FULCRUM
environmental consulting

April 7, 2023

Rhonda Luke, Project Coordinator
Toxics Cleanup Program - Central Regional Office
Washington State Department of Ecology
1250 West Alder Street
Union Gap, Washington 98903
Email: john.zinza@ecy.wa.gov

RE: Yakima Mill Site (Boise Cascade Mill, Cleanup Site 12095)
Agreed Order No. DE 13959

Dear Rhonda:

Enclosed please find two signed copies of the Monitoring Well 101 Replacement Installation – Documentation Report – Revised, dated April 7, 2023 for the Yakima Mill Site (Boise Cascade Mill, Cleanup Site 12095).

Please note, this version was revised from the report delivered by email to John Zinza, P.E. Site Manager on March 13, 2023. Following Mr. Zinza's review, he directed revisions to the report. On April 6, 2023, I provided a draft of the revised report to Mr. Zinza who confirmed his acceptance of the revisions on April 7, 2023.

If you have any questions, please contact me directly at 509.728.2424.

Thank you,

Ryan K. Mathews, CIH, CHMM
Principal

Enclosure

cc: Alec Danielson, PE; Allan Gebhard; and John Greer, PG, HG, Barr Engineering Co.
Rhonda Luke, Jennifer Lind, and Valerie Bound, Washington State Department of Ecology
All copies provided electronically.

P. 509.574.0839 F. 509.575.8453
406 North 2nd Street
Yakima, Washington 98901
efulcrum.net

FULCRUM environmental consulting

April 7, 2023

John Zinza, P.E., Site Manager
Toxics Cleanup Program - Central Regional Office
Washington State Department of Ecology
1250 West Alder Street
Union Gap, Washington 98903
Email: john.zinza@ecy.wa.gov

RE: Monitoring Well 101 Replacement Installation – Documentation Report – Revised
Yakima Mill Site (Boise Cascade Mill, Cleanup Site 12095)
Agreed Order No. DE 13959

Dear John:

On February 9, 2023, Barr Engineering Co. (Barr) and Fulcrum Environmental Consulting, Inc. (Fulcrum) received conditional approval[1] from the Washington State Department of Ecology (Ecology) to install one monitoring well (MW) associated with the Yakima Mill Site (the Site). On February 13, 2023, MW-101R was installed at the Site. On February 14, 2023, MW-101R was developed and on February 23, 2023 groundwater sampling of MW-101R was completed along with sampling of six other wells currently being monitored at the Site.

Selected Location

On February 1, 2023, Ryan Mathews and Amanda Enbysk with Fulcrum met with HLA Engineering & Surveying, Inc. (HLA) at the former location of MW-101 at the Site. HLA surveyed and marked the former location of MW-101, placed markers along the planned city road corridor, and placed markers along the construction easement for future work associated with construction of the roadway. Using these markings, Fulcrum identified an area located west of former MW-101 and selected a location for MW-101R. The selected location is shown on the map provided in Attachment A.

Fulcrum shared the proposed location with the City of Yakima and the City's consultant, Landau Associates (Landau). Fulcrum received confirmation from Landau prior to installation that that proposed location would not be expected to impact the vapor barrier system that will be placed during the City's interim action associated with roadway and utility construction.

[1] The February 9, 2023 Ecology letter conditionally approving the February 8, 2023 MW-101R Work Plan states that the conditional approval was based on Ecology concerns relating to meeting the four consecutive quarterly sampling schedule, for all wells in the supplemental sampling program, and the short time schedule available for Ecology to review the Work Plan and provide comments so the well could be replaced. A follow up meeting with Ecology on March 3, 2023 clarified the sampling schedule and addressed other Ecology questions about the installation and development of the replacement well and the Work Plan.

P. 509.574.0839 F. 509.575.8453
406 North 2nd Street
Yakima, Washington 98901
efulcrum.net

Utility Locate

Fulcrum submitted a public utility location request for the proposed MW-101R location and an area of approximately 100-foot radius surrounding the proposed location. No public utilities were reported to be present in or around the area of installation.

Fulcrum retained Utilities Plus, LLC to complete a private utility location survey and to utilize ground penetrating radar to evaluate the area for underground features. Utilities Plus LLC did not identify any underground features at the selected drilling location.

Well Installation

On February 13, 2023, Fulcrum observed the installation of MW-101R. Observation of well installation was completed by Amanda Enbysk (an Environmental Geologist) and Julian Howe (an Environmental Technician), both with Fulcrum. Anderson Environmental Contracting, LLC (AEC) provided drilling services by Rotosonic methods. The monitoring well was completed to a depth of approximately 28-feet below ground surface (bgs). Soil generated during drilling as an investigation derived waste was placed in a labeled drum and stored onsite pending characterization and disposal. AEC affixed label BNM549 to MW-101R. See Attachment B for the Resource Protection Well Report prepared by AEC and Attachment C for the well boring log prepared by Fulcrum.

During drilling, groundwater was observed in the boring approximately 21-feet bgs. Fulcrum measured the groundwater level in the boring after drilling was completed to be approximately 22.6-feet bgs. Based on the ground surface elevation measured during the subsequent survey, this depth corresponds to a groundwater elevation of approximately 1048.2-feet WSRN NAVD88.

Fulcrum completed field screening of the soils recovered during drilling. The field screening included observations of visual staining and odor and measurement of volatile organic compound (VOC) vapor concentrations. The vapor concentration measurements were made using a MultiRAE equipped with a 10.6-eV lamp photoionization detector (PID). The MultiRAE unit measures VOC presence in parts per million (ppm). Field screening found no indications of petroleum or other contaminant impacts.

No municipal solid waste was encountered in the boring. Three layers of log yard material were observed in the soil boring cuttings from approximately 3-feet bgs to 17-feet bgs. Fulcrum observed field screening PID detections at concentrations between 1 ppm and 6 ppm and an organic odor only within the log yard material layers. Field screening did not detect any combustible gas concentrations (measured as the lower explosive level) within the log yard material.

Well Construction

As noted above, the monitoring well boring was drilled to a depth of 28-feet bgs. The 6-inch diameter boring was backfilled with 0.5-feet of bentonite chips prior to installation of the well screen and riser. A 10-foot long, 2-inch diameter, 20-slot Schedule 40 PVC well screen was installed from the top of the

P. 509.574.0839 F. 509.575.8453
406 North 2nd Street
Yakima, Washington 98901
efulcrum.net

bentonite backfill at 27.5-feet bgs to 17.5-feet bgs. Filter sand, consisting of #2x12 sand, was placed from 27.5-feet to 15-feet bgs. The Schedule 40 PVC 2-inch diameter well riser pipe was installed from 17.5-feet bgs to about 2.5-feet above ground surface. The annulus between the riser pipe and the borehole wall was sealed with bentonite chips from the top of the filter sand to 2-feet bgs. A concrete surface seal was placed from 2-feet bgs to the ground surface. The well was finished with a 6-inch diameter steel protective casing with a locking metal cap.

Well Development

Fulcrum completed monitoring well development on February 14, 2023. Monitoring well development was completed as described in *Standard Operating Procedure – Yakima Mill Site: Monitoring Well Development* contained in Appendix A of the January 2019 Revised Final Remedial Investigation Work Plan (RIWP) Sampling and Analysis Plan (SAP), referenced in the February 2023 MW-101R Installation Work Plan. Purged groundwater was captured as an investigation derived waste and placed into a storage tote along with other purge water collected during well sampling at the site. Management of this groundwater will be completed as provided in the RIWP.

During development of MW-101R, turbidity was measured as provided in the *Standard Operating Procedure – Yakima Mill Site: Field Measurement of Turbidity in Water* from the RIWP SAP. Fulcrum calculated the water volume in the well to be 0.77-gallons. Fulcrum purged approximately 45 gallons of water from the well during development and measured a final turbidity of 7.12 NTU.

Surveyed Well Location

Following installation, HLA surveyed the location of the well and the elevations of the ground surface, top of the protective monument, and top of the casing. All elevation measurements were based on GPS measurements using the Washington State Reference Network (WSRN) NAVD88. The horizontal location of the well was based on GPS measurements using WSRN, Washington State Plane South Zone NAD83/2011. The northing and easting locations of the well are N 466,866.934 and E 1,641,434.307.

Table 1: MW-101R Survey

Location	Elevation (feet)
Ground Elevation	1067.2
Top of Concrete Surrounding Monument	1067.44
Top of Protective Monument	1071.08
Top of Casing	1070.73

See Attachment A for the survey figure showing the location of MW-101R.

Inadvertent Discovery Plan

No indications of suspected Native American ancestral remains, funerary objects, sacred objects, or objects of cultural patrimony were discovered during the field investigation.

P. 509.574.0839 F. 509.575.8453
406 North 2nd Street
Yakima, Washington 98901
efulcrum.net

Non-Aqueous Phase Liquids

Fulcrum did not identify non-aqueous phase liquid during drilling, well development, or sampling of MW-101R. All purge water appeared clear and no sheen was observed on the water surface.

If you have any questions, please contact Allan Gebhard, YMS Project Coordinator with Barr Engineering Co or Ryan Mathews.

Sincerely,

Amanda Enbysk, GIT
Project Scientist

Ryan K. Mathews, CIH, CHMM
Principal

cc: Alec Danielson, PE; Allan Gebhard; and John Greer, PG, HG, Barr Engineering Co.
Rhonda Luke, Jennifer Lind, and Valerie Bound, Washington State Department of Ecology
All copies provided electronically.

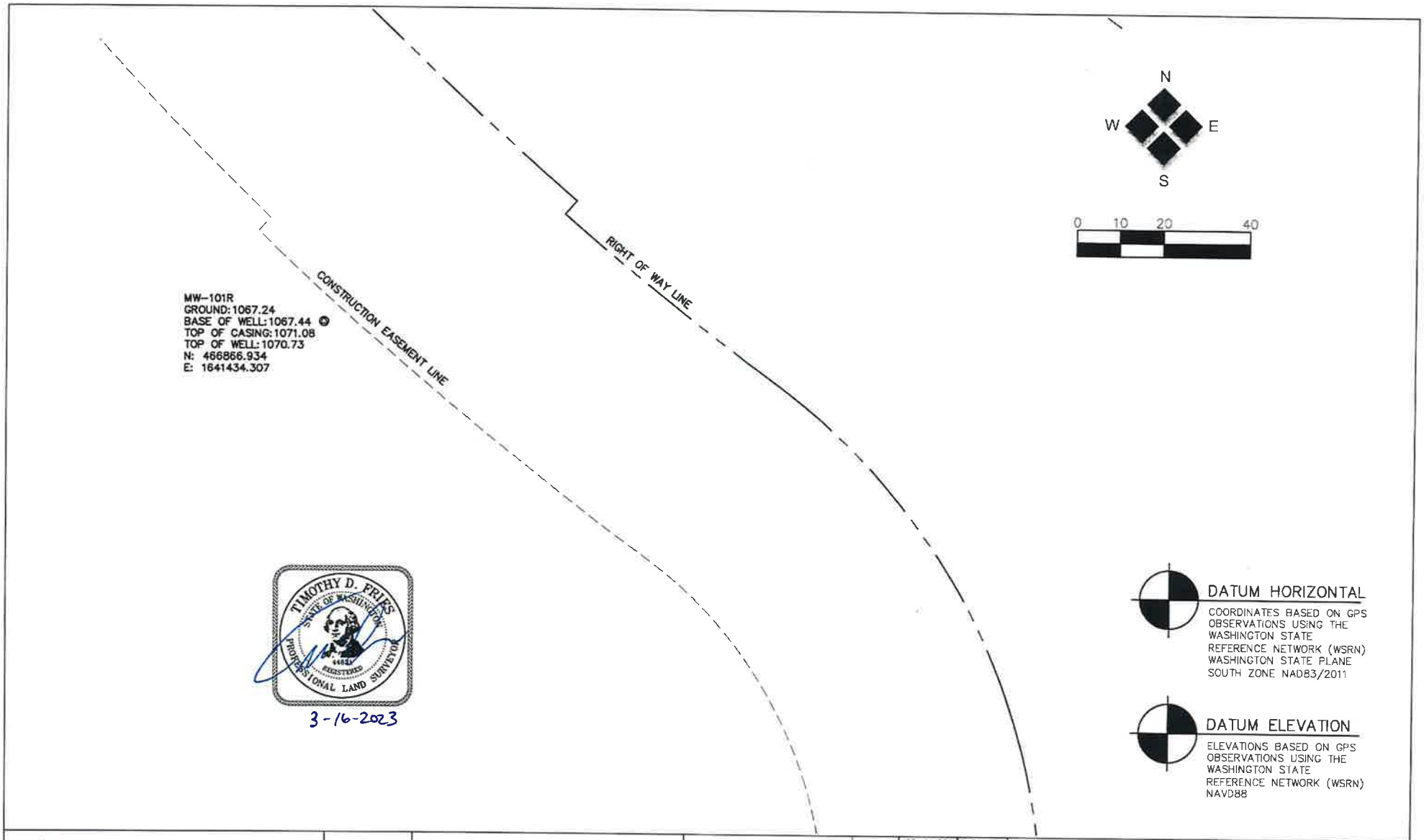
P. 509.574.0839 F. 509.575.8453
406 North 2nd Street
Yakima, Washington 98901
efulcrum.net

FULCRUM
environmental consulting

Attachment A

HLA Survey Figure – MW-101R

P. 509.574.0839 F. 509.575.8453
406 North 2nd Street
Yakima, Washington 98901
efulcrum.net



HLA
Engineering and Land Surveying, Inc.
2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

REVISION	DATE

JOB NUMBER: 21246 | DATE: 03-16-23
FILE NAMES: DRAWING: 21246.dwg
CHECKED BY: ETH
ENTERED BY: TDF

FULCRUM ENVIRONMENTAL CONSULTING, INC.
YAKIMA MILL SITE SURVEY
YAKIMA, WASHINGTON

MW – 101R EXHIBIT MAP

SHEET 1 OF 1

FULCRUM
environmental consulting

Attachment B

AEC Well Construction Log

P. 509.574.0839 F. 509.575.8453
406 North 2nd Street
Yakima, Washington 98901
efulcrum.net

DEPARTMENT OF ECOLOGY
State of Washington

Resource Protection Well Report

Submit one well report per well installed. See page two for instructions.

Type of Work:

■ Construction
☐ Decommission ⇒ Original NOI No. _____

Ecology Well ID Tag No. BNM-549
Site Well Name MW-101R
Consulting Firm FULCRUM
Was a variance approved for this well/boring? ☐ Yes ■ No
If yes, what was the variance for? _____

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

■ Driller ☐ Trainee ☐ Engineer
Name (Print Last, First Name) Wright, John
Driller/Engineer/Trainee Signature John Wright
License No. 3356
Company Name Anderson Environmental Contracting LLC

If trainee box is checked, sponsor's license number: _____
Sponsor's signature _____

Notice of Intent No. RE24132

Type of Well:

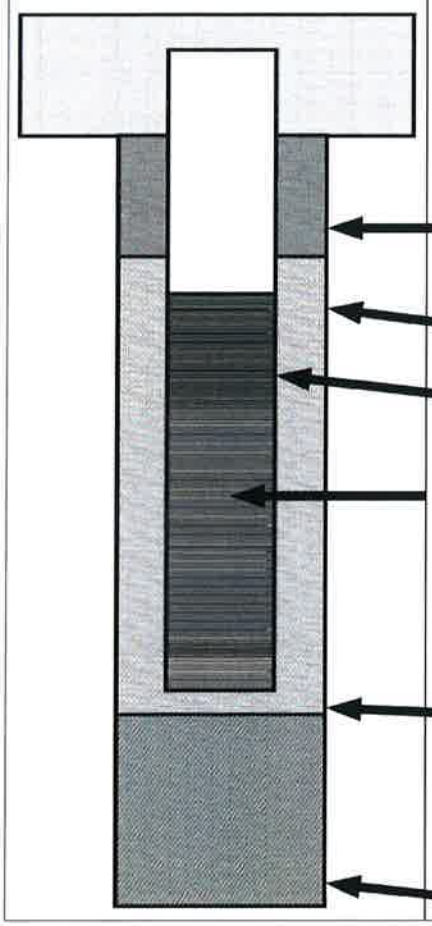
■ Resource Protection Well ☐ Injection Point
☐ Remediation Well ☐ Grounding Well
☐ Geotechnical Soil Boring ☐ Ground Source Heat Pump
☐ Environmental Boring ☐ Other _____
↳ ☐ Soil- ☐ Vapor- ☐ Water-sampling

Property Owner LEELYNN INC AND WILEY MT INC
Well Street Address 611 NORTH 8TH STREET
City YAKIMA County YAKIMA
Tax Parcel No. 191318-42001

Location (see instructions): WWM ☐ or EWM ■
NW ¼-¼ SE ¼, Section 18 Town 13N Range 19E
Latitude (Example: 47.12345) 46.36830
Longitude (Example: -120.12345) -120.29748
(WGS 84 Coordinate System)

Borehole diameter 6 inches Casing diameter 2 inches
Static water level 22.5 ft below top of casing Date 02/13/2023
■ Above-ground completion with bollards ☐ Flush monument
↳ Stick-up of top of well casing 2.5 ft above ground surface
Start Date 02/13/2023 Completed Date 02/13/2023

Construction/Design



Well Data

Concrete Surface Seal Depth	2	FT
Blank Casing (dia x dep)	2" x 17.5'	
Material	SCHEDULE 40 PVC	
Backfill		FT
Type	Chips	
Seal	13'	FT
Gravel Pack	12.5'	FT
Material	Sand	
Screen (dia x dep)	2" x 10'	
Slot Size	.002	
Material	SCHEDULE 40 PVC	
Well Depth	27.5'	FT
Backfill	.5'	
Material	CHIPS	
Total Hole Depth	28'	FT

Formation Description

0-22.5' FT
DARK BROWN SAND AND MEDIUM TO LARGE GRAVELS

22.5-28' FT
DARK GREY SILTY SANDS

_____ FT

Space Reserved for Ecology Stamp of Receipt

FULCRUM
environmental consulting

Attachment C

Fulcrum Soil Boring Log

P. 509.574.0839 F. 509.575.8453
406 North 2nd Street
Yakima, Washington 98901
efulcrum.net

Project: Yakima Mill Site
Project No.: 192665.04 (Fulcrum).
Location: Yakima, Washington
Coordinates: N 466,866.934 ft. E 1,641,434.307 ft.
Datum: NAD83 State Plane Washington South Zone

Surface Elevation: 1067.24 ft
Drilling Method: Rotosonic
Sampling Method: 4" sonic core
Completion Depth: 28 ft

LOG OF BORING MW-101R

SHEET 1 of 1

Unique Well NO.: BNM 549

Depth, feet	Sample Type & Recovery	Sample NO.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAIL	Elevation, Feet
0			PID:0 D/O/S:None/None/None G/S/F:30/30/40	ML		SANDY SILT WITH GRAVEL (ML): Brown (10YR 4/3); dry; Angular to subangular	Concrete surface seal 0-2'	
2			PID:0 D/O/S:None/None/None G/S/F:NA				Protective Casing Steel, 6"	1066
4	78%		PID:3 D/O/S:None/Slight organic/None G/S/F:NA			LOG YARD MATERIAL: Black; dry		1064
6			PID:1 D/O/S:None/Slight organic/None G/S/F:50/30/20	ML		SANDY SILT WITH GRAVEL (ML):Gray (10YR 5/1); dry		1062
8			PID:6 D/O/S:None/Yes/None G/S/F:50/30/20			LOG YARD MATERIAL: Black; dry SILTY GRAVEL WITH SAND (GM): dry; Angular to subangular; High sand content in fines	Back fill Bentonite Chips 2-15'	1060
10			PID:2 D/O/S:None/None/None G/S/F:50/30/20	GM				1058
12			PID:1 D/O/S:None/None/None G/S/F:NA					1056
14	68%		PID:1 D/O/S:None/None/None G/S/F:NA			LOG YARD MATERIAL		1054
16			PID:0 D/O/S:None/None/None G/S/F:10/20/70				Schedule 40 PVC Riser Pipe 2" Dia.	1052
18			PID:0 D/O/S:None/None/None G/S/F:10/20/70	ML		SANDY SILT WITH GRAVEL (ML): moist; Gravel subrounded to subangular		1050
20			PID:0 D/O/S:None/None/None G/S/F:10/20/70				Sand pack, sized for screen 15-27.5'	1048
22	▽		PID:0 D/O/S:None/None/None G/S/F:50/25/25			SILTY GRAVEL WITH SAND (GM): light grey (5YR 7/1); moist; Subrounded to subangular		1046
24	100%		PID:0 D/O/S:None/None/None G/S/F:50/25/25	GM			Screen, Schedule 40 PVC, 2" Dia. 0.020-inch Slot 17.5-27.5'	1044
26			PID:0 D/O/S:None/None/None G/S/F:50/25/25					1042
28						End of Boring 28 feet	Back fill Bentonite Chips 27.5-28'	1040
30								1038

Date Boring Started: 2/13/23 7:30 am
Date Boring Completed: 2/13/23 12:00 pm
Logged By: AE/JH
Drilling Contractor: Anderson Environmental Contracting
Drill Rig: Tracked Sonic

Remarks: Data presented as recorded in the field.
Elevation datum based on WSRN NAVD88.
Well monument finished with 6-inch diameter steel casing w/locking metal cap

D/O/S: discoloration/odor/sheen
G/S/F: %gravel/%sand/%fines