Post-Restoration and Cleanup Action Report

Olympic View Triangle Restoration Project

Commencement Bay, Washington

Prepared for the

Washington Department of Natural Resources

POST-RESTORATION AND CLEANUP ACTION REPORT

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Prepared for the

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Prepared by

RIDOLFI Inc.

September 2007

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LIST OF ACRONYMS AND ABBREVIATIONS

AEC	Anderson Environmental Contracting, LLC
ARI	Analytical Resources, Inc.
Baseline	Baseline Engineering, Inc.
bgs	below ground surface
DNR	Washington Department of Natural Resources
Ecology	Washington State Department of Ecology
HPA	Hydraulic Project Approval
Landau	Landau Associates
LWD	large woody debris
mg/kg	milligrams per kilogram
MLLW	mean lower low water
MS/MSD	matrix spike/matrix spike duplicate
MTCA	Model Toxics Control Act
OVRA	Olympic View Resource Area
NGVD 29	national geodetic vertical 1929 datum
NOAA	National Oceanic and Atmospheric Administration
NRDA	Natural Resources Damage Assessment
Ridolfi	RIDOLFI Inc.
the Site	Olympic View Triangle Restoration Project
Trustees	Commencement Bay Natural Resource Damage Assessment Trustees
U.S. EPA	U.S. Environmental Protection Agency
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
XRF	x-ray fluorescence

1.0 INTRODUCTION

This report was prepared on behalf of the Washington Department of Natural Resources (DNR) to summarize the habitat restoration and cleanup action work performed in 2007 at the Olympic View Triangle Restoration Project (the Site), adjacent to Commencement Bay in Tacoma, Washington (Figure 1). The Site is managed by DNR.

The restoration work was performed in partnership with the Commencement Bay Natural Resource Damage Assessment (NRDA) and Restoration Trustees (Trustees), who are responsible for identifying, designing, and implementing restoration projects. The Trustees include the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of the Interior (U.S. Fish and Wildlife Service), the Puyallup Tribe of Indians, the Muckleshoot Indian Tribe, the Washington State Department of Ecology [Ecology (lead agency for the State)], the DNR, and the Washington State Department of Fish and Wildlife (WDFW). The Trustees initiated restoration studies and preliminary design at the Site but after soil contamination was encountered, DNR assumed responsibility for directing the combined restoration and cleanup action efforts.

Numerous soil investigations have been conducted at the Site to evaluate the condition of the soils. During a 2004 investigation, arsenic-contaminated soil was encountered in samples collected using a hand auger. In 2005, Ecology excavated and removed soil up to approximately 3 feet deep from the most contaminated part of the Site. During a 2006 investigation, the horizontal and vertical extent of arsenic contamination were further delineated (Landau, 2006a) with a direct push rig that allowed collection of deeper samples. The results of that study were incorporated into a cleanup plan for the Site (Landau, 2006b), which was submitted to Ecology's Toxics Cleanup Program. The recommendations in the cleanup plan were incorporated into the grading plan for the restoration project so that cleanup actions and restoration could be accomplished as a single project (Ridolfi, 2007a).

RIDOLFI Inc. (Ridolfi), the design engineers for the project, worked under contract to DNR, which served as the lead NRDA Trustee. Environmental studies and design efforts were

performed by a team that included Ridolfi, Osborn Pacific Group Inc., and Landau Associates (Landau). Anderson Environmental Contracting, LLC (AEC), the construction contractor for the site work, performed the restoration work under direct contract to DNR. To aid restoration design efforts, a topographic survey of the Site was conducted by Duane Hartman and Associates, Inc. in 2004. The vertical datum for the survey was mean lower low water (MLLW) to facilitate site grading and selection of planting zones for riparian and marsh species.

1.1 Site Description and Background

The Site is on state-owned aquatic lands at the northern tip of the peninsula that separates the Thea Foss Waterway and the Middle Waterway in Tacoma, Washington. The property is administered by the DNR. The Site is bordered by the Thea Foss Waterway to the west, the NuStar Terminal facility (formerly Superior Oil Company) to the south, Commencement Bay to the north, and property remediated by the City of Tacoma (the former Puget Sound Plywood Mill) to the northeast. The City's remediation site is known as the Olympic View Resource Area (OVRA). The OVRA project included the use of clean import material to form protective caps over contaminated sediment that was left in place. One of the caps, known as Cap B, is directly adjacent to a sheet pile wall on the Site.

The Site does not have an address but is adjacent to the Shore Terminal facility, which is located at 250 East D Street, Tacoma, Washington (Figure 1).

Prior to the project, most of the Site was at an elevation of 15 feet above MLLW. The Site is flat and mostly barren, with several grassy areas. Soil at the Site is fill material consisting of silty sand, gravel, and cobbles. A riprap bank and sheet pile retaining wall run along the Site's seaward perimeter, adjacent to the Thea Foss Waterway and Commencement Bay. The Site is approximately triangular in shape and occupies an area of about 1.2 acres (Figure 2).

The Site, which is currently vacant, serves as a breakwater and buffer area to protect the adjacent fuel storage facility. The only structures on the Site are two ground water monitoring wells and the sheet pile retaining wall. Historical uses of the Site appear to have been limited to

the staging of logs and storage of milled timber. Figure 3 illustrates the conditions at the Site prior to the project.

1.2 Project Goals and Objectives

DNR established goals and objectives for the restoration work that were used to guide design efforts at the Site. These were refined by the design team in a conceptual design process. The design objectives included:

- Creating fish rearing and foraging habitat;
- Creating salt marsh habitat;
- Increasing habitat complexity and diversity adjacent to Commencement Bay by installing large woody debris (LWD);
- Creating riparian buffer areas to enhance food sources for juvenile salmonids and forage fish;
- Creating wildlife habitat for birds and small mammals in riparian buffer areas; and
- Providing landscape connectivity between other restoration and mitigation projects in the vicinity of the site.

2.0 SCOPE OF RESTORATION WORK

The following sections describe the construction, restoration, and cleanup work that were performed at the Site. AEC mobilized to begin work in June 2007 and completed the project by the end of July 2007.

Construction work at the Site included clearing and grubbing, installation of temporary erosion control measures, excavation and grading to reach design elevations, installation of large woody debris, removal of a portion of the existing rip rap bank, removal of a portion of the existing sheet pile retaining wall, and removal of two groundwater monitoring wells. Additionally, over excavation occurred at the Site to remove arsenic-contaminated soil. Over excavated areas were brought to subgrade with clean fill. A description of the arsenic-contaminated soil removal and confirmation sampling and analysis results is provided in Section 3 of this report. Figure 2 shows the Site grading plan. These tasks are described in the following sections.

2.1 Clearing, Debris Removal, Excavation, and Grading

Restoration work began on June 4, 2007. A condition of the Hydraulic Project Approval (HPA) permit issued by the WDFW was that in-water work (work in or connected to Commencement Bay) could not occur until July 16. To meet this deadline, the project was scheduled around the work window. Additionally, AEC kept the rip rap bank, associated berm, and sheet pile retaining wall intact until the final weeks of the project. This method also allowed for relatively dry working conditions at the Site. However, once grade was below MLLW, tidal water did seep into the Site through the berm, at the future opening of the Site. To avoid working in standing water, construction efforts were scheduled to avoid high tides or conducted in higher elevation areas of the Site.

The first actions at the Site were to install temporary and permanent erosion control measures and related preparatory measures in accordance with the plans and specifications and an erosion control plan developed for the site (Ridolfi, 2007a). These measures included installation of:

- Silt fencing along the back perimeter of the Site (Figures 4);
- Floating silt curtains across the entrance of the Site (Figure 5);
- A rock driveway at the Site entrance; and
- Bank protection: geotextile fabric and Geoweb material backfilled with crushed rock and quarry spalls along the outside perimeter of the Site (Figure 6).

After the preparatory activities were finished, a trackhoe was used to clear and grub the vegetation. One madrone tree was protected in the riparian berm area. A large boulder was also salvaged and placed near the opening of the marsh to provide habitat complexity.

Two groundwater monitoring wells were abandoned by Cascade Drilling under Subcontract to AEC during the project according to procedures established by Ecology [Washington Administrative Code (WAC) 173-160]. These monitoring wells were installed on the Site to monitor past releases from the adjacent NuStar Terminal facility, which comprises a dock and fuel storage area. The nature of the design was such that the monitoring wells had to be abandoned to complete the excavation. Notice of Decommission applications were submitted to Ecology by Cascade Drilling to notify them of the well decommissioning efforts.

Excavation began near the south corner of the Site along the Thea Foss Waterway and proceeded towards the north corner of the Site (south to north). Excavation was performed with trackhoes, and the materials were loaded directly from the stockpiles into dump trucks for transport the waste facility (Figure 7). Subsequently, 7,194 tons of materials were excavated to remove arsenic-contaminated soil and achieve design elevations. The materials included sand and gravel that had been placed at the ground surface and fill material consisting of arsenic-contaminated soil, concrete rubble, demolition wastes, bricks, scrap metal, and slag material. Approximately, 340 tons of concrete slabs and blocks were removed from the Site and rip rap bank. These materials were sorted and placed in onsite stockpiles. All materials were hauled offsite and legally disposed of. The arsenic-contaminated soil was hauled offsite to LRI's Landfill in Graham, Washington, a waste facility licensed to accept contaminated materials. All other waste

materials, including concrete, steel, vegetation, and general waste, were hauled offsite to a recycling facility or a municipal landfill.

During construction, grade control was maintained using a laser level and construction staking. A survey crew, staffed by Baseline Engineering, Inc. (Baseline) working under contract to AEC, placed stakes indicating the required final grade and cut or fill prior to the initiation of earthwork (Figures 8). AEC's field personnel used the stakes for control and checked elevations provided in the construction plans to verify that the subgrade elevation had been achieved. The subgrade elevation was established to allow placement of materials (topsoil, bank protection systems, or marsh entrance rock) at the final design elevation; these materials were placed with a trackhoe and bull dozer (Figure 9).

A shallow embayment opening to Commencement Bay was constructed in the central portion of the Site at elevations intended to support salt marsh vegetation. An opening was constructed on the bayside of the embayment to allow tidal waters from Commencement Bay to enter and subsequently drain from the Site. A berm was constructed around the perimeter of the embayment at elevations intended to support riparian vegetation (Figure 10).

2.2 Erosion Control

A bank protection system was installed along the western corner of the Site on top of the existing rip rap bank, bordering the Thea Foss Waterway and Commencement Bay. The system consists of geotextile and Geoweb cell materials backfilled with gravel and bordered with quarry spalls. It is intended to provide bank protection and permanent erosion control for the Site (Figure 6). Topsoil was placed on top of the bank protection system to create the riparian habitat (Figure 9).

The upper corner of the sheet pile retaining wall adjacent to the embayment was cut with an acetylene torch so that it would blend with the existing beach profile and transition into the newly created opening for the salt marsh (Figure 11). A portion of the sheet pile retaining wall remains in place, providing bank protection and permanent erosion control for the northern corner of the Site (Figure 3). The area behind the remaining wall was brought to grade with clean fill. An approximately 3 foot swath of rock mix was placed along the edge of the sheet pile

retaining wall and blended into the adjacent marsh opening. The rock swath or border is intended to provide erosion control and protection from wave action. The remaining area was covered with topsoil and will be planted with riparian vegetation.

2.3 Marsh Entrance Rock and Fish Mix

In early 2005, the City of Tacoma and the U.S. Environmental Protection Agency (U.S. EPA) expressed concern that construction of the Site could promote erosion of Cap B at the OVRA site. The sheet pile retaining wall and northern extent of the rip rap bank are immediately adjacent to OVRA Cap B. To address the concerns expressed about possible erosion, the DNR consulted with Hugh Shipman, a regional expert on coastal erosion and sediment dynamics at Ecology. The consultation included a review of the restoration plans, a meeting with the project team, and a site visit to observe coastal processes at the Site. Mr. Shipman provided recommendations to the design team in a technical memorandum (Shipman, 2005). The technical memorandum notes an area adjacent to the sheet pile retaining wall that could become a potential sediment sink. The memorandum recommends constructing a low berm in this area to "pre-fill" the sink and limit sediment transport from adjacent Cap B. The memorandum also recommends backfilling the area where rip rap will be removed to match the existing beach profile.

To fulfill the recommendations of the memorandum, two gravel mixes were placed at the entrance of the marsh, with the larger of the two mixes closer to the OVRA site. The gravel mixes were brought to a grade that matched the existing OVRA beach profile (Figure 12). The design is intended to minimize impacts to the adjacent sediment cap at the OVRA site as well as protect the existing embankment and adjacent fuel storage facility from erosion. Additionally, the gravel mixes will provide foraging habitat for salmonids and forage fish.

2.4 Large Woody Debris Installation

Eight large stumps or LWD, were installed along the transition between the riparian berm and upper salt marsh. The purpose of these features is to provide habitat complexity and possible

refuge for juvenile salmonids that migrate through the area. Additionally, LWD provides habitat for insects; a critical food source for juvenile salmonids. The LWD was generally installed with the trunk end of the stump buried in the slope of the marsh and the root ball sitting at the edge of the marsh (Figure 13).

Each piece of LWD was anchored with two Manta Ray™ mechanical anchors; one placed on each side of the LWD (Figure 14). A long threaded bolt was attached to each anchor. The anchors were then driven into the ground using a hydraulically operated percussion hammer. The anchors were driven 6 to 12 feet below ground surface (bgs) and retracted to engage the folding arms of the anchor, much like drywall toggle bolts. The trackhoe bucket was used to pull up on the anchor so that it retracted. The remaining lengths of the threaded bolts were cut to just above ground surface and an eyebolt was screwed on the top of each bolt, so that it sat flush with the ground surface. A chain was then threaded through one eyebolt, wrapped over the top of the LWD, and threaded through the second eyebolt. The chain was cinched tight with the force of the trackhoe bucket before being connected with a shackle (Figure 15).

3.0 CONFIRMATION SOIL SAMPLING AND ANALYTICAL RESULTS

This section discusses the sampling methods and analytical results from the confirmation soil sampling conducted at the Site. The sampling took place during the construction of tidal marsh and riparian habitat to confirm if further excavation was necessary at any of the graded areas of the Site to remove residual arsenic-contaminated soil.

An area in the northeast corner of the Site had been determined to be a "hot spot" where the most contaminated soil was located. In this area, additional soil was excavated below the desired final site elevation to remove the arsenic-contaminated soil. These areas were backfilled with clean fill material and topsoil, which contain arsenic concentrations less than 10 milligrams per kilogram (mg/kg), to bring them to the grade needed to create salt marsh habitat.

3.1 Field Sampling

Sampling was conducted according to the Olympic View Triangle Restoration Project Confirmation Soil Sampling and Analysis Plan (Ridolfi, 2007b). Surface samples were collected using new plastic spoons and new plastic disposable bags. Before filling the sample containers, each soil sample was thoroughly homogenized and all large organic debris and material such as leaves, twigs, roots, and rock was removed. In the "hot spot" area of the Site, one sample was collected approximately every 20 feet. For the remainder of the Site one sample was collected every 40 feet. A vertical composite of soil, from 0 to 12 inches bgs, was collected from each sample point. The sample locations and results are shown on Figure 16.

For the first round of sampling, 55 samples were collected from excavated areas of the Site and analyzed on-site with a rented portable x-ray fluorescence (XRF) device (Figure 17). The on-site XRF analysis was conducted according to U.S. EPA Method 6200 Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment (U.S. EPA, 1998). The instrument was operated by personnel trained and knowledgeable in the operation of an XRF instrument. All radiation safety measures in the operating manual were followed.

In most of the "hot spot" area, the excavated depth was below the depth of ground water at the Site. In areas where the excavation was below the ground water depth, water seeped into the pit. However, the amount of water in the pit fluctuated with the tide; and, for convenience, samples were collected when water levels were lowest.

If the first round soil sample results were greater than cleanup levels, as defined in Table 1, additional soil was removed from the area. After the additional soil was removed, a second round of samples was collected using the same methods as the first round of sampling. This iterative process was continued until the soil samples were in compliance with cleanup standards. Soil descriptions and other observations noted during the sampling activities were recorded in a field notebook.

Table 1. Action Levels of Arsenic

More than 12 inches below final surface	20 milligrams per kilogram[(1)]
Within 12 inches of final surface	10 milligrams per kilogram[(2)]

[(1)]Based on the Model Toxics Control Act Residential Cleanup Standard.

[(2)]Based on protection of ecological receptors per Endangered Species Act consultants with the U.S. Fish and Wildlife Service.

Sixty-seven percent of the soil samples were submitted to Analytical Resources Inc. (ARI) of Seattle, Washington, and analyzed for arsenic. The samples were submitted to ARI in daily batches so that analytical results could be obtained as quickly as possible. The ARI sample results were used to confirm the accuracy of the XRF results. ARI provided the arsenic analytical results to Ridolfi within 72-hours of when the samples arrived at the lab. Final grading and topsoil placement of the Site were not allowed until it was confirmed that the soil samples were in compliance with cleanup standards. Any deviations from this protocol are discussed in Section 3.4.

After approximately 20 sample pairs were obtained, a correlation analysis between the XRF and analytical results was conducted. The XRF and laboratory data were correlated as shown in Figure 18. The correlation was calculated to evaluate the agreement between the two methods.

When the correlation coefficient was equal to or greater than 0.75, the XRF method was considered to be sufficiently accurate and was used for cleanup decisions at the Site. During the last two weeks of the project, the number of samples submitted to the laboratory decreased to 20 percent.

The samples were scanned with the XRF to obtain preliminary arsenic concentrations. If the concentrations exceeded the action levels as defined in Table 1, the contractor was directed to excavate another one foot in that sample grid. When the concentration was less than the action level based on the XRF reading at each grid location, a sample was collected and sent to ARI for quick turn-around arsenic analysis. Once a sufficient number of pairs of results (XRF and laboratory data) were obtained, the data was correlated. When the data were well correlated, the percentage of laboratory samples decreased from 100 percent to 20 percent.

3.2 Quality Control

Five (10 percent of the primary samples collected) field duplicate samples were collected at the Site. The duplicate sample was collected from the same homogenized sample material as the primary sample and was analyzed for arsenic by the same method.

Matrix Spike/Matrix Spike Duplicate Samples (MS/MSD) were collected at five of the sample stations from the same homogenized material as the primary sample. The MS/MSD sample was designated in the field and identified on the chain-of-custody document. Preferably, the MS/MSD samples came from the same sample locations as the field duplicates. The MS/MSD samples were analyzed for arsenic by the same method as the primary samples and on the same day, if possible.

3.3 Investigation Derived Waste

All non-contaminated trash, personal-protective equipment, disposable sampling equipment, and other solid waste generated during sampling was placed in plastic garbage bags and hauled off-site for proper disposal. Because disposable sampling equipment was used, no waste water was generated.

3.4 XRF and Laboratory Analytical Results

The confirmation soil samples were analyzed for inorganic arsenic by U.S. EPA method 6010B and by an XRF instrument. The results of the arsenic analysis were compared to the Washington State Model Toxics Control Act (MTCA) ecological indicator soil concentration of 10 mg/kg (Ecology, 2001) and the MTCA value for residential land use of 20 mg/kg (Ecology, 2005) depending on where at the Site the sample was collected. Samples that were collected in areas that were excavated below the final project elevation by at least 1 foot and backfilled with clean fill material were considered in compliance if detected arsenic concentrations were less than 20 mg/kg. The contractor was required to provide clean fill material with a concentration of arsenic less than 10 mg/kg. All other areas were considered in compliance with cleanup levels if concentrations of arsenic were less than 10 mg/kg. A sufficiently sensitive analytical method was chosen to insure that the laboratory target reporting limit was below the cleanup level. A summary of the arsenic concentrations detected in the soil samples is presented in Table 2. Figure 16 provides the confirmation soil sampling locations and results.

Soil encountered at the Site was fill material consisting of silty sand, gravel, and cobbles. In the bottom of the pit in the "hot spot" area, the soil consisted of hardpan fill material, broken slag brick, and light brown silty sand.

Arsenic was detected in 29 soil samples collected at the Site with concentrations ranging from 6 to 150 mg/kg. Arsenic was detected at concentrations above the screening level of 20 mg/kg in four of the soil samples: sample 07061501Lab at sample point CS-08 (34 mg/kg); 07061921XRF at sample point CS-40 (26 mg/kg); sample 07071602Lab at sample point CS-46 (150 mg/kg); and sample 07071702Lab at sample point CS-48 (32 mg/kg). These sample points were over-excavated to depths of over 3 to 7 feet below final grade of the Site. After consultation with DNR and Ecology, a decision was made to halt further over-excavation at these sample points and backfill the areas with clean fill. The rationale for this decision was based on the possibility of "chasing" the arsenic off property and the fact that groundwater was present in the excavation at the deepest sampling locations.

In the "hot spot" area, an approximately 8 foot diameter 7 foot deep test pit was dug around sample point CS-46 in an attempt to reach arsenic levels under the MTCA level of 20 mg/kg. A composite sample was collected from the bottom of the pit and sent to ARI for arsenic analysis. Arsenic was detected in the composite sample 07071602Lab at a concentration of 150 mg/kg, which exceeds the cleanup level by a factor of 7.5. Arsenic concentrations at the sampling points surrounding CS-46 or the pit were below the cleanup level of 20 mg/kg, with the exception of sample point CS-48 (07071702Lab) which had an arsenic concentration of 32 mg/kg. Based on these results and the fact that the bottom of the pit was approximately 7 feet below grade and the surrounding area was 3 to 5 feet below grade a decision was made to stop further over-excavation in the area and cap it with clean fill. The decision was made after DNR consulted with Ecology.

Additionally, a toxicity characteristic leaching procedure sample was collected from the "hot spot" area to determine if the waste soil could be legally disposed at the waste disposal facility. Because of the old motor oil smell and the oily sheen on the standing water in the bottom of the pit in the "hot spot" area, a composite sample was collected and analyzed for the eight Resource Conservation and Recovery Act metals, semi-volatile organic compounds, and extended range diesel/oil hydrocarbons. Laboratory analytical results for these samples are included in Appendix B. The results from these samples were also compared to MTCA Method A cleanup standards or Ecology's Dangerous Waste Regulatory Values, as appropriate. None of the parameters exceeded screening levels with the exception of arsenic in soil, which was described above.

3.5 Data Review

Ridolfi conducted a limited independent review of the laboratory data package. Laboratory performance was assessed relative to method requirements for accuracy and precision. All performance criteria evaluated were acceptable.

4.0 PROJECT SCHEDULE

According to AEC's original schedule, the project was slated to begin on June 4, 2007 and finish by July 27, 2007. The project schedule included two phases to allow the project to be in compliance with a condition of the HPA permit issued by the WDFW. The first phase was scheduled from June 4 to June 22. During this phase, soil was excavated from the upland area behind a berm that isolated the excavation from Commencement Bay. AEC demobilized for 3 weeks and returned to the Site on July 16, 2007 for the second phase of the project, which was scheduled to last for two weeks. This phase of the project included completing the removal of arsenic-contaminated soil, installing floating silt curtains, excavating and constructing the opening to the marsh, cutting the sheet pile retaining wall, and placing the fill and topsoil throughout the Site. This schedule was adequate and allowed for changed conditions (contaminated soil excavation and disposal and potentially 6 days of standby time during confirmation soil sampling, which was described in Section 3) and seasonal weather conditions.

During the confirmation soil sampling event 2 days of standby time occurred, although the final invoice from AEC included a total of 3 days. The discrepancy is a result of differing interpretations of the definition of standby time. The project was halted on Wednesday June 20, because of the elevated concentrations of arsenic in the confirmation soil samples collected in the bullseye area. This was in the middle of the second or last week of the first phase of the project. DNR decided to halt the project and resume July 16, allowing time for consultation with Ecology. As a result, AEC was awarded 2 days of standby time. During the first week of the second phase of the project, AEC's ability to apply topsoil in some portions of the Site was restricted because ARI had not provided analytical lab results for those portions of the Site. Although AEC invoiced one day of standby time, they continued to work in other areas of the Site. At no time were they completely stopped from working. This discrepancy is currently being addressed.

The weather was relatively dry through the entire project, which facilitated excavation operations. To control dust, AEC frequently watered the Site. However, it rained heavily during the last week, creating muddy conditions in the lowest elevations of the Site. Because the Site

drained so well, the wet muddy soil dried within a few days and did not cause a problem. During this time, AEC covered the stockpiles with plastic, washed the wheels of the dump trucks leaving the Site, and continuously washed and swept the access route through Capital Lumber. This reduced the amount of material or mud leaving the Site.

5.0 FIELD CHANGES

This section describes the field changes that were processed during the project. No change orders were processed during the project. Field changes and change orders can raise the costs of the project as well as extend the schedule. Limiting change orders is an important part of managing a construction project. Some change orders can be limited prior to construction through additional data collection activities. Others are essentially unpredictable, and it is prudent to include a contingency in both budget and schedule for these eventualities.

Although a few design changes did occur, they were minimal and did not alter the cost of the project. The changes that occurred involved the sheet pile retaining wall, the use of mechanical anchors, the addition of a gravel pad, and the allowance of some confirmation soil sampling points to have concentrations above the MTCA level of 20 mg/kg. The confirmation soil sampling changes were discussed in Section 3.4.

The original design included plans for the portions of the sheet pile retaining wall within the Site to be completely removed (Figure 3). The first step of this process was to excavate all material from behind the sheet pile retaining wall. After this step was completed, it was determined that the sheet pile retaining wall was far more substantial then was previously anticipated. The wall was tied into a concrete footing with metal tie back rods. Pilings were present within the footing and appeared to be part of an old pier or structure. A decision was made to backfill the area with clean fill and only cut the corner segment of the wall bordering the opening of the Site and Commencement Bay (Figure 11). A full description of this task was discussed in Section 2.2.

The next change involved the anchors that were installed to tie down the LWD. Although not technically a change because the specifications allowed for either concrete anchors or mechanical anchors, it should be mentioned that Manta Ray™ mechanical anchors were used in place of cement anchors (Figure 14). A full discussion of the installation process is provided in Section 2.4.

The final change involved the addition of a 12 by 12 foot gravel pad installed along the access road in the central portion of the Site (Figure 2). The pad was designed to house water holding tanks in the event they are needed for the future irrigation system.

6.0 FINAL SITE CONDITIONS

At the end of the construction and restoration work described in this report, AEC used the surveying firm Baseline to prepare an as-built survey of the site (Figure 2). A planting plan, which includes wetland/marsh vegetation and riparian or upland plants, is currently being developed. Planting efforts are scheduled for the spring of 2008. Additionally, a temporary drip irrigation system will be designed to provide water for the upland plants until their roots are established.

7.0 PROJECT PERFORMANCE

The preliminary restoration objective of grading the site to desired elevations and removing arsenic-contaminated soil has been achieved. It is too early to determine whether the ultimate goal of providing a functional habitat will be achieved. First, the plants must be installed and allowed to grow. The plant community may take several years to develop, and it may progress in a trajectory different than envisioned in the design. In addition to development of a floral community, it is anticipated that a diverse faunal community will develop at the site as overall habitat conditions improve. Again, faunal development may take years to achieve, and monitoring will be required to document the progression.

8.0 PROJECT COSTS

Costs for restoration projects are controlled primarily by the amount of excavation required to reach appropriate elevations for restoration of salt marsh vegetation. Table 3 provides a comparison of estimated and final construction costs. As shown in Table 3, the engineer's estimate and the bid received from the contractor were within 2 percent.

Although field changes occurred and there was a discrepancy in actual amount of standby time accrued as described in Section 4.0, the final project cost was lower than the base bid; the final cost was just over $6,000 below the total original bid.

9.0 LESSONS LEARNED

In general, the restoration project proceeded within normal limits for projects of this type. The work was essentially completed as planned. The project was completed one day earlier than the original schedule. Although, the project was suspended for 2 days during the first phase it required 3 days less to complete the project than what was originally scheduled. The final cost of the project was less than the project bid. These positive results can be attributed at least in part to a strong working relationship between DNR as the owner, Ridolfi as the design engineer providing field oversight, and AEC as the Contractor. An important part of the working relationship was frequent, ongoing communication between field personnel (both contractor and oversight engineer) and office staff regarding conditions in the field compared to construction plans. Less frequent inspections or more formalized lines of communication might have allowed this type of problem to grow into a dispute costing time and money.

However, there were events that occurred that suggested that there was room for improvement and these are repeated here with the hope that future projects can benefit from these lessons:

There was a misunderstanding between DNR, Ridolfi, and AEC in the amount of standby time that was actually accrued during the confirmation soil sampling and arsenic-contaminated soil removal actions of the project. The discrepancy is a result of differing interpretations of the definition of standby time. Although the definition of standby time was informally discussed throughout the project, it would have been better to hold one meeting, before the soil sampling and removal activities began, with all participants involved in the project to discuss the issue, document the outcome in writing, and have all parties agree on the definition of standby time.

10.0 NEXT STEPS

The next step is to finish planting plan and plant the desired vegetation. Temporary irrigation systems are planned to provide water for the upland plants. After the plants are installed, a monitoring program will be instituted to document project performance. This program will involve physical and biological monitoring to evaluate whether the site is performing as intended. This will include measurement of parameters to evaluate elevation, soil type and salinity. Additionally, measurements will be made to evaluate function such as the density and diversity of plants, fish, and birds. This monitoring program will be conducted by the Trustees as part of a wider effort to evaluate restoration effectiveness in Commencement Bay.

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Washington State Department of Ecology (Ecology). 2005. Model Toxics Control Act Chapter 70.105D RCW [Amended 2005] and Cleanup Regulation Chapter 173-340 WAC. Toxics Cleanup Program, Department of Ecology. October.

TABLES

Table 1. Action Levels of Arsenic

More than 12 inches below final surface	20 milligrams per kilogram[(1)]
Within 12 inches of final surface	10 milligrams per kilogram[(2)]

[(1)]Based on the Model Toxics Control Act Residential Cleanup Standard.

[(2)]Based on protection of ecological receptors per Endangered Species Act consultants with the U.S. Fish and Wildlife Service.

Table 2. Confirmation Soil Sample Identification and Analytical Results

Sample Identification	Station Location	Sample Matrix	Date Collected	Time Collected	Analyses Requested Arsenic mg/kg	
07053053Lab	CS-01	Soil	5/30/2007	1:15 PM	14	
07053054Lab	CS-02	Soil	5/30/2007	1:18 PM	13	
07053052Lab	CS-03	Soil	5/30/2007	1:12 PM	12	
07053051Lab	CS-04	Soil	5/30/2007	1:10 PM	8	
07053055Lab	CS-05	Soil	5/30/2007	1:20 PM	12	
07060803Lab	CS-06	Soil	6/8/2007	2:25 PM	5	U
07060802Lab	CS-07	Soil	6/8/2007	2:10 PM	5	U
07061501Lab	CS-08	Soil	6/15/2007	2:00 PM	34	
07053050Lab	CS-09	Soil	5/30/2007	1:00 PM	8	
07061403Lab	CS-10	Soil	6/14/2007	1:10 PM	14	
07060804Lab	CS-11	Soil	6/8/2007	2:40 PM	5	U
07060801Lab	CS-12	Soil	6/8/2007	2:00 PM	5	
07061404Lab	CS-13	Soil	6/14/2007	1:25 PM	5	U
07061402Lab	CS-14	Soil	6/14/2007	1:00 PM	5	U
07060805Lab	CS-15	Soil	6/8/2007	2:50 PM	8	
07061408Lab	CS-16	Soil	6/14/2007	2:40 PM	19	
07061405Lab	CS-17	Soil	6/14/2007	1:35 PM	5	U
07061406Lab	CS-17	Soil	6/14/2007	1:40 PM	5	U
07071904XRF	CS-18	Soil	7/19/2007	1:04 PM	6	
07061409Lab	CS-19	Soil	6/14/2007	3:15 PM	5	U
07061401Lab	CS-20	Soil	6/14/2007	12:45 PM	5	U
07071905XRF	CS-21	Soil	7/19/2007	1:09 PM	15	U
07061502Lab	CS-22	Soil	6/15/2007	2:27 PM	6	U
07061410Lab	CS-23	Soil	6/14/2007	3:20 PM	5	U
07071915XRF	CS-24	Soil	7/19/2007	2:20 PM	12	U
07061407Lab	CS-25	Soil	6/14/2007	1:50 PM	5	U
07061503Lab	CS-26	Soil	6/15/2007	2:55 PM	6	U
07061411Lab	CS-27	Soil	6/14/2007	3:25 PM	5	U
07071916XRF	CS-28	Soil	7/19/2007	2:23 PM	19	U
07061506Lab	CS-29	Soil	6/15/2007	3:50 PM	20	
07071704Lab	CS-30	Soil	7/17/2007	10:55 AM	20	

Table 2. Confirmation Soil Sample Identification and Analytical Results

Sample Identification	Station Location	Sample Matrix	Date Collected	Time Collected	Analyses Requested	
					Arsenic mg/kg	
07061412Lab	CS-31	Soil	6/14/2007	3:30 PM	10	
07061511Lab	CS-32	Soil	6/15/2007	4:20 PM	20	U
07071615XRF	CS-33	Soil	7/16/2007	2:21 PM	17	U
07071710XRF	CS-34	Soil	7/17/2007	1:48 PM	10	U
07061510Lab	CS-35	Soil	6/15/2007	4:15 PM	20	U
07071701Lab	CS-37	Soil	7/17/2007	9:00 AM	19	
07071901Lab	CS-38	Soil	7/19/2007	3:00 PM	16	
07061508Lab	CS-39	Soil	6/15/2007	4:00 PM	6	U
07061921XRF	CS-40	Soil	6/19/2007	1:05 PM	26	
07071824XRF	CS-41	Soil	7/18/2007	2:13 PM	16	
07071629XRF	CS-42	Soil	7/16/2007	3:04 PM	15	U
07071623XRF	CS-43	Soil	7/16/2007	2:38 PM	11	U
07061916XRF	CS-44	Soil	6/19/2007	12:42 PM	7	U
07071661XRF	CS-45	Soil	7/16/2007	5:35 PM	9	U
07071602Lab	CS-46	Soil	7/16/2007	3:00 PM	150	
07061915XRF	CS-47	Soil	6/19/2007	12:37 PM	10	
07071702Lab	CS-48	Soil	7/17/2007	9:30 AM	32	
07071703Lab	CS-48[a]	Soil	7/17/2007	9:35 AM	32	
07061917XRF	CS-49	Soil	6/19/2007	12:48 PM	14	
07071826XRF	CS-50	Soil	7/18/2007	2:40 PM	20	
07071820XRF	CS-51	Soil	7/18/2007	1:12 PM	12	
07071606XRF	CS-52	Soil	7/16/2007	1:47 PM	16	U
07071823XRF	CS-53	Soil	7/18/2007	1:58 PM	10	U
07071705Lab	CS-54	Soil	7/17/2007	2:40 PM	9	U
07061905XRF	CS-55	Soil	6/19/2007	12:15 PM	10	

Notes:
a: Sample 07071703Lab is a field duplicate of sample 07071702Lab
cs: confirmation sample
mg/kg: milligrams per kilogram
U: not detected

Table 3. Comparison of Estimated and Final Construction Costs

Description	Cost
Engineer's estimate	$510,000
Anderson Environmental Contracting bid amount	$517,765
Anderson Environmental Contracting final cost	$511,634

FIGURES

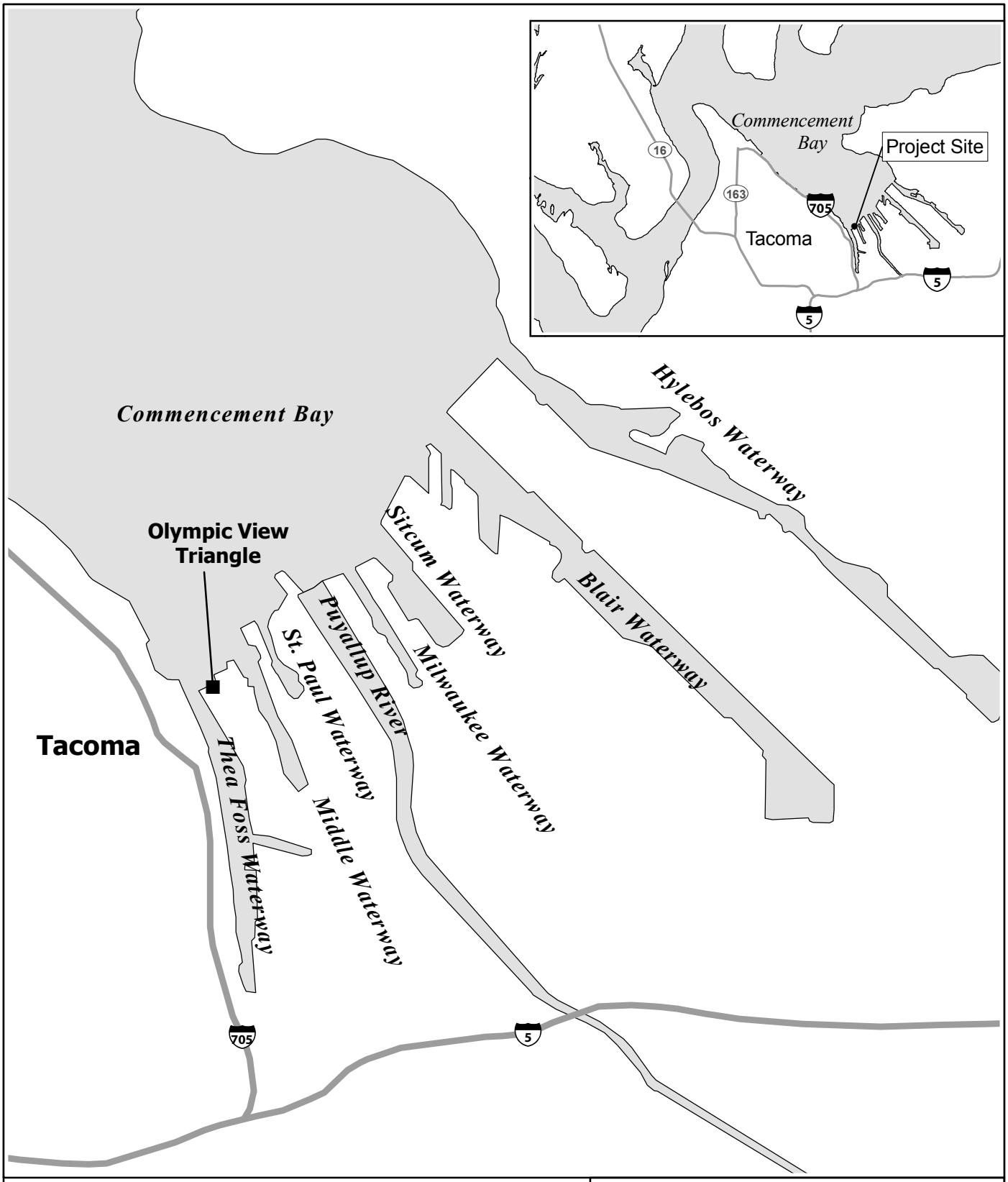


Figure 1
Vicinity Map

Olympic View Triangle Restoration Project
Post-Restoration and Cleanup Action Report

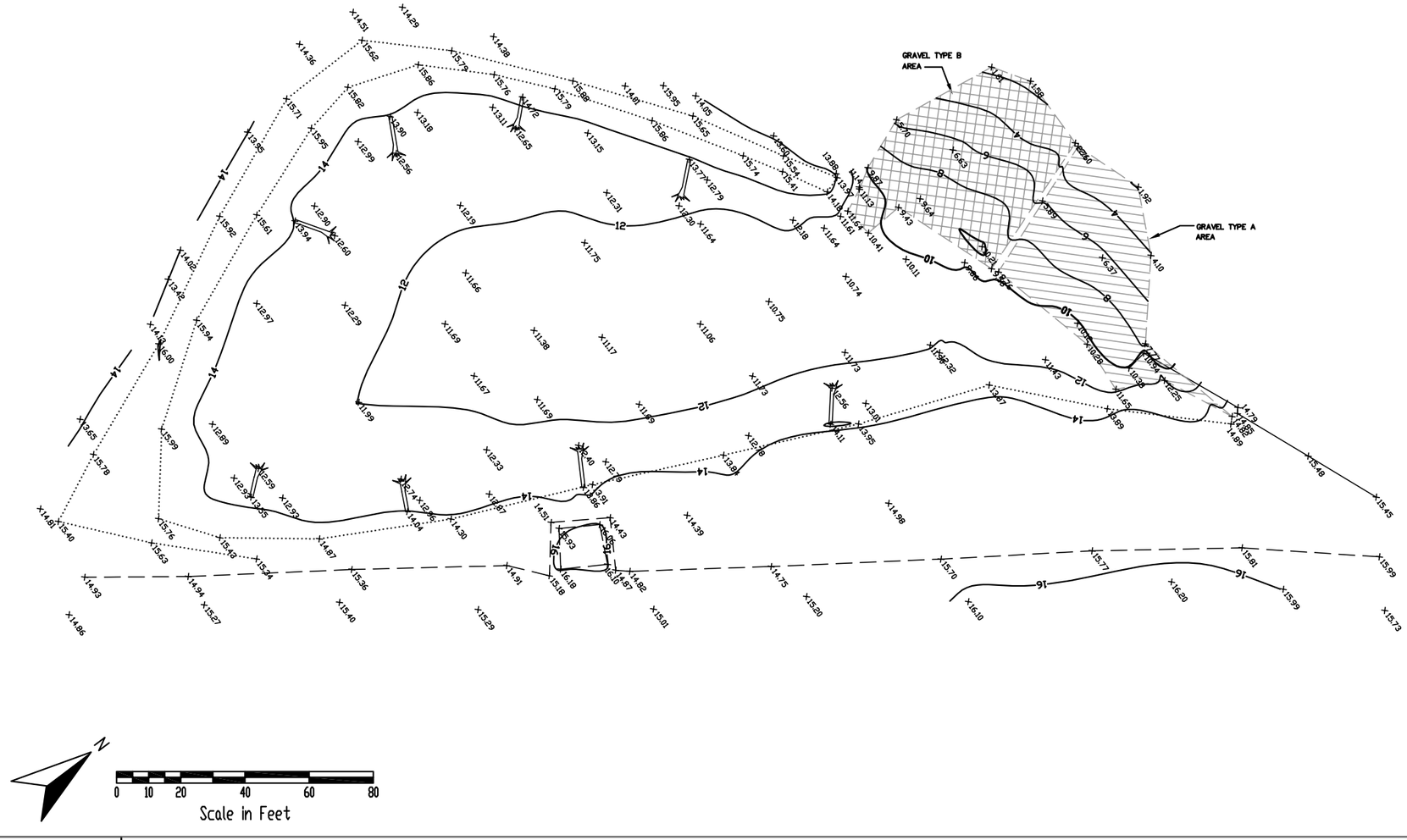
September 2007

RIDOLFI Inc.

File Path: ...\\Active Projects\502 Washington DNR\502B WDNR_Oly_View\GIS\mapfile\postrestreport\figure_01_location.mxd

OLYMPIC VIEW TRIANGLE HABITAT RESTORATION PROJECT
FINAL CONSTRUCTION SURVEY

FIELD SURVEY COMPLETED 7/31/07



HORIZONTAL DATUM

PROJECT DATUM AS PROVIDED BY CONTRACTING AGENCY.
WASHINGTON STATE COORDINATE SYSTEM OF 1983, NORTH ZONE

VERTICAL DATUM

PROJECT DATUM AS PROVIDED BY CONTRACTING AGENCY.
MLLW US COAST AND GEODETIC SURVEY (USC&GS)

BASELINE ENGINEERING, INC.

Land Development Professional Services

(253)565-4491 • Seattle (206)824-1205 • FAX (253)565-8563

Land Planning & Use • Engineering • Surveying

1910-64th Avenue West, • Tacoma, WA 98466

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RIDOLFI Inc.	Post-Restoration and Cleanup Action Report	September 2007	Figure 2
	Olympic View Triangle Restoration Project	Final Construction Survey	

Figure 3. Existing Site Conditions

Figure 4. Setting Up Erosion Control Fencing to Protect Adjacent Waterbodies

Figure 5. Floating Silt Curtain to Prevent Sedimentation of Commencement Bay

Figure 6. Bank Protection with Geotextile Fabric and Geoweb Material

Figure 7. Stockpiles of Waste Materials and Waste Hauling Truck

Figure 8. Survey Crew Planning Site Layout Staking

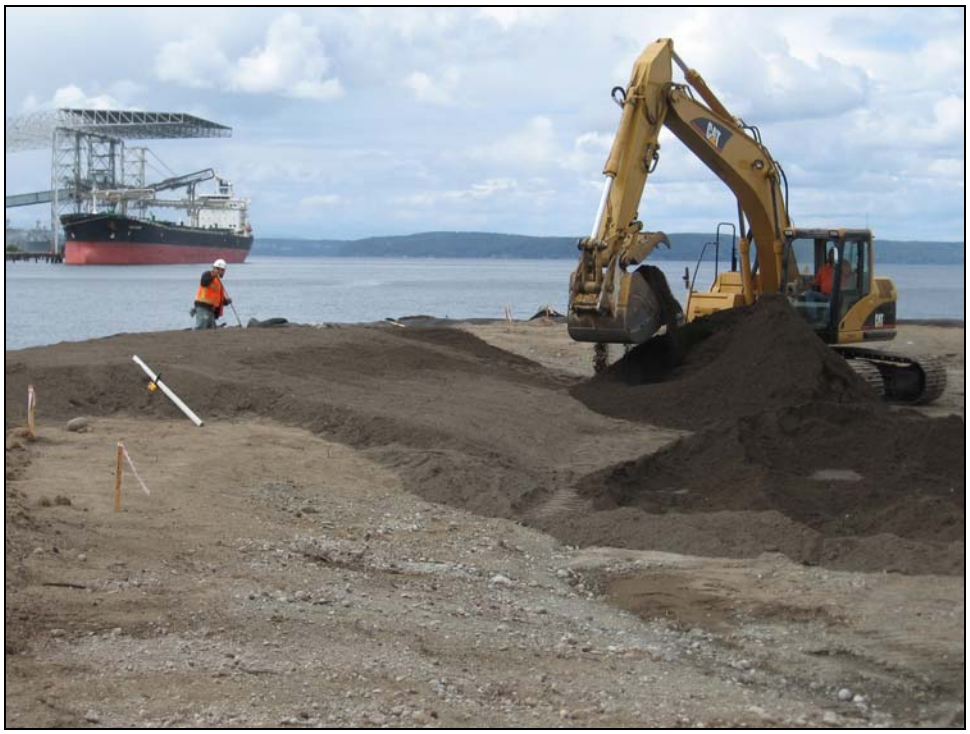


Figure 9. Placing Topsoil Using a Trackhoe

Figure 10. Final Site Features

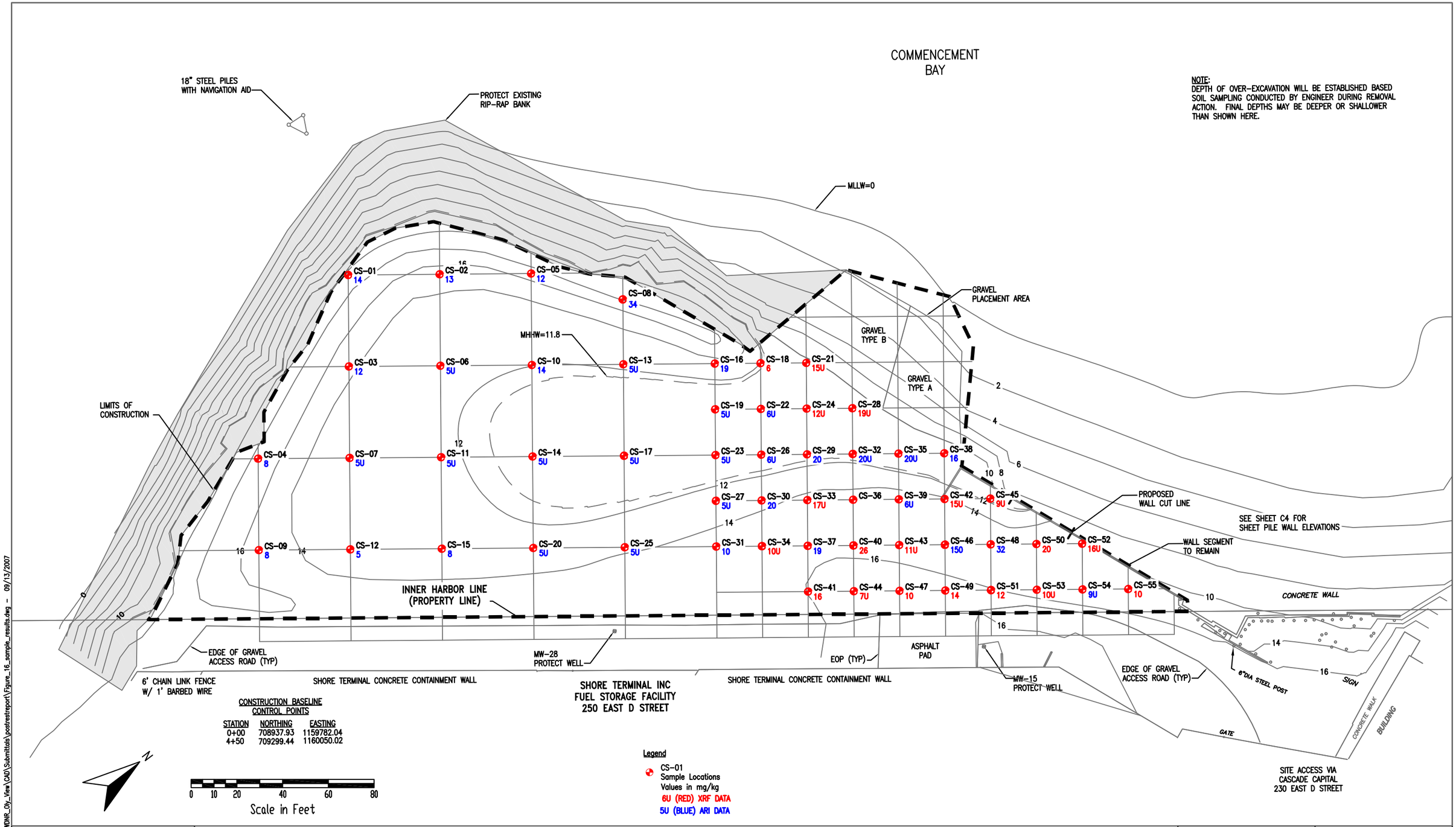
Figure 11. Sheet Pile Wall Being Cut with Acetylene Torch

Figure 12. Marsh Opening Gravel Mixes

Figure 13. Large Woody Debris

Figure 14. Manta Ray Mechanical Anchors for Large Woody Debris

Figure 15. Chaining and Anchoring Large Woody Debris



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RIDOLFI Inc.	Post-Restoration and Cleanup Action Report	September 2007	Figure 16
	Olympic View Triangle Restoration Project	Confirmation Soil Sample Locations and Results	

Figure 17. Testing a Soil Sample with the Portable XRF

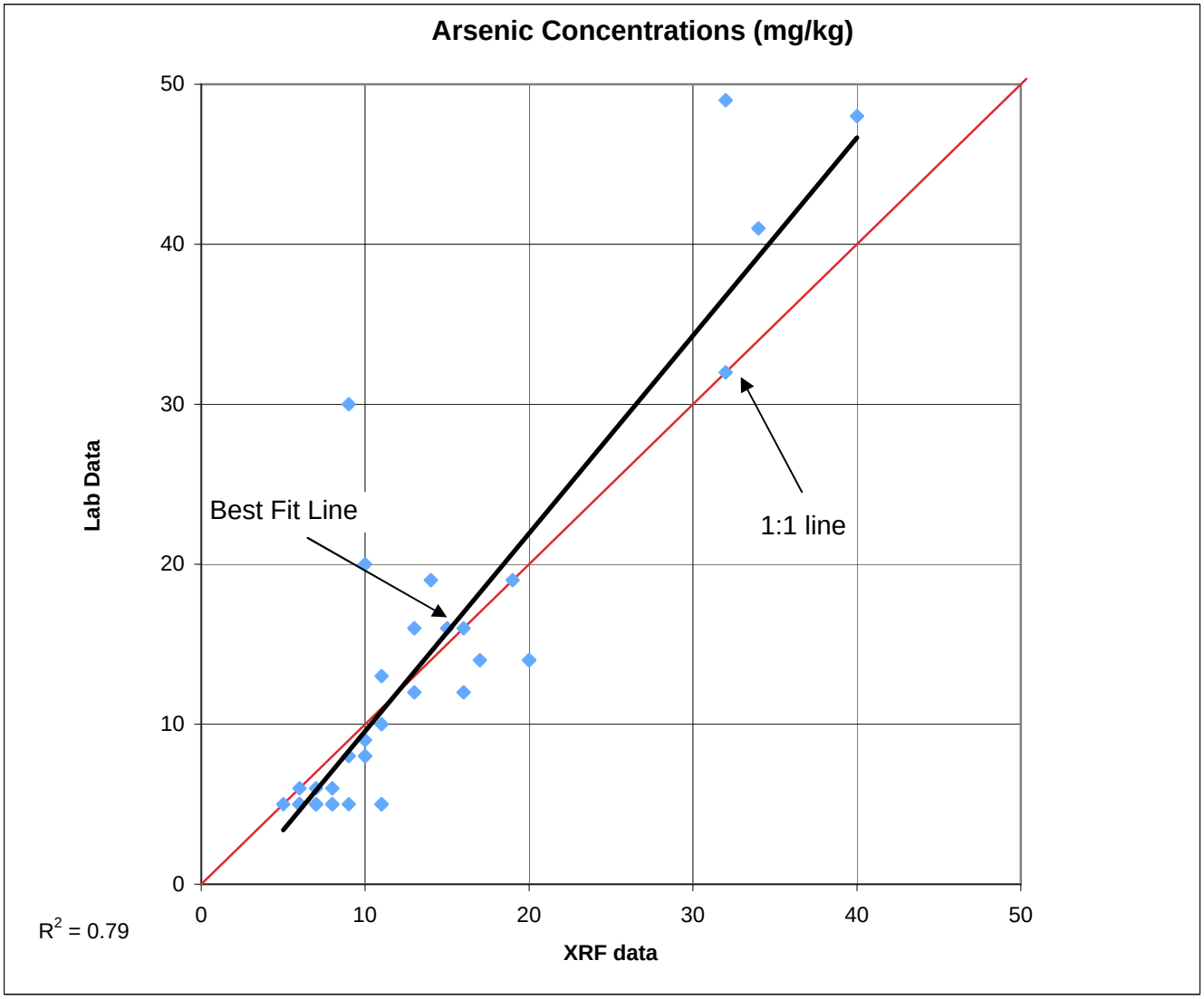

Figure 18. XRF and Laboratory Correlation

APPENDIX A
Field Observation Reports

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 4, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: C. Wagoner (Ridolfi), Sherrie Duncan (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); Tim Goodman (DNR) and Father in-law; Man decommissioning monitoring wells; Fill material provider; materials and equipment providers

WEATHER: Overcast **TEMPERATURE:**

WIND: Calm Time: 0900 Temp. F: ~65

ACTIVITIES and PROGRESS

1. Activities Underway –

First day of project. AEC was mobilizing.

2. Equipment in Use –

One trackhoe (Cat) and a ditchwitch on site. Approximately 4-6 dumptrucks with trailors delivered gravel for temporary road and bank protection areas and quarry spalls for bank protection areas. Trackhoe was used to grub and clear and grade for installation of geotextile and geocell in the bank protection area on the west corner of the site. Ditchwitch was used to dig trench to install silt fence on along the east border of the site.

3. Progress to Date –

- First day of project. AEC mobilizing. Ridolfi and AEC had a tailgate safety meeting. Equipment arrives at site: trackhoe; ditchwitch; and toilet. Gravel for the temporary road was delivered; Gravel (5/8") and quarry spalls (8") for the bank protection area on the western corner of the site was delivered; geotextile and geocell material was delivered.
- Temporary road was put in along the eastern border of the site.
- Silt fence was installed along the eastern border of the site.
- The western corner of the site was grubbed and cleared and brought to grade for the installation of the geotextile and geocell to create the bank protection area.
- Installation of the bank protection area was started: geotextile; geocell; and gravel were placed starting along bank protection area on the bay side.
- Monitoring wells were decommissioned.
- Security Fence installed at entrance to site and back of Cascade Capital's yard.

OBSERVATIONS and DISCUSSION

- Everything off to a good start. Things are running smooth. One of the gravel trucks took a chunk of wood in the sidewall of a tire. Tire went flat. Truck parked outside of Cascade Capital to have tire changed. First day of trucks and access went smooth with Cascade Capital.
- Geotextile; geocell; gravel installation looked good. Rod suggested laying the excess geotextile over the installed geocell material that was filled with gravel. This would act as a barrier between the geocell and topsoil and provide additional filtration and bank protection. Colin agreed and thought it was a great idea.
- Wells decommissioned by man pouring bentonite into pipes. Rod suggested cutting the pipes just below grade so the wells remained sealed. If the pipes are pulled out there will be a void and the wells technically would not be sealed. Colin thought this was a good idea and said he would double check with Ecology to see if it met their criteria.
- A seal visited the site.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

No problems were identified.

ACTION ITEMS

1. Colin will contact Ecology to see if it is ok to cut the well casing pipes just below grade instead of pulling the pipes.
2. Company providing fish mix wants to know how many additional tons of Type A are needed.
3. Need sample of topsoil and analytical for organic matter and pH.
4. Garrett Hale (AEC) will provide Stormwater Pollution Prevention Plan.
5. Sherrie will drive hospital route to make sure it has not changed with all the construction underway in Tacoma.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 5, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); Fill material provider; materials and equipment providers; Baseline surveyors

WEATHER: Overcast **TEMPERATURE:**

WIND: Calm Time: 0900 Temp. F: ~52

ACTIVITIES and PROGRESS

1. Activities Underway –

Clearing and grubbing; bank protection area installation; surveying.

2. Equipment in Use –

One trackhoe (Cat); AEC crew trucks; water tank on trailor. Rental company picked up ditchwitch.

3. Progress to Date –

- Second day of project. AEC grubbing/clearing and installing bank protection area on the western corner of the site (geotextile, geocell, gravel, quarry spalls). Equipment arrives at site: water tank on trailor for dust control.
- Installation of the bank protection area was started: geotextile; geocell; and gravel were placed starting along bank protection area on the bay side.
- Surveyors onsite surveyed up to 1+50 line.

OBSERVATIONS and DISCUSSION

- Things are running smooth.
- Geotextile; geocell; gravel installation looked good.
- Colin got ok from Ecology to cut monitoring well pipes just below grade.
- Geocell material has 6" cells instead of 4" cells (it's thicker). Rod says price will be same.
- Analytical back from ARI for the first samples. All except one meet criteria of 20 mg/kg arsenic. CS08 will be overexcavated and resampled. No topsoil can be placed in this area. Four samples did not meet criteria of 10 mg/kg. AEC was directed to put 1 foot of topsoil in these areas.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

No problems were identified.

ACTION ITEMS

1. Colin will contact Ecology to see if it is ok to cut the well casing pipes just below grade instead of pulling the pipes.
2. Company providing fish mix wants to know how many additional tons of Type A are needed.
3. Need sample of topsoil and analytical for organic matter and pH.
4. Garrett Hale (AEC) will provide Stormwater Pollution Prevention Plan.
5. Sherrie will drive hospital route to make sure it has not changed with all the construction underway in Tacoma.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 6, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); Fill material provider; materials and equipment providers

WEATHER: Overcast **TEMPERATURE:**

WIND: SW ~10K Time: 1420 Temp. F: ~55

ACTIVITIES and PROGRESS

1. Activities Underway –

Excavation has started.

2. Equipment in Use –

One trackhoe (Cat); AEC crew trucks; water tank on trailer.

3. Progress to Date –

- Third day of project. AEC grubbing/clearing and installing bank protection area on the western corner of the site (geotextile, geocell, gravel, quarry spalls).
- Installation of the bank protection area was started: geotextile; geocell; and gravel were placed starting along bank protection area on the bay side.
- Well ballards are gone.

OBSERVATIONS and DISCUSSION

- Things are running smooth.
- Geotextile; geocell; gravel installation looked good.
- Rod asked if blackberries should be removed from south corner of site. It was not clear on the drawing. He was concerned the rip-rap wall would get torn-up. We asked him to remove them and smooth the area to match the final grade. He was able to do this without disturbing too many of the cement blocks in the rip-rap wall.
- AEC requested to use mechanical anchors instead of cement anchors for LWD. The specifications and drawings had both listed. The HPA called for cement anchors. The use o f mechanical Manta Ray 2 anchors was ok'd by Colin and Tim.
- We will be able to sample the next section of the site on Friday June 8.
- Rod asked if hydro-seeding will occur.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

No problems were identified.

ACTION ITEMS

1. Make sure Garrett knows that every sample needs to go to the lab.
2. Get plans/procedures from AEC for installing mechanical Manta Ray 2 anchors for LWD.
3. Consider hydro-seeding site when it is done. If hydro-seeded, who will water it?

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 6, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); Fill material provider; materials and equipment providers; Baseline surveyors

WEATHER: Overcast **TEMPERATURE:**

WIND: SW ~10K Time: 1420 Temp. F: ~55

ACTIVITIES and PROGRESS

1. Activities Underway –

Excavation has started.

2. Equipment in Use –

One trackhoe (Cat); AEC crew trucks; water tank on trailer. Rental company picked up ditchwitch.

3. Progress to Date –

- Third day of project. AEC grubbing/clearing and installing bank protection area on the western corner of the site (geotextile, geocell, gravel, quarry spalls).
- Installation of the bank protection area was started: geotextile; geocell; and gravel were placed starting along bank protection area on the bay side.
- Well ballards are gone.

OBSERVATIONS and DISCUSSION

- Things are running smooth.
- Geotextile; geocell; gravel installation looked good.
- Rod asked if blackberries should be removed from south corner of site. It was not clear on the drawing. He was concerned the rip-rap wall would get torn-up. We asked him to remove them and smooth the area to match the final grade. He was able to do this without disturbing too many of the cement blocks in the rip-rap wall.
- AEC requested to use mechanical anchors instead of cement anchors for LWD. The specifications and drawings had both listed. The HPA called for cement anchors. The use of mechanical Manta Ray 2 anchors was ok'd by Colin and Tim.
- We will be able to sample the next section of the site on Friday June 8.
- Rod asked if hydro-seeding will occur.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

No problems were identified.

ACTION ITEMS

1. Make sure Garrett knows that every sample needs to go to the lab.
2. Get plans/procedures from AEC for installing mechanical Manta Ray 2 anchors for LWD.
3. Consider hydro-seeding site when it is done. If hydro-seeded, who will water it?

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 8, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Kathryn Foster (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); Luke Becker (H&B Topsoil); Fill material provider

WEATHER: Sunny **TEMPERATURE:**

WIND: Slight breeze from north Time: 1430 Temp. F: ~70

ACTIVITIES and PROGRESS

1. Activities Underway –

Excavated to 1+50 line.

2. Equipment in Use –

One trackhoe (Cat); AEC crew trucks; water tank on trailer.

3. Progress to Date –

- Fifth day of project. AEC excavating site and placing waste in a pile for trucks to haul out. AEC left before 3pm to travel back to Longview.
- Pierce County lagged getting AEC the waste hauling permit.

OBSERVATIONS and DISCUSSION

- Things are running smooth.
- Site is excavated to 1+50 line.
- Kathryn and I were able to XRF and collect 5 more soil samples for the lab
- Luke Becker from H&B Topsoil was on-site. He brought analytical results for topsoil. Everything was ok except that the pH was below 6. He suggested amending it with lime after it is all placed. He also suggested aiming for a pH of 6, instead of a pH of 8, which is closer to what native plants need. Colin ok'd the topsoil to be delivered and amended in the field after it is placed.
- The possibility of rain was discussed. Rod and I walked the perimeter of the waste pile and determined it was highly unlikely that runoff and turbidity from the pile would enter the bay if it rained. The pile was not covered for the weekend.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

No problems were identified.

ACTION ITEMS

1. Make sure Garrett knows that every sample needs to go to the lab.
2. Second round of sampling tomorrow.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 11, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); Luke Becker (H&B Topsoil); Topsoil provider; waste hauling providers

WEATHER: Cloudy **TEMPERATURE:**

WIND: 5K SW Time: 1330 Temp. F: ~60

ACTIVITIES and PROGRESS

1. Activities Underway –

- Waste haulers taking out loads.
- Topsoil being delivered and placed.
- Wetting area for dust control

2. Equipment in Use –

One trackhoe (Cat); AEC crew trucks; water tank on trailer.

3. Progress to Date –

Sixth day of project. AEC loading waste hauling trucks from the enormous waste pile. AEC placing topsoil on bank protection area and creating berm in western corner of the site.

OBSERVATIONS and DISCUSSION

- Things are running smooth.
- Waste pile looked fine after weekend. It only rained a little bit and actually helped with dust control. Waste haulers are making a tiny dent. Twenty-six to thirty waste hauling trucks moving through site. Approximately 1,000 tons of waste removed by 1400.
- Lots of loads of topsoil being delivered.
- Lots of activity on-site with trucks and CATs
- Truck traffic so far seems ok with Capital.
- LWD looks great.
- Garrett says a hoe-pack needs to be used in the over-excavation bullseye area. I contacted Colin and verified that we did not want any of the site to be compacted. We reiterated that we wanted the site "roughed-up" before topsoil is placed. Rod will do this by using the CAT bucket with teeth.
- Loan madrone was saved in middle of site on the bayside.
- I observed approximately 25 juvenile salmon cruising the rip-rap bank near the future opening of the site!
- We will be able to sample Thursday or Friday. More of the waste pile has to be moved before excavation can resume.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

No problems were identified.

ACTION ITEMS

1. Make sure Garrett knows that every sample needs to go to the lab.
2. Make sure Garrett knows that work may be stopped if lab results don't come in.
3. Make sure Garrett knows that no compaction is to take place on the site.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 13, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); Topsoil provider; waste hauling providers

WEATHER: Partly sunny **TEMPERATURE:**

WIND: 5-10K SW Time: 1000 and 1630 Temp. F: ~60

ACTIVITIES and PROGRESS

1. Activities Underway –

- Waste haulers taking out loads.
- Topsoil being delivered and placed on berm.
- LWD set out in approximate locations.
- Wetting area for dust control.

2. Equipment in Use –

One trackhoe (Cat); AEC crew trucks; water tank on trailer.

3. Progress to Date –

- Eighth day of project. AEC loading waste hauling trucks from the enormous waste pile. AEC placing topsoil on bank protection area and creating berm in western corner of the site. Topsoil is placed on berm and down to 13 MLLW, waiting for lab results so they can place more.
- LWD has been placed in approximate locations throughout the upper end of the site.
- Approximately 2000 tons of waste has been removed from the site.
- Lab results came in clean for last round. AEC can spread topsoil.
- Rod is going to over excavate CS08 (48 mg/kg) so that we can resample it tomorrow.

OBSERVATIONS and DISCUSSION

- Things are running smooth.
- Lots of activity on-site with trucks and CATs
- Truck traffic so far seems ok with Capital.
- We will be able to sample Thursday or Friday. More of the waste pile has to be moved before excavation can resume.
- Over excavation in bullseye will start soon. Rod needs to know what the elevations are in the bullseye.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

No problems were identified.

ACTION ITEMS

1. Get elevations of over excavation are for Rod so he knows where and how deep to dig.
2. Sample tomorrow.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 14, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Kathryn Foster (Ridolfi); Colin Wagoner (Ridolfi); Tim Goodman (DNR); Tom Gibbons (DNR); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); Luke Becker (H&B Topsoil); Topsoil provider; waste hauling providers

WEATHER: Partly sunny **TEMPERATURE:**

WIND: 5K N Time: 1000 Temp. F: ~60

ACTIVITIES and PROGRESS

1. Activities Underway –

- Waste haulers taking out loads.
- Topsoil being delivered and placed on berm.
- LWD set out in approximate locations.
- Wetting area for dust control.

2. Equipment in Use –

Two trackhoes (Cat); AEC crew trucks; water tank on trailer.

3. Progress to Date –

- Ninth day of project. AEC loading waste hauling trucks from the enormous waste pile. Topsoil is placed on berm and down to 13 MLLW, waiting for lab results so they can place more.
- LWD has been placed in approximate locations throughout the upper end of the site.
- Approximately 4300 tons of waste has been removed from the site.
- Onsite to do another round of XRF and soil sampling. DNR came to observe sampling process.
- Rod over excavated CS08 (48 mg/kg) and we took another confirmation sample to send to the lab.

OBSERVATIONS and DISCUSSION

- Things are running smooth.
- Lots of activity on-site with trucks and CATs
- Truck traffic so far seems ok with Capital.
- Rod, Colin, Kathryn, and I had a safety talk about working onsite with all the heavy equipment.
- We will be able to sample today and Friday. More of the waste pile has to be moved before excavation can resume.
- Over excavation in bullseye will start tomorrow.
- Colin and Hazel provided Rod a figure with the elevations in the bullseye area.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

No problems were identified.

ACTION ITEMS

1. Sample tomorrow.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 15, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Kathryn Foster (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); Topsoil provider; waste hauling providers

WEATHER: Sunny **TEMPERATURE:**

WIND: 5K N Time: 1000 Temp. F: ~65

ACTIVITIES and PROGRESS

1. Activities Underway –

- Waste haulers taking out loads.
- Topsoil being delivered and placed on berm.
- LWD set out in approximate locations.
- Wetting area for dust control.
- Soil sampling.

2. Equipment in Use –

Two trackhoes (Cat); Dozer; AEC crew trucks; water tank on trailer.

3. Progress to Date –

- Tenth day of project. AEC loading waste hauling trucks from the enormous waste pile. Topsoil is placed on berm and down to 13 MLLW, waiting for lab results so they can place more.
- LWD has been placed in approximate locations throughout the upper end of the site.
- Approximately 5800 tons of waste have been removed from the site.
- Onsite to do another round of XRF and soil sampling and XRF showing some high hits. XRF stopped working after batteries were changed. Continued to jar samples to send them to lab.
- AEC left around 1400 to head home.
- Over excavation has started in the bullseye area.

OBSERVATIONS and DISCUSSION

- Things are running smooth.
- Lots of activity on-site with trucks and CATs
- Truck traffic so far seems ok with Capital.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

No problems were identified.

ACTION ITEMS

1. Kathryn will work on getting XRF to resume working.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 18, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); waste hauling providers

WEATHER: Sunny **TEMPERATURE:**

WIND: 5K N Time: 1000 Temp. F: ~65

ACTIVITIES and PROGRESS

1. Activities Underway –

- Waste haulers taking out loads.
- LWD installation.
- Wetting area for dust control.
- Excavation of bullseye area.

2. Equipment in Use –

Two trackhoes (Cat); Dozer; AEC crew trucks; water tank on trailer.

3. Progress to Date –

- Eleventh day of project. AEC loading waste hauling trucks from the enormous waste pile. Topsoil is placed on berm and down to 13 MLLW, waiting for lab results so they can place more.
- After tomorrow the berm will be raked and wetted on last time. We need to stay off of it!
- LWD is being installed throughout the upper end of the site.
- Manta Ray 2 anchors and 2600lb chain and quick links are being installed; LWD is anchored to them. Specs called for 4000lb chain and 1/2"4000lb shackles which are used in big rivers-Colin ok'd the switch.
- Can't place last three LWD until lab results come in.
- Approximately 6048 tons of waste has been removed from the site.
- Over excavation has started in the bullseye area.

OBSERVATIONS and DISCUSSION

- Things are running smooth.
- Lots of activity on-site with trucks and CATs
- Truck traffic so far seems ok with Capital.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

No problems were identified.

ACTION ITEMS

1. AEC will not be part of soil amendment activities. That will be H&B Topsoil's responsibility.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 19, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Kathryn Foster (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); waste hauling providers

WEATHER: Sunny **TEMPERATURE:**

WIND: 5K N Time: 1000 Temp. F: ~65

ACTIVITIES and PROGRESS

1. Activities Underway –

- LWD installation.
- Wetting area for dust control.
- Soil sampling.

2. Equipment in Use –

Two trackhoes (Cat); Dozer; AEC crew trucks; water tank on trailer.

3. Progress to Date –

- Twelfth day of project. AEC loading waste hauling trucks from the enormous waste pile. Topsoil is placed on berm and down to 13 MLLW, waiting for lab results so they can place more.
- Berm is done, stay off of it!
- LWD is being installed throughout the upper end of the site.
- Can't place last three LWD until lab results come in.
- Approximately 6048 tons of waste has been removed from the site. Small pile being created at far eastern end of the site for the remaining waste from the bullseye area.
- Over excavation in the bullseye area is complete. The first phase of the site is excavated to subgrade. Only the opening, berm, steel sheetpile area need to be excavated.
- Tide water is entering the site to approximately 11 MLLW.

OBSERVATIONS and DISCUSSION

- We found slag in the northwest half of the bullseye area during soil sampling! Arsenic concentrations in this area are ranging from 20-460 mg/kg according to the XRF. One piece of slag had a reading of 9,856 mg/kg arsenic; 541 mg/kg silver; 3,667 mg/kg lead; and 541 mg/kg silver.
- Called Colin he is contacting Tim. DNR will come to site tomorrow to decide what to do about slag. Only a TCLP sample was taken today.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

Slag and high concentrations of arsenic found in the northwest half of the bullseye area.

ACTION ITEMS

1. Onsite meeting tomorrow to decide what to do about slag.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** June 20, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Kathryn Foster (Ridolfi); Colin Wagoner (Ridolfi); Tim Goodman (DNR); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); rental equipment supplier

WEATHER: Sunny **TEMPERATURE:**

WIND: 5K N Time: 0900 Temp. F: ~65

ACTIVITIES and PROGRESS

1. Activities Underway –

- Wetting area for dust control.
- Digging test pits to XRF arsenic concentrations in soil in the bullseye area.
- Discussing slag problem

2. Equipment in Use –

Two trackhoes (Cat); Dozer; AEC crew trucks; water tank on trailer.

3. Progress to Date –

Thirteenth day of project.

- Topsoil is placed on berm down to 13 MLLW, waiting for lab results so AEC can place more.
- Berm is done, stay off of it!
- LWD is installed throughout the upper end of the site.
- Can't place last three LWD until lab results come in.
- Over excavation in the bullseye area is complete. The first phase of the site is excavated to subgrade. Only the opening, berm, steel sheetpile area need to be excavated.
- Tide water is entering the site to approximately 11 MLLW.

OBSERVATIONS and DISCUSSION

- Rod dug test pits so we could see the extent of the slag material in the northwest corner of the site. Around noon it was decided to stop the project because of the slag and high concentrations of arsenic. The project is scheduled to resume July 16.
- AEC demobilized and was gone from the site by 1400.
- As part of the demobilization AEC covered the remaining (small) waste pile with plastic.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

Slag and high concentrations of arsenic in the northwest half of the bullseye area

ACTION ITEMS

1. Colin will come up with cost estimates for Tim. The cost estimates will provide an idea of how much money and time is needed to deal with the slag and arsenic contamination.
2. Sherrie will finish field reports and photo logs.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** July 16, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Kathryn Foster (Ridolfi); Colin Wagoner (Ridolfi); Tim Goodman (DNR); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); rental equipment supplier

WEATHER: Sunny **TEMPERATURE:**

WIND: 5K N Time: 0800 Temp. F: ~80

ACTIVITIES and PROGRESS

1. Activities Underway –

- Remobilization for last phase of project.
- Floating silt curtain being prepared for deployment.
- Wetting area for dust control.
- Starting over dig to remove arsenic from bullseye area.
- XRF arsenic concentrations in soil in the bullseye area.
- Discussing slag problem.

2. Equipment in Use –

Two trackhoes (Cat 320C); AEC crew trucks; water tank on trailer.

3. Progress to Date –

Second phase of project.

Colin and Tim were on site to determine the best approach to dealing with arsenic removal in bullseye area. Tim set some protocols for the over dig.

1. Top of grade to 3 feet below grade needs to have an XRF reading of 15 ppm or less arsenic.
2. From 3 feet to 5 feet below grade needs to have an XRF reading of 50 ppm or less arsenic.
3. From 5 feet below grade needs to have an XRF reading of 100 ppm or less arsenic.
4. Any area with an XRF reading of 16 ppm or greater arsenic needs to have 3 feet of clean fill placed on top of it.
5. An estimated 180 to 200 tons of waste soil will come out of the over dig. The over dig needs to stop once the 200 ton limit is reached, so that the project does not exceed its over dig budget.
6. The over dig near the road should be kept at a 1:1 slope.
7. If the material in the berm (opening) has an XRF reading of 20 ppm or less arsenic, that material can be used as backfill in the over dig area.
8. Any material in the berm with an XRF reading of 21 ppm arsenic or more needs to be hauled off site.

OBSERVATIONS and DISCUSSION

- We tested the soil at the mid way point of the berm facing (site side). We started at the 2+50 line on the drawings and worked to the northeast along the berm. Twenty feet northeast of the berm had an XRF reading of 77 ppm. This area can not be used as backfill. From this point we took readings every 10 feet along the mid point of the berm. These XRF readings were all Non Detect arsenic. We were not able to take readings from the top of the berm because it is still covered with concrete rubble.
- During the over dig around sample point CS 46 (the hotspot). The XRF readings ranged from 375 ppm to 170 ppm 7 feet below grade. An old motor oil smell was coming out of the bottom of the pit and the pit filled with approximately one foot of water. There was a slight sheen on the water in the pit. Rod had to break apart hardpan fill material which appeared to include broken slag and brick to reach this depth. We called Tim and he said to stop digging. We grabbed an archive soil sample to be potentially analyzed for TPH-dx, RCRA 8 metals, and SVOCs at a later date. The pit will be covered/capped with approximately 6.5 feet of clean fill. We measured the location of the pit using the concrete wall and the end of the sheet pile wall as reference points. This information can be used in the future if it is decided that a monitoring well needs to be put in at the site in the vicinity of the hot spot.
- Lab results came back for the area of the site that was constructed during the first phase of the project. They were clean. Topsoil can be placed up to the bullseye area. AEC has decided to place topsoil throughout the entire site as their last task. This will ensure the topsoil will not be disturbed during the final over digs and construction phase.
- Topsoil is placed on berm down to 13 MLLW, waiting for lab results so AEC can place more.
- Berm is done, stay off of it!
- LWD is installed throughout the upper end of the site.
- Only the opening, berm, steel sheetpile area need to be excavated.
- Tide water is entering the site to approximately 11 MLLW.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

- Slag and high concentrations of arsenic in the northwest half of the bullseye area.
- The sheet pile wall is more substantial. It has concrete footings and steel pipe tie back rods running from the sheet pile wall to the footings. Colin will come tomorrow to decide how to modify the cut of the wall and the contours of the final grade in the sheet pile wall area.

ACTION ITEMS

1. Take more XRF readings after the concrete rubble has been removed from the berm area (opening) to see if the material can be used as back fill.
2. Colin will modify design of sheet pile wall cut and the contours of the final grade in that area.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** July 17, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Kathryn Foster (Ridolfi); Colin Wagoner (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); rental equipment supplier

WEATHER: Overcast **TEMPERATURE:**

WIND: 5K N Time: 0800 Temp. F: ~55

ACTIVITIES and PROGRESS

1. Activities Underway –

- Floating silt curtain deployed.
- Wetting area for dust control.
- Continuing over dig to remove arsenic from bullseye area.
- XRF arsenic concentrations in soil in the bullseye area.
- Colin deciding on design modifications for sheet pile wall area.

2. Equipment in Use –

Two trackhoes (Cat 320C); AEC crew trucks; water tank on trailer.

3. Progress to Date –

Second phase of project.

- Turbidity curtain is set from the remaining riprap wall to the corner of the sheet pile wall. The curtain will be in place for the rest of the project. AEC will monitor it and adjust it as needed.
- Concrete waste from the berm area and the bullseye area is being hauled off site. The concrete will be measured and submitted in cubic yards instead of tonnage. This differs from the specifications. A few of the trucks will be weighed at weigh scales to get an average weight to use in the conversion.
- Four trucks hauled off waste soil today for an approximate total of 120 tons. The concrete trucks area carrying approximately 20 tons. Four to five trucks hauled off concrete today for an approximate total of 80 to 100 tons.
- Protocols for over dig in bullseye and berm area:
    1. Top of grade to 3 feet below grade needs to have an XRF reading of 15 ppm or less arsenic.
    2. From 3 feet to 5 feet below grade needs to have an XRF reading of 50 ppm or less arsenic.
    3. From 5 feet below grade needs to have an XRF reading of 100 ppm or less arsenic.
    4. Any area with an XRF reading of 16 ppm or greater arsenic needs to have 3 feet of clean fill placed on top of it.
    5. An estimated 180 to 200 tons of waste soil will come out of the over dig. The over dig needs to stop once the 200 ton limit is reached, so that the project does not exceed its over dig budget.
    6. The over dig near the road should be kept at a 1:1 slope.
    7. If the material in the berm (opening) has an XRF reading of 20 ppm or less arsenic, that material can be used as backfill in the over dig area.
    8. Any material in the berm with an XRF reading of 21 ppm arsenic or more needs to be hauled off site.
- Lab results came back for the area of the site that was constructed during the first phase of the project. They were clean. Topsoil can be placed up to the bullseye area. AEC has decided to place topsoil throughout the entire site as their last task. This will ensure the topsoil will not be disturbed during the final over digs and construction phase.

- We took five confirmation samples in the bullseye area and have one more to get under the berm at the opening.
- Topsoil is placed on berm down to 13 MLLW.
- Berm is done, stay off of it!
- LWD is installed throughout the upper end of the site.
- Only the opening, berm, steel sheetpile area need to be excavated.
- Tide water is entering the site to approximately 11 MLLW.

OBSERVATIONS and DISCUSSION

- Two feet of standing water in the over dig pit (CS 46). Oily sheen on the water seems to have dissipated and the old oil smell is gone. Soil at the bottom of the pit is hardpan fill material with broken slag brick and light brown soil. The area needs to be broken with the trackhoe to dig any further. Material seems to be acting as a cap. The bottom of the pit is approximately 7 feet below final grade.
- The design drawings point out that the elevations may be wrong in the vicinity of the sheetpile wall and the beach area of the site. Rod shot the elevations at the sheet pile wall and along the Gravel A and B areas. The 0 foot contour on our drawings is correct. The corner of the sheetpile wall is really 8 feet instead of 10 feet as shown on the drawings. May want to update the drawings to reflect this.
- Colin has modified the design in the area of the sheet pile wall. Tim needs to verify the new design change. Basically, the wall will not be cut to the level of the existing beach. It will be cut to just above the steel tie back rods. The concrete footings will remain. Only the corner portion of the wall will be cut out. The final grade will be determined after the cut and will simply be feathered into the final grade of the berm area and the adjacent beach. The area will be planted according to the final elevations.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

Slag and high concentrations of arsenic in the northwest half of the bullseye area.

ACTION ITEMS

1. Take more XRF readings after the concrete rubble has been removed from the berm area (opening) to see if the material can be used as back fill.
2. Update drawings to reflect true elevations.
3. If any of the fill in the berm area is clean (<20 ppm arsenic) it can be used as backfill in the bullseye area. If this happens AEC will be paid an hourly rate of $578/hr. All equipment and AEC personnel will work on the berm area during this time. Rod and I need to document and agree on the hours at the end of the day. All other work will go back to the standard pay rate.
4. Colin will write up a design modification for the sheet pile wall so that the change is documented and Rod can continue.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** July 18, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Kathryn Foster (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); rental equipment supplier

WEATHER: Rain **TEMPERATURE:**

WIND: 5K NW Time: 0800 Temp. F: ~55

ACTIVITIES and PROGRESS

1. Activities Underway –

- Concrete and waste soil being hauled off site.
- Clean fill being placed in bullseye area.
- XRF arsenic concentrations in soil in the berm (opening area).

2. Equipment in Use –

Two trackhoes (Cat 320C); AEC crew trucks; water tank on trailer.

3. Progress to Date –

Second phase of project.

- Turbidity curtain is set from the remaining riprap wall to the corner of the sheet pile wall. The curtain will be in place for the rest of the project. AEC will monitor it and adjust it as needed.
- The berm is ready to be taken out. We tested the soil on top of the berm, at the mid way point of the berm facing (site side and bayside), and at the bottom of the berm. We started at the 2+50 line on the drawings and worked to the northeast along the berm taking readings every 20 feet. We shot numerous points along the berm with the XRF and determined that all of the material will all have to be removed from the site. The berm material had XRF readings over 20 ppm arsenic, the highest being 3587 ppm. None of the berm material can be used as fill in the site. We will go back to the original plan of all waste being hauled off site and there will be no hourly charge rate.
- The bullseye overdig area has been covered with one foot or more of clean fill.
- Concrete waste and waste soil from the berm area and the bullseye area is being hauled off site.
- Five trucks hauled off waste soil from the overdig bullseye area for a total of 150 tons. We came in under the 200 ton budgeted limit for waste soil from the bullseye area to be hauled off site. The concrete trucks are carrying approximately 20 tons. The only concrete left to haul off site is the concrete in the berm.
- Lab results came back for the area of the site that was constructed during the first phase of the project. They were clean. Topsoil can be placed up to the bullseye area. AEC has decided to place topsoil throughout the entire site as their last task. This will ensure the topsoil will not be disturbed during the final over digs and construction phase.
- We took five confirmation samples in the bullseye area and have one more to get under the berm at the opening.
- Topsoil is placed on berm down to 13 MLLW.
- Berm is done, stay off of it!
- LWD is installed throughout the upper end of the site.
- Only the opening, berm, steel sheetpile area need to be excavated.

OBSERVATIONS and DISCUSSION

- Tide water is entering the site to approximately 11 MLLW.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

None

ACTION ITEMS

1. Take more XRF readings from the berm area (opening) to see if it needs to be over excavated to remove arsenic.
2. Update drawings to reflect true elevations.
3. Colin will write up a design modification for the sheet pile wall so that the change is documented and Rod can continue.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** July 19, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Kathryn Foster (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); rental equipment supplier

WEATHER: Rain **TEMPERATURE:**

WIND: 5K NW Time: 0900 Temp. F: ~55

ACTIVITIES and PROGRESS

1. Activities Underway –

- Concrete and waste soil being hauled off site.
- Clean fill being placed in bullseye area.
- XRF arsenic concentrations in soil in the berm (opening area).

2. Equipment in Use –

Two trackhoes (Cat 320C); AEC crew trucks; water tank on trailer.

3. Progress to Date –

Second phase of project.

- Turbidity curtain is set from the remaining riprap wall to the corner of the sheet pile wall. The curtain will be in place for the rest of the project. AEC will monitor it and adjust it as needed. Seems to be working great through the rain storms.
- Jana Magoon and Desiree Poole from City of Tacoma came and toured the site this morning. We were not here. Rod showed them around.
- The berm is gone. We tested the soil at subgrade in the berm area and had to have Rod dig down another foot. It is now clean! The whole site can have fill placed throughout it and be finished. We took our last confirmation sample and the last 6 samples will be sent to the lab today. Our archive sample from the pit area (CS 46) will be analyzed for RCRA 8 metals, TPH-Dx, and SVOCs. Tim signed off on this analysis plan. The XRF can be sent back to the rental company.
- The bullseye overdig area has been covered with one foot or more of clean fill. Approximately 675 tons of fill was used in the area.
- Concrete waste and waste soil from the berm area and the bullseye area are being hauled off site.
- Nine trucks hauled off waste soil from the berm area for a total of approximately 270 tons. Approximately 150 tons of waste soil remain at the site and will be removed from the site Monday. The pile will be covered with plastic for the weekend. All of the concrete will be gone from the site by early next week.
- As soon as the waste pile is gone the sheet pile wall will be cut.
- Gravel A and B mix will be showing up at the site tomorrow and will be stock piled along the opening. On the low tide Monday the mixes will be placed throughout the beach area.

- 850 tons of topsoil is currently on site. Approximately 500 to 600 tons will be needed to finish the site.
- Topsoil can be placed throughout the site. AEC has decided to place topsoil throughout the entire site as their last task. This will ensure the topsoil will not be disturbed during the final over digs and construction phase.
- Topsoil is placed on berm down to 13 MLLW.
- Berm is done, stay off of it!
- LWD is installed throughout the upper end of the site.
- Only the steel sheetpile area needs to be brought to grade.
- Tide water is entering the site to approximately 11 MLLW.

OBSERVATIONS and DISCUSSION

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PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

None

ACTION ITEMS

1. Update drawings to reflect true elevations.
2. Colin will write up a design modification for the sheet pile wall so that the change is documented and Rod can continue.
3. The Trustees will be visiting the site Tuesday July 24 at 10:15 am.
4. AEC needs to remove the last 25 gal. drum that was at the site before construction began.
5. Schedule final site walk with Tim (Thursday?).

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** July 23, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC)

WEATHER: Overcast **TEMPERATURE:**

WIND: 5K NW Time: 0900 Temp. F: ~55

ACTIVITIES and PROGRESS

1. Activities Underway –

- Concrete and waste soil being hauled off site.
- Clean fill being placed in bullseye area.
- Gravel A and B stockpiled onsite.
- Preparing to cut sheet pile wall.

2. Equipment in Use –

Two trackhoes (Cat 320C); AEC crew trucks; water tank on trailer.

3. Progress to Date –

Second phase of project.

- Quantities of material hauled on and off site as of 7/23/07:

  Topsoil:
  815 tons on site
  450 to 550 tons needed to finish
  Estimated Total: 1,265 to 1,365 tons

  LRI Waste:
  6,000 tons from 1st phase
  792 tons from 7/16 to 7/20
  150 tons left to be hauled out
  Estimated Total: 6,942 tons

  Fill Material:
  675.54 tons on site

  Concrete:
  290 to 310 tons

  Gravel A:
  200 tons (may need a little more)

  Gravel B:
  290 tons

- Turbidity curtain is set from the remaining riprap wall to the corner of the sheet pile wall. The curtain will be in place for the rest of the project. AEC will monitor it and adjust it as needed. Seems to be working great through the rain storms.
- The berm is gone. We tested the soil at subgrade in the berm area and had to have Rod dig down another foot. It is now clean! The whole site can have fill placed throughout it and be finished. We took our last confirmation sample and the last 6 samples will be sent to the lab today. Our archive sample from the pit area (CS 46) will be analyzed for RCRA 8 metals, TPH-Dx, and SVOCs. Tim signed off on this analysis plan. The XRF can be sent back to the rental company.
- The bullseye overdig area has been covered with one foot or more of clean fill. Approximately 675 tons of fill was used in the area.
- Concrete waste and waste soil from the berm area and the bullseye area are being hauled off site.
- As soon as the waste pile is gone the sheet pile wall will be cut.
- Gravel A and B mix is stock piled along the opening and will be spread throughout the beach area during the low tide.
- Topsoil can be placed throughout the site. AEC has decided to place topsoil throughout the entire site as their last task. This will ensure the topsoil will not be disturbed during the final over digs and construction phase.
- Topsoil is placed on berm down to 13 MLLW.
- Berm is done, stay off of it!
- LWD is installed throughout the upper end of the site.
- Only the steel sheetpile area needs to be brought to grade.
- Tide water is entering the site to approximately 11 MLLW.

OBSERVATIONS and DISCUSSION

- Tim signed off on the sheet pile wall cut modification. The corner of the sheet pile wall will be cut out and the concrete footings and tie-back rods will remain. A 3 foot swath of Gravel A will be spread along the areas of the sheet pile wall that face the water. This will protect the topsoil that will be placed in the area and help dissipate wave action. The sheet pile wall area will be tapered into the surrounding grade.
- As a result of the large amounts of rain over the past few days, the site is fairly mucky. Rod will dress the area from the riparian berm to the 2+50 line (marsh area) and let a tide cycle run through to allow the muck to settle before placing topsoil in the area.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

None

ACTION ITEMS

1. Update drawings to reflect true elevations.
2. Colin will write up a design modification for the sheet pile wall so that the change is documented and Rod can continue.
3. The Trustees will be visiting the site Tuesday July 24 at 10:15 am.
4. Schedule final site walk with Tim (Thursday?).

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** July 24, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Colin Wagoner (Ridolfi); Kirk Hackler (Osborne Pacific); Tim Goodman (DNR); Dan Averil (DNR); Trustees group; Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); Luke Becker (H&B Topsoil)

WEATHER: Sunny **TEMPERATURE:**

WIND: 5K NW Time: 0900 Temp. F: ~60

ACTIVITIES and PROGRESS

1. Activities Underway –

- Trustees visiting the site.
- Clean fill being placed in bullseye area.
- Topsoil being place in marsh area.
- LWD being placed in marsh area.
- Preparing to cut sheet pile wall.

2. Equipment in Use –

Two trackhoes (Cat 320C); bulldozer; AEC crew trucks; water tank on trailer.

3. Progress to Date –

Second phase of project.

- All waste materials have been hauled off site.
- Tim signed off on the sheet pile wall cut modification. The corner of the sheet pile wall will be cut out and the concrete footings and tie-back rods will remain. A 3 foot swath of Gravel A will be spread along the areas of the sheet pile wall that face the water. This will protect the topsoil that will be placed in the area and help dissipate wave action. The sheet pile wall area will be tapered into the surrounding grade.
- As a result of the large amounts of rain over the past few days, the site is fairly mucky. Rod will dress the area from the riparian berm to the 2+50 line (marsh area) and let a tide cycle run through to allow the muck to settle before placing topsoil in the area.
- Quantities of material hauled on and off site as of 7/23/07:

  Topsoil:
  815 tons on site
  450 to 550 tons needed to finish
  Estimated Total:
  1,265 to 1,365 tons

  LRI Waste:
  6,000 tons from 1st phase
  792 tons from 7/16 to 7/20
  150 tons left to be hauled out
  Estimated Total: 6,942 tons

Fill Material:
675.54 tons on site

Concrete:
290 to 310 tons

Gravel A:
200 tons (may need a little more)

Gravel B:
290 tons

- Turbidity curtain is set from the remaining riprap wall to the corner of the sheet pile wall. The curtain will be in place for the rest of the project. AEC will monitor it and adjust it as needed. Seems to be working great through the rain storms.
- The berm is gone. We tested the soil at subgrade in the berm area and had to have Rod dig down another foot. It is now clean! The whole site can have fill placed throughout it and be finished. We took our last confirmation sample and the last 6 samples will be sent to the lab today. Our archive sample from the pit area (CS 46) will be analyzed for RCRA 8 metals, TPH-Dx, and SVOCs. Tim signed off on this analysis plan. The XRF can be sent back to the rental company.
- The bullseye overdig area has been covered with one foot or more of clean fill. Approximately 675 tons of fill was used in the area.
- Concrete waste and waste soil from the berm area and the bullseye area are being hauled off site.
- As soon as the waste pile is gone the sheet pile wall will be cut.
- Gravel A and B mix is stock piled along the opening and will be spread throughout the beach area during the low tide.
- Topsoil can be placed throughout the site. AEC has decided to place topsoil throughout the entire site as their last task. This will ensure the topsoil will not be disturbed during the final over digs and construction phase.
- Topsoil is placed on berm down to 13 MLLW.
- Berm is done, stay off of it!
- LWD is installed throughout the site.
- Only the steel sheetpile area needs to be brought to grade.
- Tide water is entering the site to approximately 11 MLLW.

OBSERVATIONS and DISCUSSION

- Site looks great!! All of Gravel A and B mixes are spread throughout the beach area. Rod dressed the marsh area and is now placing topsoil over it. More fill is needed to bring the bullseye area to grade. As soon as it is to grade the area will be ready for topsoil. The final LWD pieces were being installed today. Topsoil is being brought in and spread throughout the marsh area. Colin provided Rod a drawing showing the modification to the sheet pile wall. The cut should be done at the end of today.
- Kirk and the Trustees were onsite to do a walk through and discuss planting designs. The Trustees seemed very happy with the way the site was turning out. Kirk suggested hydro-seeding the site with short grass or clover to stop erosion and add nitrogen. The short grasses or one season crop would be easy to manipulate when it came time to do the real plantings. Kirk also agreed with Luke that a pH of 5.5 is just fine for native plants and amending it with lime would cause the soil to lose some of its water retention. Colin contacted Tim and Tim agreed that the soil did not have to be amended with lime to be brought up to pH 6. Tim will email Garrett with this information and Rod will pass it on to Luke. We

also discussed irrigation. Luke is coming up with some cost estimates and some ideas on how best to deal with the irrigation issue (no water or electricity on site and only need the system for 2 years).

- Rod was directed to create a 12 foot X 12 foot gravel pad across from Valero's security gate between the 2+00 and 1+50. The gravel pad will be used to store water storage tanks for the irrigation system.
- Desiree Poole and Terry (last name?) from the City of Tacoma came to the site. We were not there. Rod gave them a tour and they were really happy with the progress and how the site looked. Seemed excited that the restoration was happening.
- Rod and I scheduled at pre-final site walk for Wednesday afternoon. We will try to do a final site walk with Tim mid-morning Thursday.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

None

ACTION ITEMS

1. Update drawings to reflect true elevations.
2. Schedule final site walk with Tim (Thursday?).

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** July 25, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC);

WEATHER: Sunny **TEMPERATURE:**

WIND: 5K NW Time: 1430 Temp. F: ~65

ACTIVITIES and PROGRESS

1. Activities Underway –

- Trustees visiting the site.
- Topsoil being placed in bullseye area.
- Topsoil being place in marsh area.
- Cutting sheet pile wall.

2. **Equipment in Use –** Two trackhoes (Cat 320C); bulldozer; AEC crew trucks; water tank on trailer.

3. Progress to Date –

Second phase of project.

- All waste materials have been hauled off site.
- Site looks great!! All of Gravel A and B mixes are spread throughout the beach area. As a result of the large amounts of rain over the past few days, the site was fairly mucky. Rod dressed the area from the riparian berm to the 2+50 line (marsh area) and let a tide cycle run through to allow the muck to settle before placing topsoil in the area. The marsh area is dressed and Rod is placing topsoil over it and the bullseye area. The sheet pile wall will be cut by the end of today.
- Tim signed off on the sheet pile wall cut modification. The corner of the sheet pile wall will be cut out and the concrete footings and tie-back rods will remain. A 3 foot swath of Gravel A will be spread along the areas of the sheet pile wall that face the water. This will protect the topsoil that will be placed in the area and help dissipate wave action. The sheet pile wall area will be tapered into the surrounding grade.
- Quantities of material hauled on and off site as of 7/25/07:

Topsoil:
1535 tons

LRI Waste:
7044

Fill Material:
924.27 tons

Concrete:
290 to 310 tons

Gravel A:
261.31

Gravel B:
286.42 tons

- Turbidity curtain is set from the remaining riprap wall to the corner of the sheet pile wall. The curtain will be in place for the rest of the project. AEC will monitor it and adjust it as needed. Seems to be working great through the rain storms.
- The berm is gone. We tested the soil at subgrade in the berm area and had to have Rod dig down another foot. It is now clean! The whole site can have fill placed throughout it and be finished. We took our last confirmation sample and the last 6 samples will be sent to the lab today. Our archive sample from the pit area (CS 46) will be analyzed for RCRA 8 metals, TPH-Dx, and SVOCs. Tim signed off on this analysis plan. The XRF can be sent back to the rental company.
- The bullseye overdig area has been covered with one foot or more of clean fill. Approximately 675 tons of fill was used in the area.
- Concrete waste and waste soil from the berm area and the bullseye area are being hauled off site.
- As soon as the waste pile is gone the sheet pile wall will be cut.
- Gravel A and B mix is stock piled along the opening and will be spread throughout the beach area during the low tide.
- Topsoil can be placed throughout the site. AEC has decided to place topsoil throughout the entire site as their last task. This will ensure the topsoil will not be disturbed during the final over digs and construction phase.
- Topsoil is placed on berm down to 13 MLLW.
- Berm is done, stay off of it!
- LWD is installed throughout the site.
- Only the steel sheetpile area needs to be brought to grade.
- Tide water is entering the site to approximately 11 MLLW.

OBSERVATIONS and DISCUSSION

- The high tide today is 10.1 feet at 1700. Around 1430 the silty freshwater lens of the Puyallup River swung and extended from the mouth of the river and to the southern shoreline of the bay including the site. The Puyallup River water was entering the site. I took pictures and called Kirk Hackler (Landscape Architect) and let him know this was happened. We talked yesterday about the possibility of freshwater input from the river supporting Carex L. I let him know we have salinity measurements from multiple years of fish monitoring at the site and suggested that we could take a few more readings at the site during high tides from now until planting (April) to determine whether or not Carex would survive.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

None

ACTION ITEMS

1. Update drawings to reflect true elevations.
2. Final site walk with Tim and Colin tomorrow.

REPORT PREPARED BY: Sherrie Duncan

FIELD OBSERVATION REPORT

PROJECT: 502B **DATE:** July 25, 2007

PROJECT NO. Olympic View Triangle Habitat Restoration Site Construction Oversight **REPORT NO.**

CONTRACTORS ON-SITE: Anderson Environmental Contracting LLC. (AEC)

PERSONS ON-SITE: Sherrie Duncan (Ridolfi); Colin (Ridolfi); Tim Goodman (DNR);Rod Rea (AEC Foreman), Randy (AEC), Brad (AEC); Luke Becker (H&B Topsoil); Ted Lilyeblade (NuStar); Fence installers

WEATHER: Overcast **TEMPERATURE:**

WIND: 5K NW Time: 1000 Temp. F: ~55

ACTIVITIES and PROGRESS

1. Activities Underway –

- Final site walk with Colin and Tim and Rod.
- Site is being prepared for demob.

2. Equipment in Use –

Two trackhoes (Cat 320C); bulldozer; AEC crew trucks; water tank on trailer.

3. Progress to Date –

Second phase of project.

- Site is dressed and done!
- Quantities of material hauled on and off site as of 7/26/07:

Topsoil:
1535 tons

LRI Waste:
7044

Fill Material:
924.27 tons

Concrete:
290 to 310 tons

Gravel A:
261.31

Gravel B:
286.42 tons

OBSERVATIONS and DISCUSSION

- This is the final walk through. Everything looks great. Colin had Rod (AEC) wrap some Gravel A and Gravel B around the toe of the berm to blend it into the beach area and help protect the area from potential erosion. The sheet pile wall is out. It took 20 hrs to cut the wall due to the thickness and condition of the wall.
- We were able to see the whole site, as we were there at low tide which was a -0.6 foot tide. When we left AEC was finishing up placing gravel on NuStar's service road and creating the 12 X 12 foot gravel pad for the irrigation tanks. Luke Becker was on site and street sweeping Cascade's road. The fence installers were finishing up Cascade's new security fence, and AEC did a final inspection of Cascade's road with Cascade. Everything seemed good.
- Ted Lilyeblade from NuStar came on site and participated in the final walk. He was pleased with the site. He said we had to go through the legal avenues with NuStar's head office to find out if NuStar would be willing to enter an agreement to fill the irrigation tanks with their water.
- AEC will have Baseline survey and create the as-built report. Baseline is scheduled to do the surveying Monday July 30.
- Colin and I placed nine pieces of rebar throughout the site to monitor elevation changes overtime. The rebar pieces were two to four feet in length and were driven into the ground until approximately 1 foot remained above ground surface. Five pieces run from the beach area to through the center of the site to the toe of the berm and three cross this line at the 1+50 line to form a T. One piece of rebar is at the end of the short section of the sheet pile wall in topsoil. We took our first measurements today. R1 (at opening in gravel) 1.40 ft; R2 1.20 ft; R3 1.31 ft; R4 0.84 ft; R5 0.95 ft; R6 (at 1+50 line near road) 1.00 ft; R7 1.17 ft; R8 (at 1+50 line at toe of berm) 0.98 ft; R9 (at end of short section of sheetpile wall in topsoil) 1.06 ft.

PROBLEM IDENTIFICATION and CORRECTIVE MEASURES

None

ACTION ITEMS

1. Update drawings to reflect true elevations.
2. Write Engineers Final Report and submit to DNR by September 15, 2007.

REPORT PREPARED BY: Sherrie Duncan

APPENDIX B
Laboratory Reports

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: 07071601
SAMPLE

Lab Sample ID: LI18A
LIMS ID: 07-14922
Matrix: Soil
Data Release Authorized:
Reported: 07/30/07

QC Report No: LI18-Ridolfi, Inc.
Project: Olympic View
502B
Date Sampled: 07/16/07
Date Received: 07/19/07

Date Extracted: 07/26/07
Date Analyzed: 07/30/07 12:54
Instrument/Analyst: NT6/LJR
GPC Cleanup: No

Sample Amount: 7.69 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: 30.6%
pH: 9.5

CAS Number	Analyte	RL	Result
108-95-2	Phenol	65	< 65 U
111-44-4	Bis-(2-Chloroethyl) Ether	65	< 65 U
95-57-8	2-Chlorophenol	65	< 65 U
541-73-1	1,3-Dichlorobenzene	65	< 65 U
106-46-7	1,4-Dichlorobenzene	65	< 65 U
100-51-6	Benzyl Alcohol	320	< 320 U
95-50-1	1,2-Dichlorobenzene	65	< 65 U
95-48-7	2-Methylphenol	65	< 65 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	65	< 65 U
106-44-5	4-Methylphenol	65	< 65 U
621-64-7	N-Nitroso-Di-N-Propylamine	320	< 320 U
67-72-1	Hexachloroethane	65	< 65 U
98-95-3	Nitrobenzene	65	< 65 U
78-59-1	Isophorone	65	< 65 U
88-75-5	2-Nitrophenol	320	< 320 U
105-67-9	2,4-Dimethylphenol	65	< 65 U
65-85-0	Benzoic Acid	650	< 650 U
111-91-1	bis(2-Chloroethoxy) Methane	65	< 65 U
120-83-2	2,4-Dichlorophenol	320	< 320 U
120-82-1	1,2,4-Trichlorobenzene	65	< 65 U
91-20-3	Naphthalene	65	< 65 U
106-47-8	4-Chloroaniline	320	< 320 U
87-68-3	Hexachlorobutadiene	65	< 65 U
59-50-7	4-Chloro-3-methylphenol	320	< 320 U
91-57-6	2-Methylnaphthalene	65	< 65 U
77-47-4	Hexachlorocyclopentadiene	320	< 320 U
88-06-2	2,4,6-Trichlorophenol	320	< 320 U
95-95-4	2,4,5-Trichlorophenol	320	< 320 U
91-58-7	2-Chloronaphthalene	65	< 65 U
88-74-4	2-Nitroaniline	320	< 320 U
131-11-3	Dimethylphthalate	65	< 65 U
208-96-8	Acenaphthylene	65	< 65 U
99-09-2	3-Nitroaniline	320	< 320 U
83-32-9	Acenaphthene	65	< 65 U
51-28-5	2,4-Dinitrophenol	650	< 650 U
100-02-7	4-Nitrophenol	320	< 320 U
132-64-9	Dibenzofuran	65	< 65 U
606-20-2	2,6-Dinitrotoluene	320	< 320 U

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: 07071601
SAMPLE

Lab Sample ID: LI18A
LIMS ID: 07-14922
Matrix: Soil
Date Analyzed: 07/30/07 12:54

QC Report No: LI18-Ridolfi, Inc.
Project: Olympic View
502B

CAS Number	Analyte	RL	Result
121-14-2	2,4-Dinitrotoluene	320	< 320 U
84-66-2	Diethylphthalate	65	< 65 U
7005-72-3	4-Chlorophenyl-phenylether	65	< 65 U
86-73-7	Fluorene	65	< 65 U
100-01-6	4-Nitroaniline	320	< 320 U
534-52-1	4,6-Dinitro-2-Methylphenol	650	< 650 U
86-30-6	N-Nitrosodiphenylamine	65	< 65 U
101-55-3	4-Bromophenyl-phenylether	65	< 65 U
118-74-1	Hexachlorobenzene	65	< 65 U
87-86-5	Pentachlorophenol	320	< 320 U
85-01-8	Phenanthrene	65	< 65 U
86-74-8	Carbazole	65	< 65 U
120-12-7	Anthracene	65	< 65 U
84-74-2	Di-n-Butylphthalate	65	< 65 U
206-44-0	Fluoranthene	65	< 65 U
129-00-0	Pyrene	65	< 65 U
85-68-7	Butylbenzylphthalate	65	< 65 U
91-94-1	3,3'-Dichlorobenzidine	320	< 320 U
56-55-3	Benzo(a)anthracene	65	< 65 U
117-81-7	bis(2-Ethylhexyl)phthalate	65	< 65 U
218-01-9	Chrysene	65	< 65 U
117-84-0	Di-n-Octyl phthalate	65	< 65 U
205-99-2	Benzo(b)fluoranthene	65	< 65 U
207-08-9	Benzo(k)fluoranthene	65	< 65 U
50-32-8	Benzo(a)pyrene	65	< 65 U
193-39-5	Indeno(1,2,3-cd)pyrene	65	< 65 U
53-70-3	Dibenz(a,h)anthracene	65	< 65 U
191-24-2	Benzo(g,h,i)perylene	65	< 65 U
90-12-0	1-Methylnaphthalene	65	< 65 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	59.6%	2-Fluorobiphenyl	62.4%
d14-p-Terphenyl	70.8%	d4-1,2-Dichlorobenzene	56.0%
d5-Phenol	55.2%	2-Fluorophenol	49.3%
2,4,6-Tribromophenol	73.3%	d4-2-Chlorophenol	58.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Page 1 of 1
Matrix: Soil

QC Report No: LI18-Ridolfi, Inc.
Project: Olympic View
502B
Date Received: 07/19/07

Data Release Authorized:
Reported: 07/26/07

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
MB-072407	Method Blank	07/24/07	07/24/07	1.00	Diesel	5.0	< 5.0 U
07-14922	HC ID: ---		FID3A	1.0	o-Terphenyl		86.7%
LI18A	07071601	07/24/07	07/24/07	1.00	**Diesel**	**7.2**	**76**
07-14922	HC ID: ---		FID3A	1.0	o-Terphenyl		83.6%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel quantitation on total peaks in the range from C12 to C24.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: 07071601
SAMPLE

Lab Sample ID: LI18A
LIMS ID: 07-14922
Matrix: Soil
Data Release Authorized:
Reported: 08/01/07

QC Report No: LI18-Ridolfi, Inc.
Project: Olympic View
502B
Date Sampled: 07/16/07
Date Received: 07/19/07

Percent Total Solids: 71.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	07/24/07	6010B	07/31/07	**7440-38-2**	**Arsenic**	20	**150**	
3050B	07/24/07	6010B	07/31/07	**7440-39-3**	**Barium**	1	**632**	
3050B	07/24/07	6010B	07/31/07	7440-43-9	Cadmium	0.7	0.7	U
3050B	07/24/07	6010B	07/31/07	**7440-47-3**	**Chromium**	2	**32**	
3050B	07/24/07	6010B	07/31/07	**7439-92-1**	**Lead**	7	**9**	
CLP	07/24/07	7471A	07/26/07	7439-97-6	Mercury	0.06	0.06	U
3050B	07/24/07	6010B	07/31/07	7782-49-2	Selenium	20	20	U
3050B	07/24/07	6010B	07/31/07	7440-22-4	Silver	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TCLP METALS
Page 1 of 1

Sample ID: 07061904
SAMPLE

Lab Sample ID: LD97A
LIMS ID: 07-12413
Matrix: Soil
Data Release Authorized:
Reported: 06/22/07

QC Report No: LD97-Ridolfi, Inc.
Project: Olympic View
502B
Date Sampled: 06/19/07
Date Received: 06/19/07

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
1311	06/20/07	6010B	06/21/07	**7440-38-2**	**Arsenic**	0.2	**0.5**	
1311	06/20/07	6010B	06/21/07	**7440-39-3**	**Barium**	0.02	**1.00**	
1311	06/20/07	6010B	06/21/07	7440-43-9	Cadmium	0.01	0.01	U
1311	06/20/07	6010B	06/21/07	7440-47-3	Chromium	0.02	0.02	U
1311	06/20/07	6010B	06/21/07	7439-92-1	Lead	0.1	0.1	U
1311	06/21/07	7470A	06/21/07	7439-97-6	Mercury	0.0001	0.0001	U
1311	06/20/07	6010B	06/21/07	7782-49-2	Selenium	0.2	0.2	U
1311	06/20/07	6010B	06/21/07	7440-22-4	Silver	0.02	0.02	U

U-Analyte undetected at given RL
RL-Reporting Limit