

PRE-REMEDIAL DESIGN  
INVESTIGATION 2 DATA REPORT  
Chlor-Alkali RAU, GP West Site, Bellingham,  
Washington

Prepared for: Port of Bellingham

Project No. AS210368-B-06 • February 28, 2024 FINAL



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# 1 Introduction

This Pre-Remedial Design Investigation (PRDI) 2 Data Report (Report) supports the Chlor-Alkali Remedial Action Unit (RAU) cleanup at the GP West Site (Site). The cleanup action selected in the RAU Cleanup Action Plan (CAP) includes removal of remnant structural obstructions and then in situ solidification/stabilization (ISS) treatment of soils containing visible elemental mercury (Hg) in the Chlorine Plant Area. The PRDI 2 Project Plan defined the field pilot testing and laboratory treatability testing necessary to complete the remedial design for this key component of the cleanup action (Aspect, 2022). This Report summarizes the results of the PRDI 2 Project Plan implementation.

In August 2009, the Washington State Department of Ecology (Ecology) and the Port of Bellingham (Port) entered Agreed Order No. DE 6834 (Order) to clean up the GP West Site. In August 2013, an amendment to the Order separated the GP West Site into the Pulp/Tissue Mill and Chlor-Alkali RAU. In September 2021, Ecology issued the final Cleanup Action Plan (CAP) for the RAU (Ecology, 2021). In March 2022, Ecology issued a minor modification to the Order that revised a Schedule of Deliverables for Remedial Design for the RAU, including this Draft Report as Deliverable D.4a (Ecology, 2022).

The completed PRDI 2 activities are summarized as:

- **Field Pilot Testing of Obstruction Removal** – To conduct the required ISS treatment, it is necessary to first remove all structural obstructions (large concrete elements and underlying timber pilings) within the Hg-contaminated fill down to the contact between the Hg-contaminated fill and underlying native silt aquitard unit (depth of 14 to 15 feet below grade). Given complexities associated with that work, a field pilot test was conducted to evaluate the means and methods of obstruction removal for a portion of the Cell Building foundation (Figure 1). The completed field pilot test successfully removed three pile caps and associated grade beams and timber pilings. The timber pilings extend to depths greater than the contact between the Hg-contaminated fill and underlying native silt aquitard unit; they were successfully cut at or just below the contact without compromising the aquitard unit. All structural debris removed during the field pilot test was disposed of at a Subtitle C landfill (Chemical Waste Management, Inc. in Arlington, OR). No ISS soil mixing was conducted during the field pilot test. The field pilot test area was regraded and paved with asphalt, restoring it to existing condition.
- **Laboratory Treatability Testing** – Soil, groundwater, and tap water were collected during the field pilot test for use in laboratory treatability testing. The laboratory treatability testing evaluated 11 ISS-mix designs using two soil homogenates. The evaluation was based on strength, hydraulic conductivity, and leachability performance criteria. The completed laboratory treatability testing concluded that a mix design of 15 percent total cement content,<sup>1</sup> as mixture of 7.5 percent granular blast furnace slag and 7.5 percent Type I Portland Cement,

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<sup>1</sup> All mix percentages expressed as percentage of dry soil weight.

satisfies the Treatability Testing performance criteria and, therefore, selected as the mix design for the engineering design and construction of the ISS cleanup action.

This Report completes the PRDI activities conducted to inform the remedial design for the removal of obstructions and ISS treatment of soils containing visible Hg in the Chlorine Plant area. The Engineering Design Report (Deliverable D.6) will present obstruction removal and ISS remedial design, to be prepared after PRDI 3 Project Plan implementation (Aspect, 2023).

## 2 ISS Component of Cleanup Action Plan

The cleanup action for the Chlor-Alkali RAU includes removal of obstructions and ISS treatment of soils containing visible Hg, all of which occur within the vicinity of the former Chlorine Plant. The area of residual Chlorine Plant-area soils with visible Hg to be treated with ISS is shown on Figure 2. Much of this soil is situated within dense arrays of foundation pilings that supported the Cell Building and other Chlorine Plant infrastructure. To conduct ISS treatment, it is first necessary to remove the concrete grade beams and pile caps resting on the timber pilings. Then Fill Unit soils will be moved, as needed, to expose the timber pilings down to the aquitard, so they can be cut off at the Fill Unit/aquitard interface (roughly 15 feet below grade). Soils from the Fill Unit containing visible Hg will then be treated via ISS. The ISS of all soils containing visible Hg will achieve the following remedial action objectives (RAOs):

- Prevent direct contact with and erosion of mercury-contaminated soils by physical solidification of soil into a monolith.
- Prevent vapor intrusion from elemental mercury-contaminated unsaturated soils or groundwater by physical solidification, thereby reducing volatilization.
- Significantly reduce mercury leaching to groundwater from mercury-contaminated soils and prevent discharge of mercury-contaminated groundwater to the Whatcom Waterway.

The remedial design of the ISS cleanup action required implementation of: (1) a field pilot test (Pilot Test) for complete removal of structural obstructions down to the aquitard layer, and (2) laboratory treatability testing (Treatability Testing).

Section 3 summarizes the Pilot Test completed in November 2022. Subsequent to the Pilot Test, the Treatability Testing was completed from February through July 2023, and the results are reported in Section 4.

### 3 Field Pilot Test for Obstruction Removal

The Pilot Test evaluated means and methods of removal of three concrete pile caps, identified as J5, J4, and L4, and associated concrete grade beams and timber pilings that comprised the foundation for a portion of the Cell Building, as shown on Figure 3. The specific objectives for the Pilot Test were to:

1. Determine optimal means and methods of grade beam and pile cap removal.
2. Determine optimal means and methods for cutting timber pilings at the aquitard surface and removing them.
3. Evaluate grade change after obstruction removal and backfill of excavated soils.
4. Evaluate stability of the aquitard during removal of Fill Unit soils and obstructions.
5. Evaluate water management (dewatering) level of effort to accomplish obstruction removal to the aquitard.
6. Evaluate Hg vapor emissions and mitigation method.

No ISS soil mixing was conducted during the Pilot Test. Consistent with the final cleanup action, the Pilot Test involved proper landfill disposal of all structural debris removed, and did not involve off-site disposal of contaminated soils that were temporarily stockpiled within the area of contamination<sup>2</sup> to expose the aquitard. The excavation to expose the aquitard was subsequently backfilled with the stockpiled soils as soon as practical after the target obstruction removal was completed. Upon completion of all obstruction removal, the complete Pilot Test area was regraded and paved with asphalt to match surrounding grades.

Following solicitation of competitive Contractor bids to conduct the Pilot Test work, Aspect Consulting (Aspect) subcontracted Strider Construction Co. Inc. (Strider or Contractor), to conduct the work under Aspect's direction. The Pilot Test was completed between October 24 to November 4, 2022. The following sections summarize the completed Pilot Test scope of work and observations obtained during it.

#### 3.1 Health and Safety

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The subsurface materials exposed and handled during the Pilot Test contained high concentrations of Hg, including nonaqueous phase liquid Hg that can generate high concentrations of Hg in air. Hg vapors are invisible, have no odor, and represent a significant health and safety exposure risk, and were, therefore, monitored in real time during the Pilot Test.

The Contractor prepared, maintained, and implemented a Site-specific Health and Safety Plan (HASP) for the Pilot Test work in conformance with Washington Administrative Code (WAC) 296-843-120. The HASP covered all aspects of the Pilot Test and required workers within the exclusion zone wear Level C personal protective equipment (PPE), including air-purifying respirators with Hg-vapor cartridges. The HASP was prepared

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<sup>2</sup> The CAP identifies that soils containing visible mercury may be moved within the area of contamination to the extent required for pile removal and subsequent ISS treatment without generating a remediation waste under the Resource Conservation and Recovery Act (RCRA).

and approved by a Certified Industrial Hygienist and approved by Aspect prior to Pilot Test mobilization (Appendix C). Aspect also prepared a HASP with equivalent PPE requirements for Aspect staff conducting oversight and monitoring during the Pilot Test.

The Hg air concentrations remained significantly below action levels for the duration of the Pilot Test. The Hg air monitoring is discussed further in Section 3.8.

## 3.2 Mobilization and Site Preparation

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Strider mobilized and staged equipment, materials, and labor required for the Pilot Test starting on October 19, 2022. The equipment mobilized included three excavators, a front-end loader, a 10,000-gallon weir tank for settling solids in dewatering water, water truck, water hauler, and two Conex boxes for equipment storage. The following activities were completed in preparation for the start of excavation:

- Constructed the temporary soil stockpile area described in Section 3.3.
- Mobilized and setup the water management system described in Section 3.7.
- Materials prepared and staged for Hg vapor mitigation defined in Section 3.8.
- Established exclusion zone and perimeter air monitoring locations discussed in Section 3.8.

Figure 3 presents approximate locations for the work areas employed during the Pilot Test.

Strider prepared for Aspect approval a Temporary Erosion and Sediment Control (TESC) Plan that described erosion and sedimentation control best management practices (BMPs) that were then installed and maintained to manage and prevent stormwater from leaving the Pilot Test area. The TESC Plan and BMPs implemented were in accordance with City of Bellingham design standards for temporary erosion control.

Within the area of planned obstruction removal, the existing asphalt, base course, and separation geotextile were carefully removed to the extent necessary to expose the targeted subsurface structures. These materials were placed in the temporary soil stockpile area. Asphalt and separation geotextile were exported and landfilled or recycled, and base course was reused for Pilot Test area restoration. A photo log of Pilot Test activities is included in Appendix B.

During removal of the asphalt and separation geotextile, a concrete slab was discovered that was not shown on Georgia-Pacific's historical drawings included in the PRDI 2 Project Plan (Aspect, 2022). This concrete slab was approximately 1.5 feet thick, 30 feet long, and 25 feet wide and supported by grade beams spanning the pile caps targeted for removal (J5, J4, and L4 shown on Figure 4). The portion of this unanticipated concrete slab necessary to complete the Pilot Test scope was removed and shown on Figure 4. In addition, at least 10 timber pilings were discovered underneath the concrete slab that were not removed as part of this Pilot Test, but were documented for design of the final ISS cleanup action and are depicted on Figure 4.

## 3.3 Temporary Soil Removal

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Soil was excavated and temporarily stockpiled, as needed, to expose and remove the pile caps J4, J5, and L4, and associated timber pilings. Beneath the separation geotextile, fill

soils consisted of loose silty sands and pockets of gravel with varying degrees of visible Hg contamination. Deeper fill soils consisted of very dark gray brown to black silts with a strong organic odor were observed below the pile caps and beginning at depths ranging from approximately 6 to 10 feet below grade. For each pile cap targeted for removal, soil excavation was performed in a manner to minimize the disturbance of the timber pilings and required excavating an area approximately 10 feet by 5 feet to a depth of approximately 15 feet below grade to expose the timber piles to be cut. Aspect observed the depth of soil excavation, confirmed when excavation reached the aquitard, and then directed Strider to stop excavation.

The observed aquitard consisted of a very dark grey to brown organic silt underlain by a nonorganic gray silt. When excavating soil underlying pile cap J5, the aquitard was encountered at approximately 14 feet below grade. During the exposure and cutting of timber pilings associated with pile cap J5, slight seepage was observed from the aquitard and the excavation was immediately backfilled with approximately 0.5 feet of soil to reduce the potential of aquitard breaching while obstruction removal continued.

All excavated soils were temporarily stockpiled to facilitate the obstruction removal. After which, the stockpiled soil was placed back into the excavation as described in Section 3.10. No soil was removed from the Site during the Pilot Test.

### 3.4 Pile Cap and Grade Beam Removal

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The Pilot Test successfully removed the targeted three pile caps and associated timber pilings, denoted as J4, J5, and L4 (Figure 4). The letter-number combinations assigned to the three pile caps are derived from Georgia-Pacific's Cell Building Ground Floor Framing Plan included in the PRDI 3 Project Plan (Aspect, 2022).

Grade beams connected the three pile caps and extended to approximately 3.5 feet below grade. The grade beams oriented north-south<sup>3</sup> had a vertical dimension of approximately 2 to 2.5 feet, and the grade beams oriented east-west had a vertical dimension of approximately 3 feet. Strider removed the minimum length of grade beams necessary to remove the three pile caps and associated timber pilings down to the aquitard.

Demolition of the grade beams was conducted using an excavator with a hydraulic cracker. The grade beams were heavily reinforced, with large-diameter rebar. The concrete slab discovered during the Pilot Test was demolished, as needed, to access the pile caps, using the same methods.

The top of the three pile caps removed occurred at approximately 3.5 feet below grade and were approximately 2.5 to 3.0 feet thick (vertical dimension). The actual dimensions of each pile cap (types P9, P3, and P5 at locations J4, J5, and L4, respectively) were generally consistent with the Cell Building Pile Cap Details drawing C-2 attached to the PRDI 3 Project Plan (Aspect, 2022).

To minimize disturbance of the timber piles on which the pile caps rested, demolition of the pile caps was conducted by drilling holes in a 1-foot grid and filling the holes with expansive demolition grout (Dexpan®) and leaving overnight. This process fractured the pile cap structure with no disturbance of timber piles (Appendix G). The pile caps were

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<sup>3</sup> All directions are referenced to the Mill (or Project) North convention, which is 45 degrees west of True North (refer to North arrows on figures).

then demolished using an excavator with a hydraulic breaker. The removal of the soil surrounding the concrete pile caps before the use of demolition grout allowed for expansion resulting in larger fractures, which in turn required less force from the hydraulic breaker, and reduced disturbance of underlying timber pilings.

All demolished concrete slab, grade beam, and pile cap debris was transported off-site and disposed as hazardous waste in a Subtitle C landfill, as described in Section 3.9.

### 3.5 Timber Piling Removal

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The Pilot Test also successfully cut and removed the timber pilings supporting the pile caps J4, J5, and L4. The timber pilings were cut at depths of approximately 14 to 16 feet below grade using an excavator-mounted hydraulic shear attachment. The attachment quickly and efficiently cut the pilings with minimal disturbance of the aquitard or the remaining section of piling extending into and beneath it.

Based on Georgia-Pacific's historical drawings, pile cap J4 was anticipated to have nine pilings arranged in a battered configuration (Aspect, 2022). The Pilot Test encountered 10 pilings (none battered). In addition, three additional adjacent timber pilings were cut to access pilings under pile caps L4 and J4 (Figure 4). These additional pilings were cut at approximately 8 to 10 feet below grade (4 to 6 feet above the aquitard).

As anticipated, pile cap J5 had three vertical timber pilings that were successfully cut at the aquitard.

As anticipated, pile cap L4 had five vertical timber pilings that were successfully cut at the aquitard and the cut sections.

A total of 21 timber pilings were cut and removed during the Pilot Test. Of the 21 pilings, 18 supported the three pile caps, and were cut at the aquitard. All 21 timber pilings were vertical. No battered piles were encountered during the Pilot Test. All removed pilings were cut into 8- to 10-foot lengths.

At least 10 timber pilings were observed underneath the unanticipated concrete. These timber pilings were not part of the Pilot Test scope and were left undisturbed. The approximate locations of these remaining timber pilings are depicted on Figure 4.

All timber pilings removed during the Pilot Test were transported offsite and disposed as hazardous waste at a Subtitle C landfill as described in Section 3.9.

### 3.6 Temporary Stockpiling

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A temporary stockpile area was constructed adjacent to the Pilot Test area. The temporary stockpile area was prepared by removing debris from the asphalt surface and placing a polyethylene geomembrane underliner with a thickness of 0.010 inches (10 mil) on the asphalt. Adjacent geomembrane sections were continuously overlapped by a minimum of 6 inches. Berms were constructed around the stockpile area to a minimum 9-inch height. Steel plates were placed within the temporary soil stockpile to protect the underliner from damage.

Asphalt, hazardous debris (concrete and timber pilings), and soil were segregated and staged in discrete stockpiles in the temporary stockpile area.

When not in active use, stockpiles were covered with 10 mil polyethylene geomembrane and anchored, as needed, to prevent disturbance by wind and outside working hours. No tears or discontinuities in the geomembrane underliner or cover were observed. No excavated soils were released or otherwise dispersed outside of the temporary stockpile area.

### 3.7 Dewatering and Water Management

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Dewatering of Fill Unit groundwater was necessary to expose and cut the timber pilings at the aquitard surface. Dewatering was necessary during the excavation to expose timber pilings supporting pile caps J5 and L4. During the excavation below pile cap J4, dewatering was not needed until a small portion of the sidewall collapsed and groundwater entered the excavation.

Dewatering was conducted using submersible pumps installed in slotted casing pipe surrounded by drain rock (construction sump). Relatively low rates of groundwater inflow were observed throughout the work. Over the course of the Pilot Test, roughly 3,500 gallons Fill Unit groundwater were extracted from the temporary excavations. All water generated from excavation dewatering was conveyed to a 11,000-gallon settling weir tank to remove settleable solids, and then trucked from the weir tank to the Port's pump station (Figure 1) that conveys water to the Aerated Stabilization Basin (ASB) in accordance with the Port's NPDES Permit No. WA-000109-1. Prior to beginning work, Aspect submitted to the Ecology NPDES permit manager a letter requesting authorization to discharge non-routine flows (groundwater) to the ASB per NPDES permit condition S7, which Ecology approved. Copies of those communications and the NPDES permit are included in Appendix A.

Aspect monitored effluent water quality from Strider's water treatment system using a LaMotte 1-liter Imhoff Cone. All effluent water had less than or equal to 10 milliliter per liter (ml/L) of settleable solids (monitoring data are included in Appendix A). No alterations were needed to achieve the Project Water Quality Performance Standards of total settleable solids below 50 milliliters per liter (ml/L), and there was no visible separate-phase oil (including sheen) in water discharged to the ASB pump station.

### 3.8 Air Monitoring

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Throughout the Pilot Test, the area of excavation open at any one time was minimized to limit Hg vapor emissions. For the duration that excavations were open, Aspect and Strider conducted air monitoring for Hg within the breathing zone for the purpose of worker health and safety. Aspect also conducted periodic work zone perimeter monitoring for fugitive emissions. The air monitoring was conducted using a hand-held Hg air monitoring instrument (Jerome J505). The perimeter air monitoring was conducted at the four locations (P1 through P4) shown on Figure 3.

The following action levels for Hg in air were established for the Pilot Test (Aspect, 2022):

- **Within the worker breathing zone:** the 100 micrograms per cubic meter ( $\text{ug}/\text{m}^3$ ) Occupational Safety and Health Administration (OSHA) permissible exposure limit.

- **At the perimeter monitoring locations:** a 5 ug/m<sup>3</sup> Model Toxics Control Act (MTCA) air remediation level that is a modified Method B (unrestricted) air cleanup level derived in Aspect (2016). That action level assumed a 6-week duration of vapor generation from exposed Hg (thus exposure). The Pilot Test was completed in less than 1 week; therefore, the action level was conservative.

Neither the worker breathing zone, nor the perimeter air action levels were exceeded during the Pilot Test. Temperatures ranging from 47 to 58 degrees Fahrenheit (°F) throughout the Pilot Test work likely contributed to the low Hg vapor emissions. Aspect's perimeter air monitoring results are tabulated in Appendix A.1, and the worker breathing zone air monitoring results tabulated in Appendix A.2 are provided in Appendix A.

Due to consistent monitoring results significantly below action levels, on October 27, the exclusion zone was reduced to only include the excavation. The highest reading recorded was 12 ug/m<sup>3</sup> in the worker breathing zone adjacent to the excavation when pile cap J5 was exposed (Appendix A.2). Outside the exclusion zone, the perimeter air monitoring results were consistently below the 5 ug/m<sup>3</sup> threshold (Appendix A.1).

Based on the compliant air monitoring results, vapor suppression mitigation was not required, but could have involved the application of Hg vapor suppressants. Strider had 300 gallons of Hg vapor suppressant solution prepared on standby in the event that mitigation was required for vapor emissions from the excavation or stockpile area.

### 3.9 Debris Management

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All concrete debris (grade beams, pile caps, and slab) and wooden pilings removed during the Pilot Test were designated by the Port as characteristic hazardous waste debris (D009). The concrete and wood debris removed were loaded and transported as a single waste stream under manifest to the Chemical Waste Management (CWM) Subtitle C Landfill in Arlington, Oregon, where it was treated by macro encapsulation to meet federal land disposal restrictions (LDRs) for hazardous debris, in accordance with 40 Code of Federal Regulations (CFR) 268.45 and then disposed in the Subtitle C landfill.

A total of 93.26 tons of characteristic hazardous waste debris was exported and disposed during the Pilot Test. Appendix D includes documentation for offsite disposal of the debris removed.

### 3.10 Excavation Backfill and Restoration

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Following obstruction removal, the Pilot Test excavation area was backfilled using the temporarily stockpiled soil. That soil filled the excavation to approximately 1 to 1.5 feet below the surrounding asphalt grade. To raise the soil grade to approximately 6 inches below the surrounding asphalt grade, approximately 90 tons of virgin gravel borrow<sup>4</sup> were imported and placed.

All the backfill deeper than 2 feet below final grade were placed in loose lifts no greater than 24 inches and tamped with an excavator bucket. Backfill within 2 feet of final grade was placed in loose lifts no greater than 8 inches thick and compacted with an excavator bucket.

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<sup>4</sup> Imported gravel borrow was sourced from the Miles Sand & Gravel's Siper pit.

After placement of the backfill, the Contractor restored the Pilot Test area by constructing a hot mix asphalt (HMA) pavement section to match the surrounding existing asphalt surface. The HMA section consisted of, from bottom up:

- A minimum of 3 inches of Crushed Surfacing Base Course (CSBC) per Section 9-03.9(3) of the 2022 WSDOT Standard Specifications
- 3 inches of HMA Class ½”, PG 64-22

The perimeter of the new HMA surface was tapered to generally match surrounding grade to make a smooth transition that is drivable by automobile.

### 3.11 Pilot Test Conclusions

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The Pilot Test effectively evaluated means and methods for removing obstructions consisting of subsurface structures associated with three pile caps of varying configuration and timber piling support. The Pilot Test specific objectives outlined in Section 3 were achieved, as listed below:

1. Objective: Determine optimal means and methods of grade beam and pile cap removal.

Pilot Test Result: The use of a hydraulic cracker effectively removed the grade beams, including the steel reinforcement. Removal of all surrounding soils and use of Dexpan® (demolition grout) was effective in fracturing the pile caps, so a hydraulic breaker could demolish the pile caps with minimal disturbance of the underlying timber pilings.

2. Objective: Determine optimal means and methods for cutting timber pilings at the aquitard surface and removing them.

Pilot Test Result: The hydraulic shears were highly effective in cutting the timber pilings at the top of the aquitard with minimal disturbance of the aquitard.

3. Objective: Evaluate grade change after obstruction removal and backfill of excavated soils.

Pilot Test Result: A total of 90.27 tons of gravel borrow were imported to account for lost volume, due to the export of structural debris.

4. Objective: Evaluate stability of the aquitard during removal of Fill Unit soils and obstructions.

Pilot Test Result: The aquitard appeared stable during the removal of timber pilings with only a slight disturbance when excavations extended deeper than the brown organic-rich layer into underlying the dark gray silt layer. Terminating excavation in the organic-rich upper aquitard was effective in keeping the aquitard stable.

5. Objective: Evaluate water management (dewatering) level of effort to accomplish obstruction removal to the aquitard.

Pilot Test Result: Dewatering was generally required during the Pilot Test, but flow rates were minimal.

6. Objective: Evaluate Hg vapor emissions and mitigation methods.

Pilot Test Result: Hg vapor emissions outside the excavation were minimal, under 5 ug/m<sup>3</sup>, and negligible at the perimeter monitoring locations. No Hg vapor mitigation was required during the Pilot Test. With a larger excavation area during full-scale ISS treatment, there may be higher Hg vapor emissions. However, the Hg air monitoring conducted during this Pilot Test combined with monitoring conducted during the two prior Chlorine Plant interim actions—one in the summer and one in November—make clear that Hg emissions are substantially decreased in cooler weather, and that can be a special consideration for the ISS construction schedule.

## 4 Laboratory Treatability Testing

Laboratory treatability testing (Treatability Testing) consisted of creating laboratory-scale monoliths of Site soil evaluating a range of mix designs for ISS performance criteria.

ISS as a remediation technology that targets reduction of contaminant leaching from soil to groundwater by solidifying the soil mass and reducing its hydraulic conductivity. ISS is constructed by mixing cementitious reagent(s) with impacted Site soils, resulting in a solidified monolith of increased strength and reduced hydraulic conductivity in comparison to existing Site soil conditions. After ISS, groundwater is diverted around the solidified treatment zone, limiting contact of groundwater and treated soils, thereby reducing leaching of contaminants to groundwater.

The Treatability Testing evaluated 11 mix designs based on the following strength, hydraulic conductivity, and leachability performance criteria:

1. Achieve an unconfined compressive strength of at least 50 pounds per square inch (psi) according to American Society for Testing of Materials International (ASTM) D2166.
2. Achieve an average hydraulic conductivity of the treated soils equal to or less than  $1 \times 10^{-6}$  centimeters per second (cm/s) according to ASTM D5084 (flexible wall permeameter).
3. Reduce leachability of Hg, as determined by U.S. Environmental Protection Agency's (EPA) leaching environmental assessment framework (LEAF; SW-846 Method 1315). The reduction in Hg leaching from the treated monolith will be sufficient to ensure the groundwater cleanup level for Hg of 0.059 micrograms per liter (ug/L) is achieved at the groundwater conditional points of compliance established in the CAP.

The Treatability Testing methods, results, and the selected mix design are reported in this section.

### 4.1 Sample Collection

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Soil, groundwater, and tap water were collected from the Site for use in Treatability Testing.

#### 4.1.1 Soil

Bulk soil samples were collected from the Pilot Test excavation. To represent the entire vertical profile of the Fill soils to be treated with ISS, the soil sample was collected by cutting the entire vertical sidewall during the Pilot Test to the extent practical. Two bulk soil samples were collected:

- Soil 1 was collected from soils containing elemental Hg visible during the Pilot Test—representing the most highly contaminated soils to be treated. A total of approximately 35 gallons of Soil 1 was collected in 5-gallon buckets with vapor-tight threaded lids.

- Soil 2 was collected from soils not containing visible elemental Hg—representing soils around the edge of the planned ISS monolith. Approximately 25 gallons of Soil 2 was collected in 5-gallon buckets with vapor-tight threaded lids.

The soil samples were collected with the Pilot Test equipment and placed within a small plastic containment within the temporary stockpile area, where it was homogenized into the Soil 1 and Soil 2 bulk samples.

#### **4.1.2 Water**

A bulk groundwater sample was collected from upgradient well EMW-4S for use in the LEAF testing component of the Treatability Testing (location shown on Figure 3). The basis of using EMW-4S groundwater is established in the PRDI 2 Project Plan (Aspect, 2022). The groundwater was sampled at a rate less than 500 milliliters per minute and was contained in 1-gallon plastic cubitainers. A total of approximately 20 gallons of bulk groundwater from EMW-4S was collected for Treatability Testing.

Approximately 5 gallons of on-Site tap water was collected into 1-gallon plastic containers for Treatability Testing. The tap water was blended 50/50 with the Site groundwater to prepare the mix designs, because it will also be the water source used to create reagent grout during the future full-scale ISS cleanup action.

All soil and water samples were transported to Anchor QEA’s Environmental Geochemistry Laboratory (EGL) in Portland, Oregon. On November 2, 2022, all samples were transported by Aspect staff in a secure and covered space isolated from the vehicle cab during transit and relinquished to Anchor QEA’s EGL staff.

### **4.2 Baseline Testing**

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The Soil 1 and Soil 2 homogenates were initially characterized to understand soil type, physical properties, and baseline chemistry. Soil samples were analyzed for moisture content, grain-size analysis, Atterberg limits, specific gravity, pH, total Hg, total organic carbon, and synthetic precipitation leaching procedure (SPLP) leaching in accordance with the methods defined in the PRDI 2 Project Plan (Aspect, 2022). The SPLP was modified by using EMW-4S groundwater as the leachant; the SPLP leachate was analyzed for total and dissolved mercury.

EGL performed the moisture content, grain-size analysis, specific gravity, and soil pH analysis, and their laboratory data and notes are included in Appendix E. Apex Laboratories (Apex) in Tigard, Oregon, performed the general chemistry laboratory analysis. Budinger & Associates Inc. (Budinger) performed the Atterberg limits geotechnical analysis in their laboratory in Spokane, Washington. The baseline test results are reported in Table 1, and the Apex and Budinger laboratory reports included in Appendix F. The results are discussed in Section 4.5.1.

### **4.3 Reagent Mixing and Cement Mold Construction**

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The basis of reagent mixes evaluated during Treatability Testing was established in the PRDI 2 Project Plan (Aspect, 2022). The raw reagent materials selected for Treatability Testing are all locally available and commercially viable for the future full-scale ISS cleanup action. The ISS Treatability Testing evaluated eleven mix designs using the following three reagent mixes in various proportions to soil:

1. MaxCem – A pre-mixed reagent of 70 percent Type 1L Portland cement (PC) and 30 percent NewChem blast furnace slag (BFS)
2. Terraflow – A pre-mixed reagent of 25 percent Type 1L PC and 75 percent NewChem BFS
3. A mixed reagent of 50 percent Type 1L PC and 50 percent NewCem BFS

The suppliers' specification or product sheets for the raw materials used in the reagent mixes are included in Appendix G.

A total of 11 mix designs were evaluated with a total cement content of 5, 10, 15, or 20 percent dry soil weight (Table 2). On February 1, 2023, EGL prepared the mix designs using the Soil 1 homogenate at the mix design-specified percentages, with the addition of water as 50/50 blend of groundwater and tap water collected from Site. Each mix design was prepared in 2-inch-diameter by 4-inch-tall plastic cylinder containers and in accordance with the EGL SAP in the PRDI 2 Project Plan (Aspect, 2022). The water-to-cement ratio used for each mix design is recorded in Table 2. During the mixing and mold construction, EGL staff measured temperature and pH, and performed a standard slump test, and these results are presented in Table 3.

During the mixing, EGL conducted air monitoring for potential Hg emissions within their laboratory. At the end of day on February 1, EGL staff stopped work while preparing Soil 1 Mix 9 based on their measured Hg air concentrations when opening a Soil 1 bucket. The EGL manager recommended procurement and installation of indoor air ventilation/purification system to complete the Treatability Testing.

Aspect instead elected to complete the Soil 2 mixes and mold construction at Budinger's geotechnical laboratory in Spokane, Washington, the laboratory prescribed to do geotechnical testing of the cured monoliths. By February 14, 2023, EGL staff shipped the bulk soil, bulk water, Soil 1 Mix-1 through Mix-9 cylinders (a total of 90 cylinders), and raw materials to Budinger's geotechnical laboratory to complete the remaining Treatability Testing.

On March 2, 2023, Budinger prepared the 11 mix designs for Soil 2 using the 50/50 groundwater/tap water blend. The molds were prepared in accordance with ASTM D-1632. A total of 88 Soil 2 cylinders were cast for the eleven soil mixes. The water-to-cement ratio used is recorded in Table 2, and the soil pH in Table 3 for each of the 11 mix designs. The Budinger laboratory notes are included in Appendix F. Aspect staff observed the completion of the mixing and cement mold construction and conducted Hg air monitoring during mixing. No Hg was detected in air during the Soil 2 mixing.

As a result of the stopped work associated with Soil 1 Hg vapor emissions, Mix-10 (20 percent Terraflow) and Mix-11 (10 percent PC and 10 percent BFS) were only evaluated using Soil 2.

## 4.4 Performance Testing Methods

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The cylinders were evaluated based on strength, hydraulic conductivity, and leaching performance according to the monitoring methods and plan defined in the PRDI 2 Project Plan (Aspect, 2022). EGL conducted soil pocket penetrometer tests at 1, 4, and 7 days after mixing for Soil 1 Mix-1 through Mix-9 (Table 3). These pocket penetrometer tests qualitatively identified mix designs that were gaining strength quickly. This initial

understanding of promising mix designs allowed Budinger to only conduct soil pocket penetrometer test once, 7 days after Soil 2 mixing.

The Soil 1 cylinders cast by EGL did not meet the specimen dimension criteria for ASTM D1663; therefore, ASTM D2166 was used for all UCS tests conducted by Budinger. The UCS tests were completed to observed structural failure and the UCS results via ASTM 2166 are deemed reliable for comparison with strength performance criteria.

Unconfined compressive strength (UCS) tests were conducted 14 days after mixing for all nine Soil 1 mixes and all eleven Soil 2 mixes. Subsequent UCS tests were performed 28 and 56 days after soil mixing for the most promising mixes (discussed in Section 4.5.3). The final Soil 2 UCS test was conducted in triplicate for the preferred mix design. All UCS tests results are included in Table 4 and Budinger laboratory reports included in Appendix F.

The UCS results identified the preferred mix design that was used for hydraulic conductivity estimation using a flexible-wall permeameter (ASTM D5084). On April 6 and April 27, 2023, a hydraulic conductivity test was performed on one Soil 1 cylinder and one Soil 2 cylinder, respectively—65 and 57 days after mixing of Soil 1 and Soil 2, respectively. The hydraulic conductivity results are presented in Table 4 and the Budinger laboratory reports are included in Appendix F.

The preferred mix design was also evaluated for leachability performance using EPA's LEAF SW-846 Method 1315 for mass transfer rates of constituents for monolithic or compacted granular materials using a semidynamic tank leaching procedure. Budinger shipped one Soil 1 and one Soil 2 cylinder for the preferred mix design to Eurofins Environment Testing Laboratory (Eurofins) in Corvallis, Oregon, for the LEAF testing. Aspect collected 10 gallons of additional EMW-4S Site groundwater and shipped it to Eurofins for use as the leachant in the testing. The LEAF testing was initiated on May 1, 2023, and included nine leachate exchange events completed 0.08, 1, 2, 7, 14, 28, 42, 49, and 63 days later on July 4, 2023. The eluate (leachate) pH and electrical conductivity were measured in the Eurofins Corvallis laboratory for each leaching cycle. An eluate sample from each cycle was shipped to Eurofins' Pensacola location for low-level Hg analysis by EPA Method 1631 for each of leaching cycles; results are included in Table 5. The Eurofins laboratory report is included in Appendix F.

## 4.5 Baseline Test Results

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### 4.5.1 General Chemistry

The following summarizes the Soil 1, Soil 2, and EMW-4S groundwater general chemistry results analyzed to establish baseline conditions against which Treatability Testing performance is evaluated. The results are presented in Table 1.

- The dissolved Hg concentration of EMW-4S groundwater was 0.0953 µg/L, which is representative of groundwater quality flowing through the planned ISS area (Aspect, 2022). This 2023 result is greater than the 0.00323 µg/L and 0.00094 µg/L (nondetect) dissolved Hg concentrations measured in 2009 and 2010, respectively (Aspect, 2013). This EMW-4S groundwater was used as leachant for modified SPLP extractions.

- The total Hg in Soil 1 sample was 3,940 milligrams per kilogram (mg/kg) and duplicate result of 4,490 mg/kg (average 4,215 mg/kg).
- The total aqueous Hg concentration in modified SPLP extraction from Soil 1 was 406 µg/L and duplicate result of 660 µg/L (average 533 ug/L).
- The dissolved aqueous Hg concentration in modified SPLP extraction from Soil 1 was 562 µg/L and duplicate result of 505 µg/L (average 533.5 ug/L).

The Soil 1 total Hg concentration is representative of the vertically mixed soil column containing elemental Hg that is targeted for ISS. The dissolved Hg concentration leached from Soil 1 is over 5,000 times greater than the EMW-4S (leachant) concentration. These baseline results confirm that Soil 1 can be considered worst-case conditions with respect to ISS performance criteria.

The following summarizes Soil 2 baseline results:

- The total Hg in Soil 2 sample was 22.3 mg/kg and duplicate result of 128 mg/kg (average of 75.15 mg/kg).
- The total aqueous Hg concentration in modified SPLP extraction from Soil 2 was 7.74 µg/L and duplicate result of 9.23 µg/L (average 8.49 ug/L).
- The dissolved aqueous Hg concentration in modified SPLP extraction from Soil 2 was 3.81 µg/L and duplicate result of 4.39 µg/L (average 4.1 ug/L).

The total organic carbon (TOC) concentration in both Soil 1 and Soil 2 ranges in concentration from 54,000 to 61,000 mg/kg or 5.4 to 6.1 percent. This TOC concentration is associated with natural organic content of the dredged fill soils.

The total Hg concentrations confirm the absence of elemental Hg in Soil 2, and that Soil 2 is representative of soils on the perimeter of the ISS-treated monolith where groundwater contacts, and Hg leaching would predominantly occur.

The baseline SPLP results represent leaching from untreated soils against which the LEAF test results will be compared in Section 4.6.3.

#### **4.5.2 Index Properties**

Soil 1 contains 54.1 percent fines content (percent passing #200 sieve) with a plasticity index of 10 and is classified as organic silt (OL) with low to medium plasticity. Soil 2 contains 32.9 percent fines content with a higher liquid limit and plasticity index of 13 and is classified as silty sand (SM).

Moisture content was measured in triplicate and the average Soil 1 and Soil 2 moisture content was 56.2 percent and 61.3 percent, respectively.

## **4.6 Performance Test Results**

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### **4.6.1 Strength**

The Treatability Testing strength results for different mix designs were evaluated based on the ability to achieve a UCS of at least 50 pounds per square inch (psi) according to ASTM D2166. This performance criterion is consistent ISS treatment standards (ITRC,

2011; Bates, 2015) and is within the range of typical UCS values for glacial till in the Puget Sound region.

All Soil 1 and Soil 2 mix designs were tested for UCS after 14 days of curing time (Table 4). Based on the 14-day UCS results, the four mix designs of at least 15 percent total cement content were tested again 28 days after curing. Based on the 28-day results, three Soil 1 mix designs were tested for UCS after 56 days. Of these 56-day results, only Mix-8 and Mix-9 achieved the performance strength criterion with results of 100 and 118 psi.

Because Soil 2 mixes were created 16 days after Soil 2, the three highest performing Soil 1 mix designs were selected for a Soil 2 28-day UCS test. Soil 2 Mix 8 exhibited the highest 28-day UCS result; therefore, the only Soil 2 mix design evaluated for 56-day UCS. The four 56-day UCS results from Mix 8 are 100 psi (Soil 1), and 57, 55, and 27 psi (Soil 2 in triplicate). The 27 psi UCS result at 58 days, is less than the 14-day and 28-day UCS results and believed to be anomalous, potentially attributable to inclusion of organic debris (wooden piling fragment) that created a failure surface within the test cylinder. The Budinger laboratory reports can be referenced in Appendix F.

Based on the strength performance testing results, Mix 8 comprised of 7.5 percent Type 1 PC and 7.5 percent BFS was selected for the hydraulic conductivity and leachability performance tests.

#### **4.6.2 Hydraulic Conductivity**

The highest performing mix design based on strength criteria, Mix 8, was evaluated for the hydraulic conductivity performance criteria of equal to or less than  $1 \times 10^{-6}$  cm/s according to ASTM D5084 (flexible wall permeameter test). The flexible wall permeameter test is typically used to estimate vertical hydraulic conductivity within a core of soil. Because nearly all natural soils have some degree of stratification, vertical hydraulic conductivity (across the stratification) is nearly always less than horizontal hydraulic conductivity (parallel to stratification). Because of the ISS mixing processes, both in the laboratory testing and in the field at full-scale application, the ISS monolith lacks stratification, and is therefore isotropic with respect to hydraulic conductivity. Therefore, permeameter test results can be applied to horizontal or vertical flow of groundwater through the ISS monolith and is standard for ISS practice (ITRC, 2011; Bates, 2015).

Both Soil 1 and Soil 2 Mix 8 cylinders were tested, and the hydraulic conductivity results of the treated soils were  $3.2 \times 10^{-7}$  and  $4.7 \times 10^{-7}$  cm/s, achieving the hydraulic conductivity performance criterion. For comparison, these values are roughly four to five orders of magnitude less than the estimated horizontal hydraulic conductivity of Fill Unit soils ( $3 \times 10^{-3}$  to  $3 \times 10^{-2}$  cm/s), and one order of magnitude less than the estimated vertical hydraulic conductivity of the underlying aquitard unit ( $2 \times 10^{-6}$  to  $4 \times 10^{-6}$  cm/s), within the Chlor-Alkali RAU (Aspect, 2013).

#### **4.6.3 Leachability**

The Treatability Testing evaluated leaching performance of the treated soils by EPA's LEAF methodology (SW-846 Method 1315). The LEAF analysis is included in Appendix H. The leachability performance criteria is to reduce Hg leaching from the treated monolith sufficiently to ensure the groundwater cleanup level for Hg of 0.059  $\mu\text{g/L}$  is achieved at the groundwater conditional points of compliance, which the CAP establishes

at the shoreline hundreds of feet downgradient of the ISS remediation area (Ecology, 2021).

The Soil 1 LEAF results—representing what will be the most heavily contaminated center of the ISS monolith—illustrate an initial eluate dissolved Hg concentration of 13 and 6.4 µg/L during the first two leaching cycles in the first 24 hours (Table 5). The eluate dissolved Hg concentration ranged from 0.42 to 2.0 µg/L (mean of 1.1 µg/L) during the final seven leaching cycles over the cumulative leaching time of 62 days. The mean eluate concentration represents the expected dissolved Hg concentration leaching from ISS treated soils with elemental Hg. This mean LEAF concentration represents a 99.7 percent reduction in Hg leachability when compared to the SPLP result from untreated Soil 1 homogenate.<sup>5</sup>

The Soil 2 LEAF results, representing the perimeter of the planned ISS monolith, illustrate a mean eluate dissolved Hg concentration of 0.078 ug/l and maximum of 0.2 ug/L. This maximum Soil 2 LEAF concentration represents a 95 percent reduction in leachability when compared to the untreated soils represented by Soil 2 homogenate (based on comparison with average SPLP dissolved Hg result of 4.1 µg/L; Table 1). The LEAF eluate concentrations and SPLP results are depicted on Figure 5.

Further, EMW-19S, which is approximately 160 feet downgradient of the planned ISS area (Figure 3), had a dissolved Hg concentration of 30 µg/L in April 2023 (Aspect, 2023). The maximum Soil 2 LEAF dissolved Hg concentration of 0.2 ug/L represents a 99 percent reduction in leachability of the untreated soils when compared to the current maximum dissolved Hg groundwater concentration at EMW-19S. Furthermore, dissolved Hg concentrations up to 619 µg/L were historically detected at well CP-MW15<sup>6</sup> (Aspect, 2013), located approximately 100 feet upgradient of EMW-19S and closer to the planned Cell Building ISS area. The ISS treated Soil 1 and Soil 2 resulted in a greater than 95 percent reduction in leachability, which is demonstrated by an empirical assessment of dissolved mercury transport and attenuation (described below) to satisfy the Treatability Testing leachability performance criteria of achieving the groundwater cleanup level for Hg at the groundwater conditional points of compliance.

An Hg attenuation factor was developed by analyzing dissolved mercury concentrations in wells located along a transect from the Hg source area to the conditional point of compliance at the shoreline, parallel to the groundwater flow direction (AMW-02, CP-MWB1, CP-MWB2, and CP-MWB3). The locations of the wells and their 2015 mercury concentrations are shown on Figure I-1 in Appendix I. Data from 2015 was used in the analysis because monitoring wells CP-MWB2 and CP-MWB3 are currently located in an area covered in large boulders, and they were not found during the 2023 well inventory. The source area was defined as the area where visible elemental Hg is present and will be treated by ISS, at the former Cell Building.

A mercury attenuation factor under ambient conditions was calculated by comparing the change in dissolved Hg concentrations from the source area to the shoreline, as shown in Table I-1 and Figure I-2. For the purposes of this analysis, the results of the baseline SPLP testing were used as the untreated source area Hg concentration, and the

<sup>5</sup> The Soil 1 SPLP dissolved Hg results of 562 and 505 µg/L were averaged (533 µg/L) for estimating percent reduction in leachability of ISS treated Soil 1.

<sup>6</sup> Well CP-MW15 was removed during the 2013 caustic plume interim action.

concentration at CP-MWB3 (located 700 feet downgradient of the source area) was used as the shoreline concentration. An ambient dissolved Hg attenuation factor of approximately 2,600 was calculated from the source area to the shoreline, based on the empirical data.

This attenuation factor can then be applied to the treated monolith Hg concentration to predict a shoreline groundwater Hg concentration after the ISS cleanup action has been implemented, as shown on Figure I-3 and the calculations in Appendix I. The predicted shoreline Hg concentration at CP-MWB3 after the ISS cleanup action would be 0.0004 µg/L, which is below both the remediation level of 7.6 µg/L applicable at shoreline wells and the groundwater cleanup level of 0.059 µg/L applicable within the sediment bioactive zone. In fact, the predicted concentration at the shoreline well is nearly 20,000 times less than the remediation level, affording a large “factor of safety” in the predictive assessment. This assessment of dissolved mercury transport and attenuation demonstrates that reduction in Hg leaching from the treated monolith will be sufficient to meet the groundwater cleanup level for Hg at the groundwater conditional point of compliance.

## 4.7 Treatability Test Conclusions

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Based on the evaluation of mix designs in the Treatability Testing and the results discussed above, it is recommended that 15 percent total cement content<sup>7</sup> mixture of 7.5 percent blast furnace slag and 7.5 percent Type I Portland Cement be used for the engineering design and construction of the ISS cleanup action. This mix achieves greater than 95 percent reduction in Hg leachability from the Hg-contaminated soils while also achieving the defined ISS performance criteria for strength (> 50 psi) and hydraulic conductivity (< 1 x 10<sup>-6</sup> cm/sec).

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<sup>7</sup> All mix percentages expressed as percentage dry soil weight.

## 5 Schedule and Reporting

This Report, once approved by Ecology, will serve as a primary basis for the ISS cleanup action remedial design to be described in the Engineering Design Report for the Chlor-Alkali RAU cleanup action, and then refined in the construction plans and specifications for the Chlorine Plant ISS cleanup action (Project C as identified in the Chlor-Alkali RAU CAP).

## 6 References

- Aspect Consulting (Aspect), 2013, Remedial Investigation, Georgia-Pacific West Site, Bellingham, August 5, 2013.
- Aspect Consulting (Aspect), 2022, Pre-Remedial Design Investigation 2 Project Plan, Georgia-Pacific West Site, September 22, 2022.
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- Interstate Technology & Regulatory Council (ITRC), 2011, Development of Performance Specifications for Solidification/Stabilization. S/S-1, Washington, D.C.: Interstate Technology & Regulatory Council, Solidification/Stabilization Team, [www.itrcweb.org](http://www.itrcweb.org), 2011
- Washington State Department of Ecology (Ecology), 2011, First Amendment to Agreed Order No. 6834, Georgia-Pacific West Site, Bellingham, Washington, August 30, 2011.
- Washington State Department of Ecology (Ecology), 2021, Cleanup Action Plan, Chlor-Alkali Remedial Action Unit, Georgia-Pacific West Site, Bellingham, Washington, September 7, 2021.
- Washington State Department of Ecology (Ecology), 2022, Georgia-Pacific West Bellingham Site—Minor Modification to Third Amendment to Agreed Order No. 6834, March 22, 2022.

## 7 Limitations

Work for this project was performed for Port of Bellingham (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

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# **TABLES**

## Table 1. Soil Homogenate Baseline Tests

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington

Soil Homogenate	Moisture Content ASTM D2216	Grain Size Analysis ASTM D422			Specific Gravity ASTM D854 g/mL	Atterberg Limits ASTM 4318		pH by ASTM D4972	Total Organic Carbon by EPA 9060A mg/kg	Total Mercury EPA Method 6020B mg/kg	SPLP Mercury (Total) <sup>1</sup> ug/L	SPLP Mercury (Dissolved) <sup>1</sup> ug/L
		Gravels	Sands	Fines		Plastic Limit	Liquid Limit					
Soil 1	56.2%	0.0%	45.9%	54.1%	1.67	32	42	7.28	58,000	3,940	406	562
Soil 1 - DUP	--	--	--	--	--	--	--	7.24	54,000	4,490	660	505
Soil 2	61.3%	0.0%	67.1%	32.9%	1.70	39	52	7.37	61,000	22.3	7.74	3.81
Soil 2 - DUP	--	--	--	--	--	--	--	--	--	128	9.23	4.39

### Notes:

Moisture content is the average of three results included in Appendix E.

ASTM - American Society of Testing and Materials International

1 - EPA Method 1312 - SPLP; Aqueous Mercury analysis by EPA Method 6020B

## Table 2. Treatability Test - Mix Designs

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington

Soil Homogenate	Mix No.	MaxCem	Terraflow	Type 1L Portland Cement	NewCem (Pure BFS)	Total Cement Content	Water to Cement Ratio <sup>1</sup>
		% dry soil weight	% dry soil weight	% dry soil weight	% dry soil weight	%	
Soil 1	Mix-1	5	--	--	--	5	2.91
	Mix-2	--	5	--	--	5	3.72
	Mix-3	10	--	--	--	10	1.74
	Mix-4	--	10	--	--	10	2.03
	Mix-5	--	--	5	5	10	1.79
	Mix-6	15				15	1.57
	Mix-7		15			15	1.59
	Mix-8			7.5	7.5	15	1.65
	Mix-9	20				20	1.15
Soil 2	Mix-1	5	--	--	--	5	5.89
	Mix-2	--	5	--	--	5	5.89
	Mix-3	10	--	--	--	10	3.25
	Mix-4	--	10	--	--	10	3.25
	Mix-5	--	--	5	5	10	3.25
	Mix-6	15	--	--	--	15	2.36
	Mix-7	--	15			15	2.23
	Mix-8	--	--	7.5	7.5	15	2.46
	Mix-9	20	--	--	--	20	1.92
	Mix-10	--	20	--	--	20	1.92
	Mix-11	--	--	10	10	20	1.92

### Notes:

1 - Water to Cement Ratio is ratio of mass of water (g) to mass of cement (g)

Water is 50 percent Site tap water, 50 percent groundwater

ASTM - American Society of Testing and Materials International

BFS - blast furnace slag

All cements from LafargeHolcim's Seattle Plant

MaxCem is 70 percent Type 1L Cement and 30 percent NewCem ground granulated blast furnace slag.

Terraflow75 is 25 percent Type 1L Cement and 75 percent NewCem ground granulated BFS.

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## Table 2

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### Table 3. Treatability Test - Days 0 to 7 Results

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington

Soil Homogenate	Mix No.	Mix Description	Temperature After Mixing	Standard Slump	pH by ASTM D4972	Pocket Penetrometer Results (psi)		
			°F	inches		1-day	4-day	7-day
Soil 1	Mix-1	3.5% PC, 1.5% BFS	65.1	4.6	12.07	0	0	0.2
	Mix-2	1.25% PC, 3.75% BFS	65.4	4.5	11.56	0	0	0
	Mix-3	7% PC, 3% BFS	66.5	4.5	12.48	2.5	3.1	3.3
	Mix-4	2.5% PC, 7.5% BFS	66.7	5.1	11.95	0	0	0
	Mix-5	5% PC, 5% BFS	66.2	4.3	12.21	1.2	1.9	2.1
	Mix-6	10.5% PC, 4.5% BFS	66.9	4.5	12.27	3.5	4.4	4.1
	Mix-7	3.75% PC, 11.25% BFS	67.5	5.1	12.03	1	1.5	2.1
	Mix-8	7.5% PC, 7.5% BFS	68.5	5.1	--	3.5	>4.5	>4.5
	Mix-9	14% PC, 6% BFS	68.4	4.6	--	4.5	>4.5	>4.5
Soil 2	Mix-1	3.5% PC, 1.5% BFS	69.8	--	11.6	--	--	0
	Mix-2	1.25% PC, 3.75% BFS	67.0	--	10.1	--	--	0
	Mix-3	7% PC, 3% BFS	69.4	--	11.2	--	--	4.1
	Mix-4	2.5% PC, 7.5% BFS	68.4	--	11.9	--	--	0
	Mix-5	5% PC, 5% BFS	69.0	--	10.5	--	--	4.5
	Mix-6	10.5% PC, 4.5% BFS	69.4	--	12.5	--	--	3.6
	Mix-7	3.75% PC, 11.25% BFS	69.0	--	12	--	--	2.5
	Mix-8	7.5% PC, 7.5% BFS	63.0	--	11.3	--	--	4
	Mix-9	14% PC, 6% BFS	68.8	--	11.7	--	--	4.3
	Mix-10	5% PC, 15% BFS	65.0	--	10.8	--	--	4.2
	Mix-11	10% PC, 10% BFS	63.8	--	11.2	--	--	4.3

**Notes:**

ASTM - American Society of Testing and Materials International

BFS - blast furnace slag

PC - Type 1L Portland cement

UCS - Unconfined Compressive Strength

% - percent, °F - degrees Fahrenheit, psi - pounds per square inch

## Table 4. Treatability Test - Days 8 to 56, Strength and Hydraulic Conductivity Results

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington

Soil Homogenate	Mix No.	Mix Description	UCS (ASTM D2166)			Hydraulic Conductivity (ASTM D5084)
			14-day UCS (psi)	28-day UCS (psi)	56-day UCS (psi)	>56-day (cm/sec)
Soil 1	Mix-1	3.5% PC, 1.5% BFS	4	--	--	--
	Mix-2	1.25% PC, 3.75% BFS	0	--	--	--
	Mix-3	7% PC, 3% BFS	22	--	--	--
	Mix-4	2.5% PC, 7.5% BFS	1	--	--	--
	Mix-5	5% PC, 5% BFS	13	--	--	--
	Mix-6	10.5% PC, 4.5% BFS	30	40	49	--
	Mix-7	3.75% PC, 11.25% BFS	18	21	--	--
	Mix-8	7.5% PC, 7.5% BFS	23	69	100	3.22E-07
	Mix-9	14% PC, 6% BFS	67	84	118	--
Soil 2	Mix-1	3.5% PC, 1.5% BFS	0	--	--	--
	Mix-2	1.25% PC, 3.75% BFS	0	--	--	--
	Mix-3	7% PC, 3% BFS	22	--	--	--
	Mix-4	2.5% PC, 7.5% BFS	0	--	--	--
	Mix-5	5% PC, 5% BFS	37	--	--	--
	Mix-6	10.5% PC, 4.5% BFS	26	39	--	--
	Mix-7	3.75% PC, 11.25% BFS	18	--	--	--
	Mix-8	7.5% PC, 7.5% BFS	33	43	57,55,27 (triplicate)	4.66E-07
	Mix-9	14% PC, 6% BFS	35	34	--	--
	Mix-10	5% PC, 15% BFS	25	--	--	--
	Mix-11	10% PC, 10% BFS	49	--	--	--

### Notes:

ASTM - American Society of Testing and Materials International

BFS - blast furnace slag

PC - Type 1L Portland cement

UCS - Unconfined Compressive Strength

% - percent, cm/sec - centimeters per second, psi - pounds per square inch

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**Table 4**

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**Table 5. Treatability Test - Leaching Results**

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington

Soil Homogenate	Mix No.	Mix Description	LEAF (SW846 Method 1315M) Dissolved Mercury (ug/L)								
			Interval T1 Duration: 2 hours Cum. Leach Time: 0.08 days	Interval T2 Duration: 23 hours Cum. Leach Time: 1 day	Interval T3 Duration: 23 hours Cum. Leach Time: 2 days	Interval T4 Duration: 5 days Cum. Leach Time: 7 days	Interval T5 Duration: 7 days Cum. Leach Time: 14 days	Interval T6 Duration: 14 days Cum. Leach Time: 28 days	Interval T7 Duration: 14 days Cum. Leach Time: 42 days	Interval T8 Duration: 7 days Cum. Leach Time: 49 days	Interval T9 Duration: 14 days Cum. Leach Time: 63 days
Blank	--	--	0.0011	0.0039	0.0024	0.0010	0.0008	0.00082	0.0011	0.00065	0.0015
Soil 1	Mix-8	7.5% PC, 7.5% BFS	13	6.4	1.2	0.86	0.42	1.1	2.0	1.1	1.0
Soil 2	Mix-8	7.5% PC, 7.5% BFS	0.028	0.048	0.027	0.031	0.026	0.072	0.200	0.096	0.17

**Notes:**  
 BFS - blast furnace slag  
 PC - Type 1L Portland cement  
 ug/L - micrograms per liter  
 %- percent

# FIGURES



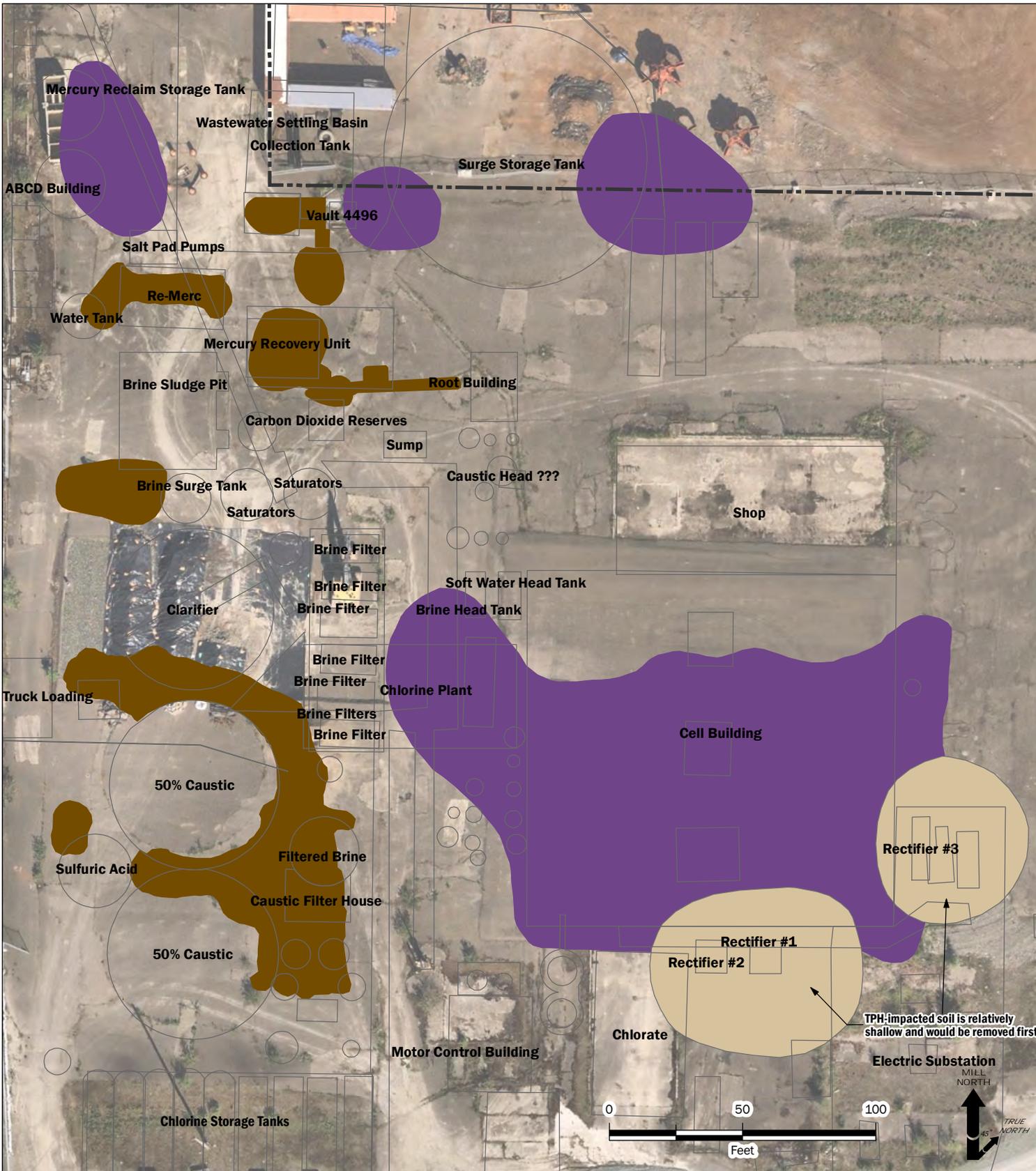
GIS Path: G:\projects\ChloralkaliRAU\_210368\_Delivered\GPWest\PreRemedial\ID\slm\01\_Site\_Location\_Map.mxd | Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet | Date Saved: 2/1/2024 | User: Norakochie | Print Date: 2/1/2024

 Monitoring Well



**Site Location Map**  
 Pre-Remedial Design Investigation 2 Data Report  
 Chlor-Alkali RAU - GP West Site  
 Bellingham, Washington

	FEB-2024	BY: ACG / HMD	FIGURE NO.  <b>1</b>
	PROJECT NO. 210368	REVISED BY: --- / ---	



 Completed 2014 Interim Action Excavations	 ABC Recycling Lease Boundary
<b>Cell Building Area Cleanup Action</b>	 Former Structures Related to Chlorine Plant Operations
 Soil Removal/Offsite Disposal	
 Aggressive Removal of Obstructions and In Situ Solidification of Soils	

## ISS Cleanup Action Limits

Pre-Remedial Design Investigation 2 Data Report  
Chlor-Alkali RAU - GP West Site  
Bellingham, Washington

**Notes:**  
 1. The areas of previous soil removal are assumed to be capped along with the surrounding soils that exceed cleanup levels, although capping of these areas would not be required.  
 2. Areas of current soil removal are capped where impacted soils remain at depth.

	FEB-2024	BY: ACG / HMD	FIGURE NO. <b>2</b>
	PROJECT NO. 210368	REVISED BY: --- / ---	

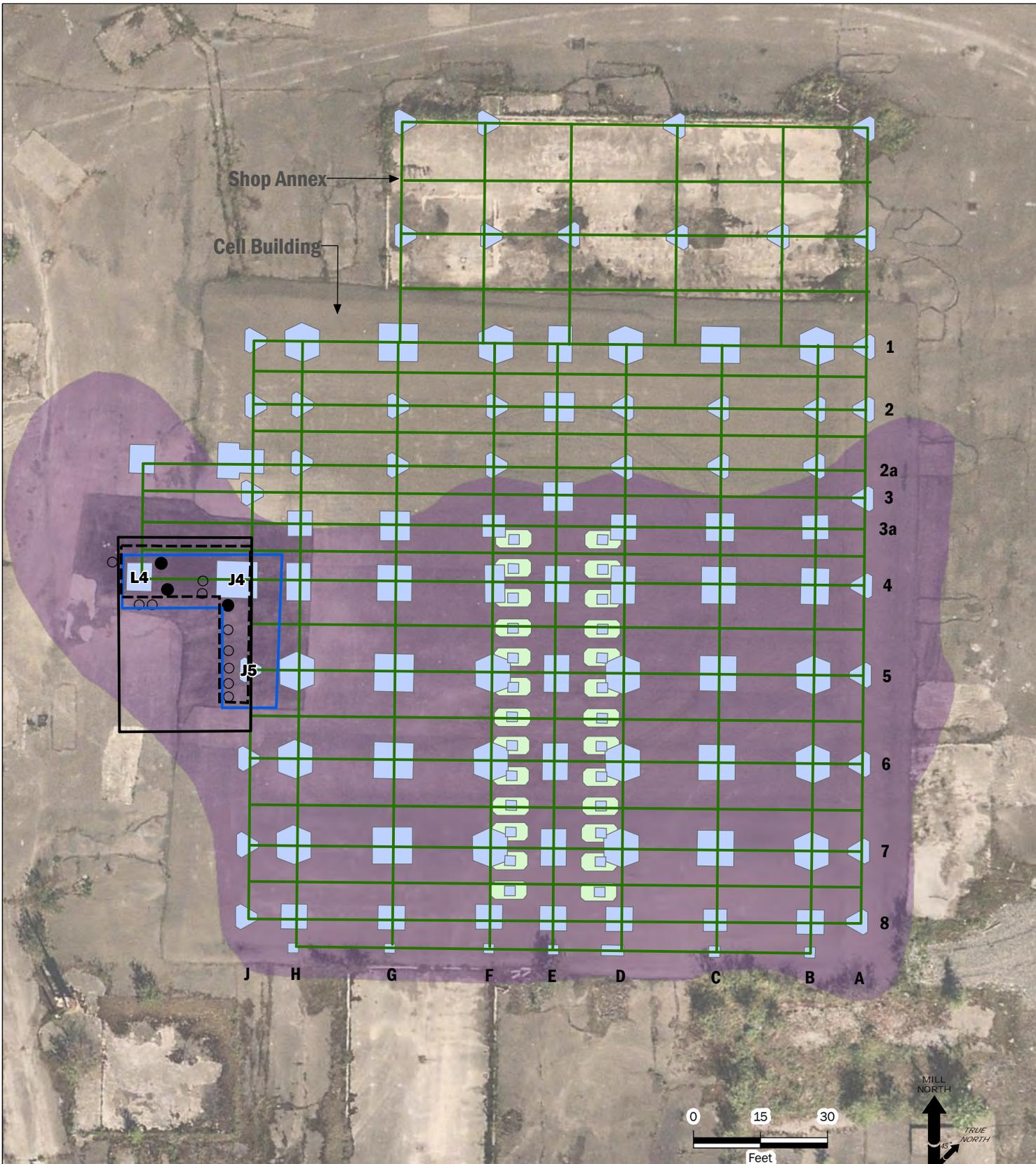


	Monitoring Well		Pilot Test Area
	Perimeter Air Monitoring Location		Equipment and Water Management Area
	Pile Caps		Former Cell Building
	Temporary Stockpile Area		Shop Slab
	ABC Recycling Lease Boundary		Paved Area (2017)
	Fence		

## Field Pilot Testing - Plan View (1 of 2)

Pre-Remedial Design Investigation 2 Data Report  
 Chlor-Alkali RAU - GP West Site  
 Bellingham, Washington

	NOV-2023	BY: ACG / HMD	FIGURE NO. <b>3</b>
	PROJECT NO. 210368	REVISED BY: --- / ---	



- |                                     |   |
|-------------------------------------|---|
| <b>Pilot Test</b>                   | <b>Cell Building Foundation Elements</b>                      |
| ● Timber Pilings Cut above Aquitard | — Grade Beam  |
| ○ Timber Pilings Remaining          | ■ Pile Cap  |
| □ Area of Excavation to Aquitard    | ■ Pile-Supported Structure                                    |
| □ Estimated Extent of Concrete Slab | <b>Cell Building Area Cleanup Action</b>                      |
| □ Removed Extent of Concrete Slab   | ○ Removal of Obstructions and In Situ Solidification of Soils |

## Field Pilot Testing - Plan View (2 of 2)

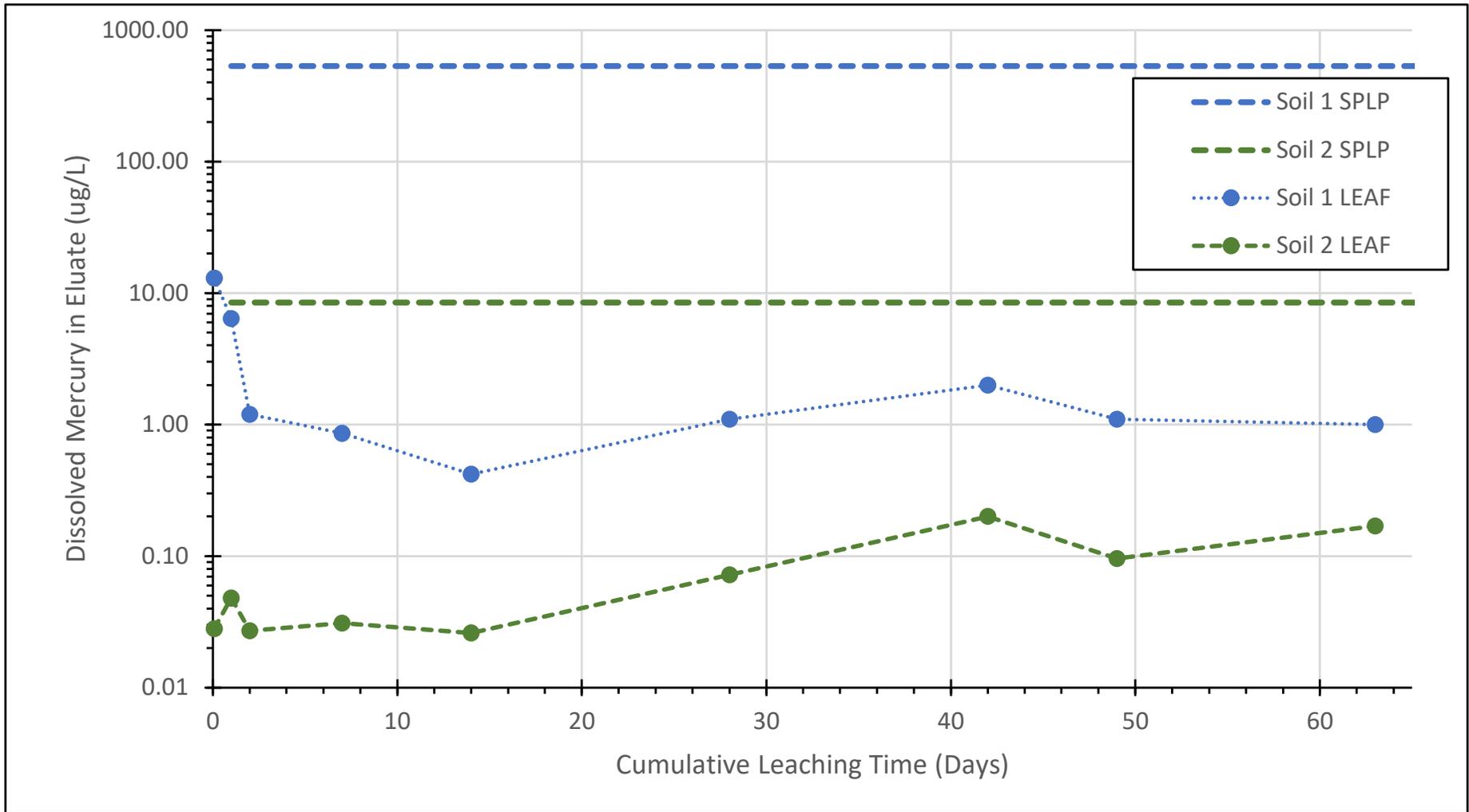
Pre-Remedial Design Investigation 2 Date Report  
Chlor-Alkali RAU - GP West Site  
Bellingham, Washington



NOV-2023  
PROJECT NO.  
210368

BY:  
ACG / HMD  
REVISED BY:  
--- / ---

FIGURE NO.  
**4**



**Figure 5**  
**LEAF Results**

## **APPENDIX A**

### **Air and Water Discharge Monitoring Results for Pilot Test**

**Table A.1. Perimeter Air Monitoring (Hg) Data**

Project No. 210368, Seattle, Washington

Date / Time	Location	Weather	Temperature (°F)	Wind Direction	Wind Speed (mph)	Hg Reading (ug/m3)	Activity On-Site
10/26/22 8:47 AM	P1	overcast, drizzle	51	170	5	0	Breaking asphalt
10/25/22 3:58 PM	P1	Sprinkle	51	170	10	0.01	Breaking concrete
10/26/22 8:08 AM	P1	Partly cloudy	48	170	2	0.01	Moving concrete debris
10/26/22 3:45 PM	P1	Overcast	50	170	2	0.02	Pot holing for
10/27/22 8:23 AM	P1	overcast	52	170	7	0	Breaking concrete caps
10/27/22 1:24 PM	P1	Overcast	57	190	4.5	0.06	Soil Excavation and Timber pile removal
10/31/22 8:52 AM	P1	Drizzle	53	165	5	0.04	Breaking concrete
11/1/22 10:16 AM	P1	Partly cloudy	57	-	0	0.19	Excavation
11/1/22 5:50 PM	P1	Clear	47	-	0	0.02	After completion of on-site work
10/26/22 9:16 AM	P2	overcast, drizzle	51	170	5	0	Breaking asphalt
10/25/22 3:06 PM	P2	Overcast	48	170	7	0.01	Breaking concrete
10/26/22 7:53 AM	P2	Partly cloudy	49	-	0	0.01	None (pre-construction)
10/26/22 8:34 AM	P2	Overcast	50	170	2	0	Demo/expose pile caps
10/26/22 11:28 AM	P2	Overcast	52	170	3	0.01	Drilling through cap
10/26/22 2:43 PM	P2	Overcast	52	120	3	0.83	Drilling and cleaning cap holes
10/26/22 3:49 PM	P2	Overcast	50	170	1	0.01	Pot holing for
10/27/22 8:10 AM	P2	overcast	52	170	7	0	Breaking concrete caps
10/27/22 12:07 PM	P2	cloudy	56	180	10	0.06	Breaking concrete cap and soil excavation.
10/31/22 8:24 AM	P2	Light rain	53	170	8	0.03	Soil Excavation and Timber pile removal
10/31/22 4:45 PM	P2	Mostly cloudy	52	170	2	0.08	After completion of on-site work
11/1/22 10:28 AM	P2	Partly cloudy	53	-	0	0.01	Excavating soil, loading concrete.
11/1/22 5:55 PM	P2	Clear	47	-	0	0.02	After completion of on-site work
10/26/22 9:23 AM	P3	overcast, drizzle	51	170	6	0.02	Breaking asphalt
10/25/22 3:15 PM	P3	Overcast	48	170	9	0.03	Breaking concrete
10/25/22 3:15 PM	P3	Overcast	48	170	9	0.03	Breaking concrete
10/25/22 3:50 PM	P3	Overcast	51	165	6	0.03	Breaking concrete
10/26/22 7:59 AM	P3	Partly cloudy	50	190	3	0.15	Equipment maintenance
10/26/22 2:45 PM	P3		52	160	4	0.26	Drilling and cleaning (air pressure) cap holes
10/26/22 3:54 PM	P3	Overcast	-	170	3	0	Pot holing for
10/27/22 8:31 AM	P3	overcast	52	170	7	0	Breaking concrete caps
10/27/22 1:32 PM	P3	Overcast	57	190	4.5	0.05	Soil Excavation and Timber pile removal
10/31/22 12:07 PM	P3	Overcast	51	180	5	0.03	Crushing concrete
10/31/22 4:39 PM	P3	Overcast	53	170	3	0.08	After completion of on-site work
11/1/22 10:24 AM	P3	Partly cloudy	53	150	4	0.14	Excavating soil, loading concrete.
11/1/22 5:40 PM	P3	Clear	48	170	2	0.01	After completion of on-site work
10/26/22 9:33 AM	P4	overcast, drizzle	51	150	2	0	Breaking and loading asphalt
10/25/22 3:54 PM	P4	Sprinkle	52	170	2	0.01	Breaking concrete
10/26/22 8:04 AM	P4	Partly cloudy	48	-	0	0	Moving concrete debris
10/26/22 10:24 AM	P4	Overcast	50	-	-	0.96	Expose caps
10/26/22 3:41 PM	P4	Overcast	50	160	2	0.07	Pot holing for
10/27/22 8:27 AM	P4	overcast	52	170	7	0.03	Breaking concrete caps
10/27/22 1:28 PM	P4	Overcast	57	190	4.5	0.05	Soil Excavation and Timber pile removal
10/31/22 8:58 AM	P4	Light rain	53	Variable	2	0.01	Breaking concrete
10/31/22 9:32 AM	P4	Rain	53	160	11	0.08	Loading debris
11/1/22 10:20 AM	P4	Partly cloudy	52	-	0	0.1	Excavation, loading concrete
11/1/22 5:47 PM	P4	Clear	47	-	0	0.04	After completion of on-site work

**Notes:**

°F - degrees Fahrenheit

mph - miles per hour

ug/m<sup>3</sup> - micrograms per cubic meter

## Table A.2. Worker Breathing Zone - Air Monitoring (Hg) Data

Project No. 210368, Seattle, Washington

Date / Time	Location	Weather	Temperature (F)	Wind Direction From	Wind Speed (mph)	Hg Reading (ug/m3)	Activity On-Site
10/26/22 8:49 AM	At edge of excavation	Overcast	50	170	2	0.77	Demo, grade beam crushing
10/26/22 10:18 AM	At edge of excavation	Overcast	50	180	3	12.25	Exposing pile caps following grade beam removal
10/27/22 8:25 AM	Upwind of excavation	overcast	52	170	7	0.01	Breaking pile caps
10/27/22 8:40 AM	At edge of excavation	overcast	52	170	7	1.13	Breaking pile caps
10/27/22 9:48 AM	At edge of excavation	partly cloudy	54	180	5	1.98	After excavating fill material.
10/27/22 2:19 PM	North of excavation.	cloudy	58	190	5	3.3	Excavating soil
10/31/22 9:05 AM	Up wind	Light rain	53	170	4	0.06	Before start of excavation
10/31/22 9:20 AM	Downwind of roll off	Rain	53	60	6	1.13	Loading roll off
10/31/22 11:53 AM	Downwind of excavation	Overcast	52	170	9	2.77	Crushing concrete
10/31/22 12:41 PM	In conex	Overcast	54	170	6	0.00	Drilling pile cap
10/31/22 12:44 PM	Down wind of excavtion	Overcast	53	170	6	2.01	Drilling pile cap
10/31/22 12:48 PM	Upwind of excavation	Overcast	53	170	7	0.07	Drilling pile cap
10/31/22 2:27 PM	Downwind of excavation	Overcast	52	170	6	1.61	After drilling pile cap

### Notes:

°F - degrees Farenheit

mph - miles per hour

ug/m<sup>3</sup> - micrograms per cubic meter

Aspect Consulting

2/28/2024

V:\210368 Remedial Dsgn and Cnstrctn Ovrsght, Chlor-Alkali RAU\Deliverables\210368-B Chlor-Alkali RAU\2024\_02 PRDI 2 Data Report\FINAL\Appendices\Appendix A\_Air and Discharge Monitoring Results\A.1 and A.2 Air Monitoring Tables





October 11, 2022

Mr. Steve Hood  
Washington State Department of Ecology  
Bellingham Field Office  
913 Squalicum Way No. 101  
Bellingham, Washington 98225

**Re: Information for Port of Bellingham ASB NPDES Permit Condition S7  
Request to Discharge Dewatering Water to ASB during Pilot Test for Cleanup  
Project No. 210368-B-03**

Dear Mr. Hood:

This letter transmits information to satisfy condition S7 for non-routine and unanticipated discharges of water to the Port of Bellingham's (Port) Aerated Stabilization Basin (ASB) under their NPDES permit for the facility. The permit condition S7 states:

*"1. Beginning on the effective date of this permit, the Permittee is authorized to discharge wastewater to the ASB on a case-by-case basis if pre-approved by Ecology. Prior to any discharge, the Permittee must contact Ecology 30 days in advance and at a minimum provide the following information: ..."*

Information to address each of the eight listed points is provided below.

- a. The proposed discharge location.** Water would be conveyed from the cleanup project site to the Port's dockside pump station from which it would be pumped to the ASB.
- b. The nature of the activity that will generate the discharge.** The Port is undertaking cleanup of the Chlor-Alkali Remedial Action Unit (RAU) of the GP West Site (Site) in accordance with Washington State's Model Toxics Control Act (MTCA; Chapter 173-340 WAC). In March 2022, Ecology issued a minor modification to the Agreed Order that revised the schedule of deliverables for the Chlor-Alkali RAU remedial design, including Pre-Remedial Design Investigation (PRDI) 2 Project Plan (Plan).

The Final PRDI 2 Plan approved by Ecology defines the field pilot testing and laboratory treatability testing necessary to complete the remedial design for the cleanup action of removal of structural obstructions and then *in-situ* solidification/stabilization (ISS) treatment of soils containing visible elemental mercury (Hg) in the Chlorine Plant Area.

The field pilot test will evaluate the means and methods of obstruction removal for a small portion of the Cell Building foundation. Soil will be excavated and temporarily stockpiled within the area of contamination, as needed, to expose and remove three pile caps and their timber pilings down to the aquitard surface expected at a depth of approximately 15 feet below existing grade. No ISS soil mixing will be conducted during the field pilot test. The field pilot test area will be regraded and paved with asphalt restoring to existing condition.



Dewatering of groundwater is expected to be necessary to expose the pilings at the aquitard interface. All water accumulating in stockpile areas and water generated from excavation dewatering will also be collected and conveyed to the Contractor's onsite water treatment system and from there to the Owner's ASB pump station.

- c. **Any alternatives to the discharge, such as reuse, storage, or recycling of the water.** Due to the nature of the water generated as a component of a MTCA cleanup, there are no reuse, storage, or recycling alternatives for management of the water generated during the cleanup.
- d. **The total volume of the water expected to be discharged.** Based on prior cleanup excavation work in near proximity to the pilot test, we estimate that up to 50 gpm will be necessary to dewater the Fill unit sufficiently to exposure the pilings to a depth of about 15 feet. Conservatively assuming a dewatering duration of 3 weeks, a total discharge volume of up to 18,000 gallons is estimated for the pilot test.
- e. **Provide the most current tightness test results for conveyance piping from GP-West to the ASB.** A copy of the Memorandum documenting the July 2021 testing is attached (Attachment 1).
- f. **The results of chemical analysis of the water.** Table 1 presents the available groundwater quality data collected from the five wells located closest to (just downgradient of) the pilot test location. The data were collected between 1993 and 2015, but not all wells were sampled at the same time. In 2013-2014, a substantial removal of Hg-contaminated soil with groundwater dewatering was completed over a period of several months near the pilot test location; wells CP-MW14 and CP-MW15 were in the excavation boundary and were decommissioned at that time. As such, the Table 1 data collected prior to June 2014 are likely conservative with respect to the current local contaminant (high pH and Hg) concentrations. In addition, the groundwater pH and dissolved Hg have been gradually attenuating over time, as illustrated by the data from well EMW-19S [1993-2015], further indicating that the available groundwater quality data (Table 1) are conservative with respect to anticipated current conditions.
- g. **The date of proposed discharge and the rate at which the water will be discharged, in gallons per minute.** The PRDI 2 Plan pilot test activities will commence on October 24, 2022, and will be completed by November 11, 2022. Active dewatering will occur during portions of this time and is not anticipated to be continuous for 3 weeks.

Dewatering water will be conveyed to a 11,000-gallon settling tank equipped with a series of weirs to reduce settleable solids and capture separate-phase oil, if present. Any water containing total settleable solids greater than 100 milliliter per liter (mL/L) or with visible petroleum sheen will undergo additional treatment prior to discharge to the ASB pump station.

- h. If the proposed discharge is to a municipal storm drain and is approved by the Department, the Permittee shall notify the municipality of the discharge.** No discharge to a municipal storm drain will occur.

Please contact Ben Howard at the Port (360-676-2500) or me (206-619-6743) if we can provide additional clarification regarding this information. Following your review of this letter, the Port requests written authorization for the requested discharge as soon as possible. Thank you.

Sincerely,

Aspect consulting, LLC



**Steve Germiot, LHG, CGWP**  
Principal Hydrogeologist  
sgermiot@aspectconsulting.com

Attachments: Table 1 – Groundwater Quality Data from Wells Near the Pilot Test Area  
Attachment 1 – Anchor QEA Memorandum Re: NPDES Permit WA0001091,  
Special Condition S4.A.a.2; Annual ASB Pipeline Tightness  
Test Results, July 21, 2021 (December 2, 2021)

cc: Ben Howard, Port of Bellingham

V:\210368 Remedial Dsgn and Cnstrctn Ovrsght, Chlor-Alkali RAU\Deliverables\2022\_10 Ecology Letter Re ASB Permit Condition\Letter to satisfy ASB Permit Condition S7 - PRDI 2 Pilot Test.docx

## **TABLE 1**

**Table 1. Groundwater Quality Data from Wells Near the Pilot Test Area**

GP West, Project No. 210368-B-03

Chemical Name	CP-MW06 10/02/09	CP-MW06 04/05/10	CP-MW13 12/17/10	CP-MW14 12/23/10	CP-MW15 12/21/10	CP-MW15 02/01/11	EMW-19S 12/10/93	EMW-19S 02/18/94	EMW-19S 10/02/09	EMW-19S 04/05/10	EMW-19S 08/14/14	EMW-19S 09/01/15
<b>Dissolved Metals</b>												
Dissolved Arsenic in ug/L						97.2						
Dissolved Cadmium in ug/L						1.44						
Dissolved Chromium in ug/L						999						
Dissolved Copper in ug/L						56.9						
Dissolved Lead in ug/L						20.2						
Dissolved Mercury in ug/L		4.9	0.406	1.26	619	232	460	460	18.5	28.5	6.92	8.61
Dissolved Nickel in ug/L						587						
Dissolved Zinc in ug/L						155						
<b>Conventional Chemistry Parameters (including other metals)</b>												
Alkalinity (Total) in mg/L as CaCO3	1,550	1,470	241 J	12,000	10,200	9,510	9,380		1,710	4,900		
Bicarbonate in mg/L				7,750	9.0 U							
Bromide in mg/L	0.4 J								5 U			
Carbon, Dissolved Organic in mg/L			11.6	786	2,580	2,600						
Carbon, Total Organic in ug/L							55,100					
Carbonate in mg/L				4,240	9,500							
Chloride in mg/L	3,270	2,690				1,320	1,370		557	3,310		
Conductivity in umhos/cm			2,470	47,800	15,800							
Dissolved Calcium in mg/L	6.92	12				15.4	4.6		5.96	9.9		
Dissolved Iron in mg/L	2.3		0.102	5.1	32.7	24.5			6.6			
Dissolved Magnesium in mg/L	0.681	1.48				0.071 J	0.05 U		0.0411	0.0215 J		
Dissolved Manganese in mg/L	0.028		0.014	0.0373	0.0201 U	0.014	0.01 U		0.0451			
Dissolved Potassium in mg/L	5.65	4.96				23	25		8.87	25.2		
Dissolved Sodium in mg/L	2,820	2,490				4,730	4,700		1,480	4,310		
Fluoride in mg/L	2.3 J								10 U			
Nitrate as Nitrogen in mg/L	5 UJ					2.5 U			5 UJ			
Nitrite as Nitrogen in mg/L	10 U								5 U			
Sulfate in mg/L	30	23	0.64	20 U	32	18	1,220		601	296		
Sulfide in mg/L	13.4	0.92	0.4	16.1	98.9	75.4	0.5 U		7.57	82.7		
Total Dissolved Solids in mg/L	8,240	6,640	1,590	38,100	10,900	19,000			4,520	13,700		
<b>Field Parameters</b>												
Conductivity in us/cm	12,870	10,500	2,551	49,760	17,250		15,000		6,342	1,779	2926	2494
Dissolved Oxygen in mg/L	0.4	0.22	0.5	0.28	0.2		0.64	3	0.39	0.36	0.28	0.16
Eh (ORP) in mVolts	-598.1	-272.7	-40.7	-339.4	-375.7		-312	-317	-640.8	-477.7	-224	-13.4
pH in pH units	9.33	8.9	7.86	9.06	11.17		11.93	13.19	10.92	11.14	9.19	8.5
Temperature in deg C	18.78	14.23	14.97	15.97	15.5		10.5	11.4	19.21	12.39	11.94	19.7
Turbidity in NTU	10	50	10		50				10	30	20	36.2

**Notes:**

U: Not detected at associated reporting limit. J: Estimated concentration.

## **ATTACHMENT 1**

**Anchor QEA Memorandum Re: NPDES  
Permit WA0001091, Special Condition  
S4.A.a.2; Annual ASB Pipeline  
Tightness Test Results, July 21, 2021  
(December 2, 2021)**

# Memorandum

December 2, 2021

To: Jennifer Allen and Ben Howard, Port of Bellingham  
From: Kyle List and Andy Brew, Anchor QEA, LLC  
cc: Mark Larsen and Amy Corp, Anchor QEA, LLC  
Re: **NPDES Permit WA0001091, Special Condition S4.A.a.2;  
Annual ASB Pipeline Tightness Test Results, July 21, 2021**

## Background

This memorandum summarizes the results of the annual *ASB Pipeline Tightness Test* that occurred on July 21, 2021. In accordance with the National Pollutant Discharge Elimination System (NPDES) Permit requirements, the test was conducted to evaluate the tightness of three force mains that run under the Whatcom Waterway from the Dockside Pump Station (DPS) to the Aeration Stabilization Basin (ASB). The test was performed in accordance with methods developed in coordination with the Washington State Department of Ecology.

## Test Parameters

The test was conducted in accordance with the Single Line Diagram illustrated in Figure 1. Before the test began, the water level in the sump was manually pumped down to equilibrate the clearwater and process water vault cells through the connection weir. The vault water level showed some fluctuations over the course of the testing, from approximately elevation +5.96 mean lower low water (MLLW) to elevation +6.31 feet MLLW. The common manifold in the DPS was manually vented to the atmosphere, as was the common manifold on the ASB. Discharge pipes (i.e., B, C, and D) were manually drained to a static water level below the invert elevation of the common manifold in the DPS.

**Table 1**  
**Predicted Tides During Test<sup>1</sup>**

Measurement	Value	Date	Time
Predicted test at low tide	-2.19 feet MLLW	July 21, 2021	9:31 a.m.
Predicted test at high tide	+8.14 feet MLLW	July 21, 2021	5:40 p.m.
Predicted change in tide level	+10.33 feet (between test low and high tide)	--	--

<sup>1</sup> Predicted tides from National Oceanic and Atmospheric Administration Station ID No. 9449211 for Bellingham Bay.

## Test Conditions

**Table 2**  
**Weather During Test<sup>2</sup>**

Measurement	Value	Date	Time
Barometric pressure at low tide	30.11 inches Hg	July 21, 2021	9:31 a.m.
Barometric pressure at high tide	30.12 inches Hg	July 21, 2021	5:40 p.m.
Change in barometric pressure	+0.01 inches Hg (from low to high tide)	--	--
Wind direction (blowing from)	South	--	--
Wind speed (range of speeds)	Sustained 12 to 14 mph; Gusts 23 mph	--	--

Notes:  
Hg: mercury  
mph: miles per hour

## Test Measurements

**Table 3**  
**Dockside Pump Station Effluent Line Test Measurements**

ID	Measurement	Value <sup>4</sup> (feet, MLLW)	Date	Time
D-1	Water level, Discharge Pipe D <sup>1</sup>	11.18	July 21, 2021	9:31 p.m.
C-1	Water level, Discharge Pipe C <sup>2</sup>	11.03	July 21, 2021	9:31 p.m.
B-1	Water level, Discharge Pipe B <sup>3</sup>	10.68	July 21, 2021	9:31 p.m.
T-1	Tide, test low-point	-1.30	July 21, 2021	9:31 p.m.
D-2	Water level, Discharge Pipe D <sup>1</sup>	11.19	July 21, 2021	12:07 p.m.
C-2	Water level, Discharge Pipe C <sup>2</sup>	11.03	July 21, 2021	12:07 p.m.
B-2	Water level, Discharge Pipe B <sup>3</sup>	10.67	July 21, 2021	12:07 p.m.
T-2	Tide, test lower mid-point	1.00	July 21, 2021	12:07 p.m.
D-3	Water level, Discharge Pipe D <sup>1</sup>	11.19	July 21, 2021	3:31 p.m.
C-3	Water level, Discharge Pipe C <sup>2</sup>	11.04	July 21, 2021	3:31 p.m.
B-3	Water level, Discharge Pipe B <sup>3</sup>	10.66	July 21, 2021	3:31 p.m.
T-3	Tide, test higher mid-point	6.90	July 21, 2021	3:31 p.m.
D-4	Water level, Discharge Pipe D <sup>1</sup>	11.18	July 21, 2021	5:41 p.m.
C-4	Water level, Discharge Pipe C <sup>2</sup>	11.05	July 21, 2021	5:41 p.m.
B-4	Water level, Discharge Pipe B <sup>3</sup>	10.67	July 21, 2021	5:41 p.m.
T-4	Tide, test high-point	8.40	July 21, 2021	5:41 p.m.

Notes:

1. Pipe D is a 30-inch-diameter steel pipe, which is an alternate/backup discharge pipe from the DPS to the ASB; this pipe can convey water independently from the other pipes (i.e., A, B, C) with the use of isolation valves and requires operation of Pump P6 (Figure 1).
2. Pipe C is a 42-inch-diameter fiberglass reinforced pipe and primary discharge pipe from the DPS to the ASB.

---

<sup>2</sup> Weather data were recorded at the Bellingham International Airport National Oceanic and Atmospheric Administration station. Data available at: <https://w1.weather.gov/obhistory/KBLI.html>.

- Pipe B is a 30-inch-diameter steel pipe, which is believed to fill during pumping, but does not discharge a significant amount from the DPS to the ASB (valves are closed on both ends but may not be fully tight).
- Precision of each measurement is +/- 0.02 foot, resulting in an overall test precision of approximately 0.04 foot. No corrections have been applied to account for water elevation changes in the pipes that may result from differences in barometric pressure or tide-induced compression of the discharge lines.

## Test Results

The test performance was within test protocol requirements. Test results are calculated from test measurements listed in Table 3 and are summarized in Table 4. No significant change in water levels was noted during the test.

**Table 4**  
**Test Performance Results**

Measurement	Value
Duration of test	08:09 (hours:minutes)
Change in measured tide level (low to high)	+9.70 feet
Change in water level, Discharge Pipe D	<0.04 feet
Change in water level, Discharge Pipe C	<0.04 feet
Change in water level, Discharge Pipe B	<0.04 feet
Relative head in Discharge Pipe D at low tide <sup>1</sup>	11.98 feet MLLW
Relative head in Discharge Pipe C at low tide <sup>1</sup>	12.33 feet MLLW
Relative head in Discharge Pipe B at low tide <sup>1</sup>	12.48 feet MLLW

Note:

- Relative head in each discharge pipe at low tide is the difference in elevation between the low tide measurement and the water level in the sight tube for each discharge pipe.

## Conclusions

The test results did not show any indications of pipe leakage. The test will be repeated annually consistent with permit requirements.

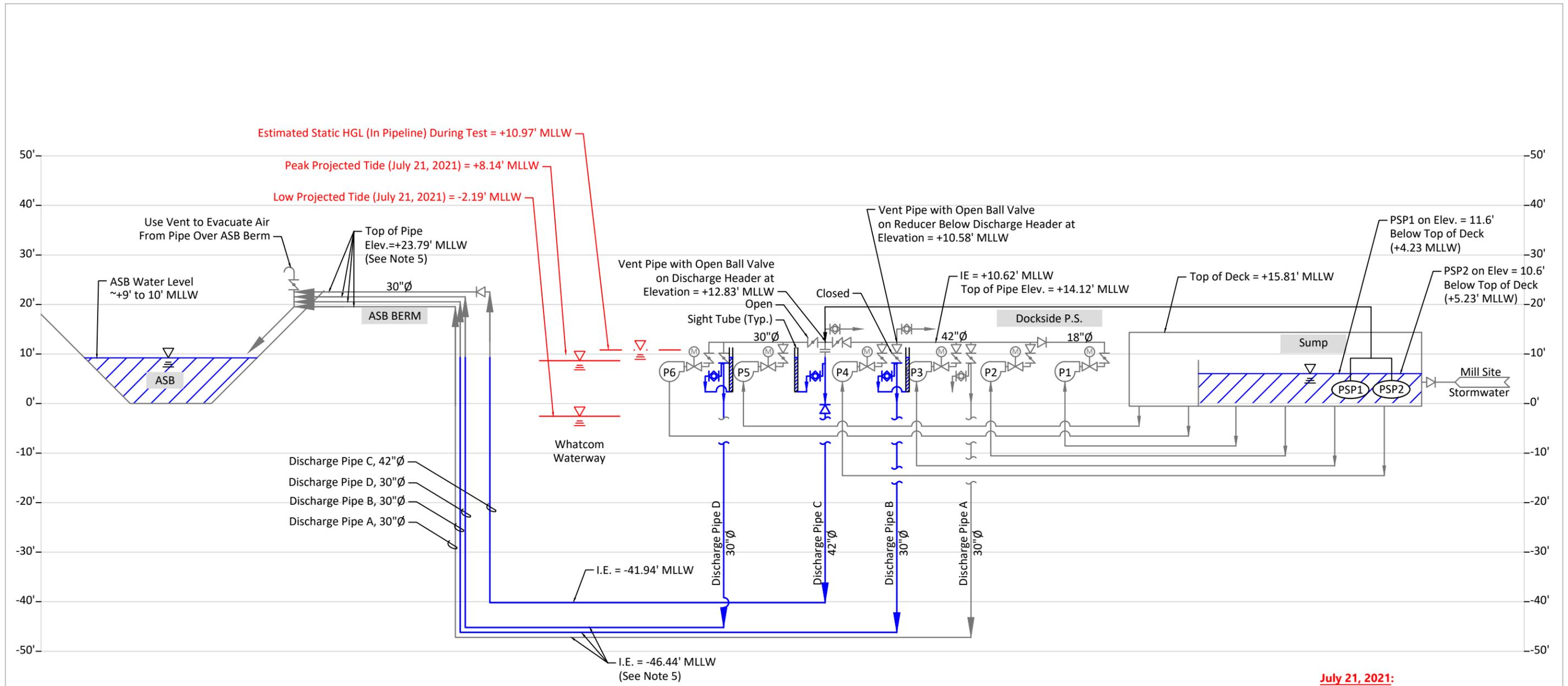
## Attachment

Figure 1 Proposed Tightness Testing – Single Line Diagram

Figure 1

Proposed Tightness Testing – Single Line  
Diagram

---



**July 21, 2021:**  
 1. This figure has been updated to reflect current test conditions.  
 2. Updates to this figure are shown in red.

**VERTICAL DATUM:**

1. The vertical datum for this drawing is Mean Lower Low Water (MLLW).
2. Tide elevations are predicted tides from National Oceanic and Atmospheric Administration (NOAA) tide charts, based on MLLW datum.
3. The top of deck elevation is the measured elevation on the top of the metal hatch above Pump No. 4. The elevation of that point was measured relative to the known elevation of the rim at CB #4253 (+14.83 feet MLLW) as part of the preparation for tightness testing. Based on the measurements made, the elevation of the top of the hatch above Pump No. 4 is +15.81 feet MLLW. Record drawings on file with the Port of Bellingham indicate that the top of deck elevation is +17.25 feet MLLW. The resulting conversion equation for record drawing elevations is: MLLW=Record Drawing Elevation -1.44 feet.

**NOTES:**

1. Pilot Study Pump (PSP) No. 1 and No. 2 are currently acting as the duty pumps. All other pumps are backup.
2. Pumps may be manually powered off during test.
3. Sight tubes are 0.5-inch-diameter cross-linked polyethylene (PEX) clear tubing.
4. All butterfly valves are normally open, unless otherwise noted.
5. Pipes are offset for the sake of showing the continuation of piping. However, all four pipes cross the Aerated Stabilization Basin (ASB) berm at the same elevation. All three 30-inch-diameter pipes cross the Whatcom Waterway at the same elevation.

Publish Date: 2021/08/11 10:58 AM | User: thutchison  
 Filepath: B:\Projects\Port of Bellingham\Whatcom Waterway (080007-01)\CAD\DPS\_Testing\08000701-RP-003\_2021.dwg Figure 1



**Figure 1**  
**Proposed Tightness Testing - Single Line Diagram**

Annual ASB Pipeline Tightness Test Results, July 21, 2021  
 Whatcom Waterway Cleanup and Marina

## **APPENDIX B**

### **Photo Log for Pilot Test**



Photograph 1. Site set up with two conex boxes, and prepared stockpile zone.



Photograph 2. Pulling up asphalt cap and separation geotextile covering the grade beams and pile caps.



Photograph 3. Demolition of grade beams and unreported concrete slab above L4.



Photograph 4. Exposed grade beams over pile caps J5 and J4.



Photograph 5. Demolition of grade beams.



Photograph 6. Constructed groundwater sump and the drilled pile caps for J5 and J4.



Photograph 7. Excavation to 16 feet below ground surface in preparation to cut timber piles underneath pile cap J5. Additional previously undocumented timber pile is noted in the top right of the image; this and other timber piles not associated with pile caps J5, J4, and L4 were not removed.



Photograph 8. Cut and extraction of timber pile underneath pile cap J5.



Photograph 9. Filling of excavation beneath the removed J5 pile cap and the removal of pile cap J4.



Photograph 10. Excavation to the aquitard beneath pile cap J4 in preparation for timber pilings cutting and removal.



Photograph 11. Image showing a cut timber piling and the first 1.5 feet of the silt aquitard.



Photograph 12. Exposed pile cap L4.



Photograph 13. Pile cap L4 after drilling and filling with Dexpan.



Photograph 14. Using excavator mounted jack hammer to break up pile cap L4. Break up required 1 to 3 hits from the jack hammer to break with minimal vibration.



Photograph 15. The tops of exposed timber pilings beneath pile cap L4.



Photograph 16. Excavation in preparation of cutting the timber pilings under pile cap L4.



Photograph 17. The use of hydraulic shears to cut one of five timber pilings under pile cap L4. The shears appeared to cause minimal disturbance to piling below the cut.



Photograph 18. Completed excavation and removal of pile cap L4 and associated timber pilings. In the upper left of the photo, the undocumented concrete slab is visible and its associated timber pilings that were not removed.



Photograph 19. The backfilled excavation after the completion of the Pilot Test excavation.



Photograph 20. The backfilled excavation after removal of structure associated with pile caps J4 and J5.

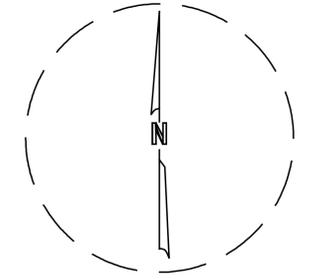


Photograph 21. Stockpile with erosion and sedimentation control best management practices in place, per the TESC Plan.

## **APPENDIX C**

### **Subcontractor Records for Pilot Test**

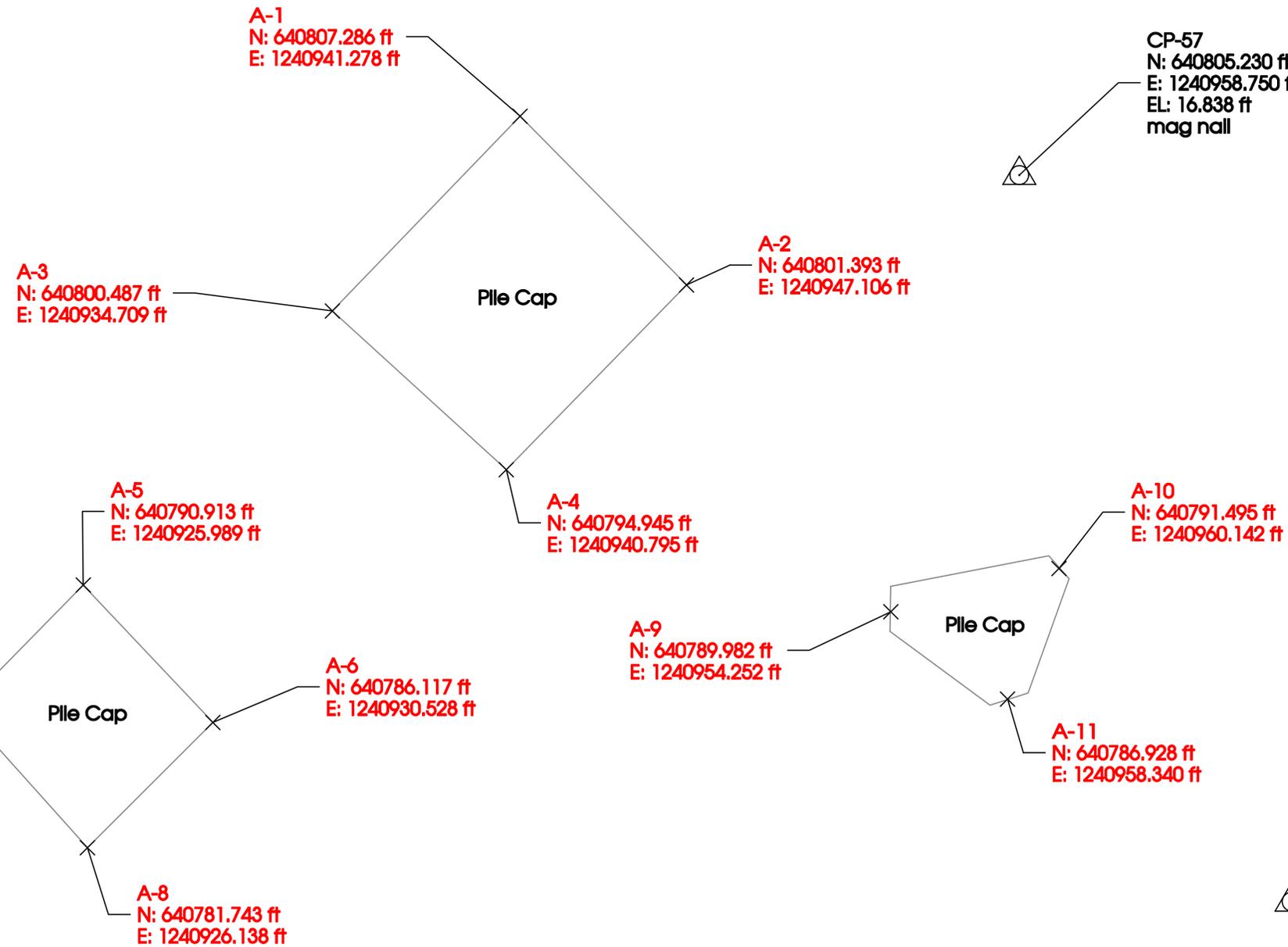
**Survey Notes:**  
 -Tied to C.O.B. Control NAD83/98  
 -Held C.O.B. Monument #5588 Aluminum Disk  
 N: 643391.018  
 E: 1242172.024  
 Elev: 18.969  
 -Vertical Datum NAVD88  
 -Pile Cap Corners were as-built by taping  
 dimensions from CP-55, 56, & 57



CP-55  
 N: 640817.697 ft  
 E: 1240943.915 ft  
 EL: 16.578 ft  
 mag nail

CP-57  
 N: 640805.230 ft  
 E: 1240958.750 ft  
 EL: 16.838 ft  
 mag nail

CP-56  
 N: 640779.858 ft  
 E: 1240968.280 ft  
 EL: 16.907 ft  
 mag nail



**Survey Notes:**

-Tied to C.O.B. Control NAD83/98

-Held C.O.B. Monument #5588 Aluminum Disk

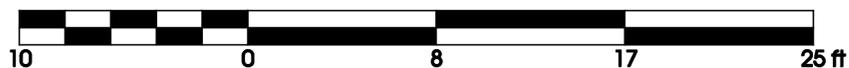
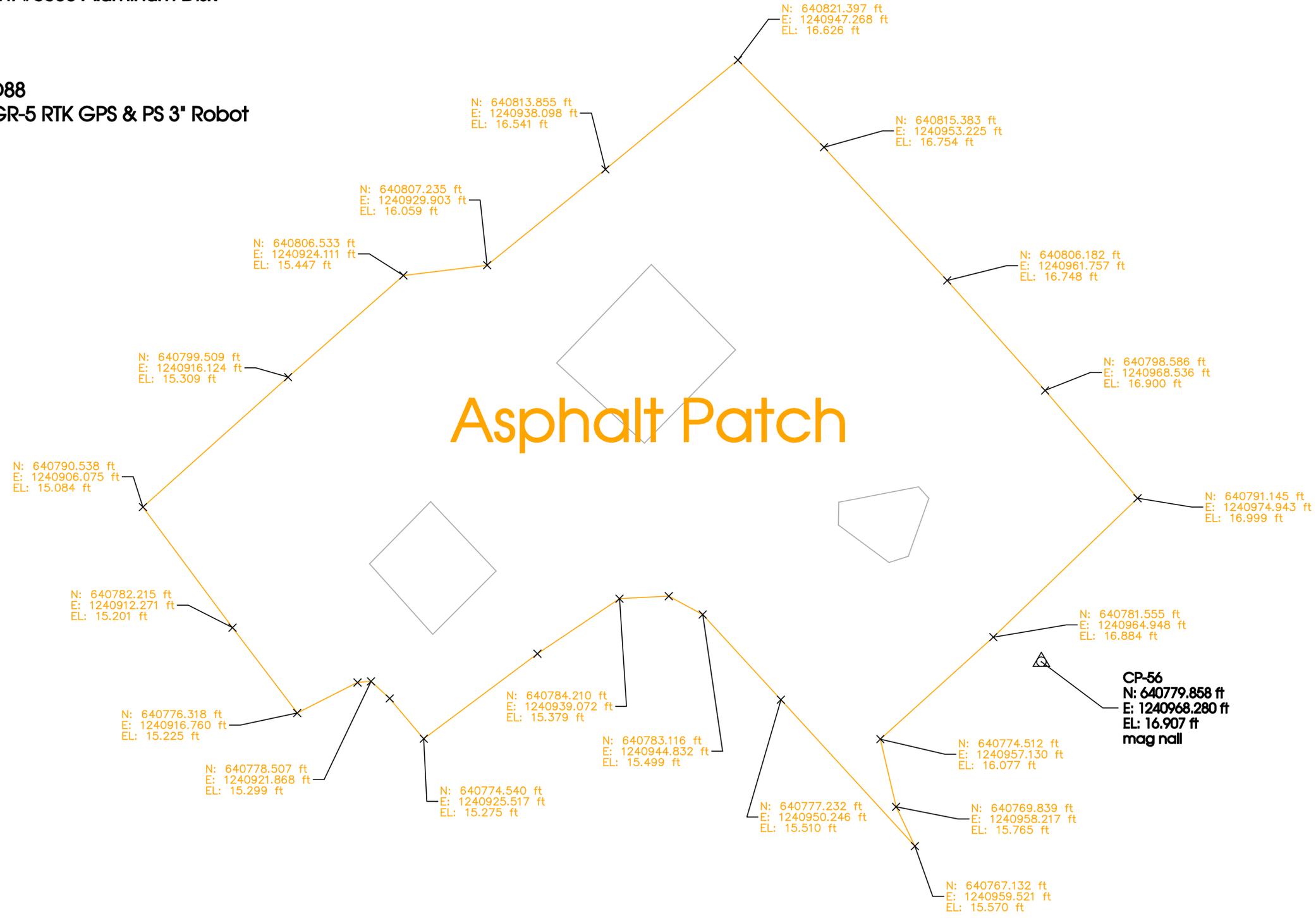
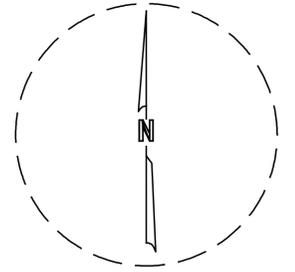
N: 643391.018

E: 1242172.024

Elev: 18.969

-Vertical Datum NAVD88

-Equipment: Topcon GR-5 RTK GPS & PS 3" Robot





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# **STRIDER CONSTRUCTION COMPANY, INC. SITE-SPECIFIC HEALTH AND SAFETY PLAN**

## **OBSTRUCTION REMOVAL PILOT TEST GP WEST SITE BELLINGHAM, WASHINGTON**

The logo for Strider Construction Company, featuring the word "STRIDER" in a bold, blue, italicized sans-serif font with a slight shadow effect.

***Prepared for:  
Strider Construction***

***Prepared by:  
EMB Consulting LLC***

***Revision date: October 25, 2022***



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## FIGURES

- FIGURE 1      ROUTE TO HOSPITAL MAP  
FIGURE 2      ROUTE TO WALK-IN CLINIC MAP



## ACRONYMS

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Aspect	Aspect Consulting
CIH	Certified Industrial Hygienist
COCs	Contaminants of Concern
DOSH	Washington State Division of Occupational Safety and Health
EMB	EMB Consulting
ESLI	End of Service Life Indicator
GP	Georgia Pacific
Hazwop	Hazardous Waste Site Operations
Hg	Mercury
IARC	International Agency for Research on Cancer
$\mu\text{g}/\text{m}^3$	microgram per cubic meter of air
$\text{mg}/\text{m}^3$	milligrams per cubic meter of air
MTCA	Model Toxics Control Act
PEL	Permissible Exposure Limit
Plan	Site-Specific Health and Safety Plan
PPE	Personal Protective Equipment
PRDI	Pre-remedial design investigation
Site	GP West Site
SHSO	Site Health and Safety Officer
STEL	Short-term exposure limit
Strider	Strider Construction
TWA	Time-Weighted Average
WAC	Washington Administrative Code



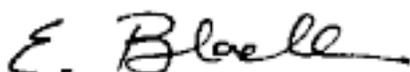
**Strider Construction  
 Site-Specific Health and Safety Plan  
 Obstruction Removal Pilot Test  
 GP West Site  
 Bellingham, Washington**

Strider Construction (Strider) and EMB Consulting, LLC (EMB) have developed this Site-Specific Health and Safety Plan (Plan) for use by Strider, its subcontractors, and visitors to the GP West Site (Site) located in Bellingham, Washington. Strider and EMB claim no responsibility for its use by others. The Plan covers activities with the potential for exposure to elemental mercury during Obstruction Removal Pilot Test project activities at the Site. This Plan is written for the specific site conditions, operations, purposes, and personnel specified and must be amended if conditions change. The intent of this Plan is to meet the requirements of the Washington State Division of Occupational Safety and Health (DOSH) Hazardous Waste Site Operations (HAZWOP) regulation (WAC 296-843). It is not intended to address normal safety practices on construction sites, such as those covered in the DOSH Safety Standards for Construction Work (WAC 296-155).

Each subcontractor is still responsible for the health and safety of their own individual employees and subcontractors.

**Plan Approval**

**PLAN PREPARED BY:**



October 25, 2022

---

Elisabeth Black, CIH  
 EMB Consulting, LLC

---

Date

**PLAN ACCEPTED FOR STRIDER CONSTRUCTION BY:**



October 26, 2022

---

Kyle Gebhardt  
 Strider Construction

---

Date



## HEALTH AND SAFETY CONTACT INFORMATION

<b>SITE LOCATION</b>	<p>GP West Site 300 West Laurel Street Bellingham, Washington</p> <p>A Site figure is provided with this Plan in Section 2.</p>																				
<b>NEAREST MEDICAL FACILITIES</b>	<p>Peacehealth St Joseph Medical (Hospital) 2901 Squalicum Parkway Bellingham, Washington 1.360.734.5400</p> <p>Family Care Network – Urgent Care (Walk-In Clinic) 3130 Squalicum Parkway Bellingham, Washington 360.671.4509</p> <p>The routes from the Site to the medical facilities are provided at the end of this Plan.</p>																				
<b>EMERGENCY RESPONDERS</b>	Bellingham Police, Fire, and Ambulance 911																				
<b>EMERGENCY CONTACTS</b>	<table style="width: 100%; border: none;"> <tr> <td style="width: 60%;">Kyle Gebhardt</td> <td style="text-align: right;">360-303-8520</td> </tr> <tr> <td>Derek Johnson (alternate) Project Manager Strider Construction</td> <td style="text-align: right; vertical-align: top;">360-739-1051</td> </tr> <tr> <td> </td> <td></td> </tr> <tr> <td>Dan Horsmon Site Superintendent Strider Construction</td> <td style="text-align: right; vertical-align: top;">360-927-1748</td> </tr> <tr> <td> </td> <td></td> </tr> <tr> <td>Rachel Horsmon Site Health and Safety Officer (SHSO) Strider Construction</td> <td style="text-align: right; vertical-align: top;">360-303-1936</td> </tr> <tr> <td> </td> <td></td> </tr> <tr> <td>Adam Griffin Client Contact Aspect Consulting</td> <td style="text-align: right; vertical-align: top;">865-696-7658</td> </tr> <tr> <td> </td> <td></td> </tr> <tr> <td>Elisabeth Black, CIH EMB Consulting, LLC</td> <td style="text-align: right; vertical-align: top;">206.915.2395</td> </tr> </table>	Kyle Gebhardt	360-303-8520	Derek Johnson (alternate) Project Manager Strider Construction	360-739-1051	 		Dan Horsmon Site Superintendent Strider Construction	360-927-1748	 		Rachel Horsmon Site Health and Safety Officer (SHSO) Strider Construction	360-303-1936	 		Adam Griffin Client Contact Aspect Consulting	865-696-7658	 		Elisabeth Black, CIH EMB Consulting, LLC	206.915.2395
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Elisabeth Black, CIH EMB Consulting, LLC	206.915.2395																				
<b>PROVIDE THE FOLLOWING INFORMATION TO EMERGENCY RESPONDERS</b>	<ul style="list-style-type: none"> <li>• Where You Are: Address, cross streets, or landmarks</li> <li>• Phone Number you are calling from</li> <li>• What Happened? Type of injury, accident</li> <li>• How many persons need help</li> <li>• What is being done for the victim(s)</li> <li>• You hang up last</li> </ul>																				



# 1. INTRODUCTION

Strider and its subcontractors are participating in the Obstruction Removal Pilot Test project at the GP West site (Site) in Bellingham, Washington. The project is being performed as part of Pre-Remedial Design Investigation (PRDI) activities for the Chlor-Alkali Remedial Action Unit at the G-P West Site in Bellingham, Washington (Site). Environmental investigations on the Site and previous project work in the area have identified elemental mercury on the Site, resulting from former industrial activity in the project area.

The goal of the Pilot Test is to determine the optimal means and methods to efficiently and effectively expose and remove subsurface obstructions—consisting of grade beams, pile caps, and timber piles that supported the Site’s former Cell Building—without compromising the underlying aquitard unit. All of the soil and structural elements to be encountered and handled are assumed to be contaminated with mercury.

This Plan was developed specifically for, and is limited to, the portions of the Site in which contaminated soils, building materials, and air may be impacted. This Plan is intended to be used in conjunction with the corporate health and safety programs of Strider and their subcontractors, and will be used as the foundation for training personnel on Site.

This Plan is intended to be a “living” document. It will be reevaluated and updated periodically as needed in light of work progression and changing conditions. A copy of this Plan will be located on the work site. Table 1.1 includes a summary of project information.

**TABLE 1.1  
SUMMARY OF PROJECT INFORMATION**

<b>Project Name</b>	Obstruction Removal Pilot Test GP West Site Bellingham, Washington
<b>Site Location</b>	GP West Site 300 West Laurel Street Bellingham, Washington (See Site map in Section 2)
<b>Known Chemical Hazards</b>	Elemental Mercury
<b>Known Physical Hazards</b>	Trucks and heavy machinery, lifting, trips, falls, noise
<b>Field Activities</b>	<ul style="list-style-type: none"> <li>• Mobilization</li> <li>• Mercury Vapor Mitigation</li> <li>• Soil Excavation</li> <li>• Grade Beam and Pile Cap Removal</li> <li>• Timber Pile Removal</li> <li>• Stockpiling of Removed Materials</li> <li>• Dewatering and Water Management</li> <li>• Soil Backfill</li> <li>• Hazardous Waste Debris Transportation and Disposal</li> </ul>



## **2. SITE INFORMATION**

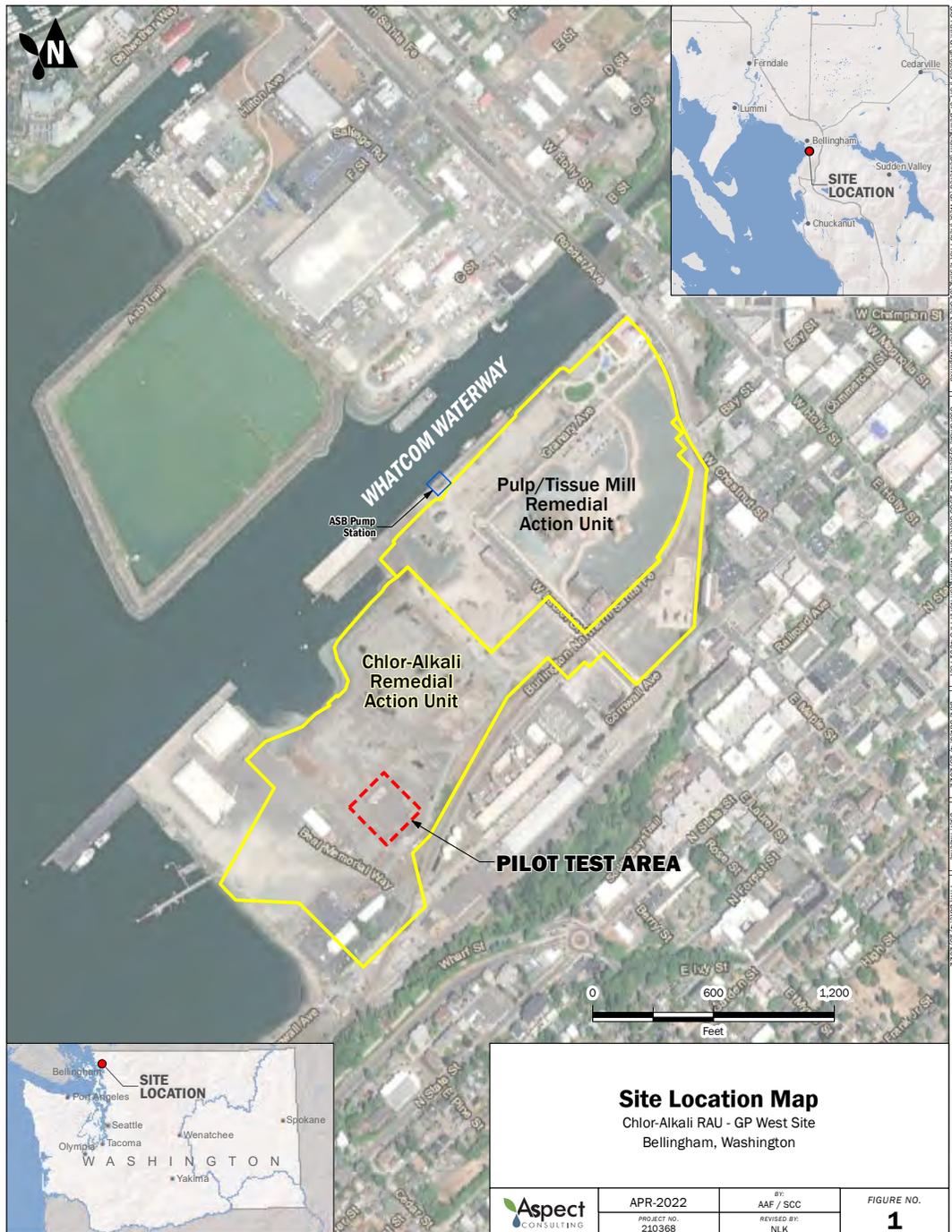
### **2.1 SITE BACKGROUND**

The Georgia Pacific West site located at 300 W. Laurel Street in Bellingham, Washington encompasses approximately 64 acres on the south side of the Whatcom Waterway. The site is defined by the Whatcom Waterway to the north, BNSF Railway Company to the east and south, and Bellingham Bay and the Bellingham Shipping Terminal to the west. The area of the site that is the subject of this Plan is located on the southwest corner of the property.

The above-grade portions of the former Cell Building have been demolished but most of the foundation structures remain beneath asphalt pavement. The former Cell Building foundation structures consists of concrete grade beams and pile caps sitting atop timber piles which extend through the aquitard and into the underlying sandy aquifer. All these obstructions will need to be removed from the Fill Unit to conduct ISS during full scale remedial construction. The removal of the obstructions will need to be completed without compromising the aquitard's ability to prevent mercury from migrating into the underlying aquifer.

## 2.2 SITE MAP

The following maps illustrate the Site location and pilot test area within the Site. Photos were extracted from the Aspect Consulting (Aspect) Obstruction Removal Pilot Test – Request for Proposal. GP West Site, Bellingham, Washington Project No. 210368-B. May 13, 2022.





Pile Cap	Pilot Test Area	<h3>Field Pilot Testing - Plan View (1 of 2)</h3> <p>Chlor-Alkali RAU - GP West Site Bellingham, Washington</p>			
Available benching area to access piles	Equipment and Water Management Area				
Temporary Stockpile Area	Former Cell Building		APR-2022	BY: MAV / HRL	FIGURE NO. <b>2</b>
Perimeter Air Monitoring Location	Shop Slab		PROJECT NO. 210368	REVISED BY: DAH / RAP / NLK	
Fence	Paved Area (2017)				

Basemap Layer Credits || Whatcom County



## 2.3 CONTAMINATION CHARACTERIZATION

Based on available environmental data, the Contaminant of Concern (COC) for this project is limited to mercury.

Mercury is a naturally occurring element with a chemical symbol of Hg. Elemental mercury is a silver liquid at standard temperature that can also evaporate into the air. It can combine with other substances to form solid compounds that are categorized into two groups: inorganic mercury salts and organic mercury compounds. Mercury and mercury compounds are odorless.

All forms of mercury can affect the nervous system and the kidneys. Workers exposed to elemental mercury vapor and people who eat foods with high levels of methylmercury experienced tremors, incoordination, impaired vision, impaired learning and memory, and mood changes. Some children born in communities that ate food with high levels of organic mercury had learning, sensory, and movement problems. In people exposed to high levels of methylmercury in their diets, birth defects have occurred. Some humans and animals that ate mercury compounds had high blood pressure and alterations in their immune systems. Animals that breathed elemental mercury vapor or ate organic or inorganic mercury compounds in their diets showed nervous system effects and/or kidney damage. Animals that ate high levels of mercury compounds showed decreased fertility and/or birth defects.

The nervous system is very sensitive to all forms of mercury. Elemental mercury primarily causes health effects when it is breathed as a vapor where it can be absorbed through the lungs. Exposure to vapors will increase in warm or poorly ventilated indoor spaces.

The immediate symptoms of exposure to elemental mercury vapors include lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation. Delayed symptoms include tremors, emotional changes (e.g., mood swings, irritability, nervousness, excessive shyness), insomnia, neuromuscular changes (such as weakness, muscle atrophy, twitching), headaches, disturbances in sensations, and changes in nerve responses. At very higher exposures there may be kidney effects, respiratory failure, and death.

The International Agency for Research on Cancer (IARC) classified methylmercury compounds as possibly carcinogenic to humans. IARC designated inorganic mercury and elemental mercury as not classifiable for causing cancer in humans.

The DOSH Permissible Exposure Limit (PEL) for elemental mercury vapor is 0.1 milligram per cubic meter of air ( $\text{mg}/\text{m}^3$ ), with a Short-Term Exposure Limit (STEL) of  $0.3 \text{ mg}/\text{m}^3$ . The PEL is the time-weighted average (TWA) exposure legal limit that an employee can be exposed to in an 8-hour period. The STEL is a 15-minute TWA limit that cannot be exceeded at any time during the workday.



### 3. CHEMICAL HAZARD/RISK ANALYSIS

This Plan addresses only the chemical exposures that may occur when coming into contact with contaminated media. It is intended to be used in conjunction with the comprehensive safety and health program of Strider and its subcontractors, in which physical work hazards of the construction industry are addressed.

Site activities which may involve chemical exposures include disturbance of soil, subgrade building materials, or groundwater. Potential chemical hazards that may be encountered during Site work are limited to mercury. Workers could be exposed through the following routes:

- Inhalation of airborne dust during soil disturbance
- Inhalation of chemical vapors during project activities
- Accidental ingestion of contaminated soil

Health risks for the known chemical contamination on this Site are low if appropriate controls are implemented. However, unknown contamination is always a possibility. Any unexpected contamination should be treated with caution and reported for evaluation at the soonest opportunity.



## 4. AIR MONITORING

### 4.1 MERCURY VAPOR BY JEROME 431-X

Strider will conduct real-time monitoring for mercury vapor using the Jerome 431-X instrument. The Jerome has a limit of detection for mercury of 3 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) of air. The DOSH PEL for mercury is  $100 \mu\text{g}/\text{m}^3$  as an 8-hour time-weighted average (TWA).

Action Levels for workers and the limits of the exclusion have been established as follows.

**TABLE 4.1  
ACTION LEVELS FOR MERCURY IN EXCLUSION ZONE FOR WORKER PROTECTION**

Mercury Readings (in $\mu\text{g}/\text{m}^3$ )	Action	Personal Protective Equipment
< or = $500 \mu\text{g}/\text{m}^3$  <i>sustained for 1 minute</i>	Continued monitoring	Level C
> $500 \mu\text{g}/\text{m}^3$ but < or = $1,000 \mu\text{g}/\text{m}^3$  <i>sustained for 1 minute</i>	Inform site workers of potentially high VOC levels. Increase existing engineering controls, such as fans or reducing the size of the open excavation.  HgX will be applied to Site soils to reduce mercury vapors	Level C
> $1,000 \mu\text{g}/\text{m}^3$  <i>sustained for 1 minute</i>	STOP WORK; notify Site Superintendent.	If work is resumed, apply additional controls. This Plan will be revised to list those controls.

$\mu\text{g}/\text{m}^3$                       micrograms per cubic meter of air



**TABLE 4.2  
ACTION LEVELS FOR MERCURY AT EDGE OF EXCLUSION ZONE**

<b>Mercury Readings (in ug/m<sup>3</sup>)</b>	<b>Action</b>	<b>Personal Protective Equipment</b>
< or = 100 ug/m <sup>3</sup> <i>sustained for 1 minute</i>	Continued monitoring	Level C
> 100 ug/m <sup>3</sup> but < or = 200 ug/m <sup>3</sup> <i>sustained for 1 minute</i>	Inform site workers of potentially high VOC levels. Increase existing engineering controls, such as fans or reducing the size of the open excavation.  HgX will be applied to Site soils to reduce mercury vapors	Level C
> 500 ug/m <sup>3</sup> <i>sustained for 1 minute</i>	STOP WORK; notify Site Superintendent.	If work is resumed, apply additional controls. This Plan will be revised to list those controls.

ug/m<sup>3</sup>                      micrograms per cubic meter of air

If action levels are reached or exceeded, the following actions will be initiated to reduce vapor concentrations. These actions are not listed in order of application or preference. Strider and Aspect may select the actions deemed most effective at the time of the occurrence.

- reduce the amount of contaminated soil exposed at any point in time;
- use plastic or soil to cover exposed contaminated soil and reduce vapor release;
- use fans to dilute and redirect vapors in the work areas; and
- apply HgX to exposed contaminated soil to reduce vapor release.

Continuous air monitoring will be conducted to evaluate the effectiveness of these control actions.

#### **4.2 WORKER EXPOSURE MONITORING - FULL SHIFT**

At least one day per week, mercury diffusion badges will be used to collect full-shift worker exposure data for comparison with the DOSH PEL of 100 ug/m<sup>3</sup>. If Jerome readings are consistently elevated, select that day to implement air sampling using mercury diffusion badges.

Samples will be delivered to the Project Industrial Hygiene Laboratory, ALS Laboratory in Salt Lake City, Utah for analysis for mercury. The results will not be received until several days



following the sampling event. Worker exposure assessment data will be evaluated using the following criteria to initiate changes in project protections.

**TABLE 4.3  
ACTION LEVELS FOR SITE WORKERS BASED ON FULL SHIFT MEASUREMENTS**

<b>Mercury Results (8-hr TWA in ug/m3)</b>	<b>Action</b>
< or = 500	Continue work and maintain specified controls
> 500, but < or = 1,000	Continue work Reassess controls
>1,000	Stop work Reassess controls

If action levels are reached or exceeded, the following actions will be initiated to reduce vapor concentrations. These actions are not listed in order of application or preference. Aspect or Strider may select the actions deemed most effective at the time of the occurrence.

- reduce the amount of contaminated soil exposed at any point in time;
- use plastic or soil to cover exposed contaminated soil and reduce vapor release;
- use fans to dilute and redirect vapors in the work areas ; and
- apply HgX to exposed contaminated soil to reduce vapor release.

Additional air monitoring may be conducted to evaluate the effectiveness of these control actions.



## 5. RESPONSIBILITIES AND LINES OF AUTHORITY

### 5.1 SITE ORGANIZATIONAL STRUCTURE

<u>Team Member</u>	<u>Function</u>
Kyle Gebhardt	Project Manager
Derek Johnson	Alternative Project Manager
Dan Horsmon	Site Superintendent
Rachel Horsmon	Site Health and Safety Officer
Elisabeth Black, CIH	Project Certified Industrial Hygienist

### 5.2 RESPONSIBILITIES

Duties of the Project Manager include:

- Ensure employer's responsibilities for safety and health are being implemented
- Ensure that field staff have the appropriate level of training and medical clearance for the tasks assigned
- Ensure that field staff have the appropriate equipment required to conduct the work safely
- Consult with CIH regarding new or unanticipated Site hazards.

Duties of the SHSO include:

- Ensure employer's responsibilities for safety and health are being implemented by daily inspections.
- Implement Site safety and health requirements in the field.
- Monitor Site conditions during work activities where hazardous compounds may be present.
- Implement the program of air monitoring for Strider employees using mercury diffusion badges.
- Record any variances in conditions.
- Record any illness, disease, injury, pulmonary disorder, or death of any person on the Site.
- Communicate requirements to field personnel and subcontractors.
- Perform safety record keeping.
- Verify that medical monitoring and training have been performed.



Duties of the Certified Industrial Hygienist include:

- Develop and coordinate the Site-Specific Health and Safety Plan (this Plan).
- Communicate requirements to the Project Manager.
- Review mercury diffusion badge results once they become available to verify that PPE is adequate. Upgrade PPE, as necessary.
- Respond to field requests for assistance in safety and health from Strider and the SHSO.

Duties of the Site Workers include:

- Read and follow this Plan.
- Check all personal safety equipment to ensure it is in good working condition prior to entering the exclusion zone.
- Immediately report any accidents/illness, spills, unsafe conditions, any unusual smells or chemical smell to the SHSO.
- Incidents must be reported on a daily basis in detail for spills or accidents.
- Immediately report any symptoms of exposure.

### **5.3 SUBCONTRACTORS**

The SHSO will ensure the Subcontractor's personnel are briefed on the procedures in this Plan and are aware of its location should it be needed for reference. Subcontractors will be responsible for the safety and health of their own personnel. The SHSO will have the authority to ensure Subcontractors follow the health and safety procedures set forth in the Plan. All subcontractors on Site must follow Site restrictions.



## 6. TRAINING

### 6.1 GENERAL HAZARDOUS WASTE OPERATIONS TRAINING

At a minimum, all personnel who may come into direct contact with impacted environmental media will meet the requirements of WAC 296-843, related to HAZWOP training. This training requires a 40-hour initial class followed by 8-hour annual refresher training. Those who are in a supervisory position on Site are also required to have the 8-hour supervisor course.

All supervisory personnel (and at least two persons on-Site whenever work is performed) will be CPR/First Aid trained.

Workers who do not have HAZWOP training may enter the Site as long as they do not enter an exclusion zone and are not at any time in contact with contaminated media (soil, building materials, air, water). Barriers may be created to provide a walkway for untrained workers so that they can access a non-contaminated area of the Site. If workers will disturb contaminated media by digging or otherwise displacing soil or water, they will be required to follow HAZWOP training requirements. All workers must receive Site-specific training.

### 6.2 SITE-SPECIFIC TRAINING

A pre-work safety conference will be held prior to commencement of field activities and attended by all field personnel. This meeting will be conducted by the SHSO to ensure that all personnel are familiar with requirements and responsibilities for maintaining a safe and healthful work environment, including the hazards related to elemental mercury.

Daily Site-wide pre-work meetings will be held to further assist Site personnel in conducting their activities safely. A briefing will be provided when changes in work practices must be implemented due to new information made available or if Site environmental conditions change. Briefings will also be given to facilitate conformance with prescribed safety practices when conformances with these practices are not being followed or if deficiencies are identified during safety inspections.

Personnel who may potentially wear respirators will have had training in the use of respirators, fit tested, undergone a baseline medical exam, and have been cleared to wear respirators.

Information concerning the hazards associated with elemental mercury shall be communicated to employees according to the requirements of the Hazard Communication Standard (WAC 296-800-170). This information shall include but not be limited to health effects, PPE requirements, the requirements concerning warning signs and labels, safety data sheets (SDSs), and the contents of this Plan. Training shall include:

- The specific nature of operations which could result in exposure to elemental mercury;
- Routes of exposure and signs and symptoms of exposure;
- The specific PPE, engineering controls and work practices associated with the employee's job assignments, including training of employees to follow relevant good work practices; and
- The employee's right of access to records under part B, chapter 296-62 WAC.

Employee training records shall be maintained by the employer for the duration of employment plus two (2) years.



## 7. PERSONAL PROTECTIVE EQUIPMENT (PPE)

This PPE program has been implemented to ensure that no personnel have dermal or airborne exposures to elemental mercury.

A Level C PPE ensemble will be used with the main objective to prevent unnecessary dermal exposure. The SHSO will be consulted to up- or downgrade the PPE requirements. Personnel operating heavy equipment are also required to wear PPE while operating that equipment. The following PPE is required, unless conditions change:

PPE Required	General site work	Soil, Building Material, Water Disturbance
Hard Hat	X	X
Safety Glasses/Goggles	X	
Ear Plugs	Av	Av
<b>Gloves:</b>		
Nitrile	X	X
Neoprene outer glove		X
Dupont Tychem 2000 Suit with hood and socks		X
High-visibility Vest	X	
Neoprene Steel-Toe Boots	X	X
<b>Full Face Air-Purifying Respirator with Mercury Vapor Cartridge with End of Service Life Indicator (ESLI)</b>	Av	X

*X = PPE Required*

*Av = Have available at work site, use as needed*

### 7.1 PPE PROGRAM

The PPE program of contractors on Site will comply with WAC 296-800-160 and the respiratory protection requirements of WAC 296-842. As per WAC 296-800-160, protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, will be provided, used, and maintained in a sanitary and reliable condition whenever it is necessary by reason of hazards of processes or environment, chemical hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact.

### 7.2 ANTICIPATED LEVELS OF PROTECTION

Support personnel who will not enter the exclusion zone will wear Level D PPE. Level D should be used when the workplace atmosphere is below odor indicators for respiratory protection and work functions preclude the potential for unexpected inhalation hazards or dermal contact with hazardous levels of any chemical.

Level D Personal Protective Equipment will include the following:

- Safety shoes or boots
- High-visibility safety vest
- Safety glasses or goggles
- Hard hat, as necessary



- Nitrile gloves
- Ear plugs when conditions require hearing protection (>85 dBA)
- Rain gear, as necessary

Level C PPE will be required for any worker who enters the exclusion zone or who comes into contact with contaminated soil, building materials, water, or air. Level C Personal Protective Equipment will include the following:

- Full-face air-purifying respirator with mercury vapor cartridges with ESLI
- Dupont Tychem 2000 coveralls with hood and socks
- Neoprene steel-toed boots
- Hard hat, as necessary
- Chemical resistant Nitrile inner and Neoprene outer gloves
- Ear plugs when conditions require hearing protection (>85 dBA)

### **7.3 MAINTENANCE AND STORAGE**

PPE must be maintained and stored properly to prevent damage or malfunction due to exposure to dust, moisture, sunlight, damaging chemicals, extreme temperatures, and impact. PPE on Site will be stored in a designated area within the personnel/office trailer, or if no job site trailer is available, they will be properly stored in the SHSO's or employee's vehicle in such a way as to prevent damage.

- Potentially contaminated clothing will be stored in an area separate from street clothing.
- Potentially contaminated clothing will be stored in a well-ventilated area, with good airflow around each item, if possible.
- Protective clothing will be folded or hung in accordance with manufacturers' recommendations.

### **7.4 DECONTAMINATION AND DISPOSAL**

Potentially contaminated clothing will be washed separately from street clothes or thrown away depending on the severity of the contamination. Used Tychem suits will be disposed of, at a minimum, at the end of each shift, or when damaged. Tychem suits will not be reused.

### **7.5 TRAINING AND FITTING**

Training will be completed prior to actual PPE use in the field. The training will delineate the user's responsibilities and explain the following:

- DOSH requirements as delineated in WAC 296-800-160.
- The proper use and maintenance of the selected PPE, including capabilities and limitations.
- The nature and the hazards and the consequences of not using the PPE.
- The human factors influencing PPE performance.



- Instruction in inspecting, donning, checking, fitting, and using PPE.
- The user's responsibility (if any) for decontamination, cleaning, maintenance, repair of PPE.
- Emergency procedures and self-rescue in the event of PPE failure.

Individualized employee fit testing will be conducted prior to arrival on Site. Any other person needing PPE will be fitted on Site outside the exclusion and contamination reduction zone.

## 7.6 EQUIPMENT DONNING

Proper procedures for dressing prior to entering the regulated areas will minimize the potential for contaminants to bypass the protective clothing and escape decontamination. In general, all fasteners will be fully used (i.e., zippers fully closed, all buttons used, all snaps closed, etc.). Gloves and boots will be tucked under the sleeves and legs of outer clothing, and hoods (if not attached) will be worn outside the collar. Another pair of tough outer gloves may be worn over the sleeves. All punctures will be temporarily taped to prevent contaminants from running inside the gloves, boots, and jackets (or suits, if one-piece construction). Torn PPE will be replaced.

Prior to each use, the PPE will be checked to ensure that it contains no cuts or punctures that could expose workers to wastes. Similarly, any injuries to the skin surface, such as cuts and scratches, may enhance the potential for chemicals to penetrate into the body. Particular care should be taken to protect these areas. Workers with large areas of damaged skin will be kept from working on Site until the skin heals.

Donning Level D PPE will include the following:

- Inspect clothing before donning
- Don coveralls or raingear appropriate for activities where contaminated media may be disturbed (i.e., no exposed skin).
- Put on safety shoes or boots
- Put on safety glasses or goggles
- Put on hardhat, if required
- Don work gloves

Donning Level C PPE will include the following:

- Inspect clothing before donning
- Don disposable Tychem coveralls
- Put on safety shoes or boots
- Don full-face respirator, as required, and adjust it to be secure, but comfortable, make sure cartridges are securely attached, and perform negative and positive respirator seal test
- Put on hardhat, if required
- Don inner and outer chemical resistant gloves



## 8. MEDICAL SURVEILLANCE

### 8.1 MEDICAL EXAMINATION REQUIREMENTS

Personnel working directly elemental mercury within the Site boundaries will have undergone a medical examination prior to participation in fieldwork that complies with WAC 296-843-210. The medical examination is conducted by a board-certified occupational health physician. The physician is made familiar with the job-related duties of each worker examined. Personnel who may potentially wear respirators will have undergone the medical exam and have been cleared to wear respirators.

Workers who will work in the exclusion zone shall have baseline blood-mercury levels established before starting work on the Site. Additional medical monitoring for mercury may be conducted during and at the end of the project. Each employee who has received full medical monitoring shall be provided with a copy of the physician's written opinion within five working days of the receipt of the results.

#### ***Physicians Written Opinion***

The physician will address the employee's ability to perform hazardous remediation work and will contain the following:

- The physician's recommended limitations, if any, upon the employee's assigned work and/or PPE usage.
- The physician's opinion about increased risk to the employee's health resulting from work; and
- A statement that the employee has been informed and advised about the results of the examination.

### 8.2 RECORDKEEPING

All medical monitoring and surveillance records shall be maintained by the employer for the duration of employment plus 30 years.



## 9. PERSONAL HYGIENE AND DECONTAMINATION

Personnel entering the work area or otherwise exposed or subject to exposure to mercury chemical vapors, liquids, or contaminated solids will adhere to the following personal hygiene and decontamination provisions. Decontamination will be conducted on the edge of the exclusion zone, prior to entering the conex. Employees will be trained in the procedures that will be enforced throughout Site operations.

### 9.1 DECONTAMINATION FACILITIES

The Site will have two decontamination stations.

#### Exclusion Zone

Workers entering the exclusion zone will begin decontamination outside of the conex that will act as the decontamination zone. Workers will remove outer gloves, suits, and decontaminate boots. At the end of each workday, each Tychem suit will be disposed of. The outer gloves and Tychem suits will remain at the exclusion zone side of the conex. Once inside the conex, workers will remove their respirators and inner gloves. Respirators will be wiped down using an HgX solution and stored for the next day of use. The ESLI indicator on the respirator cartridges will be checked at this time.

#### Clean Zone

A second decontamination station will be present for all workers before they leave the site. This station will consist of a second boot wash and a hand/face washing facility with HgX. All workers will wash hands and face before breaks, lunch, and before leaving the job Site.

### 9.2 PERSONNEL DECONTAMINATION PROCEDURES

All personnel, clothing, equipment, and samples leaving the contaminated area of a site must be decontaminated to remove any chemicals or dust that may have adhered to them or they must be disposed of within the exclusion zone.

- Tychem and outer gloves will be removed and disposed of in a trash barrel lined with plastic. Tychem will be disposed of daily. Outer gloves will be disposed of weekly. Contaminated PPE will be disposed of with contaminated buried structure waste stream.
- Boots, hard hats, and respirators will be washed with HgX detergent and rinsed with water.

All personnel will be trained in decontamination procedures to minimize contact with possible contaminants and maximize worker protection. These procedures will be enforced throughout Site operations.

### 9.3 EQUIPMENT DECONTAMINATION PROCEDURES

All equipment in the exclusion zone will be decontaminated with steam to remove soil and site contaminants. The decontamination will be verified using the Jerome mercury vapor analyzer before the equipment can leave the exclusion zone.



## 10. SITE MANAGEMENT

Effective Site management is critical in controlling the migration of chemical contaminants, eliminating physical hazards, and enforcing Site security. Some areas of the Site are known to contain contaminants in environmental media, and other areas may be considered “clean”, or free of identified contaminants. Workers in areas that are determined to be “clean” are not required to comply with the provisions of this Plan, unless and until Site COCs are identified in those areas. This section addresses areas of the Site known to contain contaminated environmental media.

The purpose of contaminated area boundaries (a.k.a “exclusion zones”) is twofold: to define contaminated areas for field investigators and to prevent unauthorized personnel from entering the area. Barrier tape, traffic cones or some other means (locked fences, in some cases) will be used to establish an exclusion zone. The following paragraph briefly discusses required site management procedures for contaminated areas.

Workers who do not have HAZWOP training may enter the Site as long as they do not enter an exclusion zone and are not at any time in contact with contaminated media (soil, building materials, air, water). This may be accomplished in some instances by putting down visqueen or another barrier material between the workers’ boots and contaminated soil, as soil is the only contaminated media in that area. If workers will disturb contaminated media by digging or otherwise displacing soil or water, they will be required to follow HAZWOP training requirements.

### 10.1 WORK ZONES

A traditional approach to designating areas in hazardous waste work sites is to be used in areas of suspected or confirmed contamination. To reduce the accidental spread of Site by workers and equipment and to assure that the proper PPE is worn, whenever feasible, the following work zones are delineated while engaging in exploration activities or any activity that may disturb contaminated media. Work zones are not required when field activities are limited to reconnaissance inspections, surveying without disturbing soils or water, or work on uncontaminated soils or water.

#### 10.1.1 Exclusion Zone

The exclusion zone (EZ) will be stationary for this Site. EZ dimensions will be determined based on the size of the work area, Site limitations, and the potential for exposure to contaminated soils or other media.

Contaminated areas where work is being conducted shall have controlled entrance and accessible exit areas. The edges of the work area shall be marked in some way to identify the exclusion zone. Decontamination will be conducted in or near the entrance/exit area.

The outer boundary of the EZ initially will be established by contamination sampling and/or data from initial or previous Site surveys. Other factors, such as distances needed to prevent fire or an explosion from affecting personnel outside the zone, the physical area necessary to conduct Site operations, and the potential for airborne Site to reach non-contaminated areas shall be considered.



## 10.2 CONTAMINATION REDUCTION ZONE

The Contamination Reduction Zone (CRZ) shall provide a buffer to ensure that the physical transfer of Site by personnel, equipment, or through the air is limited by a combination of decontamination, distance between the EZ and population, air dilution, zone restrictions, and work functions. The CRZ will be physically marked or well defined by barrier tape, signs, or physical barriers (e.g., chains, fences, ropes, etc.). Personnel entering the CRZ will wear prescribed PPE for each task to be performed. Prior to reentering the Support Zone (see below), personnel will remove any PPE worn in the CRZ. The CRZ will begin a safe distance from the activities in contaminated media.

A plastic waste bag or other designated receptacle will be available for all disposable outer boots, gloves, and external PPE and will be located within the CRZ adjacent to the access control point from the EZ into the CRZ.

## 10.3 SUPPORT ZONE

This is the outermost area of the Site and is considered to be a non-contaminated or clean area. Access is restricted to authorized Site personnel and visitors. Because normal work clothes are appropriate within this zone, potentially contaminated personnel clothing, equipment, and samples are not permitted until they are decontaminated, if necessary, in the CRZ. Functions performed in the Support zone include the following:

- Administration
- Sanitary facilities (toilets and hand-washing station)
- Equipment and supply storage
- Sample storage

The location of support facilities in the Support Zone must be easily accessible. (It should have an adequate view of activities in the EZ and CRZ.) Support facilities will be located upwind of the EZ. However, shifts in wind direction and other conditions may be such that an ideal location determined on the basis of wind direction alone does not exist. Distance can neutralize this factor.

**SITE-SPECIFIC HEALTH AND SAFETY PLAN**

**Obstruction Removal Pilot Test  
GP West Site  
Bellingham, Washington**

**REVIEW SIGNATURE SHEET**

**Health and Safety Plan Certification:** This Site-Specific Health and Safety Plan is written in compliance with industry standards and the requirements of WAC 296-843 for application at the subject Site in Bellingham, Washington for the tasks specified in this Plan.



October 25, 2022

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Elisabeth Black, CIH  
EMB Consulting LLC

Date

We, the undersigned, have reviewed this Plan, are familiar with its contents, and agree to abide by all the provisions herein:

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Signature

Date

**Figure 1: DIRECTIONS TO HOSPITAL**

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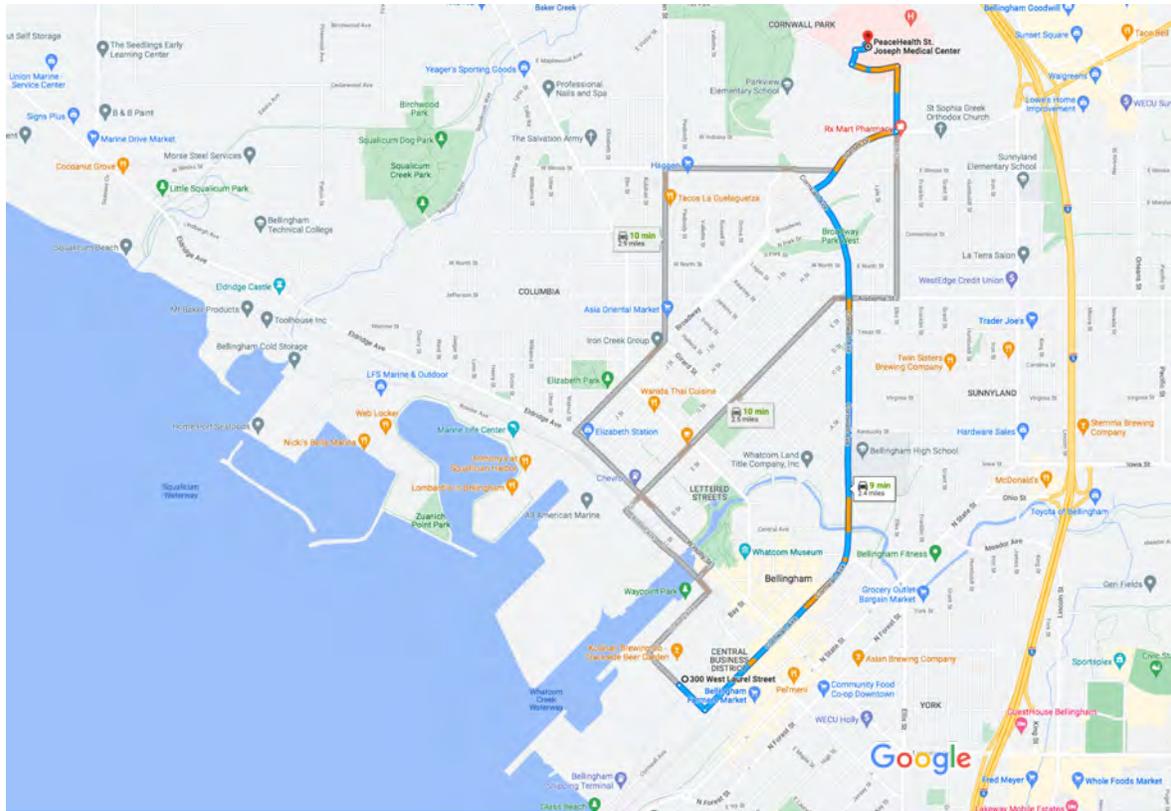
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300 W Laurel St, Bellingham, WA 98225 to PeaceHealth St. Joseph Medical Center, 2901 Squalicum Pkwy, Bellingham, WA 98225

Drive 2.4 miles, 9 min

Route to Hospital



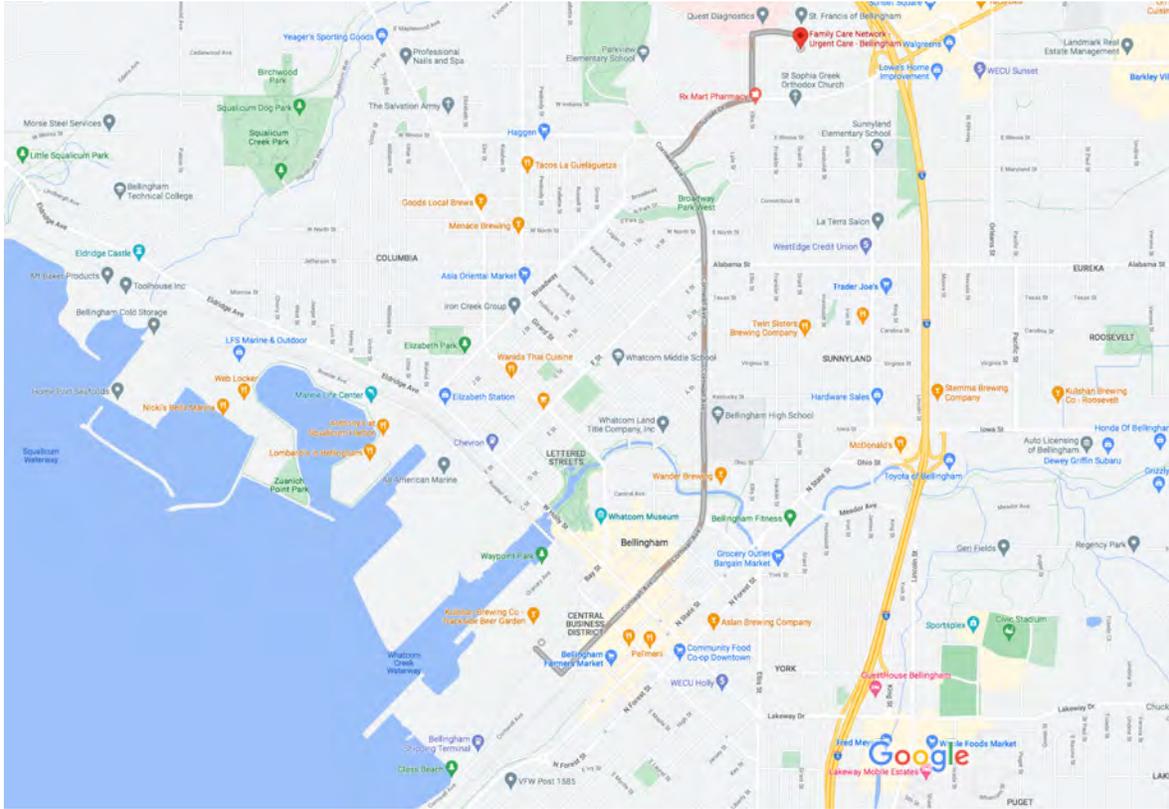
**Figure 2: DIRECTIONS TO WALK-IN MEDICAL CLINIC**

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# Google Maps Family Care Network - Urgent Care - Bellingham

Route to Walk-In Clinic



## **APPENDIX D**

### **Documentation for Disposal of Debris Removed during Pilot Test**



CWM OF THE NORTHWEST  
Federal EPA ID: ORD089452353  
17629 CEDAR SPRINGS LANE  
ARLINGTON, OR 97812

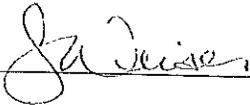
GEORGIA PACIFIC WEST INC  
ATTN: MANIFEST SECTION  
WAD009252297  
300 W LAUREL ST  
BELLINGHAM WA 98225

CERTIFICATE OF DISPOSAL  
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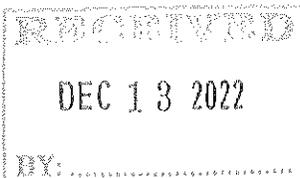
CWM OF THE NORTHWEST, EPA ID: ORD089452353, has received waste material from GEORGIA PACIFIC WEST INC on 11/14/22 as described on Shipping Document number 015868656FLE.

Profile Number: OR352436  
CWM Tracking ID: 49216601  
CWM Unit #: 1\*0  
Disposal Date: 11/15/22

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT  
Certificate # 267185  
12/06/22





CWM OF THE NORTHWEST  
Federal EPA ID: ORD089452353  
17629 CEDAR SPRINGS LANE  
ARLINGTON, OR 97812

GEORGIA PACIFIC WEST INC  
ATTN: MANIFEST SECTION  
WAD009252297  
300 W LAUREL ST  
BELLINGHAM WA 98225

CERTIFICATE OF DISPOSAL  
-----

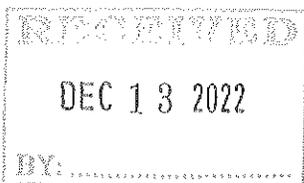
CWM OF THE NORTHWEST, EPA ID: ORD089452353, has received waste material from GEORGIA PACIFIC WEST INC on 11/14/22 as described on Shipping Document number 015868657FLE.

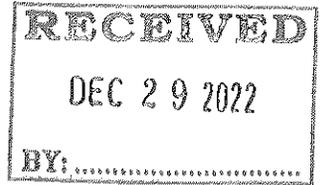
Profile Number: OR352436  
CWM Tracking ID: 49216301  
CWM Unit #: 1\*0  
Disposal Date: 11/16/22

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

  
\_\_\_\_\_

CWMNW RECORDS DEPARTMENT  
Certificate # 267184  
12/06/22





CWM OF THE NORTHWEST  
Federal EPA ID: ORD089452353  
17629 CEDAR SPRINGS LANE  
ARLINGTON, OR 97812

GEORGIA PACIFIC WEST INC  
ATTN: MANIFEST SECTION  
WAD009252297  
300 W LAUREL ST  
BELLINGHAM WA 98225

CERTIFICATE OF DISPOSAL  
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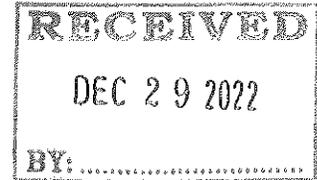
CWM OF THE NORTHWEST, EPA ID: ORD089452353, has received waste material from GEORGIA PACIFIC WEST INC on 11/14/22 as described on Shipping Document number 015868659FLE.

Profile Number: OR352436  
CWM Tracking ID: 49216501  
CWM Unit #: 1\*0  
Disposal Date: 11/15/22

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT  
Certificate # 266973  
11/29/22



CWM OF THE NORTHWEST  
Federal EPA ID: ORD089452353  
17629 CEDAR SPRINGS LANE  
ARLINGTON, OR 97812

GEORGIA PACIFIC WEST INC  
ATTN: MANIFEST SECTION  
WAD009252297  
300 W LAUREL ST  
BELLINGHAM WA 98225

CERTIFICATE OF DISPOSAL  
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CWM OF THE NORTHWEST, EPA ID: ORD089452353, has received waste material from GEORGIA PACIFIC WEST INC on 12/14/22 as described on Shipping Document number 015868667FLE.

Profile Number: OR352436  
CWM Tracking ID: 49288501  
CWM Unit #: 1\*0  
Disposal Date: 12/15/22

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT  
Certificate # 267472  
12/19/22



RECEIVED  
DEC 29 2022  
BY: .....

CWM OF THE NORTHWEST  
Federal EPA ID: ORD089452353  
17629 CEDAR SPRINGS LANE  
ARLINGTON, OR 97812

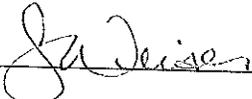
GEORGIA PACIFIC WEST INC  
ATTN: MANIFEST SECTION  
WAD009252297  
300 W LAUREL ST  
BELLINGHAM WA 98225

CERTIFICATE OF DISPOSAL  
-----

CWM OF THE NORTHWEST, EPA ID: ORD089452353, has received waste material from GEORGIA PACIFIC WEST INC on 12/15/22 as described on Shipping Document number 015868658FLE.

Profile Number: OR352436  
CWM Tracking ID: 49290701  
CWM Unit #: 1\*0  
Disposal Date: 12/15/22

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

  
\_\_\_\_\_

CWMNW RECORDS DEPARTMENT  
Certificate # 267531  
12/22/22

Please print or type.

492907

Form Approved. OMB No. 2050-0039

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b>		1. Generator ID Number WAD009252297	2. Page 1 of 2	3. Emergency Response Phone 1 (800)424-9300	4. Manifest Tracking Number 015868658 FILE	
5. Generator's Name and Mailing Address PORT OF BELLINGHAM 300 WEST LAUREL STREET BELLINGHAM WA 98225 Generator's Phone: (360)676-2500				Generator's Site Address (if different than mailing address)		
6. Transporter 1 Company Name R TRANSPORT INC.				U.S. EPA ID Number WAH000028338		
7. Transporter 2 Company Name UNION PACIFIC RAILROAD				U.S. EPA ID Number NED001792210		
8. Designated Facility Name and Site Address CHEMICAL WASTE MANAGEMENT, INC. 17629 CEDAR SPRINGS LANE ARLINGTON OR 97812-9709 Facility's Phone: (503)454-2643				U.S. EPA ID Number ORD089452353		
9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
		No.	Type			
X	1. NA3077,HAZARDOUS WASTE,SOLID,N.O.S.,9,III	01	CM	<del>40000</del> 34000 JW	P	D009
	2.					
	3.					
	4.					
14. Special Handling Instructions and Additional Information 1.PROFILE # OR352438;HAZARDOUS DEBRIES;ERG=171;RQ=10LBS CHEMTREC#CCN24117 CONTAINER 300071 34000p.						
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.						
Generator's/Offeror's Printed/Typed Name MATTHEW VONDERAHE				Signature <i>[Signature]</i>		Month Day Year 11   01   22
16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: _____ Date leaving U.S.: _____ Transporter signature (for exports only): _____						
17. Transporter Acknowledgment of Receipt of Materials Transporter 1 Printed/Typed Name Jason Edwards Signature <i>[Signature]</i> Month Day Year 11   1   22 Transporter 2 Printed/Typed Name JK Signature <i>[Signature]</i> Month Day Year 11   3   22						
18. Discrepancy 18a. Discrepancy Indication Space <input checked="" type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection weight changed per Derek Johnson/Strider Construction Project Mngr. JW 12/22/22						
18b. Alternate Facility (or Generator) _____ U.S. EPA ID Number _____ Facility's Phone: _____						
18c. Signature of Alternate Facility (or Generator) _____ Month Day Year _____						
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems) 1. H132 2. 3. 4.						
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a Printed/Typed Name Morgan Wolf Signature <i>[Signature]</i> Month Day Year 12   15   22						

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY





**Chemical Waste Management  
Of The Northwest**

17629 Cedar Springs Lane  
Arlington, Oregon 97812  
541-454-2643  
EPA I.D.# ORDO89452353

LOAD NO. \_\_\_\_\_

MANIFEST DOC. NO. \_\_\_\_\_

**INBOUND**

T/D: 10:18:56 2022-12-15  
ID: 492907 TRK ID: 300071 MACRO1A  
85380 lb G

**OUTBOUND**

T/D: 10:53:43 2022-12-15  
ID: 492907 TRK ID: 300071 MACRO1A  
85380 lb G  
51380 lb PT  
34000 lb N

NET 17.00 TONS

GENERATOR \_\_\_\_\_

492163

Please print or type.

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b>		1. Generator ID Number WAD0009252297	2. Page 1 of	3. Emergency Response Phone (800)421-9300	4. Manifest Tracking Number 015868657 FLE	
5. Generator's Name and Mailing Address PORT OF BELLINGHAM 300 WEST LAUREL STREET BELLINGHAM WA 98225 Generator's Phone: (360)676-2500				Generator's Site Address (if different than mailing address) 11/8		
6. Transporter 1 Company Name R TRANSPORT INC.				U.S. EPA ID Number WAH000028338		
7. Transporter 2 Company Name UNION PACIFIC RAILROAD				U.S. EPA ID Number 910 NED001792210		
8. Designated Facility Name and Site Address ma 11-28-22 541 CHEMICAL WASTE MANAGEMENT, INC. 17629 CEDAR SPRINGS LANE ARLINGTON OR 97812-9709 Facility's Phone: (503)454-2643				U.S. EPA ID Number ma 1128-22 ORD089452353		
9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
		No.	Type			
X	1. NA3077,HAZARDOUS WASTE,SOLID,N.O.S.,9,III	01	CM	400.00	P	D008
	2.					
	3.					
	4.					
14. Special Handling Instructions and Additional Information 1.PROFILE # OR352436,HAZARDOUS DEBRIS;ERG=171;RQ=10LBS CHEMTREC#CCN24117 CONTAINER 300120 36000p						
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.						
Generator's/Offeror's Printed/Typed Name MATTHEW VONDERRAH				Signature <i>[Signature]</i>		Month Day Year 11   01   22
16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: _____ Date leaving U.S.: _____ Transporter signature (for exports only): _____						
17. Transporter Acknowledgment of Receipt of Materials Transporter 1 Printed/Typed Name Jason Edwards Signature <i>[Signature]</i> Month Day Year 11   1   22 Transporter 2 Printed/Typed Name Debbie Mab Signature <i>[Signature]</i> Month Day Year 11   08   22						
18. Discrepancy 18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection Manifest Reference Number: _____ 18b. Alternate Facility (or Generator) U.S. EPA ID Number _____ Facility's Phone: _____ 18c. Signature of Alternate Facility (or Generator) Month Day Year _____						
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems) 1. H132 2. 3. 4.						
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a Printed/Typed Name Morgan Gove Signature <i>[Signature]</i> Month Day Year 11   10   22						

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

110



**Chemical Waste Management  
Of The Northwest**

17629 Cedar Springs Lane  
Arlington, Oregon 97812  
541-454-2643  
EPA I.D.# ORDO89452353

LOAD NO. \_\_\_\_\_

MANIFEST DOC. NO. \_\_\_\_\_

**INBOUND**

T/D: 13:23:55 2022-11-16  
ID: 492163 TRK ID: 300120 MACRO1A  
86760 lb G

**OUTBOUND**

T/D: 13:37:31 2022-11-16  
ID: 492163 TRK ID: 300120 MACRO1A  
86760 lb G  
50760 lb PT  
36000 lb N

NET 18.00 TONS

GENERATOR \_\_\_\_\_

492065

11/9

Please print or type.

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b>		1. Generator ID Number WAD009252297	2. Page 1 of 1	3. Emergency Response Phone (800)424-9300	4. Manifest Tracking Number 015868659 FLE		
5. Generator's Name and Mailing Address PORT OF BELLINGHAM 300 WEST LAUREL STREET BELLINGHAM WA 98225 Generator's Phone: (360)876-2500				Generator's Site Address (if different than mailing address)			
6. Transporter 1 Company Name R TRANSPORT INC.				U.S. EPA ID Number WAH000028338			
7. Transporter 2 Company Name UNION PACIFIC RAILROAD				U.S. EPA ID Number 2910 <del>NED001702248</del> md 11-16-22			
8. Designated Facility Name and Site Address CHEMICAL WASTE MANAGEMENT, INC. 17629 CEDAR SPRINGS LANE ARLINGTON OR 97812-9709 Facility's Phone: (503)454-2843				U.S. EPA ID Number ORD089452353 luw 11-14-22 511			
9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes	
		No.	Type				
X	1. NA3077, HAZARDOUS WASTE, SOLID, N.O.S., 9, III	01	CM	40,000	P	D008	
	2.						
	3.						
	4.						
14. Special Handling Instructions and Additional Information 1. PROFILE # OR352436; HAZARDOUS DEBRIS; ERG=171; RQ=10LBS CHEMTREC#CCN24117 CONTAINER 309257 38100p							
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.							
Generator's/Offeror's Printed/Typed Name Matthew von der Ahe				Signature 		Month Day Year 11   01   22	
16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: _____ Transporter signature (for exports only): _____ Date leaving U.S.: _____							
17. Transporter Acknowledgment of Receipt of Materials							
Transporter 1 Printed/Typed Name Jason Edmonds				Signature 		Month Day Year 11   1   22	
Transporter 2 Printed/Typed Name JK				Signature 		Month Day Year 11   2   22	
18. Discrepancy							
18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection							
18b. Alternate Facility (or Generator) Manifest Reference Number: _____ U.S. EPA ID Number: _____ Facility's Phone: _____							
18c. Signature of Alternate Facility (or Generator)						Month Day Year	
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)							
1. H132		2.		3.		4.	
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a							
Printed/Typed Name Morgan Wolf				Signature 		Month Day Year 11   14   22	

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

38100p  
BMS



**Chemical Waste Management  
Of The Northwest**

17629 Cedar Springs Lane  
Arlington, Oregon 97812  
541-454-2643  
EPA I.D.# ORDO89452353

LOAD NO. \_\_\_\_\_

MANIFEST DOC. NO. \_\_\_\_\_

**INBOUND**

T/D: 13:59:27 2022-11-14  
ID: 492165 TRK ID: 300257 MACRO 1A  
89280 lb G

**OUTBOUND**

T/D: 14:12:58 2022-11-14  
ID: 492165 TRK ID: 300257 MACRO 1A  
89280 lb G  
51180 lb PT  
38100 lb N

NET 19.05 TONS

GENERATOR \_\_\_\_\_

Please print or type.

Form Approved. OMB No. 2050-0039

492160

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b>		1. Generator ID Number WAD009252287	2. Page 1 of 1	3. Emergency Response Phone (800)424-9300	4. Manifest Tracking Number 015868656 FILE	
5. Generator's Name and Mailing Address PORT OF BELLINGHAM 300 WEST LAUREL STREET BELLINGHAM WA 98225 Generator's Phone: (360)876-2500				Generator's Site Address (if different than mailing address) 119		
6. Transporter 1 Company Name R TRANSPORT INC.				U.S. EPA ID Number WAHQ00028338		
7. Transporter 2 Company Name UNION PACIFIC RAILROAD				U.S. EPA ID Number 910 NED001792240 mel 11-28-22		
8. Designated Facility Name and Site Address CHEMICAL WASTE MANAGEMENT, INC. 17629 CEDAR SPRINGS LANE ARLINGTON OR 97812-9709 Facility's Phone: (503)454-2643 New 11-14-22 541				U.S. EPA ID Number ORD088452353		
9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
		No.	Type			
X	1. NA3077,HAZARDOUS WASTE,SOLID,N.O.S.,9,III	01	CM	40,000	P	D009
	2.					
	3.					
	4.					
14. Special Handling Instructions and Additional Information 1.PROFILE # OR352436;HAZARDOUS DEBRIS;ERG=171;RQ=10LBS CHEMTREC#CCN24117 CONTAINER 8534 36740P						
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.						
Generator's/Offeror's Printed/Typed Name M. Howard				Signature [Signature]		Month Day Year 10 31 22
16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: _____ Date leaving U.S.: _____						
17. Transporter Acknowledgment of Receipt of Materials Transporter 1 Printed/Typed Name: Jason [Signature] Month Day Year: 10 31 22 Transporter 2 Printed/Typed Name: JR [Signature] Month Day Year: 11 7 22						
18. Discrepancy 18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection						
18b. Alternate Facility (or Generator) Facility's Phone: _____				Manifest Reference Number: _____ U.S. EPA ID Number: _____		
18c. Signature of Alternate Facility (or Generator)						Month Day Year ____   ____   ____
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)						
1.	2.	3.	4.			
1.	H132					
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a						
Printed/Typed Name Morgan [Signature]				Signature [Signature]		Month Day Year 11 15 22

MD



**Chemical Waste Management  
Of The Northwest**

17629 Cedar Springs Lane  
Arlington, Oregon 97812  
541-454-2643  
EPA I.D.# ORDO89452353

LOAD NO. \_\_\_\_\_

MANIFEST DOC. NO. \_\_\_\_\_

INBOUND  
T/D: 11:52:39 2022-11-15  
ID: 492166 TRK ID: 8534 MACRO1A  
85240 lb G

OUTBOUND  
T/D: 12:07:44 2022-11-15  
ID: 492166 TRK ID: 8534 MACRO1A  
85240 lb G  
48500 lb PT  
36740 lb N

NET 18.37 TONS

GENERATOR \_\_\_\_\_

Please print or type.

492885

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number WAD008252297	2. Page 1 of 2	3. Emergency Response Phone (800)424-9300	4. Manifest Tracking Number 015868667 FLE		
5. Generator's Name and Mailing Address PORT OF BELLINGHAM 300 WEST LAUREL STREET BELLINGHAM WA 98225 Generator's Phone: (360)678-2500				Generator's Site Address (if different than mailing address)			
6. Transporter 1 Company Name R TRANSPORT INC.			U.S. EPA ID Number WAH000028338				
7. Transporter 2 Company Name UNION PACIFIC RAILROAD			U.S. EPA ID Number NED001782210				
8. Designated Facility Name and Site Address CHEMICAL WASTE MANAGEMENT, INC. 17629 CEDAR SPRINGS LANE ARLINGTON OR 97812-9709 Facility's Phone: (503)454-2643			U.S. EPA ID Number ORD089452353				
GENERATOR	9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number and Packing Group (if any))	10. Containers		11. Total Quantity	12. Unit Wt./Vol	13. Waste Codes
	X	1. NA3077, HAZARDOUS WASTE, SOLID, N.O.S., III	No. 01	Type CM	40,000	P	0008
		2.					
		3.					
		4.					
14. Special Handling Instructions and Additional Information 1. PROFILE # OR352436; HAZARDOUS DEBRIS, ERG=171, RQ=10LBS CHEMTREC#CCN24117 CONTAINER 5840 41680p							
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.							
Generator's/Officer's Printed/Typed Name MATTIE VONTRAPPE			Signature [Signature]		Month Day Year 10 31 22		
16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: _____ Date leaving U.S.: _____							
17. Transporter Acknowledgment of Receipt of Materials							
Transporter 1 Printed/Typed Name Jason Edmonds			Signature [Signature]		Month Day Year 10 31 22		
Transporter 2 Printed/Typed Name JR			Signature [Signature]		Month Day Year 10 9 22		
18. Discrepancy							
18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection							
18b. Alternate Facility (or Generator) Manifest Reference Number: _____ U.S. EPA ID Number _____							
18c. Signature of Alternate Facility (or Generator) _____ Month Day Year _____							
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)							
1. H132		2.		3.		4.	
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a							
Printed/Typed Name Morgan Wolf			Signature [Signature]		Month Day Year 12 15 22		

oms 2.16.22

541

TRANSporter INT'L

DESIGNATED FACILITY

oms





**Chemical Waste Management  
Of The Northwest**

17629 Cedar Springs Lane  
Arlington, Oregon 97812  
541-454-2643  
EPA I.D.# ORDO89452353

LOAD NO. \_\_\_\_\_

MANIFEST DOC. NO. \_\_\_\_\_

INBOUND

T/D: 12:46:20 2022-12-15  
ID: 492885 TRK ID: 8840 MACRO 1A  
90420 lb G

OUTBOUND

T/D: 13:20:44 2022-12-15  
ID: 492885 TRK ID: 8840 MACRO 1A  
90420 lb G  
48740 lb PT  
41680 lb N

NET 20.84 TONS

GENERATOR \_\_\_\_\_

## **APPENDIX E**

### **Anchor QEA EGL Laboratory Data for Treatability Testing**

### Mositure Content by ASTM D2216

Type of Soil	Geotechnical soil moisture (%)*	Avg Moisture Content (%)
Soil 1	53.7%	56.2%
	55.8%	
	58.9%	
Soil 2	60.4%	61.3%
	61.0%	
	62.6%	

\* Geotechnical soil moisture refers to the mass of water divided by the mass of dry soil

Note: Soils oven dried at 60C +/- 2C for 48 h

**Grain Size Analysis (with hydrometer) by ASTM D422**

Soil #1						
Initial Sample Weight		26.22 g				
Sieve	Weigh boat mass (g)	Sample + weigh boat mass (g)	Retained Sample Weight (g)	% Retained	% Passing	Grain Size (mm)
10	1.49	2.06	0.57	2.17	97.8	2
18	1.51	2.32	0.81	5.26	94.7	1
35	1.48	2.96	1.48	10.91	89.1	0.5
60	1.54	2.84	1.36	16.09	83.9	0.25
120	1.52	6.63	5.11	35.58	64.4	0.125
200	1.64	4.36	2.72	45.96	54.0	0.074
>200	1.57		14.17	100.00	0.0	0.0063

Soil #2						
Initial Sample Weight		31.91 g				
Sieve	Weigh boat mass (g)	Sample + weigh boat mass (g)	Sample Weight (g)	% Retained	% Passing	Grain Size (mm)
10	1.65	1.89	0.24	0.75	99.2	2
18	1.53	2.1	0.57	2.54	97.5	1
35	1.57	3.27	1.7	9.57	90.4	0.5
60	1.48	5.84	4.36	26.20	73.8	0.25
120	1.5	6.64	5.14	45.80	54.2	0.125
200	1.45	7.03	5.58	67.09	32.9	0.074
>200	1.53		14.32	100.00	0.0	0.0063

**Hydrometer Procedure**

Sample ID	mass of sample (g)	mass of sodium hexametaphosphate (g)	Specific gravity (g/mL)
Soil #1	25.97	2.47	2.65
Soil #2	24.65	2.50	2.65

Start time: 11:40:00 AM										
Sample ID	Time (mins)		Hydrometer reading	Temp (degrees Celcius)	Specific gravity of solution (g/mL)	Percent particles remaining in solution	Composite correction factor, Ct	Effective depth (L) cm	K for assumed specific gravity	Diameter of Soil particles (mm)
Soil #1	2	11:42:00 AM	1.011	19.9	0.99822	78.9	-0.039357	13.4	0.01365	0.353
	5	11:45:00 AM	1.0095	19.9	0.99822	69.7	-0.039357	13.8	0.01365	0.227
	15	11:55:00 AM	1.008	19.6	0.99829	60.0	-0.078218	14.2	0.01365	0.133
	30	12:10:00 PM	1.008	19.7	0.99827	60.1	-0.065306	14.2	0.01365	0.094
	60	12:40:00 PM	1.006	19.7	0.99827	47.8	-0.065306	14.7	0.01365	0.068
	250	3:50:00 PM	1.0055	19.3	0.99855	42.9	-0.116759	14.9	0.01385	0.034
	1440	11:40:00 AM	1.005	20.2	0.99833	41.2	-0.000050	15	0.01365	0.014

Start time: 12:05:00 PM										
Sample ID	Time (mins)		Hydrometer reading	Temp (degrees Celcius)	Specific gravity of solution (g/mL)	Percent particles remaining in solution	Effective depth (L) cm	K for assumed specific gravity	Diameter of Soil particles (mm)	
Soil #2	2	12:07:00 PM	1.0145	19.0	0.99841	90.7	12.5	0.01365	0.341	
	5	12:10:00 PM	1.013	19.0	0.99841	82.2	12.9	0.01365	0.219	
	15	12:20:00 PM	1.011	19.3	0.99835	71.3	13.4	0.01365	0.129	
	30	12:35:00 PM	1.008	19.4	0.99833	54.5	14.2	0.01365	0.094	
	60	12:55:00 PM	1.0075	19.4	0.99833	51.7	14.3	0.01365	0.067	
	250	4:15:00 PM	1.0055	19.3	0.99855	39.2	14.9	0.01385	0.034	
	1440	12:05:00 PM	1.005	20.2	0.99833	37.6	15.0	0.01365	0.014	

**Specific Gravity by ASTM D854 on wet soils**

Sample ID	Replicate	Specific gravity of sample (g/mL)	Average
Soil #1	1	1.32	1.40
	2	1.11	
	3	1.48	
	4	1.58	
	5	1.52	
Soil #2	1	1.21	1.36
	2	1.38	
	3	1.19	
	4	1.50	
	5	1.52	

**Specific Gravity by ASTM D854 on dry soils**

Sample ID	Specific gravity of sample (g/mL)
Soil #1	1.67
Soil #1	1.7

**Specific Gravity by ASTM D854**

Sample ID	Dried soil Basis	Wet Soil Basis
Soil #1	1.67	1.40
Soil #2	1.70	1.36

## **APPENDIX F**

### **Laboratory Reports for Treatability Testing**



ANALYTICAL REPORT

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

Friday, January 6, 2023  
Sumant Avasarala  
Anchor QEA, LLC  
6720 SW Macadam Ave. Suite 125  
Portland, OR 97219

RE: A2K0581 - Chlor-Alkali RAU, GP West Site - 220204-01.01 Task 01

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A2K0581, which was received by the laboratory on 11/9/2022 at 1:24:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

---

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1                      2.4 degC

---

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.  
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

---



Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

---

Darwin Thomas, Business Development Director



ANALYTICAL REPORT

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b>Anchor QEA, LLC</b> 6720 SW Macadam Ave. Suite 125 Portland, OR 97219	Project: <b>Chlor-Alkali RAU, GP West Site</b> Project Number: <b>220204-01.01 Task 01</b> Project Manager: <b>Sumant Avasarala</b>	<b>Report ID:</b> <b>A2K0581 - 01 06 23 0451</b>
--	---	---

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GPW-Soil-1-TOC	A2K0581-01	Soil	11/08/22 13:00	11/09/22 13:24
GPW-Soil-1-TOC-DUP	A2K0581-02	Soil	11/08/22 13:05	11/09/22 13:24
GPW-Soil-2-TOC	A2K0581-03	Soil	11/08/22 13:10	11/09/22 13:24
GPW-Soil-1	A2K0581-04	Soil	11/08/22 13:15	11/09/22 13:24
GPW-Soil-1-DUP	A2K0581-05	Soil	11/08/22 13:20	11/09/22 13:24
GPW-Soil-2	A2K0581-06	Soil	11/08/22 13:25	11/09/22 13:24
GPW-Soil-2-DUP	A2K0581-07	Soil	11/08/22 13:30	11/09/22 13:24
GPW-Soil-1-SPLP	A2K0581-08	Water	11/09/22 10:00	11/09/22 13:24
GPW-Soil-1-SPLP-DUP	A2K0581-09	Water	11/09/22 10:05	11/09/22 13:24
GPW-Soil-2-SPLP	A2K0581-10	Water	11/09/22 10:10	11/09/22 13:24
GPW-Soil-2-SPLP-DUP	A2K0581-11	Water	11/09/22 10:15	11/09/22 13:24
GPW-EMW-45	A2K0581-12	Water	11/09/22 12:30	11/09/22 13:24

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ANALYTICAL REPORT

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Tigard, OR 97223  
503-718-2323  
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--	---	---

**ANALYTICAL SAMPLE RESULTS**

Total Metals by EPA 6020B (ICPMS)									
Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
<b>GPW-Soil-1 (A2K0581-04RE2)</b>					<b>Matrix: Soil</b>				
Batch: 22K0657									
Mercury	3940	347	694	mg/kg dry	50000	11/22/22 05:40	EPA 6020B		
<b>GPW-Soil-1-DUP (A2K0581-05RE2)</b>					<b>Matrix: Soil</b>				
Batch: 22K0657									
Mercury	4490	359	718	mg/kg dry	50000	11/22/22 05:45	EPA 6020B		
<b>GPW-Soil-2 (A2K0581-06RE1)</b>					<b>Matrix: Soil</b>				
Batch: 22K0657									
Mercury	22.3	0.708	1.42	mg/kg dry	100	11/19/22 05:57	EPA 6020B		
<b>GPW-Soil-2-DUP (A2K0581-07RE2)</b>					<b>Matrix: Soil</b>				
Batch: 22K0657									
Mercury	128	6.61	13.2	mg/kg dry	1000	11/22/22 06:01	EPA 6020B		
<b>GPW-Soil-1-SPLP (A2K0581-08)</b>					<b>Matrix: Water</b>				
Batch: 22K0890									
Mercury	406	40.0	80.0	ug/L	1000	11/28/22 13:17	EPA 6020B	Q-42	
<b>GPW-Soil-1-SPLP-DUP (A2K0581-09)</b>					<b>Matrix: Water</b>				
Batch: 22K0890									
Mercury	660	40.0	80.0	ug/L	1000	11/28/22 13:27	EPA 6020B		
<b>GPW-Soil-2-SPLP (A2K0581-10)</b>					<b>Matrix: Water</b>				
Batch: 22K0890									
Mercury	7.74	0.400	0.800	ug/L	10	11/28/22 13:38	EPA 6020B		
<b>GPW-Soil-2-SPLP-DUP (A2K0581-11)</b>					<b>Matrix: Water</b>				
Batch: 22K0890									
Mercury	9.23	0.400	0.800	ug/L	10	11/28/22 13:43	EPA 6020B		
<b>GPW-EMW-45 (A2K0581-12RE1)</b>					<b>Matrix: Water</b>				
Batch: 22K0956									
Mercury	0.179	0.0600	0.120	ug/L	1	11/29/22 16:44	EPA 6020B		

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**ANALYTICAL SAMPLE RESULTS**

**Dissolved Metals by EPA 6020B (ICPMS)**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
<b>GPW-Soil-1-SPLP (A2K0581-08RE1)</b>				<b>Matrix: Water</b>					
Batch: 22K0834									
Mercury	562	40.0	80.0	ug/L	1000	11/23/22 06:04	EPA 6020B (Diss)		
<b>GPW-Soil-1-SPLP-DUP (A2K0581-09RE1)</b>				<b>Matrix: Water</b>					
Batch: 22K0834									
Mercury	505	40.0	80.0	ug/L	1000	11/23/22 06:25	EPA 6020B (Diss)		
<b>GPW-Soil-2-SPLP (A2K0581-10RE1)</b>				<b>Matrix: Water</b>					
Batch: 22K0834									
Mercury	3.81	0.400	0.800	ug/L	10	11/23/22 06:30	EPA 6020B (Diss)		
<b>GPW-Soil-2-SPLP-DUP (A2K0581-11RE1)</b>				<b>Matrix: Water</b>					
Batch: 22K0834									
Mercury	4.39	0.400	0.800	ug/L	10	11/23/22 06:36	EPA 6020B (Diss)		
<b>GPW-EMW-45 (A2K0581-12RE2)</b>				<b>Matrix: Water</b>					
Batch: 22K0834									
Mercury	0.0953	0.0400	0.0800	ug/L	1	11/28/22 12:50	EPA 6020B (Diss)		

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**ANALYTICAL SAMPLE RESULTS**

**Demand Parameters**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>GPW-Soil-1-TOC (A2K0581-01RE1)</b>				<b>Matrix: Soil</b>				
Batch: 22K0627								
<b>Total Organic Carbon</b>	<b>58000</b>	200	200	mg/kg	1	11/21/22 17:42	EPA 9060Amod	
<b>GPW-Soil-1-TOC-DUP (A2K0581-02RE1)</b>				<b>Matrix: Soil</b>				
Batch: 22K0627								
<b>Total Organic Carbon</b>	<b>54000</b>	200	200	mg/kg	1	11/21/22 17:53	EPA 9060Amod	
<b>GPW-Soil-2-TOC (A2K0581-03RE1)</b>				<b>Matrix: Soil</b>				
Batch: 22K0627								
<b>Total Organic Carbon</b>	<b>61000</b>	200	200	mg/kg	1	11/21/22 18:03	EPA 9060Amod	

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**ANALYTICAL SAMPLE RESULTS**

Percent Dry Weight									
Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
<b>GPW-Soil-2-TOC (A2K0581-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 22L0621</b>		<b>H-01</b>	
% Solids	54.2	1.00	1.00	%	1	12/19/22 05:29	EPA 8000D		
<b>GPW-Soil-1 (A2K0581-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 22K0572</b>			
% Solids	58.6	1.00	1.00	%	1	11/16/22 05:58	EPA 8000D		
<b>GPW-Soil-1-DUP (A2K0581-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 22K0572</b>			
% Solids	57.4	1.00	1.00	%	1	11/16/22 05:58	EPA 8000D		
<b>GPW-Soil-2 (A2K0581-06)</b>				<b>Matrix: Soil</b>		<b>Batch: 22K0572</b>			
% Solids	58.4	1.00	1.00	%	1	11/16/22 05:58	EPA 8000D		
<b>GPW-Soil-2-DUP (A2K0581-07)</b>				<b>Matrix: Soil</b>		<b>Batch: 22K0572</b>			
% Solids	59.4	1.00	1.00	%	1	11/16/22 05:58	EPA 8000D		

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Total Metals by EPA 6020B (ICPMS)**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 22K0657 - EPA 3051A</b>						<b>Soil</b>						
<b>Blank (22K0657-BLK1)</b>			Prepared: 11/17/22 07:05 Analyzed: 11/17/22 23:06									
<u>EPA 6020B</u>												
Mercury	ND	0.0385	0.0769	mg/kg wet	10	---	---	---	---	---	---	
<b>LCS (22K0657-BS1)</b>			Prepared: 11/17/22 07:05 Analyzed: 11/17/22 23:16									
<u>EPA 6020B</u>												
Mercury	1.01	0.0400	0.0800	mg/kg wet	10	1.00	---	101	80-120%	---	---	
<b>Duplicate (22K0657-DUP1)</b>			Prepared: 11/17/22 07:05 Analyzed: 11/17/22 23:37									
<u>QC Source Sample: Non-SDG (A2K0290-02)</u>												
Mercury	1.72	0.0393	0.0786	mg/kg dry	10	---	1.69	---	---	2	20%	PRO
<b>Matrix Spike (22K0657-MS1)</b>			Prepared: 11/17/22 07:05 Analyzed: 11/17/22 23:43									
<u>QC Source Sample: Non-SDG (A2K0290-02)</u>												
<u>EPA 6020B</u>												
Mercury	2.48	0.0402	0.0804	mg/kg dry	10	1.01	1.69	79	75-125%	---	---	PRO
<b>Batch 22K0890 - EPA 3015A</b>						<b>Water</b>						
<b>Blank (22K0890-BLK1)</b>			Prepared: 11/23/22 12:31 Analyzed: 11/28/22 13:06									
<u>EPA 6020B</u>												
Mercury	ND	0.0400	0.0800	ug/L	1	---	---	---	---	---	---	
<b>LCS (22K0890-BS1)</b>			Prepared: 11/23/22 12:31 Analyzed: 11/28/22 13:11									
<u>EPA 6020B</u>												
Mercury	1.11	0.0400	0.0800	ug/L	1	1.11	---	100	80-120%	---	---	
<b>Duplicate (22K0890-DUP1)</b>			Prepared: 11/23/22 12:31 Analyzed: 11/28/22 13:22									
<u>QC Source Sample: GPW-Soil-1-SPLP (A2K0581-08)</u>												
<u>EPA 6020B</u>												
Mercury	606	40.0	80.0	ug/L	1000	---	406	---	---	40	20%	Q-17
<b>Matrix Spike (22K0890-MS1)</b>			Prepared: 11/23/22 12:31 Analyzed: 11/28/22 13:33									
<u>QC Source Sample: GPW-Soil-1-SPLP-DUP (A2K0581-09)</u>												

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--	---	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Total Metals by EPA 6020B (ICPMS)**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 22K0890 - EPA 3015A</b>						<b>Water</b>						
<b>Matrix Spike (22K0890-MS1)</b>			Prepared: 11/23/22 12:31 Analyzed: 11/28/22 13:33									
<b>QC Source Sample: GPW-Soil-1-SPLP-DUP (A2K0581-09)</b>												
Mercury	679	40.0	80.0	ug/L	1000	1.11	660	1740	75-125%	---	---	Q-65

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--	---	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Total Metals by EPA 6020B (ICPMS)**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 22K0956 - EPA 3015A</b>						<b>Water</b>						
<b>Blank (22K0956-BLK1)</b>			Prepared: 11/29/22 10:36 Analyzed: 11/29/22 16:34									
<u>EPA 6020B</u>												
Mercury	ND	0.0400	0.0800	ug/L	1	---	---	---	---	---	---	
<b>LCS (22K0956-BS1)</b>			Prepared: 11/29/22 10:36 Analyzed: 11/29/22 16:39									
<u>EPA 6020B</u>												
Mercury	0.935	0.0400	0.0800	ug/L	1	1.11	---	84	80-120%	---	---	
<b>Duplicate (22K0956-DUP1)</b>			Prepared: 11/29/22 10:36 Analyzed: 11/29/22 17:16									
<u>QC Source Sample: Non-SDG (A2K0762-01)</u>												
Mercury	ND	0.0400	0.0800	ug/L	1	---	ND	---	---	---	20%	
<b>Matrix Spike (22K0956-MS1)</b>			Prepared: 11/29/22 10:36 Analyzed: 11/29/22 17:21									
<u>QC Source Sample: Non-SDG (A2K0762-01)</u>												
<u>EPA 6020B</u>												
Mercury	0.686	0.0400	0.0800	ug/L	1	1.11	ND	62	75-125%	---	---	A-01, Q-01

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Dissolved Metals by EPA 6020B (ICPMS)**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 22K0834 - Matrix Matched Direct Inject</b>						<b>Water</b>						
<b>Blank (22K0834-BLK2)</b>			Prepared: 11/22/22 10:04 Analyzed: 11/23/22 05:53									
<u>EPA 6020B (Diss)</u>												
Mercury	ND	0.0400	0.0800	ug/L	1	---	---	---	---	---	---	Q-16
<b>LCS (22K0834-BS2)</b>			Prepared: 11/22/22 10:04 Analyzed: 11/23/22 05:59									
<u>EPA 6020B (Diss)</u>												
Mercury	1.13	0.0400	0.0800	ug/L	1	1.11	---	101	80-120%	---	---	Q-16
<b>Duplicate (22K0834-DUP2)</b>			Prepared: 11/22/22 10:04 Analyzed: 11/23/22 06:20									
<u>QC Source Sample: GPW-Soil-1-SPLP (A2K0581-08RE1)</u>												
<u>EPA 6020B (Diss)</u>												
Mercury	539	40.0	80.0	ug/L	1000	---	562	---	---	4	20%	Q-16

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Demand Parameters**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 22K0627 - EPA 9060A</b>						<b>Soil</b>						
<b>Blank (22K0627-BLK1)</b>			Prepared: 11/16/22 11:08 Analyzed: 11/19/22 02:10									
<u>EPA 9060Amod</u>												
Total Organic Carbon	ND	200	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (22K0627-BS1)</b>			Prepared: 11/16/22 11:08 Analyzed: 11/19/22 02:21									
<u>EPA 9060Amod</u>												
Total Organic Carbon	11000	200	200	mg/kg	1	10000	---	107	86-110%	---	---	
<b>Duplicate (22K0627-DUP1)</b>			Prepared: 11/16/22 11:08 Analyzed: 11/19/22 02:43									
<u>QC Source Sample: Non-SDG (A2K0539-01)</u>												
Total Organic Carbon	<b>11000</b>	200	200	mg/kg	1	---	8600	---	---	22	30%	
<b>Duplicate (22K0627-DUP2)</b>			Prepared: 11/16/22 11:08 Analyzed: 11/19/22 02:54									
<u>QC Source Sample: Non-SDG (A2K0539-01)</u>												
Total Organic Carbon	<b>8100</b>	200	200	mg/kg	1	---	8600	---	---	7	30%	
<b>Duplicate (22K0627-DUP4)</b>			Prepared: 11/16/22 11:08 Analyzed: 11/21/22 18:14									
<u>QC Source Sample: GPW-Soil-2-TOC (A2K0581-03RE1)</u>												
<u>EPA 9060Amod</u>												
Total Organic Carbon	<b>55000</b>	200	200	mg/kg	1	---	61000	---	---	10	30%	Q-16

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes	
<b>Batch 22K0572 - Total Solids (Dry Weight)</b>						<b>Soil</b>							
<b>Duplicate (22K0572-DUP1)</b>			Prepared: 11/15/22 18:51 Analyzed: 11/16/22 05:58						<b>PRO</b>				
<u>QC Source Sample: Non-SDG (A2K0477-02)</u>													
% Solids	98.7	1.00	1.00	%	1	---	98.4	---	---	0.3	10%		
<b>Duplicate (22K0572-DUP2)</b>			Prepared: 11/15/22 18:51 Analyzed: 11/16/22 05:58										
<u>QC Source Sample: Non-SDG (A2K0584-01)</u>													
% Solids	83.1	1.00	1.00	%	1	---	82.5	---	---	0.7	10%		
<b>Duplicate (22K0572-DUP3)</b>			Prepared: 11/15/22 18:51 Analyzed: 11/16/22 05:58										
<u>QC Source Sample: Non-SDG (A2K0593-02)</u>													
% Solids	77.3	1.00	1.00	%	1	---	79.3	---	---	3	10%		
<b>Duplicate (22K0572-DUP4)</b>			Prepared: 11/15/22 20:32 Analyzed: 11/16/22 05:58										
<u>QC Source Sample: Non-SDG (A2K0603-02)</u>													
% Solids	78.6	1.00	1.00	%	1	---	80.7	---	---	3	10%		

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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ANALYTICAL REPORT

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b>Anchor QEA, LLC</b> 6720 SW Macadam Ave. Suite 125 Portland, OR 97219	Project: <b>Chlor-Alkali RAU, GP West Site</b> Project Number: <b>220204-01.01 Task 01</b> Project Manager: <b>Sumant Avasarala</b>	<b>Report ID:</b> <b>A2K0581 - 01 06 23 0451</b>
--	---	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 22L0621 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (22L0621-DUP1)</b>			Prepared: 12/16/22 11:56 Analyzed: 12/19/22 05:29									
<u>QC Source Sample: GPW-Soil-2-TOC (A2K0581-03)</u>												
<u>EPA 8000D</u>												
% Solids	56.8	1.00	1.00	%	1	---	54.2	---	---	5	10%	
<b>Duplicate (22L0621-DUP2)</b>			Prepared: 12/16/22 11:56 Analyzed: 12/19/22 05:29									
<u>QC Source Sample: Non-SDG (A2L0426-01)</u>												
% Solids	78.5	1.00	1.00	%	1	---	77.6	---	---	1	10%	
<b>Duplicate (22L0621-DUP3)</b>			Prepared: 12/16/22 11:56 Analyzed: 12/19/22 05:29									
<u>QC Source Sample: Non-SDG (A2L0426-02)</u>												
% Solids	76.3	1.00	1.00	%	1	---	75.9	---	---	0.5	10%	
<b>Duplicate (22L0621-DUP4)</b>			Prepared: 12/16/22 11:56 Analyzed: 12/19/22 05:29									
<u>QC Source Sample: Non-SDG (A2L0472-01)</u>												
% Solids	88.1	1.00	1.00	%	1	---	87.9	---	---	0.3	10%	
<b>Duplicate (22L0621-DUP5)</b>			Prepared: 12/16/22 11:56 Analyzed: 12/19/22 05:29									
<u>QC Source Sample: Non-SDG (A2L0652-03)</u>												
% Solids	79.1	1.00	1.00	%	1	---	82.6	---	---	4	10%	TEMP

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Darwin Thomas, Business Development Director



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**SAMPLE PREPARATION INFORMATION**

**Total Metals by EPA 6020B (ICPMS)**

<u>Prep: EPA 3015A</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 22K0890</u>							
A2K0581-08	Water	EPA 6020B	11/09/22 10:00	11/23/22 12:31	45mL/50mL	45mL/50mL	1.00
A2K0581-09	Water	EPA 6020B	11/09/22 10:05	11/23/22 12:31	45mL/50mL	45mL/50mL	1.00
A2K0581-10	Water	EPA 6020B	11/09/22 10:10	11/23/22 12:31	45mL/50mL	45mL/50mL	1.00
A2K0581-11	Water	EPA 6020B	11/09/22 10:15	11/23/22 12:31	45mL/50mL	45mL/50mL	1.00
<u>Batch: 22K0956</u>							
A2K0581-12RE1	Water	EPA 6020B	11/09/22 12:30	11/29/22 10:36	30mL/50mL	45mL/50mL	1.50

<u>Prep: EPA 3051A</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 22K0657</u>							
A2K0581-04RE2	Soil	EPA 6020B	11/08/22 13:15	11/17/22 07:05	0.492g/50mL	0.5g/50mL	1.02
A2K0581-05RE2	Soil	EPA 6020B	11/08/22 13:20	11/17/22 07:05	0.485g/50mL	0.5g/50mL	1.03
A2K0581-06RE1	Soil	EPA 6020B	11/08/22 13:25	11/17/22 07:05	0.484g/50mL	0.5g/50mL	1.03
A2K0581-07RE2	Soil	EPA 6020B	11/08/22 13:30	11/17/22 07:05	0.509g/50mL	0.5g/50mL	0.98

**Dissolved Metals by EPA 6020B (ICPMS)**

<u>Prep: Matrix Matched Direct Inject</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 22K0834</u>							
A2K0581-08RE1	Water	EPA 6020B (Diss)	11/09/22 10:00	11/22/22 10:04	45mL/50mL	45mL/50mL	1.00
A2K0581-09RE1	Water	EPA 6020B (Diss)	11/09/22 10:05	11/22/22 10:04	45mL/50mL	45mL/50mL	1.00
A2K0581-10RE1	Water	EPA 6020B (Diss)	11/09/22 10:10	11/22/22 10:04	45mL/50mL	45mL/50mL	1.00
A2K0581-11RE1	Water	EPA 6020B (Diss)	11/09/22 10:15	11/22/22 10:04	45mL/50mL	45mL/50mL	1.00
A2K0581-12RE2	Water	EPA 6020B (Diss)	11/09/22 12:30	11/22/22 10:04	45mL/50mL	45mL/50mL	1.00

**Demand Parameters**

<u>Prep: EPA 9060A</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 22K0627</u>							
A2K0581-01RE1	Soil	EPA 9060Amod	11/08/22 13:00	11/16/22 11:08			NA
A2K0581-02RE1	Soil	EPA 9060Amod	11/08/22 13:05	11/16/22 11:08			NA
A2K0581-03RE1	Soil	EPA 9060Amod	11/08/22 13:10	11/16/22 11:08			NA

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**SAMPLE PREPARATION INFORMATION**

Percent Dry Weight

<u>Prep: Total Solids (Dry Weight)</u>				Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Initial/Final	Initial/Final	Factor
<u>Batch: 22K0572</u>						
A2K0581-04	Soil	EPA 8000D	11/08/22 13:15	11/15/22 18:51		NA
A2K0581-05	Soil	EPA 8000D	11/08/22 13:20	11/15/22 18:51		NA
A2K0581-06	Soil	EPA 8000D	11/08/22 13:25	11/15/22 18:51		NA
A2K0581-07	Soil	EPA 8000D	11/08/22 13:30	11/15/22 18:51		NA
<u>Batch: 22L0621</u>						
A2K0581-03	Soil	EPA 8000D	11/08/22 13:10	12/16/22 11:56		NA

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**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- A-01** Serial dilution was performed and meets acceptance criteria. Data are acceptable.
- H-01** This sample was analyzed outside the recommended holding time.
- PRO** Sample has undergone sample processing prior to extraction and analysis.
- Q-01** Spike recovery and/or RPD is outside acceptance limits.
- Q-16** Reanalysis of an original Batch QC sample.
- Q-17** RPD between original and duplicate sample is outside of established control limits.
- Q-42** Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)
- Q-65** Spike recovery is estimated due to the high analyte concentration of the source sample.
- TEMP** Sample was received outside of recommended temperature. See Case Narrative.

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.
- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.  
  
Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

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Table with 3 columns: Client (Anchor QEA, LLC), Project (Chlor-Alkali RAU, GP West Site), and Report ID (A2K0581 - 01 06 23 0451)

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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Signature of Darwin Thomas

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LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) -
EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Table with 6 columns: Matrix, Analysis, TNI\_ID, Analyte, TNI\_ID, Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Handwritten signature of Darwin Thomas

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A2K0581

### Chain of Custody Record & Laboratory Analysis Request

Laboratory Number: 503-972-5019      Date: 11/9/2022

Project Name: Chlor-Alkali RAU, GP West Site

Project Number: 220204-01.01 Task 01

Project Manager: Sumant Avasarala

Phone Number: 503-972-5008

Shipment Method: Apex Courier

Line	Field Sample ID	Collection		Matrix	No. of Containers	Total Organic Carbon by EPA 9060	Total Hg by EPA 1631	Dissolved Hg by 6020A	Parameters	Comments/Preservation
		Date	Time							
1	GPW-Soil-1-TOC	11/8/2022	13:00	Soil	1	X				
2	GPW-Soil-1-TOC-DUP	11/8/2022	13:05	Soil	1	X				
3	GPW-Soil-2-TOC	11/8/2022	13:10	Soil	1	X				
4	GPW-Soil-1	11/8/2022	13:15	Soil	1	X				
5	GPW-Soil-1-DUP	11/8/2022	13:20	Soil	1	X				
6	GPW-Soil-2	11/8/2022	13:25	Soil	1	X				
7	GPW-Soil-2-DUP	11/8/2022	13:30	Soil	1	X				
8	GPW-Soil-1-SPRP	11/9/2022	10:00	Water	2	X	X	X		HCl preserved bottles
9	GPW-Soil-1-SPRP-DUP	11/9/2022	10:05	Water	2	X	X	X		HCl preserved bottles
10	GPW-Soil-2-SPRP	11/9/2022	10:10	Water	2	X	X	X		HCl preserved bottles
11	GPW-Soil-2-SPRP-DUP	11/9/2022	10:15	Water	2	X	X	X		HCl preserved bottles
12	GPW-EMW-45	11/9/2022	12:30	Water	2	X	X	X		HCl preserved bottles
13										
14										
15										

Notes: Soil samples contain elevated levels of Hg. If diluting >10x, please call Sumant (503)972-5008. EMAIL RESULTS to labdata@anchorqea.com, savasara@anchorqea.com, gwilliams@anchorqea.com

Requisitioned by: <b>GILLIAN WILLIAMS</b> Signature/Print Name: <i>Gillian Williams</i> Date/Time: 13:24 11/9/2022 Company: <b>Anchor QEA</b>	Received by: _____ Signature/Print Name: _____ Received by: _____ Signature/Print Name: _____
--	--

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original. Page 1 of 1

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**APEX LABS COOLER RECEIPT FORM**

Client: Anchor Element WO#: A2K0581

Project/Project #: Chlor-Alkali RAU, GP West Site / 220204-01.01 Task 01

**Delivery Info:**  
 Date/time received: 11/9/22 @ 13:24 By: AJM  
 Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Date/time inspected: 11/9/22 @ 14:31 By: AJM  
 Chain of Custody included? Yes  No  Custody seals? Yes  No   
 Signed/dated by client? Yes  No   
 Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>2.4</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>Y</u>						
Ice type: (Gel/Real/Other)	<u>Real</u>						
Condition (In/Out):	<u>In</u>						

Cooler out of temp? (Y/N) (N) Possible reason why: \_\_\_\_\_  
 Green dots applied to out of temperature samples? Yes  No   
 Out of temperature samples form initiated? Yes  No

**Sample Inspection:** Date/time inspected: 11/10/22 @ 16:41 By: AAW  
 All samples intact? Yes  No  Comments: \_\_\_\_\_

Bottle labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

COC/container discrepancies form initiated? Yes  No

Containers/volumes received appropriate for analysis? Yes  No  Comments: 250 mL HCl (FF) numbers provided for dissolved 6020 Hg

Do VOA vials have visible headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water samples: pH checked: Yes  No  NA  <sup>DSS 11-15-22</sup> pH appropriate? Yes  No  NA  <sup>DSS 11-15-22</sup>

Comments: GPBW-EMW-45 received unprocessed, pH checked = 7, to be presented by analyst

**Additional information:** \_\_\_\_\_

Labeled by: DSS Witness: [Signature] Cooler Inspected by: [Signature]

Form Y-003 R-00

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Darwin Thomas, Business Development Director

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Project Number: L23116  
 Pre Remedial Design Investigation

Laboratory notes from 3/2/23 Working with Soil Mix #2

- Soil mixed with cement by weight
- cement moisture content is assumed to be negligible per Rory
- each mix needs 8 cylinders
- figured 400 g per cylinder, 3200 g per mix including H<sub>2</sub>O
- water used for mixing today was H<sub>2</sub>O 50/50
- water : cement 3:1 to 1:1
- Solid must be at or above Liquid Limit to ensure proper mixing, as well as getting it within the desired slump range
- Cylinders were rodded in 3 lifts

Soil #2	Mix #1	5% MaxCem	Cast time 9:45 AM
2850 g wet soil 88 g MaxCem 257 g water added Current proportions are far too stiff and will not yield appropriate slump values Doubling water (added additional 261.2 g) Consistency looks acceptable so 8 cylinders were cast Moisture Content 89.7%                      pH at cast time 11.5 & 7 day 11.6                      Temperature 69.8° F			
Soil #2	Mix #2	5% Terraflow	Cast time 10:15 AM
2850 g wet soil 88 g T-75 cement 518 g water added Consistency looks acceptable so 8 cylinders were cast Moisture Content 90.2%                      pH at cast time 11.2 & 7 day 10.1                      Temperature 67.0° F			
Soil #2	Mix #3	10% MaxCem	Cast time 10:45 AM
2730 g wet soil 169 g MaxCem 550 g water added Consistency looks acceptable so 8 cylinders were cast Moisture Content 78.0%                      pH at cast time 11.4 & 7 day 11.2                      Temperature 69.4° F			
Soil #2	Mix #4	10% Terraflow	Cast time 11:15 AM
2730 g wet soil 169 g T-75 cement 550 g water added Consistency looks acceptable so 8 cylinders were cast Moisture Content 82.3%                      pH at cast time 11.9 & 7 day 11.9                      Temperature 68.4° F			

Soil #2	Mix #5	10% 50/50	Cast time 12:30 PM
2730 g wet soil 169 g 50/50 cement 550 g water added Consistency looks acceptable so 9 cylinders were cast Moisture Content 77.2%                      pH at cast time 12.3 & 7 day 10.5                      Temperature 69.0° F			
Soil #2	Mix #6	15% MaxCem	Cast time 12:30 PM
2600 g wet soil 242 g MaxCem 570 g water added Consistency looks acceptable so 8 cylinders were cast Moisture Content 80.9%                      pH at cast time 12.7 & 7 day 12.5                      Temperature 69.4° F			
Soil #2	Mix #7	15% Terraflow	Cast time 1:00 PM
2600 g wet soil 242 g Terraflow 540 g water added Current proportions are far too stiff and will not yield appropriate slump values (added 35g more water and an additional 20g) Consistency looks acceptable so 8 cylinders were cast Moisture Content 97.7%                      pH at cast time 12.0 & 7 day 12.0                      Temperature 69.0° F			
Soil #2	Mix #8	15% 50/50	Cast time 1:30 PM
2600 g wet soil 242 g 50/50 595 g water added Consistency looks acceptable so 8 cylinders were cast Moisture Content 97.5%                      pH at cast time 12.4 & 7 day 11.3                      Temperature 63.0° F			
Soil #2	Mix #9	20% MaxCem	Cast time 2:00 PM
2560 g wet soil 317 g MaxCem 610 g water added Consistency looks acceptable so 8 cylinders were cast Moisture Content 88.2%                      pH at cast time 12.3 & 7 day 11.7                      Temperature 68.8° F			
Soil #2	Mix #10	20% Terraflow	Cast time 3:00 PM
2560 g wet soil 317 g Terraflow 610 g water added Consistency looks acceptable so 8 cylinders were cast Moisture Content 88.8%                      pH at cast time 12.5 & 7 day 10.8                      Temperature 65.0° F			

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Soil #2	Mix #11	20% 50/50	Cast time 2:30 PM
2560 g wet soil			
317 g 50/50			
610 g water added			
Consistency looks acceptable so 8 cylinders were cast			
Moisture Content 89.3%	pH at cast time 12.2 & 7 day 11.2		Temperature 63.8° F

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*Proudly serving the Inland Northwest since 1976*

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Rory Kilkenny, PE  
Aspect Consulting, LLC  
710 2<sup>nd</sup> Ave, Suite 550  
Seattle, WA 98104

February 23, 2023

Project Number L23116

**PROJECT: Pre Remedial Design Investigation**

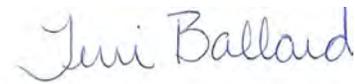
**SUBJECT: Results of Laboratory Testing  
Report #1**

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of specific laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of nine samples delivered to our laboratory on February 1, 2023. Laboratory tests were performed in general accordance with methods listed in the attached *Laboratory Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,  
Budinger & Associates, Inc.



Terri Ballard  
Laboratory Manager

TJB/lat/Addressee –  
Rory Kilkenny – rkilkenny@aspectconsulting.com

Attachments:  
Unconfined Compression Test Results Report – 9 pages

L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results

**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number: 23-0131**

Tested by: TB/KC

**Sample ID: Mix 1 Cylinder 4**

Test Date: 2/16/23

Soil Description: Soil Mix 1

Diameter of Sample: 1.989 inches

Area of Sample (A<sub>o</sub>): 0.022 ft<sup>2</sup>

Height of Sample (L<sub>o</sub>): 3.957 inches

Water Content: 95.3%

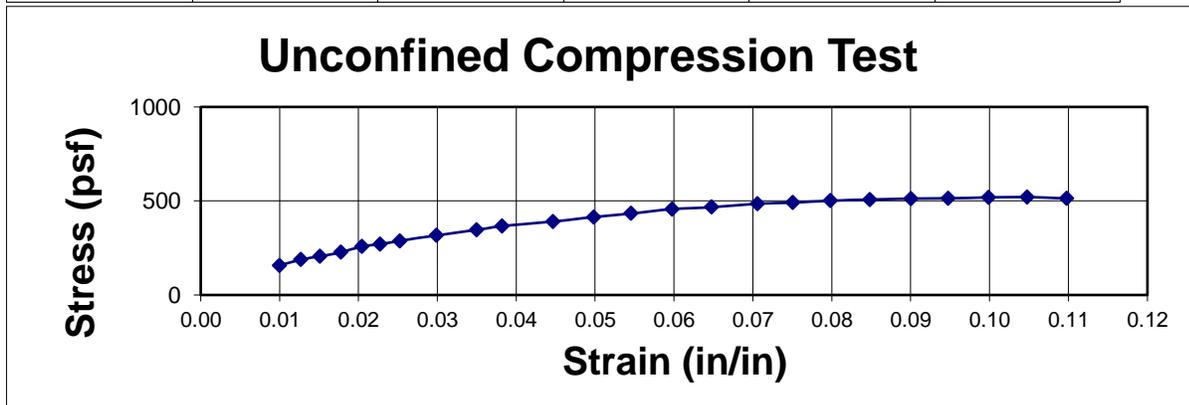
Dry Density: 46.9 lb/ft<sup>3</sup>

Height to Diameter Ratio: 2.0

Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_o$	Area CF 1 - $\epsilon$	Corrected Area (ft <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psf)
0.039	0.010	0.990	0.0222	3.5	158
0.050	0.013	0.987	0.0223	4.2	188
0.060	0.015	0.985	0.0223	4.6	206
0.070	0.018	0.982	0.0224	5.1	228
0.081	0.020	0.980	0.0225	5.8	258
0.090	0.023	0.977	0.0225	6.1	271
0.100	0.025	0.975	0.0226	6.5	288
0.118	0.030	0.970	0.0227	7.2	317
0.138	0.035	0.965	0.0228	7.9	347
0.151	0.038	0.962	0.0229	8.4	367
0.177	0.045	0.955	0.0230	9.0	391
0.197	0.050	0.950	0.0232	9.6	415
0.216	0.055	0.945	0.0233	10.1	434
0.237	0.060	0.940	0.0234	10.7	457
0.256	0.065	0.935	0.0235	11.0	468
0.279	0.071	0.929	0.0237	11.5	486
0.297	0.075	0.925	0.0238	11.7	492
0.316	0.080	0.920	0.0239	12.0	502
0.336	0.085	0.915	0.0240	12.2	508
0.356	0.090	0.910	0.0242	12.4	513
0.375	0.095	0.905	0.0243	12.5	514
0.395	0.100	0.900	0.0244	12.7	520
0.415	0.105	0.895	0.0246	12.8	521
0.434	0.110	0.890	0.0247	12.7	514





L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results

**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number: 23-0133** Tested by: TB/KC

**Sample ID: Mix 3 Cylinder 2** Test Date: 2/16/23

Soil Description: Soil Mix 1

Diameter of Sample: 2.033 inches

Area of Sample (Ao): 0.023 ft<sup>2</sup>

Height of Sample (Lo): 4.043 inches

Water Content: 91.7%

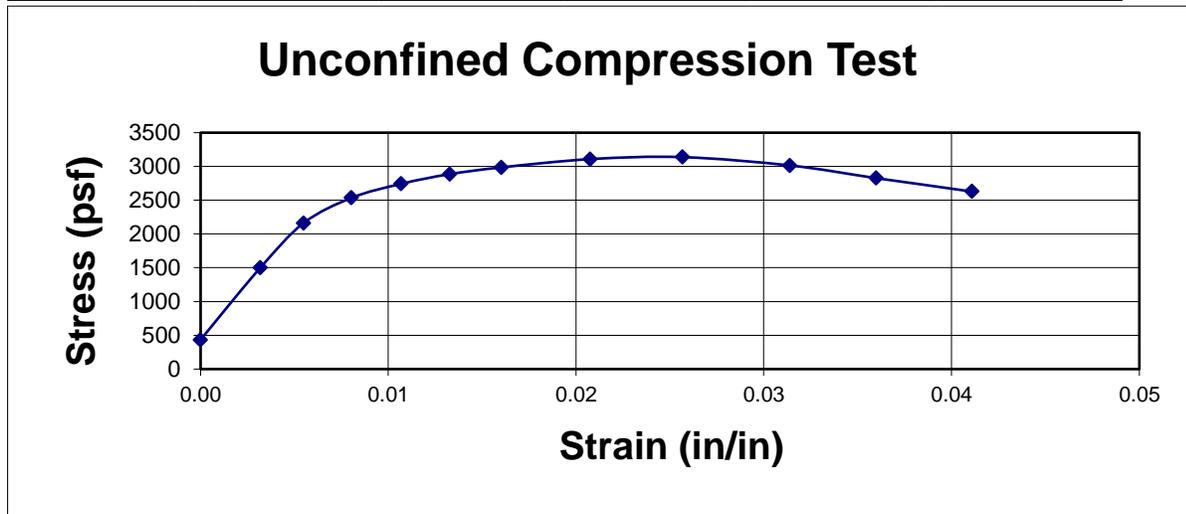
Dry Density: 46.5 lb/ft<sup>3</sup>

Height to Diameter Ratio: 2.0

Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (ft <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psf)
0.000	0.000	1.000	0.0230	10.0	435
0.013	0.003	0.997	0.0231	34.7	1504
0.022	0.005	0.995	0.0231	50.0	2162
0.033	0.008	0.992	0.0232	58.8	2536
0.043	0.011	0.989	0.0232	63.8	2744
0.054	0.013	0.987	0.0233	67.3	2887
0.065	0.016	0.984	0.0234	69.8	2986
0.084	0.021	0.979	0.0235	73.0	3108
0.104	0.026	0.974	0.0236	74.1	3139
0.127	0.031	0.969	0.0237	71.6	3015
0.146	0.036	0.964	0.0239	67.5	2829
0.166	0.041	0.959	0.0240	63.1	2631



L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results

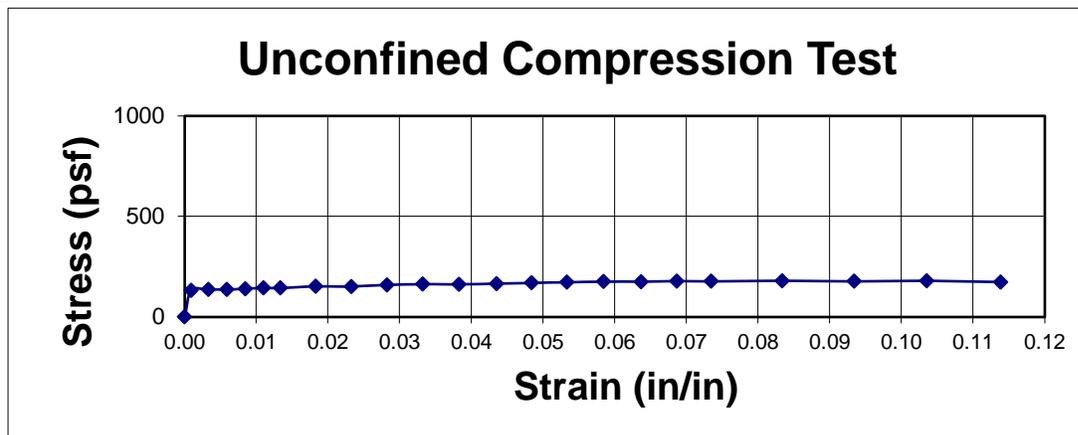
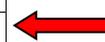
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0134      Tested by: TB/KC  
**Sample ID:** Mix 4 Cylinder 2      Test Date: 2/16/23  
 Soil Description: Soil Mix 1  
 Diameter of Sample: 2.017 inches  
 Area of Sample (Ao): 0.022 ft<sup>2</sup>  
 Height of Sample (Lo): 3.900 inches  
 Water Content: 82.3%  
 Dry Density: 52.6 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 1.9  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (ft <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psf)
0.000	0.000	1.000	0.0220	0.0	0
0.004	0.001	0.999	0.0220	2.9	132
0.013	0.003	0.997	0.0221	3.0	136
0.023	0.006	0.994	0.0221	3.0	136
0.033	0.008	0.992	0.0222	3.1	140
0.043	0.011	0.989	0.0222	3.2	144
0.052	0.013	0.987	0.0223	3.2	144
0.071	0.018	0.982	0.0224	3.4	152
0.091	0.023	0.977	0.0225	3.4	151
0.110	0.028	0.972	0.0226	3.6	159
0.130	0.033	0.967	0.0228	3.7	163
0.149	0.038	0.962	0.0229	3.7	162
0.170	0.044	0.956	0.0230	3.8	165
0.189	0.048	0.952	0.0231	3.9	169
0.208	0.053	0.947	0.0232	4.0	172
0.228	0.058	0.942	0.0234	4.1	175
0.249	0.064	0.936	0.0235	4.1	174
0.268	0.069	0.931	0.0236	4.2	178
0.287	0.073	0.927	0.0237	4.2	177
0.325	0.083	0.917	0.0240	4.3	179
0.364	0.093	0.907	0.0243	4.3	177
0.404	0.104	0.896	0.0245	4.4	179
0.444	0.114	0.886	0.0248	4.3	173



L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results

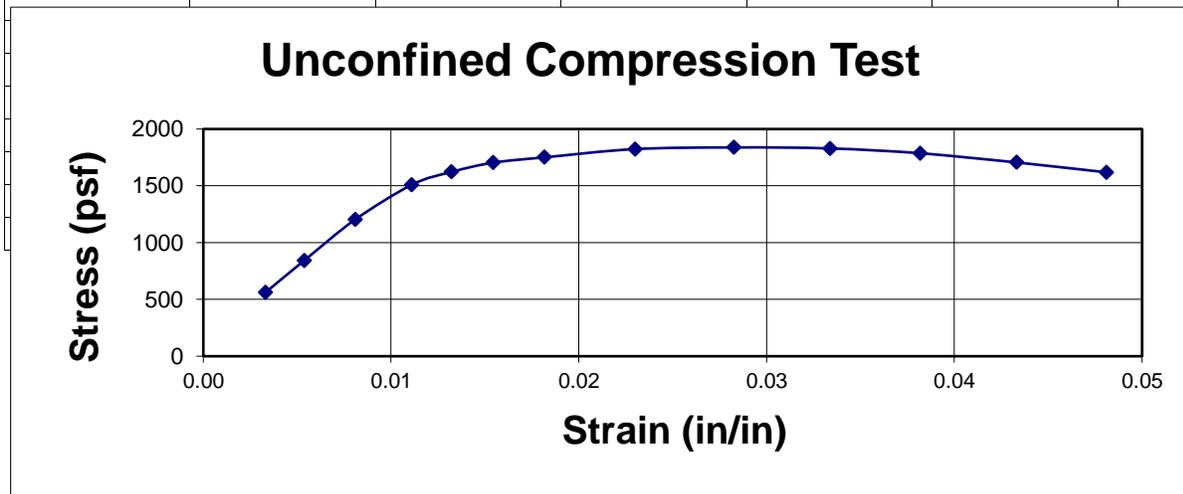
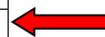
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0135      Tested by: TB/KC  
**Sample ID:** Mix 5 Cylinder 2      Test Date: 2/16/23  
 Soil Description: Soil Mix 1  
 Diameter of Sample: 2.030 inches  
 Area of Sample (A<sub>o</sub>): 0.023 ft<sup>2</sup>  
 Height of Sample (L<sub>o</sub>): 4.017 inches  
 Water Content: 78.1%  
 Dry Density: 51.9 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_o$	Area CF 1 - $\epsilon$	Corrected Area (ft <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psf)
0.013	0.003	0.997	0.0231	13.0	563
0.022	0.005	0.995	0.0231	19.5	843
0.033	0.008	0.992	0.0232	27.9	1203
0.045	0.011	0.989	0.0233	35.1	1509
0.053	0.013	0.987	0.0233	37.8	1622
0.062	0.015	0.985	0.0234	39.8	1704
0.073	0.018	0.982	0.0234	41.0	1750
0.092	0.023	0.977	0.0235	42.9	1822
0.114	0.028	0.972	0.0237	43.5	1838
0.134	0.033	0.967	0.0238	43.5	1828
0.153	0.038	0.962	0.0239	42.7	1786
0.174	0.043	0.957	0.0240	41.0	1705
0.193	0.048	0.952	0.0242	39.1	1618



L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results

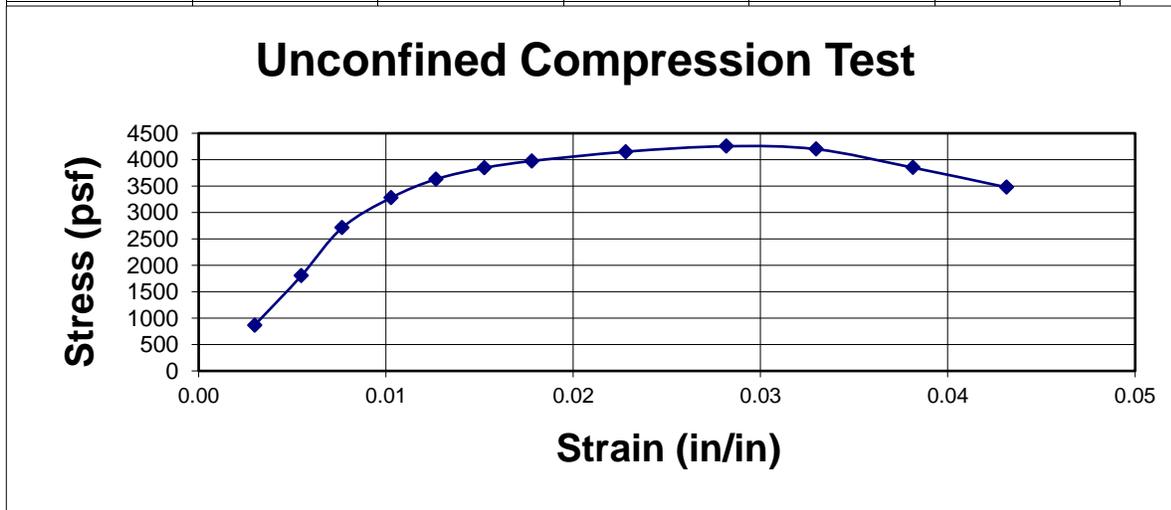
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0136      Tested by: TB/KC  
**Sample ID:** Mix 6 Cylinder 2      Test Date: 2/16/23  
 Soil Description: Soil Mix 1  
 Diameter of Sample: 2.033 inches  
 Area of Sample (Ao): 0.023 ft<sup>2</sup>  
 Height of Sample (Lo): 4.030 inches  
 Water Content: 78.9%  
 Dry Density: 51.9 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF $1 - \epsilon$	Corrected Area (ft <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psf)
0.012	0.003	0.997	0.0231	20.0	867
0.022	0.005	0.995	0.0231	41.7	1803
0.031	0.008	0.992	0.0232	62.9	2714
0.041	0.010	0.990	0.0232	76.2	3279
0.051	0.013	0.987	0.0233	84.6	3632
0.062	0.015	0.985	0.0234	89.8	3845
0.072	0.018	0.982	0.0234	93.1	3976
0.092	0.023	0.977	0.0235	97.7	4151
0.114	0.028	0.972	0.0237	100.7	4255
0.133	0.033	0.967	0.0238	99.9	4200
0.154	0.038	0.962	0.0239	92.1	3852
0.174	0.043	0.957	0.0240	83.6	3478



L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results

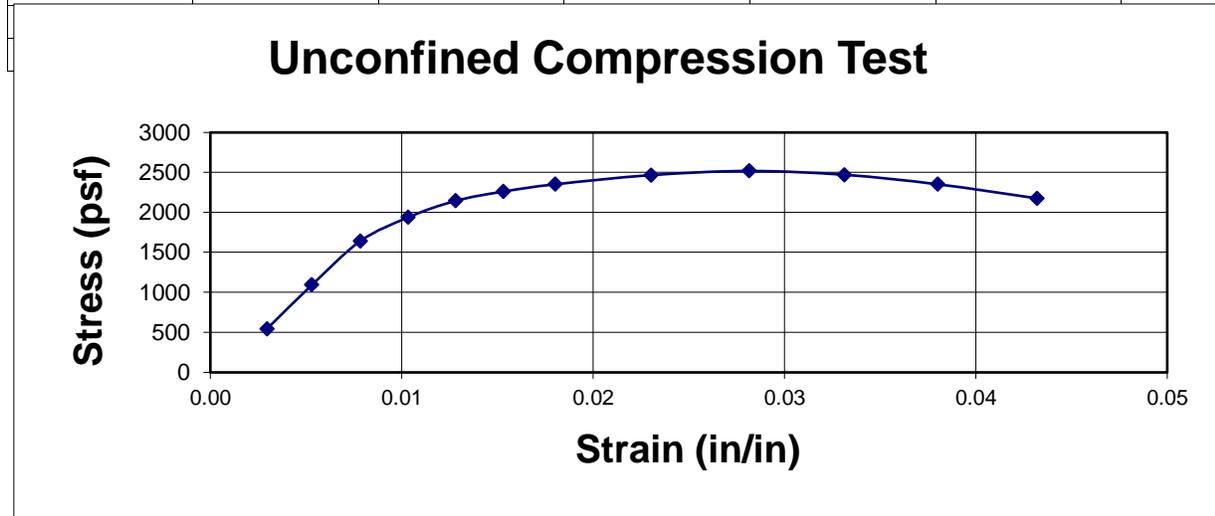
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0137      Tested by: TB/KC  
**Sample ID:** Mix 7 Cylinder 2      Test Date: 2/16/23  
 Soil Description: Soil Mix 1  
 Diameter of Sample: 2.023 inches  
 Area of Sample (Ao): 0.022 ft<sup>2</sup>  
 Height of Sample (Lo): 4.017 inches  
 Water Content: 81.1%  
 Dry Density: 52.3 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (ft <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psf)
0.012	0.003	0.997	0.0221	12.0	544
0.021	0.005	0.995	0.0221	24.2	1094
0.032	0.008	0.992	0.0222	36.4	1642
0.042	0.010	0.990	0.0222	43.1	1939
0.052	0.013	0.987	0.0223	47.8	2145
0.062	0.015	0.985	0.0223	50.5	2260
0.072	0.018	0.982	0.0224	52.7	2352
0.093	0.023	0.977	0.0225	55.5	2465
0.113	0.028	0.972	0.0226	57.0	2518
0.133	0.033	0.967	0.0228	56.2	2470
0.153	0.038	0.962	0.0229	53.8	2352
0.174	0.043	0.957	0.0230	50.0	2175

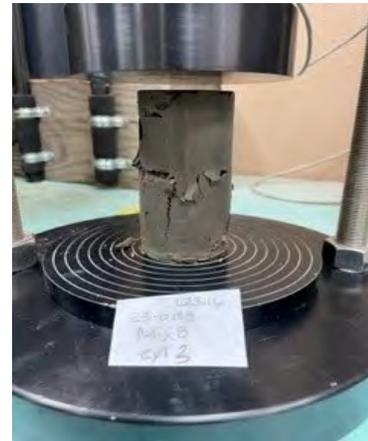


L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results

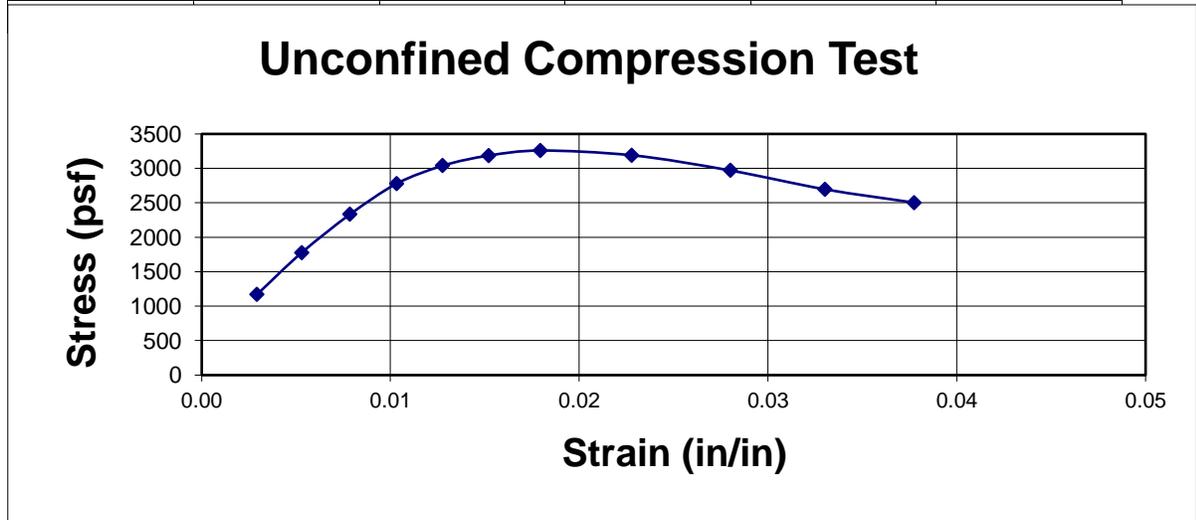
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0138      Tested by: TB/KC  
**Sample ID:** Mix 8 Cylinder 3      Test Date: 2/16/23  
 Soil Description: Soil Mix 1  
 Diameter of Sample: 2.033 inches  
 Area of Sample (A<sub>o</sub>): 0.023 ft<sup>2</sup>  
 Height of Sample (L<sub>o</sub>): 3.998 inches  
 Water Content: 68.2%  
 Dry Density: 55.8 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_o$	Area CF 1 - $\epsilon$	Corrected Area (ft <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psf)
0.012	0.003	0.997	0.0231	27.0	1170
0.021	0.005	0.995	0.0231	41.1	1777
0.031	0.008	0.992	0.0232	54.1	2334
0.041	0.010	0.990	0.0232	64.6	2780
0.051	0.013	0.987	0.0233	70.8	3039
0.061	0.015	0.985	0.0234	74.4	3186
0.072	0.018	0.982	0.0234	76.3	3258
0.091	0.023	0.977	0.0235	75.1	3191
0.112	0.028	0.972	0.0237	70.3	2971
0.132	0.033	0.967	0.0238	64.1	2695
0.151	0.038	0.962	0.0239	59.8	2502



L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results

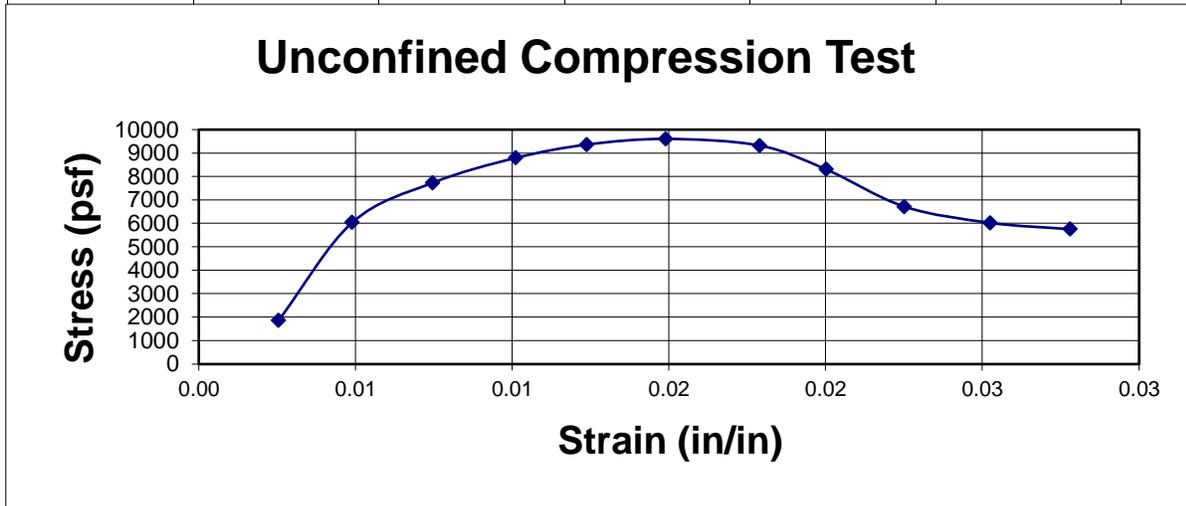
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0139      Tested by: TB/KC  
**Sample ID:** Mix 9 Cylinder 4      Test Date: 2/16/23  
 Soil Description: Soil Mix 1  
 Diameter of Sample: 2.037 inches  
 Area of Sample (Ao): 0.023 ft<sup>2</sup>  
 Height of Sample (Lo): 4.047 inches  
 Water Content: 67.8%  
 Dry Density: 57.3 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (ft <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psf)
0.010	0.003	0.997	0.0231	43.0	1865
0.020	0.005	0.995	0.0231	139.7	6044
0.030	0.007	0.993	0.0232	179.2	7733
0.041	0.010	0.990	0.0232	204.5	8801
0.050	0.012	0.988	0.0233	218.1	9365
0.060	0.015	0.985	0.0233	224.3	9607
0.072	0.018	0.982	0.0234	218.3	9322
0.081	0.020	0.980	0.0235	195.0	8309
0.091	0.023	0.977	0.0235	158.1	6719
0.102	0.025	0.975	0.0236	142.2	6026
0.113	0.028	0.972	0.0237	136.3	5761





Rory Kilkenny, PE  
Aspect Consulting, LLC  
710 2<sup>nd</sup> Ave, Suite 550  
Seattle, WA 98104

March 3, 2023

Project Number L23116

**PROJECT: Pre Remedial Design Investigation**

**SUBJECT: Results of Laboratory Testing  
Report #2**

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of specific laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of four samples delivered to our laboratory on February 1, 2023. Laboratory tests were performed in general accordance with methods listed in the attached *Laboratory Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,  
Budinger & Associates, Inc.

Terri Ballard  
Laboratory Manager

TJB/lat/Addressee –  
Rory Kilkenny – rkilkenny@aspectconsulting.com

Attachments:  
Unconfined Compression Test Results Report – 4 pages

L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results

**ASTM D2166**

**Unconfined Compression Test Results**

Laboratory Number: 23-0136 Tested by: TB/KC

Sample ID: Mix 6 Cylinder 5 Test Date: 3/1/23

Soil Description: Soil Mix 1

Diameter of Sample: 2.038 inches

Area of Sample (A<sub>o</sub>): 3.262 in<sup>2</sup>

Height of Sample (L<sub>o</sub>): 4.018 inches

Water Content: 76.4%

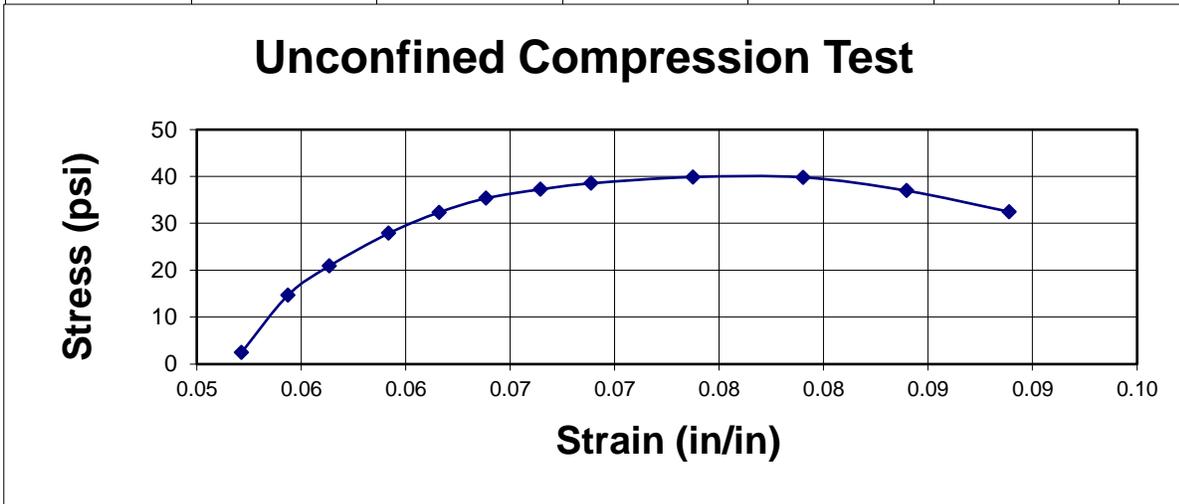
Dry Density: 52.4 lb/ft<sup>3</sup>

Height to Diameter Ratio: 2.0

Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_o$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.210	0.052	0.948	3.4414	8.6	2
0.218	0.054	0.946	3.4495	50.6	15
0.226	0.056	0.944	3.4568	72.4	21
0.238	0.059	0.941	3.4672	96.8	28
0.248	0.062	0.938	3.4761	112.5	32
0.257	0.064	0.936	3.4844	123.3	35
0.267	0.066	0.934	3.4942	130.3	37
0.277	0.069	0.931	3.5033	135.1	39
0.296	0.074	0.926	3.5217	140.5	40
0.318	0.079	0.921	3.5419	141.1	40
0.337	0.084	0.916	3.5610	131.8	37
0.357	0.089	0.911	3.5802	116.3	32









Rory Kilkenny, PE  
Aspect Consulting, LLC  
710 2<sup>nd</sup> Ave, Suite 550  
Seattle, WA 98104

March 10, 2023

Project Number L23116

**PROJECT: Pre Remedial Design Investigation**

**SUBJECT: Results of Laboratory Testing  
Report #3**

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of specific laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of twenty samples delivered to our laboratory February 2023. Laboratory tests were performed in general accordance with methods listed in the attached *Laboratory Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,  
Budinger & Associates, Inc.



Terri Ballard  
Laboratory Manager

TJB/lat/Addressee –  
Rory Kilkenny – rkilkenny@aspectconsulting.com

Attachments:  
Soils Laboratory Summary – 1 page

**SOILS**  
**LABORATORY SUMMARY**

LABORATORY NUMBER	23-0113	23-0114	23-0115	23-0116	23-0117	23-0118	23-0119	23-0120	23-0121	
SAMPLED BY	Client									
SAMPLE TYPE	Soil Cylinder									
SOIL NUMBER	1	1	1	1	1	1	1	1	1	
MIX NUMBER	1	2	3	4	5	6	7	8	9	
DATE TESTED										
<b>POCKET PENETROMETER</b>	2/9/2023	.24	0	3.3	0	2.1	4.1	2.1	4.5	4.5 plus*
	2/16/2023	.38	0	3.5	.06	2.4	4.4	2.5	4.5	4.5 plus*

\* penetrometer read to 4.5 max

**SOILS**  
**LABORATORY SUMMARY**

LABORATORY NUMBER	23-0199	23-0200	23-0201	23-0202	23-0203	23-0204	23-0205	23-0206	23-0207	23-0208	23-0209	
SAMPLED BY	B&A											
SAMPLE TYPE	Soil Cylinder											
SOIL NUMBER	2	2	2	2	2	2	2	2	2	2	2	
MIX NUMBER	1	2	3	4	5	6	7	8	9	10	11	
DATE TESTED												
<b>POCKET PENETROMETER</b>	3/9/2023	0	0	4.1	0	4.5	3.6	2.5	4.0	4.3	4.2	4.3

\* penetrometer read to 4.5 max

Rory Kilkenny, PE  
Aspect Consulting, LLC  
710 2<sup>nd</sup> Ave, Suite 550  
Seattle, WA 98104

March 21, 2023

Project Number L23116

**PROJECT: Pre Remedial Design Investigation**

**SUBJECT: Results of Laboratory Testing  
Report #4**

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of specific laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of twenty samples delivered to our laboratory February 2023. Laboratory tests were performed in general accordance with methods listed in the attached *Laboratory Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,  
Budinger & Associates, Inc.



Terri Ballard  
Laboratory Manager

TJB/lat/Addressee –  
Rory Kilkenny – rkilkenny@aspectconsulting.com

Attachments:  
Soils Laboratory Summary – 1 page  
Unconfined Compression Test Results Soil Mix 2 Report – 11 pages

**SOILS  
LABORATORY SUMMARY**

LABORATORY NUMBER			23-0113 Client	23-0114 Client	23-0115 Client	23-0116 Client	23-0117 Client	23-0118 Client	23-0119 Client	23-0120 Client	23-0121 Client
SAMPLED BY			Soil Cylinder								
SAMPLE TYPE											
SOIL NUMBER			1	1	1	1	1	1	1	1	1
MIX NUMBER			1	2	3	4	5	6	7	8	9
	UNITS	DATE TESTED									
<b>POCKET PENETROMETER</b>	TONS/SQ FT	2/9/2023	.24	0	3.3	0	2.1	4.1	2.1	4.5	4.5 plus*
	TONS/SQ FT	2/16/2023	.38	0	3.5	.06	2.4	4.4	2.5	4.5	4.5 plus*

\* penetrometer read to 4.5 max

**SOILS  
LABORATORY SUMMARY**

LABORATORY NUMBER			23-0199 B&A	23-0200 B&A	23-0201 B&A	23-0202 B&A	23-0203 B&A	23-0204 B&A	23-0205 B&A	23-0206 B&A	23-0207 B&A	23-0208 B&A	23-0209 B&A
SAMPLED BY			Soil Cylinder										
SAMPLE TYPE													
SOIL NUMBER			2	2	2	2	2	2	2	2	2	2	2
MIX NUMBER			1	2	3	4	5	6	7	8	9	10	11
	UNITS	DATE TESTED											
<b>POCKET PENETROMETER</b>	TONS/SQ FT	3/9/2023	0	0	4.1	0	4.5	3.6	2.5	4.0	4.3	4.2	4.3
	TONS/SQ FT	3/16/2023	0	0	4.3	0	4.5	5.1	3.1	4.5	4.4	4.5	4.5

\* penetrometer read to 4.5 max





L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results Soil Mix 2

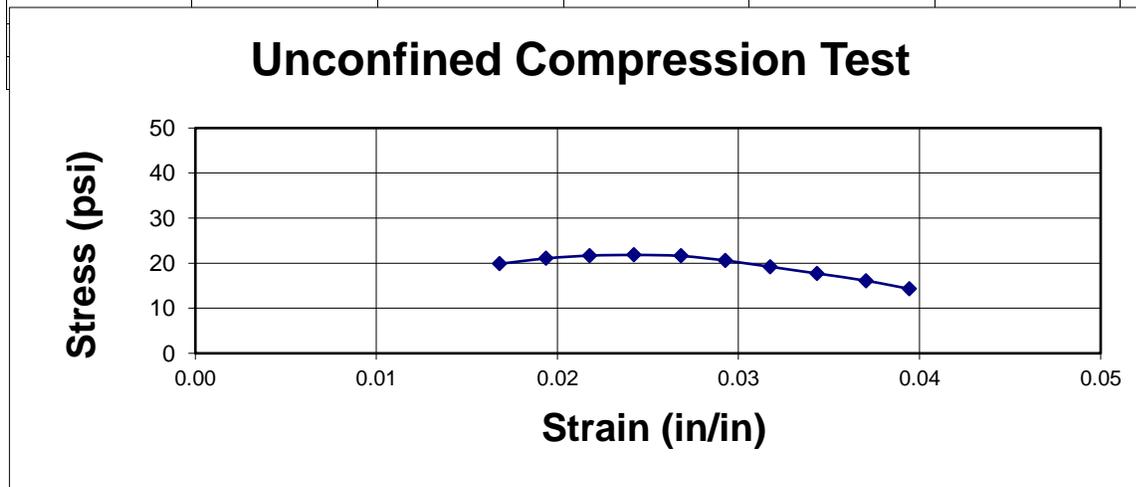
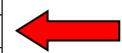
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0201      Tested by: TB/KC  
**Sample ID:** Mix 3 Cylinder 3      Test Date: 3/16/23  
 Soil Description: Soil Mix 2  
 Diameter of Sample: 1.989 inches  
 Area of Sample (Ao): 3.107 in<sup>2</sup>  
 Height of Sample (Lo): 3.970 inches  
 Water Content: 79.3 %  
 Dry Density: 50.9 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.059	0.015	0.985	3.1539	54.7	17
0.067	0.017	0.983	3.1601	62.8	20
0.077	0.019	0.981	3.1684	66.8	21
0.087	0.022	0.978	3.1762	68.9	22
0.096	0.024	0.976	3.1842	69.6	22
0.107	0.027	0.973	3.1926	69.1	22
0.116	0.029	0.971	3.2007	66.0	21
0.126	0.032	0.968	3.2089	61.6	19
0.136	0.034	0.966	3.2175	57.1	18
0.147	0.037	0.963	3.2266	52.0	16
0.157	0.039	0.961	3.2346	46.3	14





L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results Soil Mix 2

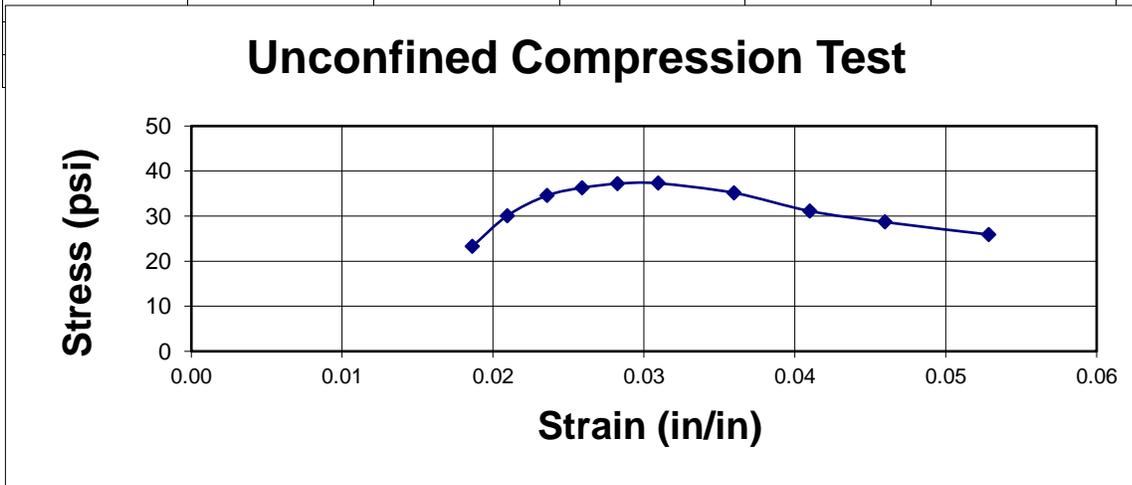
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0203      Tested by: TB/KC  
**Sample ID:** Mix 5 Cylinder 3      Test Date: 3/16/23  
 Soil Description: Soil Mix 2  
 Diameter of Sample: 1.997 inches  
 Area of Sample (Ao): 3.132 in<sup>2</sup>  
 Height of Sample (Lo): 3.930 inches  
 Water Content: 73.6 %  
 Dry Density: 54.6 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF $1 - \epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.063	0.016	0.984	3.1827	54.4	17
0.073	0.019	0.981	3.1914	74.3	23
0.082	0.021	0.979	3.1990	96.3	30
0.093	0.024	0.976	3.2077	111.0	35
0.102	0.026	0.974	3.2153	116.7	36
0.111	0.028	0.972	3.2230	119.9	37
0.122	0.031	0.969	3.2320	120.6	37
0.141	0.036	0.964	3.2489	114.3	35
0.161	0.041	0.959	3.2659	101.7	31
0.181	0.046	0.954	3.2829	94.3	29
0.208	0.053	0.947	3.3068	85.7	26



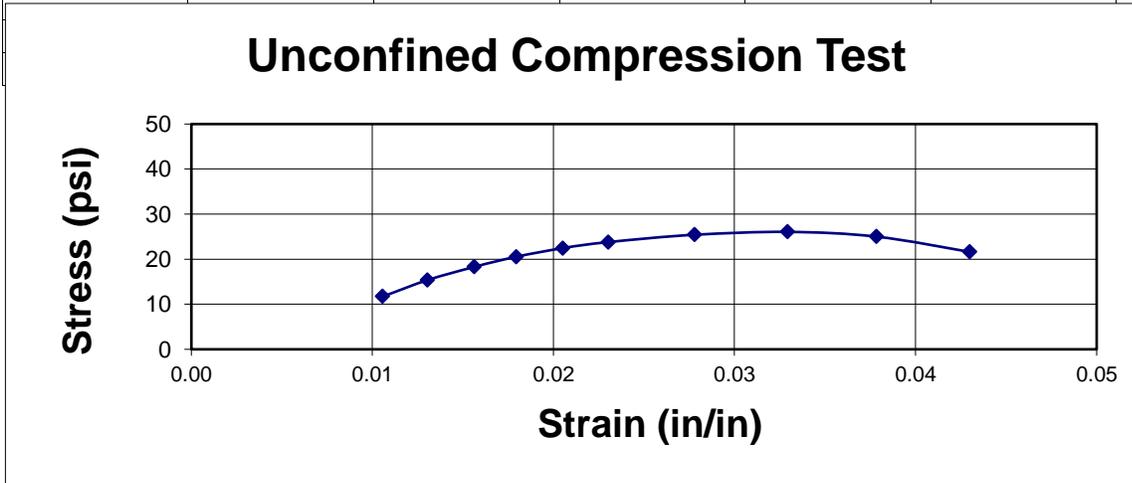
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0204      Tested by: TB/KC  
**Sample ID:** Mix 6 Cylinder 3      Test Date: 3/16/23  
 Soil Description: Soil Mix 2  
 Diameter of Sample: 1.996 inches  
 Area of Sample (Ao): 3.129 in<sup>2</sup>  
 Height of Sample (Lo): 3.954 inches  
 Water Content: 77.7 %  
 Dry Density: 52.5 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.033	0.008	0.992	3.1553	25.2	8
0.042	0.011	0.989	3.1624	37.2	12
0.052	0.013	0.987	3.1704	48.8	15
0.062	0.016	0.984	3.1787	58.3	18
0.071	0.018	0.982	3.1862	65.5	21
0.081	0.021	0.979	3.1945	71.8	22
0.091	0.023	0.977	3.2028	76.2	24
0.110	0.028	0.972	3.2185	81.9	25
0.130	0.033	0.967	3.2355	84.4	26
0.150	0.038	0.962	3.2520	81.4	25
0.170	0.043	0.957	3.2696	70.8	22



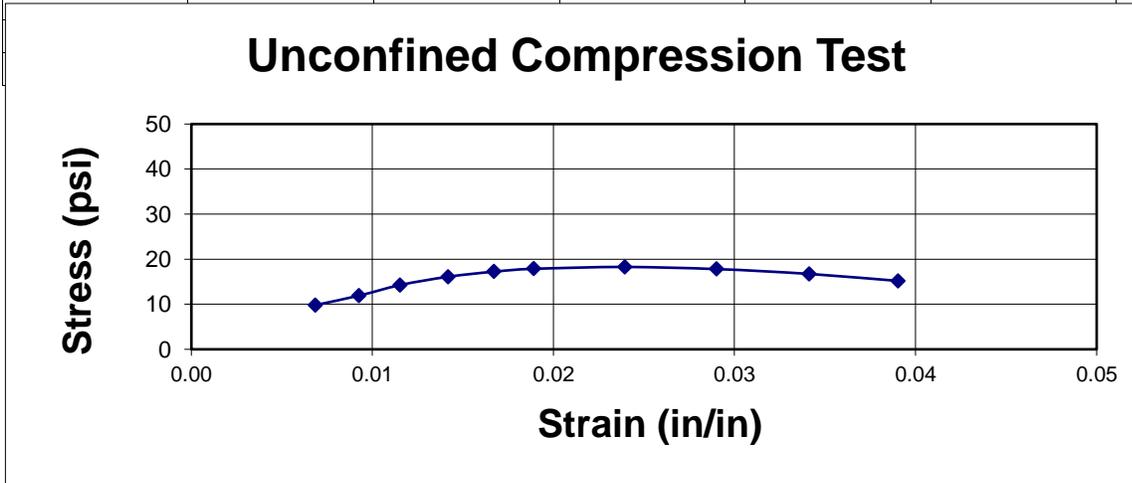
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0205      Tested by: TB/KC  
**Sample ID:** Mix 7 Cylinder 3      Test Date: 3/16/23  
 Soil Description: Soil Mix 2  
 Diameter of Sample: 1.974 inches  
 Area of Sample (Ao): 3.060 in<sup>2</sup>  
 Height of Sample (Lo): 3.971 inches  
 Water Content: 95.4 %  
 Dry Density: 46.1 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF $1 - \epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.017	0.004	0.996	3.0730	21.1	7
0.027	0.007	0.993	3.0811	30.3	10
0.037	0.009	0.991	3.0886	36.9	12
0.046	0.012	0.988	3.0957	44.2	14
0.056	0.014	0.986	3.1040	50.0	16
0.066	0.017	0.983	3.1120	53.7	17
0.075	0.019	0.981	3.1190	55.8	18
0.095	0.024	0.976	3.1351	57.3	18
0.115	0.029	0.971	3.1514	56.2	18
0.136	0.034	0.966	3.1681	53.0	17
0.155	0.039	0.961	3.1843	48.4	15



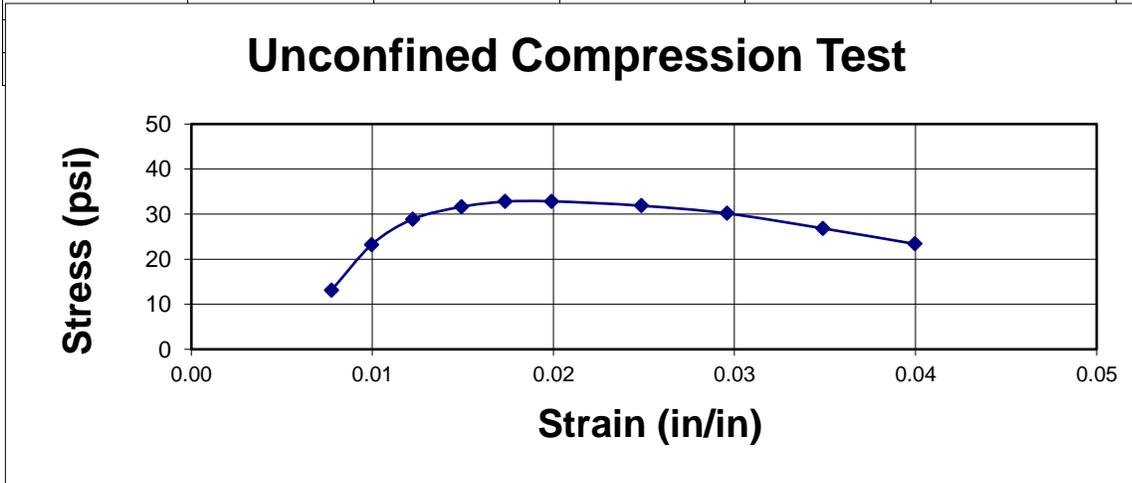
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0206      Tested by: TB/KC  
**Sample ID:** Mix 8 Cylinder 3      Test Date: 3/16/23  
 Soil Description: Soil Mix 2  
 Diameter of Sample: 1.995 inches  
 Area of Sample (Ao): 3.125 in<sup>2</sup>  
 Height of Sample (Lo): 3.965 inches  
 Water Content: 94.5 %  
 Dry Density: 45.6 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.021	0.005	0.995	3.1414	15.9	5
0.031	0.008	0.992	3.1494	41.4	13
0.040	0.010	0.990	3.1564	73.3	23
0.049	0.012	0.988	3.1637	91.4	29
0.059	0.015	0.985	3.1724	100.4	32
0.069	0.017	0.983	3.1801	104.3	33
0.079	0.020	0.980	3.1884	104.7	33
0.099	0.025	0.975	3.2047	102.2	32
0.117	0.030	0.970	3.2203	97.2	30
0.138	0.035	0.965	3.2379	86.9	27
0.159	0.040	0.960	3.2551	76.2	23



L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results Soil Mix 2

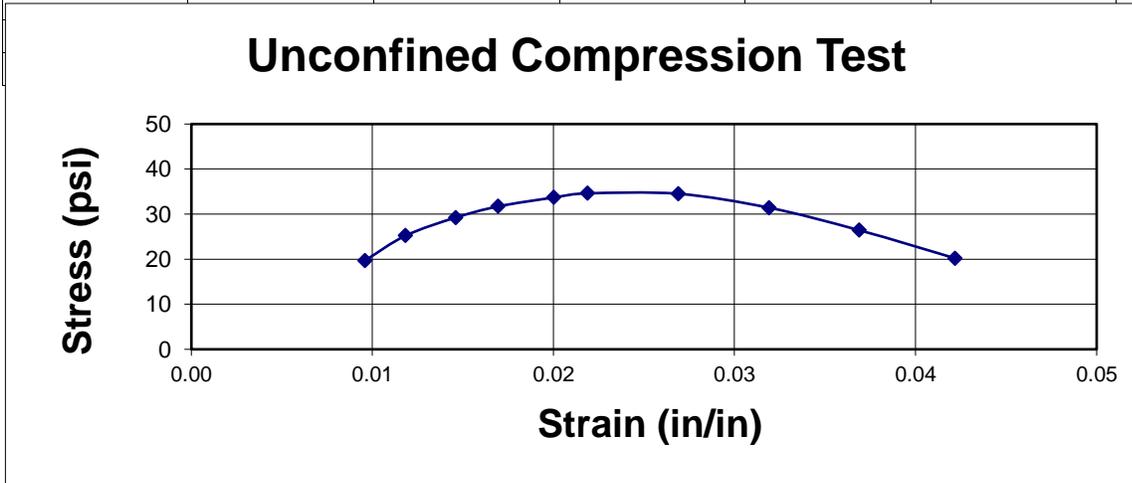
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0207      Tested by: TB/KC  
**Sample ID:** Mix 9 Cylinder 3      Test Date: 3/16/23  
 Soil Description: Soil Mix 2  
 Diameter of Sample: 1.991 inches  
 Area of Sample (Ao): 3.113 in<sup>2</sup>  
 Height of Sample (Lo): 3.971 inches  
 Water Content: 85.1 %  
 Dry Density: 49.2 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.029	0.007	0.993	3.1357	41.9	13
0.038	0.010	0.990	3.1432	61.9	20
0.047	0.012	0.988	3.1503	79.5	25
0.058	0.015	0.985	3.1591	92.4	29
0.067	0.017	0.983	3.1667	100.5	32
0.080	0.020	0.980	3.1766	107.1	34
0.087	0.022	0.978	3.1826	110.3	35
0.107	0.027	0.973	3.1990	110.5	35
0.127	0.032	0.968	3.2156	101.1	31
0.147	0.037	0.963	3.2322	85.5	26
0.168	0.042	0.958	3.2501	65.7	20



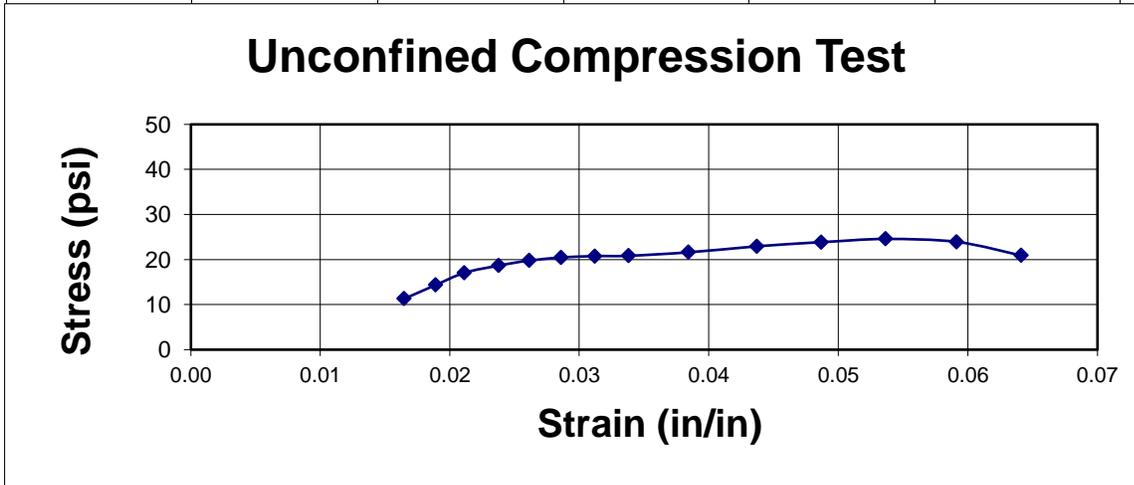
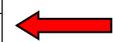
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0208      Tested by: TB/KC  
**Sample ID:** Mix 10 Cylinder 4      Test Date: 3/16/23  
 Soil Description: Soil Mix 2  
 Diameter of Sample: 2.000 inches  
 Area of Sample (Ao): 3.142 in<sup>2</sup>  
 Height of Sample (Lo): 3.932 inches  
 Water Content: 85.5%  
 Dry Density: 48.8 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.054	0.014	0.986	3.1858	29.7	9
0.065	0.016	0.984	3.1946	36.2	11
0.074	0.019	0.981	3.2025	46.0	14
0.083	0.021	0.979	3.2098	54.8	17
0.094	0.024	0.976	3.2185	60.1	19
0.103	0.026	0.974	3.2263	63.9	20
0.112	0.029	0.971	3.2345	66.2	20
0.123	0.031	0.969	3.2432	67.3	21
0.133	0.034	0.966	3.2519	67.9	21
0.151	0.038	0.962	3.2676	70.7	22
0.172	0.044	0.956	3.2856	75.4	23
0.191	0.049	0.951	3.3028	78.8	24
0.211	0.054	0.946	3.3201	81.7	25
0.233	0.059	0.941	3.3395	79.9	24
0.252	0.064	0.936	3.3572	70.3	21



**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number: 23-0209** Tested by: TB/KC

**Sample ID: Mix 11 Cylinder 3** Test Date: 3/16/23

Soil Description: Soil Mix 2

Diameter of Sample: 1.996 inches

Area of Sample (A<sub>o</sub>): 3.129 in<sup>2</sup>

Height of Sample (L<sub>o</sub>): 3.933 inches

Water Content: 83.5%

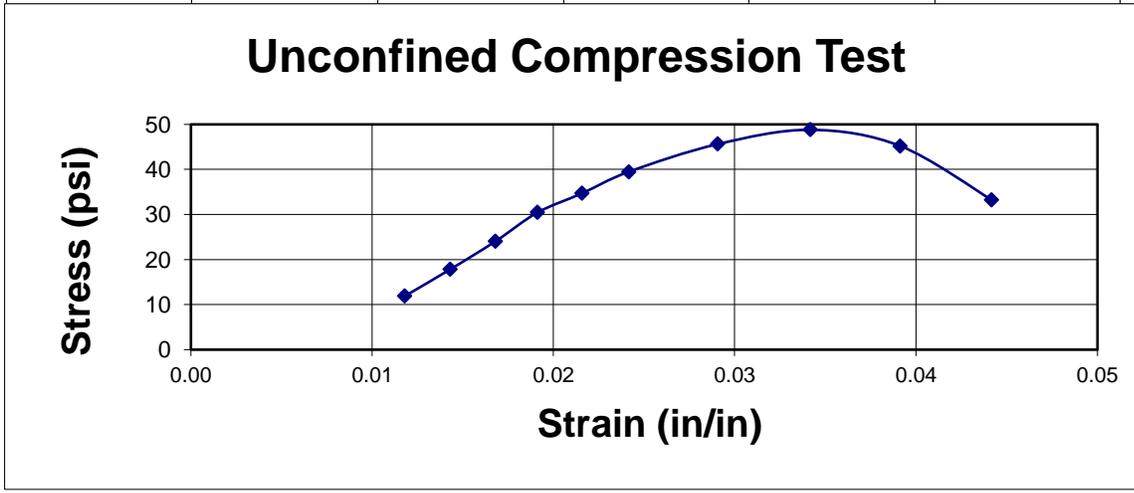
Dry Density: 49.9 lb/ft<sup>3</sup>

Height to Diameter Ratio: 2.0

Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_o$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.038	0.010	0.990	3.1594	20.9	7
0.046	0.012	0.988	3.1664	37.7	12
0.056	0.014	0.986	3.1744	56.7	18
0.066	0.017	0.983	3.1825	76.6	24
0.075	0.019	0.981	3.1900	97.2	30
0.085	0.022	0.978	3.1980	111.1	35
0.095	0.024	0.976	3.2065	126.6	39
0.114	0.029	0.971	3.2227	147.1	46
0.134	0.034	0.966	3.2397	158.2	49
0.154	0.039	0.961	3.2564	147.2	45
0.174	0.044	0.956	3.2736	108.9	33





Rory Kilkenny, PE  
Aspect Consulting, LLC  
710 2<sup>nd</sup> Ave, Suite 550  
Seattle, WA 98104

March 31, 2023

Project Number L23116

**PROJECT: Pre Remedial Design Investigation**

**SUBJECT: Results of Laboratory Testing  
Report #5**

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of specific laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of six samples delivered to our laboratory February 2023. Laboratory tests were performed in general accordance with methods listed in the attached *Laboratory Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,  
Budinger & Associates, Inc.

Terri Ballard  
Laboratory Manager

TJB/lat/Addressee –  
Rory Kilkenny – rkilkenny@aspectconsulting.com

Attachments:  
Unconfined Compression Test Results Soil Mix 1 Report – 3 pages  
Unconfined Compression Test Results Soil Mix 2 Report – 3 pages



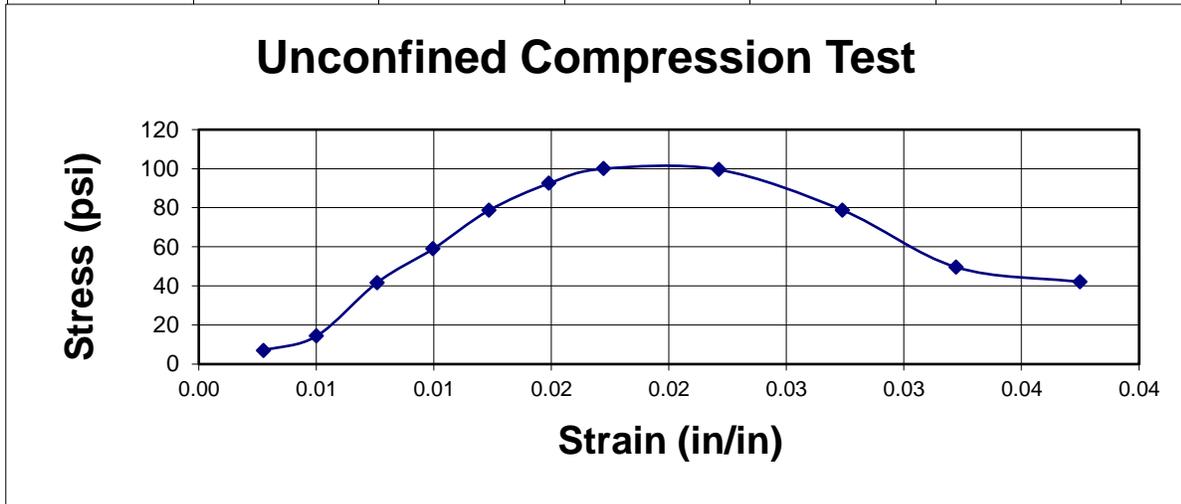
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0138      Tested by: TB/KC  
**Sample ID:** Mix 8 Cylinder 8      Test Date: 3/29/23  
 Soil Description: Soil Mix 1      56 day break  
 Diameter of Sample: 2.036 inches  
 Area of Sample (Ao): 3.256 in<sup>2</sup>  
 Height of Sample (Lo): 4.036 inches  
 Water Content: 64.4%  
 Dry Density: 58.3 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.011	0.003	0.997	3.2650	22.5	7
0.020	0.005	0.995	3.2724	47.0	14
0.031	0.008	0.992	3.2809	136.7	42
0.040	0.010	0.990	3.2888	194.1	59
0.050	0.012	0.988	3.2967	259.4	79
0.060	0.015	0.985	3.3052	305.9	93
0.070	0.017	0.983	3.3131	331.5	100
0.089	0.022	0.978	3.3297	331.5	100
0.111	0.027	0.973	3.3477	263.8	79
0.130	0.032	0.968	3.3644	167.0	50
0.151	0.037	0.963	3.3828	142.3	42





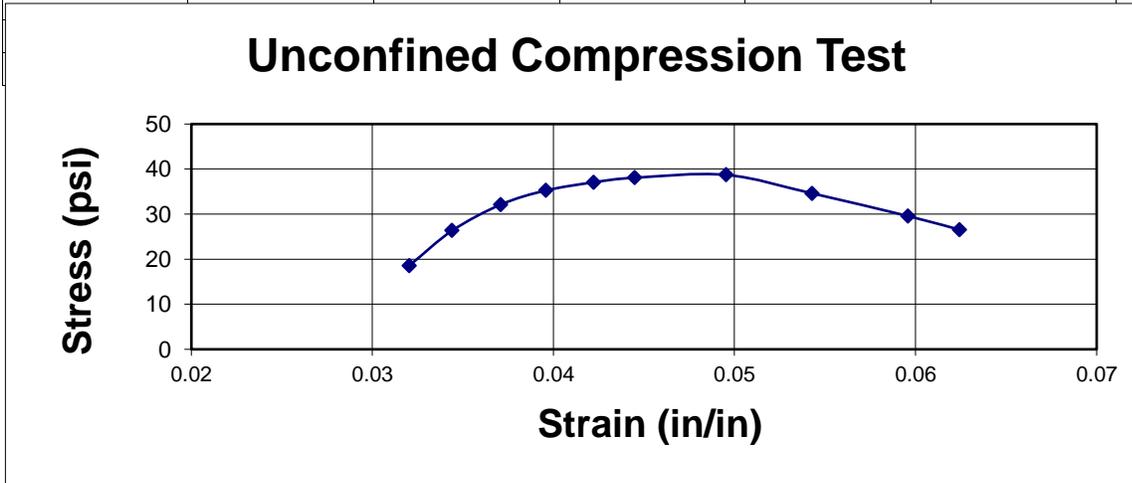
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0204      Tested by: TB/KC  
**Sample ID:** Mix 6 Cylinder 5      Test Date: 3/30/23  
 Soil Description: Soil Mix 2      28 day break  
 Diameter of Sample: 2.001 inches  
 Area of Sample (Ao): 3.145 in<sup>2</sup>  
 Height of Sample (Lo): 3.936 inches  
 Water Content: 76.0 %  
 Dry Density: 52.8 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.117	0.030	0.970	3.2413	35.9	11
0.126	0.032	0.968	3.2491	60.3	19
0.135	0.034	0.966	3.2570	85.9	26
0.146	0.037	0.963	3.2662	105.0	32
0.156	0.040	0.960	3.2746	115.5	35
0.166	0.042	0.958	3.2837	121.8	37
0.175	0.044	0.956	3.2914	125.4	38
0.195	0.050	0.950	3.3089	128.2	39
0.214	0.054	0.946	3.3256	115.1	35
0.235	0.060	0.940	3.3442	99.0	30
0.246	0.062	0.938	3.3544	89.1	27



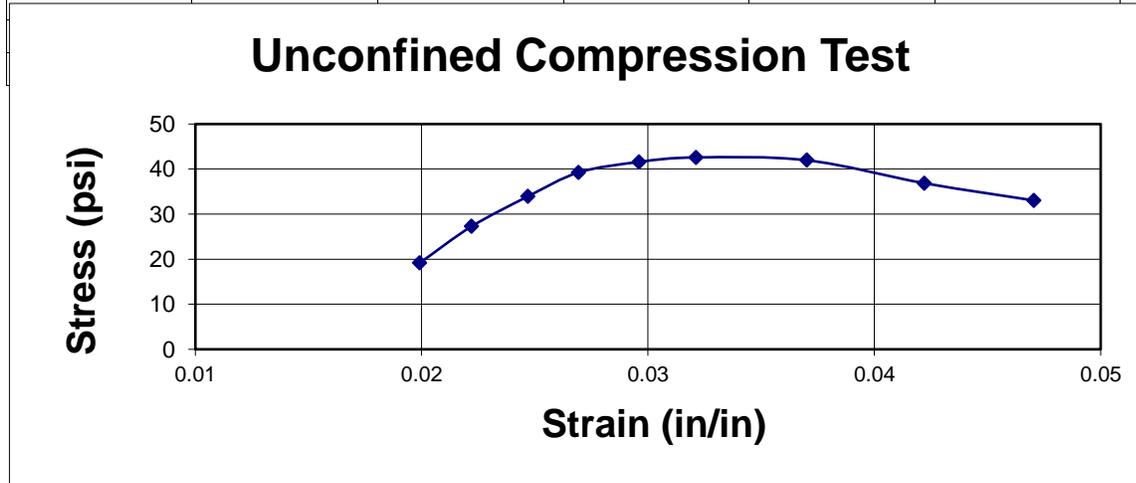
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0206      Tested by: TB/KC  
**Sample ID:** Mix 8 Cylinder 4      Test Date: 3/30/23  
 Soil Description: Soil Mix 2      28 day break  
 Diameter of Sample: 1.995 inches  
 Area of Sample (Ao): 3.125 in<sup>2</sup>  
 Height of Sample (Lo): 3.968 inches  
 Water Content: 94.1%  
 Dry Density: 45.3 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.069	0.017	0.983	3.1799	35.4	11
0.079	0.020	0.980	3.1885	61.1	19
0.088	0.022	0.978	3.1960	87.2	27
0.098	0.025	0.975	3.2041	108.8	34
0.107	0.027	0.973	3.2115	126.1	39
0.118	0.030	0.970	3.2204	134.0	42
0.128	0.032	0.968	3.2287	137.5	43
0.147	0.037	0.963	3.2451	136.2	42
0.168	0.042	0.958	3.2627	120.3	37
0.187	0.047	0.953	3.2793	108.4	33



L23116 Pre Remedial Design Investigation - Unconfined Compression Test Results Soil Mix 2

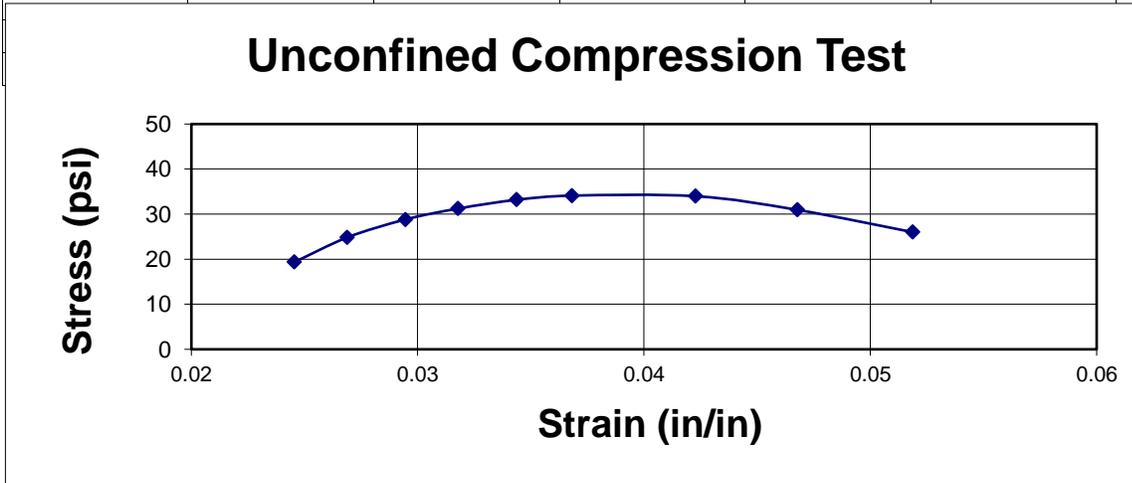
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0207      Tested by: TB/KC  
**Sample ID:** Mix 9 Cylinder 4      Test Date: 3/30/23  
 Soil Description: Soil Mix 2      28 day break  
 Diameter of Sample: 1.993 inches  
 Area of Sample (Ao): 3.112 in<sup>2</sup>  
 Height of Sample (Lo): 3.962 inches  
 Water Content: 82.5 %  
 Dry Density: 49.9 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.883	0.222	0.778	4.0031	41.9	10
0.098	0.025	0.975	3.1914	61.9	19
0.107	0.027	0.973	3.1990	79.5	25
0.117	0.029	0.971	3.2075	92.4	29
0.126	0.032	0.968	3.2152	100.5	31
0.137	0.034	0.966	3.2238	107.1	33
0.146	0.037	0.963	3.2320	110.3	34
0.168	0.042	0.958	3.2504	110.5	34
0.186	0.047	0.953	3.2658	101.1	31
0.206	0.052	0.948	3.2833	85.5	26





Rory Kilkenny, PE  
Aspect Consulting, LLC  
710 2<sup>nd</sup> Ave, Suite 550  
Seattle, WA 98104

May 1, 2023

Project Number L23116

**PROJECT: Pre Remedial Design Investigation**

**SUBJECT: Results of Laboratory Testing  
Report #6**

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of specific laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of three samples delivered to our laboratory February 2023. Laboratory tests were performed in general accordance with methods listed in the attached *Laboratory Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,  
Budinger & Associates, Inc.

Terri Ballard  
Laboratory Manager

TJB/lat/Addressee –  
Rory Kilkenny – rkilkenny@aspectconsulting.com

Attachments:  
Unconfined Compression Test Results Soil Mix 2 Report – 3 pages

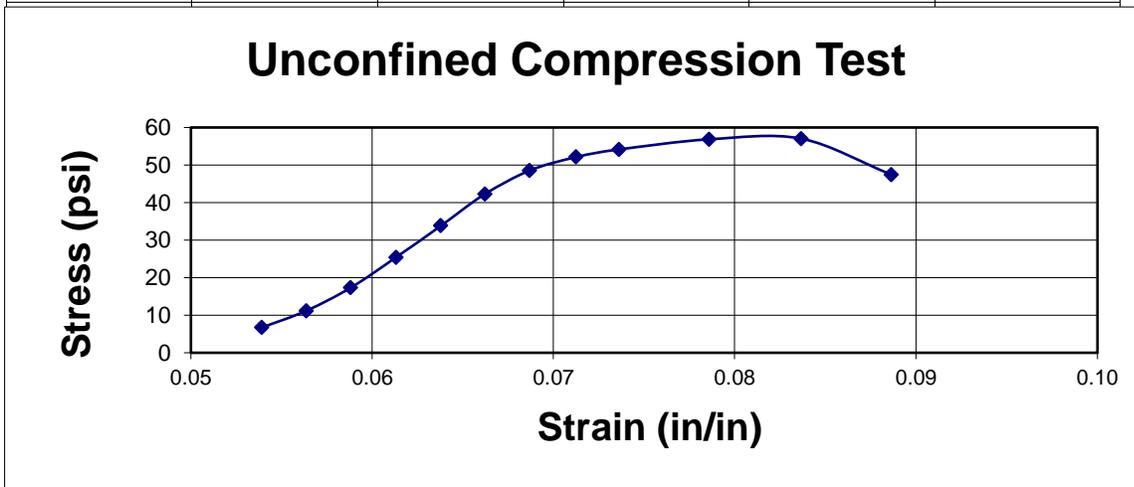
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0206      Tested by: TB/KC  
**Sample ID:** Mix 8 Cylinder 2      Test Date: 4/27/23  
 Soil Description: Soil Mix 2      56 day break  
 Diameter of Sample: 1.985 inches  
 Area of Sample (Ao): 3.095 in<sup>2</sup>  
 Height of Sample (Lo): 3.979 inches  
 Water Content: 89.6%  
 Dry Density: 47.6 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF $1 - \epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.215	0.054	0.946	3.2714	22.1	7
0.224	0.056	0.944	3.2799	36.7	11
0.234	0.059	0.941	3.2884	57.0	17
0.244	0.061	0.939	3.2972	83.9	25
0.254	0.064	0.936	3.3059	111.9	34
0.264	0.066	0.934	3.3145	140.1	42
0.273	0.069	0.931	3.3233	161.4	49
0.284	0.071	0.929	3.3324	173.8	52
0.293	0.074	0.926	3.3409	180.9	54
0.313	0.079	0.921	3.3590	191.0	57
0.333	0.084	0.916	3.3776	192.6	57
0.353	0.089	0.911	3.3960	161.1	47



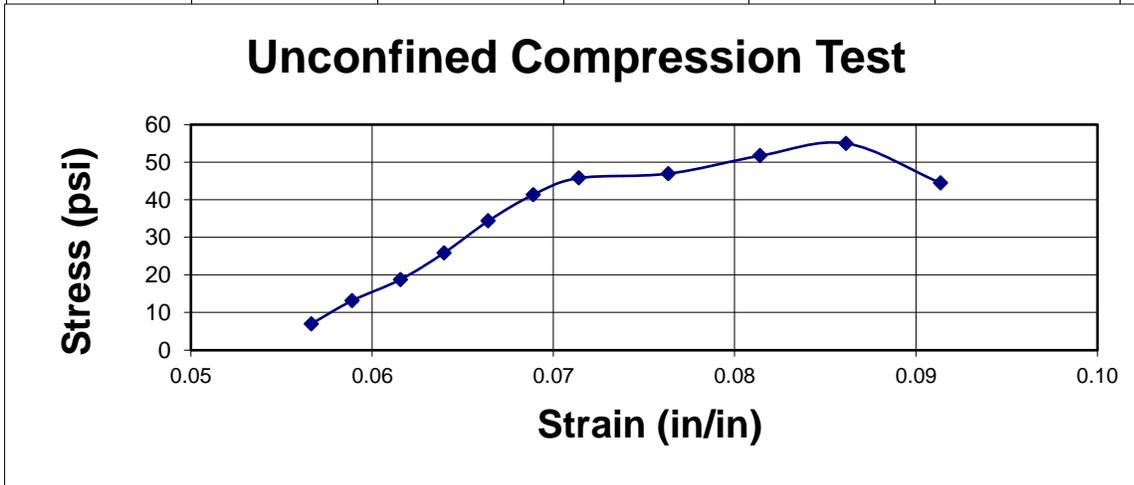
**ASTM D2166**

**Unconfined Compression Test Results**

**Laboratory Number:** 23-0206      Tested by: TB/KC  
**Sample ID:** Mix 8 Cylinder 7      Test Date: 4/27/23  
 Soil Description: Soil Mix 2      56 day break  
 Diameter of Sample: 1.998 inches  
 Area of Sample (Ao): 3.135 in<sup>2</sup>  
 Height of Sample (Lo): 3.947 inches  
 Water Content: 93.2%  
 Dry Density: 45.9 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.224	0.057	0.943	3.3233	23.3	7
0.233	0.059	0.941	3.3312	44.0	13
0.243	0.062	0.938	3.3407	62.8	19
0.253	0.064	0.936	3.3493	86.7	26
0.262	0.066	0.934	3.3580	115.5	34
0.272	0.069	0.931	3.3669	139.4	41
0.282	0.071	0.929	3.3760	154.7	46
0.301	0.076	0.924	3.3941	159.4	47
0.321	0.081	0.919	3.4128	176.7	52
0.340	0.086	0.914	3.4305	188.8	55
0.361	0.091	0.909	3.4502	153.5	44



**ASTM D2166**

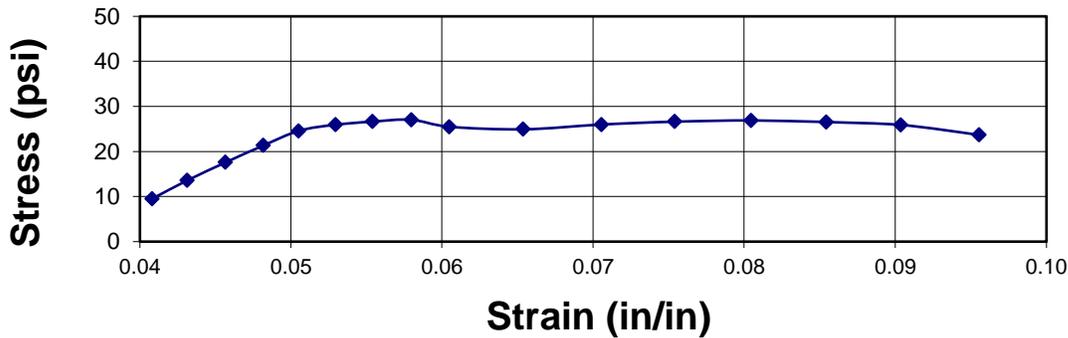
**Unconfined Compression Test Results**

**Laboratory Number:** 23-0206      Tested by: TB/KC  
**Sample ID:** Mix 8 Cylinder 8      Test Date: 4/27/23  
 Soil Description: Soil Mix 2      56 day break  
 Diameter of Sample: 1.998 inches  
 Area of Sample (Ao): 3.135 in<sup>2</sup>  
 Height of Sample (Lo): 3.983 inches  
 Water Content: 81.0%  
 Dry Density: 48.4 lb/ft<sup>3</sup>  
 Height to Diameter Ratio: 2.0  
 Average Rate of Strain: 30%/hour



Deformation Dial Reading (in)	Unit Strain $\epsilon = \Delta L/L_0$	Area CF 1 - $\epsilon$	Corrected Area (in <sup>2</sup> )	Load on Sample (lbs)	Sample Stress (psi)
0.163	0.041	0.959	3.2684	18.3	6
0.172	0.043	0.957	3.2763	31.2	10
0.182	0.046	0.954	3.2850	44.7	14
0.192	0.048	0.952	3.2937	58.0	18
0.201	0.051	0.949	3.3018	70.6	21
0.211	0.053	0.947	3.3103	81.4	25
0.221	0.055	0.945	3.3189	86.2	26
0.231	0.058	0.942	3.3279	88.7	27
0.241	0.060	0.940	3.3368	90.3	27
0.260	0.065	0.935	3.3543	85.5	25
0.281	0.071	0.929	3.3730	84.2	25
0.300	0.075	0.925	3.3906	88.1	26
0.321	0.080	0.920	3.4093	90.9	27
0.340	0.085	0.915	3.4279	92.2	27
0.360	0.090	0.910	3.4464	91.5	27
0.381	0.096	0.904	3.4662	89.8	26
0.400	0.100	0.900	3.4851	82.6	24

**Unconfined Compression Test**



Rory Kilkenny, PE  
Aspect Consulting, LLC  
710 2<sup>nd</sup> Ave, Suite 550  
Seattle, WA 98104

May 10, 2023

Project Number L23116

**PROJECT: Pre Remedial Design Investigation**

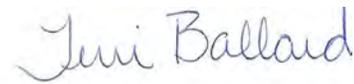
**SUBJECT: Results of Laboratory Testing  
Report #7**

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of specific laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of one sample delivered to our laboratory February 2023. Laboratory tests were performed in general accordance with methods listed in the attached *Laboratory Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,  
Budinger & Associates, Inc.



Terri Ballard  
Laboratory Manager

TJB/lat/Addressee –  
Rory Kilkenny – rkilkenny@aspectconsulting.com

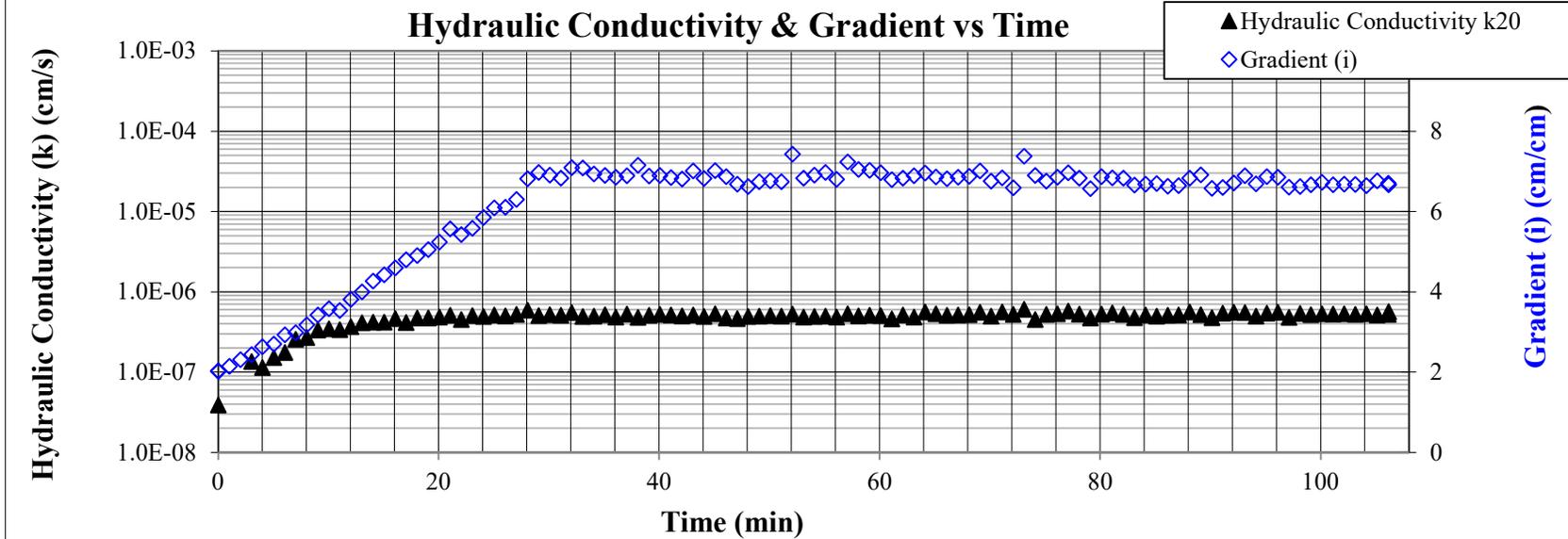
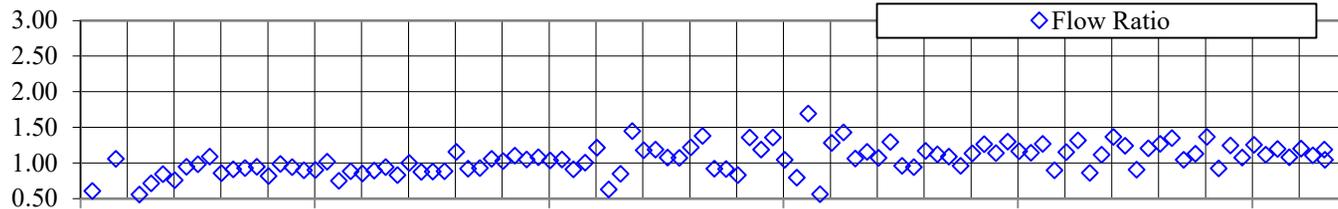
Attachments:  
Hydraulic Conductivity Using a Flexible Wall Permeameter Report – 1 page

**Hydraulic Conductivity using a Flexible Wall Permeameter  
ASTM D5084**

Project Name: Pre Remedial Design Investigator  
 Project No.: L23116  
 Sample ID: Soil 2, Mix 8  
 Tested by: WH  
 Sampled By: \_\_\_\_\_  
 Sample No.: Cylinder 6

Sample Description: Soil 2, Mix 8, Cylinder 6  
 Initial/Final Dry Density (pcf): 45.7 / 45.6  
 Initial/Final Moisture Content: 89.3% / 93.1%  
 Date Tested: 4/27/2023  
 Initial/Final Saturation: 32% / 96%  
 Consolidation Stress (psi): 5  
 Undisturbed: X                      Remolded: \_\_\_\_\_  
 Initial Mass: 252.4 g                      Assumed SG: 2.7  
 Final Mass: 256.5 g                      Liquid type: Water  
 Temperature (deg. C): 21.2

Height: 3.46 in                      Height: 8.78 cm  
 Diameter: 2.02 in                      Diameter: 5.14 cm  
 Volume: 11.11 in<sup>3</sup>                      Volume: 71.65 cm<sup>3</sup>



**Hydraulic Conductivity  $k_{20}$  =**

4.66E-07                      cm/sec

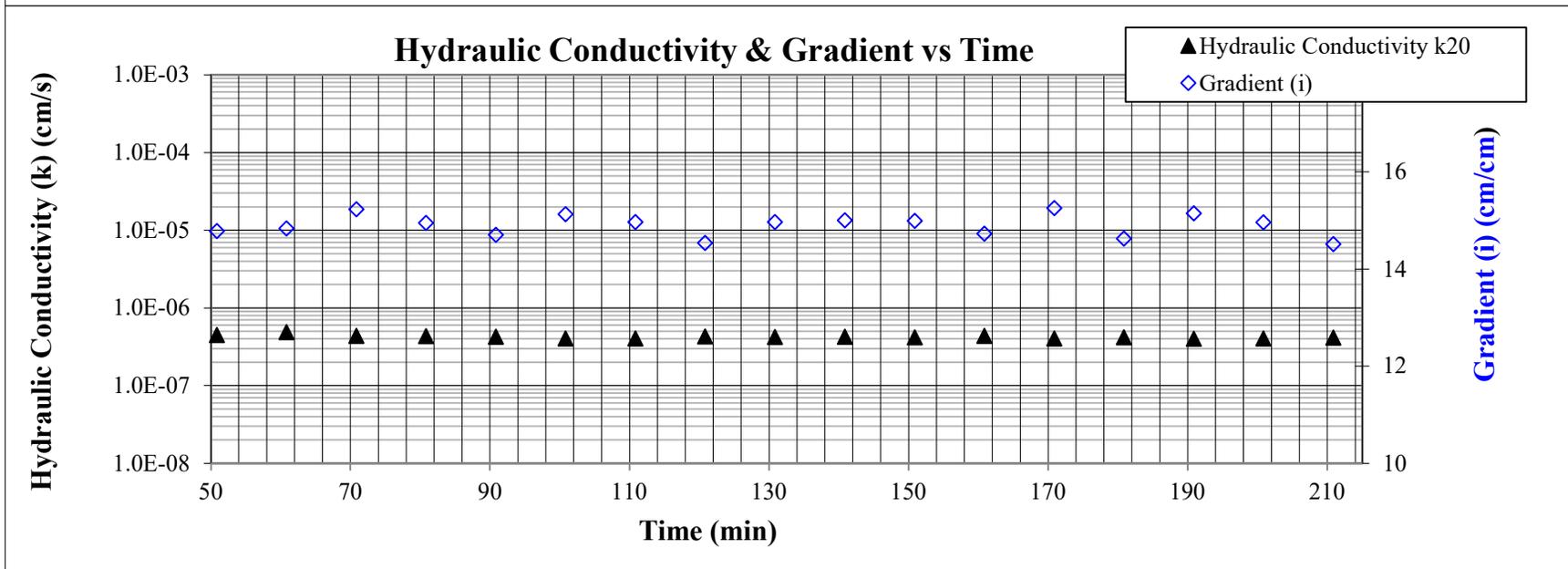
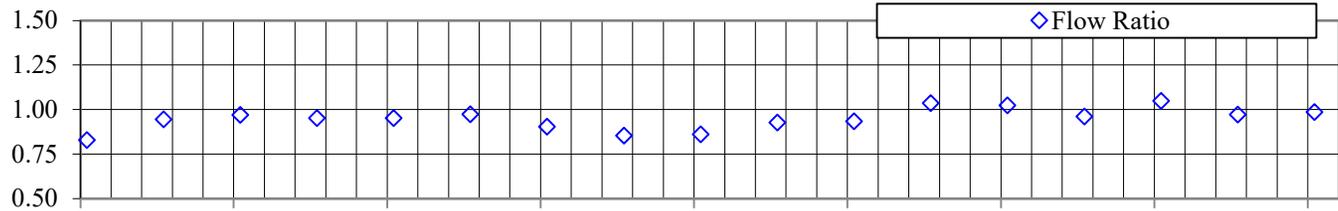
**Hydraulic Conductivity using a Flexible Wall Permeameter  
ASTM D5084**

Project Name: Pre Remedial Design Investigator  
 Project No.: L23116  
 Sample ID: Soil 1 Mix 8  
 Tested by: WH  
 Sampled By: Client  
 Sample No.: Soil 1 Mix 8

Sample Description: Silty Sand  
 Initial/Final Dry Density (pcf): 62.6 /  
 Initial/Final Moisture Content: 48.4% /  
 Date Tested: 4/6/2023  
 Initial/Final Saturation: 23% / 97%  
 Consolidation Stress (psi): 5

Height: <u>2.60 in</u>	Height: <u>6.59 cm</u>
Diameter: <u>2.06 in</u>	Diameter: <u>5.23 cm</u>
Volume: <u>8.65 in<sup>3</sup></u>	Volume: <u>55.84 cm<sup>3</sup></u>

Undisturbed:	Remolded: <u>X</u>
Initial Mass: <u>210.9 g</u>	Assumed SG: <u>2.7</u>
Final Mass: <u>        g</u>	Liquid type: <u>Water</u>
	Temperature (deg. C): <u>21.2</u>



**Hydraulic Conductivity  $k_{20}$  =**

3.22E-07 cm/sec

Hydraulic Conductivity using a Flexible Wall Permeameter  
ASTM D5084

**SOILS**  
**LABORATORY SUMMARY**

LABORATORY NUMBER			22-1441	22-1442
SAMPLED BY			Client	Client
SAMPLE TYPE			Bulk	Bulk
DATE RECEIVED			12/12/22	12/12/22
CLIENT SAMPLE IDENTIFICATION			GPW Soil 1	GPW Soil 2
	<u>UNITS</u>	<u>TEST METHOD</u>		
<b>ATTERBERG LIMITS</b>		ASTM D4318		
Liquid Limit	%		42	52
Plastic Limit	%		32	39
Plasticity Index	%		10	13

Samples 22-1441 & 22-1442 were prepared:  
 Wet Preparation  
 Over #40 Sieve  
 Hand Rolled  
 Plastic Grooving Tool

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# ANALYTICAL REPORT

## PREPARED FOR

Attn: Brett Muckey  
Eurofins Environment Testing Northwest, LLC  
1100 NE Circle Blvd  
Suite 310  
Corvallis, Oregon 97330

Generated 5/10/2023 2:02:54 PM

## JOB DESCRIPTION

Aspect Mercury LEAF

## JOB NUMBER

400-237194-1

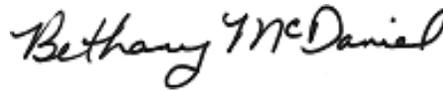
# Eurofins Pensacola

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

## Authorization



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5/10/2023 2:02:54 PM

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Authorized for release by  
Bethany McDaniel, Senior Project Manager  
[Bethany.McDaniel@et.eurofinsus.com](mailto:Bethany.McDaniel@et.eurofinsus.com)  
(713)358-2005



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# Case Narrative

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

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**Job ID: 400-237194-1**

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**Laboratory: Eurofins Pensacola**

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**Narrative**

**Job Narrative  
400-237194-1**

**Receipt**

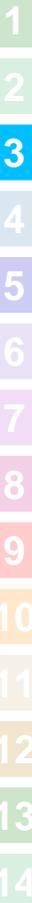
The samples were received on 5/5/2023 9:09 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 3.7°C

**Metals**

Method 1631E: The following sample was labeled as "Field Blank". The results for this sample do not match what is consistent with a field blank. The sample was analyzed twice with both results having a hit above the reporting limit.

Method 1631E: The following samples were diluted to bring the concentration of target analytes within the calibration range: R4505-01 T1 (400-237194-3), R4505-01 T2 (400-237194-7), R4505-02 T2 (400-237194-8), R4505-01-T3 (400-237194-11) and R4505-02-T3 (400-237194-12). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.



# Detection Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

## Client Sample ID: FIELD BLANK

Lab Sample ID: 400-237194-1

No Detections.

## Client Sample ID: 1315 BLANK 050223-T1

Lab Sample ID: 400-237194-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	1.1		0.50	0.20	ng/L	1		1631E	Total/NA

## Client Sample ID: R4505-01 T1

Lab Sample ID: 400-237194-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	13000		200	80	ng/L	400		1631E	Total/NA

## Client Sample ID: R4505-02 T1

Lab Sample ID: 400-237194-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	28		0.50	0.20	ng/L	1		1631E	Total/NA

## Client Sample ID: FIELD BLANK

Lab Sample ID: 400-237194-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	0.61		0.50	0.20	ng/L	1		1631E	Total/NA

## Client Sample ID: 1315 BLANK 050223-T2

Lab Sample ID: 400-237194-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	3.9		0.50	0.20	ng/L	1		1631E	Total/NA

## Client Sample ID: R4505-01 T2

Lab Sample ID: 400-237194-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	6400		200	80	ng/L	400		1631E	Total/NA

## Client Sample ID: R4505-02 T2

Lab Sample ID: 400-237194-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	48		10	4.0	ng/L	20		1631E	Total/NA

## Client Sample ID: FIELD BLANK

Lab Sample ID: 400-237194-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	0.33	J	0.50	0.20	ng/L	1		1631E	Total/NA

## Client Sample ID: 1315 BLANK 050223-T3

Lab Sample ID: 400-237194-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	2.4		0.50	0.20	ng/L	1		1631E	Total/NA

## Client Sample ID: R4505-01-T3

Lab Sample ID: 400-237194-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	1200		100	40	ng/L	200		1631E	Total/NA

## Client Sample ID: R4505-02-T3

Lab Sample ID: 400-237194-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	27		10	4.0	ng/L	20		1631E	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Pensacola

# Sample Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
400-237194-1	FIELD BLANK	Water	05/02/23 13:17	05/05/23 09:09
400-237194-2	1315 BLANK 050223-T1	Water	05/02/23 13:19	05/05/23 09:09
400-237194-3	R4505-01 T1	Water	05/02/23 13:20	05/05/23 09:09
400-237194-4	R4505-02 T1	Water	05/02/23 13:24	05/05/23 09:09
400-237194-5	FIELD BLANK	Water	05/03/23 11:25	05/05/23 09:09
400-237194-6	1315 BLANK 050223-T2	Water	05/03/23 11:12	05/05/23 09:09
400-237194-7	R4505-01 T2	Water	05/03/23 11:15	05/05/23 09:09
400-237194-8	R4505-02 T2	Water	05/03/23 11:18	05/05/23 09:09
400-237194-9	FIELD BLANK	Water	05/04/23 11:07	05/05/23 09:09
400-237194-10	1315 BLANK 050223-T3	Water	05/04/23 11:09	05/05/23 09:09
400-237194-11	R4505-01-T3	Water	05/04/23 11:11	05/05/23 09:09
400-237194-12	R4505-02-T3	Water	05/04/23 11:16	05/05/23 09:09



# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-237194-1**

Date Collected: 05/02/23 13:17

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		05/05/23 15:00	05/09/23 11:14	1

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# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: 1315 BLANK 050223-T1**

**Lab Sample ID: 400-237194-2**

Date Collected: 05/02/23 13:19

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	1.1		0.50	0.20	ng/L		05/05/23 15:00	05/09/23 11:22	1

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# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: R4505-01 T1**

**Lab Sample ID: 400-237194-3**

Date Collected: 05/02/23 13:20

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	13000		200	80	ng/L		05/05/23 15:00	05/09/23 14:32	400

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: R4505-02 T1**

**Lab Sample ID: 400-237194-4**

Date Collected: 05/02/23 13:24

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	28		0.50	0.20	ng/L		05/05/23 15:00	05/09/23 11:37	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-237194-5**

Date Collected: 05/03/23 11:25

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.61		0.50	0.20	ng/L		05/05/23 15:00	05/09/23 12:50	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: 1315 BLANK 050223-T2**

**Lab Sample ID: 400-237194-6**

Date Collected: 05/03/23 11:12

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	3.9		0.50	0.20	ng/L		05/05/23 15:00	05/09/23 11:52	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: R4505-01 T2**

**Lab Sample ID: 400-237194-7**

Date Collected: 05/03/23 11:15

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	6400		200	80	ng/L		05/05/23 15:00	05/09/23 15:46	400

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: R4505-02 T2**

**Lab Sample ID: 400-237194-8**

Date Collected: 05/03/23 11:18

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	48		10	4.0	ng/L		05/05/23 15:00	05/09/23 16:50	20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-237194-9**

Date Collected: 05/04/23 11:07

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.33	J	0.50	0.20	ng/L		05/05/23 15:00	05/09/23 16:16	1

- 1
- 2
- 3
- 4
- 5
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- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: 1315 BLANK 050223-T3**

**Lab Sample ID: 400-237194-10**

Date Collected: 05/04/23 11:09

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	2.4		0.50	0.20	ng/L		05/05/23 15:00	05/09/23 16:26	1

- 1
- 2
- 3
- 4
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- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: R4505-01-T3**

**Lab Sample ID: 400-237194-11**

Date Collected: 05/04/23 11:11

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	1200		100	40	ng/L		05/05/23 15:00	05/09/23 17:03	200

- 1
- 2
- 3
- 4
- 5
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- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: R4505-02-T3**

**Lab Sample ID: 400-237194-12**

Date Collected: 05/04/23 11:16

Matrix: Water

Date Received: 05/05/23 09:09

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	27		10	4.0	ng/L		05/05/23 15:00	05/09/23 16:43	20

- 1
- 2
- 3
- 4
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- 12
- 13
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# Definitions/Glossary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# QC Association Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

## Metals

### Prep Batch: 623956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-237194-1	FIELD BLANK	Total/NA	Water	1631E	
400-237194-2	1315 BLANK 050223-T1	Total/NA	Water	1631E	
400-237194-3 - DL	R4505-01 T1	Total/NA	Water	1631E	
400-237194-4	R4505-02 T1	Total/NA	Water	1631E	
400-237194-5	FIELD BLANK	Total/NA	Water	1631E	
400-237194-6	1315 BLANK 050223-T2	Total/NA	Water	1631E	
400-237194-7 - DL	R4505-01 T2	Total/NA	Water	1631E	
400-237194-8 - DL	R4505-02 T2	Total/NA	Water	1631E	
400-237194-9	FIELD BLANK	Total/NA	Water	1631E	
400-237194-10	1315 BLANK 050223-T3	Total/NA	Water	1631E	
400-237194-11 - DL	R4505-01-T3	Total/NA	Water	1631E	
400-237194-12 - DL	R4505-02-T3	Total/NA	Water	1631E	
MB 400-623956/3-A	Method Blank	Total/NA	Water	1631E	
LCS 400-623956/4-A	Lab Control Sample	Total/NA	Water	1631E	
LCSD 400-623956/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	

### Analysis Batch: 624185

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-237194-1	FIELD BLANK	Total/NA	Water	1631E	623956
400-237194-2	1315 BLANK 050223-T1	Total/NA	Water	1631E	623956
400-237194-3 - DL	R4505-01 T1	Total/NA	Water	1631E	623956
400-237194-4	R4505-02 T1	Total/NA	Water	1631E	623956
400-237194-5	FIELD BLANK	Total/NA	Water	1631E	623956
400-237194-6	1315 BLANK 050223-T2	Total/NA	Water	1631E	623956
400-237194-7 - DL	R4505-01 T2	Total/NA	Water	1631E	623956
400-237194-8 - DL	R4505-02 T2	Total/NA	Water	1631E	623956
400-237194-9	FIELD BLANK	Total/NA	Water	1631E	623956
400-237194-10	1315 BLANK 050223-T3	Total/NA	Water	1631E	623956
400-237194-11 - DL	R4505-01-T3	Total/NA	Water	1631E	623956
400-237194-12 - DL	R4505-02-T3	Total/NA	Water	1631E	623956
MB 400-623956/3-A	Method Blank	Total/NA	Water	1631E	623956
LCS 400-623956/4-A	Lab Control Sample	Total/NA	Water	1631E	623956
LCSD 400-623956/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	623956

# QC Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

## Method: 1631E - Mercury, Low Level (CVAFS)

**Lab Sample ID: MB 400-623956/3-A**  
**Matrix: Water**  
**Analysis Batch: 624185**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 623956**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		05/08/23 16:18	05/09/23 09:42	1

**Lab Sample ID: LCS 400-623956/4-A**  
**Matrix: Water**  
**Analysis Batch: 624185**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 623956**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	5.00	5.20		ng/L		104	79 - 121

**Lab Sample ID: LCSD 400-623956/5-A**  
**Matrix: Water**  
**Analysis Batch: 624185**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 623956**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	5.00	5.24		ng/L		105	79 - 121	1	20

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-237194-1**

Date Collected: 05/02/23 13:17

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			624185	05/09/23 11:14	VLC	EET PEN

**Client Sample ID: 1315 BLANK 050223-T1**

**Lab Sample ID: 400-237194-2**

Date Collected: 05/02/23 13:19

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			624185	05/09/23 11:22	VLC	EET PEN

**Client Sample ID: R4505-01 T1**

**Lab Sample ID: 400-237194-3**

Date Collected: 05/02/23 13:20

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	400			624185	05/09/23 14:32	VLC	EET PEN

**Client Sample ID: R4505-02 T1**

**Lab Sample ID: 400-237194-4**

Date Collected: 05/02/23 13:24

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			624185	05/09/23 11:37	VLC	EET PEN

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-237194-5**

Date Collected: 05/03/23 11:25

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			624185	05/09/23 12:50	VLC	EET PEN

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: 1315 BLANK 050223-T2**

**Lab Sample ID: 400-237194-6**

Date Collected: 05/03/23 11:12

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			624185	05/09/23 11:52	VLC	EET PEN

**Client Sample ID: R4505-01 T2**

**Lab Sample ID: 400-237194-7**

Date Collected: 05/03/23 11:15

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	400			624185	05/09/23 15:46	VLC	EET PEN

**Client Sample ID: R4505-02 T2**

**Lab Sample ID: 400-237194-8**

Date Collected: 05/03/23 11:18

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	20			624185	05/09/23 16:50	VLC	EET PEN

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-237194-9**

Date Collected: 05/04/23 11:07

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			624185	05/09/23 16:16	VLC	EET PEN

**Client Sample ID: 1315 BLANK 050223-T3**

**Lab Sample ID: 400-237194-10**

Date Collected: 05/04/23 11:09

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			624185	05/09/23 16:26	VLC	EET PEN

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

**Client Sample ID: R4505-01-T3**

**Lab Sample ID: 400-237194-11**

Date Collected: 05/04/23 11:11

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	200			624185	05/09/23 17:03	VLC	EET PEN

**Client Sample ID: R4505-02-T3**

**Lab Sample ID: 400-237194-12**

Date Collected: 05/04/23 11:16

Matrix: Water

Date Received: 05/05/23 09:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		40 mL	40 mL	623956	05/05/23 15:00	VLC	EET PEN
							Completed:	05/08/23 10:00 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	20			624185	05/09/23 16:43	VLC	EET PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-623956/3-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	623956	05/08/23 16:18	VLC	EET PEN
							Completed:	05/09/23 09:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			624185	05/09/23 09:42	VLC	EET PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-623956/4-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	623956	05/08/23 16:18	VLC	EET PEN
							Completed:	05/09/23 09:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			624185	05/09/23 09:50	VLC	EET PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-623956/5-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	623956	05/08/23 16:18	VLC	EET PEN
							Completed:	05/09/23 09:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			624185	05/09/23 09:58	VLC	EET PEN

<sup>1</sup> This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

# Method Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

Method	Method Description	Protocol	Laboratory
1631E	Mercury, Low Level (CVAFS)	EPA	EET PEN
1631E	Preparation, Mercury, Low Level	EPA	EET PEN

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001



## Accreditation/Certification Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237194-1

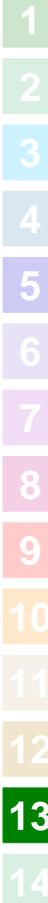
### Laboratory: Eurofins Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	06-30-23
ANAB	ISO/IEC 17025	L2471	02-22-26
Arkansas DEQ	State	88-0689	09-01-23
California	State	2510	06-30-23
Florida	NELAP	E81010	06-30-23
Georgia	State	E81010(FL)	06-30-23
Illinois	NELAP	200041	10-09-23
Kansas	NELAP	E-10253	10-31-23
Kentucky (UST)	State	53	06-30-23
Louisiana (All)	NELAP	30976	06-30-23
Louisiana (DW)	State	LA017	12-31-23
Maryland	State	233	09-30-23
Michigan	State	9912	06-30-23
North Carolina (WW/SW)	State	314	12-31-23
Oklahoma	NELAP	9810	08-31-23
Pennsylvania	NELAP	68-00467	01-31-24
South Carolina	State	96026	06-30-23
Tennessee	State	TN02907	06-30-23
Texas	NELAP	T104704286	09-30-23
US Fish & Wildlife	US Federal Programs	A22340	06-30-23
USDA	US Federal Programs	P330-21-00056	05-17-24
USDA	US Federal Programs	FLGNV23001	01-08-26
Virginia	NELAP	460166	06-14-23
West Virginia DEP	State	136	03-31-24

# Chain of Custody Record

<b>Client Information</b>		Sampler: <b>McDaniel, Bethany A</b>		COC No: 400-119288-41034.1					
Client Contact: <b>Brett Muckey</b>		Phone: <b>Bethany.McDaniel@et.eurofins.com</b>		Page: 1 of 4					
Company: <b>Eurofins Environment Testing Northwest, LLC</b>		PWSID:		Job #:					
Address: 1100 NE Circle Blvd Suite 310		Due Date Requested:		Carrier Tracking No(s):					
City: <b>Conavallis</b>		TAT Requested (days):		State of Origin:					
State, Zip: <b>OR, 97330</b>		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		Analysis Requested					
Phone:		PO #: <b>Purchase Order not required</b>		 400-237194 COC					
Email: <b>Alyssa.Lampert@Eurofins.com</b>		WO #:							
Project Name: <b>Brett Muckey</b>		Project #: <b>40014571</b>							
Aspect: <b>Mercury LEAF</b>		SSOW#:							
Site: <b>Com</b>									
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=other)	Field Filtered Sample (Yes or No)	Formal Method (Ref. to COC)	1631E - Mercury, Low Level (CVAFS)	Total Number of Containers	Special Instructions/Note:
Field blank	05/02/23	13:17		Water	X				
1315 BLANK 050223 - T1		13:19		Water	X				
R 4505-01 T1		13:20		Water	X				
R 4805-02 T1		13:24		Water	X				
Field blank	05/03/23	11:25		Water	X				
1315 BLANK 050223 - T2		11:12		Water	X				
R 4505-01 T2		11:15		Water	X				
R 505-02 T2		11:19		Water	X				
1315 Field Blank	05/04/23	11:07		Water	X				
1315 BLANK 050223 - T3		11:09		Water	X				
R 4505-01 - T3		11:11		Water	X				
<b>Possible Hazard Identification</b> <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological									
<b>Deliverable Requested:</b> I, II, III, IV, Other (specify)									
<b>Empty Kit Relinquished by:</b>									
<b>Relinquished by:</b> <i>[Signature]</i> Date: 05/04/23 12:00 Company: <b>BETA LLC</b>									
<b>Relinquished by:</b> <i>[Signature]</i> Date/Time: Company:									
<b>Relinquished by:</b> <i>[Signature]</i> Date/Time: Company:									
<b>Custody Seals Intact:</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>Custody Seal No.:</b>									
<b>Special Instructions/QC Requirements:</b>									
<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b> <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months									
<b>Method of Shipment:</b>									
<b>Received by:</b> Date/Time: Company:									
<b>Received by:</b> Date/Time: Company:									
<b>Received by:</b> <i>[Signature]</i> Date/Time: 5.23 9:09 Company:									
<b>Cooler Temperature(s) °C and Other Remarks:</b> 3.7 F 128									





## Login Sample Receipt Checklist

Client: Eurofins Environment Testing Northwest, LLC

Job Number: 400-237194-1

**Login Number: 237194**

**List Number: 1**

**Creator: Roberts, Alexis J**

**List Source: Eurofins Pensacola**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.7°C IR8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# ANALYTICAL REPORT

## PREPARED FOR

Attn: Michelle Bennett  
Eurofins Environment Testing Northwest, LLC  
1100 NE Circle Blvd  
Suite 310  
Corvallis, Oregon 97330

Generated 5/16/2023 2:23:03 PM

## JOB DESCRIPTION

Aspect Mercury LEAF

## JOB NUMBER

400-237432-1

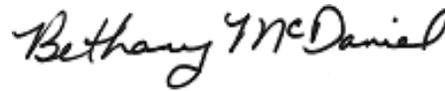
# Eurofins Pensacola

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

## Authorization



Generated  
5/16/2023 2:23:03 PM

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Authorized for release by  
Bethany McDaniel, Senior Project Manager  
[Bethany.McDaniel@et.eurofinsus.com](mailto:Bethany.McDaniel@et.eurofinsus.com)  
(713)358-2005

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# Case Narrative

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

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**Job ID: 400-237432-1**

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**Laboratory: Eurofins Pensacola**

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**Narrative**

**Job Narrative  
400-237432-1**

**Receipt**

The samples were received on 5/10/2023 9:25 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 13.1°C

**Metals**

Method 1631E: The following sample was diluted to bring the concentration of target analytes within the calibration range: B4505-01 T4 (400-237432-3). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.



# Detection Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

## Client Sample ID: FIELD BLANK

Lab Sample ID: 400-237432-1

No Detections.

## Client Sample ID: 1315 BLANK 050223

Lab Sample ID: 400-237432-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	1.0		0.50	0.20	ng/L	1		1631E	Total/NA

## Client Sample ID: B4505-01 T4

Lab Sample ID: 400-237432-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	860		25	10	ng/L	50		1631E	Total/NA

## Client Sample ID: B4505-02 T4

Lab Sample ID: 400-237432-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	31		0.50	0.20	ng/L	1		1631E	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Pensacola

# Sample Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
400-237432-1	FIELD BLANK	Water	05/09/23 11:50	05/10/23 09:25
400-237432-2	1315 BLANK 050223	Water	05/09/23 11:37	05/10/23 09:25
400-237432-3	B4505-01 T4	Water	05/09/23 11:40	05/10/23 09:25
400-237432-4	B4505-02 T4	Water	05/09/23 11:46	05/10/23 09:25

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-237432-1**

Date Collected: 05/09/23 11:50

Matrix: Water

Date Received: 05/10/23 09:25

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		05/10/23 15:00	05/16/23 12:46	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

**Client Sample ID: 1315 BLANK 050223**

**Lab Sample ID: 400-237432-2**

Date Collected: 05/09/23 11:37

Matrix: Water

Date Received: 05/10/23 09:25

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	1.0		0.50	0.20	ng/L		05/10/23 15:00	05/16/23 12:54	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

**Client Sample ID: B4505-01 T4**

**Lab Sample ID: 400-237432-3**

Date Collected: 05/09/23 11:40

Matrix: Water

Date Received: 05/10/23 09:25

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	860		25	10	ng/L		05/10/23 15:00	05/16/23 13:51	50

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

**Client Sample ID: B4505-02 T4**

**Lab Sample ID: 400-237432-4**

Date Collected: 05/09/23 11:46

Matrix: Water

Date Received: 05/10/23 09:25

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	31		0.50	0.20	ng/L		05/10/23 15:00	05/16/23 13:09	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Definitions/Glossary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# QC Association Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

## Metals

### Prep Batch: 625028

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-237432-1	FIELD BLANK	Total/NA	Water	1631E	
400-237432-2	1315 BLANK 050223	Total/NA	Water	1631E	
400-237432-3 - DL	B4505-01 T4	Total/NA	Water	1631E	
400-237432-4	B4505-02 T4	Total/NA	Water	1631E	
MB 400-625028/3-A	Method Blank	Total/NA	Water	1631E	
LCS 400-625028/4-A	Lab Control Sample	Total/NA	Water	1631E	
LCSD 400-625028/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	

### Analysis Batch: 625100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-237432-1	FIELD BLANK	Total/NA	Water	1631E	625028
400-237432-2	1315 BLANK 050223	Total/NA	Water	1631E	625028
400-237432-3 - DL	B4505-01 T4	Total/NA	Water	1631E	625028
400-237432-4	B4505-02 T4	Total/NA	Water	1631E	625028
MB 400-625028/3-A	Method Blank	Total/NA	Water	1631E	625028
LCS 400-625028/4-A	Lab Control Sample	Total/NA	Water	1631E	625028
LCSD 400-625028/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	625028

# QC Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

## Method: 1631E - Mercury, Low Level (CVAFS)

**Lab Sample ID: MB 400-625028/3-A**  
**Matrix: Water**  
**Analysis Batch: 625100**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 625028**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		05/15/23 16:00	05/16/23 09:51	1

**Lab Sample ID: LCS 400-625028/4-A**  
**Matrix: Water**  
**Analysis Batch: 625100**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 625028**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	5.00	5.07		ng/L		101	79 - 121

**Lab Sample ID: LCSD 400-625028/5-A**  
**Matrix: Water**  
**Analysis Batch: 625100**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 625028**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	5.00	5.20		ng/L		104	79 - 121	2	20

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-237432-1**

Date Collected: 05/09/23 11:50

Matrix: Water

Date Received: 05/10/23 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625028	05/10/23 15:00	VLC	EET PEN
							Completed:	05/11/23 15:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625100	05/16/23 12:46	VLC	EET PEN

**Client Sample ID: 1315 BLANK 050223**

**Lab Sample ID: 400-237432-2**

Date Collected: 05/09/23 11:37

Matrix: Water

Date Received: 05/10/23 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625028	05/10/23 15:00	VLC	EET PEN
							Completed:	05/11/23 15:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625100	05/16/23 12:54	VLC	EET PEN

**Client Sample ID: B4505-01 T4**

**Lab Sample ID: 400-237432-3**

Date Collected: 05/09/23 11:40

Matrix: Water

Date Received: 05/10/23 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		40 mL	40 mL	625028	05/10/23 15:00	VLC	EET PEN
							Completed:	05/11/23 15:00 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	50			625100	05/16/23 13:51	VLC	EET PEN

**Client Sample ID: B4505-02 T4**

**Lab Sample ID: 400-237432-4**

Date Collected: 05/09/23 11:46

Matrix: Water

Date Received: 05/10/23 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625028	05/10/23 15:00	VLC	EET PEN
							Completed:	05/11/23 15:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625100	05/16/23 13:09	VLC	EET PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-625028/3-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625028	05/15/23 16:00	VLC	EET PEN
							Completed:	05/16/23 09:13 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625100	05/16/23 09:51	VLC	EET PEN

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-625028/4-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625028	05/15/23 16:00	VLC	EET PEN
							Completed:	05/16/23 09:13 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625100	05/16/23 09:58	VLC	EET PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-625028/5-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625028	05/15/23 16:00	VLC	EET PEN
							Completed:	05/16/23 09:13 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625100	05/16/23 10:06	VLC	EET PEN

<sup>1</sup> This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

# Method Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

Method	Method Description	Protocol	Laboratory
1631E	Mercury, Low Level (CVAFS)	EPA	EET PEN
1631E	Preparation, Mercury, Low Level	EPA	EET PEN

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001



## Accreditation/Certification Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237432-1

### Laboratory: Eurofins Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	06-30-23
ANAB	ISO/IEC 17025	L2471	02-22-26
Arkansas DEQ	State	88-0689	09-01-23
California	State	2510	06-30-23
Florida	NELAP	E81010	06-30-23
Georgia	State	E81010(FL)	06-30-23
Illinois	NELAP	200041	10-09-23
Kansas	NELAP	E-10253	10-31-23
Kentucky (UST)	State	53	06-30-23
Louisiana (All)	NELAP	30976	06-30-23
Louisiana (DW)	State	LA017	12-31-23
Maryland	State	233	09-30-23
Michigan	State	9912	06-30-23
North Carolina (WW/SW)	State	314	12-31-23
Oklahoma	NELAP	9810	08-31-23
Pennsylvania	NELAP	68-00467	01-31-24
South Carolina	State	96026	06-30-23
Tennessee	State	TN02907	06-30-23
Texas	NELAP	T104704286	09-30-23
US Fish & Wildlife	US Federal Programs	A22340	06-30-23
USDA	US Federal Programs	P330-21-00056	05-17-24
USDA	US Federal Programs	FLGNV23001	01-08-26
Virginia	NELAP	460166	06-14-23
West Virginia DEP	State	136	03-31-24



## Login Sample Receipt Checklist

Client: Eurofins Environment Testing Northwest, LLC

Job Number: 400-237432-1

**Login Number: 237432**

**List Number: 1**

**Creator: Roberts, Alexis J**

**List Source: Eurofins Pensacola**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	13.1°C IR11
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# ANALYTICAL REPORT

## PREPARED FOR

Attn: Michelle Bennett  
Eurofins Environment Testing Northwest, LLC  
1100 NE Circle Blvd  
Suite 310  
Corvallis, Oregon 97330

Generated 5/22/2023 3:48:42 PM

## JOB DESCRIPTION

Aspect Mercury LEAF

## JOB NUMBER

400-237779-1

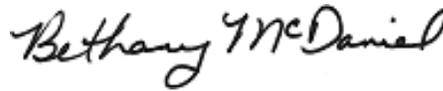
# Eurofins Pensacola

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

## Authorization



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5/22/2023 3:48:42 PM

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Authorized for release by  
Bethany McDaniel, Senior Project Manager  
[Bethany.McDaniel@et.eurofinsus.com](mailto:Bethany.McDaniel@et.eurofinsus.com)  
(713)358-2005



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# Case Narrative

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

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**Job ID: 400-237779-1**

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**Laboratory: Eurofins Pensacola**

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**Narrative**

**Job Narrative**  
**400-237779-1**

**Receipt**

The samples were received on 5/17/2023 9:32 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 11.8°C

**Metals**

Method 1631E: The following sample was diluted to bring the concentration of target analytes within the calibration range: B4505-01 T5 (400-237779-3). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.



# Detection Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

## Client Sample ID: FIELD BLANK

Lab Sample ID: 400-237779-1

No Detections.

## Client Sample ID: 1315 BLNK 050223

Lab Sample ID: 400-237779-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	0.79		0.50	0.20	ng/L	1		1631E	Total/NA

## Client Sample ID: B4505-01 T5

Lab Sample ID: 400-237779-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	420		20	8.0	ng/L	40		1631E	Total/NA

## Client Sample ID: B4505-02 T5

Lab Sample ID: 400-237779-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	26		0.50	0.20	ng/L	1		1631E	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Pensacola

# Sample Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
400-237779-1	FIELD BLANK	Water	05/16/23 12:04	05/17/23 09:32
400-237779-2	1315 BLNK 050223	Water	05/16/23 12:06	05/17/23 09:32
400-237779-3	B4505-01 T5	Water	05/16/23 12:10	05/17/23 09:32
400-237779-4	B4505-02 T5	Water	05/16/23 12:14	05/17/23 09:32

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-237779-1**

Date Collected: 05/16/23 12:04

Matrix: Water

Date Received: 05/17/23 09:32

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		05/19/23 15:25	05/22/23 11:54	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

**Client Sample ID: 1315 BLNK 050223**

**Lab Sample ID: 400-237779-2**

Date Collected: 05/16/23 12:06

Matrix: Water

Date Received: 05/17/23 09:32

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.79		0.50	0.20	ng/L		05/19/23 15:25	05/22/23 12:02	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

**Client Sample ID: B4505-01 T5**

**Lab Sample ID: 400-237779-3**

Date Collected: 05/16/23 12:10

Matrix: Water

Date Received: 05/17/23 09:32

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	420		20	8.0	ng/L		05/19/23 15:25	05/22/23 12:24	40

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

**Client Sample ID: B4505-02 T5**

**Lab Sample ID: 400-237779-4**

Date Collected: 05/16/23 12:14

Matrix: Water

Date Received: 05/17/23 09:32

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	26		0.50	0.20	ng/L		05/19/23 15:25	05/22/23 12:32	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Definitions/Glossary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# QC Association Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

## Metals

### Prep Batch: 625891

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-237779-1	FIELD BLANK	Total/NA	Water	1631E	
400-237779-2	1315 BLNK 050223	Total/NA	Water	1631E	
400-237779-3 - DL	B4505-01 T5	Total/NA	Water	1631E	
400-237779-4	B4505-02 T5	Total/NA	Water	1631E	
MB 400-625891/3-A	Method Blank	Total/NA	Water	1631E	
LCS 400-625891/4-A	Lab Control Sample	Total/NA	Water	1631E	
LCSD 400-625891/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	

### Analysis Batch: 625988

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-237779-1	FIELD BLANK	Total/NA	Water	1631E	625891
400-237779-2	1315 BLNK 050223	Total/NA	Water	1631E	625891
400-237779-3 - DL	B4505-01 T5	Total/NA	Water	1631E	625891
400-237779-4	B4505-02 T5	Total/NA	Water	1631E	625891
MB 400-625891/3-A	Method Blank	Total/NA	Water	1631E	625891
LCS 400-625891/4-A	Lab Control Sample	Total/NA	Water	1631E	625891
LCSD 400-625891/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	625891

# QC Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

## Method: 1631E - Mercury, Low Level (CVAFS)

**Lab Sample ID: MB 400-625891/3-A**  
**Matrix: Water**  
**Analysis Batch: 625988**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 625891**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		05/19/23 16:00	05/22/23 09:59	1

**Lab Sample ID: LCS 400-625891/4-A**  
**Matrix: Water**  
**Analysis Batch: 625988**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 625891**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	5.00	4.55		ng/L		91	79 - 121

**Lab Sample ID: LCSD 400-625891/5-A**  
**Matrix: Water**  
**Analysis Batch: 625988**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 625891**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	5.00	4.57		ng/L		91	79 - 121	0	20

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-237779-1**

Date Collected: 05/16/23 12:04

Matrix: Water

Date Received: 05/17/23 09:32

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625891	05/19/23 15:25	VLC	EET PEN
							Completed:	05/22/23 09:45 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625988	05/22/23 11:54	VLC	EET PEN

**Client Sample ID: 1315 BLNK 050223**

**Lab Sample ID: 400-237779-2**

Date Collected: 05/16/23 12:06

Matrix: Water

Date Received: 05/17/23 09:32

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625891	05/19/23 15:25	VLC	EET PEN
							Completed:	05/22/23 09:45 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625988	05/22/23 12:02	VLC	EET PEN

**Client Sample ID: B4505-01 T5**

**Lab Sample ID: 400-237779-3**

Date Collected: 05/16/23 12:10

Matrix: Water

Date Received: 05/17/23 09:32

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		40 mL	40 mL	625891	05/19/23 15:25	VLC	EET PEN
							Completed:	05/22/23 09:45 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	40			625988	05/22/23 12:24	VLC	EET PEN

**Client Sample ID: B4505-02 T5**

**Lab Sample ID: 400-237779-4**

Date Collected: 05/16/23 12:14

Matrix: Water

Date Received: 05/17/23 09:32

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625891	05/19/23 15:25	VLC	EET PEN
							Completed:	05/22/23 09:45 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625988	05/22/23 12:32	VLC	EET PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-625891/3-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625891	05/19/23 16:00	VLC	EET PEN
							Completed:	05/22/23 09:10 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625988	05/22/23 09:59	VLC	EET PEN

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-625891/4-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625891	05/19/23 16:00	VLC	EET PEN
							Completed:	05/22/23 09:10 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625988	05/22/23 10:07	VLC	EET PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-625891/5-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	625891	05/19/23 16:00	VLC	EET PEN
							Completed:	05/22/23 09:10 <sup>1</sup>		
Total/NA	Analysis	1631E		1			625988	05/22/23 10:15	VLC	EET PEN

<sup>1</sup> This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

# Method Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

Method	Method Description	Protocol	Laboratory
1631E	Mercury, Low Level (CVAFS)	EPA	EET PEN
1631E	Preparation, Mercury, Low Level	EPA	EET PEN

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001



# Accreditation/Certification Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-237779-1

## Laboratory: Eurofins Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	06-30-23
ANAB	ISO/IEC 17025	L2471	02-22-26
Arkansas DEQ	State	88-0689	09-01-23
California	State	2510	06-30-23
Florida	NELAP	E81010	06-30-23
Georgia	State	E81010(FL)	06-30-23
Illinois	NELAP	200041	10-09-23
Kansas	NELAP	E-10253	10-31-23
Kentucky (UST)	State	53	06-30-23
Louisiana (All)	NELAP	30976	06-30-23
Louisiana (DW)	State	LA017	12-31-23
Maryland	State	233	09-30-23
Michigan	State	9912	06-30-23
North Carolina (WW/SW)	State	314	12-31-23
Oklahoma	NELAP	9810	08-31-23
Pennsylvania	NELAP	68-00467	01-31-24
South Carolina	State	96026	06-30-23
Tennessee	State	TN02907	06-30-23
Texas	NELAP	T104704286	09-30-23
US Fish & Wildlife	US Federal Programs	A22340	06-30-23
USDA	US Federal Programs	P330-21-00056	05-17-24
USDA	US Federal Programs	FLGNV23001	01-08-26
Virginia	NELAP	460166	06-14-23
West Virginia DEP	State	136	03-31-24

# Chain of Custody Record

<b>Client Information</b>		Lab P/N: <b>McDaniel, Bethany A</b>	Carrier Tracking No(s):	COC No: <b>400-119288-41034.4</b>
Client Contact: <b>Alyssa Lampi - Brett Muckey</b>		E-Mail: <b>Bethany.McDaniel@et.eurofins.com</b>	State of Origin:	Page: <b>4 of 4</b>
Company: <b>Eurofins Environment Testing Northwest, LLC</b>		PWSID:	Job #:	
Address: <b>1100 NE Circle Blvd Suite 310</b>		Due Date Requested:	Analysis Requested	
City: <b>Conavallis</b>		TAT Requested (days):	Total Number of Containers	
State, Zip: <b>OR, 97330</b>		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No	Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Phone: <b>brett.muckey</b>		Purchase Order not required	M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify)	
Email: <b>AlyssaLamp1@Eurofinset.com</b>		WO #:	Special Instructions/Note:	
Project Name: <b>Aspect Mercury LEAF</b>		Project #: <b>40014571</b>	Special Instructions/Note:	
Site:		SSOW#:	Special Instructions/Note:	
<b>Sample Identification</b>		<b>Field Filtered Sample (Yes or No)</b>	<b>1631E - Mercury, Low Level (CVAFS)</b>	<b>Total Number of Containers</b>
<b>Sample Date</b>	<b>Sample Time</b>	<b>Sample Type (C=Comp, G=grab)</b>	<b>Matrix (W=water, S=solid, O=soil, BT=Tissue, A=Air)</b>	<b>Preservation Code</b>
12/16/23	12:04		Water	
12/16/23	12:03		Water	
12/16/23	12:10		Water	
12/16/23	12:14		Water	
Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Matrix (W=water, S=solid, O=soil, BT=Tissue, A=Air) Sample Type (C=Comp, G=grab) Sample Date Sample Time Preservation Code		Special Instructions/Note: 400-237779 COC		
<b>Possible Hazard Identification</b> <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify)				
<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b> <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months				
<b>Special Instructions/QC Requirements:</b>				
<b>Empty Kit/Relinquished by:</b> Relinquished by: <b>Brett Muckey</b> Date/Time: <b>5/16/23 12:59</b>		<b>Method of Shipment:</b> Received by: _____ Date/Time: _____ Company: _____		
<b>Relinquished by:</b> Relinquished by: <b>Brett Muckey</b> Date/Time: _____ Company: _____		<b>Relinquished by:</b> Relinquished by: _____ Date/Time: _____ Company: _____		
<b>Custody Seals Intact:</b> <input type="checkbox"/> Yes <input type="checkbox"/> No		<b>Custody Seal No.:</b> <b>2205274</b> <b> cooler Temperature(s) °C and Other Remarks:</b> <b>11.8°C CR8</b>		



FedEx Track 7721 6280 6503

## Login Sample Receipt Checklist

Client: Eurofins Environment Testing Northwest, LLC

Job Number: 400-237779-1

**Login Number: 237779**

**List Number: 1**

**Creator: Whitley, Adrian**

**List Source: Eurofins Pensacola**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	11.8°C IR8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# ANALYTICAL REPORT

## PREPARED FOR

Attn: Michelle Bennett  
Eurofins Environment Testing Northwest, LLC  
1100 NE Circle Blvd  
Suite 310  
Corvallis, Oregon 97330

Generated 6/13/2023 2:48:50 PM

## JOB DESCRIPTION

Aspect Mercury LEAF

## JOB NUMBER

400-238437-1

# Eurofins Pensacola

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

## Authorization



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6/13/2023 2:48:50 PM

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Authorized for release by  
Bethany McDaniel, Senior Project Manager  
[Bethany.McDaniel@et.eurofinsus.com](mailto:Bethany.McDaniel@et.eurofinsus.com)  
(713)358-2005



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# Case Narrative

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

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**Job ID: 400-238437-1**

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**Laboratory: Eurofins Pensacola**

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**Narrative**

**Job Narrative  
400-238437-1**

**Receipt**

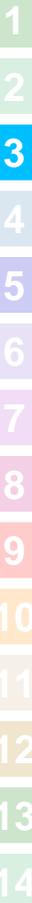
The samples were received on 5/31/2023 9:06 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.3°C

**Metals**

Method 1631E: The following sample was diluted to bring the concentration of target analytes within the calibration range: B4505-01 T6 (400-238437-3). Elevated reporting limits (RLs) are provided.

Method 1631E: The following samples were diluted to bring the concentration of target analytes within the calibration range: B4505-01 T6 (400-238437-3) and B4505-02 T6 (400-238437-4). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.



# Detection Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

## Client Sample ID: FIELD BLANK

Lab Sample ID: 400-238437-1

No Detections.

## Client Sample ID: 1315 BLNK 050223 T6

Lab Sample ID: 400-238437-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	0.82		0.50	0.20	ng/L	1		1631E	Total/NA

## Client Sample ID: B4505-01 T6

Lab Sample ID: 400-238437-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	1100		100	40	ng/L	20		1631E	Total/NA

## Client Sample ID: B4505-02 T6

Lab Sample ID: 400-238437-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	72		5.0	2.0	ng/L	10		1631E	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Pensacola

# Sample Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
400-238437-1	FIELD BLANK	Water	05/30/23 13:00	05/31/23 09:06
400-238437-2	1315 BLNK 050223 T6	Water	05/30/23 13:00	05/31/23 09:06
400-238437-3	B4505-01 T6	Water	05/30/23 13:00	05/31/23 09:06
400-238437-4	B4505-02 T6	Water	05/30/23 13:00	05/31/23 09:06

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# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-238437-1**

Date Collected: 05/30/23 13:00

Matrix: Water

Date Received: 05/31/23 09:06

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		06/12/23 16:25	06/13/23 13:00	1

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# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

**Client Sample ID: 1315 BLNK 050223 T6**

**Lab Sample ID: 400-238437-2**

Date Collected: 05/30/23 13:00

Matrix: Water

Date Received: 05/31/23 09:06

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.82		0.50	0.20	ng/L		06/12/23 16:25	06/13/23 12:32	1

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# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

**Client Sample ID: B4505-01 T6**

**Lab Sample ID: 400-238437-3**

Date Collected: 05/30/23 13:00

Matrix: Water

Date Received: 05/31/23 09:06

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	1100		100	40	ng/L		06/12/23 16:25	06/13/23 13:07	20

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# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

**Client Sample ID: B4505-02 T6**

**Lab Sample ID: 400-238437-4**

Date Collected: 05/30/23 13:00

Matrix: Water

Date Received: 05/31/23 09:06

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	72		5.0	2.0	ng/L		06/12/23 16:25	06/13/23 12:52	10

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# Definitions/Glossary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# QC Association Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

## Metals

### Prep Batch: 628993

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-238437-1	FIELD BLANK	Total/NA	Water	1631E	
400-238437-2	1315 BLNK 050223 T6	Total/NA	Water	1631E	
400-238437-3 - DL	B4505-01 T6	Total/NA	Water	1631E	
400-238437-4 - DL	B4505-02 T6	Total/NA	Water	1631E	
MB 400-628993/3-A	Method Blank	Total/NA	Water	1631E	
LCS 400-628993/4-A	Lab Control Sample	Total/NA	Water	1631E	
LCSD 400-628993/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	

### Analysis Batch: 629069

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-238437-1	FIELD BLANK	Total/NA	Water	1631E	628993
400-238437-2	1315 BLNK 050223 T6	Total/NA	Water	1631E	628993
400-238437-3 - DL	B4505-01 T6	Total/NA	Water	1631E	628993
400-238437-4 - DL	B4505-02 T6	Total/NA	Water	1631E	628993
MB 400-628993/3-A	Method Blank	Total/NA	Water	1631E	628993
LCS 400-628993/4-A	Lab Control Sample	Total/NA	Water	1631E	628993
LCSD 400-628993/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	628993

# QC Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

## Method: 1631E - Mercury, Low Level (CVAFS)

**Lab Sample ID: MB 400-628993/3-A**  
**Matrix: Water**  
**Analysis Batch: 629069**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 628993**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		06/12/23 16:00	06/13/23 10:36	1

**Lab Sample ID: LCS 400-628993/4-A**  
**Matrix: Water**  
**Analysis Batch: 629069**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 628993**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	5.00	4.45		ng/L		89	79 - 121

**Lab Sample ID: LCSD 400-628993/5-A**  
**Matrix: Water**  
**Analysis Batch: 629069**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 628993**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	5.00	4.46		ng/L		89	79 - 121	0	20

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-238437-1**

Date Collected: 05/30/23 13:00

Matrix: Water

Date Received: 05/31/23 09:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	628993	06/12/23 16:25	VLC	EET PEN
							Completed:	06/12/23 16:25 <sup>1</sup>		
Total/NA	Analysis	1631E		1			629069	06/13/23 13:00	VLC	EET PEN

**Client Sample ID: 1315 BLNK 050223 T6**

**Lab Sample ID: 400-238437-2**

Date Collected: 05/30/23 13:00

Matrix: Water

Date Received: 05/31/23 09:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	628993	06/12/23 16:25	VLC	EET PEN
							Completed:	06/12/23 16:25 <sup>1</sup>		
Total/NA	Analysis	1631E		1			629069	06/13/23 12:32	VLC	EET PEN

**Client Sample ID: B4505-01 T6**

**Lab Sample ID: 400-238437-3**

Date Collected: 05/30/23 13:00

Matrix: Water

Date Received: 05/31/23 09:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		4 mL	40 mL	628993	06/12/23 16:25	VLC	EET PEN
							Completed:	06/12/23 16:25 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	20			629069	06/13/23 13:07	VLC	EET PEN

**Client Sample ID: B4505-02 T6**

**Lab Sample ID: 400-238437-4**

Date Collected: 05/30/23 13:00

Matrix: Water

Date Received: 05/31/23 09:06

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		40 mL	40 mL	628993	06/12/23 16:25	VLC	EET PEN
							Completed:	06/12/23 16:25 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	10			629069	06/13/23 12:52	VLC	EET PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-628993/3-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	628993	06/12/23 16:00	VLC	EET PEN
							Completed:	06/13/23 09:17 <sup>1</sup>		
Total/NA	Analysis	1631E		1			629069	06/13/23 10:36	VLC	EET PEN

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-628993/4-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	628993	06/12/23 16:00	VLC	EET PEN
							Completed:	06/13/23 09:17 <sup>1</sup>		
Total/NA	Analysis	1631E		1			629069	06/13/23 10:43	VLC	EET PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-628993/5-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	628993	06/12/23 16:00	VLC	EET PEN
							Completed:	06/13/23 09:17 <sup>1</sup>		
Total/NA	Analysis	1631E		1			629069	06/13/23 10:51	VLC	EET PEN

<sup>1</sup> This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001



# Method Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

Method	Method Description	Protocol	Laboratory
1631E	Mercury, Low Level (CVAFS)	EPA	EET PEN
1631E	Preparation, Mercury, Low Level	EPA	EET PEN

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001



## Accreditation/Certification Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-238437-1

### Laboratory: Eurofins Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	06-30-23
ANAB	ISO/IEC 17025	L2471	02-22-26
Arkansas DEQ	State	88-0689	09-01-23
California	State	2510	06-30-23
Florida	NELAP	E81010	06-30-23
Georgia	State	E81010(FL)	06-30-23
Illinois	NELAP	200041	10-09-23
Kansas	NELAP	E-10253	10-31-23
Kentucky (UST)	State	53	06-30-23
Louisiana (All)	NELAP	30976	06-30-23
Louisiana (DW)	State	LA017	12-31-23
Maryland	State	233	09-30-23
Michigan	State	9912	06-30-23
North Carolina (WW/SW)	State	314	12-31-23
Oklahoma	NELAP	9810	08-31-23
Pennsylvania	NELAP	68-00467	01-31-24
South Carolina	State	96026	06-30-23
Tennessee	State	TN02907	06-30-23
Texas	NELAP	T104704286	09-30-23
US Fish & Wildlife	US Federal Programs	A22340	06-30-23
USDA	US Federal Programs	P330-21-00056	05-17-24
USDA	US Federal Programs	FLGNV23001	01-08-26
Virginia	NELAP	460166	06-14-23
West Virginia DEP	State	136	03-31-24



## Login Sample Receipt Checklist

Client: Eurofins Environment Testing Northwest, LLC

Job Number: 400-238437-1

**Login Number: 238437**

**List Number: 1**

**Creator: Whitley, Adrian**

**List Source: Eurofins Pensacola**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.3°C IR11
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# ANALYTICAL REPORT

## PREPARED FOR

Attn: Brett Muckey  
Eurofins Environment Testing Northwest, LLC  
1100 NE Circle Blvd  
Suite 310  
Corvallis, Oregon 97330

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## JOB DESCRIPTION

Aspect Mercury LEAF

## JOB NUMBER

400-239220-1

# Eurofins Pensacola

## Job Notes

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The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

## Authorization



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Authorized for release by  
Bethany McDaniel, Senior Project Manager  
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(713)358-2005



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# Case Narrative

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

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**Job ID: 400-239220-1**

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**Laboratory: Eurofins Pensacola**

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**Narrative**

**Job Narrative  
400-239220-1**

**Receipt**

The samples were received on 6/15/2023 9:29 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.7°C

**Metals**

Method 1631E: The following sample was diluted to bring the concentration of target analytes within the calibration range: B4505-01 T7 (400-239220-3). Elevated reporting limits (RLs) are provided.

Method 1631E: The following samples were diluted to bring the concentration of target analytes within the calibration range: B4505-01 T7 (400-239220-3) and B4505-02 T7 (400-239220-4). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.



# Detection Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

## Client Sample ID: FIELD BLANK

Lab Sample ID: 400-239220-1

No Detections.

## Client Sample ID: 1315 BLNK 050223-T7

Lab Sample ID: 400-239220-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	1.1		0.50	0.20	ng/L	1		1631E	Total/NA

## Client Sample ID: B4505-01 T7

Lab Sample ID: 400-239220-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	2000		200	80	ng/L	40		1631E	Total/NA

## Client Sample ID: B4505-02 T7

Lab Sample ID: 400-239220-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	200		5.0	2.0	ng/L	10		1631E	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Pensacola

# Sample Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
400-239220-1	FIELD BLANK	Water	06/13/23 15:00	06/15/23 09:29
400-239220-2	1315 BLNK 050223-T7	Water	06/13/23 15:00	06/15/23 09:29
400-239220-3	B4505-01 T7	Water	06/13/23 15:00	06/15/23 09:29
400-239220-4	B4505-02 T7	Water	06/13/23 15:00	06/15/23 09:29

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# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-239220-1**

Date Collected: 06/13/23 15:00

Matrix: Water

Date Received: 06/15/23 09:29

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		06/26/23 15:35	06/27/23 12:33	1

- 1
- 2
- 3
- 4
- 5
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- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

**Client Sample ID: 1315 BLNK 050223-T7**

**Lab Sample ID: 400-239220-2**

Date Collected: 06/13/23 15:00

Matrix: Water

Date Received: 06/15/23 09:29

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	1.1		0.50	0.20	ng/L		06/26/23 15:35	06/27/23 12:44	1

- 1
- 2
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- 12
- 13
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# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

**Client Sample ID: B4505-01 T7**

**Lab Sample ID: 400-239220-3**

Date Collected: 06/13/23 15:00

Matrix: Water

Date Received: 06/15/23 09:29

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	2000		200	80	ng/L		06/26/23 15:35	06/27/23 14:42	40

- 1
- 2
- 3
- 4
- 5
- 6
- 7
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- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

**Client Sample ID: B4505-02 T7**

**Lab Sample ID: 400-239220-4**

Date Collected: 06/13/23 15:00

Matrix: Water

Date Received: 06/15/23 09:29

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	200		5.0	2.0	ng/L		06/26/23 15:35	06/27/23 13:00	10

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Definitions/Glossary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# QC Association Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

## Metals

### Prep Batch: 630854

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-239220-1	FIELD BLANK	Total/NA	Water	1631E	
400-239220-2	1315 BLNK 050223-T7	Total/NA	Water	1631E	
400-239220-3 - DL	B4505-01 T7	Total/NA	Water	1631E	
400-239220-4 - DL	B4505-02 T7	Total/NA	Water	1631E	
MB 400-630854/3-A	Method Blank	Total/NA	Water	1631E	
LCS 400-630854/4-A	Lab Control Sample	Total/NA	Water	1631E	
LCSD 400-630854/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	

### Analysis Batch: 631055

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-239220-1	FIELD BLANK	Total/NA	Water	1631E	630854
400-239220-2	1315 BLNK 050223-T7	Total/NA	Water	1631E	630854
400-239220-3 - DL	B4505-01 T7	Total/NA	Water	1631E	630854
400-239220-4 - DL	B4505-02 T7	Total/NA	Water	1631E	630854
MB 400-630854/3-A	Method Blank	Total/NA	Water	1631E	630854
LCS 400-630854/4-A	Lab Control Sample	Total/NA	Water	1631E	630854
LCSD 400-630854/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	630854

# QC Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

## Method: 1631E - Mercury, Low Level (CVAFS)

**Lab Sample ID: MB 400-630854/3-A**  
**Matrix: Water**  
**Analysis Batch: 631055**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 630854**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		06/26/23 17:12	06/27/23 10:46	1

**Lab Sample ID: LCS 400-630854/4-A**  
**Matrix: Water**  
**Analysis Batch: 631055**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 630854**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	5.00	5.76		ng/L		115	79 - 121

**Lab Sample ID: LCSD 400-630854/5-A**  
**Matrix: Water**  
**Analysis Batch: 631055**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 630854**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	5.00	5.27		ng/L		105	79 - 121	9	20

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-239220-1**

Date Collected: 06/13/23 15:00

Matrix: Water

Date Received: 06/15/23 09:29

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	630854	06/26/23 15:35	VLC	EET PEN
							Completed:	06/27/23 09:40 <sup>1</sup>		
Total/NA	Analysis	1631E		1			631055	06/27/23 12:33	VLC	EET PEN

**Client Sample ID: 1315 BLNK 050223-T7**

**Lab Sample ID: 400-239220-2**

Date Collected: 06/13/23 15:00

Matrix: Water

Date Received: 06/15/23 09:29

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	630854	06/26/23 15:35	VLC	EET PEN
							Completed:	06/27/23 09:40 <sup>1</sup>		
Total/NA	Analysis	1631E		1			631055	06/27/23 12:44	VLC	EET PEN

**Client Sample ID: B4505-01 T7**

**Lab Sample ID: 400-239220-3**

Date Collected: 06/13/23 15:00

Matrix: Water

Date Received: 06/15/23 09:29

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		4 mL	40 mL	630854	06/26/23 15:35	VLC	EET PEN
							Completed:	06/27/23 09:40 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	40			631055	06/27/23 14:42	VLC	EET PEN

**Client Sample ID: B4505-02 T7**

**Lab Sample ID: 400-239220-4**

Date Collected: 06/13/23 15:00

Matrix: Water

Date Received: 06/15/23 09:29

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		40 mL	40 mL	630854	06/26/23 15:35	VLC	EET PEN
							Completed:	06/27/23 09:40 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	10			631055	06/27/23 13:00	VLC	EET PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-630854/3-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	630854	06/26/23 17:12	VLC	EET PEN
							Completed:	06/27/23 09:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			631055	06/27/23 10:46	VLC	EET PEN

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-630854/4-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	630854	06/26/23 17:12	VLC	EET PEN
							Completed:	06/27/23 09:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			631055	06/27/23 10:54	VLC	EET PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-630854/5-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	630854	06/26/23 17:12	VLC	EET PEN
							Completed:	06/27/23 09:00 <sup>1</sup>		
Total/NA	Analysis	1631E		1			631055	06/27/23 11:02	VLC	EET PEN

<sup>1</sup> This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

# Method Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

Method	Method Description	Protocol	Laboratory
1631E	Mercury, Low Level (CVAFS)	EPA	EET PEN
1631E	Preparation, Mercury, Low Level	EPA	EET PEN

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001



## Accreditation/Certification Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239220-1

### Laboratory: Eurofins Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	06-30-23
ANAB	ISO/IEC 17025	L2471	02-22-26
Arkansas DEQ	State	88-00689	09-01-23
California	State	2510	06-30-23
Florida	NELAP	E81010	06-30-23
Georgia	State	E81010(FL)	06-30-23
Illinois	NELAP	200041	10-09-23
Kansas	NELAP	E-10253	10-31-23
Kentucky (UST)	State	53	06-30-23
Louisiana (All)	NELAP	30976	06-30-23
Louisiana (DW)	State	LA017	12-31-23
Maryland	State	233	09-30-23
North Carolina (WW/SW)	State	314	12-31-23
Oklahoma	NELAP	9810	08-31-23
Pennsylvania	NELAP	68-00467	01-31-24
South Carolina	State	96026	06-30-23
Tennessee	State	TN02907	06-30-23
Texas	NELAP	T104704286	09-30-23
US Fish & Wildlife	US Federal Programs	A22340	06-30-23
USDA	US Federal Programs	P330-21-00056	05-17-24
USDA	US Federal Programs	FLGNV23001	01-08-26
Virginia	NELAP	460166	06-14-24
West Virginia DEP	State	136	03-31-24



## Login Sample Receipt Checklist

Client: Eurofins Environment Testing Northwest, LLC

Job Number: 400-239220-1

**Login Number: 239220**

**List Number: 1**

**Creator: Roberts, Alexis J**

**List Source: Eurofins Pensacola**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	2.7°C IR8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# ANALYTICAL REPORT

## PREPARED FOR

Attn: Michelle Bennett  
Eurofins Environment Testing Northwest, LLC  
1100 NE Circle Blvd  
Suite 310  
Corvallis, Oregon 97330  
Generated 6/29/2023 2:43:49 PM

## JOB DESCRIPTION

Aspect Mercury LEAF

## JOB NUMBER

400-239502-1

# Eurofins Pensacola

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

## Authorization



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6/29/2023 2:43:49 PM

Authorized for release by  
Bethany McDaniel, Senior Project Manager  
[Bethany.McDaniel@et.eurofinsus.com](mailto:Bethany.McDaniel@et.eurofinsus.com)  
(713)358-2005



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# Case Narrative

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

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**Job ID: 400-239502-1**

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**Laboratory: Eurofins Pensacola**

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**Narrative**

**Job Narrative  
400-239502-1**

**Receipt**

The samples were received on 6/22/2023 9:10 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.3°C

**Metals**

Method 1631E: The samples were received with labels already on the vials.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.



# Detection Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

## Client Sample ID: FIELD BLANK

Lab Sample ID: 400-239502-1

No Detections.

## Client Sample ID: 1315 BLNK 050223 T8

Lab Sample ID: 400-239502-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	0.65		0.50	0.20	ng/L	1		1631E	Total/NA

## Client Sample ID: R 4505-01 T8

Lab Sample ID: 400-239502-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	1100		20	8.0	ng/L	40		1631E	Total/NA

## Client Sample ID: R 4505-02 T8

Lab Sample ID: 400-239502-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury - DL	96		5.0	2.0	ng/L	10		1631E	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Pensacola

# Sample Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
400-239502-1	FIELD BLANK	Water	06/20/23 14:09	06/22/23 09:10
400-239502-2	1315 BLNK 050223 T8	Water	06/20/23 14:11	06/22/23 09:10
400-239502-3	R 4505-01 T8	Water	06/20/23 14:13	06/22/23 09:10
400-239502-4	R 4505-02 T8	Water	06/20/23 14:15	06/22/23 09:10

- 1
- 2
- 3
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- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-239502-1**

Date Collected: 06/20/23 14:09

Matrix: Water

Date Received: 06/22/23 09:10

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		06/28/23 15:50	06/29/23 13:33	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

**Client Sample ID: 1315 BLNK 050223 T8**

**Lab Sample ID: 400-239502-2**

Date Collected: 06/20/23 14:11

Matrix: Water

Date Received: 06/22/23 09:10

**Method: EPA 1631E - Mercury, Low Level (CVAFS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.65		0.50	0.20	ng/L		06/28/23 15:50	06/29/23 13:40	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

**Client Sample ID: R 4505-01 T8**

**Lab Sample ID: 400-239502-3**

Date Collected: 06/20/23 14:13

Matrix: Water

Date Received: 06/22/23 09:10

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	1100		20	8.0	ng/L		06/28/23 15:50	06/29/23 13:48	40

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

**Client Sample ID: R 4505-02 T8**

**Lab Sample ID: 400-239502-4**

Date Collected: 06/20/23 14:15

Matrix: Water

Date Received: 06/22/23 09:10

**Method: EPA 1631E - Mercury, Low Level (CVAFS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	96		5.0	2.0	ng/L		06/28/23 15:50	06/29/23 13:56	10

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Definitions/Glossary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# QC Association Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

## Metals

### Prep Batch: 631287

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-239502-1	FIELD BLANK	Total/NA	Water	1631E	
400-239502-2	1315 BLNK 050223 T8	Total/NA	Water	1631E	
400-239502-3 - DL	R 4505-01 T8	Total/NA	Water	1631E	
400-239502-4 - DL	R 4505-02 T8	Total/NA	Water	1631E	
MB 400-631287/3-A	Method Blank	Total/NA	Water	1631E	
LCS 400-631287/4-A	Lab Control Sample	Total/NA	Water	1631E	
LCSD 400-631287/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	

### Analysis Batch: 631374

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-239502-1	FIELD BLANK	Total/NA	Water	1631E	631287
400-239502-2	1315 BLNK 050223 T8	Total/NA	Water	1631E	631287
400-239502-3 - DL	R 4505-01 T8	Total/NA	Water	1631E	631287
400-239502-4 - DL	R 4505-02 T8	Total/NA	Water	1631E	631287
MB 400-631287/3-A	Method Blank	Total/NA	Water	1631E	631287
LCS 400-631287/4-A	Lab Control Sample	Total/NA	Water	1631E	631287
LCSD 400-631287/5-A	Lab Control Sample Dup	Total/NA	Water	1631E	631287

# QC Sample Results

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

## Method: 1631E - Mercury, Low Level (CVAFS)

**Lab Sample ID: MB 400-631287/3-A**  
**Matrix: Water**  
**Analysis Batch: 631374**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 631287**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50	U	0.50	0.20	ng/L		06/28/23 16:00	06/29/23 10:44	1

**Lab Sample ID: LCS 400-631287/4-A**  
**Matrix: Water**  
**Analysis Batch: 631374**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 631287**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	5.00	4.95		ng/L		99	79 - 121

**Lab Sample ID: LCSD 400-631287/5-A**  
**Matrix: Water**  
**Analysis Batch: 631374**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 631287**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	5.00	4.91		ng/L		98	79 - 121	1	20

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

**Client Sample ID: FIELD BLANK**

**Lab Sample ID: 400-239502-1**

Date Collected: 06/20/23 14:09

Matrix: Water

Date Received: 06/22/23 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	631287	06/28/23 15:50	VLC	EET PEN
							Completed:	06/29/23 09:20 <sup>1</sup>		
Total/NA	Analysis	1631E		1			631374	06/29/23 13:33	VLC	EET PEN

**Client Sample ID: 1315 BLNK 050223 T8**

**Lab Sample ID: 400-239502-2**

Date Collected: 06/20/23 14:11

Matrix: Water

Date Received: 06/22/23 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	631287	06/28/23 15:50	VLC	EET PEN
							Completed:	06/29/23 09:20 <sup>1</sup>		
Total/NA	Analysis	1631E		1			631374	06/29/23 13:40	VLC	EET PEN

**Client Sample ID: R 4505-01 T8**

**Lab Sample ID: 400-239502-3**

Date Collected: 06/20/23 14:13

Matrix: Water

Date Received: 06/22/23 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		40 mL	40 mL	631287	06/28/23 15:50	VLC	EET PEN
							Completed:	06/29/23 09:20 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	40			631374	06/29/23 13:48	VLC	EET PEN

**Client Sample ID: R 4505-02 T8**

**Lab Sample ID: 400-239502-4**

Date Collected: 06/20/23 14:15

Matrix: Water

Date Received: 06/22/23 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E	DL		40 mL	40 mL	631287	06/28/23 15:50	VLC	EET PEN
							Completed:	06/29/23 09:20 <sup>1</sup>		
Total/NA	Analysis	1631E	DL	10			631374	06/29/23 13:56	VLC	EET PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-631287/3-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	631287	06/28/23 16:00	VLC	EET PEN
							Completed:	06/29/23 08:53 <sup>1</sup>		
Total/NA	Analysis	1631E		1			631374	06/29/23 10:44	VLC	EET PEN

# Lab Chronicle

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-631287/4-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	631287	06/28/23 16:00	VLC	EET PEN
							Completed:	06/29/23 08:53 <sup>1</sup>		
Total/NA	Analysis	1631E		1			631374	06/29/23 10:52	VLC	EET PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-631287/5-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1631E			40 mL	40 mL	631287	06/28/23 16:00	VLC	EET PEN
							Completed:	06/29/23 08:53 <sup>1</sup>		
Total/NA	Analysis	1631E		1			631374	06/29/23 11:00	VLC	EET PEN

<sup>1</sup> This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

# Method Summary

Client: Eurofins Environment Testing Northwest, LLC  
Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

Method	Method Description	Protocol	Laboratory
1631E	Mercury, Low Level (CVAFS)	EPA	EET PEN
1631E	Preparation, Mercury, Low Level	EPA	EET PEN

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001



## Accreditation/Certification Summary

Client: Eurofins Environment Testing Northwest, LLC  
 Project/Site: Aspect Mercury LEAF

Job ID: 400-239502-1

### Laboratory: Eurofins Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	06-30-23
ANAB	ISO/IEC 17025	L2471	02-22-26
Arkansas DEQ	State	88-00689	09-01-23
California	State	2510	06-30-23
Florida	NELAP	E81010	06-30-23
Georgia	State	E81010(FL)	06-30-23
Illinois	NELAP	200041	10-09-23
Kansas	NELAP	E-10253	10-31-23
Kentucky (UST)	State	53	06-30-23
Louisiana (All)	NELAP	30976	06-30-23
Louisiana (DW)	State	LA017	12-31-23
Maryland	State	233	09-30-23
North Carolina (WW/SW)	State	314	12-31-23
Oklahoma	NELAP	9810	08-31-23
Pennsylvania	NELAP	68-00467	01-31-24
South Carolina	State	96026	06-30-23
Tennessee	State	TN02907	06-30-23
Texas	NELAP	T104704286	09-30-23
US Fish & Wildlife	US Federal Programs	A22340	06-30-23
USDA	US Federal Programs	P330-21-00056	05-17-24
USDA	US Federal Programs	FLGNV23001	01-08-26
Virginia	NELAP	460166	06-14-24
West Virginia DEP	State	136	03-31-24





## Login Sample Receipt Checklist

Client: Eurofins Environment Testing Northwest, LLC

Job Number: 400-239502-1

**Login Number: 239502**

**List Source: Eurofins Pensacola**

**List Number: 1**

**Creator: Roberts, Alexis J**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.3°C IR8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## **APPENDIX G**

### **Material Specifications Sheets**



## Dexpan® Expansive Demolition Grout for Concrete & Rock Breaking

### What is Dexpan® Non-Explosive Demolition Agent?



Concrete Demolition



Rock Breaking



Stone Quarrying

**Free Sample!** \*Business Only  
**Free Job Estimates!**  
**Free Drilling Designs!**

- Amazing 18,000 PSI Expansive Strength to break concrete & rock.
- Easy to use: Drill, Mix and Pour.
- No Noise, No Vibration, No Dust.
- SDS is available upon request.

- Our Technical staff can help you save time and money by allowing us to quote and discuss your next project!
- Expansion time varies by the job, the expansion process is 24 hours, cracks should be visible within that time.



#### Types of Dexpan®

(Based on Ambient and Core Temperature)

- Dexpan® I 77 to 104 F° (25 to 40 C°)
- Dexpan® II 50 to 77 F° (10 to 25 C°)
- Dexpan® III 23 to 50 F° (-5 to 10 C°)

- In the demolition, concrete cutting and excavating industry, Dexpan® helps break reinforced concrete and rock into chunks, so you may easily cut off rebar, haul it away without damage to the existing structure.
- In the mining and quarrying industry, Dexpan® helps to achieve almost perfect slabs and blocks from limestone, onyx, marble, granite or any other type of stone you are working with. Compared to blasting, Dexpan® helps to conserve the waste of valuable stone, high insurance, costly storage and labor.

- **Packaging:** Each 44 Lb. Box and/or Bucket contain Four 11 Lb. bags of the Dexpan Powder. 11 Lb. Bucket Contains one 11 Lb. Bag of the Dexpan Powder.
- **Mixture:** Thick Pourable Slurry.

Dexpan® USA / Archer Company USA inc.

Technical Support: 1-866-272-4378 or +1-575-528-5454 (Se Habla Español)

Download Instructions, Videos, and SDS at [www.Dexpan.com](http://www.Dexpan.com)



Concrete Demolition and Rock Breaking has Never been Easier!

Visit [www.Dexpan.com](http://www.Dexpan.com) for more Job Photos

Concrete Demolition Jobs



Demolition of Highway Bridge

Rock Breaking Jobs



Boulder Breaking

Stone Quarrying Jobs



Granite Quarrying



Residential Demolition



Rock Breaking



Marble Quarrying



Concrete Demolition



Swimming Pool Excavating



Limestone Quarrying



Interior Demolition



Rock Trenching



Sandstone Quarrying

Dexpan® USA / Archer Company USA inc.
Technical Support: 1-866-272-4378 or +1-575-528-5454 (Se Habla Español)
Download Instructions, Videos, and SDS at www.Dexpan.com

# SAFETY DATA SHEET

## DEXPAN (Expansive Cement)



### Section 1. Identification

**GHS product identifier** : DEXPAN (Expansive Cement)  
**Product code** : Not available.  
**Other means of identification** : Expanding Cement.  
**Product type** : Powder.

#### Relevant identified uses of the substance or mixture and uses advised against

**Identified uses** : For controlled demolition, reinforced concrete cutting, rock breaking, quarrying, stone dimension, mining, excavating...

**Manufacturer** : Archer Company USA, Inc.  
2031 Appaloosa Dr.  
Sunland Park, NM 88063  
Tel: 575-528-5454  
Fax: 575-528-5458  
Toll Free: 866-272-4378

**Distributor/Canada** :

**Emergency telephone number (with hours of operation)** : +1-575-528-5454  
(24/7)

### Section 2. Hazards identification

**OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Classification of the substance or mixture** : SKIN CORROSION/IRRITATION - Category 2  
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1  
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3

#### GHS label elements

**Hazard pictograms** :



**Signal word** : Danger

## Section 2. Hazards identification

<b>Hazard statements</b>	: H318 - Causes serious eye damage. H315 - Causes skin irritation. H335 - May cause respiratory irritation.
<b>Precautionary statements</b>	
<b>Prevention</b>	: P280 - Wear protective gloves. Wear eye or face protection. P271 - Use only outdoors or in a well-ventilated area. P261 - Avoid breathing dust. P264 - Wash hands thoroughly after handling.
<b>Response</b>	: P304 + P340 + P312 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. P302 + P352 + P362+P364 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. P332 + P313 - If skin irritation occurs: Get medical attention. P305 + P351 + P338 + P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
<b>Storage</b>	: P405 - Store locked up.
<b>Disposal</b>	: P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
<b>Hazards not otherwise classified</b>	: Not applicable.

## Section 3. Composition/information on ingredients

<b>Substance/mixture</b>	: Mixture
<b>Other means of identification</b>	: Expanding Cement.

Ingredient name	%	CAS number
Calcium dihydroxide	≥75 - ≤90	1305-62-0

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

## Section 4. First aid measures

### Description of necessary first aid measures

<b>Eye contact</b>	: Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 20 minutes. Chemical burns must be treated promptly by a physician.
<b>Inhalation</b>	: Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

## Section 4. First aid measures

- Skin contact** : Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 20 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### Most important symptoms/effects, acute and delayed

#### Potential acute health effects

- Eye contact** : Causes serious eye damage.
- Inhalation** : May cause respiratory irritation.
- Skin contact** : Causes skin irritation.
- Ingestion** : No known significant effects or critical hazards.

#### Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:  
pain  
watering  
redness
- Inhalation** : Adverse symptoms may include the following:  
respiratory tract irritation  
coughing
- Skin contact** : Adverse symptoms may include the following:  
pain or irritation  
redness  
blistering may occur
- Ingestion** : Adverse symptoms may include the following:  
stomach pains

### Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

### Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : None known.

**Specific hazards arising from the chemical** : No specific fire or explosion hazard.

**Hazardous thermal decomposition products** : Decomposition products may include the following materials:  
metal oxide/oxides

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

**For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

### Methods and materials for containment and cleaning up

**Spill** : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

## Section 7. Handling and storage

### Precautions for safe handling

**Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe dust. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

## Section 7. Handling and storage

- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. See also Section 8 for additional information on hygiene measures.
- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

## Section 8. Exposure controls/personal protection

### Control parameters

#### United States

##### Occupational exposure limits

Ingredient name	Exposure limits
Calcium dihydroxide	<b>ACGIH TLV (United States, 3/2017).</b> TWA: 5 mg/m <sup>3</sup> 8 hours. <b>NIOSH REL (United States, 10/2016).</b> TWA: 5 mg/m <sup>3</sup> 10 hours. <b>OSHA PEL (United States, 6/2016).</b> TWA: 5 mg/m <sup>3</sup> 8 hours. Form: Respirable fraction TWA: 15 mg/m <sup>3</sup> 8 hours. Form: Total dust

#### Canada

##### Occupational exposure limits

Ingredient name	Exposure limits
Calcium dihydroxide	<b>CA Alberta Provincial (Canada, 4/2009).</b> 8 hrs OEL: 5 mg/m <sup>3</sup> 8 hours. <b>CA British Columbia Provincial (Canada, 7/2016).</b> TWA: 5 mg/m <sup>3</sup> 8 hours. <b>CA Ontario Provincial (Canada, 7/2015).</b> TWA: 5 mg/m <sup>3</sup> 8 hours. <b>CA Quebec Provincial (Canada, 1/2014).</b> TWA <sub>AEV</sub> : 5 mg/m <sup>3</sup> 8 hours. <b>CA Saskatchewan Provincial (Canada, 7/2013).</b> STEL: 10 mg/m <sup>3</sup> 15 minutes. TWA: 5 mg/m <sup>3</sup> 8 hours.

- Appropriate engineering controls** : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

- Environmental exposure controls** : In some cases, dust collection, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

### Individual protection measures

#### Hygiene measures

- Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

## Section 8. Exposure controls/personal protection

- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

## Section 9. Physical and chemical properties

### Appearance

- Physical state** : Solid. [Powder.]
- Color** : Gray.
- Odor** : Odorless.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point** : 1000°C (1832°F)
- Boiling point** : Not available.
- Flash point** : Not available.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : Not available.
- Vapor density** : Not available.
- Relative density** : 3.2
- Solubility** : Very slightly soluble in the following materials: cold water.
- Partition coefficient: n-octanol/water** : Not available.
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : Not available.
- Viscosity** : Not available.
- Flow time (ISO 2431)** : Not available.

## Section 10. Stability and reactivity

- Reactivity** : No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Conditions to avoid** : No specific data.
- Incompatible materials** : Reactive or incompatible with the following materials: moisture.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

### Information on toxicological effects

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Calcium dihydroxide	LD50 Oral	Rat	7340 mg/kg	-

#### Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Calcium dihydroxide	Eyes - Severe irritant	Rabbit	-	10 mg	-

#### Sensitization

There is no data available.

#### Mutagenicity

There is no data available.

#### Carcinogenicity

There is no data available.

#### Reproductive toxicity

There is no data available.

#### Teratogenicity

There is no data available.

#### Specific target organ toxicity (single exposure)

Name	Category	Target organs
Calcium dihydroxide	Category 3	Respiratory tract irritation

#### Specific target organ toxicity (repeated exposure)

There is no data available.

#### Aspiration hazard

There is no data available.

**Information on the likely routes of exposure** : Dermal contact. Eye contact. Inhalation. Ingestion.

#### Potential acute health effects

## Section 11. Toxicological information

- Eye contact** : Causes serious eye damage.  
**Inhalation** : May cause respiratory irritation.  
**Skin contact** : Causes skin irritation.  
**Ingestion** : No known significant effects or critical hazards.

### Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following:  
pain  
watering  
redness
- Inhalation** : Adverse symptoms may include the following:  
respiratory tract irritation  
coughing
- Skin contact** : Adverse symptoms may include the following:  
pain or irritation  
redness  
blistering may occur
- Ingestion** : Adverse symptoms may include the following:  
stomach pains

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

- Potential immediate effects** : No known significant effects or critical hazards.  
**Potential delayed effects** : No known significant effects or critical hazards.

#### Long term exposure

- Potential immediate effects** : No known significant effects or critical hazards.  
**Potential delayed effects** : No known significant effects or critical hazards.

#### Potential chronic health effects

- General** : Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.  
**Carcinogenicity** : No known significant effects or critical hazards.  
**Mutagenicity** : No known significant effects or critical hazards.  
**Teratogenicity** : No known significant effects or critical hazards.  
**Developmental effects** : No known significant effects or critical hazards.  
**Fertility effects** : No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

There is no data available.

## Section 12. Ecological information

### Toxicity

Product/ingredient name	Result	Species	Exposure
Calcium dihydroxide	Acute LC50 33884.4 µg/L Fresh water	Fish - Clarias gariepinus - Fingerling	96 hours

### Persistence and degradability

There is no data available.

### Bioaccumulative potential

There is no data available.

### Mobility in soil

Soil/water partition coefficient ( $K_{oc}$ ) : Not available.

Other adverse effects : No known significant effects or critical hazards.

## Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling empty containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## Section 14. Transport information

	DOT Classification	TDG Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-
Transport hazard class(es)	-	-	-	-
Packing group	-	-	-	-
Environmental hazards	No.	No.	No.	No.

AERG : Not applicable.

## Section 14. Transport information

**Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

## Section 15. Regulatory information

**U.S. Federal regulations** : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined  
**United States inventory (TSCA 8b):** All components are listed or exempted.

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Not listed

**Clean Air Act Section 602 Class I Substances** : Not listed

**Clean Air Act Section 602 Class II Substances** : Not listed

**DEA List I Chemicals (Precursor Chemicals)** : Not listed

**DEA List II Chemicals (Essential Chemicals)** : Not listed

### SARA 302/304

#### Composition/information on ingredients

No products were found.

**SARA 304 RQ** : Not applicable.

### SARA 311/312

**Classification** : SKIN CORROSION/IRRITATION - Category 2  
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1  
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3

#### Composition/information on ingredients

Name	Classification
Calcium dihydroxide	SKIN CORROSION/IRRITATION - Category 2 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3

### SARA 313

There is no data available.

### State regulations

**Massachusetts** : The following components are listed: Calcium dihydroxide; Silica, vitreous; Diiron trioxide; Aluminium oxide

**New York** : None of the components are listed.

**New Jersey** : The following components are listed: Calcium dihydroxide; Silica, vitreous; Diiron trioxide; Aluminium oxide

**Pennsylvania** : The following components are listed: Calcium dihydroxide; Diiron trioxide; Aluminium oxide

### California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

## Section 15. Regulatory information

### Canada

#### Canadian lists

**Canadian NPRI** : None of the components are listed.

**CEPA Toxic substances** : None of the components are listed.

**Canada inventory (DSL  
NDSL)** : All components are listed or exempted.

## Section 16. Other information

### Procedure used to derive the classification

<b>Classification</b>	<b>Justification</b>
SKIN CORROSION/IRRITATION - Category 2	Calculation method
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3	Calculation method

### History

**Date of issue mm/dd/yyyy** : 04/30/2019

**Date of previous issue** : 04/15/2015

**Version** : 7

**Prepared by** : KMK Regulatory Services Inc.

### Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



# TerraFlow® Mill Test Report

Month of Issue: July 2022

Plant: Seattle, Washington  
Product: TerraFlow 75  
Manufactured: June 2022  
Mill Test Report Number: TerraFlow75\_July2022

## ASTM C 1157 Standard Requirements

CHEMICAL ANALYSIS			PHYSICAL ANALYSIS		
Item	Spec limit	Test Result	Item	Spec limit	Test Result
Slag, %	---	75	Passing 325 Sieve (%)	---	96.8
Type II, %	---	25	Autoclave expansion (%)	0.8	-0.05
			Compressive strength (MPa)		
			3 days	5.0 min	15.1
			7 days	11.0 min	23.1
			28 days	--	36.4

We certify that the above described cement, at the time of shipment, meets the chemical and physical requirements of applicable Specifications for Type MH

Seattle Plant  
5400 W. Marginal Way SW, Seattle, WA 98106  
Phone: 206-937-8025

Certified By:

Rob Shogren Technical Director

July 1, 2022



# MaxCem® Mill Test Report

Month of Issue: July 2022

Plant: Seattle, Washington  
 Product: MaxCem® - Type IT(L11)(S30)MS  
 Month of Production: June of 2022  
 Mill Test Report Number: SEA\_MAXCEM\_July2022

## ASTM C 595 and AASHTO M 240 Standard Requirements

CHEMICAL ANALYSIS			PHYSICAL ANALYSIS		
Item	Spec limit	Test Result	Item	Spec limit	Test Result
<i>Rapid Method, X-Ray (C 114)</i>			<i>Air content of mortar (%) (C 185)</i>		
SiO <sub>2</sub> (%)	---	25.8		12 max	5
Al <sub>2</sub> O <sub>3</sub> (%)	---	8.7	<i>Blaine Fineness (m<sup>2</sup>/kg) (C 204)</i>		
Fe <sub>2</sub> O <sub>3</sub> (%)	---	2.1		---	488
CaO (%)	---	56.2	<i>Fineness, Residue retained on a 45 um sieve (%)</i>		
MgO (%)	---	3.0		---	3.6
Sulphate as SO <sub>3</sub> (%)	3.0 max*	3.4	<i>Autoclave expansion (%) (C 151)</i>		
Loss on ignition (%)	10.0 max	4.0		0.80 max -0.20 min	-0.02
Total Alkalis (Type IL)	---	0.37	<i>Compressive strength (PSI) (C 109)</i>		
Slag addition (%)		30		1890 min	3440
Richmond Type IL (%)		70		2900 min	4670
				3620 min	5710
			<i>Time of setting (minutes)</i>		
				45 - 420	153
			<i>Vicat Initial (C 191)</i>		
				0.020	0.005
			<i>C-1038 Expansion 14-day (%) (C 1038)*</i>		

\*Table 1 chemical requirements states that SO<sub>3</sub> content above 3.0 is permissible if the C1038 expansion is below 0.020% at 14 days.

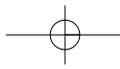
We certify that the above described cement, at the time of shipment, meets the chemical and physical ASTM C595 Standard Requirements and AASHTO M 240.

Lafarge PNW, Inc - Seattle Plant  
 5400 W. Marginal Way SW, Seattle, WA 98106  
 Phone: 206-937-8025

Certified By:

Rob Shogren - Technical Director

July 1, 2022



## NewCem<sup>®</sup>

# LAFARGE

NewCem slag cement is engineered for strength and durability. Benefits start at the pour with easier workability, improved pumpability and less heat at hydration. NewCem delivers higher 28-day strengths, reduced permeability and increased resistance to chemical attack. As a "green" product, NewCem is also the environmentally friendly choice.

### Product Description

NewCem is a Ground Granulated Blast Furnace Slag (GGBFS) conforming to ASTM C 989 Grade 120, AASHTO M302 Grade 120, CSA A363 and CSA A23.5 Type S.

### Applicable Specifications

Produced in accordance with ASTM C 989 *Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars*, AASHTO M302 *Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars*, CSA A363 *Cementitious Hydraulic Slag* and CSA A23.5 *Supplementary Cementing Materials*.

### General Statement

NewCem is generally used in varying percentages as a portland cement replacement in concrete and mortars. Higher ultimate strengths, improved durability, economics and aesthetics are potential reasons for using NewCem. As with most cementitious products, care is needed when proportioning, batching, placing, finishing and curing concrete containing this product.

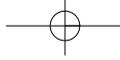
### NewCem and the Environment

NewCem is a by-product material that is derived from the iron-making process. The use of NewCem in concrete saves virgin raw materials that would otherwise be needed for the production of portland cement. NewCem also requires less energy to produce than portland cement, so the amount of greenhouse gases released into the environment is reduced when NewCem partly replaces portland cement in concrete.



Cement



**NEWCEM<sup>®</sup>****Properties of "Fresh Concrete"**

**Water Requirements:** Concrete mixes containing NewCem will require about the same amount of water for a given slump as concrete containing only portland cement.

**Air Content:** The use of NewCem as a partial replacement for portland cement will not appreciably change the dosage rate requirements of air entraining agents. When changing mix ingredients, it is recommended to check dosage rates and adjust if necessary.

**Bleeding:** The bleeding characteristics of concrete containing NewCem will not be appreciably affected.

**Segregation:** There is no segregation issue related to the use of NewCem.

**Heat of Hydration:** NewCem can be used to moderate the development of heat in mass concrete. It is recommended that replacement factors above 60% be used for this type of application. It is highly recommended that mix designs be assessed on an individual basis.

**Setting Time:** Concrete containing NewCem may have extended set times compared to straight portland mixes, especially at lower ambient/concrete temperatures and higher replacement levels. At normal summertime temperatures, set times will only be slightly affected.

**Finishability:** The finishability of concrete is generally improved with the use of NewCem.

**Pumping:** Concrete containing NewCem generally has improved pumpability.

**Proportioning:** NewCem has a lower specific gravity than normal portland cement. Consequently, the mix design should be modified to accommodate this change. ACI 211 should be followed for proportioning and mix proportions should be verified.

**Curing:** Proper curing of all concrete is essential. It is recommended that the procedures in ACI 308 *Standard Practice for Curing Concrete* be followed.

**Properties of "Hardened Concrete"**

**Strength:** Generally, later strengths (beyond 7 days) both compressive and flexural, are enhanced with NewCem. Early strengths (up to 14 days) can be reduced when compared to straight portland mixes, especially at higher replacement rates and at cooler temperatures.

**Permeability and Absorption:** When properly proportioned, concrete containing NewCem is less permeable and has a lower absorption rate than mixes containing only portland cement.

**Concrete Color:** Concrete made with NewCem as a replacement for portland cement will be lighter in color. A green or blue-green color may occasionally be observed in freshly cured concrete; however, this is very rare and will only occur under certain conditions. This tint normally disappears once the concrete surface is exposed to air and dries out.

**Alkali-Silica Reactivity:** Concrete containing NewCem can help mitigate ASR. This is dependent on the qualities of the aggregate and the replacement rate as well as other variables. Concrete mixtures should be assessed on an individual basis.

**Resistance to Sulfate Attack:** NewCem can be used as part of a system to improve the resistance of concrete to sulfate attack. The degree of resistance achieved is dependent on the replacement rate and other factors. Mixes should be assessed individually.

**Corrosion of Embedded Steel:** There is a direct relationship between permeability and corrosion resistance. Corrosion can be reduced by replacing part of the portland cement with NewCem in concrete mixtures.

**Carbonation:** When used in a properly designed concrete mix, and with appropriate finishing and curing procedures applied in the field, the use of NewCem will not significantly affect the depth of carbonation.

**Freeze-Thaw Resistance:** When used in a properly designed concrete mix with an adequate air-void system and with proper finishing and curing procedures applied in the field, the use of NewCem will not detract from the freeze-thaw resistance of concrete.

**Deicer Salt Scaling:** When using NewCem as a replacement for portland cement in concrete that will be exposed to deicing salts, the limits specified in ACI 318 *Building Code Requirements for Structural Concrete* and ACI 301 *Specifications for Structural Concrete* must be followed.

**Chemical Resistance:** Reduced permeability, and therefore improved chemical resistance, can be achieved through the use of NewCem in concrete mixtures.

**Note:** Appropriate testing should be conducted with different NewCem/portland levels to assure desired results are achieved. Results may vary with the use of different portland cements.

**Product Name**

NewCem

**Manufacturer**

Lafarge North America Inc.  
12950 Worldgate Drive, Suite 500  
Herndon, Virginia 20170  
www.lafargenorthamerica.com

**Precautions**

Direct contact with wet cement should be avoided. If contact occurs, the skin should be washed with water as soon as possible. Exposure can cause serious, potentially irreversible tissue destruction in the form of chemical (caustic) burns. If cement gets into the eyes, immediately rinse thoroughly with water and seek medical attention. For more information, reference the applicable Lafarge Material Safety Data Sheet (MSDS). The MSDS should be consulted prior to use of this product and is available upon request and online at www.lafargenorthamerica.com.

**Contact your Lafarge Regional Office for specific product information, availability and ordering.****Great Lakes Region**

Southfield, Michigan  
Phone: 248-354-9050

**Northeast Region**

Montréal, Québec  
Phone: 514-861-1411

**River Region**

Lee's Summit, Missouri  
Phone: 816-251-2100

**Southeast Region**

Alpharetta, Georgia  
Phone: 678-746-2000

**Western Region**

Calgary, Alberta  
Phone: 403-271-9110

**Limited Warranty**

Lafarge warrants that Lafarge NewCem meets the requirements of ASTM C 989 *Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars* and CSA A23.5 *Supplementary Cementing Materials*. Lafarge makes no other warranty, whether of merchantability, or fitness for a particular purpose with respect to Lafarge NewCem. Having no control over its use, Lafarge will not guarantee finished work in which Lafarge NewCem is used.





# Portland Cement – Type IL

## Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.  
Issue date: 12/19/2013 Revision date: 6/22/2021 Supersedes: 11/15/2017 Version: 3.0

### SECTION 1: Identification

#### 1.1. Identification

Product form : Mixture  
Product name : Portland Cement – Type IL

#### 1.2. Recommended use and restrictions on use

Use of the substance/mixture : Mortar mixes for construction use.

#### 1.3. Supplier

##### Manufacturer

Sakrete of North America  
625 Griffith Rd., Ste 100  
Charlotte, NC 28217  
T 866-725-7383

#### 1.4. Emergency telephone number

Emergency number : CHEMTREC (800) 424-9300

### SECTION 2: Hazard(s) identification

#### 2.1. Classification of the substance or mixture

##### GHS US classification

Acute Tox. 4 (Oral)	Harmful if swallowed
Skin Corr. 1	Causes severe skin burns and eye damage
Eye Dam. 1	Causes serious eye damage
Skin Sens. 1B	May cause an allergic skin reaction
Carc. 1A	May cause cancer
STOT SE 3	May cause respiratory irritation

#### 2.2. GHS Label elements, including precautionary statements

##### GHS US labeling

Hazard pictograms (GHS US) :



Signal word (GHS US) : Danger

Hazard statements (GHS US) : Harmful if swallowed  
Causes severe skin burns and eye damage  
May cause an allergic skin reaction  
May cause respiratory irritation  
May cause cancer

Precautionary statements (GHS US) : Obtain special instructions before use.  
Do not handle until all safety precautions have been read and understood.  
Do not breathe dust/fume/gas/mist/vapors/spray.  
Wash hands, forearms and face thoroughly after handling.  
Do not eat, drink or smoke when using this product.  
Use only outdoors or in a well-ventilated area.  
Contaminated work clothing must not be allowed out of the workplace.  
Wear protective gloves/protective clothing/eye protection/face protection.

# Portland Cement – Type IL

## Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

If exposed or concerned: Get medical advice/attention.  
If swallowed: rinse mouth. Do NOT induce vomiting.  
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.  
If skin irritation or rash occurs: Get medical advice/attention.  
If inhaled: Remove person to fresh air and keep comfortable for breathing.  
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
Immediately call a poison center or doctor.  
Store in a well-ventilated place. Keep container tightly closed.  
Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

### Supplemental Information

: Read and follow all precautions listed in the Safety Data Sheet, which is available on request. Additional information on the selection and use of respirators can be found in the NIOSH Respirator Selection Logic (DHHS [NIOSH] Publication No. 2005-100) and the NIOSH Guide to Industrial Respiratory Protection (DHHS [NIOSH] Publication No. 87-116) available at <http://www.cdc.gov/niosh/docs/87-116/>.

This product contains greater than 0.1% crystalline silica. Crystalline silica has been linked to cancer, silicosis, and other lung problems in conditions of prolonged airborne over-exposure.

Keep product dry until use. Avoid contact with bleed water from wet product. Clothing saturated with wet product can result in delayed, serious alkali skin burns.

### 2.3. Other hazards which do not result in classification

No additional information available

### 2.4. Unknown acute toxicity (GHS US)

91.25 % of the mixture consists of ingredient(s) of unknown acute toxicity (Oral)

## SECTION 3: Composition/Information on ingredients

### 3.1. Substances

Not applicable

### 3.2. Mixtures

Name	Product identifier	%
Cement, portland, chemicals	CAS-No.: 65997-15-1	77 – 95
Gypsum (Ca(SO <sub>4</sub> ).2H <sub>2</sub> O)	CAS-No.: 13397-24-5	4 – 8
Magnesium oxide (MgO)	CAS-No.: 1309-48-4	0.5 – 7
Limestone	CAS-No.: 1317-65-3	0 – 15
Calcium oxide	CAS-No.: 1305-78-8	≤ 3.5
Flue dust, Portland Cement	CAS-No.: 68475-76-3	≤ 2.75
Quartz	CAS-No.: 14808-60-7	0.02 – 0.21
Nickel	CAS-No.: 7440-02-0	10 – 130 ppm
Chromium, ion (Cr 6+)	CAS-No.: 18540-29-9	0 – 120 ppm

# Portland Cement – Type II

## Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

### SECTION 4: First-aid measures

#### 4.1. Description of first aid measures

First-aid measures general	: IF EXPOSED or concerned: Get medical advice/attention.
First-aid measures after inhalation	: If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor/physician.
First-aid measures after skin contact	: If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a POISON CENTER or doctor. Wash contaminated clothing before reuse.
First-aid measures after eye contact	: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
First-aid measures after ingestion	: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor. Never give anything by mouth to an unconscious person.

#### 4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation	: May cause burns to the respiratory tract.
Symptoms/effects after skin contact	: Causes severe skin burns. Symptoms may include redness, pain, blisters. May cause an allergic skin reaction. Skin contact during hydration may slowly develop sufficient heat that may cause severe burns possibly resulting in permanent injury. Do not allow product to harden around any body part or allow continuous, prolonged contact with skin. Handling can cause dry skin.
Symptoms/effects after eye contact	: Causes serious eye damage. Symptoms may include discomfort or pain, excess blinking and tear production, with marked redness and swelling of the conjunctiva. May cause burns.
Symptoms/effects after ingestion	: Harmful if swallowed. May cause gastrointestinal irritation, nausea, vomiting and diarrhea. May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract.
Chronic symptoms	: May cause cancer.

#### 4.3. Immediate medical attention and special treatment, if necessary

Symptoms may be delayed. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

### SECTION 5: Fire-fighting measures

#### 5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media	: Use extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media	: None known.

#### 5.2. Specific hazards arising from the chemical

Fire hazard	: Product does not burn; however its packaging may. Products of combustion may include, and are not limited to: oxides of carbon.
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#### 5.3. Special protective equipment and precautions for fire-fighters

Protection during firefighting	: Keep upwind of fire. Wear full fire fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA).
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### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

General measures	: Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Avoid contact with skin and eyes.
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##### 6.1.1. For non-emergency personnel

No additional information available

# Portland Cement – Type IL

## Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

### 6.1.2. For emergency responders

No additional information available

### 6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if product enters sewers or public waters. Avoid release to the environment.

### 6.3. Methods and material for containment and cleaning up

For containment : Contain spill, then place in a suitable container. Minimize dust generation. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment (PPE).

Methods for cleaning up : Vacuum or sweep material and place in a disposal container. Minimize generation of dust. Provide ventilation.

### 6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection".

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes, on skin, or on clothing. Do not breathe dust. Do not swallow. Good housekeeping is important to prevent accumulation of dust. The use of compressed air for cleaning clothing, equipment, etc, is not recommended. Handle and open container with care.

Hygiene measures : Take off immediately all contaminated clothing and wash it before reuse. Always wash hands after handling the product.

### 7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep out of the reach of children. Keep container tightly closed. Store in a well-ventilated place. Avoid any dust buildup by frequent cleaning and suitable construction of the storage area. Do not store in an area equipped with emergency water sprinklers. Clean up spilled material promptly.

Storage area : Store away from heat.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Portland Cement – Type IL	
No additional information available	
Cement, portland, chemicals (65997-15-1)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Portland Cement – Type IL
ACGIH OEL TWA	1 mg/m <sup>3</sup> (particulate matter containing no asbestos and <1% crystalline silica, respirable particulate matter)
Remark (ACGIH)	TLV® Basis: Pulm func; resp symptoms; asthma. Notations: A4 (Not classifiable as a Human Carcinogen)
ACGIH chemical category	Not Classifiable as a Human Carcinogen
Regulatory reference	ACGIH 2020

# Portland Cement – Type II

## Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

<b>Cement, portland, chemicals (65997-15-1)</b>	
<b>USA - OSHA - Occupational Exposure Limits</b>	
OSHA PEL (TWA) [1]	15 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable fraction)
<b>USA - IDLH - Occupational Exposure Limits</b>	
IDLH	5000 mg/m <sup>3</sup>
<b>USA - NIOSH - Occupational Exposure Limits</b>	
NIOSH REL (TWA)	10 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable dust)
<b>Gypsum (Ca(SO<sub>4</sub>).2H<sub>2</sub>O) (13397-24-5)</b>	
<b>USA - ACGIH - Occupational Exposure Limits</b>	
ACGIH OEL TWA	10 mg/m <sup>3</sup> (inhalable particulate matter (Calcium sulfate))
<b>USA - OSHA - Occupational Exposure Limits</b>	
OSHA PEL (TWA) [1]	15 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable fraction)
<b>USA - NIOSH - Occupational Exposure Limits</b>	
NIOSH REL (TWA)	10 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable dust)
<b>Magnesium oxide (MgO) (1309-48-4)</b>	
<b>USA - ACGIH - Occupational Exposure Limits</b>	
ACGIH OEL TWA	10 mg/m <sup>3</sup> (inhalable particulate matter)
ACGIH chemical category	Not Classifiable as a Human Carcinogen
<b>USA - OSHA - Occupational Exposure Limits</b>	
OSHA PEL (TWA) [1]	15 mg/m <sup>3</sup> (fume, total particulate)
<b>USA - IDLH - Occupational Exposure Limits</b>	
IDLH	750 mg/m <sup>3</sup> (fume)
<b>Flue dust, Portland Cement (68475-76-3)</b>	
<b>USA - ACGIH - Occupational Exposure Limits</b>	
ACGIH OEL TLV	10 mg/m <sup>3</sup> (as inhalable fraction, PNOS) 3 mg/m <sup>3</sup> (as respirable fraction, PNOS)
<b>USA - OSHA - Occupational Exposure Limits</b>	
OSHA PEL	15 mg/m <sup>3</sup> (as total dust, PNOR) 5 mg/m <sup>3</sup> (as respirable fraction, PNOR)
<b>Calcium oxide (1305-78-8)</b>	
<b>USA - ACGIH - Occupational Exposure Limits</b>	
Local name	Calcium oxide
ACGIH OEL TWA	2 mg/m <sup>3</sup>
Remark (ACGIH)	TLV® Basis: URT irr
Regulatory reference	ACGIH 2020

# Portland Cement – Type IL

## Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

Calcium oxide (1305-78-8)	
<b>USA - OSHA - Occupational Exposure Limits</b>	
Local name	Calcium oxide
OSHA PEL (TWA) [1]	5 mg/m <sup>3</sup>
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1
<b>USA - IDLH - Occupational Exposure Limits</b>	
IDLH	25 mg/m <sup>3</sup>
<b>USA - NIOSH - Occupational Exposure Limits</b>	
NIOSH REL (TWA)	2 mg/m <sup>3</sup>
Quartz (14808-60-7)	
<b>USA - ACGIH - Occupational Exposure Limits</b>	
ACGIH OEL TWA	0.025 mg/m <sup>3</sup> (respirable particulate matter)
ACGIH chemical category	Suspected Human Carcinogen
<b>USA - OSHA - Occupational Exposure Limits</b>	
Local name	Quartz (Total Dust) (Silica: Crystalline)
OSHA PEL (TWA) [1]	50 µg/m <sup>3</sup> (Respirable crystalline silica)
Remark (OSHA)	Table Z-3. For OSHA PEL (TWA) use formula: (30 mg/m <sup>3</sup> / (%SiO <sub>2</sub> +2)) for mg/m <sup>3</sup> . CAS No. source: eCFR Table Z-1.
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-3 Mineral Dusts
<b>USA - IDLH - Occupational Exposure Limits</b>	
IDLH	50 mg/m <sup>3</sup> (respirable dust)
<b>USA - NIOSH - Occupational Exposure Limits</b>	
NIOSH REL (TWA)	0.05 mg/m <sup>3</sup> (respirable dust)
Limestone (1317-65-3)	
<b>USA - OSHA - Occupational Exposure Limits</b>	
OSHA PEL (TWA) [1]	15 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable fraction)
<b>USA - NIOSH - Occupational Exposure Limits</b>	
NIOSH REL (TWA)	10 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable dust)

### 8.2. Appropriate engineering controls

- Appropriate engineering controls : Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapor, etc.) below recommended exposure limits. Provide readily accessible eye wash stations and safety showers.
- Environmental exposure controls : Avoid release to the environment.

### 8.3. Individual protection measures/Personal protective equipment

#### Personal protective equipment:

Avoid all unnecessary exposure.

#### Hand protection:

Wear suitable gloves resistant to chemical penetration

# Portland Cement – Type IL

## Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

### Eye protection:

Wear eye/face protection

### Skin and body protection:

Wear suitable clothing common to do-it-yourself projects.

### Respiratory protection:

A NIOSH approved dust mask or filtering facepiece is recommended in poorly ventilated areas or when permissible exposure limits may be exceeded. Respirators should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134) and ANSI's standard for respiratory protection (Z88.2).

### Other information:

Do not eat, drink or smoke when using this product. Handle in accordance with good industrial hygiene and safety procedures.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: Powder.
Color	: Gray
Odor	: odorless
Odor threshold	: No data available
pH	: 12 – 13 (Highly alkaline when wet.)
Melting point	: No data available
Freezing point	: Not applicable
Boiling point	: No data available
Flash point	: Not applicable
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: Non flammable.
Vapor pressure	: No data available
Relative vapor density at 20 °C	: No data available
Relative density	: 2.8 – 3.1
Solubility	: Slight. Water: 0.1 - 1 %
Partition coefficient n-octanol/water	: No data available
Auto-ignition temperature	: Not applicable
Decomposition temperature	: No data available
Viscosity, kinematic	: Not applicable
Viscosity, dynamic	: No data available
Explosion limits	: Not applicable
Explosive properties	: No data available
Oxidizing properties	: No data available

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

No dangerous reactions known under normal conditions of use. An alkali reaction from components of Portland Cement – Type IL will corrode aluminum.

# Portland Cement – Type IL

## Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

### 10.2. Chemical stability

Stable under normal storage conditions. Keep dry in storage.

### 10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use. Do not mix with other chemicals.

### 10.4. Conditions to avoid

Moisture – product must be kept dry until ready to use. Heat. Incompatible materials.

### 10.5. Incompatible materials

None known.

### 10.6. Hazardous decomposition products

None known.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity (oral) : Harmful if swallowed.  
Acute toxicity (dermal) : Not classified  
Acute toxicity (inhalation) : Not classified

#### Portland Cement – Type IL

ATE US (oral)	500 mg/kg body weight
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#### Magnesium oxide (MgO) (1309-48-4)

LD50 oral rat	3870 mg/kg
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#### Flue dust, Portland Cement (68475-76-3)

LD50 oral rat	> 1848 mg/kg body weight Animal: rat, Guideline: other:OECD 422
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LD50 dermal rat	≥ 2000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity)
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LC50 inhalation rat	> 6.04 mg/l air Animal: rat, Guideline: OECD Guideline 436 (Acute Inhalation Toxicity: Acute Toxic Class Method)
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#### Calcium oxide (1305-78-8)

LD50 dermal rabbit	> 5000 mg/kg body weight Animal: rabbit, Guideline: other:US Federal Register 38: 187, Part 1500, Section 41, 1973.
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Skin corrosion/irritation : Causes severe skin burns.  
pH: 12 – 13 (in water)

Serious eye damage/irritation : Causes serious eye damage.  
pH: 12 – 13 (in water)

Respiratory or skin sensitization : May cause an allergic skin reaction.

Product may contain trace concentrations of Chromate and Nickel compounds that can cause an allergic skin reaction, allergic contact dermatitis, or ACD. Once sensitized, brief skin contact with very small amounts of Cr 6+ may result in inflammation, rash, itching or severe skin ulcers. ACD is long-lasting and employees can remain sensitized to Cr 6+ for many years.

Germ cell mutagenicity : Not classified

Carcinogenicity : May cause cancer.

#### Quartz (14808-60-7)

IARC group	1 - Carcinogenic to humans
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# Portland Cement – Type II

## Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

Quartz (14808-60-7)	
National Toxicology Program (NTP) Status	Known Human Carcinogens
In OSHA Hazard Communication Carcinogen list	Yes
Reproductive toxicity	: Not classified
STOT-single exposure	: May cause respiratory irritation.
Cement, portland, chemicals (65997-15-1)	
STOT-single exposure	May cause respiratory irritation.
Flue dust, Portland Cement (68475-76-3)	
STOT-single exposure	May cause respiratory irritation.
Calcium oxide (1305-78-8)	
STOT-single exposure	May cause respiratory irritation.
STOT-repeated exposure	: Not classified
Calcium oxide (1305-78-8)	
LOAEL (oral, rat, 90 days)	300 mg/kg body weight Animal: rat, Animal sex: male, Guideline: OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)
NOAEC (inhalation, rat, dust/mist/fume, 90 days)	0.413 mg/l air Animal: rat, Animal sex: male, Guideline: OECD Guideline 412 (Subacute Inhalation Toxicity: 28-Day Study)
Quartz (14808-60-7)	
STOT-repeated exposure	Causes damage to organs through prolonged or repeated exposure.
Aspiration hazard	: Not classified
Viscosity, kinematic	: Not applicable
Potential Adverse human health effects and symptoms	: No data available.
Symptoms/effects after inhalation	: May cause burns to the respiratory tract.
Symptoms/effects after skin contact	: Causes severe skin burns. Symptoms may include redness, pain, blisters. May cause an allergic skin reaction. Skin contact during hydration may slowly develop sufficient heat that may cause severe burns possibly resulting in permanent injury. Do not allow product to harden around any body part or allow continuous, prolonged contact with skin. Handling can cause dry skin.
Symptoms/effects after eye contact	: Causes serious eye damage. Symptoms may include discomfort or pain, excess blinking and tear production, with marked redness and swelling of the conjunctiva. May cause burns.
Symptoms/effects after ingestion	: Harmful if swallowed. May cause gastrointestinal irritation, nausea, vomiting and diarrhea. May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract.
Chronic symptoms	: May cause cancer.
Other information	: Likely routes of exposure: ingestion, inhalation, skin and eye.

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - general : No ecological consideration when used according to directions. Normal dilution of this product to drains, sewers, septic systems and treatment plants is not considered environmentally harmful. Do not flush to sewer or allow to enter waterways.

Calcium oxide (1305-78-8)	
LC50 - Fish [1]	1070 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [static])
NOEC chronic fish	100 mg/l Test organisms (species): other: Tilapia nilotica Duration: '46 d'

# Portland Cement – Type IL

## Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

### 12.2. Persistence and degradability

#### Portland Cement – Type IL

Persistence and degradability	Not established.
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### 12.3. Bioaccumulative potential

#### Portland Cement – Type IL

Bioaccumulative potential	Not established.
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#### Calcium oxide (1305-78-8)

BCF - Fish [1]	(no bioaccumulation)
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### 12.4. Mobility in soil

#### Portland Cement – Type IL

Ecology - soil	No data available.
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### 12.5. Other adverse effects

Other adverse effects : No data available.  
Other information : No other effects known.

## SECTION 13: Disposal considerations

### 13.1. Disposal methods

Product/Packaging disposal recommendations : Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

## SECTION 14: Transport information

In accordance with DOT

### 14.1. UN number

Not regulated for transport

### 14.2. UN proper shipping name

Proper Shipping Name (DOT) : Not applicable

### 14.3. Transport hazard class(es)

**DOT**  
Transport hazard class(es) (DOT) : Not applicable

### 14.4. Packing group

Packing group (DOT) : Not applicable

### 14.5. Environmental hazards

Other information : No supplementary information available.

### 14.6. Special precautions for user

Special transport precautions : Do not handle until all safety precautions have been read and understood.

# Portland Cement – Type IL

## Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

### 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

All components of this product are listed as Active, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

Gypsum (Ca(SO <sub>4</sub> ).2H <sub>2</sub> O)	CAS-No. 13397-24-5
---	--------------------

### 15.2. International regulations

No additional information available

### 15.3. US State regulations

**⚠ WARNING:** This product can expose you to Silica, crystalline (airborne particles of respirable size), which is known to the State of California to cause cancer. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

## SECTION 16: Other information

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

Issue date : 12/19/2013  
Revision date : 06/22/2021  
Other information : None.  
Prepared by : Nexreg Compliance Inc.  
[www.Nexreg.com](http://www.Nexreg.com)



Full text of H-phrases	
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Carc. 1A	Carcinogenicity Category 1A
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Skin Corr. 1	Skin corrosion/irritation Category 1
Skin Sens. 1B	Skin sensitization, category 1B
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation

Safety Data Sheet (SDS), USA

Disclaimer: We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind. The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for the user's own particular use.

## **APPENDIX H**

### **LEAF Analysis**

**Table H1. Treatability Test - Leaching Results**

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington

**LEAF Testing Results for Soil 1 - Mix 8**

	Interval T1 Duration: 2 hours Cum. Leach Time: 0.08 days	Interval T2 Duration: 23 hours Cum. Leach Time: 1 day	Interval T3 Duration: 23 hours Cum. Leach Time: 2 days	Interval T4 Duration: 5 days Cum. Leach Time: 7 days	Interval T5 Duration: 7 days Cum. Leach Time: 14 days	Interval T6 Duration: 14 days Cum. Leach Time: 28 days	Interval T7 Duration: 14 days Cum. Leach Time: 42 days	Interval T8 Duration: 7 days Cum. Leach Time: 49 days	Interval T9 Duration: 14 days Cum. Leach Time: 63 days
Dissolved Mercury in Eluate (ug/L)	13	6.4	1.2	0.86	0.42	1.1	2	1.1	1
Cumulative Leach Time (days)	0.08	1	2	7	14	28	42	49	63
Eluate volume (mL)	1418.07	1429.22	1512.74	1456.22	1389.75	1468.73	1468.73	1478.74	1469.50
Eluate pH (std units)	6.64	6.90	6.64	7.05	7.04	7.59	7.46	7.22	7.56
Eluate Electrical Conductivity (uS/cm)	2220	2320	2280	2120	2050	1830	1920	2180	1940
Mercury Mass Released per Interval (mg/m2)	0.0092	0.0046	0.0009	0.0006	0.0003	0.0008	0.0015	0.0008	0.0007
Cumulative Mercury Mass Released (mg/m2)	0.0092	0.0137	0.0147	0.0153	0.0156	0.0164	0.0178	0.0187	0.0194
Mercury Mass Flux per Interval (mg/m2-day)	0.0092	0.00496	0.00090	0.00012	0.00004	0.00006	0.00010	0.00012	0.00005
Mean Interval for Flux plot (day)	0.02	0.4	1.5	4.1	10	20	35	45	56

**LEAF Testing Results for Soil 2 - Mix 8**

	Interval T1 Duration: 2 hours Cum. Leach Time: 0.08 days	Interval T2 Duration: 23 hours Cum. Leach Time: 1 day	Interval T3 Duration: 23 hours Cum. Leach Time: 2 days	Interval T4 Duration: 5 days Cum. Leach Time: 7 days	Interval T5 Duration: 7 days Cum. Leach Time: 14 days	Interval T6 Duration: 14 days Cum. Leach Time: 28 days	Interval T7 Duration: 14 days Cum. Leach Time: 42 days	Interval T8 Duration: 7 days Cum. Leach Time: 49 days	Interval T9 Duration: 14 days Cum. Leach Time: 63 days
Dissolved Mercury in Eluate (ug/L)	0.028	0.048	0.027	0.031	0.026	0.072	0.200	0.096	0.17
Cumulative Leach Time (days)	0.08	1	2	7	14	28	42	49	63
Eluate volume (mL)	1446.21	1428.69	1494.68	1485.03	1417.72	1484.85	1484.85	1475.91	1391.68
Eluate pH (std units)	6.65	6.91	6.75	6.96	7.11	7.64	7.36	7.17	7.61
Eluate Electrical Conductivity (uS/cm)	2180	2130	2180	1980	1930	1720	1900	2220	1930
Mercury Mass Released per Interval (mg/m2)	0.00002	0.00003	0.00002	0.00002	0.00002	0.00005	0.00015	0.00007	0.00012
Cumulative Mercury Mass Released (mg/m2)	0.00002	0.00005	0.00008	0.00010	0.00012	0.00017	0.00032	0.00039	0.00051
Mercury Mass Flux per Interval (mg/m2-day)	0.00002	0.000037	0.000020	0.000005	0.000003	0.000004	0.000011	0.000010	0.000008
Mean Interval for Flux plot (day)	0.02	0.4	1.5	4.1	10	20	35	45	56

**Notes:**  
ug/L - micrograms per liter

## **APPENDIX I**

### **Empirical Assessment of Dissolved Mercury Transport and Attenuation in the Caustic Plume**

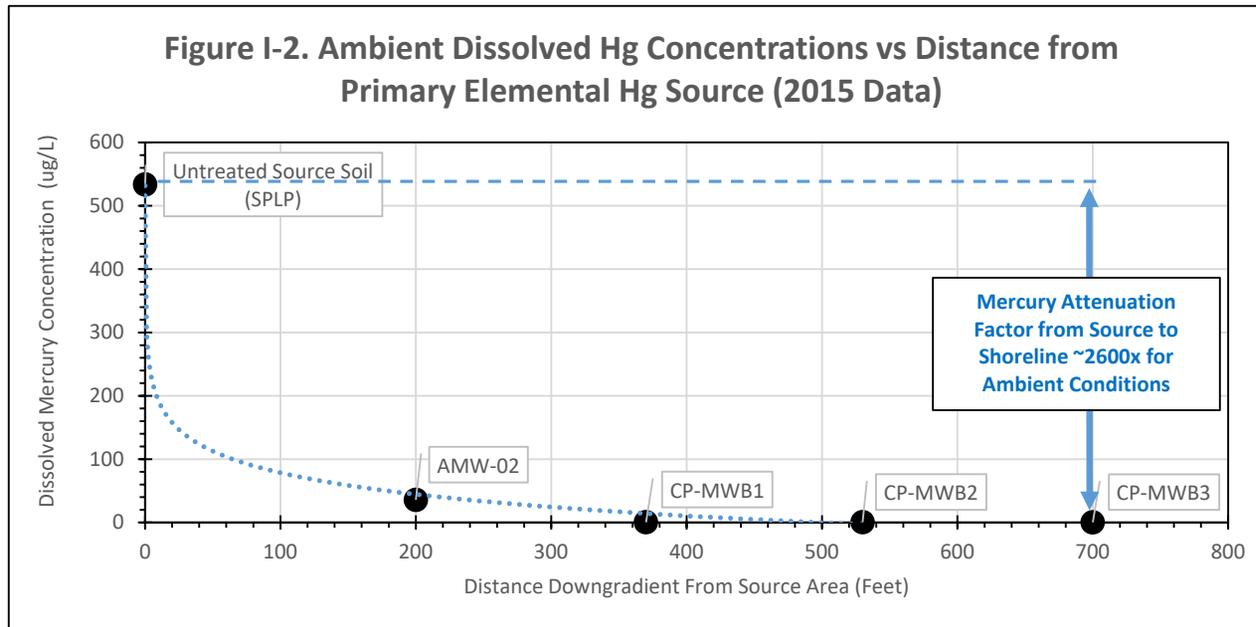
# Appendix I. Empirical Assessment of Dissolved Mercury Transport and Attenuation in the Caustic Plume

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington

**Table I-1. Ambient Groundwater Concentrations Prior to ISS Treatment of Mercury Source Soils**

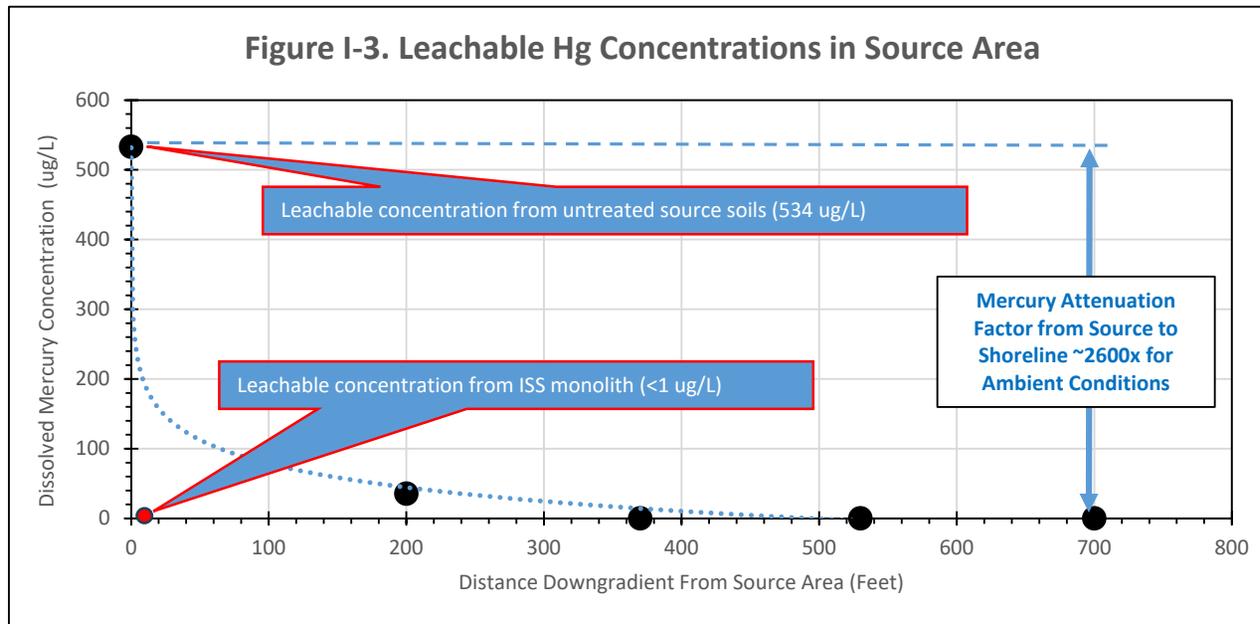
	Untreated Source Soil (SPLP)	AMW-02	CP-MWB1	CP-MWB2	CP-MWB3
Approx. Distance from downgradient edge of source (ft)	0.01	200	370	530	700
2015 Data (µg/L)	534	35.6	0.29	0.27	0.20
2023 Data (Average) (µg/L)	534	2.7	0.10	n/a	n/a
Mercury Attenuation Factor as of 2015	1	15	1840	1976	2641

n/a: Well not found in 2023, thus sample not collected.



# Appendix I. Empirical Assessment of Dissolved Mercury Transport and Attenuation in the Caustic Plume

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington



## Comparison of Estimated Post-Treatment Groundwater Concentration to Shoreline Well to CAP Remediation Level

### Transport Between Untreated Source (SPLP) to Shoreline Well CP-MWB3 (2015 Conditions)

$$\begin{aligned} & [\text{Untreated source soil Hg (SPLP)}] / [\text{2015 Hg at CP-MWB3}] = \text{attenuation factor} \\ & (534 \mu\text{g/L}) / (0.2 \mu\text{g/L}) = \underline{2,600} \text{ attenuation factor} \end{aligned}$$

### Transport from Treated Monolith (<1 ug/L by LEAF) to Shoreline Well

#### CP-MWB3, Assuming Same Attenuation Factor

$$\begin{aligned} & [\text{Treated monolith Hg}] / \text{attenuation factor} = [\text{Treated Hg at CP-MWB3}] \\ & (1 \mu\text{g/L}) / 2600 = \underline{0.0004} \mu\text{g/L at CP-MWB3 after ISS cleanup action} \end{aligned}$$

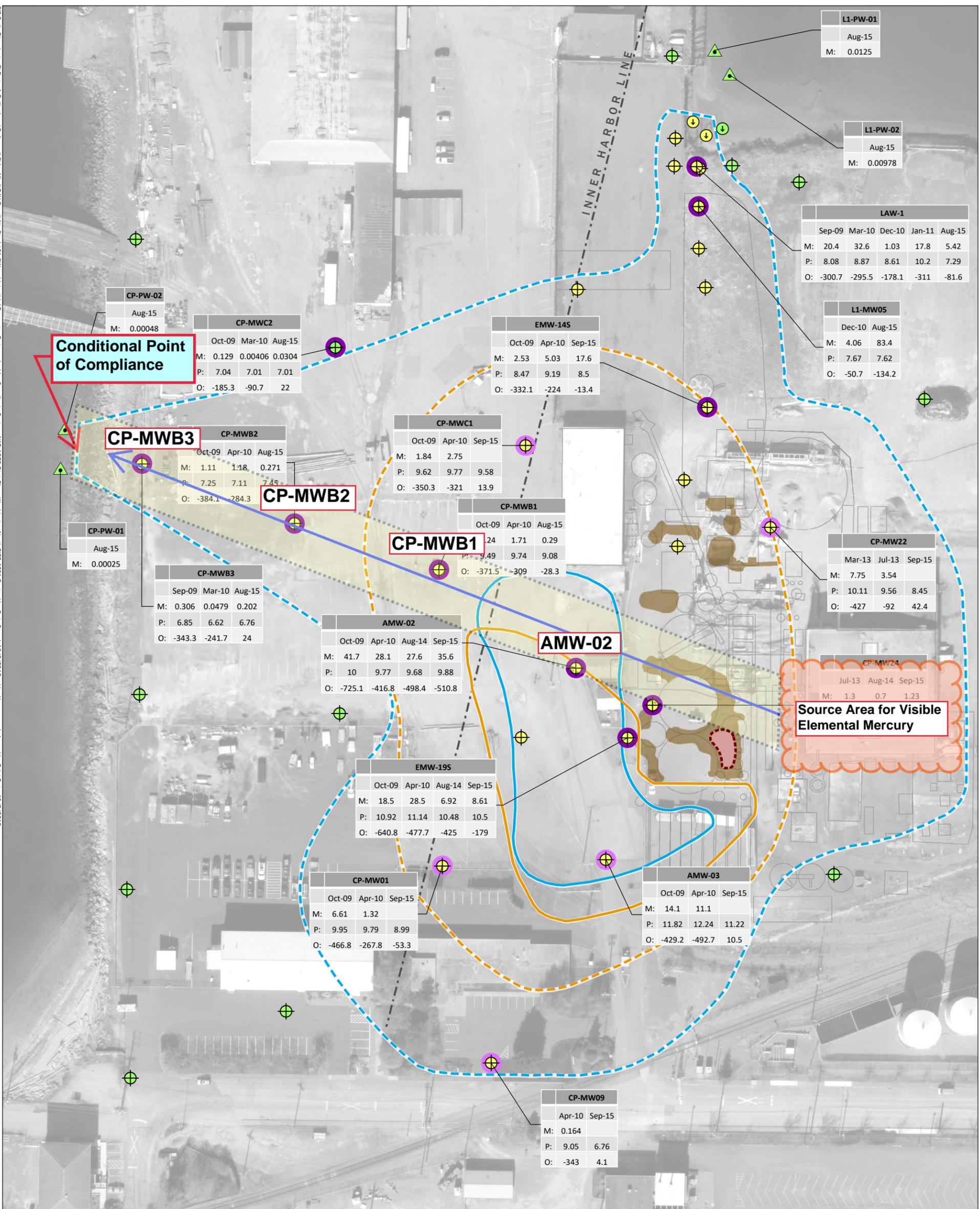
### Comparison to CAP Hg Remediation Level

$$\text{CAP Remediation Level at CP-MWB3} = 7.6 \mu\text{g/L}$$

$$[\text{CAP Hg Remediation Level}] / [\text{Treated Hg at CP-MWB3}] = \text{factor of safety}$$

$$(7.6 \mu\text{g/L}) / (0.0004 \mu\text{g/L}) = \underline{19,760} \text{ "factor of safety" for protection of discharge to Bellingham Bay}$$

GIS Path: \\projects\_8\port\_of\_bellingham\delivered\color\metal\hgw\feasibility\_study\01\_gw\_and\_interstitial\_porewater\_data.mxd | Coordinate System: NAD 1983 StatePlane Washington North FIPS 4801 Feet | Date Saved: 10/6/2015 | User: scumbaker | Print Date: 10/6/2015



Well ID	LAW-1				
Sample Date	Sep-09	Mar-10	Dec-10	Jan-11	Aug-15
Dissolved Mercury (in µg/L)	M: 20.4	32.6	1.03	17.8	5.42
pH	P: 8.08	8.87	8.61	10.2	7.29
ORP (mV)	O: -300.7	-295.5	-178.1	-311	-81.6

**Qualifiers:**  
 U = Not Detected,  
 J = Estimated Concentration.  
 (Blank = No Sample)

**Sample Location Not Sampled Aug 2015 (symbol):**

- ⊕ Fill Unit Monitoring Well
- Ⓣ Intertidal Well Point

**Mercury in Groundwater (post-interim action) (symbol color):**

- Green: Dissolved Hg ≤ 0.059 µg/L
- Yellow: Dissolved Hg > 0.059 µg/L

**Fill Unit Groundwater pH (post-interim action):**

- Orange: > 8.5
- Yellow: > 10

**Fill Unit Dissolved Hg in Groundwater (post-interim action):**

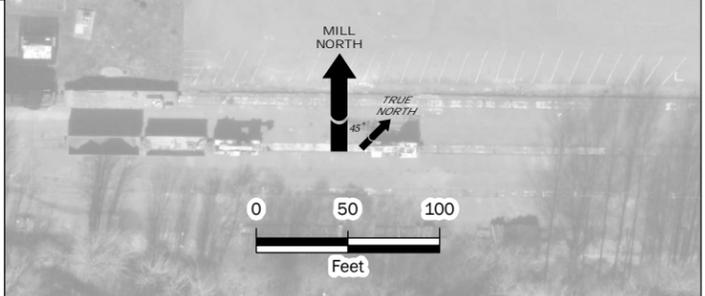
- Blue: > 0.059 µg/L
- Light Blue: > 10 µg/L

**Aug 2015 Sample Locations**

- Ⓣ Intertidal Porewater Sample (Hg and pH)
- ⊕ Monitoring well (Hg and pH)
- ⊕ Monitoring well (pH)

**Other Symbols:**

- Red dashed circle: Approximate Area of Siderite-Amended Backfill
- Brown shaded area: Previous Soil Removal Areas, Caustic Plume Interim Action



**Dissolved Mercury Transport and Attenuation - Sept 2015**  
 Pre-Remedial Design Investigation 2 Data Report  
 GP West Site, Bellingham, Washington

	OCT-2015 PROJECT NO. 070188	BY: PPW REVISED BY: EAC	FIGURE NO. <b>I-1</b>
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