Former Mill E/Koppers Facility

Performance and Compliance Monitoring Plan Addendum

Prepared for

The Weyerhaeuser Company
220 Occidental Avenue South
Seattle, Washington 98104

August 2017

20 YEARS FLOYD | SNIDER
strategy ▪ science ▪ engineering
Two Union Square • 601 Union Street • Suite 600
Seattle, Washington 98101 • tel: 206.292.2078

LIMITATIONS

This report has been prepared for the exclusive use of The Weyerhaeuser Company, their authorized agents, and regulatory agencies. It has been prepared following the described methods and information available at the time of the work. No other party should use this report for any purpose other than that originally intended, unless Floyd|Snider agrees in advance to such reliance in writing. The information contained herein should not be utilized for any purpose or project except the one originally intended. Under no circumstances shall this document be altered, updated, or revised without written authorization of Floyd|Snider.

The interpretations and conclusions contained in this report are based in part on site characterization data collected by others. Floyd|Snider cannot assure the accuracy of this information.

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List of Acronyms and Abbreviations

Acronym/ Abbreviation	Definition
bgs	Below ground surface
CAP	Cleanup Action Plan

Acronym/ Abbreviation	Definition
Consent Decree	Consent Decree 98-2-08718-6
Ecology	Washington State Department of Ecology
IHS	Indicator hazardous substance
MAP #2	M.A.P. #2, LLC
PCMP	Performance and Compliance Monitoring Plan
Site	Former Mill E/Koppers Facility
WAC	Washington Administrative Code
Weyerhaeuser	The Weyerhaeuser Company

1.0 Introduction

This Performance and Compliance Monitoring Plan (PCMP) Addendum supplements the existing PCMP (PCMP; EMCON 1998) for the Former Mill E/Koppers Facility (the Site) located in Everett, Washington, as shown on Figure 1-1. The PCMP was prepared to meet compliance monitoring requirements under the 1998 Cleanup Action Plan (CAP) for the Site consistent with the performance and compliance monitoring requirements of Washington Administrative Code (WAC) 173-340-410 and Consent Decree 98-2-08718-6 (Consent Decree). This is the first addendum to the 1998 PCMP.

The Weyerhaeuser Company (Weyerhaeuser) is the former owner of the Site. In 1946, Weyerhaeuser leased a 6.6-acre portion along the west bank of the Snohomish River to American Lumber and Treating Company (and then Koppers Company). Wood treatment continued at the Site until 1963. In 1971, Weyerhaeuser constructed Mill E, a small lumber mill, which operated until it was dismantled in 1988. Washington State Department of Ecology (Ecology)-approved cleanup actions were completed in 1999, in accordance with the CAP and Consent Decree. Weyerhaeuser sold the property to M.A.P. #2, LLC (MAP #2) in 2005. Site monitoring has been conducted in accordance with the PCMP since 1999, by Weyerhaeuser prior to August 2005 and by MAP #2 after August 2005.

1.1 PURPOSE OF THIS ADDENDUM

The purpose of the PCMP Addendum is to provide modifications to the existing performance and compliance monitoring program described in the CAP and PCMP. More specifically, this addendum addresses modifications to performance monitoring for water elevation measurements, as described in Section 2.3.2 and Table 2-2 of the PCMP. These changes are being made to provide additional indicators of barrier wall performance, as requested by Ecology in a letter dated December 8, 2016 (Ecology 2016).

In the December 8, 2016, letter to Weyerhaeuser and MAP #2, Ecology described concerns that were identified following the June 2016 periodic review for the Site, and additional actions that Ecology believes are necessary to address these concerns. This PCMP Addendum addresses those concerns regarding the performance of the containment system, which consists of a subsurface containment barrier wall and asphalt cap, as shown on Figure 1-2.

This PCMP Addendum will be used as a supplement to (and be incorporated with) the PCMP, which is Exhibit E to the Consent Decree. The PCMP Addendum is only intended to modify specific elements of the monitoring program related to water level measurements. Except as noted, all other elements of the existing performance and compliance monitoring program described in the 1998 PCMP will remain unchanged.

1.2 BACKGROUND

As described in the CAP and documented in the Construction Report (EMCON 1999), the cleanup action was designed to manage the most contaminated area of the Site by preventing direct contact with contaminated soil, minimizing infiltration of precipitation into the subsurface contamination, and reducing the hydraulic connection between the contained area and the surrounding and underlying groundwater. The barrier wall surrounds the contained area of contamination in shallow fill material and an Upper Sand Aquifer, which extend to depths of approximately 6 to 10 feet below ground surface (bgs). The barrier wall is embedded in a low permeability Upper Silt Aquitard below this unit. A Lower Sand Aquifer is present beneath the Upper Silt Aquitard. In addition to horizontal gradients that drive groundwater flow easterly into the Snohomish River outside the barrier wall, typically downward hydraulic gradients drive a component of groundwater flow from both the Upper Sand Aquifer and Upper Silt Aquitard to discharge groundwater downward toward the Lower Sand Aquifer, albeit slowed greatly by the low permeability of the aquitard and upward gradients at high tide. The Lower Sand Aquifer discharges to the Snohomish River and is strongly tidally influenced by the river.

This containment system is determined to be functioning as designed provided water levels in the Upper Sand Aquifer inside the barrier wall are stable or decrease relative to those in the Upper Sand Aquifer outside the barrier wall, as described in the CAP and PCMP. Lower hydraulic head inside the barrier wall not only indicates inward horizontal gradients limiting groundwater flow out of the contained area into the surrounding Upper Sand Aquifer, but also indicates reduced downward gradients, and therefore reduced groundwater flux from the Upper to the Lower Sand Aquifer inside the barrier wall. In accordance with the PCMP, barrier wall performance has been monitored by measurements of water levels at three pairs of piezometers in the Upper Sand Aquifer, each with one piezometer inside the barrier wall and one outside the barrier wall. Piezometer pairs PZ-1A/B, PZ-2A/B, and PZ-3A/B are shown on Figure 1-2. Results from water level measurements collected following remedy installation in 1999 through 2016 in these piezometer pairs have confirmed that the Upper Sand Aquifer water level inside the barrier wall is consistently lower than the Upper Sand Aquifer water level outside the barrier wall (AES 2016). This performance and compliance monitoring indicates that the containment system is functioning as designed.

Ecology noted in the December 2016 letter that, though the CAP and PCMP called for monitoring water levels inside and outside of the barrier using these three piezometer pairs as the primary measure of performance, the PCMP also suggested that measurements of lowered water levels inside the containment area should be compared with the average elevation of the hydraulic head of the Lower Sand Aquifer (Ecology 2016). Ecology pointed out that the PCMP identified the usefulness of this comparison in its statement that lowered water levels in the Upper Sand Aquifer would constitute a new equilibrium with the Lower Sand Aquifer. Table 2-1 of the PCMP summarized rationale for the approach for performance monitoring and that long-term reductions in flux of indicator hazardous substances (IHSs) in deep groundwater migrating to the river should be evaluated through a metric of reduced hydraulic gradients between the Upper and Lower Sand Aquifers (EMCON 1998). Table 2-1 is included with this addendum, unchanged

from the PCMP. This rationale for monitoring Lower Sand Aquifer water levels may have been overlooked because it was not described in the more specific Table 2-2, Performance Monitoring Plan (EMCON 1998), which instead listed the three Upper Sand Aquifer piezometer pairs for monitoring. Lower Sand Aquifer piezometers were not installed for PCMP monitoring, and Lower Sand Aquifer water level measurements were, therefore, not subsequently collected. A revised Table 2-2 is also included as part of this PCMP Addendum with modifications from the original noted, as further described in Section 2.0.

The remainder of this PCMP Addendum describes modifications to the PCMP to address Ecology's request for water level measurements from the Lower Sand Aquifer and consideration of vertical hydraulic gradients. To support these modifications, additional water levels were measured by Weyerhaeuser's environmental consultant, Floyd|Snider, on February 16, 2017, from the three piezometer pairs, and two existing adjacent Lower Sand Aquifer monitoring wells (LLMW-19D and LLMW-20D) installed as part of the Everett Smelter Lowlands Remedial Investigation/ Feasibility Study. The results of these measurements, reported in a technical memorandum (Floyd|Snider 2017), indicated that water levels remained consistently lower inside the barrier wall than outside, as had previously been demonstrated. The results also quantified the tidally influenced water level fluctuation in the Lower Sand Aquifer at the perimeter of the barrier wall to be up to approximately 5 feet during the study, with Lower Sand Aquifer water levels rising above the more stable Upper Sand Aquifer water levels at higher tide levels. Throughout the portion of the tidal cycle monitored, and despite the tidal variation, vertical gradients and inferred groundwater flux remained lower inside the barrier wall than outside.

2.0 Modifications to Water Elevation Performance Monitoring

In this section, specific modifications to the PCMP, specifically Section 2.3.2 of the PCMP, are described. These modifications are included as the first revision to Table 2-2 from the PCMP (refer to Table 2-2 [rev 1]). No other modifications to the PCMP are included in this PCMP Addendum.

2.1 WATER LEVEL MEASUREMENTS IN LOWER SAND AQUIFER

For each groundwater elevation monitoring event, water levels will be measured at three locations (two existing monitoring wells and one proposed piezometer) outside the barrier wall and screened in the Lower Sand Aquifer, in addition to the six existing Upper Sand Aquifer piezometers (PZ-1A, PZ-1B, PZ-2A, PZ-2B, PZ-3A, and PZ-3B).

The Lower Sand Aquifer measurements will be collected from two existing monitoring wells and one new piezometer to be installed for this purpose. Existing monitoring well LLMW-19D is located in close proximity (80 to 100 feet) to PZ-1A and PZ-1B, and screened from approximately 17 to 27 feet bgs. Existing monitoring well LMW-20D is located in close proximity to PZ-3A and PZ-3B and screened from approximately 11 to 21 feet bgs (GeoEngineers 2016). Access to these monitoring wells will be requested from Ecology, as these wells are associated with the Everett Smelter Lowland Site. Refer to Figure 1-2 for well and piezometer locations and Appendix A for boring logs. Refer to Table 2-2 (rev 1) for modifications to the monitoring plan for water level monitoring.

Proposed piezometer PZ-2D will be located adjacent to PZ-2B, and constructed with a 10-foot screened interval below the Upper Silt Aquitard. New piezometer PZ-2D will be installed and developed using standard methods so that it is consistent with the other Lower Sand Aquifer monitoring wells and suitable for measuring hydraulic head in the Lower Sand Aquifer. After the installation of PZ-2D, all nine monitoring locations will be surveyed for accurate elevation reference points at the top of casing.

The three additional water level monitoring locations (one new proposed piezometer and two existing monitoring wells) will be incorporated into the Site performance monitoring and compliance network, expanding the three piezometer pairs into piezometer triplets. Groundwater elevation measurements will otherwise be conducted in accordance with methods described in the PCMP, except as noted here:

- Water level measurements will be collected within 2 hours of the daytime low tide.
- The frequency of water level monitoring will be increased to quarterly for the first year, and will then revert back to annual monitoring.
- Annual monitoring will be conducted in the month of September, consistent with recent monitoring.

2.2 HYDRAULIC HEAD DIFFERENCE COMPARISON

Water level elevation results will be used to calculate hydraulic head differences between the Lower Sand Aquifer and the Upper Sand Aquifer, both inside and outside the barrier wall, for each piezometer triplet. A difference in water level elevation or head is effectively a hydraulic gradient that omits the distance between measuring points, so that it is a more appropriate metric for measuring hydraulic performance of the barrier wall, where the distance between piezometers is short and the measurement of consequence is the difference in water level elevation.

The Lower Sand Aquifer piezometer for each triplet will be used to calculate vertical differences in head between piezometers both inside and outside the barrier wall. Using the same piezometer for both measurements is appropriately representative of the Lower Sand Aquifer in the vicinity, given that the comparison is intended to be relative to the average head elevation of the Lower Sand Aquifer. In addition, the groundwater elevation of the Lower Sand Aquifer is not significantly influenced by the barrier wall above (EMCON 1998), so Lower Sand Aquifer measurements outside of the barrier wall are indicators of the water level elevation in the Lower Sand Aquifer beneath the barrier wall.

Vertical head differences will be presented in a comparative table during routine reporting, and calculated by subtracting the Lower Sand Aquifer elevation from the Upper Sand Aquifer value for each triplet:

Vertical head difference outside barrier wall	=	"B" piezometer Upper Sand Aquifer elevation	–	Lower Sand Aquifer elevation
Vertical head difference inside barrier wall	=	"A" piezometer Upper Sand Aquifer elevation	–	Lower Sand Aquifer elevation

Horizontal head differences for each triplet have been presented in a plot in annual reports (AES 2016). For consistency, these will also be presented in a comparative table during routine reporting. Horizontal head differences will be calculated by subtracting the Upper Sand Aquifer elevation inside the barrier wall from the Upper Sand Aquifer elevation outside the barrier wall:

Horizontal head difference	=	"B" piezometer Upper Sand Aquifer elevation	–	"A" piezometer Upper Sand Aquifer elevation

2.3 PERFORMANCE CRITERIA AND POTENTIAL CORRECTIVE ACTIONS

Consistent with the CAP and PCMP, the performance criteria for vertical and horizontal head differences will be indications of inward horizontal gradients across the barrier wall and lesser downward gradients inside the barrier wall than outside. These criteria will confirm that the barrier wall and asphalt cap are functioning properly as a hydraulic containment system, by limiting horizontal migration of groundwater beyond the barrier wall and reducing the downward flux of groundwater inside the barrier through the Upper Silt Aquitard.

Specifically, the vertical head difference outside the barrier wall should exceed the vertical head difference inside the barrier wall. The horizontal head difference, calculated by subtracting the Upper Sand Aquifer water elevation outside the barrier wall from the Upper Sand Aquifer water elevation inside the barrier wall, should be positive, indicating higher water levels outside the barrier wall (refer to Table 2-2 [rev 1]).

As described in the CAP and PCMP, failure to meet these criteria may indicate that there is a problem with the effectiveness of the containment system. If monitoring indicates that these criteria have not been met, the frequency of water level monitoring will be increased in consultation with Ecology. Additional inspection of the asphalt cap will be completed if appropriate. If the increased monitoring indicates that the containment performance criteria are still not being met, Weyerhaeuser or MAP #2 will notify Ecology and evaluate the cause and appropriate response action. In accordance with the PCMP, “should steadily increasing water level elevations become apparent within the contained portion of the upper sand, Weyerhaeuser (and/or MAP #2 as the current property owner) will propose a plan to correct the cause of the elevated water levels.”

3.0 Schedule and Reporting

This section describes adjustments to the monitoring schedule and reporting related to the changes described in this PCMP Addendum.

3.1 PIEZOMETER INSTALLATION AND WELL SURVEY

The additional proposed piezometer, PZ-2D, will be installed, and the piezometer network re-surveyed, within 45 days of Ecology approval of this PCMP Addendum. It is expected that the piezometer network update will be completed in summer/fall of 2017 (pending Ecology's approval). Ideally, routine monitoring should commence in September 2017 to keep consistency with the previous monitoring schedule.

3.2 WATER LEVEL MEASUREMENT SCHEDULE

Based on the expected schedule for approvals and the piezometer network update, it is expected that water level monitoring will resume in September 2017. To confirm that vertical hydraulic head differences meet performance criteria throughout the seasons, water level monitoring will take place on a quarterly basis for the first year of monitoring (i.e., September 2017, December 2017, March 2018, and June 2018), before reverting to annual monitoring (refer to Table 2-2 [rev 1]).

3.3 REPORTING

Quarterly measurements in the first year of water level monitoring under the PCMP Addendum, and subsequent annual measurements, will be reported as part of the annual groundwater monitoring summary. Therefore, no change is made to the frequency of reporting. As noted above, Ecology will be notified if monitoring results indicate that performance criteria have not been met.

4.0 References

Associated Earth Sciences, Inc. (AES). 2016. *Mill E 2016 Ground Water Monitoring Summary*. Technical Memorandum from Otto K. Paris and Lara B. Koger, AES, to Pacific Topsoils, Inc. December 2.

EMCON. 1998. *Performance and Compliance Monitoring Plan, Former Mill E/Koppers Facility, Everett, Washington*. Prepared for The Weyerhaeuser Company. 8 October.

EMCON. 1999. *Construction Report, Former Mill E/Koppers Site Remediation*. Prepared for The Weyerhaeuser Company. 7 September.

Floyd|Snider. 2017. *February 2017 Water Level Measurements at the Former Mill E/Koppers Facility*. Technical Memorandum from Brett Beaulieu and Lynn Grochala, Floyd|Snider, to Carol Wiseman, The Weyerhaeuser Company.

GeoEngineers. 2016. *Final Supplemental Remedial Investigation Report, Everett Smelter Lowland Area, Everett, Washington*. Prepared for Washington State Department of Ecology. 8 February.

Washington State Department of Ecology (Ecology). 2016. *Re: Weyerhaeuser Mill E – Need for additional remedial action*. Letter from David South, Ecology, to Carol Wiseman, The Weyerhaueser Company, and Sandra L. Forman, M.A.P. #2, LLC. 8 December.

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Tables

Table 2-1
Rationale for Performance Monitoring Approach[1]

Cleanup Action Component	Performance Objective	Performance Metric	Monitoring Approach
Asphalt Cap	Prevent direct contact with contaminated soil	• Physical integrity of cap	• Periodic inspection
	Minimize infiltration and reduce leaching of contaminants from soil to groundwater	• Physical integrity of cap • Water levels inside barrier wall	• Periodic inspection • Water level measurements
Soil Cover	Prevent direct contact with contaminated soil	• Physical integrity of soil cover	• Periodic inspection
Barrier Wall	Minimize flow of groundwater through contaminated soil and NAPL	• Hydraulic containment of major source areas.	• Water level measurements • Water quality monitoring
	Long-term reductions in flux of IHSs in shallow groundwater migrating to river.	• Hydraulic contaminate of major source areas.	• Water level measurements
	Long-term reductions in flux of IHSs in deep groundwater migrating to river	• Reduced hydraulic gradients between shallow and deep aquifers.	• Water level measurements

Note:
1 This table has not been modified and is included for reference. Original source: EMCON 1998.

Table 2-2 (rev 1)
Performance Monitoring Plan[1]

Monitoring Activity	Description	Frequency	Criteria
Asphalt Cap Inspection	Inspect asphalt cap and related drainage features for the following: • cracked or damaged asphalt • areas of uneven settlement or standing water • general condition of the drainage ditches • drainage ditches free of debris	• Semi-annually for first two years, including at least one per year during storm event • Annually for years 3 through 5	• If potential problems identified, repair or maintain per O&M manual
Soil Cover Inspection	Inspect soil cover, to include the following: • excessive erosion or poorly vegetated areas • excessive standing water	• Semi-annually for first two years • Annually for years 3 through 5	• If potential problems identified, repair or maintain per O&M manual
Water Level Monitoring[2]	Measure water levels at three Upper Sand Aquifer piezometers installed inside barrier wall (PZ-1A, PZ-2A, and PZ-3A), three Upper Sand Aquifer piezometers installed outside barrier wall (PZ-1B, PZ-2B, and PZ-3B), and three Lower Sand Aquifer piezometers or monitoring wells installed outside barrier wall (LLMW-19D, LLMW-20D, and PZ-2D)	• Quarterly for first year of PCMP Addendum (September 2017 – June 2018) • Annually in September thereafter	• If water levels inside barrier wall are stable or decrease, as indicated by inward horizontal head differences and lower vertical head differences inside barrier wall, system is functioning adequately • If water levels increase, as indicated by outward horizontal head differences or higher vertical head differences inside barrier wall, evaluate performance of cap and implement corrective action as necessary, and increase water level monitoring frequency
Water Quality Monitoring	Monitor well PZ-3A for arsenic, pentachlorophenol, and TPH	• Semiannually for first year • Annually in years 3 and 5	• Monitor changes in concentrations of chemical constituents within barrier wall

Notes:

1 This Performance Monitoring Plan (PMP) is the first revision to Table 2-2, modified from EMCON 1998.

2 The Water Level Monitoring portion of the PMP is the only portion that was modified with this revision.

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Figures

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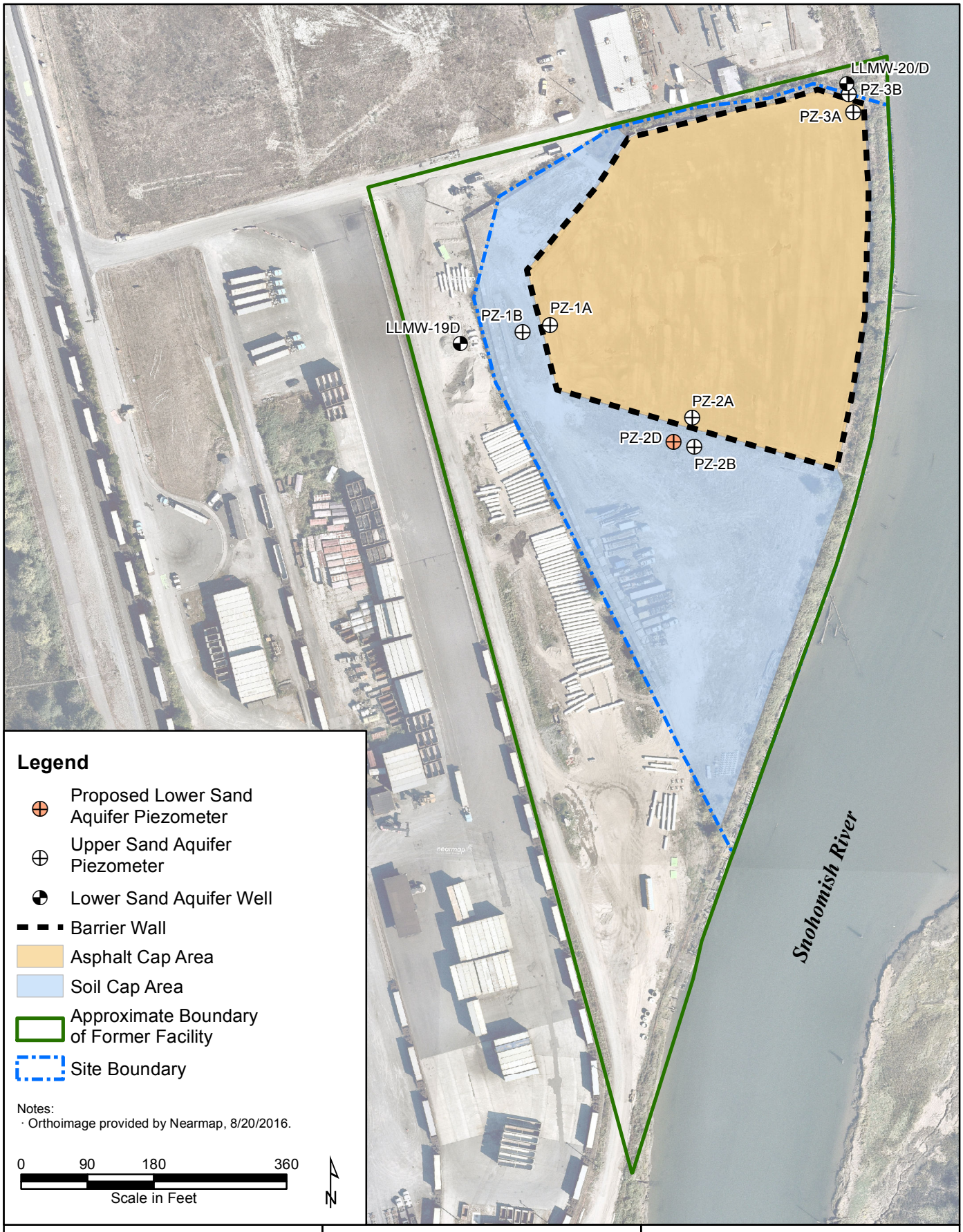
Former Mill E/Koppers Facility
Everett, Washington

Figure 1-1
Vicinity Map

I:\GIS\Projects\WEYER_MILL_E\MXD\PCMPAddendum\Figure 1-1 Vicinity Map.mxd
4/6/2017



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Former Mill E/Koppers Facility
Everett, Washington

Figure 1-2
Site Map

I:\GIS\Projects\WEYER_MILL_E\MXD\PCMPAddendum\Figure 1-2 Site Map.mxd
4/6/2017

Former Mill E/Koppers Facility

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Appendix A
Boring Logs

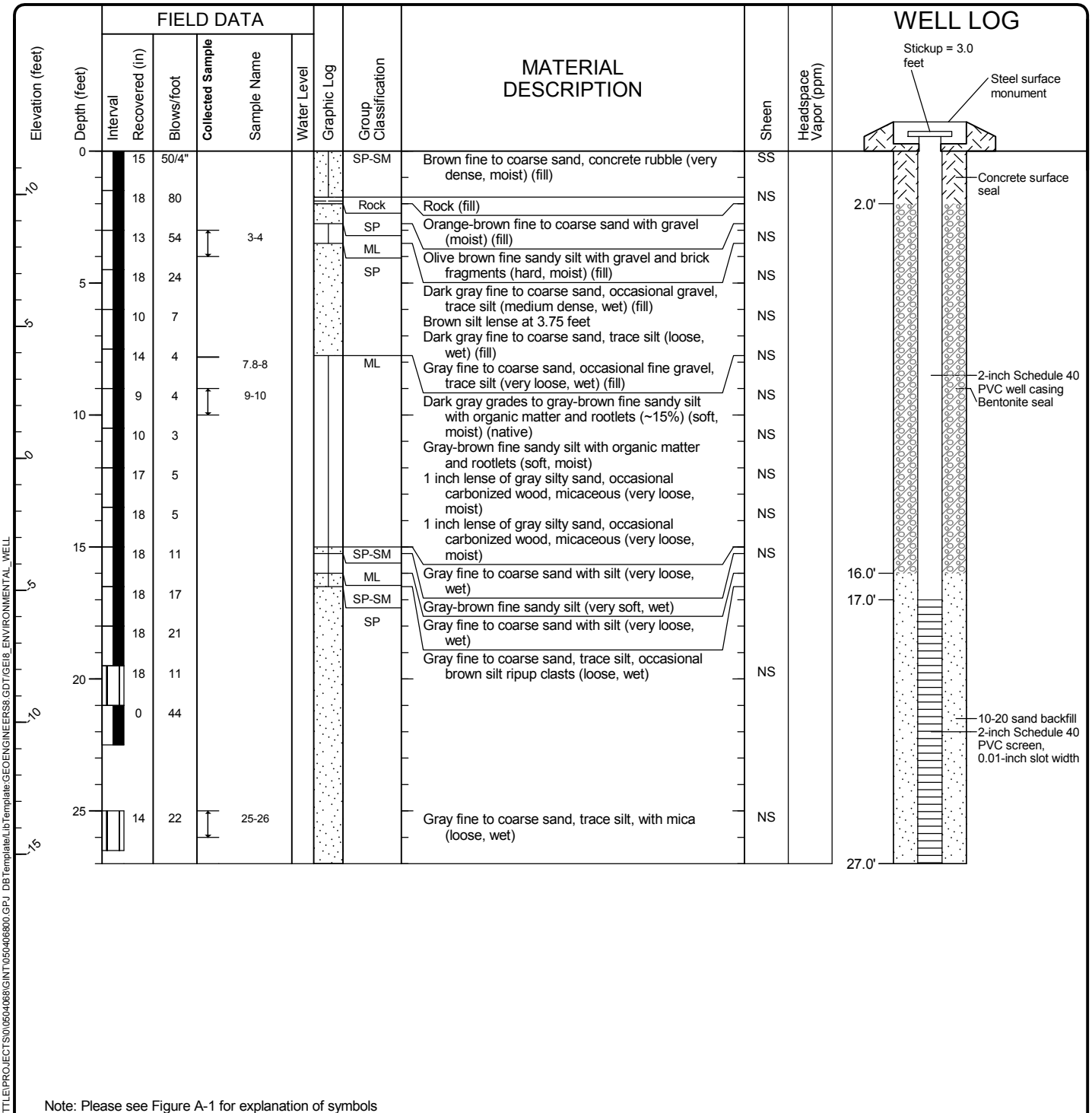
Drilled	Start	End	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
	12/6/2012	12/6/2012	27	AMW	Holocene Drilling	Hollow-stem Auger

Hammer Data	140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-120
Surface Elevation (ft) / Vertical Datum	11.642 / NAVD88	Top of Casing Elevation (ft)	
Easting (X) / Northing (Y)	370189.3895 / 1310224.846	Horizontal Datum	WA State Plane North 83/91

DOE Well I.D.: BHU-005
A 2 (in) well was installed on 12/6/2012 to a depth of 27 (ft).

Groundwater		
Date Measured	Depth to Water (ft)	Elevation (ft)

Notes:



Note: Please see Figure A-1 for explanation of symbols

Log of Monitoring Well LLMW-19D

GeoEngineers

Project:	Everett Lowland
Project Location:	Everett, Washington
Project Number:	0504-068-00

Figure A-37
Sheet 1 of 1

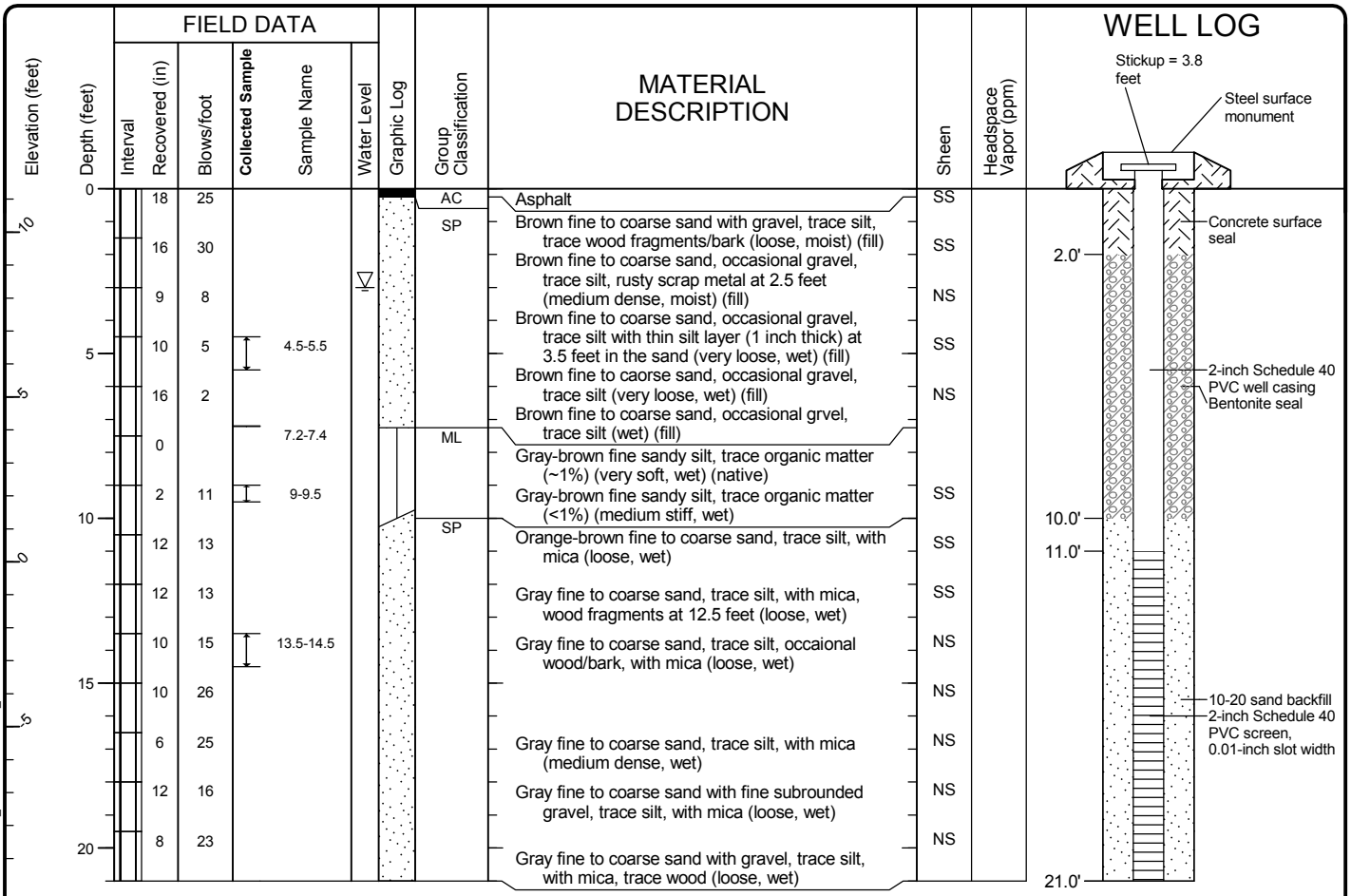
Drilled Start	End	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/12/2012	12/12/2012	21	AMW	Holocene Drilling	Hollow-stem Auger

Hammer Data	140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 850 Track Rig
Surface Elevation (ft)	11.3205	Top of Casing Elevation (ft)	
Vertical Datum	NAVD88		
Easting (X)	370542.4429	Horizontal Datum	WA State Plane North 83/91
Northing (Y)	1310748.178		

DOE Well I.D.: BHU-037
A 2 (in) well was installed on 12/12/2012 to a depth of 21 (ft).

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
12/12/2012	3.0	8.3

Notes:



Note: Please see Figure A-1 for explanation of symbols

Log of Monitoring Well LLMW-20D

GeoEngineers

Project:	Everett Lowland
Project Location:	Everett, Washington
Project Number:	0504-068-00

Figure A-38
Sheet 1 of 1

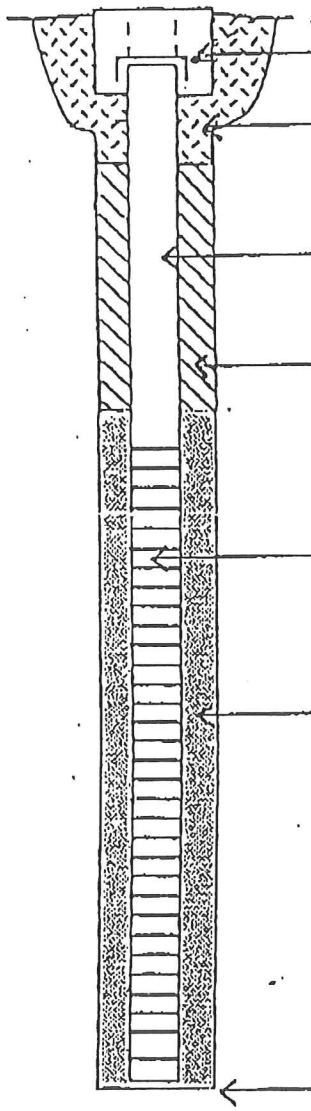
RESOURCE PROTECTION WELL REPORT

START CARD NO. R039901

PROJECT NAME: Weyerhaeuser Mill
WELL IDENTIFICATION NO. AEM 337/P2-1A
DRILLING METHOD: HSA
DRILLER: Brian G. Gose
FIRM: Cascade Drilling, Inc.
SIGNATURE: [signature]
CONSULTING FIRM: WRS
REPRESENTATIVE: Randy Richardson
9033

COUNTY: Snohomish
LOCATION SW¼ NW¼ Sec 8 Twn 29N R 5E
STREET ADDRESS OF WELL: 101 E. Marine View Dr, Everett
WATER LEVEL ELEVATION: 31'
GROUND SURFACE ELEVATION: N/A
INSTALLED: 1/26/99
DEVELOPED: No

AS-BUILT



WELL DATA

SURFACE (@ THAT TIME) APPROX. 7.75' Stick Up
WELL COVER
CONCRETE SURFACE SEAL
DEPTH = 1/ft
PVC BLANK 2 "x 2'
BACKFILL 1 ft.
TYPE: bent. Chips
PVC SCREEN 2 "x 3.6"
SLOT SIZE: .010
GRAVEL PACK 4 ft.
MATERIAL: 10/20 colo.
WELL DEPTH 5.6 "

FORMATION DESCRIPTION

0 - 5.6 ft.
brown / black sand

- ft.

- ft.

SCALE: 1" = _____ PAGE _____ OF _____

ECY 050-12 (Rev. 11/09)

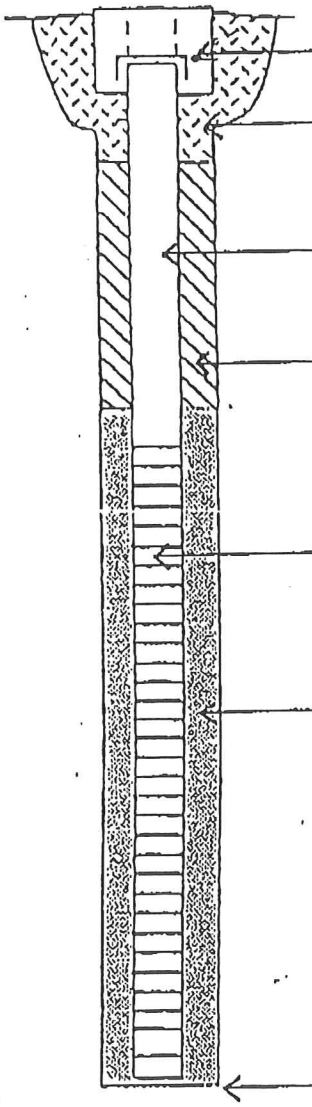
RESOURCE PROTECTION WELL REPORT

START CARD NO. R039901

PROJECT NAME: Weyerhaeuser Mill
WELL IDENTIFICATION NO. AEM 336 / PZ 13
DRILLING METHOD: HSA
DRILLER: Brian G. Gose
FIRM: Cascade Drilling, Inc.
SIGNATURE: B
CONSULTING FIRM: WRS
REPRESENTATIVE: Randy Richardson
9033

COUNTY: Snohomish
LOCATION SW 1/4 NW 1/4 Sec 8 Twn 29N R 5E
STREET ADDRESS OF WELL: 101 E. Marine View Dr, Everett
WATER LEVEL ELEVATION: 3'
GROUND SURFACE ELEVATION: N/A
INSTALLED: 1/26/99
DEVELOPED: No

AS-BUILT



WELL DATA

SURFACE (@ THAT TIME) APPROX. 6.95' ~ RVR
WELL COVER
CONCRETE SURFACE SEAL
DEPTH = 1/ft
PVC BLANK 2 "x 3,1' 6"
BACKFILL 3' ft.
TYPE: bent. Chips
PVC SCREEN 2 "x 3,1' 6"
SLOT SIZE: .010
GRAVEL PACK 4 ft.
MATERIAL: 10/20 colo.
WELL DEPTH 7 ' "

FORMATION DESCRIPTION

0 - 7 ft.
brown / black sand
- ft.
- ft.

SCALE: 1" = PAGE OF

ECY 050-12 (Rev. 11/89)

RESOURCE PROTECTION WELL REPORT

START CARD NO. R039901

PROJECT NAME: Weyerhaeuser Mill
WELL IDENTIFICATION NO. AEM 338 / P2-2A
DRILLING METHOD: HSA
DRILLER: Brian G. Gose
FIRM: Cascade Drilling, Inc.
SIGNATURE: [signature]
CONSULTING FIRM: WRS
REPRESENTATIVE: Randy Richardson

COUNTY: Snohomish
LOCATION SW¼ NW¼ Sec 8 Twn 29N R 5E
STREET ADDRESS OF WELL: 101 E. Marine View Dr., Everett
WATER LEVEL ELEVATION: 3'
GROUND SURFACE ELEVATION: N/A
INSTALLED: 1/26/99
DEVELOPED: No

9033

AS-BUILT	WELL DATA	FORMATION DESCRIPTION
	SURFACE (AT THAT TIME) APPROX 28'	Rock
	WELL COVER	0 - 8 ft.
	CONCRETE SURFACE SEAL DEPTH = 1/ft	brown/black sand
	PVC BLANK 2 "x 3 '	- ft.
	BACKFILL 2.6' 1" ft. TYPE: bent. Chips	- ft.
	PVC SCREEN 2 "x 5 ' SLOT SIZE: .010	
	GRAVEL PACK 5.6' 1" ft. MATERIAL: 10/20 sand	
	WELL DEPTH 8 ' "	

SCALE: 1" = _____ PAGE _____ OF _____

ECY 050-12 (Rev. 11/09)

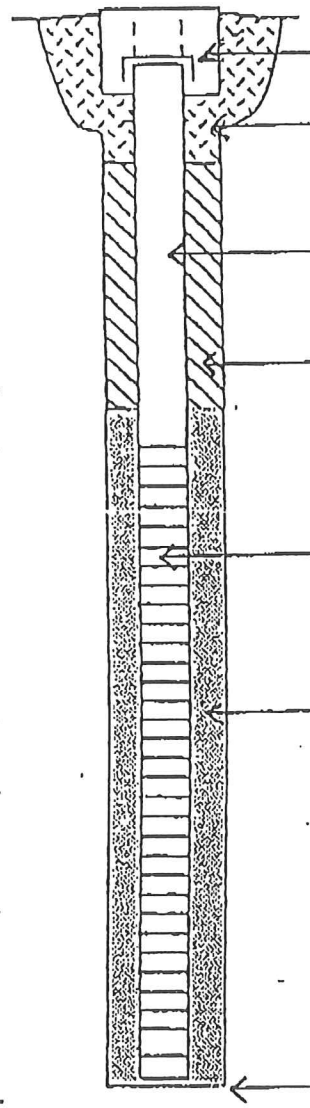
RESOURCE PROTECTION WELL REPORT

START CARD NO. R039901

PROJECT NAME: Weyerhauser Mill
WELL IDENTIFICATION NO. AEM 339/PZ-2B
DRILLING METHOD: HSA
DRILLER: Brian G. Gose
FIRM: Cascade Drilling, Inc.
SIGNATURE: Brian
CONSULTING FIRM: WRS
REPRESENTATIVE: Randy Richardson 9033

COUNTY: Snohomish
LOCATION SW 1/4 NW 1/4 Sec 8 Twp 29N R 5E
STREET ADDRESS OF WELL: 101 E. Marine View Dr. Everett
WATER LEVEL ELEVATION: 3'
GROUND SURFACE ELEVATION: N/A
INSTALLED: 1/26/99
DEVELOPED: No

AS-BUILT



WELL DATA

SURFACE (AT TIME OF DRILLING): 0.7'
WELL COVER
CONCRETE SURFACE SEAL
DEPTH = 1/ft
PVC BLANK 2 "x 2'6"
BACKFILL 2 ft.
TYPE: bent. Chips
PVC SCREEN 2 "x 5'
SLOT SIZE: .010
GRAVEL PACK 5'6" ft.
MATERIAL: 10/20 sand
WELL DEPTH 7'6"

FORMATION DESCRIPTION

RMR
0 - 7'6" ft.
brown / black sand
- ft.
- ft.

SCALE: 1" = _____ PAGE _____ OF _____

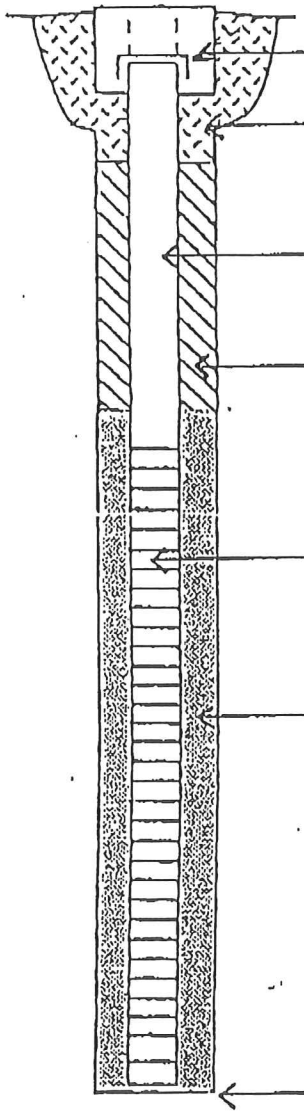
ECY 050-12 (Rev. 11/09)

RESOURCE PROTECTION WELL REPORT

START CARD NO. R039901

PROJECT NAME: Weyerhaeuser Mill
WELL IDENTIFICATION NO. AEM 335/PZ-3A
DRILLING METHOD: HSA
DRILLER: Brian G. Gose
FIRM: Cascade Drilling, Inc.
SIGNATURE: [signature]
CONSULTING FIRM: WRS
REPRESENTATIVE: Randy Richardson 9033

COUNTY: Snohomish
LOCATION SW¼ NW¼ Sec 8 Twn 29N R 5E
STREET ADDRESS OF WELL: 101 E. Marine View Dr, Everett
WATER LEVEL ELEVATION: ?'
GROUND SURFACE ELEVATION: N/A
INSTALLED: 1/26/99
DEVELOPED: No

AS-BUILT	WELL DATA	FORMATION DESCRIPTION
	SURFACE (STAFT DIST) APPROX. 7.75' Rock WELL COVER CONCRETE SURFACE SEAL DEPTH = 1/ft PVC BLANK 2 "x 2'.6" BACKFILL 2 ft. TYPE: bent. Chips PVC SCREEN 2 "x 4 ' SLOT SIZE: .010 GRAVEL PACK 4'.6" ft. MATERIAL: 10/20 colo. WELL DEPTH 6 . 6 "	0 - 6'.6" ft. brown/black sand - ft. - ft.

SCALE: 1" = _____ PAGE _____ OF _____

ECY 050-12 (Rev. 11/09)

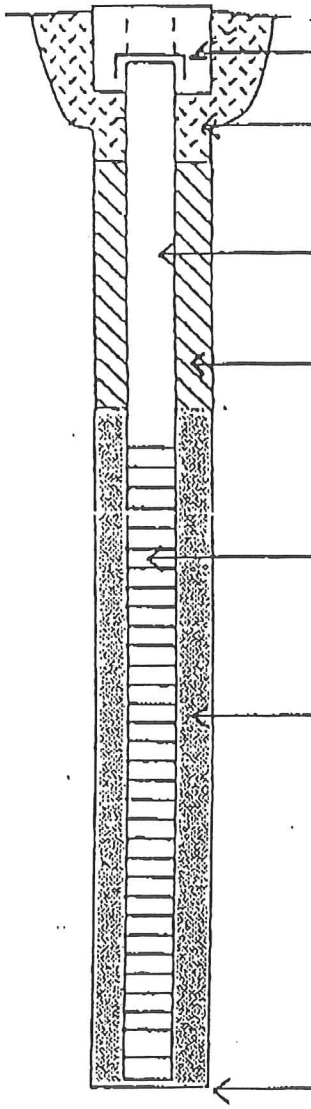
RESOURCE PROTECTION WELL REPORT

START CARD NO. R039901

PROJECT NAME: Weyerhaeuser Mill
WELL IDENTIFICATION NO. AEM334 / PZ-3B
DRILLING METHOD: HSA
DRILLER: Brian G. Gose
FIRM: Cascade Drilling, Inc.
SIGNATURE: [signature]
CONSULTING FIRM: WRS
REPRESENTATIVE: Randy Richardson 9033

COUNTY: Snohomish
LOCATION SW¼ NW¼ Sec 8 Twn 29N R 5E
STREET ADDRESS OF WELL: 101 E. Marine View Dr, Everett
WATER LEVEL ELEVATION: 3'
GROUND SURFACE ELEVATION: N/A
INSTALLED: 1/26/99
DEVELOPED: NO

AS-BUILT



WELL DATA

- SURFACE (@ THAT TIME) APPROX. 8' MWR
- WELL COVER
- CONCRETE SURFACE SEAL DEPTH = 1/ft
- PVC BLANK 2 "x 3 '
- BACKFILL 1 ft.
  TYPE: bent. Chips
- PVC SCREEN 2 "x 3 '
  SLOT SIZE: .010
- GRAVEL PACK 3.5 ft.
  MATERIAL: 10/20 colo.
- WELL DEPTH 6 ' "

FORMATION DESCRIPTION

0 - 6 ft.
brown / black sand

- ft.

- ft.

Post-it® Fax Note 7671
To Randy
Co./Dept.
Phone #
Fax #
From Mike Colbert
Co. Cascade drilling
Phone # 425-481-8308
Fax #
Date
# of pages ▶

SCALE: 1" = _____ PAGE _____ OF _____

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