

# CITY OF NEWCASTLE TREE INVENTORY REPORT

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## Puget Sound Energy – Energize Eastside Project

Prepared for:

Jens Nedrud  
Puget Sound Energy  
355 10<sup>th</sup> Avenue NE  
Mail Stop: EST03W48  
Bellevue, WA 98004

Prepared by:



750 Sixth Street South  
Kirkland . WA 98033

p 425.822.5242

f 425.827.8136

[watershedco.com](http://watershedco.com)

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**The Watershed Company Reference Number:**  
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**The Watershed Company Contact Person:**  
Jennifer Creveling, Senior Biologist  
or Mike Foster, Ecologist & Arborist

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## Acronyms and Abbreviations

APS	APS Survey & Mapping, LLC
DBH	Diameter at 4.5 feet above the surface of the ground
ISA	International Society of Arboriculture
NMC	Newcastle Municipal Code
PSE	Puget Sound Energy
ROE	Right of entry
ROW	Right-of-way
WSDOT	Washington State Department of Transportation
TWC	The Watershed Company



# CITY OF NEWCASTLE TREE INVENTORY REPORT

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PUGET SOUND ENERGY – ENERGIZE EASTSIDE

## 1 EXECUTIVE SUMMARY

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The Watershed Company conducted a field-based tree inventory from March 23, 2015 to November 9, 2015, collecting data on a total of 6,166 trees and 357 groupings of small trees along the 18-mile-long Willow and Oak routes. 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.

This report summarizes the 1.52-mile section of Segment M that crosses through the City of Newcastle. Segment M comprises a portion of the Phase 2 DEIS Segment 3. A total of 461 trees were tagged and assessed in the City. Of those trees, only 62 meet the City's definition of "significant" and would be subject to the applicable tree ordinances summarized in this report.

The study area is an approximately 100-foot wide easement that contains overhead transmission lines and pole structures.

All vegetation with a potential to reach a height of 15 feet or more was evaluated under this study. Any landscaped tree or shrub meeting this criteria, regardless of trunk diameter or height, was marked with a small, numbered aluminum tag with either a nail or wire tie. Thickets of small, non-significant weedy trees were grouped and assessed as a polygon. Hedges were mapped and assessed using the polygon method as well.

The tree totals reported here are an underestimate of the total number of trees subject to the inventory criteria in the study areas. Trees located in parcels where entry was refused to field crews were not tagged, assessed or survey-located. Several parcels in the City of Newcastle were not screened because of refusals. More detailed parcel data (including records of refusal) were collected and tracked by Enviro Issues and PSE during the field work.

Tree replacement ratios are discussed in the Newcastle Municipal Code. Although utility project are exempt from the permit requirements, tree retention and replacement requirements may still apply.

## 2 INTRODUCTION

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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 the 18-mile-long subject corridor consisting of the routes known as “Willow” and “Oak”. 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. These routes have been identified by Puget Sound Energy (PSE) as part of the Energize Eastside project. This report summarizes the findings for the City of Newcastle portion of the Willow and Oak routes. The overall project crosses through a total of five local jurisdictions, including King County and the Cities of Bellevue, Redmond, Newcastle, and Renton. Trees inventoried in other jurisdictions as part of this study are summarized in separate reports. Data collected during the study is compiled in an Excel spreadsheet.

### 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 the Sammamish substation in Redmond to the Talbot substation in Renton (Figure 1). The two routes diverge only through a portion 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, and N. The Willow route comprises Segments A, C, E, J, M, and N.

### 2.2 Study Area

The City of Newcastle portion includes a 1.52-mile section of PSE-labeled Segment M that extends from Newcastle Way in the north to SE 95<sup>th</sup> Way in the south. Segment M, which is included within Phase 2 DEIS Segment 3, is also located in the adjacent jurisdictions of Bellevue, Renton, and a small pocket of King County. The study area corridor is an approximately 100-foot-wide easement that includes two existing sets of 115kV transmission lines. These sets, consisting of three conductors (wires) each, are spaced approximately 50 feet apart on-center; H-frame pole structures carry each set of transmission lines.



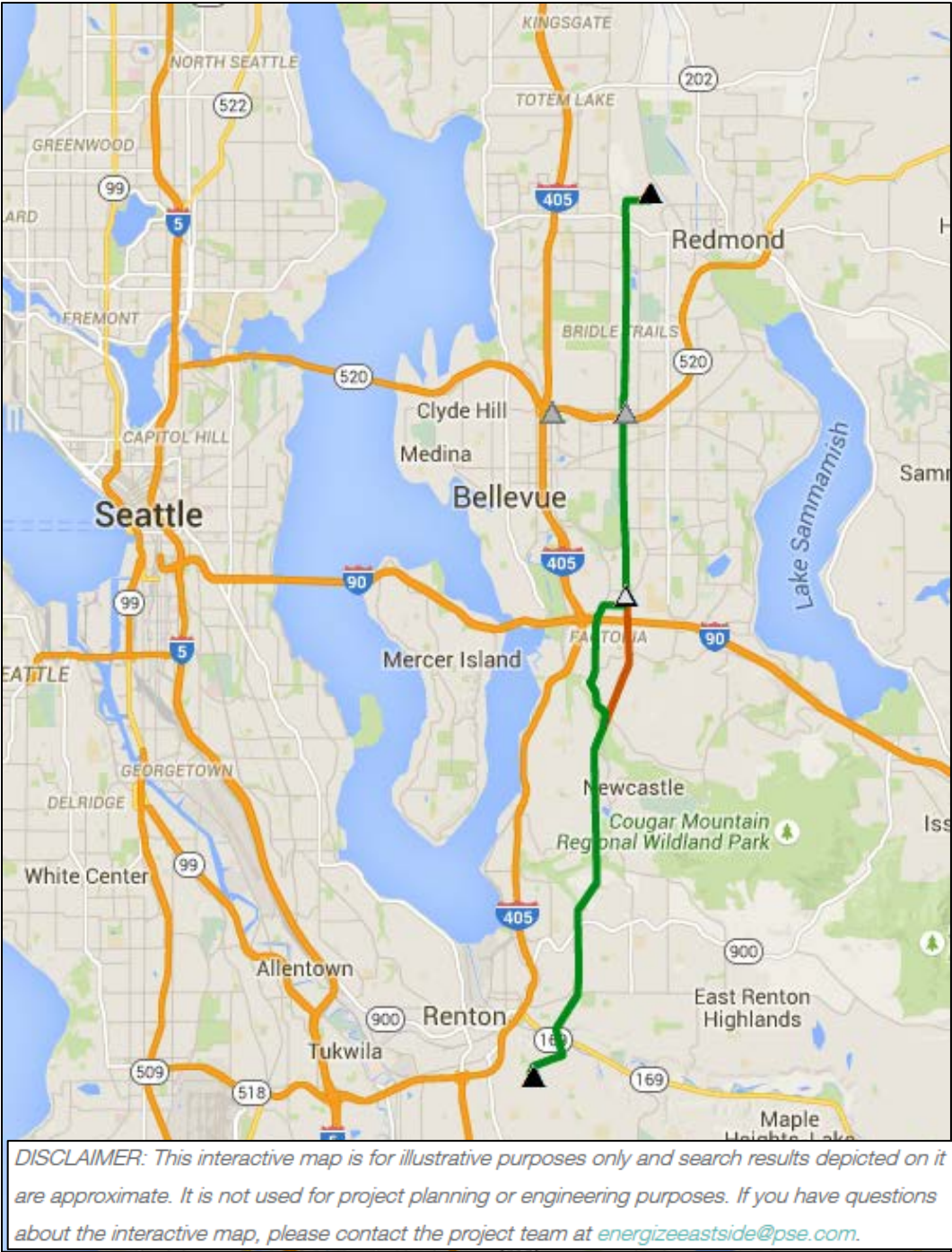


Figure 1 - Map of proposed Oak and Willow routes from the Energize Eastside website. The Oak route is depicted in green while the Willow route variation is shown in orange.

PSE 230kV Route  
Newcastle Tree Inventory Report

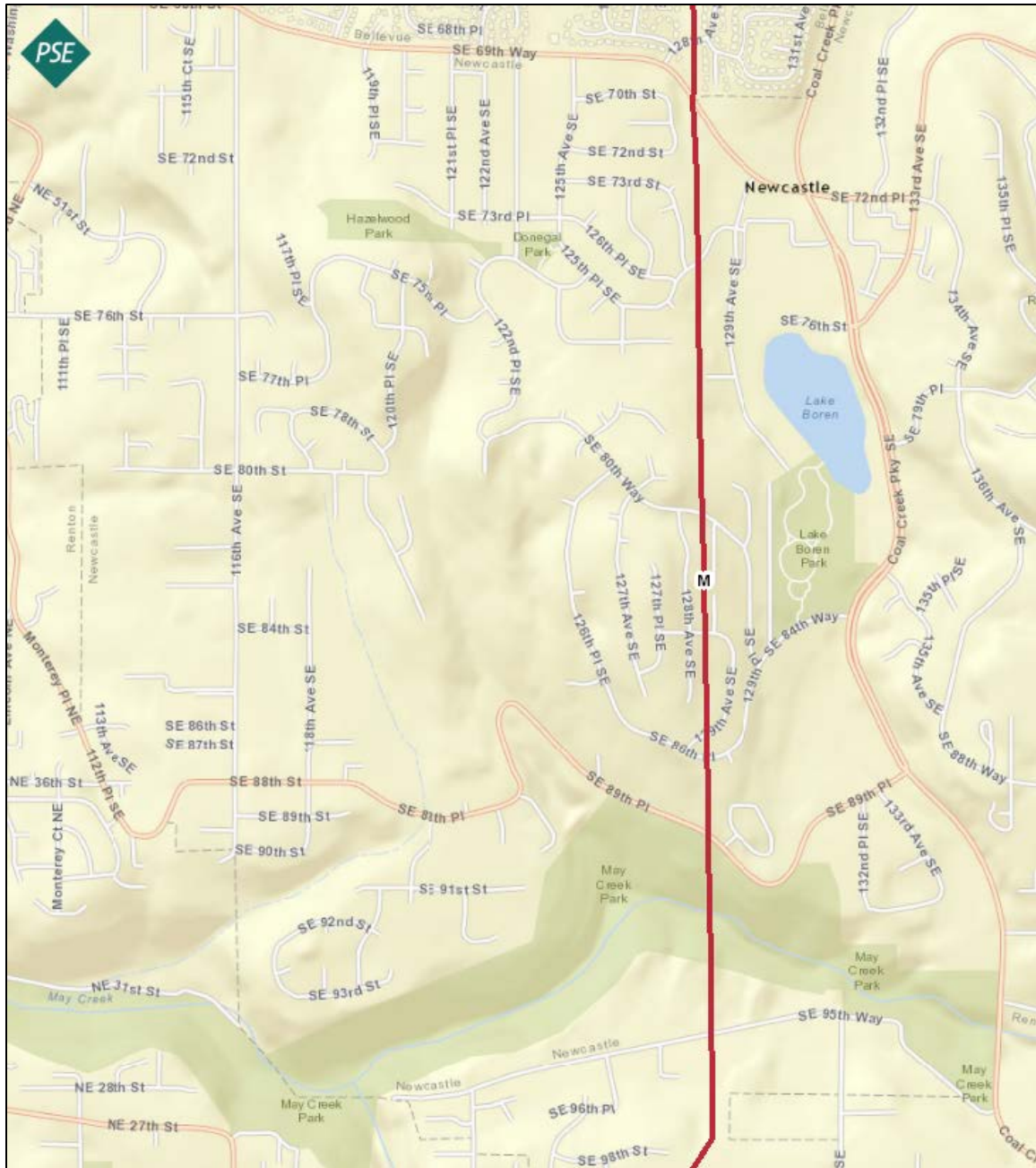


Figure 2 - Overview of the study area corridor in the City of Newcastle which comprises a portion of Segment M.

### 3 SITE DESCRIPTION

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The study area in the City of Newcastle includes residential areas and May Creek Park, generally zoned Residential (R-6) and Limited Open Space (LOC), respectively. At the north end, the corridor passes through the Donegal and Olympus neighborhoods (Figure 3) before crossing May Creek Park (Figure 4) situated at the south end of the City. The study area is located in Township 24N, Range 05E, Sections 28 and 33.

Vegetation in the corridor is generally limited to landscaped beds and maintained yards. However, some larger undeveloped and Park parcels in the City contain Himalayan blackberry, grass and small saplings. The May Creek Park portion of the Segment is an example. The lowest portion of the May Creek ravine retains some tall trees as the height of the lines in this area is more than 100 feet above the surface of the ground.

# 4 PHOTOS

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Figure 3 - Typical landscaped yard in the Olympus neighborhood of the City of Newcastle. Several small landscaped trees were tagged here. (photo taken April 27, 2015)



Figure 4 - A photo from the south edge of the May Creek Ravine, looking north. (photo taken May 4, 2015)



Figure 5 - An example of the aluminum tag with bright flagging. (photo taken May 4, 2015)



Figure 6 - A hedge of arborvitae in the Olympus Neighborhood (polygon number p135). (photo taken May 4, 2015)

## 5 METHODS

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Watershed Company ISA-certified arborists conducted a field-based inventory from March 23, 2015, to November 9, 2015 using the methods detailed below. 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 that had the potential to reach a mature height of 15 feet or taller. The following methodology is based on the memorandum. Any deviation due to specific conditions encountered during field work is noted and described below.

### 5.1 Significant Trees

Within the City of Newcastle, a significant tree is defined as an existing healthy tree which, when measured four feet above grade, has a minimum diameter of: eight inches for evergreen trees; or twelve inches for deciduous trees (NMC 18.06.598). Newcastle does not recognize or regulate “landmark” trees (i.e., any tree over 30 inches in diameter) differently than significant trees.

In order to achieve a more inclusive look at trees within the corridor, any tree with a diameter of six inches at four-and-a-half feet above the surface of the ground (DBH) was tagged and included. A round one-and-one-quarter-inch-wide, numbered aluminum tag was affixed to the trunk of significant trees using a two-and-one-quarter-inch long aluminum nail (Figure 5). Where property owners would not allow nailing, a small wire tie was used to affix the tag to a lateral branch or smaller shoot near the trunk. For a majority of the tags, a length of pink- and black-stripped flagging was included behind the tag to aid survey crews in visually locating the subject trees. Survey crews removed the bright flagging once the tree was survey-located.

Aluminum tags are intended to remain on the tree in perpetuity; however, they will eventually be consumed by the expanding radius of the tree trunk. Some tags may have been removed by property owners after the inventory work was completed.

### 5.2 Non-Significant Trees and Shrubs

Small, non-significant trees and shrubs with a potential maximum height of 15 feet or more (regardless of height during the study) 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 height at the time of the field work, was inventoried. A numbered aluminum tag was affixed to the trunk with a nail where possible. If the trunk diameter was smaller than two inches, generally the aluminum tag was affixed to the trunk or a branch near the trunk using a wire tie.

#### **5.2.2 Weedy non-significant trees and tall shrubs; DBH between 3 and 6 inches**

In residential areas, any weedy, non-significant tree or shrub exhibiting a trunk diameter of between three and six inches, with a potential maximum height of over 15 feet, was tagged similar to Section 5.2.1.

#### **5.2.3 Weedy non-significant trees and tall shrubs; DBH less than 3 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. 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 (see Figure 6). Groupings of trees and shrubs with a potential maximum height of greater than 15 feet growing in a row with contiguous and trimmed foliage, regardless of the maintained height, 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**

Online resources were referenced to determine the maximum potential 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 spreadsheet reporting.

### **5.4 Vegetation Mapping**

APS Survey and Mapping, LLC (APS) survey-located all TWC-tagged vegetation in the City of Newcastle. The Watershed Company provided hand-drawn sketches of the tag locations to APS survey crews after one to two field days to

assist in subject tree location. Generally, APS survey-located tagged vegetation within three days following the TWC inventory.

Polygons maps for vegetation described in Sections 5.2.3 and 5.2.4 were hand-drafted on aerial imagery in the field. The sketched polygon locations were converted into AutoCAD in the office by The Watershed Company.

## 5.5 Attribute data collection

The attributes collected during the field survey are described in Table 1, below. The Microsoft Excel spreadsheet database contains the data collected for each tree and polygon inventoried. 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 averages.

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, where the stem is measured at 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 below.

## 5.6 Data Management

Data were recorded using paper field data sheets. Data were entered into a Microsoft (MS) 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.

### 5.6.1 Data Summary

Summary data reported in the Findings section below was derived from querying the tree spreadsheet using Excel formulas. The City of Newcastle definition of significant tree was used to tally data from the spreadsheet. Any evergreen tree with a diameter of eight inches or greater and that has a condition rating of *excellent*, *good*, *fair*, or *poor* was counted. This total was added to the number of deciduous trees in the City with a diameter of 12 inches or greater and that have a condition rating of *excellent*, *good*, *fair*, or *poor*.



## 6 Limitations of Study

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The number of trees reported below is an under-representation of the total number of subject trees along the Newcastle portion of the Willow and Oak routes. TWC and APS were denied entry to several residential parcels in the City and were unable to identify, assess, map or tally the trees in those parcels. The details of which parcels were not inventoried were collected and tracked by EnviroIssues and PSE during the field work.

Tree identification was done using the vegetative characteristics present at the time of the inventory. Some trees and shrubs may be misidentified. Some trees and shrubs were unidentifiable, although most were identified to genus and species, or to at least genus. Some taxa, such as the “cherry” genus, contain many species and botanical varieties that were not identifiable given the time limitation and without all characteristics present. Where genus was known, but species was not, the 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.

Some reported parcel numbers in the spreadsheet may not be correct; the survey should be used as the authority. 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 always possible. The survey should be referenced to verify the exact ownership and location of any particular tree.

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.
DECIDUOUS/EVERGREEN	Notes whether a tree is considered deciduous or evergreen.
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	Health rating of an assessed tree using a 5-tier system as follows: 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 unbalance 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.

# 7 TREE INVENTORY RESULTS

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Within the City of Newcastle, 461 trees were tagged and assessed for the tree inventory; 62 of these trees are considered significant trees by the City of Newcastle (Table 2).

The largest tree in the subject area in Newcastle is a 36-inch big leaf maple, the only healthy tree over 30 inches.

A total of 46 polygons containing smaller trees and shrubs were assessed along the corridor. The polygons mapped for this study contain anywhere from two small plants (p68; two small Beaked hazelnut trees) to over 100 small plants (e.g., p74; many black cottonwood, common hawthorn, beaked hazelnut and pacific madrone saplings). All the vegetation in these polygons have average stem diameters ranging from one-quarter inch to three inches.

Some of the subject trees (and tree polygons) in the May Creek Park and Lake Boren areas may be located in regulated wetlands and/or stream and wetland buffers. See the *City of Newcastle Critical Areas Delineation Report: Puget Sound Energy – Energize Eastside Project* (The Watershed Company, 2016) for more information about wetland and streams in Newcastle.

Table 2. Number of tagged and significant trees located on designated PSE segments in the City of Newcastle.

SEGMENT	NUMBER OF TAGGED TREES	NUMBER OF SIGNIFICANT <sup>1</sup> TREES	NUMBER OF POLYGONS <sup>2</sup> DESCRIBED
M <sup>3</sup>	461	62	46
NEWCASTLE TOTAL	461	62	46

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<sup>1</sup> According to NMC 18.06.598, a significant tree is any healthy evergreen tree measuring eight (8) inches in diameter at breast height (d.b.h.), or any healthy deciduous tree measuring twelve (12) inches at breast height (d.b.h.).

<sup>2</sup> Does not indicate number of trees included in each polygon. See spreadsheet for more information.

<sup>3</sup> Indicates partial Segments; only the portion of the Segment in the City of Newcastle is included in the tree total numbers

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