

SEGMENT O TREE INVENTORY REPORT

Puget Sound Energy – Energize Eastside Project

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Acronyms and Abbreviations

APS	APS Survey & Mapping, LLC
BCC	Bellevue City Code
DBH	Diameter at 4.5 feet above the surface of the ground.
I-90	Interstate-90
ISA	International Society of Arboriculture
LUC	Land Use Code: Title 20 of the Bellevue City Code
PSE	Puget Sound Energy
ROE	Right of entry
ROW	Right-of-way
SR520	State Route 520
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation
TWC	The Watershed Company

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SEGMENT O TREE INVENTORY REPORT

PUGET SOUND ENERGY – ENERGIZE EASTSIDE

1 EXECUTIVE SUMMARY

The Watershed Company conducted a field-based tree inventory from November 9, 2015 to November 16, 2015, collecting data on a total of 211 trees and 5 groupings of small trees along the approximately 1-mile-long Segment O. Of those trees, 101 meet the City’s definition of “significant”. This report summarizes the findings for this Segment, which is completely located in the City of Bellevue. This inventory provides baseline information and does not represent the number of trees that could be pruned or removed as a result of the Energize Eastside project.

The study area covered by the tree inventory is an area extending 30-feet outward from edge of the street rights-of-way. All landscaped trees or shrubs that would achieve a maximum potential height of 15 feet, regardless of trunk diameter at the time of the assessment, were inventoried. Groupings of small, non-significant weedy trees were grouped in polygons and assessed as a unit. Manicured hedges made up of species with a potential maximum height of 15 feet, regardless of current size, were mapped and assessed using the polygon method as well.

2 INTRODUCTION

The purpose of this tree inventory is to quantify and characterize all significant trees, as well as vegetation with the potential to reach greater than 15 feet in height along a portion of the “Oak” route in the Bellevue Factoria neighborhood. “Segment O” has been identified by Puget Sound Energy (PSE) as a part of the “Oak 2” route for the Energize Eastside project. This report summarizes the findings for Segment O; the findings contained within provide baseline information and do not represent the number of trees that could be pruned or removed as a result of the Energize Eastside project.

2.1 Background

The Energize Eastside project proposes to build a new electric substation and higher capacity transmission lines to serve homes and businesses on the Eastside. Current route options include Oak and Willow routes that will extend from Redmond to Renton (Figure 1). The two routes diverge through the Factoria and Somerset neighborhoods of the City of Bellevue. Each route option includes a set of Segments, as follows. The Oak route comprises Segments A, C, E, G2, I, K2, M, N, and O. The Willow route comprises Segments A, C, E, J, M, N, and P. This report explores Segment O within the Factoria neighborhood in Bellevue (Figure 2). Segment O is part of the Oak 2 route.

2.2 Defined Study Area

The study area of the Segment O includes:

- SE 38th Street between Factoria Boulevard SE and 124th Avenue SE; and
- 124th Avenue SE ending at Coal Creek Parkway SE

The length of the study area corridor totals approximately 1 mile. This study area is not located under existing sets of high-voltage transmission lines (although there are lower-voltage local lines in the area) as with other segments along the Willow and Oak routes. As such, the limits of the study area were defined as an area extending 30-feet outward from the edge of existing City rights-of-way (ROW). Trees and shrubs were inventoried only on the east side of 124th Avenue SE and the south sides of SE 38th Street. This scope was developed through a series of email conversations between TWC and PSE in Fall of 2015.

3 SITE DESCRIPTION

Segment O is located within the Factoria neighborhood of Bellevue. The majority of the study area is zoned commercial and light industrial/office, but includes some multifamily and single family districts and is characterized mostly by commercial businesses, office buildings, a church, apartment buildings, and Newport High School. The study area is primarily parking strips, landscaped beds along commercial development, grass fields, and one patch of native trees and shrubs near Newport High School. The corridor is located in the following public land survey sections: Sections 9 and 16 of Township 24N, Range 05E.

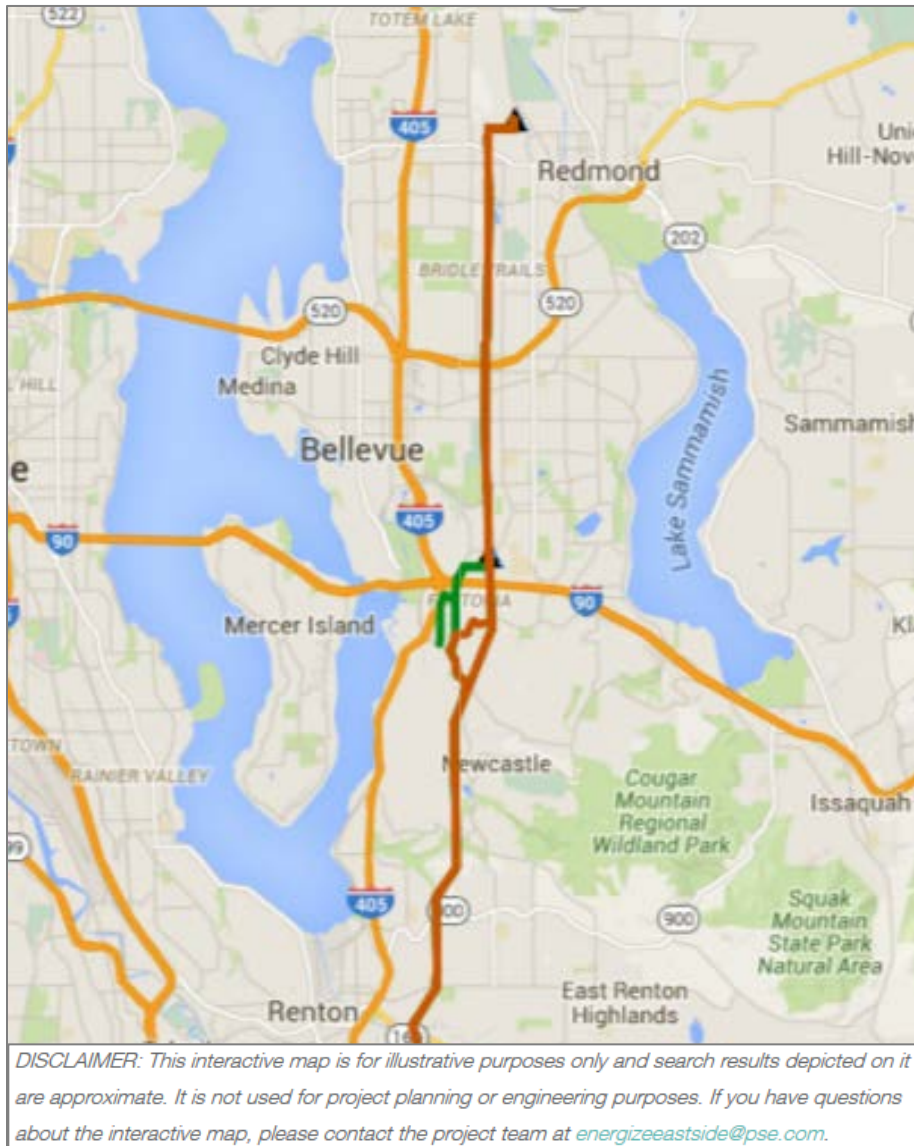


Figure 1 - An overview map of proposed Oak (green) and Willow (orange) routes from the Energize Eastside website.

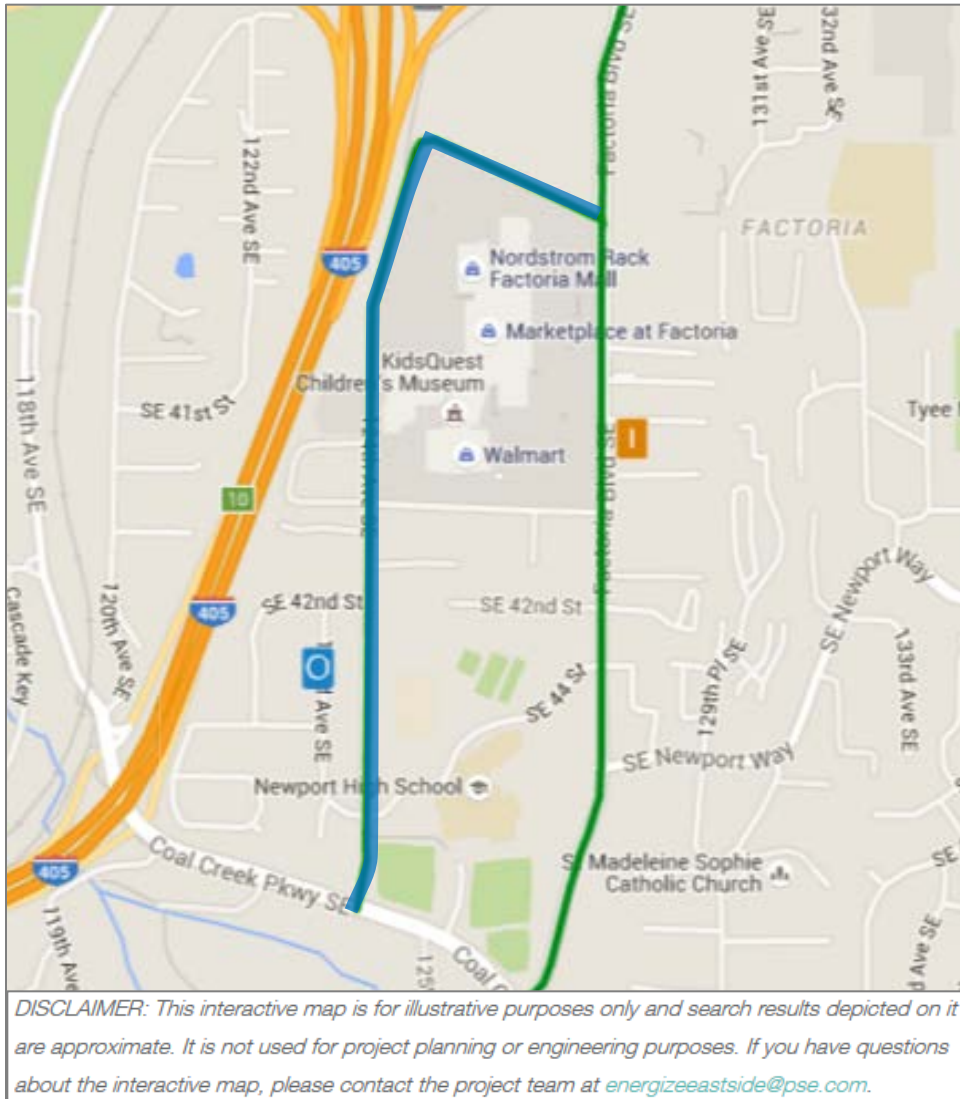


Figure 2 - Map of Segment O (blue) as part of the Oak route (green).

4 PHOTOS



Figure 3 – Looking northwest planting strip vegetation at the southeast corner of 124th Ave SE and SE 41st Pl. (Photo taken November 16, 2016)



Figure 4 – A Google Street View image of the Norway maple trees that line the south side of SE 38th St in Segment O. (Photo courtesy of Google Maps, 2016)



Figure 5 - Google Street View image showing a red maple and American sycamore tree, along with hedged Fraser photinia (p614) along the east side of 124th Ave SE just south of SE 38th St in Segment O. (Photo courtesy of Google Maps, 2016)



Figure 6 – A Google Street View image showing a landscaped area at the southeast corner of 124th Ave SE and an entrance to the Factoria Mall. Japanese Maples and Alaska cedars are located in the study area here. (Photo courtesy of Google Maps, 2016)



Figure 7 - Google Street View showing the small patch of native trees at the northwest corner of Newport High School (Photo courtesy of Google Maps, 2016)

5 METHODS

The Watershed Company certified arborists conducted a field-based inventory from November 9, 2015, to November 16, 2015. Proposed methodology was developed, written and submitted to PSE in a Technical Memorandum dated March 13, 2015 for review and approved prior to field work. The methodology was developed to comprehensively identify, describe (by collecting attribute data), and mark (i.e., flagging to assist survey in locating subject trees) all vegetation greater than 15 feet tall, or which has the potential to reach a mature height of 15 feet or taller. The following methodology is based on the memorandum and on email correspondence in Fall of 2015 regarding the location and size of the study area.

5.1 Significant Trees

According to LUC 20.50.046, the City of Bellevue defines a significant tree as a healthy evergreen or deciduous tree, eight inches in diameter or greater, measured four feet above existing grade. The Director of the Development Services Department may authorize the exclusion of any tree which for reasons of health, age or site development is not desirable to retain.

Any tree with a diameter of six inches at four-and-a-half feet above the surface of the ground (DBH) was considered significant in the field. Significant trees were assigned an identification number, but not tagged in any way.

5.2 Non-Significant Trees and Shrubs

Small, non-significant trees and shrubs with a potential maximum height of 15 feet or more were assessed and mapped according to the following methods:

5.2.1 Landscaped trees and landscaped tall shrubs

Any landscaped or maintained tree or shrub with a potential maximum height of over 15 feet in a landscaped bed or maintained yard, regardless of trunk diameter or current height, was assessed and mapped as a singular point under this study.

5.2.2 Weedy non-significant trees and tall shrubs; DHB between three and six inches

Weedy non-significant trees with a diameter of greater than three inches were assessed and mapped as a point similar to 5.2.1.

5.2.3 Weedy non-significant trees and tall shrubs; DBH less than three inches

Groups of weedy, non-significant trees and tall shrubs (i.e., from seed, not-planted and not maintained) composed of species with a potential maximum

height of greater than 15 feet, but with stem diameters smaller than three inches, were mapped and recorded as a polygon instead of as several individual points. Attribute data was averaged and recorded for the group of vegetation. A polygon was drawn onto an aerial map and converted to AutoCAD in the office. These polygons were not survey-located. No significant trees were inventoried using this method. Attribute data was collected for each polygon per Section 5.5 below and is included in the data table.

5.2.4 Hedges

Landscaped hedges were also described and mapped using polygons instead of tagging the individual plants that make up the hedge. Maintained contiguous groupings of trees and shrubs with a potential maximum height of greater than 15 feet (e.g., cherry laurel, Portuguese laurel, and arborvitae) that are growing in a row and or hedged were assessed as a polygon. Attribute data was collected for each polygon per Section 5.5 below and is included in the data table.

5.3 Authority

Several resources were referenced to determine the maximum height of the various species of tree and shrub encountered in the subject area. For landscape trees and shrubs (plants not native to Washington State), the Oregon State University Department of Horticulture online landscape plant database (Oregon State University, 2016) was referenced. Native trees and shrub maximum heights were verified using the University of Washington WTU herbarium website (University of Washington, 2016) and the USDA plant database (United States Department of Agriculture, 2016). These resources were used for both the scientific names and the common names for the data reporting.

5.4 Vegetation Mapping for Segment O

Trees and shrubs in Segment O were hand-sketched in the field only. None of the tree points for Segment O delivered in the accompanying AutoCAD file as a part of this study were surveyed at the time this report was issued. Tree and shrub point locations were digitized using a combination of ArcGIS and AutoCAD software in the office.

Polygon maps for vegetation described in Sections 5.2.2 and 5.2.4 were hand-drafted on aerial imagery in the field, manually entered into ArcGIS, reviewed and corrected before being converted to AutoCAD.

Table 1. Attributes recorded for all inventoried vegetation and that are presented in the spreadsheet database.

ATTRIBUTE	DESCRIPTION OF ATTRIBUTE
DATE OF ASSESSMENT	Date that The Watershed Company field crew tagged and assessed the tree or shrub.
ID NUMBER	Unique number assigned to an assessed tree or polygon. This number corresponds to the tag number in the field or the polygon number on the maps.
PARCEL NUMBER	Parcel number(s) in which the subject tree or polygon is located. In some cases, the parcel number corresponds to the closest parcel if the tree is in a City right-of-way.
SCIENTIFIC NAME	Formal scientific name conforming to the International Code of Nomenclature.
COMMON NAME	Name that is based on normal or common language of the Pacific Northwest.
STEMS	Number of trunks or shoots that contribute significantly to the canopy.
DBH	Diameter at Breast Height; or 4.5 feet from the ground surface. See Section 5.5 for variations.
DBH2	DBH of secondary and other minor stems.
HEIGHT	Approximate distance from the ground surface at the trunk to the highest point of the subject tree as visually estimated. Average height for polygons.
CANOPY RADIUS	Measurement from the stem to the average drip line, or end of branches.
CONDITION	<p>Health rating of an assessed tree using a 5-tier system as follows:</p> <ol style="list-style-type: none"> 1 – Excellent: No apparent problems with the tree. Form is exemplary for the species. 2 – Good: Few minor defects such as crossed branches, minor foliage die-back, minor trunk damage, or unbalanced canopy. 3 – Fair: Several minor problems exist. 4 – Poor: Major defects visible such as significant trunk decay, codominant leaders with included bark, significant canopy die-back, major cracks in a stem or major limbs, and/or other structural problems. Topped trees are generally considered poor. 5 – Dead or dying: Tree is dead or is in a state of significant decline.
NOTES	Additional comments relating to assessment of the tree or polygon unit.

5.5 Attribute data collection

The attributes collected during the field survey are listed and described in Table 1. The Microsoft Excel spreadsheet database contains information collected during the field visit. General attributes documented for all inventoried vegetation include the date of assessment, unique identification number of tree or polygon, location (parcel number), and name of plant species. Physical attributes include number of stems, stem diameter (DBH), height, canopy radius, condition, and notes. For polygons, approximate number of individual trees or large shrubs within a polygon was recorded instead of stem number, and other physical attributes for vegetation within polygons were recorded as ranges.

Diameter of all subject trees was measured at four-and-a-half feet above the surface of the ground at the trunk (DBH) where possible; however, some stems were measured differently due to size or branching structure. Very small trees without a defined stem at four-and-a-half feet above the ground were measured using the caliper-method, in which the stem is measured six inches above the ground. For trees with major branching at or below four-and-a-half feet, the smallest portion of the trunk below major branching was measured.

Methodology for measuring diameter of trees with major leans, on steep slopes, and with multiple trunks or stems generally followed those outlined in the Guide for Plant Appraisal (Gooding, et al., 2000). Other attributes collected are listed and described in Table 1.

5.6 Data Management

Data were recorded in the field using paper field data sheets or a Trimble GeoXH GPS unit. Data were entered into a Microsoft Excel spreadsheet in the office and subsequently reviewed, corrected, and organized into a searchable database. The spreadsheet file will be delivered along with this report.

For the purposes of determining which trees along the corridor constitute a significant tree in the City of Bellevue, this study excludes all tagged trees or shrubs that rate as *Dead or Dying*. Any tagged tree with a primary DBH equal to or exceeding eight inches with a condition rating of *Excellent, Good, Fair* or *Poor* is considered significant.

6 LIMITATIONS OF STUDY

When trees and shrubs occurred within the ROW or on public land, attributes were measured directly. All trees and shrubs on private property were assessed from the ROW boundary. Consequently, most measurements on private property are only an approximation based on best professional judgement. Due to lack of foliage of deciduous trees, condition of the tree was based upon observations of trunk, bark and root condition. Direct examination of the trees and shrub in summer could reveal different results.

Trees were identified using the identifiable characteristics present at the time of the inventory. For Segment O, identification to the species level was hindered by inability to closely examine the vegetation and lack of foliage due to seasonality; as a result, some trees and shrubs may be misidentified. Some trees and shrubs were unidentifiable, although most were identified to genus and species. Some taxa, such as the "cherry" genus, contain many species and botanical varieties that were not identifiable without all characteristics present. Where identification to the species level was not possible, species was indicated with "sp." in the spreadsheet. An unknown cherry tree, for example, was indicated as "*Prunus* sp." If an uncommon tree was simply not identifiable (for lack of leaves or flowers), an "unk.", or "unknown" was entered into the name column of the spreadsheet and any descriptor that would aid in identification was added to the notes field.

Trees and polygons located on the edge of parcel boundaries were assigned a parcel number based on field observations. However, fence lines sometimes do not exactly match parcel lines, and the parcel boundary overlay on aerial imagery used in the field was sometimes inaccurate. Determining exact parcel boundary locations in the field was not possible.

Tree size and condition vary with time. The attributes reported here in this report represent a snapshot at the time of the field work and may not necessarily be accurate in the future.

7 TREE INVENTORY RESULTS

The Segment O study area contains 211 trees; 101 of which currently meet the City's significant tree definition. The largest, a 23-inch black cottonwood, is located in the small native patch of vegetation at the northwest corner of the Newport High School property. The most common trees along the corridor are American sycamore, red oak, and red and Norway maples. Several apple, vine maple and Douglas-fir trees are also rooted in planting strips along 124th Ave SE.

A total of five polygons containing groupings of smaller trees and shrubs were mapped and described in this area. Hedged and landscaped cherry laurel, Frasier photinia, and eastern arborvitae make up the majority of the plant species in the five polygons.

No wetlands or above-ground streams are located in Segment O (The Watershed Company, 2016 [*City of Bellevue Critical Areas Delineation Report: Puget Sound Energy – Energize Eastside Project*]; The Watershed Company, 2016 [*Energize Eastside - Segment O Critical Area Addendum*]). None of the subject trees are located within regulatory critical areas or critical area buffers. Note that an unmapped piped section of Richards Creek may extend south of the mapped portion in the 2016 report. Please see the Critical Area Addendum for more information on critical areas.

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