SUMMIT AVE. TREE SURVEY

Including an Analysis of Construction Impacts

Version 3.0

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Introduction and Scope of Work

Trees & Me LLC was engaged on July 2, 2022, to perform a tree survey and analysis as well as the preparation of this report at the request of the Save Our Street committee of the Summit Avenue Residential Preservation Association in Saint Paul, MN. Field work and surveys were performed in July and August 2022.

This report focuses on the results of a tree survey and analysis of the severity of potential construction impacts performed along Summit Avenue in Saint Paul, MN in three sections. The first survey location (Section 1) extends from Saratoga Street North to Albert Street North. The second survey location (Section 2) extends from Lexington Parkway South to Victoria Street South. The third survey location (Section 3) extends from Virginia Street to Nina Street.

Section 1 examines select trees in an area of Summit Avenue that may experience mill and overlay street construction at some point in the future. Trees were selected and surveyed from both sides of the center median as well as the north and south boulevards adjacent to the divided portion of Summit Avenue. Sections 2 and 3 examine trees in two areas of Summit Avenue that may experience complete street reconstruction at some point in the future.

The project area is limited to the survey and analysis of public trees in the areas described above and select private trees directly adjacent to the right-of-way that may experience impacts resulting from potential construction that may occur at some time in the future.

Tree surveys, data analysis, and report preparation was provided by Chad Giblin (Trees & Me LLC) and Manuel Jordán (Heritage Shade Tree Consultants).

Data Acquisition & Global Positioning Services

Data was acquired on several dates in July and August 2022 using ArcGIS Collector (Environmental Systems Research Institute, Redlands, CA, USA), global positioning services (GPS) were provided by an Arrow 100 GNSS Receiver (EOS Positioning Systems, Terrebonne QC, Canada). Data was collected by Chad Giblin (Trees & Me LLC) and Manuel Jordán (Heritage Shade Tree Consultants). Post-processing and data analysis was performed using ArcGIS Pro (Environmental Systems Research Institute, Redlands, CA, USA) and Microsoft Excel (Microsoft Corporation, Redmond, WA, USA).

Limitations & Assumptions

This survey is limited to trees present at the time of field surveys were performed. Analysis of construction impacts is limited by the lack of construction plans. For the purposes of estimating construction impacts in Section 1 it was assumed that a cleared vertical workspace area over the road (approximately 16 to 20 ft.) will be established to avoid vehicle and tree conflicts. Also assumed for Section 1 was an increased severity of construction impacts at intersections resulting from installation of new curbs and ramps. In Sections 2 and 3 it was assumed that all existing curbs, driveway aprons, sidewalks, and carriage walks will be removed and replaced using typical construction practices (e.g., 12 in. setback behind existing curbs and driveway aprons, 6 in. setback behind existing sidewalks and carriage walks.) It was also assumed that all existing and visible utilities (e.g., water, streetlights, etc.) will be removed and replaced. It was assumed that a cleared vertical workspace area over the road (approximately 20 to 24 ft.) will be established to avoid vehicle and tree conflicts in Sections 2 and 3.

Tree impacts were estimated without the inclusion of in situ tree protection or implementation of tree preservation measures. Changes to the scope of proposed construction activities and/or tree preservation measures that occur after this date will result in a need to perform a new analysis to update results.

This survey is limited to the 194 trees in the public right-of-way in the areas described in the scope of work. It does also include five selected trees on private property that are close enough to the project area where construction impacts to the trees are expected. During the data collection process, trees were inspected visually from the ground.

Executive Summary

At the request of Save Our Street, Trees & Me LLC was retained to perform a survey of trees in three sections of Summit Ave. to estimate the impact of proposed construction activities that may occur at some point in the future. Construction impacts were estimated for mill and overlay (Section 1) and complete street reconstruction (Sections 2 and 3). Complete street reconstruction was assumed to include the removal of the existing roadbed, curbs, sidewalks, carriage walks, and all visible utilities in these sections. Mill and overlay construction was assumed to occur entirely within the existing roadbed with curb and sidewalk construction occurring at intersections. Furthermore, construction impact estimates were made without final construction plans, as well as without the implementation of tree preservation measures. A total of 199 trees were surveyed including 194 public trees and five trees located on private property. Seventeen unique species were identified having an average stem diameter (diameter at breast height or DBH) of 17 inches. Minimum DBH surveyed was 2 inches and a maximum DBH surveyed was 32 inches. Estimated construction impacts increased notably when moving from mill and overlay construction to complete street reconstruction. Overall, 68 trees are estimated to have minor impacts, 48 with significant impacts, and 83 with severe impacts.

Tree Preservation Overview

Lacking tree preservation policies or ordinances at the Federal or State level In the United States, tree preservation practices are generally guided by policies and ordinances developed by local authorities or by individual practitioners using the practices set forth by the American National Standards Institute (ANSI). These standards and best management practices are described in *Tree, Shrub, and Other Woody Plant Management Standard Practices (Management of Trees and Shrubs During Site Planning, Site Development, and Construction (ANSI A300 (Part 5)-2019)* and *Tree, Shrub, and Other Woody Plant Management Standard Practices (Root Management) (ANSI A300 (Part 8)-2020 Root Management)*. The ANSI standards define expectations of those engaging in development and construction during plan review, throughout the construction process, and after construction is complete. Outcomes are typically less negative when tree preservation practices and policies are applied throughout the entire process of construction. Outcomes are also improved by providing a strong commitment to enforcement of tree protection during the construction process.

In stark contrast to the United States, tree preservation in the United Kingdom is defined by The Town and Country Planning (Tree Preservation) (England) Regulations 2012. These national regulations provide protection for certain species of trees or those in specific woodlands. Subsequent protection orders are drafted by local planning authorities for the purposes of tree preservation and protection.

In the United States, preservation policies and/or ordinances usually exist at the county or municipal level. These are typically designed like the regulations in the UK, where certain species, such as native oaks in Los Angeles County are recognized “as significant historical, aesthetic, and ecological resources” requiring a permit when construction or development may impact protected species in certain size classes. In Atlanta, GA, home to one of the most comprehensive and progressive tree preservation ordinances in the country, private and public trees are deemed locally important and are protected from willful removal, damage, or other harm. In some cases, protected trees may be removed by developers who must replant new trees to offset the loss of trees due to construction, but only after review by local planning authorities.

In Minnesota, many municipalities have a tree preservation ordinance that is designed to engage public officials when existing trees may be affected by construction or a new development. This allows for plan review prior to construction and to intervene for the benefit of tree preservation when possible or practical. In many cases, the protection of public trees when construction occurs on adjacent private property is addressed via an ordinance where preservation measures are approved by municipal staff during the planning phase. In Minneapolis, for example, the Minneapolis Park & Recreation Board (MPRB) has an Urban Forestry Policy that was adopted in 2004 to ensure the protection, management, replacement, and maintenance of the urban forest.

The City of Saint Paul also has a tree preservation ordinance that applies to a specific "Tree Preservation District" which is "located south of Lower Afton Road in Highwood" and "[a]nywhere in the city for residential development that affects slopes steeper than 12%". In these areas and situations developers must submit a Tree Preservation Plan for review by city staff. The plan must show existing trees on-site including those scheduled for removal, any new trees to be planted, existing and proposed grading, any new development (e.g., buildings, hard surfaces, changes to the existing grade), and tree protection measures designed to protect trees near construction areas. The areas surveyed for the purposes of this report are not a part of the Tree Preservation District in the City of Saint Paul.

A Case Study in Tree Failure

After the severe storms that occurred on June 21, 2013, a research project was commissioned by MPRB to investigate how construction activities influence tree failure (Johnson et. Al 2019). In this study (*A Case Study of the June 21, 2013 Wind Loading Event in Minneapolis: Tree Failures and the Relationship to Pre-existing Site Conditions*), Johnson and colleagues found that sidewalk replacement in the last five years adjacent to American basswood and linden (*Tilia* spp.) significantly increased the likelihood of complete tree failure (i.e., tipping) by 2.24 times during the aforementioned storm event. An increase in tree failure due to tipping was also observed in other species such as ash (*Fraxinus* spp.), maple (*Acer* spp.), and elm (*Ulmus* spp.) where these species were almost twice as likely to fail if sidewalks were replaced adjacent to these trees. The authors emphasize that this research is focused on only one storm event and limited to the 3,076 public trees surveyed as part of the research.

This research was largely in response to public complaints about adverse impacts to boulevard trees from sidewalk repair and replacement and acknowledging the gap of knowledge and dialogue between Minneapolis Public Works and the MPRB. After the 2013 storm event, the dialogue broadened to include other city departments, private developers, utilities, arborist companies and others, leading to improved specifications in city contracts and overall better communication between all entities involved in working around public trees. In 2016, as a result of the research conducted in 2013 by Johnson and colleagues, this policy was "updated to reflect the report findings and recommendations, and generally modernize the policy."

Tree Protection Definitions

Critical Root Zone (CRZ) is the area around the trunk where roots essential for tree health and structural stability are located. The CRZ is generally visualized as a circle superimposed over the tree which has a radius of at least one (1) foot for each one (1) inch of stem diameter measured at standard height. The area of the CRZ is modified based on tree vitality, maturity, and location. Impacts to or disruption of up to 20% of the CRZ will have minimal to moderate impacts to a healthy tree, which should have a high likelihood of recovery using conventional arboricultural practices. Disruption of or impacts to 20 to 33% of the CRZ may lead to an increased likelihood for a tree to become a negative landscape element that is not recoverable via conventional arboricultural practices. This likelihood is increased when coupled with impacts to the SRP. Disruption of over 33% of the CRZ is not recommended for trees that are to be retained post-construction. Protect the CRZ during construction via the application of six (6) inches or more of wood mulch topped with ¾" plywood to minimize soil compaction from construction traffic, equipment, and other related activities. This is especially important in staging areas or avenues of primary access to the construction site.

Structural Root Plate (SRP) is defined by a zone of rapid taper beginning at the root flare and moving outward, incorporating the associated structural root system. Preservation and protection of the SRP is focused on maintaining tree stability when forces are applied to the trunk and/or crown. SRP is proportional to the trunk diameter (DBH). Calculations for SRP include multiple variables including species, age, condition, and location. SRP is not defined by a consistent metric like CRZ and requires individual on-site interpretation by a trained and qualified arboricultural professional. Trees that experience disruption of or impacts to the SRP have an increased likelihood to become negative landscape elements that are not recoverable via conventional arboricultural practices. Root severance within the SRP may also contribute to a decrease in tree stability resulting from a reduction in anchoring via the structural root system. If trees are designated for protection during construction, a durable fence that prohibits access to this area by construction equipment and/or vehicles should be erected and maintained throughout the entire construction process to protect the SRP.

A Tree Protection Zone (TPZ) is an arborist-defined area surrounding the trunk intended to protect roots and soil within the construction limits. This area should have enough space to ensure minimal impact on the CRZ and no impact on the SRP, with the ultimate goal being a reasonable and practical expectation of tree survival many years after construction has ended.

Oak Wilt Prevention During Construction

Injury to all parts of oak trees (*Quercus* spp.) should be avoided from April through October to minimize the risk of oak wilt (*Bretziella fagacearum*) infection. Overland transmission of oak wilt occurs when oaks are wounded during periods of high-risk (typically April through October in Minnesota). These wounds attract beetles which feed on the sap at these exposed tissue sites while inadvertently transferring fungal spores of the oak wilt fungus. If any roots, trunk, and/or branches are accidentally damaged during construction, all wounds should be sprayed with clear shellac within 15 minutes of injury.

General Root Pruning Recommendations

If roots between 1 and 2 inches are exposed and must be severed during construction, they should be cut using a sharp saw that has been surface sterilized using a solution of water containing 10% bleach by volume and promptly buried or sprayed with shellac within 15 minutes of the injury.

Severance of roots greater than 2 inches is not advised. If severance is unavoidable during construction, root management should be supervised and/or performed by a qualified Certified Arborist with a background in root management and possessing a Tree Risk Assessment Qualification. Any root cutting should be performed using a sharp saw that has been surface sterilized using a solution of water containing 10% bleach by volume and promptly buried or sprayed with shellac within 15 minutes of the injury.

Post-Construction Management

Application of techniques and materials (e.g., wood mulch) designed to improve soil health and irrigation post construction will aid in recovery of roots impacted or lost due to construction practices.

Tree Survey Results & Construction Impact Analysis

Species Composition

- 24 - American basswood
- 12 - American elm
- 24 - Autumn Blaze Freeman maple
- 1 - Black walnut
- 7 - Bur oak
- 1 - Ginkgo
- 8 - Green ash
- 13 - Hackberry
- 6 - Honeylocust
- 5 - Hybrid elm
- 1 - Linden
- 27 - Norway maple
- 17 - Pin oak
- 7 - Red maple
- 2 - Red oak
- 10 - Silver maple
- 34 - Sugar maple

Tree Size

- Average DBH across all species was 17 in.
- Maximum DBH - 49 in. (American basswood)
- Minimum DBH – 2 in. (Hackberry, American elm, Autumn Blaze Freeman maple (tie))

Public vs. Private Trees

- 194 public trees
- 5 private trees

Construction Impacts

- 83 trees with severe construction impact
- 48 trees with significant construction impact
- 68 trees with minor construction impact

Discussion of Results

Species

A total of 199 trees comprising 17 unique species were identified as a result of this survey. Minnesota-native trees are represented by 12 unique species with introduced trees represented by five unique species, cultivars, and/or varieties (Figs. 1, 7, 8, 9)

All surveyed trees are deciduous trees (angiosperms), no coniferous trees (gymnosperms) were surveyed apart from one ginkgo, a deciduous gymnosperm. The highest number of individuals within a single species was observed in sugar maple (*Acer saccharum*) with 34 individual trees, followed by Norway maple (*Acer platanoides*) with 27 individual trees.

Tree Size (Diameter)

Average tree diameter (DBH) across all species was 17 inches. Maximum diameter observed was 49 inches in American basswood (*Tilia americana*) and minimum diameter observed was 2 inches (Hackberry, American elm, Autumn Blaze Freeman maple (tie)). The highest average diameter was observed in bur oak (*Quercus macrocarpa*) at 32 inches, and lowest average diameter was observed in honeylocust (*Gleditsia triacanthos*) (Figs. 2, 10, 11, 12).

Public vs. Private Trees

Public trees represented the majority of trees surveyed with 194 of 199 trees occurring within the right-of-way or the center median. The remaining five private trees were those occurring directly adjacent to the right-of-way on private property and were surveyed in Sections 2 and 3 (Figs. 13, 14).

Construction Impacts

A scale of construction impacts based on the level of damage inflicted by proposed and/or potential activities was utilized for estimated impact analysis. Construction impacts were estimated based on the proximity of proposed construction activities to existing trees. These impacts may include damage to the roots, trunk, and crown/branches. Particular focus was applied to assessment of impacts to the critical root zone and the structural root plate.

In Section 1, where impacts resulting from proposed mill and overlay construction were estimated, most trees will have minor impacts resulting from proposed construction; however, some will be impacted to a greater degree. In Sections 2 and 3, where impacts from proposed complete street reconstruction were estimated, most trees will have severe impacts resulting from proposed construction; however, some will be impacted to a lesser degree. In Section 3 all proposed construction will result in either severe or significant estimated impacts.

The 83 trees that were assigned a “severe” construction impact rating should be considered unlikely to recover from damage resulting from construction. As a result, these trees will develop into negative landscape elements, ultimately requiring removal. The 48 trees that received a "significant" construction impact rating, could possibly recover from damage resulting from construction. These trees have a lower likelihood of developing into negative landscape elements, assuming post-construction arboricultural recovery techniques are successful. A “minor” construction impact rating was assigned to 83 trees that will likely survive construction activities and continue to have the biological capacity to recover. Damage that may have occurred as a result of construction, can likely be mitigated through implementation of post-construction arboricultural recovery techniques (Figs. 3, 4, 5, 15, 16, 17).

Attestation

I certify that I have no present or contemplated future interest in the subject property, and that neither the employment of this report, nor the compensation for it, is contingent upon the results of the report.

I have no personal interest in or bias with respect to the subject matter of this report or the parties involved, and to my knowledge and belief, all statements and information in this report are true and correct.

Chad Patrick Giblin, M.S.

ISA Certified Arborist (MN-4668A)
ISA Qualified Tree Risk Assessor

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Manuel Jordán

ISA Certified Arborist (MN-0206A)
ISA Qualified Tree Risk Assessor

Attached Figures

References & Further Reading

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