948). No further work is known to have been undertaken at the site until the mid-1970s, when the site was revisited and proposed as the location of the Quath-la-potle (“Cathlapotle” is now the preferred spelling) village visited by Lewis and Clark in 1806. An effort was undertaken to place 45CL4 on the National Register of Historic Places because of this association (Saul 1976). Objections were raised to the attribution of the site as Cathlapotle. To better determine the character of the 45CL4 deposits, the University of Washington conducted the first professional excavations at the site. Those excavations indicated evidence of intensive occupation, and the report concluded that the site “*could*” (italics in original) represent a village and was “probably Quathlapotle” (Abramowitz 1980:50-52).

The question of whether 45CL4 was Cathlapotle thus remained unclear. In 1984, excavations conducted by Minor and Toepel determined that the site consisted of a series of small campsites occupied as early as circa AD 30-60 but with occupation intensifying after circa AD 1200 and continuing into the era of Euroamerican contact (Minor and Toepel 1985:76-80). Minor and Toepel were the first researchers to establish that 45CL4 is likely where members of the Lewis and Clark Expedition camped on the evening of March 29, 1806, after visiting Cathlapotle (Minor and Toepel 1985:19). Their research thus resolved that the site was not Cathlapotle. Lewis and Clark (Moulton 1991:30) described their campsite as “where the natives [sic] make a portage of their Canoes and

Wapato [sic] roots to and from a large pond at a Short distance.” The “large pond” is likely to have been Carty Lake, and 45CL4 has become known as the “Wapato Portage” site (Bourdeau 2004).

No further fieldwork was undertaken at 45CL4 until 1999, when the USFWS and US Geological Survey conducted a magnetometer survey, subsurface coring, and backhoe trenching to address a proposed bank stabilization project following severe erosion in the northern site area during the 1996 winter flood. This study provided more information on the evolution of the site landscape (Bourdeau 2004).

The most recent fieldwork at 45CL4 was in 2012, when Archaeological Investigations Northwest monitored regrading of the upland portion of the PWT site. Archaeological deposits were encountered during the regrading, which led to excavation of four trenches to identify site boundaries within the upland PWT area to minimize or avoid further disturbance of the deposits. This discovery led to formal extension of the southern boundary of 45CL4, the first time the site has been documented outside the Ridgefield National Wildlife Refuge. Radiocarbon dates from the 2012 field investigations indicated the southern portion of the site was occupied between circa 200-300 years ago (Reese et al. 2013).

Major erosion has occurred and continues to occur at 45CL4. The first formal recording of this site in 1948 characterized the site as badly affected by “much erosion by river,” and an informant at the time stated that when steamers passed on the river by the site in the early 1900s artifacts would be exposed as their wakes eroded the banks (Smith and Hudziak 1948). Major erosion of site deposits has been noted in almost every subsequent visit and field study at the site (Abramowitz 1980:53; Bourdeau 2004:21; Minor and Toepel 1984:4, 42; Reese et al. 2012:3, 6; Ross and Starkey 1975:21; Saul 1976). Artifacts observed on the beach over the past 64 years have included fire-cracked rock, lithic debitage, complete and fragmentary projectile points, hammerstones, cobble choppers, a maul, and other tools or tool fragments.

There appears to be some confusion regarding the possible presence of burials at 45CL4. There are informant reports of burials at the nearby site of 45CL1 (Abramowitz 1980:34; Ross and Starkey 1975:10), which has been confirmed as the location of the Cathlapotle village. There are, however, no direct references to burials at 45CL4 other than Ross and Starkey (1975:19) state that the burials at 45CL1 might be associated with 45CL4. However, this statement was based on the assumption at the time that 45CL4 was the Cathlapotle village site. The DAHP records on WISAARD list the site as a cemetery and state that burials and human remains have been reported at the site. None of the available reports, other than those cited above, make any reference to burials or remains at the site.

Site 45CL4 is listed on the National Register of Historic Places as a contributing resource in the Vancouver Lakes Archaeological District.

1.2.2. Site 45CL286H

This site was recorded during the 1979 University of Washington fieldwork on the Ridgefield National Wildlife Refuge. It is an extensive scatter of historic-period debris that appears to date to the mid- to late nineteenth century. The archaeological deposits extend along the eastern edge of Carty Lake and some materials may extend into lake itself. The site may be associated with a Carty family residence near the southeast shore of Carty Lake in the late 1800s (Abramowitz 1980:39; Abramowitz and Larson 1979). No archaeological investigations are known to have been undertaken at this site since it was recorded in 1979.

2. Proposed Cleanup Actions

2.1. Carty Lake

Proposed cleanup actions for Carty Lake consist of the following four elements:

1. Mechanical excavation of sediments exceeding remediation levels in the southern portion of the lake. The excavation area would be isolated from the rest of Carty Lake and construction would be conducted “in the dry.” Excavated material will be placed in trucks for land transport as nonhazardous material waste to a Subtitle D landfill facility.
2. Placement of a limited residuals cap in the southern portion of the lake, which would consist of an approximately 1-foot-thick clean sand layer.
3. Construction of a berm on the Carty Lake side of an existing bulkhead to stabilize the bank.
4. Planting of the excavation and clean sand area and the berm with native species.

The proposed excavation and sand cap area in Carty Lake and the proposed berm are indicated in Figures 4 and 5.

In addition to the cleanup action in the lake, it will be necessary to improve access to southern Carty Lake, which would probably include clearing and grubbing and construction of a staging area.

3. Archaeological Monitoring

Based on current information, the cleanup actions proposed at this time would not impact significant archaeological resources.

As described above, WillametteCRA conducted a survey of the current Carty Lake project area in 2013. The only evidence of archaeological or historical resources was one artifact documented in

a subsurface probe. Given the potential for encountering additional artifacts in the excavation in Carty Lake, agencies and Tribes have requested that the excavation activity be monitored by a qualified archaeologist. Tribal monitors may also monitor the excavation activity. The monitoring will be undertaken within the framework of procedures defined below.

The following procedures have been developed to address potential inadvertent discoveries of archaeological objects and sites and Indian and historic graves and human remains to ensure compliance with the relevant federal and Washington archaeological and cultural resource laws and regulations (36 CFR 800, especially 36 CFR 800.13; RCW 27.44, 27.53, and 68.60 and Washington Administrative Code [WAC] 25-48) for cleanup actions on non-federal lands. These procedures would also address inadvertent discoveries of archaeological resources, burials, or human remains during cleanup-related activities on the Ridgefield National Wildlife Refuge to ensure compliance with the NHPA, ARPA, and NAGPRA and their implementing regulations (36 CFR 800, 43 CFR 7, and 43 CFR 10, respectively).

3.1. Professional Archaeologist On-Site: Carty Lake Cleanup

The Port will retain the services of a professional archaeologist as defined in RCW 27.53.030(8) and who also meets the Professional Qualifications Standards of the Secretary of the Interior's Standards and Guidelines in Archaeology and Historic Preservation. The archaeologist will provide on-site monitoring during all activity associated with cleanup actions that would involve potential disturbance of native soils. The archaeological monitor will coordinate his or her monitoring actions with Tribal monitors who may also be present.

3.2. Carty Lake Cleanup

Field studies to determine if archaeological resources present in areas in which cleanup actions are proposed at Carty Lake were conducted in 2013. The only resource identified was a piece of lithic debitage. However it should be assumed that archaeological monitoring of the excavation and berm construction will be required. Monitoring of the excavation will employ the following procedures. The archaeological monitor would inspect excavated sediments as they are deposited in trucks prior to transport to the disposal facility. Upon discovery of a suspected archaeological object or other evidence of an archaeological resource, the archaeological monitor—at his/her discretion—may temporarily halt the excavation activity. The objective of this halting is to allow the archaeologist to confirm and/or make a preliminary assessment of the discovery. Precontact artifacts or possible precontact artifacts encountered during excavation activity will be recovered and their locations or approximate locations documented in fieldnotes, maps, and photographs. Modern debris would be noted but not collected.

The archaeological monitor will also observe all ground-disturbing activity associated with construction of the berm. Upon discovery of a suspected archaeological object or archaeological

site, the monitoring archaeologist—at his/her discretion—may slow or halt the excavation or other ground-disturbing activities. The objective of this slowing or halting of ground-disturbing activity is to allow the archaeologist to confirm and/or make a preliminary assessment of the discovery.

Should the monitoring archaeologist determine that a possible intact cultural resource has been encountered, he or she may direct the immediate cessation of all ground-disturbing activity in the vicinity of the discovery. The monitor will promptly notify the USFWS of the discovery. The USFWS will promptly notify the appropriate Tribes, the USACE, and the DAHP of the find. The monitor and the USFWS will coordinate to determine when and where work can continue. The USFWS, in consultation with other appropriate agencies and Tribes will make the decision whether any finds are significant resources.

At the request of the monitoring archaeologist, the Port will assist in securing access to the location of the discovery and take appropriate measures to protect the location of the discovery from rain, stormwater, and other possible disturbances.

In the event that likely or confirmed human remains are encountered, the monitoring archaeologist will be responsible for immediately notifying the USFWS. The USFWS will then be responsible for implementing the requirements of 43 CFR 10.4. All activity must cease that may cause further disturbance to those remains and the area of the find must be secured and protected from further disturbance and exposure to rain, wind, etc. The remains should not be touched, moved, or further disturbed. Any further ground-disturbing activity in the vicinity of the vicinity may not proceed without authorization from the USFWS.

3.2.1. Other Actions

Artifacts associated with 45CL4 are present on the beach within the area proposed for bank stabilization. Prior to placement of the armor, the Port will retain the services of a professional archaeologist to systematically map the distribution of artifacts on the beach within the area to be armored. Temporally and functionally diagnostic artifacts, sacred objects, and objects of cultural patrimony will be collected. The disposition of these artifacts will be determined in consultation with the USACE, DAHP, and the Tribes.

4. Confidentiality

The Port shall make its best efforts, in accordance with state law, to ensure that its personnel and contractors keep the discovery of any found or suspected human remains, other cultural items, and potential historic properties confidential. Contractors and agency personnel are prohibited from contacting the media or any third party or otherwise sharing information regarding the discovery

with any member of the public, and to immediately notify the Port and direct any inquiry from the media or public. Prior to any release, the Port, the USFWS, the USACE, and the Tribes shall concur on the amount of information, if any, to be released to the public, any third party, and the media and the procedures for such a release, to the extent permitted by law.

5. References

Abramowitz, Alan

1980 *Cultural Resources Assessment of the Carty Unit, Ridgefield Wildlife Refuge, Clark County, Washington*. Prepared by the Office of Public Archaeology, Institute for Environmental Studies, University of Washington, Seattle. Submitted to U.S. Fish and Wildlife Service, Portland, Oregon, under contract number 14-16-0001-7917S. On file, Washington DAHP, Olympia.

Abramowitz, Alan, and L. L. Larson

1979 Cultural Resources Site Survey Record for Site 45-CL-286H. On file, Washington DAHP, Olympia

Bourdeau, Alex

2004 *Geologically Complex; The Flood Plain of the Lower Columbia River, Results of Research in Support of the Wapato Portage (45CLA) Cutbank Stabilization Project. Ridgefield National Wildlife Refuge, Clark County, Washington*. U.S. Fish and Wildlife Service, Sherwood, Oregon.

Gilmour, Daniel, Caitlin A. Wichlacz, Michael A. Daniels, and David V. Ellis

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Minor, Rick, and Kathryn Toepel

1984 *Archaeological Investigations at 45-CL-4, Ridgefield National Wildlife Refuge, Ridgefield, Washington*. Report No 37. Submitted to U.S. Fish and Wildlife Service, Portland, Oregon, under contract number FWS No. 14-16-0001-84082. On file, Washington DAHP, Olympia, Washington.

Moulton, Gary E. (editor).

1991 *The Journals of the Lewis and Clark Expedition*. Volume 7. University of Nebraska Press, Lincoln, Nebraska and London.

Reese, Jo, Kristen A. Fuld, Michele Punke, and Vernon J. Veysey

2013 *Archaeological Monitoring of the Port of Ridgefield's Millers' Landing Project, Cell 2 Area, Clark County, Washington*. Archaeological Investigations Northwest Report No. 3061. Submitted to the Port of Ridgefield.

Ross, Lester A., and Judy Starkey

1975 Archaeological Survey of Lower Lake River and Bachelor Island Slough, Clark County, Washington. Oregon Archaeological Society, Portland.

Saul, Susan

1976 National Register of Historic Places Property Photograph Form. Quathlapotl Village, CL4. National Park Service, Washington, D.C.

Smith, Clarence, and Robert Hudziak

1948 University of Washington Archaeological Field Form, Site Survey Form, CL4. University of Washington, Seattle.

Figure 1. Locations of LRIS-Carty Lake project area.

Figure 2. Locations of previously recorded archaeological sites in the Carty Lake area.

Figure 3. Previous archaeological investigations in the Carty Lake area.

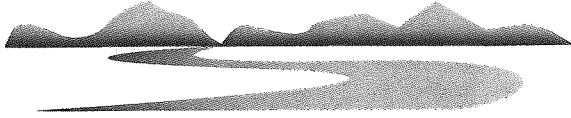
Figure 4. Maximum extent of Carty Lake excavation areas.

Figure 5. Proposed location of berm construction and associated features at Carty Lake.

Attachment A

Contact Information for Inadvertent Discovery Plan

Name	Affiliation	Phone
Laurie Olin	Operations Director Port of Ridgefield	360-887-3873
Josh Elliot	Construction Engineering Manager - MFA	503-953-6067
Connor Lamb	Construction Engineering Manager - MFA	360-977-8056
Lance Lundquist	Archaeologist USACE-Seattle	206 764-6909
Nick Valentine	Archaeologist USFWS	503 625-4377
Rob Whitlam	State Archaeologist	360 586-3080
Guy Tasa	State Physical Anthropologist DAHPP	360 586-3534
	Clark County Sheriff's Dept	360 397-2211
Dennis J. Wickham, M.D.	Clark County Medical Examiner	360 397-8405
Kate Valdez	Tribal Historic Preservation Officer	509 985-7596
Johnson Meninick	Cultural Resources Program Manager Yakama Nation	509 685-7203
Dave Burlingame	Cultural Resources Director	360 577-6962
Nathan Reynolds	Ethnoecologist Cowlitz Tribe	360 577-8140
Briece Edwards	Archaeologist Grand Ronde Tribe	503 879-2084
Ray Gardner	Tribal Council Chair Chinook Indian Nation	360 875-6670



TRANSMITTAL

To: Laura Phillips

From: Kanani Paraso, Archaeologist *KP*

Date: December 18, 2014

Re: CR-2014-42
45CL1087 Artifacts and Archives

- Per your request
- For your signature
- For your review
- For your approval
- For your information
- Other

Notes: Please find enclosed the archival material and diagnostic artifacts from the survey at 45CL1087, Clark County Washington. As per the email correspondence with Laura Phillips, the specimens and archives are less than one cubic meter in volume and the agreed upon curation fee will be \$300.00. Thank you for your assistance. If you have any questions or concerns regarding these archives or this project, please do not hesitate to contact us.

Josh Elliott

From: Rankine, Craig (ECY) <cran461@ECY.WA.GOV>
Sent: Thursday, September 18, 2014 1:20 PM
To: Madi Novak; Josh Elliott; Laurie Olin
Cc: Mercuri, Joyce (ECY)
Subject: RE: Carty Lake Sand Import - Request for Approval

Madi,

Thank you for the data submittal and explanation.

The analytical results indicate the sand does not contain compounds of concern.

This e-mail is written Ecology approval allowing use of the sampled sand for fill material on the Carty Lake remedy.

Craig

Craig Rankine, RG, LHG
Dept. of Ecology, Toxics Cleanup Program
Vancouver Field Office
2108 Grand Blvd, Vancouver, 98661
(360) 690-4795

From: Madi Novak [<mailto:mnovak@maulfoster.com>]
Sent: Wednesday, September 17, 2014 9:49 PM
To: Mercuri, Joyce (ECY); Rankine, Craig (ECY)
Cc: Josh Elliott
Subject: Carty Lake Sand Import - Request for Approval

Hi Craig and Joyce,

I'm e-mailing to seek your approval to place imported sand.

Three samples of sand were collected and analyzed consistent with Carty Lake Remedy technical specifications 35 42 00. Samples were collected from 5-gallon samples provided by the construction contractor at a frequency of 1 per 2,000 cubic yard for testing. Results are provided in the attached Table. All three samples were collected from the same pile of homogenous sand. Sample results for IMP-1 and IMP-3 are below screening criteria. Sample results for IMP-2 are below screening criteria, with the exception of PCBs (43.5 ug/kg) above the associated screening criteria of 5 ug/kg.

The PCB screening criteria of 5 ug/kg was selected to represent a level that would generally be considered at or below ambient conditions (e.g., the Portland Harbor PCB ambient concentration is currently set at 17.5 ug/kg). PCBs above the specification criteria are not expected to cause unacceptable risk to human health or the environment. The concentration of PCBs detected in IMP-2 is well below the Sediment Management Standards Freshwater Sediment Cleanup Objective of 110 ug/kg. Further, human health concerns related to consumption of tissue that accumulate PCBs is moot, given that an institutional control prohibiting fishing in Carty Lake will be in place upon completion of the active remedy.

The PCB detection in sample IMP-2 appeared to be anomalous because the other two samples collected from the same pile of homogenous sand were non-detect for PCBs. Therefore, the laboratory re-extracted and re-analyzed sample IMP-2. The follow-up result showed no detections of PCBs.

The sand is considered usable for fill material based on the following:

- The PCB concentration in IMP-2 is unlikely to cause unacceptable risk to human health or the environment.
- The follow-up IMP-2 analysis indicates the initial PCB detection may be anomalous.
- There were no exceedances of specified criteria in samples IMP-1 and IMP-3.

I'll follow up with a call to Craig in the morning in case there are any questions. We would appreciate receiving your approval tomorrow if possible.

Thank you,

MADI NOVAK | MAUL FOSTER & ALONGI, INC.

direct. 503 501 5212 | main. 971 544 2139 | cell. 971 227 1060 | www.maulfooster.com
2001 NW 19th Avenue, Suite 200, Portland, OR 97209

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Josh Elliott

From: Rankine, Craig (ECY) <cran461@ECY.WA.GOV>
Sent: Thursday, September 25, 2014 4:28 PM
To: Josh Elliott; Mercuri, Joyce (ECY)
Cc: Madi Novak; lolin@porridgefield.org
Subject: RE: Topsoil import acceptance

Josh,
Thank you for the topsoil analytical results and summary.
This e-mail is Ecology written approval to proceed with use of the topsoil as specified below.
Please let Joyce and I know when top soil placement starts.
Thank you,
Have a great evening and weekend.
I am not working tomorrow Sep 26.
Craig

Craig Rankine, RG, LHG
Dept. of Ecology, Toxics Cleanup Program
Vancouver Field Office
2108 Grand Blvd, Vancouver, 98661
(360) 690-4795

From: Josh Elliott [mailto:jelliott@maulfoster.com]
Sent: Thursday, September 25, 2014 1:40 PM
To: Mercuri, Joyce (ECY); Rankine, Craig (ECY)
Cc: Madi Novak; lolin@porridgefield.org
Subject: RE: Topsoil import acceptance

Good afternoon Joyce & Craig,

I'm e-mailing to seek your approval to place imported topsoil. The soil will be placed on the Carty Lake bank and will also be mixed with the top layer of imported sand to provide a substrate for vegetation in the Carty Lake excavation area.

One sample of topsoil (identified as 80/20 soil on the data table) was collected and analyzed consistent with Carty Lake Remedy technical specifications section 35 42 00. The sample was collected at a frequency of roughly 1 per 2,000 cubic yards for testing. Results are provided in the attached Table.

Results detected were below screening criteria except for the dioxin TEQ. The dioxin TEQ is 6.49 ng/kg which is above the cleanup level of 5 ng/kg. MFA conducted a brief evaluation of potential risk to human health and the environment related to exposure to dioxins in the topsoil. Results are as follows:

- Adverse effects to aquatic ecological receptors is not anticipated. Individual dioxin and furan congener concentrations are well below the remediation levels in the cleanup action plan (see attached Table). The remediation levels are based on protection of water-dependent fish, mammals, and birds.
- Adverse effects to upland ecological receptors is not anticipated. The ecological-based dioxin TEQ and furan TEQ in the topsoil are 4.85 ng/kg and 3.60 ng/kg, respectively, which are below upland ecological-based cleanup levels of 9.8 ng/kg and 11.4 ng/kg, respectively (see attached Table).

- Unacceptable risk to human health associated with direct exposure to the topsoil is not anticipated. The dioxin TEQ of 6.49 is below the Model Toxics Control Act Method B Cleanup Level of 11 ng/kg, which is protective of exposures related to direct contact and incidental ingestion.
- Unacceptable risk to human health associated with consumption of aquatic species that may accumulate dioxins in tissue is not anticipated. Upon completion of remedy construction an institutional control prohibiting fishing in Carty Lake will be implemented, consistent with the Consent Decree.

Further, note that in the wetland area the top 4 inches of the 1-foot layer will contain topsoil. Therefore, the effective surface concentration under post-remedy conditions would be approximately 2.44 ng/kg dioxin TEQ, given that the average sand concentration is 0.42 ng/kg dioxin TEQ. This concentration is below the cleanup level of 5 ng/kg TEQ and is similar to ambient sediment conditions in the Lower Columbia River of 2 ng/kg TEQ (MFA, 2011). Note that ambient sediment conditions are representative of sediment with low organic content (median of 0.49%) while the soil will have a higher organic carbon content (approximately 4.9%), further limiting dioxin bioavailability relative to regional conditions.

PCBs were not detected in soil. The highest method detection limit of 18 ug/kg is above the PCB screening criteria of 5 ug/kg. However, as discussed in the September 17th, 2014 electronic mail (M. Novak to J. Mercuri, RE: Carty Lake Sand Import - Request for Approval), 5 ug/kg was selected to represent a level that would generally be considered at or below ambient conditions. PCBs, if present at concentrations below detection limits, are not expected to cause unacceptable risk to human health or the environment. Method detection limits are well below the Sediment Management Standards Freshwater Sediment Cleanup Objective of 110 ug/kg and human health concerns related to consumption of tissue that accumulate PCBs is moot, given that an institutional control prohibiting fishing in Carty Lake will be in place upon completion of the active remedy. Further note that method detection limits for more common Aroclor formulations such as 1248 and 1254 are marginally above 5 ug/kg at 8.5 ug/kg.

Thanks and we can discuss further if necessary during our 3:00 pm conference call,

JOSH ELLIOTT, PE MAUL FOSTER & ALONGI, INC.
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 2001 NW 19th Avenue, Suite 200, Portland, OR 97209

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From: Madi Novak
Sent: Wednesday, September 24, 2014 11:23 AM
To: Mercuri, Joyce (ECY) (jmer461@ECY.WA.GOV); Rankine, Craig (ECY) (cran461@ECY.WA.GOV)
Cc: Josh Elliott
Subject: Topsoil import acceptance

Good morning Joyce and Craig,

We are going to be sending another e-mail soon to request your approval of topsoil import material. The topsoil will be placed on the Carty Lake bank and will be mixed into the imported sand (that you already approved) in the excavation area. We submitted the samples to the laboratory over two weeks ago but the lab is late delivering the results. The lab has assured us that they will provide the results tomorrow.

The contractor is ready to place the topsoil on Friday, so our plan is to validate and table the data tomorrow as soon as we get the results and provide you with an e-mail that interprets the results, similar to the e-mail we send for the sand import material. The e-mail may come late (after 5?) on Thursday, depending on when we get the laboratory

deliverable. Would it be possible to prearrange a call first thing on Friday morning to discuss the results (in case there are any questions) and receive your approval (if appropriate)?

Sorry for the rush on this.

Thank you,

MADI NOVAK | MAUL FOSTER & ALONGI, INC.

direct. 503 501 5212 | main. 971 544 2139 | cell. 971 227 1060 | www.maulfooster.com
2001 NW 19th Avenue, Suite 200, Portland, OR 97209

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