



Technical Memorandum

Reconnaissance-Level Geologic Hazard Assessment

1107 6th Street Southeast
Bandon, Oregon 97411

July 29, 2022

Prepared for:

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Project No. 959-22001-01

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By:



EXP. 2/1/2023

1022

Lynn D. Green, C.E.G., Principal Engineering Geologist

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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. This report has been prepared consistent with standard geologic practices.¹ This report is valid for a period of five years from the date of site reconnaissance. 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, as outlined in the City's ordinance Chapter 17.78.

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,

¹ Oregon State Board of Geologist Examiners. May 30, 2014. Guidelines for Preparing Engineering Geologic Reports.

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). The subject property is currently developed with a single-story rental home with attached garage situated on east-central portion of the lot and a smaller studio 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 studio. The proposed garage is to be located at the north end of the western driveway and west of the studio. The portion of the lot to the south of the rental home is lawn and the portion north of the studio 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 studio 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)² 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-

² 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.

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 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 portion 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 studio 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 arially

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 projections³, 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)² 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 system⁴. The most recent subduction zone earthquake known to have occurred in the Northwest was in January of 1700.

³ 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>

⁴ 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.

- 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.

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 years⁵. 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.

⁵ 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.

DOGAMI's tsunami inundation map⁶ (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 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 furthestmost 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:

- The property is subject to potential natural hazards and that development thereon is subject to potential risk of damage from such hazards. 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.
- Use of construction techniques that will render new buildings readily moveable in the event they need to be relocated.
- Properties shall possess access of sufficient width and grade to permit new buildings to be relocated or dismantled and removed from the site.
- 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.

⁶ DOGAMI. 2012. Local Source (Cascadia Subduction Zone) Tsunami Inundation Map. Tsunami Inundation Map Coos-16.

- 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 furthestmost 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;⁷
 - NVS Tsunami Evacuation Zones Map, Brochures, Warnings, Planning;⁸
 - ODOGAMI, Oregon Tsunami Clearinghouse: Evacuation Zone Map Viewer, Evacuation Brochures, Regulatory Maps;⁹
 - NOAA, National Tsunami Warning Center;¹⁰ and,
 - Coos County, Emergency Management.¹¹

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 conjunction 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

⁷ https://www.oregon.gov/OMD/OEM/Pages/plans_train/tsunamis.aspx

⁸ <http://nvs.nanoos.org/TsunamiEvac>

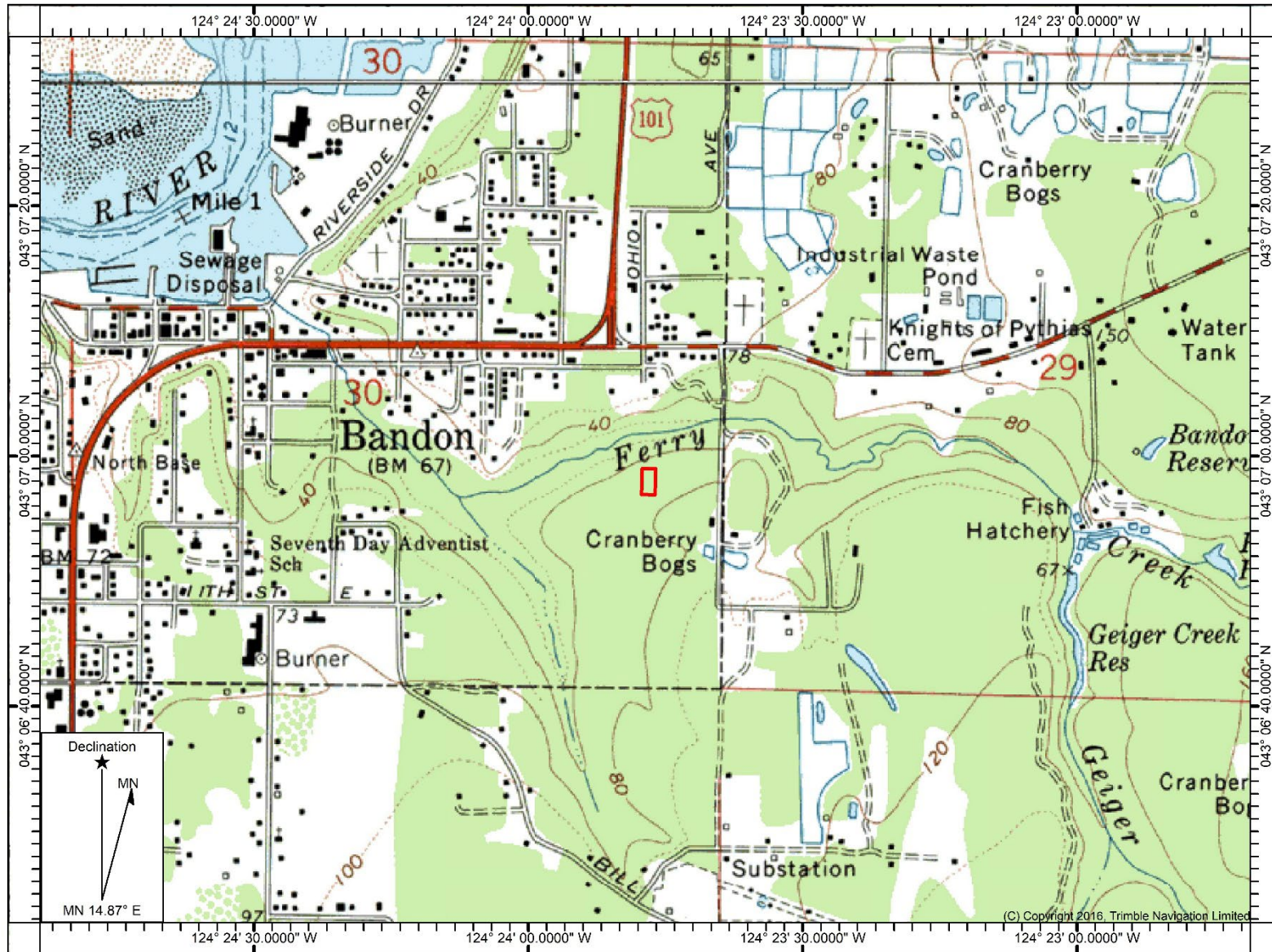
⁹ <http://www.oregongeology.org/tsuclearinghouse/>

¹⁰ <http://wcatwc.arh.noaa.gov/>

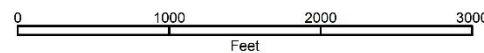
¹¹ <http://www.co.coos.or.us/Departments/SheriffsOffice/EmergencyManagement.aspx>

specifically evaluate, or conditions that were not generally recognized at the time this report was prepared.

FIGURES



Name: BANDON
Date: 03/02/22



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



Date Drawn: 3/15/2022
CAD File Name: 959-22001-01_fig1sv_map
Drawn By: CLR
Approved By: LDG

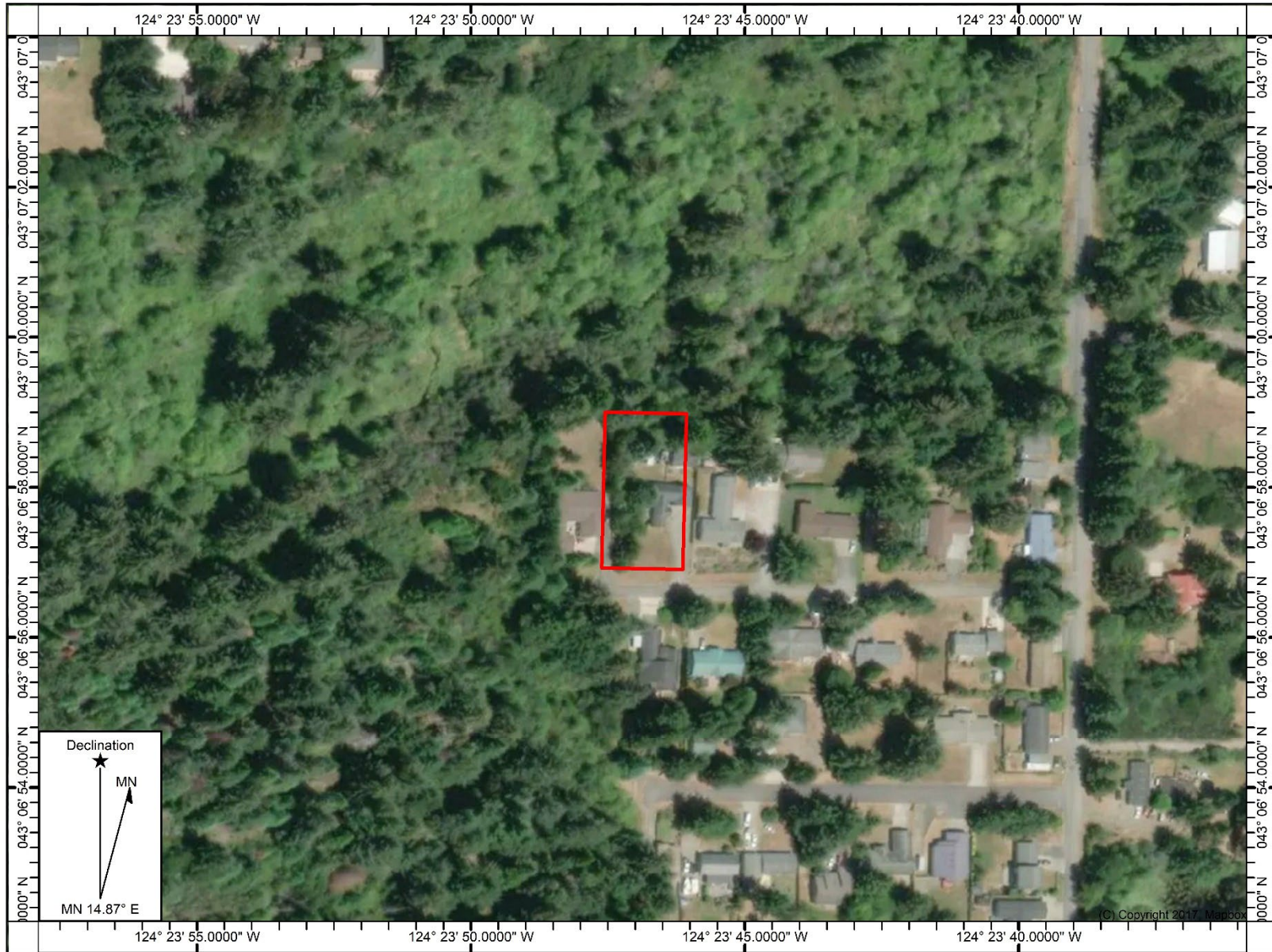
Residential Property
1107 6th Street SE
Bandon, Oregon

Site Vicinity Map

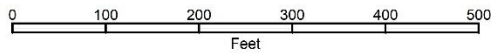
Project No.
959-22001

Figure No.

1

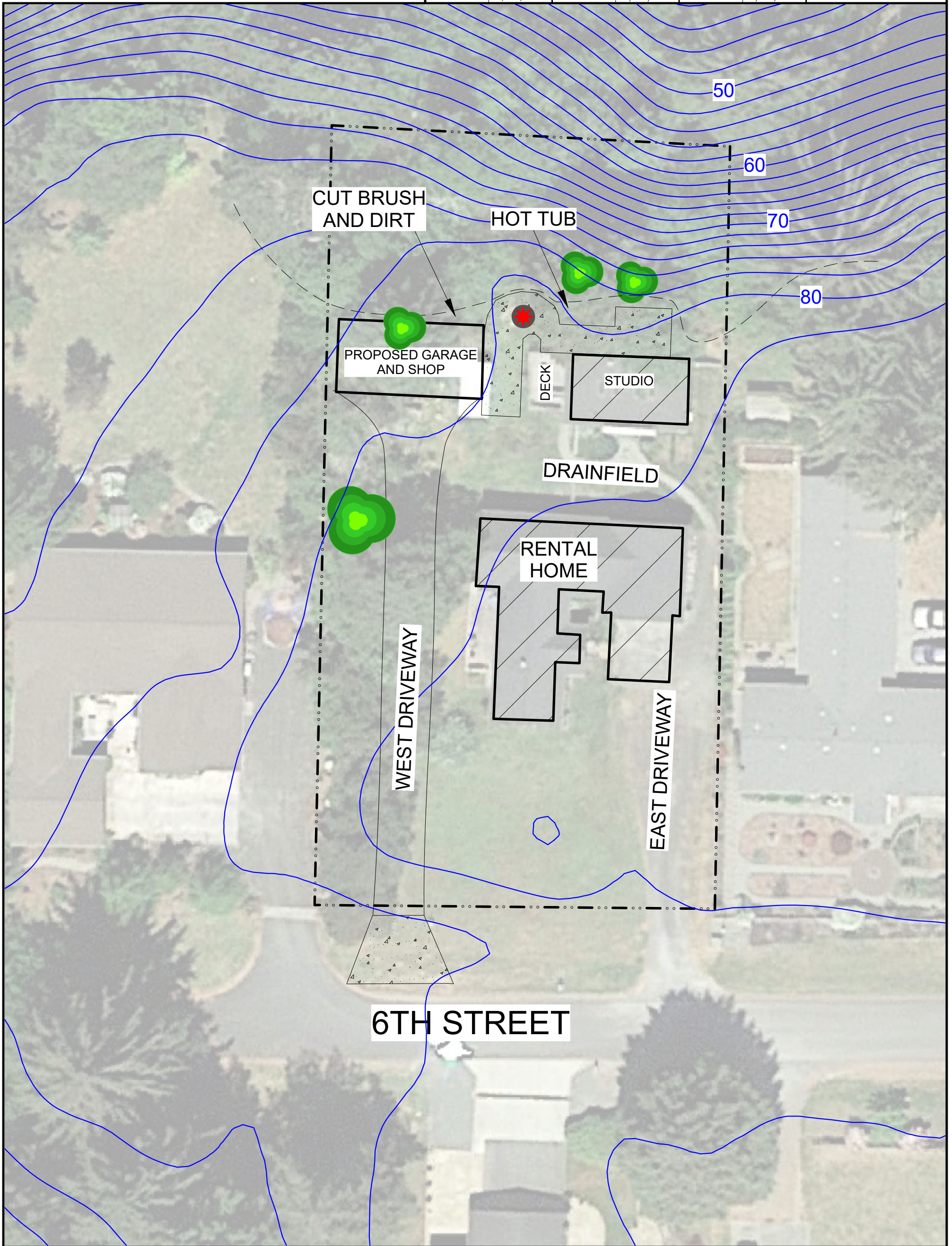


Name: Satellite Image
Date: 03/02/22










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

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

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

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



environmental natural resource consultants

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FIGURE 2
SITE PLAN
RESIDENTIAL PROPERTY
1107 6TH STREET SE
BRANDON, OREGON

THIS MAP WAS PREPARED FOR
ASSESSMENT PURPOSE ONLY

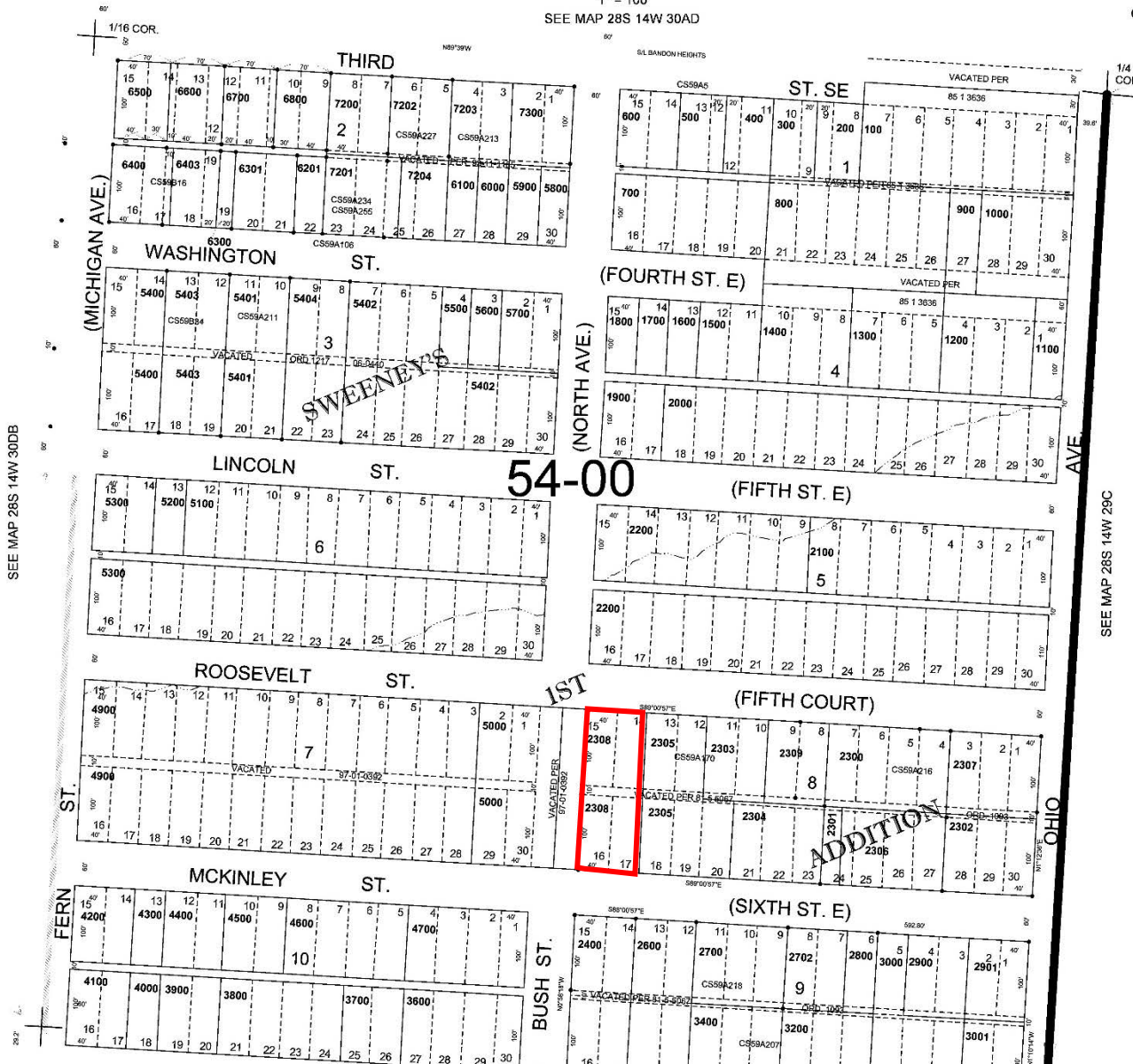
NE1/4 SE1/4 SEC.30 T28S R14W W.M.
COOS COUNTY

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




Date Drawn: 3/15/2022
 CAD File Name: 959-22001-01_fig4TaxLot
 Drawn By: CLR
 Approved By: LDG


Residential Property
 1107 6th Street SE
 Bandon, Oregon




Tax Lot Map

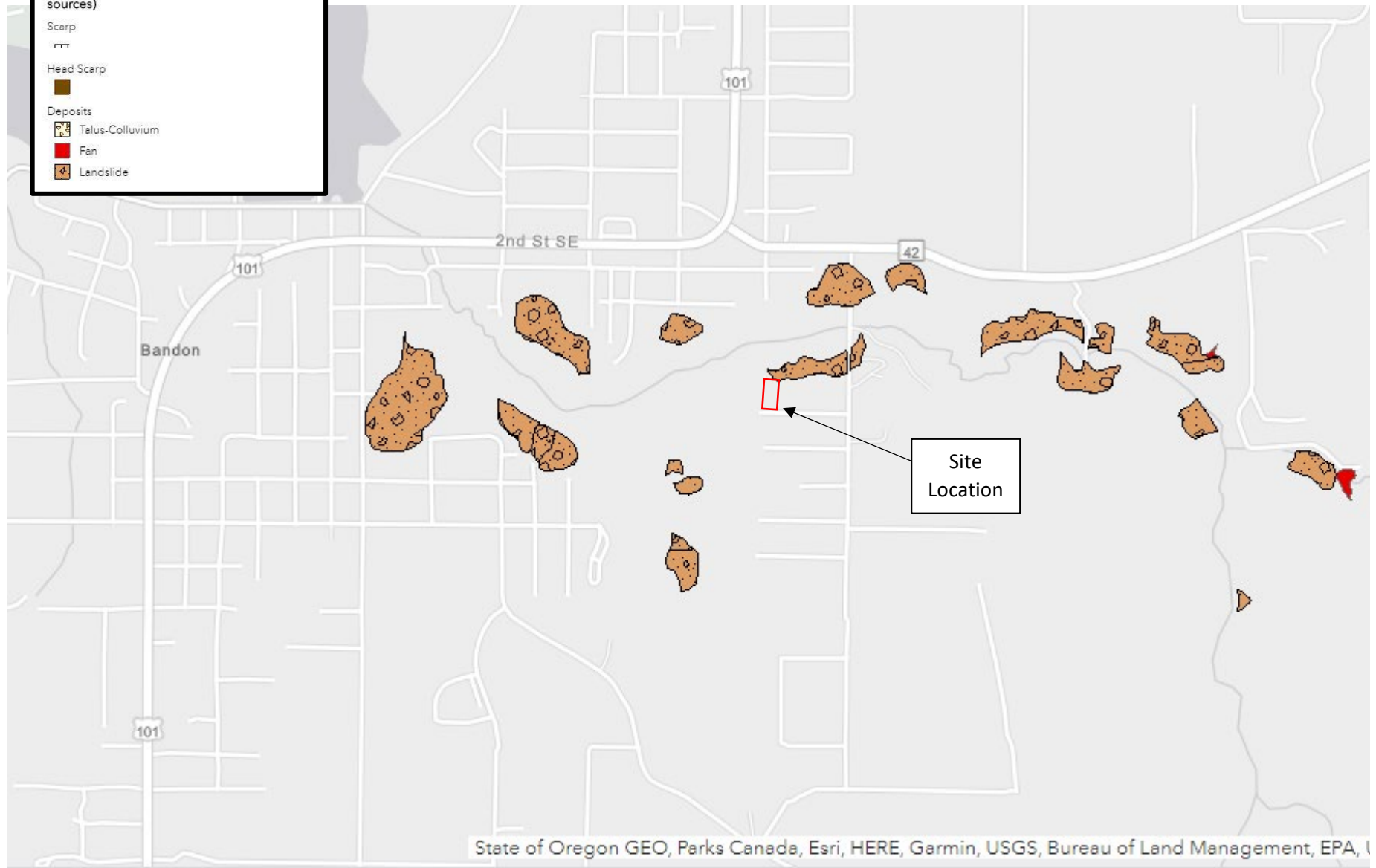
Project No.
 959-22001
 Figure No.
4

Landslide Inventory (areas and points; various sources)

Scarp


Head Scarp


Deposits
 Telus-Colluvium
 Fan
 Landslide



State of Oregon GEO, Parks Canada, Esri, HERE, Garmin, USGS, Bureau of Land Management, EPA, I

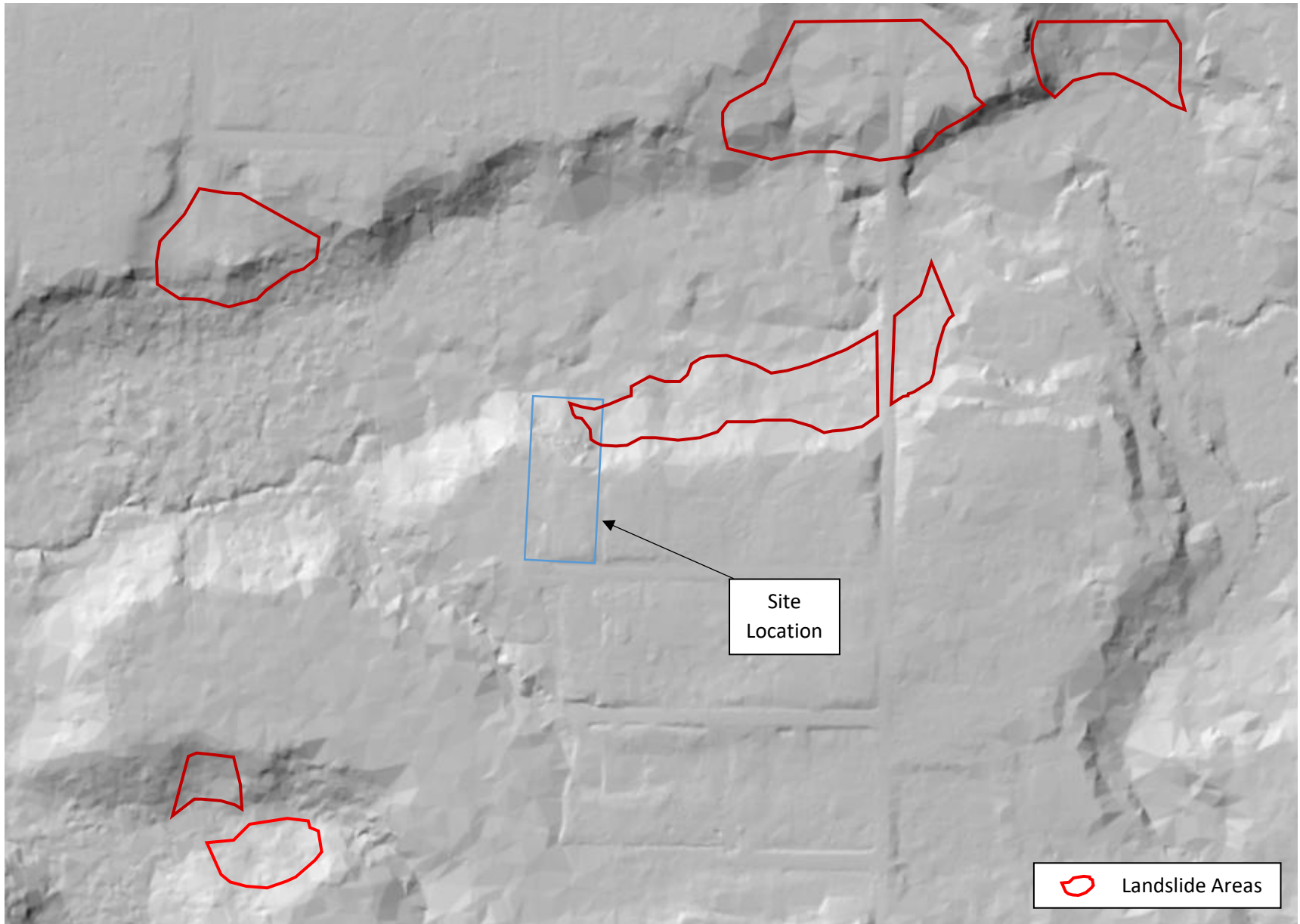



Date Drawn: 3/15/2022
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 Drawn By: CLR
 Approved By: LDG

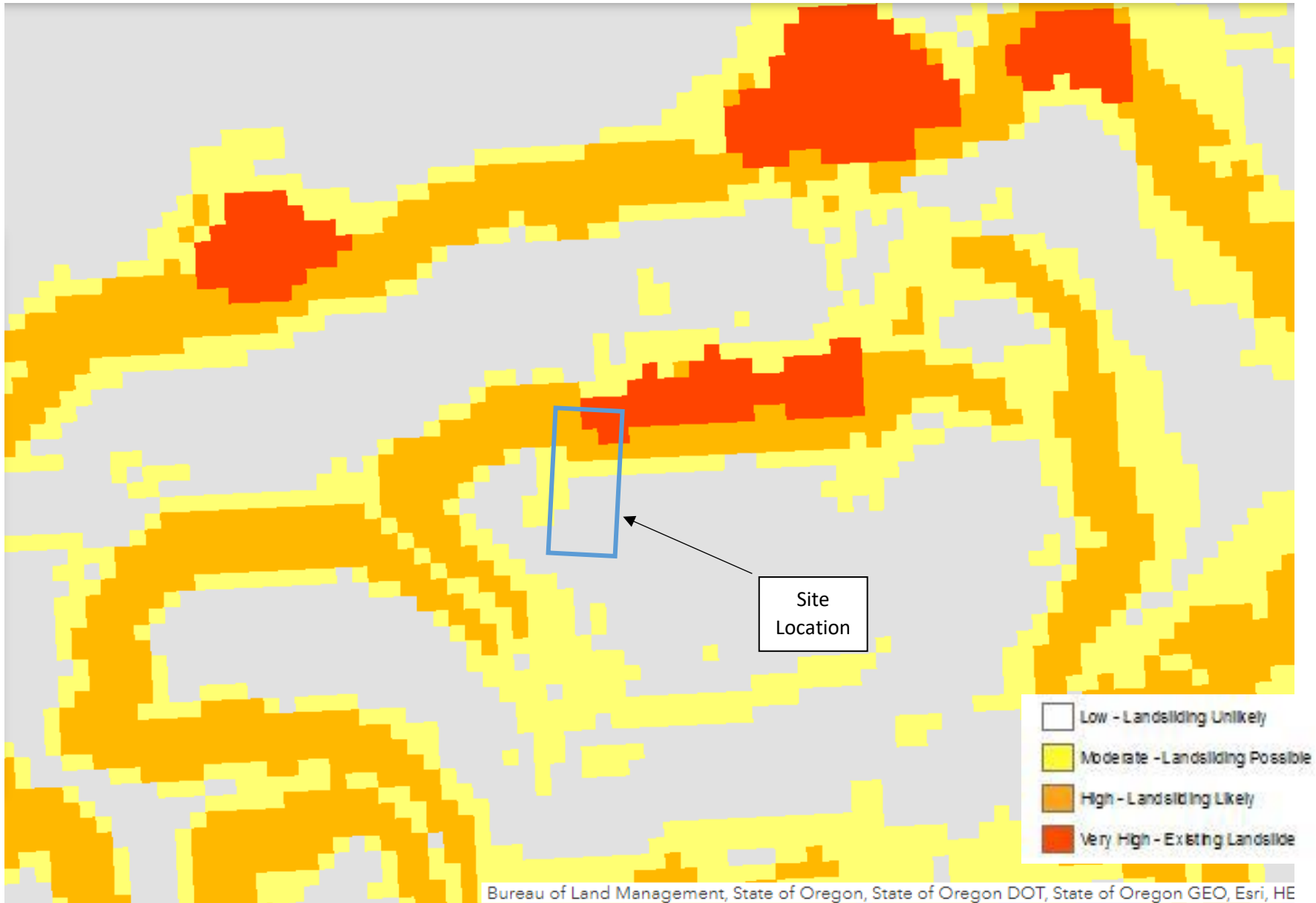
Residential Property
 1107 6th Street SE
 Bandon, Oregon

**Historically Active
 Landslide Map**

Project No.
 959-22001
 Figure No.
5a



 <p>EVRENNORTHWEST Environmental, Natural Resource Consultants</p>	<p>Date Drawn: 3/15/2022 CAD File Name: 959-22001-01_fig5b_Lidar(v01) Drawn By: CLR Approved By: LDG</p>	<p>Residential Property 1107 6th Street SE Bandon, Oregon</p>	<p>LiDAR Map</p>	<p>Project No. 959-22001 Figure No. 5b</p>
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Date Drawn: 3/15/2022
 CAD File Name: 959-22001-01_fig5c_LandsSus(v01)
 Drawn By: CLR
 Approved By: LDG

Residential Property
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 Bandon, Oregon

Landslide Susceptibility Map

Project No.
 959-22001
 Figure No.
5c



Flood Hazard Zones

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee



Date Drawn: 3/15/2022
 CAD File Name: 959-22001-01_fig6_Flood insuranceMap(v01)
 Drawn By: CLR
 Approved By: LDG

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 1107 6th Street SE
 Bandon, Oregon

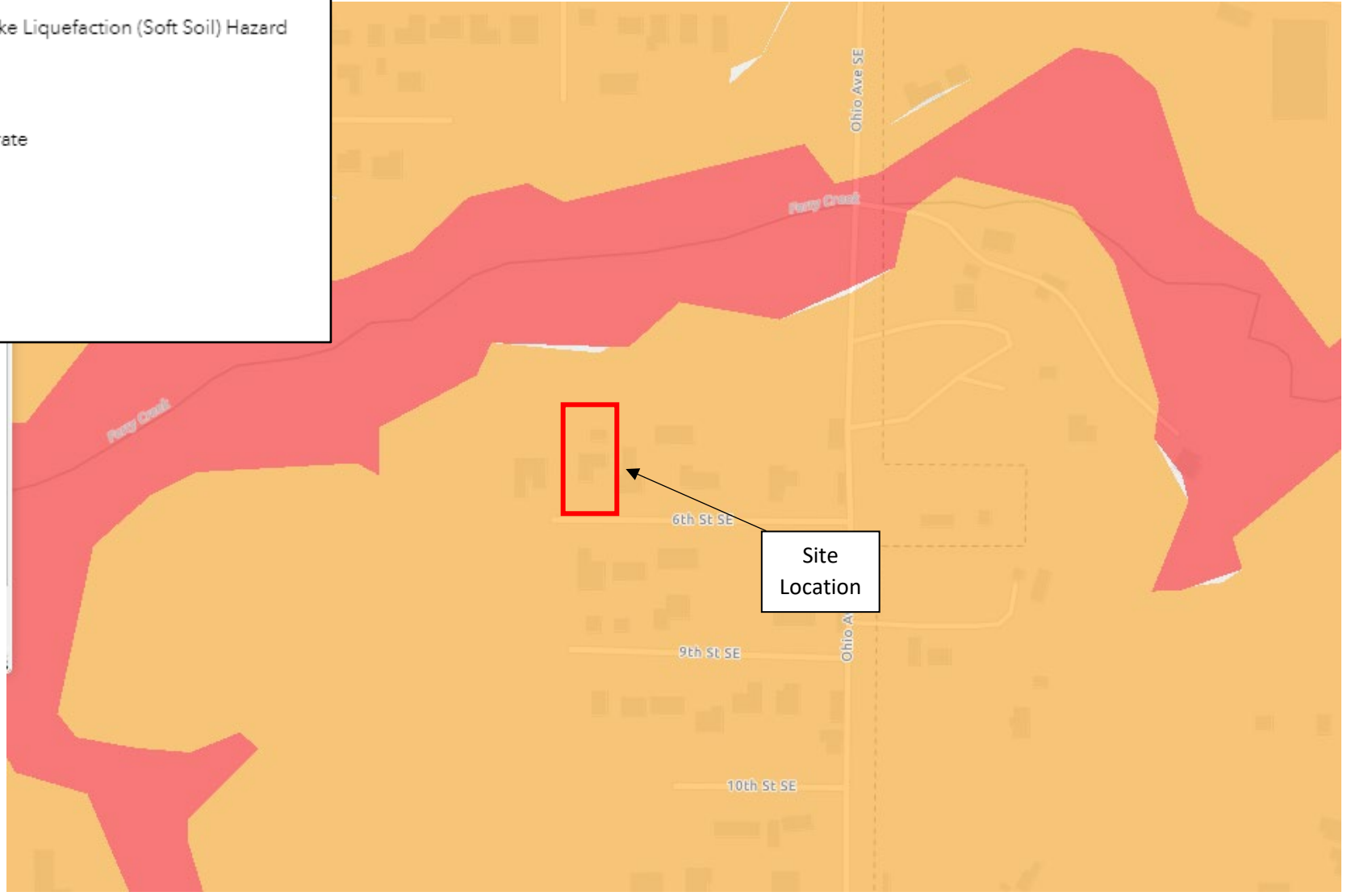
**Flood Insurance
 Rate Map**


Project No.
 959-22001
 Figure No.
6

Earthquake Hazard

Earthquake Liquefaction (Soft Soil) Hazard

- High ■
- Moderate ■
- Low ■

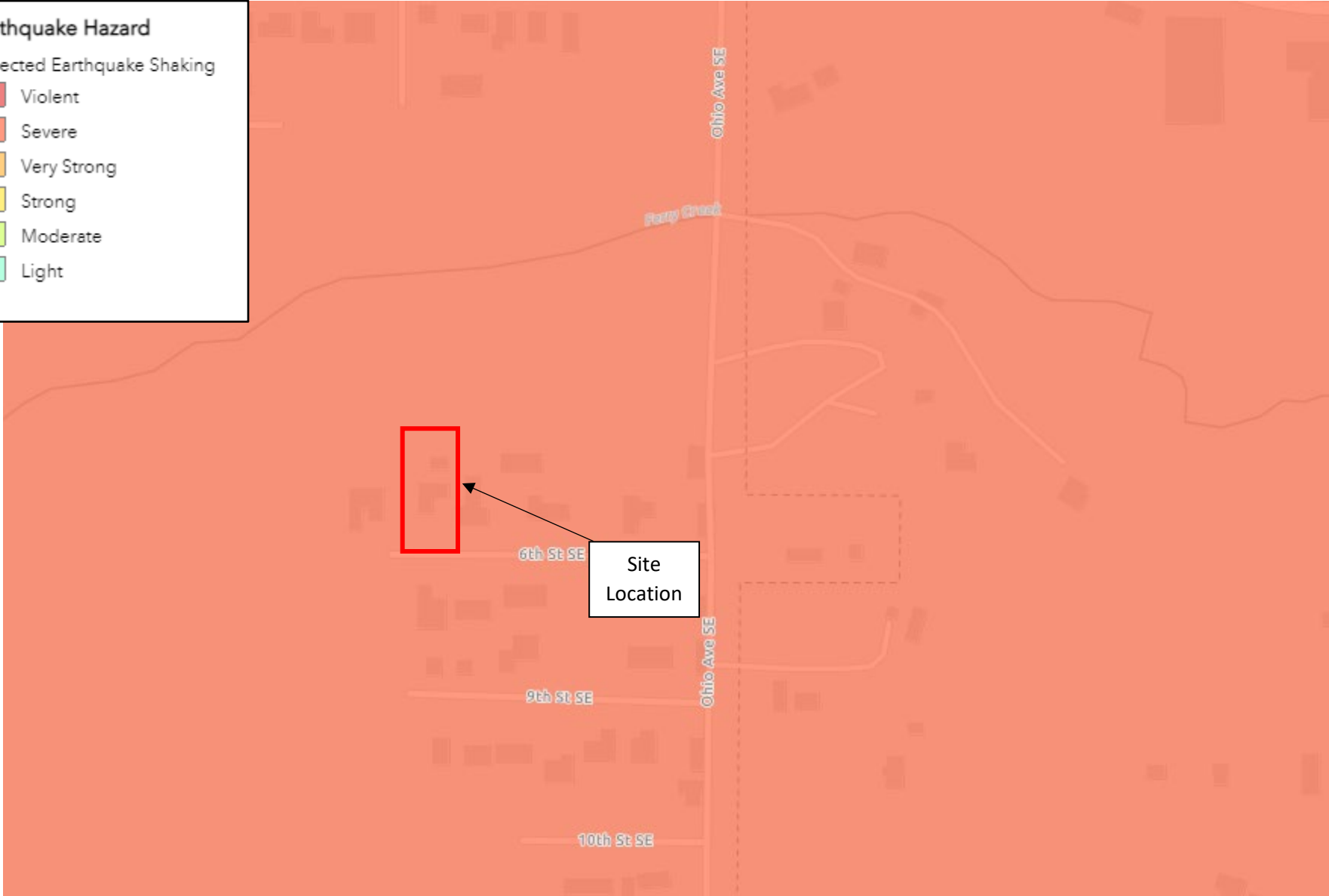


	<p>Date Drawn: 3/15/2022 CAD File Name: 959-22001-01_fig7A_EarthquakeLiquifactionMap(v01) Drawn By: CLR Approved By: LDG</p>	<p>Residential Property 1107 6th Street SE Bandon, Oregon</p>	<p>Earthquake Liquefaction Map</p>	<p>Project No. 959-22001 Figure No. 7a</p>
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Earthquake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

Expected Earthquake Shaking

- Violent
- Severe
- Very Strong
- Strong
- Moderate
- Light

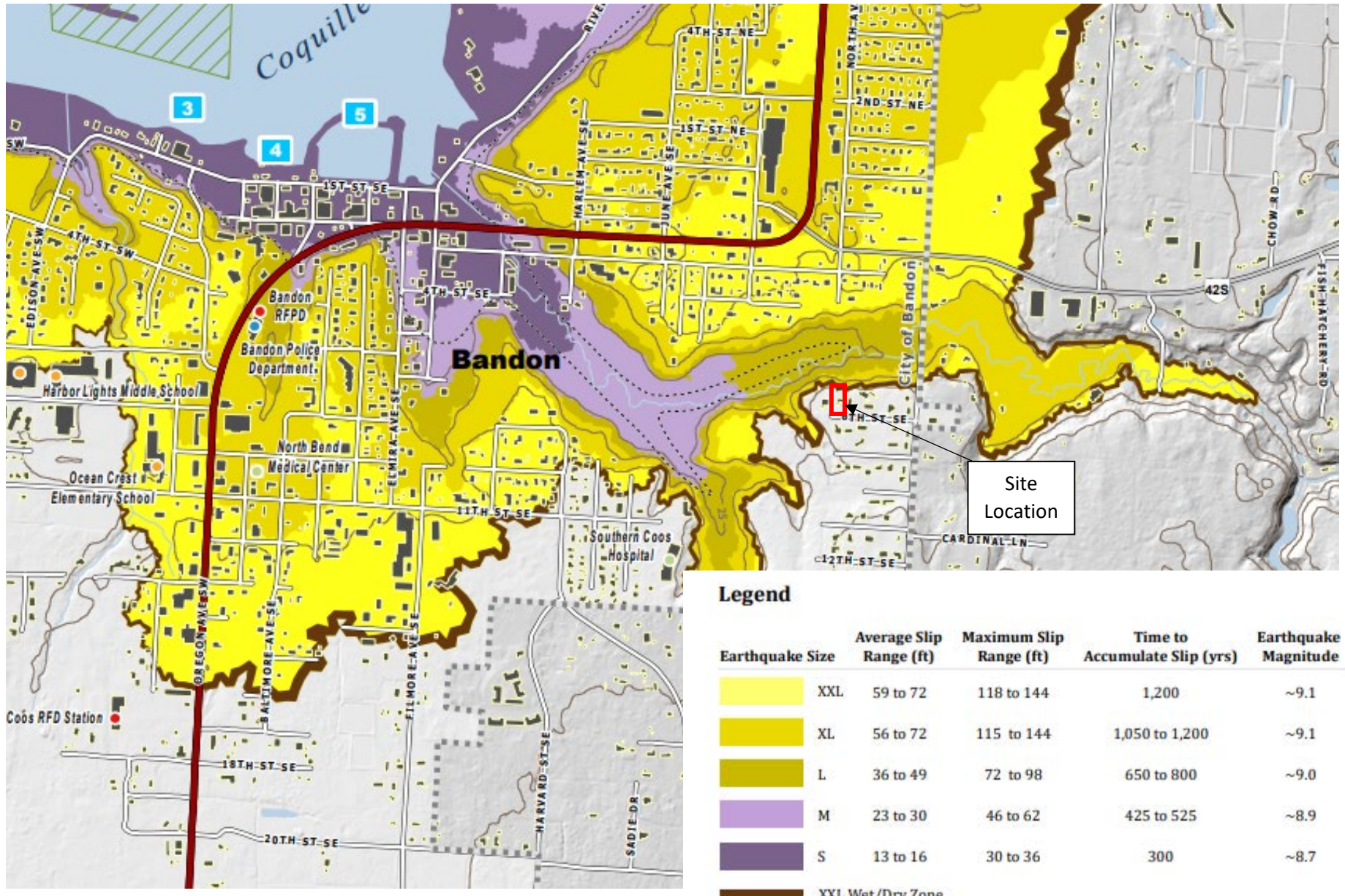


Date Drawn: 3/15/2022
 CAD File Name: 959-22001-01_fig7b_Earthquake ShakingMap(v01)
 Drawn By: CLR
 Approved By: LDG

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				

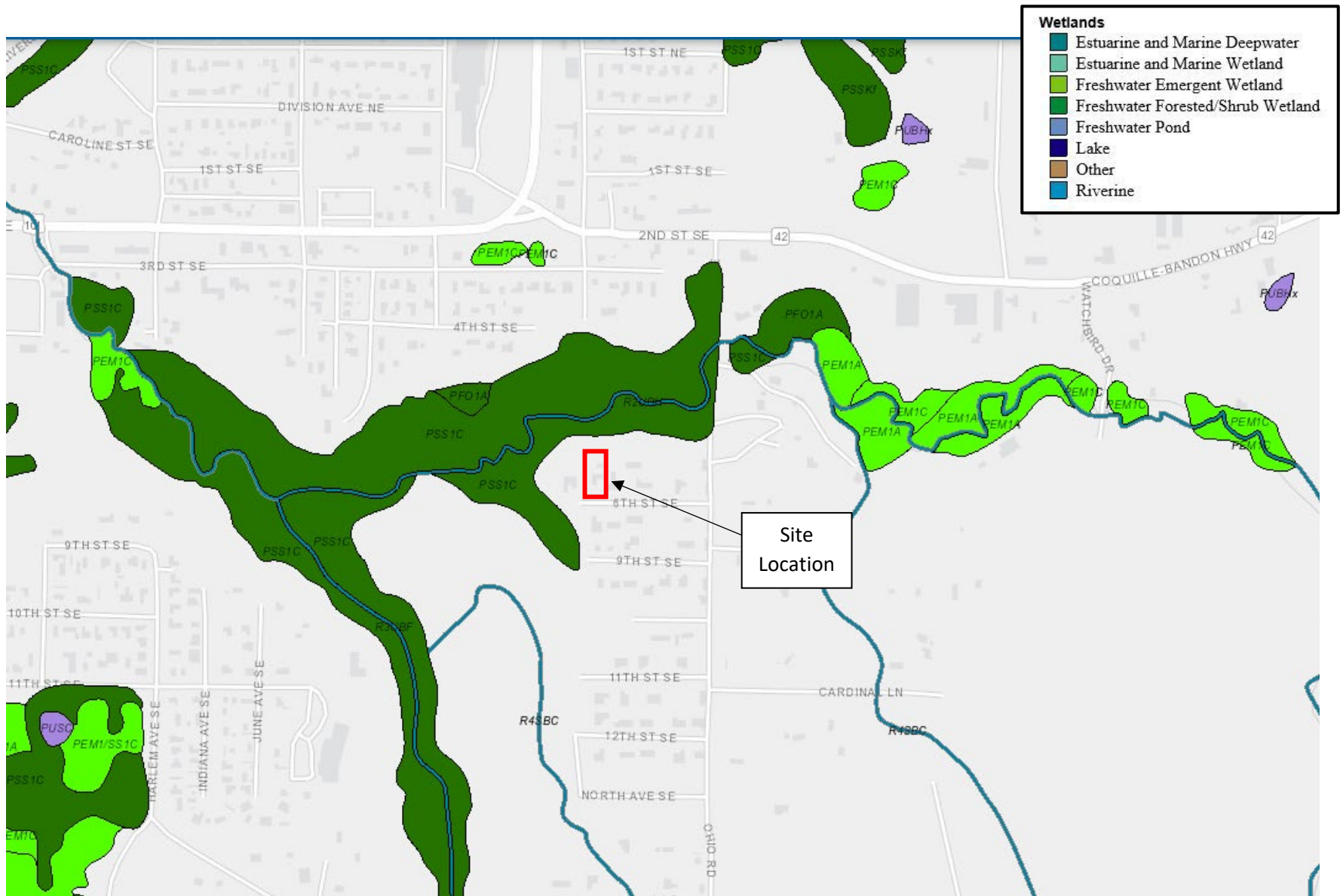


Date Drawn: 3/15/2022
 CAD File Name: 959-22001-01_fig7a_TsunamiZoneMap(v01)
 Drawn By: CLR
 Approved By: LDG

Residential Property
 1107 6th Street SE
 Bandon, Oregon

**Tsunami Inundation
 Zone Map**

Project No.
 959-22001
 Figure No.
8



- Wetlands**
- Estuarine and Marine Deepwater
 - Estuarine and Marine Wetland
 - Freshwater Emergent Wetland
 - Freshwater Forested/Shrub Wetland
 - Freshwater Pond
 - Lake
 - Other
 - Riverine

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



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



Studio 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.



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 studio. Note bowed trees lower right.



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



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



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 studio.



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



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.



Spring discharging from slope north of studio.



Gravel exposed downslope from spring.



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



Residential Property
1107 6th Street SE
Bandon, Oregon

Site Photographs

Project No.
959-22001-01

Appendix

A



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

	Residential Property 1107 6 th Street SE Bandon, Oregon	Site Photographs	Project No. 959-22001-01 Appendix A
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APPENDIX B
MONITORING WELL AND GEOTECHNICAL HOLE
REPORTS

STATE OF OREGON WATER SUPPLY WELL REPORT

SEP - 6 1996

WELL ID. # LC7154

(START CARD) # 93070

(as required by ORS 537.765)

WATER RESOURCES DEPT.

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

SALEM, OREGON

(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

Table with columns: HOLE, SEAL, Diameter, From, To, Material, From, To, Sacks or pounds. Includes handwritten entry for 10 inch diameter hole sealed with cement.

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:

Table with columns: Diameter, From, To, Gauge, Steel, Plastic, Welded, Threaded. Includes handwritten entry for removed casing.

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

Table with columns: From, To, Slot size, Number, Diameter, Material, Tele/pipe size, Casing, Liner. Includes handwritten entry for removed perforations.

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

Table with columns: Pump, Bailer, Air, Flowing Artesian, Yield gal/min, Drawdown, Drill stem at, Time. Includes handwritten test results.

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 of W. WM.
Section 30 NE 1/4 SE 1/4
Tax Lot 5403 Lot Block Subdivision
Street Address of Well (or nearest address) 1032 Laurel 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

Table with columns: From, To, Estimated Flow Rate, SWL. Includes handwritten entry for 16 to 20 feet depth with -1/2 GPM flow rate.

(12) WELL LOG:

Ground Elevation +1300'

Table with columns: Material, From, To, SWL. Includes handwritten log entries such as Top soil, Sandy Clay Tan, Gravel Fine-med w, Gravel Fine-med w, Sand Brown, Gravel Fine-med w, Sandy Clay Orange, Clay Gray.

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 Joe Mock Sr. MGCW Date 9/5/96

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.

28-14-30
WELL I.D. # L 69434
START CARD # 164010

(1) LAND OWNER
Name John Ebel Well Number 996
Address 105 SW 1164
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 267 ft
Explosives used Yes No Type _____ Amount (100)

HOLE			SEAL			Sacks or pounds
Diameter	From	To	Material	From	To	
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#	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6"	+14	4'	250	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>(Protective Casing)</u>							
Liner:				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

(7) PERFORATIONS/SCREENS:

Perforations Method Attached to casing
 Screens Type Nyloka V-w Material SS

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
21'7"	26'7"	10/16		5"	Pipe	<input type="checkbox"/>	<input type="checkbox"/>

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

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 BW&S
Did any strata contain water not suitable for intended use? Too little
 Salty Muddy Odor Colored Other _____
Depth of strata: _____
Bandon Well & Pump Company

(9) LOCATION OF WELL by legal description:
County Coos Latitude _____ Longitude _____
Township 28 N of S Range 14 E of W. W.M.
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	+1-10	12'10"

(12) WELL LOG:
Ground Elevation +1-300'

Material	From	To	SWL
Top soil	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	

Date started 8/2/04 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.
Signed _____ WWC Number _____ 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.
Signed Jim Mack Sr Mgr WWC Number 1443 Date 8/23/04