

E

Appendix E:
Supplemental Information:
Plants & Animals



APPENDIX E-1. PSE VEGETATION MANAGEMENT STANDARDS

Vegetation Management Standards

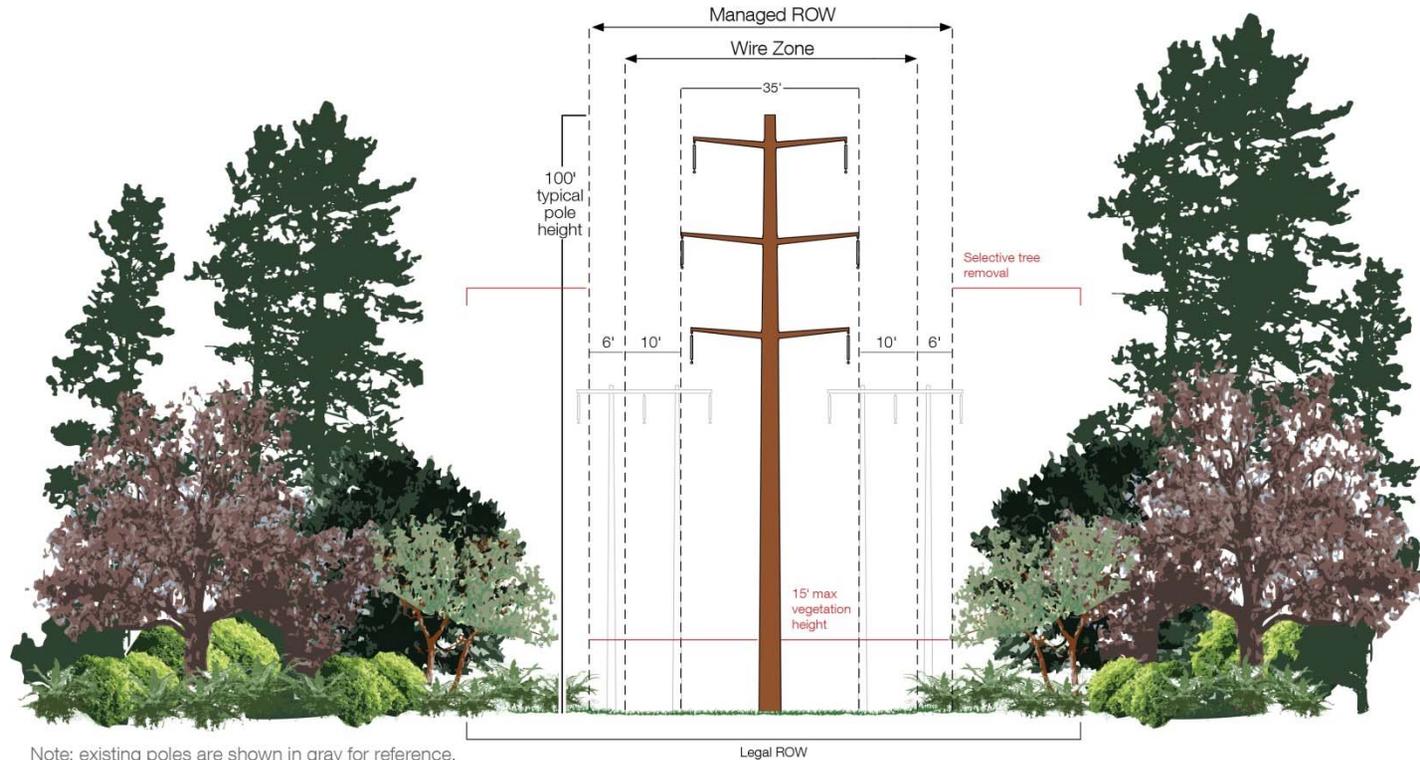
230 kV transmission lines

PSE's 230 kV transmission vegetation management standards generally requires removing trees located in the wire zone that have a mature height of more than 15 feet.

Wire Zone: Section of a utility transmission right of way extending to 10 feet from the outside transmission wire(s). Vegetation with a mature height of 15 feet or less is allowed in this zone.

Managed Right of Way (ROW): The section of a transmission right of way that extends roughly 16 feet from the outside transmission wire(s). Vegetation with a mature height of 15 feet or less is allowed in this zone.

Legal Right of Way (ROW): The full width of the easement. Maximum height of mature vegetation between the Managed ROW and Legal ROW is dependent upon tree species, tree health, and distance from the wires.



Note: existing poles are shown in gray for reference.

energizeEASTSIDE

PSE PUGET SOUND ENERGY

Vegetation Management Standards

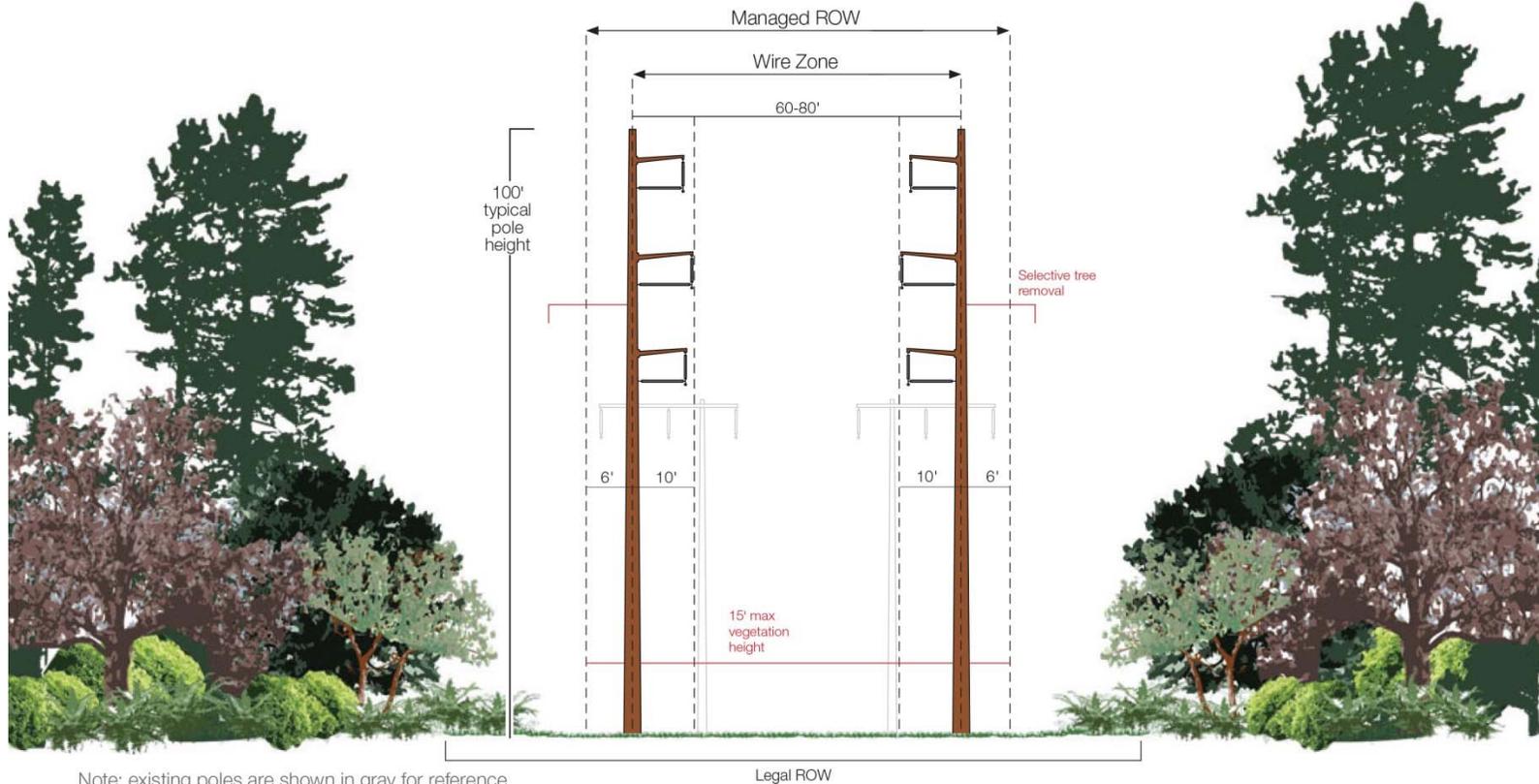
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energizeEASTSIDE

PSE PUGET SOUND ENERGY

Vegetation Management Standards

230 kV transmission lines

Pole Structure Type: C-16

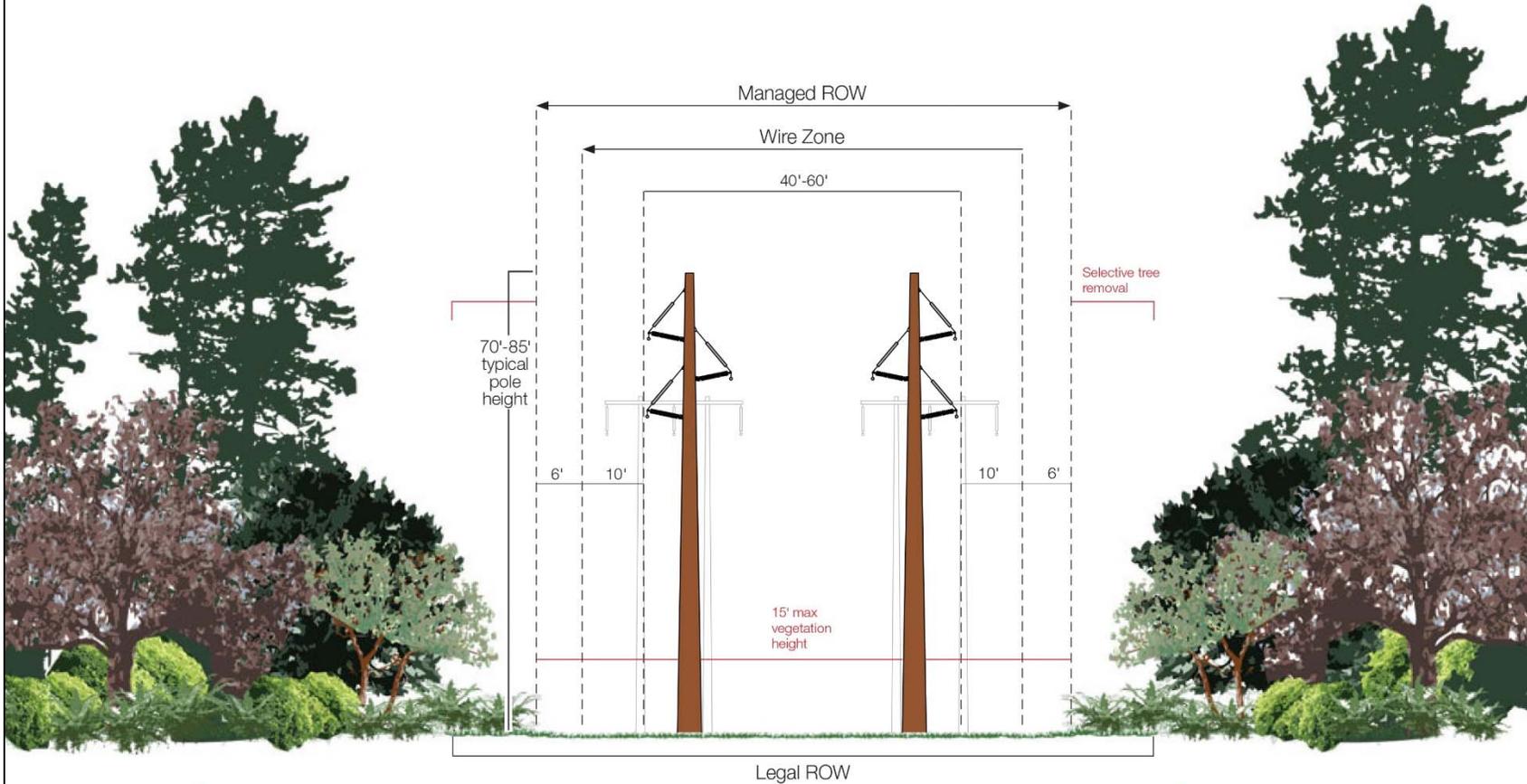
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energize **EASTSIDE**

PSE **PUGET SOUND ENERGY**

Updated: Fall 2017

APPENDIX E-2. TREE INVENTORY AND REMOVAL ANALYSIS METHODOLOGY

This appendix documents the steps taken by Environmental Science Associates (ESA) to determine the tree removal numbers for the Phase 2 Draft EIS and Final EIS. The methodology is divided into five phases or parts for ease of understanding: Inventory, Impact Analysis, Phase 2 Draft EIS Analysis, Data Analysis Review, and Final EIS. Figure E2-1 shows the legal right-of-way, the managed right-of-way, and wire zone for 230 kV transmission lines, which were used to determine the areas where trees could be affected by the project.

Part 1: Inventory

The Watershed Company (TWC) outlined its methodology for the tree inventory in a series of Tree Inventory Reports (TWC, 2016a), published in May or July 2016; see the referenced reports for detailed description. Below is a summary of these methods:

1. Boundaries for the tree inventory study area were established and included the following:
 - a. Trees within the 100-foot-wide legal right-of-way along the existing 115 kV transmission line corridor.
 - b. For project segments that are outside the existing corridor, trees within the road right-of-way plus a 30-foot-wide strip extending outward from either side of the road right-of-way where both sides of the street were inventoried. If only one side of the street was inventoried, only the right-of-way plus one 30-foot strip was included.
2. Trees within the inventory study area were surveyed and mapped as geospatial points and assigned a unique identification number. The identification number was marked on a tree tag attached to each tree (e.g., 3908).
3. Arborists in the field collected detailed information for each inventoried tree within the study area (e.g., tree species, tree health, etc.). There were 38 properties in the study area outside of the existing corridor that were wholly or partially inaccessible to the arborist and/or survey field crews. Tree locations on these properties were not captured completely, and/or detailed inventory data may not have been collected. Arborists used orthophotos and observations from off-site to determine tree location and inventory data as best as feasible for these properties.
4. Inventoried trees were assigned a maximum potential height (MPH). MPH was determined based on species, according to best available resources to determine mature vegetation growth potential.

Vegetation Management Standards

230 kV transmission lines

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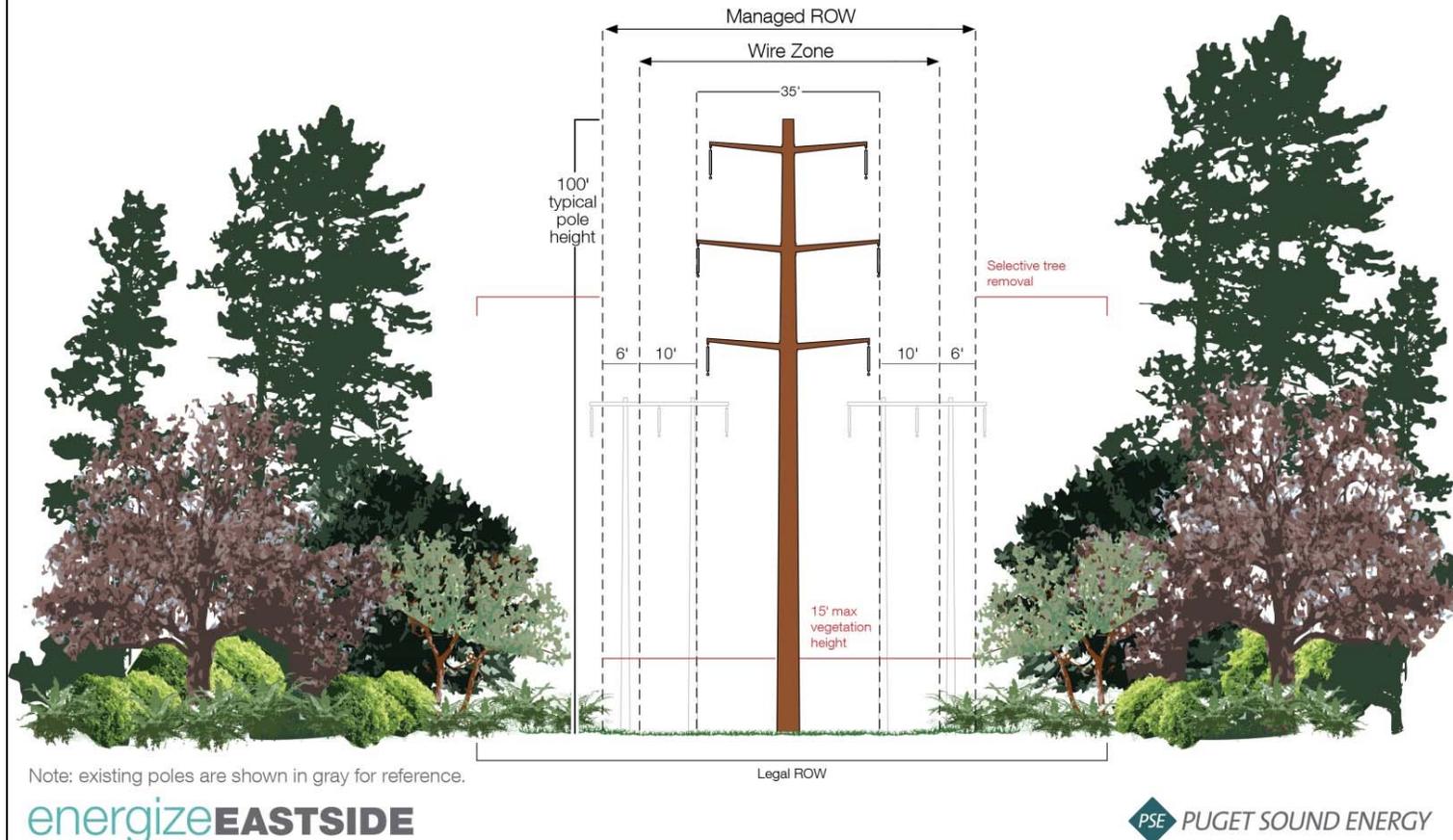


Figure E2-1. Legal Right-of-Way, Managed Right-of-Way, and Wire Zone for 230 kV Transmission Lines

Part 2: Impact Analysis

TWC outlined its methodology for the impact analysis in Methodology for Vegetation Impact Analysis (TWC, 2016b); see the referenced reports for detailed description. Below is a summary of these methods:

1. TWC placed the surveyed tree points on a georeferenced base map and overlaid it with the proposed conductor and pole alignments establishing the wire zone and managed right-of-way.
2. Trees that met the following criteria were flagged for removal:
 - a. Dead and dying trees.
 - b. Trees within the legal right-of-way but outside of the managed right-of-way with an MPH exceeding 70 feet.
 - c. Trees within the managed right-of-way and wire zone with an MPH exceeding 15 feet.
3. TWC identified trees flagged for removal that were located in a critical area or critical area buffer, using a combination of publicly available GIS layers, wetland delineations, and stream surveys conducted by TWC.

See the referenced report for a detailed description for limitations of the data, including errors.

Part 3: Draft EIS Analysis

The Tree Inventory Reports (TWC, 2016a), Methodology for Vegetation Impact Analysis (TWC, 2016b), a GIS data worksheet, and GIS data layers were provided to ESA to use for the analysis in the Phase 2 Draft EIS. ESA took the following steps to review TWC results:

1. Google Earth and street view, combined with ArcGIS Desktop, were used to review surveyed trees to generally confirm that the number of trees surveyed within the study area matched the number of trees present in the corridor, and to confirm that trees flagged for removal matched the proposed project alignment.
2. Surveyed trees were cross-checked against the Phase 2 Draft EIS segments and options to confirm that the TWC study area was consistent with the project description evaluated in the Phase 2 Draft EIS.
3. ESA ecologists visited five locations within the study area on 10/6/2016 by to confirm that data provided by TWC were consistent with on-the-ground conditions. ESA ecologists checked tree species, height, and location of trees at each site and cross checked with data provided. They visited the following locations:
 - a. Redmond Segment – existing easement between the Sammamish substation and Redmond Way, near Willows Creek.
 - b. Bellevue Central Segment – existing easement from SE 2nd Street to SE 7th Street along Lake to Lake Trail.
 - c. Richards Creek substation site.
 - d. Bellevue South Segment – existing easement north and south of Forest Drive.

- e. Newcastle Segment – existing easement from SE 95th Way to the May Creek crossing and existing easement near Newcastle Way.
4. ESA confirmed that the tree inventory and impact analysis methodology was consistent with standard practice.
5. To identify the number of pole centroids that would be located within critical areas and critical area buffers, ESA used the pole location centroid data provided by PSE, applied a 25-foot square centered on each pole location centroid, and overlaid the wetland/stream and wetland/stream buffer layers provided by TWC. If any portion of the 25-foot square was located outside a wetland, stream, or associated buffer, the pole centroid was excluded from the overall pole counts in critical areas and critical area buffers. This exclusion was made because PSE has the flexibility to adjust the precise location of a pole and would avoid impacts to wetlands, streams, or associated buffers where possible. The numbers of poles proposed in a wetland, stream, or associated buffer were presented in the Water Resources and Plants and Animals sections of the Phase 2 Draft EIS (Sections 3.3 and 3.4, respectively).
6. To identify tree removal within recreation sites, using GIS ESA overlaid trees identified for removal by TWC with a parks layer and reported in the Recreation section of the Phase 2 Draft EIS (Section 3.6).

Part 4: Data Analysis Review after Phase 2 Draft EIS

In response to public comment on the Phase 2 Draft EIS that suggested inconsistencies in the tree removal analysis, ESA worked with TWC to review its data analysis. TWC sent ESA the following GIS layers: legal right-of-way, managed right-of-way, wire zone, inventoried trees, and supporting attributes and metadata. Metadata provides definitions for various attributes like unique identifiers, tree species, MPH, notes, and trees flagged for removal. In GIS, ESA conducted the following queries to review the analysis done by TWC:

1. Trees flagged for removal:
 - a. Checked to see if trees flagged for removal were located within the managed right-of-way or the wire zone (including checking if any trees were flagged for removal outside of these two zones).
 - b. ESA reviewed the attributes of the trees flagged for removal within the managed right-of-way and wire zone to see if they met the removal criteria (i.e., had an MPH greater than 15 feet or were dead/dying).
 - c. Checked to see if trees flagged for removal outside of the managed right-of-way and wire zone (but within the legal right-of-way) had an MPH exceeding 70 feet or were dead/dying.
2. Trees not flagged for removal:
 - a. Checked to see if trees not flagged for removal within the managed right-of way or wire zone met the removal criteria (had an MPH greater than 15 feet or were dead/dying).
 - b. Checked to see if trees not flagged for removal outside of the managed right-of-way and wire zones (but within the legal right-of-way) had an MPH exceeding 70 feet or were dead/dying.

3. In response to the review by ESA, TWC provided clarification regarding trees that did not appear to be categorized correctly. There were no changes to TWC's tree impact numbers as a result of this review. Differences in ESA's results were caused by slight differences in the way ESA had interpreted and analyzed the information provided by TWC. TWC documented this review and changes in a memo, *Energize Eastside Vegetation Impact Analysis* (TWC, 2017).
4. ESA then checked the tree removal numbers and calculations used in the Phase 2 Draft EIS against the updated GIS data provided by TWC and presented the revised information in Chapter 3, *Errata*, of this Final EIS. While this corrected the Phase 2 Draft EIS analysis, it was not intended to provide the full analysis of PSE's Proposed Alignment for the Final EIS, which is described in Part 5 below.

Part 5: Final EIS

ESA presented the tree inventory and removal numbers in the Final EIS based on revised GIS data provided by TWC. Two sets of GIS data were used for the Final EIS: tree inventory data collected and analyzed during 2015 and 2016, and tree inventory data that were collected and analyzed in 2017. The tree data from 2017 were only available for portions of the alignment being considered for permits (i.e., in South Bellevue and Newcastle). The following subsections summarize what was included in the two datasets, and how the data are presented in the Final EIS.

The Watershed Company GIS Data (2016)

This tree inventory was conducted for the Phase 2 Draft EIS and data were collected as described above. For the Final EIS, these data were used for the Redmond Segment, Bellevue North Segment, Bellevue Central Segment north of Lakeside substation, and the Renton Segment.

To determine which trees were associated with each segment, ESA created a GIS attribute field called "Seg." An ESA GIS analyst conducted a spatial assessment of the data and identified the segment with which each tree was associated. TWC provided information as to whether a tree would be removed under any of the Phase 2 alternatives/options. For the Final EIS, the only option that was considered was "A1_Exesmt." Filters were applied based on "Seg" and whether or not the "A1_Exesmt" field said "remove." The "Signfcnt" field provided in TWC's attribute data denotes if a tree was marked as being significant or not (as defined by local regulations). "Critical_A" indicated if the tree is located in a critical area. "CA_Buffer" indicated if the tree is located in a critical area buffer. The following values were counted as being in the buffer: (In, LIKELY IN, POSSBLY IN, Y).

The Watershed Company GIS Data (2017)

The tree data from 2017 were only available for portions of the alignment being considered for permits, which included the following:

- The portion of the Bellevue Central Segment that included the Lakeside substation.
- Richards Creek substation site.
- Bellevue South Segment.
- Newcastle Segment, Option 1 (No Code Variance).
- Newcastle Segment, Option 2 (Code Variance).

TWC used a different, more refined methodology to analyze the tree data for these sections (TWC, 2018).

The Bellevue South dataset from the Watershed Company included the Bellevue Central Segment associated with the Lakeside substation and the Richards Creek substation. A GIS analyst at ESA created a “Seg” field and conducted a spatial analysis to determine which trees are associated with the Lakeside substation (in the Bellevue Central Segment), which are associated with the Richards Creek substation site, and which are associated with the Bellevue South Segment (as defined in the Final EIS). The data had similar fields to those associated with the 2016 attribute data, so similar filters were applied.

References:

- TWC (The Watershed Company). 2016a. Tree Inventory: Energize Eastside Project. Includes the following separate reports: City of Bellevue Tree Inventory Report; King County Tree Inventory Report; City of Newcastle Tree Inventory Report; City of Redmond Tree Inventory Report; City of Renton Tree Inventory Report; Richards Creek Parcel Tree Inventory Report; Segment O Tree Inventory Report; Segment P Tree Inventory Report; and Bypass Routes 1 and 2 Tree Inventory and Analysis Report. Prepared for Puget Sound Energy, Bellevue, WA. Prepared by The Watershed Company, Kirkland, WA. May and July 2016.
- TWC (The Watershed Company). 2016b. Methodology for Vegetation Impact Analysis. Prepared for Puget Sound Energy, Bellevue, WA. Prepared by The Watershed Company, Kirkland, WA. September 2016.
- TWC (The Watershed Company). 2016c. GIS Dataset Labeled as twc_ee_veg_impact_results_20160914. September 14, 2016.
- TWC (The Watershed Company). 2017. Energize Eastside Vegetation Impact Analysis. Prepared for Puget Sound Energy, Bellevue, WA. Prepared by The Watershed Company, Kirkland, WA. November 2017.
- TWC (The Watershed Company). 2018. Energize Eastside Tree Impact Assessment, Draft Methodology for Vegetation Impact Analysis memorandum. Prepared by The Watershed Company, Kirkland, WA. February 9, 2018.