

Sequoia Report



In September of 2009, Grounds Manager, Shannon Britton, retained the services of Favero Greenforest, a Registered Consulting Arborist, to provide recommendations on the best methods to protect the Sequoia during the trenching to repair Piggot's steam line.

A tree root zone is larger and closer to the surface than most people would expect. The tree root zones usually extend 2-3 times that of the trunk and canopy. Protecting the root zone is critical because it collects and transports water and nutrients to the above ground portion of the tree. Not only do the roots collect and transport water they also create the stability that keeps the above ground portion of the tree upright. Recommendations were made for protecting the Sequoia using the following thresholds for assessing trees:

- **Rootplate.** The rootplate is a structural feature comprised of roots and soil equal in mass to that of the above-ground portion of the tree. It is disk-shaped, and in the event of windthrow, this disk rotates. Disturbance or encroachment into the rootplate can cause whole-tree failure. [1]
- **TPZ.** Tree Protection Zone is a recommended distance around the base of the tree to remain undisturbed. This area can be safely encroached on one side when the remaining sides are not disturbed. [2]
- **3 X DBH.** This is the distance from the tree where root injury and loss will affect tree stability. When a single linear soil cut past a tree occurs at this distance from the trunk, or closer, it affects the tree's ability to remain standing. If the remaining root system is undisturbed, there are adequate roots to maintain tree health, but the tree is predisposed to windthrow. [3]

Upon assessing the recommendations, air excavation as the trenching method was chosen because of its minimal disturbance to the root zone. Air excavation in the root zone of trees is performed using great volumes of compressed air to remove and break up soil in a way that does not wound the tree, leaving the roots and their bark intact and undamaged. Once the roots are made visible, it can be determined which can be pruned to allow additional room for further excavation, leaving the remaining roots intact.

Protection and the highest quality of care are key issues when preserving trees in construction sites.

During the steam line repair, it was necessary to trench on the south and west sides of the Sequoia's root zone. The trenching was extensive, affecting half of the tree's root zone. It's more difficult for a mature tree to adjust to changes in its root zone. Knowing this, Seattle University Grounds Department evaluated the Sequoia's site conditions and made adjustments that would help minimize stress to the Sequoia.

When the central leader turned brown in January 2010, atypical summer temperatures were considered a primary stressor. During July 2009, Seattle experienced higher than average extended summer temperatures. As temperatures increase, trees water requirements increase. The Sequoia's root zone had not yet recovered fully to transport enough water for atypical summer temperatures. The brown at the top is where the central leader experienced cellular damage.

Grounds and Landscaping

The Grounds Department Management Action Plan includes:

- Close visual monitoring of the top, watching for a lateral branch to become the new central leader. If multiple lateral branches compete for the central position, an arborist with certified tree worker climbing skills will need to be retained to evaluate and select a central leader, then remove competing lateral branches.
- The water needs for the Sequoia will be closely monitored by the Irrigation Specialist. This monitoring will include coring for below ground soil saturation, and visual inspection for plant turgor. He will then make the necessary adjustments to the water budget plan.
- The IPM Specialist will continue to monitor the tree for potential pests. The Sequoia rarely suffers from pest problems in our region. Application of biostimulants to the root zone will be applied to encourage root recovery.

The prospects are good for the Sequoia making a recovery with time and care. Sequoias are vigorous trees in the Pacific Northwest with little susceptibility to many of the pests and diseases of other conifers.

[1]Coder, Kim D. 2005. *Tree Biomechanics Series*. University of Georgia School of Forest Resources.

[2]Matheny, Nelda and James R. Clark. *Trees and Development. A Technical Guide to Preservation of Trees During Land Development*. ISA.

[3] Thomas Smiley, Ph.D. *Assessing the failure Potential of Tree Roots, shade Tree Technical Report*. Bartlett Tree Research Laboratories.

(<http://www.wunderground.com/history/airport/KSEA/2009/7/4/MonthlyHistory.html#calendar>)

