

WATER WELL ASSESSMENT REPORT



WEST SIDE QUARRY LLC

6655 SW Hergert Road
Cornelius, Oregon 97113
Washington County Tax Lot 1S3200000405

ODEQ Case No. WQ/SW-NWR-2019-171

Prepared for:

West Side Quarry LLC

PO Box 1060
Woodburn, Oregon 97071

Issued on:

February 9, 2021
EVREN NORTHWEST, INC.
Project No. 1350-20001-05

This

Water Well Assessment Report

Report for:

WEST SIDE QUARRY LLC

6655 SW Hergert Road
Cornelius, Oregon 97113

Has been prepared for the sole benefit and use of our Client:

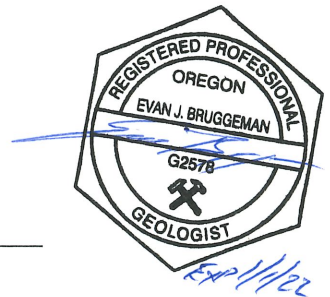
West Side Quarry LLC

PO Box 1060
Woodburn, Oregon 97071

Issued February 9, 2021 by:



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Evan J Bruggeman, R.G., Principal Field Geologist



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EXP. 2/1/2022

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List of Acronyms

amsl	above mean sea level
bgs	below ground surface
CRB	Columbia River Basalts
DOGAMI	Department of Geology and Mineral Industries
ENW	EVREN Northwest, Inc.
EPA	US Environmental Protection Agency
MCL	Maximum Contaminant Level
µg/L	micrograms per Liter
mg/L	milligrams per Liter
ODEQ	Oregon Department of Environmental Quality
OWRD	Oregon Water Resources Department
RBCs	Risk Based Concentrations
SLRBC	Screening Level Risk Based Concentration
West Side Entities	Columbia Northwest Recycling, Inc. (doing business as Construction Materials Recycling), West Side Quarry LLC, Westside Redi-Mix & Rock, Inc. (formerly known as Westside Rock, Inc.), and Westside Rock & Reclaim, LLC

1.0 Introduction

EVREN Northwest, Inc. (ENW) has prepared this report documenting assessment of a water sample collected from a water well located at the West Side Quarry (Figures 1 and 2; subject site). The water well was sampled at the request of the Oregon Department of Environmental Quality (ODEQ) for the purpose of identifying potential impacts to ground-water quality at the quarry location.

This investigation was conducted on behalf of West Side Quarry LLC, one of the “West Side Entities” comprised of: (1) Columbia Northwest Recycling, Inc. (doing business as Construction Materials Recycling), (2) West Side Quarry LLC, (3) Westside Redi-Mix & Rock, Inc. (formerly known as Westside Rock, Inc.), and (4) Westside Rock & Reclaim, LLC (collectively herein the “West Side Entities”).

1.1 Background

The subject site is an upland basalt quarry located in the southern part of the Tualatin Valley in western Washington County. The site is identified on Tax Map 1S320 in the SE quarter of Section 20, Township 1 South Range 3 West, and it is over 100 acres in total area.

Mining operations reportedly ceased in or around early 2016 and mine reclamation was commenced. Sometime in early 2017, West Side Entities brought glass cullet and recyclable asphalt shingles (no tear off, only unused shingles direct from the manufacturer) to the site as part of a supplementary recycling operation.

In May 2020, ODEQ issued a Notice of Civil Penalty Assessment and Order for unauthorized solid waste disposal practices at the quarry site. The order cites improper storage of recycled material containing a minor fraction of residual plastic and metal, which has been ground (“processed”) and used without approval from ODEQ. The order required West Side Entities to immediately cease recycling operations.

In May 2020, ODEQ issued an amended civil penalty for contamination of storm-water discharge, including possible contribution of iron contamination at the spring below the site. ODEQ requested a ground-water investigation be conducted to determine if wells in the area may have been impacted by solid waste at the facility.

In late 2020, ENW prepared a report titled “Revised Ground Water Assessment,” dated November 25, 2020, in which site hydrogeologic conditions were reviewed and presented for the purpose of assessing potential impacts to ground water quality near the site. Although the assessment concluded that ground water impacts were unlikely, in a January 12, 2021 correspondence, ODEQ expressed continued concerns that contaminants from recycled waste may have caused an impact to ground water. Because a ground water well (WASH 76790) is within the quarry boundaries and relatively close to where the known/suspected wastes are managed, ODEQ requested that a sample of ground water from the well be collected and analyzed for constituents of potential concern and to submit the results to ODEQ for review.

1.2 Purpose and Objectives

ENW developed the Scope of Work consistent with the following data quality objectives:

- Collect ground water quality data for pertinent COPCs, as specified by ODEQ;
- Ensure sample results are representative of underlying aquifer conditions;
- Ensure laboratory reporting limits are sufficiently low for useful comparison to regulatory ground water quality standards; and,
- Include appropriate assurance/quality control procedures during sampling to achieve sample integrity.

1.3 Scope of Work

ENW conducted the following scope of work to achieve the project objectives.

- Conducted a pre-sampling site visit to confirm the location of the water well, its configuration, and confirm the method of purging and sampling the well.
- Purged the well to remove standing water from the well casing and draw representative ground water into the well.
- Collected a ground water sample following standard industry practices.
- Submitted the ground water sample to an accredited laboratory for analysis.
- Evaluated the laboratory results and summarized findings in this report.

The scope of work was completed on January 27, 2020 and documented in a photographic log included as Appendix A.

2.0 Site Setting

The subject quarry site is located at the northern end of the Chehalem Mountains on northeastward-sloping terrain (see Figure 1 for Site Vicinity Map). The elevation of the site ranges from approximately 300 feet above mean sea level (amsl) at its northeastern boundary to about 800 feet amsl near its southwestern boundary. The site is in an agricultural area and is surrounded by farms and rural residences on lots typically greater than five acres in area.

2.1 Site Geology

The site is underlain by Miocene and Pliocene Columbia River Basalts (CRB) of Trimble (1963)¹, comprising a series of tholeiitic flood basalts measuring up to 420 feet thick locally. The CRB underlies the entire Tualatin Valley, the Tualatin Mountains, Cooper and Blue mountains, Parrett Mountain, the Chehalem

¹ Trimble, D.E., 1963, Geology of Portland, Oregon and adjacent areas: U.S. Geological Survey. Bulletin, v. 1119, 119p.

Mountains, David Hills, and the Red Hills of Dundee. Different flood basalt flows are separated by well-developed columnar jointing and vesicular to slaggy vesicular zones (interflow zones).²

The structural character of the Chehalem Mountains is dominated by a broad, northwestern trending anticline ridge dipping generally eastward into the Tualatin Valley. To the east and west of the Chehalem Mountains are the Tualatin basin syncline and the Newberg and Wilsonville valleys, respectively. Bordering synclinal structures are attributed to broad regional downwarping that has been modified by faulting and erosion. A large normal fault trending in a northwesterly direction borders the west edge of the Chehalem Mountains, possibly occurring during folding.

The West Side Entities quarry generally bisects the Grande Ronde member of the CRBs.³ Exposures of the Grande Ronde basalt in the Chehalem Mountains dip generally east and northeast into the Tualatin Valley at 9 to 11 degrees.²

2.2 Ground Water

The Oregon Water Resources Department (OWRD) identifies 87 water wells within the same township/section/range as the subject site. A review of well log information indicates productive ground water aquifers occur at depths between 120 feet bgs and 605 feet bgs in the site vicinity. Well drillers' notes describe a variety of aquifer characteristics ranging from sandy clay and claystone to basalt, porous basalt, and fractured or broken basalt.

Details of the on-site well's construction are presented in Table 2-1 and a copy of the OWRD well report for the on-site well is included in Appendix B. The well is located near the tipping station at the northeastern part of the quarry at an elevation of approximately 364 feet amsl (see Figure 2). The well is completed with a 6-inch diameter welded steel casing extending to 98 feet bgs, below which is an open borehole extending to the total depth of 268 feet bgs. A 4.5-inch diameter welded plastic pipe installed inside the outer steel casing withdraws ground water from perforations extending from 248 to 267 feet bgs. Static water in the well was reported at 73 feet bgs, and the water-bearing unit is described as basalt with occasional soft interbeds.

Table 2-1. Well Construction Details – WASH 76970

Well ID	Name	Approx Elev. (feet)	Completion Depth (feet)	Static Water Level (feet)	Water-Bearing Units (depth in feet)	Aquifer Characteristics
Section 20						
WASH76970	Columbia NW	364	268	73	180 - 265	Basalt Occass. Soft Interbeds

² Interflow zones consist of the top of one basalt flow and the bottom of the overlying flow as well as any intervening sediment, if present, and generally are permeable where the basalt is vesicular or brecciated.

³ Al-Eisa, A., 1980. "The Structural and Stratigraphy of the Columbia River Basalt in the Chehalem Mountains, Oregon, Portland State University Masters Thesis".

3.0 Field Methods

The on-site water well was sampled on January 27, 2021 by ENW field personnel, with permission by West Side Entities and in accompaniment of Mr. Jeremy Phillipi of West Side Quarry. Water from the well was accessed by a conventional water spigot located at the well head and water flow and pressure was regulated by opening a 3-inch diameter ball valve immediately downstream of the spigot.

To collect the sample, a water well sampling manifold was attached to a short length of clean garden hose which in turn was attached to the well spigot. The sample manifold consists of a female-threaded inlet attachment with a ball valve and four discharge ports with ball valves. The sample port on the manifold is a barbed fitting connected in parallel to the four discharge ports. A section of tubing pressed onto the barbed fitting and a valve controls the flow of ground water during sampling.

Ground water was retrieved from the well by activating the well's down hole pump from a control panel inside the well house. Ground water from the well was discharged directly from the 4-inch well casing through the 3-inch ball valve and the garden hose spigot and sample manifold during purging and sampling. The flow was regulated by adjusting the ball valve, and individual valves on the sample manifold. The well's pressure tank is connected in parallel to the flow, but the sampled portion of well water did not pass through the pressure tank prior to reaching the sample manifold.

Prior to sampling, ground water from the well was discharged into a 5-gallon bucket and the time to fill the bucket was recorded to determine the flow rate of the well. Once the flow rate was determined (approximately 50 gallons per minute), the 3-inch ball valve on the well head was opened to purge the well for a period of approximately 20 minutes (equal to a volume of 1,000 gallons). Purge water was discharged through 2-inch flex hose into a nearby tank. A 5-gallon bucket collected overflow to provide a modified flow through cell. During purging, a water quality meter (In-Situ Aqua Troll 500) was used to periodically measure temperature, specific conductivity, dissolved oxygen, pH, oxygen reduction potential, and turbidity. Ground water monitoring field data were recorded on Field Sampling Data Sheets (FSDS) (included in Appendix C).

When ground water parameters stabilized (within 10% of preceding readings), the 3-inch ball valve was left open to prevent pressure from building up in the system and sampling commenced at the sample manifold. The flow rate of water from the well was adjusted at the sample manifold down to approximately 200 milliliters per minute using the control valve at the barbed fitting. Samples were decanted into laboratory-supplied sample containers, sealed with Teflon-lined lids, uniquely labelled, and preserved in a cooler with artificial ice pending transport to the laboratory.

3.1 Quality Assurance/Quality Control Sample

In addition to the well sample, ENW collected an equipment blank for quality assurance/quality control (QA/QC) purposes. ENW collected the equipment rinsate blank using a sample of contaminant free water that was passed through the non-disposable ground water sampling manifold and the attached polyvinyl chloride (PVC) garden hose.

3.2 Analytical Schedule

Samples were shipped to Friedman & Bruya, Incorporated in Seattle, Washington (F&BI) for analysis. The water well sample and equipment blank were analyzed using ODEQ-approved analytical methods according to the analytical schedule presented in Table 3-1.

Table 3-1. Analytical Plan

Analytical Method	Constituents	Ground Water
NWTPH-Gx	Total Petroleum Hydrocarbons as gasoline-range organics (GRO)	All samples
NWTPH-Dx	Total Petroleum Hydrocarbons as diesel-range organics and residual-range organics (DRO and RRO, respectively)	All samples
U.S. Environmental Protection Agency (USEPA) Method 6020	Resource Conservation and Recovery Act (RCRA) 8 Total Metals	All Samples

3.3 Cleanup Standards

3.3.1 Risk-Based Cleanup

ODEQ allows site closure using a risk-based approach; risk-based cleanup concentrations (RBCs) are derived in accordance with ODEQ's RBDM guidance document. This document provides guidance on the remediation of hazardous substance cleanups as well as petroleum-contaminated sites.

RBCs are based on Oregon unacceptable additional risk criteria for cancer occurrence and for non-carcinogenic health impacts. The State of Oregon considers acceptable additional risk of cancer from contact with carcinogenic constituents at less than one in one million incidences, or, for non-carcinogenic constituents, below the constituent threshold concentration at which health impacts would occur. RBCs are generally used to evaluate sampling analytical results as follows:

- ODEQ's lowest RBC for residential receptors is used as an initial 'conservative' screening of all constituents of interest. If a constituent's concentration exceeds its screening-level RBC (SLRBC), it requires further evaluation and is identified as a constituent of potential concern (COPC). Otherwise, the constituent is considered unlikely to pose unacceptable risk to any human receptor.
- COPCs are further evaluated through a risk-based assessment which evaluates site-specific exposure pathways and receptors against generic ODEQ-provided RBCs.

Should constituents be identified that also exceed their generic, but exposure pathway- and receptor-specific RBCs, then the appropriateness of additional site-specific methods allowed under the RBDM

guidance document will be evaluated (e.g., the development of site-specific RBCs, sampling of soil gas and/or vapor, etc.).⁴

3.4 Other Numeric Criteria

3.4.1 Background Metals

Analytical data were compared with background concentrations established by the ODEQ⁵. ODEQ does not require cleanup for metals concentrations below default background concentrations. Background concentrations are used for screening data for metals in ground water as part of the risk assessment.

4.0 Findings

4.1 Laboratory Analytical Results

The results of laboratory analysis are summarized in Table 1, behind the Tables tab following the text. Results in Table 1 are screened against ODEQ's most stringent human health risk-based concentrations published in Appendix A of their guidance document titled "Risk-Based Decision Making for Remediation of Contaminated Sites," dated September 2003, updated May 2018. The laboratory analytical report, including quality control information, is provided in Appendix D.

4.2 Water Well Sample Results

4.2.1 Total Petroleum Hydrocarbons

Laboratory analysis of the water well sample "WW-210127" by methods NWTPH-Gx or NWTPH-Dx did not detect the presence of total petroleum hydrocarbons above the laboratory method reporting limit (MRL).

4.2.2 Total RCRA 8 Metals

Laboratory analysis of water well sample "WW-210127" by EPA Method 6020B detected the following inorganic constituents:

- Barium was detected at 7.27 micrograms per liter (µg/L). The detected concentration is below the ODEQ's SLRBC for barium of 4,000 µg/L.
- Arsenic, cadmium, chromium, lead, mercury, and selenium and silver were not detected above their respective laboratory MRL.

⁴ ODEQ RBDM Data Table, Dated October 2017

⁵ ODEQ, October 28, 2002, Default Background Concentrations for metals, Memo from Toxicology Workgroup to DEQ Cleanup, Table 1 – Oregon DEQ Suggested Default Background Concentrations for Inorganic Contaminants in Various Environmental Media.

4.3 Quality Control Sample Results

4.3.1 Laboratory QA/QC Results

Laboratory results were verified through review of surrogate recovery percentages and the analyses of laboratory method blanks. All of the required surrogate recoveries were within acceptable limits and analysis of the method blanks revealed no detectable constituent concentrations. According to the laboratory report, samples were analyzed within acceptable QA/QC limits and appropriate method hold times.

4.3.2 Equipment Blank Rinsate Sample

The equipment rinsate blank was used to assess the adequacy of the cleanup process involving reusable equipment, as well as potential contaminant introduction from handling and storage of equipment. Laboratory analysis of the equipment rinsate blank did not detect the presence of any of the constituents analyzed.

5.0 Discussion

The results of the water well sampling indicate low levels of barium are present in well water. A 1987 EPA survey indicated that barium was typically present in drinking water supplies, usually the result of naturally occurring barium rather than industrial releases.

The concentration of barium in the water well sample (7.27 µg/L) is less than ODEQ's residential RBC for *Ingestion & Inhalation from Tap Water* (4,000 µg/L), and less than EPA's Maximum Contaminant Level (MCL) for barium (2,000 µg/L). The detection of barium is likely related to background concentrations in the CRB interflows.

6.0 Conclusion

The findings of this investigation, which included the laboratory analysis of one water sample for total petroleum hydrocarbons and RCRA 8 inorganic constituents, detected only barium in the sample. The concentration of barium was below state and federal cleanup standards and is likely related to background levels of barium within the CRB interflow units. The findings suggest ground water beneath the subject site has not been adversely impacted by materials stored at the facility.

Table 1 - Summary of Analytical Data, Well Water

Location ID	Water Well	Quality Control	Maximum Ground Water Concentration	ODEQs Screening-level Risk-Based Concentrations (SLRBCs) ¹	Background Concentrations (metals) ²	Exceeds Background Concentrations (metals)?	COPC?	
Sample ID	WW-210127	Equip Blank-210127						
Date Sampled	1/27/21	1/27/21						
Depth Sampled (feet)	--	--						
Sampled By	ENW	ENW						
Location	Onsite Water Well	Equipment Blank Rinsate Sample				TRUE OR Y FALSE OR N	TRUE OR Y FALSE OR N	
Constituent of Interest	Note	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)				
Metals								
Arsenic	c, nv	<1 (ND)	<1 (ND)	<1 (ND)	0.052	2	N	BKG
Barium	nc, nv	7.27	<1 (ND)	7.27	4000	<200 ³	N	N
Cadmium	nc, nv	<1 (ND)	<1 (ND)	<1 (ND)	20	1	N	N
Chromium (III)	nc, nv	<1 (ND)	<1 (ND)	<1 (ND)	30000	1	N	N
Lead	NA, nv	<2 (ND)	<2 (ND)	<2 (ND)	15	13.3	N	N
Mercury	nc, nv	<1 (ND)	<1 (ND)	<1 (ND)	6.0	0.1	(Y)	N
Total Petroleum Hydrocarbons								
Generic Gasoline (GRO)	nc, v	<100 (ND)	<100 (ND)	<100 (ND)	110	NE	--	N
Generic Diesel / Heating Oil (DRO)	nc, v	<500 (ND)	<500 (ND)	<500 (ND)	100	NE	--	(Y)
Generic Mineral Insulating Oil (RRO)	nc, nv	<250 (ND)	<250 (ND)	<250 (ND)	300	NE	--	N

Notes:

ug/L = micrograms per Liter or parts per billion (ppb).

<# (ND) = not detected at or above the laboratory method reporting limit shown.

NE = not established.

¹ Lowest Risk-Based Concentration (RBC) for ground water (screening level assumes residential use, from ODEQ RBCs dated May 2018).

² ODEQ Suggested Default Background Concentrations for Inorganic Contaminants in Various Media, Toxicology Workgroup Memo to DEQ Cleanup Project Managers, October 28, 2002.

³ EPA survey data indicated that barium was typically present in drinking water supplies at levels less than 0.2 milligrams per liter: EPA Fact Sheet on Drinking Water Chemical Contaminant - Barium. 1993.

— = not analyzed or not applicable.

c = carcinogenic

nc = noncarcinogenic

v = volatile

nv = nonvolatile

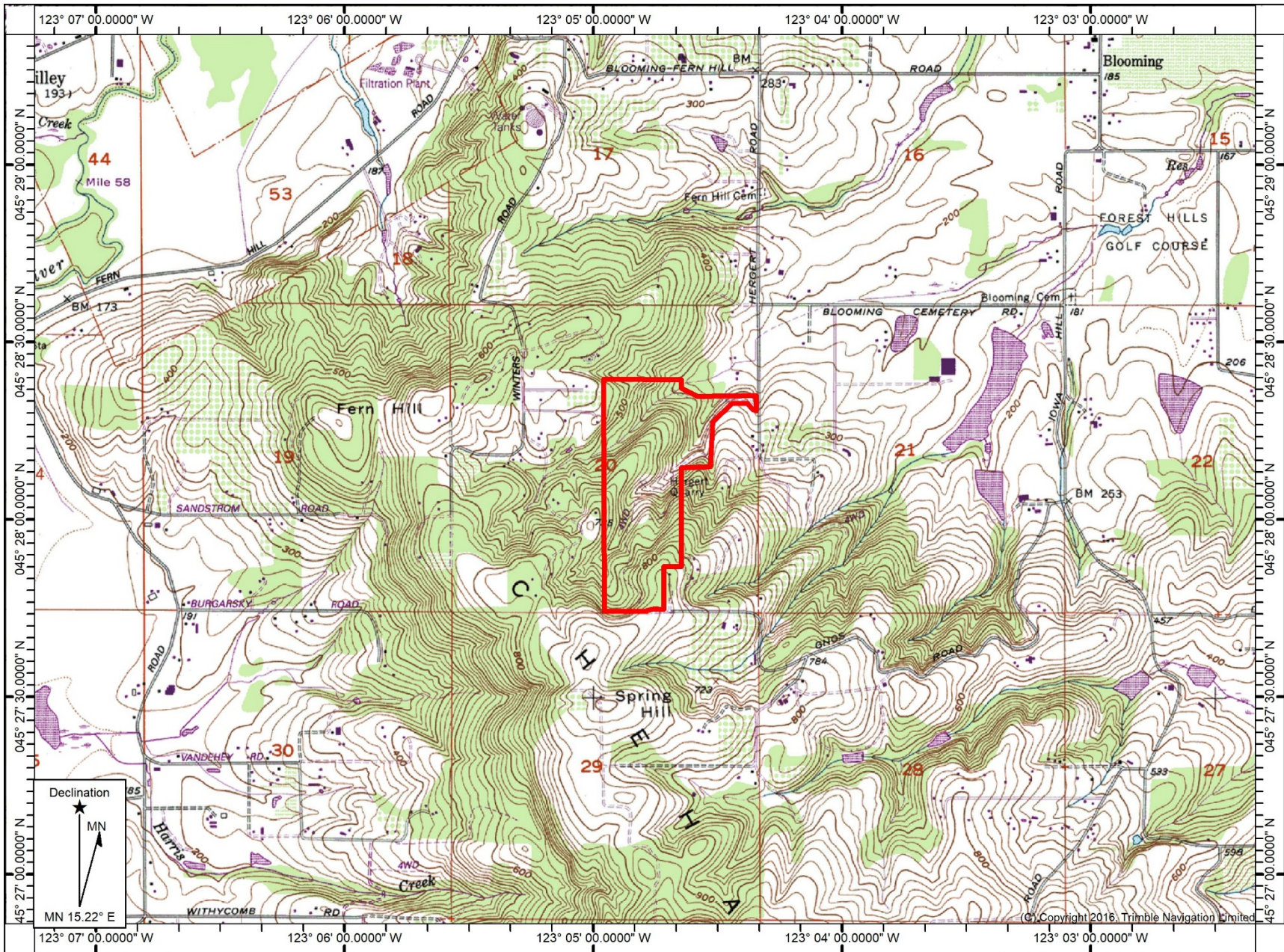
GRO = gasoline-range organics.

DRO = diesel-range organics.

RRO = residual-range organics.

BKG = constituent exceeded its SLRBC; however, was not detected above default background concentrations in ground water

(Y) indicates analyte not detected, but detection limit is above screening concentration.



Name: LAURELWOOD
 Date: Jan 1, 1992



Location: 045° 28' 06.8697" N, 123° 04' 47.6088" W
 Contour Interval: 20 ft



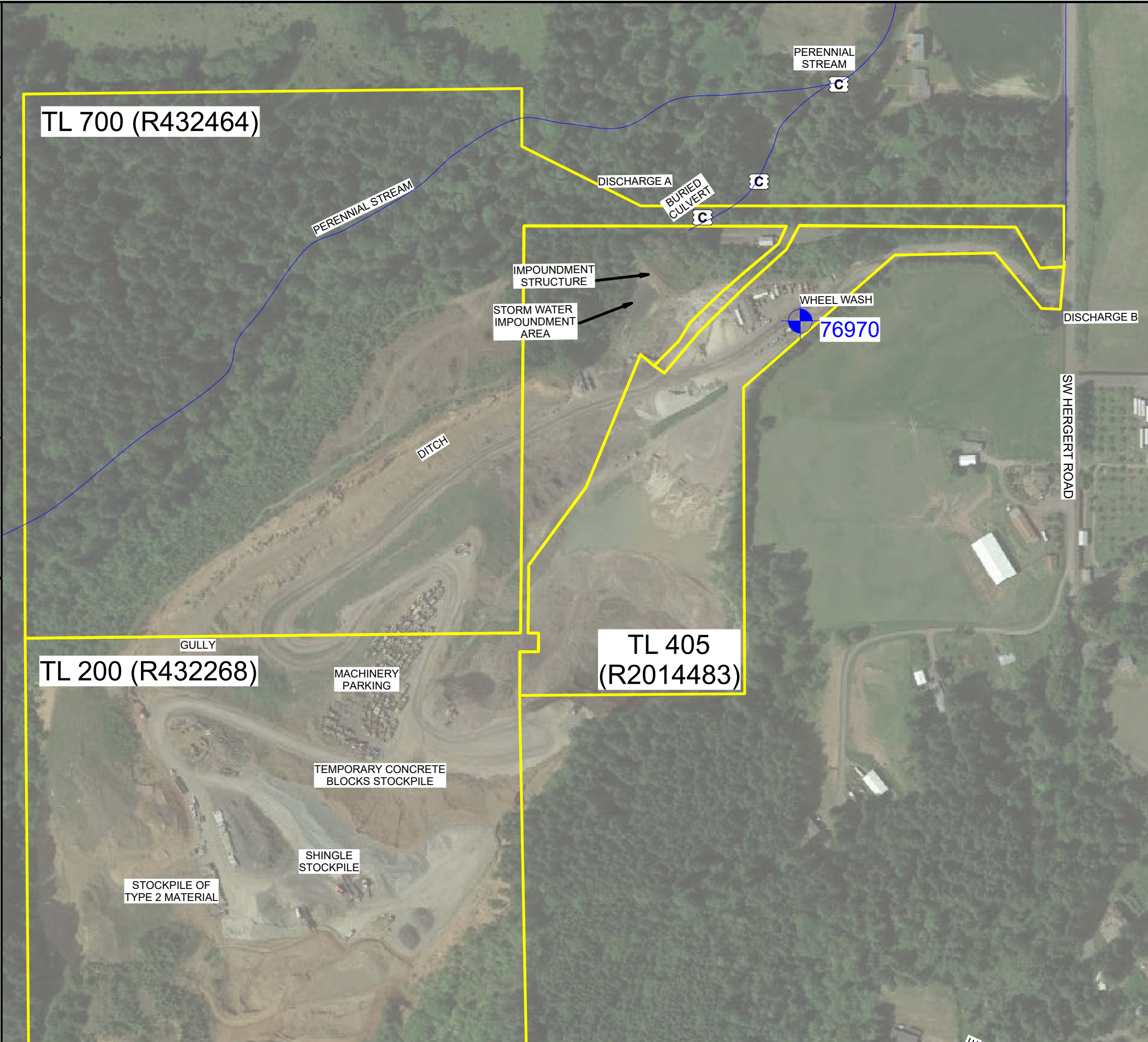
Date Drawn: 11/24/2020
 CAD File Name:
 Drawn By: CLR
 Approved By: LDG

West Side Quarry
 6655 SW Hergert Road
 Cornelius, Oregon

Site Vicinity Map

Project No.
 1350-20001
 Figure No.
 1

DRAWN BY: C. ROSEBROOK 02/08/2021
 CHECKED BY: E. CHAPMAN 02/08/2021
 APPROVED BY: L. GREEN 02/08/2021
 DRAWING NUMBER: 1350-20001(v01)

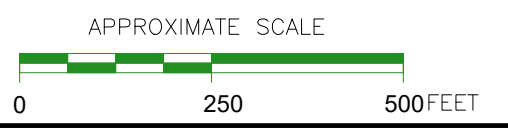


LEGEND:

- TAXLOT BOUNDARIES
- WELL LOCATION
- CULVERT
- C1 CULVERT ON VANAKIN PROPERTY
- C2 CULVERT FROM CONFLUENCE OF DRAINAGES
- C3 OUTLET FROM C1

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2019 AND ENW FIELD NOTES.
2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.
3. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT SHAPE, SIZE, OR ORIENTATION.



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FIGURE 2
 SITE PLAN

WEST SIDE QUARRY LLC
 6655 HERGERT ROAD
 CORNELIUS, OREGON

Appendix A – Photographic Log



The on-site water well is located in the northeastern part of the Westside Rock quarry. The well head is shown next to the shed. The control panel and pressure tank were located inside the shed.



A close-up view taken the week before sampling shows the wellhead with a gate valve and a 2-inch flex hose attached to the well. The flex hose was used to purge the well prior to sampling.



A garden spigot connected to the well head inside the well monument provided access for sampling. Note: the pictured hose was not utilized for sampling collection.



View of sampling manifold and hose connected to the spigot on the wellhead during sampling.



View of ground water being sampled from a barbed fitting on the sample manifold.

Appendix B – OWRD Well Log Report

(1) LAND OWNER Owner Well I.D. _____
First Name _____ Last Name _____
Company COLUMBIA NORTHWEST RECYCLING
Address P.O. BOX 947
City NORTH PLAINS State OR Zip 97133

(9) LOCATION OF WELL (legal description)
County WASHINGTON Twp 1 S N/S Range 3 W E/W WM
Sec 20 SE 1/4 of the NE 1/4 Tax Lot 405
Tax Map Number _____ Lot _____
Lat _____ " or _____ DMS or DD
Long _____ " or _____ DMS or DD
 Street address of well Nearest address

6655 SW HERGERT RD., CORNELIUS, OR 97113

(2) TYPE OF WORK New Well Deepening Conversion
 Alteration (complete 2a & 10) Abandonment (complete 5a)

(2a) PRE-ALTERATION
Dia + From To Gauge Stl Plstc Wld Thrd
Casing: _____
Material From To Amt sacks/lbs
Seal: _____

(3) DRILL METHOD
 Rotary Air Rotary Mud Cable Auger Cable Mud
 Reverse Rotary Other _____

(4) PROPOSED USE Domestic Irrigation Community
 Industrial/ Commercial Livestock Dewatering
 Thermal Injection Other _____

(5) BORE HOLE CONSTRUCTION Special Standard (Attach copy)
Depth of Completed Well 268 ft.

BORE HOLE

Dia	From	To	Material	From	To	Amt	sacks/ lbs
10	0	98	Cement w/1% Bentonit	0	98	25	S
						Calculated	24.72
6	98	268					
						Calculated	

How was seal placed: Method A B C D E
 Other _____
Backfill placed from _____ ft. to _____ ft. Material _____
Filter pack from _____ ft. to _____ ft. Material _____ Size _____
Explosives used: Yes Type _____ Amount _____

(5a) ABANDONMENT USING UNHYDRATED BENTONITE
Proposed Amount Pounds Actual Amount Pounds

(6) CASING/LINER
Casing Liner Dia + From To Gauge Stl Plstc Wld Thrd
 6 2 98 .250
 4.5 2 268 200#
Shoe Inside Outside Other Location of shoe(s) _____
Temp casing Yes Dia _____ From _____ To _____

(7) PERFORATIONS/SCREENS
Perforations Method DRILLED
Screens Type _____ Material PVC
Perf/S Casing/ Screen Scrm/slot Slot # of Tele/ green Liner Dia From To width length slots pipe size
Perf Liner 4.5 248 267 .50 42 PIPE

(8) WELL TESTS: Minimum testing time is 1 hour
 Pump Bailer Air Flowing Artesian
Yield gal/min Drawdown Drill stem/Pump depth Duration (hr)
52 210 .5
65 240 } 1
65 265 }

Temperature 57 °F Lab analysis Yes By _____
Water quality concerns? Yes (describe below) TDS amount 254 ppm
From To Description Amount Units

(10) STATIC WATER LEVEL
Date SWL(psi) + SWL(ft)
Existing Well / Pre-Alteration _____
Completed Well 08-17-2018 73
Flowing Artesian? Dry Hole?

WATER BEARING ZONES Depth water was first found 180


SWL Date	From	To	Est Flow	SWL(psi)	+ SWL(ft)
08-17-2018	180	265	65		73

(11) WELL LOG Ground Elevation _____

Material	From	To
ROCK FILL	0	3
BROWN CLAY	3	15
DECOMP BROWN BASALT	15	79
SOFT BROWN BASALT	79	93
FIRM GRAY BROWN BASALT	93	103
HARD GRAY BASALT	103	159
FIRM GRAY BROWN BASALT WITH SOFT	159	
BROWN INTERBEDS		169
LITE BROWN CLAYSTONE	169	180
FIRM GRAY BROWN BASALT OCC. SOFT	180	
INTERBEDS		238
HARD GRAY BASALT	238	259
SOFT BLACK BASALT	259	268

Date Started 08-09-2018 Completed 08-17-2018

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
License Number _____ Date _____
Signed _____

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
License Number 1266 Date 08-20-2018
Signed 
Contact Info (optional) _____

RECEIVED
AUG 23 2018

Appendix C – Field Sampling Data Sheets

EVREN Northwest GROUND WATER FIELD SAMPLING DATA FORM (FIELD)

PROJECT NAME: 1350-20001-05
 Event: water well assessment

PROJECT NUMBER: _____
 Date: 01/27/21

Field Personnel: Dan and Tia Monitoring Well ID: 130433
 Weather Conditions: showers 37°F Start Time: 14:35
 DTW (prior to purging): -

WELL PURGING INFORMATION

Time	DTW During Purging (feet)	Pumping Rate gal/L/min	Temperature (degree C)	Specific Conductivity (mS/cm), ±3%	Dissolved Oxygen (mg/L), ±10%	Water pH (S.U.), ±0.1%	ORP (mV), ±10 mV	Turbidity (NTU), ±10%	Total Quantity Purged (gallons/liters)
14:36	pump	turned	on						
14:39		50	10.37	523.66	2.85	6.70	203.1	3.87	200
14:43		50	10.94	527.62	3.40	6.63	193.9	25.41	400
14:47		50	11.11	529.27	6.12	6.59	190.1	246.56	600

Total Purged: 1000

Tubing: sampling manifold
 Purge Pumping Rate (approx. L/m): 50 gal/min
 Decontamination method: _____

Well casing (in. diam): _____
 Approx. Pump/Intake Depth: _____

Well Conversion Factors: 2" = 0.17 gal / foot; 5/8" = 0.02 gal/foot

WELL CONDITION

Recommended Well Repairs/Additional Notes: _____

QA/QC Sample: Duplicate Lab QA/QC Equipment Blank None
 Sampling Method: Grundfos Pump Peristaltic Pump Bladder Pump Dual Valve syringe from well

SAMPLE INFORMATION

Analytical Parameters	Destination Laboratory	Preservative	Bottle Size	Number of bottles	Sample ID	Time Sampled
Gx	F3B	HCl	40ml	3	ww-210127	14:55
Px	↓	none	500ml	1	↓	↓
Total RCRA8	↓	HNO3	250ml	1	↓	↓

Method of Transportation of samples: FedEx Courier
 All samples were immediately placed into a cooler and packed with ice or "blue ice" Yes No

Field Observations/Notes of sampling event:
- purging water into nearby tank through 2 in flex hose
- collected samples at 14:55

Signature of Field Personnel: [Signature]

Appendix D – Laboratory Report

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 9, 2021

Lynn Green, Project Manager
Evren Northwest, Inc.
PO Box 14488
Portland, OR 97293

Dear Mr Green:

Included are the results from the testing of material submitted on January 28, 2021 from the 1350-20001-05, F&BI 101400 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures

c: Neil Woller, Paul Trone, Evan Bruggeman
ENW0209R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on January 28, 2021 by Friedman & Bruya, Inc. from the Evren Northwest 1350-20001-05, F&BI 101400 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Evren Northwest</u>
101400 -01	WW-210127
101400 -02	equip blank-210127

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 02/09/21
Date Received: 01/28/21
Project: 1350-20001-05, F&BI 101400
Date Extracted: 01/29/21
Date Analyzed: 01/29/21

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-G_x**
Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 51-134)
WW-210127 101400-01	<100	89
equip blank-210127 101400-02	<100	87
Method Blank 01-129 MB	<100	89

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 02/09/21
Date Received: 01/28/21
Project: 1350-20001-05, F&BI 101400
Date Extracted: 01/29/21
Date Analyzed: 01/29/21

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND RESIDUAL RANGE
USING METHOD NWTPH-D_x**
Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Residual Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 41-152)
WW-210127 101400-01	<500	<250	90
equip blank-210127 101400-02	<500	<250	87
Method Blank 01-271 MB	<500	<250	101

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	WW-210127	Client:	Evren Northwest
Date Received:	01/28/21	Project:	1350-20001-05, F&BI 101400
Date Extracted:	01/28/21	Lab ID:	101400-01
Date Analyzed:	02/04/21	Data File:	101400-01.169
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	7.27
Cadmium	<1
Chromium	<1
Lead	<2
Mercury	<1
Selenium	<1
Silver	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	equip blank-210127	Client:	Evren Northwest
Date Received:	01/28/21	Project:	1350-20001-05, F&BI 101400
Date Extracted:	01/28/21	Lab ID:	101400-02
Date Analyzed:	02/04/21	Data File:	101400-02.170
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<2
Mercury	<1
Selenium	<1
Silver	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Evren Northwest
Date Received:	NA	Project:	1350-20001-05, F&BI 101400
Date Extracted:	01/28/21	Lab ID:	I1-58 mb
Date Analyzed:	01/28/21	Data File:	I1-58 mb.084
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 02/09/21

Date Received: 01/28/21

Project: 1350-20001-05, F&BI 101400

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: 101393-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	96	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 02/09/21

Date Received: 01/28/21

Project: 1350-20001-05, F&BI 101400

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	92	63-142	4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 02/09/21

Date Received: 01/28/21

Project: 1350-20001-05, F&BI 101400

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 6020B**

Laboratory Code: 101400-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<1	85	85	75-125	0
Barium	ug/L (ppb)	50	7.62	106	108	75-125	2
Cadmium	ug/L (ppb)	5	<1	98	100	75-125	2
Chromium	ug/L (ppb)	20	<1	99	98	75-125	1
Lead	ug/L (ppb)	10	<1	85	86	75-125	1
Mercury	ug/L (ppb)	5	<1	82	84	75-125	2
Selenium	ug/L (ppb)	5	1.17	91	89	75-125	2
Silver	ug/L (ppb)	5	<1	91	92	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	92	80-120
Barium	ug/L (ppb)	50	94	80-120
Cadmium	ug/L (ppb)	5	96	80-120
Chromium	ug/L (ppb)	20	95	80-120
Lead	ug/L (ppb)	10	89	80-120
Mercury	ug/L (ppb)	5	92	80-120
Selenium	ug/L (ppb)	5	100	80-120
Silver	ug/L (ppb)	5	87	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

101400

SAMPLE CHAIN OF CUSTODY

ME 01/28/21

WV/EZ/ADR

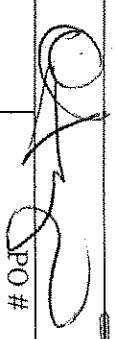
Report To Lynn Green

Company Evern Northwest

Address PO BOX 1498

City, State, ZIP Portland OR 97293

Phone 503 452 5561 Email Lynn.Green@Evern-NW.com

SAMPLERS (signature) 

PROJECT NAME

1350-20001-05

PO #

REMARKS

INVOICE TO

Page # 1 of 1

TURNAROUND TIME

Standard turnaround

RUSH
Rush charges authorized by:

SAMPLE DISPOSAL

Archive samples

Other
Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED										Notes			
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Total RCRA metals						
WW-210127	01A-E	01/27/21	14:55	W	5	X	X												
eguo blank-210127	02A-E	01/27/21	14:15	W	5	X	X												

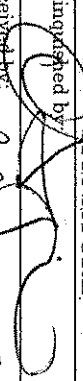

Samples received at 3 °C

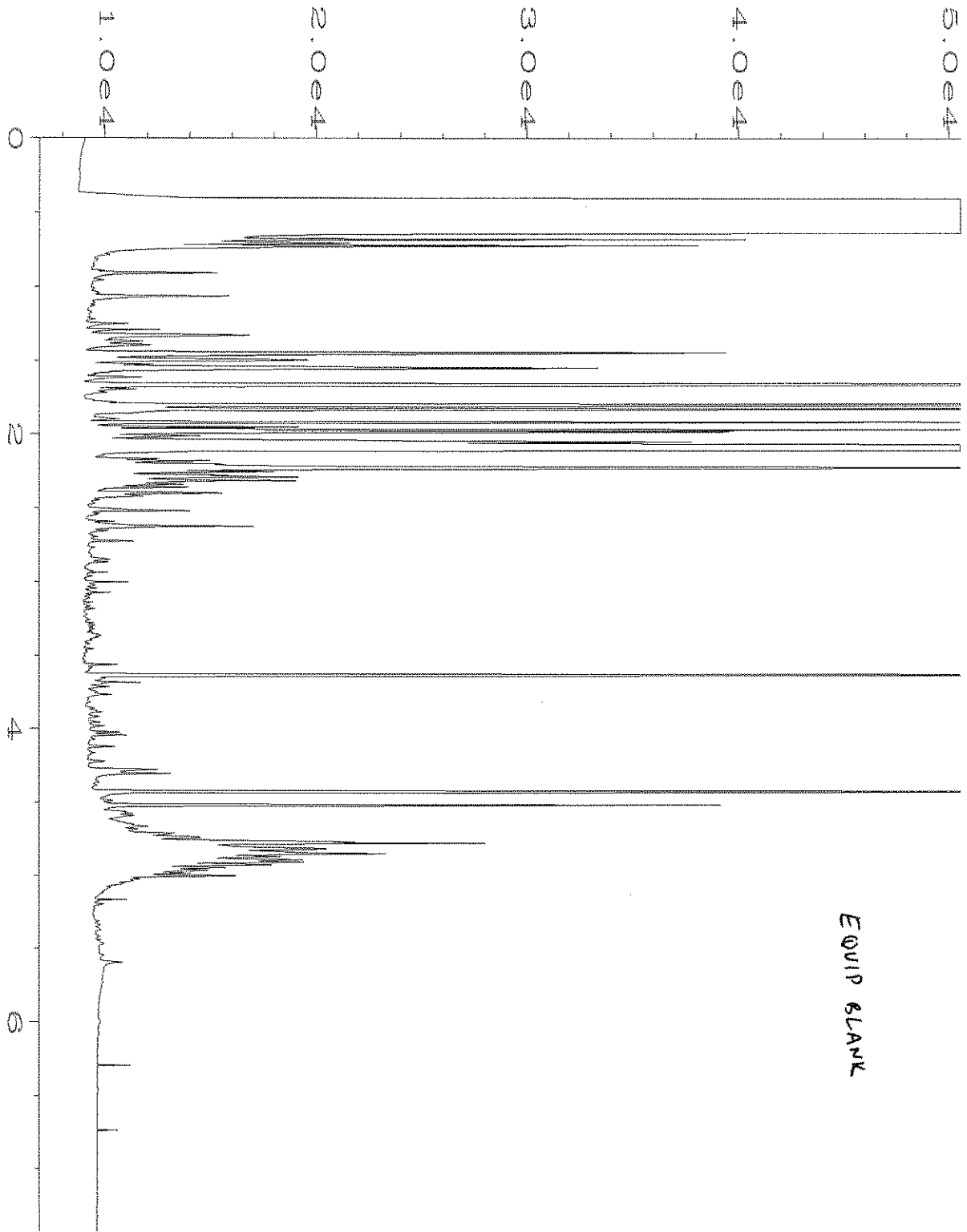
Friedman & Bruya, Inc.

3012 16th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
	Don Saiko	ENVJ	01/27/21	18:00
	Nhan Phan	FCBI	01/28/21	1025
Received by:				



Data File Name	: C:\HPCHEM\1\DATA\01-29-21\037F0501.D	Page Number	: 1
Operator	: TL	Vial Number	: 37
Instrument	: GC1	Injection Number	: 1
Sample Name	: 101400-02	Sequence Line	: 5
Run Time Bar Code:		Instrument Method:	DX.MTH
Acquired on	: 29 Jan 21 03:55 PM	Analysis Method	: DEFAULT.MTH
Report Created on:	01 Feb 21 07:25 AM		