Technical Memorandum

Reconnaissance-Level Geologic Hazard Assessment

1107 6th Street Southeast
Bandon, Oregon 97411

May 29, 2022

Prepared for:

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Project No. 959-22001-01

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By:

EVREN NORTHWEST INC.
environmental natura resource consultants

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Contents

Figures (after text)

Appendices

Technical Memorandum
Reconnaissance-Level Geologic Hazard Assessment

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1.0 INTRODUCTION

This report presents the results of a reconnaissance-level geologic hazard assessment conducted by EVREN Northwest, Inc. (ENW) for a developed residential lot in Bandon, Oregon. The County designation for the for the approximately 1/2-acre property is Tax Lot 2308, T28S R14W 30DA (see Figures 1 and 2). The assessment was limited to the subject property, and findings and recommendations contained in this report are specific to that property. The assessment was conducted in March of 2022.

1.1 Purpose

The purpose of the investigation was to identify the potential geologic hazards and related issues, if any, associated with the subject property; and to evaluate them relative to the property owner's proposal to construct a 20-foot by 40-foot garage/shop building (garage) on the property and the requirements of the City of Bandon's Hazard Overlay Zone.

1.2 Scope

The scope of this investigation consisted of a background review, field investigation, analysis of findings, and development of conclusions. The background review included resources in the office library including maps and publications on regional topography, general geology, engineering geology, geologic hazards, and soils. A tax lot map was provided by the County. Relevant on-line information reviewed included available historical aerial and satellite photography, Oregon Department of Geology and Mineral Industries (ODOGAMI), Statewide Landslide Information Database for Oregon (SLIDO), and published geologic reports and maps of the project area. Information sources are cited in the report and referenced at the end of the report. The field investigation consisted of visual observation of landforms and surface features, and examination of subsurface materials exposed in natural exposures.

1.3 Site Description

The subject property consists of a developed residential lot that is approximately 200-feet long by 100-feet wide and located in the northeast quarter of the southeast quarter of Section 30, Township 28 south, Range 14 west of the Willamette Meridian in Bandon, Oregon (Figures 1 and 2). It is bordered on the east and west by lots developed with single family residences, on the south by 6th Street SE, and on the north by the undeveloped drainage corridor of Ferry Creek (see Figures 2 and 3). There are two residences on the subject property. The largest is a single-story rental home with attached garage situated on east-central portion of the lot. The second is a smaller two-story accessory dwelling unit (ADU) located approximately twenty-five feet behind

(north of) the rental home. A driveway on the eastern edge of the property serves the rental home, and a driveway on the western edge serves the ADU. The proposed garage is to be located at the north end of the western driveway and west of the ADU. The portion of the lot to the south of the rental home is lawn and the portion north of the ADU is woodland (see Figure 3 and photographs in Appendix A).

The homes in the area are served by municipal water; however, municipal sanitary and storm sewers are not available. According to the property owner the domestic waste from both residences is routed to an on-site septic tank and gravity fed drainfield system.

2.0 SITE SETTING

2.1 Topography/Geomorphology

The study area is located on a broad, elevated, marine terrace landform that underlies Bandon and the coastal strip for approximately 10 miles south of Bandon. In the project area the terrace surface has been cut into by Ferry Creek and its tributaries. The southern three-quarters of the subject property is relatively flat and approximately 40-feet above mean sea level (amsl). The northern quarter of the property is quite steep and drops into the Ferry Creek drainage. The elevation of Ferry Creek near the subject property was not determined, but based on area topographic maps, it appears to be at least twenty feet lower in elevation than the terrace surface (see Figure 1). As shown on the site plan (Figure 3), the slope break between the flat and sloping ground is immediately adjacent to the north sides of the ADU and the proposed garage.

2.2 Hydrology

No surface water features (seeps, streams, ponds, etc.) were observed on the subject property during ENW's March 4, 2022, visit to the site. However, the presence of roadside ditches along 6th Street SE and various drainpipes discharging to the Ferry Creek drainage (Figure 3 and Appendix A) suggest that storm water management is an issue during wet seasons of the year. Spring discharge was observed on the slope north of the subject property. Since the boundary of the subject property had not been marked in the field, the distance of the spring from the subject property could not be determined. Water from the spring flowed downslope to a marsh area that covers the southern portion of the broad the Ferry Creek drainage. The main channel of the creek appeared to be on the far (north) side of the drainage.

2.3 Geology

Regional: Beaulieu and Hughes (1975)[1] map the entire coastal strip extending 10 miles south of Bandon and the Coquille River and 2 to 4 miles east from the Pacific shoreline as being underlain by Quaternary marine terrace deposits consisting of "unconsolidated to semi-consolidated flat-lying and elevated marine deposits of sand, silt, clay, and gravel…". These deposits reportedly range in thickness from a few feet to over fifty feet and are typically underlain by bedrock geologic units of Tertiary age. The bedrock unit in the Bandon area is identified by Beaulieu and Hughes as the Roseburg Formation, which they describe as rhythmically bedded hard sandstone and

[1] Beaulieu, J. D., and Hughes, P. W., 1975, Environmental geology of western Coos and Douglas Counties, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 87, 148 p., scale 1:62,500.

siltstone with associated marine basalts.

Site: The surface geology of the subject property is mapped by Beaulieu and Hughes as Quaternary marine terrace deposits (described above). ENW reviewed water supply well reports (well logs) for two domestic water wells reported to have been completed in the same quarter section (160-acre area) as the subject property and on file in the Oregon Water Resources Department (OWRD) well log data base (GRID database). Copies of these well logs are in Appendix B. These well logs indicate that the terrace deposits are approximately 20- to 25-feet thick and consist primarily of fine to medium gravel and sand. The natural land surface in the developed potion of the subject property has been modified by development related activities, and the undeveloped portion of the property is covered with dense vegetation. Surface soils in roadside ditches and other exposed areas on and near the subject property consist of medium-stiff to stiff silts and sandy silts. Soil (sediment) exposed at and downstream of the spring (approximately 10- to 15-feet lower in elevation than the terrace surface) consists of loose sandy gravel. (See Appendix A).

2.4 Hydrogeology/Ground Water

Well logs (Appendix B) indicate that ground water is present in the marine terrace deposits. Static water levels reported on the two well logs reviewed by ENW are 16’ below ground surface (bgs) and 12.8’ bgs. This shallow ground water is recharged by the infiltration and downward percolation of incident precipitation, and discharges naturally to seeps and springs or as underflow to streams and other surface water features. Ground water can also be withdrawn by wells. The spring observed north of the subject property is likely the result of ground water discharge from the terrace deposits.

3.0 POTENTIAL GEOLOGIC HAZARDS

3.1 Aseismic Hazards

3.1.1 Mass Wasting

Mass wasting includes all forms of down slope movement of soil and rock material under the influence of gravity. It includes everything from barely perceptible soil creep to catastrophic mud flows and landslides. Steep slopes, weak soil and rock strength, and the various effects of water on soil and rock are the primary controlling factors for mass wasting. The potential for mass wasting can be increased by adding weight to the top of a slope or excavating soil from the lower portion of a slope. Also, earthquakes often serve as triggers for mass wasting events. The flat-lying, unconsolidated to semi-consolidated terrace deposits that underlie the subject property are relatively stable, unless they are exposed on steep slopes or in the sea cliff. As noted above, the northern portion of the subject property is quite steep, with slopes ranging from 30% to more than 100%. No fresh scarps or other evidence of active or recently active landslides or slumps was observed. However, evidence indicative of past mass wasting (hummocky topography and bowed tree trunks) was observed (see Appendix A). No exposures of bedrock were observed on the subject property. However, it is anticipated that bedrock is present 20- to 30-feet beneath unconsolidated terrace sediments mapped at the surface of the site.

Mass wasting events have been mapped within the immediate area of the subject site (Figure 5a and 5b), and the State has indicated that the landslide susceptibility hazard is low to moderate on the flat-lying southern portion of the site and high to very high on the steeply sloping northern portion of the site (Figure 5c).

- It is anticipated that the load created by construction of a 20' by 40' garage at the proposed location on the northern portion of the subject property would increase the potential for mass wasting.

3.1.2 Compressible Soils

No surface evidence of highly compressible soils commonly associated with perennial wetlands or bogs was noted on the subject property during the site visit. Poorly compacted, and locally wet soils were noted along and north of the topographic break in slope on the northern portion of the site, and wetlands and standing water were observed in the Ferry Creek drainage north of the site. It is anticipated that seasonal heavy rains in the project area may result in temporary flowing or standing water on portions of the property, so appropriate storm water management (see following section) may be required if the proposed garage is constructed.

- Weak or somewhat compressible soils may be encountered beneath or adjacent to the northern edge of the proposed garage.

3.1.3 Storm Water

Given the high anticipated annual rainfall in the project area, storm water management will be a critical element of any site construction project. All storm water run-off from natural surfaces and developed areas (driveways, parking areas, roof gutter down spouts, footing drains, etc.) must be managed in such a way as to prevent surface ponding, flooding of crawl spaces, and excessive erosion or sedimentation. Blocked or broken drain lines or ditches and saturated soils are frequently contributing factors to severe erosion, mass wasting, localized flooding, and foundation settlement. For example, stormwater discharging from the drainpipes currently observed in the slope north of the ADU has the potential to raise the soil moisture content and lead to mass wasting.

3.1.4 Flooding

Given the elevation and topographic setting of the subject property, the potential for seasonal, area-wide stream or tidal flood events is very unlikely. A Flood Insurance Rate Map from Federal Emergency Management Agency is attached (Figure 6) showing the entire subject property is outside of the 1% annual chance (100-year) flood plain.

- The exact elevation of the property and the predicted elevations of periodic seasonal flood events (annual, 10-year, 100-year, etc.) in the project area were not established as part of this assessment. Field observations indicate that there is little potential for aerially extensive seasonal or periodic flooding. Flooding of any portion subject property by seismically generated tsunamis is low. This possibility is discussed further in section 3.3.

3.1.5 High Ground Water Table

Based on well construction reports for area wells, the uppermost regional ground-water table beneath the project area is likely greater than five feet bgs.

3.1.6 Sea Level Rise

According to National Research Council projections[2], a change in sea level ranging from -4 cm (-2 in) to +23 cm (9 in) is projected by the year 2030 along the northern coast of California (north of Cape Mendocino), Oregon, and Washington. Similar projections along the same section of coastline range from -3 cm (-1 in) to +48 cm (19 in) by the year 2050, and +10 cm (4 in) to +143 cm (56 in) by the year 2100.

- The developed portion of the subject property is approximately 40-feet amsl (based on USGS mapping, see Figure 1), so even a dramatic rise in sea level will not adversely affect the proposed project.

3.1.7 Wind Erosion

The entire site is developed or covered with vegetation and no loose soils subject to wind erosion were observed.

- Efforts should be made to limit the removal of or damage to vegetation during construction, and any bare areas of loose soil resulting from construction should be planted with grass or otherwise protected from wind or water erosion.

3.2 Seismic Hazards

3.2.1 Earthquakes

Beaulieu and Hughes (1975)[1] state that geologic evidence for earthquake activity in western Coos and Douglas Counties is ambiguous and historical data are limited; however, the possibility of future faulting of undefined magnitude remains. In the past three decades, geologists have determined that the Northwest is subject to infrequent, but very powerful (magnitude 9+ on the Richter Scale) subduction zone earthquakes on the offshore Cascadia Subduction Zone (CSZ) fault system[3]. The most recent subduction zone earthquake known to have occurred in the Northwest was in January of 1700.

- Geologists have determined that very large subduction zone earthquakes occur on a 300- to 500-year recurring basis, and that smaller, but still significant, subduction related earthquakes occur on a much more frequent basis.

[2] National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council, 2012, Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future, Report in Brief, http://dels.nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/sea-level-rise-brief-final.pdf

[3] Priest, G.A., 1995, Explanation of Mapping Methods and Use of the Tsunami Hazard Maps of the Oregon Coast: State of Oregon Department of Geology and Mineral Industries Open-File Report O-95-67, 20 p, figures, tables, and appendices.

3.2.1 Liquefaction

No subsurface exploration or testing was completed by ENW for this project; however, saturated fine-sandy soils were reportedly encountered during construction of some area wells. These materials are known to have a high liquefaction risk. Earthquake liquefaction hazard is moderate at the subject site (Figure 7a).

3.2.1 Slope Failure or Lateral Spread

The effect on slope stability in the project area is difficult to predict. Evidence of mass wasting was observed on the subject property and has been mapped onto the northeast corner of the site (Figures 5a and 5b) and the State has indicated that the landslide hazard is low to moderate on the flat-lying southern portion of the site and high to very high on the steeply sloping northern portion of the site (Figure 5c). The occurrence of a major subduction zone earthquake will certainly increase the likelihood of mass wasting on the northern portion of the site.

- It is anticipated that the load created by construction of a 20' by 40' garage at the proposed location on the northern portion of the subject property would increase the potential for mass wasting.

3.2.2 Amplification of Ground Shaking

The subject site is within the area of the state where peak ground accelerations of 55% of gravity can inflict considerable damage in specially designed structures and great damage in ordinary structures during an earthquake occurring once in every 1,000 years[4]. Earthquake shaking potential at the site and surrounding area is expected to be severe (Figure 7b).

- We recommend quantifying the severity of ground motions at the site and/or designing the home to prevent collapse during a worst-case scenario to minimize injury and/or loss of life to the structure's occupants.

3.3 Tsunamis

Tsunamis are seismically generated sea waves that typically cause catastrophic flooding when they strike coastal areas. Major earthquakes that occur anywhere in the Pacific Basin have the potential to generate a tsunami that could impact the project area. However, the greatest threat is from an earthquake occurring along the Cascadian Subduction Zone (CSZ), located just offshore of the Pacific Northwest coastline. The magnitude of the earthquake and its resultant tsunami are primarily driven by the amount and geometry of the slip that takes place when the North American Plate snaps westward over the Juan de Fuca Plate during a CSZ event.

DOGAMI's tsunami inundation map[5] (Figure 8) displays the output of its computer models representing five (5) selected tsunami scenarios (S, M, L, XL and XXL), all of which include the earthquake-produced subsidence and the tsunami-amplifying effects of the splay fault, which roughly parallels the CSZ. This model predicts that the subject site is largely outside the area that would be inundated by a tsunami under the less frequent L, XL and XXL scenarios, which

[4] Madin, I. P. and Mabey, M. A., 1996, Earthquake Hazard Maps for Oregon: Geological Map Series GMS-100, issued by the State of Oregon Department of Geology and Mineral Industries.

[5] DOGAMI. 2012. Local Source (Cascadia Subduction Zone) Tsunami Inundation Map. Tsunami Inundation Map Coos-16.

correspond to an approximate magnitude 9.1 earthquake. It has been just over 300 years since the last CSZ event. Based on modeling by the State, the maximum wave elevation generated by an "L" event would be about 50 feet, and nearly 80 feet by an XXL event. The estimated time required to generate the energy necessary for L and XXL events is greater than 650 years. The estimated time required to generate the energy necessary for smaller events (S and M) is 300 years or more.

- Based on the State's models, only the furthermost northern reaches, i.e., lowest elevation part of the slope, of the subject site would potentially be impacted by an XXL event, which is estimated to take up to 1200 years to accumulate enough energy to generate this size of an event.

4.0 WETLANDS

Based on information provided by Coos County and the US Fish and Wildlife Service, there are no inventoried wetlands on the subject property (Figure 9). Based on ENW's observations, there are significant wetland areas in the Ferry Creek drainage north of the site.

5.0 RECOMENDATIONS

Based on the work completed for this assessment and the findings discussed above, ENW makes the following recommendations:

- If the location of the proposed garage cannot be moved at least 25' back (south) from the break in slope, the services of a geotechnical engineer should be used in designing the foundation for that structure.
- Storm water run-off, including downspout and footing drain discharge, from any structure constructed on the property should be managed in a way to prevent ponding, flooding, or excessive erosion or sedimentation. Existing and new drainpipes should be routed away from the sloping northern portion of the property or extended beyond the northern property boundary and to the Ferry Creek drainage.
- Efforts should be made to limit the removal of or damage to vegetation during construction, and any bare areas of loose soil resulting from construction should be planted with grass or otherwise protected from wind or water erosion.
- It is possible that the furthermost northern reaches of the subject property could be inundated by a less frequent XXL tsunami scenario generated by a 9.1 or greater magnitude earthquake along the CSZ. The owner of the subject property should be aware of and prepared for such an event. There are many helpful emergency preparation and planning resources particularly designed for tsunami response, to name a few:
    - Oregon Office of Emergency Management Tsunami Information, Mitigation & Recovery, Operations and Preparedness;[6]

[6] https://www.oregon.gov/OMD/OEM/Pages/plans_train/tsunamis.aspx

- NVS Tsunami Evacuation Zones Map, Brochures, Warnings, Planning;[7]
- ODOGAMI, Oregon Tsunami Clearinghouse: Evacuation Zone Map Viewer, Evacuation Brochures, Regulatory Maps;[8]
- NOAA, National Tsunami Warning Center;[9] and,
- Coos County, Emergency Management.[10]

6.0 LIMITATIONS

The scope of this Technical Memorandum is limited to observations made during on-site work; interviews with knowledgeable sources; and review of readily available published and unpublished reports and literature. As a result, these conclusions are based on information supplied by others as well as interpretations by qualified parties.

No subsurface exploration has been performed in conduction with this assessment, and detailed mapping has not been completed. Figures and findings presented herein are based on limited site reconnaissance. Conclusion and recommendation presented in this assessment were prepared in accordance with generally accepted professional geologic engineering principals and practice. We make no warranty, either express or implied.

We have performed our services for this project in accordance with our agreement and understanding with the Client. This document and the information contained herein have been prepared solely for the use of the Client. We have performed this study under a limited scope of services per our agreement. It is possible, despite the use of reasonable care and interpretation that we may have failed to identify the presence of geological hazards other than those specifically mentioned in this assessment. We assume no responsibility for conditions that we did not specifically evaluate, or conditions that were not generally recognized at the time this report was prepared.

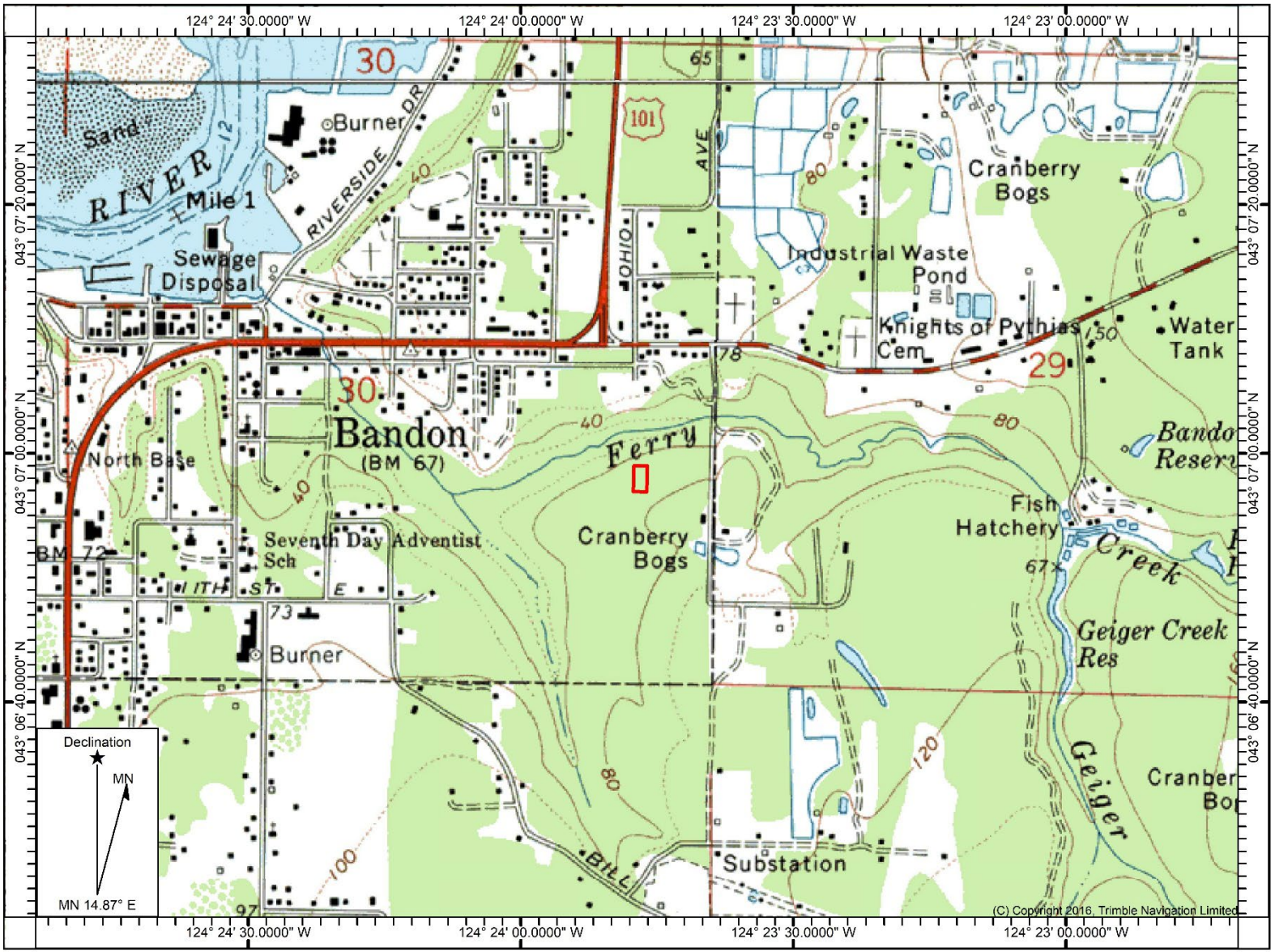
[7] http://nvs.nanoos.org/TsunamiEvac

[8] http://www.oregongeology.org/tsuclearinghouse/

[9] http://wcatwc.arh.noaa.gov/

[10] http://www.co.coos.or.us/Departments/SheriffsOffice/EmergencyManagement.aspx

FIGURES

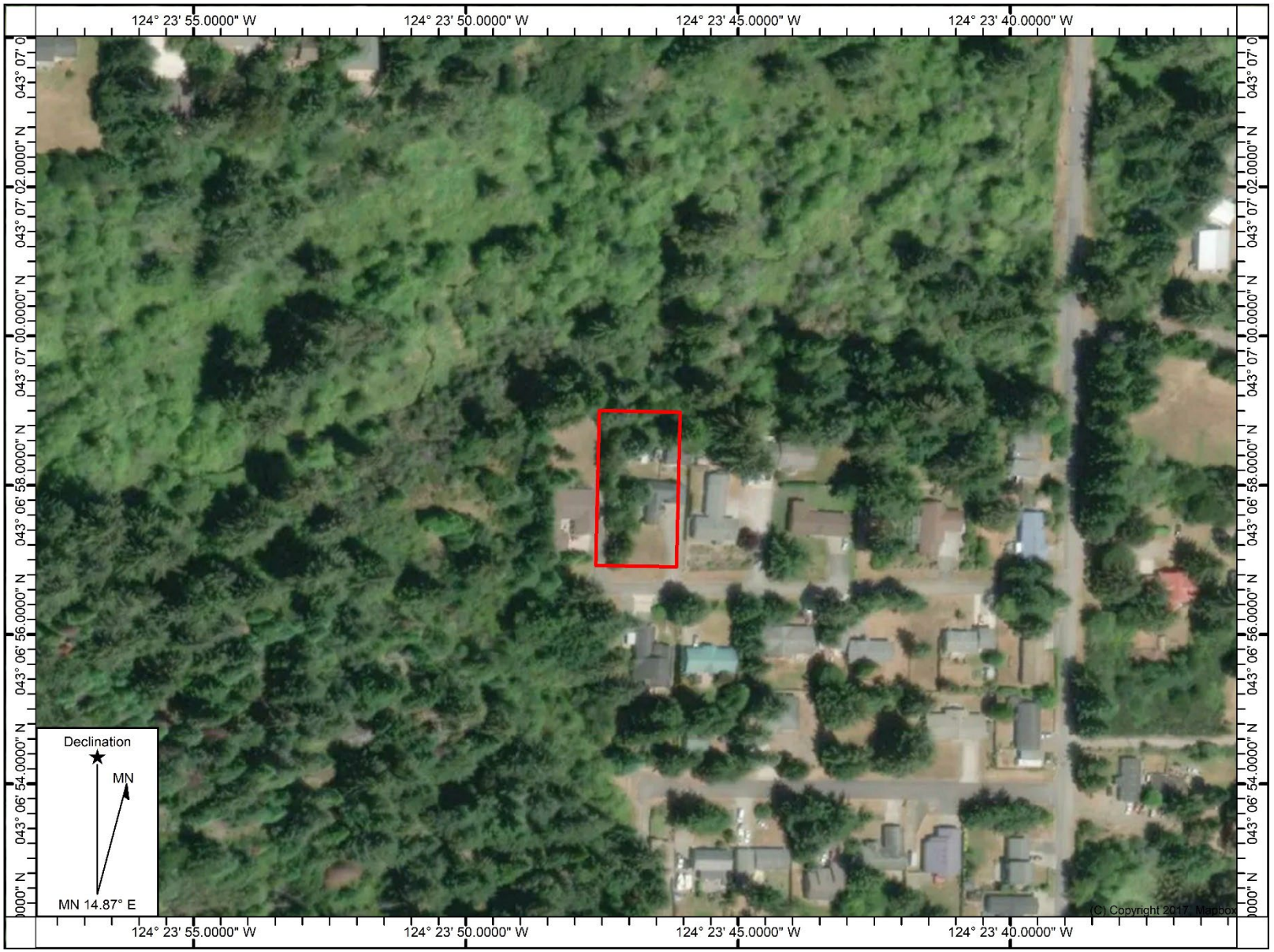


Name: BANDON
Date: 03/02/22

0 1000 2000 3000
Feet

Location: 043° 06' 58.1186" N, 124° 23' 47.2347" W
Contour Interval: 40 ft

EVREN NORTHWEST INC. environmental natural resource consultants	Date Drawn: 3/15/2022 CAD File Name: 959-22001-01_fig1sv_map Drawn By: CLR Approved By: LDG	Residential Property 1107 6th Street SE Bandon, Oregon	**Site Vicinity Map**	Project No. 959-22001 Figure No. **1**



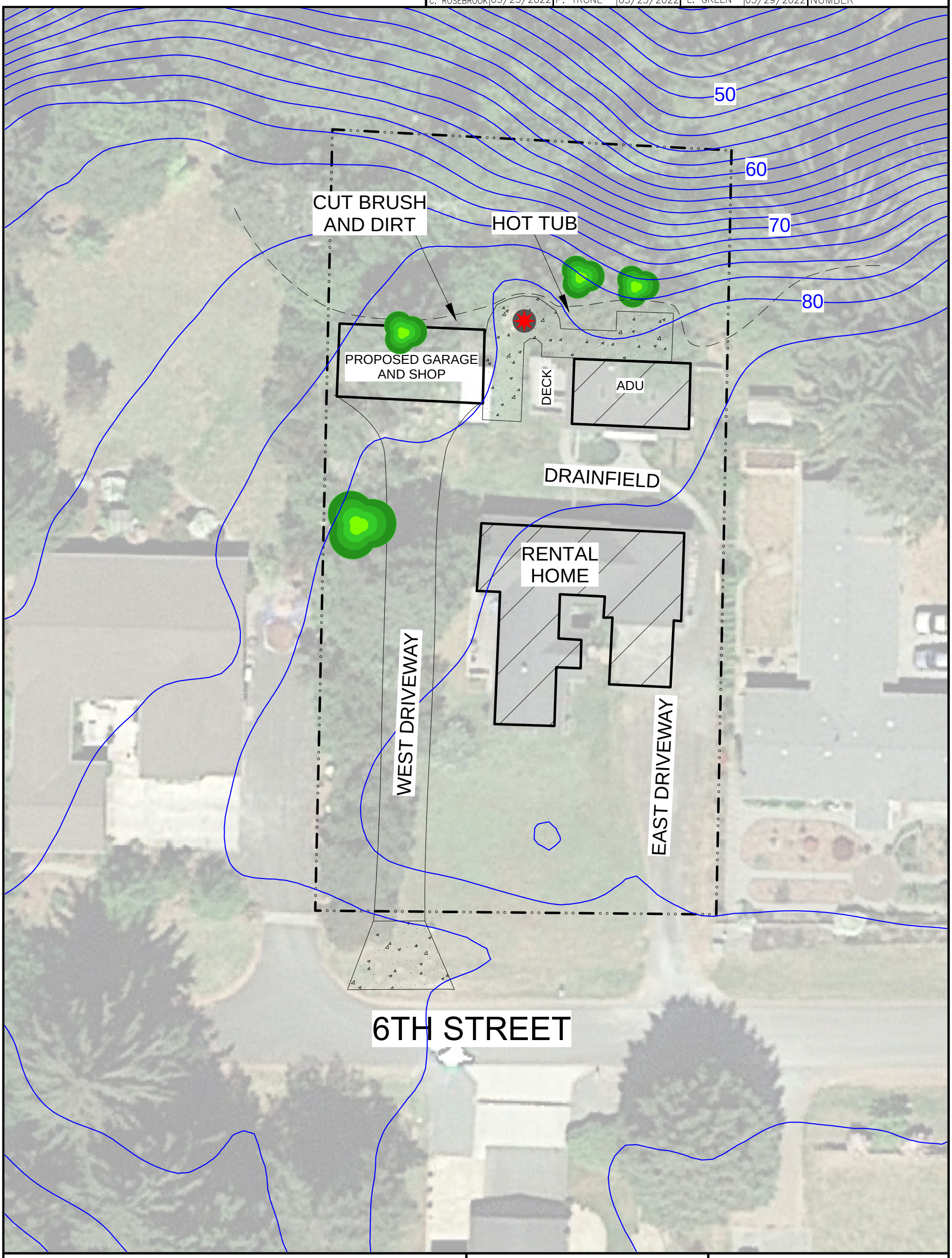
Name: Satellite Image
Date: 03/02/22

0 100 200 300 400 500
Feet

Location: 043° 06' 58.1186" N, 124° 23' 46.8714" W

EVREN NORTHWEST	Date Drawn: 3/15/2022 CAD File Name: 959-22001-01_fig2aerial Drawn By: CLR Approved By: LDG	Residential Property 1107 6th Street SE Bandon, Oregon	**Aerial Photo Map**	Project No. 959-22001 Figure No. **2**

DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
C. ROSEBROOK	03/25/2022	P. TRONE	03/25/2022	L. GREEN	05/29/2022	959-22001(v01)



LEGEND:

- SUBJECT BUILDINGS
- SUBJECT PROPERTY BOUNDARIES
- ESTIMATED 2-FOOT CONTOURS BASED ON SURFACE MODELING USING DOGAMI LIDAR DATA
- BREAK IN SLOPE
- FIRE PIT
- NEW CONCRETE
- TREE

ADU = ACCESSORY DWELLING UNIT

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2022 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.

APPROXIMATE SCALE

0 25 50 FEET

N

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FIGURE 3

SITE PLAN

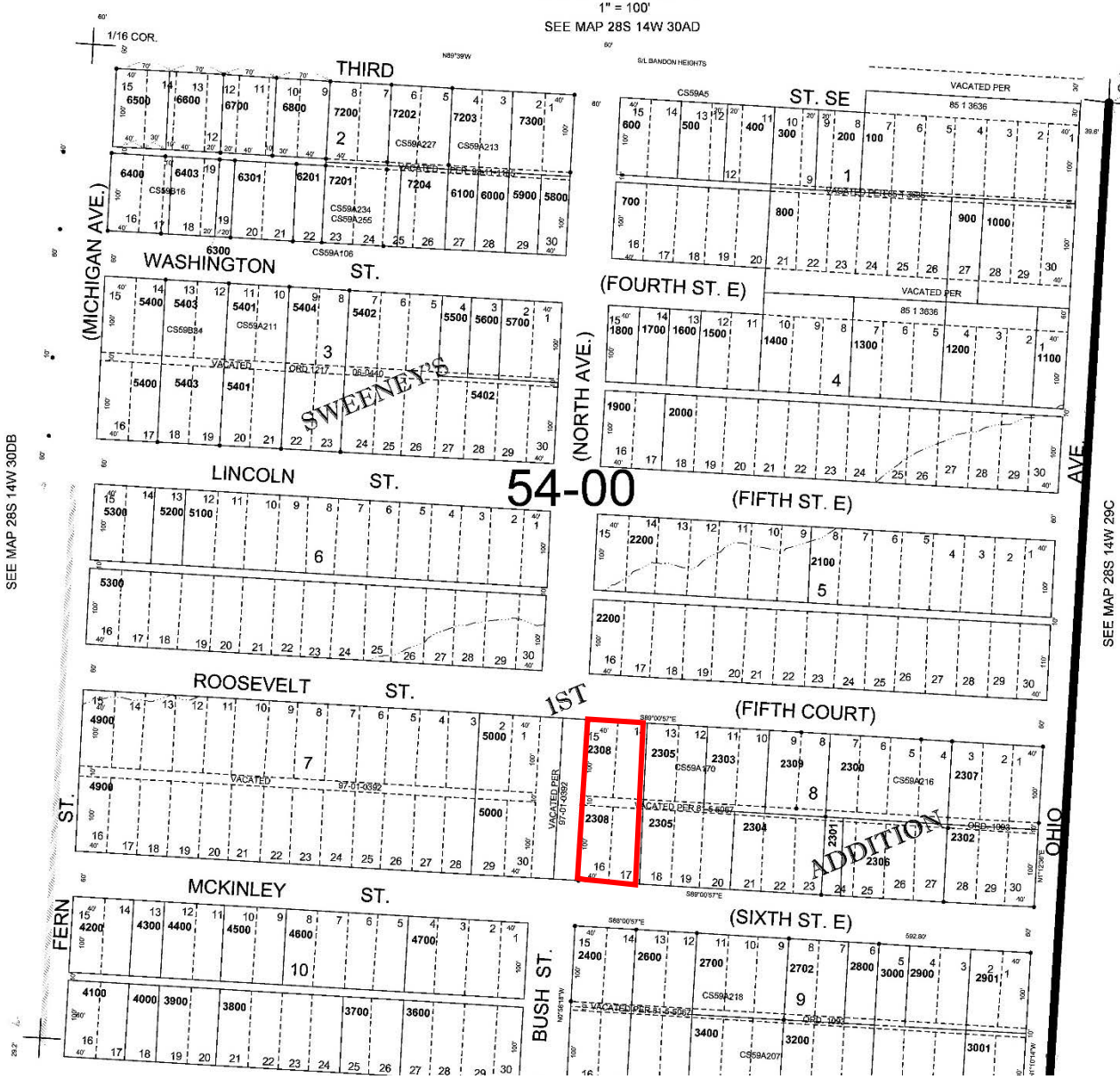
RESIDENTIAL PROPERTY
1107 6TH STREET SE
BRANDON, OREGON

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSE ONLY

NE1/4 SE1/4 SEC.30 T28S R14W W.M.
COOS COUNTY
1" = 100'
SEE MAP 28S 14W 30AD

28S 14W 30DA
BANDON

CANCELLED NO.
6402
6200
6900
7000
7100
2802
2500
3500
7301
4800
2801
3100
2701
7205
6401
3300



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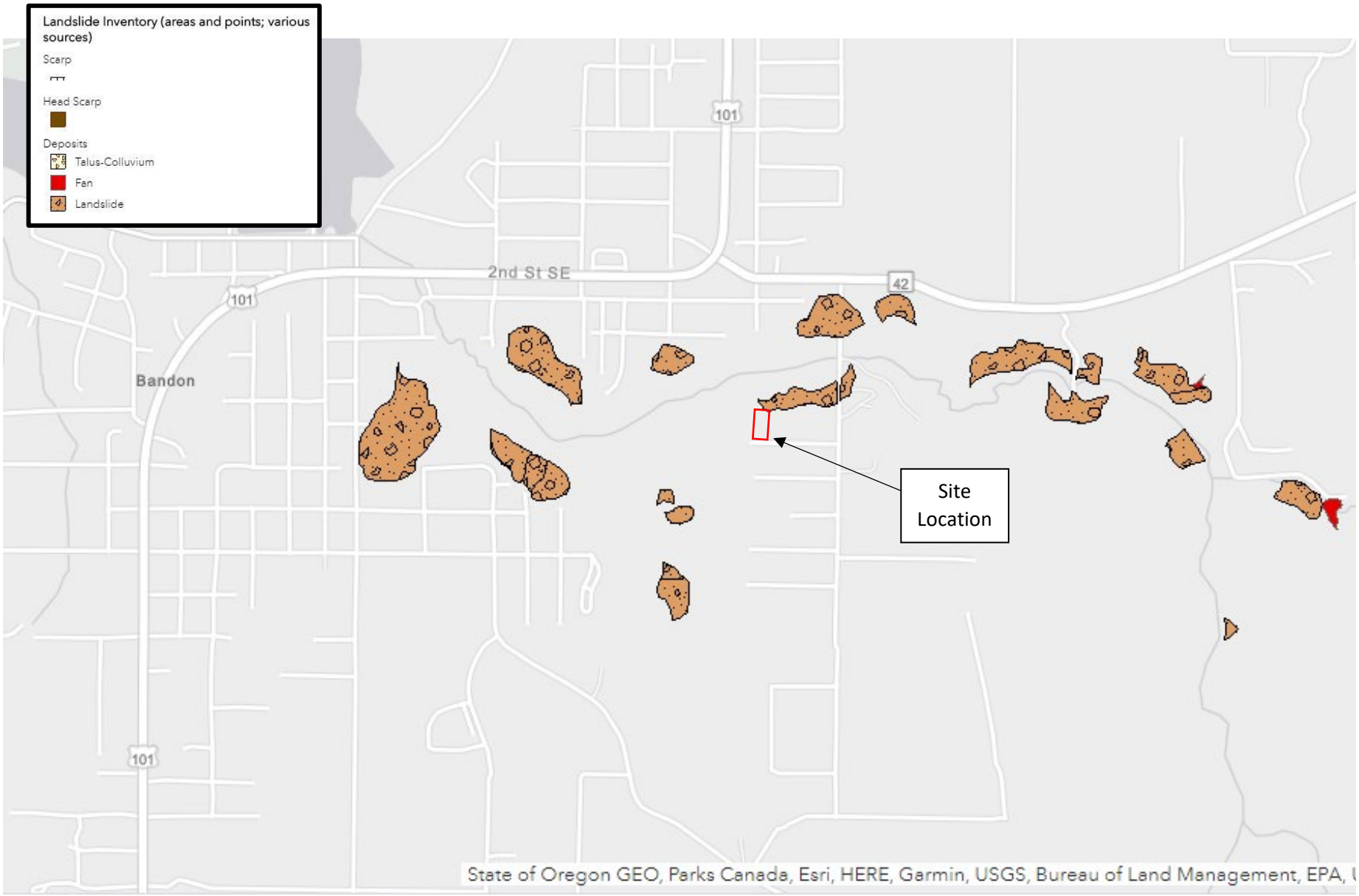

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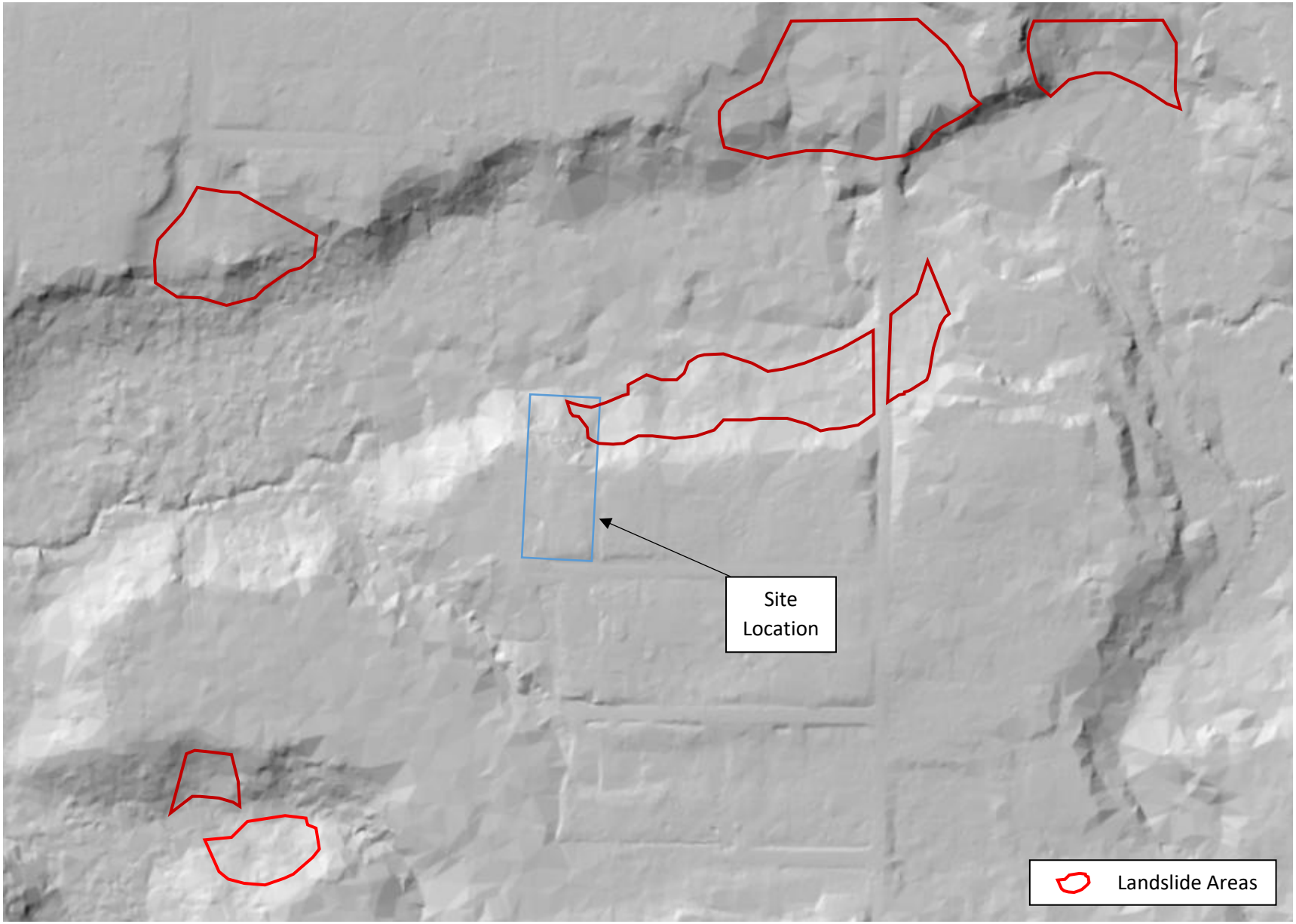

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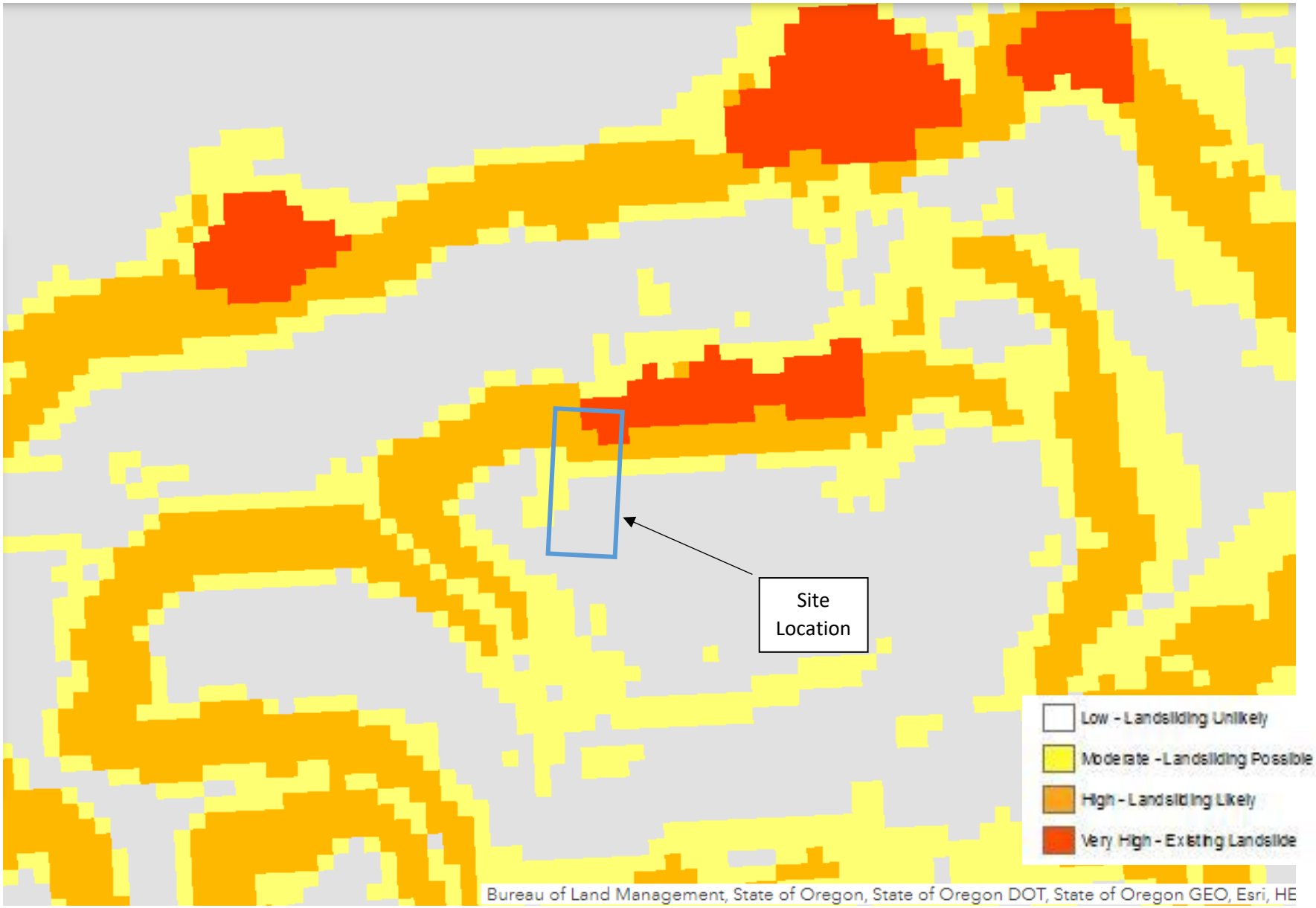

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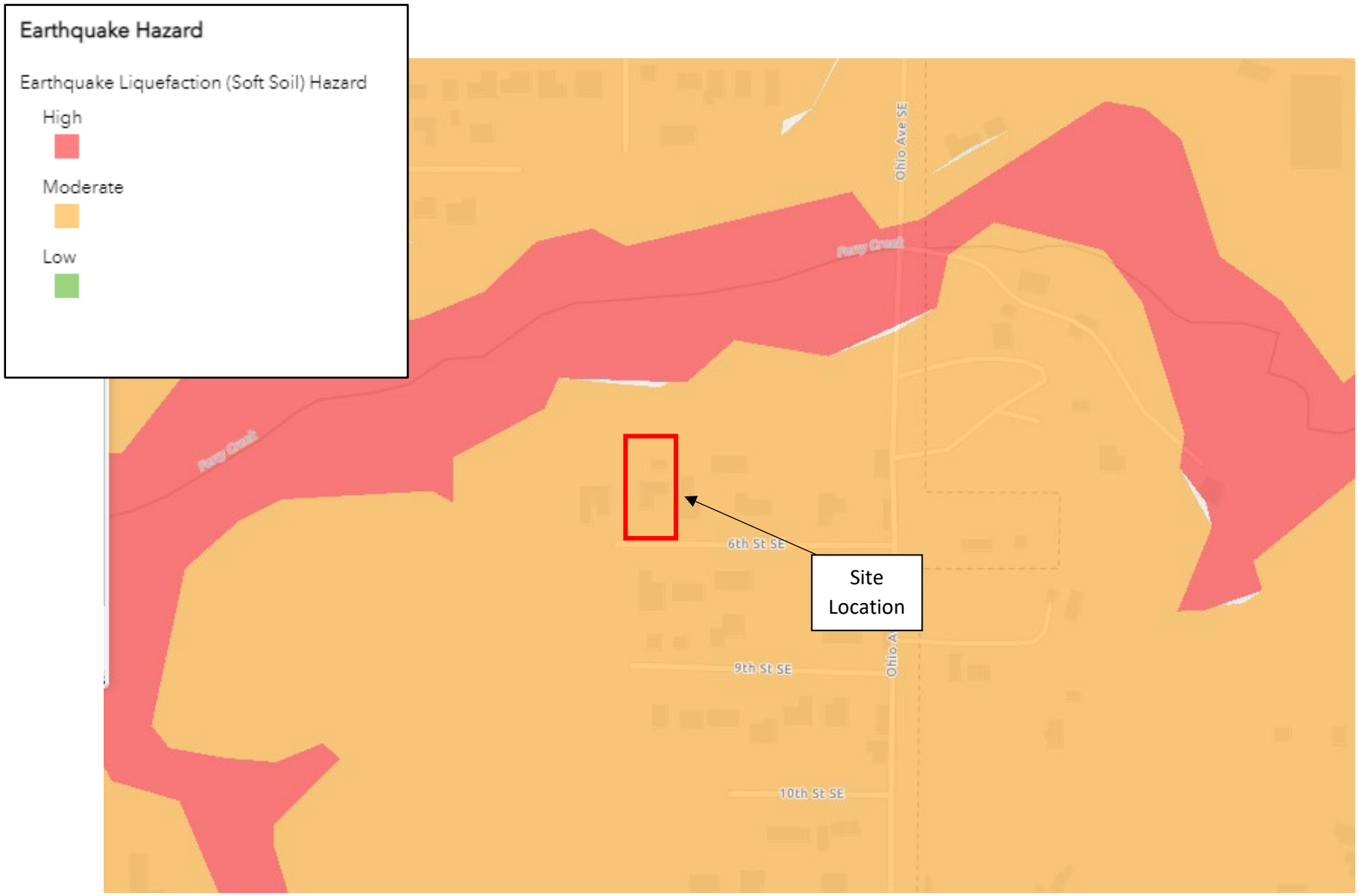
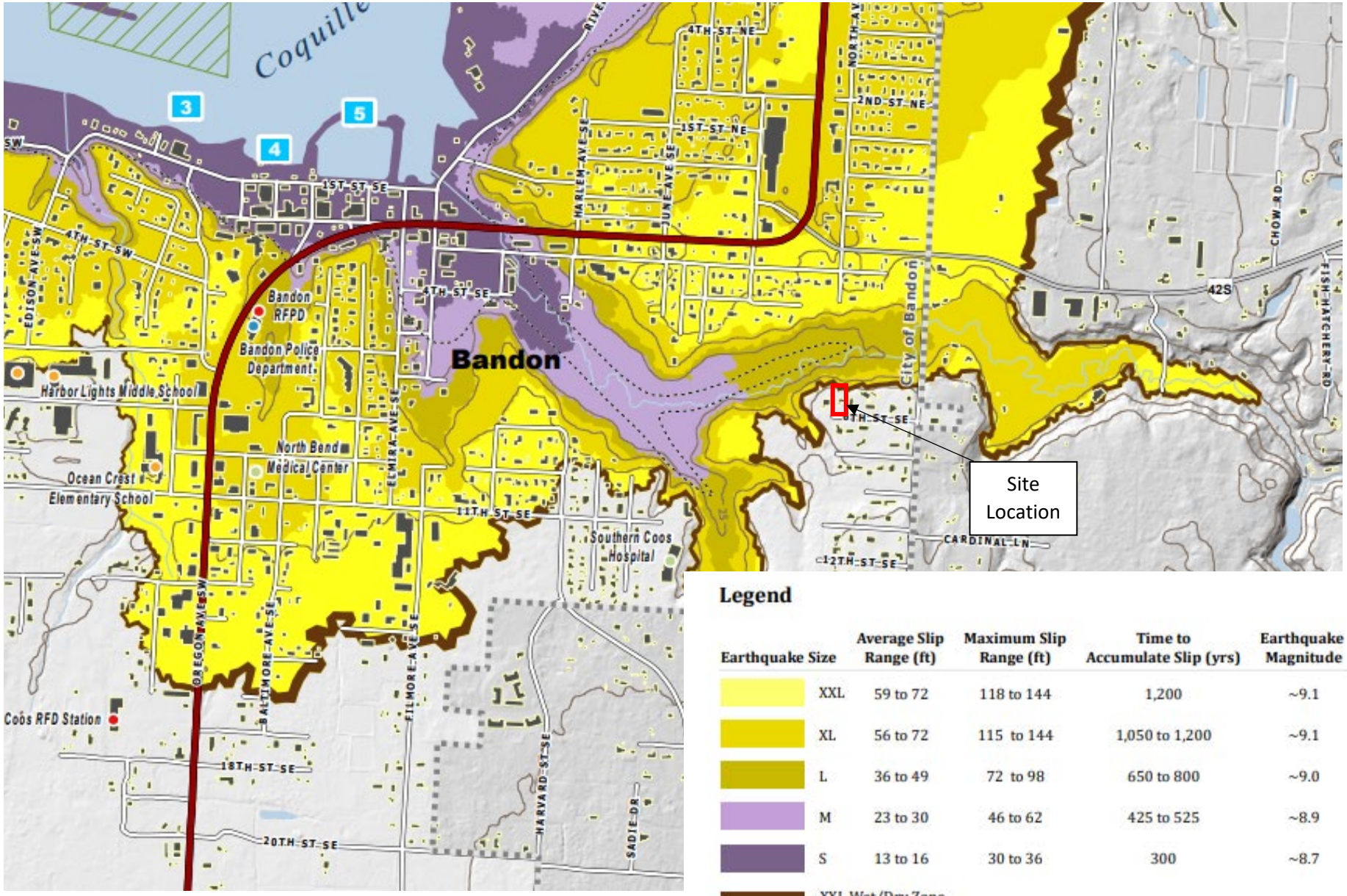
EVREN NORTHWEST INC. environmental natural resource consultants	Date Drawn: 3/15/2022 CAD File Name: 959-22001-01_fig6_Flood insuranceMap(v01) Drawn By: CLR Approved By: LDG	Residential Property 1107 6th Street SE Bandon, Oregon	**Flood Insurance Rate Map**	Project No. 959-22001 Figure No. **6**



EVREN NORTHWEST	Date Drawn: 3/15/2022 CAD File Name: 959-22001-01_fig7A_EarthquakeLiquifactionMap(v01) Drawn By: CLR Approved By: LDG	Residential Property 1107 6th Street SE Bandon, Oregon	**Earthquake Liquefaction Map**	Project No. 959-22001 Figure No. **7a**

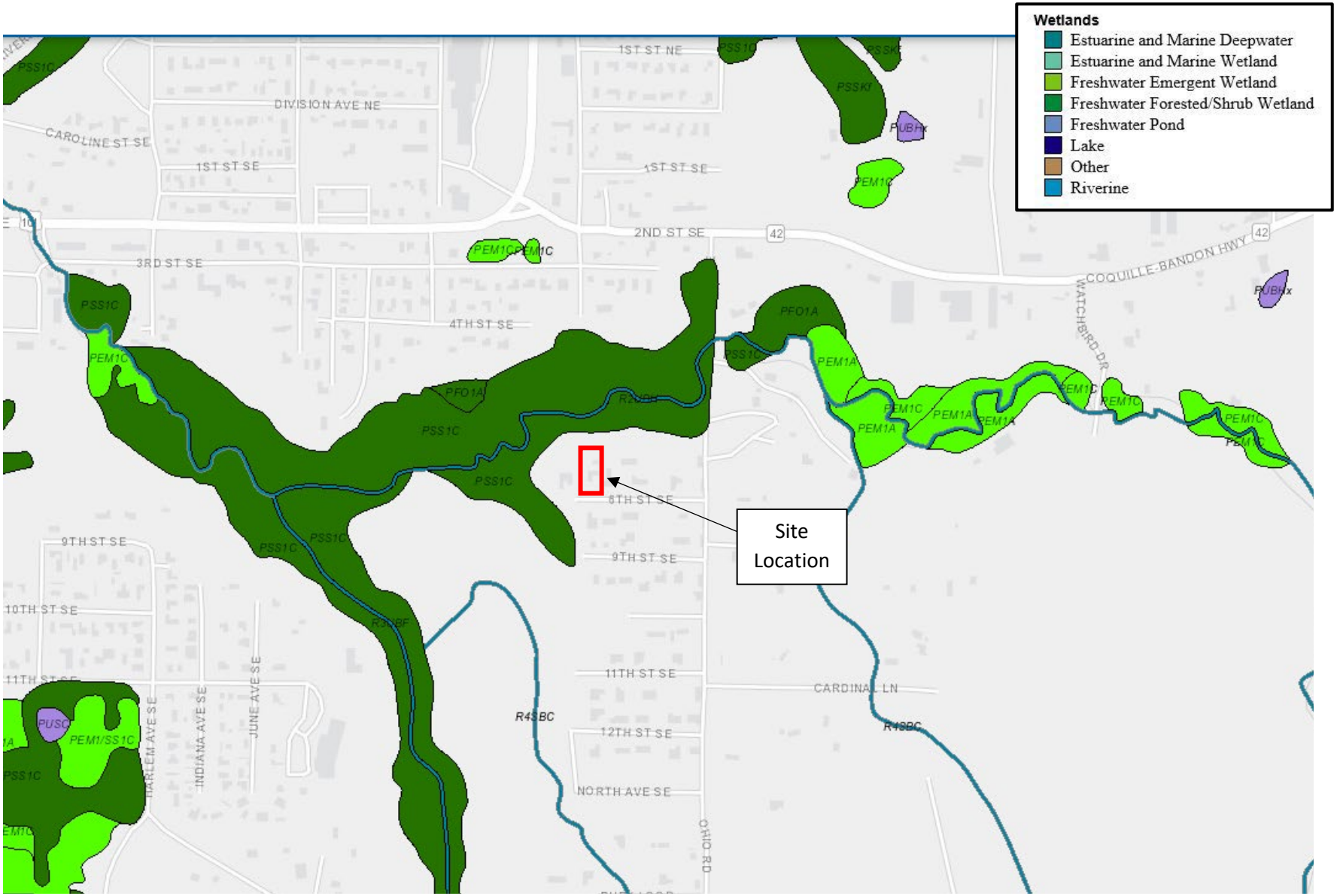
EVREN NORTHWEST INC. environmental natural resource consultants	Date Drawn: 3/15/2022 CAD File Name: 959-22001-01_fig7b_EarthquakeShakingMap(v01) Drawn By: CLR Approved By: LDG	Residential Property 1107 6th Street SE Bandon, Oregon	**Earthquake Shaking Hazard Map**	Project No. 959-22001 Figure No. **7b**



Legend

Earthquake Size	Average Slip Range (ft)	Maximum Slip Range (ft)	Time to Accumulate Slip (yrs)	Earthquake Magnitude
XXL	59 to 72	118 to 144	1,200	~9.1
XL	56 to 72	115 to 144	1,050 to 1,200	~9.1
L	36 to 49	72 to 98	650 to 800	~9.0
M	23 to 30	46 to 62	425 to 525	~8.9
S	13 to 16	30 to 36	300	~8.7
XXL Wet/Dry Zone				

EVREN NORTHWEST	Date Drawn: 3/15/2022 CAD File Name: 959-22001-01_fig7a_TsunamiZoneMap(v01) Drawn By: CLR Approved By: LDG	Residential Property 1107 6th Street SE Bandon, Oregon	**Tsunami Inundation Zone Map**	Project No. 959-22001 Figure No. **8**



EVREN NORTHWEST	Date Drawn: 3/15/2022 CAD File Name: 959-22001-01_fig8_WetlandInvMap(v01) Drawn By: CLR Approved By: LDG	Residential Property 1107 6th Street SE Bandon, Oregon	**Wetland Inventory Map**	Project No. 959-22001 Figure No. **9**

APPENDIX A

SITE PHOTOGRAPHS

Driveway for ADU on west side of subject property looking north from 6th Street SE. Rental house in center-right of photo.

ADU located behind (north of) rental home – looking northeast from western driveway.

Driveway for rental house on the east side of the property looking north from 6th Street SE along east boundary of subject property.

Proposed site of garage/shop building – looking north from the driveway on the west side of the property.

EVREN NORTHWEST INC. environmental natural resource consultants	Residential Property 1107 6th Street SE Bandon, Oregon	**Site Photographs**	Project No. 959-22001-01 Appendix **A**

Proposed garage/shop building site – looking southeast.

Looking west-northwest from near the northeast corner of the ADU. Note bowed trees lower right.

Looking west at the steep slope along the north side of the ADU.

Looking south (uphill) from a position near the northeast property corner.

EVREN NORTHWEST INC. environmental natural resource consultants	Residential Property 1107 6th Street SE Bandon, Oregon	**Site Photographs**	Project No. 959-22001-01 Appendix **A**

Looking west from a position near the northeast property corner.

Masonry block foundation on north side of rental house – view east.

Looking south-southeast at north edge of patio slab near the northwest corner of the ADU.

Masonry block foundation on west side of rental house – view south.

EVREN NORTHWEST INC. environmental natural resource consultants	Residential Property 1107 6th Street SE Bandon, Oregon	**Site Photographs**	Project No. 959-22001-01 Appendix **A**

Drainpipes (center and upper left) discharging to slope. Vertical post in upper right is on east boundary of subject property.

Gravel exposed downslope from spring.

Spring discharging from slope north of ADU.

Looking south along Ohio Street – Ferry Creek drainage in the middle ground, which drainage is north of the subject site.

Looking west from Ohio Street toward Ferry Creek drainage; the subject property backs up to this drainage.

APPENDIX B

MONITORING WELL AND GEOTECHNICAL HOLE REPORTS

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WATER RESOURCES DEPT.
SALEM, OREGON

Coos 50209 28-14-30

WELL I.D.# L07154

(START CARD) # 93070

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number 455

Name H.F. Sawyer

Address PO Box 1412

City Bandon State OR Zip 97411

(2) TYPE OF WORK

☐ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☒ Abandonment

(3) DRILL METHOD:

☐ Rotary Air ☒ Rotary Mud ☐ Cable ☐ Auger

☐ Other

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☐ Yes ☒ No Depth of Completed Well 21 ft.

Explosives used ☐ Yes ☒ No Type _____ Amount _____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0	21	Cement	0	21	8 sx

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other

Backfill placed from ____ ft. to ____ ft. Material

Gravel placed from ____ ft. to ____ ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	Removed				☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☐ Perforations Method

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
	Removed					☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
- 1/2	—	21	1 hr.

Temperature of water 53° Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Coos Latitude _____ Longitude _____

Township 28 N or (S) Range 14 E or (W) WM.

Section 30 NE 1/4 SE 1/4

Tax Lot 5403 Lot _____ Block _____ Subdivision _____

Street Address of Well (or nearest address) 1032 Fourth Street SE (Washington) Bandon OR

(10) STATIC WATER LEVEL:

16 ft. below land surface. Date 9/3/96

Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:

Depth at which water was first found 16 - 20

From	To	Estimated Flow Rate	SWL
16	20	- 1/2 GPM	16'

(12) WELL LOG:

Ground Elevation +/- 300'

Material	From	To	SWL
Topsoil	0	2	
Sandy Clay Tan	2	5	
Gravel Fine - med	5	8	
Gravel Fine - med w Sand Brown	8	18	16
Gravel Fine - med w/ Sandy Clay Orange	18	20	
Clay Gray	20	21	

Date started 9/3/96 Completed 9/4/96

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, 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.

WWC Number

Signed Bandon Well + Pump Co Date

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, 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.

WWC Number 1493

Signed Jim Mack Jr. MGWC Date 9/5/96

ORIGINAL & FIRST COPY WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

COOS 52985

28-14-30

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

WELL I.D. # L 69434
START CARD # 164010

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number 996
Name John Eberl
Address PO Box 1184
City Bandon State OR Zip 97411

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☐ Rotary Air ☒ Rotary Mud ☐ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 26'7" ft.
Explosives used ☐ Yes ☒ No Type Amount (10c)

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0	26	Bentonite	0	19	13 SX

How was seal placed: Method ☐A ☐B ☐C ☐D ☐E
☒ Other Poured from surface
Backfill placed from ft. to ft. Material
Gravel placed from 19 ft. to 26 ft. Size of gravel 10/20

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	5"	+1	21'7"	160#	☐	☒	☒	☐
					☐	☐	☐	☐
	6" (Protective Casing)	+1'4	4'	250	☒	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Drive Shoe used ☐ Inside ☐ Outside ☐ None
Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method Attached to Casing
☒ Screens Type Wajioka V-wire Material SS

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
21'7	26'7	1016		5"	Pipe	☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
10	–	25	1 hr.

Temperature of water 52° Depth Artesian Flow Found
Was a water analysis done? ☒ Yes By whom BWPS
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Coos Latitude Longitude
Township 28 N or S Range 14 E of W. WM.
Section 30 SW 1/4 SE 1/4
Tax Lot 2200 Lot Block Subdivision
Street Address of Well (or nearest address) 87707 Bulls Creek Rd Bandon

(10) STATIC WATER LEVEL:
12'10" ft. below land surface. Date 8/21/04
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found 12'10"

From	To	Estimated Flow Rate	SWL
12'10	25	+/- 10	12'10

(12) WELL LOG:
Ground Elevation +/-300'

Material	From	To	SWL
Topsoil	0	2	
Sandy Clay Lt Brown	2	8	
Sand Fine brown	8	12	
Sand F-C w/ Gravel F Brown	12	17	
Sand F-C w Gravel F-m Brn	17	19	
Gravel F-m w/ Sand F-C grey	19	22	
Clay Gray Sandy	22	23	
Gravel F-C w/ Sand C-F	23	25	
+Wood			
Sandstone grey	25	26	

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AUG 25 2004
WATER RESOURCES DEPT
SALEM, OREGON

Date started 8/21/04 Completed 8/21/04

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, 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.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, 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.
WWC Number 1493
Signed Jim Mach Jr. MGWC Date 8/23/04

Bandon Well & Pump Company

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER