Prepared for:
ASARCO Multi-State Environmental Custodial Trust

Prepared by:
Ramboll US Corporation

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Project Number:
1690016006-001

OPERATION & MAINTENANCE PLAN

FORMER CASCADE TIMBER #1 SITE
TACOMA, WASHINGTON

Ramboll
901 5th Ave
Suite #2820
Seattle, WA 98164
T +1 206 336 1650

RAMBOLL

CONTENTS

FIGURES

ATTACHMENTS

1. INTRODUCTION

1.1 Site Background and History

On behalf of the ASARCO Multi-State Environmental Custodial Trust (Trust), Ramboll US Corporation[1] (Ramboll) has prepared this Operation & Maintenance (O&M) Plan for the Former Cascade Timber #1 Site (Facility ID 1204; Parcel 0321268000) located at 2502 Marine View Drive in Tacoma, Washington (Site). Figure 1 depicts the location of the Site, and Figure 2 depicts the Site layout.

The Site is located on the Hylebos Waterway and is part of the Commencement Bay Nearshore/Tideflats (CBN/T) Superfund site; the Site and surrounding property were among the upland areas believed to have contributed to contamination in the waterway. The United States Environmental Protection Agency (USEPA) is the lead agency providing oversight of sediment cleanup in the waterway, and the Washington Department of Ecology (Ecology) is responsible for the cleanup of upland areas that are sources of impacts to the waterway of which this site is a part of.

The Site comprises 0.51 acres and is part of a larger property (two lots) formerly owned by the Cascade Pole Company, who leased the property (inclusive of the Site) to Cascade Timber Company as a log sort yard from 1977 to 1981. Slag from ore smelting processes produced at the American Smelting and Refining Company (ASARCO) smelting facility in Tacoma, Washington was used as ballast at the Site to support the storage of heavy equipment from at least 1977 to 1981. In 1986, the property was transferred to McFarland Cascade Holdings, Inc. (MCHI).

Elevated concentrations of arsenic, copper, lead, and zinc were detected in surface water runoff at the greater MCHI property in the 1980s. At that time, Ecology issued an Agreed Order naming MCHI and Cascade Pole Company as potentially liable parties under the Washington Model Toxics Control Act (MTCA) and requiring development of a Remedial Investigation/Feasibility Study (RI/FS) and draft Cleanup Action Plan for the property.

In 1993, MCHI, Cascade Pole Company and ASARCO entered into a Consent Decree No. 932100995 with Ecology. As part of this consent decree, a Final Remedial Design Report was completed that required the installation of a capped containment cell (for slag and other metals-impacted media at the property), installation of a storm water collection system, and monitoring of surface water and groundwater. The purpose of the containment cell and monitoring was (1) to prevent both direct contact with and leaching from the smelter slag and (2) to control surface water infiltration through and run-off from the slag. A Restrictive Covenant was also recorded for the Site, which required that (1) the Site can only be used for industrial purposes (under City of Tacoma zoning regulations); (2) activities at the Site can't impact the efficacy of the cleanup action or the required operation, maintenance, or monitoring; (3) activities at the Site can't result in release of hazardous substance contained as part of the cleanup; and (4) maintenance for the containment cell must be provided.

In July 1995, MCHI and ASARCO entered an agreement under which ASARCO assumed full responsibility for all sediment cleanup costs and natural resource damage claims relating to the sediment contamination that resulted from a release from the slag on the MCHI property. ASARCO's remedial activities included (1) removal of fill materials from the property with ASARCO slag and materials with concentrations that exceeded MTCA cleanup levels and (2) storage of those materials in a containment cell constructed on the Site.

[1] Ramboll was previously known as Ramboll Environ US Corporation and ENVIRON International Corporation.

Construction of the Ecology approved remedy occurred between 1993 and 1994. Consistent with the Final Remedial Design Report[2], the containment cell was constructed with a flexible membrane liner (including a leachate collection and recovery system) at the base and was covered with a multi-layer cap consisting of the following layers:

- a layer of 4-inch quarry rock, ranging in depth from approximately 18 inches along the perimeter to a minimum of 6 inches at the crest of the cell;
- a non-woven geotextile layer;
- sandy pitrun, ranging in thickness from approximately 6 inches along the perimeter to 12 inches at the crest of the cell;
- a geotextile drainage layer;
- a 60-mil flexible membrane liner (FML);
- a geosynthetic clay layer (GCL); and
- a 6-inch gas migration layer consisting of sandy pitrun.

The containment cell was also equipped with gas vents and a leachate collection system consisting of a perforated high density polyethylene (HDPE) collection pipe along the length of the bottom of the containment cell, terminating in a collection sump on the lower (south) end and a cleanout manhole at the upper (north) end. The only surface features of the leachate collection system are the exposed portions of the leachate collection sump and cleanout manhole. The containment cell cap was sloped to direct surface water runoff to a single discharge point on the southeast corner of the Site. Four groundwater monitoring wells were installed consisting of individual wells adjacent to each of the four sides of the containment cell (see Figure 2). Large concrete blocks (i.e., ecology blocks) were placed to form a berm around the cap's perimeter, and a six-foot chain link security fence was installed around the Site perimeter. After construction of the containment cell, the cell, surface water runoff, and groundwater were monitored by ASARCO.

In 2005, ASARCO filed for bankruptcy. On December 9, 2009, the United States Bankruptcy Court for the Southern District of Texas entered an order associated with ASARCO's bankruptcy, Case No. 05-21207, that approved a Settlement Agreement establishing the ASARCO Multi-State Custodial Trust (Trust) for certain ASARCO-owned facilities, including the "McFarland Designated Property" corresponding to the approximately 0.5-acre Site inclusive of the containment cell. At that time, the Site was conveyed to the Trust and the Trust has since been responsible for the O&M of the ASARCO implemented remedy under the purview of Ecology consistent with the Trust Agreement.

In 2011, Ramboll (at that time, ENVIRON International Corporation), conducted the post-closure containment cell inspections and the groundwater monitoring program at the Site on behalf of the Trust to 1) assess the status of the groundwater, and 2) evaluate the effectiveness of the containment cell. In association with initial site inspections, the Trust installed warning signage at the Site to discourage trespassing. Since that time, and consistent with Ecology approved work plans, Ramboll has completed semi-annual (2011 through 2012) and annual (2013 to 2018) operations and maintenance inspections and groundwater sampling on behalf of the Trust.

Based on the results of ten consecutive sampling events conducted by Ramboll from 2011 to 2018, the concentrations of the primary constituents of concern in groundwater (i.e., arsenic, copper, lead

[2] Hydrometrics, Inc. Final Remedial Design Report, Cascade Timber No.1 Remediation, Tacoma, Washington. December 10, 1993.

and zinc) were below the cleanup criteria specified in the Consent Decree, with one exception (i.e., copper in one sample from MCW-2 during the 2016 event). As noted in the Second Periodic Review Report published by Ecology in June 2016, groundwater cannot be used for drinking water purposes due to salinity. Given the general compliance with the established Site cleanup criteria – and considering that the Site and adjacent properties are currently used for industrial purposes with no current or likely future use of groundwater for drinking water purposes – Ramboll recommended on behalf of the Trust in the 2018 Annual Report[3] that no additional groundwater monitoring be conducted for the Site. Based on these groundwater results, Ecology worked with the Trust to revise O&M procedures to remove groundwater sampling and reporting and limit Site O&M mainly to physical preventative maintenance items. In 2019, and by way of approval of the 2019 budget and subsequent confirmation in an email from Ecology dated January 16, 2019, Ecology confirmed that groundwater sampling was no longer required for the Site.

Ecology requested preparation of this O&M Plan and supersedes any previous O&M plan prepared for the Site with a focus on post-closure activities and provides methods for conducting and documenting site inspections and routine maintenance activities. This O&M Plan is consistent with, and builds upon, the O&M Plan prepared by Hydrometrics for ASARCO in 1993.[4] The Hydrometrics plan primarily focused on the initial years of system maintenance, while this O&M Plan considers the mature condition of the cap cover and current status of the Site

The ability of the Trust to conduct the O&M identified in this Plan, including any potential corrective actions, is dependent on the limitations of the remaining Trust funds. The Trust also cannot implement the O&M Plan (e.g., semi-annual inspections) without the concurrence of Ecology to utilize the remaining Trust funds for this purpose, including the timely approval of annual Trust budgets to implement the O&M Plan, as well as approval of specific work scopes and associated budgets (e.g., for corrective measures not included in an annual budget).

1.2 Baseline Condition

As discussed in Section 1.1, Ecology approved of the discontinuation of groundwater sampling, and is, therefore, satisfied with the environmental performance of the cap and its related infrastructure. The Site and containment cell were most recently inspected by Ramboll on June 10, 2020. No significant issues were identified from the inspection. The Site inspection report and photographic log are included in Attachment 1 for reference, and the conditions documented in Attachment 1 and described herein serve to establish the baseline condition for the O&M program described in this Plan.

As discussed in Attachment 1, appropriate signage was observed at the Site during the June 2020 inspection, no obvious security issues were noted, and there was no visible damage to the containment cell piping or vents. The containment cell cap had limited vegetation growth, and the quarry rock cover was in place. The liner was not visible, and there were no indications of bulging of the cap FML. Based on vegetation levels identified during the inspection (as well as seasonal vegetation patterns observed during prior inspections), trimming and removal of vegetation is recommended on the containment cell cap and around the perimeter of the cell in areas where overgrowth was observed. Vegetation trimming and removal will be scheduled for the fall of 2020 in accordance with the annual vegetation maintenance program discussed in Section 3.2.

[3] Ramboll. 2018. 2018 Annual Report, Cascade Timber #1 Site, 2502 Marine View Drive, Tacoma, WA. December.
[4] Hydrometrics, Inc. 1993. Operations and Maintenance Plan, Cascade Timber No. 1 Remediation, Tacoma, Washington. November 1.

2. SITE INSPECTIONS

This O&M plan addresses physical site characteristic to mitigate damage to the containment cell that could affect performance and are discussed in more detail below.

2.1 Frequency

Following approval of this O&M Plan, Site inspections will be conducted on an annual basis in the fall of each year. More frequent inspections will be conducted if Site conditions dictate, such as following flood events or notification to the Trust or Ecology of trespassing or vandalism.

2.2 Notification

Ecology will be notified of planned Site inspections seven (7) calendar days prior to implementation of the Site inspection. The date of inspection will be coordinated, to the extent reasonably possible, to allow Ecology representatives the opportunity to attend the Site inspection, if requested.

2.3 Activities

At a minimum, Site inspections will include completion of the following activities:

1. Visual inspection of the containment cell cap and vegetation growth to evaluate evidence of the following conditions:
    - erosion of the cap quarry rock layer, including evidence of erosion rills or depressions;
    - exposure or damage to the FML (e.g., due to subsidence or bulging from landfill gas trapped in pockets under the liner);
    - significant activity or intrusion of pests or unwanted vegetation (e.g., burrowing animals or woody plants with deeper root systems); and
    - slope failure or settlement of the cap system (e.g., subsidence, sink holes, cracking of soil cover, ponded water).
2. Visual inspection of the containment cell leachate collection and vent systems, including any indications of damage or obstruction to the associated piping, the absence or presence of leachate in the collection sump or cleanout manhole, and any indications of leachate seepage.
3. Inspection of surface drainage patterns (excessive wetness or dryness) and drain pipes along the edges of the containment cell for visual evidence of erosion from the cap or areas surrounding the containment cell, including any significant gaps beneath the security fence due to erosion.
4. Inspection of manholes, monitoring wells, locks, access gates, security fence, and posted signage around the Site perimeter for degradation or intentional damage.

2.4 Process

Following health and safety precautions, the inspection process will include observing the entire Site systematically as follows:

- walking the perimeter of the Site to assess the gate, fencing, and overall security;
- walking the perimeter of the containment cell to assess the base of the cell, peripheral drainages, discharge pipes, leachate collection sump and cleanout manhole, and monitoring wells; and

- using a ladder, climbing up to view the top of the containment cell at several locations on each side of the cell, including inspection of the cap and vent pipes.

During the inspection, the Site Layout map will be used to ensure all areas of the Site are inspected and to document the locations of observed features, as discussed below.

2.5 Documentation

Site inspections will be documented using the inspection checklist included in Attachment 2. Issues or deficiencies identified from the inspection process will be documented with relevant information including location, sketch and/or photo, dimensions, and a description (e.g., bulging cell cover; sediment-clogged piping; loose manhole cover). A photographic log of the issues, repairs, and general Site conditions will be completed for each visit using the template included in Attachment 1. As discussed in Section 4.2, the inspection forms and photographic logs will be maintained in the Site file as part of the long-term evaluation of the containment cell performance and for planning repair strategies.

3. ROUTINE MAINTENANCE

Routine maintenance of the containment cell and Site will be evaluated annually during site inspections and conducted on an as need basis. Specifically, routine maintenance may include varying levels of effort to address deficiencies identified from the inspection activities described in Section 2. Maintenance activities to address routine Site erosion, vegetation, pipe/sump, animal/pest, and/or security issues are listed in Sections 3.1 through 3.5. Section 3.6 outlines procedures to be undertaken for non-routine maintenance activities or significant repairs.

3.1 Erosion

Minor erosional areas (i.e., rills or depressions less than three inches deep) will be documented as areas of interest for future inspections. Significant erosion losses, holes (e.g., animal burrow holes), or depressions in the containment cell cap (i.e., those greater than three inches deep) will be repaired annually in the spring or fall and promptly repaired. Quarry rock of similar size (i.e., 4-inch) will be used for replacing surficial losses on the cap.

3.2 Vegetation

The original containment cell design included a vegetated cap established within an approximately 6-inch layer of topsoil covering the cell. Based on the Final Engineering Report[5], the vegetated top layer was not installed, and instead was replaced with a layer of 4-inch quarry rock overlying sandy pitrun soil. The quarry rock was used in place of a vegetative cover to prevent erosion, due to the slope of the containment cell. Therefore, elements of the previous O&M plan prepared by Hydrometrics[6] relating to vegetation management (specifically, reseeding) are not applicable and have not been included in this O&M plan.

Limited vegetation (sparse grasses, blackberry vines, weeds) have grown on the containment cell despite the absence of a topsoil layer. Trimming and removal will be conducted annually in the fall season to maintain the growth level of vegetation and deter the establishment of large woody plants and associated root systems that could potentially impact the integrity of the containment cell cap. Trimming of vegetation along the base of the containment cell and security fence will also be conducted annually to avoid damage associated with overgrowth in these areas (e.g., uprooting of fence or base structures from tree or brush growth).

While sporadic weeds have occasionally been observed on the containment cell cap in certain areas (e.g., in and around rock covered areas or vent pipes) during prior inspections conducted since 2011, the distribution of weeds has not adversely impacted the control of erosion by cap cover, and has not indicated potential threats to the liner integrity. If a vegetation problem occurs at the Site that causes an erosion issue (e.g., evidence of rills, disturbance to quarry rock cover), a management strategy will be developed (e.g., chemical, manual, or with input from a local consultant/contractor) and implemented to address the issue.

3.3 Pipes and Sump

Any obstructions will be removed from drain and vent pipes to ensure proper operation. The leachate sump will be observed during inspections to evaluate the need for removal. If necessary, water or

[5] Hydrometrics, Inc. Final Engineering Report, Cascade Timber No.1 Remediation, Tacoma, Washington. April 1995.
[6] Hydrometrics. 1993. Operations and Maintenance Plan, Cascade Timber No. 1 Remediation, Tacoma, Washington. November 1.

material that has collected in the leachate collection system sump will be characterized and disposed off-site.

3.4 Animal and Pest Control

Reduction of animal and pest activity can be achieved by maintaining a healthy and dense grass cover on the containment cell and avoiding the development of desirable habitat (e.g., brush overgrowth). If an animal or pest control problem occurs at the Site, a management strategy will be developed (e.g., chemical, manual, or with input from a local consultant/contractor) and provided to Ecology for review. Such measures may include, as appropriate, commercial (lawful) insecticides or rodenticides, trapping, or placement of decoys. As discussed in Section 3.1, significant holes caused by burrowing animals will be filled prior to each seeding event.

3.5 Security

Where present, damage to fencing, locks, and access gates will be repaired within 30 days following identification during Site inspections. Posted signage around the Site perimeter will be replaced when the signage has been damaged, has become sufficiently faded that it is not legible, or when contact information included on the signage is outdated. Occasional lubrication of the hinges on the gate and the lock will be conducted as needed to ensure their efficacy.

3.6 Non-Routine Maintenance

Should significant issues in connection with Sections 3.1 through 3.5 occur, or the need for non-routine repairs be identified from the Site inspections, a summary of the problem and recommended actions to address the problem will be prepared and submitted to Ecology for review and approval prior to the implementation of corrective action(s).

4. DOCUMENTATION

4.1 Recordkeeping

The parties responsible for implementing this O&M Plan will maintain records regarding monitoring, maintenance, and repair including the following:

- Printed copy of the O&M Plan;
- Site inspection forms;
- Documentation related to maintenance and repairs;
- Photographic documentation;
- Regulatory inspection reports, as needed;
- Regulatory correspondence; and
- Amendments to the O&M Plan.

These records will be retained by the party responsible for implementing this plan for a minimum of five years; the records retained will be maintained in electronic format.

4.2 Reporting

The party responsible for implementing this plan will submit an annual report to Ecology documenting the annual inspection and any maintenance activities conducted at the Site during the reporting year. The report will be submitted in the first quarter of the calendar year following completion of the reporting year (e.g., the 2020 report will be submitted by March 31, 2021). The report will include a brief description of key findings and activities for the reporting year; site inspection forms and photographic logs will be included in the report as attachments.

The Trust will implement the O&M Plan (e.g., semi-annual inspections) with the concurrence of Ecology to utilize the Trust funds for this purpose, including the timely approval of annual Trust budgets to implement the O&M plan as per the identified schedule.

As noted in Section 3.6, should the need for non-routine or significant maintenance activities be identified based on inspection results, the issue and proposed corrective action will be provided to Ecology. If necessary, this information will be communicated separately to Ecology in writing (e.g., via email communication) from the annual reporting cycle in order to avoid delay in advancing corrective action. The Trust cannot conduct non-routine maintenance activities without the approval of specific work scopes and associated budgets (e.g., for corrective measures not included in an annual budget). Accordingly, when the Trust identifies an issue and proposes a corrective action, the submittal will include a request for approval by Ecology of the approved scope of work and associated budget for implementation. Only when the scope and budget is approved, and if sufficient Trust funding remains, will the Trust complete the non-routine maintenance.

4.3 Management of Change

Should a third party assume the environmental responsibilities of the Trust for the Site (i.e., via purchase or transfer of the property following the sunset of the Trust), including O&M conducted under this plan, the responsible party shall notify Ecology in writing within 60 calendar days.

FIGURES

Legend

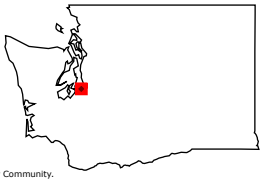
Site Boundary

0 0.5 1

Scale in Miles

0 2,000 4,000

Scale in Feet



KEY MAP

SOURCE:
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community.
Map Scale: 1:1:24,000; Spatial Reference: NAD 1983 StatePlane California V FIPS 0405 Feet;
Map Center: 122°23'4"W 47°16'38"N

C:\Users\sleick\OneDrive - Ramboll\Documents\Working\GIS\McFarland\Figures.aprx\Figure 1-Site Location Map

RAMBOLL

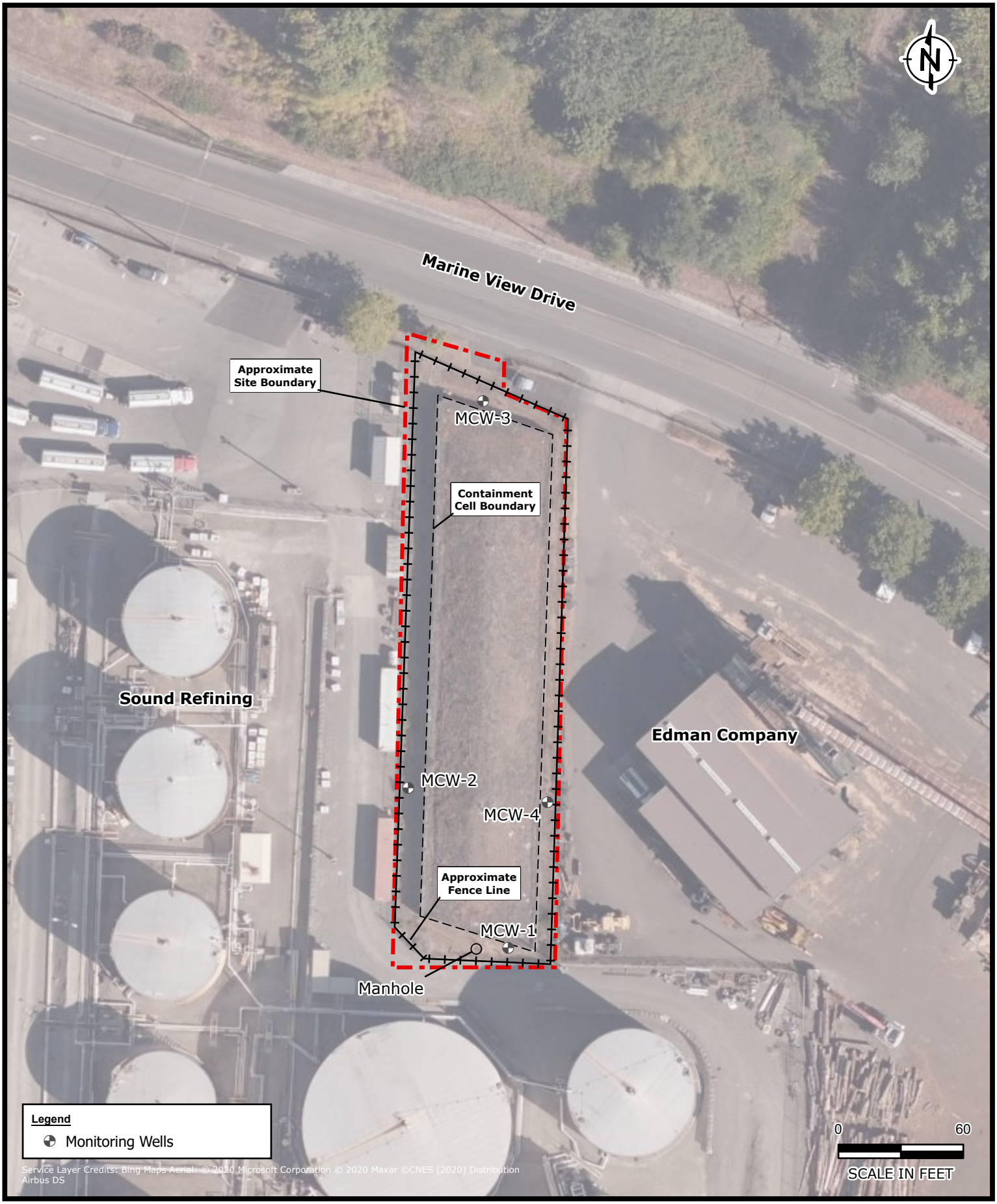
DRAFTED BY :SLEICK | DATE: 5/21/2020

Site Location Map

Former Cascade Timber #1 Site
2502 Marine View Drive
Tacoma, WA 98422

FIGURE
1

PROJECT: 1690016006-001



C:\Users\sleick\OneDrive - Ramboll\Documents\Projects\GIS\McFarland\Figures.aprx\Figure 2 - Site Layout

RAMBOLL

DRAFTED BY :SLEICK | DATE: 9/14/2020

Site Layout

Former Cascade Timber #1 Site
2502 Marine View Drive
Tacoma, WA 98422

FIGURE
2

PROJECT: 1690016006-001

ATTACHMENT 1
BASELINE CAP CONDITION – SITE INSPECTION REPORT AND PHOTOGRAPHIC LOG

Photo 1: View of the north gate, the main entrance on Marine View Drive (facing southwest).

Photo 2: View of the south gate (facing south)

Photo 3: View of the west side of the containment cell and the driveway west of containment cell (facing south).

Photo 4: View of the south side of the containment cell and the south gate (facing east).

Photo 5: View of the north side of the containment cell with monitoring well MCW-3 (facing west).

Photo 6: View of the northwest corner containment cell cap with a vent pipe (facing southeast)

Photo 7: View of the north side of containment cell cap (facing east).

Photo 8: View of the center of containment cell cap with weed growth around a vent pipe (facing east).

Photo 9: View of the west side of containment cell cap (facing south).

Photo 10: View of the west side of containment cell cap (facing north).

Photo 11: View of the south side of containment cell cap (facing east).

Photo 12: View of a drain located at southeast corner of the containment cell cap with weeds.

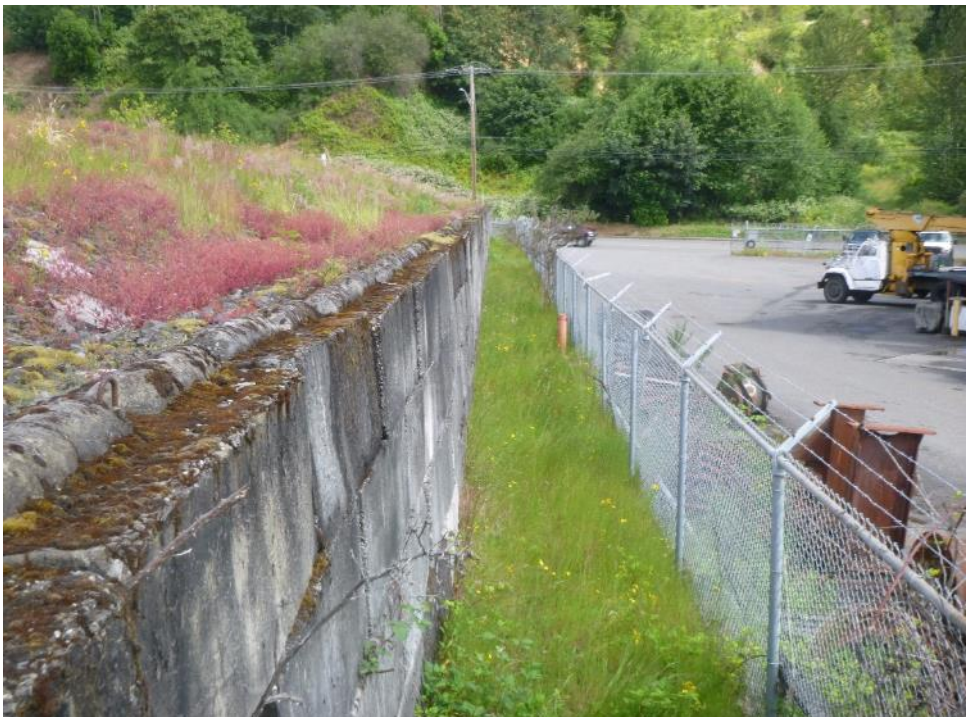


Photo 13: View of the east side of containment cell cap (facing north).

Photo 14: View of the center of containment cell cap (facing west).

Photo 15: View of the east side of containment cell cap (facing south).

Photo 16: View of a possibly dead tree east of containment cell (facing north).

Photo 17: View of monitoring well (MCW-3) with an inner cap.

Photo 18: Monitoring well (MCW-3) with a new padlock.

Photo 19: View of monitoring well (MCW-1) with an inner cap.

Photo 20: Monitoring well (MCW-1) with a new padlock.

Photo 21: View of monitoring well (MCW-1) with an inner cap.

Photo 22: Monitoring well (MCW-4) with a new padlock.

Photo 23: View of the monitoring well (MCW-2) with an inner cap.

Photo 24: View of a manhole and vent pipe located south of the containment cell.

Photo 25: View of the drainpipe in the southeast corner of the containment cell.

ATTACHMENT 2
SITE INSPECTION FORM

ANNUAL SITE INSPECTION FORM
FORMER CASCADE TIMBER #1 FACILITY
2502 MARINE VIEW DRIVE, TACOMA, WASHINGTON

Inspection Conducted by:

Date of Inspection:

Arrival Time:

Departure Time:

Weather Conditions:

Required Site Inspection Scope of Work:

Follow health and safety precautions. Observe the entire Site systematically as follows:

- walk the perimeter of the Site to assess the gate, fencing, and overall security;
- walk the perimeter of the containment cell to assess the base of the cell, peripheral drainages, discharge pipes, leachate collection sump and cleanout manhole, and monitoring wells; and
- using a ladder, climb up to view the perimeter of the containment cell and portions of the containment cap at several locations on each side of the cell.

During the inspection, the Site Layout map will be used to ensure all areas of the Site are inspected and to document the locations of observed features, as discussed below.

Site Inspection Field Notes	
	Notes/Actions Taken or Needed
General Site Conditions	
Perimeter walk observations	
Condition of manholes, locks, gates, fencing, signage, monitoring wells	
Containment Cell Inspection	
Cap vegetation (e.g., weed growth, presence of woody plants with root systems that could damage liner)	
Erosion (e.g., rills or depressions)	
FML condition (e.g., subsidence, bulging)	
Pest or vegetation intrusion (potential impacts to FML)	
General slope failure/settlement issues (e.g., subsidence, sinkholes, cracks, ponded water)	
Leachate Collection and Vent System	
Damage or obstruction to piping/vents	
Absence/presence of leachate (sump or cleanout)	
Indications of potential seepage	
Surface Drainage	
Evidence of erosion due to surface drainage (e.g., within cell, around base of cell, around fence)	

Maintenance Actions			
	Defect	**Conditions When Maintenance is Needed**	**Maintenance Required and Results Expected**
General Site Conditions			
General Site Conditions	Trash & Debris	Trash and debris present.	Trash and debris cleared from slopes.
Signs	Illegible or missing	Signs are missing or illegible.	Clean or replace signs. Rehang.
Gate	Routine maintenance	As moving gate parts get stiff or dirty.	Clean and lubricate hinges, latches, and locks.
Fence	Routine maintenance	Degraded, damaged, or if erosion beneath the fenceline has occurred.	Repair or replace affected portions of fenceline.
Manhole	Insecure	Verify manholes are covered/secured.	Clean, repair, or replace as necessary.
Monitoring Wells	Damaged	Surface monument or well cover is cracked	Evaluate concrete or well box repair/replacement (including ring seal).
Containment Cell Inspection			
Cover liner	Visible or breached	If portions of the liner are visible, repair without delay.	Cover liner with appropriate materials (sand, 4” rock, etc.).
	Bulging	If bulging of liner is visible the landfill gas collection system is not working correctly.	Open area. Remove any landfill gas accumulation and repair collection system. Replace cap.
Vegetative Cover	Unwanted vegetation	Overgrowth of weeds or woody plants.	Manual removal/chemical herbicide.
	Cover disturbance	When sinkholes, standing water, cracks, or mounds are discovered.	Note depths/locations of problem areas on inspection forms. Even ground, reseed.
Leachate Collection and Vent System			
Pipes and Culverts	Malfunctioning parts	Operate all moveable parts to assure continued smooth working use.	Repair or replace parts as necessary.
	Damaged	Visible damage to piping.	Repair or replace pipe.
Maintenance Actions			

	Defect	Conditions When Maintenance is Needed	Maintenance Required and Results Expected
Leachate Collection and Vent System			
Pipes and Culverts	Vegetation	Vegetation present that reduces water flow.	Remove vegetation
	Sediment and Debris	Accumulated sediment present.	Clean/flush pipe so that it matches design.
	Coating damaged	Protective coating is damaged; rust is causing deterioration to any part of pipe.	Repair, replace or recoat pipe.
	Misalignment	If misalignment observed, evaluate affected area.	Repair or replace pipe.
	Blockage	Check culvert inlet and outlet for evidence of erosion or blockage	Remove and sediment and restore to proper flow conditions.
Surface Drainage			
Standing water	Poor drainage	Ponding water observed for prolonged periods after rain events.	Restore surface grade as appropriate.
Surface erosion near piping or cell materials	Exposed piping or other improvements	Surface material worn to expose or undermine components	Inspect to evaluate need for repairs and surface restoration to modify drainage patterns.