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ISA Arborist & TRAQ PN-8826A

ARBORIST MEMORANDUM

Attention: Aaron Olson, PE KPFF & Coreen Schmidt, PM KPG Psomas

Date: October 13, 2022

Project Title: N 148th Non-Motorized Bridge - Phase 1
Project Address: Site Address 307th NE 151st St, Shoreline, WA 98155
Project No: 16114W29

SCOPE & QUALIFICATIONS

On October 5th, 2022, KPG Psomas requested Land Meets Water (LMW) to perform tree risk assessments and determine the protection zone of the trees in the backyard of 307th NE 151st in Shoreline and potential impacts from the proposed underground vault.

LMW's certified ISA Arborist, qualified Tree Risk Assessor, and licensed Landscape Architect is Tristan Fields. Tristan has over three (3) years of experience doing tree risk assessments in relation to construction.

OBSERVATIONS

Methodology

LMW performed a visual level one and level two tree risk assessments from the Sound Transit working site. A level one and level two (2) tree risk assessments per ISA standards include, but are not limited to, visual inspection, tree identification, determination of targets, review of site conditions, a visual inspection of the tree, assessment of expected loads, assessment of general health, and record of site conditions. Initial tree assessments were undertaken by Urban Forestry Services in 2016 as part of the "Sound Transit Lynnwood Link Extension Tree Assessment Summary Report" (Barborinas, 2016).

Site Ecology

The site is a mixture of native and non-native species. The site borders the freeway and is in the Lake Washington watershed. The predominant wind direction is from the south/southwest (see Figure 1). As a tree reaches failure, the prevailing wind direction can cause the tree to fail in a specific direction.

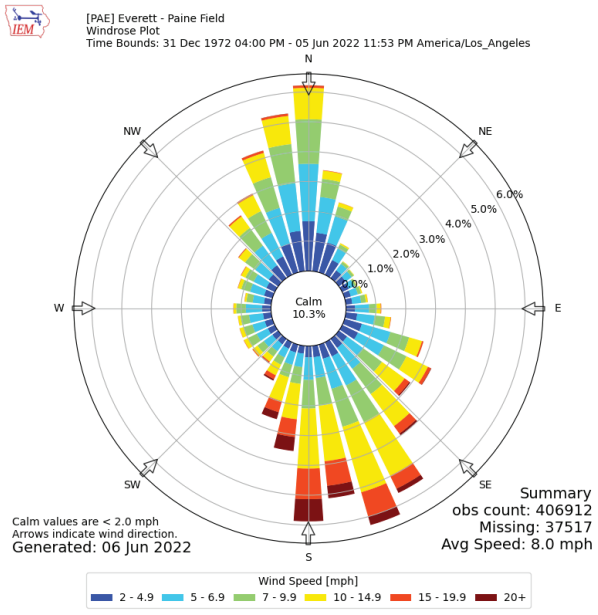


Figure 1 - *Windrose for Everett - Paine Field showing predominant wind direction.*

Image 1 - *Bird's eye aerial of project site with the tree's unique identifiers.*

Discussion

As the trees were not physically accessible, all measurements are from the 2016 arborist report. A conservative estimate of radial growth rate per year has been applied to each tree's DBH at .125" per year, giving each tree a 1.5" increase in diameter to compensate for the six (6) years between data collection and 2022. Estimating radial growth rate is a complicated function of an assortment of interacting variables. Applied is an average in this instance for ease of applicability.

Figure 2, below, shows all the existing trees on site applying the DBH as it translates to critical root zones (red dashed line) and the inner critical root zones (magenta dashed line). The site assessment revealed a variance between the proposed drawings and the existing site conditions. Figure 2 shows the estimated existing fence line location (magenta) and the proposed fence line location (light grey). Also shown in Figure 2 is the proposed underground vault.

Specifications

The impacts from the excavation for the proposed vaults will be significant to Trees 02, 03, 04, and 05. Trees 02, 03, 04, and 05 shall be removed.

Trees 02, 03, 04, and 05 are outside of parcel ownership of 307 NE 151st St (parcel number 3222200040). The trees also have varying degrees of health (see Table 1, page 3). Tree 02 is suspected to be in slow decline due to an infection of Bronze Birch Borers. Tree 03 is in fair health, showing drought stress, and Trees 04 and 05 are in decline with top die-back.

Tree replacements per municipal code 20.50.360.

Trees 01, 06, and 07 can be preserved. Because of the extent of excavation happening within the critical root zone (CRZ) of Trees 01 and 06, municipal code 20.50.370.E. shall be followed by having a project arborist on site to supervise the work. Any roots found within the CRZ of three inches or greater in diameter will be cleanly cut to the edge of the trench to avoid ripping of the root.

Trees 01, 06, and 07 should be monitored annually for decline and wind firmness. If the trunks of Trees 02, 03, 04, and 05 can be flush cut, that is preferred to aid in the structural health of Trees 01, 06, and 07.

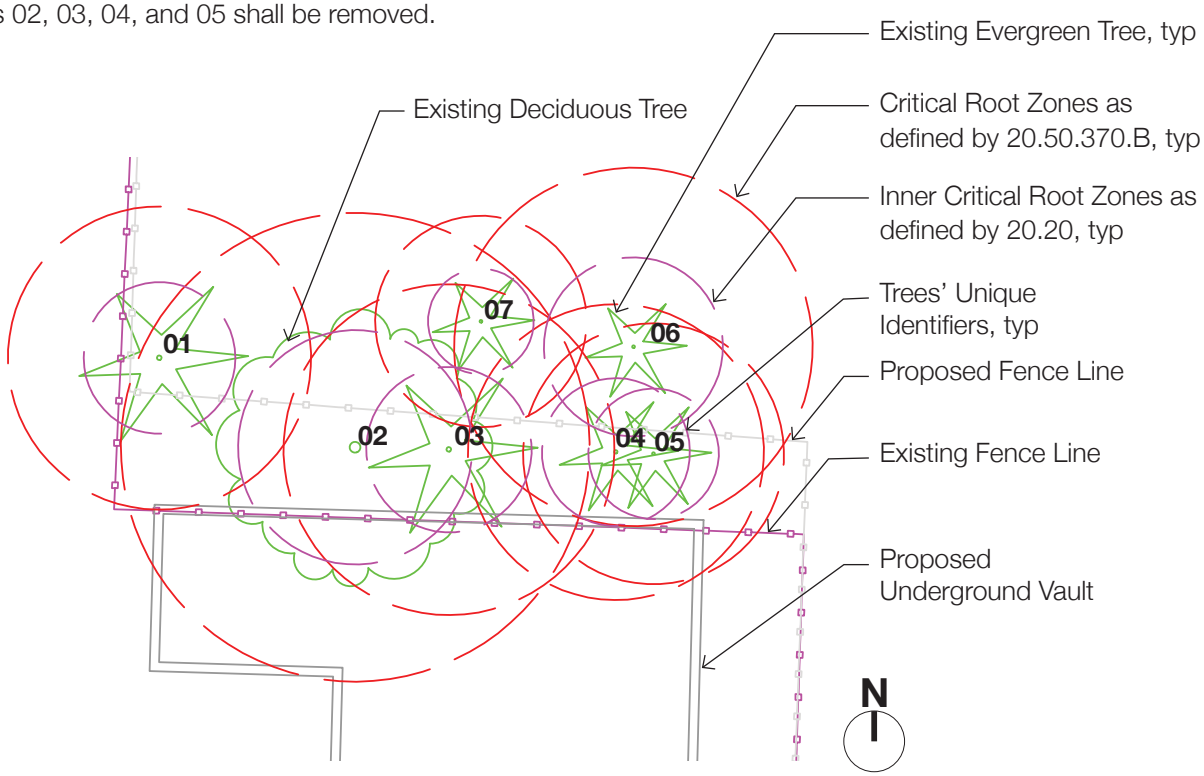


Figure 2 - *1:20 scale tree protection plan showing tree locations and critical root zones in relation to the underground vault.*

TABLE 1 - *SHOWING MEASUREMENTS & HEALTH OF INDIVIDUAL TREES*

Unique ID	Unique ID 2016	Latin Name	Common Name	DBH in 2016	Adjusted DBH	Condition from 2016	Condition from 2022
1	22970	Picea engelmannii	Rocky Mountain White Spruce	15”	16.5”	Fair, Slight lean to the west, dead branches	Fair, similar conditions to 2016
2	1354	Betula pendula	European White Birch	24”	25.5”	Fair, Topped with good response growth, broken branches	Slow decline, suspicion of Bronze Birch Borer infestation from die-back at the top of the tree
3	1355	Thuja occidentalis ‘Fastigiata’	Pyramidal Arborvitae	16.5”	18”	Fair, Sparse foliage, branch pruning, nice tapering, yellow foliage	Fair, showing drought stress, similar conditions to 2016
4	1356	Thuja occidentalis ‘Fastigiata’	Pyramidal Arborvitae	14.6”	16.1”	Fair, Tri-dominant union, 6” of included bark, trunk wound on stem 3, yellow foliage	Decline, showing die-back at the top
5	1357	Thuja occidentalis ‘Fastigiata’	Pyramidal Arborvitae	12.8”	14.2”	Fair, Tri-dominant union, two stems growing away from each other, included bark	Decline, showing die-back at the top
6	22968	Thuja plicata	Western Red Cedar	18”	19.5”	Fair, Leaning 45°, corrected at 3’, shaded by 1357	Fair, similar conditions to 2016
7	22967	Picea sitchensis	Sitka Spruce	10”	11.5”	Fair, Shaded on southern side by 1355, dead branches, slight lean to the north	Fair, similar conditions to 2016

DISCLAIMER

As the site was not physically accessible, there was some difficulty in discerning which trees on the survey and report were still viable today compared to the viable trees in 2016. The arborist used the best professional analysis and opinion.

Visual inspections determined the tree’s conditions from above ground. Of concern are trunk soundness, tree structure, bud fullness and color, twig length, crown ratio, the density of leaves, evidence of disease-causing bacteria, fungi or viruses, deadwood, and dead or broken hanging branches.

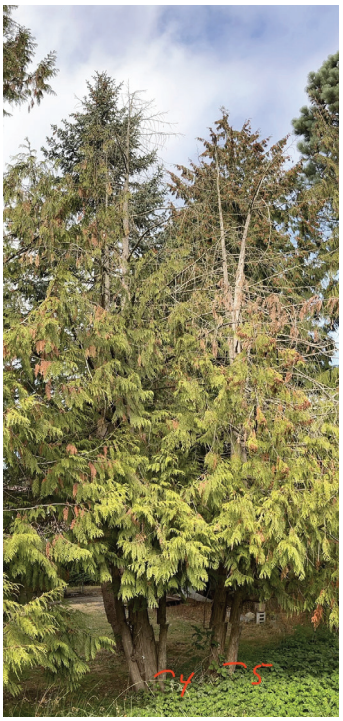
While no one can predict which trees will fail and which trees will remain healthy, by a methodical process, we can predict those most likely to fail by the conditions observed and take appropriate action to reduce or eliminate the potential hazard.

Tree 01 - *showing fair health and proximity to Tree 02*

Tree 02 - *showing classic symptoms of Bronze Birch Borer disease with top die-back*

Tree 02 - *looking south east*

Tree 03 - *hidden in the foliage of Tree 02*



Trees 04 & 05 - *showing top die-back, stress, and decline*

Trees 06, 07, and 01 - *looking south east, showing the fair health of Trees 06 & 07*

DEFINITIONS - CHAPTER 20.20 & 20.50.350

Critical Root Zone (CRZ). Shoreline 20.50.370.B The area, as defined by the International Society of Arboriculture (ISA), equal to one-foot radius from the base of the tree's trunk for each one inch of the tree's diameter at 4.5 feet above grade (referred to as diameter at breast height). Example: A 24-inch diameter tree would have a critical root zone radius (CRZ) of 24 feet. The total protection zone, including trunk, would be 50 feet in diameter. This area is also called the tree protection zone (TPZ). The CRZ area is not synonymous with the dripline. (Ord. 955 § 1 (Exh. A), 2022).

Hazard Tree. A tree that is either dead, permanently damaged and/or is continuing in declining health or is so affected by a significant structural defect or disease that falling or failure appears imminent, or a tree that impedes safe vision or traffic flow, or that otherwise currently poses a threat to life or property. (Ord. 955 § 1 (Exh. A), 2022).

Inner Critical Root Zone. The area, as defined by the International Society of Arboriculture (ISA), encircling the base of a tree equal to one-half the diameter of the critical root zone. This area may also be referred to as the interior critical root zone. Disturbance of this area would cause significant impact to the tree, potentially life threatening, and would require maximum post-damage treatment to retain the tree. (Ord. 955 § 1 (Exh. A), 2022).

Landmark Trees. Trees which have been designated as landmark trees by the City of Shoreline because they are 30 inches or larger in diameter or particularly impressive or unusual due to species, size, shape, age, historical significance and/or are an outstanding row or group of trees, have become a landmark to the City of Shoreline or are considered specimens of their species shall not be removed unless the applicant meets the exception requirements of subsection B of this section. The Director shall establish criteria and procedures for the designation of landmark trees. (Ord. 955 § 1 (Exh. A), 2022; Ord. 850 § 1 (Exh. A), 2019; Ord. 789 § 1 (Exh. A), 2018; Ord. 741 § 1 (Exh. A), 2016; Ord. 724 § 1 (Exh. A), 2015; Ord. 640 § 1 (Exh. A), 2012; Ord. 406 § 1, 2006; Ord. 398 § 1, 2006; Ord. 238 Ch. V § 5(G), 2000).

Significant Trees. Any healthy tree six inches or greater in diameter at breast height (dbh) excluding those trees that qualify for complete exemptions from Chapter 20.50 SMC, Subchapter 5, Tree Conservation, Land Clearing, and Site Grading Standards, under SMC 20.50.310(A). (Ord. 955 § 1 (Exh. A), 2022; Ord. 669 § 1 (Exh. A), 2013).