

Heidelberg Materials (a.k.a. Lehigh Cement Co)
Permit Number WA0045586

Metalline Falls, WA

Inspection Date: May 4, 2023

Prepared by: Diana Washington

Department of Ecology

Eastern Regional Office

Water Quality Program

Lead Inspector Signature/Date:

	August 29, 2023
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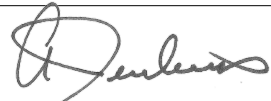
Diana Washington

Second Inspector Signature/Date:

	September 6, 2023
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Charlotte Daskalopoulos

Supervisor Signature/Date:

	8/29/2023
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Art Jenkins

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(All details in this report were obtained through conversations with Heidelberg Materials and Geosyntec representatives or from observations made during the inspection.)

Facility Information

Facility Name: Heidelberg Materials (a.k.a Lehigh Cement Co.)

Permit Number: WA0045586

Facility Owner: Heidelberg Materials

Contract Operator: Geosyntec Consultants Inc.

Physical Address: Milepost 14.7, Washington State Route 31, Metaline Falls, WA 99153

Facility Location: Latitude: 48.8609 Longitude: -117.3668

Mailing Address: 300 E Carpenter Fwy, Irving, TX 75062

Receiving Water: Sullivan Creek

Discharge Location: Latitude: 48.861192 Longitude: -117.366772

NAICS Code: 327310 (Cement Manufacturing) SIC Code: 3241 (Cement)

Present at Inspection:

Heidelberg Materials:

Gregory J Ronczka
Vice President, Environment & Sustainability
300 E John Carpenter Fwy
Irving, Texas
Phone (972) 657-4301

Geosyntec Consultants (Contract Operator):

Brent Miller
Senior Principal Engineer
520 Pike St, Suite #2600
Seattle, WA 98101
(206)496-1450

Adrianna Jarosz
Project Engineer
Boise, Idaho
(206) 379-2002

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Diana Washington
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Kristin Beck
Toxics Cleanup Program
Senior Hydrogeologist/ Project Manager
(509) 514-6806

Inspection Information

Inspection Date: May 4, 2023

Inspectors: Diana Washington and Charlotte Daskalopoulos

Arrival Time: 9:47 AM

Departure Time: 12:50 PM

Purpose: Conduct a non-sampling NPDES compliance evaluation and site inspection

Permit Information

NPDES permit number WA0045586 authorizing discharge to Sullivan Creek was developed by the Toxics Cleanup Program (TCP) and went into effect on October 15, 2006. The permit expired on October 14, 2011. The facility is operated under the extended permit until the renewal permit is issued.

Background

History

While processing cement from 1914 -1989, Heidelberg Materials (a.k.a Lehigh Cement) utilized a dry processing kiln. The resulting kiln gases were routed through the plant's dust collection systems. The cement kiln dust (CKD), a by-product of Portland cement production, was transported to the ravine across Quarry Road, east of the plant. Approximately 544,000 tons of CKD were dumped in the ravine. The CKD repository is located just east of the Town of Metairie Falls along Highway 31 (Attachment A).

When Heidelberg sold the cement production plant and other holdings to Lafarge Corporation in 1989, they retained ownership of the CKD pile. In 1996 Heidelberg capped the CKD pile, creating a repository, and installed other closure systems in accordance with an Ecology-approved Closure Plan.

Capping the CKD pile did not eliminate CKD-affected groundwater flowing to Sullivan Creek. Groundwater contacting the CKD has high pH and elevated metals concentrations. In 2006 a Consent Decree was issued requiring Heidelberg to implement the in-situ carbon dioxide injection system required to clean up the groundwater prior to discharge to Sullivan Creek. The aerial photograph in Attachment B provides a view of the location of the components of the system. The schematic in Attachment C provides an overview of the treatment system. The system was designed to be operated from a remote location. As a result, the facility has a SCADA system that allows operators to make operational changes from a remote location. When there is an alarm, then the operator must come from Seattle, approximately eight hours away, to make physical changes to the site.

In September 2006, Ecology's Toxics Cleanup Program (TCP) developed NPDES Permit WA 0045586, and the Water Quality Program (WQ) issued the permit. The permit expired in 2011 and Ecology administratively extended the permit. The permit allowed for discharge to Sullivan Creek and placed limits on total arsenic, chromium, lead, manganese, and pH.

Permit Limits:

The extended permit has the following limitations for the discharge from the groundwater treatment system:

Table 1: Permit Limits

Parameter	Average Monthly Limit	Maximum Daily Limit
Arsenic (total)	5 ug/L	5 ug/L
Chromium (total)	10 ug/L	10 ug/L
Lead (total)	5 ug/L	5 ug/L
Manganese (total)	2,240 ug/L	2,240 ug/L
pH	Not Applicable	Daily minimum is equal to or greater than 6.5 and the daily maximum is less than or equal to 8.5

Compliance:

Heidelberg has had difficulty meeting the cleanup levels identified in the permit. The new permit under development will implement water quality-based effluent limits which should result in fewer violations as new information indicates that a mixing zone may apply. The following is a summary of the violations over the course of the permit, July 2009 - January 2023:

- pH: 28 violations 19 below 6.5 and 9 above 8.5
- Total arsenic: 138 violations
- Total chromium: 3 violations
- Total lead: 28 violations
- Total manganese: 22 violations

Inspection Chronology

On March 24, 2023, Ecology staff requested that Heidelberg be available for a compliance inspection. The date was set for May 4, 2023, and coupled the site inspection with an introduction to the new TCP project manager, Kristin Beck. Ecology confirmed the date and sent an email to Heidelberg staff requesting a list of documents be made available during the inspection for Ecology review.

Ecology staff arrived on site at 9:47 AM and provided credentials.

The opening conference began at 10 am.

Geosyntec provided a presentation starting at 10:16 AM.

Ecology began document review at 10:53 AM.

Laboratory procedures were reviewed at 11:40 AM.

The site inspection started at 12:06 PM

The closing conference started at 12:43 PM.

Ecology left the site at 12:58 PM.

Opening Conference

Ecology Water Quality Program and Toxics Cleanup Program staff met with the Heidelberg representative and the contract operator representatives from Geosyntec Consultants. Ecology discussed the inspection chronology with Heidelberg and Geosyntec. Geosyntec informed Ecology that they planned to provide a presentation (Photo 1) updating the progress at the site. Heidelberg was provided a list of documents to be reviewed in the response to the meeting request on March 24, 2023. The list included the following:

- Operator Log (last 3 years)
- Operations & Maintenance Manual
- Lab results (this is a review of random lab quality assurance/quality control and results paperwork (bench sheets) compared to reported data (Data Monitoring Reports) (last 3 years)

File Review

Ecology reviewed documents from 10:50 AM to 11:40 AM and observed the following:

- The Operations & Maintenance Manual (O&M) appears to be an updated version of the O&M file copy at Ecology.
- Ecology was given a blank O&M checklist package (Photo 2) during the O&M documentation review. Geosyntec indicated that checklists are completed every quarter. Ecology requested a completed checklist via email. The checklist package provided during the inspection does not match the checklists emailed to Ecology (Photo 3).
- The lab results, checklists and photos are managed electronically (Photo 4). Ecology viewed the electronic documentation.
- The treatment system was designed to be operated remotely. The system has a supervisory control and data acquisition (SCADA) system (Photo 5). This system records the pH and allows the operator to control dosage of carbon dioxide dependent upon the real time pH. There is not an operator log that tracks the day-to-day actions taken in response to the SCADA system.
- The permit requires the operator to collect samples every two weeks when they are discharging to the creek. According to previous discussions with TCP Project Manager Bill Fees (retired), TCP changed this to monthly when discharging due to the remoteness of the site and minimal risk to the surface water. TCP and the previous WQ permit manager did not modify the permit prior to expiration. Heidelberg samples monthly when discharging.
- The contract between Heidelberg and contract operator Geosyntec was reviewed. This contract must identify the roles and responsibilities of the contract operator. This contract was not onsite for review and has not been submitted to Ecology for review and approval. This is a general condition that has been added to all permits issued by Ecology but is not a condition in the permit written in 2006.

Site Inspection

The site inspection started in the sample storage and collection area on the second floor of the building (Attachment D).

- The pH probe calibration solutions were available, as was the log with the calibration records (Photo 6).
- All onsite field measurements are made using a YSI Pro DSS 4 port sampler. The sampler has probes for dissolved oxygen, pH, temperature, and turbidity (Photo 7).
- Sample bottles are ordered and maintained at the site (Photo 8).
- Extra pH probes for the two-inch (Photo 9) and four-inch (Photo 10) wells are stored on the counter. The pH probe manufacturer O&M was not available. Ecology asked if the probes should be in solution, and the representatives at the site did not know at the time of inspection. Given the salt ring around the tops, it appears that the probes were stored in solution but there was not any solution in the probe storage containers.

The inspection proceeded to the carbon dioxide injection treatment system (Attachment D). The treatment system was built to treat high pH groundwater discharging to Sullivan Creek. Attachment B provides an aerial photograph showing the approximate location of the constructed components on the site.

- Carbon dioxide (CO₂) is stored in bulk on site (Photo 11). The tank is stored on the ground floor of the same building as the lab and meeting area, second floor. The building is equipped with CO₂ sensor and warning system. The CO₂ is piped to the subsurface to the distribution system.
- The treatment system is fenced (Photo 12) and secured (Photo 13). The signage shows Bill Fees phone number (509) 329-3589 as the Ecology emergency contact and Timothy Matz phone number (972) 653-3787 as the Lehigh emergency contact. These phone numbers and contacts are no longer valid.
- The fence is only located on three sides of the site and ends near the edge of the rip rap covered diffusion area. (Photos 14-15).
- The site provides access panels to the CO₂ distribution tubing, programable logic controllers (PLCs) and sampling access locations to the pipes going to the diffuser (Photo 16-17).
- Geosyntec piloted increased oxygen to effluent to precipitate additional arsenic. They did not implement the full-scale change to the treatment process. The remnants of a recent pilot project were still onsite (Photo 18).

Ecology inspection included the other constructed features on the site located outside the fence:

- Just east of the fenced site is a constructed stormwater drainage channel that discharges surface runoff from the CDK pile to Sullivan Creek (Photos 19-22). No standing water was visible in the drainage channel. Geosyntec indicated that their staff have never seen standing or flowing water in the channel. The channel consists of medium size cobbles and gravel.
- The site was originally constructed with a distribution box (Photo 23) that would send groundwater from a French drain to either a constructed wetland (Photo 24) or the treatment system capture zone. After years of monitoring the decision was made to leave the valve in the discharge to the capture zone mode.
- Ecology walked the drainage on the eastern boundary of the site. Ecology observed a drainage channel that appeared to be constructed (Photo 25). A culvert at the south end of the channel runs under Highway 31 (Photo 26). The channel appears to have standing water in it near the culvert (Photo 27). The drainage channel discharges to Sullivan Creek.
- On the northeast toe of the CKD pile there was what appeared to be a wetland with standing water (Photo 28-29). Review of the construction documents, upon return to the office, indicated that this was constructed as a sedimentation basin when the other work at the site was completed. This area is growing vegetation and is acting as a wetland. It was not possible to tell where the geomembrane cover for the repository cover began. As a result, it was not possible to tell if roots from small trees and other vegetation may impact the cover for the repository.

Ecology discussed sampling the pH of this wetland if there was still standing water when Geosyntec returns to the site to conduct sampling and quarterly site inspection. The results of the pH sampling were provided to Ecology via email on July 10, 2023, with the DMR. The pH for the sediment pond on May 9, 2023, was 8.2 standard units.

- Ecology viewed the north side of the repository. The soil and vegetation covering the repository geomembrane appeared to be intact (Photos 30-31). There was some woody vegetation starting to grow at the toe of the repository. It is not possible to tell where the repository cover begins. There should be markers so that vegetation that may negatively impact the cover could be identified and removed.
- Upon reentering the site on the north side of Highway 31, Ecology identified pipes and tubing sticking out of the ground. Geosyntec identified the remnants of the original in situ pilot for the full-scale groundwater treatment system (Photos 32-35). These pipes potentially provide direct access to the groundwater on the site. The old pilot should be properly closed with appropriate disposal of the waste materials.

- Heidelberg Materials leases the shop to someone else that has a common wall with the CO2 storage/lab. This area is clean and organized. The area no longer has waste drums and batteries laying around the site.

Areas of Concern

Effluent Limit Exceedances

Arsenic and lead violations may be resolved when the updated permit is issued. The facility conducted a mixing zone evaluation and will be given a mixing zone and with water quality based effluent limits.

Proper Operations and Maintenance

Heidelberg should identify the proper storage requirements for pH probes when not in use.

Pilot treatment systems should be closed, and solid wastes should be recovered for reuse or discarded.

Record Keeping

Operator logs documenting SCADA review and actions taken should be kept and made available during inspections.

The most recent version of the O&M manual with updated checklists for site evaluation should be made available to Ecology.

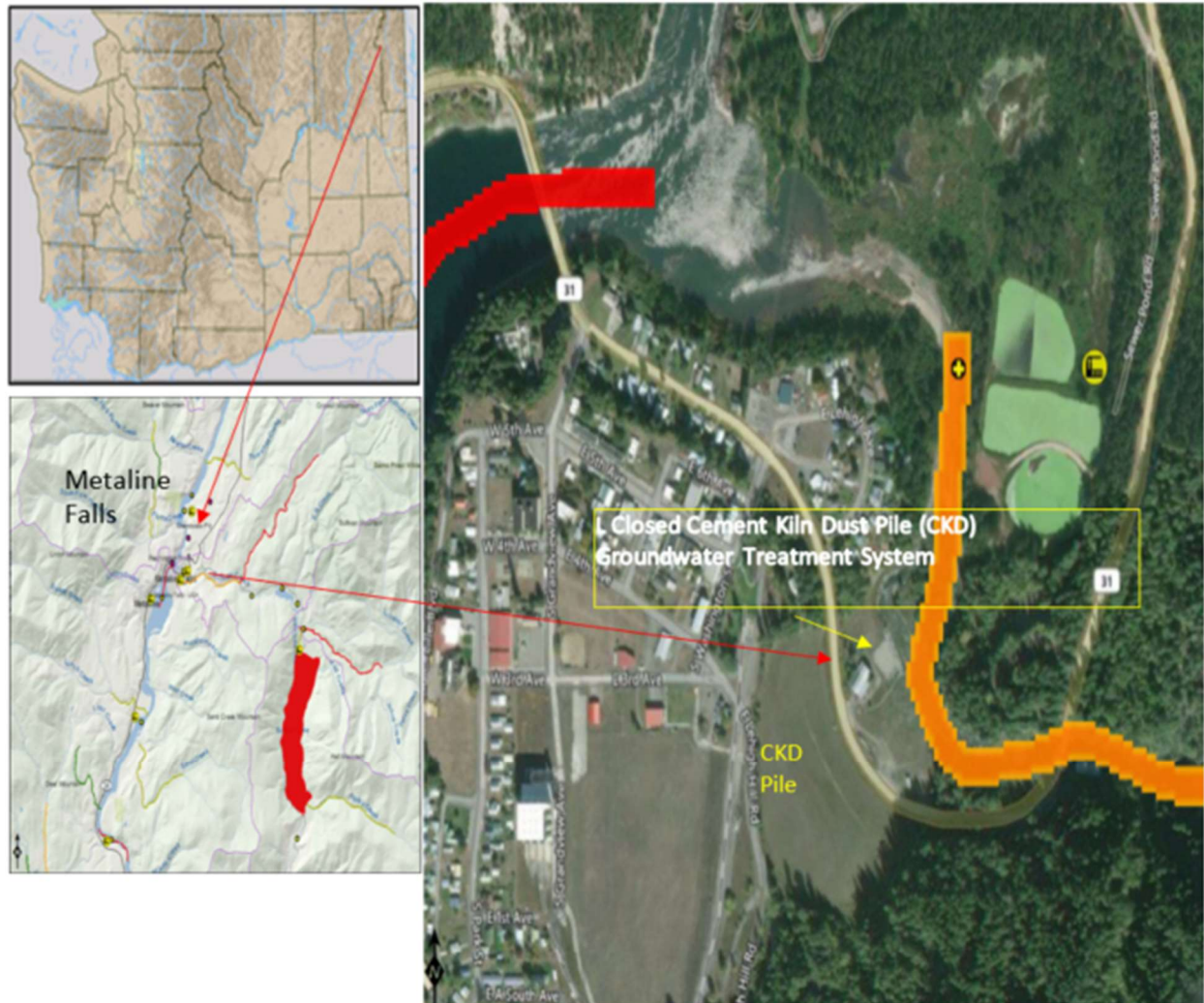
Contract Operator

A copy of the contract operator contract should be submitted to Ecology for review and approval.

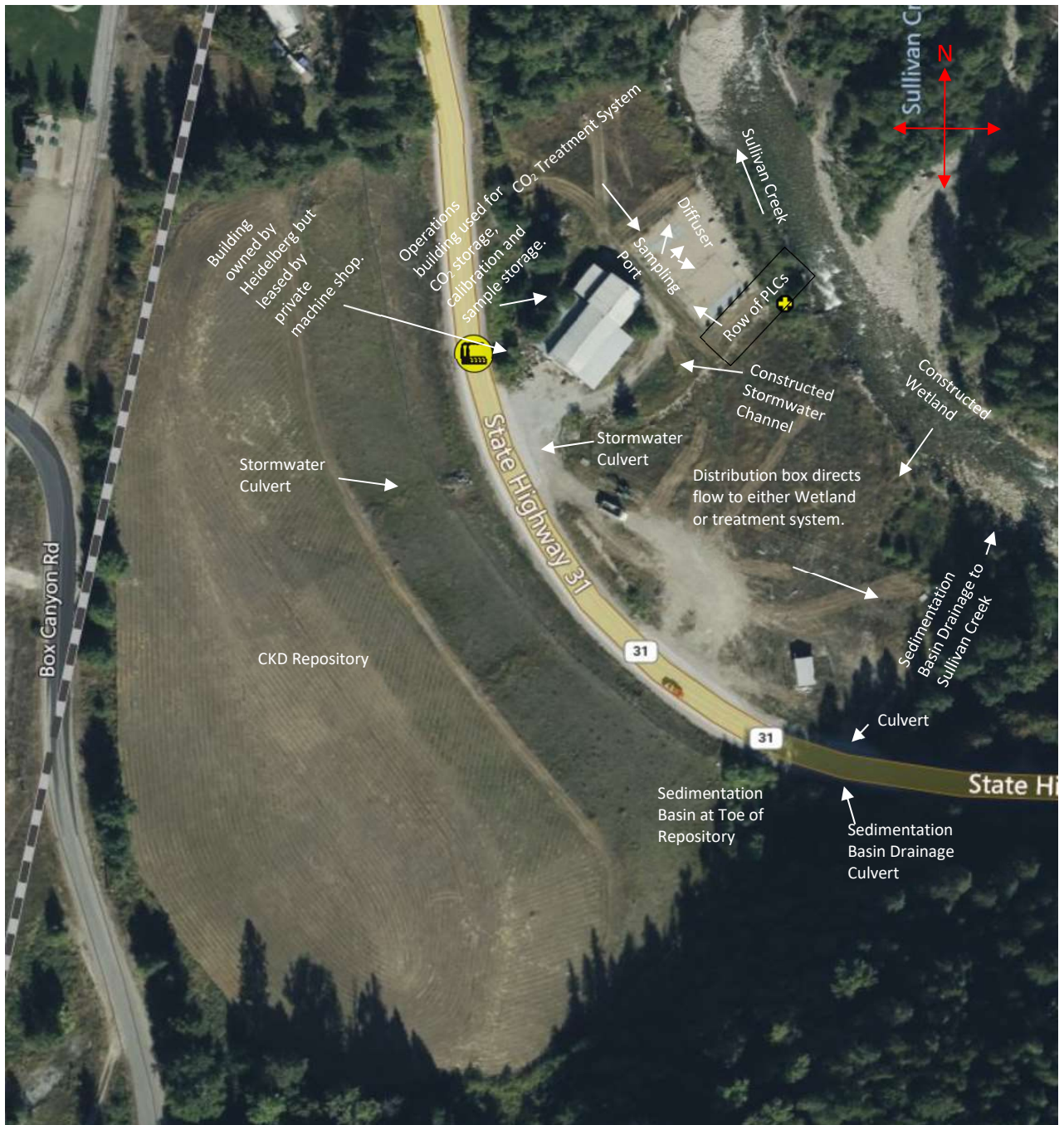
Closing Conference

- Ecology discussed cleaning up the pilot systems and disposing of wastes with Heidelberg and Geosyntec.
- Ecology asked that Heidelberg sample the ponding water on the east toe of the repository.
- Ecology left the site at 12:50 PM.

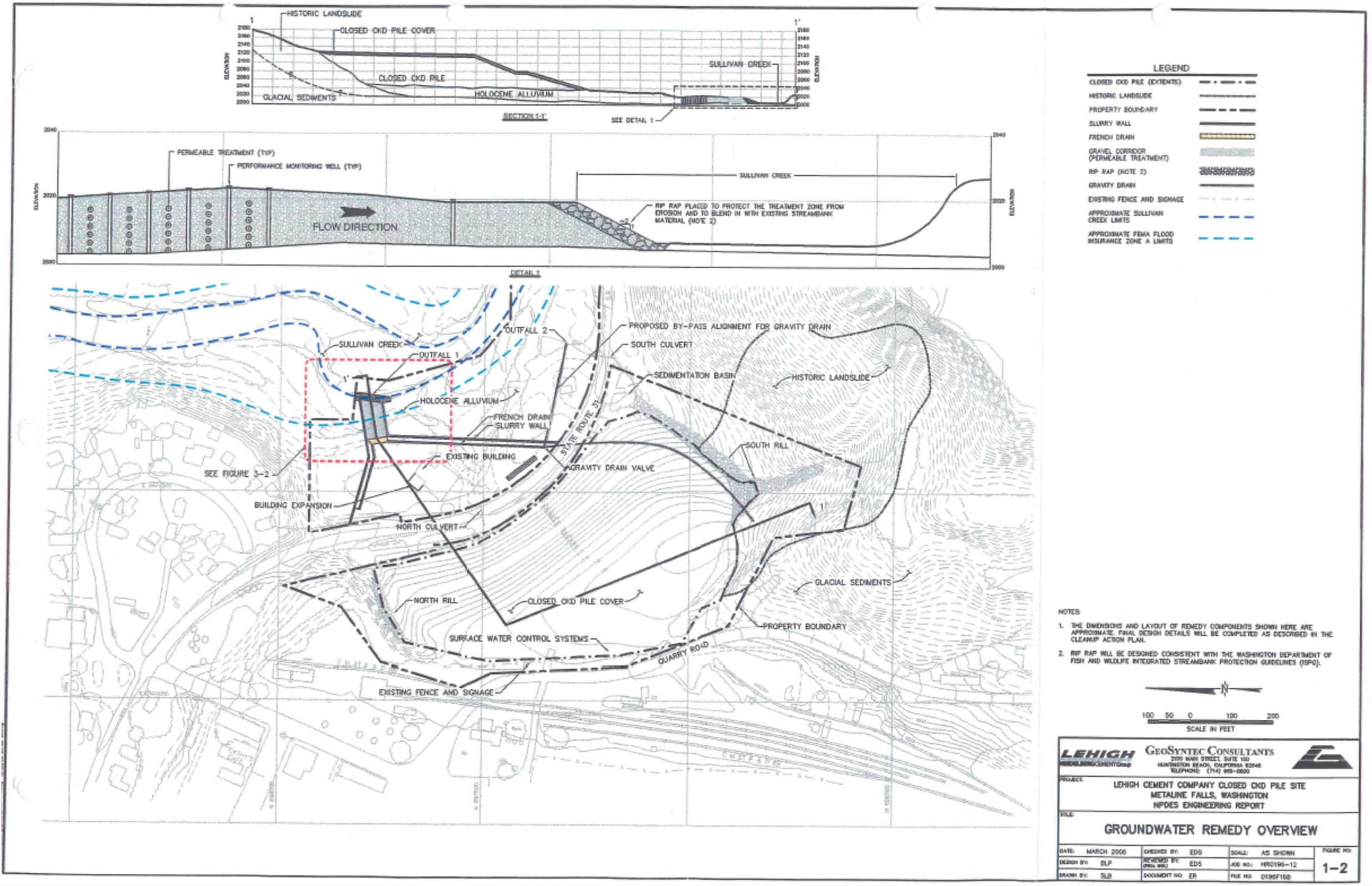
ATTACHMENT A: Facility Location Map



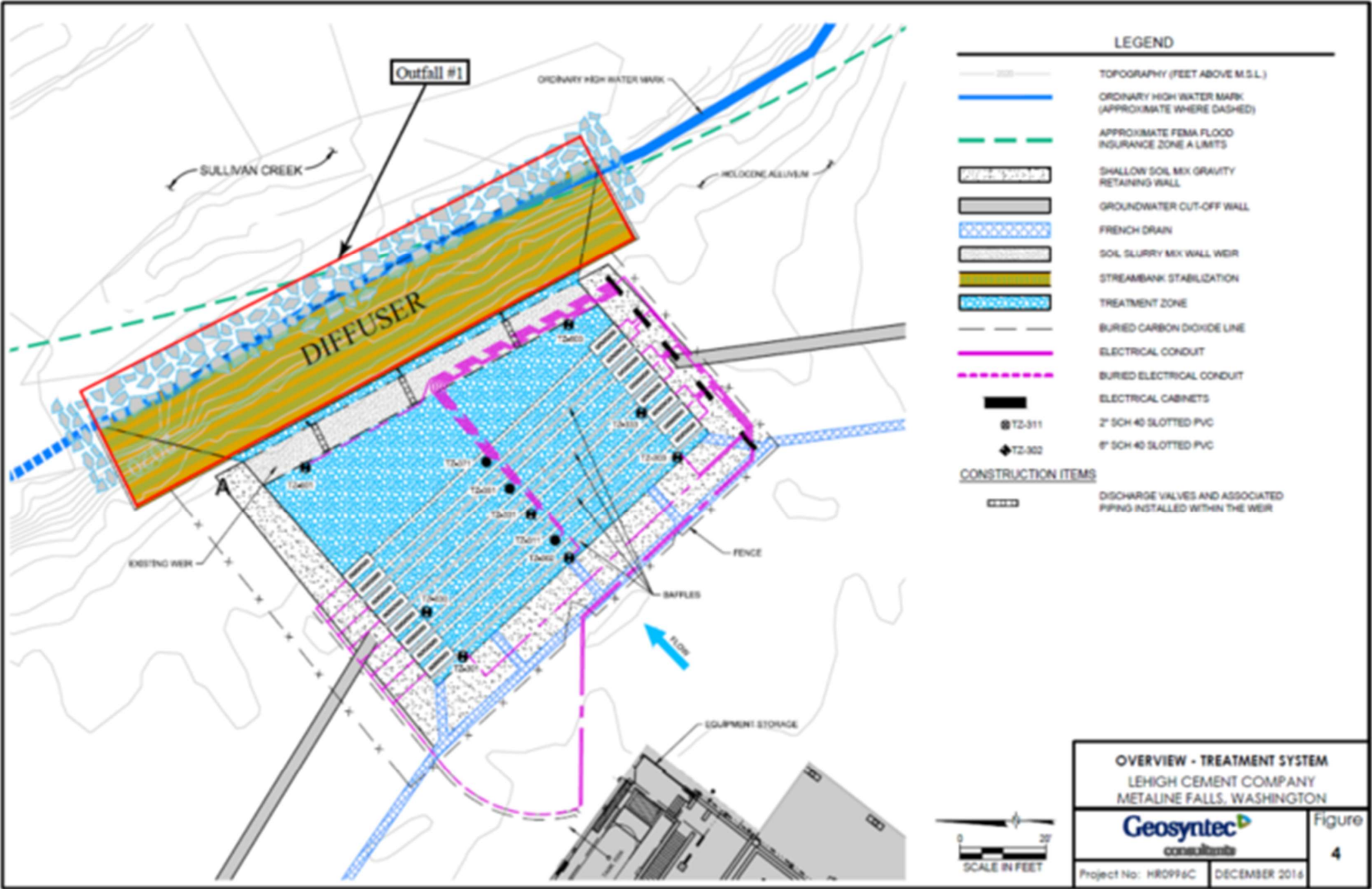
ATTACHMENT B: Aerial Photo of Heidelberg Materials Cement Kiln Dust (CKD) Repository and Groundwater Treatment System



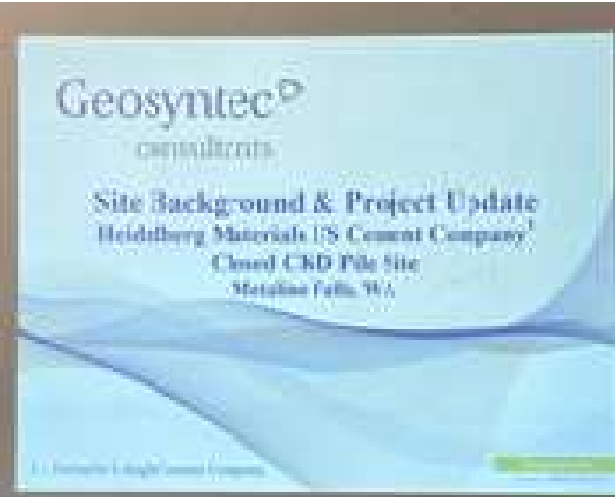
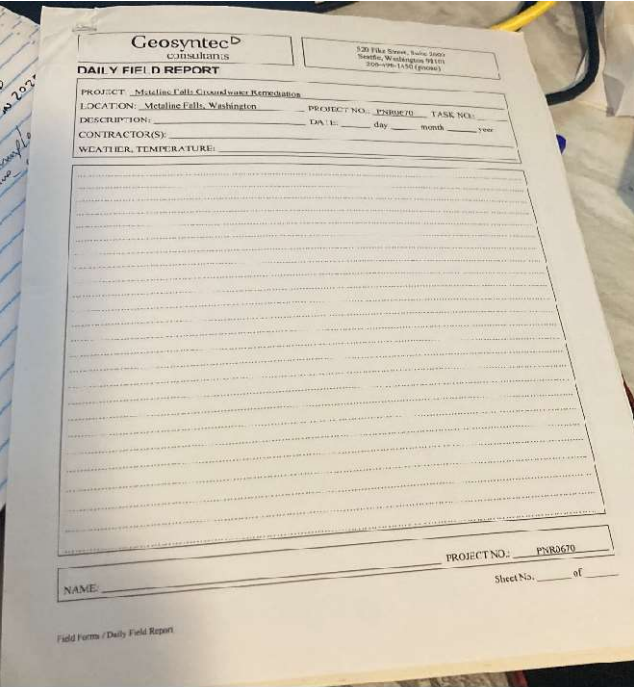
ATTACHMENT C: Closed CKD Pile Treatment System Site Layout



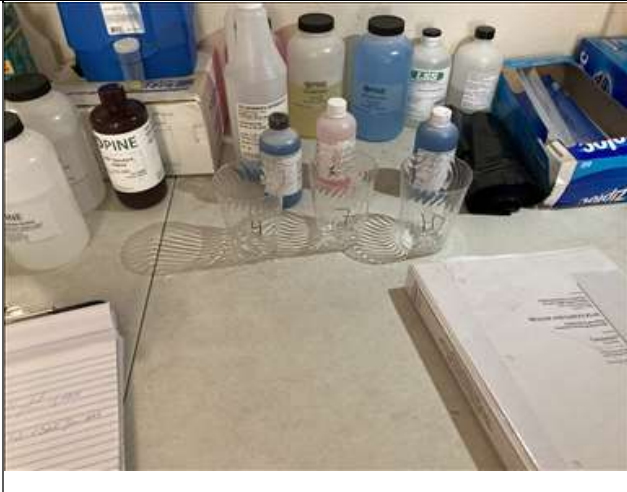


Attachment D: Carbon Dioxide Subsurface Groundwater Treatment System








ATTACHMENT E: Photo Log for Heidelberg Materials (aka: Lehigh Cement Co)



Photo Number	Photographs	Description
1	 <p>The image shows a presentation slide from Geosyntec consultants. The title is 'Site Background & Project Update Heidelberg Materials US Cement Company'. Below the title, it says 'Closed CKD Pile Site' and 'Metalline Falls, WA'. The slide has a blue background with a wavy pattern at the bottom.</p>	<p>Geosyntec provided a presentation updating the new TCP project manager and WQ permit manager on operations at the site.</p>
2	 <p>The image shows a 'Geosyntec consultants DAILY FIELD REPORT' form. The form is filled out with the following information: PROJECT: Metalline Falls Closed water Remediation; LOCATION: Metalline Falls, Washington; PROJECT NO.: 12080670; TASK NO.:; CONTRACTOR(S):; WEATHER, TEMPERATURE:; NAME:; PROJECT NO.: 12080670; Sheet No. of. The form is dated 10/20/2021.</p>	<p>O&M checklist package provided to Ecology during inspection.</p>




3	<div><div>O&M CHECKLIST</div><div><div>Project: Metaline Falls Groundwater Remediation</div><div>Location: Metaline Falls, Washington</div><div>Date: 12/16/2023</div></div><div><div>Task No: 12</div></div><table><thead><tr><th>Task</th><th>Frequency</th><th>Completed</th><th>Comments</th></tr></thead><tbody><tr><td colspan="4">Groundwater Treatment System O&M</td></tr><tr><td>Check CO₂ alarm sensors in building</td><td>Each Visit</td><td>Yes No</td><td></td></tr><tr><td>Calibrate pH probes</td><td>Quarterly</td><td>Yes No</td><td>Will calibrate during next monthly visit</td></tr><tr><td>Maintain inlet valves and other moving parts</td><td>Quarterly</td><td>Yes No</td><td></td></tr><tr><td>Leak inspection</td><td>If pressure drops are observed</td><td>Yes No</td><td>1/2 Yearly observed</td></tr><tr><td>Refill the carbon dioxide tanks</td><td>As needed</td><td>Yes No</td><td>As needed power supply, computer and security system</td></tr><tr><td>Computer Maintenance</td><td>As needed</td><td>Yes No</td><td></td></tr><tr><td>Adjust valves on CO₂ dosing manifold</td><td>As needed</td><td>Yes No</td><td></td></tr><tr><td>Replace silicone tubing</td><td>As needed</td><td>Yes No</td><td></td></tr><tr><td>Inspect air compressor and recirc pump system</td><td>As needed</td><td>Yes No</td><td></td></tr><tr><td>Vegetation removal in treatment zone</td><td>As needed</td><td>Yes No</td><td></td></tr><tr><td>Vegetation control in remnant stream</td><td>As needed</td><td>Yes No</td><td></td></tr><tr><td>Calibration of CO₂ gas sensors in building</td><td>Every 2 years</td><td>Yes No</td><td></td></tr><tr><td>Carbon Dioxide Tank Gauge Readings:</td><td>Each Visit</td><td>Yes No</td><td></td></tr><tr><td>Tank Pressure</td><td>Cont. psi</td><td>False</td><td>Tank #101A: 0.00 Tank #101B: ~ 0.0</td></tr><tr><td>Mass of Contents</td><td>Cont. lbs</td><td>False</td><td>Tank #101A: 1.0 Tank #101B: ~ 1.0</td></tr><tr><td>Outlet Pressure (inside hard cabinet door)</td><td>Cont. psi</td><td>False</td><td>Tank #101A: ~ 0.0 Tank #101B: ~ 0.0</td></tr><tr><td colspan="4">Wetland Mitigation O&M</td></tr><tr><td>Visual inspection</td><td>Each Visit</td><td>Yes No</td><td>Positive vegetation growth</td></tr><tr><td>Take photographs (N, S, E, W)</td><td>Each Visit</td><td>Yes No</td><td></td></tr><tr><td>Remove accumulated sediment/debris</td><td>As needed</td><td>Yes No</td><td>NO removal needed</td></tr><tr><td>Re-anchor erosion control fabric</td><td>As needed</td><td>Yes No</td><td></td></tr><tr><td>Trim vegetation, install plants</td><td>As needed</td><td>Yes No</td><td></td></tr></tbody></table><div><div>NAME: Matt Mohr</div><div>Sheet No. 4 of 1</div></div></div> <td><div>Photo of checklists used during O&M site inspections emailed to Ecology after the inspection.</div></td>	Task	Frequency	Completed	Comments	Groundwater Treatment System O&M				Check CO ₂ alarm sensors in building	Each Visit	Yes No		Calibrate pH probes	Quarterly	Yes No	Will calibrate during next monthly visit	Maintain inlet valves and other moving parts	Quarterly	Yes No		Leak inspection	If pressure drops are observed	Yes No	1/2 Yearly observed	Refill the carbon dioxide tanks	As needed	Yes No	As needed power supply, computer and security system	Computer Maintenance	As needed	Yes No		Adjust valves on CO ₂ dosing manifold	As needed	Yes No		Replace silicone tubing	As needed	Yes No		Inspect air compressor and recirc pump system	As needed	Yes No		Vegetation removal in treatment zone	As needed	Yes No		Vegetation control in remnant stream	As needed	Yes No		Calibration of CO ₂ gas sensors in building	Every 2 years	Yes No		Carbon Dioxide Tank Gauge Readings:	Each Visit	Yes No		Tank Pressure	Cont. psi	False	Tank #101A: 0.00 Tank #101B: ~ 0.0	Mass of Contents	Cont. lbs	False	Tank #101A: 1.0 Tank #101B: ~ 1.0	Outlet Pressure (inside hard cabinet door)	Cont. psi	False	Tank #101A: ~ 0.0 Tank #101B: ~ 0.0	Wetland Mitigation O&M				Visual inspection	Each Visit	Yes No	Positive vegetation growth	Take photographs (N, S, E, W)	Each Visit	Yes No		Remove accumulated sediment/debris	As needed	Yes No	NO removal needed	Re-anchor erosion control fabric	As needed	Yes No		Trim vegetation, install plants	As needed	Yes No		<div>Photo of checklists used during O&M site inspections emailed to Ecology after the inspection.</div>
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4	<div><div>330 - Field Notes & Photos > 2023</div><div><div>Name</div><div>Date modified</div></div><div><div>01262023 Monthly Event</div><div>1/30/2023 10:12 AM</div></div><div><div>02222023 Monthly Event</div><div>2/27/2023 11:58 AM</div></div><div><div>03162023 Quarterly Event</div><div>3/20/2023 10:09 AM</div></div><div><div>04272023 Monthly Event</div><div>5/15/2023 4:57 PM</div></div><div><div>05092023 Monthly Event</div><div>5/13/2023 6:39 PM</div></div><div><div>330 - Field Notes & Photos > 2022</div><div><div>Name</div><div>Date modified</div></div><div><div>01182022 Monthly Event</div><div>1/20/2022 12:30</div></div><div><div>02082022 Monthly Event</div><div>2/9/2022 4:40 PM</div></div><div><div>03072022 Quarterly Event</div><div>5/4/2022 3:10 PM</div></div><div><div>04062022 Monthly Event</div><div>5/4/2022 4:05 PM</div></div><div><div>05112022 Monthly Event</div><div>5/15/2022 5:35 PM</div></div><div><div>06022022 Quarterly Event</div><div>6/27/2022 7:12 PM</div></div><div><div>07132022 Monthly Event</div><div>8/3/2022 12:49 PM</div></div><div><div>08172022 Monthly Event</div><div>8/22/2022 5:33 PM</div></div><div><div>09212022 Quarterly Event</div><div>9/26/2022 8:35 PM</div></div><div><div>10012022 Monthly Event</div><div>10/4/2022 11:52 PM</div></div><div><div>11032022 Quarterly Event</div><div>11/6/2022 8:28 PM</div></div><div><div>12052022 Monthly Event</div><div>12/8/2022 2:01 PM</div></div><div><div>330 - Field Notes & Photos > 2021</div><div><div>Name</div><div>Date modified</div></div><div><div>20210113 Monthly Event</div><div>1/13/2021 6:11 PM</div></div><div><div>20210210 Quarterly</div><div>3/31/2022 3:54 PM</div></div><div><div>20210302 Monthly</div><div>3/17/2021 2:51 PM</div></div><div><div>20210407 Monthly</div><div>7/14/2021 1:47 PM</div></div><div><div>20210503 Quarterly</div><div>7/14/2021 1:47 PM</div></div><div><div>20210629 Monthly</div><div>7/2/2021 8:07 PM</div></div><div><div>20210722 Monthly</div><div>8/25/2021 11:21 AM</div></div><div><div>20210821 Quarterly</div><div>8/25/2021 11:20 AM</div></div><div><div>20210921 Monthly</div><div>1/8/2022 2:40 PM</div></div><div><div>20211006 Quarterly</div><div>1/8/2022 2:36 PM</div></div><div><div>20211101 Monthly</div><div>12/10/2021 1:56 PM</div></div><div><div>20211221 Monthly</div><div>12/27/2021 11:08 AM</div></div></div></div><td><div>Filing system used by Geosyntec for electronic files.</div></td></div>	<div>Filing system used by Geosyntec for electronic files.</div>																																																																																																
5	<div><div>PLC control display for SCADA system</div></div>																																																																																																	



6		pH and DO calibration station.
7		YSI Pro DSS 4 port sampler. Samples DO, pH, temperature, and turbidity.
8		Sample bottles are stored on site in boxes. Some of the bottles have preservative.



9	 A photograph showing five pH probes standing upright on a wooden table. To the left of the probes is a small glass jar. Labels on the table include 'CLEANING SOLUTION (2" WELLS)', 'STORAGE SOLUTION (2" WELLS)', and 'CLEANING SOLUTION'. The probes have black caps and white bodies.	<p>pH probes used for 2" wells. Probes have salt around the rim of the cover and 3 did not have solution.</p>
10	 A photograph showing three pH probes and two glass jars on a wooden table. Labels on the table include 'TOKA4P', 'STORAGE SOLUTION (2" WELLS)', and 'CLEANING SOLUTION'. A small white card with text is also visible on the table.	<p>pH probes used for 6" wells. Jars did not have any storage solution.</p>
11	 A photograph of a large, white, cylindrical carbon dioxide storage tank. The tank has two pressure gauges on its front panel, one labeled '15' and the other '50'. A red 'CAUTION' label is visible on the tank door. A yellow safety vest is hanging on the left side of the tank.	<p>Carbon dioxide storage tank.</p>



12	 A photograph showing a gravel-covered area, likely a treatment facility. A chain-link fence runs across the middle ground. A black sign with white text is posted on the fence. The sign reads "DANGER" in large letters, followed by "NO WY, EXCESSIVE", "SUNSHINE", and "CONDITIONS". In the background, there are trees and a clear blue sky.	<p>Fence on the south, west and east sides of the treatment facility. Open on the north side next to the Sullivan Creek. Sign provides warning and emergency contact information.</p>
13	 A close-up photograph of a chain-link fence gate. The gate is closed and locked with a metal padlock. The fence is made of metal posts and chain-link mesh. The ground behind the fence is covered in gravel and some sparse vegetation.	<p>Gate at the site is locked.</p>



14		<p>Northwest corner of the site. The fence ends at the edge of the riprap on the north side of the site along Sullivan Creek.</p>
15		<p>North edge of the site. The fence ends at the northeast corner of the site at the edge of the riprap along Sullivan Creek.</p>



16		Subsurface carbon dioxide addition pH treatment system. The control panels are east of the staff and sampling locations 2 and 3 are in the bunkers to the north of the staff.
17		Sampling sump
18		Remnants of a pilot treatment system intended to improve arsenic removal by adding dissolved oxygen. The project was abandoned.



19		<p>Manhole located at the south end of the constructed stormwater drainage channel.</p>
20		<p>Constructed stormwater drainage channel runs north to the creek in the background.</p>



21		<p>Constructed rock stormwater drainage channel runs from the road to the creek. The covered kiln dust pile is in the background.</p>
22		<p>The constructed stormwater drainage system ends at the creek. No discharge visible.</p>



23		<p>Valve box contains a valve that may be used to discharge to either the wetland or the treatment system. The valve is left in the position directing water to the treatment system.</p>
24		<p>Constructed wetland northeast of the treatment system in the floodplain along the south bank of Sullivan Creek.</p>

25		Stormwater/snow melt discharge channel from east culvert runs to Sullivan Creek.
26		East culvert has standing water at the discharge point.

27		<p>Culvert on the east edge of the Heidelberg site, runs under Highway 31. Culvert discharges stormwater and snow melt from the south side of Highway 31.</p>
28		<p>Pond of water collected on the southside of Highway 31 at the toe of the repository. The pond appears to discharge through the east culvert to avoid flow over Highway 31. This was not discharging at the time photo was taken.</p>

29	 A photograph showing a small, shallow pond of water in a wooded area. The water is surrounded by dry grass and some green foliage. The background shows more trees and a slight rise in the ground.	<p>Ponding water at the northeast toe of the repository and north of the ravine running along the eastside of the repository.</p>
30	 A photograph showing a steep, grassy hillside. The hillside is covered in dry, yellowish-brown grass. In the background, there is a dense forest of tall evergreen trees under a clear blue sky. A few dark, irregular shapes are visible on the grassy slope.	<p>Northeast side of the repository.</p>

31		Northeast corner of the repository.
32		Residual infrastructure of the original treatment pilot. This part of the site is not fenced.

33	 A photograph showing a monitoring well in a grassy field. The well is a vertical pipe with a cap, surrounded by some gravel. In the background, there is a large industrial building and some trees.	Monitoring well next to the residual treatment pilot.
34	 A photograph showing abandoned infrastructure for a carbon dioxide treatment pilot. Several open pipes are visible in the ground, surrounded by grass and gravel. In the background, there is a dirt road and some trees.	Original carbon dioxide treatment pilot abandoned infrastructure. Open pipes in the ground.

35		Original carbon dioxide pilot treatment system is located adjacent to Highway. 31.
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