State and Local Laws and Regulations Exhibit

Cascade Renewable Transmission

Wasco, Hood River, and Multnomah Counties, Oregon

January 2026

Prepared for
Cascade Renewable Transmission, LLC

Submitted to
Oregon Energy Facility Siting Council

Contents

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Acronyms and Abbreviations

Applicant	Cascade Renewable Transmission, LLC (CRT)
AW	Arid West
CFR	Code of Federal Regulation
dB	decibel
dBA	A-weighted decibel
DSL	Oregon Department of State Lands
HAB	horizontal auger boring
HDD	Horizontal Directional Drilling
HDR	HDR Engineering, Inc.
HTL	High Tide Line
HVAC	high-voltage alternating current
HVDC	high-voltage direct current
Hz	hertz
JPA	Joint Permit Application
NHD	National Hydrography Dataset
NIST	National Institute of Standards and Technology
NWI	National Wetland Inventory
OAR	Oregon Administrative Rules
OR EFSC	Oregon Energy Facility Siting Council
ORS	Oregon Revised Statues
PGE	Portland General Electric
Project	Cascade Renewable Transmission Project
RM	river mile
USACE	U.S. Army Corps of Engineers
WOS	Waters of the State
WUS	Waters of the U.S.
WVMC	Western Mountains, Valleys and Coasts

1 Introduction

This exhibit provides information pertaining to potential adverse impacts of construction and operation of the proposed Cascade Renewable Transmission Project (Project) on regulated waters of the State (WOS), as required by Oregon Administrative Rules (OAR) 345-022-0160(1) subsections (A) through (F). The information provided in this exhibit is consistent with the *Wetland and Waterbodies Delineation Report* (HDR 2025; Attachment 1), and the Joint Permit Application (JPA; Attachment 2).

This exhibit was also prepared to meet the submittal requirements in OAR 345-022-0160(2) and (3) related to Project water use and noise requirements. The Applicant (Cascade Renewable Transmission [CRT]) would require the use of water for construction-related activities such as making concrete for foundations in the converter stations and for foundations for the overhead transmission structures, converter station grading and site work, and dust suppression. During operations, the Applicant would require the use of water for control rooms with bathroom/kitchen facilities at each converter station.

2 Analysis Area

The survey area for wetlands and other jurisdictional waters lies within the proposed site boundary (Attachment 1). The site boundary is defined in detail in the Background Information Exhibit, which includes the information required by OAR 345-021-0010(3)(a) and (b).

3 Wetlands and Other Jurisdictional Waters (OAR 345-022-0160(1)(a)(A))

(1) Regarding Water:

(a) Information based on literature and field study, as appropriate, about waters of this state, as defined under ORS 196.800, including:

(A) A description of all areas within the site boundary that might be waters of this state and a map showing the location of these features;

RESPONSE

The following sections describe wetlands and other waters, identified by the Applicant (Cascade Renewable Transmission [CRT]). Descriptions of the wetlands and other waters and maps showing locations of delineated features are provided in the *Wetland and Waterbodies Delineation Report* (Attachment 1).

3.1 Definitions

Oregon Revised Statutes (ORS) 196.800(15) defines WOS as “all natural waterways, tidal and non-tidal bays, intermittent streams, constantly flowing streams, lakes, wetlands, that portion of the Pacific Ocean that is in the boundaries of this state, all other navigable and non-navigable bodies of water in this state and those portions of the ocean shore, as defined in ORS 390.605, where removal or fill activities are regulated under a state-assumed permit program as provided in 33 United States Code 1344(g) of the Federal Water Pollution Control Act, as amended."

The Oregon Department of State Land's (DSL) definition of wetlands mirrors the federal definition. See OAR 141-085-0510(110).

3.2 Jurisdictional Versus Non-Jurisdictional Waters

Not all wetlands and streams are within the jurisdiction of state regulation. For the Project, several jurisdictional distinctions are important to allow the Applicant to estimate impacts only to jurisdictional wetland and other waters. These include determinations related to the following:

- Perennial and intermittent streams, which are generally regulated by DSL, as distinct from ephemeral streams, which generally are not under state jurisdiction.
- Artificially created roadside and farm ditches, which are considered WOS only if they contain food or game fish and are connected to WOS (OAR 141-085-0515(8)).

Ephemeral streams are defined in the Oregon Streamflow Duration Assessment Method as streams that flow "only in direct response to precipitation. Water typically flows only during and shortly after large precipitation events. An ephemeral stream may or may not have a well-defined channel, the stream bed is always above the water table, and stormwater runoff is the primary source of water. An ephemeral stream typically lacks biological, hydrological, and physical characteristics commonly associated with the continuous or intermittent conveyance of water" (Nadeau 2015).

In contrast, the State of Oregon defines intermittent streams as "any stream which flows during a portion of every year and which provides spawning, rearing or food-producing areas for food and game fish" (OAR 141-085-0510(49)). Food-producing streams are typically one stream order above a fish-bearing stream.

The State of Oregon defines wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (OAR 141-085-0510(110)).

This exhibit presents the Applicant's best professional judgement as to which wetland and other water features are jurisdictional under DSL regulation. While this exhibit uses the term "jurisdictional waters," the Applicant recognizes that final determination of agency jurisdiction will be made by DSL, based on the information presented by the Applicant.

3.3 Desktop Study

Prior to field work, HDR Engineering, Inc. (HDR) biologists performed a desktop review of the survey area to identify potentially jurisdictional wetlands, WOS, and waters of U.S. (WUS) The analysis included review of the National Wetlands Inventory (NWI; USFWS 2024), the National Hydrography Dataset (NHD; USGS 2024), hydric soils data (NRCS 2024), along with the DSL Statewide Wetlands Inventory (SWI) and aerial photographs. Digital maps used in the field contained the NWI, NHD, Natural Resources Conservation Service, and recent aerial photograph overlays.

The desktop review indicates there are wetlands and waterbodies present within the survey area. These identified wetlands and waterbodies are shown in Figure 3 of Appendix A in the *Wetland and Waterbodies Delineation Report* (Attachment 1).

3.4 Delineations of Wetlands and Other Water Features

Field investigations for the delineations of wetlands and other waters included pedestrian surveys within the survey area. HDR biologists conducted field delineations on November 8, 2023, March 11-13, 2024, April 2, 2024, and March 20, 2025.

3.4.1 Wetlands

HDR biologists investigated the survey area for wetlands using the methods described in the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory 1987) and the regional supplements to the USACE Wetland Delineation Manual: Western Mountains, Valleys and Coast (WVMC; Environmental Laboratory 2010) and the Arid West (AW; Environmental Laboratory 2008). Wetland indicator status for plants was determined using the State of Oregon 2016 Wetland Plant List (Lichvar et al. 2012).

- Wetland boundaries were recorded using survey-grade global positioning system (GPS) units capable of sub-meter accuracy (ArcCollector GPS unit with EOS Arrow global navigation satellite system (GNSS) receiver)
- Paired sample plots were established in logical locations to document wetland boundaries (Attachment 1: Figure 3 of Appendix A)
- The number of sample plots established in wetlands ranged based on the size and complexity of the wetland, and whether the wetland was bordered by upland or another wetland with a different Cowardian classification;
- Formal paired data plots were collected for each wetland in the survey area;
- Paired sample plot locations were selected based on available resource maps (NWI and NHD datasets), aerial imagery, and on-site assessment of the survey area, which included the identification of dominant plant species, changes in topography, soil test probes, and hydrologic inputs.
- Photographs were taken to document wetland and upland conditions at the sample plots and the wetland boundary (Attachment 1: Appendix C)
- Detailed descriptions of methods for wetlands are provided in the *Wetland and Waterbodies Delineation Report* (Attachment 1).

3.4.2 Non-wetland Water Evaluations

HDR biologists investigated the survey area non-wetland water bodies. Details regarding the non-wetland waters delineated during the field investigations are included in Attachment 1.

- Details on mapping methods are presented in Section 5.2 of the *Wetland and Waterways Delineation Report* (Attachment 1).
- The centerline of non-wetland waters less than 6 feet wide was recorded as a line feature.

- Non-wetland waters greater than 6 feet wide were recorded as left and right bank lines.
- Jurisdictional streams that cross the survey area entirely or partially contained within the survey area were fully delineated.
- Ephemeral streams were determined using the Streamflow Duration Assessment Method for Oregon (Nadeau 2015) and filled out for each ephemeral stream.

3.4.3 Methods

In preparation for field work, HDR biologists reviewed the following data to identify wetlands and other waters, as described in the preceding sections. HDR biologists prepared digital field maps with data from the available database listed below and uploaded onto tablets to assist field staff in identifying the locations of probable wetlands and non-wetland waters within or adjacent to the survey area.

The following databases were reviewed:

- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FEMA 2024);
- NWI (USFWS 2024);
- Local Wetland Inventory (LWI) (DSL 2024b);
- Statewide Wetland Inventory (SWI) (DSL 2024a);
- NHD maps and data (USGS 2024);
- Oregon Fish Passage Barrier Data (ODFW 2024);
- Essential Salmonid Habitat Map (DSL 2024c);
- Natural Resources Conservation Service 2024 Soil Survey Web Map geographic database for Multnomah and Wasco County Areas, Oregon (NRCS 2024);
- National Hydric Soils List (NRCS 2015);
- National Oceanic and Atmospheric Administration Tides & Currents data (NOAA 2024a and 2024b);
- Historical, seasonal, and current ESRI and Google Earth aerial photographs to determine probable locations for wetlands and water bodies (Google Earth 2024).

The following guidance documents and procedures were reviewed:

- Per OAR 141-085-0515(2) (Removal-Fill Jurisdiction by Type of Water), HDR biologists identified the highest measured tide (HMT) in the survey area. The HMT "may be determined by a land survey referenced to the closest tidal benchmark based upon the most recent tidal epoch", which in the project area is the highest astronomical tide over the 19-year epoch. In the absence of actual data, the HMT may be based upon actual tide gauge measurements during a wintertime spring tide or observation or field indicators. Field indicators can include the uppermost drift or wrack (or debris) line, water marks on eroding banks or structures (e.g., walls piles), or intertidal zone inhabited by aquatic mollusks along rocky shorelines, or the upland boundary associated with tidal wetlands/dunes.

- USACE *A Field Guide to the identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley 2008);
- USACE *A Guide to Ordinary High-Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys and Coast Regions of the United States* (Mersel and Lichvar 2014);
- OAR 141-085-0515(3) Removal-Fill Jurisdiction by Type of Water;
- EPA, USACE, DSL's *Streamflow Duration Assessment Method* for Oregon (Nadeau 2015);
- OAR Chapter 141, Division 90, Administrative Rules for Wetland Delineation report Requirements for Jurisdictional Determinations for the Purpose of Regulating Fill and removal within Waters of the State.

Detailed descriptions of methods for non-wetland waters are provided in the *Wetland and Waterbodies Delineation Report* (Attachment 1). The report will be submitted to DSL for concurrence.

3.4.4 Results

Using methods recommended in the USACE delineation manual, OAR 141-085-0515(2), and AW and WMVC supplements, HDR biologists delineated or estimated a total of five wetlands, three non-jurisdictional aquatic features, one pit, four waterbodies, two ditches and two drainages within the survey area (Table 2). Biologists did not have access to all wetlands and water bodies in the survey area as some locations were limited by lack of right-of-entry. The resources within areas that were not accessed were estimated using desktop methods, field observations (where possible), and best professional judgment. Not all features that were delineated will be impacted by the Project.

Table 1. Summary of Wetlands and Other Waters within the Project Survey Area

Water Type (Cowardian Class)[a]	Number of Features	Area (acre)[b]	Approx. Length in Survey Area (feet)[c]
Palustrine Emergent Wetland	3	0.83	-
Palustrine Scrub-Shrub Wetlands	2	4.02	-
Aquatic Features	3	0.14	-
Pit	1	0.01	-
Drainages	2	-	132 (Drainage 1) and 547 (Drainage 2)
Intermittent Streams	*1*	-	*1064 (TC)*
Perennial Streams	*3*	-	*3257 (CR); 283 (CS); 1096 (WR)*
Ditches	2	-	600 (D1) and 0 (D2)

a. As measured within the survey area.
b. *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979; FGDC 2013). PSS = palustrine scrub shrub; PEM = palustrine emergent.
c. As measured within the survey area

Table 2. Potentially Jurisdictional Wetland and Waters within the Project Survey Area

Wetland/ Stream ID	Attachment 1: Figure 5 Reference / Map #	DSL PJD[b]	Additional Information for Jurisdictional Determination
Wetland 1	31	Yes, (4)	Wetland 1 occurs within a small closed depressional area on Hayden Island. Wetland 1 is located outside of the proposed alignment, there are no proposed impacts.
Wetland 2A	29	Yes, (4)	Wetland 2a occurs within a small, closed depression on Hayden Island. There is no outlet or surface water connection to a jurisdictional WOS.
Wetland 2B	29	Yes, (4)	Wetland 2b occurs within a closed depressional area on Hayden Island. The wetland is characterized as a depressional permanently ponded area with fringe PEM vegetative community
Aquatic Feature –Area A	35 and 36	No, (7)(b)	Area A occurs within a man-made depressional feature created in upland soils in the early 2000s. This feature appears to have been created for stormwater conveyance due to the presence of an outlet on the east end of the feature, but no signs of flow were observed in the field. As an artificially created wetland this area should be considered exempt from state regulation per OAR 141-085-0515(7)(b).
Aquatic Feature –Area B	35 and 36	No, (7)(b)	Area B occurs within a man-made depressional feature created in upland soils. Area B is an artificially created wetland and should be considered exempt from state regulation per OAR 141-085-0515(7)(b).
Wetland 3	5 and 6	Yes, (4)	Wetland 3 occurs within a large depressional area near the Willamette River. In addition, because this wetland is an artificially created wetland created entirely from upland soils, this area should be considered exempt from state regulation per OAR 141-085-0515(7)(b). Wetland 3 is located outside of the proposed alignment, and there are no proposed impacts.
Aquatic Feature –Area C	1 and 2	No, (7)(b)	Area C occurs within a man-made berm constructed in 2020; the fill material is from a wetland restoration project on the property to the north. This wetland is an artificially created wetland created entirely from upland; this area should be considered exempt from state regulation per OAR 141-085-0515(7)(b). This area occurs within Flood Zone X.
Wetland 4	49	Yes, (4)	Wetland 4 is a wetland that occurs within the OHWM of Threemile Creek. Wetland 4 is located outside of the proposed alignment and there are no proposed impacts.
Threemile Creek (TC)	49-51	Yes, (3)	This creek is a relatively permanent waterbody (RPW) that discharges directly to the Columbia River. The creek gradient within the survey corridor varies between 2-10% with steeper gradients occurring upslope and adjacent to OR 197.
Columbia River (CR)	27, 28, 33, 34, 41, and 42	Yes, (2)	The Columbia River is a navigable water (WOS) that occurs within the east and west end survey areas.
Columbia Slough (CS)	18	Yes, (2)	The Columbia Slough is a WOSthat the survey area crosses in one location. The Columbia Slough discharges to the Willamette River roughly 0.9 miles northwest of the survey area. The NWI maps the slough as a R1UBV riverine habitat.
Willamette River (WR)	2 and 4	Yes, (2)	The Willamette River is a WOS that the survey area crosses in one location. The Willamette River discharges to the Columbia River roughly 3 miles downstream of the survey area. The river is mapped as a R1UBV riverine habitat by the NWI.
Drainage 1	59	No (3)	This is a dry ephemeral drainage feature with no indicators of intermittent or perennial stream flow. There are no signs of bed or bank, or wetland vegetation, and there is no visible connection to downstream waters.

Wetland/ Stream ID	Attachment 1: Figure 5 Reference / Map #	DSL PJD[b]	Additional Information for Jurisdictional Determination
Drainage 2	54 and 55	No (3)	This is a dry ephemeral drainage feature with no indicators of intermittent or perennial stream flow. There are no signs of bed or bank, or wetland vegetation, and there is no visible connection to downstream waters.
Ditch 1	1	No (7)(c)	Ditch 1 was excavated within the previously disturbed and graded substation footprint. A stormwater detention pond occurs adjacent to Ditch 1 and is likely hydrologically connected via a culvert below ground surface. The ditch does not contain game fish and does not have a free and open connection to WOS.
Ditch 2	1	No (7)(c)	Ditch 2 was excavated within the previously disturbed and graded substation footprint. The ditch does not contain game fish and does not have a free and open connection to waters of the state. There are no hydrophytic vegetation or hydric soils.

[a.] Code of Federal Regulations (CFR) Title 33 Part 328.3, USACE.
[b.] OAR 141-085-0515.

3.5 Effects on Wetlands and Other Jurisdictional Waters of the State (OAR 345-022-0160(1)(a)(B))

(B) An analysis of whether construction or operation of the proposed facility would adversely affect any waters of this state;

OAR 345-022-0160(1)(a)(B) requests an analysis of adverse effects on WOS from the Project. The Project will adversely affect one WOS, the Columbia River, as defined under OAR 141-0856-0510. This section describes the Applicant’s avoidance and minimization efforts, consistent with what has been reported in the JPA.

3.5.1 Avoidance and Minimization

The Applicant has worked to avoid as many potential impacts as possible and will continue to do so through Project construction. The Project avoids all impacts to wetlands and landward water resources. Impacts to the Columbia River are unavoidable, but avoidance and minimization efforts for these impacts have been and will continue to be implemented during Project design to the extent practicable.

Impacts to the Columbia River include temporary disturbances to the water associated with the installation of the high-voltage direct current (HVDC) cable and the permanent fill associated with the cable bundle and cable protection. The in-river HVDC transmission cables would be bundled together, the bundle being approximately 12 inches in diameter, consisting of two 6-inch-diameter conductor cables (one positive and one negative) and one approximately 1-inch-diameter fiber optic cable for communication (see the Background Information Exhibit). The cable protection required where preferred burial depth is not possible would consist of articulated concrete block mats or hydraulicly stable rock placed over the cable to keep it weighted down and protect it from damage (see the Background Information Exhibit).

The localized, temporary direct impacts to water quality result from cable installation in the Columbia River using hydroplow techniques, installation of the cofferdams at land-to-water transitions, and possible preinstallation dredging. Impacts to turbidity as a result of this activity are expected to be short term and localized. The Columbia River substrate temporarily disturbed through the hydroplow and three-sided wet cofferdams would resettle and the benthic community would become re-established and populated from nearby areas, within days or months. As such there are no proposed restoration activities.

There is also potential for an indirect impact of drilling fluids (i.e., inert clay-based materials) exiting the boreholes during horizontal directional drilling (HDD) installation. There would also be some localized permanent effects in the benthic zone (i.e., elevated temperature) when the cable is installed at a depth of 2 feet or less.

As part of site characterization, sediment sampling was conducted in the Columbia River in November 2024, based on a Sediment and Analysis Plan approved by the USACE Portland Sediment Evaluation Team. The sediment analysis identified the sediments as primarily course, heavy sand and sediment modeling shows the sand is not expected to drift or stay suspended in the water column. In addition, laboratory analysis results show that the sediment samples do not contain contaminants above agency thresholds. This indicates that the hydroplow activity will have minimal impacts to water quality in the Columbia River. The Project was sited to avoid known contaminated sites; therefore, temporary or permanent changes to toxic compounds or concentrations within the Columbia River are not expected.

Permanent impacts as a result of the removal and fill associated with the placement of the HVDC cable are listed below in Table 3 and Table 4.

Avoidance and minimization measures for all wetlands and landward waters include the following:

- Using HDD to transition from land to water segments, avoiding disturbance to riparian upland areas.
- Using trenchless installation methods to install under Willamette River, Oregon Slough (between Hayden Island and West Portland Harbor), and Columbia Slough, thereby, avoiding all waters other than the Columbia River.
- Siting the cable in paved areas and using HDD to minimize wetland impacts.
- Placing HDD areas to minimize temporary disturbance to wetlands areas with woody vegetation.
- Using existing roads and cleared areas and siting HDD laydown areas outside woody riparian areas, to shorten restoration recovery.
- Restoring site post construction to match or improve pre-construction vegetation.
- Installing during the prescribed in-water work window when fish use is lower.

Additional avoidance and minimization efforts for the potential for discharges to waters include:

- Obtaining and complying with erosion control permit(s).
- Preparing and adhering to a plan for inadvertent loss of drilling fluids.
- Ongoing monitoring of sediment and water quality during construction. Adjusting installation methods, as needed, to meet standards.

- Undertaking a sediment characterization to inform sediment transport and disposal approach.

Avoidance and minimization efforts for the HVDC cable within the Columbia River include:

- Siting the cable in or adjacent to the mid-channel of the Columbia River, avoiding the more ecologically productive near shore and shallow area habitats.
- Siting the cable to minimize work in historic shorelines (i.e., areas inundated by the dams), that may have a higher potential for cultural resources.
- Installing during the prescribed in-water work window when fish use is lower.

3.5.2 Continued Assessment of Impacts

The Applicant will continue to adjust the location of Project components to avoid and minimize impacts to WOS to the extent practicable. Certain areas along the transmission line survey area were not accessible during the field effort. These areas will be surveyed prior to construction after access has been obtained. The Applicant anticipates avoiding wetlands and streams identified along these areas during transmission line construction.

3.5.3 Significance of Impacts (OAR 345-022-0160(1)(a)(C)

(C) A description of the significance of potential adverse impacts to each feature identified in (A), including the nature and amount of material the applicant would remove from or place in the waters analyzed in (B);

The work within WOS consists of installing a cable bundle and related actions within the bed of the Columbia River. Cable installation via HDD is proposed under the bed of the Willamette River and the Columbia Slough. Work within WUS includes:

- Burying 78.3 miles of a 12-inch HVDC cable bundle in the bed of the Columbia River.
- Protecting cable, consisting of rock or articulated concrete blocks where the cable might be buried less than 5 feet deep. The cable protection footprint would be up to 8 feet wide over a total length of 2.4 miles.

To support installation, the project would require the following:

- Four temporary land-to-water transition areas that facilitate transition from uplands to the water. Three-sided wet cofferdams (70 feet x 300 feet) would be used to isolate the work area and riverbed substrate would be removed from inside the wet cofferdam totaling up to 32,644 cubic yards. The Applicant proposes to side cast channel substrate adjacent to the cofferdams.
- Pre-installation dredging of material over a length of 1,650 linear feet and 24 feet wide to facilitate required depths of cable installation in the navigation channel prism. This material would be side cast outside the navigation channel prism.
- Eight geotechnical borings totaling 48 cubic yards removal for off-site sampling and analysis.
- Removal and fill volumes and dimensions are described in Table 3 and Table 4.

Table 3. Removal Quantities Associated with the Placement of the HVDC Cable

Wetland / Waterbody Name	Removal Dimensions					Time Removal is to remain	Material
	Length (ft.)	Width (ft.)	Depth (ft.)	Area (sq.ft. or ac.)	Volume (c.y.)		
Columbia River	413,318	2	10	19 ac.	306,162	Temporary	Channel substrate
Columbia River	300	70	10	1.93 ac.	32,644	Temporary	Channel substrate and sheet pile
Columbia River	2	2	50	26 sq. ft.	48	Permanent	Channel substrate
Columbia River	1,650	20	3	0.92 ac.	4,500	Temporary	Channel substrate

Ft.=feet; ac.=acre; sq.ft.=square feet; c.y.=cubic yard

Table 4. Fill Quantities Associated with the Placement of the HVDC Cable

Wetland / Waterbody Name	Fill Dimensions					Time Fill is to remain	Material
	Length (ft.)	Width (ft.)	Depth (ft.)	Area (sq. ft. or ac.)	Volum e (c.y.)		
Columbia River	413,318	1	1	9.50 ac.	15,627	Permanent	HVDC cable bundle (buried)
Columbia River	13,000	8	2.5	2.4 ac.	7,500	Permanent	Rock or articulated concrete block (surface)
Columbia River	413,318	2	10	19 ac.	306,162	Temporary	Channel substrate
Columbia River	300	70	10	1.93 ac.	32,644	Temporary	Channel substrate and sheet pile
Columbia River	2,000	20	3	40,000 sq. ft.	4,500	Temporary	Channel substrate

Ft.=feet; ac.=acre; sq.ft.=square feet; c.y.=cubic yard

Permanent fill material would consist of the HVDC cable materials and cable protection (i.e., stone or articulated concrete blocks). Temporary fill would include channel substrate and sheet piles. If stone is used, materials would be sourced from manufacturing and/or permitted sources (i.e., quarries).

3.6 Evidence that Removal-Fill Permit Need Not Be Issued (OAR 345-022-0160(1)(a)(D))

(D) If the proposed facility would not need a removal-fill authorization, an explanation of why no such authorization is required for the construction and operation of the proposed facility;

The Project will require a Removal-Fill Permit. Temporary and permanent removal and fill of material will be required within the Columbia River. The quantities and types of temporary and permanent removal fill volumes are shown in Section .

3.7 Information Supporting Issuance of Removal-Fill Permit (OAR 345-022-0160(1)(a)(E))

(E) If the proposed facility would need a removal-fill authorization, information to support a determination by the Council that the Oregon Department of State Lands should issue a removal-fill permit, including information in the form required by the Department of State Lands under OAR Chapter 141 Division 85;

The Applicant has and will continue to provide DSL with sufficient information outlined in the OAR Chapter 141 Division 85 to obtain a Removal-Fill Permit. DSL will submit a draft Removal-Fill Permit to Oregon Department of Energy (ODOE) to be included as an attachment to the draft proposed order.

3.8 Mitigation and Monitoring Program (OAR 345-022-0160(1)(a)(F))

(F) A description of proposed actions to mitigate adverse impacts to the features identified in (A) and the applicant's proposed monitoring program, if any, for such impacts.

The Applicant designed the current proposed layout specifically to avoid impacts to wetlands and waters and identified additional avoidance and minimization methods and efforts for use during construction. The resulting impacts to the Columbia River as a result of the Project have yet to be assigned mitigation. The Applicant will work with tribes, resource agencies, and landowners during the permitting process to identify relevant and scale appropriate mitigation and/or off-setting actions for the Project.

This section describes the avoidance and minimization measures used during design as well as measures that will be used during construction to avoid potential impacts. No adverse impacts to WOS would occur.

3.8.1 Avoidance and Minimization

The Applicant has and will continue to design the Project to avoid impacts to wetlands and waters to the extent practicable. The mitigation proposed here is consistent with what is recorded in the Section 404 application.

Mitigation for impacts to the Columbia River will be evaluated for water quality, noise, and visual disturbance. In water, most (i.e., approximately 97 percent) Project impacts would be temporary and transient. Recovery to baseline conditions and functions is expected from days (water quality, noise, visual disturbance) to months (benthic communities).

The Applicant does not currently propose restoration for work in the Columbia River to address temporary disturbances, because the river substrate would resettle and the benthic community would become reestablished and populated from nearby areas.

Two locations have been identified where the cable cannot be installed below 5 feet and/or will require cable protection. This scenario may occur in two locations at river mile (RM) 121.5 (known utility crossing of two 20-inch gas pipelines) and RMs 185.8-187 and RMs 187.5 to 188.7 (deep section of river with bathymetric indications of steeper banks and potentially rocky river bottoms).

In these areas, shallow burial and cable protection would only be used if riverbed conditions and existing pipeline elevations limit depth. There is uncertainty related to the need for shallow burial/cable protection at RM 121.5, because the elevation of the two 20-inch pipelines has not been identified, and between RM 185.8 and 188.7, because of limited mapping and observable riverbank characteristics. Between RM 185.8 and 199.7, there appears to be potential for limited sediment deposition or presence of bedrock. However, substrate depth and type have yet to be identified. Additional geophysical surveys will be completed prior to construction to further ascertain substrate depth and type.

This shallow burial and/or cable protection has the potential to affect sediment continuity and biodiversity functions within a localized area. At RM 121.5, the substrate consists of sands and soils, and the cable protection (approximately 8 feet wide by 600 feet long) would introduce different substrate that may alter the benthic community or sediment continuity in that specific area. At RMs 185.8 through 188.7, if cable protection is needed, it would be due to a rocky substrate, in which case, the hydraulically stable cable protection is expected to closely mimic the natural substate.

Changes to geomorphic functions from the Project at a reach scale are not anticipated. There is potential for elevated sediment temperature in the benthic zone if the cable is buried less than 2 feet below the mudline. Elevated temperatures could be present over a 16-inch-diameter area, totaling 0.4 acre, across the Project area. This temperature change may affect the benthic community and cause sediment dwelling fish (e.g., lamprey) to avoid the area. The Applicant is pursuing the identification of mitigation or off-setting actions to address Project impacts. Examples of actions could include:

- Removing anthropogenic debris or materials (e.g., derelict vessels, waste, etc.)
- Improving habitat
- Funding to support studies

3.8.2 Environmental Training

The Applicant would implement the following measures during construction to avoid impacts:

- Develop an environmental awareness course for the construction contractors that will provide information on the sensitive wetland and stream resources present on site, the exclusion flagging/signing, permit requirements, and other environmental issues.

- Require construction site personnel to attend the environmental awareness course in conjunction with hazard and safety training prior to working on-site. The Applicant's construction contractor will maintain a list of on-site construction personnel who have received the training.

3.9 Required Authorization (OAR 141-085-0565)

OAR 141-085-0565 provides the framework for Department [DSL] Determinations and Considerations in Evaluating Individual Permit Applications. The provided JPA is an application for an individual removal-fill permit which provides information requested by the DSL to allow the Department to make a permit decision.

3.10 Lower Willamette River Management Plan (OAR 141-080-105)

Under OAR 141-080-105, DSL considers the Project's compliance with the Lower Willamette River Management Plan. The Project does comply with the Lower Willamette Management Plan as there will be no impacts to shallow water, surface water, the existing navigable channel, designated water surface areas for existing and future river dependent and river related development, public access and riverbank rehabilitation, harbor line, water surface areas and their appearance, water quality, or public trust values.

4 Description of Water Use (OAR 345-022-0160(1)(b)(A))

(b) Information about anticipated water use during construction and operation of the proposed facility. The applicant must include:

(A) A description of the use of water during construction and operation of the proposed facility.

RESPONSE

4.1 Construction

During construction of the converter stations, water would be required for dust control, compaction, and concrete mixing for building and structure foundations. During high-voltage direct current (HVDC) and high-voltage alternating current (HVAC) underground cable placement, water would be required for concrete casings in trenches and for mixing drilling mud for horizontal directional drilling (HDD). During HVDC in-river cable placement, water will be required to operate the hydroplow.

4.2 Operations

During operation, water would be required daily at each converter station for the control room with basic facilities (bathroom/kitchen).

4.3 Water Sources and Amounts (OAR 345-022-0160(1)(b)(B))

(B) A description of each source of water and the applicant's estimate of the amount of water the facility will need during construction and during operation from each source under annual average and worst-case conditions.

RESPONSE

The Applicant's third-party construction contractor would be responsible for identifying water sources and obtaining required permits or approvals prior to construction. It is anticipated that water needed during construction would be obtained from the City of The Dalles and the City of Portland under existing municipal water rights. The Applicant has contacted the City of The Dalles and the City of Portland, who each have indicated a willingness and ability to supply the amount of water needed during construction and operations. Attachment 3 contains a record of communication with the City of The Dalles and the City of Portland indicating their ability to provide water during construction and operation.

4.3.1 Construction

During construction, the Project would require an anticipated maximum of approximately 1,250,336 gallons of water. The water would be used for constructing the converter stations, for concrete casings in trenches, and for HDD to transition the cables from land to water, under roadways in The Dalles, and under the Willamette River. As described in the Background Information Exhibit, the converter stations would be built at the same time as the transmission line and would take approximately 2.5 years (30 months). The underground transmission cable would be installed over approximately 6 months and the in-river transmission cable installation would occur over approximately 4 months, from roughly November 2026 to February 2027, to follow the in-water work windows on the Columbia River for Oregon and Washington.

Table 5. Water Requirements during Construction

Proposal component	Water use(s)	Construction duration	Monthly water use (in gallons)	Total water use (in gallons)
The Dalles, Oregon				
Eastern Converter Station	Concrete, site grading/compaction, and dust suppression	30 months	7,500	225,000
HVDC cable placement via trench	Concrete casing	6 months	15,642	93,856
Cable placement via HDD	Drilling mud	5 days per HDD	N/A	24,200
			The Dalles Total	**343,056**
Portland, Oregon				
Western Converter Station	Concrete, site grading/compaction, and dust suppression	30 months	7,500	225,000
HVAC cable placement via trench	Concrete casing	6 months	43,733	262,400

Proposal component	Water use(s)	Construction duration	Monthly water use (in gallons)	Total water use (in gallons)
HVDC cable placement via trench	Concrete casing	6 months	13,195	79,168
Cable placement via HDD	Drilling mud	5 days per HDD	N/A	191,400
			Portland Total	**757,968**
			Total	**1,250,336**

Construction of the converter stations would require approximately 450,000 gallons of water (225,000 gallons per converter station) for dust control, compaction, and concrete mixing for building and structure foundations. It is anticipated that up to 250 gallons per day per converter station would be used over an approximately 30-month construction period, which equals 7,500 gallons per month from the City of The Dalles and 7,500 gallons per month from the City of Portland. Daily water use would vary depending on the timing of construction and the weather. Water would be supplied from an existing source with a valid water right.

During the HVDC underground cable placement, approximately 388,624 gallons of water would be required for concrete casings in trenches and for mixing drilling mud for HDD; approximately 173,024 gallons would be required for casings in trenches and approximately 215,600 gallons would be required for HDD drilling mud. A geotechnical investigation completed for final design would determine HDD drilling durations, but for estimating purposes, an average of 5 days per HDD drill is used. During HVAC cable placement, approximately 262,400 gallons of water would be required for concrete casings in trenches.

During HVDC in-river cable placement, water from the Columbia River would be required to operate the hydroplow. The amount of water needed to operate the hydroplow is unknown at this time. However, water from the Columbia River would be pumped on the vessel (barge or similar) through a screen and into the hydroplow line, returning to the river (i.e., not a consumptive use).

The worst-case water use is estimated to require 50 percent additional water. Based on this assumption, a “worst-case” water estimate for the Project during construction would be 1,875,504 gallons over a 2.5 year or 30-month duration.

4.3.2 Operations

During operation, each converter station would require approximately 150 gallons of water per day for the basic facilities (bathroom/kitchen) in the control rooms. This was determined using conservative calculated estimates using 12 gallons per day multiplied by 12 employees[1]. At the western converter station, the City of Portland would provide water. At the eastern converter station, an on-site well would provide water. Water use would be much less than 5,000 gallons per day, which is considered an exempt use under Oregon Revised Statutes (ORS) 537.545(1)(f), therefore, the Applicant is not required to obtain a new water right permit from the Oregon Water Resources Department. The Applicant anticipates that a new exempt well would be drilled for the purpose of supplying water to the eastern converter station control room.

[1] Estimating Methods for Determining End-Use Water Consumption | Department of Energy

4.4 Wastewater and Loss (OAR 345-022-0160(1)(b)(C))

(C) A description of each avenue of water loss or output from the facility site for the uses described in (A), the applicant's estimate of the amount of water in each avenue under annual average and worst-case conditions and the final disposition of all wastewater.

RESPONSE

The Applicant does not anticipate any discharge of water from the Project. During construction, water loss would occur primarily through evaporation and infiltration from wetted construction surfaces. Because of the relatively low rates of water use and application and adherence to the National Pollutant Discharge Elimination System (NPDES) 1200-C permit and associated erosion and sediment control plan (ESCP), it is assumed that no runoff would occur outside the construction site. Water used for foundations would remain in the concrete mix. The Waste Minimization Exhibit addresses management and handling of concrete truck washout. No water from the Project would be discharged into wetlands, lakes, rivers, or streams. During construction, sanitary waste would be collected on site in portable toilets, provided and maintained by a licensed subcontractor.

During operation, approximately 12 full-time employees would be located at each converter station; minimal discharges of domestic wastewater are anticipated. The western converter station would discharge to the municipal system and stormwater gravity main within the utility easement that abuts N Leadbetter Road. It is unknown if the eastern converter station would discharge to a municipal system or require a licensed, on-site septic system; however, significant impacts to community sewer systems are not anticipated.

4.5 Thermal Power Plants (OAR 345-022-0160(1)(b)(D))

(D) For thermal power plants, a water balance diagram, including the source of cooling water and the estimated consumptive use of cooling water during operation, based on annual average conditions.

RESPONSE

The Project is not a thermal power plant; therefore, this standard is not applicable.

4.6 Explanation of Lack of Need for Groundwater/Surface Water Permit or Water Right Transfer (OAR 345-022-0160(1)(b)(E))

(E) If the proposed facility would not need a groundwater permit, a surface water permit or a water right transfer, an explanation of why no such permit or transfer is required for the construction and operation of the proposed facility.

RESPONSE

The Project does not require groundwater permits, surface water permits, or water right transfers. As discussed above, water for construction would be obtained from municipalities with existing valid water rights. Operations water use would be minimal and qualify as exempt under ORS 537.545(1)(f), which allows certain industrial or commercial uses of up to 5,000 gallons per day. Exempt industrial water use includes drinking, flushing toilets, using sinks, and other general industrial uses. The Applicant expects to rely on an exempt well allowed under ORS 537.545 to provide water to the eastern converter station. For the western converter station, the City of Portland would provide water.

4.7 Information to Support Issuance of Groundwater/Surface Water Permit or Water Right Transfer (OAR 345-022-0160(1)(b)(F))

(F) If the proposed facility would need a groundwater permit, a surface water permit or a water right transfer, information to support a determination by the Council that the Water Resources Department should issue the permit or transfer of a water use, including information in the form required by the Water Resources Department under OAR chapter 690, divisions 310 and 380.

RESPONSE

No groundwater permits, water rights, or surface water permits are needed; therefore, this standard is not applicable.

4.8 Mitigation Measures (OAR 345-022-0160(1)(b)(G))

(G) A description of proposed actions to mitigate the adverse impacts of water use on affected resources.

RESPONSE

Construction and operation of the facility would not have adverse impacts to water use, as described above; therefore, mitigation measures are not proposed.

5 Noise (OAR 345-022-0160(2))

5.1 Acoustic Terminology

Sound is what is heard. Sound is defined as a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure creating a sound wave and reaching our ears to exert tiny pressures on our eardrums. Sound energy is characterized by the properties of sound waves, which are frequency, wavelength, period, amplitude, and velocity. When sound becomes noise is a highly subjective determination, largely dependent on the following factors (not provided in any specific order of importance):

- Magnitude or intensity of noise with a frequency weighting to human hearing response;
- Duration of the intruding noise;
- Time of year (windows open or closed – outdoor exposure and location of outdoor activities);

- Time of day (higher sensitivities may occur at night);
- Existing ambient sound levels in the community when the noise is not present, including effects of wind generated noise (eolian) and masking by foliage in areas with established tree stands during elevated wind conditions;
- History of prior exposure to the same or similar noise sources;
- Existence of a pure tone, tonal, or impulsive character in the sound;
- Level of community outreach and notification of schedule of potential noisy periods (i.e., construction activities);
- Predetermined attitudes towards a proposed project or activity; and
- Facility benefits including private and public economic incentives.

The unit of sound pressure is the decibel (dB). The decibel scale is logarithmic to accommodate the vast dynamics of sound intensities to which the human ear is subjected. A logarithmic scale is formed by taking 20 times the base logarithm (base 10) of the ratio of two sound pressures[2]: the measured sound pressure divided by a reference sound pressure. The reference sound pressure is 20 micro-Pascals, the approximate threshold of human perception to sound at a frequency of 1,000 hertz (Hz; 0 dB). The loudness of a sound is determined by the source sound power level (L_W), the total acoustic power radiated by an object or structure measured in decibels referenced to 10_{-12} watts and is independent of environmental conditions. The received sound pressure level (L_P) includes the effects of propagation and attenuation that occur between source and receptor location.

Sound is typically composed of acoustic energy spanning across a wide range of frequencies, referred to as the frequency spectrum; however, the human ear does not interpret the sound level from each frequency equally as loud. To compensate for the physical response of the human ear, the A-weighting filter is commonly used for describing environmental sound levels. The A-weighted sound level is the most widely accepted descriptor for community noise assessments. A-weighting filters the frequency spectrum of sound levels to correspond to the human ear frequency response (attenuating low and high frequency energy like the way people hear sound). Sound levels that are A-weighted to reflect human response are presented as dBA. Table 6 shows how this scale is related to some common noise sources and environment. Unweighted sound levels are referred to as linear, or dBL. An inherent property of the logarithmic decibel scale is that the sound pressure levels of two separate sounds are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is a 3-dB increase (or 53 dB), not an arithmetic doubling to 100 dB. The human ear does not hear changes in the sound pressure level as equivalent changes in perceived loudness.

Scientific research demonstrates the following general relationships between sound level and human perception for two broadband sound levels with identical (or very similar) frequency characteristics are valid:

- **1 dBA** increase or decrease is a non-perceptible change in an environmental sound level.

2 Or, alternatively, 10 times the base-10 logarithm of the ratio of two powers.

- **3 dBA** increase or decrease is a doubling or halving of acoustic energy, respectively, and it corresponds to the threshold of perceptibility of change in an ideal listening environment such as an audiology booth. In practice, the average person may or may not be able to distinguish a 3 dBA change in environmental sound levels outdoors.
- **5 dBA** increase or decrease is described as a perceptible change in an environmental sound level and is a clearly discernable change in an outdoor environment.
- **10 dBA** increase is a tenfold increase in acoustic energy but is perceived as only a doubling in loudness (i.e., the average person will judge a 10 dBA change in sound level to be twice or half as loud, depending on if it is a 10 dBA increase or decrease).

Table 6. Sound Pressure Levels (LP) and Relative Loudness

Noise Source or Activity (distance from source)	Sound Level (dBA)	Subjective Impression	Relative Loudness (Perception of Different Sound Levels)
Jet aircraft takeoff from carrier (50 feet)	140	Threshold of pain	64 times as loud
50-hp siren (100 feet)	130	-	32 times as loud
Loud rock concert near stage Jet takeoff (200 feet)	120	Uncomfortably loud	16 times as loud
Float plane takeoff (100 feet)	110	-	8 times as loud
Jet takeoff (2,000 feet)	100	Very loud	4 times as loud
Heavy truck or motorcycle (25 feet)	90	-	2 times as loud
Garbage disposal Food blender (2 feet) Pneumatic drill (50 feet)	80	Loud	Reference loudness
Vacuum cleaner (10 feet)	70	Moderate	1/2 as loud
Passenger car at 65 mph (25 feet)	65		--
Large store air-conditioning unit (20 feet)	60		1/4 as loud
Light auto traffic (100 feet)	50	Quiet	1/8 as loud
Quiet rural residential area with no activity	45		--
Bedroom or quiet living room or bird calls	40	Faint	1/16 as loud
Typical wilderness area	35		--
Quiet library, soft whisper (15 feet)	30	Very quiet	1/32 as loud
Wilderness with no wind or animal activity	25	Extremely quiet	--
High-quality recording studio	20		1/64 as loud
Acoustic test chamber	10	Just audible	--
--	0	Threshold of hearing	--

Source: Adapted from Beranek 1988 and USEPA 1971
Notes: dBA=A-weighted decibel; mph=miles per hour

5.2 Acoustic Metrics

Noise can be measured, modeled, and presented in various formats. The most common sound metrics used in community sound surveys are the equivalent sound level (L_{eq}), the day-night sound level (L_{dn}), the maximum sound level (L_{max}), and statistical sound levels (L_n). The sound metrics that were employed in the Project acoustic assessment are the following:

The L_{eq} value is the energy averaged sound level and is defined as the steady, continuous sound level, over a specified time, which has the same acoustic energy as the actual varying sound levels over the same time. The L_{eq} has been shown to provide both an effective and uniform method for comparing time varying sound levels that typically occur and have been used routinely in assessing construction and transportation noise studies.

The L_{dn} is essentially a 24-hour L_{eq}, with nighttime sound levels (from 10:00 pm until 7:00 am) receiving a 10-dB penalty to account for increased sensitivity to noise during the night.

The L_n descriptor is a statistical sound level, which identifies the sound level that is exceeded "n" percent of the time over a measurement period The L_{10} is the A-weighted sound level that is exceeded for 10 percent of the time during a specified measurement period. For example, during a 100-minute period, the L_{10} would be the sound level that was exceeded by other sound levels for 10 minutes of the 100-minute measurement period. The L_{50} is the median sound level. During a given period, the measured sound levels are greater than the L_{50} half of the time, and less than the L_{50} half of the time.

The L_{max} is the maximum instantaneous sound level as measured during a specified time period. It can also be used to quantify the maximum sound pressure level generated by a piece of equipment or an activity that normally varies with time or the maximum allowable noise sound pressure level as set as a regulatory criterion or manufacturers maximum source level emission level.

These sound metrics are broadband, meaning they include sounds at all audible frequencies. In addition to broadband, sound level data typically include an analysis of the various frequency components of the sound spectrum to determine tonal characteristics. The unit of frequency is Hz, measuring the cycles per second of the sound pressure waves, and typically the frequency analysis includes 10 octave bands from 31 Hz (low frequency) to 16,000 Hz (high frequency).

At a converter station, noise-generating equipment is expected to operate at a steady state. Therefore, the predicted L_{eq} levels from the station may be treated as representative of the station L_n and L_{max} levels.

5.3 Regulatory Environment

This section describes the noise-related requirements that may be applicable to the Cascade Renewable Transmission Project (Project) at the federal, state, county, and local levels. The acoustic assessment described in this exhibit is limited to potential noise exposure of off-site receptors and not potential on-site noise exposure as regulated by the United States Occupational Health and Safety Administration (OSHA).

5.3.1 Federal Noise Regulations

No noise-related federal regulations apply to this project. The U.S. Environmental Protection Agency (USEPA) offers non-binding guidelines for noise levels, including a maximum L_{dn} of 55 dBA in residential areas to avoid interference with sleep. However, the Noise Control Act of 1972 reserves primary responsibility for setting noise limits to state and local authorities.

5.3.2 State Noise Regulations

OAR Chapter 340, Division 35 regulations, which are incorporated into the Oregon Energy Facility Siting Council's (OR EFSC) general standard of review at OAR 345-022-0000, prescribes noise limits applicable throughout the State of Oregon, with specific requirements in OAR 340-035-0035, "Noise Control Regulations for Industry and Commerce." This regulation provides guidance for new noise sources on previously used and previously unused sites:

OAR 340-035-0035(1)(b)(A) New Sources Located on Previously Used Sites. No person owning or controlling a new industrial or commercial noise source located on a previously used industrial or commercial site shall cause or permit the operation of that noise source if the statistical noise levels generated by that new source and measured at an appropriate measurement point, specified in subsection (3)(b) of this rule, exceed the levels specified in Table 8, except as otherwise provided in these rules.

(B) New Sources Located on Previously Unused Site. No person owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site shall cause or permit the operation of that noise source if the noise levels generated or indirectly caused by that noise source increase the ambient statistical noise levels, L10 or L50, by more than 10 dBA in any one hour, or exceed the levels specified in Table 8, as measured at an appropriate measurement point, as specified in subsection (3)(b) of this rule, except as specified in subparagraph (1)(b)(B)(iii).[3]

RESPONSE

Table 7 gives limits for statistical noise levels as summarized below. All limits are presented in terms of dBA. The noise limits apply at "appropriate measurement points" on "noise sensitive property."[4] The appropriate measurement point is defined as whichever of the following is farther from the noise source:

- 25 feet toward the noise source from that point on the noise sensitive building nearest the noise source; or
- The point on the noise sensitive property line nearest the noise source.

"Noise sensitive property" is defined as "real property normally used for sleeping, or normally used as schools, churches, hospitals, or public libraries. Property used in industrial or agricultural activities is not Noise Sensitive Property unless it meets the above criteria in more than an incidental manner."

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[3] Subparagraph (1)(b)(B)(iii) applies to wind energy facilities only.

[4] OAR 340-035-0035(3)(b)

Table 7. Industrial and Commercial Noise Standards

1-Hour Statistical Noise Level	Maximum Permissible Noise Levels (dBA)	
	Daytime (7am-10pm)	Nighttime (10pm-7am)
L_{50}	55	50
L_{10}	60	55
L_{1}	75	60

Source: OAR 340-035-0035, Table 8
Notes: dBA=A-weighted decibel

5.3.2.1 Exemptions to State Noise Regulations

OAR 340-035-0035(5) specifically exempts construction activity from the state noise standards and regulations, as indicated below. This section also provides an exemption for maintenance of capital equipment, the operation of aircraft (such as helicopters used in Project construction), and sounds created by activities related to timber harvest.

> ***OAR 340-035-0035(5) Exemptions:***
>
> *Except as otherwise provided in subparagraph (1)(b)(B)(ii) of this rule, the rules in section (1) of this rule shall not apply to:*
>
> *[section abridged for brevity]*
>
> *(b) Warning devices not operating continuously for more than 5 minutes;*
>
> *(g) Sounds that originate on construction sites.*
>
> *(h) Sounds created in construction or maintenance of capital equipment;*
>
> *(j) Sounds generated by the operation of aircraft and subject to pre-emptive federal regulation. This exception does not apply to aircraft engine testing, activity conducted at the airport that is not directly related to flight operations, and any other activity not preemptively regulated by the federal government or controlled under OAR 340-035-0045;*
>
> *(k) Sounds created by the operation of road vehicle auxiliary equipment complying with the noise rules for such equipment as specified in OAR 340-035-0030(1)(e);*
>
> *(m) Sounds created by activities related to the growing or harvesting of forest tree species on forest land as defined in subsection (1) of ORS 526.324.*

RESPONSE

5.3.2.2 Exceptions to State Noise Regulations

OAR 340-035-0035(6) allows for some exceptions to the state noise regulations. OAR 340-035-0035 (6)(d) applies to parties that have agreed to sign a waiver to allow for an exception of the noise regulations.

> ***OAR 340-035-0035 (6) Exceptions:***
>
> *Upon written request from the owner or controller of an industrial or commercial noise source, the Department may authorize exceptions to section (1) of this rule, pursuant to rule 340-035-0010, for:*
>
> *(a) Unusual and/or infrequent events;*

(b) Industrial or commercial facilities previously established in areas of new development of noise sensitive property;

(c) Those industrial or commercial noise sources whose statistical noise levels at the appropriate measurement point are exceeded by any noise source external to the industrial or commercial noise source in question;

(d) Noise sensitive property owned or controlled by the person who controls or owns the noise source;

(e) Noise sensitive property located on land zoned exclusively for industrial or commercial use.

RESPONSE

5.3.3 County and Municipal Noise Regulations

The City of Portland City Code, Chapter 18.10, establishes maximum permissible sound pressure levels based on land use of the noise source and noise receiver (Table 8). The code does not give an explicit sound level metric for these levels, so it may conservatively be assumed to be the L_{max}.

Table 8. City of Portland Permissible Sound Levels (dBA)

Zone Category of Source	Zone Category of Receiver (measured at property line)			
	Residential	Open Space	Commercial/ Mixed Use	Industrial
Residential	55	55	60	65
Open Space	55	55	60	65
Commercial/ Mixed Use	60	60	70	70
Industrial	65	65	70	75

Source: Portland City Code, Chapter 18.10, Figure 1
Note: During nighttime hours (10 am – 7 am), all sound level limits decreased by 5 dB
During all hours, sound level limits decreased by 5 dB for narrow band or steady sound (apply 1 only).

Note the decreases for nighttime and steady sound. Since the converter station would run steadily at all hours, noise limits are effectively decreased by 10 dB from those shown in Table 8).

Octave-band sound pressure limits may also apply if it is found that the frequency characteristics of the sound are such that the A-weighted levels specified above are inadequate to protect the public health, welfare, or safety.

When the property of the receiver is unoccupied, sound levels in excess of the limits are considered only as a technical violation of the standard. No citation would be issued in such instances, nor is corrective action required by the noise source.

The Portland City Code regulates construction noise as follows:

18.10.060 Construction Activities and Equipment

A. Maximum sound levels: No person shall operate any equipment or appurtenances thereto in commercial construction activities which exceeds 85 dBA, when measured at 50 feet (15.2 meters) from the source. This standard shall not apply to trucks (see Section 18.10.020), pile drivers, pavement breakers, scrapers, concrete saws and rock drills.

B. Night, weekend, and legal holidays limitation: From 6:00 p.m. to 7:00 a.m. the following morning, and 6:00 p.m. Saturday to 7:00 a.m. the following Monday, and on legal holidays, the permissible sound levels of Section 18.10.010 shall apply to all construction activities except by variance or for reasons of emergency. The exempted equipment of Section 18.10.060 A is not exempted during these hours. For purposes of this Subsection, construction activities on a public road within a zone shall be considered as taking place on private property within that zone.

C. The adjustments to permissible sound levels established in Section 18.10.010 B apply to Subsections A and B above.

D. All equipment used in commercial activities shall have sound control devices no less effective than those provided on the original equipment, and no equipment shall have an unmuffled exhaust.

E. All equipment used in commercial construction activities shall comply with pertinent standards of the U.S. Environmental Protection Agency.

F. Pile Drivers:

1. Notwithstanding Subsection B above, the permissible sound levels of Section 18.10.010 shall apply to pile drivers from 6 p.m. to 8 a.m. the following morning, and 6 p.m. Friday to 8 a.m. the following Monday, and on legal holidays.

2. The owner of a site on which pile driving will occur shall cause a notice to be mailed to all residences within 500 feet of the site. Mailing will occur no fewer than 30 days prior to the commencement of pile driving. The notice shall list the expected starting and ending dates for pile driving and give a telephone number for further information.

RESPONSE

Note that the 85 dBA maximum sound level for construction equipment is not cumulative; it applies to individual equipment only.[5] The adjustments for nighttime noise and narrow band or steady sound noted in Table 8 also apply to construction activities, as noted under heading C above.

Multnomah County does not have noise ordinances that would apply to this Project.

Title 8, Chapter 12 of the Hood River County Code sets forth noise limits of 65 dBA at any time and 55 dBA at night (10 pm – 7 am), when measured within 20 feet of a noise-sensitive facility. Noise-sensitive facilities are defined as lawfully sited dwellings and schools, hospitals, churches, and public libraries. Noise limits are for average sound levels (i.e., not L_{max}). Construction between 7 am and 7 pm is exempt.

Wasco County does not have noise ordinances that would apply to this Project.

The Dalles municipal code section 5.08.020 prohibits unreasonable noise, including construction between 8 pm and 7 am, except by special permit. Section 10.3.050.040 prohibits noise across property lines in excess of 60 dB. Metrics and decibel weighting are not specified, so an L_{max} limit of 60 dBA is assumed.

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[5] City of Portland. 2025. Accessed January 2025: https://www.portland.gov/code/18/10

5.4 Existing Conditions

To establish existing noise conditions near the proposed converter station sites, HDR Engineering, Inc. (HDR) performed 24-hour noise measurements near each site. The measurements were conducted between December 13 and 14, 2023. At each location, HDR used a Larson Davis Model 831C (LD 831C) real-time sound level analyzer to measure and store the noise measurement results. The LD 831C also continuously recorded a digital audio file on an external USB drive for the duration of the measurement. HDR recorded wind speed, wind direction, and temperature at each location using a Vaisala digital weather station. Weather station measurement data were also stored in the LD 831C. The analyzer and recorder systems were stored in a weather-resistant Pelican case. The microphone was situated at a height of approximately 5 feet. A windscreen covered the microphone, and the windscreen had a single spike on it to discourage birds from sitting on the windscreen.

Calibration checks were performed in the field prior to and upon completion of the measurement. The sound level meter and handheld calibrator meet Class 1/Type 1 precision requirements of the American National Standards Institute (ANSI) and International Electrotechnical Commission (IEC) standards. All instrumentation used to measure noise levels on this project is calibrated on a regular basis by an independent accredited calibration laboratory using standards traceable to the National Institute of Standards and Technology (NIST). The instrumentation was adjusted to a reference level traceable to NIST prior to transportation to the measurement site.

Measurement data was processed to remove periods of precipitation and wind in excess of 11 miles per hour (mph).

5.4.1 Portland Site

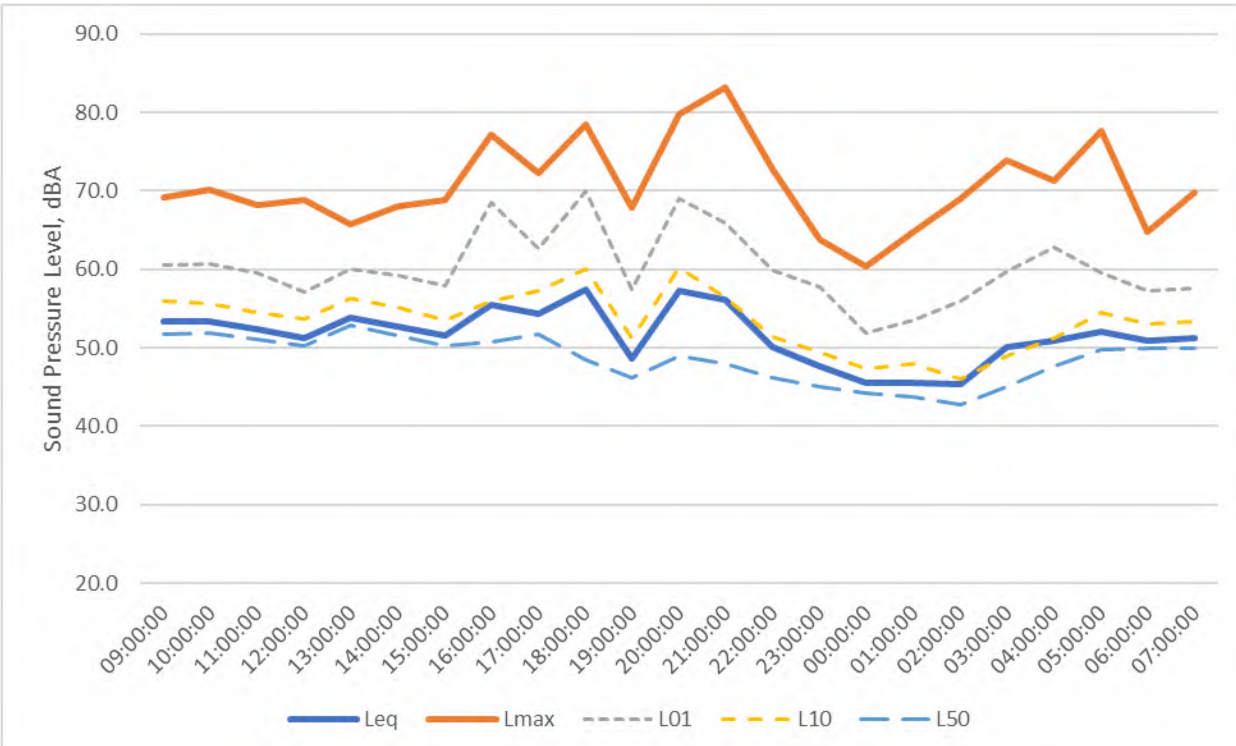
The proposed Portland converter station site is located in an industrial area that includes warehouses and Port facilities, and the noise environment is characterized by Port activities, including train and air traffic. Noise-sensitive land uses near the proposed converter station include walking paths along the Columbia Slough, which pass immediately adjacent to the site; the Bybee Lakes Hope Center, a homeless shelter and service center approximately 2,000 feet south of the site; and Kelley Point Park, approximately 3,500 feet to the north. The noise measurement location was on the converter station site, as this was deemed to be the most secure location for personnel and unattended equipment, while being reasonably representative of the noise environment at the nearby noise-sensitive areas, particularly the walking path. The noise measurement at the Portland converter station site occurred from 9 am on Wednesday, December 13 through 8 am on Thursday, December 14 (the measurement was ended 1 hour early due to rain). Measurement results at this location are summarized in Table 9 and Figure 1.

Table 9. Portland Site Existing Noise Measurement Summary

Noise Metric	Results (dBA)		
	Overall	Daytime (7am-10pm)	Nighttime (10pm-7am)
Hourly L_{eq} range	45-57	49-57	45-52
Hourly L_{max} range	60-83	66-83	60-78
Hourly L_{50} range	43-53	46-53	43-50
Hourly L_{10} range	46-60	51-60	46-54
Hourly L_1 range	52-70	57-70	52-63

Notes: dBA=A-weighted decibel

Figure 1. Portland Existing Noise Measurement, Dec 13-14, 2023



During the measurement, the state daytime L_{10} limit was exceeded during 2 hours and the nighttime L_1 limit was exceeded during 1 hour. Portland's L_{max} limit was exceeded in every hour, largely due to traffic and train noise.

5.4.2 The Dalles Site

The proposed The Dalles converter station site is located near existing substations operated by Bonneville Power Administration (BPA). Noise-sensitive land uses near the proposed converter station include homes along Fifteen Mile Road, approximately 850 feet to the north; an RV park approximately 3,000 feet to the northwest; and a veteran's care center, approximately 4,000 feet to the southwest. The noise measurement location was near the intersection of Columbia View Drive and Fifteen Mile Road, and was selected to represent the noise environment near the homes along Fifteen Mile Road, which are the nearest noise-sensitive receivers to the proposed converter station site. The noise measurement for the converter station site near The Dalles occurred from 11 am on

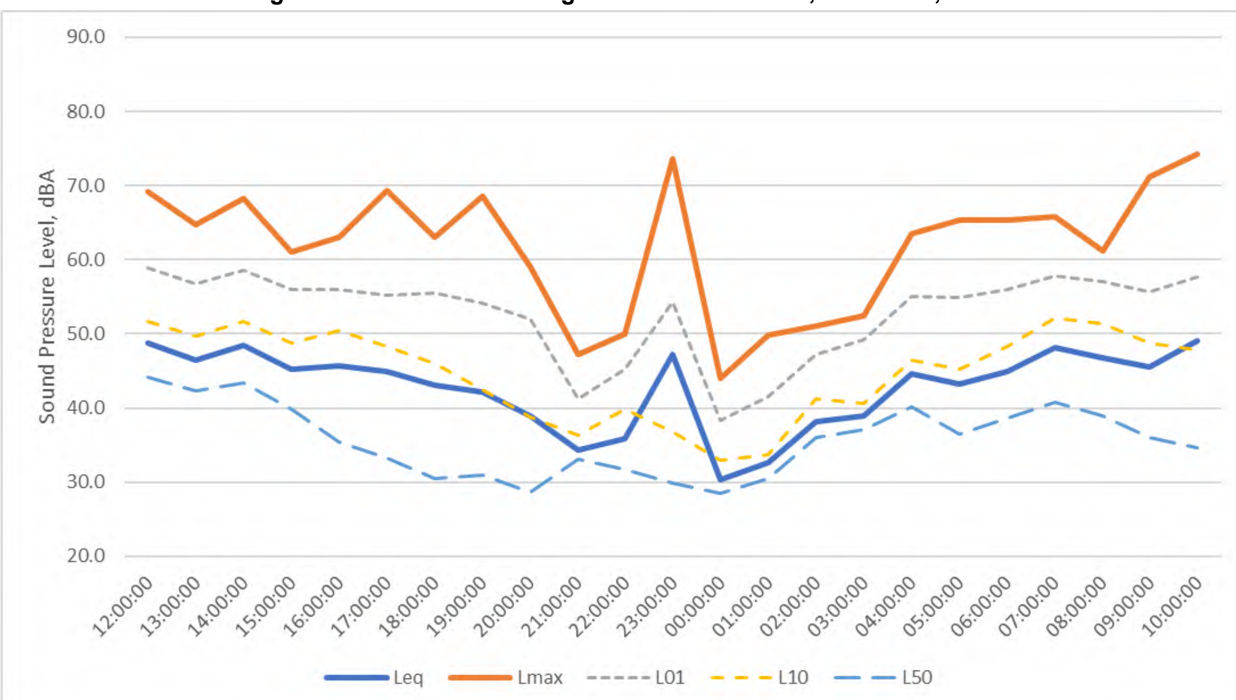
Wednesday, December 13 through 11 am on Thursday, December 14. Measurement results for this location are summarized in Table 10 and Figure 2.

Table 10. The Dalles Site Existing Noise Measurement Summary

Noise Metric	Results (dBA)		
	Overall	Daytime (7am-10pm)	Nighttime (10pm-7am)
Hourly L_{eq} range	30-49	34-49	30-47
Hourly L_{max} range	44-74	47-74	44-74
Hourly L_{50} range	29-44	29-44	29-40
Hourly L_{10} range	33-52	36-52	33-48
Hourly L_{1} range	38-59	41-59	38-56

Notes: dBA=A-weighted decibel

Figure 2. The Dalles Existing Noise Measurement, Dec 13-14, 2023



No exceedances of the state statistical limits were noted during the measurement period. A total of 17 hours had L_{max} levels in excess of The Dalles limit of 60 dBA, mostly due to traffic on adjacent streets and aircraft.

5.5 Predicted Noise Levels (OAR 345-022-0160(2)(a))

(2) Information about noise generated by construction and operation of the proposed facility, providing evidence to support a finding by the Council that the proposed facility complies with the Oregon Department of Environmental Quality's noise control standards in OAR 340-035-0035. The applicant must include:

(a) Predicted noise levels resulting from construction and operation of the proposed facility;

RESPONSE

5.5.1 Construction Noise Assessment

HDR reviewed potential noise associated with Project construction; however, according to OAR 340-035-0035(5)(g), sound originating from construction sites is exempt from state noise regulations.

Construction phases of the converter stations would include site preparation, building construction, and installation and pre-commissioning. Equipment used would include dozers, backhoes, excavators, trenchers, skid steers, dump trucks, derrick trucks, telehandlers, manlifts, concrete mixer trucks, cranes, graders, and rollers. Construction of the short segment of aboveground transmission line near the converter station near The Dalles would involve similar equipment to the construction of the converter station buildings.

Construction of buried and submerged transmission lines would involve horizontal directional drilling (HDD), horizontal auger boring (HAB), and the construction of temporary three-sided cofferdams. Cofferdam construction would involve barges with cranes and vibratory pile drivers, pumps, and dive boats with diver equipment, including air compressors. HDD/HAB drilling areas would include a drill rig, drill pipe handling equipment, pumps to manage drill fluid, and mixing machines to make the drilling mud. Receiving on water would be a barge, a tug, and dive boat with diver equipment including air compressors. Receiving on land would be pipe fusing equipment and several excavators to help pull the conduit and cables into the receiving pit. Cable laying operations on the river is not expected to be noticeably different from existing vessel traffic along the river. Open trenching on land would include a backhoe, front loader, dump truck, concrete mixer truck, grader, and roller.

Construction noise was not modeled; however, a list of construction phases and equipment with expected noise levels is provided for informational purposes in Table 11. The combined noise from the loudest two equipment types for each construction phase is also presented.[6] Figure 12 in the Background Information Exhibit shows locations of cofferdams and HDD sites.

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[6] The combination of the loudest two equipment types is presented instead of all equipment types because construction equipment operation is not constant, so it would be unlikely for all equipment to be operating simultaneously. Presenting the loudest two equipment types operating simultaneously is a conservative but realistic scenario.

Table 11. Typical Sound Levels for Construction Equipment

Noise Source	Quantity	Leq at 50 feet, dBA (single)	Leq at 50 feet, dBA (combined)	Leq at 1,000 feet, dBA (combined)
Converter Station Construction				
Site Preparation (3 months)				
Dozer	1	80	80	54
Backhoe	2	76	79	53
Excavator	1	77	77	51
Trencher	1	85	85	59
Skid Steer	1	72	72	46
Dump Truck	2	82	85	59
Derrick Truck	1	88	88	61
Telehandler	1	81	81	55
Manlift	2	72	75	49
Concrete Mixer Truck	2	81	84	58
Crane	1	74	74	48
Loudest 2 pieces of equipment		**89**		**63**
Building Construction (8 months)				
Crane	2	2	74	77
Telehandler	2	2	81	84
Manlift	4	4	72	78
Loudest 2 pieces of equipment		**85**		**59**
Installation/Pre-Commissioning (15 months/2 weeks for Grader/Dozer/Roller)				
Manlift	3	72	77	51
Telehandler	1	81	81	55
Forklift	1	81	81	55
Grader	1	79	79	53
Dozer	1	80	80	54
Compacter (roller)	1	82	82	56
Loudest 2 pieces of equipment		**85**		**59**
Coffer Dams (1 month per site)				
Crane	1	74	74	48
Compressor	4	66	72	46
Pump	4	73	79	53
Vibratory Pile Driver	1	99	99	73
Loudest 2 pieces of equipment		**99**		**73**
HDD/HAB (1 month per site)				
Drill Rig	1	87	87	61
Drum Mixer	2	66	69	43
Pumps	2	73	76	50
Compressor	2	66	69	43
Excavator	1	77	77	51

Noise Source	Quantity	Leq at 50 feet, dBA (single)	Leq at 50 feet, dBA (combined)	Leq at 1,000 feet, dBA (combined)
Welding	1	71	71	45
Loudest 2 pieces of equipment		**87**		**61**
Open Trenching (variable, moving site)				
Backhoe	1	76	76	50
Front Loader	1	72	72	46
Dump Truck	1	82	82	56
Concrete Mixer Truck	1	81	81	55
Grader	1	78	78	52
Compacter (roller)	1	82	82	56
Loudest 2 pieces of equipment		**85**		**59**

Source: Burge 2022, CAT 2024
Notes: dBA=A-weighted decibel

5.5.2 Operational Noise Assessment

Sound generated during Project operation would include that associated with the converter stations and aboveground portion of the transmission lines. As discussed in Section 5.6.2 below, buried and underwater portions of the transmission cable are not expected to generate audible noise5.5.2.2; therefore, no assessment of operational noise from those segments is provided.

Converter station noise was modeled using Cadna-A environmental noise modeling software. Cadna-A incorporates calculations from ISO 9613-2—the international acoustical standard for outdoor sound propagation (ISO 1996). ISO 9613-2 is considered accurate to within 3 dB across 1,000 meters (3,280 feet). The following assumptions were used for the modeling:

- Topography was included in the model out to 1 mile from each site.
- Large buildings were included in the model (warehouses near the Portland site).
  - Up to two reflections off of buildings are included.
- The ground was given a ground factor of 0.1 for the Portland site and 0.5 for The Dalles site, where 0 is fully reflective (e.g., pavement, open water) and 1 is fully absorptive (e.g., vegetated areas, soft soil).
- Weather conditions were set at ISO 9613 standard values of 10 C and 70% relative humidity, which are representative of the project area.
- Based on ISO 9613, Cadna-A automatically assumes that each receiver is downwind from each source (simultaneous downwind propagation in all directions).

Each converter station would include noise-generating equipment as shown in Table 12**.** Octave-band sound power data was not available for the equipment, so the given dBA levels were modeled at 500 Hz in accordance with ISO 9613-2.

Table 12. List of Equipment Sound Power Levels for each Station

Noise Source	Quantity	Sound Power Level (dBA re: 1 pW)
Air Fan Pump Room	1	92
Air Handling Unit Air Supply	3 (The Dalles) 6 (Portland)	90
Air Handling Unit Case Breakout	3 (The Dalles) 6 (Portland)	68
Auxiliary Transformer (400V)	2	75
Chiller Control Building	1	79
Chiller Converter Hall	1	92
Converter Cooler	1	98
Converter Transformer	3	92
Smoothing Reactor	6	73
	Total:	**102**
Source: Siemens		

Notes: dBA=A-weighted decibel

The site layout of each converter station will not be finalized until final design. The equipment was modeled with the interim layouts shown in Attachment 5.

5.5.2.1 Transmission Line Noise

An approximately 500-foot-long segment of overhead high-voltage alternating current (HVAC) transmission wire would connect the converter station near The Dalles to the existing Big Eddy substation. Corona noise is generated when high-voltage power lines discharge energy into the surrounding air. This noise is typically heard as a crackling or hissing, and a hum component at the frequency of the alternating current in the lines can sometimes be heard as well. The noise is strongly affected by atmospheric conditions such as humidity and precipitation. During dry conditions, the noise may be nearly nonexistent, while during foggy or rainy conditions, it may be clearly audible.

There are several other overhead HVAC transmission lines in the immediate vicinity of the proposed 500-foot segment. The proposed segment of line would not pass closer to any noise-sensitive receivers than existing transmission lines. Since the noise from the new line would be of identical character to noise from the existing lines, and since the length of the new line is very short compared to the length of existing lines and would not pass close to any noise-sensitive receivers, noise from the overhead HVAC may be considered negligible.

5.5.2.2 Noise from Buried and In-River Cables

Buried and in-river segments of the transmission line would include 3.1 miles of HVAC line between the Portland converter station and the Harborton substation, and 96.4 miles of high-voltage direct current (HVDC) transmission line between the two converter stations.

Both buried and in-river cables would be heavily insulated, which would eliminate or substantially reduce corona noise from the cables, since less energy would be discharged into the surrounding medium.

What little noise may be generated would be attenuated by transmission through soil and water. Soil is a poor medium for transmission of noise, with transmission loss of up to 30 dB per centimeter depending on soil characteristics. Even conservatively assuming a transmission loss of 0.5 dB per centimeter, noise would be reduced by at least 60 dB at the depths the cable would be buried (4 feet [122 centimeters] on land and 10 feet [305 centimeters] under water). Although water is an efficient medium for noise propagation with negligible transmission loss, the air-water boundary reflects most underwater noise back into the water. Therefore, no audible noise is expected from buried and in-river segments of the transmission line.

5.6 Assessment of Compliance with Applicable Noise Regulations (OAR 345-022-0160(2)(b))

(b) An analysis of the proposed facility's compliance with the applicable noise regulations in OAR 340-035-0035, including a discussion and justification of the methods and assumptions used in the analysis;

RESPONSE

5.6.1 Construction Noise Assessment

Construction activities are categorically exempted under OAR 340-35-0035(5)(g).

In the City of Portland, individual items of construction equipment may not exceed a sound pressure level of 85 dBA at 50 feet from the source. Trucks, pile drivers, pavement breakers, scrapers, concrete saws, and rock drills are exempt. From 6 pm to 7 am the following morning, and 6 pm Saturday to 7 am the following Monday, and on legal holidays, the overall noise limits given in Table 8 apply to construction activities, and no equipment types are exempt.

Certain construction activities, particularly HDD, may exceed the limit of 85 dBA at 50 feet. Temporary noise barriers would be erected to mitigate noise during HDD operations.

In Hood River County, construction between 7 am and 7 pm is exempt from the noise ordinance. However, no construction would occur on land in Hood River County and in-river operations are not expected to produce audible sound.

In The Dalles, construction between 8 pm and 7 am is prohibited except by special permit. Construction would not occur during this time frame, except in the unlikely event that a special permit may be needed for a specific purpose (e.g., to complete a necessary construction activity that extends beyond 8 pm).

Construction noise is short term, so it would not result in any long-term impacts at any noise sensitive receptors.

5.6.2 Operational Noise Assessment

Table 13 and Figure 3 show modeled operational noise levels from the western converter station (Portland) at noise-sensitive receptors within 1 mile.

Table 13. Calculated Operational Noise Levels at Each Receptor (Western Station)

Receptor ID	Land Use	Zone Category	Distance from Site (feet)	Modeled Noise Level (dBA)	OAR Noise limit (Day/ Night)	Portland Noise Limit (Day/ Night)
W001	Trail	Open Space	15	60	N/A	60/55
W002	Homeless services	Residential	573	32*	55/50	60/55
W003	Park	Recreational (OAR)	1019	24*	N/A	60/55
*Predicted sound level below the minimum measured L_{50} of 43 dBA						

Noise levels at the closest point of the nearby walking trail could reach 60 dBA. Noise levels at the other noise-sensitive areas would be below the background ambient level and would be unlikely to be audible. The OAR noise limits do not apply to recreational areas, including the ambient anti-degradation standard for new noise sources on previously unused sites. The predicted level at the homeless services receptor would be well below the minimum measured L_{10} of 46 dBA and L_{50} of 43 dBA in the area. The City of Portland limit is 65 dBA for noise generated on an industrial property and received in “open space,” reduced by 5 dBA for continuous or narrow-band noise during day hours and another 5 dBA for night hours. Therefore, the noise limit for the trail receptor would be 60 dBA during day hours and 55 dBA during night hours. The modeled dBA for the trail is 60 dBA. Since the trail would not be typically used at nighttime, it would be considered an unoccupied receiver and sound levels in excess of 55 dBA would be a technical violation and corrective action is not required (PCC 18.10.010(H)

Table 14 and Figure 3 show modeled operational noise levels from the eastern converter station (The Dalles) at noise-sensitive receptors within 1 mile of the station.

Table 14. Calculated Operational Noise Levels at Each Receptor (Eastern Station)

Receptor ID	Land Use	Distance from Site (feet)	Modeled Noise Level (dBA)
E001	Residence	1025	22*
E002	Residence	1015	23*
E003	Residence	1033	28*
E004	Residence	1153	32
E005	Residence	1233	33
E006	Residence	1358	33
E007	Residence	5315	6*
E008	Residence	5284	13*
E009	Residence	5248	9*
E010	Residence	5215	10*
E011	Residence	5199	9*
E012	Residence	5189	8*
E013	Residence	5195	8*
E014	Residence	5200	7*
E015	Residence	5208	7*
E016	Residence	5223	5*
E017	Residence	5250	5*
E018	Veterans Home	5262	6*
E019	Residence	5295	7*

Receptor ID	Land Use	Distance from Site (feet)	Modeled Noise Level (dBA)
E020	Residence	3763	22*
E021	Residence	4085	22*
E022	Residence	4182	22*
E023	Residence	4279	21*
E024	Residence	4376	15*
E025	Residence	4472	14*
E026	Residence	4515	18*
E027	Residence	4540	18*
E028	Residence	4563	21*
E029	Residence	5166	13*
E030	Residence	5099	13*
E031	Residence	5017	13*
E032	Residence	4941	13*
E033	Residence	4887	12*
E034	Church	5008	20*
E035	Motel	4603	10*
E036	RV Park	3292	9*
E037	Residence	1647	22*
E038	Residence	2185	11*
E039	Residence	2701	20*
E040	Residence	4072	8*
E041	Residence	3344	15*
E042	Park	4035	23*
E043	Residence	2694	29
E044	Residence	2973	29
E045	Residence	3262	21*
E046	Residence	3159	23*

*Predicted sound level below the minimum measured L_{50} of 29 dBA.
Notes: dBA=A-weighted decibel

At the site near The Dalles, operational noise levels would be below the minimum measured L_{50} at most noise-sensitive receptors within the study area. The loudest levels would be 33 dBA, at the homes along Fifteen Mile Road that are closest to the proposed station. This would not exceed the 50 dBA OAR limit, or the 60 dBA City of The Dalles limit. With existing sound levels around 29 dBA, no receptors would experience a noise increase of 10 dBA or greater. The OAR ambient degradation standard would not apply since the eastern converter station would not be on a previously unused site[7].

[7] While the station footprint itself is not being repurposed from previous industrial use, the station is located on the same parcel as, and immediately adjacent to, the existing Big Eddy Substation, which should qualify it as a previously used site.

5.7 Measures to Reduce Noise Levels or Impacts to Address Public Complaints (OAR 345-022-0160(2)(c))

(c) Any measures the applicant proposes to reduce noise levels or noise impacts or to address public complaints about noise from the facility;

RESPONSE

Construction noise is exempt from OAR regulations. Other jurisdictions generally only put a limit on allowable hours of the day for construction noise, so noisy construction activities would be restricted to the hours appropriate to each jurisdiction. The City of Portland has a construction noise limit of 85 dBA at 50 feet, which may require temporary noise barriers for certain drilling activities.

Because Cascade Renewable Transmission, LLC (CRT; the Applicant) can comply with the OAR 340-035-0035, Table 8 limits, and applicable local noise regulations for operational noise, no further mitigation measures are required for project operations.

To address potential public complaints about construction noise from the facility, the Applicant would require the construction contractor to employ the following measures to minimize noise levels to the extent practicable:

- Existing access road speed limits would be enforced, and construction site speed limits would be established and enforced during the construction period.
- Electrically powered equipment would be used instead of pneumatic or internal combustion powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas would be located as far as practicable from NSRs.
- The use of noise-producing signals, including horns, whistles, alarms, and bells would be for safety warning purposes only.
- Noise-producing construction equipment and vehicles using internal combustion engines would be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features as per original factory specification and maintained in good operating condition. Mobile or fixed “package” equipment (e.g., arcwelders, air compressors) would be equipped with shrouds and noise control features that are readily available for that type of equipment.
- Construction noise complaints would be logged within 48 hours of issuance. The construction supervisor would have the responsibility and authority to receive and resolve noise complaints. A clear appeal process to the Applicant would be established prior to the start of construction for resolving noise problems that cannot be resolved by the site supervisor in a reasonable period of time.

5.8 Monitoring (OAR 345-022-0160(2)(d))

(d) Any measures the applicant proposes to monitor noise generated by operation of the facility;

RESPONSE

Because the Applicant can comply with the OAR 340-035-0035, Table 8 limits, and applicable local noise regulations for operational noise, there would be no noise impacts; therefore, an operational monitoring program is not proposed at this time.

5.9 Owners of Noise Sensitive Property (OAR 345-022-0160(2)(e))

(e) A list of the names and addresses of all owners of noise sensitive property, as defined in OAR 340-035-0015, within one mile of the proposed site boundary.

RESPONSE

Attachment 4 provides a list of the names and addresses of all owners of noise-sensitive property within 1 mile from the Project site boundary, as defined in OAR 340-035-0015.

6 Evaporative Cooling Towers (OAR 345-022-0160(3)

OAR 345-022-0160(3) requires proponents to provide information about the cooling tower plume, if the proposed project includes an evaporative cooling tower.

The Project is exempt from the requirements of this standard since the proposed Facility does not include the development or use of evaporative cooling towers.

7 Conclusions

Water: The Applicant has worked to avoid as many potential impacts as possible and will continue to do so through Project construction. The Project avoids all impacts to wetlands and landward water resources. Impacts to the Columbia River are unavoidable, but avoidance and minimization efforts for these impacts have been and will continue to be implemented during Project design to the extent practicable.

The information provided in this exhibit demonstrates that construction and operation of the Project would not result in significant adverse impacts to water resources. Therefore, the Applicant has satisfied the requirements of OAR 345-022-0160(1)(b).

For the reasons set forth in this exhibit, the OR EFSC may find that the Project can be constructed and operated in compliance with applicable noise standards at OAR 340-035-0035.

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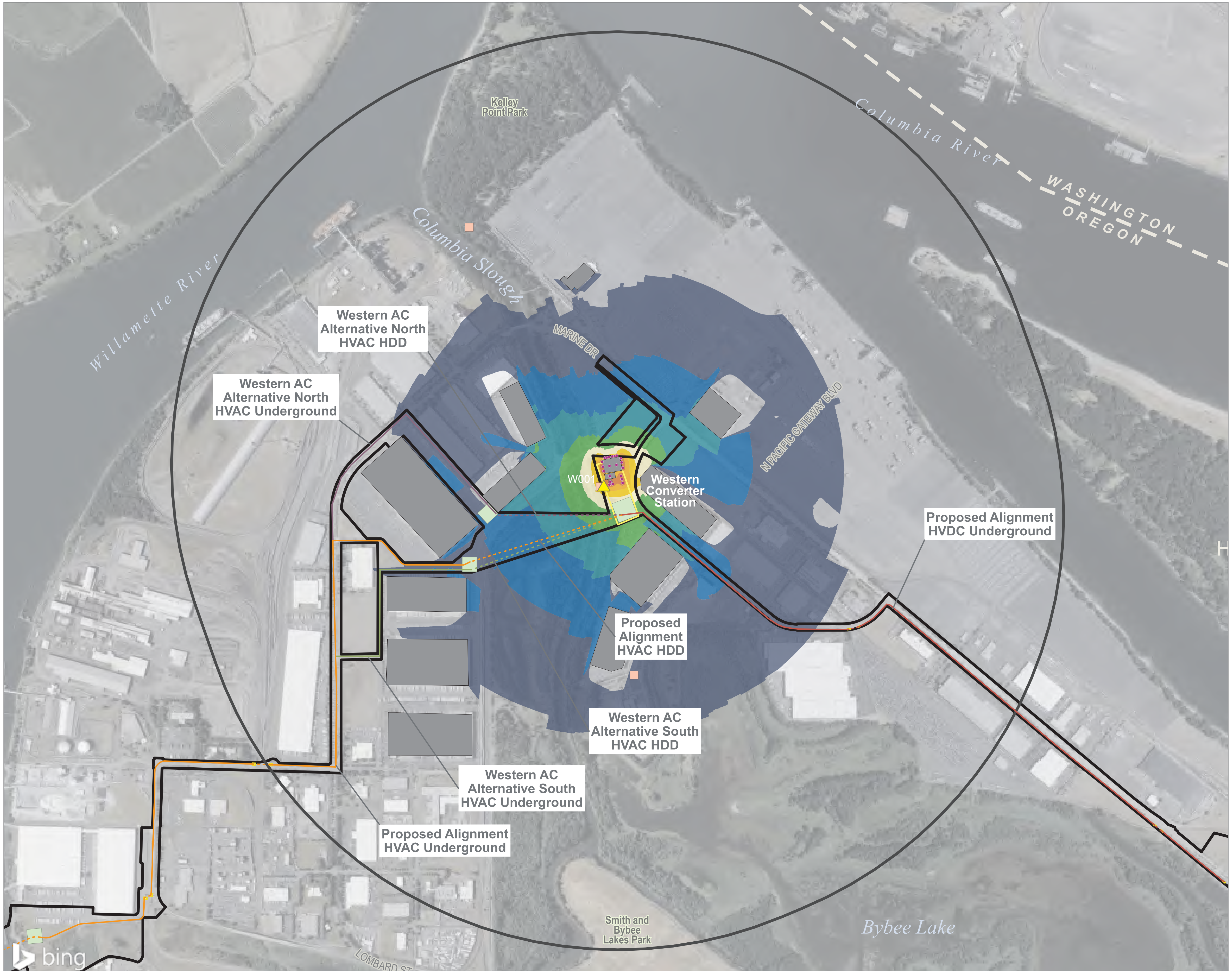
9 Large-scale Figure



12/4/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 3
MODELED OPERATIONAL NOISE LEVELS
PAGE 1 OF 2

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVAC HDD
- PROPOSED ALIGNMENT - HVAC UNDERGROUND
- WESTERN AC ALTERNATIVE NORTH - HVAC HDD
- WESTERN AC ALTERNATIVE NORTH - HVAC UNDERGROUND
- WESTERN AC ALTERNATIVE SOUTH - HVAC HDD
- WESTERN AC ALTERNATIVE SOUTH - HVAC UNDERGROUND
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- CONVERTER STATION
- OREGON EFSC SITE BOUNDARY
- STATE BOUNDARY
- NOISE SOURCES
- NOISE MONITORING LOCATIONS
- NOISE-SENSITIVE RECEPTORS
- MODELED BUILDINGS
- SITE BOUNDARY
- NOISE STUDY AREA

SOUND LEVEL CONTOUR (DBA)

35 40 45 50 55 60 65 70 75

CASCADE RENEWABLE TRANSMISSION

0 0.3 mi
1:14,749

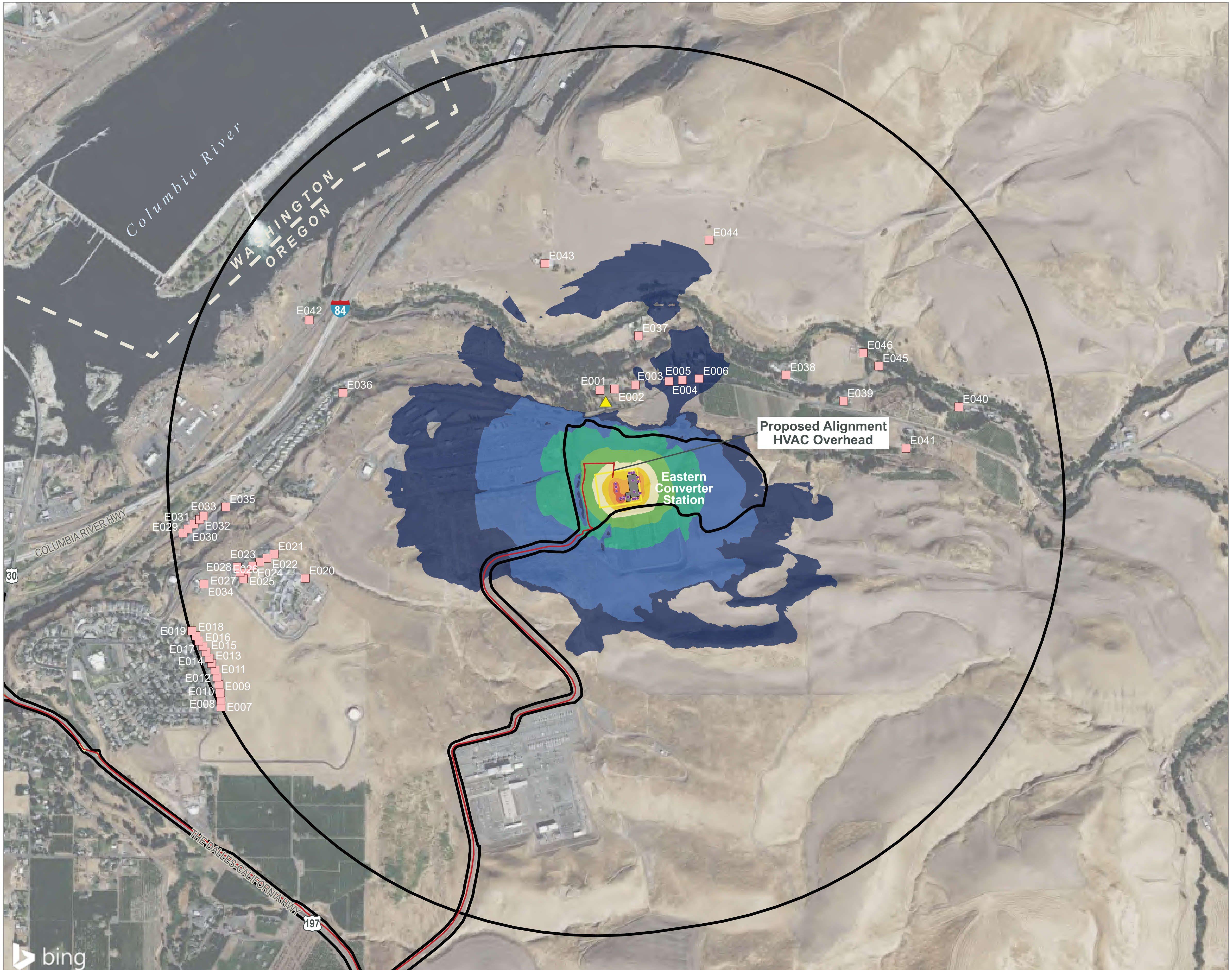


FIGURE 3
MODELED OPERATIONAL NOISE LEVELS
PAGE 2 OF 2

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- CONVERTER STATION
- OREGON EFSC SITE BOUNDARY
- STATE BOUNDARY
- NOISE MONITORING LOCATIONS
- NOISE SOURCES
- NOISE-SENSITIVE RECEPTORS
- MODELED BUILDINGS
- SITE BOUNDARY
- NOISE STUDY AREA

SOUND LEVEL CONTOUR (DBA)

35 40 45 50 55 60 65 70 75

CASCADE RENEWABLE TRANSMISSION

0 0.3 mi
1:14,748

10/15/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

Attachment 1. Wetland and Water Body Delineation Report

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

A complete report and signed report cover form, along with applicable review fee, are required before a report review timeline can be initiated by the Department of State Lands. All applicants will receive an emailed confirmation that includes the report's unique file number and other information.

Ways to submit report:

- **Under 50MB** - A single unlocked PDF can be emailed to: wetland.delineation@dsl.oregon.gov.
- **50MB or larger** - A single unlocked PDF can be uploaded to DSL's Box.com website. After upload notify DSL by email at: wetland.delineation@dsl.oregon.gov.
- OR a hard copy of the unbound report and signed cover form can be mailed to: Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.

Ways to pay review fee:

- By credit card on DSL's epayment portal after receiving the unique file number from DSL's emailed confirmation.
- By check payable to the Oregon Department of State Lands attached to the unbound mailed hardcopy OR attached to the complete signed cover form if report submitted electronically.

Contact and Authorization Information

☒ Applicant ☐ Owner Name, Firm and Address:
Chris Hocker, VP
Cascade Renewable Transmission, LLC
501 Kings Highway East, Suite 300
Fairfield, CT 06825

Business phone # (203) 416-5590
Mobile phone # (optional) (203) 417-9684
E-mail: chocker@powerbridge.us

☒ Authorized Legal Agent, Name and Address (if different):
Alessandra Capretti
HDR Engineering, Inc.
1050 SW 6th Avenue, Suite 1800
Portland, OR 97204

Business phone # (503) 727-3902
Mobile phone # (optional) (971) 303-5596
E-mail: alessandra.capretti@hdrinc.com

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.

Typed/Printed Name: ______________________ **Signature:** ______________________
Date: ______ Special instructions regarding site access: _____

Project and Site Information

Project Name: Cascade Renewable Transmission Project	Latitude: See attached Longitude: See attached **decimal degree** - centroid of site or start & end points of linear project
Proposed Use: See attached	Tax Map # See attached Tax Lot(s) See attached Tax Map # See attached Tax Lot(s) See attached
Project Street Address (or other descriptive location): Linear project; see attachments	Township Range Section QQ Use separate sheet for additional tax and location information
City: County:	Waterway: River Mile:

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
Jennifer Maze
HDR Engineering, Inc.
1050 SW 6th Avenue, Suite 1800
Portland, OR 97204

Phone # (503) 724-6320
Mobile phone # (if applicable)
E-mail: jennifer.maze@hdrinc.com

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.
Consultant Signature: Date: 04/18/2025

Primary Contact for report review and site access is ☐ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☒ Yes ☐ No Study Area size: 387 Total Wetland Acreage: 4.9900

Check Applicable Boxes Below

- ☐ R-F permit application submitted
- ☐ Mitigation bank site
- ☐ EFSC/ODOE Proj. Mgr: ______
- ☐ Wetland restoration/enhancement project (not mitigation)
- ☐ Previous delineation/application on parcel
  If known, previous DSL # _____
- ☐ Fee payment submitted **$** 575
- ☐ Resubmittal of rejected report ($100)
- ☐ Request for Reissuance. See eligibility criteria. (no fee)
  DSL # _____ Expiration date_____
- ☐ LWI shows wetlands or waters on parcel
  Wetland ID code _____

For Office Use Only

DSL Reviewer: ______________ Fee Paid Date: _____ / _____ / _____ DSL WD # ______________

Date Delineation Received: ___/ ___/ ___ DSL App.# ______________

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Wetlands and Waterbodies Delineation Report

Cascade Renewable Transmission Project

Portland and The Dalles, Oregon

April 17, 2025

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Contents

Tables

Appendices

Acronyms and Abbreviations

°F	degrees Fahrenheit
AC	alternating current
amsl	above mean sea level
Applicant	Cascade Renewable Transmission (CRT)
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
DAREM	Direct Antecedent Rainfall Evaluation Method
DSL	Oregon Department of State Lands
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GPS	global positioning system
HAB	horizontal auger boring
HAT	highest astronomical tide
HDD	Horizontal directional drilling
HDR	HDR Engineering, Inc.
HMT	highest measured tide
HTL	high tide line
HUC	Hydrologic Unit Code
HVAC	high-voltage alternating current
HVDC	high-voltage direct current
I-84	U.S. Interstate 84
kV	kilovolt
LWI	Local Wetland Inventory
MLLW	mean lower-low water
MW	megawatt
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
OHW	ordinary high water mark
OR 30	Oregon Route 30
ORS	Oregon Revised Statute
PEM	palustrine emergent
PFO	palustrine forested
PGE	Portland General Electric
Port	Port of Portland
Project	Cascade Renewable Transmission Project
PSS	palustrine scrub-shrub
ROW	right-of-way
SA	survey area
SDAM	Streamflow Duration Assessment Method

SFAM	stream functional assessment
SWI	Statewide Wetland Inventory
TNW	traditional navigable water
UPRR	Union Pacific Railroad
US 197	U.S. Route 197
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WETS	Climate Analysis for Wetlands Table (NRCS)
WVMC	Western Mountains, Valleys, and Coast

1 Introduction and Background

1.1 Introduction

HDR Engineering, Inc. (HDR), on behalf of Cascade Renewable Transmission, LLC (CRT; Applicant) completed a wetland and waterbodies delineation within the proposed Cascade Renewable Transmission Project (Project) survey area (SA) in Oregon in April 2023, November 2023, March 2024, April 2024, and March 2025 (Figure 1, Appendix A; Section 1.3). This report describes the methods and findings of the delineation completed within landward portions of the Project SA in Oregon State and serves to inform Project design and support local, state, and federal permitting required for the Project. The surveys were completed in accordance with Section 404 of the Clean Water Act and the Oregon Removal-Fill Law.

Wetlands and waters in the Washington State portion of the proposed Project (SA) have been included in a wetland delineation report prepared for the Washington Energy Facility Site Evaluation Council and will be submitted separately.

In addition, work proposed within the Columbia River was evaluated using the Department of State Lands (DSL) Stream Functional Assessment Method. A Stream Functional Assessment Report was developed for in-water work and will be submitted separately.

1.2 Project Description

The proposed Project is a roughly 95-mile 400-kilovolt (kV)/1,100-megawatt (MW) high-voltage direct current (HVDC) electric transmission facility interconnecting the existing Bonneville Power Administration (BPA) Big Eddy 500-kV alternating current (AC) substation, located east of the City of The Dalles, Wasco County, Oregon, and the existing Portland General Electric (PGE) Harborton 230-kV AC substation, located in the City of Portland, Multnomah County, Oregon (Figure 1 in Appendix A). The eastern converter station would convert AC power from Big Eddy substation to direct current (DC) for transmission on the Project's 400-kV cable system to the western converter station, where power would be converted back to AC at Harborton substation.

At the eastern end of the Project in The Dalles, Oregon (east end), a converter station is proposed near the Big Eddy substation with approximately 500 feet of overhead, (500-kV) high-voltage alternating current (HVAC) transmission line to connect the converter station to the substation. From the converter station, HVDC transmission cables with associated fiber optic communications cable would be buried underground in conduits to the edge of the Columbia River. The cable bundle would be bundled together and buried in the bed of the Columbia River in Oregon and Washington from The Dalles to Portland using jet plow methods. To bypass the dam, locks, juvenile fish passage, and tribal fishing areas at the Bonneville Lock and Dam, the Proposed Alignment HVDC cables would be brought on land in Washington, east of the dam complex, buried underground on the Washington side of the Columbia River for approximately 7.6 miles, then re-enter the river west of the dam complex. All in-water to land transitions would be completed using horizontal directional drilling (HDD) installation methods to avoid Columbia River shoreline areas and other waters of the U.S. and state. Another trenchless installation method, horizontal auger boring (HAB), may be used for shorter paths beneath railroads and roadways.

In Portland, the cable bundle would exit the Columbia River north of Hayden Island, be placed beneath the channel of the Columbia River adjacent to the south of Hayden Island via HDD methods, and landfall near Terminal 6 at the Port of Portland. The western converter station in Portland would be connected to the existing Harborton substation with three-phase, 230-kV transmission cable, installed via HDD beneath the Columbia Slough and Ramsey wetlands and via trench in road rights-of-way (ROWs) to the edge of the Willamette River. Approximately 0.5 miles of transmission cable would cross under the bed of the Willamette River, installed by HDD to a final landing site at Harborton substation.

To bypass the dam, locks, juvenile fish passage, and tribal fishing areas at the Bonneville Lock and Dam, the HVDC cable bundle would be brought on land in Washington State east of the dam complex, buried underground on the Washington side of the Columbia River for approximately 7.5 miles, then re-enter the river west of the dam complex. The trench for underground HVDC transmission line would be approximately 2.5 feet wide by 4.5 feet deep. Within the trench, two 8-inch conduits side-by-side and one 4-inch fiber optic conduit on top (cable bundle) would be placed within a 6-inch concrete casing. To cross highways, railroads, or sensitive areas, the transmission line would be placed with HDD or HAB trenchless installation methods. HDD would be used to transition the in-river cables to land, avoiding any shoreline areas. The SA description and findings of the wetland and waters delineation performed in Washington State are not addressed in this report.

1.3 Site Description and Survey Area

The roughly 387-acre SA occurs within two distinct locations in the City of The Dalles, Oregon (east end), and the City of Portland, Oregon (west end) (Figure 1, Appendix A). In each city, the SA encompasses areas necessary for construction of the converter stations, cable trenching areas, cable landing and HDD/HAB sites, and construction staging and laydown sites. Landownership types within the SA include federal, state, and local governmental agencies, ports, railroads, local businesses, and private residences. Tax lots that occur within the SA are shown on Figure 2 of Appendix A.

1.3.1 East End

Approximately 152 acres of the SA occurs within the City of The Dalles city limits and in unincorporated Wasco County on BPA property at the Big Eddy substation located just east of The Dalles (Figure 1, Pages 8-12). The legal land description of this portion of the SA includes the following townships/ranges/sections: T2N, R14E, Sections 31 and 32; T1N, R14E, Sections 5, 6 and 7; T1N, R13E, Section 1, 2, and 3; Willamette Meridian. The east end of the Project is located within U.S. Geological Survey (USGS) 7.5-minute quadrangle maps for The Dalles South and Petersburg and in the Hydrologic Unit Code (HUC) 17070105 Middle Columbia-Hood in the Pacific Northwest Region.

From the proposed eastern converter station site at the substation, the Project cable alignment follows Columbia View Drive roughly 1.9 miles to U.S. Route 197 (US 197) (Figure 1, Pages 11 and 12). The proposed converter station site and surrounding SA are comprised of actively farmed wheat fields and electricity transmission infrastructure, including multiple substations and maintained transmission line ROW. The SA along Columbia View Drive is mainly paved roadway and roadway shoulder with undeveloped land and BPA infrastructure and offices.

The alignment continues north on US 197 for roughly 1.2 miles to the junction with Oregon Route 30 (OR 30), follows OR 30 for about 900 feet until the State Street exit, continuing east for 600 feet before leaving the roadway prism to an HDD site located just south of the Union Pacific Rail Road (UPRR) rail lines, north of State Street (Figure 1, page 10). The SA along US 197, OR 30, and State Street is comprised of paved roadway and roadway ROW with vegetated shoulder areas adjacent. Threemile Creek occurs adjacent to these roadways and crosses beneath the alignment in three locations.

The cable would be installed by HAB methods beneath the UPRR rail lines and continue via trenching methods through a vegetated area just east of a railroad access road. The SA is comprised of a large, vegetated parcel that includes a portion of Threemile Creek and is bordered by road and rail ways. The alignment continues west roughly 1.5 miles along a paved road that parallels U.S. Interstate 84 (I-84) to the south to an HDD landing site (HDD Area 12) located in a vegetated depressional area between I-84 and Tie Plant Road (Figure 1, Pages 8 and 9). The SA also includes parcels to the south of Tie Plant Road. From HDD Area 12, the cable would be drilled under I-84 and the Columbia River shoreline to a cofferdam within the river channel.

1.3.2 West End

Approximately 235 acres of the SA occurs within the City of Portland city limits and in unincorporated Multnomah County on Hayden Island (Figure 1, Pages 1-7). The legal land description of this portion of the SA includes the following townships/ranges/sections: T2N, R1E, Sections 25, 29, 30, 31, and 32 and T2N, R1W, Sections 23, 24, 25, 26, 27, 34 and 35; Willamette Meridian. The west end of the Project is located within USGS 7.5-minute quadrangle maps for Vancouver, Portland, Sauvie Island, and Linnton, and in HUC 17090012 Lower Willamette in the Pacific Northwest Region.

The Project SA begins on the north side of Hayden Island where in-river cable installation methods transition to HDD methods bring the cable to land near N. Hayden Island Drive (Figure 1, Page 7). From HDD Area 08, the cable would be installed using trenching methods along an existing graveled transmission line access road. Two alternative routes were evaluated to bring the alignment from Hayden Island south to Terminal 6 at the Port of Portland (Figure 1, Page 5 and 6). The SA on Hayden Island is comprised mainly of maintained transmission line ROW with some forested riparian areas near the Columbia River shoreline.

From the proposed landing site alternatives within Terminal 6, the cable would be placed via trenching methods within the shoulder areas of N. Marine Drive and N. Leadbetter Road for approximately 1.8 to 2.3 miles to the proposed western converter station site (Figure 1, Pages 3-6). The SA at the landing sites, HDD areas, and the converter station site are comprised of undeveloped and previously disturbed land. The SA along existing roadways is mainly landscaped ROW.

From west of the proposed converter station site, two alternative routes beneath the Columbia Slough and Ramsey Lake are being considered. HDD methods are proposed for each alternative to avoid Project effects to these waterways. Two alternative landing sites were evaluated west of the Columbia Slough and Ramsey Lake. From each of the alternative landing sites, the proposed alignment would land within the Rivergate Industrial Area on previously developed industrial parcels and continue west to N. Columbia Boulevard, south to Ramsey Road, and west to N. Rivergate Boulevard. The alignment would veer west from N. Rivergate Boulevard to HDD Area 2 prior to being drilled under the bed of the Willamette River. HDD methods would also be used to cross the cable under two existing rail lines. Most of the SA is comprised of paved roadways and railroad ROW with one undeveloped area parcel adjacent to the west side of the Willamette River.

The SA on the east side of the Willamette River is comprised of river shoreline, a large, vegetated material stockpile, and the fenced, graveled yard of PGE’s Harborton substation.

2 Landscape Setting and Land Use

2.1 Landscape Setting

2.1.1 East End

The east end SA lies within the Columbia Plateau (10) Level III ecoregion and the Pleistocene Lake Basin (10e) Level IV ecoregion at elevations between roughly 100 and 800 feet above mean sea level (amsl) (Thorson et al. 2003).

The Columbia Plateau is a drier, low elevation island surrounded by higher elevation, mountainous region with high rainfall. Rain shadow from the Cascade Mountains to the west results in an arid to semi-arid climate typical of mid-latitude deserts to mid-latitude steppes. The mountains also separate this region from the influence of the ocean, leading to a higher occurrence of extreme or unpredictable weather. Precipitation is seasonally variable over much of the region. The perennial and intermittent streams and rivers located here originate from the adjacent mountainous areas. The remaining streams are ephemeral, with flowing water present only for a short duration during or following precipitation events. Most of this region is covered in arid sagebrush steppe or grassland. Tree cover throughout much of the region is sparse to nonexistent (Thorson et al. 2003).

The Pleistocene Lake Basins once contained vast temporary lakes that were created by flood waters from glacial lakes Missoula and Columbia. In Oregon, the flood waters accumulated from the eastern entrance of the Columbia River Gorge upstream to the Wallula Gap to form ancient Lake Condon. Today, the Pleistocene Lake Basin Ecoregion is the driest and warmest part of the Columbia Plateau, with mean annual precipitation varying from 7 to 10 inches. Native vegetation consists of bunchgrass and sagebrush (Thorson et al. 2003).

2.1.2 West End

The west end SA lies within the Willamette Valley (3) Level III ecoregion and the Pleistocene Portland Vancouver (3a) Level IV ecoregion at elevations between 10 and 50 feet amsl (Thorson et al. 2003).

The Willamette Valley contains terraces and floodplains of the Willamette River system, scattered hills, buttes, and adjacent foothills. Originally, it was covered by prairies, oak savanna, coniferous forest, extensive wetlands, and deciduous riparian rainforests. Elevation and relief of the lower and the vegetation mosaic differs from the coniferous forest of the surrounding ecoregions. Mean annual rainfall is 37 to 60 inches and summers are generally dry; overall, precipitation is lower than in the surrounding mountains. Today, the Willamette Valley contains the bulk of Oregon population, industry, commerce, and cropland. Productive soils and a temperate climate make it one of the most important agricultural areas in Oregon (Thorson et al. 2003).

The Portland Vancouver ecoregion is a depression at the base of the Portland Hills fault block. It contains the confluence of the Columbia and Willamette rivers and is composed of deltaic sands and gravels deposited by Pleistocene floods. Today, many wetlands, oxbow lakes, and ponds still occur, but overall, the Portland/Vancouver Basin is dominated by urban and suburban development, pastures, and nurseries. The climate is usually marine influenced but, periodically, easterly winds entering via the Columbia River Gorge bring continental temperature extremes to the Portland Vancouver Basin (Thorson et al. 2003).

2.2 Current and Past Land Uses

2.2.1 East End

Wasco County (created in 1854) and Dalles City (incorporated January 26, 1857, now called The Dalles) was historically inhabited by Native Americans, the Wascos, who are now part of the Confederated Tribes of the Warm Springs. Euro-American settlers began arriving in the area in 1830s and emigrants began arriving to the area via the Oregon Trail in the 1840s, and many, faced with the difficulties of negotiating the Columbia River Gorge by wagon, settled in The Dalles (City of The Dalles 2024; Buce 2024). This area is now considered one of the most significant archaeological regions in the Pacific Northwest. The Dalles, which has two historic districts with over 70 properties on the National Register of Historic Places, remains a trading hub for the Mid-Columbia River.

Development of trade, travel routes, and rail lines, including the Great Southern Railroad completed in 1905, continued through the 1900s (City of The Dalles 2024). The Dalles Lock and Dam, one of the 10 largest hydropower dams in the nation, provides a reliable water source for navigation, irrigation, and seasonal flood mitigation. The dam went into operation on March 10, 1957, and created a 24-mile backwater lake that formed behind the dam (Buce 2024).

The Dalles is the county seat and had a population of about 16,000 people in 2020. Top industries in the city and northern Wasco County include medical centers, schools, farmers and growers, hydroelectric and renewable energy, and data storage facilities (Buce 2024).

2.2.2 West End

The City of Portland was first platted in 1845, and Multnomah County was created in 1854 on land traditionally used by the Multnomah Chinooks (Abbott 2024; OHS 2014). Multnomah County is the smallest county in Oregon.

During the 1850s, Portland became the largest city in Oregon and first experienced substantial growth during the California Gold Rush, which created a large market for goods produced in Oregon, including wheat and lumber. Steamboat and portage railroad commerce facilitated trade to and from the Portland area across Oregon and neighboring states via the Columbia River and Pacific Ocean (Abbott 2024).

A well-positioned city, Portland experienced prosperity and growth for the next 60 years with the expansion of the regional railroad system, in particular, the completion of the transcontinental link via the Northern Pacific Railroad in 1883. The railroad expanded access to goods produced from logging, ranching, and agriculture. A variety of mills, factories and shipyards were developed along the Willamette waterfront and major rail and river corridors (OHS 2014; Abbot 2024).

The present-day Port of Portland (Port) was established formally by the Oregon Legislature in 1970 by incorporating the Portland Commission of Public Docks, a city agency dating from 1910, to the original Port of Portland, a public corporation operating since 1910 (Abbott 2022).

Urbanization and industrialization continued during the next several decades, with neighborhoods expanding and the electric streetcar increasing transportation between Portland's many districts and across the Willamette River to the east. Shipyard activity increased again during World War II, spurring further population growth (Abbott 2024).

While urban and suburban growth continues, since the 1960s and 1970s more efforts to preserve natural areas, create parks, and establish scenic areas have been initiated (Abbott 2024). Current land uses include industrial, urban, suburban, commercial, and natural. The Rivergate Industrial District, Smith and Bybee Wetlands Natural Area, Columbia Slough, railroads, streets, and businesses are all near or intersecting the SA.

The City of Portland is the county seat and had a population of about 652,500 people in 2020. Major industries in the SA and northern Multnomah County include industrial development, Port operations, and preserved natural areas. The west end of the SA is located in multiple City of Portland zoning overlays, including Airport Landing and Noise Impact, Prime Industrial, Environmental Protection and Conservation, Natural Resource Management Plan, and Greenway zones associated with the Willamette River (River General, River Industrial and River Water Quality) (City of Portland 2025).

3 Site Alterations

Most of the Project SA in Wasco and Multnomah counties has been altered by development, including agriculture, electricity transmission and distribution networks, road and rail ways, parks, and industrial and urban infrastructure, and to a lesser degree residential development. These alterations have likely impacted vegetation, soils, and surface water flows within the SA on lands adjacent.

The east end has seen minimal recent site alteration within the past 20 years. Major alterations along the proposed SA include the development of I-84 (built in 1957), US 197 (built in 1917), UPRR railroad, BPA electricity transmission infrastructure (built in the 1950s through the 1970s), agriculture, and urban and residential development.

Within the SA in Multnomah County, historic topographic images show development began at the Port around the 1930s and 1940s prior to which it was comprised mainly of wetlands, lakes (including Smith, Bybee and Ramsey), and a multitude of surface water channels connecting them or draining to the Columbia and Willamette Rivers (USGS 2024a). Early 1900s images show that most of the Rivergate Industrial District was comprised of Ramsey Lake. Filling for development and the installation of water control systems, dikes, dams and channelization of existing water features began in earnest in the 1950s and continued to alter the landscape, vegetative communities, local hydrology, and native soils.

The west side of Hayden Island within the SA is currently undeveloped except for an existing transmission line corridor and access road. Oregon Metro added this area to the urban growth boundary in 1982 and the Port purchased lands in 1993. In 2010, the Portland City Council allotted 300 acres of west Hayden Island for a port facility and preserved 500 acres as a protected natural area (Daley 2022).

4 Precipitation Data and Analysis

Precipitation and climate data analysis was conducted for the SA for the site visits conducted on April 19-21, 2023 (west end), November 8, 2023 (east end), March 11-13, 2024 (west end), April 2, 2024 (east end), and March 20, 2025 (west end) field investigations. The east end of the Project was evaluated using data from The Dalles weather station (Station ID 358407/Wasco County FIPS 41065) located in Oregon, approximately 2 miles west of the SA at an elevation of 150 feet amsl. The Dalles weather station is the closest station in a similar geographic position to the SA with the requisite data history to evaluate normal rainfall conditions. The west end of the Project was evaluated using data from the Portland International Airport Station (Station ID 356751/Multnomah County FIPS 41051) located in Oregon, approximately 5 miles southeast of the SA at an elevation of roughly 20 feet amsl.

Normal rainfall was analyzed using data for the past 30 years (1992-2022) derived from the U.S. Department of Agriculture (USDA) Climate Analysis for Wetlands Table (WETS) for The Dalles and Portland International Airport weather stations (USDA NRCS 2024a and 2024b; Appendix D). Antecedent rainfall data collected at these weather stations were also used during the analysis. The Direct Antecedent Rainfall Evaluation Method (DAREM) was used to determine if the antecedent rainfall recorded during the 3 months prior to the surveys was within normal range, drier than normal, or wetter than normal (Sumner et al. 2009).

4.1 Climate and Growing Season

Wasco County is within Oregon Climate Division 6, North Central Area (NOAA 2005). The SA is in a relatively dry region located in the rain shadow of the Cascade Mountains (Taylor 1993a). According to WETS table for The Dalles, average annual precipitation received within the area between 1992 and 2022 was 13.80 inches, most of which occurs between October and April as rainfall (USDA NRCS 2024a). Average mean air temperature for the same period ranges from 36.6 degrees Fahrenheit (°F) in December to 73.6°F in July. The approximate growing season begins March 20 and ends November 5 (230 days).

Multnomah County is within Oregon Climate Division 2, Willamette Valley (NOAA 2005). The Project SA experiences mild climate characterized by cool, wet winters and warm, dry summers (Taylor 1993b). According to USDA WETS table for Portland International Airport, average annual precipitation received within the area between 1992 and 2022 was 37.04 inches, most of which occurs between October and May as rainfall (USDA NRCS 2024b). Average mean air temperature for the same period ranges from as low as 41.1°F in December to 70.5°F in August. The approximate growing season begins February 9 and ends December 7 (301 days).

4.2 Precipitation Data

Field investigations for wetlands and other waters occurred on April 19-21, 2023 (west end), November 8, 2023 (east end), March 11-13, 2024 (west end), April 2, 2024 (east end), and March 20, 2025. The observed and percent of normal rainfall for the water year for each field survey is summarized in Table 1 and precipitation analysis is summarized in sections below.

Table 1. Antecedent and Percent of Normal Rainfall for Water Year to Date

Period	Recorded Precipitation (inches)	Average Precipitation (inches)	Percentage of Average Recorded
Total water year to date, April 2023 field survey (10/1/2022 through 4/18/23)	30.22	29.26	103
Total water year to date, November 2023 field survey (10/1/2023 through 11/7/23)	2.14	1.43	150
Total water year to date, March 2024 field survey (10/1/23 through 3/10/24)	31.23	25.00	125
Total water year to date, April 2024 field survey (10/1/23 through 4/1/24)	12.71	11.17	114
Total water year to date, March 2025 field survey (10/1/24 through 3/19/25)	26.30	26.04	99

4.2.1 April 19-21, 2023, Field Survey

During the 3 months prior to the April 2023 field surveys (January – March 2023) in the Portland area, antecedent rainfall received within the SA was 10.19 inches or 81 percent of average (Table 2). Rainfall conditions were drier than normal during January, and within normal range for February and March. Results of DAREM indicated that rainfall received in the area during this period was within the normal range (Table 3). Antecedent rainfall recorded in the 2 weeks prior to the first day of field surveys (April 5-18, 2023) was 3.47 inches, 2.16 inches above the 1.31-inch average for the same period. Rainfall received the 3 days prior to the survey was 0.42 inches above average.

Table 2. Summary of Precipitation Analysis January - March 2023

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Percent of Average Recorded	30% chance less than or more than ranges for normal precipitation (inches)
January 2023	3.34	5.17	66%	<3.88 >6.04
February 2023	2.49	3.65	68%	<2.28 >4.41
March 2023	4.36	3.84	114%	<2.75 >4.54
Total	10.19	12.66	81%	–

Table 3. Results of Precipitation Analysis using DAREM January - March 2023

Month	30% less than	Average	30% more than	Rainfall	Condition
January 2023	3.88 in.	5.17 in.	6.04 in	3.34 in.	Dry
February 2023	2.28 in.	3.65 in.	4.41 in.	2.49 in.	Normal
March 2023	2.75 in.	3.84 in.	4.54 in.	4.36 in.	Normal

4.2.2 November 8, 2023, Field Survey

During the 3 months prior to the November 2023 field survey (August – October 2023) in The Dalles, antecedent rainfall received within the SA was 1.59 inches or 104 percent of average (Table 4). Rainfall conditions were within normal range for August, above normal for September, and drier than normal for October. Results of DAREM indicated the amount of rainfall received in the area during the same period was within normal range (Table 5). Antecedent rainfall recorded in the 2 weeks prior to the field survey (October 25 – November 7, 2023) was 1.56 inches, 0.92 inches above the 0.64-

inch average for the same period. There was no rainfall on the day of the field survey (average is 0.06 inches).

Table 4. Summary of Precipitation Analysis August - October 2023

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Percent of Average Recorded	30% chance less than or more than ranges for normal precipitation (inches)
August 2023	0.00	0.17	0%	<0.00 >0.14
September 2023	1.01	0.29	348%	<0.06 >0.27
October 2023	0.58	1.07	54%	<0.68 >1.28
Total	1.59	1.53	104%	–

Table 5. Results of Precipitation Analysis using DAREM August - October 2023

Month	30% less than	Average	30% more than	Rainfall	Condition
August 2023	0.00 in.	0.17 in.	0.14 in	0.00 in.	Normal
September 2023	0.06 in.	0.29 in.	0.27 in.	1.01 in.	Wet
October 2023	0.68 in.	1.07 in.	1.28 in.	0.58 in.	Dry

4.2.3 March 11-13, 2024, Field Survey

During the 3 months prior to the March 2024 field surveys (December 2023 – February 2024) in the Portland area, antecedent rainfall received within the SA was 13.72 inches or 156 percent of average (Table 6). Rainfall conditions were above normal range for December and January, and normal for February. Results of DAREM indicated the amount of rainfall received in the area during the same period was roughly 5 inches above average (Table 7). Antecedent rainfall recorded in the 2 weeks prior to the first day of field survey (February 26 – March 10, 2024) was 2.71 inches, 0.98 inches above the 1.73-inch average for the same time period. Rainfall received on the 3 days of surveys was 0.30 inches, below the 0.40-inch average.

Table 6. Summary of Precipitation Analysis December 2023 - February 2024

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Percent of Average Recorded	30% chance less than or more than ranges for normal precipitation (inches)
December 2023	8.73	5.92	148 %	<3.88 >6.04
January 2024	9.43	5.17	182%	<2.28 >4.41
February 2024	4.29	3.65	118%	<2.75 >4.54
Total	13.72	8.82	156 %	–

Table 7. Results of Precipitation Analysis using DAREM December 2023 - February 2024

Month	30% less than	Average	30% more than	Rainfall	Condition
December 2023	3.88 in.	5.92 in.	6.04 in	8.73 in.	Wet
January 2024	2.28 in.	5.17 in.	4.41 in.	9.43 in.	Wet
February 2024	2.75 in.	3.65 in.	4.54 in.	4.29 in.	Normal

4.2.4 April 2, 2024, Field Survey

During the 3 months prior to the April 2024 field survey (January 2024 – March 2024) in The Dalles, antecedent rainfall received near the SA was 4.69 inches or 92 percent of average (Table 8). Rainfall conditions were within normal range for all 3 months. Results of DAREM indicated the amount of rainfall received in the area during the same period was within the normal range (Table 9). Antecedent rainfall recorded in the 2 weeks prior the field survey (March 19 – April 1, 2024) was 0.83 inches, 0.36 inches above the 0.47-inch average for the same period. There was no rainfall on the day of the field survey (average is 0.06 inches).

Table 8. Summary of Precipitation Analysis January - March 2024

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Percent of Average Recorded	30% chance less than or more than ranges for normal precipitation (inches)
January 2024	2.19	2.35	93 %	<1.53 >2.83
February 2024	1.63	1.53	107 %	<0.80 >1.87
March 2024	0.87	1.23	71 %	<0.76 >1.47
Total	4.69	5.11	92 %	–

Table 9. Results of Precipitation Analysis using DAREM January - March 2024

Month	30% less than	Average	30% more than	Rainfall	Condition
January 2024	1.53 in.	2.35 in.	2.83 in	2.19 in.	Normal
February 2024	0.80 in.	1.53 in.	1.87 in.	1.63 in.	Normal
March 2024	0.76 in.	1.23 in.	1.47 in.	0.87 in.	Normal

4.2.5 March 20, 2025, Field Survey

During the 3 months prior to the March 2025 field survey (December 2024 – February 2025) in the Portland area, antecedent rainfall received near the SA was 7.27 inches or 82 percent of average (Table 10). Rainfall conditions were drier than normal in January and within normal range for December and February. Results of DAREM indicated the amount of rainfall received in the area during the same period was within the normal range (Table 11). Antecedent rainfall recorded in the 2 weeks prior the field survey (March 6 – March 19, 2025) was 2.63 inches, 0.94 inches above the 1.69-inch average for the same period. Rainfall received on the field survey day was 0,12 inches, slightly below the 0.13-inch average.

Table 10. Summary of Precipitation Analysis December 2024 - February 2025

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Percent of Average Recorded	30% chance less than or more than ranges for normal precipitation (inches)
December 2024	6.79	5.92	115 %	<4.30 >6.98
January 2025	2.93	5.17	57 %	<3.88 >6.04
February 2025	4.34	3.65	119 %	<2.28 >4.41
Total	7.27	8.82	82 %	–

Table 11. Results of Precipitation Analysis using DAREM December 2024 - February 2025

Month	30% less than	Average	30% more than	Rainfall	Condition
December 2024	4.30 in.	5.92 in.	6.98 in	6.79 in.	Normal
January 2025	3.88 in.	5.17 in.	6.04 in.	2.93 in.	Dry
February 2025	2.28 in.	3.65 in.	4.41 in.	4.34 in.	Normal

5 Methods

Wetland and water delineations were completed in accordance with Section 404 of the Clean Water Act, Oregon Administrative Rule (OAR) 141-090, the Oregon Removal-Fill Law, and followed the DSL (2017) delineation guidance for large or linear projects. Prior to field surveys, HDR biologists completed a desktop review of relevant information, including online maps, public databases, and historical documentation, listed in Section 5.1. Following this review, HDR biologists completed a thorough field survey that included wetland and water body identification, delineation, and classification. These methods are detailed in Section 5.2.

5.1 Desktop Research

A desktop review of existing literature, maps, and other materials was conducted to identify potential wetlands and waters of the U.S. within the SA prior to initiating the field review. Existing documents reviewed included:

- Current and historic topographic maps (USGS 2024a)
- City of Portland Zoning Maps (City of Portland 2025)
- National Hydrography Dataset (NHD) maps and data (USGS 2024b)
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) (FEMA 1986)
- USDA Natural Resources Conservation Service (NRCS) Land Resource Regions (USDA NRCS 2022)
- Climate data from WETS, The Dalles (USDA NRCS 2024a)
- Climate data from WETS, Portland International Airport (USDA NRCS 2024b)
- GeoHub Willamette Valley Wetland Priority Sites (GeoHub 2023)
- National Hydric Soils List (USDA NRCS 2024c)
- NRCS Web Soil Survey (USDA NRCS 2024d)
- National Wetland Inventory (NWI) (USFWS 2024)
- National Oceanic and Atmospheric Administration (NOAA) Tides & Currents data (NOAA 2024a and 2024b)
- Essential Salmonid Habitat Map (DSL 2025)
- Statewide Wetland Inventory (SWI) (DSL 2024a)
- Local Wetland Inventory (LWI) (DSL 2024b)

- Oregon Department of Fish and Wildlife (ODFW) Compass Mapping for Fish and Wildlife Habitats (ODFW 2021)
- Oregon Fish Passage Barrier Data (ODFW 2024)
- Historic and current ESRI and Google Earth aerial photographs

5.2 Field Methodology

5.2.1 Wetlands

The survey team investigated the SA for wetlands using the methods described in the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Manual; Environmental Laboratory 1987) and the Regional Supplement to the USACE *Wetland Delineation Manual: Western Mountains, Valleys and Coast (WMVC) Region* (WMVC Supplement; Environmental Laboratory 2010). The methodology outlined in the manuals is based on three parameters for identifying wetlands: hydrophytic vegetation, hydric soils, and hydrology. In general, the three parameters must be present to determine the presence of a wetland, except in unusual circumstances.

The east end SA in The Dalles occurs just west and within the recommended boundary for use of the WVMC Supplement versus the Arid West supplement. After review of the desktop resources, including recorded climate data, topographic and elevation data, and based on observations of hydrology and vegetative cover within and surrounding the SA, HDR biologists concluded the area within the east end SA was not dissimilar enough from characteristics found in the west to warrant use of the Arid West supplement.

Formal paired sample plots were established and evaluated in each wetland identified within the SAs. Paired sample plot locations were selected based on available resource maps, aerial imagery, and on-site assessment of the SA, which included identifying dominant plant species, changes in topography, soil test probes, and observed hydrologic inputs. In addition, verification plots were collected to characterize conditions in upland areas that had the potential to meet wetland criteria, including NWI mapped wetlands, mapped hydric soils, areas with hydrophytic vegetation and in geomorphic landscape positions that may support wetlands (e.g., toe of slopes, depressions, etc.).

Alternative methods were used at some locations within the SA. Wetlands were determined to be present within the ordinary high-water mark (OHW) of Threemile Creek. Boundaries were estimated based on geomorphic position and observations of hydrophytic vegetation, predominantly reed canarygrass (*Phalaris arundinacea*) and broadleaf cattail (*Typha latifolia*), and the presence of perennial surface water. No sample plots were collected at this site.

In some areas, mainly riverward of HDD drill areas, only desktop and visual surveys were conducted due to access restrictions (impenetrable understory, fencing) and safety concerns (steep slopes) (Figure 5, Appendix A). Conclusions about the presence or absence of wetland or other water resources in these areas could not be made; however, these areas are all outside the anticipated ground disturbance footprint, in areas of deep underground drilling, and would not be impacted by the Project. If ground disturbing activities are proposed in the future, additional field surveys may be needed in these areas. NWI wetlands mapped within the desktop and visual SAs are assumed to be present and are mapped on Figure 3 (Appendix A). At the Harborton substation site within the west end SA, permission to excavate soil pits was not granted. As a result, one wetland was determined to have hydric soils based on observations of hydrophytic vegetation and hydrology indicators present at the ground surface; this wetland boundary was conservatively estimated based on these observations (Section 6).

Sample plot and wetland boundary locations were recorded with survey-grade global positioning system (GPS) units capable of sub-meter accuracy (ArcCollector GPS unit with EOS Arrow GNSS receiver), surveyed by a qualified delineator, and mapped on Figure 5 (Appendix A). Sample plot observations were recorded on wetland determination data forms, provided in Appendix B. Ground-level color photographs recorded for each surveyed feature and at verification plots are presented in Appendix C. The methods used to determine the presence of hydric soils, hydrology, and hydrophytic vegetation are discussed in the following sections.

Soils

Generally, an area must contain hydric soils to be a wetland. Hydric soil forms when soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part (12 inches). Biological activities in saturated soil result in reduced oxygen concentrations, and organisms turn to anaerobic processes for metabolism. Over time, anaerobic biological processes result in certain soil color patterns, which are used as indicators of hydric soil. Typically, low-chroma colors are formed in the soil matrix, and bright-colored redoximorphic features form within the matrix. Other important hydric soil indicators include organic matter accumulations in the surface horizon, reduced sulfur odors, and organic matter staining in the subsurface (USDA NRCS 2018).

Soils at each representative wetland and upland sample plot were typically inspected to a depth of 16 to 24 inches to determine the presence or absence of hydric soil indicators based on guidance presented in the WMVC Supplement and Field Indicators of Hydric Soils Version 8.2 (USDA NRCS 2018). Soil samples were moistened when necessary to aid in the determination of soil matrix and redoximorphic features (if present): hue, value, and chroma (Munsell Color Services 2009). Soil texture was evaluated using field methods described by USACE and NRCS.

Wetland sample plots or verification plots were established in each type of hydric soil within the west end SA that were accessible and where permissions to excavate were granted. Two hydric soils occur in this area: Rafton Silt Loam (39) and Sauvie Silt Loam (44). Other soils that occur within the west end SA have minor hydric components: Pilchuck Sand (31) and Pilchuck-Urban Complex 0-3 percent slopes (33A). No hydric soils occur on the east end of the SA. All soil units occurring within the SAs are presented on Figure 4 (Appendix A).

Hydrology

Sample plots were examined for evidence of hydrology. Wetland hydrology criteria were considered satisfied if it appeared that the soil was seasonally inundated or saturated to the surface for a consecutive number of days greater than or equal to 12.5 percent of the approximate growing season. Approximate growing seasons, as recorded for the Portland International Airport and The Dalles weather stations, are detailed in Section 4.

Wetland hydrology indicators are divided into two categories: primary and secondary (Environmental Laboratory 2008; Environmental Laboratory 2010). Primary indicators of hydrology include surface inundation, high water table, and saturated soils. The presence of one primary indicator is sufficient to conclude that wetland hydrology is present. In the absence of a primary indicator, observation of two or more secondary indicators is required to conclude that wetland hydrology is present. Secondary indicators of hydrology include dry-season water table, shallow aquitard, geomorphic position, and facultative (FAC)-neutral test (Environmental Laboratory 2008; Environmental Laboratory 2010).

Antecedent rainfall received in the west end SA 3 months prior to the field survey was approximately 5 inches greater than normal (Section 4). As a result, HDR biologists were cognizant of potentially observing false positives for wetland hydrology during the field survey. Precipitation received within the SAs for all other surveys was considered within normal range.

Vegetation

The sample plots were examined for the presence of hydrophytic vegetation and the proportion of hydrophytic vegetation to non-hydrophytic vegetation. Sample plots varied in size depending on site topography and habitat complexity. The objective of establishing plots is to depict plant associations that reflect specific water regimes or other ecological factors. Therefore, on steep-sided riparian areas, a plot may consist of a narrow strip along the water's edge; or within a floodplain, a plot may be a standard 30-foot circle.

Hydrophytic vegetation is defined as vegetation adapted to wetland conditions. To meet the hydrophytic vegetation criterion, more than 50 percent of the dominant plants in each stratum must be facultative, facultative wetland, or obligate, based on the wetland indicator category assigned to each plant species by the USACE National Wetland Plant List (Table 12; Environmental Laboratory 2020). Table 12 lists the definitions of the indicator categories.

Dominant plant species and their wetland indicator status were evaluated to determine if vegetation criteria were met. In accordance with USACE methodology, for a vegetative community to be considered hydrophytic, the sample plot must meet either the rapid test for wetland vegetation, greater than 50 percent of the dominant plant species must be classified as hydrophytic or have a prevalence index of less than 3.00, where the sample plot also meets hydric soils and wetland hydrology indicators.

Table 12. Definition of Wetland Plant Indicator Categories

Wetland Indicator Category	Symbol	Definition
Obligate wetland plants	OBL	Almost always occur in wetlands.
Facultative wetland plants	FACW	Usually occur in wetlands but may occur in non-wetlands.
Facultative plants	FAC	Occur in wetlands and non-wetlands.
Facultative upland plants	FACU	Usually occur in non-wetlands but may occur in wetlands.
Upland plants	UPL	Almost never occur in wetlands.

Source: Lichvar et al. (2012)

5.2.2 Waterbodies

The OHW, the highest measured tide (HMT) and high tide line (HTL) for identified perennial and intermittent waters within the SA were recorded with survey-grade GPS units capable of sub-meter accuracy (ArcCollector GPS unit with EOS Arrow GNSS receiver), surveyed by qualified delineator, and mapped on Figure 5 (Appendix A). The centerline of ephemeral drainages was collected using the same method.

Ordinary High Water Mark

The SA was investigated for non-wetland, non-tidal water bodies using the methods described in the USACE *A Guide to Ordinary High Water Mark (OHW) Delineation for Non-Perennial Streams in the*

Western Mountain, Valleys, and Coast Region of the United States (Mersel and Lichvar 2014), OAR 141-085-0515 Removal-Fill Jurisdiction by Type of Water, and the *Streamflow Duration Assessment Method for Oregon* (Nadeau 2011). HDR biologists first identified likely features based on an analysis of aerial imagery, topographic maps, and available online mapping of resources (USGS 2024a; USGS 2024b). A field survey was conducted in these areas and others to evaluate features indicative of perennial, intermittent, or ephemeral streams, mainly the OHW: a clear, natural scour line, changes in depositional sediment, destruction of terrestrial vegetation, distribution of upland and water-tolerant vegetation, and drift deposits (OAR 141-085-0515[3]; Mersel and Lichvar 2014).

High Tide Line

Water bodies that occur below Bonneville Lock and Dam are considered tidally influenced (Roegner et al. 2010; DSL 2024c). Within the SA these water bodies include the Columbia and Willamette rivers, and the Columbia Slough.

HDR biologists identified the HTL in the SA using USACE guidance. Per USACE, (33 Code of Federal Regulations [CFR] 328.3[c][4]), the HTL is “the line of intersection of the land with the water’s surface at the maximum heights reached by a rising tide.” In the absence of actual data, the HTL can be identified by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. Additionally, the line includes spring high tides and other high tides that occur with periodic frequency but excludes storm surges.

A method used by the USACE to obtain the HTL uses the highest astronomical tide (HAT) referenced to the mean lower-low water (MLLW) datum (0.0 feet), as reported by NOAA station data for water surface elevations. The HAT refers to the highest predicted astronomical tide expected to occur at a specific station over the National Tidal Datum Epoch.

In Oregon, tidal rivers below the head of tide (Bonneville Lock and Dam) are jurisdictional to the state up to the elevation of the HMT or to the upper edge of wetland, whichever is higher and excluding storm surge (OAR 141-085-0515(2)). The HMT is determined by using tidal station data, installing gages on site or delineating in the field; using tidal data the HMT is considered the “highest water level elevation…converted to geodetic datum NAVD88” (DSL 2024c).

HDR reviewed tidal data maintained by NOAA for the Columbia River and Columbia River Slough from the Vancouver station (9440083) and tidal data for the Willamette River from the Portland Morrison Bridge station (9439221) (NOAA 2024a and 2024b). The data measurement “highest observed tide (max tide)” is assumed to represent the HMT. The HMT is expected to be located at a higher elevation than the HAT due to the nature of the waterways in the geographic landscape. Along with tidal influences, the Willamette and Columbia rivers and the Columbia Slough are subjected to annual and periodic fluctuations in water levels based on many factors, including regional precipitation input, upstream dam operations and the spring freshet.

Additionally, following OAR 141-085-0515 [2 (a-f)], biologists delineated HMTs on March 11-13, 2024, on the west bank of the Willamette River, the Columbia River shore north of Terminal 6 and the east side of the Columbia Slough. Delineated HTLs, nearby recorded tidal data and topographic resources were used to determine the high tide line or highest measured tide within the SA where shorelines were not accessible or tidal data is missing.

According to NOAA, highest observed tide (maximum tide) of 15.49 feet and HAT of 3.83 feet was recorded for the MLLW datum at the Vancouver station, which corresponds to elevation of 17.30 feet for maximum tide and HAT of 5.64 feet for the North American Vertical Datum of 1988 (NAVD88) datum with the Columbia River Datum offset. The present values are based on data from 1983 through 2001 (NOAA 2024a). The highest observed tide for the NAVD88 datum, 17.30 feet is mapped on Figure 5 (Appendix A) as the HTL for the Columbia River and Columbia Slough and is generally consistent with and slightly more conservative than physical indicators observed in the field which mainly occurred between 13 and 15 feet in elevation.

Tidal data from the Portland Morrison Street Bridge station (9439221) was used to determine HTL on the Willamette River. According to NOAA, the HAT of 4.12 feet was recorded for the MLLW datum, which corresponds to an elevation of 11.15 feet for the NAVD88 datum. There was no maximum tide (highest observed tide) recorded; therefore, the HAT of 11.15 feet was used as a reference, taken with field delineated highest measured tide to determine the elevation of the HTL. The present values are based on data from 1983 through 2001 (NOAA 2024b). For the Willamette River, the field indicators of the high water were located at a higher elevation (approximately 14 feet) than the NAVD88 HAT data (11.15 feet) recorded at the Portland Morrison Street Bridge station. The elevation of field indicators is presented on Figure 5 (Appendix A).

6 Description of All Wetlands and Other Non-Wetland Waters

A total of four wetlands, three aquatic features, four waterbodies, two ditches, and two ephemeral drainages were delineated or estimated within the east and west end SAs. No areas of special concern, as defined by OAR 141-090-0020(3), were identified in the SA. General location information and physical descriptions of each wetland and non-wetland water are summarized in subsections below, more detailed information is presented in Table 13 and Table 14. Other waters are fully described in Table 15.

Biologists did not have full access to all wetlands and water bodies in the SA due to property access issues, lack of permission to excavate soils, and safety concerns. The resources within areas that were not accessed were estimated using desktop methods, field observations (where possible), and best professional judgment, as noted in Section 5.2.1 and in this section. There are four mapped NWI wetlands that occur within the “desktop and visual survey only area” outlined on Figure 5. The alignment through these areas would be placed using HDD methods beneath shoreline and wetland areas. The following mapped NWI wetlands were not fully accessed during the wetland delineation survey and are assumed present within the SA:

- Between HDD Area 12 and Cofferdam 4 in The Dalles, PSS/EM1Ah, PFO1Ch and PEM1Fh wetlands are mapped by the NWI along the Columbia River shoreline (Figure 3, page 8). No NRCS hydric soils are mapped in this area. The topography in this area is approximately 5 to 10% grade downslope toward the river. Visual observation in the field and desktop review indicates the area mapped as PSS/EM1Ah wetland occurs within Wasco County Riverfront Park and is mainly comprised of an asphalt parking area and park infrastructure including restroom facilities, small maintenance buildings and a playground. The areas of mapped PSS/EM1Ah that occur outside park development are assumed present. Mapped PFO1CH and PEM1Fh wetlands occur in vegetated areas along the Columbia River shoreline and are assumed present.

- An area of mapped NWI PFO1S occurs southwest of HDD Area 07 East (Figure 3, page 6). No NRCS hydric soils area mapped in this area. Review of topography during survey and desktop resources show the potential for groundwater and rainwater to collect in a low topographic depression that occurs parallel and slightly north of the Columbia River shoreline. An overstory of black cottonwood (*Populus trichocarpa*) was observed during survey; however, the understory in the area was heavily armored with Himalayan blackberry (*Rubus armeniacus*) and not accessible. Field observation and desktop review indicate these wetlands are likely present.
- Ramsey Lake and multiple wetland types are mapped by the NWI (PEM1F, PSS1S, PSS1R, PFO1S, PUBV, and PUBT) between HDD Area 04 and HDD Areas 03a and 03b (Figure 3, page 3). NRCS mapped hydric soils occur in this area. Strong wetland signatures of hydrology and wetland vegetation were observed in the field and using desktop resources. These wetlands are assumed present.
- Along the west shore of the Willamette River, the NWI maps a narrow area PFO1R wetland (Figure 3, page 1). NRCS hydric soils are mapped in this area. Visual observations in the field of shoreline vegetation and desktop resources indicate these wetlands are likely present.

In addition, a stormwater feature, roughly 3,700 square feet, was observed within the footprint of HDD Area 2 located on the right bank of the Willamette River (Figure 5, page 4, Appendix A; Photo 39, Appendix C). Site access was not granted to fully investigate the site. Therefore, review of this feature was limited to visual observations in the field and desktop review of online resources. Standing water was present during the time of the survey. Aerial imagery shows the feature was likely created in 2020 as part of a large site expansion project on the parcel and likely receives hydrology inputs from stormwater runoff from impervious surfaces located on industrial lot to the north. No mapped NWI wetlands or hydric soils occur in the SA, and no wetland features were noted on historic aerial images or in the field. Downstream connection to the Willamette River could not be confirmed; collected stormwater could infiltrate on site.

The following is a summary of all wetland and other non-wetland waters.

6.1 Wetland 1

Wetland 1 (0.06 acres) occurs in a small closed depressional area on Hayden Island within the Hayden Island – Columbia River watershed (HUC 170800030200; OSU 2025) (Figure 5, page 31, Appendix A; Photos 18 and 19, Appendix C). This wetland is mapped in the NWI as PEM1C, and within the Hayden Island wetland priority site (GeoHub 2023). Dominant vegetation within the wetland includes reed canarygrass (*Phalaris arundinacea*) and Fuller's teasel *(Dipsacus follonum*). Vegetation in Wetland 1 was classified in the field as palustrine emergent (PEM) (Cowardin 1979). Soil profiles within the wetland meet the hydric soil indicator for redox dark surface. Soils are silt loam across three layers with matrix colors of 10YR 3/3, 7.5YR 3/1, and 2.5Y 3/3. Redox concentrations of 5YR 3/4, 7.5YR 3/3, 7.5YR 2.5/3, 10YR 3/4, and 2.5Y 3/1 begin 2 inches below the surface in the bottom two layers and are located in the matrix and pore linings. Wetland hydrology indicators include the primary indicators for inundation visible on aerial imagery. Secondary indicators for saturation visible on aerial imagery, geomorphic position, and FAC-neutral test are met. Wetland hydrology is attributed to groundwater and precipitation inputs.

6.2 Wetland 2A

Wetland 2A (0.06 acres) occurs in a small depressional area located to the south of Wetland 2B on Hayden Island within the Hayden Island – Columbia River watershed (HUC 170800030200; OSU 2025) (Figure 5, pages 29, Appendix A; Photos 20 and 46, Appendix C). The wetland is mapped in the NWI as PUBT and within the Hayden Island wetland priority site (GeoHub 2023). Dominant vegetation in the wetland is reed canarygrass. Vegetation in Wetland 2A was classified in the field as PEM (Cowardin 1979). Soil profiles within the wetland meet the hydric soil indicator for sandy redox. Soils are sandy loam, loamy sand or sand, with a matrix color of 10YR 2/1 or 10YR 4/1 and redox concentrations of 5YR 3/4 or 10YR 4/3 as concentrations in the matrix or along pore lining and root channels. Wetland hydrology indicators include visible inundation and saturation on aerial imagery and geomorphic position. Wetland hydrology is attributed to groundwater and precipitation inputs.

South of Wetland 2A and outside the SA, a verification plot (VP-13, Appendix B) confirmed wetland conditions. Dominant vegetation in the area is reed canarygrass. Soils were sandy and meet the sandy redox indicator for hydric soils. Positive wetland hydrology indicators include visible inundation on aerial imagery and the FAC-neutral test. No additional hydrology indicators were observed in the field. The wetland boundary was estimated from field observation and included on Figure 5, page 29 (Appendix A) and a ground-level photograph is included in Appendix C, photo 45.

6.3 Wetland 2B

Wetland 2B (0.71 acres) occurs in a depressional ponded area located on Hayden Island within the Hayden Island – Columbia River watershed (HUC 170800030200; OSU 2025) (Figure 5, page 29, Appendix A; Photos 21, 22a and 22b, Appendix C). The wetland is mapped in the NWI as PUBT and within the Hayden Island wetland priority site (GeoHub 2023). Dominant vegetation within the wetland includes reed canarygrass and an unidentified bluegrass species (*Poa ssp*). Vegetation in Wetland 2B was classified in the field as PEM (Cowardin 1979). Soil profiles within the wetland meet the hydric soil indicators for sandy redox. Soils are sandy loam, sand, and loamy sand with matrix colors of 10YR 2/2, 10 Y/R 3/2, 2.5Y 3/2, 2.5Y 4/1 and 5Y 3/1 and redox concentrations of 5YR 3/4 as concentrations in the matrix or along root channels. Wetland hydrology indicators include surface water, high water table, saturation, surface water visible on aerial imagery. According to current and historic aerial imagery, the ponded area within Wetland 2B is permanently flooded. The depth of surface water was roughly 2 to 3 feet deep at the time of the delineations. Wetland hydrology is attributed to groundwater and precipitation inputs.

6.4 Wetland 3

Wetland 3 (3.97 acres) is a depressional area that receives stormwater and precipitation inputs located east of the Willamette River and is located in both the Balch Creek – Willamette River watershed (HUC 170900120202) and the Columbia Slough watershed (HUC 170900120201; OSU 2025) (Figure 5, pages 5, Appendix A; Photos 32 through 38, Appendix C). The wetland has several distinct lobes and is mapped in the NWI as PUBH, PEM1F, and PSS1C, and within the Columbia Slough and Lakes wetland priority site (GeoHub 2025). Dominant vegetation includes reed canarygrass, bittercress (*Cardamine oligosperma*), an unidentified bluegrass species, an unidentified senecio (*Senecio ssp.*) species, slough sedge (*Carex obnupta*) red alder (*Alnus rubra*), shining willow (*Salix lasiandra*), and Hooker's willow (*Salix hookeriana*). Vegetation within the wetland was predominantly classified as palustrine scrub/shrub (PSS) with smaller communities of as PEM and palustrine forested (PFO) communities present (Cowardin 1979). Soil textures varied across the wetland and included sandy loam, sandy clay, silt loam, sand and, to a lesser degree, organic matter. Matrix colors included 10YR 3/2, 10YR 2/2, 7.5YR 2.5/1, 2.5Y 3/1 and 5Y 2.5/1 with redox concentrations of 7.5YR 3/4 within the matrix or along pore linings and root channels. Soil profiles within the wetland meet the hydric soil indicators for sandy redox, hydrogen sulfide, and redox dark surface across multiple soil pits. Wetland hydrology indicators include surface water, high water table, saturation, water marks, iron deposits, inundation and saturation visible on aerial imagery, oxidized rhizospheres along living roots, hydrogen sulfide odor, FAC-neutral test and geomorphic position. Wetland hydrology is attributed to groundwater, stormwater runoff and precipitation inputs. A roughly 24-inch stormwater culvert located on the east end likely discharges hydrology from upstream wetlands as well as stormwater inputs from the surrounding industrial developments (Photo 32, Appendix C). According to current and historic aerial imagery, ponded areas within Wetland 3 are permanently flooded. The depth of surface water was roughly 2 to 3 feet deep in the deepest portions of the ponded areas. During the field investigations it was observed that each distinct lobe of the wetland is hydrologically connected via stormwater pipes and surface water channels. No surface water connection to the Willamette River was observed during the wetland delineation.

6.5 Wetland 4

Wetland 4 (0.05 acres) is a riverine wetland located within the OHW of Threemile Creek and is within the Threemile Creek watershed (HUC 170701050402; OSU 2025) (Figure 5, pages 49, Appendix A; Photos 8, Appendix C). The wetland is mapped in the NWI as PSS1C. Dominant vegetation includes reed canarygrass and cattail (*Typha latifolia*). Red alder and Himalayan blackberry occur at the edges of the wetland and stream. Vegetation in Wetland 4 was classified in the field as PSS (Cowardin 1979). Wetland hydrology indicators include surface water, high water table, and saturation and are attributed to the wetland proximity to Threemile Creek. Soil pits were not dug for Wetland 4; hydric soils are assumed present.

6.6 Area A

Area A (0.03 acres) occurs in a depressional area within a historic dredged fill placement site and is in the Lake River – Frontal Columbia River watershed (HUC 170800030104; OSU 2025) (Figure 5, pages 35 and 36, Appendix A; Photos 24 and 25, Appendix C). This feature is not mapped in the NWI. Dominant vegetation includes western dogwood (*Cornus alba*), balsam poplar (*Populus balsamifera*) and an unidentified bluegrass species. Vegetation in Area A was classified in the field as PEM (Cowardin 1979). Soils in the wetland meet the hydric soil indicator for sandy gleyed matrix. Soils are sandy loam or sand with a matrix color of 10YR 2/2, 2.5YR 3/2 and 5GY 4/1 with no redox concentrations present. Wetland hydrology indicators include the primary indicators surface water, high water table, and saturation, with secondary indicators geomorphic position and FAC-neutral test. Hydrology is attributed to precipitation inputs.

6.7 Area B

Area B (0.01 acres) occurs in a depressional area within a historic dredged fill placement located southwest of Area B and within the Lake River – Frontal Columbia River watershed (HUC 170800030104; OSU 2025) (Figure 5, pages 35 and 36, Appendix A; Photos 25 and 26, Appendix C). This feature is not mapped in the NWI. Dominant vegetation includes an unidentified bunch grass (*Festuca ssp*) and *Poa ssp.*, both assumed to be facultative wetland species. Soils in the wetland meet the hydric soil indicators for sandy redox and stripped matrix. The soils are sand and sandy loam with a matrix color of 10YR 2/1 and 2.5Y 5/1 with redox concentrations of 7.5 YR 2.5/2 and 7.5YR 3/4 located in the matrix. Wetland hydrology indicators include the primary indicators high water table, and saturation, with one secondary indicator meeting geomorphic position. Hydrology is attributed to precipitation inputs.

6.8 Area C

Area C (0.10 acres) occurs in a depressional area located within a man-made berm and is located within the Birch Creek – Willamette River watershed (HUC 170900120202; OSU 2025) (Figure 5, pages 1 and 2, Appendix A; Photo 41, Appendix C). This depressional area formed in fill material from the Harborton Restoration Project completed in 2020 (PGE 2025). The fill material was excavated from dredging and restoration of the Harborton Wetlands located to the north. Fill was placed just east of the Harborton substation in order to create upland habitat. The area is not mapped as a wetland by NWI. USGS hydric soils are mapped; however, these soils are likely associated with the relic floodplain to the Willamette River located several feet below the fill material. Permission to excavate soils was denied so hydric soil indicators could not be evaluated. Dominant vegetation includes reed canarygrass, yarrow (*Achillea millefolium*), and *Poa ssp.* The primary wetland hydrology indicator for surface water was observed collected in equipment tire tracks (Photo 41b, Appendix C). High water table and saturation are assumed but could not be confirmed in the field. Hydrology is attributed to precipitation inputs and poor drainage due to soil compaction that likely occurred during fill placement and grading.

6.9 Threemile Creek

Threemile Creek is located within the SA at multiple locations along the east end of the project in The Dalles, Oregon (Figure 5, pages 49 through 52, Appendix A; Photos 6 through 8, Appendix C). In the SA, the creek is mapped in the NWI as PSS1C and in the NHD as an intermittent waterbody. Threemile Creek is located in Threemile Creek Watershed (HUC 170701050402; OSU 2025). The creek originates in the foothills of the east side of Mt. Hood and generally flows northeast to its confluence with the Columbia River. The stream gradient within the survey corridor varied between 2 and 10 percent with steeper gradients occurring upslope and adjacent to US 197. The existing riparian area has been truncated by urban development through the majority of the SA and generally consisted of an overstory of Russian olive (*Elaeagnus angustifolia*), Himalayan blackberry, and a varied herbaceous layer. Threemile Creek flows beneath US 197 between HDD Area 17 and 18 (Figure 5, page 52, Appendix A) and south of HDD Area 16 via culvert, and again beneath OR 30 west of HDD Area 14 via culvert (Figure 5, page 50 and 51, Appendix A). In these locations, both US-197 and OR 30 are elevated from the ground surface due to road fill while Threemile Creek flows beneath them. Threemile Creek also flows parallel to the proposed trench location south of I-84 (Figure 5, page 49, Appendix A). In this location, the OHW of Threemile Creek is approximately 100 feet east of the proposed cable location. Threemile Creek has an associated wetland within the SA, Wetland 4, near the northeast portion of the SA. Threemile Creek and Wetland 4 continue off site to the north.

6.10 Columbia River

The Columbia River is located within the east and west ends of the SAs and is located in the Lower - and Middle Columbia River Basins (HUC 170800 and 170701; OSU 2025) (Figure 5, pages 27, 28, 36, 37, 41, and 42, Appendix A; Photos 14, 27 and 28, Appendix C). The Columbia River is mapped in the NWI and NHD as a traditional navigable water (TNW). The Columbia River and its tributaries form the fourth largest river basin in North America, originating at Columbia Lake in British Columbia. The Columbia River is buffered by riparian habitat on both the east and west end as it flows through the project area, and is generally characterized as contiguous intact riparian vegetation, as described in the SFAM report. The proposed line will enter the Columbia River outside of the OHW at project HDD Area 12 and be installed via HDD to Cofferdam 4 within the OHW (Figure 5, page 42 and 43, Appendix A). From Cofferdam 4, the line will be installed via hydroplow within the OHW of the Columbia River as it is placed moving west up to a cofferdam located outside Hayden Island. The line will be drilled beneath the OHW to HDD Area 08 on Hayden Island (Figure 5, page 41, Appendix A). From HDD Area 08, the cable will be placed along Hayden Island via trench and be drilled beneath the Columbia River via HDD between the two HDD Areas 06 and 07, both of which are located outside the OHW (Figure 5, pages 36 and 37, Appendix A). All HDD areas and above ground trenching are located outside the OHW of the Columbia River and are placed in previously cleared areas with minimal to no riparian vegetation. The SFAM report was developed for in-water work in the Columbia River and will be submitted separately.

6.11 Columbia Slough

Columbia Slough is located within the western end of the project in Portland, Oregon (Figure 5, pages 16 and 17, Appendix A; Photo 31, Appendix C). In the SA, The Columbia Slough is mapped in the NWI as PFO1F, R1UBV, PSS1R, PEM1R, and PUBV and in the NHD as a perennial waterbody. The Columbia Slough is located in the Columbia Slough Watershed (HUC 170900120201; OSU 2025). The Columbia Slough is a narrow waterway about 20 miles long in the floodplain of the Columbia River. The slough generally meanders west from the Columbia River to the Willamette River, is low gradient (approximately 1.5 percent) and contains many adjacent wetlands and riparian habitat primarily comprised of black cottonwood, willow (*Salix ssp.*), ash (*Fraxinus ssp.)* and oak (*Quercus ssp.*) trees. The Columbia Slough within the SA is mapped by as the Columbia Slough and Lakes wetland priority site (GeoHub 2025). Within the SA the Columbia Slough is located between HDD Area 03a/03b and HDD Area 04 (Figure 5, pages 15 through 17, Appendix A). All these HDD work areas and all above ground trenching are located outside the HTL of the Columbia Slough and are placed in previously cleared areas with minimal to no riparian vegetation. The cable will be drilled beneath the Columbia Slough via HDD between HDD Areas 04 and 03a/03b.

6.12 Willamette River

The Willamette River is located at the west end of the SA in Portland, Oregon (Figure 5, pages 2 through 4, Appendix A; Photograph 40, Appendix C). In the SA, the river is mapped in the NWI as R1UBV and PFO1R, and in the NHD as a perennial waterbody. The Willamette River is located in the Balch Creek-Willamette River watershed (HUC 170900120202; OSU 2025). The Willamette River originates in the mountains south and southeast of Eugene and flows northward through Portland to its confluence with the Columbia River. The Willamette River riparian corridor is characterized generally as a riparian forest with forested wetlands, freshwater marshes and mudflats, with diverse vegetation of species and structure, though the riparian area within the SA has been previously disturbed, is not forested, contains no wetlands, and has much less species diversity. Within the SA, the cable will be drilled beneath the Willamette River between HDD Areas 01 and 02 (Figure 5, pages 1, 2 and 4, Appendix A). Both HDD work areas and all above ground trenching are located outside the OHW of the Willamette River and are placed in previously cleared areas with minimal to no riparian vegetation.

6.13 Verification Plots

A total of 12 verification plots (VP-1 through VP-14) were established in the SA to confirm upland conditions in areas where mapped NWI features occur, including within mapped hydric soils, areas with hydrophytic vegetation, and in geomorphic landscape positions that may support wetlands (e.g., toe of slopes, depressions, etc.). Plots VP-1 and VP-2 were established in an actively farmed agricultural field; early growing season aerial images are included in Appendix A.

Table 13 and Table 14 summarize the wetland and water bodies, respectively. All features in Table 13 meet the definition of a wetland based on survey of positive indicators of hydrophytic vegetation, hydric soils and wetland hydrology; three areas (Area A, Area B, and Area C) are presumed not to be jurisdictional to the USACE or DSL per regulations outlined in the table. Table 15 summarizes surveyed drainages and other waters. Detailed wetland and water body delineation maps, including verification plot locations, are provided in Figure 5 of Appendix A. Wetland determination data forms are provided in Appendix B. Representative ground-level color photographs are provided in Appendix C. Stream duration assessment forms are in Appendix E.

Table 13. Wetland Summary

Name	Figure 5 Map #	Lat/Long	Area (acre)[a]	Cowardin Classification[b]	HGM Classification[c]	Sample Points	Photo Points	USACE PJD[d]	DSL PJD[e]	Additional Information for Jurisdictional Determination	Access (yes/no)
Wetland 1	31	45.623584 -122.710258	0.06	PEM	Depressional	W1-P1 (W) W1-P2 (U)	18-19	No, (a)(4)	Yes, (4)	Wetland 1 occurs within a small closed depressional area on Hayden Island with PEM vegetation. Inundation is visible on aerial imagery in some years but there is no surface water connection to a jurisdictional water of the U.S. or state. This wetland is mapped by the NWI as (PEM1C) and NRCS hydric soils. This wetland is within a FEMA AE flood zone.	Yes
Wetland 2A	29	45.626912 -122718384	0.71	PEM	Depressional	W2-P1 (W) W2-P2 (U) VP-14	20, 46	No, (a)(4)	Yes, (4)	Wetland 2A occurs within a small closed depressional area on Hayden Island with PEM vegetation. The topography slopes i from southwest to northeast. No outlet or surface water connection to a jurisdiction water of the US or state was observed during the survey. This wetland is mapped by the NWI as (PUBT) and is within a FEMA AE flood zone but is not mapped as hydric soils (NRCS)	Yes
Wetland 2B	29	46.626522 -122717146	0.06	PEM	Depressional	W2-P3 (W) W2-P4 (U) W2-P5 (W) W2-P6 (U)	21, 22a and 22b	No, (a)(4)	Yes, (4)	Wetland 2B occurs within a closed depressional area on Hayden Island. The wetland is characterized as a depressional permanently ponded area with fringe PEM vegetative community. Inundation is visible on aerial imagery in some years. No outlet or surface water connection to a jurisdiction water of the US or state was observed during the survey. This wetland is mapped by the NWI (PUBT) with PSS fridge and is within FEMA AE flood zone but is not mapped as hydric soils (NRCS). No shrub/scrub vegetation was observed during the site visit.	Yes
Area A	35 and 36	45.618825 -122.716722	0.03	PEM	Depressional	Area A-P1 (W) Area A-P2 (U)	24-25	No, (b)(7)	No, (7)(b)	Area A occurs within a man-made depressional feature created in upland in the early 2000s by the placement of a large quantity of dredge fill sand placed over geomembrane fabric. This feature appears to have been created for stormwater conveyance due to the presence of an outlet on the east end of the feature, but no signs of flow were observed in the field. No wetland is mapped in this location in the NWI nor do NRCS hydric soils occur here. This area occurs within FEMA Flood Zone X. This area meets the definition of a wetland but would not be considered a water of the US per USACE Title 33 CFR 328(b)(7). In addition, because this wetland is an artificially created wetland created entirely from upland soils, this area will likely be considered exempt from state regulation per OAR 141-085-0515(7)(b).	Yes
Area B	35 and 36	45.618658 -122.716893	0.01	PEM	Depressional	Area B-P1 (W) Area B-P2 (U)	25-26	No, (b)(7)	No, (7)(b)	Area B is physically similar to Area A and these areas are separated by a man-made soil berm. No outlet is present. No wetland was mapped on the NWI or hydric soils mapped on NRCS. This area occurs within FEMA Flood Zone X. This area meets the definition of a wetland but would not be considered a water of the U.S. per USACE Title 33 CFR 328(b)(7). In addition, because this wetland is an artificially created wetland created entirely from upland, this area will likely be considered exempt from state regulation per OAR 141-085-0515(7)(b).	Yes
Wetland 3	5	45.618080 -122.781029; 45.617280 -122.785019; 45.616996 -122.783152	3.97	PSS	Depressional	W3-P1 (W) W3-P2 (U) W3-P3 (W) W3-P4 (U) W3-P5 (W) W3-P6 (U)	32-38	No, (a)(4)	Yes, (4)	Wetland 3 is a wetland complex that occurs within a large depressional area near the Willamette River. In early 2000s, the majority of the wetland is artificially created and serves as a stormwater retention basin. The area is mapped as several different NWI wetlands with the following Cowardin classes: PEM1F, PSS1C, and PUBH. This area occurs within FEMA Flood Zone X and is not mapped in NRCS hydric soils.	Yes
Area C	1 and 2	45.614694 -122.794906	0.10	PEM	Flats	Area C-P1 (W) Area C-P2 (U)	41	No, (b)(7)	No, (7)(b)	Area C occurs within a man-made berm constructed in 2020 for the PGE Harborton Wetland Restoration Project. The area is mapped as hydric soils (NRCS) but not mapped in the NWI. Permission to excavate soil samples was not granted; hydric soils are assumed. This area meets the definition of a wetland but would not be considered a water of the US per USACE Title 33 CFR 328(b)(7). In addition, because this area is created entirely from upland, this area will likely be considered exempt from state regulation per OAR 141-085-0515(7)(b). This area occurs within FEMA Flood Zone X.	Yes, with condition of no excavation of soils
Wetland 4	49	45.601846 -121.141901	0.05	PSS	Riverine	N/A	8	Yes, (a)(4)(i)	Yes, (4)	Wetland 4 is a riverine wetland that occurs within the OHW of Threemile Creek. This wetland is mapped by NWI (PSS1C) and occurs in a FEMA Zone A floodway. No NRCS hydric soils are mapped in this portion of the SA. Wetland 4 continues off site to the north and there is a mapped surface connection to the Columbia River via Threemile Creek.	Yes

[a.] As measured within the survey area.
[b.] *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979; FGDC 2013). PSS = palustrine scrub shrub; PEM = palustrine emergent; PUB = palustrine unconsolidated bottom.
[c.] Hydrogeomorphic (HGM) classification is based on *A Hydrogeomorphic Classification for Wetlands* (Brinson 1993).
[d.] Code of Federal Regulations (CFR) Title 33 Part 328.3, USACE.
[e.] OAR 141-085-0515.

Table 14. Water Bodies Summary

Name	Figure 5 Map #	Linear feet in survey area	Flow Regime[a]	Receiving Water Body[b]	USACE PJD[c]	DSL PJD[d]	ESH (yes/no)[e]	OHW Width (ft)[f]	Photo Point(s)	Additional Information for Jurisdictional Determination	Access (yes/no)
Threemile Creek	49 - 52	1064	Intermittent	Columbia River	Yes, (a)(3)	Yes, (3)	Yes	40	6 - 8	According to the NWI, this creek is mapped as a relatively permanent waterbody (RPW) that discharges directly to the Columbia River. Wetland 4 is mapped within the OHW of this creek and contains reed canary grass (FACW) and broadleaf cattail (OBL) species within the stream channel in the downstream reaches of the SA. Several individuals of two species of macroinvertebrates, caddisfly (family Leptoceridae) and mayfly (family Leptohyphidea) were observed attached to large cobble across multiple sample sites within the stream bed. Stream flow in the creek was determined to be intermittent using SDAM (Appendix E). The stream is mapped in the NWI as a PSS1C wetland and as an intermittent water in the USGS NHD. Wetland 4 occurs within the OHW of Threemile Creek (Figure 5, page 49). This creek is mapped by DSL as essential salmonid habitat (ESH) for coastal cutthroat trout (*Oncorhynchus clarkii clarkii*) and summer steelhead (*Oncorhynchus mykiss*) (DSL 2025). ODFW also lists Threemile Creek as habitat for coho salmon (*Oncorhynchus kisutch*) (ODFW 2021).	Yes
Columbia River	27, 28, 36, 37, 41, 42,	3,257	Perennial	Pacific Ocean	Yes, (a)(1)(i)	Yes, (2)	Yes	1600-3840	14, 27, 28,	The Columbia River is a traditional navigable water (TNW) that occurs within the east and west end SAs. The Columbia River is well-documented as having suitable habitat for multiple fish species including protected resident and anadromous species such as coastal cutthroat, coho salmon, chum salmon (*Oncorhynchus keta*), and multiple runs of Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead, among others (ODFW 2021). The main stem of the Columbia River is mapped as essential fish habitat for chum salmon between river mile 125 and 147, roughly from Bonneville Dam downstream to Reed Island (DSL 2025). Areas within the Columbia associated with discharge locations for Mill, Chenoweth, Rock, Viento, and Dry creeks are mapped as essential fish habitat for coastal cutthroat trout and coho salmonid habitat near the mouth of Herman Creek.	Yes
Columbia Slough	16 and 17	283	Perennial	Willamette River	Yes, (a)(1)(i)	Yes, (2)	Yes	170	31	The Columbia Slough is a TNW that is within the SA roughly 1 mile upstream of its discharge point to the Willamette River. ODFW documents occurrences of and mapped essential salmonid habitat for fall Chinook salmon, coho salmon and summer steelhead. This water is channelized and does not support wetland conditions within the SA. The Columbia Slough discharges to the Willamette River roughly 0.9 miles northwest of the SA. The NWI maps the Columbia Slough as a R1UBV riverine habitat.	Yes
Willamette River	2 - 4	1096	Perennial	Columbia River	Yes, (a)(1)(i)	Yes (2)	Yes	1,150	40	The Willamette River is a TNW that is within the SA at approximate river mile 3.5. The river is fish bearing and has habitat and documented fish presence for many of the same species as the Columbia River (ODFW 2021) and is mapped as essential salmonid habitat for fall and winter Chinook salmon, coho salmon and summer steelhead (DSL 2025). The Willamette River discharges to the Columbia River roughly 3 miles downstream of the SA. The stream is mapped as a R1UBV riverine habitat by the NWI.	Yes

[a] Nadeau 2011.
[b] USGS 2024b.
[c] Title 33 CFR 328.3
[d] OAR 141-085-0515.
[e] DSL 2025.
[f] As measured at the OHW from within the survey area.

Table 15. Drainage and Other Waters Summary

Name	Figure 5 Map #	Linear feet in survey area	Flow Regime[a]	Receiving Water Body[b]	USACE PJD[c]	DSL PJD[d]	ESH (yes/no)[e]	OHW Width (ft)[f]	Photo Point(s)	Additional Information for Jurisdictional Determination	Access (yes/no)
Drainage 1	60	132	Ephemeral	Not determined	No, (b)(8)	No, (3)	No	N/A	3	Dry stormwater feature occurs roughly 75 feet below road grade of Columbia View Drive. No indicators of intermittent or perennial stream flow observed, flow determined to be ephemeral using Streamflow Duration Assessment Method (SDAM) (Appendix E). Any hydrology received in the drainage is assumed to infiltrate onsite and does not appear to make a downstream connection to jurisdictional waters. Large quantities of rock were placed at the entrance and exit of the culvert located roughly 75 feet below road grade. No sign of stream flow (debris rack, stream bed scour, rock/gravel sorting, etc.) was observed. Channel estimated to be 10-30 feet wide. There were no signs of bed and bank or wetland vegetation. No visible connection to downstream waters was found. Appears to infiltrate to uplands roughly 0.9 miles north. Drainage is not mapped by the NWI or within hydric soils and does not support fish (DSL 2025; ODFW 2021).	Yes
Drainage 2	54 and 56	547	Ephemeral	Threemile Creek	No, (b)(8)	No, (3)	No	N/A	4 - 5	Drainage 2 crosses the SA in two places, once at Columbia View Drive and once along. No sign of stream flow (debris rack, stream bed scour, rock/gravel sorting, etc.) was observed in either drainage location within the US 197SA. No indicators of intermittent or perennial stream flow observed, flow determined to be ephemeral using SDAM (Appendix E). Both channels estimated to be 10-30 feet wide. There were no signs of bed and bank or wetland vegetation. The drainage discharges to Threemile Creek roughly 0.25 miles downstream to the northwest. Both sections of the drainage that occur in the SA are mapped in the NWI as a R4SBC stream, but field investigations determined the feature to be an ephemeral channel. Drainage is not within mapped hydric soils and does not support fish (DSL 2025; ODFW 2021).	Yes
Pit 1	44	-	Seasonally flooded	N/A	No (b)(5)	No (7)(d)	No	15	11	A pit, roughly 15 feet x 10 feet around was observed within HDD Area 12. Field observations, historic aerials and ground level imaging indicate this pit is man made and associated with farming by a transient community inhabiting the area since roughly 2012. Surface water was observed approximately 4 feet below ground level, no inlet or outlet was present. Hydrology is likely from a high-water table and fluctuates seasonally. Depth of water within the pit was not able to be determined in the field. Vegetation surrounding the pit was mostly absent except for dispersed patches of Bermuda grass and an unidentified *Poa* species. This area is mapped by the NWI as PSS/EMCh1 and is not located with USDA hydric soils.	
Ditch 1	1 and 2	600	Intermittent	N/A	No, (b)(3)	No, (7)(c)	No	12	42 - 43	Ditch 1 occurs within SA and adjacent to the south side of the Harborton Substation fenced yard. This stormwater detention ditch was created within mapped NWI hydric soils. However, it was noted that this ditch was excavated within the previously disturbed and graded substation footprint. Wetland signatures were not observed on historic aerial images. Hydrology was present during the time of the survey, but no other wetland indicators were observed, nor was an outlet observed. A stormwater detention pond occurs adjacent to Ditch 1 and is likely hydrologically connected via a culvert below ground surface to a wetland depression located 20-30 feet lower in elevation. The ditch does not contain game fish and does not have a free and open connection to waters of the state. Permission to excavate soils at the site was not granted so no verification plot was established.	Yes, with condition of no excavatio n of soils
Ditch 2	1	0	Intermittent	N/A	No, (b)(3)	No, (7)(c)	No	12	44	Ditch 2 occurs adjacent to and outside the northern fence line and SA at Harborton Substation. This stormwater detention ditch was created within NWI mapped hydric soils. However, it was noted that this ditch was excavated within the previously disturbed and graded substation footprint which is elevated above the surrounding landscape at this location. Wetland signatures were not observed on historic aerial images. Hydrology was present during the time of the survey, but no other wetland indicators nor outlets were observed. The ditch does not contain game fish and does not have a free and open connection to waters of the state. Permission to excavate soils at the site was not granted so no verification plot was established.	Yes, with condition of no excavatio n of soils

[a] Nadeau 2011.
[b] USGS 2024b.
[c] Title 33 CFR 328.3
[d] OAR 141-085-0515.
[e] DSL 2025.
[f] As measured at the OHW from within the survey area.

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7 Deviation from NHD or NWI

NWI and NHD mapped features are included on Figure 3 in Appendix A, with accompanying photos provided in Appendix C. The SWI and NWI were used during desktop review and SWI is analogous to the NWI wetlands mapped within the SA (DSL 2024a). No wetlands or waters are mapped in LWI databases within the SAs (DSL 2024b).

7.1 East End

Many of the wetlands and waters are mapped by the NWI within the historic Columbia River floodplain. These areas have been heavily modified by human activities, including highway and road construction, industrial and commercial development, and conversion of the Columbia River shoreline into maintained park lands. Field investigations within the delineation SA determined that many mapped wetland features lacked indicators for wetland hydrology, vegetation, and soils; thus, are not considered wetlands.

Drainage 2 is mapped as a riverine intermittent habitat, but field investigations determined the feature to be an ephemeral channel. Threemile Creek is mapped within the SA by the NWI as palustrine forested/palustrine scrub-shrub (PFO/PSS1C) wetland but most of the streambed gradient and undercutting along the banks inhibit wetland formation. PEM wetlands are mapped by the NWI outside the SA where stream bed characteristics such as relatively shallow gradient and unconsolidated bottom material are conducive to wetland formation.

The depressional area south of I-84 and north and south of Tie Plant Road near Verification Plot 5 (VP-5) and HDD Area 12 is an NWI-mapped palustrine shrub-scrub/emergent (PSS/EMCh1) wetland (Figure 5, Pages 43 and 44, Appendix A). A few dispersed black cottonwood trees (*Populis balsamifera*) and nootka rose (*Rosa nutkana*) were noted on the west end of the depressional area but did not form a dominant community. Biologists observed that the majority of the depression was filled with large boulders and the vegetation community was dominated by upland species, including tree of heaven (*Ailanthus altissima*), Russian olive (*Elaeagnus angustifolia*), Canada thistle (*Cirsium arvense*), bull thistle (Cirsium vulgare), common mullein (*Verbascum thapsus*), blackberry (*Rubus armeniacus*) and upland grasses mainly Bermuda grass (*Cynodon dactylon*), downy brome (*Bromus tectorum*). A pit, roughly 15 feet x 10 feet was noted within HDD Area 12 (Photo 11, Appendix C). Surface water was observed approximately 4 feet below ground level, no inlet or outlet was present, hydrology is likely from a high-water table. Vegetation surrounding the pit was mostly absent except for dispersed patches of Bermuda grass and an unidentified *Poa* species. Lands within the HDD Area 12 footprint were comprised mostly of bare sandy ground with dispersed occurrences of upland grasses with blackberry, Russian olive and tree of heaven occurrences at the boundaries. Verification Plot 5 (VP-5) was established just west of this area, in the lowest point of the depression where minor change in vegetation occurs. The verification plot is located near a culvert from beneath I-84 to the north; no signs of flow were observed during the field investigation. Based on desktop and field investigations, this area was determined to be upland.

The same plant species observed above were also found in the SA located along the roadway on the south side of Tie Plant Road. No data plot was established for this area to determine the presence or absence of the mapped NWI wetland in this location. No wetland signatures were observed on current and historic aerials and the area within the previously disturbed portion of the

SA does not occur in hydric soils. This area is not within the anticipated disturbance area for project construction.

Lands north of I-84 and occurring in Riverfront Park are mapped NWI wetlands. No hydric soils are mapped in this area. No data plots were established in the area; only a visual survey was conducted on lands north of HDD Area 12 as no ground disturbing activities are proposed and the park was closed at the time of the survey. Additional desktop review and visual field survey show this land is comprised mainly of paved areas associated with park and boat ramp entrances, and vehicle and boat trailer parking. Areas landward of the delineated OHW were generally sloped (3 to 15 percent) toward the Columbia River shoreline and no areas likely to accumulate hydrology were observed. Parcels within the SA in this location are previously disturbed and currently maintained park and recreation facilities with no wetland signatures.

7.2 West End

Most of NWI wetlands and NHD waters mapped within the west end SA were determined to be present in the field. Three additional wetlands were delineated in areas where human activity created conditions appropriate for wetland formation.

Mapped NWI wetlands located west of HDD Area 07 East were not fully accessed due to site access issues (Figure 5, Pages 32 and 37, Appendix A). Verification Plot 9 (VP-9) was established just outside but at the same elevation as the NWI wetlands and at the lowest point within the HDD footprint. The verification plot did not meet any wetland indicators, and the area is considered upland. For SAs that were inaccessible, additional desktop resources were reviewed. No wetland signatures were observed on aerials or from viewpoints in the field and no hydric soils are mapped in this area. Where mapped NWI wetlands were accessible, the same vegetation species as VP-9 were observed; no hydrology indicators were observed. No ground disturbance is anticipated in this area.

7.2.1 Mapping Methods

During the field surveys, sample plot and photo point locations, wetland boundaries, and OHW boundaries were recorded using ArcCollector GPS unit with EOS Arrow GNSS receiver capable of submeter accuracy. The resulting data are shown as points, lines, and polygons on Figure 5 in Appendix A. The coordinate system included a referenced horizontal datum using the OR North American Datum of 1983 (NAD83) State Plane Coordinate System.

Wetland and waterway features were entered in the GPS in the field with a simple nomenclature by waterbody name. Waterway features that continued outside the SA were not mapped.

Data points collected with the GPS receivers used in the field were plotted onto the 2017 aerial images. The aerial imagery does not align with GPS data as the aerial is offset roughly +/- 10 feet. As such, the aerial imagery is provided for general reference only.

8 Additional Information

DSL and USACE would have jurisdiction over water and wetland features if they meet regulatory authority defined as described below.

DSL regulates “waters” (including rivers and wetlands) for the State of Oregon. DSL regulates waters using volume amounts of materials (i.e., sediments) removed or filled into a regulated water resource and location of activity. Waters of the state regulated under the Removal-Fill Law (Oregon Revised Statute [ORS] 196.795–196.795.990) are defined under OAR 141-085-510 and include:

> *“…all natural waterways, tidal and non-tidal bays, intermittent streams, constantly flowing streams, lakes, wetlands, that portion of the Pacific Ocean that is in the boundaries of this state, all other navigable and non-navigable bodies of water in this state and those portions of the ocean shore, as defined in Oregon Revised Statute 390.605, where removal or fill activities are regulated under a state-assumed permit program as provided in 33 U.S Code 1344(g) of the Federal Water Pollution Control Act, as amended.”*

Per OAR 141-085-0515, estuaries, tidal bays, and rivers below the head of tide are jurisdictional to the elevation of the highest measured tide (excluding storm surge) or to the upper edge of the wetland, whichever is higher. Wetlands are further defined as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (OAR 141-085-0510[105]). Wetlands are jurisdictional within the wetland boundary.

USACE would have jurisdiction over traditional navigable waters, which includes all the waters described in 33 CFR 328.3(a)(1) and 40 CFR 230.3(s)(1). USACE would also assert jurisdiction over tributaries that are relatively permanent waters and wetlands adjacent to these tributaries or traditional navigable waters, including over adjacent wetlands that do not have a continuous surface connection to traditional navigable waters or tributaries that are relatively permanent waters.

USACE and DSL preliminary jurisdictional determinations are summarized in Table 13, Table 14 and Table 15.

9 Results and Conclusions

A total of five wetlands, three aquatic features, four waterbodies, two ditches, two drainages and one pit were delineated or estimated during the wetland and waters surveys conducted in 2023, 2024, and 2025. Preliminary jurisdictional determinations for identified aquatic features are included in Table 13, Table 14, and Table 15; jurisdictional wetlands and waters would be regulated by the provisions of the Clean Water Act as administered the USACE and DSL.

10 Disclaimer

This report documents the investigation, best professional judgment, and conclusions of the investigators. It should be considered a Preliminary Jurisdictional Determination and used at your own risk until it has been approved in writing by the DSL in accordance with OAR 141-090-0005 through 141-090-0055, and the USACE in accordance with Section 404 of the Clean Water Act (OAR 141-090-0035 [7][k]).

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Appendix A. Figures

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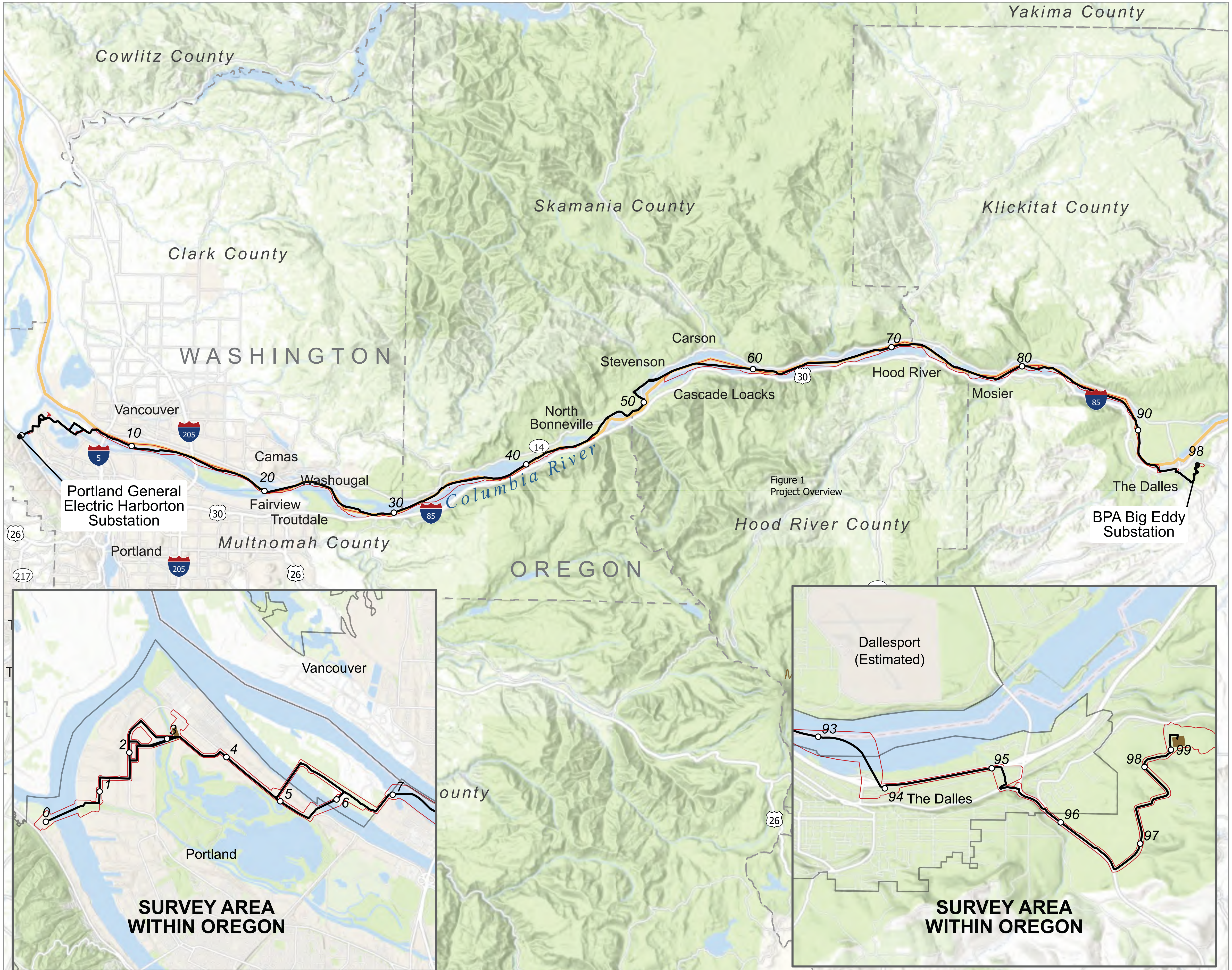


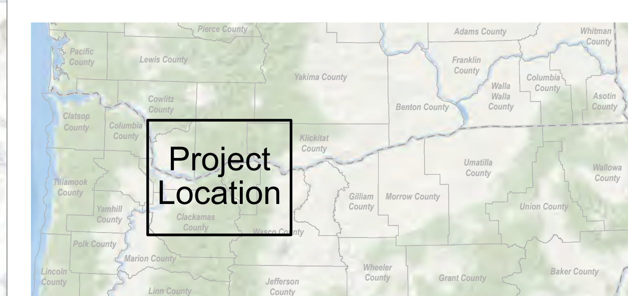
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1
PROJECT OVERVIEW

FOR INFORMATION ONLY - CONCEPT DRAWING

- Project Alignment Miles (Miles)
- Proposed Alignment
- County Boundary
- State Boundary
- Wetland and Waters Survey Area

CASCADE RENEWABLE TRANSMISSION



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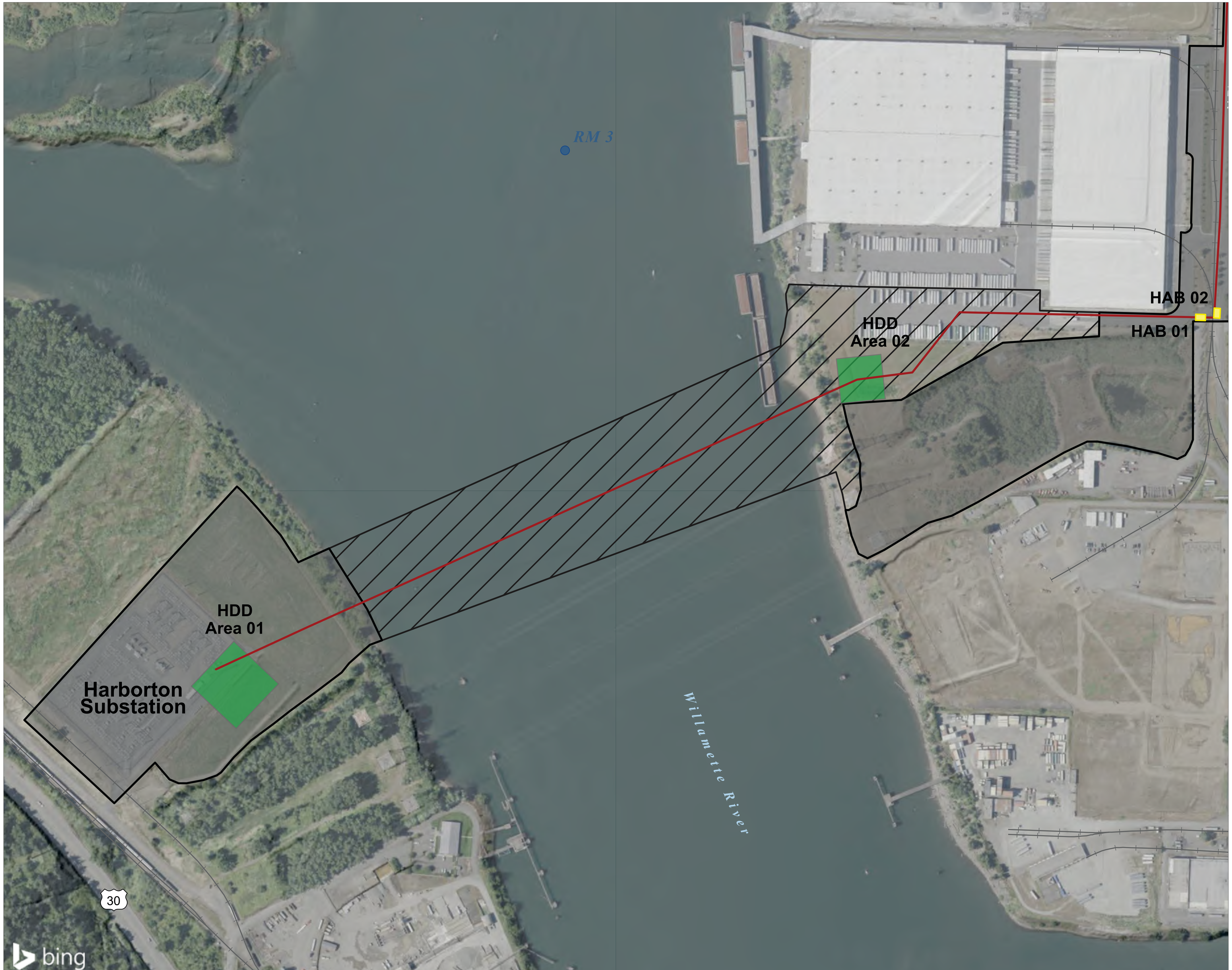
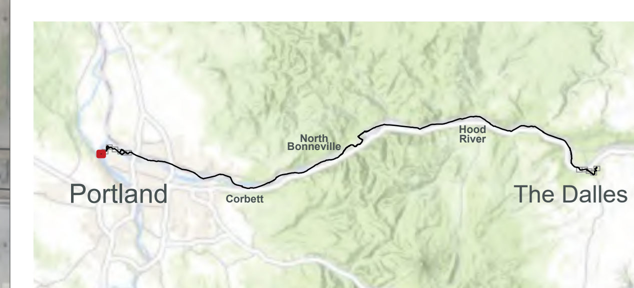


FIGURE 1 PROJECT LOCATION MAP
PAGE 1 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

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4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 2 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION

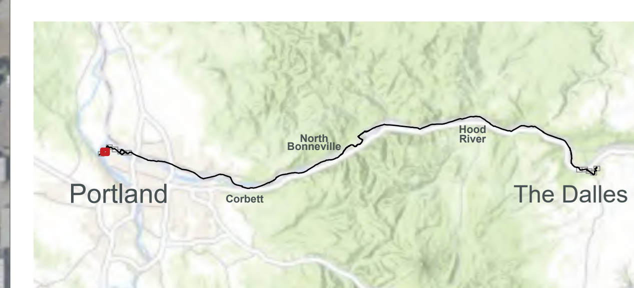

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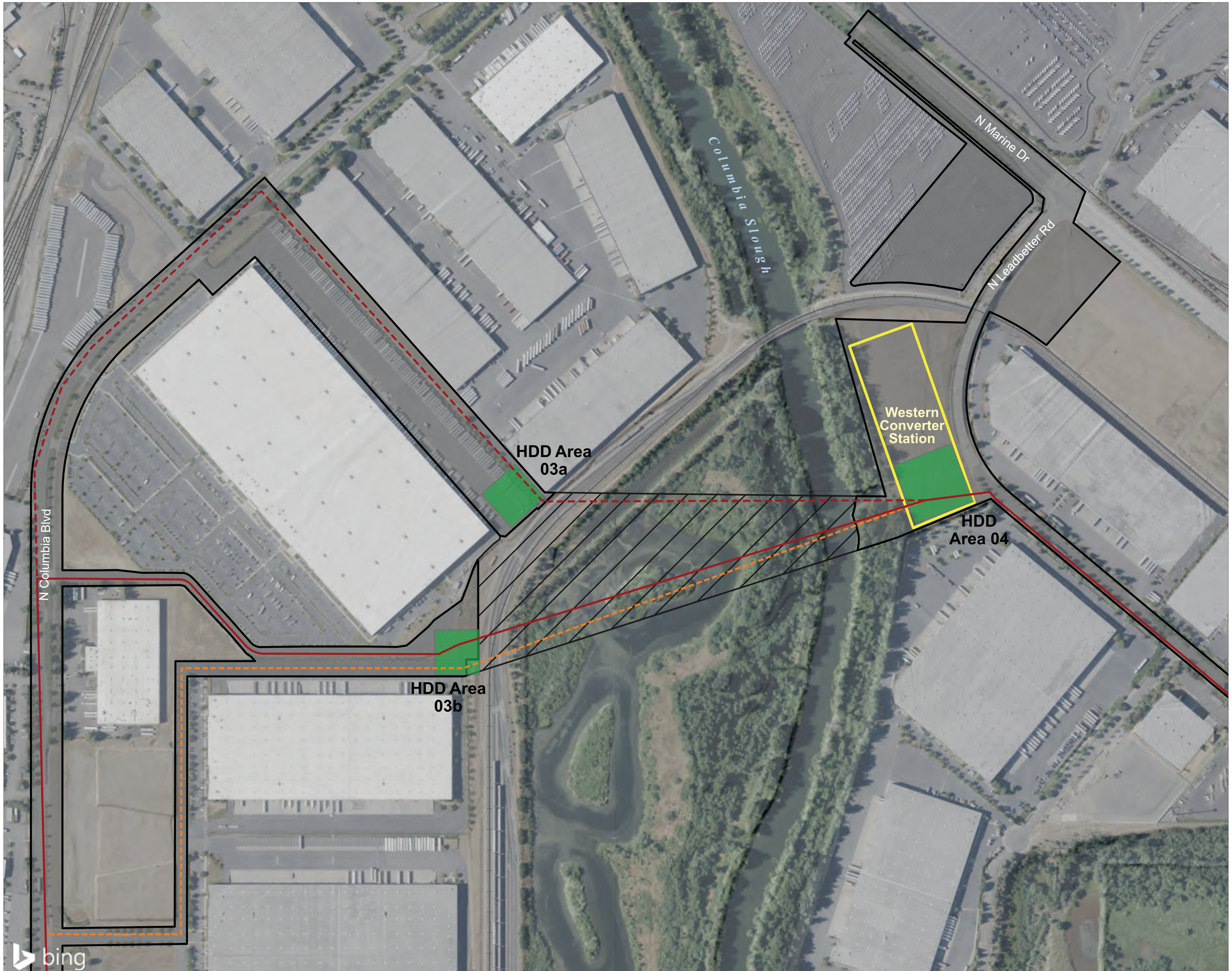
FIGURE 1 PROJECT LOCATION MAP
PAGE 3 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WESTERN AC ALTERNATIVE NORTH
- WESTERN AC ALTERNATIVE SOUTH
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY



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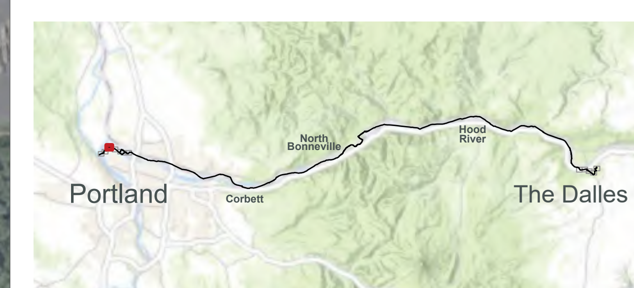

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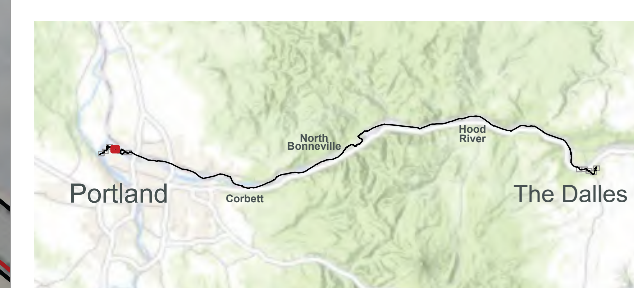
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 4 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25, 30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



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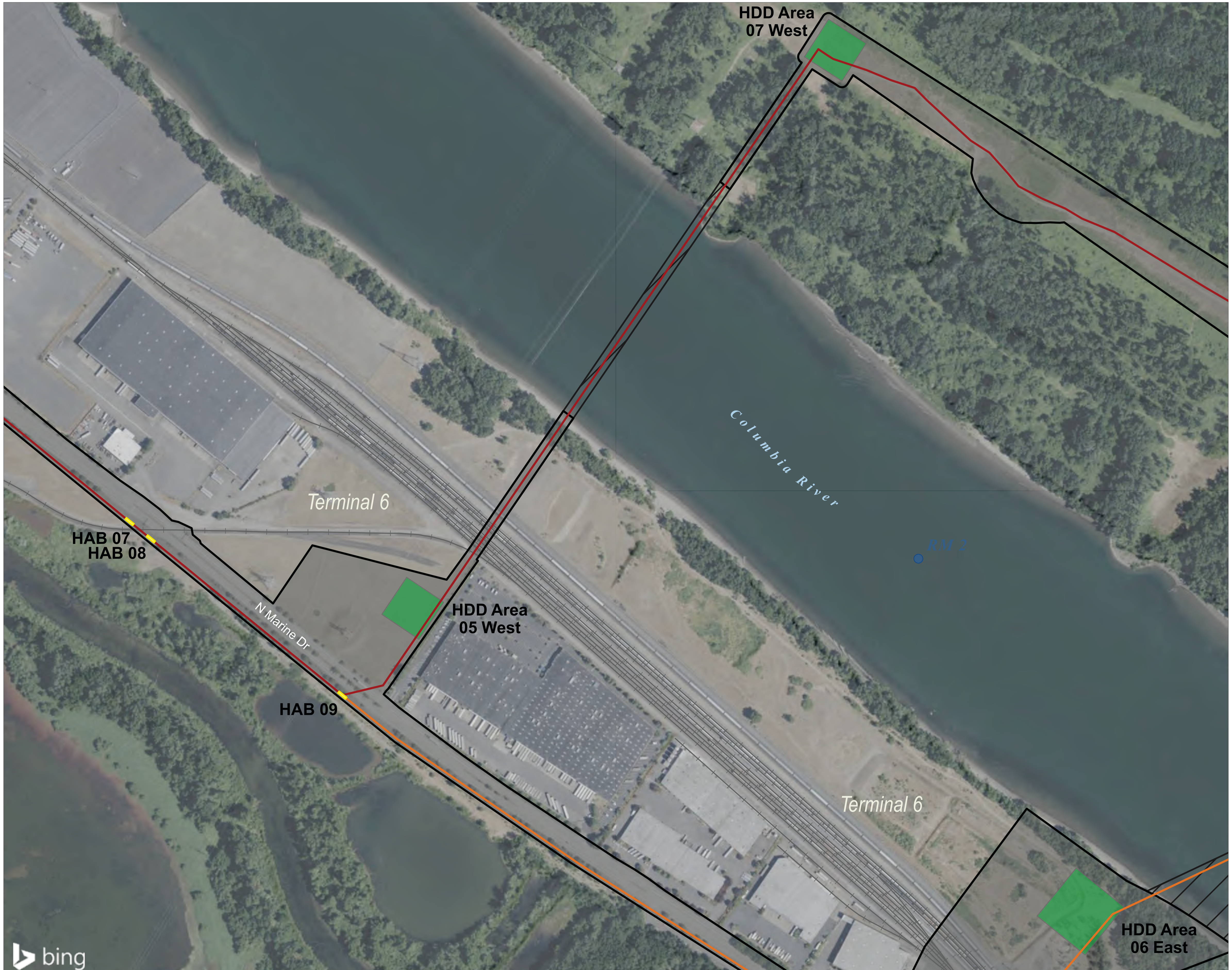
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

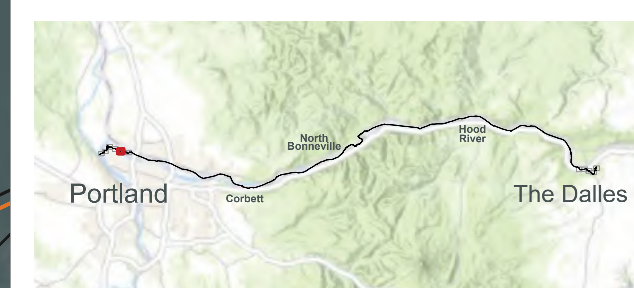
FIGURE 1 PROJECT LOCATION MAP
PAGE 5 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND



FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



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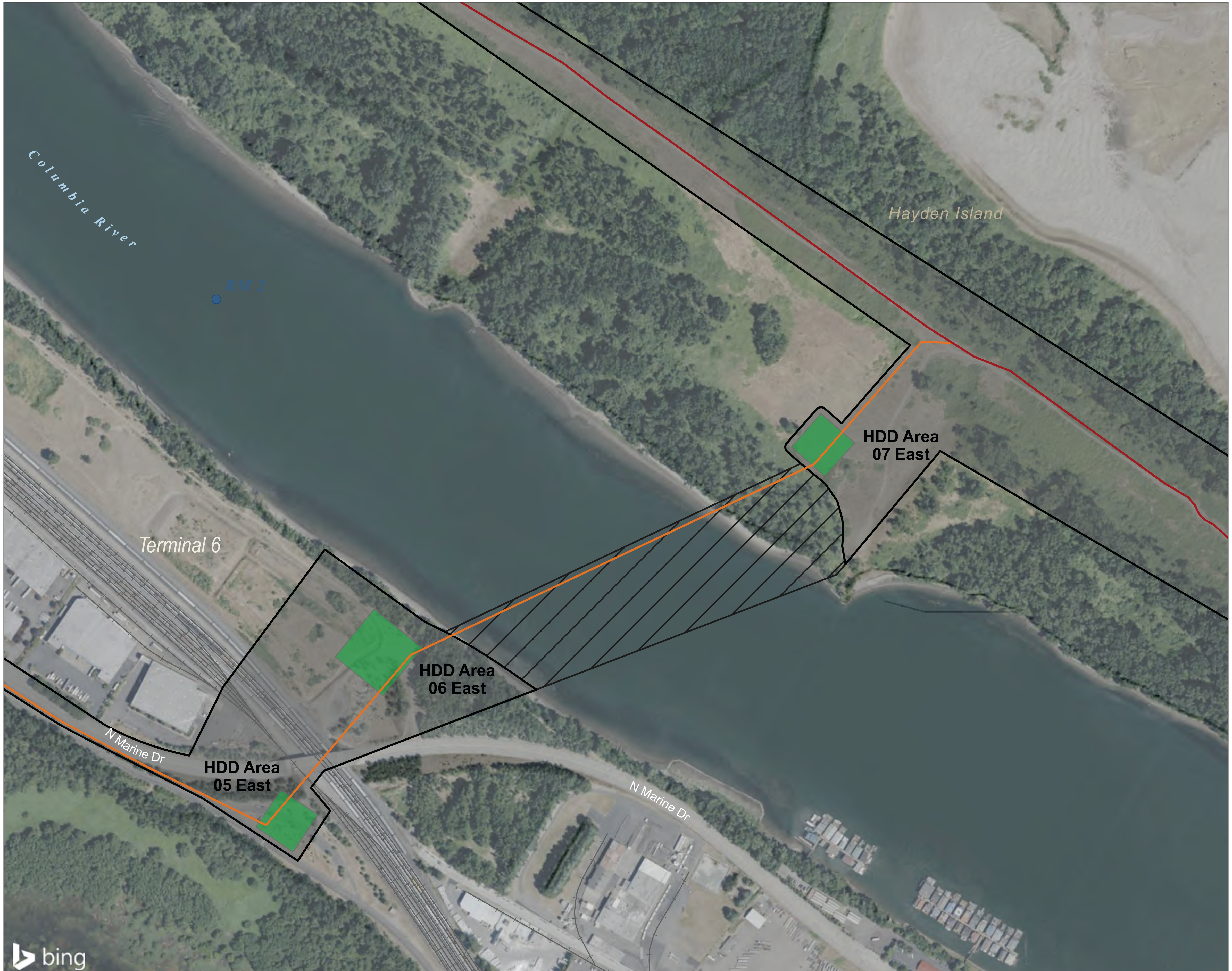
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



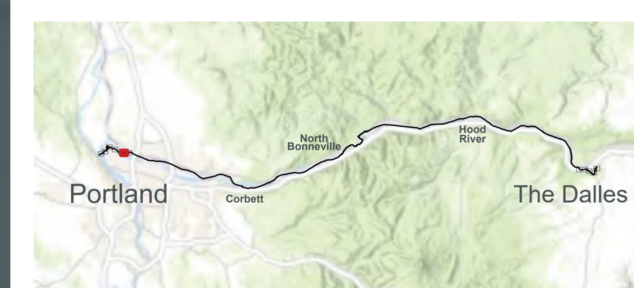
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 6 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



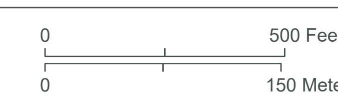
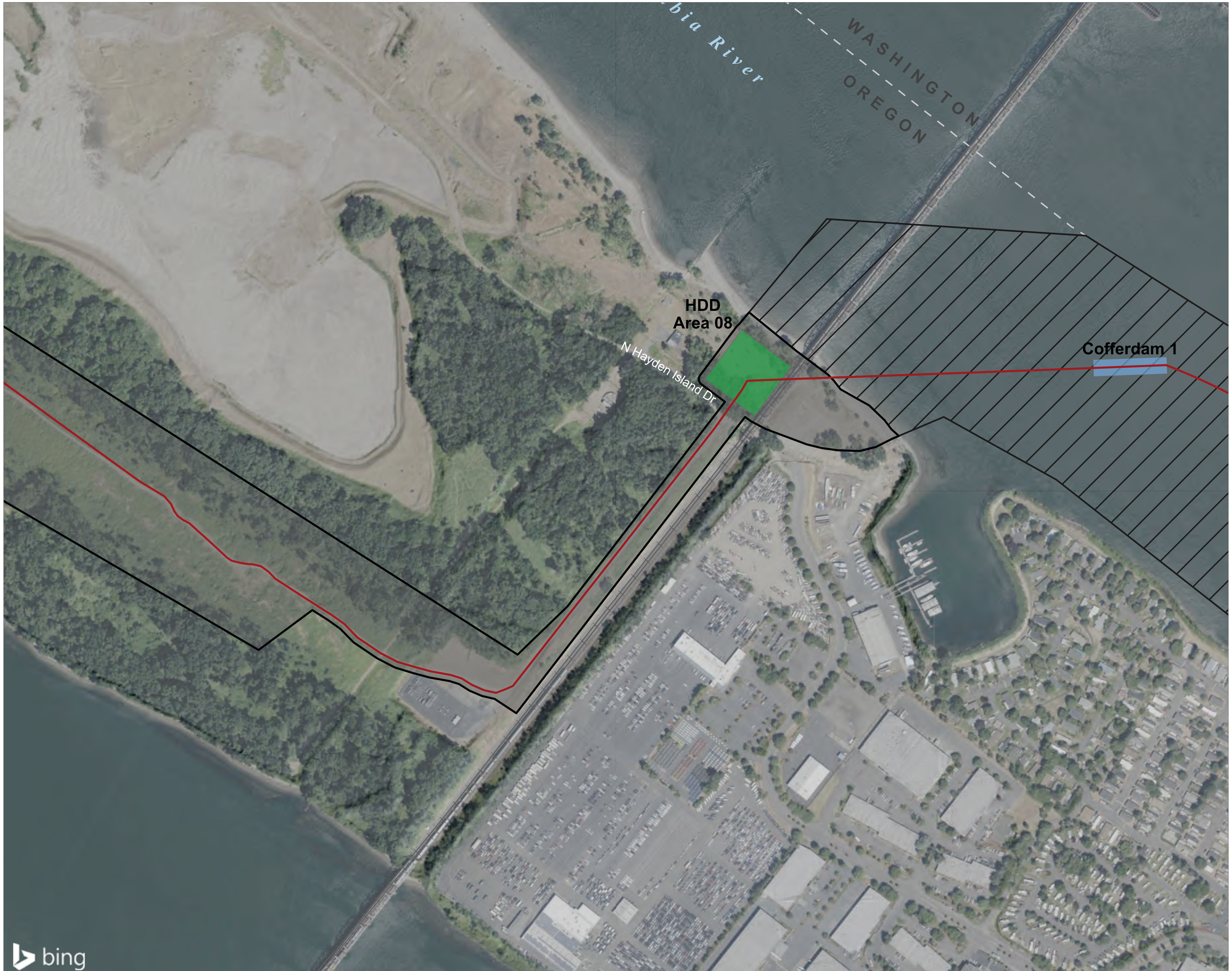


FIGURE 1 PROJECT LOCATION MAP
PAGE 7 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY



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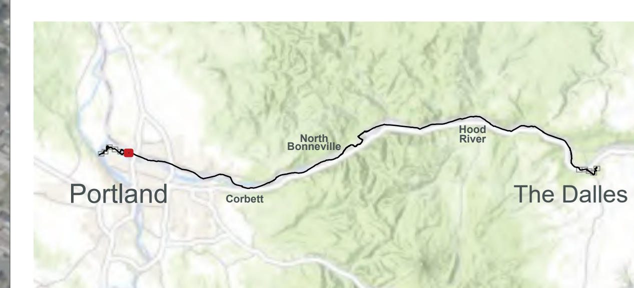

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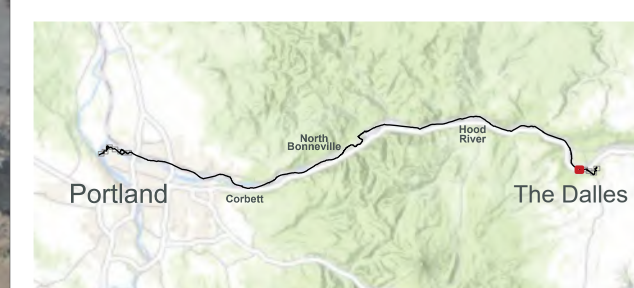
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 8 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT
TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
TEMPORARY 3-SIDED WET COFFERDAM
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

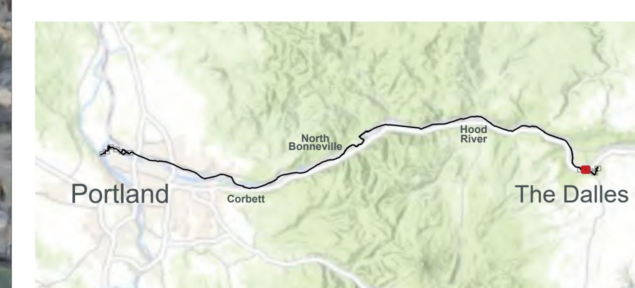
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 9 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

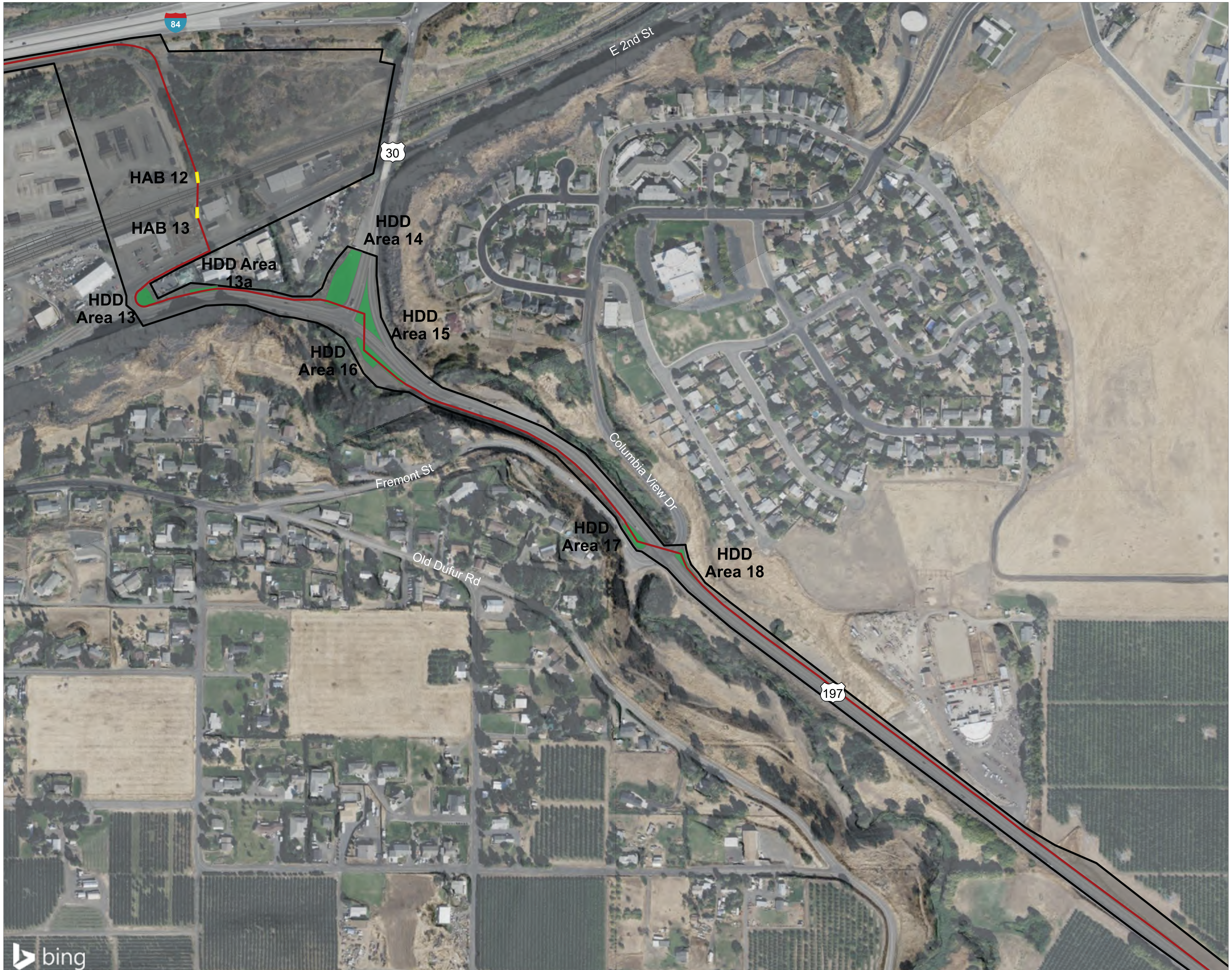
CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



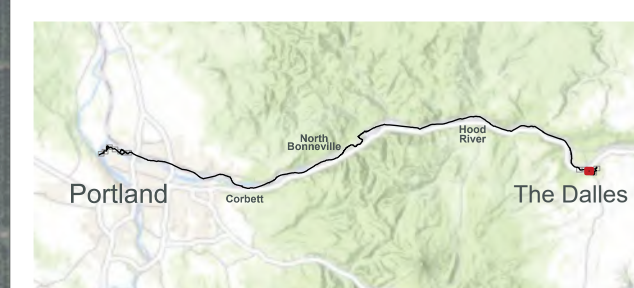
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 10 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

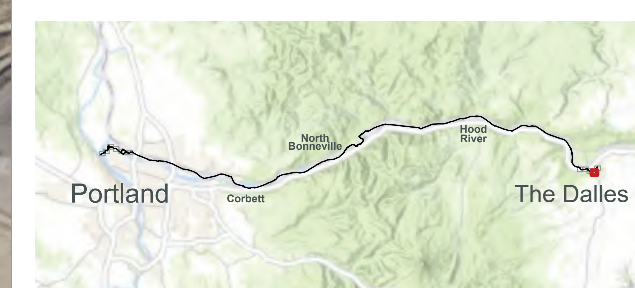
0 500 Feet
0 150 Meters

FIGURE 1 PROJECT LOCATION MAP
PAGE 11 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

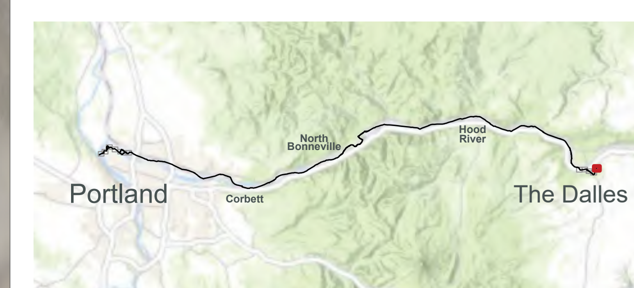
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 12 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT
CONVERTER STATION
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

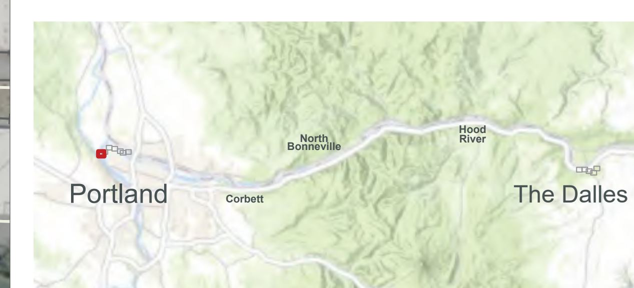
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 1 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



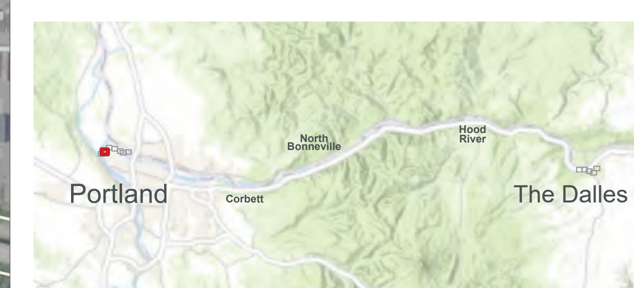
0 500 Feet
0 150 Meters

FIGURE 2 TAXLOT MAP
PAGE 2 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WESTERN AC ALTERNATIVE SOUTH
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

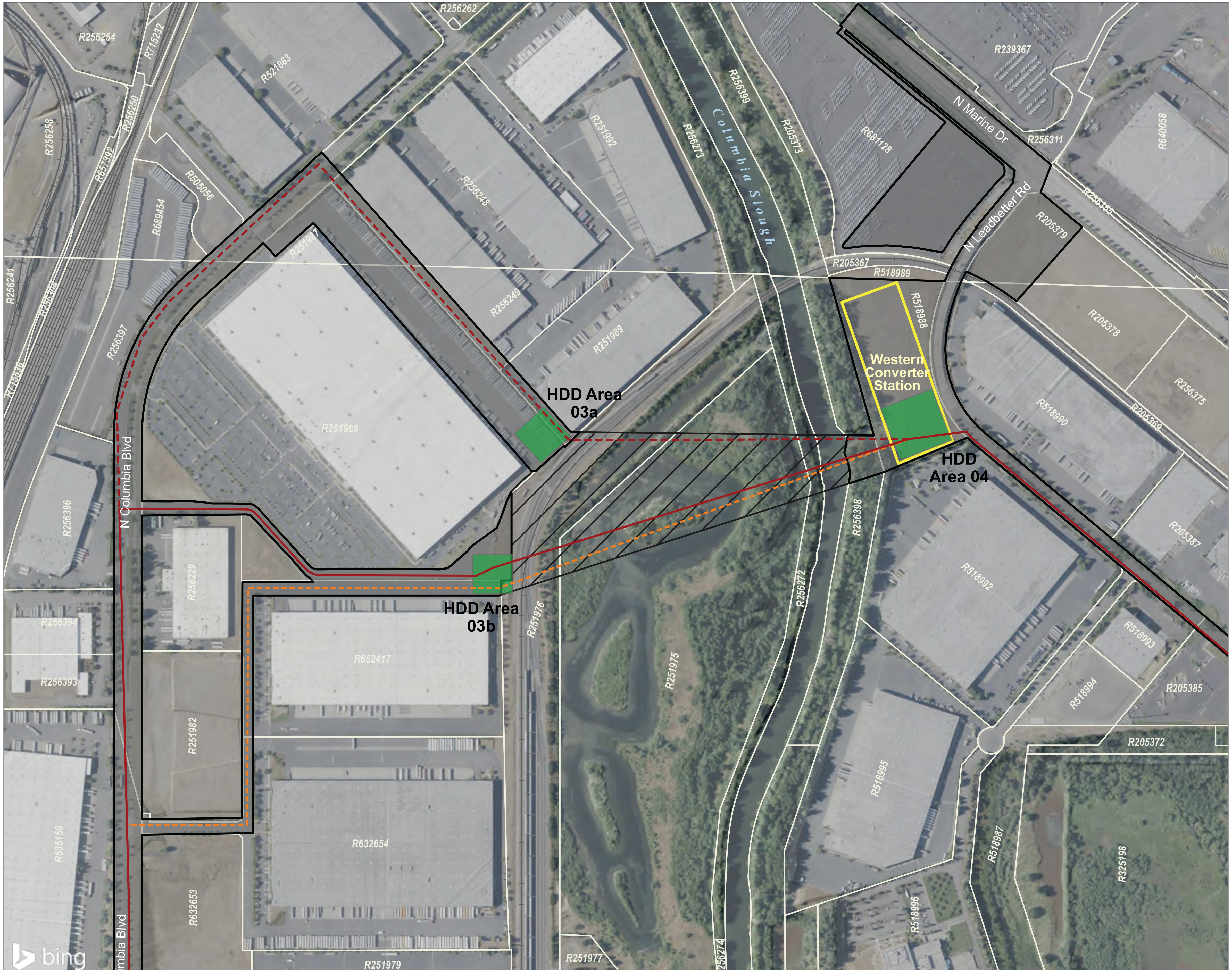
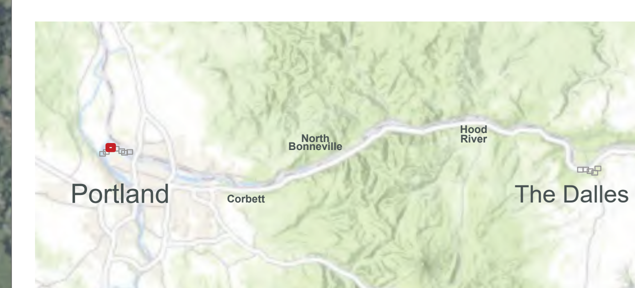


FIGURE 2 TAXLOT MAP
PAGE 3 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WESTERN AC ALTERNATIVE NORTH
- WESTERN AC ALTERNATIVE SOUTH
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

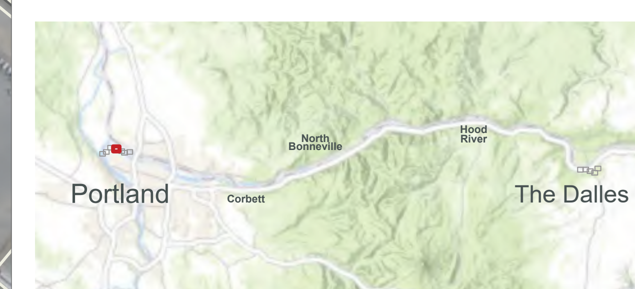
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 4 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25, 30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

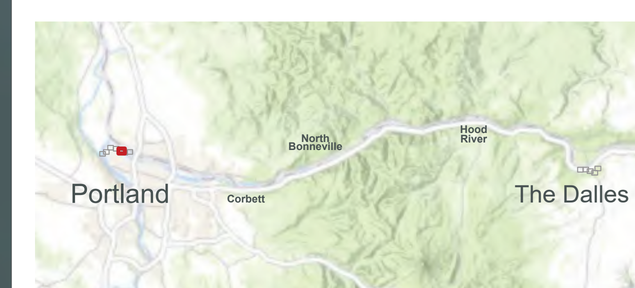
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 5 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

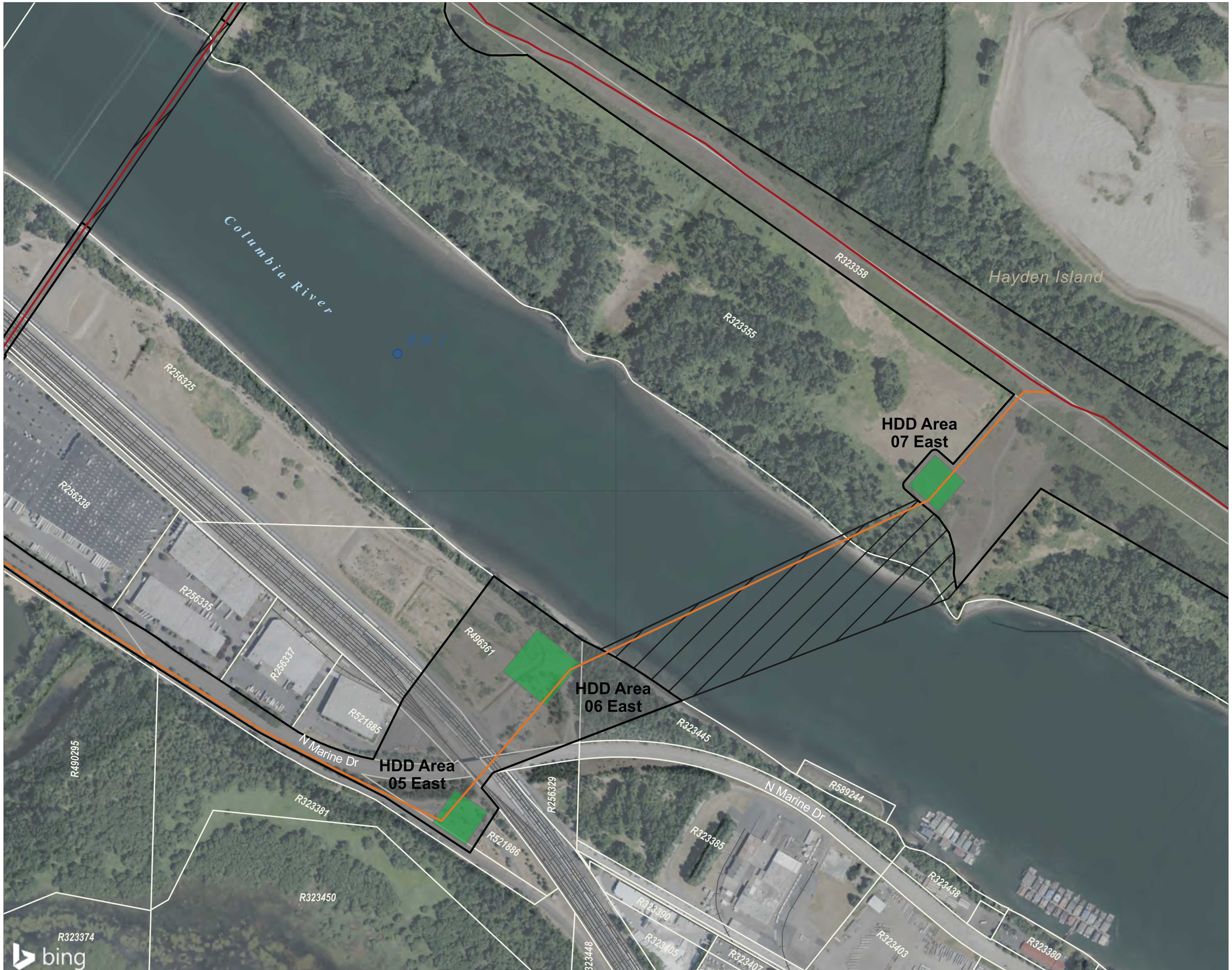
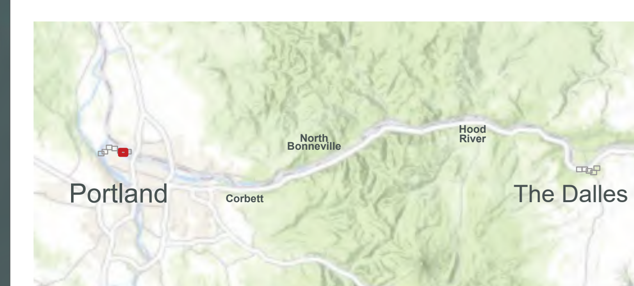


FIGURE 2 TAXLOT MAP
PAGE 6 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 7 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

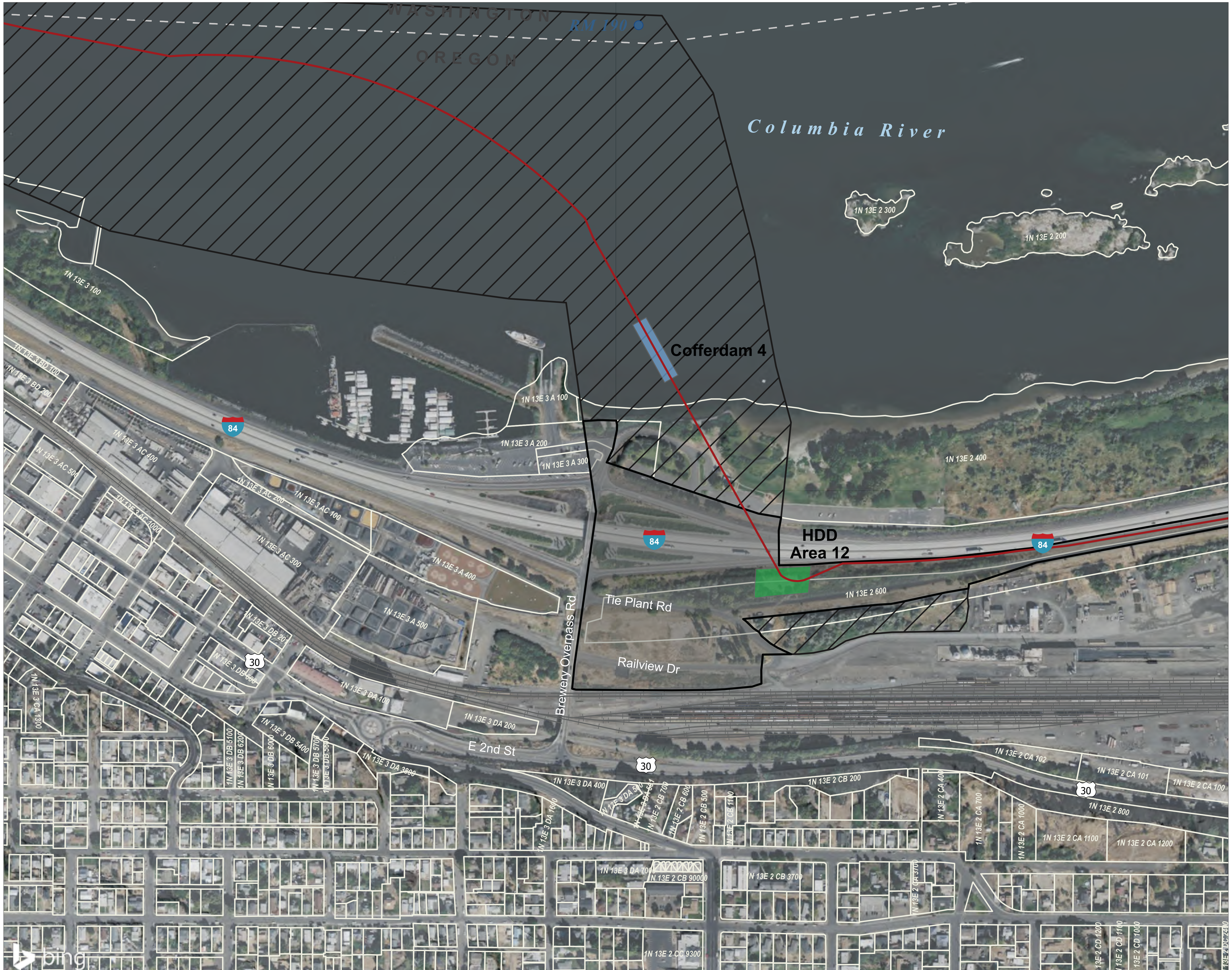
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION

HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 8 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION

HDR

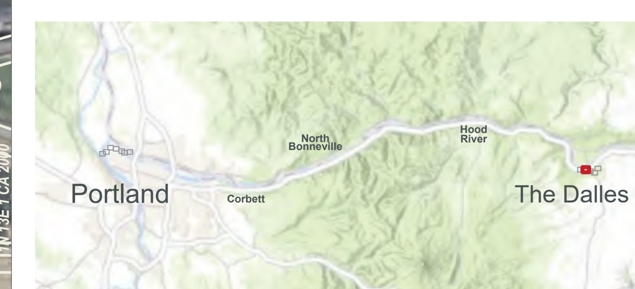
0 500 Feet
0 150 Meters

FIGURE 2 TAXLOT MAP
PAGE 9 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION

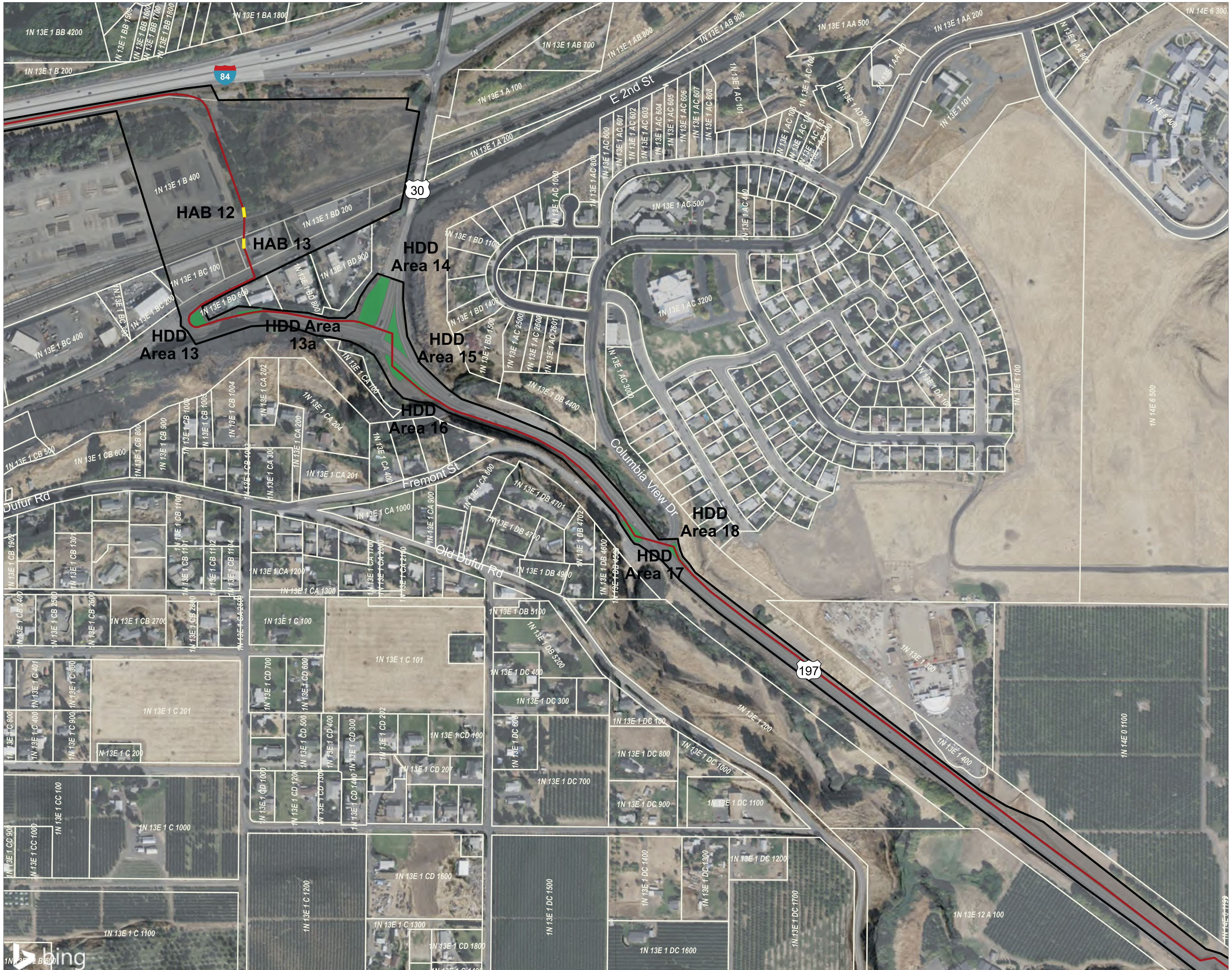


HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

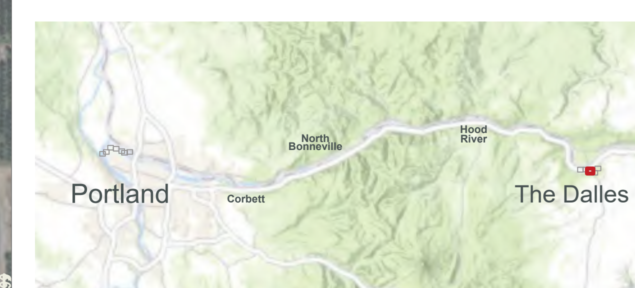
FIGURE 2 TAXLOT MAP
PAGE 10 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH



FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

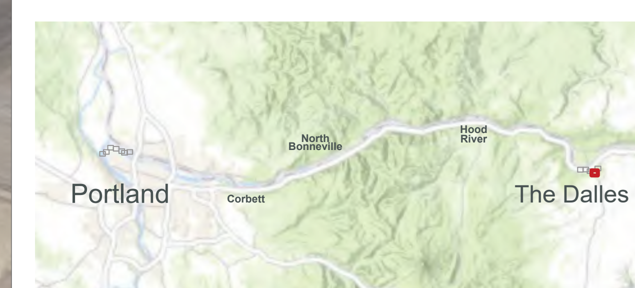
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 11 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 12 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

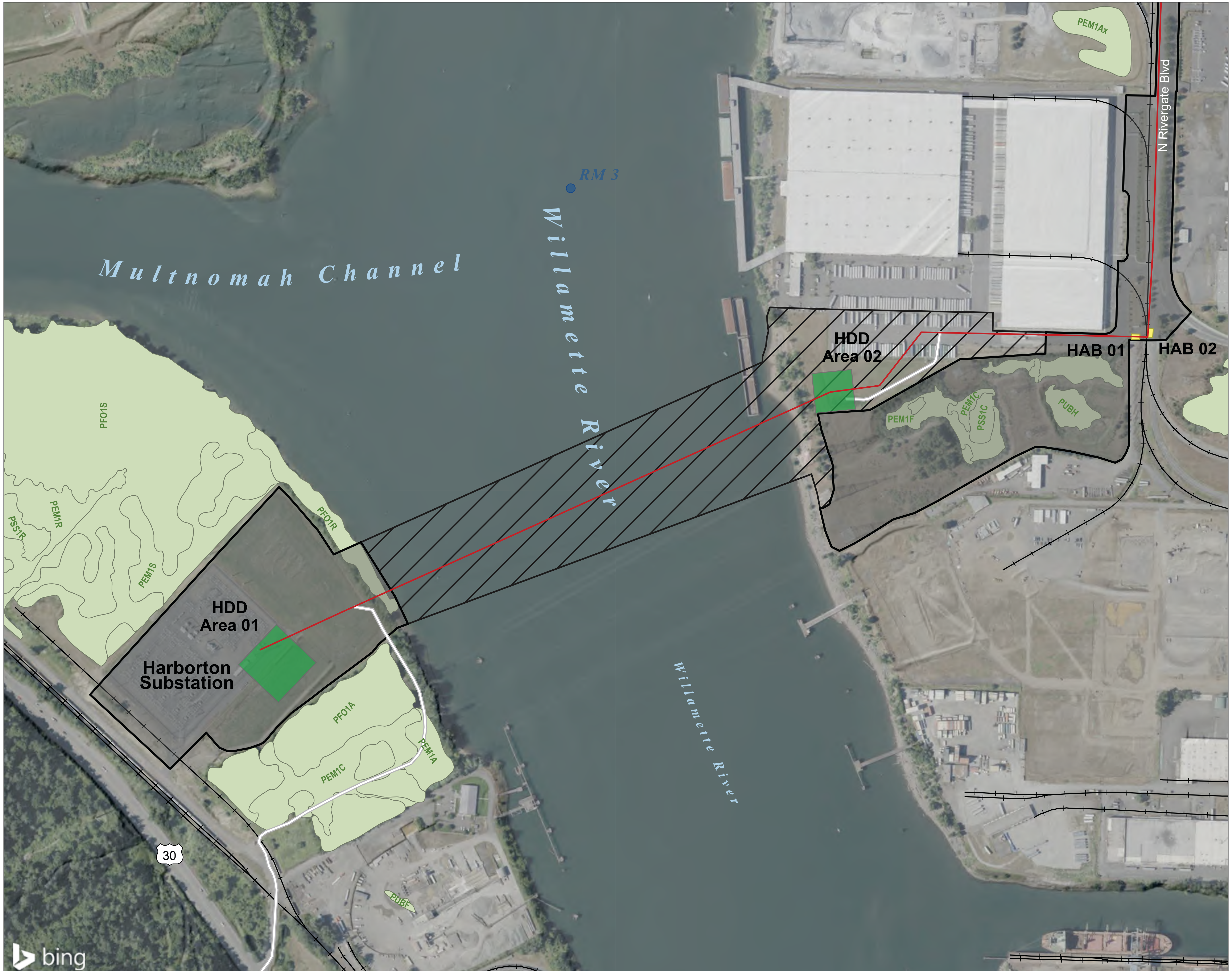
- PROPOSED ALIGNMENT
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION

HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

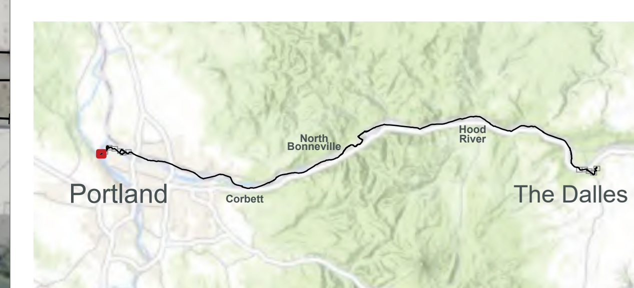
FIGURE 3: NWI AND NHD MAP
PAGE 1 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME: LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

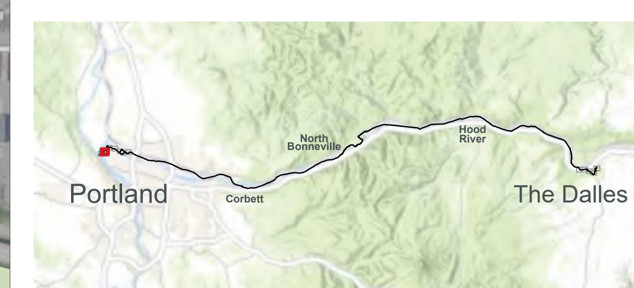
FIGURE 3: NWI AND NHD MAP
PAGE 2 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WESTERN AC ALTERNATIVE SOUTH
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

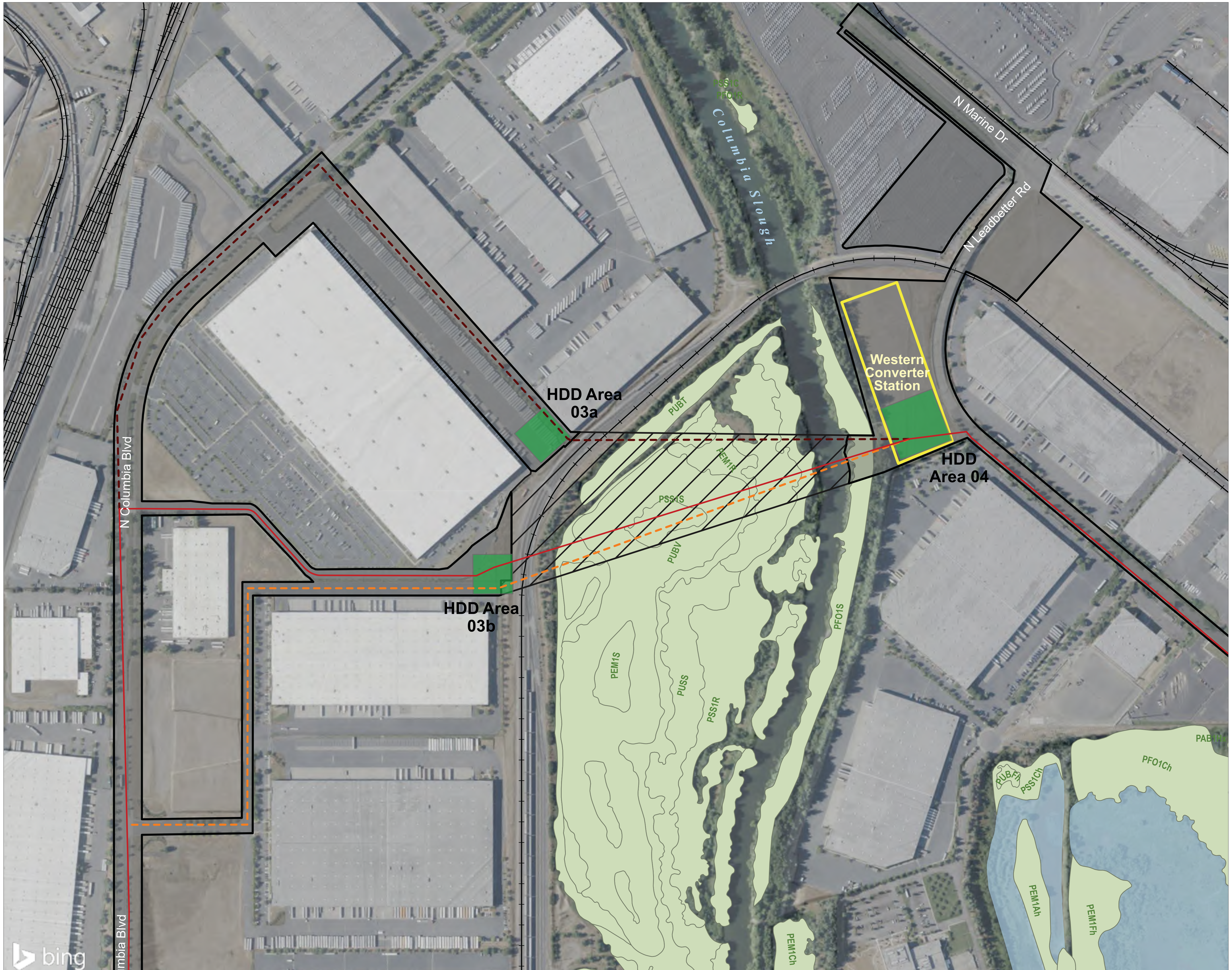


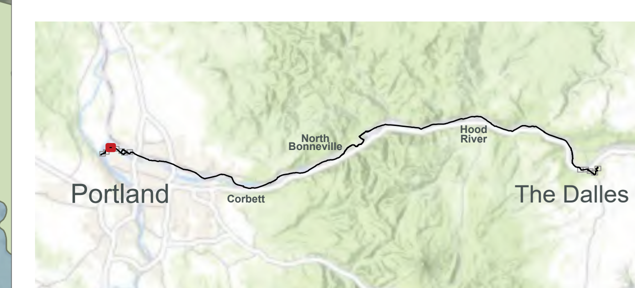
FIGURE 3: NWI AND NHD MAP
PAGE 3 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WESTERN AC ALTERNATIVE NORTH
- WESTERN AC ALTERNATIVE SOUTH
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

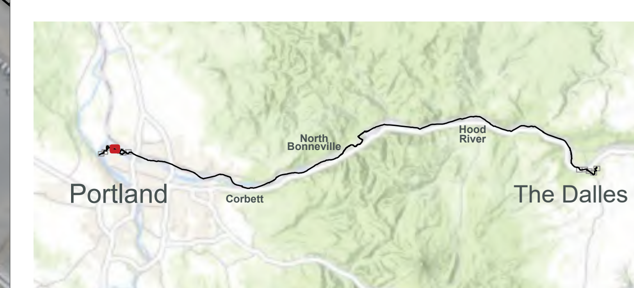
FIGURE 3: NWI AND NHD MAP
PAGE 4 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25, 30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

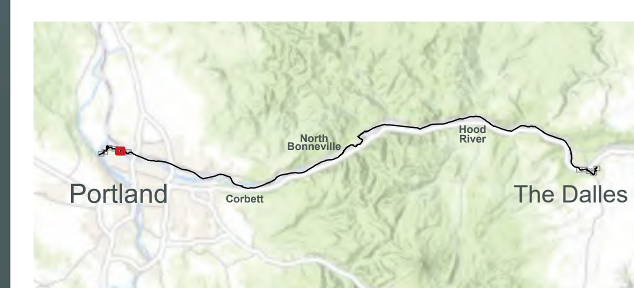
FIGURE 3: NWI AND NHD MAP
PAGE 5 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

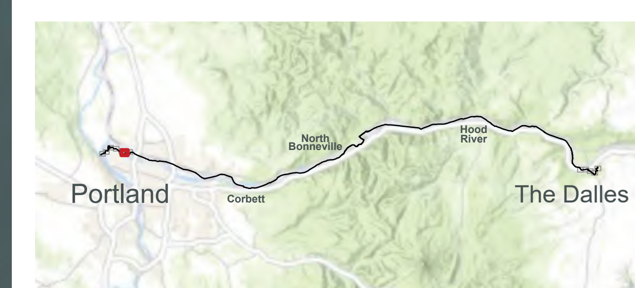
FIGURE 3: NWI AND NHD MAP
PAGE 6 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

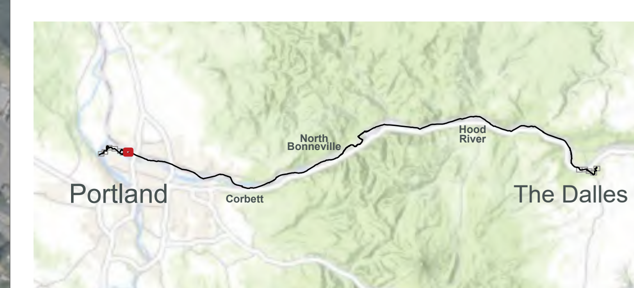


FIGURE 3: NWI AND NHD MAP
PAGE 7 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- ACCESS ROAD
- COFFER DAM
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION

HDR

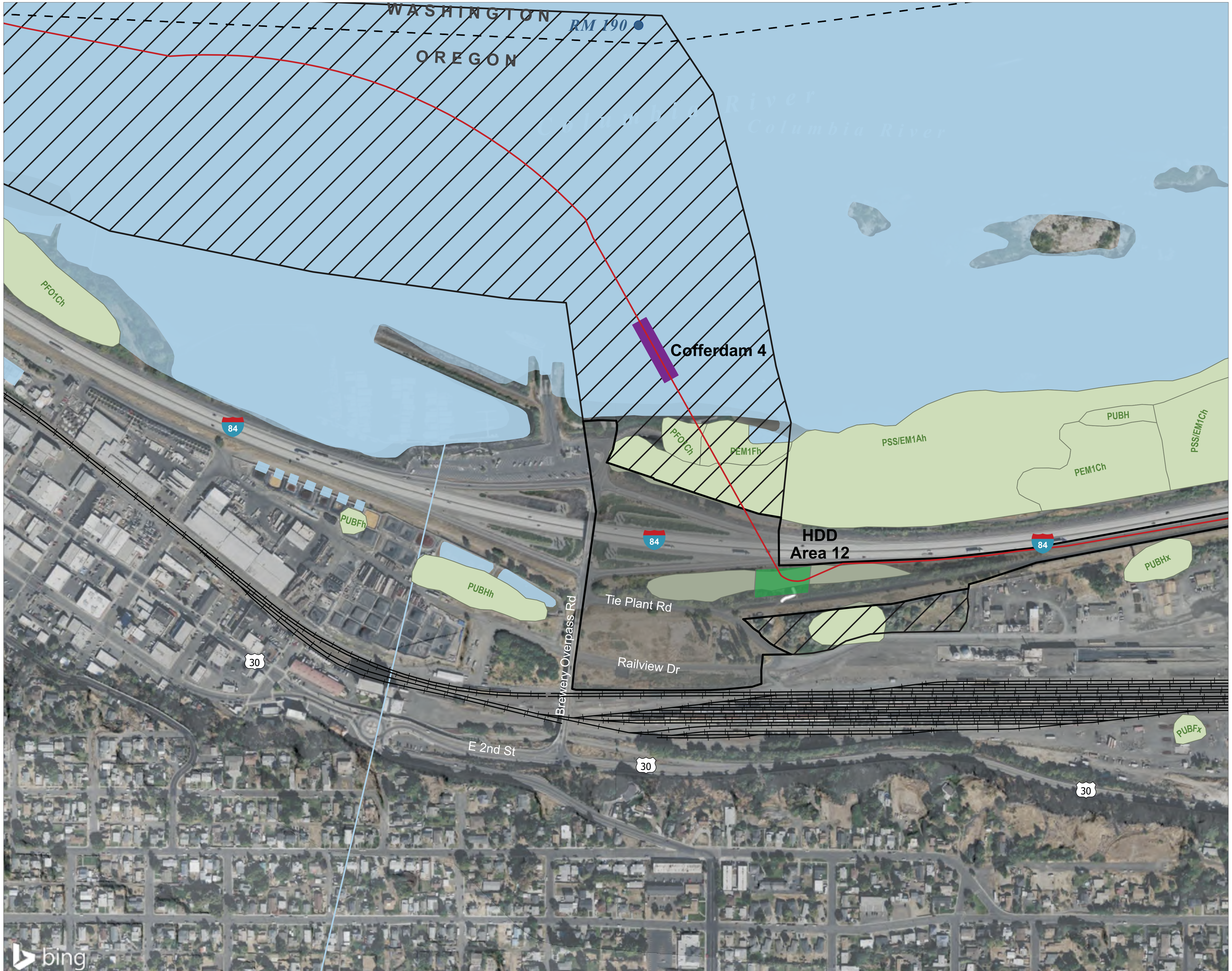
0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 3: NWI AND NHD MAP
PAGE 8 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

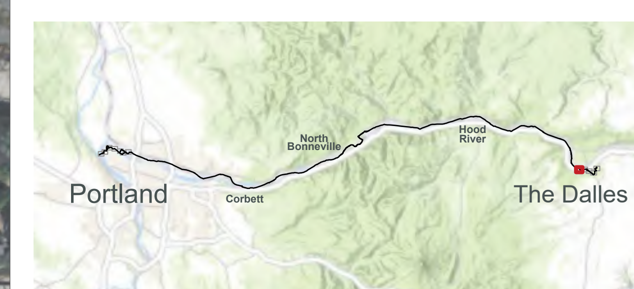
FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- ACCESS ROAD
- COFFER DAM
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY



NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



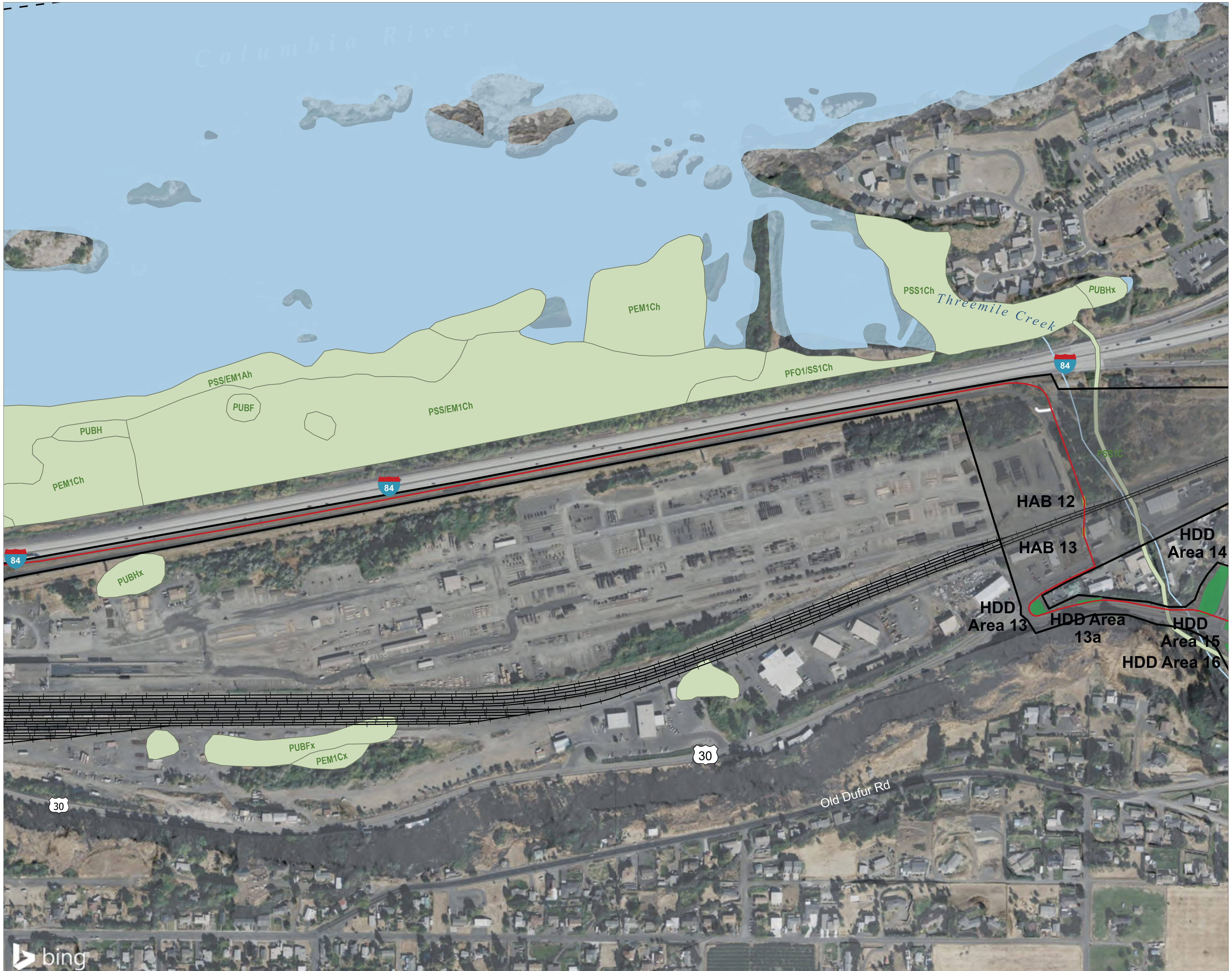
0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 3: NWI AND NHD MAP
PAGE 9 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

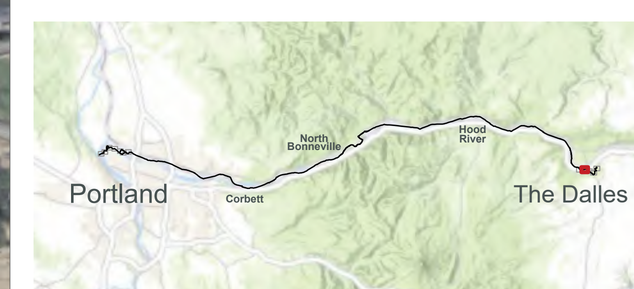
FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY



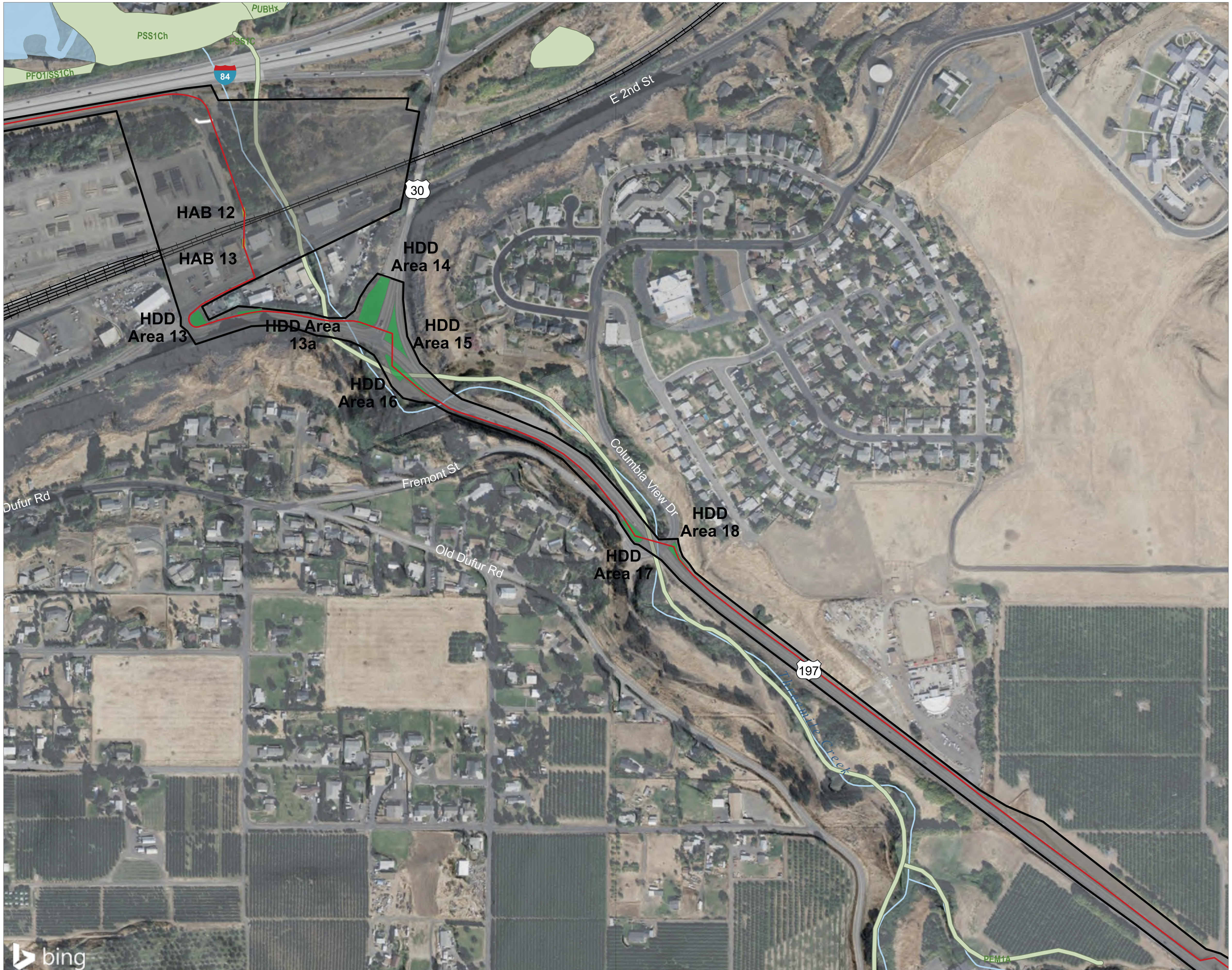
NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

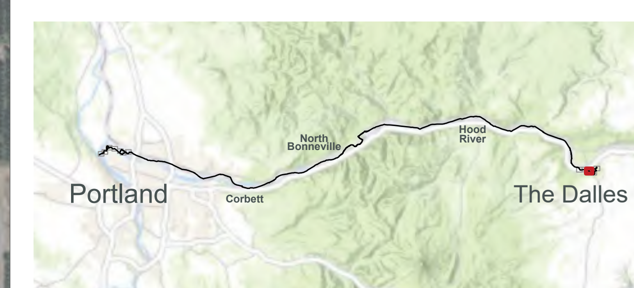
FIGURE 3: NWI AND NHD MAP
PAGE 10 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

FIGURE 3: NWI AND NHD MAP

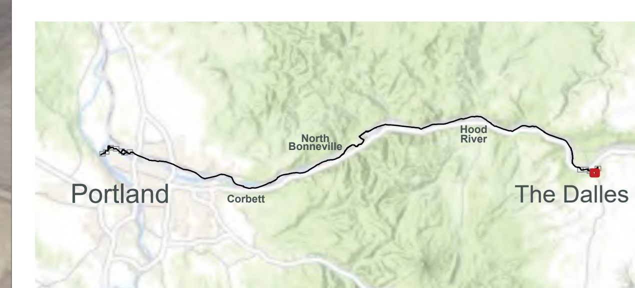
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

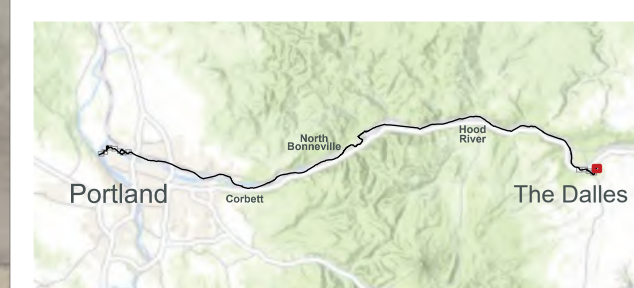
FIGURE 3: NWI AND NHD MAP
PAGE 12 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME: PETERSBURG

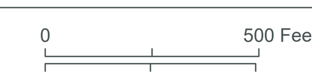
FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION





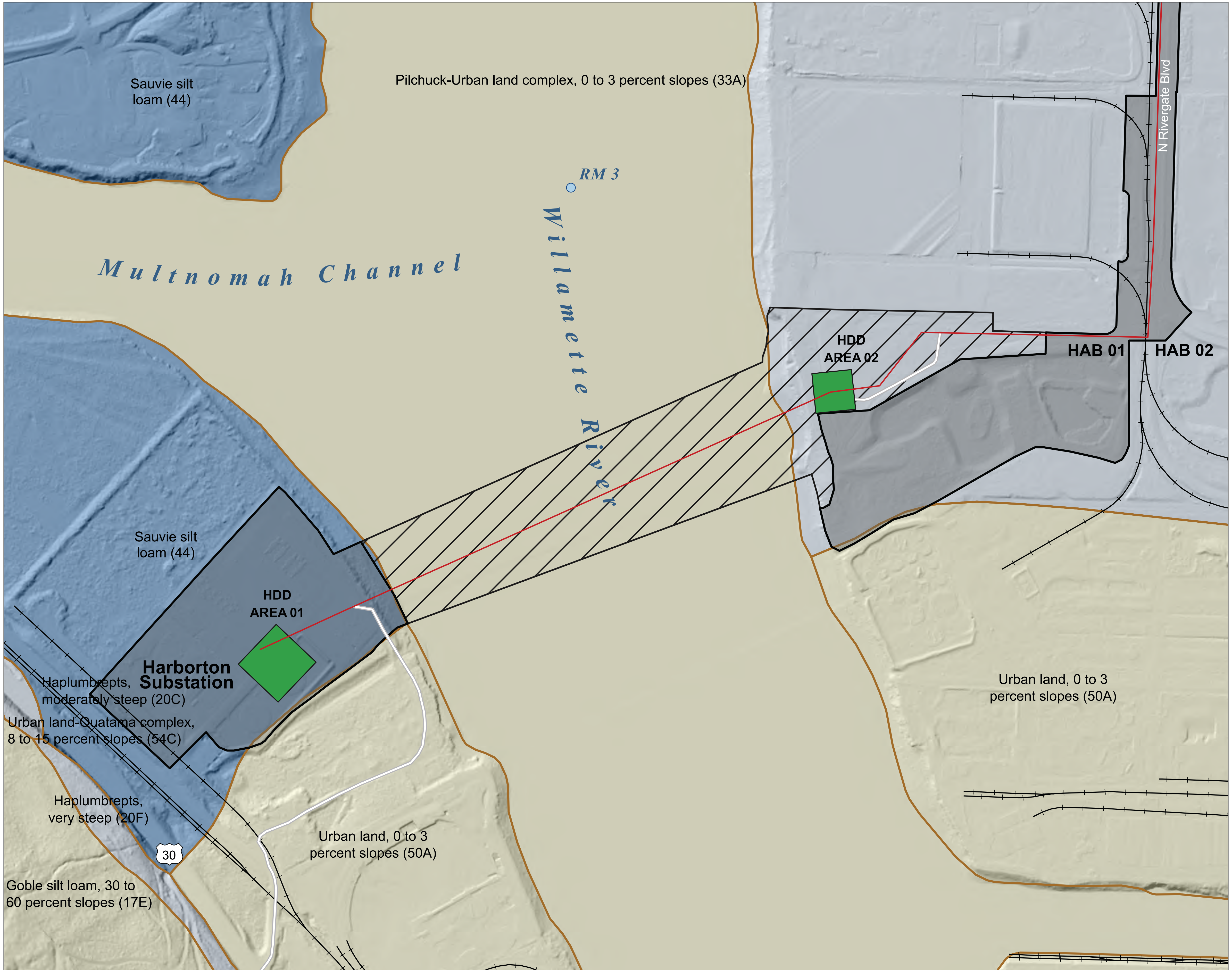


FIGURE 4 SOIL SURVEY MAP
PAGE 1 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME: LINNTON

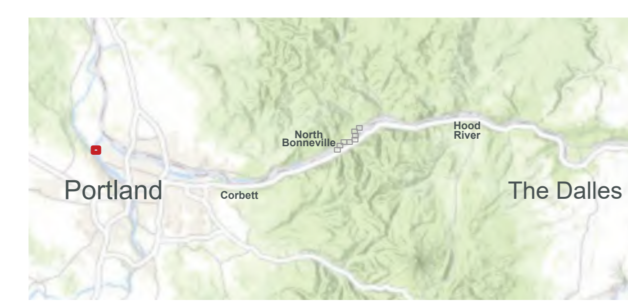
FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

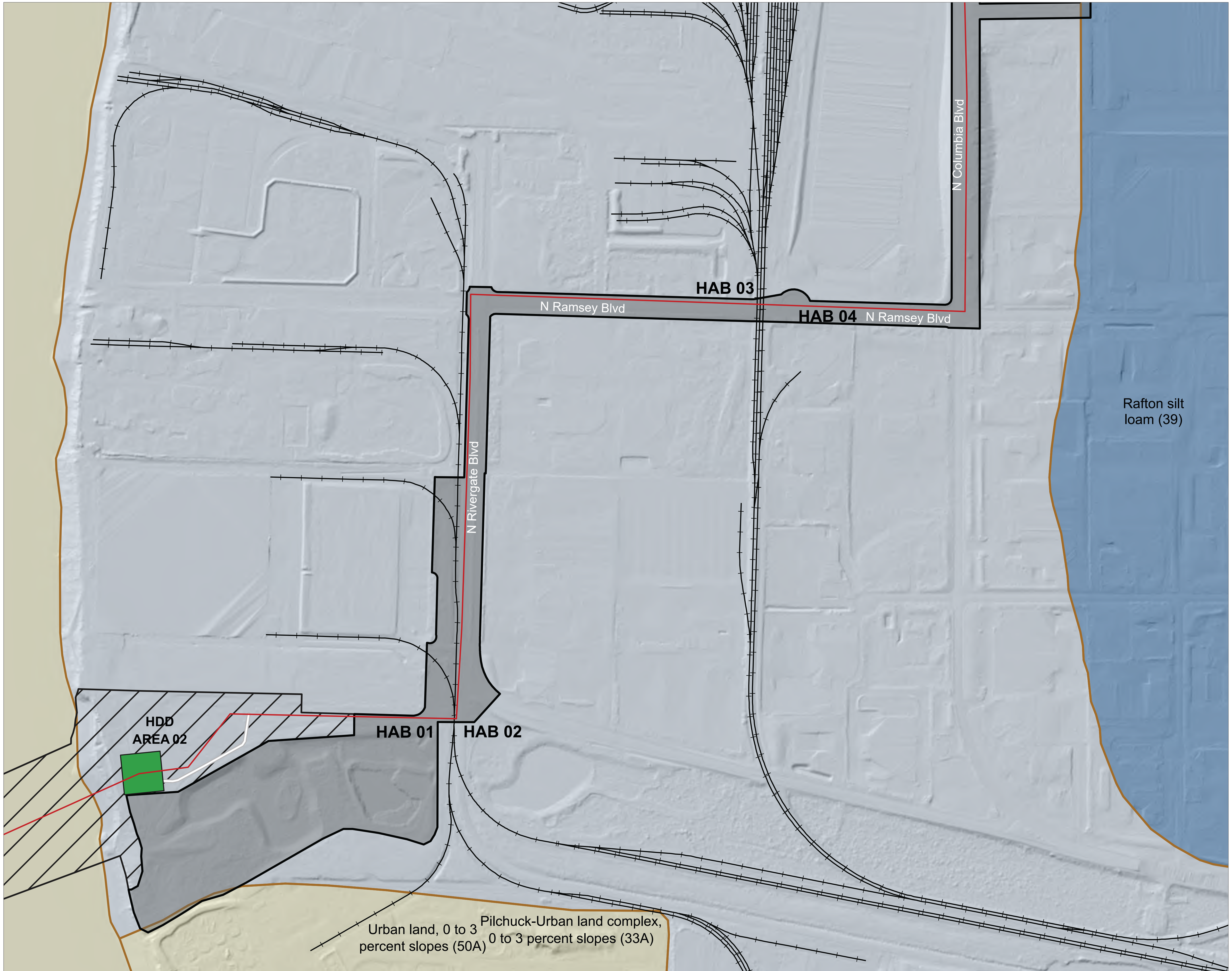


FIGURE 4 SOIL SURVEY MAP
PAGE 2 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

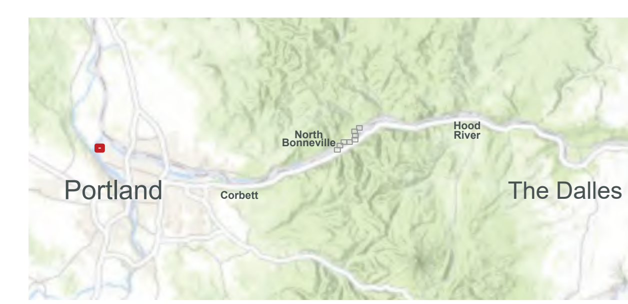
FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION

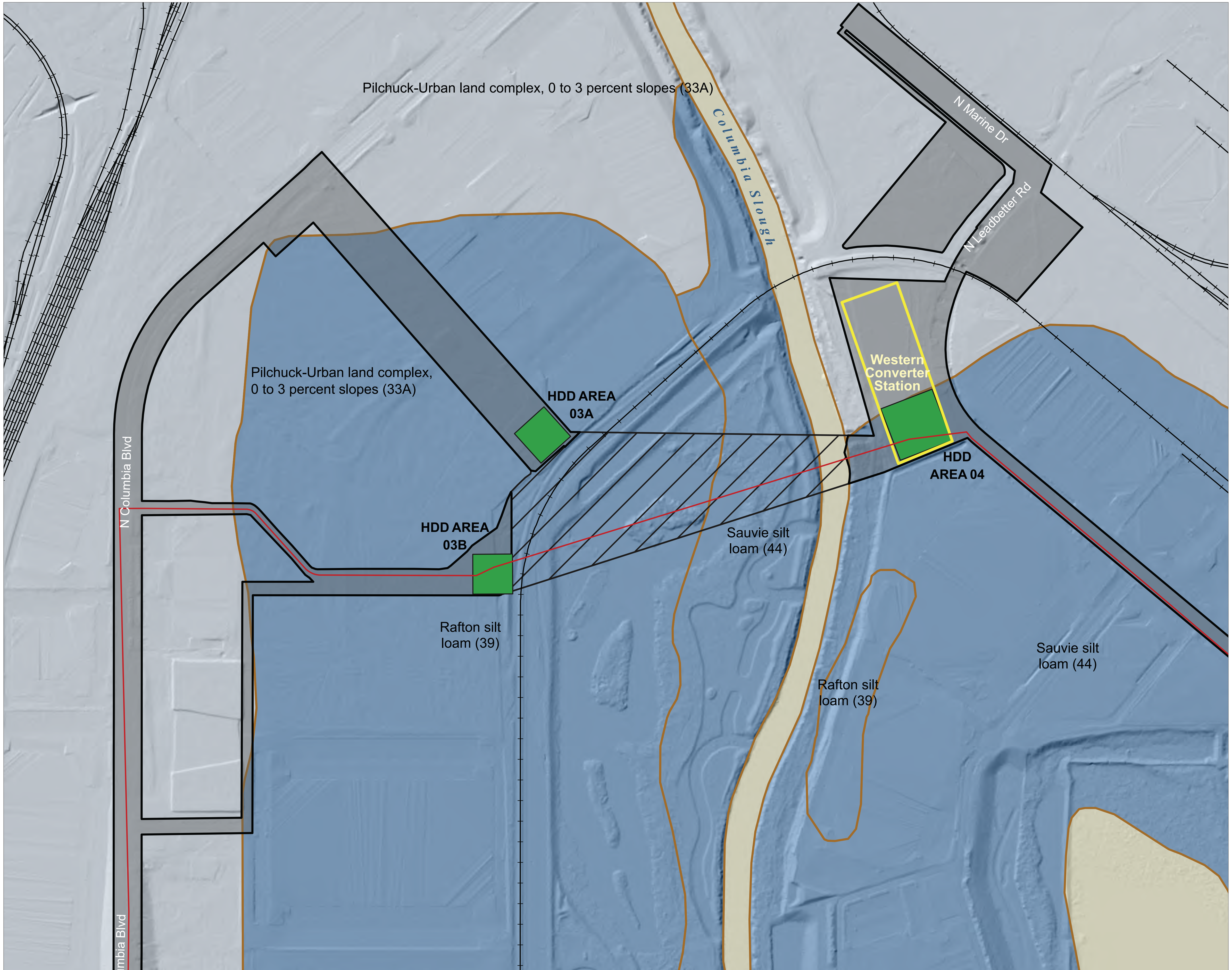


HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 3 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND



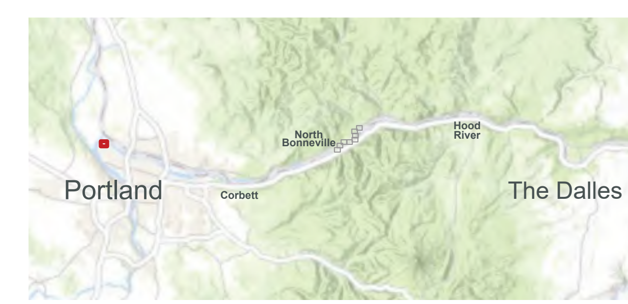
FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

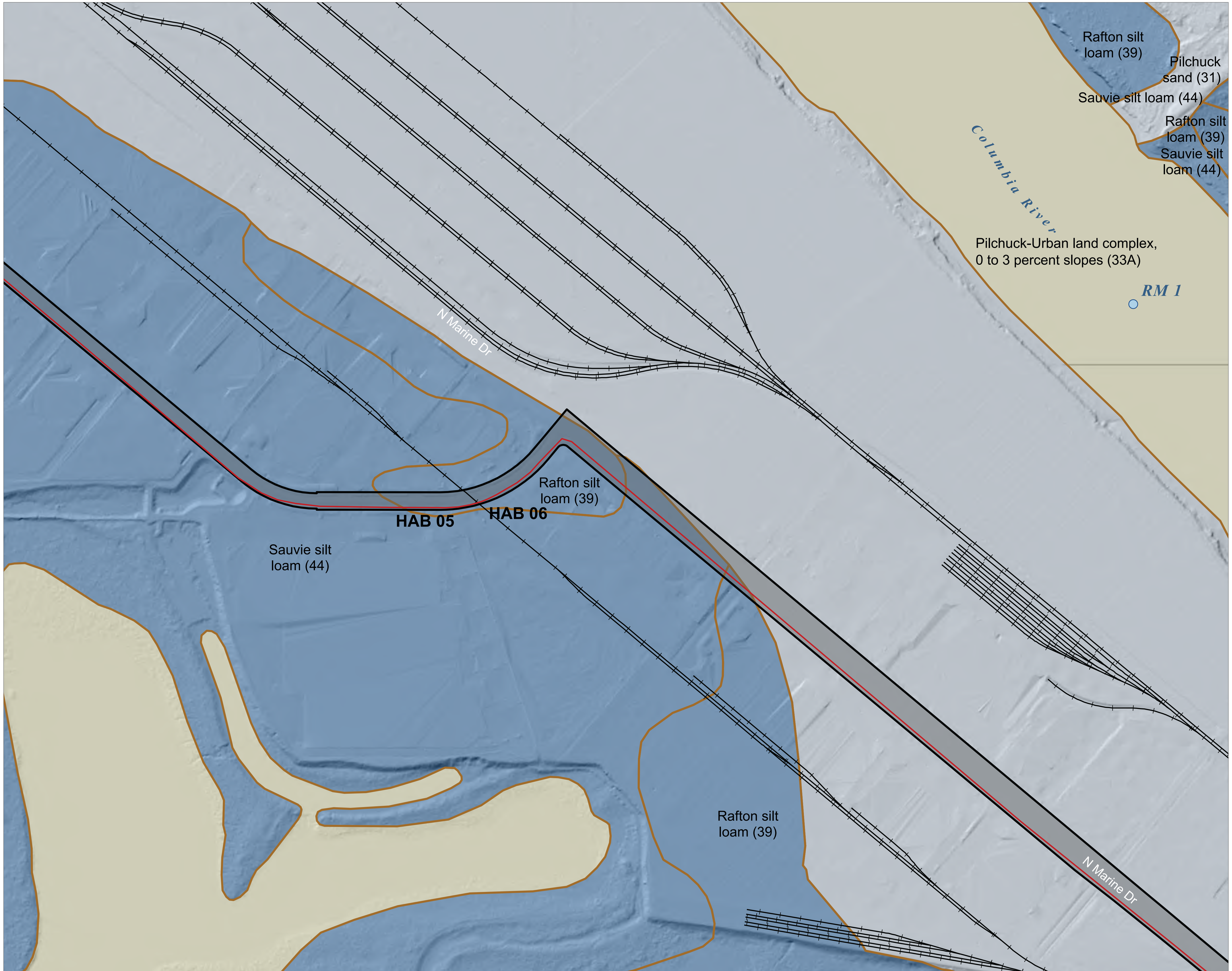


FIGURE 4 SOIL SURVEY MAP
PAGE 4 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25, 30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

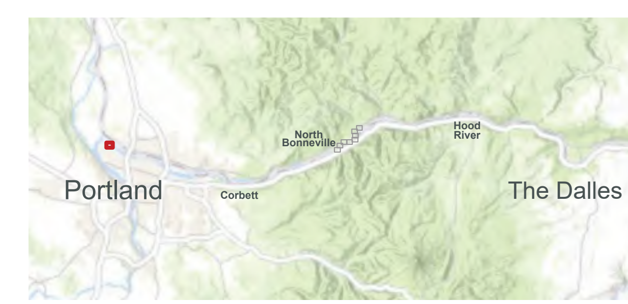
FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

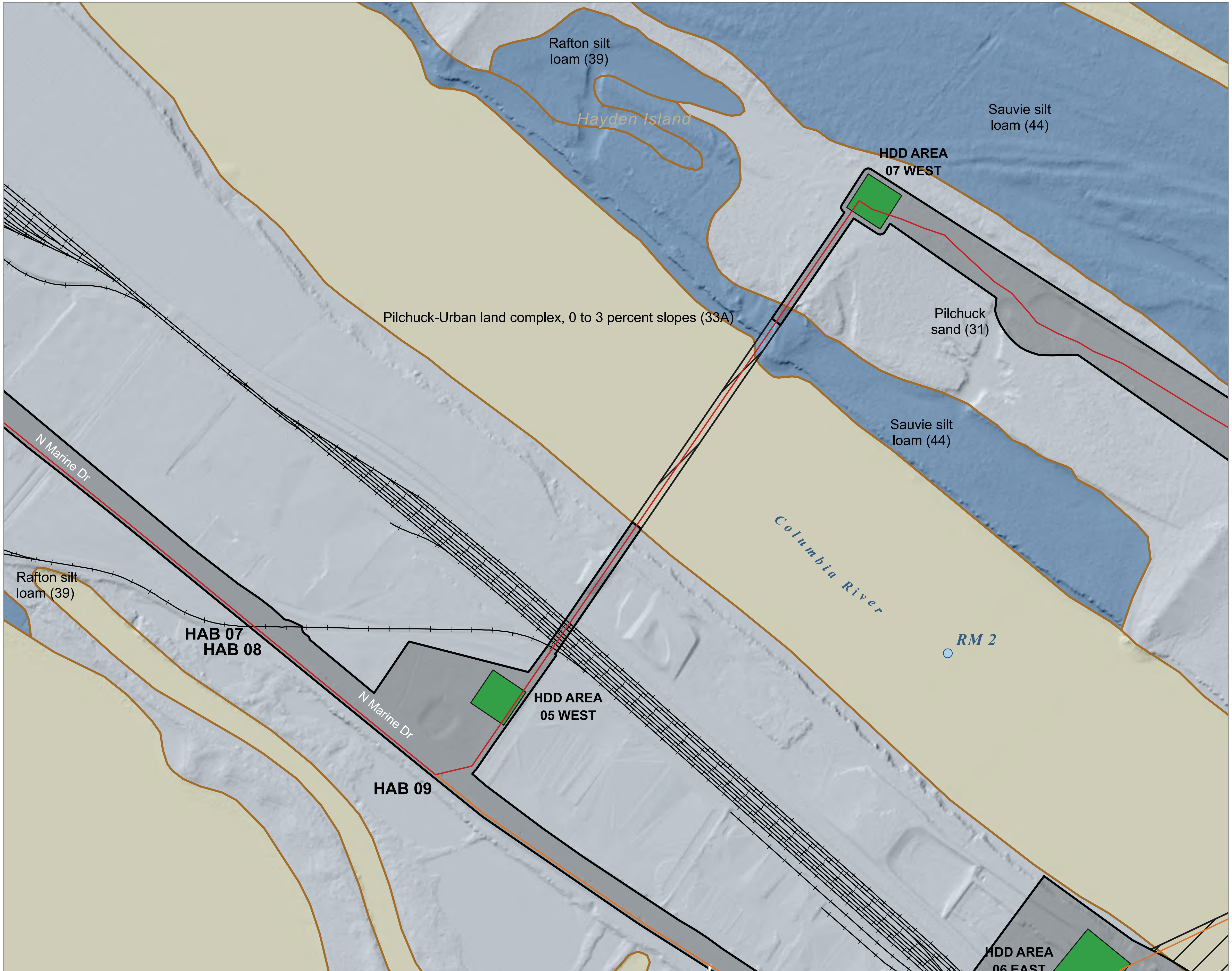
- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 5 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

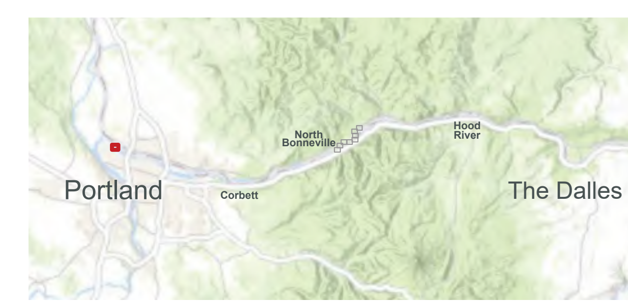
FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

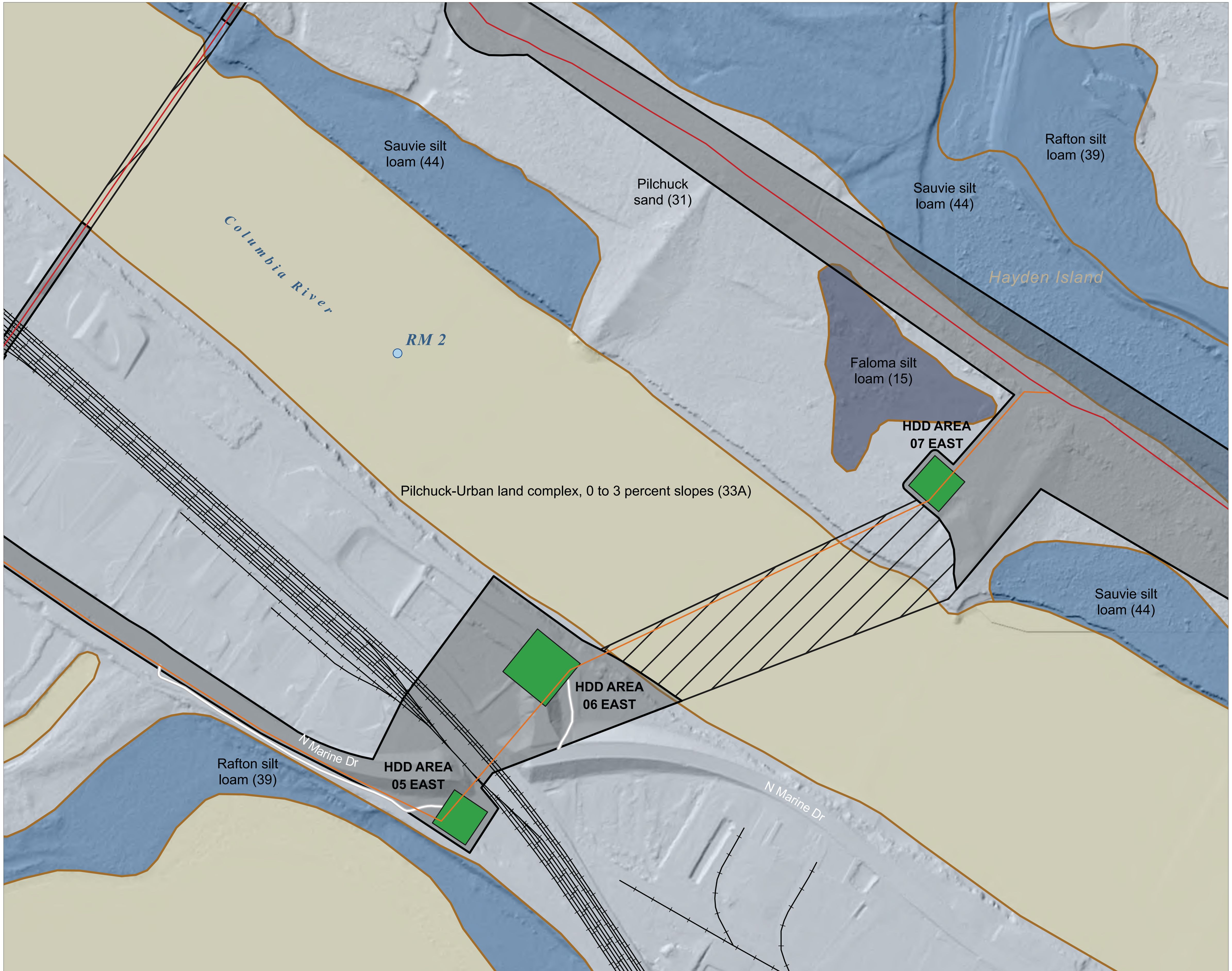
HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters



4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 6 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

USACE RIVER MILE
PROPOSED ALIGNMENT
HAYDEN ISLAND ALTERNATIVE
ACCESS ROAD
TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
SOIL MAP UNIT

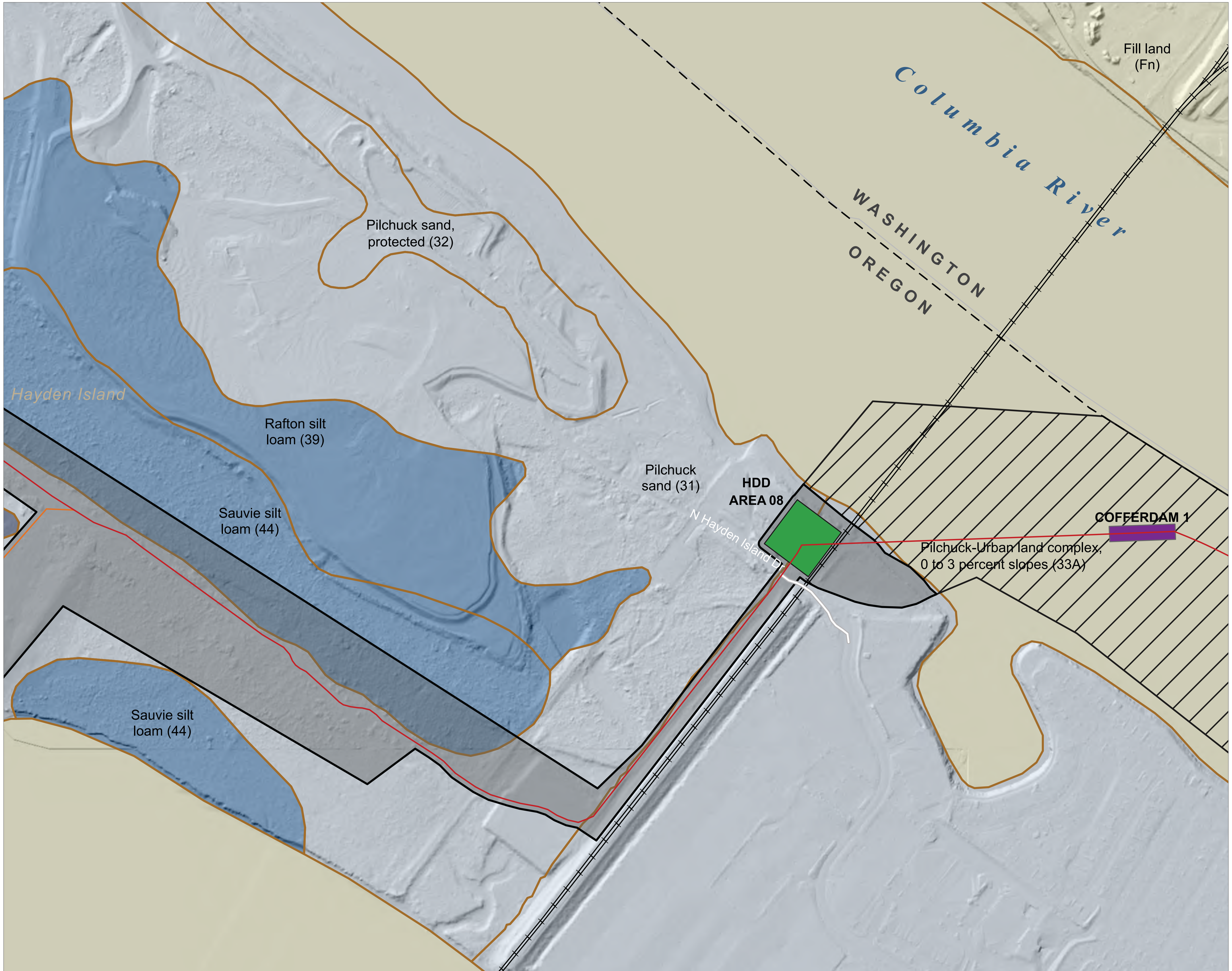
HYDRIC SOIL CLASSIFICATION
NOT HYDRIC
MINIMALLY HYDRIC (1 - 25%)
PARTIALLY HYDRIC (26 - 50%)
MODERATELY HYDRIC (51 - 75%)
MOSTLY HYDRIC (76 - 95%)
ALL HYDRIC
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION

0 500 Feet
0 150 Meters

FIGURE 4 SOIL SURVEY MAP
PAGE 7 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

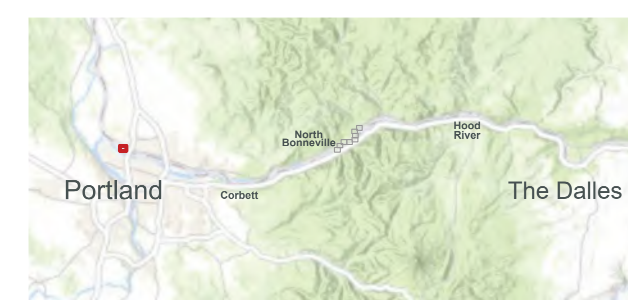
FOR INFORMATION ONLY - CONCEPT DRAWING



PROPOSED ALIGNMENT
HAYDEN ISLAND ALTERNATIVE
ACCESS ROAD
TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
TEMPORARY 3-SIDED WET COFFERDAM
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
SOIL MAP UNIT

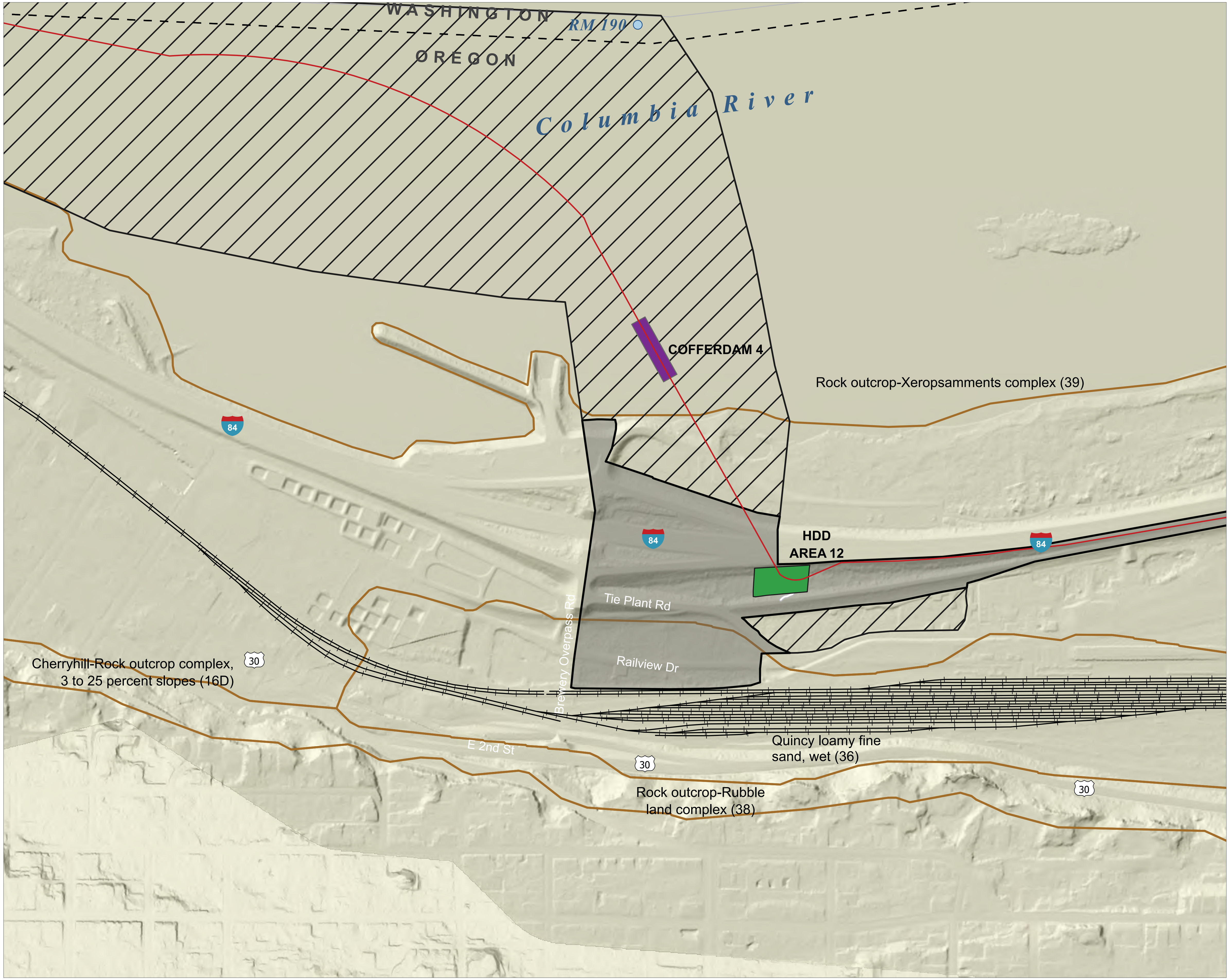
HYDRIC SOIL CLASSIFICATION
NOT HYDRIC
MINIMALLY HYDRIC (1 - 25%)
PARTIALLY HYDRIC (26 - 50%)
MODERATELY HYDRIC (51 - 75%)
MOSTLY HYDRIC (76 - 95%)
ALL HYDRIC
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 8 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

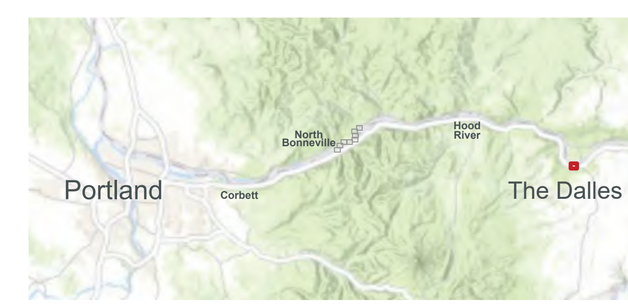
FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

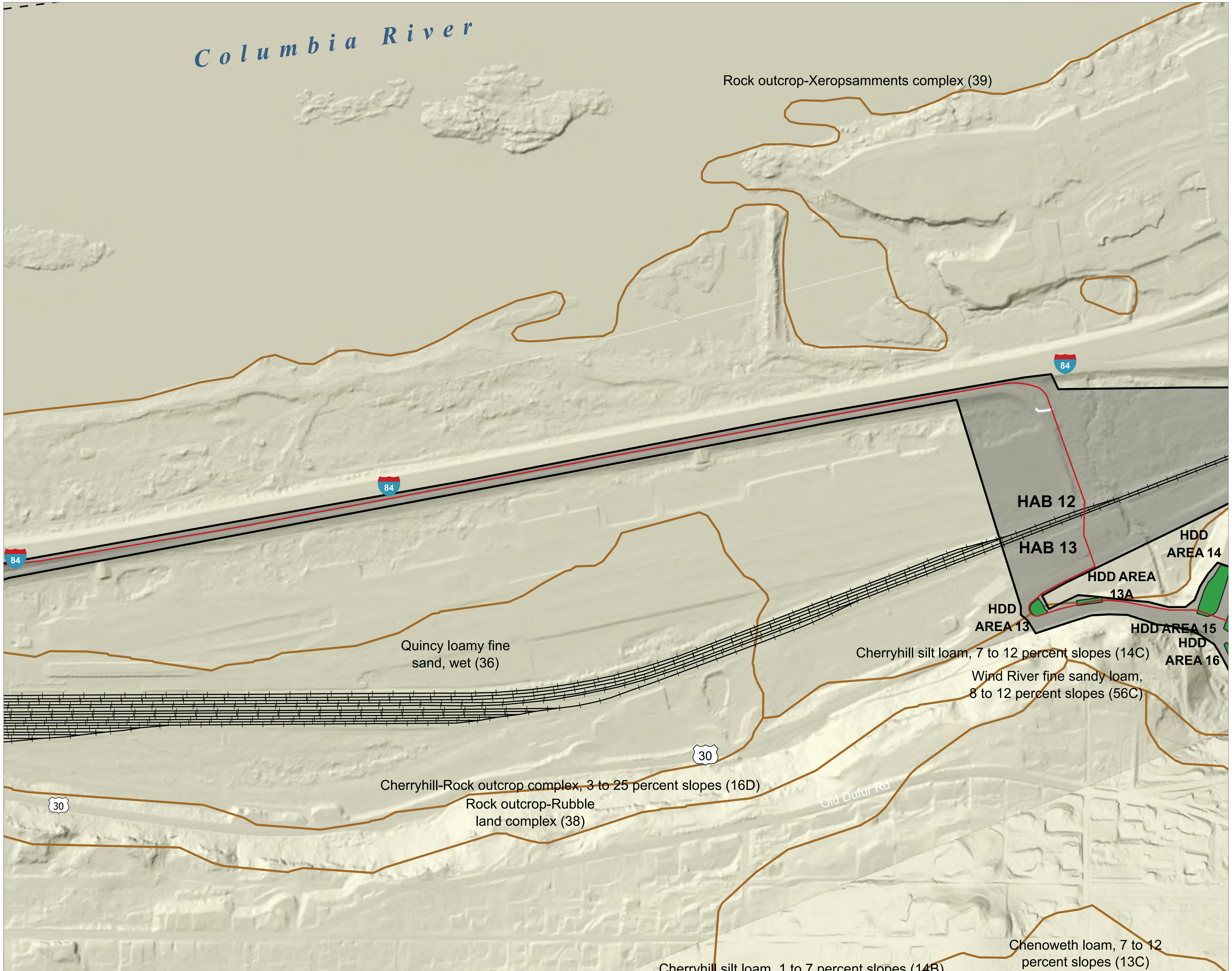
HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters



4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 9 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

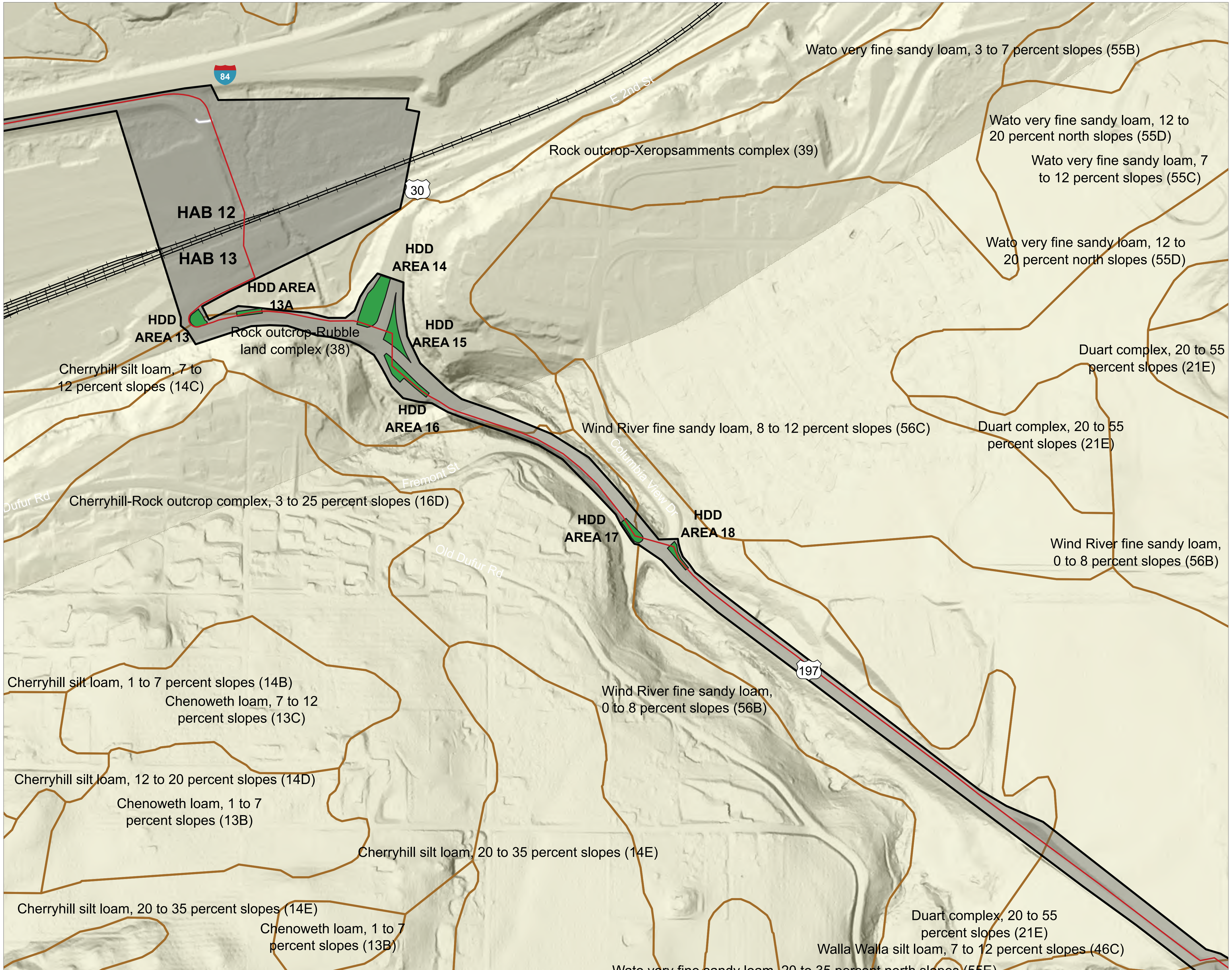
HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION

0 500 Feet
0 150 Meters

FIGURE 4 SOIL SURVEY MAP
PAGE 10 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH



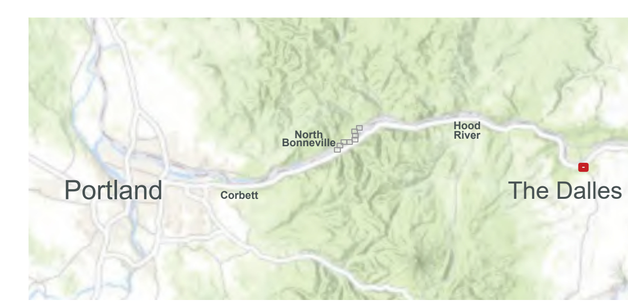
FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



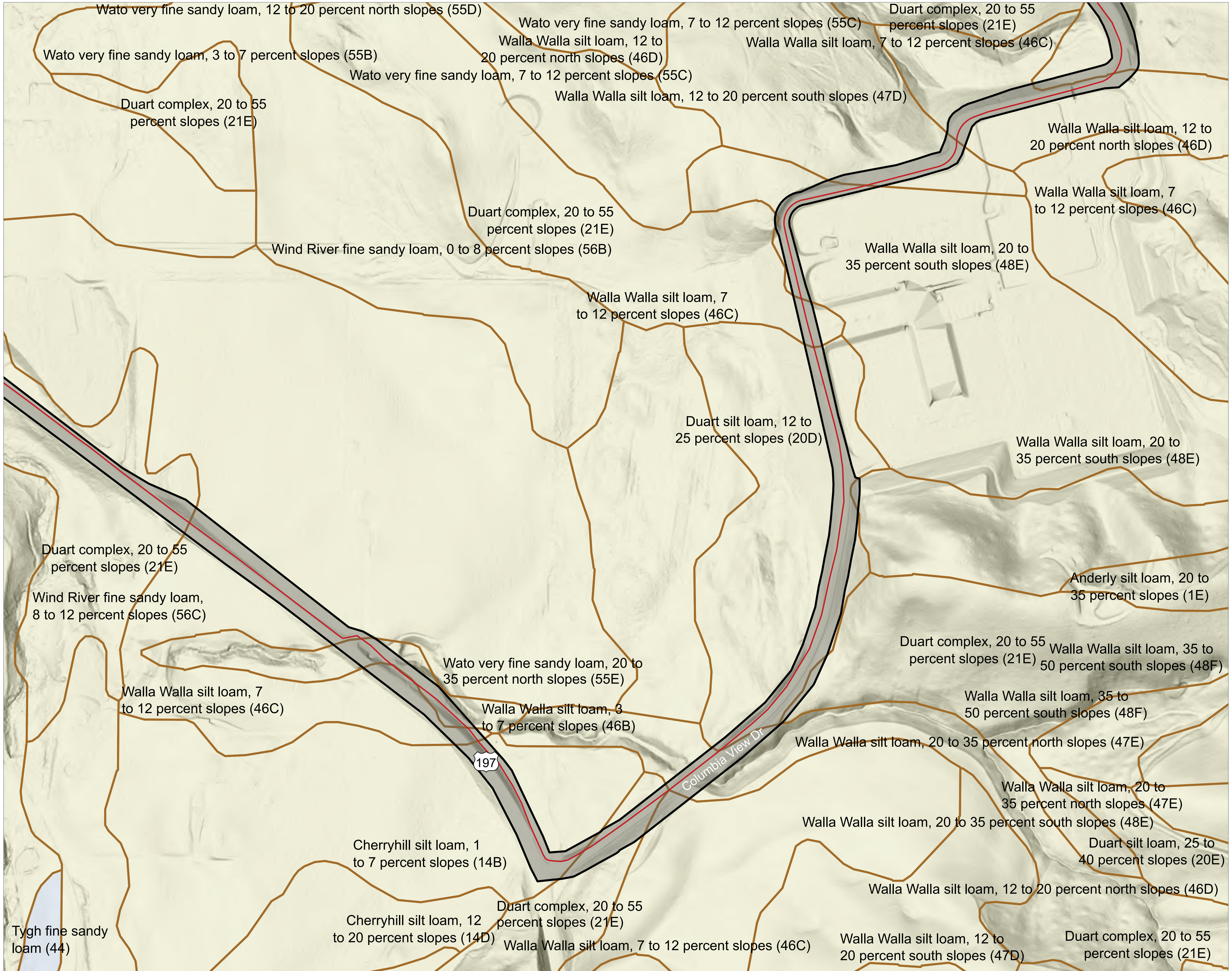
HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 11 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

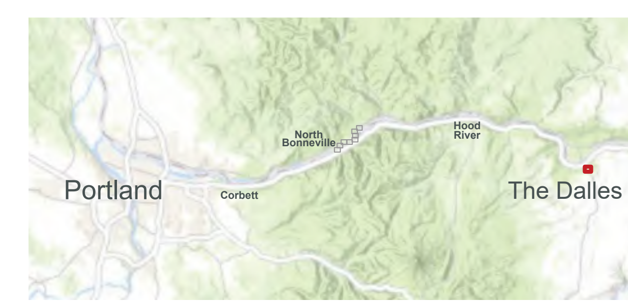
FOR INFORMATION ONLY - CONCEPT DRAWING



PROPOSED ALIGNMENT
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION
NOT HYDRIC
MINIMALLY HYDRIC (1 - 25%)
PARTIALLY HYDRIC (26 - 50%)
MODERATELY HYDRIC (51 - 75%)
MOSTLY HYDRIC (76 - 95%)
ALL HYDRIC
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

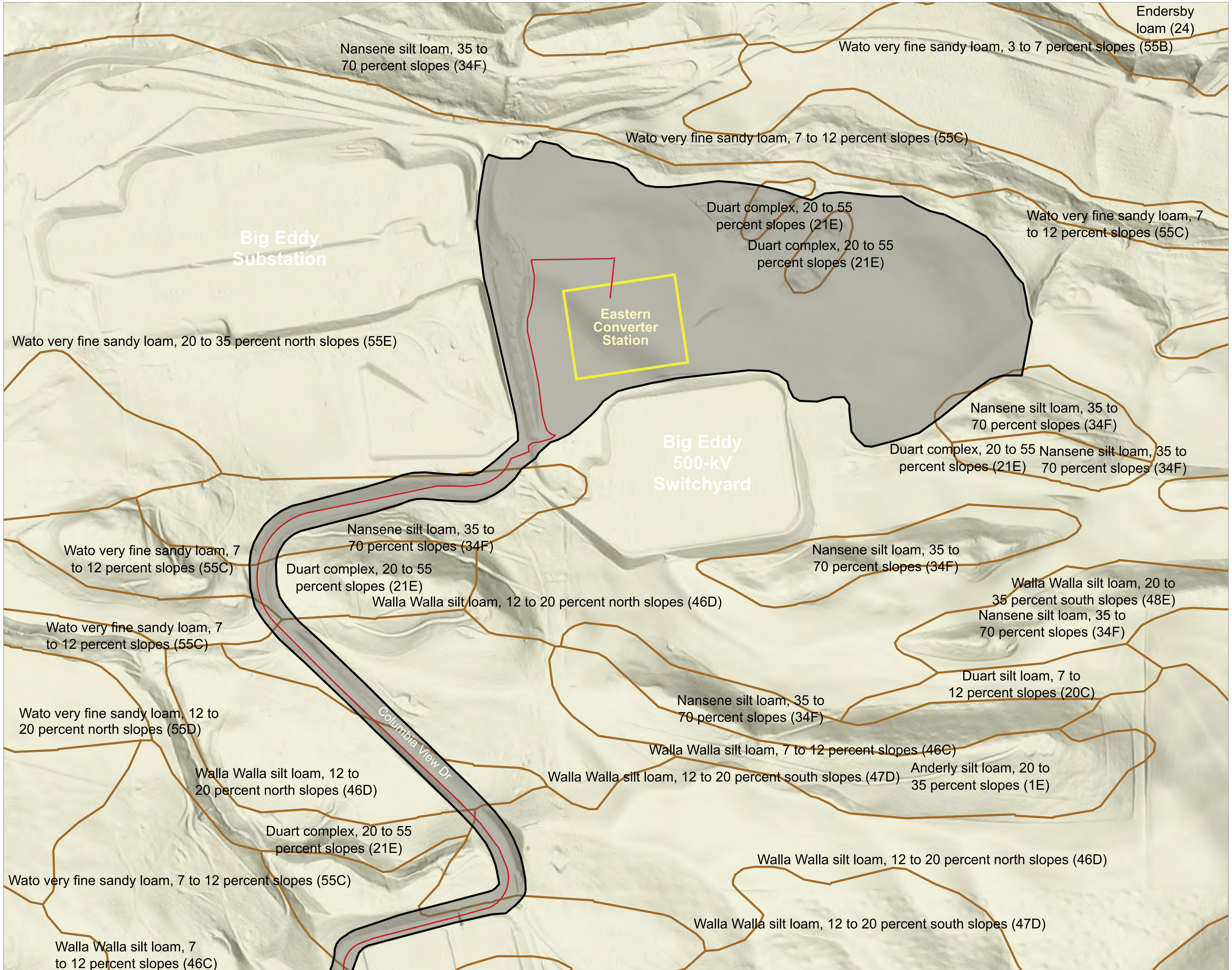


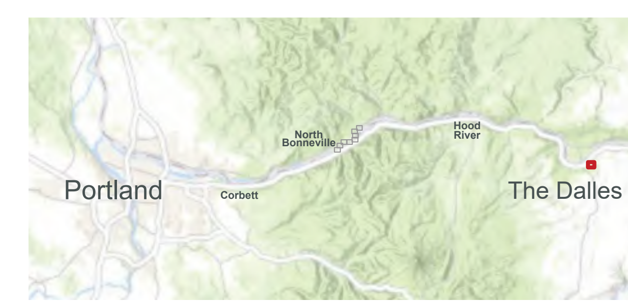
FIGURE 4 SOIL SURVEY MAP
PAGE 12 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME: PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT
CONVERTER STATION
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION
NOT HYDRIC
MINIMALLY HYDRIC (1 - 25%)
PARTIALLY HYDRIC (26 - 50%)
MODERATELY HYDRIC (51 - 75%)
MOSTLY HYDRIC (76 - 95%)
ALL HYDRIC
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 1 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

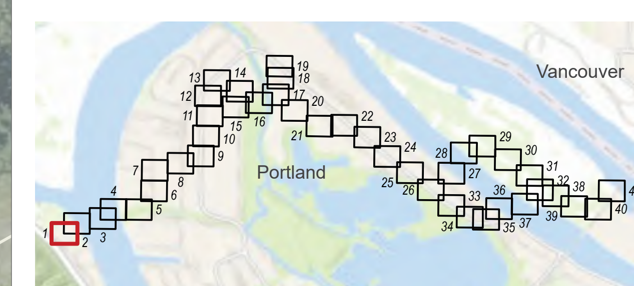
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- ESTIMATED CENTERLINE OF DITCH
- DELINEATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

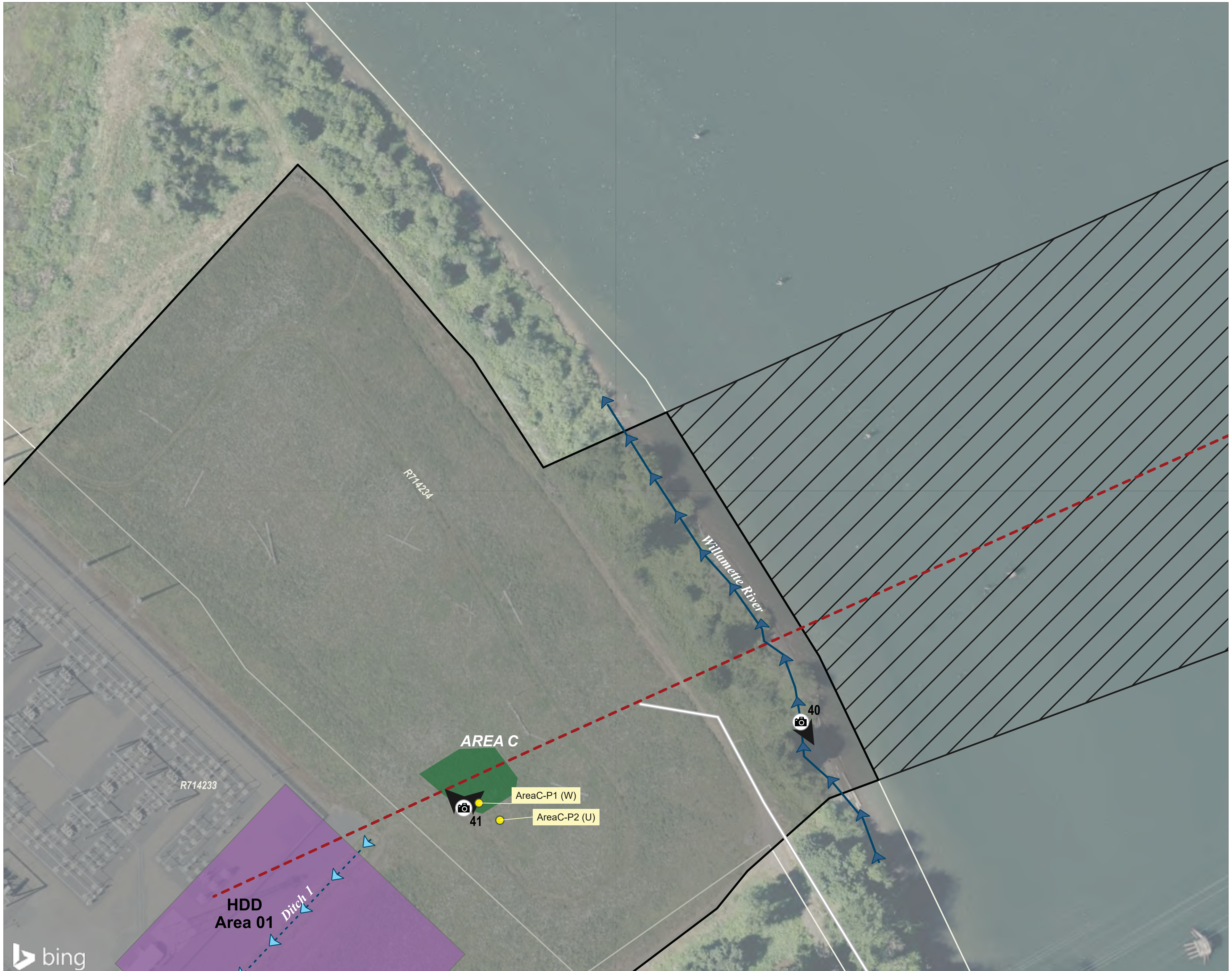


FIGURE 5 WETLAND & WATER SURVEY MAP

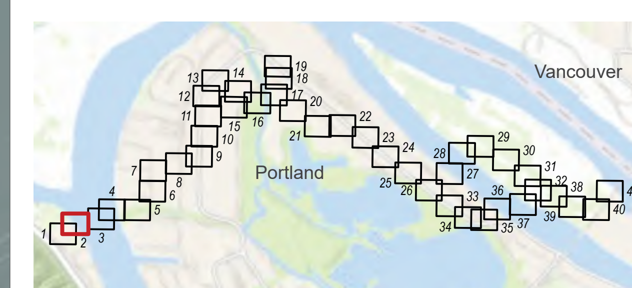
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- ESTIMATED CENTERLINE OF DITCH
- DELINEATED HTL
- DELINEATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

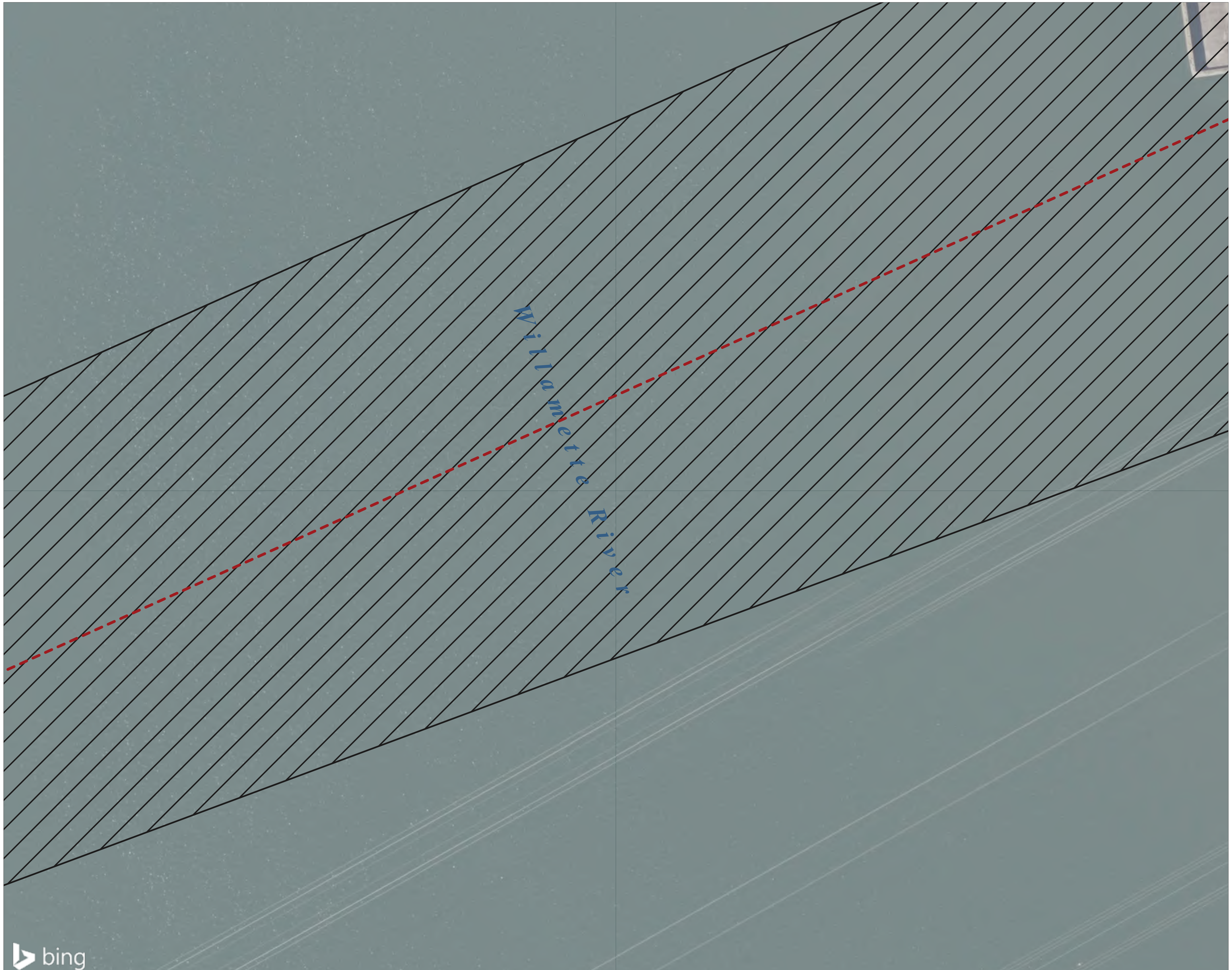


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 3 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

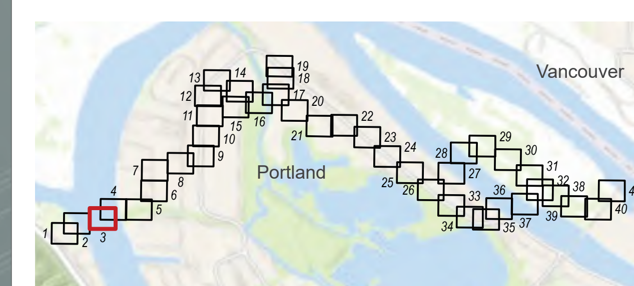
INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

DESKTOP AND VISUAL SURVEY ONLY

TAXLOT

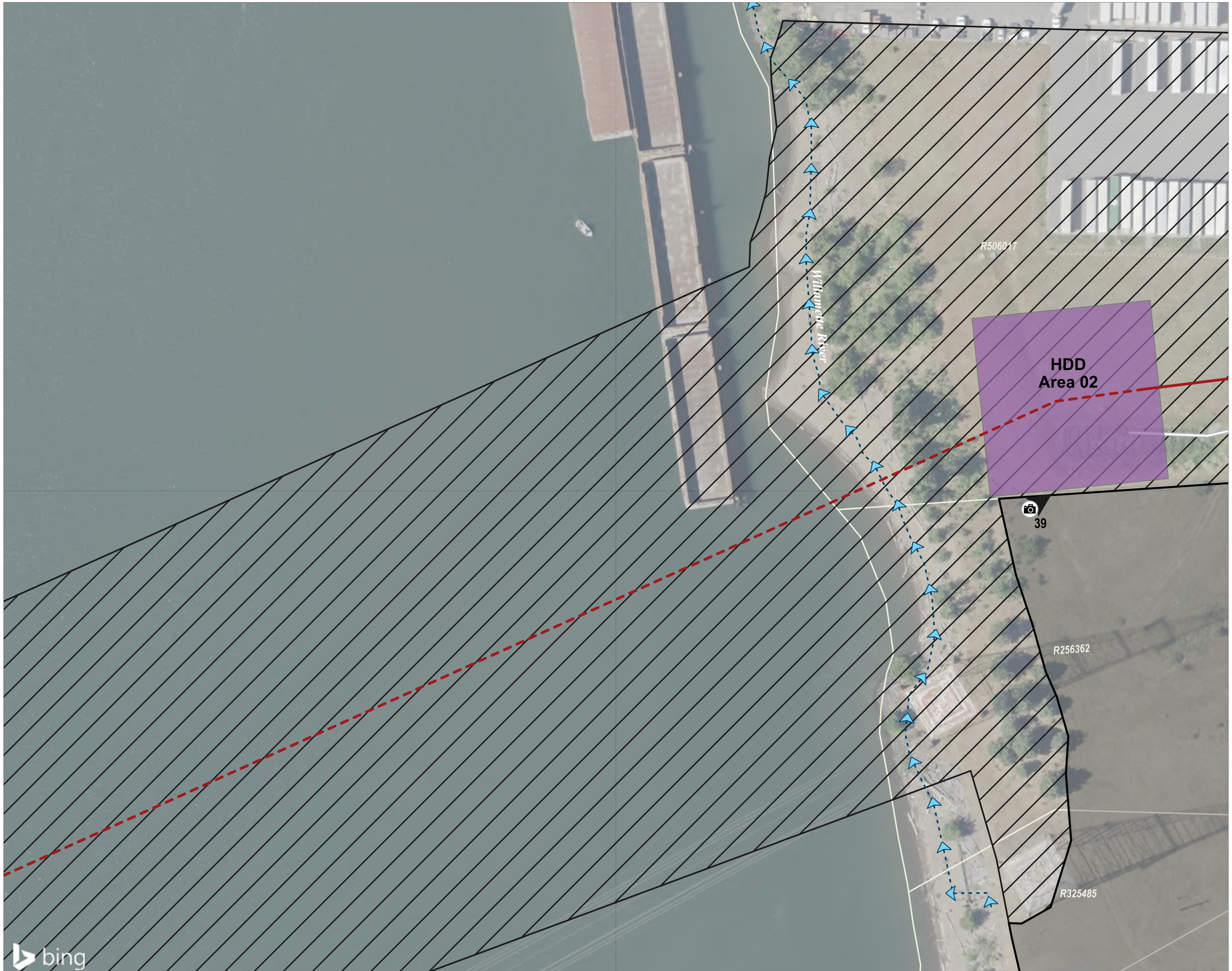
SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 4 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

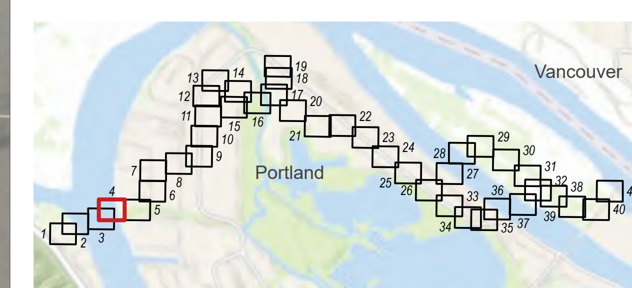
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- PHOTO POINT
- CALCULATED HTL
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

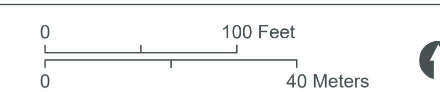


FIGURE 5 WETLAND & WATER SURVEY MAP

PAGE 5 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

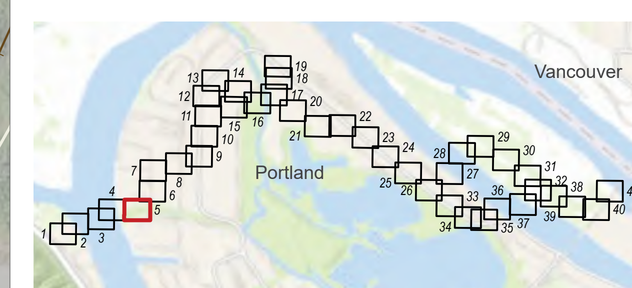
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- SAMPLE PLOT
- PHOTO POINT
- DELINEATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

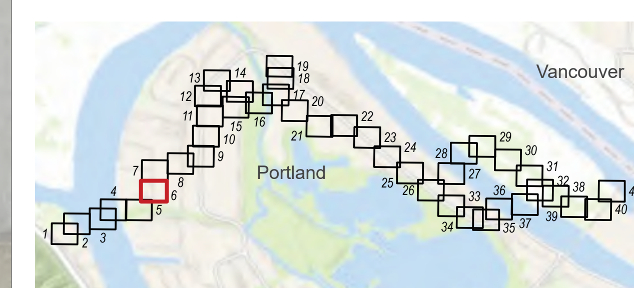
WETLAND AND WATERS SURVEY AREA

RAIL CENTERLINE

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 7 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

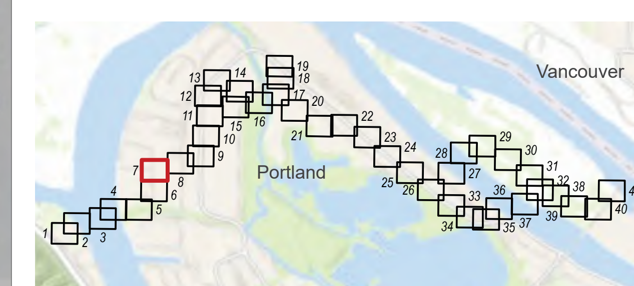
WETLAND AND WATERS SURVEY AREA

RAIL CENTERLINE

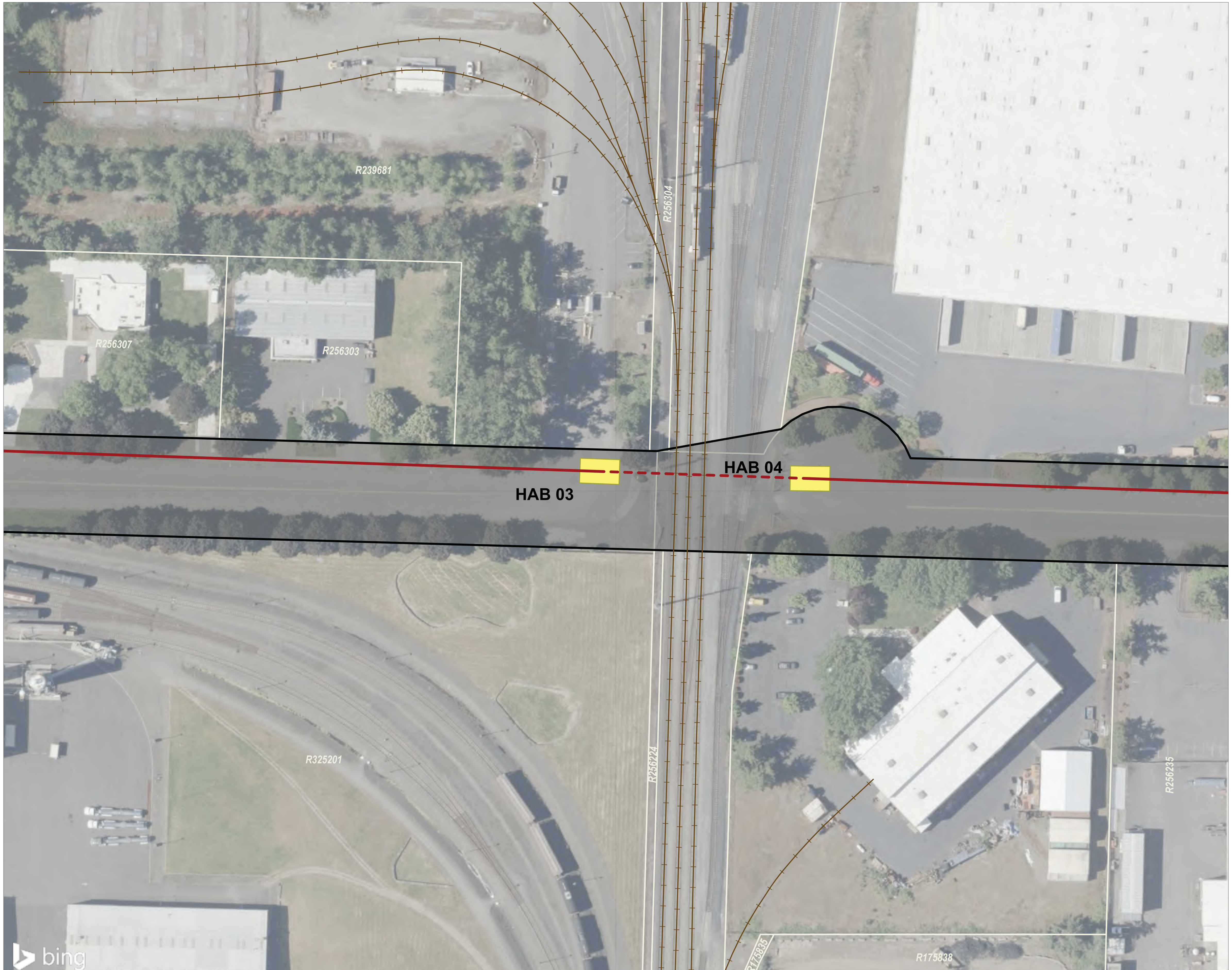
TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 8 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

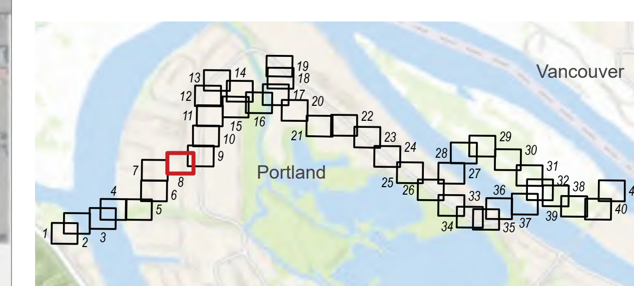
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 9 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

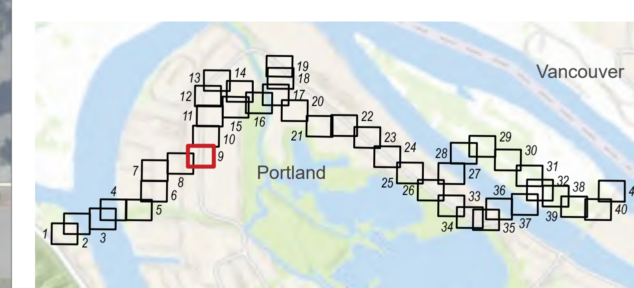
INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 10 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WESTERN AC ALTERNATIVE SOUTH

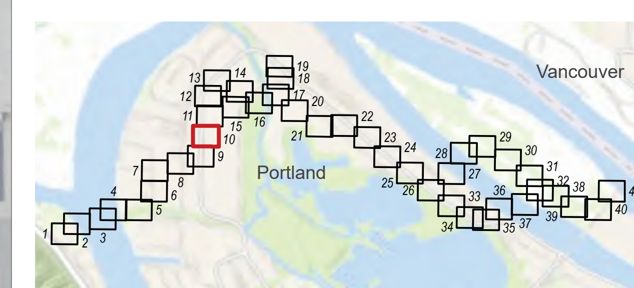
UPLAND INSTALLATION (E.G., TRENCHING)

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

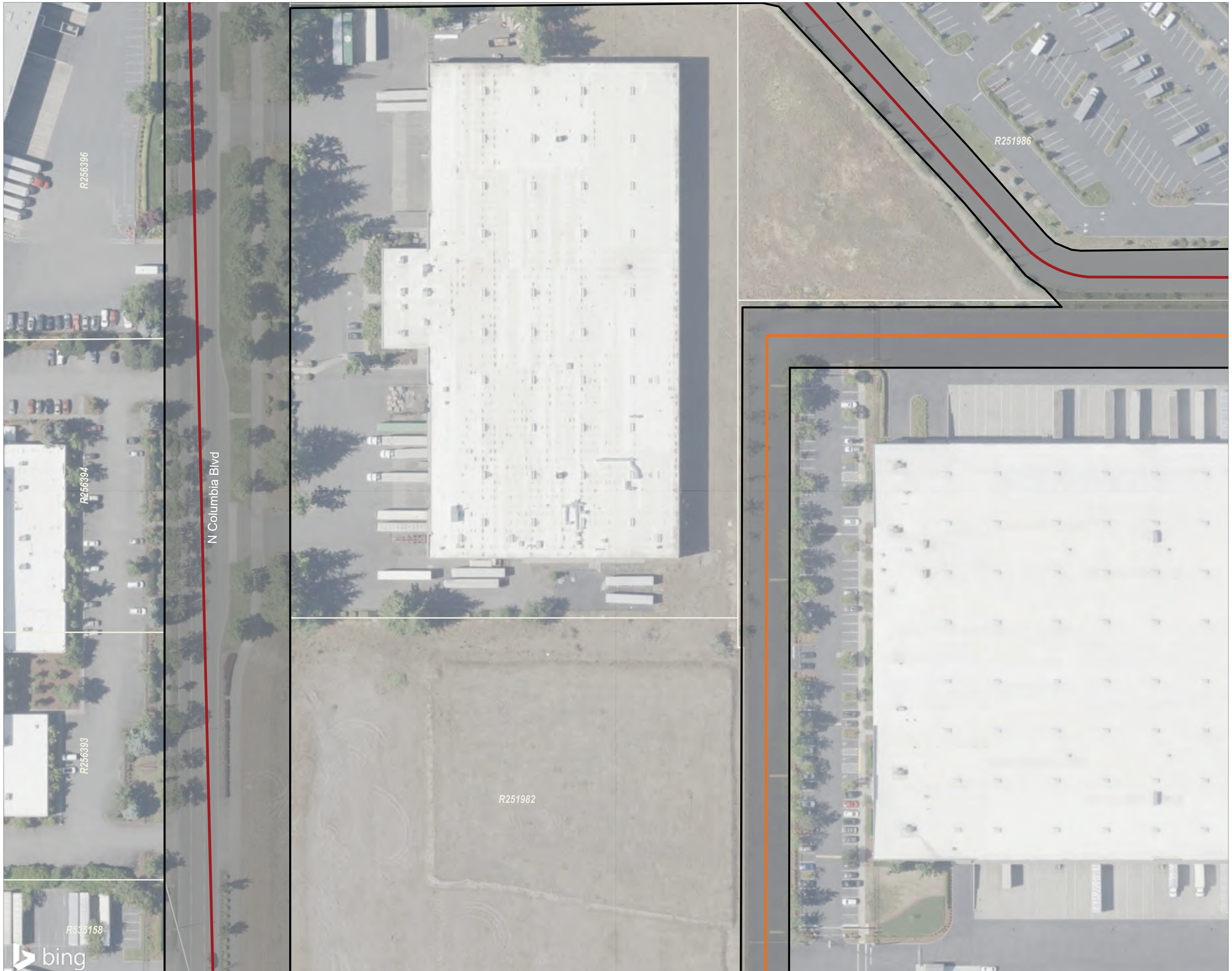


FIGURE 5 WETLAND & WATER SURVEY MAP

PAGE 11 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WESTERN AC ALTERNATIVE SOUTH

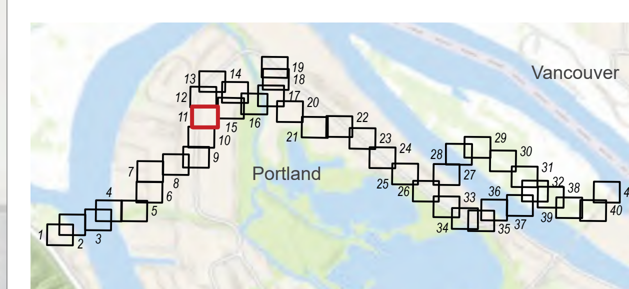
UPLAND INSTALLATION (E.G., TRENCHING)

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

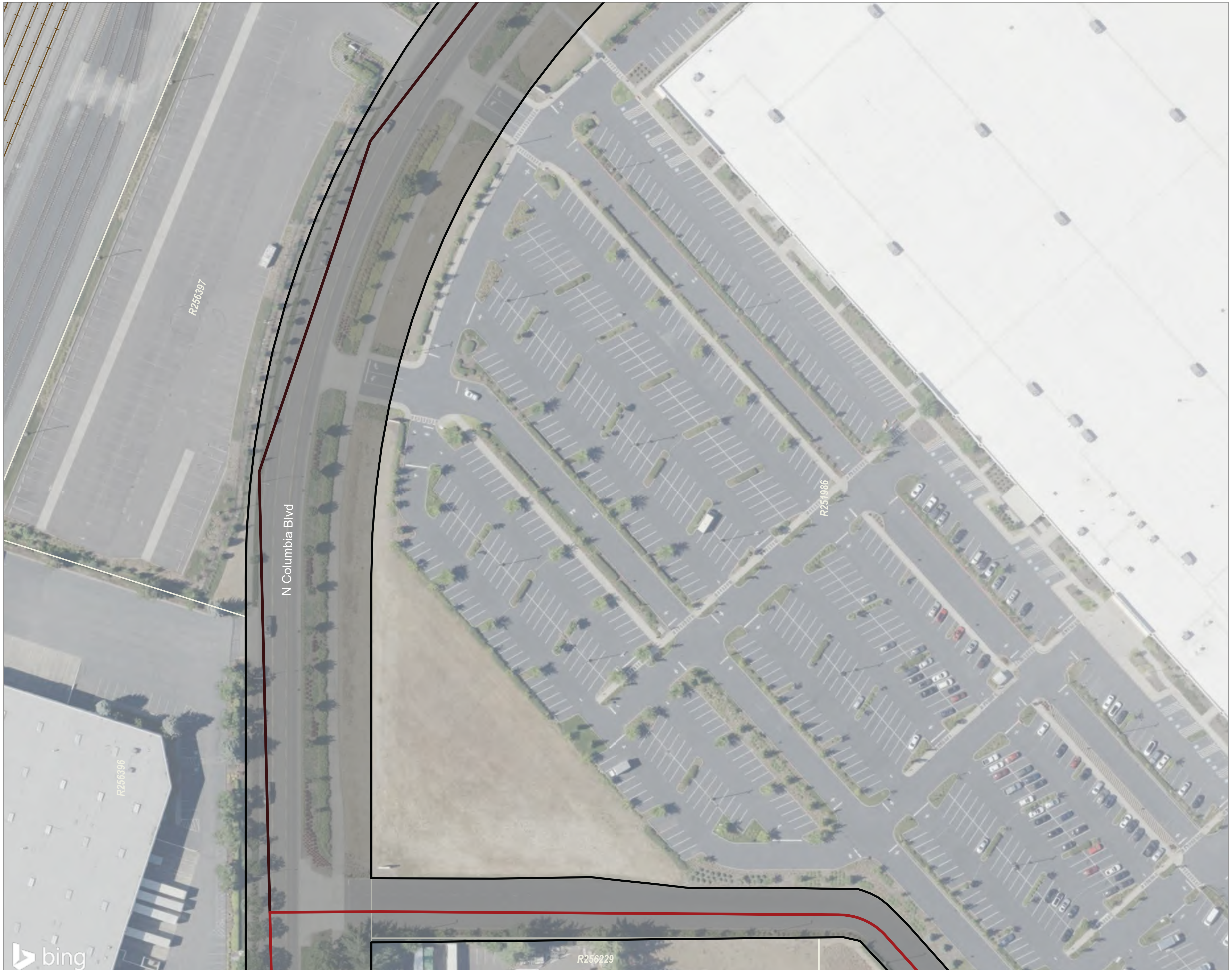


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 12 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WESTERN AC ALTERNATIVE NORTH

UPLAND INSTALLATION (E.G., TRENCHING)

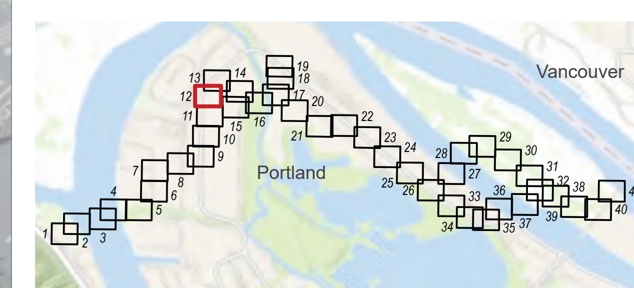
WETLAND AND WATERS SURVEY AREA

RAIL CENTERLINE

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

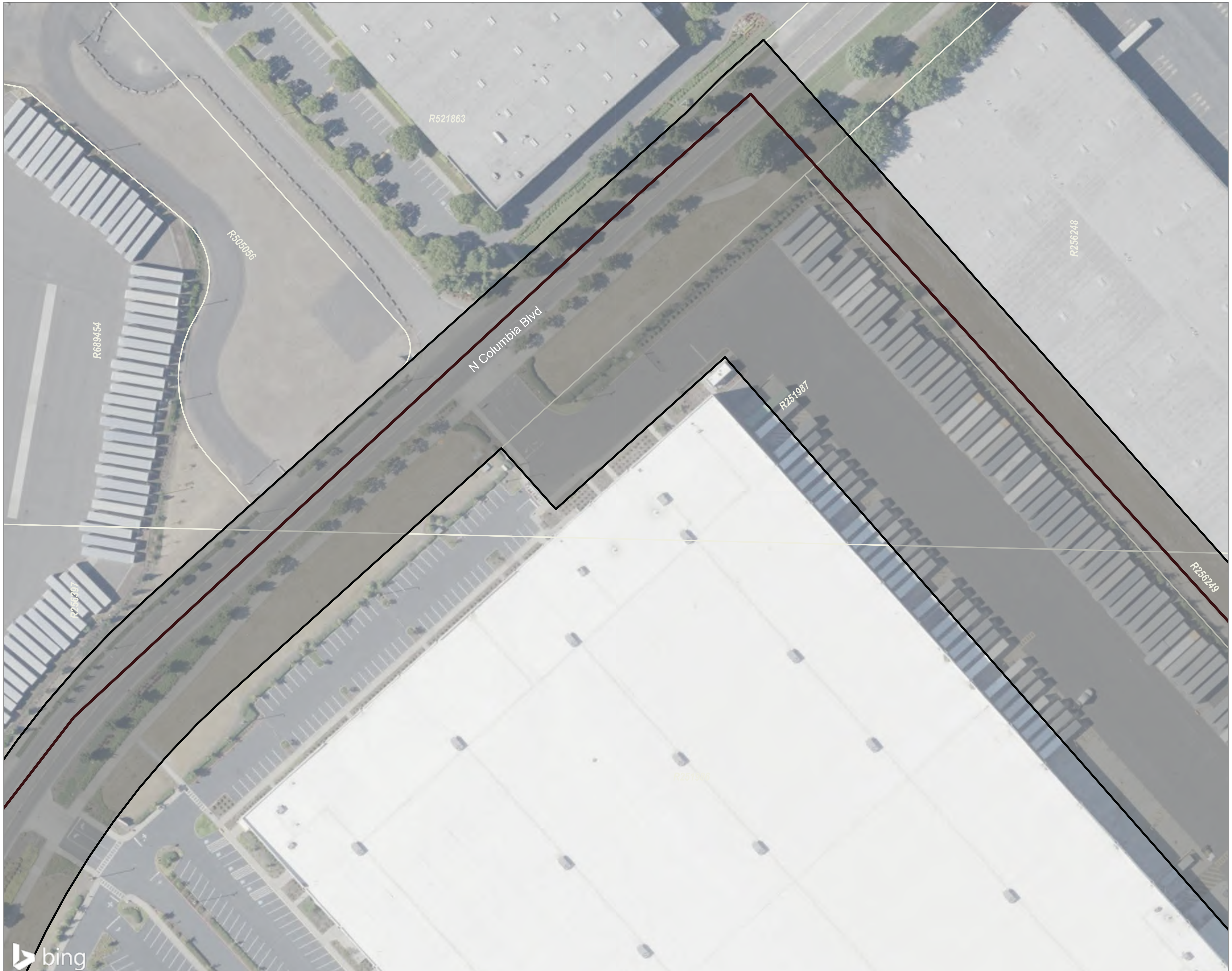


FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

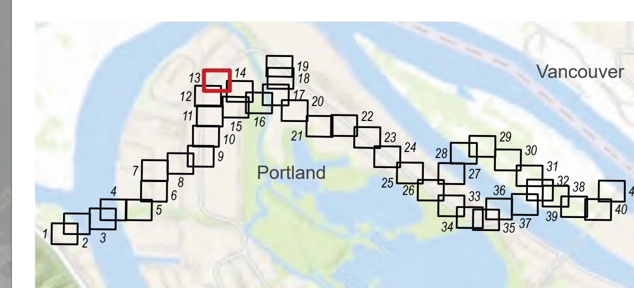
FOR INFORMATION ONLY - CONCEPT DRAWING

WESTERN AC ALTERNATIVE NORTH

- UPLAND INSTALLATION (E.G., TRENCHING)
- WETLAND AND WATERS SURVEY AREA
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 14 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

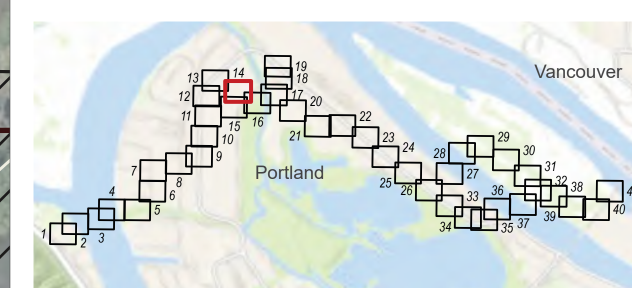
FOR INFORMATION ONLY - CONCEPT DRAWING

WESTERN AC ALTERNATIVE NORTH

- UPLAND INSTALLATION (E.G., TRENCHING)
- HDD
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

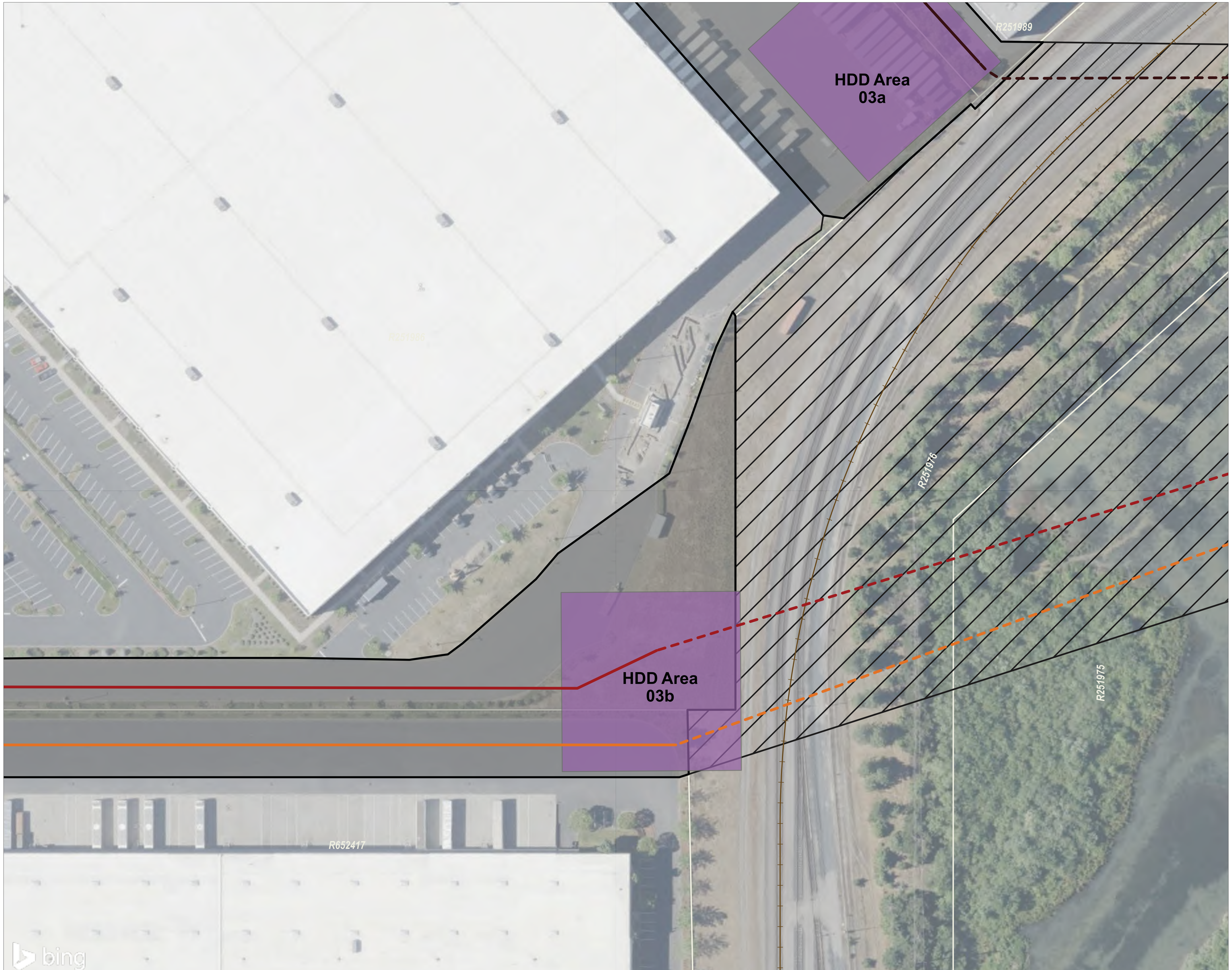


FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

WESTERN AC ALTERNATIVE NORTH

- UPLAND INSTALLATION (E.G., TRENCHING)
- HDD

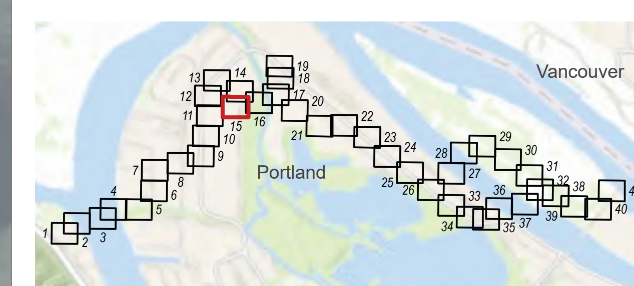
WESTERN AC ALTERNATIVE SOUTH

- UPLAND INSTALLATION (E.G., TRENCHING)
- HDD

- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- RAIL CENTERLINE
- TAXLOT

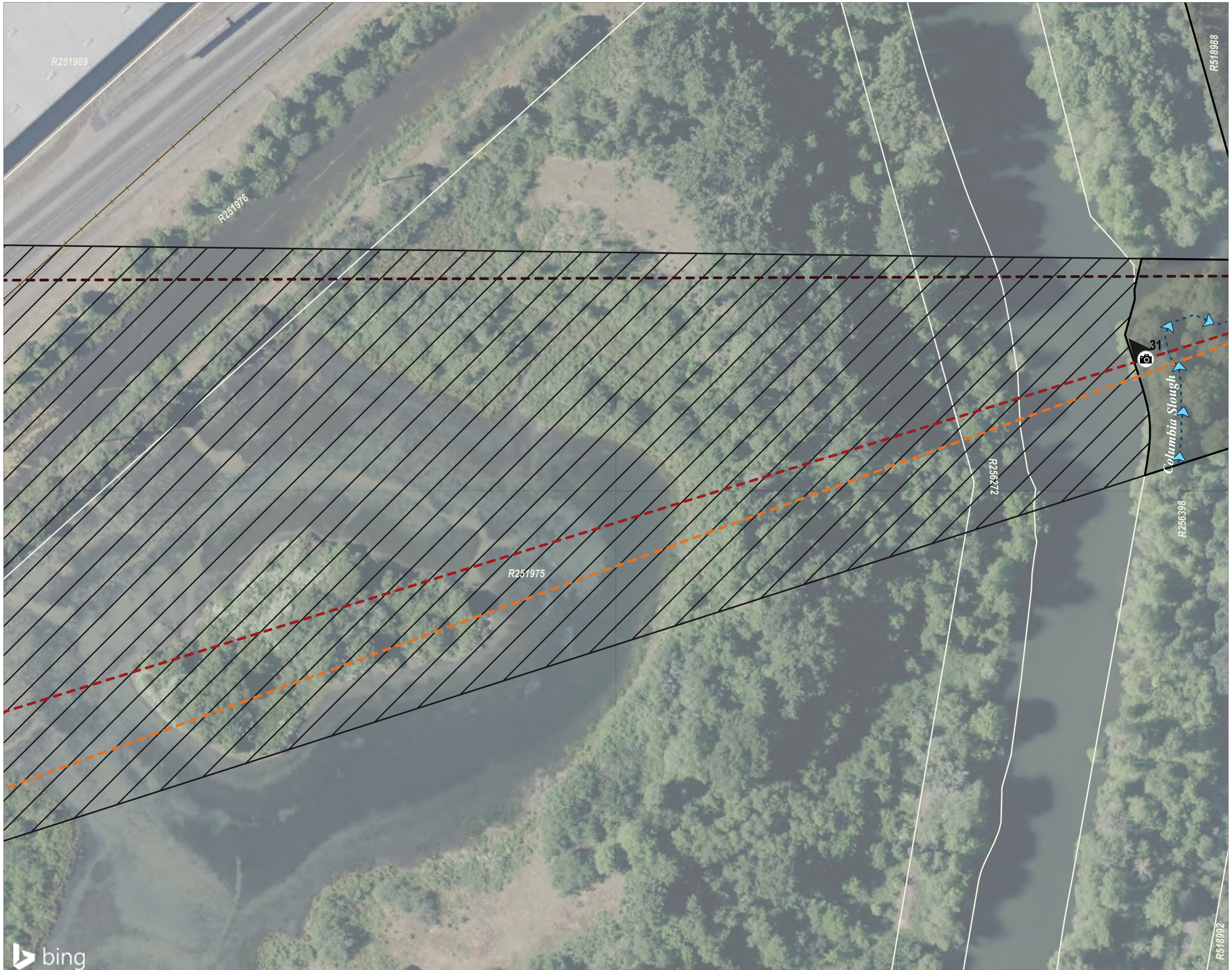
SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 16 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

WESTERN AC ALTERNATIVE NORTH

HDD

WESTERN AC ALTERNATIVE SOUTH

HDD

PHOTO POINT

CALCULATED HTL

WETLAND AND WATERS SURVEY AREA

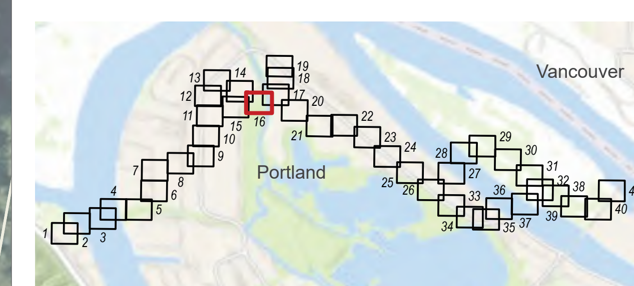
DESKTOP AND VISUAL SURVEY ONLY

RAIL CENTERLINE

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

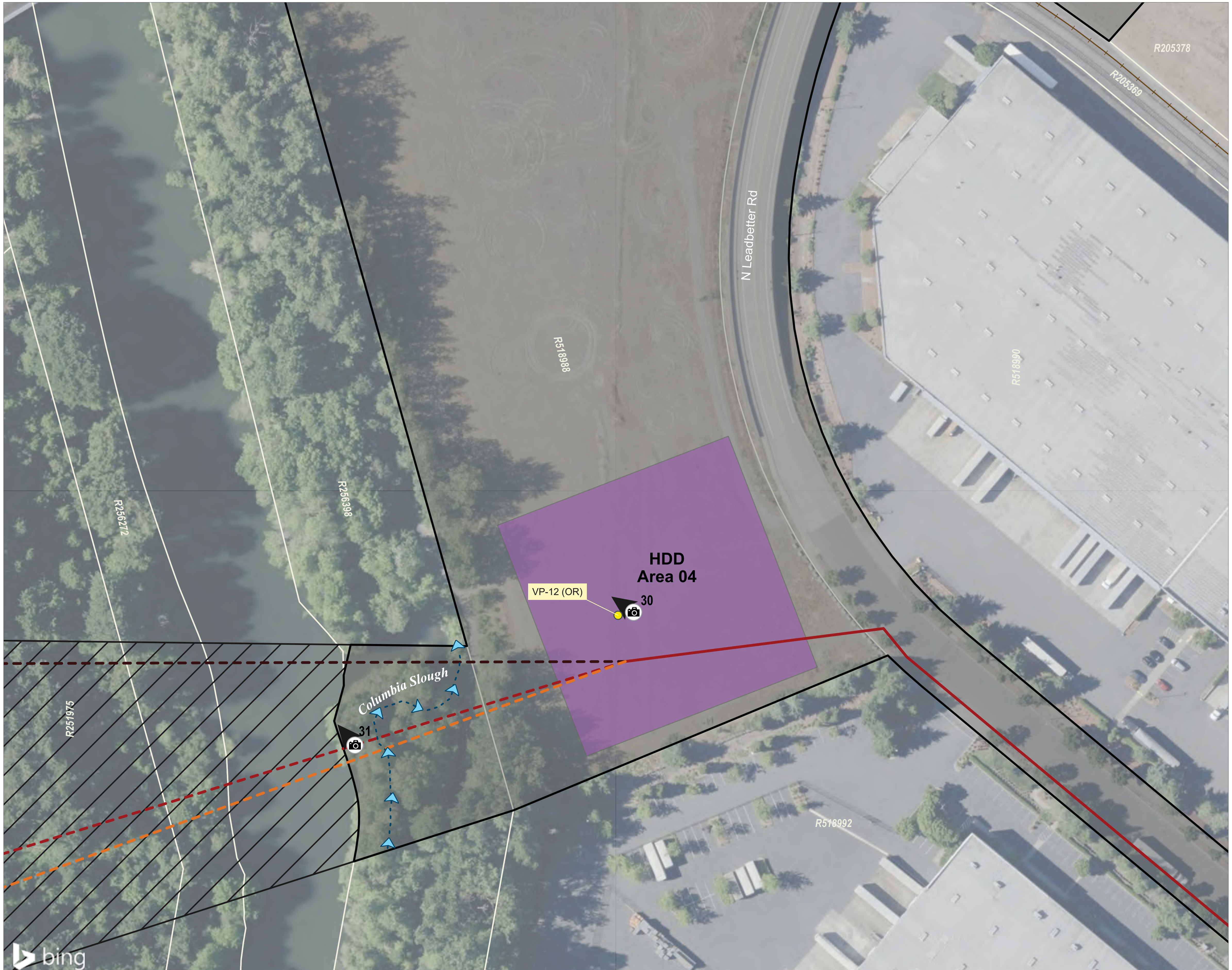


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 17 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

WESTERN AC ALTERNATIVE NORTH
- HDD

WESTERN AC ALTERNATIVE SOUTH
- HDD
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- CALCULATED HTL
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

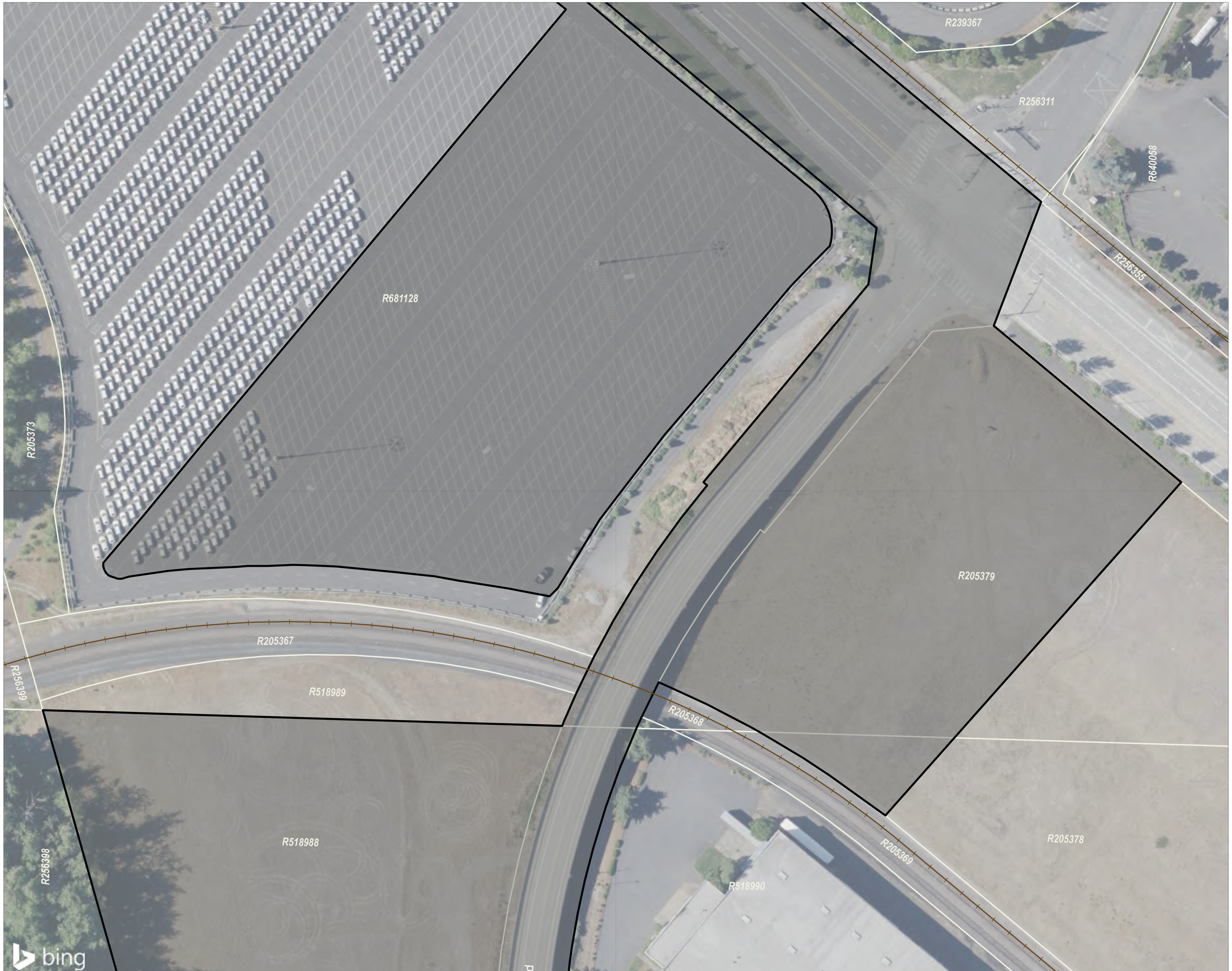


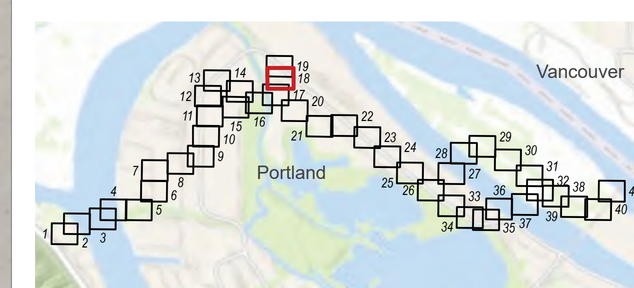
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 18 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

WETLAND AND WATERS SURVEY AREA
RAIL CENTERLINE
TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

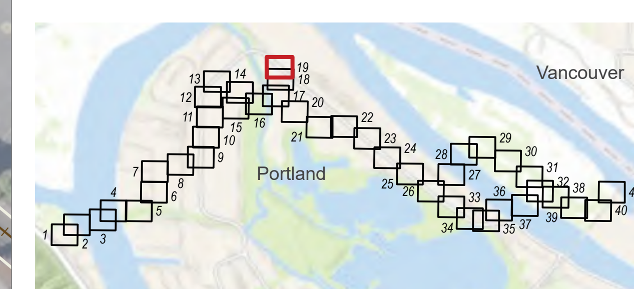
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 19 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

WETLAND AND WATERS SURVEY AREA
RAIL CENTERLINE
TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

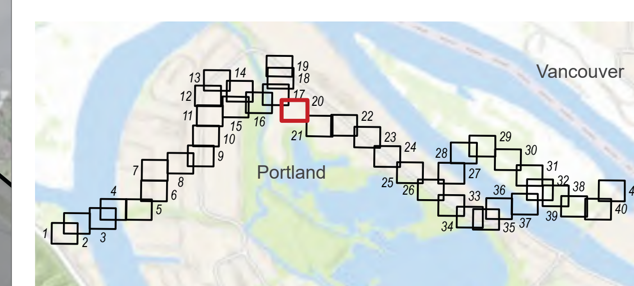
WETLAND AND WATERS SURVEY AREA

RAIL CENTERLINE

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 21 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25,30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

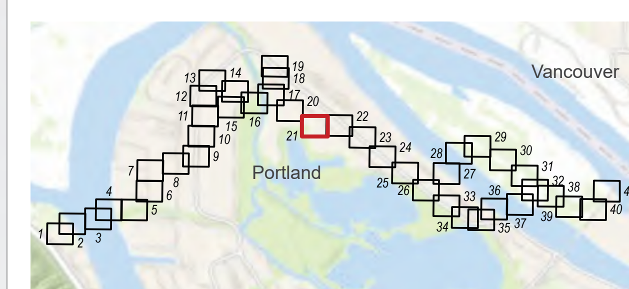
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 22 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25,30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

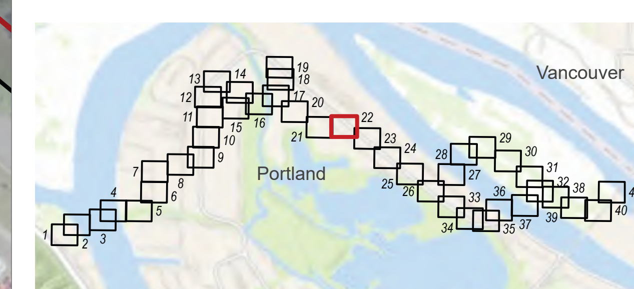
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 23 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25,30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

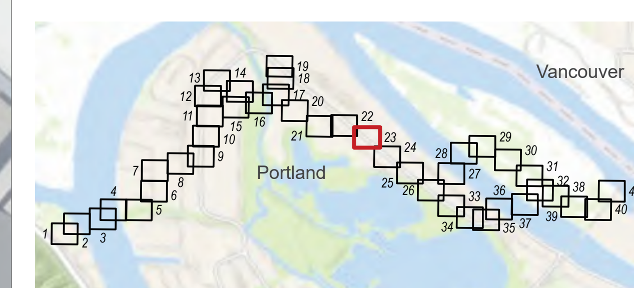
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 24 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25,30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

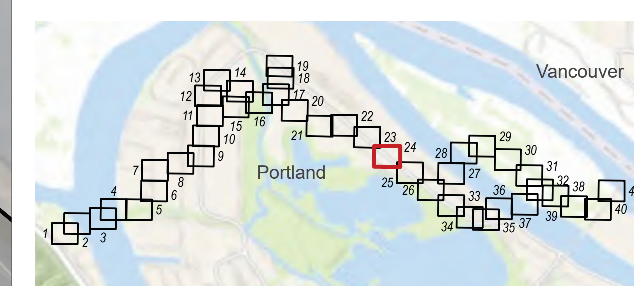
WETLAND AND WATERS SURVEY AREA

RAIL CENTERLINE

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 25 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

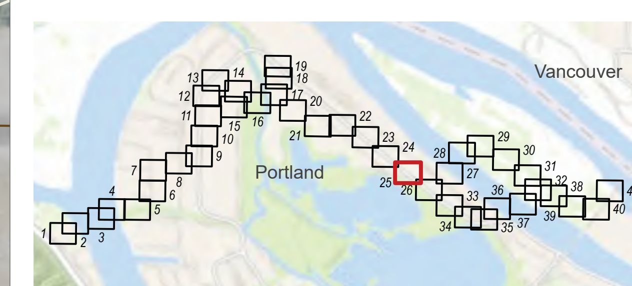
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 26 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

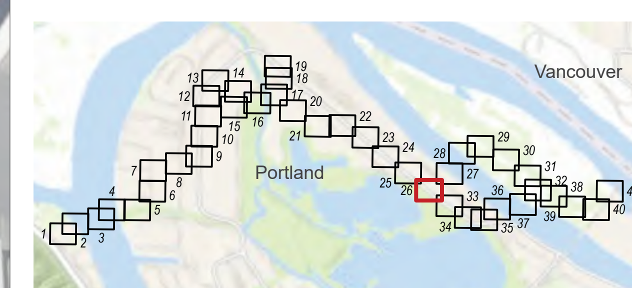
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

HAYDEN ISLAND ALTERNATIVE
- UPLAND INSTALLATION (E.G., TRENCHING)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- SAMPLE PLOT
- PHOTO POINT
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 27 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

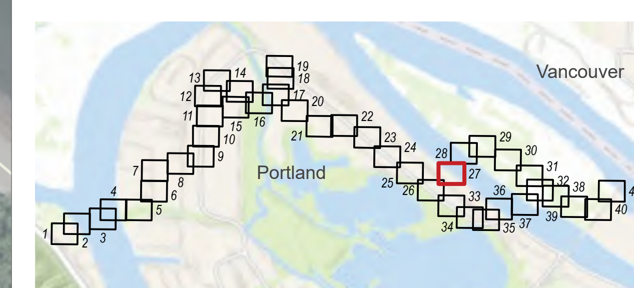
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- PHOTO POINT
- CALCULATED HTL
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 28 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

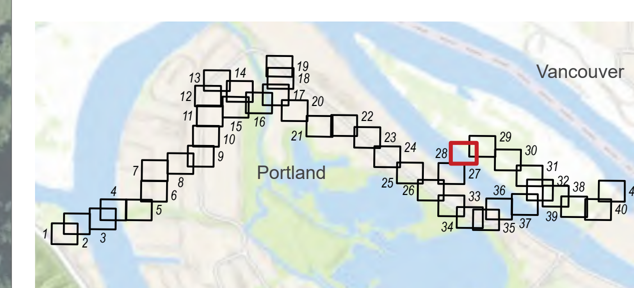
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- CALCULATED HTL
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

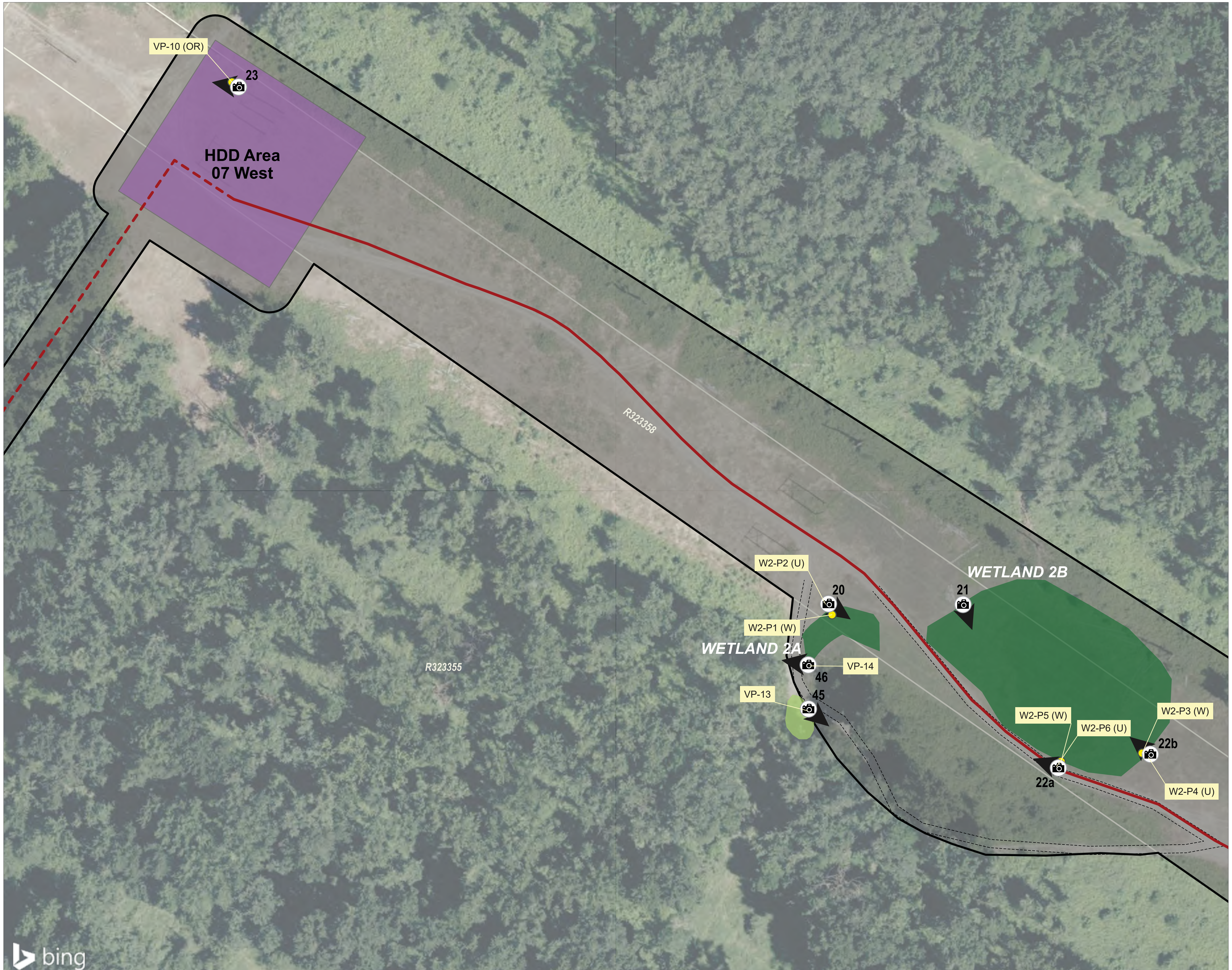


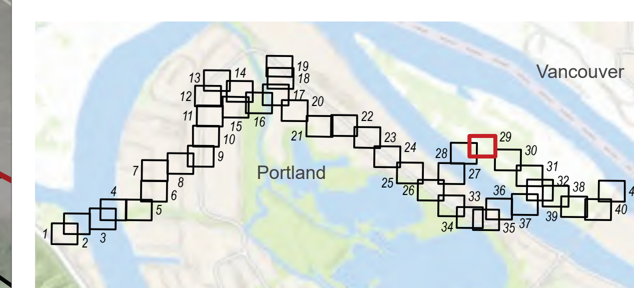
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 29 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- DELINEATED ROAD
- DELINEATED WETLAND
- ESTIMATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

PAGE 30 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

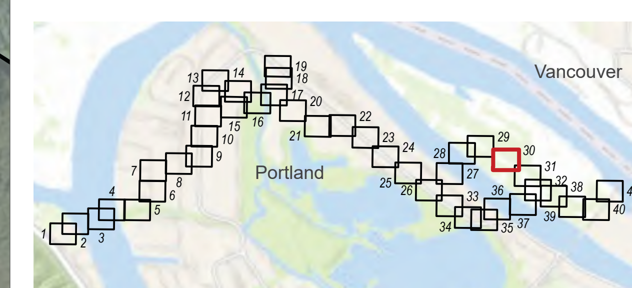
DELINEATED ROAD

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 31 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

HAYDEN ISLAND ALTERNATIVE

UPLAND INSTALLATION (E.G., TRENCHING)

SAMPLE PLOT

PHOTO POINT

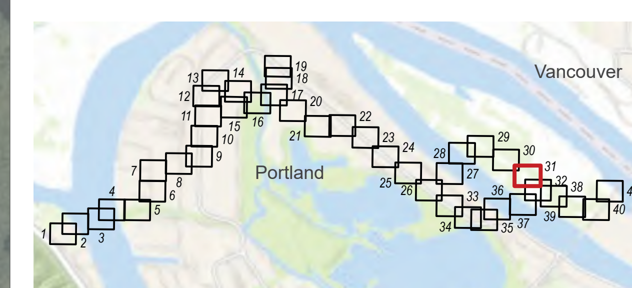
DELINEATED WETLAND

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 32 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

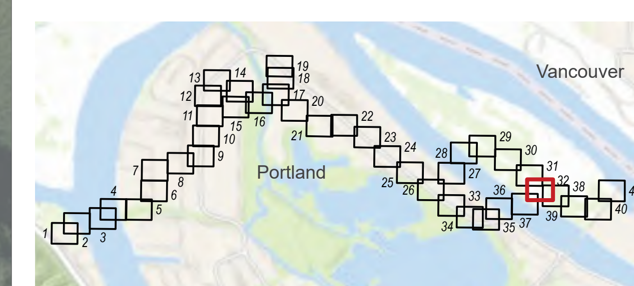
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING

HAYDEN ISLAND ALTERNATIVE
- UPLAND INSTALLATION (E.G., TRENCHING)
- HDD
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 33 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

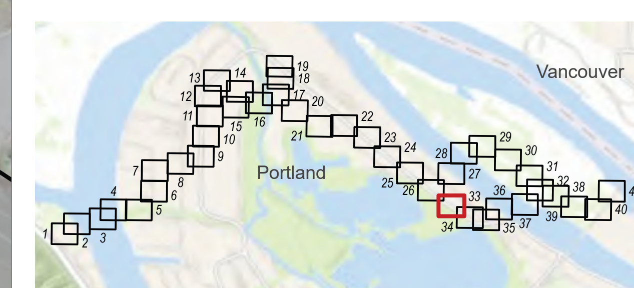
FOR INFORMATION ONLY - CONCEPT DRAWING

HAYDEN ISLAND ALTERNATIVE

- UPLAND INSTALLATION (E.G., TRENCHING)
- WETLAND AND WATERS SURVEY AREA
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 34 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

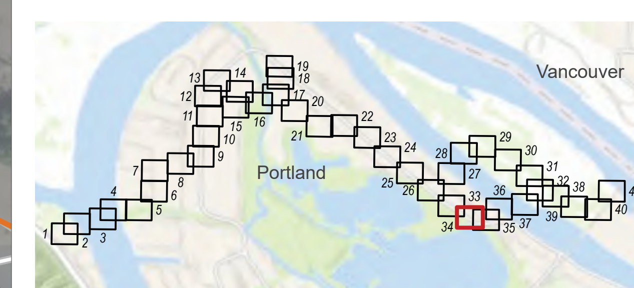
FOR INFORMATION ONLY - CONCEPT DRAWING

HAYDEN ISLAND ALTERNATIVE

- UPLAND INSTALLATION (E.G., TRENCHING)
- WETLAND AND WATERS SURVEY AREA
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

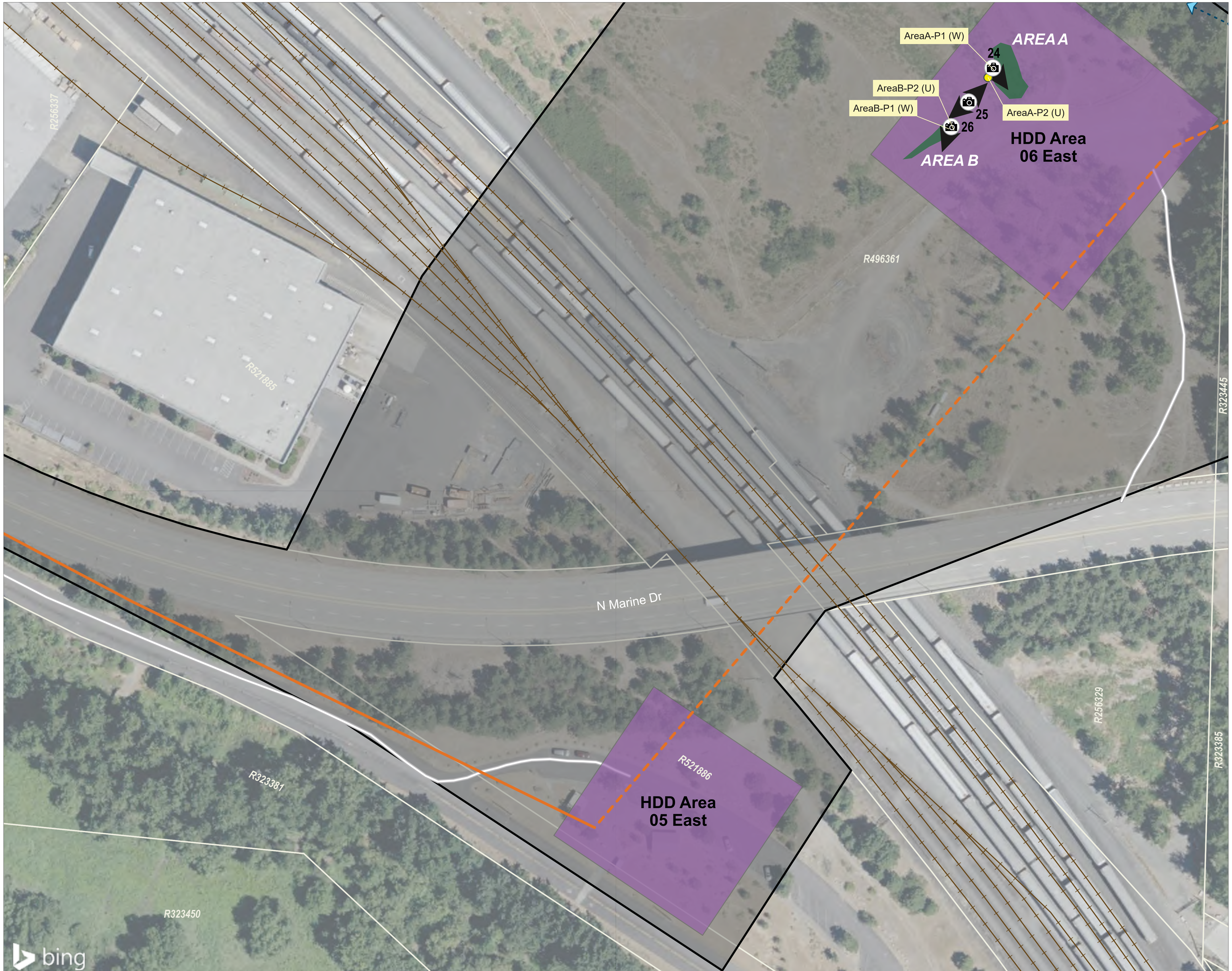
SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 35 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

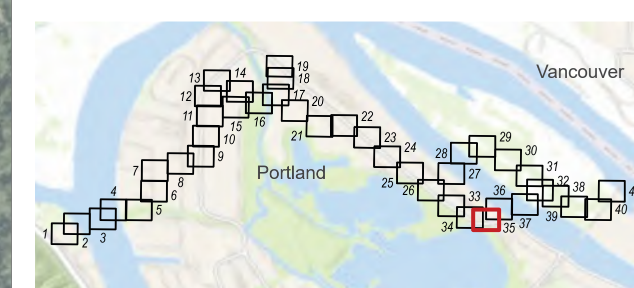
FOR INFORMATION ONLY - CONCEPT DRAWING

HAYDEN ISLAND ALTERNATIVE

- UPLAND INSTALLATION (E.G., TRENCHING)
- HDD
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- CALCULATED HTL
- DELINEATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 36 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

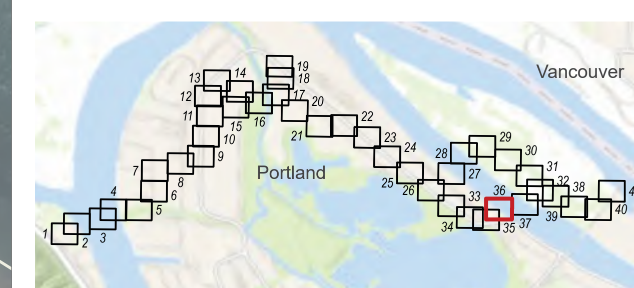
FOR INFORMATION ONLY - CONCEPT DRAWING

HAYDEN ISLAND ALTERNATIVE

- HDD
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- CALCULATED HTL
- DELINEATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 37 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

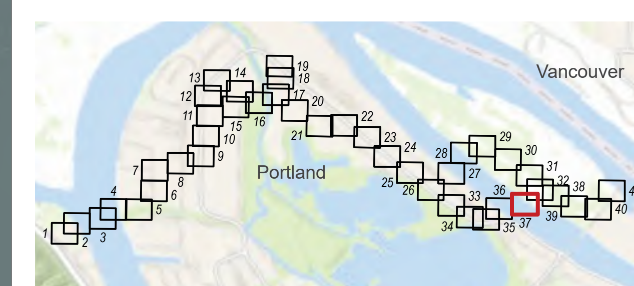
FOR INFORMATION ONLY - CONCEPT DRAWING

HAYDEN ISLAND ALTERNATIVE

- UPLAND INSTALLATION (E.G., TRENCHING)
- HDD
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- CALCULATED HTL
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

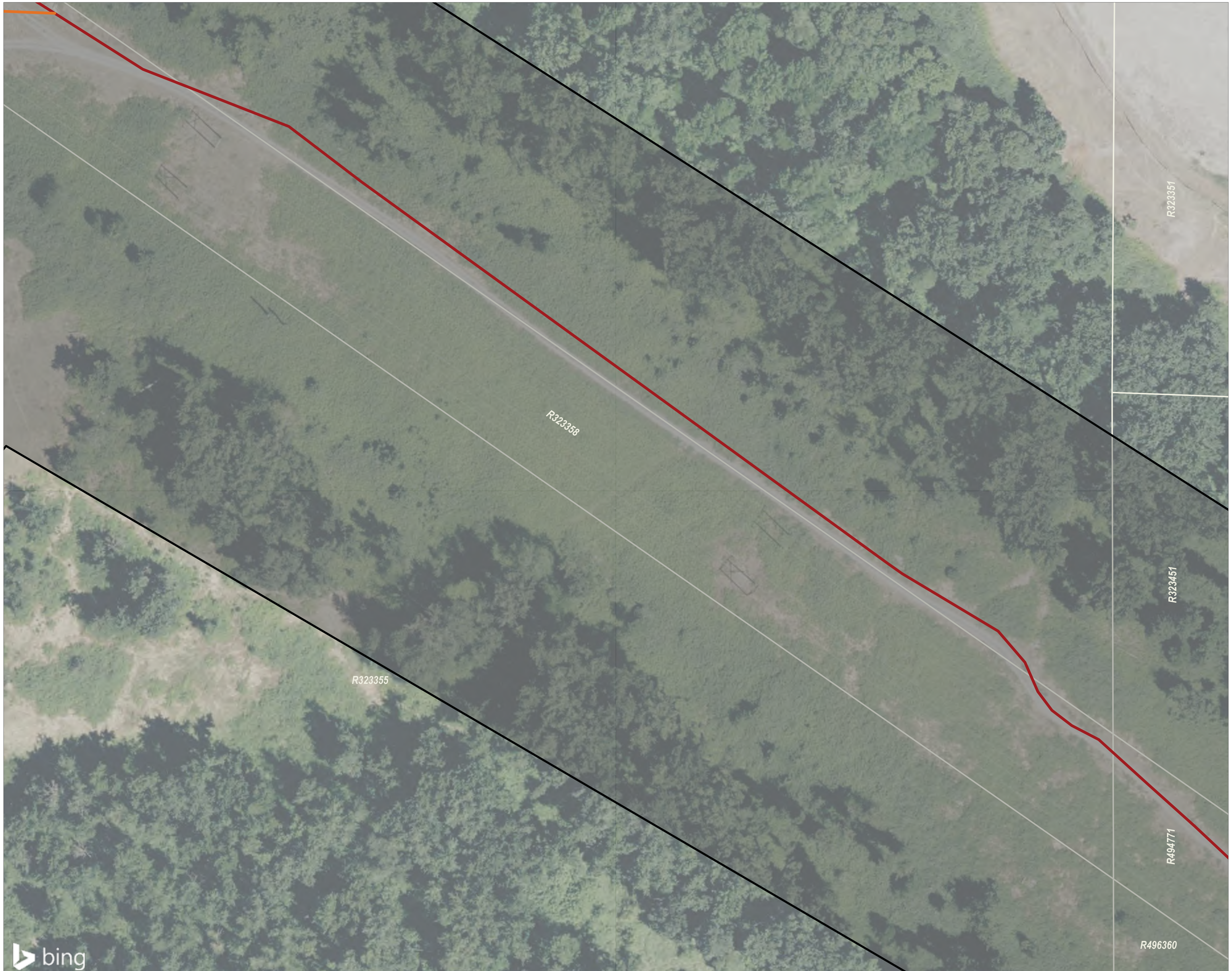


FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

HAYDEN ISLAND ALTERNATIVE

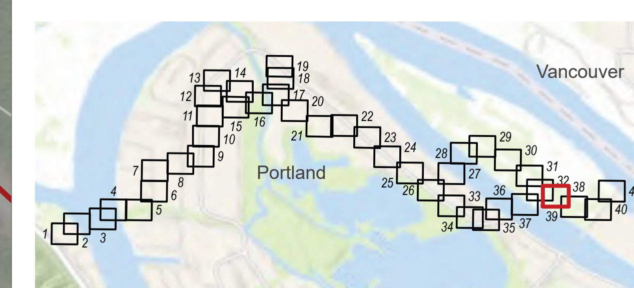
UPLAND INSTALLATION (E.G., TRENCHING)

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

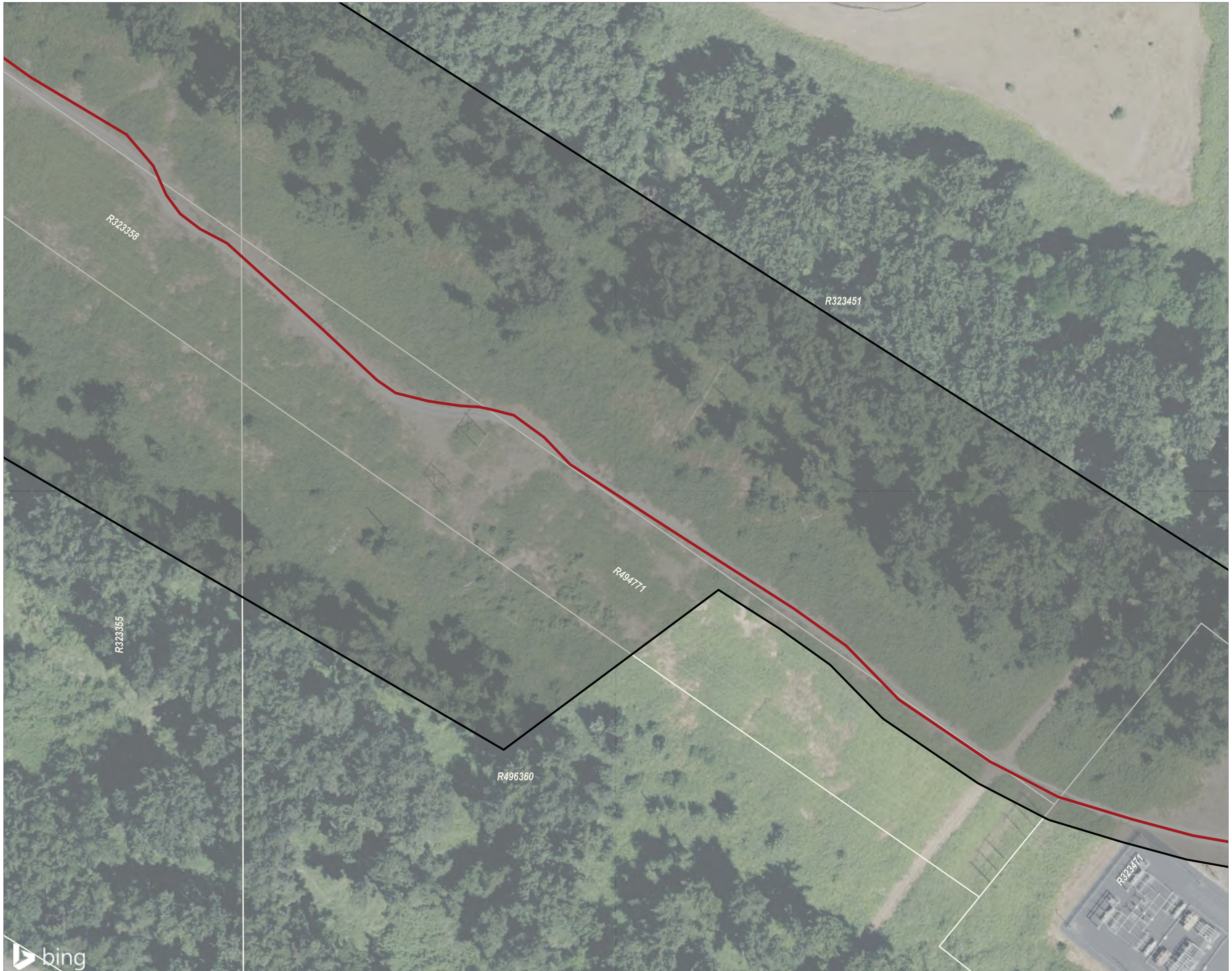


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 39 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

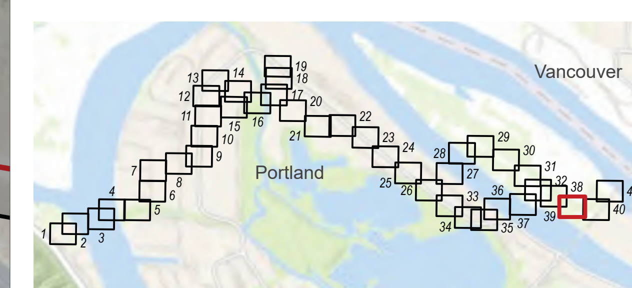
INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

PAGE 40 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

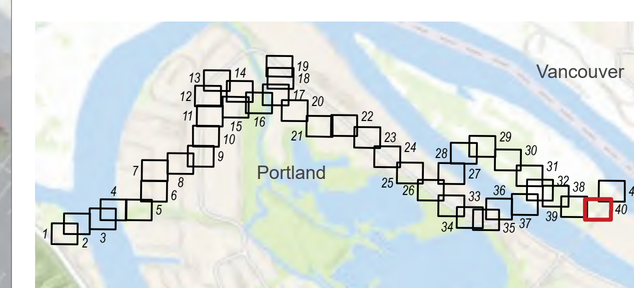
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- SAMPLE PLOT
- PHOTO POINT
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

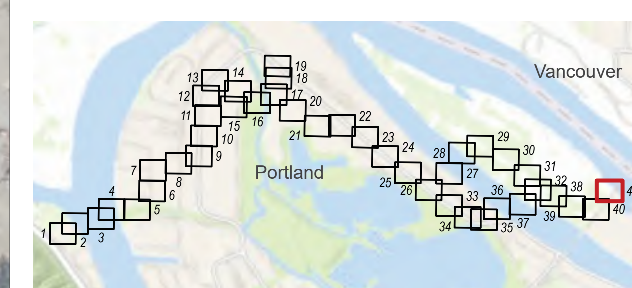
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 41 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- CALCULATED HTL
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

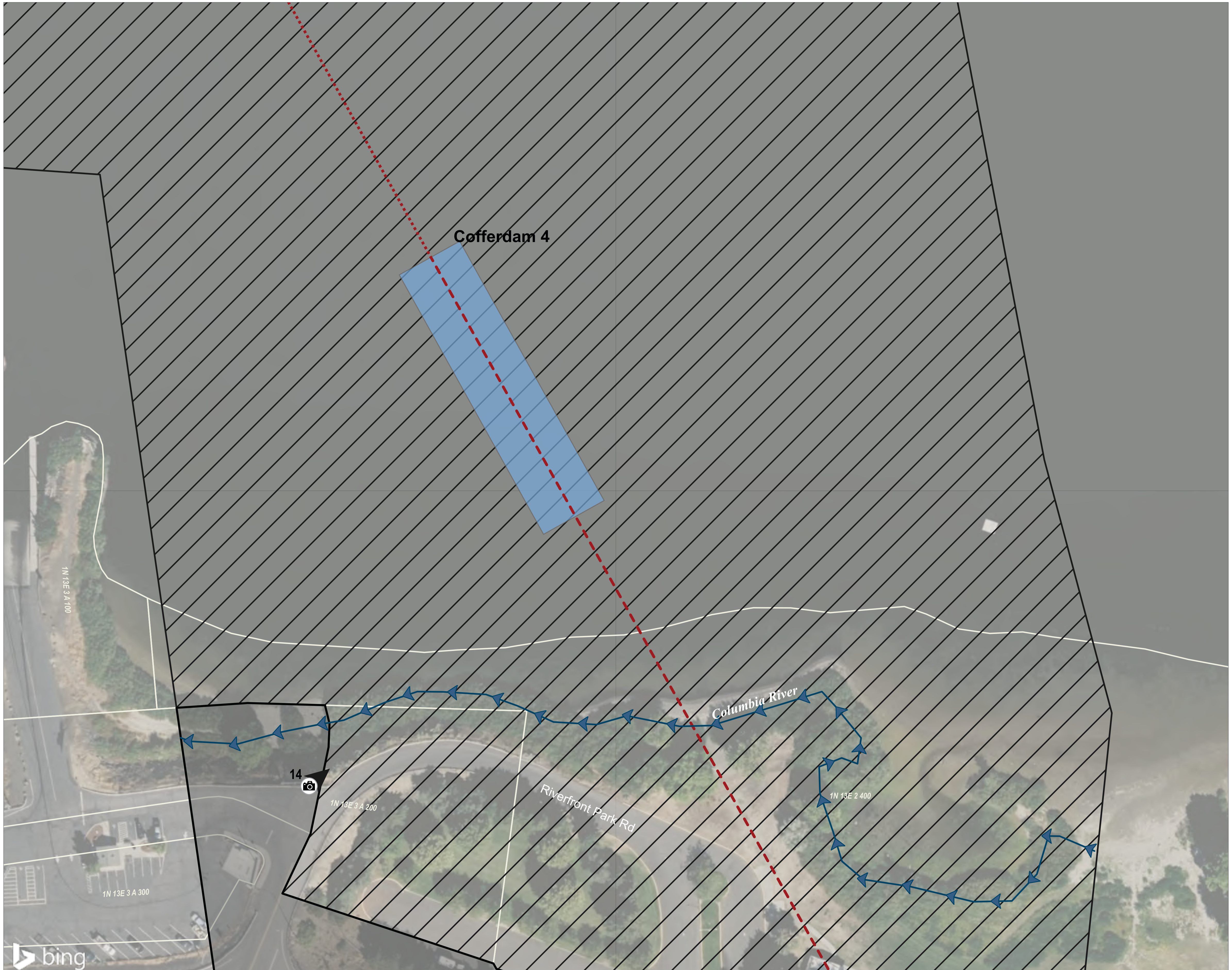


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 42 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

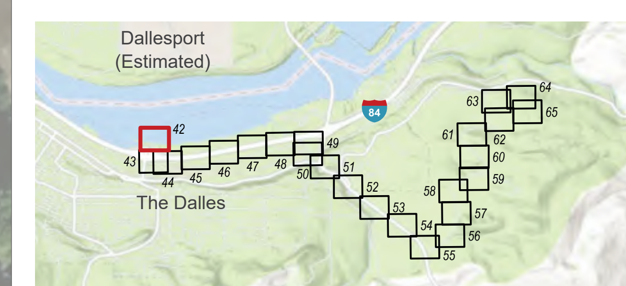
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HYDROPLOW
- TEMPORARY 3-SIDED WET COFFERDAM
- PHOTO POINT
- DELINEATED OHWM
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

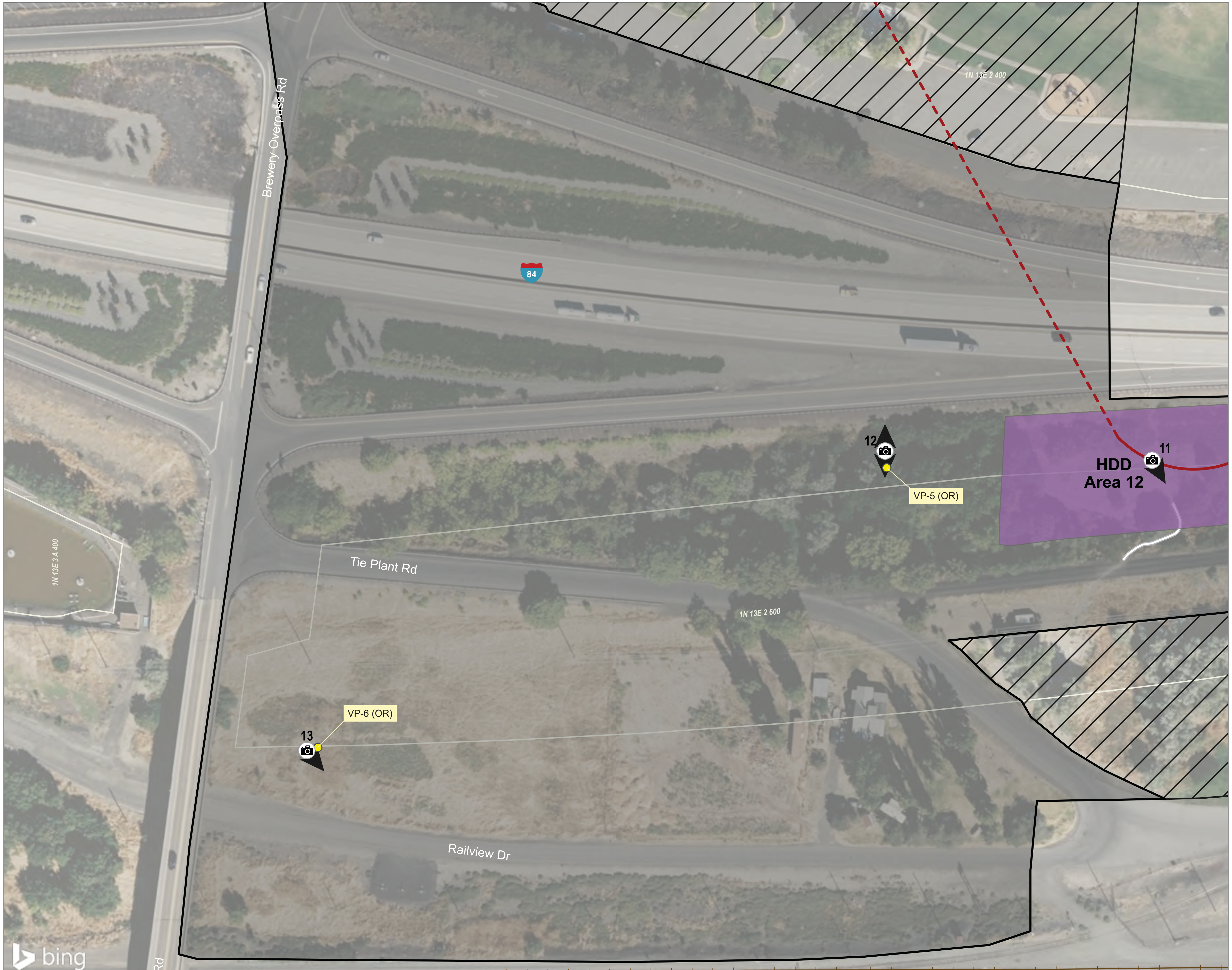


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 43 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

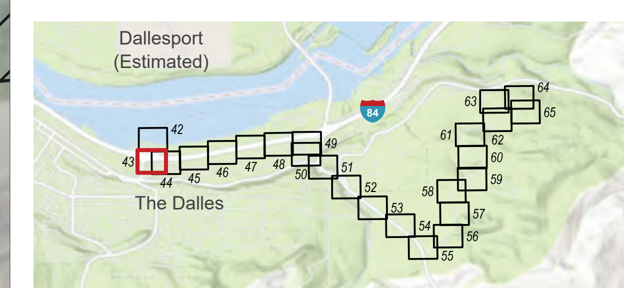
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT
- CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

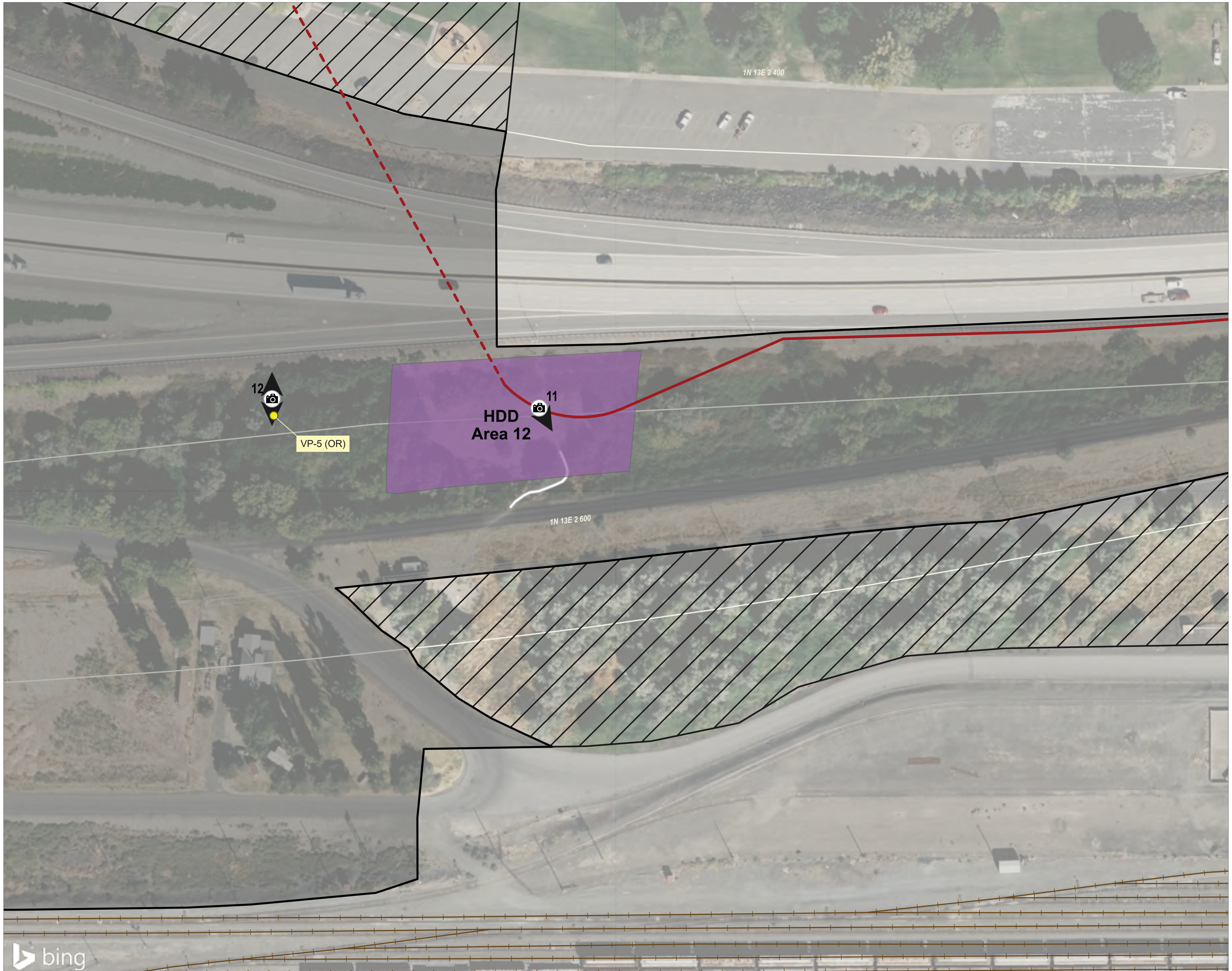


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 44 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA

SAMPLE PLOT

PHOTO POINT

WETLAND AND WATERS SURVEY AREA

DESKTOP AND VISUAL SURVEY ONLY

ACCESS ROAD

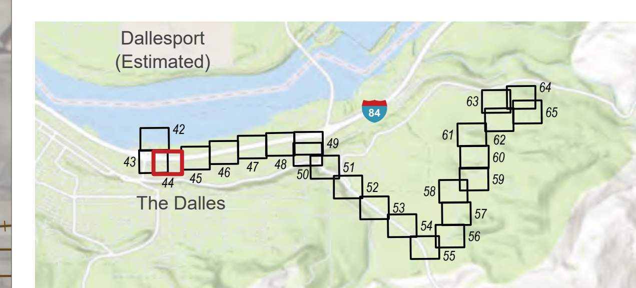
RAIL CENTERLINE

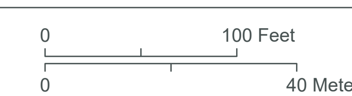
TAXLOT

CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION





4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 45 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

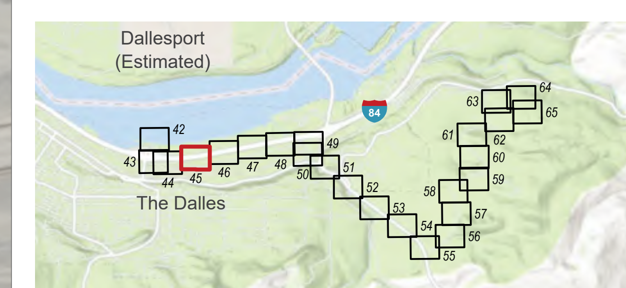
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

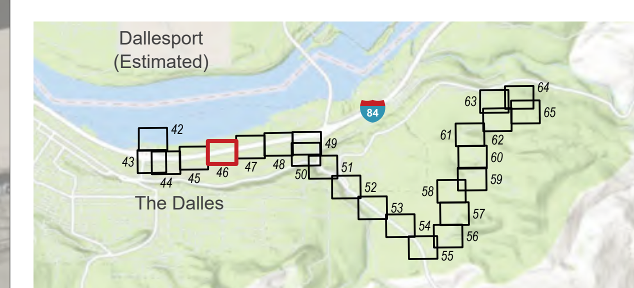
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 46 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
INSTALLATION VIA TRENCHING
WETLAND AND WATERS SURVEY AREA
TAXLOT
CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 47 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

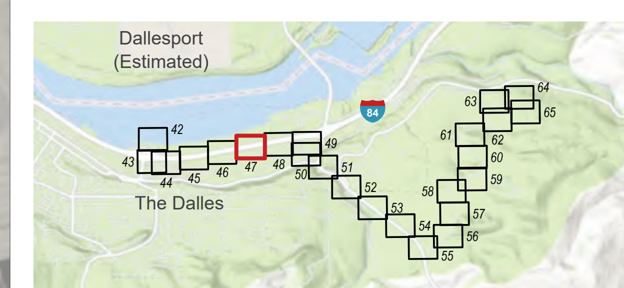
WETLAND AND WATERS SURVEY AREA

TAXLOT

CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 48 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

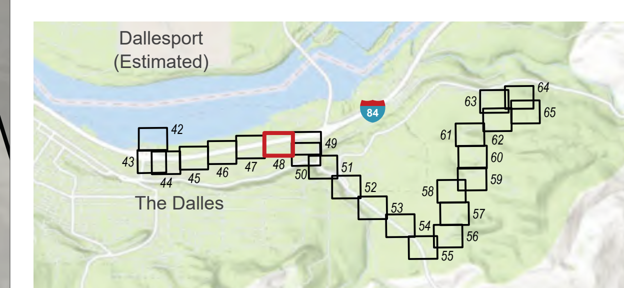
RAIL CENTERLINE

TAXLOT

CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



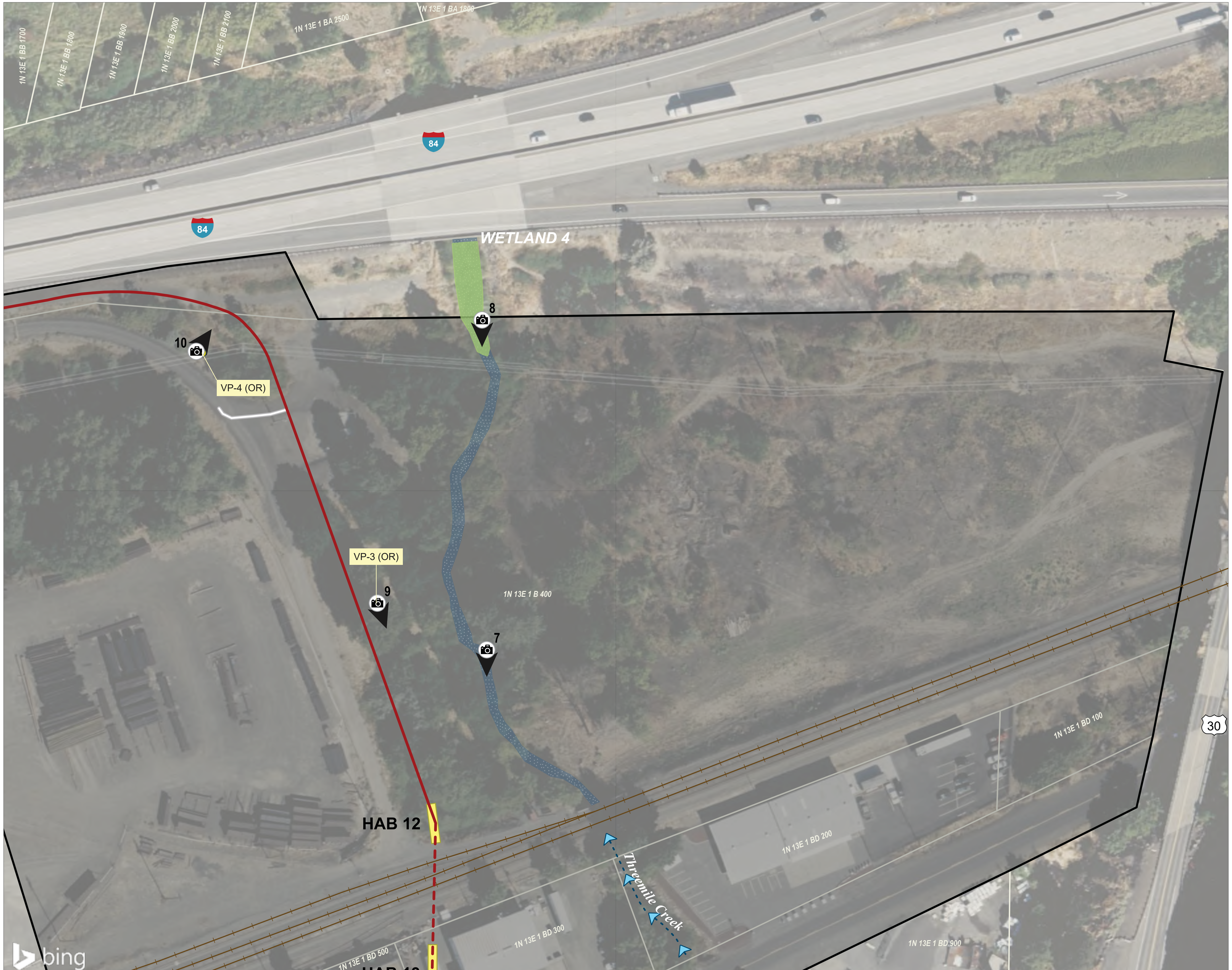
HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 49 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

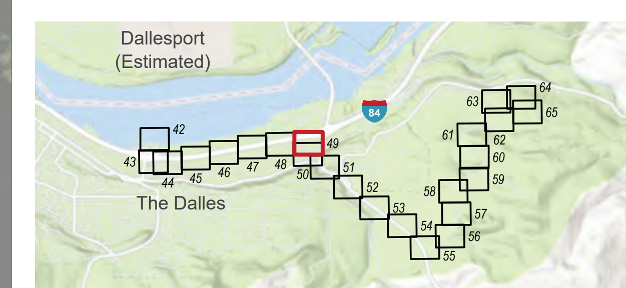


PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- SAMPLE PLOT
- PHOTO POINT
- ESTIMATED CENTERLINE OF DITCH
- DELINEATED WATERBODY
- ESTIMATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT
- CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

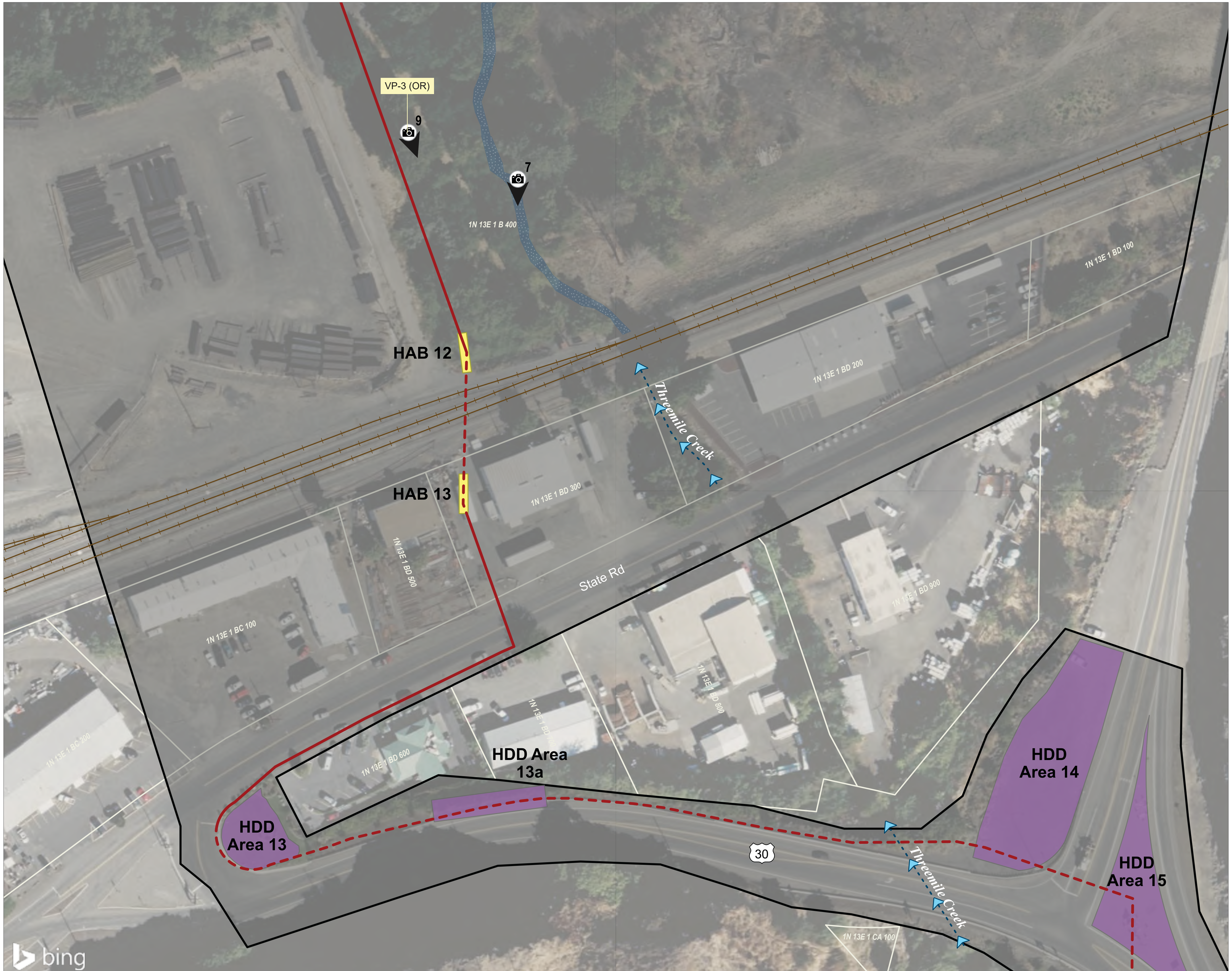


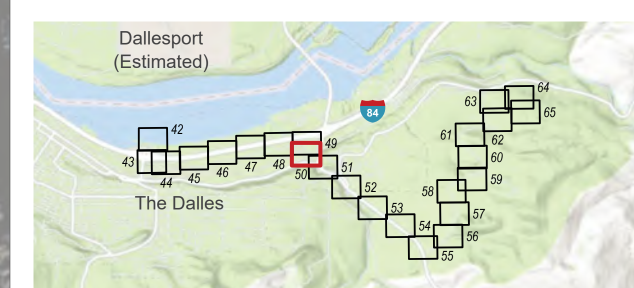
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 50 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- SAMPLE PLOT
- PHOTO POINT
- ESTIMATED CENTERLINE OF DITCH
- DELINEATED WATERBODY
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT
- CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

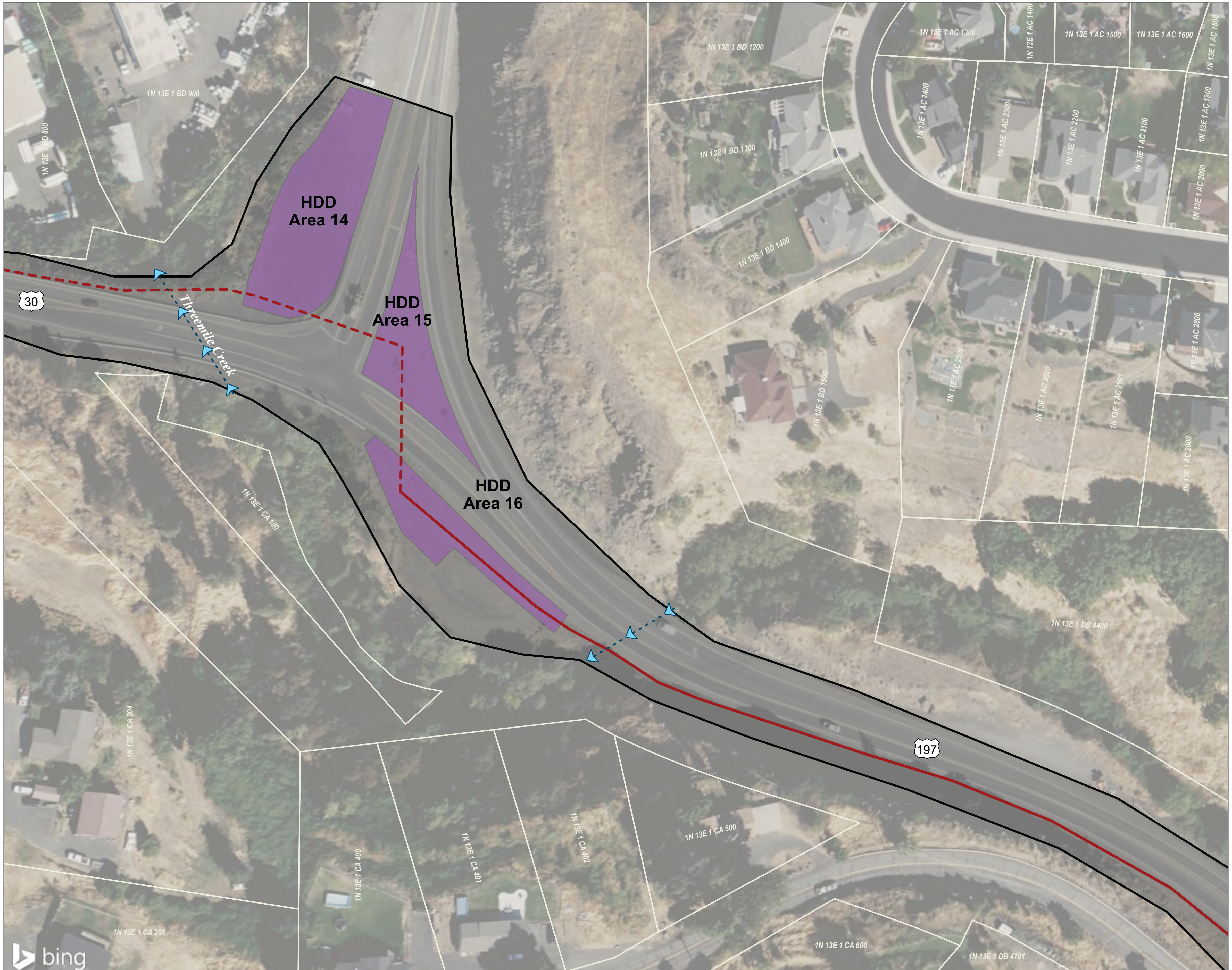
CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 51 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- ESTIMATED CENTERLINE OF DITCH
- WETLAND AND WATERS SURVEY AREA
- TAXLOT
- CITY BOUNDARY

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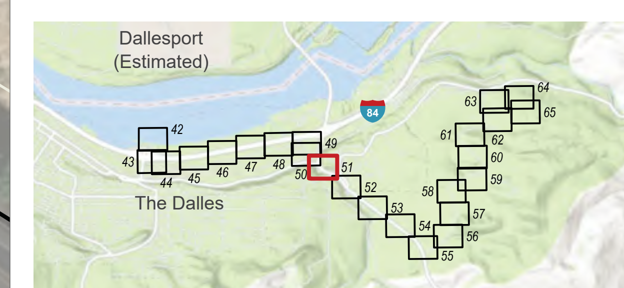

0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 52 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

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- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- PHOTO POINT
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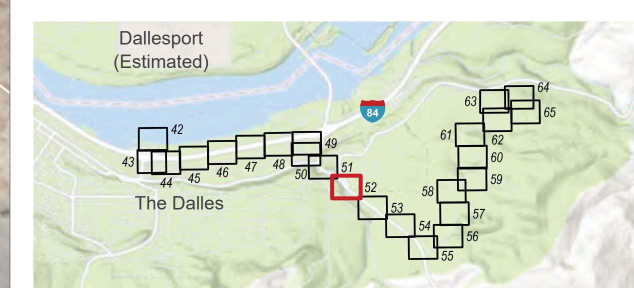

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 53 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

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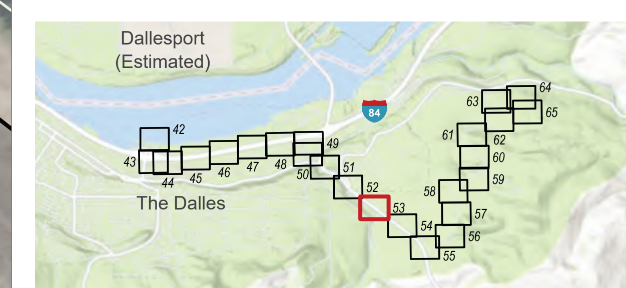
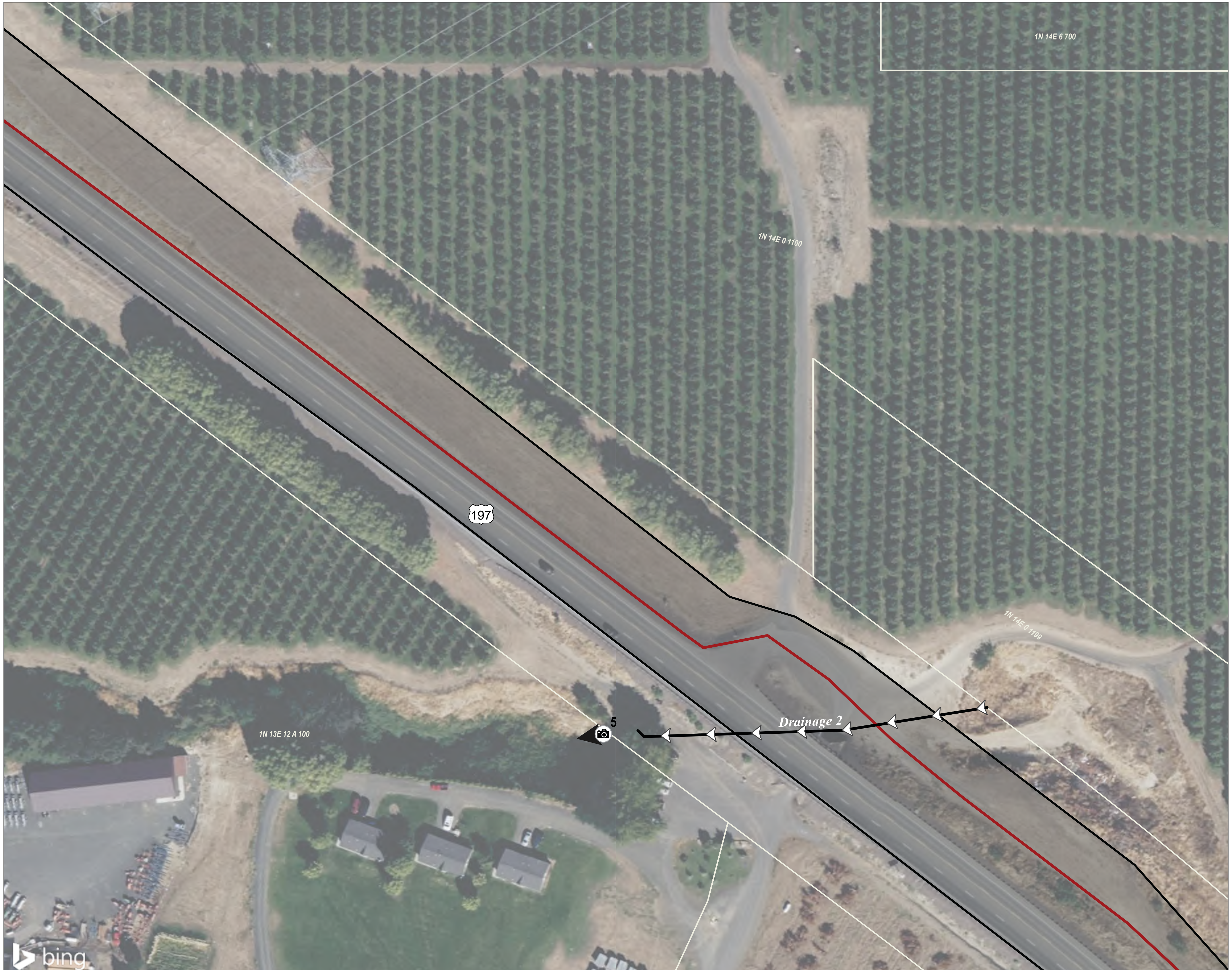


0 100 Feet
0 40 Meters



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 54 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

PHOTO POINT

ESTIMATED CULVERT

WETLAND AND WATERS SURVEY AREA

TAXLOT

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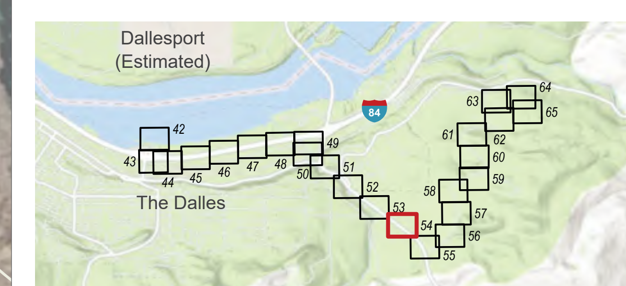

0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 55 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

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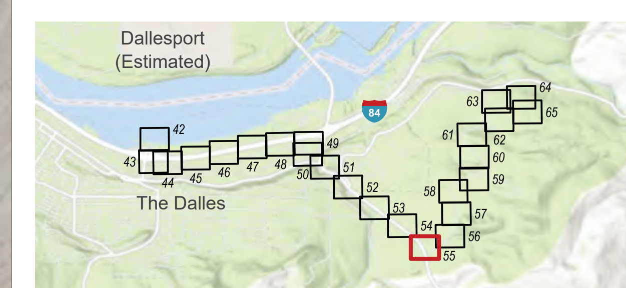

HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 56 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

PHOTO POINT

ESTIMATED CULVERT

WETLAND AND WATERS SURVEY AREA

TAXLOT

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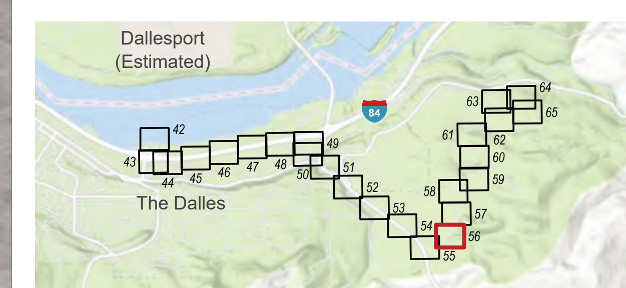

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- WETLAND AND WATERS SURVEY AREA
- TAXLOT

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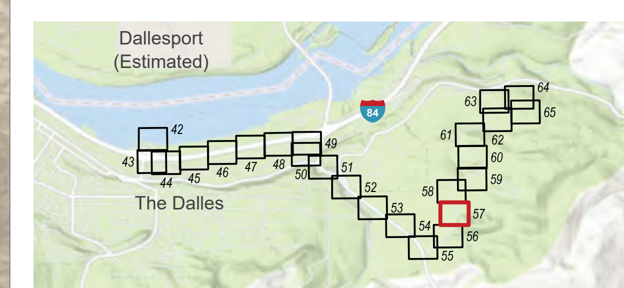

HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 58 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

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PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

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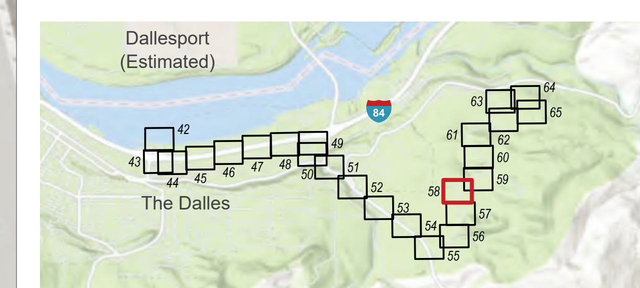

0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

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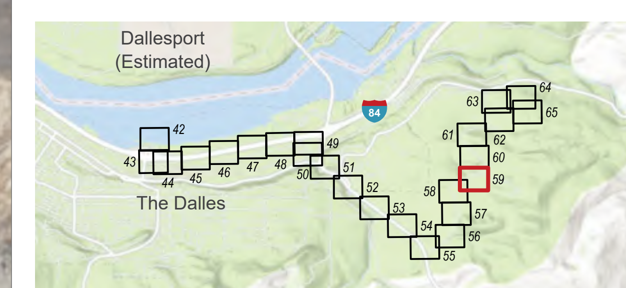

HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 60 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- PHOTO POINT
- ESTIMATED CULVERT
- WETLAND AND WATERS SURVEY AREA
- TAXLOT

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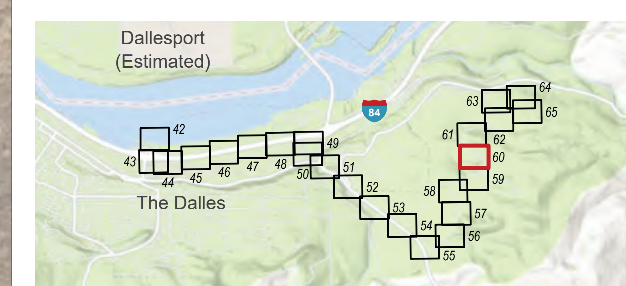

HDR

0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 61 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

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PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

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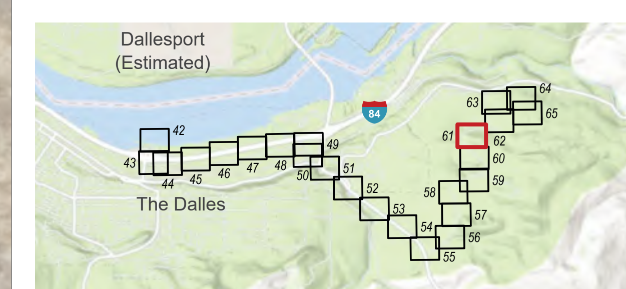
CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME: PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- EASTERN CONVERTER STATION
- SAMPLE PLOT
- PHOTO POINT
- WETLAND AND WATERS SURVEY AREA
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

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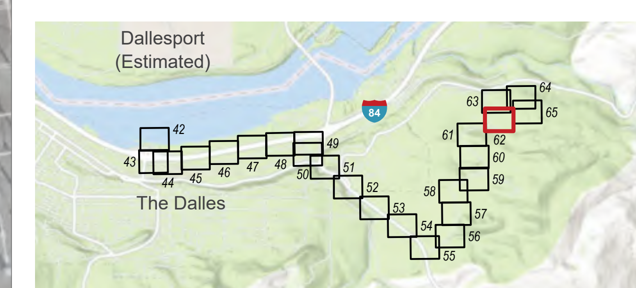

HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
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USGS QUAD NAME:
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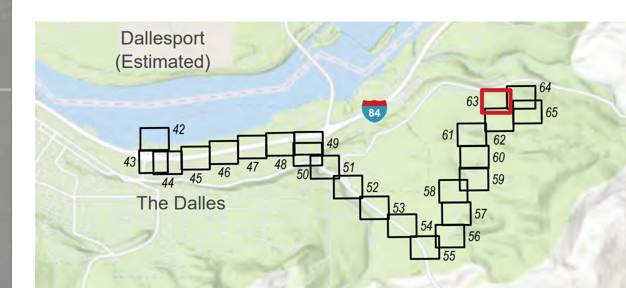

HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
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SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

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WETLAND AND WATERS SURVEY AREA

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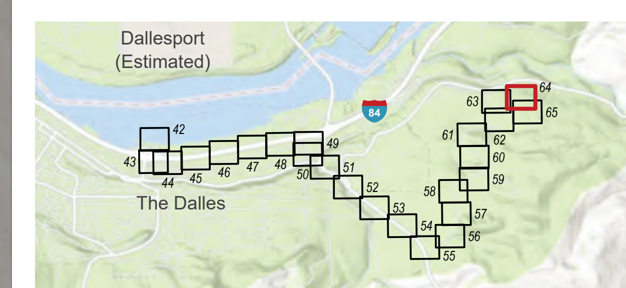

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 65 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

WETLAND AND WATERS SURVEY AREA

TAXLOT

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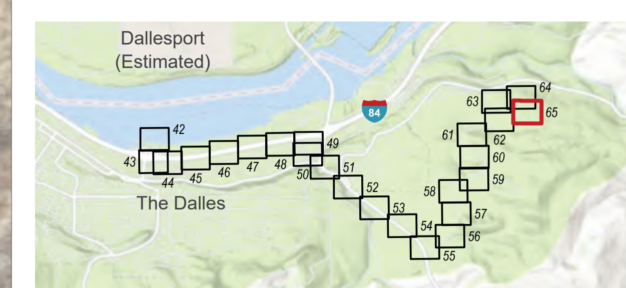

HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.


Aerial: May 2015
Eastern Converter Station Site
182
182
Columbia View Dr
Columbia View Dr
Google Earth
N
600 ft


Aerial: March 2016
Eastern Converter Station Site
182
182
Columbia View Dr
Columbia View Dr
Google Earth
600 ft
N


Aerial: March 2020
Eastern Converter Station Site
182
182
Columbia View Dr
Columbia View Dr
Google Earth
Image © 2024 CNES / Airbus
N
600 ft

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Appendix B. Wetland Determination Data Forms

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WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables   City/County: Wasco   Sampling Date: 11/8/2023

Applicant/Owner: Cascade Renewables   State: OR   Sampling VP-1 (OR)

Investigators: B DARBY, J MAZE   Section, Township, Range: T2N R14E S31

Landform (hillslope, terrace, etc.): Depression   Local Relief (concave, convex, none): Concave   Slope(%): 0

Subregion (LRR): B - Northwest Wheat/Range   Lat: 45.605589   Long: -121.109524   Datum: WGS84

Soil Map Unit Name: Wato very fine sandy loam, 7 to 12 percent slopes   NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed?   Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X		
Hydric Soil Present?	Yes ___	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ___	No X	**within a Wetland?**	Yes ___ No X

Remarks:

Sample plot established at a toe slope on a bluff above the Columbia River in an actively farmed wheat field. Wheat had been harvested at the time of the wetland survey. No wetland indicators observed in the plot.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Triticum ssp.	85	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 15			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species		x3=	0
FACU species		x4=	0
UPL species	85	x5=	425
Column Totals:	85	(A)	425 (B)

Prevalence Index = B/A= 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Wheat seedlings showing signs of stress (yellowing) likely from herbicide application in the weeks prior to the survey. No indicators of hydrophytic vegetation present within sample plot.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-12	7.5YR 3/1	100					Silt Loam	
12-24	10YR 3/2	100					Silt Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Ho hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary indicators of wetland hydrology present.

Additional Reference Data: Photos

Photo Name: Photo_231108100540

Photo Name: Photo_231108100847

Photo Name: Photo_231108100506

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Wasco | Sampling Date: 11/8/2023

Applicant/Owner: Cascade Renewables | State: OR | Sampling: VP-2 (OR)

Investigators: B DARBY, J MAZE | Section, Township, Range: T2N R14E S31

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 0

Subregion (LRR): B - Northwest Wheat/Range | Lat: 45.605807 | Long: -121.107958 | Datum: WGS84

Soil Map Unit Name: Wato very fine sandy loam, 7 to 12 percent slopes | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Sample plot established at a toe slope on a bluff above the Columbia River in an actively farmed wheat field. Wheat had been harvested at the time of the wetland survey. No wetland indicators observed in the plot.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Triticum ssp.	85	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species		x3=	0
FACU species		x4=	0
UPL species	85	x5=	425
Column Totals:	85 (A)		425 (B)

Prevalence Index = B/A= 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

No indicators for hydrophytic vegetation met.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-11	7.5YR 3/1	100					Silt Loam	
11-20	10YR 3/2	100						

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: 20

Depth (inches): Hard pan

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary indicators of hydrology present

Additional Reference Data: Photos

Photo Name: Photo_231108104233

Photo Name: Photo_231108104246

Photo Name: Photo_231108104228

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Wasco Sampling Date: 4/2/2024

Applicant/Owner: Cascade Renewables State: OR Sampling VP-3 (OR)

Investigators: B DARBY, J MAZE Section, Township, Range: T1N R13E S1

Landform (hillslope, terrace, etc.): Floodplain Local Relief (concave, convex, none): Concave Slope(%): 3

Subregion (LRR): B - Northwest Wheat/Range Lat: 45.600985 Long: -121.142271 Datum: WGS84

Soil Map Unit Name: Rock outcrop - Xeropsamments complex NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No		
Hydric Soil Present?	Yes	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes	No X	**within a Wetland?**	Yes ___ No X

Remarks:

Sample plot occurs in relic floodplain of Threemile Creek in a shallow depression between a railroad access road and the creek. Plot meets hydrophytic vegetation indicator but no wetland soils or hydrology are present.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1. Populus balsamifera	60	Yes	FAC
2.			
3.			
4.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Rubus armeniacus	2	Yes	FAC
2.			
3.			
4.			
5.			
	2	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Conium maculatum	60	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1. Clematis ligusticifolia	10	Yes	FAC
2.			
	10	= Total Cover	
% Bare Ground in Herb Stratum 40			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	132	x3=	396
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	132 (A)		396 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the dominance test for hydrophytic vegetation. Bare ground is attributed to thick layer of leaf litter and downed woody debris.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-4	Not keyed	100					Organic	Leaves, humus
4-18	10YR 4/3	100					Sand	Some fibrous roots

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	___
Water Table Present?	Yes ___	No	X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Wasco | Sampling Date: 4/2/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling VP-4 (OR)

Investigators: B DARBY, J MAZE | Section, Township, Range: T1N R13E S1

Landform (hillslope, terrace, etc.): Floodplain | Local Relief (concave, convex, none): Concave | Slope(%): 5

Subregion (LRR): B - Northwest Wheat/Range | Lat: 45.601675 | Long: -121.142966 | Datum: WGS84

Soil Map Unit Name: Rock outcrop-Xeropsamments complex | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Small depression at base of roadway prism. Hydrophytic vegetation occurs in sample plot but hydric soils and hydrology are absent.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1. Crataegus monogyna	5	Yes	FAC
2.			
3.			
4.			
	5	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Conium maculatum	95	Yes	FAC
2. Festuca spp.	10	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	110	x3=	330
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	110	(A)	330 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Unidentified grass is believed to be fescue but could not be identified to species; assumed facultative. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-18	10YR 3/2	100					Sandy Loam	Mostly fine sand

[1]Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site:	Cascade Renewables	City/County:	Wasco	Sampling Date:	11/8/2023
Applicant/Owner:	Cascade Renewables	State:	OR	Sampling	VP-5 (OR)
Investigators:	B DARBY, J MAZE	Section, Township, Range:	T2N R13E S2		
Landform (hillslope, terrace, etc.):	Depression	Local Relief (concave, convex, none):	Concave	Slope(%):	0
Subregion (LRR):	B - Northwest Wheat/Range	Lat: 45.599054	Long: -121.166568	Datum:	WGS84
Soil Map Unit Name:	Rock outcrop-Xeropsamments complex	NWI Classification:	PSS/EM1Ch		

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No			
Hydrophytic Vegetation Present?	X		**Is the Sampled Area within a Wetland?**	Yes ___	No X
Hydric Soil Present?		X			
Wetland Hydrology Present?		X			

Remarks:

Sample plot positioned within the lowest elevational point of a depression between two roadways in an area suspected of collecting and concentrating water. An 18-inch culvert is present extending from the roadway prism toe slope, but no signs of flow observed. Hydrophytic vegetation present within sample plot. No hydric soils or wetland hydrology observed.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1. Ailanthus altissima	40	Yes	FACU
2. Elaeagnus angustifolia	15	Yes	FAC
3. Fraxinus americana	10	No	FACU
4.			
	65	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Rubus armeniacus	5	Yes	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Conium maculatum	10	Yes	FAC
2. Phalaris arundinacea	2	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	12	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 88

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	75	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	2	x2=	4
FAC species	30	x3=	90
FACU species	50	x4=	200
UPL species		x5=	0
Column Totals:	82 (A)		294 (B)

Prevalence Index = B/A= 3.59

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Bare ground is attributed to leaf litter and downed woody debris. Sample plot meets dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-15	2.5Y 3/1	100					Silt Loam	
15-24	5Y 3/2	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Deeper soil layer is too bright to be depleted or gleyed, hydric soil indicators for depleted below dark surface (A11) and thick dark surface (A12) do not apply.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One secondary wetland hydrology indicator for geomorphic position (D2) is met.

Additional Reference Data: Photos

Photo Name: Photo_231108145436

Photo Name: Photo_231108151019

Photo Name: Photo_231108145504

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Wasco | Sampling Date: 11/8/2023
Applicant/Owner: Cascade Renewables | State: OR | Sampling: VP-6 (OR)
Investigators: B DARBY, J MAZE | Section, Township, Range: T1N R13E S3
Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 0
Subregion (LRR): B - Northwest Wheat/Range | Lat: 45.598266 | Long: -121.168805 | Datum: WGS84
Soil Map Unit Name: Quincy loamy fine sand, wet | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Sample plot positioned within the lowest elevational point of a depression between three roadways in an area suspected of collecting and concentrating water. Hydrophytic vegetation present but no wetland soils or hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Conium maculatum	90	Yes	FAC
2. Poa spp.	50	Yes	FAC
3. Triticum spp.	10	No	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	150	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	140	x3=	420
FACU species		x4=	0
UPL species	10	x5=	50
Column Totals:	150 (A)		470 (B)

Prevalence Index = B/A= 3.13

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Multistoried herb canopy. Grasses too young to be identified to species; wheat assumed to be upland, poa assumed to be facultative. Sample plot meets dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-11	10YR 2/1	100					Sandy Loam	
11-24	5Y 3/2	99	10YR 3/6	1	C	M	Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Deeper soil layer is too bright to be depleted or gleyed; hydric soil indicators for depleted below dark surface (A11) and thick dark surface (A12) do not apply.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One secondary wetland hydrology indicator for geomorphic position (D2) is met.

Additional Reference Data: Photos

Photo Name: Photo_231108153736

Photo Name: Photo_231108153806

Photo Name: Photo_231108153752

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling VP-7 (OR)

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 3

Subregion (LRR): A - Northwest Forest | Lat: 45.622002 | Long: -122.694618 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Hydrophytic vegetation present but no hydric soils or wetland hydrology observed at sample plot.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1. Populus balsamifera	50	Yes	FAC
2.			
3.			
4.			
	50	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Rubus armeniacus	25	Yes	FAC
2. Pseudotsuga menziesii	2	No	FACU
3. Cytisus scoparius	1	No	UPL
4.			
5.			
	28	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	95	Yes	FAC
2. Schedonorus arundinaceus	5	No	FAC
3. Polystichum munitum	2	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	102	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	175	x3=	525
FACU species	4	x4=	16
UPL species	1	x5=	5
Column Totals:	180	(A)	546 (B)

Prevalence Index = B/A= 3.03

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0¹

___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants¹

___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-3	10YR 2/1	100					Loamy Sand	
3-18	10YR 2/2	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):	

Wetland Hydrology Present? Yes ___ **No X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot meets one secondary wetland hydrology indicator for geomorphic position (D2).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Multnomah Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables State: OR Sampling VP-8 (OR)

Investigators: J MAZE, R SCHNELLBACH Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope(%): 3

Subregion (LRR): A - Northwest Forest Lat: 45.619555 Long: -122.697372 Datum: WGS84

Soil Map Unit Name: Pilchuck sand NWI Classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes X	No

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs in a flat open area adjacent to access road. Hydrophytic vegetation present and two secondary wetland hydrology indicators are met; no hydric soil indicators occur at sample plot. The sample plot likely occurs at the boundary of a wetland but not within. Sample plot located just outside project survey area.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Cornus alba	5	Yes	FACW
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	85	Yes	FACW
2. Urtica dioica	10	No	FAC
3. Geranium molle	3	No	UPL
4. Cardamine oligosperma	2	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	90	x2=	180
FAC species	12	x3=	36
FACU species		x4=	0
UPL species	3	x5=	15
Column Totals:	105 (A)		231 (B)

Prevalence Index = B/A= 2.20

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the rapid test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-2	10YR 2/2	100					Silt Loam	Fibrous roots
2-12	10YR 3/2	100					Silty Clay Loam	
12-18	2.5YR 4/2	95	7.5YR 3/3	5	C	M	Silty Clay Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Redox concentrations too deep and soils are too bright to meet hydric soil indicators; no hydric soils present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils moist but not saturated. Sample plot meets two secondary wetland hydrology indicators for geomorphic position (D2) and the FAC-neutral test (D5).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Multnomah Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables State: OR Sampling VP-9 (OR)

Investigators: J MAZE, R SCHNELLBACH Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): None Slope(%): 0

Subregion (LRR): A - Northwest Forest Lat: 45.621066 Long: -122.709379 Datum: WGS84

Soil Map Unit Name: Pilchuck sand NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X		
Hydric Soil Present?	Yes ___	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ___	No X	**within a Wetland?**	Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. No wetland indicators are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Holcus lanatus	25	Yes	FAC
2. Rumex acetosella	25	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 50			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	25	x3=	75
FACU species	25	x4=	100
UPL species		x5=	0
Column Totals:	50 (A)		175 (B)

Prevalence Index = B/A= 3.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Multistoried herb canopy. Bare ground is attributed to moss coverage. No hydrophytic vegetation indicators occur at the sample plot.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-8	10YR 3/3	100					Sandy Loam	
8-18	2.5Y 4/1	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Bright upper soil layer, lack of redox concentrations and location of depleted matrix prevent soils from meeting indicators for depleted below dark surface (A11) and thick dark surface (A12). No hydric soils present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches):	___
Water Table Present?	Yes	___	No	X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches):	___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling: VP-10 (OR)

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): Concave | Slope(%): 2

Subregion (LRR): A - Northwest Forest | Lat: 45.628342 | Long: -122.720811 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Hydrophytic vegetation present but no hydric soils or wetland hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Rubus armeniacus	5	Yes	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Holcus lanatus	90	Yes	FAC
2. Stellaria media	1	No	FACU
3. Geranium molle	1	No	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	92	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 8			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	95	x3=	285
FACU species	1	x4=	4
UPL species	1	x5=	5
Column Totals:	97	(A)	294 (B)

Prevalence Index = B/A= 3.03

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets dominance test for hydrophytic vegetation. Bare ground is attributed to moss coverage.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-4	10YR 2/2	100					Loamy Sand	
4-8	10YR 3/2	100					Loamy Sand	
8-13	2.5Y 2.5/1	100					Sand	
13-18	10YR 3/3	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling VP-11 (OR)

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1E S30

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 2

Subregion (LRR): A - Northwest Forest | Lat: 45.621785 | Long: -122.727104 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Hydrophytic vegetation present at sample plot but no hydric soils or wetland hydrology.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10 feet)			
1. Plantago lanceolata	5	Yes	FACU
2. Poa ssp.	3	Yes	FAC
3. Holcus lanatus	2	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	10		
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 90

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species		x2= 0
FAC species	5	x3= 15
FACU species	5	x4= 20
UPL species		x5= 0
Column Totals:	10 (A)	35 (B)

Prevalence Index = B/A= 3.50

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Poa grass too young to identified to species; assumed facultative. Bare ground attributed to moss coverage. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-4	10YR 2/1	100					Loamy Sand	
4-10	10YR 3/2	100					Loamy Sand	
10-16	2.5Y 3/1	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/11/2024
Applicant/Owner: Cascade Renewables | State: OR | Sampling VP-12 (OR)
Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S25
Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 2
Subregion (LRR): A - Northwest Forest | Lat: 45.632861 | Long: -122.758003 | Datum: WGS84
Soil Map Unit Name: Sauvie Silt Loam | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot does not meet any wetland indicators.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Erodium cicutarium	25	Yes	UPL
2. Poa ssp.	3	No	FAC
3. Plantago lanceolata	2	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 90

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	3	x3=	9
FACU species	2	x4=	8
UPL species	25	x5=	125
Column Totals:	30	(A)	142 (B)

Prevalence Index = B/A= 3.40

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Poa too young to be identified to species; assumed facultative. Multistoried herb canopy. Bare ground is attributed to moss coverage. No hydrophytic vegetation present at sample plot.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-3	10YR 3/2	100					Sand	
3-18	2.5Y 3/2	100					Sand	

[1]Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators are met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ **No X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Multnomah Sampling Date: 3/20/2025
Applicant/Owner: Cascade Renewables State: OR Sampling VP-13 (OR)
Investigators: B DARBY, J MAZE, A CAPRETTI Section, Township, Range: North of T2N R1E S32
Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): Concave Slope(%): 1
Subregion (LRR): A - Northwest Forest and Lat: 45.626663 Long: -122.718491 Datum: WGS84
Soil Map Unit Name: Pilchuck sand NWI Classification: PUBT
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	
Hydric Soil Present?	Yes X	No ___	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X	No ___	**within a Wetland?** Yes X No ___

Remarks:
Sample point is located south of an existing access road. Sample plot meets indicator for wetland vegetation, hydrology and soils.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	20	Yes	FACW
2. Geranium molle	10	Yes	UPL
3. Trifolium repens	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	35	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 65			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	20	x2=	40
FAC species	5	x3=	15
FACU species		x4=	0
UPL species	10	x5=	50
Column Totals:	35 (A)		105 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Prevalence index of 3 meets requirements for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-14	10YR 4/1	90	10YR 4/3	10	C	M	Loamy Sand	
14-24	10YR 4/1	100					Loamy Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Soils meet hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
X Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Inundation is visible on aerial imagery for several years including November 2011, May 2017, June and July 2022, and May 2023, meeting primary wetland hydrology indicator B7. The DAREM was completed for these months and years of excess flooding shown in Google Earth, confirming these to be wetter than normal conditions leading to the excess flooding that extends to the south.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Multnomah Sampling Date: 3/20/2025

Applicant/Owner: Cascade Renewables State: OR Sampling VP-14 (OR)

Investigators: B DARBY, J MAZE, A CAPRETTI Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope(%): 1

Subregion (LRR): A - Northwest Forest Lat: 45.626587 Long: -122.718536 Datum: WGS84

Soil Map Unit Name: Pilchuck sand NWI Classification: PUBT

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?**	Yes X No ___

Remarks:

Sample plot taken on north side of access road showing that the wetland extends to the road. The plot meets wetland indicators of hydrophytic vegetation, hydric soil and hydrology and occurs at the southernmost boundary of Wetland 2A..

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	45	Yes	FACW
2. Hypochaeris radicata	15	No	FACU
3. Geranium molle	15	No	UPL
4. Equisetum arvense	10	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	45	x2=	90
FAC species	10	x3=	30
FACU species	15	x4=	60
UPL species	15	x5=	75
Column Totals:	85 (A)		255 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0¹

___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants¹

___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the rapid test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-4	10YR 4/1	95	10YR 4/3	5	C	M	Loamy Sand	
4-26	10YR 4/1	100					Loamy Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X No ___

Remarks:

Soils meet hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ______

Water Table Present? Yes ___ No ___ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ______

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Inundation is visible on aerial imagery for several years including November 2011, May 2017, June and July 2022, and May 2023, meeting primary wetland hydrology indicator B7. The DAREM was completed for these months and years of excess flooding shown in Google Earth, confirming these to be wetter than normal conditions leading to the excess flooding that extends to the south.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling W1-P1 (W) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): Concave | Slope(%): 1

Subregion (LRR): A - Northwest Forest | Lat: 45.623584 | Long: -122.710258 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?**	Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. As noted on historic aerials, soils may not be inundated every year. Some upland vegetation establishment at the time of the survey.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	75	Yes	FACW
2. Dipsacus fullonum	50	Yes	FAC
3. Stellaria media	15	No	FACU
4. Geranium molle	15	No	UPL
5. Cirsium vulgare	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
	160	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	75	x2=	150
FAC species	50	x3=	150
FACU species	20	x4=	80
UPL species	15	x5=	75
Column Totals:	160	(A)	455 (B)

Prevalence Index = B/A= 2.84

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Multistoried vegetative canopy. Mixed upland and wetland plant community. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-2	10YR 3/3	100					Silt Loam	Fibrous roots
2-7	7.5YR 3/1	70	7.5YR 3/3	25	C	PL M	Silt Loam	
			5YR 3/4	5	C	M		
7-18	2.5Y 3/3	90	7.5YR 2.5/3	5	C	M	Silt Loam	Iron and manganese masses
			10YR 3/4	3	C	M		
			2.5Y 3/1	2	C	M		

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Prominent redox concentrations occurring in a 5-inch thick layer within the upper 12 inches of soil. Sample plot meets hydric soil indicator for redox dark surface (F6).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	___
Water Table Present?	Yes ___	No	X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils moist but not saturated. Current and historic aerials show surface water inundation some years (2011 and 2017) meeting primary wetland hydrology indicator B7. Sample plot meets secondary indicators for visible saturation on aerial imagery (C9), geomorphic position (D2) and the FAC-neutral test (D5).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables   City/County: Multnomah   Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables   State: OR   Sampling W1-P2 (U) - OR

Investigators: J MAZE, R SCHNELLBACH   Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Flat   Local Relief (concave, convex, none): None   Slope(%): 1

Subregion (LRR): A - Northwest Forest   Lat: 45.623601   Long: -122.710265   Datum: WGS84

Soil Map Unit Name: Pilchuck sand   NWI Classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?	X	
Is the Sampled Area within a Wetland?		X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. One primary wetland hydrology is met but not hydrology indicators observed at the time of the survey. No hydrophytic vegetation or hydric soil indicators met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Stellaria media	50	Yes	FACU
2. Geranium molle	15	Yes	UPL
3. Dipsacus fullonum	10	No	FAC
4. Galium aparine	10	No	FAC
5. Phalaris arundinacea	10	No	FACW
6. Poa ssp.	3	No	FAC
7. Vicia americana	1	No	FAC
8. Cirsium vulgare	1	No	FACU
9. Verbascum thapsus	1	No	FACU
10.			
11.			
	101	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	10	x2=	20
FAC species	24	x3=	72
FACU species	52	x4=	208
UPL species	15	x5=	75
Column Totals:	101	(A)	375 (B)

Prevalence Index = B/A= 3.71

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0¹

___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants¹

___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

No indicators for hydrophytic vegetation are met.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-2	7.5YR 3/2	100					Silt Loam	Organics present
2-13	10YR 3/2	90	10YR 3/1	5	C	M	Silt Loam	
			7.5YR 2.5/3	5	C	M		
13-18	10YR 4/2	90	10YR 3/3	10	C	M	Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Layers above depleted matrix are too bright and redox concentrations within the depleted matrix are too faint to meet hydric soil indicator for thick dark surface (A12). No hydric soil indicators are met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
X Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Current and historic aerials show surface water inundation some years (2011 and 2017) meeting primary wetland hydrology indicator B7. No hydrology indicators observed at the time of the survey.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling W2-P1 (W) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 5

Subregion (LRR): A - Northwest Forest | Lat: 45.626912 | Long: -122.718384 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: PUBT

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?**	Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Wetland 2A occurs in a depressional area with a shallow perennial pond. All three wetland indicators are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	100	x2=	200
FAC species		x3=	0
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A= 2.00

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0¹

___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants¹

___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Rapid test for hydrophytic vegetation is met.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-4	10YR 2/1	100					Sandy Loam	Roots; decomposing organics
4-20	10YR 2/1	95	5YR 3/4	5	C	PL RC	Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Prominent redox concentrations in soft masses and pore linings of the matrix. Sample plot meets the hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
X Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
X Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils were moist but not saturated. One primary hydrology indicator for inundation on aerial imagery (2011 and 2017) is met (B7). Sample plot meets two secondary wetland hydrology indicators for saturation visible on aerial imagery (C9) and geomorphic position (D2).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling W2-P2 (U) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 5

Subregion (LRR): A - Northwest Forest | Lat: 45.626941 | Long: -122.718411 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: PUBT

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?	X	
Is the Sampled Area within a Wetland?		X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Upland plot located roughly 6 feet northwest of paired wetland plot. One primary wetland hydrology indicator is met for visible inundation on aerial images; no hydrology indicators were observed in the field. No hydrophytic vegetation or hydric soil indicators are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Geranium molle	60	Yes	UPL
2. Poa ssp.	20	Yes	FAC
3. Cardamine oligosperma	3	No	FAC
4. Phalaris arundinacea	3	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	86	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 14			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	3	x2=	6
FAC species	23	x3=	69
FACU species		x4=	0
UPL species	60	x5=	300
Column Totals:	86 (A)		375 (B)

Prevalence Index = B/A= 4.36

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Poa too young to be identified to species. Bare ground is attributed to unvegetated areas and moss coverage. Sample plot does not meet any hydrophytic vegetation indicators.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-5	10YR 3/2	100					Loamy Sand	
5-9	2.5YR 3/2	100					Loamy Sand	
9-18	2.5Y 4/1	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No redox concentrations present and upper soil layers too bright to meet depleted below dark surface indicator (A11). Depleted matrix begins too shallow to meet thick dark surface indicator (A12). Soils are not hydric.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
X Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches):	
Water Table Present?	Yes	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	No	X	Depth (inches):	

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One secondary wetland hydrology indicator met for visible saturation/inundation visible on aerial imagery (C9).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling W2-P3 (W) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): None | Slope(%): 1

Subregion (LRR): A - Northwest Forest | Lat: 45.626552 | Long: -122.717145 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: PUBT

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. All three wetland parameters are met for Wetland 2B.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	100	x2=	200
FAC species		x3=	0
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A= 2.00

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the rapid test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-2	10YR 2/2	100					Sandy Loam	Many fibrous roots
3-5	2.5Y 3/2	98	10YR 4/6	2	C	M	Sand	Some fibrous roots
5-9	2.5Y 3/2	45	10YR 4/6	25	C	M	Sand	
	5Y 3/1	30						
9-18	5Y 3/1	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:
Many prominent redox concentrations occur in a mixed matrix. Sample plot meets hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

X Surface Water (A1)
___ High Water Tables (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
X Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches):	36.00
Water Table Present?	Yes X	No ___	Depth (inches):	16.0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	11.0

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Sample plot is located at the edge of a shallow vegetated pond roughly 2-3 feet deep. Primary indicators for surface water (A1), saturation (A3) and visible inundation on aerial imagery (B7) are met. One secondary indicator for geomorphic position (D2) is met.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024
Applicant/Owner: Cascade Renewables | State: OR | Sampling W2-P4 (U) - OR
Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32
Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 1
Subregion (LRR): A - Northwest Forest | Lat: 45.626540 | Long: -122.717120 | Datum: WGS84
Soil Map Unit Name: Pilchuck sand | NWI Classification: PUBT
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?	X	

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot is positive for hydrophytic vegetation. One primary wetland hydrology indicator is met for visible inundation on historic aerials, but no hydrology indicators were observed at the time of the survey. No hydric soils present. Data plot near but not within wetland boundary.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	50	Yes	FACW
2. Festuca spp.	30	Yes	FAC
3. Geranium molle	15	No	UPL
4. Cardamine oligosperma	10	No	FAC
5. Stellaria media	3	No	FACU
6. Galium aparine	2	No	FAC
7.			
8.			
9.			
10.			
11.			
	110	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	50	x2=	100
FAC species	42	x3=	126
FACU species	3	x4=	12
UPL species	15	x5=	75
Column Totals:	110	(A)	313 (B)

Prevalence Index = B/A= 2.85

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Multistoried herb layer. Festuca could not be identified to species: standing dead missing inflorescences and emerging grass too young to be identified to species. Vegetation meets dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-8	10YR 3/2	99	10YR 4/3	1	C	M	Sandy Loam	
8-18	10YR 4/2	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Soils do not meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
X Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes		No	X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One primary wetland hydrology indicator (B7) is met for inundation visible on aerial imagery (2011, 2017 and 2023). No wetland hydrology indicators were observed during the wetland survey.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/20/2025
Applicant/Owner: Cascade Renewables | State: OR | Sampling: W2-P5 (W) - OR
Investigators: B DARBY, J MAZE, A CAPRETTI | Section, Township, Range: North of T2N R1E S32
Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 0
Subregion (LRR): A - Northwest Forest | Lat: 45.626392 | Long: -122.717506 | Datum: WGS84
Soil Map Unit Name: Pilchuck sand | NWI Classification: PUBT
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:
Wetland 2B occurs in a depressional area with a shallow perennial pond. Wetland plot established at a minor topographic change between the wetland and an adjacent transmission line access road. Sample plot meets all three wetland indicators.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	30	Yes	FACW
2. Poa ssp.	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 50			

Dominance Test Worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species	30	x2= 60
FAC species	20	x3= 60
FACU species		x4= 0
UPL species		x5= 0
Column Totals:	50 (A)	120 (B)

Prevalence Index = B/A= 2.40

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Poa too young to be identified to species. Bare ground attributed to surface water and unvegetated areas. Sample plot meets the dominance test indicator for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-4	10YR 3/2	100					Sand	Large rocks present
4-18	2.5Y 4/1	65	7.5YR 4/6	25	C	M RC	Loamy Sand	
			5YR 4/6	10	C	M RC		

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Large rock present in soil pit, likely from adjacent roadbed. Prominent redox concentrations present in the matrix and along pore linings. Sample plot meets the hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

X Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
X Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	X	No	Depth (inches):	36.00
Water Table Present?	Yes	X	No	Depth (inches):	8.0
Saturation Present? (includes capillary fringe)	Yes	X	No	Depth (inches):	8.0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot is located near an unimproved access road at the edge of a shallow pond roughly 2-3 feet deep. Primary indicators for surface water (A1), high water table (A2), saturation A3, and visible inundation on aerial imagery (B7) are met. One secondary indicator for geomorphic position (D2) is met.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/20/2025

Applicant/Owner: Cascade Renewables | State: OR | Sampling W2-P6 (U) - OR

Investigators: B DARBY, J MAZE, A CAPRETTI | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 1

Subregion (LRR): A - Northwest Forest | Lat: 45.626472 | Long: -122.717461 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: PUBT

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?	X	

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Upland plot established roughly 6 feet south of wetland plot. Indicator for hydrophytic vegetation is met. One primary wetland hydrology indicator is met for visible inundation of historic aerials, but no hydrology indicators were observed at the time of the survey. No hydric soils present. Sample plot occurs near but not within a wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Rubus armeniacus	5	Yes	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	25	Yes	FAC
2. Phalaris arundinacea	5	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 70

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species	5	x2= 10
FAC species	30	x3= 90
FACU species		x4= 0
UPL species		x5= 0
Column Totals:	35 (A)	100 (B)

Prevalence Index = B/A= 2.86

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Poa too young to be identified to species. Vegetation growth has been limited by access road use. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-16	10YR 3/2	100					Loamy Sand	
16-18	2.5Y 4/1	70	5Y 4/6	5	C	M	Loamy Sand	
			7.5YR 4/6	15	C	M		

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Soils overlaying redox layer are too bright and redox is too deep to meet any hydric soil indicators. No hydric soils present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
X Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes		No	X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One primary wetland hydrology indicator (B7) is met for inundation visible on aerial imagery (2011, 2017, 2022, and 2023). No wetland hydrology indicators were observed during the wetland survey.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables   City/County: Multnomah   Sampling Date: 3/11/2024

Applicant/Owner: Cascade Renewables   State: OR   Sampling: Area A-P1 (W) - OR

Investigators: J MAZE, R SCHNELLBACH   Section, Township, Range: T2N R1E S32

Landform (hillslope, terrace, etc.): Depression   Local Relief (concave, convex, none): Concave   Slope(%): 2

Subregion (LRR): A - Northwest Forest   Lat: 45.618825   Long: -122.716722   Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes   NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed?   Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes X No ___	Is the Sampled Area	
Wetland Hydrology Present?	Yes X No ___	within a Wetland?	Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs within a historic dredged fill placement site. Wetland occurs on the most eastern end of a large man-made depression surrounded by soil berms roughly 6-10 feet high. A 24-inch culvert is located at the base of the berm on the east end of wetland that carries flow from the wetland to a 12-inch pipe that discharges directly to the Columbia River. Surface water observed in wetland during the survey but no flow through the culvert.

VEGETATION – Use scientific names of plants.

Stratum	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Cornus alba	15	Yes	FACW
2. Populus balsamifera	5	Yes	FAC
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 60

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	15	x2=	30
FAC species	45	x3=	135
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	60 (A)		165 (B)

Prevalence Index = B/A= 2.75

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Bare ground is attributed to unvegetated areas and moss coverage. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-2	10YR 2/2	100					Sandy Loam	
2-5	2.5YR 3/2	100					Sand	
5-16	5GY 4/1	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
X Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Soils within sample plot meet the hydric soil indicator for sandy gleyed matrix (S4).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

X Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	X	No	Depth (inches):	2.00
Water Table Present?	Yes	X	No	Depth (inches):	5.0
Saturation Present? (includes capillary fringe)	Yes	X	No	Depth (inches):	3.0

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot was established at the lowest point of the depression that occurs within the survey area. Surface water was observed in isolated microdepressions across the sample plot; no evidence of flow to the culvert was noted. Primary wetland hydrology indicators for surface water (A1), water table (A2), and saturation (A3) are met as well as secondary indicators for geomorphic position (D2) and the FAC-neutral test (D5).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/11/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling: Area A-P2 (U) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1E S32

Landform (hillslope, terrace, etc.): Footslope | Local Relief (concave, convex, none): None | Slope(%): 25

Subregion (LRR): A - Northwest Forest | Lat: 45.618803 | Long: -122.716744 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs on a man-made soil berm just upslope from a depressional area. Sample plot meets criteria for hydrophytic vegetation but no hydric soils or wetland hydrology are present.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Cornus alba	25	Yes	FACW
2.			
3.			
4.			
5.			
	25	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	40	Yes	FAC
2. Taraxacum officinale	2	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	42	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 40

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	25	x2=	50
FAC species	40	x3=	120
FACU species	2	x4=	8
UPL species		x5=	0
Column Totals:	67 (A)		178 (B)

Prevalence Index = B/A= 2.66

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Grasses too young to be identified to species. Bare ground is attributed to moss coverage. Wetland meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-4	10YR 2/2	100					Sand	
4-10	7.5YR 3/4	100					Sand	
10-13	2.5Y 3/2	98	10YR 3/4	2	C	M	Sand	
13-16	5GY 4/1	95	5GY 2.5/1	5	C	M	Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Upper soil layers are too bright to meet depleted below dark surface (A11) or thick dark surface (A12). Gleyed matrix and redox concentrations too deep to meet sandy gleyed matrix (S4) or sandy redox (S5) indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes		No		Depth (inches):
Surface Water Present?	Yes		No	X	
Water Table Present?	Yes	X	No		15.0
Saturation Present? (includes capillary fringe)	Yes	X	No		13.0

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One secondary wetland hydrology indicator, the FAC-neutral test, is met.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Multnomah Sampling Date: 3/11/2024

Applicant/Owner: Cascade Renewables State: OR Sampling Area B-P1 (W) - OR

Investigators: J MAZE, R SCHNELLBACH Section, Township, Range: T2N R1E S32

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope(%): 2

Subregion (LRR): A - Northwest Forest Lat: 45.618658 Long: -122.716893 Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	
Hydric Soil Present?	Yes X	No ___	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X	No ___	**within a Wetland?** Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs within a historic dredged fill placement site. Wetland occurs on the most eastern end of a large man-made depression surrounded by soil berms roughly 6-10 feet high. A thick plastic liner was encountered 12 inches below ground surface.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	60	Yes	FAC
2. Festuca spp.	30	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 10			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	90	x3=	270
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	90	(A)	270 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Grasses too young to be identified to species; assumed facultative. Bare ground attributed to moss coverage. Wetland plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-2	10YR 2/1	100					Sandy Loam	
2-16	2.5Y 5/1	90	7.5YR 2.5/2	7	C	M	Sand	
			7.5YR 3/4	3	C	M		

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
X Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Manganese and iron oxide concentrations located in stripped matrix. Sample plot meets hydric soil indicators for sandy redox (S5) and stripped matrix (S6).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes		No		Depth (inches):	
Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes	X	No		Depth (inches):	10.0
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	7.0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The sample plot meets two primary wetland hydrology indicators for high water table (A2) and saturation (A3) as well as one secondary indicator for geomorphic position (D2).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables   City/County: Multnomah   Sampling Date: 3/11/2024
Applicant/Owner: Cascade Renewables   State: OR   Sampling Area B-P2 (U) - OR
Investigators: J MAZE, R SCHNELLBACH   Section, Township, Range: T2N R1E S32
Landform (hillslope, terrace, etc.): Toeslope   Local Relief (concave, convex, none): None   Slope(%): 25
Subregion (LRR): A - Northwest Forest   Lat: 45.618655   Long: -122.716873   Datum: WGS84
Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes   NWI Classification: Not mapped
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed?   Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:
Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs on a man-made soil berm just upslope from a depressional area. Sample plot meets criteria for hydrophytic vegetation but no hydric soils or wetland hydrology present.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	45	Yes	FAC
2. Festuca spp.	35	Yes	FAC
3. Erigeron canadensis	10	No	FACU
4. Senecio jacobaea	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 5			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	80	x3=	240
FACU species	15	x4=	60
UPL species		x5=	0
Column Totals:	95 (A)		300 (B)

Prevalence Index = B/A= 3.16

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Grasses too young to be identified to species. Bare ground is attributed to moss coverage. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-4	10YR 3/2	100					Sandy Loam	
4-16	10YR 3/3	100					Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1) (except MLRLA 1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

____ 2 cm Muck (A10)
____ Red Parent Material (TF2)
____ Very Shallow Dark Surface (TF12)
____ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ____ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

____ Surface Water (A1)
____ High Water Tables (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Surface Soil Cracks (B6)
____ Inundation Visible on Aeriel Imagery (B
____ Sparsley Vegetated Concave Surface (B8)
____ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
____ Salt Crust (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres along Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Stunted or Stressed Plants (D1) (**LRR A**)
____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

____ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
____ Drainage Patterns (B10)
____ Dry-Season Water Table (C2)
____ Saturation Visible on Aeriel Imagery (C9)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ FAC-Neutral Test (D5)
____ Raised Ant Mounds (D6) (**LRR A**)
____ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ________
Water Table Present? Yes ____ No X Depth (inches): ________
Saturation Present? Yes ____ No X Depth (inches): ________
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/13/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling: W3-P1 (W) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S35

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 1

Subregion (LRR): A - Northwest Forest | Lat: 45.618080 | Long: -122.781029 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: PEM1F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs in large stormwater feature. All three wetland criteria are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	98	Yes	FACW
2. Typha latifolia	2	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x1=	2
FACW species	98	x2=	196
FAC species		x3=	0
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	100 (A)		198 (B)

Prevalence Index = B/A= 1.98

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the rapid test for hydrophytic vegetation. Distinct break in wetland vegetation to the south. Northern boundary comprised of willow and dogwood shrubs.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-3	10YR 3/2	100					Sandy Loam	Thick fibrous roots
3-14	2.5Y 3/1	90	7.5YR 3/4	10	C	PL RC	Sandy Clay	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

A hydrogen sulfide smell was noted during soil excavation (A4). Soils also meets redox dark surface indicator (F6).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Tables (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches):	2.00	
Water Table Present?	Yes X	No ___	Depth (inches):	10.0	
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	2.0	**Wetland Hydrology Present? Yes X No ___**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water within sample plot adjacent to the soil pit, average 2 inches deep located in narrow channels. Naturally occurring iron deposits present on water surface. Sample plot meets primary wetland hydrology indicators for high water table (A2), saturation (A3), iron deposits on adjacent surface water boundaries (B5), hydrogen sulfide odor (C1) and oxidized rhizospheres (C3). Two secondary indicators for visible saturation on aerial imagery (B7) and geomorphic position (D2) are met.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Multnomah Sampling Date: 3/13/2024
Applicant/Owner: Cascade Renewables State: OR Sampling W3-P2 (U) - OR
Investigators: J MAZE, R SCHNELLBACH Section, Township, Range: T2N R1W S35
Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope(%): 15
Subregion (LRR): A - Northwest Forest Lat: 45.618059 Long: -122.781042 Datum: WGS84
Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes NWI Classification: PEM1F
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Upland sample plot taken on slope roughly 6 feet upslope from wetland depressional area.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Cardamine oligosperma	50	Yes	FAC
2. Stellaria media	40	Yes	FACU
3. Holcus lanatus	10	No	FAC
4. Poa ssp.	10	No	FAC
5. Erodium botrys	10	No	FACU
6. Cirsium vulgare	3	No	FACU
7. Rumex acetosella	3	No	FACU
8. Hypochaeris radicata	1	No	FACU
9. Senecio jacobaea	1	No	FACU
10. Geranium molle	1	No	UPL
11. Lamium purpureum	1	No	UPL
	130	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 5			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	70	x3=	210
FACU species	58	x4=	232
UPL species	2	x5=	10
Column Totals:	130 (A)		452 (B)

Prevalence Index = B/A= 3.48

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Multistoried herb cover. Grass too young to be identified to species, Poa assumed facultative.
Plant community does not meet wetland criteria for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-18	10YR 2/2	100					Sand	Fibrous roots in top inch

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Indicators for hydric soil are not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes	X	No		Depth (inches): 14.0
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches): 13.0

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Water table and saturation is too deep to meet wetland hydrology indicators.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Multnomah Sampling Date: 3/13/2024

Applicant/Owner: Cascade Renewables State: OR Sampling W3-P3 (W) - OR

Investigators: J MAZE, R SCHNELLBACH Section, Township, Range: T2N R1W S35

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope(%): 3

Subregion (LRR): A - Northwest Forest Lat: 45.617280 Long: -122.785019 Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes NWI Classification: PEM1F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?** Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs within a large stormwater feature. All three wetland parameters are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1. Alnus rubra	40	Yes	FAC
2.			
3.			
4.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Alnus rubra	40	Yes	FAC
2. Salix lasiandra	20	Yes	FACW
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Cardamine oligosperma	10	Yes	FAC
2. Poa ssp.	10	Yes	FAC
3. Senecio spp.	10	Yes	FAC
4. Geranium robertianum	3	No	FACU
5. Lamium purpureum	3	No	UPL
6. Galium aparine	1	No	FACU
7.			
8.			
9.			
10.			
11.			
	37	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 63			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	20	x2=	40
FAC species	110	x3=	330
FACU species	4	x4=	16
UPL species	3	x5=	15
Column Totals:	137	(A)	401 (B)

Prevalence Index = B/A= 2.93

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Grasses too young to be identified to species, facultative Poa spp. assumed.
Bare ground is sample plot is attributed to unvegetated areas and surface water. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-2	5Y 2.5/1	100					Silt Loam	High organic matter
2-12	10YR 2/2	98	7.5YR 3/4	2	C	M	Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

	Histosol (A1)	X	Sandy Redox (S5)		2 cm Muck (A10)
	Histic Epipedon (A2)		Stripped Matrix (S6)		Red Parent Material (TF2)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (except MLRLA 1)		Very Shallow Dark Surface (TF12)
X	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)		Other (Explain in Remarks)
	Depleted Below Dark Surface (A11)		Depleted Matrix (F3)		
	Thick Dark Surface (A12)		Redox Dark Surface (F6)		
	Sandy Mucky Mineral (S1)		Depleted Dark Surface (F7)		
	Sandy Gleyed Matrix (S4)		Redox Depressions (F8)		

Indicators for Problematic Hydric Soils³: (listed in the right column above)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Thick roots

Depth (inches): 12

Hydric Soil Present? Yes X No

Remarks:

Investigators noted hydrogen sulfide odor during soil excavation (A4). Sample plot also meets primary hydric soil indicators for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply) | *Secondary Indicators (2 or more required)*

X	Surface Water (A1)	X	Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)	X	Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
X	High Water Tables (A2)				
X	Saturation (A3)		Salt Crust (B11)		Drainage Patterns (B10)
X	Water Marks (B1)		Aquatic Invertebrates (B13)		Dry-Season Water Table (C2)
	Sediment Deposits (B2)	X	Hydrogen Sulfide Odor (C1)	X	Saturation Visible on Aeriel Imagery (C9)
	Drift Deposits (B3)		Oxidized Rhizospheres along Living Roots (C3)	X	Geomorphic Position (D2)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Shallow Aquitard (D3)
	Iron Deposits (B5)		Recent Iron Reduction in Tilled Soils (C6)	X	FAC-Neutral Test (D5)
	Surface Soil Cracks (B6)		Stunted or Stressed Plants (D1) (**LRR A**)		Raised Ant Mounds (D6) (**LRR A**)
X	Inundation Visible on Aeriel Imagery (B		Other (Explain in Remarks)		Frost-Heave Hummocks (D7)
	Sparsley Vegetated Concave Surface (B8)				

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches):	3.00
Water Table Present?	Yes X	No	Depth (inches):	3.0
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches):	0.0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Relatively large (>1 acre) vegetated pond adjacent to sample plot. Shallow surface water present within sample plot and at varying depths across the pond but likely not greater than 2-3 feet deep at the time of the field investigations. Sample plot meets several primary and secondary wetland hydrology indicators.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Multnomah Sampling Date: 3/13/2024

Applicant/Owner: Cascade Renewables State: OR Sampling W3-P4 (U) - OR

Investigators: J MAZE, R SCHNELLBACH Section, Township, Range: T2N R1W S35

Landform (hillslope, terrace, etc.): Toeslope Local Relief (concave, convex, none): Concave Slope(%): 10

Subregion (LRR): A - Northwest Forest Lat: 45.617269 Long: -122.785031 Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes ___ No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ___ No X	**within a Wetland?**	Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Upland plot established roughly 5 feet and slightly upslope of wetland plot. Hydrophytic vegetation present within sample plot but no hydric soil or wetland hydrology indicators met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Alnus rubra	70	Yes	FAC
2. Mahonia aquifolium	3	No	FACU
3.			
4.			
5.			
	73	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Cardamine oligosperma	40	Yes	FAC
2. Poa ssp.	40	Yes	FAC
3. Senecio jacobaea	20	No	FACU
4. Geranium molle	5	No	UPL
5. Lamium purpureum	2	No	UPL
6.			
7.			
8.			
9.			
10.			
11.			
	107	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	150	x3=	450
FACU species	23	x4=	92
UPL species	7	x5=	35
Column Totals:	180	(A)	577 (B)

Prevalence Index = B/A= 3.21

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Grasses too young to be identified to species, facultative Poa spp. assumed. Sample plot meets dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type¹	Loc²	Texture	Remarks
0-5	5Y 2.5/1	100					Silt Loam	Mostly organic matter
5-18	7.5YR 3/2	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes	X	No		Depth (inches): 14.0
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches): 13.0

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Water table and saturation too deep to meet wetland hydrology indicators.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/13/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling: W3-P5 (W) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S35

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 3

Subregion (LRR): A - Northwest Forest | Lat: 45.616996 | Long: -122.783152 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: PEM1F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occur within a large stormwater feature. All three wetland parameters are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1. Alnus rubra	30	Yes	FAC
2.			
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Salix hookeriana	60	Yes	FACW
2.			
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Carex obnupta	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	100	x1= 100
FACW species	60	x2= 120
FAC species	30	x3= 90
FACU species		x4= 0
UPL species		x5= 0
Column Totals:	190 (A)	310 (B)

Prevalence Index = B/A= 1.63

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Plant species within sample plot meet the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type¹	Loc²	Texture	Remarks
0-1	7.5YR 2.5/1	100					Organic	Roots, plant material
1-14	10YR 2/2	60	7.5YR 3/4	40	C	M RC	Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Large roots

Depth (inches): 14

Hydric Soil Present? Yes X No ___

Remarks:

Soils within the sample plot meet hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Tables (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- X Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	X	No	___	Depth (inches):	2.00
Water Table Present?	Yes	X	No	___	Depth (inches):	11.0
Saturation Present? (includes capillary fringe)	Yes	X	No	___	Depth (inches):	8.0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Relatively large (>1 acre) vegetated pond adjacent to sample plot. Shallow surface water present within sample plot and at varying depths across the pond but likely not greater than 2-3 feet deep at the time of the field investigations. Sample plot meets several primary and secondary wetland hydrology indicators.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/13/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling: W3-P6 (U) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S35

Landform (hillslope, terrace, etc.): Toeslope | Local Relief (concave, convex, none): None | Slope(%): 25

Subregion (LRR): A - Northwest Forest | Lat: 45.616980 | Long: -122.783150 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: Not Mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Wetland plot roughly 6 feet upslope of depressional area. No wetland indictors met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	25	Yes	FAC
2. Galium aparine	25	Yes	FACU
3. Geranium molle	25	Yes	UPL
4. Carex obnupta	10	No	OBL
5. Holcus lanatus	5	No	FAC
6. Vicia americana	5	No	FAC
7. Rumex acetosella	5	No	FACU
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 30

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x1=	10
FACW species		x2=	0
FAC species	35	x3=	105
FACU species	30	x4=	120
UPL species	25	x5=	125
Column Totals:	100 (A)		360 (B)

Prevalence Index = B/A= 3.60

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Multistoried vegetative canopy. Bare ground attributed to unidentified moss species. No hydrophytic vegetation indicators met.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-2	7.5YR 2.5/1	100					Sandy Loam	
2-16	10YR 3/3	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators are met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	___
Water Table Present?	Yes ___	No	X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils moist but not saturated; no wetland hydrology indicators met.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/11/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling: Area C-P1 (W) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S34

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 0

Subregion (LRR): A - Northwest Forest | Lat: 45.614694 | Long: -122.794906 | Datum: WGS84

Soil Map Unit Name: Sauvie Silt Loam | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil X or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Wetland vegetation developing on recently formed material stockpile, likely from a wetland restoration project that was completed on the adjacent property in October 2020. PHAR may be attributed to seed load in dredged wetland soils placed in this location. Access to excavate soil pits was not granted.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	30	Yes	FAC
2. Achillea millefolium	25	Yes	FACU
3. Phalaris arundinacea	25	Yes	FACW
4. Prunella vulgaris	20	No	FACU
5. Lupinus latifolius	15	No	FAC
6. Taraxacum officinale	5	No	FACU
7. Cardamine oligosperma	2	No	FAC
8. Cirsium vulgare	2	No	FACU
9. Tellima grandiflora	2	No	FACU
10. Geranium molle	2	No	UPL
11.			
	128	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	25	x2=	50
FAC species	47	x3=	141
FACU species	54	x4=	216
UPL species	2	x5=	10
Column Totals:	128 (A)		417 (B)

Prevalence Index = B/A= 3.26

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Newly developed site, vegetation mainly comprised of upland weedy species. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type¹	Loc²	Texture	Remarks

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

No dig zone, subsurface soils were not evaluated. Hydric soils assumed based on the presence of hydrophytic vegetation and wetland hydrology.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 1.00

Water Table Present? Yes X No ___ Depth (inches): ___

Saturation Present? Yes X No ___ Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Property owner requested no soil pits be excavated; subsurface hydrology was not evaluated. Saturation and water table assumed based on presence of surface water.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/11/2024
Applicant/Owner: Cascade Renewables | State: OR | Sampling Area C-P2 (U) - OR
Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S34
Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 0
Subregion (LRR): A - Northwest Forest | Lat: 45.614648 | Long: -122.794822 | Datum: WGS84
Soil Map Unit Name: Sauvie Silt Loam | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil X or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs on a recently formed material stockpile, likely from a wetland restoration project that was completed on the adjacent property in October 2020. PHAR may be attributed to seed load in dredged wetland soils placed in this location. Access to excavate soil pits was not granted.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	45	Yes	FAC
2. Achillea millefolium	30	Yes	FACU
3. Prunella vulgaris	20	No	FACU
4. Phalaris arundinacea	10	No	FACW
5. Cardamine oligosperma	5	No	FAC
6. Geranium molle	5	No	UPL
7.			
8.			
9.			
10.			
11.			
	115	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	10	x2=	20
FAC species	50	x3=	150
FACU species	50	x4=	200
UPL species	5	x5=	25
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A= 3.43

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Multistoried vegetation canopy. Poa spp. could not be identified to species; assumed facultative. Newly developed site, plant species comprised of upland and wetland species. Sample plot does not meet any hydrophytic indicators.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks:

Subsurface soils were not evaluated due to no dig zone; soils assumed non-hydric based on lack of hydrophytic vegetation, wetland hydrology, and landscape position.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): ______
Saturation Present? Yes ___ No X Depth (inches): ______
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Property owner requested no soil pits be excavated; subsurface hydrology was not evaluated. Lack of subsurface hydrology presumed based on observed vegetation and landscape position.

Appendix C. Site Visit Photos

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Photo 1	Overview of Verification Plot 1 (VP-1); proposed eastern converter site location in The Dalles, Oregon.
Date: 11/08/23	
Direction: Northwest	

Photo 2	Overview of Verification Plot 2 (VP-2); near proposed eastern converter site location in The Dalles, OR.
Date: 11/08/23	
Direction: West	

Photo 3a	Looking downstream at an ephemeral drainage (Drainage 1) beneath Columbia View Drive, culvert occurs roughly 75 feet below road grade.
Date: 11/08/23	
Direction: Southwest	

Photo 3b	Looking upstream at an ephemeral drainage (Drainage 1) beneath Columbia View Drive, culvert occurs roughly 75 feet below road grade.
Date: 11/08/23	
Direction: Northeast	

Photo 4a	Looking upstream at an ephemeral drainage (Drainage 2) to Threemile Creek beneath Columbia View Drive; culvert present roughly 30-40 feet below road grade.
Date: 11/08/23	
Direction: East	

Photo 4b	Looking downstream at an ephemeral drainage (Drainage 2) to Threemile Creek beneath Columbia View Drive; culvert present roughly 30-40 feet below road grade.
Date: 11/08/23	
Direction: Northwest	

Photo 5	Looking downstream at an ephemeral drainage (Drainage 2) to Threemile Creek located west of OR-197.
Date: 11/08/23	
Direction: West	

Photo 6	Threemile Creek adjacent to the east of OR-197. Streambed occurs roughly 50 feet below road grade.
Date: 11/08/23	
Direction: Northwest	

Photo 7	Threemile Creek, looking upstream.
Date: 04/02/24	
Direction: South	

Photo 8	Looking upstream at Threemile Creek and Wetland 4. Mosaic of reed canary grass and broadleaf cattail occur within the ordinary high water mark.
Date: 04/02/24	
Direction: South	

Photo 9	Verification Plot 3 (VP-3); area determined to be upland.
Date: 04/02/24	
Direction: South	

Photo 10	Verification Plot 4 (VP-4); roadside depressional area determined to be upland.
Date: 04/02/24	
Direction: Northwest	

Photo 11	Human-excavated pit (Pit 1) created in uplands.
Date: 11/08/23	
Direction: Southeast	

Photo 12a	Verification Plot 5 (VP-5). Depressional area mapped by the NWI; area determined to be upland.
Date: 11/08/23	
Direction: South	

Photo 12b	Culvert placed beneath adjacent road grade, no signs of recent flow.
Date: 11/08/23	
Direction: North	

Photo 13	Verification Plot 6 (VP-6); depressional area determined to be upland.
Date: 11/08/23	
Direction: Southeast	

Photo 14	Overview of Columbia River shoreline within survey area in The Dalles.
Date: 11/08/23	
Direction: Northeast	

Photo 15	Verification Plot (VP-7); depressional area determined to be upland.
Date: 03/12/24	
Direction: East	

Photo 16	Verification Plot 8 (VP-8). Sample plot taken just outside survey area at NWI-mapped wetland boundary but not within wetland.
Date: 03/12/24	
Direction: Northwest	

Photo 17	Verification Plot 9 (VP-9); area determined to be upland.
Date: 03/12/24	
Direction: Southwest	

Photo 18	Sample Plot W1-P1 (W). Wetland 1 is a small depressional wetland with no outlet.
Date: 03/12/24	
Direction: West	

Photo 19	Wetland 1 looking east.
Date: 03/12/24	
Direction: East	

Photo 20	Sample Plot W2-P1 (W). Wetland 2A is a relatively large palustrine emergent wetland with a perennial pond.
Date 03/12/24	
Direction: Southeast	

Photo 21	Perennial pond within Wetland 2B boundary with surface water roughly 2-3 feet deep.
Date: 03/12/24	
Direction: South	

Photo 22a	Existing access road along the southern boundary of Wetland 2B. This area determined to be upland.
Date: 03/20/2025	
Direction: NW	

Photo 22b	Sample Plot W2-P3 (W). Large perennial pond within the boundary of Wetland 2B.
Date: 03/12/24	
Direction: Northwest	

Photo 23	Verification Plot 10 (VP-10). Small depressional area determined to be upland.
Date: 03/12/24	
Direction: West	

Photo 24	Sample Plot Area A-P1 (W) taken within suspect depressional area in human-made stormwater feature. Culvert discharge to 12-inch pipe to Columbia River shoreline. No evidence of flow observed.
Date: 03/11/24	
Direction: Southeast	

Photo 25a	Overview of Area A; Columbia River in background.
Date: 03/11/24	
Direction: Northeast	

Photo 25b	Overview of Area B.
Date: 03/11//24	
Direction: Southwest	

Photo 26	Sample Plot Area B-P1 (W) taken within suspect depressional area in human-made stormwater feature with no outlet. Geomembrane liner encountered 12 inches below ground surface.
Date: 03/11/24	
Direction: Southwest	

Photo 27	Columbia River shoreline within the survey area near the eastern landing site alternative at the Port of Portland.
Date: 03/11/24	
Direction: West	

Photo 28	Columbia River shoreline within the survey area near the western landing site alternative at the Port of Portland.
Date: 03/11//24	
Direction: East	

Photo 29	Verification Plot 11 (VP-11) at proposed western alternative landing site at the Port of Portland. Area determined to be upland.
Date: 03/11/24	
Direction: Northwest	

Photo 30	Verification Plot 12 (VP-12) taken at proposed western converter station site. Area determined to be upland.
Date: 03/11/24	
Direction: Northwest	

Photo 31	Columbia Slough high tide line.
Date: 03/11/24	
Direction: Northwest	

Photo 32	Roughly 24-inch culvert inlet to Wetland 3; a large stormwater feature. Signs of recent flow observed.
Date: 03/13/24	
Direction: East	

Photo 33	Shallow perennial pond (2-3 feet deep) within Wetland 3 boundary.
Date: 03/13/24	
Direction: Northwest	

Photo 34	A series of water channels conveys hydrology around Wetland 3.
Date: 03/13/24	
Direction: West	

Photo 35	Overview of Wetland 3 from near Sample Plot W3-P1 (W); palustrine emergent wetland with shrub/scrub fringe along northern boundary.
Date: 03/13/24	
Direction: Northwest	

Photo 36	A series of water channels conveys hydrology around Wetland 3.
Date: 03/13/24	
Direction: Southwest	

Photo 37a	Sample Plot W3-P3 (W) take at the edge of a large perennial pond with surface water roughly 2-3 feet deep.
Date: 03/13/24	
Direction: Northeast	

Photo 37b	Sample Plot W3-P3 (W); wetland condition changes rapidly to upland with elevation rise on graded slopes around depressional area.
Date: 03/11/24	
Direction: East	

Photo 38a	Sample Plot W3-P5 (W) taken at topographic break where wetland condition in depressional area transitions to upland on steeply graded slopes at wetland boundary.
Date: 03/13/24	
Direction: Northwest	

Photo 38b	Steeply graded slope around depressional stormwater feature create distinct break from wetland to upland condition.
Date: 03/13/24	
Direction: Northeast	

Photo 39	Stormwater feature near landing site on the east side of the Willamette River.
Date: 03/13/24	
Direction: Northeast	

Photo 40	High tide line of the Willamette River within survey area near Harborton Substation.
Date: 03/11/24	
Direction: Southeast	

Photo 41a	Sample Plot Area C-P2 (U) taken from top of large fill material stockpile excavated from wetland restoration project on adjacent property.
Date: 03/11/24	
Direction: Northeast	

Photo 41b	Overview of Area C. Wetland vegetation likely attributed to relic seed load in material excavated from wetland restoration project on adjacent property.
Date: 03/11/24	
Direction: Northwest	

Photo 42	Stormwater collection pond located south of Harborton substation.
Date: 03/11//24	
Direction: North	

Photo 43	Stormwater collection canal (Ditch 1) located south of Harborton substation. Parallels substation fence line outside southern fence boundary.
Date: 03/11//24	
Direction: North	

Photo 44	Stormwater collection canal (Ditch 2) located north of Harborton Substation.
Date: 03/11//24	
Direction: Northwest	

Photo 43	Stormwater collection canal (Ditch 1) located south of Harborton substation. Parallels substation fence line outside southern fence boundary.
Date: 03/11//24	
Direction: North	

Photo 44	Stormwater collection canal (Ditch 2) located north of Harborton Substation.
Date: 03/11//24	
Direction: Northwest	

Photo 45	Verification Plot 13 (VP-13) located south of Wetland 2A. This area determined to be wetland but occurs outside the survey area.
Date: 03/20/25	
Direction: Southwest	

Photo 46	Verification Plot 14 (VP-14) located south of Wetland 2A. This area determined to be wetland.
Date: 03/20/25	
Direction: Northwest	

Appendix D. WETS Tables

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WETS Table

WETS Station: THE DALLES, OR								
Requested years: 1992 - 2022								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	43.4	30.3	36.9	2.35	1.51	2.83	6	4.7
Feb	49.4	30.3	39.9	1.53	0.80	1.87	4	2.5
Mar	57.7	34.6	46.2	1.23	0.76	1.49	4	0.2
Apr	64.9	39.4	52.1	0.95	0.50	1.16	3	0.0
May	73.6	47.4	60.5	0.75	0.33	0.89	3	-
Jun	79.6	53.6	66.6	0.42	0.15	0.48	2	-
Jul	88.5	58.7	73.6	0.10	0.00	0.06	0	-
Aug	88.9	58.0	73.5	0.17	0.00	0.14	1	-
Sep	81.7	50.1	65.9	0.29	0.06	0.27	1	-
Oct	67.5	40.5	54.0	1.07	0.68	1.28	3	0.0
Nov	52.1	34.0	43.0	1.95	1.22	2.35	6	1.1
Dec	43.1	30.0	36.6	3.00	1.83	3.63	7	3.5
Annual:					-	-		
Average	65.9	42.2	54.1	-	-	-	-	-
Total	-	-	-	13.80			40	-

GROWING SEASON DATES			
Years with missing data:	24 deg = 13	28 deg = 11	32 deg = 11
Years with no occurrence:	24 deg = 0	28 deg = 0	32 deg = 0
Data years used:	24 deg = 18	28 deg = 20	32 deg = 20
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	Insufficient data	3/20 to 11/5: 230 days	4/11 to 10/19: 191 days
70 percent *	Insufficient data	3/11 to 11/14: 248 days	4/4 to 10/27: 206 days
* Percent chance of the growing season occurring between the Beginning and Ending dates.			

STATS TABLE - total precipitation (inches)													
Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1893	0.69	1.84	0.96	1.69	0.69	0.06	0.30	0.00	1.21	4.40	4.36	1.77	17.97
1894	4.84	1.83	3.73	0.64	0.47	1.15	0.10	T	1.02	2.08	0.51	1.65	18.02
1895	4.72	0.47	0.65	0.24	0.94	0.00	0.32	0.05	1.14	0.00	1.20	4.15	13.88
1896	3.45	0.72	1.00	0.95	0.63	0.10	T	0.28	0.42	0.60	5.87	2.74	16.76
1897	1.14	2.98	1.94	0.23	0.27	1.07	0.24	0.08	0.54	0.24	3.84	4.03	16.60
1898	M0.82	0.98	0.30	0.11	0.03	M0.90	0.17	0.02	0.85	0.13	2.13	1.14	7.58
1899	2.82	2.19	0.94	1.05	0.45	0.20	0.00	0.86	0.81	1.56	3.57	2.29	16.74
1900	1.90	M1.92	1.62	0.42	0.03	0.47	T	0.55	1.09	2.02	2.25	1.33	13.60

1901	3.46	4.15	0.68	0.09	0.39	0.20	T	0.16	1.84	0.13	1.69	3.04	15.83
1902	1.61	3.79	0.52	1.82	0.63	0.13	0.26	0.00	0.36	0.78	3.53	4.00	17.43
1903	2.87	0.47	0.56	0.23	0.05	2.11	0.12	0.11	0.15	1.10	M2.42	0.56	10.75
1904	M1.41	4.50	3.10	0.98	0.09	0.46	0.40	0.04	0.61	1.44	1.01	1.79	15.83
1905	3.27	0.51	0.63	0.18	0.66	1.27	0.19	0.10	1.19	1.88	0.84	1.07	11.79
1906	1.90	1.67	1.21	0.11	0.95	1.05	T	0.31	0.35	0.23	3.99	M2.87	14.64
1907	3.92	3.08	1.30	1.67	0.41	0.42	0.22	0.74	0.29	0.29	2.22	5.50	20.06
1908	1.06	0.77	1.50	0.17	0.92	0.10	0.36	0.16	0.03	1.42	0.48	1.21	8.18
1909	4.26	M1.39	M0.35	0.08	0.13	0.13	0.39	0.00	1.05	0.83	M4.39	3.09	16.09
1910	1.87	2.67	0.41	0.83	1.31	0.72	T	0.00	0.05	1.01	4.18	1.51	14.56
1911	1.23	0.56	0.22	0.21	0.80	0.30		0.00	2.92	0.33	1.19	1.23	8.99
1912	6.30	2.03	1.03	0.28	0.82	0.43	0.02	0.55					11.46
1913			0.71	0.69	0.92	1.55	0.09	T		1.65	2.21	M1.72	9.54
1914	3.33	1.06	0.30	M1.15	0.35	M0.79	0.01	0.00	1.24	1.22	1.06	0.91	11.42
1915	2.24	2.05	M1.59	0.42	1.63	0.00	0.76	0.00	0.22	0.52	3.95	2.49	15.87
1916	2.28	3.33	2.89	0.60	0.66	M0.98	1.28	0.01	0.18	0.30	1.20	1.83	15.54
1917	0.68	1.08	0.71	2.05	0.33	0.10	0.00	0.00	0.37	0.00	2.53	4.99	12.84
1918	2.42	1.87	0.14	0.24	1.16	0.00	0.24	0.30	1.40	2.18	1.03	1.01	11.99
1919	2.57	2.97	1.11	0.87	0.21	0.15	0.22	0.05	0.60	0.66	2.86	2.92	15.19
1920	2.22	0.00	0.82	0.98	0.07	0.69	0.10	0.54	1.05	0.65	2.82	2.94	12.88
1921	2.58	4.12	1.93	0.65	0.36	0.34	0.00	0.01	0.71	0.46	9.41	1.13	21.70
1922	1.00	0.74	1.12	0.50	0.01	0.09	0.00	0.58	0.17	1.30	M0.67	2.95	9.13
1923	M4.40	0.57	1.58	1.20	0.34	0.65	1.18	0.70	0.93	0.58	1.04	3.05	16.22
1924	1.81	1.39	0.35	0.02	0.00	0.41	0.15	0.18	0.20	1.32	3.35	1.15	10.33
1925	4.04	2.49	0.52	0.80	1.47	T	T	0.01	0.81	0.03	1.94	1.11	13.22
1926	1.71	3.06	T	0.18	0.62	0.00	T	0.23	0.44	0.75	5.50	1.42	13.91
1927	4.19	3.35	0.45	T	0.40	0.30	T	T	2.51	0.81	3.02	0.87	15.90
1928	3.50	0.23	2.92	1.04	T	0.54	0.12	0.00	0.09	0.15	1.81	2.61	13.01
1929	2.24	0.02	T	0.40	T	0.55	0.00	T	0.13	0.23	0.02	4.96	8.55
1930	2.18	1.85	0.88	0.20	0.12	0.12	0.00	0.03	0.21	1.06	1.60	0.75	9.00
1931	1.26	0.38	M1.63	0.50	T	1.35	0.00	MT	0.85	0.80	1.83	M1.38	9.98
1932	1.82	1.72	1.42	0.68	1.62	T	T	T	0.00	1.01	2.28	2.19	12.74
1933	1.52	1.07	0.99	T	1.34	0.45	0.00	T	0.84	1.04	1.07	4.79	13.11
1934	2.15	0.38	1.72	0.59	0.28	0.05	T	0.23	0.88	1.80	3.08	M2.87	14.03

1935	M0.36	0.52	M1.03	0.48	0.03	0.14	M0.08	0.02	0.44	M0.44	0.69	2.11	6.34
1936	5.07	1.90	0.63	0.19	M0.68	1.57	0.04	0.00	0.08	0.08	0.05	2.39	12.68
1937	2.62	2.49	1.28	1.09	0.09	2.19	0.29	0.71	0.25	0.58	3.11	4.56	19.26
1938	1.71	2.69	2.30	0.40	0.09	0.37	0.16	T	T	1.10	1.59	1.46	11.87
1939	0.66	1.35	1.18	T	0.28	0.33	M0.02	0.09	0.11	0.13	0.09	2.13	6.37
1940	M1.82	4.79	M2.54	1.01	0.20	0.24	0.14	0.00	1.38	1.43	1.76	M1.33	16.64
1941	M2.31	0.81	0.32	0.39	0.86	0.08	0.00	0.33	0.56	0.82	2.48	2.69	11.65
1942	1.53	2.80	0.09	0.26	1.25	0.30	0.02	0.08	0.00	0.26	5.10	3.96	15.65
1943	3.39	1.57	1.53	1.48	0.30	0.87	0.10	0.95	T	3.84	1.49		15.52
1944		M0.41	0.13	0.49	0.25	0.68	0.00	T	0.50	0.26	2.05	0.72	5.49
1945	1.43	1.72	0.61	0.57	2.05	T	T	0.03	0.22	0.65	3.33	3.91	14.52
1946	2.13	1.81	1.39	T	0.32	0.80	0.31	0.06	0.24	1.50	2.11	0.92	11.59
1947	1.45	0.99	1.07	0.95	0.03	2.81	0.41	0.01	1.14	3.15	1.60	0.76	14.37
1948	3.31	2.80	1.67	0.59	1.04	M1.97	M0.30	0.20	1.60	0.46	3.15	3.88	20.97
1949	0.43	3.45	1.27	0.03	0.57	0.17	0.03	T	0.27	0.49	2.48	0.93	10.12
1950	5.57	1.79	2.03	0.51	0.12	0.40	T	0.02	0.70	3.98	3.28	3.42	21.82
1951	M3.94	2.39	2.10	0.22	0.90	0.43	0.03	0.41	0.35	2.45	1.80	2.87	17.89
1952	2.65	1.90	0.35	0.05	0.78	1.21	0.00	0.00	M0.07	0.01	0.39	2.81	10.22
1953	6.18	1.98	0.62	0.63	1.59	0.50	0.00	0.71	0.02	0.58	2.68	3.47	18.96
1954	5.59	0.60	0.65	0.28	0.63	0.58	0.10	0.08	0.47	0.84	1.36	0.88	12.06
1955	0.57	0.43	1.92	1.26	0.37	0.38	0.21	0.00	0.64	2.39	3.58	4.72	16.47
1956	6.57	1.24	0.91	0.06	0.54	0.57	0.00	0.49	0.49	0.88	0.23	1.34	13.32
1957	1.29	1.88	3.84	0.66	0.21	0.02	0.07	0.14	0.56	1.81	0.93	3.74	15.15
1958	3.15	3.11	1.00	1.24	0.32	1.47	T	T	0.21	0.20	3.03	1.88	15.61
1959	2.36	1.56	1.35	0.10	0.33	0.17	T	0.00	0.94	1.12	0.54	0.48	8.95
1960	1.92	2.06	3.20	1.17	1.26	0.06	T	0.18	0.15	0.85	3.51	1.44	15.80
1961	1.76	4.24	2.40	0.87	1.01	0.54	0.17	0.26	0.30	1.15	2.42	3.19	18.31
1962	0.55	2.01	1.83	0.94	1.04	0.02	0.00	0.72	0.49	2.80	1.49	1.72	13.61
1963	0.65	2.35	1.28	1.33	M0.41	0.04	0.04	0.14	0.66	0.40	2.55	1.62	11.47
1964	3.18	0.13	0.55	0.15	0.02	0.69	0.06	0.14	T	0.53	3.19	9.05	17.69
1965	3.05	0.41	1.56	0.99	0.30	0.36	0.13	0.60	0.15	0.25	2.37	0.73	10.90
1966	3.77	0.65	1.12	T	0.27	0.11	0.75	0.00	0.79	0.84	2.76	3.41	14.47
1967	2.03	0.20	0.99	1.21	0.10	0.30	0.00						4.83
1968													
1969													
1970													

1971													
1972													
1973													
1974													
1975		2.72	1.66	0.98	0.10	0.65	0.26	0.86	0.00	1.87	2.15	2.80	14.05
1976	1.33	1.79	1.08	0.96	0.24	0.13	0.14	0.56	0.24	0.26	0.56	0.33	7.62
1977	0.42	0.76	0.45	T	0.83	0.30	0.30	0.84	0.68	0.20	3.14	5.94	13.86
1978	3.21	1.91	0.62	0.69	0.41	T	0.20	0.90	0.58	0.12	0.83	1.56	11.03
1979	1.55	2.12	0.79	0.85	0.16	0.13	0.04	1.17	0.48	2.29	1.81	1.31	12.70
1980	5.43	2.40	1.02	1.32	0.19	0.86	0.00	0.09	0.39	0.72	2.00	5.24	19.66
1981	1.52	2.51	0.29	0.17	0.61	1.53	1.04	0.00	1.03	1.00	1.99	6.43	18.12
1982	M1.80	M1.79	0.65	1.01	0.25	0.29	M0.04	0.16	1.90	2.33	1.21	3.91	15.34
1983	3.41	4.32	3.21	0.46	0.45	0.11	0.38	1.77	0.89	0.58	3.78	M3.28	22.64
1984	0.97	1.81	1.72	0.99	0.76	0.76	0.00	0.00	0.48	1.26	4.32	1.29	14.36
1985	0.08	1.06	1.00	0.12	0.30	0.89	0.02	0.29	0.43	M0.75	1.10	1.73	7.77
1986	3.97	4.87	0.99	0.12	0.43	0.12	0.15	0.07	M1.11	0.47	1.90	1.13	15.33
1987	M2.62	2.16	1.29	0.48	0.51	M0.06	0.57	0.07	0.02	0.05	0.83	5.38	14.04
1988	2.44	0.17	0.91	1.48	0.15	1.11	0.08	T	0.18	T	3.47	0.59	10.58
1989	1.99	0.58	1.89	0.87	0.57	0.44	0.16	0.85	0.10	0.70	0.68	1.25	10.08
1990	3.28	0.58	0.71	1.72	1.84	0.35	0.07	1.22	0.13	0.69	0.96	1.48	13.03
1991	1.46	M0.95	1.51	0.92	M0.42	0.39	0.00	0.26	0.00	1.99	2.82	1.03	11.75
1992	1.07	2.90	0.30	1.87	T	0.15	M0.00	0.11	0.44	0.68	2.43	3.69	13.64
1993	M1.56	0.91	1.45	0.99	1.37	0.55	0.10	M0.01	0.02	0.35	0.35	1.87	9.53
1994	2.30	M3.06	0.96	0.75	0.92	0.51	0.00	0.03	0.01	3.42	2.17	1.67	15.80
1995	5.12	2.33	1.06	1.67	1.04		1.32	0.19	1.03	0.82	4.23	3.08	21.89
1996	M5.69	3.98	1.46	1.33	0.65		0.05	T	0.55	1.34	2.11	6.82	23.98
1997	3.97	1.63	2.03	1.08	0.51	0.55	T	0.45	0.23	1.98	0.79	0.68	13.90
1998	2.95	1.62	1.30	0.85					1.03	0.39	2.44	3.49	14.07
1999	2.11			0.12	0.43	0.18	0.07	0.34	0.00	0.90	2.59	M0.98	7.72
2000	M2.91	3.85	M0.93	0.40	0.61	0.11	T	0.00	0.04			0.99	9.84
2001	0.78	0.39	1.03	0.45			0.15		M0.12	1.16	3.66	2.32	10.06
2002	1.39	1.32	0.96	0.43	0.35								4.45
2003	M3.31	1.26	3.02	1.24	0.24	T	0.00	0.29	0.11	0.65	1.70		11.82
2004		M1.26	0.51	0.70	0.47	1.04	0.02	M0.69		0.70	0.24	1.01	6.64
2005	1.03	0.24	1.80	0.74	1.75		T	T		1.09			6.65
2006	4.26	M1.74	0.81	0.93	1.08	0.71		T	T	0.41	M4.44	3.59	17.97

2007	1.48	0.90	0.77	M0.28	0.27	0.17	0.04	M0.38	0.10	1.00	3.05		8.44
2008		1.38		M0.39	M0.36	0.15	0.03			0.49	2.23		5.03
2009			1.37	0.43	M1.16	0.10	0.00	0.02	0.10	0.69	1.30	5.28	10.45
2010	3.95	M1.30	M0.34	0.64	1.06	1.31	T	0.04	M0.62	1.30	1.62	5.69	17.87
2011	1.35	0.26	2.83	3.52	2.03	0.07	0.40	T	T	0.71	1.29	2.18	14.64
2012	1.97	1.49	1.68	1.12	0.42	0.97	T	0.00	0.00	1.74	1.75	3.33	14.47
2013	0.42	0.31	1.99	0.73	1.58	0.85	0.00	0.47	1.09	0.42	1.07	1.52	10.45
2014	1.62	3.70	2.09	1.37	0.76	0.23	0.45	0.24	0.17	2.01	1.82	M2.04	16.50
2015	2.34	1.39	0.62	0.19	0.25			M0.03	0.04	0.61	M0.00	M6.87	12.34
2016	3.20	1.25	1.80	0.29	M0.00	0.09		M0.00	0.01	2.53	1.40	M1.34	11.91
2017	M0.14	M1.82	2.29	1.60	0.21	0.37	0.00	0.06	M0.72	1.68	2.05	M1.44	12.38
2018	1.38	M0.49	0.93	1.03	0.04	M0.20	0.00	0.00	0.04	0.90	0.95	2.85	8.81
2019	2.01	M0.84	T	1.77	0.06	0.01	0.03	1.04	1.20	0.61	0.51	2.17	10.25
2020	2.94	0.36	0.22	0.52	1.58	0.36	T	T	0.04	0.63	2.70	2.25	11.60
2021	1.72	M0.64	0.23	0.07	0.03	0.02	0.00	0.00	0.25	1.00	1.99	2.72	8.67
2022	0.70	0.31	1.01	1.91	1.77	1.10	0.03	0.00	0.21	0.69	1.69	8.15	17.57
2023	2.23	0.55		1.49	0.29	0.00	0.00	0.00	1.01	0.58	1.83	5.61	13.59
2024	M2.19	1.63	0.87	0.26	0.59								5.54
Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.													
Data missing for all days in a month or year is blank.													
Creation date: 2024-06-07													

WETS Table

WETS Station: PORTLAND INTL AIRPORT, OR								
Requested years: 1992 - 2022								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	47.1	36.3	41.7	5.17	3.88	6.04	13	1.6
Feb	50.6	36.4	43.5	3.65	2.28	4.41	9	1.5
Mar	56.3	39.7	48.0	3.84	2.75	4.54	11	0.1
Apr	61.6	43.5	52.5	2.86	1.93	3.41	9	0.1
May	68.9	49.5	59.2	2.45	1.31	3.00	7	0.0
Jun	74.2	54.4	64.3	1.64	1.00	1.98	5	0.0
Jul	81.6	58.7	70.2	0.49	0.21	0.55	1	0.0
Aug	82.1	59.0	70.5	0.50	0.16	0.54	2	0.0
Sep	76.2	54.3	65.2	1.60	0.79	1.92	4	0.0
Oct	64.0	46.9	55.5	3.48	2.31	4.17	8	0.0
Nov	52.9	40.6	46.8	5.44	3.74	6.49	12	0.0
Dec	46.2	36.0	41.1	5.92	4.30	6.98	13	1.3
Annual:					32.49	40.76		
Average	63.5	46.3	54.9	-	-	-	-	-
Total	-	-	-	37.04			94	4.6

GROWING SEASON DATES			
Years with missing data:	24 deg = 0	28 deg = 0	32 deg = 0
Years with no occurrence:	24 deg = 10	28 deg = 0	32 deg = 0
Data years used:	24 deg = 31	28 deg = 31	32 deg = 31
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	1/14 to 1/7: 358 days	2/9 to 12/7: 301 days	3/18 to 11/18: 245 days
70 percent *	No occurrence	1/31 to 12/16: 319 days	3/13 to 11/23: 255 days
* Percent chance of the growing season occurring between the Beginning and Ending dates.			

STATS TABLE - total precipitation (inches)													
Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1938				2.10	0.57	0.34	0.17	0.49	1.18	2.58	4.26	4.78	16.47
1939	5.47	5.49	2.36	0.27	1.09	1.42	0.78	1.62	0.55	2.14	1.73	9.22	32.14
1940	2.56	11.41	4.95	3.29	1.60	0.02	0.80	0.06	3.54	4.13	4.53	4.85	41.74
1941	5.27	1.59	1.74	1.66	4.27	0.81	0.03	1.45	3.58	2.18	5.04	9.11	36.73
1942	3.63	M3.53	1.63	2.38	2.84	1.94	1.40	0.17	0.06	3.49	11.57	9.37	42.01
1943	5.50	3.27	5.54	2.21	1.42	2.80	0.32	1.39	0.06	5.59	M2.20	2.70	33.00
1944	2.81	3.11	1.93	2.28	1.07	0.81	0.06	0.03	2.73	1.64	5.00	1.90	23.37
1945	4.10	4.36	5.30	2.42	4.57	0.07	0.51	0.37	3.96	2.11	8.58	5.61	41.96

1946	5.12	4.99	4.23	0.78	1.24	1.91	1.08	0.18	1.15	4.81	7.57	5.47	38.53
1947	3.72	2.77	4.11	1.81	0.66	2.93	0.94	0.29	1.06	8.04	4.08	4.64	35.05
1948	5.87	5.02	4.24	3.41	3.76	1.42	0.32	1.55	3.28	2.39	6.89	8.06	46.21
1949	1.02	9.46	2.78	0.72	2.12	0.68	0.91	0.24	1.66	2.35	5.56	4.86	32.36
1950	10.10	5.77	4.76	2.74	0.57	2.50	0.50	0.72	1.45	7.00	8.67	6.31	51.09
1951	7.71	5.02	3.86	1.14	1.75	0.03	0.28	0.02	2.55	6.81	5.31	5.06	39.54
1952	4.40	3.59	3.82	1.45	0.78	2.23	T	0.18	0.33	0.72	1.44	6.76	25.70
1953	12.83	3.71	3.82	1.89	3.45	2.04	0.03	1.79	1.16	3.56	6.46	7.85	48.59
1954	8.95	4.57	2.55	2.54	1.83	3.58	1.24	1.92	0.85	3.40	5.09	5.01	41.53
1955	2.30	3.37	3.06	4.72	1.24	1.83	0.89	T	2.86	6.69	7.34	10.14	44.44
1956	11.66	2.04	4.30	0.53	2.50	2.03	0.01	2.56	1.12	5.10	1.47	3.64	36.96
1957	2.23	4.14	7.52	1.84	1.97	0.73	0.19	0.69	0.49	3.53	3.07	6.15	32.55
1958	6.56	5.13	2.20	3.33	1.35	3.04	T	0.02	1.05	1.49	6.39	5.06	35.62
1959	7.57	4.18	3.22	0.92	2.89	2.38	0.56	0.09	2.81	3.51	3.30	3.08	34.51
1960	3.93	4.00	4.77	3.33	3.37	0.52	T	1.00	1.37	2.39	8.63	2.61	35.92
1961	4.50	8.92	6.04	3.59	2.80	0.47	0.42	1.07	0.64	2.89	4.67	5.94	41.95
1962	1.58	3.43	4.25	3.15	2.56	0.78	0.06	1.49	1.66	3.31	9.32	2.59	34.18
1963	2.27	3.48	4.69	3.78	2.74	1.71	1.17	0.87	0.75	3.04	5.64	3.60	33.74
1964	9.51	0.78	2.28	1.56	1.04	1.96	0.68	0.90	1.61	0.84	6.78	9.92	37.86
1965	7.44	2.22	1.10	2.20	1.31	0.83	0.44	0.73	0.01	2.03	5.64	7.34	31.29
1966	5.74	1.70	4.71	0.85	0.91	1.02	1.19	0.59	1.70	3.06	5.50	6.89	33.86
1967	6.21	2.02	4.31	2.17	1.02	1.01	0.00	T	0.76	4.72	2.27	4.75	29.24
1968	4.58	6.64	2.68	1.91	3.63	2.20	0.14	4.53	2.20	5.03	6.23	11.12	50.89
1969	7.60	3.14	1.13	2.28	1.61	2.99	0.14	0.04	3.86	3.02	3.18	8.12	37.11
1970	11.81	4.77	2.58	2.94	1.55	0.49	0.05	T	1.10	2.85	5.72	7.49	41.35
1971	7.09	3.36	4.87	2.72	1.00	1.76	0.26	0.95	3.53	2.37	5.76	8.05	41.72
1972	5.71	4.08	5.41	2.98	2.23	0.68	0.56	0.67	3.06	0.87	3.78	8.79	38.82
1973	3.69	1.94	2.45	1.33	1.43	1.45	0.06	1.41	3.29	3.14	11.55	9.93	41.67
1974	8.51	4.61	5.65	1.76	1.74	0.80	2.01	0.07	0.21	2.14	6.73	6.05	40.28
1975	8.43	4.75	3.45	1.88	1.35	1.13	0.43	2.10	T	4.76	4.10	6.68	39.06
1976	5.14	4.92	2.93	2.34	2.29	0.78	0.66	3.29	0.73	1.48	0.77	1.38	26.71
1977	1.07	2.49	3.50	1.04	4.30	0.83	0.39	3.26	3.33	2.28	5.56	8.98	37.03
1978	4.85	3.28	1.49	3.96	3.17	1.69	1.36	2.05	2.07	0.36	3.83	2.51	30.62
1979	2.55	6.53	2.51	2.47	2.41	0.64	0.25	1.18	1.75	4.85	3.38	7.23	35.75

1980	8.51	4.01	3.11	2.58	2.19	2.50	0.19	0.39	1.56	1.18	6.47	9.72	42.41
1981	1.47	3.86	2.33	1.79	2.25	3.23	0.24	0.15	1.86	4.12	4.62	8.37	34.29
1982	6.31	5.98	2.38	3.56	0.46	1.66	0.94	1.66	3.98	4.44	3.51	8.16	43.04
1983	6.23	7.78	6.80	1.87	1.30	1.95	2.68	2.29	0.39	1.95	8.65	5.30	47.19
1984	2.01	3.93	3.19	3.20	3.41	4.06	T	0.09	1.46	3.85	9.74	2.56	37.50
1985	0.06	1.79	3.08	1.07	1.52	2.34	0.55	0.48	2.76	2.75	3.89	2.19	22.48
1986	4.65	5.31	2.60	1.91	2.19	0.23	1.20	0.10	4.30	1.99	6.26	4.30	35.04
1987	6.93	2.45	4.91	1.94	1.63	0.14	1.03	0.35	0.30	0.27	1.96	8.00	29.91
1988	4.95	1.17	3.13	4.57	2.53	2.34	0.69	0.10	1.76	0.19	7.92	2.37	31.72
1989	3.30	2.84	6.73	2.08	2.87	0.78	0.91	1.07	1.48	1.73	3.18	3.08	30.05
1990	7.95	3.43	2.52	2.31	2.37	1.94	0.32	0.95	0.34	4.65	3.68	2.40	32.86
1991	2.56	3.65	4.64	4.05	3.34	2.31	0.07	0.70	0.02	1.51	6.36	4.34	33.55
1992	4.31	4.12	1.87	3.82	0.10	0.60	0.67	0.49	1.12	2.87	4.55	4.98	29.50
1993	3.06	0.72	4.39	5.26	4.36	1.69	2.41	0.37	T	1.59	1.50	5.01	30.36
1994	3.56	4.92	1.84	1.91	0.56	1.67	0.07	0.13	1.13	8.41	5.91	4.85	34.96
1995	5.56	3.19	3.82	3.49	1.65	2.62	1.23	0.81	1.31	3.15	10.74	5.91	43.48
1996	7.15	10.03	3.24	5.12	4.88	0.44	0.73	0.25	3.05	5.38	9.58	13.35	63.20
1997	7.32	1.63	7.14	3.73	3.63	2.83	0.52	1.58	1.98	6.40	4.02	3.03	43.81
1998	6.77	5.27	4.06	1.04	5.55	1.73	0.59	T	1.09	2.16	11.02	6.74	46.02
1999	6.63	8.73	4.03	1.56	1.97	1.73	0.51	0.75	0.10	2.44	6.81	3.62	38.88
2000	5.66	4.50	3.21	1.82	2.70	1.19	0.15	0.12	1.67	3.25	2.46	3.47	30.20
2001	1.47	1.29	3.11	2.85	0.91	1.79	0.95	0.74	0.70	3.12	6.89	6.62	30.44
2002	6.22	3.55	3.40	2.34	1.86	1.57	0.19	0.04	1.54	0.63	1.91	8.00	31.25
2003	7.64	2.37	5.75	4.37	1.49	0.31	T	0.19	0.85	3.01	4.09	7.45	37.52
2004	4.86	3.95	1.53	1.01	1.78	1.12	0.04	2.68	1.03	3.36	2.38	3.91	27.65
2005	1.94	1.30	3.77	3.49	4.34	2.21	0.41	1.05	1.70	3.39	4.98	7.52	36.10
2006	10.92	2.15	2.96	2.46	3.00	0.92	0.47	0.10	0.86	1.39	11.92	5.85	43.00
2007	2.72	3.47	3.20	2.01	1.45	1.08	0.55	0.46	2.04	3.26	4.25	7.57	32.06
2008	4.71	2.19	3.71	2.08	2.02	1.00	0.29	1.23	0.48	1.74	4.15	3.52	27.12
2009	4.50	1.36	3.36	2.31	3.26	1.30	0.34	0.76	1.40	3.02	5.13	3.76	30.50
2010	4.94	2.76	3.58	2.92	4.68	4.27	0.59	0.23	3.36	3.87	6.63	8.35	46.18
2011	4.73	4.28	6.43	5.04	2.92	0.73	0.96	0.17	0.62	2.14	6.57	2.51	37.10
2012	6.82	2.83	7.89	3.25	3.37	4.10	0.21	T	0.04	6.14	8.23	7.56	50.44
2013	3.49	1.26	1.46	2.19	4.75	1.35	T	0.78	5.62	1.15	3.05	1.62	26.72

2014	2.70	5.12	7.52	3.03	2.39	2.33	1.05	0.01	0.98	5.94	2.99	6.05	40.11
2015	3.33	3.71	4.71	1.75	0.59	0.40	0.57	0.66	1.26	3.69	4.49	15.24	40.40
2016	7.23	4.10	4.73	1.96	1.72	1.42	0.66	0.09	1.69	8.31	6.83	4.61	43.35
2017	4.13	10.36	7.26	4.51	1.92	1.08	T	0.06	2.38	4.57	6.44	3.09	45.80
2018	5.36	1.86	2.50	3.34	0.17	1.03	0.02	0.06	1.59	3.43	2.86	5.08	27.30
2019	2.79	4.10	1.54	2.98	1.51	0.45	0.80	1.23	3.85	1.51	1.52	4.39	26.67
2020	7.58	1.55	2.43	0.79	2.21	3.51	0.05	0.38	2.06	1.51	5.28	5.09	32.44
2021	7.03	3.73	1.55	0.39	0.58	1.25	T	0.05	3.76	3.72	6.43	7.10	35.59
2022	5.10	2.77	2.96	5.73	3.78	3.09	0.17	T	0.31	3.18	5.17	7.76	40.02
2023	3.34	2.49	4.36	5.08	0.91	1.21	T	0.62	1.25	2.49	5.27	8.73	35.75
2024	9.43	4.29	2.70	1.79	2.44	M1.04							21.69
Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.													
Data missing for all days in a month or year is blank.													
Creation date: 2024-06-07													

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Appendix E. Streamflow Duration Assessment Method Forms

Streamflow Duration Field Assessment Form

Project # / Name: Cascade Renewable Transmission Project	Assessor: J. Maze, B. Darby
Address: BPA Celilo Substation, Columbia View Drive	Date: Nov 8, 2023
Waterway Name: Drainage 1	Coordinates at downstream end (ddd.mm.ss): Lat. 45.599077 N; Long. -121.111442 W
Reach Boundaries: As viewed from Columbia View Drive	
Precipitation w/in 48 hours (cm): 0.9	Channel Width (m): 3-10
☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow 0

% of reach w/any flow (surface or hyporheic) 0

# of pools observed 0

Observations

Observed Wetland Plants (and indicator status):

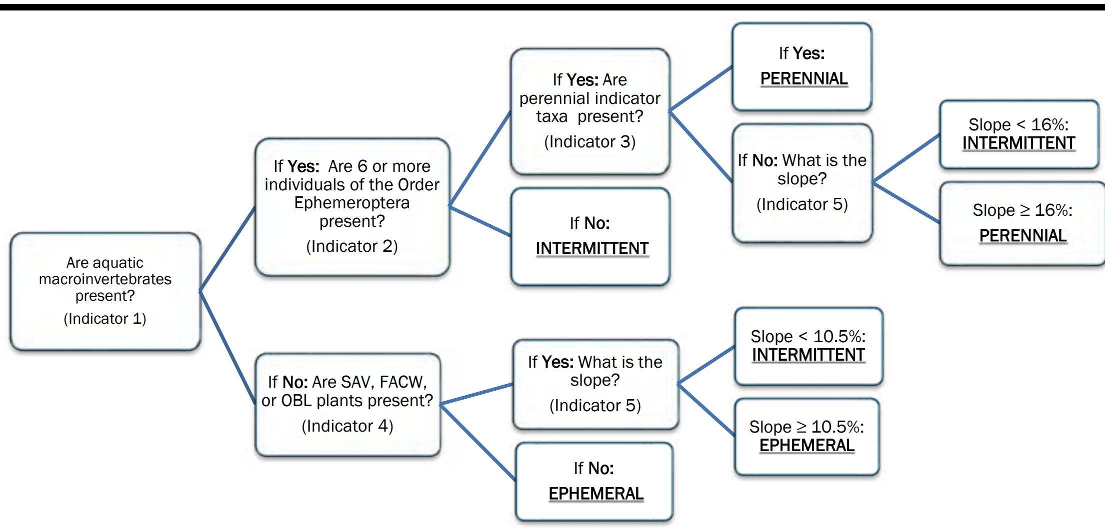
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemeroptera?	# of Individuals

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	______ %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding: ☒ Ephemeral ☐ Intermittent ☐ Perennial

Notes: (explanation of any single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.) Dry drainage feature occurs roughly 75 feet below road grade. No indicators of intermittent or perennial stream flow observed.

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

☐ Prolonged Abnormal Rainfall / Snowpack

☐ Below Average

☐ Above Average

☐ Natural or Anthropogenic Disturbance

☐ Other: ____________________________

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

Large quantities of rock were place at the entrance and exit of the culvert located roughly 75 feet below road grade. No sign of stream flow (debris rack, stream bed scour, rock/gravel sorting, etc.) was observed. Channel estimated to be 3-10 meters wide, no signs of bed and bank or wetland vegetation. No visible connection to downstream waters was found, appears to infiltrate to uplands roughly 0.9 miles north. Drainage is not mapped by the NWI or within hydric soils.

See Appendix A, Figure 6, Page 59 for map of drainage. Ground level photographs (Photos 3a and 3b) are found in Appendix C.

Ancillary Information:

☐ Riparian Corridor

☐ Erosion and Deposition

☐ Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

Streamflow Duration Field Assessment Form

Project # / Name: Cascade Renewable Transmission Project	Assessor: J. Maze, B. Darby
Address: BPA Celilo Substation, Columbia View Drive	Date: Nov 8, 2023
Waterway Name: Drainage 2	Coordinates at downstream end (ddd.mm.ss): Lat. 45.591017 N
Reach Boundaries: As viewed from Columbia View Drive & US-197	Long. -121.125175 W
Precipitation w/in 48 hours (cm): 0.9	Channel Width (m): 3-10
☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow 0

% of reach w/any flow (surface or hyporheic) 0

# of pools observed 0

Observations

Observed Wetland Plants (and indicator status):

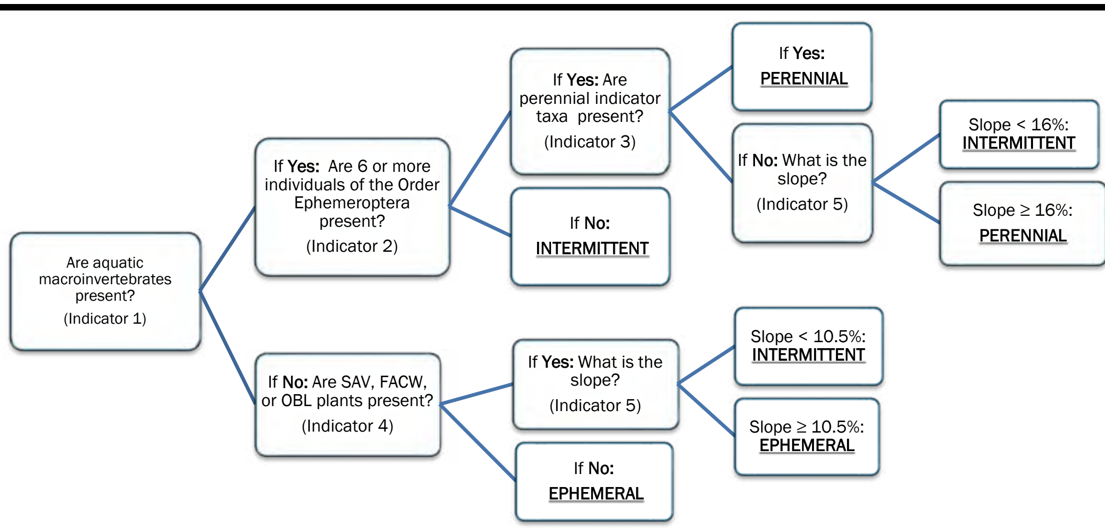
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemeroptera?	# of Individuals

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	______ %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Notes: (explanation of any single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.) Dry drainage crosses survey area via culverts beneath Columbia View Drive and US-197. No indicators of perennial or intermittent streams observed.

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

☐ Prolonged Abnormal Rainfall / Snowpack

- ☐ Below Average
- ☐ Above Average

☐ Natural or Anthropogenic Disturbance

☐ Other: ____________________________

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

Drainage 2 crosses the survey area in two places, once at m View Drive and once along US-197. No sign of stream flow (debris rack, stream bed scour, rock/gravel sorting, etc.) was observed in either drainage. Both channels estimated to be 3-10 meters wide, no signs of bed and bank or wetland vegetation. The drainage connects to Threemile Creek roughly 0.25 miles downstream to the northwest. Both sections of the drainage that occur in the survey area are mapped in the NWI as a R4SBC stream. Drainage is not mapped within hydric soils.

See Appendix A, Figure 6, Page 54 and 55 for map of drainage. Ground level photographs (Photos 4a. 4b. and 5) are found in Appendix C.

Ancillary Information:

☐ Riparian Corridor

☐ Erosion and Deposition

☐ Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

Streamflow Duration Field Assessment Form

Project # / Name: Cascade Renewable Transmission Project	Assessor: J. Maze, B. Darby
Address: South of I-84, east of US-197	Date: Nov 8, 2023
Waterway Name: Threemile Creek	Coordinates at downstream end (ddd.mm.ss): Lat. 45.601748 N; Long. -121.141884 W
Reach Boundaries: South of I-84 and west of US-197	
Precipitation w/in 48 hours (cm): 0.9	Channel Width (m): 3-7
☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow_100%

% of reach w/any flow (surface or hyporheic)_100%

# of pools observed__0_____

Observations

Observed Wetland Plants (and indicator status):

Phalaris arunidinacea (FACW)
Typha latifolia (OBL)

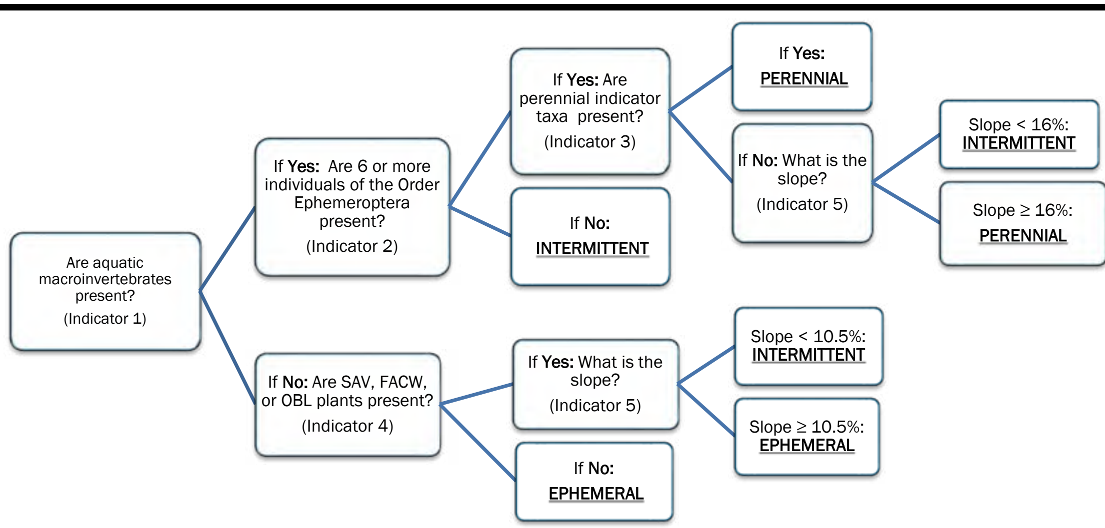
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemeroptera?	# of Individuals
Leptohyphidea	1	Yes	4
Leptoceridae	1	No	9

Indicators

1. Are aquatic macroinvertebrates present?	☒ Yes	☐ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☒ Yes	☐ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☒ Yes	☐ No
5. What is the slope? (In percent, measured for the valley, not the stream)	___10___ %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☐ Ephemeral
☒ Intermittent
☐ Perennial

Notes: (explanation of any single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.) Intermittent stream with macroinvertebrates and hydrophytic vegetation.

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

☐ Prolonged Abnormal Rainfall / Snowpack

- ☐ Below Average
- ☐ Above Average

☐ Natural or Anthropogenic Disturbance

☐ Other: ____________________________

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

Threemile Creek crosses the survey area in multiple places across varied gradients. OHWM ranged between 13 to 32 feet wide, averaging 17 feet wide across multiple measurements. Stream bed substrate was mainly comprised of cobbles and sorted gravels in the upper reaches of the survey area and unconsolidated stream bottom in the lower reaches. Threemile Creek discharges to th Columbia River roughly 1,300 feet downstream to the northwest. The stream is mapped in the NWI as a PSS1C wetland within the survey area. Stream is not mapped within hydric soils.

See Appendix A, Figure 5, Page 49-53 for maps of Threemile Creek. Ground level photographs (Photos 4a. 4b. and 5) are found in Appendix C.

Ancillary Information:

☐ Riparian Corridor

☐ Erosion and Deposition

☐ Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

Attachment 2. Joint Permit Application

Joint Permit Application

This is a joint application, and must be sent to all agencies (Corps, DSL, and DEQ). Alternative forms of permit applications may be acceptable; contact the Corps and DSL for more information.

Date Stamp

U.S. Army Corps of Engineers Portland District	Oregon Department of State Lands	Oregon Department of Environmental Quality
Action ID Number	Number	

(1) TYPE OF PERMIT(S) IF KNOWN (check all that apply)

Corps: ☐Individual ☐Nationwide No.: ________ ☐Regional General Permit ________ ☐Other (specify): _______

DSL: ☒Individual ☐GP Trans ☐GP Min Wet ☐GP Maint Dredge ☐GP Ocean Energy ☐No Permit Waiver

(2) APPLICANT AND LANDOWNER CONTACT INFORMATION

	Applicant	Property Owner (if different)	Authorized Agent (if applicable) ☒ Consultant ☐ Contractor
Name (Required) Business Name Mailing Address 1 Mailing Address 2 City, State, Zip	Chris Hocker, VP Cascade Renewable Transmission, LLC (CRT) 501 Kings Highway East, Suite 300 Fairfield, CT 06825	See Attachment (Section 2) for a list of property owners.	Amy Dammarell HDR Engineering, Inc. 1455 NW Irving Street Suite. 800 Portland, OR 97209
Business Phone Cell Phone Email	(203) 416-5590 (203) 417-9684 chocker@powerbridge.us		(503) 473-3700 (503) 358-2918 Amy.dammarell@hdrinc.com

(3) PROJECT INFORMATION

A. Provide the project location.

Project Name	Latitude & Longitude* (in DD.DDDD format)
Cascade Renewable Transmission	Start: 45.603972 N 121.106306 W End: 45.613694 N 122.797917 W

Project Address / Location	City (nearest)	County
Linear project; see attachments	The Dalles, OR; Stevenson, WA; North Bonneville, WA; Portland, OR	Multnomah + Wasco OR Skamania, WA

Township	Range	Section	Quarter / Quarter	Tax Lot
See Section 3 of Attachment				

The project would begin at Big Eddy substation located in The Dalles, Oregon. From Interstate-84 eastbound, Exit 87, right on SR-197, left on Columbia View Drive for approximately 2 miles. The project would terminate at Harborton substation in Portland, Oregon. From I 405- southbound, Exit 3 for SR-30 West for 17 miles, left on NE Marina Way.

B. What types of waterbodies or wetlands are present in your project area? (Check all that apply.)

☒ River / Stream ☒ Non-Tidal Wetland ☒ Lake / Reservoir / Pond
☐ Estuary or Tidal Wetland ☐ Other ☐ Pacific Ocean

Waterbody or Wetland Name**	River Mile	6th Field HUC Name	6th Field HUC (12 digits)
See Section 3 Attachment	CR: 105.5 -143.5 and 150- 190	See Attachment	See Attachment

* In decimal format (e.g., 44.9399, -123.0283)

** If there is no official name for the wetland or waterbody, create a unique name (such as "Wetland 1" or "Tributary A").

C. Indicate the project category. (Check all that apply.)		
☐ Commercial Development	☐ Industrial Development	☐ Residential Development
☐ Institutional Development	☐ Agricultural	☐ Recreational
☐ Transportation	☐ Restoration	☐ Bridge
☐ Dredging	☒ Utility lines	☐ Survey or Sampling
☐ In- or Over-Water Structure	☐ Maintenance	☐ Other:

(4) PROJECT DESCRIPTION

A. JPA for the entire project (Washington and Oregon) was submitted in June 2024 to the U.S. Army Corps of Engineers. This JPA is specific to Oregon and reflects minor updates to the project description and analysis since that time.

B. Summarize the overall project including work in areas both in and outside of waters or wetlands.

The proposed project (Project) consists of a high-voltage direct current (HVDC) of up to 400-kilovolt [kV]), 1,100-megawatt (MW) electric transmission facility (Facility). The facility would interconnect the existing Bonneville Power Administration (BPA) Big Eddy 500-kV alternating current (AC) substation, located in The Dalles, Oregon (Eastern Interconnection), and the existing PGE Harborton 230-kV substation in Portland, Oregon (Western Interconnection). The project includes two converter stations, proximal to the terminal substations, which convert high- voltage alternating current (HVAC) to HVDC and overhead and underground supporting HVAC lines between the existing substations and proposed converter stations.

The project would be located near The Dalles, Wasco County, Oregon, in the bed of the Columbia River (Oregon and Washington); in Stevenson and North Bonneville, Skamania County, Washington; and in Portland and under the Willamette River, Multnomah County, Oregon.

See Section 4 of the Attachment for additional project information and descriptions.

C. Describe work within waters and wetlands.

The work within waters consists of installation of a cable bundle and related actions within the bed of the Columbia River. Cable installation via horizontal directional drilling (HDD) is proposed under the bed of the Willamette River, Columbia Slough and Oregon Slough. Work within waters of the U.S. includes:

- 46.2 miles of a 12-inch HVDC cable bundle buried in the bed of the Columbia River in Oregon.
- Cable protection, consisting of rock or articulated concrete blocks where the cable might be buried less than 5 feet deep. The cable protection footprint would be up to 8 feet wide over a total length of 2.4 miles.

To support installation, the project would require the following:

- Two temporary land-to-water transition areas that facilitate transition from uplands to the water. Three-sided wet cofferdams (70 feet x 300 feet) would be used to isolate the work area and riverbed substrate would be removed from inside the wet cofferdam totaling up to 16,400 cubic yards. The proposal is to side cast channel substrate adjacent to the cofferdams.
- Pre-installation dredging of material over a length of 1,650 linear feet and 24 feet wide to facilitate required depths of cable installation in the navigation channel prism. This material would be side cast outside the navigation channel prism.
- Four geotechnical borings totaling 24 cubic yards removal for off-site sampling and analysis.

D. Construction Methods. Describe how the removal and/or fill activities will be accomplished to minimize impacts to waters and wetlands.

The following section summarizes the construction avoidance and minimization efforts. Additional information regarding construction methods is available in Section 4.

No work in wetlands/waters or direct discharge to wetlands or waters from construction or operation of the converter stations. The Project will obtain and adhere to erosion control permits and provide natural treatment of stormwater via infiltration trench.

No direct work in wetlands/waters; waters have been avoided through use of trenchless methods to install under Willamette River, Oregon Slough (between Hayden Island and West Portland Harbor) and Columbia Slough. Project will minimize the potential for discharges to waters by:

- Obtaining and complying with erosion control permit.
- Preparation and adherence of a plan for inadvertent loss of drilling fluids completed prior to construction.
- Using existing roads and cleared areas and siting HDD laydown areas outside woody riparian areas, to shorten restoration recovery.
- Restoring site post construction to match or improve pre-construction vegetation.

There would be temporary disturbance to waters associated with installation of the HVDC cable and permanent fill associated with the cable bundle and cable protection. The project will avoid and minimize wetland and water effects through:

- Siting the cable in or adjacent to the mid-channel of the Columbia River, avoiding the more ecologically productive near shore and shallow area habitats.
- Siting the cable to minimize work in historic shorelines (i.e., areas inundated by the dams),that may have a higher potential for cultural resources.
- Siting the cable in paved areas and using HDD to minimize wetland impacts.
- Using HDD to transition from land to water segments, avoiding disturbance to riparian upland areas.
- Using HDD under the Oregon Slough.
- Preparation and adherence of a plan for inadvertent loss of drilling fluids.
- Ongoing sediment and water quality monitoring during construction. Adjusting installation methods as needed to meet standards.
- Installation during the prescribed in-water work window when fish use is lower.
- Placement of HDD areas to minimize temporary disturbance to wetlands areas with woody vegetation.
- Undertaking a sediment characterization to inform sediment transport and disposal approach.

D. Describe source of fill material and disposal locations if known.

Disposal would be required for up to 4,500 of cubic yards of pre-installation dredge materials in the area downstream of Bonneville Dam and up to 16,400 cubic yards of river substrate removal from the wet coffer dams; the three-sided wet cofferdams would be located near The Dalles, Oregon, upstream of Bonneville Lock and Dam; and Hamilton Island and near Hayden Island downstream of Bonneville Lock and Dam. CRT worked with the Portland Sediment Evaluation Team (PSET) related to the characterization of sediment in these locations. CRT proposed to side cast or undertake in-water disposal in designated areas. The sediment characterization work and modeling is complete. Sediment samples that met total organic carbon levels underwent chemical characterization were analyzed for 10 metals, total petroleum hydrocarbons (diesel range organics / residual range organics), and total volatile solids.

None of the samples had metal concentrations that exceeded freshwater screening levels. Sediment samples were analyzed for nine pesticides. None of the pesticides were detected above the method reporting limit. None of the polychlorinated biphenyl Aroclors were detected above the method detection level. Total polychlorinated biphenyl Aroclors were not detected and did not exceed the freshwater screening level. None of the polynuclear aromatic hydrocarbons or semivolatile organic compounds were detected above the method detection level, except for 4-methylphenol (p-cresol). The detected concentrations for 4-methylphenol (p-cresol) did not exceed the freshwater screening level. None of the organotin analytes were detected above the method detection level.

The PSET determined that based on the “Very Low” management area rank and suitability of the overlying dredge prism sediments, the PSET infers the **post-dredge surfaces** are **suitable** for **unconfined, aquatic exposure** per the SEF guidance without further testing.

Permanent fill material would consist of the HVDC cable materials and cable protection (i.e., stone or articulated concrete blocks). Temporary fill would include sheet piles for cofferdams. All materials would be sourced from manufacturing and/or permitted sources (i.e., quarries).

(4) PROJECT DESCRIPTION (continued)

E. Construction timeline.

What is the estimated project start date? **2028**
What is the estimated project completion date? **End of 2031**

Is any of the work underway or already complete? ☐ **Yes** ☒ **No**

If yes, please describe.

F. Removal Volumes and Dimensions (if more than 7 impact sites, include a summary table as an attachment)							
Wetland / Waterbody Name *	**Removal Dimensions**					**Time Removal is to remain****	**Material*****
	Length (ft.)	**Width (ft.)**	**Depth (ft.)**	**Area (sq.ft. or ac.)**	**Volume (c.y.)**		
Columbia River (total)	243,936	2	10	11.2 ac.	180,693	Temporary	Channel substrate
Columbia River	300	70	10	0.43 ac.	16,400	Temporary	Channel substrate and sheet pile x 2 cofferdams
Columbia River	2	2	50	3.12 sq. ft.	5.8	Permanent	Channel substrate
Columbia River	1,650	20	3	0.92 ac.	4,500	Temporary	Channel substrate

G. Total Removal Volumes and Dimensions (permanent)			
Total Removal to Wetlands and Other Waters	**Length (ft.)**	**Area (sq. ft or ac.)**	**Volume (c.y.)**
Total Removal to Wetlands			
Total Removal Below Ordinary High Water	2	1.56	2.9
Total Removal Below Highest Measured Tide	2	1.56	2.9
Total Removal Below High Tide Line			
Total Removal Below Mean High Water Tidal Elevation			

H. Fill Volumes and Dimensions (if more than 7 impact sites, include a summary table as an attachment)							
Wetland / Waterbody Name*	**Fill Dimensions**					**Time Fill is to remain****	**Material*****
	Length (ft.)	**Width (ft.)**	**Depth (ft.)**	**Area (sq. ft. or ac.)**	**Volume (c.y.)**		
Columbia River	243,936	1	1	5.6 ac.	7.0	Permanent	HVDC cable bundle
Columbia River	13,000	8	2.5	2.4 ac.	7,500	Permanent	Rock or ACB (cable protection)
Columbia River	243,936	2	10	11.2 ac.	180,693	Temporary	Channel substrate
Columbia River	2	2	50	3.12 sq ft.	5.8	Permanent	Bentonite (boreholes)
Columbia River	300	70	10	0.43 ac.	16,400	Temporary	Channel substrate and sheet pile (2 cofferdam)
Columbia River	1,650	24	3	40,000 sq. ft.	4,500	Temporary	Channel substrate (pre-dredge)

I. Total Fill Volumes and Dimensions (permanent)			
Total Fill to Wetlands and Other Waters	**Length (ft.)**	**Area (sq. ft or ac.)**	**Volume (c.y.)**
Total Fill to Wetlands			
Total Fill Below Ordinary High Water	29,044+1,056 + ft + 2 = 31,102 ft	0.7 + 0.19 + 1.56 = 2.45 ac.	0.8 + 864.4+ 2.9 = 868.1 c.y.
Total Fill Below Highest Measured Tide	214,891+11,944 + 2 = 229,837 ft	4.9 + 2.21 + 1.56 = 8.87 ac.	6.2 +6,635.6 + 2.9 = 6,644.7 c.y.
Total Fill Below High Tide Line			
Total Fill Below Mean High Water Tidal Elevation			

*If there is no official name for the wetland or waterbody, create a unique name (such as "Wetland 1" or "Tributary A").
**Indicate whether the proposed area of removal or fill is permanent or, if you are proposing temporary impacts, specify the days, months or years the fill or removal is to remain.
*** Example: soil, gravel, wood, concrete, pilings, rock etc.

(5) PROJECT PURPOSE AND NEED

Provide a statement of the purpose and need for the overall project.

The Project is proposed to address the need for long-term transmission capacity between utility scale renewable generation on the east side of the Cascade Mountain Range and the urban demand centers on the west side, and to enhance system reliability. This project supports Washington and Oregon state requirements to meet renewable energy goals associated with climate policies while maintaining electric transmission system reliability.

For additional information, please see Section 5 of the Attachment.

(6) DESCRIPTION OF RESOURCES IN PROJECT AREA

A. Describe the existing physical, chemical, and biological characteristics of each wetland or waterbody. Reference the wetland and waters delineation report if one is available. Include the list of items provided in the instructions.

The following major waterbodies are located in the Project vicinity:

- Columbia River
- Willamette River and Columbia Slough

For more information regarding the Project and the Columbia River, the Willamette River, and Columbia Slough, please see Section 6 of the Attachment and the biological assessment and water quality assessment in Section 14 (Exhibits).

There are five wetlands, three aquatic features, four streams, two drainages, and two ditches identified within Oregon. For more information regarding the Project and wetlands and waterbodies, please see Section 6 of the Attachment and Attachment 14 (Exhibits) for Oregon wetland and waterbodies delineation report.

Cultural resources are also present within the Columbia River and surrounding landscape. The Project spans the traditional territories and primary resource procurement areas of several groups of native peoples, including the Multnomah, the Clackamas, the Chilluckittequaw, the Wasco, the Yakama, and Klickitat peoples. Today, many of these groups of people are represented by sovereign nations residing within treaty-formed reservations, including the Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of Grand Ronde, Confederated Tribes of Warm Springs, the Confederated Tribes of the Umatilla Indian Reservation, Cowlitz Indian Tribe, and Nez Perce Tribe. The Columbia River, its tributaries, and ecosystems hold high importance to those with ancestral ties for fishing, hunting, and resource gathering, as well as spiritual practices and beliefs The Columbia River is also the location of historic European-American fur trapping and trade, which established settlement and subsequent commercial and industrial navigation use of the river. Cultural resources surveys are ongoing for the Project, the results of which will be presented in a forthcoming technical report that complies with Section 106 of the National Historic Preservation Act and Oregon Revised Statutes. For more information regarding the Project, cultural resources, and relevant federal permitting requirements, please see Section 6 of the Attachment.

B. Describe the existing navigation, fishing and recreational use of the waterbody or wetland.

The Columbia River is a navigational waterway that supports commerce within the Pacific Northwest. Watercrafts that navigate on Columbia River from Vancouver to The Dalles (stretch of river containing the project area) primarily include tug and barge traffic. Other watercraft traveling this section and immediately downstream include container vessels, bulk carrier vessels, charter and commercial fishing ships, and recreational boaters. Most of the traffic that occurs between Vancouver and The Dalles includes the transport of petroleum products, wheat, wool, rafted logs bound downstream, and general freight going upstream.

The Columbia River is fished commercially, recreationally, and by tribes for traditional and commercial uses. Commercially common angled fish are salmonids as well as shad, pikeminnow, smelt, walleye, and sturgeon. The Columbia River Inter-Tribal Fish Commission (CRITFC) manages nine in-lieu/treaty fishing access sites within the Project area. These sites were set aside by congress to provide access to fishing for local tribes, whose traditional fishing areas were inundated by the dams.

Other recreational activities on the water include windsurfing, sailing, yachting, swimming, kayaking, canoeing, wake boarding/water skiing, and paddleboarding. Terrestrial activities along the Columbia River shorelines include hiking, waterfall viewing, biking, bird watching, and picnicking. These terrestrial activities may occur in local parks in municipalities or in state parks along the river, with popular parks and trails proximal to the project installation activities including The Dalles Marina, The Dalles Riverfront Park, and the Hamilton Island recreation area.

For more information regarding the Project and navigation, fishing, and recreational use of the Columbia River, please see Section 6 of the Attachment.

(7) PROJECT SPECIFIC CRITERIA AND ALTERNATIVES ANALYSIS

Describe project-specific criteria necessary to achieve the project purpose. Describe alternative sites and project designs that were considered to avoid or minimize impacts to the waterbody or wetland.*

The Project purpose and need were developed based on market needs and in consultation with energy providers within the Pacific Northwest Region based on capacity and system upgrades (e.g., specific convertor stations). During initial screening and analysis for the Project, the Applicant (CRT) considered design and route alternatives on land and in water that were evaluated and removed from further consideration as practicable alternatives either due to logistics or because the alternative did not meet the purpose and need. The Applicant evaluated several routes, converter station, and landfall alternatives in relation to the Project's purpose, need, cable technology, and geographic requirements, as well as the practicability and environmental considerations of each alternative. Alternatives evaluated and discounted included:

- Overhead HVAC transmission
- Different direct current (DC) voltages and/or cable system technology
- Transmission along rail right-of-way (ROW)
- Growth of community based and larger-scale solar in western Oregon and Washington
- Offshore wind development
- Transmission along SR 14 (ROW)
- Terrestrial based route along Interstate-84 (Oregon)

The proposed Project has been routed and sited to avoid and minimize impacts in the following ways:

- Placing the in-water cable bundle near the middle of the river in or adjacent to the navigation channel to avoid shallow nearshore and river confluences (i.e., avoid areas with greater aquatic habitat complexity).
- Routing to avoid known areas with cultural resources considerations and in the historic Columbia River channel to minimize the potential to disrupt archeological resources and avoiding direct disturbances to Fee In-Lieu/Treaty Access Fishing Areas Fee.
- Avoiding known National Priority List (NPL) sites, such as Portland Harbor and Bradford Island. Completed I sediment analysis (winter 2024/2025) that confirmed sediment in project area as low risk for contamination.
- Placing terrestrial route in paved areas, gravel roads, road shoulders, and upland areas previously disturbed (i.e., grassy/ non-woody vegetation).
- Siting converter stations proximal to existing substations and within grassy, previously disturbed areas and would not require tree clearing.
- Using Trenchless technology crossings to avoid stream and wetland disturbance at the Willamette River, Columbia Slough, and Oregon Slough.

(8) ADDITIONAL INFORMATION

Are there state or federally listed species on the project site? ☒ **Yes** ☐ **No** ☐ **Unknown**

Is the project site within designated or proposed critical habitat? ☒ **Yes** ☐ **No** ☐ **Unknown**

Is the project site within a national Wild and Scenic River? ☐ **Yes** ☒ **No** ☐ **Unknown**

Is the project site within a State Scenic Waterway? ☐ **Yes** ☒ **No** ☐ **Unknown**

Is the project site within the100-year floodplain? ☒ **Yes** ☐ **No** ☐ **Unknown**

If yes to any above, explain in Block 6 and describe measures to minimize adverse effects to those resources in Block 7.

Is the project site within the Territorial Sea Plan (TSP) Area? ☐ **Yes** ☒ **No** ☐ **Unknown**

If yes, attach TSP review as a separate document for DSL.

Is the project site within a designated Marine Reserve? ☐ **Yes** ☒ **No** ☐ **Unknown**

If yes, certain additional DSL restrictions will apply.

Will the overall project involve ground disturbance of one acre or more? ☒ **Yes** ☐ **No** ☐ **Unknown**

If yes, you may need a 1200-C permit from the Oregon Department of Environmental Quality (DEQ).

Is the fill or dredged material a carrier of contaminants from on-site or off-site spills? ☐ **Yes** ☒ **No** ☐ **Unknown**

Has the fill or dredged material been physically and/or chemically tested? ☒ **Yes** ☐ **No** ☐ **Unknown**

If yes, explain in Block 6 and provide references to any physical/chemical testing report(s).

(*Applicant Note: Applicant completed chemical testing during in-water work period winter of 2024/2025; For more information regarding the physical/chemical testing report, please see Sediment Characterization Report Cascade Renewable Transmission Project)*

Has a cultural resource (archaeological and/or built environment) survey been performed on the project area? ☒ **Yes** ☐ **No** ☐ **Unknown**

Do you have any additional archaeological or built environment documentation, or correspondence from tribes or the State Historic Preservation Office? ☒ **Yes** ☐ **No** ☐ **Unknown**

If yes, provide a copy of the survey and/or documentation of correspondence with this application to the Corps only.
Do not describe any resources in this document. Do not provide the survey or documentation to DSL.

Is the project part of a DEQ Cleanup Site? ☒ No ☐ Yes Permit Number: _________
DEQ contact ___________

Will the project result in new impervious surfaces or the redevelopment of existing surfaces? ☒ **Yes** ☐ **No**

If yes, the applicant must submit a post-construction stormwater management plan as part of this application to DEQ's 401 WQC program for review and approval, see https://www.oregon.gov/deq/FilterDocs/401wqcertPostCon.pdf

Identify any other federal agency that is funding, authorizing or implementing the project.

Agency Name	Contact Name	Phone Number	Most Recent Date of Contact

List other certificates or approvals/denials required or received from other federal, state or local agencies for work described in this application.

Agency	Certificate / approval / denial description	Date Applied
BPA	Interconnection Agreement	Pending
Oregon Dept. of Energy, Energy Facility Siting Council	Application for Site Certificate	Pending

Other DSL and/or Corps Actions Associated with this Site (Check all that apply.)

☒ Work proposed on or over lands owned by or leased from the Corps (may require authorization pursuant to 33 USC 408). These could include the federal navigation channel, structures, levees, real estate, dikes, dams, and other Corps projects.

☒ State owned waterway	DSL Waterway Lease #:	
☒ Other Corps or DSL Permits	Corps #	DSL #
☐ Violation for Unauthorized Activity	Corps #	DSL #
☒ Wetland and Waters Delineation	Corps #	DSL #

Submit the entire delineation report to the Corps; submit only the concurrence letter (if complete) and approved maps to DSL. If not previously submitted to DSL, send under a separate cover letter

(9) IMPACTS, RESTORATION/REHABILITATION, AND COMPENSATORY MITIGATION

A. Describe unavoidable environmental impacts that are likely to result from the proposed project. Include permanent, temporary, direct, and indirect impacts.

There would be localized, temporary direct impacts to water quality from cable installation in the Columbia River using hydroplow techniques, as well as from installation of the cofferdams at land-to-water transitions, and pre-installation dredging (if needed). Impacts to turbidity are expected to be short term and localized.

There is also potential for an indirect impact of drilling fluids (i.e., inert clay-based materials) exiting the boreholes during HDD installation. There would be localized permanent effects in the benthic zone (i.e., elevated temperature) when the cable is installed at a depth 2 feet or less. Temporary or permanent changes to toxic compounds or concentrations within the Columbia River are not expected as a result of the Project, as the project avoids any known contaminated sediments.

Project effects on cultural resources that are listed in or eligible for listing in the National Register of Historic Places (NRHP) are currently unknown because the cultural resources survey is still ongoing. The Applicant has selected the Project footprint to avoid and/or minimize areas with known or high-likelihood to contain cultural resources that were identified during desktop records reviews. Field surveys and coordination with tribes and agencies with cultural resources expertise (i.e., State Historic Preservation Officers) are ongoing, the results of which will be summarized in a forthcoming technical report that complies with Section 106 of the National Historic Preservation Act and the Oregon Revised Statutes.

Terrestrial species could be affected by temporary construction noise during construction of the converter stations, vibratory pile driving for the sheet pile cofferdams at the land to water transition areas, as well as trenching and backfilling the cable trenches. Fish would be temporarily affected by elevated in-water noise and localized turbidity; short-term elevated underwater noise and turbidity from potential pre- installation dredging, cable installation, and vibratory installation of the temporary sheet pile cofferdams would result during construction. There would be temporary disturbance to aquatic habitat and the benthic community as a result of installing the HVDC transmission cable, temporary three-sided wet cofferdams, and possible pre-installation dredging. Long-term there is the potential for magnetic forces (generally referred to as electro-magnetic forces or EMF) to be above background in the benthic area and water column when the cable is not installed at a depth of 5 or more feet.

Please see Section 9, Part A, of the Attachment for further information regarding impacts likely to result from the Project, including potential effects to ESA-listed species and designated critical habitats, cultural resources, navigation, fishing, and recreation.

B. For temporary removal or fill or disturbance of vegetation in waterbodies, wetlands or riparian (i.e., streamside) areas, discuss how the site will be restored after construction to include the timeline for restoration.

The Columbia River substrate temporarily disturbed through the hydroplow and three sided wet cofferdams would re-settle and the benthic community would become re-established and populated from nearby areas, within days or months. As such there are no proposed restoration activities.

Upland riparian areas will be stabilized and replanted and restored to pre-construction or improved conditions. Pre-construction photos will be taken as a reference for post- construction restoration. In riparian areas (i.e., within 200 feet of the ordinary high water) tree removal will be documented and trees will be replanted. The Applicant will work with landowners to replace vegetation of similar type and preferably with native species. Seeding and planting will occur in the appropriate season to increase survivability during the period following construction in that location. Because construction is generally occurring in late fall and winter, plantings will likely be completed in late winter/early spring in groups that tie to the construction location (e.g., converter station, roadside sections, etc.). Temporary erosion prevention and sediment management practices will remain in place until seeding has become established.

Please see Section 9, Part B, of the Attachment for further information regarding site restoration.

Compensatory Mitigation

C. Proposed mitigation approach. Check all that apply:

Permittee responsible	Permittee responsible	Mitigation Bank or	Payment In-Lieu
☐ Onsite Mitigation	☐ Offsite Mitigation	☐ In-Lieu Fee Program	☐ (Not approved for use with Corps permits)

C. Provide a brief description of proposed mitigation approach and the rationale for choosing that approach. If you believe mitigation should not be required, explain why.

The specific mitigation proposal has yet to be formulated. The Applicant will work with tribes, resource agencies, and landowners during the permitting process to identify relevant and scale appropriate mitigation and/or off-setting actions for the Project.

Please see Section 9, Parts C and D, for further information regarding mitigation.

Mitigation Bank / In-Lieu Fee Information:

Name of mitigation bank or in-lieu fee project: Type
and amount of credits to be purchased:

If you are proposing permittee-responsible mitigation, have you prepared a compensatory mitigation plan?

☐ Yes. Submit the plan with this application and complete the remainder of this section.

☐ No. A mitigation plan will need to be submitted (for DSL, this plan is required for a complete application).

Mitigation Location Information (Fill out only if permittee-responsible mitigation is proposed)

Mitigation Site Name/Legal Description	Mitigation Site Address	Tax Lot #

County	City	Latitude & Longitude* (in DD.DDDD format)

Township	Range	Section	Quarter/Quarter

(10) ADJACENT PROPERTY OWNERS FOR PROJECT AND MITIGATION SITE		
☐ **Pre-printed mailing labels of adjacent property owners attached separately (if more than 30).**	**Project Site Adjacent Property Owners**	**Mitigation Site Adjacent Property Owners**
Contact Name Address 1 **Address 2** **City, ST ZIP Code**	Please see Section 10 of the Attachment for list of Adjacent Property Owners. Updated parcel owner data will be provided to ODOE when the Application for Site Certification (ASC) is submitted.	N/A
Contact Name Address 1 **Address 2** **City, ST ZIP Code**		
Contact Name Address 1 **Address 2** **City, ST ZIP Code**		

(11) CITY/COUNTY PLANNING DEPARTMENT LAND USE AFFIDAVIT (TO BE COMPLETED BY LOCAL PLANNING OFFICIAL)

I have reviewed the project described in this application and have determined that:

☐ This project is not regulated by the comprehensive plan and land use regulations

☐ This project is consistent with the comprehensive plan and land use regulations

☐ This project is consistent with the comprehensive plan and land use regulations with the following:

- ☐ Conditional Use Approval
- ☐ Development Permit
- ☐ Other Permit (explain in comment section below)

☐ This project is not currently consistent with the comprehensive plan and land use regulations. To be consistent requires:

- ☐ Plan Amendment
- ☐ Zone Change
- ☐ Other Approval or Review (explain in comment section below)

An application or variance request has ☐ has not ☐ been filed for the above required above.

Local planning official name (print)	Title	City / County

Signature	Date

Comments:

The Oregon Energy Facility Siting Certificate process will address local land use in Oregon. Oregon Department of Energy will be coordinating with cities and counties as part of their process**.** The Washington Energy Facility Siting and Evaluation Council process will address local land use in Washington. State of Washington Energy Facility Site Evaluation Council will be coordinating with cities and counties as part of their process.

(12) COASTAL ZONE CERTIFICATION

If the proposed activity described in your permit application is within the Oregon Coastal Zone, the following certification is required before your application can be processed. The signed statement will be forwarded to the Oregon Department of Land Conservation and Development (DLCD) for its concurrence or objection. For additional information on the Oregon Coastal Zone Management Program and consistency reviews of federally permitted projects, contact DLCD at 635 Capitol Street NE, Suite 150, Salem, Oregon 97301 or call 503-373-0050 or click here.

CERTIFICATION STATEMENT

I certify that, to the best of my knowledge and belief, the proposed activity described in this application complies with the approved Oregon Coastal Zone Management Program and will be completed in a manner consistent with the program.

Print /Type Applicant Name	**Title**
Applicant Signature	**Date**

(13) SIGNATURES

Application is hereby made for the activities described herein. I certify that I am familiar with the information contained in the application, and, to the best of my knowledge and belief, this information is true, complete and accurate. I further certify that I possess the authority to undertake the proposed activities. By signing this application I consent to allow Corps or DSL staff to enter into the above-described property to inspect the project location and to determine compliance with an authorization, if granted. I hereby authorize the person identified in the authorized agent block below to act in my behalf as my agent in the processing of this application and to furnish supplemental information in support of this permit application. I understand that the granting of other permits by local, county, state or federal agencies does not release me from the requirement of obtaining the permits requested before commencing the project. I understand that payment of the required state processing fee does not guarantee permit issuance.

To be considered complete, the fee must accompany the application to DSL. The fee is not required for submittal of an application to the Corps.

Fee Amount Enclosed	$

Applicant Signature (required) must match the name in Block 2

Print Name	Title
Signature	Date

Authorized Agent Signature

Print Name	Title
Signature	Date

Landowner Signature(s)[*]

Landowner of the Project Site (if different from applicant)

Print Name	Title
Signature	Date

Landowner of the Mitigation Site (if different from applicant)

Print Name	Title
Signature	Date

Department of State Lands, Property Manager (to be completed by DSL)

If the project is located on state-owned submerged and submersible lands, DSL staff will obtain a signature from the Land Management Division of DSL. A signature by DSL for activities proposed on state-owned submerged/submersible lands only grants the applicant consent to apply for a removal-fill permit. A signature for activities on state-owned submerged and submersible lands grants no other authority, express or implied and a separate proprietary authorization may be required.

Print Name	Title
Signature	Date

[*] Not required by the Corps.

(14) ATTACHMENTS

☒Drawings

☒Location map with roads identified

☐U.S.G.S topographic map

☒ Tax lot map

☒Site plan(s)

☒Plan view and cross section drawing(s) ☒ Recent aerial photo

☒Project photos (*Applicant note - included with the wetland delineation*)

☐Erosion and Pollution Control Plan(s), if applicable (*Applicant Note - pending via the WA EFSC and OR EFSEC processes*)

☐DSL / Corps Wetland Concurrence letter and map, if approved and applicable

☒Pre-printed labels for adjacent property owners (Required if more than 30)

(Applicant Note – Word document with formatting for labels for mailing labels can provide pre-printed labels upon request.)

☐Incumbency Certificate if applicant is a partnership or corporation

☐Restoration plan or rehabilitation plan for temporary impacts

☐Mitigation plan

☐Wetland functional assessments, if applicable

☐Cover Page

☐Score Sheets

☐ORWAP OR, F, T, & S forms

☐ORWAP Reports

☐Assessment Maps

☐ORWAP Reports: Soils, Topo, Assessment area, Contributing area

☒Stream Functional Assessments, if applicable

☒Cover Page

☒Score

☒Sheets

☒SFAM PA, PAA, & EAA forms

☒SFAM Report

☒Assessment Maps

☐Aerial Photo Site Map and Topo Site Map (Both maps should document the PA, PAA, & EAA)

☐Compensatory Mitigation (CM) Eligibility & Accounting Worksheet

☐Matching Quickguide sheet(s)

☐CM Eligibility & Accounting sheet

☐Alternatives analysis

☒Biological assessment (if requested by the Corps project manager during pre-application coordination)

☒Stormwater management plan (may be required by the Corps or DEQ)

☐Other Please describe:

For U.S. Army Corps of Engineers send application to:

USACE Portland District
ATTN: CENWP-ODG-P
PO Box 2946
Portland, OR 97208-2946
Phone: 503-808-4373
portlandpermits@usace.army.mil

Counties:
Baker, Benton, Clackamas, Clatsop, Columbia, Gilliam, Grant, Hood River, Jefferson, Lincoln, Linn, Malheur, Marion, Morrow, Multnomah, Polk, Sherman, Tillamook, Umatilla, Union, Wallowa, Wasco, Washington, Wheeler, Yamhill

U.S. Army Corps of Engineers
ATTN: CENWP-ODG-E
211 E. 7th AVE, Suite 105
Eugene, OR 97401-2722
Phone: 541-465-6868
portlandpermits@usace.army.mil

Counties:
Coos, Crook, Curry, Deschutes, Douglas, Jackson, Josephine, Harney, Klamath, Lake, Lane

For Department of State Lands send application to:

West of the Cascades:
Department of State Lands
775 Summer Street NE, Ste 100
Salem, OR 97301-1279
Phone: 503-986-5200
https://www.oregon.gov/dsl/wetlands-waters/Documents/uploadinstructions_removalfill.pdf

East of the Cascades:
Department of State Lands
951 SW Simpson Ave, Ste 104
Bend, OR 97702
Phone: 541-388-6112
https://www.oregon.gov/dsl/wetlands-waters/Documents/uploadinstructions_removalfill.pdf

For Department of Environmental Quality:

Submit all application materials electronically through *Your DEQ Online*.

For questions related to *Your DEQ Online*, please visit the *Your DEQ Online* help page, email YourDEQOnline@deq.state.or.us, or call 503-229-6184

CRTS JPA Supplemental Permit Application Materials

Section 2. Applicant and Landowner Contact Information

2.1 Property Owner Contact Information

The proposed project is located on properties owned by individuals and entities listed in Table 1. The list of property owners will be updated by CRT through the Oregon Energy Site Certificate process.

Table 1. Landowners

Tax lot(s)		Owner	Street Address	City	State	ZIP
R205368 R205369 R205378 R205379 R205382 R251975 R251976 R251982 R256272 R256279 R256325 R256358	R256398 R256399 R323351 R323355 R323358 R323451 R490506 R494771 R496361 R505949 R518988 R518989	Port of Portland	NE Marine Dr PO Box 3529	Portland	OR	97208-3529
R205385		7410 Leadbetter LLC	4513 Parkhurst St	Mira Loma	CA	91752-1452
R251986 R251987 R256397		Port OF Portland Lease - Rivergate V Associates LLC	1717 McKinney Ave Ste 1900	Dallas	TX	75202
R251989 R256248 R256249		IPT Kelly Point DC LLC	1800 Wazee St #500	Denver	CO	80202
R323354		Inland Sea Maritime Group LLC	11836 S Breyman Ave	Portland	OR	97219
R323445		Eco Services Operations Corp	300 Lindenwood Drive	Malvern	PA	19555
R323471 R714233 R714234		Portland General Electric Company	121 SW Salmon St	Portland	OR	97204-2901
R506017		Port of Portland Lease – Georgia Pacific Consumer Products (Northwest) LLC	133 Peachtree St	Atlanta	GA	30303-1808
R518992		Port of Portland Lease – Colliers International, Bybee Lake Logistics Center	7820-7832 N Leadbetter Rd	Portland	OR	97203
R521886		Metro & Port of Portland	600 NE Grand Ave	Portland	OR	97232-2736
R632654		Port of Portland	14300-14310 N Columbia Blvd	Portland	OR	97203

Tax lot(s)	Owner	Street Address	City	State	ZIP
	Lease – MEPT Rivergate III LLC				
R652417	Port of Portland Lease – MEPT Rivergate IV LLC	14510 N Columbia Blvd	Portland	OR	97203
1N 13E 1 BD 300	Rosette Rollin S. & Rosella	1415 Jordan	The Dalles	OR	97058
1N 13E 2 400	Northern Wasco County Parks & Recreation	602 W 2nd	The Dalles	OR	97058
1N 13E 2 600 1N 13E 1 B 400	Union Pacific Railroad	1400 Douglas St 1640	Omaha	NE	68179-1640
1N 14E 6 300 1N 14E 7 300 1N 14E 0 900 2N 14E 31 D 1400	BPA	905 NE 11th Ave	Portland	OR	97232
Columbia River, Oregon	OR DSL	775 Summer St. NE	Salem	OR	97301-1279

Section 3: Project Information

3.1 Project Location

The project area encompasses the townships, ranges, sections, and tax lots identified in Table 2. Portions of the Columbia River within Washington are not within designated tax lots.

Table 2. Townships, Ranges, Sections, and Tax Lots

Township and Range	Sections	Quarter-Section	Tax Lots	
T01N R01E	01	N/A	1N1E01AC 1N1E01AD 1N1E01BD	
T01N R02E	03, 04, 05, 06, 11, 12	N/A	1N2E03 1N2E03 1N2E04 1N2E05	1N2E06 1N2E11 1N2E12
T01N R03E	07, 13, 14, 15, 16, 17	N/A	1N3E18 1N3E13 1N3E17	1N3E21 In Columbia River
T01N R04E	17, 18, 19, 20, 21, 25, 26, 27	N/A	1N4E20 1N4E26BD	1N4E26BC In Columbia River
T01N R05E	20, 21	N/A	1N5E21 1N5E14 1N5E15DD	1N5E22 In Columbia River
T01N R06E	N/A	N/A	In Columbia River	
T01N R13E	01, 02, 03	NW, SE, SW; NE, NW; NE	1N 13E 1 B 400 1N 13E 1 BD 300 1N 13E 2 400	1N 13E 2 600 In Columbia River
T01N R14E	06, 07	NE, NW, SE, SW; NW	1N 14E 0 900 2N 14E 31 D 1400 1N 14E 6 300	1N 14E 7 300 In Columbia River
T02N R01W	23, 24, 25, 26, 34, 35	NE, NW; NE; NE; NW	2N1W23D R251987 R256248 R205379 2N1E30 2N1W25A 2N1W25B 2N1W25 R251975 R251976 R256272 R518988 R251975 R251976 2N1E30 2N1W25 2N1W25A 2N1W25B R205368 R205369 R205378	2N1W26 2N1W26A 2N1W26C 2N1W26D 2N1W35 R251976 R251982 R251986 R251987 R251989 R256248 R256249 R256279 R256397 R632654 R652417 R506017 2N1W34 R714233 R714234 2N1W34

Township and Range	Sections	Quarter-Section	Tax Lots	
			R205379 R205382 R205385 R251976 R251986 R251989 R256398 R518988 R251976 2N1W23D	R506017 R714233 R714234 R256358 R505949 R506017 2N1W35 R256279 R256358 R505949
T02N R01E	28, 29, 30, 31, 32, 33, 34, 35, 36	SW; SE; NE	2N1E28 2N1E33A 2N1E28 R323351 R323354 R323358 R323355 R323355 2N1E29 R323355 R323358 2N1E29 2N1E30 2N1E30 2N1E30C 2N1E30D 2N1E30D R256325 R490506 2N1E30D	2N1E29 2N1E30D 2N1E32B 2N1E32B R323355 R323445 R496361 R521886 2N1E33A R323451 R323471 R494771 2N1E33A 2N1E34 1N1E02 1N1E02A 1N1E02B 1N1E01BC R323358 R323471
T02N R06E	NA	NA	2N6E35 In Columbia River	
T02N R12E	NA	NA	In Columbia River	
T02N R13E	20	NA	In Columbia River	
T02N R14E	31	SE	2N 14E 31 D 1400	
T03N R08E	NA	NA	In Columbia River	
T03N R09E	NA	NA	03083644030100 In Columbia River	
T03N R10E	NA	NA	In Columbia River	
T03N R11E	NA	NA	In Columbia River	
T03N R12E	NA	NA	In Columbia River	

3.2 Waterbody Name, River Mile, and HUC Information

The project area encompasses the following waterbody locations within Oregon and hydrologic unit codes (HUCs) identified in Table 3.

Table 3. Waterbody, River Mile, and HUC Information

Waterbody Name	River Mile or Lat/ Long	6th Field HUC Name	6th Field HUC (12 digit)
Columbia River	190-149; 144-105; 2	Columbia river	170701050406, 170701051105, 170701051106 170701051204 170800010801 170800010802 170800010803 170800010804 170800030200
Columbia River	180.5 - 169	Rowena Creek - CR	170701051105
Columbia River	143.5 – 142.5	Tanner Creek - CR	170800010801
Columbia River	137 - 132	Viento Creek - CR	170800010803
Columbia River	132 - 121	Latourell Creek – CR	170800010804
Columbia River	121 – 106.5	Hayden Island - CR	170900120500
Columbia Slough	9	Columbia Slough – Frontal CR	170900120201
Willamette River	3	Willamette River	170900012020

Section 4: Project Description

Part A. Summarize the overall project including work in areas both in and outside of waters or wetlands.

The following section that is inclusive of both Washington and Oregon to provide an overview of the proposed project and describes each project element as the project spans two states. However, Oregon- specific permitting elements are noted where relevant and necessary (e.g., removal-fill estimates). Supporting exhibits are located in Section 14 (Attachments); however, some illustrative figures are included in the text descriptions below.

The proposed project is a buried high-voltage direct current (HVDC) 1,100-megawatt (MW) electric transmission system interconnecting the existing Bonneville Power Administration (BPA) Big Eddy 500-kilovolt (kV) alternating current substation located near The Dalles, Oregon (Eastern Interconnection), and the existing Portland General Electric (PGE) Harborton substation in Portland, Oregon (Western Interconnection). This project would include the following components:

- Two converter stations in Oregon near the project termini that convert high-voltage alternating current (HVAC) to HVDC, and vice versa.
- HVAC transmission lines between the eastern converter station and the existing Big Eddy substation (The Dalles, Oregon) and between the western converter station and the existing Harborton substation (Portland, Oregon).
- HVDC transmission cables between the converter stations (i.e., buried cables) and associated fiber optic communications cable. The HVDC cable system has three segment types with different installation methods and slightly different configurations:
    - Underground (i.e., on land)
    - Underwater (i.e., in river, predominately below mudline)
    - Land-to-water transition or under riverbed/wetlands (i.e., horizontal directional drilling [HDD])

Table 4 outlines the major project components and notes which components affect wetlands/waters of the U.S. and/or State. Project components are described in more detail following the table. Each converter station would have approximately 1.5 acres of paved roads/buildings and approximately 3.5 acres of graveled area.

Table 4. Major Project Components

Project Component	Work relative to Wetlands/Waters
Converter Stations	No work in wetlands/waters; no direct discharges to wetland/waters from post- development stormwater management.
HVAC Transmission	No work in wetlands/waters; would use trenchless methods to install under waters including portions of the Willamette River and Columbia Slough.
HVDC Transmission	Work would occur within waters in Oregon. . Elements in the Columbia River include: • 12-inch cable bundle installation • Cable protection in select areas, if necessary, depending on installation depth • Pre- installation dredging in select areas, if necessary, to achieve installation depth. • Temporary in-river three-sided coffer dams (would not be dewatered). Work outside of wetlands/waters includes upland construction and trenchless installation under the Oregon Slough.

4.1 Converter Stations

The proposed project would include an eastern converter station on BPA property to the north of the Big Eddy substation. The western converter station would be located on Port of Portland property on N. Leadbetter Road. The western converter station is in an industrial-zoned area and the eastern converter station is in an agricultural-zoned area; both are consistent with the local zoning.

Each converter station would permanently disturb approximately 5 acres material laydown areas would temporarily disturb an additional 5 acres. The converter station sites would be predominately graveled and fenced with minimal parking and appropriate site-specific stormwater management. These converter stations would include conventionally designed transformers and protective circuit breakers and would include a control room for operating the facility as well as basic facilities for staff (bathroom/kitchen). Final design at each converter station will be in accordance with approved site plans that account for local zoning requirements. For illustrative purposes, a typical general arrangement diagram for the project converter station is shown in Figure 1.

Figure 1. Typical Converter Station Layout

4.2 HVAC Transmission

The eastern converter station would be connected to the Big Eddy substation with approximately 500 feet of overhead 500-kilovolt (kV), alternating current (AC) transmission line, which would be supported by two new lattice structures about 80 feet wide and 60 feet tall. One lattice structure would be located in the Big Eddy substation and one lattice structure would be within the eastern converter station.

The western converter station would be connected to the Harborton substation with approximately 3 miles of underground AC transmission line installed in private property and in road right-of-way (ROW) to the Willamette River edge. Approximately 0.4 mile of HVAC would be installed under the Columbia Slough and Ramsey Lakes wetland complex and approximately 0.6 mile of 230-kV HVAC transmission cables would be installed under the Willamette River. Cable in both locations would be installed using HDD. These underground HVAC segments would be installed in accordance with construction methods outlined for the on-land and land-to-water transitions, as described below.

4.3 HVDC Transmission Cable

The proposed HVDC cable is designed for a capacity of 1,100 MW, up to 400kV. Both the underground and underwater cables would feature cross-linked polyethylene (XLPE) dielectric insulation cable design and include a 1-inch fiber optic cable.

4.3.1 HVDC Underground (On Land) Transmission Cable

For the underground transmission cable, the conductor is of a compact circular design, constructed from stranded copper wires. The trench for underground HVDC transmission line would be approximately 3 feet wide by 4.5 feet deep. Within the trench, individual conduits would be spaced approximately 20 inches apart: two 8-inch conduits containing 5-inch diameter, high-voltage cables (one positive and one negative) and one 2-inch conduit containing a 1-inch fiber optic cable for communication. The conduits would be surrounded by a 6-inch-thick concrete casing. The actual cables would be pulled through the conduits after conduit installation is completed and the trench is backfilled and restored.

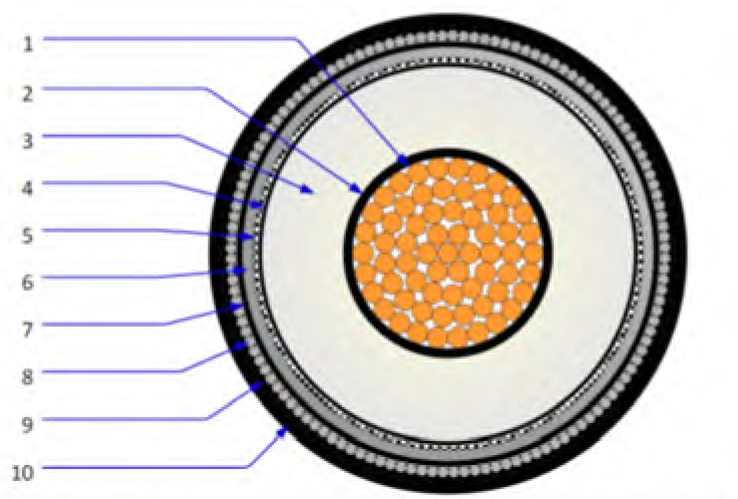
Near The Dalles, approximately 4.4 miles of underground transmission cable would be installed in a trench in road ROW from the eastern converter station to the HDD transition area, which would be approximately 650 feet from the southern edge of the Columbia River shoreline, south of Interstate 84 (I-84). In North Portland, approximately 4.2 miles of underground transmission cable would be installed from the western converter station to the HDD transition area on Hayden Island, which would be approximately 150 feet from the eastern edge of the Columbia River. There would also be approximately 7.4 miles of underground cable installed mostly under the roadbed of State Route 14 (SR 14) between Stevenson and North Bonneville, Washington, to route the transmission cables around the Bonneville Lock and Dam.

Most of the underground conduit installation would be done in road ROW, using open cut methods, but some segments would be placed via HDD or other trenchless method such as horizontal auger boring (HAB). These locations include in The Dalles area to cross U.S. Highway 197 (SR 197) and State Route 30 (SR 30), Union Pacific Railroad (UPRR) property, and I-84: and along Ash Creek Road (near Skamania, Washington) to avoid cross-slope culverts.

4.3.2 HVDC Underwater (In-River) Cable

For the in-river transmission cables, the conductor is of a compacted circular design, constructed from annealed copper wires and filled with a water-blocking material to limit water propagation in case of cable severance, as seen in Figure 2. The in-river transmission cable bundle would consist of two 6-inch-diameter, high-voltage cables and one 1-inch fiber optic cable for communication, which would be bundled together to create a 12-inch-diameter installed width. The cable bundle would be installed via hydroplow (see description below in Part C), with the exception of some installation work completed by divers at the land-to-water connections (i.e., three-sided wet cofferdams).

Figure 2. Cross Section of HVDC In-River Transmission Cable*



Item	Description
1	Conductor
2	Semi-conductive water swelling tape
3	Semi-conductive extruded layer
4	Insulation
5	Semi-conductive extruded layer + Longitudinal water penetration barrier
6	Metallic Sheath
7	Anti-corrosion sheath
8	Bedding tape
9	Armour wires
10	Serving

**Note: cable bundle includes two of these sections and a 1-inch fiber optic cable.*

The cable bundle would be installed in the bed sediments at a planned depth of 10 feet below the mudline. Where the cable bundle crosses the navigation channel prism, below Bonneville Lock and Dam, the cable bundle would be installed to a depth of at least -34 feet in Columbia River Datum (CRD), which may require installation deeper than 10 feet.

In these instances, the hydroplow can extend the installation depth to 15 feet, which is the approximate installation limit of the equipment. This limitation of the hydroplow may require pre-installation dredging to meet the -34 feet CRD requirement within the navigation channel prism (i.e., shallower than -20 feet CRD). Potential pre-installation dredging locations are shown in Section 14 (Attachments).

Pre-installation dredging would occur prior to installation and only in the areas needed to extend the hydroplow reach to the required -34 CRD. The installer would complete a geophysical survey of the proposed cable corridor leading up to the construction window, which includes bathymetric survey. The need to dredge will depend on bed elevations at that time. It is possible that less pre-installation dredging will be needed than is evaluated in this permit application.

There are some potential locations where the cable may not be able to be installed at the 10-foot depth below the mudline due to utility conflicts or potential substrate limitations. In these locations, cable protection may be used to protect the cable bundle from anchor strikes or exposure due to bed load migration. See Section 4, Part B, for discussion of cable protection.

4.4 Land-to-Water Transition

Cable transitioning between land and water would be installed via HDD. On land, temporary areas approximately 1.4 acres in size would be used to establish HDD drill entry pits and stage equipment. Temporary areas up to 0.74 acres in size would be used to receive the HDD drill and conduits. Each temporary land area for HDD entry would be positioned to minimize vegetation removal and sensitive resources.

In water, a temporary in-water isolation area (three-sided wet cofferdam) of 70 feet by 300 feet would be required. This would be a three-sided isolation area formed by sheet pile, which would not be dewatered. The purpose of the cofferdam is to provide protection for divers from currents and debris while working and minimize turbidity changes in adjacent areas. Bed material would be removed via clamshell to afford a uniform workspace for divers and equipment to install the submarine cables and accumulate the cables into the hydroplow for launching down the river. Material disposal will be done in consultation with the U.S. Army Corps of Engineers (USACE) Section 408 program and the Portland Sediment Evaluation Team (PSET) which is a cross agency team that evaluates sediment quality for dredging in the Columbia River.

Exhibits in Section 14-Attachments show the locations of the land-to-water transitions, including the on-land and in-water portions for each location. The land-side HDD areas were sited to avoid woody riparian vegetation and provide distance from riverbank upland ranges from 100 to 750 feet. On the water side of the transition, the distance of the cofferdam to the riverbank ranges from 500 to 750 feet into the river.

4.5 Decommissioning

While the cable’s estimated useful life is 50 years, the lifespan of existing, installed cables is typically longer. Cable decommissioning (i.e., removal and/or abandonment) will comply with USACE permit conditions, as well as the Oregon Department of Energy (ODOE), Energy Facility Siting Council (OR EFSC) requirements. The cable would be removed from the riverbed, leaving the affected area, as much as possible, in the same condition as it was prior to cable removal. Or, if resource and regulatory agencies prefer, the cable could remain in place.

Part B. Describe work within waters and wetlands.

4.6 Waters (Columbia River)

The in-water work consists of installing a cable bundle and related actions within the bed of the Columbia River. Cables in individual conduits are also proposed for installation under the bed of the Willamette River, Oregon Slough, and Columbia Slough via HDD. Work within waters of the U.S. includes:

- 77.8 miles of a 12-inch HVDC cable bundle buried in the bed of the Columbia River. Of this distance, 46.2 miles would be within Oregon.
- Cable protection, consisting of rock or articulated concrete blocks, where the cable might be buried less than 5 feet depth. The footprint would be up to 8 feet wide over a total combined length of up to 2.4 miles.

To support installation, the project would require the following:

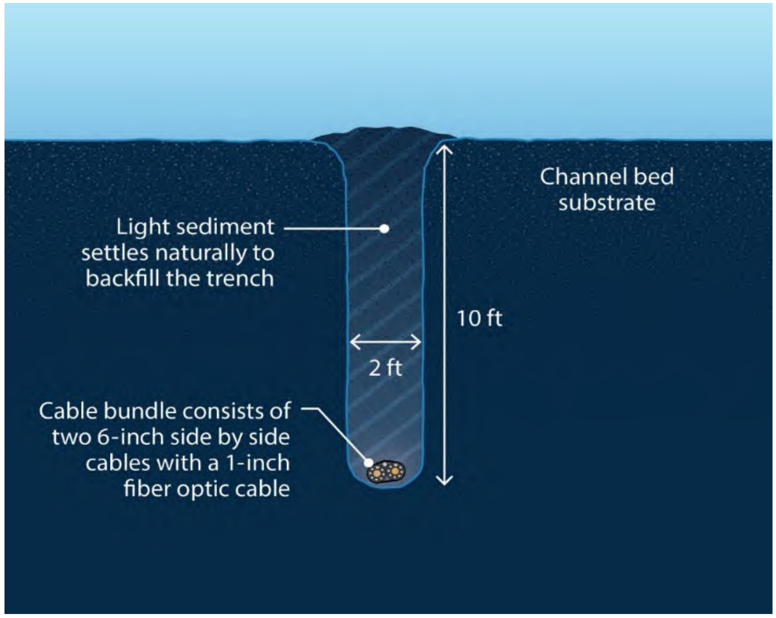
- Four temporary land-to-water transition areas that facilitate cable transition from uplands to the water. Two of the four coffer dams would be located in Oregon. Three-sided wet cofferdams (70 feet by 300 feet) would be used to isolate the work area and riverbed totaling up to 32,644 cubic yards, 16,500 cubic yards in Oregon, would be removed from inside the wet cofferdam. The proposal is to either haul or stockpile on a barge to side cast channel substrate adjacent to the cofferdams.
- Pre- installation dredging of material over a length of 1,650 linear feet and 24 feet wide to facilitate required depths of cable installation in the navigation channel prism. Pre-dredging areas would be in Oregon. This material would be side cast into the channel, outside the navigation channel prism.
- Eight geotechnical borings totaling 48 cubic yards removal for off-site sampling and analysis, four of which would be in Oregon.

4.6.1 HVDC Cable Bundle

A 12-inch HVDC cable bundle would be plowed in the bed of the Columbia River from approximately The Dalles to Portland, Oregon, except for routing on land near Stevenson, Washington, to avoid Bonneville Lock and Dam and fish bypass, Bradford Island Superfund Site, and Treaty fishing in-lieu sites. The proposed cable route has been sited in the mid-river area in, or adjacent to, the Federal Navigation Channel to avoid vegetated and near shore areas.

The cable would be installed at a depth of 10 feet for most of the project alignment. Installation could be up to 15 feet deep in the Federal Navigation Channel prism, where this depth is required to meet the USACE requirement of installation below -34 CRD. The cable would also be less than 10 feet deep in some locations where the cable bundle must avoid other utilities within the Columbia River and where there may be shallow sediment cover (i.e., up to 2.4 miles of the in-water alignment). Figure 3 shows a section of the cable bundle at a 10-foot depth.

Figure 3. Section showing cable bundle at 10-foot depth



4.6.2 Cable Protection

Cable protection may be needed where the cable bundle would be shallower than 5 feet. Cable protection will not be used unless essential. The need for cable protection would be verified after completion of the geophysical survey, prior to construction. Exhibits in Section 14 (Attachments) identify the potential location of cable protections, which is also summarized below.

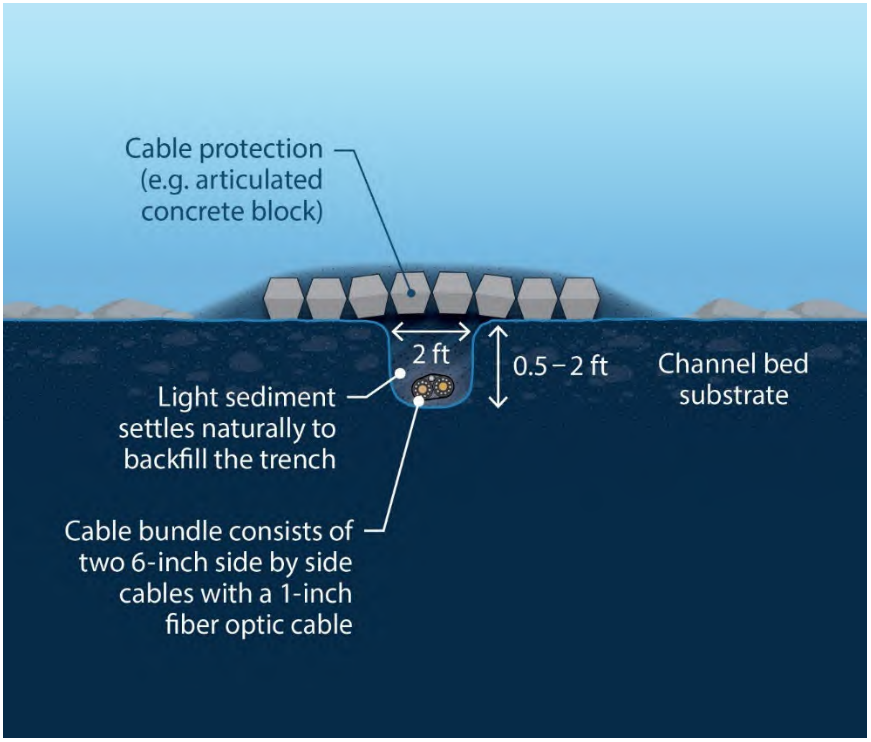
Table 5. Potential Cable Protection Locations

River Mile	Total Length	Comments
187 to 189	4,875	Deep section of river with bathymetric and sub-bottom profile soundings indications of rocky river bottom
186 to 187	1,925	Deep section of river with bathymetric indications of steeper banks and potentially rocky river bottom.
177	2,000	Deep section of river with bathymetric indications of steeper banks and potentially rocky river bottom.
121.5	300 feet (0.06 mile)	Known utility crossing of two, 20- inch gas pipelines
120 to 121	3,500 feet	Section of river with bathymetric and sub-bottom profile soundings indications of shallow consolidated material
Total Length/Area	2.4 miles/2.4 acre	--

Between river miles (RM) 185.8 and 188.7, there may not be adequate substrate depth because the channel substrate consists of bedrock or other large boulders. In this scenario, the cable protection would mirror the existing substrate type and function. Figure 4 shows the cable bundle at varying depths along with cable protection examples.

Cable protection methods would consist of either articulated concrete blocks or hydraulically stable rock. Drawings (Section 14-Attachments) show where cable protection might be needed along with the proposed cable route and Federal Navigation Channel. Prior to installation, the contractor will be required to do detailed soundings to identify existing utilities and confirm installation slopes and substrates.

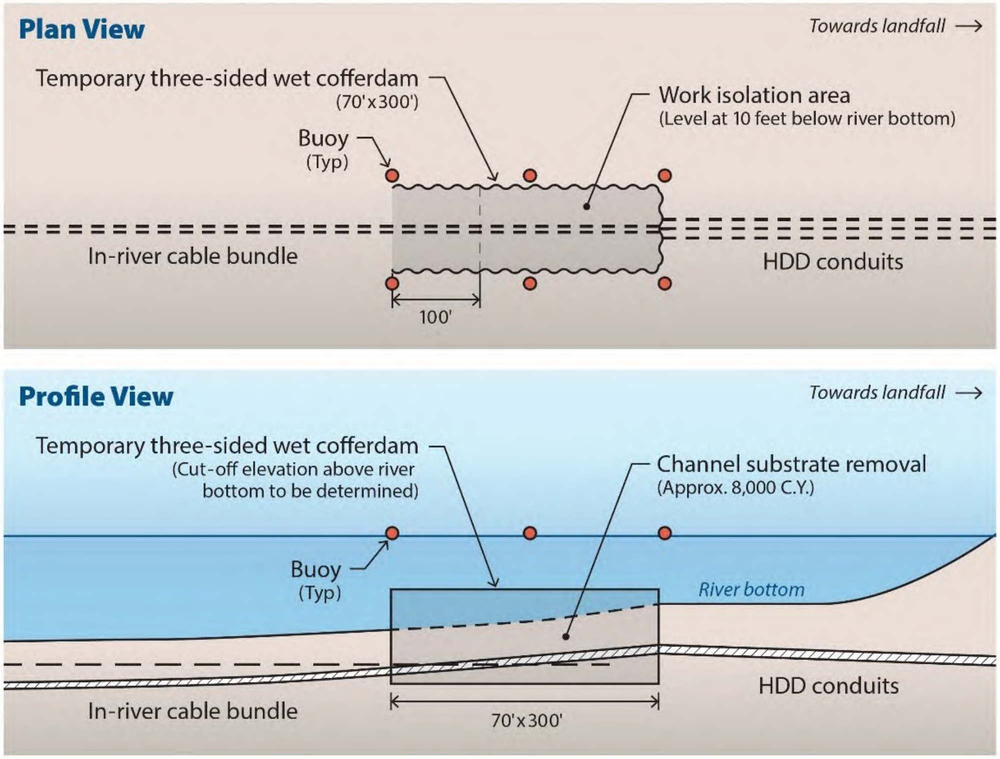
Figure 4. Illustrative section showing cable bundle at 2 feet depth with cable protection



4.6.3 Land-to-Water Transition (Water Side)

There would be a total of four in-river transition areas, two in Oregon. On the water side of the transitions, the work area would be 70 feet by 300 feet. Work isolation methods (e.g., sheet pile) would be used to contain sediment and protect the work area. The isolation methods would be set up as a “U,” and the work area would remain “wet” throughout the construction process (see Figure 5). Divers would guide the ends of the in-water cables into pre-installed conduits; these would be pulled through the conduits into the land side transition areas for jointing to the land-based cables. The approximate depth below the channel bed surface that would require excavation is 10 feet.

Figure 5. Three-sided Cofferdam Plan and profile



4.6.4 Pre-Installation Dredging

The USACE requires that the cable bundle be installed to a minimum depth of -34 CRD (top of bundle) in and/or proximal to the Federal Navigation Channel. The hydroplow can install to a depth of approximately 15 feet; therefore, some pre-installation dredging may be needed to allow the hydroplow to reach USACE required depths.

This would occur in limited areas within the navigation channel or immediate buffer area. The pre-installation dredging volumes have been included as a placeholder since bedloads and channel maintenance schedules may change between permit submittal and proposed construction. The contractor would survey the bathymetry prior to construction and confirm depths and needed pre-dredging if any.

The locations with the highest potential for pre- installation dredging location are shown in the Plan View Exhibits (in Section 14-Attachments). These are located near the Interstate 205 bridge and Government Island, in Oregon.

4.6.5 HVAC and HVDC HDD

Cables will be installed via HDD below the Willamette River (HVAC), Columbia Slough (HVAC), and Oregon Slough (HVDC). There would be two bores at each HDD location. For HVAC technology, there would be three cables in each bore, each in its own conduit. For HVDC technology, there would be one conduit per bore with one cable in each conduit. In addition, one fiber optic cable/conduit would be installed in each bore.

Exhibits in Section 14 (Attachments) show the location of the HDD entry and exit pits and a typical section of the conduit installation for the HVAC lines. The shoreline setback and depth would avoid disturbing the bed or banks of the Willamette River, including remediation areas associated with the Portland Harbor Superfund site. The bore pits would be set back approximately 200 feet from the Willamette River shoreline.

These cables would be installed at a minimum elevation of -45 feet CRD under the bottom of the Willamette River. This depth is below the USACE navigation channel authorized depth of -40 feet CRD and would avoid disturbing sediment within the Portland Harbor Superfund Site action areas.

The cables would also be installed at a depth below the bottoms of the Columbia Slough, Oregon Slough, and Ramsey Lake to avoid sediment disturbance or upwelling. An inadvertent return (i.e., frac-out) plan will be developed to monitor and manage drilling fluids prior to construction. Drilling fluids are mostly water, but can have additives that help stabilize the bore, such as bentonite, an absorbent clay or soda ash.

4.7 Wetlands

All work on land (i.e., converter stations, transmission elements, HDD pits) outside the Columbia River, would not result in permanent impacts to wetlands, waters, and vegetated riparian areas. To the extent practicable, all work has been sited within paved and/or previously disturbed areas (e.g., roadway right of ways) or in locations with limited vegetation (e.g., graveled areas). Erosion control, drilling fluids, and construction and post-development stormwater runoff will be managed to avoid and/or minimize the potential for discharge into waters of the U.S./State. There will be no wetland impact in Oregon.

Part C. Construction Methods. Describe how the removal and/or fill activities will be accomplished to minimize impacts to waters and wetlands.

The following section outlines the construction methods for each major project component. Table 7 summarizes the construction avoidance and minimization efforts. Additional information regarding construction methods and actions follows.

Table 6. Efforts to Minimize Impacts in Wetlands/Waters

Project Component	Wetland and Water Avoidance and Minimization
Converter Stations	No work in wetlands/waters or direct discharge to wetlands or waters. Project will obtain and adhere to erosion control permits and provide natural treatment of stormwater via infiltration trench.
HVAC Transmission	No direct work in wetlands/waters; Waters have been avoided through use of trenchless methods to install under Willamette River and Columbia Slough. Project will minimize the potential for discharges to waters by: • Obtaining and complying with erosion control permit. • Preparation and adherence of a plan for inadvertent loss of drilling fluids. • Using existing roads and cleared areas and siting HDD laydown areas outside woody riparian areas, to shorten restoration recovery. • Restoring site post construction to match or improve pre-construction vegetation.
HVDC Transmission	There would be temporary disturbance to waters associated with installation of the cable and permanent fill associated with the cable and cable protection. The project will avoid and minimize wetland and water effects through: • Siting the cable in or adjacent to the navigation channel of the Columbia River, avoiding the more ecologically productive near shore and shallow area habitats. • Siting the cable to minimize work in historic shorelines (i.e., areas inundated by the dams), that may have a higher potential for cultural resources. • Siting the cable in paved areas (e.g., Ash Creek Road, SR-14) and using HDD to minimize wetland impacts. • Using HDD to transition from land to water segments, avoiding disturbance to riparian upland areas. • Using HDD under the Oregon Slough. • Preparation of and adherence to a plan for inadvertent loss of drilling fluids. • Ongoing sediment and water quality monitoring during construction. Adjusting installation methods as needed to meet standards. • Installation during the prescribed in-water work window when fish use is lower. • Placement of HDD areas to minimize temporary disturbance to wetlands areas with woody vegetation. • Undertaking a sediment characterization to inform sediment transport and disposal approach.

4.8 Converter Stations

Converter stations would be constructed over a 2-year period. Both sites are located in open, undeveloped areas. The erosion prevention and sediment control will meet the Oregon Department of Environmental Quality (ODEQ) requirements for 1200-C and receive permit authorization prior to construction. On both sites, the stormwater management approach is to use natural drainage practices and infiltrate the stormwater. There would be no direct discharges of stormwater to waters or wetlands during construction or long term operation.

4.9 Underwater (in-river) HVDC Transmission

The Applicant will undertake activities during construction to minimize effects to the Columbia River during these activities. Construction activities are described below. All construction activities would be completed within the agreed to in-water work window.

4.9.1 Pre-Installation Activities

Prior to cable laying, the following activities would occur to verify conditions and minimize impacts for operations. The installer would be required to survey the entire cable route to identify pre-project bathymetric contours and conduct soundings to identify any utility conflicts or other anomalies that may affect construction. The contractor would finalize the installation plan to include areas of pre-installation dredging and cable protection needed (if any). Adjustments in the final route may be made to avoid large channel features, such as rock outcrops or buried immoveable features.

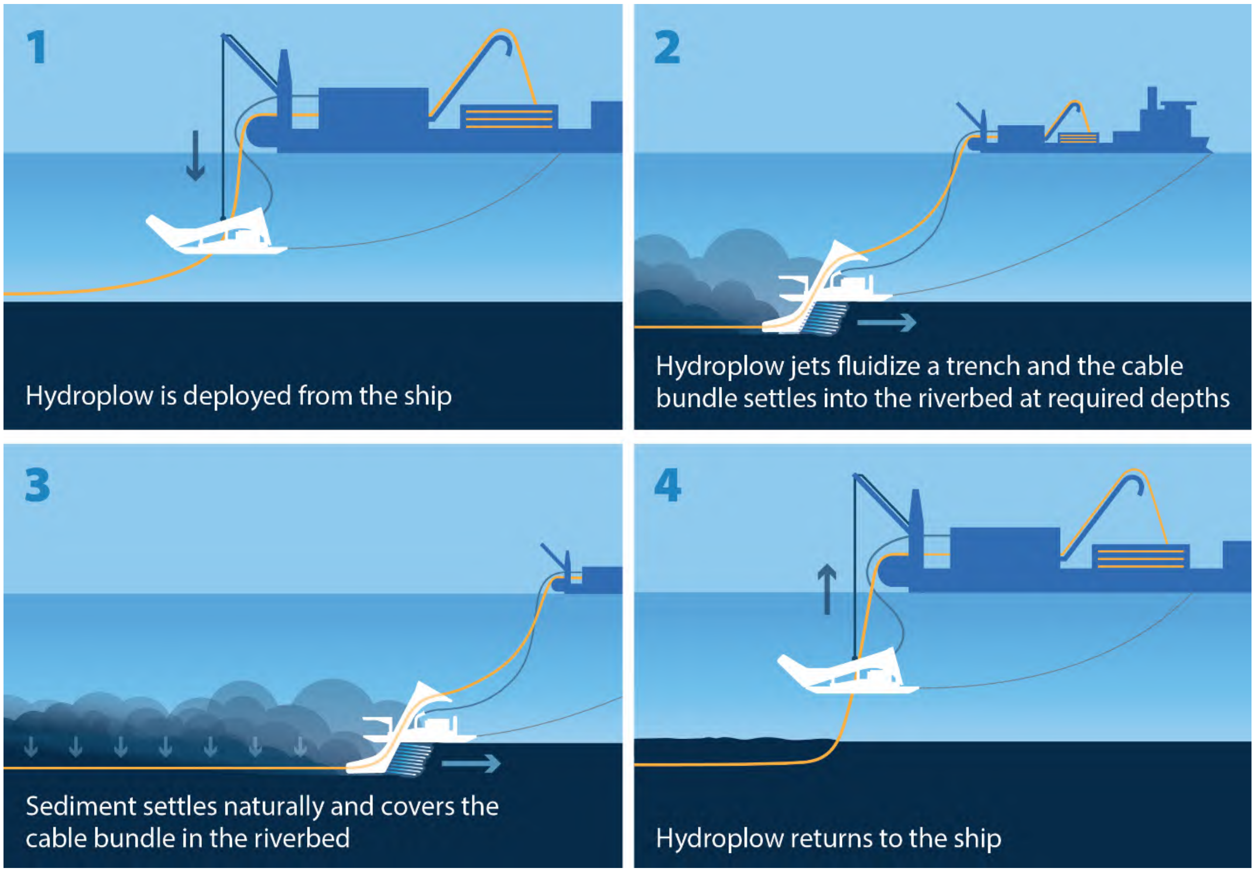
The installer would then conduct pre-installation dredging, as necessary, approximately 2 to 4 weeks before cable installation. This would be completed by a vessel separate from the cable-laying vessel via clamshell dredging. Material would be disposed of in accordance with USACE direction via their Section 408 program and in consultation with the PSET. This would likely be in-water disposal given the low quantity of anticipated dredge volume and sediment quality (i.e., low risk for contamination).

At designated sites along the cable route, a pre-installation grapnel run may be conducted to confirm that there are no obstructions present for cable installation. The pre-installation grapnel run is designed as a single pass along the center line of the installation route and would penetrate the riverbed at a depth of 0.5 to 1.6 feet and a width of 3 to 7 inches. The grapnel would be towed behind the vessel along the seabed and the grapnel pull resistance would be monitored throughout the towing operation. This initial survey is aimed at identifying any stray surface-lying lines/wires or other obstructions that are located within the cable installation corridor.

4.9.2 Cable-Laying and Burial Operations

Following the pre-installation dredging and grapnel run, the cable-laying vessel would begin the cable-laying process. Cable installation does not need to occur in a single continuous method. Different segments can be installed and spliced together if needed to manage installation logistics. Figure 7 depicts the anticipated cable sequence.

Figure 6. Hydroplow Installation Overview



The Applicant has allotted two in-water work seasons to complete the installation to accommodate in-water work windows and to minimize effects to aquatic resources, specifically listed and non-listed fish species. The cable is estimated to be installed at a rate of approximately 1 mile per day. However, there may be some down time due to weather, vessel maintenance, or other unforeseen events.

The cables would be laid and backfilled simultaneously using a hydroplow. The hydroplow fluidizes the channel bottom along the cable installation path to obtain the predetermined depth. When all the appropriate connections are secured, the on-board crane would lift the hydroplow from the deck of the cable-laying vessel and place it on the riverbed in the cofferdam. A team of divers would disconnect the crane from the hydroplow and engage the cable bundle into the machine itself. The machine would then be ready to start cable burial activities.

Cable installation activities begin when towing tension is applied to the hydroplow from the cable-laying vessel. At this time, the water jets would be activated, and the cable burial operation would commence. The cable laying vessel would move along the cable route as the cables are paid out and simultaneously buried by hydroplow in the 24-inch wide trench. During cable laying and burial operations, the vessel would use either dynamic positioning propulsion or anchors to steady the position.

As the cable operations are underway, the HVDC cables and fiber optic lines would be conveyed from turntables into a wrapping machine on board the vessel, which would secure the three cables into a bundle configuration. During this step, approximately 3-foot strips of polypropylene would be wound around the cables. Then, the cables would be fed off the rear of the vessel and down into the hydroplow for laying and burial. Cable laying activities are constantly monitored by operators and adjusted in order to confirm the cable is being installed correctly. Vessel speed, hydroplow water pressures, and cable instillation depth and speed are some of the tasks coordinated by the on-board computer and operator during the installation process.

Cable vessel movement along the route during installation will be monitored using a differential global positioning system (DGPS), providing vessel position. The position of the hydroplow on the riverbed would be determined by the vessel's hydroacoustic positioning system. A marine surveyor will be on-board to confirm cable positioning and produce as-built data.

The day-to-day installation schedule will be coordinated with other maritime activities and the United States Coast Guard at regularly scheduled project meetings. Planned installation and construction sequencing is intended to maintain the safe movement of commercial and recreation traffic along the cable route and minimize the disturbance and impact due to Federal Navigation Channel maintenance.

4.9.3 Post-Installation

A post-installation cable inspection would be conducted following cable installation, and include, if necessary, additional bathymetric, side-scan sonar and magnetometer surveys. The post-installation survey would be conducted to establish baseline conditions concerning cable location, the approximate depth below the riverbed of the cable, and post-installation bathymetry along the cable route. Actual cable burial depth and location would have been established by a system mounted on the hydroplow and transmitted in real time during installation.

The cable does not require active maintenance. In the rare event an incident occurs that affects the cable, work will be conducted according to appliable requirements and regulations.

4.10 Suspended Sediment and Water Quality Monitoring

Turbidity monitoring will be conducted prior to and during hydroplow cable installation operations. The monitoring will characterize the effect of sediment disturbance on the overlying water column and provide information for operational refinements that could minimize the amount and extent of sediment suspension during cable-laying to the extent practicable. Should turbidity exceed background beyond the permit allowance (assumed 4 hours), operations can be slowed and/or jet force adjusted to address elevated turbidity.

Monitoring will focus on defining the extent of the suspended sediment plume associated with sediment disturbance. This will be accomplished using a combination of real-time instrumentation and laboratory analysis of water samples as follows:

1. Periodic turbidity profiling measurements using in situ optical backscatter (OBS) monitoring equipment;
2. Continuous in situ acoustical backscatter monitoring for suspended sediment using an acoustic Doppler current profiler (ADCP);
3. Grab sample collection for laboratory analysis of total suspended solids (TSS);

4. Periodic temperature profiling measurements using conductivity, temperature, and depth (CTD) equipment; and
5. Concurrent time and positional information using a DGPS.

The OBS and ADCP backscatter data (1 and 2 above) will be used in conjunction with the grab samples for TSS to afford wide spatial and temporal coverage of the anticipated suspended sediment plume in near real-time. Vertical profiling of temperature will provide information on ambient conditions that may contribute to plume dynamics. Data will include time and positional information from the shipboard DGPS system (5).

Results of the pre-installation trials will be summarized and the findings and recommendations for procedures to be implemented during cable burial and associated monitoring will be provided upon request.

Suspended sediments and turbidity will be monitored along transects positioned perpendicular to the axis of the expected plume and located down-current of cable burial operations. Exact monitoring locations would vary but will be selected so that the three transects relative to the cable-burial operations fully enclose the sediment plume. Previous surveys of similar operations suggest that 200 feet, 500 feet, and 800 feet down-current would provide adequate coverage; these distances will be used initially.

The length of each transect would vary (primarily determined by current velocity); however, each transect will be of sufficient length to establish the spatial extent (boundaries) of the plume. Each sampling location will include the collection of three water samples for laboratory TSS measurement: one from 18 inches below the surface, one at mid-depth, and one 3 feet above the bottom. Vertical profiles of turbidity and water temperature will be measured at each sampling location as well. Turbidity will be measured in nephelometric turbidity units (NTU) using an OBS instrument. These measurements will then be correlated to suspended sediment concentrations (milligrams per liter) based on field calibrations and TSS/ turbidity correlations obtained during previous monitoring efforts.

The OBS instrument will be attached to the CTD so that a single instrument cluster will be lowered through the water column for each sampling location. Background suspended sediments and turbidity monitoring will be conducted throughout the cable burial operations outside the area of the expected plume (approximately 500 feet upstream or adjacent to cable burial operations depending on tidal conditions) for comparison purposes.

Backscatter data from the ADCP would be compared to simultaneous TSS and turbidity measurements to determine the relationship between acoustical backscatter and suspended sediment, as well as the error associated with this relationship. ADCP data will be correlated to TSS and/or turbidity based on the relationship developed from the field measurements and laboratory analysis to create an uninterrupted profile across each section of the sediment plume traversed during water quality monitoring. Water temperature and salinity data will be used to calculate speed of sound to improve acoustical backscatter results. Water samples collected for TSS measurement will be transferred for analytical analysis 24 to 48 hours following collection. The total turnaround time, including laboratory analysis, data entry, and data processing, is expected to take 4 to 6 days. It is anticipated that gross sediment characteristics (grain size distribution, sediment type, etc.) over the permitted cable route would not vary substantially over a 3-day period of cable installation. Thus, TSS results on the fourth day will be used to guide the monitoring crew interpreting real-time acoustical and optical backscatter data. Field activities during the first 3 to 4 days would be guided by backscatter correlations developed during pre-trial installation trials. Estimates of volumetric plume extent for each day will be provided following completion of cable burial activities.

4.11 Land-to-Water Transition

A three-sided isolation area (wet cofferdam) would be installed on the water side of the land-to-water transition area consisting of sheet pile (Section 14-Attachments). The locations of the cofferdams were placed to avoid near shore habitats and vegetation. The intent of the isolation area is to protect divers from currents and other debris while working and minimize turbidity in adjacent areas. The isolation area would not be dewatered. The sediment within the isolation area would be removed to the depth needed to bury the cable at the location (i.e., 5 to 10 feet). The material in the isolation area would be removed as determined in consultation with the PSET and sediment sampling. Options could include side cast, removal, and/or beneficial reuse.

4.12 Horizontal Directional Drilling

HDD is proposed to avoid disturbance to the Willamette River, Columbia Slough, and the North Portland Harbor channel area by Hayden Island (Oregon Slough). HDD is also an approved method of crossing railroad tracks. HDD is proposed to avoid disturbing lands or key infrastructure. All HDD areas would occur outside of wetlands, waters, and vegetated riparian areas. Inadvertent return of drilling fluids (i.e., frac-out) will be managed to avoid and/or minimize the potential for discharge into waters of the U.S., as outlined below. HDD pits along with other on-land work will be restored to pre-project conditions.

4.13 Underground (on-land) HVAC and HVDC Transmission

The Applicant has minimized effects to wetlands and waters associated with on-land work by predominately locating cables in paved areas, gravel roads and road shoulders, and upland areas previously cleared (i.e., grassy/non-woody vegetation). In addition, other adjacent disturbed upland areas would be used for equipment laydown and material stockpiling. Where water crossings are needed, HDD will be used to avoid stream and wetland disturbance of the Willamette River, Oregon Slough, Columbia Slough.

Prior to construction, photo documentation of the disturbed areas will be collected to aid in the site restoration to pre-construction conditions. Traffic control plans would be developed for work adjacent to active roadways and/or that may require road closure. Erosion prevention and sediment control plans will be prepared, and erosion prevention and sediment control permits will be secured from the appropriate agencies in Oregon prior to beginning construction activities. Erosion prevention and sediment control will minimize the likelihood of discharges to waters and wetlands proximal to the work and minimize water quality and related affects during work in the waterbody.

Part D. Describe source of fill material and disposal locations if known.

Disposal would be required for up to 4,500 cubic yards of pre-installation dredge materials in the area downstream of Bonneville Lock and Dam and up to 16,322 cubic yards of removal from the wet cofferdams located near Hayden Island downstream of Bonneville Lock and Dam.

As part of site characterization, sediment sampling was conducted in the Columbia River in November 2024, based on a Sediment and Analysis Plan approved by the USACE PSET. Sediments were screened for 10 metals, total petroleum hydrocarbons (diesel range organics / residual range organics), and total volatile solids.

The sediment analysis identified the sediments as primarily course, heavy sand and sediment modeling shows the sand is not expected to drift or stay suspended in the water column. In addition, laboratory analysis results show that the sediment samples do not contain contaminants above established thresholds. PSET classified the project locations as 'Very Low' rank based on project sampling and other data sources. Based on the "Very Low" management area rank and suitability of the overlying dredge prism sediments, the PSET infers that the dredge prism material is suitable for unconfined, aquatic placement and that the post-dredge surfaces are suitable for unconfined, aquatic exposure per the Sediment Evaluation Framework guidance without further testing.

This indicates that the hydroplow activity will have minimal impacts to water quality in the Columbia River. The Project was sited to avoid known contaminated sites; therefore, temporary or permanent changes to toxic compounds or concentrations within the Columbia River are not expected.

Permanent fill material would consist of the HVDC cable materials and cable protection (i.e., stone or articulated concrete blocks). Temporary fill would include sheet piles. All materials would be sourced from manufacturing and/or permitted sources (i.e., quarries).

Part E. Construction timeline.

The start of commercial operation is targeted for late 2031, though the Applicant would try to bring the facility online earlier, if achievable. The converter stations would be built at the same time as the transmission line and would take approximately 4 years. The underground portion of the transmission line would take approximately 6 months and then approximately 6 months for the in-river installation. Applicant would plan to work over two winter in-water work windows: 2028/2029 and 2029/2030.

The proposed in-water work windows are November 1 through February 28, for the reach below Bonneville Lock and Dam, and November 1 through March 15 for the reach above Bonneville Lock and Dam. These proposed construction windows will avoid peak uses by fish and other aquatic organisms in the river. The Applicant is proposing to undertake construction on Hayden Island between September 1 and December 31 to minimize disturbance to nesting bald eagles in the vicinity. The exception to this proposed Hayden Island timing would be for the HDD area adjacent to the railroad bridge. Access to this area would be needed to accommodate the in-water work associated with this land-to-water transition.

Section 5. Purpose and Need

The energy landscape of the Pacific Northwest region is rapidly changing in response to large coal-fired power plant retirements, state and municipal decarbonization public policy, and regional trends such as population growth, new energy-intensive industries[1], and vehicle electrification.[2] These changes are resulting in increased energy demands in population centers, renewable development, and a need for reliable transmission capacity[3] between the energy generation and end users.

To illustrate, Portland General Electric's (PGE) most recent 2023 Clean Energy Plan and Integrated Resource Plan (2023 CEP-IRP; 2023), which was acknowledged by the Public Utility Commission of Oregon in April 2024, projected an increasing progression of additional net needs to meet demand: 1,136 megawatts (MW) by 2030, 1,647 MW by 2035, and 4,173 MW by 2040. Most notably, these energy needs reflect the outcome of PGE's "Preferred Portfolio," which considers increased energy conservation, demand-side management, distributed energy (e.g., rooftop solar), and community-based renewables.

In Washington, Puget Sound Energy (PSE) has identified 3,200 MW of wind and solar resources needed by 2030, of which 2,800 MW are located east of the Cascades and will require transmission to western load centers (PSE 2023). PSE held a Resource Planning Advisory Group Meeting in February 2025 to discuss local and regional transmission needs, among other items. In this meeting, PSE identified a transmission need of 4,497 MW by 2035 as "[t]transmission across the region is significantly constrained" and "[a]dditional Cross-Cascades capacity is critical first step to deliver clean energy to PSE."[4]

According to the 2024 update to the Pacific Northwest Utilities Conference Committee's (PNUCC) Northwest Regional Forecast, there is

> *"…more momentum for the surge in demand for electricity in the Pacific Northwest. The increase is attributed to factors such as data center development, hightech manufacturing growth and the continued trend toward electrification. The Forecast projects electricity consumption could increase from about 23,700 average megawatts (aMW) in 2024 to about 31,100 aMW in 2033 (an increase of 7,400 aMW), which is an increase in demand of over 30% in the next 10 years…An increase of 7,400 aMW is equivalent to having to meet the electricity demand of about seven cities the size of Seattle. The dual challenge of extraordinary growth in consumption and the transition to lower carbon-emitting generation resources translates to a tremendous and urgent need to upgrade the region's electricity infrastructure – including expanding transmission capacity and diversifying power supplies as well as accelerating the adoption of advanced grid technologies."*

[1] Portland Business Journal (May 1, 2024) Intel Expansion Will Create Major Energy Demand – Oregon Business

[2] PNNL (July 23,2020) Electric Vehicles at Scale Phase 1 analysis: DOE_EV-GRID_IMPACTS_final.docx (pnnl.gov)

[3] U.S. Department of Energy (October 2023). National Transmission Needs Study (energy.gov)

[4] PSE Resource Planning Advisory Group Meeting (February 2025). https://irp.cdn-website.com/dc0dca78/files/uploaded/2025_0227_RPAGMeeting_Final-f626b91c.pdf

At the same time as there are increased energy demands, Oregon and Washington have enacted strong mandates for decarbonization, including the following:

- Washington's Clean Energy Transformation Act (CETA), enacted in 2019, requires all state utilities to eliminate coal-fired generation by 2025, become "greenhouse gas neutral" (i.e., no additional production of greenhouse gases) by 2030, and achieve 100 percent generation using non-emitting renewables by 2045.
- Oregon's House Bill (HB) 2021, enacted in 2021, requires major utilities to reduce greenhouse gas emissions by 80 percent by 2030, 90 percent by 2035, and 100 percent by 2040, and prohibits site certification for new fossil fuel generation or amendments to existing site certificates to allow net increase in emissions.

To comply with CETA (Washington) and HB 2021 (Oregon), a combination of utility-scale renewable generation (e.g., photovoltaic solar and wind), demand reduction strategies and small-scale solutions (e.g., rooftop solar and biogas), will be required. Generally, large-scale, cost-effective renewable energy projects are developed east of the Cascade Mountains because there is higher wind and solar resource quality (i.e., stronger, more consistent winds and sunshine) and land availability.

As of April 1, 2024, there are over 95,000 MW of renewable energy projects in development requesting grid interconnection on BPA's transmission system east of the Cascade Mountain range, compared to approximately 8,000 MW west of the Cascades. While the interconnection queue does not predict that this quantity of renewable generation can, will, or even should be built, it demonstrates the abundance of potential development opportunities east of the Cascades compared to the west.

These potential resources are stranded due to transmission constraints that exist on BPA's system east to west over the Cascade Mountain Range. BPA's 2023 Transmission System Expansion Plan (TSEP) noted that 13 different transmission upgrades on the existing system would be required to deliver 50 MW of additional capacity between BPA's Big Eddy substation and the PGE service territory (BPA 2023). These upgrades include overhead transmission line upgrades with timelines that stretch up to 2038 to complete. These collective upgrades would contribute to only 12 percent of the 2040 net need identified by PGE.

To serve their load centers located west of the Cascades, PGE, PSE, and other electric utility companies rely heavily on East-to-West BPA Transmission Rights on the Cross Cascades North and Cross Cascades South flowgates[5], which PGE has identified as "seasonally constrained" (i.e., constraints are most acute during peak demand periods that occur when ambient temperatures are above or below normal) as far back as its 2019 IRP. These constraints have increased notably over the past 5 years.

Available transmission capacity on BPA's system fluctuates as new generation and transmission interconnection applications are submitted, existing requests are terminated, and system upgrades are built. BPA periodically publishes a Transmission Long-Term Original Inventory Map that can be

[5] A "flowgate" represents a critical point or section on the transmission network where the flow of electricity is monitored and sometimes limited to ensure the system stays reliable. A flowgate is an identified spot, often a group of transmission lines, where the power transfer capacity is tracked, and system operators adjust power flows or take other measures to avoid overloading the grid.

used by prospective transmission customers to see the potential impacts of transmission service requests on BPA's internal transmission system and available transmission capacity on various parts of the BPA system. As of the last update of this file (May 16, 2024), there is *negative*[6] 2,294 MW of available transmission capacity identified on the Cross Cascade South flowgate, which is used to monitor transmission flows into the greater Portland area and roughly corresponds to the project's route from Big Eddy to Harborton. On January 27, 2022, there was negative 210 MW capacity, showing that this transmission deficiency continues to grow.

Additionally, there is *negative* 2,933 MW of available transmission capacity on the North of Pearl flowgate, which monitors south to north transmission flows into Portland metro load areas that are experiencing particularly high levels of demand growth. These two BPA transmission paths are the two most constrained across the BPA internal system, using this mapping analysis.

These BPA transmission paths are essential to customers beyond the Portland area. As BPA documented in their 2023 TSEP report, transmission requests from planned resources east of the Cascade Mountains to PSE in Seattle required multiple transmission upgrades, including throughout the Willamette Valley and on the North of Pearl transmission path, to be completed to grant delivery service to PSE. The timelines for some of these transmission projects, as noted for the transmission request to serve Portland above, stretch into the late 2030s and require new bulk overhead transmission.

All of Oregon and Washington's Cross Cascade high-voltage transmission is overhead and concentrated in a few transmission corridors that run through areas of extreme wildfire risk. For example, a single transmission corridor that runs over the Cascades from the Big Eddy substation to the Portland metro area (an electric path similar to the project, including the same terminal at Big Eddy) includes the Big Eddy – Ostrander 500kV, Big Eddy – Parkdale 230kV, Big Eddy – Chemawa 230kV and Big Eddy – McLoughlin 230kV lines. All of these lines could be affected by a single, local extreme weather event. Overhead lines are more susceptible to hazards such as wind, ice, snow, and wildfire. There is a need to increase transmission reliability both in the number of flow paths and limit the potential for natural hazards to cause outages.

The purpose of the project is to develop a controllable HVDC underground transmission facility that will facilitate the reliable and cost-effective transfer of up to 1,100 MW of renewable energy from east of the Cascades to energy load centers located west of the Cascades in Oregon and Washington. The project will facilitate the transfer of electricity, improve availability, and diversify the electric energy supply portfolio for the Pacific Northwest. Reliability is defined as the ability to provide dependable transmission over the50-year lifecycle, including the ability to withstand natural hazards and events, such as wildfire, landslides, ice storms, etc.

The project will support Washington and Oregon in meeting their renewable energy public policy requirements enacted by legislation (CETA in Washington, and HB 2021 in Oregon) while

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[6] BPA's estimates of available transmission capacity are forward-looking representations that combine, among other things, estimates of near-term future peak demand (load) and requests for transmission capacity from generators (such as solar and wind project developers). A positive number means that BPA foresees sufficient transmission capacity at a given flowgate to accommodate supply and demand. A negative number means there is insufficient capacity. Since demand varies daily and seasonally, a negative number may but does not necessarily mean a current constraint on electricity supply; rather, a negative number suggests the likelihood of supply curtailments during high peak periods.

maintaining and enhancing electric transmission system reliability and resiliency. While the project intends to meet a variety of needs, it would not facilitate the transmission of renewable energy from a specific generation facility or group of facilities; rather, it would help support and enhance regional electric transmission infrastructure as a whole.

Transmission power flow studies conducted by the project team indicate that the project provides approximately 50 percent relief to North of Pearl and approximately 75 percent relief to Cross Cascade South transmission flows (i.e., the project would provide approximately 550 MW of relief to North of Pearl and 825 MW of relief to Cross Cascade South). The project would provide material relief to the most pressing BPA transmission constraints unlocking new renewable energy projects that are needed to meet public policy and maintain reliability.

With the passing of these clean energy goals for electric utilities and insufficient long-term transmission capacity across the Cascade Mountain Range, the project would address the following:

- Meeting increased energy demand as growing population centers are primarily west of the Cascades Mountain Range.
- Reducing the potential for stranded utility scale renewables generation east of the Cascade Mountain Range and supporting carbon emission reduction goals.
- Providing transmission capacity that addresses transmission needs between energy generation and users.
- Increasing distribution reliability through installation of a system resistant to natural hazards including wind, snow/ice, and wildfire.

In addition to meeting these needs, the project would add flexibility to the regional energy system that will provide benefits such as emergency surge capacity, distribution system stability, and system efficiency.

Section 6: Description of Resources in the Area

1. Describe the existing physical and biological characteristics of each wetland or waterbody. Reference the wetland and waters delineation report if one is available. Include the list of items provided in the instructions.

6.1 Columbia River

The following section summarizes the physical and biological systems of the Columbia River. A Stream Function Assessment Methodology (SFAM) was completed and is provided in Section 14 (Attachments).

6.1.1 Hydrology and Hydraulics

In the project vicinity, the perennial flowing Columbia River has both meandering and braided segments with a variable width, ranging between 0.2 miles and 1.2 miles. The ordinary high water (OHW) mark was field identified in areas where the project alignment intersects with the Columbia River shoreline (see Wetland and Waters Reports in Section 14). In areas outside of the field identification, a City of Portland/USACE data set was used to map the OHW within the City of Portland limits and Applicant approximated the OHW outside of these limits using aerial photos. Water elevation and corresponding depths of the Columbia River vary depending on the time of year and dam operations. The lowest water levels occur in September and highest levels occur in May (NOAA 2022).

Channel depths in the main channel of the Columbia River below Bonneville Lock and Dam generally range from 20 to 50 feet. Side channels and fringe areas that are adjacent to riverine islands range from 2 to 14 feet. The reach below Bonneville Lock and Dam is tidally influenced and typical tidal fluctuation around Portland is approximately 3 feet, with extreme ranges up to 13 feet. The reach above Bonneville Lock and Dam is generally deeper, with depths ranging from 30 to 70 feet, with sections of deeper pools. Near The Dalles, depths can be up to 300 feet (USGS 1981). Bed sediments in the Columbia River downstream of the Willamette River were characterized as having mean sediment size ranging from 0.2 to 1.2 millimeters (Cohn and Moritz 2023).

At The Dalles, average discharge is 190,300 cubic feet per second (cfs). Annual average discharges at the Vancouver, Washington, station along the Columbia River (calculated from 10 records between 1964 – 2020) is 198,770 cfs, with ranges from 173,300 to 237,800 cfs (USGS 2023).

During the proposed in-water work period below Bonneville Lock and Dam (November 1 – February 28), the median monthly discharge ranges from 93,500 to 260,000 cfs (Table 8). During the proposed in-water work period above Bonneville Lock and Dam (proposed November 1 – March 15), the median monthly discharge ranges from 71,700 to 280,750 cfs (Table 9). From a seasonal perspective, flows during the in-water work period tend to correlate with the annual averages as this is the period between the low late summer flows and the high late spring freshet flows.

Table 7.Statistics for outflow at the Bonneville Dam in Oregon.

Time Period	5% - Bonneville (cfs)	50% - Bonneville (cfs)	95% - Bonneville (cfs)
Nov	93,500	126,200	182,500
Dec	99,600	138,800	231,600
Jan	112,900	165,100	260,000
Feb	117,300	162,200	285,800
Work Window	**85,700**	**157,100**	**356,100**

Note: 126,200 cfs = 1.8 ft/s. 260,000 cfs = 2.8 ft/s

Table 8. Flow statistics for the Columbia River at The Dalles, Oregon.

Month	5% - The Dalles (cfs)	50% - The Dalles (cfs)	95% - The Dalles (cfs)
November	71,700	125,000	229,000
December	73,850	127,750	220,500
January	73,765	134,750	236,500
February	81,500	148,750	279,250
March	89,125	154,250	280,750
Work Window	**75,825**	**136,750**	**250,125**

The United States Geological Survey (USGS) undertook velocity measurements via acoustic doppler current profiles for the Columbia River near Vancouver, Washington (Table 10) and The Dalles, Oregon (Table 11). According to the outputs, the velocity profiles followed expected velocity distribution with the maximum velocities in the upper-middle portions of the water column and the lowest velocity near the sides and bottom. The measurements indicate that the expected average river velocities during the in-water work window will range between 1.2 and 3.4 feet per second downstream of Bonneville Lock and Dam and 2.0 to 4.9 feet per second above Bonneville Lock and Dam.

Table 9. Measured Velocity Summary for Vancouver, WA.

Flow (cfs)	Maximum Velocity (ft/s)	Average Velocity (ft/s)
83,200	2.75	1.2
190,000	3.9	2.4
305,000	6.7	3.4
439,000	6.2	3.9

Table 10. Measured Velocity Summary for The Dalles, OR.

Flow (cfs)	Maximum Velocity (ft/s)	Average Velocity (ft/s)
92,500	2.1	0.921
136,000	3.6	1.41
230,000	4	2.24
315,000	4.9	3.05
438,000	6.2	4.05

6.1.2 Water Quality

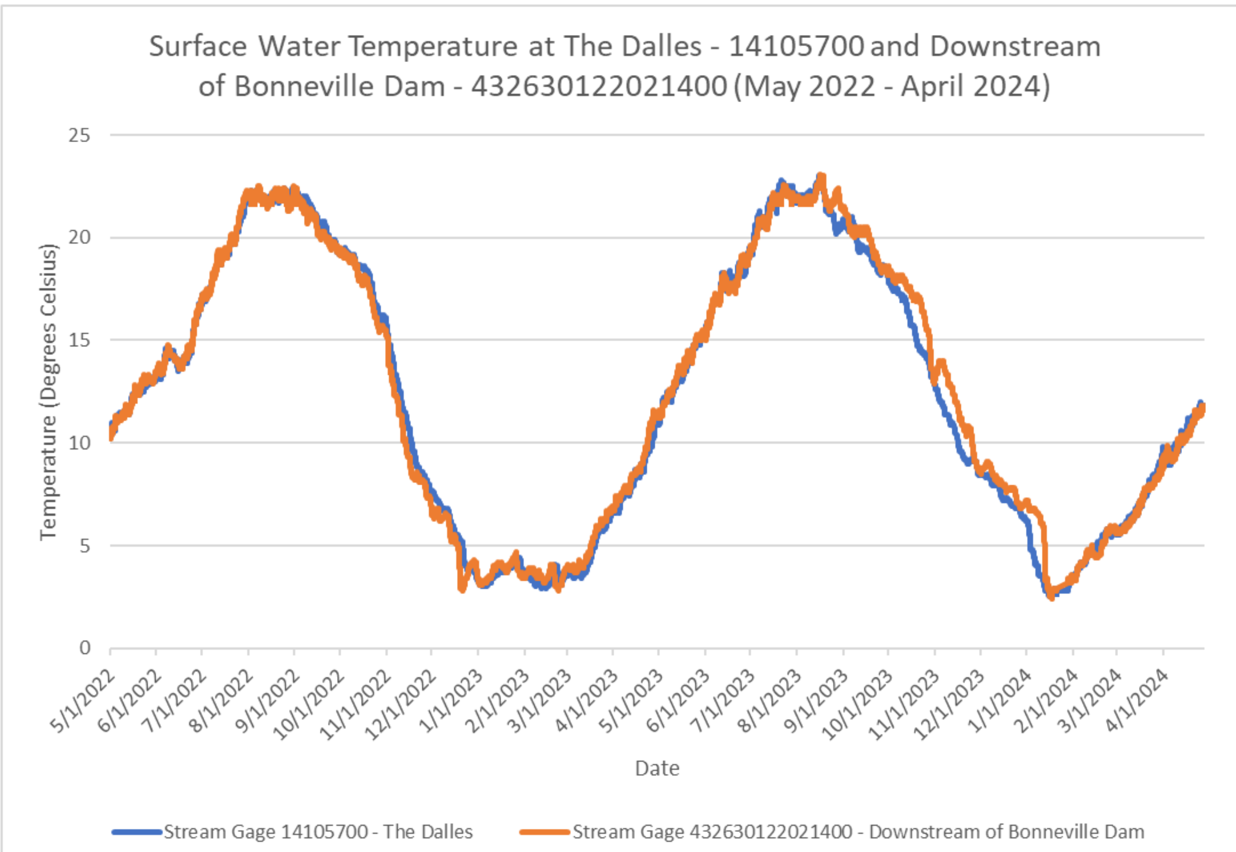
Additional information regarding water quality and water quality standards is provided in the application for site certificate and will be available in materials provided to Oregon DEQ in support of 401 Certification review. A summary of water quality baseline conditions is provided below.

Temperature

Surface water temperatures in the Columbia River vary throughout the year. USGS stream gage at The Dalles (14105700) has recorded a minimum temperature of 2.4 degrees Celsius and a maximum of 23.1 degrees Celsius between May 2022 and May 2024 (Figure 8; USGS 2024a). This temperature range is similar to that recorded at downstream of Bonneville Dam at Dodson, OR (426330122021400) over the same period (2.5 to 23.0 degrees Celsius; Figure 8; USGS 2024b).

The U.S. Environmental Protection Agency (USEPA) has identified 23 Cold Water Refuge tributaries along the Lower Columbia River, with 12 of these particularly important for salmon and steelhead. Eight of these tributaries occur in Oregon and meet with the Columbia River on river miles where the proposed project would occur.

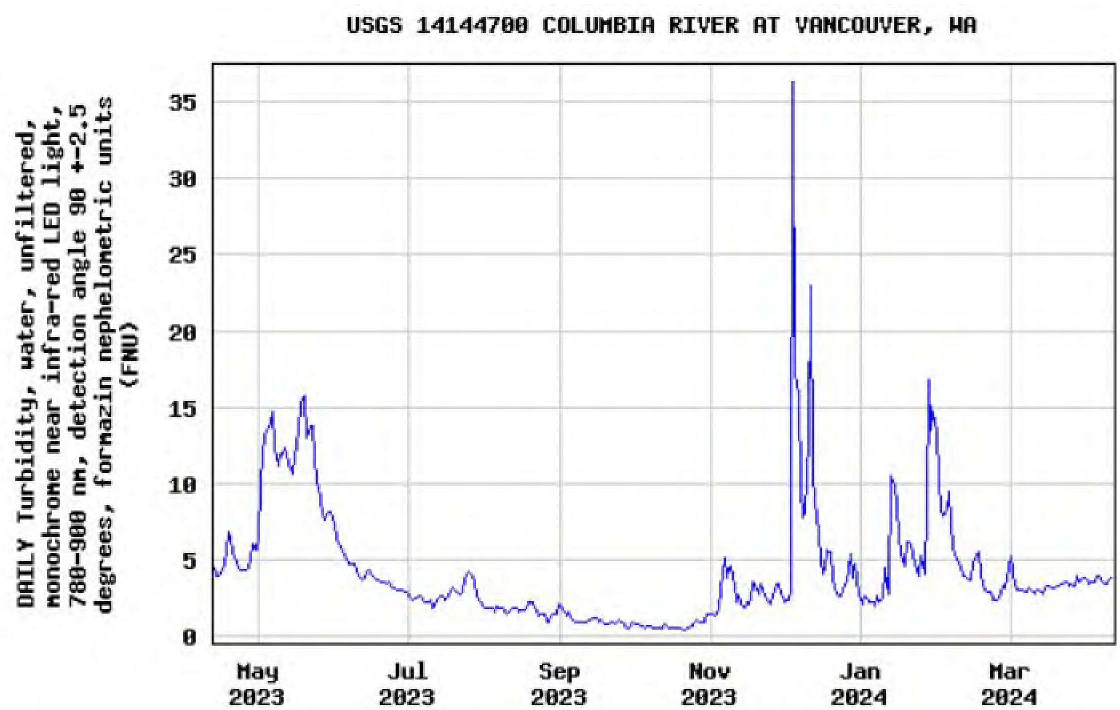
Figure 7. Columbia River Surface Water Temperature



Turbidity

Turbidity is a measure of water clarity. Increases in suspended solids such as sediments result in an increase in turbidity, which lowers light penetration into the water column. Information on turbidity is available at USGS stream gage at Vancouver, WA (14144700) (Figure 9). Turbidity within the proposed in-water work window is generally below 20 formazin NTU. Intermittent spikes above 30 occur for about 24 hours intermittently, on the range of 3 to 5 events per year. This increase in turbidity does not appear to correlate with flow or velocity and may be from other temporary inputs or disturbances.

Figure 8. USGS Stream Gage 14144700 Turbidity (April 2023- April 2024)



Total Suspended Solids

TSS are the total amount of organic and inorganic particles suspended in the water. Several studies have looked at TSS and other components of water chemistry in the project area. *Regional Environmental Monitoring and Assessment Program: 2009 Lower mid-Columbia River Ecological Assessment Final Report,* conducted grab samples within the Columbia River at The Dalles (Caton 2012). These grabs were analyzed for TSS among other water quality constituents. TSS within and surrounding the project area ranged from less than 1 to 26 milligrams per liter (mg/L). A sample taken at The Dalles produced a TSS measurement of 2 mg/L.

The USEPA conducted an additional study on Mid-Columbia River Fish Toxics at 42 locations within the Columbia River between Oregon and Washington. The results of their analysis produced an average TSS of 2 mg/L (Herger et al. 2017).

Toxics

There are number of toxic compounds present in the Columbia River, primarily between the Hayden Island land-to-water transition at RM 105.5 and the Sandy River (RM 121). Table 12 summarizes the chemicals, which are 303(d)-listed or have an active, established total maximum daily load (TMDL).

Table 11. 303(d) and Total Maximum Daily Load Listings for Columbia River

Compound	Location	Status
Copper	Bridal Veil Creek to Sandy River (RM121-132)	303(d) Listing (Oregon)
DDE 4,4’	Willamette River to Multnomah Creek (RM 102-136)	303(d) Listing (Oregon)
Dioxin	Willamette River to Sandy River (RM 102-121)	TMDL
PAHs	Willamette River to McCord Creek (RM 102-142.5)	303(d) Listing (Oregon)
PCBs	Willamette River to McCord Creek (RM 102-142.5)	303(d) Listing (Oregon)
Temperature	Extent of Project Area	TMDL
TDG	Lady Island to Pierce Island (RM 121-142.5)	TMDL
Vinyl Chloride	Willamette River to Lady Island (RM 102-121)	303(d) Listing (Washington)

Source: DEC 2024, USEPA 2024c

Note: DDE – 4,4’ = 4,4’ Dichlorodiphenyltrichloroethane (DDT), PCBs = Polychlorinated Biphenyls, PAHs = Polycyclic Aromatic Hydrocarbons, TMDL = Total Maximum Daily Load, TDG = Total Dissolved Gas

The Applicant is coordinating with the PSET, a multi-agency review team, related to the potential for sediment disturbance through project activities. The PSET classified the project locations as ‘Very Low’ rank based on project specific sampling and other data sources. Based on the “Very Low” management area rank and suitability of the overlying dredge prism sediments, the PSET infers that the dredge prism material is suitable for unconfined, aquatic placement and that the post-dredge surfaces are suitable for unconfined, aquatic exposure per the Sediment Evaluation Framework guidance without further testing. The project is proximal to, but not within, two known areas of contaminated sediments on the National Priority List (NPL; known as superfund sites) in or near to the Columbia River.

The Union Pacific Railroad Company Tie Treating Plant located in The Dalles near the Columbia River covers 83 acres. The site was contaminated with wood treatment chemicals, including creosote, pentachlorophenol, and arsenic. benzene, and other volatile organic compounds. The site was identified for NPL listing in 1990. The most recent 5-year review for the site was completed in 2022, which determined that the current cleanup module is being phased out because contaminate recovery rates are approaching asymptotic slopes (USEPA 2024a). The proposed cable alignment is routed adjacent to the site to the east (i.e., downslope).

Bradford Island is part of the Bonneville Lock and Dam complex and was listed on the NPL in 2022. The site includes a landfill that was used between the 1940s and 1980s and electrical equipment and light bulb disposal in surrounding areas. Landfill debris, including electrical equipment, has been found in the sediments of the Columbia River adjacent to the island. Site investigations have revealed polychlorinated biphenyls; semi volatile organic compounds, butyltins, volatile organic compounds, and several pesticides. The proposed cable route will avoid the island and transit 4 miles downstream of the site and 2.5 miles upstream. While the extent of the remediation areas is still being determined, the cable alignment is anticipated to be outside the limits (USEPA 2024d).

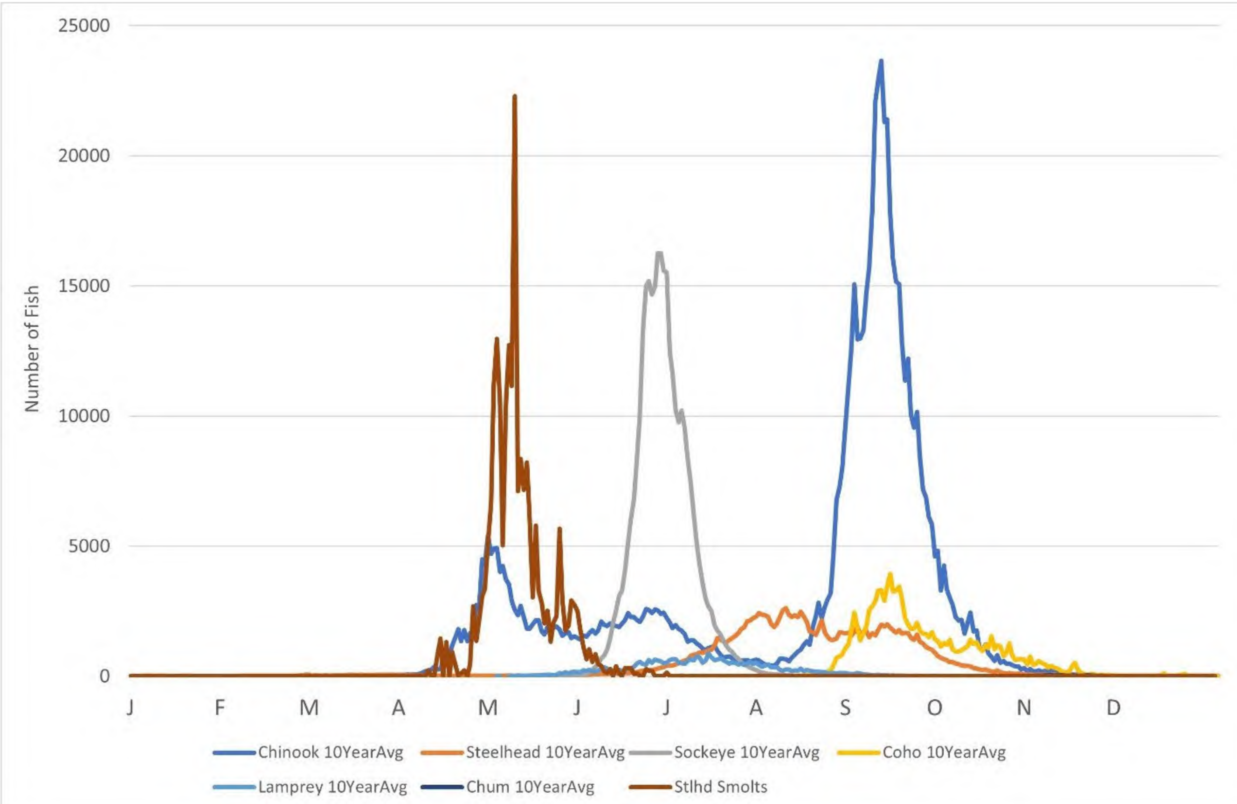
6.1.3 Endangered Species Act Species and Critical Habitat

The Columbia River provides habitat and forage for many terrestrial and aquatic species. The United States Fish and Wildlife Information Planning and Consultation (USFWS IPaC) tool identified Endangered Species Act (ESA) protected terrestrial mammal, avian, insect, and plant species that may occur in the project area. Notably, ESA fish species with designated critical habitat are present within the project area. A BA was prepared for the project and available upon request. See Table 13 for a list of ESA fish species and critical habitat that likely occur within the project area. Fish presence returns are shown in Figure 10, which summarizes the run times in the Lower Columbia River based on 10-years of fish passage counts at Bonneville Lock and Dam.

Table 12. Habitat and listing information for ESA species that could occur within the project area.

Species	Listing Status	Critical Habitat	Run Times
Bull Trout (*Salvelinus confluentus*)	Threatened	Designated in the mainstem Columbia River.[2]	Upstream migration of adults occurs late April – early October[1] Downstream migration of juveniles and subadults occurs from March – July
Chinook Salmon *(Oncorhynchus tshawytscha)*	Upper Columbia River Endangered All other Evolutionary Significant Units Threatened	All of the mainstem Columbia River	Timing varies by specific run; peak adult migration and downstream juvenile migration is between March- August
Steelhead *(Oncorhynchus mykiss)*	Threatened	Designated in all basins supporting the populations in the Columbia River and the mainstem Columbia River.	Timing varies by run; generally adult migration between April and July; downstream migration March-August
Chum Salmon *(Oncorhynchus keta)*	Threatened	Designated in the mainstem Columbia River up to White Salmon River	Adults may enter or return to Columbia River September – December and spawn November – December
Coho Salmon *(Oncorhynchus kisutch)*	Threatened	Designated in entire mainstem Columbia River	Adults enter June – February Juveniles out-migrate March – mid-June
Sockeye Salmon *(Oncorhynchus nerka)*	Endangered	Designated in entire mainstem Columbia River	Adults present mid-April to mid-July Out-migrating juveniles reach lower Columbia River March – mid-Jul
Eulachon *(Thaleichthys pacificus)*	Threatened	Designated from the Columbia River mouth to Bonneville Dam	Late November – March
Green Sturgeon *(Acipenser medirostris)*	Threatened	Designated from the Columbia River mouth to river mile 46.	May – October

Figure 9. Columbia River salmonid and lamprey passage timing at Bonneville Dam; no Bull Trout were observed during the 10-year data period (2013-2022).



Source: Columbia Basin Research 2024

6.1.4 Fish and Wildlife

There are several fish and wildlife species present within the project area that rely on the Columbia River for part or all of their lifecycle. The following section summarizes presence and lifecycle of species not protected under the ESA, but have been noted as important species by the Tribes and/or natural resource agencies. .

Bald Eagle

The Columbia River provides forage and habitat for species protected by the Migratory Bird Treaty Act (MBTA) and Bald and Gold Eagle Protection Act (BGEPA), including bald eagles (*Haliaeetus lecocephalus*), which are known to hunt and nest along the shorelines of the Columbia River near Hayden Island and the Columbia River Slough. Bald eagles will roost and hunt in the Columbia River Gorge in January and February timeframes.

Field surveys conducted in 2024 identified an active bald eagle nest on the south shoreline of Hayden Island. The nest buffer of 660 feet overlaps with the proposed project route for approximately 600 feet along the Columbia River, as the on-land cable work is just outside of the nest buffer area. The HDD pit, where the land to water transition would begin, is approximately 850 feet away from the nest.

There are no other known nests within 660 feet of the terrestrial portion of the route. It is unlikely that there are other, undocumented nests along the Columbia River within 660 feet of the in-water cable installation route. The in-water portion of the cable is within 660 feet of a shoreline in one location, adjacent to Government Island between upstream of Interstate 205 for a distance of 2,500 feet.

Pacific Lamprey

Pacific lamprey (*lampetra tridentata*) are anadromous and travel between the ocean and river systems, migrating miles upstream in large river systems, including the Columbia River. Pacific Lamprey are culturally important to multiple Native American tribes, as they are harvested in subsistence fisheries and used for spiritual and medicinal purposes. They are designated a species of greatest conservation need (SGCN). Lamprey do not return to their natal (original) stream but instead follow scents of pheromones released from larval lamprey in the water to spawning grounds. Some adults enter freshwater in summer and fall and then overwinter (stream-maturing), holding in deep pools and under logs and rocks, before spawning in spring or early summer. Other adults will enter freshwater in the spring (“ocean-maturing”) and will spawn shortly after entering the freshwater.

Larval lamprey (also known as ammocoetes) are eyeless and burrow in fine sediments where they live for up to 10 years. Larval lamprey are filter feeders; they stick their heads out of their burrows and consume drifting detritus and algae that is in the water column. Larval lamprey are present year-round in the project area and have been found as deep as 70 feet. A study by Blanchard and others (2023) found the probability of larval lamprey presence is lowest near the center of the river and when most distant from any river mouth junction, and an order of magnitude higher in river mouth habitats than in reservoir pool habitats. After years rearing in the stream environment, larval lamprey transform into juveniles to migrate downstream to the ocean where they adapt to live and feed in salt water. Migrating adults and larval lamprey could be present during cable installation activities.

Western Ridged Mussel

The western ridged mussel (*Conidea angulata*) is under review for listing as endangered under the ESA. This species occurs along the Pacific West Coast from California to southern British Columbia, as well as in Nevada and Idaho. While it is known to occur in the Columbia River, population density and dispersal within the river is unknown. The western ridged mussel is commonly found in streams and rivers with constantly flowing water and can be found in substrates of various sizes; therefore, they may occur within the Columbia River where the proposed project would occur (USFWS 2024a; WDFW 2024). However, they are typically found in shallow areas with stable substrate conditions, and the cable would be installed in or near the navigation channel at a depth where the mussel is not likely to occur. The narrow reach in The Dalles where the Applicant may not be able to bury the cable due to bedrock substrate, the depth and benthic habitat in the cable route would be unsuitable for mussel populations.

White Sturgeon

White sturgeon (*Acipenser transmontanus*) is an anadromous species of concern in both Oregon and Washington, and designated SGCN and a priority species in Washington. It occurs throughout the Lower and Middle Columbia River, using the mainstem as well as tributaries. Populations downstream of Bonneville Lock and Dam are subject to significant predation from sea lions, with these populations having stricter fishing regulations than populations from Bonneville Lock and Dam to McNary Dam (ODFW and WDFW 2024). White sturgeon adults spend most of their lives in the ocean and migrate into freshwater early spring, typically spawning late spring to early summer. They return to the Pacific Ocean after their reproductive cycle is complete; therefore, white sturgeon would not be present in the Columbia River during the proposed in-water work window.

Cutthroat Trout

Cutthroat trout (*Oncorhynchus clarkia*) is a federal species of concern and Oregon state-listed sensitive species. Populations may be both migratory and non-migratory, as well as freshwater run or sea run. They are widely distributed west of the Cascade Mountains, with anadromous distributions confined to areas downstream of Bonneville Lock and Dam. Sea-run cutthroat enter freshwater during the late summer or fall and adults spawn in the late winter or spring before returning to the ocean (NOAA 1999). While they may be present in the Columbia River during the proposed in-water work window, they are likely to congregate near shorelines during spawning and rearing (Oregon Conservation Strategy 2024). Adults prefer in-stream structures and vegetation for protection, and juveniles may move into tributaries and pools while rearing. As they will be closer to the shoreline during this period, it is unlikely that they will be present in or near the main channel where the proposed cable installation would occur.

6.1.5 Stream Function Assessment Methodology

An SFAM was prepared to provide a method for assessing wadable stream functions and values (Section 14-Attachments). This is done by placing a rating on grouped functions and values in four areas (i.e., hydrologic, geomorphic, biologic and water quality). The Value group ratings describe the opportunity and importance of providing a specific ecological function while Function group ratings represent how well the system is performing that function. A representative function is the function that is most influential to the grouped function ratings.

The Columbia River is a non-wadable river. HDR assessed the project area based on best professional judgement, in accordance with Oregon Administrative Rule (OAR) 141-085-0685(f), and in consultation with the Oregon Department of State Lands (DSL). HDR assessed two reaches of the Columbia River: the upstream project area (UPA) and the downstream project area (DPA). The UPA and DPA are separated by the Bonneville Lock and Dam. Table 14 and Table 15 summarize the results of the function and value analyses for the UPA and DPA, respectively. A discussion of potential impacts of the project on functions and values is provided in Section 9 of the permit application.

Table 13. UPA Function and Value Ratings

Grouped Functions	Representative Function	Function Group Rating	Value Group Rating
Hydrologic Function	Surface Water Storage	Lower	Moderate
Geomorphic Function	Sediment Continuity	Moderate	Lower
Biologic Function	Sustain Trophic Structure	Moderate	Higher
Water Quality Function	Chemical Regulation	Moderate	Moderate

Source: Oregon Explorer 2024

Table 14. DPA Function and Value Ratings

Grouped Functions	Representative Function	Function Group Rating	Value Group Rating
Hydrologic Function	Sub/Surface Water Transfer	Moderate	Higher
Geomorphic Function	Sediment Mobility	Moderate	Moderate
Biologic Function	Maintain Biodiversity	Lower	Higher
Water Quality Function	Chemical Regulation	Moderate	Higher

Source: Oregon Explorer 2024

6.2 Willamette River and Columbia Slough

HDD methods would be used to install the cable beneath the Willamette River and Columbia Slough. The Willamette River flows south to north in a relatively straight line for approximately 187 miles. Where the cable would cross from Portland to the Harborton substation, the river is approximately 40 to 50 feet deep. The Columbia River Slough's main channel is approximately 19 miles with an estimated 12 miles of side channels. It flows westward toward the Willamette River in a meandering shape, with a water depth of 10 feet or less. The proposed HDD method of boring under the Willamette River would avoid changes to water quality characteristics, including temperature and turbidity.

The proposed cable alignment avoids one superfund site and a notable contaminated area in the vicinity of the Willamette River and Columbia River Slough. The Portland Harbor Superfund Site encompasses approximately 10 miles of the Willamette River upstream of its confluence with the Columbia River. The site contains several disconnected zones contaminated with hazardous substances, including polychlorinated biphenyls, polycyclic aromatic hydrocarbons, dioxins/furans, pesticides, and heavy metals. The cable will be buried using HDD in the vicinity of the Portland Harbor Superfund Site and routed between contamination zones (USEPA 2024b). Industrial practices have left sediments in several areas of the Columbia Slough contaminated. In 2000, the Columbia Slough Record of Decision established a cleanup plan for several sites in the area. One of these areas, St Johns Landfill, lies to the south of the proposed cable route (ODEQ 2024).

6.2.1 Endangered Species Act and Critical Habitat

The Willamette River and Columbia River Slough provide forage and habitat for many terrestrial and aquatic species, including anadromous fish, such as salmonids, which may use both waterbodies during their migrations. The National Marine Fisheries Service (NMFS) has designated the lower Willamette River as critical habitat for Lower Columbia River Chinook salmon *(Oncorhynchus tshawytscha)*, Upper Willamette River steelhead *(Oncorhynchus mykiss)*, and is proposed critical habitat for the Lower Columbia River coho salmon *(Oncorhynchus kisutch)* (NMFS 2005). As discussed in previous sections, the cable would be installed during the in-water work window when these fish are least likely to be present and routed under the bed to avoid impacting the stream channel or critical habitat.

6.2.2 Fish and Wildlife

As mentioned above, the Willamette River and Columbia River Slough provide forage and habitat for many terrestrial and aquatic species. They also provide forage and habitat for species protected by the MBTA and BGEPA, including bald eagles, which are known to hunt and nest along the shorelines of the Columbia River Slough. Other species of concern that may be present in or around the Willamette River and/or Columbia River Slough include white sturgeon, lamprey, and Townsend's big-eared bat (*Corynorhinus townsendii*). While white sturgeon may be present in the Willamette River during the proposed in-water work window, the HDD cable installation method would avoid all aquatic species by boring beneath the river.

6.3 Wetlands

Wetlands and waters within the project area were delineated in Oregon. Wetland delineation reports are in Section 14 (Attachments). There are no aquatic resources of special concern located in the project area.

There are 6 wetlands and 10 streams identified within Oregon. Wetlands within Oregon are adjacent to HDD laydown areas. Wetlands in Oregon will be avoided during construction.

6.4 Cultural Resources

The project spans the traditional territories and primary resource procurement areas of several groups of native peoples, including the various divisions of Chinookian peoples that inhabited much of the lower Columbia River. These groups include Multnomah people that inhabited the Portland area, the Clackamas people that inhabited the Troutdale area, the Chilluckittequaw people that inhabited the Hood River and White Salmon area, and the Wasco people that inhabited the area around The Dalles. Various bands of the Sahaptian-speaking groups, including the Yakama and Klickitat peoples, were also present within the lower Columbia River region (Ruby and Brown 2010). Today, many of these groups of people are represented by sovereign nations residing within treaty-formed reservations, including the Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of Grand Ronde, Confederated Tribes of Warm Springs, the Confederated Tribes of the Umatilla Indian Reservation, Cowlitz Indian Tribe, and Nez Perce Tribe. The Columbia River, its tributaries, and ecosystems hold high importance to those with ancestral ties for fishing, hunting, and resource gathering, as well as spiritual practices and beliefs.

Early documented non-native exploration of the Columbia River began with the Lewis and Clark Expedition, which reached the area in 1805. During their travels, the explorers mapped the river, the surrounding landscape, and the various villages of people they encountered along its shorelines (Tate 2004). The region was frequented by fur trappers and traders for the remainder of the early 1800s, including the Hudson's Bay Company, which established Fort Vancouver in 1825, located approximately 0.5 mile north of the western end of the project. Settlement and subsequent commercial and industrial navigational use of the river intensified by mid-nineteenth century, spurred by various settlement acts, including the Donation Land Claim Act of 1850.

The Cascade Rapids, once present along the central portion of the project alignment near North Bonneville, soon proved a significant barrier to the transportation of goods and services along the river. The USACE constructed a canal that operated between 1878 to 1896 to ease transportation in the area, and railroads arrived along the shoreline around the same time (Wilma 2006). In 1938, the Bonneville Lock and Dam was constructed, which flooded the Cascade Rapids and forever altered the landscape of the region. The Bonneville Lock and Dam and pool erased many villages and traditional fishing sites of the area's local Native peoples, and at the same time, greatly improved transportation and navigation issues and provided hydroelectric power across the larger region. The town of North Bonneville was formed during construction, and other towns grew rapidly along the lower Columbia River during the remainder of the twentieth century. In 1986, Congress created the Columbia River Gorge National Scenic Area, which requires all development within the scenic area to be coordinated with local commissions responsible to the U.S. Forest Service. Today, the lower Columbia River is primarily used for tourism, hydroelectric power generation, irrigation, and the transportation of goods (FWEE 2022; Wilma 2006).

Due to federal permitting, the project must comply with Section 106 of the National Historic Preservation Act (NHPA). It is anticipated that the USACE, as lead federal agency, will initiate Section 106 consultation with affected Indian tribes, Oregon SHPO, federal and state land-managing agencies, as well as other agencies and interested parties. HDR has completed a desktop records review of the cultural resources inventory area and prepared a survey plan. Starting in 2023 through 2026, HDR completed cultural resources surveys for archaeological and historic built environment resources to document cultural resources in the cultural resources inventory area. HDR will prepare a technical report that complies with guidelines of SHPO and Section 106 of the NHPA and will include recommendations regarding the National Register of Historic Places (NRHP) eligibility of resources documented during surveys and potential project effects on those resources that are eligible or listed in the NRHP.

2. Describe the existing navigation, fishing and recreational use of the waterbody or wetland.

6.5 Columbia River

6.5.1 Navigation

The Columbia River is a navigational waterway that supports commerce within the Pacific Northwest, with an estimated 1,300 cargo ships transporting goods along the Columbia River each year (Ecology 2017). Watercrafts that navigate on Columbia River from Vancouver to The Dalles (stretch of river containing the project area) primarily include tug and barge traffic. Other watercraft traveling this section and immediately downstream include container vessels, bulk carrier vessels, charter and commercial fishing ships, recreational boaters, and cruise ships with the larger vessels not traveling past river mile 101.4 (downstream tip of Hayden Island) where the federal channel changes from a depth of 43 feet to 27 feet. Most of the traffic that occurs between Vancouver and The Dalles includes the transport of petroleum products, wheat, wool, rafted logs bound downstream, and general freight going upstream.

The project area is within the reach of the Columbia River commonly called ”Vancouver to The Dalles.” The federal navigation channel, within the project area, maintained by the USACE from Vancouver to The Dalles (RM 106.5 to 189.7) has an authorized depth of 27 feet (maintained at a 17-foot depth) and has a 300-foot width. There are two distinct reaches of the Columbia River within the project area that include: (1) Vancouver to the Bonneville Lock and Dam and (2) Bonneville Lock and Dam to The Dalles Dam.

1. Vancouver to the Bonneville Lock and Dam –The vertical datum used in this section is CRD. Navigation channel depth within this reach is considered -27 feet CRD. Authorized depth

referenced to North American Vertical Datum of 1988 (NAVD88) varies along this reach as the river stage changes elevation.

2. Bonneville Lock and Dam to The Dalles Dam – this section of river is bound by two dams. The vertical datum used in this section is Minimum Pool Elevation. Minimum Pool Elevation within this reach is considered 73.3 feet above NAVD88. Navigation channel depth within this reach is considered -27 feet Minimum Pool Elevation. Authorized depth referenced to NAVD88 is +46.3 feet NAVD88. River bottom elevation is much lower than the authorized elevation (i.e., -60 feet Minimum Pool Elevation to below -150 feet Minimum Pool Elevation).

The proposed cable route travels adjacent to the federal navigation channel (i.e., disturbed area of the river but outside potential USACE maintenance dredging locations) for approximately 55 miles. When the transmission cable is within the federal navigation channel (approximately 23.5 miles), it is placed at a minimum of -34 feet CRD (below the Bonneville Lock and Dam) or -34 feet Minimum Pool Elevation (above the Bonneville Lock and Dam). Above the Bonneville Lock and Dam, the cable is located well below the federal navigation channel due to channel depths in this reach.

The size of vessels on the Columbia River ranges from small recreational boats to large container and bulk cargo ships. Recreational boats are typically less than 26 feet long while bulk cargo ships on the river can be upwards of 300 feet long. The larger vessels are limited by their draft and as such, most of the cargo traffic within the project area is limited to tug and barge. The busiest areas for ships are around Portland, Oregon, and Vancouver, Washington, which have major ports. The Port of Portland owns Terminal 6, which is around RM 102, approximately 3.5 miles downstream of the proposed project area. The Port of Vancouver in Washington is around RM 106. However, at this river mile, the proposed project would be on the Oregon side of the river and turning south to Hayden Island, avoiding this port.

Turning basins along the Columbia River that occur near the project are the Lower Vancouver Washington and Upper Vancouver Washington, which occur at RMs 105.5 and 106.5, respectively. The Lower Vancouver turning basin is approximately 43 feet deep, 800 feet wide, and 5,000 feet long; and the Upper Vancouver turning basin is approximately 35 feet deep, 800 feet wide, and 2,000 feet long. Commercial vessels that use the turning basins are typically tugs with barges that travel through the basins, rather than use it for turning. Use of the turning basins is not anticipated to increase in the future, as commercial, business, and residential development will prevent the development of new ports. Furthermore, a buoy located 600 feet downstream of the Interstate 5 bridge (which is on the eastern edge of the upper turning basin) has prevented deep draft vessels from using the turning basin for turning maneuvers since 1975 (CRC 2013). These turning basins are adjacent to the downstream termini of the proposed in-water route, adjacent to the Washington state shoreline. The lower turning basin is approximately 0.25 mile from where the cable moves southward into Hayden Island. The upper turning basin runs adjacent to the proposed route, ranging from 400 to 1,000 feet north of it. Therefore, the proposed project would not encroach upon the turning basins or any vessels that may be within it.

Dangers to navigation may occur based on seasonality. In January and February, ice can interfere with navigation for up to 2 weeks or more (NOAA 2023). While cruise ships do not operate in the winter, vessels transporting goods still travel up and down the Columbia River. When the river elevation is lower in fall and winter due to reduced flows, cargo loading can be restricted and worsen issues related to shoaling (PNWA no date).

6.5.2 Fishing

The Columbia River is fished commercially, recreationally, and by tribes for traditional and commercial uses. Commercially common angled fish are salmonids as well as shad, pikeminnow, smelt, walleye, and sturgeon. The peak fishing for spring chinook is March to May, sockeye salmon June to August, and for fall chinook and coho salmon the best times for fishing are August to November. Walleye are fished from March to October, and shad from May to July. Winter is the least busy season for fishing on the Columbia River, although some people will fish for sturgeon and steelhead, which can be caught through the winter (Dan Ponciano, 2023).

A Recreation Report from August 23, 2023, found that in week prior, there were 36 anglers from 17 boats between Bonneville Lock and Dam and The Dalles Dam, 31 anglers on 17 boats and 31 bank anglers in the Gorge, 302 anglers from 153 boats near Troutdale, and 97 anglers on 46 boats from Portland, Oregon to Sauvie Island (ODFW 2023). While fishers can be spotted all along the Columbia River, one of the most popular spots is around Bonneville Lock and Dam (NWPCC 2023), with water and bank fishing occurring heavily between spring through summer. The Bonneville Lock and Dam also supports a large fish hatchery. The hatchery raises about 1.2 million coho salmon, 8.5 million fall chinook salmon, 215,000 summer steelhead, and 60,000 winter steelhead each year. These species are raised for recreational, commercial, and tribal fisheries (ODFW 2023).

The Columbia River Inter-Tribal Fish Commission (CRITFC) manages nine in-lieu/treaty fishing access sites within the project area. These sites were set aside by congress to provide access to fishing for local tribes, whose traditional fishing areas were inundated by the dams. There are no sites between RM 105.5 (Portland, OR) and RM 146. Between RM 146 and RM 190 on the Columbia River, there are four in-lieu sites and six treaty fishing access sites (CRITFC 2021). Tribal fishing activities are covered in the cultural resources section (Section 8).

6.5.3 Recreation

The Columbia River is used for many recreational purposes, with the most popular activities being fishing and boating (NWPCC 2023). Other recreational activities on the water include windsurfing, sailing, yachting, swimming, kayaking, canoeing, wake boarding/water skiing, and paddleboarding. Water sports are enjoyed primarily in the summer. While individuals may enjoy these activities in the spring and fall, the most popular months for water sports are May to August (NWPCC 2023).

Terrestrial activities along the Columbia River shorelines include hiking, waterfall viewing, biking, bird watching, and picnicking. These terrestrial activities may occur in local parks in municipalities or in state parks along the river, with popular parks and trails, including Beacon Rock, Rooster Rock, and Multnomah Falls.

Boat ramps in the project vicinity include The Dalles Marina, Beacon Rock Boat Launch, Dalton Point Boat Launch, and Rooster Rock Boat Ramp. In Portland, Oregon, there are several boat ramps to the Columbia River, including the Chinook Landing Marine Park, James Gleason Memorial Boat Ramp, Columbia Crossings Marina, Hayden Bay Marina, and Marine Park in Oregon. In these locations, the proposed cable would be placed mid-channel in or adjacent to the navigation channel.

The Dalles Marina, adjacent to the Riverfront Park in The Dalles, Oregon, is proximal to the proposed land-to-water transition area. The marina has space for houseboats, private and public moorages, and a boat launch, the latter of which locals may use for access to the Columbia River.

The adjacent Riverfront Park offers walking trails, scenic views, a beach and swim area, and picnic tables, making it a popular recreational spot during the summer months. However, the park is closed from November 1 through Memorial Day weekend, reducing recreational use during the proposed project's construction window.

6.6 Willamette River and Columbia Slough

6.6.1 Navigation

The Willamette River is also navigable, although it is less heavily trafficked than the Columbia River. The Willamette River Federal Navigation Channel maintained by the USACE is 40 feet deep with a varying width from 600 to 2,000 feet (USACE 2023). The width of the Willamette River (bank to bank) in the project area varies in width from 1,000 feet to 2,000 feet with depths ranging from 30 feet to over 70 feet. Vessels that use the Willamette River include barges, tugboats, and freighters that transport goods upstream and downstream. Cruise ships and recreational boaters may also boat on the Willamette River. As there will be no in-water work in the Willamette River, the proposed project will not interfere with navigation along the Willamette River.

6.6.2 Fishing

The Willamette River is fished commercially and recreationally, with spring and fall chinook, steelhead, smallmouth bass, and trout, popular species to fish. Similar to the Columbia River, winter is the least busy season for fishing, although some individuals may fish for winter sturgeon and steelhead. People may fish on the Columbia River Slough; however, there are health advisories established by the Oregon Health Administration due to sediment contamination. Cable would be installed via HDD under the Willamette River and Columbia Slough and the entry and exit locations are set back from the bank from a distance ranging from 250 to 600 feet. As there will be no in-water work in the Willamette River, the proposed project will not interfere with fishing along the Willamette River.

6.6.3 Recreation

On the Willamette River near where the proposed project would occur, boat ramps include the Marina Way Moorage, Fred's Marina, and Kelly Point Park which has a canoe launch. These ports are 0.5 mile or more away from the proposed project and are likely less frequently used in the winter months. There are two paddle launch locations on the Columbia River Slough near the project, one below Smith and Bybee Wetlands and another in the northwest of Portland near Marine Drive. The Smith and Bybee Wetlands paddle launch is approximately 2 miles upstream of the proposed project. The paddle launch near Marine Drive is 0.2 mile downstream of where work would occur adjacent to Columbia Slough. However, the paddle launch is closed so will not be actively used during the proposed construction window.

Section 8: Additional Information

Information in Table 16 expands on the checklist in Section 8 of the application.

Table 15. Additional Information

Information Item	Response
State and Federally Listed Species	There are federally listed species within the project area, and these are addressed in Section 6 and the Biological Assessment prepared for federal consultation. In Oregon, state-listed species present in our project area, are also federally listed (i.e., state and federal status overlap).
Critical Habitat	The Columbia River is designated critical habitat and is addressed in the Biological Assessment.
Wild and Scenic River	There are no National Wild and Scenic Rivers within the project area.
State Scenic Waterway	There are no waterways listed as an Oregon State Scenic waterway within the project area.
100-year Floodplain	The Columbia River is designated by the Federal Emergency Management Agency (FEMA) as Zone A (i.e., 1 percent annual exceedance probability) and as a Regulatory Floodway between Willamette River and upstream to RM 129 (Rooster Rock).
Territorial Sea Plan + Marine Reserves	The project is not located within Oregon's Territorial Sea or Marine Reserves.
Ground Disturbance	The project will disturb over 1 acre and the appropriate erosion control permits will be secured prior to construction from Oregon state agencies.
Sediment Quality	The Applicant has been coordinating with the Portland Sediment Evaluation Team (PSET). The Applicant conducted sediment characterization along the route to further inform sediment quality and distribution analysis. PSET classified the risk as 'Very Low' rank based on project sampling and other data sources.
Cultural Resources	The project area includes known and/or high potential cultural resource areas. The Applicant has prepared a desktop study, conducted outreach to Tribes and state cultural resource offices, and prepared a field study plan for additional investigations and additional outreach and analysis as necessary to meet Section 106 of the National Historic Preservation Act.
DEQ Clean up	The project area is not within the limits of an Oregon Department of Environmental Quality (ODEQ) clean-up site.
Impervious Surfaces	The project will result in up to 5 acres of new impervious surfaces at each converter station. This is inclusive of paved/building areas and graveled surfaces, which is a conservative estimate since the gravel may or may not have similar runoff properties as pavement. Post- construction stormwater management will be designed to meet local standards, and at both sites' stormwater would be treated via vegetated infiltration basins.
Permits/Clearances	The following approvals will be needed. These efforts will also include coordination and engagement with federal, state, and local agencies in addition to those listed below. And some of these authorizations are coordinated by the Oregon Site Certificate Process and the respective agencies. • National Environmental Policy Act (USACE Portland District) • Rivers and Harbors Act, Section 10 (USACE Portland District) • Rivers and Harbors Act, Section 14 (i.e., 408 Review) (USACE Portland District) • Clean Water Act, Section 404 (USACE Portland District) • Clean Water Act, Section 401 WQ Certification (ODEQ) • Clean Water Act, Section 402 [Erosion Control] (ODEQ) • Endangered Species Act, Section 7 (NMFS, USFWS) • National Historic Preservation Act, Section 106 (Oregon SHPO) • Special Use/Utility Permit within the National Scenic Area (USFS)

Information Item	Response
	• Site Certificates (Oregon EFSC) • Removal- Fill Authorization (Oregon DSL) • Oregon Owned Waterway Lease (Oregon DSL) • Archeological Excavation Permit (Oregon SHPO) • Encroachment Permit – Utility (Oregon DOT) • City/County approvals related to land use (e.g., shoreline review) and building permits (e.g., structural, electrical, grading)
Wetland Delineation	A wetland delineation reports have been prepared. The Oregon report is in Section 14 (Attachments) of this application and will be submitted under separate cover for agency reviews.
Other Clearances	The project would be on/over lands owned/leased by USACE and will require authorization pursuant to 33 USC 408 and leases from Oregon (i.e., state-owned waterways).

Section 9. Impacts, Restoration/Rehabilitation, and Compensatory Mitigation

Part A. Describe unavoidable environmental impacts that are likely to result from the proposed project. Include permanent, temporary, direct, and indirect impacts.

9.1 Hydrology and Hydraulics

There would be no temporary or permanent impacts to basin hydrology (i.e., flows), surface water storage, or groundwater/surface water exchange. There would be a temporary localized effect to river hydraulics from the temporary three-sided wet cofferdams. Velocities may accelerate around the cofferdams; but likely would return to baseline conditions within feet of cofferdams. Scour around the wet cofferdams is not anticipated based on the generally low river velocities during the in-water work period (i.e., 1.2 to 4.9 feet per second).

There may be a permanent localized effect to river hydraulics and sediment continuity if cable protection is used. Changes to sediment transport or geomorphic function at a reach scale are not anticipated. Upstream of Bonneville Lock and Dam, cable protection would be used only if substrate does not allow for burial. If cable burial is not possible due to the presence of bedrock, the bedrock would mirror that of cable protection. However, velocities and bed sheer may nominally increase or decrease around the cable protection. Cable protection would be approximately 8 feet wide compared to the river width (i.e.,900 to 1,100 feet) within the identified reaches.

9.2 Water Quality

9.2.1 Turbidity

There would be localized, temporary direct impacts to water quality, specifically turbidity from cable installation in the Columbia River. Up to 1,650 linear feet of pre-installation dredge (24 feet wide) in the navigation channel may be needed to meet required installation depths, and the three-sided cofferdams would be 70 by 300 feet. During the cable installation, an estimated 5.6 cubic yards per linear foot of bed sediment may enter the water column (approximately 20 percent), at the maximum installation depth of 15 feet.. Active, continuous monitoring of turbidity would be undertaken (see Section 4), and installation would be adjusted (e.g., speed, water pressure) to address elevated turbidity.

Mean sediment size distribution from the Columbia River ranges from 0.2 to 1.2 millimeters (i.e., coarse to fine grain sand). Coarse and medium grained sand would re-settle within a minute, assuming the sediments are disturbed up to 10 feet in the water column. Fine grained sands (0.2 millimeter) would re-settle in approximately 143 seconds. The range of river velocity expected during the in-water work period is 1.3 to 5.5 feet per second. Using this velocity and resettlement time, results in a downstream travel distance of fine grain sand (i.e., particle size of 0.2 millimeter) between 186 and 787 feet and concentrated along the bottom portion of the water column.

There is potential for an indirect impact of drilling fluids (i.e., inert clay-based materials) exiting the bores during HDD installation. The HDD bores that are from shore to shore are at least 20 feet below ground and seepage into waterbodies from that depth is unlikely. At the land-to-water transition areas, drilling fluids may exit the waterside of the transition area. The Applicant will develop an inadvertent return plan (i.e., frac-out) plan to minimize the potential for distribution of fluids into the sediments and/or water column.

9.2.2 Temperature

There would be no temporary or permanent effect to water temperature from the project. There would be some localized permanent effects in the benthic zone (i.e., elevated temperature) when the cable is installed at a depth of 2 feet or less. The affected area is approximately 16 inches in diameter, which is the width of the cable bundle plus 2 inches. The heat dissipates to ambient temperatures prior to the mudline and would not affect water temperature.

The deeper the burial, the more influence substrate has on heat insulation. The result of this is an increase in temperature at depth and distance from burial as the cable is buried deeper in the substrate. This is anticipated to reach a maximum temperature influence of 30 degrees Celsius at a burial depth of 10 feet. Heat generated from the cable at this depth is anticipated to return to ambient conditions at approximately 2.31 feet below the riverbed surface (approximately 7.69 feet away from the cable) and outside of the benthic zone.

9.2.3 Toxics

Temporary or permanent changes to toxic compounds or concentrations within the Columbia River are not expected. The project is not introducing toxic chemicals into the river and sediment disturbance would not result in transport beyond 800 feet based on median sediment size. The PSET has categorized the route as a ‘Very Low’ management rank related to the potential to encounter or transport contaminated sediments. The proposed alignment is avoiding areas of known sediment contamination. Sampling was completed in November 2024 and the results indicated there were no detections or non-detection exceedances of analytes with freshwater Sediment Evaluation Framework screening levels or ODEQ’s sediment screen level values for total PCB Aroclors in the discrete samples.

The project would avoid distributing sediments associated with NPL sites: Portland Harbor, Bradford Island and Tie Plant Road in The Dalles. The HDD would be used to install the transmission cables under the Willamette River, to a depth of at least 20 feet below the mudline and set back from the shoreline by at least 150 feet. This would avoid disturbing sediments within the Portland Harbor NPL site. While the Bradford Island site is in preliminary investigations, the project would likely be outside management areas (USEPA 2024). The proposed alignment would be located approximately 4 miles upstream, and 2.5 miles downstream of Bradford Island. The project is slose to Tie Plant Road, but outside established clean up boundaries.

9.3 Endangered Species Act Species and Critical Habitat

This section summarizes the analysis of potential effects from the project on ESA-listed species and designated critical habitats with the potential to occur in the project area (Table 17) that is included in more detail in the BA developed for this project.

Table 16. Federally Listed Species That Occur in the Project Action Area

Species	ESU/DPS	Listing Status	Agency	Critical Habitat
Birds				
Northern spotted owl (*Strix occidentalis caurina*)	NA	Threatened	USFWS	Designated in action area
Streaked horned lark (*Eremophila alpestris strigata*)	NA	Threatened	USFWS	Designated but not in action area
Yellow-billed cuckoo (*Coccyzus americanus*)	Western DPS	Threatened	USFWS	Designated but not in action area
Mammals				
Gray wolf (*Canis lupus*)	NA	Endangered	USFWS	Designated but not in action area.
Reptiles				
Northwestern pond turtle	NA	Proposed Threatened	USFWS	No critical habitat proposed or designated
Fish				
Bull trout (*Salvelinus confluentus*)	Coterminous United States	Threatened	USFWS	Designated in Columbia River in action area
Chinook salmon *(Oncorhynchus tshawytscha)*	Upper Columbia River spring-run ESU	Endangered	NMFS	Designated in Columbia River in action area
Chinook salmon *(Oncorhynchus tshawytscha)*	Multiple ESUs[1]	Threatened	NMFS	Designated in Columbia River and Willamette River[3] in action area
Steelhead *(Oncorhynchus mykiss)*	Multiple DPSs[2]	Threatened	NMFS	Designated in Columbia River and Willamette River[3] in action area
Chum salmon *(Oncorhynchus keta)*	Columbia River ESU	Threatened	NMFS	Designated in Columbia River in action area
Coho salmon *(Oncorhynchus kisutch)*	Lower Columbia River ESU	Threatened	NMFS	Designated in Columbia River in action area
Sockeye salmon *(Oncorhynchus nerka)*	Snake River ESU	Endangered	NMFS	Designated in Columbia River in action area
Eulachon *(Thaleichthys pacificus)*	Southern DPS	Threatened	NMFS	Designated in Columbia River in action area
Green sturgeon *(Acipenser medirostris)*	Southern DPS	Threatened	NMFS	Designated in downstream reach of Columbia River but not in action area
Plants				
Willamette Daisy (*Erigeron decumbens*)	NA	Endangered	USFWS	Designated but not in action area

Note: ESU = Evolutionary Significant Unit; DPS = Distinct Population Segment; NA = not applicable; NMFS = National Marine Fisheries Service; USFWS = U.S. Fish and Wildlife Service

[1] Four threatened ESUs for Chinook Salmon: Lower Columbia River, Upper Willamette River, Snake River spring/summer run, and Snake River fall run.

[2] Five threatened DPSs for steelhead: Lower Columbia River, Upper Willamette River, Middle Columbia River, Upper Columbia River, and Snake River.

[3] Critical habitat is designated in the Willamette River for the Lower Columbia River and Upper Willamette River ESUs and DPSs of Chinook salmon and steelhead, respectively.

9.3.1 Terrestrial Species

Trenching to install the cable in all terrestrial portions of the project would occur in existing roadside and road prism, which does not provide suitable habitat for ESA-listed species. No impacts to habitat supporting terrestrial ESA-listed and proposed species would occur as a result of the project.

ESA-listed terrestrial species could be affected by temporary construction noise during construction of the converter stations, vibratory pile driving for the sheet pile cofferdams at the land to water transition areas, as well as trenching and backfilling the cable trenches. The yellow-billed cuckoo is not documented to occur in the project area, but it is within the historic breeding range of the species and suitable foraging and nesting habitat is present on Hayden Island. Similarly, the gray wolf is not expected to occur in the project area, but wolves are wide ranging and transient individuals cannot be completely ruled out. Streaked horned larks and northern spotted owls are documented to occur within the vicinity of the project action area may perceive elevated in-air noise and temporarily alert to the noise source. However, alterations in behavior or displacement from occupied habitats are not expected. Habitat suitability for both species in the vicinity of the project route is marginal due to the developed, industrial nature of the area, and neither species has been observed within the project footprint or adjacent areas. The northwestern pond turtle is known to occur in the Pierce National Wildlife Refuge recovery site, located about 0.4 mile north of the proposed upland cable trenching route. The cable installation would avoid the recovery site and would not extend into suitable aquatic habitat for the northwestern pond turtle in this area and the project would have no effect on this species.

Analysis concluded that the project is not likely to adversely affect northern spotted owl, streaked horned lark, yellow-billed cuckoo, and gray wolf. Although highly unlikely, the presence of an individual, yellow-billed cuckoo or gray wolf occurring in the project area and being disturbed by construction noise cannot be completely discounted. The project would not impact Northern spotted owl and streaked horned lark habitat, but individuals could be temporarily affected by construction noise.

9.3.2 Aquatic Species

ESA-listed fish would be temporarily affected by elevated in-water noise and localized turbidity. Short-term elevated underwater noise and turbidity from cable installation and vibratory installation of the sheetpile cofferdams where cable connections occur would result during construction. These actions would occur within the in-water work window of November 1 through March 15 (February 28, downstream of Bonneville Lock and Dam) when migrating salmon are least likely to be present. Elevated underwater noise produced during vibratory sheet pile installation and removal has the potential to produce behavioral impacts to fish but is not known to cause injury or physical harm to fish. Behavioral changes can include relatively immeasurable effects or minor effects, such as startling, momentary disruption in feeding, or avoidance of the area.

In-water construction activities could stir up sediments and increase turbidity in areas close to the hydroplow when installation is occurring. Turbidity caused by the hydroplow would dissipate within minutes to hours, as sandy material quickly drops out of the water column and finer material is diluted by riverine flow. Migrating adult and/or juvenile salmon, steelhead, or bull trout that are temporarily exposed to elevated levels of turbidity may modify feeding and/or migratory behavior to avoid areas of high concentration.

Pre- installation dredging the few navigation channel segments using mechanical or hydraulic methods, as well as dredging inside the temporary cofferdams for the land to water transition HDD pits would also occur within the in-water work window when salmon are least likely to be present. Given that dredging will not occur in spawning areas where concentrations of salmon, sturgeon, or Eulachon occur, the co-occurrence of an individual of these species and the dredge bucket is extremely unlikely. As such, entrapment or any interactions with these fish species causing adverse effects during the dredging operations is also extremely unlikely and considered discountable.

Permanent, and ongoing, impacts to freshwater habitat will be negligible to ESA-listed salmonids and impacts to potentially suitable Eulachon and White Sturgeon spawning habitat would be temporary and largely avoided due to routing in or near the navigation channel.

Operation of the cable produces an electromagnetic field (EMF) and generates heat within the cable. Magnetic fields were calculated and plotted for cable burial depths at 10 feet, as well as additional cases of 0.5 feet, 2 feet and 5 feet. The magnetic field levels for the 0.5-foot burial and 2-foot burial, at the river bottom, would exceed the natural background levels of approximately 54 microteslas (μT) normally occurring in the Columbia River. The magnetic field decreases with distance and dissipates to near 0 at 30 feet from centerline of the cable. All other magnetic field levels will be below the 54μT natural background magnetic field. Based on burial depth of the cable and low amount of magnetic field measured from the cable that would be above background levels, it is unlikely that there would be measurable effects to salmonids and other fish species due to exposure to the EMF from the proposed cable. This was corroborated by NMFS biological opinions for offshore wind projects on the east coast of the U.S., which determined EMF would have insignificant effects on fish species (NOAA 2019, NOAA 2021, NOAA 2023). Therefore, effects of EMF produced by the proposed action are considered insignificant.

When electric energy is transported, a certain amount gets lost as heat, leading to an increased temperature of the cable surface and subsequent warming of the surrounding environment. The Applicant commissioned an analysis of thermal contributions from the cable at different burial depths and surrounding ambient temperatures, which showed that temperatures at the mudline and water column would remain at ambient temperatures. Therefore, there would be no thermal impacts to the water column where ESA-listed fish species occur.

Increased temperatures around the cable and subsequent changes to benthic communities are anticipated to occur in the areas where the cable could not be buried at least 2 feet below the surface. Modeling shows that at a 0.5-foot burial depth, the temperature would elevate above ambient at a 16-inch diameter around the cable center point. Based on current knowledge, shallow burial may be needed for up to 2.4 miles, principally downstream of The Dalles, where the river channel is deep, with bedrock inclusions. This temperature change is expected to alter the benthic community as some species and/or individuals may avoid the zone of elevated temperature. However, the complexity of the benthic community is likely limited due to the depth and substrate type.

The analysis outlined in the BA concluded that the project is not likely to adversely affect green sturgeon and bull trout. Bull trout suitable foraging, rearing, and holding habitats are generally lacking, and the presence of bull trout in the lower Columbia River is historically limited to a few individuals annually; they are not expected to be present during the in-water work window. Green sturgeon that generally occur in the estuary and downstream reaches of the Columbia River are highly unlikely to occur in the project area during the cable installation work window. Given the importance of the Columbia River as a major corridor for many species and runs of salmon, the project was determined likely to have temporary adverse impacts on Chinook salmon, chum salmon, coho salmon, sockeye salmon, steelhead trout, and Pacific eulachon, although impacts would be restricted to behavioral effects.

9.4 Fish and Wildlife

The following section outlines general effects to fish and wildlife and is followed by specific discussion of specific species of interest. State listed species, which are also federally listed, are addressed in the previous Section.

9.4.1 Terrestrial

The proposed alignment is located principally in urban areas and will be installed within previously disturbed areas, including road ROW (i.e., pavement, gravel, maintained embankments). HDD or other trenchless methods would be used to avoid riparian areas associated with creeks and rivers. Generally, terrestrial wildlife would experience elevated noise and visual disturbance during construction, causing individuals to temporarily vacate or avoid construction areas.

The locations of the staging areas for HDD sites were selected to avoid woody vegetation and make use of grassy/graveled areas, which would recover more quickly than other types of vegetation. However, disturbance of some limited woody vegetation may be required for construction. Disturbed vegetated areas will be restored to existing or better habitat conditions (i.e., topsoil conditioning, reseeding, planting). Photos will be taken showing pre-project conditions in the construction areas and used as a reference for restoration.

Hayden Island has a higher percentage of established riparian forested areas, relative to other locations. In this area, project installation would follow existing utility ROWs and previously cleared areas. The proposed construction timing of work on Hayden Island is from September 1 to December 31, which would minimize disruption to wildlife during peak nesting and breeding periods across many families of wildlife.

9.4.2 Aquatic

There would be temporary disturbance to aquatic habitat as a result of installing the HVDC transmission cable, three-sided wet cofferdam, and pre-installation dredging. The alignment has been sited to be close to, or within, the established federal navigation channel, which is actively maintained by the USACE. Pre-installation dredging would only occur within the navigation channel if the required installation depths cannot otherwise be met. In the Columbia River, dredging occurs within the navigation channel and the benthic community co-exists under these periodic disturbances associated with channel maintenance.

Installation would temporarily disrupt the benthic community located within the trench area and wet cofferdams. Based on the location of the route, the benthic community is anticipated to be less complex than that of shallower areas along the shorelines. Forage quantity for juvenile fish may be temporarily reduced within the in-water work areas as benthic organisms become disturbed by the project; however, re-colonization of benthic organisms would likely occur within a few weeks to a few months (i.e., 15 to 60 days) following project completion (Dernie et al. 2003; NMFS 2022; NMFS 2009).

Short-term, localized, project-related increases in background turbidity levels may occur as a result of activities associated with installation. Given the existing substrate conditions, hydroplow installation methods and transitory nature of the installation, sediment distribution would be localized (i.e., within hundreds of feet) of the proposed alignment. As such, short-term, localized increases in background turbidity resulting from temporary work are not expected to result in net change in function of the in-water habitat.

Up to 2.4 acres of cable protection may be needed in select locations (see Exhibits in Attachments). Cable protection would not be used unless essential (i.e., cable bundle cannot be buried at a depth of 5 feet or below). In some areas (e.g., below Bonneville Lock and Dam), there is potential for the cable protection to be covered by natural sediments.

Above Bonneville Lock and Dam, cable protection would be needed in locations where substrate is not suitable for burial because the channel substrate may consist of bedrock or other large boulders. In these situations, the cable protection would mirror the existing substrate type and function. As a result, cable protection is not expected to result in a change in function of the in-water habitat (i.e., biologic function, trophic structure).

Where the cable cannot be buried at least 0.5 feet, bed/sediment temperature would be elevated above background within the benthic zone (i.e., upper 8 inches of the bed sediments). Temperature would be elevated across a diameter of approximately 16 inches (i.e., the width of the cable bundle + 2 inches on either side). This elevated temperature may alter the benthic community within this area. However, most of the area where shallow burial is possible is located in a section of the river that is over 100 feet deep, with potentially rocky substrate, which likely limits benthic community complexity and abundance.

Bald Eagle

Bald eagles (*Haliaeetus leucocephalus*) are known to nest in the riparian forested areas on the south side of Hayden Island, and a bald eagle nest is located approximately 0.75 mile to the northwest of a proposed HDD area. Nesting eagles could be exposed to elevated noise during project construction of the HDD pits and trenching. The trenching and HDD work from Hayden Island would be scheduled to occur between September and December in order to avoid the nesting season. The cable route and HDD pit are sited in existing open disturbed areas following an access corridor for the transmission lines that cross the island, and no mature trees suitable for nesting would be removed.

Pacific Lamprey

Pacific lamprey (*Entosphenus tridentatus*) are anadromous and migrate up the Columbia River as adults to spawn in tributaries. Larval lamprey burrow in fine sediments where they remain as filter feeders. The larval life stage is the most susceptible to impacts from the project due to their low mobility and presence year-round in the substrate. The distribution of lamprey in the Columbia River is not well known, but they are concentrated in tributaries and at river mouths. The cable route and trenching operations avoid these areas and therefore reduce the likelihood of impacts to larval lamprey.

Adults migrate up the Columbia River generally between February and June; therefore, some migrating adults could be present in the late part of the in-water work window. As with migrating salmon, turbidity and noise effects from the cable installation would be localized and may cause a behavioral response in lamprey in the vicinity, but risk of entrainment or physical harm is considered discountable.

White Sturgeon

White sturgeon (*Acipenser transmontanus*) occur in the river both upstream and downstream of Bonneville Lock and Dam year-round and would be present during the cable installation in-water work window. Sturgeon are bottom-oriented and are more likely to be in proximity to the cable route during installation of the cable as well as EMF during operation of the cable. White sturgeon spawn and rear in the mainstem Columbia River and both adults and juvenile life stages would potentially be exposed to project impacts. Adults and subadults are highly mobile and would be able to avoid areas temporarily impacted by turbidity and underwater noise. As described in the BA, EMF levels would be below background at the surface of the riverbed where the cable is buried 10 feet or more. Low levels of EMF would be above background in the area immediately above the cable. However, studies have shown that magnetic fields need to be considerably higher (in some cases orders of magnitude) than produced by underwater transmission cables to elicit a behavioral response in sturgeon and Atlantic salmon (Bevelhimer et al. 2013; BOEM 2019).

Cutthroat Trout

Cutthroat trout (*Oncorhynchus clarkii*) inhabit the upper reaches and headwaters of tributaries and can be resident (remain in freshwater streams) or anadromous. The anadromous form are similar to salmon in that they live and feed in the ocean for a period of time and then return upriver to tributaries to spawn, including the Sandy River, Hood River, and smaller tributaries in the Columbia Gorge. Anadromous cutthroat trout use the Columbia River as a migratory corridor in the project area. As described above for salmon, impacts from the cable installation would be localized and temporary, and migrating fish could avoid the area, so impacts are considered insignificant. Cutthroat trout are also pelagic and would not be associated with the riverbed and consequently not exposed to EMF from the operating cable.

Freshwater Mussels

Freshwater mussels that inhabit the Columbia River include the Western ridged mussel (*Conidea angulata*), which is currently a candidate for listing under the ESA due to its low numbers, and floaters, including the winged floater mussel (*Anodonta nuttalliana*). The distribution of mussel beds in the mainstem Columbia River is not well documented, but they are known to inhabit shallower areas near river mouths with cobble and gravel substrates. They have also been found in deeper waters during dredging operations. Mussels that may occur in the path of the cable installation and land to water transition cofferdam areas would be susceptible to displacement, entrainment in a clam shell dredge, or burial from settling sediments and side cast dredge material. The cable route in and adjacent to the navigation channel reduces this risk due to placement in an already disturbed and routinely dredged area where mussels and other benthic organisms are less likely to occur. The deep water soft substrate and regular disturbance in the navigation channel also makes it less likely that mussels would colonize the substrate above the buried cable and are unlikely to be exposed to EMF and thermal effects which dissipate to ambient levels in the benthic zone.

9.5 Cultural Resources

Project effects on cultural resources that are listed in or eligible for listing in the NRHP is currently unknown. The Applicant has selected the project footprint to avoid and/or minimize areas with known or with a high-likelihood to contain cultural resources that were identified during desktop records reviews. Field surveys and coordination with tribes and agencies with cultural resources expertise (i.e., State Historic Preservation Officers), the results of which will be summarized in a technical report. The technical report will include recommendations of NRHP eligibility for resources documented during the surveys and preliminary assessment of project effects. An inadvertent discovery plan will be developed for the project, in consultation with the tribes and resource agencies.

9.6 Navigation

Installation generally requires the use of one main vessel (e.g., barge) and smaller supporting vessel, which is a nominal increase relative to Columbia River traffic. Where possible, the alignment has been sited to be just outside or on the edge of the 900-foot-wide navigation channel to allow for two-way traffic. The project would not affect the turning basins associated with the Port of Vancouver and will avoid commonly used vessel holding areas near Hayden Island. The three-sided cofferdams will be placed outside the navigation channel and are the non-transient components of the project installation.

The Applicant will work directly with the U.S. Coast Guard before and during installation to minimize disruption to river navigation. Based on experience, submarine cable installation does not cause notable delays to commercial traffic. The Applicant will coordinate with other notable projects (e.g., I-5 Bridge Replacement, Hood River Bridge) related to timing and placement as the project progresses to minimize impacts to navigation and construction.

9.7 Fishing

The proposed in-water work period of November 1 to March 15 coincides with the time of year when there is less commercial and recreational fishing in the river. However, there is some fishing activity year-round in the river. Project installation may displace individuals looking to fish or require caution when moving around the installation vessels and/or in-water cofferdams. The Applicant will work with the U.S. Coast Guard before and during installation related to notice and boater safety related measures.

9.8 Recreation

Generally, the project alignment is located off-shore away from boat areas, upland trails, and swimming/beach access. Additionally, water and outdoor sports occur less frequently in the winter as the temperature of the Columbia River drops and precipitation increases, which corresponds to the proposed in-water work window of November 1 to March 15. There is the possibility that water and nearshore users of the Columbia River, Willamette River and the Columbia Slough experience elevated noise, visual disturbances, and a need for individuals to re-route around active installation. These effects would be transient in nature (i.e., days to weeks). In Oregon, there is one location with closer proximity to water and shoreline users.

The Dalles land-to-water transition area has a proposed in-water cofferdam, approximately 1,000 feet from the entrance of The Dalles Marina and Yacht Club and 800 feet from the shoreline of the Riverfront Park in the Dalles. The Marina is a private facility that provides public amenities (e.g., gas, moorage). Individuals using the Marina and Yacht Club facilities may need to navigate around construction and may experience noise and visual disturbances. The Applicant will work with the U.S. Coast Guard and Marina and yacht club owners related to notices and signage to alert users and minimize the potential for conflicts and implement measures to address safety considerations.

The Riverfront Park in the Dalles is a mixed-use area that provides parking, picnicking, play area, and beach access. The park is seasonally closed (November 1- Memorial Day), which coincides with the construction period (November 1- March 15). Park users would not be directly affected by construction. This park is connected to the Riverfront Trail and it is possible that trail users would also passively use the park during off-season. If so, users could experience elevated noise and visual disturbances consistent with other general shoreline uses.

Part B. For temporary removal or fill or disturbance of vegetation in waterbodies, wetlands or riparian (i.e., streamside) areas, discuss how the site will be restored after construction to include the timeline for restoration.

There is no proposed restoration for work in the Columbia River to address temporary disturbances. The river substrate would resettle and the benthic community would become reestablished and populated from nearby areas.

Construction staging areas have been located to avoid removal of riparian trees and shrubs. Construction staging areas will be flagged and/or fenced to reduce incidental loss of woody vegetation through damage or root compaction. However, there could be individual trees or shrubs removed for access roads, or on the periphery of the staging area.

Upland riparian areas will be stabilized and replanted and restored to pre-construction or improved conditions. Pre-construction photos will be taken as a reference for post- construction restoration. In riparian areas (i.e., within 200 feet of the ordinary high water) tree removal will be documented and trees will be replanted. The Applicant will work with landowners to replace trees of similar type and preferably with native species.

Seeding and planting will occur in the appropriate season to increase survivability, during the period following construction in that location. Because construction is generally occurring in late fall and winter, plantings will likely be completed in late winter/early spring, in groups that tie to the construction location as it closes (e.g., converter station, roadside sections, etc.). Temporary erosion prevention and sediment management practices will remain in place until seeding has become established.

Part C. Proposed mitigation approach

The specific mitigation proposal is under devevelopment. The Applicant will work with Tribes (as requested), resource agencies, and landowners during the permitting process to identify relevant and scale appropriate mitigation and/or off-setting actions for the project.

Part D. Provide a brief description of mitigation approach and the rationale for choosing that approach. If you believe mitigation should not be required, explain why.

In water, most (i.e., approximately 97 percent), of project impacts (water quality, noise, visual disturbance) would be temporary and transient. Recovery to baseline conditions and functions is expected from days (water quality, noise, visual disturbance) to months (benthic communities). Changes to pre-construction conditions would occur where the cable could not be installed below 5 feet and/or would require cable protection. This scenario may occur in three locations per Table 18.

Table 17 Potential Cable Protection Locations

River Mile	Total Length	Comments
187 to 189	4,875	Deep section of river with bathymetric and sub-bottom profile soundings indications of rocky river bottom
186 to 187	1,925	Deep section of river with bathymetric indications of steeper banks and potentially rocky river bottom.
177	2,000	Deep section of river with bathymetric indications of steeper banks and potentially rocky river bottom.
121.5	300 feet (0.06 mile)	Known utility crossing of two, 20- inch gas pipelines
120 to 121	3,500 feet	Section of river with bathymetric and sub-bottom profile soundings indications of shallow consolidated material
Total Length/Area	2.4 miles/2.4 acre	--

Shallow burial and cable protection would only be used if riverbed conditions and existing pipeline elevations limit depth. There is uncertainty related to the need for shallow burial/cable protection as noted in Table 18 based on geophysical survey. Substrate depth and type will be completed prior to construction to further ascertain substrate depth and type.

This shallow burial and/or cable protection has the potential to affect sediment continuity and biodiversity functions within a localized area. At RM 121.5, the substrate consists of sands and soils, and the cable protection (approximately 8 feet wide by 600 feet long) would introduce different substrate that may alter the benthic community or sediment continuity in that specific area. At RMs 185.8-188.7, if cable protection is needed, it would be due to a rocky substrate, in which case, the hydraulically stable cable protection is expected to closely mimic the natural substate. Changes to geomorphic functions from the project at a reach scale is not anticipated.

There is the potential for elevated sediment temperature in the benthic zone if the cable is buried less than 2 feet below the mudline. Elevated temperatures could be present over a 16-inch-diameter area, totaling 0.4 acre, across the project area. This temperature change may affect the benthic community and cause sediment dwelling fish (e.g., lamprey) to avoid the area.

The Applicant is pursuing the identification of mitigation or off-setting actions to address project impacts. Examples of actions could include actions such as:

1. Removal of anthropogenic debris or materials (e.g., derelict vessels, waste, etc.)
2. Habitat improvements
3. Funding to support studies

Section 10: Adjacent Property Owners for Project

10001 NORTH RIVERGATE INDUSTRIAL LLC 2001 ROSS AVE #2800 DALLAS, TX 75201	ARCHER-DANIELS-MIDLAND COMPANY 4666 E FARIES PKWY DECATUR, IL 62526-5678	6204-6308 NORTH MARINE DRIVE LLC PO BOX 847 CARLSBAD, CA 92018
ASH GROVE CEMENT CO 11011 CODY ST OVERLAND PARK, KS 66210	BUCK KENNETH R 570 NE TOMAHAWK ISLAND DR PORTLAND, OR 97217-8094	7409-7515 LEADBETTER ROAD LLC PO BOX 847 CARLSBAD, CA 92018
BURKE NANCY M ET AL 7285 SW BRENNE LN PORTLAND, OR 97225-2018	7530 LEADBETTER LLC 621 SW ALDER ST #800 PORTLAND, OR 97205	ASSOCIATION OF UNIT OWNERS OF COLUMBIA POINT CONDO 102 N HAYDEN BAY DR PORTLAND, OR 97217
BNSF RAILWAY COMPANY 2650 LOU MENK DR AOB-3 FORT WORTH, TX 76131	AJINOMOTO FOODS NORTH AMERICA INC 4200 E CONCOURS DR ONTARIO, CA 91764	ASSOCIATION OF UNIT OWNERS OF COLUMBIA POINT WEST CONDO 233 N HAYDEN BAY DR PORTLAND, OR 97217
UNION PACIFIC RAILROAD COMPANY 1400 DOUGLAS STOP 1640 OMAHA, NE 68179-1640	AJINOMOTO TOYO FROZEN NOODLES INC ATTN: SARA FROMM 6500 N MARINE DR PORTLAND, OR 97203	BABECKOS BILL TR & DIETRICH HOWARD N JR TR 3157 NE MARINE DR PORTLAND, OR 97211-2115
WESTERN C REIT OR LLC PO BOX 460169 HOUSTON, TX 77056	AKRE STEVEN M PO BOX 6644 PORTLAND, OR 97228	WELLONS GROUP INC 2525 W FIRESTONE LN VANCOUVER, WA 98660
AMAN LLC 2105 NE FAIRWAY DR PORTLAND, OR 97211-1685	ZEIGLER, RYAN C 3023 E 2ND ST THE DALLES, OR 97058	WAYPOINTS PROPERTIES LLC 50 OAK CT #210 DANVILLE, CA 94526-4048
AMERICAN TOKYO KASEI INC 9211 N HARBORGATE ST PORTLAND, OR 97203-6308	VHE II-OR LLC PO BOX 7110 APPLETON, WI 54912-7067	ANN K FRANCIS REV TR 644 NE LOMBARD ST PORTLAND, OR 97211

BONNEVILLE POWER ADMINISTRATION 905 NE 11TH AVENUE PORTLAND, OR 97232	MICHAEL G BYERS 3693 FIFTEEN MILE RD THE DALLES, OR 97058	RONALD R CARTER, RLT PO BOX 903 THE DALLES, OR 97058
AMY V & COONEY JOHN V COONEY 1625 NE MARINE DR PORTLAND, OR 97211	EVRAZ INC NA 71 SOUTH WACKER DRIVE STE 1700 CHICAGO, IL 60606	CARTIER SHIRLENE C TR 4231 RIVERVIEW DR WEST LINN, OR 97068
CQ LANDLORD (MULTI) LLC PO BOX 56607 ATLANTA, GA 30343	FRIENDCO NW LLC 13725 SE LE ANN CT BORING, OR 97009	CHIPMAN PROPERTIES 1040 MARINA VILLAGE PKWY #100 ALAMEDA, CA 94501
RAYMOND D & CUSHMAN NANCIE A CUSHMAN 61839 NE TUMALT RD CASCADE LOCKS, OR 97014	FULTON FARMS LLC 3865 FIFTEEN MILE RD THE DALLES, OR 97058	CINTAS SALES CORPORATION 6800 CINTAS BLVD MASON, OH 45040-9151
GARD & MAXINE FULTON, LLC 9737 SW LYNWOOD TERRACE PORTLAND, OR 97225	DONNA L HERTNER & STEPHEN V HERTNER FAMILY REV LIV TR 1656 SW KENDALL CT TROUTDALE, OR 97060	NAHUM GARCIA 8250 N ALBINA AVE PORTLAND, OR 97217
DPML RAMSEY LLC 5500 EQUITY AVE RENO, NV 89502	GARY M KUNZ TR 1611 NE MARINE DR PORTLAND, OR 97211	CLASS HARBOR ASSOCIATION INC 3939 N MARINE DR PORTLAND, OR 97217-7765
ECO SERVICES OPERATIONS CORP 300 LINDENWOOD DR MALVERN, PA 19555	EHJ6 PROPERTY LLC 625 VISTA WAY MILPITAS, CA 95035-5433	GLENDEE W FITZ REV LIV TR 1595 SE COCHRAN DR GRESHAM, OR 97080-6266
COLUMBIA RIVER YACHT CLUB 37 NE TOMAHAWK IS DR PORTLAND, OR 97217	GOEKJIAN PROPERTIES GROUP LLC 13932 NE MILTON ST PORTLAND, OR 97230	COLUMBIA SPORTSWEAR USA CORP 14375 NW SCIENCE PARK DR PORTLAND, OR 97229

LAUREN ENGLAND & NOREEN CULVER 1735 NE MARINE DR PORTLAND, OR 97211	GONSALVES & SANTUCCI INC 5141 COMMERCIAL CIR CONCORD, CA 94520	HARSCH INVESTMENT PROPERTIES LLC PO BOX 2708 PORTLAND, OR 97208-2708
THIKERED IRWIN & MARY IRWIN PO BOX 55610 PORTLAND, OR 97238	KNIGHT CHERYL A-1/2 & KIPP RICHARD-1/2 1701 NE MARINE DR PORTLAND, OR 97211-1535	HAYDEN ISLAND ENTERPRISES LP 31550 NORTHWESTERN HWY #200 FARMINGTON HILLS, MI 48334
JERRY IVY & DEBORAH IVY 450 FERGUSON DR MOUNTAIN VIEW, CA 94043-5214	LACAMAS LABORATORIES INC PO BOX 17659 PORTLAND, OR 97217	HAZEL DELL ORCHARDS LLC 3551 OLD DUFUR RD THE DALLES, OR 97058
J R SIMPLOT COMPANY PO BOX 27 BOISE, ID 83707-0027	LANDCO LLC PO BOX 2048 FAIRVIEW, OR 97024	HEALTHY PLANET FARMS, LLC 19620 WELLS DR TARZANA, CA 91356
JAMES DAVID LISTON TR 328 N LOTUS ISLE DR PORTLAND, OR 97217-8071	VERNON L LANG TR & MAVOURN L LANG TR 15668 S HENRICI RD OREGON CITY, OR 97045-9312	HEUKER PROPERTIES INC PO BOX 98 CASCADE LOCKS, OR 97014
JBH PROPERTY ACQUISITIONS LLC 909 N HAYDEN ISLAND DR PORTLAND, OR 97217-8118	TIM HEUKER & CASEY HEUKER 63111 NE TUMALT RD CASCADE LOCKS, OR 97014	QING JIANG & NING LANG 13800 NW SPRINGVILLE RD PORTLAND, OR 97229
LOEB FAMILY LIV TR & FELIX LOEB III REV LIV TR 1908 SW TERRACE DR PORTLAND, OR 97201	JOHN W NEIDIG TR & BARBARA COGAN NEIDIG TR 1415 NE MARINE DR PORTLAND, OR 97211	LONE PINE LAND & CATTLE LLC 3600 CRATES WAY STE 100 THE DALLES, OR 97058
MICHAEL HRYCIW & JEAN M HEALY 10350 N VANCOUVER WAY PMB 97 PORTLAND, OR 97217-7530	MABEK CO 1813 MILLER RANCH DR WESTLAKE VILLAGE, CA 91362-4748	INLAND SEA MARITIME GROUP LLC 11836 S BREYMAN AVE PORTLAND, OR 97219

JEFF JOSLIN & KATHLEEN RYALS 2440 24TH ST SAN FRANCISCO, CA 94110	MARINE DRIVE LLC & DAVID W NICKILA 6840 N MARINE DR PORTLAND, OR 97203	IPT KELLY POINT DC LLC 1800 WAZEE ST #500 DENVER, CO 80202
KATHLEEN F LESLIE REV TR 14225 SW ROCHESTER DR BEAVERTON, OR 97008-4981	MARKMAN WILLIAM J & SHELIA 4800 EIGHT MILE RD THE DALLES, OR 97058	MARUICHI OREGON STEEL TUBE LLC 8735 N HARBORGATE ST PORTLAND, OR 97203-6363
ARTHUR R MURRELL JR & MARSHA MAHON 14740 NW GILLIHAN RD PORTLAND, OR 97231-1527	OREGON METAL SLITTERS INC 7227 N LEADBETTER RD PORTLAND, OR 97203-6490	MARY M BURCH SURVIVOR'S TR 4035 NE MARINE DR PORTLAND, OR 97211-2133
N BYBEE LAKE COURT LLC 1121 SW SALMON ST STE 500 PORTLAND, OR 97205	WHV LLC 6 HILLSHIRE DR LAKE OSWEGO, OR 97034	JOHN A MC LEOD PO BOX 48 DALLESPORT, WA 98617
NBP 8823 N HARBORGATE LLC 309 SW 6TH AVE #210 PORTLAND, OR 97204	VAN ABKOUDE PENY L & ALLEN LIV TR 3545 SW DOSCH CT PORTLAND, OR 97221	MC MARINE LLC 250 NE TOMAHAWK ISLAND DR PORTLAND, OR 97217-7906
JAYCEE R. NEWMAN AND DEBORAH L. NEWMAN PO BOX 1996 FAIRVIEW, OR 97024	OREGON STATE DEPT OF TRANSPORTATION 123 NW FLANDERS ST PORTLAND, OR 97209-4012	METRO 600 NE GRAND AVE PORTLAND, OR 97232-2736
NEZ PERCE TRIBE PO BOX 365 LAPWAI, ID 83540	WILLIAM M AND WILLIAM M HILANDS 31625 SE HINMAN AVE. ESTACADA, OR 97923 ESTACADA, OR 97023	MILLER CREEK HOLDING LLC 1800 SOUTHSHORE BLVD LAKE OSWEGO, OR 97034-5852
NORDSTROM INC PO BOX 21045 SEATTLE, WA 98101-2288	WHITBECK ISRAEL P 8509 SONETO LN LAS VEGAS, NV 89117	NORTH WASCO CO SCHOOL DISTRICT #21 3632 W 10TH ST THE DALLES, OR 97058

T DOCK LLC 750 NE COLUMBIA BLVD PORTLAND, OR 97211	MORSE BROS INC 32260 OLD HWY 34 TANGENT, OR 97389	NORTHERN WASCO CO PARKS & REC DIST 602 W 2ND THE DALLES, OR 97058
SUPREME PERLITE CO 4600 N SUTTLE RD PORTLAND, OR 97217-7720	NORTHWEST AGGREGATES CO 2025 E FINANCIAL WAY GLENDORA, CA 91741-4692	OREGON TACKLE MARINA LLC PO BOX 28184 PORTLAND, OR 97228
MULFLUR FAMILY LLC 1451 SW HIGHLAND RD PORTLAND, OR 97221	OBERMEIER CARL 61819 NE TUMALT RD CASCADE LOCKS, OR 97014	OWENS CORNING 1 OWENS CORNING PKWY TOLEDO, OH 43659
RODDA PAINT COMPANY 6107 N MARINE DR #3 PORTLAND, OR 97203-6409	ZARINS EDVARDS J PO BOX 301217 PORTLAND, OR 97295	PACMAR MARINA LLC 570 NE TOMAHAWK ISLAND DR PORTLAND, OR 97217
WAUNA LAKE CLUB C/O JODY PADDACK 2355 SW 85TH AVENUE PORTLAND, OR 97225	PORTLAND HARBOR HOLDINGS II LLC PO BOX 3349 ALBANY, GA 31706-3349	PATRICK A DAVIES & LAURA S DAVIES REV TR 21352 NE BLUE LAKE RD FAIRVIEW, OR 97024
PORTLAND YACHT CLUB 1241 NE MARINE DR PORTLAND, OR 97211-1109	PDX 13635 N LOMBARD LLC 9 SE 3RD AVE #100 PORTLAND, OR 97214	WASCO COUNTY 511 WASHINGTON ST THE DALLES, OR 97058
PR NORTH PDX LLC 2626 HOWELL ST 10TH FLOOR DALLAS, TX 75204-4064	WANNEBO RITA 865 NE TOMAHAWK IS DR #102 PMB 187 PORTLAND, OR 97217-8095	PURINA ANIMAL NUTRITION LLC PO BOX 64101 MS4015 ST PAUL, MN 55164-0101
PDX-NWTRP LLC 6102 N MARINE DR PORTLAND, OR 97203-6481	PORT OF PORTLAND 7200 NE AIRPORT WAY PORTLAND, OR 97218	R&J FAMILY REALTY LLC 14599 COMMERCE ST ALLIANCE, OH 44601

PORT OF PORTLAND RIVERGATE V ASSOCIATES LLC 1717 MCKINNEY AVE STE 1900 DALLAS, TX 75202	RANGER N LOMBARD LLC PO BOX 6027 CLEVELAND, OH 44101	WILLIAM MARSHALL, ADMINISTRATOR ESTATE OF WILLIAM WETHERAL AMMEN ESTACADA, OR 97023
PORT OF THE DALLES 3636 KLINDT DR THE DALLES, OR97058	RECOLOGY OREGON INC 9345 N HARBORGATE ST PORTLAND, OR 97203-6314	US TREASURY DEPARTMENT 620 SW MAIN ST PORTLAND, OR 97205-3037
CITY OF PORTLAND 1120 SW 5TH AVE #1000 PORTLAND, OR 97204-1912	ROGER RIDINGS TR & JUDY RIDINGS TR 62245 NE TUMALT RD CASCADE LOCKS, OR 97014-6605	PACIFICOR, LLC 1300 SW 5TH AVE #2705 PORTLAND, OR 97201
PORTLAND GENERAL ELECTRIC CO 121 SW SALMON ST 3WTCPL PORTLAND, OR 97204	RIVERGATE DEVELOPMENT LLC 337 17TH ST STE 200 ATTN: ANDY GREGG OAKLAND, CA 94612	RIVERGATE HOLDINGS LLC 14025 N RIVERGATE BLVD PORTLAND, OR 97203
TENOLD KAY K 1625 MONTANA THE DALLES, OR 97058	STANFILL CHERYL K TR 10350 N VANCOUVER WAY PMB 340 PORTLAND, OR 97217	CITY OF THE DALLES 313 COURT ST THE DALLES, OR 97058
RODDA PAINT CO 6107 N MARINE DR PORTLAND, OR 97203-6409	STATE HIGHWAY DIVISION #20408-495 4040 FAIRVIEW INDUSTRIAL DR SE SALEM, OR 97302-1142	THE FISHERY INC 11583 VALENSIN RD GALT, CA 95632
RODGERS MARINE LLC 3445 NE MARINE DR PORTLAND, OR 97211-2121	STATE OF OREGON 700 SUMMER ST NE SALEM, OR 97310-1201	THUNDERBIRD HOTEL LLC 909 N HAYDEN IS DR PORTLAND, OR 97217-8118
ROSE CITY YACHT CLUB INC PO BOX 3249 GRESHAM, OR 97030	TOWN YARD LLC PO BOX 83623 PORTLAND, OR 97283-0623	ROSETTE ROLLIN S & ROSELLA 1415 JORDAN THE DALLES, OR 97058

SUSAN L WESSINGER TR 14830 NW GILLIHAN RD PORTLAND, OR 97231	TYEE YACHT CLUB INC 2929 NE MARINE DR PORTLAND, OR 97211	RYAN'S MARINA LLC 3335 NE MARINE DR PORTLAND, OR 97211
US FOREST SERVICE 902 WASCO ST #200 HOOD RIVER, OR 97031-3117	SCHNITZER STEEL INDUSTRIES INC PO BOX 847 CARLSBAD, CA 92018	WALLACE PETER G & LISA M 3720 COLUMBIA VIEW DR THE DALLES, OR 97058
PORT OF PORTLAND 2810 MARSHALL AVE STE B TACOMA, WA 98421-3135	BURLINGTON NORTHERN RAILROAD HOLDINGD INC 999 3RD AVE SEATTLE, WA 98104-4001	7410 LEADBETTER LLC 4513 PARKHURST ST MIRA LOMA, CA 91752-1452
IRON MOUNTAIN INFORAMTION MANAGEMENT LLC 1 FEDERAL ST BOSTON, MA 02110-2012	MEPT RIVERGATE IV LLC ALTUS GROUP INC SOUTHLAKE, TX 76092	GLASS PROPERTY LLC 5700 NW FISHER CREEK DR #100 CAMAS, WA 98607
GEORGIA-PACIFIC CONSUMER PRODUCT LLC ATLANTA, GA 30348		

Section 14: Attachments

VICINITY MAP

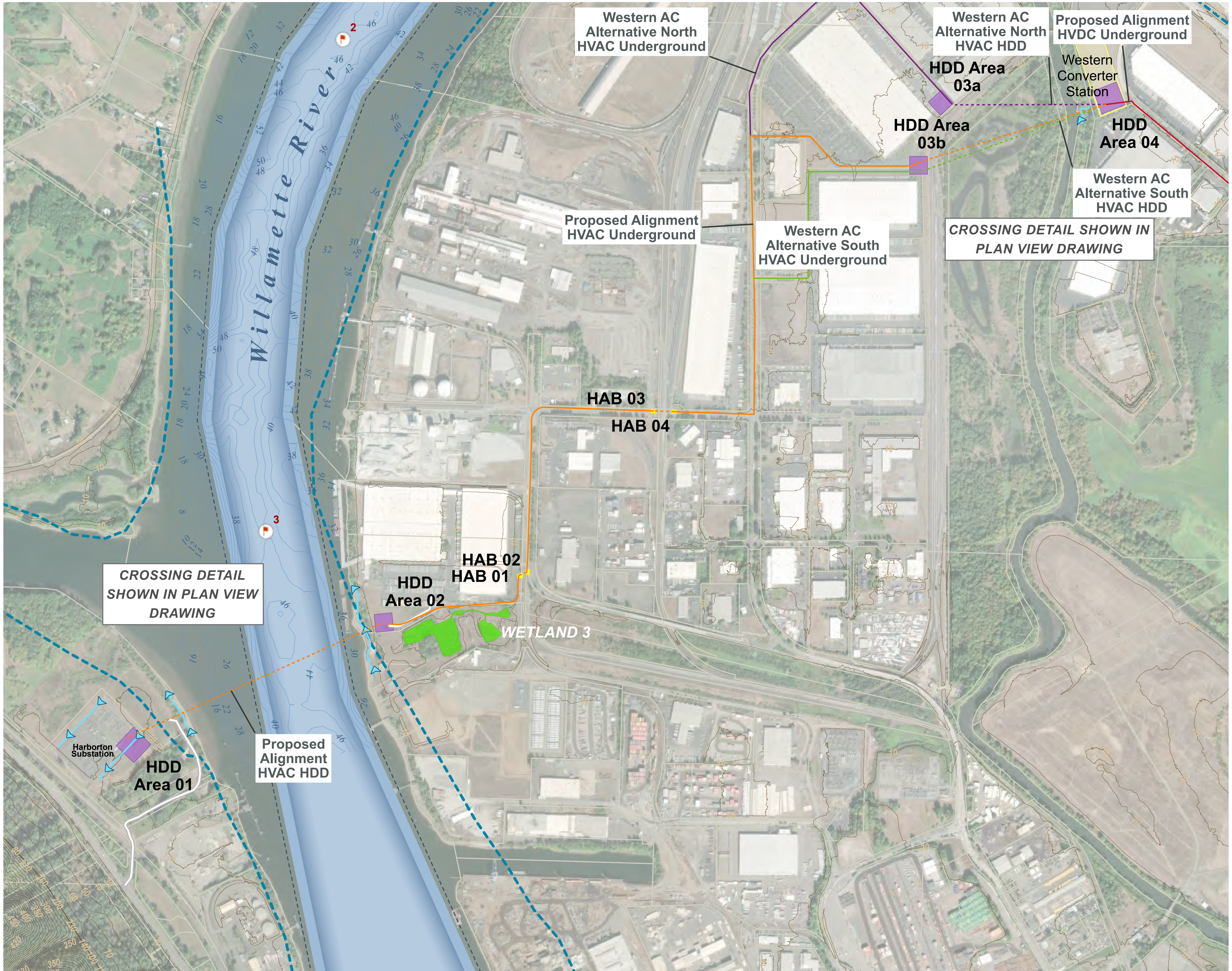
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT
ALTERNATIVES
RIVER MILES (USACE)
COUNTY BOUNDARY
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION

0 10 mi
1:450,000

10/13/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R01W
Section: 26, 27, 34, 35
USGS Quad Name: Linnton

PLAN VIEW MAP

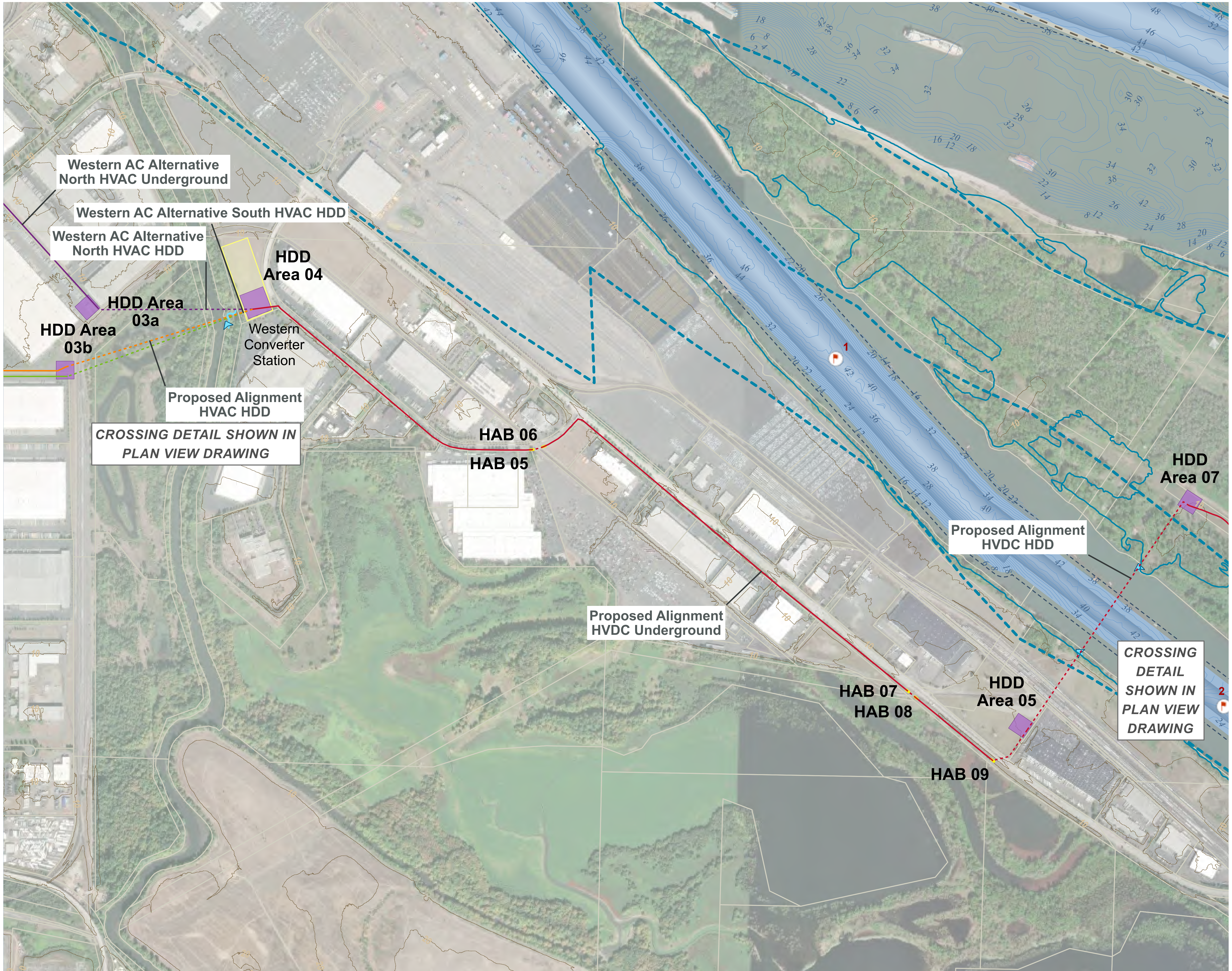
FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVAC HDD
- PROPOSED ALIGNMENT - HVAC UNDERGROUND
- WESTERN AC ALTERNATIVE NORTH - HVAC HDD
- WESTERN AC ALTERNATIVE NORTH - HVAC UNDERGROUND
- WESTERN AC ALTERNATIVE SOUTH - HVAC HDD
- WESTERN AC ALTERNATIVE SOUTH - HVAC UNDERGROUND
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- ACCESS ROAD
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000



PLAN VIEW MAP
PAGE 2 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVAC HDD
- PROPOSED ALIGNMENT - HVAC UNDERGROUND
- WESTERN AC ALTERNATIVE NORTH - HVAC HDD
- WESTERN AC ALTERNATIVE NORTH - HVAC UNDERGROUND
- WESTERN AC ALTERNATIVE SOUTH - HVAC HDD
- WESTERN AC ALTERNATIVE SOUTH - HVAC UNDERGROUND
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- USACE OHW
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

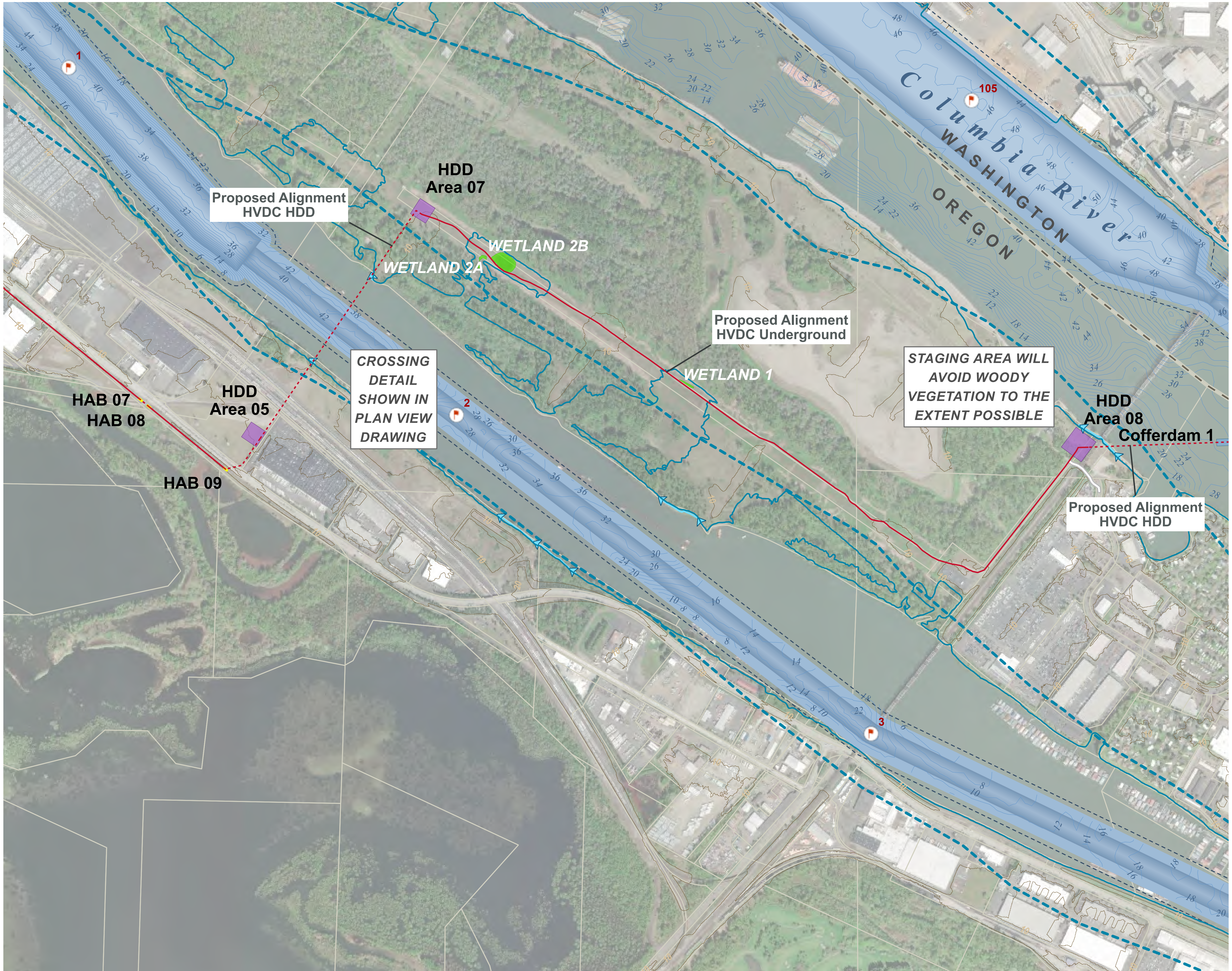
CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R01E
Section: 25, 30
USGS Quad Name: Sauvie Island and Vancouver



PLAN VIEW MAP
PAGE 3 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- ACCESS ROAD
- USACE OHW
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

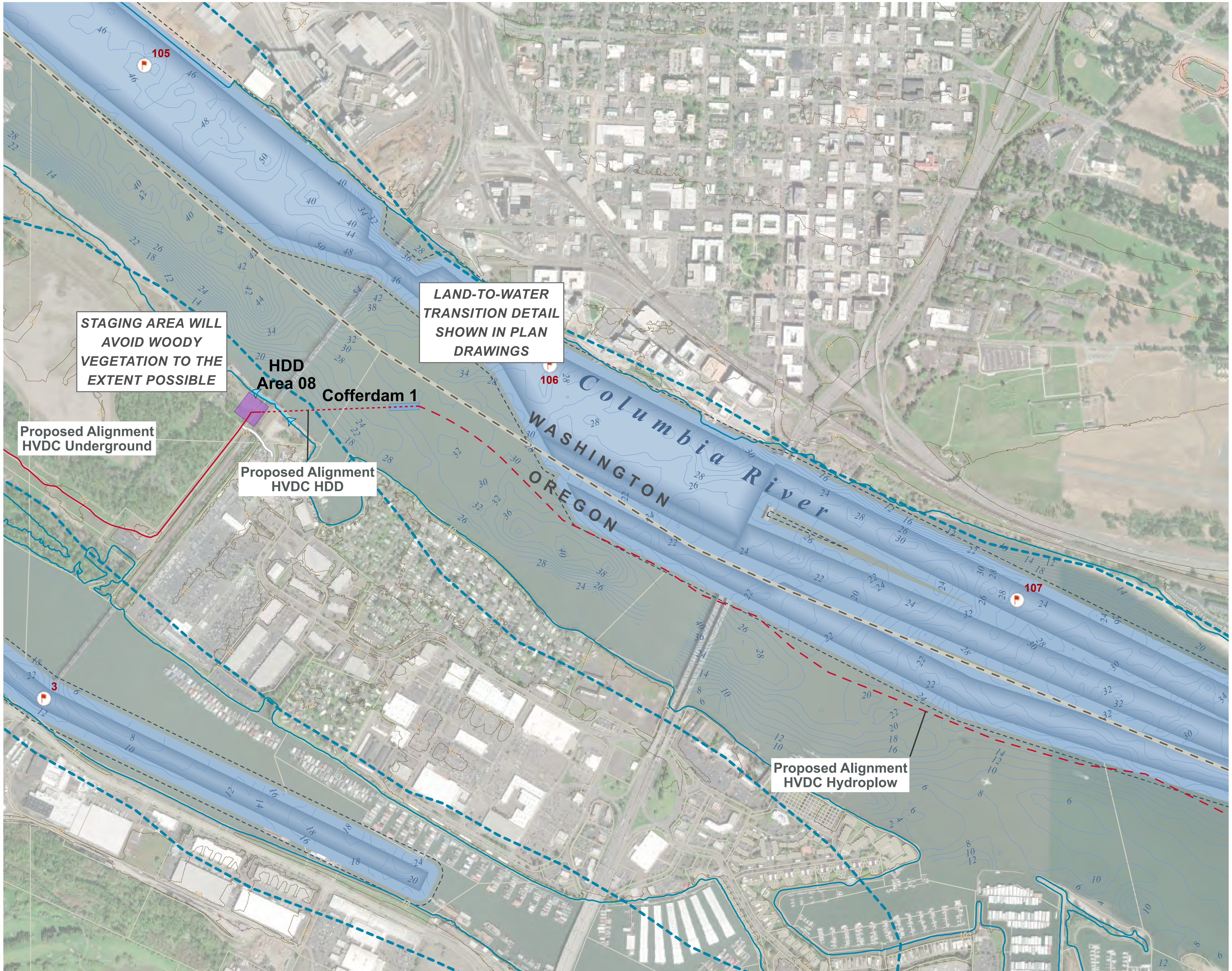
CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R01E
Section: 29, 30, 31, 32
USGS Quad Name: Portland



PLAN VIEW MAP
PAGE 4 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- ACCESS ROAD
- USACE OHW
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

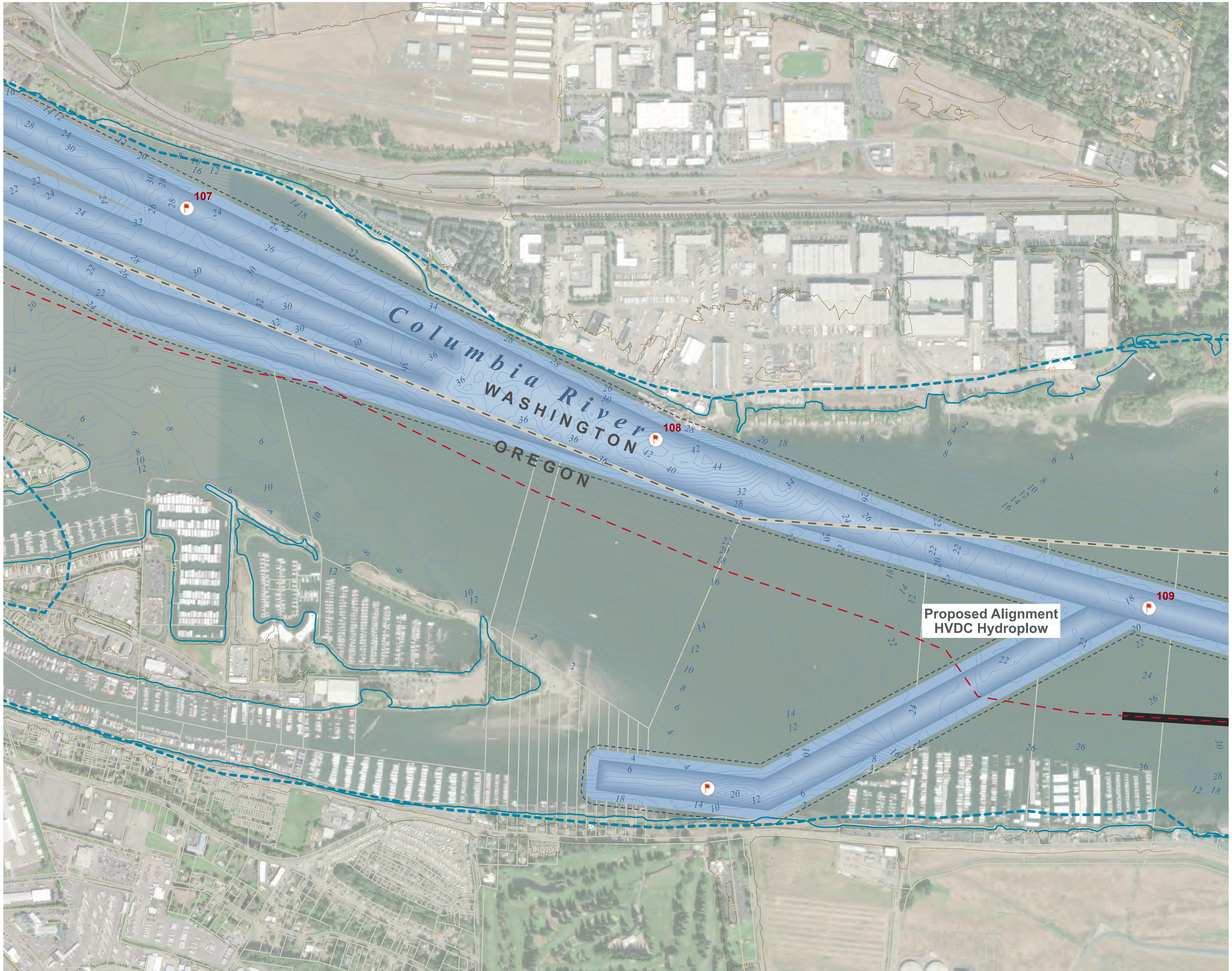
CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R01E
Section: 33
USGS Quad Name: Portland



PLAN VIEW MAP
PAGE 5 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- CABLE PROTECTION
- USACE OHW
- HISTORIC SHORELINE (ESTIMATED)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

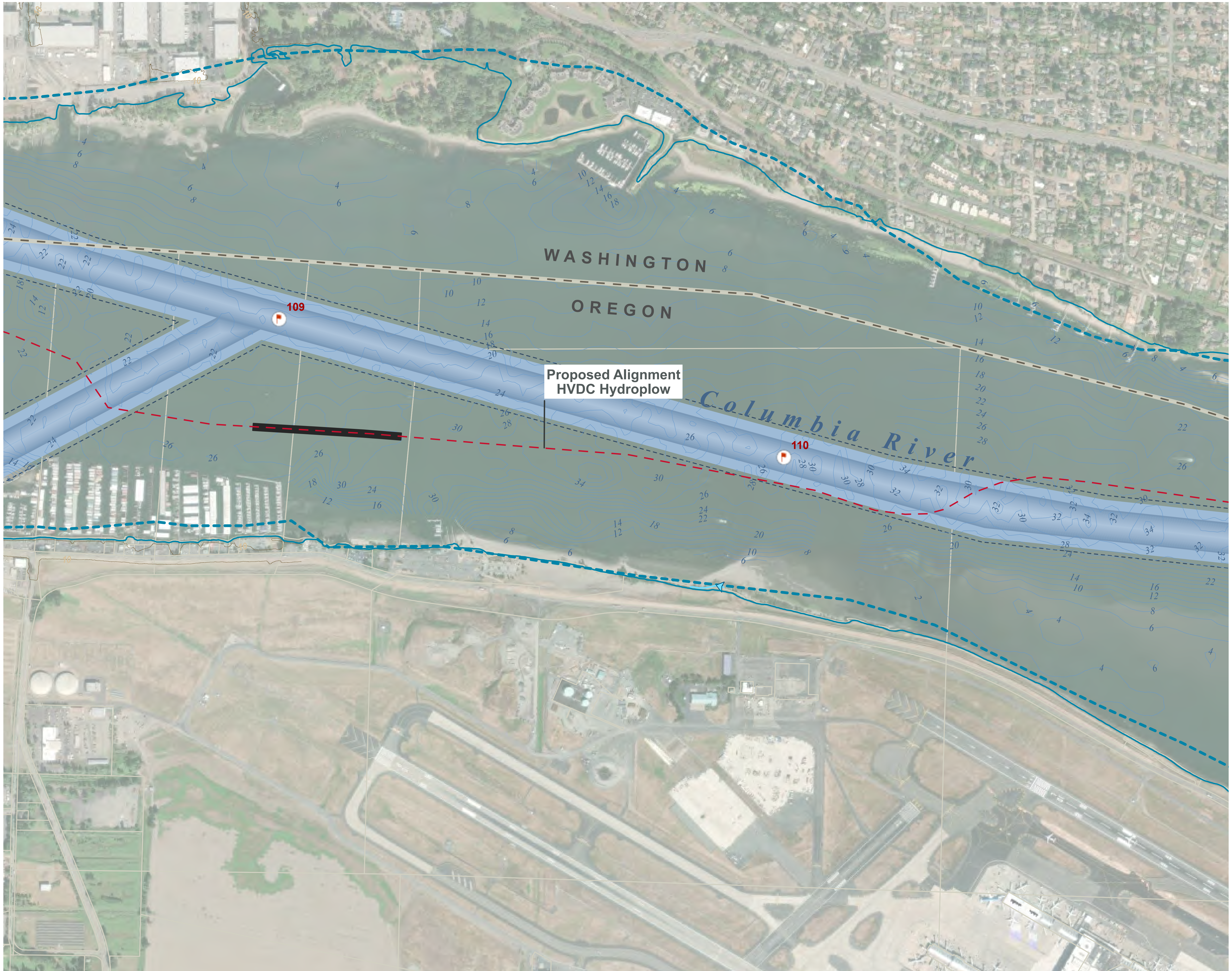
CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R01E
Section: 2
USGS Quad Name: Portland



PLAN VIEW MAP
PAGE 6 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- CABLE PROTECTION
- USACE OHW
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

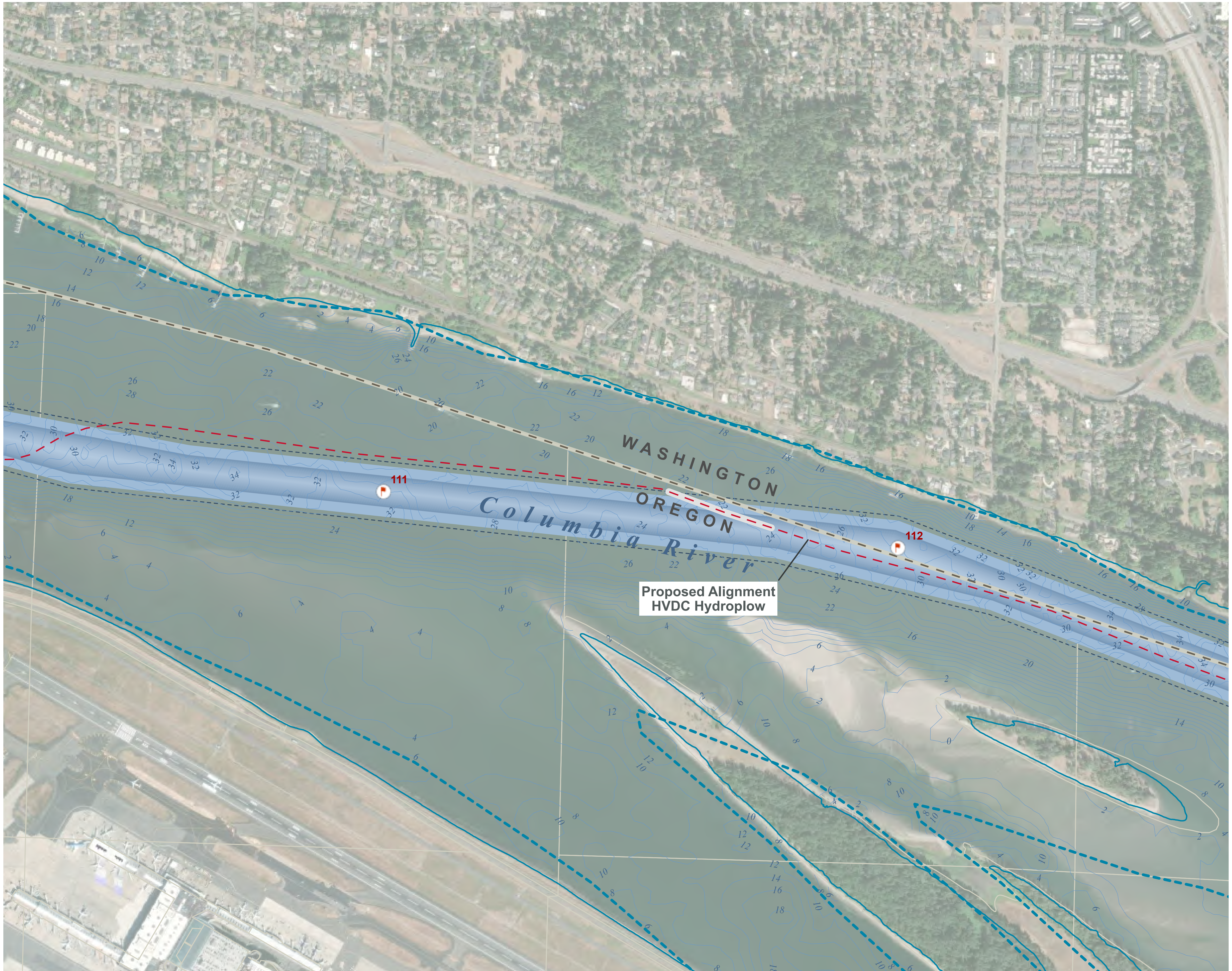
CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R02E
Section: 1, 6
USGS Quad Name: Mount Tabor



FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HVDC HYDROPLOW
PRE-DREDGING LOCATION
USACE OHW
HISTORIC SHORELINE (ESTIMATED)
BATHYMETRY CONTOUR (2FT)
FEDERAL NAVIGATION CHANNEL
FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
MULTNOMAH TAXLOT
STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

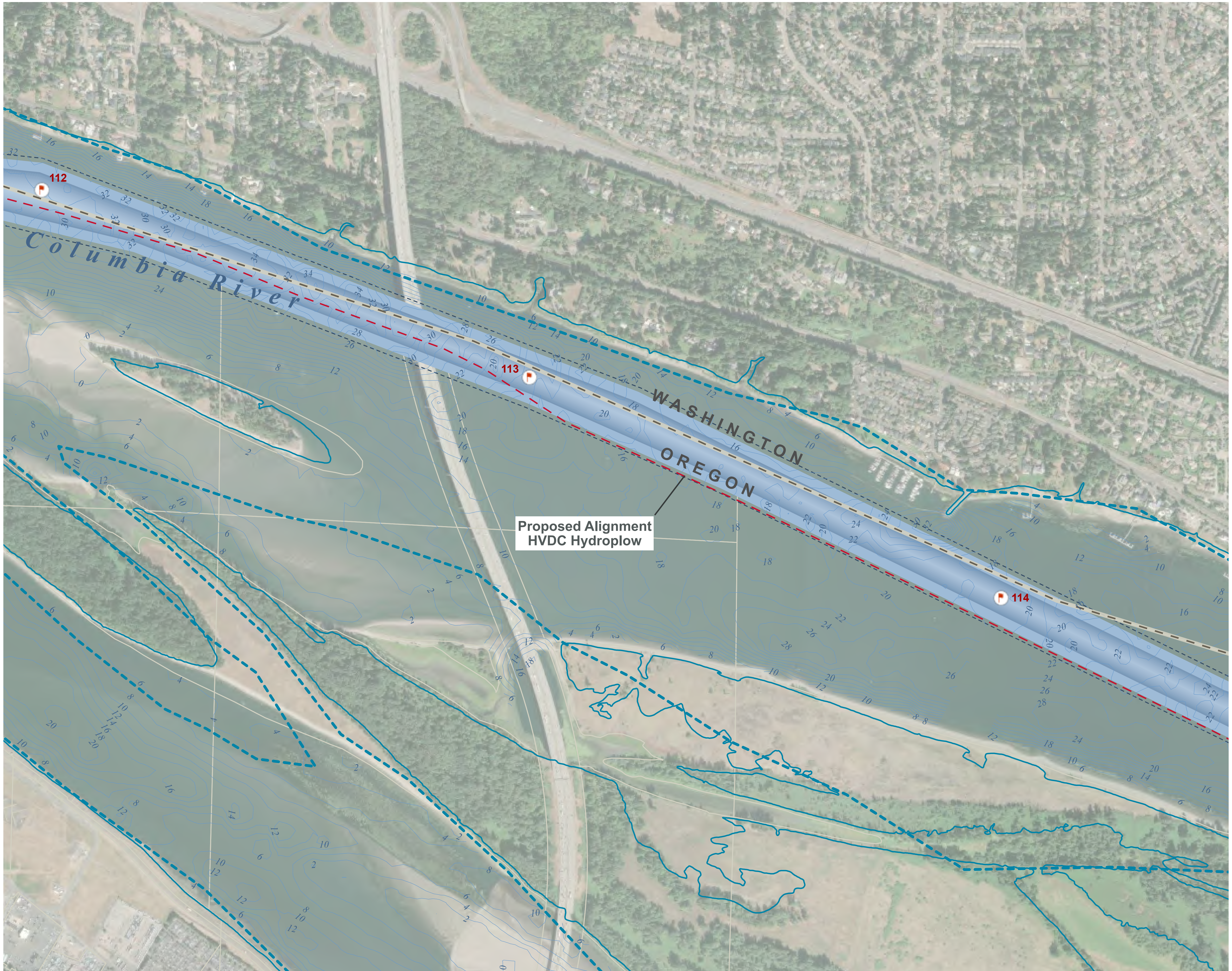
CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R02E
Section: 4, 40
USGS Quad Name: Mount Tabor

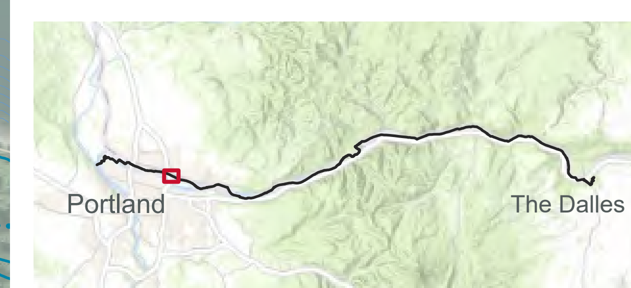


FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- USACE OHW
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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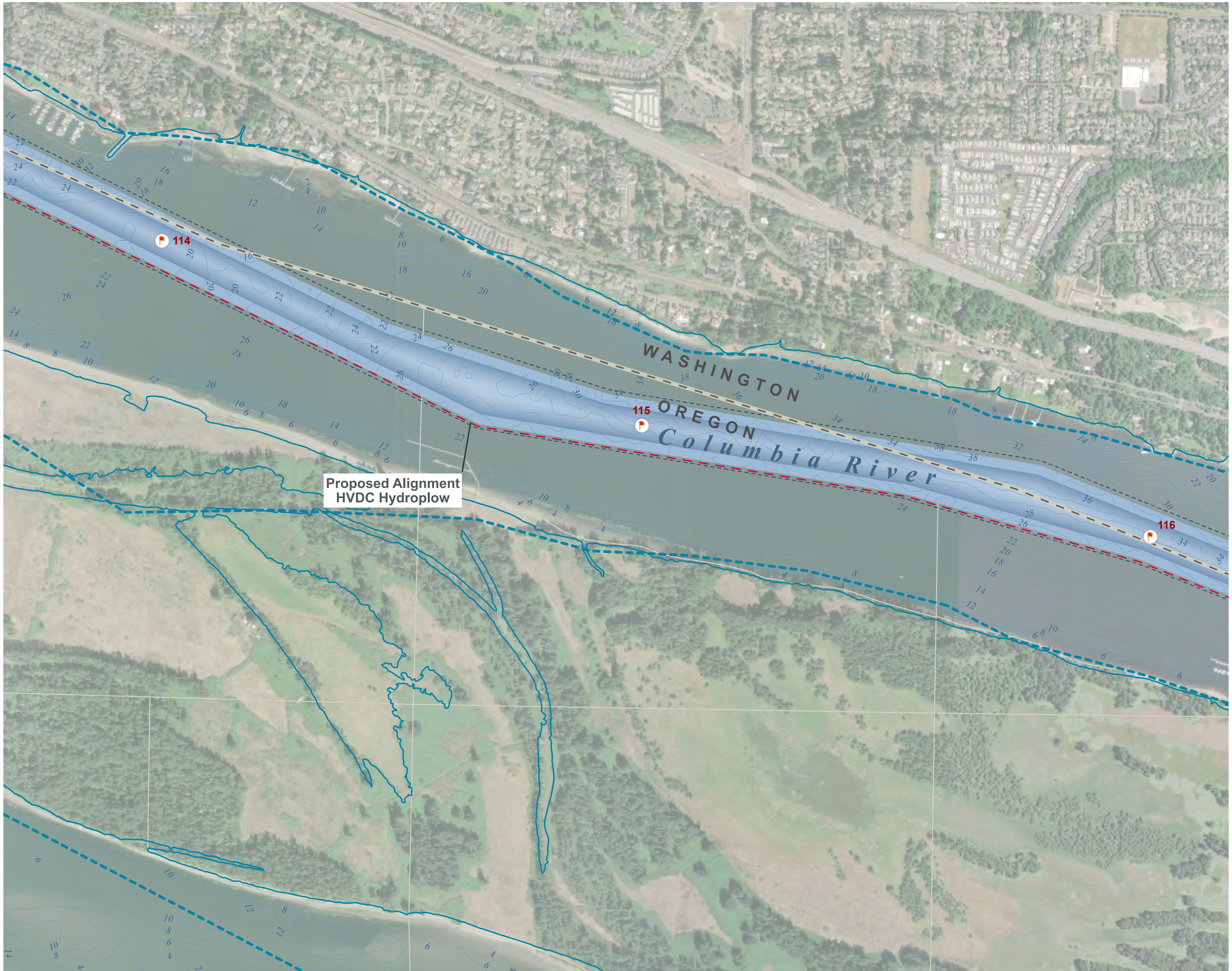
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R02E
Section: 2
USGS Quad Name: Mount Tabor



1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R02E
Section: 11, 12
USGS Quad Name: Mount Tabor

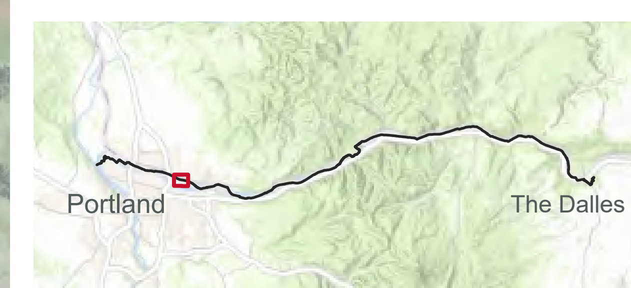
PLAN VIEW MAP

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- USACE OHW
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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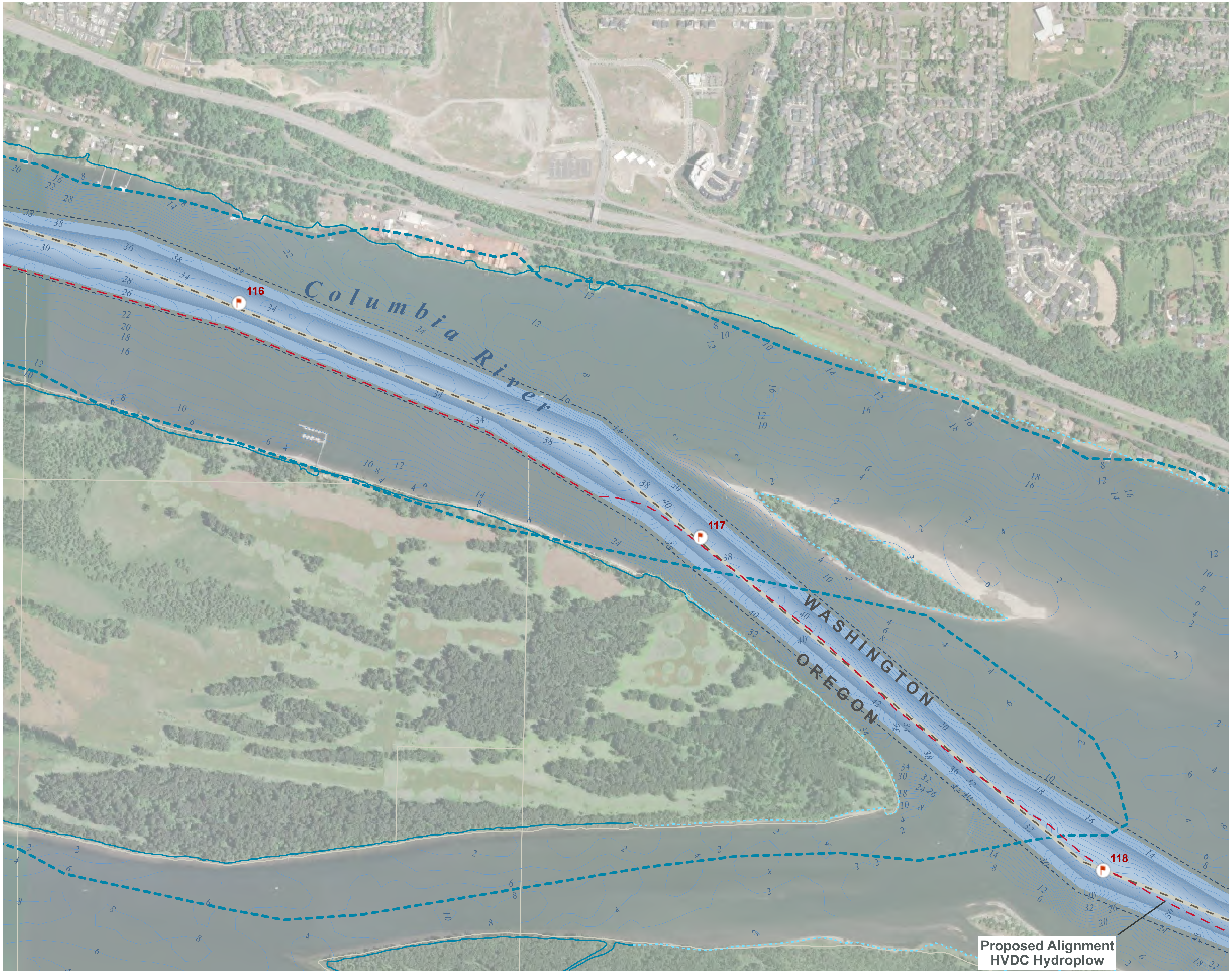


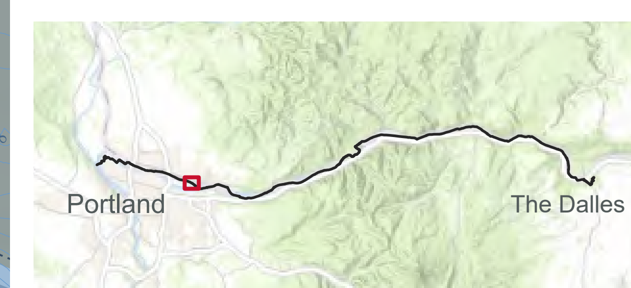
PLAN VIEW MAP

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- USACE OHW
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



0 1,500 Feet

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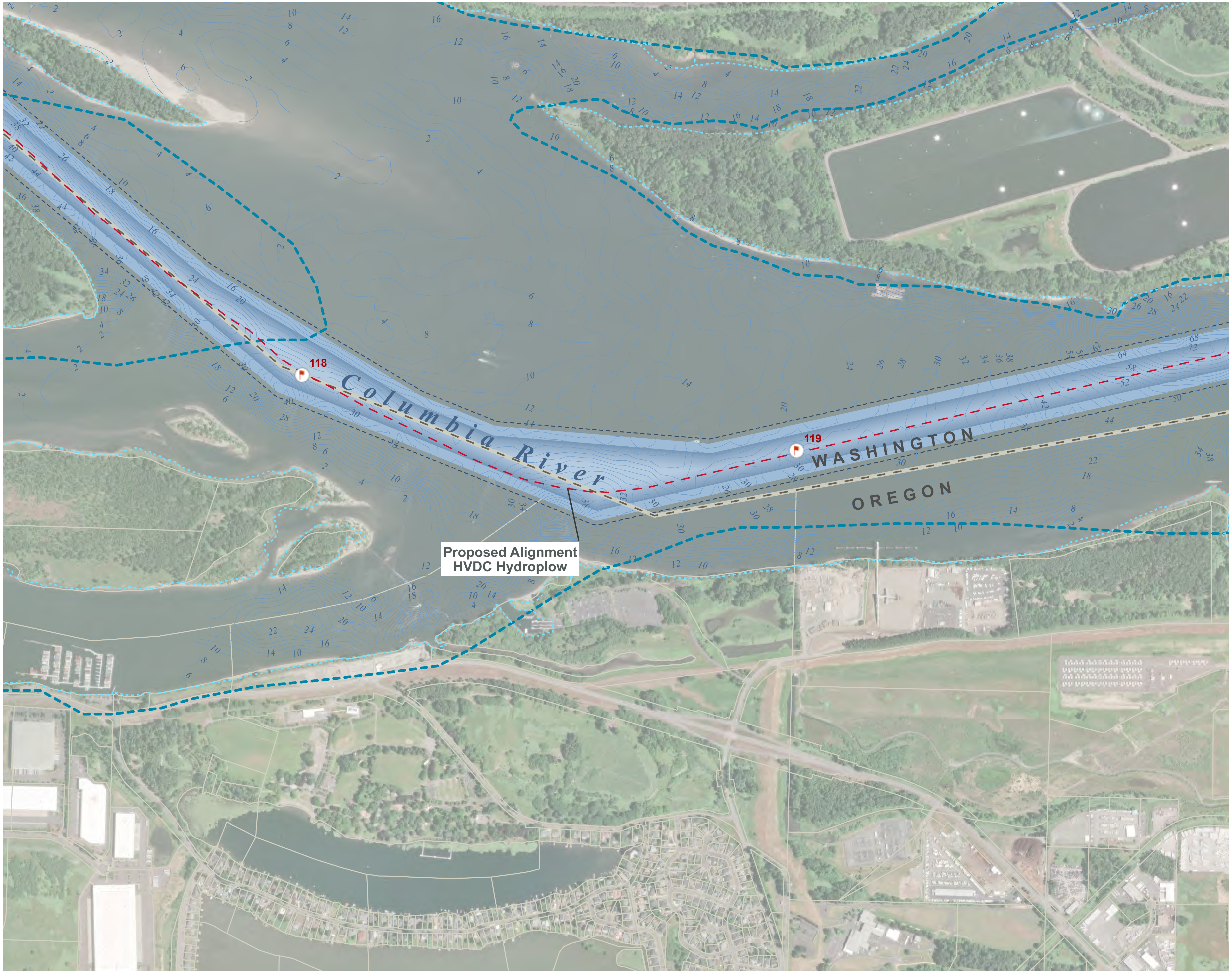
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R03E
Section: 17, 18
USGS Quad Name: Camas



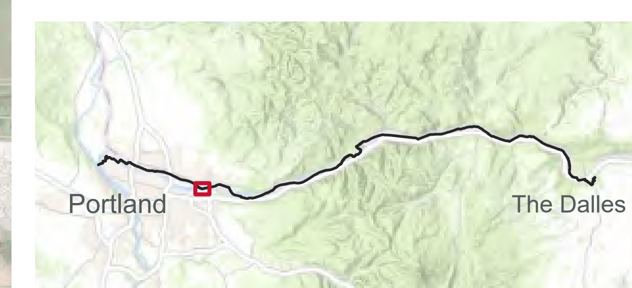
PLAN VIEW MAP

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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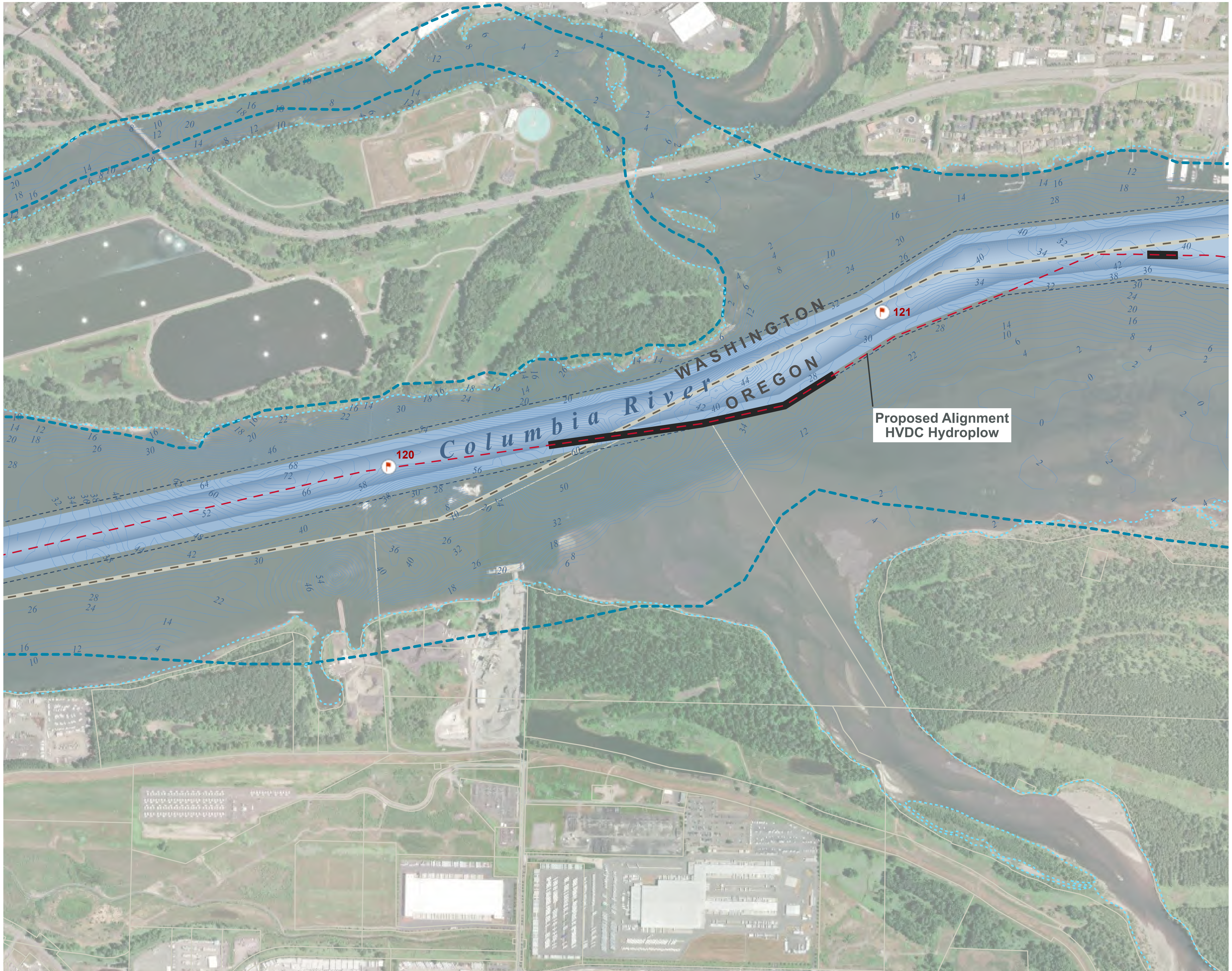
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R03E
Section: 15, 21, 22
USGS Quad Name: Camas

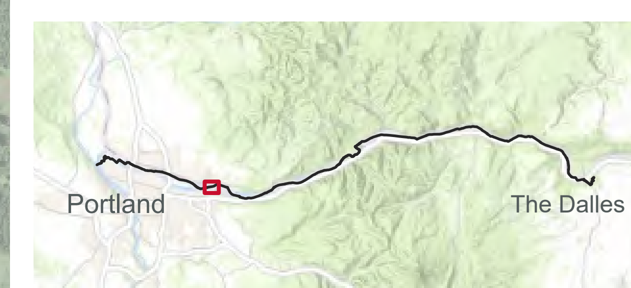


FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- CABLE PROTECTION
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



HDR

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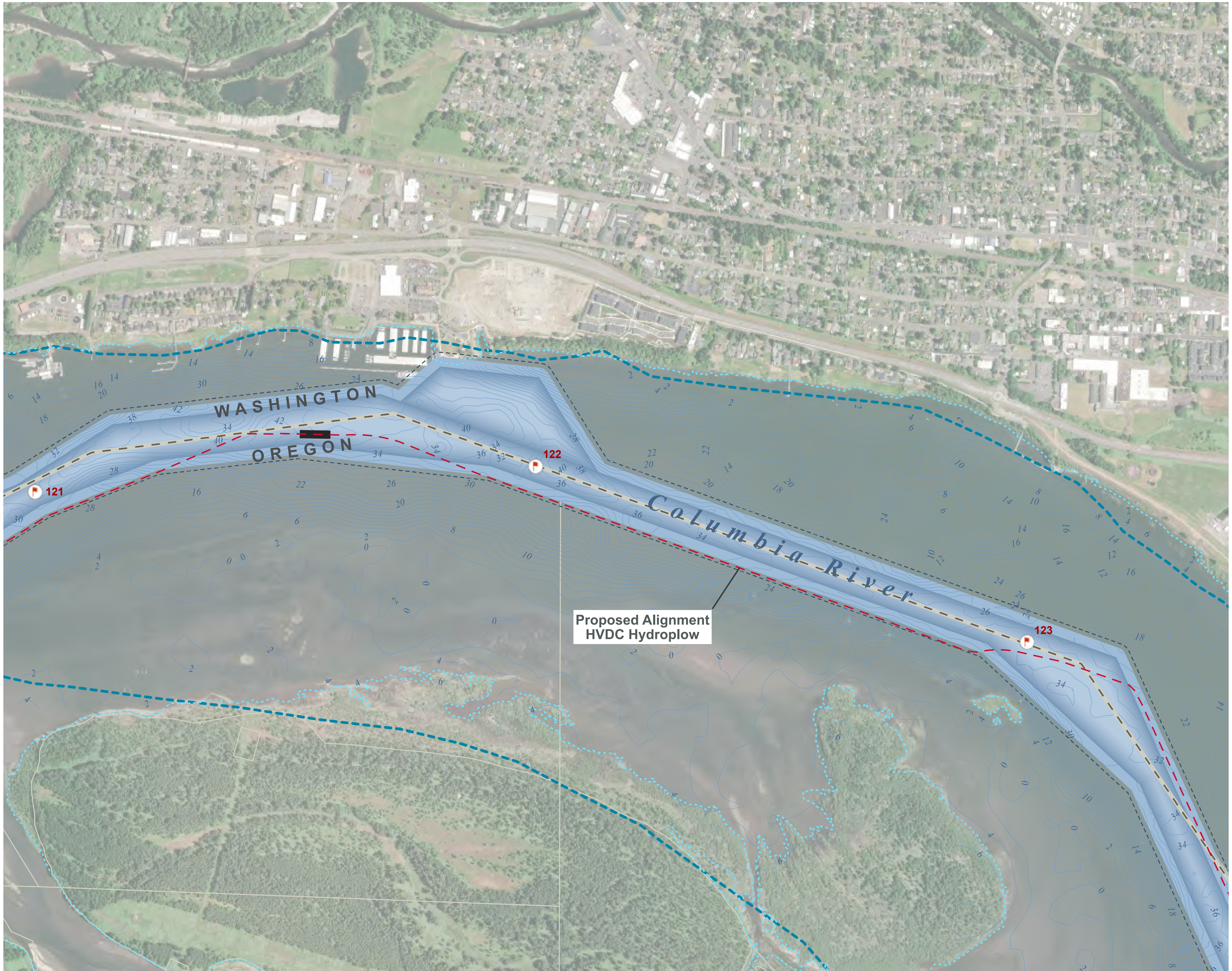
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R03E
Section: 14
USGS Quad Name: Camas



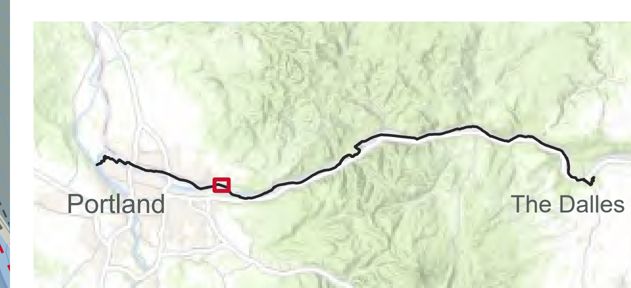
PLAN VIEW MAP
PAGE 13 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- CABLE PROTECTION
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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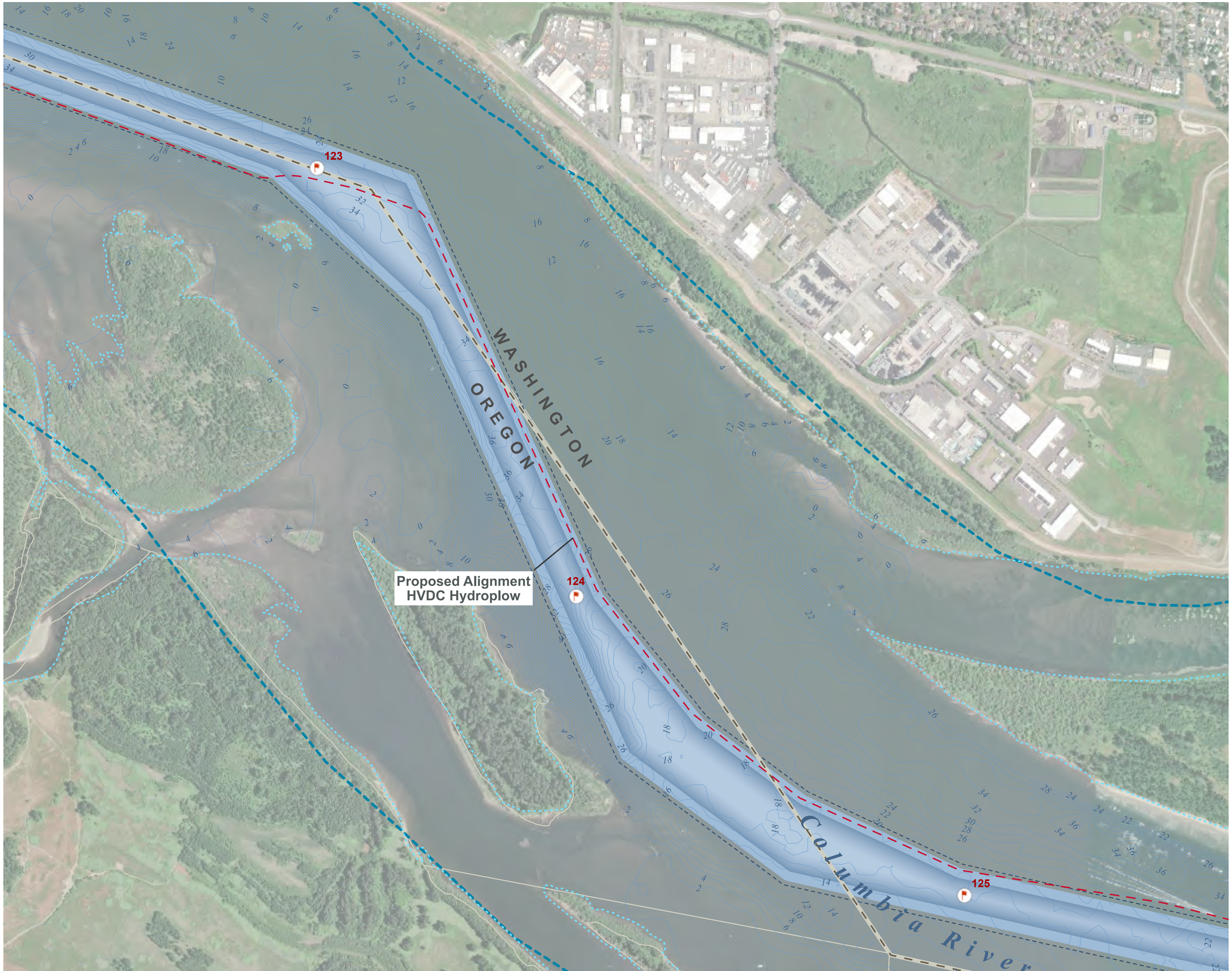
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R03E/R04E
Section: 13
USGS Quad Name: Camas and Washougal

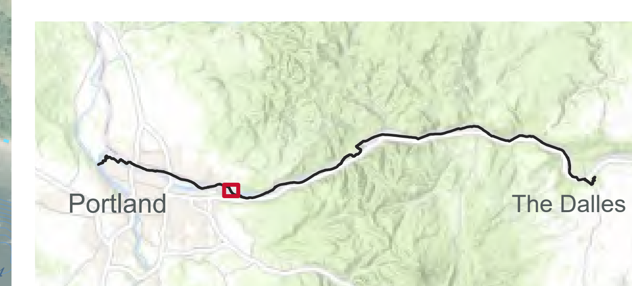


FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HVDC HYDROPLOW
OHW (ESTIMATED)
HISTORIC SHORELINE (ESTIMATED)
BATHYMETRY CONTOUR (2FT)
FEDERAL NAVIGATION CHANNEL
FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
MULTNOMAH TAXLOT
STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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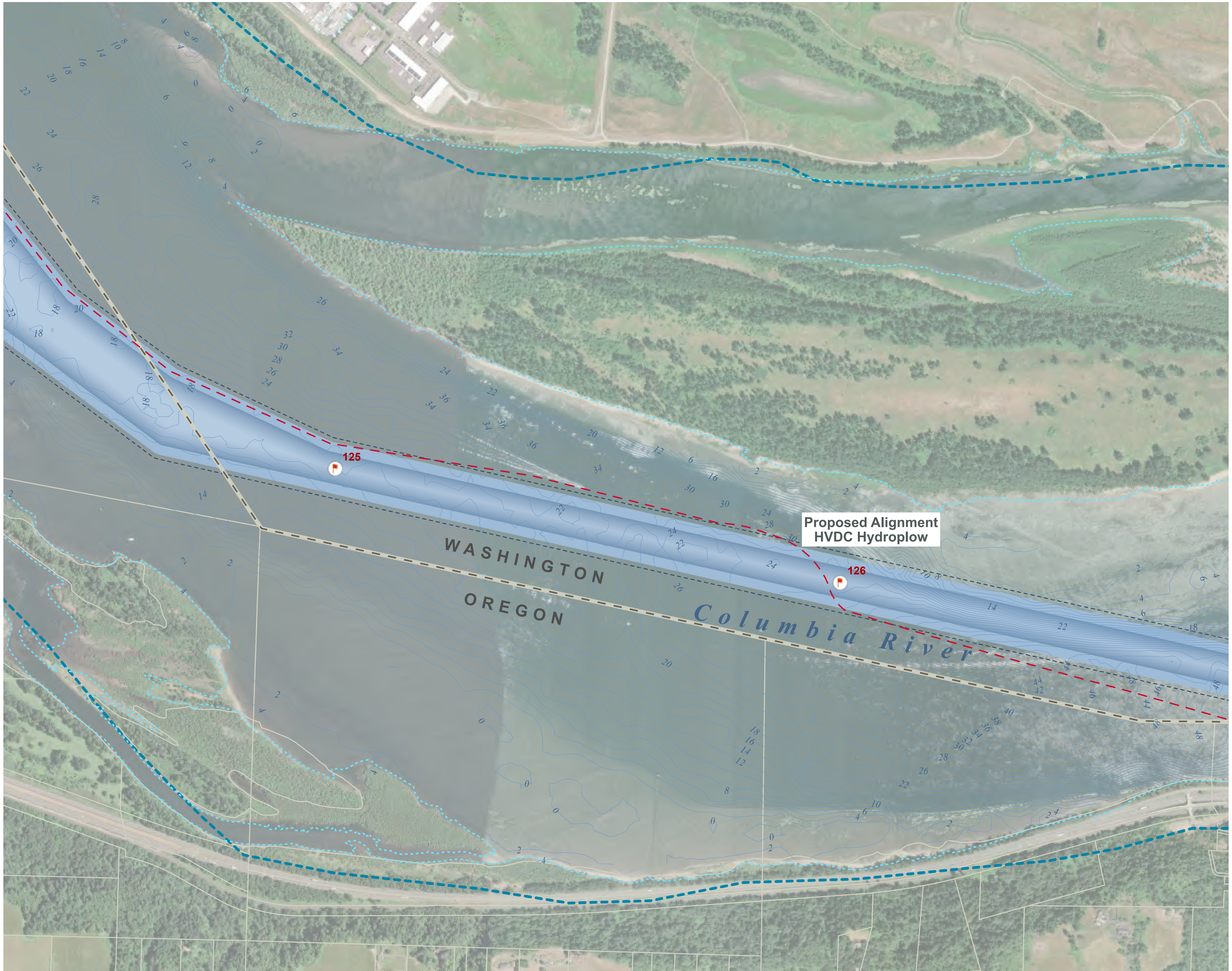
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R04E
Section: 20
USGS Quad Name: Washougal

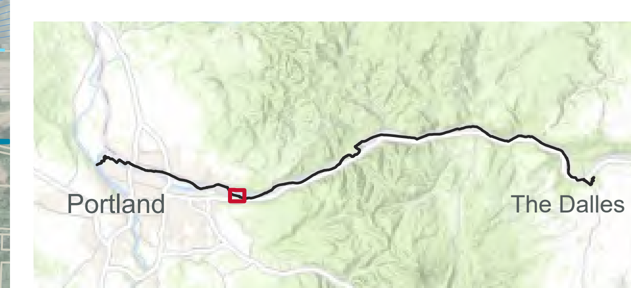


FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



HDR

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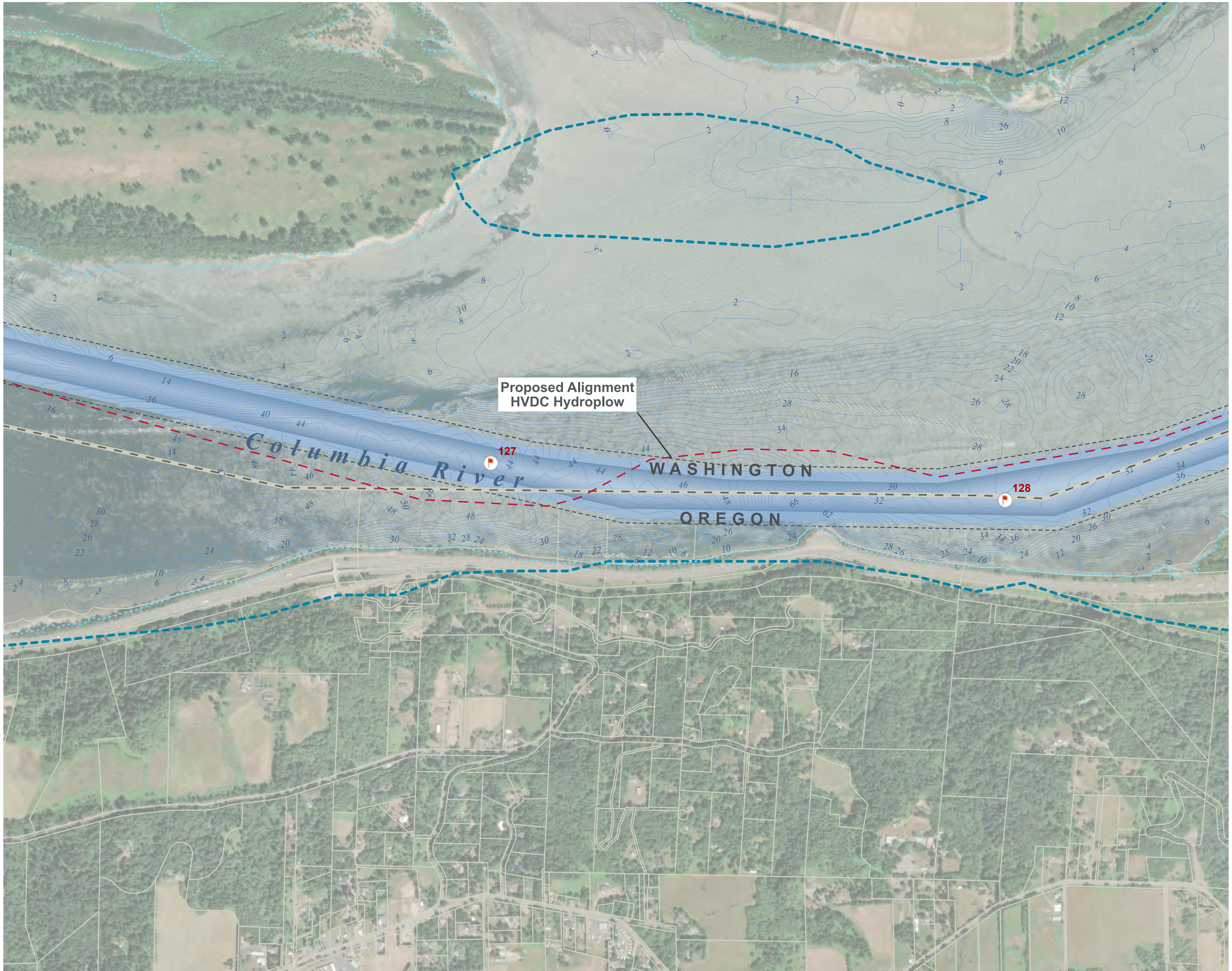
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R04E
Section: 21, 22
USGS Quad Name: Washougal



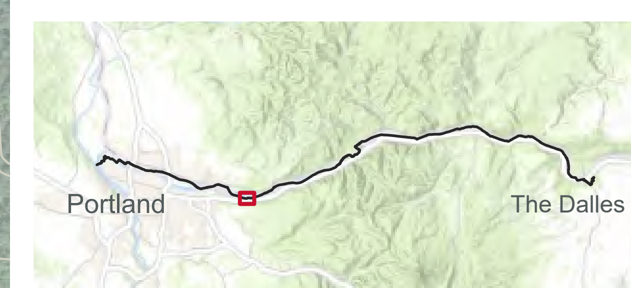
PLAN VIEW MAP

FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HVDC HYDROPLOW
OHW (ESTIMATED)
HISTORIC SHORELINE (ESTIMATED)
BATHYMETRY CONTOUR (2FT)
FEDERAL NAVIGATION CHANNEL
FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
MULTNOMAH TAXLOT
STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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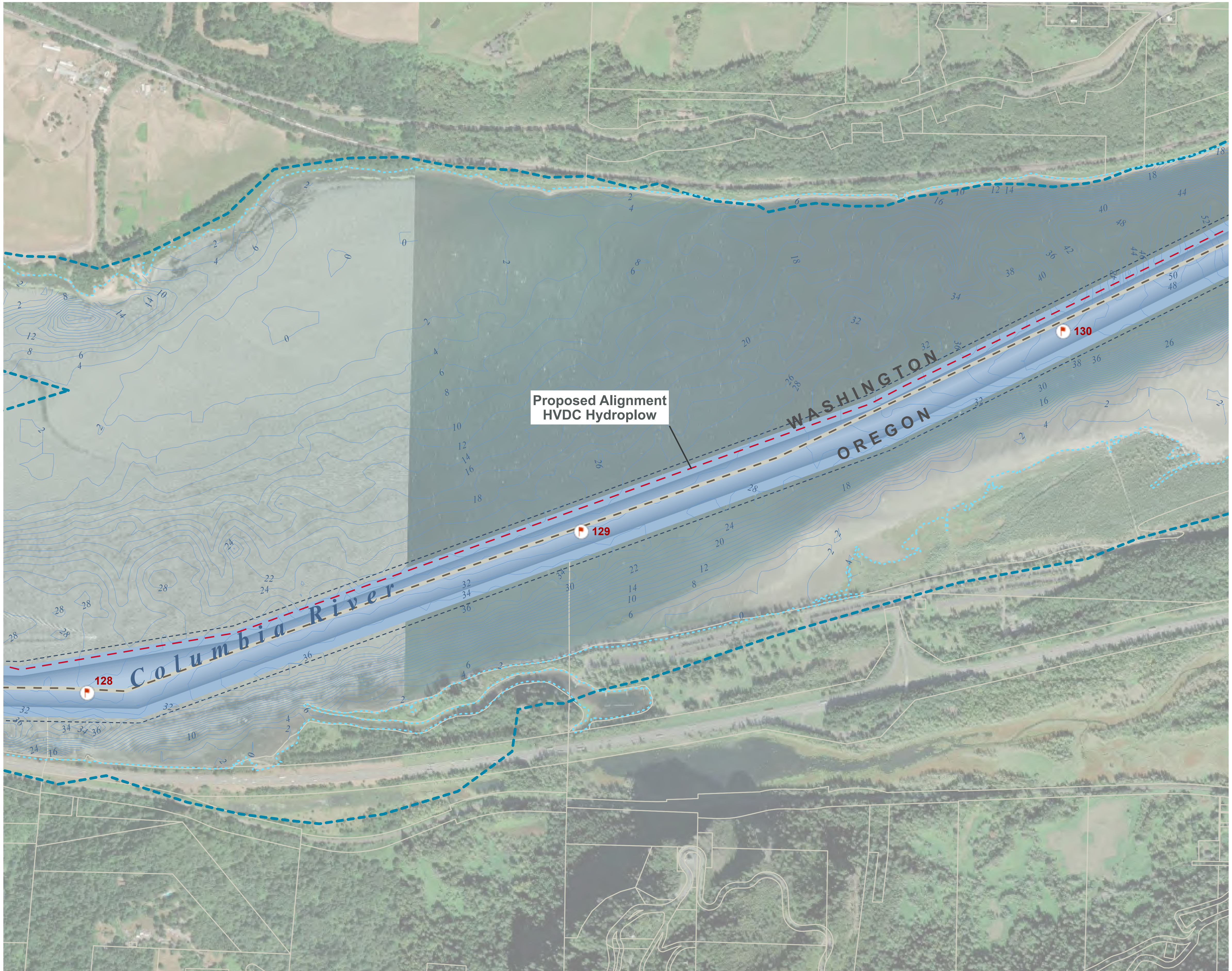
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R04E
Section: 26, 27
USGS Quad Name: Washougal

PLAN VIEW MAP
PAGE 17 OF 53

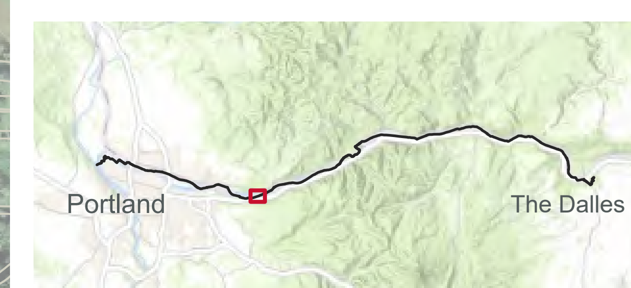
FOR INFORMATION ONLY - CONCEPT DRAWING



- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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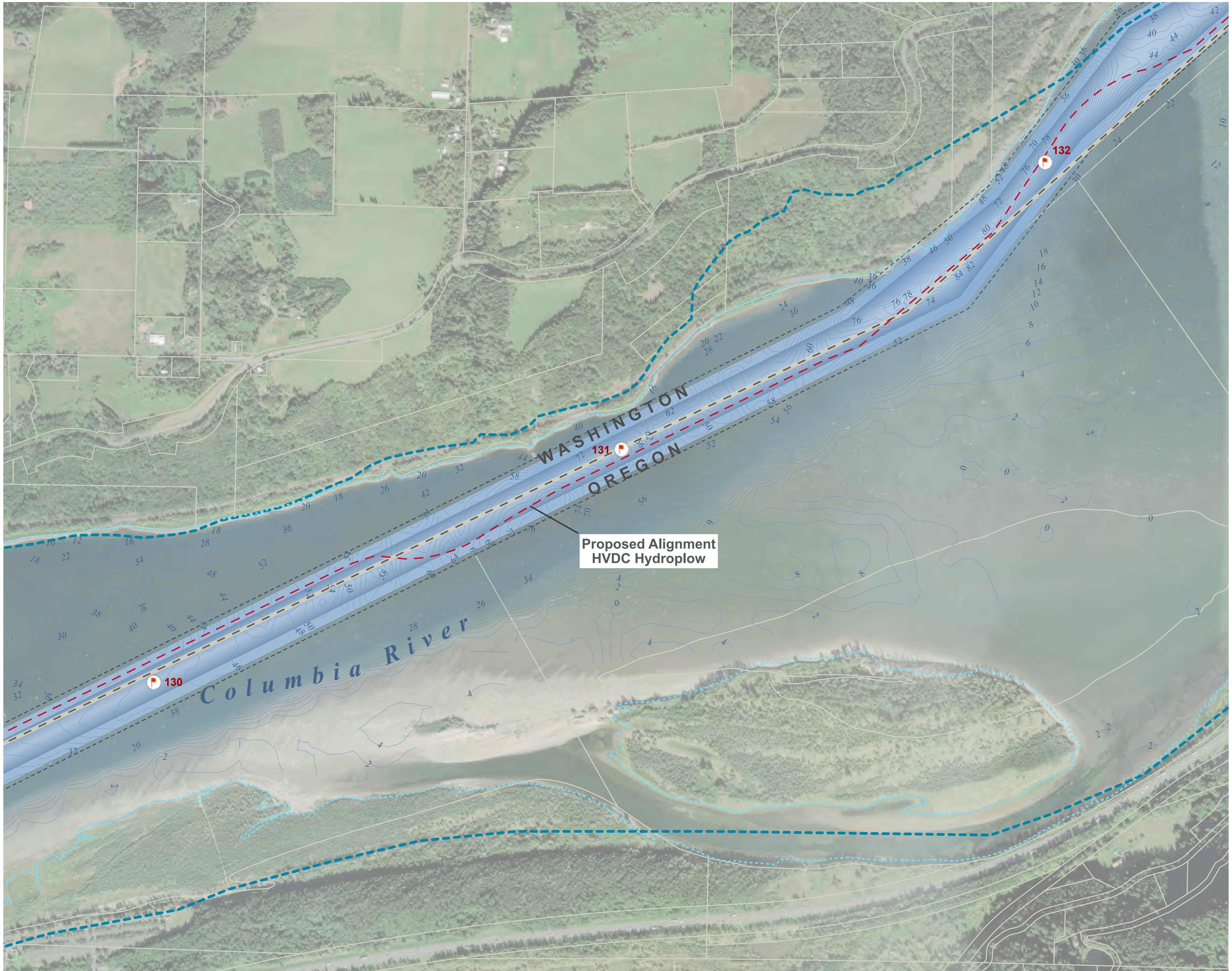
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R04E/R05E
Section: 30
USGS Quad Name: Washougal and Bridal Veil



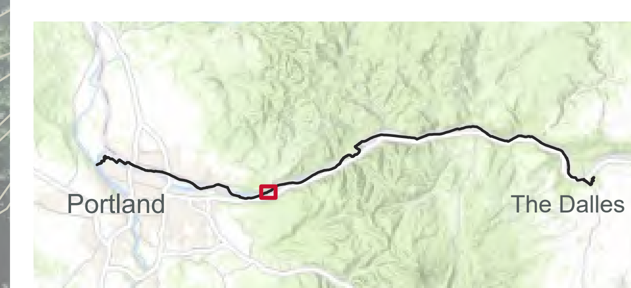
PLAN VIEW MAP
PAGE 18 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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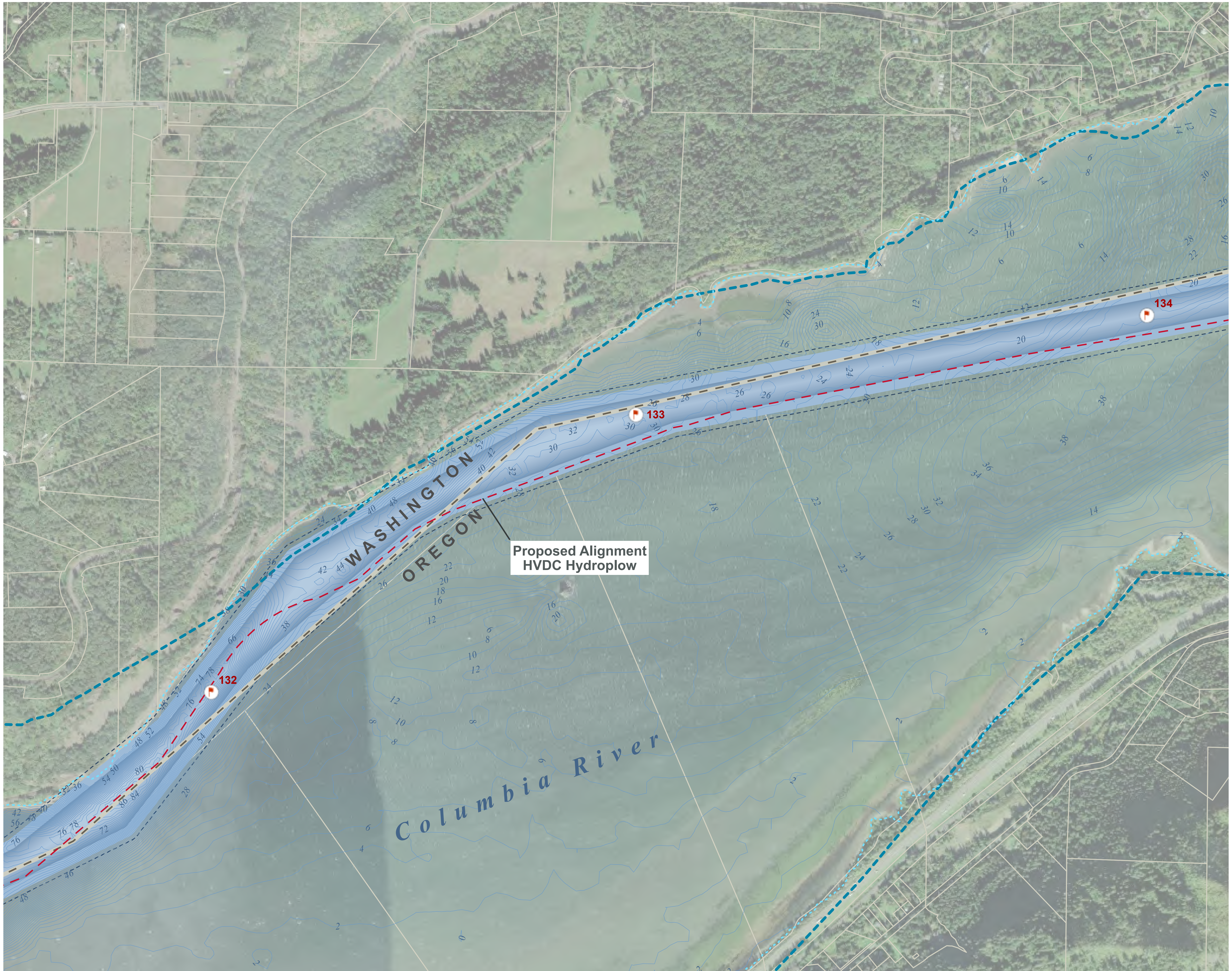
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R05E
Section: 17, 20
USGS Quad Name: Bridal Veil



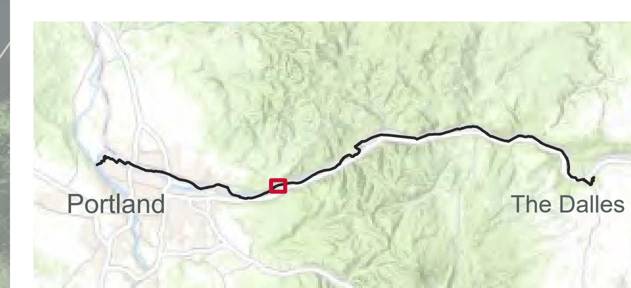
PLAN VIEW MAP

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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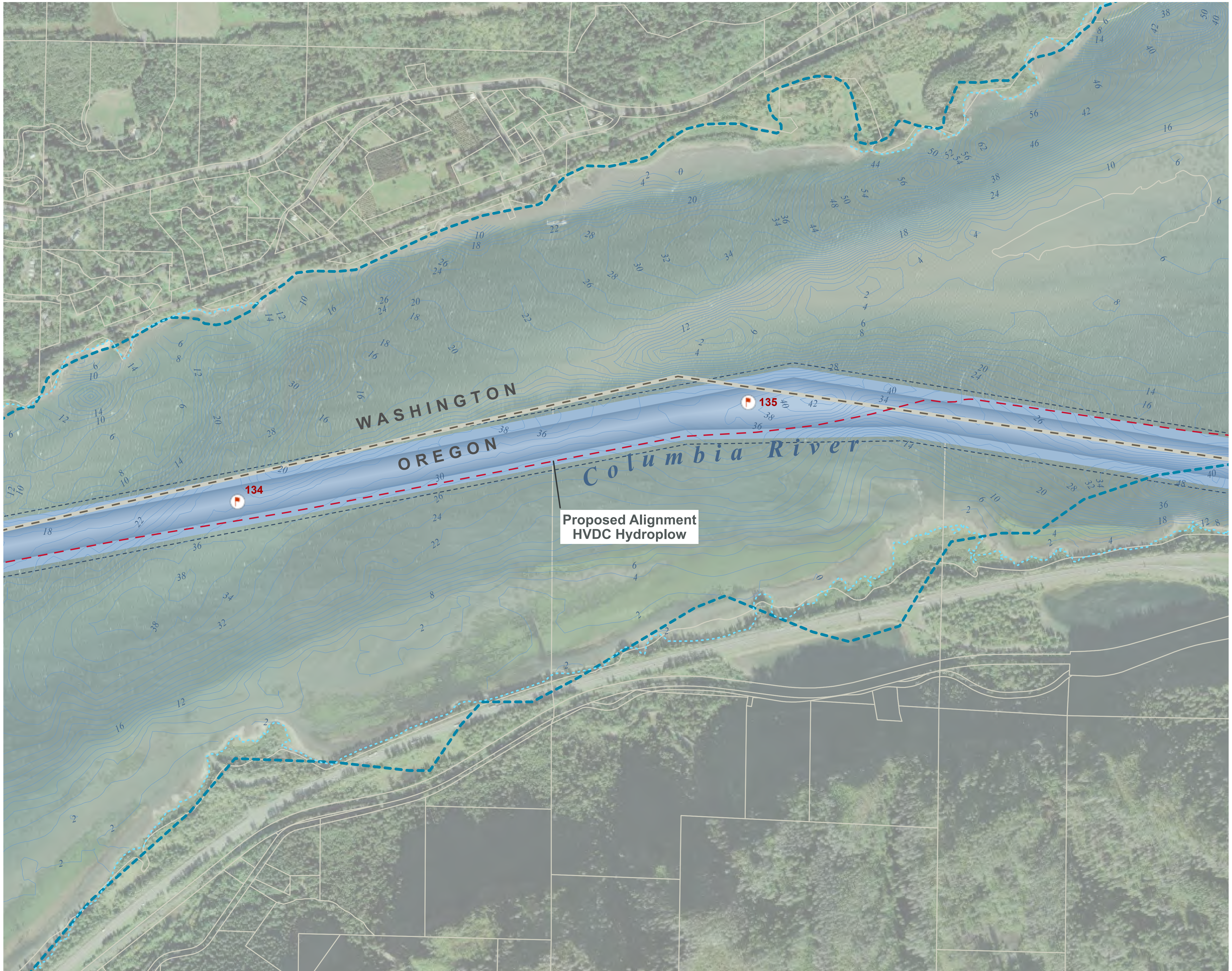
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R05E
Section: 10, 15, 16
USGS Quad Name: Bridal Veil



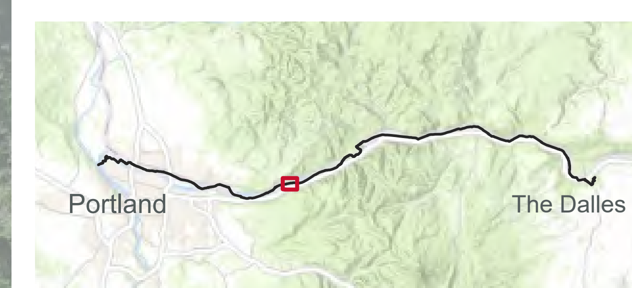
PLAN VIEW MAP
PAGE 20 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HVDC HYDROPLOW
OHW (ESTIMATED)
HISTORIC SHORELINE (ESTIMATED)
BATHYMETRY CONTOUR (2FT)
FEDERAL NAVIGATION CHANNEL
FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
SKAMANIA TAXLOT
MULTNOMAH TAXLOT
STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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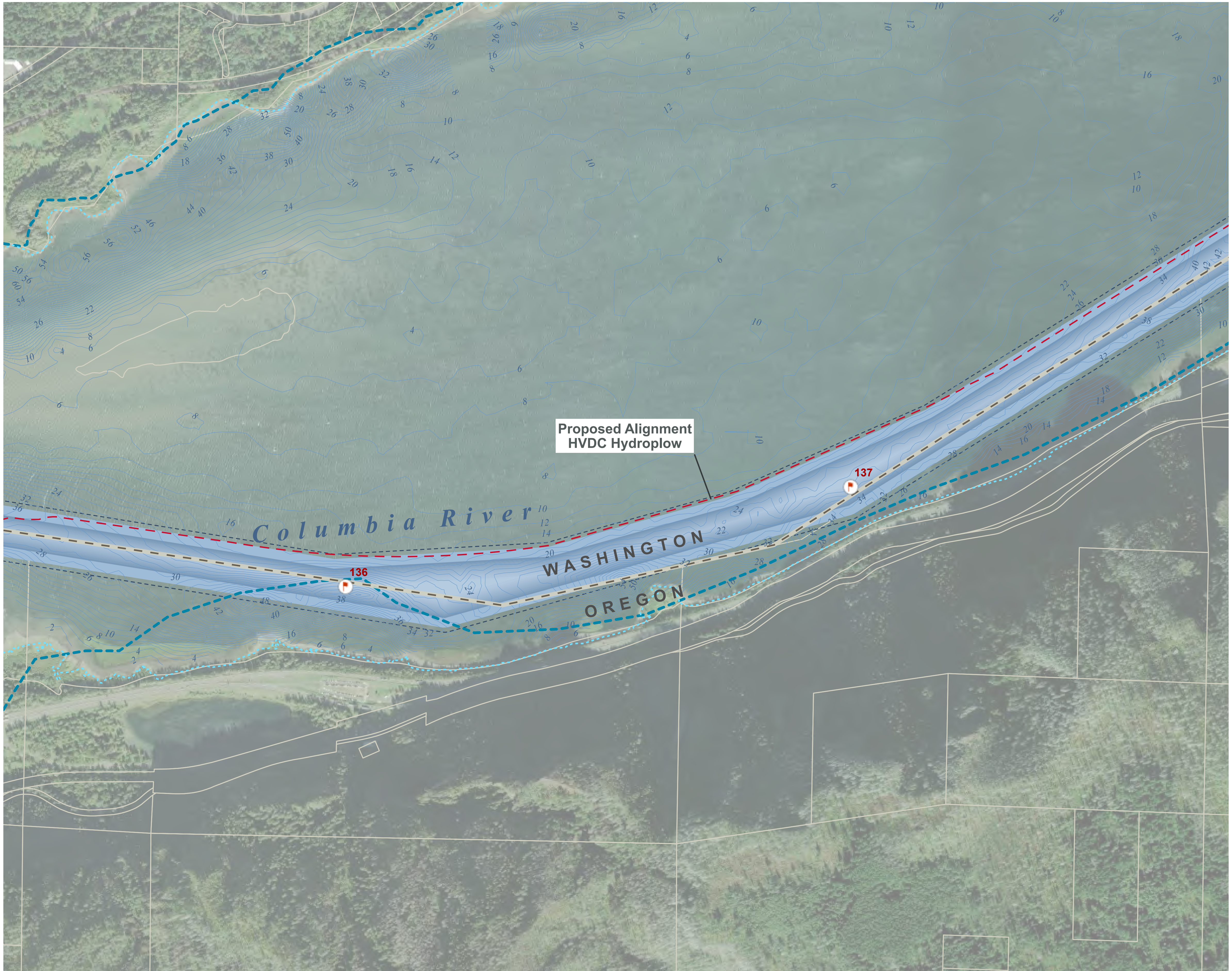
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R05E
Section: 12
USGS Quad Name: Bridal Veil

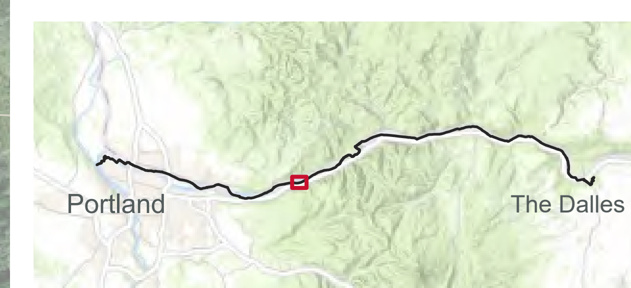


FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HVDC HYDROPLOW
OHW (ESTIMATED)
HISTORIC SHORELINE (ESTIMATED)
BATHYMETRY CONTOUR (2FT)
FEDERAL NAVIGATION CHANNEL
FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
SKAMANIA TAXLOT
MULTNOMAH TAXLOT
STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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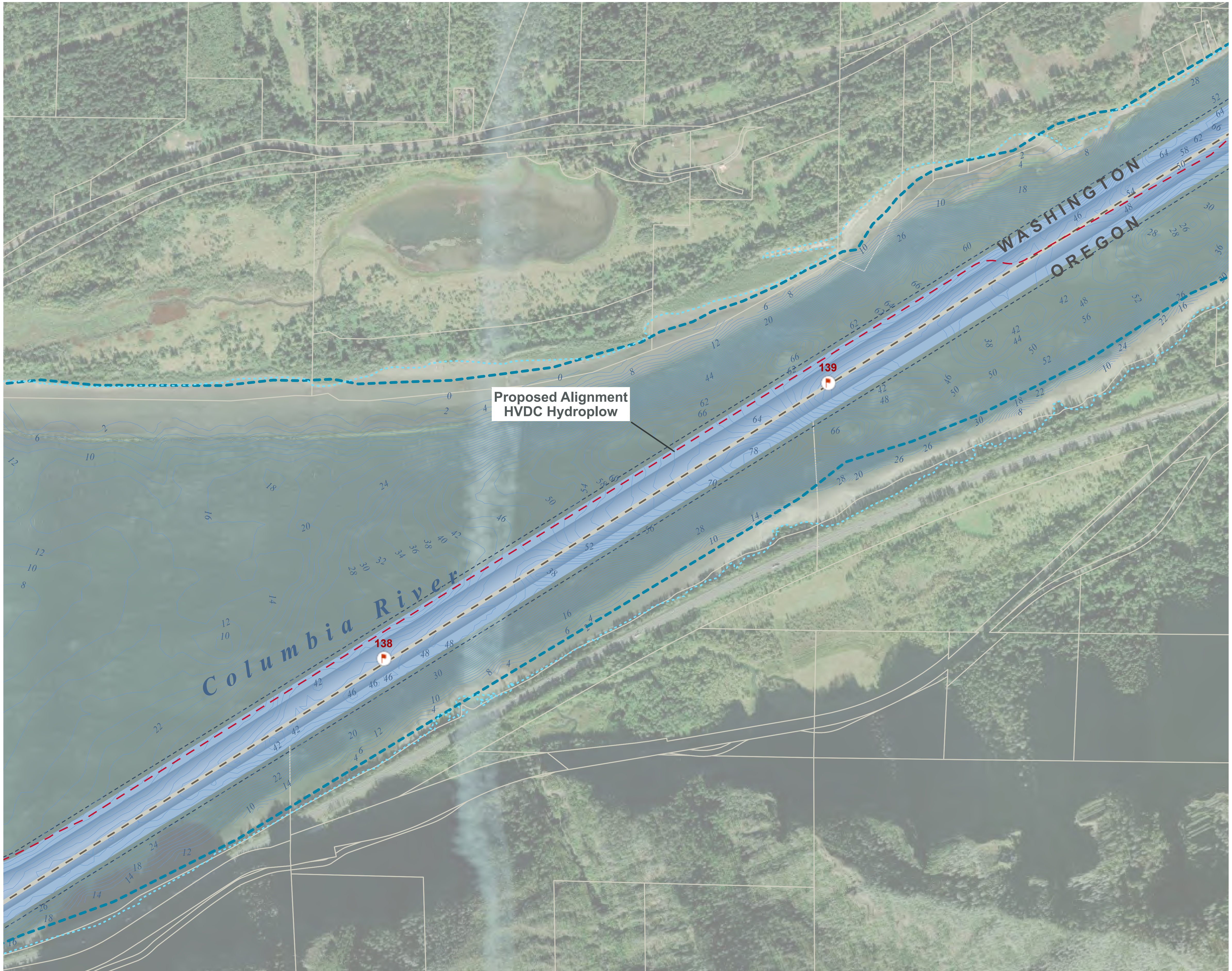
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R06E
Section: 7, 8
USGS Quad Name: Multnomah Falls



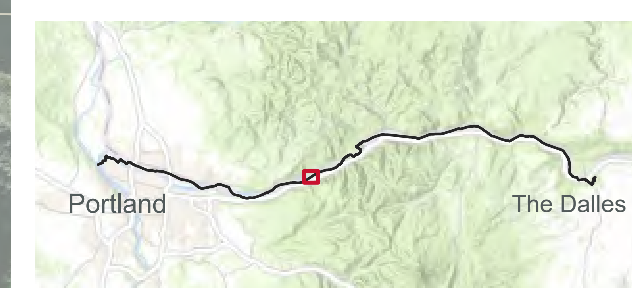
PLAN VIEW MAP

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



HDR

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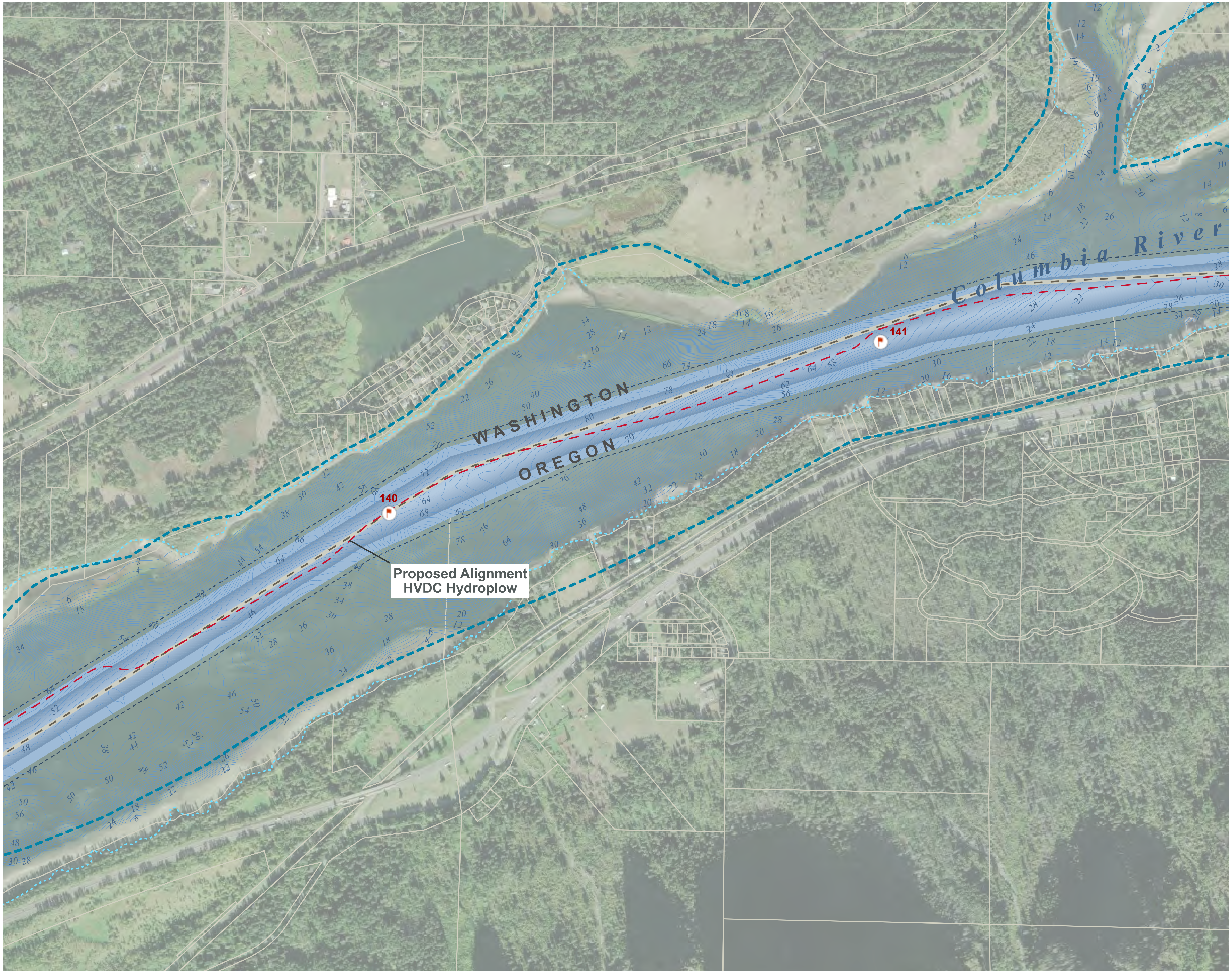
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R06E
Section: 3, 4
USGS Quad Name: Multnomah Falls



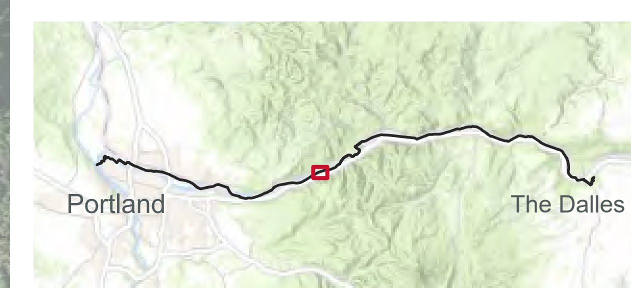
PLAN VIEW MAP

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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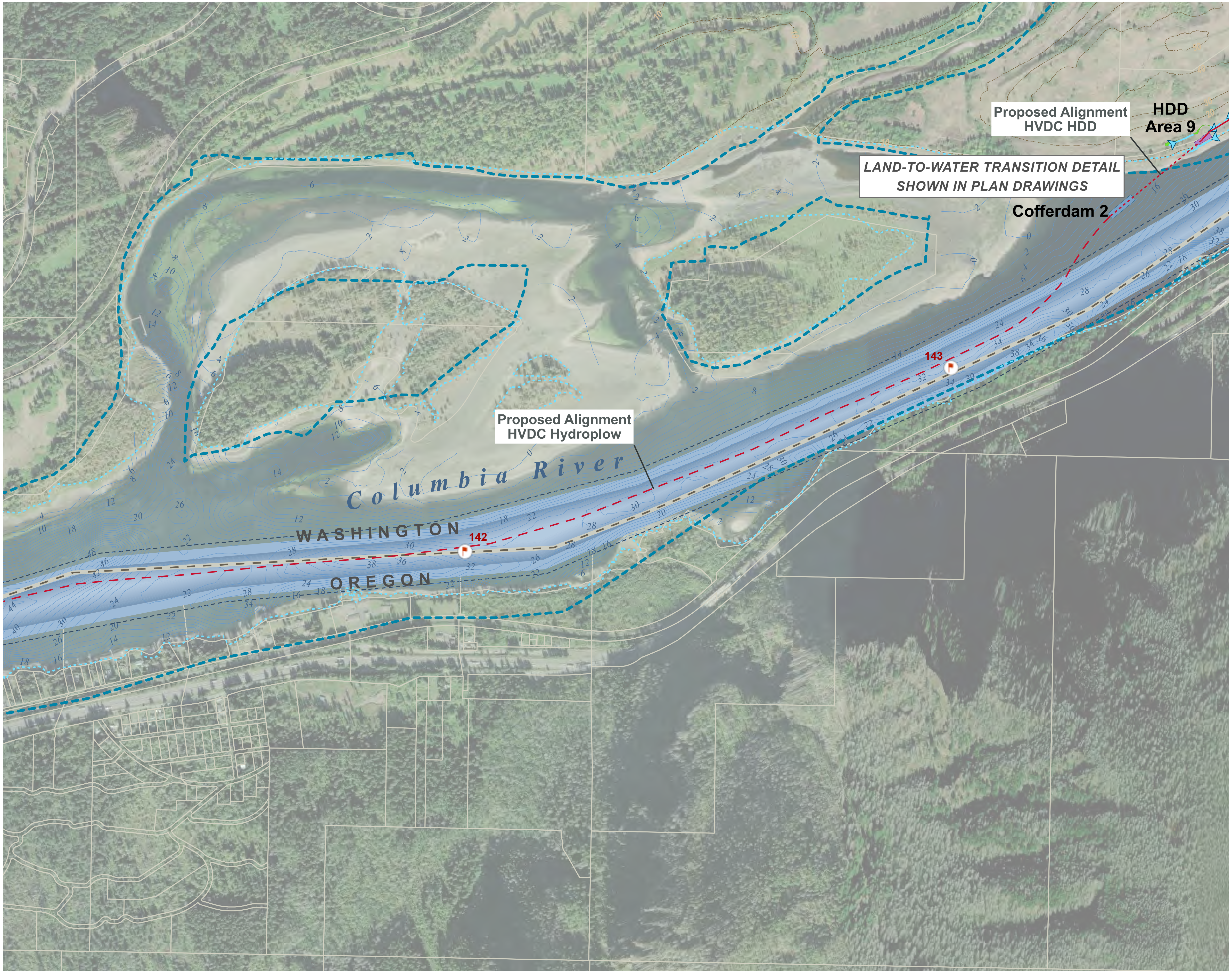
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R06E
Section: 34, 35
USGS Quad Name: Multnomah Falls



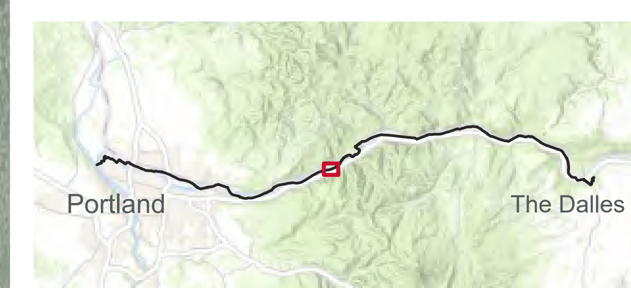
PLAN VIEW MAP
PAGE 24 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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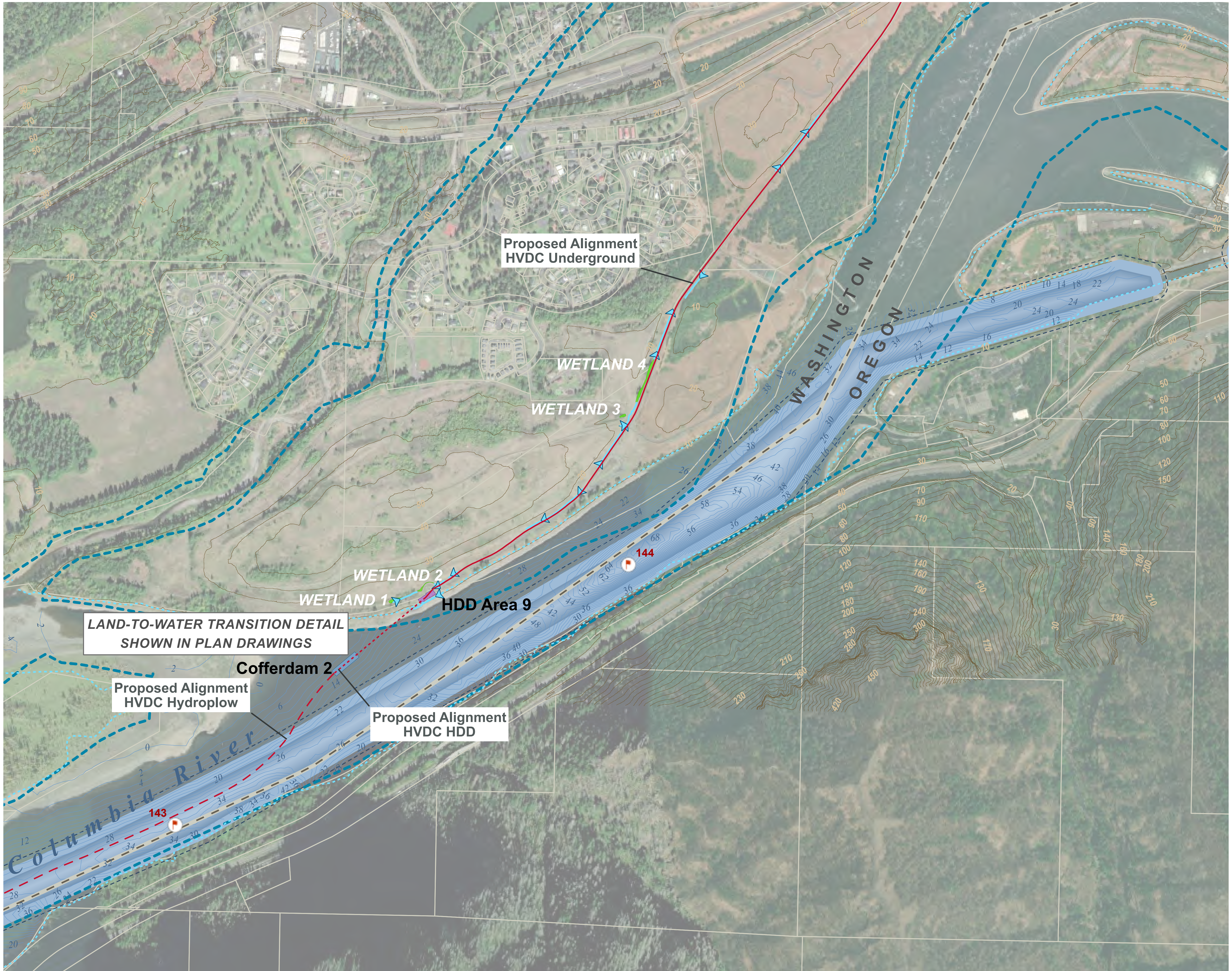
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R06E/R07E
Section: 31, 36
USGS Quad Name: Multnomah Falls and Tanner Butte

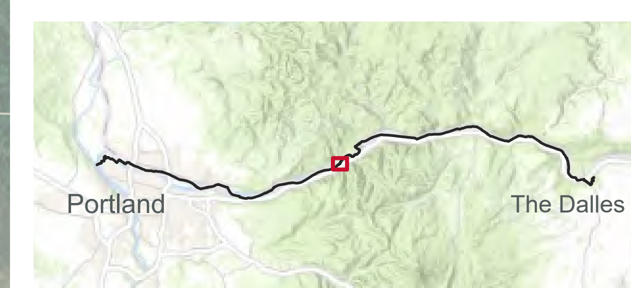


FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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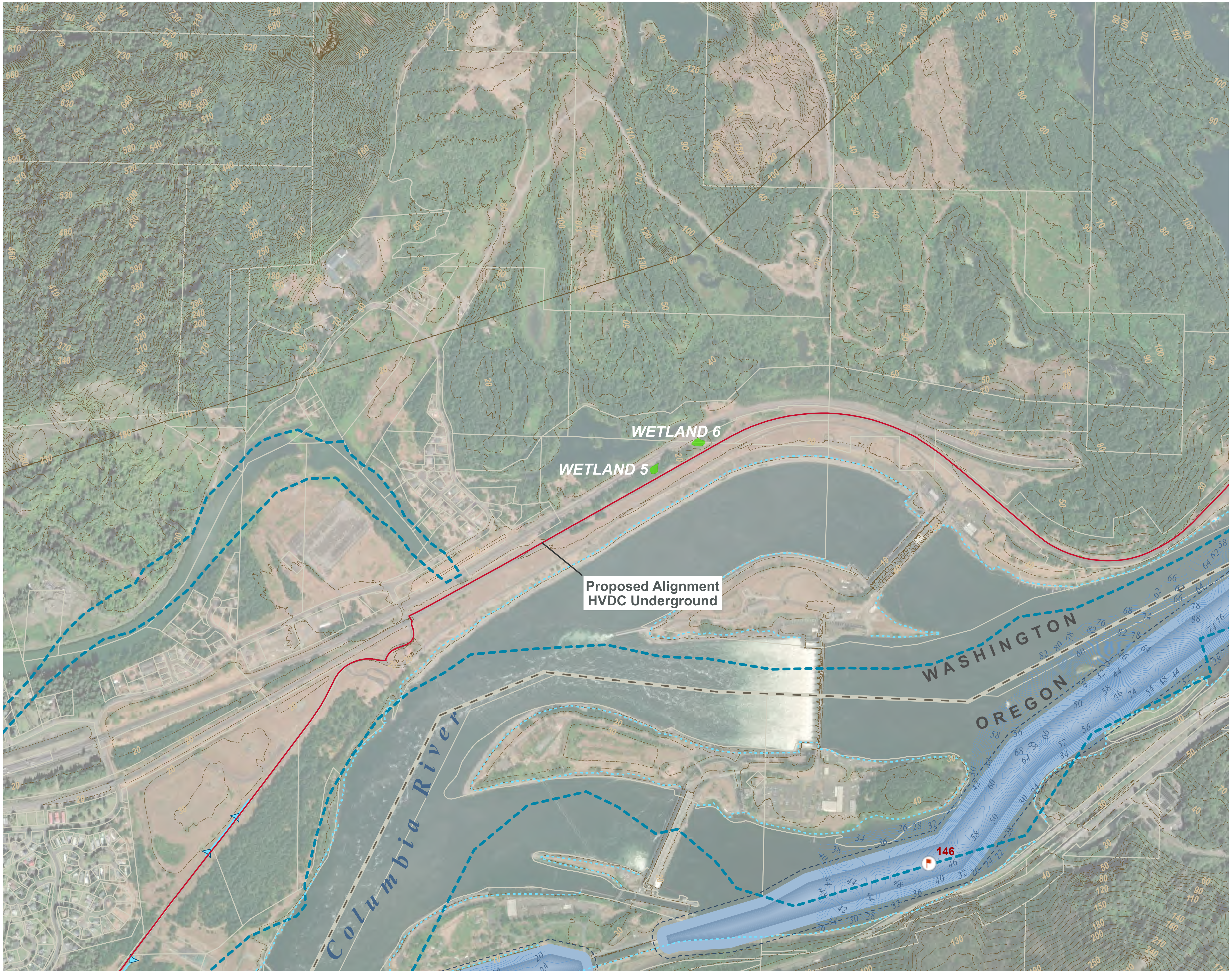
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R07E
Section: 29
USGS Quad Name: Bonneville Dam



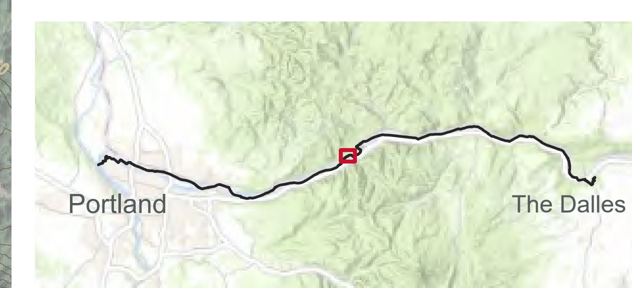
PLAN VIEW MAP

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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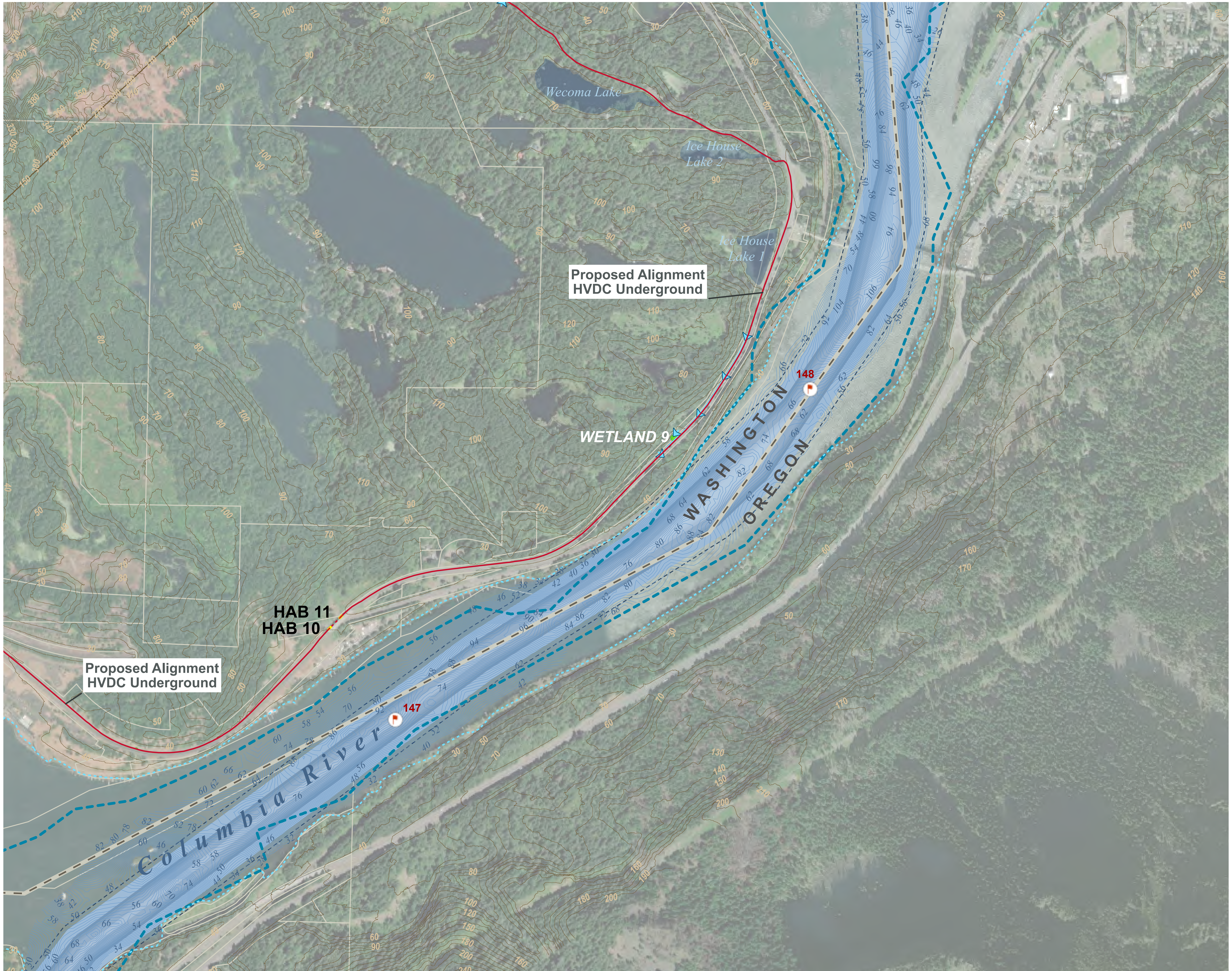
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R07E
Section: 15, 16, 21
USGS Quad Name: Bonneville Dam



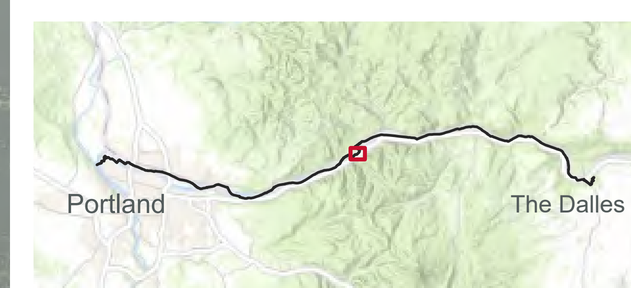
PLAN VIEW MAP
PAGE 27 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- WATERBODY
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- MULTNOMAH TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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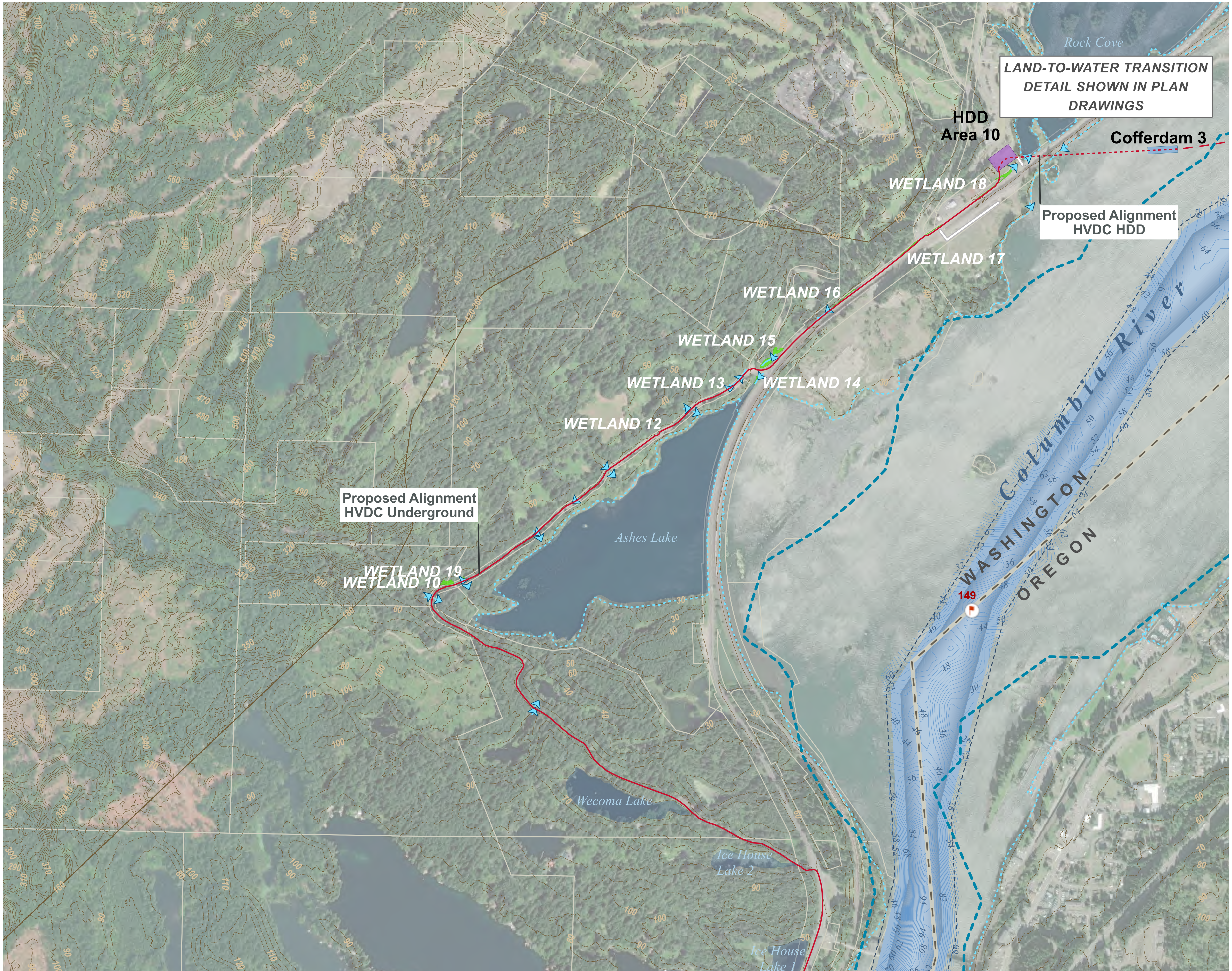
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R07E
Section: 14, 15
USGS Quad Name: Bonneville Dam

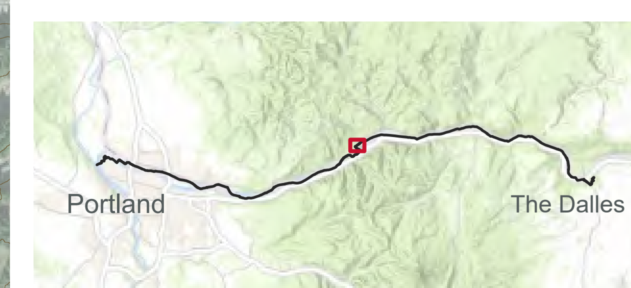


FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- ACCESS ROAD
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- WATERBODY
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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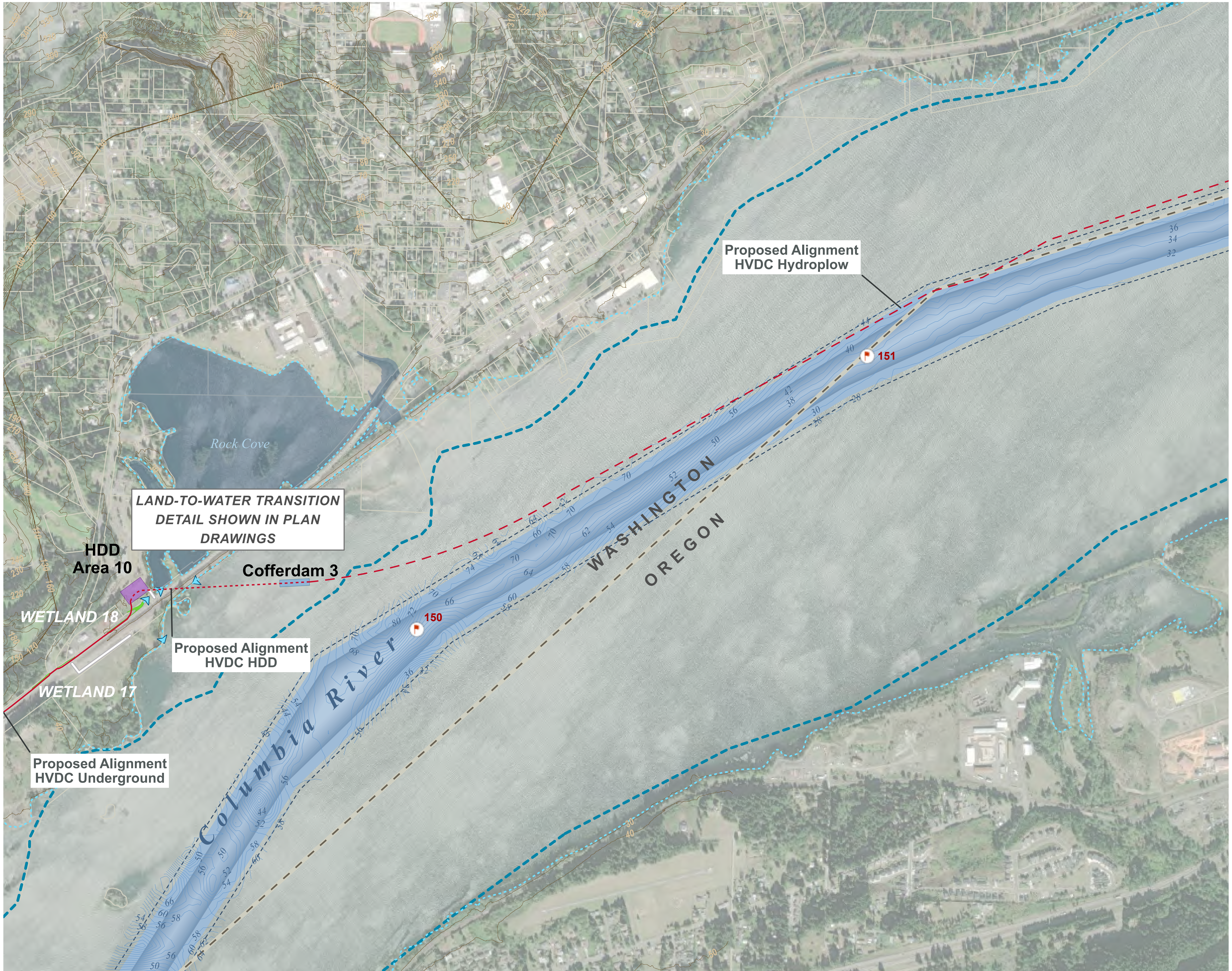
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R07E
Section: 2, 10, 11
USGS Quad Name: Bonneville Dam

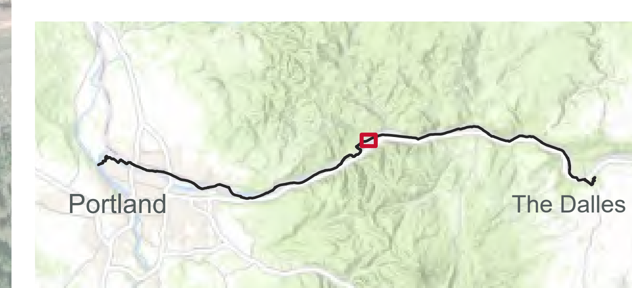


FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- ACCESS ROAD
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- WATERBODY
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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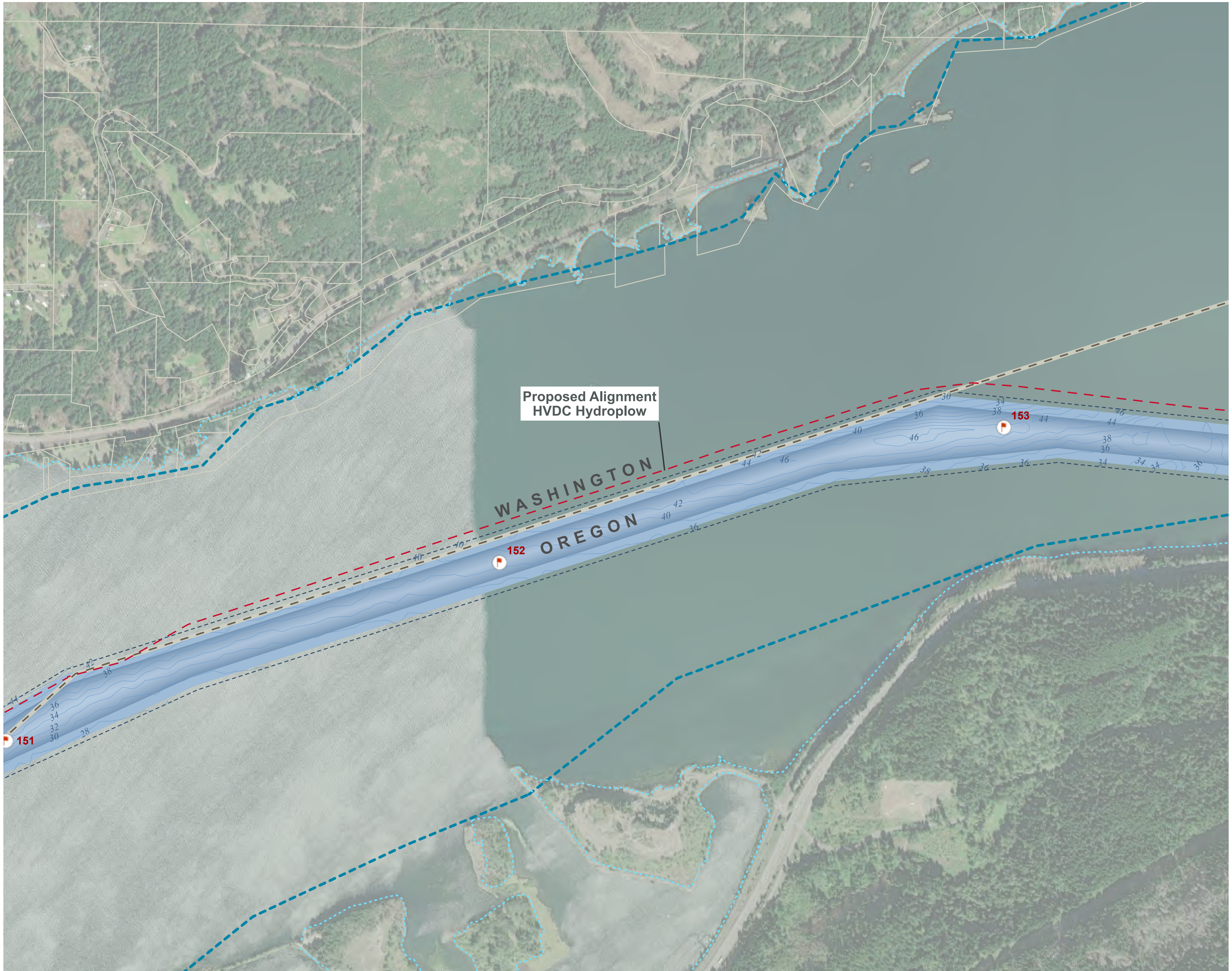
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R07E
Section: 1
USGS Quad Name: Bonneville Dam and Carson

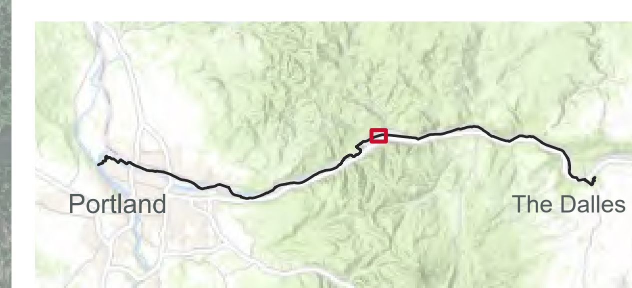


FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



HDR

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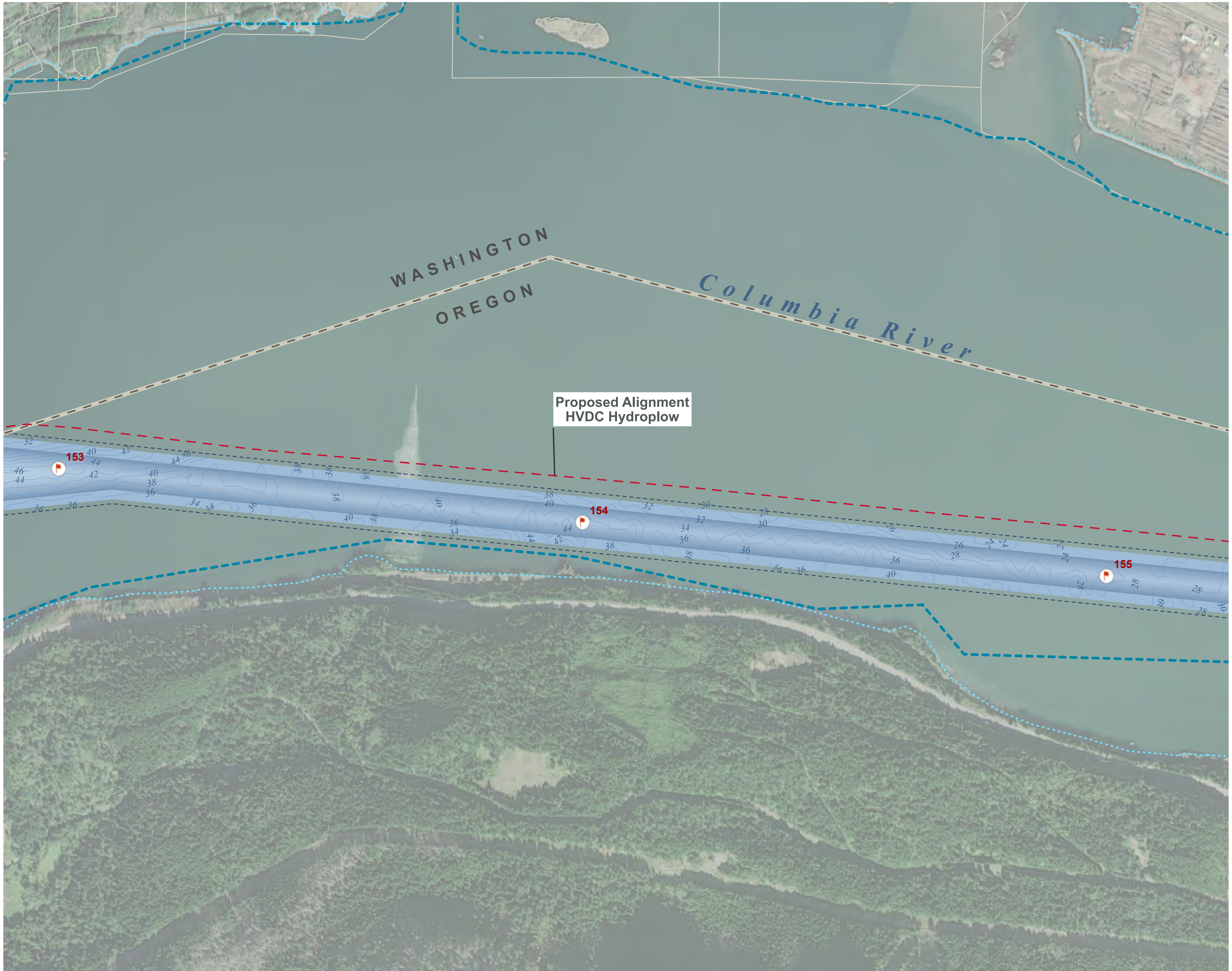
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R08E/R09E
Section: 32, 33
USGS Quad Name: Carson

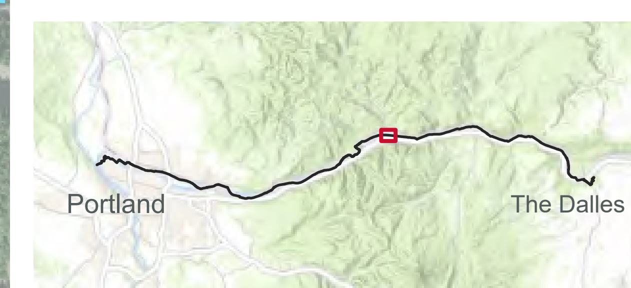


FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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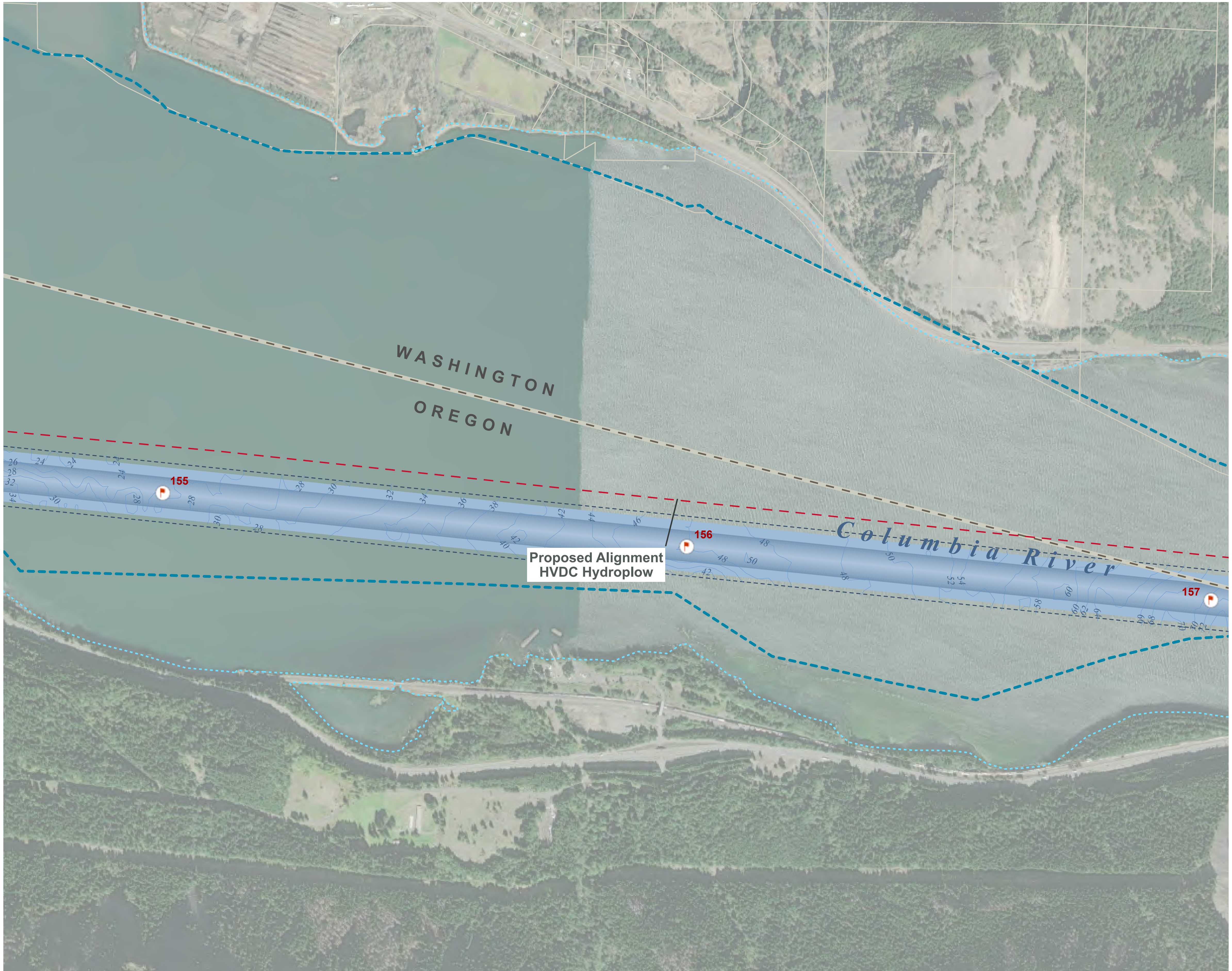
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R08E/R09E
Section: 34
USGS Quad Name: Carson

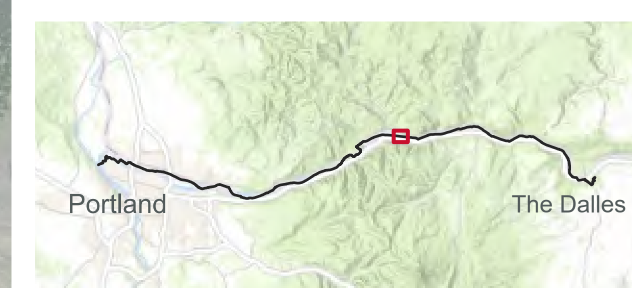


FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



HDR

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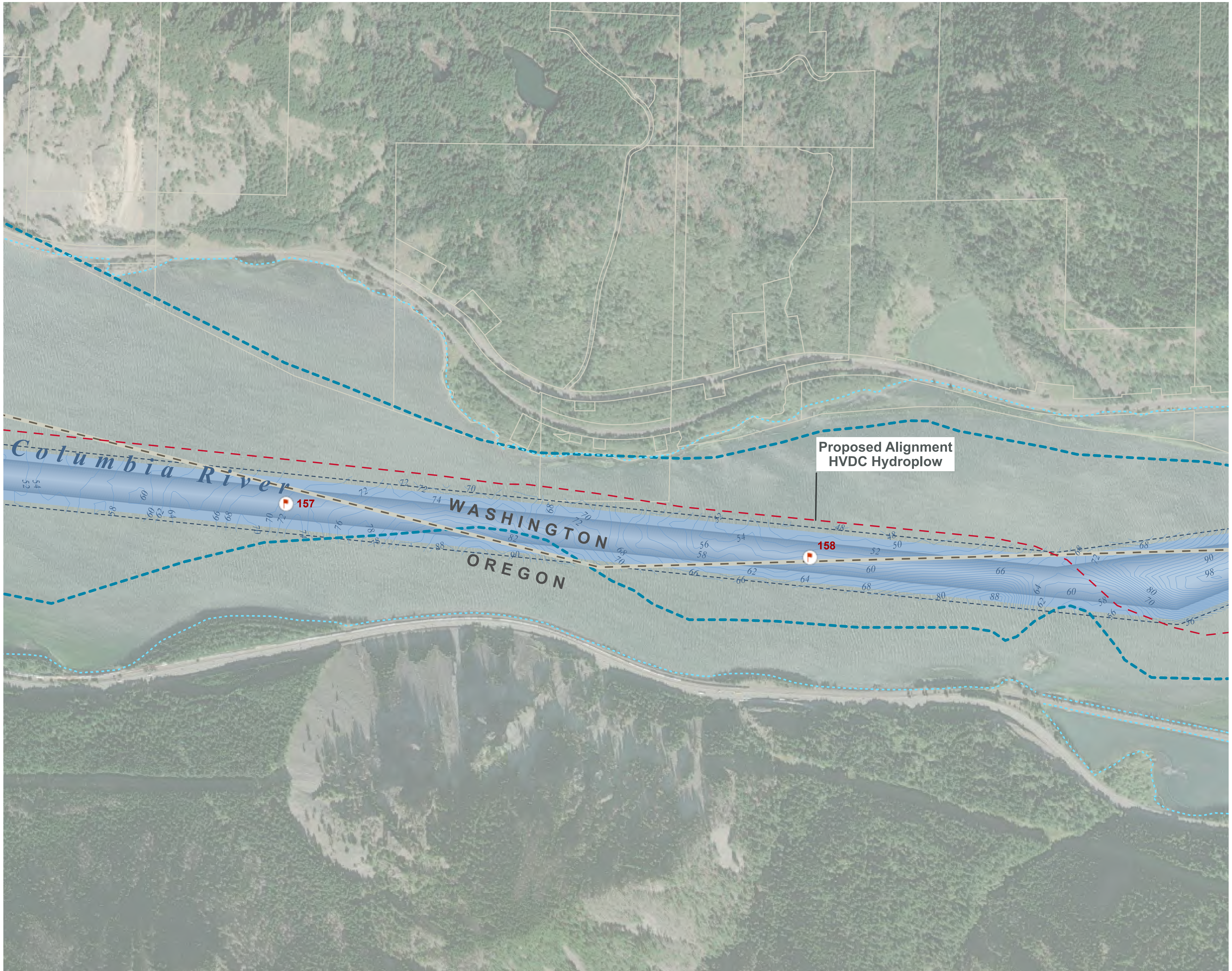
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R08E/R09E
Section: 35, 36
USGS Quad Name: Carson

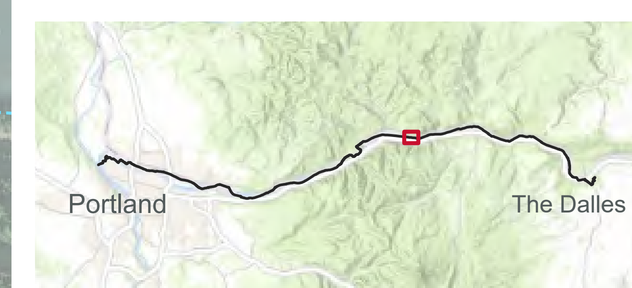


FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HVDC HYDROPLOW
OHW (ESTIMATED)
HISTORIC SHORELINE (ESTIMATED)
BATHYMETRY CONTOUR (2FT)
FEDERAL NAVIGATION CHANNEL
FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
SKAMANIA TAXLOT
STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



HDR

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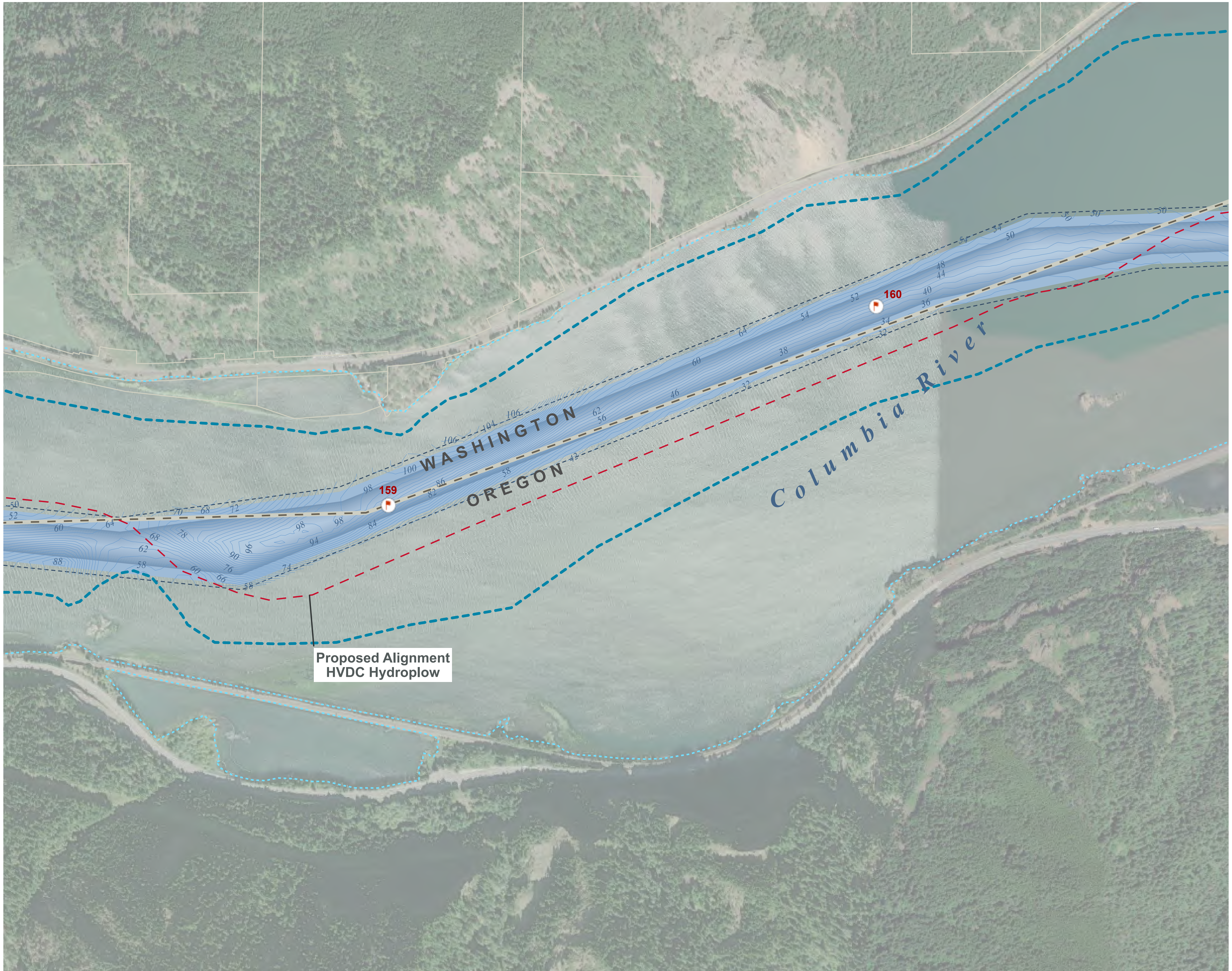
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N/T03N R09E
Section: 5, 6, 31
USGS Quad Name: Mount Defiance



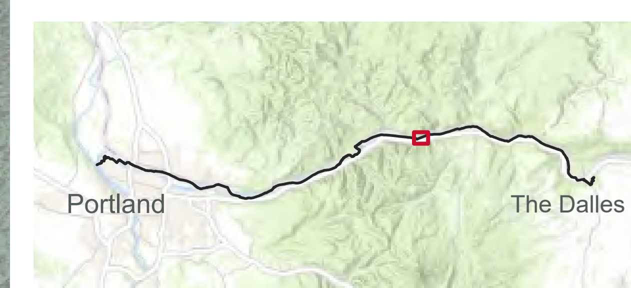
PLAN VIEW MAP
PAGE 34 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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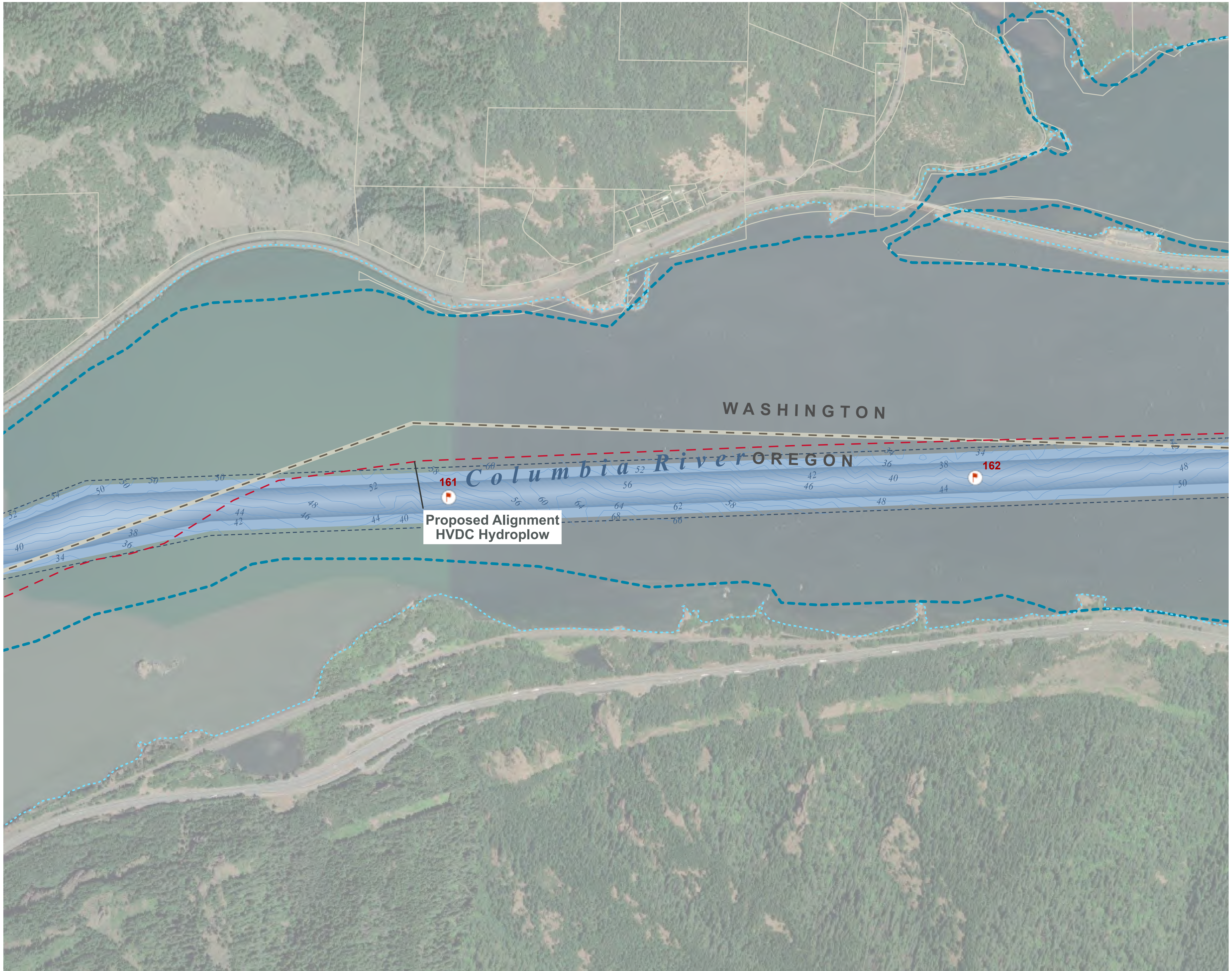
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R09E
Section: 33
USGS Quad Name: Mount Defiance



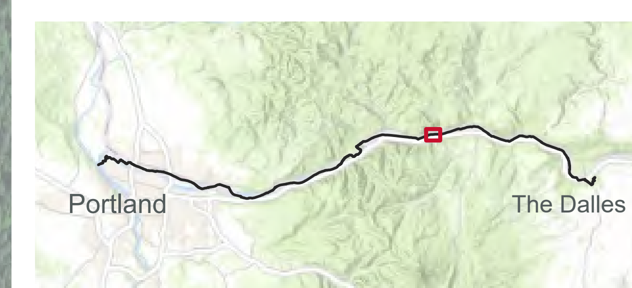
PLAN VIEW MAP

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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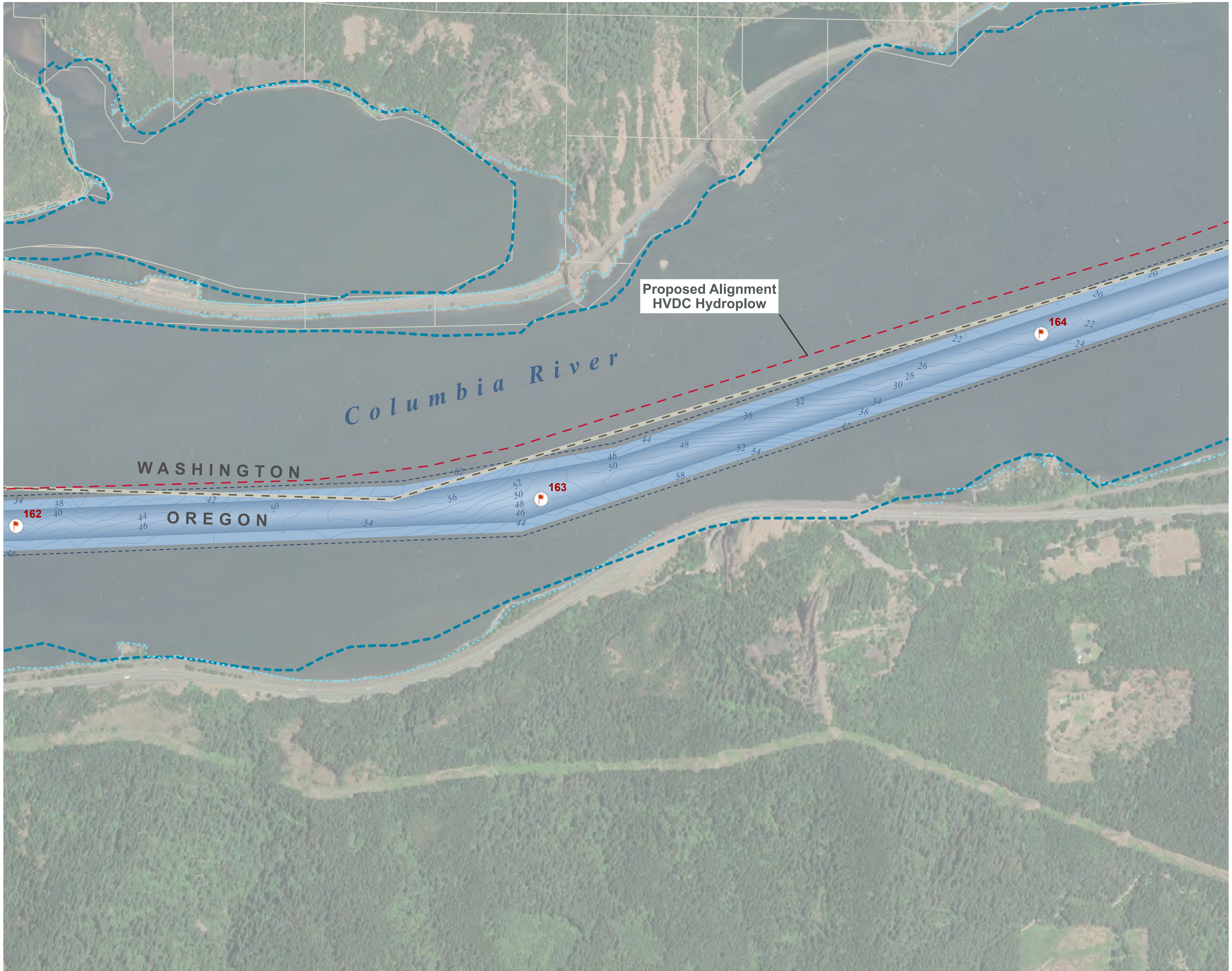
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R09E
Section: 35
USGS Quad Name: Mount Defiance



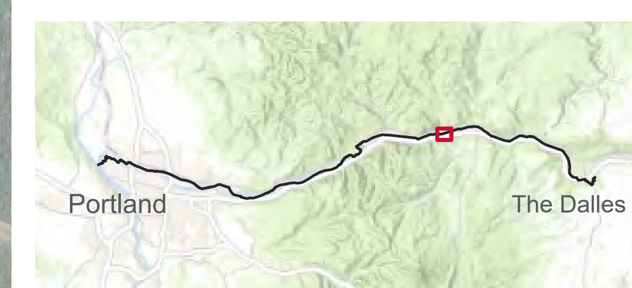
PLAN VIEW MAP

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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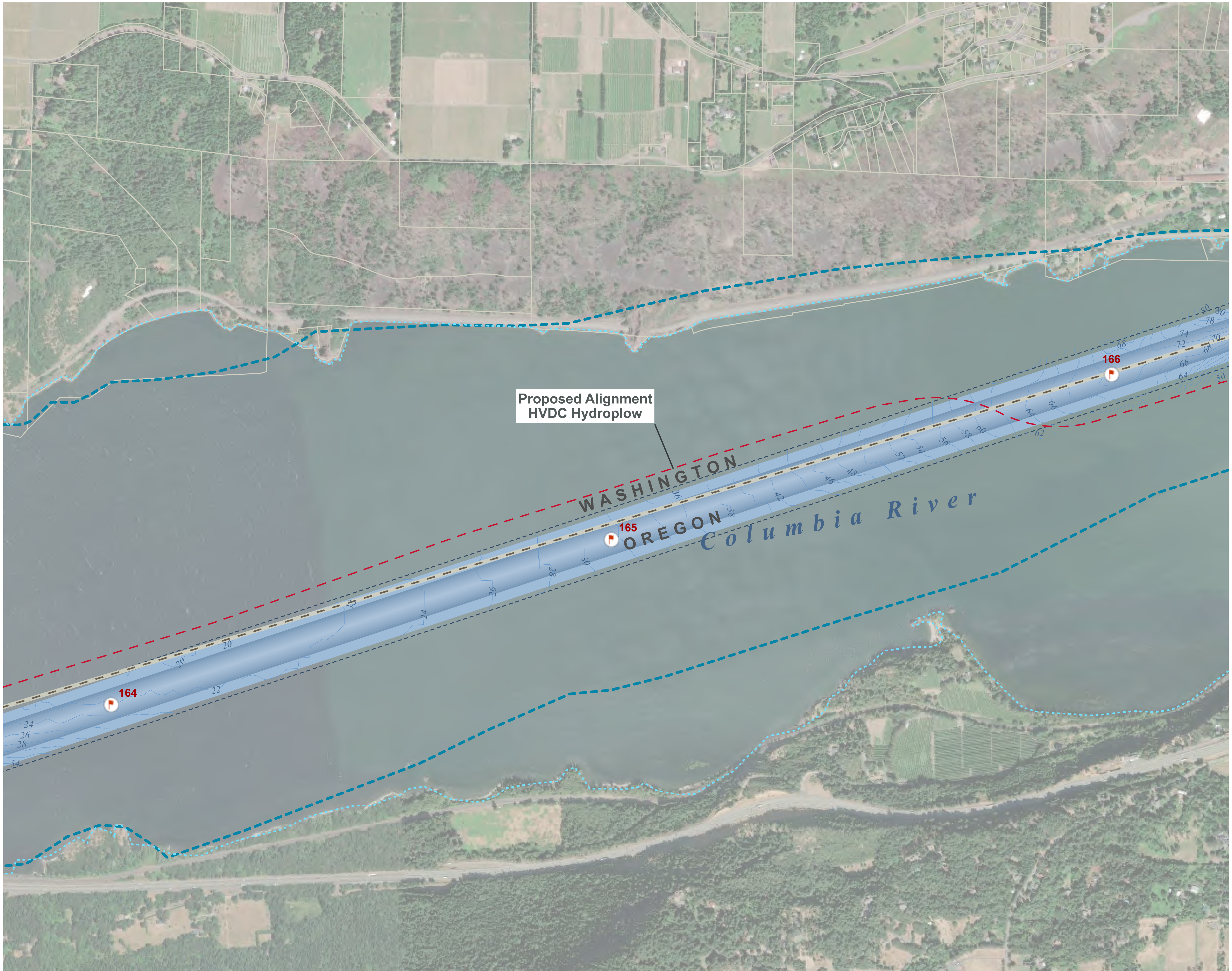
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R09E/R10E
Section: 31, 36
USGS Quad Name: Mount Defiance and Hood River



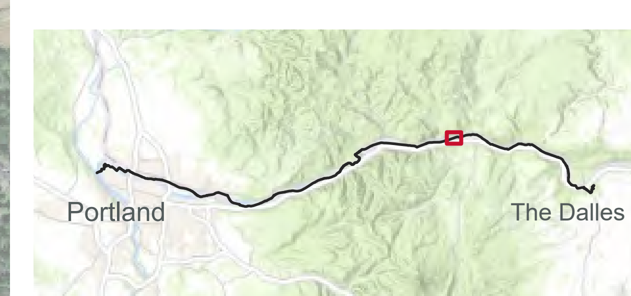
PLAN VIEW MAP
PAGE 37 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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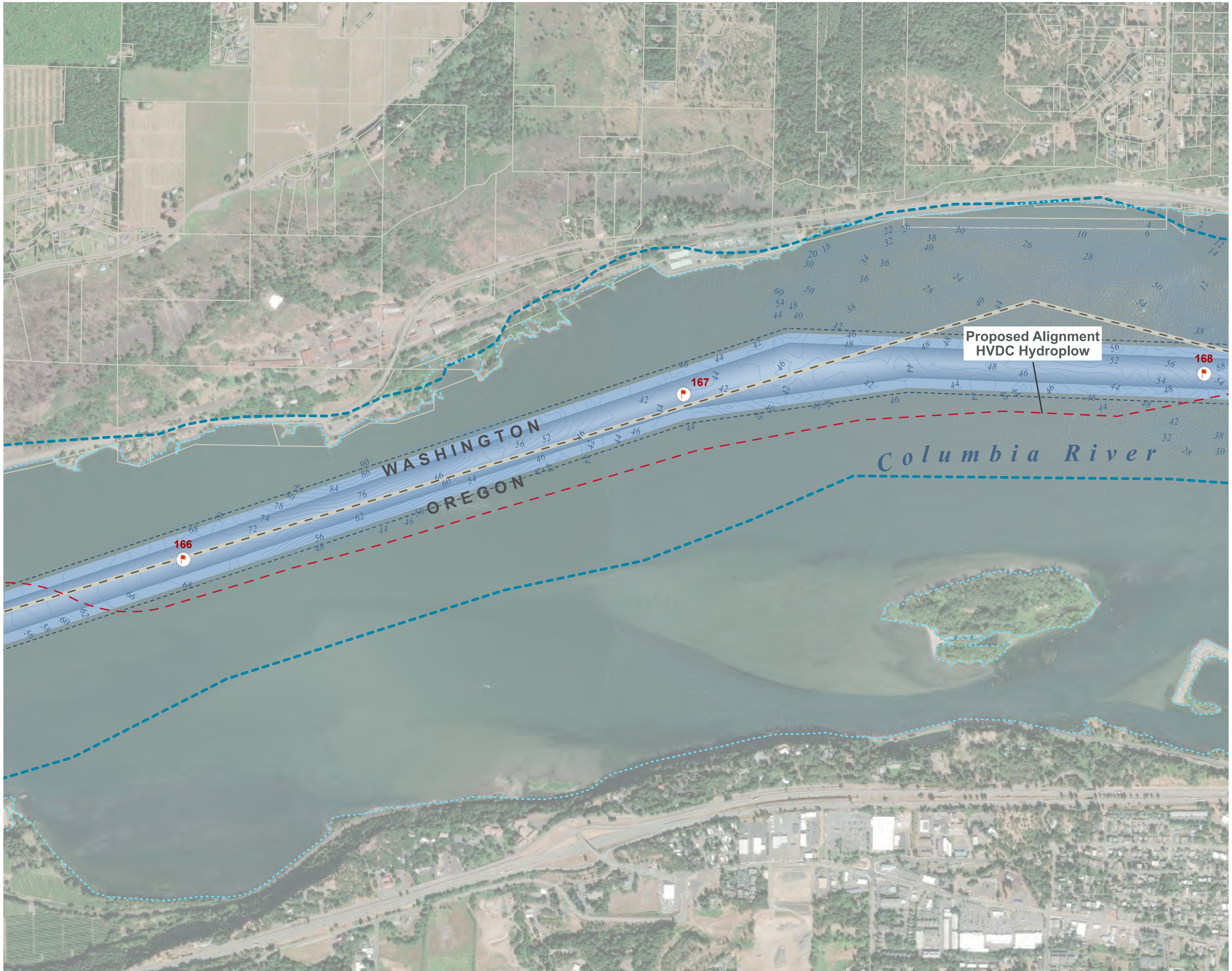
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R10E
Section: 28, 29
USGS Quad Name: Hood River



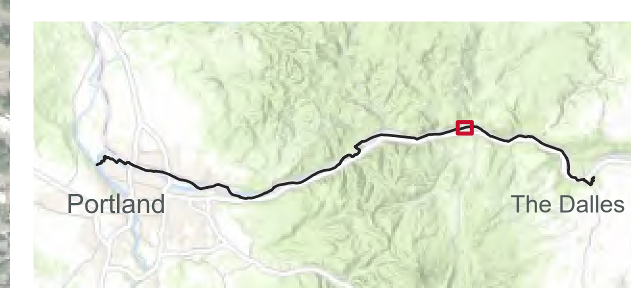
PLAN VIEW MAP
PAGE 38 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HVDC HYDROPLOW
OHW (ESTIMATED)
HISTORIC SHORELINE (ESTIMATED)
BATHYMETRY CONTOUR (2FT)
FEDERAL NAVIGATION CHANNEL
FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
SKAMANIA TAXLOT
STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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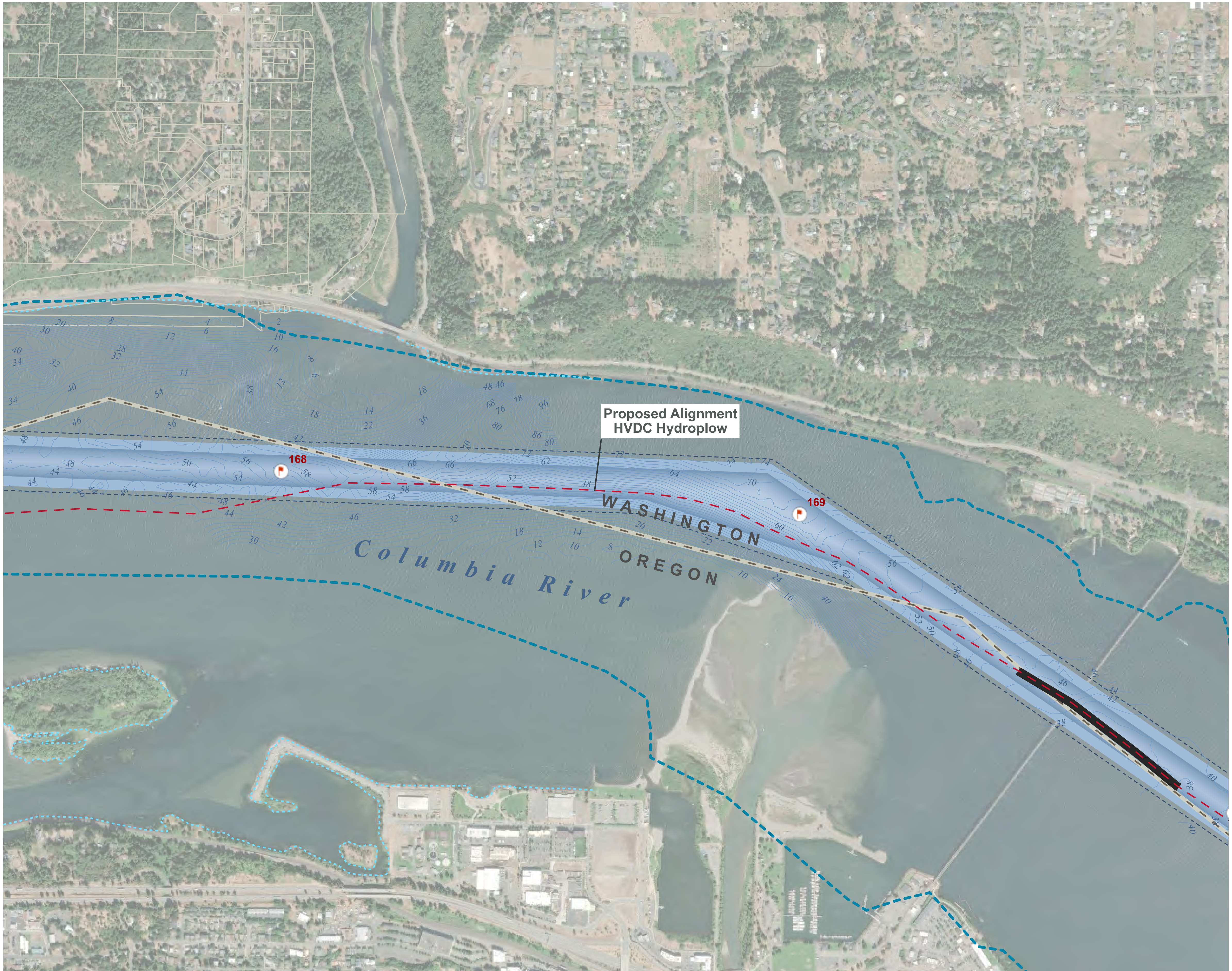
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R10E
Section: 26, 27
USGS Quad Name: Hood River



PLAN VIEW MAP
PAGE 39 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- CABLE PROTECTION
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- SKAMANIA TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

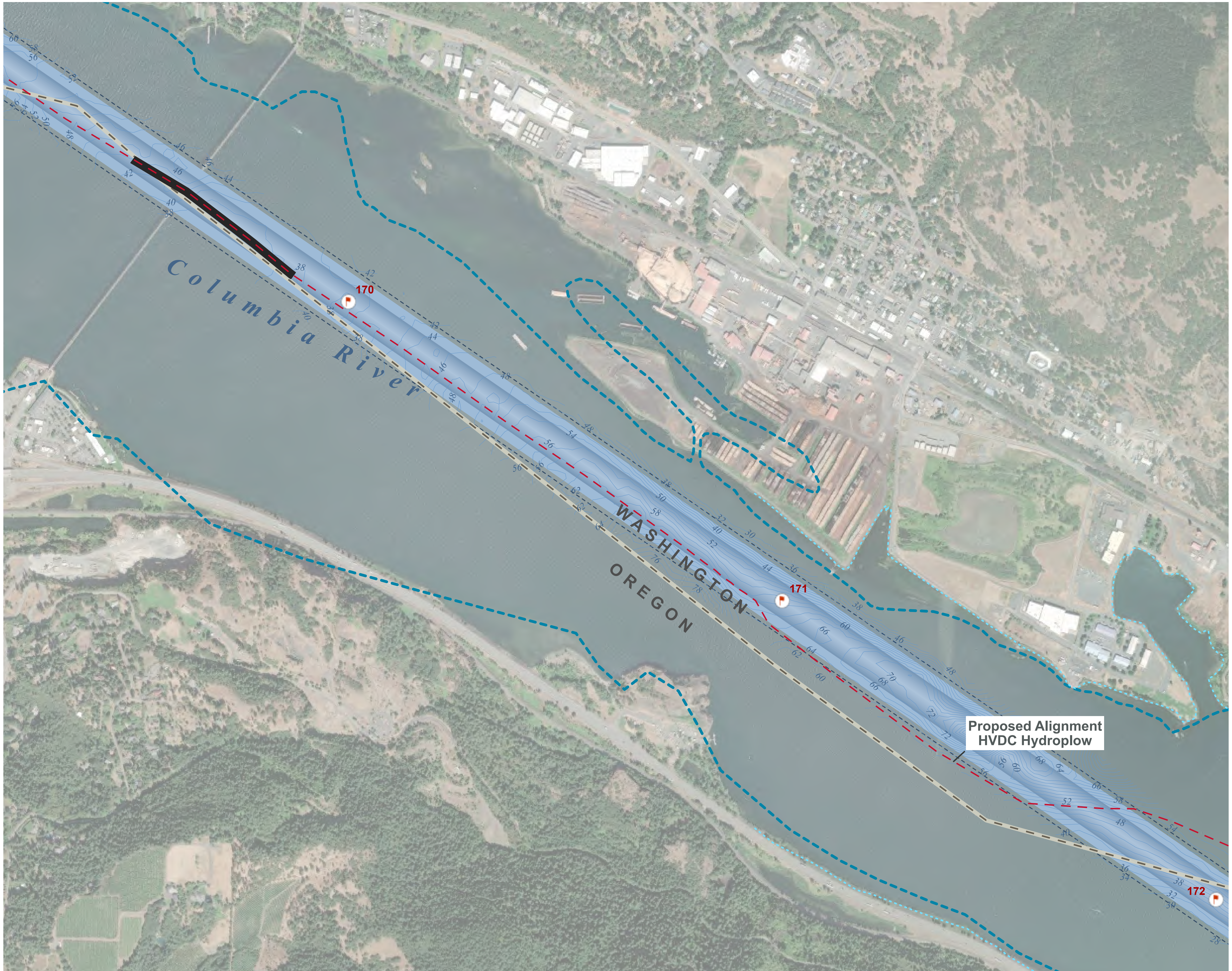
CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R10E
Section: 25
USGS Quad Name: Hood River



PLAN VIEW MAP
PAGE 40 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- CABLE PROTECTION
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION

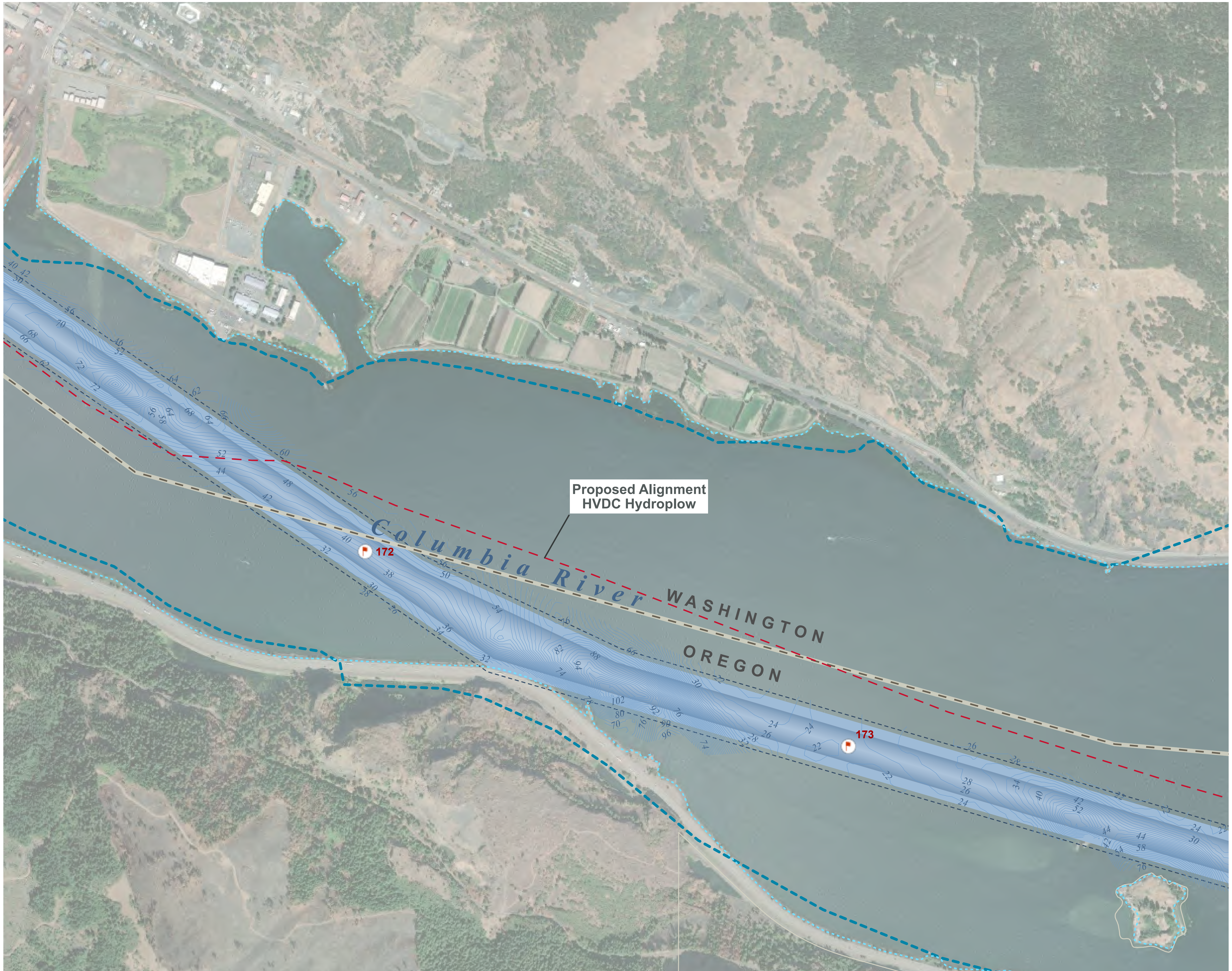
0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R11E
Section: 30, 31, 32
USGS Quad Name: White Salmon

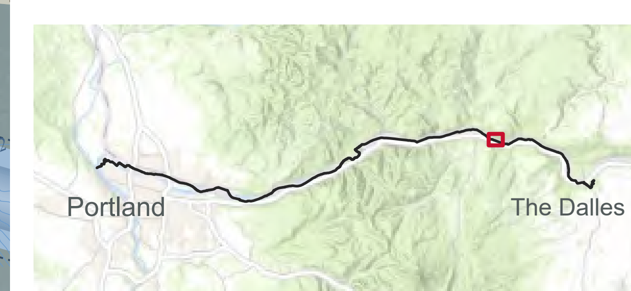
FOR INFORMATION ONLY - CONCEPT DRAWING



- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



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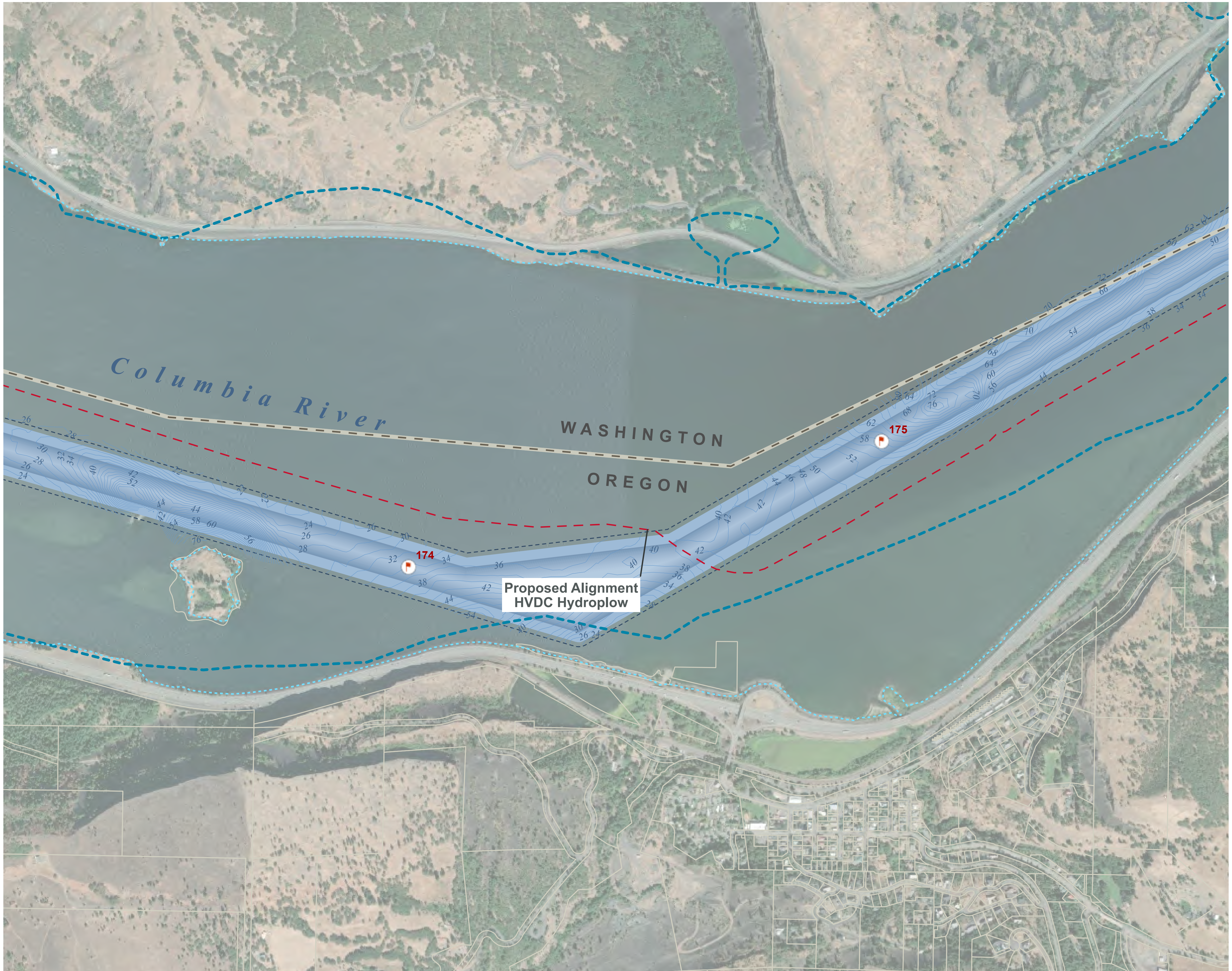
1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N/T03N R11E
Section: 32, 33
USGS Quad Name: White Salmon

PLAN VIEW MAP
PAGE 42 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING



- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION

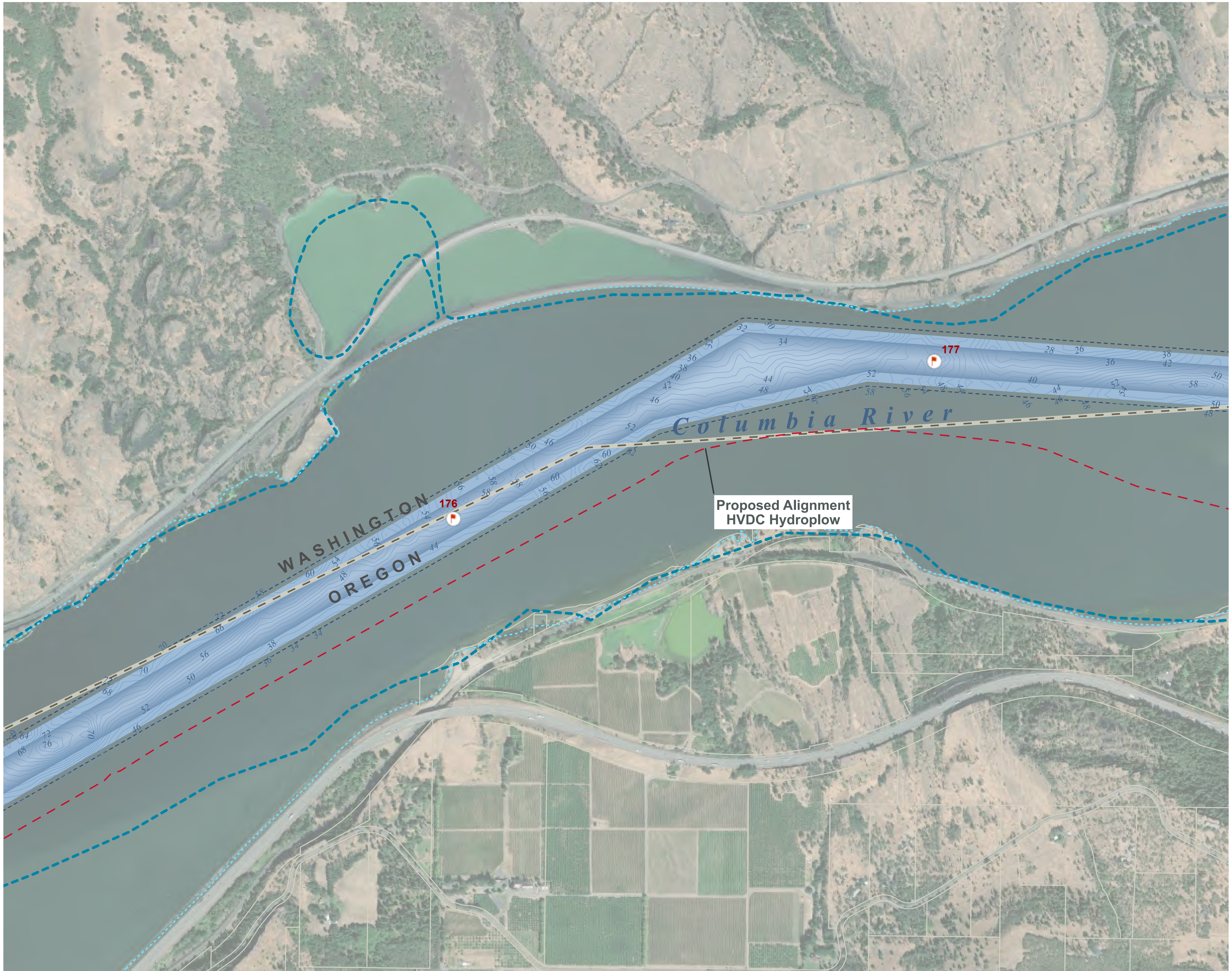
HDR

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range:
Section: 1, 2
USGS Quad Name: White Salmon

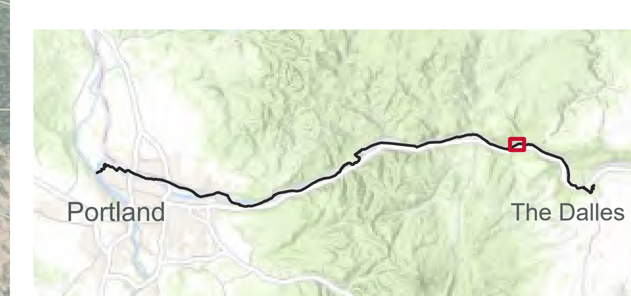


FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



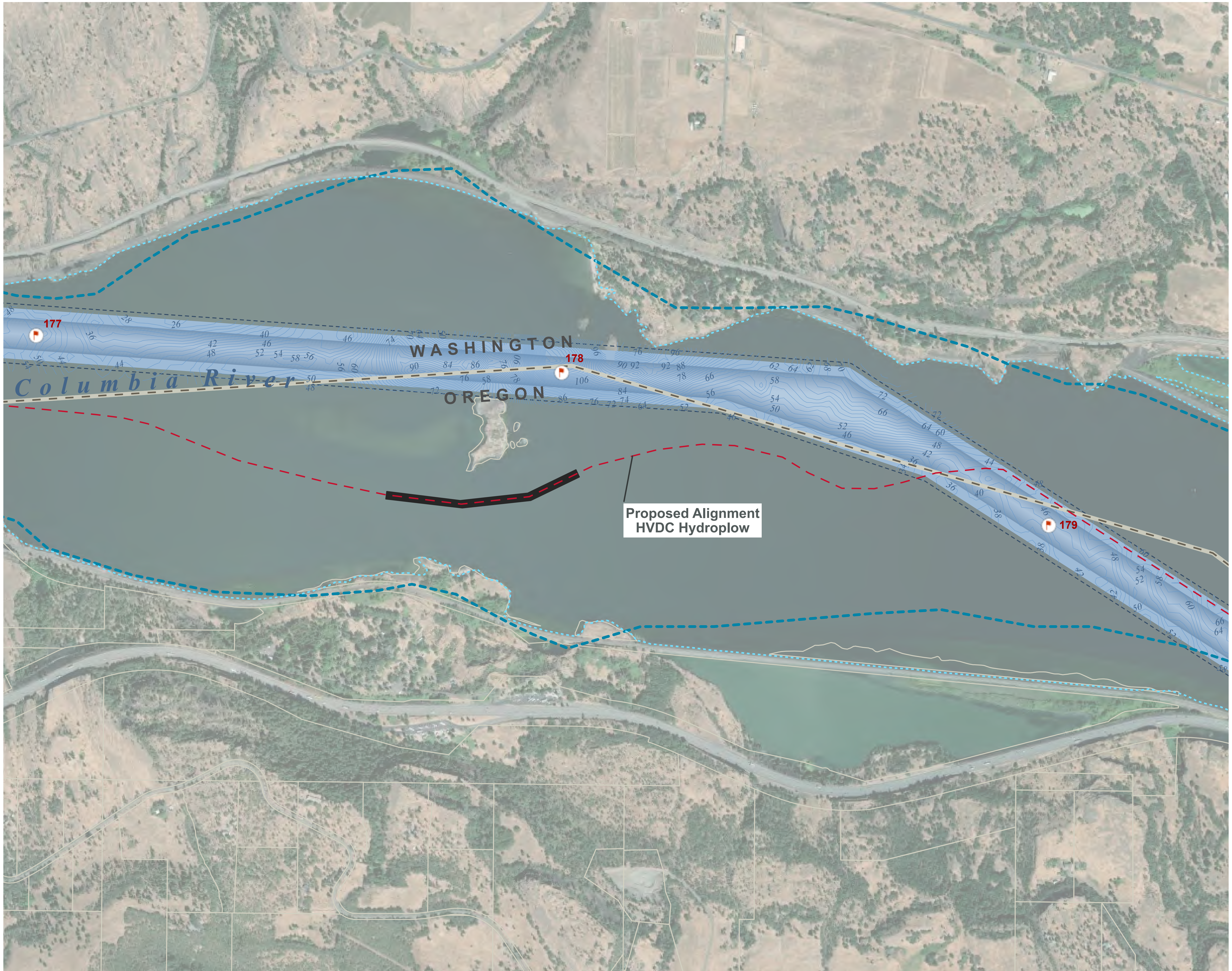
HDR

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R11E/R12E
Section: 31
USGS Quad Name: White Salmon and Lyle



FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- CABLE PROTECTION
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION

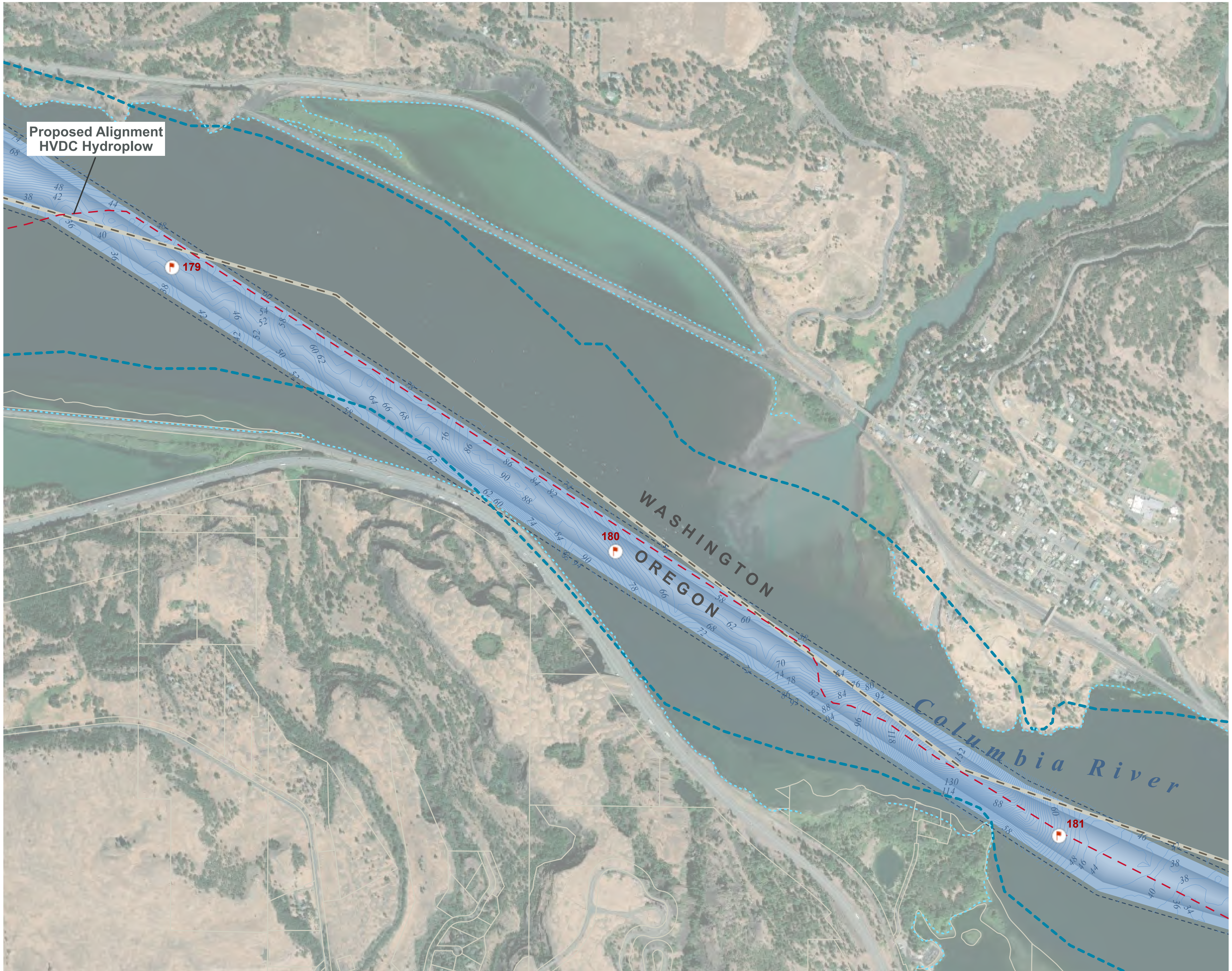
0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T03N R12E
Section: 32, 33
USGS Quad Name: Lyle

PLAN VIEW MAP
PAGE 45 OF 53



FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HVDC HYDROPLOW
OHW (ESTIMATED)
HISTORIC SHORELINE (ESTIMATED)
BATHYMETRY CONTOUR (2FT)
FEDERAL NAVIGATION CHANNEL
FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
WASCO TAXLOT
STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

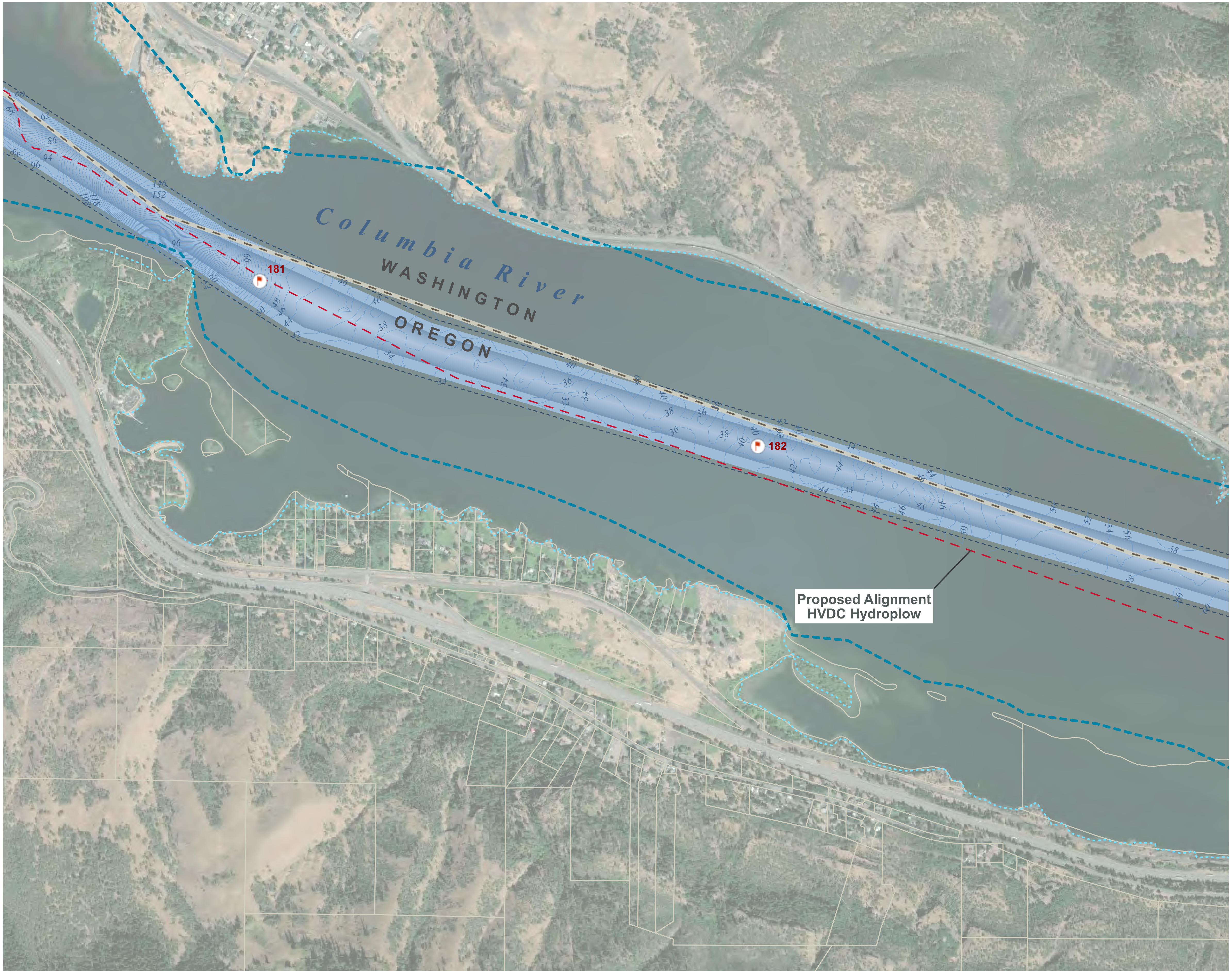
CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N/T03N R12E
Section: 3, 34
USGS Quad Name: Lyle



FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

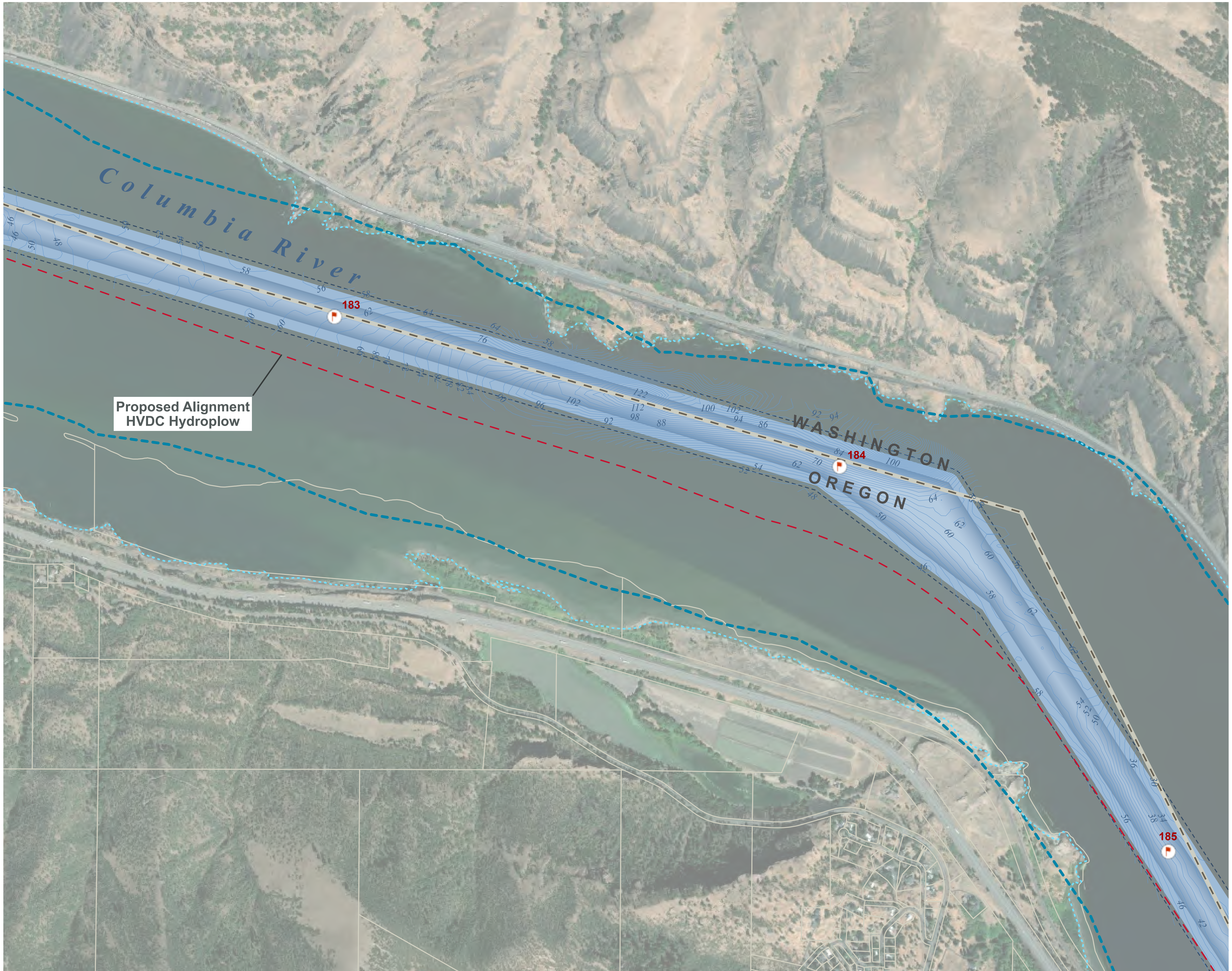
CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R12E
Section: 1, 11, 12
USGS Quad Name: Lyle



PLAN VIEW MAP
PAGE 47 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

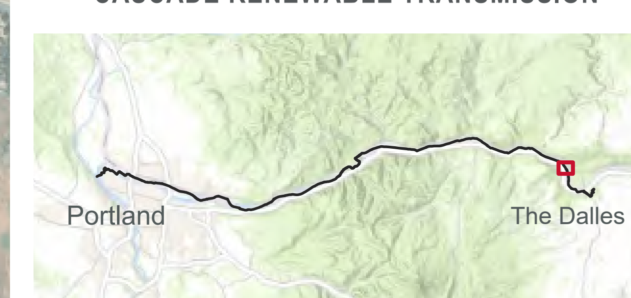
Township and Range: T02N R13E
Section: 7, 8
USGS Quad Name: The Dalles North

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION



0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R13E
Section: 16, 17
USGS Quad Name: The Dalles North

PLAN VIEW MAP
PAGE 49 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- CABLE PROTECTION
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION

HDR

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R13E
Section: 21, 28
USGS Quad Name: The Dalles North

PLAN VIEW MAP
PAGE 50 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- CABLE PROTECTION
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

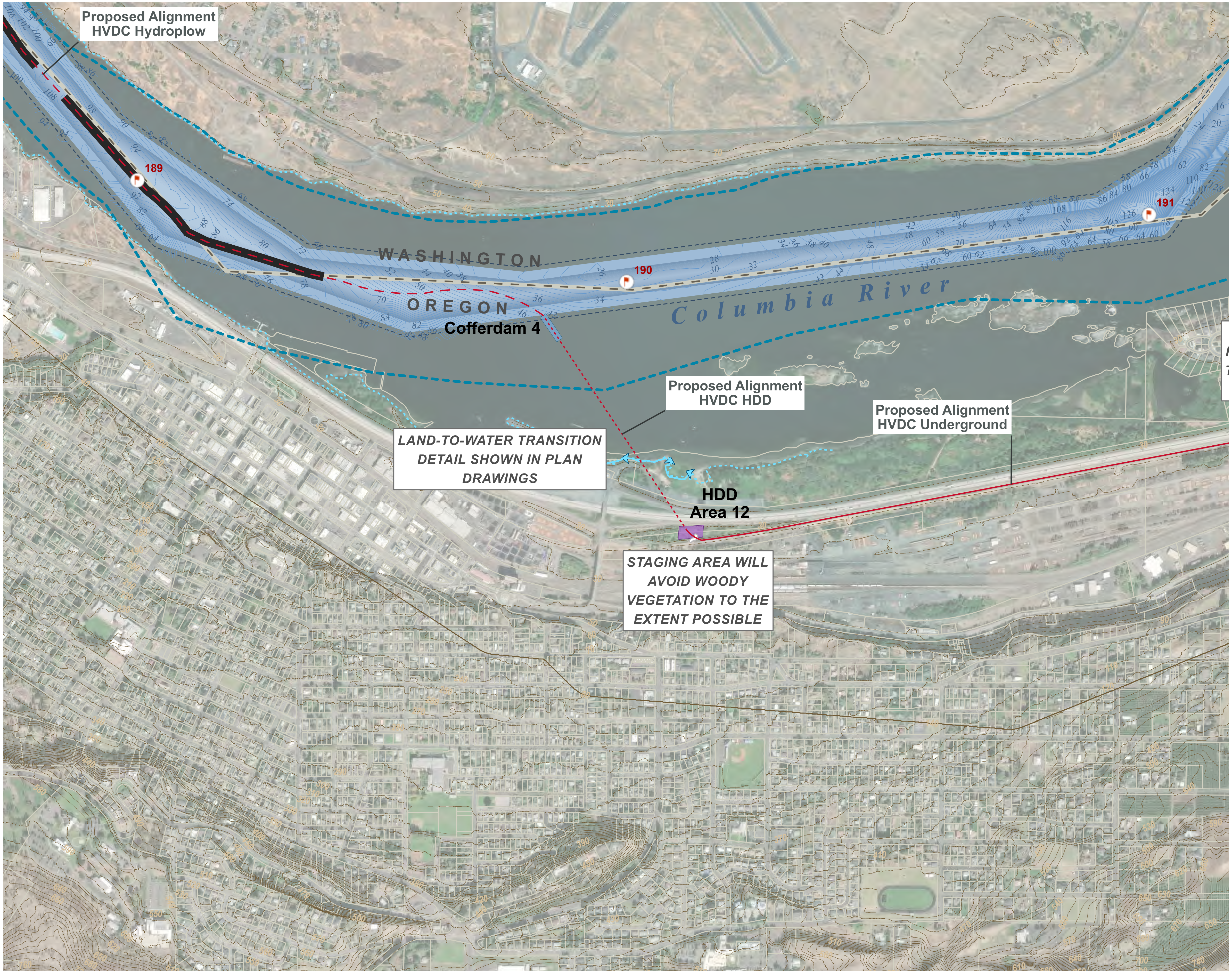
CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet;
Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T02N R13E
Section: 28, 33
USGS Quad Name: The Dalles South



FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- CABLE PROTECTION
- ACCESS ROAD
- OHW (ESTIMATED)
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

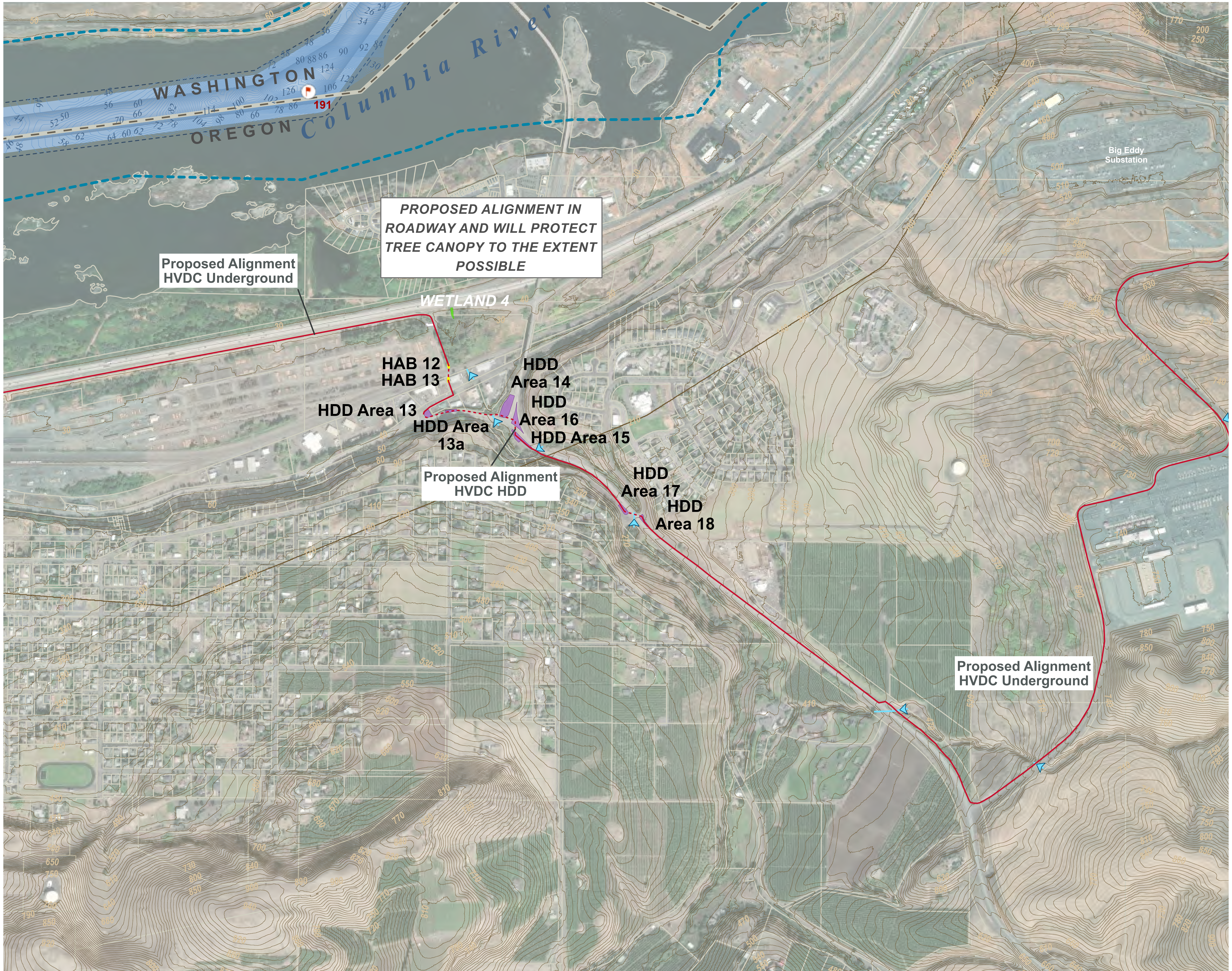
CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R13E
Section: 2, 3
USGS Quad Name: The Dalles South



PLAN VIEW MAP
PAGE 52 OF 53

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- ACCESS ROAD
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- CONTOURS (10 FT)
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION

HDR

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N R13E
Section: 1, 6
USGS Quad Name: The Dalles South

PLAN VIEW MAP

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- HISTORIC SHORELINE (ESTIMATED)
- ORDINARY HIGH WATER (OHW)
- CONTOURS (10 FT)
- WASCO TAXLOT
- STATE BOUNDARY

CABLE BUNDLE TO BE INSTALLED IN ROAD; WILL AVOID WATERS/WETLANDS

CASCADE RENEWABLE TRANSMISSION

0 1,500 Feet
1:12,000

1/16/2026
Data Sources: Aerial (2024) Esri, HDR.

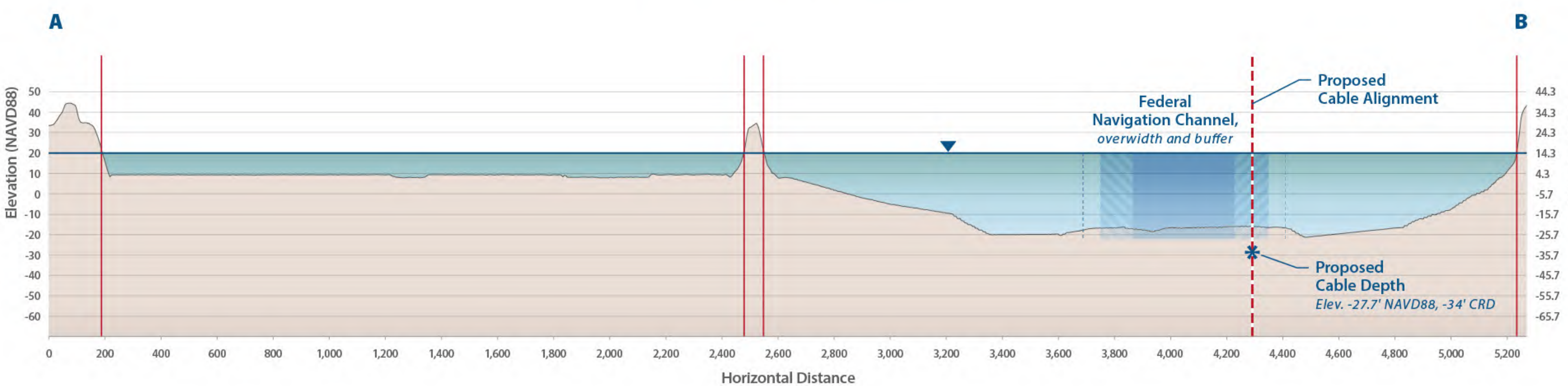
NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam - CRD, above Bonneville Dam - NAVD88

Township and Range: T01N/T02N R14E
Section: 5, 6, 31, 32
USGS Quad Name: Petersburg

FOR INFORMATION ONLY - CONCEPT DRAWING

A—B CROSS SECTION LINE
PROPOSED ALIGNMENT - HVDC HYDROPLOW
RIVER MILES (USACE)
USACE DELINEATED OHW
BATHYMETRY CONTOUR (2FT)
FEDERAL NAVIGATION CHANNEL
FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)

Cross Section View: RM 111.5



CASCADE RENEWABLE TRANSMISSION

HDR

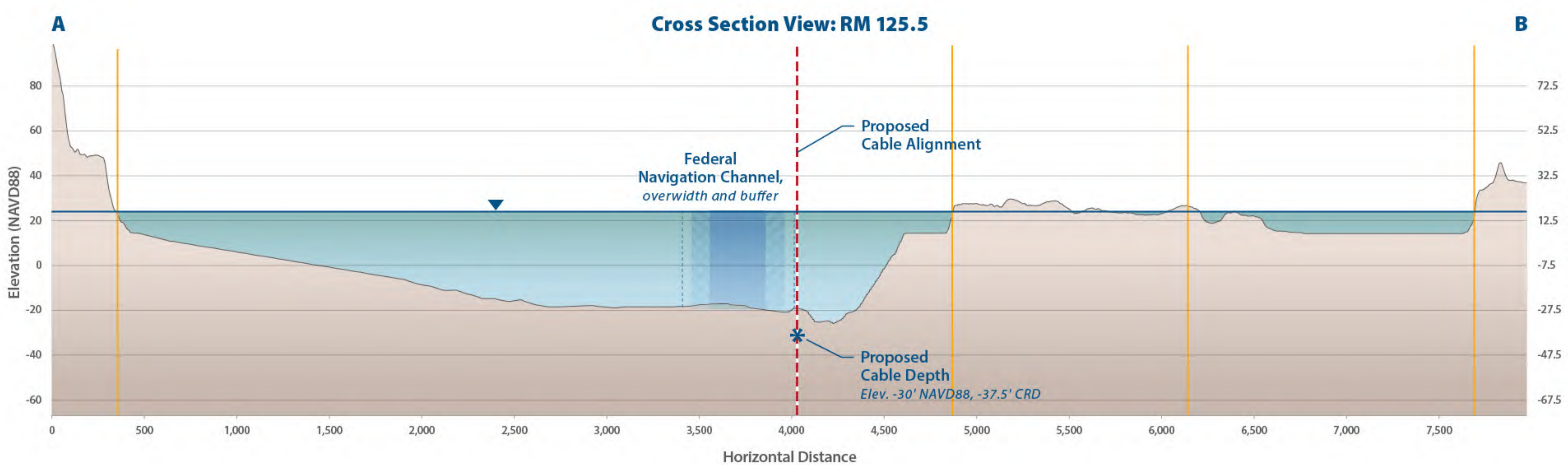
0 500 FT
1:6,000

1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, Bing

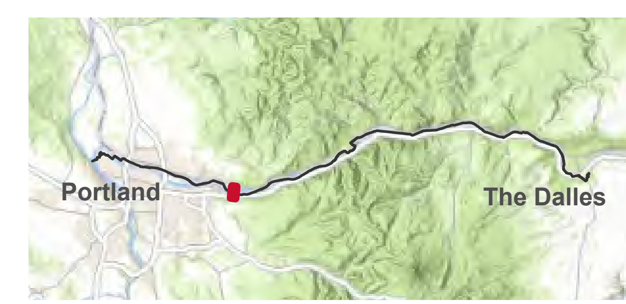
CROSS SECTION VIEW: RM 125.5
PAGE 2 OF 9

FOR INFORMATION ONLY - CONCEPT DRAWING

- A B CROSS SECTION LINE
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- RIVER MILES (USACE)
- ESTIMATED OHW
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)



CASCADE RENEWABLE TRANSMISSION



HDR

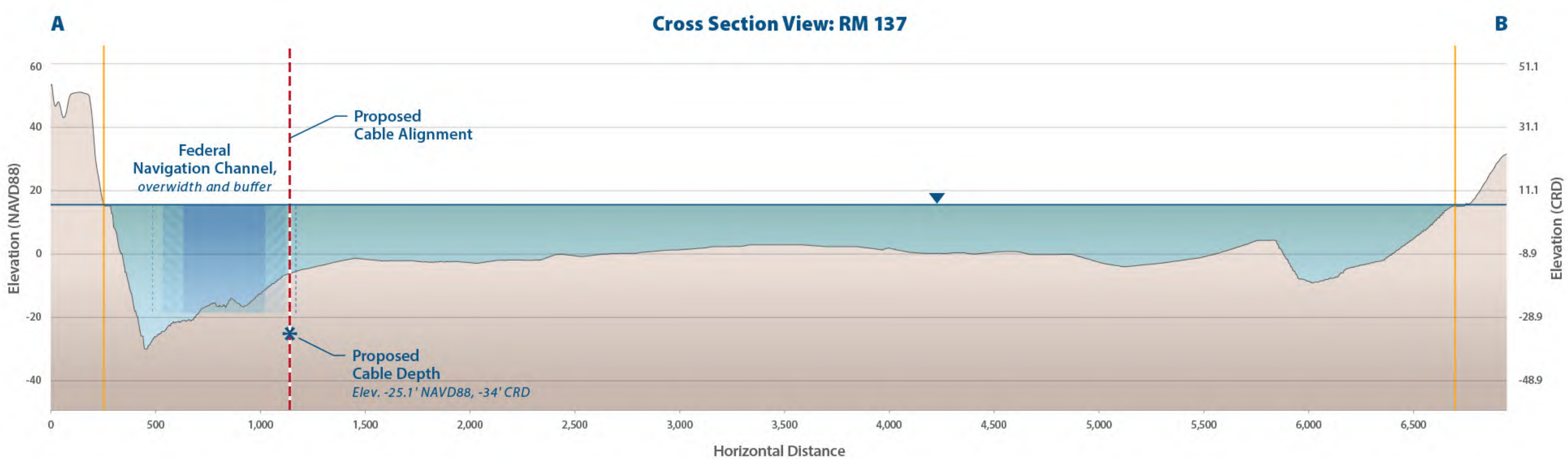
0 500 FT
1:10,000

1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, Bing

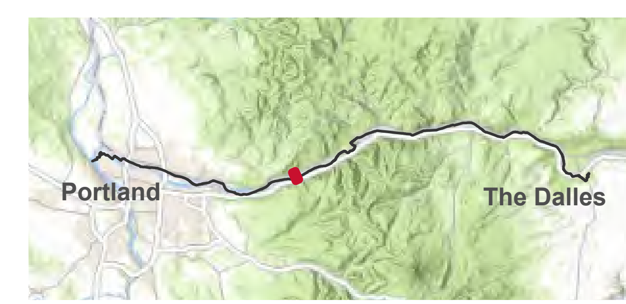
CROSS SECTION VIEW: RM 137
PAGE 3 OF 9

FOR INFORMATION ONLY - CONCEPT DRAWING

- A B CROSS SECTION LINE
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- RIVER MILES (USACE)
- ESTIMATED OHW
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)



CASCADE RENEWABLE TRANSMISSION



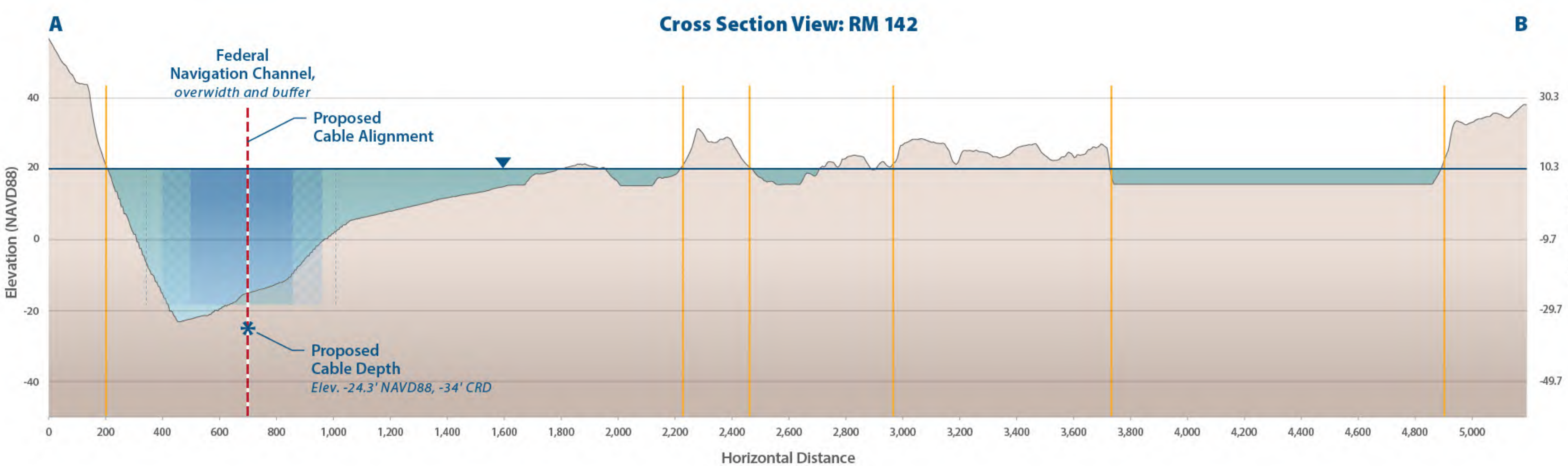
0 500 FT
1:8,000

1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, Bing

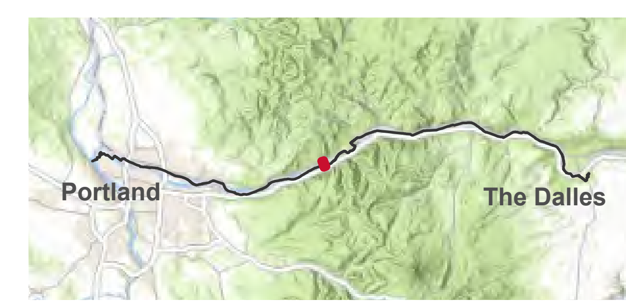
CROSS SECTION VIEW: RM 142
PAGE 4 OF 9

FOR INFORMATION ONLY - CONCEPT DRAWING

- A_B CROSS SECTION LINE
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- RIVER MILES (USACE)
- ESTIMATED OHW
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)



CASCADE RENEWABLE TRANSMISSION



0 500 FT

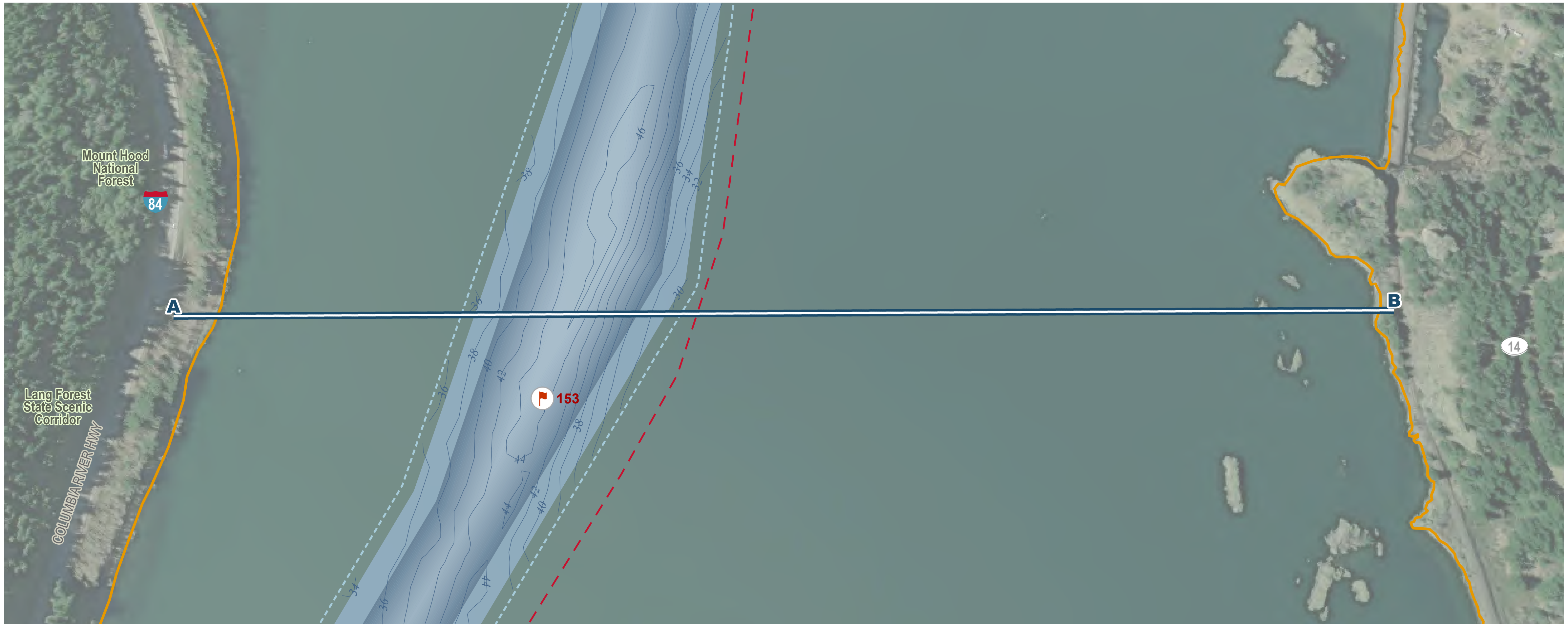
1:6,000

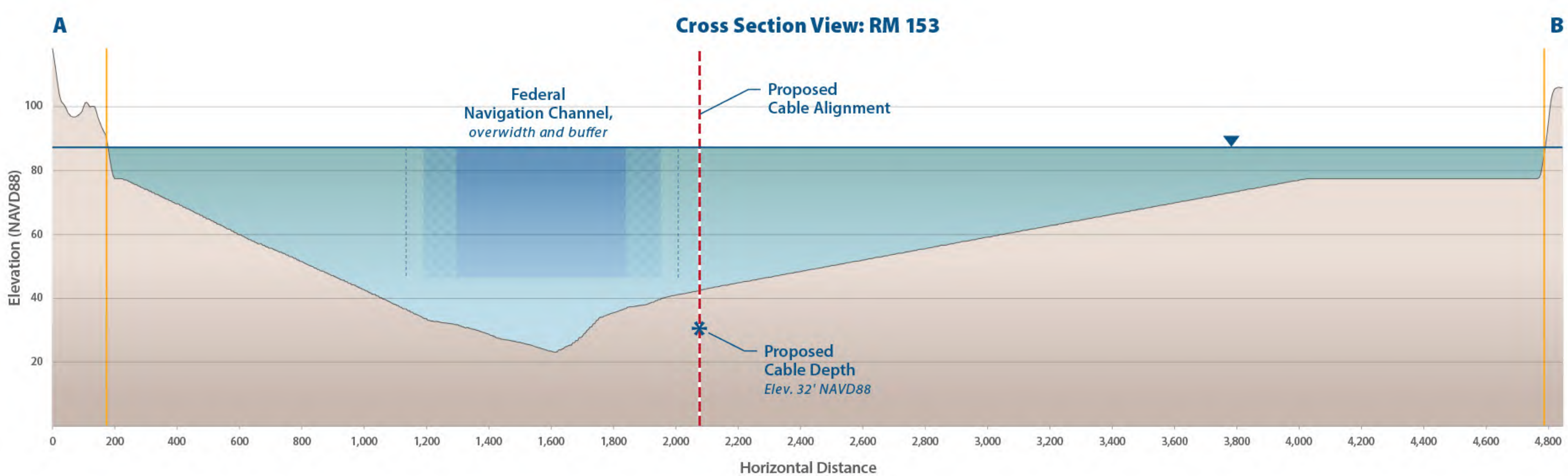
1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, Bing

CROSS SECTION VIEW: RM 153
PAGE 5 OF 9

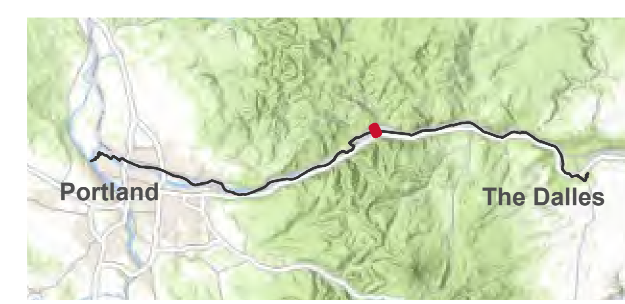
FOR INFORMATION ONLY - CONCEPT DRAWING

- A__B CROSS SECTION LINE
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- RIVER MILES (USACE)
- ESTIMATED OHW
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)





CASCADE RENEWABLE TRANSMISSION



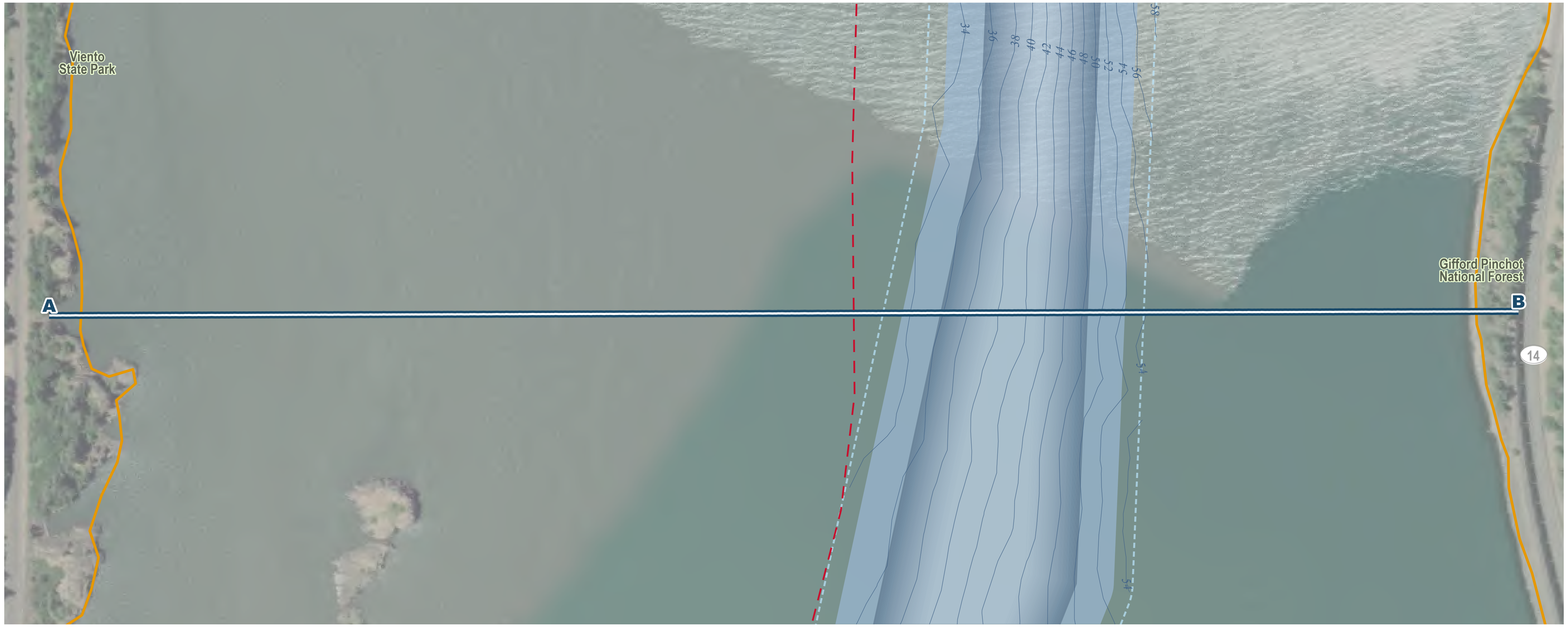
0 500 FT
1:6,000

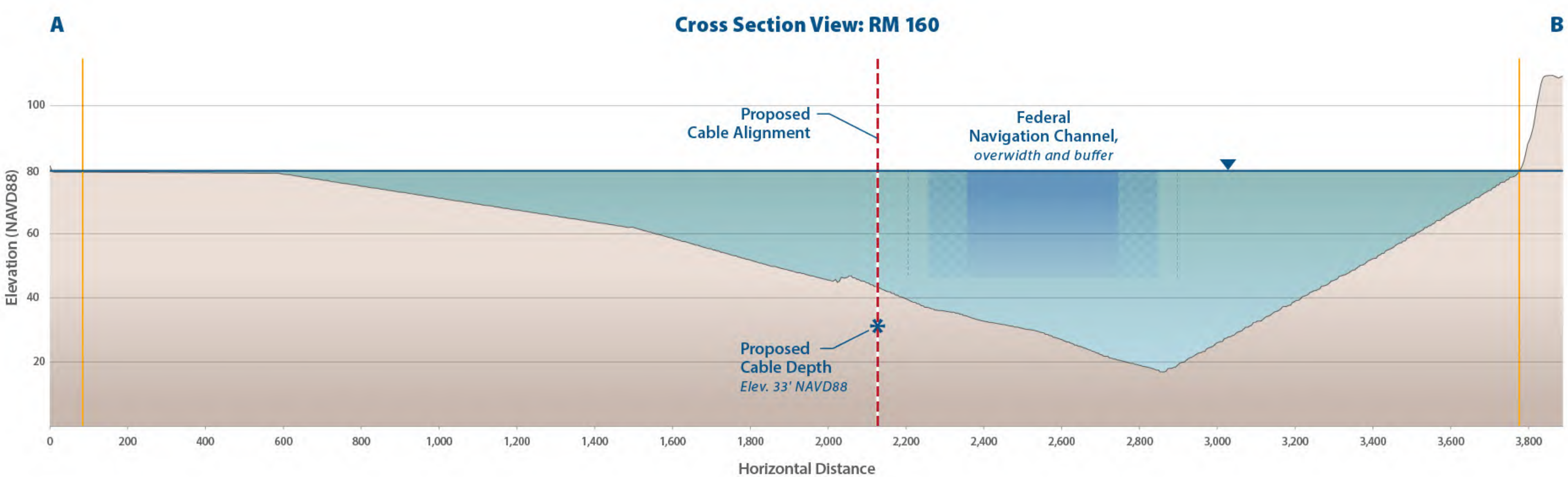
1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, Bing

CROSS SECTION VIEW: RM 160
PAGE 6 OF 9

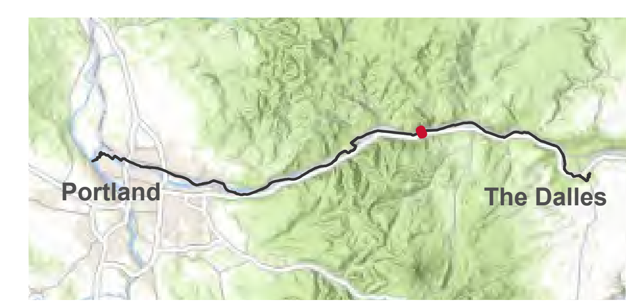
FOR INFORMATION ONLY - CONCEPT DRAWING

- A_B CROSS SECTION LINE
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- RIVER MILES (USACE)
- ESTIMATED OHW
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)





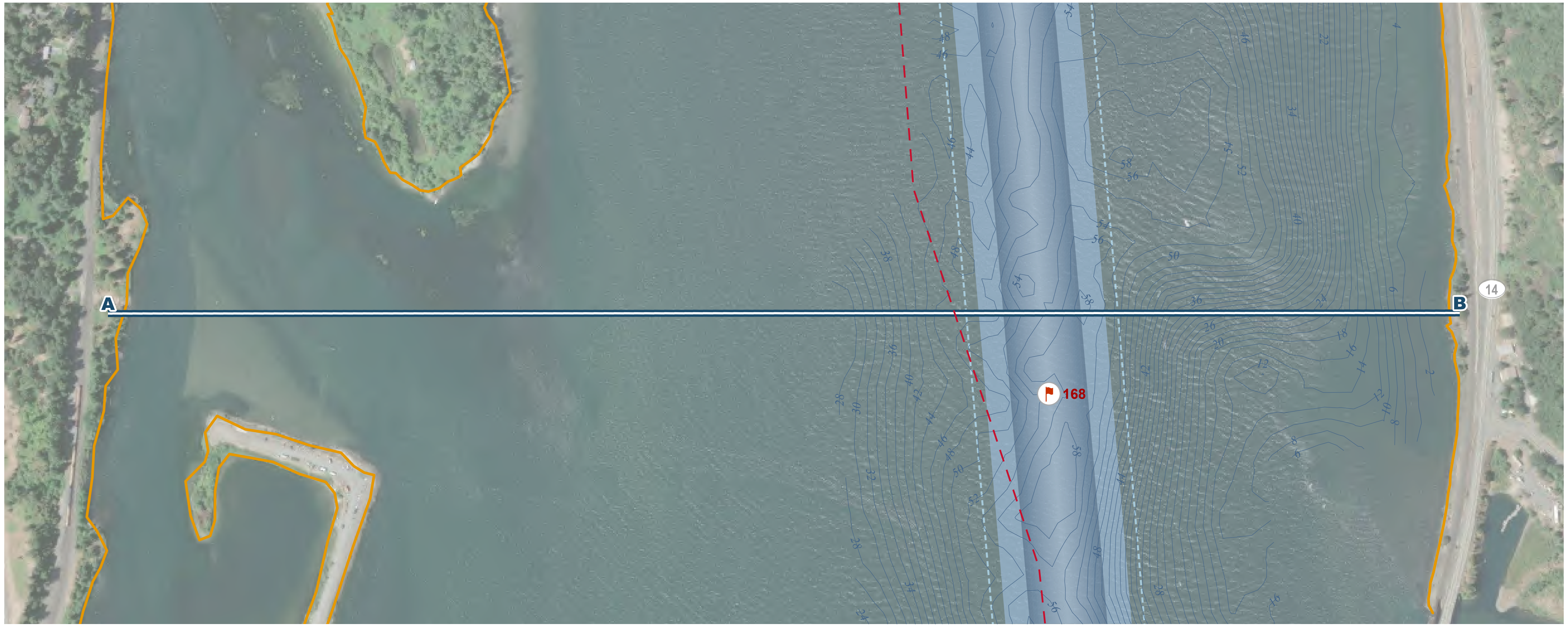
CASCADE RENEWABLE TRANSMISSION



HDR

0 500 FT
1:4,000

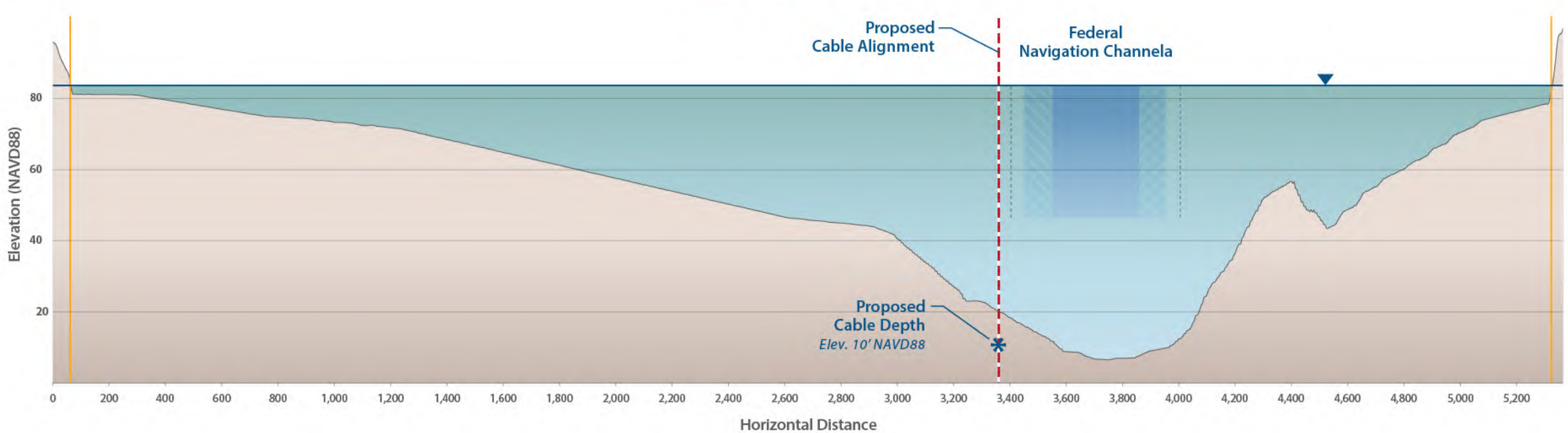
1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, Bing



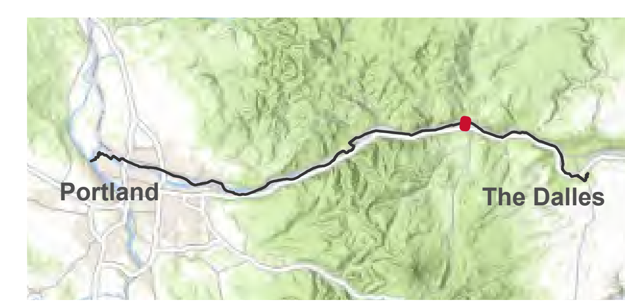
CROSS SECTION VIEW: RM 168

FOR INFORMATION ONLY - CONCEPT DRAWING

- A__B CROSS SECTION LINE
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- RIVER MILES (USACE)
- ESTIMATED OHW
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)

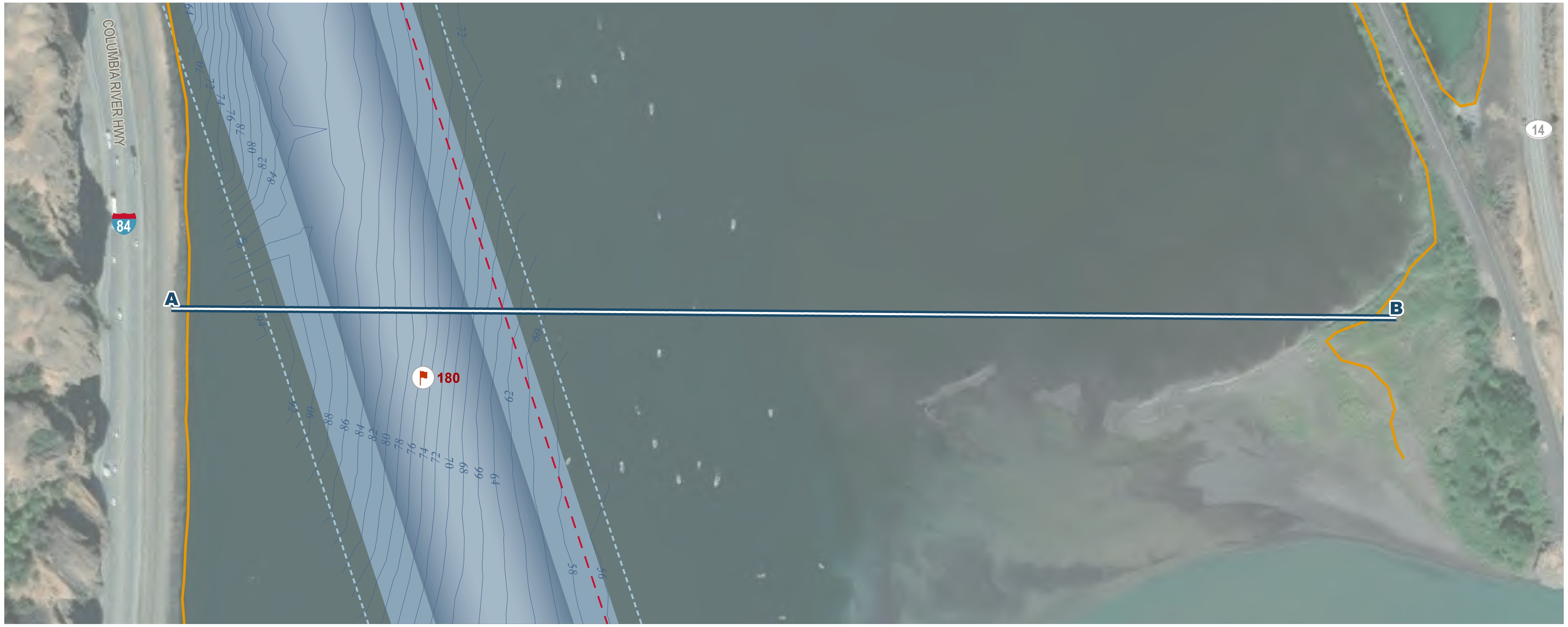


CASCADE RENEWABLE TRANSMISSION



0 500 FT
1:6,000

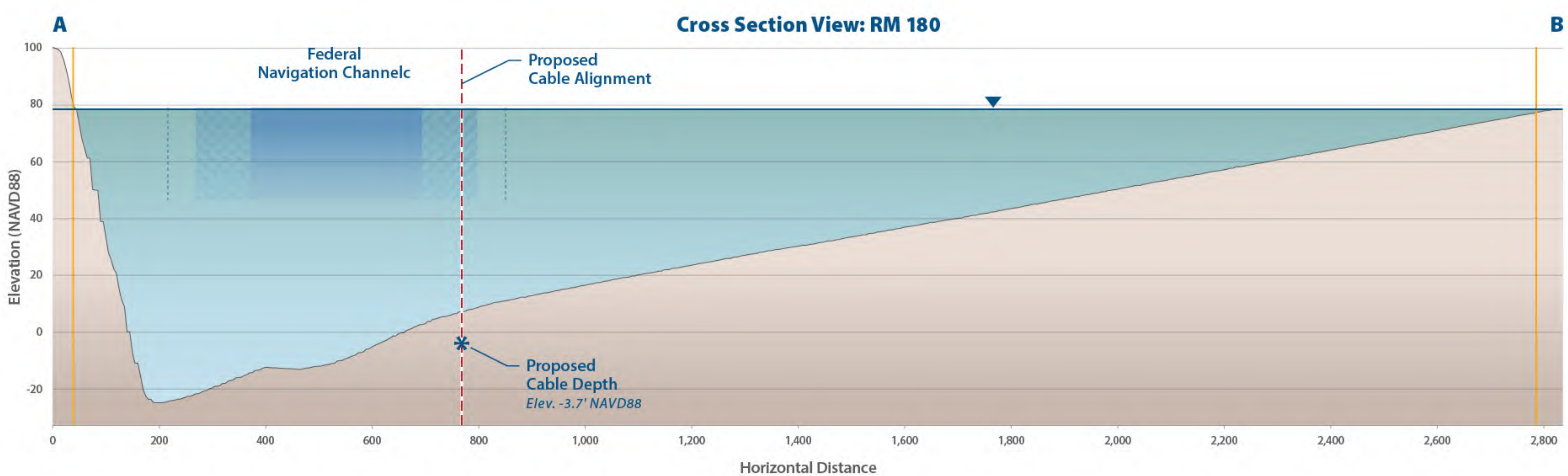
1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, Bing



CROSS SECTION VIEW: RM 180
PAGE 8 OF 9

FOR INFORMATION ONLY - CONCEPT DRAWING

- A__B CROSS SECTION LINE
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- RIVER MILES (USACE)
- ESTIMATED OHW
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)



CASCADE RENEWABLE TRANSMISSION

HDR

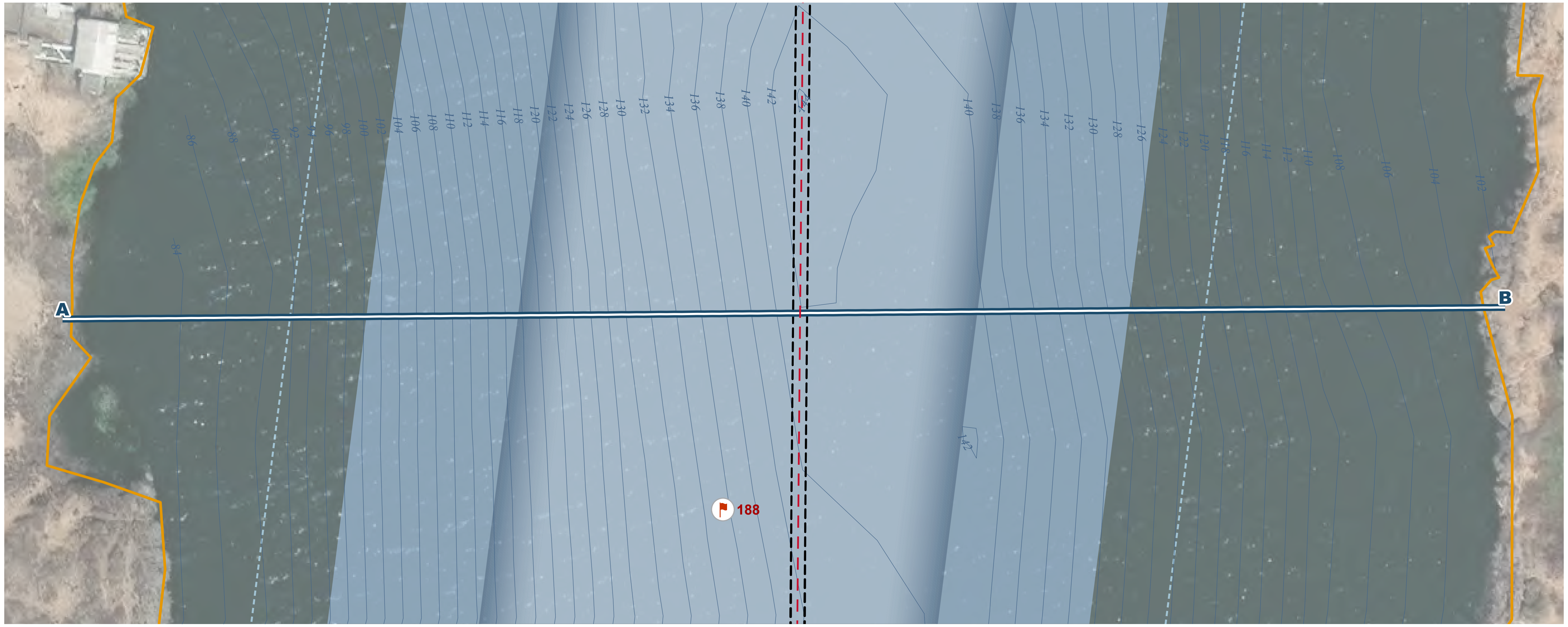
0 500 FT
1:3,500

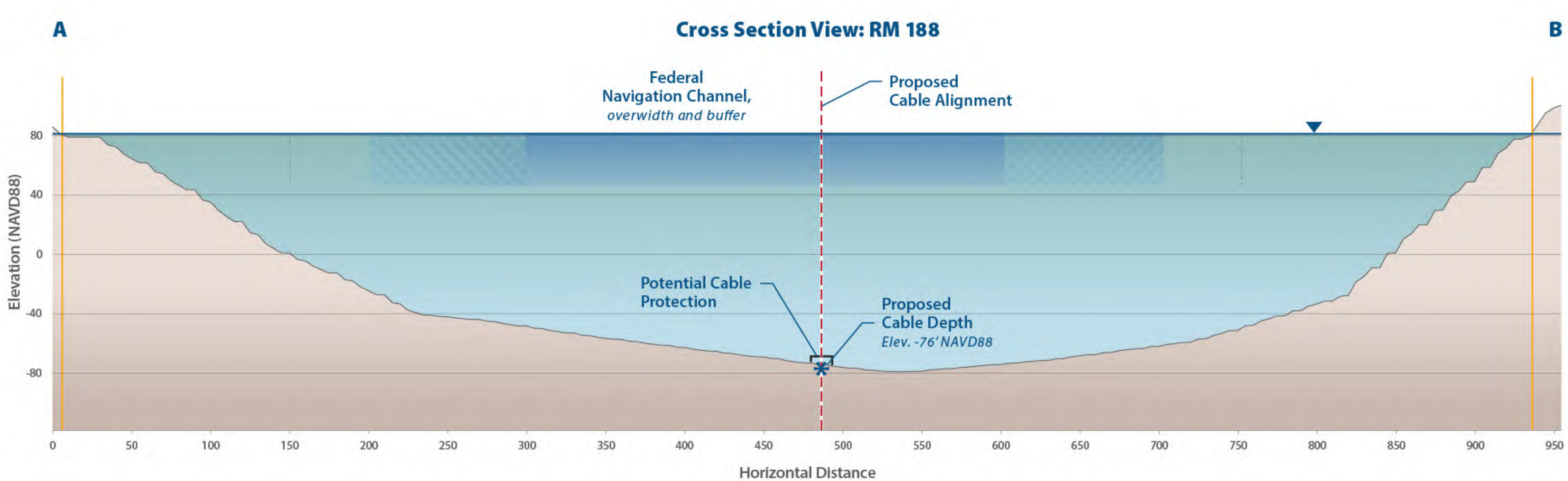
1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, Bing

CROSS SECTION VIEW: RM 188
PAGE 9 OF 9

FOR INFORMATION ONLY - CONCEPT DRAWING

A_B CROSS SECTION LINE
CONCRETE MATTRESS
PROPOSED ALIGNMENT - HVDC HYDROPLOW
RIVER MILES (USACE)
ESTIMATED OHW
BATHYMETRY CONTOUR (2FT)
FEDERAL NAVIGATION CHANNEL
FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)





CASCADE RENEWABLE TRANSMISSION

HDR

0 100 FT
1:1,000

1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, Bing

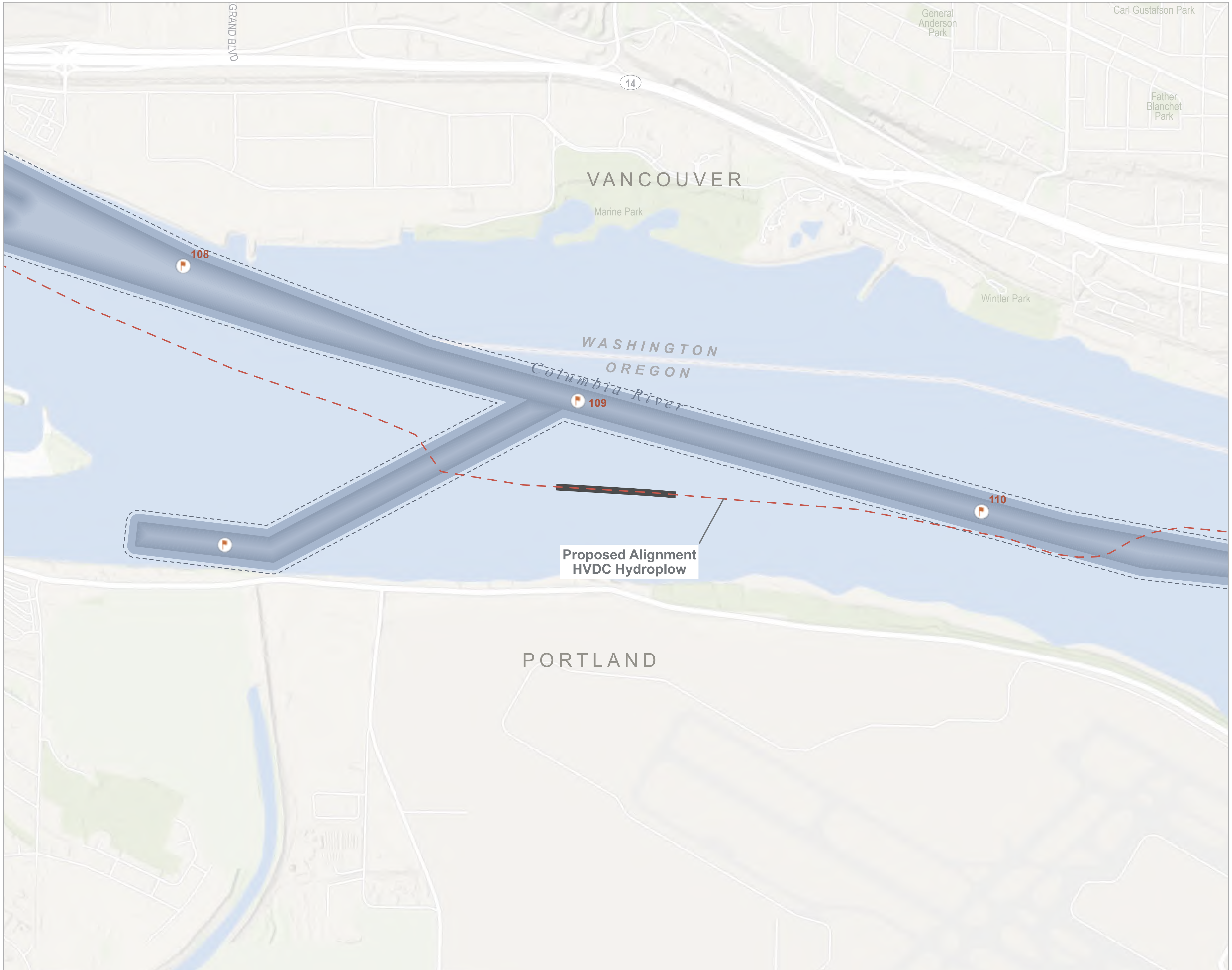


FIGURE 1
CABLE PROTECTION LOCATIONS
PAGE 1 OF 5

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT - HVDC HYDROPLOW

RIVER MILES (USACE)

CABLE PROTECTION

FEDERAL NAVIGATION CHANNEL

FEDERAL NAVIGATION CHANNEL BUFFER (50FT)

FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)

CASCADE RENEWABLE TRANSMISSION

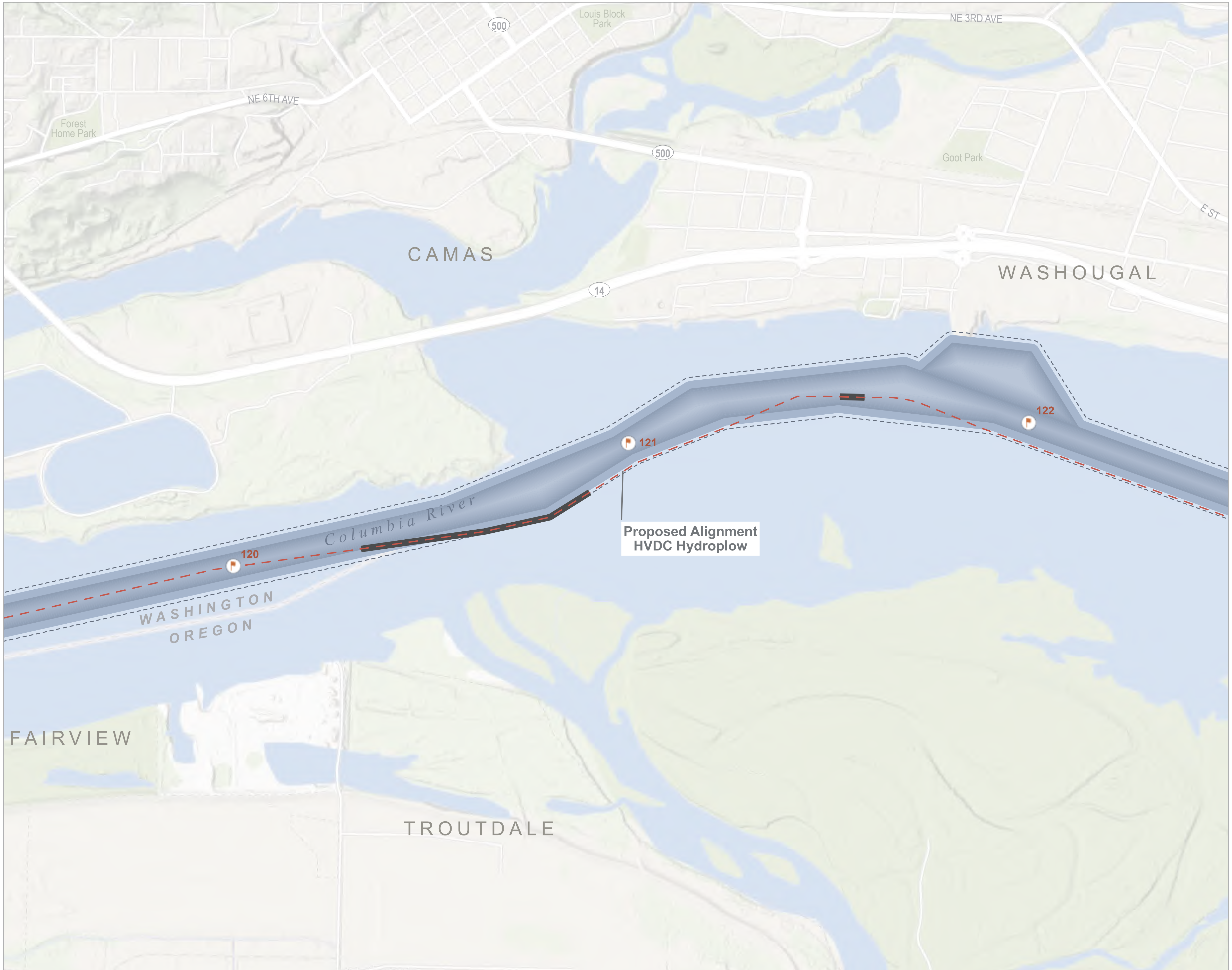
0 2,000 FT

1:15,000

1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey.

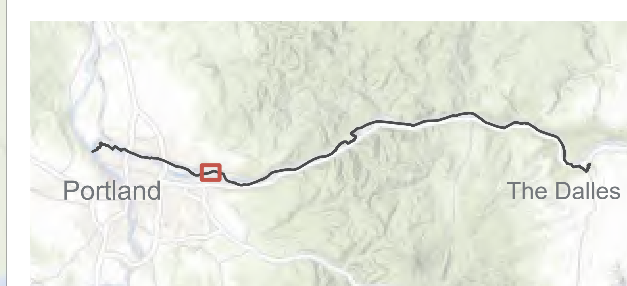
FIGURE 1
CABLE PROTECTION LOCATIONS
PAGE 2 OF 5

FOR INFORMATION ONLY - CONCEPT DRAWING



- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- RIVER MILES (USACE)
- CABLE PROTECTION
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)

CASCADE RENEWABLE TRANSMISSION



0 2,000 FT
1:15,000

1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey.

FIGURE 1
CABLE PROTECTION LOCATIONS
PAGE 3 OF 5

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- RIVER MILES (USACE)
- CABLE PROTECTION
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)

CASCADE RENEWABLE TRANSMISSION

HDR

0 2,000 FT

1:15,000

1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey.

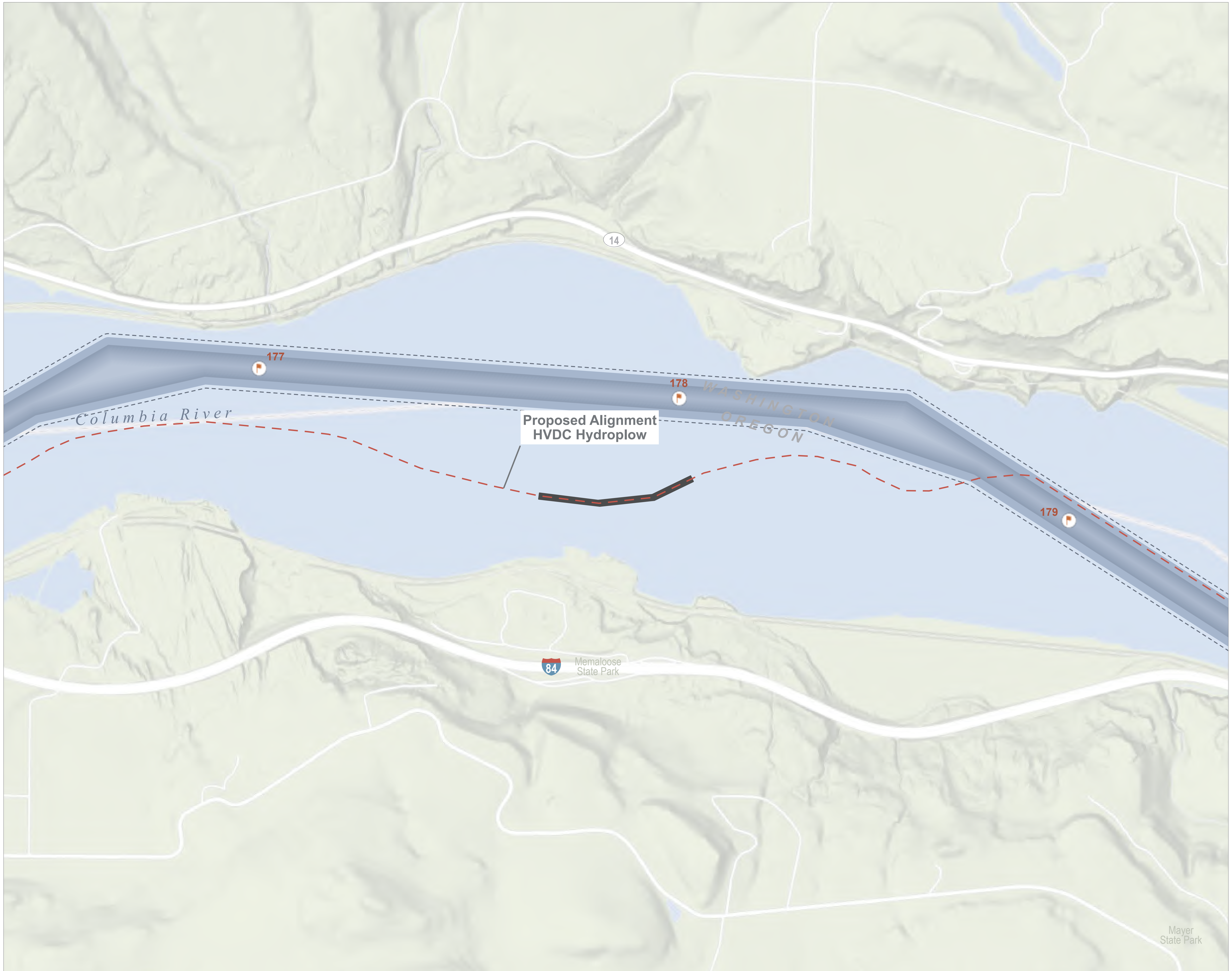


FIGURE 1
CABLE PROTECTION LOCATIONS
PAGE 4 OF 5

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT - HVDC HYDROPLOW
RIVER MILES (USACE)
CABLE PROTECTION
FEDERAL NAVIGATION CHANNEL
FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)

CASCADE RENEWABLE TRANSMISSION

0 2,000 FT
1:15,000

1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey.

FIGURE 1
CABLE PROTECTION LOCATIONS
PAGE 5 OF 5

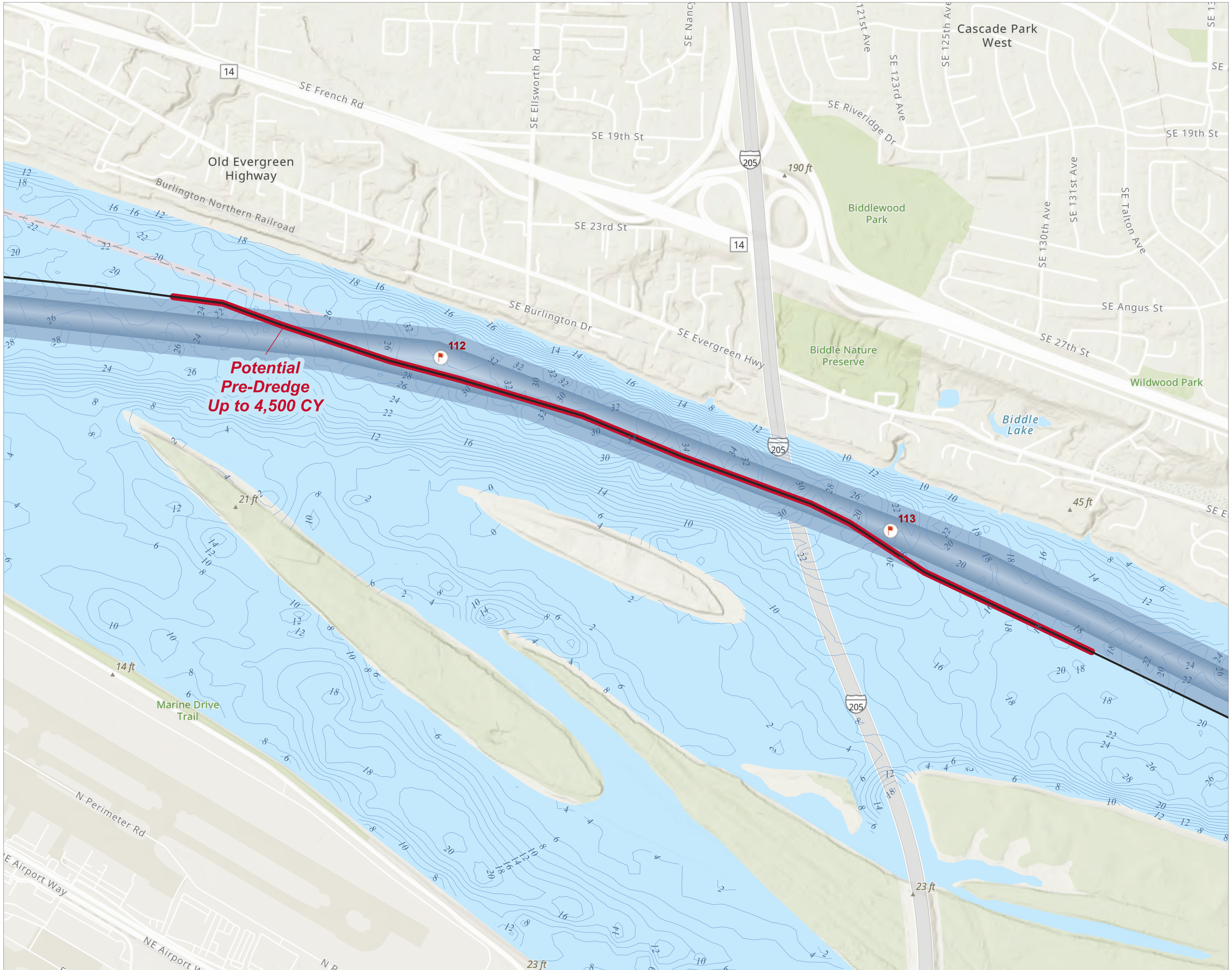
FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- RIVER MILES (USACE)
- CABLE PROTECTION
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (50FT)
- FEDERAL NAVIGATION CHANNEL OVERWIDTH (100FT)

CASCADE RENEWABLE TRANSMISSION

0 2,000 FT
1:15,000

1/15/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey.



Potential Pre-Dredge Areas

- RIVER MILES (USACE)
- POTENTIAL PRE-DREDGE
- PROPOSED ALIGNMENT
- BATHYMETRY CONTOUR (2FT)
- FEDERAL NAVIGATION CHANNEL
- FEDERAL NAVIGATION CHANNEL BUFFER (150FT)

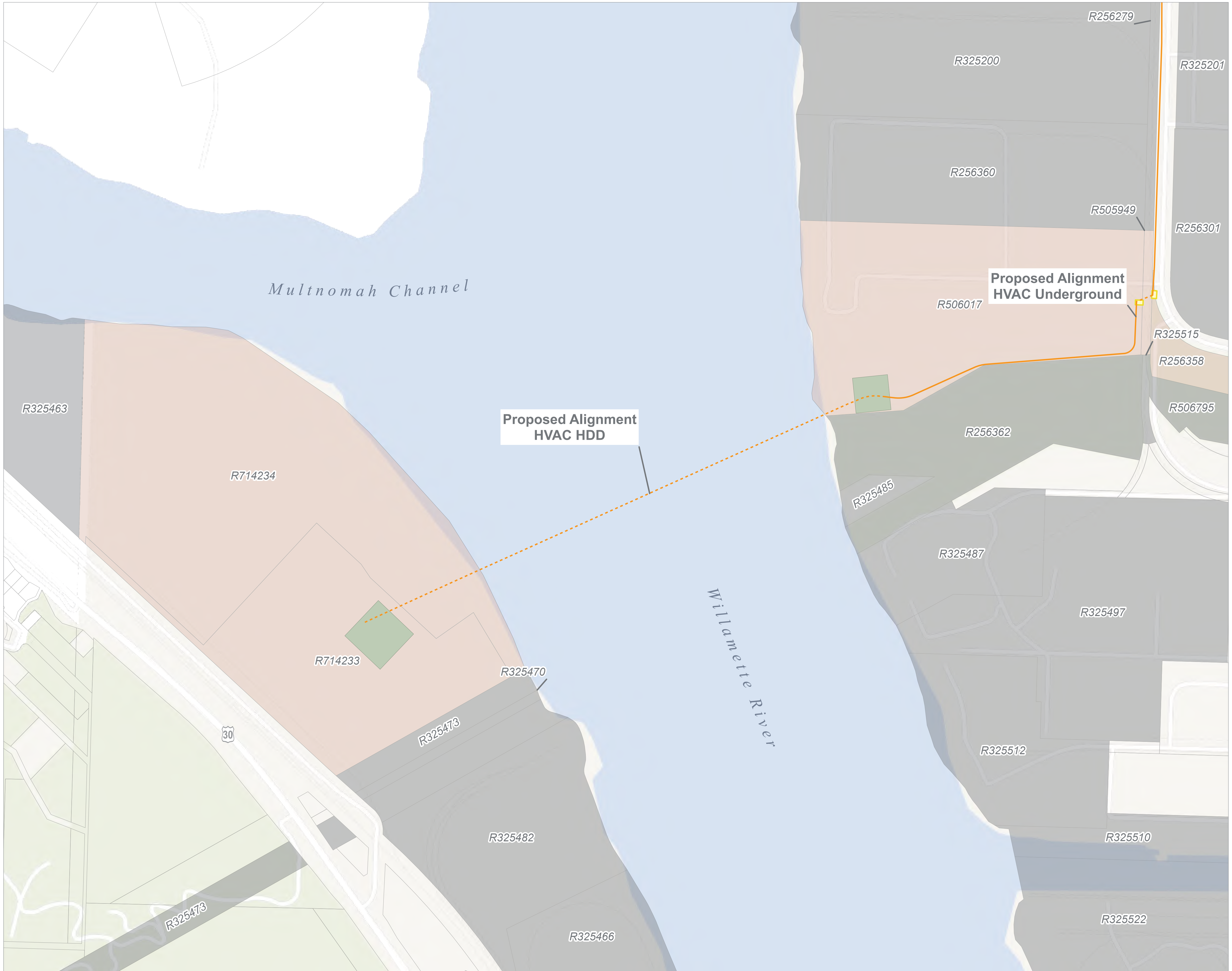
CASCADE RENEWABLE TRANSMISSION

HDR

0 0.2 mi
1:13,000

5/22/2024 NAD 1983 State Plane Oregon North Feet; Vertical Datum: Below Bonneville Dam-CRD, above Bonneville Dam - NAVD88 Data Sources: Esri, HDR, USACE Navigation Survey.

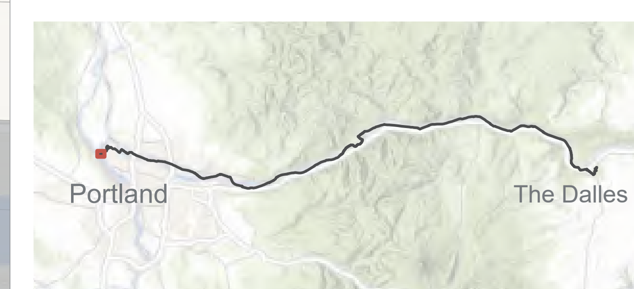
TAX LOTS
PAGE 1 OF 26



FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVAC HDD
- PROPOSED ALIGNMENT - HVAC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



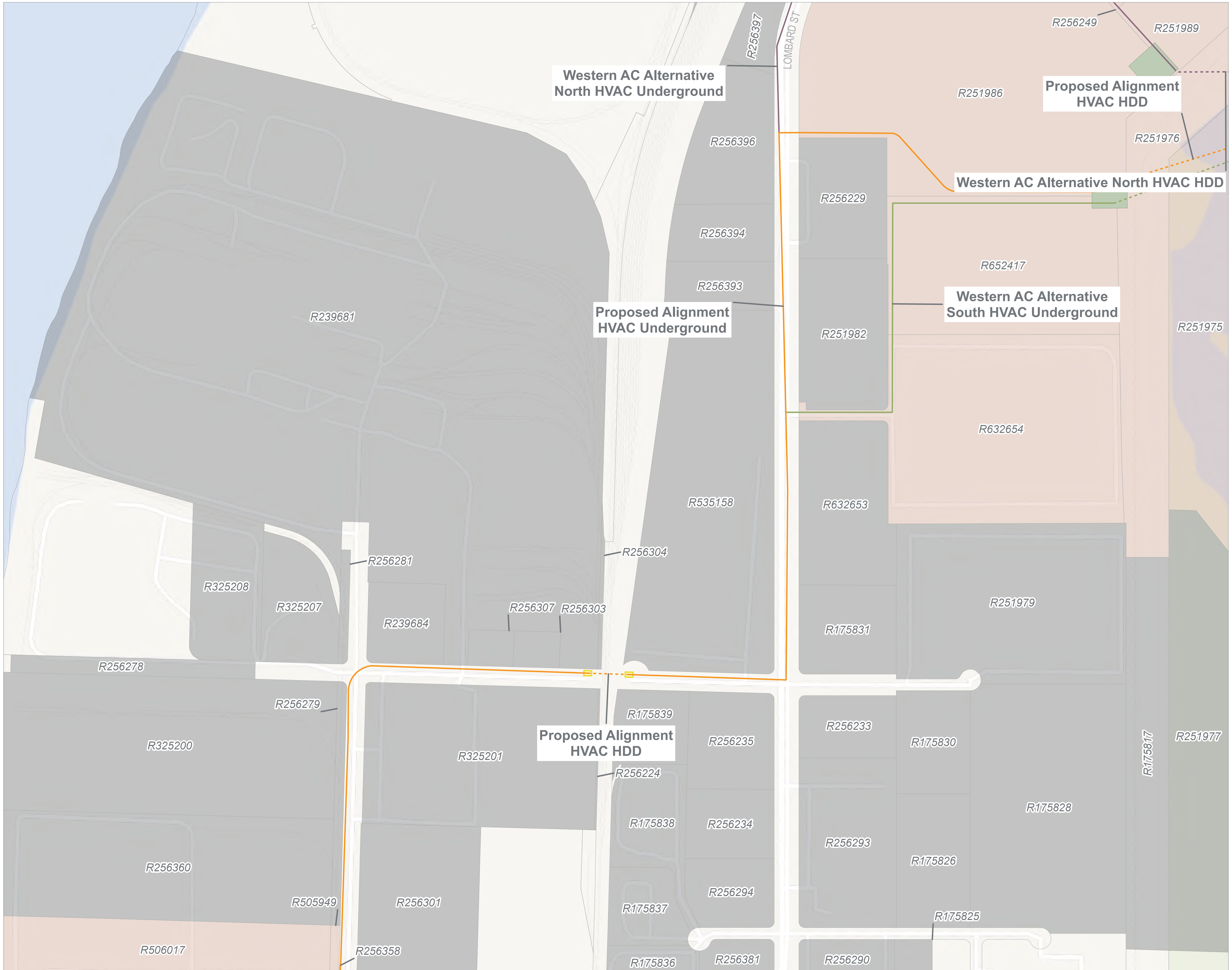
0 0.1 mi
1:6,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

TAX LOTS
PAGE 2 OF 26

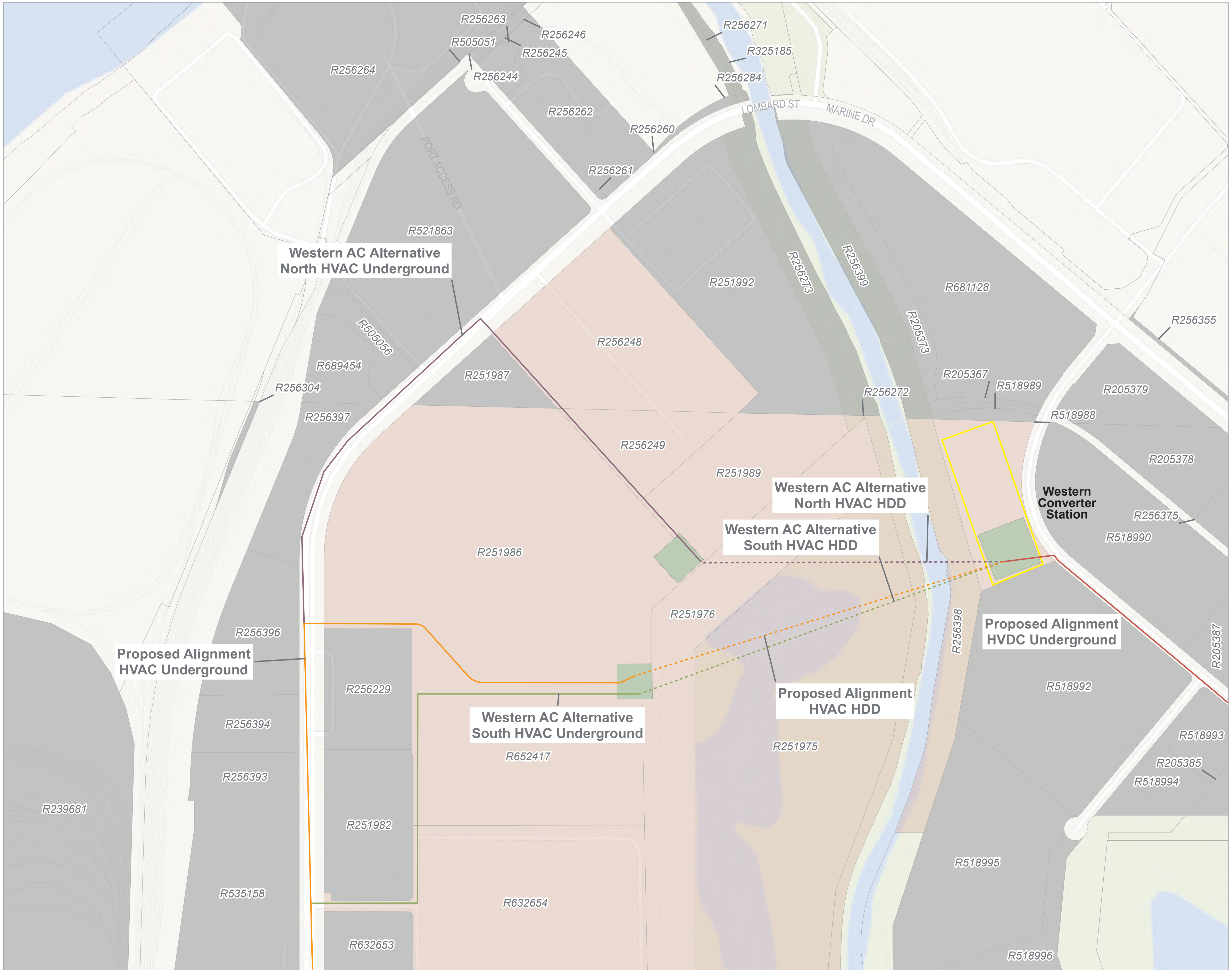
FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVAC HDD
- PROPOSED ALIGNMENT - HVAC UNDERGROUND
- WESTERN AC ALTERNATIVE NORTH - HVAC HDD
- WESTERN AC ALTERNATIVE NORTH - HVAC UNDERGROUND
- WESTERN AC ALTERNATIVE SOUTH - HVAC HDD
- WESTERN AC ALTERNATIVE SOUTH - HVAC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT



CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:6,100



1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

TAX LOTS
PAGE 3 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVAC HDD
- PROPOSED ALIGNMENT - HVAC UNDERGROUND
- WESTERN AC ALTERNATIVE NORTH - HVAC HDD
- WESTERN AC ALTERNATIVE NORTH - HVAC UNDERGROUND
- WESTERN AC ALTERNATIVE SOUTH - HVAC HDD
- WESTERN AC ALTERNATIVE SOUTH - HVAC UNDERGROUND
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- CONVERTER STATION
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:6,100

TAX LOTS
PAGE 4 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVAC HDD
- WESTERN AC ALTERNATIVE NORTH - HVAC HDD
- WESTERN AC ALTERNATIVE SOUTH - HVAC HDD
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- CONVERTER STATION
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:6,100

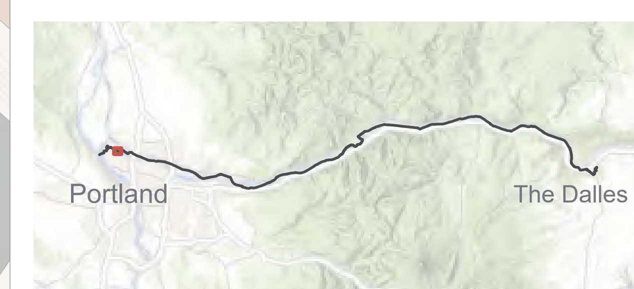
1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

TAX LOTS
PAGE 5 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT - HVDC HDD
PROPOSED ALIGNMENT - HVDC UNDERGROUND
TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
TEMPORARY HORIZONTAL AUGER BORE (HAB)
STATE BOUNDARY
TAXLOT ADJACENT TO PROPOSED ALIGNMENT
TAXLOT INTERSECTING PROPOSED ALIGNMENT
OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



0 0.1 mi
1:6,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT - HVDC HDD
PROPOSED ALIGNMENT - HVDC UNDERGROUND
TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
TEMPORARY HORIZONTAL AUGER BORE (HAB)
STATE BOUNDARY
TAXLOT ADJACENT TO PROPOSED ALIGNMENT
TAXLOT INTERSECTING PROPOSED ALIGNMENT
OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:6,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

TAX LOTS
PAGE 7 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

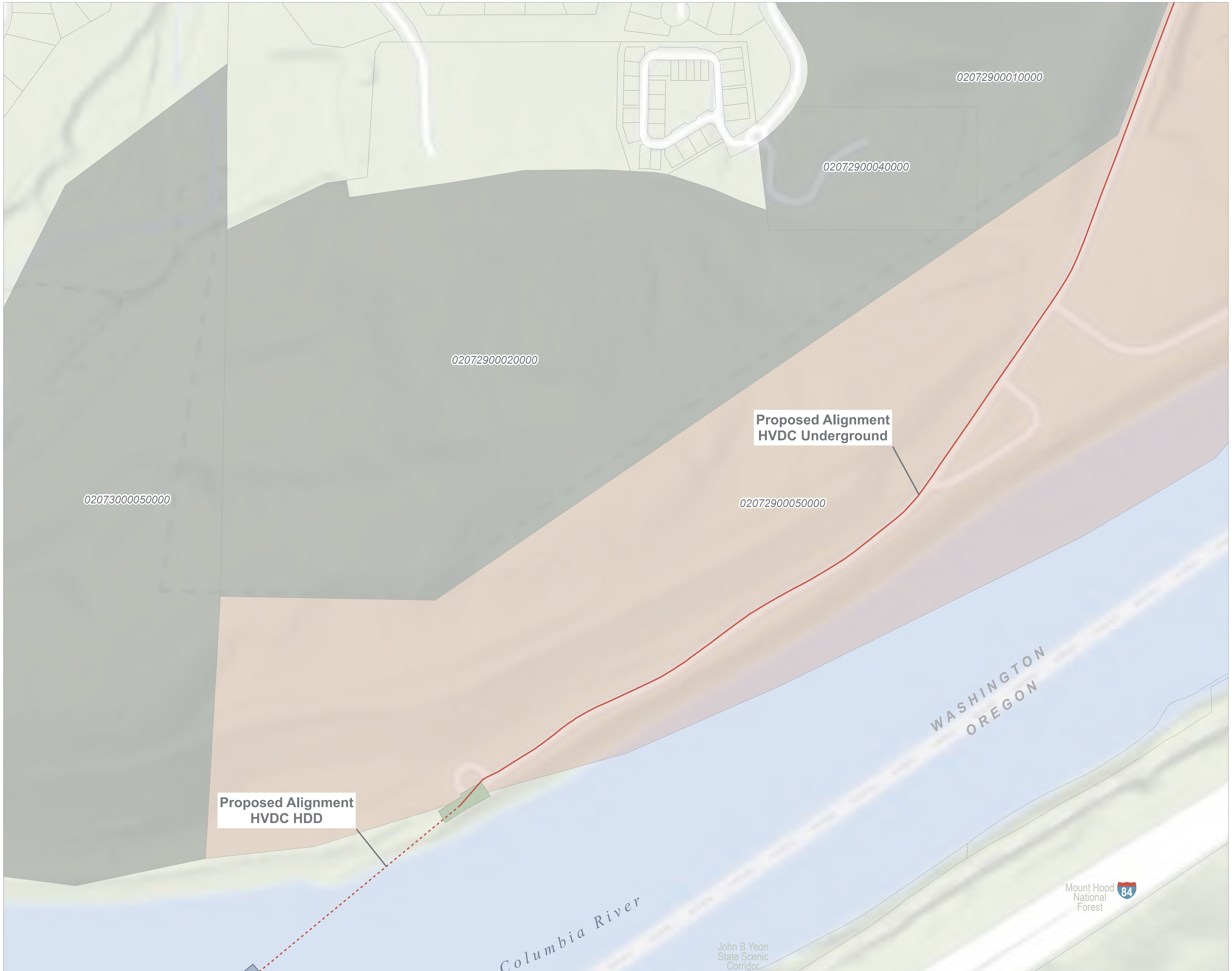
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:6,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

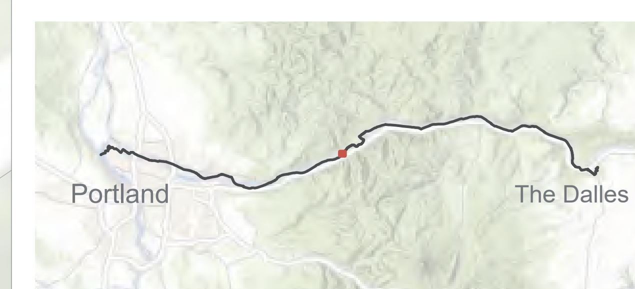
TAX LOTS
PAGE 8 OF 26



FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- COFFER DAM
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



0 0.1 mi
1:4,100

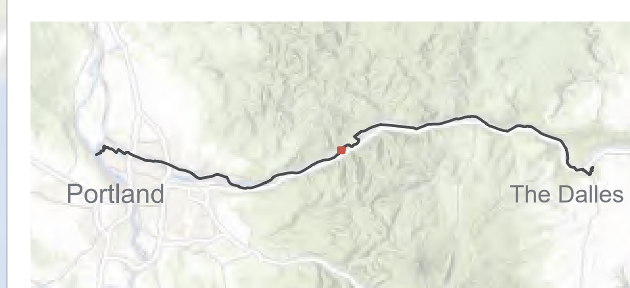
1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

TAX LOTS

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



0 0.1 mi
1:4,100

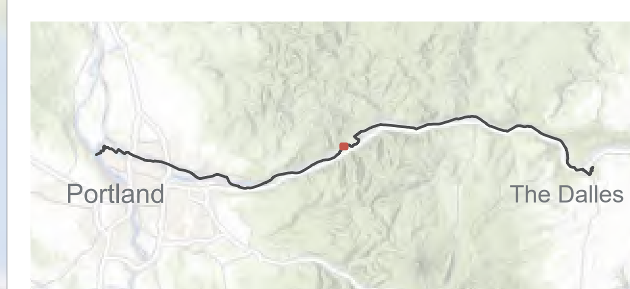
1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

TAX LOTS
PAGE 10 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT - HVDC UNDERGROUND
STATE BOUNDARY
TAXLOT ADJACENT TO PROPOSED ALIGNMENT
TAXLOT INTERSECTING PROPOSED ALIGNMENT
OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



0 0.1 mi
1:4,100

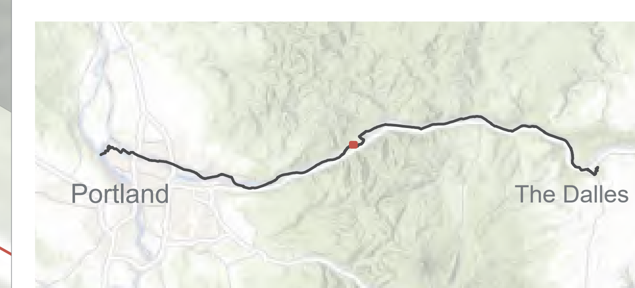
1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

TAX LOTS
PAGE 11 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



0 0.1 mi
1:4,100

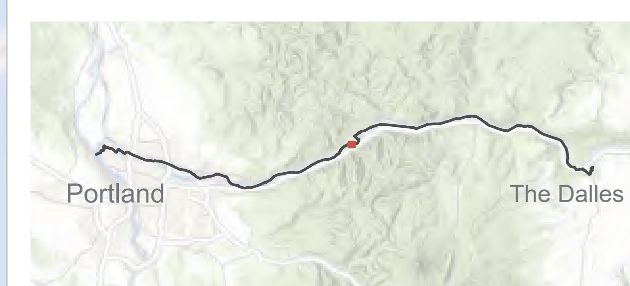
1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

TAX LOTS
PAGE 12 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT - HVDC HDD
PROPOSED ALIGNMENT - HVDC UNDERGROUND
TEMPORARY HORIZONTAL AUGER BORE (HAB)
STATE BOUNDARY
TAXLOT ADJACENT TO PROPOSED ALIGNMENT
TAXLOT INTERSECTING PROPOSED ALIGNMENT
OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



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1:4,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

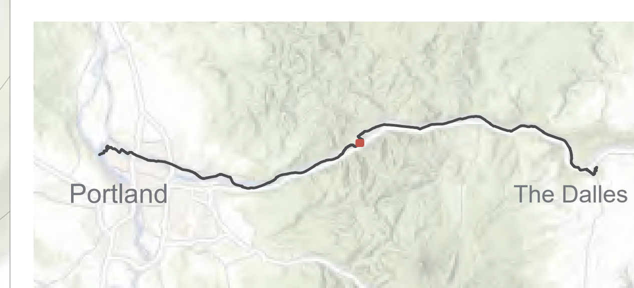
1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

TAX LOTS

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



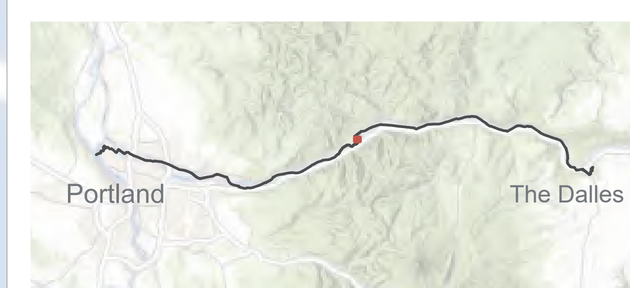
0 0.1 mi
1:4,100

TAX LOTS
PAGE 14 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



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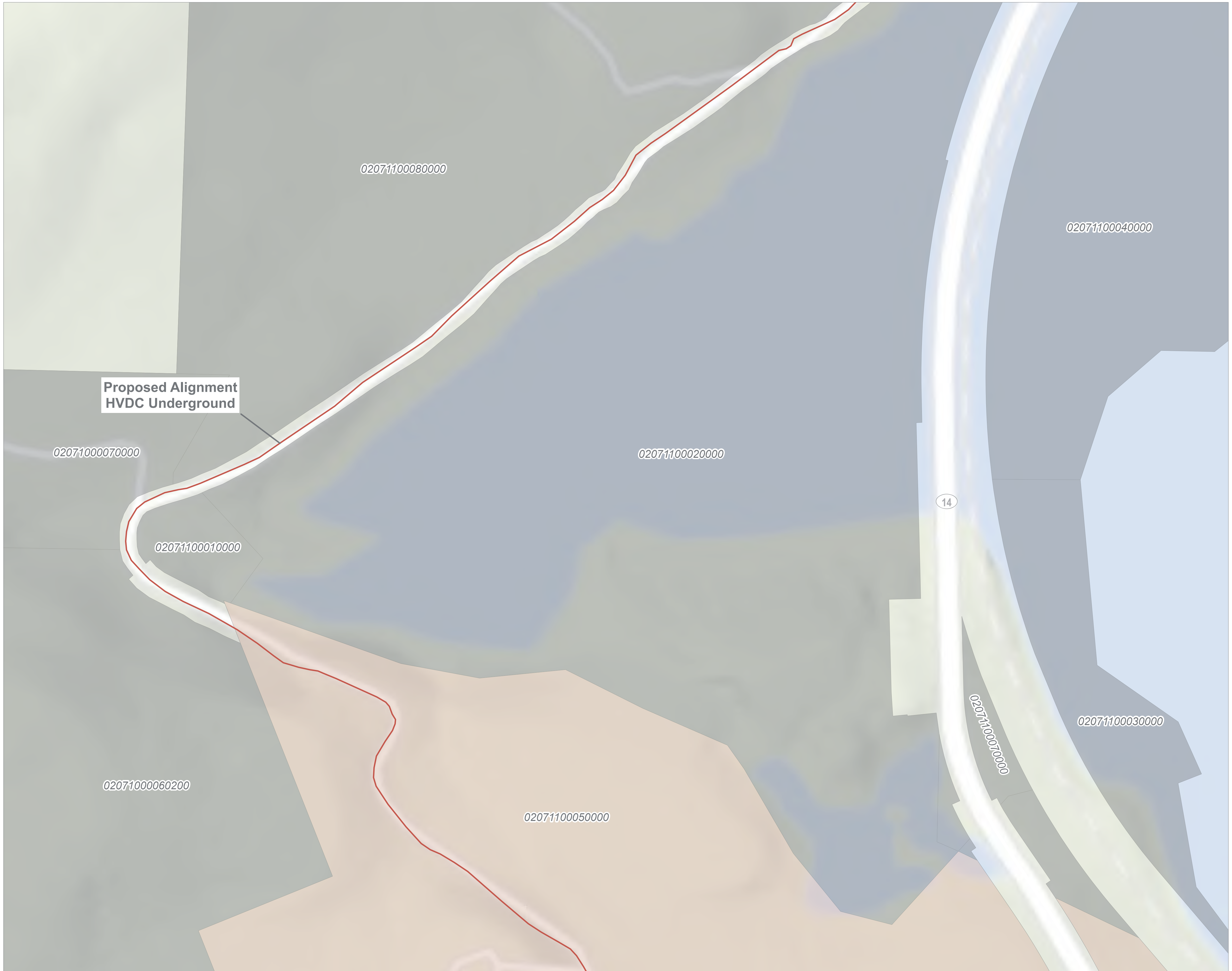
1:4,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

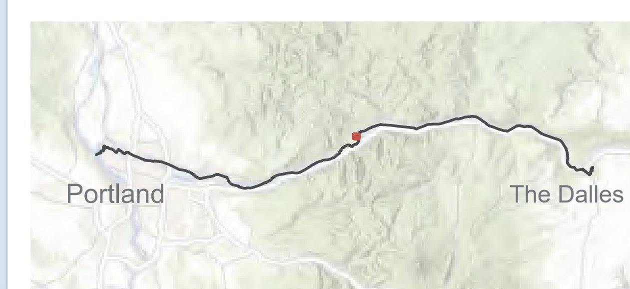


TAX LOTS

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT - HVDC UNDERGROUND
STATE BOUNDARY
TAXLOT ADJACENT TO PROPOSED ALIGNMENT
TAXLOT INTERSECTING PROPOSED ALIGNMENT
OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



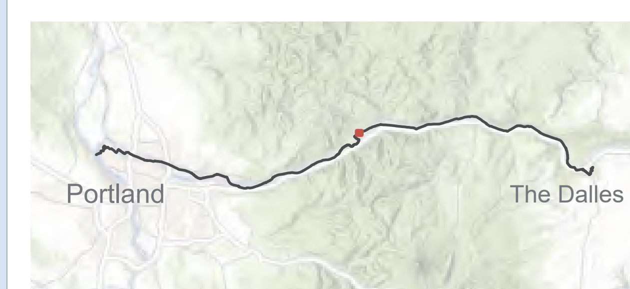
0 0.1 mi
1:4,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION

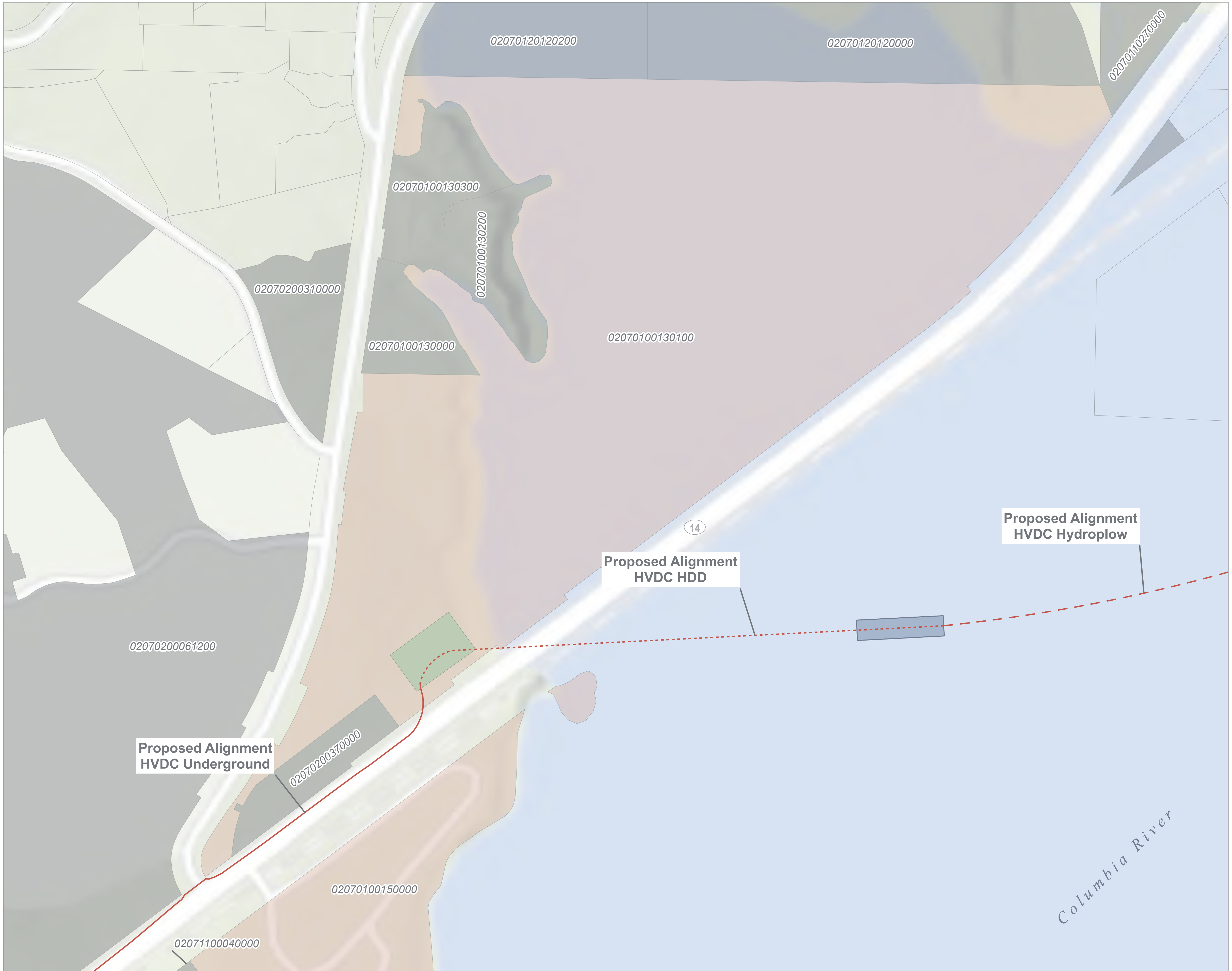


0 0.1 mi
1:4,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

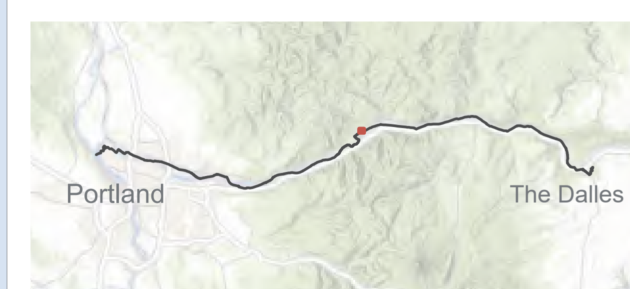
TAX LOTS
PAGE 17 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING



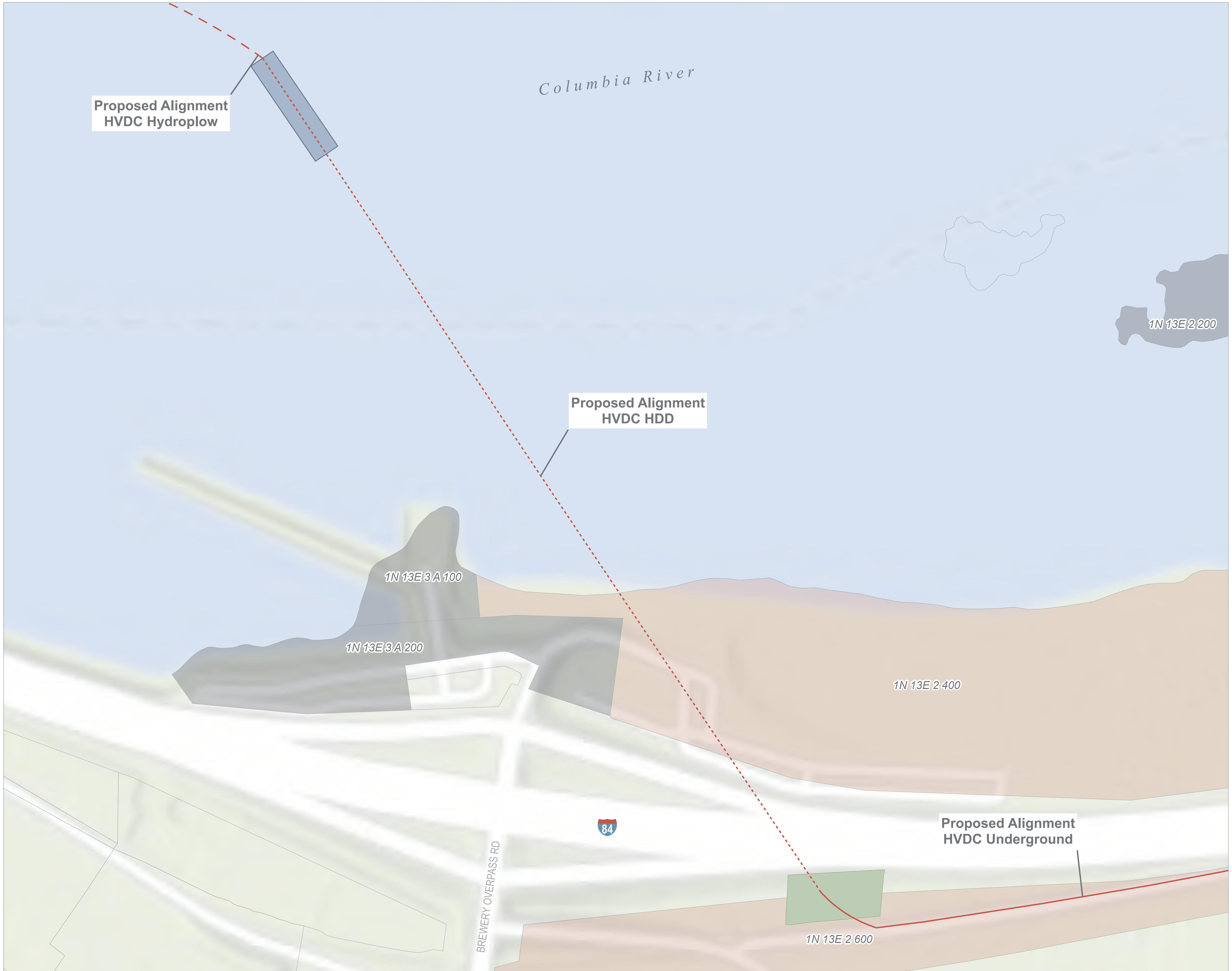
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- COFFER DAM
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



0 0.1 mi
1:4,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

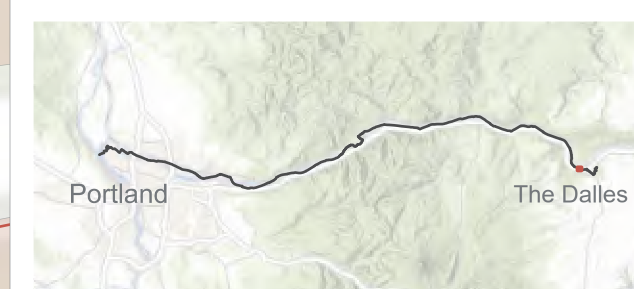


TAX LOTS
PAGE 18 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

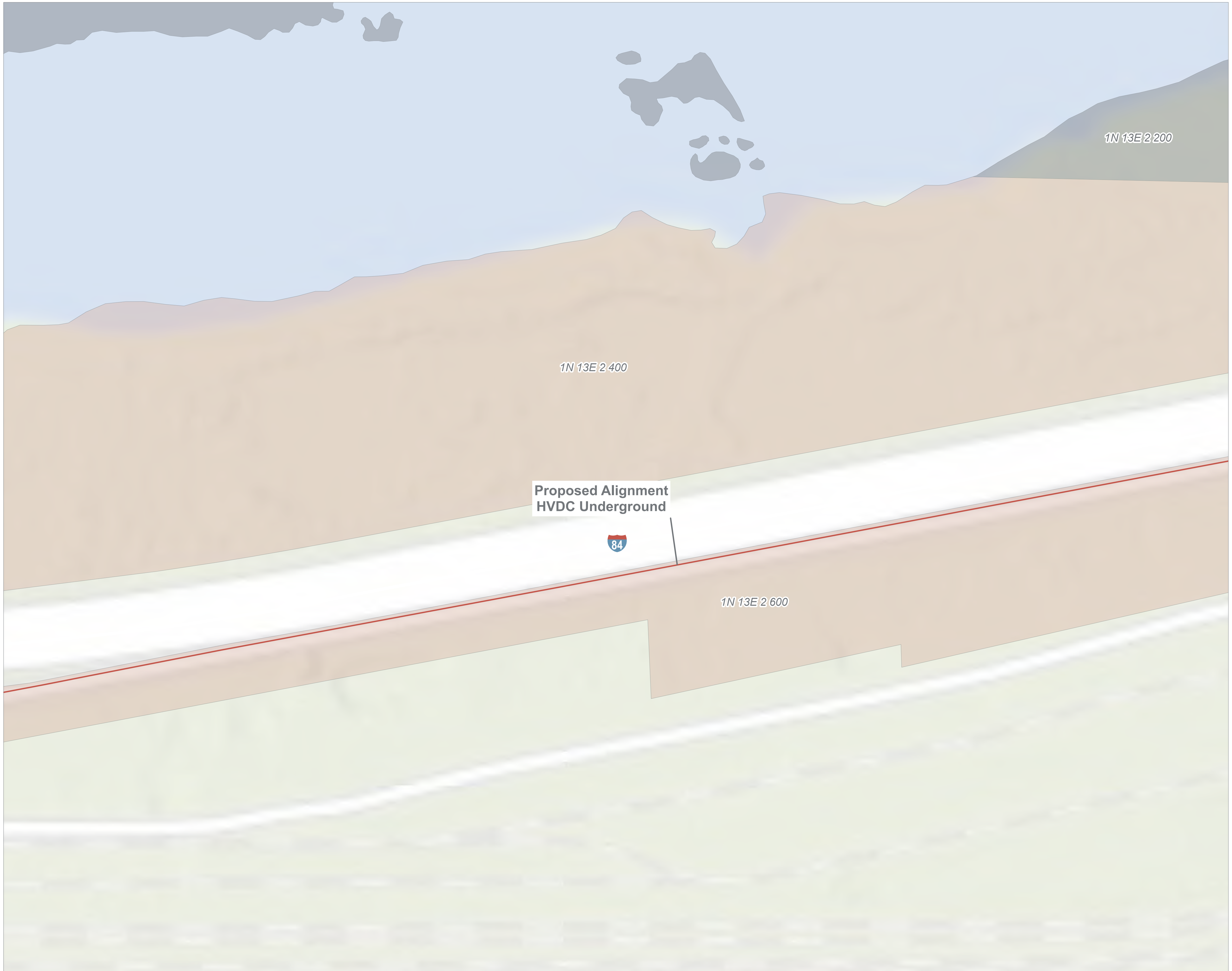
- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC HYDROPLOW
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- COFFER DAM
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION



0 0.1 mi
1:3,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



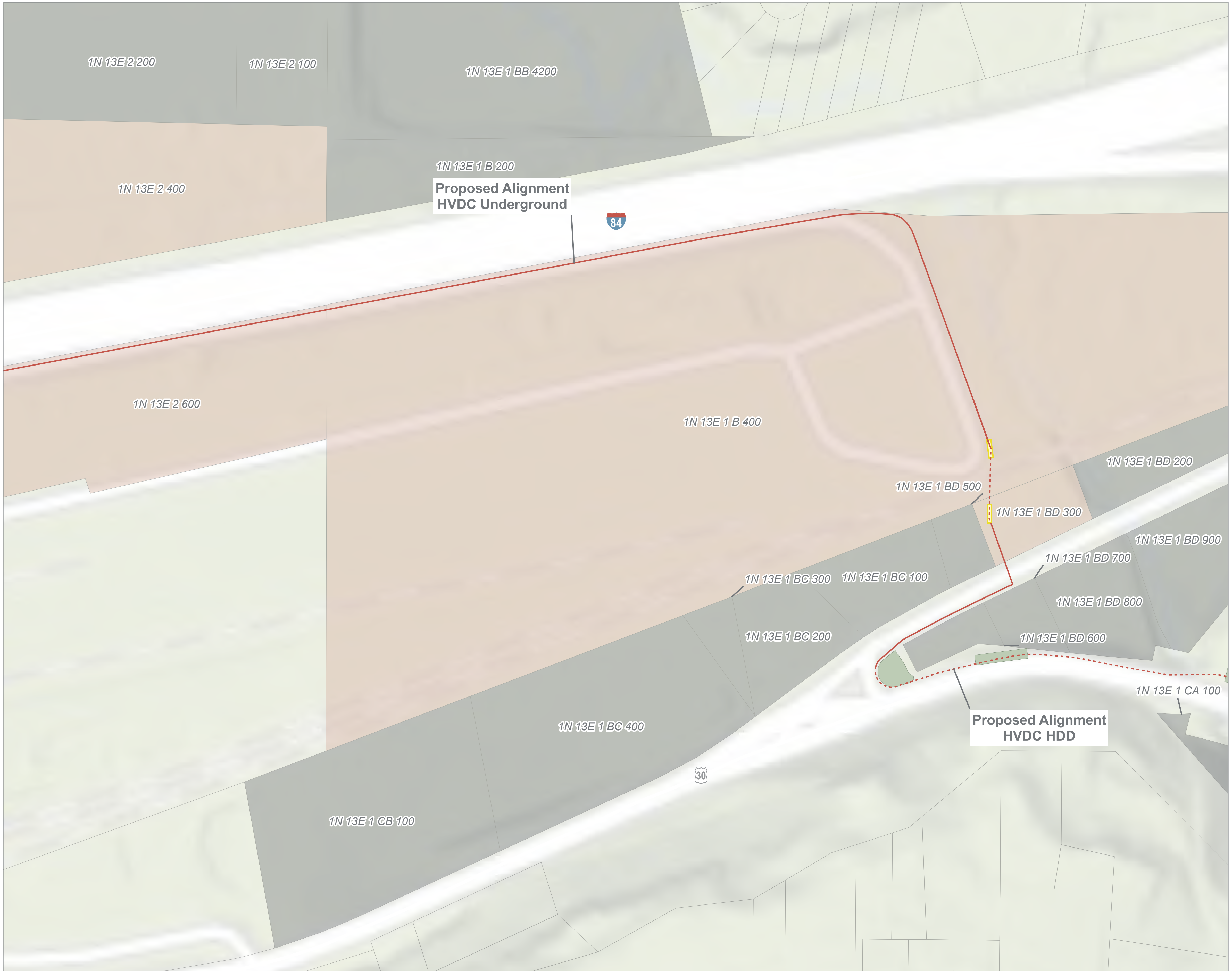
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT - HVDC UNDERGROUND
STATE BOUNDARY
TAXLOT ADJACENT TO PROPOSED ALIGNMENT
TAXLOT INTERSECTING PROPOSED ALIGNMENT

CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:2,600

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



TAX LOTS
PAGE 20 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:2,600

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

TAX LOTS
PAGE 21 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:2,600

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

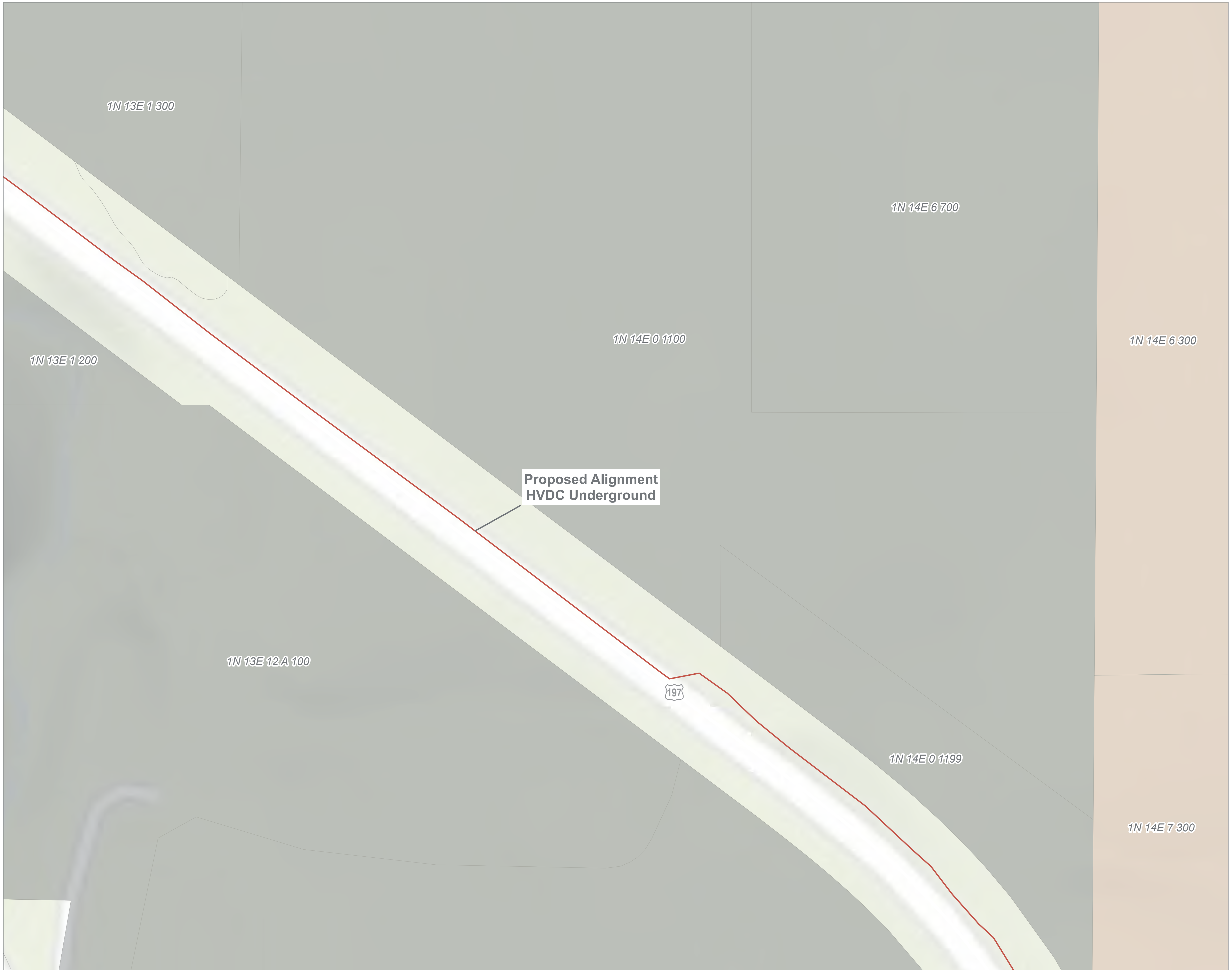
TAX LOTS
PAGE 22 OF 26

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC HDD
- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:2,600



FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT - HVDC UNDERGROUND
STATE BOUNDARY
TAXLOT ADJACENT TO PROPOSED ALIGNMENT
TAXLOT INTERSECTING PROPOSED ALIGNMENT
OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:2,600

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:2,600

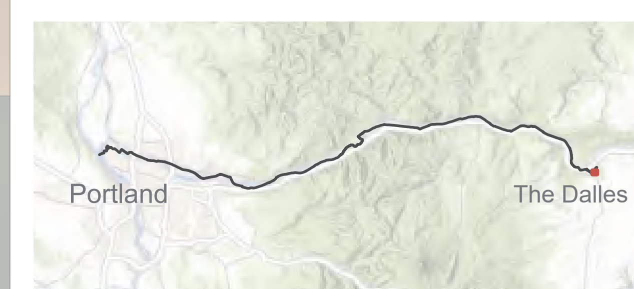
1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

TAX LOTS

FOR INFORMATION ONLY - CONCEPT DRAWING

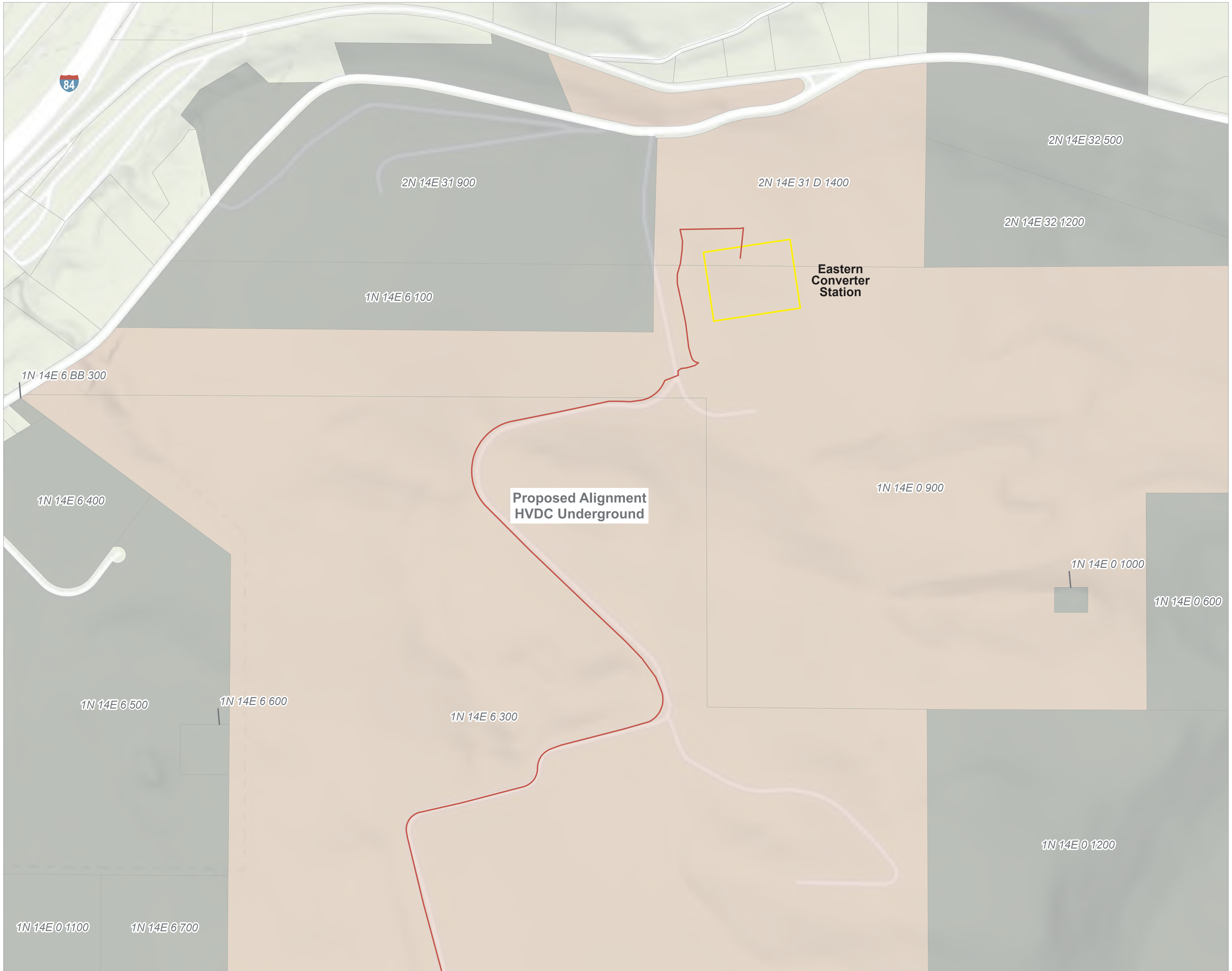
PROPOSED ALIGNMENT - HVDC UNDERGROUND
STATE BOUNDARY
TAXLOT ADJACENT TO PROPOSED ALIGNMENT
TAXLOT INTERSECTING PROPOSED ALIGNMENT

CASCADE RENEWABLE TRANSMISSION



0 0.1 mi
1:4,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



TAX LOTS

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT - HVDC UNDERGROUND
- CONVERTER STATION
- STATE BOUNDARY
- TAXLOT ADJACENT TO PROPOSED ALIGNMENT
- TAXLOT INTERSECTING PROPOSED ALIGNMENT
- OTHER TAXLOT

CASCADE RENEWABLE TRANSMISSION

0 0.1 mi
1:7,100

1/8/2026 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

Stream Functional Assessment Report

Columbia River

Cascade Renewable Transmission

Oregon, Washington

June 26, 2024

Contents

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Acronyms and Abbreviations

Acronyms used more than once in the report text.

ACB	articulated concrete block
BPA	Bonneville Power Administration
CRT	Cascade Renewables Transmission, LLC
DPA	Downstream Project Area
DSL	Oregon Department of State Lands
EAA	Extended Action Area
EMF	electromagnetic field
HAB	horizontal auger boring
HDD	horizontal directional drilling
HDPE	high-density polyethylene
HUC	hydrologic unit code
HVAC	high-voltage alternating current
HVDC	high-voltage direct current
kV	kilovolt
LEMMA	Landscape Ecology, Modeling, Mapping, and Analysis
MW	megawatt
NLCD	National Land Cover Database
OAR	Oregon Administrative Rule
ORWAP	Oregon Rapid Wetland Assessment Protocol
PAA	Proximal Action Area
ROW	right-of-way
SFAM	Stream Functions Assessment Method
UPA	Upstream Project Area
USGS	U.S. Geological Survey

1 Introduction

1.1 Project Description

HDR Engineering, Inc. (HDR), on behalf of Cascade Renewables Transmission, LLC (CRT), completed a stream functional assessment for the proposed Cascade Renewable Transmission Project (Project). The proposed Project would construct and operate a high-voltage direct current (HVDC; 320- or 400-kilovolt [kV]) 1,100-megawatt [MW]) electric transmission facility (Facility). The Facility would interconnect the existing Bonneville Power Administration (BPA) Big Eddy 500-kV alternating current (AC) substation located near The Dalles, Wasco County, Oregon (eastern converter station), and the existing Portland General Electric (PGE) Harborton 230-kV AC substation located in Portland, Multnomah County, Oregon (western converter station) (**Figure 1, Attachment A**).

The length of the transmission line would be approximately 98.4 miles, comprised of the following.

1.1.1 High Voltage Alternating Current Transmission

The converter stations would be connected to the respective substations by high-voltage alternating current (HVAC) cables.

The eastern converter station near The Dalles would be connected to the existing Big Eddy substation with approximately 500 feet of 500kV overhead HVAC wire, which would be supported by two new lattice structures about 80 feet wide and 60 feet tall. One lattice structure would be located in the Big Eddy substation and one lattice structure would be within the eastern converter station; however, the lattice structure associated with the Big Eddy substation would not be part of the Facility.

The western converter station in Portland would be connected to the existing Harborton substation via one of three underground routes.

- Under the Proposed Alignment, the western converter would connect to the Harborton substation with approximately 3.1 miles of two-per-phase, 230-kV HVAC transmission cable; 0.25 mile would be installed under and across the bed of the Columbia Slough via horizontal directional drilling (HDD), 2.3 miles would be trenched in road right-of-way (ROW) to the edge of the Willamette River, and 0.5 miles of transmission cable would be installed under and across the bed of the Willamette River via HDD.

- The Western AC Alternative South would connect the western converter station to the existing Harborton substation along a slightly shorter route than the Proposed Alignment; with approximately 2.85 miles of two-per-phase, 230-kV HVAC transmission cable; 0.25 mile would be installed under and across the bed of the Columbia Slough via HDD, 1.95 miles would be trenched in road ROW to the edge of the Willamette River, and 0.5 miles of transmission cable would be installed under and across the bed of the Willamette River via HDD.

- The Western AC Alternative North would connect the western converter station to the existing Harborton substation along a route very similar to the Proposed Alignment with approximately 3.2 miles of two-per-phase 230-kV HVAC transmission cable; 0.25 mile would be installed under and across the bed of the Columbia Slough via HDD, 2.4 miles would be trenched in road ROW to the edge of the Willamette River, and 0.5 miles of transmission cable would be installed under and across the bed of the Willamette River via HDD.

Under each alternative, the trench for the underground HVAC transmission cables would be approximately 9 feet wide by 4.5 feet deep. Within the trench, a 9-foot-wide concrete casing would be placed, housing two sets of three 8-inch high-density polyethylene (HDPE) conduits for transmission cables and a 4-inch HDPE conduit for fiber optic cable with 4-feet of separation between the sets. Under the Willamette River and Columbia Slough, each location would have two 34-inch bores having a 12-foot separation. Each bore would hold three 8-inch and one 4-inch HDPE conduits. To cross highways, railroads, or sensitive areas, the transmission line would be placed with HDD or similar trenchless technology such as horizontal auger boring (HAB). No overhead transmission line structures will be used.

1.1.2 High Voltage Direct Current Transmission

The converter stations would be connected by a 320-kV or 400-kV (1,100-MW) HVDC transmission cable with associated fiber optic communications cable in underground conduits to the edge of the Columbia River on each end, and buried in the bed of the Columbia River in Oregon and Washington. From the eastern converter station, the HVDC would be placed in a trench along road ROWs to near the edge of the Columbia River where it would be placed into the Columbia River via HDD.

HVDC cables would be brought on land in Washington, via one of two alternatives, to bypass the dam, locks, juvenile fish passage, and tribal fishing areas at the Bonneville Lock and Dam,

- Under the Proposed Alignment, HVDC cables would be brought on land in Washington, east of the dam complex, buried underground on the Washington side of the Columbia River for approximately 7.6 miles, then re-enter the river west of the dam complex.
- A Stevenson Landing Alternative is being considered that would bring the cable on land from the Columbia River that is approximately the same length as the Proposed Alignment landing.

HVDC cables would exit the Columbia River onto Hayden Island via one of two alternatives.

- Under the Proposed Alignment, where HVDC cables exit the Columbia River onto Hayden Island, they would be trenched approximately 1.4 miles along an existing utility corridor to the south and then west toward the western end of Hayden Island.
- A Hayden Island Alternative would be trenched approximately 1.2 miles along an existing utility corridor, approximately 0.75 east of the Proposed Alignment, more toward the center of Hayden Island.

The trench for the underground HVDC transmission cables would be approximately 2.5 feet wide by 4.5 feet deep. Within the trench, a 6-inch-thick concrete casing would be placed. The transmission cables would be placed in the casing in individual conduits spaced approximately 20 inches apart;

two 8-inch conduits containing 5-inch conductor cables (one positive and one negative) and one 4-inch conduit containing a 1-inch fiber optic cable for communication. HDD would be used to transition the in-river cables to land. To cross highways, railroads, or sensitive areas, the transmission cable would be placed with HDD or similar trenchless technology, such as HAB.

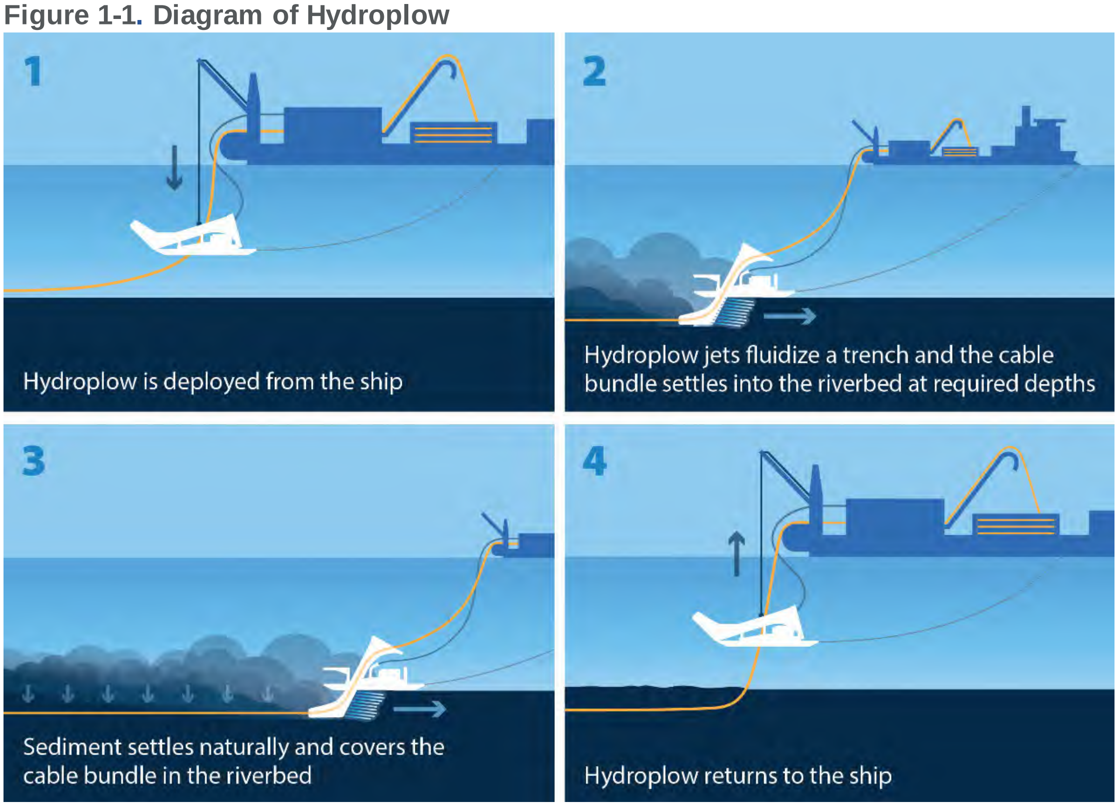
In total, approximately 79 miles of HVDC cable bundled with associated fiber optic communications cable would be buried in the bed of the Columbia River: approximately 46.2 miles of in-river HVDC transmission cable in the Columbia River in Oregon and approximately 32.7 miles of in-river HVDC transmission cable in the Columbia River in Washington.

1.2 In-Water Work

1.2.1 Hydroplow

In the Columbia River, the HVDC cable would be installed in proximity to the navigation channel at certain locations using a hydroplow in the bed of the Columbia River to a point approximately 4 miles east of the Bonneville Lock and Dam. The hydroplow would be towed by a vessel, as shown in Figure 1-1, along with a support vessel. The hydroplow would create an approximately 24-inch-wide trench by temporarily fluidizing sediment allowing the cable to be placed within the trench and the sediment to settle back over the cable, burying it at the prescribed depth in the riverbed, up to 10 feet along most of the alignment. The hydroplow would operate continuously, when allowed, and could place up to 1.5 miles of cable a day depending upon the sediment type, current circulation patterns, and river bottom conditions. Construction activities would be relatively temporary, short term and localized to the installation trench, with water quality conditions likely recovering completely once construction is complete.

Figure 1-1. Diagram of Hydroplow



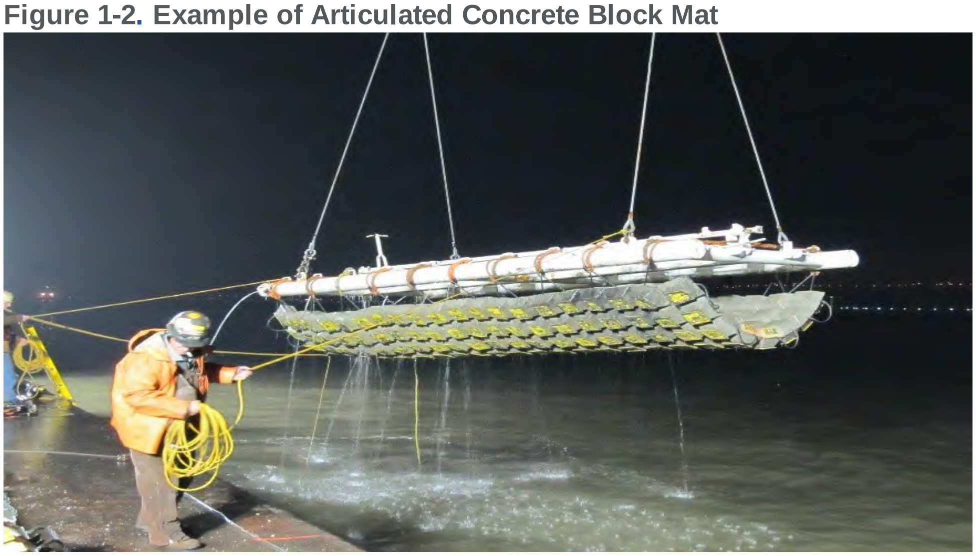
1.2.2 Wet Cofferdams

Four temporary three-sided wet cofferdams would be placed along the route for land-to-water cable transition: one near The Dalles, one near Stevenson above the Bonneville Lock and Dam, one near North Bonneville below the Bonneville Lock and Dam, and one near Hayden Island. At each location, a temporary three-sided wet cofferdam would be placed in the river to facilitate a safe workspace for divers to conduct the land-to-water cable transition. Installation of a temporary three-sided wet cofferdam could require dredging to level out the floor of the cofferdam. Each temporary three-sided wet cofferdam would be approximately 70 feet by 300 feet in size and would be removed after cable installation. All wet cofferdam disturbances would be temporary and short term.

1.2.3 Cable Protection Areas

The use of hydroplow methods for cable installation may not be feasible along some sections of the proposed alignment in the Columbia River due to existing utility and pipeline crossings, steep riverbed slopes composed primarily of bedrock, or where preferred burial depth is not possible. In these locations, articulated concrete block (ACB) mats or rock berms (cable protection) would be placed over the cable to weigh it down and protect it from damage. The exact type and placement location of cable protection will be determined during the design phase based on considerations such as the nature and depth of the sediment, the bathymetry of the river bottom, the presence of underwater obstacles, and the need to avoid sensitive habitats and cultural resources, if applicable. A typical ACB mat is approximately 8 feet wide by 12 feet long by 9 inches deep (Figure 1-2). If rock berms are used, the placement area dimensions are expected to be similar to those of the ACB mats. Based on preliminary studies, roughly 3.3 miles of cable protection is expected to be required. The anticipated placement locations of cable protection material are shown on **Figure 2, Attachment A**, and summarized in Table 1-1. The placement of cable protection material is considered a permanent impact to the Columbia River in-stream environment.

Figure 1-2. Example of Articulated Concrete Block Mat



Source: PowerBridge Inc.

Table 1-1. Anticipated Cable Protection Areas

River Mile	Cable Protection Length (mi)	Constraint
185.8 – 187 (Alignment mile 90.6 – 91.8)	1.2	Deep water Steep slopes
185.8 – 187 (Alignment mile 89.1 – 90.4)	1.05	Deep water Steep slopes
121.5 (Alignment mile 23.3	0.004	Utility crossing
Total	**2.25 miles**	
Area of cable protection	**1.02 – 2.2 acres**	

1.3 Stream Functional Assessment Requirements

In accordance with Department of State Lands (DSL) requirements, HDR prepared this stream functional assessment to assess the potential permanent impacts of the proposed cable protection measures on the functions and values at those locations within the Columbia River. Impacts, restoration, and mitigation are discussed in Section 4.

This assessment abides by the requirement in Oregon Administrative Rule (OAR) 141-085-0685 to apply the Stream Functions Assessment Method (SFAM) when assessing functions and values of "wadable," jurisdictional streams proposed for impacts and regulated under Oregon's Removal-Fill Law. Stream functions are the physical, chemical, and biological processes that create and maintain the character of a stream and the associated riparian system, and determine the flux of energy, materials, and organisms through or within a stream system. Stream values are the ecological and societal benefits that the stream system provides, determined by (a) the opportunity to provide a particular function and (b) the local significance of that function.

1.4 Columbia River Background Information

The Columbia River and its tributaries form the fourth largest river basin in North America. The river forms at Columbia Lake in British Columbia, Canada and flows for 1,270 miles and through two states before meeting the Pacific Ocean. On average the system will empty 192 million acre-feet into the Pacific Ocean annually. The mainstem of the Columbia River has many tributaries, the largest of which is the Snake River, which contributes 54,930 cubic feet per second at its confluence with the Columbia River. In total, the basin spans more than 260,000 square miles (NPCC 2024).

2 Methods

This assessment is predominantly predicated upon application of SFAM Version 1.1 (Nadeau 2020) to the Columbia River. SFAM was developed to provide a standardized, rapid, scientific method for assessing stream functions and values. This method is intended to further federal and state regulatory objectives by informing mitigation planning. Group-level functions and values were assessed based on guidance from DSL and in accordance with OAR 141-085-0685(f). Methods include:

- Incorporation of the United States Geological Survey (USGS) SFAM report and workbook (Appendix A) and other resources generated from the Oregon Explorer Oregon Rapid Wetland Assessment Protocol (ORWAP) and SFAM online mapper (Oregon Explorer 2024).

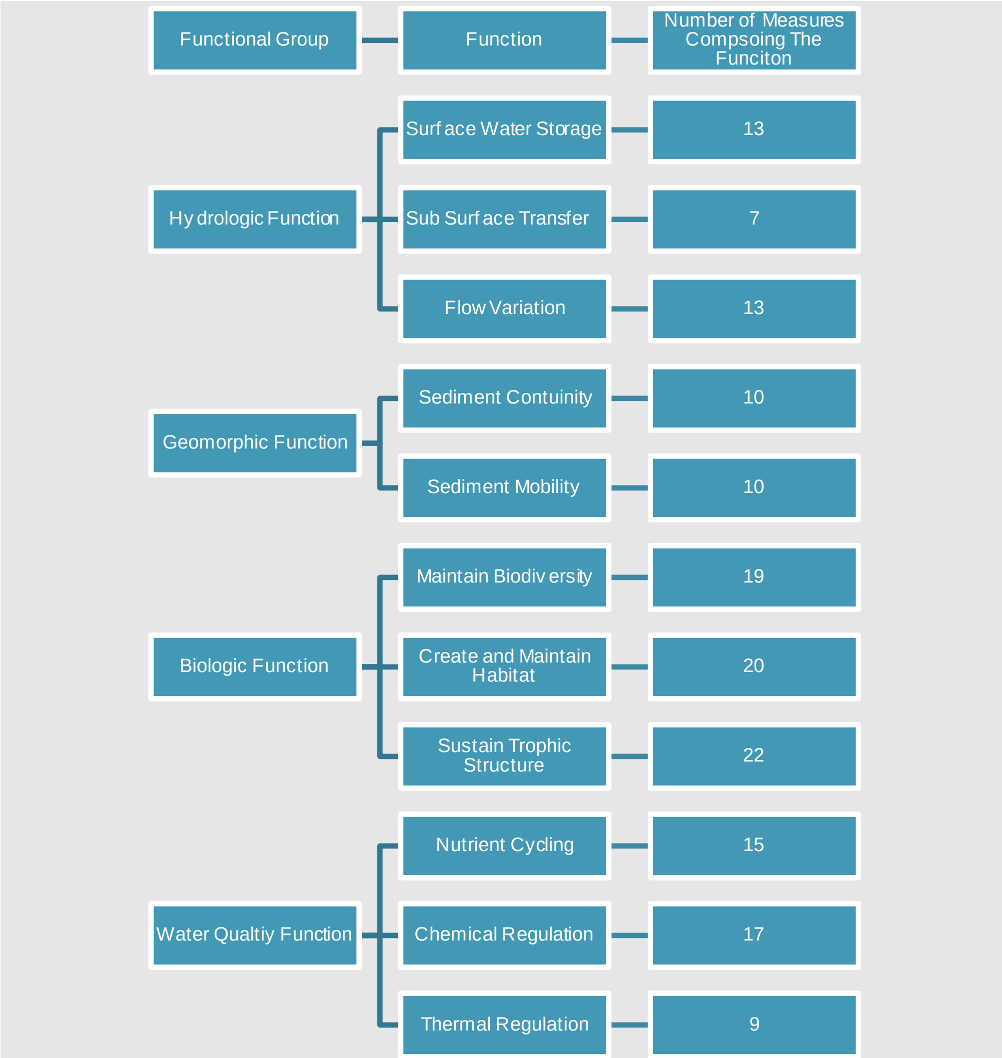
- Review and incorporation of information summarized from previous studies conducted on the Columbia River.
- Assessment of group-level function and values outlined in the DSL SFAM Version 1.1, as appropriate.
- Written discussion of rationale for determining group-level ratings of functions and values.

The Columbia River is a non-wadable river (navigable river) and the impact area for the Project is much larger than what is typical for SFAM assessments. As such, HDR received guidance from DSL to assess the project area based on best professional judgement, in accordance with OAR 141-085-0685(f), to provide group level function and value scores. This assessment of the Columbia River is provided in two separate segments, the upstream project area (UPA) and the downstream project area (DPA) (**Figure 3 in Attachment A**). The UPA and DPA are separated by the Bonneville Lock and Dam. The UPA contains all parts of the Columbia River between Bonneville Lock and Dam to where the cable is proposed to exit the river near the BPA substation. The DPA includes all waters from where the cable is proposed to enter and exit the Willamette River in addition to where the cable is to enter the Columbia River in Portland, Oregon, up to the Bonneville Lock and Dam. The project area is divided at the Columbia River for several reasons. Two distinctly different habitats exist upstream and downstream of this location. The upstream segment contains more deep water and slow-moving habitat with the Bonneville Lock and Dam's influence on river flow and subsequent creation of a reservoir. The downstream section is more typical for a mainstream reach of the Columbia River but impacted by flow modifications from Bonneville Lock and Dam. Additionally significant development surrounds the Portland and Vancouver areas that is relatively absent upstream of Bonneville Lock and Dam. The approach of splitting the project area into more than one part is also consistent within SFAM guidance outlined in the SFAM User Manual.

Per SFAM guidance, environmental variables (measures) have been assessed for the Project within the Proximal Action Area (PAA) and Extended Action Area (EAA). The PAA is defined as having the same longitudinal extent as the UPA or DPA with lateral boundaries twice the bankfull width. The EAA has the same lateral boundaries as the PAA but longitudinal boundaries extending five times the bankfull width in each direction of the PAA. The PAA and EAA are provided for both the DPA and UPA in **Figure 3 (Attachment A)**.

SFAM rates a stream's functions and relative significance to the surrounding environment. These ratings are conducted on the four functional groups: hydrologic, geomorphic, biological, and water quality. A functional group's ratings are determined by a series of tiered evaluations. The evaluations are first conducted on measures to produce measure scores. Measure scores are metrics, produced by raw data, which allow a quantitative or qualitative approach to rate stream characteristics predetermined by SFAM that can indicate the prevalence of a function within a system. Measure scores are combined to produce a rating for each function. The 11 functions are surface water storage, sub/surface water transfer, flow variation, sediment continuity, sediment mobility, maintain biodiversity, create and maintain habitat, sustain tropic structure, nutrient cycling, chemical regulation, and thermal regulation. The functions are grouped into one of the four functional groups as shown in Figure 2-1.

Figure 2-1. Functional Group Hierarchy



Note: All measures are comprising more than one function

Functions are rated on a score of 0 to 10 and defined as lower (0.0 - <3.0), moderate (≥3.0 - ≤7.0), and higher (>7.0-10.0). Two ratings are given, one for their function and a second for their value. Value ratings describe the opportunity and significance to provide a specific ecological function while function ratings represent how well the system is performing that function. Each of the 11 functions falls into 1 of 4 functional groups (Table 3-1 and Table 3-2). Functional group ratings are determined by which of their functions has the highest function and value rating (Representative Function; Table 3-1 and Table 3-2).

The process of creating measure scores is typically carried out by completing the SFAM workbook with scores from reports (e.g., SFAM and StreamStats) generated by the ORWAP and SFAM online mapper, and carrying out fieldwork specific to SFAM. HDR used the ORWAP and SFAM mapper to create an SFAM report for both the DPA and UPA to inform measure scores. However, a StreamStats report is not available for either the UPA or DPA and no field activities were carried out for this assessment. Therefore, HDR conducted a desktop study to assess the variables that would have been given a score from the StreamStats report and to fill data gaps from the lack of field activities. Results The desktop study involved a search of publications to provide data for each measure and visual observations from aerial imagery to produce measure scores that could not be obtained from the SFAM report.

The ORWAP and SFAM mapper does not provide information on the terrestrial environment in Washington. Unless noted otherwise, for variables requiring information within the terrestrial environment, only data pertaining to Oregon lands is used. This methodology is consistent with land access constraints provided in the SFAM User Guide.

3 Results

Function and value ratings help identify opportunities for improving stream function and increasing ecosystem services. A higher value rating indicates the project area has an increased opportunity to provide that function and higher local significance of that function relative to a lower or moderate rating. Functions and values for both the UPA and DPA are provided in Table 3-1 and Table 3-2, respectively. The function defining each group function rating is displayed in each table as the representative function.

Table 3-1. UPA Function and Value Ratings

Grouped Functions	Representative Function	Function Group Rating	Value Group Rating
Hydrologic Function	Surface Water Storage	Lower	Moderate
Geomorphic Function	Sediment Continuity	Moderate	Lower
Biologic Function	Sustain Trophic Structure	Moderate	Higher
Water Quality Function	Chemical Regulation	Moderate	Moderate

Source: Oregon Explorer 2024

Note: Rating groups are as follows: Lower (0.0 - <3.0), Moderate (≥3.0 - ≤7.0), and Higher (>7.0-10.0).

Table 3-2. DPA Function and Value Ratings

Grouped Functions	Representative Function	Function Group Rating	Value Group Rating
Hydrologic Function	Sub/Surface Water Transfer	Moderate	Higher
Geomorphic Function	Sediment Mobility	Moderate	Moderate
Biologic Function	Maintain Biodiversity	Lower	Higher
Water Quality Function	Chemical Regulation	Moderate	Higher

Source: Oregon Explorer 2024

Note: Rating groups are as follows: Lower (0.0 - <3.0), Moderate (≥3.0 - ≤7.0), and Higher (>7.0-10.0).

Sections 3.1 through Section 3.4 describe the four functional groups and the functions and measures they are comprised of that were not produced by the SFAM Report. Methodology for assessing each measure is consistent for the UPA and DPA.

3.1 Hydrologic

Hydrological functions are defined by the movement of water through the watershed and the variable transfer and storage of water along the stream channel, its floodplain, and associated alluvial aquifer (Nadeau et al. 2020). Individual assessment of a system's surface water storage, sub/surface water transfer, and flow variation inform its hydrologic function and value ratings. Discussion is provided below for those ratings that could not be derived from the SFAM report.

3.1.1 Upstream Project Area

HDR used the ORWAP and SFAM mapper to assess floodplains in the PAA. Steep banks and topography surrounding the Columbia River within the PAA restrict the system's floodplain. Infrastructure within the floodplain is primarily restricted to the banks of The Dalles and has been estimated to occupy less than 50 percent of the floodplain. Similarly, infrastructure is estimated to cause a disconnection in the floodplain within the PAA of 40 percent to 80 percent. This was assessed by looking at floodplain obstructions on both banks of the Columbia River. HDR used the ORWAP and SFAM mapper to review land use zoning within the PAA. The most dominant zoned land use designation is forest, open space, and public lands. As determined by the ORWAP and SFAM mapper, there are no areas of special concern for drinking water sources or groundwater recharge within 2 miles downstream of the PAA. The streamflow restoration need is not ranked in this area (Oregon Explorer 2024). Information on embeddedness for the system is not available. Given the size of the system and habitat types available (unique habitat features), embeddedness is not expected, providing a near maximum function and has been given a measure score of 0.25 (lower).

The hydrologic function score was most influenced by the measure bed channel variability. Bed channel variability is determined by the coefficient of variation for wetted width and thalweg depth (**SFAM Workbook; Attachment B**). This indicates there is a large variation in wetted width and thalweg depth within the PAA. The measure most significant to the hydrologic value score is the positioning of the system's 12-digit hydrologic unit code (HUC) within essential salmonid habitat.

3.1.2 Downstream Project Area

HDR used the ORWAP and SFAM mapper to assess floodplains in the PAA. Disconnection of the floodplain is largely limited to Interstate 84 and development in northern Portland immediately adjacent to the Columbia River. Infrastructure within the floodplain is estimated to cause a disconnection in the floodplain within the PAA of 40 percent to 80 percent. Despite the bank grade being lower in Portland with a lower surrounding elevation maximum relative to the rest of the PAA, the floodplain is still primarily restricted to the banks of the Columbia River and its tributaries. As a result, it is estimated that less than 50 percent of the floodplain is covered by infrastructure. As seen with the heavily developed areas within the PAA, commercial, industrial, and residential zoning is the most dominant zoned land use designation in the DPA. There are areas of special concern for drinking water sources or groundwater recharge within 2 miles downstream of the PAA in the DPA. Additionally, the streamflow restoration need is not ranked in this area (Oregon Explorer 2024). Embeddedness for the PAA has been scored at 0.25 for the rationale described in Section 3.1.1.

The DPA has a moderate hydrologic function rating because of the channel bed variability within the PAA. The higher value rating is the result of there being special concern for drinking water sources and groundwater recharge within 2 miles downstream of the PAA.

3.2 Geomorphic

Geomorphic functions encompass hydraulic and sediment transport processes that generate variable forces within the channel. The variable input, transfer, and storage of sediment within the channel and adjacent environs are generally responsible for channel form at multiple scales (Nadeau et al. 2020). Individual assessments of a system's sediment continuity and sediment mobility inform its geomorphic function and value rating. Discussion is provided below for those ratings that could not be derived from the SFAM report.

3.2.1 Upstream Project Area

The UPA is within the lower one-third of its eight-digit watershed HUC (17070105 Middle Columbia-Hood). Aerial imagery and bathymetry mapping of the PAA provided an average wetted width of 3,661 feet and an average thalweg depth of approximately 71 feet. Unique features in the PAA include braided channels in addition to seeps, springs, and tributaries contributing colder water to the system (Oregon Explorer 2024). Active or recent erosion within the PAA was estimated from research upstream of the project area as part of the Mid-Columbia River Long Term Erosion Monitoring Program at 40 percent (Kerr Wood Leidal Associates Ltd. 2014).

Within the terrestrial environment of the PAA and EAA, HDR used the USGS National Land Cover Database (NLCD) to inform ratings related to development and habitat characteristics. NLCD information on surrounding development revealed impervious areas are limited in the EAA (approximately 13 percent; USGS 2024). HDR used aerial imagery to assess bank armoring and influences on lateral migration along the Columbia River within the PAA on both banks. Armoring is limited to development along the Columbia River and has been approximated at 10 percent. Additionally, infrastructure such as roads and railroads present obstacles to lateral migration.

The constraints of lateral migration within the PAA have resulted in a function rating of moderate for geomorphic function. The highest measure score contributing to the low value rating is the result of the PAA's positioning at the lower one-third of its eight-digit HUC.

3.2.2 Downstream Project Area

The DPA is within the upper one-third of its eight-digit watershed HUC (17080001 Lower Columbia-Sandy). The PAA has an average wetted width of 3,864 feet and an average thalweg depth of approximately 38 feet. Unique features include braided channels in addition to seeps, springs, or tributaries contributing colder water to the system, and recent erosion is estimated to occur along 40 percent of the PAA's banks (Kerr Wood Leidal Associates Ltd. 2014).

Using the methods described in Section 3.2.1, HDR determined that approximately 22 percent of areas within the EAA are comprised of impervious surfaces (USGS 2024). Armoring is significant within the PAA and is primarily a result of engineering practices to support infrastructure within and east of Portland. Bank armoring within the PAA has been estimated at 25 percent and infrastructure limiting lateral migration has been estimated to occur along 100 percent of the PAA.

Channel bed variability has the largest influence on the DPA's geomorphic function score. Fish, rare amphibians and reptiles, and rare plants all received the highest measure score and contributed to the moderate value rating. These scores were generated from the SFAM report.

3.3 Biological

Biological functions include processes that result in the maintenance and change in biodiversity, trophic structure, and habitat within the stream channel (Nadeau et al. 2020). Individual assessments of a system's ability to maintain biodiversity, create and maintain habitat, and its sustain trophic structure inform its biological function and value rating. Discussion is provided below for those ratings that could not be derived from the SFAM report.

3.3.1 Upstream Project Area

Side channels are limited within the EAA. By measuring the length of side channels using aerial imagery, it is estimated that approximately 1 percent of the Columbia River in this area is separated by side channels (Oregon Explorer 2024). An assessment of large woody debris along the bankfull channel was derived from *Regional Environmental Monitoring and Assessment Program: 2009 Lower mid-Columbia River Ecological Assessment Final Report.* An assessment of large woody debris from this report suggests that is not a common habitat characteristic in the PAA (Caton 2012). One barrier to fish passage exists within the PAA, Bonneville Lock and Dam. Bonneville Lock and Dam is classified as a partially passable dam on the ORWAP and SFAM mapper. One other barrier to fish passage exists within 2 miles upstream of the PAA at The Dalles Dam (partially passable; Oregon Explorer 2024).

There are areas of over 500 feet of contiguous intact riparian vegetation. Given the size of the Columbia River and amount of surrounding habitat, it is believed that by identifying more than 500 feet of vegetation, yielding a measure score of 1.00 for riparian continuity, would skew high the values this measure informs (maintain biodiversity, create and maintain habitat, sustain trophic structure, nutrient cycling, chemical regulation, and thermal regulation). As such, this measure has been given a measure score of 0.50, which would be given for a wadable stream with 100 to 500 feet of intact, contiguous riparian habitat. HDR also used aerial imagery to assess the intact riparian area within the PAA, which has been estimated between 35 and 50 percent.

NLCD and Landscape Ecology, Modeling, Mapping, and Analysis (LEMMA) data were used to make an informed decision on the percentage of large tree cover. As determined by the NLCD, approximately 40 percent of the PAA is covered by deciduous forest, evergreen forest, and mixed forest. LEMMA estimates that 16 percent of forest land consists of large trees. By combining NLCD and LEMMA data, it is estimated that approximately 6 percent of the PAA are large trees (USGS 2024; Oregon Forest Resources Institute 2013).

National Wetlands Inventory (NWI) mapping and wetland delineations performed for this Project were used to assess wetland species within the PAA, including their abundance and positioning in relation to the Columbia River. Wetland indicator species are present in the PAA at a distance greater than 0.5 times the bankfull but are not distributed along more than 70 percent of the PAA (USFWS 2024). HDR used Oregon iMAPInvasives to determine the percentage of cover from invasives within the PAA. It is estimated that invasive vegetation has 2 percent cover in the PAA (iMapInvasives 2024).

The moderate function group rating is attributed to the prevalence of invasive vegetation in the PAA and the higher value rating is derived from the rating of the measures protect, zoning, fish, waterbird, rare birds and mammals, and habitat features. As generated from the SFAM report, the UPA is within 300 feet of an area designated as a special protected area, within a 12-digit HUC designated as essential salmonid habitat, and is habitat to rare songbirds, raptors, and mammals. According to the ORWAP and SFAM mapper, the primary zoning class in the area is forest, open space, and public land, and the presence of islands in addition to seeps, springs, or tributaries contributing colder water to the UPA provide unique habitat features.

3.3.2 Downstream Project Area

Unlike the UPA, the DPA contains many side channels and open conveyances of water. By measuring the extent of side channels relative to the total PAA length with aerial imagery, it is estimated that 40 percent of the PAA contains side channels.

Given that the UPA and DPA meet at Bonneville Lock and Dam, the dam is considered to be part of the DPA for this analysis. As mentioned above, Bonneville Lock and Dam is classified as a partially passable barrier to fish and the only barrier to fish passage in the PAA. No other fish passage barriers exist with 2 miles upstream of the PAA (Oregon Explorer 2024).

Wetland indicator species are present in the PAA and exist beyond half of the bank full width from the bankfull edge of the river; however, they are not distributed over 70 percent of the PAA (Oregon Explorer 2024).

Invasive vegetation cover in the PAA is estimated at 5 percent (iMapInvasives 2024). The PAA has greater than 500 feet of intact, contiguous riparian habitat, but has been given a measure score of 0.50 for the reason stated in Section 3.3.1. It is estimated that approximately 4 percent of cover within the PAA are large trees (USGS 2024; Oregon Forest Resources Institute 2013). Large woody debris are not a significant habitat component in this area (Canton 2012).

The presence of side channels resulted in the highest-rated measure for the DPA biological function rating. The higher value rating is derived from the ratings of the measures habitat features, protect, fish, rare amphibians and reptiles, water bird, and rare plants. With the exception of water bird, these measures are explained in the preceding sections. The DPA received the highest score for water bird generated by the SFAM report because there is an important bird area within 2 miles of the DPA.

3.4 Water Quality

Water quality functions include processes that govern the cycling, transfer, and regulation of energy, nutrients, chemicals, and temperature in surface and groundwater, and between the stream channel and associated riparian system (Nadeau et al. 2020). Individual assessments of a system’s nutrient cycling, chemical regulation, and thermal regulation inform the water quality function and value rating. Discussion is provided below for those ratings that could not be derived from the SFAM report.

3.4.1 Upstream Project Area

Dams and impoundments have the potential to change the flow of water and alter water quality. As discussed in Section 3.3.1, there is one large dam downstream of the PAA, Bonneville Lock and Dam, and several small dams or impoundments upstream of the PAA (Oregon Explorer 2024). Natural cover is limited in the PAA. Aerial imagery was used to determine the amount of natural cover above the river from both overstory and understory vegetation. Natural cover has been estimated at 0 percent as a result of the large wetted width in the PAA (average of 3,661 feet). Therefore, it is not anticipated that natural cover has a significant impact on thermal regulation. At the 10 transects, HDR used aerial imagery to measure the width of intact riparian vegetation. In the UPA, this produced an average riparian vegetation width of approximately 92 feet.

The riparian width, as described in Section 3.1.1, was the highest-rated measure contributing to the moderate functional group rating. Toxic impairments, position, fish, waterbird, and rare birds and mammals were all generated from the SFAM report and received the highest measure score possible. All of these measures, except for toxic impairments, are described in the previous sections. The UPA received a high rating for toxic impairments due to the presence of metals or other toxic impairments, including toxins, dioxin, heavy metals, or untreated stormwater or wastewater discharge within 500 feet of the UPA.

3.4.2 Downstream Project Area

No dams or impoundments exist downstream of the PAA. Several small dams or impoundments exist upstream of the PAA, in addition to one large dam, Bonneville Lock and Dam. Natural cover in the PAA has been estimated at 0 percent, and it is not anticipated that natural cover is significantly contributing to thermal regulation in the PAA. In the UPA, this produced an average riparian vegetation width of approximately 196 feet.

The DPA received a functional group rating of moderate and a value group rating of higher. As with the UPA, riparian width was the highest-rated measure score contributing to the functional group rating. Measures of toxic impairments, riparian area, fish, rare amphibians and reptiles, waterbird, rare plant, and source all received the highest measure ratings for the DPA and contributed to the higher rating for the value group. All of these measures are described in the previous sections.

4 Impacts and Compensatory Mitigation

Cable protection (i.e., cable protection or rock berm) is proposed in three locations and would be placed over the cable protect it from damage (Figure 1-2). Cable protection would be used where there is little or no sediment over bedrock, as such there would be negligible impacts to sediments. Benthic communities colonizing bedrock in the immediate vicinity of the cable protection may be physically impacted by the placement of the rock or ACB mattress. Benthic communities recover at varying rates depending on species composition and substrate. The addition of the mattress would result in a loss of habitat within the installation footprint but would likely be recolonized in the short term and has the potential to provide additional habitat complexity (Dernie et al. 2003). In sites where burial depth is shallow and the mattresses are needed such as utility crossings, they would introduce hard substrate in areas that may have existing sand or fines and would alter benthic habitats. Re-colonization of these areas could take longer due to the surrounding benthic community being adapted to soft substrates. The cable protection is not anticipated to have any noticeable effect on river discharge due to its shallow profile and narrow footprint.

The substrate within the project area is primarily fine grain, coarse grain, and shallow bedrock. A hydroplow would trench the cable within the sediment (i.e., hydroplowing). Hydroplowing fluidizes the seabed with high power jets. This process may result in localized suspension of the hydroplowed seabed material in the water column for up to several hours. In environments subject to high flow, such as the Columbia River, the suspended materials can be transported long distances (Ospar Commission 2012). A water quality modeling report prepared for the Project details the impacts of hydroplowing from the Project, including those related to sediment transport and total suspended solids. As determined by the report, the hydroplowing process is not anticipated to influence water quality in a way that facilitates degradation to the system. It is also anticipated from modeling that hydroplowed sediment along the Project route would not create shoals in the navigation channel. The assessment results determined that under the expected flows during the in-water work window, sediment accumulation ranges between less than 0.01 foot in the longest distance scenario for a 10-foot plume at 5.5 feet per second flow, and 1.6 feet in the shortest distance travelled for a 6-foot plume in 1.3 feet per second flow. Suspended sediments are anticipated to remain close to the riverbed (10-foot plume or less) and remain in the water column for 787 or fewer seconds. Variability in distance and time is dependent on particle size (0.2 to 1.2 millimeters diameter). CRT considered benthic conditions and flow when choosing which parts of the cable alignment would be buried to reduce potential impacts. As such, it is anticipated that conditions would return to normal after hydroplowing activities have occurred in the short term.

While the Columbia River segment of the project area is listed on the Clean Water 303(d) list as impaired waters for several pollutants, the amount of particulates suspended by the hydroplow process and dredging is not anticipated to influence water quality in a way that further contributes to the degradation of the system. Sediment sampling and analysis is proposed to occur prior to cable burial. Results from this analysis will inform the cable route and be used mitigate the potential for interactions with contaminated sediment.

Cofferdam installation and use would be short term and localized. As discussed above, sediment is expected to settle shortly after it is disturbed. Oregon does not have explicit water quality standards for total suspended solids (Donald and Michie 2022). However, given the limited dispersal anticipated for the project, TSS is not expected to accumulate in the water column and would settle shortly after being disturbed. Therefore, any impacts to turbidity would be short term and are not anticipated to impact primary production. Additionally, habitat disturbances are not anticipated for this reason. Cofferdams would result in a localized impact of river fed flow within the vicinity of and immediately adjacent to the cofferdams. Flow variability would persist while the cofferdam is in place and would return to preexisting conditions once removed. Given the small footprint of the cofferdam relative to the width of the Columbia River, impacts related to streamflow are expected to be so low as to be discountable. Benthic organisms immediately in the area of the cofferdam may be physically disturbed by construction and use; however, given the small footprint of the cofferdam, community impacts are not anticipated.

Operation of the transmission cable has the potential to impact the immediately surrounding sediment environment with localized increases in temperature emanating from the cable. Thermal impacts would not extend into the water column. Minor increases in ambient temperature from cables have been known to cause impacts to benthic organisms (Ospar Commission 2012). An analysis of temperature influence from the cable at various depths has been conducted for the Project to better understand cable impacts. Table 4-1 is a summary table of the results. The data in Table 4-1 is provided visually in Figure 4-1. A thermal cross section of the cable has been provided in Figure 4-2.

Table 4-1. Temperature below mudline with cable at various installation depths (degrees Celsius)

Depth Below Mudline (ft)	Temperature (Degrees Celsius) at Depth from 0.5 feet Cable Burial	Temperature (Degrees Celsius) at Depth from 2.0 feet Cable Burial	Temperature (Degrees Celsius) at Depth from 5.0 feet Cable Burial	Temperature (Degrees Celsius) at Depth from 10.0 feet Cable Burial
0.00[a]	15	15	15	15
0.33[b]	15	15	15	15
0.66[b]	18[c]	15	15	15
1.00	18	18	16	15
1.32	-	20	18	15
1.65	-	25	20	15
1.98	-	30[c]	21	15
2.31	-	33	22	15
2.97	-	-	26	19
3.30	-	-	27	20
4.13	-	-	30	22
4.95	-	-	40[c]	23
6.60	-	-	30	27
8.25	-	-	-	32
9.00	-	-	-	42
9.90	-	-	-	45[c]
11.00	-	-	-	37

Note: 15 degrees Celsius ambient temperature
[a] Riverbed
[b] Benthic Zone
[c] Cable Depth

Figure 4-1. Temperature Changes at Various Bural Depths (Ambient Temp 15 degrees Celsius)

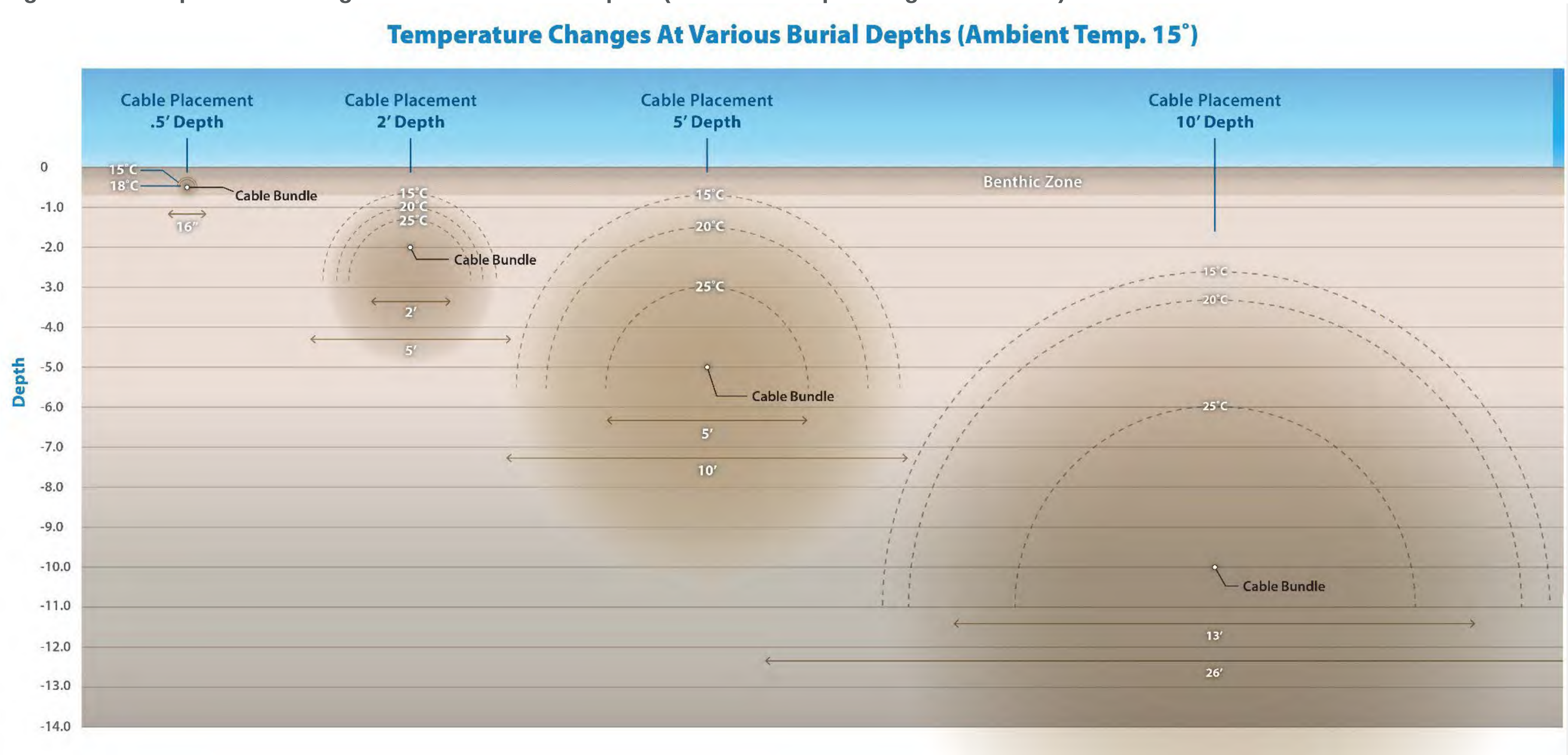
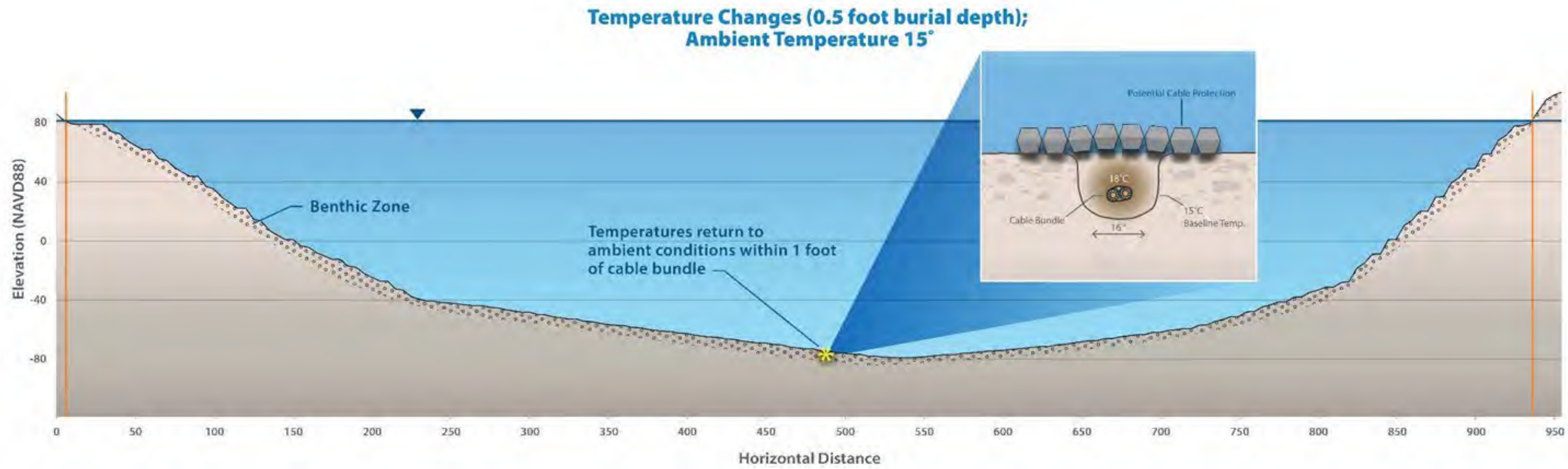


Figure 4-2. Thermal Section



Current through a cable produces an electromagnetic field (EMF). EMF has two components, electric fields (E-fields) and magnetic fields (B-fields). To minimize EMF generated by cables, all cabling would be contained in electrical shielding to prevent detectable direct electric fields. The cable construction includes shielding that eliminates any electric field from emanating from outside the cable housing—no electric field will be in the substrate or water column. In the event of a cable rupture (e.g., anchor strike), the flow of electricity shuts down instantaneously. Burial of cables is not an effective mitigation measure for EMFs because the cables emit EMFs into the environment directly as B-fields and create secondary induced electric fields (iE-fields) in the seawater, and therefore, have the potential to affect sea life. An organism's ability to detect and respond to the Earth's magnetic fields is called magnetosensitivity. Observations of magnetosensitive organs in fish and laboratory studies on fish behaviors in response to magnetic fields suggest magnetosensitivity to static (0 hertz) magnetic fields is common in many types of fish. Species reported to be magnetosensitive include salmon, American eel, sturgeon, yellowfin tuna, sharks, skates, and rays (Snyder et al. 2019). Given the mobile nature of these species, EMF is not anticipated to subject them to adverse effects because they can move away from the EMF, if necessary. Salmon and eulachon eggs have the potential to be exposed to EMF if broadcast in close proximity to the cable (less than 10 meters). However, cable placement is in most cases deeper than eulachon spawning depth and aelvin or fry have the ability to move away from EMF, if necessary, once hatched. Additionally, the portion of habitat within the Columbia River subject to EMF is relatively small compared to other spawning habitat.

The impacts discussed in this section are not expected to be elevated to the degree where they would affect the river's functions or functional groups. The footprint of the Project is relatively minor compared to physical size and volume of the Columbia River. Any impacts that would occur would return to previous state in the short term.

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Attachment A. Figures

FIGURE 1. VICINITY MAP
BPA BIG EDDY SUBSTATION
TO BONNEVILLE DAM

FOR INFORMATION ONLY - CONCEPT DRAWING

River Miles (Miles)
Proposed Alignment
County Boundary
State Boundary

CASCADE RENEWABLE TRANSMISSION

0 4 mi
1:230,000

4/23/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1. VICINITY MAP

BONNEVILLE DAM TO PGE HARBORTON SUBSTATION

FOR INFORMATION ONLY - CONCEPT DRAWING

4/23/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

Figure 2. Cable Protection Locations

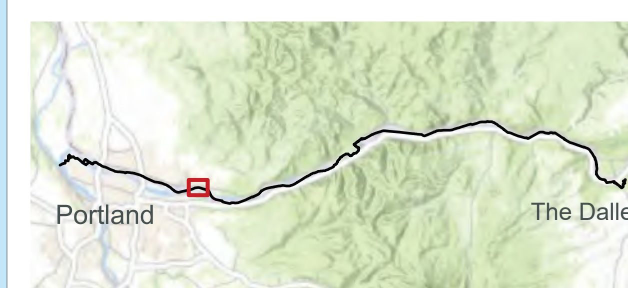
Page 1 of 3

RIVER MILES (USACE)

PROPOSED ALIGNMENT

CABLE PROTECTION LOCATION

CASCADE RENEWABLE TRANSMISSION



0 0.2 mi

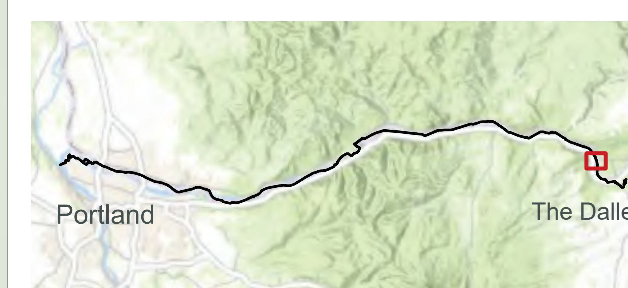
1:14,000

4/24/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey.

Figure 2. Cable Protection Locations
Page 2 of 3

RIVER MILES (USACE)
PROPOSED ALIGNMENT
CABLE PROTECTION LOCATION

CASCADE RENEWABLE TRANSMISSION

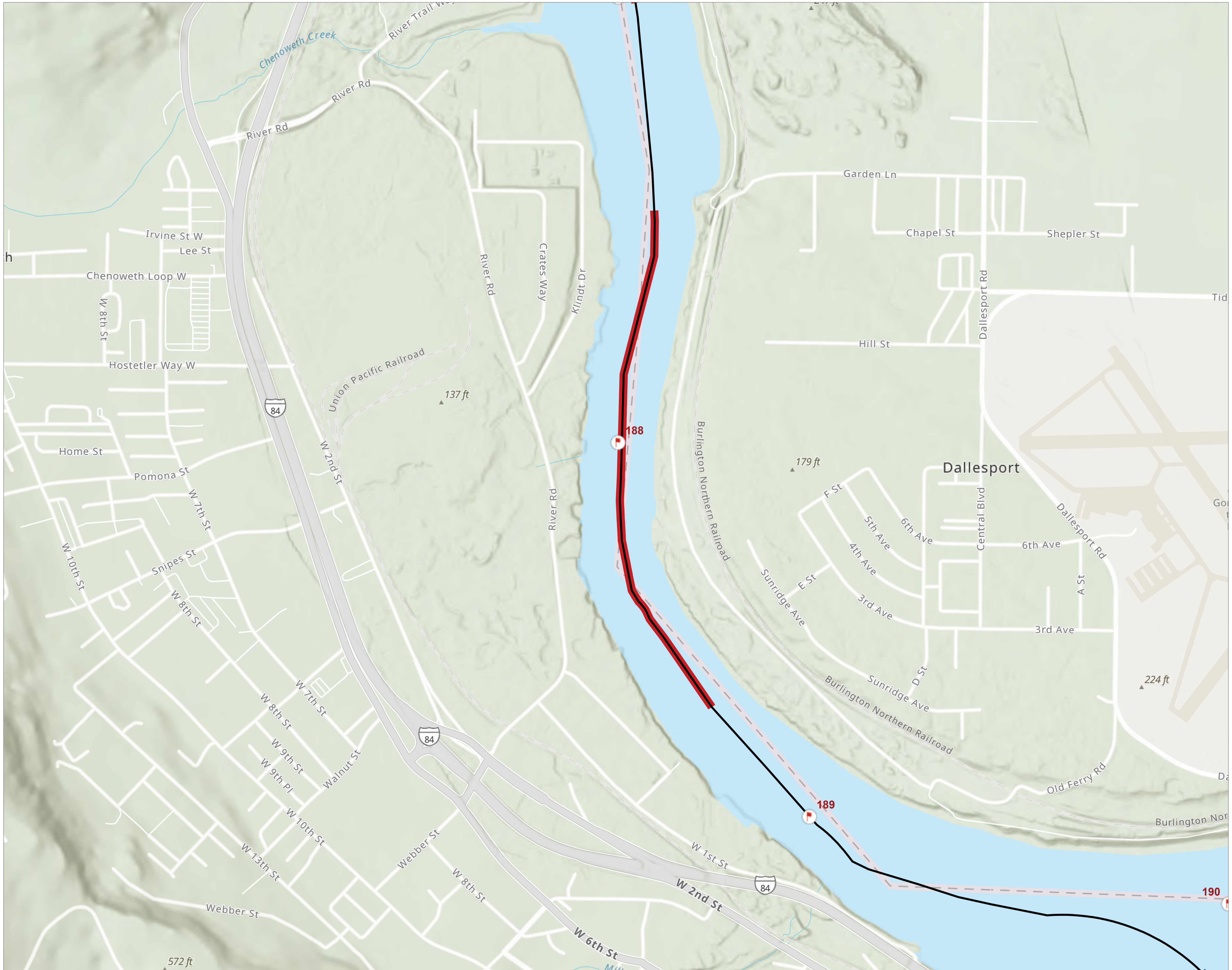


0 0.2 mi
1:14,000

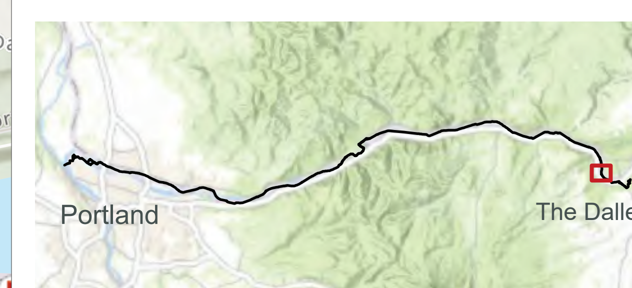
4/24/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey.

Figure 2. Cable Protection Locations

RIVER MILES (USACE)
PROPOSED ALIGNMENT
CABLE PROTECTION LOCATION
TEMPORARY 3-SIDED WET COFFERDAM



CASCADE RENEWABLE TRANSMISSION



HDR

0 0.2 mi
1:14,000

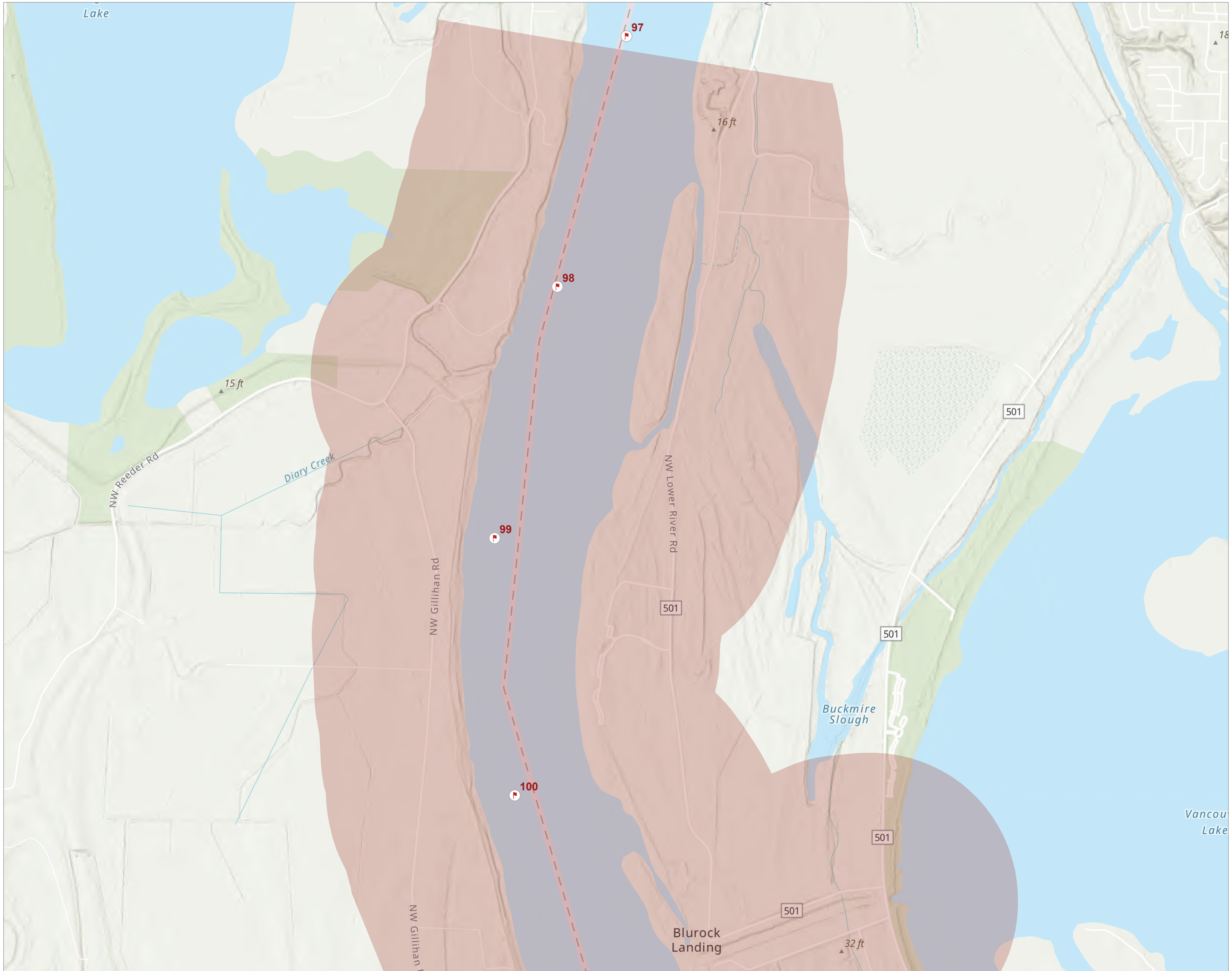
4/24/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey.

Figure 3 SFAM
Project Alignment
Page 1 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)

DOWNSTREAM EXTENDED ASSESSMENT AREA



CASCADE RENEWABLE TRANSMISSION

HDR

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6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

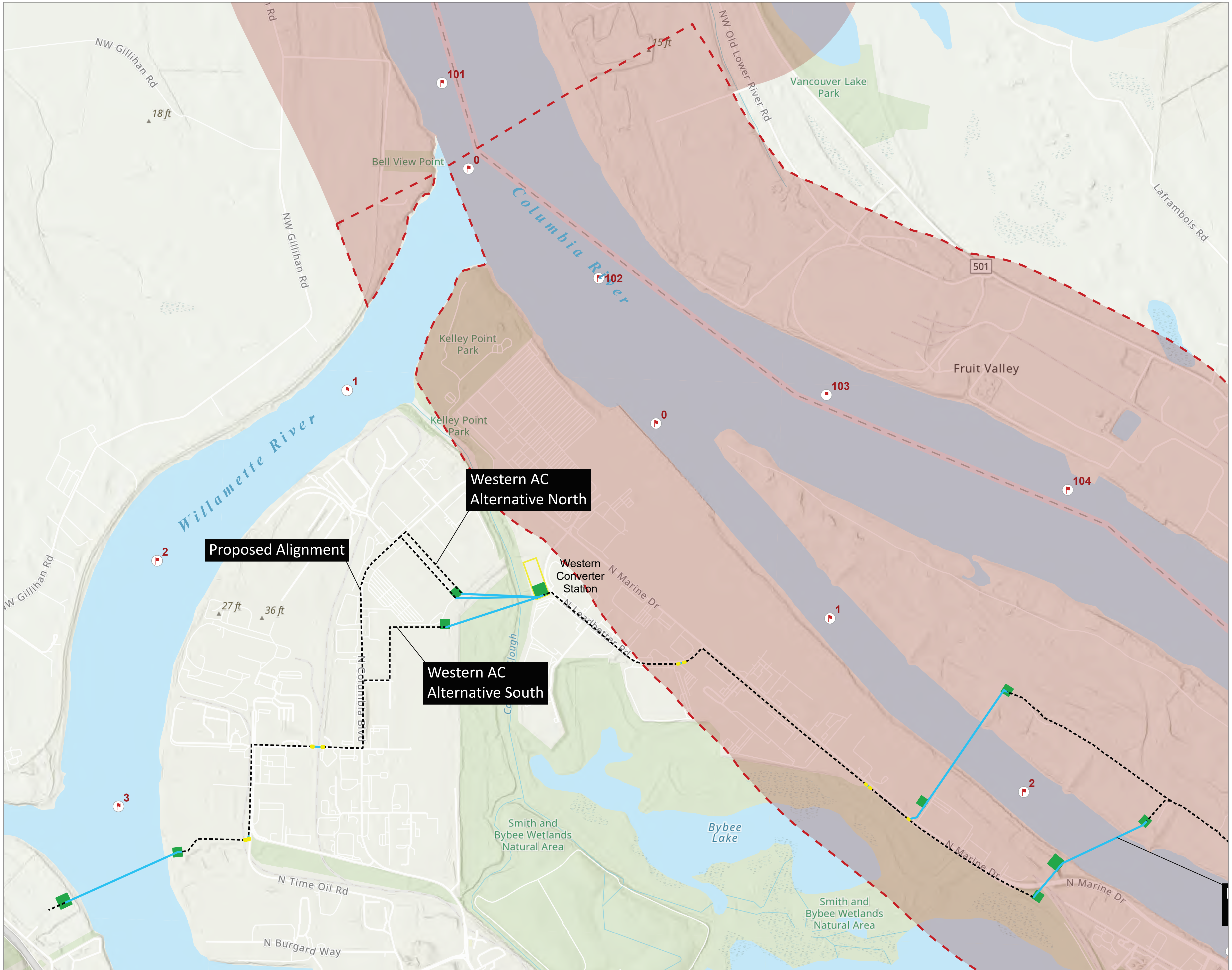


Figure 3 SFAM
Project Alignment
Page 2 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)

PROPOSED ALIGNMENT - HDD

PROPOSED ALIGNMENT - UPLAND INSTALLATION (E.G., TRENCHING)

CONVERTER STATION

TEMPORARY HORIZONTAL AUGER BORE (HAB)

TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA

DOWNSTREAM PROXIMAL ASSESSMENT AREA

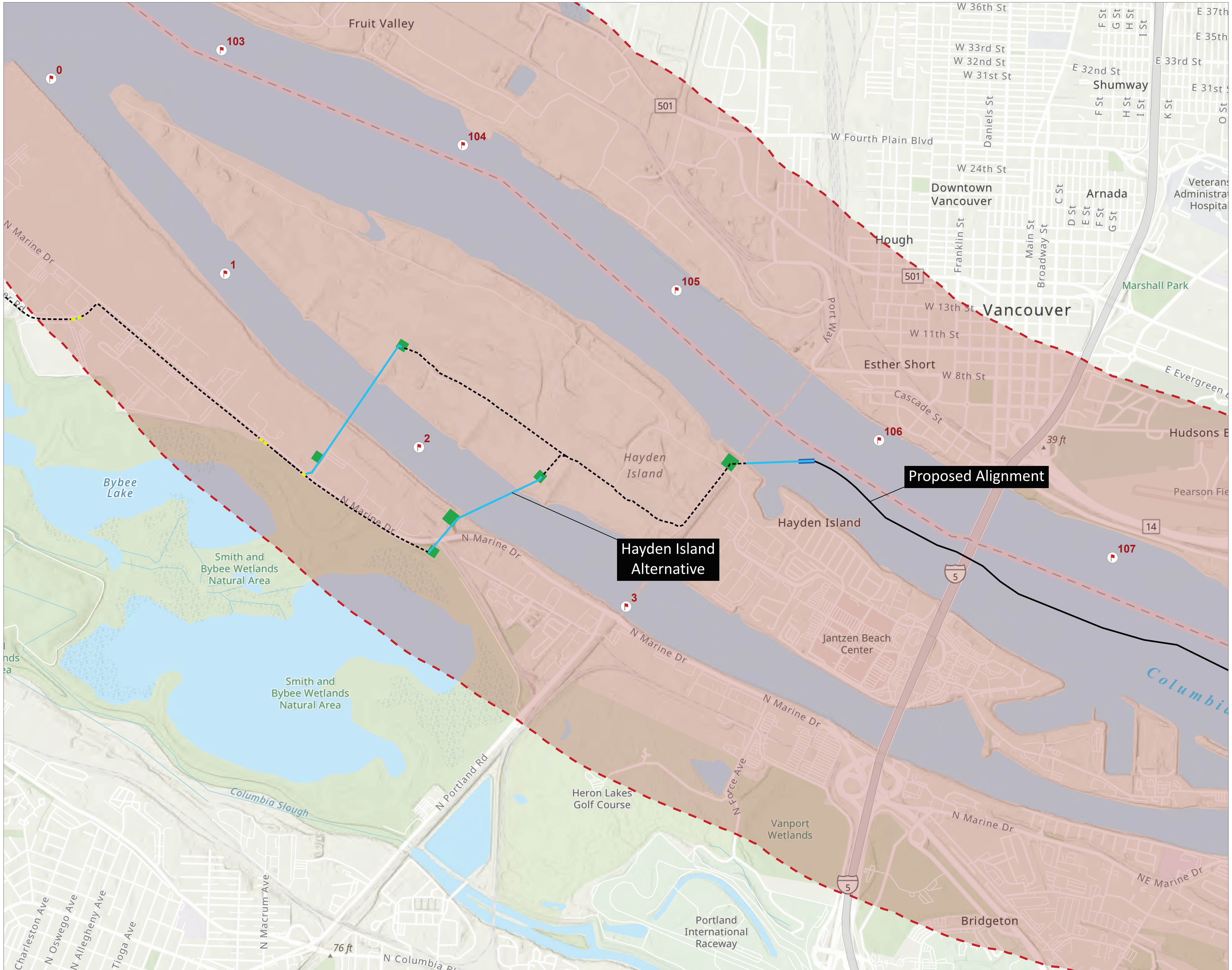
DOWNSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

0 0.5 mi

1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).



6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment
Page 3 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HDD
- PROPOSED ALIGNMENT - HYDROPLOW
- PROPOSED ALIGNMENT - UPLAND INSTALLATION (E.G., TRENCHING)
- TEMPORARY 3-SIDED WET COFFERDAM
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- DOWNSTREAM PROXIMAL ASSESSMENT AREA
- DOWNSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

HDR

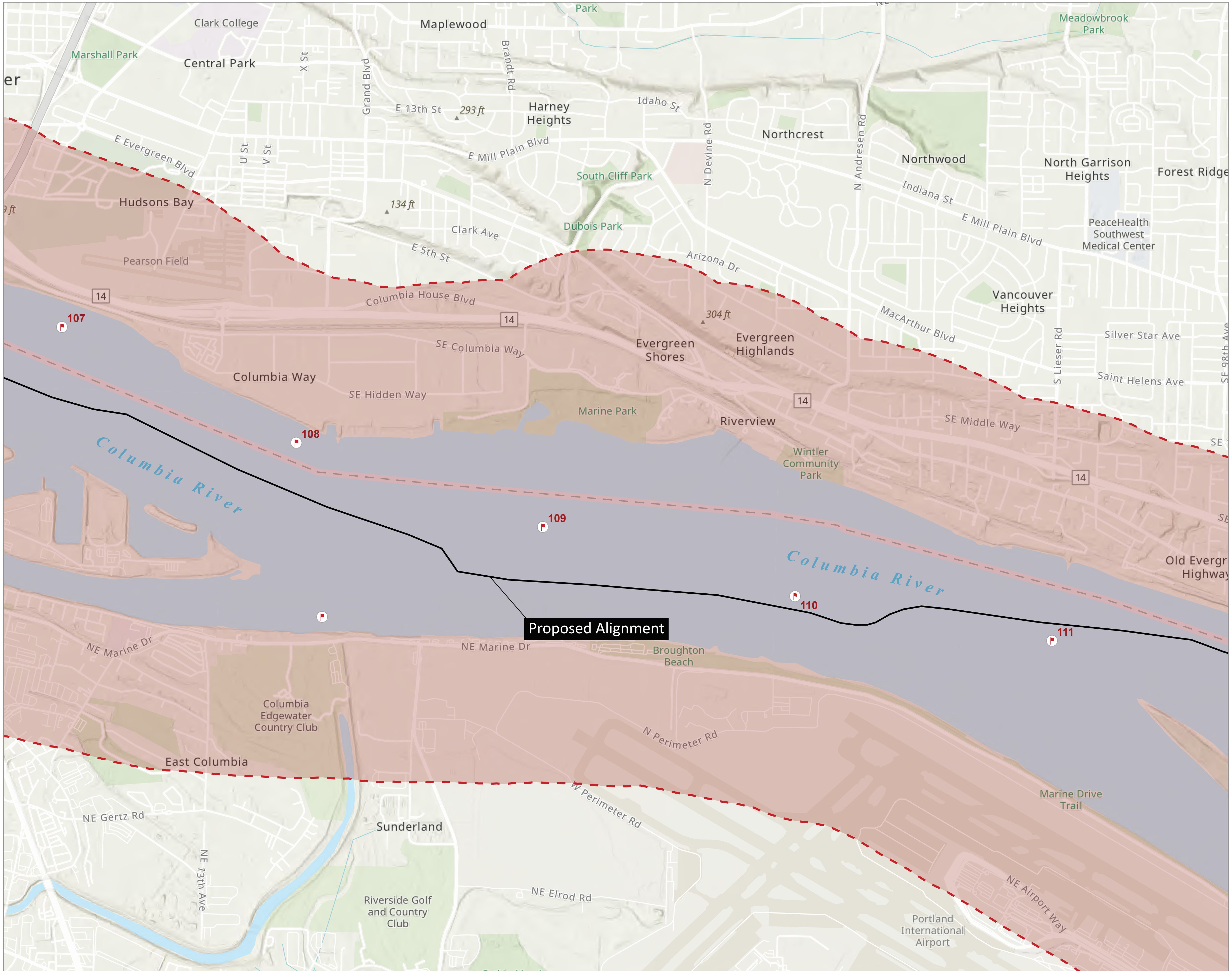
0 0.5 mi

1:24,000

Figure 3 SFAM
Project Alignment
Page 4 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HYDROPLOW
DOWNSTREAM PROXIMAL ASSESSMENT AREA
DOWNSTREAM EXTENDED ASSESSMENT AREA



CASCADE RENEWABLE TRANSMISSION

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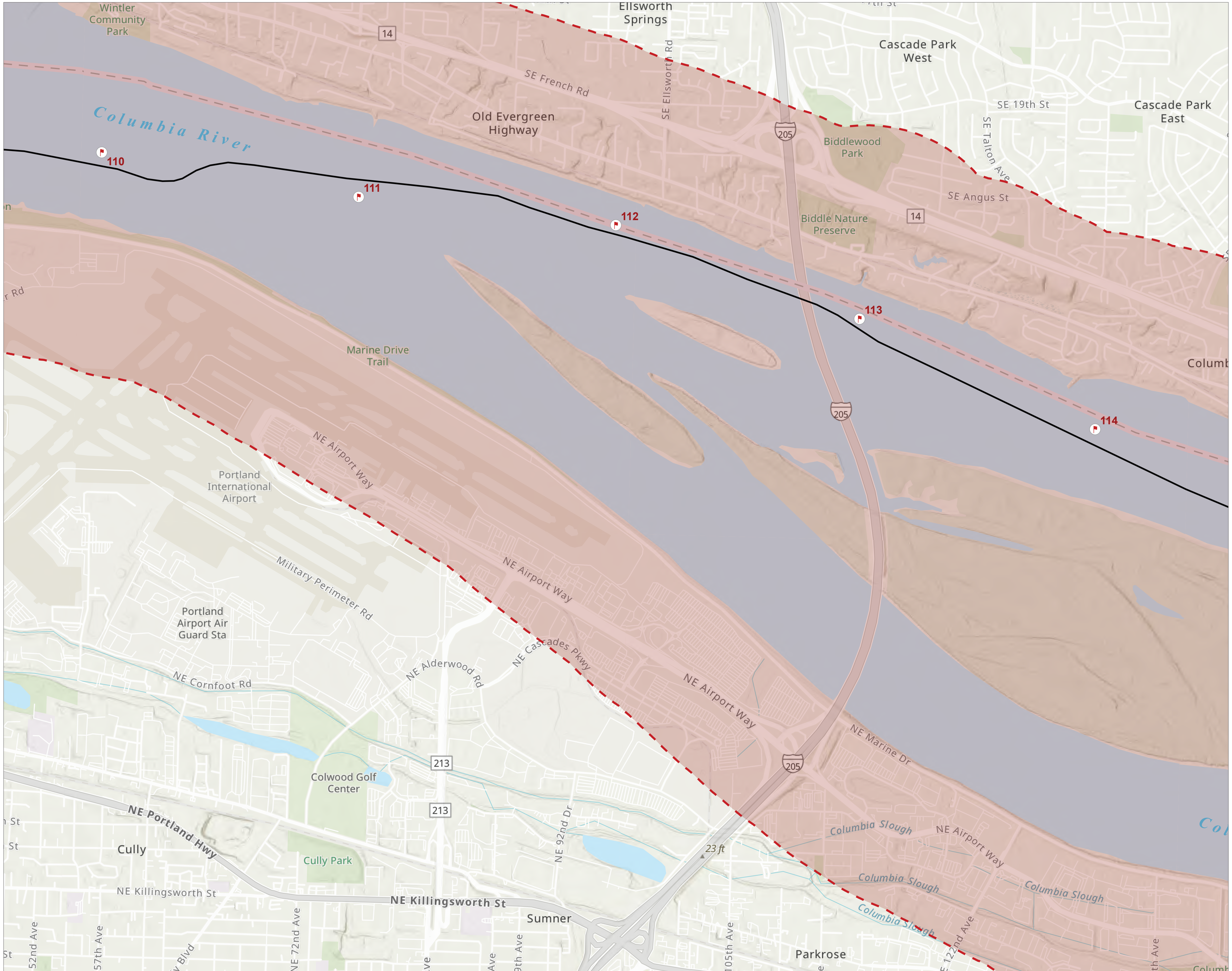


Figure 3 SFAM
Project Alignment
Page 5 of 24

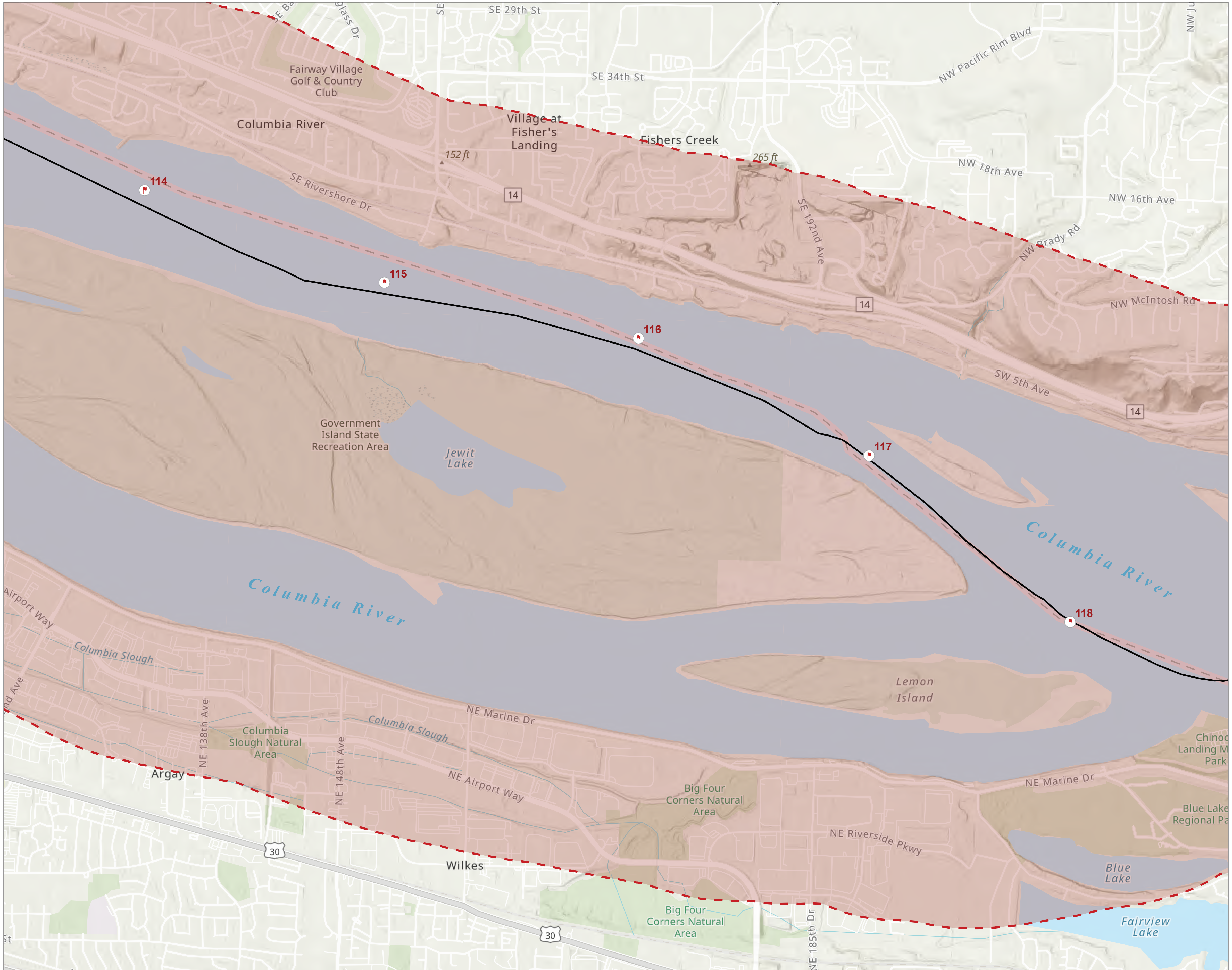
FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HYDROPLOW
DOWNSTREAM PROXIMAL ASSESSMENT AREA
DOWNSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).



6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment
Page 6 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING

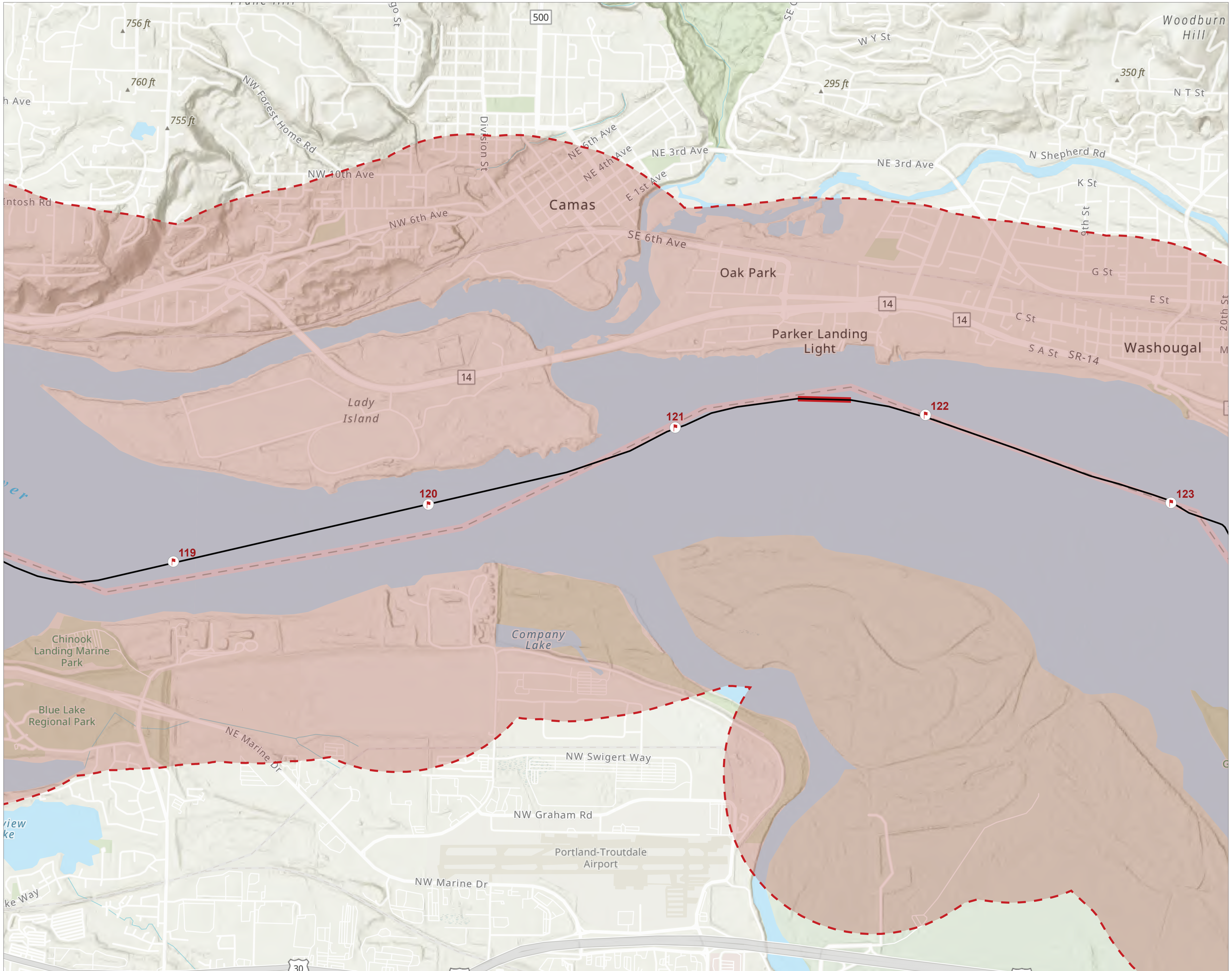
- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HYDROPLOW
- DOWNSTREAM PROXIMAL ASSESSMENT AREA
- DOWNSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

0 0.5 mi
1:24,000

Figure 3 SFAM
Project Alignment
Page 7 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING



RIVER MILES (USACE)
PROPOSED ALIGNMENT - HYDROPLOW
CABLE PROTECTION AREA
DOWNSTREAM PROXIMAL ASSESSMENT AREA
DOWNSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

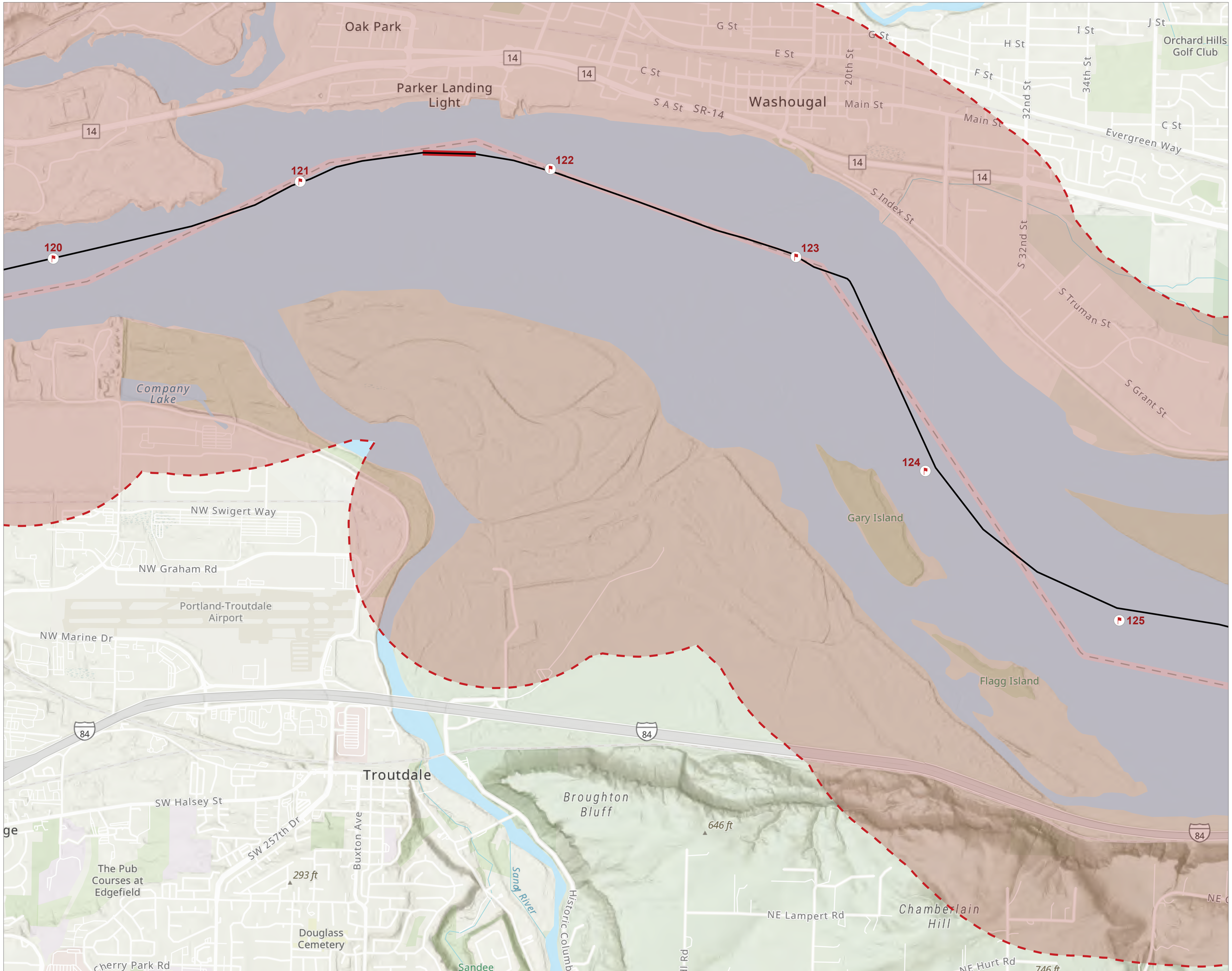
0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment
Page 8 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HYDROPLOW
CABLE PROTECTION AREA
DOWNSTREAM PROXIMAL ASSESSMENT AREA
DOWNSTREAM EXTENDED ASSESSMENT AREA



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CASCADE RENEWABLE TRANSMISSION

0 0.5 mi
1:24,000

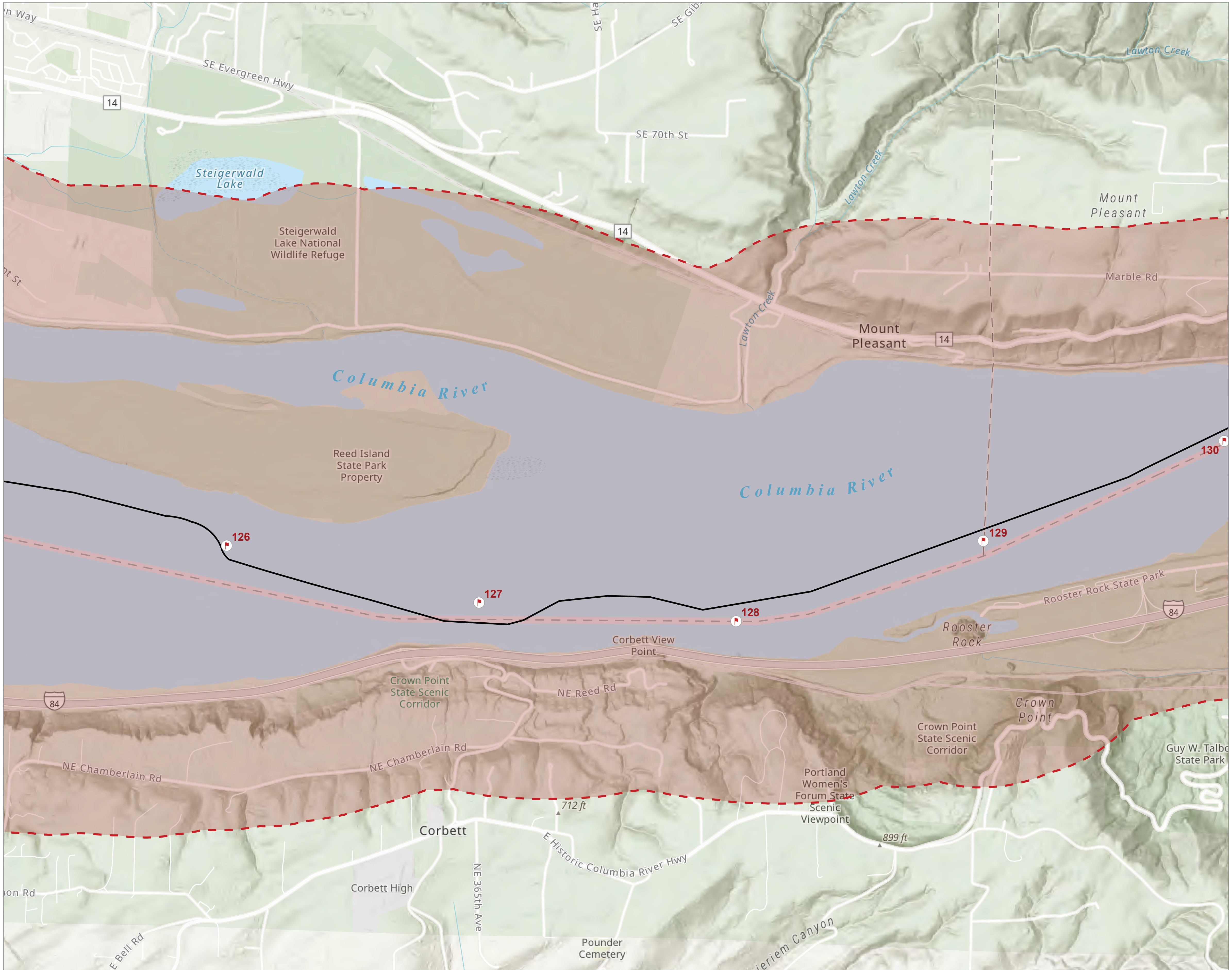


Figure 3 SFAM
Project Alignment
Page 9 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HYDROPLOW
DOWNSTREAM PROXIMAL ASSESSMENT AREA
DOWNSTREAM EXTENDED ASSESSMENT AREA

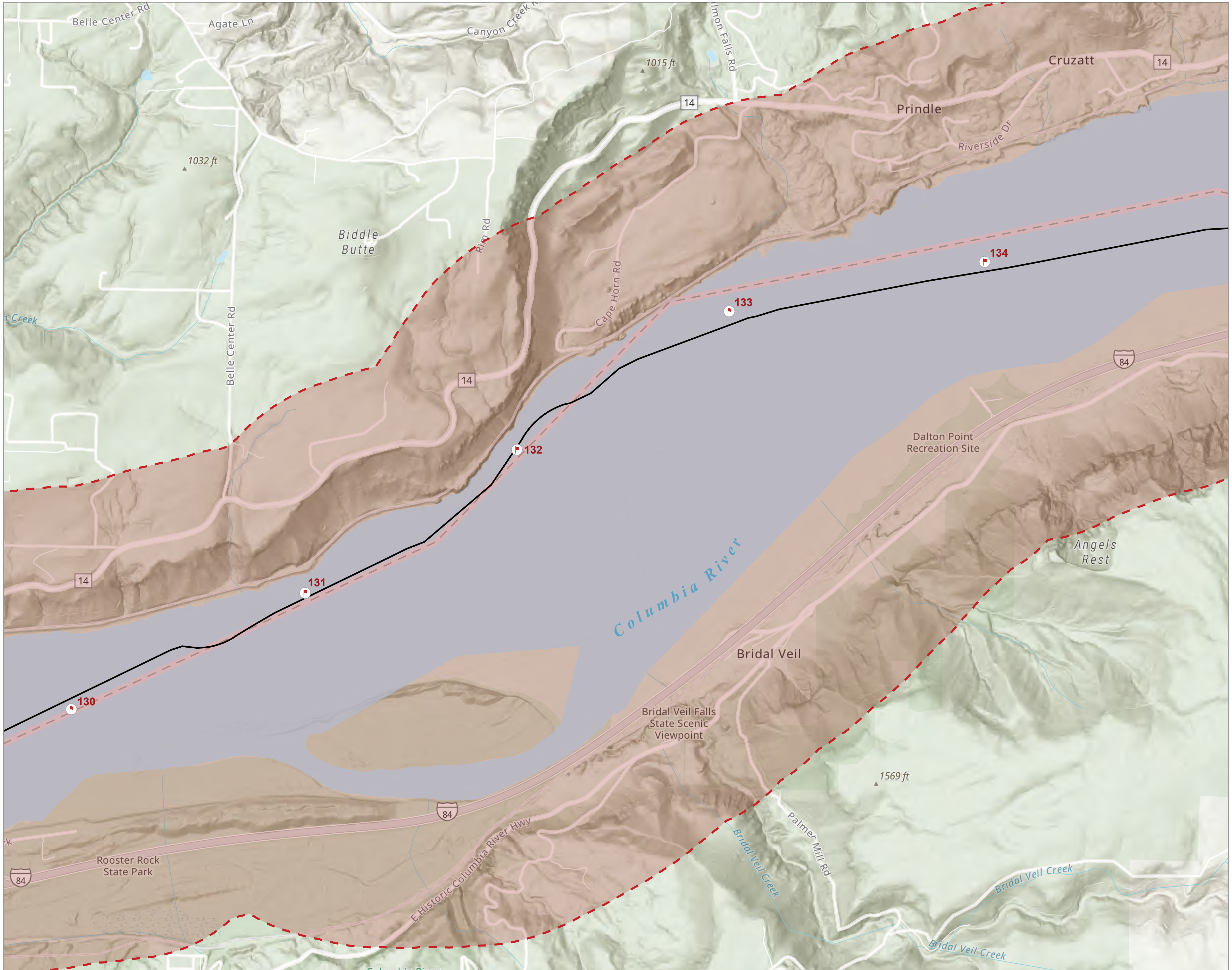
CASCADE RENEWABLE TRANSMISSION

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment
Page 10 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING



RIVER MILES (USACE)

PROPOSED ALIGNMENT - HYDROPLOW

DOWNSTREAM PROXIMAL ASSESSMENT AREA

DOWNSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

0 0.5 mi

1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

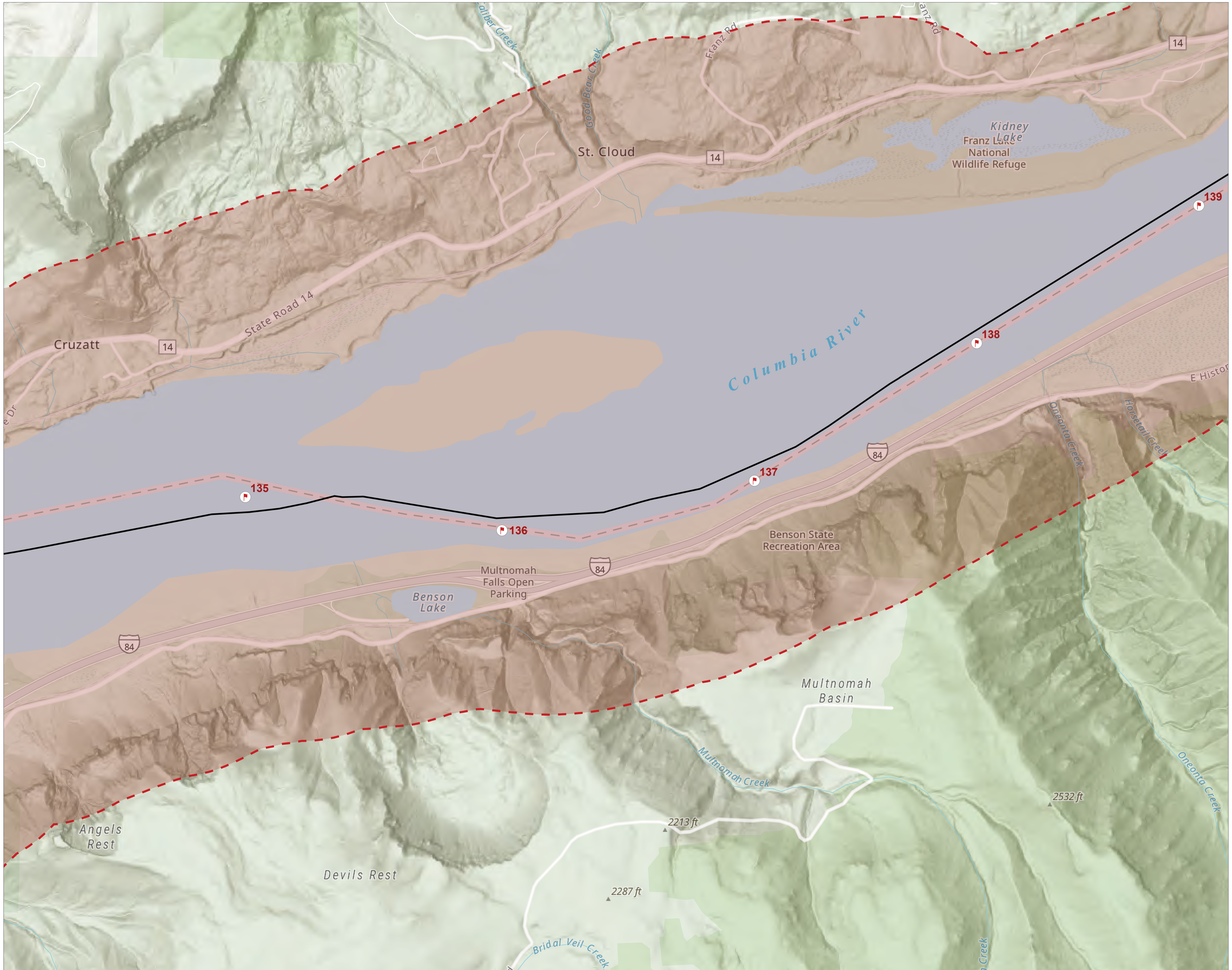


Figure 3 SFAM
Project Alignment
Page 11 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)

PROPOSED ALIGNMENT - HYDROPLOW

DOWNSTREAM PROXIMAL ASSESSMENT AREA

DOWNSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

0 0.5 mi

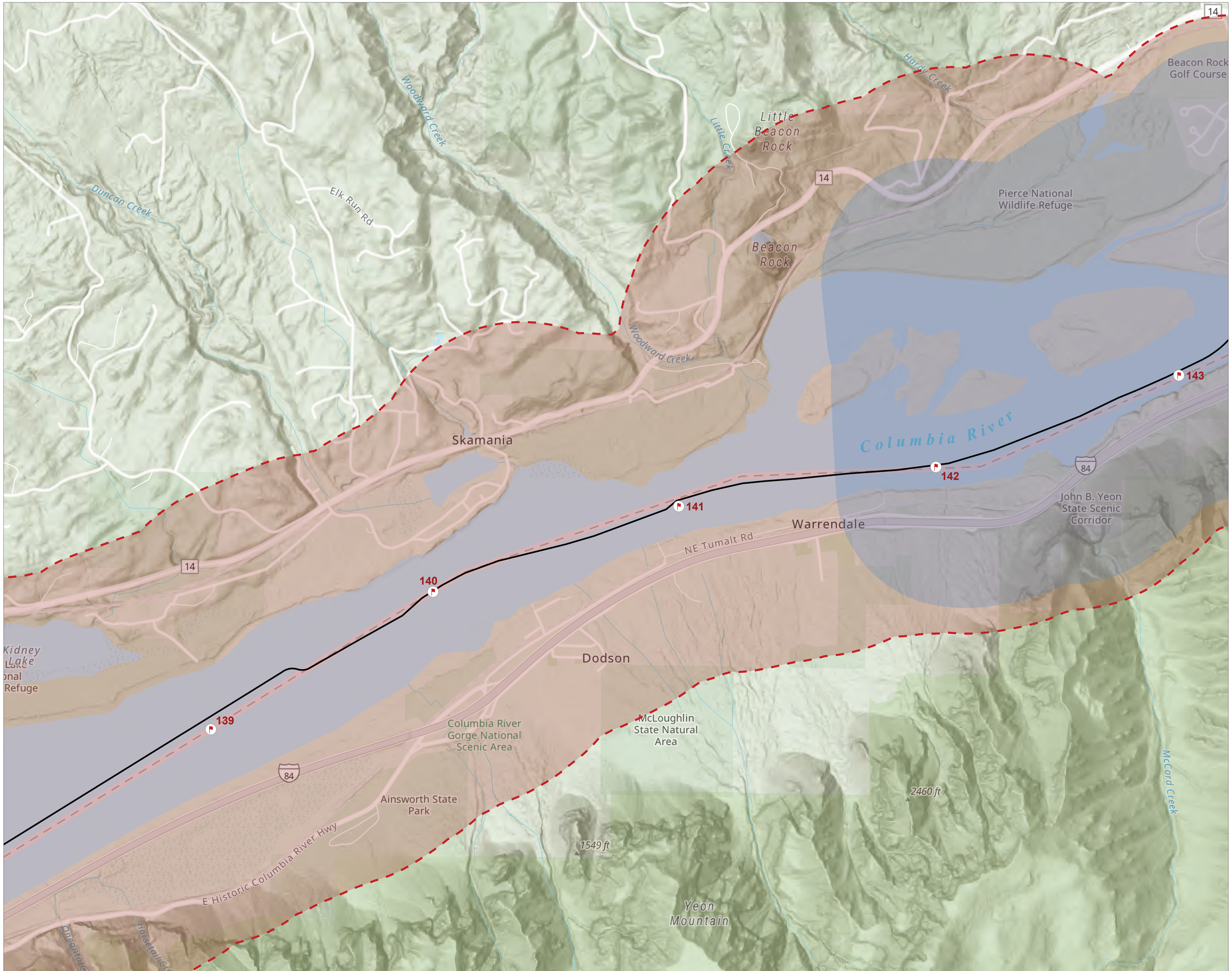
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment
Page 12 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HYDROPLOW
UPSTREAM EXTENDED ASSESSMENT AREA
DOWNSTREAM PROXIMAL ASSESSMENT AREA
DOWNSTREAM EXTENDED ASSESSMENT AREA



CASCADE RENEWABLE TRANSMISSION

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

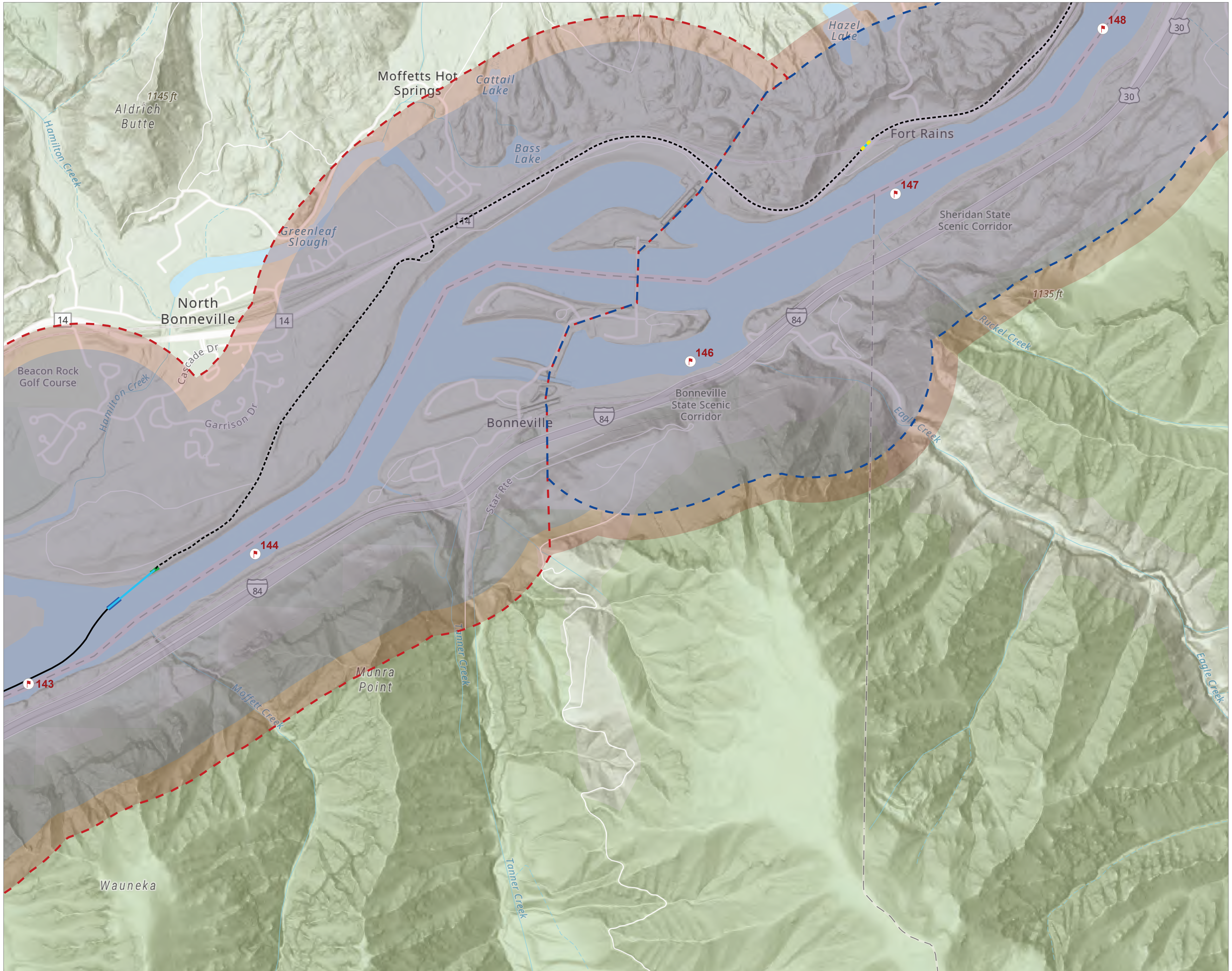


Figure 3 SFAM
Project Alignment
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FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HDD
PROPOSED ALIGNMENT - HYDROPLOW
PROPOSED ALIGNMENT - UPLAND INSTALLATION (E.G., TRENCHING)
TEMPORARY 3-SIDED WET COFFERDAM
TEMPORARY HORIZONTAL AUGER BORE (HAB)
TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
UPSTREAM PROXIMAL ASSESSMENT AREA
UPSTREAM EXTENDED ASSESSMENT AREA
DOWNSTREAM PROXIMAL ASSESSMENT AREA
DOWNSTREAM EXTENDED ASSESSMENT AREA

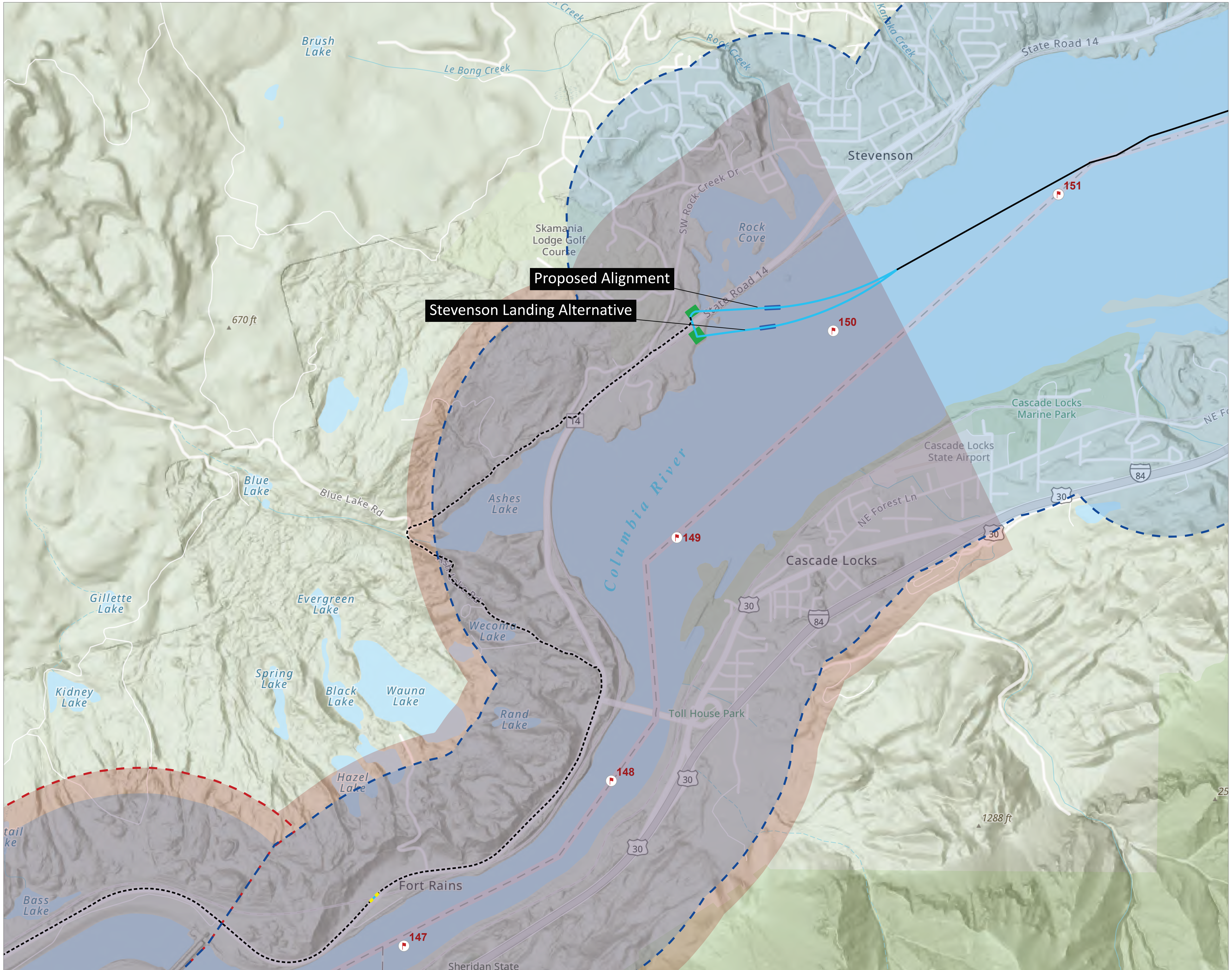
CASCADE RENEWABLE TRANSMISSION

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment
Page 14 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING



- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HDD
- PROPOSED ALIGNMENT - HYDROPLOW
- PROPOSED ALIGNMENT - UPLAND INSTALLATION (E.G., TRENCHING)
- TEMPORARY 3-SIDED WET COFFERDAM
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- UPSTREAM PROXIMAL ASSESSMENT AREA
- UPSTREAM EXTENDED ASSESSMENT AREA
- DOWNSTREAM PROXIMAL ASSESSMENT AREA
- DOWNSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

HDR

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

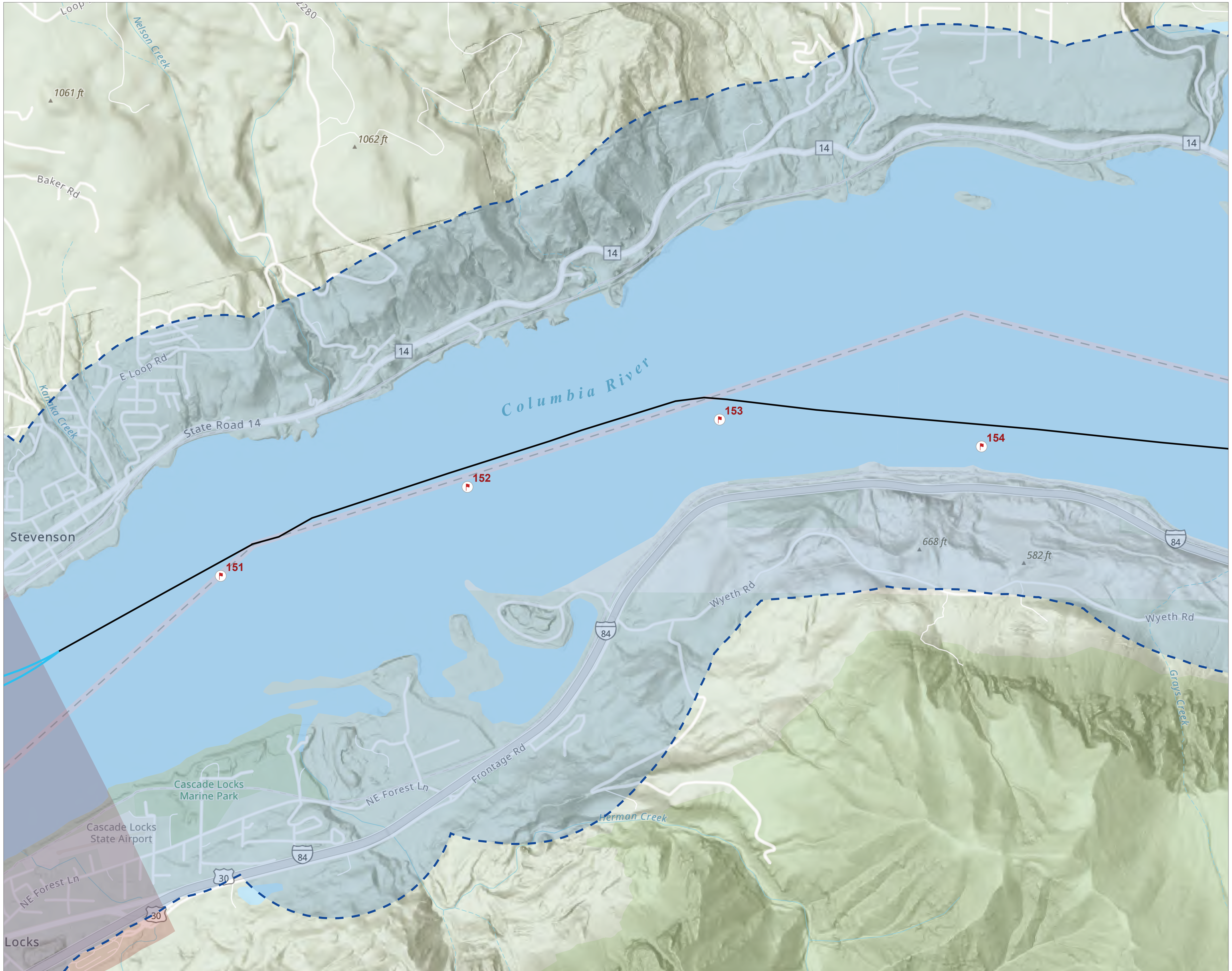


Figure 3 SFAM
Project Alignment
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FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HDD
PROPOSED ALIGNMENT - HYDROPLOW
UPSTREAM PROXIMAL ASSESSMENT AREA
UPSTREAM EXTENDED ASSESSMENT AREA
DOWNSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment
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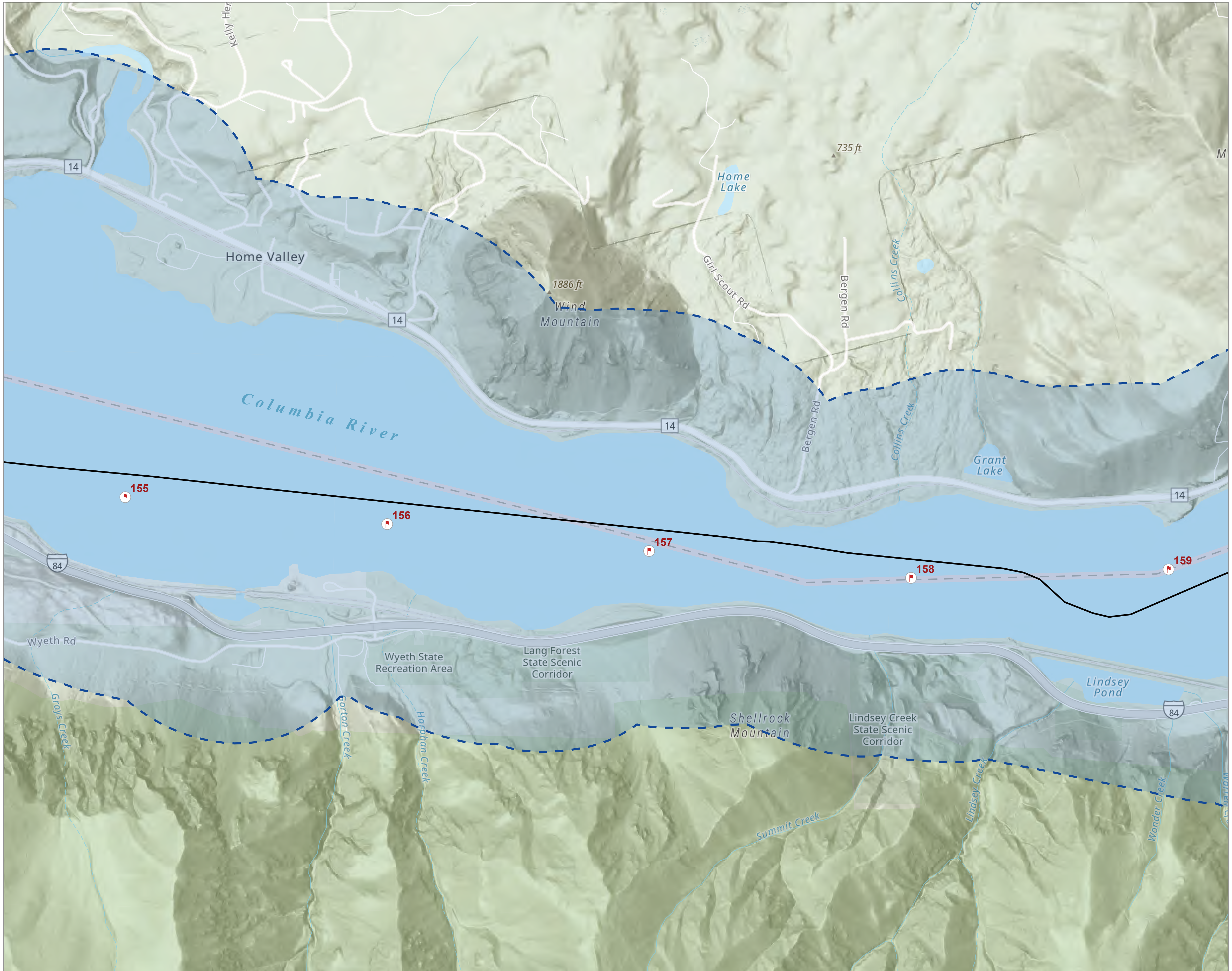
FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HYDROPLOW
UPSTREAM PROXIMAL ASSESSMENT AREA
UPSTREAM EXTENDED ASSESSMENT AREA



CASCADE RENEWABLE TRANSMISSION

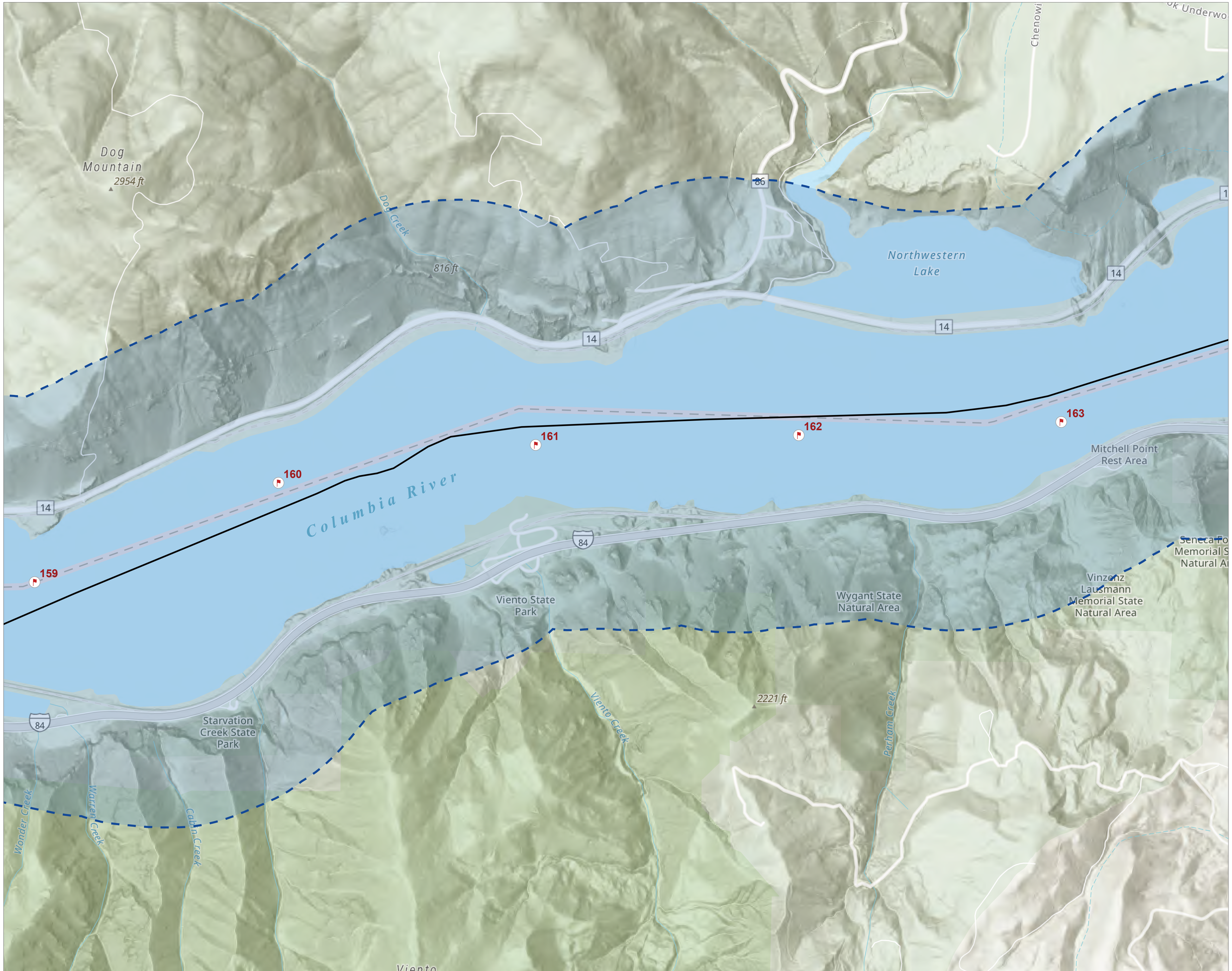
0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

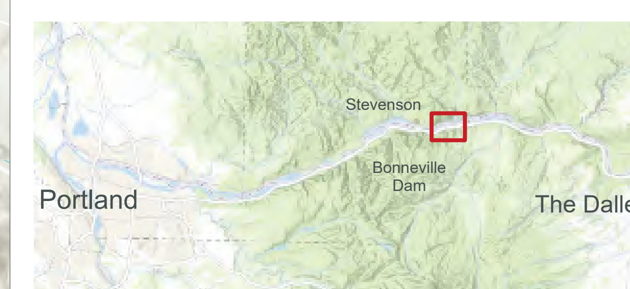
Figure 3 SFAM
Project Alignment
Page 17 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HYDROPLOW
UPSTREAM PROXIMAL ASSESSMENT AREA
UPSTREAM EXTENDED ASSESSMENT AREA



CASCADE RENEWABLE TRANSMISSION



HDR

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment
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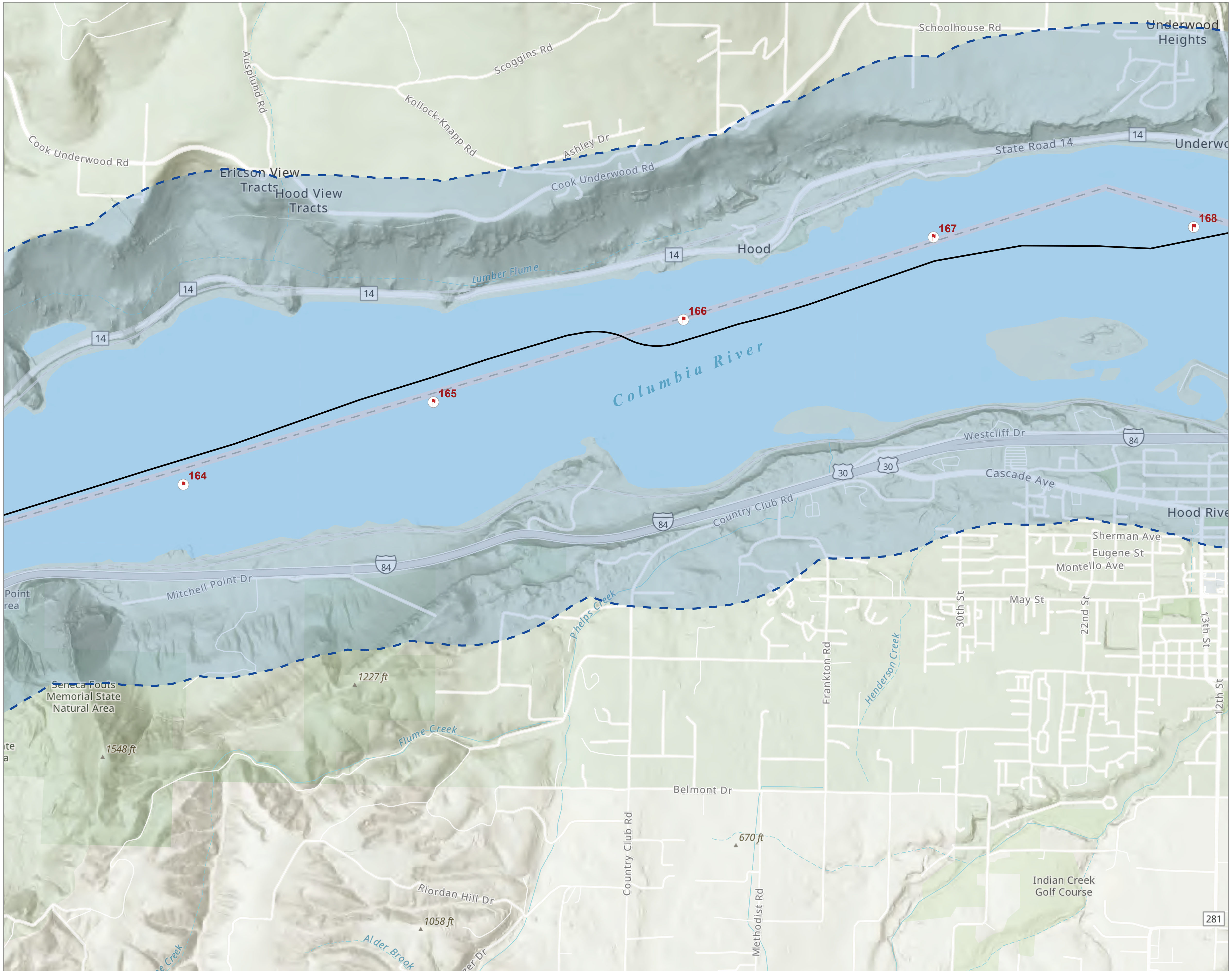
FOR INFORMATION ONLY - CONCEPT DRAWING



RIVER MILES (USACE)

PROPOSED ALIGNMENT - HYDROPLOW

UPSTREAM PROXIMAL ASSESSMENT AREA

UPSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

0 0.5 mi

1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment
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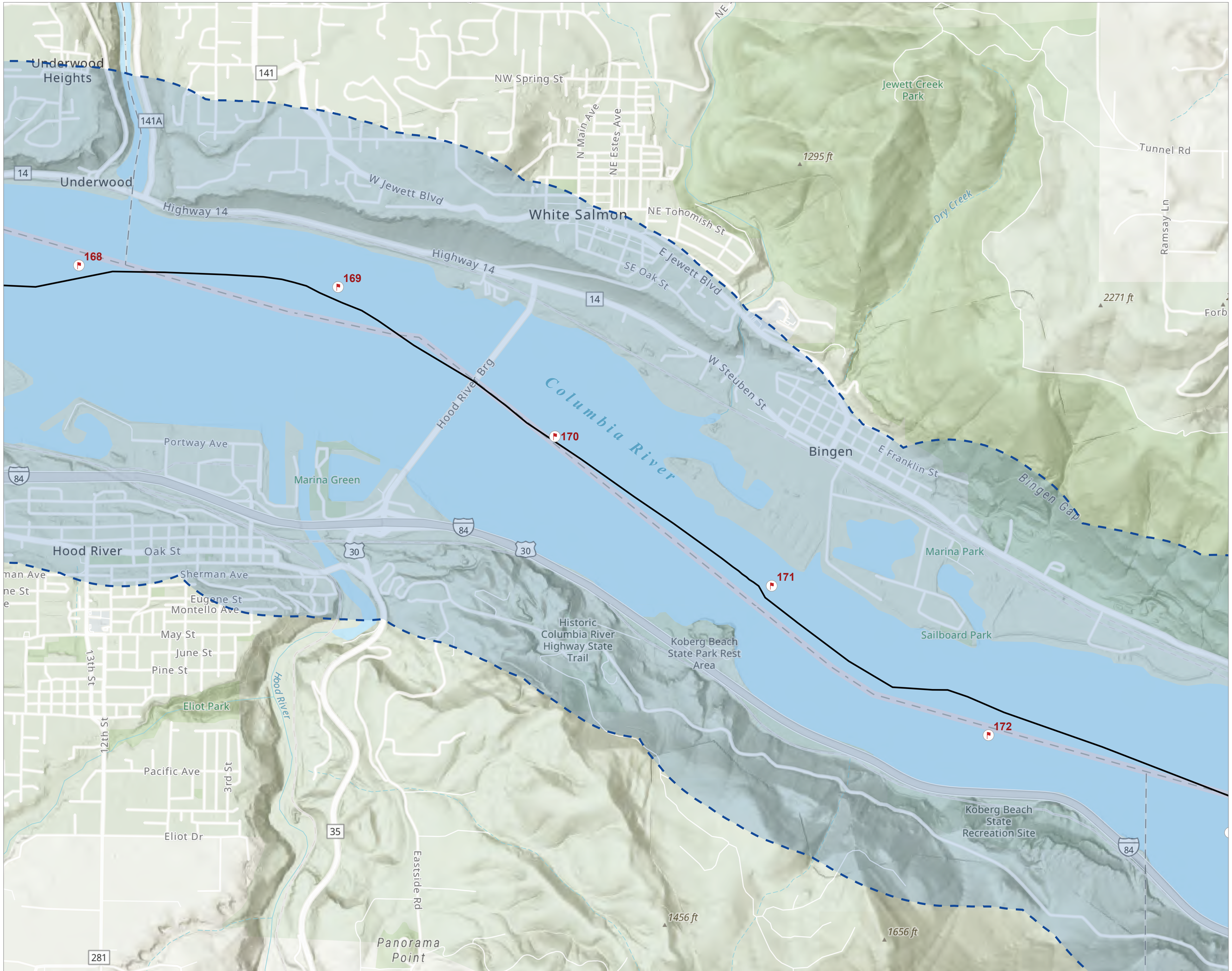
FOR INFORMATION ONLY - CONCEPT DRAWING



- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HYDROPLOW
- UPSTREAM PROXIMAL ASSESSMENT AREA
- UPSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

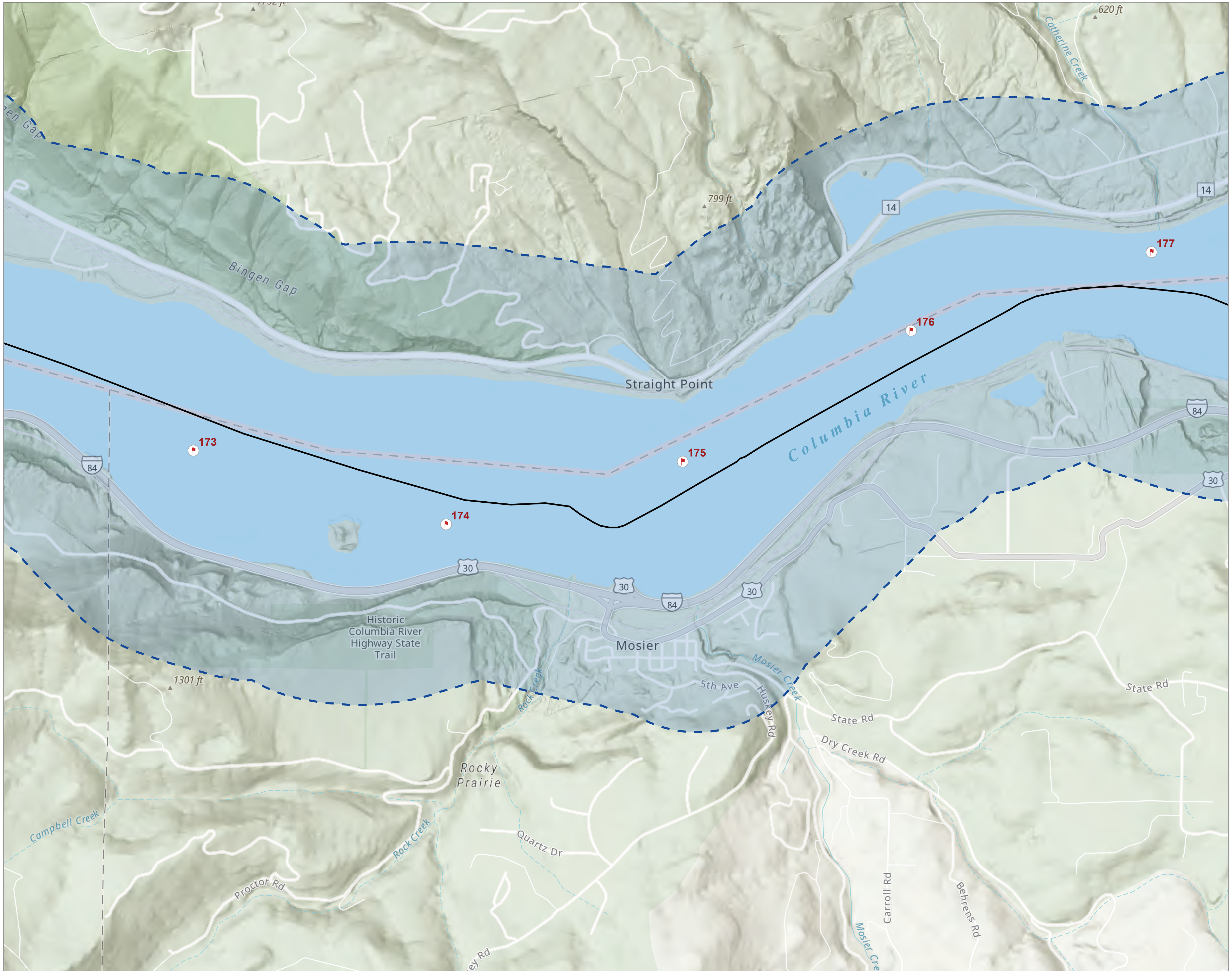


Figure 3 SFAM
Project Alignment
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FOR INFORMATION ONLY - CONCEPT DRAWING

RIVER MILES (USACE)
PROPOSED ALIGNMENT - HYDROPLOW
UPSTREAM PROXIMAL ASSESSMENT AREA
UPSTREAM EXTENDED ASSESSMENT AREA

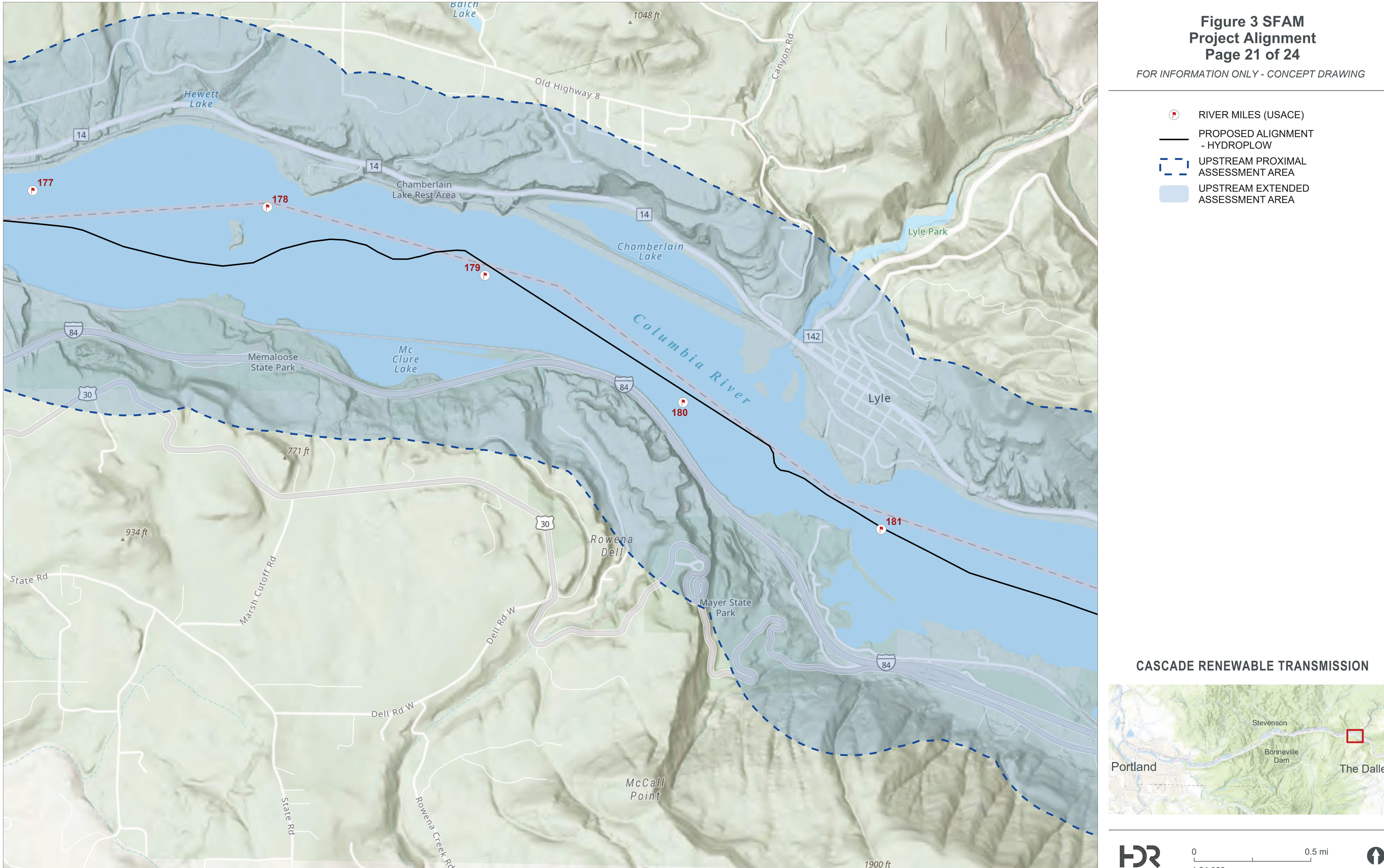
CASCADE RENEWABLE TRANSMISSION

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment
Page 21 of 24

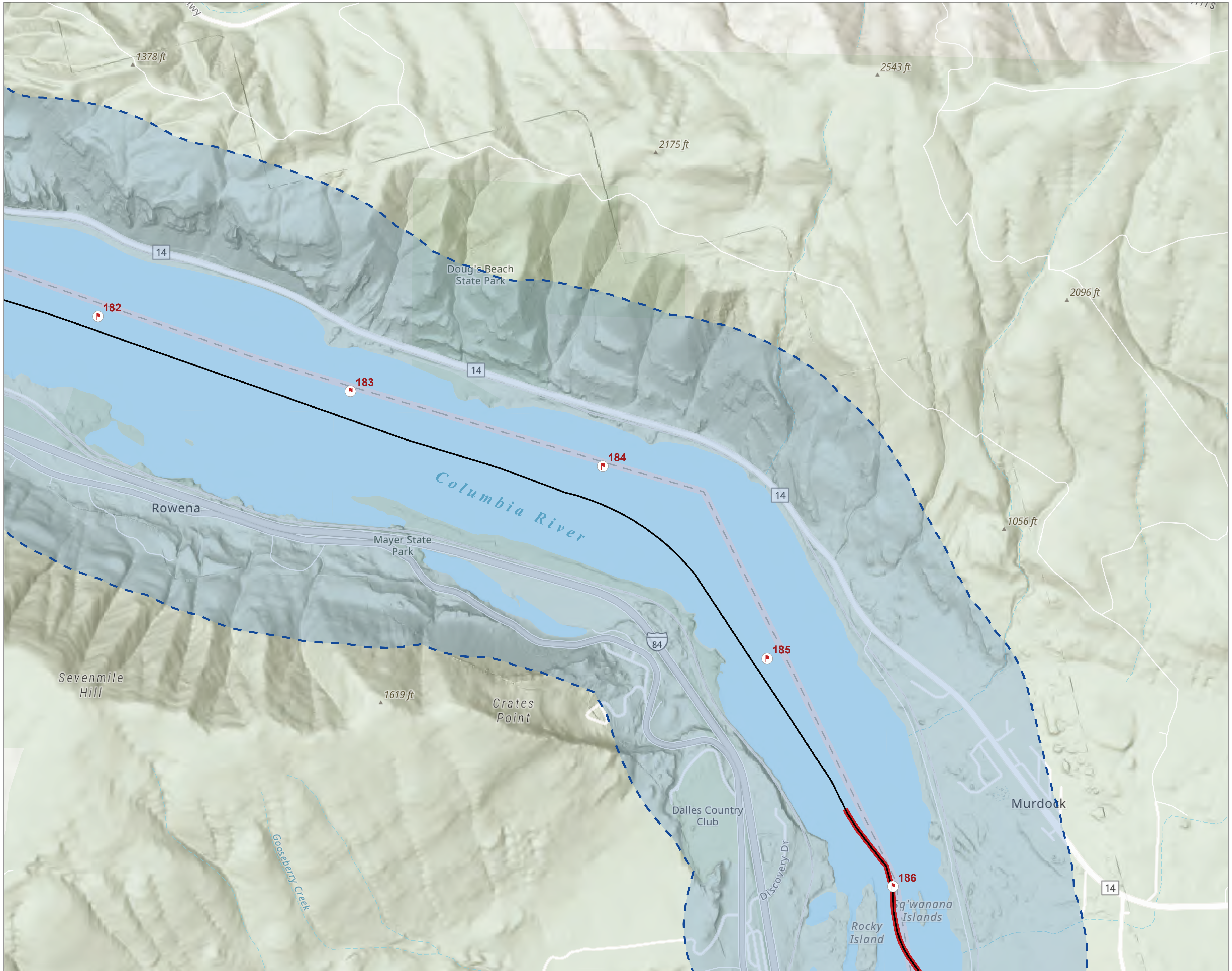
FOR INFORMATION ONLY - CONCEPT DRAWING



6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment
Page 22 of 24

FOR INFORMATION ONLY - CONCEPT DRAWING



RIVER MILES (USACE)
PROPOSED ALIGNMENT - HYDROPLOW
CABLE PROTECTION AREA
UPSTREAM PROXIMAL ASSESSMENT AREA
UPSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

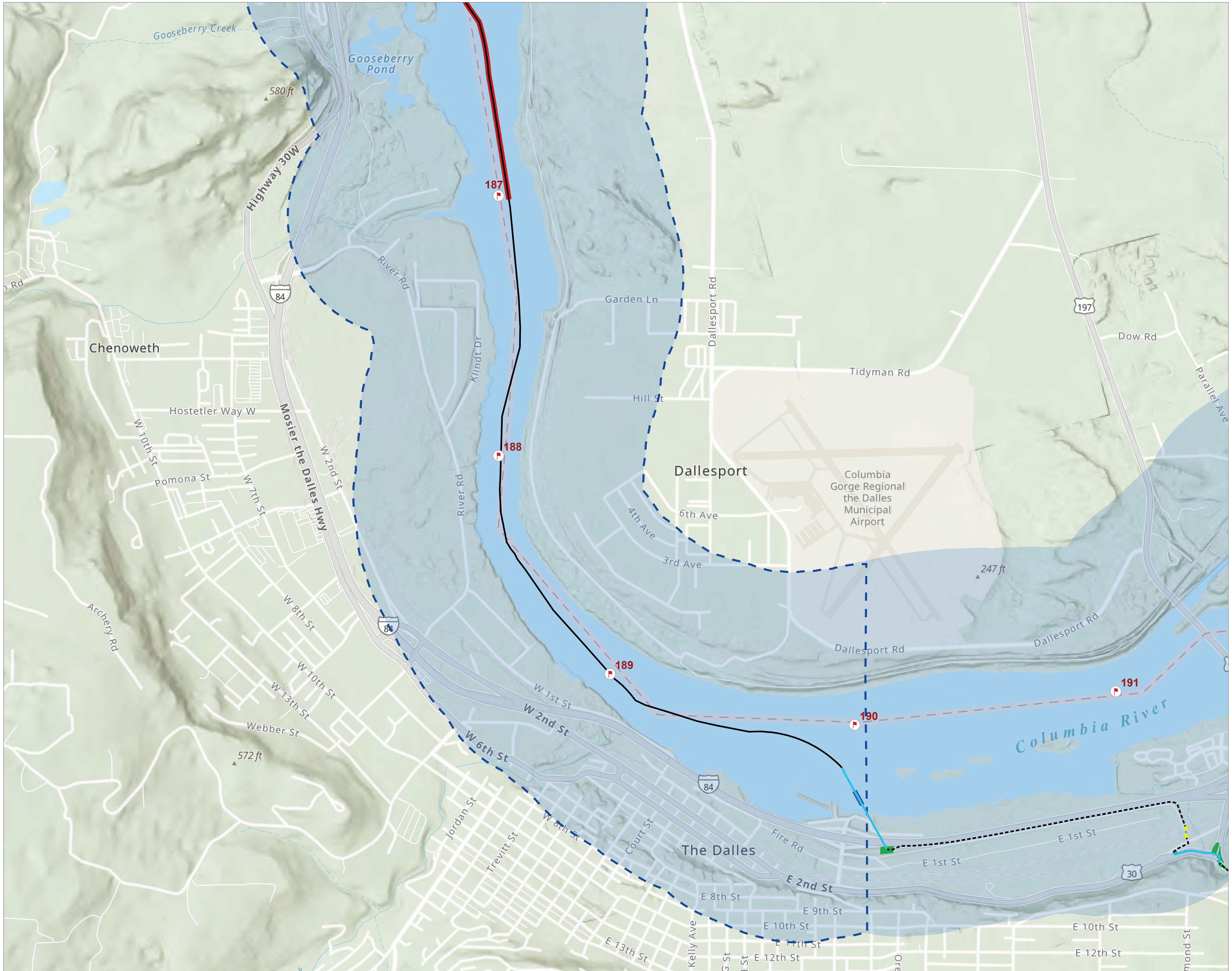
HDR

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Figure 3 SFAM
Project Alignment

FOR INFORMATION ONLY - CONCEPT DRAWING



- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HDD
- PROPOSED ALIGNMENT - HYDROPLOW
- PROPOSED ALIGNMENT - UPLAND INSTALLATION (E.G., TRENCHING)
- CABLE PROTECTION AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- UPSTREAM PROXIMAL ASSESSMENT AREA
- UPSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

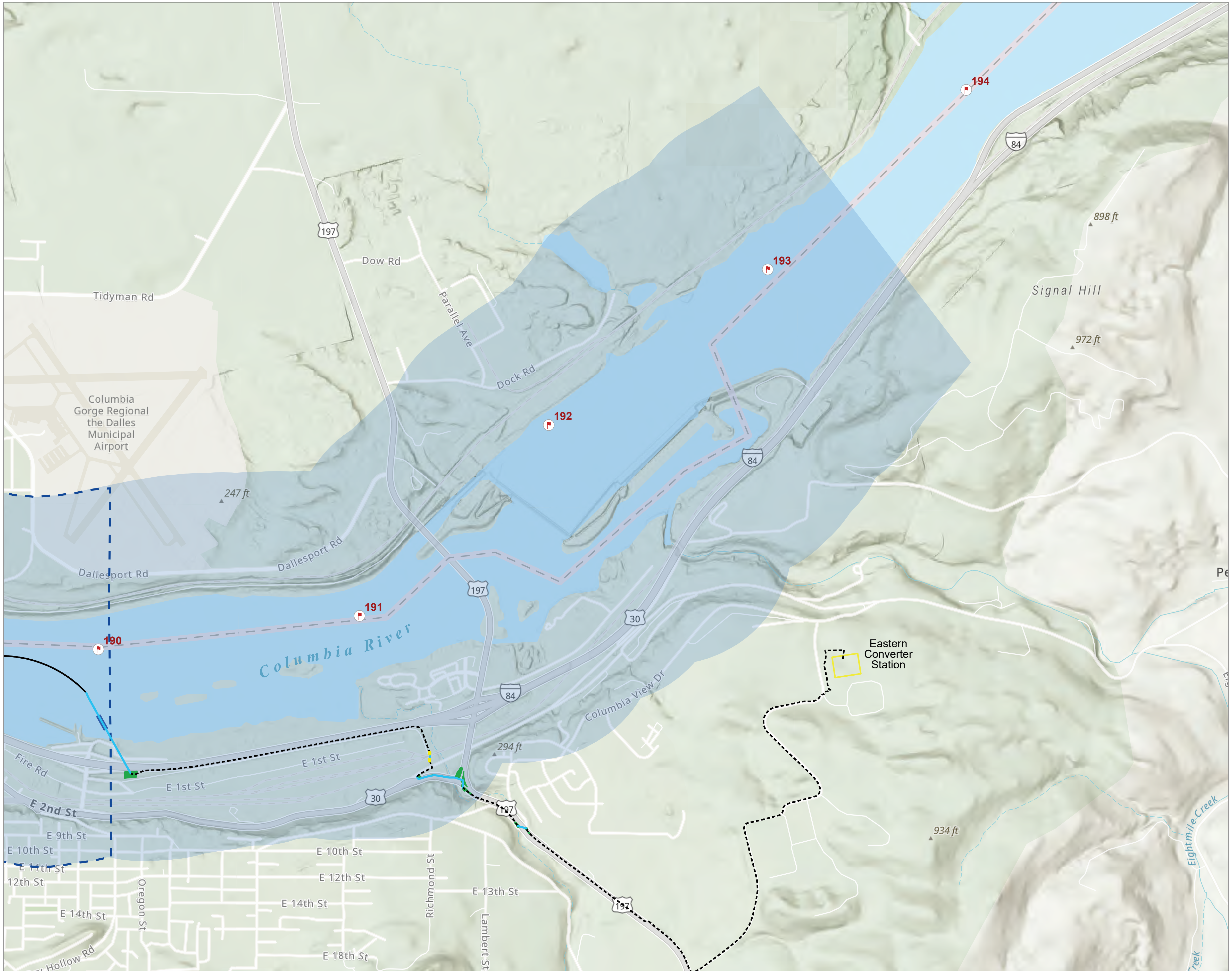


Figure 3 SFAM
Project Alignment
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FOR INFORMATION ONLY - CONCEPT DRAWING

- RIVER MILES (USACE)
- PROPOSED ALIGNMENT - HDD
- PROPOSED ALIGNMENT - HYDROPLOW
- PROPOSED ALIGNMENT - UPLAND INSTALLATION (E.G., TRENCHING)
- CONVERTER STATION
- TEMPORARY 3-SIDED WET COFFERDAM
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- UPSTREAM PROXIMAL ASSESSMENT AREA
- UPSTREAM EXTENDED ASSESSMENT AREA

CASCADE RENEWABLE TRANSMISSION

0 0.5 mi
1:24,000

6/27/2024 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR, USACE Navigation Survey (2020 - 2023).

Attachment B. SFAM Reports and Workbooks

CRTS UPA

OREGON EXPLORER

Stream Function Assessment Method (SFAM) Report

Report Generated: February 23, 2024 04:35 PM

Location Information

Latitude	45.7139 N	Longitude	-121.5605 W
Elevation	74 ft	Level III Ecoregion	Eastern Cascades Slopes and Foothills
HUC8	17070105 Middle Columbia-Hood		
HUC10	1707010511 Mosier Creek-Columbia River		
HUC12	170701051106 Grays Creek-Columbia River		
Linear ft of stream in HUC8	239,501	Annual precipitation	34 in

Stream Type and Classifications

Stream Classification	Mountain Wet / Locally Mountain Dry	Percent of project area	100.00%
Aquifer permeability	High	Soil permeability	High
Gradient	>6%	Erodibility	Moderately_Erodible

Stream classifications and associated attributes are derived from a U.S. Environmental Protection Agency stream classification geospatial data layer developed for Oregon (2015). This layer provides a statewide stream/watershed classification system for streams and rivers of various sizes, based in part on a hydrologic landscape classification system.

Report Generated: February 23, 2024 04:35 PM

Rare Species Scores and Special Habitat Designations

Rare Species Type	Maximum score	Sum Score	Rating
Non-anadromous Fish Species	0	0	None
Amphibian & Reptile Species	0.36	0.36	Intermediate
Feeding Waterbirds	0	0	None
Songbirds, Raptors, and Mammals	0.6	3.16	High
Invertebrate Species	0.6	2.76	Low
Plant Species	0.85	0.85	Intermediate

Scores have taken into account several factors for each rare species record contained in the official database of the Oregon Biodiversity Information Center (ORBIC): (a) the regional rarity of the species, (b) their proximity to the point of interest, and (c) the “certainty” that ORBIC assigns to each of those records.

Within 300 ft of a Special Protected Area?	Yes
Within a HUC12 that has designated Essential Salmonid Habitat?	Yes
Within 2 miles of an Important Bird Area?	Yes

Water Quality Impairments

Mosier Creek

Status	Impairment
Cat 3B: Insufficient data, potential concern	Alkalinity
Cat 4A: Water quality limited, TMDL approved	Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD), Temperature, Temperature
Cat 5: Water quality limited, 303(d) list, TMDL needed	DDE 4,4', Methylmercury, Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), Dissolved Oxygen, Iron (total), DDE 4,4', Thallium, Temperature

Stream Function Assessment Method (SFAM) Report

Report Generated: February 23, 2024 04:35 PM

Water quality information is derived from Oregon's 2022 Integrated Report, including the list of water quality limited waters needing Total Maximum Daily Loads (303d List). Each record in the report is assigned an assessment category based on an evaluation of water quality information. Categories included in the SFAM Report are:

Category 5: *Water is water quality limited and a TMDL is needed; Section 303(d) list.*

Category 4: *Water is impaired or threatened but a TMDL is not needed because: (A) the TMDL is approved, (B) other pollution requirements are in place, or (C) the impairment (such as flow or lack of flow) is not caused by a pollutant.*

Category 3B: *Water quality is of potential concern; some data indicate non-attainment of a criterion, but data are insufficient to assign another category.*

Dominant soil type(s)			
Soil Type	Erosion Hazard Rating	Hydric Rating	Percent Area
Water (s8369)	Null	No	18.92%
Water	Not rated	Unranked	18.11%
Water	Not rated	Unranked	15.44%
Zygore-Wilhoit-Moe-Fernwood (s6389)	Null	No	9.49%
Yallani-Ketchly-Bins-Bindle (s6452)	Null	No	6.31%
Rock outcrop-Xeropsamments complex	Not rated	No	4.94%
Wyeth very gravelly loam, 45 to 75 percent slopes	Severe	No	2.60%
Wyeth very gravelly loam, 45 to 75 percent slopes	Severe	No	2.55%
Rock outcrop-Xeropsamments complex	Not rated	No	2.12%
Rock outcrop-Rubble land complex	Not rated	No	1.90%

Stream Function Assessment Method (SFAM) Report

Report Generated: February 23, 2024 05:03 PM

Location Information

Latitude	45.5983 N	Longitude	-122.5868 W
Elevation	5 ft	Level III Ecoregion	Willamette Valley
HUC8	17080003 Lower Columbia-Clatskanie		
HUC10	1708000302 Hayden Island-Columbia River		
HUC12	170800030200 Hayden Island-Columbia River		
Linear ft of stream in HUC8	183,727	Annual precipitation	42 in

Stream Type and Classifications

Stream Classification	Transitional Wet Rain High Permeability	Percent of project area	100.00%
Aquifer permeability	High	Soil permeability	High
Gradient	>6%	Erodibility	Easily_Erodible

Stream classifications and associated attributes are derived from a U.S. Environmental Protection Agency stream classification geospatial data layer developed for Oregon (2015). This layer provides a statewide stream/watershed classification system for streams and rivers of various sizes, based in part on a hydrologic landscape classification system.

Stream Function Assessment Method (SFAM) Report

Report Generated: February 23, 2024 05:03 PM

Rare Species Scores and Special Habitat Designations

Rare Species Type	Maximum score	Sum Score	Rating
Non-anadromous Fish Species	0	0	None
Amphibian & Reptile Species	0.6	2.22	High
Feeding Waterbirds	0	0	None
Songbirds, Raptors, and Mammals	0.45	0.75	Intermediate
Invertebrate Species	0.6	5.1	Low
Plant Species	1	6.25	High

Scores have taken into account several factors for each rare species record contained in the official database of the Oregon Biodiversity Information Center (ORBIC): (a) the regional rarity of the species, (b) their proximity to the point of interest, and (c) the “certainty” that ORBIC assigns to each of those records.

Within 300 ft of a Special Protected Area?	Yes
Within a HUC12 that has designated Essential Salmonid Habitat?	Yes
Within 2 miles of an Important Bird Area?	Yes

Water Quality Impairments

Willamette River

Status	Impairment
Cat 3B: Insufficient data, potential concern	Chlorophyll-a, Lead, Aluminum, Alkalinity, Aluminum, Aquatic Weeds
Cat 4A: Water quality limited, TMDL approved	Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD), Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD), Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD), Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD), Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD), Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD),

	Methylmercury, Dioxin (2,3,7,8-TCDD), Methylmercury
Cat 5: Water quality limited, 303(d) list, TMDL needed	DDE 4,4', Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs), Copper, DDE 4,4', Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), DDE 4,4', Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), DDE 4,4', Methylmercury, Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), pH, Arsenic, Inorganic, DDE 4,4', Polychlorinated Biphenyls (PCBs), DDE 4,4', Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs), Temperature, DDD 4,4', DDE 4,4', pH, Temperature, Alkalinity, Iron (total), Copper, Dissolved Oxygen, BioCriteria, Temperature, Aldrin, DDE 4,4', Dieldrin, Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs), Harmful Algal Blooms, Cyanide

Water quality information is derived from Oregon’s 2022 Integrated Report, including the list of water quality limited waters needing Total Maximum Daily Loads (303d List). Each record in the report is assigned an assessment category based on an evaluation of water quality information. Categories included in the SFAM Report are:
Category 5: Water is water quality limited and a TMDL is needed; Section 303(d) list.
Category 4: Water is impaired or threatened but a TMDL is not needed because: (A) the TMDL is approved, (B) other pollution requirements are in place, or (C) the impairment (such as flow or lack of flow) is not caused by a pollutant.
Category 3B: Water quality is of potential concern; some data indicate non-attainment of a criterion, but data are insufficient to assign another category.

Report Generated: February 23, 2024 05:03 PM

Dominant soil type(s)			
Soil Type	Erosion Hazard Rating	Hydric Rating	Percent Area
Water	Not rated	Unranked	56.23%
Pilchuck-Urban land complex, 0 to 3 percent slopes	Slight	No	4.58%
Pilchuck-Urban land complex, 0 to 3 percent slopes	Slight	No	4.26%
Sauvie silt loam	Slight	Yes	3.34%
Sauvie silt loam	Slight	Yes	2.15%
Pilchuck sand	Slight	No	1.86%
Sauvie silt loam	Slight	Yes	1.56%
Rafton silt loam	Slight	Yes	1.38%
Pilchuck sand	Slight	No	1.30%
Multnomah silt loam, 3 to 8 percent slopes	Moderate	No	1.24%

This report contains both centroid-based and polygon-based data. The Location Information section of the report contains centroid-based data (determined by the center point of the polygon), while the remaining sections are polygon-based (determined from the entire polygon).

The rare species results in this report are based on a subset of the ORBIC rare species dataset. The SFAM tool only reports on rare species that meet the following criteria: wetland habitat species that are tracked by ORBIC, excluding historical or extirpated sites or those with low mapping accuracy. More information about specific sites and additional species can be obtained from ORBIC through data requests, see https://inr.oregonstate.edu/orbic/data-requests for details.

DPA

Stream Function Assessment Method (SFAM) Report

Report Generated: February 23, 2024 05:03 PM

Location Information

Latitude	45.5983 N	Longitude	-122.5868 W
Elevation	5 ft	Level III Ecoregion	Willamette Valley
HUC8	17080003 Lower Columbia-Clatskanie		
HUC10	1708000302 Hayden Island-Columbia River		
HUC12	170800030200 Hayden Island-Columbia River		
Linear ft of stream in HUC8	183,727	Annual precipitation	42 in

Stream Type and Classifications

Stream Classification	Transitional Wet Rain High Permeability	Percent of project area	100.00%
Aquifer permeability	High	Soil permeability	High
Gradient	>6%	Erodibility	Easily_Erodible

Stream classifications and associated attributes are derived from a U.S. Environmental Protection Agency stream classification geospatial data layer developed for Oregon (2015). This layer provides a statewide stream/watershed classification system for streams and rivers of various sizes, based in part on a hydrologic landscape classification system.

Stream Function Assessment Method (SFAM) Report

Report Generated: February 23, 2024 05:03 PM

Rare Species Scores and Special Habitat Designations

Rare Species Type	Maximum score	Sum Score	Rating
Non-anadromous Fish Species	0	0	None
Amphibian & Reptile Species	0.6	2.22	High
Feeding Waterbirds	0	0	None
Songbirds, Raptors, and Mammals	0.45	0.75	Intermediate
Invertebrate Species	0.6	5.1	Low
Plant Species	1	6.25	High

Scores have taken into account several factors for each rare species record contained in the official database of the Oregon Biodiversity Information Center (ORBIC): (a) the regional rarity of the species, (b) their proximity to the point of interest, and (c) the “certainty” that ORBIC assigns to each of those records.

Within 300 ft of a Special Protected Area?	Yes
Within a HUC12 that has designated Essential Salmonid Habitat?	Yes
Within 2 miles of an Important Bird Area?	Yes

Water Quality Impairments

Willamette River

Status	Impairment
Cat 3B: Insufficient data, potential concern	Chlorophyll-a, Lead, Aluminum, Alkalinity, Aluminum, Aquatic Weeds
Cat 4A: Water quality limited, TMDL approved	Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD), Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD), Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD), Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD), Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD), Temperature, Total Dissolved gas, Dioxin (2,3,7,8-TCDD),

	Methylmercury, Dioxin (2,3,7,8-TCDD), Methylmercury
Cat 5: Water quality limited, 303(d) list, TMDL needed	DDE 4,4', Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs), Copper, DDE 4,4', Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), DDE 4,4', Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), DDE 4,4', Methylmercury, Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), pH, Arsenic, Inorganic, DDE 4,4', Polychlorinated Biphenyls (PCBs), DDE 4,4', Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs), Temperature, DDD 4,4', DDE 4,4', pH, Temperature, Alkalinity, Iron (total), Copper, Dissolved Oxygen, BioCriteria, Temperature, Aldrin, DDE 4,4', Dieldrin, Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs), Harmful Algal Blooms, Cyanide

Water quality information is derived from Oregon’s 2022 Integrated Report, including the list of water quality limited waters needing Total Maximum Daily Loads (303d List). Each record in the report is assigned an assessment category based on an evaluation of water quality information. Categories included in the SFAM Report are:
Category 5: Water is water quality limited and a TMDL is needed; Section 303(d) list.
Category 4: Water is impaired or threatened but a TMDL is not needed because: (A) the TMDL is approved, (B) other pollution requirements are in place, or (C) the impairment (such as flow or lack of flow) is not caused by a pollutant.
Category 3B: Water quality is of potential concern; some data indicate non-attainment of a criterion, but data are insufficient to assign another category.

Report Generated: February 23, 2024 05:03 PM

Dominant soil type(s)			
Soil Type	Erosion Hazard Rating	Hydric Rating	Percent Area
Water	Not rated	Unranked	56.23%
Pilchuck-Urban land complex, 0 to 3 percent slopes	Slight	No	4.58%
Pilchuck-Urban land complex, 0 to 3 percent slopes	Slight	No	4.26%
Sauvie silt loam	Slight	Yes	3.34%
Sauvie silt loam	Slight	Yes	2.15%
Pilchuck sand	Slight	No	1.86%
Sauvie silt loam	Slight	Yes	1.56%
Rafton silt loam	Slight	Yes	1.38%
Pilchuck sand	Slight	No	1.30%
Multnomah silt loam, 3 to 8 percent slopes	Moderate	No	1.24%

This report contains both centroid-based and polygon-based data. The Location Information section of the report contains centroid-based data (determined by the center point of the polygon), while the remaining sections are polygon-based (determined from the entire polygon).

The rare species results in this report are based on a subset of the ORBIC rare species dataset. The SFAM tool only reports on rare species that meet the following criteria: wetland habitat species that are tracked by ORBIC, excluding historical or extirpated sites or those with low mapping accuracy. More information about specific sites and additional species can be obtained from ORBIC through data requests, see https://inr.oregonstate.edu/orbic/data-requests for details.

Stream Function Assessment Method (SFAM) Report

Report Generated: February 23, 2024 04:35 PM

This report contains both centroid-based and polygon-based data. The Location Information section of the report contains centroid-based data (determined by the center point of the polygon), while the remaining sections are polygon-based (determined from the entire polygon).

The rare species results in this report are based on a subset of the ORBIC rare species dataset. The SFAM tool only reports on rare species that meet the following criteria: wetland habitat species that are tracked by ORBIC, excluding historical or extirpated sites or those with low mapping accuracy. More information about specific sites and additional species can be obtained from ORBIC through data requests, see https://inr.oregonstate.edu/orbic/data-requests *for details.*

STREAM FUNCTION ASSESSMENT METHOD for OREGON

Version 1.1 (April 2020)

Name of Project Area:	CRTS - Bonneville Dam to The Dalles	**Date of Field Assessment:**	N/A	**Latitude*:**	N/A
Data Collector:		**Elevation:** (SFAM Report)	74	**Longitude*:**	N/A
					** near center of the project site*
Project Number:	N/A	**Project Area Length (feet):**	N/A	**Project Area (acres):**	N/A
Assessment timing:		**Photo Numbers:**	N/A		

What is the Oregon Stream Classification for the project area? Select from drop-down menu. Refer to the SFAM Report. If the project area spans more than one reach, describe the dominant stream classification.				Mountain Wet/Locally Mountain Dry
What ratings does the Oregon Stream Classification identify for the following measures in the local hydrologic unit? Refer to the SFAM Report. If project area spans more than one reach, describe the dominant classification:				
Aquifer Permeability (local)	High	Soil Permeability (local)	High	
Erodibility (local)	Moderately Erodible	Gradient*	> 6%	*If EPA Classification is different from the gradient you observe in the local reach, select the gradient in the local reach.

Is the channel perennial, intermittent, or ephemeral? (Map Viewer-NHD Flowline)		
Which Level III EPA Ecoregion is the site located in? (SFAM Report)	Eastern Cascades Slopes and Foothills	Western Mountains
Is the average width of the stream less than or greater than 50 feet? (User Input)	> 50 feet	Large
What is the 2 year peak flood (cfs)? (StreamStats Report)		
What is the size of the drainage area (mi^2)? (StreamStats Report)		

External Data: List below the persons and/or agencies that provided location information on rare wildlife species, and/or rare plants, and the date the information was gathered (if known).

N/A

Project Area History: Based on conversation with landowner/manager and other information, describe below the years and extent (% of project area) of past and present management actions (e.g., vegetation control), natural disturbances (e.g., fire, insect infestations), and human-associated disturbances (e.g., grazing regimes).

N/A

Assessment Notes: Note any special features of the reach or landscape, problems with scoring, or other information that may be relevant.

N/A

STREAM FUNCTION ASSESSMENT METHOD for OREGON

Name of Project Area:	CRTS - Bonneville Dam to The Dalles	Assessment Timing:		Enter Data in These Boxes ONLY / Scores Automatically Calculated in Green Boxes

VALUES MEASURES TABLE

FILL IN THE YELLOW BOXES. Most questions contain drop-down menus in their respective answer box. Select an answer from the drop-down menus, when possible, instead of typing an answer.

Measure	Function Groups	Submeasure	Measure Abbreviation	Qualifiers		Data Entry			Measure Score
V1 **Rare Species Occurrence & Special Habitat Designations**	**Are there rare species or special habitat designations in the vicinity of the PA ?** Answer each submeasure using information from the site's SFAM report (rare species scores & special habitat designations section), as well as any available survey data for the PA and its vicinity, or personal knowledge about the site. Note: The SFAM Report provides rankings of High, Intermediate, Low, or None for each category of rare species associated with aquatic and riparian habitat. Upgrade a ranking to High if there is a recent (within 5 years) onsite observation of any of these species by a qualified observer under conditions similar to what now occur. Provide references in the external notes section of the cover page. *Values informed: Surface Water Storage, Flow Variation, Substrate Mobility, Maintain Biodiversity, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation, Thermal Regulation*								
	Essential salmonid habitat or rare non-anadromous fish species:								
	Hydrology, Geomorphology, Biology, Water Quality	Fish	Fish		Is the PA within a HUC12 that has designated Essential Salmonid Habitat (ESH)? Select yes or no.	Yes			1.00
					According to the site's SFAM Report, what is the "non-anadromous fish" score? Select an answer from the dropdown menu:	None/Not Known			
	Rare amphibian and reptile species:								
	Hydrology, Geomorphology, Biology, Water Quality	Rare Amphibians and Reptiles	RarAmRep		According to the site's SFAM Report, what is the "amphibian and reptile" score? Select an answer from the dropdown menu:	Intermediate			0.50
	Important Bird Areas or rare waterbirds:								
	Biology, Water Quality	Waterbirds	Waterbird		Is there an Important Bird Area (IBA) within a 2-mile radius of the PA?	Yes			1.00
					According to the site's SFAM Report, what is the "feeding waterbird" score? Select an answer from the dropdown menu:	None/Not Known			
	Rare songbirds, raptors, and mammals:								
	Biology, Water Quality	Rare Bird and Mammals	RarBdMm		According to the site's SFAM Report, what is the "songbird, raptor and mammal" score? Select an answer from the dropdown menu:	High			1.00
	Rare invertebrate species:								
	Hydrology, Geomorphology, Biology, Water Quality	Rare Invertebrates	RarInvert		According to the site's SFAM Report, what is the "invertebrates" score? Select an answer from the dropdown menu:	Low			0.25
	Rare plant species:								
	Geomorphology, Biology, Water Quality	Rare Plants	RarPlant		According to the site's SFAM Report, what is the "plant" score? Select an answer from the dropdown menu:	Intermediate			0.50
V2 **Water Quality Impairments**	**Is this reach on the 303(d) list or other TMDL (Categories 3B-5) for any of the following impairments: sediment, nutrient, metals & toxics, temperature, or flow modification?** Answer each submeasure using information from the site's SFAM Report (water quality impairments section). *Values informed: Flow Variation, Sediment Continuity, Create & Maintain Habitat, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation, Thermal Regulation*								
	Sediment impairment: total suspended solids (TSS), sedimentation, or turbidity (note that some sedimentation can be naturally occurring and desirable therefore does not constitute a problem)								
	Geomorphology, Water Quality	Sedimentation	SedList		Select yes or no from the dropdown menu:	No			0.00
	Nutrient impairment: phosphorus, nitrate, ammonia, DO, aquatic weeds or algae, chlorophyll a, etc.; or untreated stormwater/wastewater discharge occurs within 500 feet of the reach								
	Biology, Water Quality	Nutrient Impairment	NutrImp		Select yes or no from the dropdown menu:	Yes			1.00
	Metals or other toxics impairment: toxics, dioxin, heavy metals (iron, manganese, lead, zinc, etc.); or untreated stormwater/wastewater discharge occurs within 500 feet of the reach								
	Water Quality	Metals & Toxics Impairment	ToxImp		Select yes or no from the dropdown menu:	Yes			1.00
	Temperature impairment:								
	Biology, Water Quality	Temperature Impairment	TempImp		Select yes or no from the dropdown menu:	Yes			1.00
	Flow modification:								
	Hydrology, Biology	Flow Modification	FlowMod		Select yes or no from the dropdown menu:	No			0.00

V3 **Protected Areas**	**<u>Is the PA boundary within 300 feet of a special protected area?</u>** Answer using information from the site's SFAM Report (Within 300 feet of a Special Protected Area) as well as other available data for the PA and its vicinity. Note: The SFAM Report evaluates whether BLM Areas of Critical Environmental Concern (ACEC) or Outstanding Natural Areas (ONA), federal Research Natural Areas (RNA) or Special Interest Areas (SIA), Natural Heritage Conservation Areas (NHCA), and Land Trust and Nature Conservancy Preserves are within 300 feet of the PA. If there are other lands within 300 feet of the site that are protected specifically for their high ecological significance, select yes and provide references in the assessment notes section of the cover page. *Values informed: Maintain Biodiversity, Sustain Trophic Structure*								
	Biology		Protect		Select yes or no from the dropdown menu:	Yes			1.00
V4 **Impervious Area**	**<u>What is the percent impervious area in the drainage basin?</u>** Answer using information from the site's StreamStats Report (IMPERV). *Values informed: Surface Water Storage, Flow Variation, Sediment Continuity, Substrate Mobility, Create & Maintain Habitat, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation, Thermal Regulation*								
	Hydrology, Geomorphology, Biology, Water Quality		ImpArea		<10%, select A; 10-25%, select B; >25-60%, select C; >60%, select D.	B			0.30
V5 **Riparian Area**	**<u>What is the percentage of intact riparian area within 2 miles upstream of the PA</u> ?** Intact refers to a riparian area with forest or otherwise unmanaged (i.e. natural) perennial cover appropriate for the basin that is at least 15 ft wide on both sides of the channel. Unmanaged perennial cover is vegetation that includes wooded areas, native prairies, sagebrush, vegetated wetlands, as well as relatively unmanaged commercial lands in which the ground and vegetation is disturbed less than annually, such as lightly grazed pastures, timber harvest areas, and rangeland. It does not include water, pasture, row crops (e.g., vegetable, orchards, Christmas tree farms), lawns, residential areas, golf courses, recreational fields, pavement, bare soil, rock, bare sand, or gravel or dirt roads. *Values informed: Create & Maintain Habitat, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation, Thermal Regulation*								
	Biology, Water Quality		RipArea		If >50% select A. If >35-50%, select B. If 15-35%, select C. If <15%, select D.	B			0.70
V6 **Extent of Downstream Floodplain Infrastructure**	**<u>What is the extent of infrastructure (buildings, bridges, utilities, row crops) in the floodplain</u> ?** Consider the floodplain area between the PA and either the next largest water body (large tributary, mainstem junction, lake, etc.) or 2 miles downstream, whichever is less. *Values informed: Surface Water Storage, Sediment Continuity, Create & Maintain Habitat, Sustain Trophic Structure*								
	Hydrology, Geomorphology, Biology		DwnFP		If >50% of total area, select A. If 1-50% of total area, select B. If none, select C. If not known or the downstream floodplain is not mapped, select D.	B			0.50
V7 **Zoning**	**<u>What is the dominant zoned land use designation downstream of the PA?</u>** Consider the floodplain area between the PA and either the next largest water body (larger tributary, mainstem junction, lake, etc.) or 2 miles downstream, whichever is less. *Values informed: Surface Water Storage, Create & Maintain Habitat, Sustain Trophic Structure*								
	Hydrology, Biology		Zoning		If developed (commercial, industrial, residential, etc.), select A. If agriculture or rural residential, select B. If forest, open space, or public lands, select C. If not zoned or no information, select D.	C			0.00
V8 **Frequency of Downstream Flooding**	**<u>What is the frequency of downstream flooding?</u>** Consider the floodplain area between the PA and either the next largest water body or 2 miles, whichever is less. Determine the frequency of flooding downstream of the PA that affects infrastructure (i.e. affects use of the site or causes economic loss). *Values informed: Surface Water Storage*								
	Hydrology		DwnFld		If frequent (several times a year), select A. If moderate (up to once a year), select B. If infrequent (only large events), select C. If never or not known, select D.	D			0.00

V9 **Impoundments**	**What is the prevalence of impoundments within 2 miles upstream and downstream of the PA that are likely to cause shifts in timing or volume of water?** The shift may be by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times, more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). For each category, select yes or no from the dropdown menu. *Values informed: Surface Water Storage, Flow Variation, Sediment Continuity, Substrate Mobility, Create & Maintain Habitat; Functions informed: Flow Variation*								
	Hydrology, Geomorphology, Biology		Impound		Are there 1-2 small dams or other impoundments **upstream** of the PA?	Yes	Upstream impoundments subscore:		0.00
					Are there >2 small impoundments, 1 or more large dams or other impoundments **upstream** of the PA?	Yes			
					Are there 1-2 small dams or other impoundments **downstream** of the PA?	No	Downstream impoundments subscore:		0.00
					Are there >2 small impoundments, 1 or more large dams or other impoundments **downstream** of the PA?	Yes			
V10 **Fish Passage Barriers**	**Are there man-made fish passage barriers within 2 miles upstream and/or downstream of the PA ?** Select an answer from the drop-down menu for each of the upstream and downstream directions. If more than one barrier is present, answer for the one with the most restricted level of passage (e.g. Blocked). Do not include natural barriers. *Values informed: Maintain Biodiversity, Sustain Trophic Structure*								
	Biology		Passage	Slope barrier	Upstream	Passable	1.00		0.75
					Downstream	Partial	0.50		
V11 **Water Source**	**Is there an area that is of special concern for drinking water sources or groundwater recharge within 2 miles downstream of the PA?** This includes any of the following: the source area for a surface-water drinking water source; the source area for a groundwater drinking water source; a designated Groundwater Management Area; a designated Sole Source Aquifer. *Values informed: Sub/Surface Transfer, Nutrient Cycling, Chemical Regulation*								
	Hydrology, Water Quality		Source		Select yes or no from the dropdown menu:	No			0.00
V12 **Surrounding Land Cover**	**What are the land cover types surrounding the PA?** Draw a 2 mile radius around the PA. Provide an estimate of the percentage of area within the resulting polygon that matches each land cover description. Enter 0% if none. Enter 1% if barely present. Must sum to 100%. *Values informed: Maintain Biodiversity, Sustain Trophic Structure*								
	Biology		SurrLand		Unmanaged vegetation (wetland, native grassland, forest) or water	67	× 1.00	67.00	0.72
					Managed vegetation (pasture, regularly watered lawn (i.e. park), row crops, orchards)	10	× 0.50	5.00	
					None of the above (including bare areas [dirt, rock], roads, energy facilities, residential, commercial, industrial)	23	× 0.00	0.00	
					SUM	100			
V13 **Riparian Continuity**	**What is the longitudinal extent of intact riparian area that is contiguous to the PA?** Select the longest length of contiguous riparian corridor in either the upstream or downstream direction, but do not include the PA length itself. Intact refers to a riparian area with forest or otherwise managed (i.e. natural) perennial cover appropriate for the basin that is at least 15 ft wide on both sides of the channel. Contiguous means there are no > 100 ft gaps in forested cover or unmanaged perennial cover. Unmanaged perennial cover is vegetation that includes wooded areas, native prairies, sagebrush, vegetated wetlands, as well as relatively unmanaged commercial lands in which the ground and vegetation is disturbed less than annually, such as lightly grazed pastures, timber harvest areas, and rangeland. It does not include water, pasture, row crops (e.g., vegetable, orchards, Christmas tree farms), lawns, residential areas, golf courses, recreational fields, pavement, bare soil, rock, bare sand, or gravel or dirt roads. *Values informed: Maintain Biodiversity, Create & Maintain Habitat, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation, Thermal Regulation*								
	Biology, Water Quality		RipCon		If <100 feet, select A. If 100-500 feet, select B. If >500 feet, select C.	B			0.50
V14 **Watershed Position**	**What is the relative position of the PA in its HUC 8 watershed?** Answer this question looking at position of the PA relative to the 8-digit HUC layer. • If the PA is (a) closer to the watershed's outlet than its upper end and (b) closer to the large stream/river exiting the watershed's outlet than it is to the boundary of the watershed, select "lower 1/3." • If the PA is (a) closer to the watershed's upper end than its outlet and (b) closer to the watershed's boundary than its large stream/river, select "upper 1/3." • If neither of the above conditions are met, select "middle 1/3." *Values informed: Sediment Continuity, Nutrient Cycling, Chemical Regulation*								
	Geomorphology, Water Quality		Position		Select an answer from the dropdown menu:	Lower 1/3			1.00

V15 **Flow Restoration Needs**	**What is the "streamflow restoration need" ranking of the watershed within which the PA is located?** Answer this question using the Flow Restoration Needs layer in the SFAM Map Viewer. *Values informed: Flow Variation, Create & Maintain Habitat*								
	Hydrology, Biology		FlowRest		Select an answer from the dropdown menu:	Not Ranked or Low			0.00
V16 **Unique Habitat Features**	**Are there rare aquatic habitat features within the EAA that are not common to the rest of the drainage basin ?** For each feature type, select yes or no from the dropdown menu. This question must be answered in the field, but the user can check for any mapped wetlands or seeps, springs, or tributaries in the office using the Oregon Wetlands Cover, Springs, and the Flowline layers, respectively. *Values informed: Substrate Mobility, Maintain Biodiversity, Create & Maintain Habitat, Sustain Trophic Structure, Thermal Regulation*								
	Geomorphology, Biology		HabFeat		Large log jams that span 25% or more of the active channel width?	No		Overall HabFeat score	1.00
					Braided channel or otherwise multiple channels resulting in islands?	Yes			
					Large spatial extent (>30%) of wetlands in the floodplain?	No		Substrate subscore	0.50
					Seeps, springs, or tributaries contributing colder water?	Yes		Thermal subscore	0.50
Already in Stream Classification on Cover Page - NO DATA INPUT REQUIRED.									
Surface Water Runoff	**What is the level of surface water runoff (based on local water availability and local gradient)?** No data input necessary, information taken from EPA classification (stream type & gradient).								
	Hydrology		Runoff						0.50
Aquifer Permeability	**What is the permeability of the aquifer (determined by percent permeable bedrock based on hydraulic conductivity m/day)?** No data input necessary, information taken from EPA classification.								
	Hydrology		AqPerm			High			0.00
Soil Permeability	**What is the permeability of the soil (based on hydraulic conductivity in cm/hr)?** No data input necessary, information taken from EPA classification.								
	Hydrology		SoilPerm			High			0.00
Erodibility	**What is the erodibility of this reach?** No data input necessary, information taken from EPA classification.								
	Geomorphology		Erode			Moderately Erodible			0.00

FUNCTIONS			
Function	Measure Name	Measure Score	Function Score
SWS	OBFlow	0.00	2.70
	Incision	0.50	
	Exclusion	0.20	
	BedVar	0.48	
	Wood	0.31	
	SideChan	0.03	
SST	OBFlow	0.00	2.53
	WetVeg	0.50	
	SideChan	0.03	
	BedVar	0.48	
FV	BedVar	0.48	2.44
	Embed	0.25	
	ImpoundUS	0.00	
SC	Incision	0.50	6.01
	Erosion	0.30	
	LatMigr	1.00	
SM	Armor	0.70	4.77
	Embed	0.25	
	BedVar	0.48	
MB	Barriers	0.50	2.68
	BedVar	0.48	
	Wood	0.31	
	SideChan	0.03	
	InvVeg	0.67	
	WoodyVeg	0.24	
	LgTree	0.18	
	WetVeg	0.50	

CMH	Exclusion	0.20	
	Wood	0.31	
	Embed	0.25	
	BedVar	0.48	
	WoodyVeg	0.24	
	LgTree	0.18	**1.82**
	Incision	0.50	
	SideChan	0.03	
	Barriers	0.5	
STS	OBFlow	0.00	
	Cover	0.00	
	InvVeg	0.67	
	WoodyVeg	0.24	
	WetVeg	0.50	
			3.09
NC	OBFlow	0.00	
	BedVar	0.48	
	RipWidth	0.66	
	WetVeg	0.50	
	Cover	0.00	**3.29**
CR	RipWidth	0.66	
	BedVar	0.48	
	WetVeg	0.50	
	OBFlow	0.00	
			4.11
TR	Cover	0.00	
			0.00

VALUES					
Value	Measure Name	Measure Score	Opportunity Subscore	Significance Subscore	Value Score
SWS	ImpArea	0.30			
	Runoff	0.50			
	ImpoundUS	0.00			
	DwnFP	0.50	1.33	2.50	**3.83**
	Zoning	0.00			
	DwnFld	0.00			
	Fish	1.00			
SST	AqPerm	0.00			
	SoilPerm	0.00	0.00	0.00	**0.00**
	Source	0.00			
FV	ImpArea	0.30			
	FlowMod	0.00			
	1-ImpoundUS	1.00			
	FlowRest	0.00			
	AqPerm	0.00			
	SoilPerm	0.00	2.17	2.50	**4.67**
	ImpoundDS	0.00			
	RarInvert	0.25			
	RarAmRep	0.50			
	Fish	1.00			
SC	SedList	0.00			
	ImpArea	0.30			
	ImpoundUS	0.00			
	Postion	1.00	0.43	0.83	**1.27**
	1-DwnFP	0.50			
	Erode	0.00			
	ImpoundDS	0.00			
SM	ImpArea	0.30			
	ImpoundUS	0.00			
	SubFeat	0.50			
	Fish	1.00	0.75	3.75	**4.50**
	RarPlant	0.50			
	RarAmRep	0.50			
	RareInvert	0.25			
MB	Passage	0.75			
	SurrLand	0.72			
	RipCon	0.50			
	HabFeat	1.00			
	Protect	1.00			
	Fish	1.00	3.28	5.00	**8.28**
	RarInvert	0.25			
	RarAmRep	0.50			
	Waterbird	1.00			
	RarBdMm	1.00			
	RarPlant	0.50			

CMH	1-ImpArea	0.70	2.90	3.33	**6.23**
	ImpoundUS	0.00			
	RipArea	0.70			
	RipCon	0.50			
	1-NutrImp	0.00			
	1-FlowMod	1.00			
	1-FlowRest	1.00			
	1-DwnFP	0.50			
	1-Zoning	1.00			
	ImpoundDS	0.00			
	HabFeat	1			
STS	SurrLand	0.72	2.41	5.00	**7.41**
	1-ImpArea	0.70			
	Passage	0.75			
	RipArea	0.70			
	RipCon	0.50			
	1-NutrImp	0.00			
	1-TempImp	0.00			
	Protect	1.00			
	1-DwnFP	0.50			
	1-Zoning	1.00			
	Fish	1.00			
	RarInvert	0.25			
	RarAmRep	0.50			
	Waterbird	1.00			
	RarBdMm	1.00			
	RarPlant	0.50			
	HabFeat	1.00			
NC	NutrImp	1.00	4.42	2.50	**6.92**
	ImpArea	0.30			
	1-RipArea	0.30			
	1-RipCon	0.50			
	SedList	0.00			
	Position	1.00			
	Fish	1.00			
	RareInvert	0.25			
	RarAmRep	0.50			
	Source	0.00			
CR	ToxImp	1.00	4.42	2.50	**6.92**
	ImpArea	0.30			
	1-RipArea	0.30			
	1-RipCon	0.50			
	SedList	0.00			
	Position	1.00			
	Fish	1.00			
	RarInvert	0.25			
	RarAmRep	0.50			
	Waterbird	1.00			
	RarBdMm	1.00			
	RarPlant	0.50			
	Source	0.00			
TR	1-TempImp	0.00	0.50	3.75	**4.25**
	RipArea	0.70			
	RipCon	0.50			
	ImpArea	0.30			
	Fish	1.00			
	RarInvert	0.25			
	RarAmRep	0.50			
	ThermFeat	0.50			

STREAM ASSESSMENT SCORES SHEET   Version 1.1   Assessment Timing:

Project Area Name:	CRTS - Bonneville Dam to The Dalles		
Investigator Name:			
Date of Field Assessment:	N/A		
Latitude (decimal degrees):	N/A	Longitude (decimal degrees):	N/A

SPECIFIC FUNCTIONS	Function Score	Function Rating	Value Score	Value Rating
Surface Water Storage (SWS)	2.70	Lower	3.83	Moderate
Sub/Surface Water Transfer (SST)	2.53	Lower	0.00	Lower
Flow Variation (FV)	2.44	Lower	4.67	Moderate
Sediment Continuity (SC)	6.01	Moderate	1.27	Lower
Sediment Mobility (SM)	4.77	Moderate	4.50	Moderate
Maintain Biodiversity (MB)	2.68	Lower	8.28	Higher
Create and Maintain Habitat (CMH)	1.82	Lower	6.23	Moderate
Sustain Trophic Structure (STS)	3.09	Moderate	7.41	Higher
Nutrient Cycling (NC)	3.29	Moderate	6.92	Moderate
Chemical Regulation (CR)	4.11	Moderate	6.92	Moderate
Thermal Regulation (TR)	0.00	Lower	4.25	Moderate

GROUPED FUNCTIONS	REPRESENTATIVE FUNCTION	Function Group Rating	Value Group Rating
Hydrologic Function (SWS, SST, FV)	Surface Water Storage (SWS)	Lower	Moderate
Geomorphic Function (SC, SM)	Sediment Continuity (SC)	Moderate	Lower
Biologic Function (MB, CMH, STS)	Sustain Trophic Structure (STS)	Moderate	Higher
Water Quality Function (NC, CR, TR)	Chemical Regulation (CR)	Moderate	Moderate

Formulas for each specific function and value (shown on Subscores tab) produce a numerical score between 0.0 and 10.0. For ecological functions, a score of 0.0 indicates that negligible function is being provided by the stream whereas a score of 10.0 indicates that the stream is providing maximum function (as defined) given certain contextual factors. For values, a score of 0.0 indicates that there is low opportunity for the site to provide a specific ecological function and that, even if it did, the specific function would not be of particular significance given the context of the site. Conversely, a value score of 10.0 indicates that a site has the opportunity to provide a specific function and that it would be highly significant in that particular location. For all function and value formulas, both extents of the scoring range (0.0 and 10.0) are mathematically possible.

To facilitate conceptual understanding, numerical scores are translated into ratings of Lower, Moderate, or Higher. The numerical thresholds for each of these rating categories are consistent across all functions and values such that scores of <3.0 are rated “Lower,” scores ≥3.0 but ≤7.0 are rated “Moderate,” and scores that are >7.0 are rated “Higher.” These thresholds are consistent with the standard scoring scheme applied to all individual measures.

Each specific function, and its associated value, is included in one of four thematic groups: hydrologic, geomorphic, biologic, and water quality functions. Group ratings provide an indication of the degree to which each group of processes is present at a site. Groups are represented by the highest-rated function with the highest-rated associated value among the 2-3 functions that comprise each group. This hierarchical selection system ensures that thematic functional groups are represented by the highest-performing and highest-valued ecological function.

STREAM FUNCTION ASSESSMENT METHOD for OREGON

Version 1.1 (April 2020)

Name of Project Area:	CRTS - DPA	**Date of Field Assessment:**	N/A	**Latitude*:**	N/A
Data Collector:	N/A	**Elevation:** (SFAM Report)	74	**Longitude*:**	N/A
					** near center of the project site*
Project Number:	N/A	**Project Area Length (feet):**	N/A	**Project Area (acres):**	N/A
Assessment timing:		**Photo Numbers:**	N/A		

What is the Oregon Stream Classification for the project area? Select from drop-down menu. Refer to the SFAM Report. If the project area spans more than one reach, describe the dominant stream classification.	Mountain Wet/Locally Mountain Dry

What ratings does the Oregon Stream Classification identify for the following measures in the local hydrologic unit? Refer to the SFAM Report. If project area spans more than one reach, describe the dominant classification:

Aquifer Permeability (local)	High	Soil Permeability (local)	High	
Erodibility (local)	Moderately Erodible	Gradient*	> 6%	*If EPA Classification is different from the gradient you observe in the local reach, select the gradient in the local reach.

Is the channel perennial, intermittent, or ephemeral? (Map Viewer-NHD Flowline)		
Which Level III EPA Ecoregion is the site located in? (SFAM Report)	Eastern Cascades Slopes and Foothills	Western Mountains
Is the average width of the stream less than or greater than 50 feet? (User Input)	> 50 feet	Large
What is the 2 year peak flood (cfs)? (StreamStats Report)		
What is the size of the drainage area (mi^2)? (StreamStats Report)		

External Data: List below the persons and/or agencies that provided location information on rare wildlife species, and/or rare plants, and the date the information was gathered (if known).

N/A

Project Area History: Based on conversation with landowner/manager and other information, describe below the years and extent (% of project area) of past and present management actions (e.g., vegetation control), natural disturbances (e.g., fire, insect infestations), and human-associated disturbances (e.g., grazing regimes).

N/A

Assessment Notes: Note any special features of the reach or landscape, problems with scoring, or other information that may be relevant.

N/A

STREAM FUNCTION ASSESSMENT METHOD for OREGON

Name of Project Area:	CRTS - DPA	Assessment Timing:		Enter Data in These Boxes ONLY / Scores Automatically Calculated in Green Boxes

VALUES MEASURES TABLE

FILL IN THE YELLOW BOXES. Most questions contain drop-down menus in their respective answer box. Select an answer from the drop-down menus, when possible, instead of typing an answer.

Measure	Function Groups	Submeasure	Measure Abbreviation	Qualifiers		Data Entry			Measure Score
V1 **Rare Species Occurrence & Special Habitat Designations**	**Are there rare species or special habitat designations in the vicinity of the PA ?** Answer each submeasure using information from the site's SFAM report (rare species scores & special habitat designations section), as well as any available survey data for the PA and its vicinity, or personal knowledge about the site. Note: The SFAM Report provides rankings of High, Intermediate, Low, or None for each category of rare species associated with aquatic and riparian habitat. Upgrade a ranking to High if there is a recent (within 5 years) onsite observation of any of these species by a qualified observer under conditions similar to what now occur. Provide references in the external notes section of the cover page. *Values informed: Surface Water Storage, Flow Variation, Substrate Mobility, Maintain Biodiversity, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation, Thermal Regulation*								
	Essential salmonid habitat or rare non-anadromous fish species:								
	Hydrology, Geomorphology, Biology, Water Quality	Fish	Fish		Is the PA within a HUC12 that has designated Essential Salmonid Habitat (ESH)? Select yes or no.	Yes			1.00
					According to the site's SFAM Report, what is the "non-anadromous fish" score? Select an answer from the dropdown menu:	None/Not Known			
	Rare amphibian and reptile species:								
	Hydrology, Geomorphology, Biology, Water Quality	Rare Amphibians and Reptiles	RarAmRep		According to the site's SFAM Report, what is the "amphibian and reptile" score? Select an answer from the dropdown menu:	High			1.00
	Important Bird Areas or rare waterbirds:								
	Biology, Water Quality	Waterbirds	Waterbird		Is there an Important Bird Area (IBA) within a 2-mile radius of the PA?	Yes			1.00
					According to the site's SFAM Report, what is the "feeding waterbird" score? Select an answer from the dropdown menu:	None/Not Known			
	Rare songbirds, raptors, and mammals:								
	Biology, Water Quality	Rare Bird and Mammals	RarBdMm		According to the site's SFAM Report, what is the "songbird, raptor and mammal" score? Select an answer from the dropdown menu:	Intermediate			0.50
	Rare invertebrate species:								
	Hydrology, Geomorphology, Biology, Water Quality	Rare Invertebrates	RarInvert		According to the site's SFAM Report, what is the "invertebrates" score? Select an answer from the dropdown menu:	Low			0.25
	Rare plant species:								
	Geomorphology, Biology, Water Quality	Rare Plants	RarPlant		According to the site's SFAM Report, what is the "plant" score? Select an answer from the dropdown menu:	High			1.00
V2 **Water Quality Impairments**	**Is this reach on the 303(d) list or other TMDL (Categories 3B-5) for any of the following impairments: sediment, nutrient, metals & toxics, temperature, or flow modification?** Answer each submeasure using information from the site's SFAM Report (water quality impairments section). *Values informed: Flow Variation, Sediment Continuity, Create & Maintain Habitat, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation, Thermal Regulation*								
	Sediment impairment: total suspended solids (TSS), sedimentation, or turbidity (note that some sedimentation can be naturally occurring and desirable therefore does not constitute a problem)								
	Geomorphology, Water Quality	Sedimentation	SedList		Select yes or no from the dropdown menu:	No			0.00
	Nutrient impairment: phosphorus, nitrate, ammonia, DO, aquatic weeds or algae, chlorophyll a, etc.; or untreated stormwater/wastewater discharge occurs within 500 feet of the reach								
	Biology, Water Quality	Nutrient Impairment	NutrImp		Select yes or no from the dropdown menu:	Yes			1.00
	Metals or other toxics impairment: toxics, dioxin, heavy metals (iron, manganese, lead, zinc, etc.); or untreated stormwater/wastewater discharge occurs within 500 feet of the reach								
	Water Quality	Metals & Toxics Impairment	ToxImp		Select yes or no from the dropdown menu:	Yes			1.00
	Temperature impairment:								
	Biology, Water Quality	Temperature Impairment	TempImp		Select yes or no from the dropdown menu:	Yes			1.00
	Flow modification:								
	Hydrology, Biology	Flow Modification	FlowMod		Select yes or no from the dropdown menu:	No			0.00

V3 **Protected Areas**	**<u>Is the PA boundary within 300 feet of a special protected area?</u>** Answer using information from the site's SFAM Report (Within 300 feet of a Special Protected Area) as well as other available data for the PA and its vicinity. Note: The SFAM Report evaluates whether BLM Areas of Critical Environmental Concern (ACEC) or Outstanding Natural Areas (ONA), federal Research Natural Areas (RNA) or Special Interest Areas (SIA), Natural Heritage Conservation Areas (NHCA), and Land Trust and Nature Conservancy Preserves are within 300 feet of the PA. If there are other lands within 300 feet of the site that are protected specifically for their high ecological significance, select yes and provide references in the assessment notes section of the cover page. *Values informed: Maintain Biodiversity, Sustain Trophic Structure*								
	Biology		Protect		Select yes or no from the dropdown menu:	Yes			1.00
V4 **Impervious Area**	**<u>What is the percent impervious area in the drainage basin?</u>** Answer using information from the site's StreamStats Report (IMPERV). *Values informed: Surface Water Storage, Flow Variation, Sediment Continuity, Substrate Mobility, Create & Maintain Habitat, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation, Thermal Regulation*								
	Hydrology, Geomorphology, Biology, Water Quality		ImpArea		<10%, select A; 10-25%, select B; >25-60%, select C; >60%, select D.	B			0.30
V5 **Riparian Area**	**<u>What is the percentage of intact riparian area within 2 miles upstream of the PA</u>?** Intact refers to a riparian area with forest or otherwise unmanaged (i.e. natural) perennial cover appropriate for the basin that is at least 15 ft wide on both sides of the channel. Unmanaged perennial cover is vegetation that includes wooded areas, native prairies, sagebrush, vegetated wetlands, as well as relatively unmanaged commercial lands in which the ground and vegetation is disturbed less than annually, such as lightly grazed pastures, timber harvest areas, and rangeland. It does not include water, pasture, row crops (e.g., vegetable, orchards, Christmas tree farms), lawns, residential areas, golf courses, recreational fields, pavement, bare soil, rock, bare sand, or gravel or dirt roads. *Values informed: Create & Maintain Habitat, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation, Thermal Regulation*								
	Biology, Water Quality		RipArea		If >50% select A. If >35-50%, select B. If 15-35%, select C. If <15%, select D.	A			1.00
V6 **Extent of Downstream Floodplain Infrastructure**	**<u>What is the extent of infrastructure (buildings, bridges, utilities, row crops) in the floodplain</u>?** Consider the floodplain area between the PA and either the next largest water body (large tributary, mainstem junction, lake, etc.) or 2 miles downstream, whichever is less. *Values informed: Surface Water Storage, Sediment Continuity, Create & Maintain Habitat, Sustain Trophic Structure*								
	Hydrology, Geomorphology, Biology		DwnFP		If >50% of total area, select A. If 1-50% of total area, select B. If none, select C. If not known or the downstream floodplain is not mapped, select D.	B			0.50
V7 **Zoning**	**<u>What is the dominant zoned land use designation downstream of the PA?</u>** Consider the floodplain area between the PA and either the next largest water body (larger tributary, mainstem junction, lake, etc.) or 2 miles downstream, whichever is less. *Values informed: Surface Water Storage, Create & Maintain Habitat, Sustain Trophic Structure*								
	Hydrology, Biology		Zoning		If developed (commercial, industrial, residential, etc.), select A. If agriculture or rural residential, select B. If forest, open space, or public lands, select C. If not zoned or no information, select D.	A			1.00
V8 **Frequency of Downstream Flooding**	**<u>What is the frequency of downstream flooding?</u>** Consider the floodplain area between the PA and either the next largest water body or 2 miles, whichever is less. Determine the frequency of flooding downstream of the PA that affects infrastructure (i.e. affects use of the site or causes economic loss). *Values informed: Surface Water Storage*								
	Hydrology		DwnFld		If frequent (several times a year), select A. If moderate (up to once a year), select B. If infrequent (only large events), select C. If never or not known, select D.	C			0.30

V9 **Impoundments**	**<u>What is the prevalence of impoundments within 2 miles upstream and downstream of the PA that are likely to cause shifts in timing or volume of water?</u>** The shift may be by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times, more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). For each category, select yes or no from the dropdown menu. *Values informed: Surface Water Storage, Flow Variation, Sediment Continuity, Substrate Mobility, Create & Maintain Habitat; Functions informed: Flow Variation*								
	Hydrology, Geomorphology, Biology		Impound		Are there 1-2 small dams or other impoundments **<u>upstream</u>** of the PA?	Yes	Upstream impoundments subscore:		0.00
					Are there >2 small impoundments, 1 or more large dams or other impoundments **<u>upstream</u>** of the PA?	Yes			
					Are there 1-2 small dams or other impoundments **<u>downstream</u>** of the PA?	No	Downstream impoundments subscore:		1.00
					Are there >2 small impoundments, 1 or more large dams or other impoundments **<u>downstream</u>** of the PA?	No			
V10 **Fish Passage Barriers**	**<u>Are there man-made fish passage barriers within 2 miles upstream and/or downstream of the PA ?</u>** Select an answer from the drop-down menu for each of the upstream and downstream directions. If more than one barrier is present, answer for the one with the most restricted level of passage (e.g. Blocked). Do not include natural barriers. *Values informed: Maintain Biodiversity, Sustain Trophic Structure*								
	Biology		Passage	Slope barrier	Upstream	Partial	0.50		0.75
					Downstream	None	1.00		
V11 **Water Source**	**<u>Is there an area that is of special concern for drinking water sources or groundwater recharge within 2 miles downstream of the PA?</u>** This includes any of the following: the source area for a surface-water drinking water source; the source area for a groundwater drinking water source; a designated Groundwater Management Area; a designated Sole Source Aquifer. *Values informed: Sub/Surface Transfer, Nutrient Cycling, Chemical Regulation*								
	Hydrology, Water Quality		Source		Select yes or no from the dropdown menu:	Yes			1.00
V12 **Surrounding Land Cover**	**<u>What are the land cover types surrounding the PA?</u>** Draw a 2 mile radius around the PA. Provide an estimate of the percentage of area within the resulting polygon that matches each land cover description. Enter 0% if none. Enter 1% if barely present. Must sum to 100%. *Values informed: Maintain Biodiversity, Sustain Trophic Structure*								
	Biology		SurrLand		Unmanaged vegetation (wetland, native grassland, forest) or water	49	× 1.00	49.00	0.58
					Managed vegetation (pasture, regularly watered lawn (i.e. park), row crops, orchards)	18	× 0.50	9.00	
					None of the above (including bare areas [dirt, rock], roads, energy facilities, residential, commercial, industrial)	33	× 0.00	0.00	
					SUM	100			
V13 **Riparian Continuity**	**<u>What is the longitudinal extent of intact riparian area that is contiguous to the PA?</u>** Select the longest length of contiguous riparian corridor in either the upstream or downstream direction, but do not include the PA length itself. Intact refers to a riparian area with forest or otherwise managed (i.e. natural) perennial cover appropriate for the basin that is at least 15 ft wide on both sides of the channel. Contiguous means there are no > 100 ft gaps in forested cover or unmanaged perennial cover. Unmanaged perennial cover is vegetation that includes wooded areas, native prairies, sagebrush, vegetated wetlands, as well as relatively unmanaged commercial lands in which the ground and vegetation is disturbed less than annually, such as lightly grazed pastures, timber harvest areas, and rangeland. It does not include water, pasture, row crops (e.g., vegetable, orchards, Christmas tree farms), lawns, residential areas, golf courses, recreational fields, pavement, bare soil, rock, bare sand, or gravel or dirt roads. *Values informed: Maintain Biodiversity, Create & Maintain Habitat, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation, Thermal Regulation*								
	Biology, Water Quality		RipCon		If <100 feet, select A. If 100-500 feet, select B. If >500 feet, select C.	B			0.50
V14 **Watershed Position**	**<u>What is the relative position of the PA in its HUC 8 watershed?</u>** Answer this question looking at position of the PA relative to the 8-digit HUC layer. • If the PA is (a) closer to the watershed's outlet than its upper end and (b) closer to the large stream/river exiting the watershed's outlet than it is to the boundary of the watershed, select "lower 1/3." • If the PA is (a) closer to the watershed's upper end than its outlet and (b) closer to the watershed's boundary than its large stream/river, select "upper 1/3." • If neither of the above conditions are met, select "middle 1/3." *Values informed: Sediment Continuity, Nutrient Cycling, Chemical Regulation*								
	Geomorphology, Water Quality		Position		Select an answer from the dropdown menu:	Upper 1/3			0.00

V15 **Flow Restoration Needs**	**What is the "streamflow restoration need" ranking of the watershed within which the PA is located?** Answer this question using the Flow Restoration Needs layer in the SFAM Map Viewer. *Values informed: Flow Variation, Create & Maintain Habitat*								
	Hydrology, Biology		FlowRest		Select an answer from the dropdown menu:	Not Ranked or Low			0.00
V16 **Unique Habitat Features**	**Are there rare aquatic habitat features within the EAA that are not common to the rest of the drainage basin ?** For each feature type, select yes or no from the dropdown menu. This question must be answered in the field, but the user can check for any mapped wetlands or seeps, springs, or tributaries in the office using the Oregon Wetlands Cover, Springs, and the Flowline layers, respectively. *Values informed: Substrate Mobility, Maintain Biodiversity, Create & Maintain Habitat, Sustain Trophic Structure, Thermal Regulation*								
	Geomorphology, Biology		HabFeat		Large log jams that span 25% or more of the active channel width?	No		Overall HabFeat score	1.00
					Braided channel or otherwise multiple channels resulting in islands?	Yes			
					Large spatial extent (>30%) of wetlands in the floodplain?	No		Substrate subscore	0.50
					Seeps, springs, or tributaries contributing colder water?	Yes		Thermal subscore	0.50
Already in Stream Classification on Cover Page - NO DATA INPUT REQUIRED.									
Surface Water Runoff	**What is the level of surface water runoff (based on local water availability and local gradient)?** No data input necessary, information taken from EPA classification (stream type & gradient).								
	Hydrology		Runoff						0.50
Aquifer Permeability	**What is the permeability of the aquifer (determined by percent permeable bedrock based on hydraulic conductivity m/day)?** No data input necessary, information taken from EPA classification.								
	Hydrology		AqPerm			High			0.00
Soil Permeability	**What is the permeability of the soil (based on hydraulic conductivity in cm/hr)?** No data input necessary, information taken from EPA classification.								
	Hydrology		SoilPerm			High			0.00
Erodibility	**What is the erodibility of this reach?** No data input necessary, information taken from EPA classification.								
	Geomorphology		Erode			Moderately Erodible			0.00

STREAM FUNCTION ASSESSMENT METHOD for OREGON

Name of Project Area:	CRTS - DPA	Assessment Timing:		Orange Boxes are linked to the PAA or EAA Field forms Scores Automatically Calculated in Green Boxes

FUNCTIONS MEASURES TABLE

Check the orange boxes to confirm all field entries have transferred appropriately. If necessary the orange box entries can be hand entered. However, hand entry into the orange boxes will remove the link to the Field Form. A #DIV/0! or 'FALSE' entry means that the Cover Page, PAA Field Form or EAA Field Form is not complete.

Measure	Function Groups		Measure Abbreviation	Qualifiers		Data Entry (linked to field forms)	Error Messages		Measure Score
F1 **Natural Cover**	**<u>What is the percent natural cover above the stream within the PAA?</u>** Measure the percentage of cover above the stream, including both overstory and understory vegetation and overhanging banks, by averaging spherical densiometer measurements taken at each transect within the PAA. *Functions informed: Sustain Trophic Structure, Nutrient Cycling, Thermal Regulation*								
	Biology, Water Quality		Cover	WMTlarge	**Enter a percentage**: *(round to nearest whole number)*	0	#DIV/0!		0.00
F2 **Invasive Vegetation**	**<u>What is the percent cover of invasive vegetation within the PAA ?</u>** Consider the Oregon Department of Agriculture Noxious Weed list in Appendix 3 of the SFAM User Guide, and other sources of information, such as Oregon iMAPInvasives and iNaturalist. *Functions informed: Maintain Biodiversity, Sustain Trophic Structure*								
	Biology		InvVeg		**Enter a percentage**: *(round to nearest whole number)*	5	Caution! Entry not linked to Field Form		0.59
F3 **Native Woody Vegetation**	**<u>What is the percent cover of native woody vegetation within the PAA</u>** ? *Functions informed: Maintain Biodiversity, Create & Maintain Habitat*								
	Biology		WoodyVeg		**Enter a percentage**: *(round to nearest whole number)*	6	Caution! Entry not linked to Field Form		0.09
F4 **Large Trees**	**<u>What is the percent cover of large trees (dbh>20in) within the PAA?</u>** *Functions informed: Maintain Biodiversity, Create & Maintain Habitat*								
	Biology		LgTree	East	**Enter a percentage**: *(round to nearest whole number)*	4	Caution! Entry not linked to Field Form		0.12
F5 **Vegetated Riparian Corridor Width**	**<u>What is the average width of the vegetated riparian corridor within the PAA?</u>** An intact vegetated riparian corridor is defined as one typified by largely undisturbed ground cover and dominated by "natural" species. Natural does not necessarily mean pristine and can include both upland plants and species with wetland indicator status, and native and non-native species. Natural does not include pasture or cropland, recreational fields, recently harvested forest, pavement, bare soil, gravel pits, or dirt roads. Note that relatively small features, such as a narrow walking trail, that likely have negligible effects on water quality can be included within the vegetated riparian corridor width. *Functions informed: Nutrient Cycling, Chemical Regulation*								

	Water Quality		RipWidth		**Enter the average width (feet)**:	196	Caution! Entry not linked to Field Form		0.83
F6 **Fish Passage Barriers**	**Is there a man-made fish passage barrier in the PAA?** Select an answer from the drop-down menu. Man-made barriers to fish passage can include structures such as dams, culverts, weirs/sills, tide gates, bridges and fords that can block physical passage or can create unsuitable conditions for passage (e.g. high velocity). The level of passage provided can be researched in the office using the Man-made Fish Passage Barriers data layer (Fish Passage Barriers in the Habitat Group) in the SFAM Map Viewer, then confirmed in the field. Do not include natural barriers. If more than one barrier is present, answer for the one with the most restricted level of passage (e.g. Blocked). Not all barriers have been mapped. See the User Manual for more information. *Functions informed: Maintain Biodiversity, Create & Maintain Habitat*								
	Biology		Barriers		**Select Blocked, Partial, Passable, or Unknown in the PAA Field Form:**	Partial			0.50

F7 **Floodplain Exclusion**	**<u>What percent of the floodplain has been disconnected within the PAA?</u>** For alluvial rivers, the floodplain is defined by a distinct break in slope at valley margins, a change in geologic character from alluvium to other, indications of historical channel alignments within a valley, or as the 100-year flood limit. Disconnection refers to any portion of the flood area no longer inundated due to levees, channel entrenchment, roads or railroad grades, or other structures (including buildings and any associated fill) within the proximal assessment area. All barriers should be included when estimating disconnection, even if the barrier is not present during all flood stages; EXCEPT where the structure is expressly managed for floodplain function and inundation. *Functions informed: Surface Water Storage, Create & Maintain Habitat*								
	Hydrology, Biology		Exclusion		**Enter <= 20%, >20 - 40%, >40 - 80%, or >80%.**	>40-80%			0.20
F8 **Bank Armoring**	**<u>What percentage of the stream banks within the PAA are armored?</u>** What percentage of the streambank has been stabilized using rigid methods to permanently prevent meandering processes? Examples of armoring include gabion baskets, sheet piles, rip rap, large woody debris that covers the entire bank height, and concrete. Bank stabilization methods that return bank erosion to natural rates and support meandering processes are not counted as armoring. Examples include many bioengineering practices, large woody debris placed along the bank toe, and in-stream structures that still use native vegetation cover on the streambanks. Percent armoring is calculated as the sum of the armored lengths of the left and right banks, divided by sum total lengths of both banks within PAA (i.e. twice the total PAA length). *Functions informed: Substrate Mobility*								
	Geomorphology		Armor		**Enter a percentage:** *(round to nearest whole number)*	25	#DIV/0!		0.23
F9 **Bank Erosion**	**<u>What percentage of stream banks within the PAA are actively eroding or recently (within previous year or high flow) eroded?</u>** Indications of active/recent erosion include vertical or near vertical bank stream banks that show exposed soil and rock, evidence of tension cracks, active sloughing, or that are largely void of vegetation or roots capable of holding soil together. The percent is calculated as the sum of lengths of left and right banks that are eroding, divided by the sum of total lengths of both banks within PAA. *Functions informed: Sediment Continuity*								
	Geomorphology		Erosion		**Enter a percentage:** *(round to nearest whole number)*	40	#DIV/0!		0.30
F10 **Overbank Flow**	**<u>Does the stream interact with its floodplain within the PAA?</u>** Is there evidence of fine sediment deposition (sand or silt) on the floodplain, organic litter wracked on the floodplain or in floodplain vegetation, or scour of floodplain surfaces, extending greater than 0.5xBFW onto <u>either</u> the right or left bank floodplain within the PAA? Do not include evidence from inset floodplains developing within entrenched channel systems. If the abutting land use limits the opportunity to observe evidence of overbank flow, is there other credible information that would indicate regular (at least every two years) overbank flow in the PAA? Examples of "other credible information" include first-hand knowledge, discharge/stream gauge measures, etc. Cite the evidence on the Cover Page. *Functions informed: Surface Water Storage, Sub/Surface Transfer, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation*								

Hydrology, Biology, Water Quality		OBFlow		**Select yes or no from dropdown menu:** *(If there is no floodplain, leave blank)*	NO			0.00

F11 **Wetland Vegetation**	**Are there wetland indicator plants adjacent to the channel and/or in the floodplain within the PAA?** Determine if vegetation in the riparian area of the PAA has a wetland indicator status of obligate or facultative wet. *Functions informed: Sub/Surface Transfer, Maintain Biodiversity, Sustain Trophic Structure, Nutrient Cycling, Chemical Regulation*									
	Hydrology, Biology, Water Quality		WetVeg		Are there wetland indicator plant species within the PAA?	YES			0.50
					If yes, are any wetland indicator plants located greater than 0.5 x BFW from the bankfull edge on at least one side of the stream? *(Select N/A if you answered No above)*	YES			
					If yes, are the wetland indicator plants located beyond 0.5 x BFW distributed along >70% of the length of the PAA? *(Select N/A if you answered No above)*	NO			
F12 **Side Channels**	**What proportion of the EAA length has side channels?** Side channels include all open conveyances of water, even if the channel is plugged on one end. If both ends are plugged, do not count as a side channel. *Functions informed: Surface Water Storage, Sub/Surface Transfer, Maintain Biodiversity, Create & Maintain Habitat*									
	Hydrology, Biology		SideChan		**Enter a percentage**: *(round to nearest whole number)*	40	Caution! Entry not linked to Field Form		0.60
F13 **Lateral Migration**	**What percent of both sides of the channel within the EAA is constrained from lateral migration?** Constraints on lateral migration of the channel within 2 BFW or 50 feet (whichever is greater) include bank stabilization and armoring, bridges and culverts, diversions, roads paralleling the stream and any other intentional structures or features that limit lateral channel movement whether intentionally or not. For cross-channel structures (diversions, bridges, culverts, etc.), record 4x the BFW as the length constrained on both sides of the channel. For linear features, record the length on each side of the channel. For segmented bank features, such as bendway weirs or log jams acting in concert, record the effective length of stabilization on each side of the channel affected. It is acceptable to include relevant armoring that is recorded in the Bank Armoring question, below. *Functions informed: Sediment Continuity*									
	Geomorphology		LatMigr		**Enter a percentage:** *(round to nearest whole number)*	100	Caution! Entry not linked to Field Form		0.00
F14 **Wood**	**What is the frequency of large wood in the bankfull channel within the EAA?** Report the frequency (pieces per 328 feet [100m] of channel) of independent pieces of wood, defined here as woody material with a diameter of at least 4 inches (10cm) and a length of 5 feet (1.5m) within the EAA. This means that at least 5 feet of the piece of wood must be larger than 4 inches in diameter (i.e. a circumference > 12.5 inches). Independent pieces include all those individual pieces that meet size criteria either separate from or within log jams. To be counted, wood must have some part of its length within the bankfull channel. Exclude any wood that has been intentionally anchored to or within the channel banks (using spikes, cables, ballast, etc.) for the purpose of preventing bank erosion (armoring). *Functions informed: Surface Water Storage, Maintain Biodiversity, Create & Maintain Habitat*									

	Hydrology, Biology		Wood	WMTlarge	**Enter the frequency (pieces per 328 ft) of wood in the channel:** *(round to nearest hundredth)*	0.61			0.37

F15 **Incision**	<u>**What is the degree of channel incision within the EAA?**</u> As part of the longitudinal survey, at 11 evenly spaced locations along the stream within the EAA, measure the Bank Height Ratio (BHR). The BHR is the height from the stream thalweg to the lowest floodplain/terrace divided by the bankfull height. Do not consider inset floodplains. *Functions informed: Surface Water Storage, Sediment Continuity, Create & Maintain Habitat*								
	Hydrology, Geomorphology, Biology		Incision		**Enter the average incision:** *(round to nearest hundredth)*	1.75	#DIV/0!		0.50
F16 **Embeddedness**	<u>**What is the degree of substrate embeddedness in the stream channel?**</u> To what extent are larger stream substrate particles surrounded by finer sediments on the surface of the streambed? Measurements are taken at 11 transects within the EAA. *Functions informed: Flow Variation, Substrate Mobility, Create & Maintain Habitat*								
	Hydrology, Geomorphology, Biology		Embed		**Enter a percentage:** *(round to nearest whole number)*	82	#DIV/0!		0.25
F17 **Channel Bed Variability**	<u>**Is the channel variable?**</u> Channel bed variability indicators include variation in wetted channel width and stream thalweg depth along the EAA. *Functions informed: Surface Water Storage, Sub/Surface Transfer, Flow Variation, Sediment Continuity, Maintain Biodiversity, Create & Maintain Habitat, Nutrient Cycling, Chemical Regulation*								
	Hydrology, Geomorphology, Biology, Water Quality		BedVar		Enter the **wetted width** coefficient of variation:	0.31			0.53
					Enter the **thalweg depth** coefficient of variation:	0.25			0.23
							AVERAGE		0.38

FUNCTIONS			
Function	Measure Name	Measure Score	Function Score
SWS	OBFlow	0.00	
	Incision	0.50	
	Exclusion	0.20	
	BedVar	0.38	**3.51**
	Wood	0.37	
	SideChan	0.60	
SST	OBFlow	0.00	
	WetVeg	0.50	**3.70**
	SideChan	0.60	
	BedVar	0.38	
FV	BedVar	0.38	
	Embed	0.25	
	ImpoundUS	0.00	**2.09**
SC	Incision	0.50	
	Erosion	0.30	
	LatMigr	0.00	**2.67**
SM	Armor	0.23	
	Embed	0.25	
	BedVar	0.38	**2.94**
MB	Barriers	0.50	
	BedVar	0.38	
	Wood	0.37	
	SideChan	0.60	
	InvVeg	0.59	
	WoodyVeg	0.09	**2.74**
	LgTree	0.12	
	WetVeg	0.50	

CMH	Exclusion	0.20	
	Wood	0.37	
	Embed	0.25	
	BedVar	0.38	
	WoodyVeg	0.09	
	LgTree	0.12	**1.73**
	Incision	0.50	
	SideChan	0.60	
	Barriers	0.5	
STS	OBFlow	0.00	
	Cover	0.00	
	InvVeg	0.59	
	WoodyVeg	0.09	
	WetVeg	0.50	
			2.68
NC	OBFlow	0.00	
	BedVar	0.38	
	RipWidth	0.83	
	WetVeg	0.50	
	Cover	0.00	**3.41**
CR	RipWidth	0.83	
	BedVar	0.38	
	WetVeg	0.50	
	OBFlow	0.00	
			4.26
TR	Cover	0.00	
			0.00

VALUES					
Value	**Measure Name**	**Measure Score**	**Opportunity Subscore**	**Significance Subscore**	**Value Score**
SWS	ImpArea	0.30			
	Runoff	0.50			
	ImpoundUS	0.00			
	DwnFP	0.50	1.33	3.83	**5.17**
	Zoning	1.00			
	DwnFld	0.30			
	Fish	1.00			
SST	AqPerm	0.00			
	SoilPerm	0.00	0.00	1.00	**10.00**
	Source	1.00			
FV	ImpArea	0.30			
	FlowMod	0.00			
	1-ImpoundUS	1.00			
	FlowRest	0.00			
	AqPerm	0.00	2.17	5.00	**7.17**
	SoilPerm	0.00			
	ImpoundDS	1.00			
	RarInvert	0.25			
	RarAmRep	1.00			
	Fish	1.00			
SC	SedList	0.00			
	ImpArea	0.30			
	ImpoundUS	0.00			
	Postion	0.00	0.10	2.50	**2.60**
	1-DwnFP	0.50			
	Erode	0.00			
	ImpoundDS	1.00			
SM	ImpArea	0.30			
	ImpoundUS	0.00			
	SubFeat	0.50			
	Fish	1.00	0.75	3.75	**4.50**
	RarPlant	1.00			
	RarAmRep	1.00			
	RareInvert	0.25			
MB	Passage	0.75			
	SurrLand	0.58			
	RipCon	0.50			
	HabFeat	1.00			
	Protect	1.00			
	Fish	1.00	3.05	5.00	**8.05**
	RarInvert	0.25			
	RarAmRep	1.00			
	Waterbird	1.00			
	RarBdMm	0.50			
	RarPlant	1.00			

CMH	1-ImpArea	0.70			
	ImpoundUS	0.00			
	RipArea	1.00			
	RipCon	0.50			
	1-NutrImp	0.00			
	1-FlowMod	1.00	3.20	4.17	**7.37**
	1-FlowRest	1.00			
	1-DwnFP	0.50			
	1-Zoning	0.00			
	ImpoundDS	1.00			
	HabFeat	1			
STS	SurrLand	0.58			
	1-ImpArea	0.70			
	Passage	0.75			
	RipArea	1.00			
	RipCon	0.50			
	1-NutrImp	0.00			
	1-TempImp	0.00			
	Protect	1.00			
	1-DwnFP	0.50	2.52	4.38	**6.90**
	1-Zoning	0.00			
	Fish	1.00			
	RarInvert	0.25			
	RarAmRep	1.00			
	Waterbird	1.00			
	RarBdMm	0.50			
	RarPlant	1.00			
	HabFeat	1.00			
NC	NutrImp	1.00			
	ImpArea	0.30			
	1-RipArea	0.00			
	1-RipCon	0.50			
	SedList	0.00	4.16	5.00	**9.16**
	Position	0.00			
	Fish	1.00			
	RareInvert	0.25			
	RarAmRep	1.00			
	Source	1.00			
CR	ToxImp	1.00			
	ImpArea	0.30			
	1-RipArea	0.00			
	1-RipCon	0.50			
	SedList	0.00			
	Position	0.00			
	Fish	1.00	4.16	5.00	**9.16**
	RarInvert	0.25			
	RarAmRep	1.00			
	Waterbird	1.00			
	RarBdMm	0.50			
	RarPlant	1.00			
	Source	1.00			
TR	1-TempImp	0.00			
	RipArea	1.00			
	RipCon	0.50			
	ImpArea	0.30	0.60	3.75	**4.35**
	Fish	1.00			
	RarInvert	0.25			
	RarAmRep	1.00			
	ThermFeat	0.50			

STREAM ASSESSMENT SCORES SHEET   Version 1.1   Assessment Timing:

Project Area Name:	CRTS - DPA		
Investigator Name:	N/A		
Date of Field Assessment:	N/A		
Latitude (decimal degrees):	N/A	Longitude (decimal degrees):	N/A

SPECIFIC FUNCTIONS	**Function Score**	**Function Rating**	**Value Score**	**Value Rating**
Surface Water Storage (SWS)	3.51	Moderate	5.17	Moderate
Sub/Surface Water Transfer (SST)	3.70	Moderate	10.00	Higher
Flow Variation (FV)	2.09	Lower	7.17	Higher
Sediment Continuity (SC)	2.67	Lower	2.60	Lower
Sediment Mobility (SM)	2.94	Lower	4.50	Moderate
Maintain Biodiversity (MB)	2.74	Lower	8.05	Higher
Create and Maintain Habitat (CMH)	1.73	Lower	7.37	Higher
Sustain Trophic Structure (STS)	2.68	Lower	6.90	Moderate
Nutrient Cycling (NC)	3.41	Moderate	9.16	Higher
Chemical Regulation (CR)	4.26	Moderate	9.16	Higher
Thermal Regulation (TR)	0.00	Lower	4.35	Moderate

GROUPED FUNCTIONS	**REPRESENTATIVE FUNCTION**	**Function Group Rating**	**Value Group Rating**
Hydrologic Function (SWS, SST, FV)	Sub/Surface Water Transfer (SST)	Moderate	Higher
Geomorphic Function (SC, SM)	Sediment Mobility (SM)	Lower	Moderate
Biologic Function (MB, CMH, STS)	Maintain Biodiversity (MB)	Lower	Higher
Water Quality Function (NC, CR, TR)	Chemical Regulation (CR)	Moderate	Higher

Formulas for each specific function and value (shown on Subscores tab) produce a numerical score between 0.0 and 10.0. For ecological functions, a score of 0.0 indicates that negligible function is being provided by the stream whereas a score of 10.0 indicates that the stream is providing maximum function (as defined) given certain contextual factors. For values, a score of 0.0 indicates that there is low opportunity for the site to provide a specific ecological function and that, even if it did, the specific function would not be of particular significance given the context of the site. Conversely, a value score of 10.0 indicates that a site has the opportunity to provide a specific function and that it would be highly significant in that particular location. For all function and value formulas, both extents of the scoring range (0.0 and 10.0) are mathematically possible.

To facilitate conceptual understanding, numerical scores are translated into ratings of Lower, Moderate, or Higher. The numerical thresholds for each of these rating categories are consistent across all functions and values such that scores of <3.0 are rated “Lower,” scores ≥3.0 but ≤7.0 are rated “Moderate,” and scores that are >7.0 are rated “Higher.” These thresholds are consistent with the standard scoring scheme applied to all individual measures.

Each specific function, and its associated value, is included in one of four thematic groups: hydrologic, geomorphic, biologic, and water quality functions. Group ratings provide an indication of the degree to which each group of processes is present at a site. Groups are represented by the highest-rated function with the highest-rated associated value among the 2-3 functions that comprise each group. This hierarchical selection system ensures that thematic functional groups are represented by the highest-performing and highest-valued ecological function.

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

A complete report and signed report cover form, along with applicable review fee, are required before a report review timeline can be initiated by the Department of State Lands. All applicants will receive an emailed confirmation that includes the report's unique file number and other information.

Ways to submit report:

- **Under 50MB** - A single unlocked PDF can be emailed to: wetland.delineation@dsl.oregon.gov.
- **50MB or larger** - A single unlocked PDF can be uploaded to DSL's Box.com website. After upload notify DSL by email at: wetland.delineation@dsl.oregon.gov.
- OR a hard copy of the unbound report and signed cover form can be mailed to: Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.

Ways to pay review fee:

- By credit card on DSL's epayment portal after receiving the unique file number from DSL's emailed confirmation.
- By check payable to the Oregon Department of State Lands attached to the unbound mailed hardcopy OR attached to the complete signed cover form if report submitted electronically.

Contact and Authorization Information

☒ Applicant ☐ Owner Name, Firm and Address:
Chris Hocker, VP
Cascade Renewable Transmission, LLC
501 Kings Highway East, Suite 300
Fairfield, CT 06825

Business phone # (203) 416-5590
Mobile phone # (optional) (203) 417-9684
E-mail: chocker@powerbridge.us

☒ Authorized Legal Agent, Name and Address (if different):
Alessandra Capretti
HDR Engineering, Inc.
1050 SW 6th Avenue, Suite 1800
Portland, OR 97204

Business phone # (503) 727-3902
Mobile phone # (optional) (971) 303-5596
E-mail: alessandra.capretti@hdrinc.com

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.

Typed/Printed Name: ______________________ **Signature:** ______________________
Date: ______ Special instructions regarding site access: _____

Project and Site Information

Project Name: Cascade Renewable Transmission Project

Latitude: See attached Longitude: See attached
decimal degree - centroid of site or start & end points of linear project

Proposed Use:
See attached

Tax Map # See attached
Tax Lot(s) See attached
Tax Map # See attached
Tax Lot(s) See attached

Township Range Section QQ
Use separate sheet for additional tax and location information

Project Street Address (or other descriptive location):
Linear project; see attachments

City: County:

Waterway: River Mile:

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
Jennifer Maze
HDR Engineering, Inc.
1050 SW 6th Avenue, Suite 1800
Portland, OR 97204

Phone # (503) 724-6320
Mobile phone # (if applicable)
E-mail: jennifer.maze@hdrinc.com

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.
Consultant Signature: Date: 04/18/2025

Primary Contact for report review and site access is ☐ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☐ Yes ☐ No Study Area size: 387 Total Wetland Acreage: 4.9900

Check Applicable Boxes Below

☐ R-F permit application submitted
☐ Mitigation bank site
☐ EFSC/ODOE Proj. Mgr: ______
☐ Wetland restoration/enhancement project (not mitigation)
☐ Previous delineation/application on parcel
If known, previous DSL # _____

☐ Fee payment submitted $ 575
☐ Resubmittal of rejected report ($100)
☐ Request for Reissuance. See eligibility criteria. (no fee)
DSL # _____ Expiration date_____
☐ LWI shows wetlands or waters on parcel
Wetland ID code _____

For Office Use Only

DSL Reviewer: ______________ Fee Paid Date: _____ / _____ / _____ DSL WD # ______________

Date Delineation Received: ___/ ___/ ___ DSL App.# ______________

Wetlands and Waterbodies Delineation Report

Cascade Renewable Transmission Project

Portland and The Dalles, Oregon

April 17, 2025

Contents

Tables

Appendices

Acronyms and Abbreviations

°F	degrees Fahrenheit
AC	alternating current
amsl	above mean sea level
Applicant	Cascade Renewable Transmission (CRT)
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
DAREM	Direct Antecedent Rainfall Evaluation Method
DSL	Oregon Department of State Lands
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GPS	global positioning system
HAB	horizontal auger boring
HAT	highest astronomical tide
HDD	Horizontal directional drilling
HDR	HDR Engineering, Inc.
HMT	highest measured tide
HTL	high tide line
HUC	Hydrologic Unit Code
HVAC	high-voltage alternating current
HVDC	high-voltage direct current
I-84	U.S. Interstate 84
kV	kilovolt
LWI	Local Wetland Inventory
MLLW	mean lower-low water
MW	megawatt
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
OHW	ordinary high water mark
OR 30	Oregon Route 30
ORS	Oregon Revised Statute
PEM	palustrine emergent
PFO	palustrine forested
PGE	Portland General Electric
Port	Port of Portland
Project	Cascade Renewable Transmission Project
PSS	palustrine scrub-shrub
ROW	right-of-way
SA	survey area
SDAM	Streamflow Duration Assessment Method

SFAM	stream functional assessment
SWI	Statewide Wetland Inventory
TNW	traditional navigable water
UPRR	Union Pacific Railroad
US 197	U.S. Route 197
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WETS	Climate Analysis for Wetlands Table (NRCS)
WVMC	Western Mountains, Valleys, and Coast

1 Introduction and Background

1.1 Introduction

HDR Engineering, Inc. (HDR), on behalf of Cascade Renewable Transmission, LLC (CRT; Applicant) completed a wetland and waterbodies delineation within the proposed Cascade Renewable Transmission Project (Project) survey area (SA) in Oregon in April 2023, November 2023, March 2024, April 2024, and March 2025 (Figure 1, Appendix A; Section 1.3). This report describes the methods and findings of the delineation completed within landward portions of the Project SA in Oregon State and serves to inform Project design and support local, state, and federal permitting required for the Project. The surveys were completed in accordance with Section 404 of the Clean Water Act and the Oregon Removal-Fill Law.

Wetlands and waters in the Washington State portion of the proposed Project (SA) have been included in a wetland delineation report prepared for the Washington Energy Facility Site Evaluation Council and will be submitted separately.

In addition, work proposed within the Columbia River was evaluated using the Department of State Lands (DSL) Stream Functional Assessment Method. A Stream Functional Assessment Report was developed for in-water work and will be submitted separately.

1.2 Project Description

The proposed Project is a roughly 95-mile 400-kilovolt (kV)/1,100-megawatt (MW) high-voltage direct current (HVDC) electric transmission facility interconnecting the existing Bonneville Power Administration (BPA) Big Eddy 500-kV alternating current (AC) substation, located east of the City of The Dalles, Wasco County, Oregon, and the existing Portland General Electric (PGE) Harborton 230-kV AC substation, located in the City of Portland, Multnomah County, Oregon (Figure 1 in Appendix A). The eastern converter station would convert AC power from Big Eddy substation to direct current (DC) for transmission on the Project's 400-kV cable system to the western converter station, where power would be converted back to AC at Harborton substation.

At the eastern end of the Project in The Dalles, Oregon (east end), a converter station is proposed near the Big Eddy substation with approximately 500 feet of overhead, (500-kV) high-voltage alternating current (HVAC) transmission line to connect the converter station to the substation. From the converter station, HVDC transmission cables with associated fiber optic communications cable would be buried underground in conduits to the edge of the Columbia River. The cable bundle would be bundled together and buried in the bed of the Columbia River in Oregon and Washington from The Dalles to Portland using jet plow methods. To bypass the dam, locks, juvenile fish passage, and tribal fishing areas at the Bonneville Lock and Dam, the Proposed Alignment HVDC cables would be brought on land in Washington, east of the dam complex, buried underground on the Washington side of the Columbia River for approximately 7.6 miles, then re-enter the river west of the dam complex. All in-water to land transitions would be completed using horizontal directional drilling (HDD) installation methods to avoid Columbia River shoreline areas and other waters of the U.S. and state. Another trenchless installation method, horizontal auger boring (HAB), may be used for shorter paths beneath railroads and roadways.

In Portland, the cable bundle would exit the Columbia River north of Hayden Island, be placed beneath the channel of the Columbia River adjacent to the south of Hayden Island via HDD methods, and landfall near Terminal 6 at the Port of Portland. The western converter station in Portland would be connected to the existing Harborton substation with three-phase, 230-kV transmission cable, installed via HDD beneath the Columbia Slough and Ramsey wetlands and via trench in road rights-of-way (ROWs) to the edge of the Willamette River. Approximately 0.5 miles of transmission cable would cross under the bed of the Willamette River, installed by HDD to a final landing site at Harborton substation.

To bypass the dam, locks, juvenile fish passage, and tribal fishing areas at the Bonneville Lock and Dam, the HVDC cable bundle would be brought on land in Washington State east of the dam complex, buried underground on the Washington side of the Columbia River for approximately 7.5 miles, then re-enter the river west of the dam complex. The trench for underground HVDC transmission line would be approximately 2.5 feet wide by 4.5 feet deep. Within the trench, two 8-inch conduits side-by-side and one 4-inch fiber optic conduit on top (cable bundle) would be placed within a 6-inch concrete casing. To cross highways, railroads, or sensitive areas, the transmission line would be placed with HDD or HAB trenchless installation methods. HDD would be used to transition the in-river cables to land, avoiding any shoreline areas. The SA description and findings of the wetland and waters delineation performed in Washington State are not addressed in this report.

1.3 Site Description and Survey Area

The roughly 387-acre SA occurs within two distinct locations in the City of The Dalles, Oregon (east end), and the City of Portland, Oregon (west end) (Figure 1, Appendix A). In each city, the SA encompasses areas necessary for construction of the converter stations, cable trenching areas, cable landing and HDD/HAB sites, and construction staging and laydown sites. Landownership types within the SA include federal, state, and local governmental agencies, ports, railroads, local businesses, and private residences. Tax lots that occur within the SA are shown on Figure 2 of Appendix A.

1.3.1 East End

Approximately 152 acres of the SA occurs within the City of The Dalles city limits and in unincorporated Wasco County on BPA property at the Big Eddy substation located just east of The Dalles (Figure 1, Pages 8-12). The legal land description of this portion of the SA includes the following townships/ranges/sections: T2N, R14E, Sections 31 and 32; T1N, R14E, Sections 5, 6 and 7; T1N, R13E, Section 1, 2, and 3; Willamette Meridian. The east end of the Project is located within U.S. Geological Survey (USGS) 7.5-minute quadrangle maps for The Dalles South and Petersburg and in the Hydrologic Unit Code (HUC) 17070105 Middle Columbia-Hood in the Pacific Northwest Region.

From the proposed eastern converter station site at the substation, the Project cable alignment follows Columbia View Drive roughly 1.9 miles to U.S. Route 197 (US 197) (Figure 1, Pages 11 and 12). The proposed converter station site and surrounding SA are comprised of actively farmed wheat fields and electricity transmission infrastructure, including multiple substations and maintained transmission line ROW. The SA along Columbia View Drive is mainly paved roadway and roadway shoulder with undeveloped land and BPA infrastructure and offices.

The alignment continues north on US 197 for roughly 1.2 miles to the junction with Oregon Route 30 (OR 30), follows OR 30 for about 900 feet until the State Street exit, continuing east for 600 feet before leaving the roadway prism to an HDD site located just south of the Union Pacific Rail Road (UPRR) rail lines, north of State Street (Figure 1, page 10). The SA along US 197, OR 30, and State Street is comprised of paved roadway and roadway ROW with vegetated shoulder areas adjacent. Threemile Creek occurs adjacent to these roadways and crosses beneath the alignment in three locations.

The cable would be installed by HAB methods beneath the UPRR rail lines and continue via trenching methods through a vegetated area just east of a railroad access road. The SA is comprised of a large, vegetated parcel that includes a portion of Threemile Creek and is bordered by road and rail ways. The alignment continues west roughly 1.5 miles along a paved road that parallels U.S. Interstate 84 (I-84) to the south to an HDD landing site (HDD Area 12) located in a vegetated depressional area between I-84 and Tie Plant Road (Figure 1, Pages 8 and 9). The SA also includes parcels to the south of Tie Plant Road. From HDD Area 12, the cable would be drilled under I-84 and the Columbia River shoreline to a cofferdam within the river channel.

1.3.2 West End

Approximately 235 acres of the SA occurs within the City of Portland city limits and in unincorporated Multnomah County on Hayden Island (Figure 1, Pages 1-7). The legal land description of this portion of the SA includes the following townships/ranges/sections: T2N, R1E, Sections 25, 29, 30, 31, and 32 and T2N, R1W, Sections 23, 24, 25, 26, 27, 34 and 35; Willamette Meridian. The west end of the Project is located within USGS 7.5-minute quadrangle maps for Vancouver, Portland, Sauvie Island, and Linnton, and in HUC 17090012 Lower Willamette in the Pacific Northwest Region.

The Project SA begins on the north side of Hayden Island where in-river cable installation methods transition to HDD methods bring the cable to land near N. Hayden Island Drive (Figure 1, Page 7). From HDD Area 08, the cable would be installed using trenching methods along an existing graveled transmission line access road. Two alternative routes were evaluated to bring the alignment from Hayden Island south to Terminal 6 at the Port of Portland (Figure 1, Page 5 and 6). The SA on Hayden Island is comprised mainly of maintained transmission line ROW with some forested riparian areas near the Columbia River shoreline.

From the proposed landing site alternatives within Terminal 6, the cable would be placed via trenching methods within the shoulder areas of N. Marine Drive and N. Leadbetter Road for approximately 1.8 to 2.3 miles to the proposed western converter station site (Figure 1, Pages 3-6). The SA at the landing sites, HDD areas, and the converter station site are comprised of undeveloped and previously disturbed land. The SA along existing roadways is mainly landscaped ROW.

From west of the proposed converter station site, two alternative routes beneath the Columbia Slough and Ramsey Lake are being considered. HDD methods are proposed for each alternative to avoid Project effects to these waterways. Two alternative landing sites were evaluated west of the Columbia Slough and Ramsey Lake. From each of the alternative landing sites, the proposed alignment would land within the Rivergate Industrial Area on previously developed industrial parcels and continue west to N. Columbia Boulevard, south to Ramsey Road, and west to N. Rivergate Boulevard. The alignment would veer west from N. Rivergate Boulevard to HDD Area 2 prior to being drilled under the bed of the Willamette River. HDD methods would also be used to cross the cable under two existing rail lines. Most of the SA is comprised of paved roadways and railroad ROW with one undeveloped area parcel adjacent to the west side of the Willamette River.

The SA on the east side of the Willamette River is comprised of river shoreline, a large, vegetated material stockpile, and the fenced, graveled yard of PGE’s Harborton substation.

2 Landscape Setting and Land Use

2.1 Landscape Setting

2.1.1 East End

The east end SA lies within the Columbia Plateau (10) Level III ecoregion and the Pleistocene Lake Basin (10e) Level IV ecoregion at elevations between roughly 100 and 800 feet above mean sea level (amsl) (Thorson et al. 2003).

The Columbia Plateau is a drier, low elevation island surrounded by higher elevation, mountainous region with high rainfall. Rain shadow from the Cascade Mountains to the west results in an arid to semi-arid climate typical of mid-latitude deserts to mid-latitude steppes. The mountains also separate this region from the influence of the ocean, leading to a higher occurrence of extreme or unpredictable weather. Precipitation is seasonally variable over much of the region. The perennial and intermittent streams and rivers located here originate from the adjacent mountainous areas. The remaining streams are ephemeral, with flowing water present only for a short duration during or following precipitation events. Most of this region is covered in arid sagebrush steppe or grassland. Tree cover throughout much of the region is sparse to nonexistent (Thorson et al. 2003).

The Pleistocene Lake Basins once contained vast temporary lakes that were created by flood waters from glacial lakes Missoula and Columbia. In Oregon, the flood waters accumulated from the eastern entrance of the Columbia River Gorge upstream to the Wallula Gap to form ancient Lake Condon. Today, the Pleistocene Lake Basin Ecoregion is the driest and warmest part of the Columbia Plateau, with mean annual precipitation varying from 7 to 10 inches. Native vegetation consists of bunchgrass and sagebrush (Thorson et al. 2003).

2.1.2 West End

The west end SA lies within the Willamette Valley (3) Level III ecoregion and the Pleistocene Portland Vancouver (3a) Level IV ecoregion at elevations between 10 and 50 feet amsl (Thorson et al. 2003).

The Willamette Valley contains terraces and floodplains of the Willamette River system, scattered hills, buttes, and adjacent foothills. Originally, it was covered by prairies, oak savanna, coniferous forest, extensive wetlands, and deciduous riparian rainforests. Elevation and relief of the lower and the vegetation mosaic differs from the coniferous forest of the surrounding ecoregions. Mean annual rainfall is 37 to 60 inches and summers are generally dry; overall, precipitation is lower than in the surrounding mountains. Today, the Willamette Valley contains the bulk of Oregon population, industry, commerce, and cropland. Productive soils and a temperate climate make it one of the most important agricultural areas in Oregon (Thorson et al. 2003).

The Portland Vancouver ecoregion is a depression at the base of the Portland Hills fault block. It contains the confluence of the Columbia and Willamette rivers and is composed of deltaic sands and gravels deposited by Pleistocene floods. Today, many wetlands, oxbow lakes, and ponds still occur, but overall, the Portland/Vancouver Basin is dominated by urban and suburban development, pastures, and nurseries. The climate is usually marine influenced but, periodically, easterly winds entering via the Columbia River Gorge bring continental temperature extremes to the Portland Vancouver Basin (Thorson et al. 2003).

2.2 Current and Past Land Uses

2.2.1 East End

Wasco County (created in 1854) and Dalles City (incorporated January 26, 1857, now called The Dalles) was historically inhabited by Native Americans, the Wascos, who are now part of the Confederated Tribes of the Warm Springs. Euro-American settlers began arriving in the area in 1830s and emigrants began arriving to the area via the Oregon Trail in the 1840s, and many, faced with the difficulties of negotiating the Columbia River Gorge by wagon, settled in The Dalles (City of The Dalles 2024; Buce 2024). This area is now considered one of the most significant archaeological regions in the Pacific Northwest. The Dalles, which has two historic districts with over 70 properties on the National Register of Historic Places, remains a trading hub for the Mid-Columbia River.

Development of trade, travel routes, and rail lines, including the Great Southern Railroad completed in 1905, continued through the 1900s (City of The Dalles 2024). The Dalles Lock and Dam, one of the 10 largest hydropower dams in the nation, provides a reliable water source for navigation, irrigation, and seasonal flood mitigation. The dam went into operation on March 10, 1957, and created a 24-mile backwater lake that formed behind the dam (Buce 2024).

The Dalles is the county seat and had a population of about 16,000 people in 2020. Top industries in the city and northern Wasco County include medical centers, schools, farmers and growers, hydroelectric and renewable energy, and data storage facilities (Buce 2024).

2.2.2 West End

The City of Portland was first platted in 1845, and Multnomah County was created in 1854 on land traditionally used by the Multnomah Chinooks (Abbott 2024; OHS 2014). Multnomah County is the smallest county in Oregon.

During the 1850s, Portland became the largest city in Oregon and first experienced substantial growth during the California Gold Rush, which created a large market for goods produced in Oregon, including wheat and lumber. Steamboat and portage railroad commerce facilitated trade to and from the Portland area across Oregon and neighboring states via the Columbia River and Pacific Ocean (Abbott 2024).

A well-positioned city, Portland experienced prosperity and growth for the next 60 years with the expansion of the regional railroad system, in particular, the completion of the transcontinental link via the Northern Pacific Railroad in 1883. The railroad expanded access to goods produced from logging, ranching, and agriculture. A variety of mills, factories and shipyards were developed along the Willamette waterfront and major rail and river corridors (OHS 2014; Abbot 2024).

The present-day Port of Portland (Port) was established formally by the Oregon Legislature in 1970 by incorporating the Portland Commission of Public Docks, a city agency dating from 1910, to the original Port of Portland, a public corporation operating since 1910 (Abbott 2022).

Urbanization and industrialization continued during the next several decades, with neighborhoods expanding and the electric streetcar increasing transportation between Portland's many districts and across the Willamette River to the east. Shipyard activity increased again during World War II, spurring further population growth (Abbott 2024).

While urban and suburban growth continues, since the 1960s and 1970s more efforts to preserve natural areas, create parks, and establish scenic areas have been initiated (Abbott 2024). Current land uses include industrial, urban, suburban, commercial, and natural. The Rivergate Industrial District, Smith and Bybee Wetlands Natural Area, Columbia Slough, railroads, streets, and businesses are all near or intersecting the SA.

The City of Portland is the county seat and had a population of about 652,500 people in 2020. Major industries in the SA and northern Multnomah County include industrial development, Port operations, and preserved natural areas. The west end of the SA is located in multiple City of Portland zoning overlays, including Airport Landing and Noise Impact, Prime Industrial, Environmental Protection and Conservation, Natural Resource Management Plan, and Greenway zones associated with the Willamette River (River General, River Industrial and River Water Quality) (City of Portland 2025).

3 Site Alterations

Most of the Project SA in Wasco and Multnomah counties has been altered by development, including agriculture, electricity transmission and distribution networks, road and rail ways, parks, and industrial and urban infrastructure, and to a lesser degree residential development. These alterations have likely impacted vegetation, soils, and surface water flows within the SA on lands adjacent.

The east end has seen minimal recent site alteration within the past 20 years. Major alterations along the proposed SA include the development of I-84 (built in 1957), US 197 (built in 1917), UPRR railroad, BPA electricity transmission infrastructure (built in the 1950s through the 1970s), agriculture, and urban and residential development.

Within the SA in Multnomah County, historic topographic images show development began at the Port around the 1930s and 1940s prior to which it was comprised mainly of wetlands, lakes (including Smith, Bybee and Ramsey), and a multitude of surface water channels connecting them or draining to the Columbia and Willamette Rivers (USGS 2024a). Early 1900s images show that most of the Rivergate Industrial District was comprised of Ramsey Lake. Filling for development and the installation of water control systems, dikes, dams and channelization of existing water features began in earnest in the 1950s and continued to alter the landscape, vegetative communities, local hydrology, and native soils.

The west side of Hayden Island within the SA is currently undeveloped except for an existing transmission line corridor and access road. Oregon Metro added this area to the urban growth boundary in 1982 and the Port purchased lands in 1993. In 2010, the Portland City Council allotted 300 acres of west Hayden Island for a port facility and preserved 500 acres as a protected natural area (Daley 2022).

4 Precipitation Data and Analysis

Precipitation and climate data analysis was conducted for the SA for the site visits conducted on April 19-21, 2023 (west end), November 8, 2023 (east end), March 11-13, 2024 (west end), April 2, 2024 (east end), and March 20, 2025 (west end) field investigations. The east end of the Project was evaluated using data from The Dalles weather station (Station ID 358407/Wasco County FIPS 41065) located in Oregon, approximately 2 miles west of the SA at an elevation of 150 feet amsl. The Dalles weather station is the closest station in a similar geographic position to the SA with the requisite data history to evaluate normal rainfall conditions. The west end of the Project was evaluated using data from the Portland International Airport Station (Station ID 356751/Multnomah County FIPS 41051) located in Oregon, approximately 5 miles southeast of the SA at an elevation of roughly 20 feet amsl.

Normal rainfall was analyzed using data for the past 30 years (1992-2022) derived from the U.S. Department of Agriculture (USDA) Climate Analysis for Wetlands Table (WETS) for The Dalles and Portland International Airport weather stations (USDA NRCS 2024a and 2024b; Appendix D). Antecedent rainfall data collected at these weather stations were also used during the analysis. The Direct Antecedent Rainfall Evaluation Method (DAREM) was used to determine if the antecedent rainfall recorded during the 3 months prior to the surveys was within normal range, drier than normal, or wetter than normal (Sumner et al. 2009).

4.1 Climate and Growing Season

Wasco County is within Oregon Climate Division 6, North Central Area (NOAA 2005). The SA is in a relatively dry region located in the rain shadow of the Cascade Mountains (Taylor 1993a). According to WETS table for The Dalles, average annual precipitation received within the area between 1992 and 2022 was 13.80 inches, most of which occurs between October and April as rainfall (USDA NRCS 2024a). Average mean air temperature for the same period ranges from 36.6 degrees Fahrenheit (°F) in December to 73.6°F in July. The approximate growing season begins March 20 and ends November 5 (230 days).

Multnomah County is within Oregon Climate Division 2, Willamette Valley (NOAA 2005). The Project SA experiences mild climate characterized by cool, wet winters and warm, dry summers (Taylor 1993b). According to USDA WETS table for Portland International Airport, average annual precipitation received within the area between 1992 and 2022 was 37.04 inches, most of which occurs between October and May as rainfall (USDA NRCS 2024b). Average mean air temperature for the same period ranges from as low as 41.1°F in December to 70.5°F in August. The approximate growing season begins February 9 and ends December 7 (301 days).

4.2 Precipitation Data

Field investigations for wetlands and other waters occurred on April 19-21, 2023 (west end), November 8, 2023 (east end), March 11-13, 2024 (west end), April 2, 2024 (east end), and March 20, 2025. The observed and percent of normal rainfall for the water year for each field survey is summarized in Table 1 and precipitation analysis is summarized in sections below.

Table 1. Antecedent and Percent of Normal Rainfall for Water Year to Date

Period	Recorded Precipitation (inches)	Average Precipitation (inches)	Percentage of Average Recorded
Total water year to date, April 2023 field survey (10/1/2022 through 4/18/23)	30.22	29.26	103
Total water year to date, November 2023 field survey (10/1/2023 through 11/7/23)	2.14	1.43	150
Total water year to date, March 2024 field survey (10/1/23 through 3/10/24)	31.23	25.00	125
Total water year to date, April 2024 field survey (10/1/23 through 4/1/24)	12.71	11.17	114
Total water year to date, March 2025 field survey (10/1/24 through 3/19/25)	26.30	26.04	99

4.2.1 April 19-21, 2023, Field Survey

During the 3 months prior to the April 2023 field surveys (January – March 2023) in the Portland area, antecedent rainfall received within the SA was 10.19 inches or 81 percent of average (Table 2). Rainfall conditions were drier than normal during January, and within normal range for February and March. Results of DAREM indicated that rainfall received in the area during this period was within the normal range (Table 3). Antecedent rainfall recorded in the 2 weeks prior to the first day of field surveys (April 5-18, 2023) was 3.47 inches, 2.16 inches above the 1.31-inch average for the same period. Rainfall received the 3 days prior to the survey was 0.42 inches above average.

Table 2. Summary of Precipitation Analysis January - March 2023

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Percent of Average Recorded	30% chance less than or more than ranges for normal precipitation (inches)
January 2023	3.34	5.17	66%	<3.88 >6.04
February 2023	2.49	3.65	68%	<2.28 >4.41
March 2023	4.36	3.84	114%	<2.75 >4.54
Total	10.19	12.66	81%	–

Table 3. Results of Precipitation Analysis using DAREM January - March 2023

Month	30% less than	Average	30% more than	Rainfall	Condition
January 2023	3.88 in.	5.17 in.	6.04 in	3.34 in.	Dry
February 2023	2.28 in.	3.65 in.	4.41 in.	2.49 in.	Normal
March 2023	2.75 in.	3.84 in.	4.54 in.	4.36 in.	Normal

4.2.2 November 8, 2023, Field Survey

During the 3 months prior to the November 2023 field survey (August – October 2023) in The Dalles, antecedent rainfall received within the SA was 1.59 inches or 104 percent of average (Table 4). Rainfall conditions were within normal range for August, above normal for September, and drier than normal for October. Results of DAREM indicated the amount of rainfall received in the area during the same period was within normal range (Table 5). Antecedent rainfall recorded in the 2 weeks prior to the field survey (October 25 – November 7, 2023) was 1.56 inches, 0.92 inches above the 0.64-

inch average for the same period. There was no rainfall on the day of the field survey (average is 0.06 inches).

Table 4. Summary of Precipitation Analysis August - October 2023

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Percent of Average Recorded	30% chance less than or more than ranges for normal precipitation (inches)
August 2023	0.00	0.17	0%	<0.00 >0.14
September 2023	1.01	0.29	348%	<0.06 >0.27
October 2023	0.58	1.07	54%	<0.68 >1.28
Total	1.59	1.53	104%	–

Table 5. Results of Precipitation Analysis using DAREM August - October 2023

Month	30% less than	Average	30% more than	Rainfall	Condition
August 2023	0.00 in.	0.17 in.	0.14 in	0.00 in.	Normal
September 2023	0.06 in.	0.29 in.	0.27 in.	1.01 in.	Wet
October 2023	0.68 in.	1.07 in.	1.28 in.	0.58 in.	Dry

4.2.3 March 11-13, 2024, Field Survey

During the 3 months prior to the March 2024 field surveys (December 2023 – February 2024) in the Portland area, antecedent rainfall received within the SA was 13.72 inches or 156 percent of average (Table 6). Rainfall conditions were above normal range for December and January, and normal for February. Results of DAREM indicated the amount of rainfall received in the area during the same period was roughly 5 inches above average (Table 7). Antecedent rainfall recorded in the 2 weeks prior to the first day of field survey (February 26 – March 10, 2024) was 2.71 inches, 0.98 inches above the 1.73-inch average for the same time period. Rainfall received on the 3 days of surveys was 0.30 inches, below the 0.40-inch average.

Table 6. Summary of Precipitation Analysis December 2023 - February 2024

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Percent of Average Recorded	30% chance less than or more than ranges for normal precipitation (inches)
December 2023	8.73	5.92	148 %	<3.88 >6.04
January 2024	9.43	5.17	182%	<2.28 >4.41
February 2024	4.29	3.65	118%	<2.75 >4.54
Total	13.72	8.82	156 %	–

Table 7. Results of Precipitation Analysis using DAREM December 2023 - February 2024

Month	30% less than	Average	30% more than	Rainfall	Condition
December 2023	3.88 in.	5.92 in.	6.04 in	8.73 in.	Wet
January 2024	2.28 in.	5.17 in.	4.41 in.	9.43 in.	Wet
February 2024	2.75 in.	3.65 in.	4.54 in.	4.29 in.	Normal

4.2.4 April 2, 2024, Field Survey

During the 3 months prior to the April 2024 field survey (January 2024 – March 2024) in The Dalles, antecedent rainfall received near the SA was 4.69 inches or 92 percent of average (Table 8). Rainfall conditions were within normal range for all 3 months. Results of DAREM indicated the amount of rainfall received in the area during the same period was within the normal range (Table 9). Antecedent rainfall recorded in the 2 weeks prior the field survey (March 19 – April 1, 2024) was 0.83 inches, 0.36 inches above the 0.47-inch average for the same period. There was no rainfall on the day of the field survey (average is 0.06 inches).

Table 8. Summary of Precipitation Analysis January - March 2024

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Percent of Average Recorded	30% chance less than or more than ranges for normal precipitation (inches)
January 2024	2.19	2.35	93 %	<1.53 >2.83
February 2024	1.63	1.53	107 %	<0.80 >1.87
March 2024	0.87	1.23	71 %	<0.76 >1.47
Total	4.69	5.11	92 %	–

Table 9. Results of Precipitation Analysis using DAREM January - March 2024

Month	30% less than	Average	30% more than	Rainfall	Condition
January 2024	1.53 in.	2.35 in.	2.83 in	2.19 in.	Normal
February 2024	0.80 in.	1.53 in.	1.87 in.	1.63 in.	Normal
March 2024	0.76 in.	1.23 in.	1.47 in.	0.87 in.	Normal

4.2.5 March 20, 2025, Field Survey

During the 3 months prior to the March 2025 field survey (December 2024 – February 2025) in the Portland area, antecedent rainfall received near the SA was 7.27 inches or 82 percent of average (Table 10). Rainfall conditions were drier than normal in January and within normal range for December and February. Results of DAREM indicated the amount of rainfall received in the area during the same period was within the normal range (Table 11). Antecedent rainfall recorded in the 2 weeks prior the field survey (March 6 – March 19, 2025) was 2.63 inches, 0.94 inches above the 1.69-inch average for the same period. Rainfall received on the field survey day was 0,12 inches, slightly below the 0.13-inch average.

Table 10. Summary of Precipitation Analysis December 2024 - February 2025

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Percent of Average Recorded	30% chance less than or more than ranges for normal precipitation (inches)
December 2024	6.79	5.92	115 %	<4.30 >6.98
January 2025	2.93	5.17	57 %	<3.88 >6.04
February 2025	4.34	3.65	119 %	<2.28 >4.41
Total	7.27	8.82	82 %	–

Table 11. Results of Precipitation Analysis using DAREM December 2024 - February 2025

Month	30% less than	Average	30% more than	Rainfall	Condition
December 2024	4.30 in.	5.92 in.	6.98 in	6.79 in.	Normal
January 2025	3.88 in.	5.17 in.	6.04 in.	2.93 in.	Dry
February 2025	2.28 in.	3.65 in.	4.41 in.	4.34 in.	Normal

5 Methods

Wetland and water delineations were completed in accordance with Section 404 of the Clean Water Act, Oregon Administrative Rule (OAR) 141-090, the Oregon Removal-Fill Law, and followed the DSL (2017) delineation guidance for large or linear projects. Prior to field surveys, HDR biologists completed a desktop review of relevant information, including online maps, public databases, and historical documentation, listed in Section 5.1. Following this review, HDR biologists completed a thorough field survey that included wetland and water body identification, delineation, and classification. These methods are detailed in Section 5.2.

5.1 Desktop Research

A desktop review of existing literature, maps, and other materials was conducted to identify potential wetlands and waters of the U.S. within the SA prior to initiating the field review. Existing documents reviewed included:

- Current and historic topographic maps (USGS 2024a)
- City of Portland Zoning Maps (City of Portland 2025)
- National Hydrography Dataset (NHD) maps and data (USGS 2024b)
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) (FEMA 1986)
- USDA Natural Resources Conservation Service (NRCS) Land Resource Regions (USDA NRCS 2022)
- Climate data from WETS, The Dalles (USDA NRCS 2024a)
- Climate data from WETS, Portland International Airport (USDA NRCS 2024b)
- GeoHub Willamette Valley Wetland Priority Sites (GeoHub 2023)
- National Hydric Soils List (USDA NRCS 2024c)
- NRCS Web Soil Survey (USDA NRCS 2024d)
- National Wetland Inventory (NWI) (USFWS 2024)
- National Oceanic and Atmospheric Administration (NOAA) Tides & Currents data (NOAA 2024a and 2024b)
- Essential Salmonid Habitat Map (DSL 2025)
- Statewide Wetland Inventory (SWI) (DSL 2024a)
- Local Wetland Inventory (LWI) (DSL 2024b)

- Oregon Department of Fish and Wildlife (ODFW) Compass Mapping for Fish and Wildlife Habitats (ODFW 2021)
- Oregon Fish Passage Barrier Data (ODFW 2024)
- Historic and current ESRI and Google Earth aerial photographs

5.2 Field Methodology

5.2.1 Wetlands

The survey team investigated the SA for wetlands using the methods described in the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Manual; Environmental Laboratory 1987) and the Regional Supplement to the USACE *Wetland Delineation Manual: Western Mountains, Valleys and Coast (WMVC) Region* (WMVC Supplement; Environmental Laboratory 2010). The methodology outlined in the manuals is based on three parameters for identifying wetlands: hydrophytic vegetation, hydric soils, and hydrology. In general, the three parameters must be present to determine the presence of a wetland, except in unusual circumstances.

The east end SA in The Dalles occurs just west and within the recommended boundary for use of the WVMC Supplement versus the Arid West supplement. After review of the desktop resources, including recorded climate data, topographic and elevation data, and based on observations of hydrology and vegetative cover within and surrounding the SA, HDR biologists concluded the area within the east end SA was not dissimilar enough from characteristics found in the west to warrant use of the Arid West supplement.

Formal paired sample plots were established and evaluated in each wetland identified within the SAs. Paired sample plot locations were selected based on available resource maps, aerial imagery, and on-site assessment of the SA, which included identifying dominant plant species, changes in topography, soil test probes, and observed hydrologic inputs. In addition, verification plots were collected to characterize conditions in upland areas that had the potential to meet wetland criteria, including NWI mapped wetlands, mapped hydric soils, areas with hydrophytic vegetation and in geomorphic landscape positions that may support wetlands (e.g., toe of slopes, depressions, etc.).

Alternative methods were used at some locations within the SA. Wetlands were determined to be present within the ordinary high-water mark (OHW) of Threemile Creek. Boundaries were estimated based on geomorphic position and observations of hydrophytic vegetation, predominantly reed canarygrass (*Phalaris arundinacea*) and broadleaf cattail (*Typha latifolia*), and the presence of perennial surface water. No sample plots were collected at this site.

In some areas, mainly riverward of HDD drill areas, only desktop and visual surveys were conducted due to access restrictions (impenetrable understory, fencing) and safety concerns (steep slopes) (Figure 5, Appendix A). Conclusions about the presence or absence of wetland or other water resources in these areas could not be made; however, these areas are all outside the anticipated ground disturbance footprint, in areas of deep underground drilling, and would not be impacted by the Project. If ground disturbing activities are proposed in the future, additional field surveys may be needed in these areas. NWI wetlands mapped within the desktop and visual SAs are assumed to be present and are mapped on Figure 3 (Appendix A). At the Harborton substation site within the west end SA, permission to excavate soil pits was not granted. As a result, one wetland was determined to have hydric soils based on observations of hydrophytic vegetation and hydrology indicators present at the ground surface; this wetland boundary was conservatively estimated based on these observations (Section 6).

Sample plot and wetland boundary locations were recorded with survey-grade global positioning system (GPS) units capable of sub-meter accuracy (ArcCollector GPS unit with EOS Arrow GNSS receiver), surveyed by a qualified delineator, and mapped on Figure 5 (Appendix A). Sample plot observations were recorded on wetland determination data forms, provided in Appendix B. Ground-level color photographs recorded for each surveyed feature and at verification plots are presented in Appendix C. The methods used to determine the presence of hydric soils, hydrology, and hydrophytic vegetation are discussed in the following sections.

Soils

Generally, an area must contain hydric soils to be a wetland. Hydric soil forms when soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part (12 inches). Biological activities in saturated soil result in reduced oxygen concentrations, and organisms turn to anaerobic processes for metabolism. Over time, anaerobic biological processes result in certain soil color patterns, which are used as indicators of hydric soil. Typically, low-chroma colors are formed in the soil matrix, and bright-colored redoximorphic features form within the matrix. Other important hydric soil indicators include organic matter accumulations in the surface horizon, reduced sulfur odors, and organic matter staining in the subsurface (USDA NRCS 2018).

Soils at each representative wetland and upland sample plot were typically inspected to a depth of 16 to 24 inches to determine the presence or absence of hydric soil indicators based on guidance presented in the WMVC Supplement and Field Indicators of Hydric Soils Version 8.2 (USDA NRCS 2018). Soil samples were moistened when necessary to aid in the determination of soil matrix and redoximorphic features (if present): hue, value, and chroma (Munsell Color Services 2009). Soil texture was evaluated using field methods described by USACE and NRCS.

Wetland sample plots or verification plots were established in each type of hydric soil within the west end SA that were accessible and where permissions to excavate were granted. Two hydric soils occur in this area: Rafton Silt Loam (39) and Sauvie Silt Loam (44). Other soils that occur within the west end SA have minor hydric components: Pilchuck Sand (31) and Pilchuck-Urban Complex 0-3 percent slopes (33A). No hydric soils occur on the east end of the SA. All soil units occurring within the SAs are presented on Figure 4 (Appendix A).

Hydrology

Sample plots were examined for evidence of hydrology. Wetland hydrology criteria were considered satisfied if it appeared that the soil was seasonally inundated or saturated to the surface for a consecutive number of days greater than or equal to 12.5 percent of the approximate growing season. Approximate growing seasons, as recorded for the Portland International Airport and The Dalles weather stations, are detailed in Section 4.

Wetland hydrology indicators are divided into two categories: primary and secondary (Environmental Laboratory 2008; Environmental Laboratory 2010). Primary indicators of hydrology include surface inundation, high water table, and saturated soils. The presence of one primary indicator is sufficient to conclude that wetland hydrology is present. In the absence of a primary indicator, observation of two or more secondary indicators is required to conclude that wetland hydrology is present. Secondary indicators of hydrology include dry-season water table, shallow aquitard, geomorphic position, and facultative (FAC)-neutral test (Environmental Laboratory 2008; Environmental Laboratory 2010).

Antecedent rainfall received in the west end SA 3 months prior to the field survey was approximately 5 inches greater than normal (Section 4). As a result, HDR biologists were cognizant of potentially observing false positives for wetland hydrology during the field survey. Precipitation received within the SAs for all other surveys was considered within normal range.

Vegetation

The sample plots were examined for the presence of hydrophytic vegetation and the proportion of hydrophytic vegetation to non-hydrophytic vegetation. Sample plots varied in size depending on site topography and habitat complexity. The objective of establishing plots is to depict plant associations that reflect specific water regimes or other ecological factors. Therefore, on steep-sided riparian areas, a plot may consist of a narrow strip along the water's edge; or within a floodplain, a plot may be a standard 30-foot circle.

Hydrophytic vegetation is defined as vegetation adapted to wetland conditions. To meet the hydrophytic vegetation criterion, more than 50 percent of the dominant plants in each stratum must be facultative, facultative wetland, or obligate, based on the wetland indicator category assigned to each plant species by the USACE National Wetland Plant List (Table 12; Environmental Laboratory 2020). Table 12 lists the definitions of the indicator categories.

Dominant plant species and their wetland indicator status were evaluated to determine if vegetation criteria were met. In accordance with USACE methodology, for a vegetative community to be considered hydrophytic, the sample plot must meet either the rapid test for wetland vegetation, greater than 50 percent of the dominant plant species must be classified as hydrophytic or have a prevalence index of less than 3.00, where the sample plot also meets hydric soils and wetland hydrology indicators.

Table 12. Definition of Wetland Plant Indicator Categories

Wetland Indicator Category	Symbol	Definition
Obligate wetland plants	OBL	Almost always occur in wetlands.
Facultative wetland plants	FACW	Usually occur in wetlands but may occur in non-wetlands.
Facultative plants	FAC	Occur in wetlands and non-wetlands.
Facultative upland plants	FACU	Usually occur in non-wetlands but may occur in wetlands.
Upland plants	UPL	Almost never occur in wetlands.

Source: Lichvar et al. (2012)

5.2.2 Waterbodies

The OHW, the highest measured tide (HMT) and high tide line (HTL) for identified perennial and intermittent waters within the SA were recorded with survey-grade GPS units capable of sub-meter accuracy (ArcCollector GPS unit with EOS Arrow GNSS receiver), surveyed by qualified delineator, and mapped on Figure 5 (Appendix A). The centerline of ephemeral drainages was collected using the same method.

Ordinary High Water Mark

The SA was investigated for non-wetland, non-tidal water bodies using the methods described in the USACE *A Guide to Ordinary High Water Mark (OHW) Delineation for Non-Perennial Streams in the*

Western Mountain, Valleys, and Coast Region of the United States (Mersel and Lichvar 2014), OAR 141-085-0515 Removal-Fill Jurisdiction by Type of Water, and the *Streamflow Duration Assessment Method for Oregon* (Nadeau 2011). HDR biologists first identified likely features based on an analysis of aerial imagery, topographic maps, and available online mapping of resources (USGS 2024a; USGS 2024b). A field survey was conducted in these areas and others to evaluate features indicative of perennial, intermittent, or ephemeral streams, mainly the OHW: a clear, natural scour line, changes in depositional sediment, destruction of terrestrial vegetation, distribution of upland and water-tolerant vegetation, and drift deposits (OAR 141-085-0515[3]; Mersel and Lichvar 2014).

High Tide Line

Water bodies that occur below Bonneville Lock and Dam are considered tidally influenced (Roegner et al. 2010; DSL 2024c). Within the SA these water bodies include the Columbia and Willamette rivers, and the Columbia Slough.

HDR biologists identified the HTL in the SA using USACE guidance. Per USACE, (33 Code of Federal Regulations [CFR] 328.3[c][4]), the HTL is "the line of intersection of the land with the water's surface at the maximum heights reached by a rising tide." In the absence of actual data, the HTL can be identified by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. Additionally, the line includes spring high tides and other high tides that occur with periodic frequency but excludes storm surges.

A method used by the USACE to obtain the HTL uses the highest astronomical tide (HAT) referenced to the mean lower-low water (MLLW) datum (0.0 feet), as reported by NOAA station data for water surface elevations. The HAT refers to the highest predicted astronomical tide expected to occur at a specific station over the National Tidal Datum Epoch.

In Oregon, tidal rivers below the head of tide (Bonneville Lock and Dam) are jurisdictional to the state up to the elevation of the HMT or to the upper edge of wetland, whichever is higher and excluding storm surge (OAR 141-085-0515(2)). The HMT is determined by using tidal station data, installing gages on site or delineating in the field; using tidal data the HMT is considered the "highest water level elevation…converted to geodetic datum NAVD88" (DSL 2024c).

HDR reviewed tidal data maintained by NOAA for the Columbia River and Columbia River Slough from the Vancouver station (9440083) and tidal data for the Willamette River from the Portland Morrison Bridge station (9439221) (NOAA 2024a and 2024b). The data measurement "highest observed tide (max tide)" is assumed to represent the HMT. The HMT is expected to be located at a higher elevation than the HAT due to the nature of the waterways in the geographic landscape. Along with tidal influences, the Willamette and Columbia rivers and the Columbia Slough are subjected to annual and periodic fluctuations in water levels based on many factors, including regional precipitation input, upstream dam operations and the spring freshet.

Additionally, following OAR 141-085-0515 [2 (a-f)], biologists delineated HMTs on March 11-13, 2024, on the west bank of the Willamette River, the Columbia River shore north of Terminal 6 and the east side of the Columbia Slough. Delineated HTLs, nearby recorded tidal data and topographic resources were used to determine the high tide line or highest measured tide within the SA where shorelines were not accessible or tidal data is missing.

According to NOAA, highest observed tide (maximum tide) of 15.49 feet and HAT of 3.83 feet was recorded for the MLLW datum at the Vancouver station, which corresponds to elevation of 17.30 feet for maximum tide and HAT of 5.64 feet for the North American Vertical Datum of 1988 (NAVD88) datum with the Columbia River Datum offset. The present values are based on data from 1983 through 2001 (NOAA 2024a). The highest observed tide for the NAVD88 datum, 17.30 feet is mapped on Figure 5 (Appendix A) as the HTL for the Columbia River and Columbia Slough and is generally consistent with and slightly more conservative than physical indicators observed in the field which mainly occurred between 13 and 15 feet in elevation.

Tidal data from the Portland Morrison Street Bridge station (9439221) was used to determine HTL on the Willamette River. According to NOAA, the HAT of 4.12 feet was recorded for the MLLW datum, which corresponds to an elevation of 11.15 feet for the NAVD88 datum. There was no maximum tide (highest observed tide) recorded; therefore, the HAT of 11.15 feet was used as a reference, taken with field delineated highest measured tide to determine the elevation of the HTL. The present values are based on data from 1983 through 2001 (NOAA 2024b). For the Willamette River, the field indicators of the high water were located at a higher elevation (approximately 14 feet) than the NAVD88 HAT data (11.15 feet) recorded at the Portland Morrison Street Bridge station. The elevation of field indicators is presented on Figure 5 (Appendix A).

6 Description of All Wetlands and Other Non-Wetland Waters

A total of four wetlands, three aquatic features, four waterbodies, two ditches, and two ephemeral drainages were delineated or estimated within the east and west end SAs. No areas of special concern, as defined by OAR 141-090-0020(3), were identified in the SA. General location information and physical descriptions of each wetland and non-wetland water are summarized in subsections below, more detailed information is presented in Table 13 and Table 14. Other waters are fully described in Table 15.

Biologists did not have full access to all wetlands and water bodies in the SA due to property access issues, lack of permission to excavate soils, and safety concerns. The resources within areas that were not accessed were estimated using desktop methods, field observations (where possible), and best professional judgment, as noted in Section 5.2.1 and in this section. There are four mapped NWI wetlands that occur within the “desktop and visual survey only area” outlined on Figure 5. The alignment through these areas would be placed using HDD methods beneath shoreline and wetland areas. The following mapped NWI wetlands were not fully accessed during the wetland delineation survey and are assumed present within the SA:

- Between HDD Area 12 and Cofferdam 4 in The Dalles, PSS/EM1Ah, PFO1Ch and PEM1Fh wetlands are mapped by the NWI along the Columbia River shoreline (Figure 3, page 8). No NRCS hydric soils are mapped in this area. The topography in this area is approximately 5 to 10% grade downslope toward the river. Visual observation in the field and desktop review indicates the area mapped as PSS/EM1Ah wetland occurs within Wasco County Riverfront Park and is mainly comprised of an asphalt parking area and park infrastructure including restroom facilities, small maintenance buildings and a playground. The areas of mapped PSS/EM1Ah that occur outside park development are assumed present. Mapped PFO1CH and PEM1Fh wetlands occur in vegetated areas along the Columbia River shoreline and are assumed present.

- An area of mapped NWI PFO1S occurs southwest of HDD Area 07 East (Figure 3, page 6). No NRCS hydric soils area mapped in this area. Review of topography during survey and desktop resources show the potential for groundwater and rainwater to collect in a low topographic depression that occurs parallel and slightly north of the Columbia River shoreline. An overstory of black cottonwood (*Populus trichocarpa*) was observed during survey; however, the understory in the area was heavily armored with Himalayan blackberry (*Rubus armeniacus*) and not accessible. Field observation and desktop review indicate these wetlands are likely present.
- Ramsey Lake and multiple wetland types are mapped by the NWI (PEM1F, PSS1S, PSS1R, PFO1S, PUBV, and PUBT) between HDD Area 04 and HDD Areas 03a and 03b (Figure 3, page 3). NRCS mapped hydric soils occur in this area. Strong wetland signatures of hydrology and wetland vegetation were observed in the field and using desktop resources. These wetlands are assumed present.
- Along the west shore of the Willamette River, the NWI maps a narrow area PFO1R wetland (Figure 3, page 1). NRCS hydric soils are mapped in this area. Visual observations in the field of shoreline vegetation and desktop resources indicate these wetlands are likely present.

In addition, a stormwater feature, roughly 3,700 square feet, was observed within the footprint of HDD Area 2 located on the right bank of the Willamette River (Figure 5, page 4, Appendix A; Photo 39, Appendix C). Site access was not granted to fully investigate the site. Therefore, review of this feature was limited to visual observations in the field and desktop review of online resources. Standing water was present during the time of the survey. Aerial imagery shows the feature was likely created in 2020 as part of a large site expansion project on the parcel and likely receives hydrology inputs from stormwater runoff from impervious surfaces located on industrial lot to the north. No mapped NWI wetlands or hydric soils occur in the SA, and no wetland features were noted on historic aerial images or in the field. Downstream connection to the Willamette River could not be confirmed; collected stormwater could infiltrate on site.

The following is a summary of all wetland and other non-wetland waters.

6.1 Wetland 1

Wetland 1 (0.06 acres) occurs in a small closed depressional area on Hayden Island within the Hayden Island – Columbia River watershed (HUC 170800030200; OSU 2025) (Figure 5, page 31, Appendix A; Photos 18 and 19, Appendix C). This wetland is mapped in the NWI as PEM1C, and within the Hayden Island wetland priority site (GeoHub 2023). Dominant vegetation within the wetland includes reed canarygrass (*Phalaris arundinacea*) and Fuller's teasel *(Dipsacus follonum*). Vegetation in Wetland 1 was classified in the field as palustrine emergent (PEM) (Cowardin 1979). Soil profiles within the wetland meet the hydric soil indicator for redox dark surface. Soils are silt loam across three layers with matrix colors of 10YR 3/3, 7.5YR 3/1, and 2.5Y 3/3. Redox concentrations of 5YR 3/4, 7.5YR 3/3, 7.5YR 2.5/3, 10YR 3/4, and 2.5Y 3/1 begin 2 inches below the surface in the bottom two layers and are located in the matrix and pore linings. Wetland hydrology indicators include the primary indicators for inundation visible on aerial imagery. Secondary indicators for saturation visible on aerial imagery, geomorphic position, and FAC-neutral test are met. Wetland hydrology is attributed to groundwater and precipitation inputs.

6.2 Wetland 2A

Wetland 2A (0.06 acres) occurs in a small depressional area located to the south of Wetland 2B on Hayden Island within the Hayden Island – Columbia River watershed (HUC 170800030200; OSU 2025) (Figure 5, pages 29, Appendix A; Photos 20 and 46, Appendix C). The wetland is mapped in the NWI as PUBT and within the Hayden Island wetland priority site (GeoHub 2023). Dominant vegetation in the wetland is reed canarygrass. Vegetation in Wetland 2A was classified in the field as PEM (Cowardin 1979). Soil profiles within the wetland meet the hydric soil indicator for sandy redox. Soils are sandy loam, loamy sand or sand, with a matrix color of 10YR 2/1 or 10YR 4/1 and redox concentrations of 5YR 3/4 or 10YR 4/3 as concentrations in the matrix or along pore lining and root channels. Wetland hydrology indicators include visible inundation and saturation on aerial imagery and geomorphic position. Wetland hydrology is attributed to groundwater and precipitation inputs.

South of Wetland 2A and outside the SA, a verification plot (VP-13, Appendix B) confirmed wetland conditions. Dominant vegetation in the area is reed canarygrass. Soils were sandy and meet the sandy redox indicator for hydric soils. Positive wetland hydrology indicators include visible inundation on aerial imagery and the FAC-neutral test. No additional hydrology indicators were observed in the field. The wetland boundary was estimated from field observation and included on Figure 5, page 29 (Appendix A) and a ground-level photograph is included in Appendix C, photo 45.

6.3 Wetland 2B

Wetland 2B (0.71 acres) occurs in a depressional ponded area located on Hayden Island within the Hayden Island – Columbia River watershed (HUC 170800030200; OSU 2025) (Figure 5, page 29, Appendix A; Photos 21, 22a and 22b, Appendix C). The wetland is mapped in the NWI as PUBT and within the Hayden Island wetland priority site (GeoHub 2023). Dominant vegetation within the wetland includes reed canarygrass and an unidentified bluegrass species (*Poa ssp*). Vegetation in Wetland 2B was classified in the field as PEM (Cowardin 1979). Soil profiles within the wetland meet the hydric soil indicators for sandy redox. Soils are sandy loam, sand, and loamy sand with matrix colors of 10YR 2/2, 10 Y/R 3/2, 2.5Y 3/2, 2.5Y 4/1 and 5Y 3/1 and redox concentrations of 5YR 3/4 as concentrations in the matrix or along root channels. Wetland hydrology indicators include surface water, high water table, saturation, surface water visible on aerial imagery. According to current and historic aerial imagery, the ponded area within Wetland 2B is permanently flooded. The depth of surface water was roughly 2 to 3 feet deep at the time of the delineations. Wetland hydrology is attributed to groundwater and precipitation inputs.

6.4 Wetland 3

Wetland 3 (3.97 acres) is a depressional area that receives stormwater and precipitation inputs located east of the Willamette River and is located in both the Balch Creek – Willamette River watershed (HUC 170900120202) and the Columbia Slough watershed (HUC 170900120201; OSU 2025) (Figure 5, pages 5, Appendix A; Photos 32 through 38, Appendix C). The wetland has several distinct lobes and is mapped in the NWI as PUBH, PEM1F, and PSS1C, and within the Columbia Slough and Lakes wetland priority site (GeoHub 2025). Dominant vegetation includes reed canarygrass, bittercress (*Cardamine oligosperma*), an unidentified bluegrass species, an unidentified senecio (*Senecio ssp.*) species, slough sedge (*Carex obnupta*) red alder (*Alnus rubra*), shining willow (*Salix lasiandra*), and Hooker's willow (*Salix hookeriana*). Vegetation within the wetland was predominantly classified as palustrine scrub/shrub (PSS) with smaller communities of as PEM and palustrine forested (PFO) communities present (Cowardin 1979). Soil textures varied across the wetland and included sandy loam, sandy clay, silt loam, sand and, to a lesser degree, organic matter. Matrix colors included 10YR 3/2, 10YR 2/2, 7.5YR 2.5/1, 2.5Y 3/1 and 5Y 2.5/1 with redox concentrations of 7.5YR 3/4 within the matrix or along pore linings and root channels. Soil profiles within the wetland meet the hydric soil indicators for sandy redox, hydrogen sulfide, and redox dark surface across multiple soil pits. Wetland hydrology indicators include surface water, high water table, saturation, water marks, iron deposits, inundation and saturation visible on aerial imagery, oxidized rhizospheres along living roots, hydrogen sulfide odor, FAC-neutral test and geomorphic position. Wetland hydrology is attributed to groundwater, stormwater runoff and precipitation inputs. A roughly 24-inch stormwater culvert located on the east end likely discharges hydrology from upstream wetlands as well as stormwater inputs from the surrounding industrial developments (Photo 32, Appendix C). According to current and historic aerial imagery, ponded areas within Wetland 3 are permanently flooded. The depth of surface water was roughly 2 to 3 feet deep in the deepest portions of the ponded areas. During the field investigations it was observed that each distinct lobe of the wetland is hydrologically connected via stormwater pipes and surface water channels. No surface water connection to the Willamette River was observed during the wetland delineation.

6.5 Wetland 4

Wetland 4 (0.05 acres) is a riverine wetland located within the OHW of Threemile Creek and is within the Threemile Creek watershed (HUC 170701050402; OSU 2025) (Figure 5, pages 49, Appendix A; Photos 8, Appendix C). The wetland is mapped in the NWI as PSS1C. Dominant vegetation includes reed canarygrass and cattail (*Typha latifolia*). Red alder and Himalayan blackberry occur at the edges of the wetland and stream. Vegetation in Wetland 4 was classified in the field as PSS (Cowardin 1979). Wetland hydrology indicators include surface water, high water table, and saturation and are attributed to the wetland proximity to Threemile Creek. Soil pits were not dug for Wetland 4; hydric soils are assumed present.

6.6 Area A

Area A (0.03 acres) occurs in a depressional area within a historic dredged fill placement site and is in the Lake River – Frontal Columbia River watershed (HUC 170800030104; OSU 2025) (Figure 5, pages 35 and 36, Appendix A; Photos 24 and 25, Appendix C). This feature is not mapped in the NWI. Dominant vegetation includes western dogwood (*Cornus alba*), balsam poplar (*Populus balsamifera*) and an unidentified bluegrass species. Vegetation in Area A was classified in the field as PEM (Cowardin 1979). Soils in the wetland meet the hydric soil indicator for sandy gleyed matrix. Soils are sandy loam or sand with a matrix color of 10YR 2/2, 2.5YR 3/2 and 5GY 4/1 with no redox concentrations present. Wetland hydrology indicators include the primary indicators surface water, high water table, and saturation, with secondary indicators geomorphic position and FAC-neutral test. Hydrology is attributed to precipitation inputs.

6.7 Area B

Area B (0.01 acres) occurs in a depressional area within a historic dredged fill placement located southwest of Area B and within the Lake River – Frontal Columbia River watershed (HUC 170800030104; OSU 2025) (Figure 5, pages 35 and 36, Appendix A; Photos 25 and 26, Appendix C). This feature is not mapped in the NWI. Dominant vegetation includes an unidentified bunch grass (*Festuca ssp*) and *Poa ssp.*, both assumed to be facultative wetland species. Soils in the wetland meet the hydric soil indicators for sandy redox and stripped matrix. The soils are sand and sandy loam with a matrix color of 10YR 2/1 and 2.5Y 5/1 with redox concentrations of 7.5 YR 2.5/2 and 7.5YR 3/4 located in the matrix. Wetland hydrology indicators include the primary indicators high water table, and saturation, with one secondary indicator meeting geomorphic position. Hydrology is attributed to precipitation inputs.

6.8 Area C

Area C (0.10 acres) occurs in a depressional area located within a man-made berm and is located within the Birch Creek – Willamette River watershed (HUC 170900120202; OSU 2025) (Figure 5, pages 1 and 2, Appendix A; Photo 41, Appendix C). This depressional area formed in fill material from the Harborton Restoration Project completed in 2020 (PGE 2025). The fill material was excavated from dredging and restoration of the Harborton Wetlands located to the north. Fill was placed just east of the Harborton substation in order to create upland habitat. The area is not mapped as a wetland by NWI. USGS hydric soils are mapped; however, these soils are likely associated with the relic floodplain to the Willamette River located several feet below the fill material. Permission to excavate soils was denied so hydric soil indicators could not be evaluated. Dominant vegetation includes reed canarygrass, yarrow (*Achillea millefolium*), and *Poa ssp.* The primary wetland hydrology indicator for surface water was observed collected in equipment tire tracks (Photo 41b, Appendix C). High water table and saturation are assumed but could not be confirmed in the field. Hydrology is attributed to precipitation inputs and poor drainage due to soil compaction that likely occurred during fill placement and grading.

6.9 Threemile Creek

Threemile Creek is located within the SA at multiple locations along the east end of the project in The Dalles, Oregon (Figure 5, pages 49 through 52, Appendix A; Photos 6 through 8, Appendix C). In the SA, the creek is mapped in the NWI as PSS1C and in the NHD as an intermittent waterbody. Threemile Creek is located in Threemile Creek Watershed (HUC 170701050402; OSU 2025). The creek originates in the foothills of the east side of Mt. Hood and generally flows northeast to its confluence with the Columbia River. The stream gradient within the survey corridor varied between 2 and 10 percent with steeper gradients occurring upslope and adjacent to US 197. The existing riparian area has been truncated by urban development through the majority of the SA and generally consisted of an overstory of Russian olive (*Elaeagnus angustifolia*), Himalayan blackberry, and a varied herbaceous layer. Threemile Creek flows beneath US 197 between HDD Area 17 and 18 (Figure 5, page 52, Appendix A) and south of HDD Area 16 via culvert, and again beneath OR 30 west of HDD Area 14 via culvert (Figure 5, page 50 and 51, Appendix A). In these locations, both US-197 and OR 30 are elevated from the ground surface due to road fill while Threemile Creek flows beneath them. Threemile Creek also flows parallel to the proposed trench location south of I-84 (Figure 5, page 49, Appendix A). In this location, the OHW of Threemile Creek is approximately 100 feet east of the proposed cable location. Threemile Creek has an associated wetland within the SA, Wetland 4, near the northeast portion of the SA. Threemile Creek and Wetland 4 continue off site to the north.

6.10 Columbia River

The Columbia River is located within the east and west ends of the SAs and is located in the Lower - and Middle Columbia River Basins (HUC 170800 and 170701; OSU 2025) (Figure 5, pages 27, 28, 36, 37, 41, and 42, Appendix A; Photos 14, 27 and 28, Appendix C). The Columbia River is mapped in the NWI and NHD as a traditional navigable water (TNW). The Columbia River and its tributaries form the fourth largest river basin in North America, originating at Columbia Lake in British Columbia. The Columbia River is buffered by riparian habitat on both the east and west end as it flows through the project area, and is generally characterized as contiguous intact riparian vegetation, as described in the SFAM report. The proposed line will enter the Columbia River outside of the OHW at project HDD Area 12 and be installed via HDD to Cofferdam 4 within the OHW (Figure 5, page 42 and 43, Appendix A). From Cofferdam 4, the line will be installed via hydroplow within the OHW of the Columbia River as it is placed moving west up to a cofferdam located outside Hayden Island. The line will be drilled beneath the OHW to HDD Area 08 on Hayden Island (Figure 5, page 41, Appendix A). From HDD Area 08, the cable will be placed along Hayden Island via trench and be drilled beneath the Columbia River via HDD between the two HDD Areas 06 and 07, both of which are located outside the OHW (Figure 5, pages 36 and 37, Appendix A). All HDD areas and above ground trenching are located outside the OHW of the Columbia River and are placed in previously cleared areas with minimal to no riparian vegetation. The SFAM report was developed for in-water work in the Columbia River and will be submitted separately.

6.11 Columbia Slough

Columbia Slough is located within the western end of the project in Portland, Oregon (Figure 5, pages 16 and 17, Appendix A; Photo 31, Appendix C). In the SA, The Columbia Slough is mapped in the NWI as PFO1F, R1UBV, PSS1R, PEM1R, and PUBV and in the NHD as a perennial waterbody. The Columbia Slough is located in the Columbia Slough Watershed (HUC 170900120201; OSU 2025). The Columbia Slough is a narrow waterway about 20 miles long in the floodplain of the Columbia River. The slough generally meanders west from the Columbia River to the Willamette River, is low gradient (approximately 1.5 percent) and contains many adjacent wetlands and riparian habitat primarily comprised of black cottonwood, willow (*Salix ssp.*), ash (*Fraxinus ssp.)* and oak (*Quercus ssp.*) trees. The Columbia Slough within the SA is mapped by as the Columbia Slough and Lakes wetland priority site (GeoHub 2025). Within the SA the Columbia Slough is located between HDD Area 03a/03b and HDD Area 04 (Figure 5, pages 15 through 17, Appendix A). All these HDD work areas and all above ground trenching are located outside the HTL of the Columbia Slough and are placed in previously cleared areas with minimal to no riparian vegetation. The cable will be drilled beneath the Columbia Slough via HDD between HDD Areas 04 and 03a/03b.

6.12 Willamette River

The Willamette River is located at the west end of the SA in Portland, Oregon (Figure 5, pages 2 through 4, Appendix A; Photograph 40, Appendix C). In the SA, the river is mapped in the NWI as R1UBV and PFO1R, and in the NHD as a perennial waterbody. The Willamette River is located in the Balch Creek-Willamette River watershed (HUC 170900120202; OSU 2025). The Willamette River originates in the mountains south and southeast of Eugene and flows northward through Portland to its confluence with the Columbia River. The Willamette River riparian corridor is characterized generally as a riparian forest with forested wetlands, freshwater marshes and mudflats, with diverse vegetation of species and structure, though the riparian area within the SA has been previously disturbed, is not forested, contains no wetlands, and has much less species diversity. Within the SA, the cable will be drilled beneath the Willamette River between HDD Areas 01 and 02 (Figure 5, pages 1, 2 and 4, Appendix A). Both HDD work areas and all above ground trenching are located outside the OHW of the Willamette River and are placed in previously cleared areas with minimal to no riparian vegetation.

6.13 Verification Plots

A total of 12 verification plots (VP-1 through VP-14) were established in the SA to confirm upland conditions in areas where mapped NWI features occur, including within mapped hydric soils, areas with hydrophytic vegetation, and in geomorphic landscape positions that may support wetlands (e.g., toe of slopes, depressions, etc.). Plots VP-1 and VP-2 were established in an actively farmed agricultural field; early growing season aerial images are included in Appendix A.

Table 13 and Table 14 summarize the wetland and water bodies, respectively. All features in Table 13 meet the definition of a wetland based on survey of positive indicators of hydrophytic vegetation, hydric soils and wetland hydrology; three areas (Area A, Area B, and Area C) are presumed not to be jurisdictional to the USACE or DSL per regulations outlined in the table. Table 15 summarizes surveyed drainages and other waters. Detailed wetland and water body delineation maps, including verification plot locations, are provided in Figure 5 of Appendix A. Wetland determination data forms are provided in Appendix B. Representative ground-level color photographs are provided in Appendix C. Stream duration assessment forms are in Appendix E.

Table 13. Wetland Summary

Name	Figure 5 Map #	Lat/Long	Area (acre)[a]	Cowardin Classification[b]	HGM Classification[c]	Sample Points	Photo Points	USACE PJD[d]	DSL PJD[e]	Additional Information for Jurisdictional Determination	Access (yes/no)
Wetland 1	31	45.623584 -122.710258	0.06	PEM	Depressional	W1-P1 (W) W1-P2 (U)	18-19	No, (a)(4)	Yes, (4)	Wetland 1 occurs within a small closed depressional area on Hayden Island with PEM vegetation. Inundation is visible on aerial imagery in some years but there is no surface water connection to a jurisdictional water of the U.S. or state. This wetland is mapped by the NWI as (PEM1C) and NRCS hydric soils. This wetland is within a FEMA AE flood zone.	Yes
Wetland 2A	29	45.626912 -122718384	0.71	PEM	Depressional	W2-P1 (W) W2-P2 (U) VP-14	20, 46	No, (a)(4)	Yes, (4)	Wetland 2A occurs within a small closed depressional area on Hayden Island with PEM vegetation. The topography slopes i from southwest to northeast. No outlet or surface water connection to a jurisdiction water of the US or state was observed during the survey. This wetland is mapped by the NWI as (PUBT) and is within a FEMA AE flood zone but is not mapped as hydric soils (NRCS)	Yes
Wetland 2B	29	46.626522 -122717146	0.06	PEM	Depressional	W2-P3 (W) W2-P4 (U) W2-P5 (W) W2-P6 (U)	21, 22a and 22b	No, (a)(4)	Yes, (4)	Wetland 2B occurs within a closed depressional area on Hayden Island. The wetland is characterized as a depressional permanently ponded area with fringe PEM vegetative community. Inundation is visible on aerial imagery in some years. No outlet or surface water connection to a jurisdiction water of the US or state was observed during the survey. This wetland is mapped by the NWI (PUBT) with PSS fridge and is within FEMA AE flood zone but is not mapped as hydric soils (NRCS). No shrub/scrub vegetation was observed during the site visit.	Yes
Area A	35 and 36	45.618825 -122.716722	0.03	PEM	Depressional	Area A-P1 (W) Area A-P2 (U)	24-25	No, (b)(7)	No, (7)(b)	Area A occurs within a man-made depressional feature created in upland in the early 2000s by the placement of a large quantity of dredge fill sand placed over geomembrane fabric. This feature appears to have been created for stormwater conveyance due to the presence of an outlet on the east end of the feature, but no signs of flow were observed in the field. No wetland is mapped in this location in the NWI nor do NRCS hydric soils occur here. This area occurs within FEMA Flood Zone X. This area meets the definition of a wetland but would not be considered a water of the US per USACE Title 33 CFR 328(b)(7). In addition, because this wetland is an artificially created wetland created entirely from upland soils, this area will likely be considered exempt from state regulation per OAR 141-085-0515(7)(b).	Yes
Area B	35 and 36	45.618658 -122.716893	0.01	PEM	Depressional	Area B-P1 (W) Area B-P2 (U)	25-26	No, (b)(7)	No, (7)(b)	Area B is physically similar to Area A and these areas are separated by a man-made soil berm. No outlet is present. No wetland was mapped on the NWI or hydric soils mapped on NRCS. This area occurs within FEMA Flood Zone X. This area meets the definition of a wetland but would not be considered a water of the U.S. per USACE Title 33 CFR 328(b)(7). In addition, because this wetland is an artificially created wetland created entirely from upland, this area will likely be considered exempt from state regulation per OAR 141-085-0515(7)(b).	Yes
Wetland 3	5	45.618080 -122.781029; 45.617280 -122.785019; 45.616996 -122.783152	3.97	PSS	Depressional	W3-P1 (W) W3-P2 (U) W3-P3 (W) W3-P4 (U) W3-P5 (W) W3-P6 (U)	32-38	No, (a)(4)	Yes, (4)	Wetland 3 is a wetland complex that occurs within a large depressional area near the Willamette River. In early 2000s, the majority of the wetland is artificially created and serves as a stormwater retention basin. The area is mapped as several different NWI wetlands with the following Cowardin classes: PEM1F, PSS1C, and PUBH. This area occurs within FEMA Flood Zone X and is not mapped in NRCS hydric soils.	Yes
Area C	1 and 2	45.614694 -122.794906	0.10	PEM	Flats	Area C-P1 (W) Area C-P2 (U)	41	No, (b)(7)	No, (7)(b)	Area C occurs within a man-made berm constructed in 2020 for the PGE Harborton Wetland Restoration Project. The area is mapped as hydric soils (NRCS) but not mapped in the NWI. Permission to excavate soil samples was not granted; hydric soils are assumed. This area meets the definition of a wetland but would not be considered a water of the US per USACE Title 33 CFR 328(b)(7). In addition, because this area is created entirely from upland, this area will likely be considered exempt from state regulation per OAR 141-085-0515(7)(b). This area occurs within FEMA Flood Zone X.	Yes, with condition of no excavation of soils
Wetland 4	49	45.601846 -121.141901	0.05	PSS	Riverine	N/A	8	Yes, (a)(4)(i)	Yes, (4)	Wetland 4 is a riverine wetland that occurs within the OHW of Threemile Creek. This wetland is mapped by NWI (PSS1C) and occurs in a FEMA Zone A floodway. No NRCS hydric soils are mapped in this portion of the SA. Wetland 4 continues off site to the north and there is a mapped surface connection to the Columbia River via Threemile Creek.	Yes

[a] As measured within the survey area.
[b] *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979; FGDC 2013). PSS = palustrine scrub shrub; PEM = palustrine emergent; PUB = palustrine unconsolidated bottom.
[c] Hydrogeomorphic (HGM) classification is based on *A Hydrogeomorphic Classification for Wetlands* (Brinson 1993).
[d] Code of Federal Regulations (CFR) Title 33 Part 328.3, USACE.
[e] OAR 141-085-0515.

Table 14. Water Bodies Summary

Name	Figure 5 Map #	Linear feet in survey area	Flow Regime[a]	Receiving Water Body[b]	USACE PJD[c]	DSL PJD[d]	ESH (yes/no)[e]	OHW Width (ft)[f]	Photo Point(s)	Additional Information for Jurisdictional Determination	Access (yes/no)
Threemile Creek	49 - 52	1064	Intermittent	Columbia River	Yes, (a)(3)	Yes, (3)	Yes	40	6 - 8	According to the NWI, this creek is mapped as a relatively permanent waterbody (RPW) that discharges directly to the Columbia River. Wetland 4 is mapped within the OHW of this creek and contains reed canary grass (FACW) and broadleaf cattail (OBL) species within the stream channel in the downstream reaches of the SA. Several individuals of two species of macroinvertebrates, caddisfly (family Leptoceridae) and mayfly (family Leptohyphidea) were observed attached to large cobble across multiple sample sites within the stream bed. Stream flow in the creek was determined to be intermittent using SDAM (Appendix E). The stream is mapped in the NWI as a PSS1C wetland and as an intermittent water in the USGS NHD. Wetland 4 occurs within the OHW of Threemile Creek (Figure 5, page 49). This creek is mapped by DSL as essential salmonid habitat (ESH) for coastal cutthroat trout (*Oncorhynchus clarkii clarkii*) and summer steelhead (*Oncorhynchus mykiss*) (DSL 2025). ODFW also lists Threemile Creek as habitat for coho salmon (*Oncorhynchus kisutch*) (ODFW 2021).	Yes
Columbia River	27, 28, 36, 37, 41, 42,	3,257	Perennial	Pacific Ocean	Yes, (a)(1)(i)	Yes, (2)	Yes	1600-3840	14, 27, 28,	The Columbia River is a traditional navigable water (TNW) that occurs within the east and west end SAs. The Columbia River is well-documented as having suitable habitat for multiple fish species including protected resident and anadromous species such as coastal cutthroat, coho salmon, chum salmon (*Oncorhynchus keta*), and multiple runs of Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead, among others (ODFW 2021). The main stem of the Columbia River is mapped as essential fish habitat for chum salmon between river mile 125 and 147, roughly from Bonneville Dam downstream to Reed Island (DSL 2025). Areas within the Columbia associated with discharge locations for Mill, Chenoweth, Rock, Viento, and Dry creeks are mapped as essential fish habitat for coastal cutthroat trout and coho salmonid habitat near the mouth of Herman Creek.	Yes
Columbia Slough	16 and 17	283	Perennial	Willamette River	Yes, (a)(1)(i)	Yes, (2)	Yes	170	31	The Columbia Slough is a TNW that is within the SA roughly 1 mile upstream of its discharge point to the Willamette River. ODFW documents occurrences of and mapped essential salmonid habitat for fall Chinook salmon, coho salmon and summer steelhead. This water is channelized and does not support wetland conditions within the SA. The Columbia Slough discharges to the Willamette River roughly 0.9 miles northwest of the SA. The NWI maps the Columbia Slough as a R1UBV riverine habitat.	Yes
Willamette River	2 - 4	1096	Perennial	Columbia River	Yes, (a)(1)(i)	Yes (2)	Yes	1,150	40	The Willamette River is a TNW that is within the SA at approximate river mile 3.5. The river is fish bearing and has habitat and documented fish presence for many of the same species as the Columbia River (ODFW 2021) and is mapped as essential salmonid habitat for fall and winter Chinook salmon, coho salmon and summer steelhead (DSL 2025). The Willamette River discharges to the Columbia River roughly 3 miles downstream of the SA. The stream is mapped as a R1UBV riverine habitat by the NWI.	Yes

[a] Nadeau 2011.
[b] USGS 2024b.
[c] Title 33 CFR 328.3
[d] OAR 141-085-0515.
[e] DSL 2025.
[f] As measured at the OHW from within the survey area.

Table 15. Drainage and Other Waters Summary

Name	Figure 5 Map #	Linear feet in survey area	Flow Regime[a]	Receiving Water Body[b]	USACE PJD[c]	DSL PJD[d]	ESH (yes/no)[e]	OHW Width (ft)[f]	Photo Point(s)	Additional Information for Jurisdictional Determination	Access (yes/no)
Drainage 1	60	132	Ephemeral	Not determined	No, (b)(8)	No, (3)	No	N/A	3	Dry stormwater feature occurs roughly 75 feet below road grade of Columbia View Drive. No indicators of intermittent or perennial stream flow observed, flow determined to be ephemeral using Streamflow Duration Assessment Method (SDAM) (Appendix E). Any hydrology received in the drainage is assumed to infiltrate onsite and does not appear to make a downstream connection to jurisdictional waters. Large quantities of rock were placed at the entrance and exit of the culvert located roughly 75 feet below road grade. No sign of stream flow (debris rack, stream bed scour, rock/gravel sorting, etc.) was observed. Channel estimated to be 10-30 feet wide. There were no signs of bed and bank or wetland vegetation. No visible connection to downstream waters was found. Appears to infiltrate to uplands roughly 0.9 miles north. Drainage is not mapped by the NWI or within hydric soils and does not support fish (DSL 2025; ODFW 2021).	Yes
Drainage 2	54 and 56	547	Ephemeral	Threemile Creek	No, (b)(8)	No, (3)	No	N/A	4 - 5	Drainage 2 crosses the SA in two places, once at Columbia View Drive and once along. No sign of stream flow (debris rack, stream bed scour, rock/gravel sorting, etc.) was observed in either drainage location within the US 197SA. No indicators of intermittent or perennial stream flow observed, flow determined to be ephemeral using SDAM (Appendix E). Both channels estimated to be 10-30 feet wide. There were no signs of bed and bank or wetland vegetation. The drainage discharges to Threemile Creek roughly 0.25 miles downstream to the northwest. Both sections of the drainage that occur in the SA are mapped in the NWI as a R4SBC stream, but field investigations determined the feature to be an ephemeral channel. Drainage is not within mapped hydric soils and does not support fish (DSL 2025; ODFW 2021).	Yes
Pit 1	44	-	Seasonally flooded	N/A	No (b)(5)	No (7)(d)	No	15	11	A pit, roughly 15 feet x 10 feet around was observed within HDD Area 12. Field observations, historic aerials and ground level imaging indicate this pit is man made and associated with farming by a transient community inhabiting the area since roughly 2012. Surface water was observed approximately 4 feet below ground level, no inlet or outlet was present. Hydrology is likely from a high-water table and fluctuates seasonally. Depth of water within the pit was not able to be determined in the field. Vegetation surrounding the pit was mostly absent except for dispersed patches of Bermuda grass and an unidentified *Poa* species. This area is mapped by the NWI as PSS/EMCh1 and is not located with USDA hydric soils.	
Ditch 1	1 and 2	600	Intermittent	N/A	No, (b)(3)	No, (7)(c)	No	12	42 - 43	Ditch 1 occurs within SA and adjacent to the south side of the Harborton Substation fenced yard. This stormwater detention ditch was created within mapped NWI hydric soils. However, it was noted that this ditch was excavated within the previously disturbed and graded substation footprint. Wetland signatures were not observed on historic aerial images. Hydrology was present during the time of the survey, but no other wetland indicators were observed, nor was an outlet observed. A stormwater detention pond occurs adjacent to Ditch 1 and is likely hydrologically connected via a culvert below ground surface to a wetland depression located 20-30 feet lower in elevation. The ditch does not contain game fish and does not have a free and open connection to waters of the state. Permission to excavate soils at the site was not granted so no verification plot was established.	Yes, with condition of no excavatio n of soils
Ditch 2	1	0	Intermittent	N/A	No, (b)(3)	No, (7)(c)	No	12	44	Ditch 2 occurs adjacent to and outside the northern fence line and SA at Harborton Substation. This stormwater detention ditch was created within NWI mapped hydric soils. However, it was noted that this ditch was excavated within the previously disturbed and graded substation footprint which is elevated above the surrounding landscape at this location. Wetland signatures were not observed on historic aerial images. Hydrology was present during the time of the survey, but no other wetland indicators nor outlets were observed. The ditch does not contain game fish and does not have a free and open connection to waters of the state. Permission to excavate soils at the site was not granted so no verification plot was established.	Yes, with condition of no excavatio n of soils

[a.] Nadeau 2011.
[b.] USGS 2024b.
[c.] Title 33 CFR 328.3
[d.] OAR 141-085-0515.
[e.] DSL 2025.
[f.] As measured at the OHW from within the survey area.

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7 Deviation from NHD or NWI

NWI and NHD mapped features are included on Figure 3 in Appendix A, with accompanying photos provided in Appendix C. The SWI and NWI were used during desktop review and SWI is analogous to the NWI wetlands mapped within the SA (DSL 2024a). No wetlands or waters are mapped in LWI databases within the SAs (DSL 2024b).

7.1 East End

Many of the wetlands and waters are mapped by the NWI within the historic Columbia River floodplain. These areas have been heavily modified by human activities, including highway and road construction, industrial and commercial development, and conversion of the Columbia River shoreline into maintained park lands. Field investigations within the delineation SA determined that many mapped wetland features lacked indicators for wetland hydrology, vegetation, and soils; thus, are not considered wetlands.

Drainage 2 is mapped as a riverine intermittent habitat, but field investigations determined the feature to be an ephemeral channel. Threemile Creek is mapped within the SA by the NWI as palustrine forested/palustrine scrub-shrub (PFO/PSS1C) wetland but most of the streambed gradient and undercutting along the banks inhibit wetland formation. PEM wetlands are mapped by the NWI outside the SA where stream bed characteristics such as relatively shallow gradient and unconsolidated bottom material are conducive to wetland formation.

The depressional area south of I-84 and north and south of Tie Plant Road near Verification Plot 5 (VP-5) and HDD Area 12 is an NWI-mapped palustrine shrub-scrub/emergent (PSS/EMCh1) wetland (Figure 5, Pages 43 and 44, Appendix A). A few dispersed black cottonwood trees (*Populis balsamifera*) and nootka rose (*Rosa nutkana*) were noted on the west end of the depressional area but did not form a dominant community. Biologists observed that the majority of the depression was filled with large boulders and the vegetation community was dominated by upland species, including tree of heaven (*Ailanthus altissima*), Russian olive (*Elaeagnus angustifolia*), Canada thistle (*Cirsium arvense*), bull thistle (Cirsium vulgare), common mullein (*Verbascum thapsus*), blackberry (*Rubus armeniacus*) and upland grasses mainly Bermuda grass (*Cynodon dactylon*), downy brome (*Bromus tectorum*). A pit, roughly 15 feet x 10 feet was noted within HDD Area 12 (Photo 11, Appendix C). Surface water was observed approximately 4 feet below ground level, no inlet or outlet was present, hydrology is likely from a high-water table. Vegetation surrounding the pit was mostly absent except for dispersed patches of Bermuda grass and an unidentified *Poa* species. Lands within the HDD Area 12 footprint were comprised mostly of bare sandy ground with dispersed occurrences of upland grasses with blackberry, Russian olive and tree of heaven occurrences at the boundaries. Verification Plot 5 (VP-5) was established just west of this area, in the lowest point of the depression where minor change in vegetation occurs. The verification plot is located near a culvert from beneath I-84 to the north; no signs of flow were observed during the field investigation. Based on desktop and field investigations, this area was determined to be upland.

The same plant species observed above were also found in the SA located along the roadway on the south side of Tie Plant Road. No data plot was established for this area to determine the presence or absence of the mapped NWI wetland in this location. No wetland signatures were observed on current and historic aerials and the area within the previously disturbed portion of the

SA does not occur in hydric soils. This area is not within the anticipated disturbance area for project construction.

Lands north of I-84 and occurring in Riverfront Park are mapped NWI wetlands. No hydric soils are mapped in this area. No data plots were established in the area; only a visual survey was conducted on lands north of HDD Area 12 as no ground disturbing activities are proposed and the park was closed at the time of the survey. Additional desktop review and visual field survey show this land is comprised mainly of paved areas associated with park and boat ramp entrances, and vehicle and boat trailer parking. Areas landward of the delineated OHW were generally sloped (3 to 15 percent) toward the Columbia River shoreline and no areas likely to accumulate hydrology were observed. Parcels within the SA in this location are previously disturbed and currently maintained park and recreation facilities with no wetland signatures.

7.2 West End

Most of NWI wetlands and NHD waters mapped within the west end SA were determined to be present in the field. Three additional wetlands were delineated in areas where human activity created conditions appropriate for wetland formation.

Mapped NWI wetlands located west of HDD Area 07 East were not fully accessed due to site access issues (Figure 5, Pages 32 and 37, Appendix A). Verification Plot 9 (VP-9) was established just outside but at the same elevation as the NWI wetlands and at the lowest point within the HDD footprint. The verification plot did not meet any wetland indicators, and the area is considered upland. For SAs that were inaccessible, additional desktop resources were reviewed. No wetland signatures were observed on aerials or from viewpoints in the field and no hydric soils are mapped in this area. Where mapped NWI wetlands were accessible, the same vegetation species as VP-9 were observed; no hydrology indicators were observed. No ground disturbance is anticipated in this area.

7.2.1 Mapping Methods

During the field surveys, sample plot and photo point locations, wetland boundaries, and OHW boundaries were recorded using ArcCollector GPS unit with EOS Arrow GNSS receiver capable of submeter accuracy. The resulting data are shown as points, lines, and polygons on Figure 5 in Appendix A. The coordinate system included a referenced horizontal datum using the OR North American Datum of 1983 (NAD83) State Plane Coordinate System.

Wetland and waterway features were entered in the GPS in the field with a simple nomenclature by waterbody name. Waterway features that continued outside the SA were not mapped.

Data points collected with the GPS receivers used in the field were plotted onto the 2017 aerial images. The aerial imagery does not align with GPS data as the aerial is offset roughly +/- 10 feet. As such, the aerial imagery is provided for general reference only.

8 Additional Information

DSL and USACE would have jurisdiction over water and wetland features if they meet regulatory authority defined as described below.

DSL regulates “waters” (including rivers and wetlands) for the State of Oregon. DSL regulates waters using volume amounts of materials (i.e., sediments) removed or filled into a regulated water resource and location of activity. Waters of the state regulated under the Removal-Fill Law (Oregon Revised Statute [ORS] 196.795–196.795.990) are defined under OAR 141-085-510 and include:

> *“…all natural waterways, tidal and non-tidal bays, intermittent streams, constantly flowing streams, lakes, wetlands, that portion of the Pacific Ocean that is in the boundaries of this state, all other navigable and non-navigable bodies of water in this state and those portions of the ocean shore, as defined in Oregon Revised Statute 390.605, where removal or fill activities are regulated under a state-assumed permit program as provided in 33 U.S Code 1344(g) of the Federal Water Pollution Control Act, as amended.”*

Per OAR 141-085-0515, estuaries, tidal bays, and rivers below the head of tide are jurisdictional to the elevation of the highest measured tide (excluding storm surge) or to the upper edge of the wetland, whichever is higher. Wetlands are further defined as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (OAR 141-085-0510[105]). Wetlands are jurisdictional within the wetland boundary.

USACE would have jurisdiction over traditional navigable waters, which includes all the waters described in 33 CFR 328.3(a)(1) and 40 CFR 230.3(s)(1). USACE would also assert jurisdiction over tributaries that are relatively permanent waters and wetlands adjacent to these tributaries or traditional navigable waters, including over adjacent wetlands that do not have a continuous surface connection to traditional navigable waters or tributaries that are relatively permanent waters.

USACE and DSL preliminary jurisdictional determinations are summarized in Table 13, Table 14 and Table 15.

9 Results and Conclusions

A total of five wetlands, three aquatic features, four waterbodies, two ditches, two drainages and one pit were delineated or estimated during the wetland and waters surveys conducted in 2023, 2024, and 2025. Preliminary jurisdictional determinations for identified aquatic features are included in Table 13, Table 14, and Table 15; jurisdictional wetlands and waters would be regulated by the provisions of the Clean Water Act as administered the USACE and DSL.

10 Disclaimer

This report documents the investigation, best professional judgment, and conclusions of the investigators. It should be considered a Preliminary Jurisdictional Determination and used at your own risk until it has been approved in writing by the DSL in accordance with OAR 141-090-0005 through 141-090-0055, and the USACE in accordance with Section 404 of the Clean Water Act (OAR 141-090-0035 [7][k]).

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Appendix A. Figures

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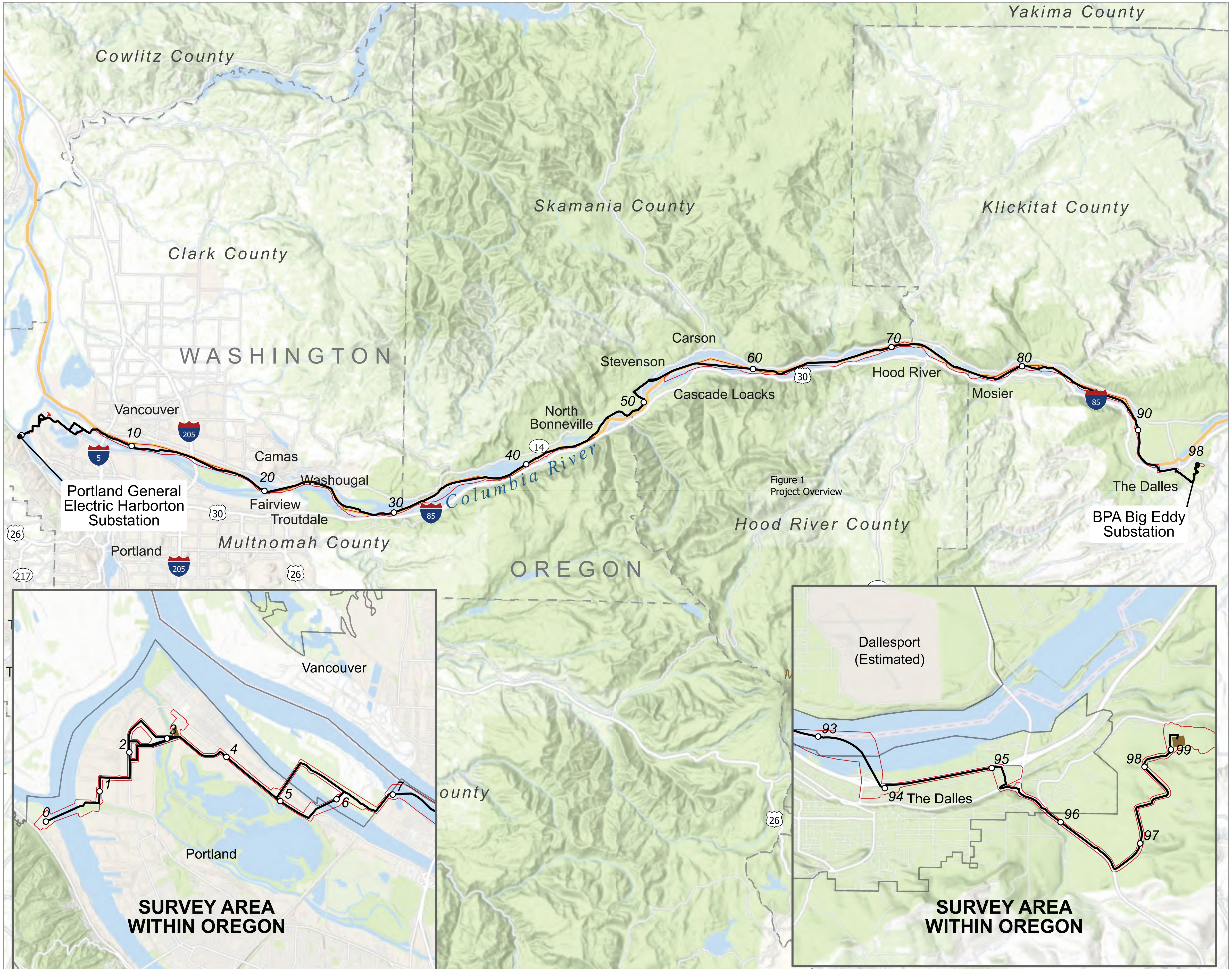
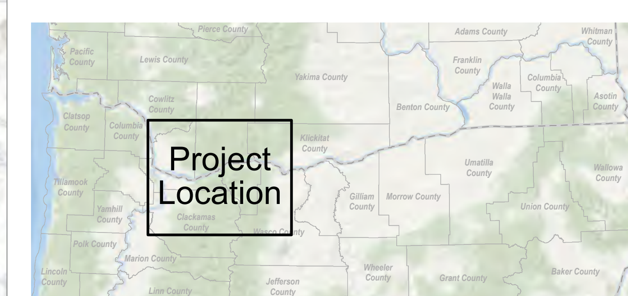


FIGURE 1
PROJECT OVERVIEW

FOR INFORMATION ONLY - CONCEPT DRAWING

- Project Alignment Miles (Miles)
- Proposed Alignment
- County Boundary
- State Boundary
- Wetland and Waters Survey Area

CASCADE RENEWABLE TRANSMISSION



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4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

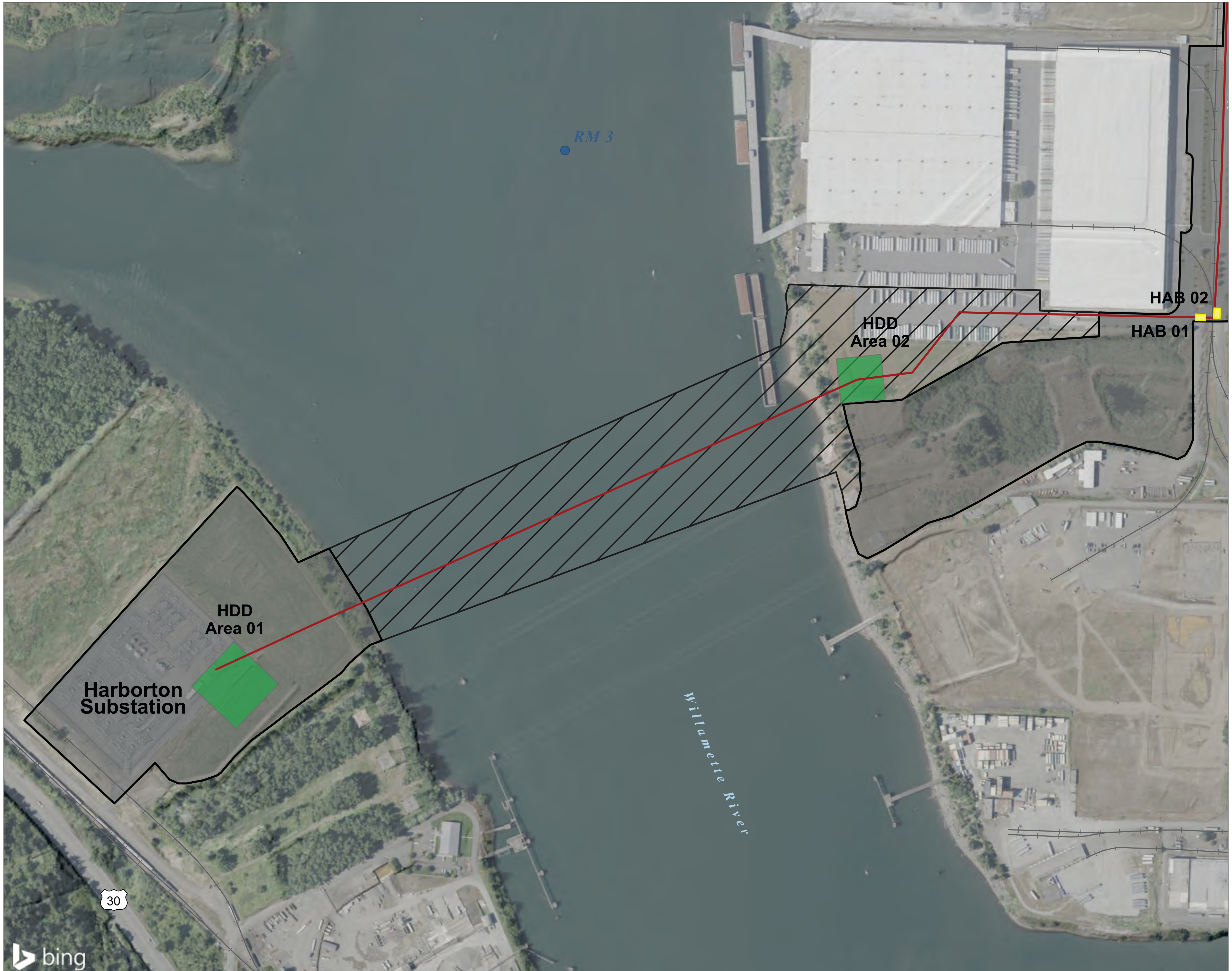
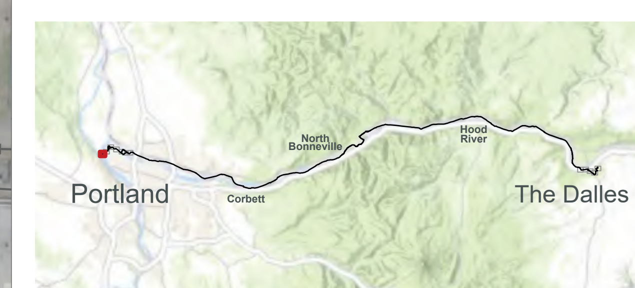


FIGURE 1 PROJECT LOCATION MAP
PAGE 1 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

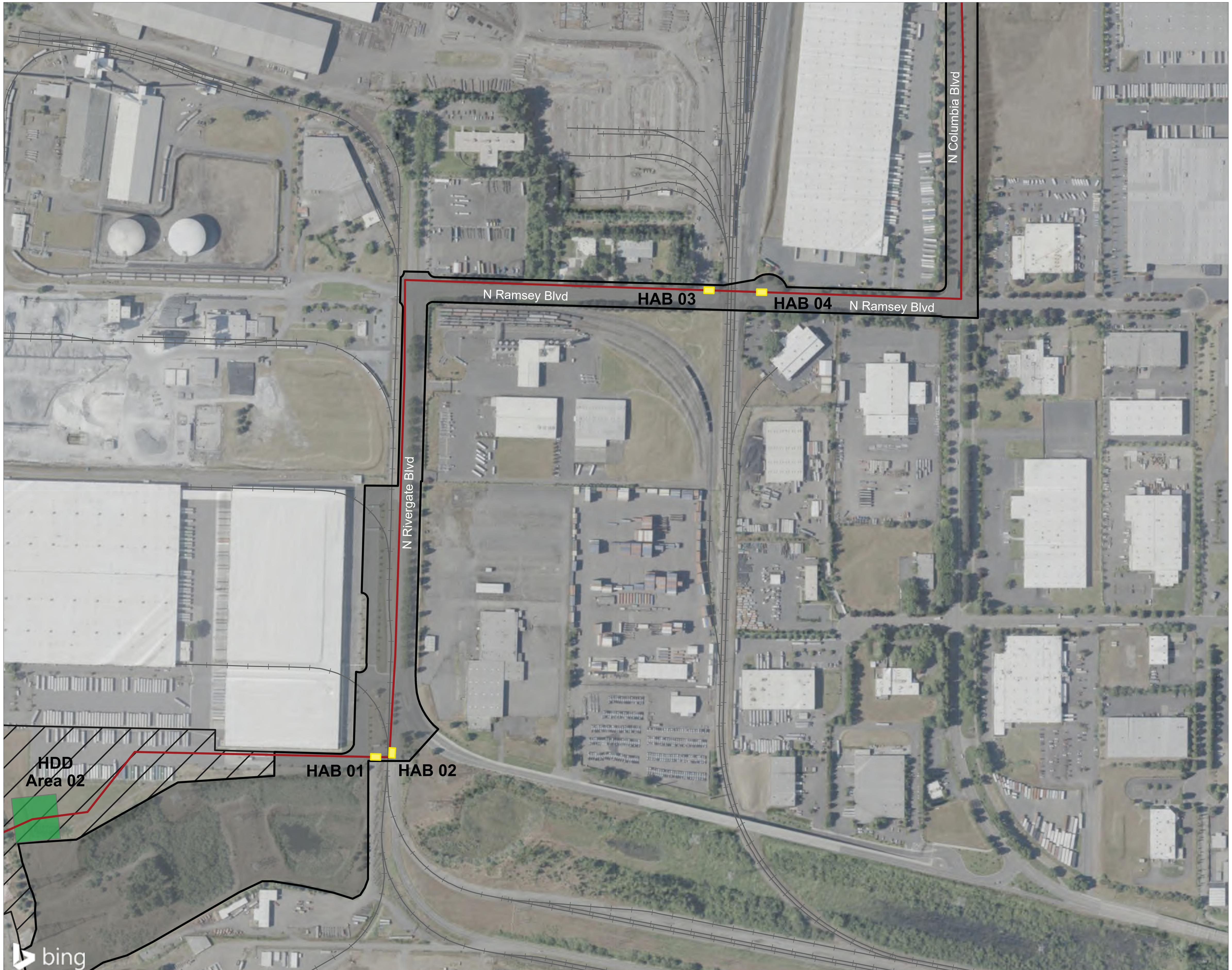
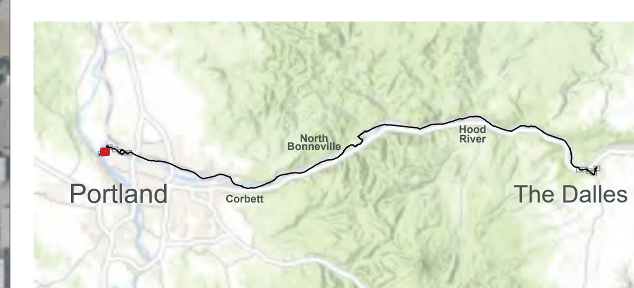


FIGURE 1 PROJECT LOCATION MAP
PAGE 2 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

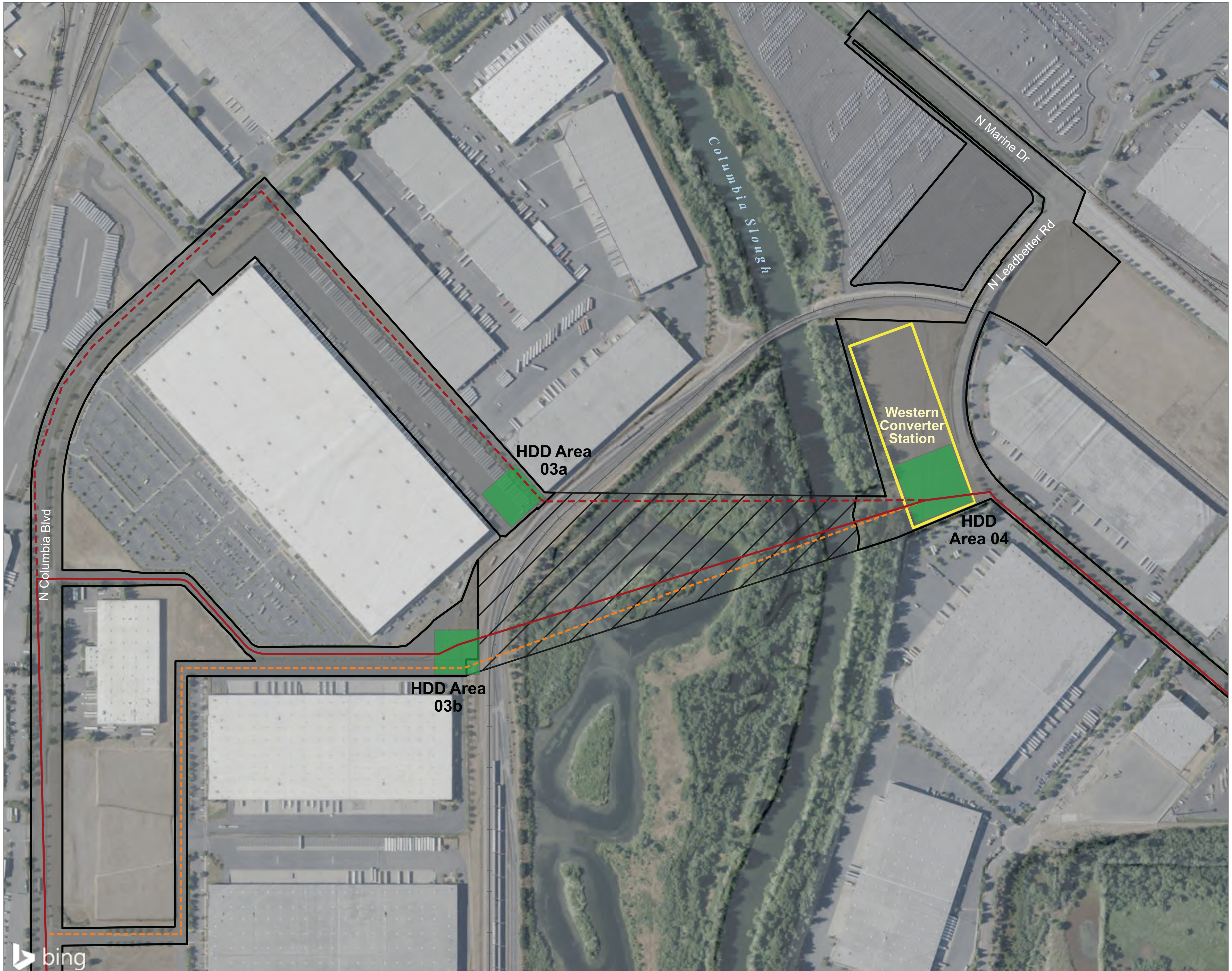
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



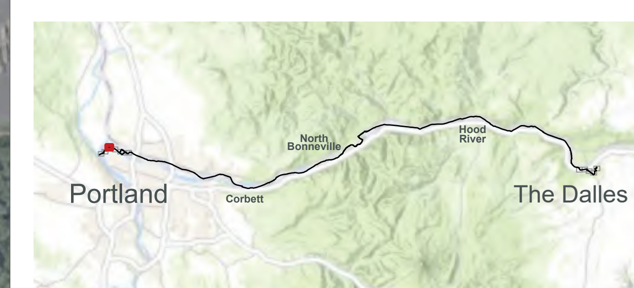
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 3 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WESTERN AC ALTERNATIVE NORTH
- WESTERN AC ALTERNATIVE SOUTH
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

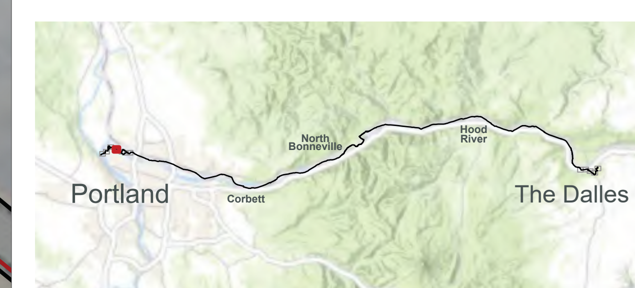
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 4 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25, 30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

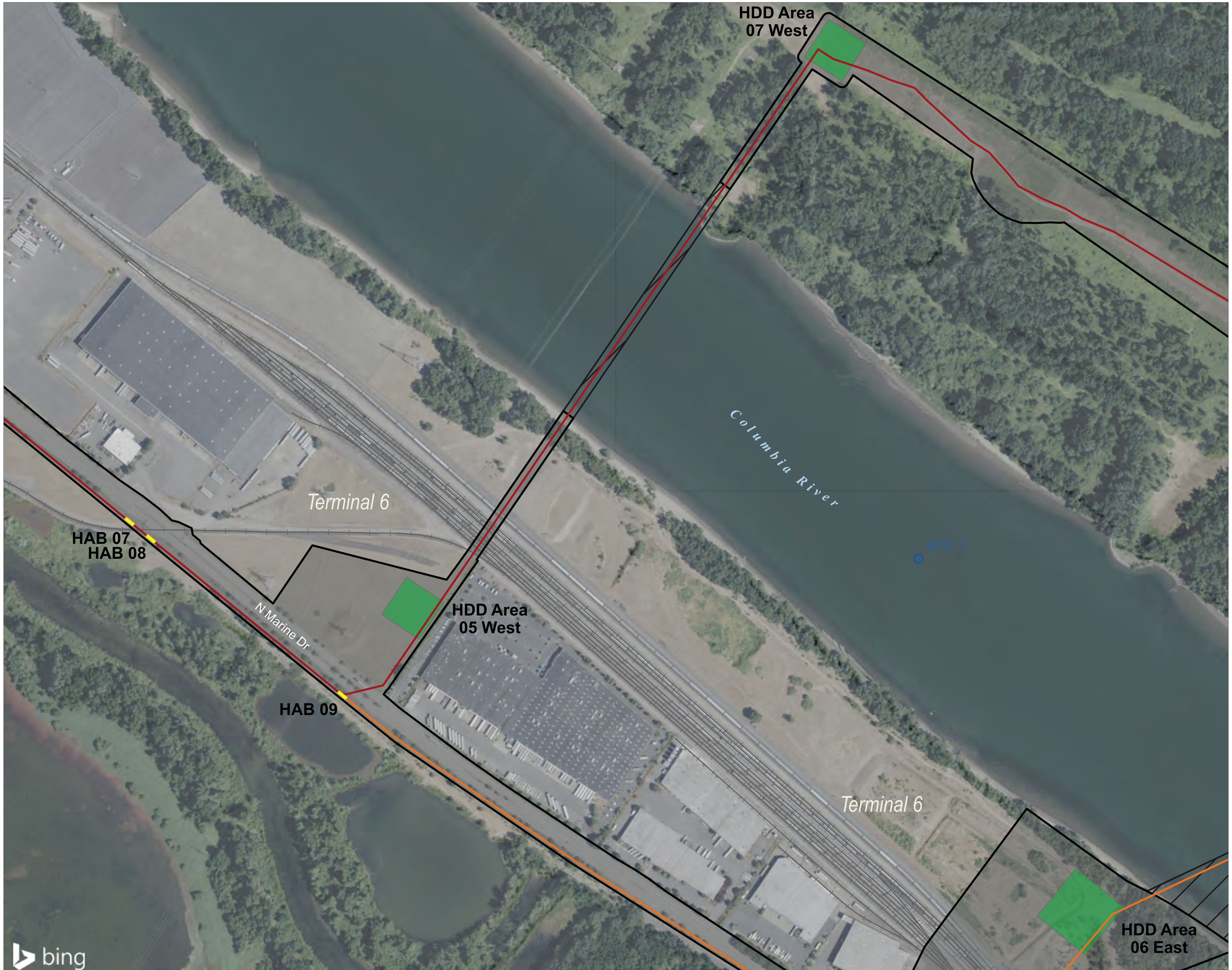
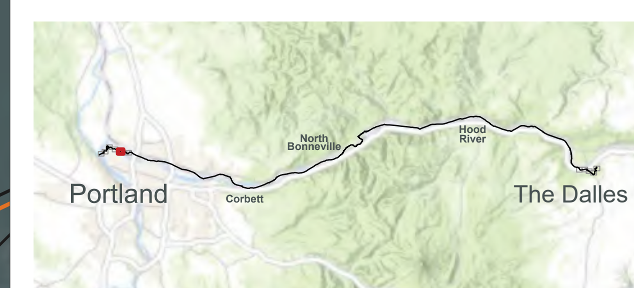


FIGURE 1 PROJECT LOCATION MAP
PAGE 5 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

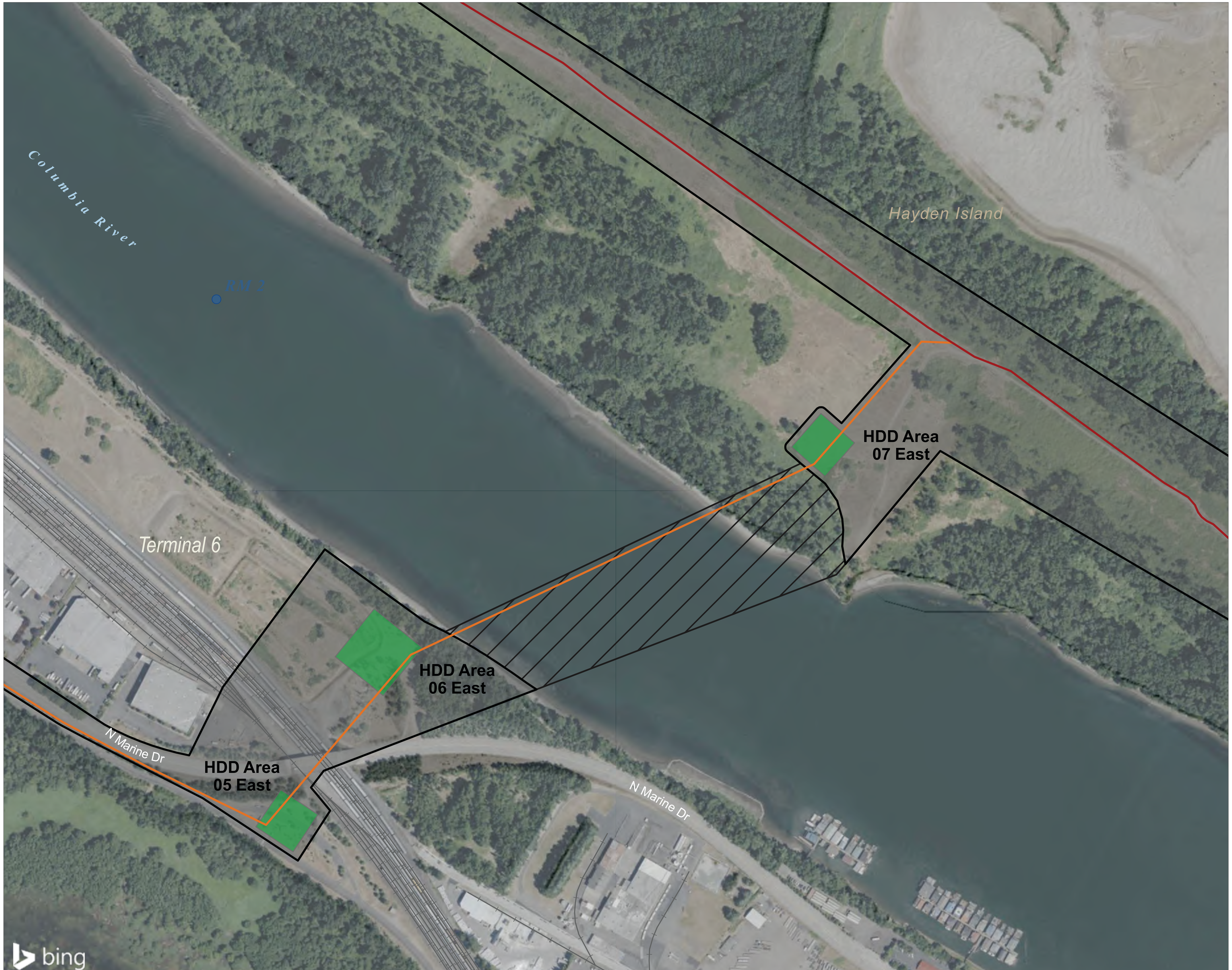
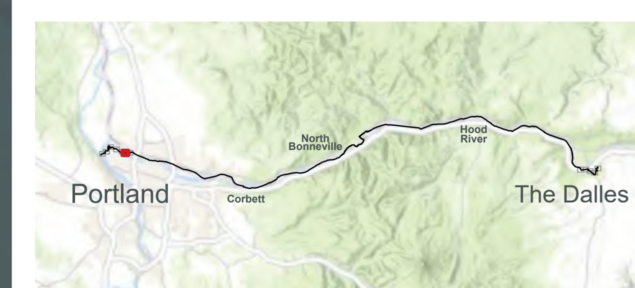


FIGURE 1 PROJECT LOCATION MAP
PAGE 6 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

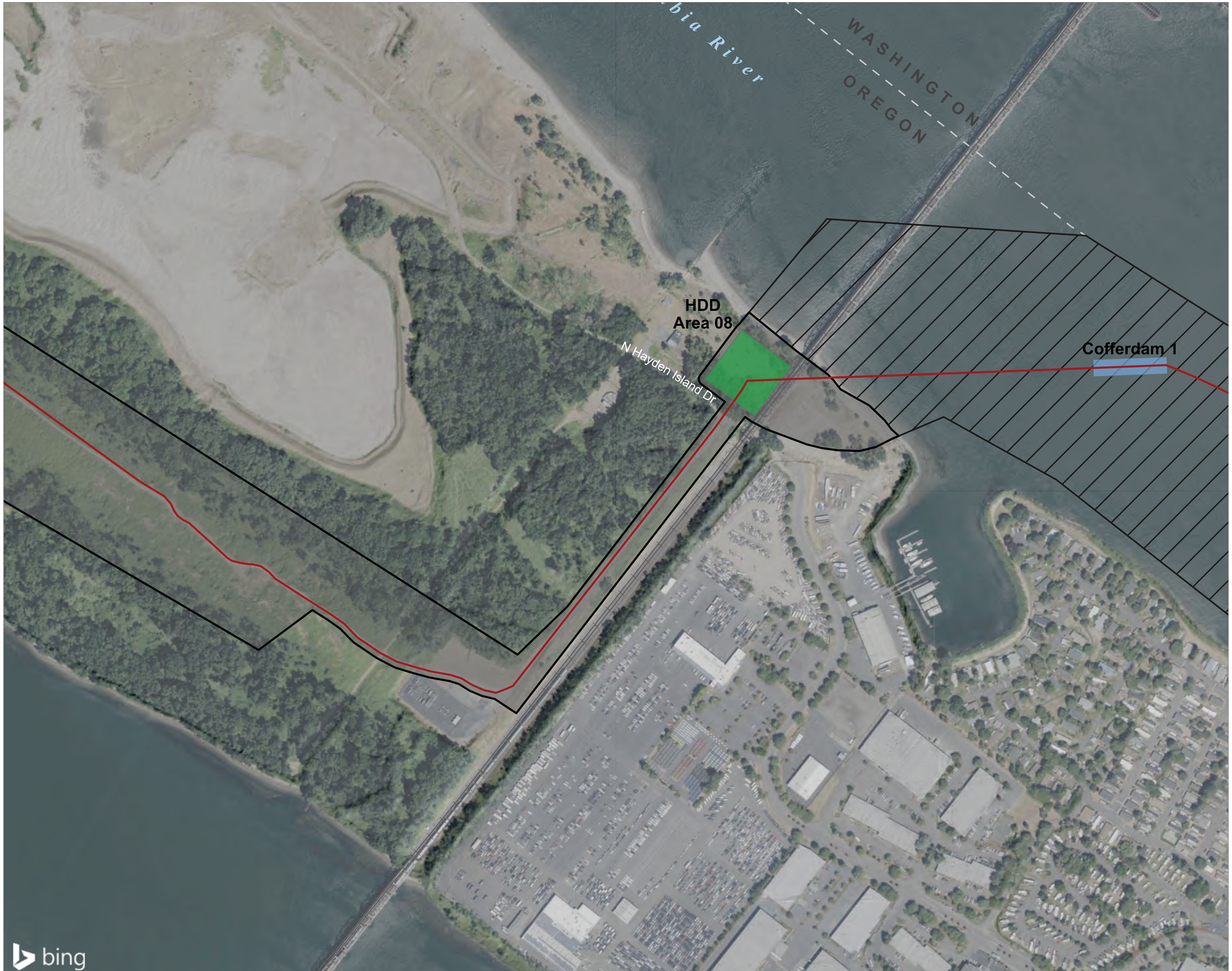
CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

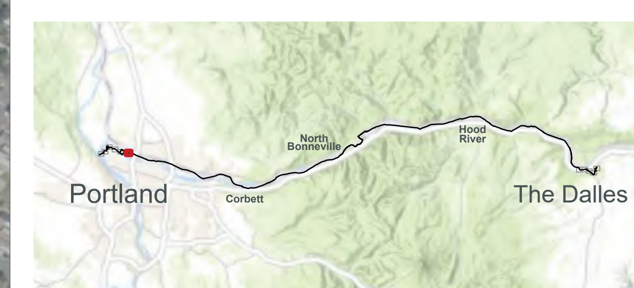
FIGURE 1 PROJECT LOCATION MAP
PAGE 7 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

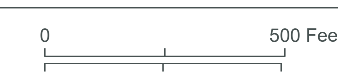


FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION





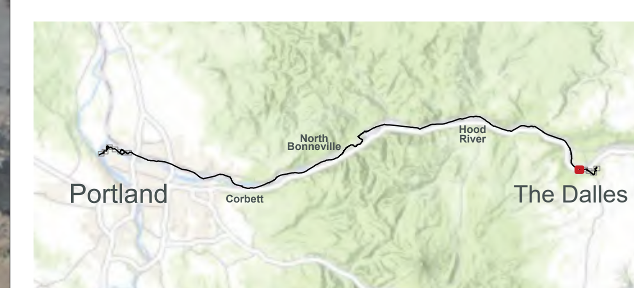
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 8 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

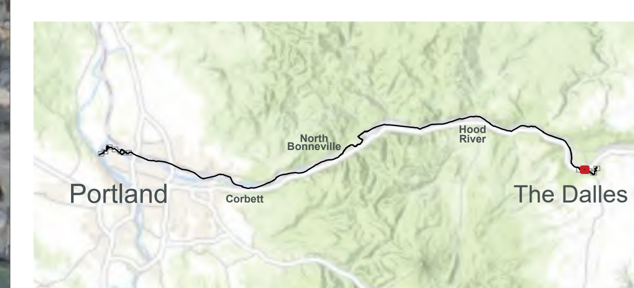
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

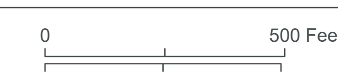
FIGURE 1 PROJECT LOCATION MAP
PAGE 9 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

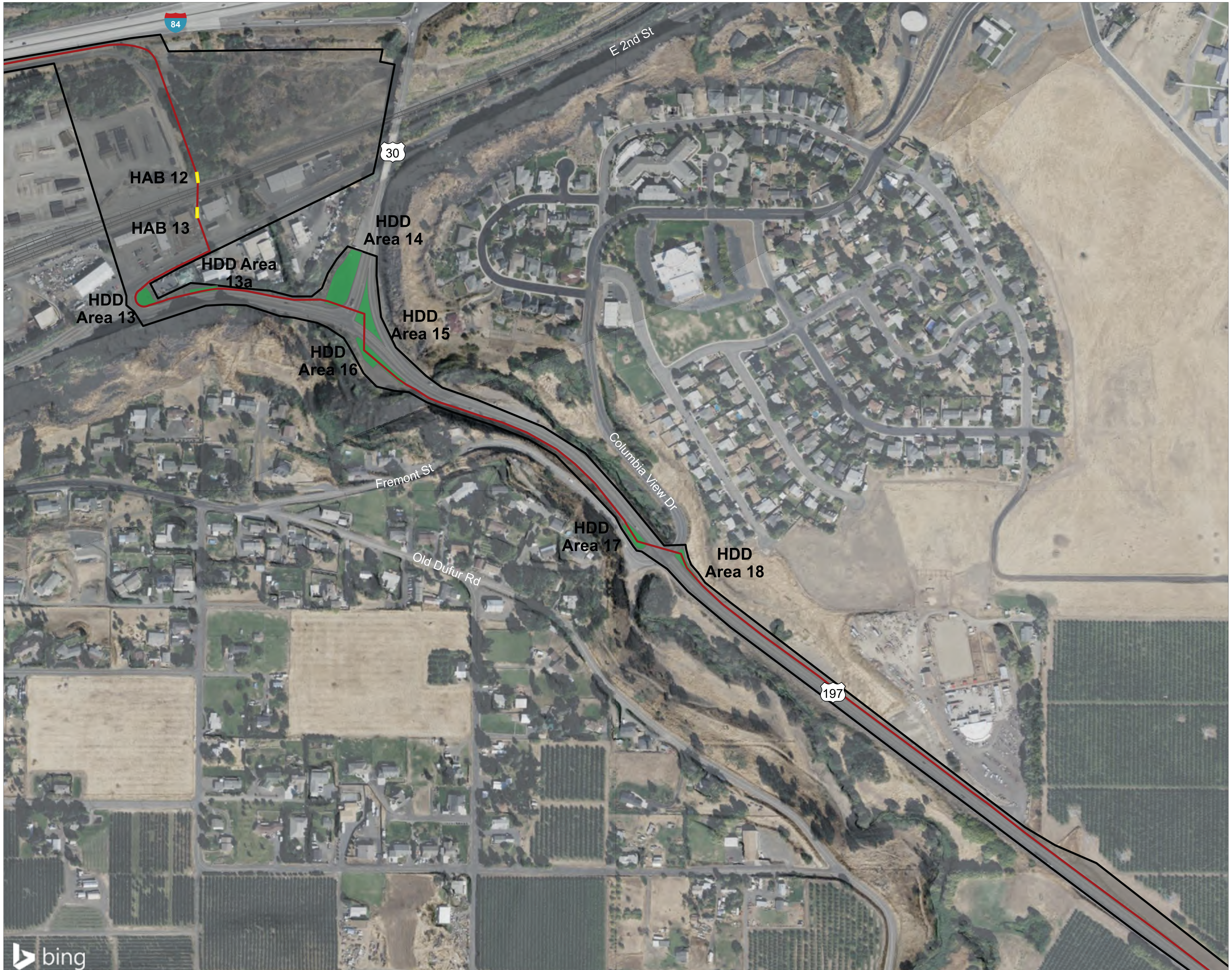
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION





4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



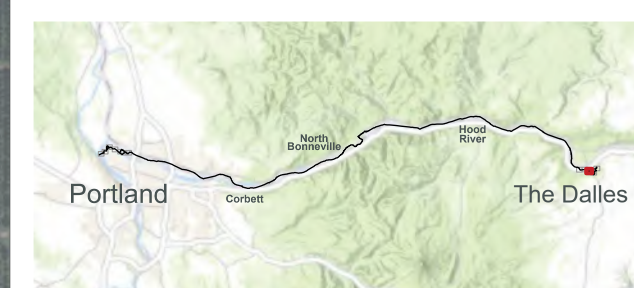
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 10 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

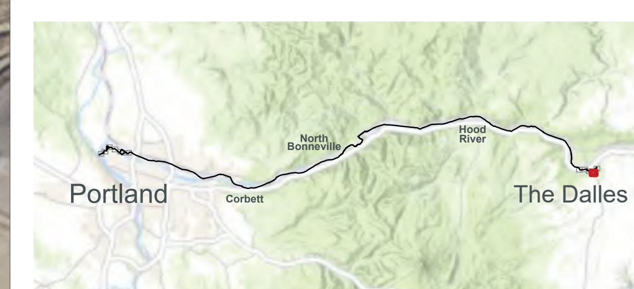
0 500 Feet
0 150 Meters

FIGURE 1 PROJECT LOCATION MAP
PAGE 11 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

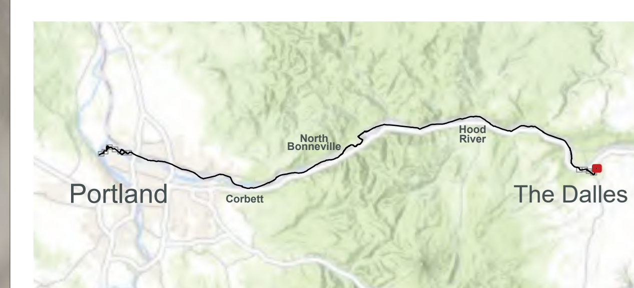
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 1 PROJECT LOCATION MAP
PAGE 12 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

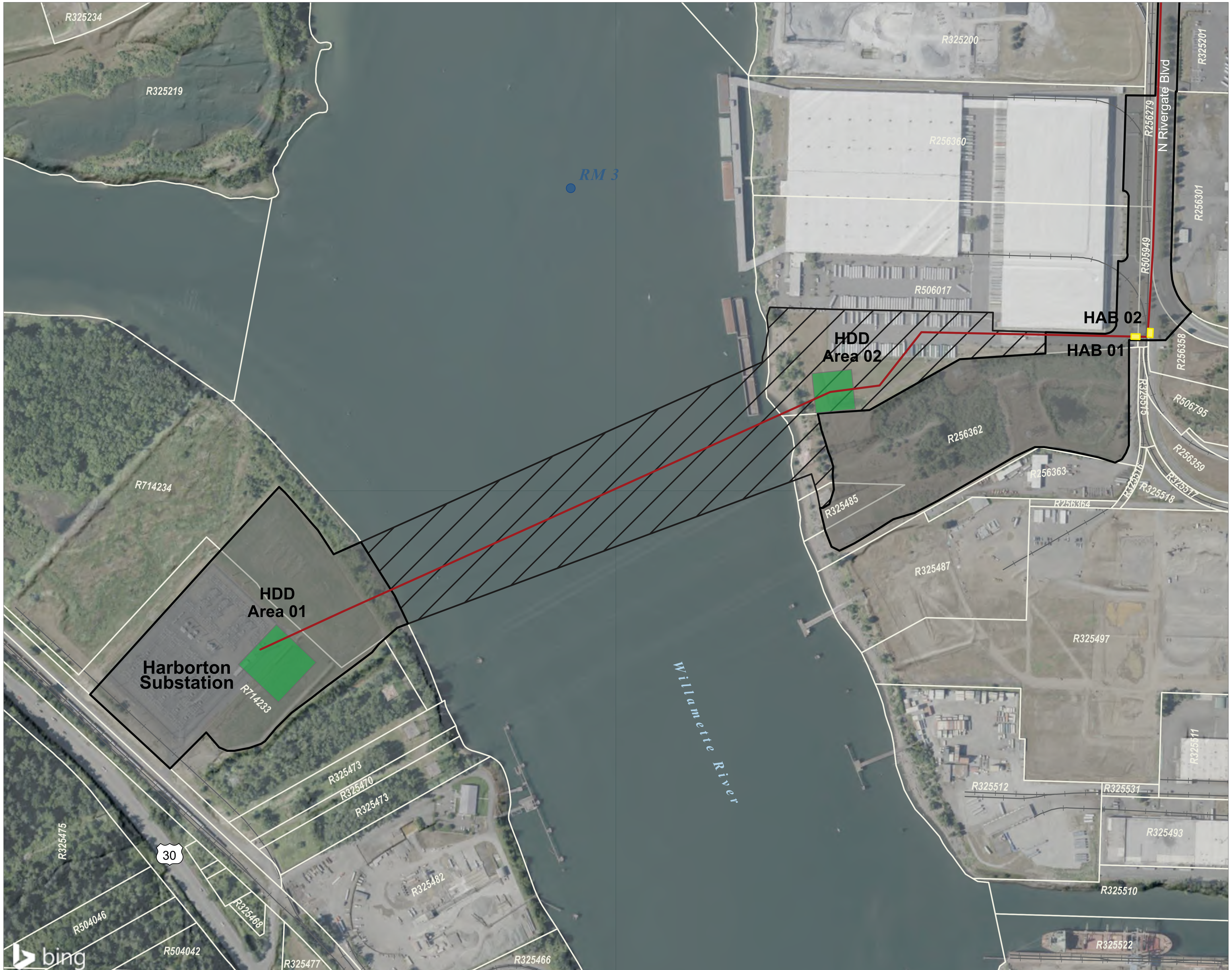
- PROPOSED ALIGNMENT
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



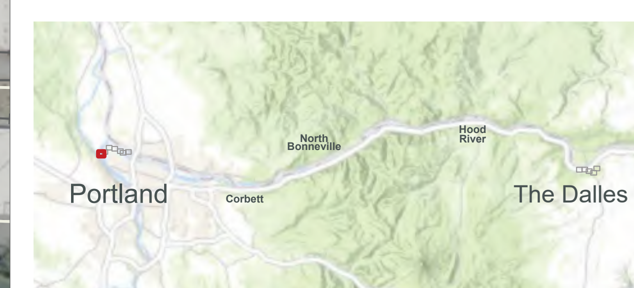
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 1 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

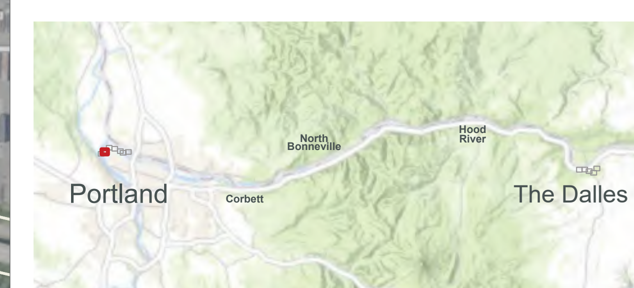
0 500 Feet
0 150 Meters

FIGURE 2 TAXLOT MAP
PAGE 2 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WESTERN AC ALTERNATIVE SOUTH
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

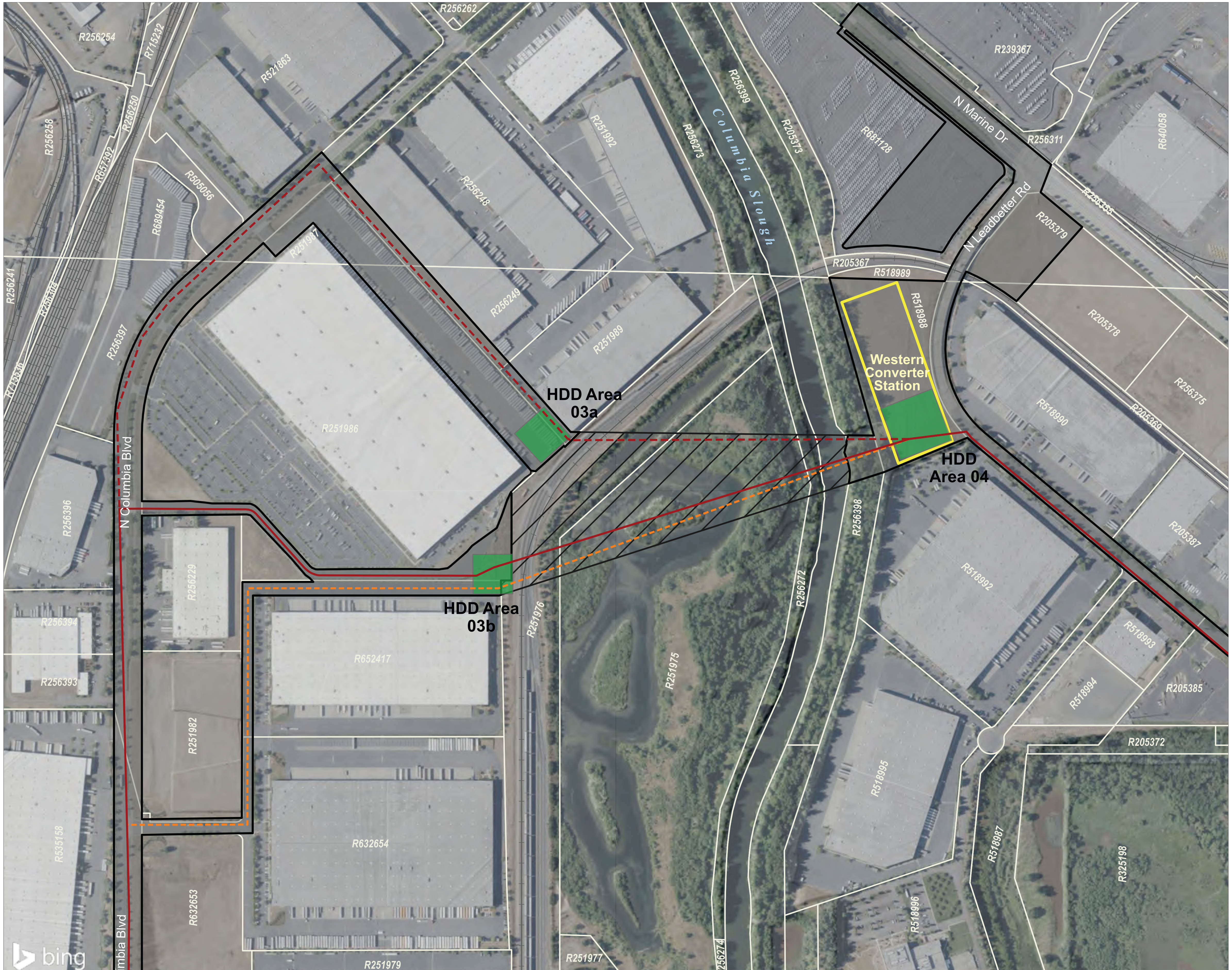
CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

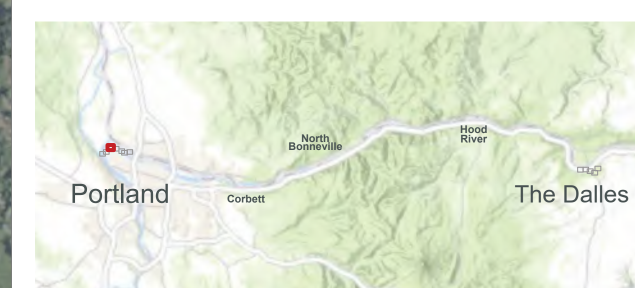
FIGURE 2 TAXLOT MAP
PAGE 3 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND



FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WESTERN AC ALTERNATIVE NORTH
- WESTERN AC ALTERNATIVE SOUTH
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

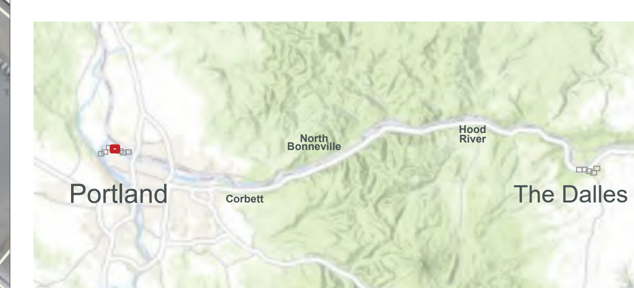
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 4 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25, 30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

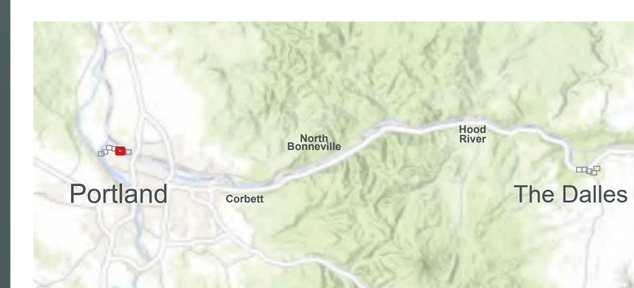
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 5 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

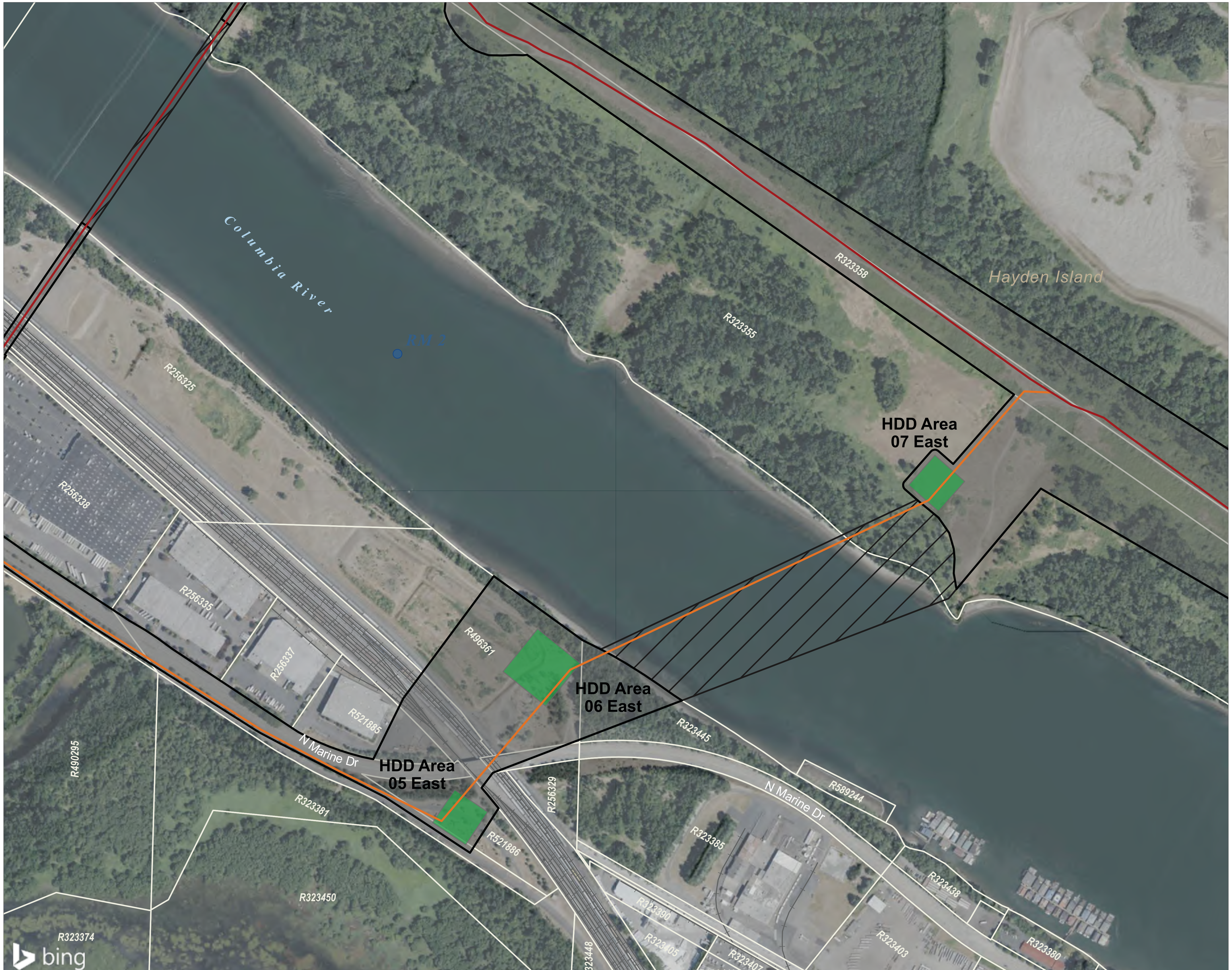
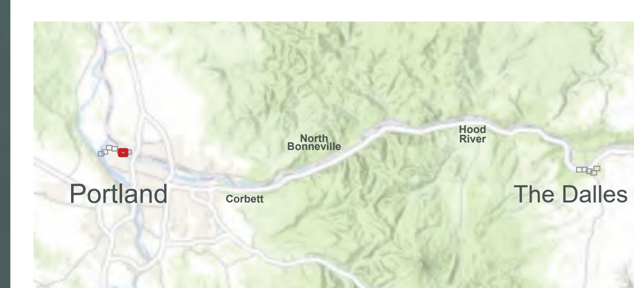


FIGURE 2 TAXLOT MAP
PAGE 6 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

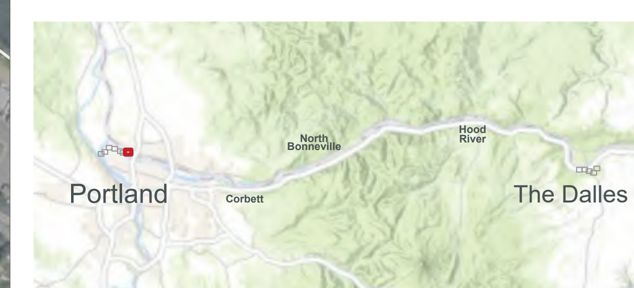
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 7 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT
HAYDEN ISLAND ALTERNATIVE
TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
TEMPORARY 3-SIDED WET COFFERDAM
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
TAXLOT
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

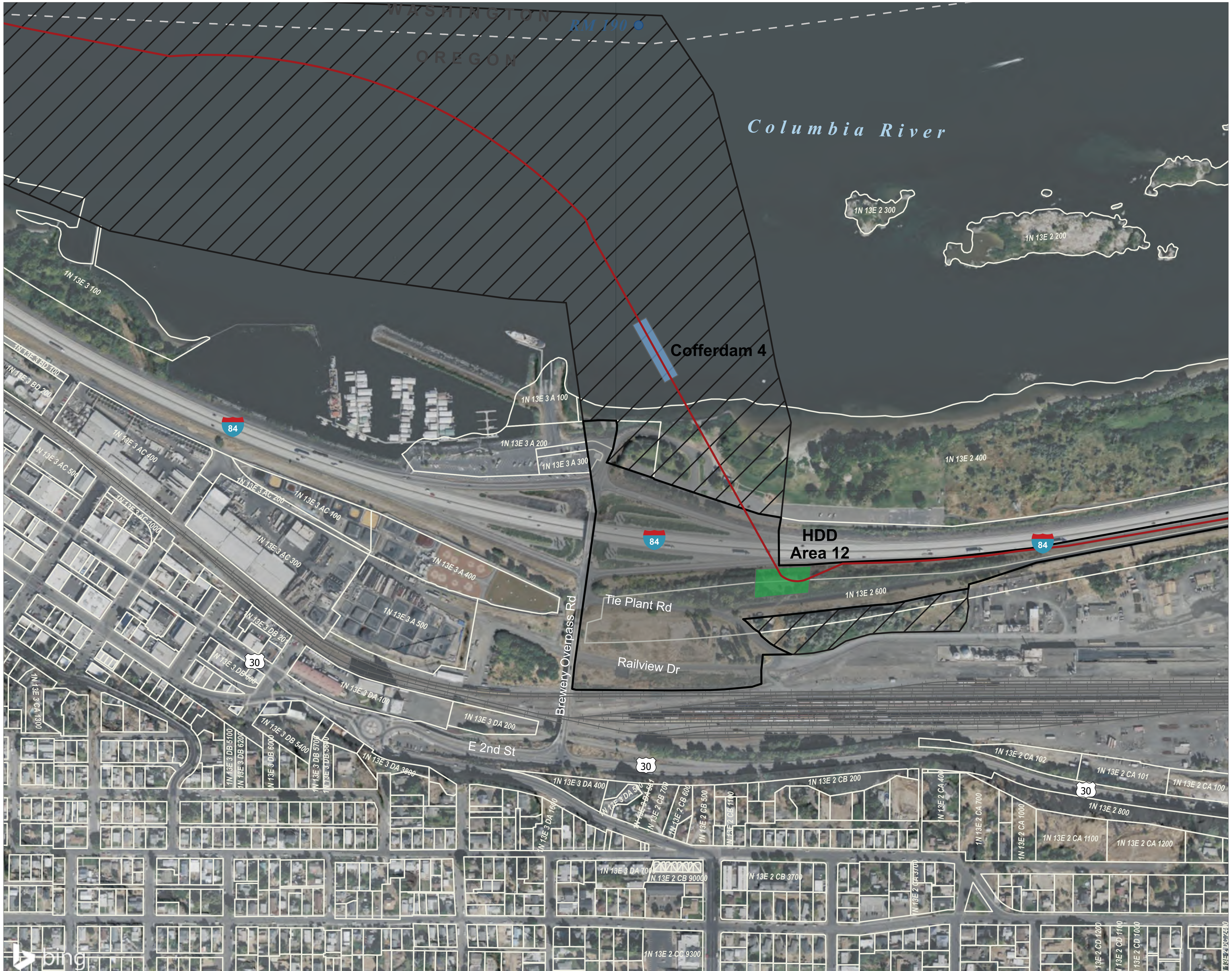
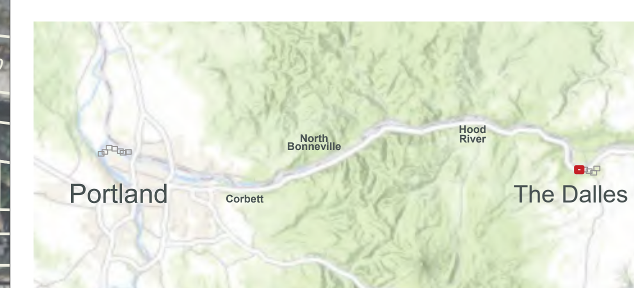


FIGURE 2 TAXLOT MAP
PAGE 8 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY 3-SIDED WET COFFERDAM
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

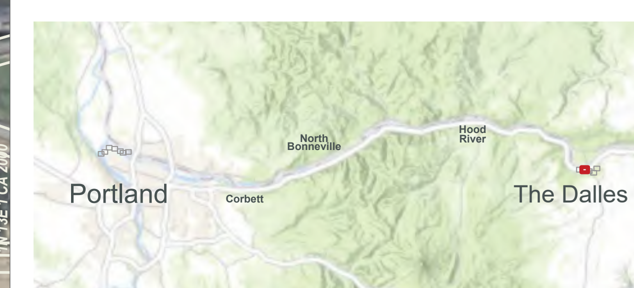
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 9 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

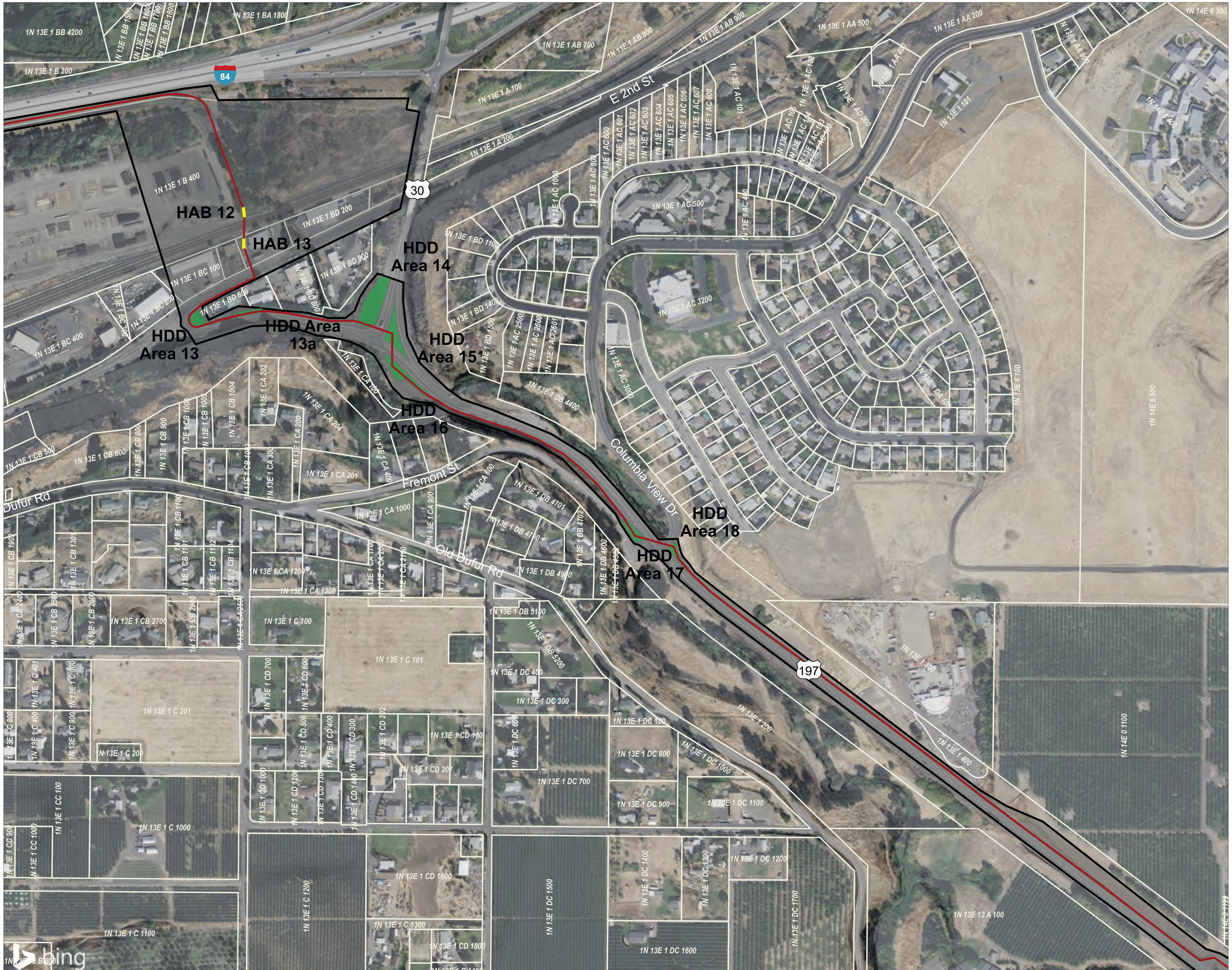
FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters



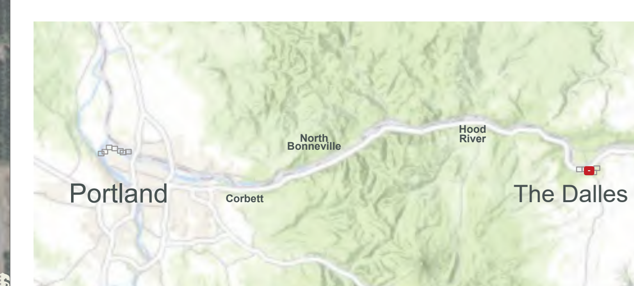
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 10 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



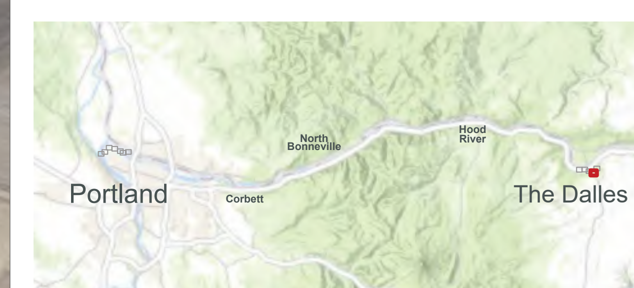
0 500 Feet
0 150 Meters

FIGURE 2 TAXLOT MAP
PAGE 11 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

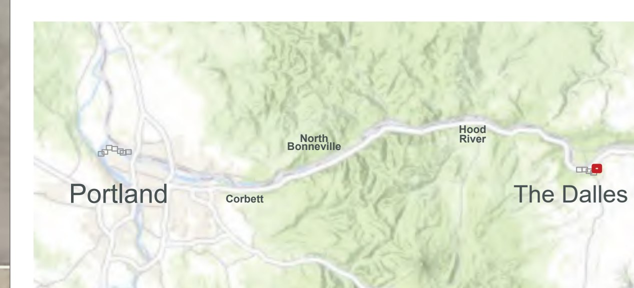
4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 2 TAXLOT MAP
PAGE 12 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT
CONVERTER STATION
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
TAXLOT
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

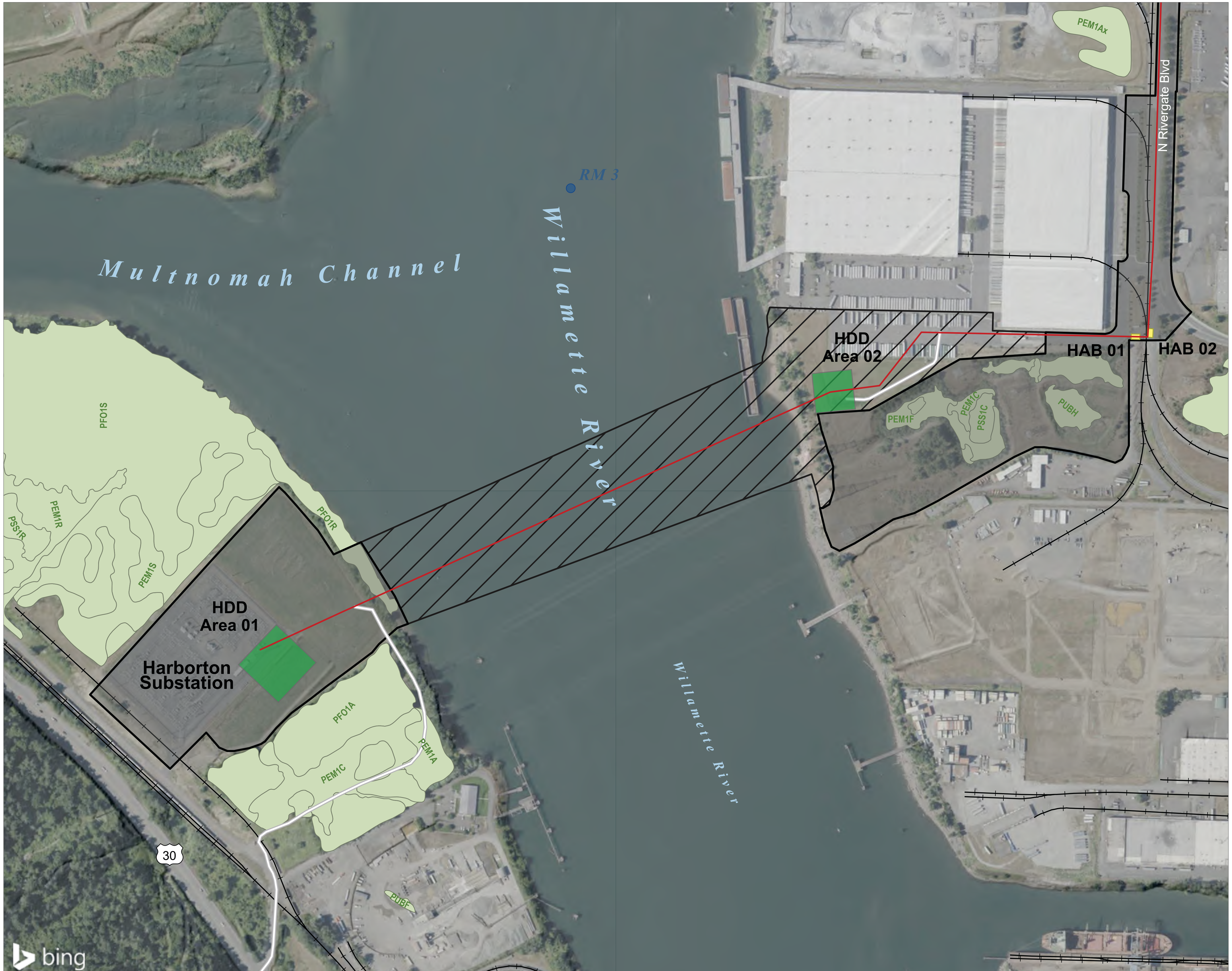


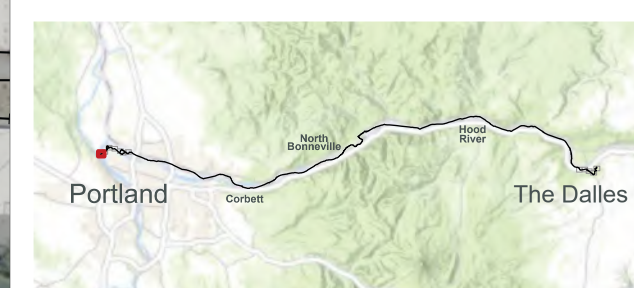
FIGURE 3: NWI AND NHD MAP
PAGE 1 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

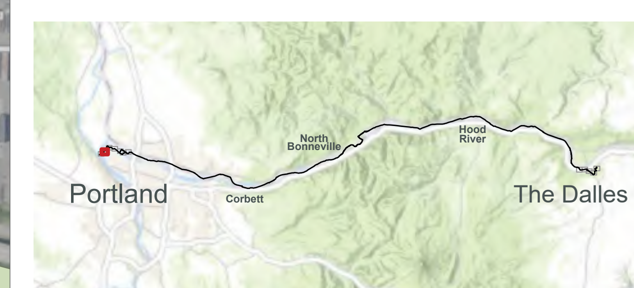
FIGURE 3: NWI AND NHD MAP
PAGE 2 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WESTERN AC ALTERNATIVE SOUTH
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

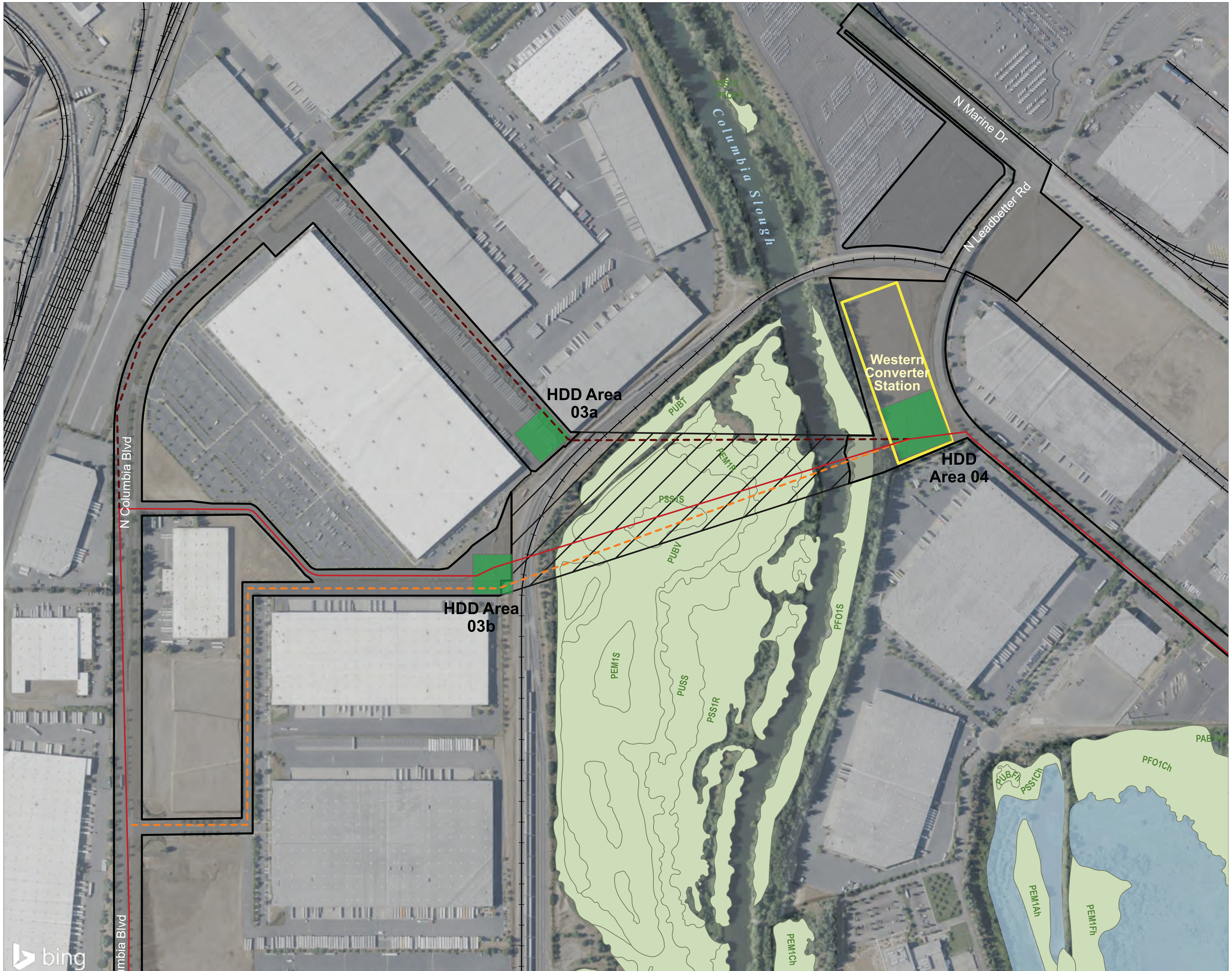


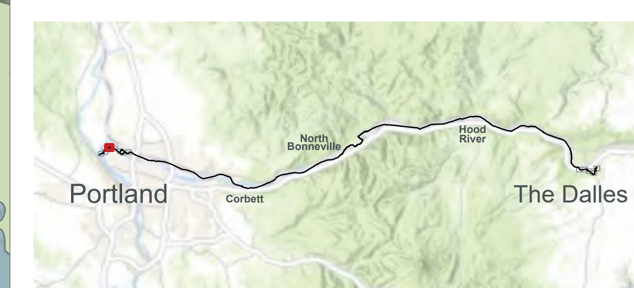
FIGURE 3: NWI AND NHD MAP
PAGE 3 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- WESTERN AC ALTERNATIVE NORTH
- WESTERN AC ALTERNATIVE SOUTH
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

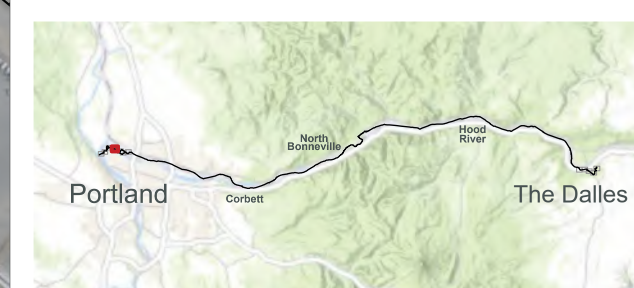
FIGURE 3: NWI AND NHD MAP
PAGE 4 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25, 30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

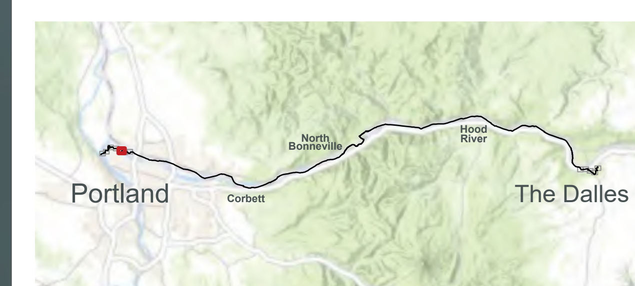
FIGURE 3: NWI AND NHD MAP
PAGE 5 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

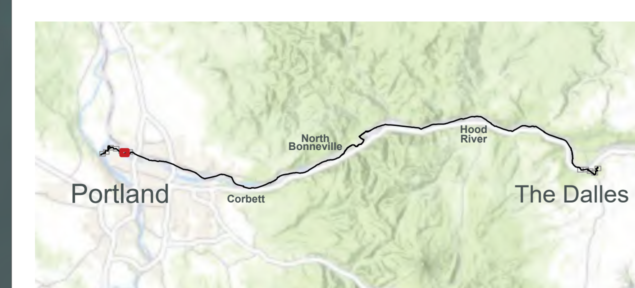
FIGURE 3: NWI AND NHD MAP
PAGE 6 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

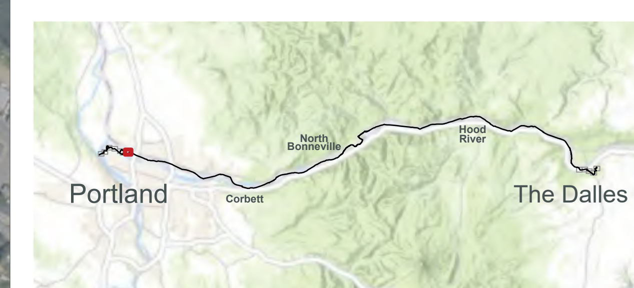
FIGURE 3: NWI AND NHD MAP
PAGE 7 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- ACCESS ROAD
- COFFER DAM
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

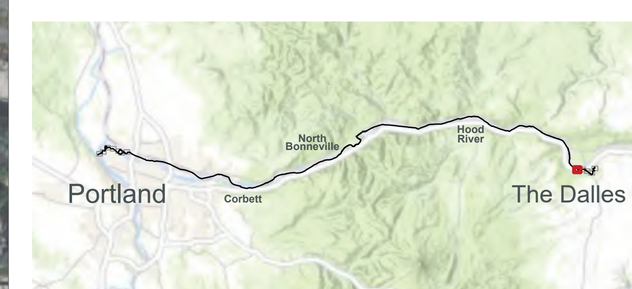
FIGURE 3: NWI AND NHD MAP
PAGE 8 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- ACCESS ROAD
- COFFER DAM
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

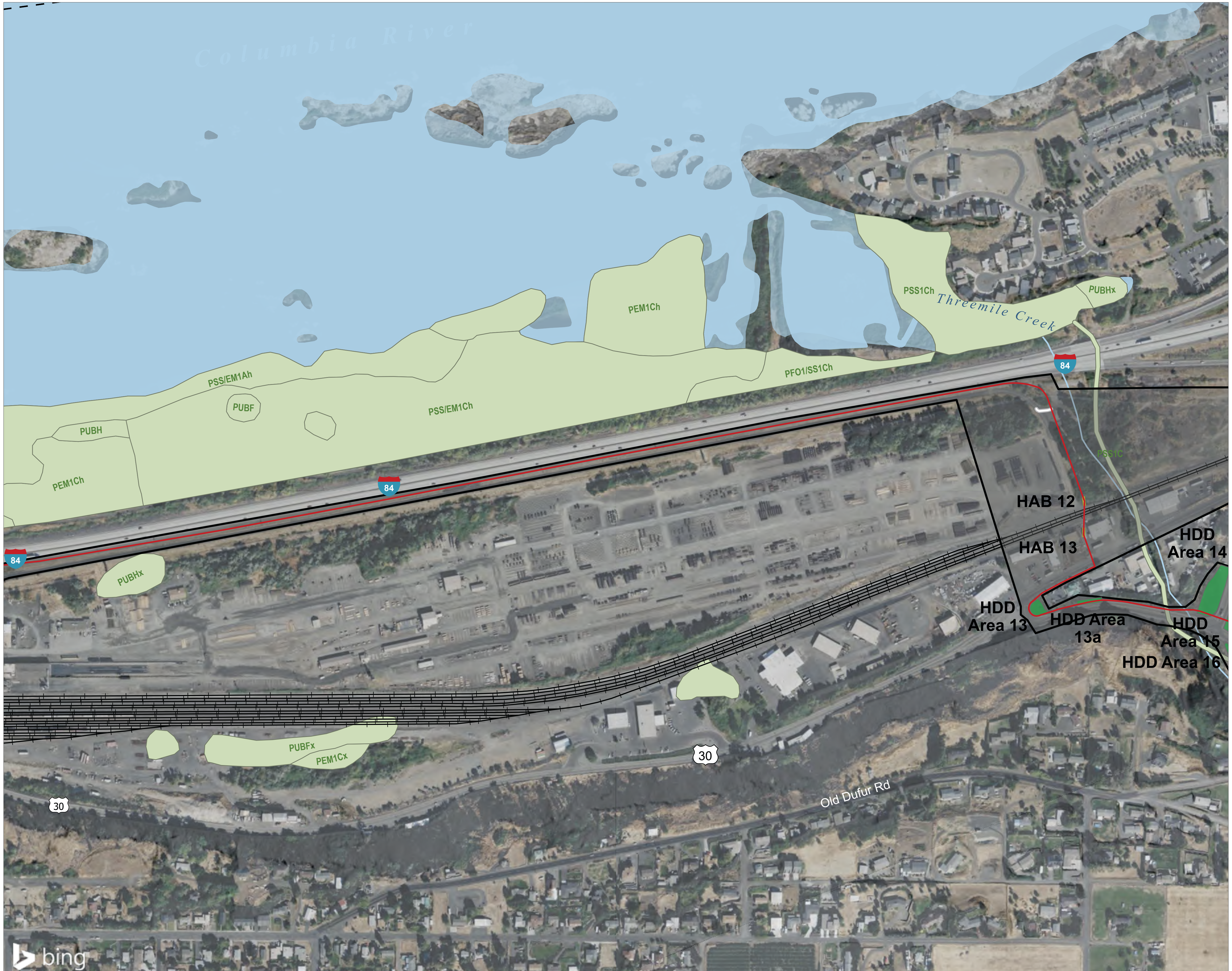
NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

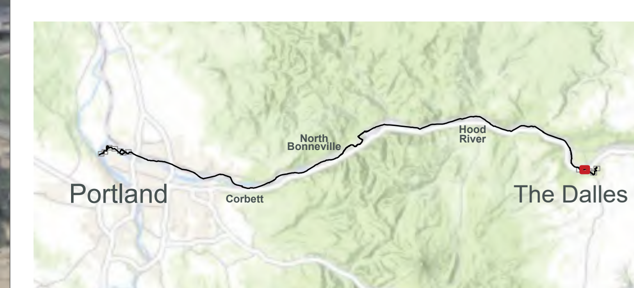
FIGURE 3: NWI AND NHD MAP
PAGE 9 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

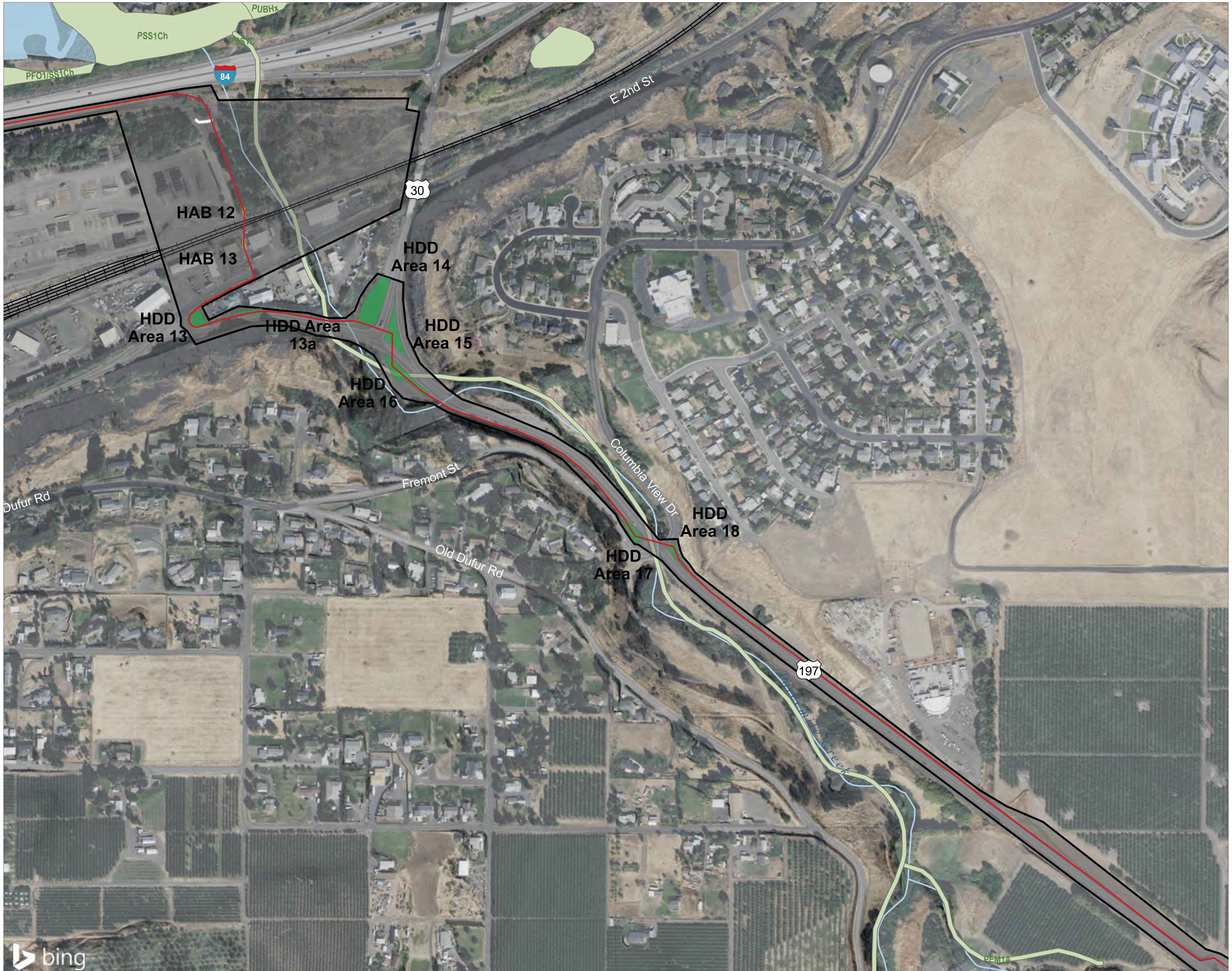
- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters



4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

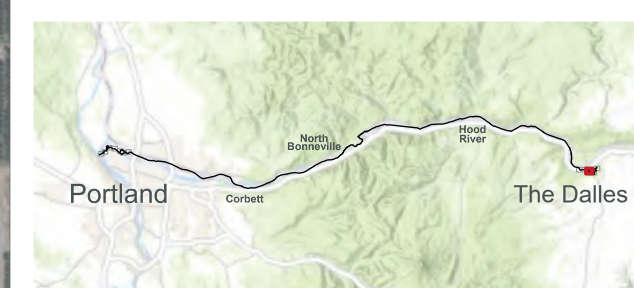
FIGURE 3: NWI AND NHD MAP
PAGE 10 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

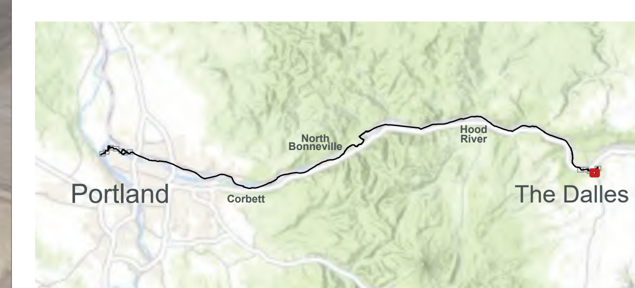
FIGURE 3: NWI AND NHD MAP
PAGE 11 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT
TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
TEMPORARY HORIZONTAL AUGER BORE (HAB)
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
NWI WETLAND
NHD STREAM/RIVER
NHD WATERBODY
STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

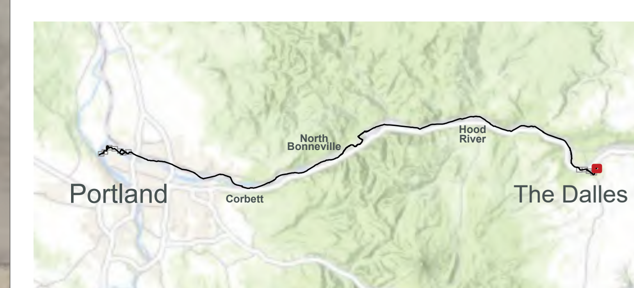
FIGURE 3: NWI AND NHD MAP
PAGE 12 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- NWI WETLAND
- NHD STREAM/RIVER
- NHD WATERBODY
- STATE BOUNDARY

NO SWI OR LWI HAS BEEN COMPLETED WITHIN THE SURVEY AREA

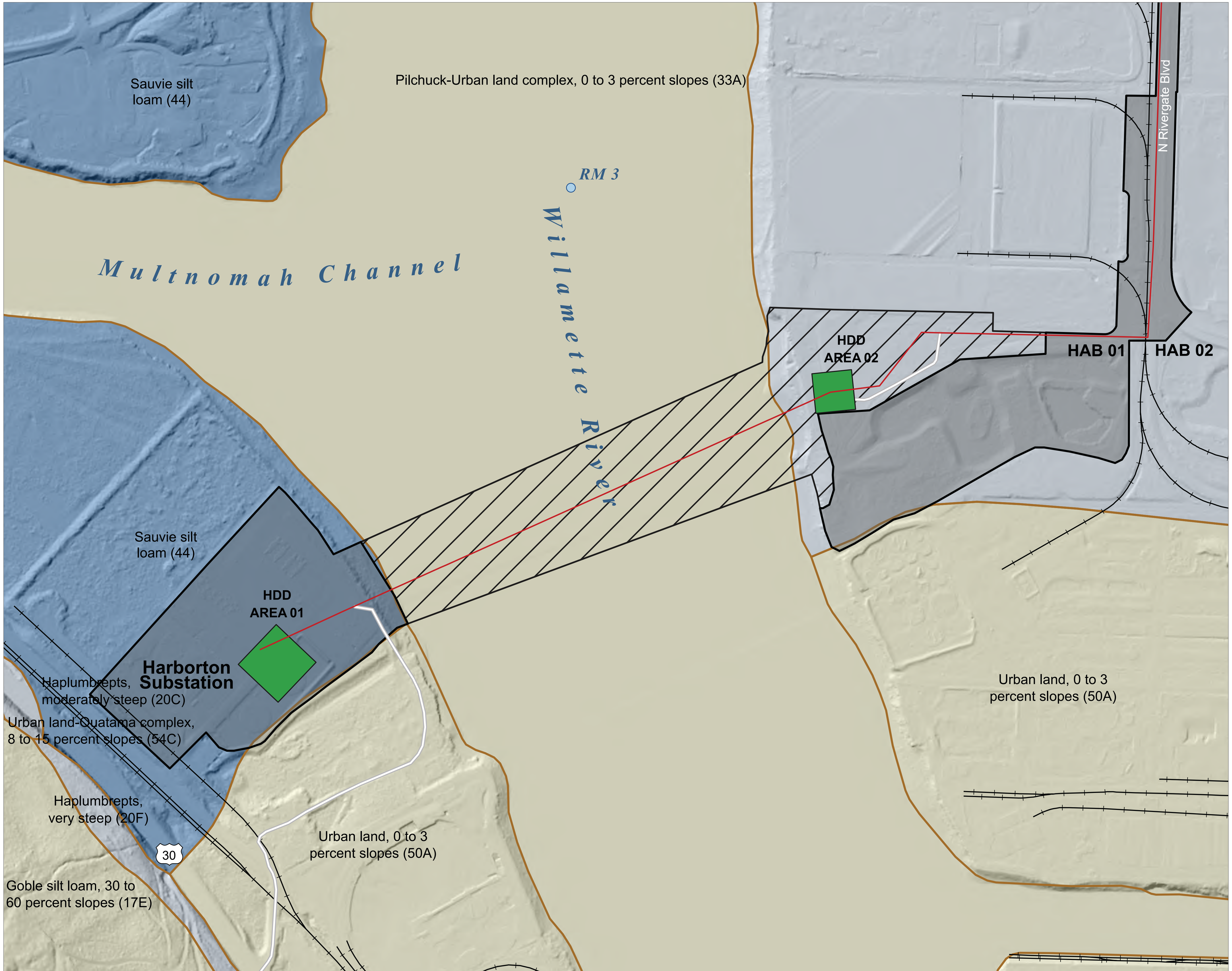
CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 1 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

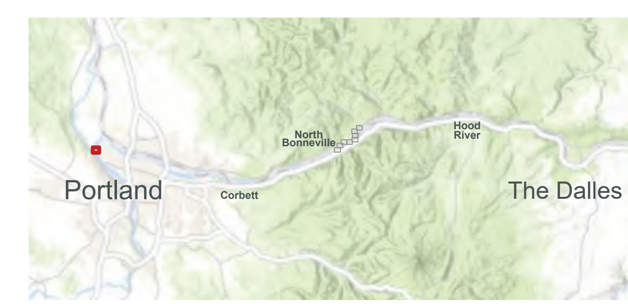


FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION
- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

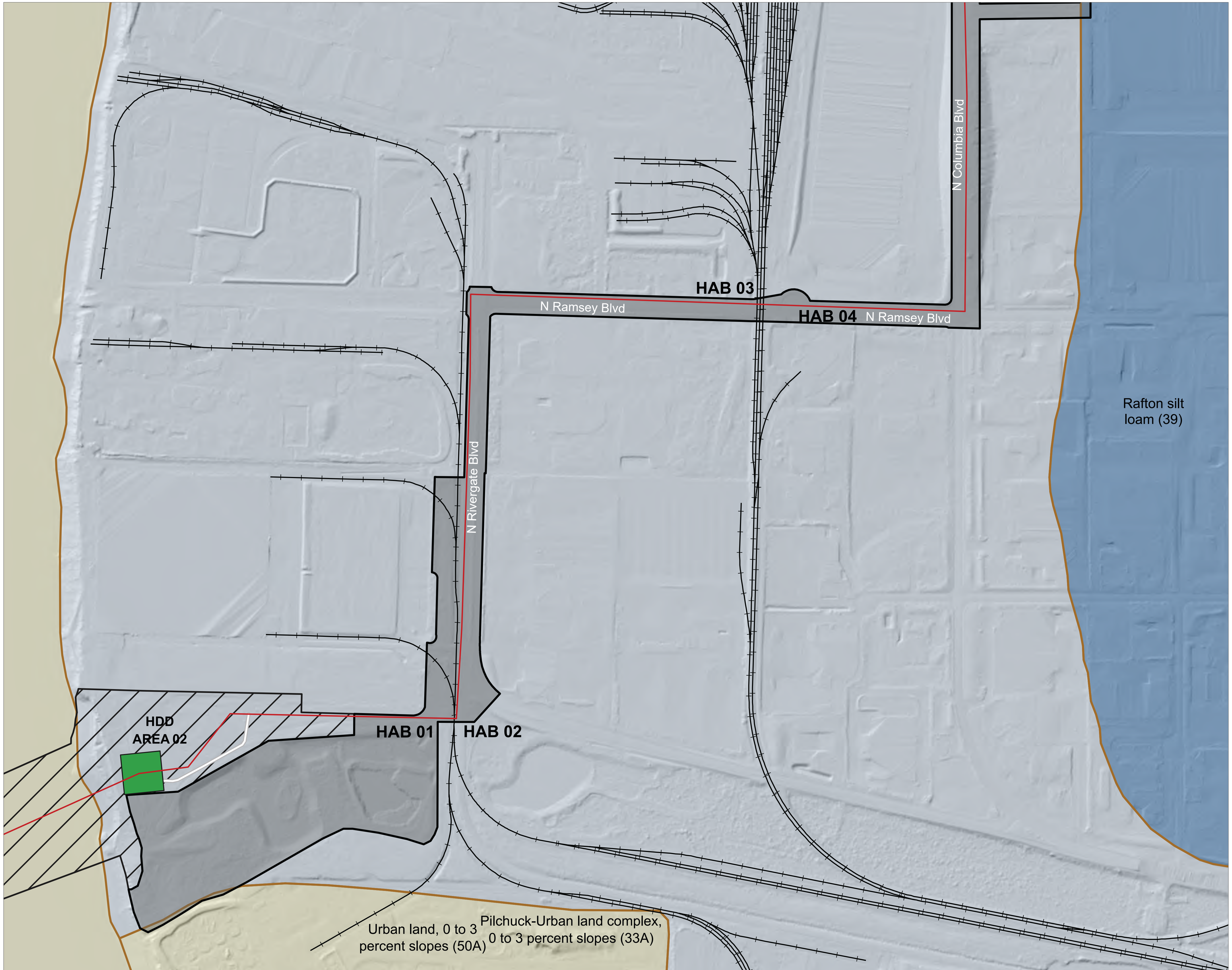


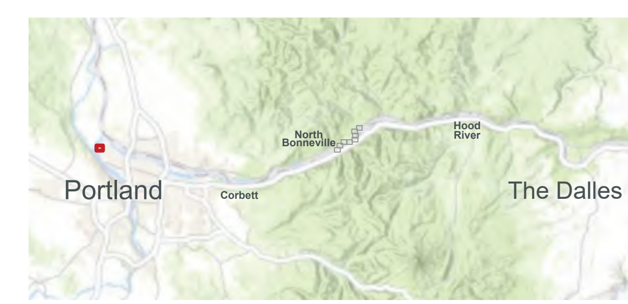
FIGURE 4 SOIL SURVEY MAP
PAGE 2 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT
ACCESS ROAD
TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION
NOT HYDRIC
MINIMALLY HYDRIC (1 - 25%)
PARTIALLY HYDRIC (26 - 50%)
MODERATELY HYDRIC (51 - 75%)
MOSTLY HYDRIC (76 - 95%)
ALL HYDRIC
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

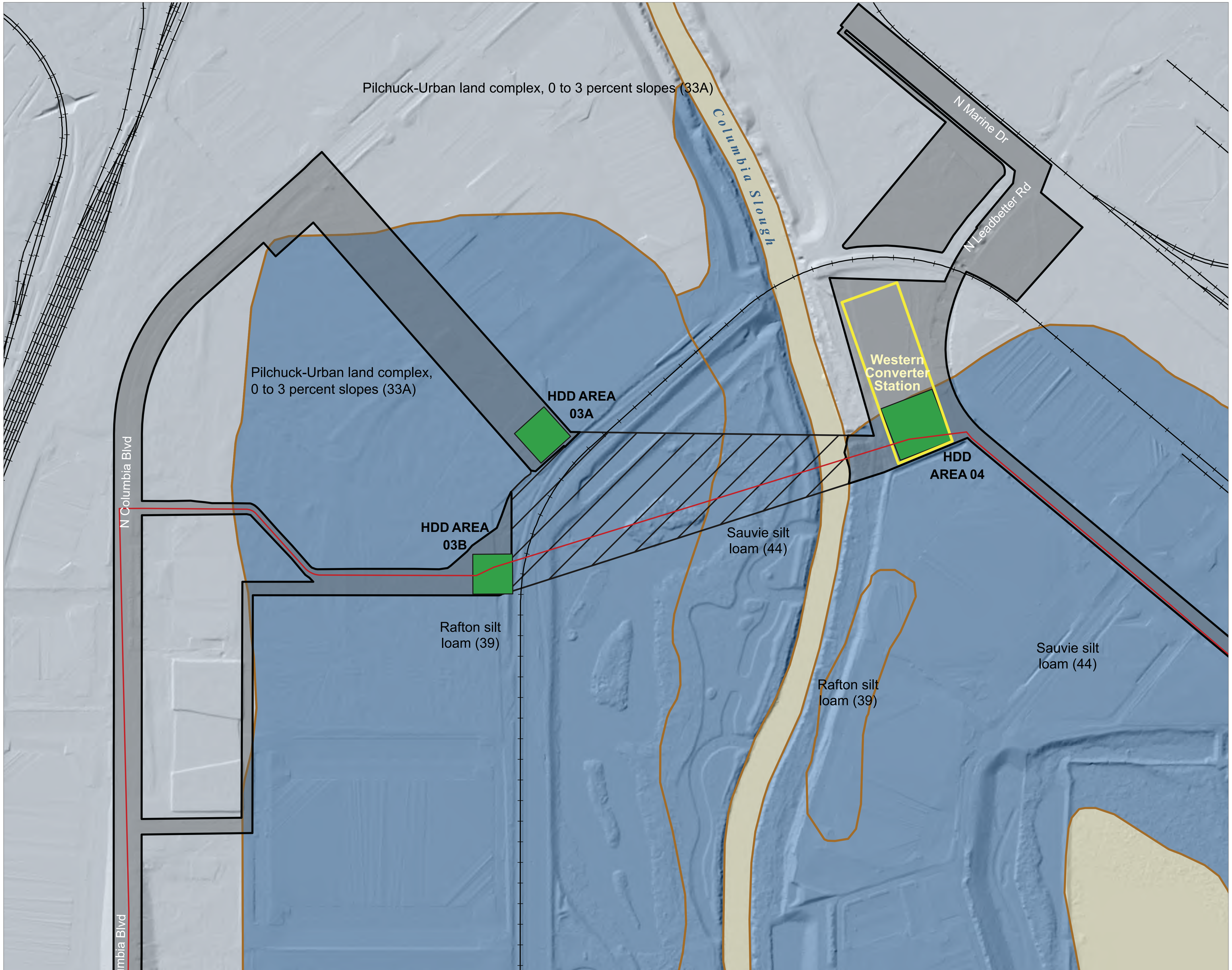


FIGURE 4 SOIL SURVEY MAP
PAGE 3 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME: SAUVIE ISLAND

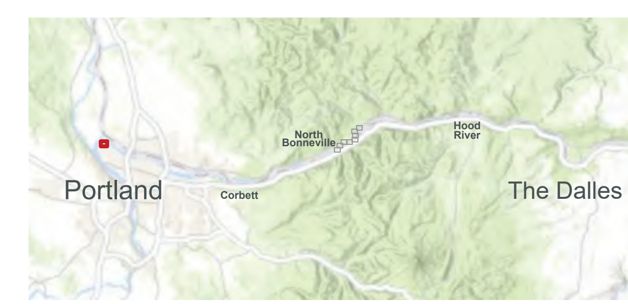
FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

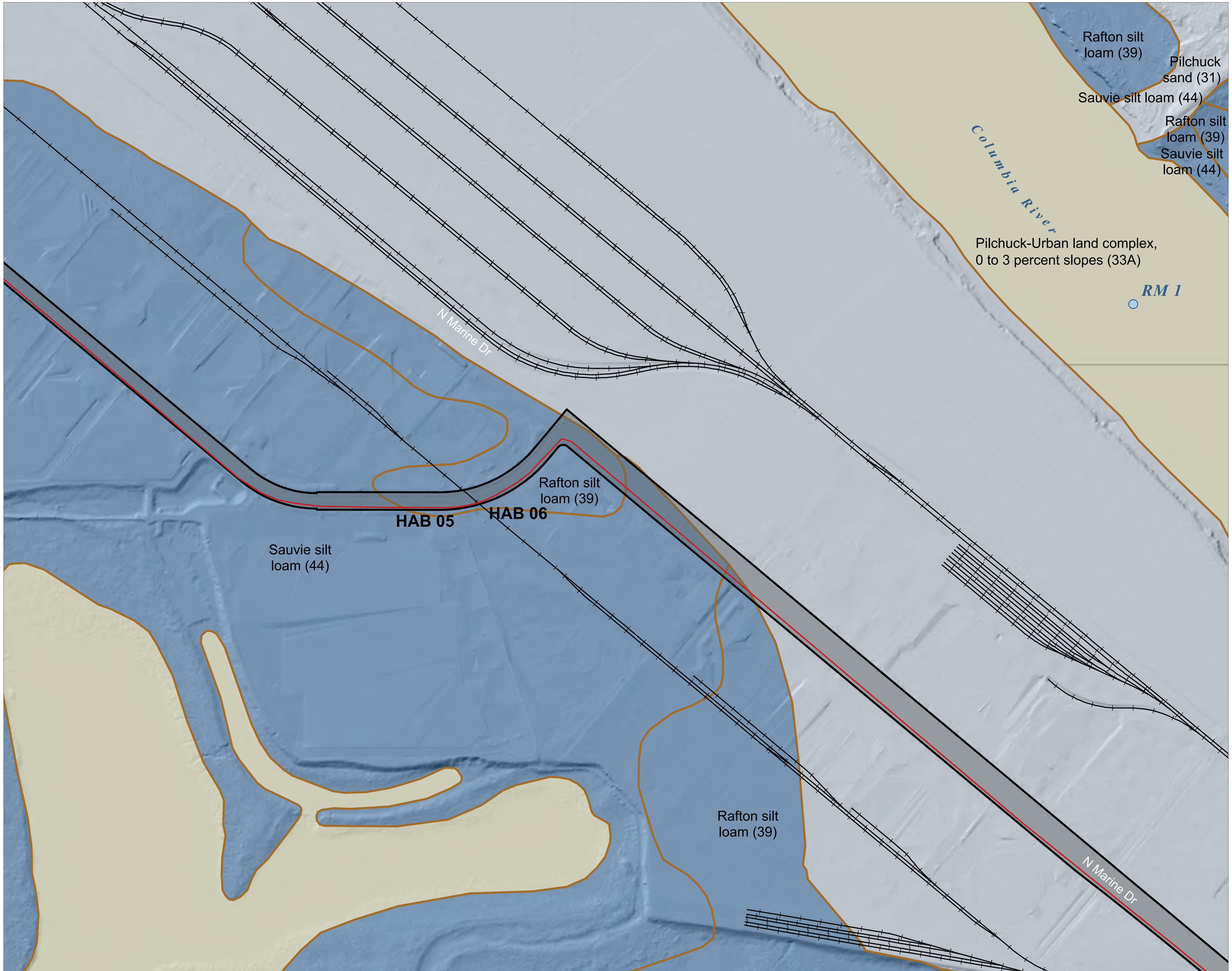
CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 4 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25, 30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER



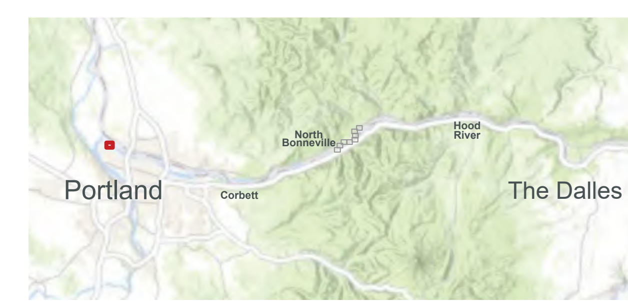
FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

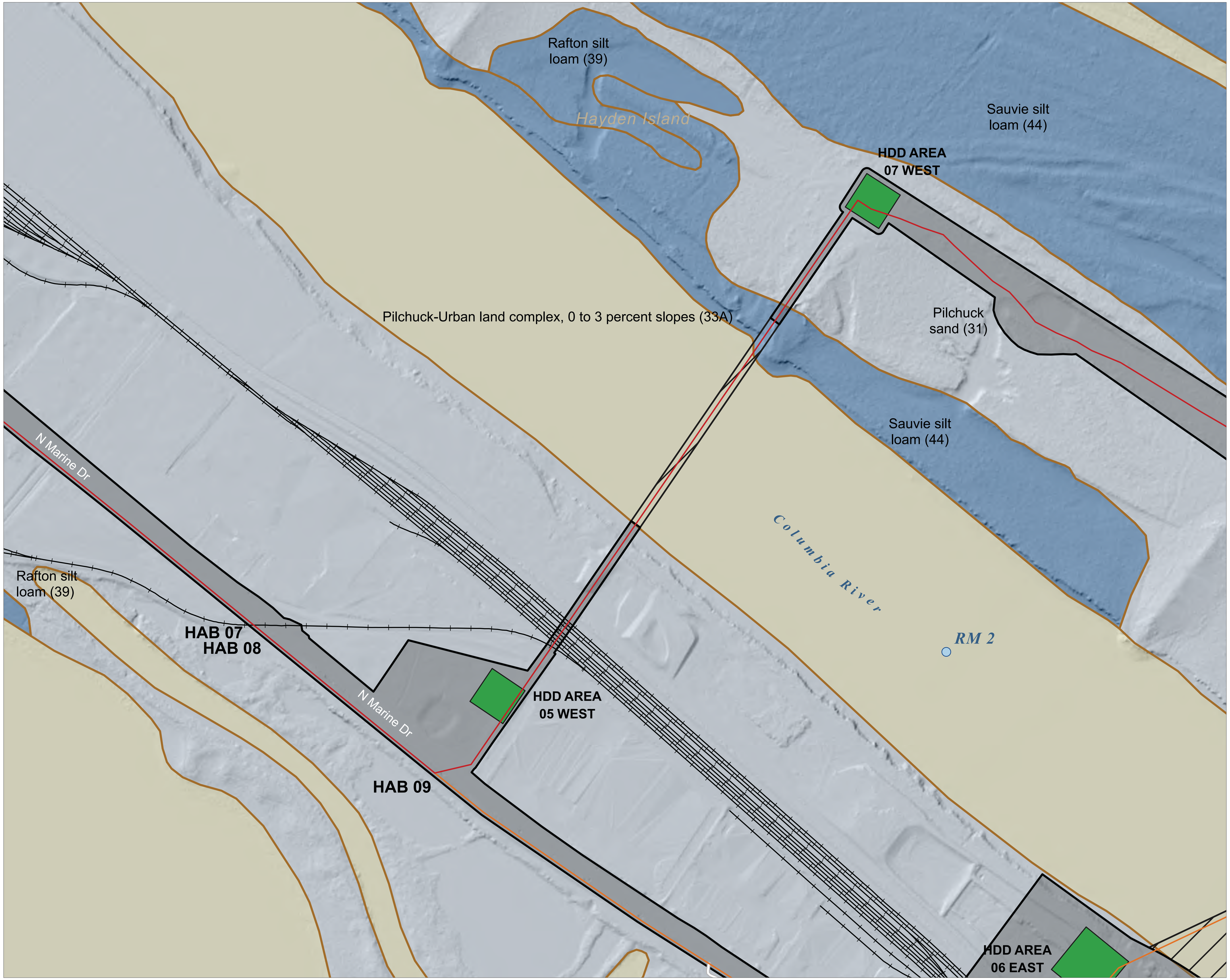
CASCADE RENEWABLE TRANSMISSION



HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 5 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

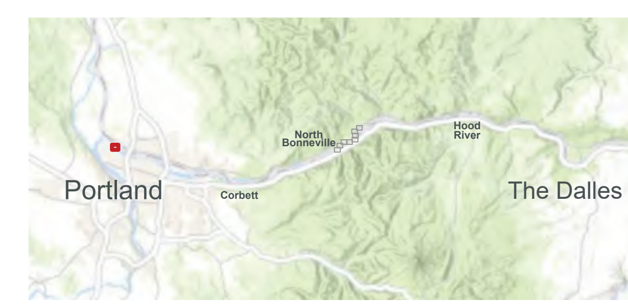
FOR INFORMATION ONLY - CONCEPT DRAWING

- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

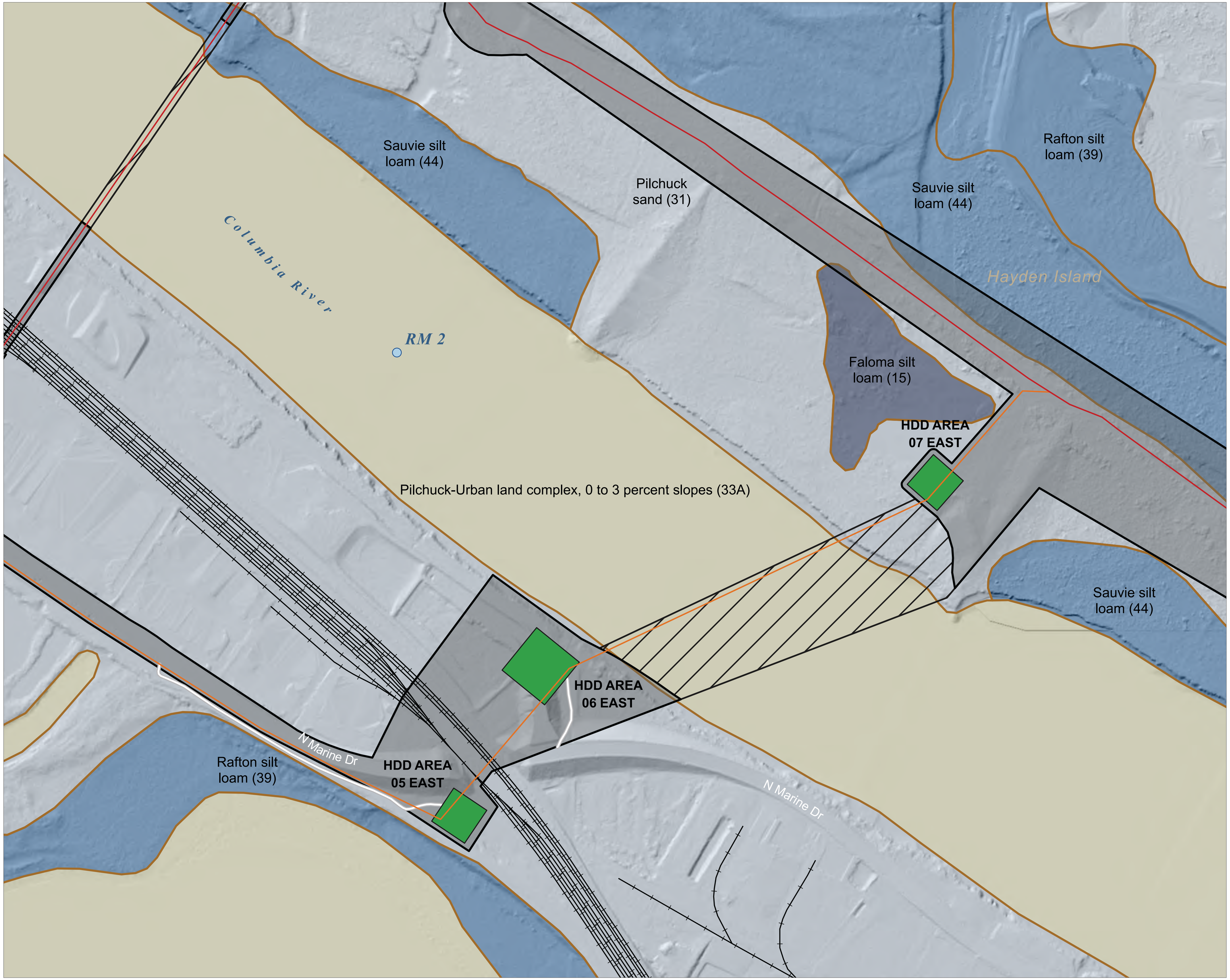
CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

FIGURE 4 SOIL SURVEY MAP
PAGE 6 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

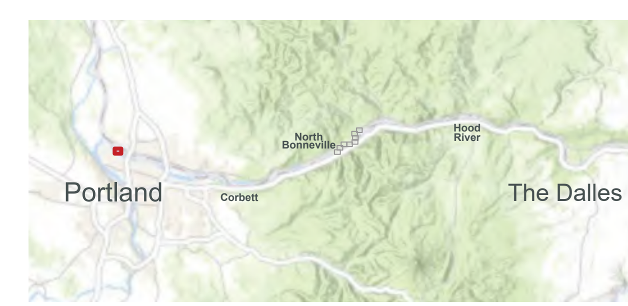


- USACE RIVER MILE
- PROPOSED ALIGNMENT
- HAYDEN ISLAND ALTERNATIVE
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

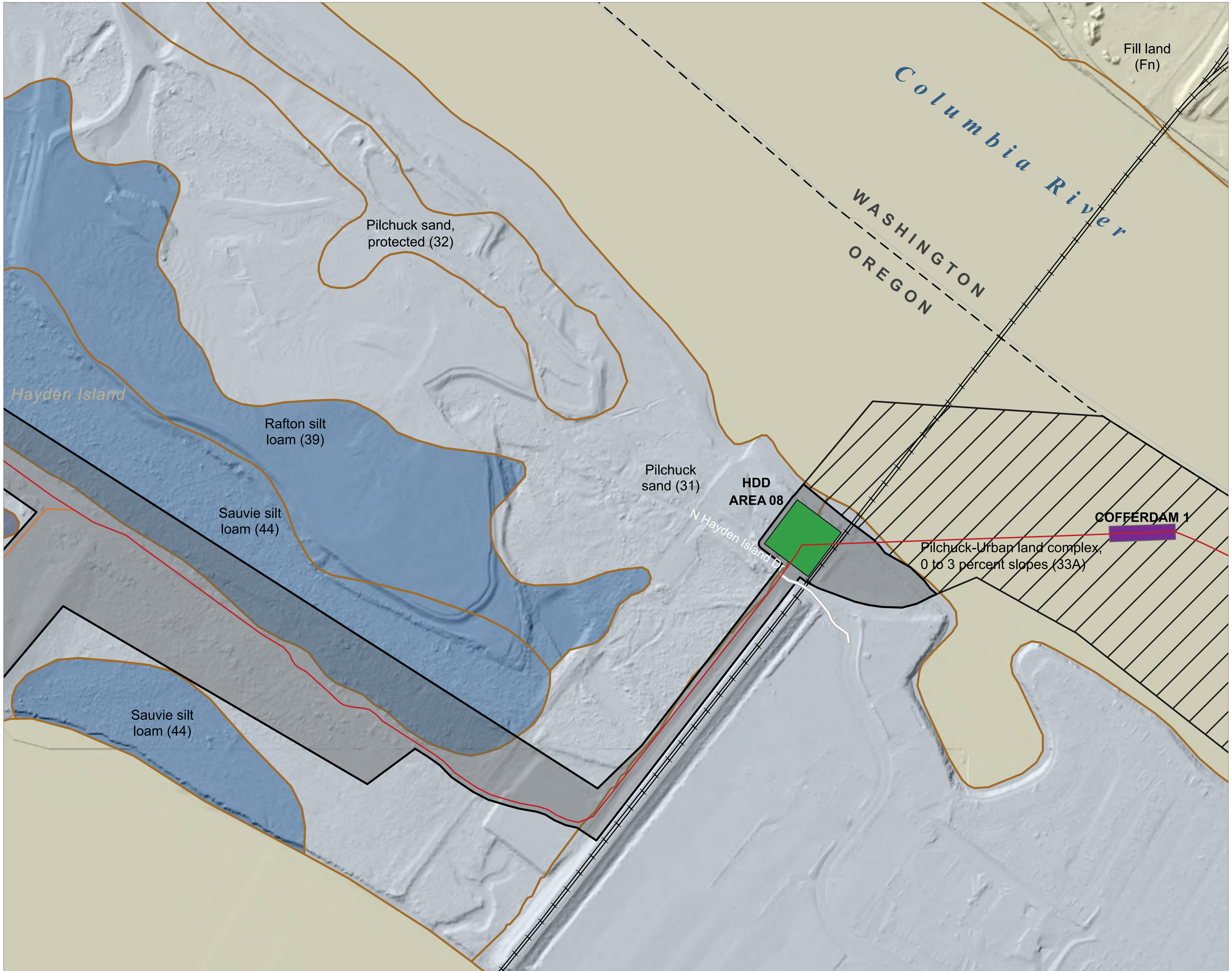


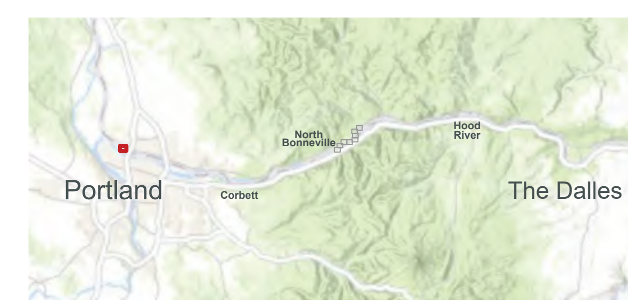
FIGURE 4 SOIL SURVEY MAP
PAGE 7 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPOSED ALIGNMENT
HAYDEN ISLAND ALTERNATIVE
ACCESS ROAD
TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
TEMPORARY 3-SIDED WET COFFERDAM
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION
NOT HYDRIC
MINIMALLY HYDRIC (1 - 25%)
PARTIALLY HYDRIC (26 - 50%)
MODERATELY HYDRIC (51 - 75%)
MOSTLY HYDRIC (76 - 95%)
ALL HYDRIC
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

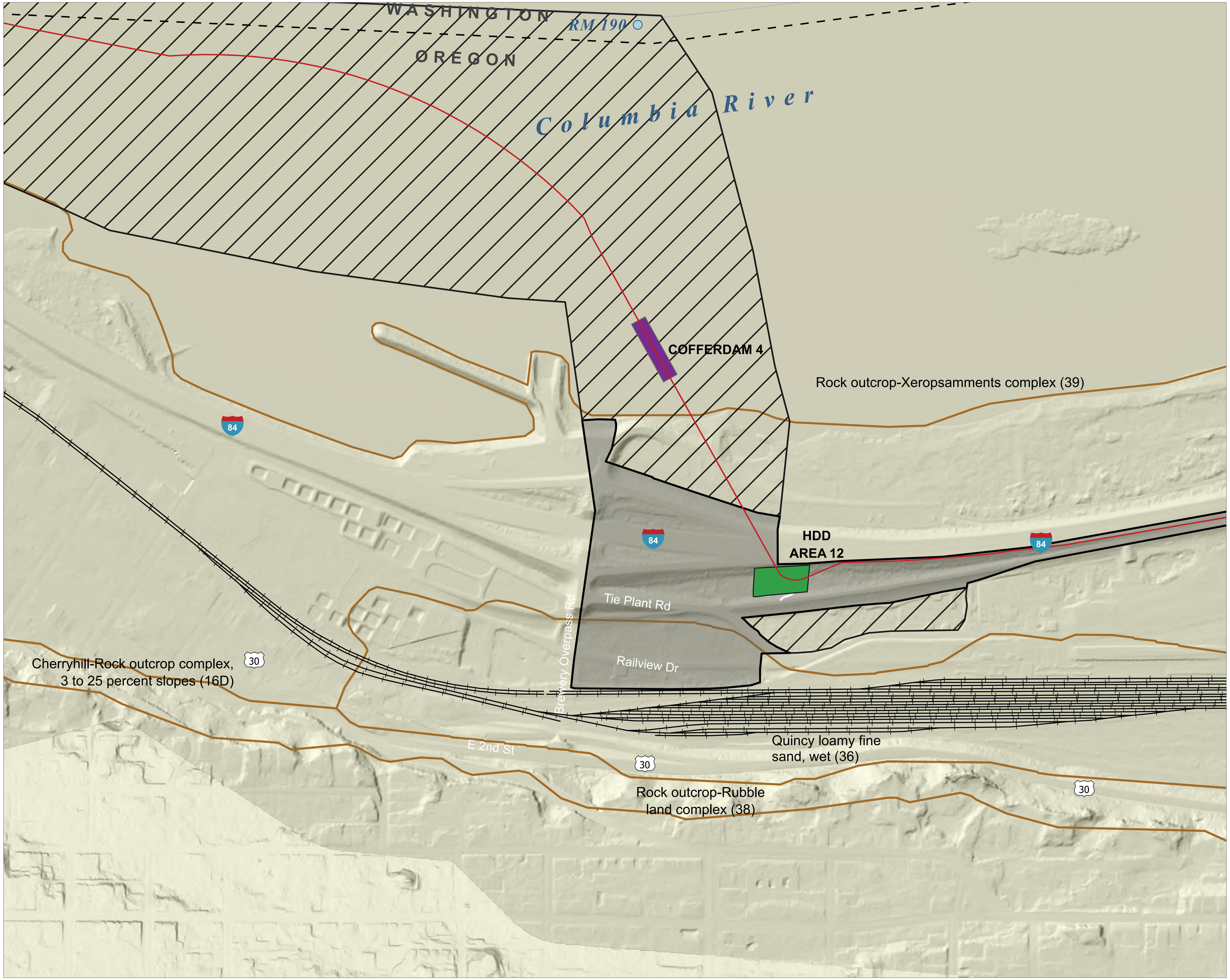


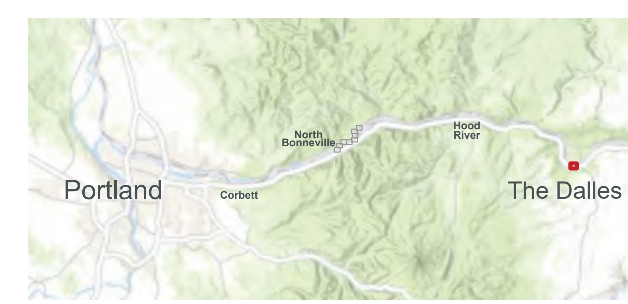
FIGURE 4 SOIL SURVEY MAP
PAGE 8 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

USACE RIVER MILE
PROPOSED ALIGNMENT
ACCESS ROAD
TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
TEMPORARY 3-SIDED WET COFFERDAM
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION
NOT HYDRIC
MINIMALLY HYDRIC (1 - 25%)
PARTIALLY HYDRIC (26 - 50%)
MODERATELY HYDRIC (51 - 75%)
MOSTLY HYDRIC (76 - 95%)
ALL HYDRIC
STATE BOUNDARY

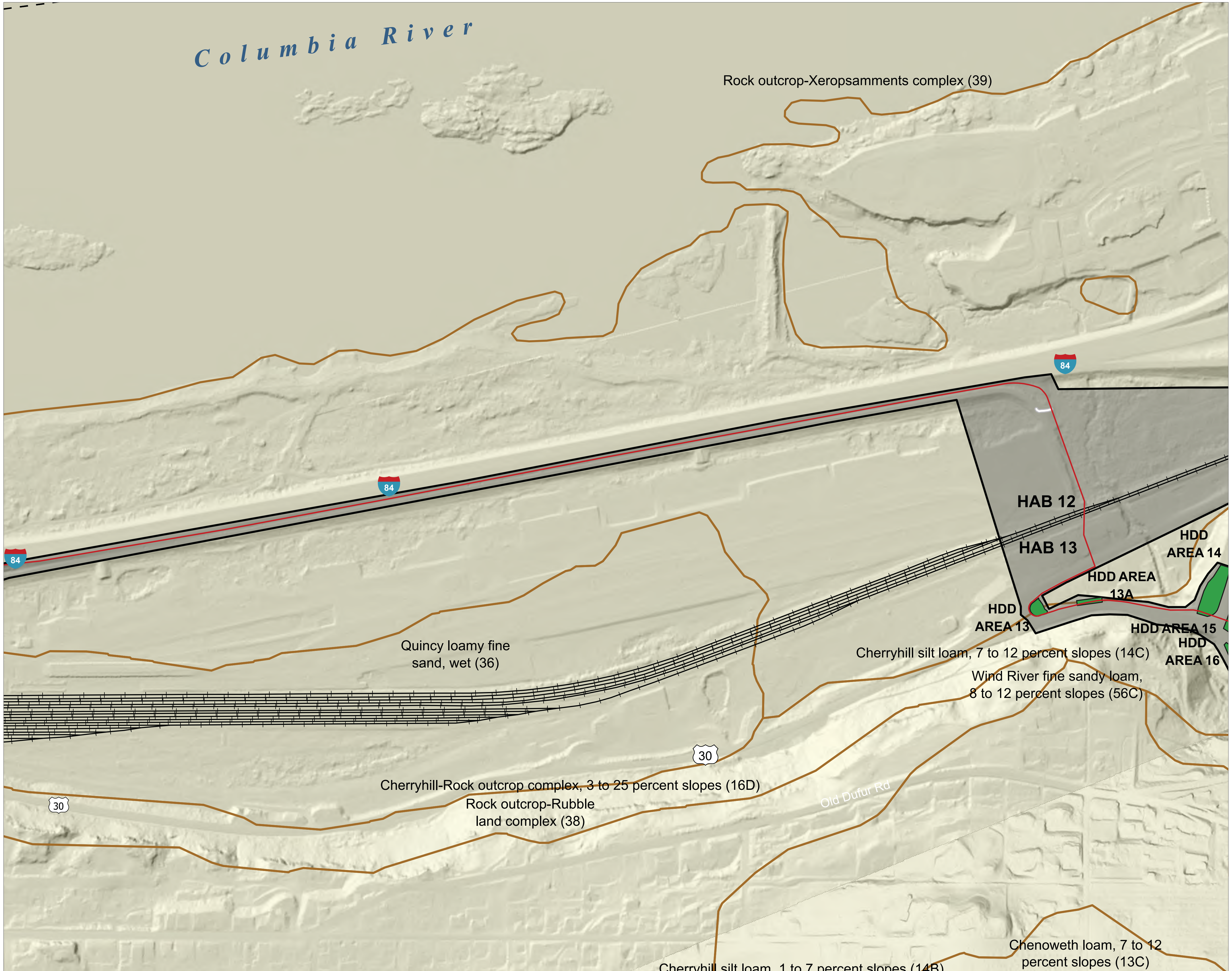
CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 9 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH



FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

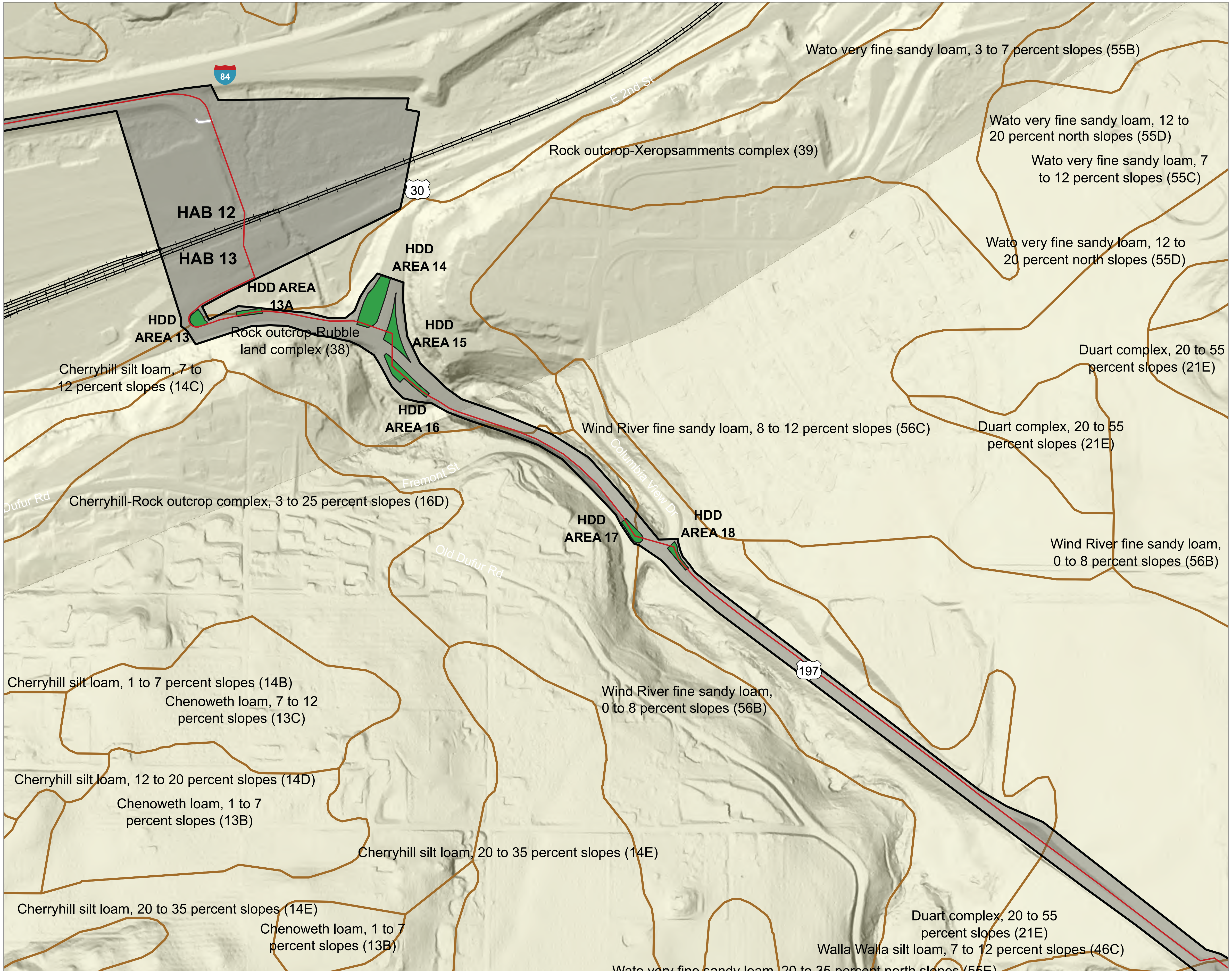
CASCADE RENEWABLE TRANSMISSION

HDR

0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 10 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH



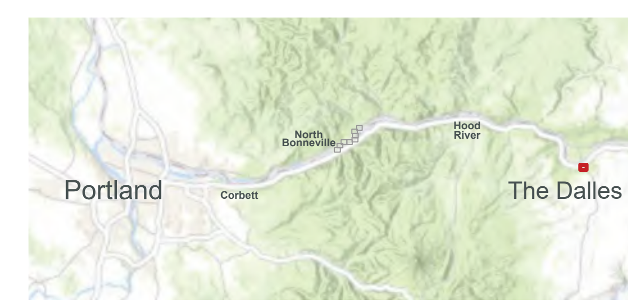
FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- ACCESS ROAD
- TEMPORARY HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION

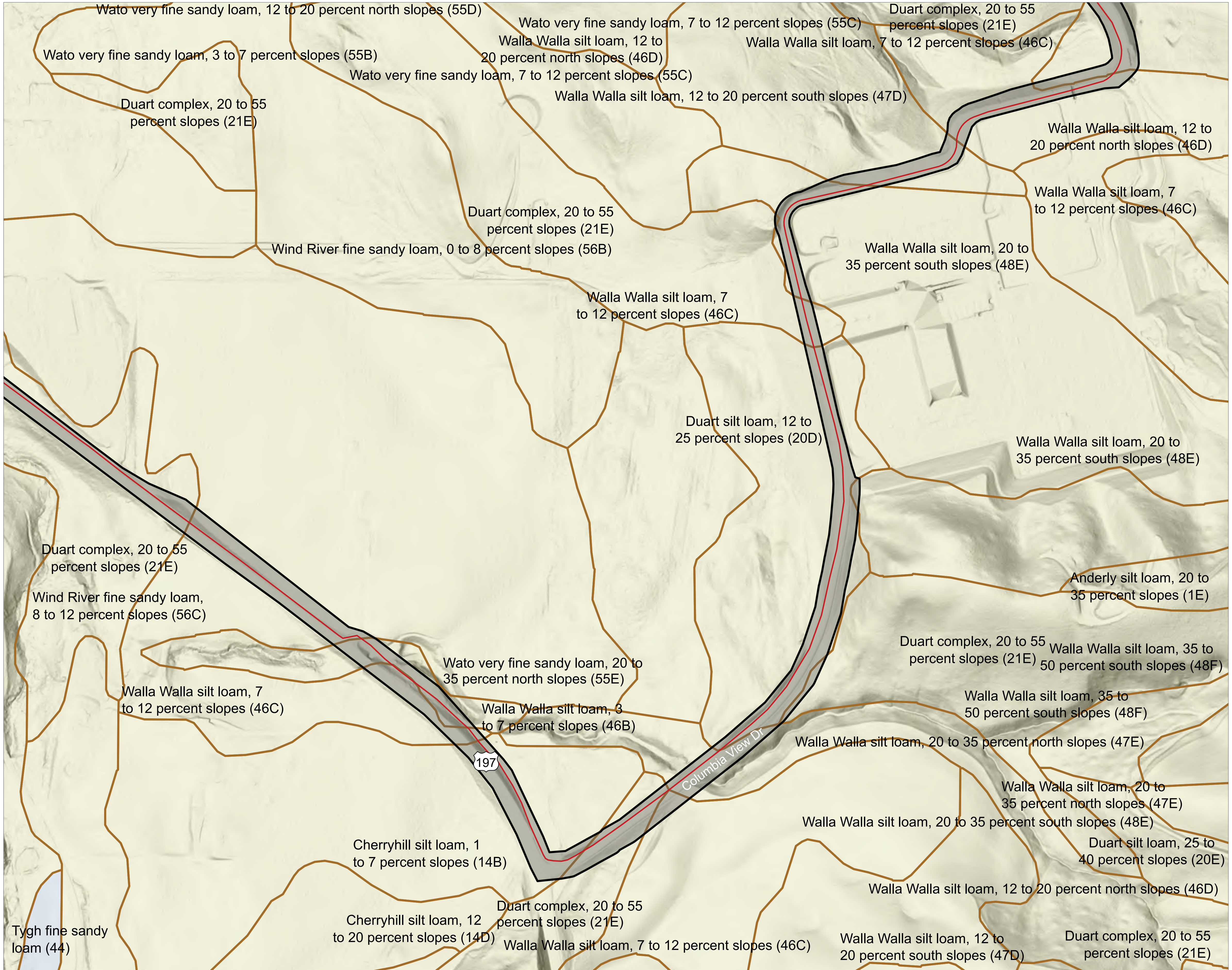


0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 11 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

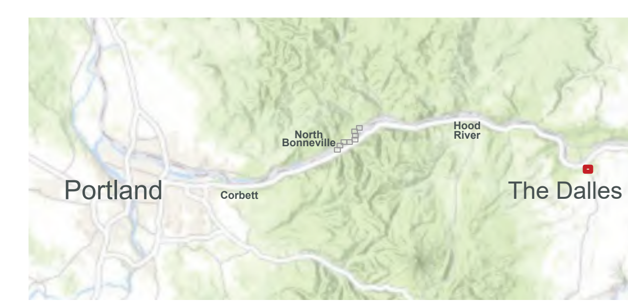
FOR INFORMATION ONLY - CONCEPT DRAWING



PROPOSED ALIGNMENT
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
SOIL MAP UNIT

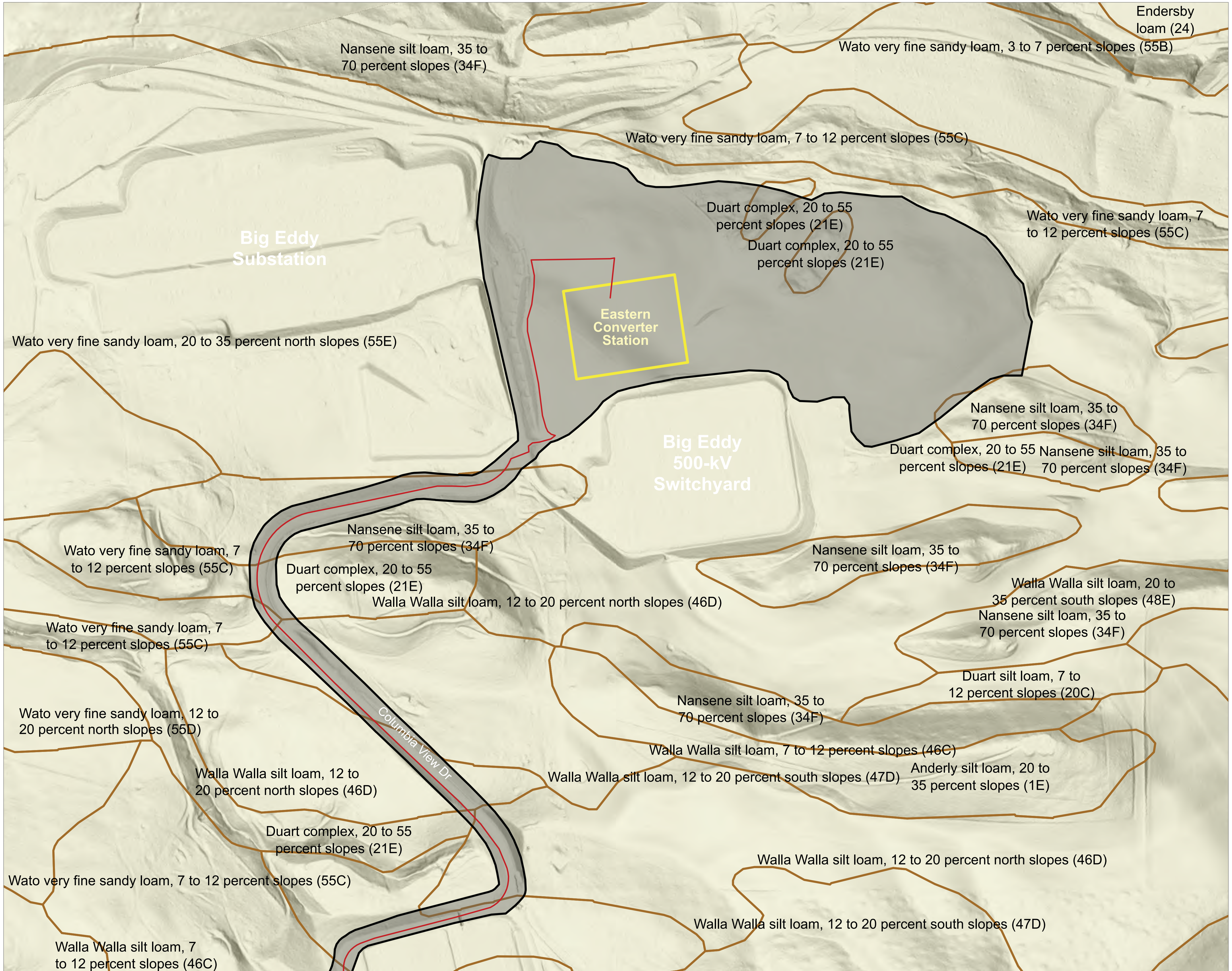
HYDRIC SOIL CLASSIFICATION
NOT HYDRIC
MINIMALLY HYDRIC (1 - 25%)
PARTIALLY HYDRIC (26 - 50%)
MODERATELY HYDRIC (51 - 75%)
MOSTLY HYDRIC (76 - 95%)
ALL HYDRIC
STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/1/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 4 SOIL SURVEY MAP
PAGE 12 OF 12
DATE: 4/1/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME: PETERSBURG

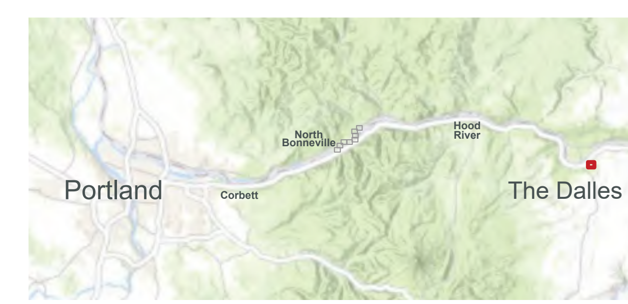
FOR INFORMATION ONLY - CONCEPT DRAWING

- PROPOSED ALIGNMENT
- CONVERTER STATION
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- SOIL MAP UNIT

HYDRIC SOIL CLASSIFICATION

- NOT HYDRIC
- MINIMALLY HYDRIC (1 - 25%)
- PARTIALLY HYDRIC (26 - 50%)
- MODERATELY HYDRIC (51 - 75%)
- MOSTLY HYDRIC (76 - 95%)
- ALL HYDRIC
- STATE BOUNDARY

CASCADE RENEWABLE TRANSMISSION



0 500 Feet
0 150 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 1 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- ESTIMATED CENTERLINE OF DITCH
- DELINEATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

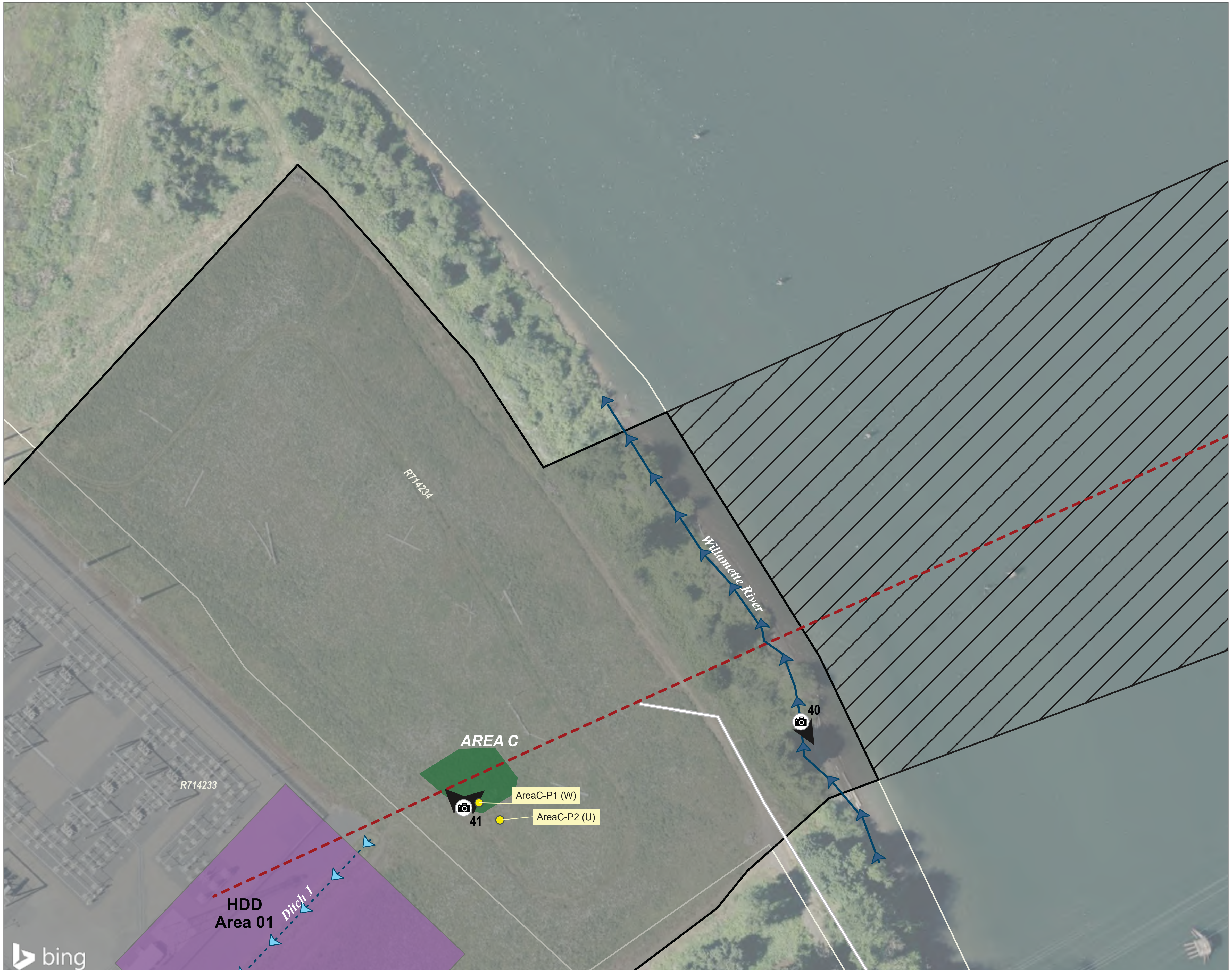


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 2 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

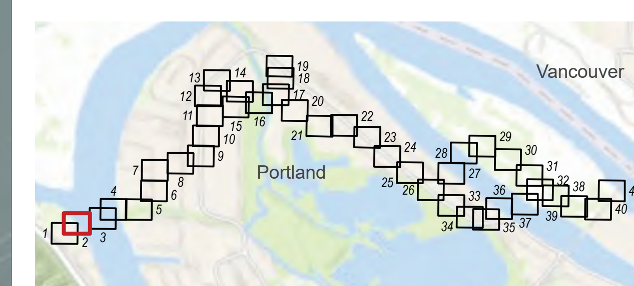
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- ESTIMATED CENTERLINE OF DITCH
- DELINEATED HTL
- DELINEATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

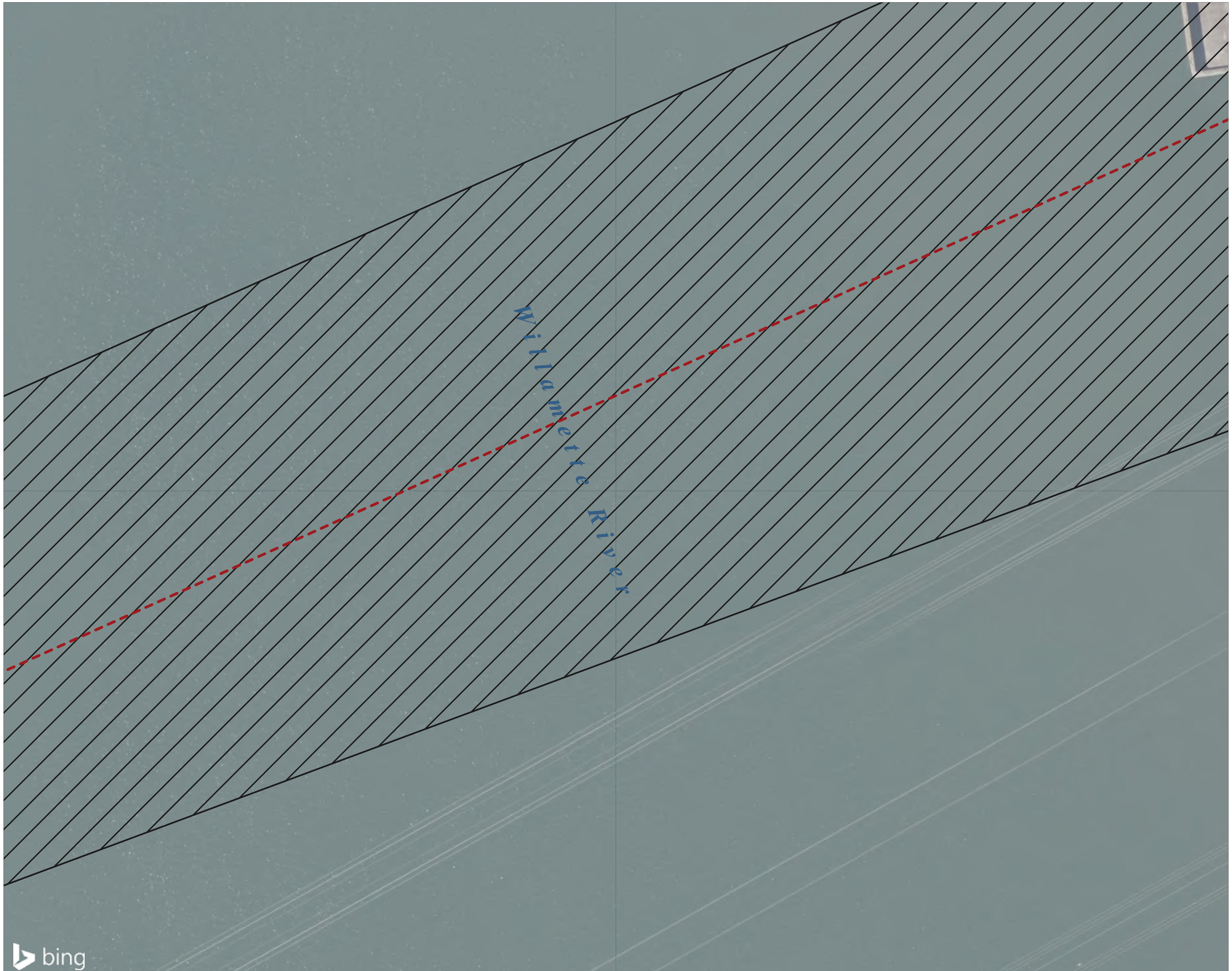


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 3 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

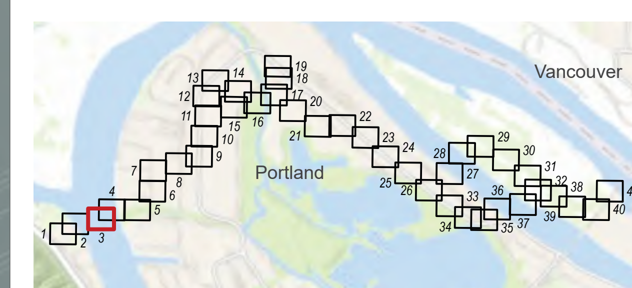
INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

DESKTOP AND VISUAL SURVEY ONLY

TAXLOT

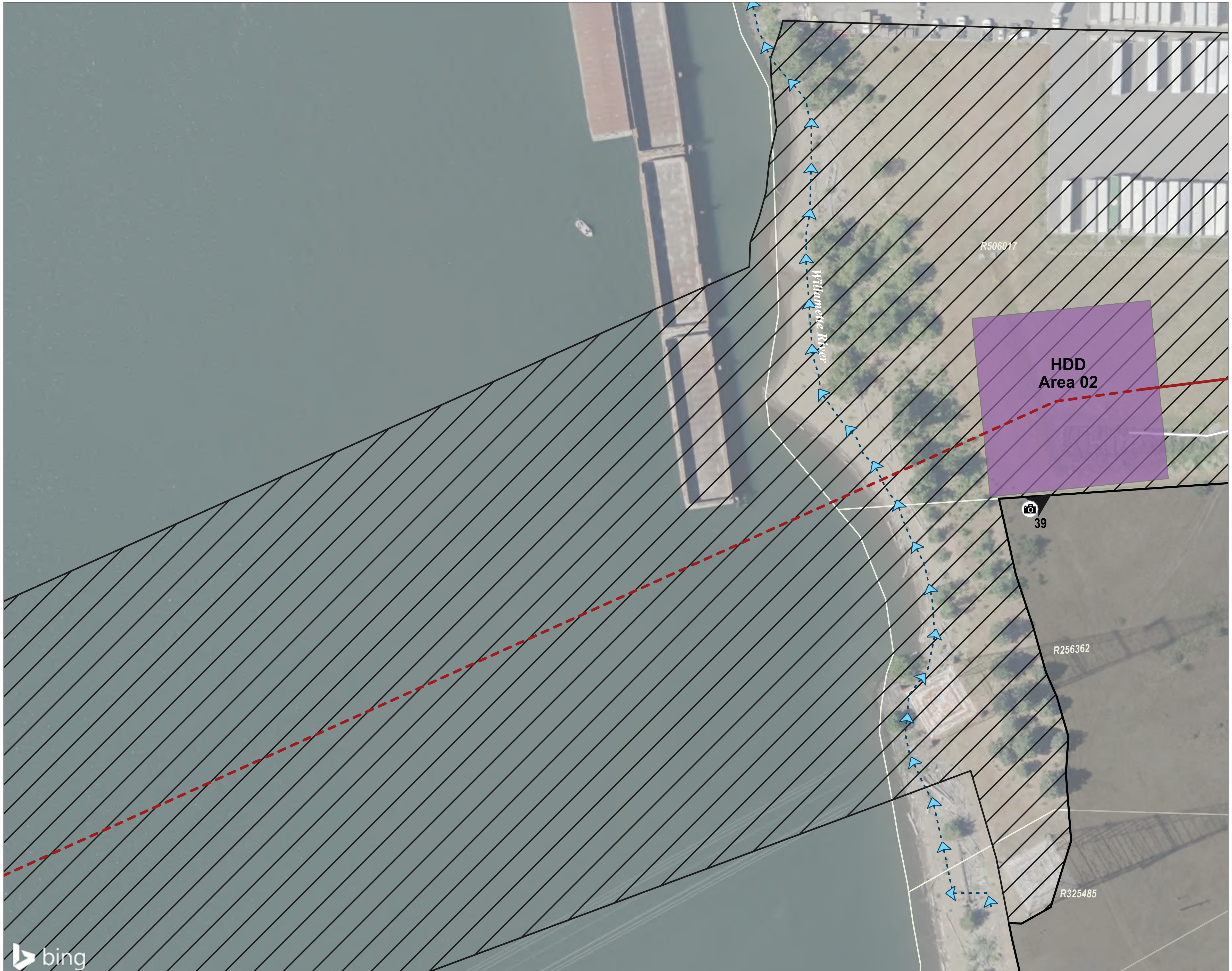
SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 4 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E/R01W
SECTION: 34, 35
USGS QUAD NAME:
LINNTON

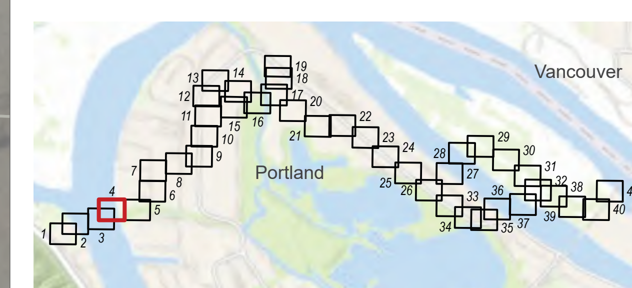
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- PHOTO POINT
- CALCULATED HTL
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

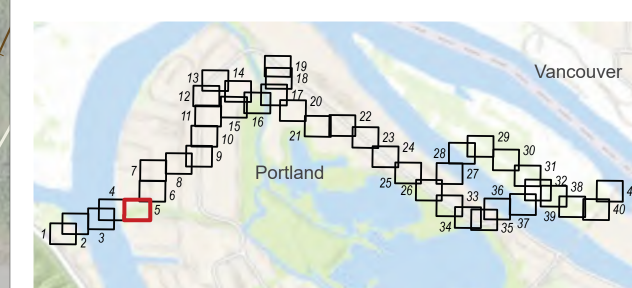
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 5 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- SAMPLE PLOT
- PHOTO POINT
- DELINEATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 6 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

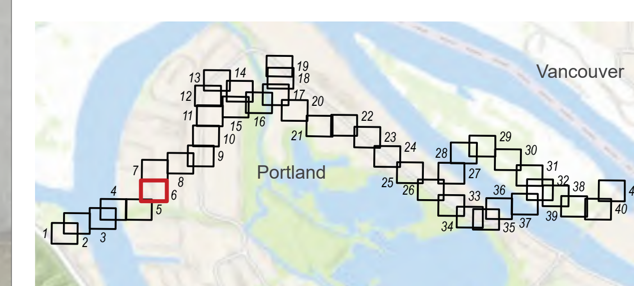
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

PAGE 7 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

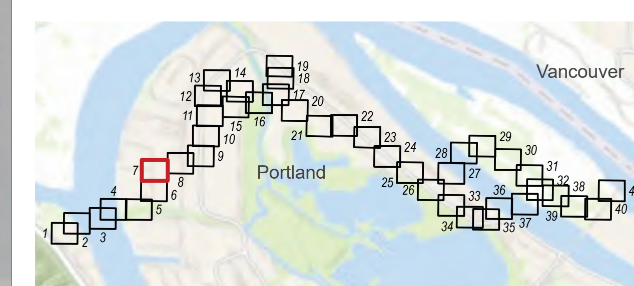
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

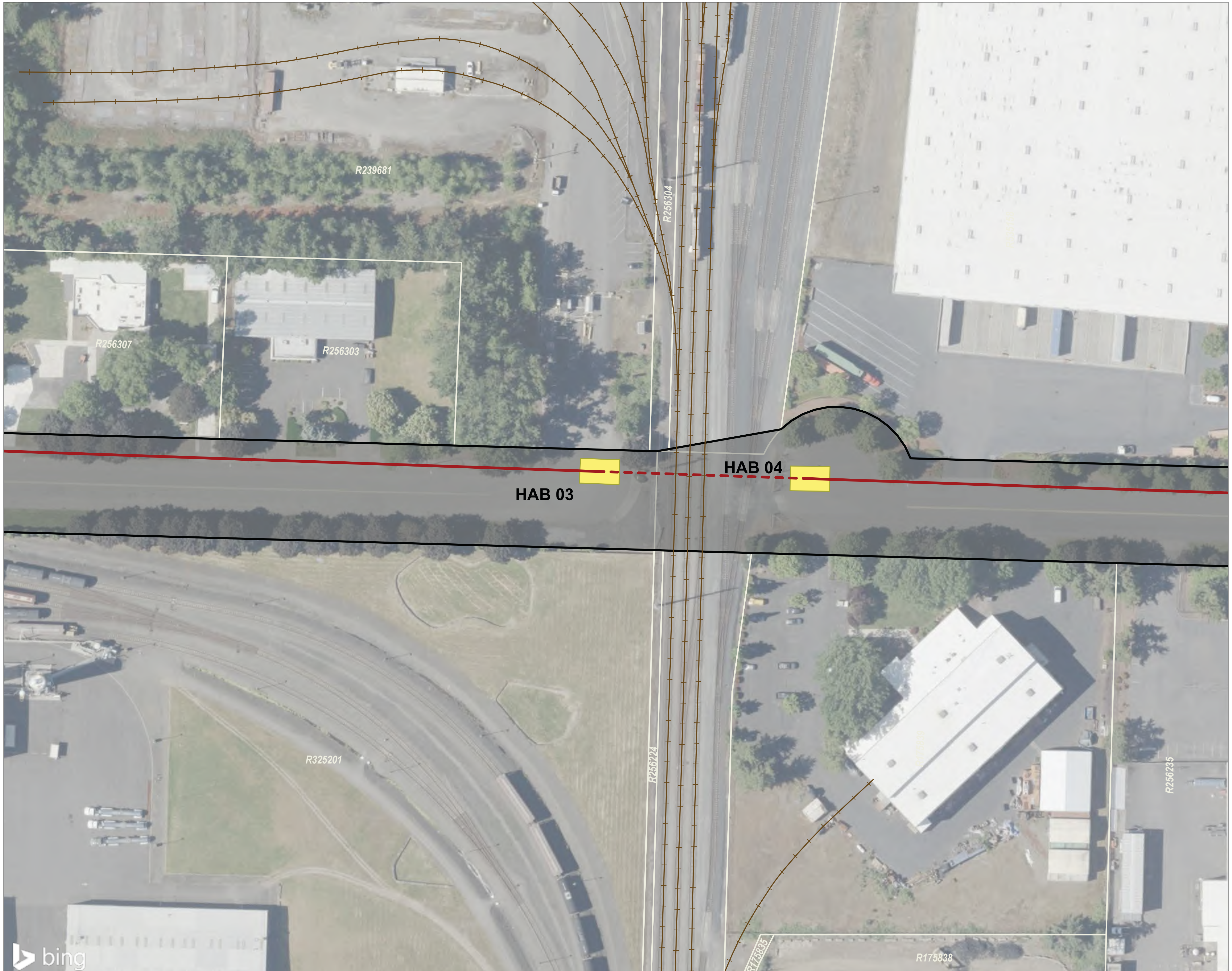
CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 8 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

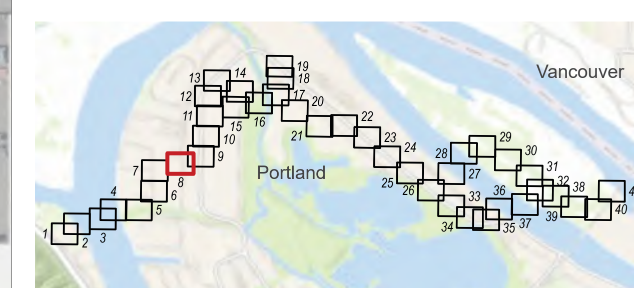
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 9 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

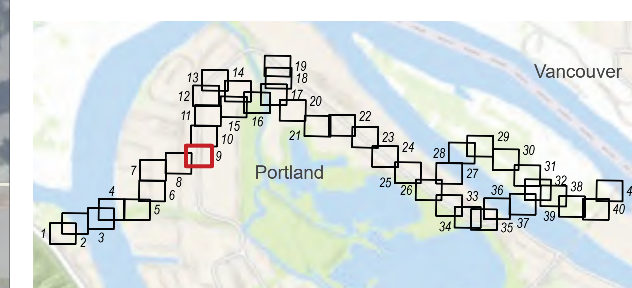
INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 10 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME: LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WESTERN AC ALTERNATIVE SOUTH

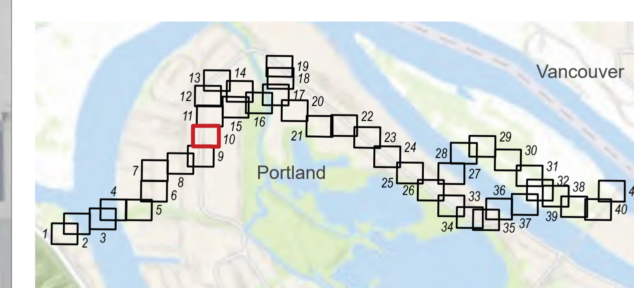
UPLAND INSTALLATION (E.G., TRENCHING)

WETLAND AND WATERS SURVEY AREA

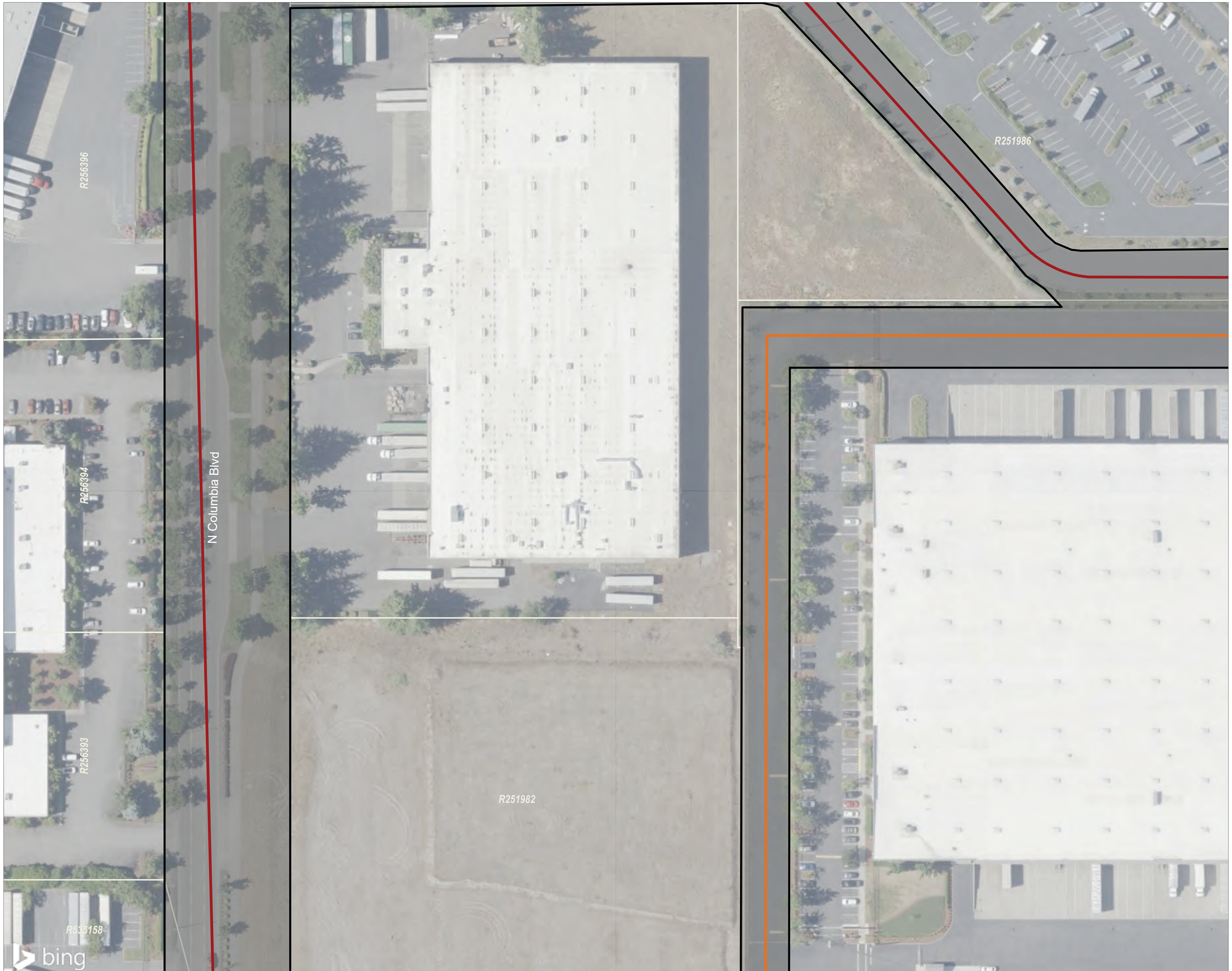
TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 11 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 26, 27, 34, 35
USGS QUAD NAME:
LINNTON

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WESTERN AC ALTERNATIVE SOUTH

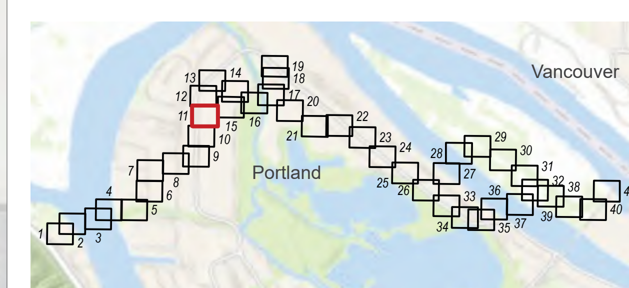
UPLAND INSTALLATION (E.G., TRENCHING)

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

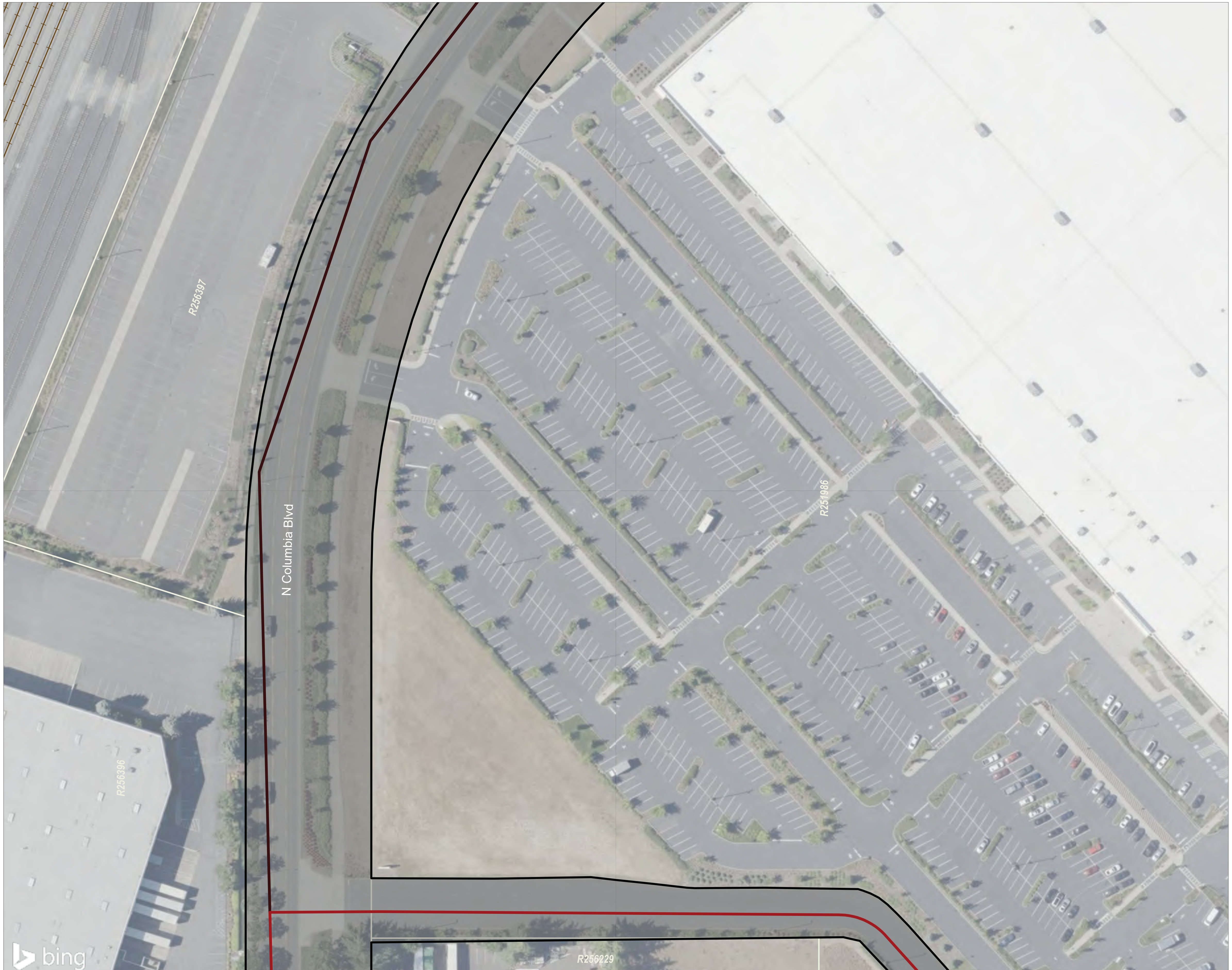


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 12 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

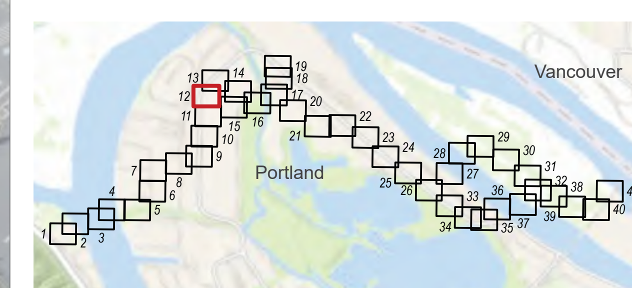
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING

WESTERN AC ALTERNATIVE NORTH
- UPLAND INSTALLATION (E.G., TRENCHING)
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

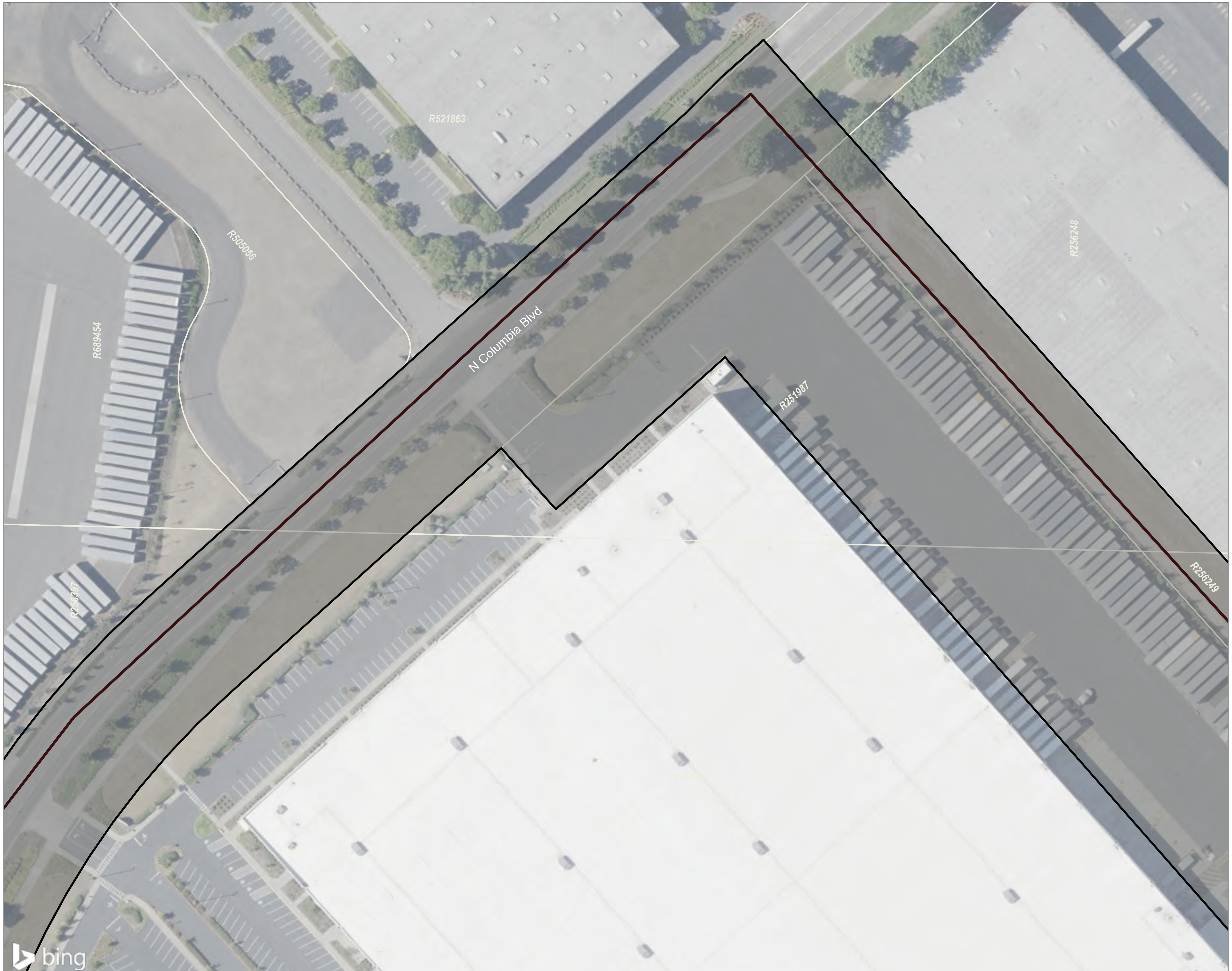


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 13 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

WESTERN AC ALTERNATIVE NORTH

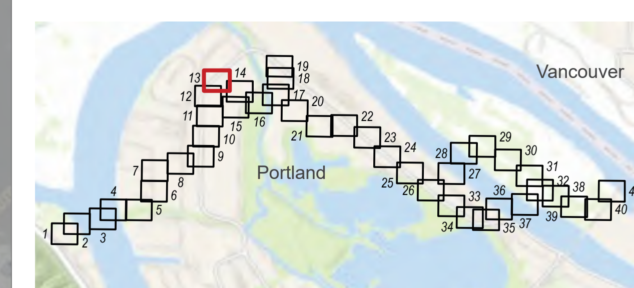
UPLAND INSTALLATION (E.G., TRENCHING)

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 14 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

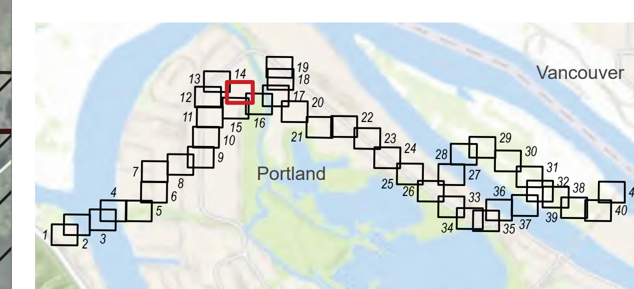
FOR INFORMATION ONLY - CONCEPT DRAWING

WESTERN AC ALTERNATIVE NORTH

- UPLAND INSTALLATION (E.G., TRENCHING)
- HDD
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

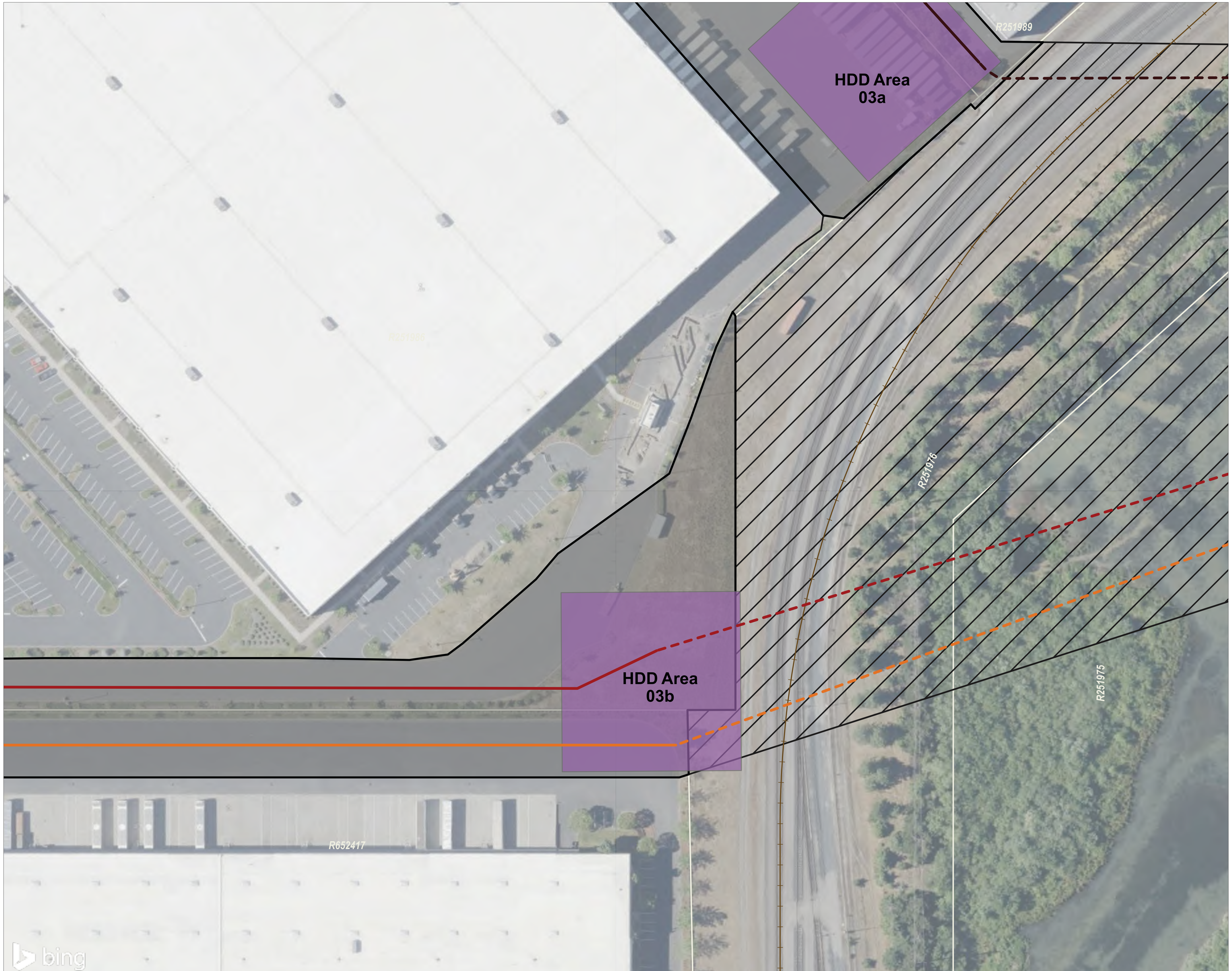


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 15 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

WESTERN AC ALTERNATIVE NORTH
- UPLAND INSTALLATION (E.G., TRENCHING)
- HDD

WESTERN AC ALTERNATIVE SOUTH
- UPLAND INSTALLATION (E.G., TRENCHING)
- HDD

- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- RAIL CENTERLINE
- TAXLOT

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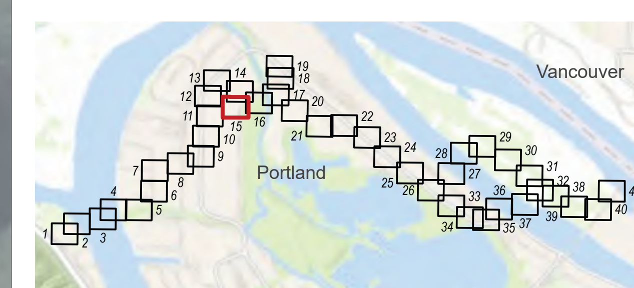
CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

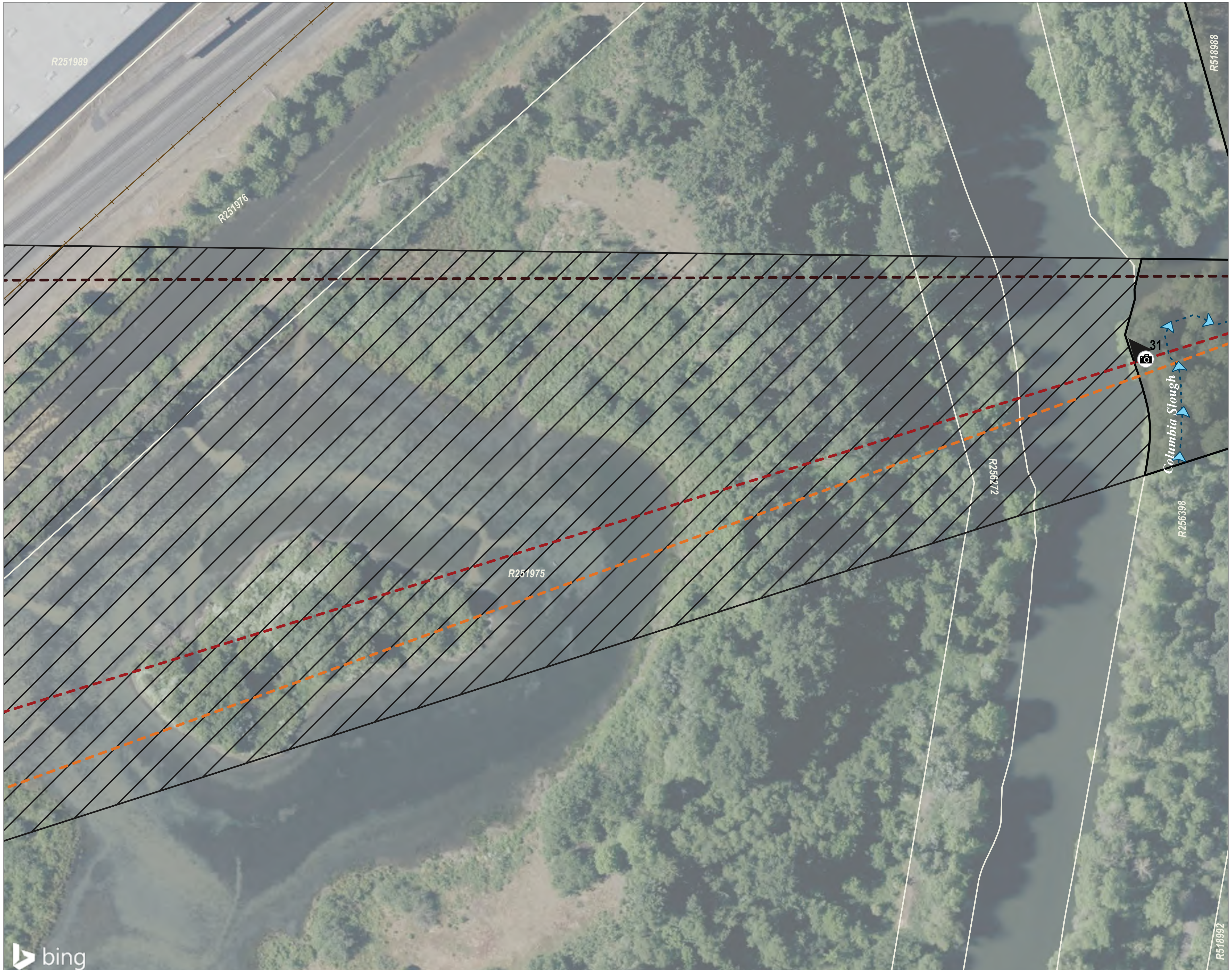


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 16 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

WESTERN AC ALTERNATIVE NORTH

HDD

WESTERN AC ALTERNATIVE SOUTH

HDD

PHOTO POINT

CALCULATED HTL

WETLAND AND WATERS SURVEY AREA

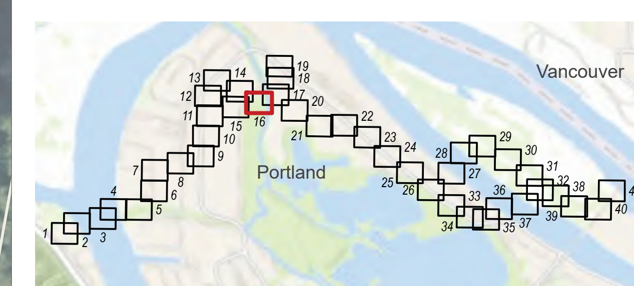
DESKTOP AND VISUAL SURVEY ONLY

RAIL CENTERLINE

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

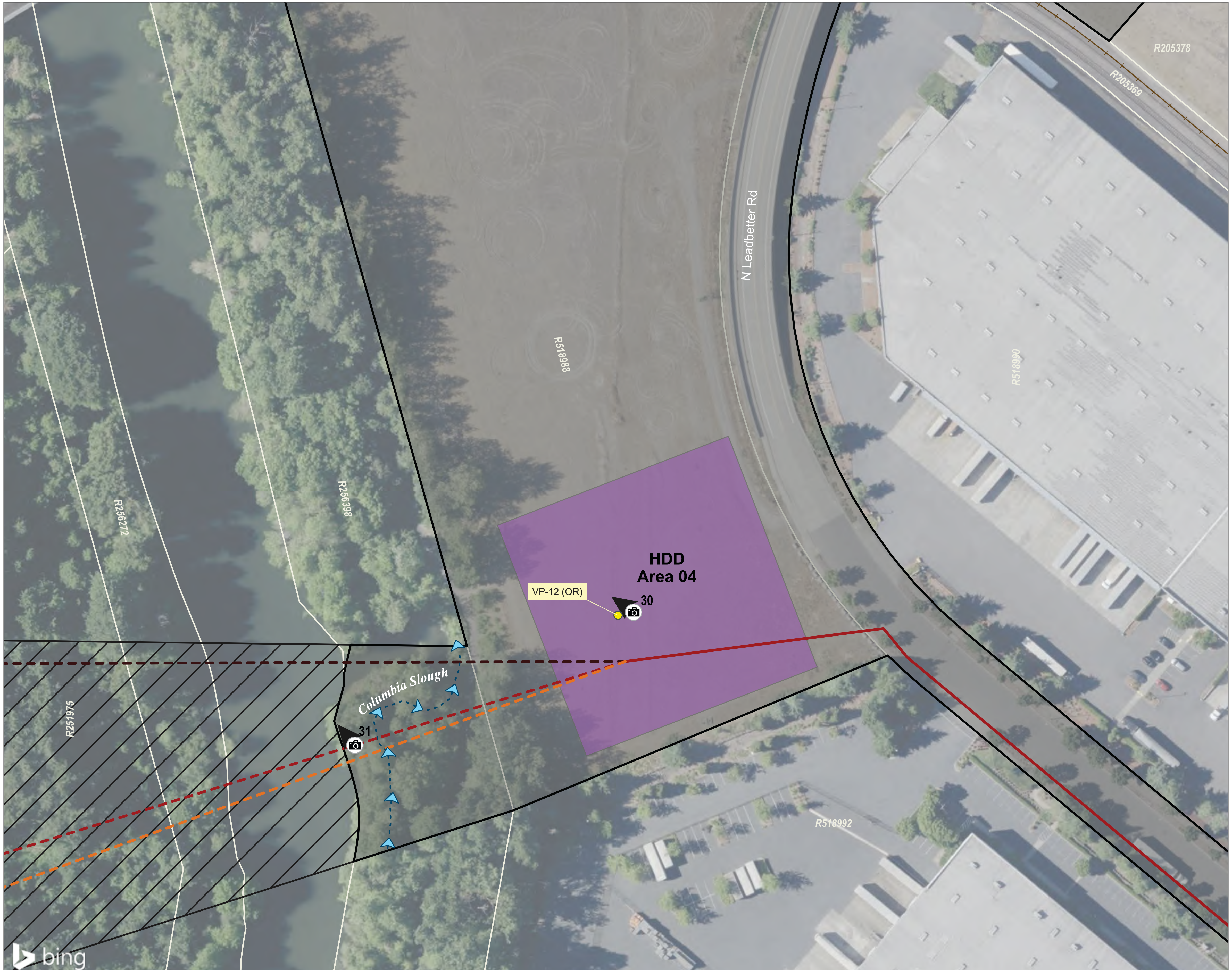
CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 17 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

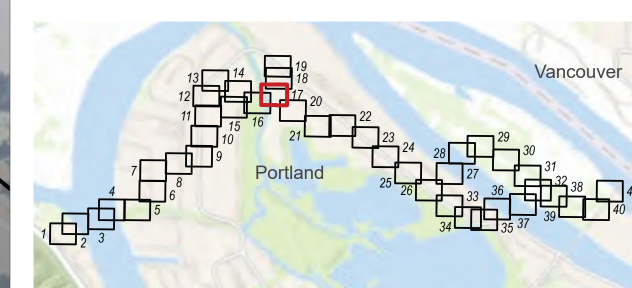
WESTERN AC ALTERNATIVE NORTH
- HDD

WESTERN AC ALTERNATIVE SOUTH
- HDD

- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- CALCULATED HTL
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

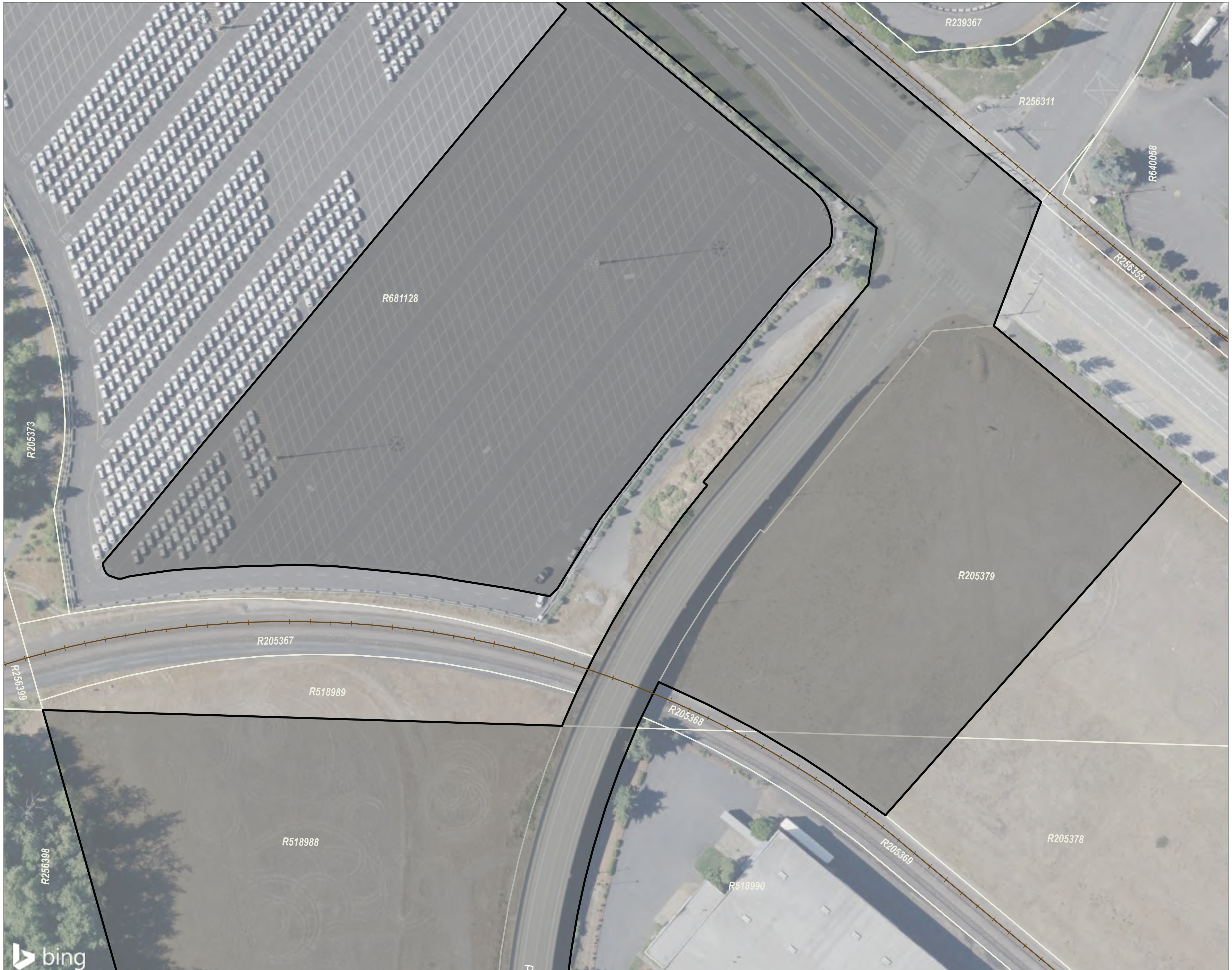


FIGURE 5 WETLAND & WATER SURVEY MAP

PAGE 18 OF 64

DATE: 4/9/2025

TOWNSHIP AND RANGE: T02N R01W

SECTION: 23, 24, 25, 26

USGS QUAD NAME:

SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

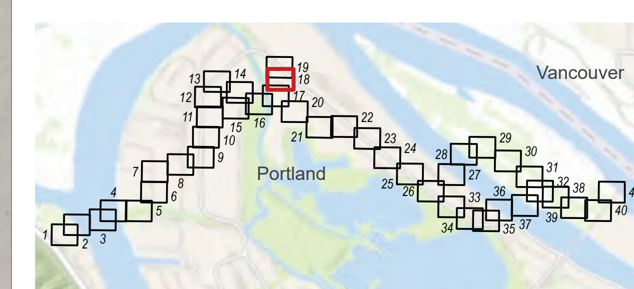
WETLAND AND WATERS SURVEY AREA

RAIL CENTERLINE

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet

0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

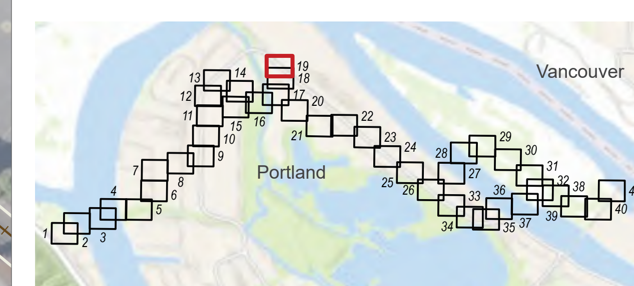
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 19 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

WETLAND AND WATERS SURVEY AREA
RAIL CENTERLINE
TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 20 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01W
SECTION: 23, 24, 25, 26
USGS QUAD NAME:
SAUVIE ISLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

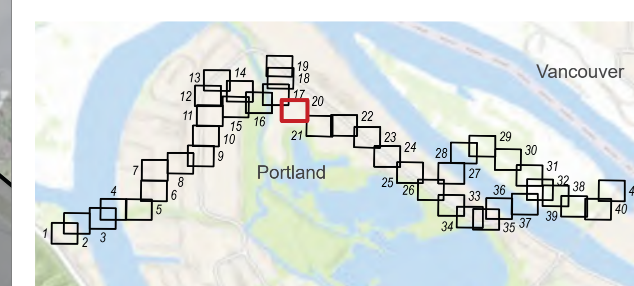
WETLAND AND WATERS SURVEY AREA

RAIL CENTERLINE

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 21 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25,30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

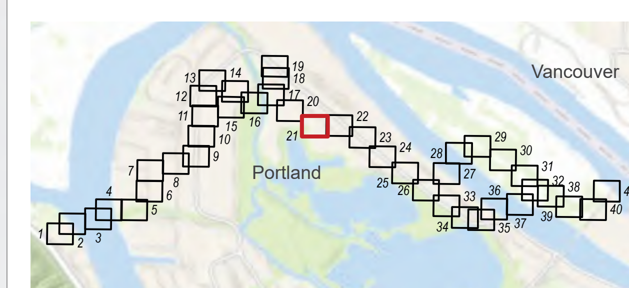
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 22 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25,30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

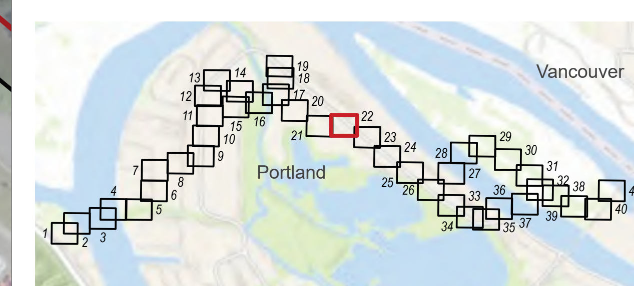
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 23 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25,30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

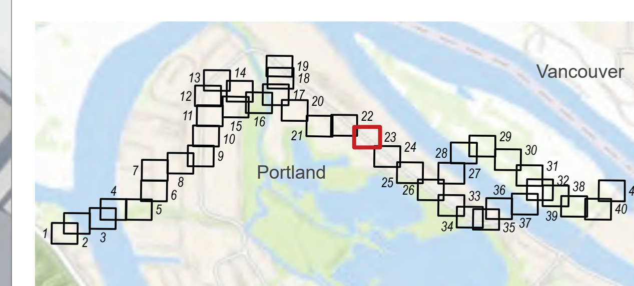
WETLAND AND WATERS SURVEY AREA

RAIL CENTERLINE

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 24 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 25,30
USGS QUAD NAME:
SAUVIE ISLAND AND VANCOUVER

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

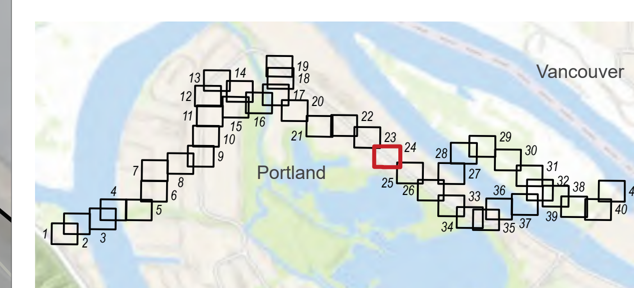
WETLAND AND WATERS SURVEY AREA

RAIL CENTERLINE

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

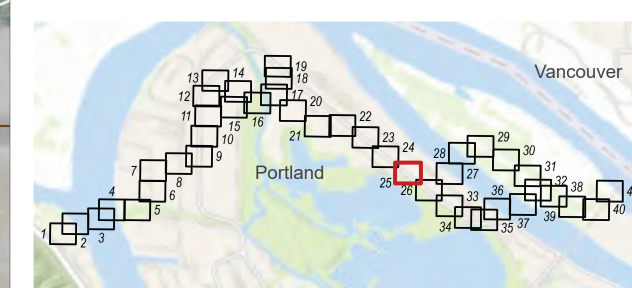


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 25 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

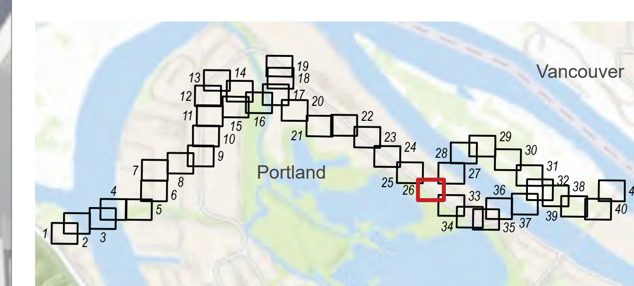
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

HAYDEN ISLAND ALTERNATIVE
- UPLAND INSTALLATION (E.G., TRENCHING)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- SAMPLE PLOT
- PHOTO POINT
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 27 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)

PHOTO POINT

CALCULATED HTL

WETLAND AND WATERS SURVEY AREA

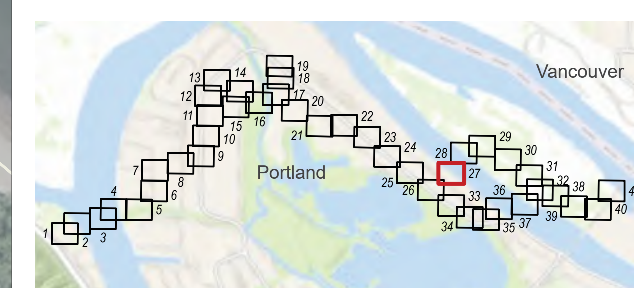
DESKTOP AND VISUAL SURVEY ONLY

RAIL CENTERLINE

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 28 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

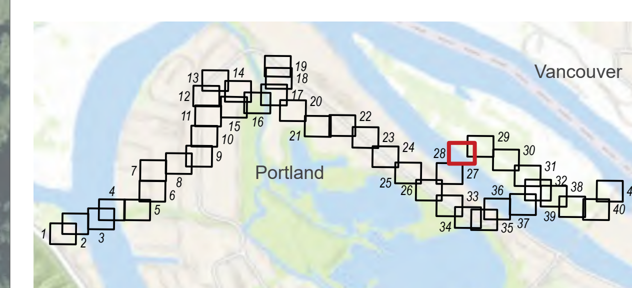
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- CALCULATED HTL
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

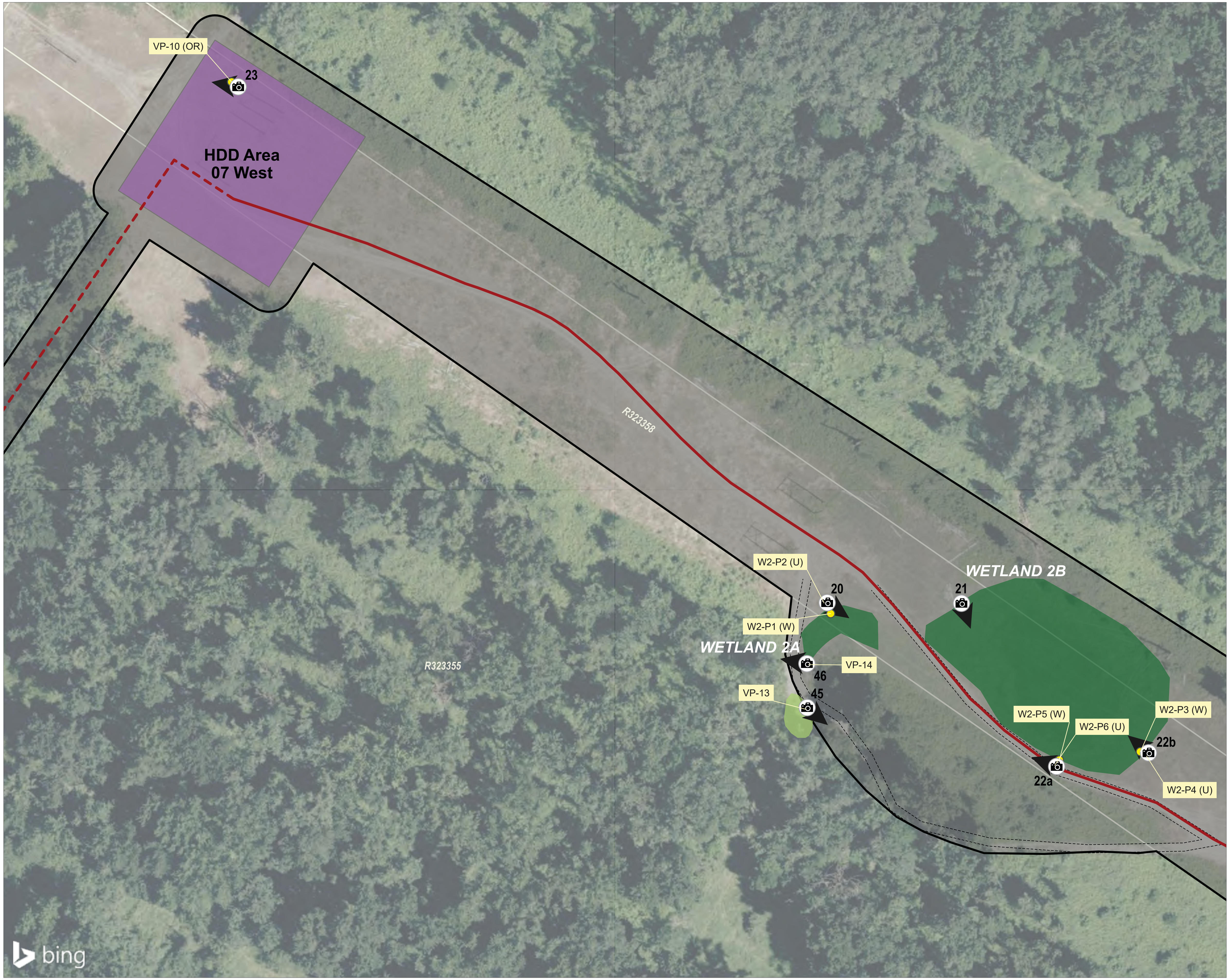


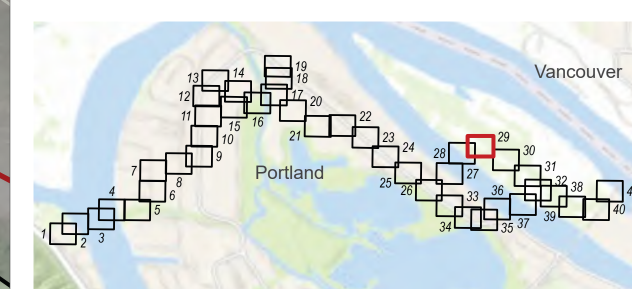
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 29 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 30, 31, 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- DELINEATED ROAD
- DELINEATED WETLAND
- ESTIMATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

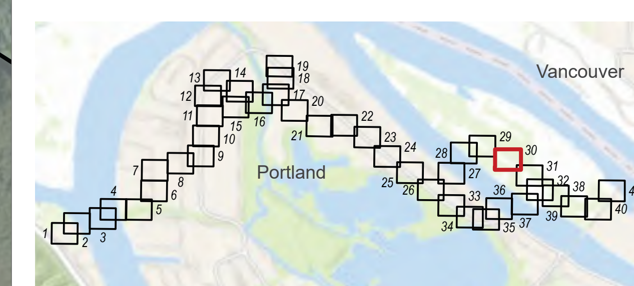
DELINEATED ROAD

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 31 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

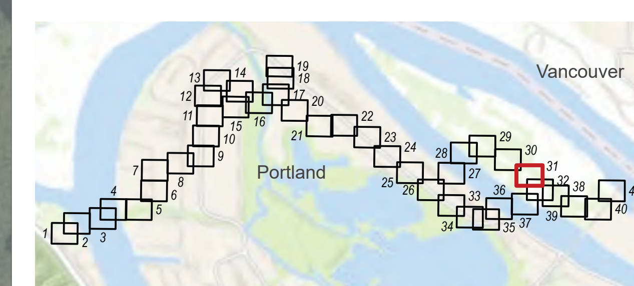
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING

HAYDEN ISLAND ALTERNATIVE
- UPLAND INSTALLATION (E.G., TRENCHING)
- SAMPLE PLOT
- PHOTO POINT
- DELINEATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

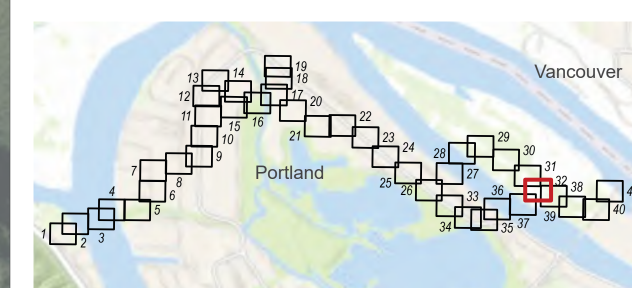
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 32 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
INSTALLATION VIA TRENCHING
HAYDEN ISLAND ALTERNATIVE
UPLAND INSTALLATION (E.G., TRENCHING)
HDD
HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
SAMPLE PLOT
PHOTO POINT
WETLAND AND WATERS SURVEY AREA
DESKTOP AND VISUAL SURVEY ONLY
TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 33 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

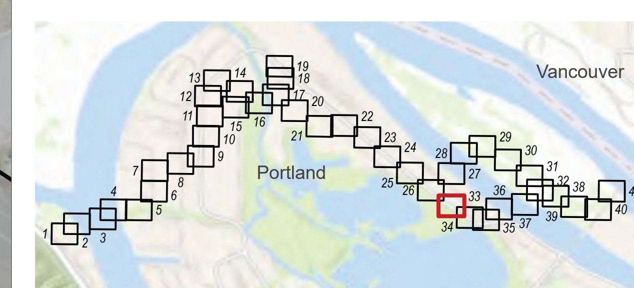
FOR INFORMATION ONLY - CONCEPT DRAWING

HAYDEN ISLAND ALTERNATIVE

- UPLAND INSTALLATION (E.G., TRENCHING)
- WETLAND AND WATERS SURVEY AREA
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

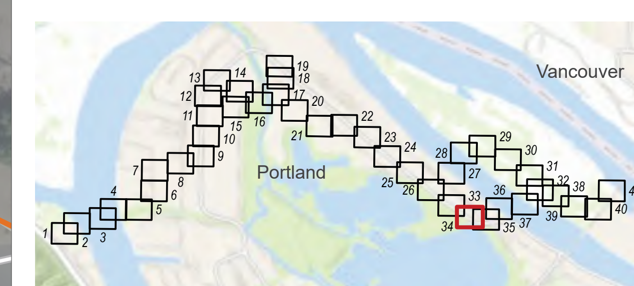
FOR INFORMATION ONLY - CONCEPT DRAWING

HAYDEN ISLAND ALTERNATIVE

- UPLAND INSTALLATION (E.G., TRENCHING)
- WETLAND AND WATERS SURVEY AREA
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

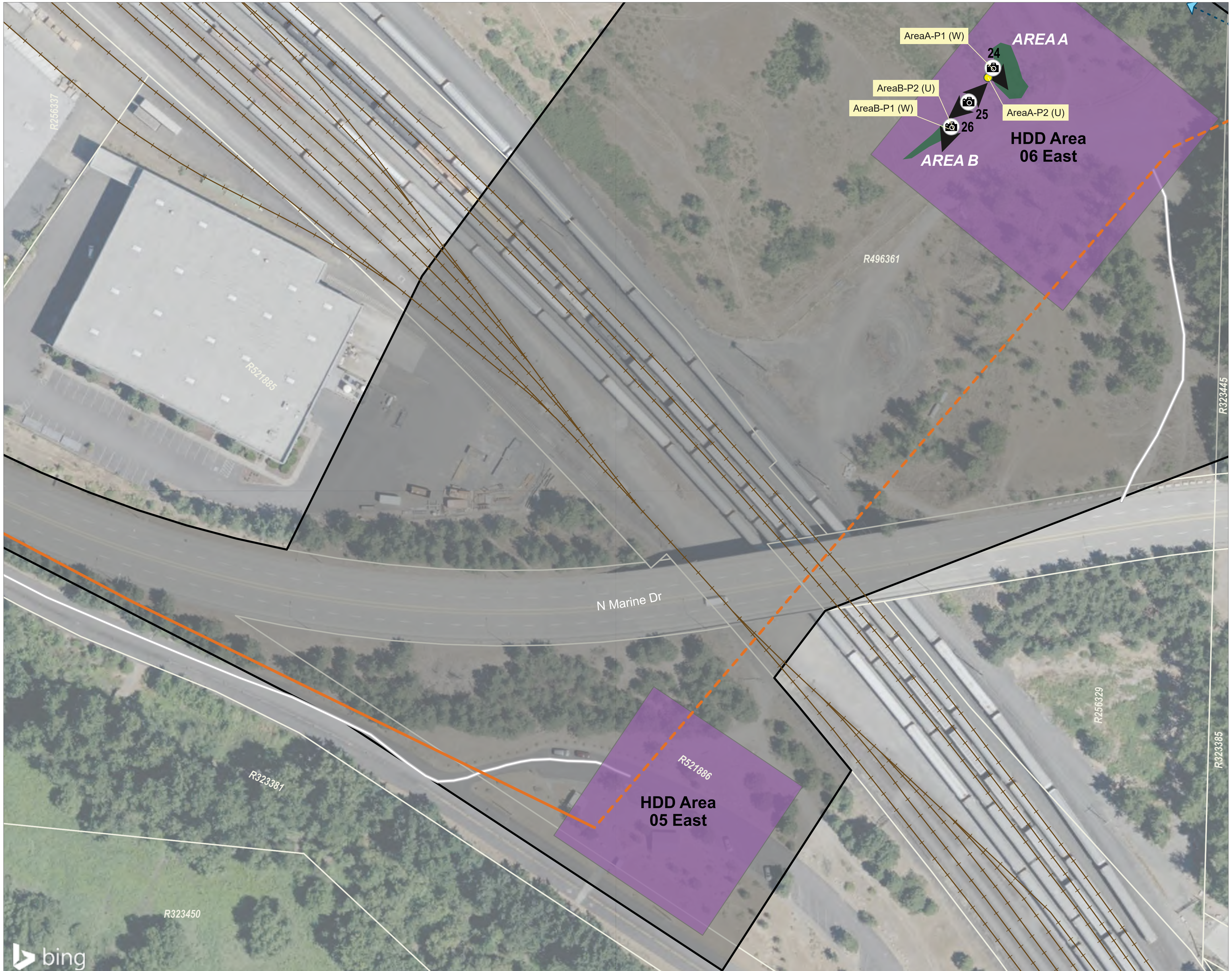


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 35 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

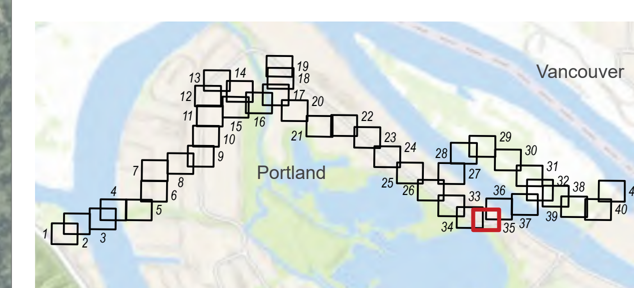
FOR INFORMATION ONLY - CONCEPT DRAWING

HAYDEN ISLAND ALTERNATIVE

- UPLAND INSTALLATION (E.G., TRENCHING)
- HDD
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- CALCULATED HTL
- DELINEATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

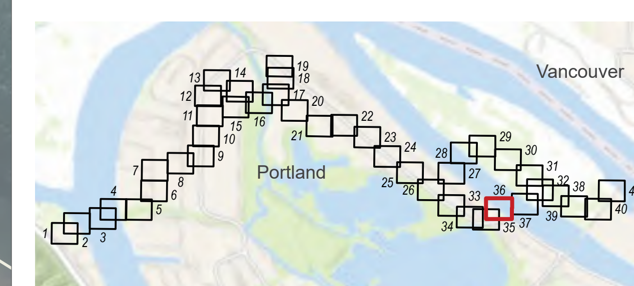
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 36 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

HAYDEN ISLAND ALTERNATIVE
- HDD
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- CALCULATED HTL
- DELINEATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 37 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 29, 30, 31, 32
USGS QUAD NAME:
PORTLAND

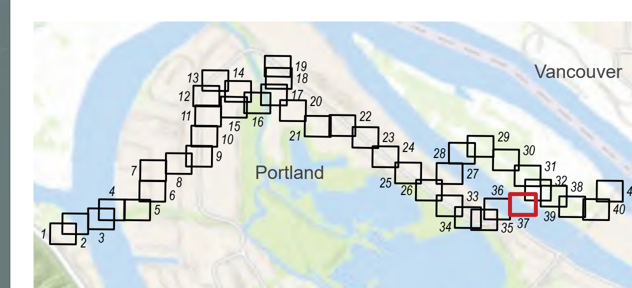
FOR INFORMATION ONLY - CONCEPT DRAWING

HAYDEN ISLAND ALTERNATIVE

- UPLAND INSTALLATION (E.G., TRENCHING)
- HDD
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- CALCULATED HTL
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 38 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

HAYDEN ISLAND ALTERNATIVE

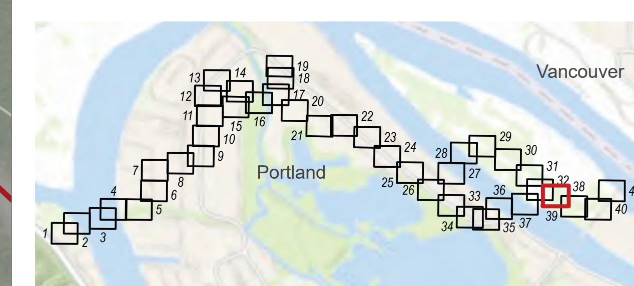
UPLAND INSTALLATION (E.G., TRENCHING)

WETLAND AND WATERS SURVEY AREA

TAXLOT

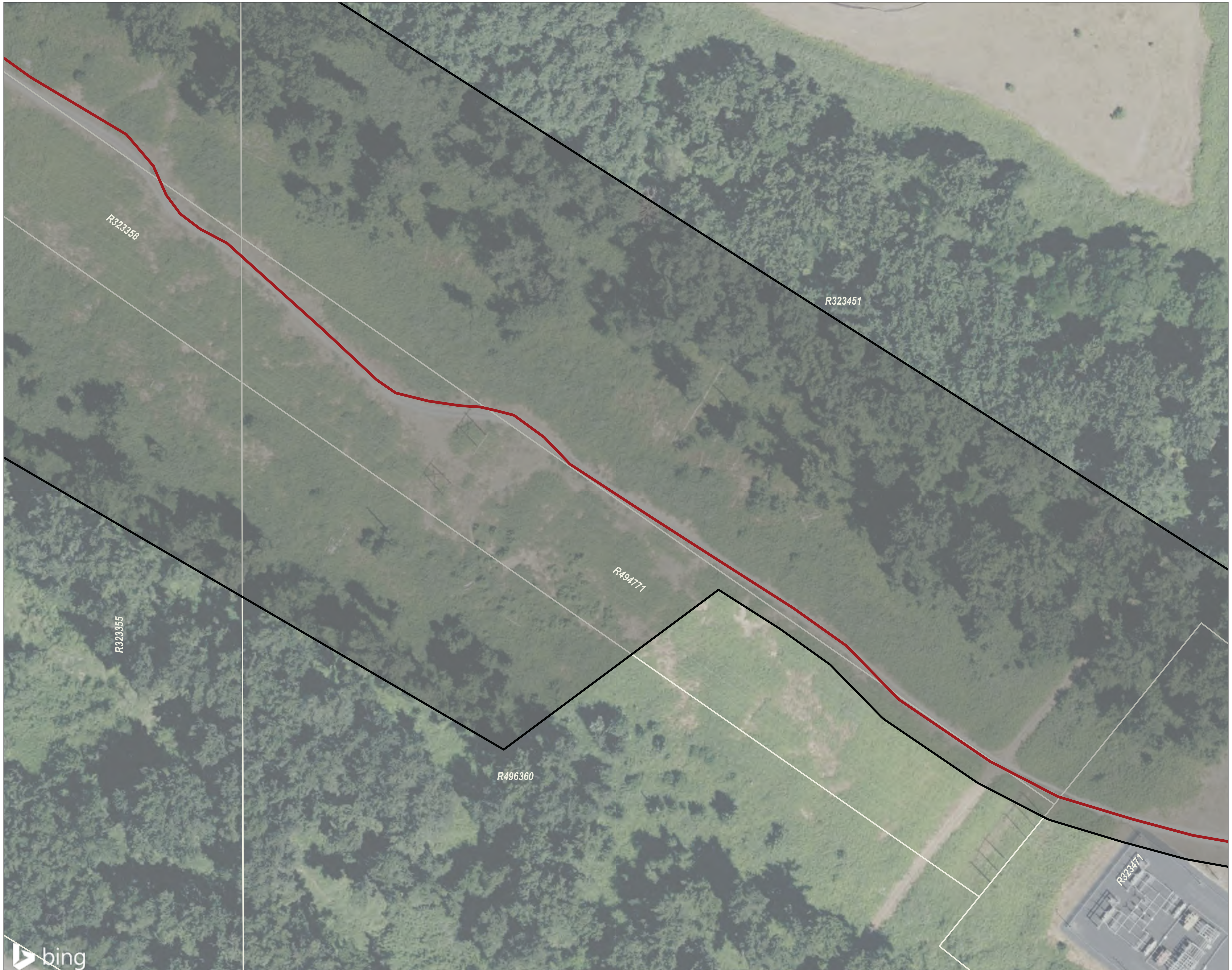
SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 39 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

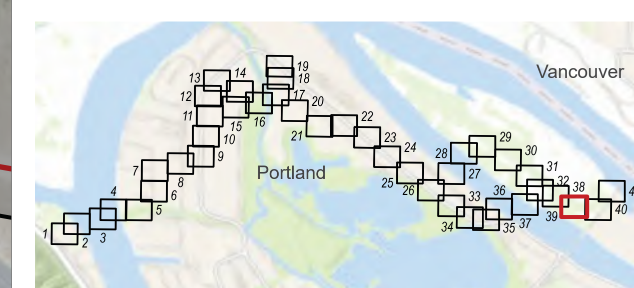
INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

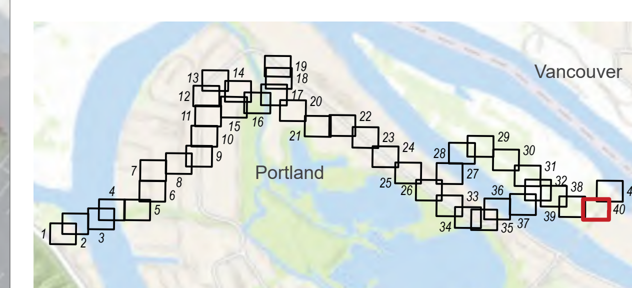
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 40 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- SAMPLE PLOT
- PHOTO POINT
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

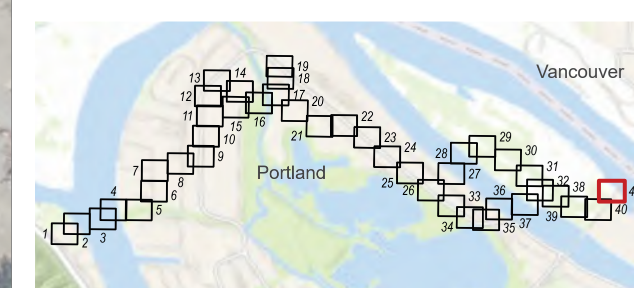
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 41 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T02N R01E
SECTION: 32
USGS QUAD NAME:
VANCOUVER AND PORTLAND

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- CALCULATED HTL
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT

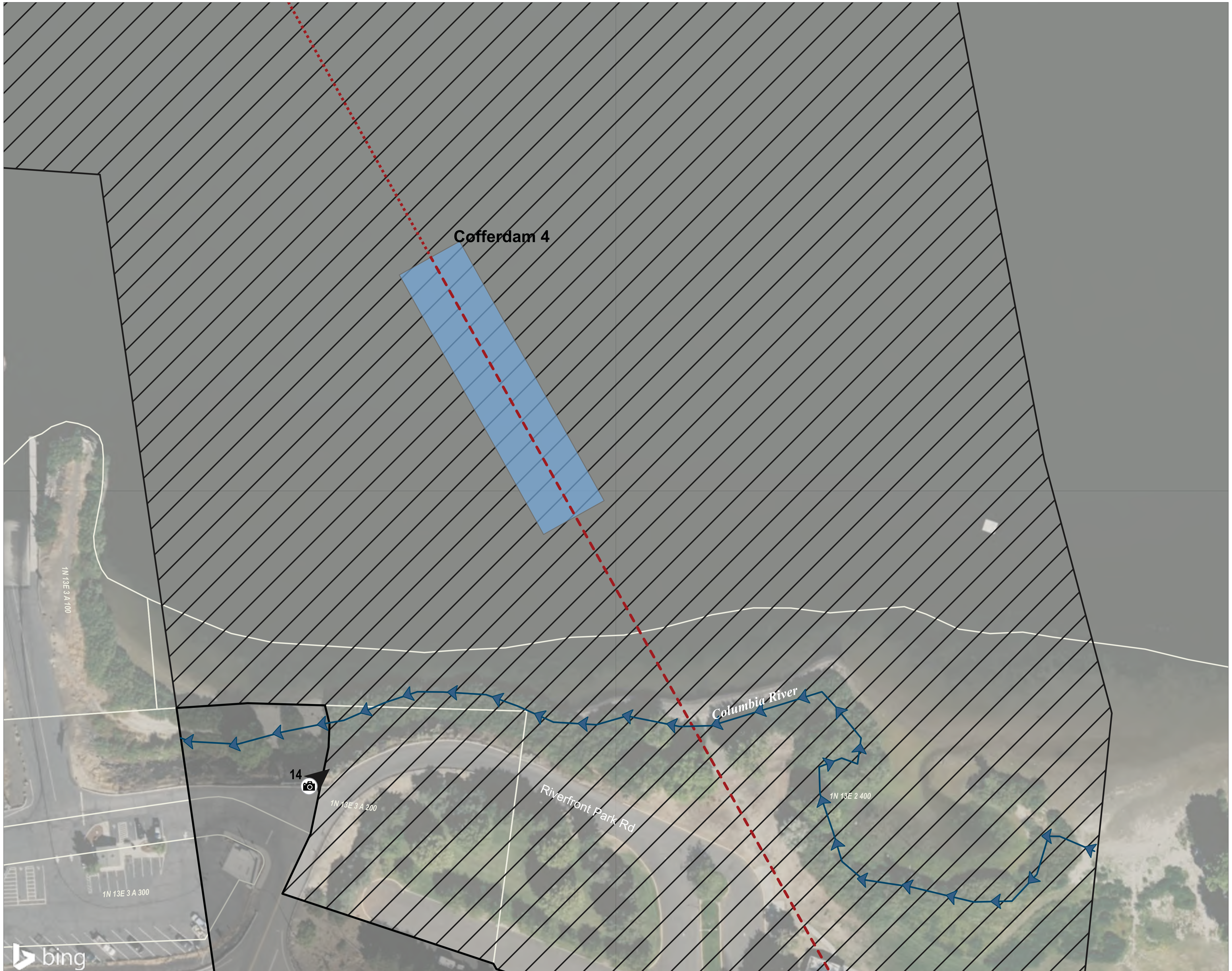
SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 42 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

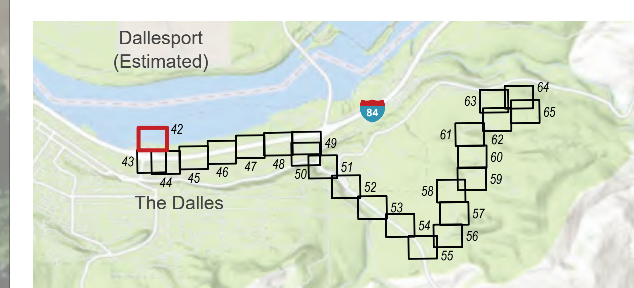
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

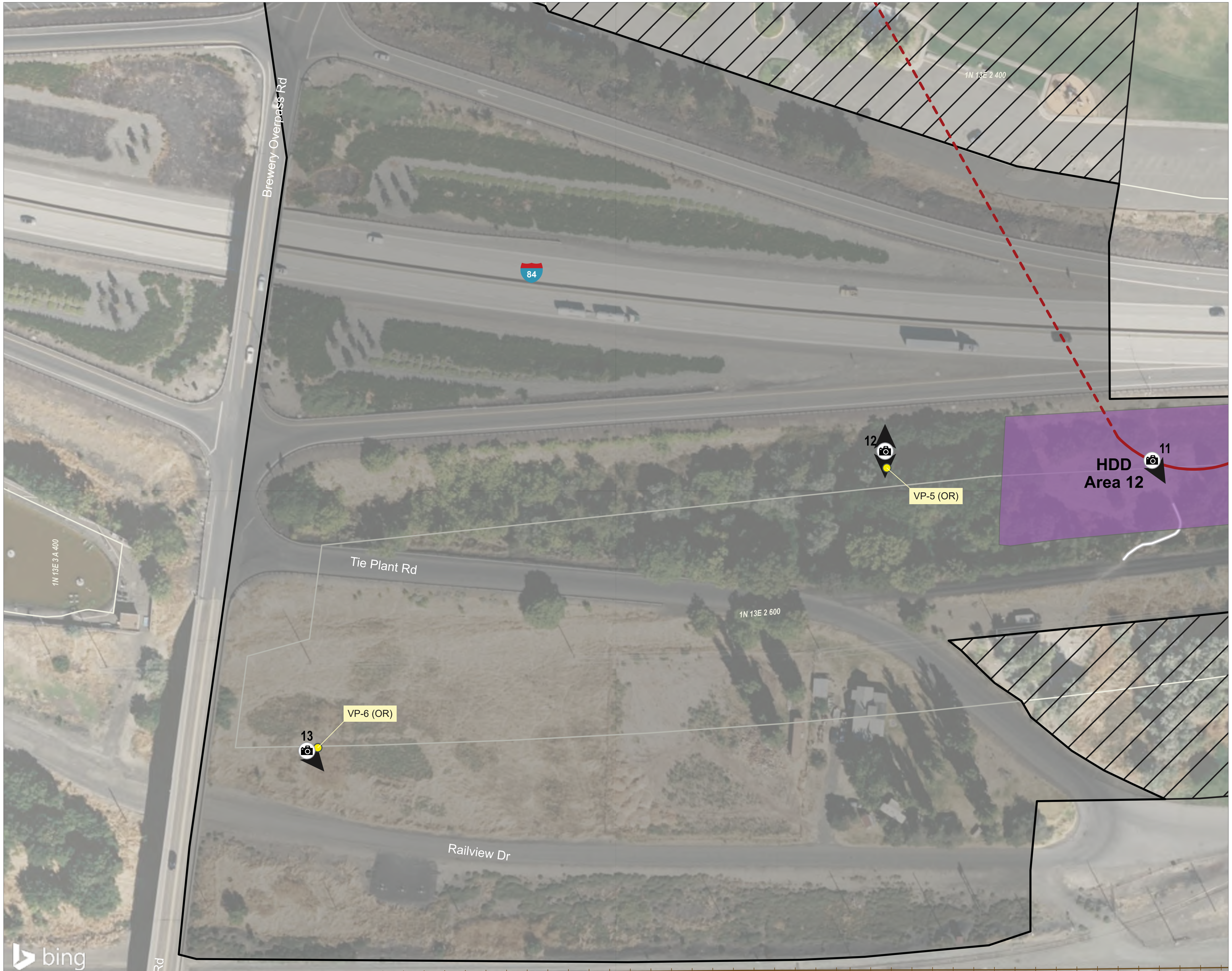
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HYDROPLOW
- TEMPORARY 3-SIDED WET COFFERDAM
- PHOTO POINT
- DELINEATED OHWM
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- TAXLOT
- CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 43 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

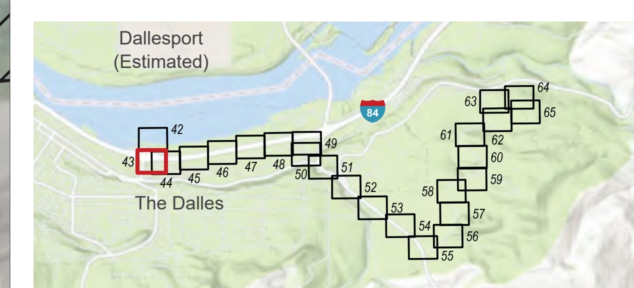
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT
- CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

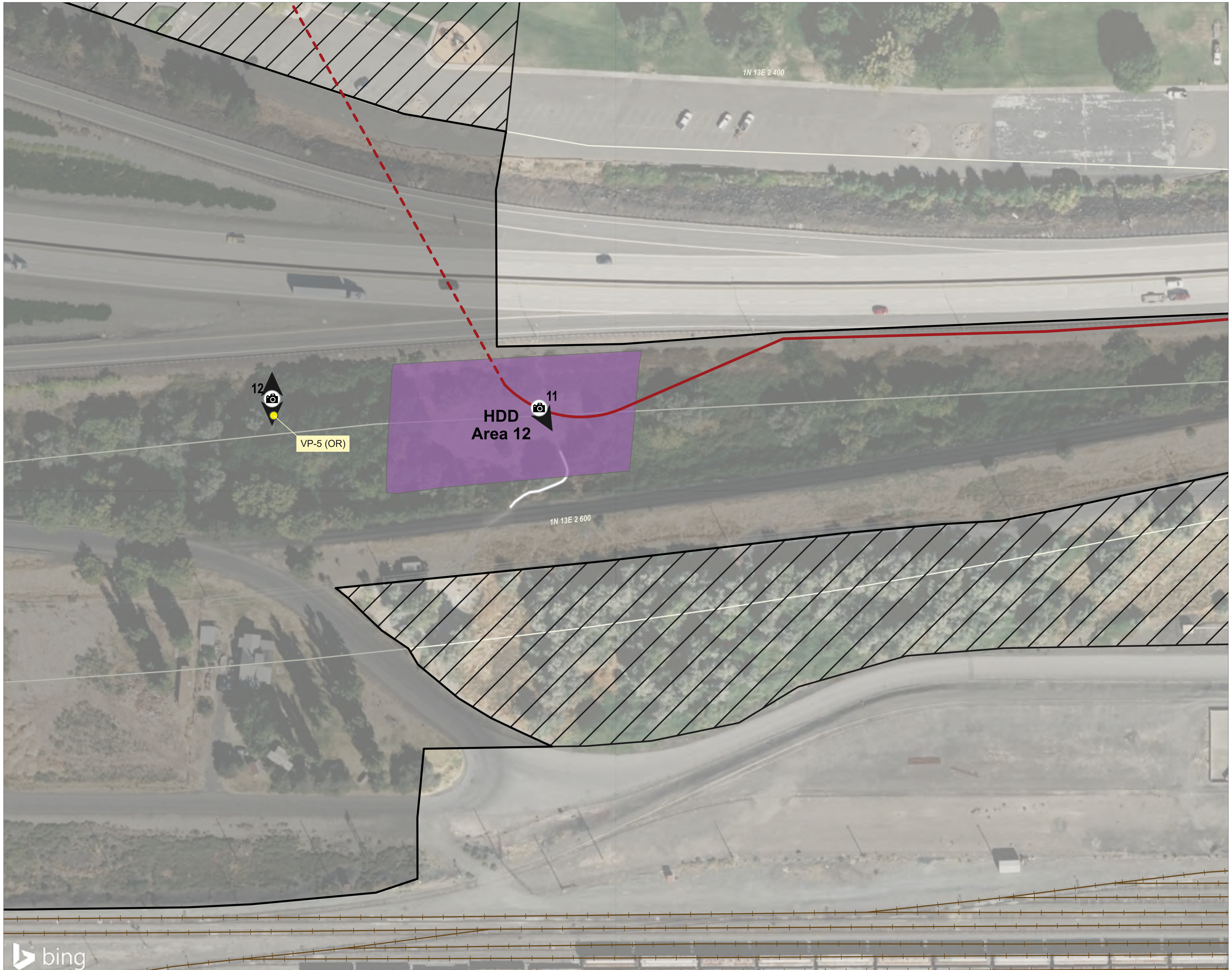


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 44 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

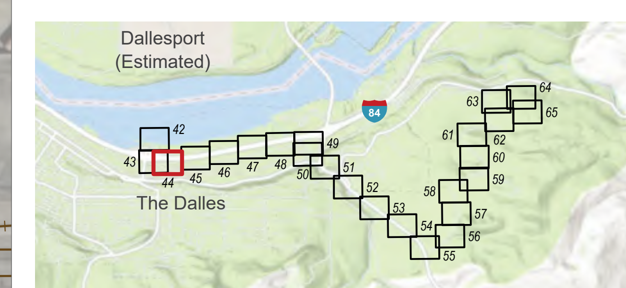
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- SAMPLE PLOT
- PHOTO POINT
- WETLAND AND WATERS SURVEY AREA
- DESKTOP AND VISUAL SURVEY ONLY
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT
- CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 45 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 2, 3
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

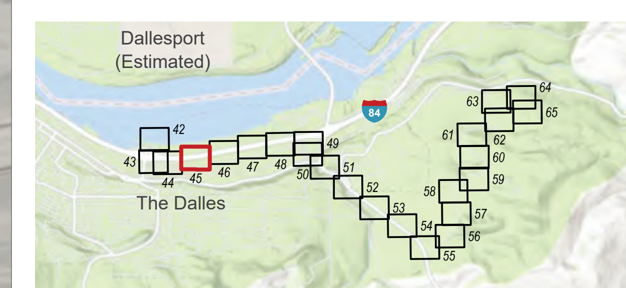
DESKTOP AND VISUAL SURVEY ONLY

TAXLOT

CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 46 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

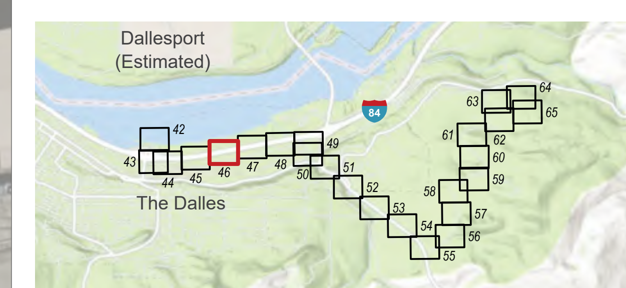
WETLAND AND WATERS SURVEY AREA

TAXLOT

CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 47 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

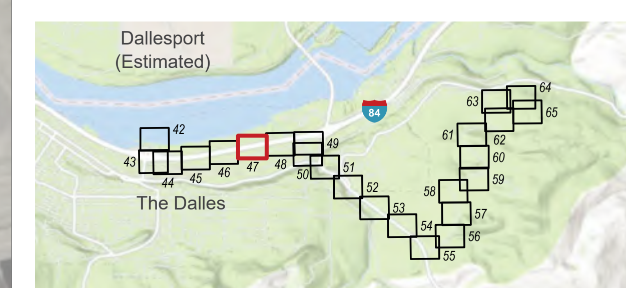
WETLAND AND WATERS SURVEY AREA

TAXLOT

CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet

0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 48 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

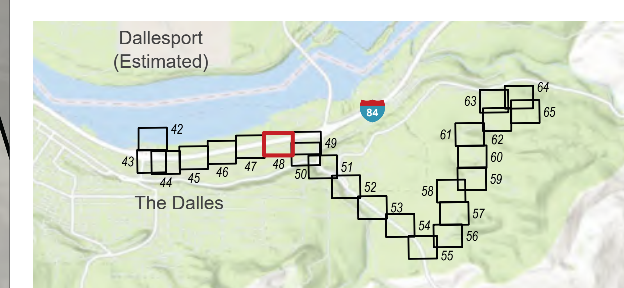
RAIL CENTERLINE

TAXLOT

CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

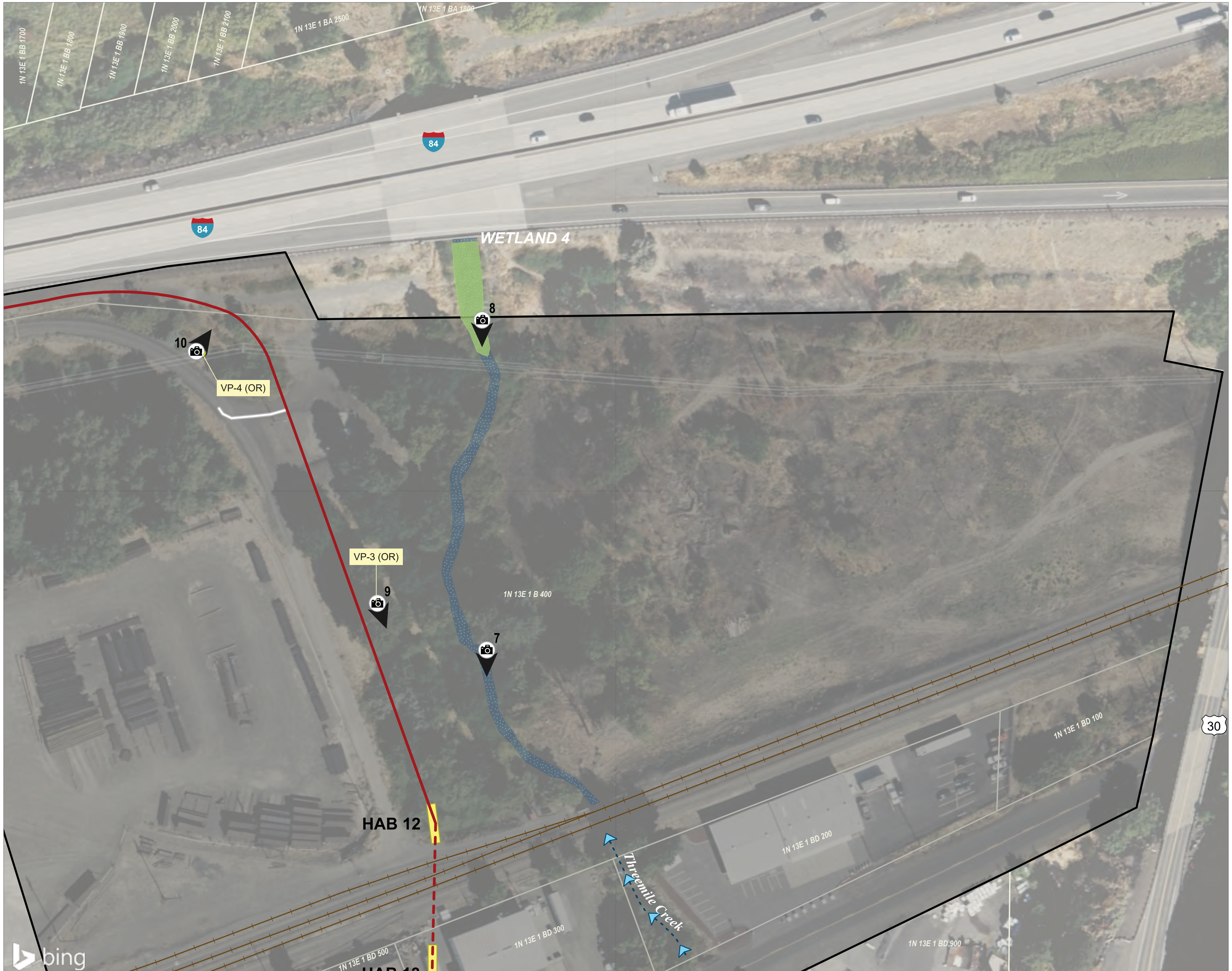
CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 49 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 2
USGS QUAD NAME:
THE DALLES SOUTH

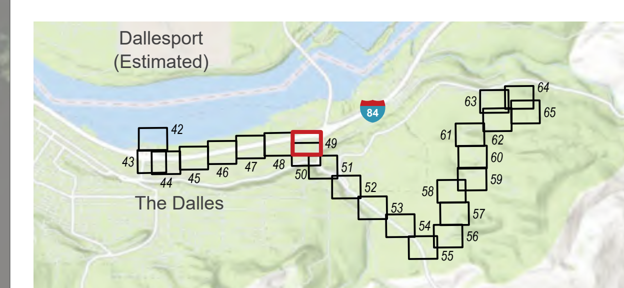
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- SAMPLE PLOT
- PHOTO POINT
- ESTIMATED CENTERLINE OF DITCH
- DELINEATED WATERBODY
- ESTIMATED WETLAND
- WETLAND AND WATERS SURVEY AREA
- ACCESS ROAD
- RAIL CENTERLINE
- TAXLOT
- CITY BOUNDARY

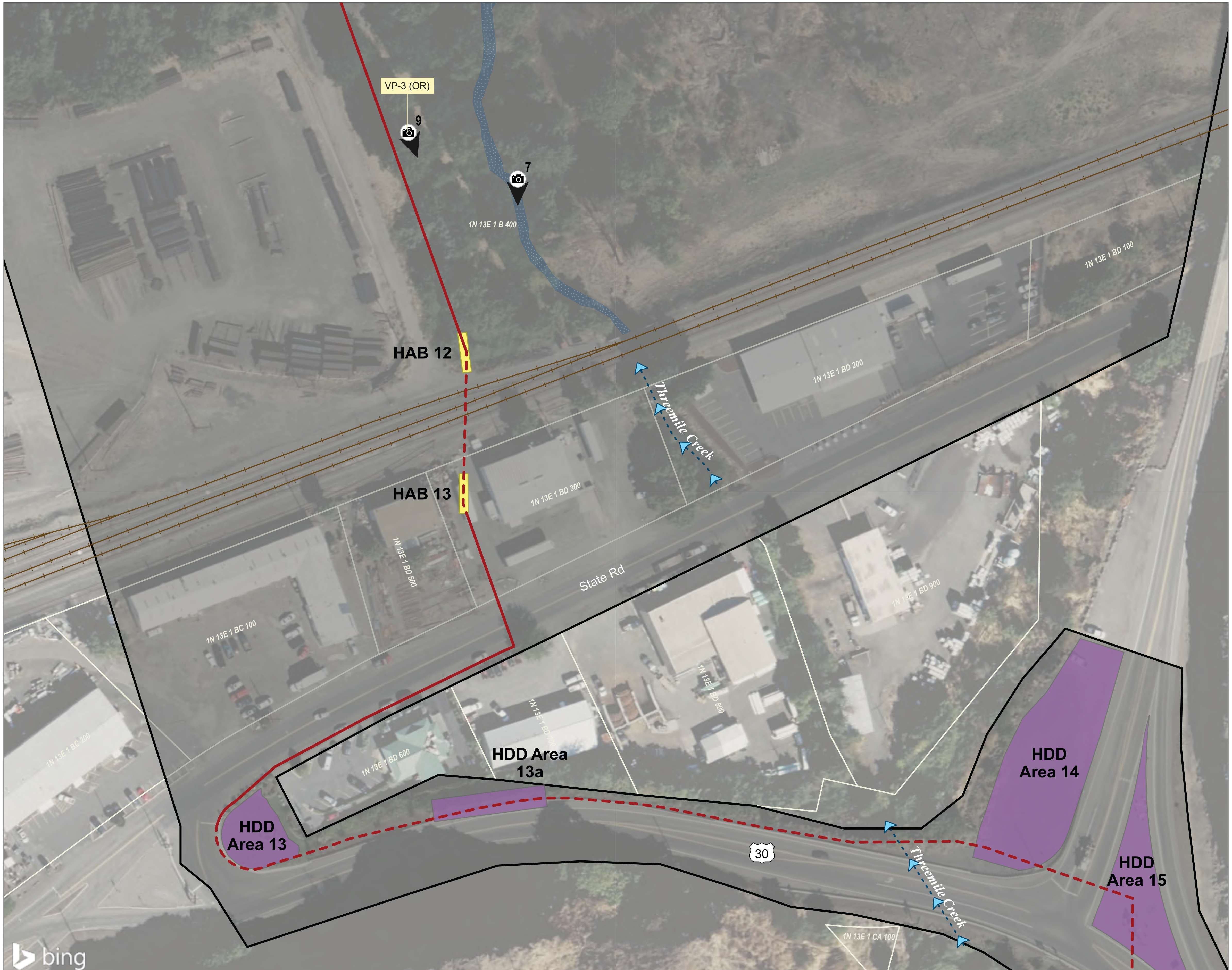
SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 50 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

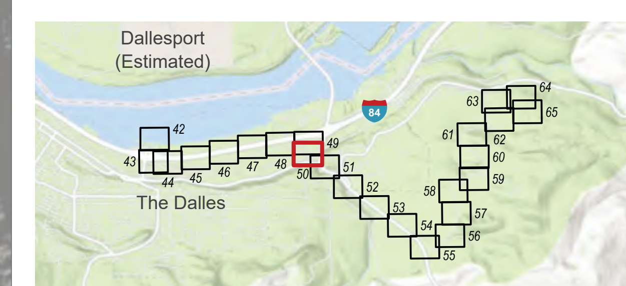
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- TEMPORARY HORIZONTAL AUGER BORE (HAB)
- SAMPLE PLOT
- PHOTO POINT
- ESTIMATED CENTERLINE OF DITCH
- DELINEATED WATERBODY
- WETLAND AND WATERS SURVEY AREA
- RAIL CENTERLINE
- TAXLOT
- CITY BOUNDARY

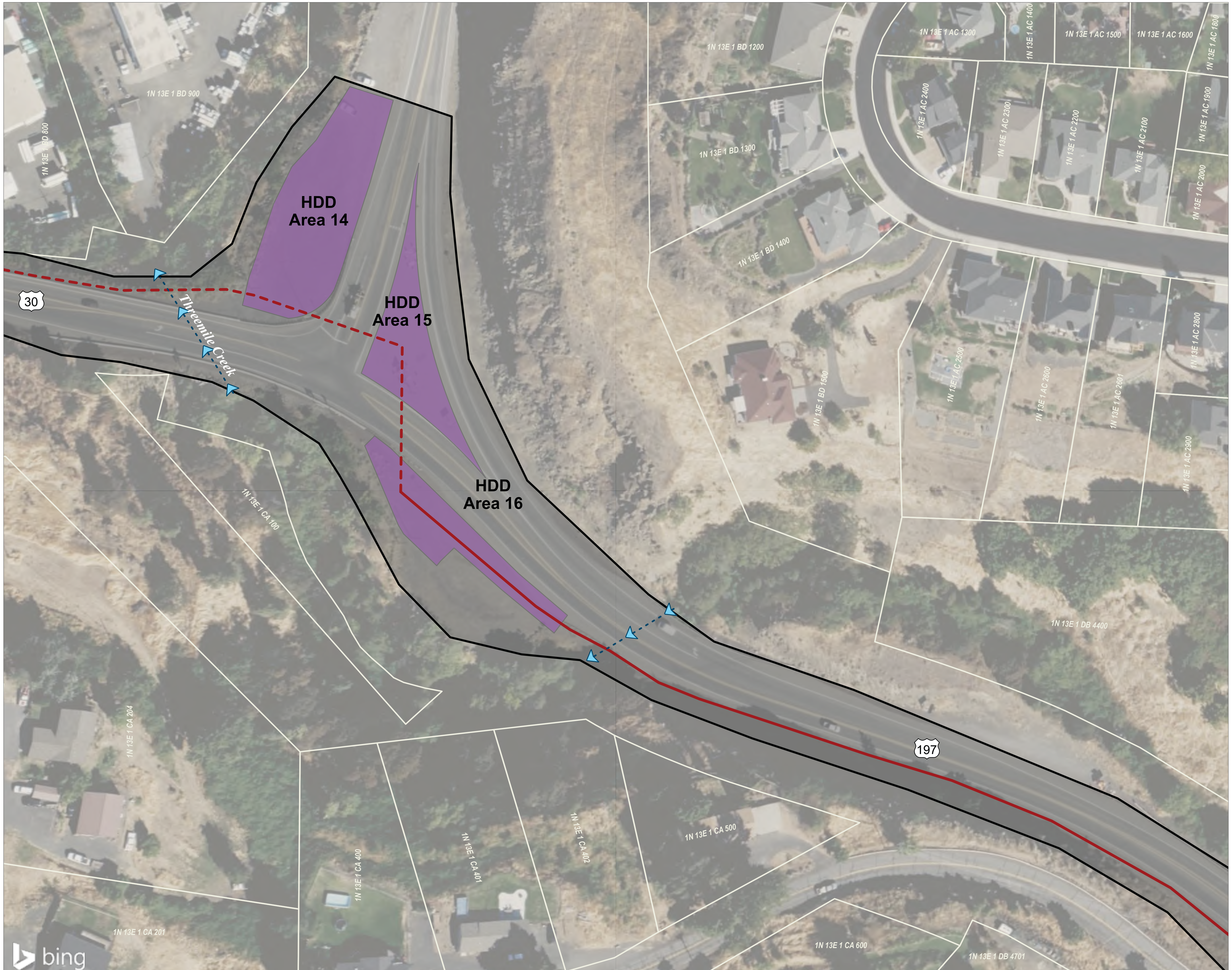
SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters



4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

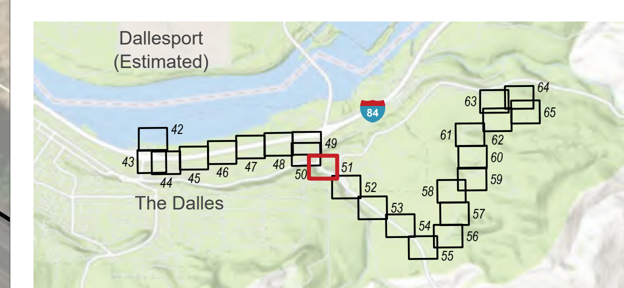
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 51 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- ESTIMATED CENTERLINE OF DITCH
- WETLAND AND WATERS SURVEY AREA
- TAXLOT
- CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

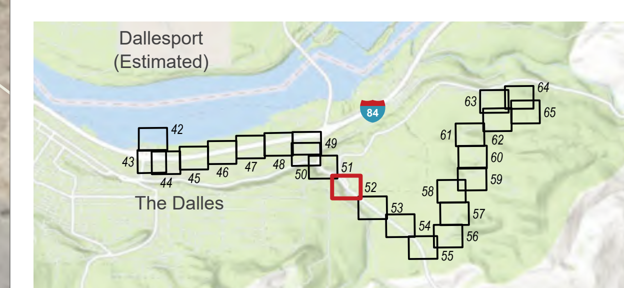
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 52 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- INSTALLATION VIA SUBSURFACE HORIZONTAL DIRECTIONAL DRILLING (HDD)
- HORIZONTAL DIRECTIONAL DRILLING (HDD) AREA
- PHOTO POINT
- ESTIMATED CENTERLINE OF DITCH
- WETLAND AND WATERS SURVEY AREA
- TAXLOT
- CITY BOUNDARY

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 53 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

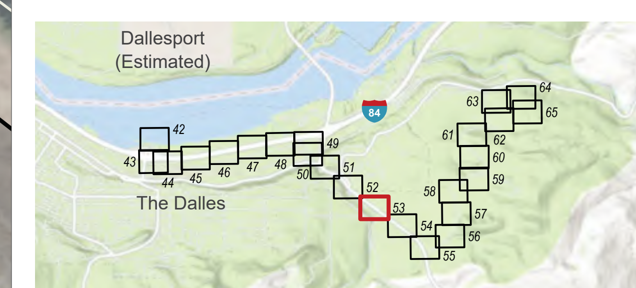
INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

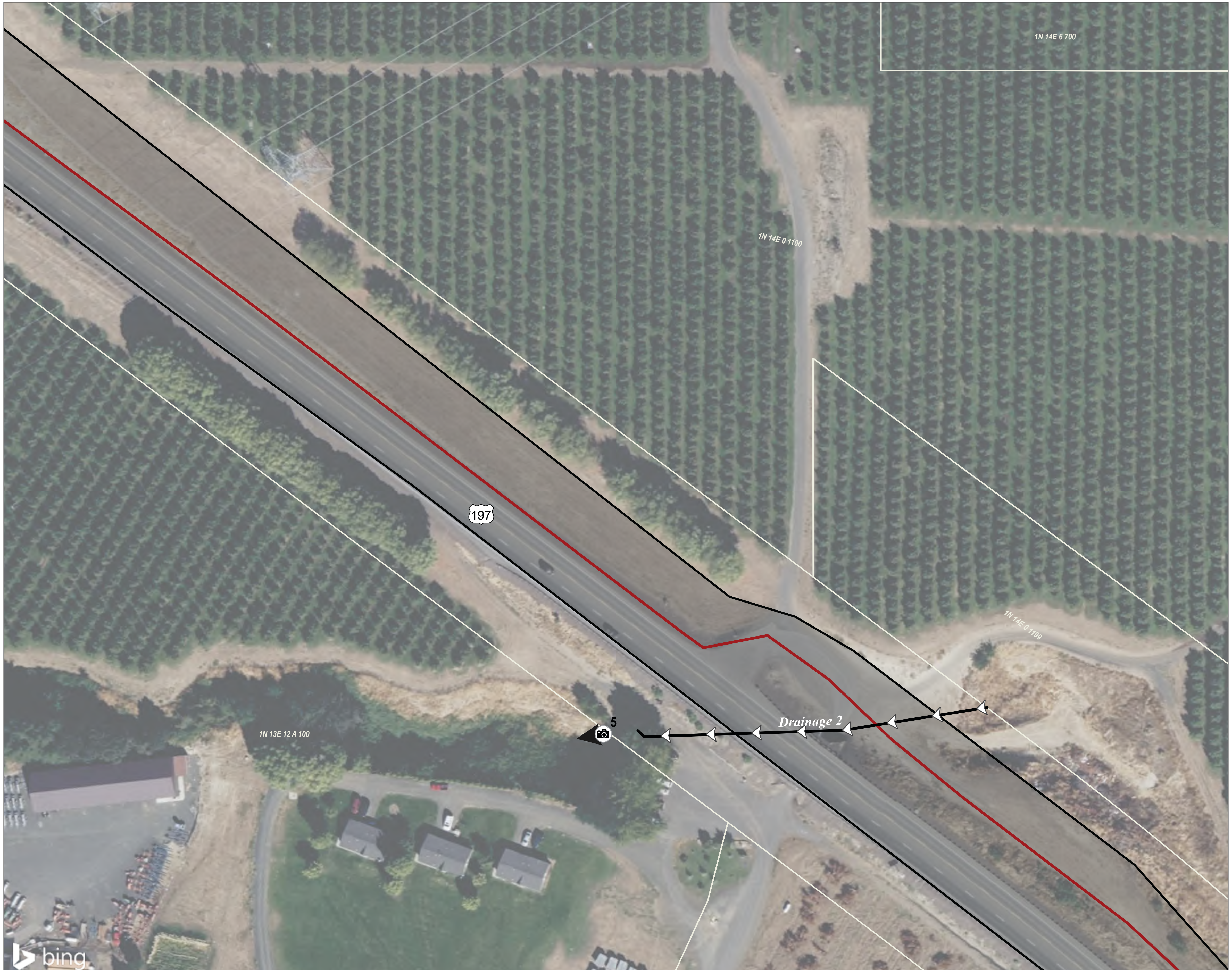


FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 54 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E
SECTION: 1, 6
USGS QUAD NAME:
THE DALLES SOUTH

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

INSTALLATION VIA TRENCHING

PHOTO POINT

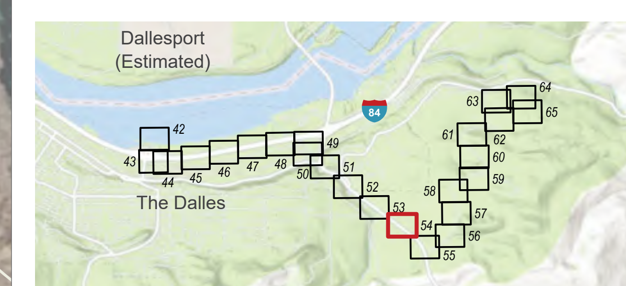
ESTIMATED CULVERT

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 55 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

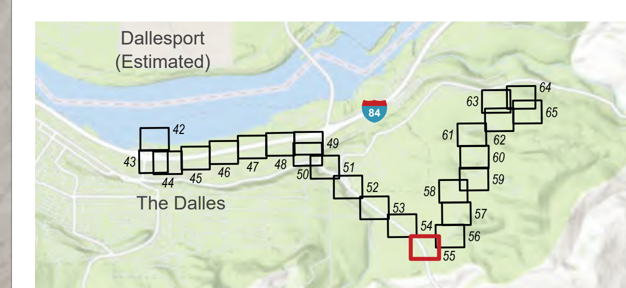
INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 56 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

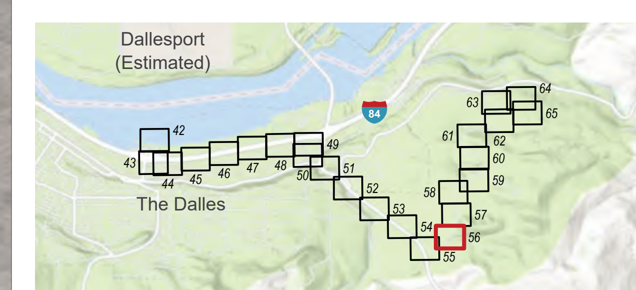
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- PHOTO POINT
- ESTIMATED CULVERT
- WETLAND AND WATERS SURVEY AREA
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 57 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

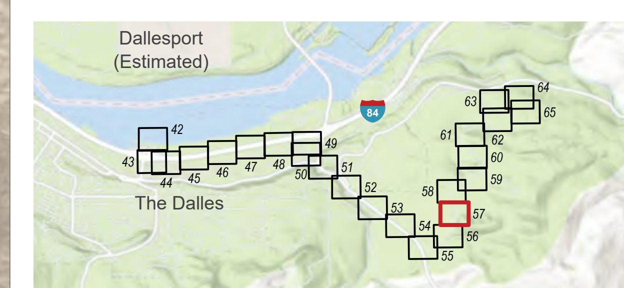
INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 58 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

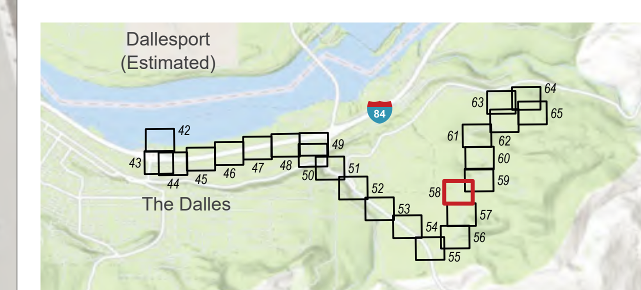
INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet

0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 59 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N R13E/R14E
SECTION: 1, 6, 7, 12
USGS QUAD NAME:
THE DALLES SOUTH AND PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

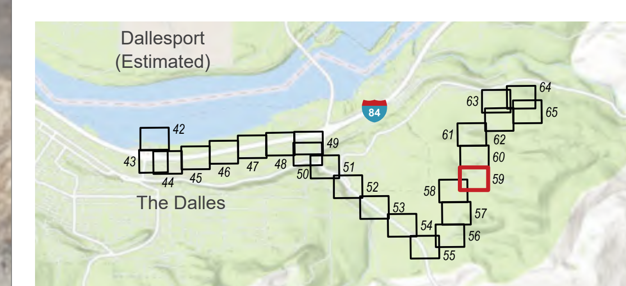
INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

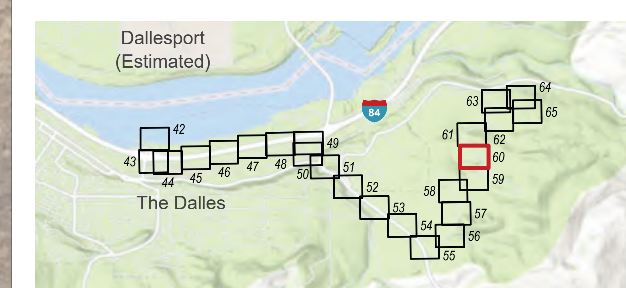
FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 60 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT
- INSTALLATION VIA TRENCHING
- PHOTO POINT
- ESTIMATED CULVERT
- WETLAND AND WATERS SURVEY AREA
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 61 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

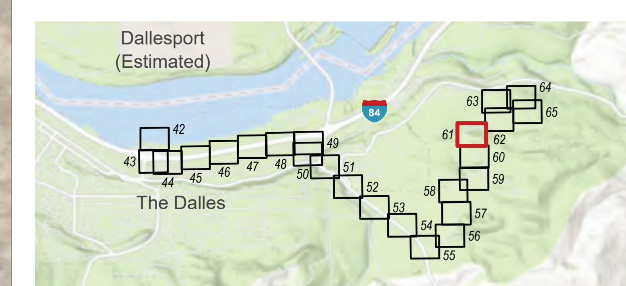
INSTALLATION VIA TRENCHING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 62 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

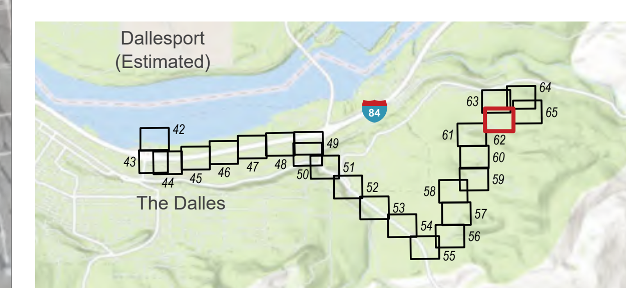
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- EASTERN CONVERTER STATION
- SAMPLE PLOT
- PHOTO POINT
- WETLAND AND WATERS SURVEY AREA
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP

DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

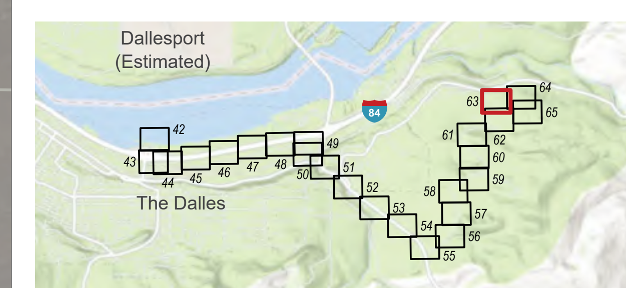
FOR INFORMATION ONLY - CONCEPT DRAWING

PROPSED ALIGNMENT

- INSTALLATION VIA TRENCHING
- EASTERN CONVERTER STATION
- SAMPLE PLOT
- PHOTO POINT
- WETLAND AND WATERS SURVEY AREA
- TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



HDR

0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 64 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

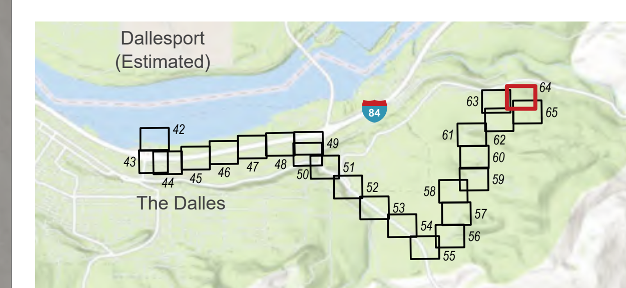
FOR INFORMATION ONLY - CONCEPT DRAWING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

FIGURE 5 WETLAND & WATER SURVEY MAP
PAGE 65 OF 64
DATE: 4/9/2025
TOWNSHIP AND RANGE: T01N/T02N R14E
SECTION: 5, 6, 31, 32
USGS QUAD NAME:
PETERSBURG

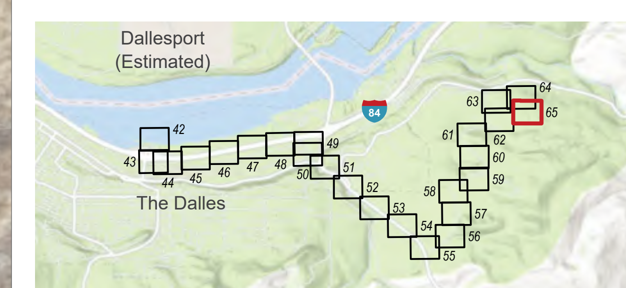
FOR INFORMATION ONLY - CONCEPT DRAWING

WETLAND AND WATERS SURVEY AREA

TAXLOT

SAMPLE PLOT LOCATIONS, WETLAND, AND HTL AND OHW BOUNDARIES WERE RECORDED USING AN ARROW EOS GNSS RECEIVER WITH SUB-METER ACCURACY AND PLOTTED ONTO 2017 AERIAL IMAGES. THE AERIAL IMAGERY MAY NOT ALIGN WITH GPS DATA AND HAS NOT BEEN GROUND TRUTHED, AND COULD BE OFFSET ROUGHLY +/- 10 FEET.

CASCADE RENEWABLE TRANSMISSION



0 100 Feet
0 40 Meters

4/9/2025 NAD 1983 State Plane Oregon North Feet Data Sources: Esri, HDR.

Aerial: May 2015
Eastern Converter Station Site
182
182
Columbia View Dr
Columbia View Dr
N
600 ft
Google Earth


Aerial: March 2016
Eastern Converter Station Site
182
182
Columbia View Dr
Columbia View Dr
Google Earth
N
600 ft

Aerial: March 2020
Eastern Converter Station Site
182
182
Columbia View Dr
Columbia View Dr
Columb
Google Earth
Image © 2024 CNES / Airbus
N
600 ft

Appendix B. Wetland Determination Data Forms

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WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Wasco Sampling Date: 11/8/2023
Applicant/Owner: Cascade Renewables State: OR Sampling VP-1 (OR)
Investigators: B DARBY, J MAZE Section, Township, Range: T2N R14E S31
Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope(%): 0
Subregion (LRR): B - Northwest Wheat/Range Lat: 45.605589 Long: -121.109524 Datum: WGS84
Soil Map Unit Name: Wato very fine sandy loam, 7 to 12 percent slopes NWI Classification: Not mapped
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	
Hydric Soil Present?	Yes ___ No X	**Is the Sampled Area**
Wetland Hydrology Present?	Yes ___ No X	**within a Wetland?** Yes ___ No X

Remarks:

Sample plot established at a toe slope on a bluff above the Columbia River in an actively farmed wheat field. Wheat had been harvested at the time of the wetland survey. No wetland indicators observed in the plot.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Triticum ssp.	85	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 15			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species		x3=	0
FACU species		x4=	0
UPL species	85	x5=	425
Column Totals:	85 (A)		425 (B)

Prevalence Index = B/A= 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Wheat seedlings showing signs of stress (yellowing) likely from herbicide application in the weeks prior to the survey. No indicators of hydrophytic vegetation present within sample plot.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-12	7.5YR 3/1	100					Silt Loam	
12-24	10YR 3/2	100					Silt Loam	

[1]Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks:

Ho hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary indicators of wetland hydrology present.

Additional Reference Data: Photos

Photo Name: Photo_231108100540

Photo Name: Photo_231108100847

Photo Name: Photo_231108100506

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Wasco | Sampling Date: 11/8/2023

Applicant/Owner: Cascade Renewables | State: OR | Sampling: VP-2 (OR)

Investigators: B DARBY, J MAZE | Section, Township, Range: T2N R14E S31

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 0

Subregion (LRR): B - Northwest Wheat/Range | Lat: 45.605807 | Long: -121.107958 | Datum: WGS84

Soil Map Unit Name: Wato very fine sandy loam, 7 to 12 percent slopes | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Sample plot established at a toe slope on a bluff above the Columbia River in an actively farmed wheat field. Wheat had been harvested at the time of the wetland survey. No wetland indicators observed in the plot.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Triticum ssp.	85	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species		x3=	0
FACU species		x4=	0
UPL species	85	x5=	425
Column Totals:	85 (A)		425 (B)

Prevalence Index = B/A= 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

No indicators for hydrophytic vegetation met.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-11	7.5YR 3/1	100					Silt Loam	
11-20	10YR 3/2	100						

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1) (except MLRLA 1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

____ 2 cm Muck (A10)
____ Red Parent Material (TF2)
____ Very Shallow Dark Surface (TF12)
____ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: 20

Depth (inches): Hard pan

Hydric Soil Present? Yes ____ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

____ Surface Water (A1)
____ High Water Tables (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Surface Soil Cracks (B6)
____ Inundation Visible on Aeriel Imagery (B
____ Sparsley Vegetated Concave Surface (B8)
____ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
____ Salt Crust (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres along Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Stunted or Stressed Plants (D1) (**LRR A**)
____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

____ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
____ Drainage Patterns (B10)
____ Dry-Season Water Table (C2)
____ Saturation Visible on Aeriel Imagery (C9)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ FAC-Neutral Test (D5)
____ Raised Ant Mounds (D6) (**LRR A**)
____ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches):	
Water Table Present?	Yes	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** ____ **No** **X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary indicators of hydrology present

Additional Reference Data: Photos

Photo Name: Photo_231108104233

Photo Name: Photo_231108104246

Photo Name: Photo_231108104228

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables   City/County: Wasco   Sampling Date: 4/2/2024

Applicant/Owner: Cascade Renewables   State: OR   Sampling VP-3 (OR)

Investigators: B DARBY, J MAZE   Section, Township, Range: T1N R13E S1

Landform (hillslope, terrace, etc.): Floodplain   Local Relief (concave, convex, none): Concave   Slope(%): 3

Subregion (LRR): B - Northwest Wheat/Range   Lat: 45.600985   Long: -121.142271   Datum: WGS84

Soil Map Unit Name: Rock outcrop - Xeropsamments complex   NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Sample plot occurs in relic floodplain of Threemile Creek in a shallow depression between a railroad access road and the creek. Plot meets hydrophytic vegetation indicator but no wetland soils or hydrology are present.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1. Populus balsamifera	60	Yes	FAC
2.			
3.			
4.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Rubus armeniacus	2	Yes	FAC
2.			
3.			
4.			
5.			
	2	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Conium maculatum	60	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1. Clematis ligusticifolia	10	Yes	FAC
2.			
	10	= Total Cover	
% Bare Ground in Herb Stratum 40			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	132	x3=	396
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	132	(A)	396 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the dominance test for hydrophytic vegetation. Bare ground is attributed to thick layer of leaf litter and downed woody debris.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-4	Not keyed	100					Organic	Leaves, humus
4-18	10YR 4/3	100					Sand	Some fibrous roots

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	___
Water Table Present?	Yes ___	No	X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Wetland Hydrology Present? Yes ___ **No X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site:	Cascade Renewables	City/County:	Wasco	Sampling Date:	4/2/2024
Applicant/Owner:	Cascade Renewables	State:	OR	Sampling	VP-4 (OR)
Investigators:	B DARBY, J MAZE	Section, Township, Range:	T1N R13E S1		
Landform (hillslope, terrace, etc.):	Floodplain	Local Relief (concave, convex, none):	Concave	Slope(%):	5
Subregion (LRR):	B - Northwest Wheat/Range	Lat: 45.601675	Long: -121.142966	Datum:	WGS84
Soil Map Unit Name:	Rock outcrop-Xeropsamments complex	NWI Classification:	Not mapped		

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No	
Hydrophytic Vegetation Present?	X		
Hydric Soil Present?		X	**Is the Sampled Area**
Wetland Hydrology Present?		X	**within a Wetland?** Yes ___ No X

Remarks:

Small depression at base of roadway prism. Hydrophytic vegetation occurs in sample plot but hydric soils and hydrology are absent.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1. Crataegus monogyna	5	Yes	FAC
2.			
3.			
4.			
	5	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Conium maculatum	95	Yes	FAC
2. Festuca spp.	10	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	110	x3=	330
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	110 (A)		330 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Unidentified grass is believed to be fescue but could not be identified to species; assumed facultative. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-18	10YR 3/2	100					Sandy Loam	Mostly fine sand

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	___
Water Table Present?	Yes ___	No	X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site:	Cascade Renewables	City/County:	Wasco	Sampling Date:	11/8/2023
Applicant/Owner:	Cascade Renewables	State:	OR	Sampling	VP-5 (OR)
Investigators:	B DARBY, J MAZE	Section, Township, Range:	T2N R13E S2		
Landform (hillslope, terrace, etc.):	Depression	Local Relief (concave, convex, none):	Concave	Slope(%):	0
Subregion (LRR):	B - Northwest Wheat/Range	Lat: 45.599054	Long: -121.166568	Datum:	WGS84
Soil Map Unit Name:	Rock outcrop-Xeropsamments complex	NWI Classification:	PSS/EM1Ch		

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Sample plot positioned within the lowest elevational point of a depression between two roadways in an area suspected of collecting and concentrating water. An 18-inch culvert is present extending from the roadway prism toe slope, but no signs of flow observed. Hydrophytic vegetation present within sample plot. No hydric soils or wetland hydrology observed.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1. Ailanthus altissima	40	Yes	FACU
2. Elaeagnus angustifolia	15	Yes	FAC
3. Fraxinus americana	10	No	FACU
4.			
	65	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Rubus armeniacus	5	Yes	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Conium maculatum	10	Yes	FAC
2. Phalaris arundinacea	2	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	12	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 88

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	75	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	2	x2=	4
FAC species	30	x3=	90
FACU species	50	x4=	200
UPL species		x5=	0
Column Totals:	82 (A)		294 (B)

Prevalence Index = B/A= 3.59

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Bare ground is attributed to leaf litter and downed woody debris. Sample plot meets dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type¹	Loc²	Texture	Remarks
0-15	2.5Y 3/1	100					Silt Loam	
15-24	5Y 3/2	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Deeper soil layer is too bright to be depleted or gleyed, hydric soil indicators for depleted below dark surface (A11) and thick dark surface (A12) do not apply.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One secondary wetland hydrology indicator for geomorphic position (D2) is met.

Additional Reference Data: Photos

Photo Name: Photo_231108145436

Photo Name: Photo_231108151019

Photo Name: Photo_231108145504

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Wasco Sampling Date: 11/8/2023

Applicant/Owner: Cascade Renewables State: OR Sampling VP-6 (OR)

Investigators: B DARBY, J MAZE Section, Township, Range: T1N R13E S3

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope(%): 0

Subregion (LRR): B - Northwest Wheat/Range Lat: 45.598266 Long: -121.168805 Datum: WGS84

Soil Map Unit Name: Quincy loamy fine sand, wet NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	
Hydric Soil Present?	Yes ___ No X	**Is the Sampled Area**
Wetland Hydrology Present?	Yes ___ No X	**within a Wetland?** Yes ___ No X

Remarks:

Sample plot positioned within the lowest elevational point of a depression between three roadways in an area suspected of collecting and concentrating water. Hydrophytic vegetation present but no wetland soils or hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Conium maculatum	90	Yes	FAC
2. Poa spp.	50	Yes	FAC
3. Triticum spp.	10	No	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	150	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	140	x3=	420
FACU species		x4=	0
UPL species	10	x5=	50
Column Totals:	150 (A)		470 (B)

Prevalence Index = B/A= 3.13

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Multistoried herb canopy. Grasses too young to be identified to species; wheat assumed to be upland, poa assumed to be facultative. Sample plot meets dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-11	10YR 2/1	100					Sandy Loam	
11-24	5Y 3/2	99	10YR 3/6	1	C	M	Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Deeper soil layer is too bright to be depleted or gleyed; hydric soil indicators for depleted below dark surface (A11) and thick dark surface (A12) do not apply.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One secondary wetland hydrology indicator for geomorphic position (D2) is met.

Additional Reference Data: Photos

Photo Name: Photo_231108153736

Photo Name: Photo_231108153806

Photo Name: Photo_231108153752

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling VP-7 (OR)

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 3

Subregion (LRR): A - Northwest Forest | Lat: 45.622002 | Long: -122.694618 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Hydrophytic vegetation present but no hydric soils or wetland hydrology observed at sample plot.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1. Populus balsamifera	50	Yes	FAC
2.			
3.			
4.			
	50	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Rubus armeniacus	25	Yes	FAC
2. Pseudotsuga menziesii	2	No	FACU
3. Cytisus scoparius	1	No	UPL
4.			
5.			
	28	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	95	Yes	FAC
2. Schedonorus arundinaceus	5	No	FAC
3. Polystichum munitum	2	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	102	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	175	x3=	525
FACU species	4	x4=	16
UPL species	1	x5=	5
Column Totals:	180	(A)	546 (B)

Prevalence Index = B/A= 3.03

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-3	10YR 2/1	100					Loamy Sand	
3-18	10YR 2/2	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ **No** **X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot meets one secondary wetland hydrology indicator for geomorphic position (D2).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024
Applicant/Owner: Cascade Renewables | State: OR | Sampling VP-8 (OR)
Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32
Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 3
Subregion (LRR): A - Northwest Forest | Lat: 45.619555 | Long: -122.697372 | Datum: WGS84
Soil Map Unit Name: Pilchuck sand | NWI Classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes X	No
Is the Sampled Area within a Wetland?	Yes	No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs in a flat open area adjacent to access road. Hydrophytic vegetation present and two secondary wetland hydrology indicators are met; no hydric soil indicators occur at sample plot. The sample plot likely occurs at the boundary of a wetland but not within. Sample plot located just outside project survey area.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Cornus alba	5	Yes	FACW
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	85	Yes	FACW
2. Urtica dioica	10	No	FAC
3. Geranium molle	3	No	UPL
4. Cardamine oligosperma	2	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	90	x2=	180
FAC species	12	x3=	36
FACU species		x4=	0
UPL species	3	x5=	15
Column Totals:	105 (A)		231 (B)

Prevalence Index = B/A= 2.20

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the rapid test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type¹	Loc²	Texture	Remarks
0-2	10YR 2/2	100					Silt Loam	Fibrous roots
2-12	10YR 3/2	100					Silty Clay Loam	
12-18	2.5YR 4/2	95	7.5YR 3/3	5	C	M	Silty Clay Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Redox concentrations too deep and soils are too bright to meet hydric soil indicators; no hydric soils present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils moist but not saturated. Sample plot meets two secondary wetland hydrology indicators for geomorphic position (D2) and the FAC-neutral test (D5).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling VP-9 (OR)

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 0

Subregion (LRR): A - Northwest Forest | Lat: 45.621066 | Long: -122.709379 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. No wetland indicators are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Holcus lanatus	25	Yes	FAC
2. Rumex acetosella	25	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 50

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	25	x3=	75
FACU species	25	x4=	100
UPL species		x5=	0
Column Totals:	50 (A)		175 (B)

Prevalence Index = B/A= 3.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0¹

___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants¹

___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Multistoried herb canopy. Bare ground is attributed to moss coverage. No hydrophytic vegetation indicators occur at the sample plot.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-8	10YR 3/3	100					Sandy Loam	
8-18	2.5Y 4/1	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Bright upper soil layer, lack of redox concentrations and location of depleted matrix prevent soils from meeting indicators for depleted below dark surface (A11) and thick dark surface (A12). No hydric soils present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling VP-10 (OR)

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): Concave | Slope(%): 2

Subregion (LRR): A - Northwest Forest | Lat: 45.628342 | Long: -122.720811 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes ___ No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ___ No X	**within a Wetland?**	Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Hydrophytic vegetation present but no hydric soils or wetland hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Rubus armeniacus	5	Yes	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Holcus lanatus	90	Yes	FAC
2. Stellaria media	1	No	FACU
3. Geranium molle	1	No	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	92	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 8

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	95	x3=	285
FACU species	1	x4=	4
UPL species	1	x5=	5
Column Totals:	97 (A)		294 (B)

Prevalence Index = B/A= 3.03

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets dominance test for hydrophytic vegetation. Bare ground is attributed to moss coverage.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-4	10YR 2/2	100					Loamy Sand	
4-8	10YR 3/2	100					Loamy Sand	
8-13	2.5Y 2.5/1	100					Sand	
13-18	10YR 3/3	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling VP-11 (OR)

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1E S30

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 2

Subregion (LRR): A - Northwest Forest | Lat: 45.621785 | Long: -122.727104 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Hydrophytic vegetation present at sample plot but no hydric soils or wetland hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Plantago lanceolata	5	Yes	FACU
2. Poa ssp.	3	Yes	FAC
3. Holcus lanatus	2	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 90

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	5	x3=	15
FACU species	5	x4=	20
UPL species		x5=	0
Column Totals:	10 (A)		35 (B)

Prevalence Index = B/A= 3.50

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Poa grass too young to identified to species; assumed facultative. Bare ground attributed to moss coverage. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-4	10YR 2/1	100					Loamy Sand	
4-10	10YR 3/2	100					Loamy Sand	
10-16	2.5Y 3/1	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	
Water Table Present?	Yes ___	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables   City/County: Multnomah   Sampling Date: 3/11/2024
Applicant/Owner: Cascade Renewables   State: OR   Sampling VP-12 (OR)
Investigators: J MAZE, R SCHNELLBACH   Section, Township, Range: T2N R1W S25
Landform (hillslope, terrace, etc.): Flat   Local Relief (concave, convex, none): None   Slope(%): 2
Subregion (LRR): A - Northwest Forest   Lat: 45.632861   Long: -122.758003   Datum: WGS84
Soil Map Unit Name: Sauvie Silt Loam   NWI Classification: Not mapped
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:
Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot does not meet any wetland indicators.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Erodium cicutarium	25	Yes	UPL
2. Poa ssp.	3	No	FAC
3. Plantago lanceolata	2	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 90

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	3	x3=	9
FACU species	2	x4=	8
UPL species	25	x5=	125
Column Totals:	30 (A)		142 (B)

Prevalence Index = B/A= 3.40

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:
Poa too young to be identified to species; assumed facultative. Multistoried herb canopy. Bare ground is attributed to moss coverage. No hydrophytic vegetation present at sample plot.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-3	10YR 3/2	100					Sand	
3-18	2.5Y 3/2	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators are met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	
Water Table Present?	Yes ___	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	

Wetland Hydrology Present? Yes ___ **No X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/20/2025
Applicant/Owner: Cascade Renewables | State: OR | Sampling VP-13 (OR)
Investigators: B DARBY, J MAZE, A CAPRETTI | Section, Township, Range: North of T2N R1E S32
Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): Concave | Slope(%): 1
Subregion (LRR): A - Northwest Forest and | Lat: 45.626663 | Long: -122.718491 | Datum: WGS84
Soil Map Unit Name: Pilchuck sand | NWI Classification: PUBT
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:
Sample point is located south of an existing access road. Sample plot meets indicator for wetland vegetation, hydrology and soils.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	20	Yes	FACW
2. Geranium molle	10	Yes	UPL
3. Trifolium repens	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	35	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 65

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	20	x2=	40
FAC species	5	x3=	15
FACU species		x4=	0
UPL species	10	x5=	50
Column Totals:	35	(A)	105 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Prevalence index of 3 meets requirements for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-14	10YR 4/1	90	10YR 4/3	10	C	M	Loamy Sand	
14-24	10YR 4/1	100					Loamy Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Soils meet hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
X Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	___
Water Table Present?	Yes ___	No	X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Inundation is visible on aerial imagery for several years including November 2011, May 2017, June and July 2022, and May 2023, meeting primary wetland hydrology indicator B7. The DAREM was completed for these months and years of excess flooding shown in Google Earth, confirming these to be wetter than normal conditions leading to the excess flooding that extends to the south.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site:	Cascade Renewables	City/County:	Multnomah	Sampling Date:	3/20/2025
Applicant/Owner:	Cascade Renewables	State:	OR	Sampling	VP-14 (OR)
Investigators:	B DARBY, J MAZE, A CAPRETTI	Section, Township, Range:	North of T2N R1E S32		
Landform (hillslope, terrace, etc.):	Depression	Local Relief (concave, convex, none):	Concave	Slope(%):	1
Subregion (LRR):	A - Northwest Forest	Lat: 45.626587	Long: -122.718536	Datum:	WGS84
Soil Map Unit Name:	Pilchuck sand	NWI Classification:	PUBT		

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?**	Yes X No ___

Remarks:

Sample plot taken on north side of access road showing that the wetland extends to the road. The plot meets wetland indicators of hydrophytic vegetation, hydric soil and hydrology and occurs at the southernmost boundary of Wetland 2A..

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	45	Yes	FACW
2. Hypochaeris radicata	15	No	FACU
3. Geranium molle	15	No	UPL
4. Equisetum arvense	10	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 15			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	45	x2=	90
FAC species	10	x3=	30
FACU species	15	x4=	60
UPL species	15	x5=	75
Column Totals:	85 (A)		255 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0¹

___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants¹

___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the rapid test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-4	10YR 4/1	95	10YR 4/3	5	C	M	Loamy Sand	
4-26	10YR 4/1	100					Loamy Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X No ___

Remarks:

Soils meet hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ______

Water Table Present? Yes ___ No ___ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ______

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Inundation is visible on aerial imagery for several years including November 2011, May 2017, June and July 2022, and May 2023, meeting primary wetland hydrology indicator B7. The DAREM was completed for these months and years of excess flooding shown in Google Earth, confirming these to be wetter than normal conditions leading to the excess flooding that extends to the south.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024
Applicant/Owner: Cascade Renewables | State: OR | Sampling W1-P1 (W) - OR
Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32
Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): Concave | Slope(%): 1
Subregion (LRR): A - Northwest Forest | Lat: 45.623584 | Long: -122.710258 | Datum: WGS84
Soil Map Unit Name: Pilchuck sand | NWI Classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?** Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. As noted on historic aerials, soils may not be inundated every year. Some upland vegetation establishment at the time of the survey.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	75	Yes	FACW
2. Dipsacus fullonum	50	Yes	FAC
3. Stellaria media	15	No	FACU
4. Geranium molle	15	No	UPL
5. Cirsium vulgare	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
	160	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species	75	x2= 150
FAC species	50	x3= 150
FACU species	20	x4= 80
UPL species	15	x5= 75
Column Totals:	160 (A)	455 (B)

Prevalence Index = B/A= 2.84

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Multistoried vegetative canopy. Mixed upland and wetland plant community. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-2	10YR 3/3	100					Silt Loam	Fibrous roots
2-7	7.5YR 3/1	70	7.5YR 3/3	25	C	PL M	Silt Loam	
			5YR 3/4	5	C	M		
7-18	2.5Y 3/3	90	7.5YR 2.5/3	5	C	M	Silt Loam	Iron and manganese masses
			10YR 3/4	3	C	M		
			2.5Y 3/1	2	C	M		

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Prominent redox concentrations occurring in a 5-inch thick layer within the upper 12 inches of soil. Sample plot meets hydric soil indicator for redox dark surface (F6).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
X Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
X Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils moist but not saturated. Current and historic aerials show surface water inundation some years (2011 and 2017) meeting primary wetland hydrology indicator B7. Sample plot meets secondary indicators for visible saturation on aerial imagery (C9), geomorphic position (D2) and the FAC-neutral test (D5).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling W1-P2 (U) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 1

Subregion (LRR): A - Northwest Forest | Lat: 45.623601 | Long: -122.710265 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?	X	
Is the Sampled Area within a Wetland?		X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. One primary wetland hydrology is met but not hydrology indicators observed at the time of the survey. No hydrophytic vegetation or hydric soil indicators met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Stellaria media	50	Yes	FACU
2. Geranium molle	15	Yes	UPL
3. Dipsacus fullonum	10	No	FAC
4. Galium aparine	10	No	FAC
5. Phalaris arundinacea	10	No	FACW
6. Poa ssp.	3	No	FAC
7. Vicia americana	1	No	FAC
8. Cirsium vulgare	1	No	FACU
9. Verbascum thapsus	1	No	FACU
10.			
11.			
	101	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	10	x2=	20
FAC species	24	x3=	72
FACU species	52	x4=	208
UPL species	15	x5=	75
Column Totals:	101 (A)		375 (B)

Prevalence Index = B/A= 3.71

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

No indicators for hydrophytic vegetation are met.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-2	7.5YR 3/2	100					Silt Loam	Organics present
2-13	10YR 3/2	90	10YR 3/1	5	C	M	Silt Loam	
			7.5YR 2.5/3	5	C	M		
13-18	10YR 4/2	90	10YR 3/3	10	C	M	Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Layers above depleted matrix are too bright and redox concentrations within the depleted matrix are too faint to meet hydric soil indicator for thick dark surface (A12). No hydric soil indicators are met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)		X	

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Current and historic aerials show surface water inundation some years (2011 and 2017) meeting primary wetland hydrology indicator B7. No hydrology indicators observed at the time of the survey.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling W2-P1 (W) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 5

Subregion (LRR): A - Northwest Forest | Lat: 45.626912 | Long: -122.718384 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: PUBT

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	
Hydric Soil Present?	Yes X	No ___	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X	No ___	**within a Wetland?** Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Wetland 2A occurs in a depressional area with a shallow perennial pond. All three wetland indicators are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	100	x2=	200
FAC species		x3=	0
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A= 2.00

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Rapid test for hydrophytic vegetation is met.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					Sandy Loam	Roots; decomposing organics
4-20	10YR 2/1	95	5YR 3/4	5	C	PL RC	Sand	

[1]Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Prominent redox concentrations in soft masses and pore linings of the matrix. Sample plot meets the hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	___
Water Table Present?	Yes ___	No	X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils were moist but not saturated. One primary hydrology indicator for inundation on aerial imagery (2011 and 2017) is met (B7). Sample plot meets two secondary wetland hydrology indicators for saturation visible on aerial imagery (C9) and geomorphic position (D2).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling W2-P2 (U) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 5

Subregion (LRR): A - Northwest Forest | Lat: 45.626941 | Long: -122.718411 | Datum: WGS84

Soil Map Unit Name: Pilchuck sand | NWI Classification: PUBT

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?	X	

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Upland plot located roughly 6 feet northwest of paired wetland plot. One primary wetland hydrology indicator is met for visible inundation on aerial images; no hydrology indicators were observed in the field. No hydrophytic vegetation or hydric soil indicators are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Geranium molle	60	Yes	UPL
2. Poa ssp.	20	Yes	FAC
3. Cardamine oligosperma	3	No	FAC
4. Phalaris arundinacea	3	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	86	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 14

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	3	x2=	6
FAC species	23	x3=	69
FACU species		x4=	0
UPL species	60	x5=	300
Column Totals:	86 (A)		375 (B)

Prevalence Index = B/A= 4.36

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Poa too young to be identified to species. Bare ground is attributed to unvegetated areas and moss coverage. Sample plot does not meet any hydrophytic vegetation indicators.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-5	10YR 3/2	100					Loamy Sand	
5-9	2.5YR 3/2	100					Loamy Sand	
9-18	2.5Y 4/1	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks:

No redox concentrations present and upper soil layers too bright to meet depleted below dark surface indicator (A11). Depleted matrix begins too shallow to meet thick dark surface indicator (A12). Soils are not hydric.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes		No	X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One secondary wetland hydrology indicator met for visible saturation/inundation visible on aerial imagery (C9).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables   City/County: Multnomah   Sampling Date: 3/12/2024

Applicant/Owner: Cascade Renewables   State: OR   Sampling W2-P3 (W) - OR

Investigators: J MAZE, R SCHNELLBACH   Section, Township, Range: North of T2N R1E S32

Landform (hillslope, terrace, etc.): Depression   Local Relief (concave, convex, none): None   Slope(%): 1

Subregion (LRR): A - Northwest Forest   Lat: 45.626552   Long: -122.717145   Datum: WGS84

Soil Map Unit Name: Pilchuck sand   NWI Classification: PUBT

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	
Hydric Soil Present?	Yes X	No ___	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X	No ___	**within a Wetland?** Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. All three wetland parameters are met for Wetland 2B.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	100	x2=	200
FAC species		x3=	0
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A= 2.00

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the rapid test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-2	10YR 2/2	100					Sandy Loam	Many fibrous roots
3-5	2.5Y 3/2	98	10YR 4/6	2	C	M	Sand	Some fibrous roots
5-9	2.5Y 3/2	45	10YR 4/6	25	C	M	Sand	
	5Y 3/1	30						
9-18	5Y 3/1	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Many prominent redox concentrations occur in a mixed matrix. Sample plot meets hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Tables (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches):	36.00
Water Table Present?	Yes X	No ___	Depth (inches):	16.0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	11.0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot is located at the edge of a shallow vegetated pond roughly 2-3 feet deep. Primary indicators for surface water (A1), saturation (A3) and visible inundation on aerial imagery (B7) are met. One secondary indicator for geomorphic position (D2) is met.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site:	Cascade Renewables	City/County:	Multnomah	Sampling Date:	3/12/2024
Applicant/Owner:	Cascade Renewables	State:	OR	Sampling	W2-P4 (U) - OR
Investigators:	J MAZE, R SCHNELLBACH	Section, Township, Range:	North of T2N R1E S32		
Landform (hillslope, terrace, etc.):	Flat	Local Relief (concave, convex, none):	None	Slope(%):	1
Subregion (LRR):	A - Northwest Forest	Lat: 45.626540	Long: -122.717120	Datum:	WGS84
Soil Map Unit Name:	Pilchuck sand	NWI Classification:	PUBT		

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?	X	

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot is positive for hydrophytic vegetation. One primary wetland hydrology indicator is met for visible inundation on historic aerials, but no hydrology indicators were observed at the time of the survey. No hydric soils present. Data plot near but not within wetland boundary.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	50	Yes	FACW
2. Festuca spp.	30	Yes	FAC
3. Geranium molle	15	No	UPL
4. Cardamine oligosperma	10	No	FAC
5. Stellaria media	3	No	FACU
6. Galium aparine	2	No	FAC
7.			
8.			
9.			
10.			
11.			
	110	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	50	x2=	100
FAC species	42	x3=	126
FACU species	3	x4=	12
UPL species	15	x5=	75
Column Totals:	110	(A)	313 (B)

Prevalence Index = B/A= 2.85

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Multistoried herb layer. Festuca could not be identified to species: standing dead missing inflorescences and emerging grass too young to be identified to species. Vegetation meets dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-8	10YR 3/2	99	10YR 4/3	1	C	M	Sandy Loam	
8-18	10YR 4/2	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Soils do not meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
X Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One primary wetland hydrology indicator (B7) is met for inundation visible on aerial imagery (2011, 2017 and 2023). No wetland hydrology indicators were observed during the wetland survey.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site:	Cascade Renewables	City/County:	Multnomah	Sampling Date:	3/20/2025
Applicant/Owner:	Cascade Renewables	State:	OR	Sampling	W2-P5 (W) - OR
Investigators:	B DARBY, J MAZE, A CAPRETTI	Section, Township, Range:	North of T2N R1E S32		
Landform (hillslope, terrace, etc.):	Depression	Local Relief (concave, convex, none):	Concave	Slope(%):	0
Subregion (LRR):	A - Northwest Forest	Lat: 45.626392	Long: -122.717506	Datum:	WGS84
Soil Map Unit Name:	Pilchuck sand	NWI Classification:	PUBT		

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes X No ___	Is the Sampled Area	
Wetland Hydrology Present?	Yes X No ___	within a Wetland?	Yes X No ___

Remarks:

Wetland 2B occurs in a depressional area with a shallow perennial pond. Wetland plot established at a minor topographic change between the wetland and an adjacent transmission line access road. Sample plot meets all three wetland indicators.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	30	Yes	FACW
2. Poa ssp.	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 50			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	30	x2=	60
FAC species	20	x3=	60
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	50 (A)		120 (B)

Prevalence Index = B/A= 2.40

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Poa too young to be identified to species. Bare ground attributed to surface water and unvegetated areas. Sample plot meets the dominance test indicator for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-4	10YR 3/2	100					Sand	Large rocks present
4-18	2.5Y 4/1	65	7.5YR 4/6	25	C	M RC	Loamy Sand	
			5YR 4/6	10	C	M RC		

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Large rock present in soil pit, likely from adjacent roadbed. Prominent redox concentrations present in the matrix and along pore linings. Sample plot meets the hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Tables (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	X		36.00
Water Table Present?	X		8.0
Saturation Present? (includes capillary fringe)	X		8.0

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot is located near an unimproved access road at the edge of a shallow pond roughly 2-3 feet deep. Primary indicators for surface water (A1), high water table (A2), saturation A3, and visible inundation on aerial imagery (B7) are met. One secondary indicator for geomorphic position (D2) is met.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/20/2025
Applicant/Owner: Cascade Renewables | State: OR | Sampling W2-P6 (U) - OR
Investigators: B DARBY, J MAZE, A CAPRETTI | Section, Township, Range: North of T2N R1E S32
Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 1
Subregion (LRR): A - Northwest Forest | Lat: 45.626472 | Long: -122.717461 | Datum: WGS84
Soil Map Unit Name: Pilchuck sand | NWI Classification: PUBT

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?	X	

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Upland plot established roughly 6 feet south of wetland plot. Indicator for hydrophytic vegetation is met. One primary wetland hydrology indicator is met for visible inundation of historic aerials, but no hydrology indicators were observed at the time of the survey. No hydric soils present. Sample plot occurs near but not within a wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Rubus armeniacus	5	Yes	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	25	Yes	FAC
2. Phalaris arundinacea	5	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 70

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	5	x2=	10
FAC species	30	x3=	90
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	35 (A)		100 (B)

Prevalence Index = B/A= 2.86

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Poa too young to be identified to species. Vegetation growth has been limited by access road use. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-16	10YR 3/2	100					Loamy Sand	
16-18	2.5Y 4/1	70	5Y 4/6	5	C	M	Loamy Sand	
			7.5YR 4/6	15	C	M		

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Soils overlaying redox layer are too bright and redox is too deep to meet any hydric soil indicators. No hydric soils present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
X Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	___
Water Table Present?	Yes ___	No	X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One primary wetland hydrology indicator (B7) is met for inundation visible on aerial imagery (2011, 2017, 2022, and 2023). No wetland hydrology indicators were observed during the wetland survey.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/11/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling: Area A-P1 (W) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1E S32

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 2

Subregion (LRR): A - Northwest Forest | Lat: 45.618825 | Long: -122.716722 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?**	Yes X No ___
Hydric Soil Present?	Yes X No ___		
Wetland Hydrology Present?	Yes X No ___		

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs within a historic dredged fill placement site. Wetland occurs on the most eastern end of a large man-made depression surrounded by soil berms roughly 6-10 feet high. A 24-inch culvert is located at the base of the berm on the east end of wetland that carries flow from the wetland to a 12-inch pipe that discharges directly to the Columbia River. Surface water observed in wetland during the survey but no flow through the culvert.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Cornus alba	15	Yes	FACW
2. Populus balsamifera	5	Yes	FAC
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 60			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	15	x2=	30
FAC species	45	x3=	135
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	60 (A)		165 (B)

Prevalence Index = B/A= 2.75

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Bare ground is attributed to unvegetated areas and moss coverage. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type¹	Loc²	Texture	Remarks
0-2	10YR 2/2	100					Sandy Loam	
2-5	2.5YR 3/2	100					Sand	
5-16	5GY 4/1	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- X Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Soils within sample plot meet the hydric soil indicator for sandy gleyed matrix (S4).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Tables (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches):	2.00	
Water Table Present?	Yes X	No ___	Depth (inches):	5.0	
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	3.0	**Wetland Hydrology Present? Yes X No ___**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot was established at the lowest point of the depression that occurs within the survey area. Surface water was observed in isolated microdepressions across the sample plot; no evidence of flow to the culvert was noted. Primary wetland hydrology indicators for surface water (A1), water table (A2), and saturation (A3) are met as well as secondary indicators for geomorphic position (D2) and the FAC-neutral test (D5).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/11/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling Area A-P2 (U) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1E S32

Landform (hillslope, terrace, etc.): Footslope | Local Relief (concave, convex, none): None | Slope(%): 25

Subregion (LRR): A - Northwest Forest | Lat: 45.618803 | Long: -122.716744 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs on a man-made soil berm just upslope from a depressional area. Sample plot meets criteria for hydrophytic vegetation but no hydric soils or wetland hydrology are present.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Cornus alba	25	Yes	FACW
2.			
3.			
4.			
5.			
	25	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	40	Yes	FAC
2. Taraxacum officinale	2	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	42	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 40

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	25	x2=	50
FAC species	40	x3=	120
FACU species	2	x4=	8
UPL species		x5=	0
Column Totals:	67 (A)		178 (B)

Prevalence Index = B/A= 2.66

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Grasses too young to be identified to species. Bare ground is attributed to moss coverage. Wetland meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-4	10YR 2/2	100					Sand	
4-10	7.5YR 3/4	100					Sand	
10-13	2.5Y 3/2	98	10YR 3/4	2	C	M	Sand	
13-16	5GY 4/1	95	5GY 2.5/1	5	C	M	Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Upper soil layers are too bright to meet depleted below dark surface (A11) or thick dark surface (A12). Gleyed matrix and redox concentrations too deep to meet sandy gleyed matrix (S4) or sandy redox (S5) indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes		No		Depth (inches):
Surface Water Present?	Yes		No	X	
Water Table Present?	Yes	X	No		15.0
Saturation Present? (includes capillary fringe)	Yes	X	No		13.0

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

One secondary wetland hydrology indicator, the FAC-neutral test, is met.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/11/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling Area B-P1 (W) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1E S32

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 2

Subregion (LRR): A - Northwest Forest | Lat: 45.618658 | Long: -122.716893 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?** Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs within a historic dredged fill placement site. Wetland occurs on the most eastern end of a large man-made depression surrounded by soil berms roughly 6-10 feet high. A thick plastic liner was encountered 12 inches below ground surface.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	60	Yes	FAC
2. Festuca spp.	30	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 10			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	90	x3=	270
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	90	(A)	270 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Grasses too young to be identified to species; assumed facultative. Bare ground attributed to moss coverage. Wetland plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-2	10YR 2/1	100					Sandy Loam	
2-16	2.5Y 5/1	90	7.5YR 2.5/2	7	C	M	Sand	
			7.5YR 3/4	3	C	M		

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- X Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Manganese and iron oxide concentrations located in stripped matrix. Sample plot meets hydric soil indicators for sandy redox (S5) and stripped matrix (S6).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Tables (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?	X		10.0
Saturation Present? (includes capillary fringe)	X		7.0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The sample plot meets two primary wetland hydrology indicators for high water table (A2) and saturation (A3) as well as one secondary indicator for geomorphic position (D2).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site:	Cascade Renewables	City/County:	Multnomah	Sampling Date:	3/11/2024
Applicant/Owner:	Cascade Renewables	State:	OR	Sampling	Area B-P2 (U) - OR
Investigators:	J MAZE, R SCHNELLBACH	Section, Township, Range:	T2N R1E S32		
Landform (hillslope, terrace, etc.):	Toeslope	Local Relief (concave, convex, none):	None	Slope(%):	25
Subregion (LRR):	A - Northwest Forest	Lat: 45.618655	Long: -122.716873	Datum:	WGS84
Soil Map Unit Name:	Pilchuck-Urban land complex, 0 to 3 percent slopes	NWI Classification:	Not mapped		

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs on a man-made soil berm just upslope from a depressional area. Sample plot meets criteria for hydrophytic vegetation but no hydric soils or wetland hydrology present.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	45	Yes	FAC
2. Festuca spp.	35	Yes	FAC
3. Erigeron canadensis	10	No	FACU
4. Senecio jacobaea	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	80	x3=	240
FACU species	15	x4=	60
UPL species		x5=	0
Column Totals:	95	(A)	300 (B)

Prevalence Index = B/A= 3.16

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Grasses too young to be identified to species. Bare ground is attributed to moss coverage. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-4	10YR 3/2	100					Sandy Loam	
4-16	10YR 3/3	100					Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ____ 2 cm Muck (A10)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Tables (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aeriel Imagery (B
- ____ Sparsley Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres along Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aeriel Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):	

Wetland Hydrology Present? Yes ____ **No X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/13/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling W3-P1 (W) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S35

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 1

Subregion (LRR): A - Northwest Forest | Lat: 45.618080 | Long: -122.781029 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: PEM1F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs in large stormwater feature. All three wetland criteria are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Phalaris arundinacea	98	Yes	FACW
2. Typha latifolia	2	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x1=	2
FACW species	98	x2=	196
FAC species		x3=	0
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	100 (A)		198 (B)

Prevalence Index = B/A= 1.98

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets the rapid test for hydrophytic vegetation. Distinct break in wetland vegetation to the south. Northern boundary comprised of willow and dogwood shrubs.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-3	10YR 3/2	100					Sandy Loam	Thick fibrous roots
3-14	2.5Y 3/1	90	7.5YR 3/4	10	C	PL RC	Sandy Clay	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

A hydrogen sulfide smell was noted during soil excavation (A4). Soils also meets redox dark surface indicator (F6).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Tables (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	X	No	Depth (inches):	2.00
Water Table Present?	Yes	X	No	Depth (inches):	10.0
Saturation Present? (includes capillary fringe)	Yes	X	No	Depth (inches):	2.0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water within sample plot adjacent to the soil pit, average 2 inches deep located in narrow channels. Naturally occurring iron deposits present on water surface. Sample plot meets primary wetland hydrology indicators for high water table (A2), saturation (A3), iron deposits on adjacent surface water boundaries (B5), hydrogen sulfide odor (C1) and oxidized rhizospheres (C3). Two secondary indicators for visible saturation on aerial imagery (B7) and geomorphic position (D2) are met.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/13/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling W3-P2 (U) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S35

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 15

Subregion (LRR): A - Northwest Forest | Lat: 45.618059 | Long: -122.781042 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: PEM1F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Upland sample plot taken on slope roughly 6 feet upslope from wetland depressional area.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Cardamine oligosperma	50	Yes	FAC
2. Stellaria media	40	Yes	FACU
3. Holcus lanatus	10	No	FAC
4. Poa ssp.	10	No	FAC
5. Erodium botrys	10	No	FACU
6. Cirsium vulgare	3	No	FACU
7. Rumex acetosella	3	No	FACU
8. Hypochaeris radicata	1	No	FACU
9. Senecio jacobaea	1	No	FACU
10. Geranium molle	1	No	UPL
11. Lamium purpureum	1	No	UPL
	130	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	70	x3=	210
FACU species	58	x4=	232
UPL species	2	x5=	10
Column Totals:	130	(A)	452 (B)

Prevalence Index = B/A= 3.48

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Multistoried herb cover. Grass too young to be identified to species, Poa assumed facultative.
Plant community does not meet wetland criteria for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-18	10YR 2/2	100					Sand	Fibrous roots in top inch

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Indicators for hydric soil are not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes	X	No		Depth (inches): 14.0
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches): 13.0

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Water table and saturation is too deep to meet wetland hydrology indicators.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/13/2024
Applicant/Owner: Cascade Renewables | State: OR | Sampling W3-P3 (W) - OR
Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S35
Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 3
Subregion (LRR): A - Northwest Forest | Lat: 45.617280 | Long: -122.785019 | Datum: WGS84
Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: PEM1F
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?**	Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs within a large stormwater feature. All three wetland parameters are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1. Alnus rubra	40	Yes	FAC
2.			
3.			
4.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Alnus rubra	40	Yes	FAC
2. Salix lasiandra	20	Yes	FACW
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Cardamine oligosperma	10	Yes	FAC
2. Poa ssp.	10	Yes	FAC
3. Senecio spp.	10	Yes	FAC
4. Geranium robertianum	3	No	FACU
5. Lamium purpureum	3	No	UPL
6. Galium aparine	1	No	FACU
7.			
8.			
9.			
10.			
11.			
	37	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 63			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	20	x2=	40
FAC species	110	x3=	330
FACU species	4	x4=	16
UPL species	3	x5=	15
Column Totals:	137 (A)		401 (B)

Prevalence Index = B/A= 2.93

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Grasses too young to be identified to species, facultative Poa spp. assumed.
Bare ground is sample plot is attributed to unvegetated areas and surface water. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-2	5Y 2.5/1	100					Silt Loam	High organic matter
2-12	10YR 2/2	98	7.5YR 3/4	2	C	M	Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Thick roots

Depth (inches): 12

Hydric Soil Present? Yes X No ___

Remarks:

Investigators noted hydrogen sulfide odor during soil excavation (A4). Sample plot also meets primary hydric soil indicators for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Tables (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- X Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches):	3.00
Water Table Present?	Yes X	No ___	Depth (inches):	3.0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	0.0

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Relatively large (>1 acre) vegetated pond adjacent to sample plot. Shallow surface water present within sample plot and at varying depths across the pond but likely not greater than 2-3 feet deep at the time of the field investigations. Sample plot meets several primary and secondary wetland hydrology indicators.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/13/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling: W3-P4 (U) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S35

Landform (hillslope, terrace, etc.): Toeslope | Local Relief (concave, convex, none): Concave | Slope(%): 10

Subregion (LRR): A - Northwest Forest | Lat: 45.617269 | Long: -122.785031 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Upland plot established roughly 5 feet and slightly upslope of wetland plot. Hydrophytic vegetation present within sample plot but no hydric soil or wetland hydrology indicators met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Alnus rubra	70	Yes	FAC
2. Mahonia aquifolium	3	No	FACU
3.			
4.			
5.			
	73	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Cardamine oligosperma	40	Yes	FAC
2. Poa ssp.	40	Yes	FAC
3. Senecio jacobaea	20	No	FACU
4. Geranium molle	5	No	UPL
5. Lamium purpureum	2	No	UPL
6.			
7.			
8.			
9.			
10.			
11.			
	107	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	150	x3=	450
FACU species	23	x4=	92
UPL species	7	x5=	35
Column Totals:	180	(A)	577 (B)

Prevalence Index = B/A= 3.21

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Grasses too young to be identified to species, facultative Poa spp. assumed. Sample plot meets dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type¹	Loc²	Texture	Remarks
0-5	5Y 2.5/1	100					Silt Loam	Mostly organic matter
5-18	7.5YR 3/2	100					Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes	X	No		Depth (inches): 14.0
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches): 13.0

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Water table and saturation too deep to meet wetland hydrology indicators.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/13/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling: W3-P5 (W) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S35

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 3

Subregion (LRR): A - Northwest Forest | Lat: 45.616996 | Long: -122.783152 | Datum: WGS84

Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: PEM1F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occur within a large stormwater feature. All three wetland parameters are met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1. Alnus rubra	30	Yes	FAC
2.			
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1. Salix hookeriana	60	Yes	FACW
2.			
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Carex obnupta	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x1=	100
FACW species	60	x2=	120
FAC species	30	x3=	90
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	190 (A)		310 (B)

Prevalence Index = B/A= 1.63

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants¹
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Plant species within sample plot meet the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-1	7.5YR 2.5/1	100					Organic	Roots, plant material
1-14	10YR 2/2	60	7.5YR 3/4	40	C	M RC	Sand	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Large roots

Depth (inches): 14

Hydric Soil Present? Yes X No ___

Remarks:

Soils within the sample plot meet hydric soil indicator for sandy redox (S5).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Tables (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- X Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches):	2.00
Water Table Present?	Yes X	No ___	Depth (inches):	11.0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	8.0

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Relatively large (>1 acre) vegetated pond adjacent to sample plot. Shallow surface water present within sample plot and at varying depths across the pond but likely not greater than 2-3 feet deep at the time of the field investigations. Sample plot meets several primary and secondary wetland hydrology indicators.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/13/2024
Applicant/Owner: Cascade Renewables | State: OR | Sampling W3-P6 (U) - OR
Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S35
Landform (hillslope, terrace, etc.): Toeslope | Local Relief (concave, convex, none): None | Slope(%): 25
Subregion (LRR): A - Northwest Forest | Lat: 45.616980 | Long: -122.783150 | Datum: WGS84
Soil Map Unit Name: Pilchuck-Urban land complex, 0 to 3 percent slopes | NWI Classification: Not Mapped
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Wetland plot roughly 6 feet upslope of depressional area. No wetland indictors met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	25	Yes	FAC
2. Galium aparine	25	Yes	FACU
3. Geranium molle	25	Yes	UPL
4. Carex obnupta	10	No	OBL
5. Holcus lanatus	5	No	FAC
6. Vicia americana	5	No	FAC
7. Rumex acetosella	5	No	FACU
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 30			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x1=	10
FACW species		x2=	0
FAC species	35	x3=	105
FACU species	30	x4=	120
UPL species	25	x5=	125
Column Totals:	100 (A)		360 (B)

Prevalence Index = B/A= 3.60

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Multistoried vegetative canopy. Bare ground attributed to unidentified moss species. No hydrophytic vegetation indicators met.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 2.5/1	100					Sandy Loam	
2-16	10YR 3/3	100					Sand	

[1]Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators are met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes		No	X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils moist but not saturated; no wetland hydrology indicators met.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables City/County: Multnomah Sampling Date: 3/11/2024
Applicant/Owner: Cascade Renewables State: OR Sampling Area C-P1 (W) - OR
Investigators: J MAZE, R SCHNELLBACH Section, Township, Range: T2N R1W S34
Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): None Slope(%): 0
Subregion (LRR): A - Northwest Forest Lat: 45.614694 Long: -122.794906 Datum: WGS84
Soil Map Unit Name: Sauvie Silt Loam NWI Classification: Not mapped
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil X or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	
Hydric Soil Present?	Yes X No ___	Is the Sampled Area
Wetland Hydrology Present?	Yes X No ___	within a Wetland? Yes X No ___

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Wetland vegetation developing on recently formed material stockpile, likely from a wetland restoration project that was completed on the adjacent property in October 2020. PHAR may be attributed to seed load in dredged wetland soils placed in this location. Access to excavate soil pits was not granted.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	30	Yes	FAC
2. Achillea millefolium	25	Yes	FACU
3. Phalaris arundinacea	25	Yes	FACW
4. Prunella vulgaris	20	No	FACU
5. Lupinus latifolius	15	No	FAC
6. Taraxacum officinale	5	No	FACU
7. Cardamine oligosperma	2	No	FAC
8. Cirsium vulgare	2	No	FACU
9. Tellima grandiflora	2	No	FACU
10. Geranium molle	2	No	UPL
11.			
	128	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	25	x2=	50
FAC species	47	x3=	141
FACU species	54	x4=	216
UPL species	2	x5=	10
Column Totals:	128 (A)		417 (B)

Prevalence Index = B/A= 3.26

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Newly developed site, vegetation mainly comprised of upland weedy species. Sample plot meets the dominance test for hydrophytic vegetation.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type¹	Loc²	Texture	Remarks

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

No dig zone, subsurface soils were not evaluated. Hydric soils assumed based on the presence of hydrophytic vegetation and wetland hydrology.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 1.00

Water Table Present? Yes X No ___ Depth (inches): ___

Saturation Present? Yes X No ___ Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Property owner requested no soil pits be excavated; subsurface hydrology was not evaluated. Saturation and water table assumed based on presence of surface water.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Cascade Renewables | City/County: Multnomah | Sampling Date: 3/11/2024

Applicant/Owner: Cascade Renewables | State: OR | Sampling Area C-P2 (U) - OR

Investigators: J MAZE, R SCHNELLBACH | Section, Township, Range: T2N R1W S34

Landform (hillslope, terrace, etc.): Flat | Local Relief (concave, convex, none): None | Slope(%): 0

Subregion (LRR): A - Northwest Forest | Lat: 45.614648 | Long: -122.794822 | Datum: WGS84

Soil Map Unit Name: Sauvie Silt Loam | NWI Classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil X or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks:

Precipitation analysis showed wetter than normal conditions in the three months prior to the delineation. Sample plot occurs on a recently formed material stockpile, likely from a wetland restoration project that was completed on the adjacent property in October 2020. PHAR may be attributed to seed load in dredged wetland soils placed in this location. Access to excavate soil pits was not granted.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10 feet)			
1. Poa ssp.	45	Yes	FAC
2. Achillea millefolium	30	Yes	FACU
3. Prunella vulgaris	20	No	FACU
4. Phalaris arundinacea	10	No	FACW
5. Cardamine oligosperma	5	No	FAC
6. Geranium molle	5	No	UPL
7.			
8.			
9.			
10.			
11.			
	115	= Total Cover	
Woody Vine Stratum (Plot size: 10 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	10	x2=	20
FAC species	50	x3=	150
FACU species	50	x4=	200
UPL species	5	x5=	25
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A= 3.43

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Multistoried vegetation canopy. Poa spp. could not be identified to species; assumed facultative. Newly developed site, plant species comprised of upland and wetland species. Sample plot does not meet any hydrophytic indicators.

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Subsurface soils were not evaluated due to no dig zone; soils assumed non-hydric based on lack of hydrophytic vegetation, wetland hydrology, and landscape position.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Property owner requested no soil pits be excavated; subsurface hydrology was not evaluated. Lack of subsurface hydrology presumed based on observed vegetation and landscape position.

Appendix C. Site Visit Photos

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Photo 1	Overview of Verification Plot 1 (VP-1); proposed eastern converter site location in The Dalles, Oregon.
Date: 11/08/23	
Direction: Northwest	

Photo 2	Overview of Verification Plot 2 (VP-2); near proposed eastern converter site location in The Dalles, OR.
Date: 11/08/23	
Direction: West	

Photo 3a	Looking downstream at an ephemeral drainage (Drainage 1) beneath Columbia View Drive, culvert occurs roughly 75 feet below road grade.
Date: 11/08/23	
Direction: Southwest	

Photo 3b	Looking upstream at an ephemeral drainage (Drainage 1) beneath Columbia View Drive, culvert occurs roughly 75 feet below road grade.
Date: 11/08/23	
Direction: Northeast	

Photo 4a	Looking upstream at an ephemeral drainage (Drainage 2) to Threemile Creek beneath Columbia View Drive; culvert present roughly 30-40 feet below road grade.
Date: 11/08/23	
Direction: East	

Photo 4b	Looking downstream at an ephemeral drainage (Drainage 2) to Threemile Creek beneath Columbia View Drive; culvert present roughly 30-40 feet below road grade.
Date: 11/08/23	
Direction: Northwest	

Photo 5	Looking downstream at an ephemeral drainage (Drainage 2) to Threemile Creek located west of OR-197.
Date: 11/08/23	
Direction: West	

Photo 6	Threemile Creek adjacent to the east of OR-197. Streambed occurs roughly 50 feet below road grade.
Date: 11/08/23	
Direction: Northwest	

Photo 7	Threemile Creek, looking upstream.
Date: 04/02/24	
Direction: South	

Photo 8	Looking upstream at Threemile Creek and Wetland 4. Mosaic of reed canary grass and broadleaf cattail occur within the ordinary high water mark.
Date: 04/02/24	
Direction: South	

Photo 9	Verification Plot 3 (VP-3); area determined to be upland.
Date: 04/02/24	
Direction: South	

Photo 10	Verification Plot 4 (VP-4); roadside depressional area determined to be upland.
Date: 04/02/24	
Direction: Northwest	

Photo 11	Human-excavated pit (Pit 1) created in uplands.
Date: 11/08/23	
Direction: Southeast	

Photo 12a	Verification Plot 5 (VP-5). Depressional area mapped by the NWI; area determined to be upland.
Date: 11/08/23	
Direction: South	

Photo 12b	Culvert placed beneath adjacent road grade, no signs of recent flow.
Date: 11/08/23	
Direction: North	

Photo 13	Verification Plot 6 (VP-6); depressional area determined to be upland.
Date: 11/08/23	
Direction: Southeast	

Photo 14	Overview of Columbia River shoreline within survey area in The Dalles.
Date: 11/08/23	
Direction: Northeast	

Photo 15	Verification Plot (VP-7); depressional area determined to be upland.
Date: 03/12/24	
Direction: East	

Photo 16	Verification Plot 8 (VP-8). Sample plot taken just outside survey area at NWI-mapped wetland boundary but not within wetland.
Date: 03/12/24	
Direction: Northwest	

Photo 17	Verification Plot 9 (VP-9); area determined to be upland.
Date: 03/12/24	
Direction: Southwest	

Photo 18	Sample Plot W1-P1 (W). Wetland 1 is a small depressional wetland with no outlet.
Date: 03/12/24	
Direction: West	

Photo 19	Wetland 1 looking east.
Date: 03/12/24	
Direction: East	

Photo 20	Sample Plot W2-P1 (W). Wetland 2A is a relatively large palustrine emergent wetland with a perennial pond.
Date 03/12/24	
Direction: Southeast	

Photo 21	Perennial pond within Wetland 2B boundary with surface water roughly 2-3 feet deep.
Date: 03/12/24	
Direction: South	

Photo 22a	Existing access road along the southern boundary of Wetland 2B. This area determined to be upland.
Date: 03/20/2025	
Direction: NW	

Photo 22b	Sample Plot W2-P3 (W). Large perennial pond within the boundary of Wetland 2B.
Date: 03/12/24	
Direction: Northwest	

Photo 23	Verification Plot 10 (VP-10). Small depressional area determined to be upland.
Date: 03/12/24	
Direction: West	

Photo 24	Sample Plot Area A-P1 (W) taken within suspect depressional area in human-made stormwater feature. Culvert discharge to 12-inch pipe to Columbia River shoreline. No evidence of flow observed.
Date: 03/11/24	
Direction: Southeast	

Photo 25a	Overview of Area A; Columbia River in background.
Date: 03/11/24	
Direction: Northeast	

Photo 25b	Overview of Area B.
Date: 03/11//24	
Direction: Southwest	

Photo 26	Sample Plot Area B-P1 (W) taken within suspect depressional area in human-made stormwater feature with no outlet. Geomembrane liner encountered 12 inches below ground surface.
Date: 03/11/24	
Direction: Southwest	

Photo 27	Columbia River shoreline within the survey area near the eastern landing site alternative at the Port of Portland.
Date: 03/11/24	
Direction: West	

Photo 28	Columbia River shoreline within the survey area near the western landing site alternative at the Port of Portland.
Date: 03/11//24	
Direction: East	

Photo 29	Verification Plot 11 (VP-11) at proposed western alternative landing site at the Port of Portland. Area determined to be upland.
Date: 03/11/24	
Direction: Northwest	

Photo 30	Verification Plot 12 (VP-12) taken at proposed western converter station site. Area determined to be upland.
Date: 03/11/24	
Direction: Northwest	

Photo 31	Columbia Slough high tide line.
Date: 03/11/24	
Direction: Northwest	

Photo 32	Roughly 24-inch culvert inlet to Wetland 3; a large stormwater feature. Signs of recent flow observed.
Date: 03/13/24	
Direction: East	

Photo 33	Shallow perennial pond (2-3 feet deep) within Wetland 3 boundary.
Date: 03/13/24	
Direction: Northwest	

Photo 34	A series of water channels conveys hydrology around Wetland 3.
Date: 03/13/24	
Direction: West	

Photo 35	Overview of Wetland 3 from near Sample Plot W3-P1 (W); palustrine emergent wetland with shrub/scrub fringe along northern boundary.
Date: 03/13/24	
Direction: Northwest	

Photo 36	A series of water channels conveys hydrology around Wetland 3.
Date: 03/13/24	
Direction: Southwest	

Photo 37a	Sample Plot W3-P3 (W) take at the edge of a large perennial pond with surface water roughly 2-3 feet deep.
Date: 03/13/24	
Direction: Northeast	

Photo 37b	Sample Plot W3-P3 (W); wetland condition changes rapidly to upland with elevation rise on graded slopes around depressional area.
Date: 03/11/24	
Direction: East	

Photo 38a	Sample Plot W3-P5 (W) taken at topographic break where wetland condition in depressional area transitions to upland on steeply graded slopes at wetland boundary.
Date: 03/13/24	
Direction: Northwest	

Photo 38b	Steeply graded slope around depressional stormwater feature create distinct break from wetland to upland condition.
Date: 03/13/24	
Direction: Northeast	

Photo 39	Stormwater feature near landing site on the east side of the Willamette River.
Date: 03/13/24	
Direction: Northeast	

Photo 40	High tide line of the Willamette River within survey area near Harborton Substation.
Date: 03/11/24	
Direction: Southeast	

Photo 41a	Sample Plot Area C-P2 (U) taken from top of large fill material stockpile excavated from wetland restoration project on adjacent property.
Date: 03/11/24	
Direction: Northeast	

Photo 41b	Overview of Area C. Wetland vegetation likely attributed to relic seed load in material excavated from wetland restoration project on adjacent property.
Date: 03/11/24	
Direction: Northwest	

Photo 42	Stormwater collection pond located south of Harborton substation.
Date: 03/11//24	
Direction: North	

Photo 43	Stormwater collection canal (Ditch 1) located south of Harborton substation. Parallels substation fence line outside southern fence boundary.
Date: 03/11//24	
Direction: North	

Photo 44	Stormwater collection canal (Ditch 2) located north of Harborton Substation.
Date: 03/11//24	
Direction: Northwest	

Photo 43	Stormwater collection canal (Ditch 1) located south of Harborton substation. Parallels substation fence line outside southern fence boundary.
Date: 03/11//24	
Direction: North	

Photo 44	Stormwater collection canal (Ditch 2) located north of Harborton Substation.
Date: 03/11//24	
Direction: Northwest	

Photo 45	Verification Plot 13 (VP-13) located south of Wetland 2A. This area determined to be wetland but occurs outside the survey area.
Date: 03/20/25	
Direction: Southwest	

Photo 46	Verification Plot 14 (VP-14) located south of Wetland 2A. This area determined to be wetland.
Date: 03/20/25	
Direction: Northwest	

Appendix D. WETS Tables

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WETS Table

WETS Station: THE DALLES, OR								
Requested years: 1992 - 2022								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	43.4	30.3	36.9	2.35	1.51	2.83	6	4.7
Feb	49.4	30.3	39.9	1.53	0.80	1.87	4	2.5
Mar	57.7	34.6	46.2	1.23	0.76	1.49	4	0.2
Apr	64.9	39.4	52.1	0.95	0.50	1.16	3	0.0
May	73.6	47.4	60.5	0.75	0.33	0.89	3	-
Jun	79.6	53.6	66.6	0.42	0.15	0.48	2	-
Jul	88.5	58.7	73.6	0.10	0.00	0.06	0	-
Aug	88.9	58.0	73.5	0.17	0.00	0.14	1	-
Sep	81.7	50.1	65.9	0.29	0.06	0.27	1	-
Oct	67.5	40.5	54.0	1.07	0.68	1.28	3	0.0
Nov	52.1	34.0	43.0	1.95	1.22	2.35	6	1.1
Dec	43.1	30.0	36.6	3.00	1.83	3.63	7	3.5
Annual:					-	-		
Average	65.9	42.2	54.1	-	-	-	-	-
Total	-	-	-	13.80			40	-

GROWING SEASON DATES			
Years with missing data:	24 deg = 13	28 deg = 11	32 deg = 11
Years with no occurrence:	24 deg = 0	28 deg = 0	32 deg = 0
Data years used:	24 deg = 18	28 deg = 20	32 deg = 20
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	Insufficient data	3/20 to 11/5: 230 days	4/11 to 10/19: 191 days
70 percent *	Insufficient data	3/11 to 11/14: 248 days	4/4 to 10/27: 206 days
* Percent chance of the growing season occurring between the Beginning and Ending dates.			

STATS TABLE - total precipitation (inches)													
Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1893	0.69	1.84	0.96	1.69	0.69	0.06	0.30	0.00	1.21	4.40	4.36	1.77	17.97
1894	4.84	1.83	3.73	0.64	0.47	1.15	0.10	T	1.02	2.08	0.51	1.65	18.02
1895	4.72	0.47	0.65	0.24	0.94	0.00	0.32	0.05	1.14	0.00	1.20	4.15	13.88
1896	3.45	0.72	1.00	0.95	0.63	0.10	T	0.28	0.42	0.60	5.87	2.74	16.76
1897	1.14	2.98	1.94	0.23	0.27	1.07	0.24	0.08	0.54	0.24	3.84	4.03	16.60
1898	M0.82	0.98	0.30	0.11	0.03	M0.90	0.17	0.02	0.85	0.13	2.13	1.14	7.58
1899	2.82	2.19	0.94	1.05	0.45	0.20	0.00	0.86	0.81	1.56	3.57	2.29	16.74
1900	1.90	M1.92	1.62	0.42	0.03	0.47	T	0.55	1.09	2.02	2.25	1.33	13.60

1901	3.46	4.15	0.68	0.09	0.39	0.20	T	0.16	1.84	0.13	1.69	3.04	15.83
1902	1.61	3.79	0.52	1.82	0.63	0.13	0.26	0.00	0.36	0.78	3.53	4.00	17.43
1903	2.87	0.47	0.56	0.23	0.05	2.11	0.12	0.11	0.15	1.10	M2.42	0.56	10.75
1904	M1.41	4.50	3.10	0.98	0.09	0.46	0.40	0.04	0.61	1.44	1.01	1.79	15.83
1905	3.27	0.51	0.63	0.18	0.66	1.27	0.19	0.10	1.19	1.88	0.84	1.07	11.79
1906	1.90	1.67	1.21	0.11	0.95	1.05	T	0.31	0.35	0.23	3.99	M2.87	14.64
1907	3.92	3.08	1.30	1.67	0.41	0.42	0.22	0.74	0.29	0.29	2.22	5.50	20.06
1908	1.06	0.77	1.50	0.17	0.92	0.10	0.36	0.16	0.03	1.42	0.48	1.21	8.18
1909	4.26	M1.39	M0.35	0.08	0.13	0.13	0.39	0.00	1.05	0.83	M4.39	3.09	16.09
1910	1.87	2.67	0.41	0.83	1.31	0.72	T	0.00	0.05	1.01	4.18	1.51	14.56
1911	1.23	0.56	0.22	0.21	0.80	0.30		0.00	2.92	0.33	1.19	1.23	8.99
1912	6.30	2.03	1.03	0.28	0.82	0.43	0.02	0.55					11.46
1913			0.71	0.69	0.92	1.55	0.09	T		1.65	2.21	M1.72	9.54
1914	3.33	1.06	0.30	M1.15	0.35	M0.79	0.01	0.00	1.24	1.22	1.06	0.91	11.42
1915	2.24	2.05	M1.59	0.42	1.63	0.00	0.76	0.00	0.22	0.52	3.95	2.49	15.87
1916	2.28	3.33	2.89	0.60	0.66	M0.98	1.28	0.01	0.18	0.30	1.20	1.83	15.54
1917	0.68	1.08	0.71	2.05	0.33	0.10	0.00	0.00	0.37	0.00	2.53	4.99	12.84
1918	2.42	1.87	0.14	0.24	1.16	0.00	0.24	0.30	1.40	2.18	1.03	1.01	11.99
1919	2.57	2.97	1.11	0.87	0.21	0.15	0.22	0.05	0.60	0.66	2.86	2.92	15.19
1920	2.22	0.00	0.82	0.98	0.07	0.69	0.10	0.54	1.05	0.65	2.82	2.94	12.88
1921	2.58	4.12	1.93	0.65	0.36	0.34	0.00	0.01	0.71	0.46	9.41	1.13	21.70
1922	1.00	0.74	1.12	0.50	0.01	0.09	0.00	0.58	0.17	1.30	M0.67	2.95	9.13
1923	M4.40	0.57	1.58	1.20	0.34	0.65	1.18	0.70	0.93	0.58	1.04	3.05	16.22
1924	1.81	1.39	0.35	0.02	0.00	0.41	0.15	0.18	0.20	1.32	3.35	1.15	10.33
1925	4.04	2.49	0.52	0.80	1.47	T	T	0.01	0.81	0.03	1.94	1.11	13.22
1926	1.71	3.06	T	0.18	0.62	0.00	T	0.23	0.44	0.75	5.50	1.42	13.91
1927	4.19	3.35	0.45	T	0.40	0.30	T	T	2.51	0.81	3.02	0.87	15.90
1928	3.50	0.23	2.92	1.04	T	0.54	0.12	0.00	0.09	0.15	1.81	2.61	13.01
1929	2.24	0.02	T	0.40	T	0.55	0.00	T	0.13	0.23	0.02	4.96	8.55
1930	2.18	1.85	0.88	0.20	0.12	0.12	0.00	0.03	0.21	1.06	1.60	0.75	9.00
1931	1.26	0.38	M1.63	0.50	T	1.35	0.00	MT	0.85	0.80	1.83	M1.38	9.98
1932	1.82	1.72	1.42	0.68	1.62	T	T	T	0.00	1.01	2.28	2.19	12.74
1933	1.52	1.07	0.99	T	1.34	0.45	0.00	T	0.84	1.04	1.07	4.79	13.11
1934	2.15	0.38	1.72	0.59	0.28	0.05	T	0.23	0.88	1.80	3.08	M2.87	14.03

1935	M0.36	0.52	M1.03	0.48	0.03	0.14	M0.08	0.02	0.44	M0.44	0.69	2.11	6.34
1936	5.07	1.90	0.63	0.19	M0.68	1.57	0.04	0.00	0.08	0.08	0.05	2.39	12.68
1937	2.62	2.49	1.28	1.09	0.09	2.19	0.29	0.71	0.25	0.58	3.11	4.56	19.26
1938	1.71	2.69	2.30	0.40	0.09	0.37	0.16	T	T	1.10	1.59	1.46	11.87
1939	0.66	1.35	1.18	T	0.28	0.33	M0.02	0.09	0.11	0.13	0.09	2.13	6.37
1940	M1.82	4.79	M2.54	1.01	0.20	0.24	0.14	0.00	1.38	1.43	1.76	M1.33	16.64
1941	M2.31	0.81	0.32	0.39	0.86	0.08	0.00	0.33	0.56	0.82	2.48	2.69	11.65
1942	1.53	2.80	0.09	0.26	1.25	0.30	0.02	0.08	0.00	0.26	5.10	3.96	15.65
1943	3.39	1.57	1.53	1.48	0.30	0.87	0.10	0.95	T	3.84	1.49		15.52
1944		M0.41	0.13	0.49	0.25	0.68	0.00	T	0.50	0.26	2.05	0.72	5.49
1945	1.43	1.72	0.61	0.57	2.05	T	T	0.03	0.22	0.65	3.33	3.91	14.52
1946	2.13	1.81	1.39	T	0.32	0.80	0.31	0.06	0.24	1.50	2.11	0.92	11.59
1947	1.45	0.99	1.07	0.95	0.03	2.81	0.41	0.01	1.14	3.15	1.60	0.76	14.37
1948	3.31	2.80	1.67	0.59	1.04	M1.97	M0.30	0.20	1.60	0.46	3.15	3.88	20.97
1949	0.43	3.45	1.27	0.03	0.57	0.17	0.03	T	0.27	0.49	2.48	0.93	10.12
1950	5.57	1.79	2.03	0.51	0.12	0.40	T	0.02	0.70	3.98	3.28	3.42	21.82
1951	M3.94	2.39	2.10	0.22	0.90	0.43	0.03	0.41	0.35	2.45	1.80	2.87	17.89
1952	2.65	1.90	0.35	0.05	0.78	1.21	0.00	0.00	M0.07	0.01	0.39	2.81	10.22
1953	6.18	1.98	0.62	0.63	1.59	0.50	0.00	0.71	0.02	0.58	2.68	3.47	18.96
1954	5.59	0.60	0.65	0.28	0.63	0.58	0.10	0.08	0.47	0.84	1.36	0.88	12.06
1955	0.57	0.43	1.92	1.26	0.37	0.38	0.21	0.00	0.64	2.39	3.58	4.72	16.47
1956	6.57	1.24	0.91	0.06	0.54	0.57	0.00	0.49	0.49	0.88	0.23	1.34	13.32
1957	1.29	1.88	3.84	0.66	0.21	0.02	0.07	0.14	0.56	1.81	0.93	3.74	15.15
1958	3.15	3.11	1.00	1.24	0.32	1.47	T	T	0.21	0.20	3.03	1.88	15.61
1959	2.36	1.56	1.35	0.10	0.33	0.17	T	0.00	0.94	1.12	0.54	0.48	8.95
1960	1.92	2.06	3.20	1.17	1.26	0.06	T	0.18	0.15	0.85	3.51	1.44	15.80
1961	1.76	4.24	2.40	0.87	1.01	0.54	0.17	0.26	0.30	1.15	2.42	3.19	18.31
1962	0.55	2.01	1.83	0.94	1.04	0.02	0.00	0.72	0.49	2.80	1.49	1.72	13.61
1963	0.65	2.35	1.28	1.33	M0.41	0.04	0.04	0.14	0.66	0.40	2.55	1.62	11.47
1964	3.18	0.13	0.55	0.15	0.02	0.69	0.06	0.14	T	0.53	3.19	9.05	17.69
1965	3.05	0.41	1.56	0.99	0.30	0.36	0.13	0.60	0.15	0.25	2.37	0.73	10.90
1966	3.77	0.65	1.12	T	0.27	0.11	0.75	0.00	0.79	0.84	2.76	3.41	14.47
1967	2.03	0.20	0.99	1.21	0.10	0.30	0.00						4.83
1968													
1969													
1970													

1971													
1972													
1973													
1974													
1975		2.72	1.66	0.98	0.10	0.65	0.26	0.86	0.00	1.87	2.15	2.80	14.05
1976	1.33	1.79	1.08	0.96	0.24	0.13	0.14	0.56	0.24	0.26	0.56	0.33	7.62
1977	0.42	0.76	0.45	T	0.83	0.30	0.30	0.84	0.68	0.20	3.14	5.94	13.86
1978	3.21	1.91	0.62	0.69	0.41	T	0.20	0.90	0.58	0.12	0.83	1.56	11.03
1979	1.55	2.12	0.79	0.85	0.16	0.13	0.04	1.17	0.48	2.29	1.81	1.31	12.70
1980	5.43	2.40	1.02	1.32	0.19	0.86	0.00	0.09	0.39	0.72	2.00	5.24	19.66
1981	1.52	2.51	0.29	0.17	0.61	1.53	1.04	0.00	1.03	1.00	1.99	6.43	18.12
1982	M1.80	M1.79	0.65	1.01	0.25	0.29	M0.04	0.16	1.90	2.33	1.21	3.91	15.34
1983	3.41	4.32	3.21	0.46	0.45	0.11	0.38	1.77	0.89	0.58	3.78	M3.28	22.64
1984	0.97	1.81	1.72	0.99	0.76	0.76	0.00	0.00	0.48	1.26	4.32	1.29	14.36
1985	0.08	1.06	1.00	0.12	0.30	0.89	0.02	0.29	0.43	M0.75	1.10	1.73	7.77
1986	3.97	4.87	0.99	0.12	0.43	0.12	0.15	0.07	M1.11	0.47	1.90	1.13	15.33
1987	M2.62	2.16	1.29	0.48	0.51	M0.06	0.57	0.07	0.02	0.05	0.83	5.38	14.04
1988	2.44	0.17	0.91	1.48	0.15	1.11	0.08	T	0.18	T	3.47	0.59	10.58
1989	1.99	0.58	1.89	0.87	0.57	0.44	0.16	0.85	0.10	0.70	0.68	1.25	10.08
1990	3.28	0.58	0.71	1.72	1.84	0.35	0.07	1.22	0.13	0.69	0.96	1.48	13.03
1991	1.46	M0.95	1.51	0.92	M0.42	0.39	0.00	0.26	0.00	1.99	2.82	1.03	11.75
1992	1.07	2.90	0.30	1.87	T	0.15	M0.00	0.11	0.44	0.68	2.43	3.69	13.64
1993	M1.56	0.91	1.45	0.99	1.37	0.55	0.10	M0.01	0.02	0.35	0.35	1.87	9.53
1994	2.30	M3.06	0.96	0.75	0.92	0.51	0.00	0.03	0.01	3.42	2.17	1.67	15.80
1995	5.12	2.33	1.06	1.67	1.04		1.32	0.19	1.03	0.82	4.23	3.08	21.89
1996	M5.69	3.98	1.46	1.33	0.65		0.05	T	0.55	1.34	2.11	6.82	23.98
1997	3.97	1.63	2.03	1.08	0.51	0.55	T	0.45	0.23	1.98	0.79	0.68	13.90
1998	2.95	1.62	1.30	0.85					1.03	0.39	2.44	3.49	14.07
1999	2.11			0.12	0.43	0.18	0.07	0.34	0.00	0.90	2.59	M0.98	7.72
2000	M2.91	3.85	M0.93	0.40	0.61	0.11	T	0.00	0.04			0.99	9.84
2001	0.78	0.39	1.03	0.45			0.15		M0.12	1.16	3.66	2.32	10.06
2002	1.39	1.32	0.96	0.43	0.35								4.45
2003	M3.31	1.26	3.02	1.24	0.24	T	0.00	0.29	0.11	0.65	1.70		11.82
2004		M1.26	0.51	0.70	0.47	1.04	0.02	M0.69		0.70	0.24	1.01	6.64
2005	1.03	0.24	1.80	0.74	1.75		T	T		1.09			6.65
2006	4.26	M1.74	0.81	0.93	1.08	0.71		T	T	0.41	M4.44	3.59	17.97

2007	1.48	0.90	0.77	M0.28	0.27	0.17	0.04	M0.38	0.10	1.00	3.05		8.44
2008		1.38		M0.39	M0.36	0.15	0.03			0.49	2.23		5.03
2009			1.37	0.43	M1.16	0.10	0.00	0.02	0.10	0.69	1.30	5.28	10.45
2010	3.95	M1.30	M0.34	0.64	1.06	1.31	T	0.04	M0.62	1.30	1.62	5.69	17.87
2011	1.35	0.26	2.83	3.52	2.03	0.07	0.40	T	T	0.71	1.29	2.18	14.64
2012	1.97	1.49	1.68	1.12	0.42	0.97	T	0.00	0.00	1.74	1.75	3.33	14.47
2013	0.42	0.31	1.99	0.73	1.58	0.85	0.00	0.47	1.09	0.42	1.07	1.52	10.45
2014	1.62	3.70	2.09	1.37	0.76	0.23	0.45	0.24	0.17	2.01	1.82	M2.04	16.50
2015	2.34	1.39	0.62	0.19	0.25			M0.03	0.04	0.61	M0.00	M6.87	12.34
2016	3.20	1.25	1.80	0.29	M0.00	0.09		M0.00	0.01	2.53	1.40	M1.34	11.91
2017	M0.14	M1.82	2.29	1.60	0.21	0.37	0.00	0.06	M0.72	1.68	2.05	M1.44	12.38
2018	1.38	M0.49	0.93	1.03	0.04	M0.20	0.00	0.00	0.04	0.90	0.95	2.85	8.81
2019	2.01	M0.84	T	1.77	0.06	0.01	0.03	1.04	1.20	0.61	0.51	2.17	10.25
2020	2.94	0.36	0.22	0.52	1.58	0.36	T	T	0.04	0.63	2.70	2.25	11.60
2021	1.72	M0.64	0.23	0.07	0.03	0.02	0.00	0.00	0.25	1.00	1.99	2.72	8.67
2022	0.70	0.31	1.01	1.91	1.77	1.10	0.03	0.00	0.21	0.69	1.69	8.15	17.57
2023	2.23	0.55		1.49	0.29	0.00	0.00	0.00	1.01	0.58	1.83	5.61	13.59
2024	M2.19	1.63	0.87	0.26	0.59								5.54
Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.													
Data missing for all days in a month or year is blank.													
Creation date: 2024-06-07													

WETS Table

WETS Station: PORTLAND INTL AIRPORT, OR								
Requested years: 1992 - 2022								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	47.1	36.3	41.7	5.17	3.88	6.04	13	1.6
Feb	50.6	36.4	43.5	3.65	2.28	4.41	9	1.5
Mar	56.3	39.7	48.0	3.84	2.75	4.54	11	0.1
Apr	61.6	43.5	52.5	2.86	1.93	3.41	9	0.1
May	68.9	49.5	59.2	2.45	1.31	3.00	7	0.0
Jun	74.2	54.4	64.3	1.64	1.00	1.98	5	0.0
Jul	81.6	58.7	70.2	0.49	0.21	0.55	1	0.0
Aug	82.1	59.0	70.5	0.50	0.16	0.54	2	0.0
Sep	76.2	54.3	65.2	1.60	0.79	1.92	4	0.0
Oct	64.0	46.9	55.5	3.48	2.31	4.17	8	0.0
Nov	52.9	40.6	46.8	5.44	3.74	6.49	12	0.0
Dec	46.2	36.0	41.1	5.92	4.30	6.98	13	1.3
Annual:					32.49	40.76		
Average	63.5	46.3	54.9	-	-	-	-	-
Total	-	-	-	37.04			94	4.6

GROWING SEASON DATES			
Years with missing data:	24 deg = 0	28 deg = 0	32 deg = 0
Years with no occurrence:	24 deg = 10	28 deg = 0	32 deg = 0
Data years used:	24 deg = 31	28 deg = 31	32 deg = 31
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	1/14 to 1/7: 358 days	2/9 to 12/7: 301 days	3/18 to 11/18: 245 days
70 percent *	No occurrence	1/31 to 12/16: 319 days	3/13 to 11/23: 255 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

STATS TABLE - total precipitation (inches)

Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1938				2.10	0.57	0.34	0.17	0.49	1.18	2.58	4.26	4.78	16.47
1939	5.47	5.49	2.36	0.27	1.09	1.42	0.78	1.62	0.55	2.14	1.73	9.22	32.14
1940	2.56	11.41	4.95	3.29	1.60	0.02	0.80	0.06	3.54	4.13	4.53	4.85	41.74
1941	5.27	1.59	1.74	1.66	4.27	0.81	0.03	1.45	3.58	2.18	5.04	9.11	36.73
1942	3.63	M3.53	1.63	2.38	2.84	1.94	1.40	0.17	0.06	3.49	11.57	9.37	42.01
1943	5.50	3.27	5.54	2.21	1.42	2.80	0.32	1.39	0.06	5.59	M2.20	2.70	33.00
1944	2.81	3.11	1.93	2.28	1.07	0.81	0.06	0.03	2.73	1.64	5.00	1.90	23.37
1945	4.10	4.36	5.30	2.42	4.57	0.07	0.51	0.37	3.96	2.11	8.58	5.61	41.96

1946	5.12	4.99	4.23	0.78	1.24	1.91	1.08	0.18	1.15	4.81	7.57	5.47	38.53
1947	3.72	2.77	4.11	1.81	0.66	2.93	0.94	0.29	1.06	8.04	4.08	4.64	35.05
1948	5.87	5.02	4.24	3.41	3.76	1.42	0.32	1.55	3.28	2.39	6.89	8.06	46.21
1949	1.02	9.46	2.78	0.72	2.12	0.68	0.91	0.24	1.66	2.35	5.56	4.86	32.36
1950	10.10	5.77	4.76	2.74	0.57	2.50	0.50	0.72	1.45	7.00	8.67	6.31	51.09
1951	7.71	5.02	3.86	1.14	1.75	0.03	0.28	0.02	2.55	6.81	5.31	5.06	39.54
1952	4.40	3.59	3.82	1.45	0.78	2.23	T	0.18	0.33	0.72	1.44	6.76	25.70
1953	12.83	3.71	3.82	1.89	3.45	2.04	0.03	1.79	1.16	3.56	6.46	7.85	48.59
1954	8.95	4.57	2.55	2.54	1.83	3.58	1.24	1.92	0.85	3.40	5.09	5.01	41.53
1955	2.30	3.37	3.06	4.72	1.24	1.83	0.89	T	2.86	6.69	7.34	10.14	44.44
1956	11.66	2.04	4.30	0.53	2.50	2.03	0.01	2.56	1.12	5.10	1.47	3.64	36.96
1957	2.23	4.14	7.52	1.84	1.97	0.73	0.19	0.69	0.49	3.53	3.07	6.15	32.55
1958	6.56	5.13	2.20	3.33	1.35	3.04	T	0.02	1.05	1.49	6.39	5.06	35.62
1959	7.57	4.18	3.22	0.92	2.89	2.38	0.56	0.09	2.81	3.51	3.30	3.08	34.51
1960	3.93	4.00	4.77	3.33	3.37	0.52	T	1.00	1.37	2.39	8.63	2.61	35.92
1961	4.50	8.92	6.04	3.59	2.80	0.47	0.42	1.07	0.64	2.89	4.67	5.94	41.95
1962	1.58	3.43	4.25	3.15	2.56	0.78	0.06	1.49	1.66	3.31	9.32	2.59	34.18
1963	2.27	3.48	4.69	3.78	2.74	1.71	1.17	0.87	0.75	3.04	5.64	3.60	33.74
1964	9.51	0.78	2.28	1.56	1.04	1.96	0.68	0.90	1.61	0.84	6.78	9.92	37.86
1965	7.44	2.22	1.10	2.20	1.31	0.83	0.44	0.73	0.01	2.03	5.64	7.34	31.29
1966	5.74	1.70	4.71	0.85	0.91	1.02	1.19	0.59	1.70	3.06	5.50	6.89	33.86
1967	6.21	2.02	4.31	2.17	1.02	1.01	0.00	T	0.76	4.72	2.27	4.75	29.24
1968	4.58	6.64	2.68	1.91	3.63	2.20	0.14	4.53	2.20	5.03	6.23	11.12	50.89
1969	7.60	3.14	1.13	2.28	1.61	2.99	0.14	0.04	3.86	3.02	3.18	8.12	37.11
1970	11.81	4.77	2.58	2.94	1.55	0.49	0.05	T	1.10	2.85	5.72	7.49	41.35
1971	7.09	3.36	4.87	2.72	1.00	1.76	0.26	0.95	3.53	2.37	5.76	8.05	41.72
1972	5.71	4.08	5.41	2.98	2.23	0.68	0.56	0.67	3.06	0.87	3.78	8.79	38.82
1973	3.69	1.94	2.45	1.33	1.43	1.45	0.06	1.41	3.29	3.14	11.55	9.93	41.67
1974	8.51	4.61	5.65	1.76	1.74	0.80	2.01	0.07	0.21	2.14	6.73	6.05	40.28
1975	8.43	4.75	3.45	1.88	1.35	1.13	0.43	2.10	T	4.76	4.10	6.68	39.06
1976	5.14	4.92	2.93	2.34	2.29	0.78	0.66	3.29	0.73	1.48	0.77	1.38	26.71
1977	1.07	2.49	3.50	1.04	4.30	0.83	0.39	3.26	3.33	2.28	5.56	8.98	37.03
1978	4.85	3.28	1.49	3.96	3.17	1.69	1.36	2.05	2.07	0.36	3.83	2.51	30.62
1979	2.55	6.53	2.51	2.47	2.41	0.64	0.25	1.18	1.75	4.85	3.38	7.23	35.75

1980	8.51	4.01	3.11	2.58	2.19	2.50	0.19	0.39	1.56	1.18	6.47	9.72	42.41
1981	1.47	3.86	2.33	1.79	2.25	3.23	0.24	0.15	1.86	4.12	4.62	8.37	34.29
1982	6.31	5.98	2.38	3.56	0.46	1.66	0.94	1.66	3.98	4.44	3.51	8.16	43.04
1983	6.23	7.78	6.80	1.87	1.30	1.95	2.68	2.29	0.39	1.95	8.65	5.30	47.19
1984	2.01	3.93	3.19	3.20	3.41	4.06	T	0.09	1.46	3.85	9.74	2.56	37.50
1985	0.06	1.79	3.08	1.07	1.52	2.34	0.55	0.48	2.76	2.75	3.89	2.19	22.48
1986	4.65	5.31	2.60	1.91	2.19	0.23	1.20	0.10	4.30	1.99	6.26	4.30	35.04
1987	6.93	2.45	4.91	1.94	1.63	0.14	1.03	0.35	0.30	0.27	1.96	8.00	29.91
1988	4.95	1.17	3.13	4.57	2.53	2.34	0.69	0.10	1.76	0.19	7.92	2.37	31.72
1989	3.30	2.84	6.73	2.08	2.87	0.78	0.91	1.07	1.48	1.73	3.18	3.08	30.05
1990	7.95	3.43	2.52	2.31	2.37	1.94	0.32	0.95	0.34	4.65	3.68	2.40	32.86
1991	2.56	3.65	4.64	4.05	3.34	2.31	0.07	0.70	0.02	1.51	6.36	4.34	33.55
1992	4.31	4.12	1.87	3.82	0.10	0.60	0.67	0.49	1.12	2.87	4.55	4.98	29.50
1993	3.06	0.72	4.39	5.26	4.36	1.69	2.41	0.37	T	1.59	1.50	5.01	30.36
1994	3.56	4.92	1.84	1.91	0.56	1.67	0.07	0.13	1.13	8.41	5.91	4.85	34.96
1995	5.56	3.19	3.82	3.49	1.65	2.62	1.23	0.81	1.31	3.15	10.74	5.91	43.48
1996	7.15	10.03	3.24	5.12	4.88	0.44	0.73	0.25	3.05	5.38	9.58	13.35	63.20
1997	7.32	1.63	7.14	3.73	3.63	2.83	0.52	1.58	1.98	6.40	4.02	3.03	43.81
1998	6.77	5.27	4.06	1.04	5.55	1.73	0.59	T	1.09	2.16	11.02	6.74	46.02
1999	6.63	8.73	4.03	1.56	1.97	1.73	0.51	0.75	0.10	2.44	6.81	3.62	38.88
2000	5.66	4.50	3.21	1.82	2.70	1.19	0.15	0.12	1.67	3.25	2.46	3.47	30.20
2001	1.47	1.29	3.11	2.85	0.91	1.79	0.95	0.74	0.70	3.12	6.89	6.62	30.44
2002	6.22	3.55	3.40	2.34	1.86	1.57	0.19	0.04	1.54	0.63	1.91	8.00	31.25
2003	7.64	2.37	5.75	4.37	1.49	0.31	T	0.19	0.85	3.01	4.09	7.45	37.52
2004	4.86	3.95	1.53	1.01	1.78	1.12	0.04	2.68	1.03	3.36	2.38	3.91	27.65
2005	1.94	1.30	3.77	3.49	4.34	2.21	0.41	1.05	1.70	3.39	4.98	7.52	36.10
2006	10.92	2.15	2.96	2.46	3.00	0.92	0.47	0.10	0.86	1.39	11.92	5.85	43.00
2007	2.72	3.47	3.20	2.01	1.45	1.08	0.55	0.46	2.04	3.26	4.25	7.57	32.06
2008	4.71	2.19	3.71	2.08	2.02	1.00	0.29	1.23	0.48	1.74	4.15	3.52	27.12
2009	4.50	1.36	3.36	2.31	3.26	1.30	0.34	0.76	1.40	3.02	5.13	3.76	30.50
2010	4.94	2.76	3.58	2.92	4.68	4.27	0.59	0.23	3.36	3.87	6.63	8.35	46.18
2011	4.73	4.28	6.43	5.04	2.92	0.73	0.96	0.17	0.62	2.14	6.57	2.51	37.10
2012	6.82	2.83	7.89	3.25	3.37	4.10	0.21	T	0.04	6.14	8.23	7.56	50.44
2013	3.49	1.26	1.46	2.19	4.75	1.35	T	0.78	5.62	1.15	3.05	1.62	26.72

2014	2.70	5.12	7.52	3.03	2.39	2.33	1.05	0.01	0.98	5.94	2.99	6.05	40.11
2015	3.33	3.71	4.71	1.75	0.59	0.40	0.57	0.66	1.26	3.69	4.49	15.24	40.40
2016	7.23	4.10	4.73	1.96	1.72	1.42	0.66	0.09	1.69	8.31	6.83	4.61	43.35
2017	4.13	10.36	7.26	4.51	1.92	1.08	T	0.06	2.38	4.57	6.44	3.09	45.80
2018	5.36	1.86	2.50	3.34	0.17	1.03	0.02	0.06	1.59	3.43	2.86	5.08	27.30
2019	2.79	4.10	1.54	2.98	1.51	0.45	0.80	1.23	3.85	1.51	1.52	4.39	26.67
2020	7.58	1.55	2.43	0.79	2.21	3.51	0.05	0.38	2.06	1.51	5.28	5.09	32.44
2021	7.03	3.73	1.55	0.39	0.58	1.25	T	0.05	3.76	3.72	6.43	7.10	35.59
2022	5.10	2.77	2.96	5.73	3.78	3.09	0.17	T	0.31	3.18	5.17	7.76	40.02
2023	3.34	2.49	4.36	5.08	0.91	1.21	T	0.62	1.25	2.49	5.27	8.73	35.75
2024	9.43	4.29	2.70	1.79	2.44	M1.04							21.69
Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.													
Data missing for all days in a month or year is blank.													
Creation date: 2024-06-07													

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Appendix E. Streamflow Duration Assessment Method Forms

Streamflow Duration Field Assessment Form

Project # / Name Cascade Renewable Transmission Project		Assessor J. Maze, B. Darby	
Address BPA Celilo Substation, Columbia View Drive			Date Nov 8, 2023
Waterway Name Drainage 1		Coordinates at downstream end (ddd.mm.ss)	Lat. 45.599077 N Long. -121.111442 W
Reach Boundaries As viewed from Columbia View Drive			
Precipitation w/in 48 hours (cm) 0.9	Channel Width (m) 3-10	☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow 0

% of reach w/any flow (surface or hyporheic) 0

# of pools observed 0

Observations

Observed Wetland Plants (and indicator status):

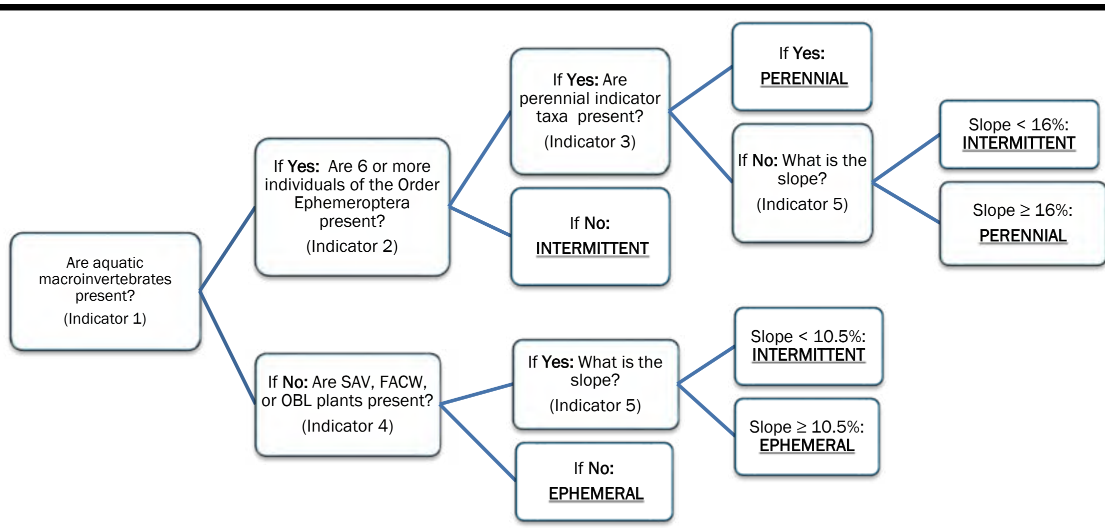
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemeroptera?	# of Individuals

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	______ %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding: ☒ Ephemeral ☐ Intermittent ☐ Perennial

Notes: (explanation of any single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.) Dry drainage feature occurs roughly 75 feet below road grade. No indicators of intermittent or perennial stream flow observed.

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

☐ Prolonged Abnormal Rainfall / Snowpack

☐ Below Average

☐ Above Average

☐ Natural or Anthropogenic Disturbance

☐ Other: ____________________________

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

Large quantities of rock were place at the entrance and exit of the culvert located roughly 75 feet below road grade. No sign of stream flow (debris rack, stream bed scour, rock/gravel sorting, etc.) was observed. Channel estimated to be 3-10 meters wide, no signs of bed and bank or wetland vegetation. No visible connection to downstream waters was found, appears to infiltrate to uplands roughly 0.9 miles north. Drainage is not mapped by the NWI or within hydric soils.

See Appendix A, Figure 6, Page 59 for map of drainage. Ground level photographs (Photos 3a and 3b) are found in Appendix C.

Ancillary Information:

☐ Riparian Corridor

☐ Erosion and Deposition

☐ Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

Streamflow Duration Field Assessment Form

Project # / Name Cascade Renewable Transmission Project	Assessor J. Maze, B. Darby
Address BPA Celilo Substation, Columbia View Drive	Date Nov 8, 2023
Waterway Name Drainage 2	Coordinates at downstream end (ddd.mm.ss) Lat. 45.591017 N
Reach Boundaries As viewed from Columbia View Drive & US-197	Long. -121.125175 W

Precipitation w/in 48 hours (cm) 0.9	Channel Width (m) 3-10	☐ Disturbed Site / Difficult Situation (Describe in "Notes")

Observed Hydrology

% of reach w/observed surface flow_0_____

% of reach w/any flow (surface or hyporheic) _0_____

# of pools observed_0_____

Observations

Observed Wetland Plants (and indicator status):

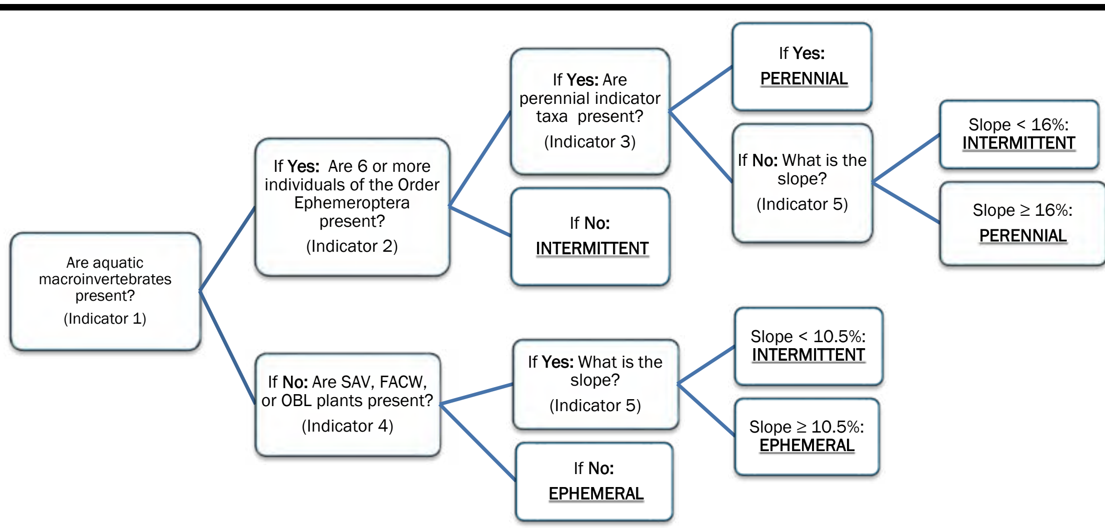
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemeroptera?	# of Individuals

Indicators

	Yes	No
1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	______ %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding: ☒ Ephemeral ☐ Intermittent ☐ Perennial

Notes: (explanation of any single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.) Dry drainage crosses survey area via culverts beneath Columbia View Drive and US-197. No indicators of perennial or intermittent streams observed.

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: ____________________________

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

Drainage 2 crosses the survey area in two places, once at m View Drive and once along US-197. No sign of stream flow (debris rack, stream bed scour, rock/gravel sorting, etc.) was observed in either drainage. Both channels estimated to be 3-10 meters wide, no signs of bed and bank or wetland vegetation. The drainage connects to Threemile Creek roughly 0.25 miles downstream to the northwest. Both sections of the drainage that occur in the survey area are mapped in the NWI as a R4SBC stream. Drainage is not mapped within hydric soils.

See Appendix A, Figure 6, Page 54 and 55 for map of drainage. Ground level photographs (Photos 4a. 4b. and 5) are found in Appendix C.

Ancillary Information:

- ☐ Riparian Corridor
- ☐ Erosion and Deposition
- ☐ Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

Streamflow Duration Field Assessment Form

Project # / Name	Cascade Renewable Transmission Project	Assessor	J. Maze, B. Darby
Address	South of I-84, east of US-197	Date	Nov 8, 2023
Waterway Name	Threemile Creek	Coordinates at downstream end (ddd.mm.ss)	Lat. 45.601748 N
Reach Boundaries	South of I-84 and west of US-197		Long. -121.141884 W
Precipitation w/in 48 hours (cm)	0.9	Channel Width (m) 3-7	☐ Disturbed Site / Difficult Situation (Describe in "Notes")

Observed Hydrology

% of reach w/observed surface flow_100%

% of reach w/any flow (surface or hyporheic)_100%

# of pools observed__0_____

Observations

Observed Wetland Plants (and indicator status):

Phalaris arunidinacea (FACW)
Typha latifolia (OBL)

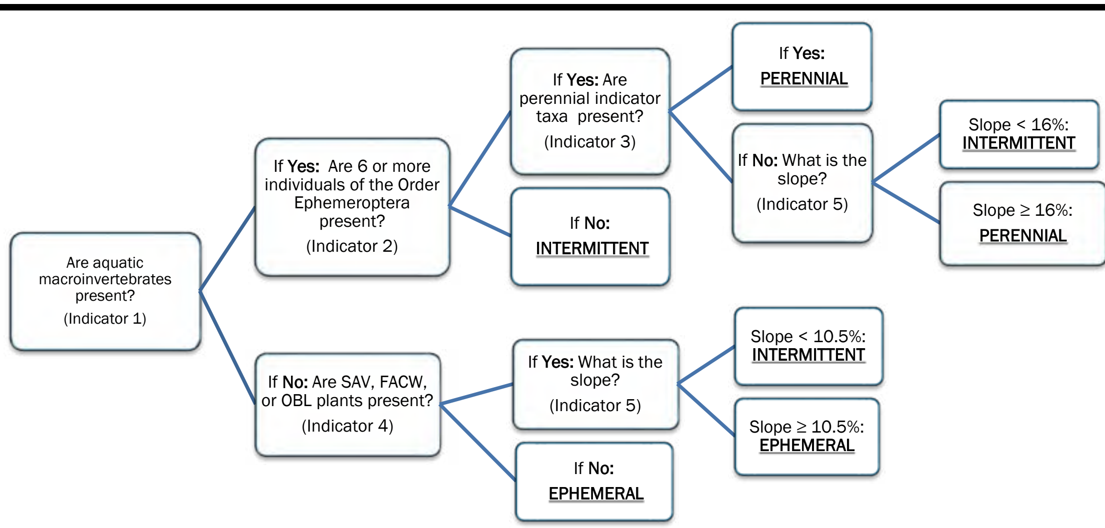
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemeroptera?	# of Individuals
Leptohyphidea	1	Yes	4
Leptoceridae	1	No	9

Indicators

1. Are aquatic macroinvertebrates present?	[X] Yes	☐ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	[X] Yes	☐ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	[X] No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	[X] Yes	☐ No
5. What is the slope? (In percent, measured for the valley, not the stream)	___10___ %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☐ Ephemeral
[X] Intermittent
☐ Perennial

Notes: (explanation of any single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.) Intermittent stream with macroinvertebrates and hydrophytic vegetation.

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

☐ Prolonged Abnormal Rainfall / Snowpack

☐ Below Average

☐ Above Average

☐ Natural or Anthropogenic Disturbance

☐ Other: ____________________________

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

Threemile Creek crosses the survey area in multiple places across varied gradients. OHWM ranged between 13 to 32 feet wide, averaging 17 feet wide across multiple measurements. Stream bed substrate was mainly comprised of cobbles and sorted gravels in the upper reaches of the survey area and unconsolidated stream bottom in the lower reaches. Threemile Creek discharges to th Columbia River roughly 1,300 feet downstream to the northwest. The stream is mapped in the NWI as a PSS1C wetland within the survey area. Stream is not mapped within hydric soils.

See Appendix A, Figure 5, Page 49-53 for maps of Threemile Creek. Ground level photographs (Photos 4a. 4b. and 5) are found in Appendix C.

Ancillary Information:

☐ Riparian Corridor

☐ Erosion and Deposition

☐ Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

References

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Attachment 3. Letters from Water Providers

-------- Original message --------

From: "O'Longaigh, David" <David.OLongaigh@portlandoregon.gov>
Date: 7/11/24 12:17 AM (GMT+00:00)
To: Chris Hocker <chocker@powerbridge.us>
Subject: Cascade Renewable Transmission

Christopher Hocker,
Vice-President,
Cascade Renewable Transmission,
Fairfield, CT.

July 10th, 2024.

Dear Mr. Hocker,

Thank you for the enquiry and information about the Cascade Renewable Transmission Project, which is expected to begin construction in Portland in the near future and be completed by 2028.

Please rest assured that the City of Portland Title 33.651.020 code ensures that all development in Portland will be served with water facilities with adequate capacity and pressure to serve the proposed development. We look forward to meeting your specific needs. City Title 21.12 further informs how the Water Bureau serves your need.

We also have a City bureau dedicated to serving development needs called Portland Permit and Development (PPD). They are in downtown Portland at the 1900 SW 4th Ave, plus they also have an online presence at www.Portland.gov/ppd. I urge you to connect with this bureau for an Early Assistance (EA) meeting, particularly the *zoning & infrastructure bureau* meeting type, where the city can review your proposal and provide you with holistic pre-application guidance on any challenges you may face.

Information on how to apply for an Early Assistance meeting can be found on the PPD website at www.Portland.gov/ppd/zoning-land-use/early-assistance, or by calling (503) 823 7300.

I look forward to hearing and seeing more about this important and critical project. If you have questions, please do not hesitate to contact me.

David O’Longaigh PE, SE (He/Him)
Engineering Manager
Portland Water Bureau
(503) 823 8498 Cellular

www.Portland.gov/water

Visit the Water Bureau’s Equity IDEA Library
Visit the Water Bureau’s Green Team Resource library
It’s code red for humanity. Let’s rise to the Climate Emergency.

From: Dave Anderson <danderson@ci.the-dalles.or.us>
Sent: Monday, July 1, 2024 8:57 AM
To: Chris Hocker <chocker@powerbridge.us>
Cc: Cavanagh, Suzy <suzy.cavanagh@hdrinc.com>; Susan Brown <sbrown@powerbridge.us>; Eric Hansen <ehansen@ci.the-dalles.or.us>; Dale McCabe <dmccabe@ci.the-dalles.or.us>
Subject: RE: Cascade Renewable Transmission Project Water Needs
Importance: High

Chris-

Good morning. This email is in response to the email and letter you sent me dated June 25, 2024 inquiring about water availability from City of The Dalles (City) for the Cascade Renewable Transmission Project (Project). With this letter, I am confirming that, short of an unanticipated water supply emergency such as equipment failure or natural disaster, the City has the capacity to supply the requested 343,056 gallons of potable water from the City municipal water system over a period of 30 months without impacting the City's ability to provide water to other users. The rate of water withdrawal from the City system may be limited (100-200 gpm) depending on the point of service that is selected. The City does not currently have water distribution systems to the BPA Starr Complex, so the Project would need to make provisions to haul water from a City-approved point of service such as a fire hydrant. The Project would need to sign up for the appropriate water service with the City and pay the applicable fees and rates in effect at the time of service.

I hope this information is helpful. Please let me know if something other than this email is needed to provide the requested confirmation. Thank you.

Dave Anderson
Public Works Director
City of The Dalles
1215 W 1st Street
The Dalles, OR 97058
(541) 506-2008

Attachment 4. Noise Sensitive Property Owners

List of Noise Sensitive Property Owners within One Mile of the Western Converter Station

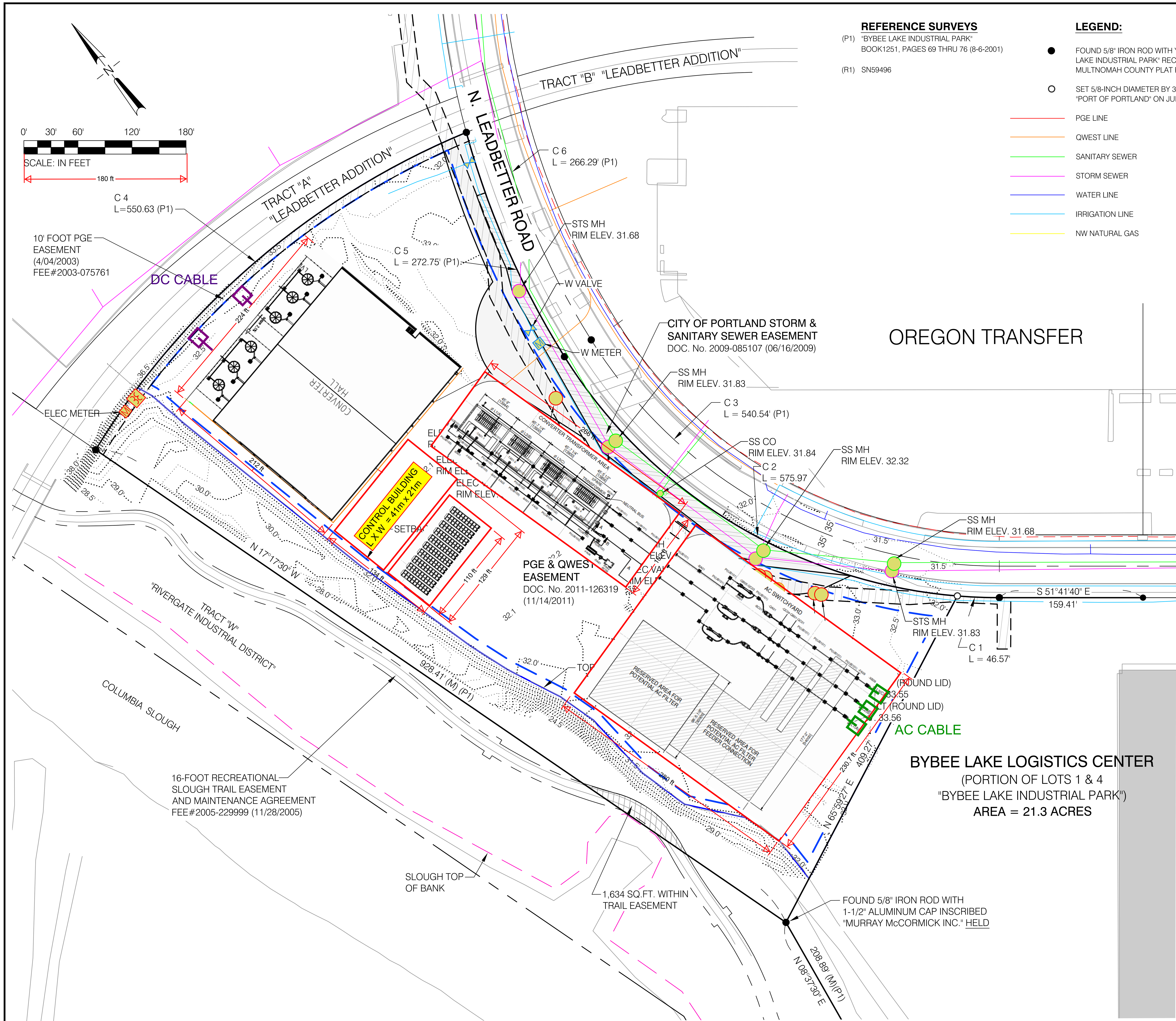
Receptor ID	Owner Name	Owner Mailing Address	Land Use	Distance from Site (ft)
W001	PORT OF PORTLAND	PO BOX 3529 PORTLAND OR 97208-3529	Trail	15
W002	N BYBEE LAKE COURT LLC	ATTN: TAX DEPARTMENT 1121 SW SALMON ST STE 500 PORTLAND OR 97205	Homeless services	573
W003	CITY OF PORTLAND	1120 SW 5TH AVE #858 PORTLAND OR 97204-1912	Park	1019

List of Noise Sensitive Property Owners within One Mile of the Eastern Converter Station

Receptor ID	Owner Name	Owner Mailing Address	Land Use	Distance from Site (ft)
E001	HAYNES DAVID R & DIANA C	PO BOX 53 THE DALLES Oregon 97058	Residence	1025
E002	ANDERSON WILLIAM J & DELINDA J	3671 FIFTEEN MILE RD THE DALLES Oregon 97058	Residence	1015
E003	LARSEN HARRY A & MARY JO	3675 FIFTEEN MILE RD THE DALLES Oregon 97058	Residence	1033
E004	CREW BENJAMIN P & JESSICA L	3679 FIFTEEN MILE RD THE DALLES Oregon 97058	Residence	1153
E005	BANKER WALTER D & RUBY K	3683 FIFTEEN MILE RD THE DALLES Oregon 97058	Residence	1233
E006	STARKS-THOMSON SARAH	3687 FIFTEEN MILE RD THE DALLES Oregon 97058	Residence	1358
E007	GILBERT KAREN L	636 SUMMIT RIDGE DR THE DALLES Oregon 97058	Residence	5315
E008	WILSON SHERRIE	PO BOX 2022 THE DALLES Oregon 97058	Residence	5284
E009	SALVATION ARMY THE	PO BOX 1970 THE DALLES Oregon 97058	Residence	5248
E010	KUMM KEVIN	616 SUMMIT RIDGE DR THE DALLES Oregon 97058	Residence	5215
E011	KANAME RYAN C	619 8TH AVE KIRKLAND Washington 98033	Residence	5199
E012	KISER JOHN J	602 SUMMIT RIDGE DR THE DALLES Oregon 97058	Residence	5189
E013	UNKNOWN OWNER 01	560 SUMMIT RIDGE DR THE DALLES Oregon 97058	Residence	5195
E014	CAEL DONALD E & LANA L	552 SUMMIT RIDGE DR THE DALLES Oregon 97058	Residence	5200
E015	HANOVER-URBAN LINDA	546 SUMMIT RIDGE DR E THE DALLES Oregon 97058	Residence	5208
E016	CAPEK HELENA	540 SUMMIT RIDGE DR THE DALLES Oregon 97058	Residence	5223
E017	WELLENSTEIN ROBERT H & HEATHER L TRUSTEES	5325 YORK HILL DR HOOD RIVER Oregon 97031	Residence	5250
E018	WALDEN ROBERT A & CONNIE E	526 SUMMIT RIDGE DR THE DALLES Oregon 97058	Veterans Home	5262
E019	BUDD DONALD L & MARLA R	520 SUMMIT RIDGE DR THE DALLES Oregon 97058	Residence	5295

Receptor ID	Owner Name	Owner Mailing Address	Land Use	Distance from Site (ft)
E020	STATE OF OREGON	700 SUMMER ST NE SALEM Oregon 97310-1201	Residence	3763
E021	WALLACE PETER G & LISA M	3720 COLUMBIA VIEW DR THE DALLES Oregon 97058	Residence	4085
E022	FERDERER WILLIAM T	3716 COLUMBIA VIEW DR THE DALLES Oregon 97058	Residence	4182
E023	JUPE STEPHEN L & LAURIE A	3712 COLUMBIA VIEW DR THE DALLES Oregon 97058	Residence	4279
E024	BARRAGAN JORGE C & LUPE T	3708 COLUMBIA VIEW DR THE DALLES Oregon 97058	Residence	4376
E025	BURFORD MARCIA E	3704 COLUMBIA VIEW DR THE DALLES Oregon 97058	Residence	4472
E026	MC GINNIS WILLIAM A & KAREN J	506 VETERANS DR THE DALLES Oregon 97058	Residence	4515
E027	SKILES SHAWN	PO BOX 32 DUFUR Oregon 97021	Residence	4540
E028	PECK TANISHA R & BRYAN J	502 VETERANS DR THE DALLES Oregon 97058	Residence	4563
E029	MORRELL LEROY T	3552 E 2ND ST THE DALLES Oregon 97058	Residence	5166
E030	PRINCEHOUSE ROCHELLE C	3554 E 2ND ST THE DALLES Oregon 97058	Residence	5099
E031	DOUTHIT REBECCA	3556 E 2ND ST THE DALLES Oregon 97058	Residence	5017
E032	MC KAY VIRGINIA	3558 E 2ND ST THE DALLES Oregon 97058	Residence	4941
E033	MYERS JACK F RLT	3560 E 2ND ST THE DALLES Oregon 97058	Residence	4887
E034	WESTERN OR CONF 7TH DAY ADVENTISTS	19800 OATFIELD RD GLADSTONE Oregon 97027-2546	Church	5008
E035	CELILO INN LLC	PO BOX 871538 VANCOUVER Washington 98687	Motel	4603
E036	VIEW POINT MHC LLC	1700 ADAMS AVE STE 212 COSTA MESA California 92626	RV Park	3292
E037	VAN EATON ARTHUR H & PATRICIA C	3655 FIFTEEN MILE RD THE DALLES Oregon 97058	Residence	1647
E038	BYERS MICHAEL G	3693 FIFTEEN MILE RD THE DALLES Oregon 97058	Residence	2185
E039	MINSON RONALD A & DENISE M	3735 FIFTEEN MILE RD THE DALLES Oregon 97058	Residence	2701
E040	TENOLD KAY K	1625 MONTANA THE DALLES Oregon 97058	Residence	4072
E041	BALDWIN LARRY & HELEN	3406 NE 252 AVE CAMAS Washington 98607	Residence	3344
E042	UNITED STATES OF AMERICA	UNDETERMINED PARTY_ADDRESS AUBURN Oregon 97058	Park	4035
E043	FULTON GARD & MAXINE LLC	9737 SW LYNWOOD TERRACE PORTLAND Oregon 97225	Residence	2694
E044	FULTON GARD & MAXINE LLC	9737 SW LYNWOOD TERRACE PORTLAND Oregon 97225	Residence	2973
E045	RUDDELL GEORGE I & MAVIS	3723 FIFTEEN MILE RD THE DALLES Oregon 97058	Residence	3262
E046	BATHKE STEVEN & SUMMER	3705 FIFTEEN MILE RD THE DALLES Oregon 97058	Residence	3159

Attachment 5. Site Layout



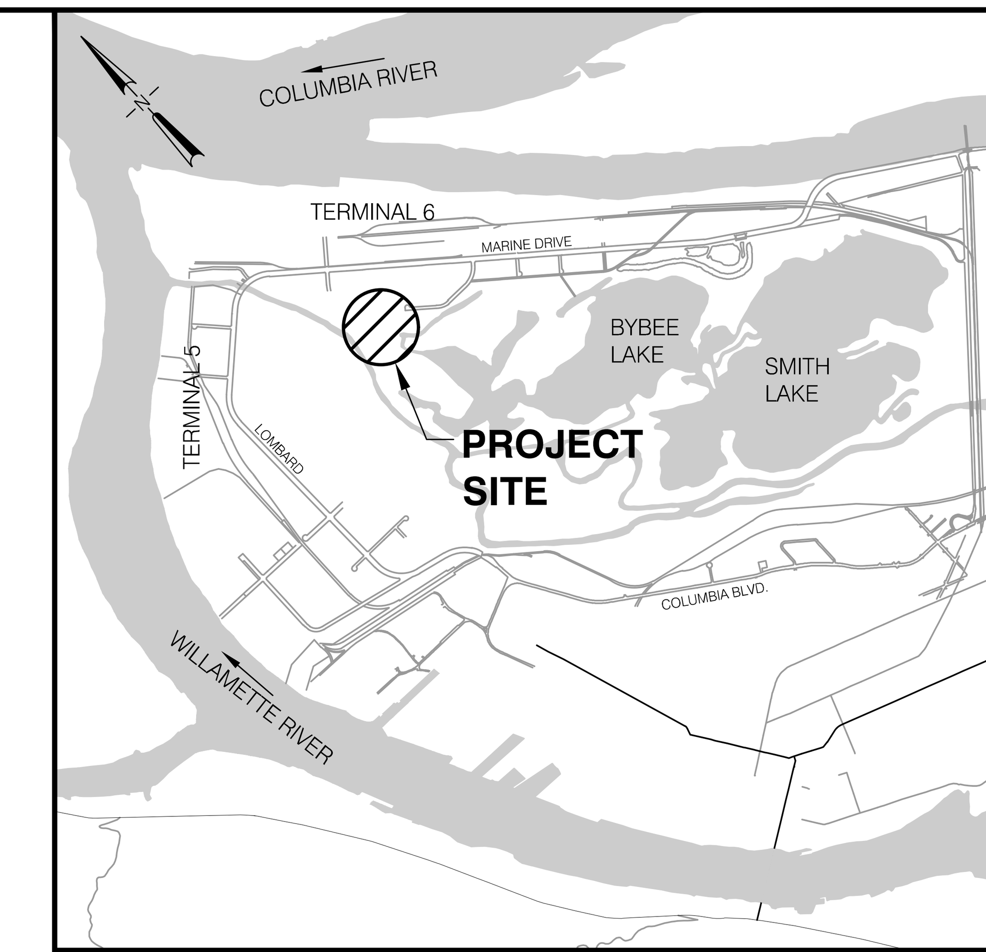
REFERENCE SURVEYS

(P1) "BYBEE LAKE INDUSTRIAL PARK" BOOK1251, PAGES 69 THRU 76 (8-6-2001)

(R1) SN59496

LEGEND:

- FOUND 5/8" IRON ROD WITH YELLOW PLASTIC CAP STAMPED, "PORT OF PORTLAND", PER "BYBEE LAKE INDUSTRIAL PARK" RECORDED AUGUST 6, 2001, BOOK 1251, PAGES 69 THRU 76, MULTNOMAH COUNTY PLAT RECORDS (HELD) UNLESS OTHERWISE NOTED.
- SET 5/8-INCH DIAMETER BY 30-INCH LONG IRON ROD WITH YELLOW PLASTIC CAP STAMPED "PORT OF PORTLAND" ON JUNE 3, 2005.
- PGE LINE
- QWEST LINE
- SANITARY SEWER
- STORM SEWER
- WATER LINE
- IRRIGATION LINE
- NW NATURAL GAS



VICINITY MAP
N.T.S.

CURVE DATA

CURVE #	RADIUS	DELTA	LENGTH	CHORD
C 1	568.91' (P1)	04°41'26"	46.57'	S 49°20'57" E 46.56'
C 2	568.91' (P1)	58°00'25" (P1)	575.97' (P1)	S 22°41'28" E 551.69'
C 3	533.91' (P1)	58°00'25" (P1)	540.54' (P1)	S 22°41'28" W 517.75'
C 4	874.24' (P1)	36°05'15" (P1)	550.63' (P1)	N 87°42'33" E 541.58'
C 5	935.00' (P1)	16°42'49" (P1)	272.75' (P1)	S 14°40'10" W 271.78'
C 6	900.00' (P1)	16°57'09"	266.29'	S 14°47'20" W 265.32'

NARRATIVE:

THE PURPOSE OF THIS SURVEY IS TO SHOW THE LIMITS OF THE DOG BONE SITE AND THE LOCATION OF THE EXISTING TOP OF BANK.

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE LINE PRODUCED BETWEEN CONTROL POINT #41 AND #36, AS SHOWN ON PORT OF PORTLAND SURVEY CONTROL DRAWING No. MD RG 2003-3024.

ALL UTILITIES SHOWN ARE FROM THE PORT OF PORTLAND GIS DATA BASE AND NEED TO BE VERIFIED.

BACKGROUND IS FOR INFORMATIONAL PURPOSES ONLY.

DOG BONE SITE LEGAL DESCRIPTION

A TRACT OF LAND BEING A PORTION OF LOT 1, "BYBEE LAKE INDUSTRIAL PARK", SITUATED IN THE NORTHWEST ONE-QUARTER OF SECTION 25, TOWNSHIP 2 NORTH, RANGE 1 WEST, WILLAMETTE MERIDIAN, CITY OF PORTLAND, MULTNOMAH COUNTY, OREGON BEING DESCRIBED AS FOLLOWS:

COMMENCING AT A 4" BRASS DISK IN CONCRETE BEING THE RE-ENTRY CORNER OF THE W.M. BYBEE D.L.C., RECORDED IN MULTNOMAH COUNTY B.T. BOOK "E", PAGE 858; THENCE NORTH 02°36'00" EAST, 440.43 FEET TO THE SOUTHWESTERLY CORNER OF LOT 4, "BYBEE LAKE INDUSTRIAL PARK" AND COMMON TO THE NORTHWESTERLY CORNER OF LOT 7, "BYBEE LAKE INDUSTRIAL PARK"; THENCE, RUNNING ALONG THE WESTERLY LOT LINE OF SAID LOT 4 NORTH 16°45'30" EAST, 414.42 FEET; THENCE NORTH 08°37'30" EAST, 771.87 FEET TO THE NORTHWEST CORNER OF THE ADJUSTED LOT 4 AND COMMON TO THE SOUTHWEST CORNER OF THE ADJUSTED LOT 1, "BYBEE LAKE INDUSTRIAL PARK" AND THE **TRUE POINT OF BEGINNING**; THENCE RUNNING ALONG THE WESTERLY LOT LINE OF LOT 1, NORTH 17°17'30" WEST, 928.41 FEET TO A POINT OF NON-TANGENCY AT THE NORTHWESTERLY CORNER OF SAID LOT 1 AND COMMON TO THE SOUTHWESTERLY CORNER OF TRACT "A" "LEADBETTER ADDITION"; THENCE 550.63 FEET ALONG THE ARC OF A 874.24 FOOT NON-TANGENT RADIUS CURVE TO THE RIGHT, CONCAVE TO THE SOUTH, THROUGH A CENTRAL ANGLE OF 36°05'15" (THE LONG CHORD BEARS NORTH 87°42'33" EAST, 541.58 FEET) TO A POINT OF NON-TANGENCY ON THE WESTERLY RIGHT OF WAY LINE OF NORTH LEADBETTER ROAD, SAID POINT BEING THE NORTHEASTERLY CORNER OF SAID LOT 1 AND COMMON TO THE SOUTHEASTERLY CORNER OF SAID TRACT "A"; THENCE RUNNING ALONG SAID WESTERLY RIGHT OF WAY LINE 272.75 FEET ALONG THE ARC OF A 935.00 FOOT NON-TANGENT RADIUS CURVE TO THE LEFT, CONCAVE TO THE EAST, THROUGH A CENTRAL ANGLE OF 16°42'49" (THE LONG CHORD BEARS SOUTH 14°40'10" WEST, 271.78 FEET) TO A POINT OF COMPOUND CURVATURE; THENCE CONTINUING ALONG SAID WESTERLY RIGHT OF WAY LINE 575.97 FEET ALONG THE ARC OF A 568.91 FOOT RADIUS CURVE TO THE RIGHT, CONCAVE TO THE EAST, THROUGH A CENTRAL ANGLE OF 58°00'25" (THE LONG CHORD BEARS SOUTH 22°41'28" EAST, 551.69 FEET) TO A POINT OF NON-TANGENCY AND THE SOUTHEASTERLY CORNER OF SAID ADJUSTED LOT 1 COMMON TO THE NORTHEASTERLY CORNER OF SAID ADJUSTED LOT 4; THENCE LEAVING SAID WESTERLY RIGHT OF WAY LINE AND RUNNING ALONG THE ADJUSTED LINE OF SAID LOT 1, SOUTH 65°59'27" WEST, 409.27 FEET TO THE TRUE POINT OF BEGINNING CONTAINING 343,689 SQUARE FEET (7.89 ACRES) MORE OR LESS.
THE BEARINGS IN THIS DESCRIPTION ARE BASED UPON PORT OF PORTLAND SURVEY CONTROL DRAWING No. "MD RG 2003-3024 1/1 (SU-1)".

CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.

NO.	DATE	BY	REVISIONS	APPVD	CKD	NO.	DATE	BY	REVISIONS	APPVD	CKD

PORT OF PORTLAND
PORTLAND, OREGON

2019UGEN — DESIGN NUMBER
1110 — PROJECT NUMBER

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JULY 25, 1995
CHRISTOPHER M. VANDERWERF
2719
SIGNED:
EXP: 6/30/2020

DESIGNED BY
DRAWN BY C. VANDERWERF
CHECKED BY V. LOGAN
DATE NOV. 2019
SCALE 1"=60'

RIVERGATE INDUSTRIAL DISTRICT

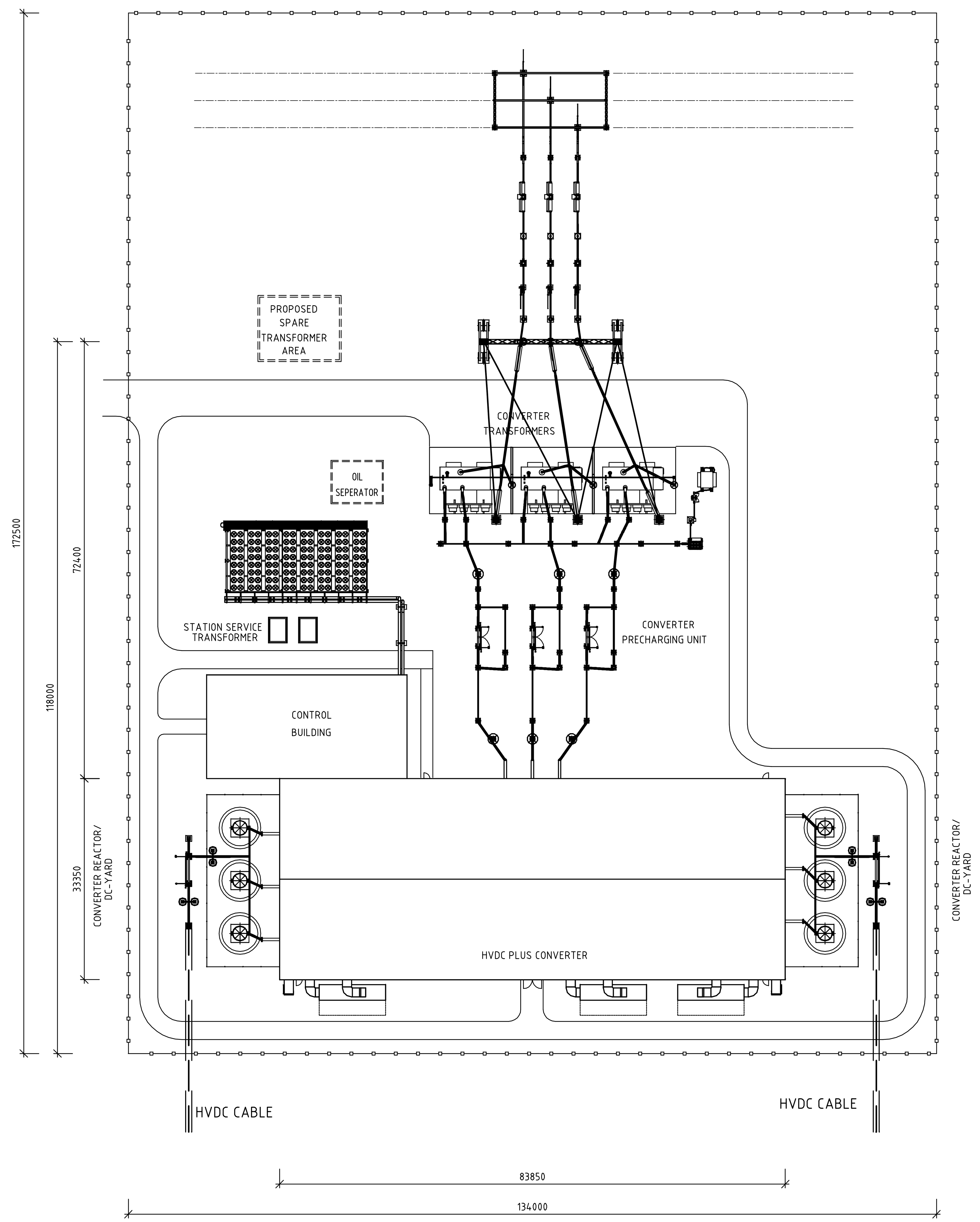
DOG BONE SITE
PORTION OF LOT 1, "BYBEE LAKE INDUSTRIAL PARK"
CONSTRAINTS MAP

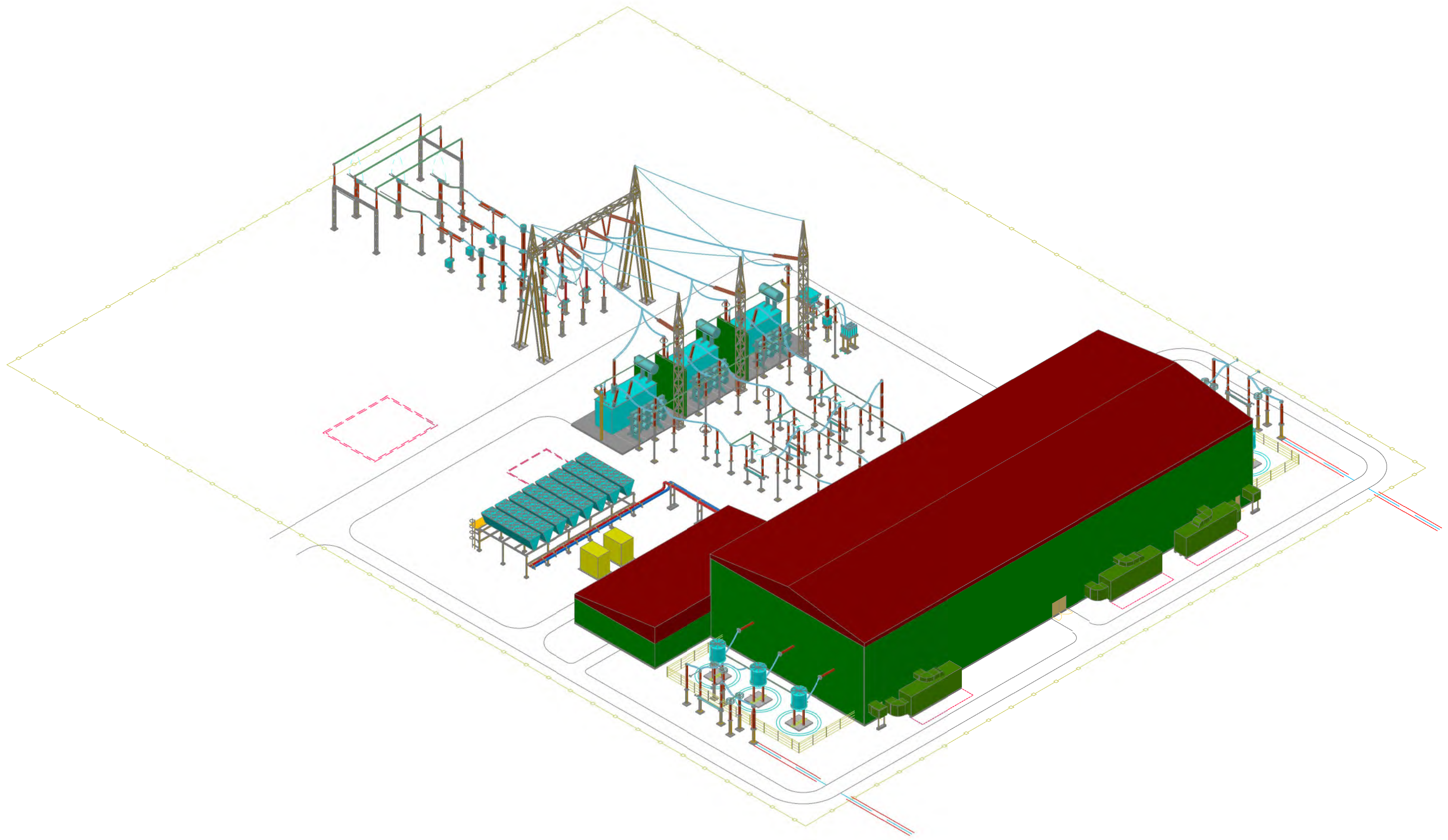
SUBMITTED BY	TYPE	DRAWING NO.	SHEET NO.	DISC. SHT. NO.
PATRICK CHRISTOPHER, BUSINESS DEVELOPMENT MANAGER	EP	RG 2019-	1/1	SU-1

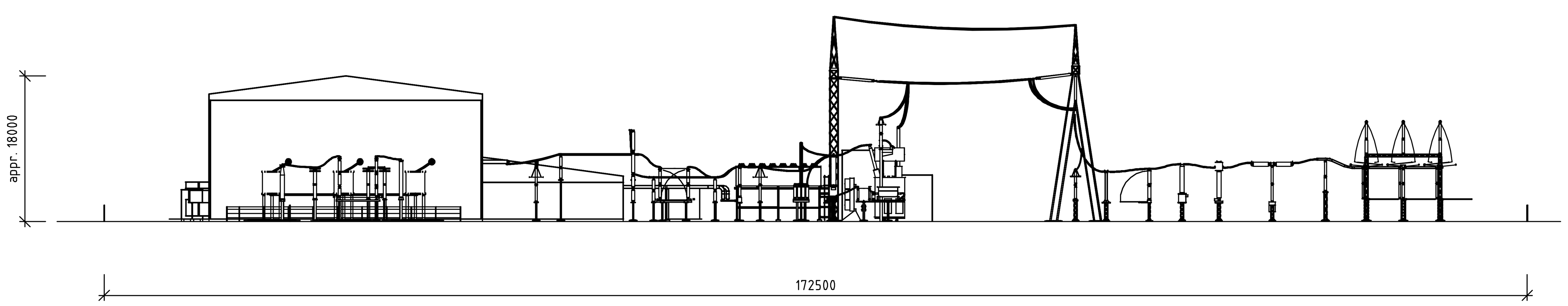
PRINTED: 1/8/2020 11:27:26 AM VANDEC r:\survey\rg\2019_ean\2019ugen\1110-rivergate development lots\lot 1 bybee lake-dog bone site-constraints map.dwg

DRAWING SCALE IS REDUCED 50% WHEN SHEET SIZE IS 11" x 17".

Appendix 1: Typical General Arrangement Diagram for VSC HVDC Converter Station







STATION FENCE

DRAFT : 03, 19.01.2015

0 10 20 30 40 50 m

SCALE 1:500

Rev.	Modification	Rev. Date	Approved By

Project ID: PV-104295		CONVERTER STATION A	
Customer: Siemens Standardization Program		HVDC PLUS	
Project: Minimum Referenz Symetrical Monopole 1000MW ISD-ST		A01	
Scale: 1:500	Paper Size: A1		
Responsible Departm.: EM TS PLM	Techn. Reference: Dr. Achenbach	Document Type: ARRANGEMENT DIAGRAM	Document Designation:
	Prepared By: Hafermaas	Title, Supplementary Title: GENERAL LAYOUT	Document ID: E50105-W0212-S765
Siemens AG	Approved By: Dr. Schettler		Rev.: 0 / Release Date: 2015-01-19 / Language: en / Sheet: 1/1