Phase I General Route Characterization and Geologic Hazard Assessment

I-5 Corridor 500 kV Transmission Line
Oregon/Washington

for
HDR Engineering, Inc.

November 22, 2010

GeoEngineers
Earth Science + Technology

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File No. 2081-032-00

November 22, 2010

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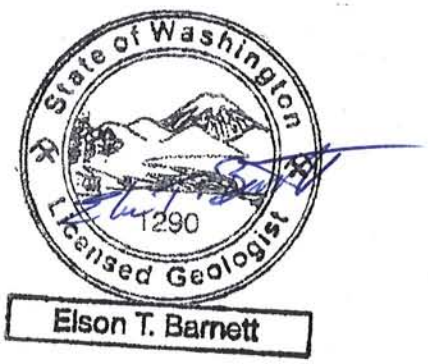

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INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) is pleased to provide our updated Phase I General Route Characterization and Geologic Hazard Assessment Report for the Bonneville Power Administration (BPA) I-5 Corridor Reinforcement 500 kV Transmission Line. GeoEngineers was contracted by HDR, Inc (HDR) on March 2, 2010 and most recently on October 8, 2010 to provide the Phase I services summarized in this report. The corridor reinforcement project consists of multiple segments along existing and proposed segments between the Casey Road Substation (CRS) north of Castle Rock, Washington and the Troutdale Substation (TS) near Troutdale, Oregon. Our updated report includes additional segments as well as all the segments previously reviewed. The maps that accompany this report show the location of those segments.

The General Route Characterization for the Phase I study included an office evaluation of (52+23) 75 segments identified by HDR totaling approximately 349 miles. We also reviewed digital data, including georectified aerial photographs, provided by HDR.

The results of our Phase I study are summarized in maps that accompany this report. Specifically, the three map books titled, "Soil and Slope Gradients", "Geology, Shallow Bedrock, Shallow Groundwater", and Geologic Hazards. In addition, we have prepared a table summarizing additional information about specific geologic hazards along the segments.

Our scope and objective for Phase I included the following tasks:

Document Review (Task 1A):

- Oregon Department of Geology and Mineral Industries (selected reports and maps)
- Washington State Department of Natural Resources (selected reports and maps)
- US Geological Survey (selected reports and maps)
- Puget Sound LiDAR (Light Detection and Ranging) Consortium (inquiries and selected maps)
- Washington Department of Ecology (selected well log data and published reports)
- Oregon Department of Water Resources (selected well log data and published reports)
- Natural Resource Conservation Service (selected soil mapping information)
- County/City Geologic Hazard Reports and Maps (selected maps and documents)
- WSDOT and ODOT Information (inquiries for local road and bridge geotechnical reports)

Data Evaluation and Mapping (Task 1B):

Geology and Soil Conditions within the Corridors

- Geology is from 7.5 minute quadrangles or larger scale where readily available
- Soil conditions are from appropriate reviewed sources such as NRCS database and geotechnical reports
- Shallow Bedrock from NRCS database less than 60 inch depth designation

NRCS Soils Data

- Mapped Soil Units (USCS/ASTM Classifications)

Geologic Hazards within the Corridors

- Landslides
- Erosion Hazards
- Steep Slope Hazards
- Channel Migration Zones
- Seismic Hazards (faults and liquefaction areas)
- Mine hazards
- Volcanic Hazards (mudflows, blast zones, etc)

Groundwater

- Shallow groundwater
- Floodplains and Floodways

Geologic Hazards Based On Available Data

Additional Data Requested. We have requested the following geotechnical reports:

- Lewis River Road, State Route (SR) 503 crossing of Marble Creek (adjacent to Segments 13 and 17)
- SR 503 crossing of Lewis River (Segments 20 and 21)
- SR 14 (Lewis and Clark Highway) of Camas Slough embayment (Columbia River) (Segment 52)
- I-205 crossing of Salmon Creek (Segment 25)
- SE Washougal River Road crossing of Little Washougal River (Segment 51)
- I-5 Crossing of East Fork Lewis River (~5 miles west of Segment 25)
- Lewis River Road (SR 503) crossing of Houghton Creek (Segment 25)
- I-5 crossing of Coweeman River (~1.3 miles west of Segment 9)
- Cowlitz Way crossing of Cowlitz River (2.2 miles south of Segment 4)
- I-84 crossing of Sandy River (.7 miles southeast of Segment 52)
- I-205 crossing of Columbia River, Oregon and Washington, (6 miles west of Segment 52)

GENERAL GEOLOGY

In general the segments cross three physiographic provinces that include the Willapa Hills, South Cascades and Portland Basin (from north to south). Province descriptions were developed from Lasmanis (1991). Key geologic unit descriptions referenced in the attached "Geology, Shallow Bedrock and Depth to Bedrock" maps (Sheets 1 through 52) are provided in parenthesis below where appropriate.

Segments 1 - 3 and A through E

Segments 1 through3 and A through E are mapped within **Willapa Hills province**, which rises to 3,110 feet above sea level locally and is part of the Coast Range. The province is situated between the Olympic Mountains to the north and the Columbia River to the south.

Tertiary age igneous and sedimentary rocks are exposed in the Willapa Hills. Beginning with the Eocene Crescent Formation basalts (**basalt flows**), thick sequences of sedimentary (**Tertiary and older sedimentary rock**) and volcanic rocks of Eocene through Miocene age are present.

Segments 4-24, 26-34, F – P, U-W

Route Segments 4 through 24, 26 through 34, F through P and U through W are located in the southern portion of the Cascade mountain range. The **South Cascade** province in Washington consists predominantly of Cenozoic volcanic rocks and associated deposits. Basalts of the Columbia Basin (**Basalt Flows and Intrusive Rocks**) lap onto the southern Cascades to the east, and the Puget Lowland is situated to the west. To the south, the Cascade Range is severed by the gorge of the Columbia River.

By the end of the Mesozoic, basement rocks were eroded to a plain on which sediments were deposited during the Eocene. These sediments are now represented by non-marine shales, siltstones, and sandstones (**Tertiary and Older Sedimentary Rocks and Deposits**).

Basalt and andesite (**Andesite Flows and Intrusive Rocks**) volcanism of the Cascades were initiated during the Eocene age. During the Oligocene, the Neogene, and through Quaternary time, mountain building in the form of volcanism predominated. Volcaniclastics, lahars, ash beds, and mud flows from volcanic centers filled depressions (**Volcaniclastic Deposits**) in the southern Cascades. They interfingered with nearshore sediments to the west. During the middle and late Miocene, Columbia River basalt flowed (**Basalt Flows**) up against the eastern flanks of the Cascades; these flows were later arched upward with uplift of the range.

Segments 25, 35- 52, Q - T

Segments 25, 35 through 52 and Q through T are generally located in the **Portland Basin province** that marks the northern terminus of the Willamette Lowland of Oregon. In Washington, the northern portion of the

Portland Basin is characterized by the low topographic relief of western Clark County.

Both upstream and downstream from Vancouver, Washington at the edge of the basin, there are exposures of Columbia River basalt (**Basalt Flows**). Within the basin itself, the basalt units lie more than 1,000 feet below the surface. Starting during the Miocene age and continuing through the Pliocene, the basin was filled by sediments of the ancestral Columbia River. Named the Troutdale Formation (**Tertiary and Older Sedimentary rocks and deposits**), these deposits can be divided into two general parts: a lower gravel section containing pebbles and cobbles that were derived from the Columbia Basin and the Okanogan Highlands provinces. A volcanic breccia (**Volcaniclastic Deposits**) subunit of the Troutdale Formation, representing a lahar, has been mapped near Woodland, Washington.

Deposition of the Troutdale Formation was followed by a period of Boring Lava volcanism (**Basalt Flows and Intrusive Rocks**). Centers of extrusive activity have been documented around the margins of the Portland Basin. This volcanism was associated with faulting and structural deformation of the Troutdale Formation and further depression of the Portland Basin.

Lastly, as the glacial Lake Missoula catastrophic floods burst (**Outburst Flood Deposits**) out of the Columbia River Gorge 12,700 to 15,300 years ago, the waters ponded in the Portland Basin. Backwaters caused the deposition of well-sorted sand, clay, and gravel.

SPECIFIC MAPPING

Geologic Mapping

GeoEngineers obtained digital geologic maps for the Washington State study area from DNR (2003) at a scale of 1:100,000. Digital geologic maps for the Oregon were obtained at a scale of 1:500,000 (Walker and MacLeod (1991). We also obtained recently mapped digital geologic maps for available 7.5 minute quadrangles (1:24,000 scale), from the USGS (Howard, 2002, Evarts 2001, Evarts, 2004a, Evarts, 2004b, Evarts, 2005, Evarts, 2006, and Evarts and O'Connor, 2008). We combined similar lithologic and depositional units as appropriate for a study of this scale. The geologic, bedrock and deposit unit maps are provided in Geology, Shallow Bedrock, and Shallow Groundwater maps, Sheets 1—52. Our approach to shading the geologic units was to use similar colors as those used for mapping by the local agencies.

We also identified NRCS digital soils data available for the three counties of the study area that include Multnomah, Oregon and Clark and Cowlitz Counties in Washington. Information with the digital soils database provides depth to bedrock as shown in Soils and Slope Gradients maps, Sheets 53 through 104.

We considered different approaches to consistently show depth to groundwater on the geology maps. Well drilling logs are available from Washington State DOE and Oregon Department of Water Resources. There is ample data from these sources in the project area, over 2,000 well logs within a 1 mile radius of the segments. However, we note that many of these wells were drilled for domestic water production and these well logs seldom show the near surface water table depth needed for Phase I.

To maintain schedule we chose another option we believe to be more consistent and reliable for a Phase I level evaluation. We selected digital soil data from the NRCS that includes a database for depth to groundwater. The benefit of using this approach is that NRCS soils are mapped at a 1:24,000 scale using shallow soil pits that likely produce consistent data for a regional study for preliminary engineering applications. Hence, depth to groundwater information is provided on the "Geologic, Shallow Bedrock, and Shallow Groundwater" maps, in Sheets 1 through 52.

Surface water and waterbody digital data available is shown on the Geologic maps as well.

Slope and Soils Mapping

GeoEngineers developed topographic base contours, percent slope, and Unified Soils Classification maps for the study characterization. Forty-foot contours were developed from a USGS 10-meter Digital Elevation Model (DEM) for the study area. A percent slope layer was also developed for the study area. The percent slope and contours are shown in the Soils and Slope percent Sheets 53 through 104. Also utilized was Light Detection and Ranging (LiDAR) data obtained from Clark County Washington to provide higher resolution percent slope mapping for Clark County. LiDAR data was not available for Cowlitz County at the time of our evaluation.

The NRCS soil data for each county was classified based on the Unified Soil Classification System (USCS) descriptions provided for the various soils units. The NRCS data provides a description of mapped soils within a depth ranging from 2 to 5 feet below the ground surface. We ignored the surficial soil classifications in the database because of the abundance of organic topsoil materials. Therefore, the Soil and Slope Gradient maps provide USCS descriptions for the lower two to three feet of the soil series unit. These soil types shown in the maps are considered to be more representative of the general soil conditions that would be encountered during earthwork, such as for foundation excavation and access road construction.

Geologic Hazards

GeoEngineers completed an evaluation of geologic hazard for the route characterization using available digital data and photogeologic interpretation identifying areas of landslides (including steep slope hazards), flood hazard mapping, potential channel migration zones (CMZ), seismic hazards (crossings of faults), steep slope hazards, mine hazards, and volcanic hazards.

Landslides and Steep Slopes

Landslide mapping for the corridor is available from DNR (Wegmann, 2006; DNR 2009) and USGS (Howard, 2002, Evarts, 2001, Evarts, 2004a, Evarts, 2004b, Evarts, 2005, Evarts, 2006, and Evarts and O'Connor, 2008). GeoEngineers also reviewed aerial photographs, percent slope maps (10m DEM and Clark County LiDAR).

Areas of potential steep slope hazards are identified for three slope gradient ranges (40-55 percent, 55-70 percent and greater than 70 percent). Although it was not within our current scope to evaluate local codes, often 40 percent is cited as the gradient where local jurisdictions typically require geotechnical engineering studies for design. Slopes that exceed 70 percent are likewise critical as DNR identifies potentially unstable areas (DNR, 2004) with

slopes greater than 70 percent for forest practices that could be significant for planning a new or expanded right-of-way.

Flooding

Areas of potential flood hazard are identified only for Clark County.

Channel Migration Zone (CMZ)

Areas of potential CMZ areas were identified from our preliminary review of the route topography and aerial photographs for indications of potential low-lying river valley areas or abandoned side channels that could be reoccupied.

Seismic Hazard

Areas of seismic hazards were identified using available fault mapping from USGS (Howard, 2002, Evarts, 2001, Evarts, 2004a, Evarts, 2004b, Evarts, 2005, Evarts, 2006, and Evarts and O'Connor, 2008). We also include mapping of liquefaction susceptibility (Palmer et. al., 2004) for Cowlitz, Clark and Multnomah Counties (Mabey et. al, 1997).

Volcanic Hazard

We evaluated potential volcanic hazards within the project area by reviewing available maps and literature with regard to Cascade Range seismicity (*USGS/Cascades Volcano Observatory, Vancouver, Washington, 2010*) that show current levels are within background norms. The geologic units within the study area are mapped with volcaniclastic deposits including lahars (volcanic mudflow) and tephra that are Pleistocene (13,000 years before present) and older in age and considered to have originated from Mt. St Helens.

The Mt. St. Helens eruption and lahar that developed on May 18, 1980 caused a significant impact to the Cowlitz River. The lahar reduced Cowlitz River (vicinity of Route Segments 1 through 5 and 9) carrying capacity at flood stage at Castle Rock from 76,000 cfs (cubic feet per second) to less than 15,000 cfs. The Columbia River was also impacted with reduced channel depth from 40 to 14 feet; stranding 31 ships in upstream ports.

From October 2004 to late January 2008, about 125 million cubic yards of lava had erupted onto the crater floor to form a new dome—enough to pave seven highway lanes three feet thick from New York City to Portland, Oregon. A comparable volume had flowed out to form the 1980s lava dome. All lava erupted since 1980 has refilled about 7 percent of the crater, which was created by the catastrophic landslide and eruption of May 18, 1980.

Mine Hazard

Our review of coal mine hazards (Schasse, et. al., 1994) did not identify coal mine hazards within the project area. Areas of recent surface mining activity within Clark County, Washington are shown in Geologic Hazard figures Sheets 105 through 156.

RESULTS

The primary results of our Phase I study are summarized in three map books that accompany this report. The map books are titled, "Soil and Slope Gradients", "Geology, Shallow Bedrock, Shallow Groundwater", and "Geologic Hazards". In addition, we completed a photogeologic mapping of the study area and prepared Table A-1 summarizing additional information about specific geologic hazards along the segments. Note that descriptions that refer to areas as "extensive" generally indicate an area of lateral extent approximately equal to or greater than ¼ mile. Likewise, the term "localized" generally refers to areas with a lateral extent of less than ¼ mile.

The results of our evaluation of specific geologic hazards are provided in Table 1 in Appendix A. For each hazard we provide a brief description, the segment location (1-52 and A-W), and the feature number within the segment. Feature numbers for geologic hazards observed in a segment typically increase from north to south within a segment (or east to west for segments like #18). A point is shown for each of the hazards observed. For example, in Segment 1 the proposed line crosses a DNR mapped deep seated landslide at point 01-03 as shown in the Geologic Hazard Map, Sheet 108.

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FIGURES

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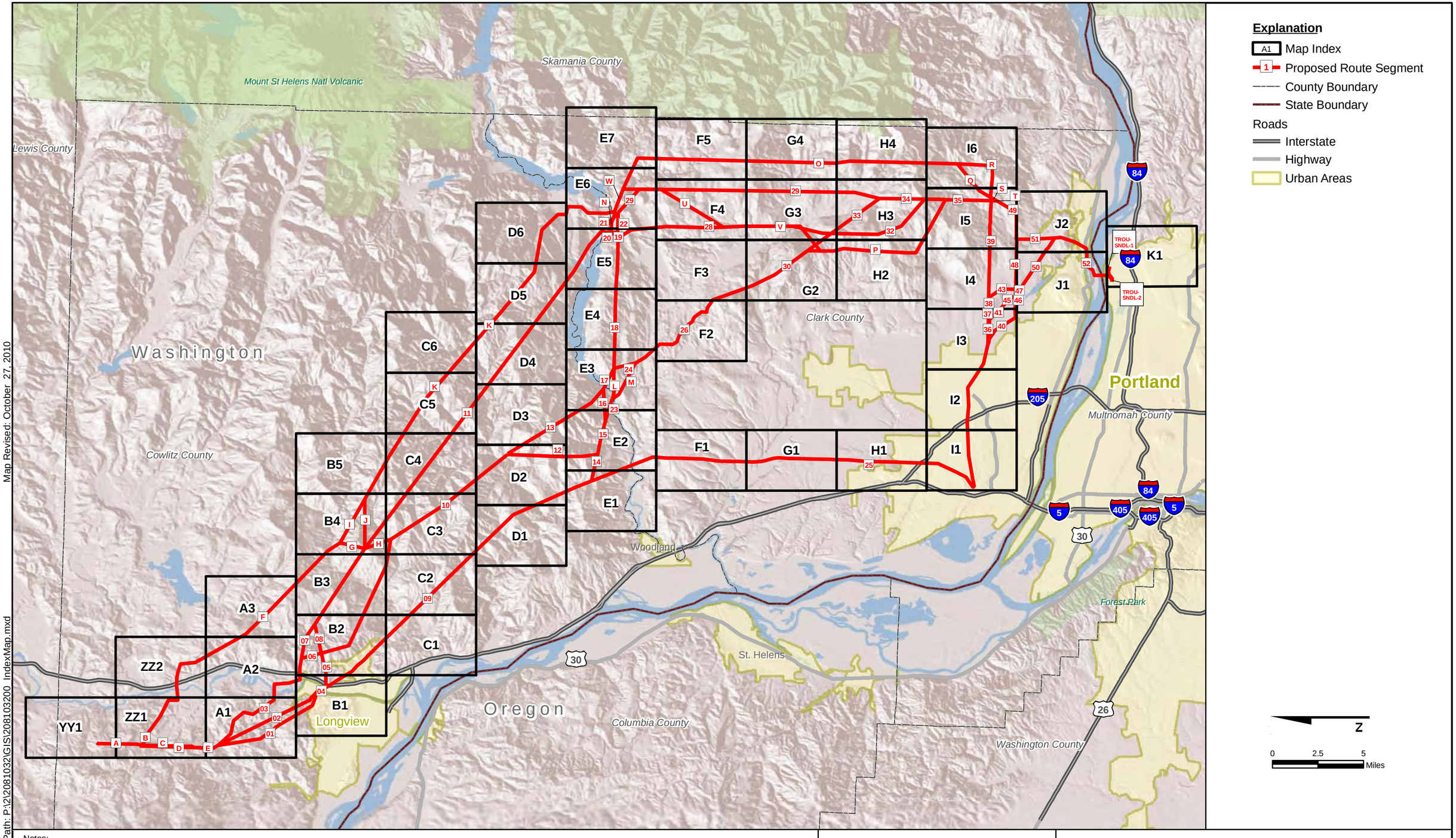

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Data Sources: Proposed Route from BPA.
Shaded relief from ESRI Online Resource Center.
Base data from ESRI Data & Maps, Street Maps 2008

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Index Map

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

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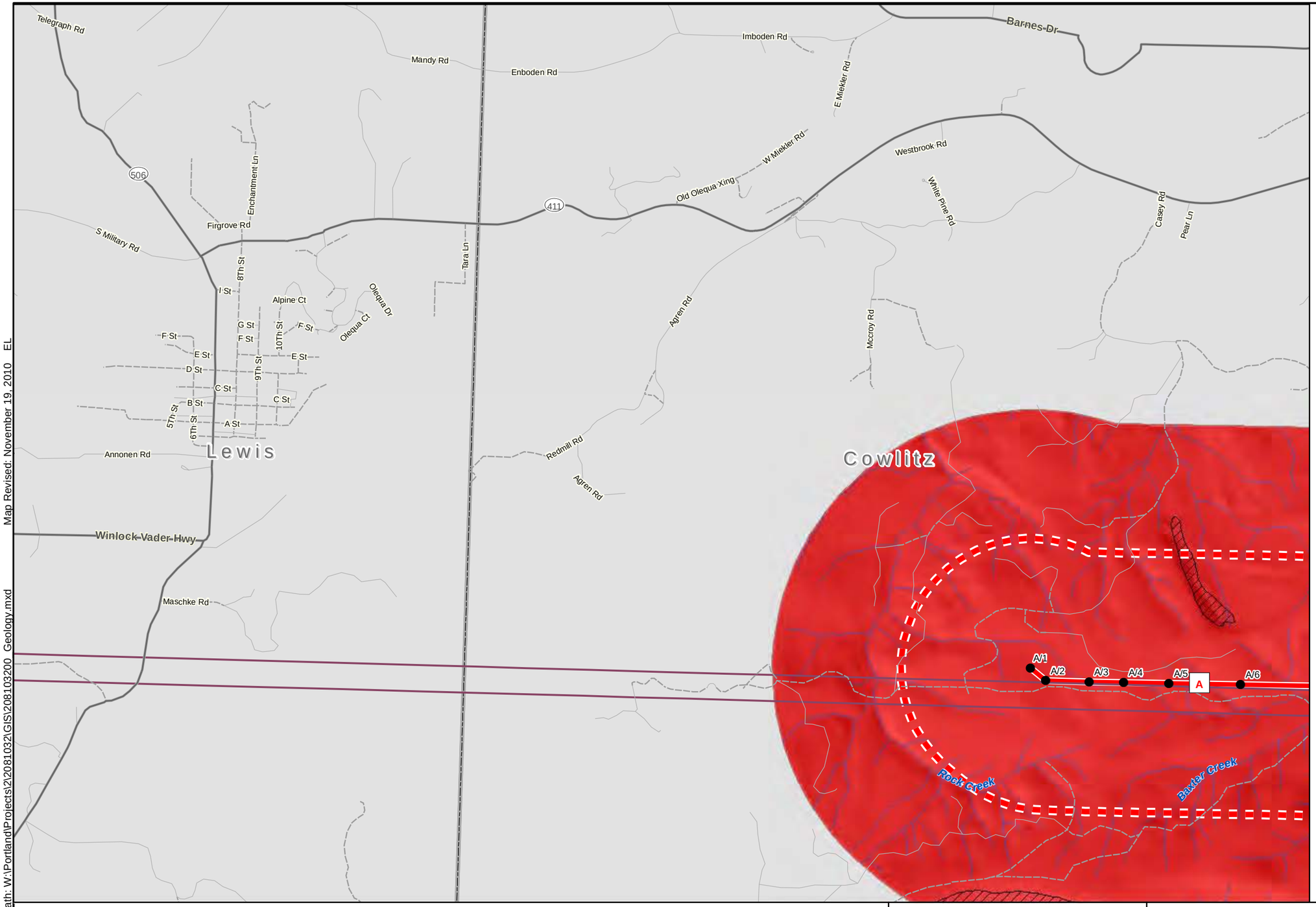

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

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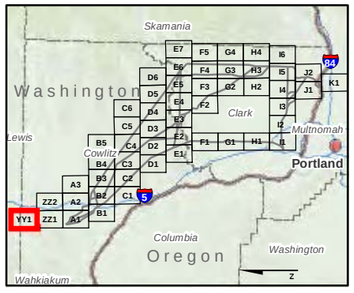

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Data Sources: Water features from Pacific Northwest Hydrography. Route information from BPA. Geology and geologic hazard data from USGS, WDNR, Dogami and Clark County.

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Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

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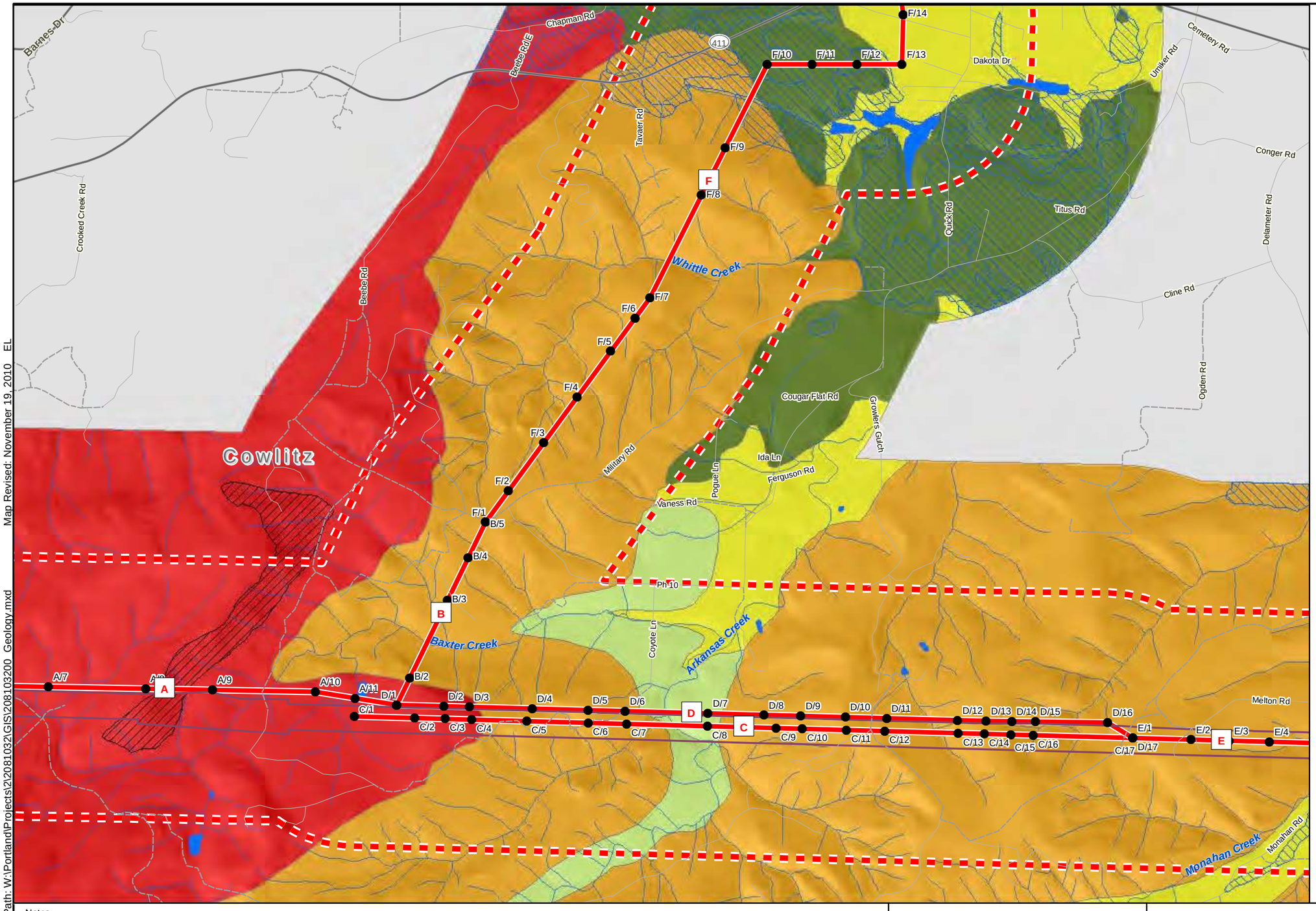

Explanation

- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

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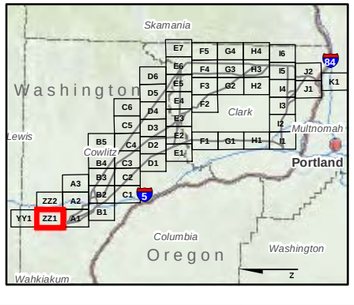

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Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

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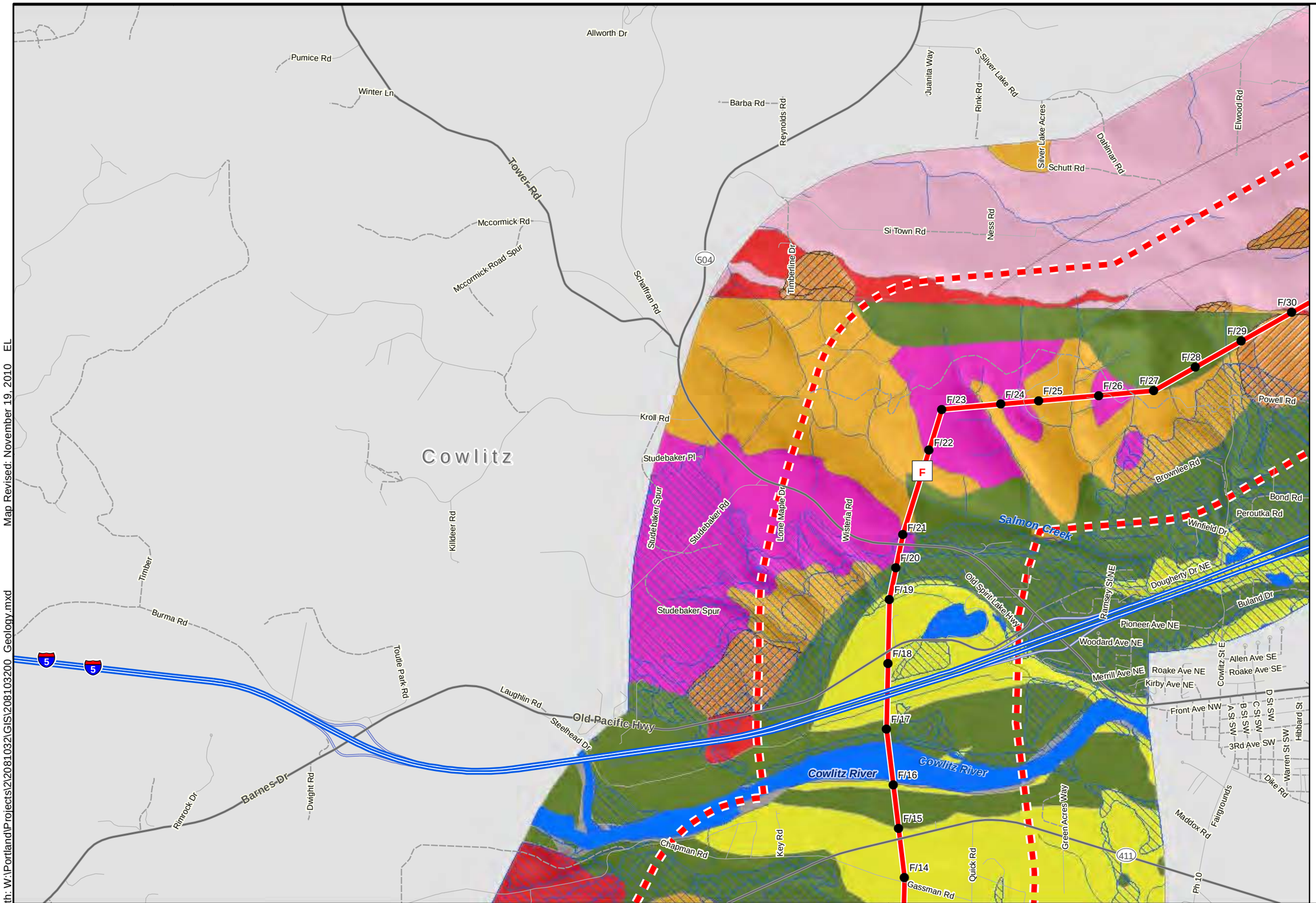

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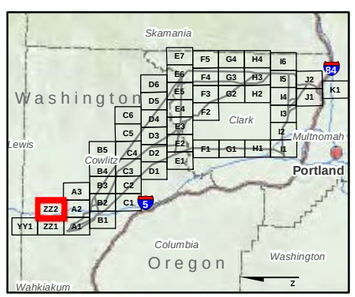

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Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

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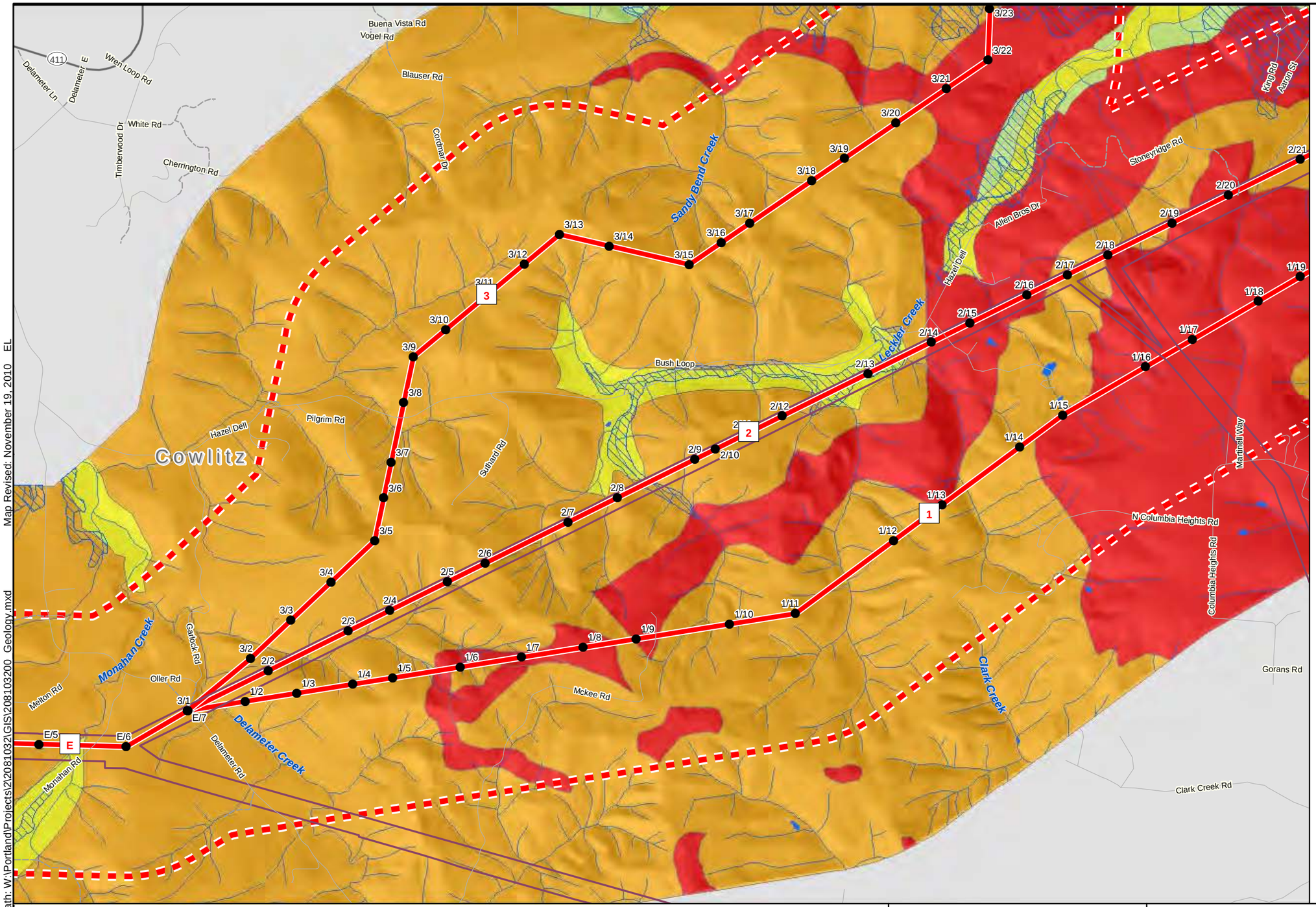


Explanation

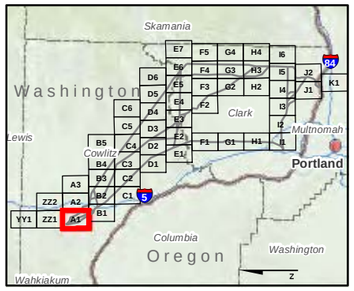
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

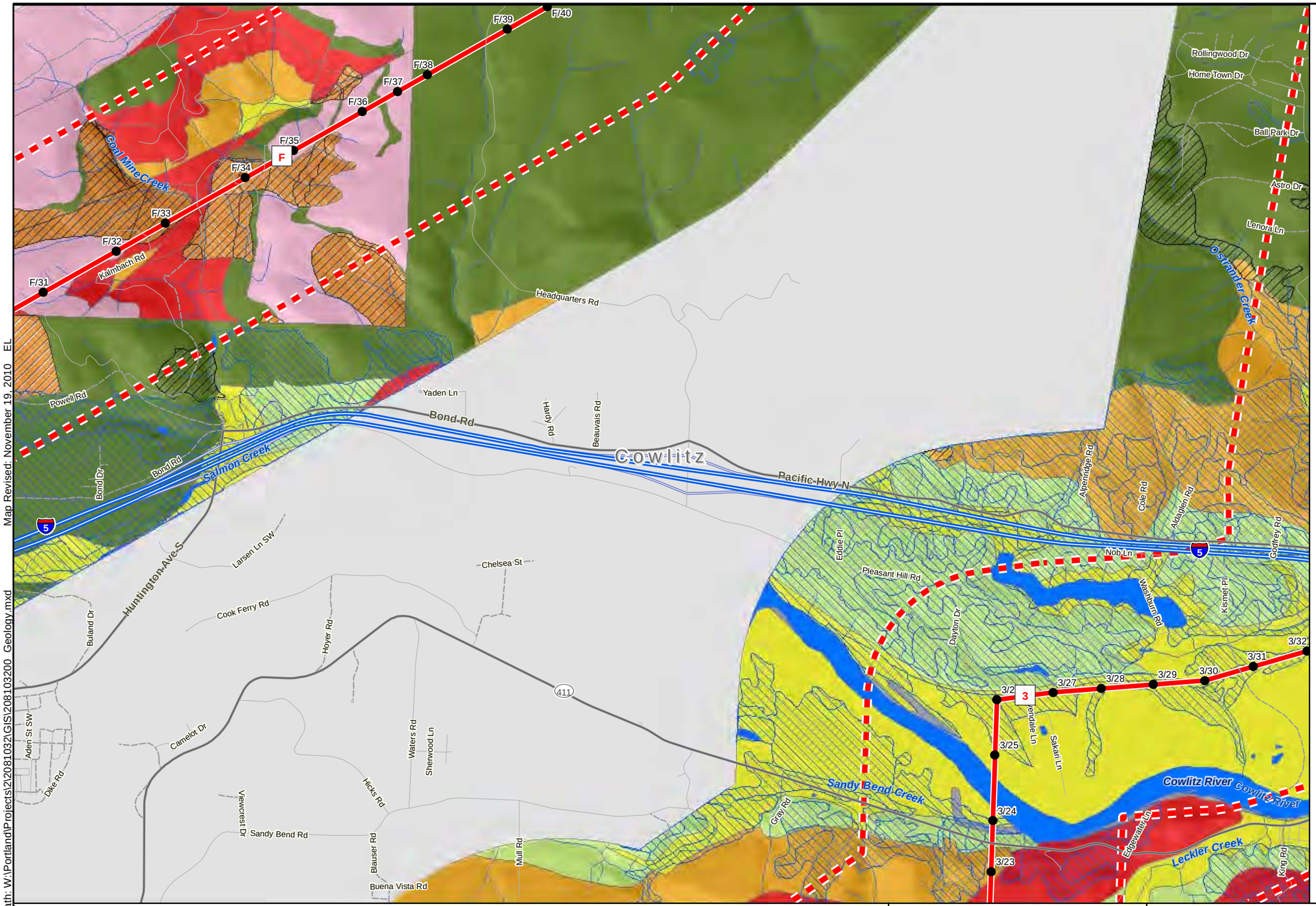
Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page A1

Sheet 4 of 156

Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\2081032000 Geology.mxd Map Revised: November 19, 2010 EL



Explanation

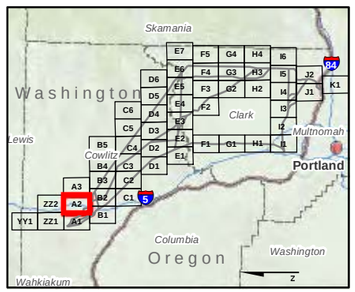
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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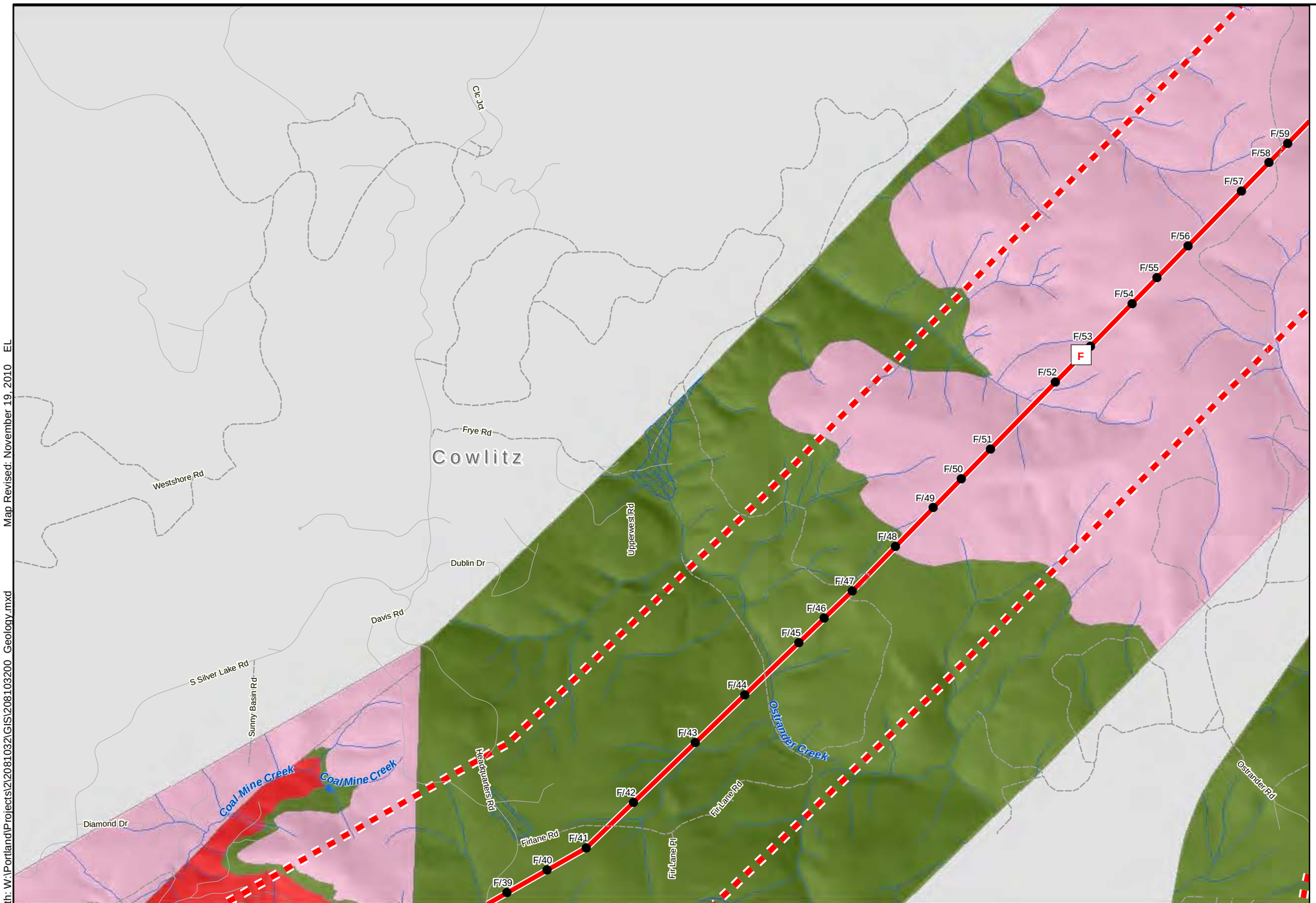
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page A2

Sheet 5 of 156



Explanation

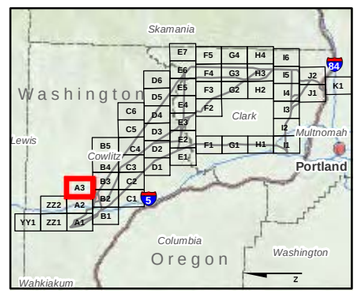
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

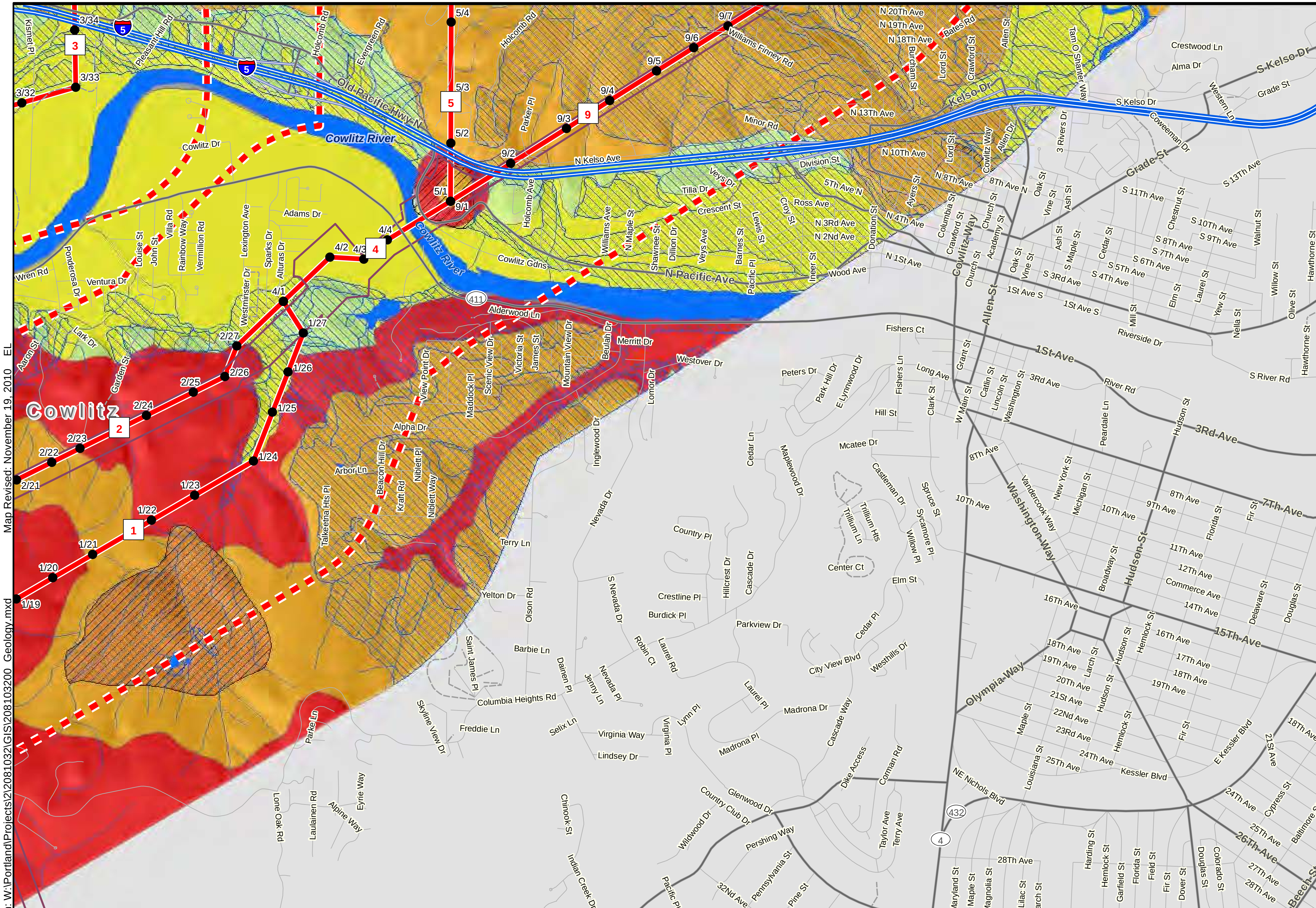
Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page A3

Sheet 6 of 156

Office: PORT Path: W:\Portland\Projects\2108103\2\GIS\208103200 Geology.mxd Map Revised: November 19, 2010 EL



Explanation

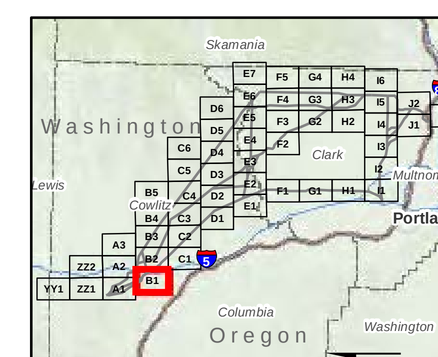
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

Z

0 1,000 2,000 Feet



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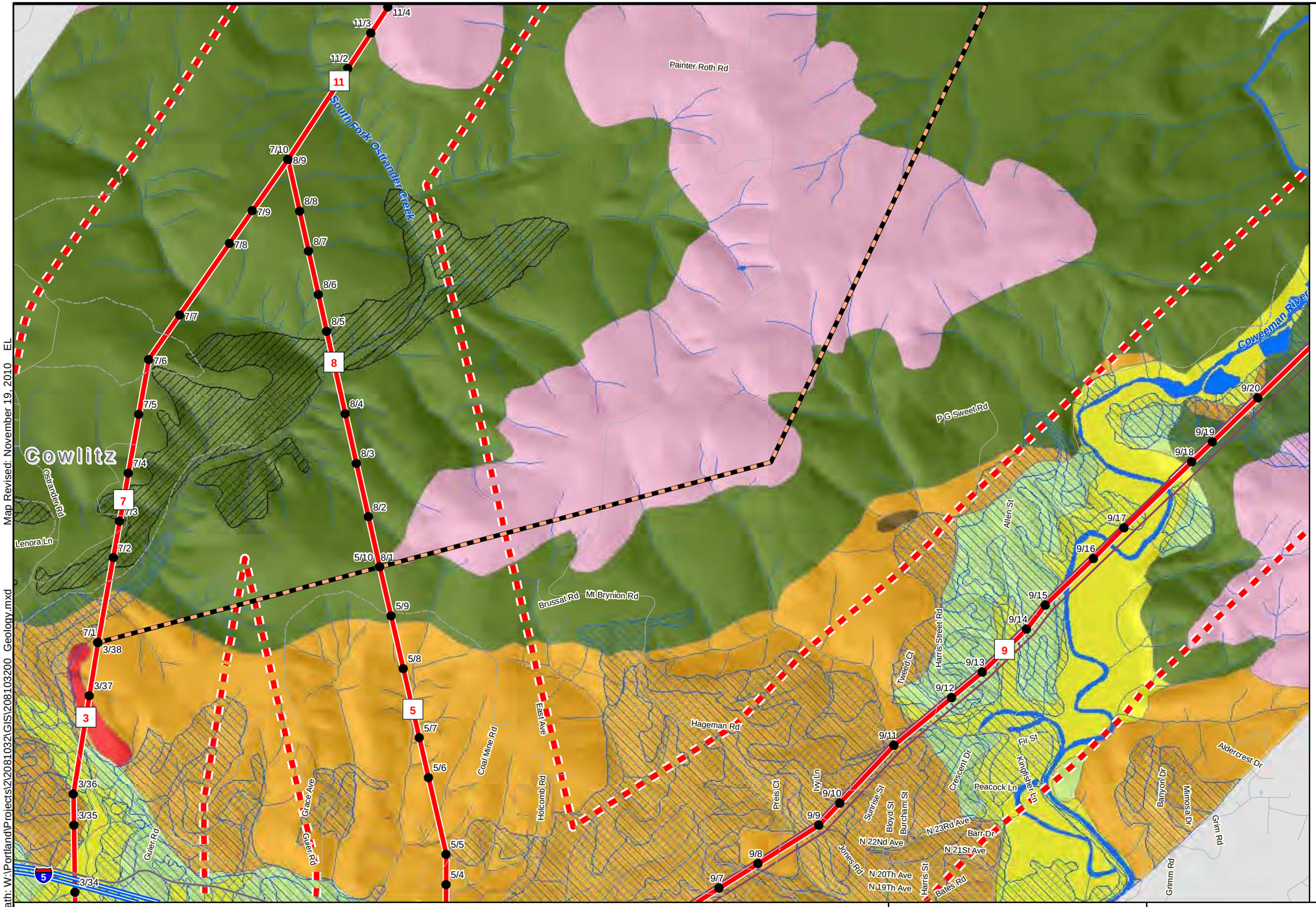
Geology, Shallow Bedrock, Shallow Groundwater	Map Page B1
BPA I5 Transmission Corridor Project Clark, Cowlitz and Multnomah Counties	Sheet 7 of 156

Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\208103200 Geology.mxd Map Revised: November 19, 2010 EL



Explanation

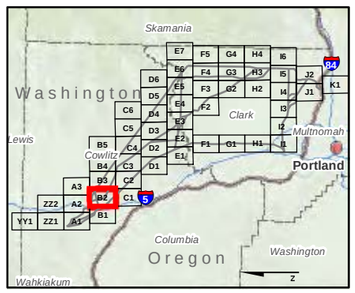
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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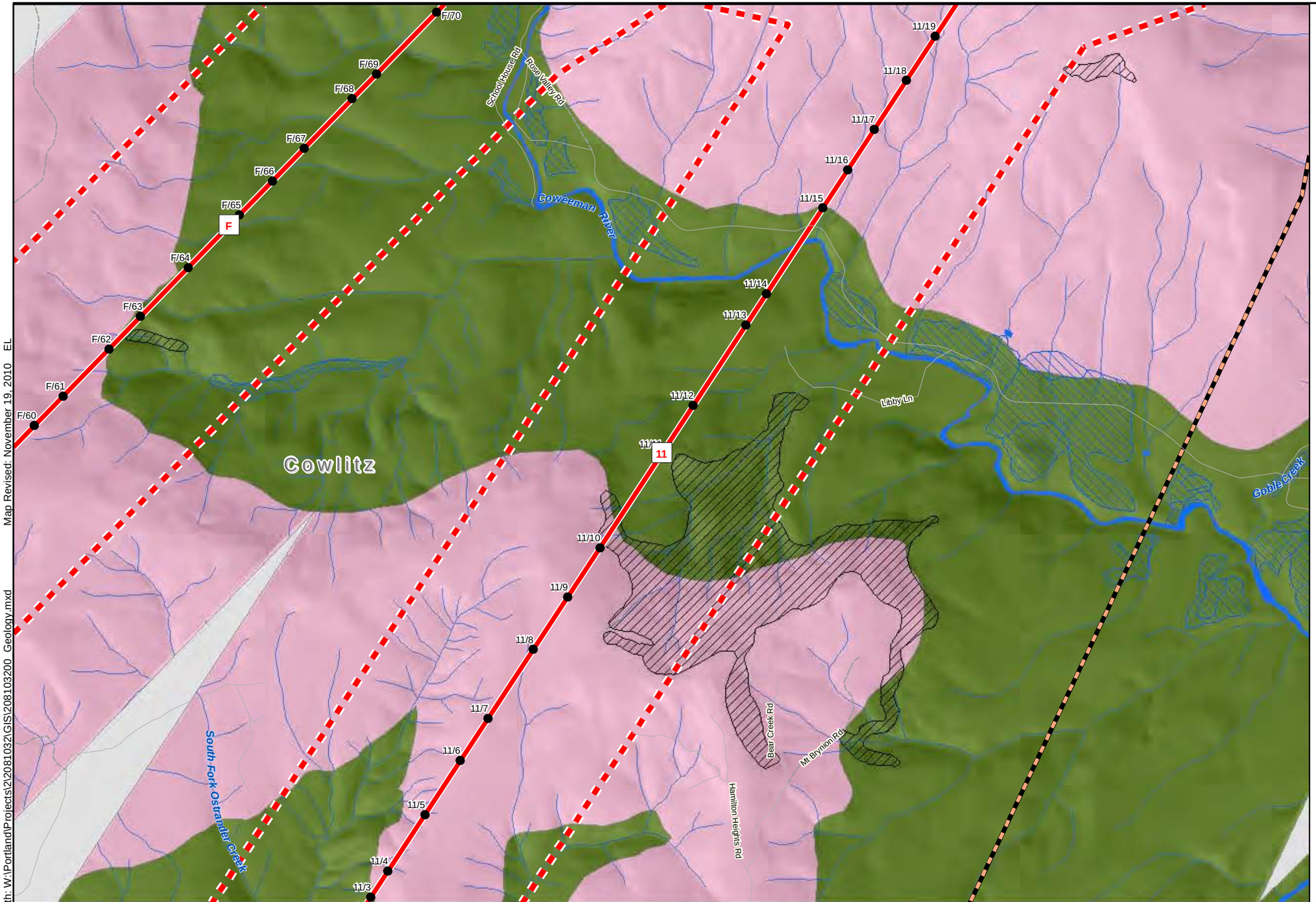
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

Map Page B2

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 8 of 156



Explanation

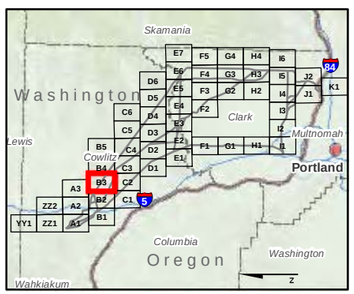
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page B3

Sheet 9 of 156

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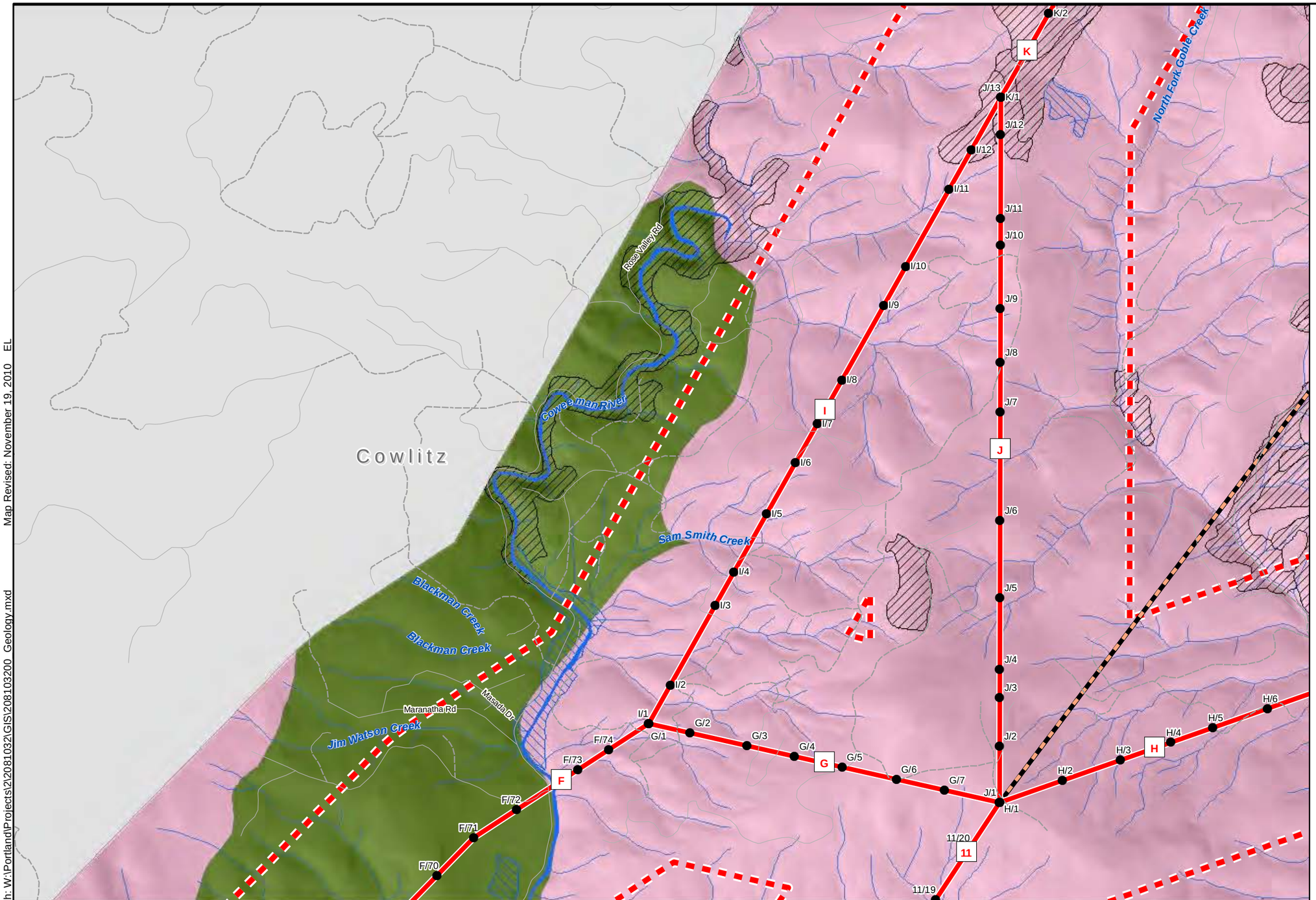


Explanation

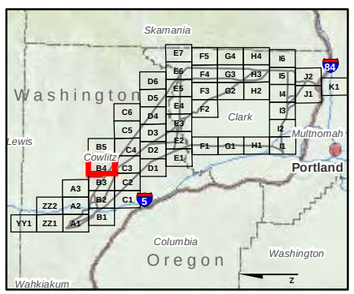
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page B4

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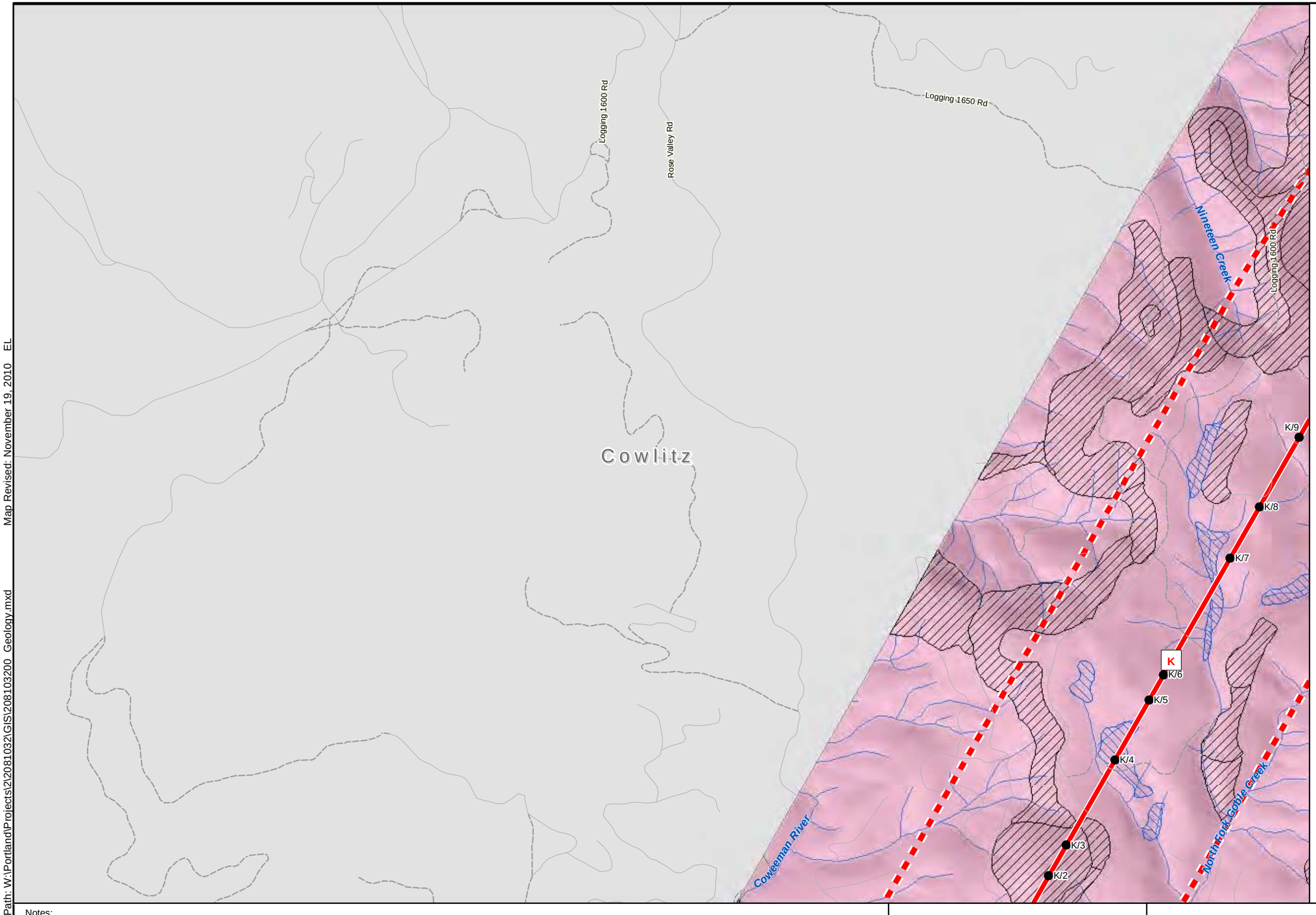


Explanation

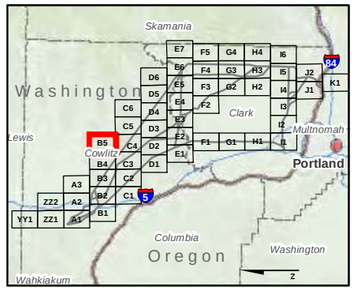
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page B5

Sheet 11 of 156

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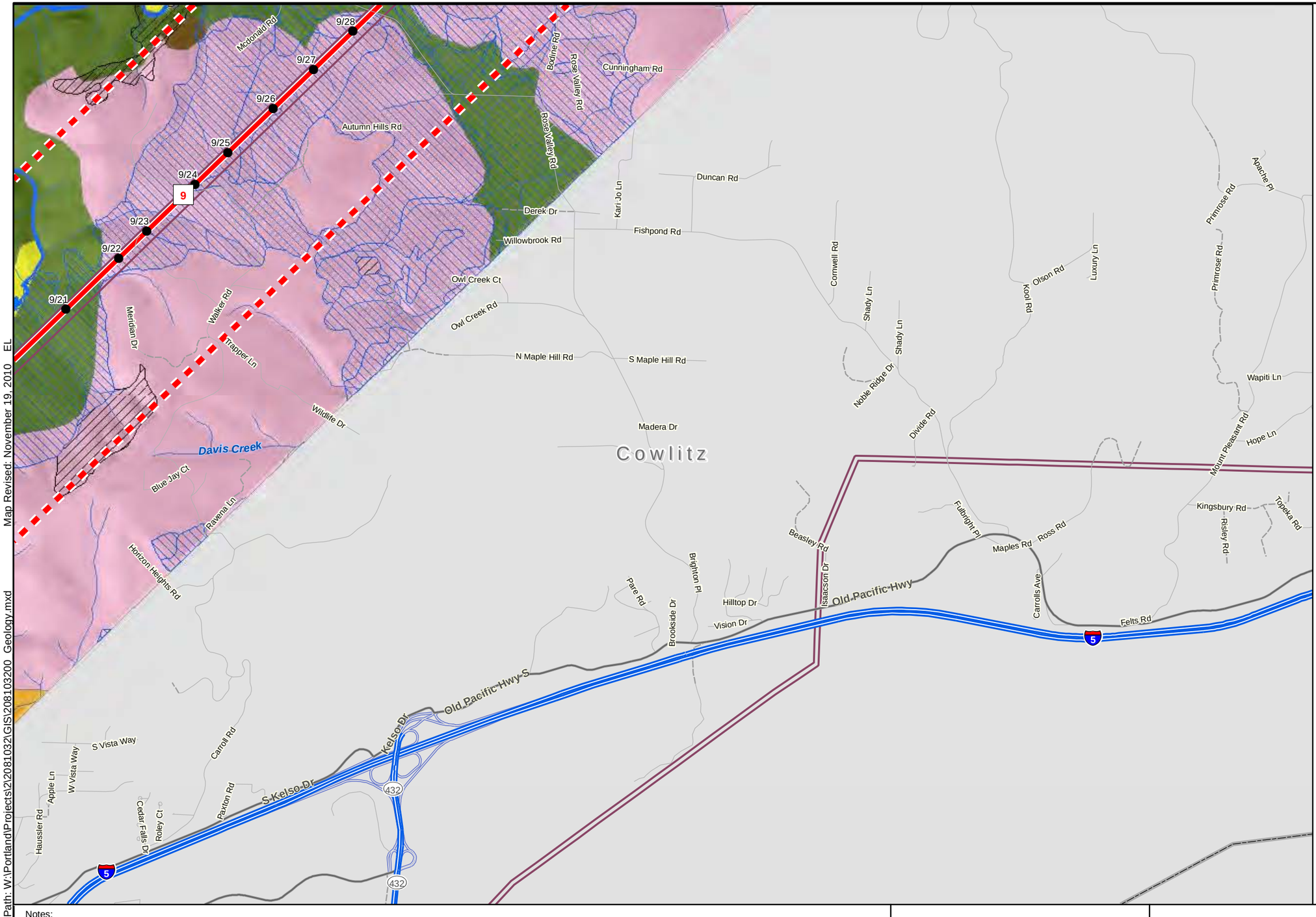


Explanation

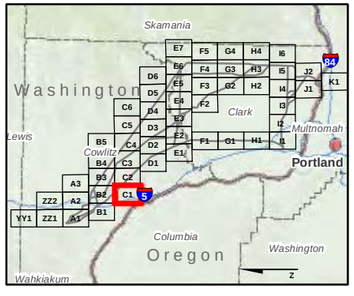
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C1

Sheet 12 of 156

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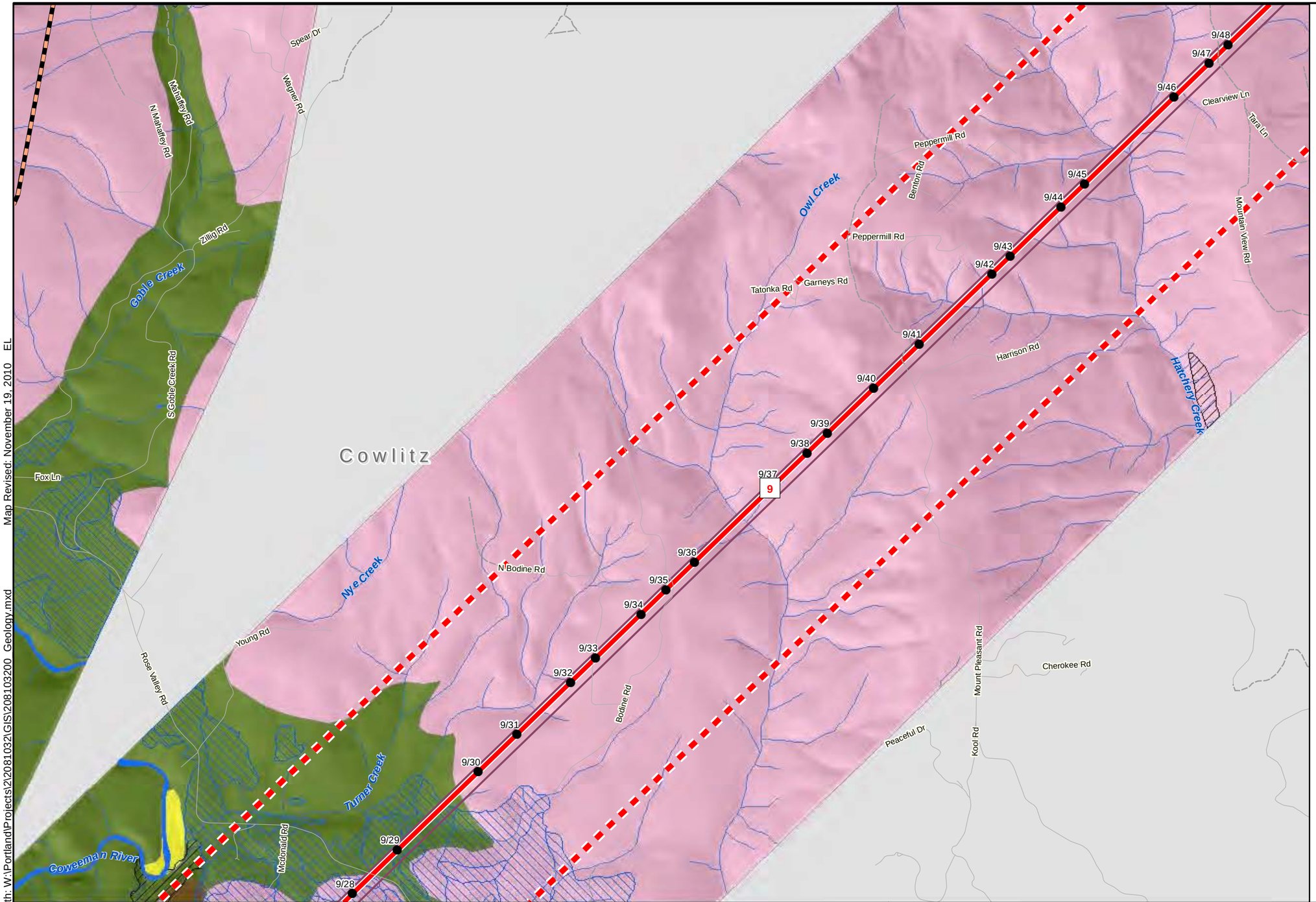

Explanation

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- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
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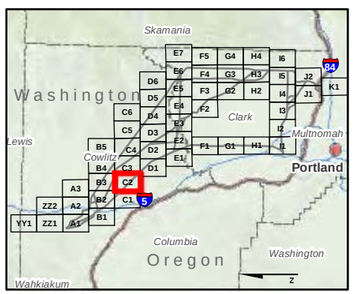
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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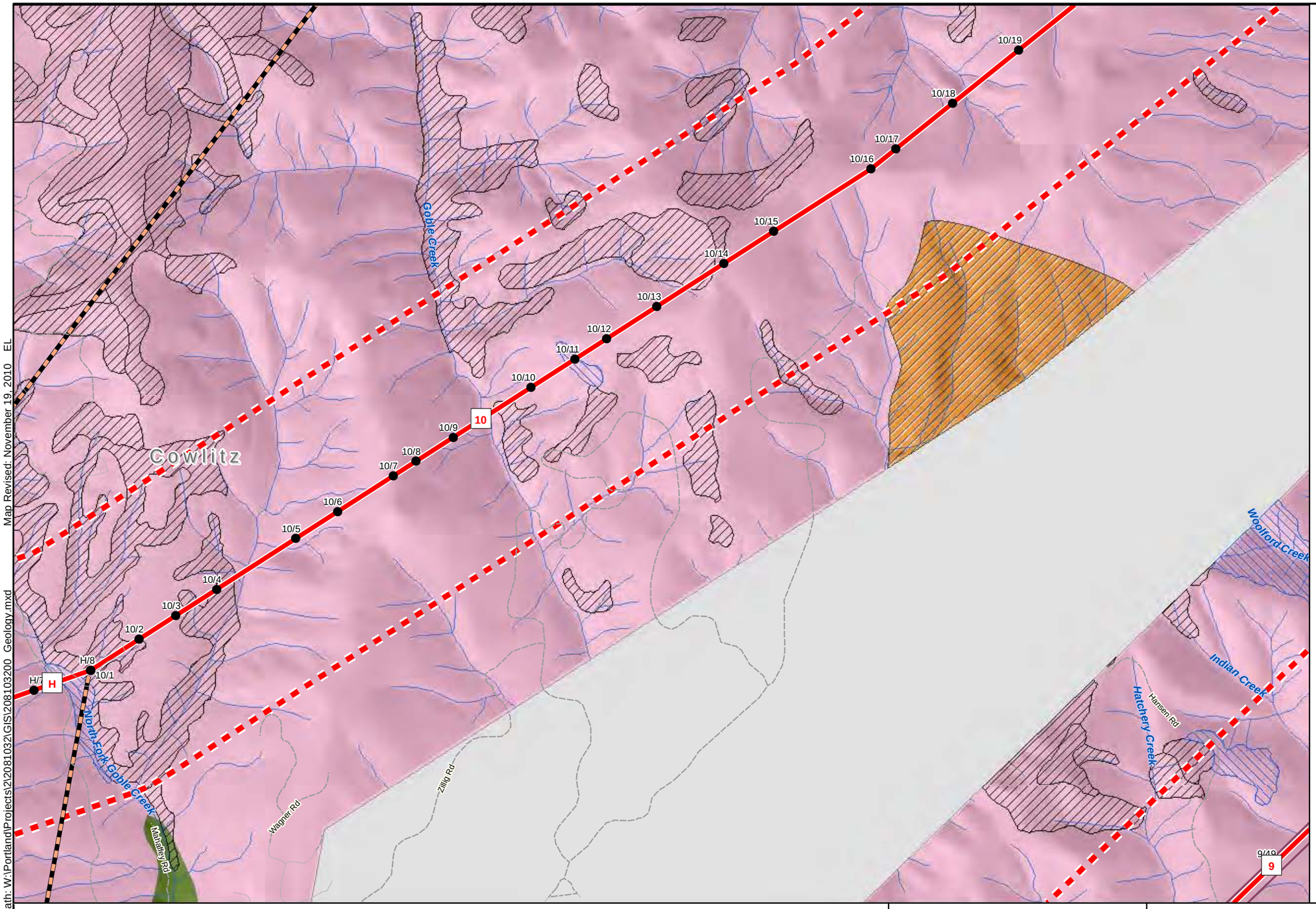
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C2

Sheet 13 of 156



Explanation

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- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
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- Intrusive Rocks
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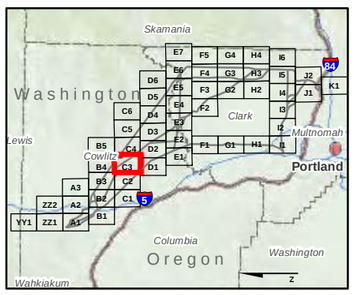
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C3

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Map Revised: November 19, 2010 EL
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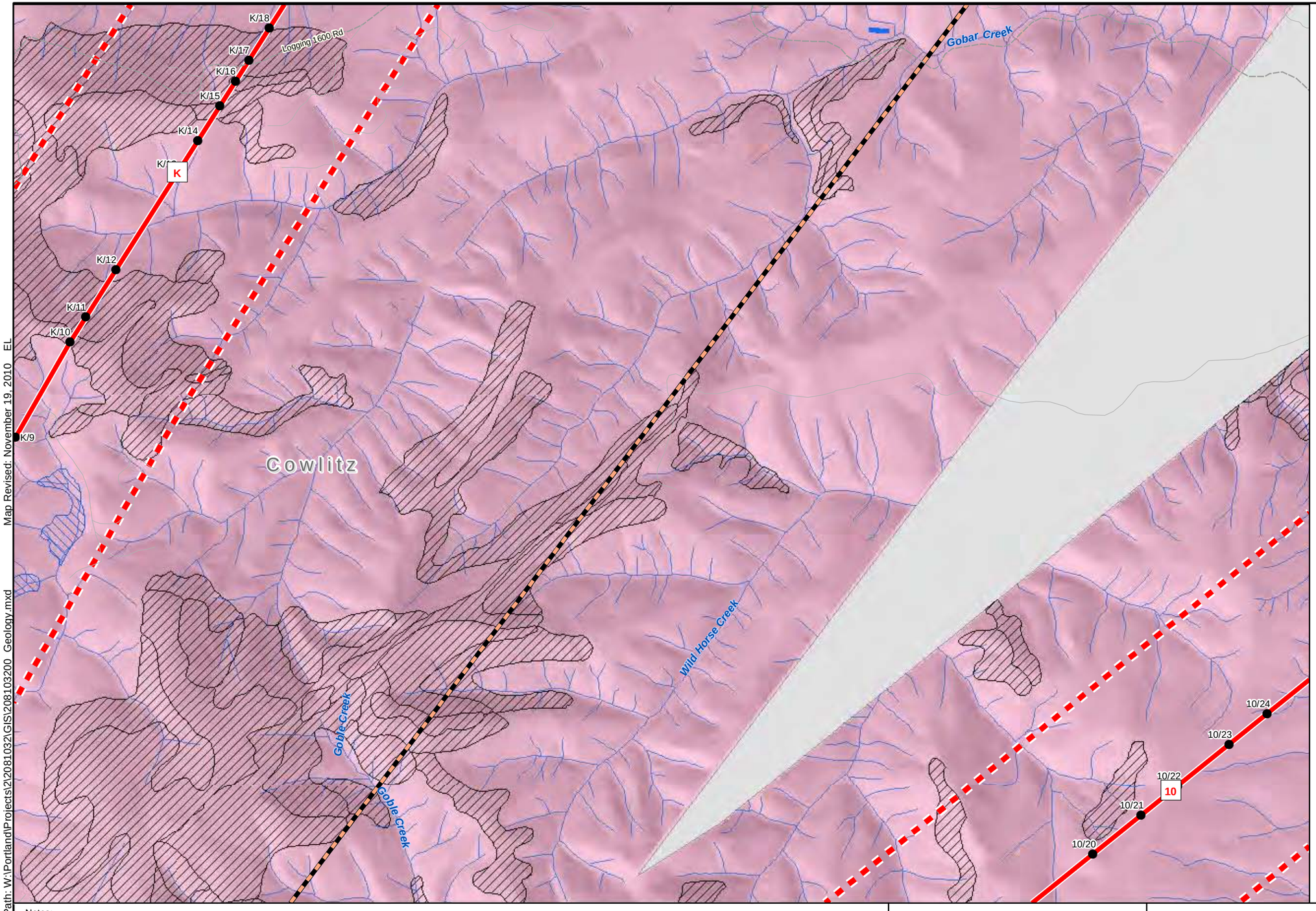
Office: PORT



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
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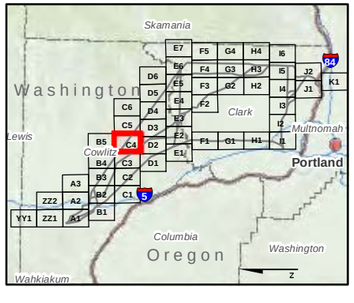
N

0 1,000 2,000 Feet



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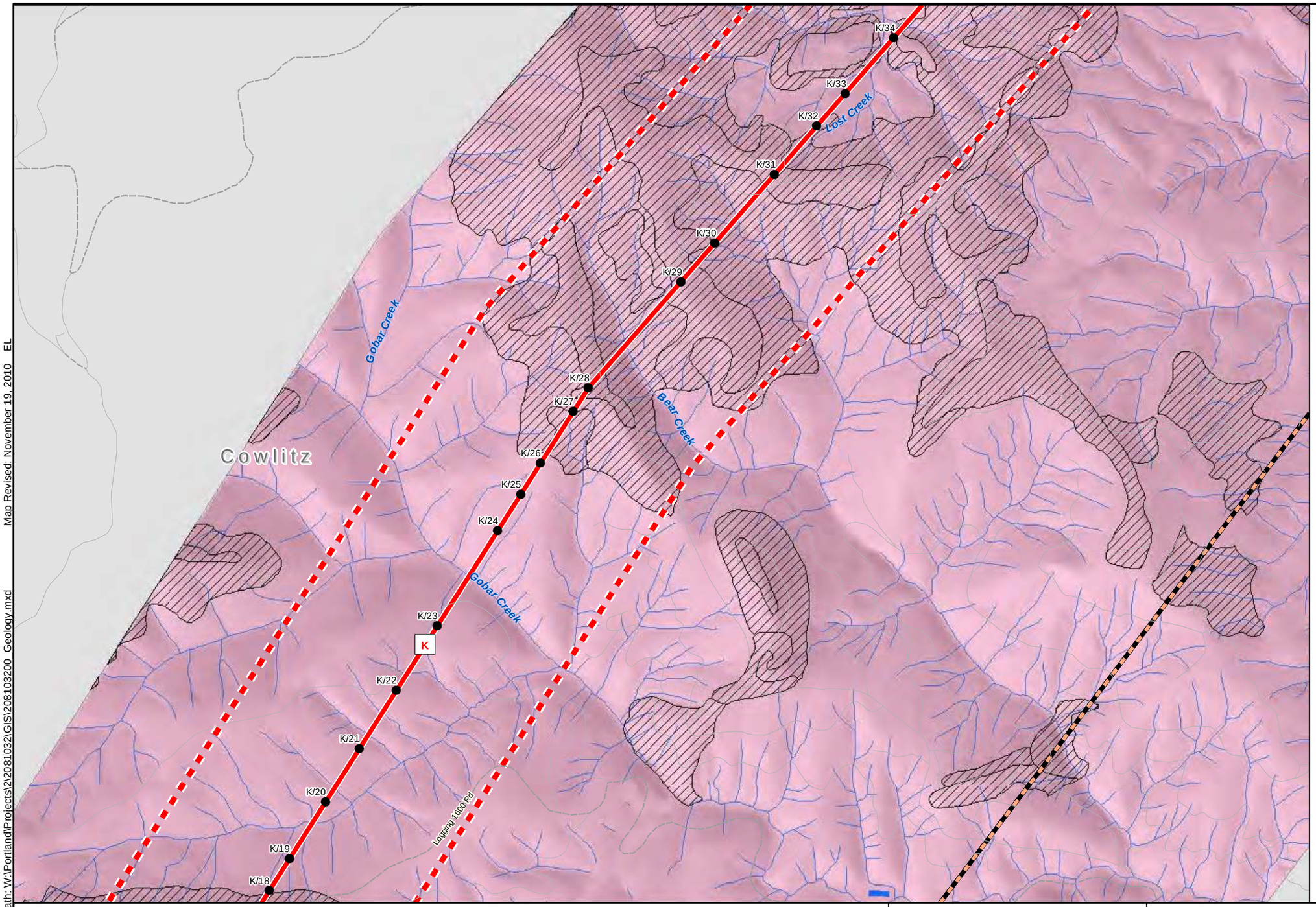
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C4

Sheet 15 of 156



Explanation

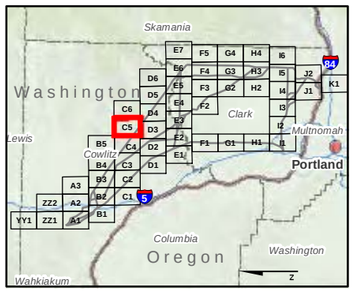
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C5

Sheet 16 of 156

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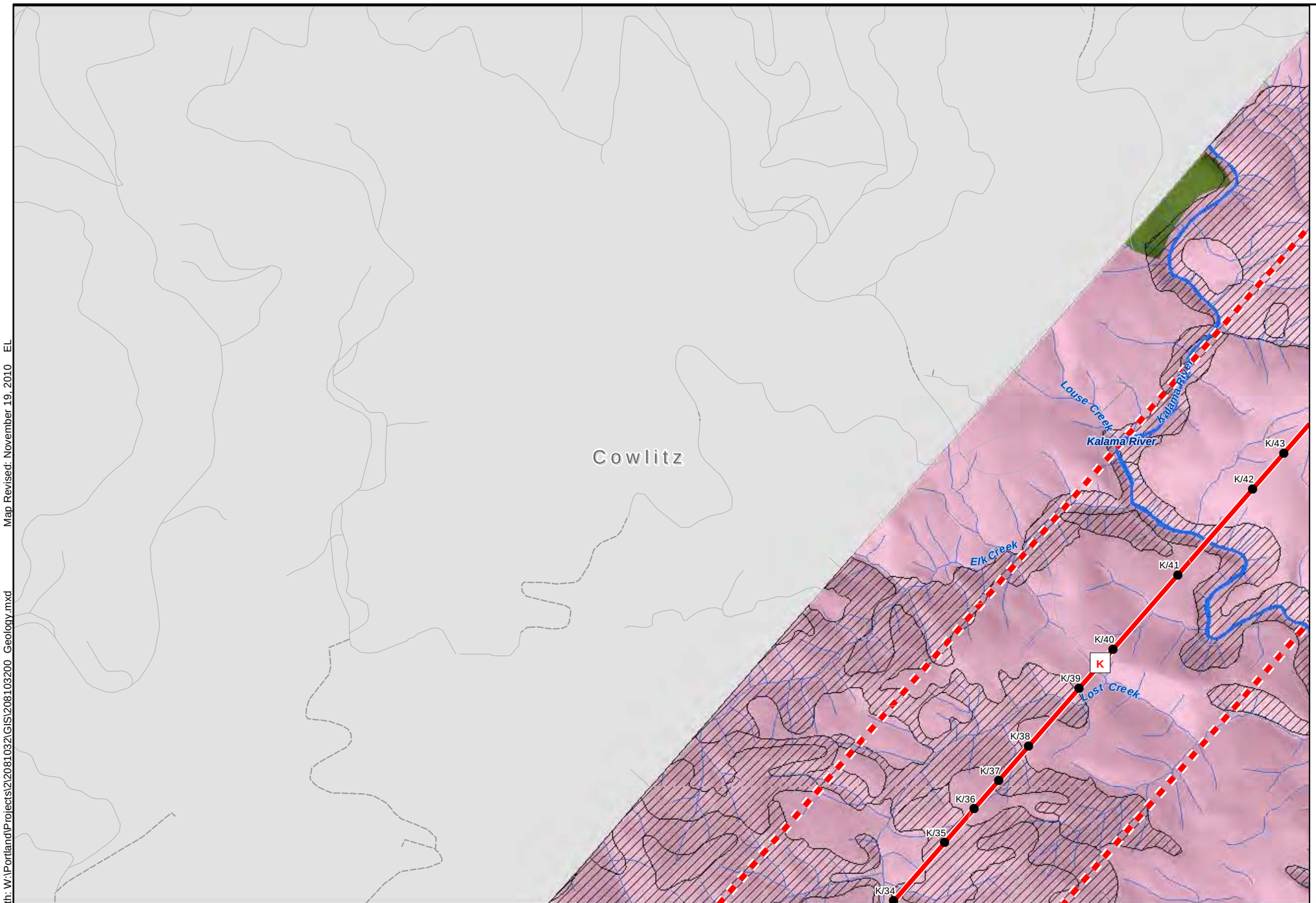


Explanation

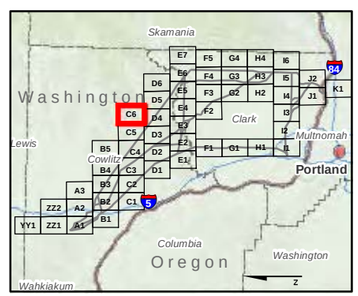
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C6

Sheet 17 of 156

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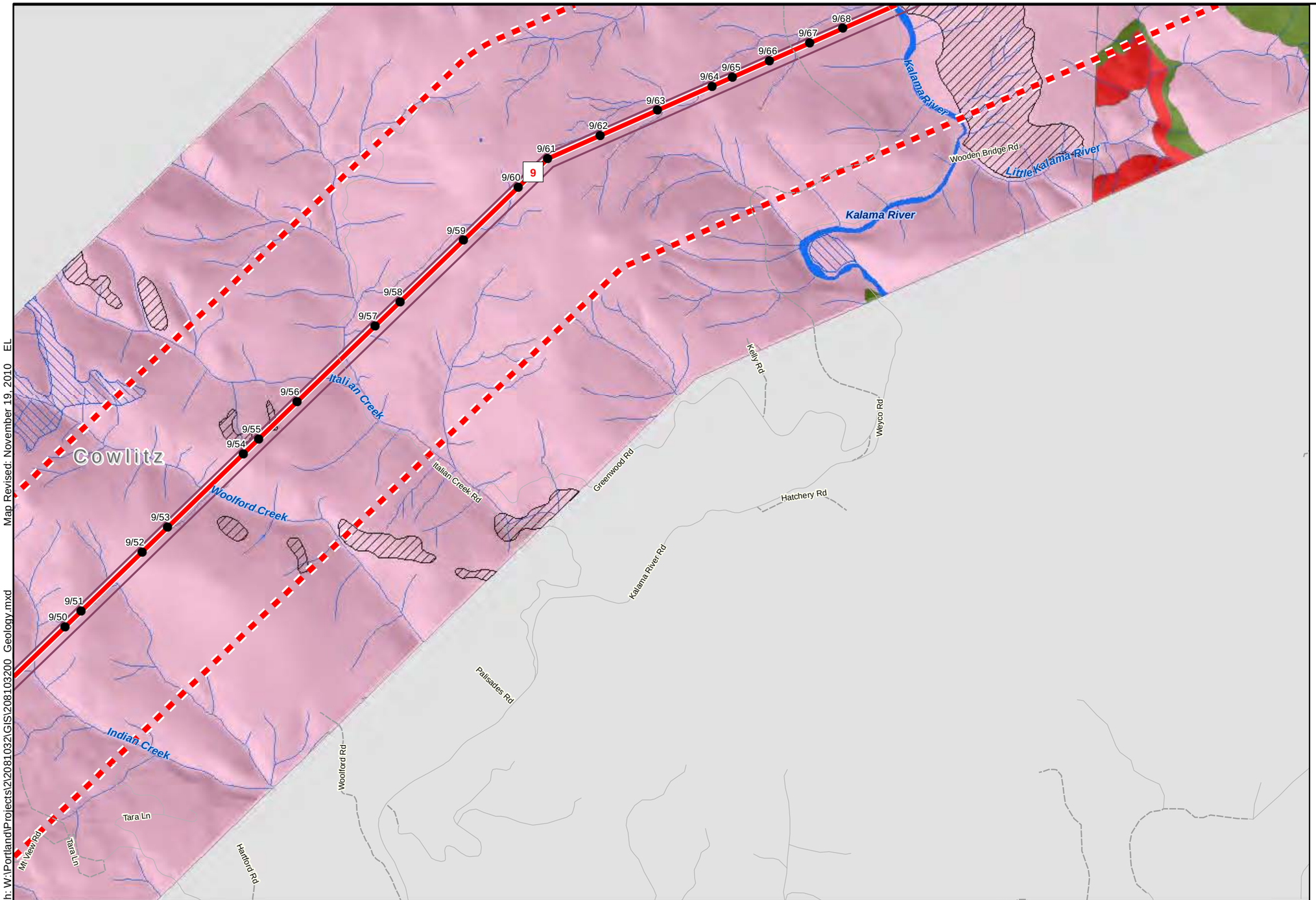


Explanation

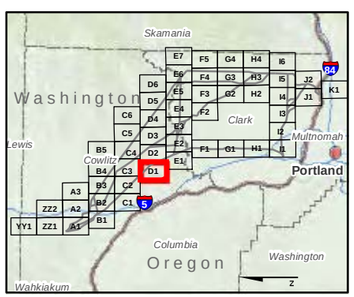
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D1

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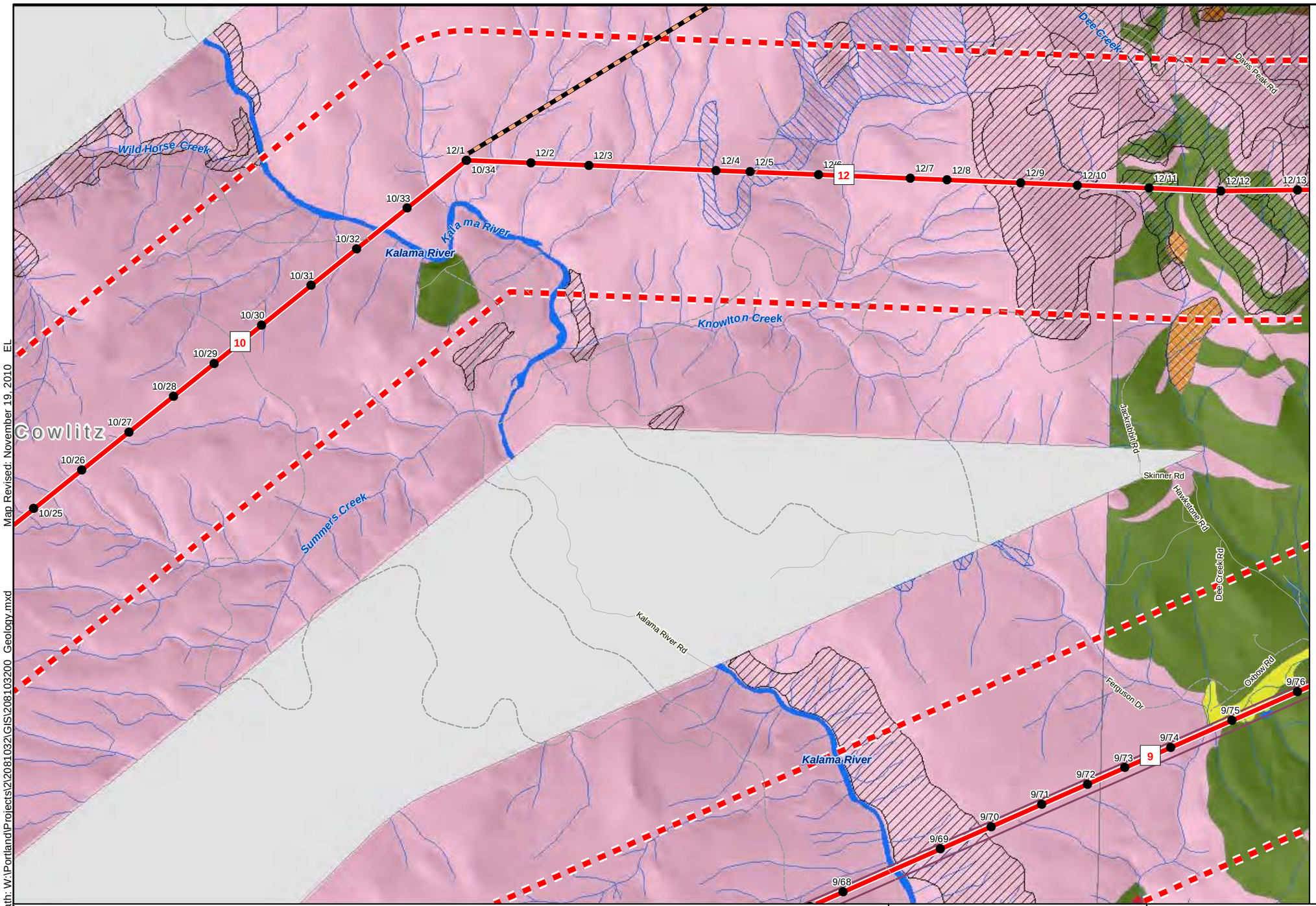


Explanation

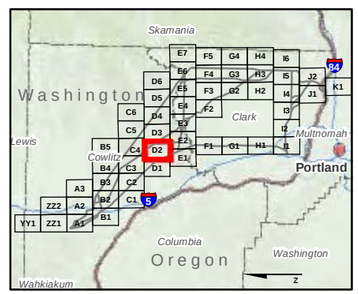
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D2

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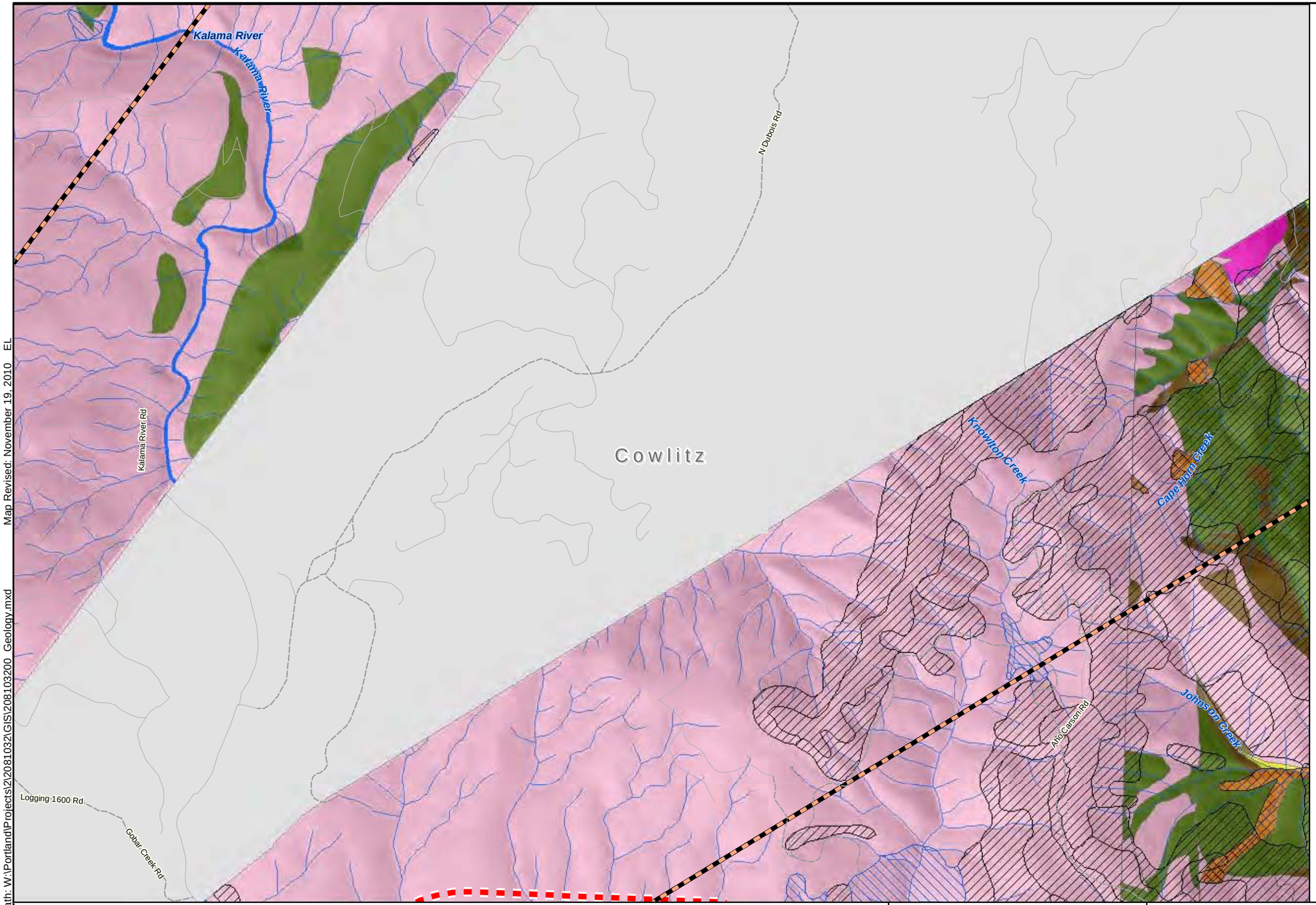


Explanation

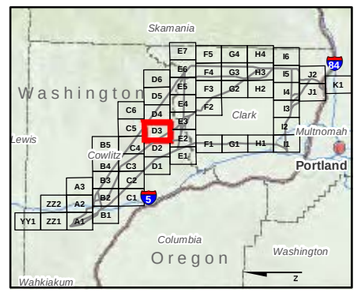
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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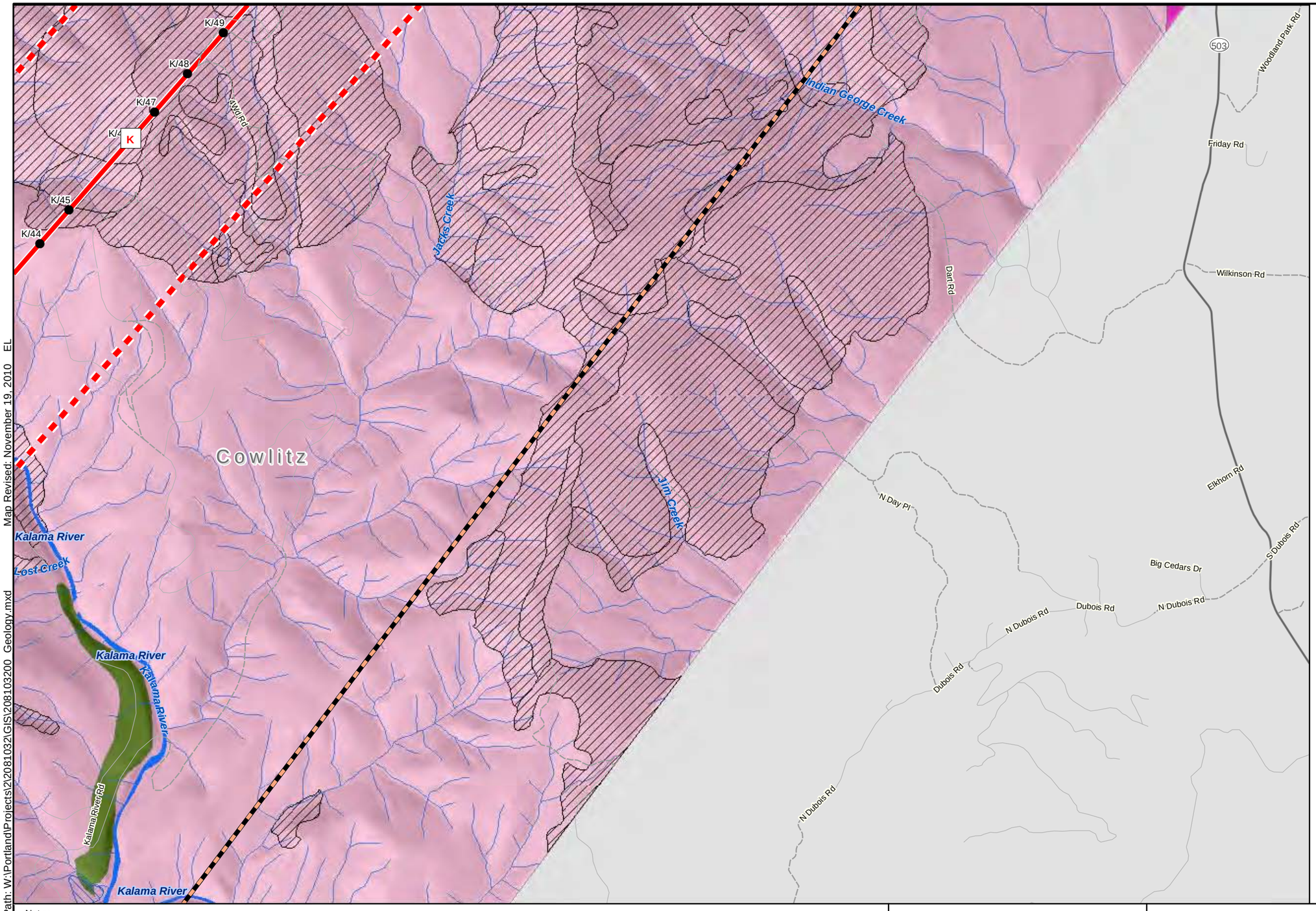
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D3

Sheet 20 of 156



Explanation

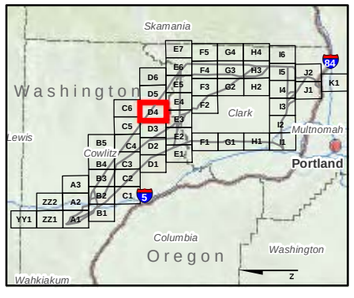
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D4

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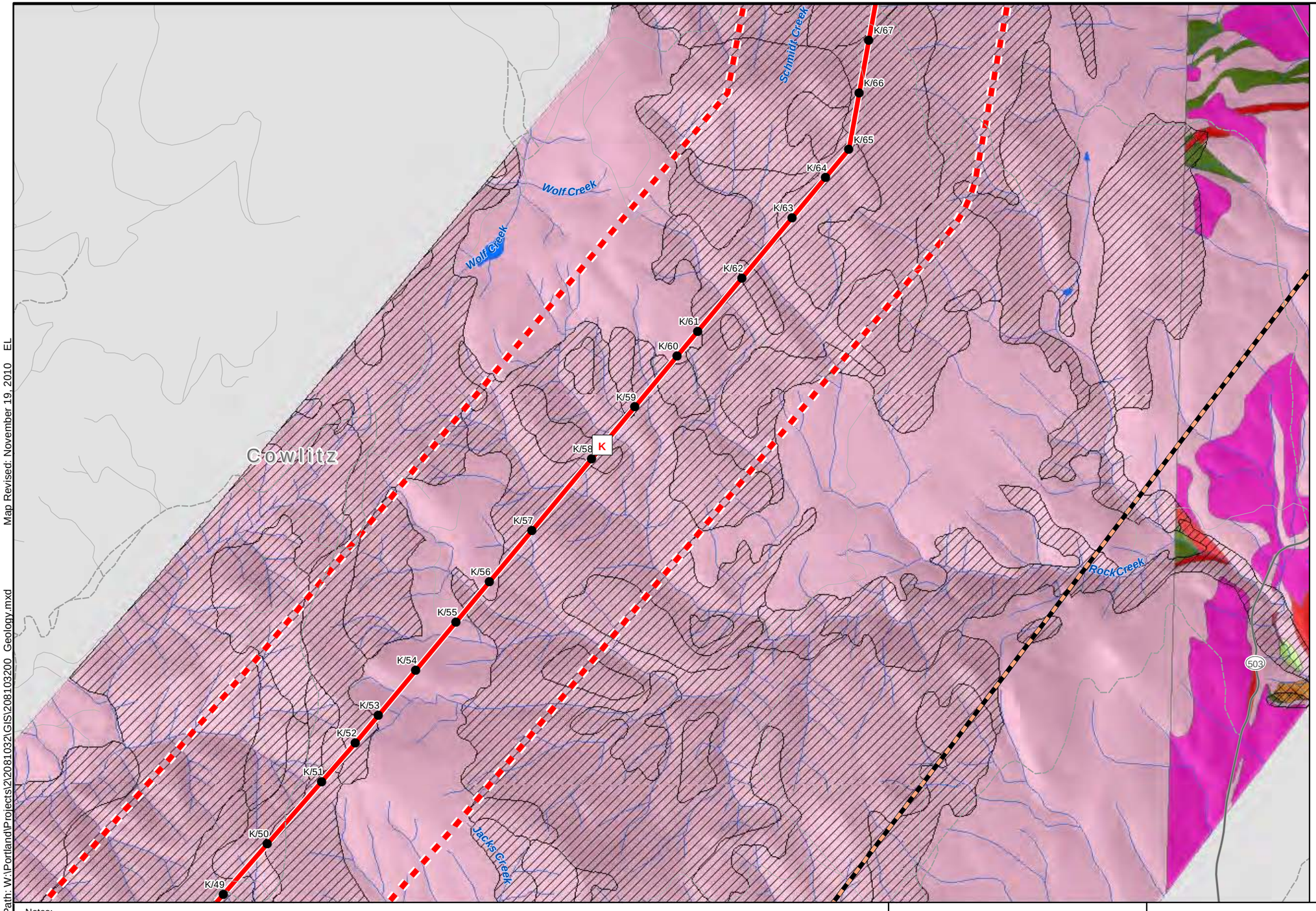


Explanation

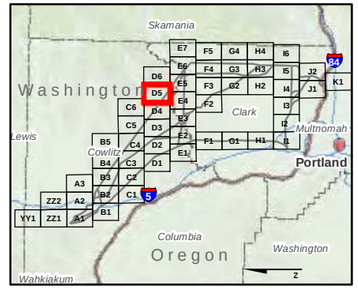
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D5

Sheet 22 of 156

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Map Revised: November 19, 2010 EL

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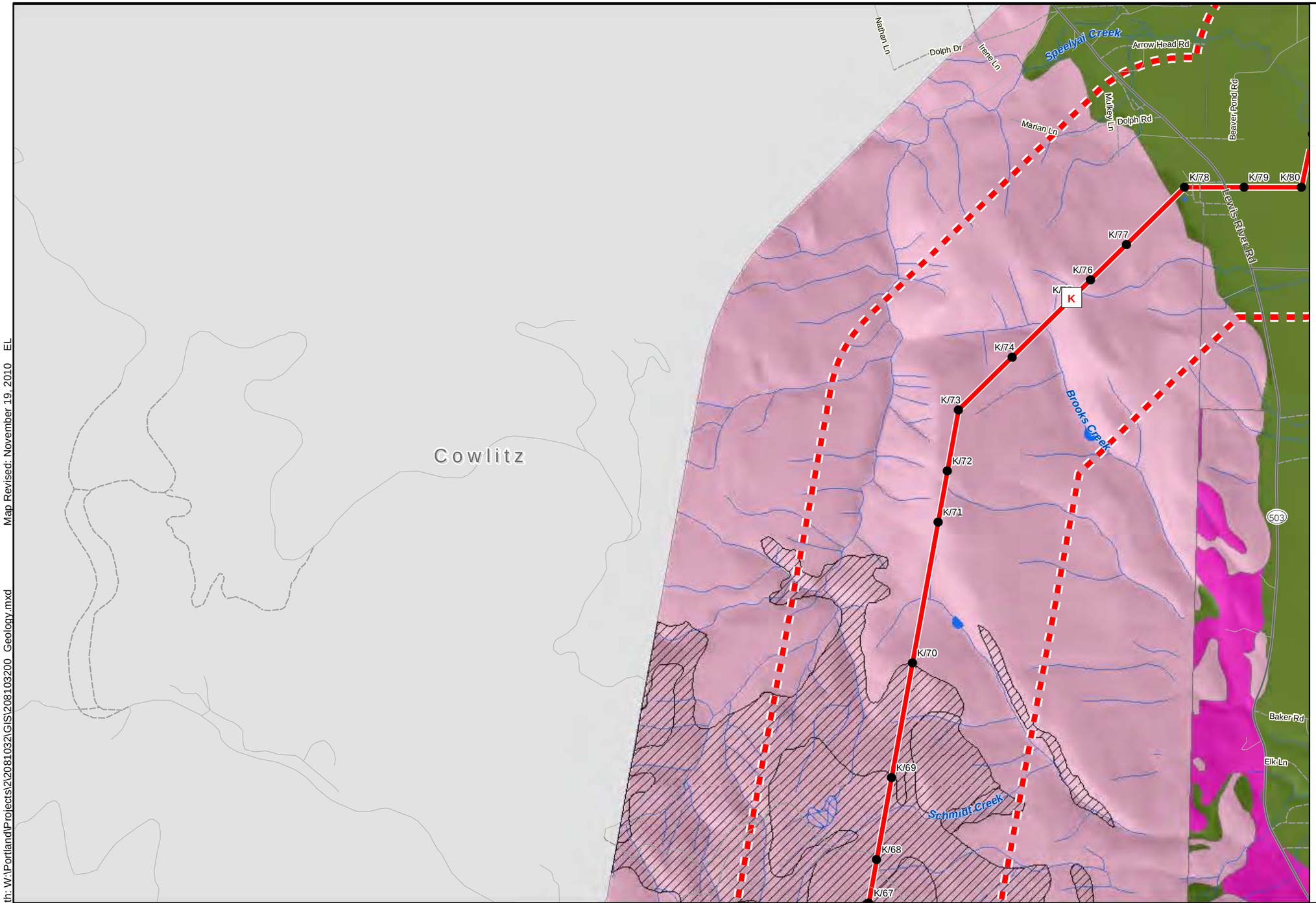


Explanation

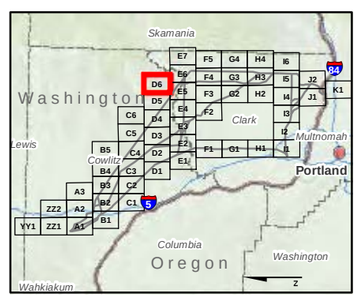
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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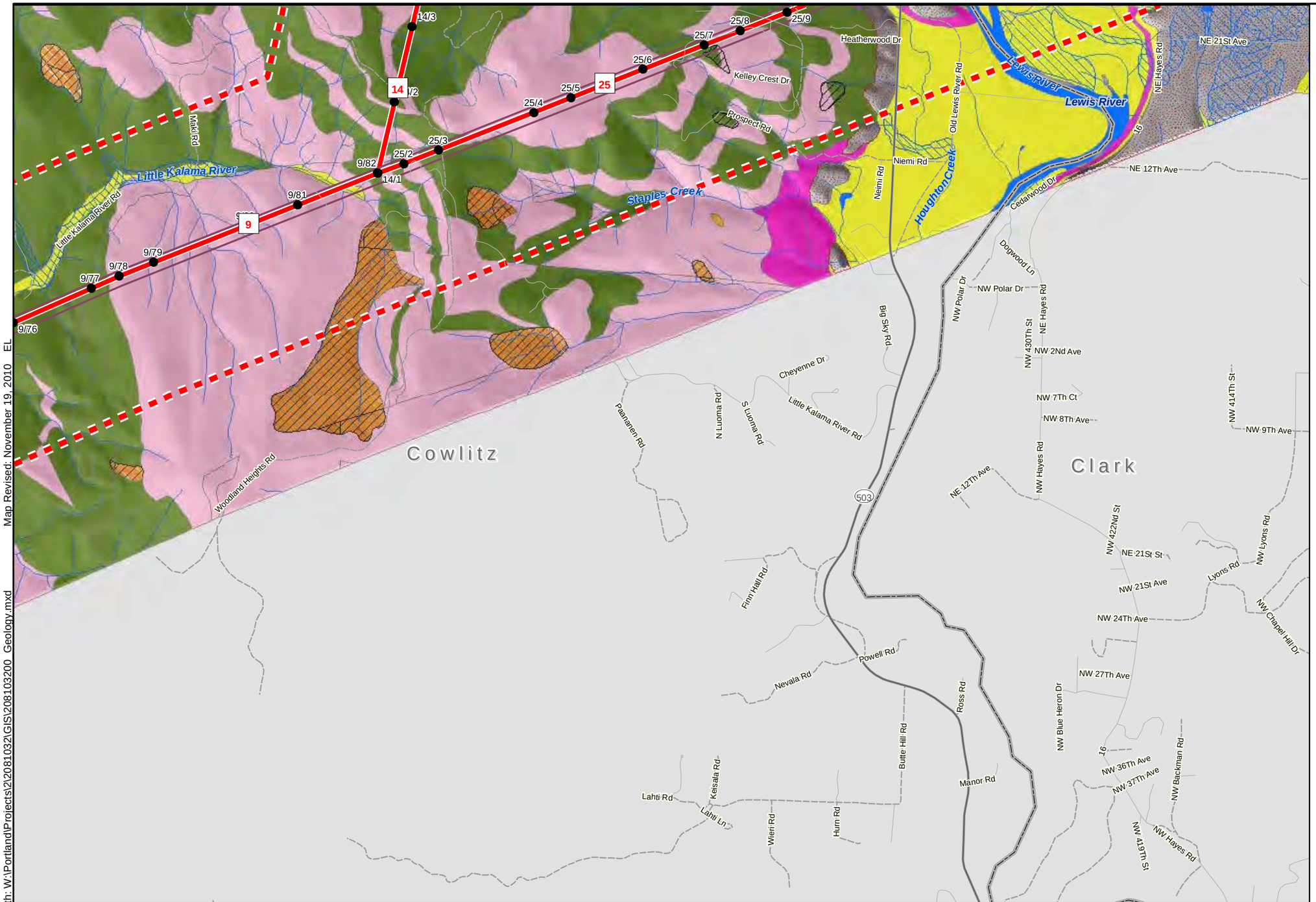
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

Map Page D6

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 23 of 156



Explanation

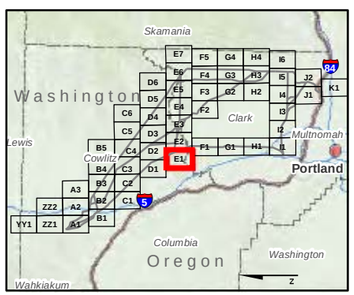
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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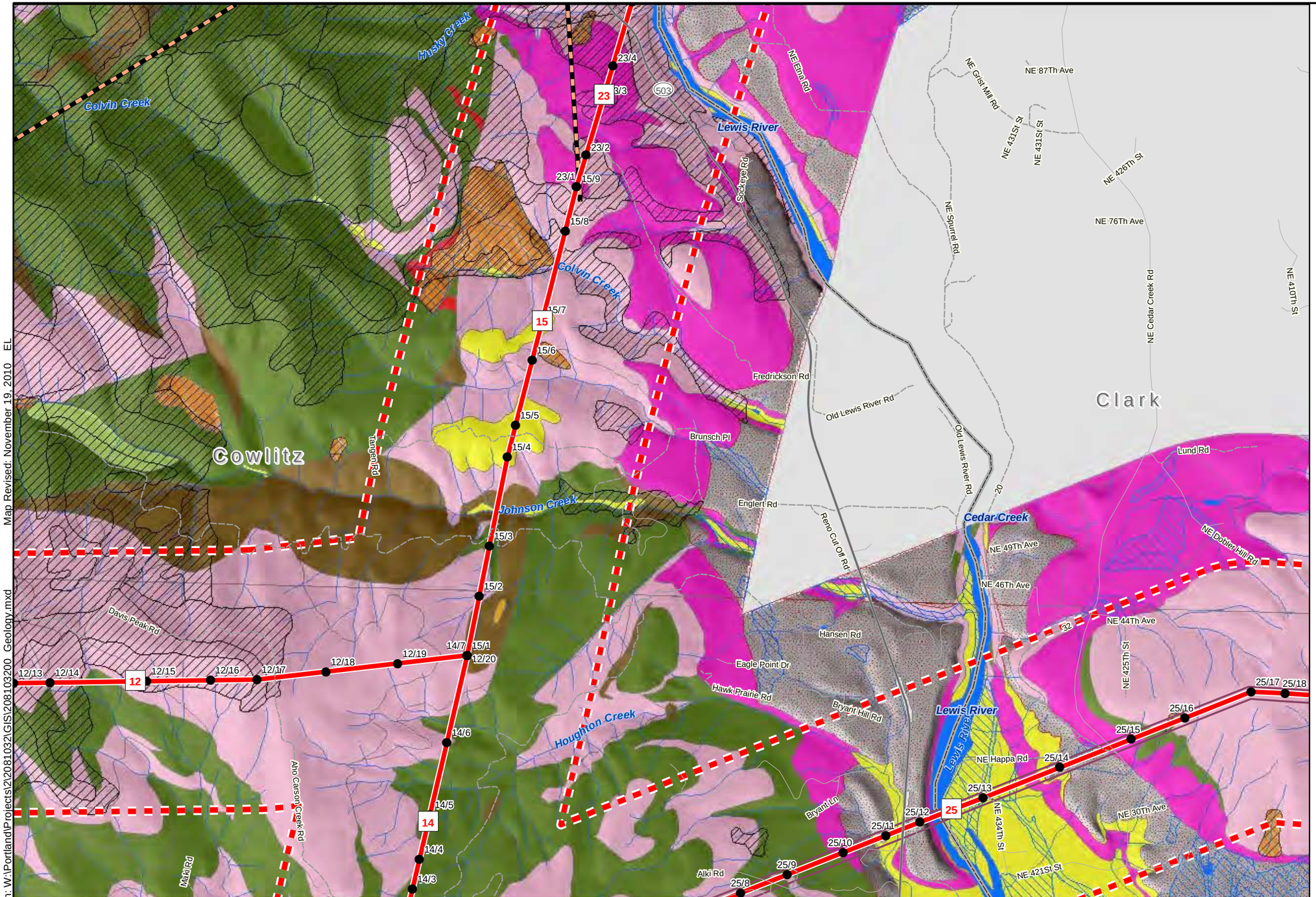
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E1

Sheet 24 of 156



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet

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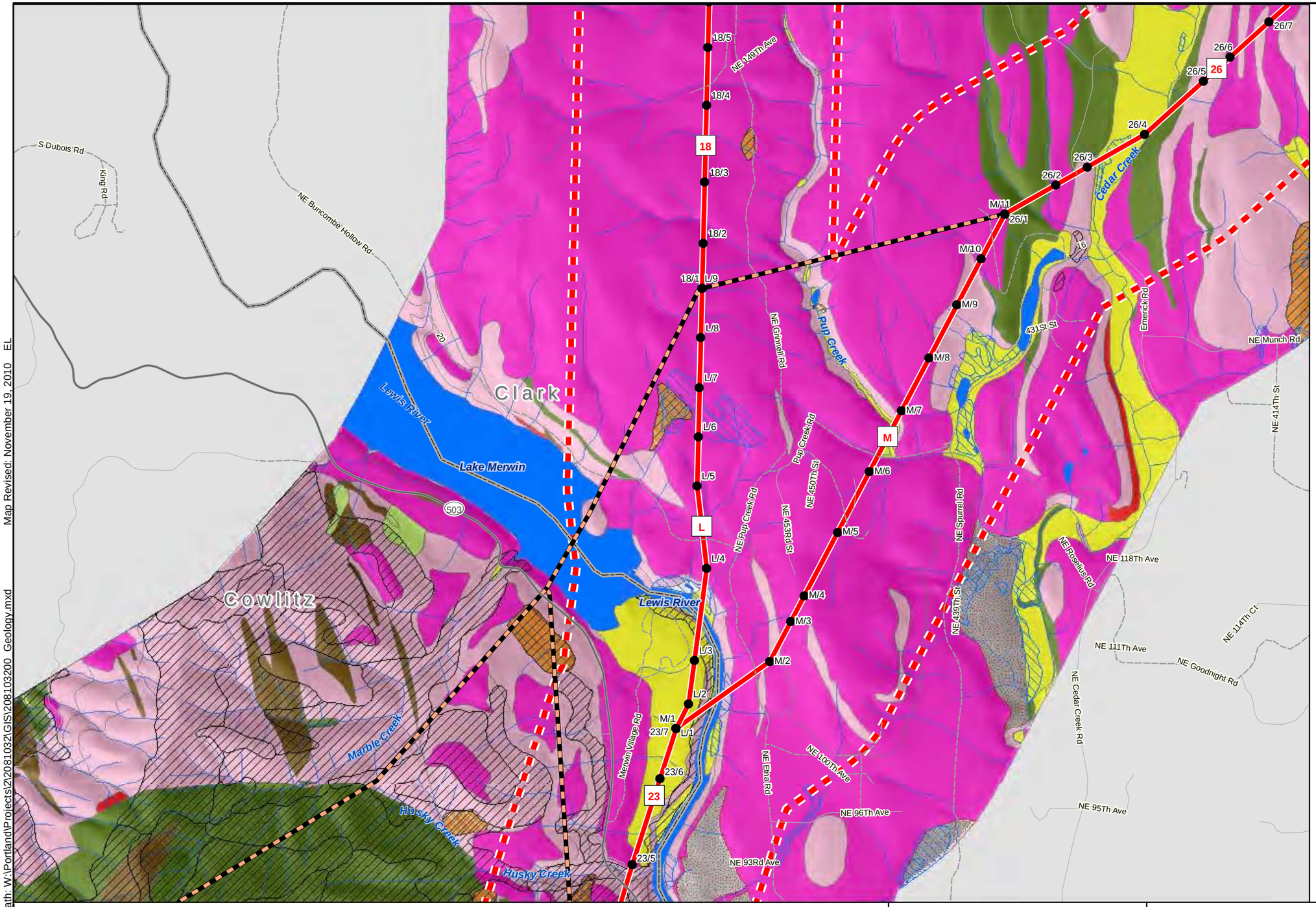
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E2

Sheet 25 of 156



Explanation

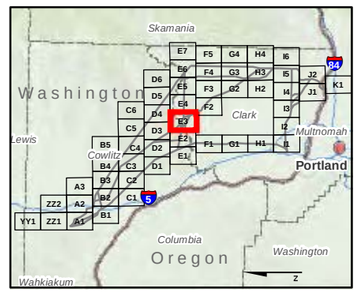
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E3

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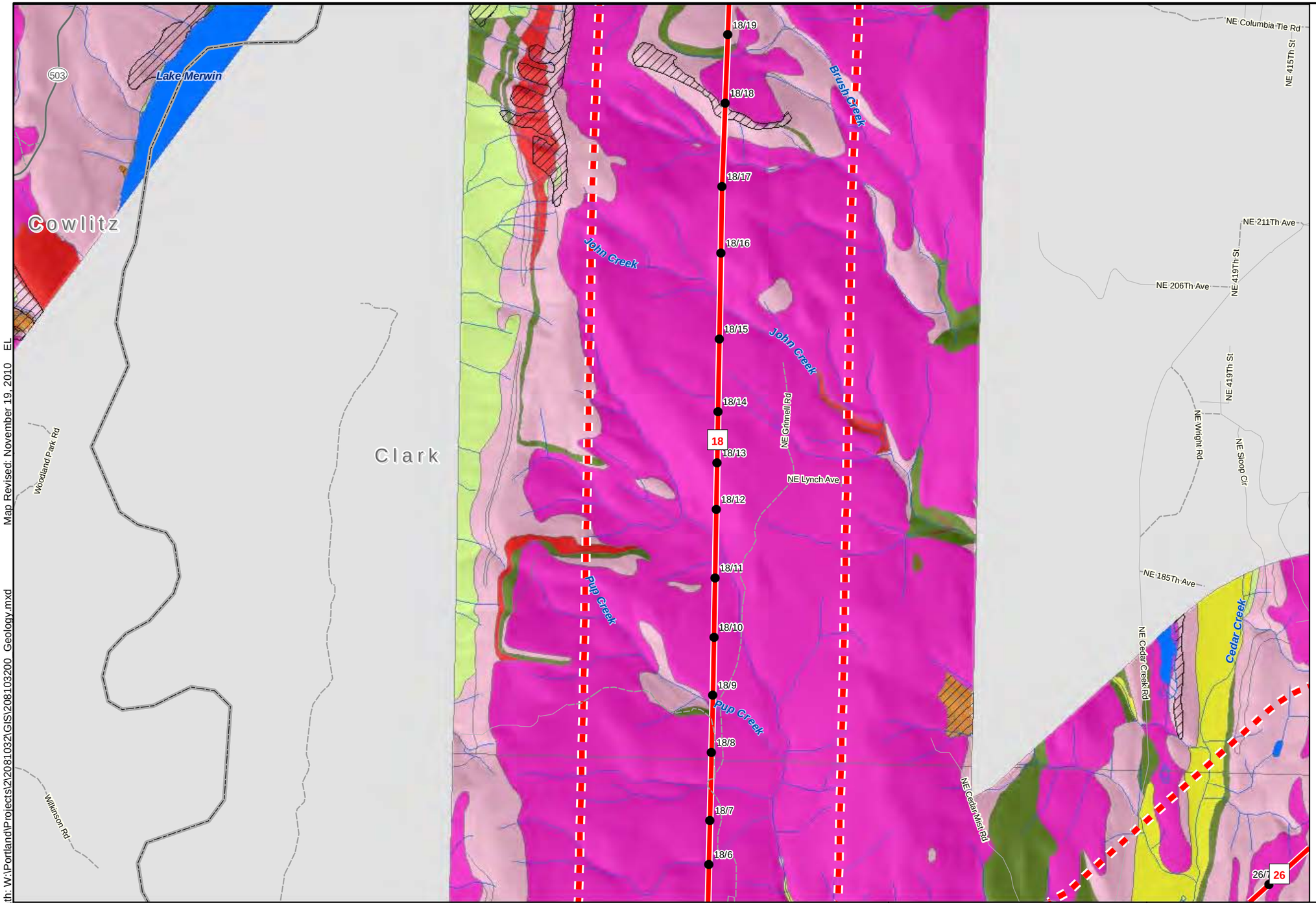

Explanation

- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
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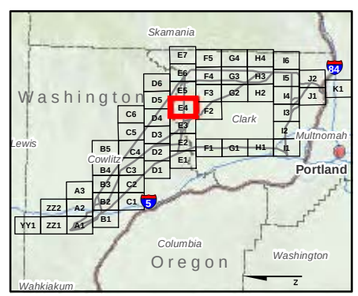
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E4

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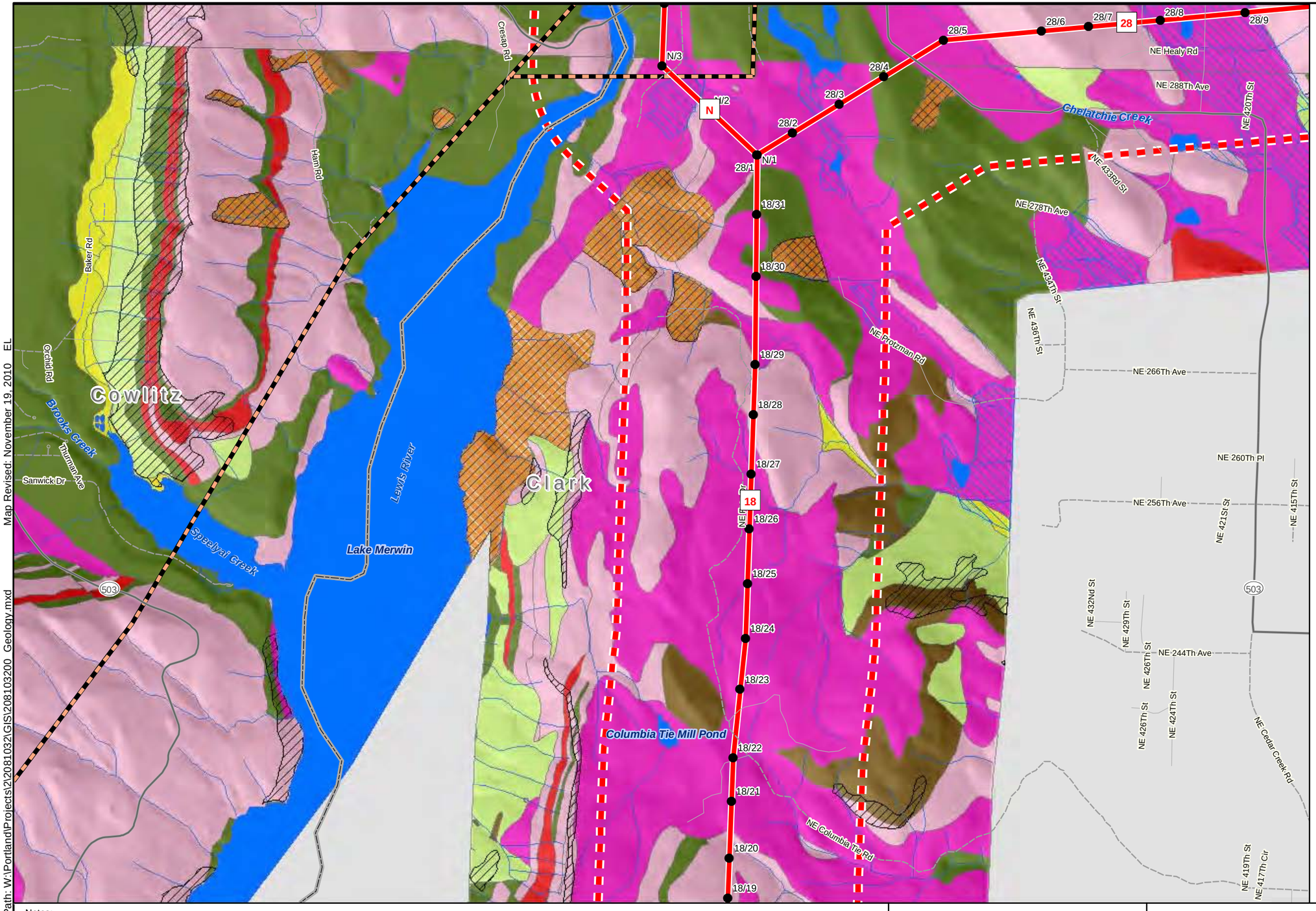

Explanation

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- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
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Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
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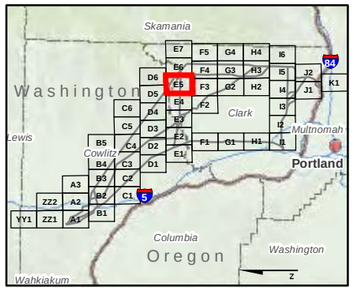
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E5

Sheet 28 of 156

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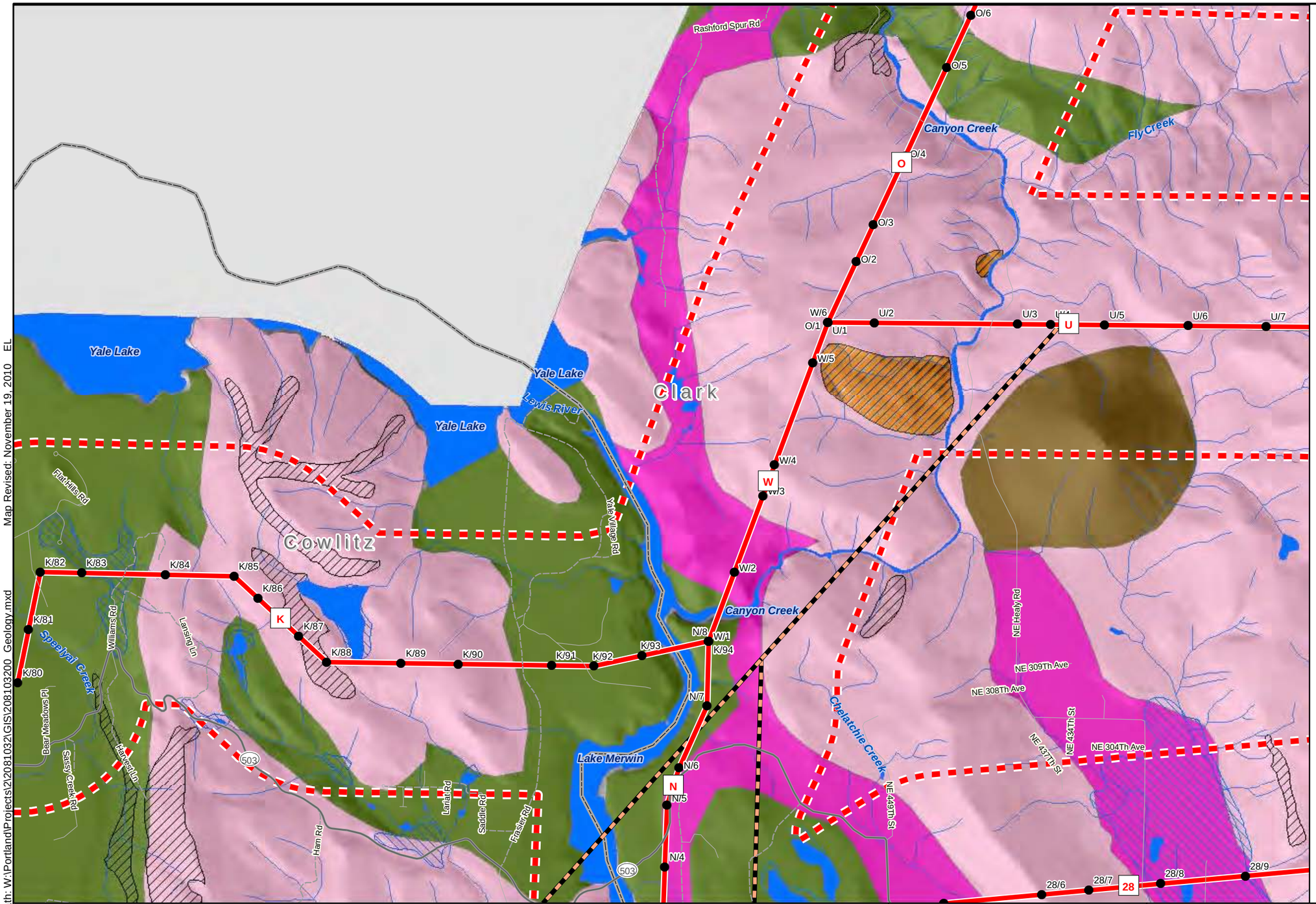


Explanation

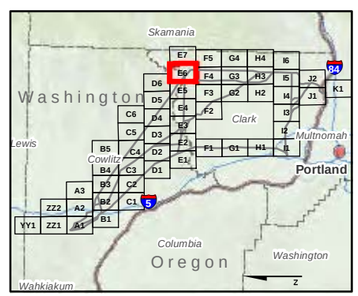
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E6

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Skamania

Clark

Nfd 5301 Rd

Nfd 54 Rd

Canyon Creek

Lost Lake

NE Healy Rd

Canyon Creek

O/6

O/7

O/8

O/9

O/10

O/11

O/12

O/13

O

Explanation

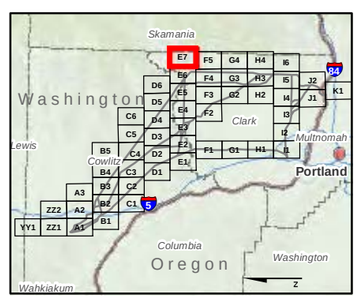
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E7

Sheet 30 of 156

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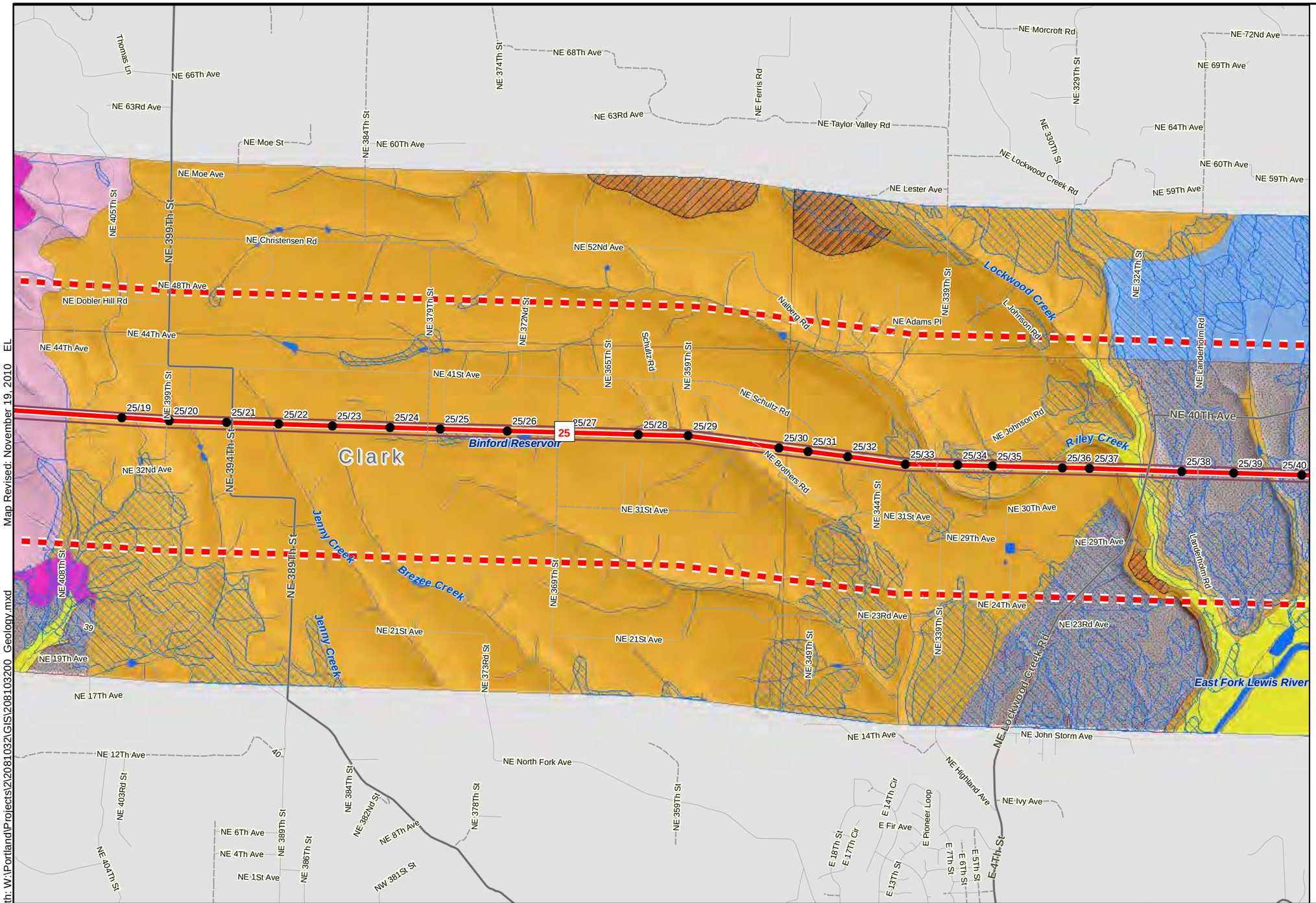

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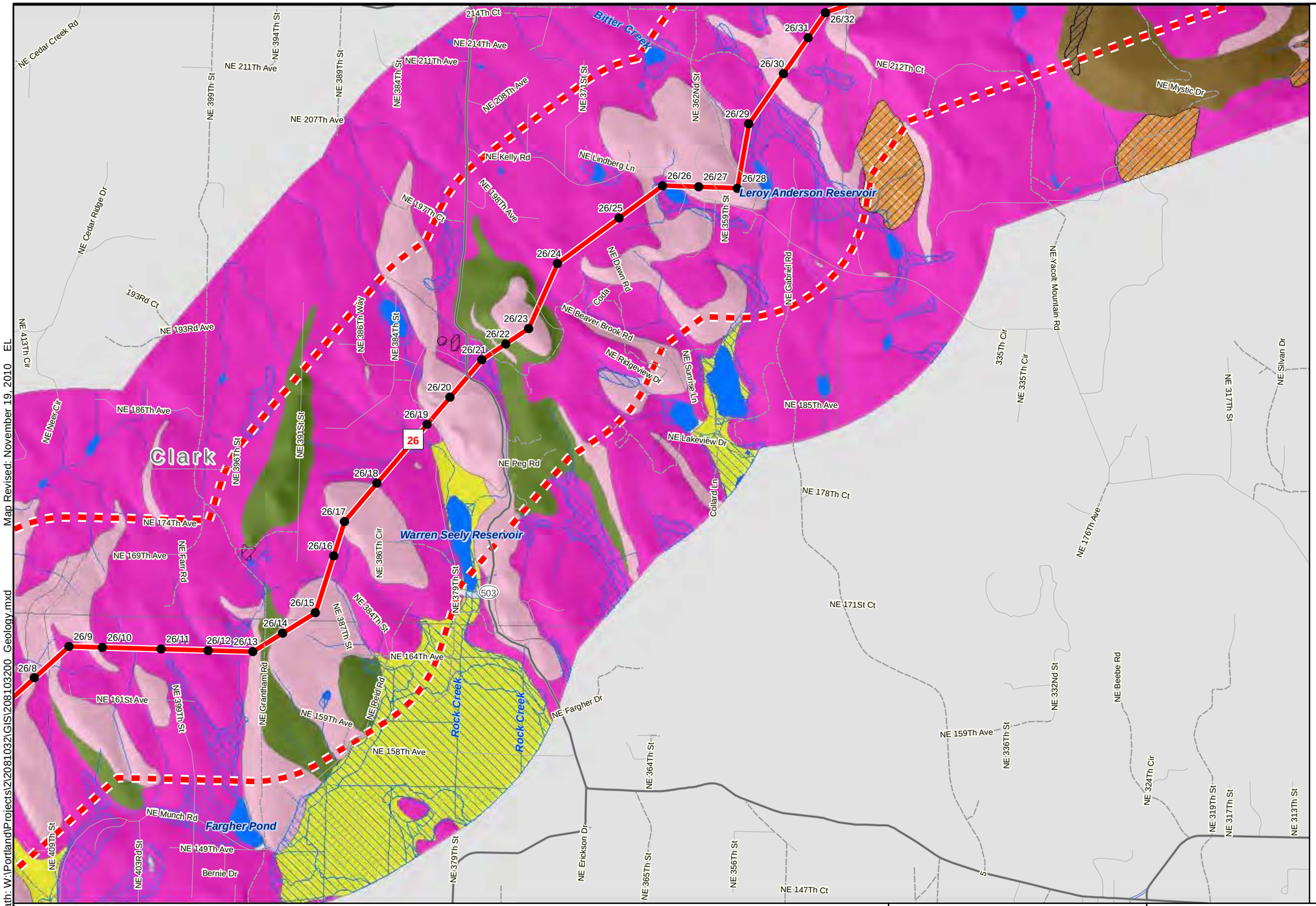
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F1

Sheet 31 of 156



Explanation

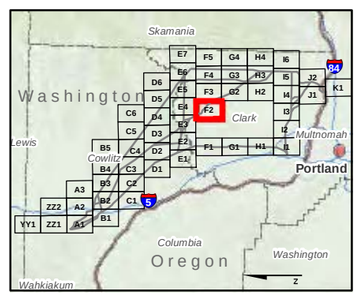
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F2

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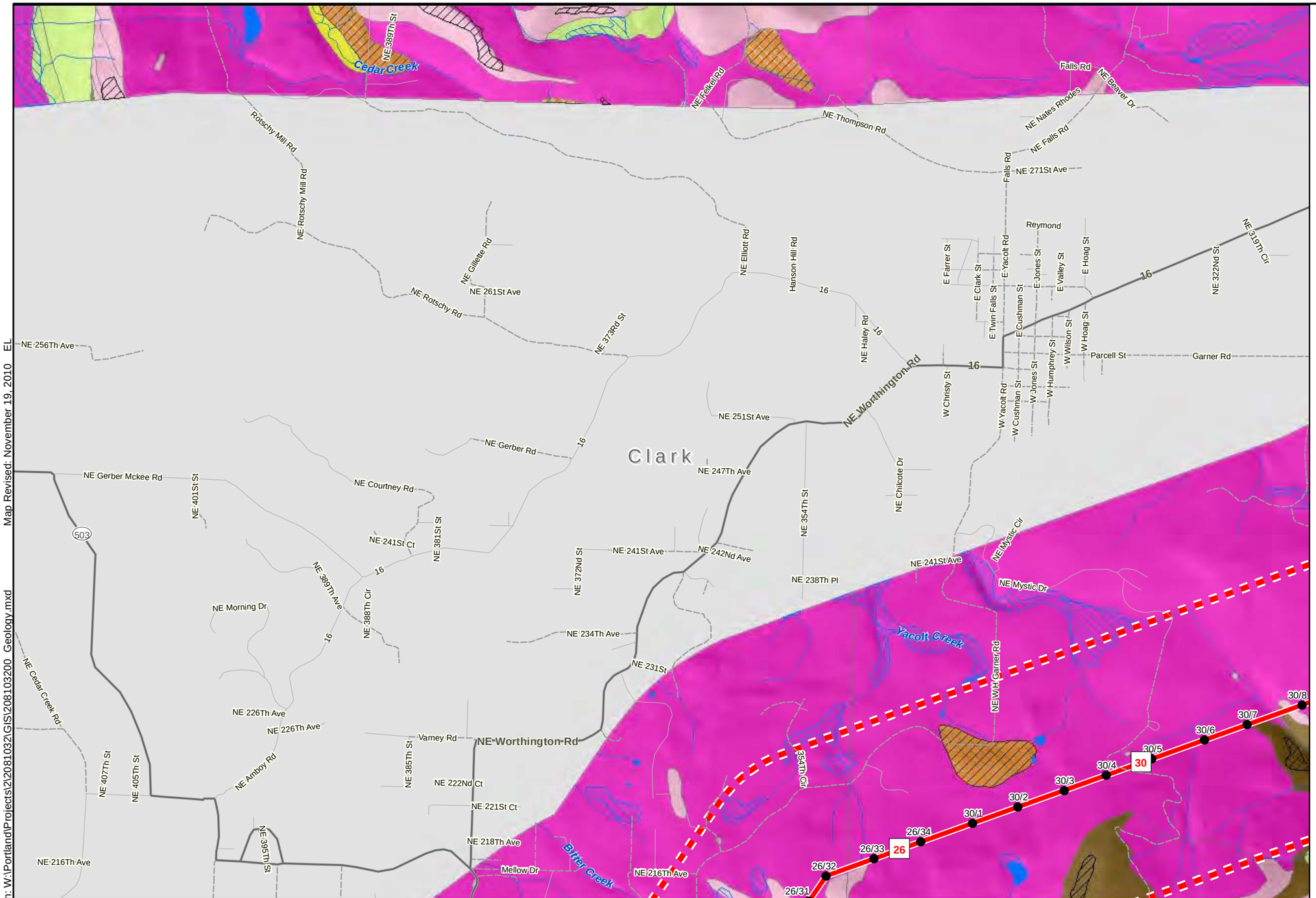

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet

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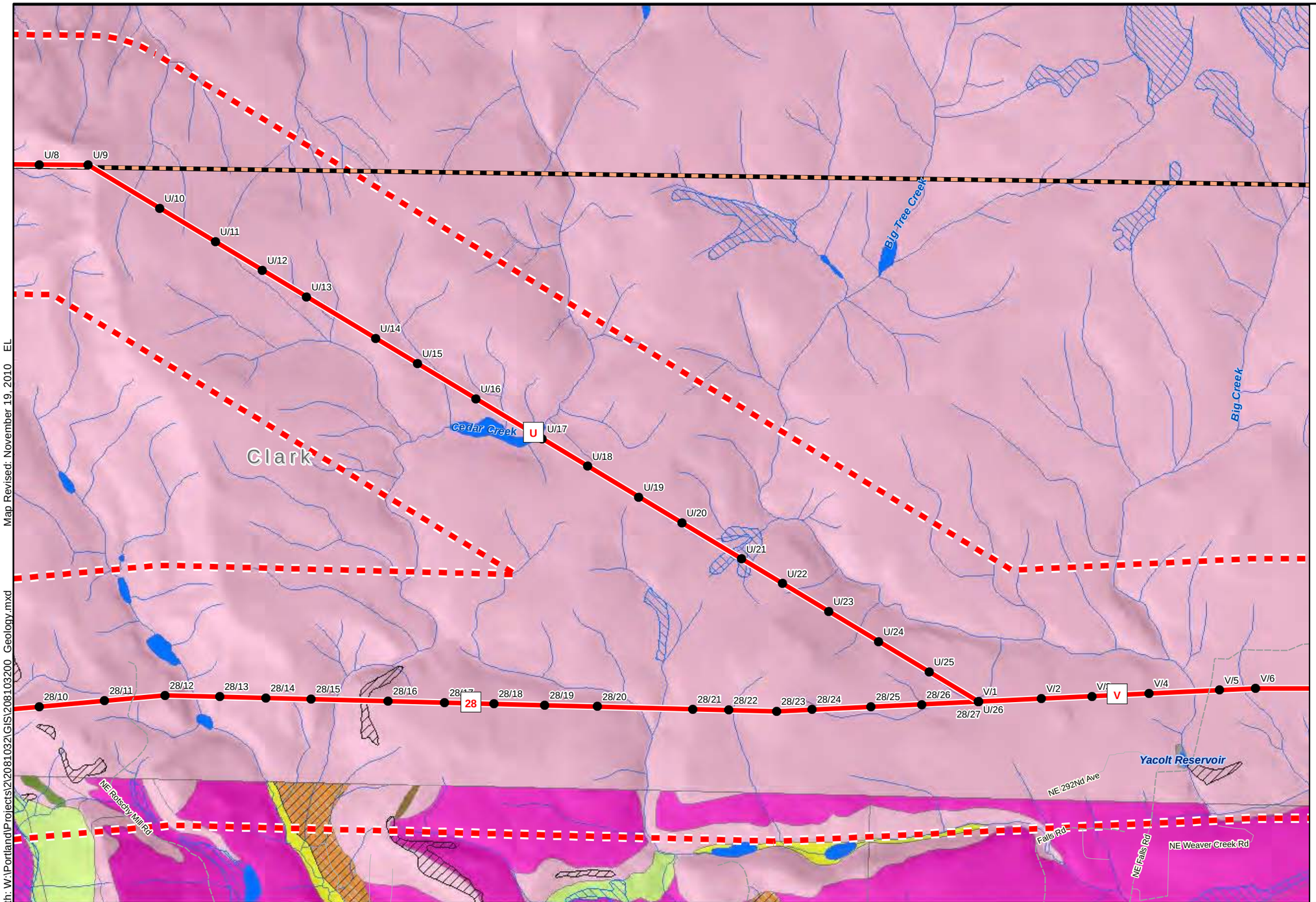
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F3

Sheet 33 of 156



Explanation

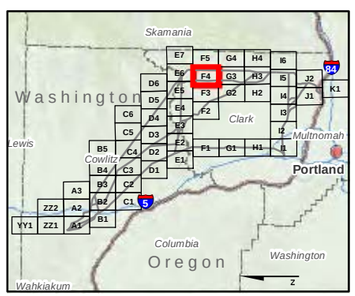
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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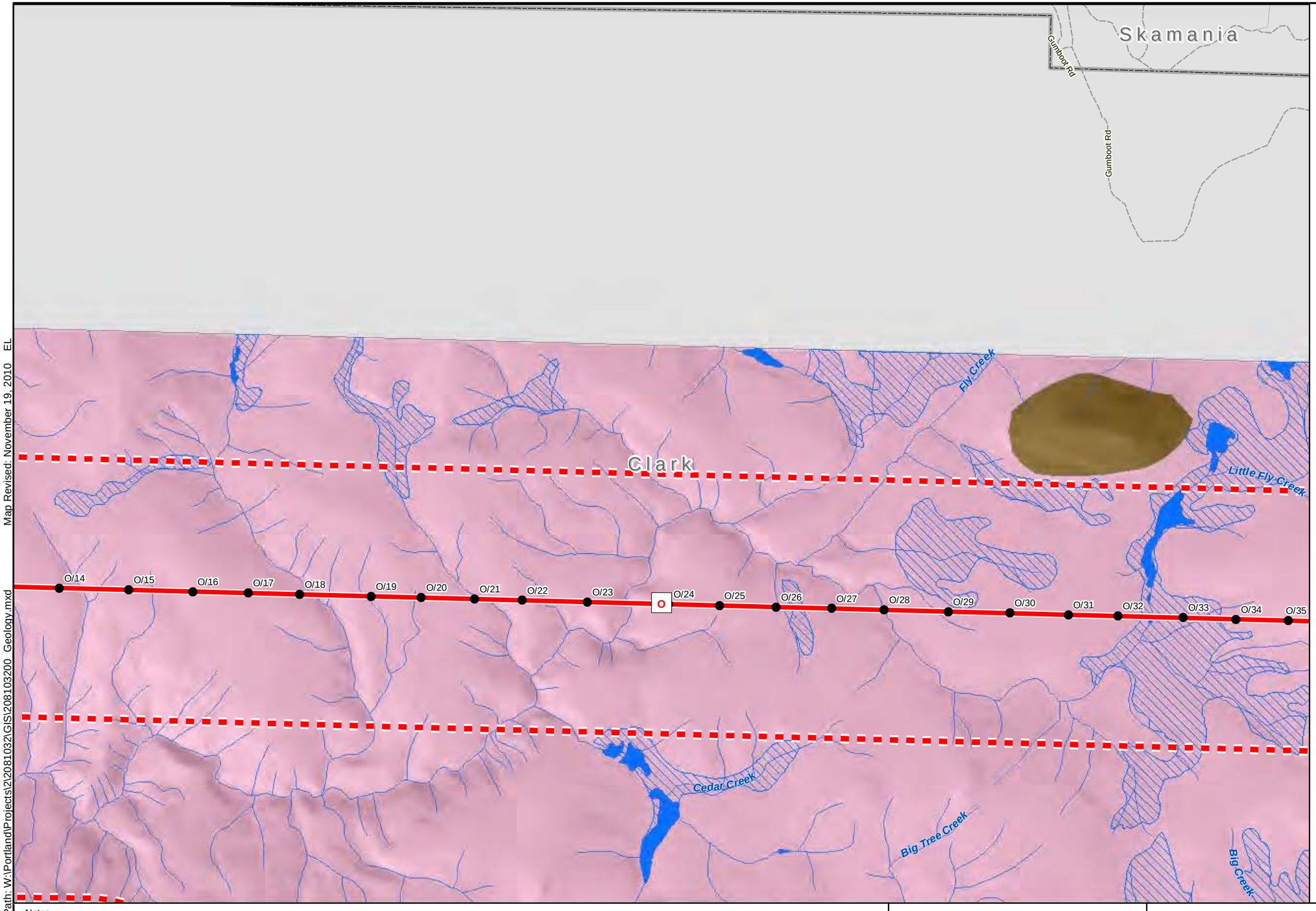
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F4

Sheet 34 of 156



Explanation

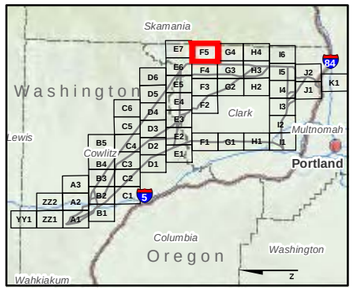
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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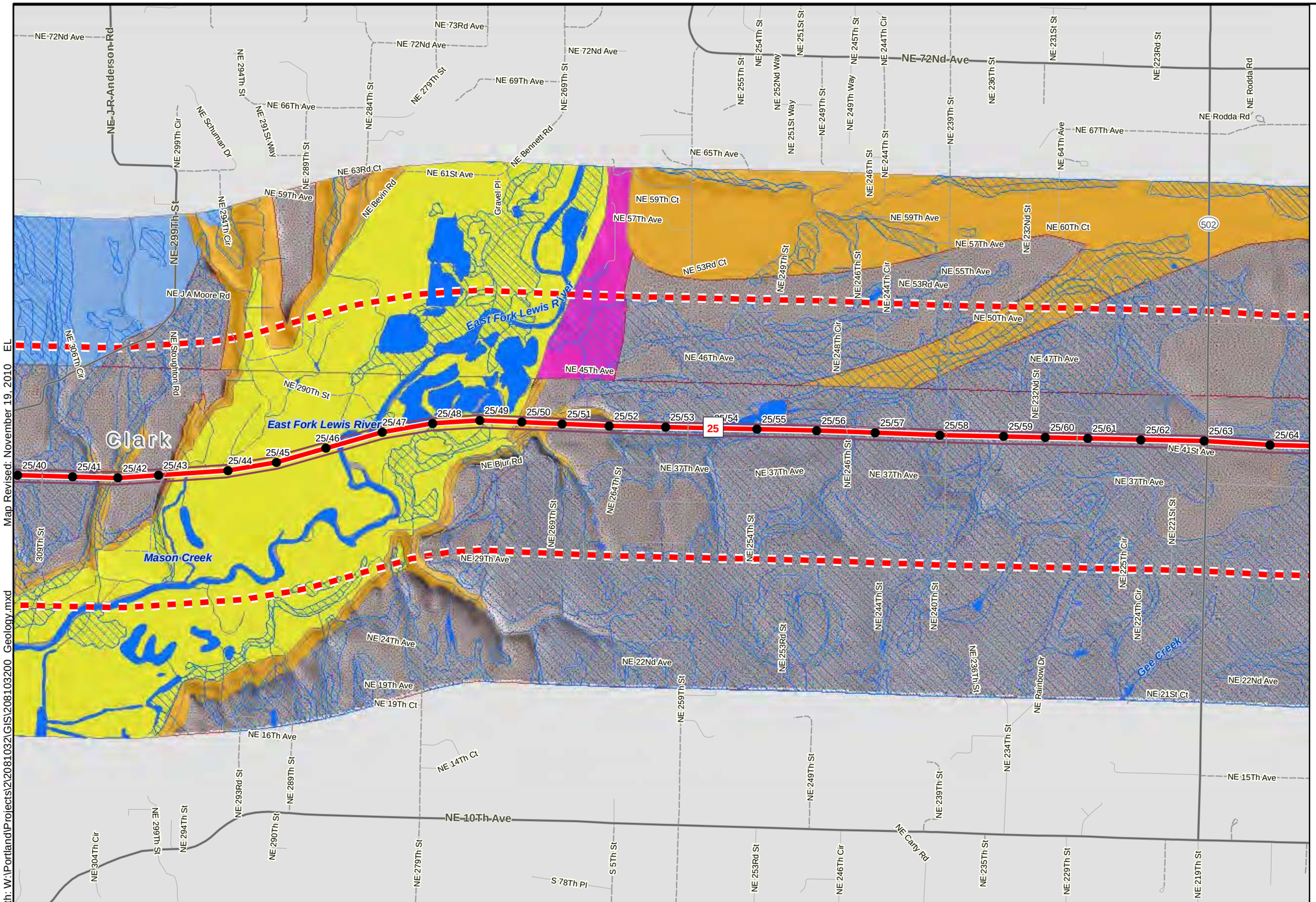
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F5

Sheet 35 of 156



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Explanation

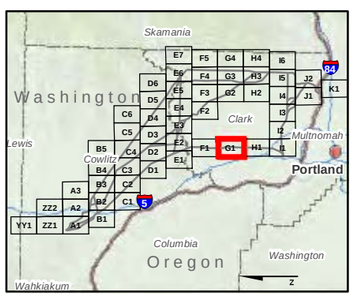
- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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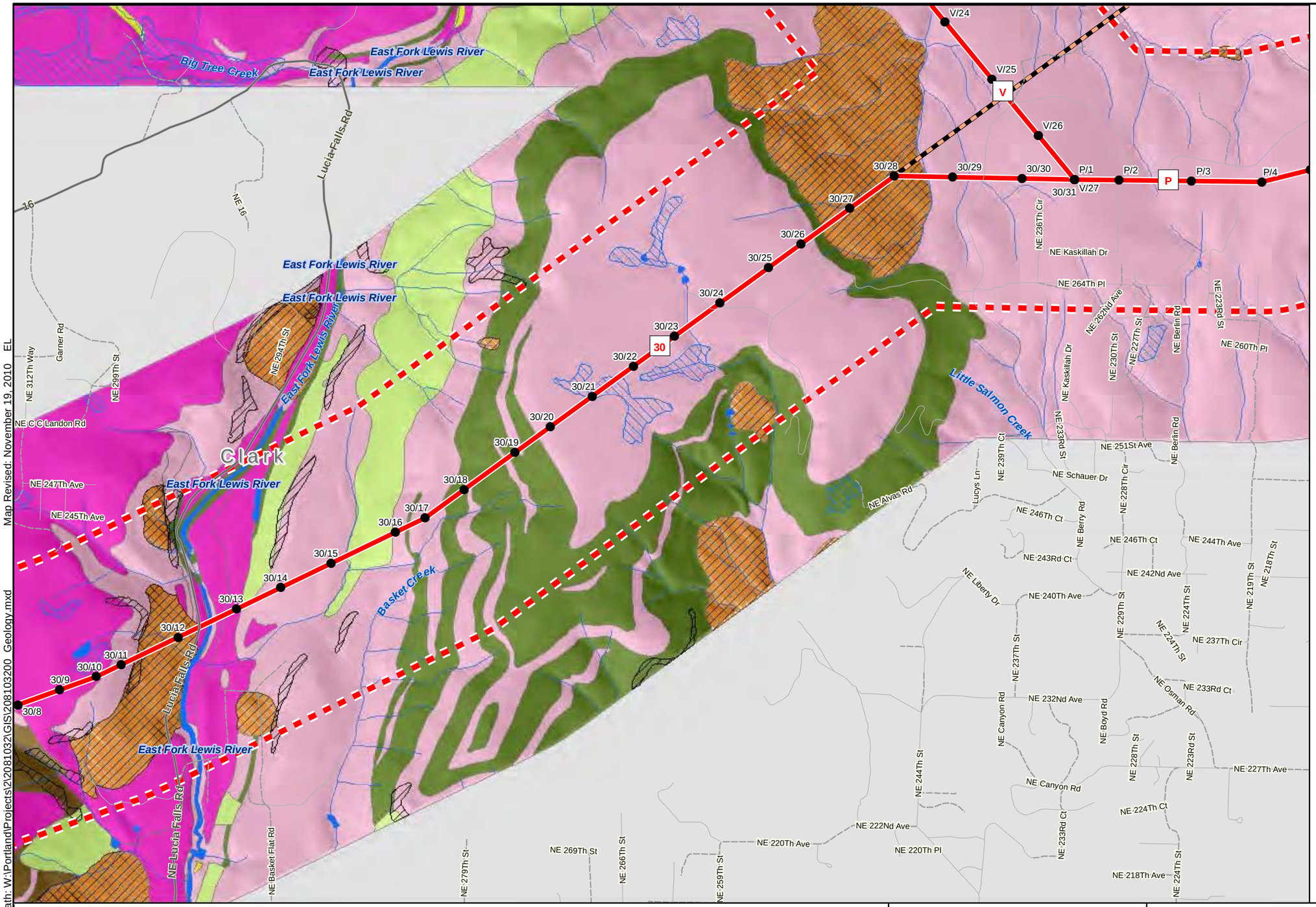
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page G1

Sheet 36 of 156



Explanation

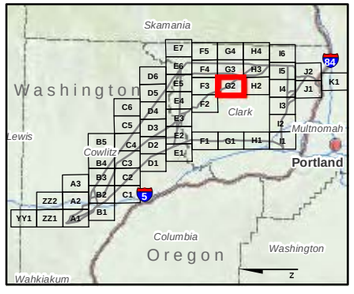
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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Geology, Shallow Bedrock, Shallow Groundwater

Map Page G2

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 37 of 156

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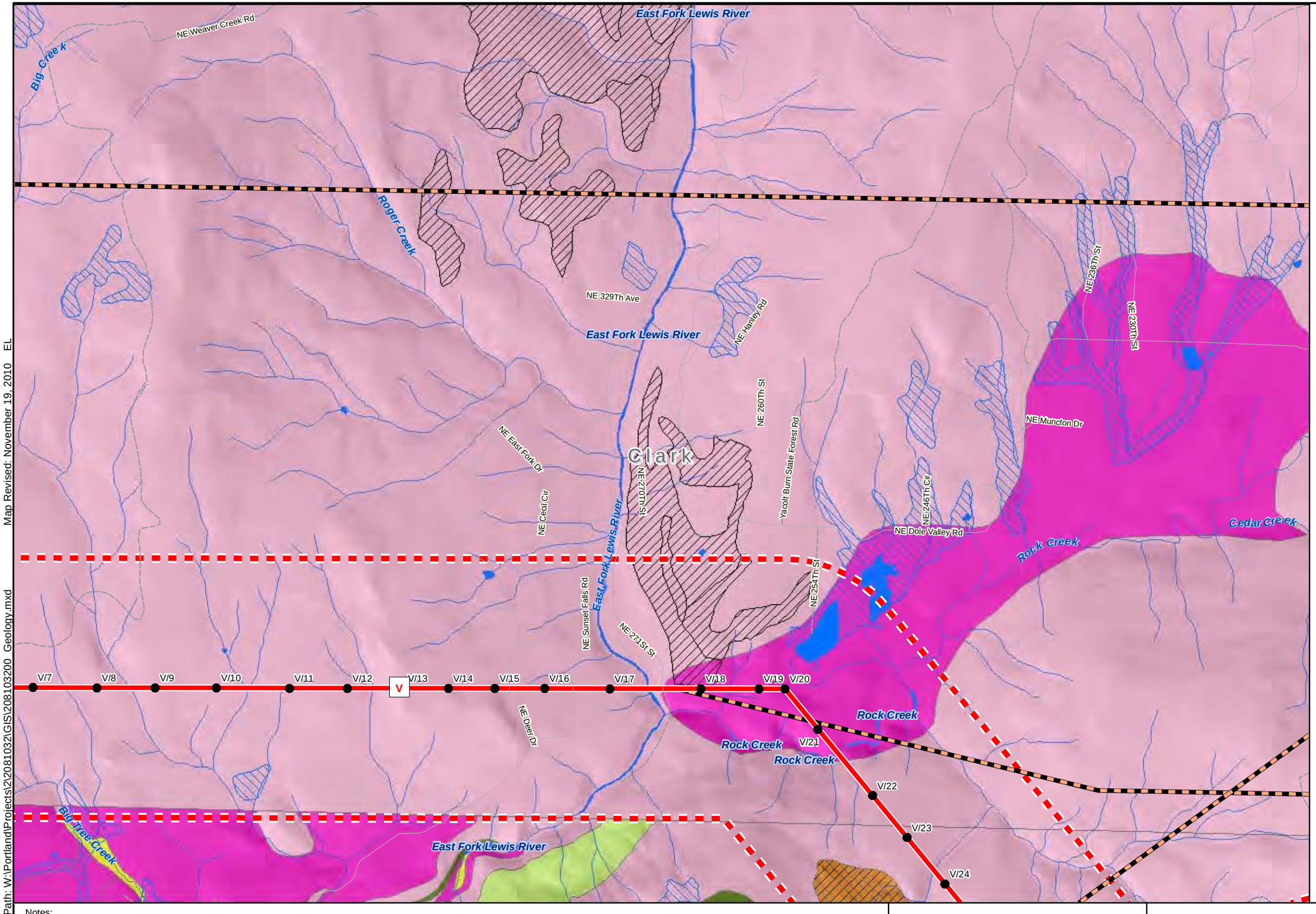


Explanation

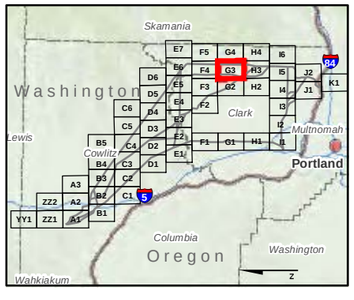
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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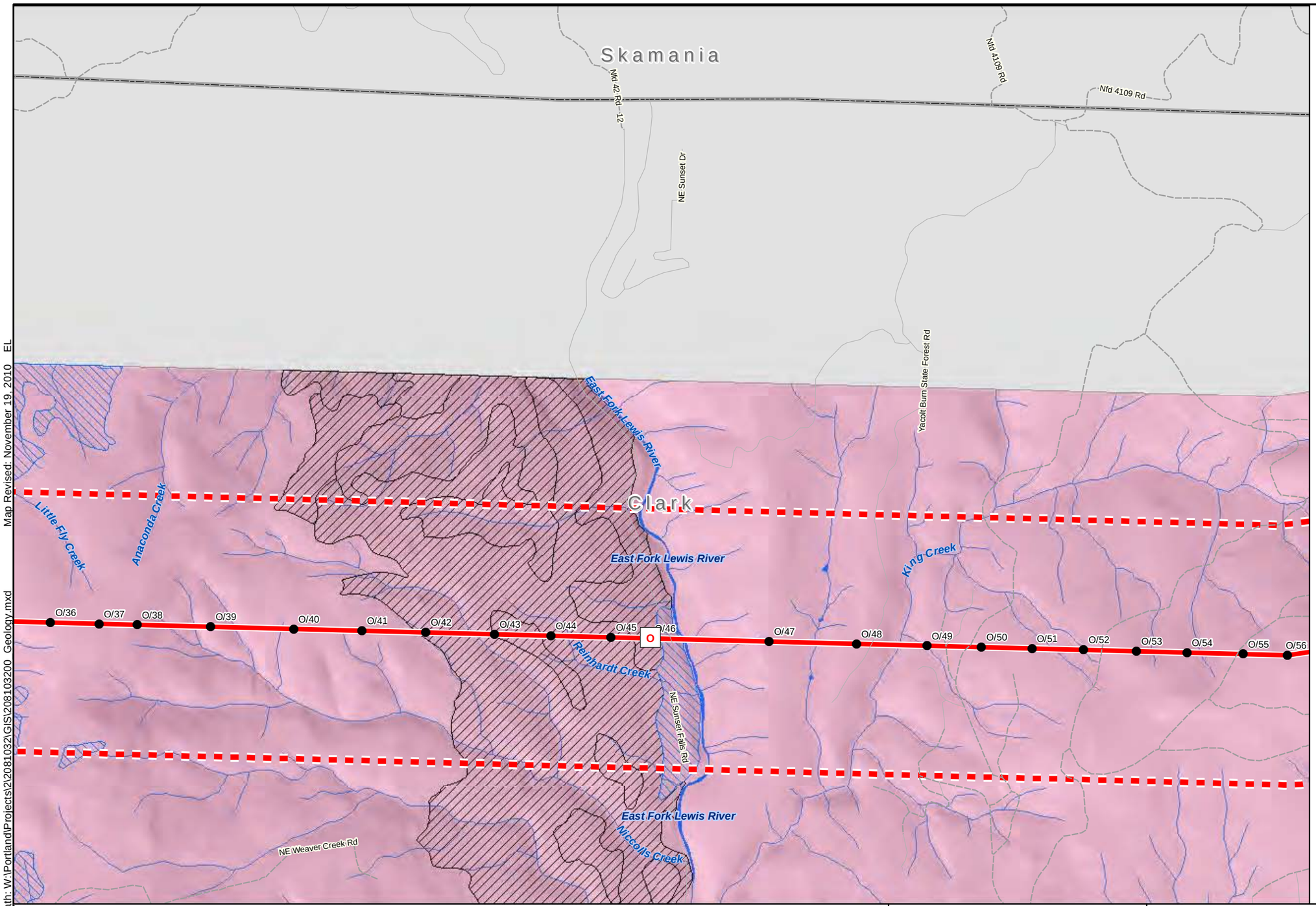
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page G3

Sheet 38 of 156



Explanation

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- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
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- Stream
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- Groundwater < 60"
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Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
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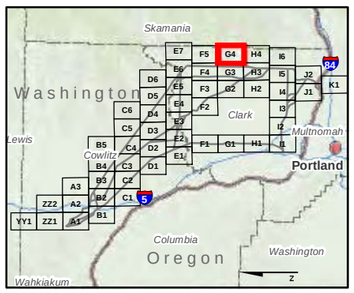
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page G4

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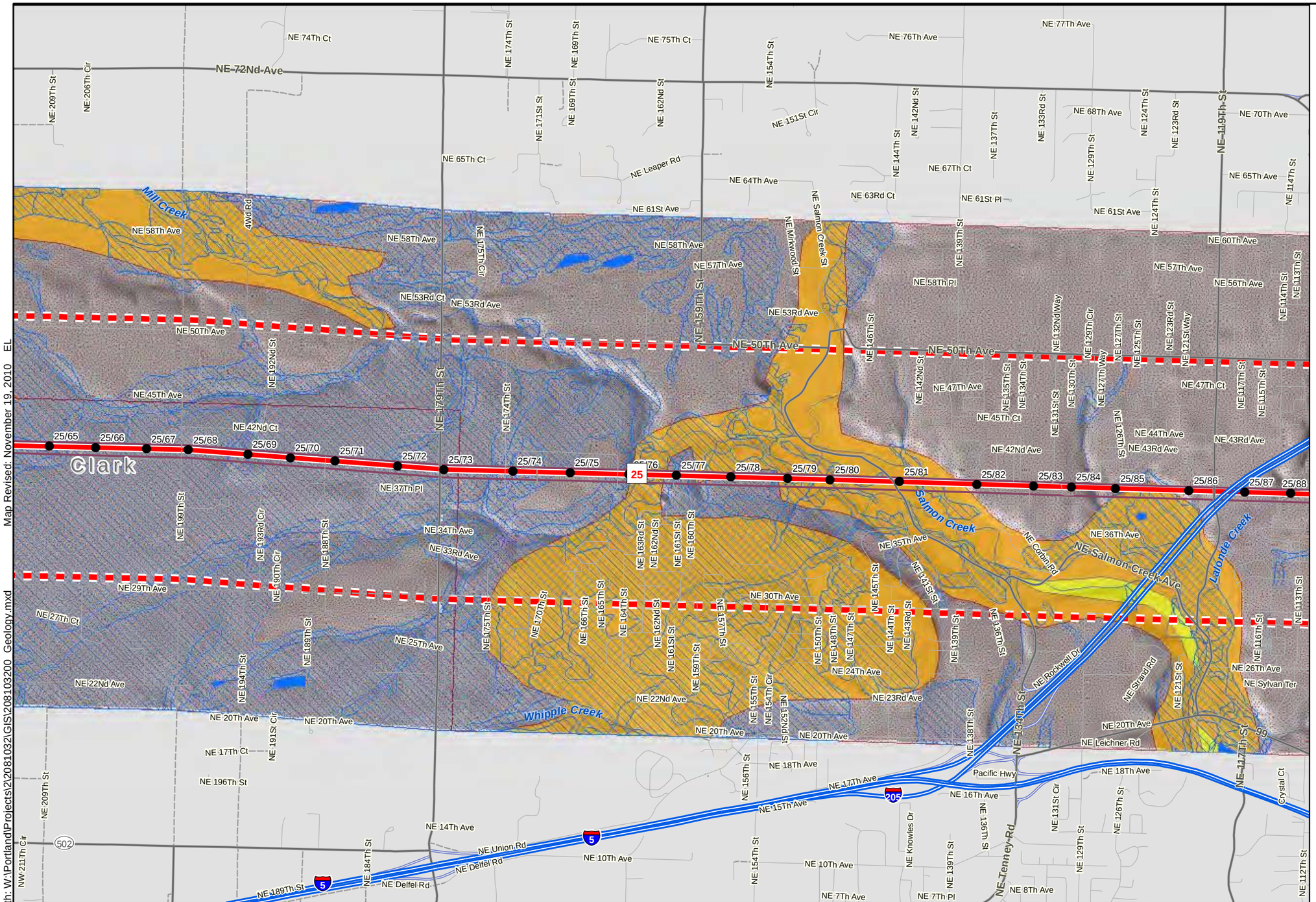

Explanation

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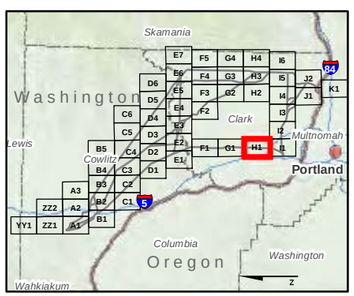
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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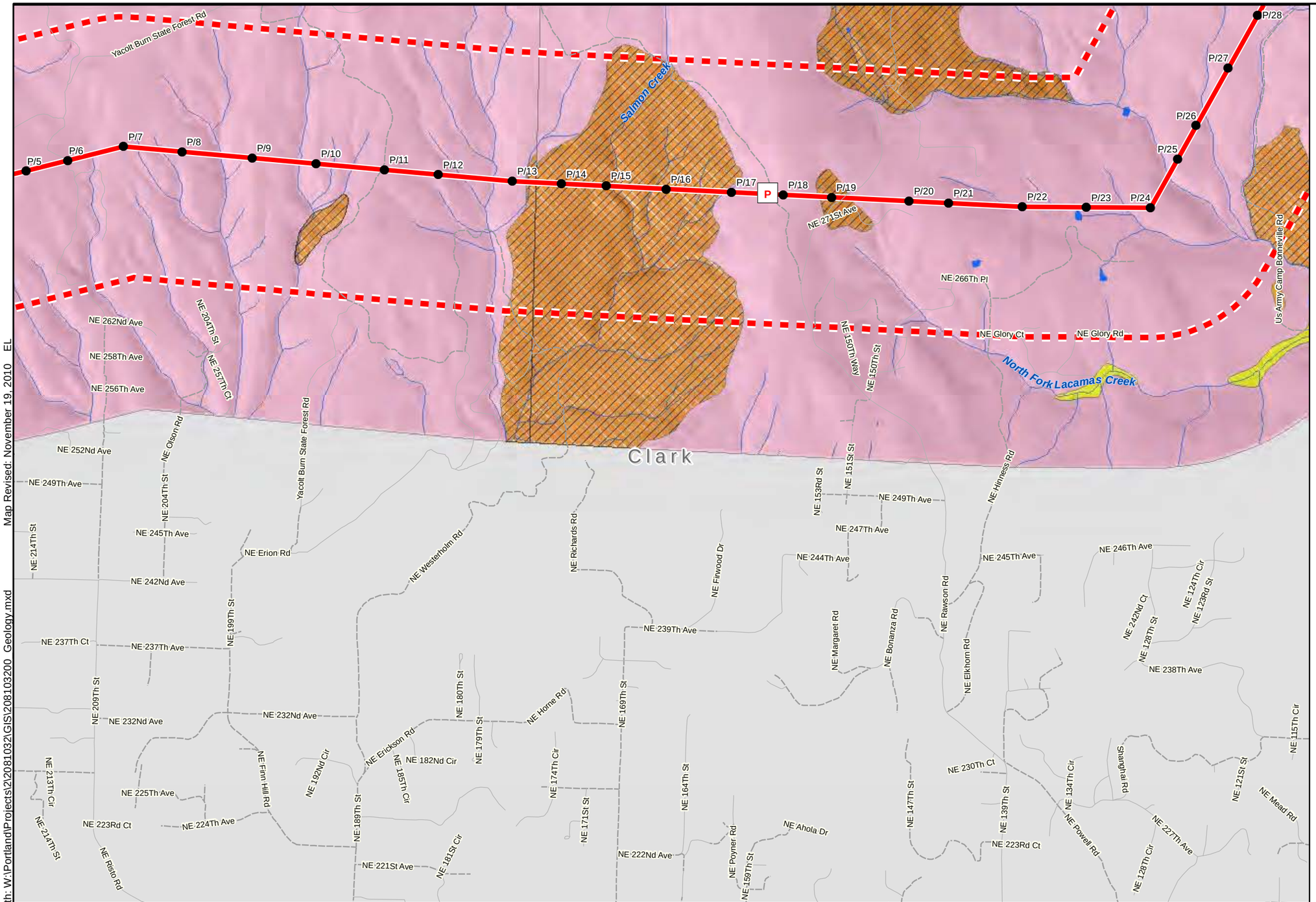
GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page H1

Sheet 40 of 156



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Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page H2

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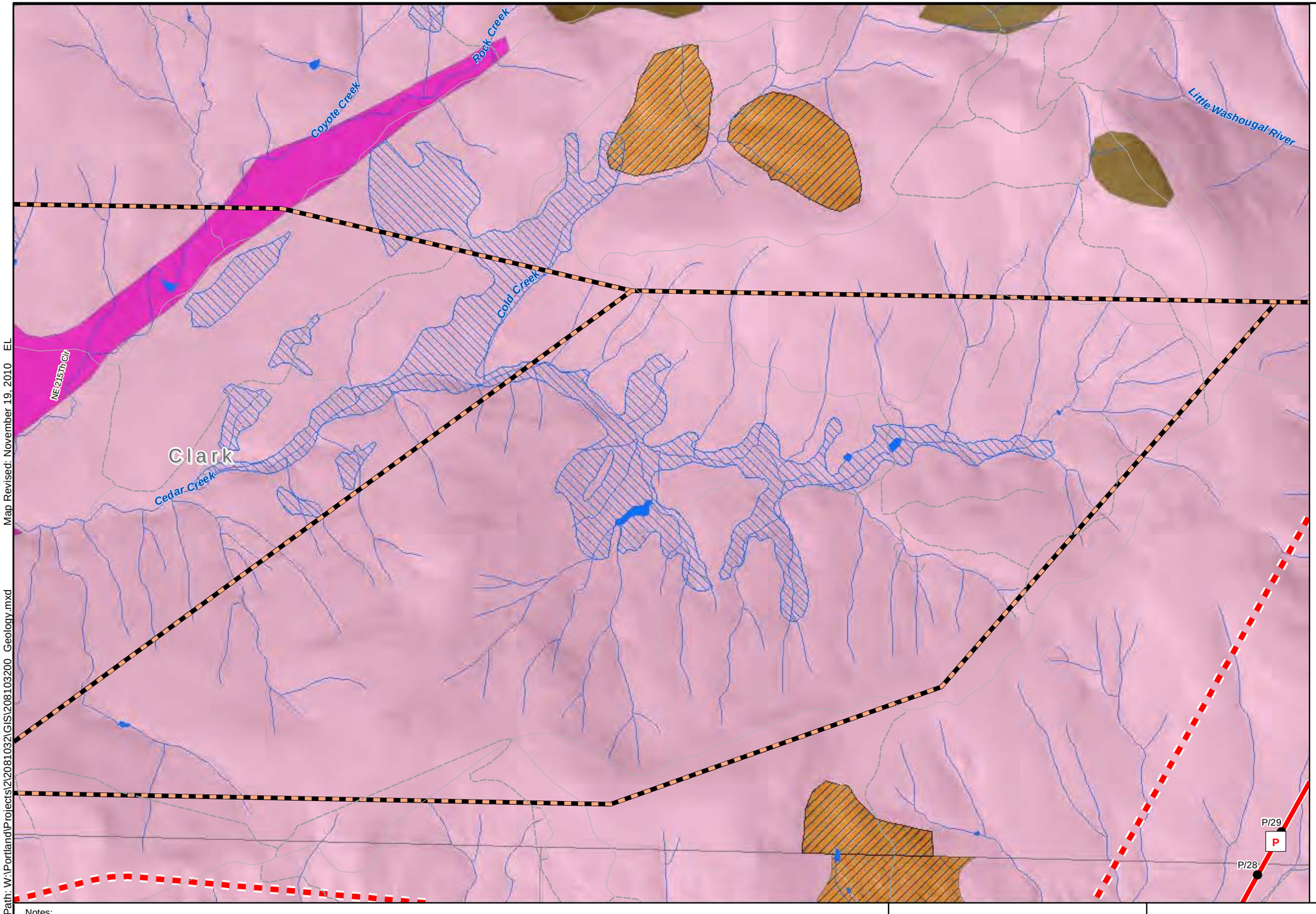


Explanation

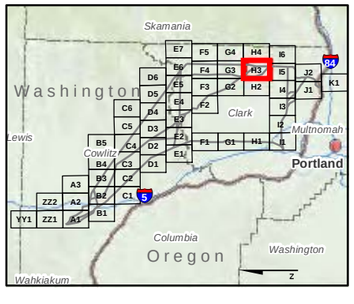
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

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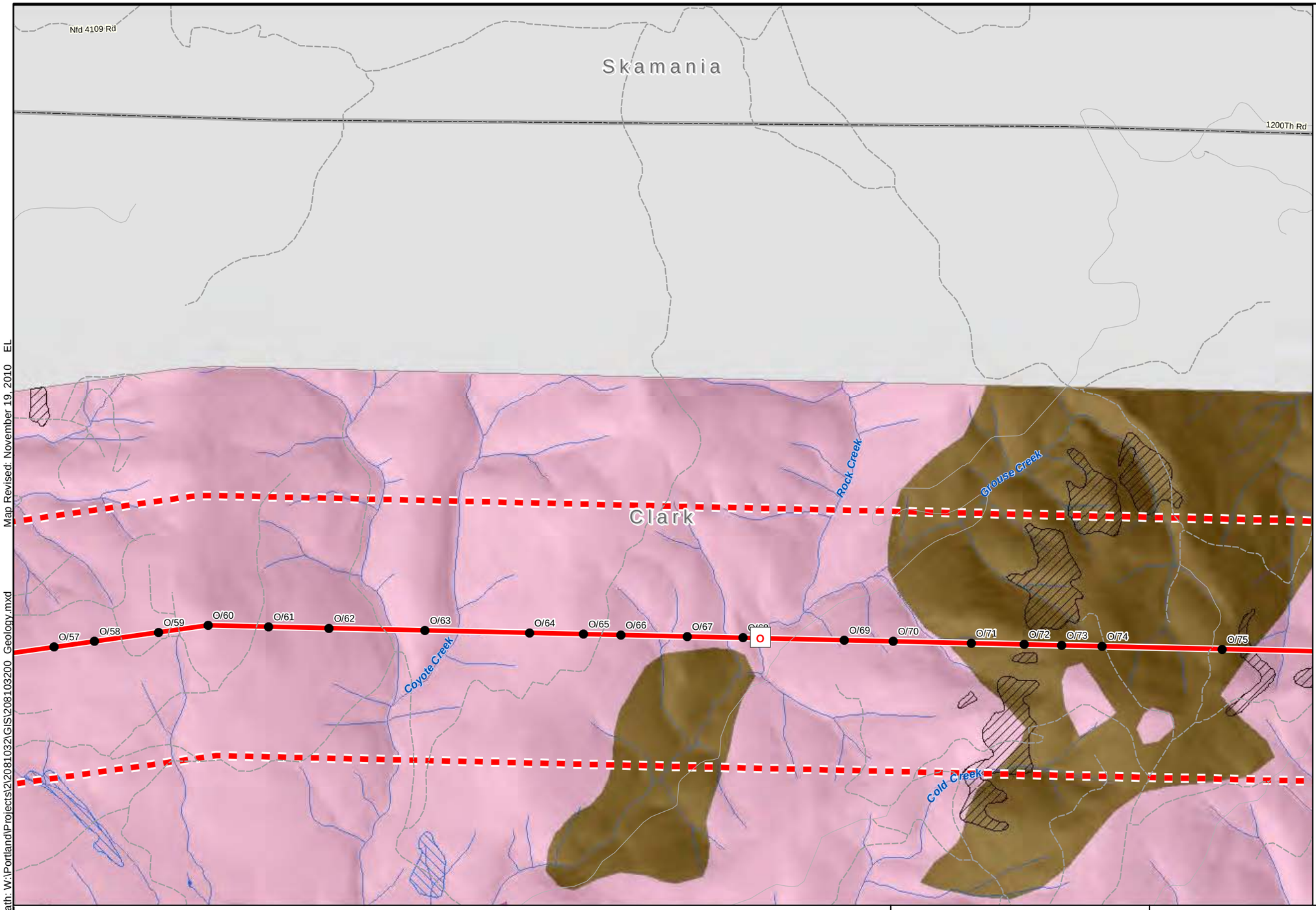

Explanation

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Geology Legend

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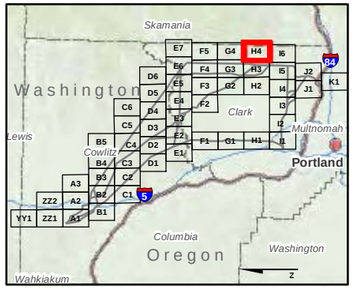
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page H4

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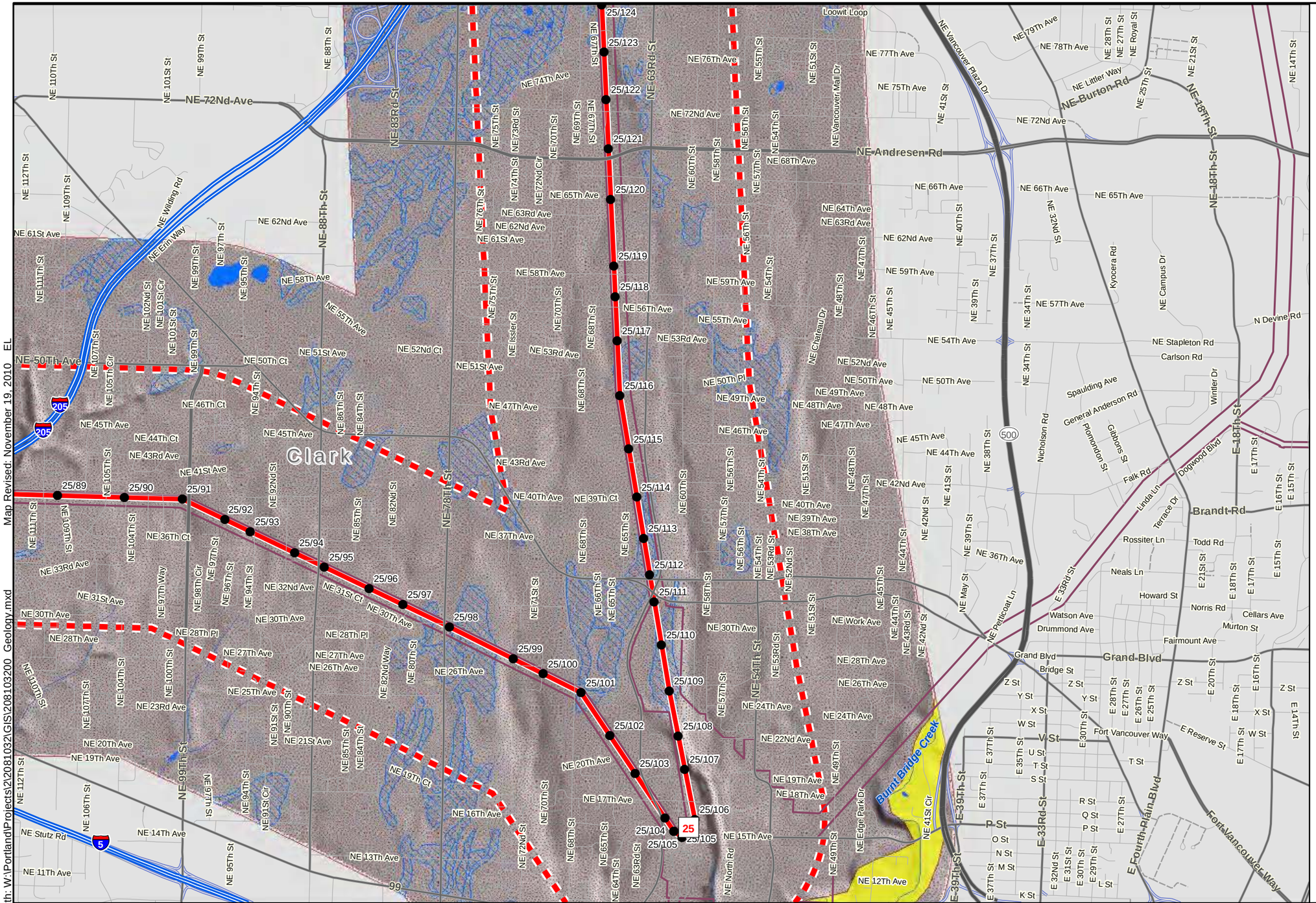

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

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Geology, Shallow Bedrock, Shallow Groundwater

Map Page I1

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 44 of 156

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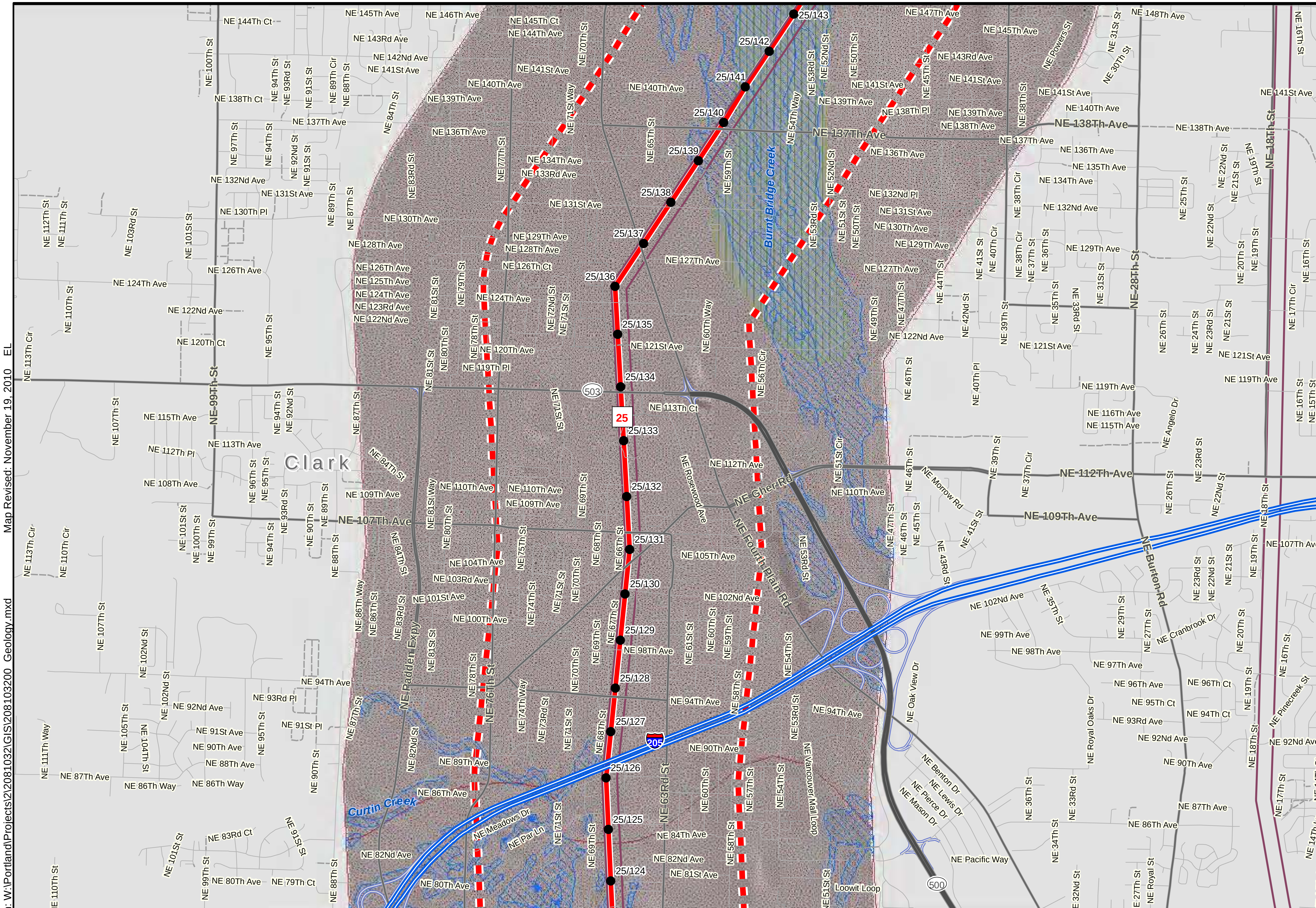


Explanation

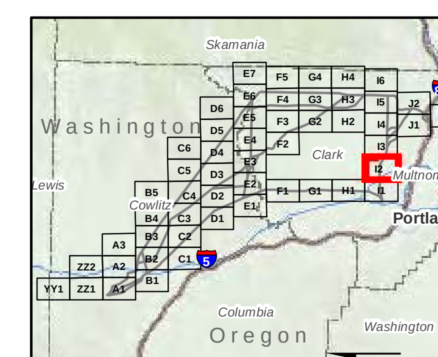
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

Z

0 1,000 2,000 Feet



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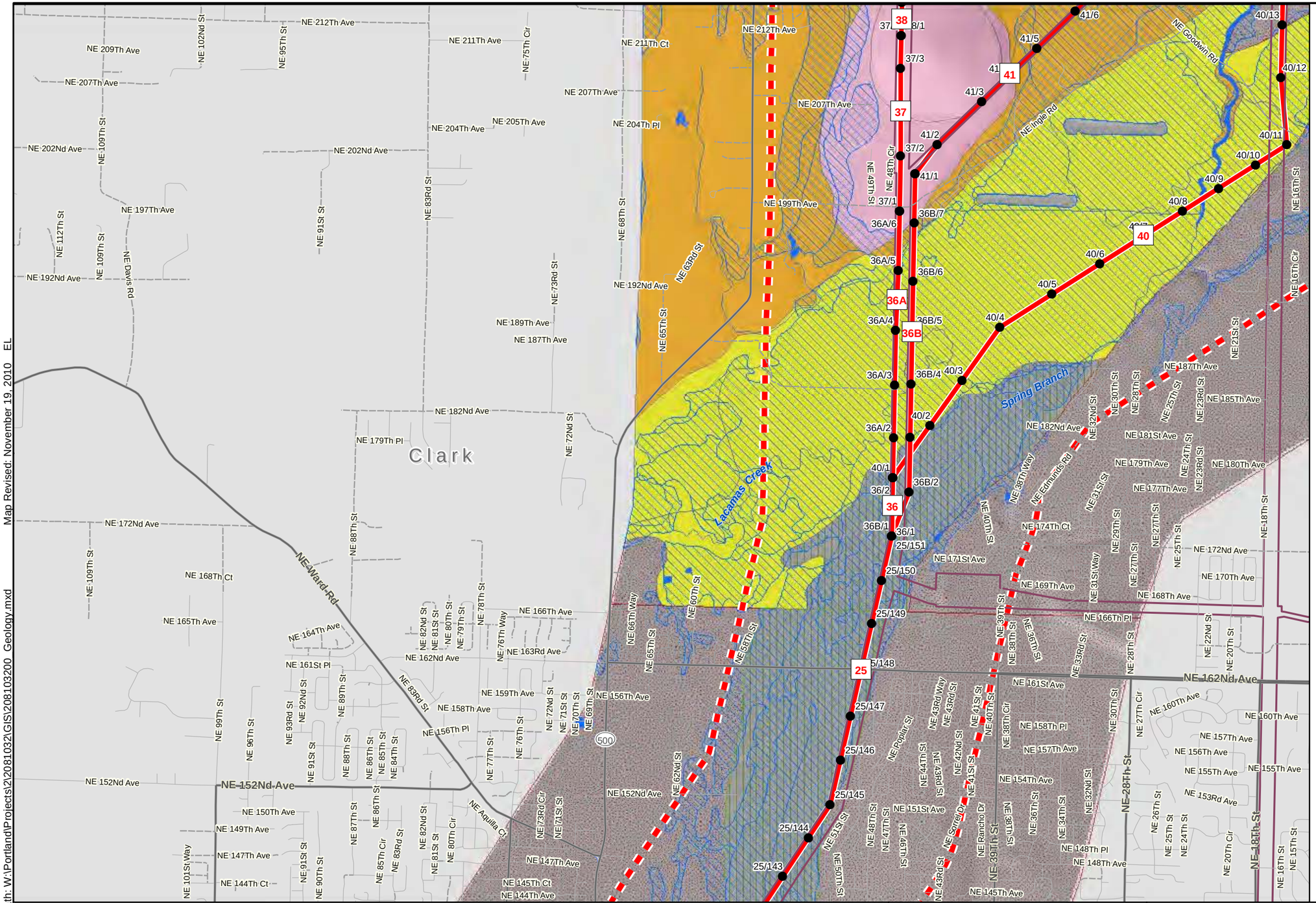
Geology, Shallow Bedrock, Shallow Groundwater	Map Page I2
BPA I5 Transmission Corridor Project Clark, Cowlitz and Multnomah Counties	Sheet 45 of 156



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

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GeoEngineers

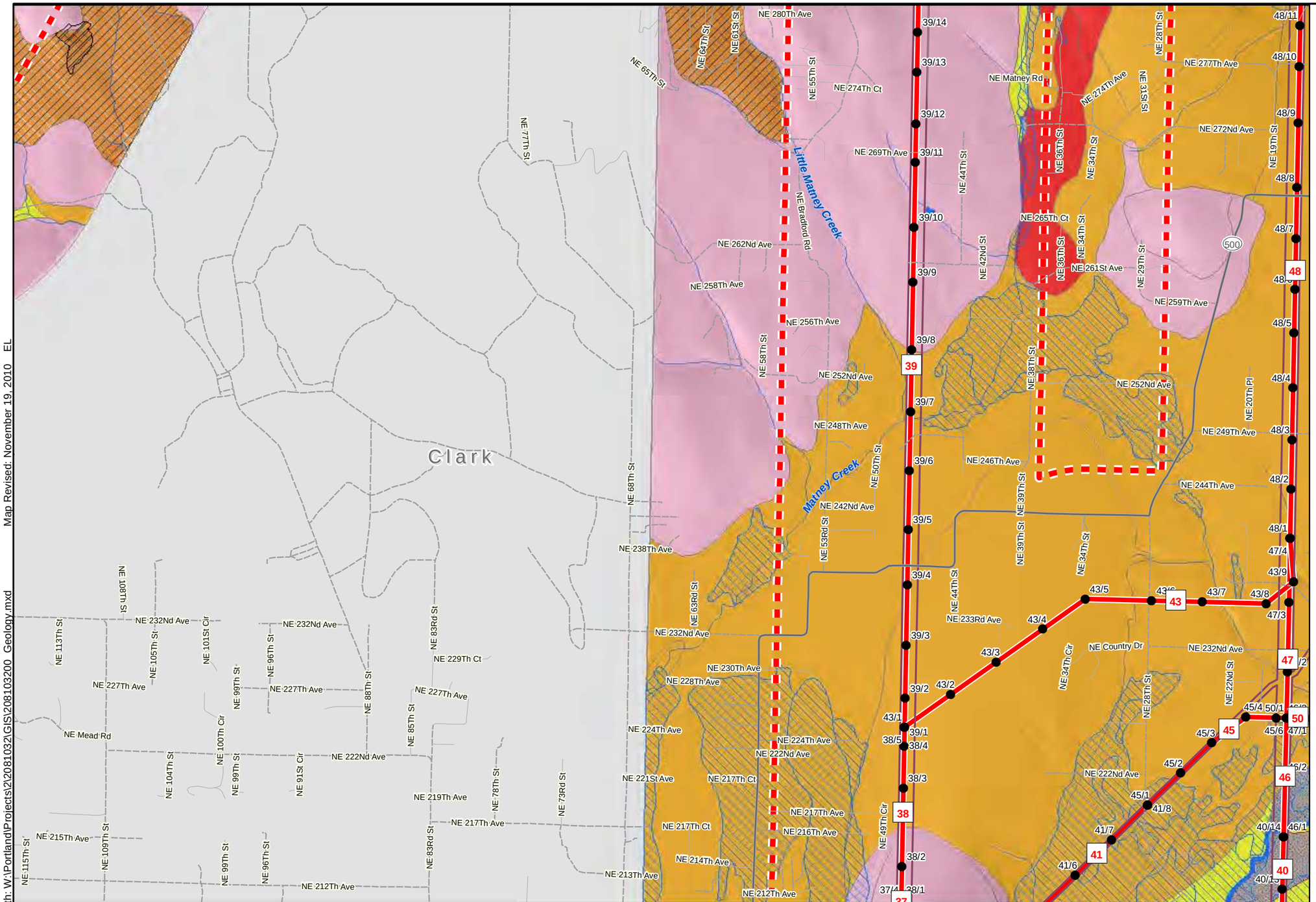
Geology, Shallow Bedrock, Shallow Groundwater

Map Page I3

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 46 of 156

Office: PORT Path: W:\Portland\Projects\2081032\GIS\208103200 Geology.mxd Map Revised: November 19, 2010 EL



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

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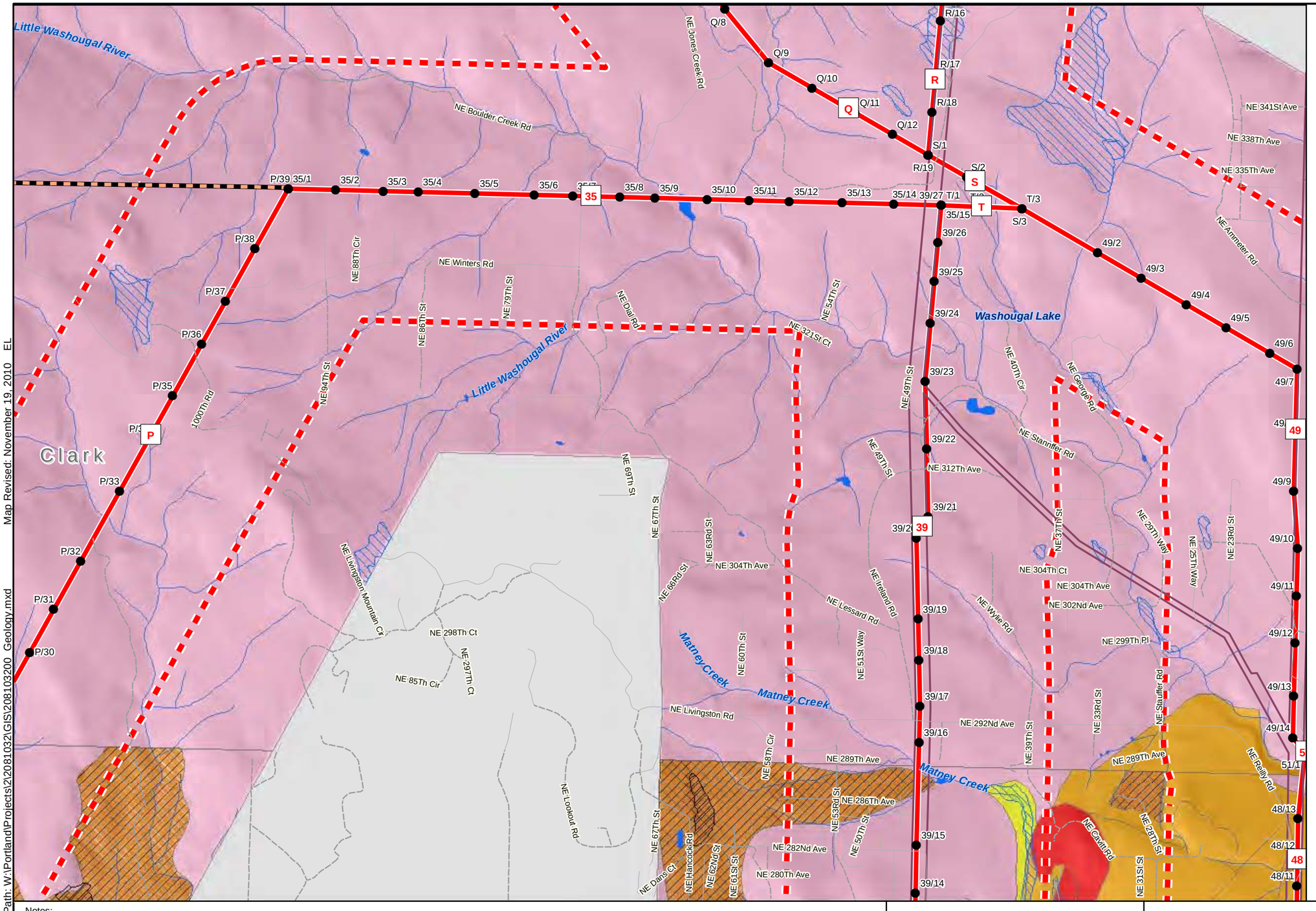


Explanation

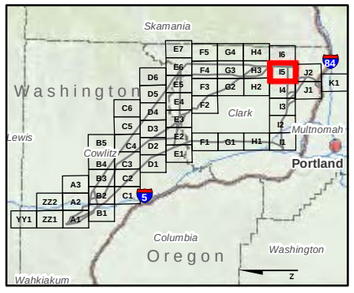
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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GeoEngineers

Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I5

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Skamania

Clark

Aberdeen Dr
NE 46Th St
NE 407Th Ave
NE 39Th St
NE Miller Rd
NE 33Rd
NE Skye View Dr
NE 44Th St
NE 48Th St
NE 399Th Ave
NE 397Th Ave
NE 26Th St
NE 24Th Cir
NE 28Th St
NE 22Nd St
NE 392Nd Ave
East Fork Little Washougal River
Cougar Creek
CougarCreek
NE 380Th Ave
NE 375Th Ave
O/76
O/77
O/78
O/79
O/80
O/81
O/82
O/83
O
Q/1
R/1
R/2
R/3
R/4
R/5
R/6
R/7
R/8
R/9
R
R/10
R/11
R/12
R/13
R/14
R/15
R/16
Q/2
Q/3
Q/4
Q
Q/5
Q/6
Q/7
Q/8
Jones Creek
NE Jones Rd
NE Jones Creek Rd
NE 52Nd St
NE 31St Cir
NE 25Th Cir
NE 359Th Ave
NE 357Th Ave

Explanation

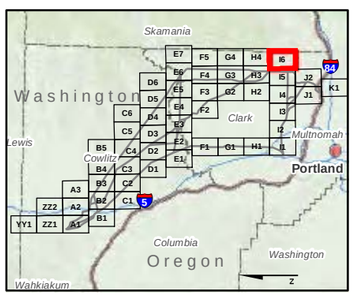
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I6

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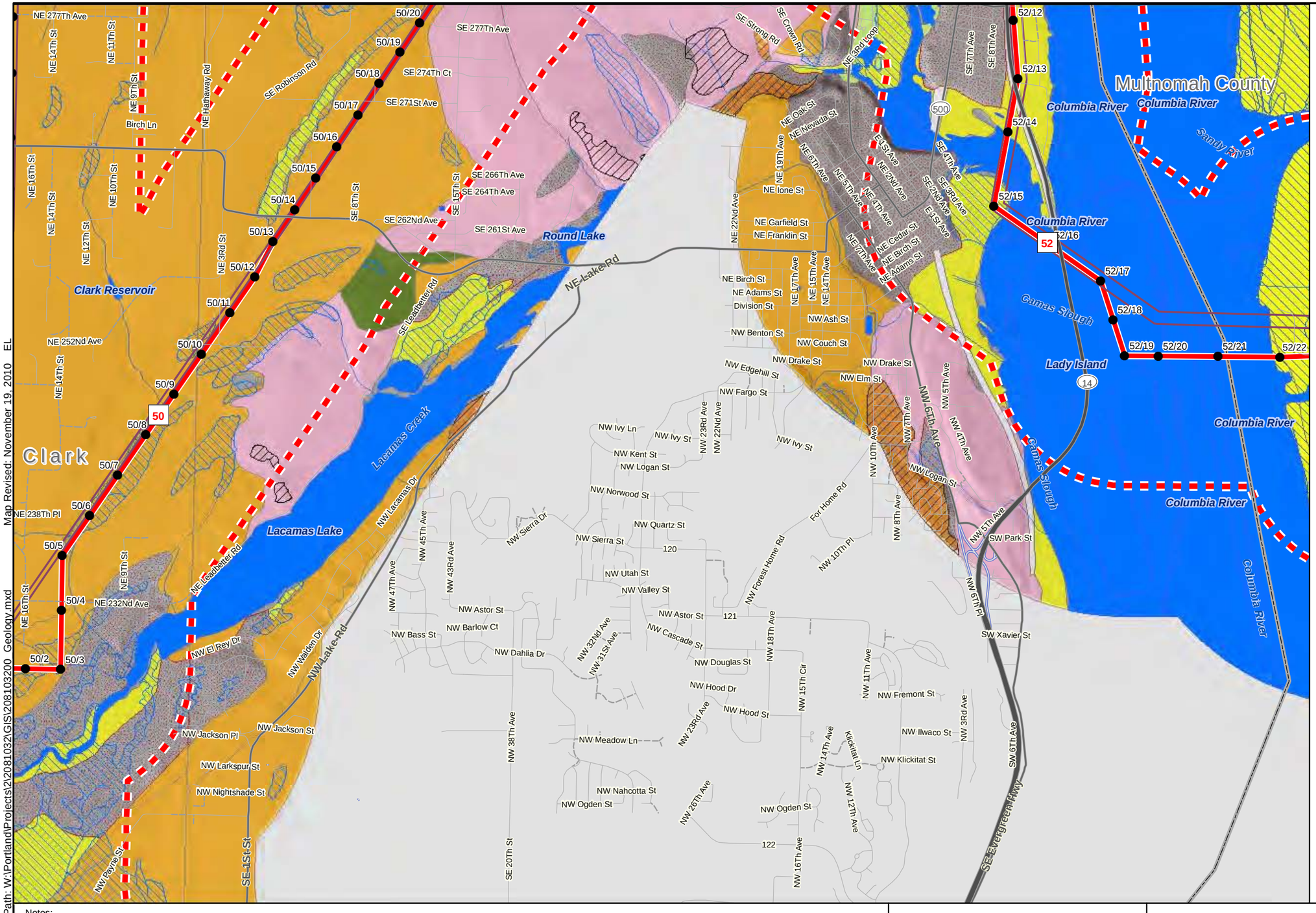


Explanation

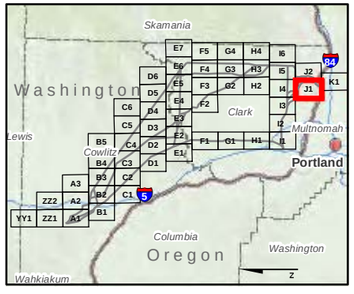
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page J1

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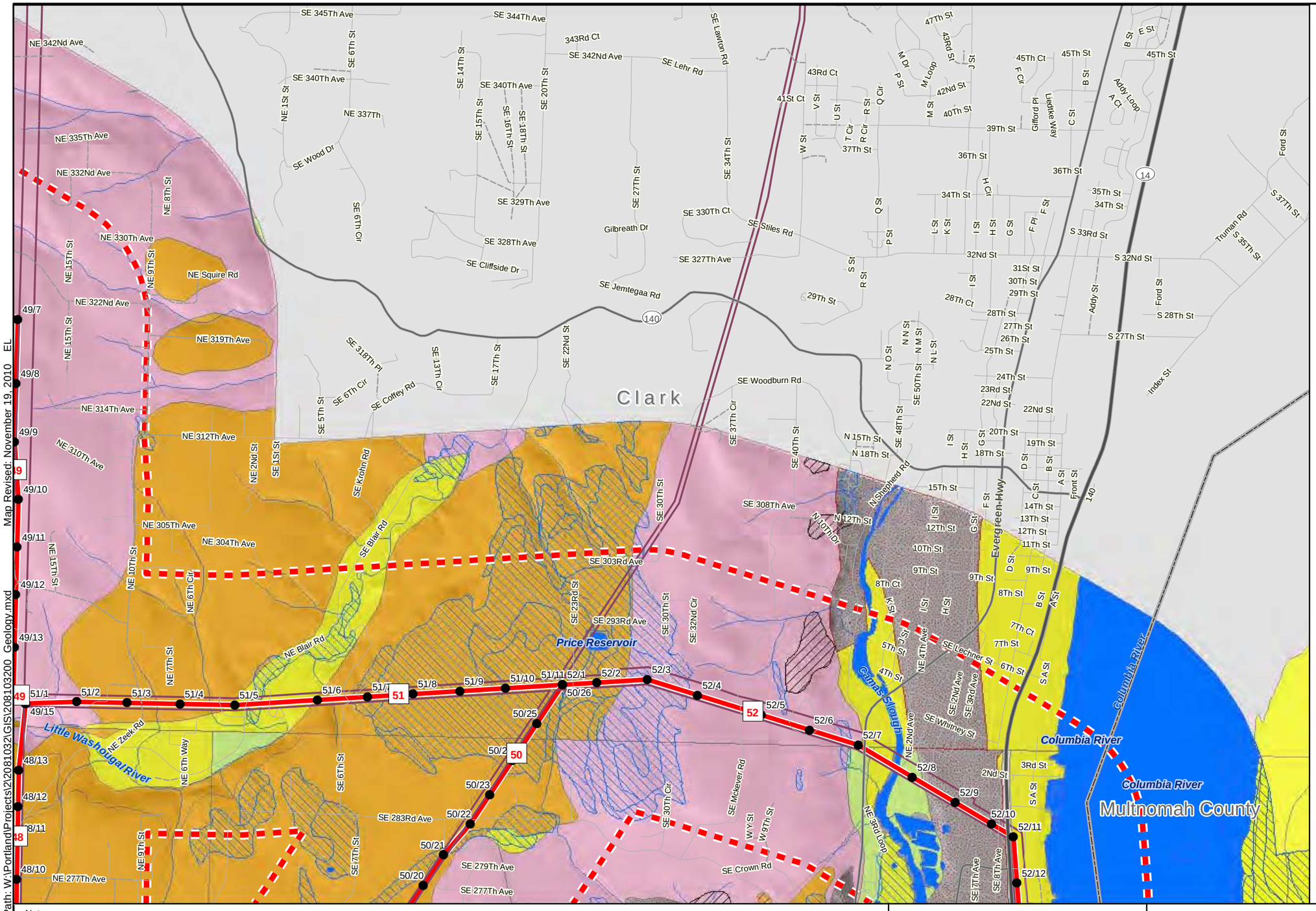

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Explanation

- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
- Bedrock < 60"

Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
- Outburst Flood Deposits
- Peat
- Qal Alluvium
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet

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Geology, Shallow Bedrock, Shallow Groundwater

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

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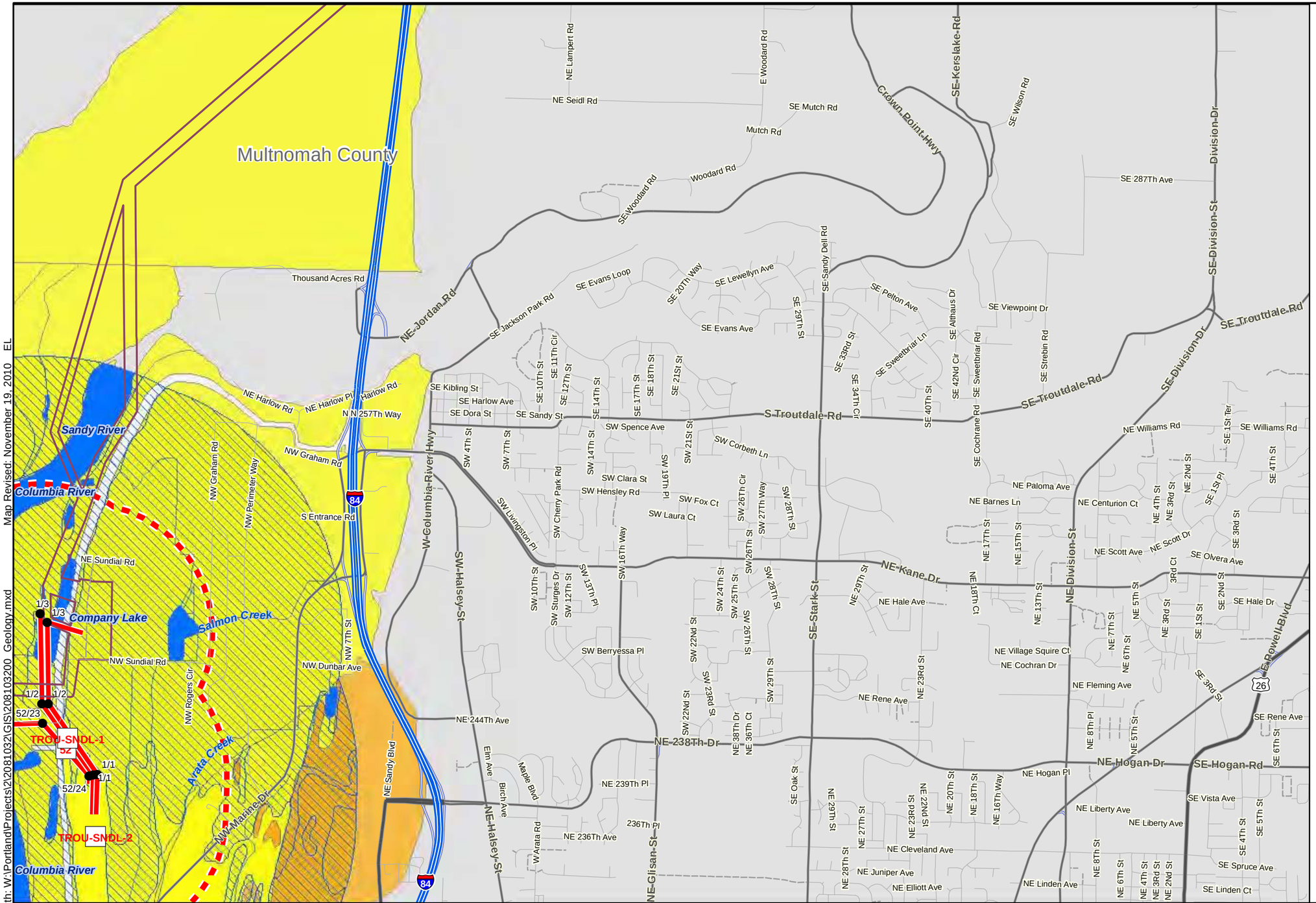

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- Groundwater < 60"
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Geology Legend

- Andesite Flows
- Basalt Flows
- Cont Sed. Deposits or Rocks
- Fan Deposits
- Glacial Drift, Pre Fraser
- Intrusive Rocks
- Landslides
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- Peat
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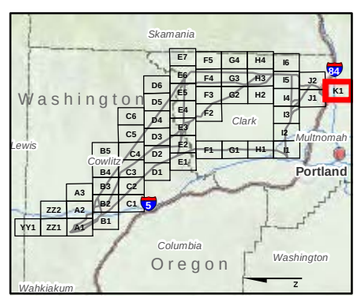
- Terrace Deposits
- Volcaniclastic Deposits

N

0 1,000 2,000 Feet



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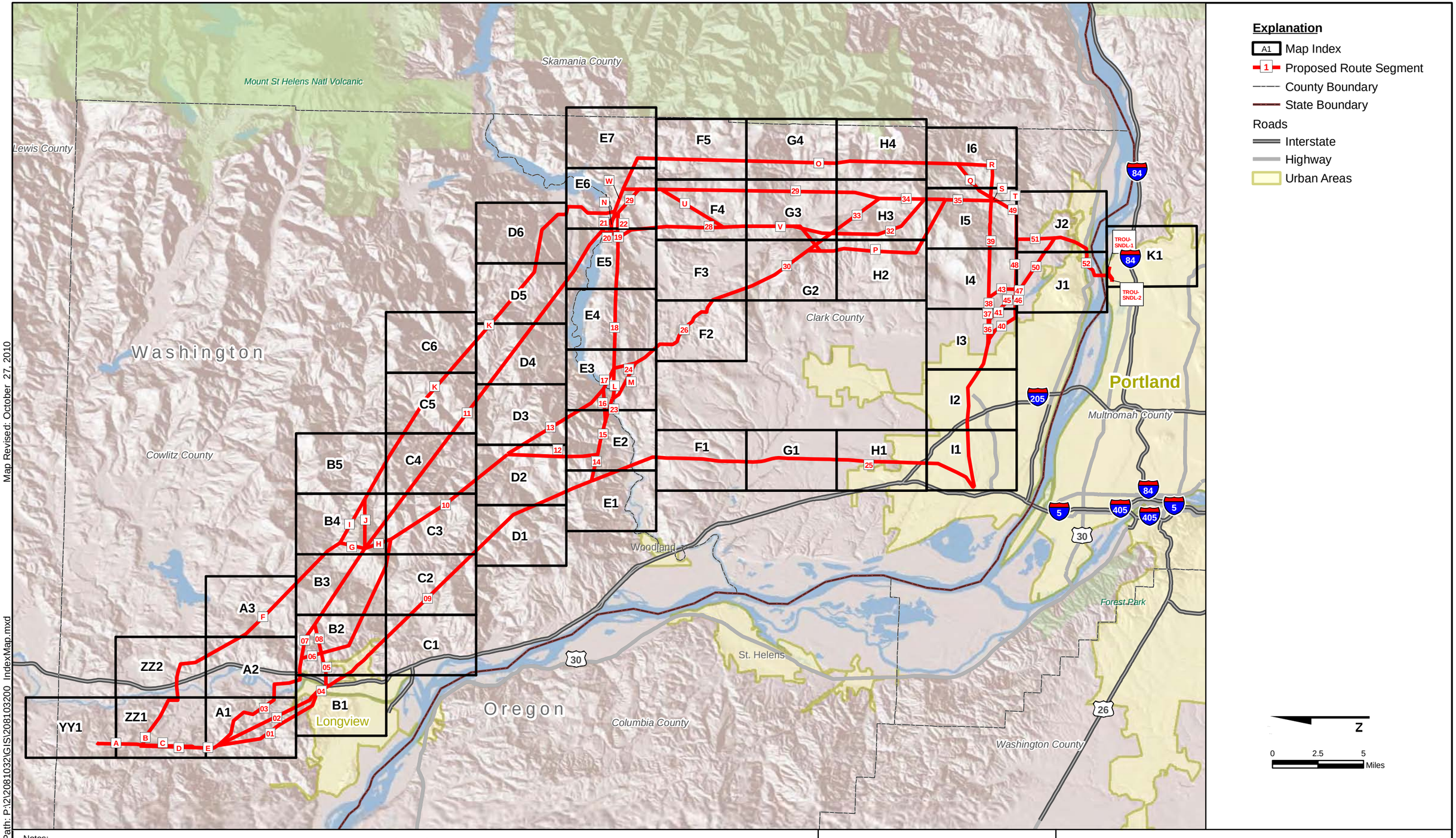
Geology, Shallow Bedrock, Shallow Groundwater

Map Page K1

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 52 of 156



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Data Sources: Proposed Route from BPA.
Shaded relief from ESRI Online Resource Center.
Base data from ESRI Data & Maps, Street Maps 2008

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Index Map

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% RETAINED ON NO. 200 SIEVE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% PASSING NO. 200 SIEVE)	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

SOIL CLASSIFICATION

GeoEngineers

FIGURE A-1

Explanation

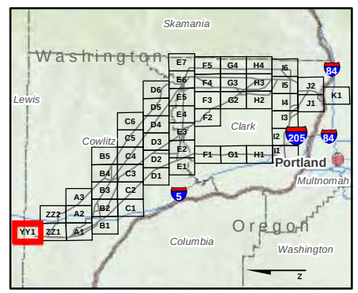
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Data Sources: Water features from Pacific Northwest Hydrography. Route information from BPA. Slopes derived from 10-meter DEM and Clark County LiDAR. Soils data from NRCS.

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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page YY1

Sheet 53 of 156

Map Revised: November 18, 2010 EL:CRC
Path: W:\Portland\Projects\2108103200\GIS\2081032_Soils.mxd
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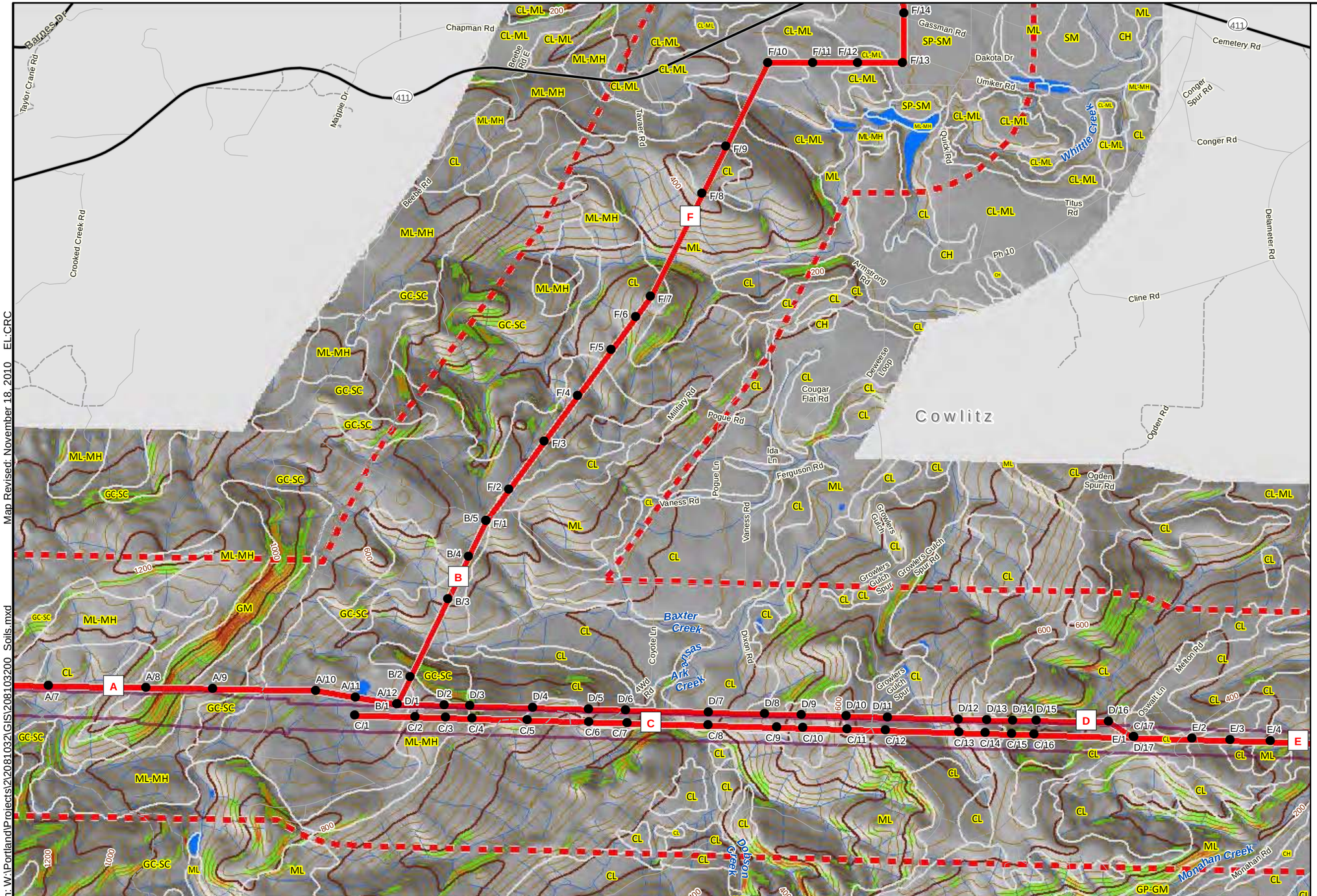

Map Revised: November 18, 2010 EL:CRC

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Explanation

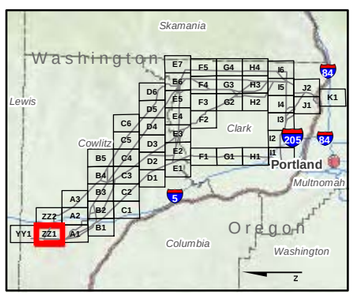
- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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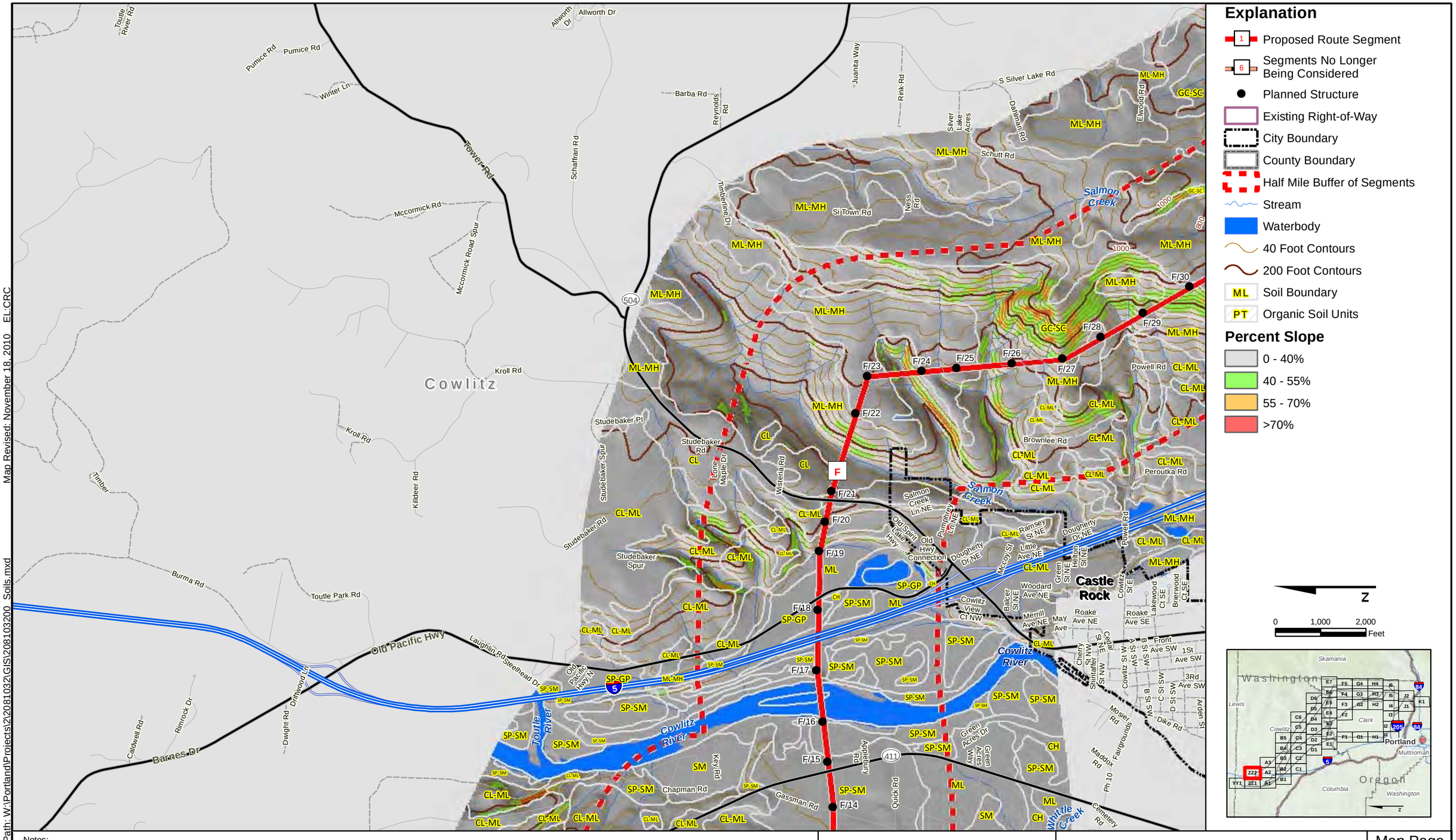
Soils and Slope Gradients

Map Page ZZ1

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 54 of 156



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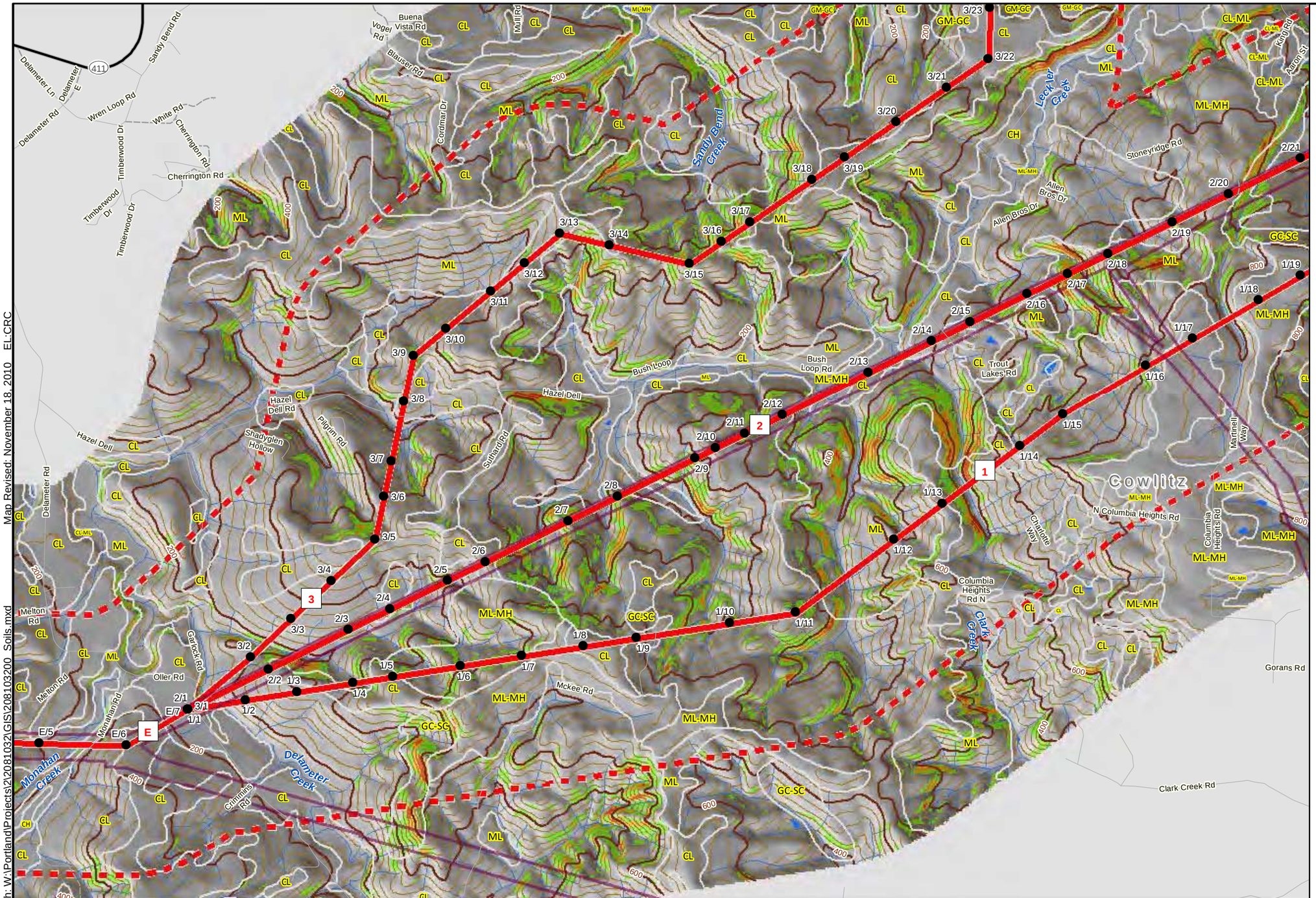
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page ZZ2

Sheet 55 of 156



Explanation

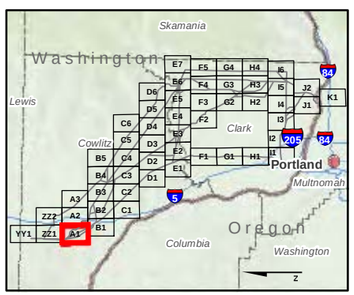
- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page A1

Sheet 56 of 156

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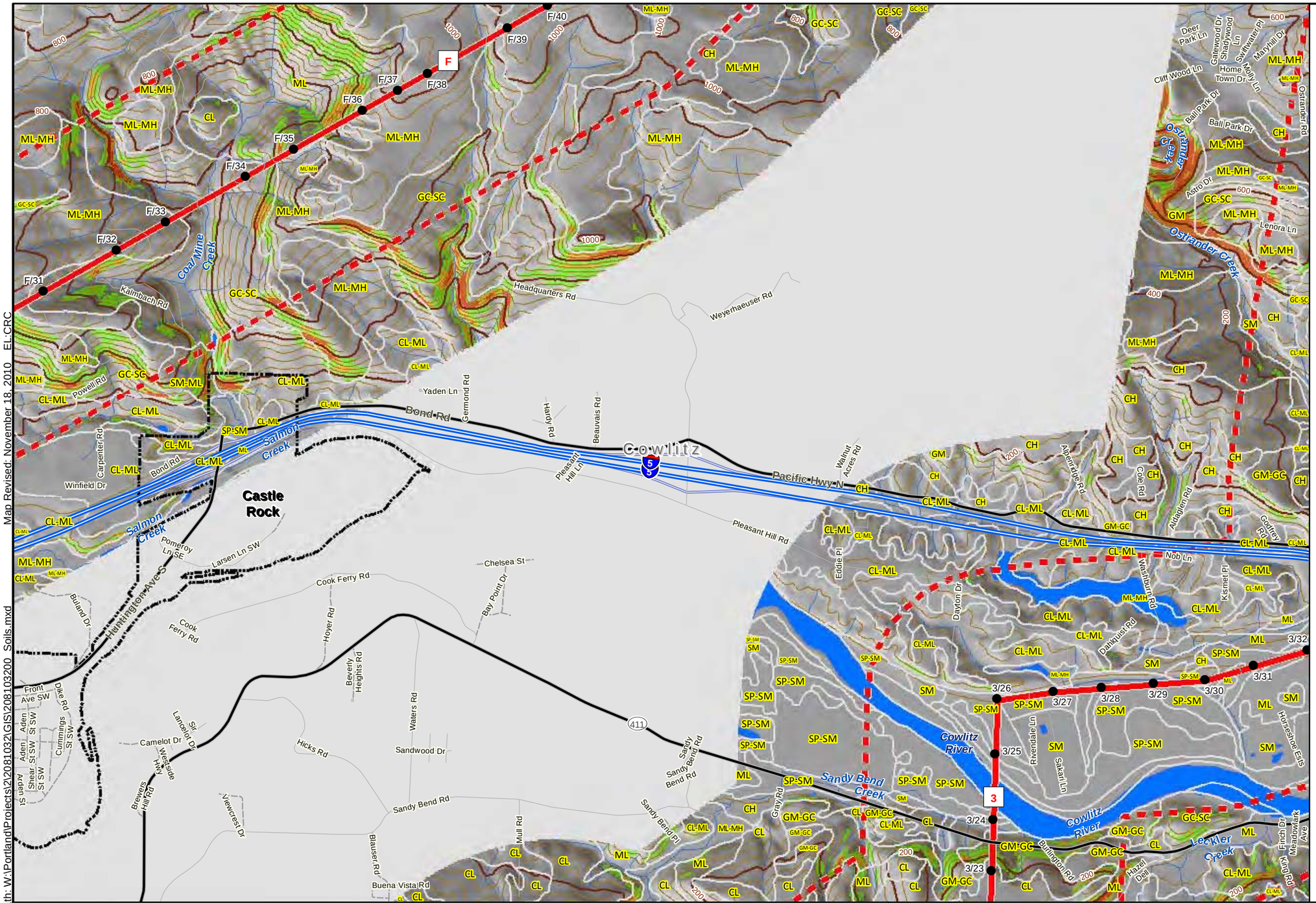


Explanation

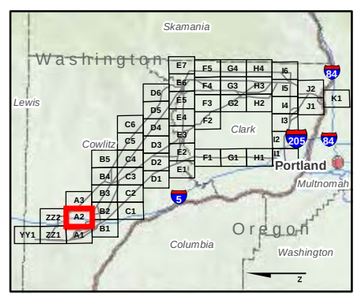
- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page A2

Sheet 57 of 156

Map Revised: November 18, 2010 EL:CRC

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Office: PORT

Cowlitz

Logging 1600 Rd
Clc Jct
Clc Jct
Clc Jct
Westshore Rd
Frye Rd
Creek
Woods Dr
Homestead Ln
Upperwest Rd
Dublin Dr
S Silver Lake Rd
Davis Spur Rd
Sunny Basin Rd
Coal Mine Creek
Headquarters Rd
Davis Rd
Diamond Dr
Firlane Rd
Fir Lane Pl
Fir Lane Rd
Ostrander Creek
Ostrander Rd

F/39 F/40 F/41 F/42 F/43 F/44 F/45 F/46 F/47 F/48 F/49 F/50 F/51 F/52 F/53 F/54 F/55 F/56 F/57 F/58 F/59

F

800 1000 1200 1400 600

GC-SC ML-MH ML CH

Explanation

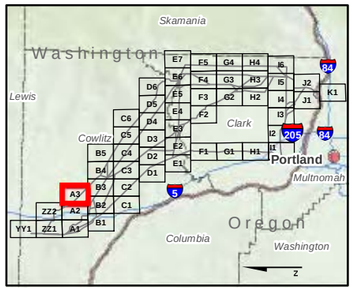
- 1 Proposed Route Segment
- 6 Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page A3

Sheet 58 of 156

Map Revised: November 18, 2010 EL:CRC

Path: W:\Portland\Projects\2081032\GIS\208103200 Soils.mxd

Office: PORT

Explanation

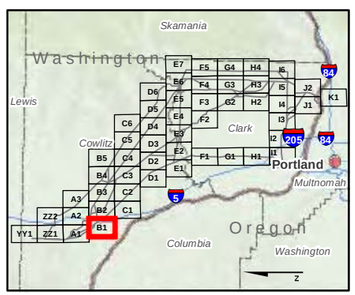
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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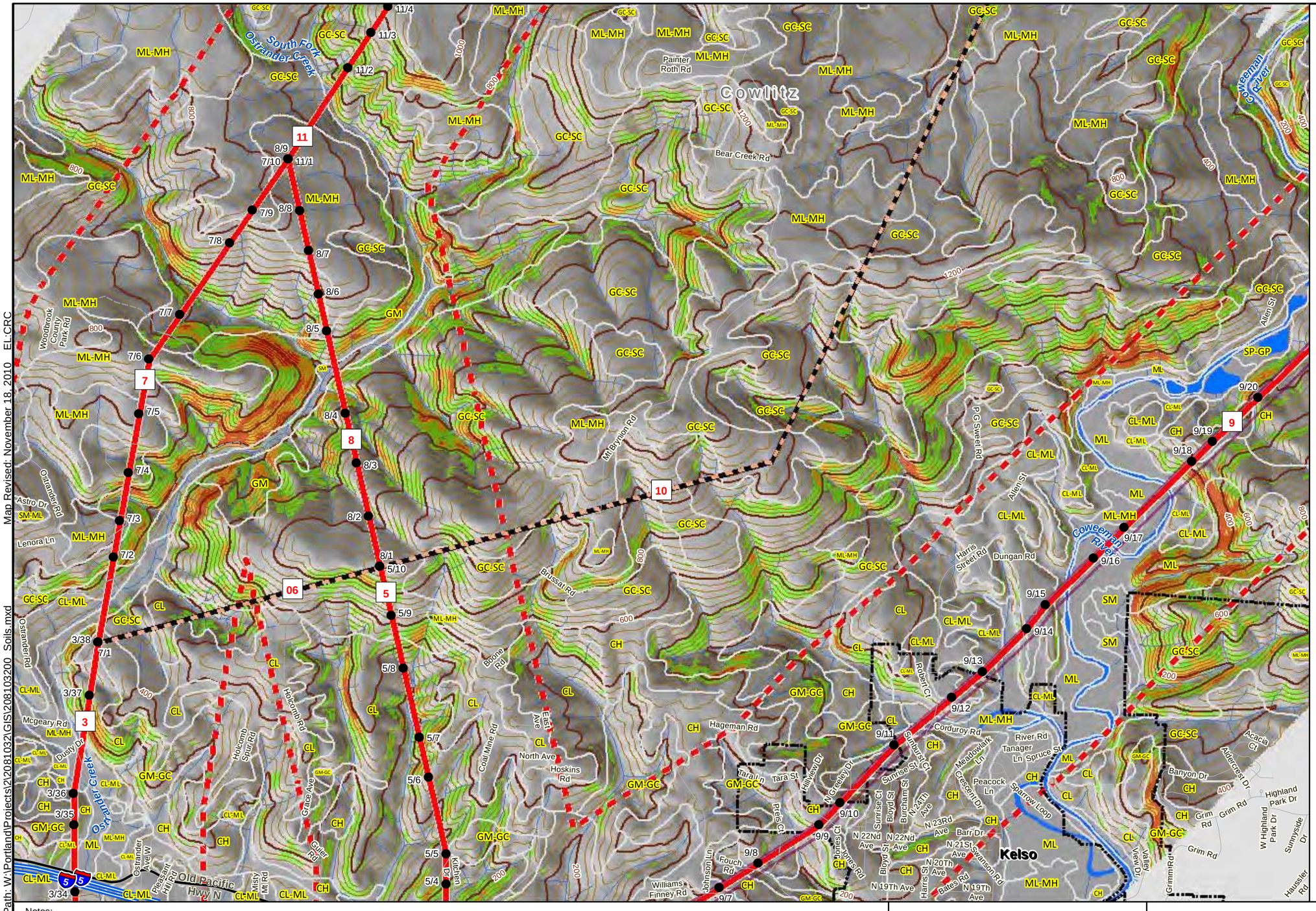
GeoEngineers

Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page B1

Sheet 59 of 156



Explanation

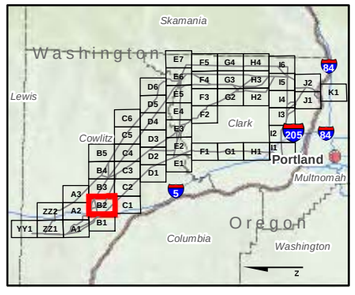
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Soil Boundary
- Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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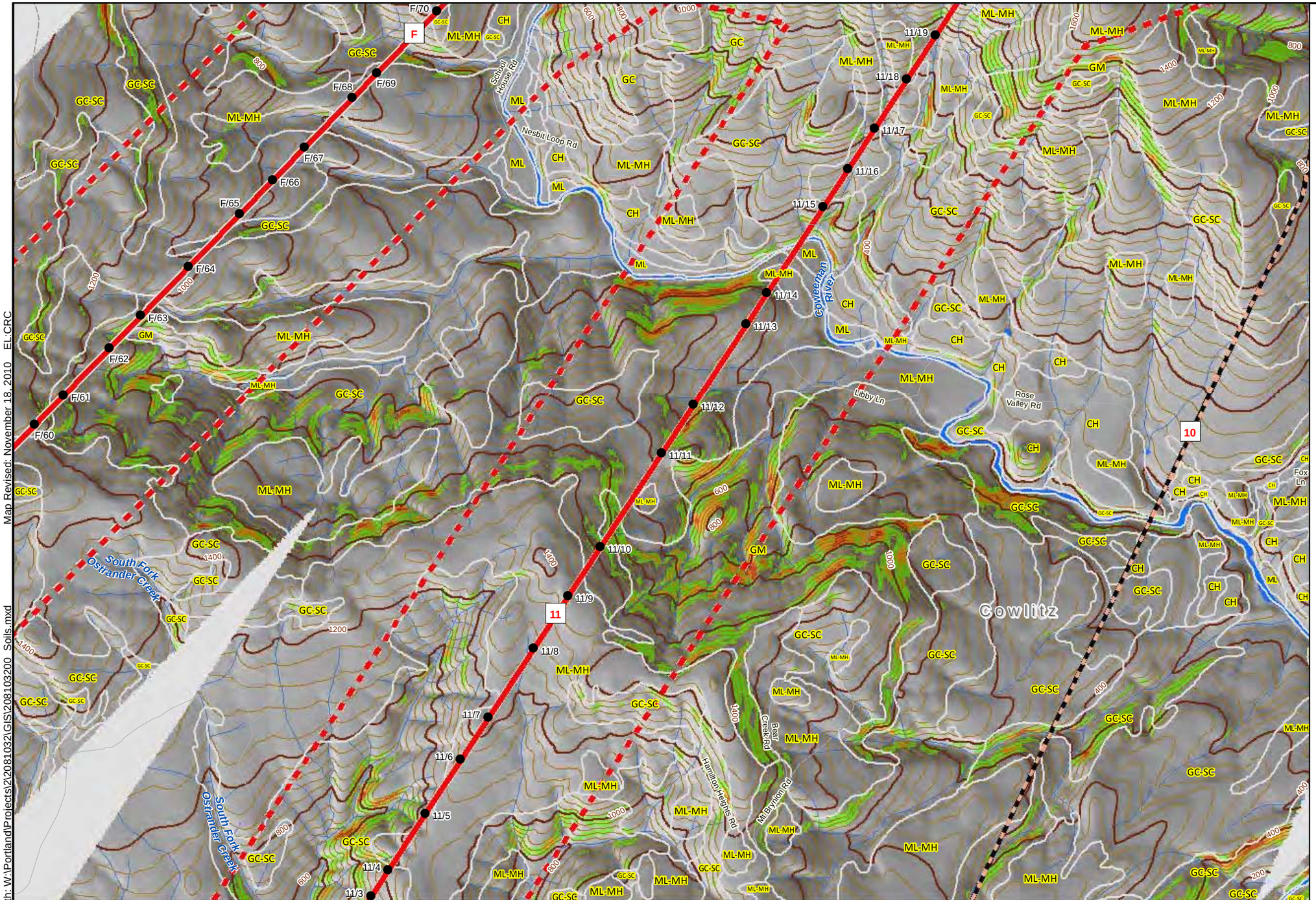
Soils and Slope Gradients

Map Page B2

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 60 of 156

Map Revised: November 18, 2010 Path: W:\Portland\Projects\2108103200\GIS\2108103200_Soils.mxd Office: PORT EL:CRC



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet

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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page B3

Sheet 61 of 156

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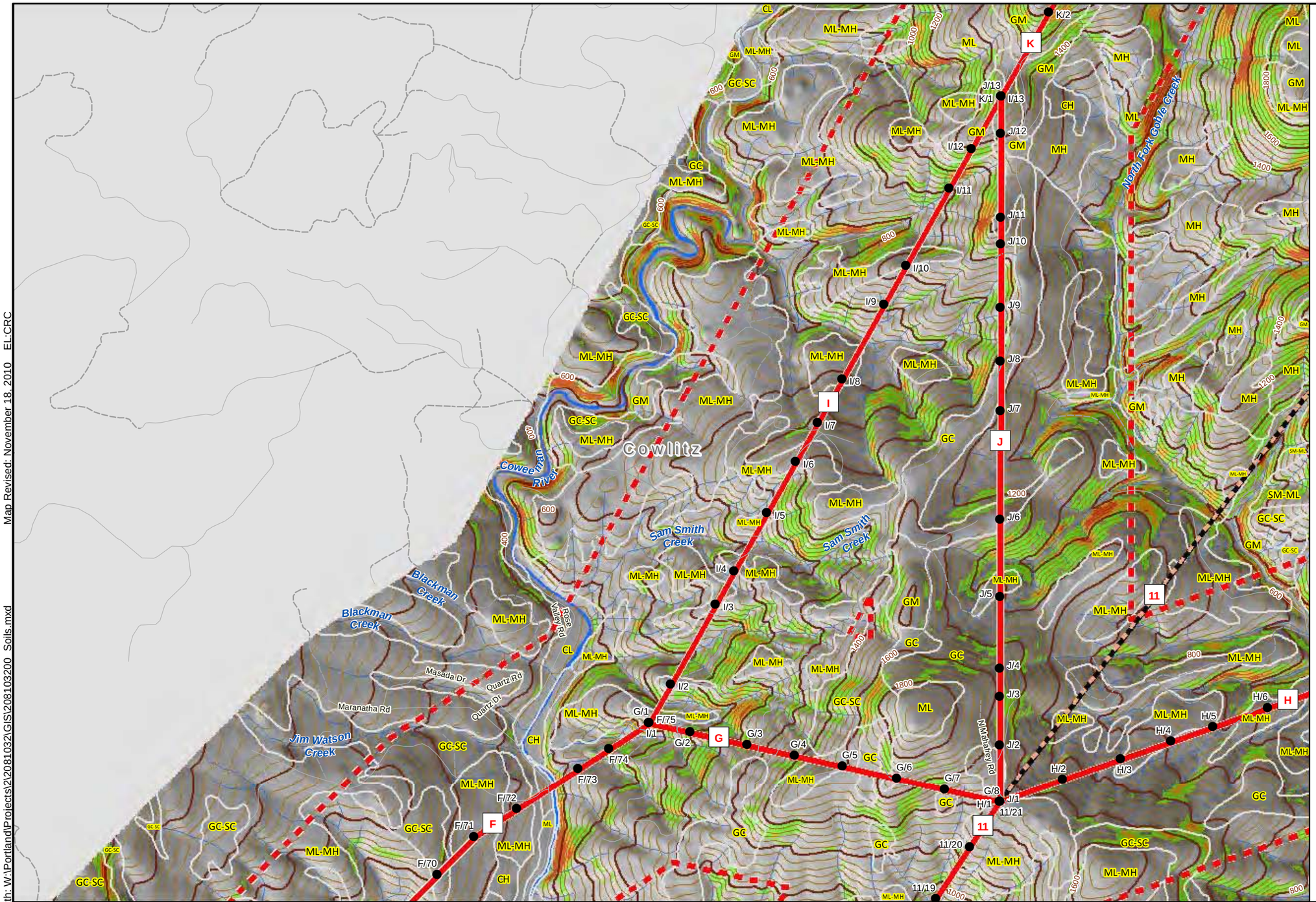

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page B4

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Explanation

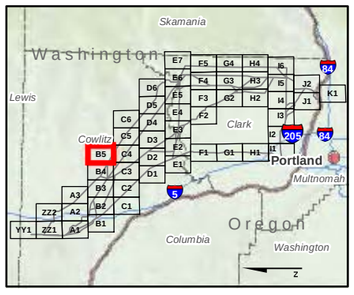
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page B5

Sheet 63 of 156

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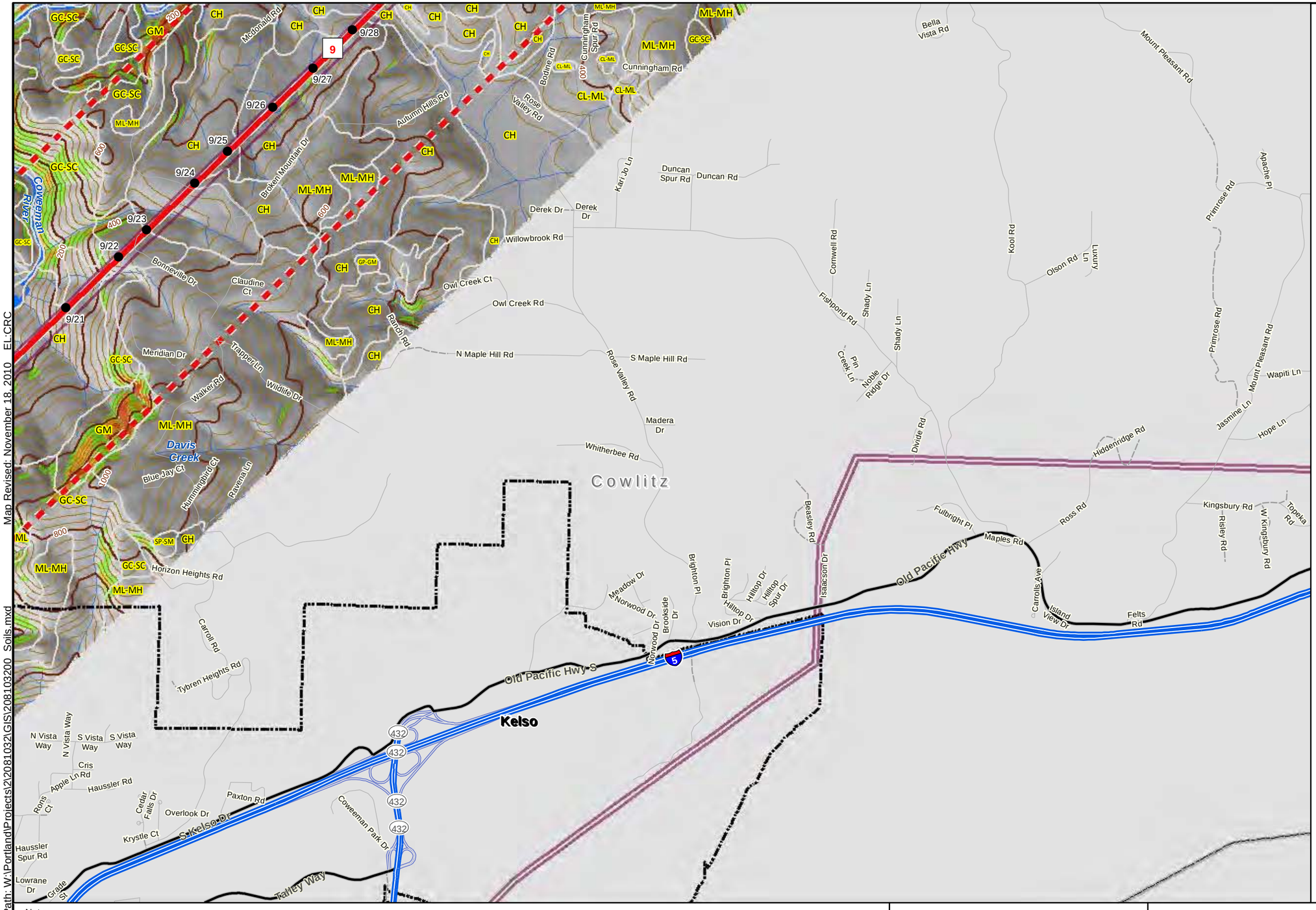


Explanation

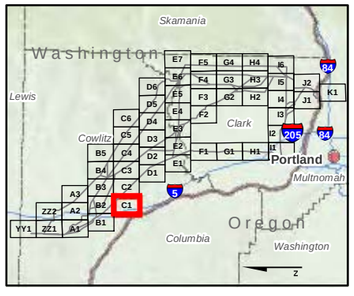
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C1

Sheet 64 of 156

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Office: PORT

Explanation

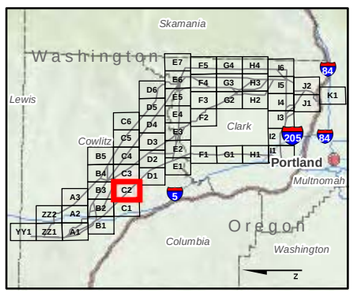
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Soil Boundary
- Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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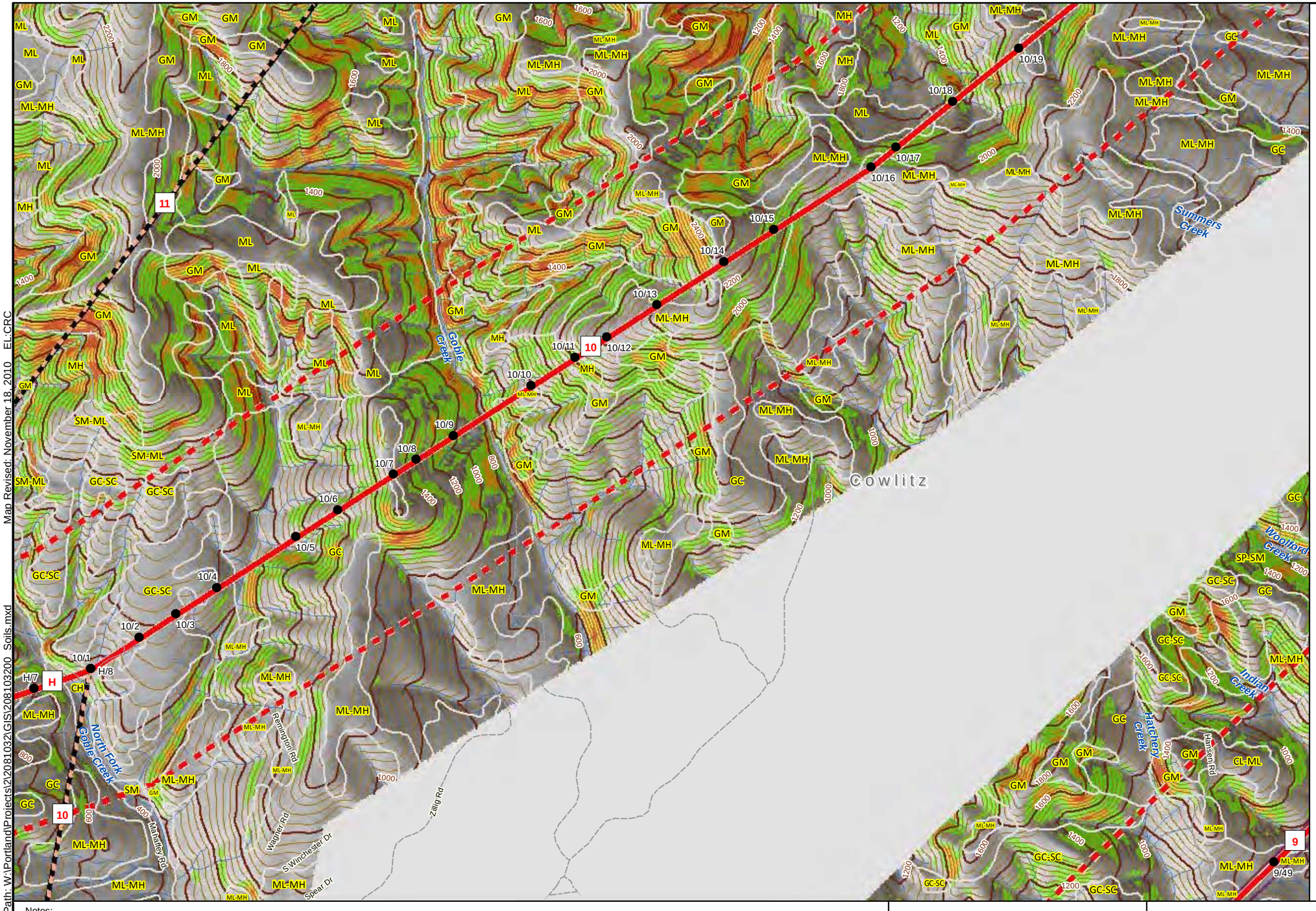
Soils and Slope Gradients

Map Page C2

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 65 of 156



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C3

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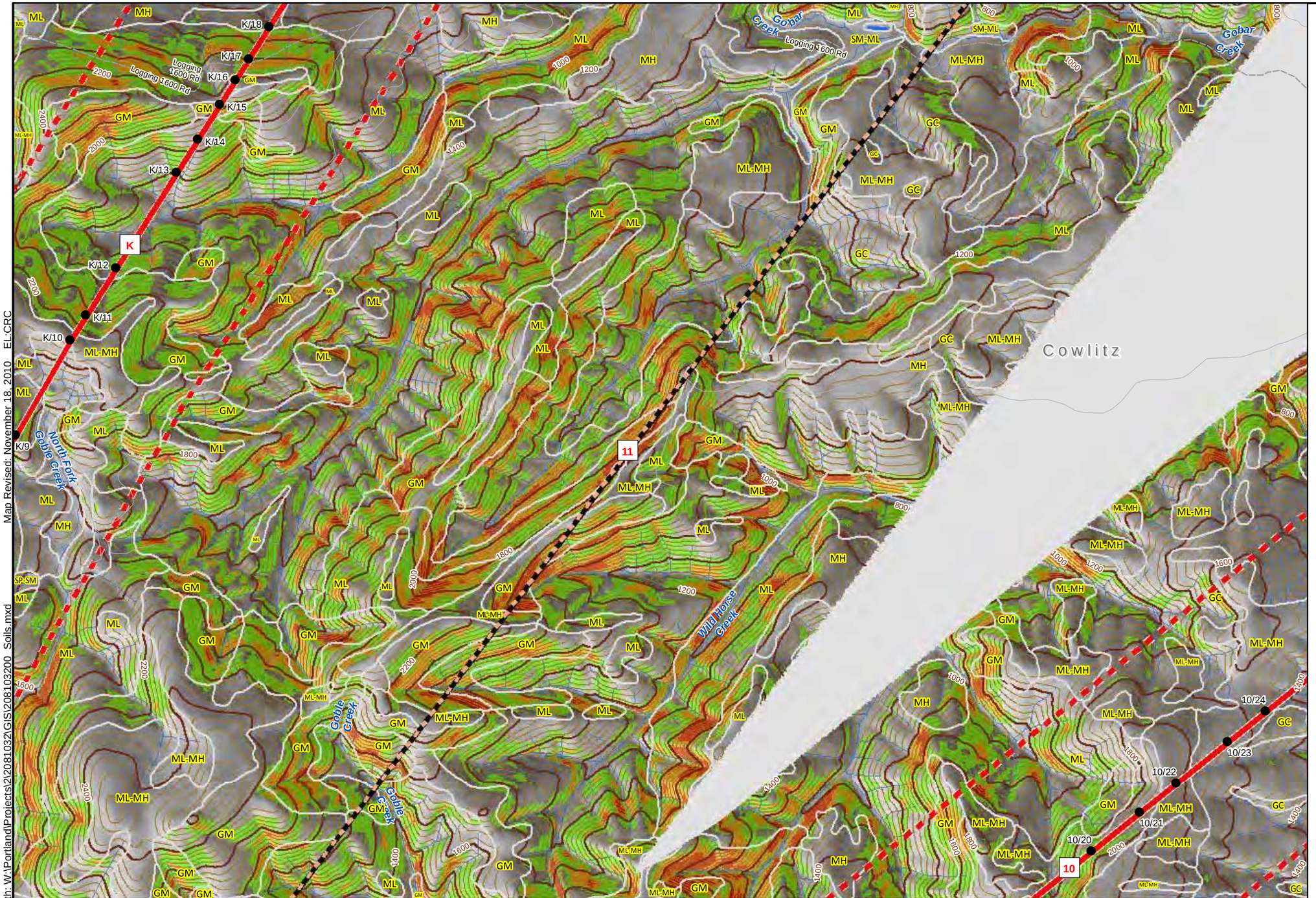


Explanation

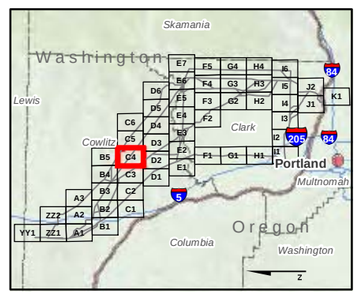
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Soil Boundary
- Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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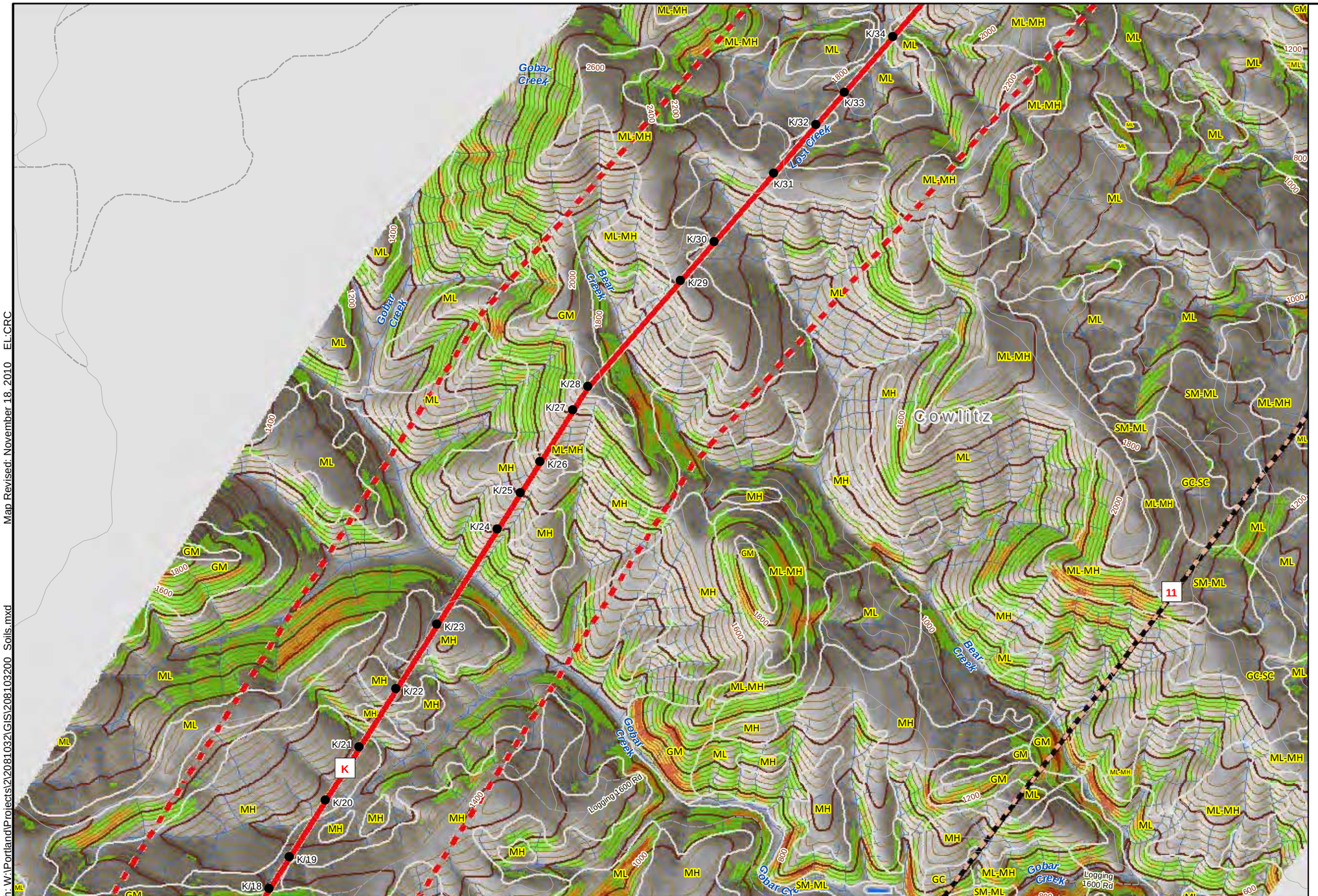
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C4

Sheet 67 of 156



Explanation

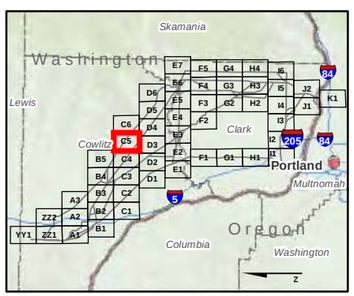
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Data Sources: Water features from Pacific Northwest Hydrography. Route information from BPA. Slopes derived from 10-meter DEM and Clark County LiDAR. Soils data from NRCS.

GeoEngineers

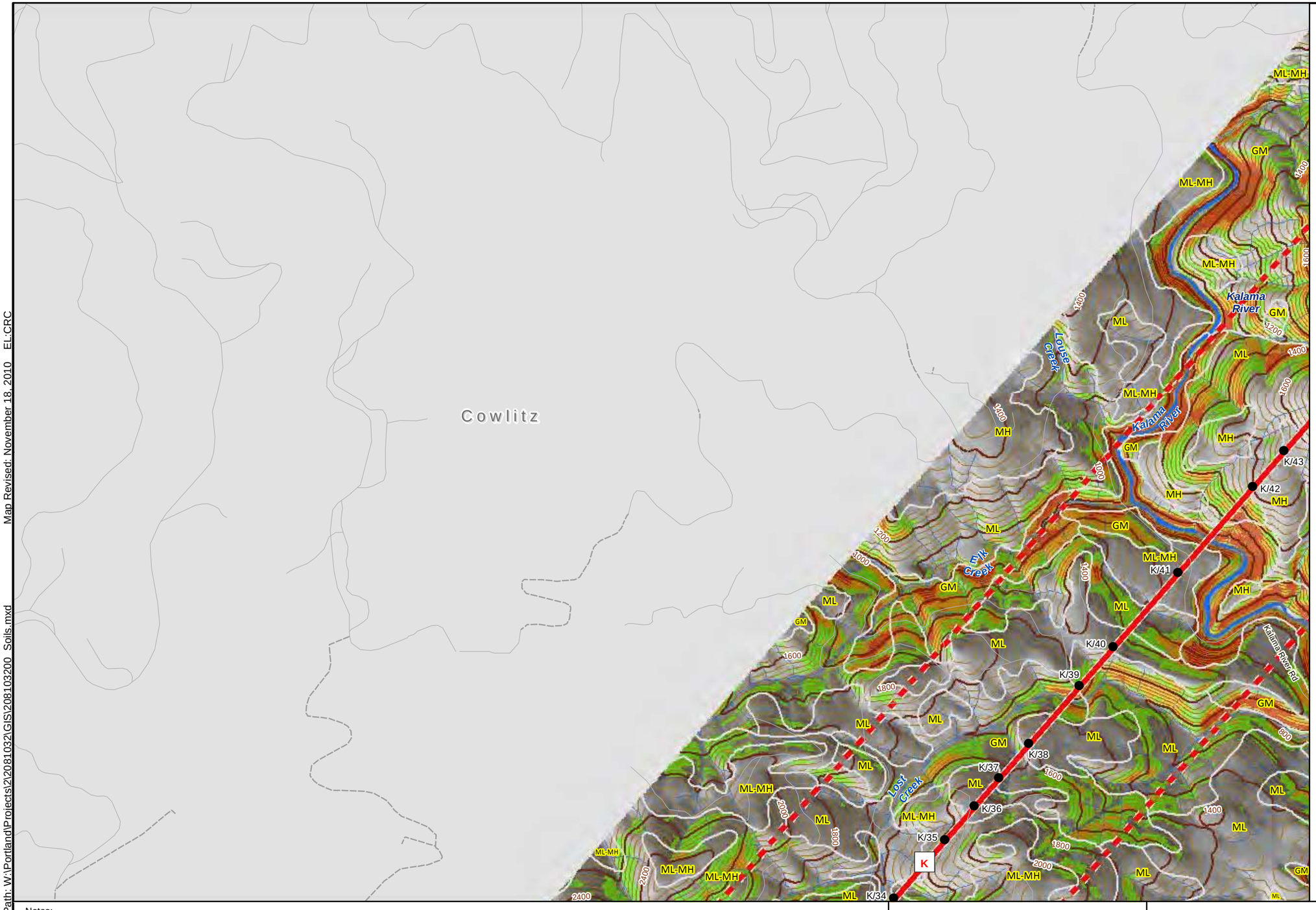
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C5

Sheet 68 of 156

Office: PORT Path: W:\Portland\Projects\2081032\GIS\2081032 Soils.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

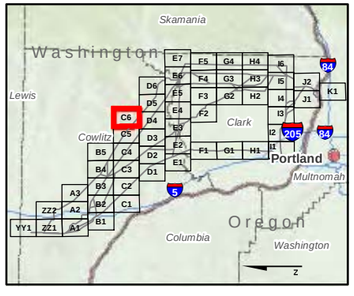
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

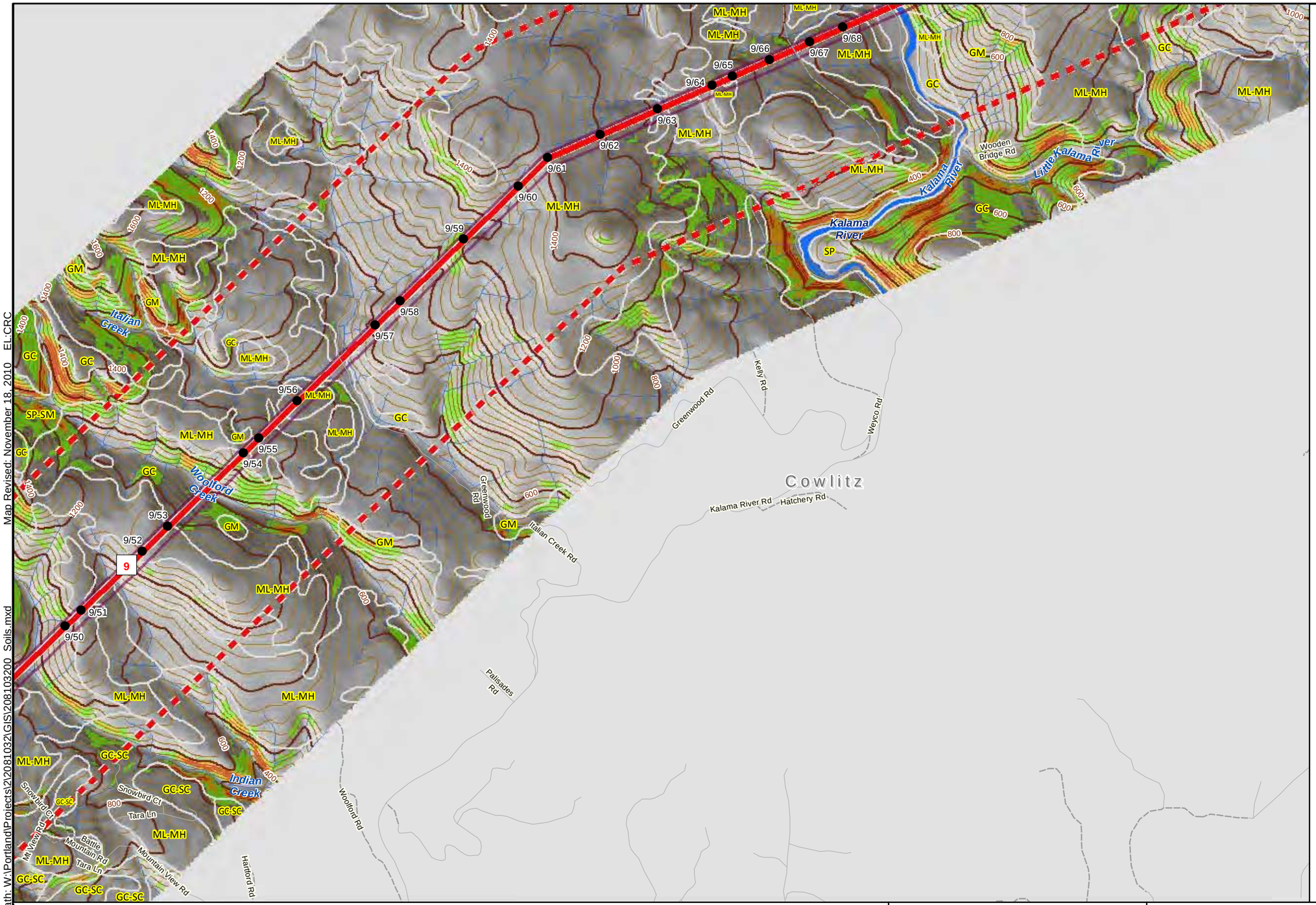
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C6

Sheet 69 of 156

Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\2081032000 Soils.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

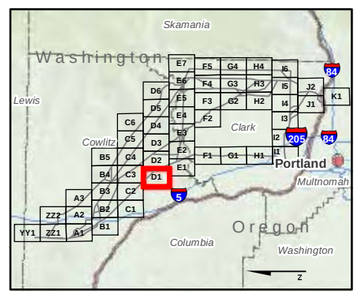
- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D1

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Map Revised: November 18, 2010 EL:CRC
Path: W:\Portland\Projects\2\2081032\GIS\2081032000 Soils.mxd
Office: PORT

Explanation

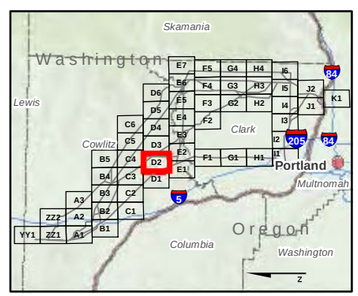
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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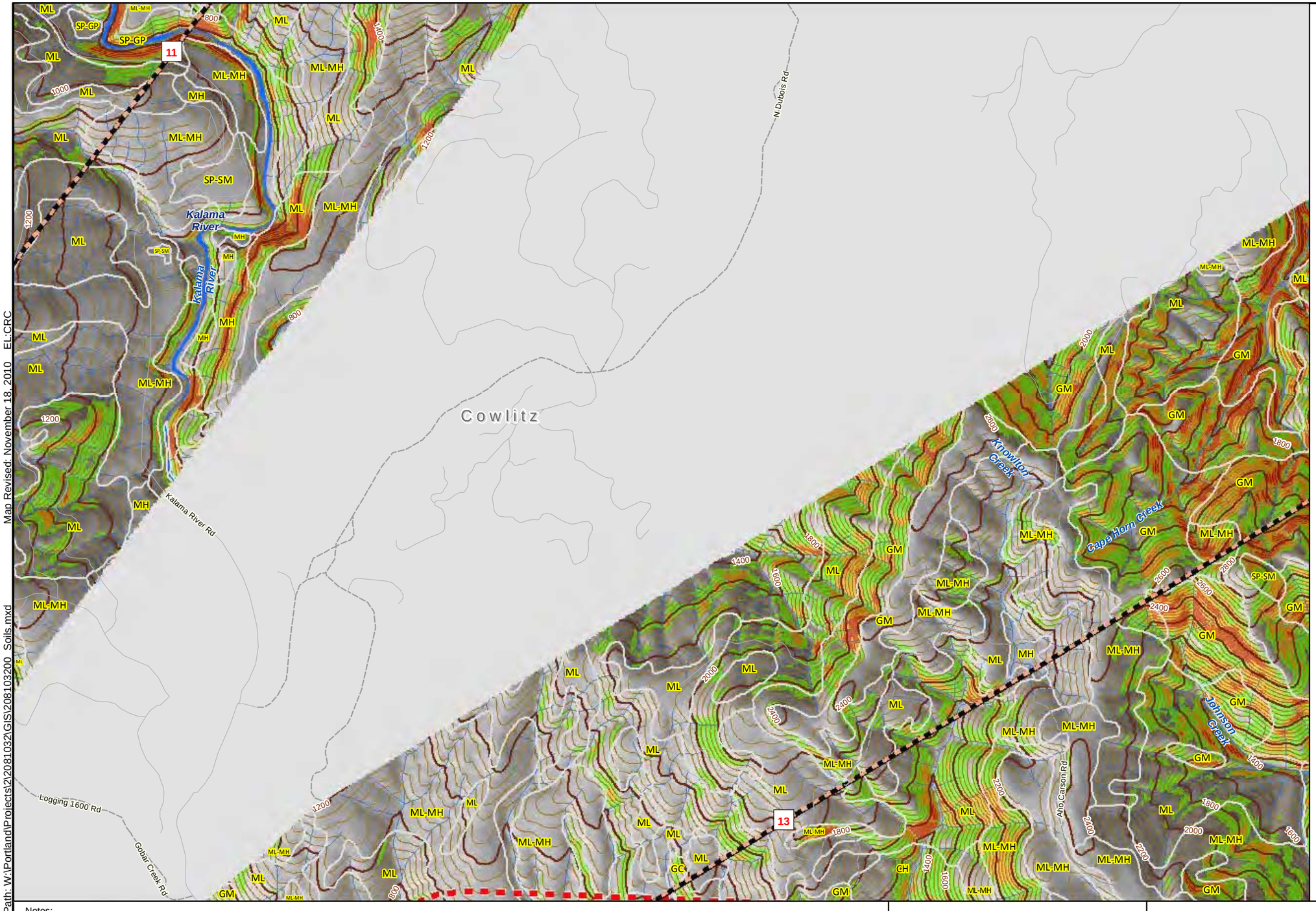
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D2

Sheet 71 of 156

Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\2081032200_Soils.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

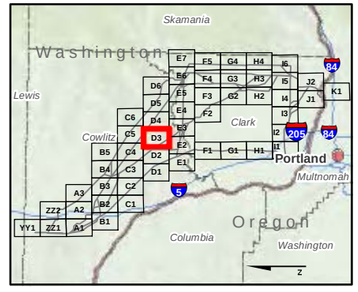
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D3

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Office: PORT

Explanation

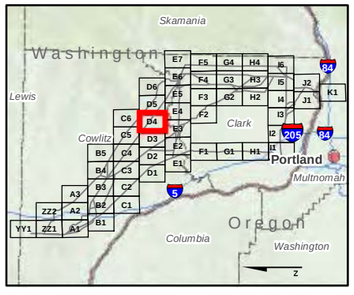
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Soil Boundary (ML)
- Organic Soil Units (PT)

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D4

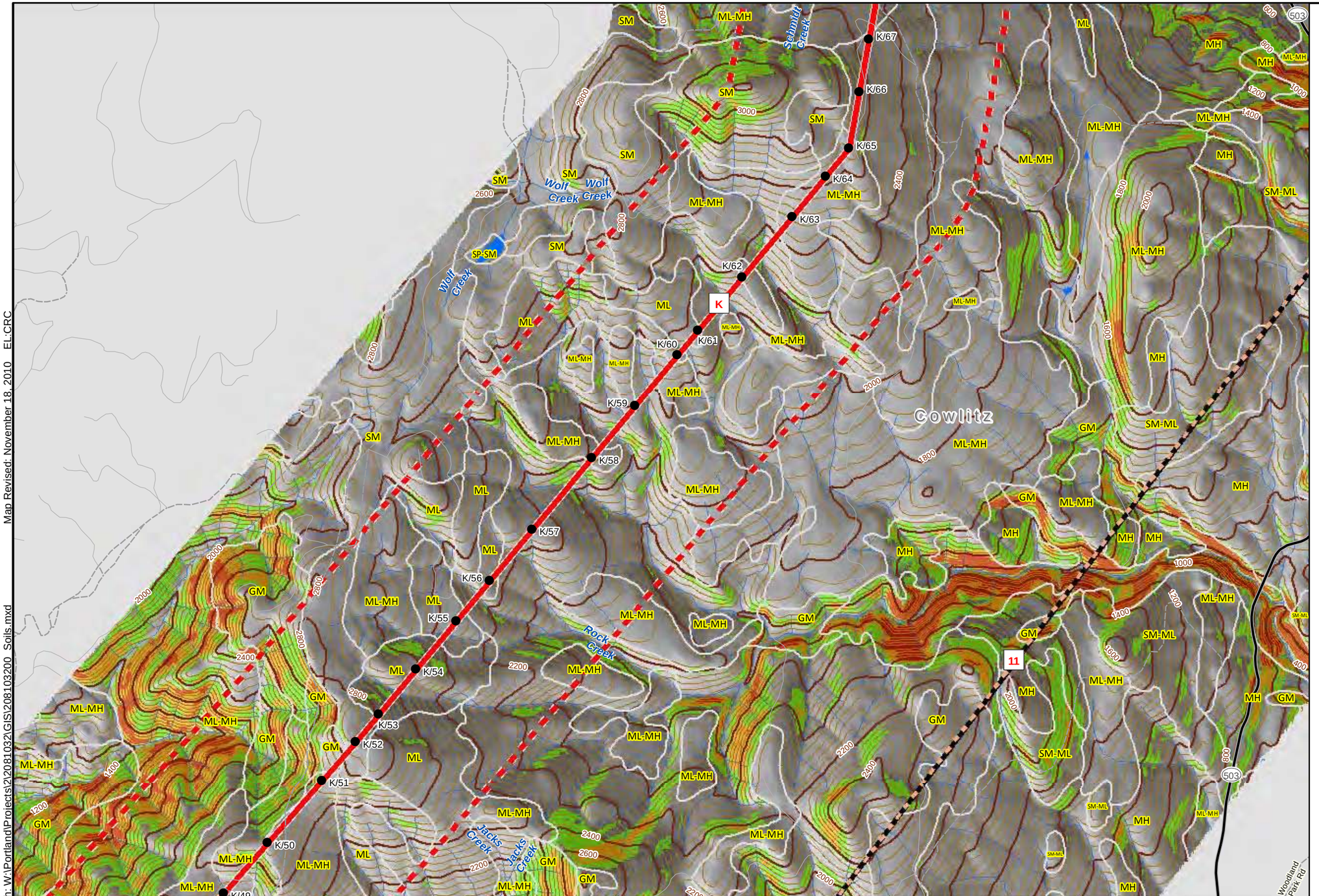
Sheet 73 of 156

Office: PORT Path: W:\Portland\Projects\21081032\GIS\21081032_Soils.mxd Map Revised: November 18, 2010 EL:CRC

Map Revised: November 18, 2010 EL:CRC

Path: W:\Portland\Projects\2081032\GIS\2081032_Soils.mxd

Office: PORT



Explanation

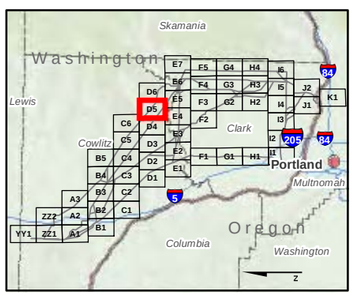
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

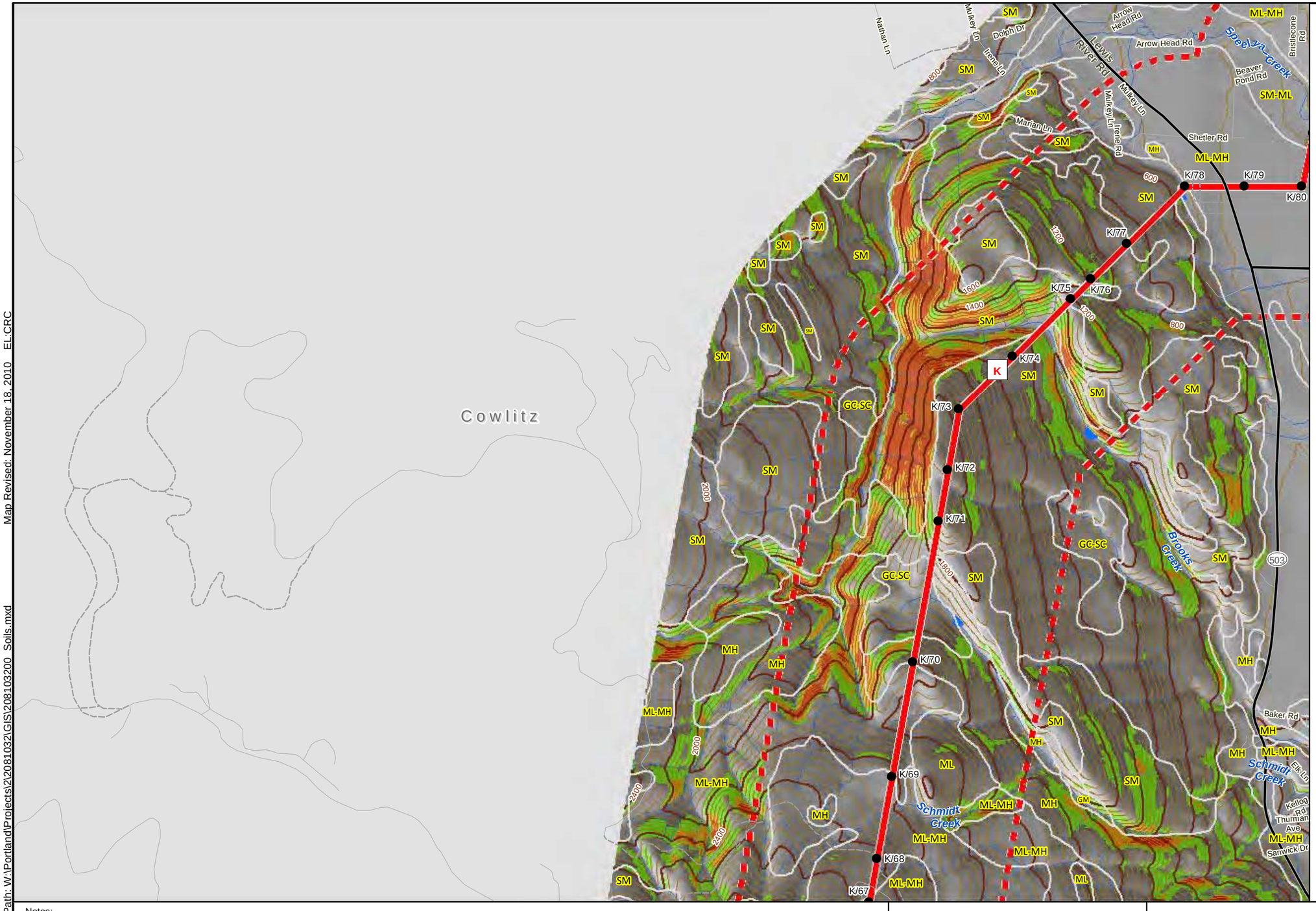
BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D5

Sheet 74 of 156

Map Revised: November 18, 2010 EL:CRC

Office: PORT Path: W:\Portland\Projects\2\208103200\GIS\208103200_Soils.mxd



Explanation

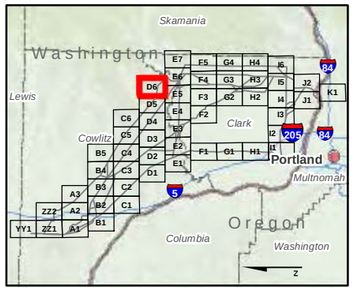
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D6

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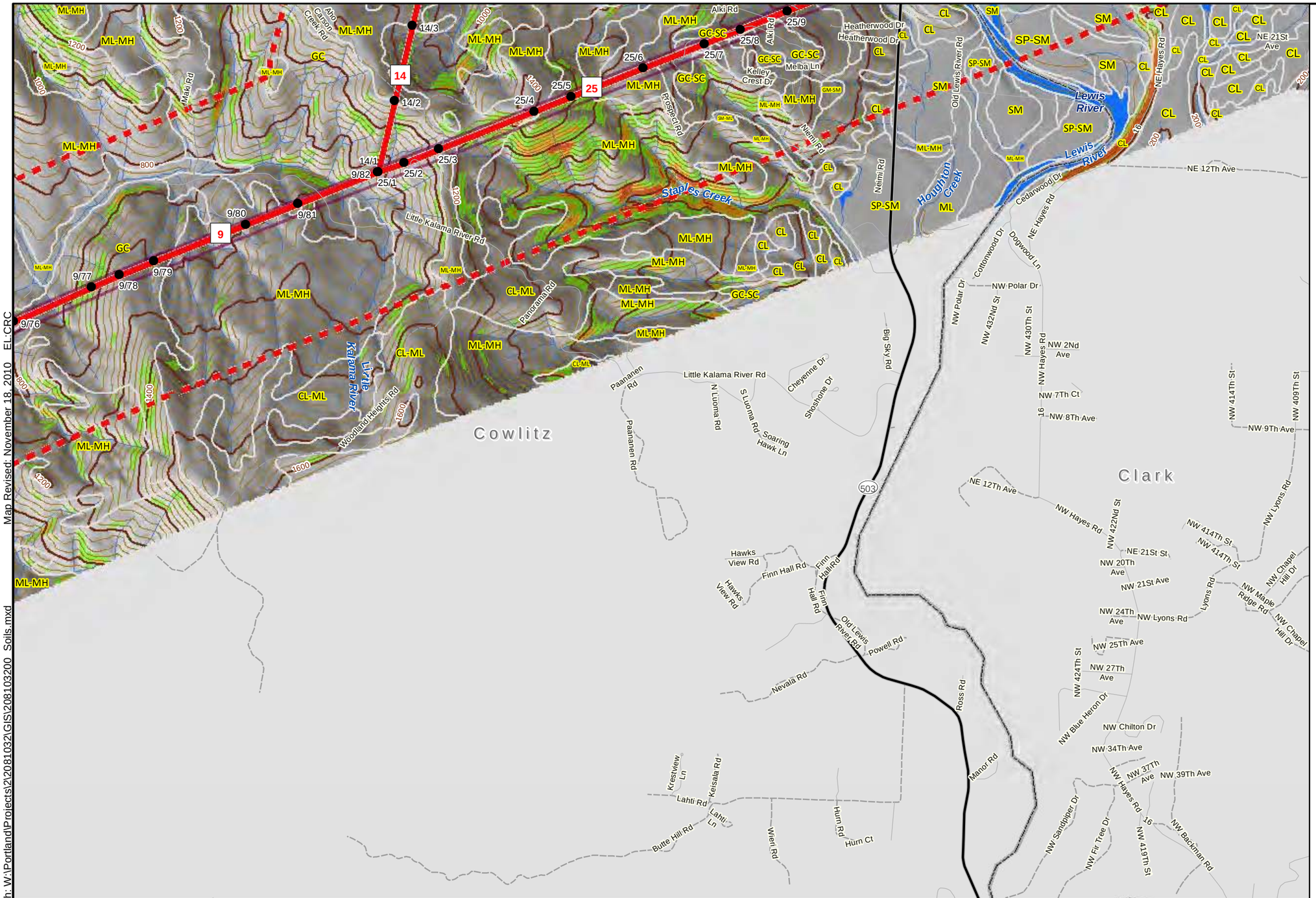

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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E1

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Map Revised: November 18, 2010 EL:CRC
Path: W:\Portland\Projects\2\2081032\GIS\2081032GIS Soils.mxd
Office: PORT

Explanation

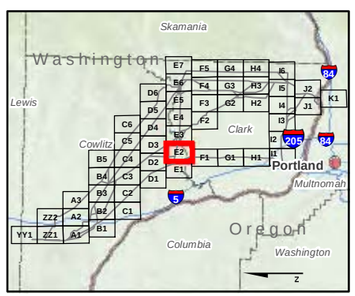
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Soil Boundary (ML)
- Organic Soil Units (PT)

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E2

Sheet 77 of 156

Map Revised: November 18, 2010 EL:CRC

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Office: PORT

Explanation

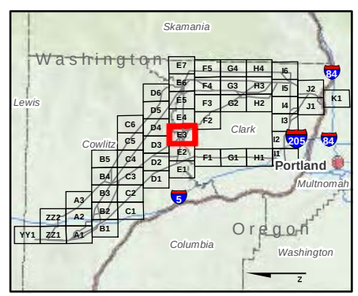
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E3

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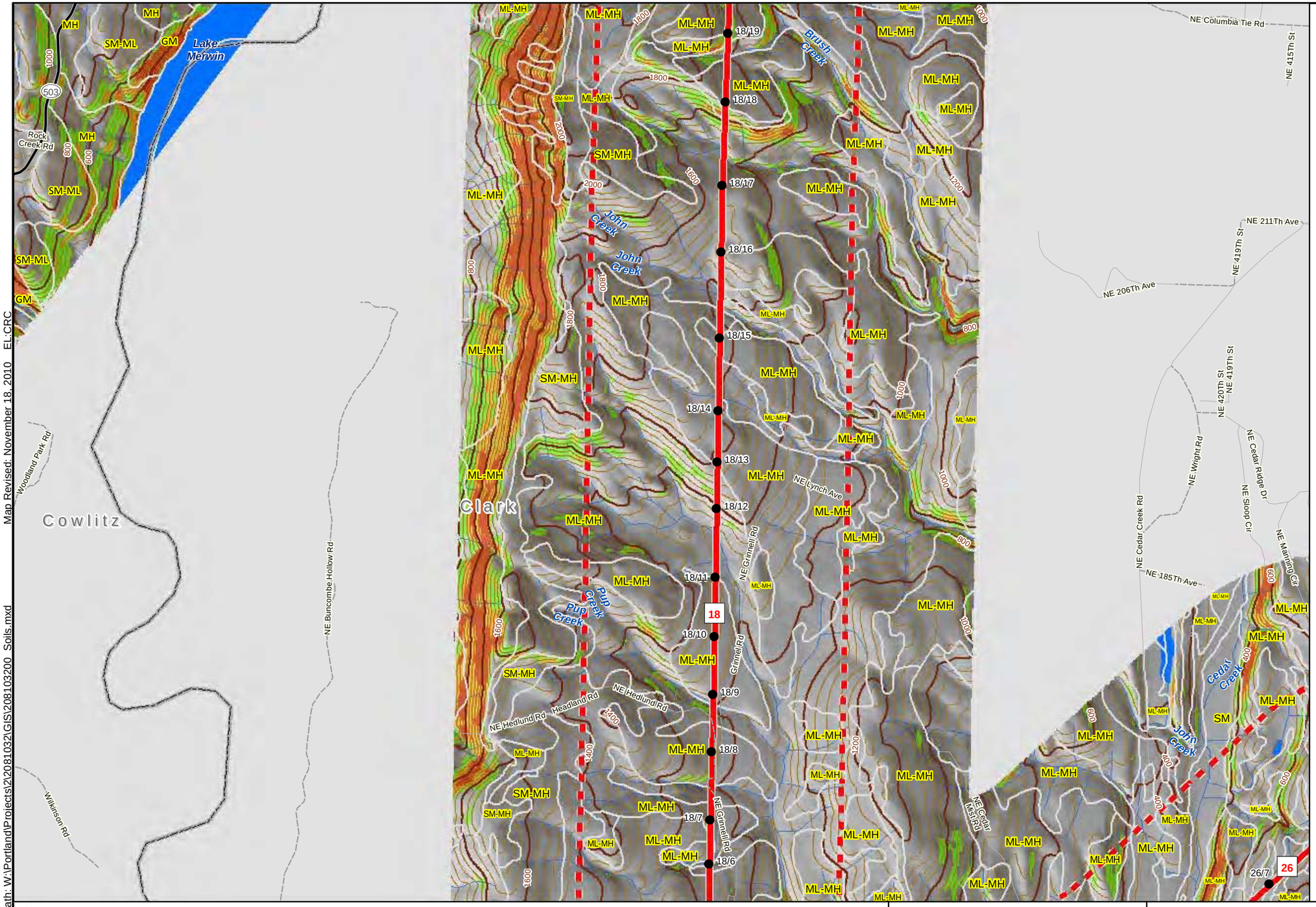


Explanation

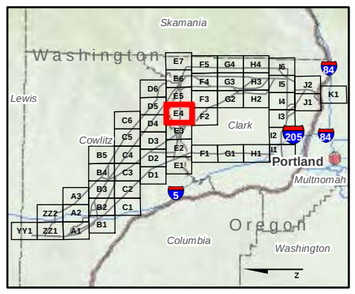
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

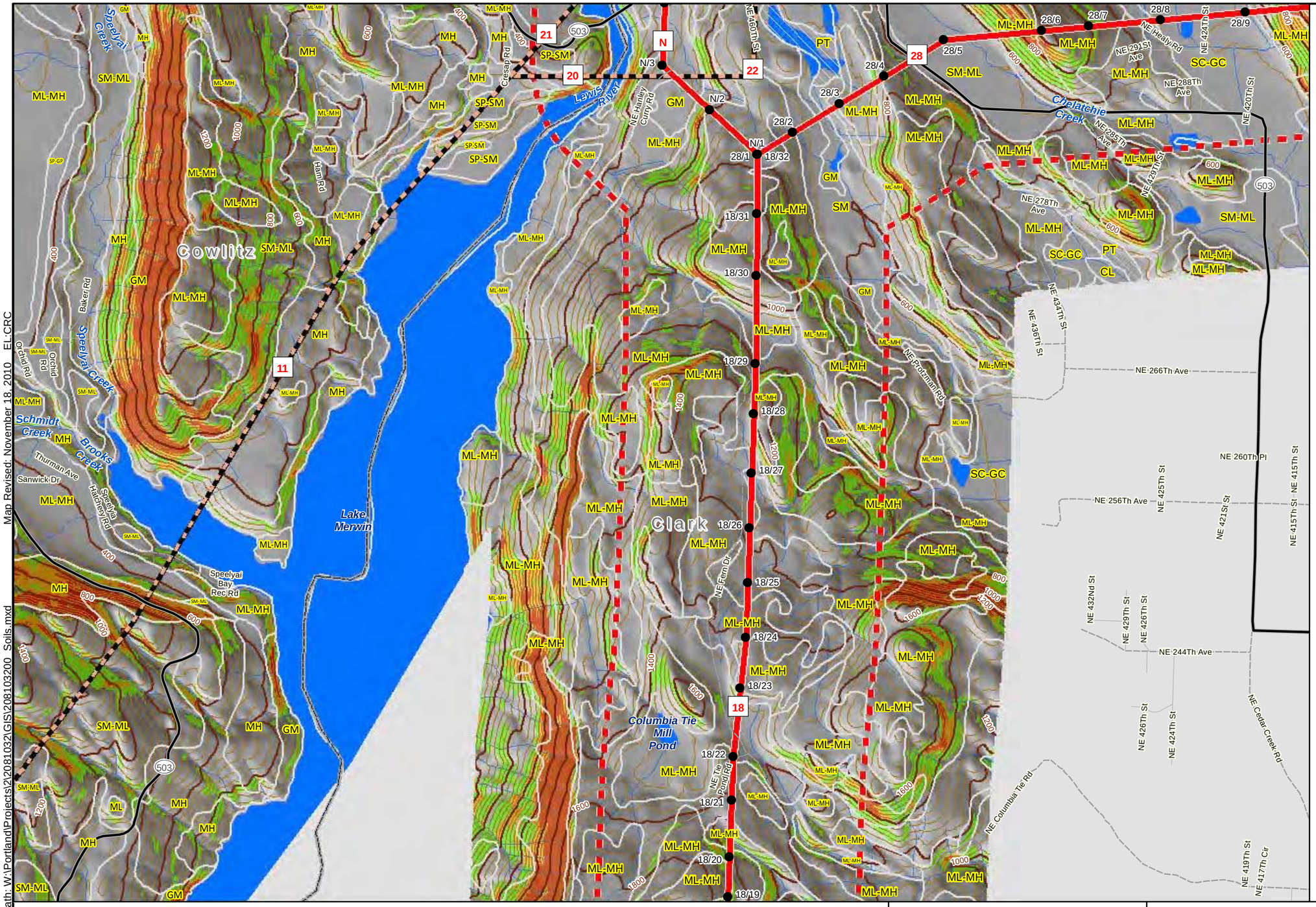
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E4

Sheet 79 of 156

Office: PORT Path: W:\Portland\Projects\210810321GIS\208103200 Soils.mxd Map Revised: November 18, 2010 EL:CRC



Map Revised: November 18, 2010 EL:CRC
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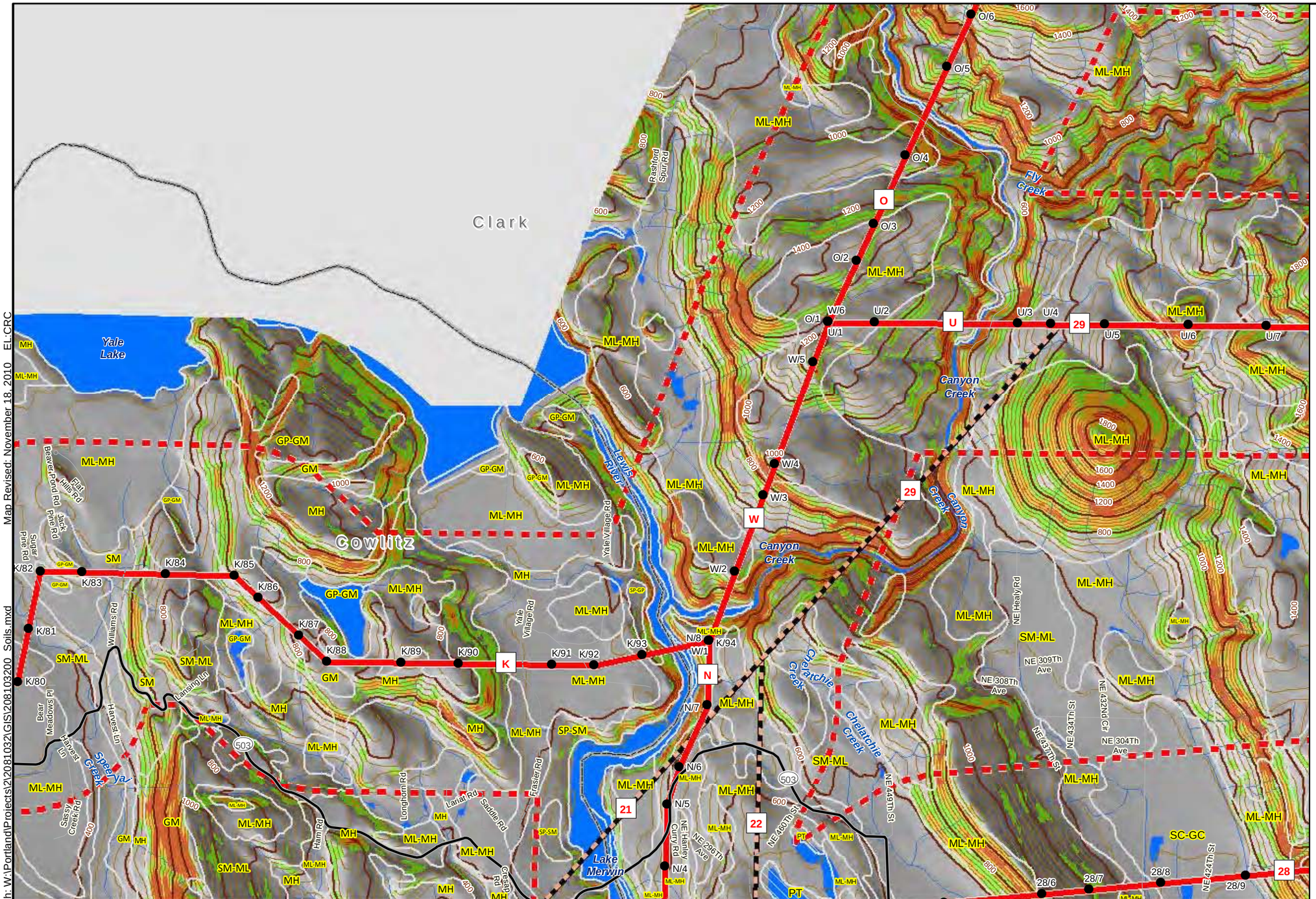
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E5

Sheet 80 of 156



Explanation

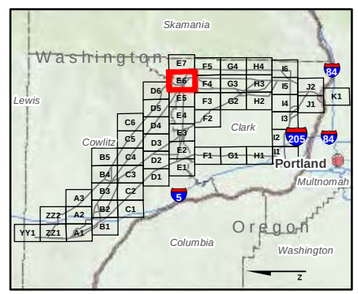
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Soil Boundary
- Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Soils and Slope Gradients

Map Page E6

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

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Explanation

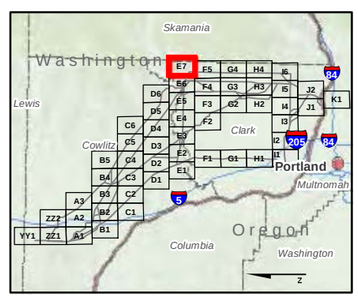
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E7

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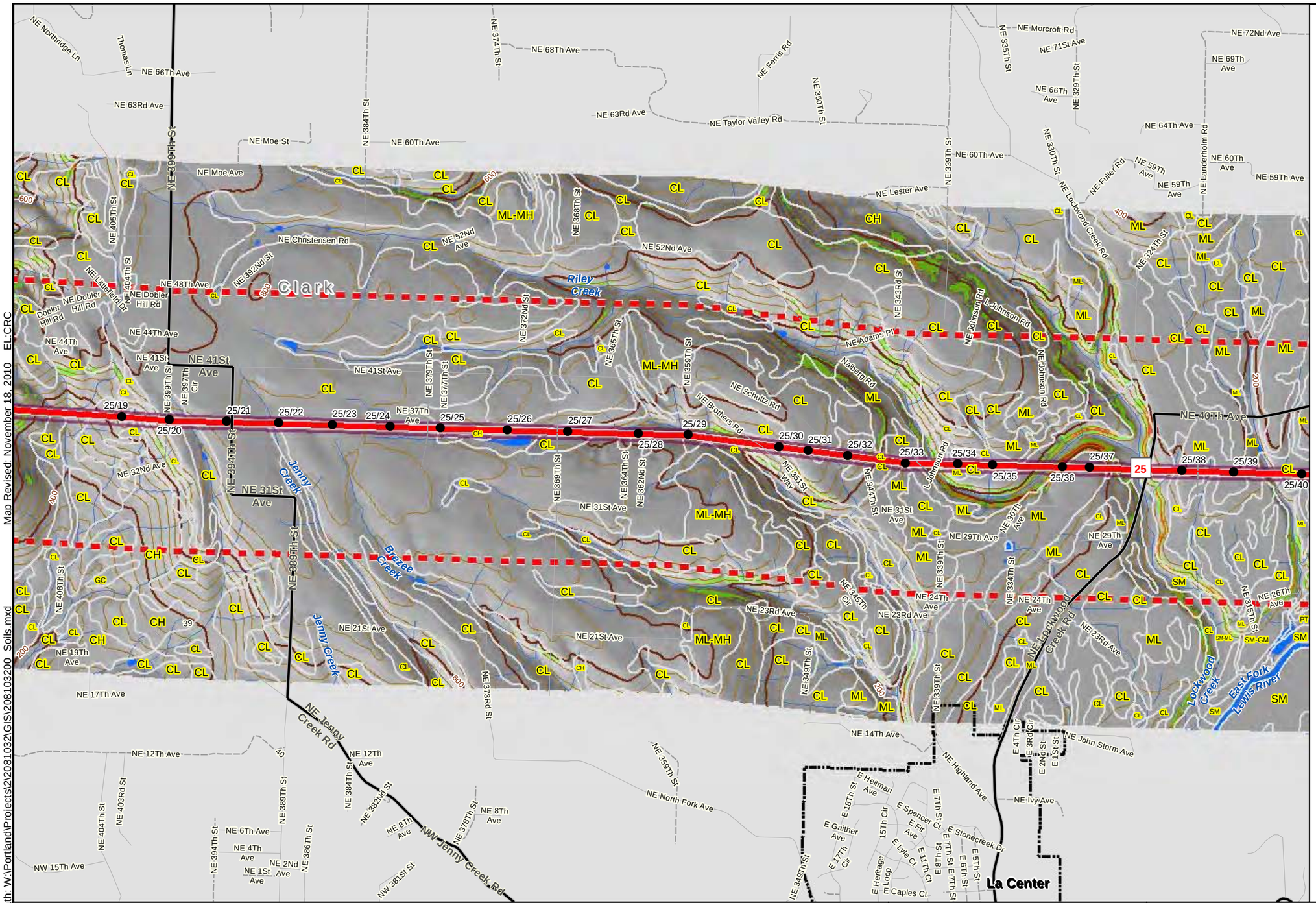
Map Revised: November 18, 2010 EL:CRC

Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\2081032_00_Soils.mxd



Explanation

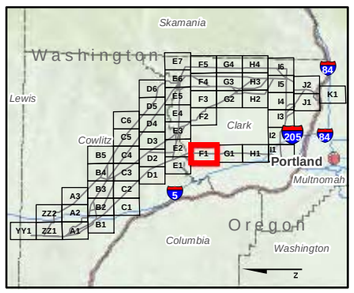
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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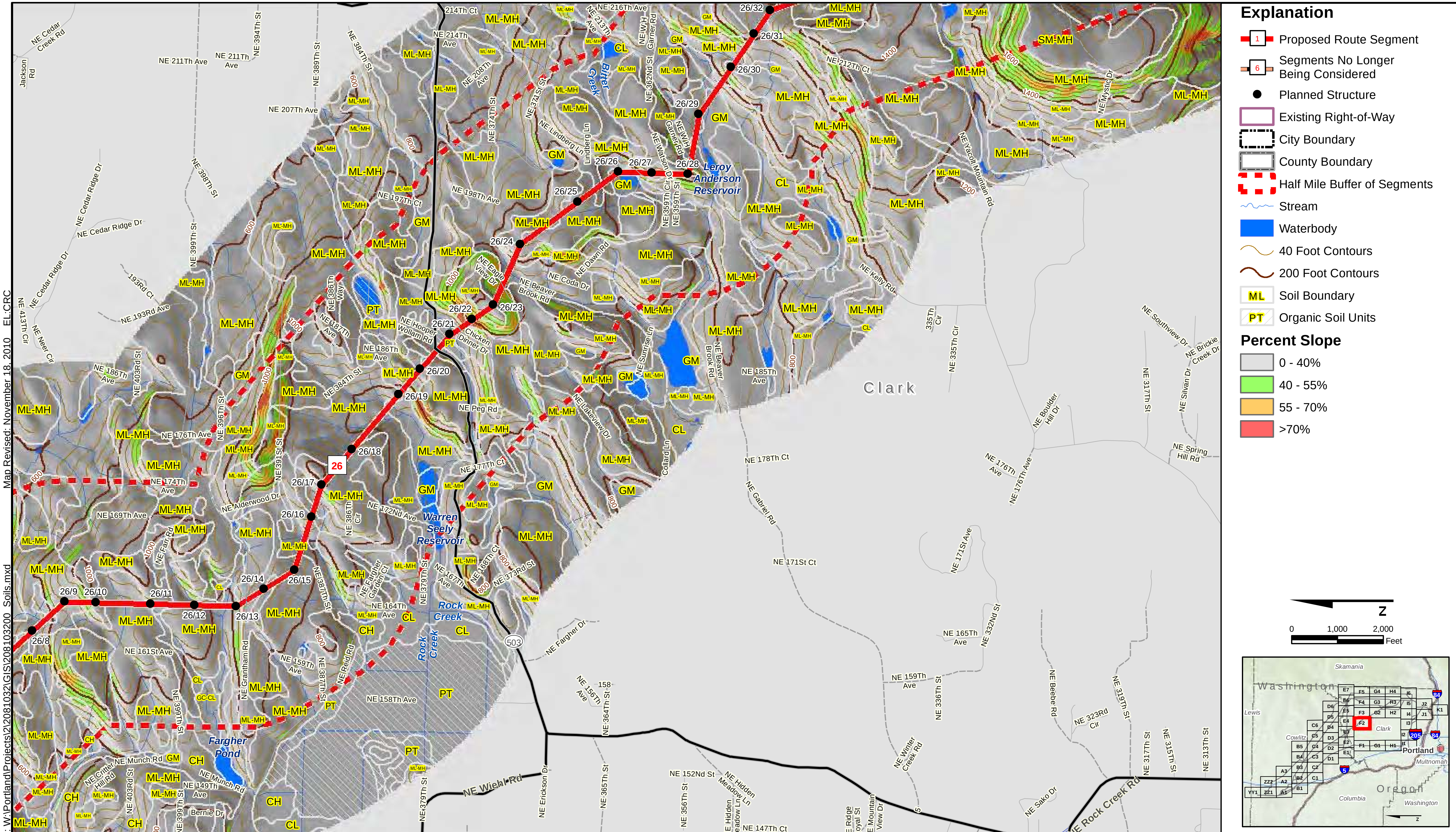
GeoEngineers

Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F1

Sheet 83 of 156



Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\208103200_Soils.mxd Map Revised: November 18, 2010 EL:CRC

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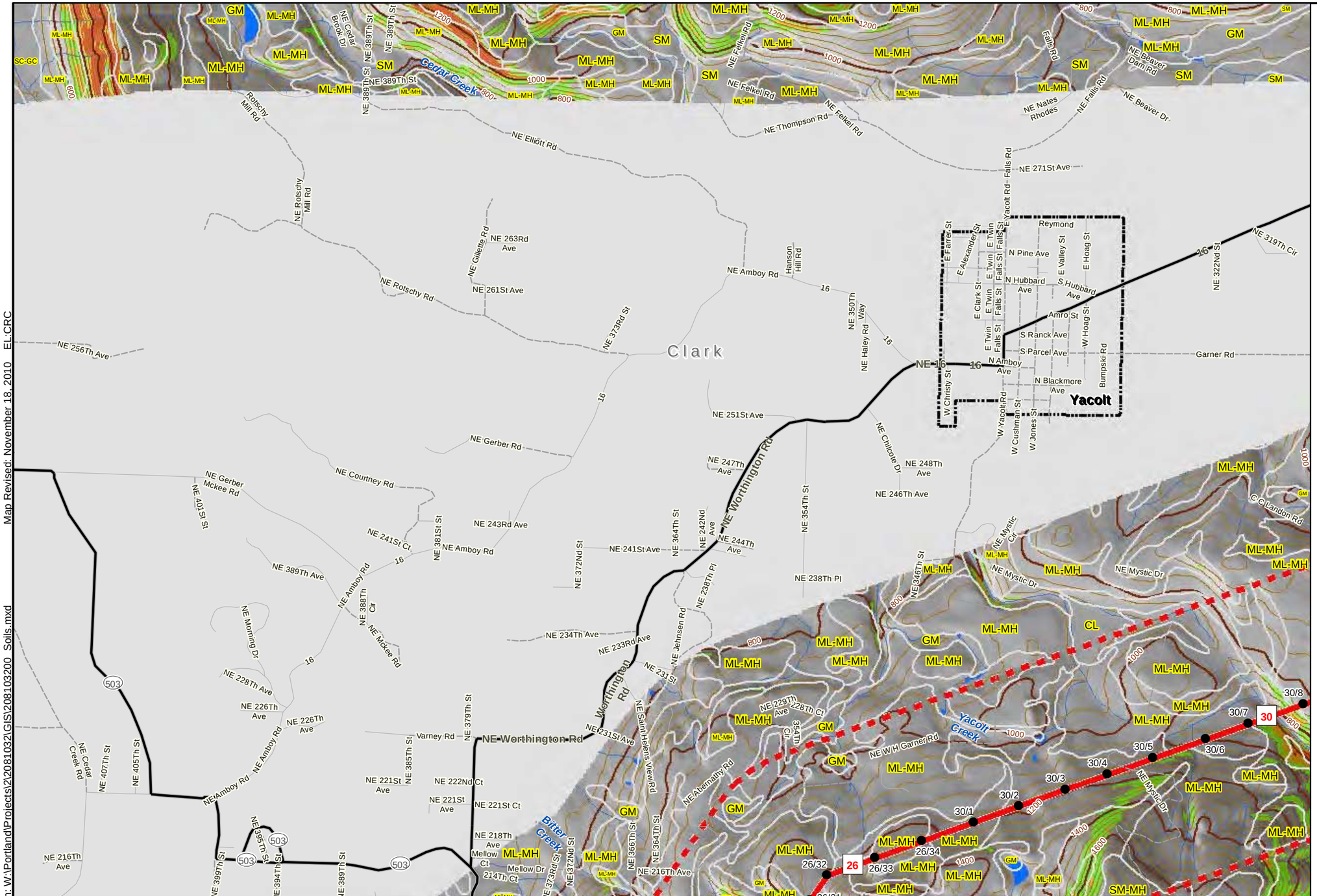
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F2



Explanation

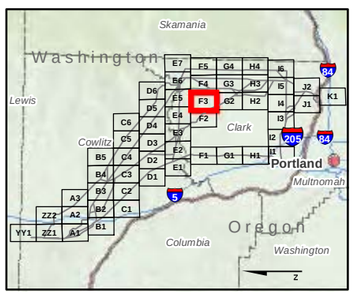
- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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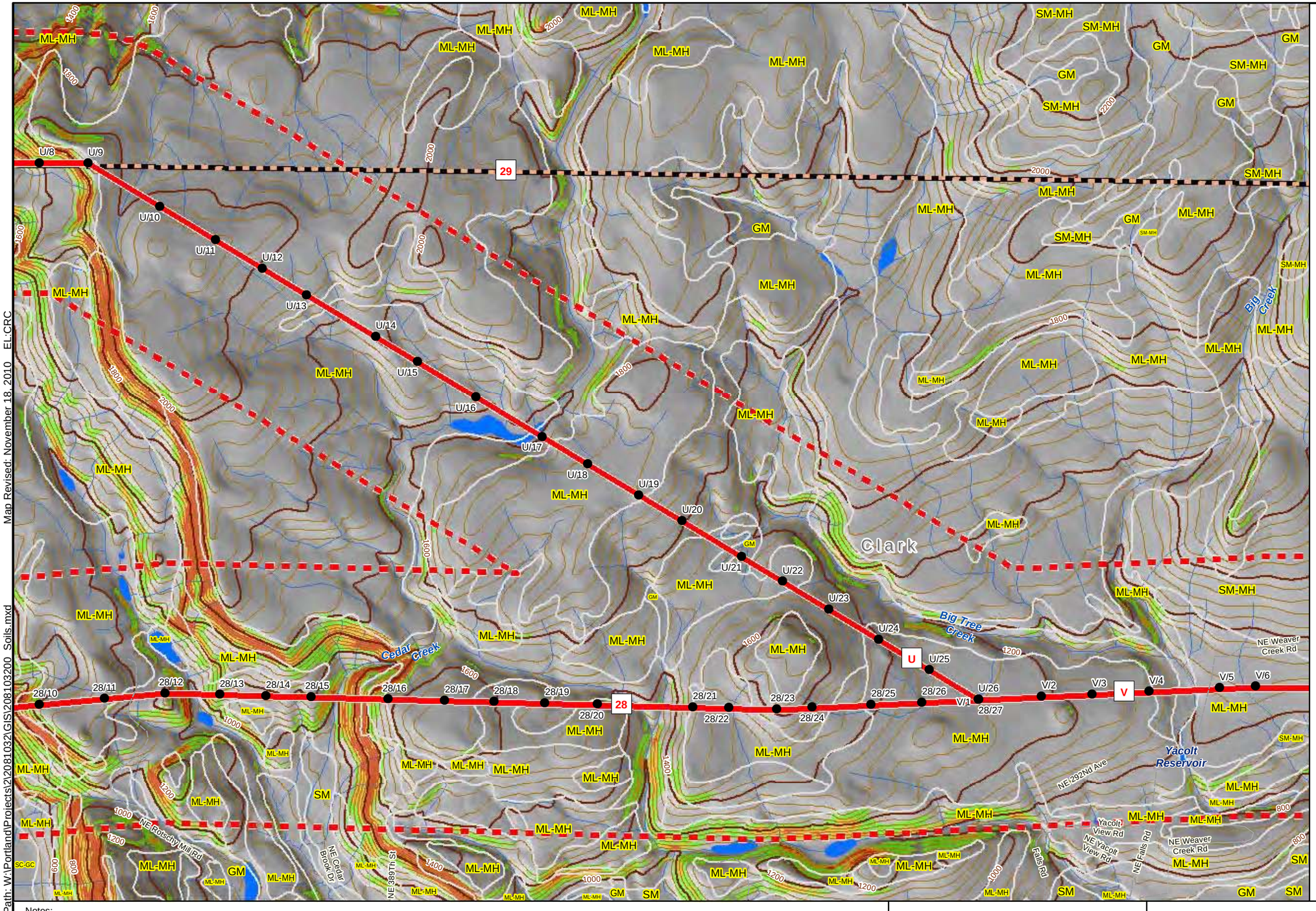
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F3



Map Revised: November 18, 2010 EL:CRC
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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

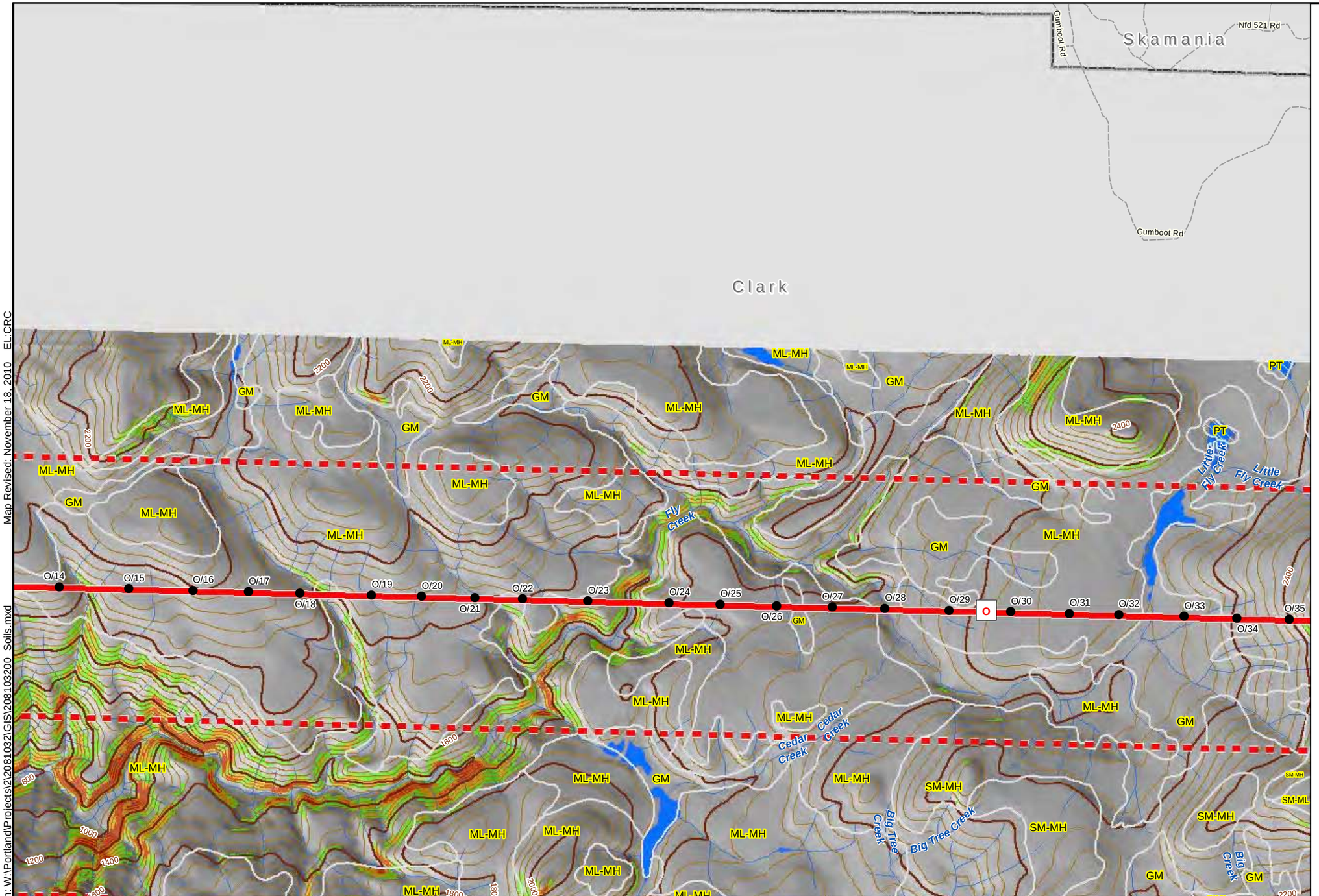
Map Page F4

Sheet 86 of 156

Map Revised: November 18, 2010 EL:CRC

Path: W:\Portland\Projects\2\208103200 Soils.mxd

Office: PORT



Explanation

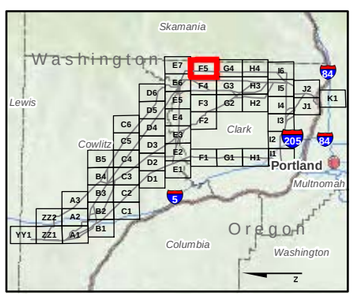
- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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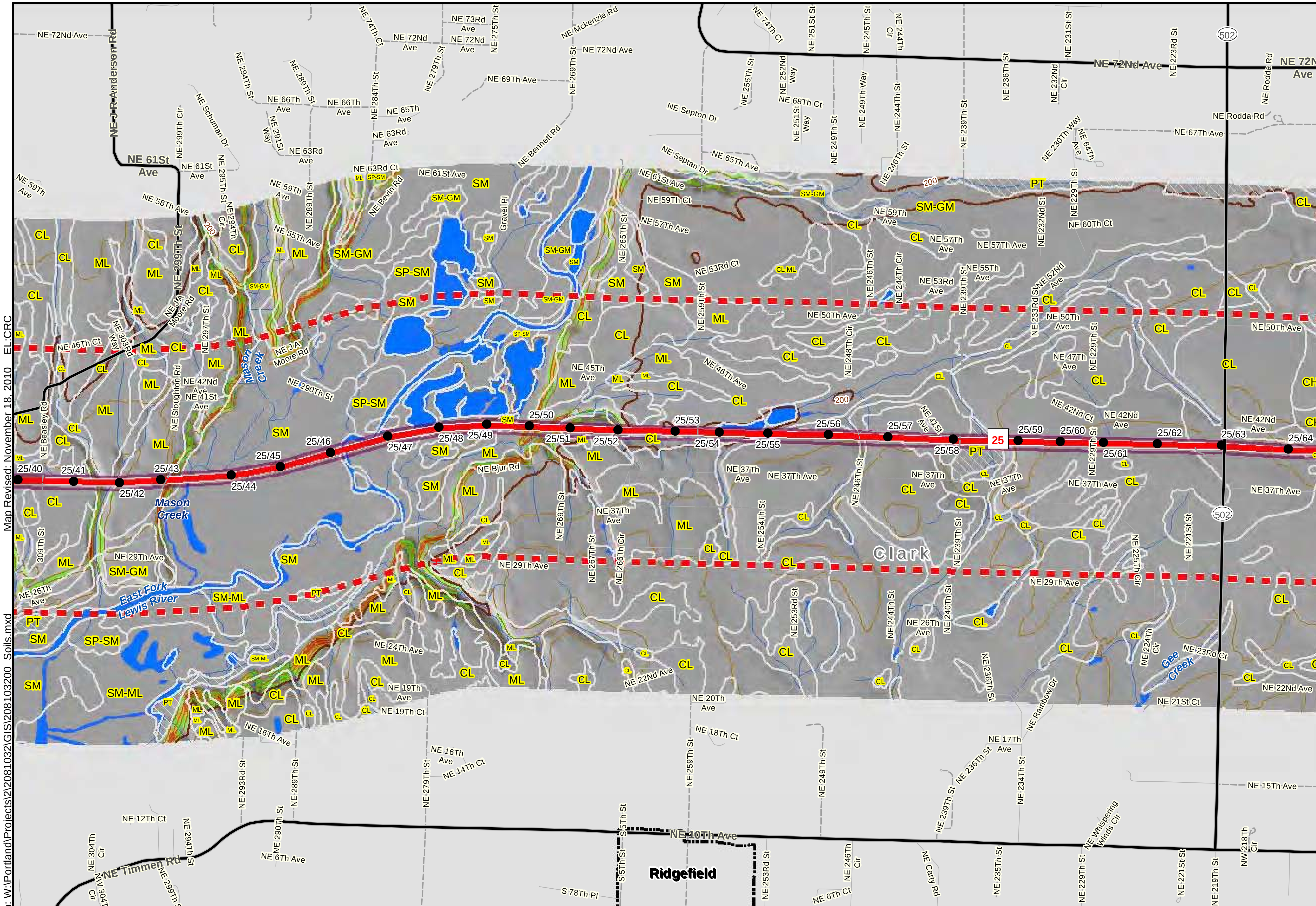
Soils and Slope Gradients

Map Page F5

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 87 of 156

Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\208103200 Soils.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

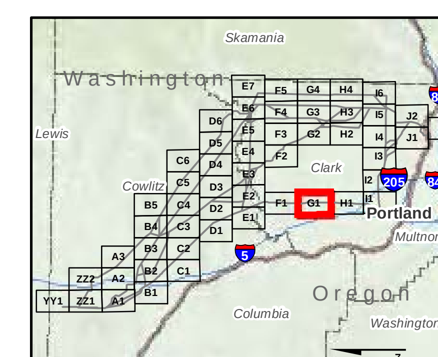
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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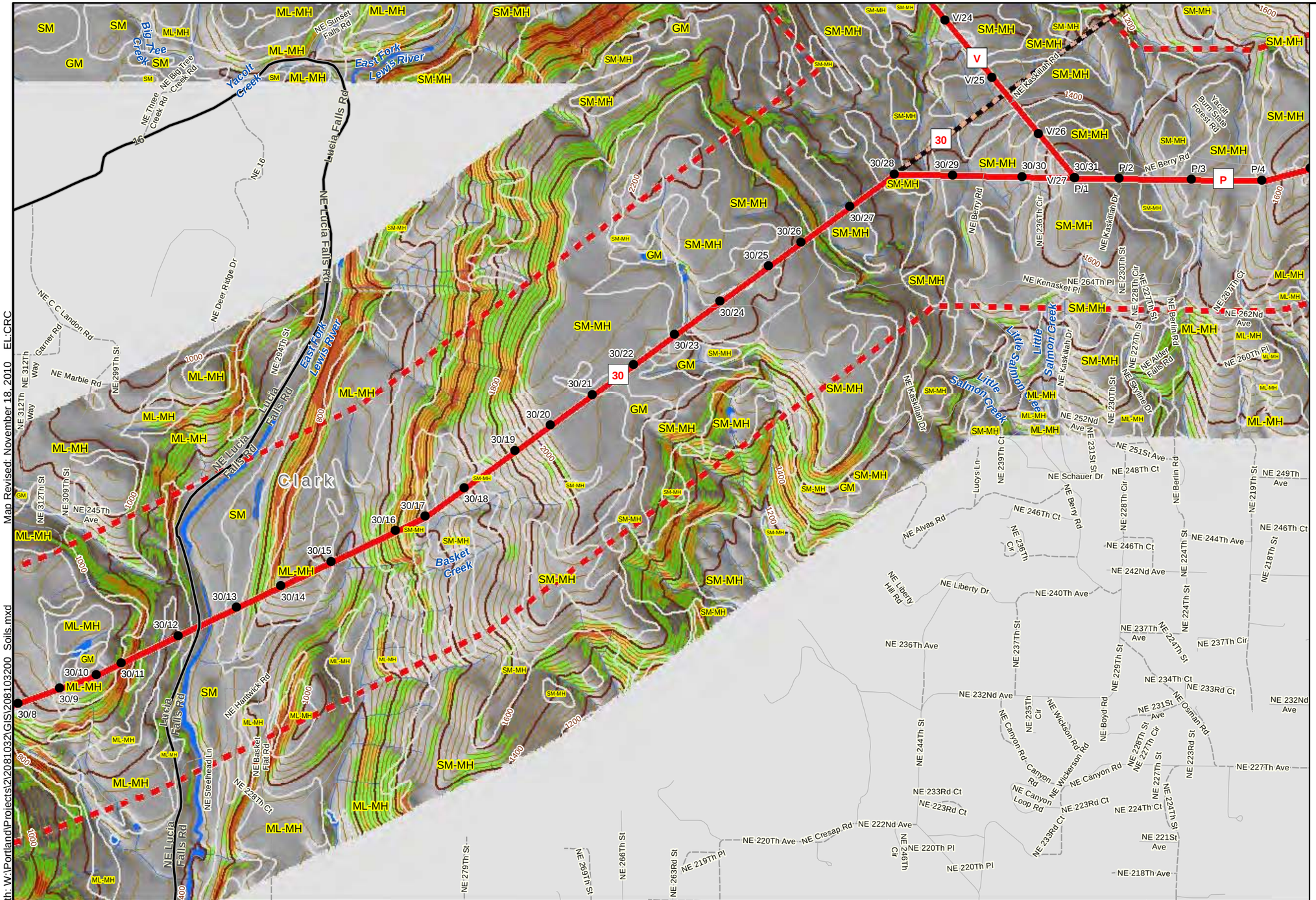
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page G1

Sheet 88 of 156



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page G2

Sheet 89 of 156

Map Revised: November 18, 2010 EL:CRC
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Explanation

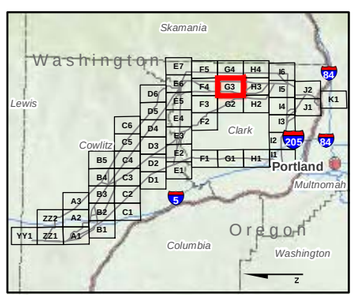
- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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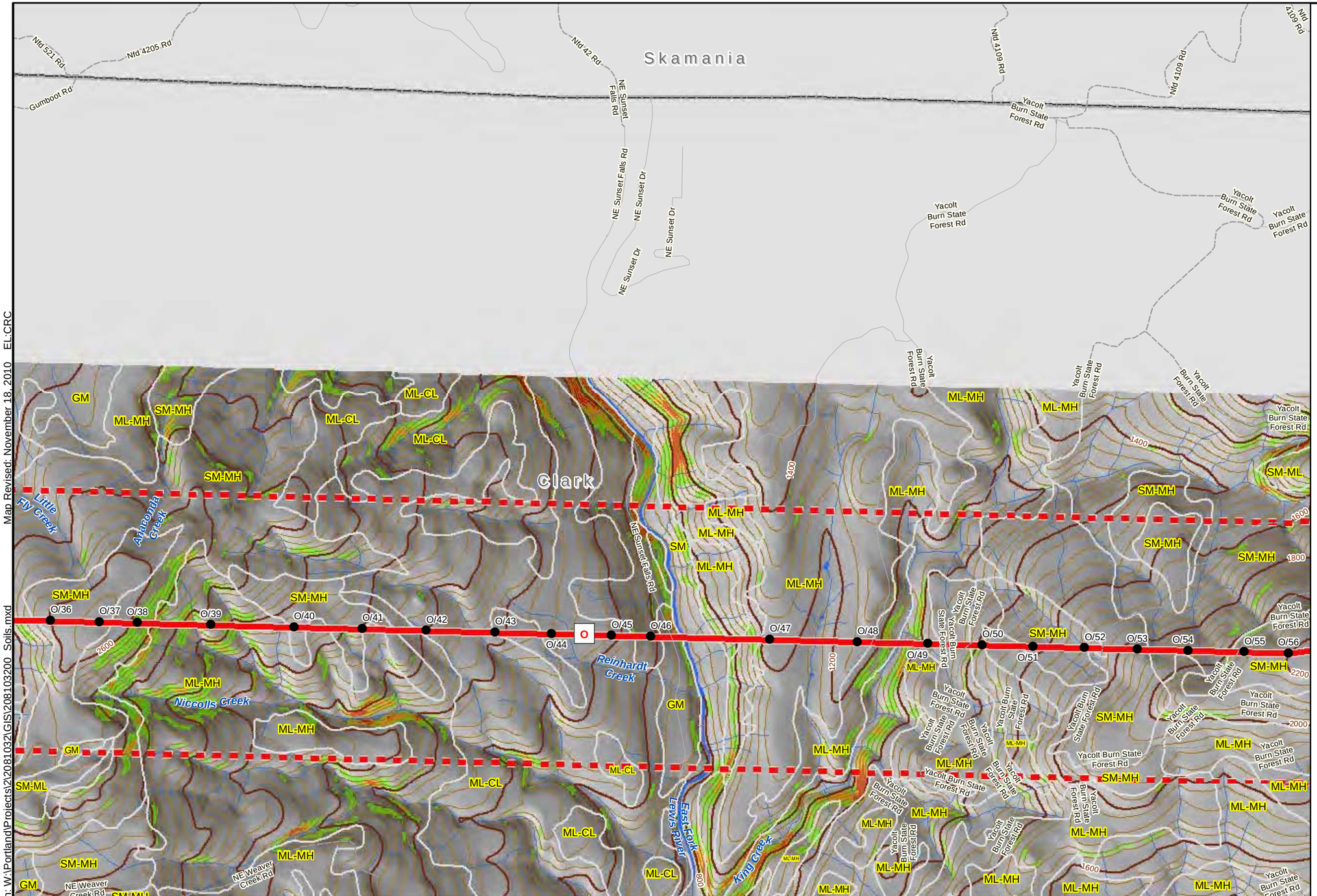
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page G3

Sheet 90 of 156



Explanation

- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

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- 55 - 70%
- >70%

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Soils and Slope Gradients

Map Page G4

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 91 of 156

Map Revised: November 18, 2010 EL:CRC
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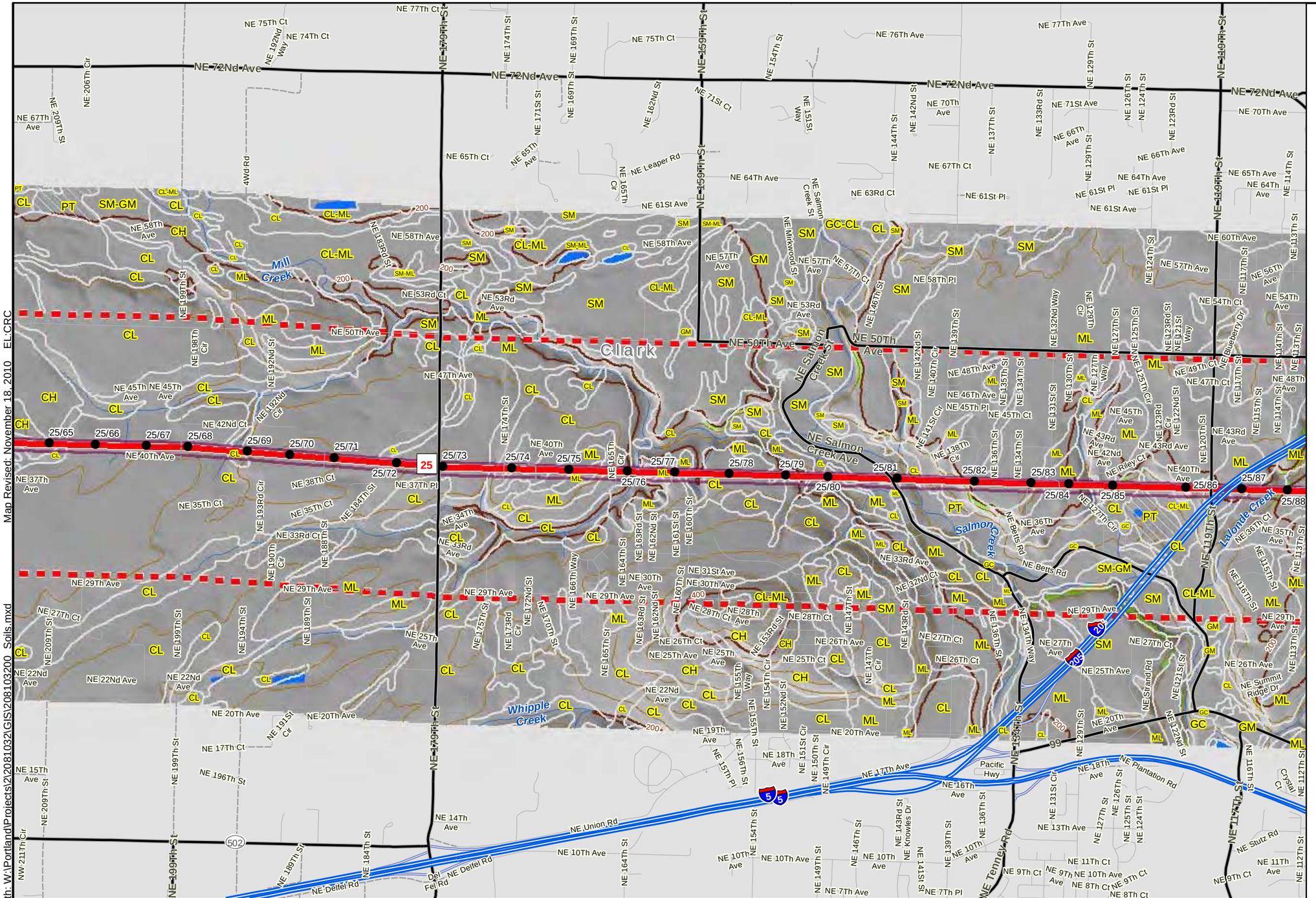
Office: PORT



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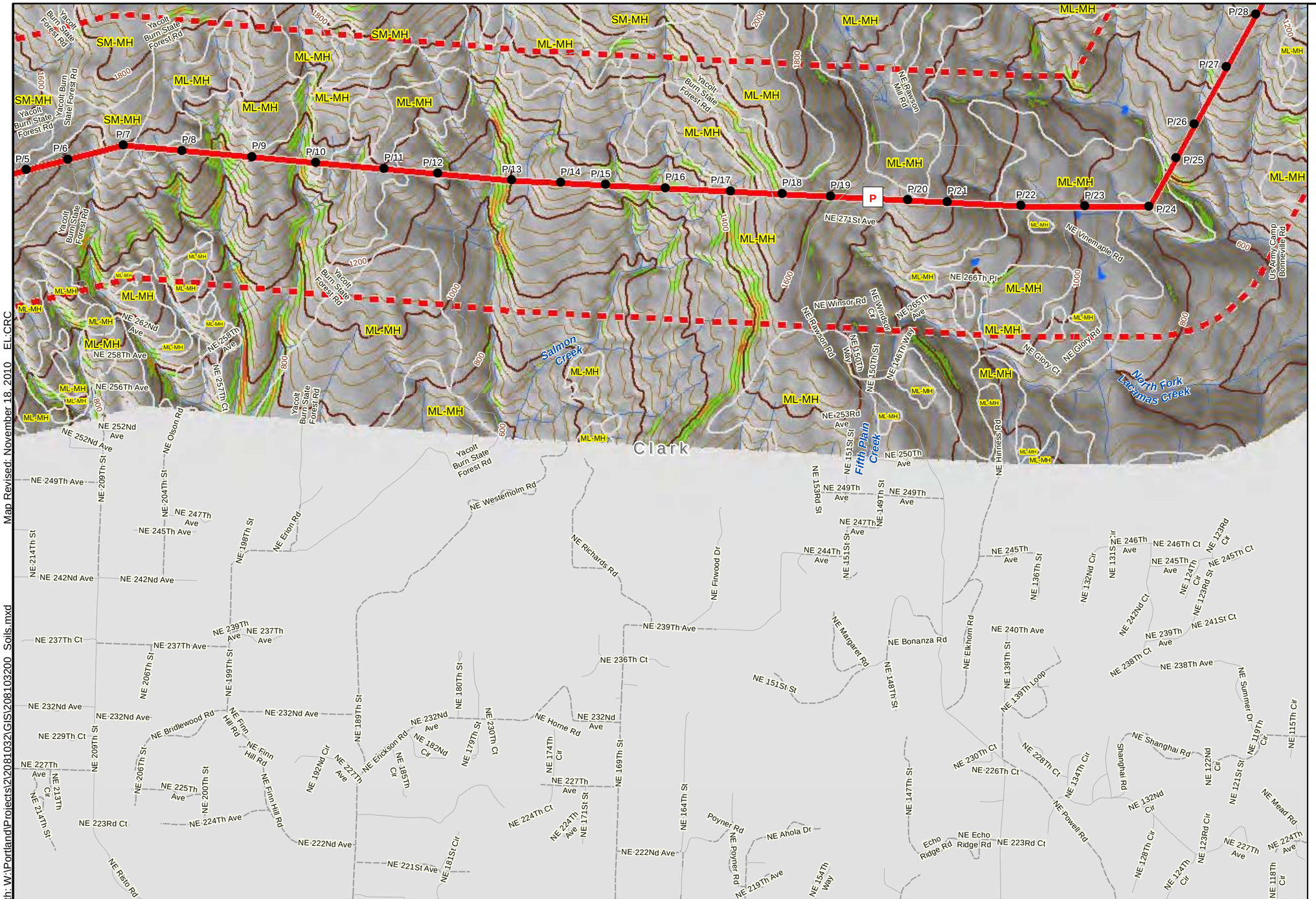
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page H1

Sheet 92 of 156



Explanation

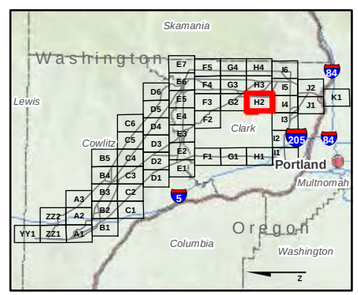
- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page H2

Sheet 93 of 156

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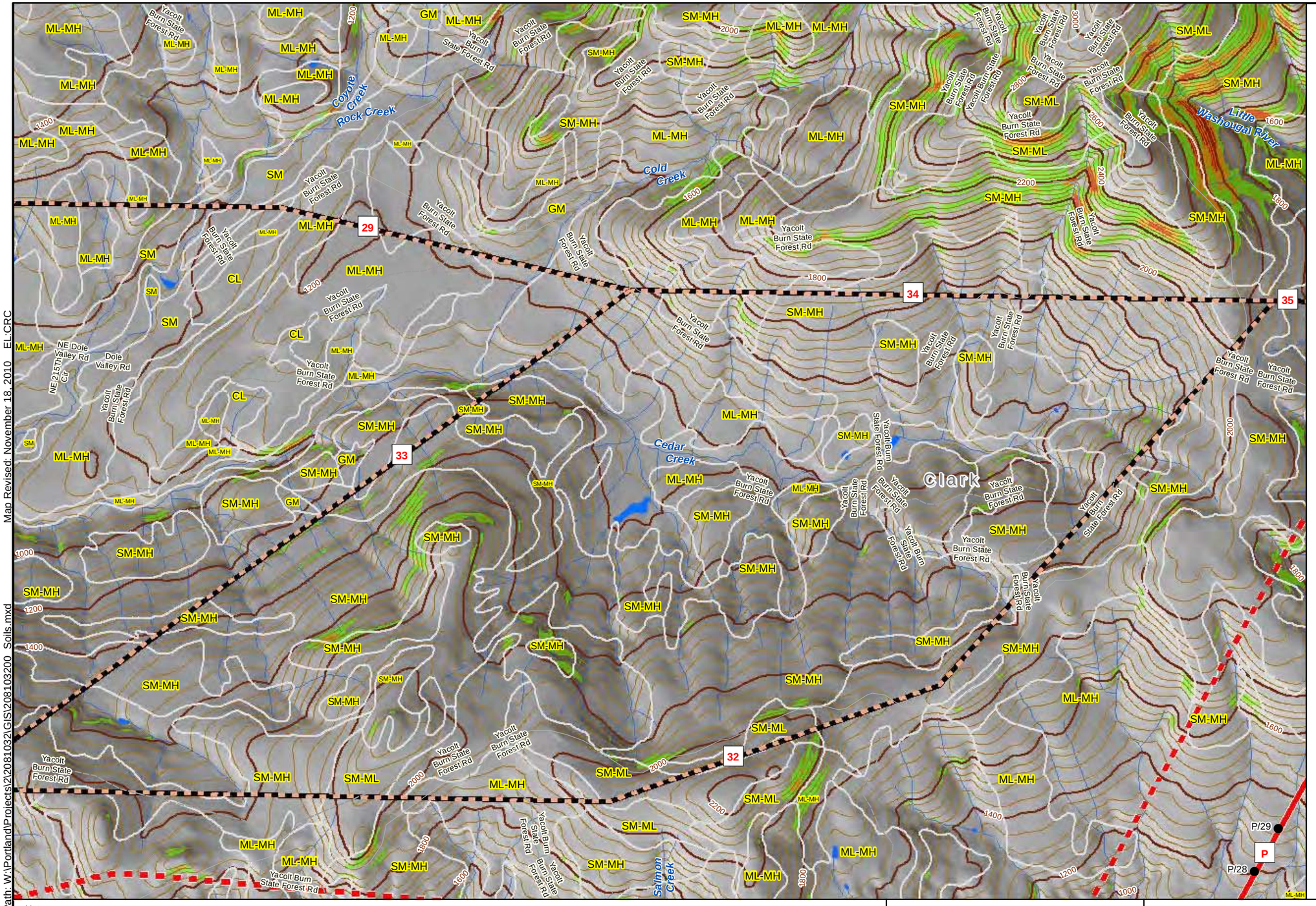

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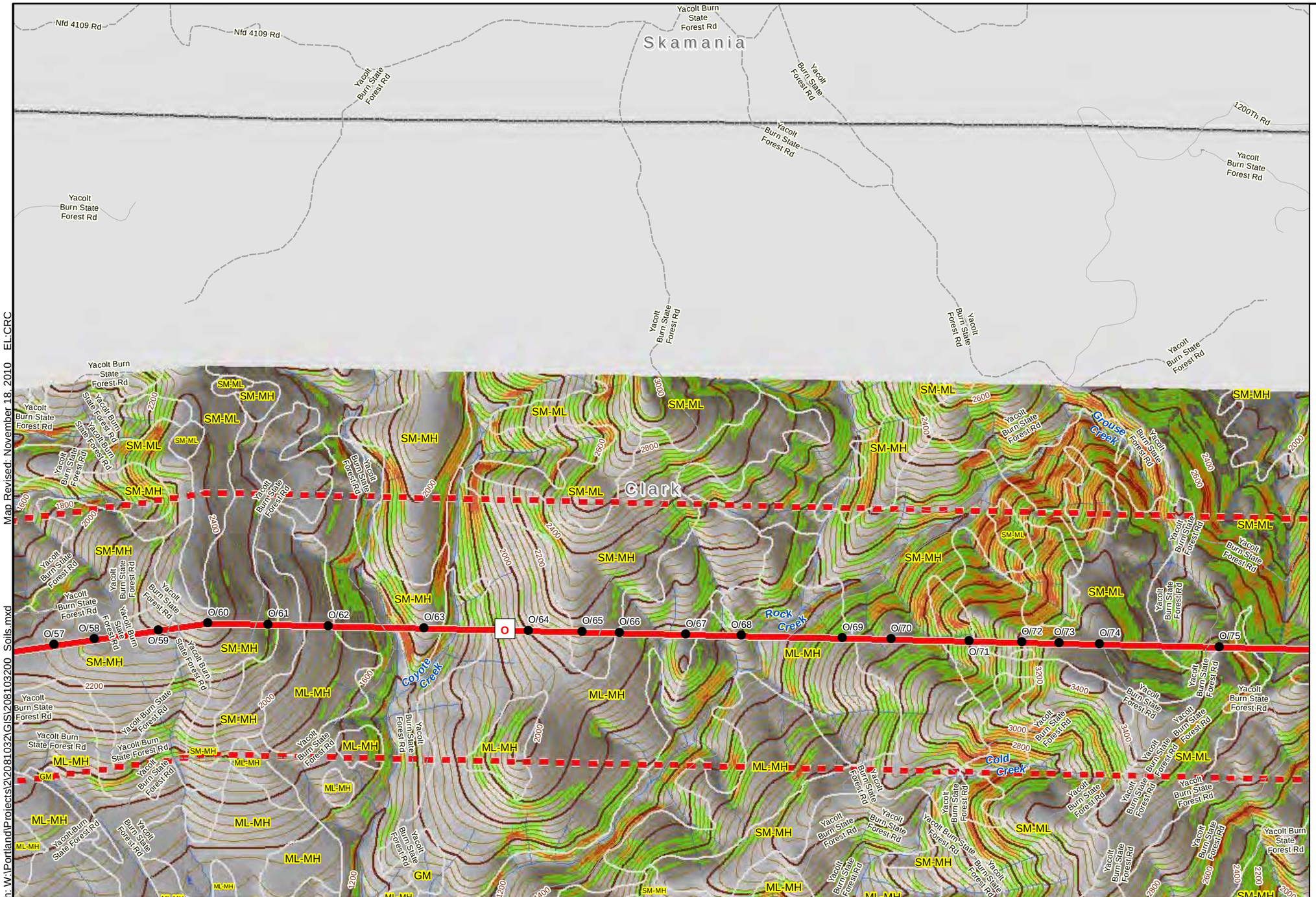
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page H3

Sheet 94 of 156



Explanation

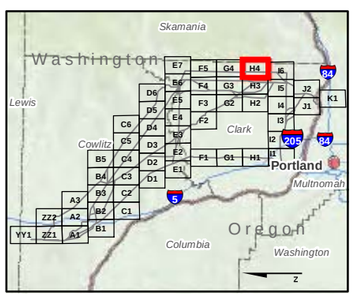
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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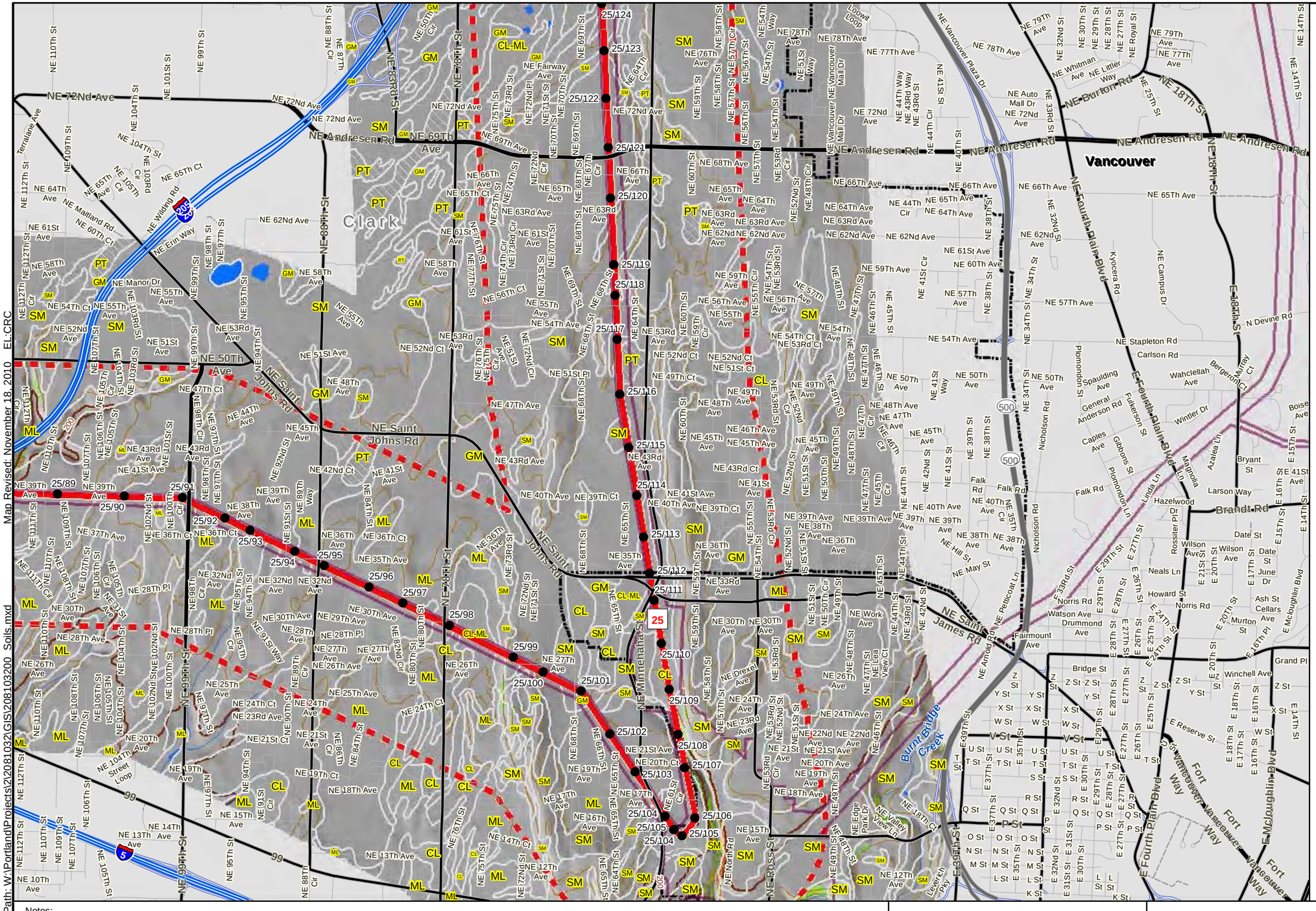
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page H4

Sheet 95 of 156

Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\2081032 Soils.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

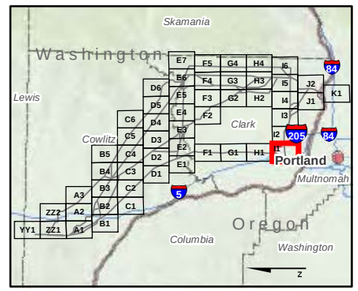
- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I1

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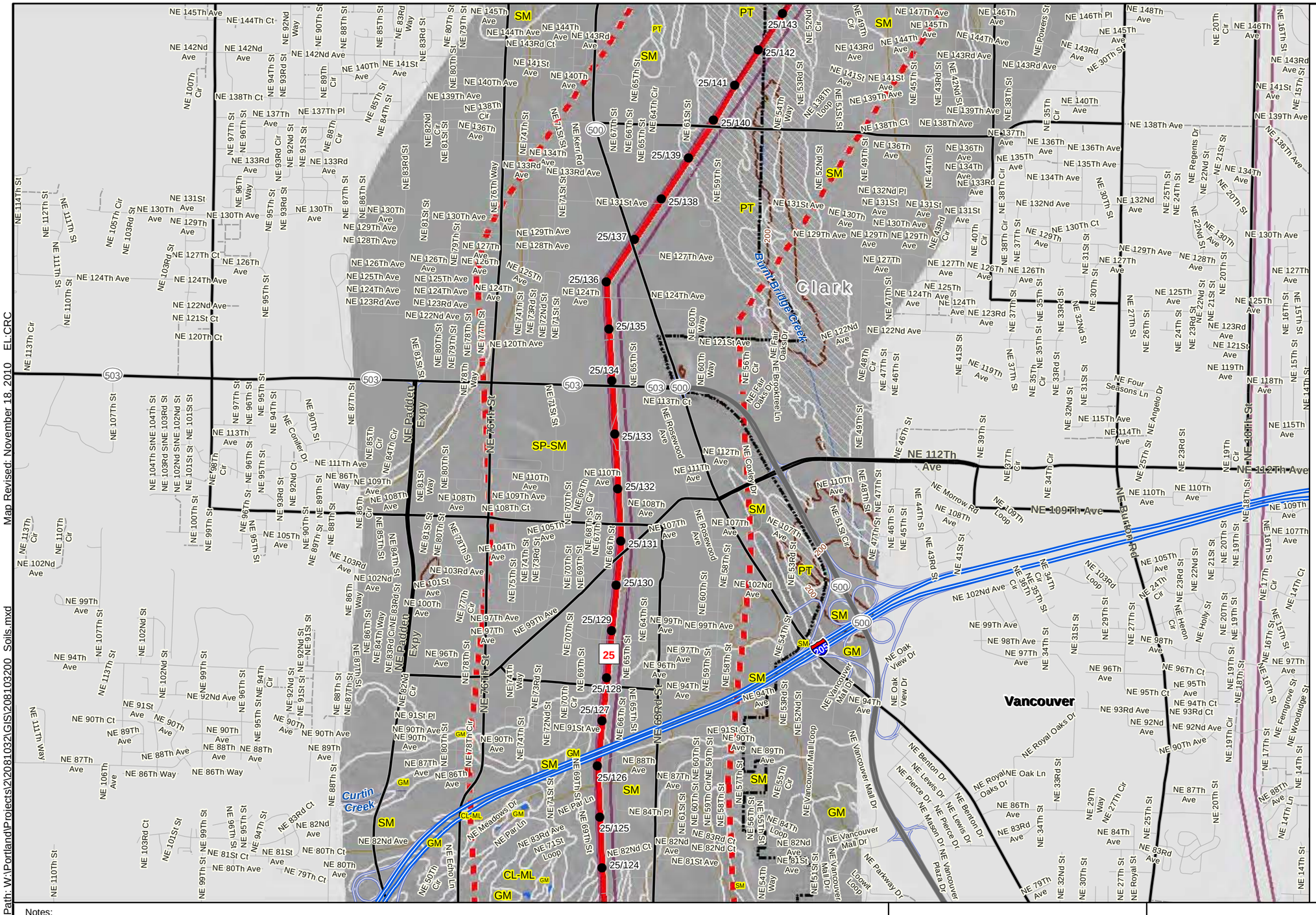

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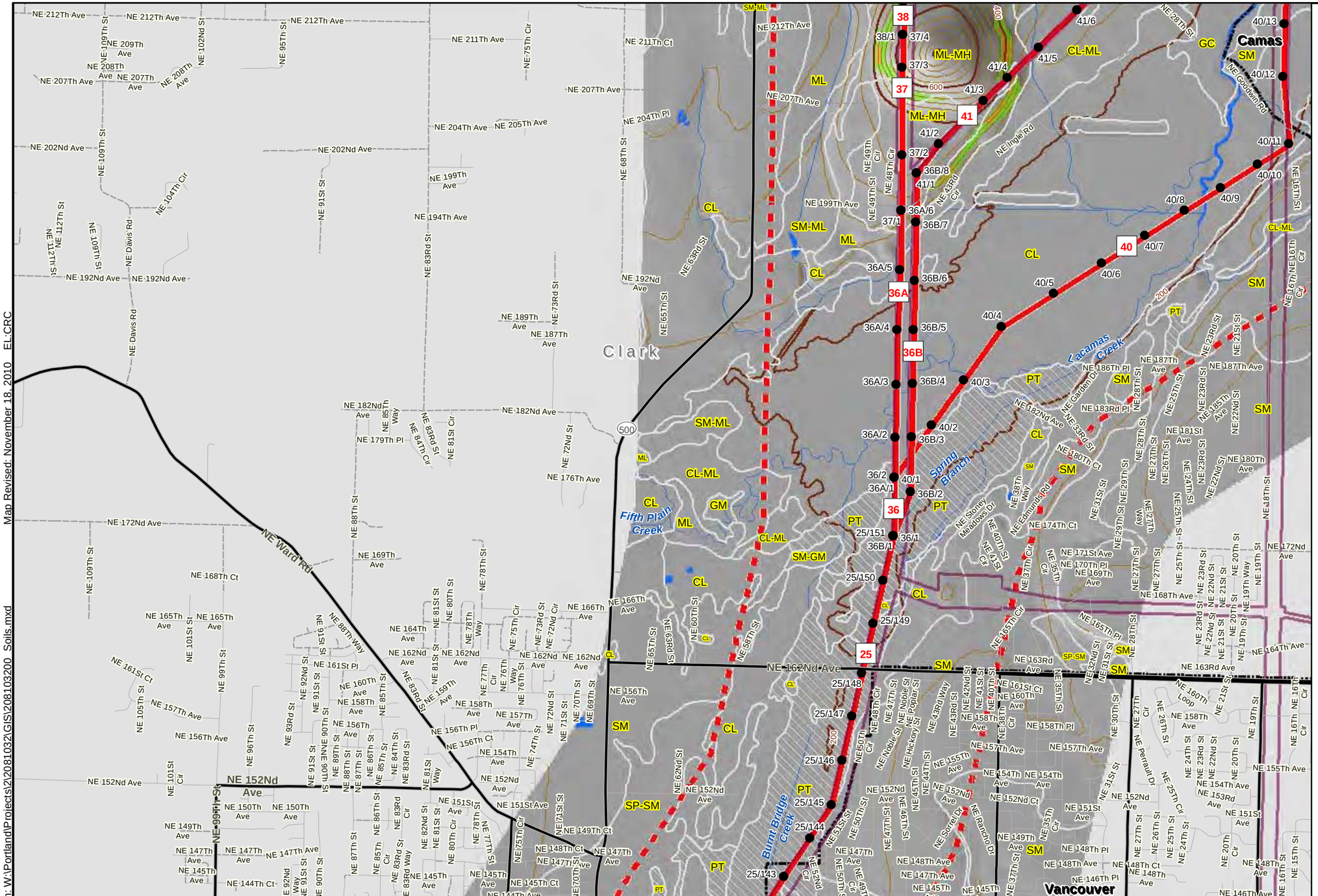
Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I2

Sheet 97 of 156

Map Revised: November 18, 2010 Path: W:\Portland\Projects\2\208103200\GIS\208103200_Soils.mxd Office: PORT EL:CRC



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I3

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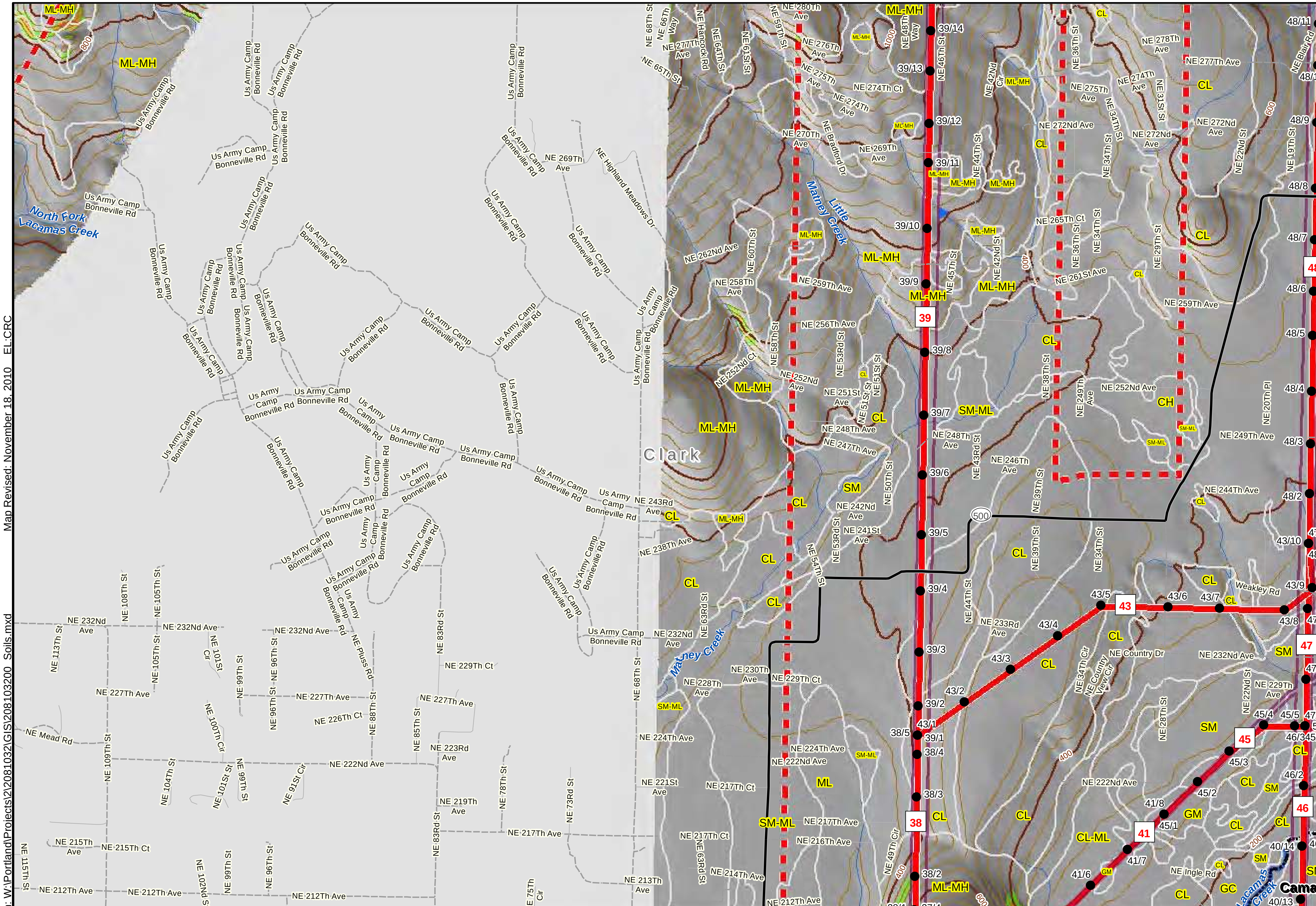


Explanation

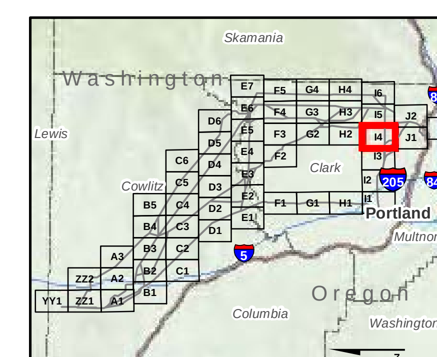
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

Z

0 1,000 2,000 Feet



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I4

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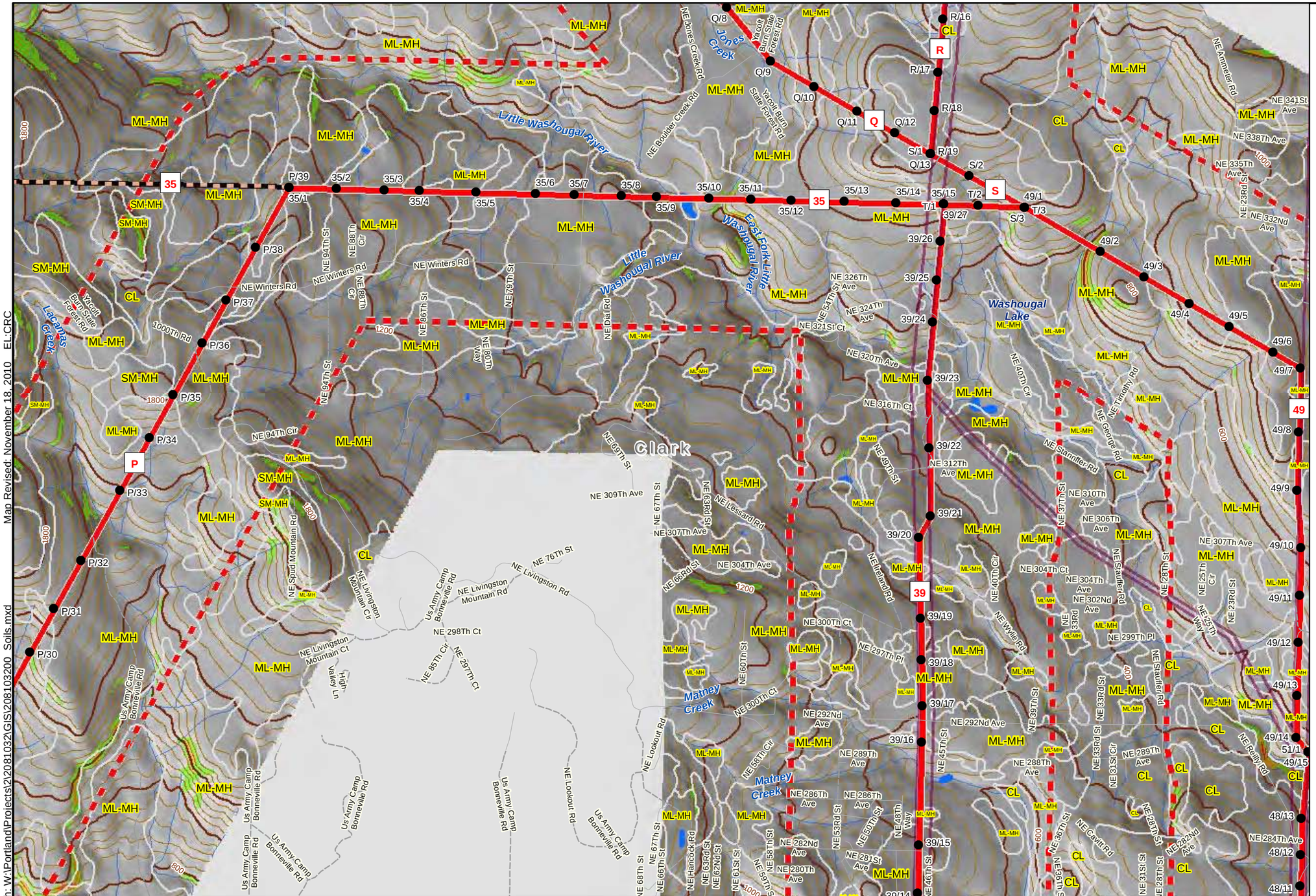
Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\208103200 Soils.mxd Map Revised: November 18, 2010 EL:CRC



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Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I5

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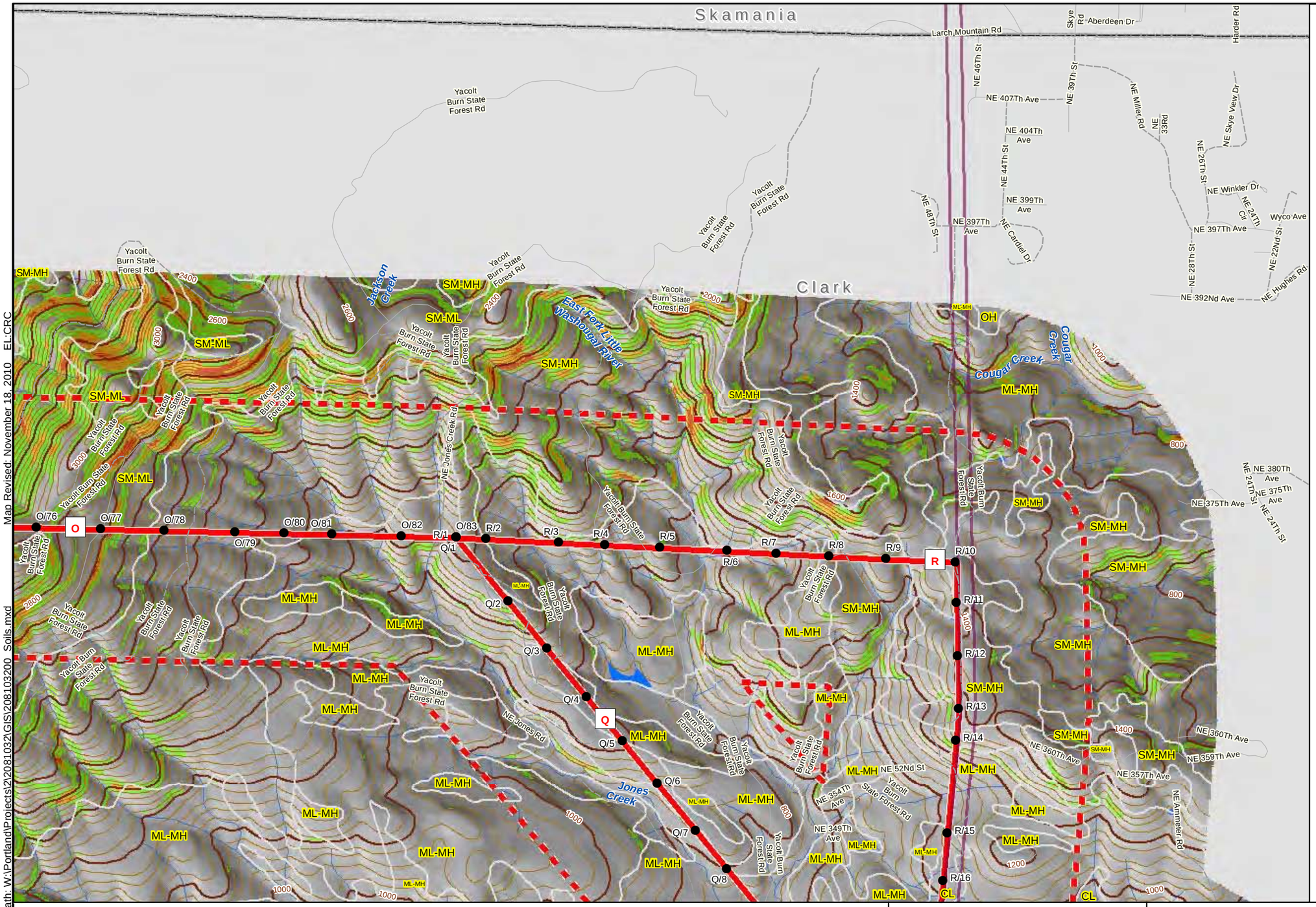
Path: W:\Portland\Projects\2\2081032\GIS\2081032_Soils.mxd
Office: PORT



Explanation

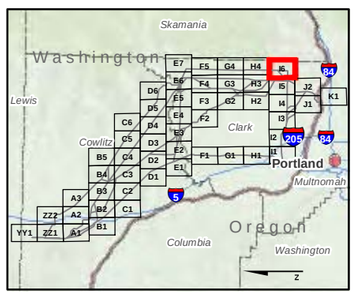
- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Data Sources: Water features from Pacific Northwest Hydrography. Route information from BPA. Slopes derived from 10-meter DEM and Clark County LiDAR. Soils data from NRCS.

GeoEngineers

Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I6

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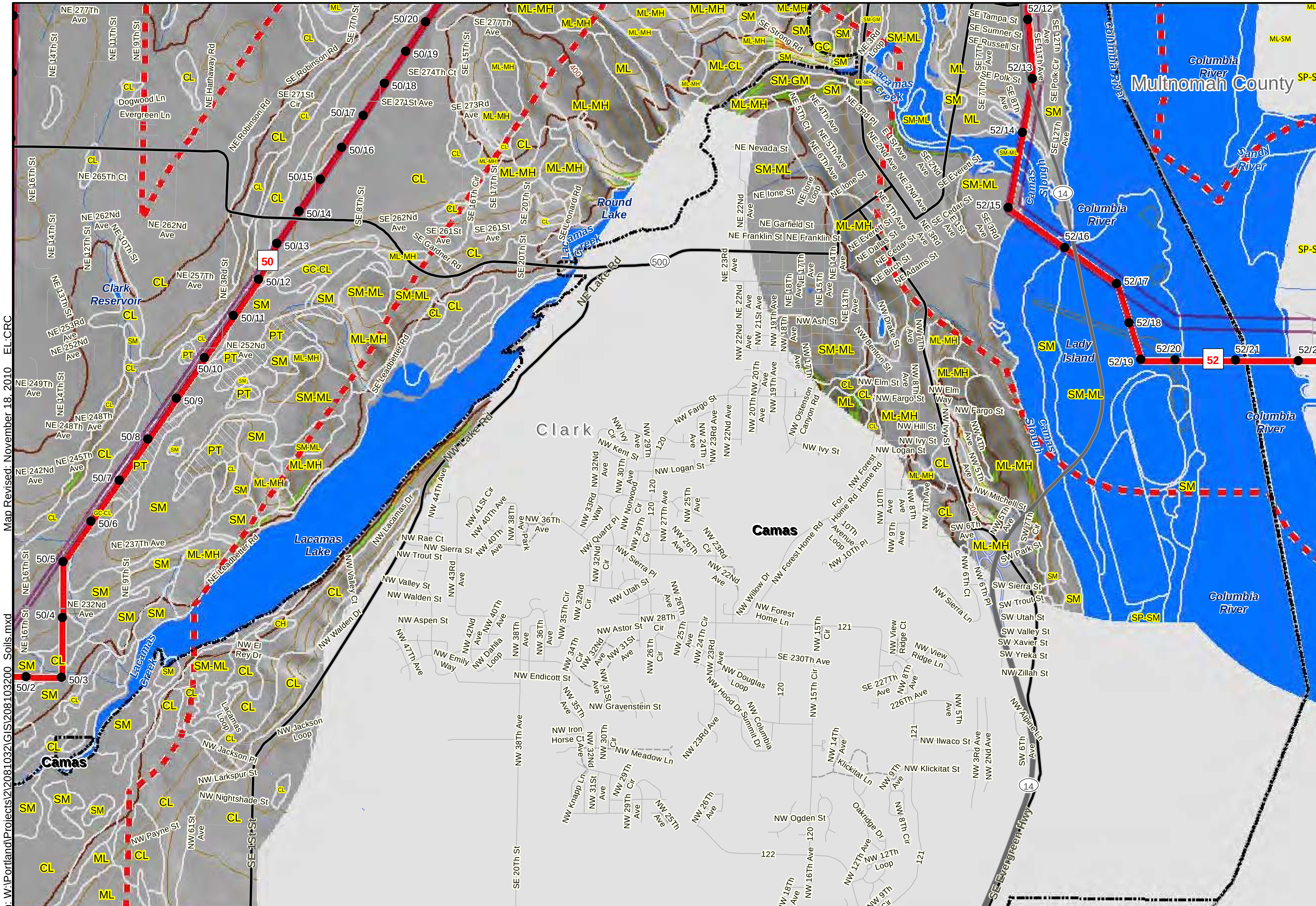
Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\2081032000 Soils.mxd Map Revised: November 18, 2010 EL:CRC



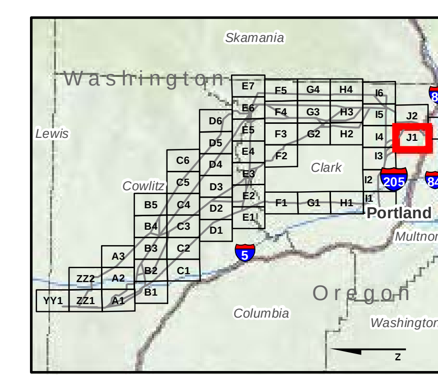
Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML Soil Boundary
- PT Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

0 1,000 2,000 Feet



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GeoEngineers

Soils and Slope Gradients

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page J1

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Map Revised: November 18, 2010 Path: W:\Portland\Projects\2\2081032\GIS\208103200_Soils.mxd Office: PORT EL:CRC

Explanation

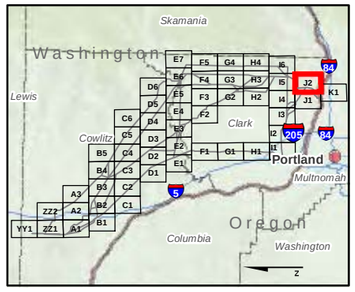
- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- ML — Soil Boundary
- PT — Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Soils and Slope Gradients

Map Page J2

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 103 of 156

Multnomah County

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Soil Boundary
- Organic Soil Units

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet

Map Revised: November 18, 2010 EL:CRC

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Data Sources: Water features from Pacific Northwest Hydrography. Route information from BPA. Slopes derived from 10-meter DEM and Clark County LiDAR. Soils data from NRCS.

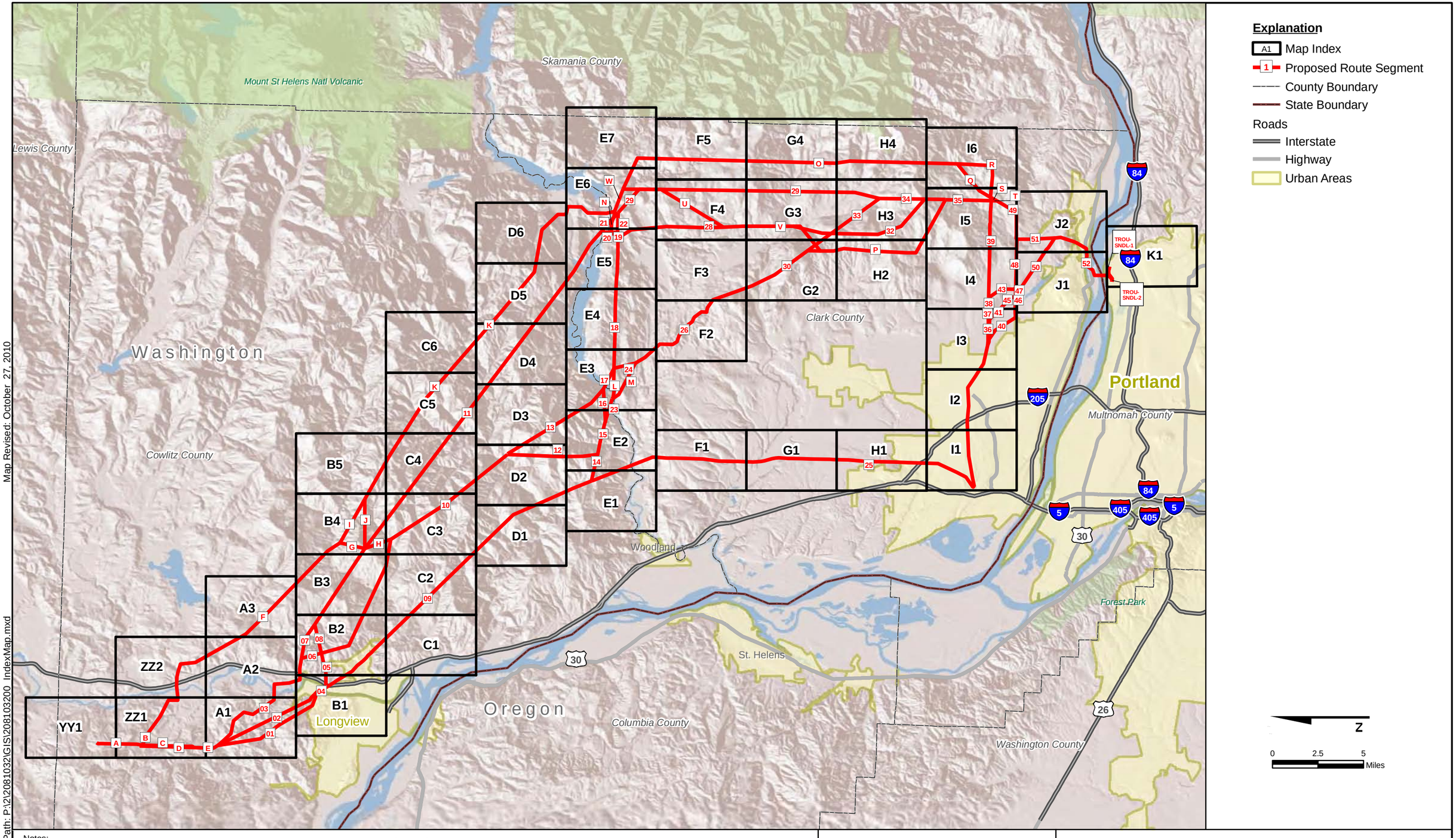
GeoEngineers

Soils and Slope Gradients

Map Page K1

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 104 of 156



Map Revised: October 27, 2010

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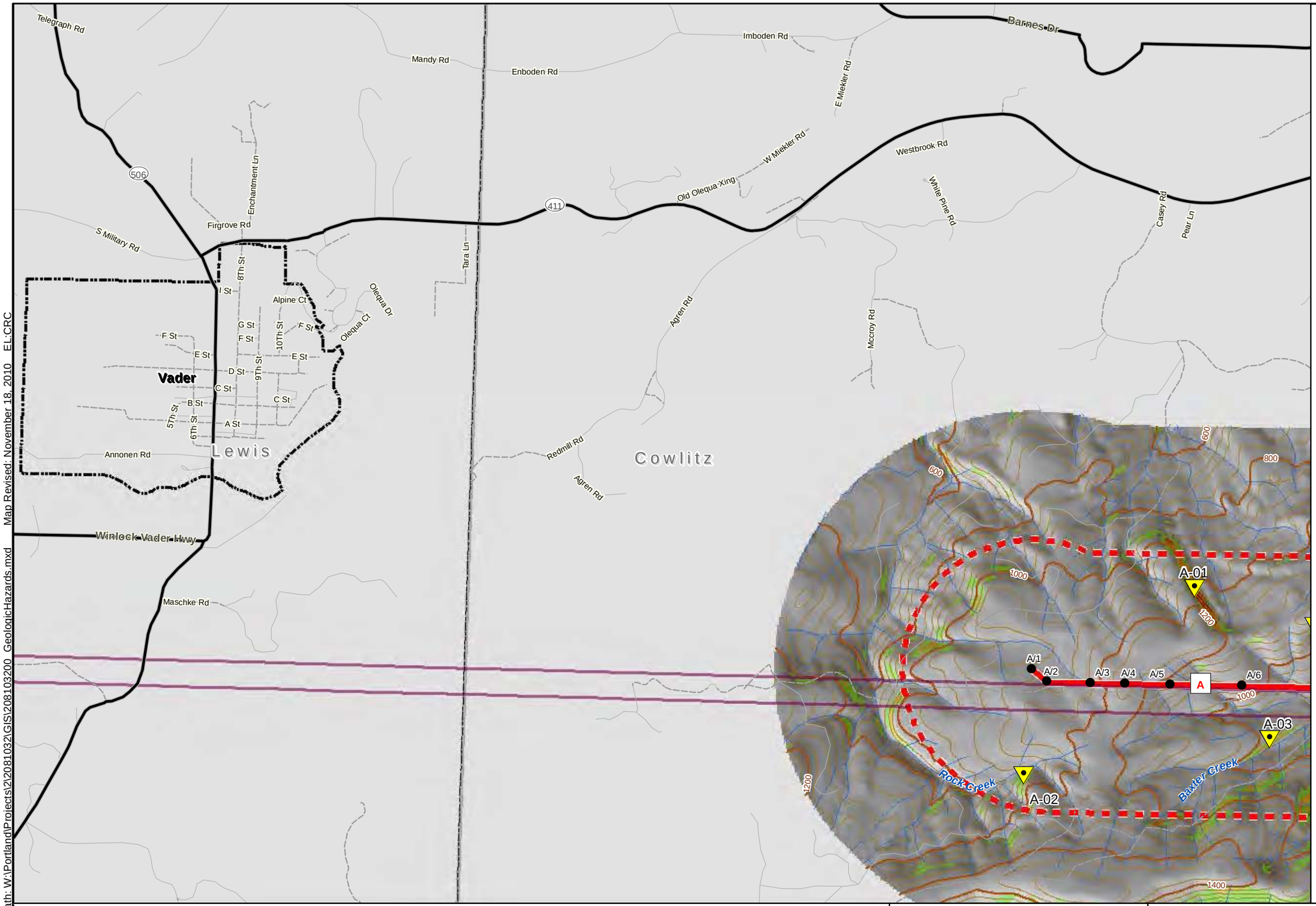
Data Sources: Proposed Route from BPA.
Shaded relief from ESRI Online Resource Center.
Base data from ESRI Data & Maps, Street Maps 2008

GeoEngineers

Index Map

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\2081103200_GeologicHazards.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

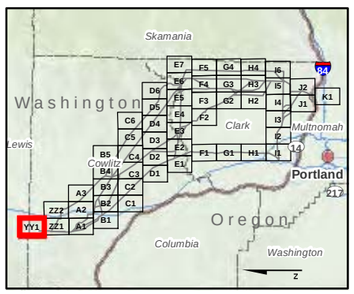
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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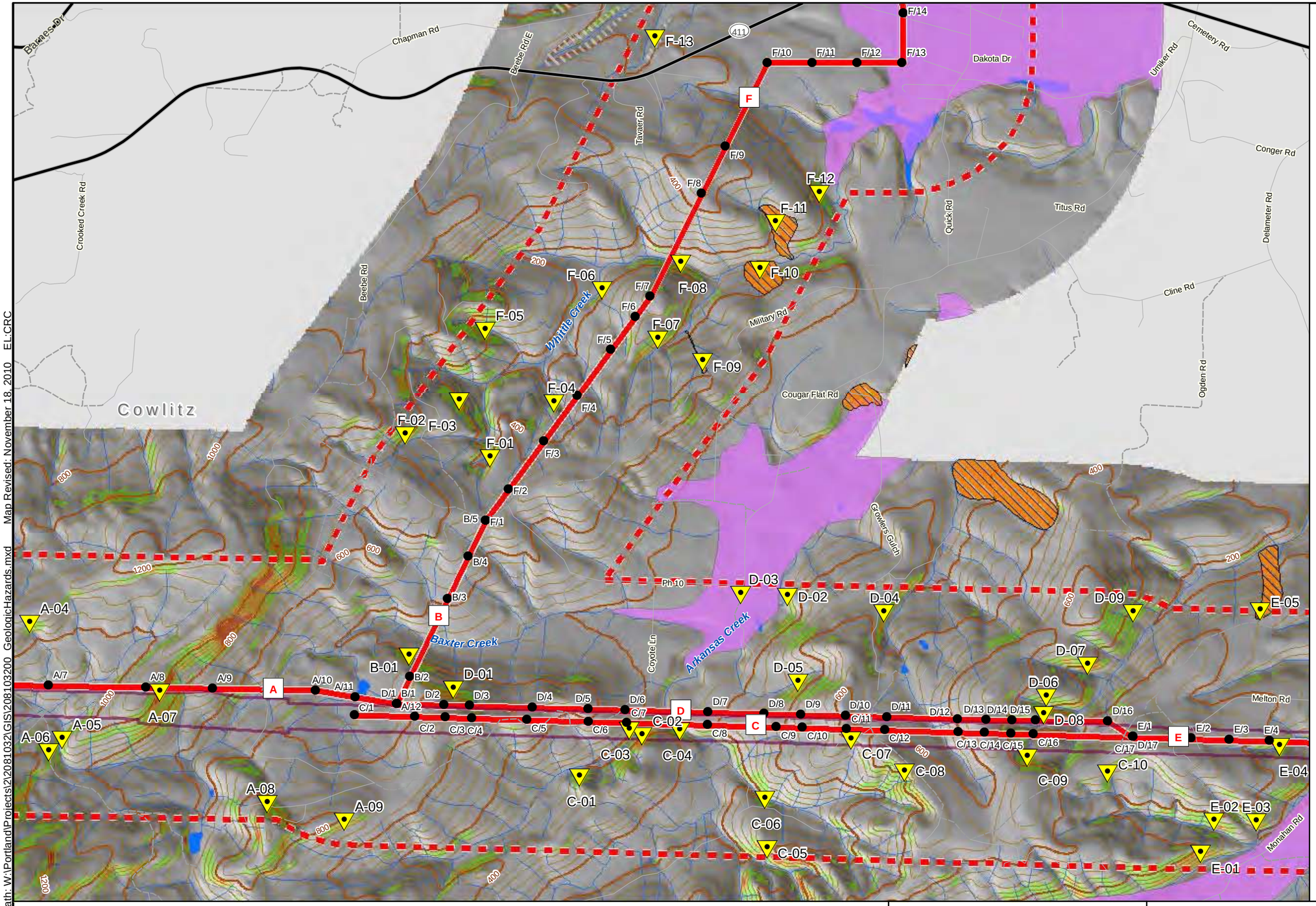
GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page YY1

Sheet 105 of 156



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

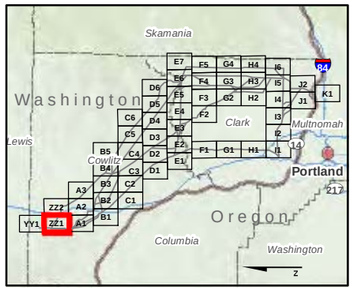
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page ZZ1

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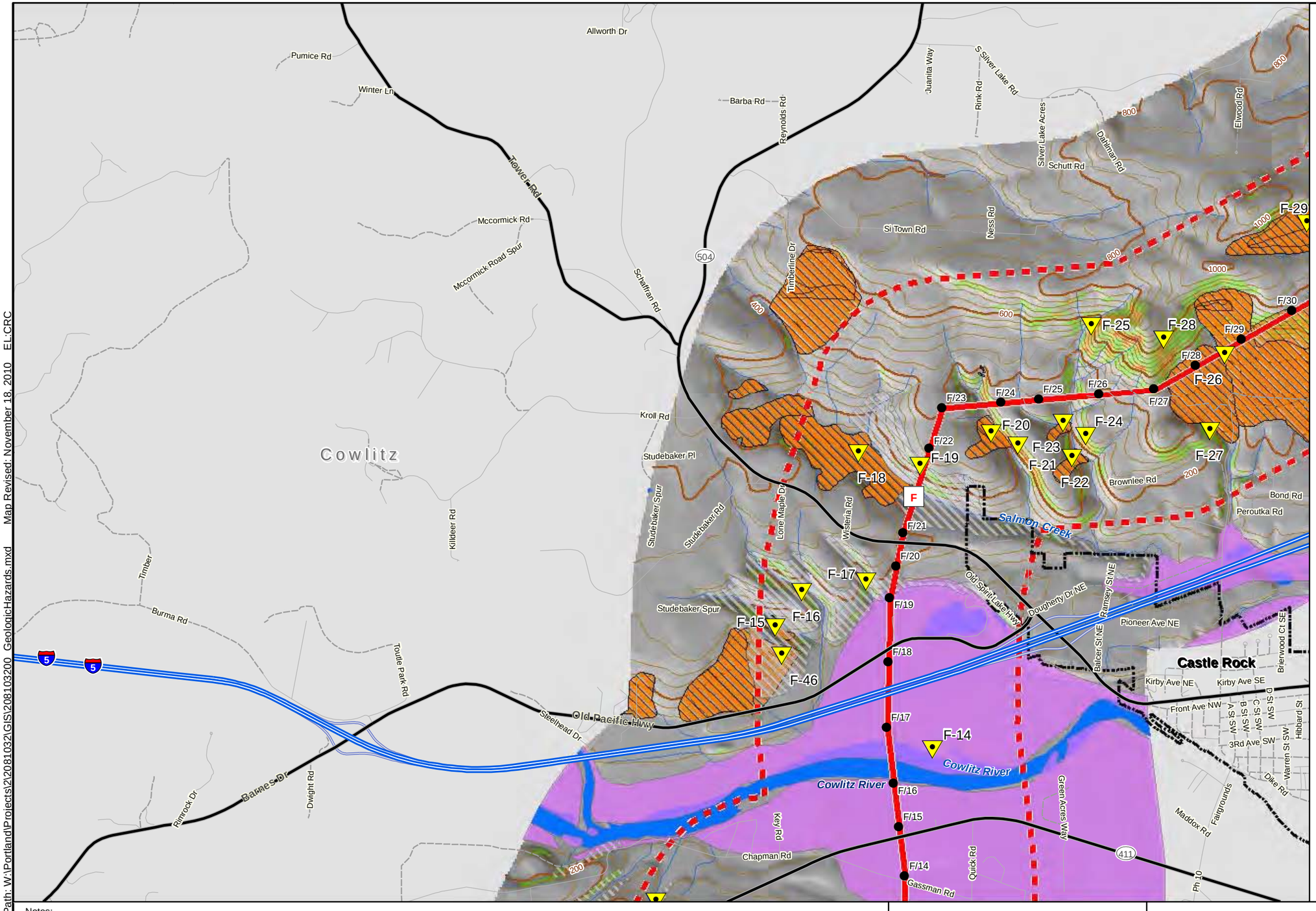
Office: PORT Path: W:\Portland\Projects\2\208103200 GeologicHazards.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

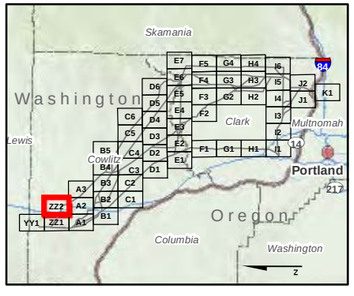
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page ZZ2

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Map Revised: November 18, 2010 EL:CRC
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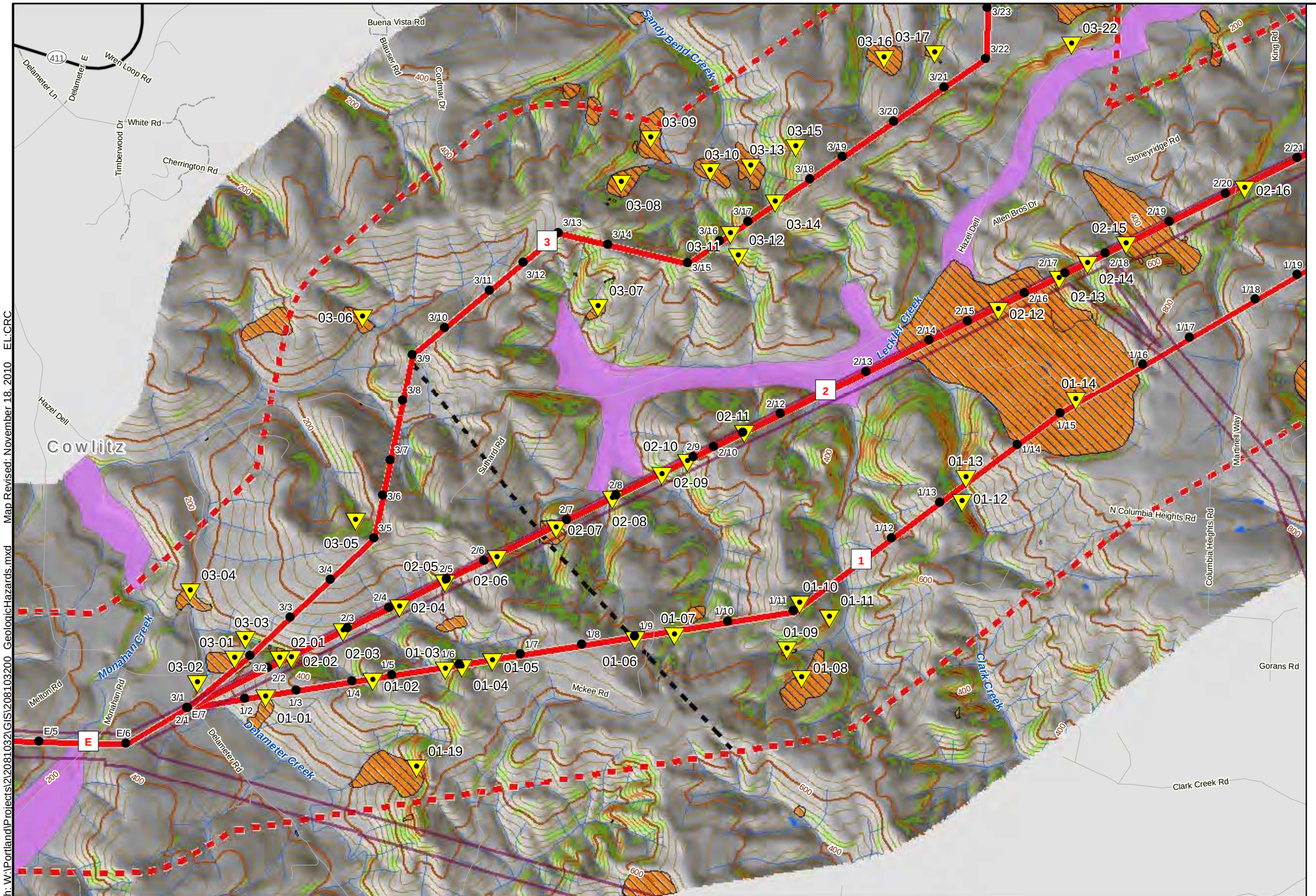
Office: PORT



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

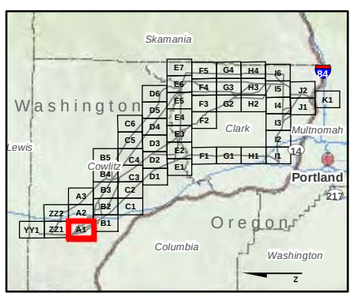
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

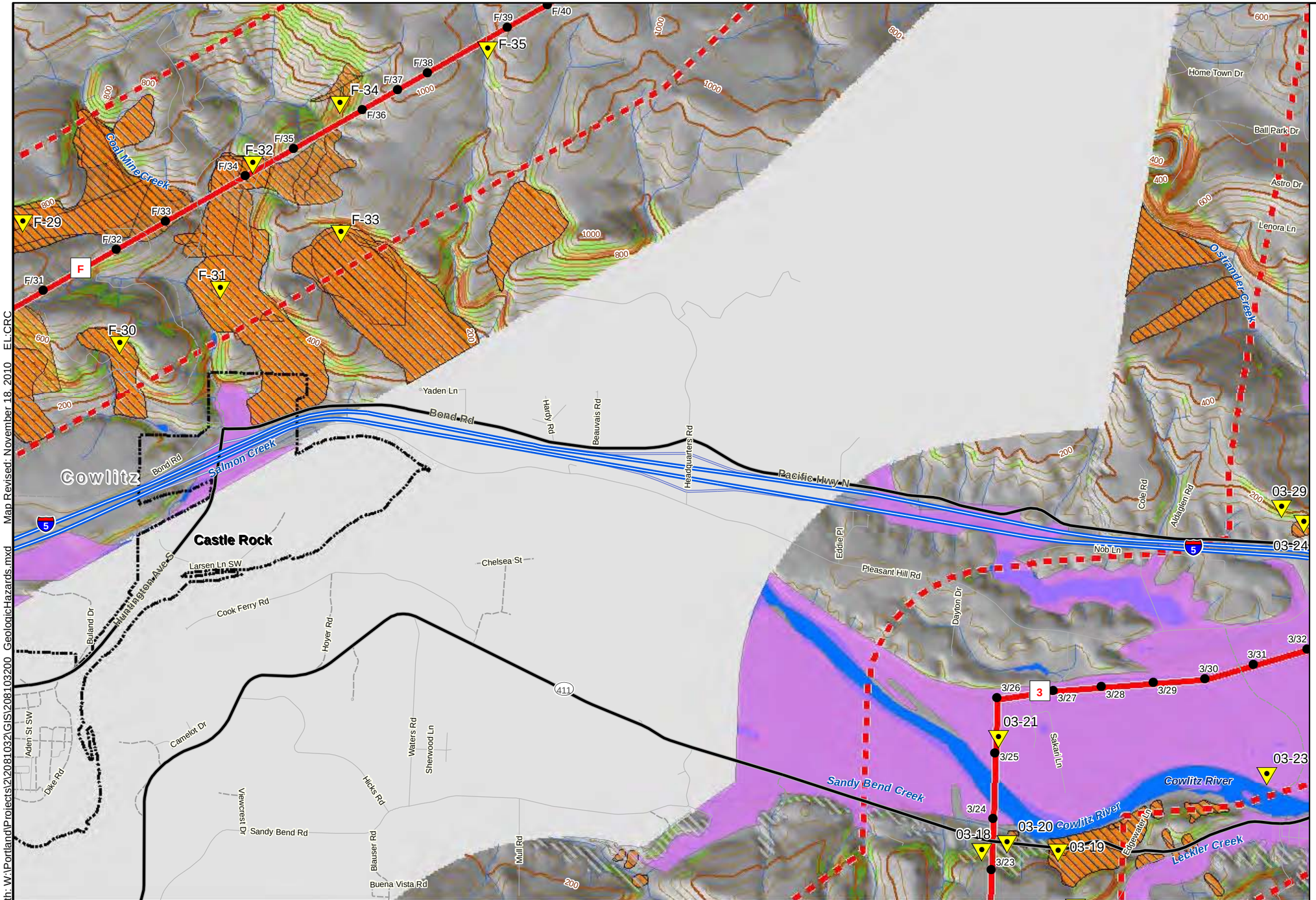
Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page A1

Sheet 108 of 156

Office: PORT Path: W:\Portland\Projects\212081032\GIS\212081032 GeologicHazards.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

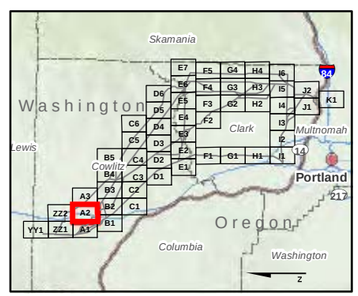
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page A2

Sheet 109 of 156

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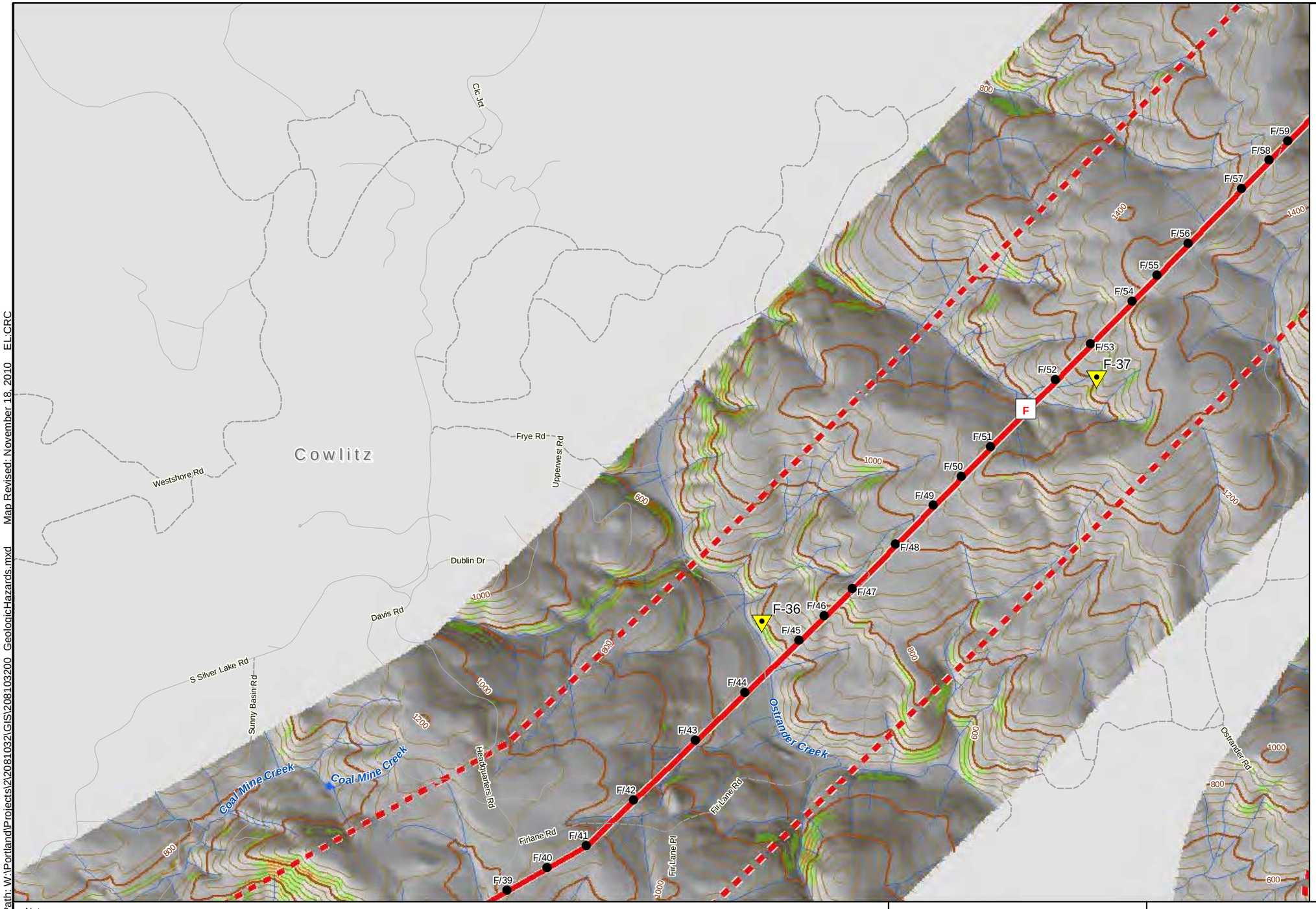


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

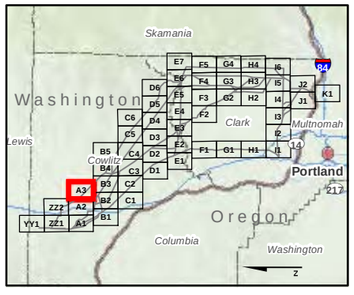
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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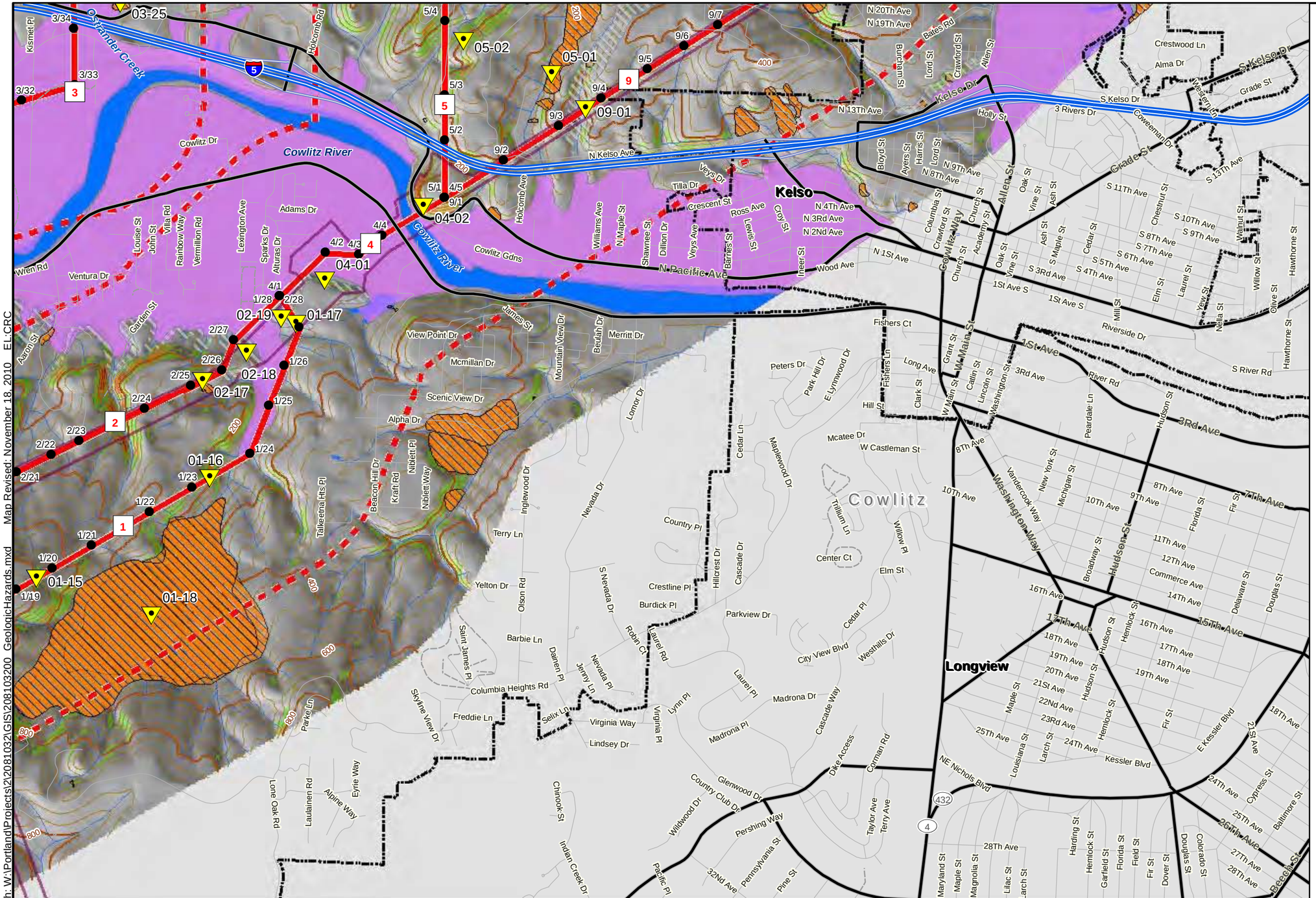
GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page A3



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet

Map Revised: November 18, 2010 EL:CRC
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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page B1

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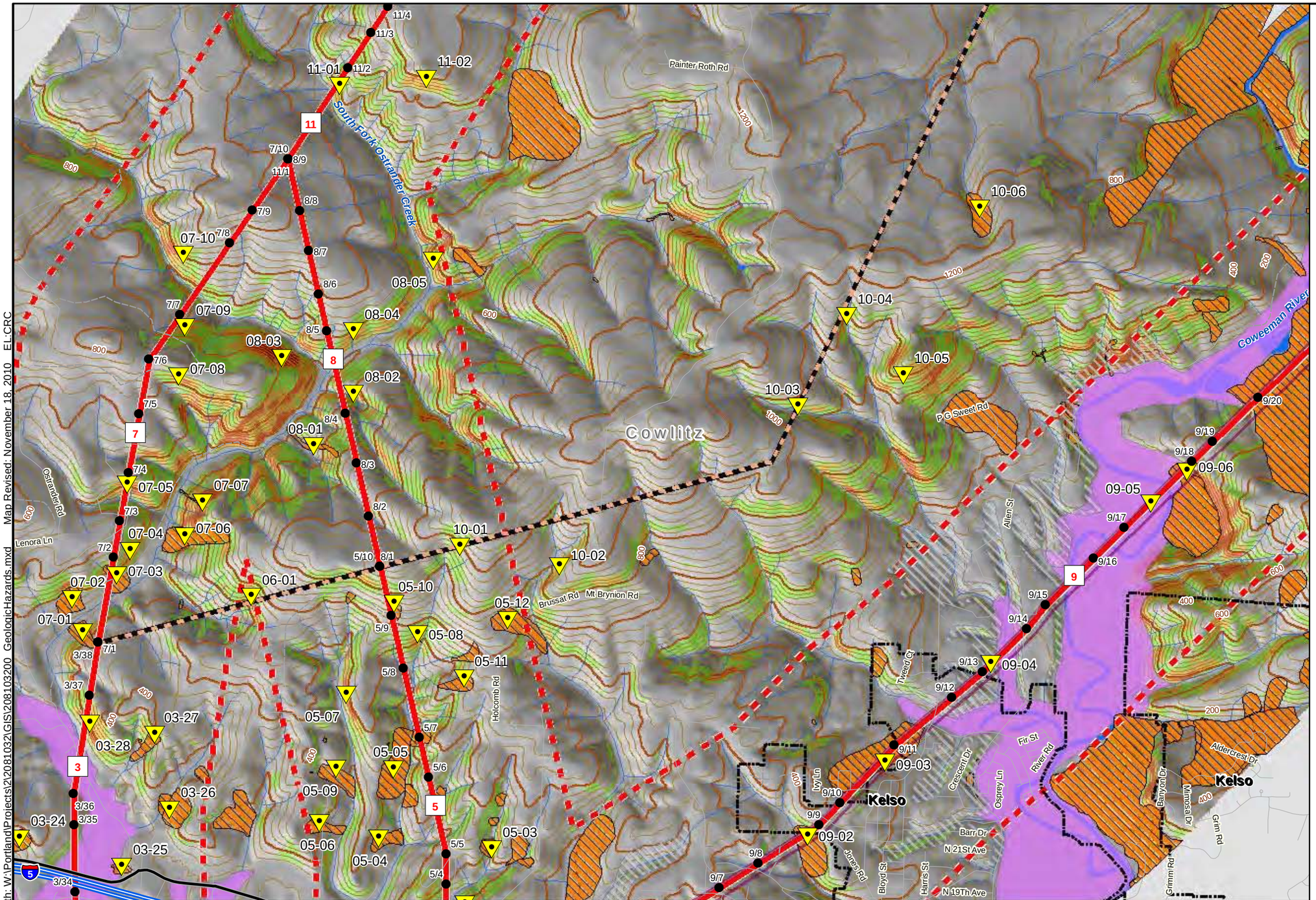

Explanation

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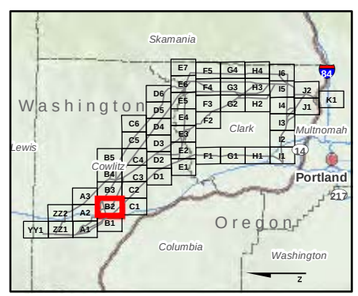
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page B2

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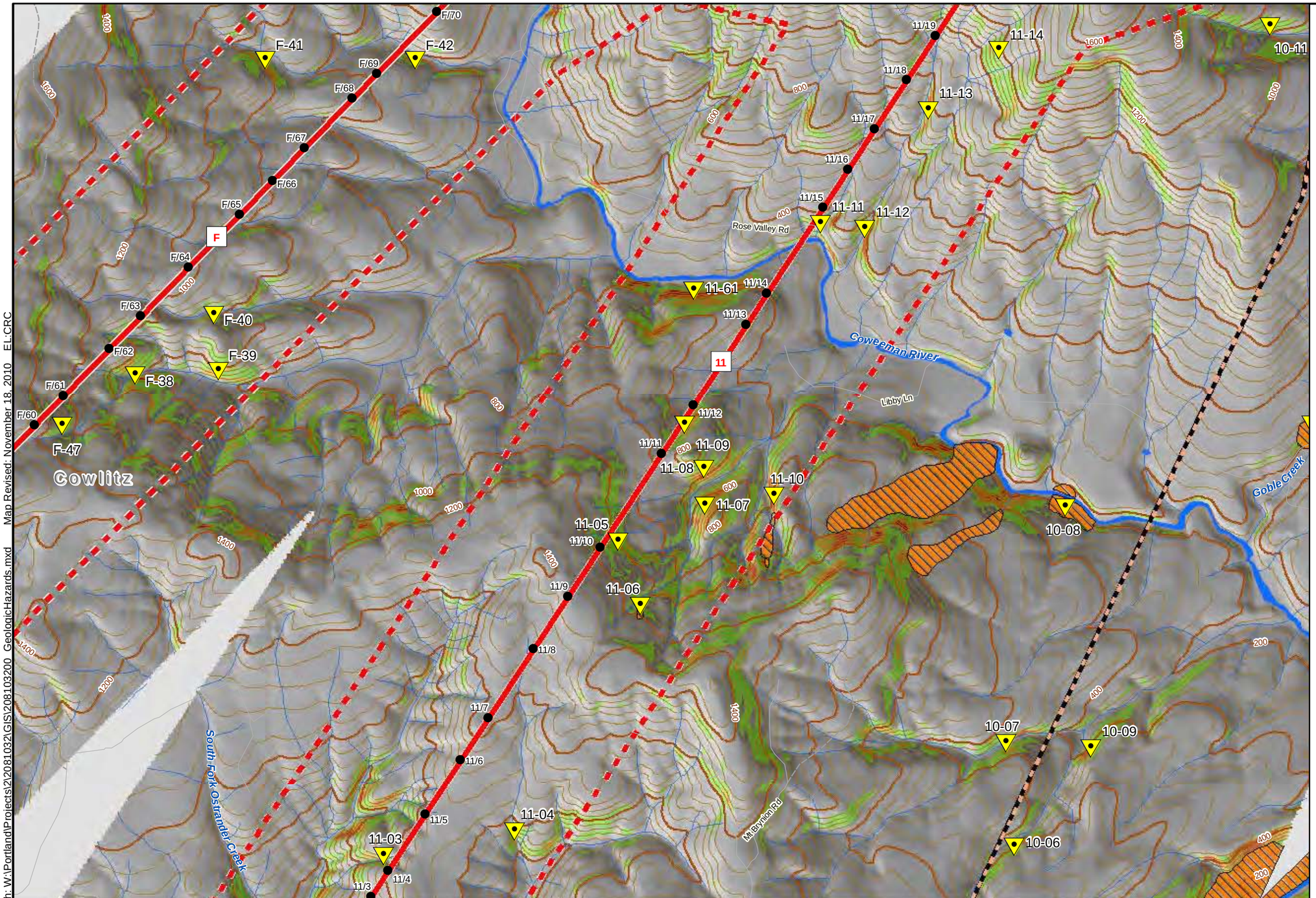
Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\2081032_GeologicHazards.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
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- Faults
- Clark Co Flooding
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- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

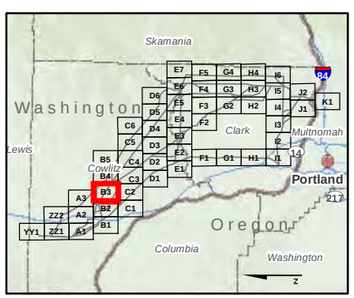
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

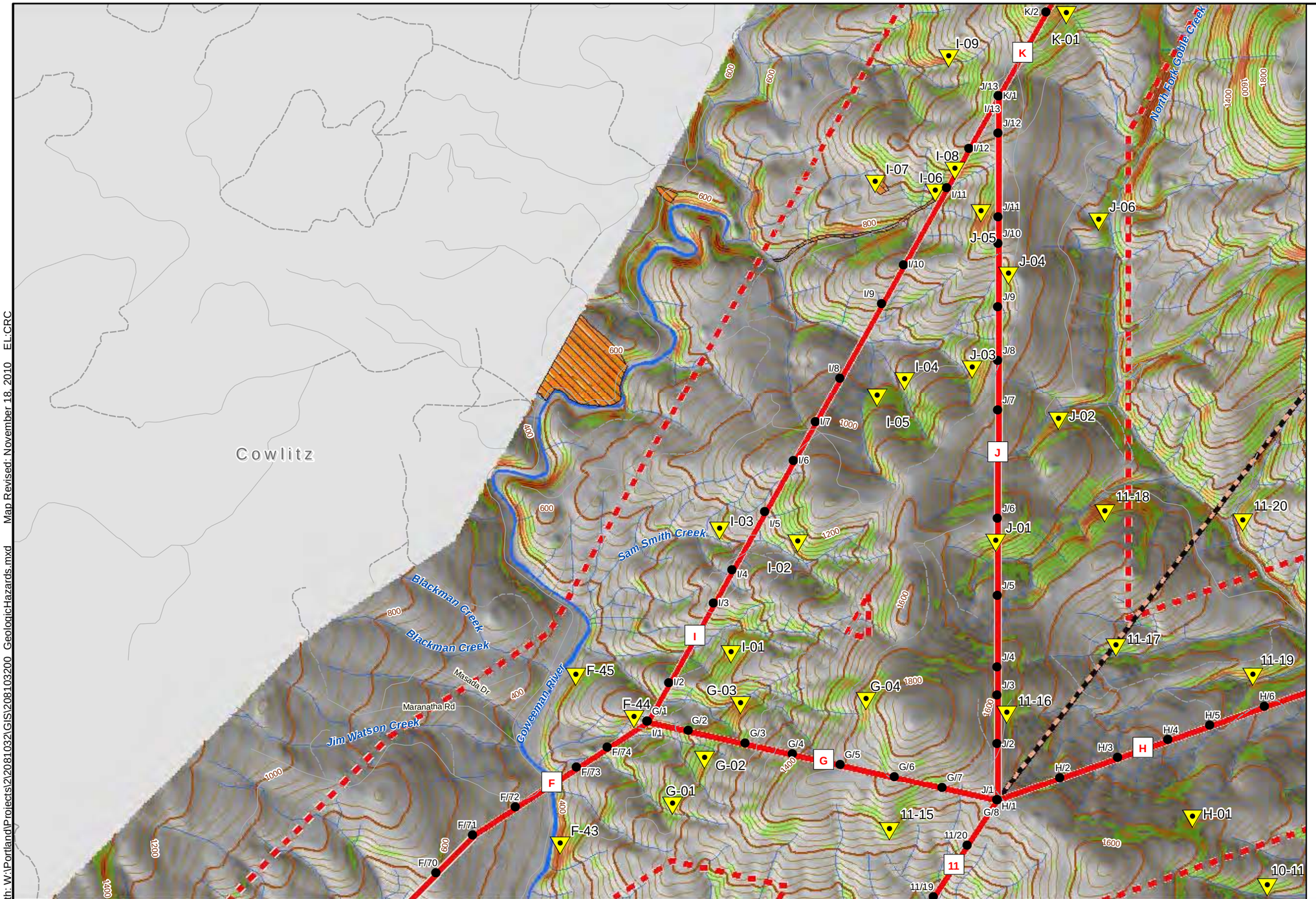
Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page B3

Sheet 113 of 156

Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\2081032000_GeologicHazards.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet

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GeoEngineers

Geologic Hazards

Map Page B4

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 114 of 156

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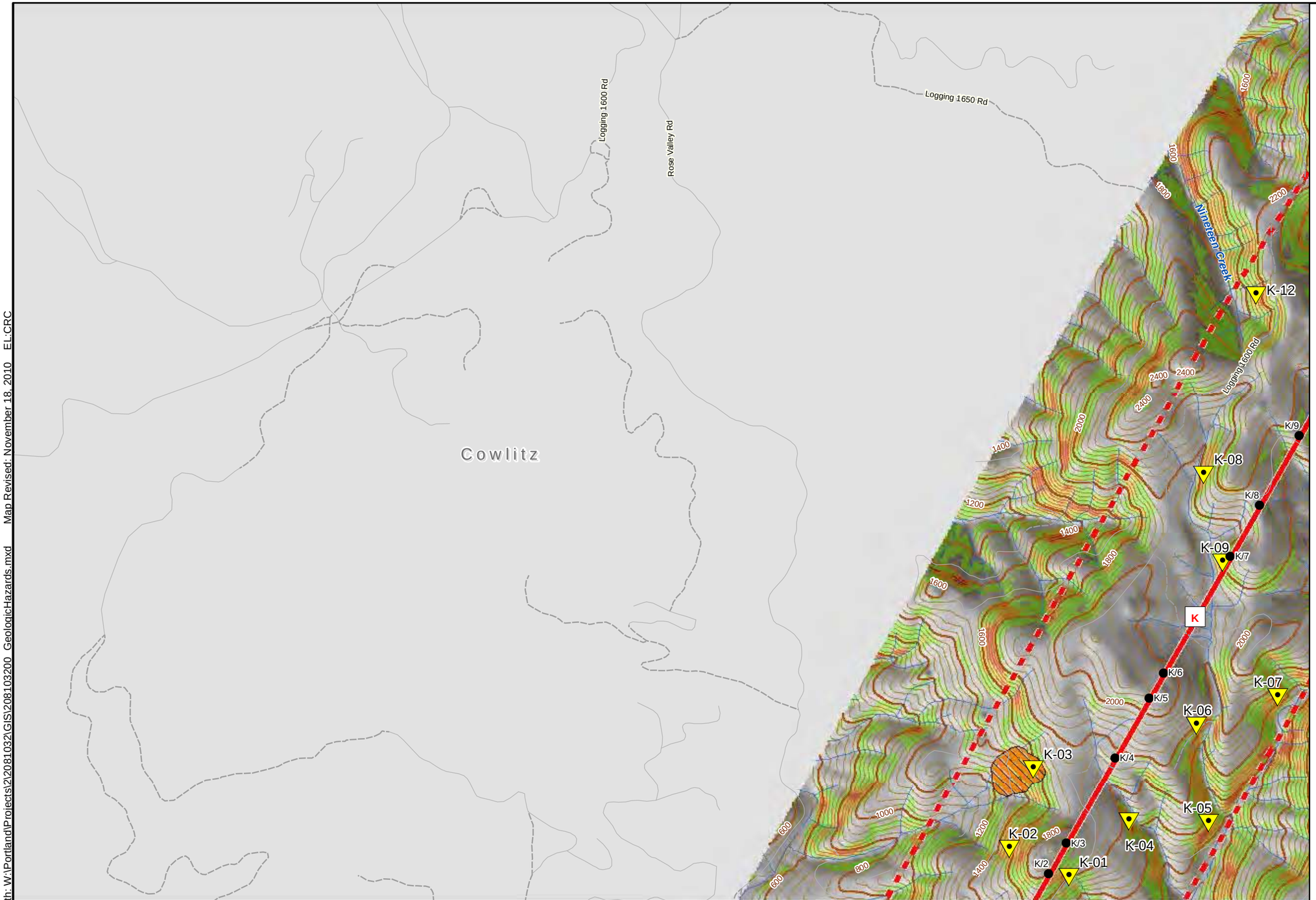


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

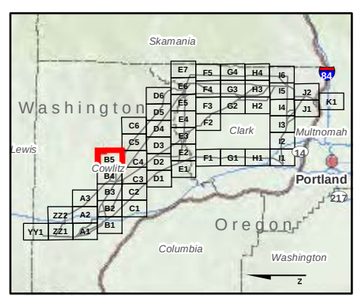
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page B5

Sheet 115 of 156

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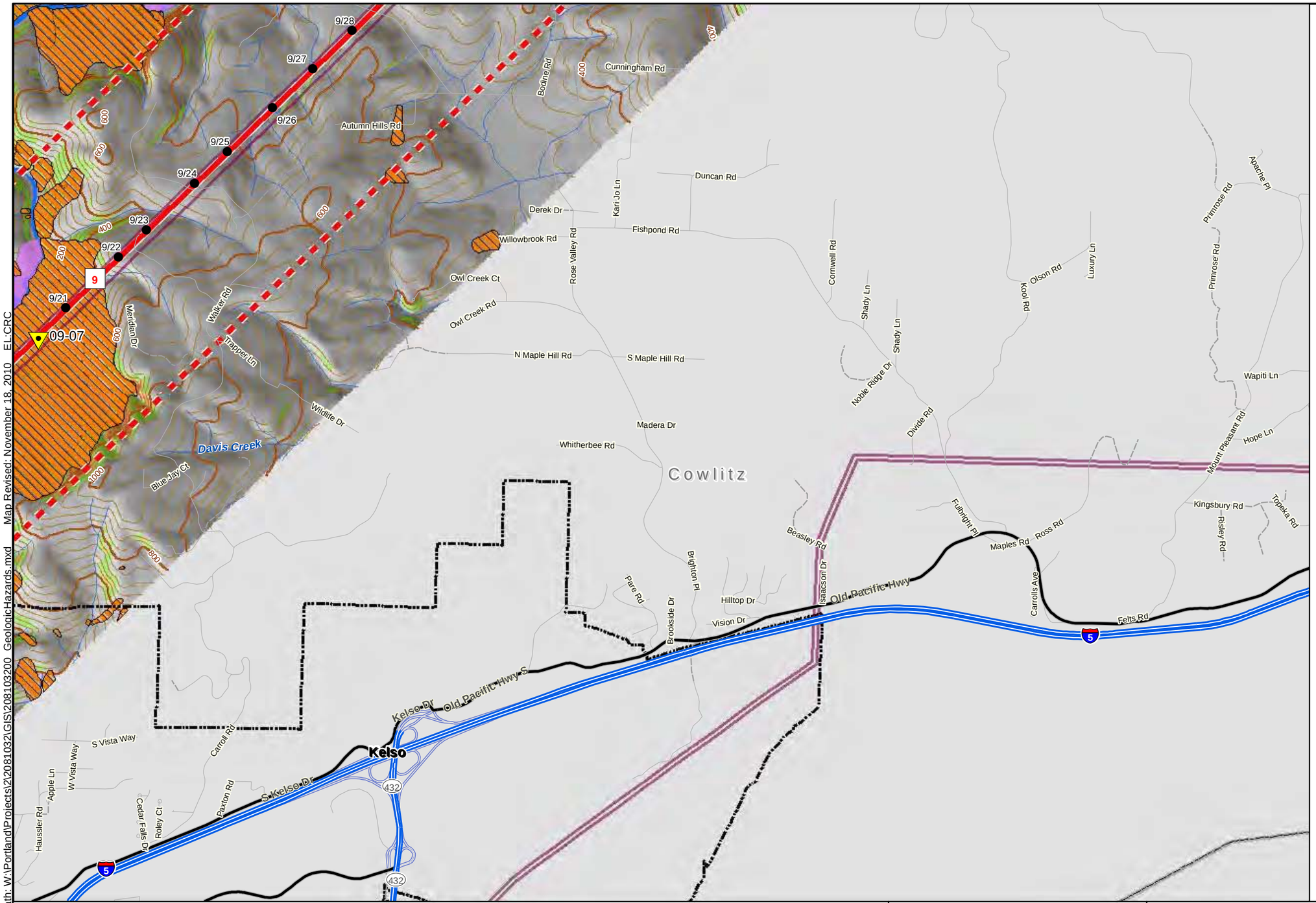


Explanation

- Proposed Route Segment (1)
- Segments No Longer Being Considered (6)
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

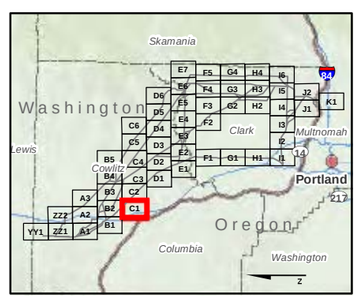
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C1

Sheet 116 of 156

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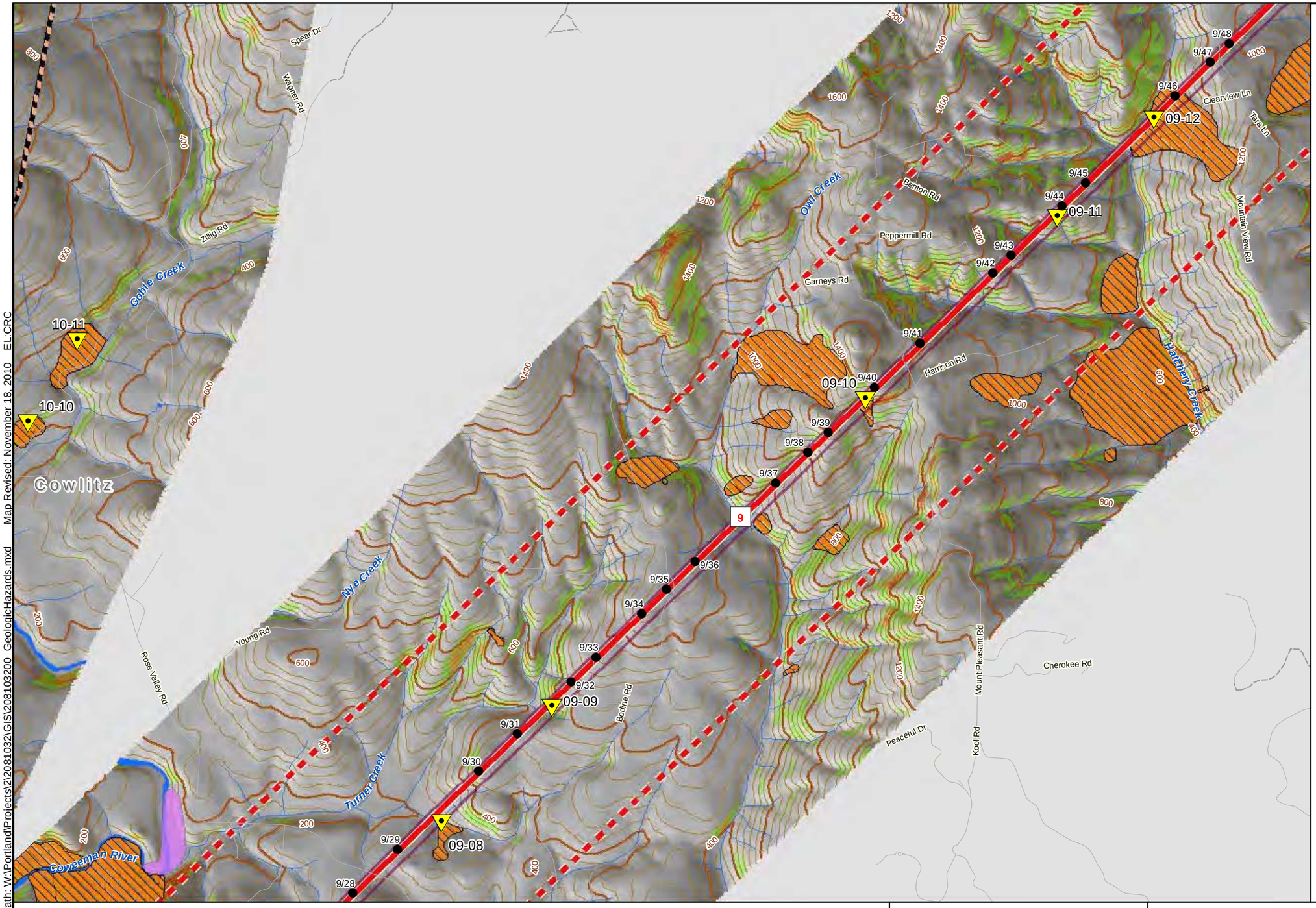


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

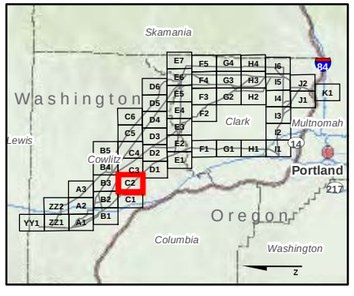
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C2

Sheet 117 of 156

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

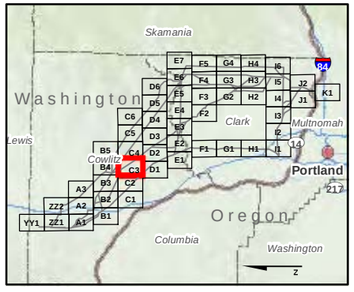
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C3

Sheet 118 of 156

Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\2081032000 GeologicHazards.mxd Map Revised: November 18, 2010 EL:CRC

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

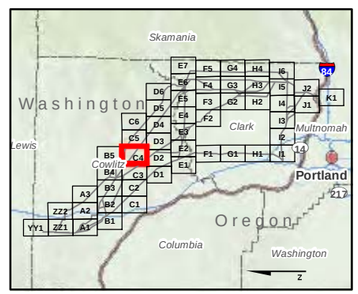
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C4

Sheet 119 of 156

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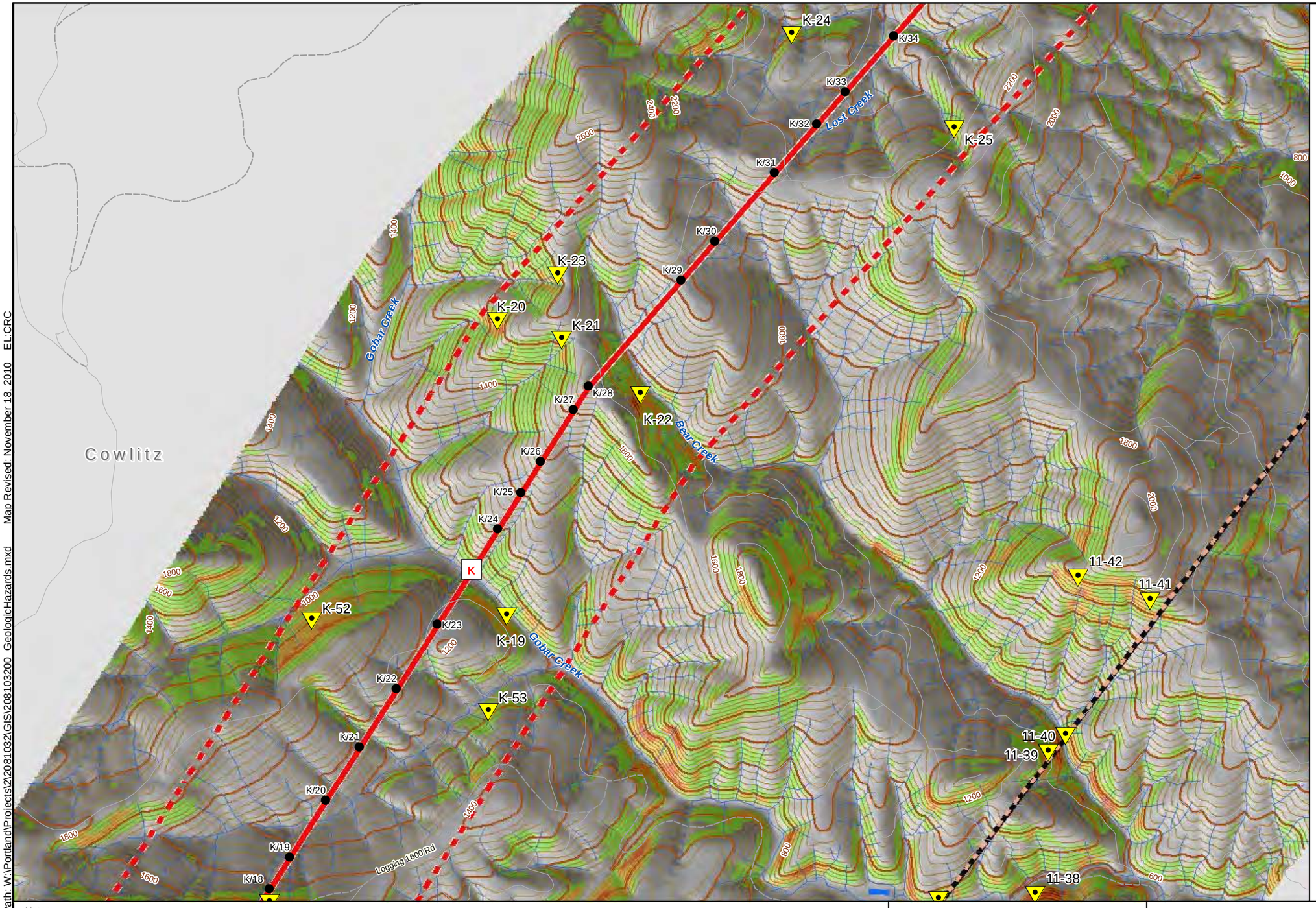


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

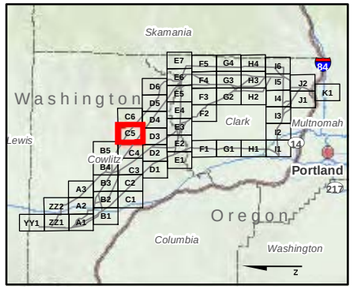
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C5

Sheet 120 of 156

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Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

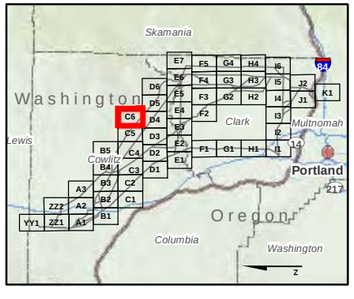
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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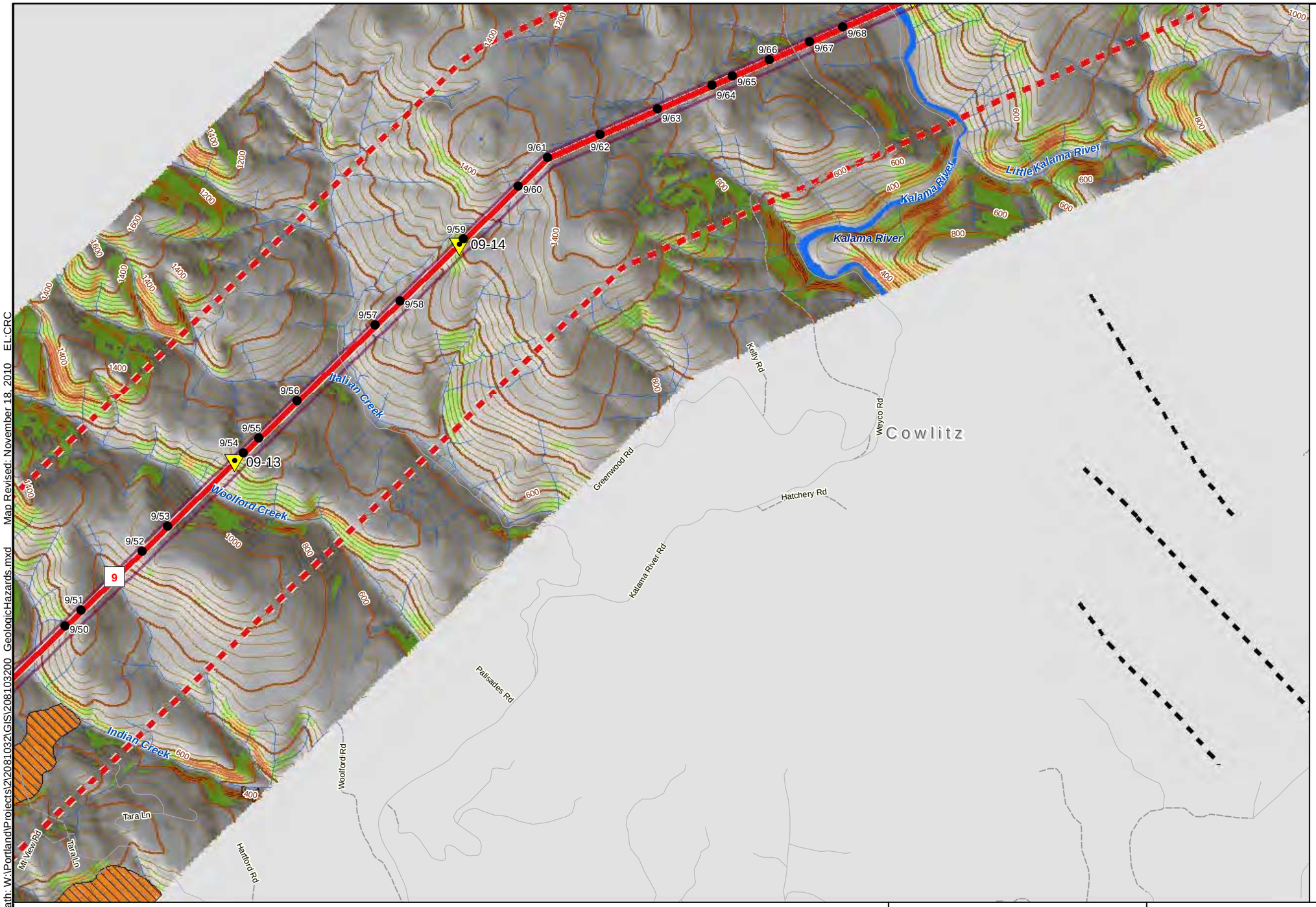
Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page C6

Sheet 121 of 156



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

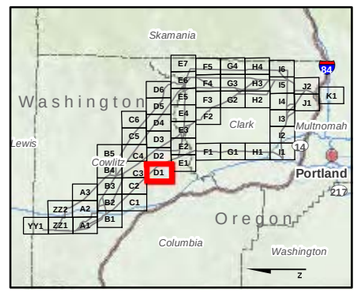
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D1

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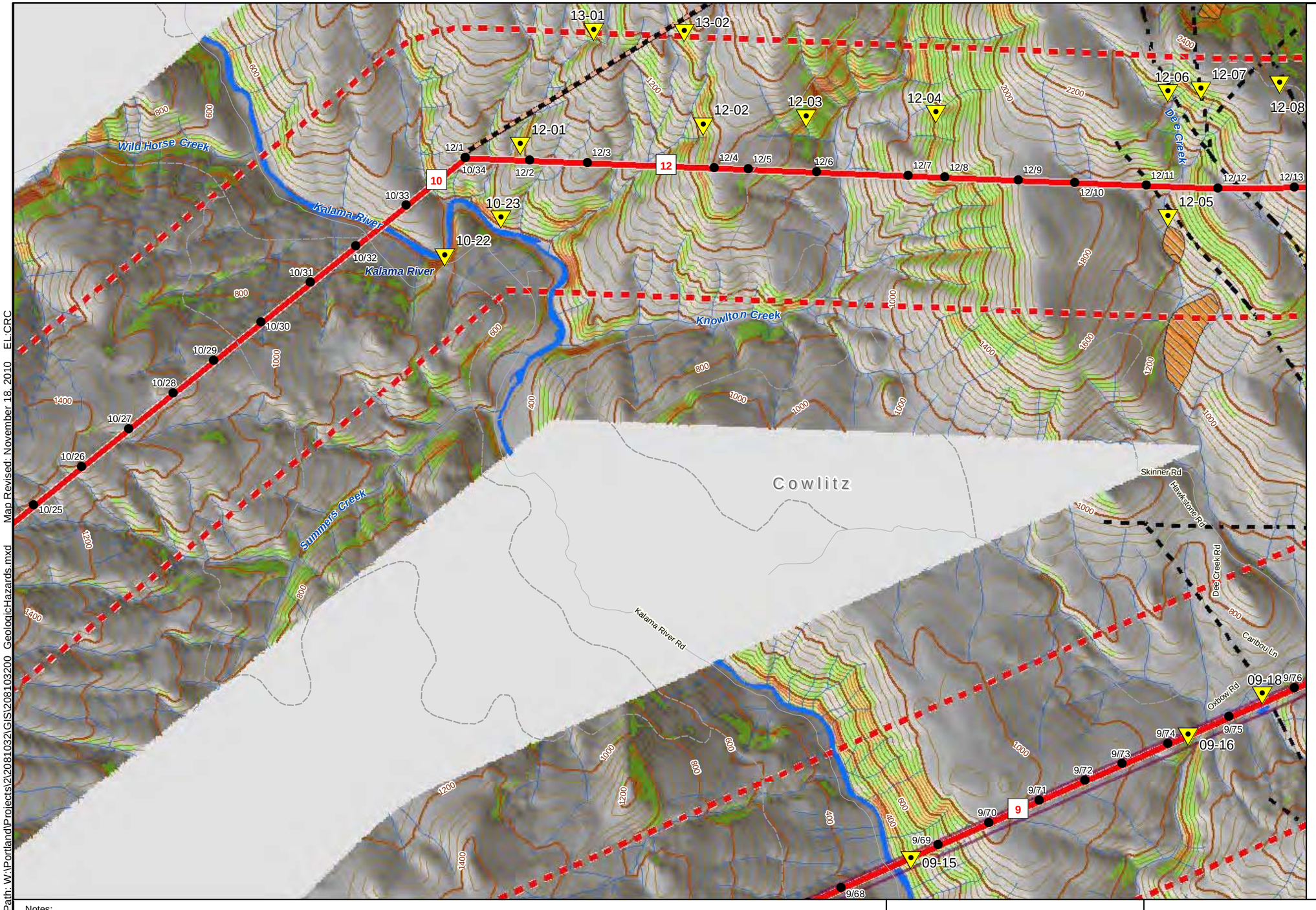


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

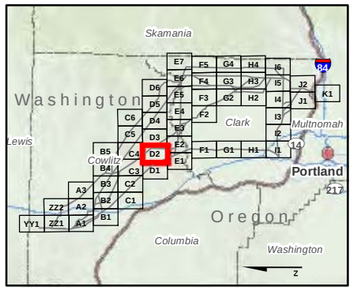
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D2

Sheet 123 of 156

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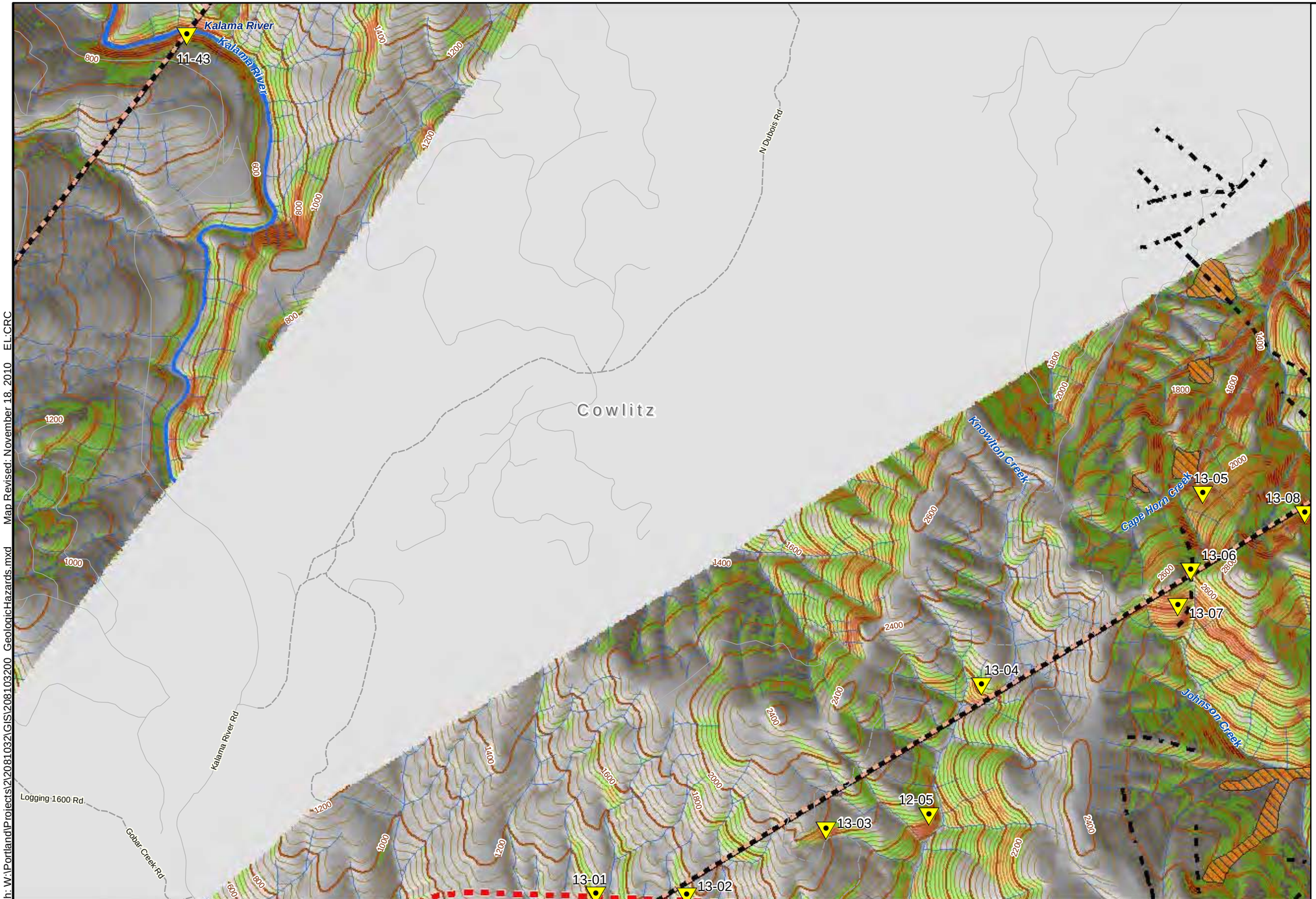


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

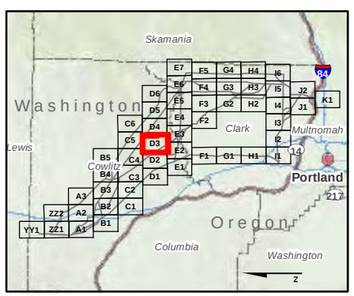
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D3

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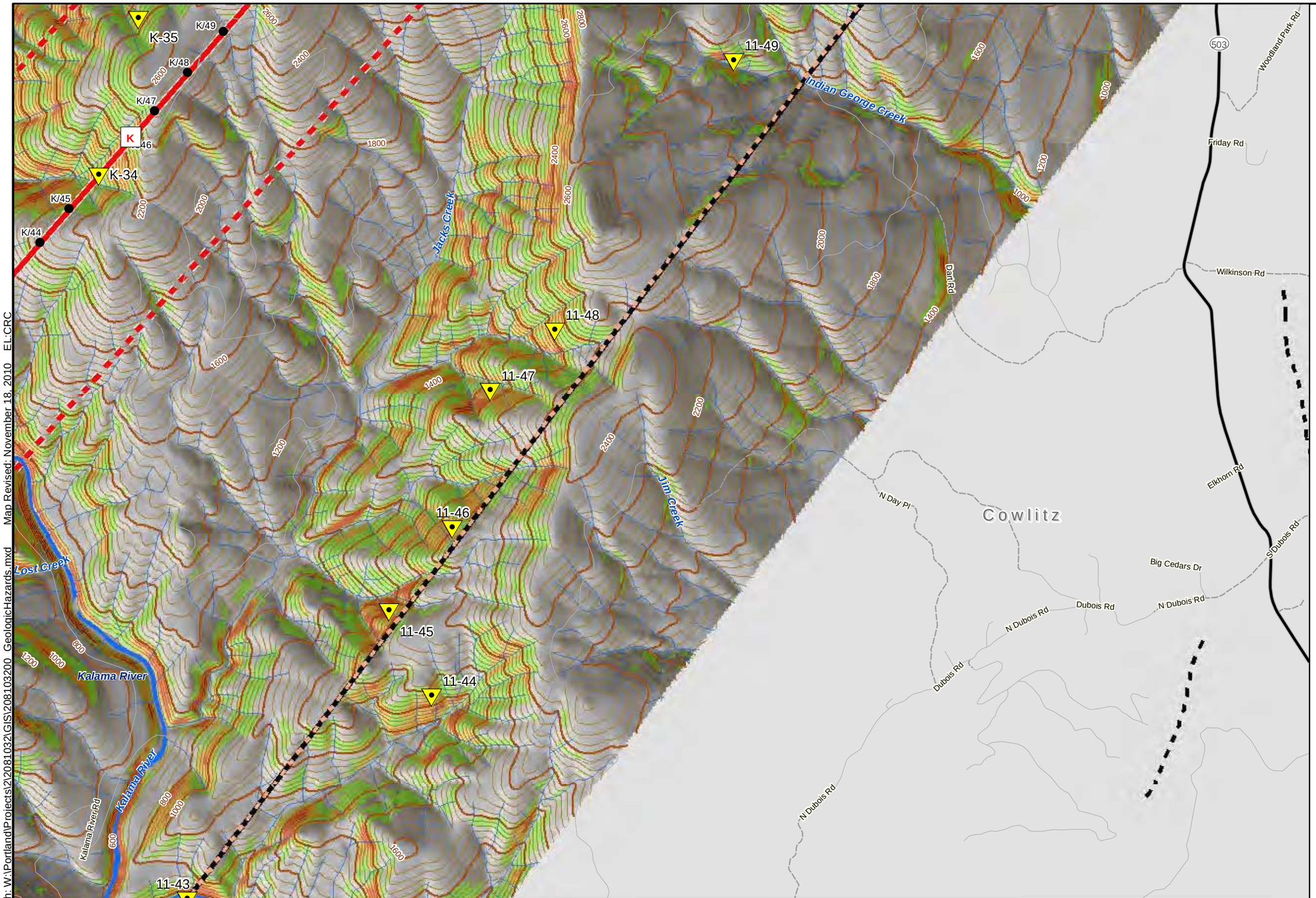


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

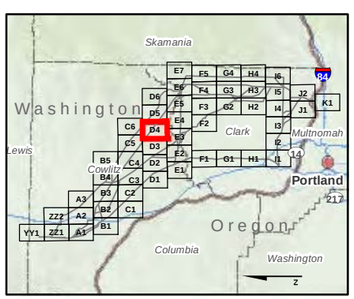
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

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Sheet 125 of 156

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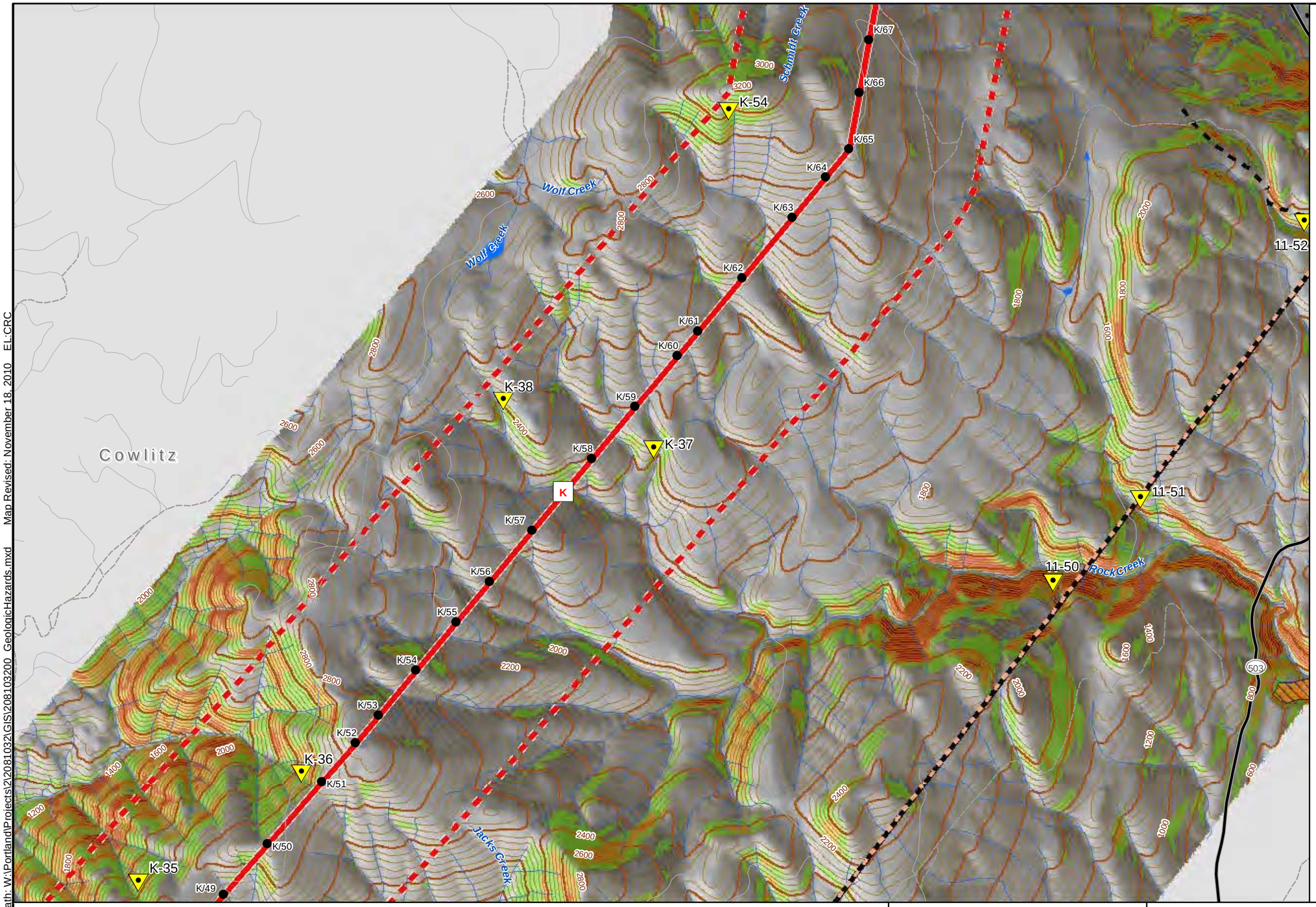


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

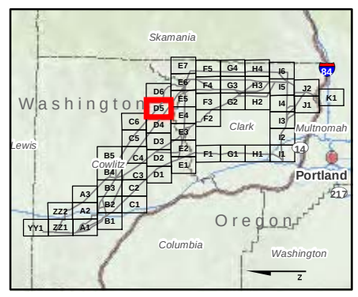
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D5

Sheet 126 of 156

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Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

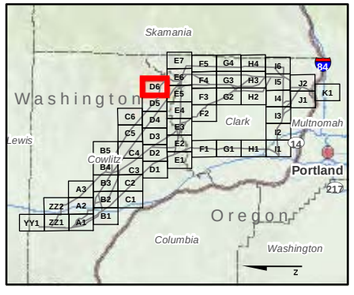
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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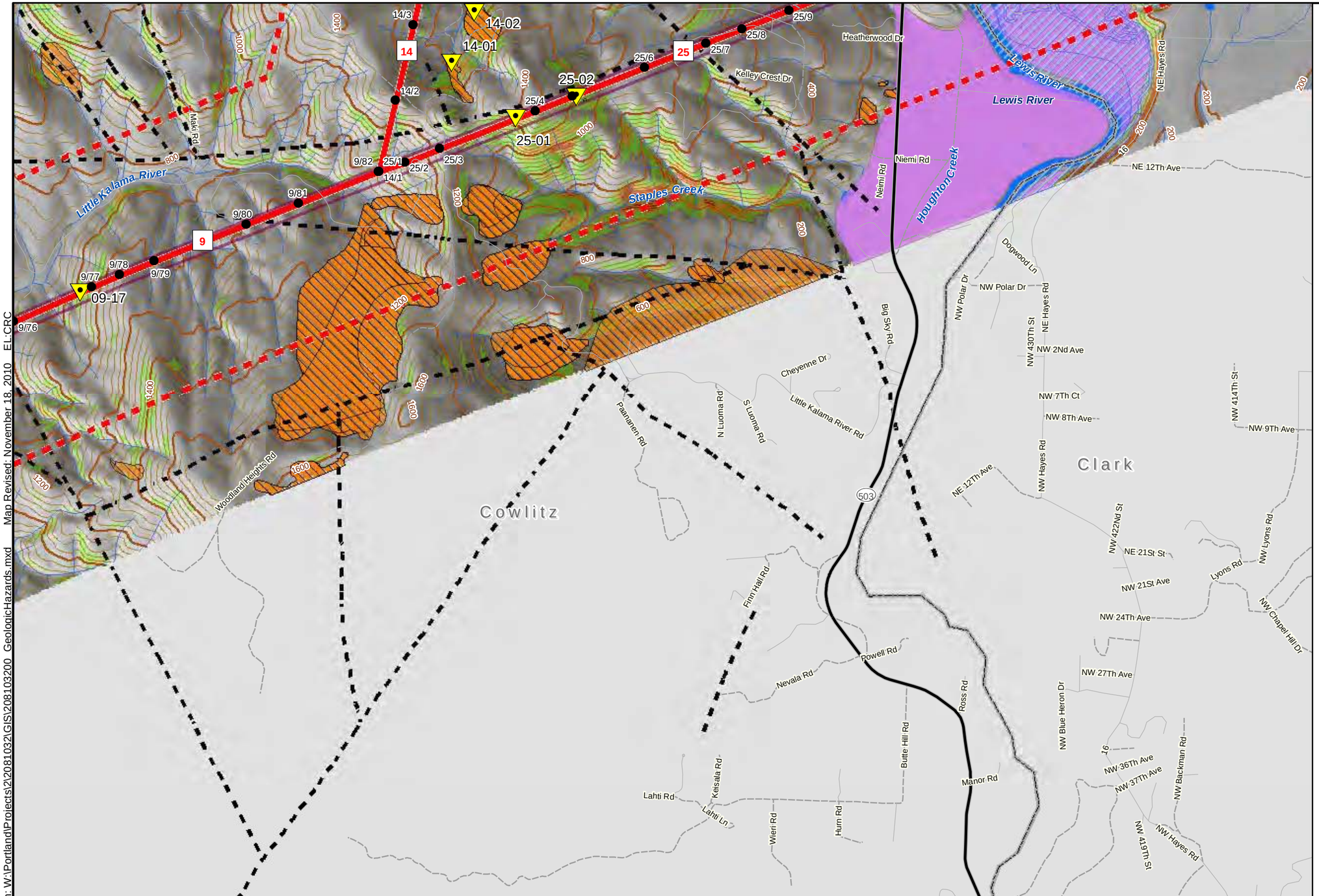
Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page D6



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

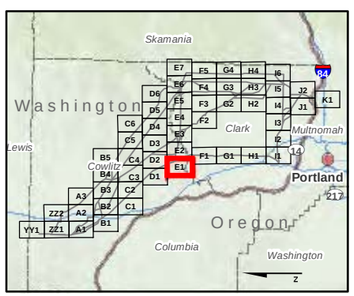
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

Map Page E1

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 128 of 156

Map Revised: November 18, 2010 EL:CRC
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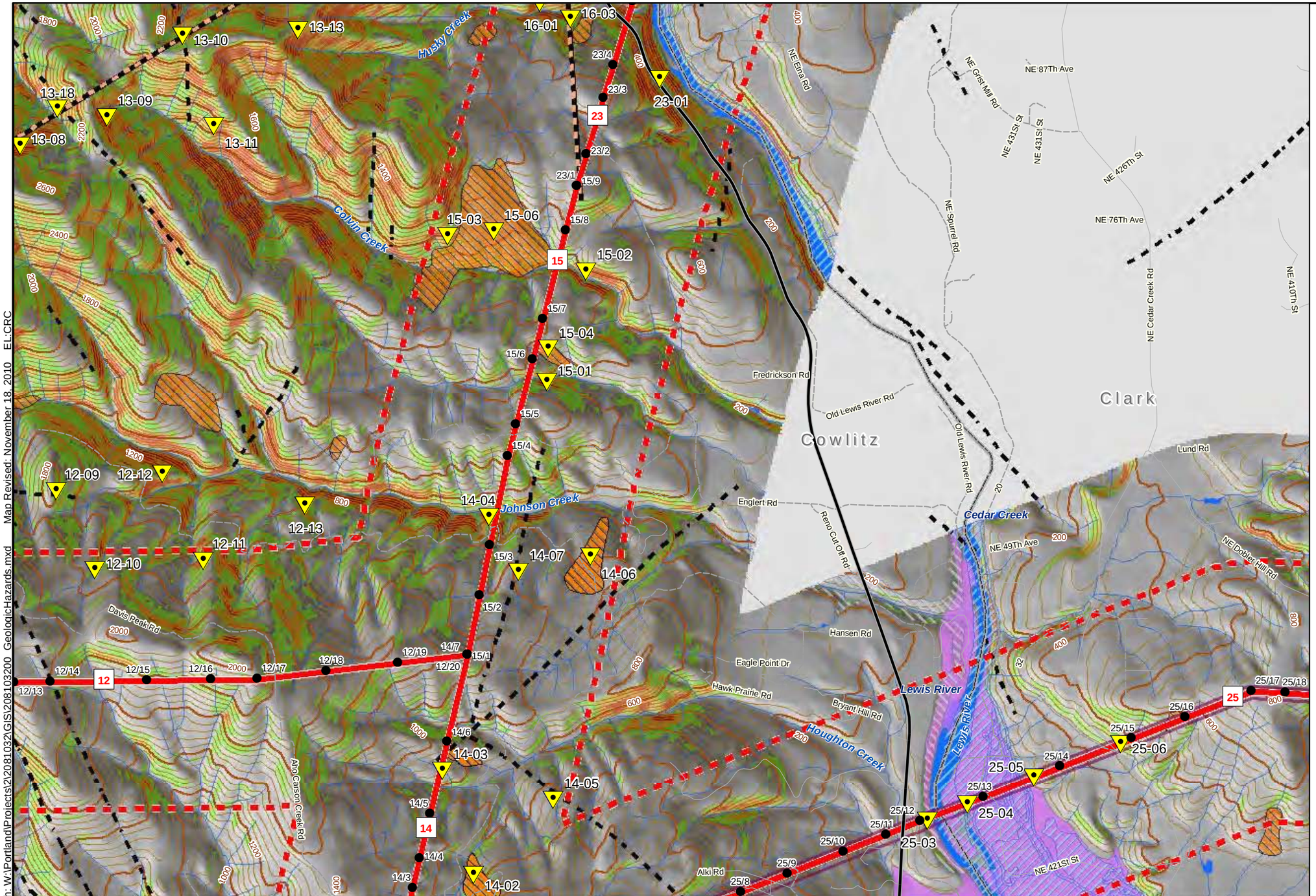

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet

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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E2

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Map Revised: November 18, 2010 EL:CRC

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Office: PORT

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

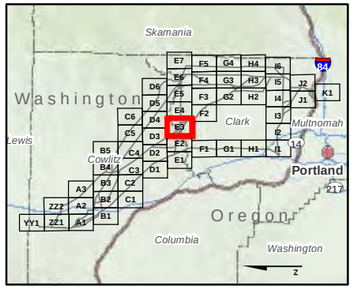
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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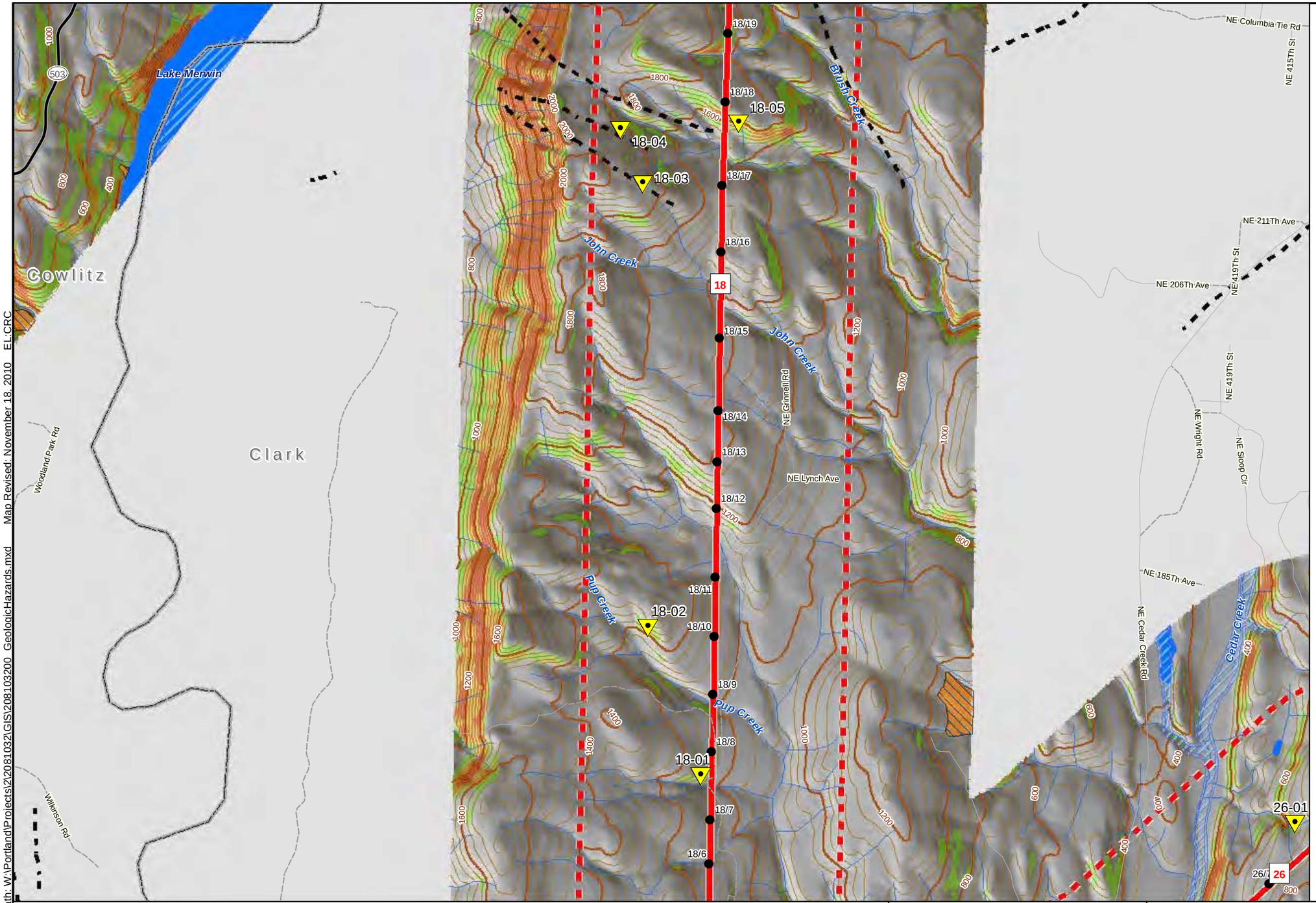
GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E3

Sheet 130 of 156



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

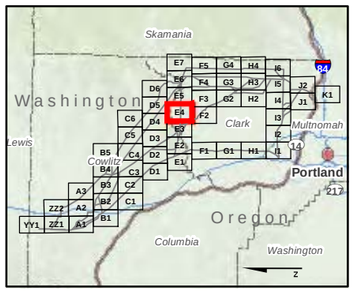
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E4

Sheet 131 of 156

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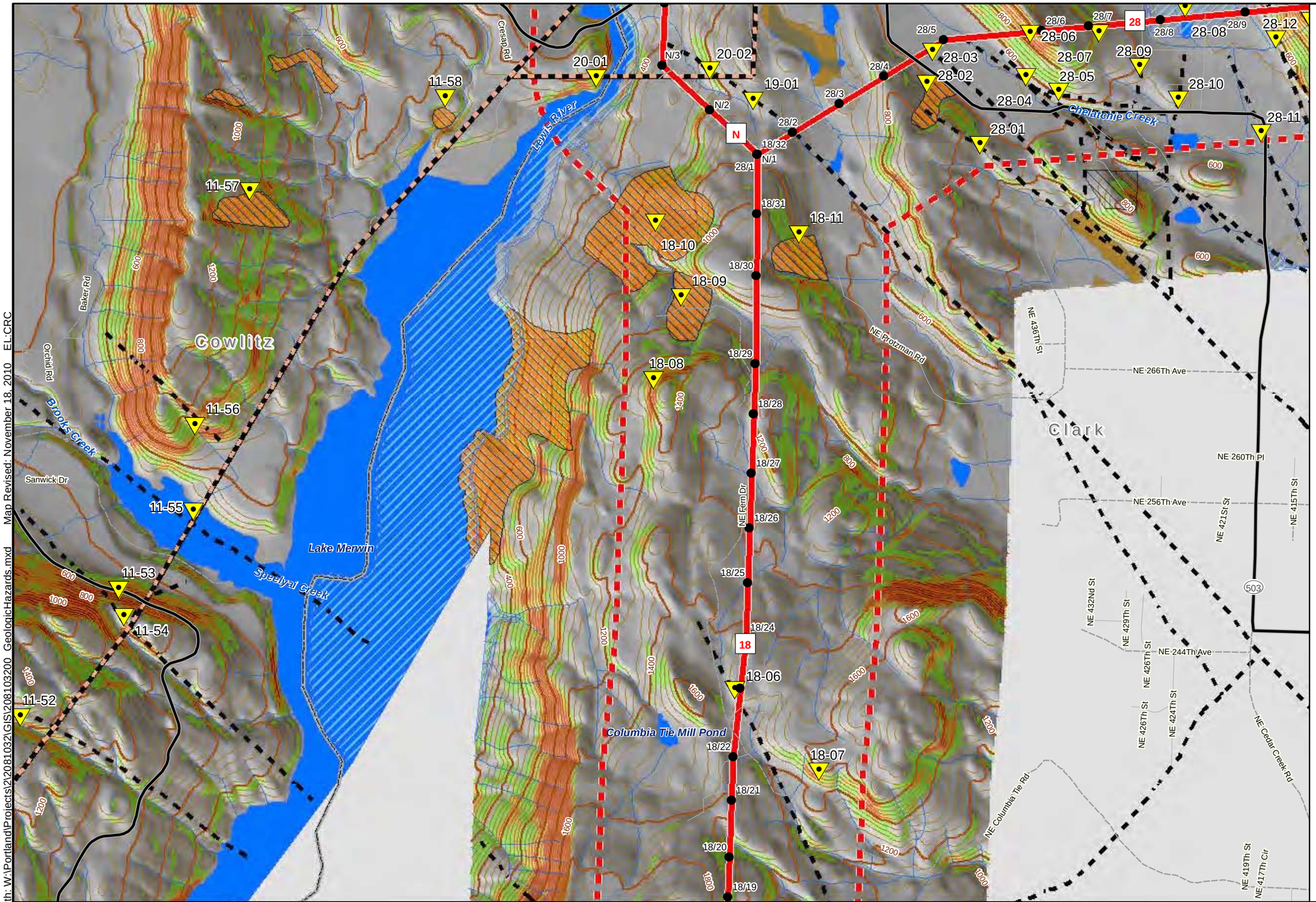


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

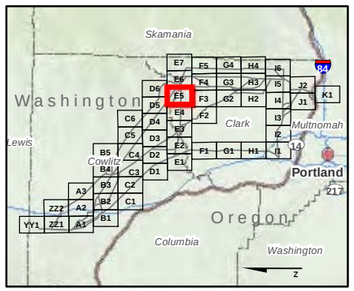
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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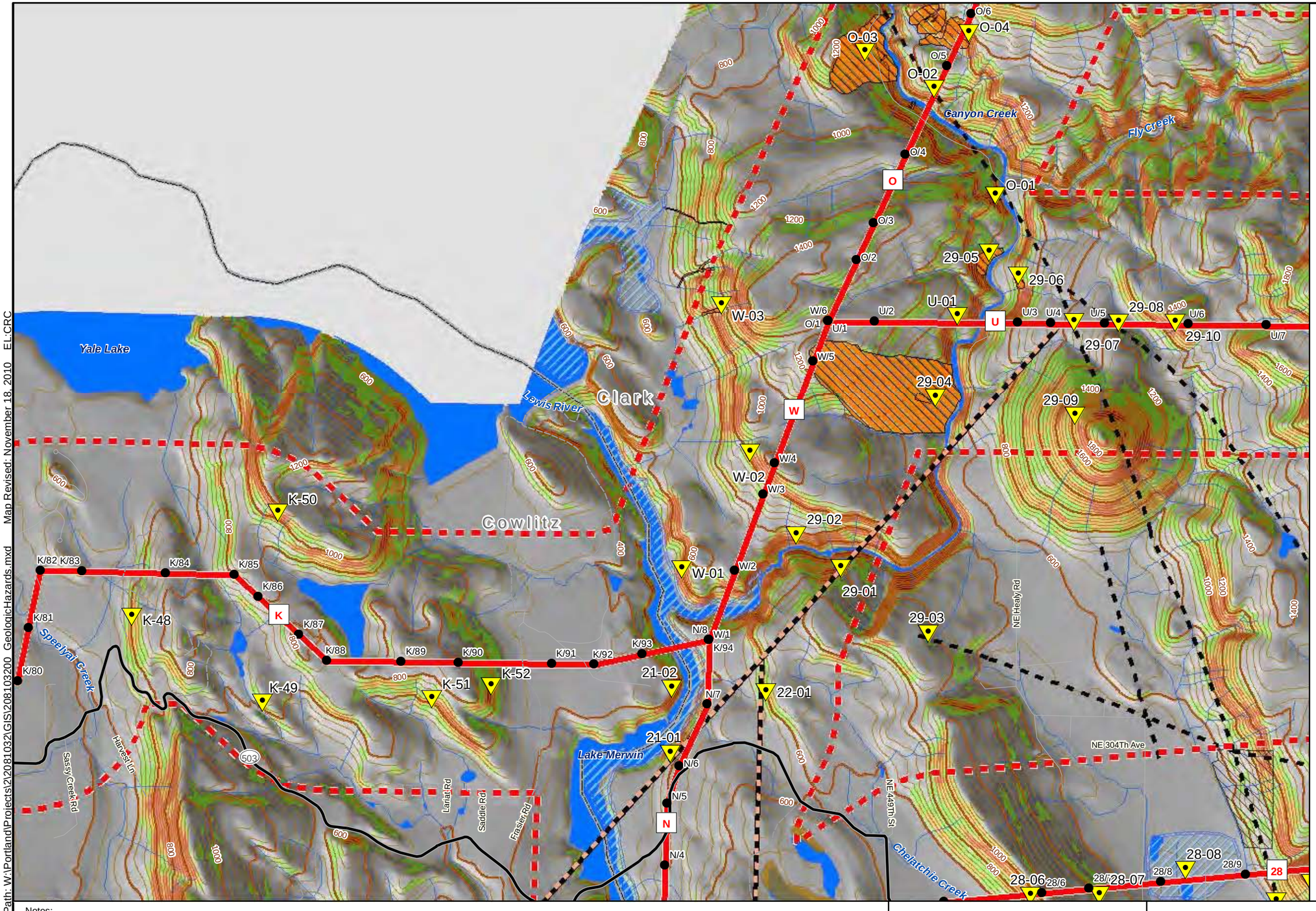
GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E5

Sheet 132 of 156



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E6

Sheet 133 of 156

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Skamania

Clark

NE Healy Rd

Nfd 5301 Rd

Nfd 54 Rd

Lost Lake

Canyon Creek

Canyon Creek

O-04 O-05 O-06 O-07 O-08 O-09 O-10

O/6 O/7 O/8 O/9 O/10 O/11 O/12 O/13

O

1000 1200 1400 1600 1800 2000 800

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

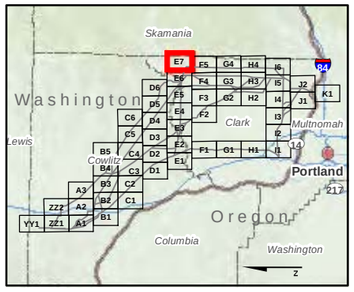
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page E7

Sheet 134 of 156

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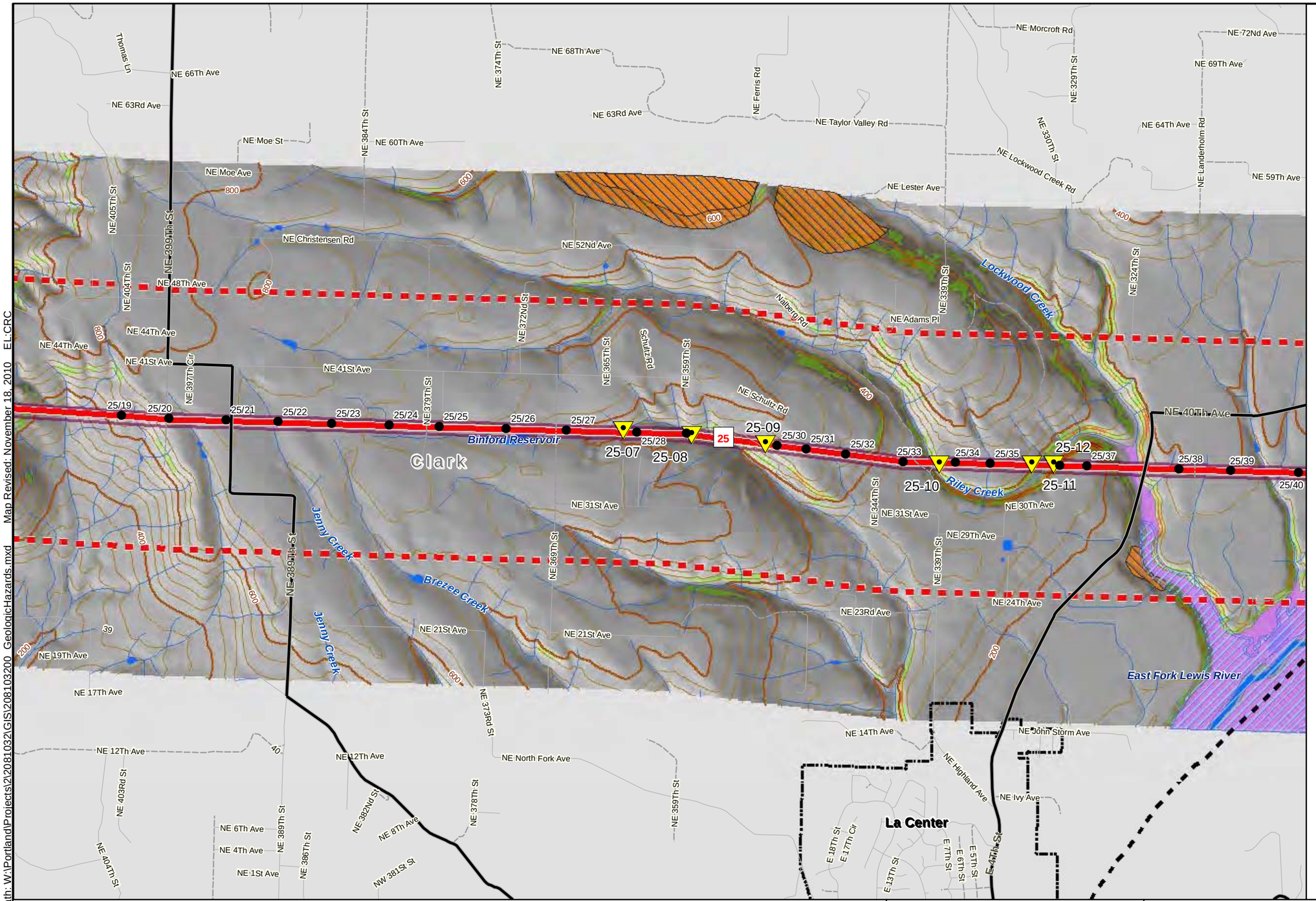

Explanation

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- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
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- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F1

Sheet 135 of 156

Map Revised: November 18, 2010 EL:CRC
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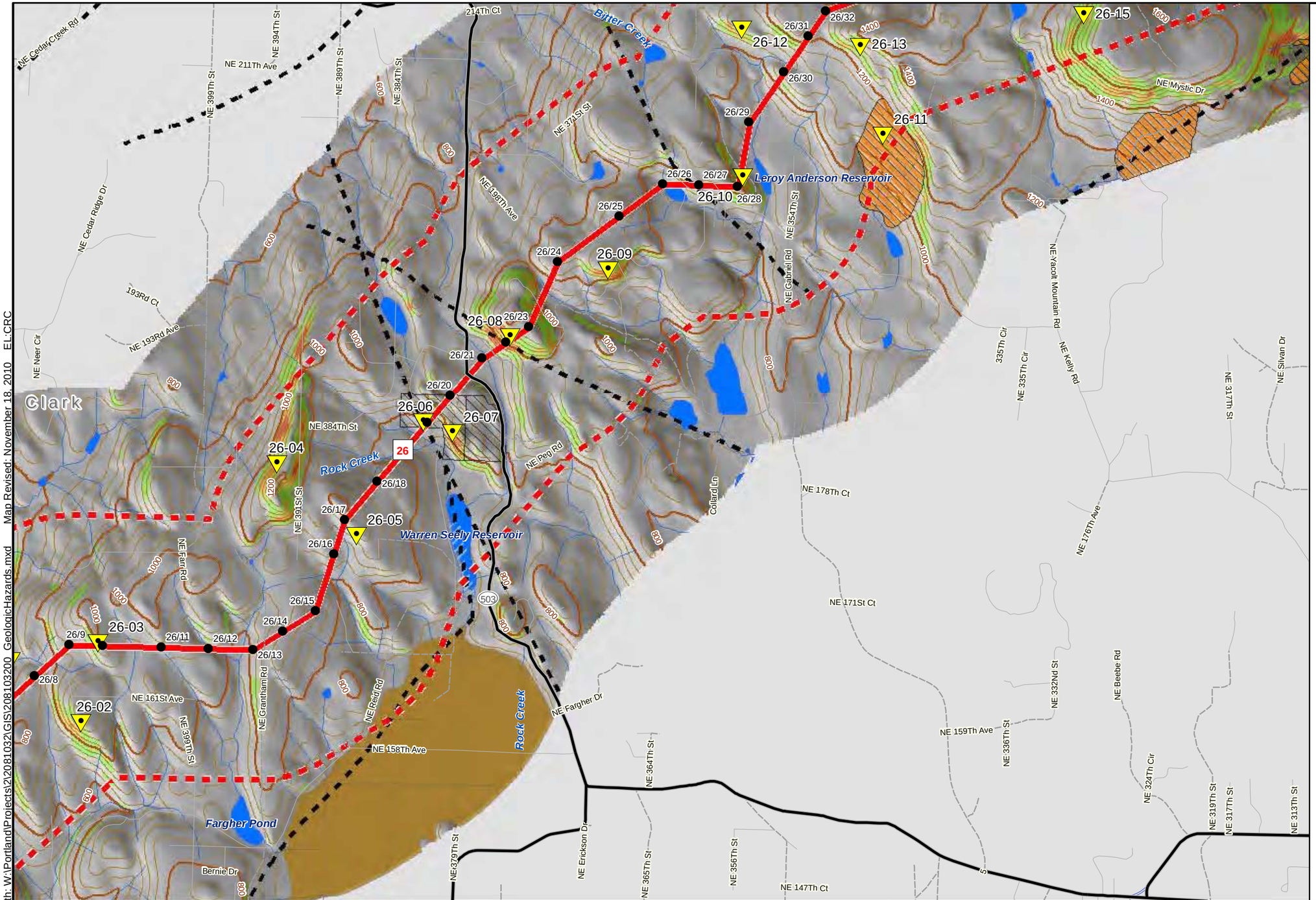
Office: PORT



Explanation

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- Existing Right-of-Way
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- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

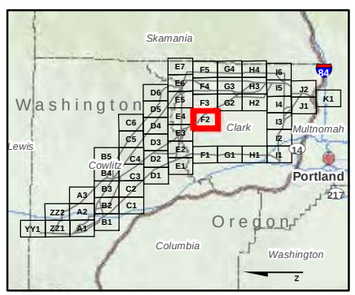
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

Map Page F2

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Sheet 136 of 156

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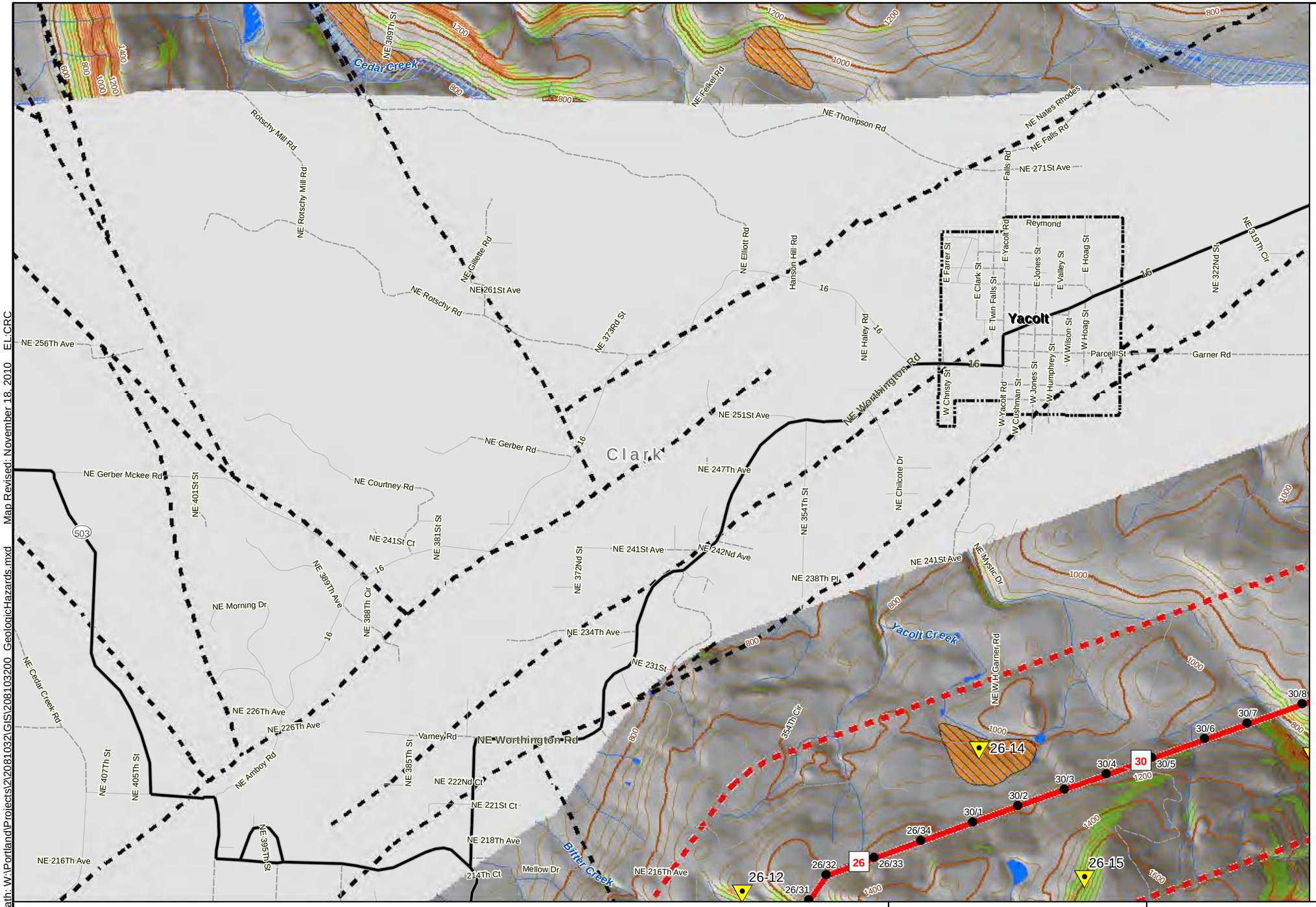

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Explanation

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- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
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- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

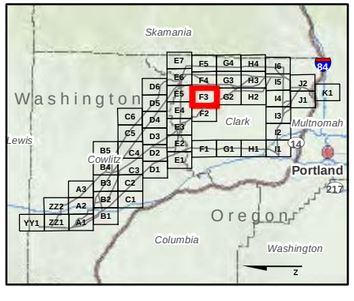
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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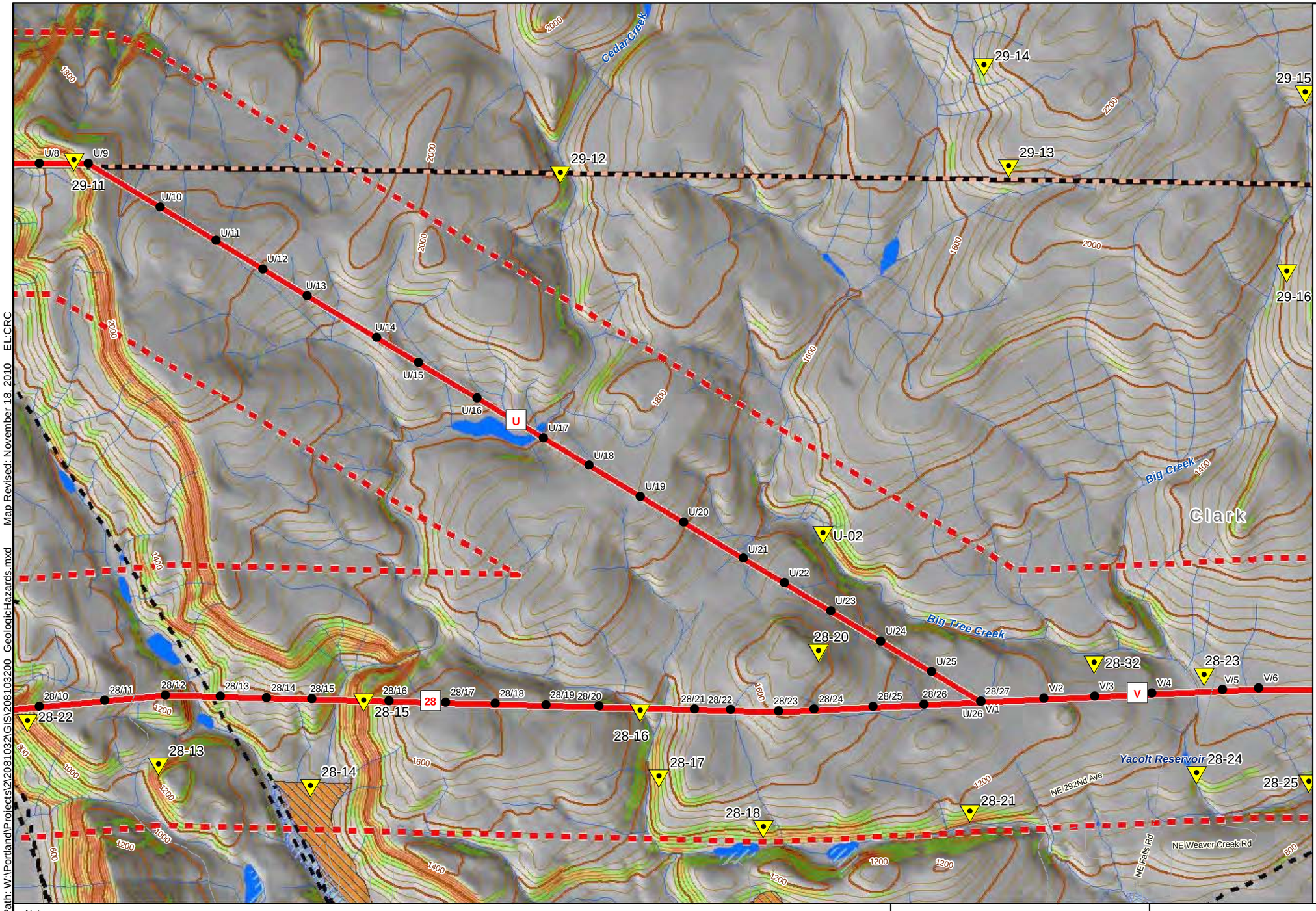
GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F3

Sheet 137 of 156



Explanation

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- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
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- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

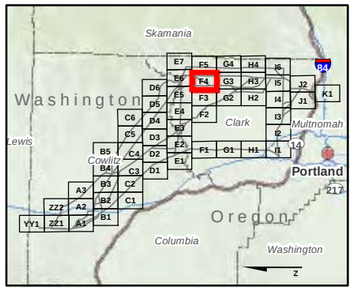
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F4

Sheet 138 of 156

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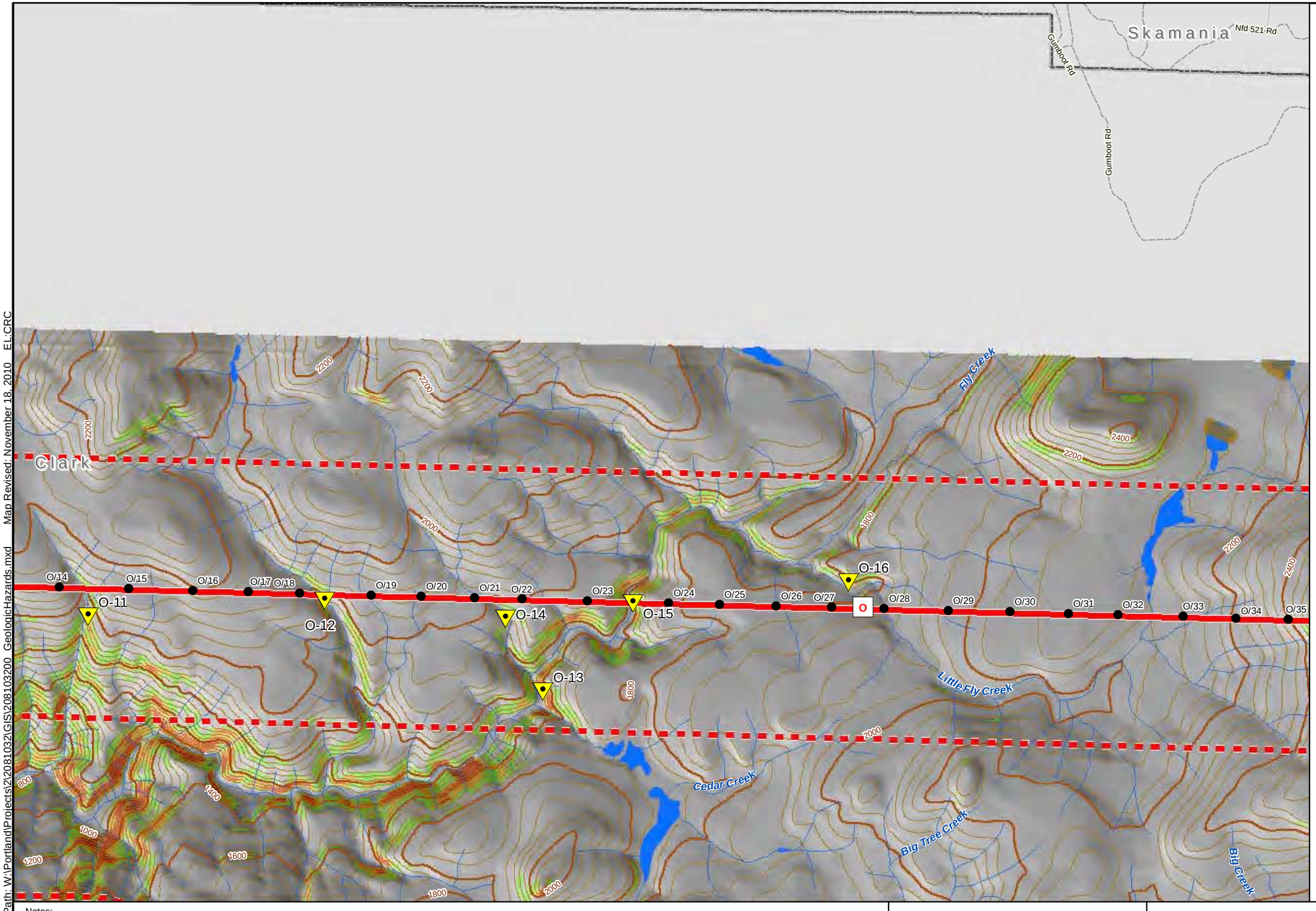


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

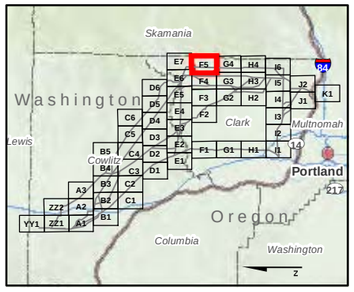
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page F5

Sheet 139 of 156

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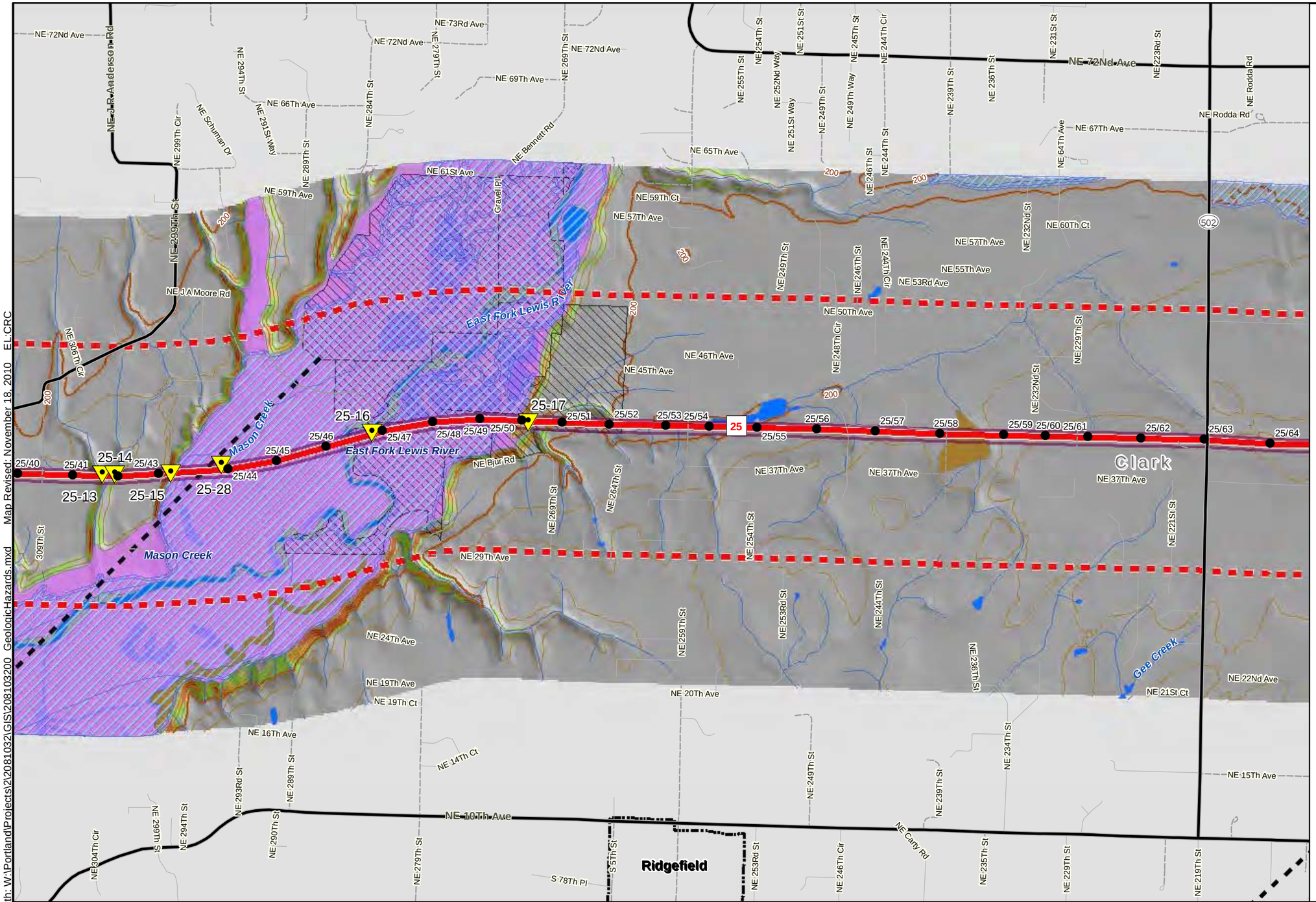

Map Revised: November 18, 2010 EL:CRC

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Office: PORT

Explanation

- 1 — Proposed Route Segment
- 6 — Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

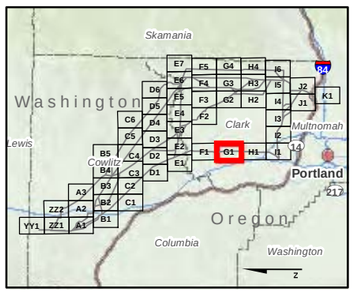
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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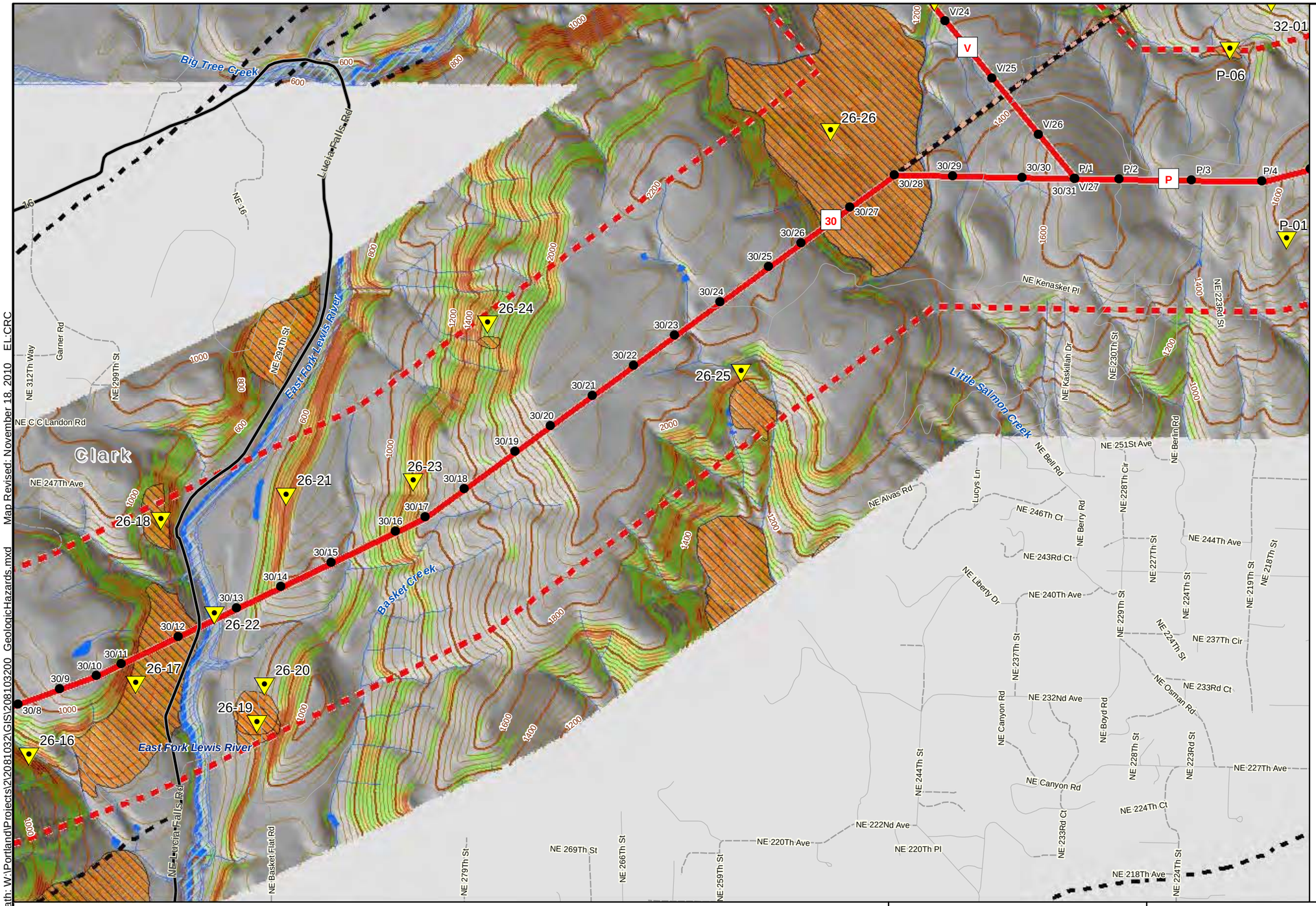
GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page G1

Sheet 140 of 156



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

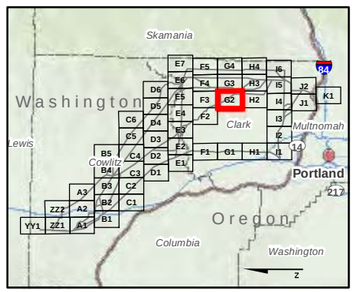
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page G2

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Map Revised: November 18, 2010 EL:CRC
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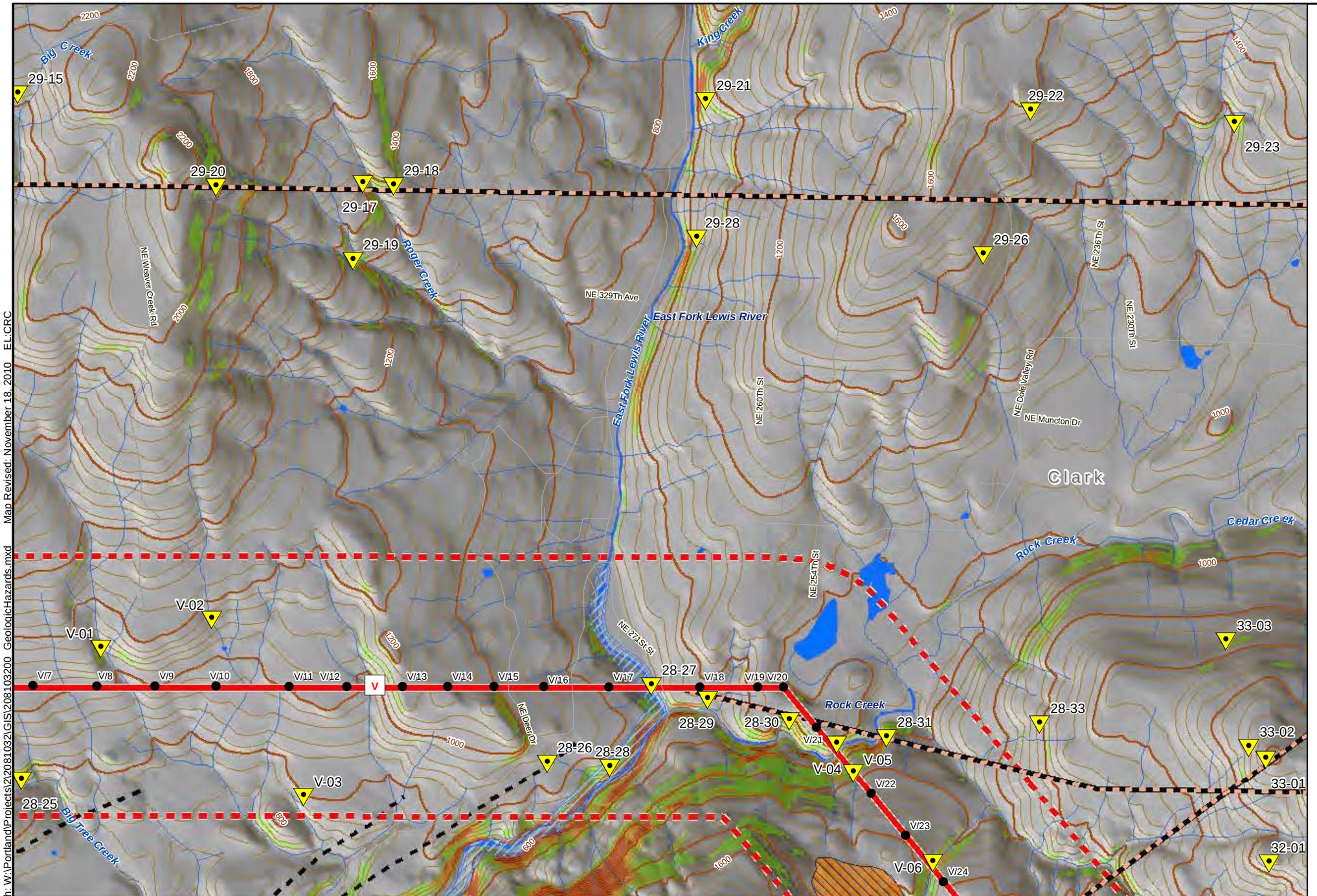
Office: PORT



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
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- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

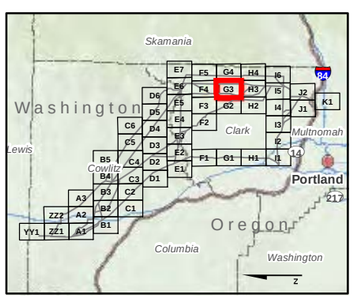
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page G3

Sheet 142 of 156

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Skamania

Clark

NE Sunset Falls Rd

NE Sunset Dr

Nfd 42 Rd

Nfd 4109 Rd

Nfd 4109 Rd

East Fork Lewis River

Anaconda Creek

Reinhardt Creek

Yacolt Burn State Forest Rd

King Creek

Nicolls Creek

NE Weaver Creek Rd

O-17

O-18

O-19

O-20

O-21

O-22

O-23

O-24

O-25

O-26

O-27

O/36 O/37 O/38 O/39 O/40 O/41 O/42 O/43 O/44 O/45 O/46 O/47 O/48 O/49 O/50 O/51 O/52 O/53 O/54 O/55 O/56

2200 2400 2600 1800 1400 2000 1600 1200 1000 800

Explanation

- 1 Proposed Route Segment
- 6 Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

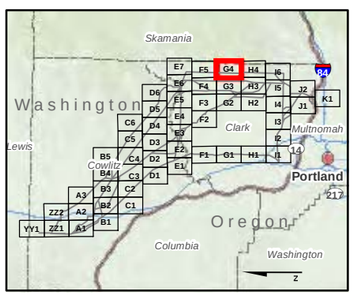
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

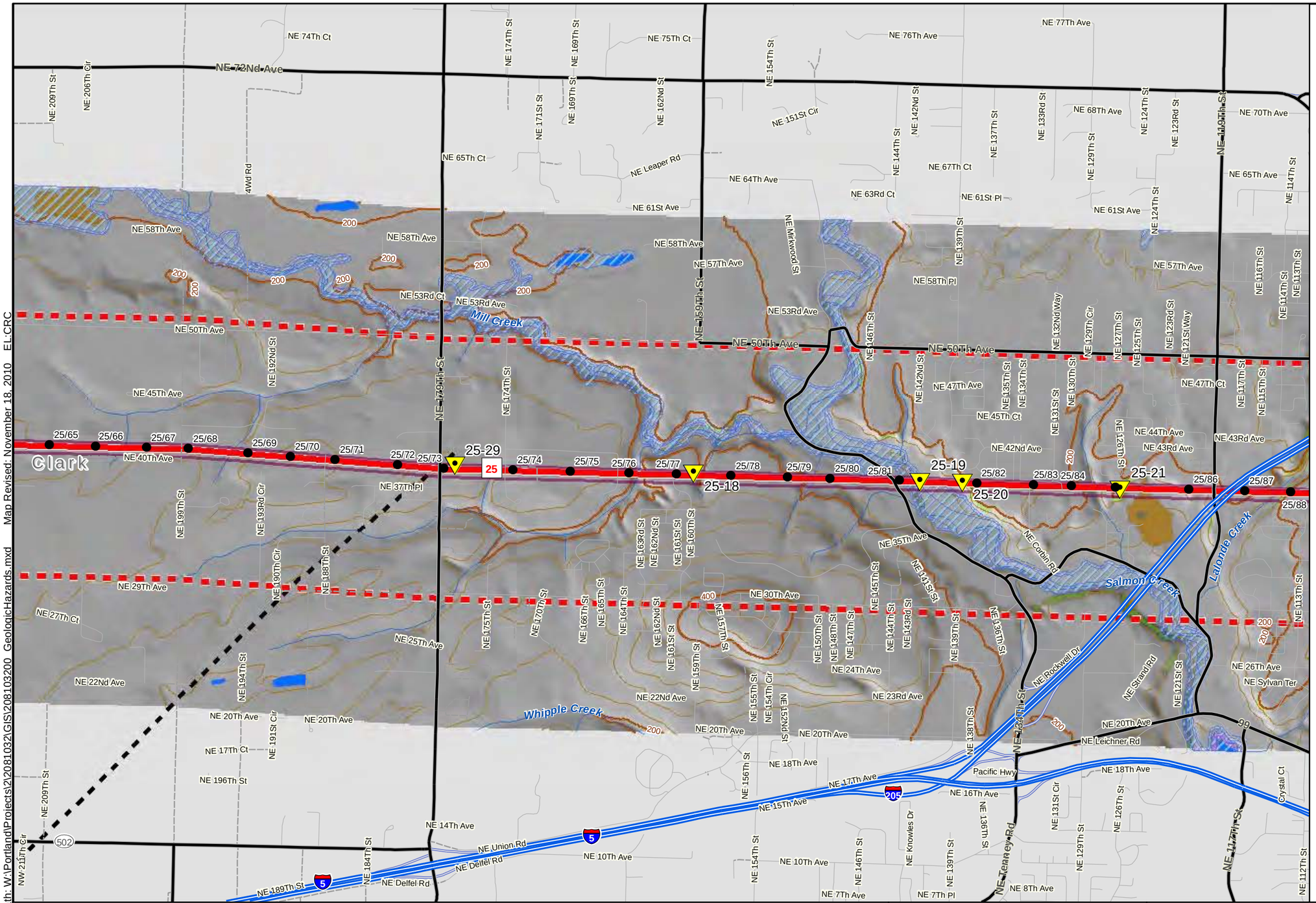
Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page G4

Sheet 143 of 156

Office: PORT Path: W:\Portland\Projects\2108103200 GIS\2108103200_GeologicHazards.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

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- 6 — Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
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- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

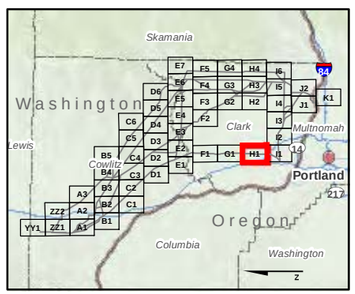
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page H1

Sheet 144 of 156

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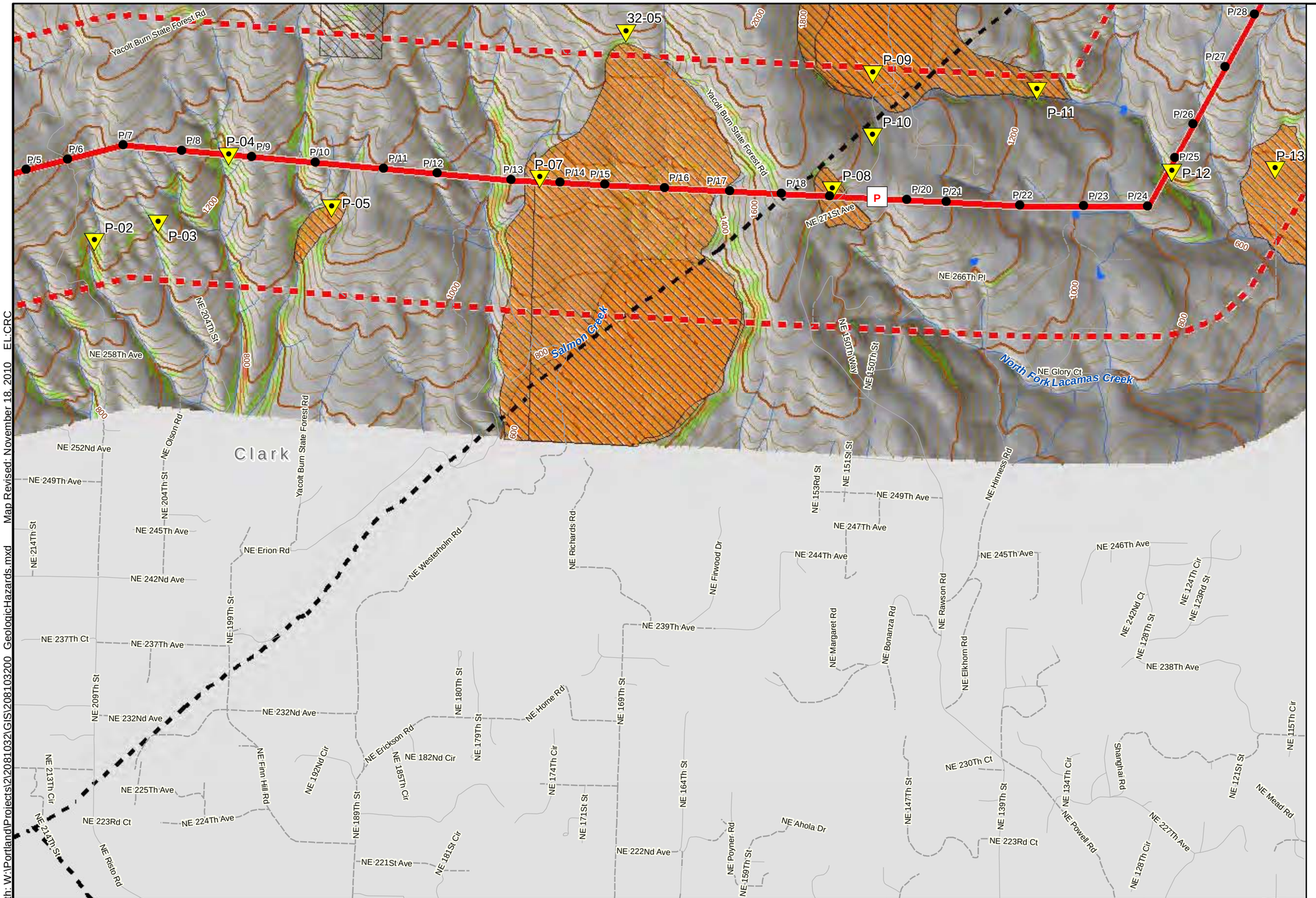

Explanation

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- Segments No Longer Being Considered
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- Existing Right-of-Way
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- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

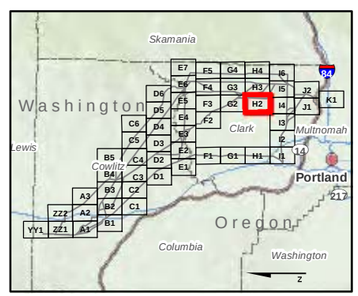
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page H2

Sheet 145 of 156

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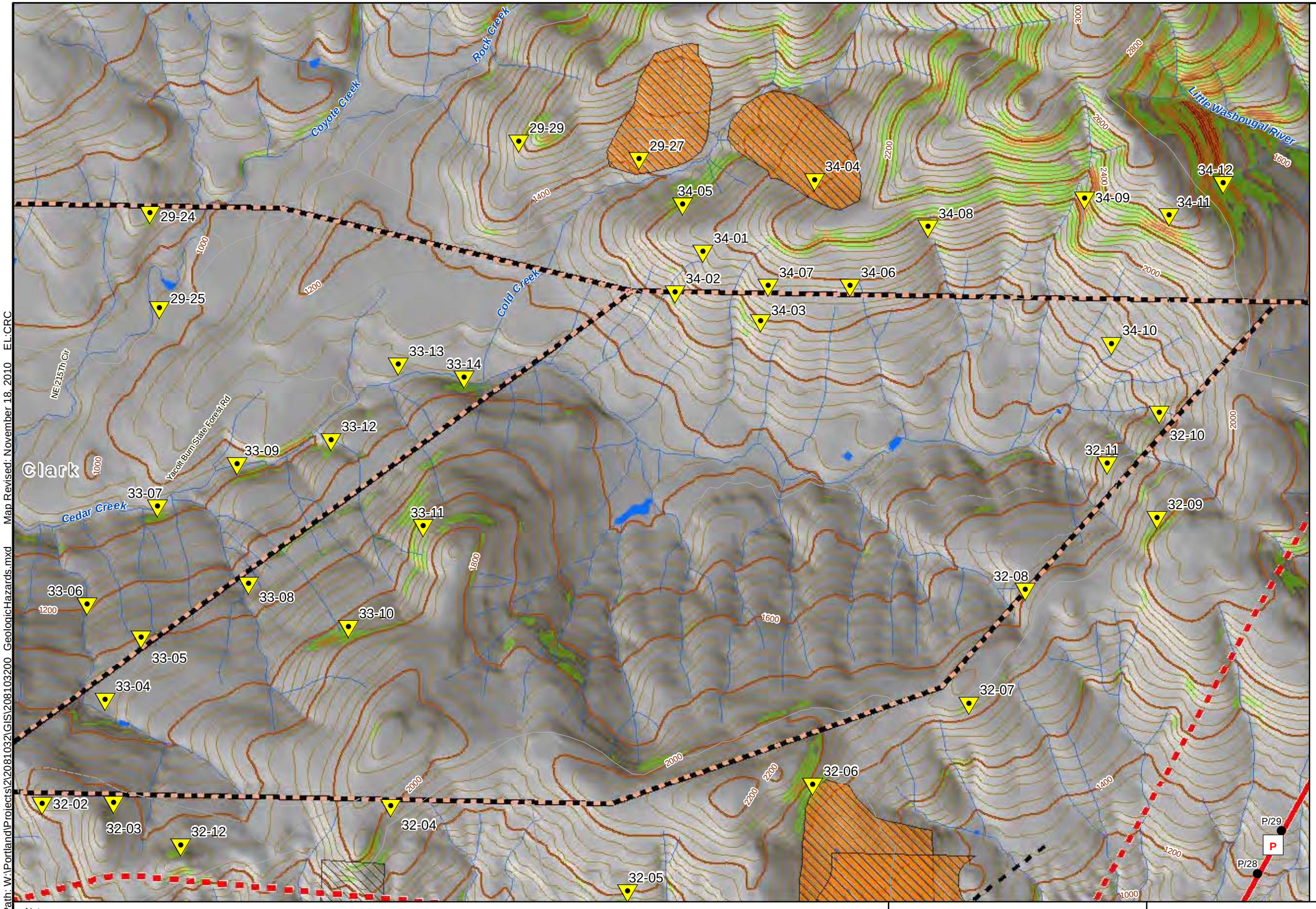

Explanation

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- GeoEngineers Identified Geologic Hazard
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- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

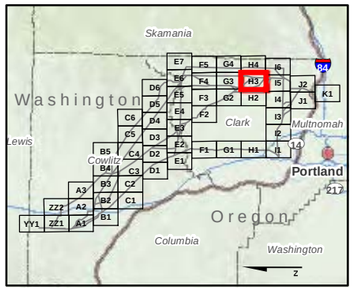
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page H3

Sheet 146 of 156

Map Revised: November 18, 2010 EL:CRC
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Office: PORT

Nfd 4109 Rd

Skamania

1200Th Rd

Clark

O-28 O-29 O-30 O-31 O-32 O-33 O-34 O-35 O-36 O-37 O-38 O-39 O-40 O-41 O-42 O-43

O/57 O/58 O/59 O/60 O/61 O/62 O/64 O/65 O/66 O/67 O/68 O/69 O/70 O/71 O/72 O/73 O/74 O/75 O

Coyote Creek

Rock Creek

Grouse Creek

Cold Creek

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
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- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

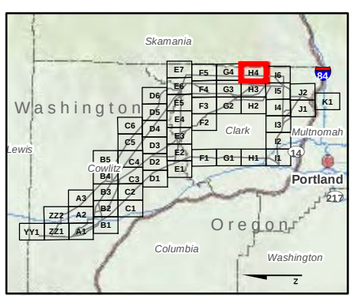
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page H4

Sheet 147 of 156

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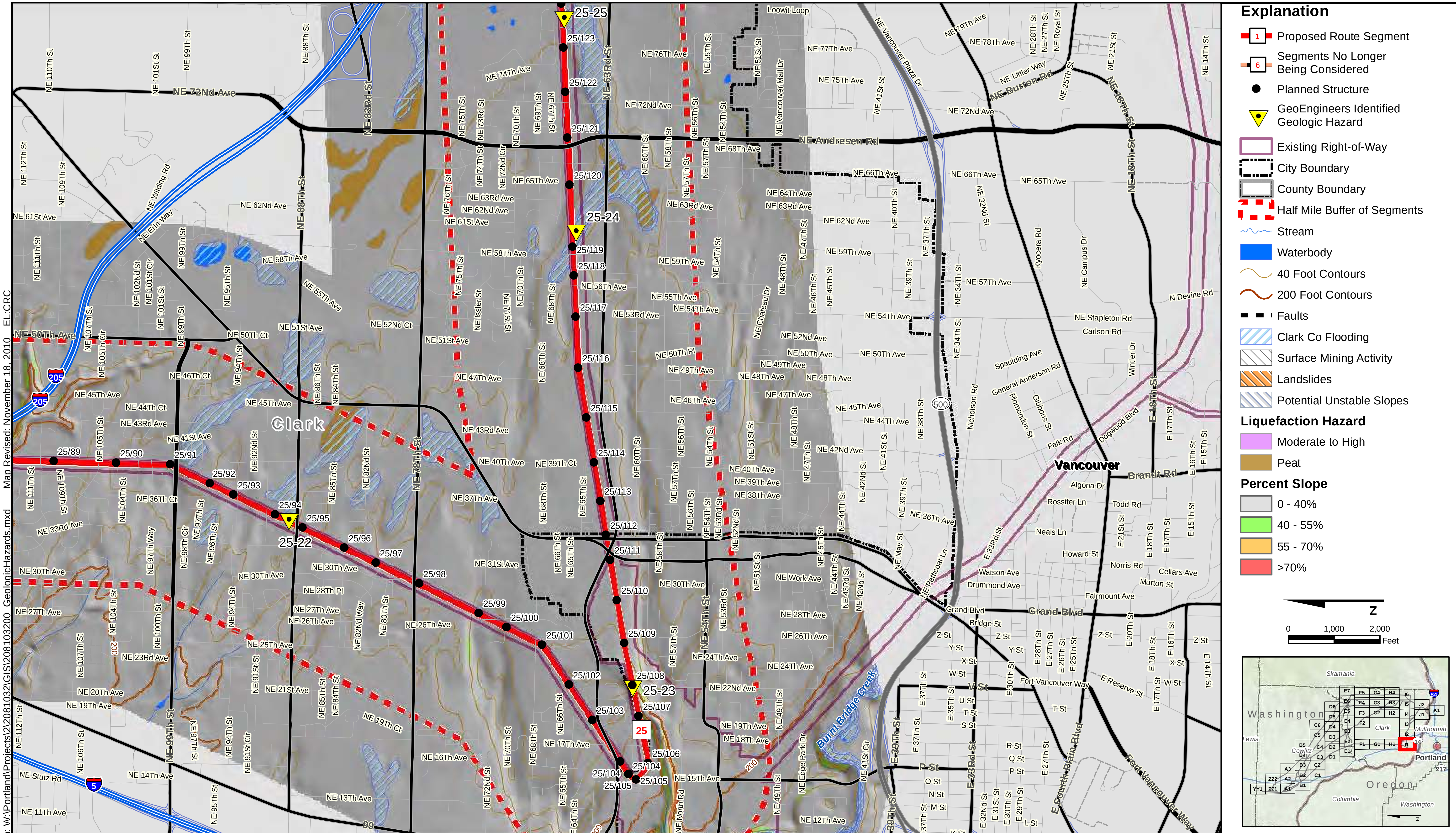

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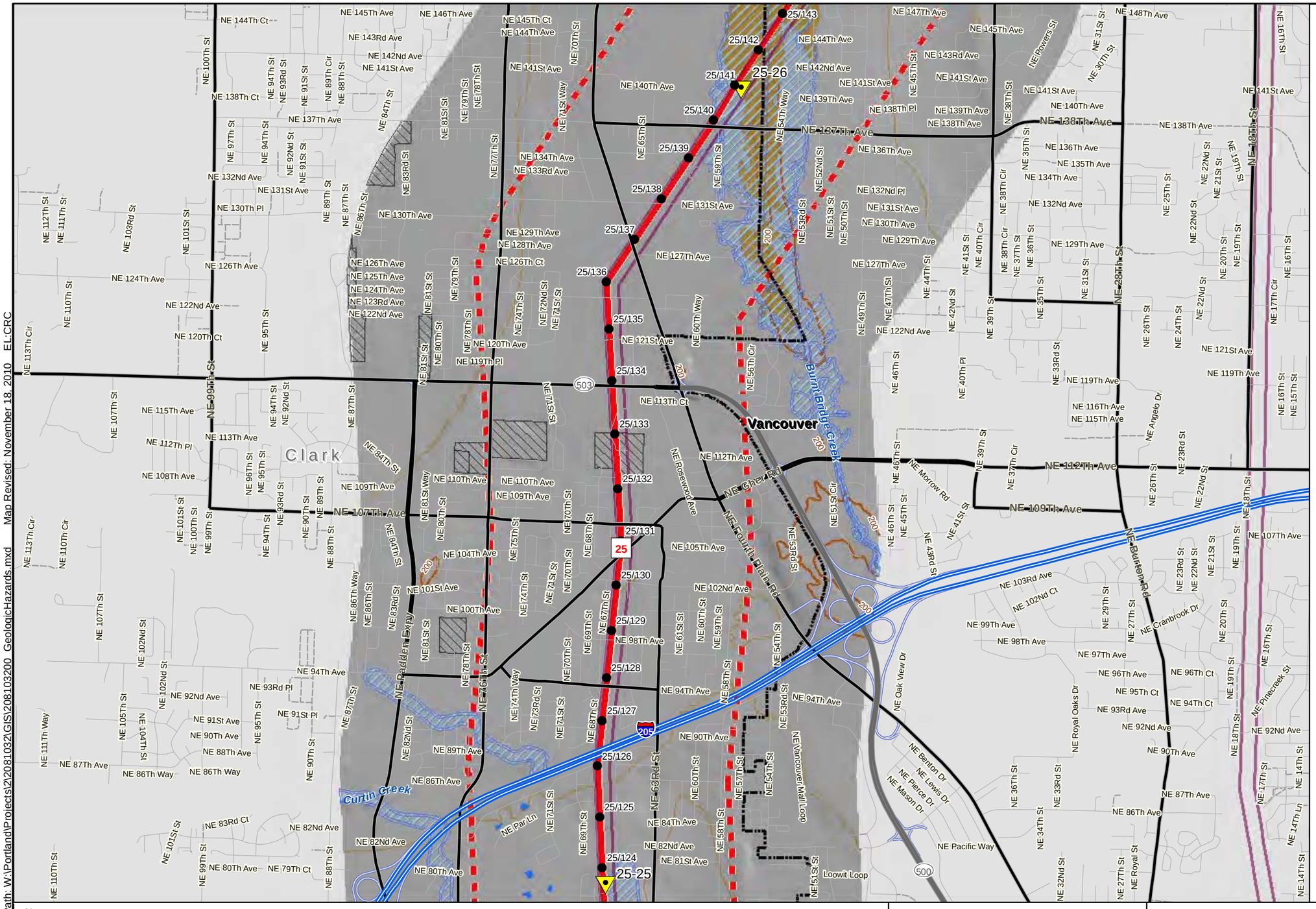
Geologic Hazard features identified by GeoEngineers.

GEOENGINEERS

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page
I1



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

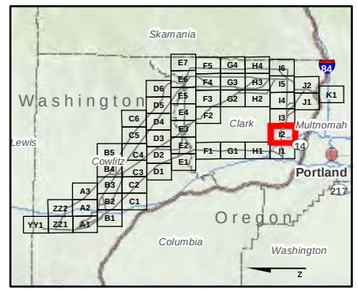
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I2

Sheet 149 of 156

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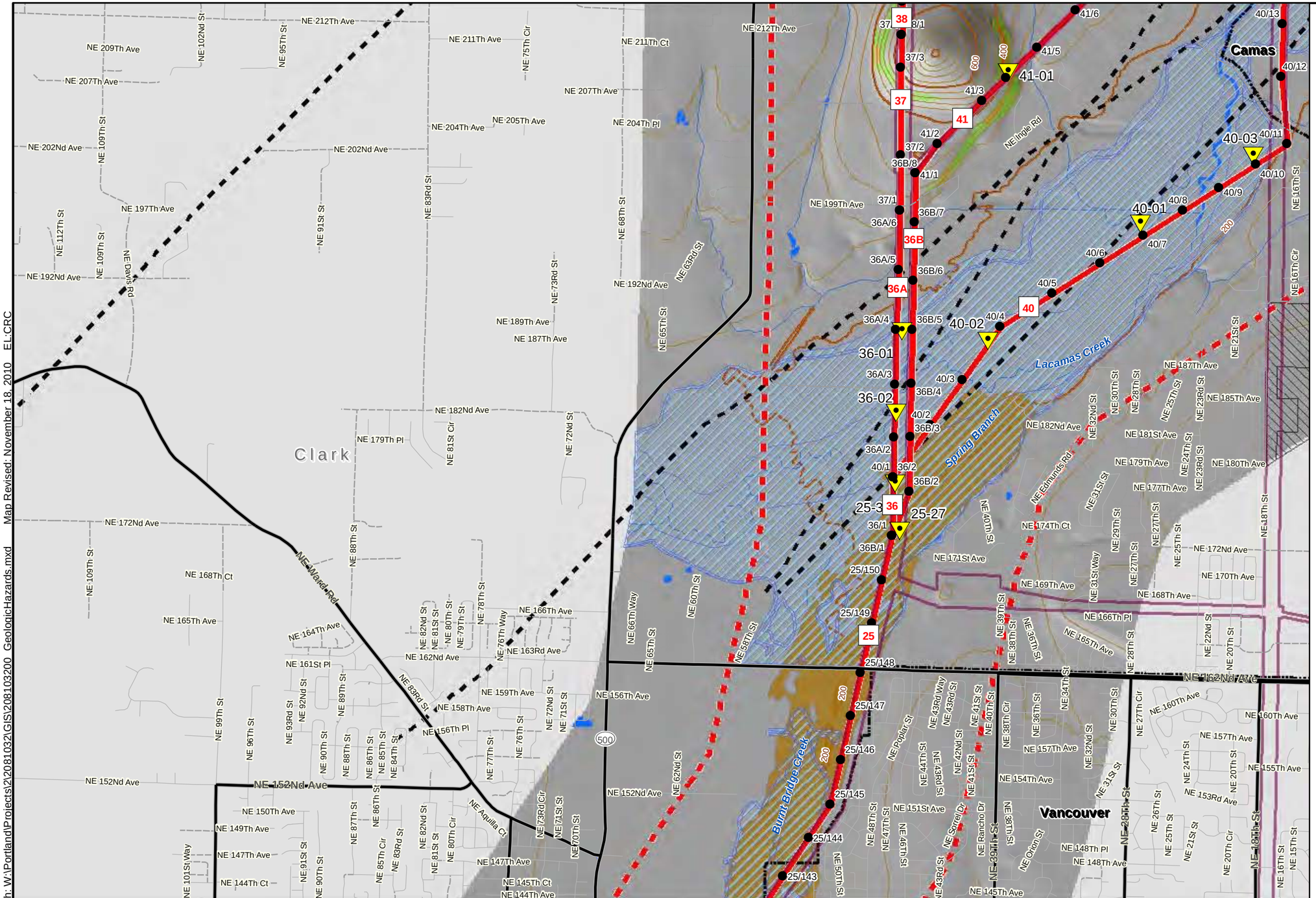

Explanation

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- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet

Map Revised: November 18, 2010 EL:CRC
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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I3

Sheet 150 of 156

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

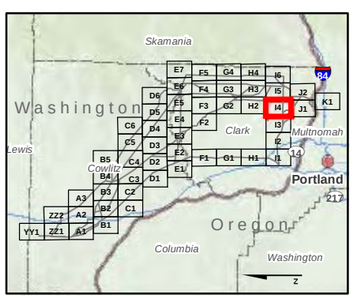
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I4

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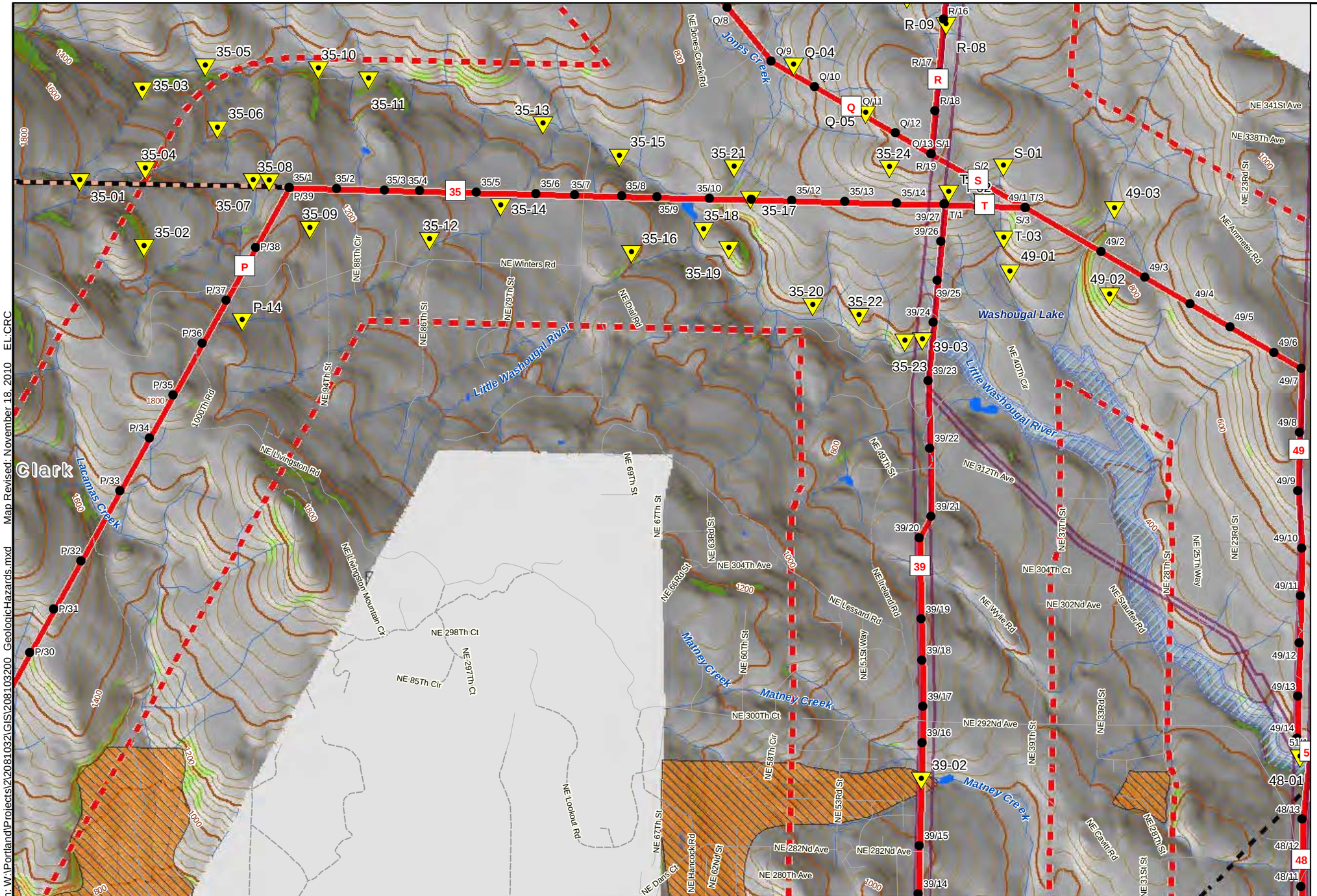
Office: PORT Path: W:\Portland\Projects\2\2081032\GIS\2081032200_GeologicHazards.mxd Map Revised: November 18, 2010 EL:CRC



Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet

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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I5

Sheet 152 of 156

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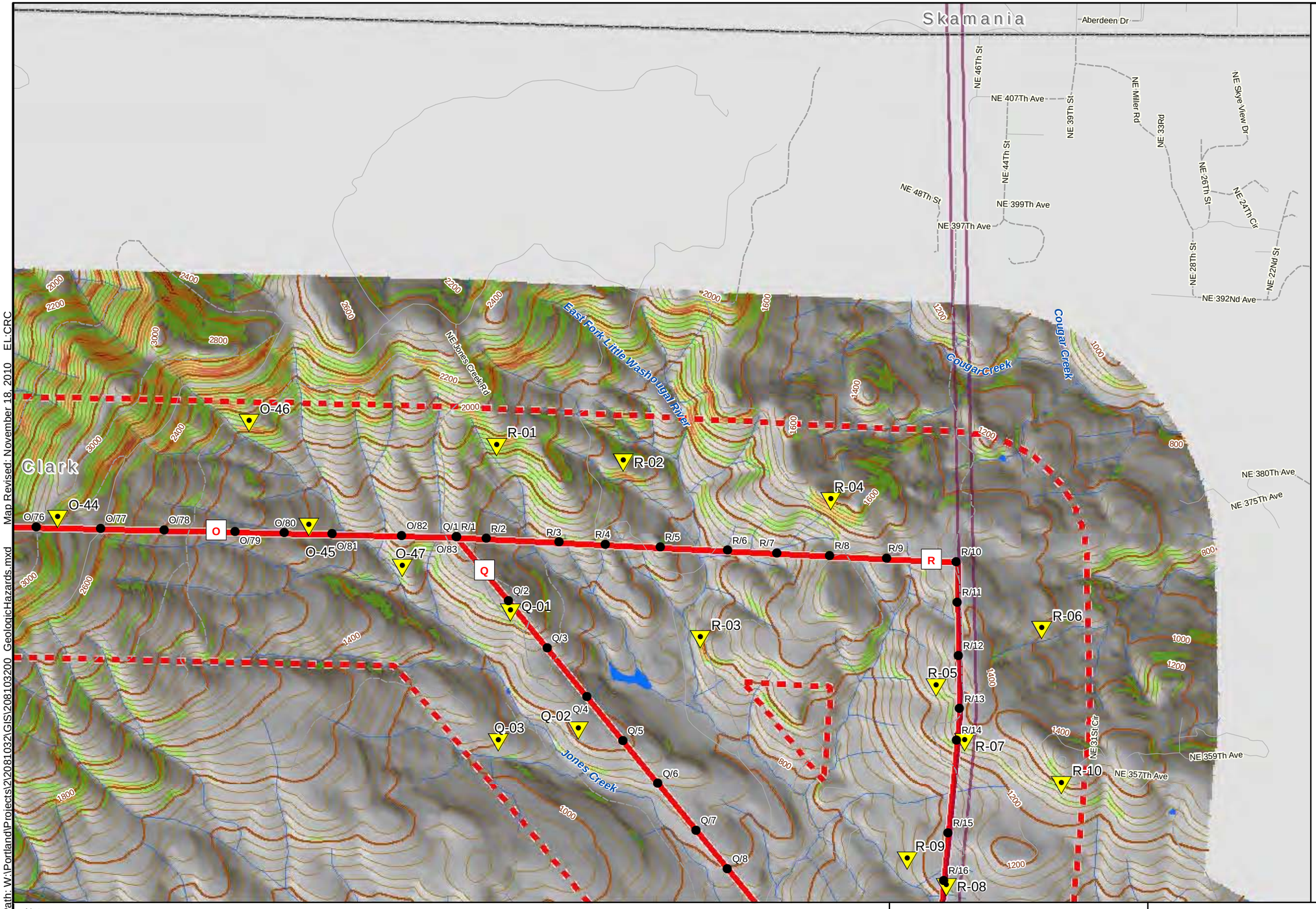


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

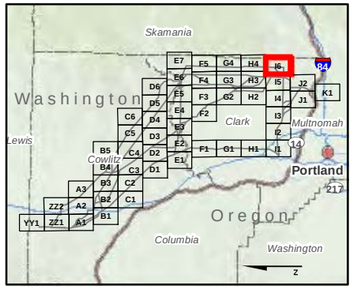
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page I6

Sheet 153 of 156

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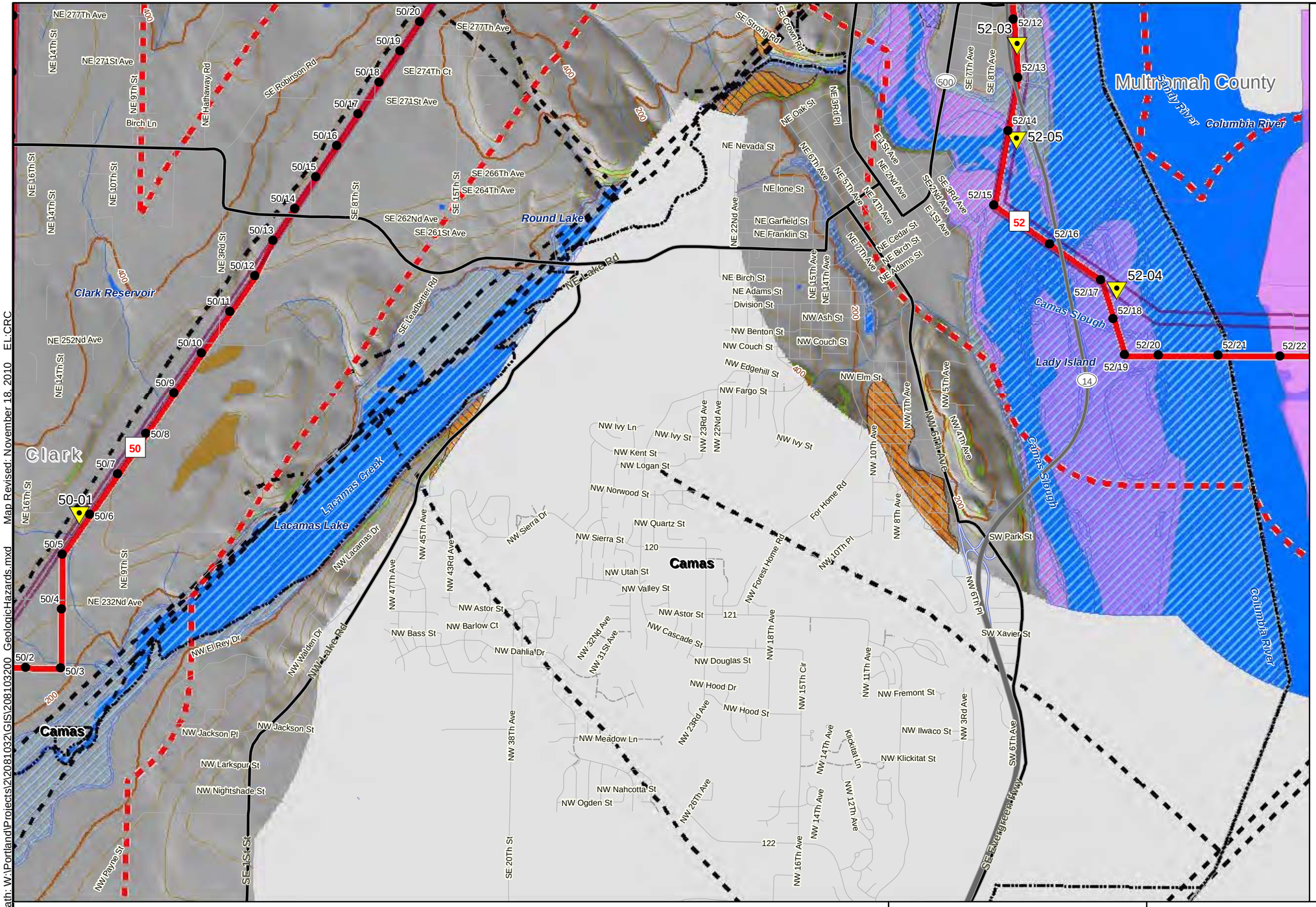


Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

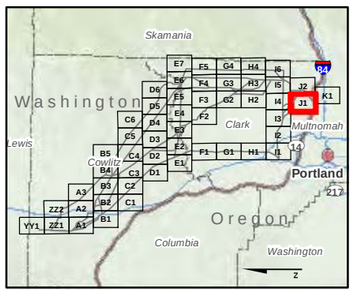
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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GeoEngineers

Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page J1

Sheet 154 of 156

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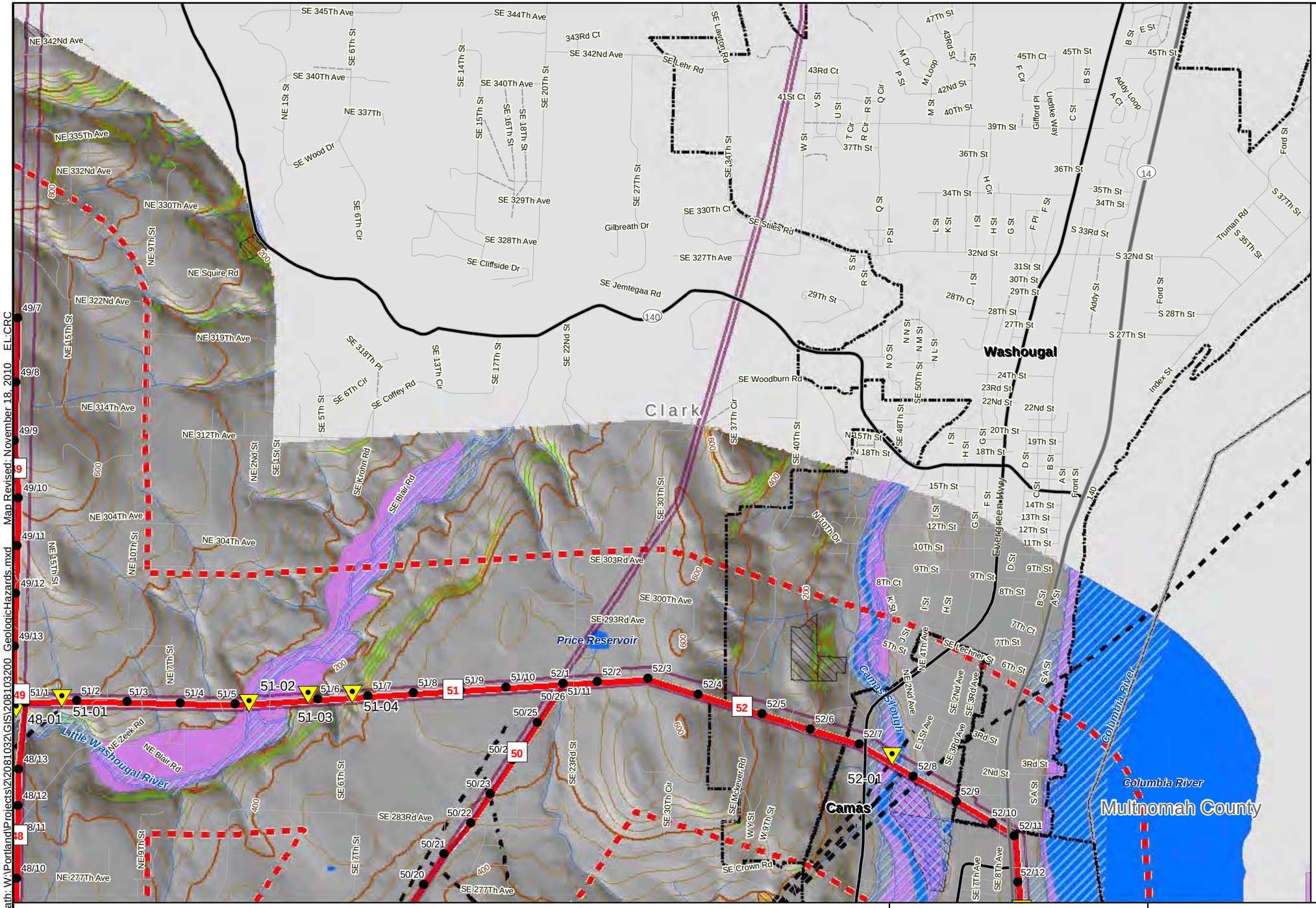

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet

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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page J2

Sheet 155 of 156

Multnomah County

Sandy River

Columbia River

Company Lake

Salmon Creek

Arata Creek

52-06

TROU-SNDL-1

TROU-SNDL-2

Explanation

- Proposed Route Segment
- Segments No Longer Being Considered
- Planned Structure
- GeoEngineers Identified Geologic Hazard
- Existing Right-of-Way
- City Boundary
- County Boundary
- Half Mile Buffer of Segments
- Stream
- Waterbody
- 40 Foot Contours
- 200 Foot Contours
- Faults
- Clark Co Flooding
- Surface Mining Activity
- Landslides
- Potential Unstable Slopes

Liquefaction Hazard

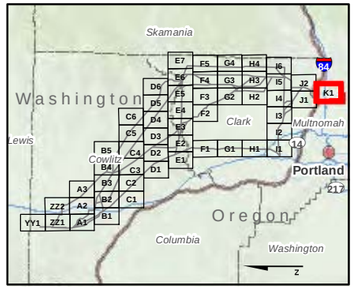
- Moderate to High
- Peat

Percent Slope

- 0 - 40%
- 40 - 55%
- 55 - 70%
- >70%

N

0 1,000 2,000 Feet



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Geologic Hazards

BPA I5 Transmission Corridor Project
Clark, Cowlitz and Multnomah Counties

Map Page K1

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APPENDICES

GeoEngineers

APPENDIX A
Geologic Hazard Table

Table A-1 - Geologic Hazard Table

Bonneville Power Administration I-5 Corridor 500 kV Transmission Line

Washington and Oregon

Segment-Hazard Number	Description
Segment 01	
01-01	Segment crossing of a DNR mapped landslide headscarp. Air photos indicate no recent harvest of landslide features forested slopes. 10-m DEM indicates slopes are inclined at gradients less than 40 percent.
01-02	Segment crossing of ravine slopes that range from 40 to 55 percent based on 10-m DEM. Air photos indicate no recent harvest of ravine slopes.
01-03	Segment crossing of localized ridge adjacent slopes ranging from 40-70 percent. Air photos indicate no recent harvest of steep forested slopes area.
01-04	Localized steep ravine slopes ranging from 40 to 70 percent. Air photos indicate no recent harvest of steep forested slopes.
01-05	Localized ridge adjacent slope ranging from 40 to 55 percent. Air photos indicate no recent harvest of steep forested slopes.
01-06	DNR-mapped fault crossing, unknown offset.
01-07	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area. Segment crosses within 200 feet upslope of DNR mapped landslide.
01-08	DNR-mapped deep-seated landslide feature.
01-09	DNR-mapped shallow landslide feature.
01-10	Localized side-hill slopes ranging from 40 to 55 percent. Air photos indicate no recent harvest of forested slopes.
01-11	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area. Adjacent to segment.
01-12	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area. Segment crosses within 200 feet upslope of DNR mapped landslide.
01-13	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area. Segment crosses within 200 feet upslope of DNR mapped landslide.
01-14	Segment crosses the head of DNR-mapped deep seated landslide. Landslide head includes slopes typically inclined from 0 to 40 percent.
01-15	Localized ridge adjacent slope ranging from 40 to 55 percent.
01-16	Localized ravine slopes ranging from 40 to 70 percent.
01-17	DNR mapped potentially unstable slope includes slopes 0 to 40 percent.
01-18	DNR mapped deep seated landslide located west and across a stream drainage from segment. Landslide area includes forested slopes inclined at gradients less than 40 percent.
01-19	DNR mapped deep seated landslide located west and across a stream drainage from segment. Landslide area includes forested slopes inclined at gradients that range from less than 40 percent to greater than 70 percent.
Segment 02	
02-01	DNR-mapped shallow landslide feature. Feature is located on cleared ROW slopes inclined from 55 to 70 percent.
02-02	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
02-03	Localized ROW slope ranging from 40 to 55 percent.
02-04	Localized ROW slope ranging from 40 to 55 percent.
02-05	Localized ROW slope ranging from 40 to 55 percent.
02-06	Localized ROW ravine slope ranging from 40 to greater than 70 percent. May include areas defined as DNR potentially unstable inner gorge slopes.
02-07	DNR-mapped deep-seated landslide feature. Landslide includes slopes that range from less than 40 percent to greater than 70 percent at the headscarp.
02-08	Localized ROW slope ranging from 40 to 55 percent.
02-09	Localized ROW slope ranging from 40 to 55 percent.
02-10	Localized ROW slope ranging from 40 to 55 percent.
02-11	Localized ROW slope ranging from 40 to 55 percent.
02-12	DNR mapped deep seated landslide located within existing ROW. Landslide area includes forested slopes inclined at gradients that range from less than 40 percent to 55 percent.
02-13	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
02-14	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
02-15	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
02-16	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
02-17	DNR-mapped deep-seated landslide feature. Landslide includes slopes that range from less than 40 percent to greater than 70 percent at the headscarp.
02-18	DNR-mapped potentially unstable slope. Area includes slopes that are typically inclined at gradients less than 40 percent.
02-19	DNR-mapped potentially unstable slope. Area includes slopes that are typically inclined at gradients less than 40 percent.

Segment-Hazard Number	Description
Segment 03	
03-01	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent
03-02	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
03-03	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
03-04	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 55 percent locally.
03-05	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
03-06	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
03-07	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
03-08	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 70 percent.
03-09	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
03-10	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
03-11	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
03-12	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
03-13	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
03-14	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
03-15	Localized steep ravine slopes ranging from 40 to greater than 70 percent locally. May include DNR unstable inner gorge area.
03-16	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
03-17	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 55 percent.
03-18	Localized steep slopes ranging from 40 to 70 percent.
03-19	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
03-20	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent adjacent to Cowlitz River.
03-21	Potential CMZ, scour hazard along the Cowlitz River. Cowlitz County moderate to high liquefaction hazard. Potential CMZ, scour hazard along the Cowlitz River.
03-22	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
03-23	Potential CMZ, scour hazard along the Cowlitz River. Cowlitz County moderate to high liquefaction hazard.
03-24	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
03-25	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
03-26	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
03-27	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
03-28	Localized steep slopes ranging from 40 to greater than 70 percent adjacent to Ostrander Creek. May include DNR inner gorge area.
03-29	Localized steep slopes ranging from 40 to 70 percent.
Segment 04	
04-01	DNR-mapped potentially unstable slope. Area includes slopes that range from gradients less than 40 percent to 55 percent.
04-02	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
Segment 05	
05-01	DNR-mapped deep-seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
05-02	Localized slope that ranges from 40 to 70 percent.
05-03	DNR-mapped deep-seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
05-04	DNR-mapped deep-seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
05-05	DNR-mapped deep-seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
05-06	DNR-mapped deep-seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
05-07	Localized slope that ranges from 40 to greater than 70 percent.
05-08	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area. Adjacent to segment.
05-09	DNR-mapped deep-seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
05-10	DNR-mapped deep seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
05-11	DNR-mapped deep-seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
05-12	DNR-mapped deep-seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.

Segment-Hazard Number	Description
Segment 06	
06-01	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
Segment 07	
07-01	Localized steep slopes ranging from 40 to greater than 70 percent.
07-02	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 70 percent.
07-03	DNR-mapped deep-seated landslide feature crossing segment. Feature is located on slopes that range from zero to 40 percent.
07-04	Localized steep slopes ranging from 40 to 70 percent. Includes areas of localized small shallow landslides.
07-05	Localized steep slopes ranging from 40 to greater than 70 percent. Includes areas of apparent localized small shallow landslides.
07-06	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 70 percent.
07-07	DNR-mapped shallow landslide feature and steep slope area that ranges from 40 to greater than 70 percent.
07-08	Localized steep slopes ranging from 40 to 70 percent. No landslides observed in air photo.
07-09	Extensive slopes ranging from 40 to greater than 70 percent. Slope was recently cleared and shows no indication of landsliding.
07-10	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
Segment 08	
08-01	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from 40 to 70 percent.
08-02	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
08-03	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
08-04	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
08-05	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
Segment 09	
09-01	DNR-mapped potentially unstable area and deep seated landslide (0.05 mile long) with slopes that locally range from 40 to 55 percent.
09-02	DNR-mapped deep-seated landslide feature (0.1 miles long). ROW crosses the right flank of the 0.1 mile long landslide area. Slopes range from 40 to 70 percent locally.
09-03	DNR-mapped deep-seated landslide feature (0.4 miles long). ROW crosses the axis of the 0.4 mile long landslide area. Slopes range from 40 to 70 percent locally.
09-04	DNR-mapped potentially unstable area with slopes that locally range from 40 to 55 percent.
09-05	Potential CMZ adjacent to the Coweeman River. Cowlitz County moderate to high liquefaction hazard.
09-06	DNR-mapped deep-seated landslide. ROW crosses the left flanks of the 0.7 mile wide landslide area. ROW is located on toe/right flank of the landslide on slopes that range from 40 to greater than 70 percent. Moderate to high liquefaction hazard.
09-07	DNR-mapped deep-seated landslide feature. ROW crosses the toe of the 0.7 mile wide landslide area. Landslide is located on slopes that range from 40 to greater than 70 percent.
09-08	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
09-09	Localized steep slopes ranging from 40 to 70 percent. No landslides observed in air photo.
09-10	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from 40 to 70 percent.
09-11	Localized steep ravine slopes ranging from 40 to 70 percent. Potential DNR unstable inner gorge.
09-12	DNR-mapped deep-seated landslide feature adjacent to Hatchery Creek. Feature is located on slopes that range from 40 to 55 percent.
09-13	Localized steep slopes ranging from 40 to 70 percent.
09-14	Localized steep ravine slopes ranging from 40 to 70 percent. Potential DNR unstable inner gorge.
09-15	Extensive steep ravine slopes ranging from 40 to 70 percent adjacent to Kalama River. May include DNR unstable inner gorge area.
09-16	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
09-17	Localized steep slopes ranging from 40 to 70 percent.
09-18	USGS-mapped fault trending NE-SW.

Segment-Hazard Number	Description
Segment 10	
10-01	Localized ravine slopes ranging from 40 to 55 percent.
10-02	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
10-03	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
10-04	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
10-05	Steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
10-06	DNR-mapped deep seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
10-06	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
10-07	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
10-08	DNR-mapped deep seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
10-09	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
10-10	DNR-mapped deep seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
10-11	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
10-12	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
10-13	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
10-14	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
10-15	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
10-16	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
10-17	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
10-18	DNR-mapped deep-seated landslide. Corridor is within mapped headscarp of landslide. Feature is located on slopes that are up to 40 percent. Cowlitz County low to moderate liquefaction hazard.
10-19	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
10-20	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
10-21	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
10-22	Localized steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Kalama River. May include DNR unstable inner gorge area.
10-23	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
10-24	DNR-mapped deep seated landslide feature. Landslide includes slopes that range from less than 40 percent to 55 percent.
Segment 11	
11-01	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-02	Localized steep ravine slopes ranging from 40 to 70 percent.
11-03	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-04	Localized steep slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area. DNR unstable inner gorge area.
11-05	DNR-mapped shallow landslide feature. Landslide includes slopes that range from less than 40 percent to 70 percent.
11-06	Localized steep slopes ranging from 40 to 70 percent.
11-07	Extensive steep slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-08	Extensive steep slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-09	Localized steep slopes ranging from 40 to greater than 70 percent. Slope apparently related to cut slope for access road.
11-10	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
11-11	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
11-12	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
11-13	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
11-14	Extensive steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-15	Localized ravine slopes ranging from 40 to 55 percent.
11-16	Ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-17	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-18	Steep ravine slopes ranging from 40 to greater than 70 percent adjacent to North Fork Goble Creek. May include DNR unstable inner gorge area.
11-19	Steep ravine slopes ranging from 40 to greater than 70 percent adjacent to North Fork Goble Creek. May include DNR unstable inner gorge area.
11-20	Steep ravine slopes ranging from 40 to greater than 70 percent adjacent to North Fork Goble Creek. May include DNR unstable inner gorge area.
11-21	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. Likely includes DNR unstable inner gorge area.

Segment-Hazard Number	Description
11-22	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-23	Extensive steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-24	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-25	Extensive steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-26	Localized steep ravine slopes ranging from 40 to 70 percent adjacent to Goble Creek. May include DNR unstable inner gorge area.
11-27	Extensive steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-28	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
11-29	Not used.
11-30	Localized steep ravine slopes ranging from 40 to greater than 70 percent adjacent to Goble Creek. Likely includes DNR unstable inner gorge area.
11-31	Extensive steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-32	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
11-33	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-34	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-35	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-36	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-37	Localized steep ravine slopes ranging from 40 to greater than 70 percent adjacent to Goble Creek. May include DNR unstable inner gorge area.
11-38	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-39	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
11-40	Extensive steep ravine slopes ranging from 40 to greater than 70 percent adjacent to Bear Creek. Likely includes DNR unstable inner gorge area.
11-41	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-42	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
11-43	Localized steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Kalama River. May include DNR unstable inner gorge area. Cowlitz County low to moderate liquefaction hazard.
11-44	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
11-45	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-46	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-47	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-48	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-49	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-50	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-51	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
11-52	Localized steep ravine slopes ranging from 40 to 70 percent. Mapped USGS fault. May include DNR unstable inner gorge area.
11-53	Localized steep ravine slopes ranging from 55 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-54	Mapped USGS approximately located normal fault.
11-55	Mapped USGS approximately located normal fault.
11-56	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-57	Mapped USGS landslide located on slope ranging from less than 40 percent to 70 percent.
11-58	Mapped USGS landslide located on slope ranging from less than 40 percent to 55 percent.
11-59	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-60	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
11-61	Extensive steep ravine slopes ranging from 40 to greater than 70 percent adjacent to Coweeman River. May include DNR unstable inner gorge area.
Segment 12	
12-01	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
12-02	Extensive steep slopes ranging from 40 to greater than 70 percent.
12-03	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. Likely includes DNR unstable inner gorge area locally.
12-04	Extensive steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
12-05	Localized steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Kalama River. Likely includes DNR unstable inner gorge area.
12-06	USGS mapped fault, approximately located, trending NE-SW and localized steep ravine slopes ranging from 55 to greater than 70 percent.
12-07	USGS mapped fault, approximately located, trending NE-SW.

Segment-Hazard Number	Description
12-08	USGS mapped fault, approximately located, trending NE-SW.
12-09	USGS mapped fault located on slopes inclined from 40 to 70 percent.
12-10	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
12-11	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
12-12	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Johnson Creek. Likely includes DNR unstable inner gorge area.
12-13	Localized steep ravine slopes ranging from 45 to greater than 70 percent adjacent to Johnson Creek. Likely includes DNR unstable inner gorge area.
12-14	USGS mapped fault, approximately located, trending NE-SW and landslide feature located on slopes typically inclined at less than 40 percent.
Segment 13	
13-01	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
13-02	Localized steep slopes ranging from 40 to greater than 70 percent.
13-03	Localized steep slopes ranging from 40 to greater than 70 percent.
13-04	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
13-05	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Cape Horn Creek. Likely includes DNR unstable inner gorge area.
13-06	USGS mapped approximately located fault trending east-west.
13-07	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
13-08	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
13-09	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
13-10	USGS mapped fault, approximately located, trending east-west.
13-11	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Colvin Creek. Likely includes DNR unstable inner gorge area.
13-12	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Marble Creek. Likely includes DNR unstable inner gorge area.
13-13	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Husky Creek. Likely includes DNR unstable inner gorge area.
13-14	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Marble Creek. Likely includes DNR unstable inner gorge area.
13-15	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Husky Creek. Likely includes DNR unstable inner gorge area.
13-16	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Marble Creek. Likely includes DNR unstable inner gorge area.
13-17	USGS mapped fault trending east-west.
13-18	USGS mapped fault trending NE-SW.
Segment 14	
14-01	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from 40 to 70 percent locally.
14-02	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 70 percent.
14-03	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent. Also within a mapped USGS fault.
14-04	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Johnson Creek. Likely includes DNR unstable inner gorge area.
14-05	USGS mapped fault trending NE-SW.
14-06	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 40 percent.
14-07	USGS mapped fault trending NW-SE.
Segment 15	
15-01	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
15-02	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Colvin Creek. Likely includes DNR unstable inner gorge area.
15-03	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent. Likely includes DNR unstable inner gorge area.
15-04	USGS mapped landslide. Feature is located on slopes up to 40 percent.
15-05	USGS mapped landslide. Feature is located on slopes that range from 40 to greater than 70 percent.
15-06	USGS mapped landslide. Feature is located on slopes up to 40 percent.
Segment 16	
16-01	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Husky Creek. Likely includes DNR unstable inner gorge area.
16-02	USGS mapped landslide located on slopes ranging from 40 to greater than 70 percent.
16-03	USGS mapped landslide located on slopes ranging from 40 to greater than 70 percent.

Segment-Hazard Number	Description
Segment 17	
17-01	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to the reservoir that includes Lewis Creek. Likely includes DNR unstable inner gorge area.
17-02	USGS mapped, approximately located reverse fault trending northeast-southwest.
17-03	USGS mapped landslide located on slopes up to 40 percent.
Segment 18	
18-01	Localized ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
18-02	Localized slopes ranging from 40 to 70 percent.
18-03	USGS mapped concealed fault, trending NE-SW.
18-04	USGS mapped concealed fault, trending NE-SW.
18-05	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
18-06	USGS mapped fault.
18-07	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
18-08	Localized steep slopes ranging from 40 to greater than 70 percent.
18-09	Mapped USGS landslide located on slope ranging from 40 percent to greater than 70 percent.
18-10	Mapped USGS landslide located on slope ranging from less than 40 percent to 55 percent.
18-11	Mapped USGS landslide located on slope ranging from 40 to greater than 70 percent. Area of recent clearcut timber harvest.
18-12	Mapped USGS landslide located on slope ranging from up to 40 percent.
Segment 19	
19-01	USGS mapped concealed fault trending NE-SW.
Segment 20	
20-01	Localized steep ravine slopes ranging from 40 to greater than 70 percent adjacent to the Lewis River. May include DNR unstable inner gorge area.
20-02	USGS mapped concealed fault trending NE-SW.
Segment 21	
21-01	Extensive steep ravine slopes ranging from 40 to greater than 70 percent adjacent to Lewis River Reservoir. Likely includes DNR unstable inner gorge area.
21-02	Extensive steep ravine slopes ranging from 40 to greater than 70 percent adjacent to Lewis River Reservoir. Likely includes DNR unstable inner gorge area.
Segment 22	
22-01	Localized steep ravine slopes ranging from 40 to 70 percent.
Segment 23	
23-01	Localized steep cut and fill slopes ranging from 55 to greater than 70 percent adjacent to the Lewis River.
23-02	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Johnson Creek. Likely includes DNR unstable inner gorge area.
23-03	Localized steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Johnson Creek. Likely includes DNR unstable inner gorge area.
23-04	USGS mapped fault trending east-west.
23-05	USGS mapped landslide feature. Landslide is located on steep slopes that range from 40 to greater than 70 percent.
23-06	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Pup Creek. Likely includes DNR unstable inner gorge area.
Segment 24	
24-01	Localized slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
24-02	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Pup Creek. Likely includes DNR unstable inner gorge area.
24-03	Clark County Flood hazard area and potential CMZ within Cedar Creek.
24-04	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Cedar Creek. Likely includes DNR unstable inner gorge area.
24-05	USGS mapped landslide feature. Landslide is located on steep slopes that range from 40 to greater than 70 percent.
24-06	Localized slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
Segment 25	
25-01	Localized steep slopes ranging from 40 to greater than 70 percent. Also includes USGS mapped strike slip fault approximately located, trending NW-SE.
25-02	Localized steep slopes ranging from 40 to 70 percent. Also includes USGS mapped strike slip fault approximately located, trending NW-SE.
25-03	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Lewis River. Cowlitz County moderate to high liquefaction hazard.
25-04	Clark County Flood hazard area and potential CMZ within Lewis River floodplain.
25-05	USGS mapped concealed fault trending NE-SW.
25-06	Extensive steep ravine slopes ranging from 55 to greater than 70 percent.

Segment-Hazard Number	Description
25-07	Localized slopes ranging from 40 to 55 percent.
25-08	Localized steep ravine slopes ranging from 40 to greater 70 percent. May include DNR unstable inner gorge slopes.
25-09	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge slopes.
25-10	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Rilay Creek. May include DNR unstable inner gorge slopes.
25-11	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Rilay Creek. May include DNR unstable inner gorge slopes.
25-12	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Rilay Creek. May include DNR unstable inner gorge slopes.
25-13	Clark County mapped area of potential instability. Includes slopes that range from 40 to greater than 70 percent.
25-14	Clark County mapped area of potential instability. Includes slopes that range from 40 to greater than 70 percent.
25-15	Localized steep slopes ranging from 40 to 70 percent. No landslides observed in air photo.
25-16	Clark County Flood and Liquefaction hazard area. Potential CMZ area.
25-17	Clark County mapped area of potential instability. Includes slopes that range from 40 to greater than 70 percent.
25-18	Clark County mapped area of potential instability. Includes localized slopes that range from 40 to greater than 70 percent.
25-19	Clark County Flood and Liquefaction hazard area.
25-20	Clark County mapped area of potential instability. Includes localized slopes that range from 40 to greater than 70 percent.
25-21	Clark County mapped area of potential instability. Includes localized slopes that range from 40 to greater than 70 percent.
25-22	Clark County Flood hazard area.
25-23	Clark County Liquefaction hazard area. Includes localized slope that range from 40 to 70 percent.
25-24	Clark County Flood hazard area.
25-25	Clark County Flood hazard area.
25-26	Clark County Flood hazard area.
25-27	Clark County Flood hazard area, and liquefaction hazard (Peat).
25-28	USGS mapped concealed fault trending NW-SE.
25-29	USGS mapped concealed fault trending NW-SE.
25-30	USGS mapped concealed fault trending NW-SE.
Segment 26	
26-01	Extensive steep slopes that include ravines. Slope gradients range from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
26-02	Localized steep slopes ranging from 40 to 70 percent.
26-03	Localized steep slopes ranging from 40 to 70 percent.
26-04	Extensive steep slopes that include ravines. Slope gradients range from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
26-05	Localized steep slopes ranging from 40 to 70 percent.
26-06	DNR mapped normal fault trending NE-SW.
26-07	Localized steep slopes that include ravines. Slope gradients range from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
26-08	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
26-09	Localized steep slopes that include ravines. Slope gradients range from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
26-10	Localized steep slopes with slope gradients that range from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
26-11	USGS mapped landslide with slopes that range from 40 up to 70 percent locally.
26-12	Localized steep slopes with slope gradients that range from 55 to greater than 70 percent.
26-13	Localized steep slopes with slope gradients that range from 55 to greater than 70 percent.
26-14	USGS mapped landslide with slopes that range up to 40 percent locally.
26-15	Localized steep slopes with slope gradients that range from 55 to greater than 70 percent.
26-16	Localized steep slopes that include ravines. Slope gradients range from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
26-17	USGS mapped landslide with slopes that range from 40 to greater than 70 percent locally.
26-18	USGS mapped landslide with slopes that range up to 40 percent locally adjacent to watercourse.
26-19	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from zero to 70 percent.
26-20	USGS mapped landslide with slopes that range up to 55 percent locally.
26-21	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
26-22	Clark County Flood hazard area. Potential CMZ in East Fork Lewis River corridor.
26-23	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.

Segment-Hazard Number	Description
26-24	USGS mapped landslide with slopes that range from 40 to greater than 70 percent locally.
26-25	USGS mapped landslide with slopes that range up to 40 percent locally adjacent to watercourse.
26-26	USGS mapped landslide with slopes that range from 40 to 70 percent locally.
Segment 28	
28-01	DNR mapped fault trending NE-SW.
28-02	USGS mapped landslide with slopes that range from 40 to 70 percent locally.
28-03	USGS mapped concealed fault trending NE-SW.
28-04	DNR mapped fault trending NE-SW.
28-05	USGS mapped concealed fault trending NE-SW.
28-06	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent.
28-07	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent.
28-08	Clark County flood hazard area.
28-09	USGS mapped fault approximately located trending east-west.
28-10	USGS mapped fault approximately located trending east-west.
28-11	USGS mapped fault approximately located trending NE-SW.
28-12	DNR mapped normal fault.
28-13	Localized steep slopes ranging from 40 to greater than 70 percent.
28-14	USGS mapped landslide (0.1 miles long) with slopes that range from up to 40 percent locally.
28-15	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Cedar Creek. May include DNR unstable inner gorge area.
28-16	Localized steep slopes that include ravines. Slopes gradients range from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
28-17	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
28-18	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
28-19	Not used.
28-20	Localized steep slopes that include gradients ranging from 55 to greater than 70 percent.
28-21	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
28-22	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
28-23	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Big Tree Creek. May include DNR unstable inner gorge area.
28-24	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Big Tree Creek. May include DNR unstable inner gorge area.
28-25	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Big Tree Creek. May include DNR unstable inner gorge area.
28-26	DNR mapped normal fault trending NW-SE.
28-27	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to East Fork Lewis River. May include DNR unstable inner gorge area. Clark Co. flood hazard.
28-28	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to East Fork Lewis River. May include DNR unstable inner gorge area. Clark Co. flood hazard.
28-29	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Rock Creek. May include DNR unstable inner gorge area. Clark Co. flood hazard.
28-30	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Rock Creek. May include DNR unstable inner gorge area. Clark Co. flood hazard.
28-31	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Rock Creek. May include DNR unstable inner gorge area. Clark Co. flood hazard.
28-32	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
28-33	Localized steep slopes that include gradients ranging from 55 to greater than 70 percent.
Segment 29	
29-01	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Canyon Creek. May include DNR unstable inner gorge area.
29-02	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Canyon Creek. May include DNR unstable inner gorge area.
29-03	DNR mapped normal fault trending NE-SW.
29-04	DNR-mapped deep-seated landslide feature adjacent to Canyon Creek. Feature is located on slopes that range from 40 to greater than 70 percent.
29-05	DNR-mapped deep-seated landslide feature adjacent to Canyon Creek. Feature is located on slopes that range from 40 to greater than 70 percent.
29-06	DNR-mapped deep-seated landslide feature. Feature is located on slopes that range from 40 to greater than 70 percent.
29-07	DNR mapped normal fault trending NE-SW.
29-08	DNR mapped normal fault trending NE-SW.
29-09	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent.
29-10	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to unnamed watercourse. May include DNR unstable inner gorge area.

Segment-Hazard Number	Description
29-11	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to unnamed watercourse. Area of recent land sliding observed (~280' wide x 300' long). Likely includes DNR unstable inner gorge area.
29-12	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent locally adjacent to Cedar Creek. Likely includes DNR unstable inner gorge area.
29-13	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to unnamed watercourse. Likely includes DNR unstable inner gorge area.
29-14	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to unnamed watercourse. Recent clearcut harvest in vicinity. Likely includes DNR unstable inner gorge area.
29-15	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Big Creek. Likely includes DNR unstable inner gorge area.
29-16	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Big Creek. Likely includes DNR unstable inner gorge area.
29-17	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to unnamed watercourses. Likely includes DNR unstable inner gorge area.
29-18	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to unnamed watercourses. Likely includes DNR unstable inner gorge area.
29-19	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to unnamed watercourses. Likely includes DNR unstable inner gorge area.
29-20	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to unnamed watercourses. Likely includes DNR unstable inner gorge area.
29-21	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to E. Fork Lewis River. Likely includes DNR unstable inner gorge area.
29-22	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
29-23	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
29-24	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
29-25	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Rock Creek. Appears to be road fill slope.
29-26	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
29-27	DNR-mapped deep-seated landslide feature (~0.5 mile long). Feature is located on slopes that range from 40 to greater than 70 percent locally.
29-28	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to E. Fork Lewis River. Likely includes DNR unstable inner gorge area.
29-29	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
Segment 32	
32-01	Localized steep slopes with gradients ranging from 55 to greater than 70 percent. Area of recent clearcut.
32-02	Localized steep slopes with gradients ranging from 55 to 70 percent adjacent to unnamed watercourse. Apparent slide scarp.
32-03	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
32-04	Localized steep slopes with gradients ranging from 55 to greater than 70 percent. Adjacent to active surface mine.
32-05	USGS mapped landslide (2 miles long) located on slopes ranging from 40 to greater than 70 percent.
32-06	DNR mapped landslide (2 miles long) located on slopes ranging from 40 to greater than 70 percent.
32-07	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
32-08	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
32-09	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
32-10	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
32-11	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
32-12	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
Segment 33	
33-01	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
33-02	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to an unnamed watercourse.
33-03	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent.
33-04	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to an unnamed watercourse.
33-05	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
33-06	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to an unnamed watercourse.
33-07	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Cedar Creek. Likely includes DNR unstable inner gorge area.
33-08	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to an unnamed watercourse.
33-09	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Cedar Creek. Likely includes DNR unstable inner gorge area.
33-10	Localized steep slopes with gradients ranging from 55 to 70 percent.
33-11	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent.
33-12	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to an unnamed watercourse.
33-13	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
33-14	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Cedar Creek. Likely includes DNR unstable inner gorge area.

Segment-Hazard Number	Description
Segment 34	
34-01	Localized steep slopes with gradients ranging from 55 to 70 percent adjacent to unnamed watercourse.
34-02	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
34-03	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
34-04	DNR-mapped deep-seated landslide feature (~0.5 mile long) adjacent to Cold Creek. Feature is located on slopes that range from 40 to greater than 70 percent locally.
34-05	Localized steep slopes with gradients ranging from 55 to 70 percent.
34-06	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to unnamed watercourse.
34-07	Localized steep slopes with gradients ranging from 55 to 70 percent.
34-08	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to unnamed watercourse.
34-09	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Cedar Creek. Apparent recent cut slope failure. Likely includes DNR unstable inner gorge area.
34-10	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to unnamed creek. Likely includes DNR unstable inner gorge area.
34-11	Localized steep slopes with gradients ranging from 55 to 70 percent.
34-12	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
Segment 35	
35-01	Localized steep slopes with gradients ranging from 40 to greater than 70 percent adjacent to unnamed watercourse. Likely includes DNR unstable inner gorge area.
35-02	Localized steep slopes with gradients ranging from 40 to greater than 70 percent adjacent to unnamed watercourse. Likely includes DNR unstable inner gorge area.
35-03	Localized steep slopes with gradients ranging from 40 to greater than 70 percent adjacent to unnamed watercourse. Likely includes DNR unstable inner gorge area.
35-04	Localized steep slopes with gradients ranging from 40 to greater than 70 percent adjacent to unnamed watercourse. Likely includes DNR unstable inner gorge area.
35-05	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
35-06	Localized steep slopes with gradients ranging from 40 to greater than 70 percent adjacent to unnamed watercourse. Likely includes DNR unstable inner gorge area.
35-07	Localized steep slopes with gradients ranging from 40 to greater than 70 percent adjacent to unnamed watercourse. Likely includes DNR unstable inner gorge area.
35-08	Localized steep slopes with gradients ranging from 40 to greater than 70 percent adjacent to unnamed watercourse. Likely includes DNR unstable inner gorge area.
35-09	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
35-10	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
35-11	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
35-12	Localized steep slopes with gradients ranging from 40 to greater than 70 percent adjacent to unnamed watercourse. Residential development locally. Likely includes DNR unstable inner gorge area.
35-13	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
35-14	Localized steep slopes with gradients ranging from 40 to greater than 70 percent adjacent to unnamed watercourse. Residential development locally. Likely includes DNR unstable inner gorge area.
35-15	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
35-16	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
35-17	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
35-18	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
35-19	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
35-20	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
35-21	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
35-22	Localized steep slopes with gradients ranging from 55 to greater than 70 percent.
35-23	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
35-24	Localized steep slopes with gradients ranging from 55 to greater than 70 percent adjacent to Little Washougal River. Likely includes DNR unstable inner gorge area.
Segment 36	
36-01	Clark County Flood hazard area, and liquefaction hazard (Peat).
36-02	USGS mapped concealed fault trending NW-SE.
Segment 39	
39-01	Clark County Flood and Liquefaction hazard area. Also include USGS mapped normal concealed fault trending NW-SE.
39-02	USGS mapped landslide feature. Segment crosses the landslide toe along a slope of up to 40 percent.
39-03	Clark County Flood and Liquefaction hazard area.

Segment-Hazard Number	Description
Segment 40	
40-01	USGS mapped normal concealed fault trending NW-SE.
40-02	Clark County Flood hazard area.
40-03	Clark County Flood hazard area.
40-04	Clark County Flood hazard area. DNR mapped normal fault.
Segment 41	
41-01	Localized steep slope inclined at gradients from 40 to greater than 70 percent.
Segment 48	
48-01	Clark County Flood hazard area. Includes localized slope that ranges from 40 to 70 percent.
Segment 49	
49-01	Localized slope that ranges from 40 to 70 percent.
49-02	Localized slope that ranges from 40 to 70 percent.
49-03	Localized slope that ranges from 40 to 70 percent.
Segment 50	
50-01	USGS mapped normal concealed fault trending NW-SE.
Segment 51	
51-01	DNR mapped normal fault. Localized slope that ranges from 40 to 70 percent.
51-02	Clark County Flood hazard area. Includes localized slope that ranges from 40 to 70 percent.
51-03	Localized slope that ranges from 40 to 70 percent.
51-04	Localized slope that ranges from 40 to 70 percent.
Segment 52	
52-01	Clark County Flood and liquefaction hazard area. Includes localized slope that ranges from 0 to 40 percent.
52-02	Not used.
52-03	Clark County Flood hazard area.
52-04	Clark County Flood hazard area. High liquefaction hazard area.
52-05	Clark County Flood and liquefaction hazard area. Includes localized slope that ranges from 0 to 40 percent.
52-06	DOGAMI mapped high liquefaction hazard area. Includes entire Oregon side of segment 52.
Segment A	
A-01	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
A-02	Localized ridge adjacent slope ranging from 40 to 55 percent.
A-03	Localized steep slopes with gradients ranging from 40 to 70 percent adjacent to Baxter Creek. Likely includes DNR unstable inner gorge area.
A-04	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
A-05	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
A-06	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
A-07	Extensive steep slopes with gradients ranging from 55 to greater than 70 percent. Likely includes DNR unstable inner gorge area.
A-08	Localized steep slopes ranging from 40 to 70 percent in an area of exposed soils observed from aerial photograph.
A-09	Localized steep slopes ranging from 40 to 70 percent. Includes localized exposed soils in access road cutslopes.
Segment B	
B-01	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
Segment C	
C-01	Localized ridge adjacent slope ranging from 40 to 70 percent.
C-02	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
C-03	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
C-04	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area adjacent to Arkansas Creek.
C-05	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area adjacent to Dobson Creek.
C-06	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
C-07	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
C-08	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.

Segment-Hazard Number	Description
C-09	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
C-10	Localized steep concave slopes ranging from 40 to 70 percent.
Segment D	
D-01	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
D-02	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
D-03	Cowlitz County moderate to high liquefaction hazard.
D-04	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
D-05	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
D-06	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
D-07	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
D-08	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
D-09	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
Segment E	
E-01	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Monahan Creek.
E-02	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
E-03	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
E-04	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
E-05	Cowlitz County-mapped deep seated landslide. Toe is located along eastern edge of 1/2-mile buffer
Segment F	
F-01	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-02	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-03	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-04	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-05	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-06	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-07	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-08	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area adjacent to Whittle Creek.
F-09	DNR mapped landslide area on slopes ranging from 0 to 40 percent.
F-10	Cowlitz County mapped deep seated landslide area on slopes ranging from 0 to 40 percent.
F-11	Cowlitz County mapped deep seated landslide area on slopes ranging from 0 to 40 percent.
F-12	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-13	Cowlitz County mapped potential unstable slopes ranging from 0 to 40 percent.
F-14	Potential CMZ, scour hazard along the Cowlitz River. Cowlitz County moderate to high liquefaction hazard. Potential Lahar hazard area.
F-15	DNR mapped landslide area on slopes ranging from 0 to 70 percent.
F-16	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-17	Extensive Cowlitz County mapped potential unstable sloes ranging up to 55 percent locally.
F-18	Cowlitz County mapped deep seated landslide area on slopes ranging from 0 to 40 percent.
F-19	Extensive Cowlitz County mapped potential unstable sloes ranging up to 55 percent locally.
F-20	Cowlitz County mapped deep seated landslide area on slopes ranging from 0 to 40 percent.
F-21	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area and DNR mapped landslides.
F-22	Cowlitz County mapped deep seated landslide area on slopes ranging from 0 to 55 percent.
F-23	Cowlitz County mapped deep seated landslide area on slopes ranging from 0 to 40 percent.
F-24	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
F-25	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
F-26	Extensive DNR-mapped deep-seated landslide feature crossing segment. Feature is located on slopes that range from zero to 70 percent.
F-27	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-28	Extensive steep slopes ranging from 40 to greater than 70 percent upslope of mapped deep seated landslide. Steep areas may be interpreted as headscarps of larger slides.
F-29	Extensive DNR-mapped deep-seated landslide feature crossing segment. Feature is located on slopes that range from zero to 70 percent.
F-30	Localized DNR-mapped deep-seated landslide feature crossing segment. Feature is located on slopes that range from zero to 70 percent.
F-31	Extensive DNR-mapped deep-seated landslide feature crossing segment. Feature is located on slopes that range from zero to greater than 70 percent and includes steep inner gorge slopes adjacent to Coal Mine Creek.

Segment-Hazard Number	Description
F-32	Localized DNR-mapped deep-seated landslide feature crossing segment. Feature is located on slopes that range from zero to 55 percent.
F-33	DNR mapped deep seated landslide area on slopes ranging from 0 to 70 percent.
F-34	Extensive steep ravine amphitheater slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
F-35	Localized steep ravine slopes ranging from 40 to greater 70 percent. May include DNR unstable inner gorge area, but likely includes steep cutslope.
F-36	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area adjacent to Ostrander Creek.
F-37	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-38	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
F-39	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-40	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-41	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-42	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
F-43	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Coweeman R..
F-44	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
F-45	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to the Coweeman R.
F-46	DNR mapped landslide area on slopes ranging from less than 40 to 70 percent.
F-47	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
Segment G	
G-01	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
G-02	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
G-03	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
G-04	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
Segment H	
H-01	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
H-02	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
Segment I	
I-01	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
I-02	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area adjacent to Sam Smith Creek.
I-03	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area adjacent to Sam Smith Creek.
I-04	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
I-05	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
I-06	DNR mapped landslide located within a stream drainage. Landslide area includes forested slopes inclined at gradients that range from less than 40 percent to greater than 70 percent.
I-07	DNR mapped landslide located on forested slopes inclined at gradients that range from 0 to 40 percent.
I-08	Segment crosses localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
I-09	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
Segment J	
J-01	Segment crosses localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
J-02	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
J-03	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
J-04	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
J-05	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
J-06	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area adjacent to North Fork Goble Creek.
Segment K	
K-01	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-02	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-03	DNR mapped landslide located on forested slopes inclined at gradients that range from 40 to 70 percent.
K-04	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-05	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to North Fork Goble Creek.
K-06	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-07	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-08	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.

Segment-Hazard Number	Description
K-09	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-10	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-11	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-12	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Nineteen Creek.
K-13	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-14	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-15	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-16	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
K-17	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
K-18	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-19	Extensive steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area adjacent to Gobar Creek.
K-20	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-21	Localized steep amphitheater/ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
K-22	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Bear Creek.
K-23	Localized steep amphitheater/ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
K-24	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-25	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-26	Extensive steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area adjacent to Lost Creek.
K-27	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
K-28	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-29	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Elk Creek.
K-30	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Lost Creek.
K-31	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Kalama R.
K-32	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Kalama R.
K-33	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Kalama R.
K-34	Extensive steep amphitheater/ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-35	Extensive steep amphitheater/ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-36	Extensive steep amphitheater/ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-37	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
K-38	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
K-39	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-40	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-41	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
K-42	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-43	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Brooks Creek.
K-44	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
K-45	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Brooks Creek.
K-46	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-47	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
K-48	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-49	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-50	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-51	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
K-52	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Gobar Creek.
K-52	Localized steep ravine slopes ranging from 40 to greater than 70 percent.
K-53	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
K-54	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.

Segment-Hazard Number	Description
Segment L	
L-01	Extensive steep ravine slopes ranging from 55 to greater than 70 percent adjacent to Johnson Creek. Likely includes DNR unstable inner gorge area.
L-02	USGS mapped fault trending east-west.
Segment M	
M-01	Localized steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge slopes adjacent to Pup Creek.
Segment O	
O-01	Extensive steep ravine slopes ranging from 55 to greater than 70 percent that includes DNR mapped landslide adjacent to Canyon Creek.
O-02	DNR mapped normal fault trending NE-SW.
O-03	DNR mapped landslide located on forested slopes inclined at gradients that range from 40 to 70 percent.
O-04	Extensive steep ravine slopes ranging from 55 to greater than 70 percent and includes DNR mapped landslides. May include DNR unstable inner gorge area adjacent to the Canyon Creek.
O-05	Extensive steep ravine slopes ranging from 55 to greater than 70 percent and includes DNR mapped landslides. May include DNR unstable inner gorge area adjacent to the Canyon Creek.
O-06	DNR mapped landslide feature that crosses a portion of the segment and includes slopes that range from less than 40 percent to greater than 70 percent locally.
O-07	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
O-08	Localized steep slopes ranging from 55 to greater than 70 percent, interpreted as being associated with a borrow pit.
O-09	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area.
O-10	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
O-11	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
O-12	Localized steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
O-13	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Fly Creek.
O-14	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-15	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Fly Creek.
O-16	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Little Fly Creek.
O-17	Extensive steep amphitheater/ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Niccolls Creek.
O-18	Extensive steep amphitheater/ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
O-19	Extensive steep amphitheater/ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
O-20	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Niccolls Creek.
O-21	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-22	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-23	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to East Fork Lewis R.
O-24	Extensive steep slopes ranging from 40 to greater than 70 percent.
O-25	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area adjacent to King Creek.
O-26	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-27	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-28	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-29	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-30	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-31	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-32	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-33	Extensive steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-34	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Coyote Creek.
O-35	Localized steep slopes ranging from 40 to greater than 70 percent.
O-36	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area.
O-37	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Rock Creek.
O-38	Localized steep ravine slopes ranging from 40 to 70 percent. May include DNR unstable inner gorge area adjacent to Grouse Creek.
O-39	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
O-40	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Grouse Creek.
O-41	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Cold Creek.
O-42	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Grouse Creek.
O-43	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
O-44	Extensive steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Grouse Creek.

Segment-Hazard Number	Description
O-45	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
O-46	Localized steep ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Jones Creek.
O-47	Localized steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to Jones Creek.
Segment P	
P-01	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent.
P-02	Localized steep slopes that include gradients ranging from 55 to greater than 70 percent. May include narrow DNR inner gorge area adjacent to Rock Creek
P-03	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area.
P-04	Extensive steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area adjacent to Rock Creek
P-05	USGS-mapped landslide feature that includes slopes that range from less than 40 percent to greater than 70 percent locally. Includes mid-slope logging road
P-06	USGS-mapped landslide feature that includes slopes that range from less than 40 percent to greater than 55 percent locally. Includes mid-slope logging road
P-07	DNR mapped and larger USGS-mapped landslide feature that crosses the entire segment and includes slopes that range from less than 40 percent to greater than 70 percent locally.
P-08	USGS mapped landslide feature that includes slopes that range from less than 40 percent to 70 percent locally.
P-09	DNR and USGS mapped landslide feature that includes slopes that range from less than 40 percent to 70 percent locally.
P-10	USGS mapped approximately located fault trending NW to SE
P-11	USGS mapped landslide feature that includes slopes that range from less than 40 percent to greater than 70 percent locally.
P-12	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include unstable DNR inner gorge area adjacent to Rock Creek
P-13	USGS mapped landslide feature that includes slopes that range from less than 40 percent to greater than 70 percent locally.
P-14	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area
Segment Q	
Q-01	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent.
Q-02	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area
Q-03	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area
Q-04	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area adjacent to East Fork Little Washougal R.
Q-05	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area.
Segment R	
R-01	Extensive steep amphitheater/ravine slopes ranging from 40 to greater than 70 percent. May include DNR unstable inner gorge area.
R-02	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area.
R-03	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area.
R-04	Extensive steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area.
R-05	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent.
R-06	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area.
R-07	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent.
R-08	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area.
R-09	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area.
R-10	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent.
Segment S	
S-01	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area
Segment T	
T-01	Localized steep slopes that include gradients ranging from 40 to 70 percent.
T-02	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area
T-03	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area
Segment U	
U-01	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
U-02	Localized steep slopes that include gradients ranging from 55 to greater than 70 percent.

Segment-Hazard Number	Description
Segment V	
V-01	Localized steep slopes that include gradients ranging from 55 to greater than 70 percent. May include narrow DNR inner gorge area
V-02	Localized steep slopes that include gradients ranging from 55 to greater than 70 percent. May include narrow DNR inner gorge area
V-03	Localized steep slopes that include gradients ranging from 55 to greater than 70 percent. May include narrow DNR inner gorge area
V-04	Localized steep slopes that include gradients ranging from 55 to greater than 70 percent. May include narrow DNR inner gorge area adjacent to Rock Creek
V-05	Localized steep slopes that include gradients ranging from 40 to greater than 70 percent. May include narrow DNR inner gorge area adjacent to Rock Creek
V-06	Localized steep slopes that include gradients ranging from 55 to greater than 70 percent. May include narrow DNR inner gorge area adjacent to Rock Creek
Segment W	
W-01	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area adjacent to the Lewis R.
W-02	Extensive steep ravine slopes ranging from 55 to greater than 70 percent. May include DNR unstable inner gorge area.
W-03	Extensive steep ravine slopes ranging from 55 to greater than 70 percent that includes DNR mapped landslide. May include DNR unstable inner gorge area.

CMZ = Channel Migration Zone
DEM = Digital Elevation Model
DNR = Department of Natural Resources (Washington)
DOGAMI = Department of Geology and Mineral Industries (Oregon)
ROW = Right-of-way
USGS = United States Geological Survey

APPENDIX B
Report Limitations and Guidelines for Use

APPENDIX B
REPORT LIMITATIONS AND GUIDELINES FOR USE

This appendix provides information to help you manage your risks with respect to the use of this report.

Report Use and Reliance

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