City of minnetonka

Feasibility Report

2018 Woodhill Road Improvements

City of Minnetonka

City Project No. 18401

BMI Project No. T19.114042

Submitted by:
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BOLTON & MENK

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October 9, 2017

Honorable Mayor and City Council
City of Minnetonka
14600 Minnetonka Boulevard
Minnetonka, MN 55345

RE: 2018 Woodhill Road Improvements – Feasibility Report
City Project No. 18401
BMI Project No.: T19.114042

Mayor and Council Members:

In accordance with your direction, the following Feasibility Report has been prepared for the 2018 Woodhill Road Improvements.

As a part of the study, the various public utilities, pedestrian facilities, and associated impacts of improvement have been reviewed. Necessary improvements have then been recommended where appropriate. Estimated project costs have been calculated and included with these findings.

During the process of studying the existing conditions within the project areas, meetings were held and input was received from area residents, City staff, and permitting partners. We would like to acknowledge the cooperation and information received and thank all parties for their support in helping us better understand the problems and concerns within the project area.

Respectfully submitted,
Bolton & Menk, Inc.

Michael J. Waltman, P.E.
Principal Engineer

Certification

Feasibility Report

for

2018 Woodhill Road Improvements

City of Minnetonka
Minnetonka, MN

City Project No. 18401

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

By: _____
Michael Waltman, P.E.
License No. 48696

Date: October 9, 2017

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Appendix

I. Executive Summary

Background Information

The 2018 Woodhill Road Improvements Project was initiated in June, 2017 after being listed in the city of Minnetonka's Capital Improvement Program for several years. The feasibility study and report have been completed to identify the infrastructure improvements needed in the proposed project area, define costs associated with the improvements, and document these findings for use by decision makers. This report will also be used as the basis for the final design component of the project.

Proposed Improvements

The project proposes street and utility reconstruction along Woodhill Road from Excelsior Boulevard to Highway 7. Proposed improvements include:

- Bituminous street reconstruction and trail construction
- Concrete curb and gutter replacement / addition
- Replacement of a transmission watermain
- Replacement and addition of a distribution watermain and water service replacement
- Sanitary sewer spot repairs
- Minor drainage improvements
- Overhead power relocation (burial) and other private utility coordination

Proposed improvements are illustrated in figures found in Appendix B. The project is proposed to be constructed between May and November, 2018. Some public and private utility replacements, such as burial of overhead power, are anticipated to occur beginning in late fall of 2017 and continue into spring of 2018 as weather permits.

Estimated Costs & Proposed Funding

A summary of estimated project costs are shown below. The city of Minnetonka is proposed to fund the project as shown in the 2018 Capital Improvement Program.

Summary of Estimated Project Costs

Surface Improvements	$3,790,000
Sanitary Sewer Improvements	$240,000
Water System Improvements	$4,360,000
Storm Sewer Improvements	$700,000
Overhead Burial Improvements	$1,200,000
Easements	$10,000
TOTAL ESTIMATED PROJECT COST	**$10,300,000**

II. Project Introduction & Background

The 2018 Woodhill Road Improvements Project was initiated in June, 2017 after being listed in the city of Minnetonka's Capital Improvement Program for several years. The feasibility study and report have been completed to identify the infrastructure improvements needed in the proposed project area, define costs associated with the improvements, and document these findings for use by decision makers. This report will also be used as the basis for the final design component of the project.

This report was authorized in June, 2017 and examines the proposed pedestrian, street, and utility improvements along Woodhill Road from Excelsior Boulevard to Highway 7. The 1.15-mile corridor project area generally consists of single family residential homes for the northerly 1 mile with some commercial properties in the southerly two blocks near Excelsior Boulevard. Woodhill Road functions as a collector corridor to several single family residential neighborhoods to the east and west, supplementing Williston Road to some degree. The project location is shown on Figure 1 below.

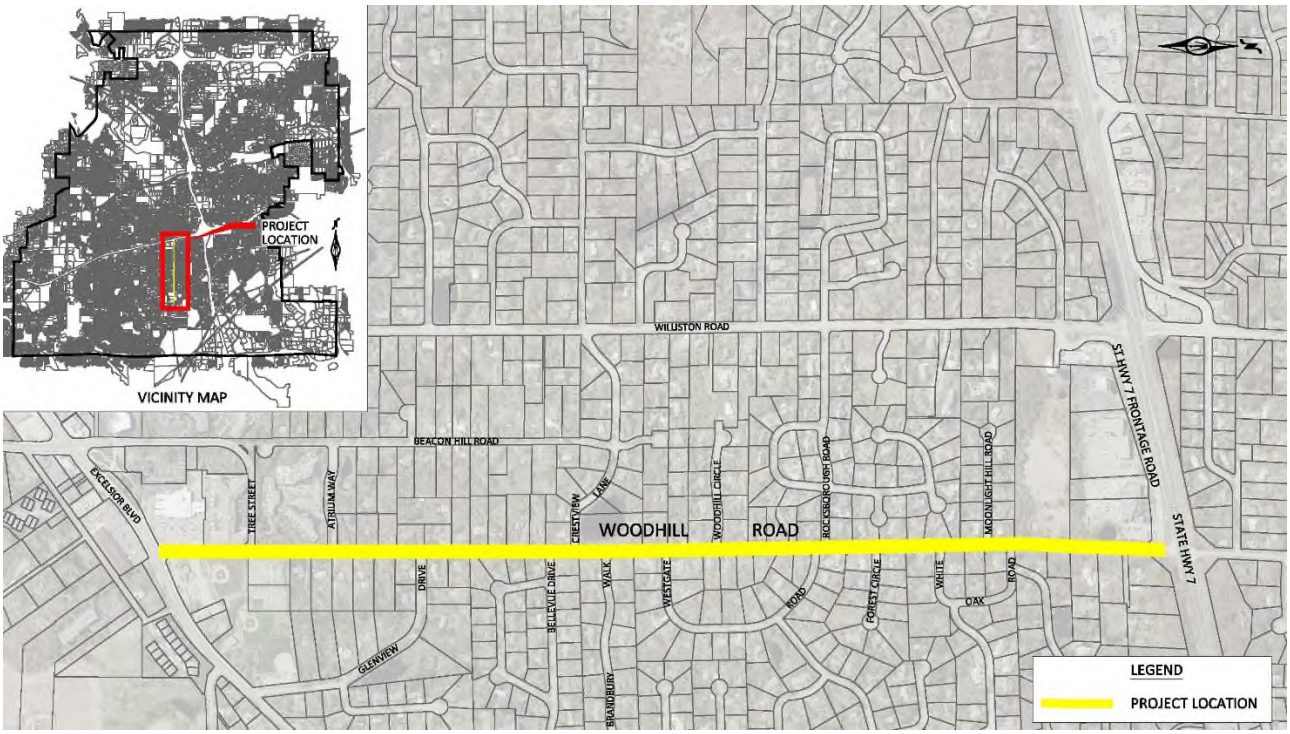


Figure 1: Project Location Map

The project scope involves:

- Bituminous street reconstruction and trail construction
- Concrete curb and gutter replacement / addition
- Replacement of a transmission watermain
- Replacement and addition of a distribution watermain and water service replacement
- Sanitary sewer spot repairs
- Minor drainage improvements
- Overhead power relocation (burial) and other private utility coordination

A topographic survey of the project area was completed in July, 2017 to facilitate evaluation of existing facility conditions. All public utilities within the project limits including watermain, sanitary sewer and storm sewer were evaluated in an effort to recommend appropriate rehabilitation techniques. Each utility was mapped and evaluated based on age, condition, and functionality.

Multiple preliminary design meetings were held with city staff to discuss needs and goals. Input from these meetings and the public were incorporated into the report recommendations.

III. Existing Conditions

Existing conditions are shown in the upper window of Figures 5-13 in Appendix B.

A. Streets

Woodhill Road is an existing bituminous street with varying width along the 1.15 mile long corridor. The corridor is currently a two lane rural section, primarily without curb and gutter with the exception of B612 concrete curb and gutter between Excelsior Boulevard and Atrium Way. Parking is allowed on either side of the street, but is not commonly utilized. The corridor has rolling terrain, with 130 feet of elevation difference between its high point and lowest point within the project area.

Table 1 summarizes the existing roadway conditions.

Table 1: Woodhill Road Existing Conditions

Limits From/To	Length	Approx. Existing Road Width	Existing Curb/Gutter?
Excelsior Boulevard to Tree Street	550'	36'	Yes
Tree Street to Atrium Way	490'	37.5'	Yes
Atrium Way to Glenview Drive	520'	36'	No
Glenview Drive to Brandbury Walk	890'	35'	No
Brandbury Walk to Westgate Road (south)	350'	41'	No
Westgate Road (south) to Westgate Road (north)	900'	41'	No
Westgate Road (north) to White Oak Road (south)	800'	40.5'	No
White Oak Road (south) to White Oak Road (north)	420'	45'	No
White Oak Road (north) to Quigley Road	690'	43'	No
Quigley Road to Highway 7	300'	43'	No

Numerous trees are located along the corridor and within the 66-foot-wide right-of-way, particularly in the area of single family residential homes north of Atrium Way. Average Daily Traffic (ADT) counts range from 3,161 near Highway 7 to 4,145 near Excelsior Boulevard.

A report of geotechnical exploration and review was completed by American Engineering and Testing, Inc. (AET) in June, 2017. Ten standard penetration test borings were taken within the project area. Geotechnical engineering analysis was prepared based on the boring samples. The existing soils beneath pavements in the project area most commonly included fill soils (former utility trenches) and the majority were classified as silty sands. The existing bituminous thickness ranged from 6 to 12 inches, but was most commonly a little more than 9 inches.

B. Pedestrian Facilities

Sidewalk is in place at the south end of the project corridor, between Excelsior Blvd and Tree Street, on both sides of Woodhill Road. The sidewalk continues on the west side of the roadway only from Tree Street to Atrium Way. North of Atrium Way, no existing pedestrian facilities are in place on either side of Woodhill Road.

C. Storm Sewer

The existing storm sewer system mainly consists of culverts which connect isolated low points and ponds adjacent to Woodhill Road. Most of the existing street does not have curb and gutter, allowing water to shed to these low lying wetland areas, and thus very little storm sewer piping exists along the project corridor.

D. Sanitary Sewer

The existing sanitary sewer system is generally located beneath the roadway along the length of Woodhill Road. The existing pipe condition was evaluated through review of televising reports, physical inspection, and discussions with city staff. Manhole structures were evaluated during a field survey completed by Bolton & Menk.

Televising reports show several deficiencies including cracked pipe, root and deposit buildup, and slight sags. Manhole evaluations revealed that the manholes are in good condition with minimal deterioration or leaking observed however most castings and concrete chimney sections are in poor condition.

E. Watermain

The existing water distribution system along the project corridor consists of 6-inch to 36-inch ductile iron pipe (DIP) or cast iron pipe (CIP) water lines. Due to the large variation in ground elevations across the project area, two pressure zones exist within the corridor. Each pressure zone is comprised of a separate network of piping.

A 36-inch trunk transmission pipeline exists to move water between the Tower Hill Reservoir, the north water treatment plants, and the south service area water treatment plants. A network of 6-inch and 8-inch distribution pipeline exists between Highway 7 and Westgate Road (south) to serve individual homes located in the high pressure zone.

Both the transmission and distribution watermains are located along the east side of Woodhill Road from Excelsior Boulevard to Crestview Lane and along the west side from Crestview Lane to Highway 7. The majority of the existing system is constructed outside or on the edge of the existing roadway. Some of the existing pipeline is located under trees, landscaping, and other features constructed adjacent to the roadway. The existing watermain is shown in the upper window of Figures 5-13 in Appendix B

Service lines in the corridor are connected to both transmission and distribution mains. Existing watermain valves and hydrants are also located throughout the project area. This pipe network was originally installed in the 1970s and has reached the end of its useful life. Minnetonka Public Works has documented watermain breaks and malfunctioning valves in Woodhill Road project area.

IV. Proposed Improvements

Proposed conditions are shown in the lower window of Figures 5-13 in Appendix B.

A. Streets

In addition to utility improvements, the project proposes to complete the following street improvements:

1. Add curb and gutter north of Atrium Way to provide curb and gutter to the entire length of the project area.
2. Add a bituminous trail from Tree Street to the South Frontage Road / Hwy 7 and reconstruct the existing sidewalk into bituminous trail between Tree Street and Atrium Way.
3. Create a consistent street width, as the corridor allows.
4. Replace the existing bituminous pavement.
5. Improve sight distance along the corridor.

South of Tree Street, the street section is proposed to be reclaimed and repaved. The limited open cut utility work and limited proposed work on curbs and sidewalks allows this less costly pavement rehabilitation method. North of Tree Street, the entire street section is to be reconstructed due to the amount of proposed utility work, age of the existing pavement, the addition of concrete curb and gutter, and addition of a bituminous trail.

Proposed street improvements include the installation of concrete curb and gutter and a new roadway section. Concrete curb and gutter is proposed to facilitate drainage without roadside erosion, create a confined edge for bituminous pavement installation, and provide a safety barrier between the roadway and proposed pedestrian facilities. Proposed reconstruction typical sections can be seen in Figures 2-4 in Appendix B.

- From Tree Street to Glenview Drive and from Brandbury Walk to Quigley Road (Figure 2), comprising 4300’ of the 5500’ of street reconstruction, Woodhill Road is proposed to be reinstalled at 30-foot-width, as measured from curb face to curb face. An 8-foot-wide bituminous trail is proposed to be installed along the west side of Woodhill Road, immediately at back of curb. The total footprint of the trail, curbs, and roadway totals 39.67’, which is nearly identical to the total footprint width. The center of the roadway is proposed to shift toward the east. This results from centering the proposed roadway footprint (with curbs and trail) over the existing roadway footprint.
- From Glenview Drive to Brandbury Walk (Figure 3), a length of about 900’, Woodhill Road is proposed to be reinstalled at 26-foot-width, again with the added 8-foot-wide bituminous trail at back of the west curb. The slightly narrowed roadway width was chosen to enable protection of retaining walls on the west side of Woodhill Road, and protect many trees and private landscaping on the east side. This proposed narrower portion is nearly matching the existing roadway footprint width in this area.
- From Quigley Road to Highway 7 (Figure 4), proposed improvements include reconstructing the roadway to 39-foot-wide. The additional width compared to other proposed segments is provided to address existing traffic operational issues. A left turn lane is proposed to be added for the northbound to westbound turning movement on Woodhill Road approaching the South Frontage Road. The addition of a designated turn lane will allow cars to wait for a permissible left turn without blocking the northbound vehicle movement. Additionally, a designated left turn lane will allow motorists to safely and legally bypass traffic that is stacked up waiting to make an eastbound entry onto Highway 7. The northbound Woodhill to eastbound Highway 7 traffic movement will also receive improvements. The southeasterly curb line will be widened to prevent continued ‘jumping’ of the curb or off-tracking, by trucks with trailers. The curb line will also be configured to accommodate a future acceleration lane entering Highway 7. A concrete median is proposed to be installed on the south leg of the Woodhill Road / Highway 7 intersection to split traffic into southbound and eastbound movements only. A hard barrier is necessary to prevent inadvertently using the left turn lane for Highway 7.

Along Woodhill Road the proposed roadway elevations are generally intended to match the existing roadway edge elevations. At centerline, this generally means the proposed profile elevation will be about six inches lower than existing to account for addition of six-inch-tall curbs at roadway edge. Only slight deviations from the existing profile will be made where beneficial and practical for proper drainage, or where sight distance improvements can be gained with minimal grading impacts outside the road. Adjacent driveways are also proposed to be reconstructed within the right-of-way as necessary to match the reconstructed roadway.

Pavement section improvements proposed for the project are consistent with the recommendations within the geotechnical report completed by AET. The proposed typical pavement section includes 7 inches of bituminous pavement over 10 inches of aggregate base class 5 placed on a compacted subgrade.

B. Pedestrian and Bicycle Facilities

An 8-foot-wide, multi-use trail is proposed along Woodhill Road from Tree Street to Highway 7. Consideration was given to installation of the trail on both the west and east sides of the roadway. The trail is proposed along the west side of Woodhill Road for a variety of reasons, three of which include:

- The trail will connect directly to the existing sidewalk at the South Frontage Road, near the General Store, without need to cross Woodhill Road
- The trail will align with the existing designated crossing of Excelsior Blvd on the west side of Woodhill Road
- The trail will provide a north-south pedestrian facility to properties between Woodhill Road and Williston Road, who would otherwise not have access to such a facility

The existing sidewalk is proposed to remain from Excelsior Boulevard to Tree Street, which along with the proposed trail, will create a continuous pedestrian facility between Excelsior Boulevard to Highway 7. The trail north of Tree Street trail is proposed to be installed directly at back of curb, which will facilitate easier snow plowing operations by the City.

The addition of facilities to serve on-street bicyclists was also considered in addition to an off-street multi-use trail. The result of adding a dedicated on-street facility would have significant additional impacts on adjacent trees and property as a result of a wider corridor footprint. Including an on-street facility would require as much as 12 feet of additional street footprint as well as additional boulevard and easement space for the trail and stormwater management areas. Understanding some advanced cyclists may still choose to utilize Woodhill Road in lieu of other available north-south routes, a 4-foot wide shoulder is proposed on both sides of Woodhill Road in addition to the two drive lanes and off-street trail.

Additionally, the connections formed and destinations reached by on-road cycling facilities were evaluated. Woodhill Road contains limited opportunity for cyclists coming from or headed to the north. From a broader perspective, Williston Road appears to be a more suitable north-south route for cyclists. As a result impacts to the area, and relatively significant additional costs with apparent limited benefit compared to other corridors, on-street bike lanes for advanced cyclists are not included in the proposed improvements.

C. Storm Sewer

The majority of the existing storm sewer piping, structures, and culverts are proposed to be replaced as a part of the project due to underlying watermain reconstruction and geometry changes necessary to accommodate the addition of curb and gutter. Additional storm water intake structures and piping are proposed to improve drainage and assist in removing water from the roadway surface in some areas where beneficial. The proposed storm sewer pipe

network will be designed to convey a 10-year storm event.

Existing drainage patterns will generally be maintained meaning the proposed storm sewer system will typically discharge water to the same locations as prior to the project.

Permanent stormwater management features (ponds, infiltration basins, etc.) are not required for this project based on the proposed improvements. The proposed corridor impervious area is not planned to increase and trigger additional stormwater management requirements. However, during final design potential improvements will be considered.

A drainage concern was reported to city staff near Quigley Road. As part of the final design, the low floor elevation of nearby homes will be compared to the predicted 100 year high water level of the basin at the southeast corner of Quigley Road and Woodhill Road. If necessary, an emergency overflow or additional piping will be evaluated to accommodate high water conditions. Other similar issues will be evaluated further during final design for consideration of potential improvements, generally involving connection of isolated low points and drainage basins to emergency outlets for high intensity rainfall events.

D. Sanitary Sewer

Two point repairs are proposed to repair cracked pipe. These point repairs are located at Westgate Road and north of Woodhill Circle. Proposed manhole rehabilitation includes the replacement of all manhole castings, chimney seals and concrete adjusting rings. Three manholes require additional repair and reconstruction of the bottom invert portion of the manhole.

E. Watermain

Woodhill Road contains the city's trunk watermain for transmission of high volumes of potable water to the south half of the city, which is located between Excelsior Boulevard and Moonlight Hill Road. The transmission main, which is 36 inches in size, operates at lower pressures in this area and therefore is referred to as the low pressure system.

A hydraulic analysis of the existing 36-inch transmission pipeline was completed to evaluate several aspects of this pipeline in preparation for its replacement. Significant findings are:

- The 36-inch transmission pipeline can be taken offline during a system demand of 22.0 MGD with minor exceptions.
- Based on a review of the water model for the area, the water system is generally adequately sized. The 36-inch transmission pipeline could be reduced in size to as small as 24-inch diameter.
- Removing individual property service lines from the transmission pipeline would benefit the reliability of the transmission pipeline.

The low pressure transmission main is proposed to be replaced with a 30-inch High Density Polyethylene (HDPE) transmission pipe and a parallel 8-inch ductile iron distribution pipe. Improvements related to this are as follows, and as shown in the lower window of Figures 5-13 in Appendix B.

- Between Excelsior Boulevard and Brandbury Walk the existing 36-inch transmission line is proposed to be replaced by sliplining method. A 30-inch (internal diameter) HDPE pipe will be pulled through the inside of the larger pipe. This replacement technique will reduce impact to adjacent properties and allow efficient and cost effective replacement of the existing transmission line. Sliplining requires access pits at each connection and at the end of each segment to allow the new pipe to be inserted into the existing pipe. The contractor will therefore need to excavate a 20-foot-wide by 50-foot-long access pit every 500'-800' along the roadway even with this otherwise trenchless method.

- The proposed 30-inch transmission main serves to move water across the ridge, from the Tower Hill Reservoir / north water treatment plants to the south service area and south water treatment plant. Given the vital nature of this main to the overall water distribution system for the city of Minnetonka, all individual service connections are proposed to be removed. Hydrant connections to the transmission main will be limited to only those needed for flushing and maintenance of the system. Minimizing connections with the transmission main is intended to increase its reliability and ease operation of the system to meet the city's needs.
- A connection between the transmission main and Westgate Road watermain is necessary to maintain adequate fire protection in the area. Additional system flexibility may be gained by adding interconnections at Crestview Lane, Atrium Way and Tree Street, though these interconnection locations and will be further evaluated during final design to determine their functionality.
- While individual service lines and fire hydrants on the 30-inch transmission main are not desirable connections, they remain necessary to serve adjacent properties to Woodhill Road. To accommodate these needs, a parallel 8-inch watermain is proposed to be installed between Tree Street and Highway 7 for reconnections of single family water services and hydrants.

Replacement of the existing 6-inch and 8-inch local watermain distribution system piping is proposed. The improvements related to this are as follows:

- All water service lines to individual properties along the corridor are proposed to be replaced to the right-of-way line with a minimum 1 ½ - inch diameter copper pipe. A new curb stop and box will be provided on each service.
- The high pressure system distribution piping is proposed to be replaced with new 6-inch and 8-inch Ductile Iron Pipe (DIP). In order to minimize impact to adjacent properties during current construction and future conflicts with overlaying landscaping, trees and driveways, as well as create a more uniform and consistent pipe network, these lines will be moved under the roadway parallel to the existing sanitary sewer from Westgate Road to Rocksborough Road and from Moonlight Hill Road to White Oak Road with the remaining segments parallel to the west curb line. This will provide uniformity to the system to facilitate future maintenance as well as maintain boulevard space for private utility installation.
- Hydrants will be installed at appropriate spacing for fire protection and maintenance on this pipe network if conversion from low pressure to high pressure is necessary it will be worked out through the final design process and any necessary modifications to piping within the homes will be discussed with each property owner.

Proposed watermain improvements will be phased to minimize outages and shutdowns to adjacent properties. Temporary water lines will be provided in order to maintain service during construction. Fire flow capacity impact has been evaluated for all adjacent waterlines during the shutdown of the 36-inch transmission pipe. In order to maintain minimum fire flow capacity in adjacent lines temporary connections at Beacon Hill Road, Bellevue Drive, Glenridge Road and Brandbury Walk will be evaluated to provide additional fire flow to these areas during construction.

F. Tree Impacts

A goal of the project is to minimize these impacts and therefore each proposed improvement was considered in concert with understanding of potential tree impacts. Given the presence of deteriorating underground utilities, some impact to mature trees is anticipated with the project. Further consideration of methods to save more trees will also occur during the final design process, and per field review prior to construction.

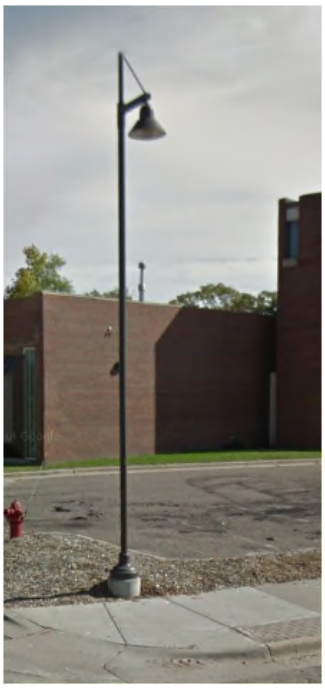
Perhaps more notably, at many existing fire hydrant and water service valve locations, shrubs and brush have grown over the existing utilities. Shrubs and brush over these facilities will be removed where necessary for excavation and replacement of underlying facilities. There are 15 locations where shrubs and brush will need to be removed and it is anticipated more locations will be identified by Xcel Energy for their burial of overhead power lines and removal of existing poles on the east side of Woodhill Road.

Tree and shrub trimming to facilitate construction and protect the overall health of vegetation is also anticipated.

G. Overhead Power Facilities

Overhead power lines and poles located on the east side of Woodhill Road are owned by Xcel Energy. In conjunction with the planned municipal improvements along this collector roadway, Xcel Energy will be replacing their existing overhead system on the east side of Woodhill Road with an underground system. All existing mainline and service wire will be buried underground throughout the project site. This work will be completed under city permits by Xcel Energy in fall, 2017 and continuing into early spring, 2018. Coordination with Xcel Energy is currently underway regarding timing of this work. Additional tree impacts may occur related to this work.

Existing overhead power lines on the west side of Woodhill Road are proposed to remain. These lines are transmission power, which cannot be buried due to the voltage they carry.



Above: Existing Lighting Unit Excelsior Blvd to Atrium Way

H. Street Lighting

Woodhill Road has existing public street lighting on both sides of the roadway between Excelsior Boulevard and Tree Street. Pedestrian scale lighting also exists along the west side of Woodhill Road north of Tree Street for one block, up to Atrium Way. The existing lighting units along the west side of the roadway are located beneath an Xcel Energy transmission power line expected to remain in place. Overhead power lines safety requirements demand appropriate clearances per code, with the specific clearance distances varying based on voltage of the power line and the qualifications of the individual entering the clearance distance.

Three lighting alternatives were evaluated for potential modification of the lighting system to avoid placement of lights under the transmission lines. This analysis is included in the appendix of the report.

From review of the findings, it was determined most cost effective to contract light maintenance and retain the existing lighting system. The city's Public Works Department could contract with a qualified electrician for routine maintenance needs on the lighting system which should mitigate the clearance issues. The use of qualified professionals can reduce the necessary clearance from the overhead power lines, per Xcel Energy. Additionally, the Public Works Department plans to complete improvement of the area lighting system with a separate project along Tree Street.

The replacement of shorter pedestrian lighting is proposed to be completed in conjunction with this project.

I. Street Signing and Striping

All existing signs are proposed to be replaced. Centerline and fog line striping will be installed upon completion of the paving operation. The proposed street width is typically 26 feet or 30 feet between curb faces, which provides either 13 or 15 feet on each side of

roadway centerline. Fog line striping is proposed to be installed 11 feet off centerline on each side for both conditions. While more width will effectively be provided for large vehicles and bicyclists, the striped 11-foot-width is intended as a simple traffic calming measure. Driver speed is typically impacted by the perception narrow corridors, causing motors to reduce speed.

J. Public Informational Meeting

A public informational meeting was held on September 28, 2017 at the Minnetonka Community Center and was attended by approximately 80 residents and property owners that are affected by the improvements. Invitations to this meeting were sent to 449 adjacent properties in an effort to inform as many people as possible about the project. Road signs and web postings were also utilized to make people aware of the meeting schedule. A presentation was given by city staff outlining the preliminary scope and schedule of the project. Following the presentation an open question and answer session was conducted. Following group discussion, questions, and responses, city staff and consultants were available for individual detailed questions and an open review of the project layouts. Attendees were provided comment cards which are included in Appendix C along with a summary of the meeting.

Much of the resident questions and discussion involved the width of the proposed roadway and side of the street the trail was proposed to be constructed. Specific concerns were raised regarding if parking would be restricted as a result of the narrower street. Parking is not proposed to be restricted as part of the project, but staff acknowledged at the meeting that shoulders would be reduced. Parking on Woodhill Road does not appear to be a commonplace today, and when parking was observed in the project area traffic was able to be accommodated even when parked vehicles encroached the drive lane. When asked if parking on Woodhill Road was common or a problem, the general consensus of neighbors at the meeting was that parking is not common and special accommodations for a designated parking area are not necessary.

V. Estimated Costs

Estimated construction costs presented in this report include a 12.5 percent contingency factor. Overhead costs, estimated at 25 percent, include legal, engineering, administrative and fiscal costs. Final costs and assessments will be determined by using low-bid construction costs of the proposed work.

Proposed construction costs for the 2018 Woodhill Road Improvements (including curb and gutter, bituminous street, pedestrian facilities, storm sewer, sanitary sewer, watermain, and turf restoration) are itemized in Appendix A and are summarized below. These cost estimates are based upon public construction cost information. Since the consultant has no control over the cost of labor, materials, competitive bidding process, weather conditions and other factors affecting the cost of construction, all cost estimates are opinions for general information of the client and no warranty or guarantee as to the accuracy of construction cost estimates is made. It is recommended that costs for project financing should be based upon actual, competitive bid prices with reasonable contingencies.

Summary of Estimated Project Costs

SURFACE IMPROVEMENTS	$3,790,000
SANITARY SEWER IMPROVEMENTS	$240,000
WATER SYSTEM IMPROVEMENTS	$4,360,000
STORM SEWER IMPROVEMENTS	$700,000
OVERHEAD BURIAL IMPROVEMENTS	$1,200,000
EASEMENTS	$10,000
TOTAL ESTIMATED PROJECT COST	**$10,300,000**

VI. Right-of-Way / Easements / Permits

The proposed improvements will be constructed within the existing street right-of-way (ROW) along the corridor.

Permit needs will be verified during final design. A preliminary list of anticipated permits for construction of the improvements include:

- Minnesota Pollution Control Agency (NPDES Construction Stormwater)
- Minnesota Department of Health (Public Watermain)
- City LGU Process for Erosion/Sediment Control
- Hennepin County (Right of Way)
- MnDOT (Right of Way)
- Wetland Conservation Act Compliance

VII. Project Schedule

The following schedule is proposed for completion of the project:

Presentation of Feasibility Report, Order Final Plans & Specifications ..... October 9, 2017

Final Design ..... October, 2017 – February, 2018

Private Utility Relocation ..... November, 2017 – April, 2018

Present Final Plans / Authorize Ad for Bids ..... February 26, 2018

Open Bids ..... March 26, 2018

Award Project ..... April 9, 2018

Construction ..... May – November 2018

VIII. Feasibility and Recommendation

From an engineering standpoint, this project is feasible, cost effective, and necessary and can best be accomplished by letting competitive bids for the work. It is recommended that the work be done under one contract in order to complete the work in an orderly and efficient manner. The city will have to determine the economic feasibility of the proposed improvements.

Appendix A: Preliminary Cost Estimates

PRELIMINARY ENGINEER'S ESTIMATE

2018 WOODHILL ROAD IMPROVEMENTS
CITY OF MINNETONKA, MN
BMI PROJECT NO. T19.114042

				ESTIMATED QUANTITY				ESTIMATED COST				TOTAL	TOTAL
ITEM NO.	DESCRIPTION	UNIT	ESTIMATED UNIT PRICE	SCHEDULE A SURFACE	SCHEDULE B SANITARY	SCHEDULE C WATER	SCHEDULE D STORM	SCHEDULE A SURFACE	SCHEDULE B SANITARY	SCHEDULE C WATER	SCHEDULE D STORM	ESTIMATED QUANTITY	ESTIMATED TOTAL COST
1	MOBILIZATION	LS	$400,000.00	0.25	0.25	0.25	0.25	$100,000	$100,000	$100,000	$100,000	1.00	$400,000
2	TRAFFIC CONTROL	LS	$25,000.00	0.25	0.25	0.25	0.25	$6,250	$6,250	$6,250	$6,250	1.00	$25,000
3	CLEAR & GRUB TREE	TREE	$500.00	20				$10,000	$0	$0	$0	20	$10,000
4	TREE TRIMMING	UMP SU	$5,000.00	1				$5,000	$0	$0	$0	1	$5,000
5	REMOVE CONCRETE CURB & GUTTER	LF	$5.50	2000				$11,000	$0	$0	$0	2,000	$11,000
6	REMOVE BITUMINOUS PAVEMENT	SY	$6.00	28500				$171,000	$0	$0	$0	28,500	$171,000
7	REMOVE CONCRETE PAVEMENT	SF	$1.25	17840				$22,300	$0	$0	$0	17,840	$22,300
8	SAWING CONCRETE PAVEMENT (FULL DEPTH)	LF	$7.00	1500				$10,500	$0	$0	$0	1,500	$10,500
9	SAWING BITUMINOUS PAVEMENT (FULL DEPTH)	LF	$3.50	1500				$5,300	$0	$0	$0	1,500	$5,300
10	RELOCATE MAILBOX	EACH	$100.00	14				$1,400	$0	$0	$0	14	$1,400
11	TEMPORARY MAILBOX	EACH	$50.00	35				$1,800	$0	$0	$0	35	$1,800
12	COMMON EXCAVATION (P) (EV)	CY	$20.00	27000				$540,000	$0	$0	$0	27,000	$540,000
13	SUBGRADE EXCAVATION (EV)	CY	$20.00	2100				$42,000	$0	$0	$0	2,100	$42,000
14	SUBGRADE PREPARATION	SY	$1.00	25300				$25,300	$0	$0	$0	25,300	$25,300
15	AGGREGATE BASE CLASS 5 (CV)	TON	$20.00	16100				$322,000	$0	$0	$0	16,100	$322,000
16	STABILIZING AGGREGATE (CV)	CY	$25.00	2100				$52,500	$0	$0	$0	2,100	$52,500
17	TOPSOIL BORROW (SPECIAL) (LV)	CY	$40.00	1220				$48,800	$0	$0	$0	1,220	$48,800
18	TYPE SP 12.5 NON WEARING COURSE MIXTURE (2,B)	TON	$70.00	5400				$378,000	$0	$0	$0	5,400	$378,000
19	TYPE SP 9.5 WEARING COURSE MIXTURE (2,B)	TON	$74.00	4150				$307,100	$0	$0	$0	4,150	$307,100
20	TYPE SP 9.5 WEARING COURSE MIXTURE B (DRIVEWAYS)	SY	$30.00	900				$27,000	$0	$0	$0	900	$27,000
21	TYPE SP 9.5 WEARING COURSE MIXTURE B (TRAIL)	SY	$22.50	4000				$90,000	$0	$0	$0	4,000	$90,000
22	SAWED/SEALED JOINT	LF	$2.50	2930				$7,300	$0	$0	$0	2,930	$7,300
23	JOINT ADHESIVE	LF	$0.75	12000				$9,000	$0	$0	$0	12,000	$9,000
24	B612 CONCRETE CURB AND GUTTER	LF	$12.00	11700				$140,400	$0	$0	$0	11,700	$140,400
25	4" CONCRETE WALK	SF	$5.75	1000				$5,800	$0	$0	$0	1,000	$5,800
26	6" CONCRETE PEDESTRIAN RAMP	SF	$6.00	2000				$12,000	$0	$0	$0	2,000	$12,000
27	6" CONCRETE DRIVEWAY PAVEMENT	SF	$7.00	12200				$85,400	$0	$0	$0	12,200	$85,400
28	TRUNCATED DOMES	SF	$50.00	400				$20,000	$0	$0	$0	400	$20,000
29	SEED MIXTURE 25-131 WITH HYDRAULIC MATRIX TYPE COMPOST	SY	$1.50	1000				$1,500	$0	$0	$0	1,000	$1,500
30	SEED MIXTURE 34-261 WITH EROSION CONTROL BLANKET CATEGORY 3	SY	$2.00	1000				$2,000	$0	$0	$0	1,000	$2,000
31	SODDING TYPE LAWN	SY	$5.00	11000				$55,000	$0	$0	$0	11,000	$55,000
32	WATER (TURF ESTABLISHMENT)	MGAL	$35.00	500				$17,500	$0	$0	$0	500	$17,500
33	WATER (DUST CONTROL)	MGAL	$25.00	300				$7,500	$0	$0	$0	300	$7,500
34	CONSTRUCT MODULAR BLOCK RETAINING WALL	SF	$40.00	400				$16,000	$0	$0	$0	400	$16,000
35	IRRIGATION SYSTEM REPAIR	EACH	$1,000.00	15				$15,000	$0	$0	$0	15	$15,000
36	STABILIZED CONSTRUCTION ENTRANCE	EACH	$1,000.00	4				$4,000	$0	$0	$0	4	$4,000
37	SIGN PANEL TYPE C	SF	$30.00	200				$6,000	$0	$0	$0	200	$6,000
38	SIGN PANEL TYPE D	SF	$45.00	100				$4,500	$0	$0	$0	100	$4,500
39	FURNISH & INSTALL SIGN POST	EACH	$100.00	30				$3,000	$0	$0	$0	30	$3,000
40	PAVT MSSG (LEFT ARROW) -PREF THERMO (GR IN)	EACH	$500.00	2				$1,000	$0	$0	$0	2	$1,000
41	PAVT MSSG (RIGHT ARROW) -PREF THERMO (GR IN)	EACH	$500.00	2				$1,000	$0	$0	$0	2	$1,000
42	4" SOLID LINE WHITE-EPOXY	LF	$0.50	11500				$5,800	$0	$0	$0	11,500	$5,800
43	4" SOLID LINE YELLOW -EPOXY	LF	$0.50	500				$300	$0	$0	$0	500	$300
44	4" DOUBLE SOLID LINE YELLOW-EPOXY	LF	$1.00	11500				$11,500	$0	$0	$0	11,500	$11,500
45	STREET LIGHTING SYSTEM MODIFICATIONS	LS	$100,000.00	1				$100,000	$0	$0	$0	1	$100,000
45	REPAIR SANITARY MANHOLE	EACH	$4,200.00		3			$0	$12,600	$0	$0	3	$12,600
46	CHIMNEY SEAL (SANITARY)	EACH	$350.00		22			$0	$7,700	$0	$0	22	$7,700
47	SANITARY SEWER CASTING ASSEMBLY	EACH	$700.00		22			$0	$15,400	$0	$0	22	$15,400
48	ADJUST CASTING	EACH	$500.00		22			$0	$11,000	$0	$0	22	$11,000
49	EXPLORATORY EXCAVATION	HOUR	$600.00		12	40		$0	$7,200	$24,000	$0	52	$31,200
50	SPOT REPAIR SANITARY SEWER PIPE	LS	$6,000.00		2			$0	$12,000	$0	$0	2	$12,000
51	REMOVE WATERMAIN	LF	$11.00			800		$0	$0	$8,800	$0	800	$8,800
52	ABANDON WATERMAIN	LF	$8.00			3050		$0	$0	$24,400	$0	3,050	$24,400
53	REMOVE GATE VALVE	EACH	$250.00			25		$0	$0	$6,300	$0	25	$6,300
54	REMOVE HYDRANT	EACH	$500.00			15		$0	$0	$7,500	$0	15	$7,500
55	6" WATERMAIN	LF	$45.00			600		$0	$0	$27,000	$0	600	$27,000
56	8" WATERMAIN	LF	$50.00			6000		$0	$0	$300,000	$0	6,000	$300,000
57	30" WATERMAIN	LF	$250.00			5200		$0	$0	$1,300,000	$0	5,200	$1,300,000
58	BORING PITS - TRENCHLESS WATERMAIN	EACH	$15,000.00			10		$0	$0	$150,000	$0	10	$150,000
59	CELLULAR GROUT (WMN ANNULAR SPACE - SLIP LINING)	CY	$150.00			300		$0	$0	$45,000	$0	300	$45,000
60	DUCTILE IRON FITTINGS	LB	$9.00			10000		$0	$0	$90,000	$0	10,000	$90,000
61	6" GATE VALVE	EACH	$1,600.00			20		$0	$0	$32,000	$0	20	$32,000
62	8" GATE VALVE	EACH	$2,000.00			57		$0	$0	$114,000	$0	57	$114,000
63	10" GATE VALVE	EACH	$3,500.00			1		$0	$0	$3,500	$0	1	$3,500
64	INSERT 24" VALVE	EACH	$30,000.00			1		$0	$0	$30,000	$0	1	$30,000
65	30" BUTTERFLY VALVE	EACH	$15,000.00			10		$0	$0	$150,000	$0	10	$150,000
66	AIR RELEASE MANHOLE (30" WATERMAIN)	EACH	$25,000.00			2		$0	$0	$50,000	$0	2	$50,000
67	1.5" CURB STOP & BOX	EACH	$525.00			40		$0	$0	$21,000	$0	40	$21,000
68	1.5" CORPORATION STOP	EACH	$500.00			40		$0	$0	$20,000	$0	40	$20,000

PRELIMINARY ENGINEER'S ESTIMATE

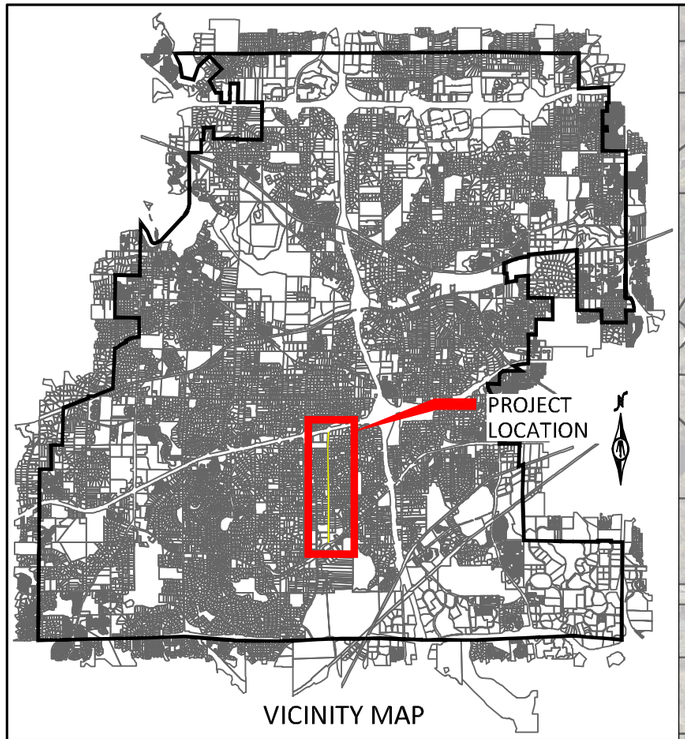
2018 WOODHILL ROAD IMPROVEMENTS
CITY OF MINNETONKA, MN
BMI PROJECT NO. T19.114042

				ESTIMATED QUANTITY				ESTIMATED COST				TOTAL	TOTAL
ITEM NO.	DESCRIPTION	UNIT	ESTIMATED UNIT PRICE	SCHEDULE A SURFACE	SCHEDULE B SANITARY	SCHEDULE C WATER	SCHEDULE D STORM	SCHEDULE A SURFACE	SCHEDULE B SANITARY	SCHEDULE C WATER	SCHEDULE D STORM	ESTIMATED QUANTITY	ESTIMATED TOTAL COST
69	1.5" PRESSURE REDUCING VALVE	EACH	$2,500.00			8		$0	$0	$20,000	$0	8	$20,000
70	HYDRANT	EACH	$5,000.00			19		$0	$0	$95,000	$0	19	$95,000
71	TEMPORARY WATER SYSTEM (LOCAL SERVICE)	LS	$30,000.00			1		$0	$0	$30,000	$0	1	$30,000
72	TEMPORARY BYPASS PIPE (TRANSMISSION)	LF	$60.00			5200		$0	$0	$312,000	$0	5,200	$312,000
73	TEMPORARY BYPASS PIPE CONNECTIONS (TRANSMISSION)	EACH	$5,000.00			6		$0	$0	$30,000	$0	6	$30,000
74	1.5" TYPE K COPPER PIPE	LF	$35.00			1200		$0	$0	$42,000	$0	1,200	$42,000
75	1.5" TYPE K COPPER PIPE (TRENCHLESS INSTALLATION)	LF	$65.00			100		$0	$0	$6,500	$0	100	$6,500
75	4" POLYSTYRENE INSULATION	SY	$50.00			50		$0	$0	$2,500	$0	50	$2,500
76	WATER SERVICE LID COVER	EACH	$275.00			10		$0	$0	$2,800	$0	10	$2,800
76	CONNECT TO EXISTING WATER SERVICE	EACH	$500.00			40		$0	$0	$20,000	$0	40	$20,000
77	CONNECT TO EXISTING WATERMAIN	EACH	$1,500.00			20		$0	$0	$30,000	$0	20	$30,000
77	REMOVE DRAINAGE STRUCTURE	EACH	$450.00				30	$0	$0	$0	$13,500	30	$13,500
78	REMOVE SEWER PIPE (STORM)	LF	$15.00				1500	$0	$0	$0	$22,500	1,500	$22,500
78	REMOVE STORM PIPE APRON	EACH	$300.00				1	$0	$0	$0	$300	1	$300
79	ADJUST STORM FRAME & RING CASTING	EACH	$500.00				2	$0	$0	$0	$1,000	2	$1,000
79	STORM SEWER CATCHBASIN (2'X3')	EACH	$1,600.00				15	$0	$0	$0	$24,000	15	$24,000
80	CONSTRUCT DRAINAGE STRUCTURE DESIGN 48-4022	EACH	$2,000.00				30	$0	$0	$0	$60,000	30	$60,000
81	OUTLET CONTROL STRUCTURE	EACH	$8,000.00				1	$0	$0	$0	$8,000	1	$8,000
82	12" RC STORM SEWER PIPE	LF	$40.00				750	$0	$0	$0	$30,000	750	$30,000
83	15" RC STORM SEWER PIPE	LF	$45.00				2650	$0	$0	$0	$119,300	2,650	$119,300
84	18" RC STORM SEWER PIPE	LF	$50.00				480	$0	$0	$0	$24,000	480	$24,000
85	21" RC STORM SEWER PIPE	LF	$58.00				100	$0	$0	$0	$5,800	100	$5,800
86	21" RC PIPE APRON W/TRASHGUARD	EACH	$1,600.00				1	$0	$0	$0	$1,600	1	$1,600
87	CONNECT TO EXISTING STORM SEWER	EACH	$1,200.00				8	$0	$0	$0	$9,600	8	$9,600
88	CASTING ASSEMBLY (STORM)	EACH	$800.00				42	$0	$0	$0	$33,600	42	$33,600
89	RANDOM RIPRAP CLASS III (CV)	CY	$115.00				7	$0	$0	$0	$800	7	$800
90	FLOTATION SILT CURTAIN TYPE STILL WATER	LF	$20.00				60	$0	$0	$0	$1,200	60	$1,200
91	SILT FENCE, TYPE HEAVY DUTY	LF	$4.00				2435	$0	$0	$0	$9,700	2,435	$9,700
92	SILT FENCE, TYPE PREASSEMBLED	LF	$1.50				2435	$0	$0	$0	$3,700	2,435	$3,700
93	STREET SWEEPER (WITH PICKUP BROOM)	HOUR	$150.00				80	$0	$0	$0	$12,000	80	$12,000
94	RAPID STABILIZATION	SY	$2.00					$0	$0	$0	$0	0	$0
95	INLET PROTECTION	EACH	$350.00				38	$0	$0	$0	$13,300	38	$13,300
			SUBTOTAL					$2,710,000	$170,000	$3,100,000	$500,000		$6,480,000
			12.5% CONTINGENCY					$340,000	$20,000	$390,000	$60,000		$810,000
			ESTIMATED CONSTRUCTION COST					**$3,050,000**	**$190,000**	**$3,490,000**	**$560,000**		**$7,290,000**
			ENGINEERING, ADMINISTRATION, AND INDIRECT COSTS					$740,000	$50,000	$870,000	$140,000		$1,800,000
			EASEMENTS										$10,000
			BURIAL OF OVERHEAD POWER										$1,200,000
			TOTAL ESTIMATED COST					**$3,790,000**	**$240,000**	**$4,360,000**	**$700,000**		**$10,300,000**

SUMMARY OF TOTAL ESTIMATED PROJECT COSTS

SCHEDULE A: SURFACE IMPROVEMENTS	$3,790,000
SCHEDULE B: SANITARY SEWER IMPROVEMENTS	$240,000
SCHEDULE C: WATER IMPROVEMENTS	$4,360,000
SCHEDULE D: STORM SEWER IMPROVEMENTS	$700,000
BURIAL OF OVERHEAD POWER	$1,200,000
EASEMENTS	$10,000
TOTAL PROJECT COST - 2018 WOODHILL ROAD IMPROVEMENTS	**$10,300,000**

Appendix B: Figures



VICINITY MAP

WILLISTON ROAD

ST HWY 7 FRONTAGE ROAD

STATE HWY 7

BEACON HILL ROAD

EXCELSIOR BLVD

TREE STREET

ATRIUM WAY

CRESTVIEW LANE

WOODHILL CIRCLE

ROCKSBOROUGH ROAD

MOONLIGHT HILL ROAD

WOODHILL ROAD

DRIVE

BELLEVUE DRIVE

WALK

WESTGATE ROAD

FOREST CIRCLE

WHITE OAK ROAD

GLENVIEW

BRANDBURY

LEGEND

PROJECT LOCATION

0 500 1000

SCALE FEET

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CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
PROJECT LOCATION MAP

FIGURE 1

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Woodhill Road

Tree Street to Glenview Drive

Brandbury Walk to Quigley Road

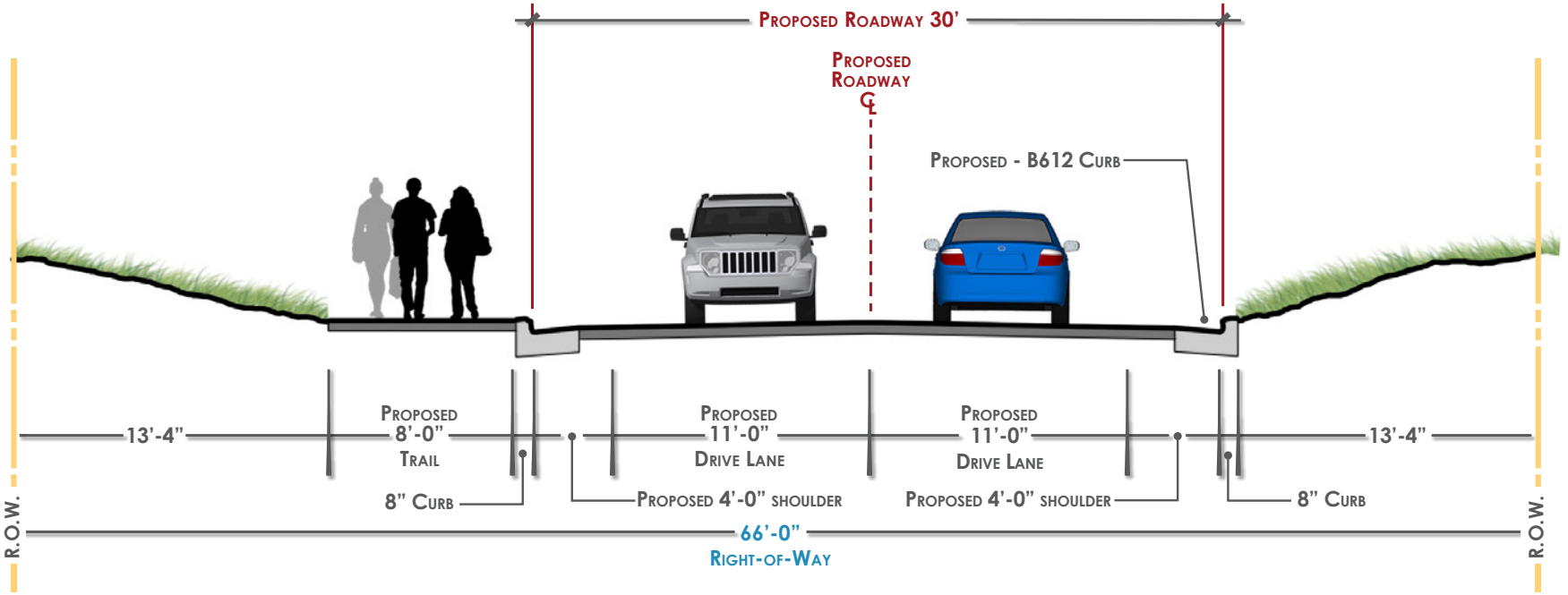


FIGURE 2

City Of Minnetonka

Proposed 2018 Woodhill Road Improvements

City of minnetonka
Where quality is our nature

Woodhill Road

Quigley Road to South Frontage Road (Hwy. 7)

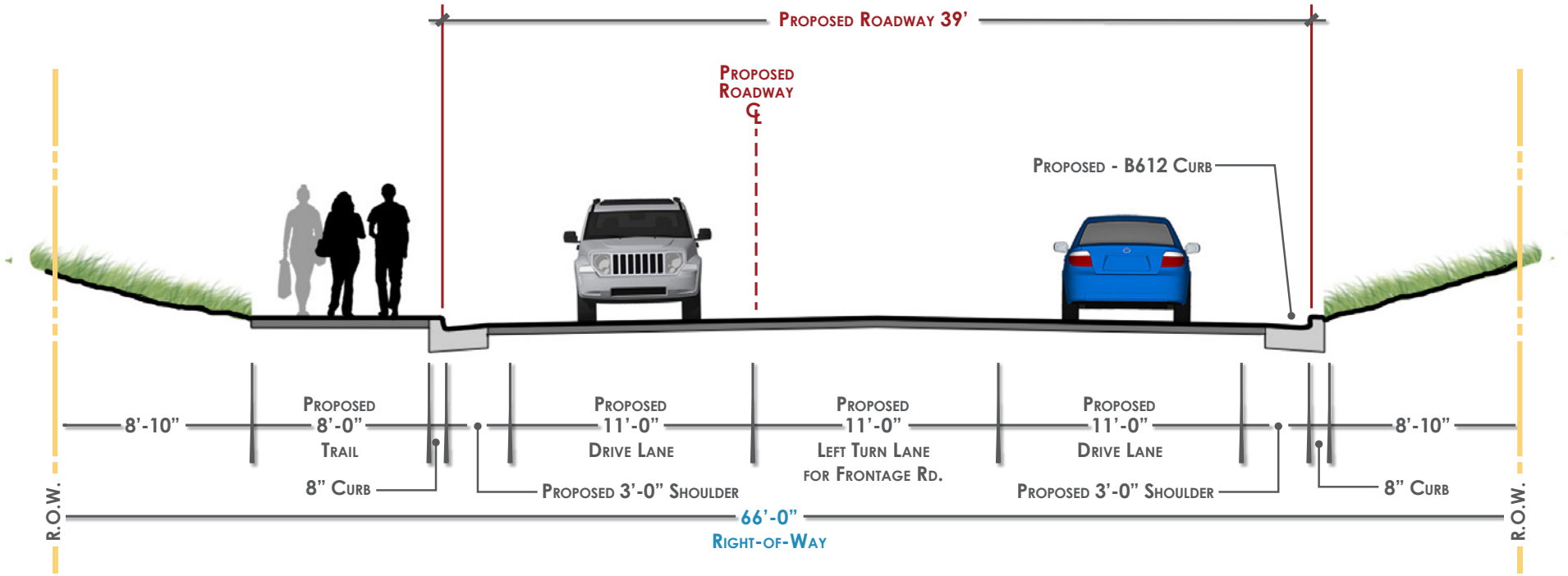


FIGURE 3

City Of Minnetonka

Proposed 2018 Woodhill Road Improvements

City of minnetonka
Where quality is our nature

Woodhill Road

Glenview Drive to Brandbury Walk

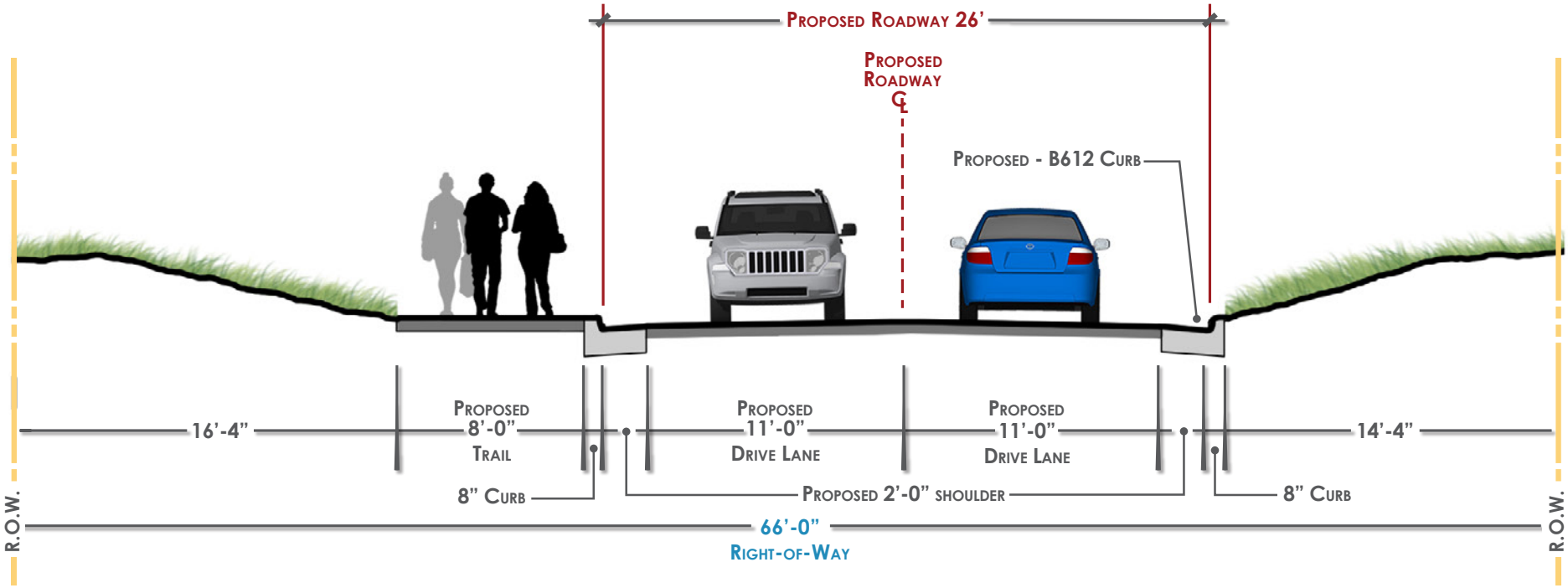
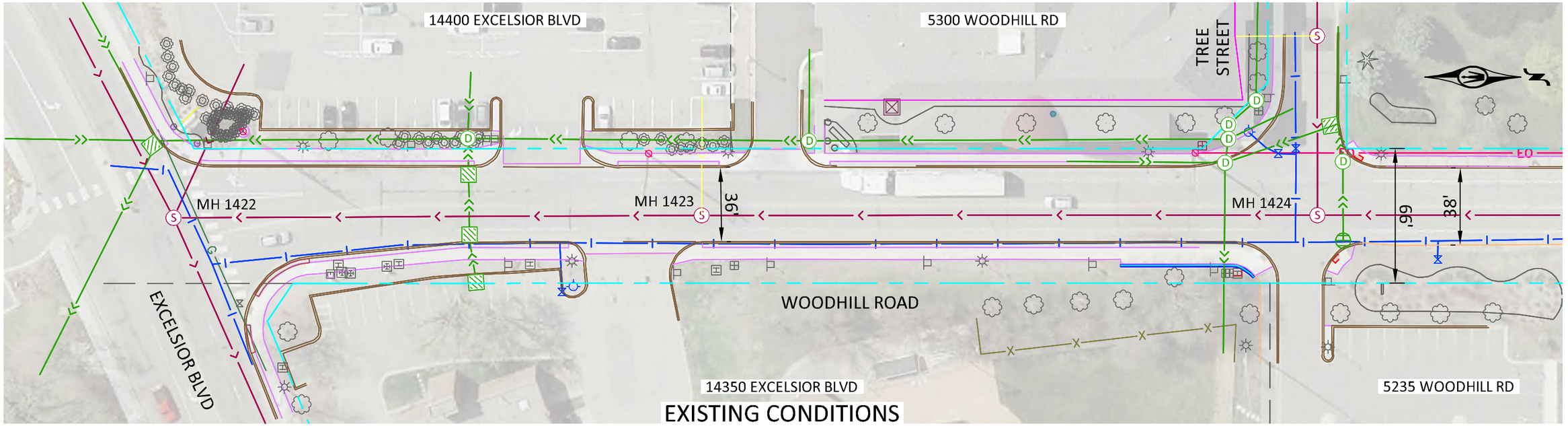


FIGURE 4

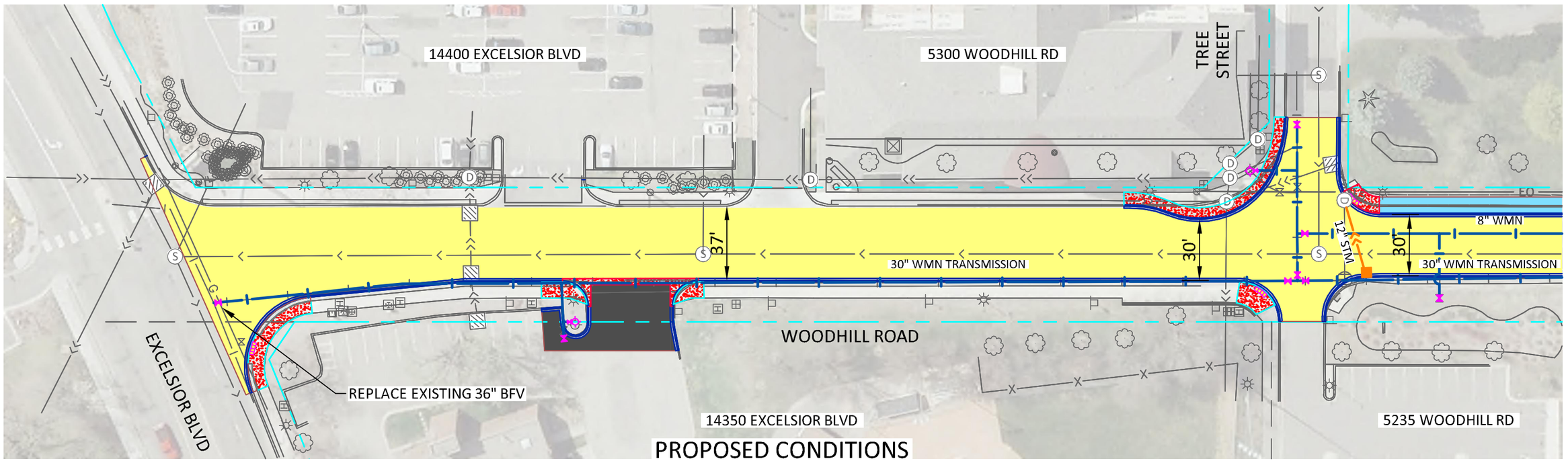
City Of Minnetonka

Proposed 2018 Woodhill Road Improvements

City of minnetonka
Where quality is our nature



EXISTING CONDITIONS



PROPOSED CONDITIONS

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SCALE FEET

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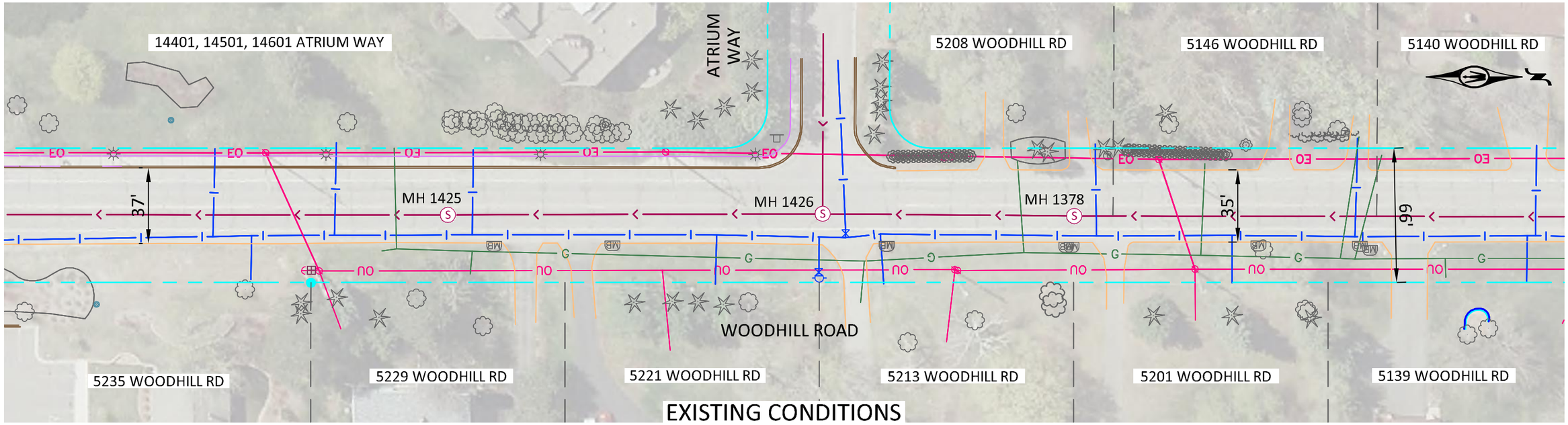
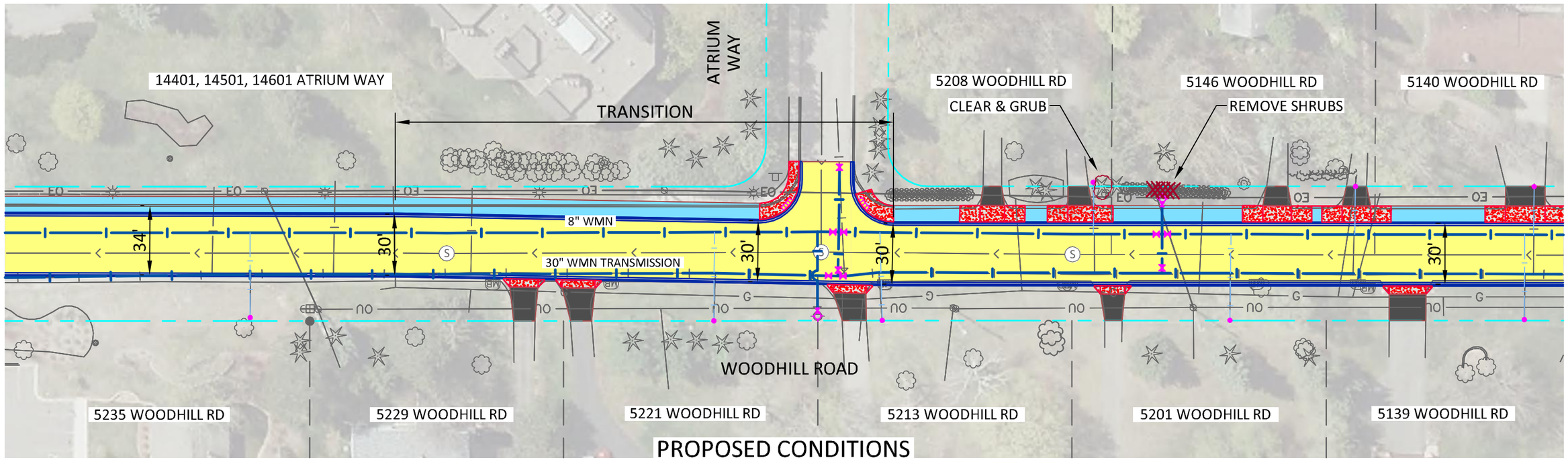
CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
EXISTING - PROPOSED CONDITIONS

FIGURE 5



EXISTING CONDITIONS



PROPOSED CONDITIONS

0 50 100
SCALE FEET

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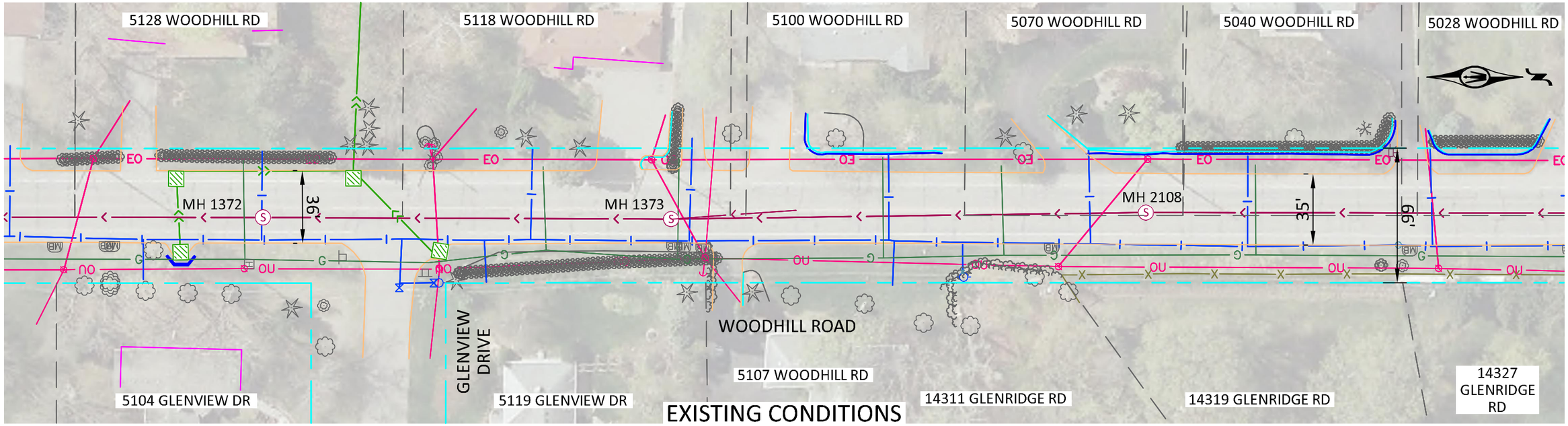
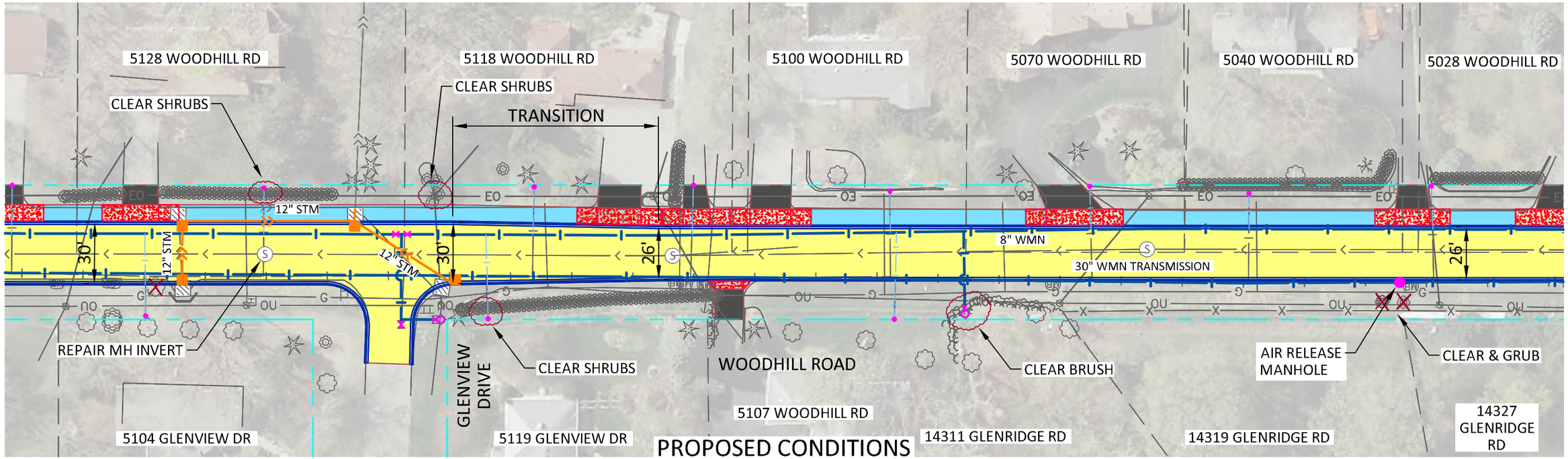
CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
EXISTING - PROPOSED CONDITIONS

FIGURE 6





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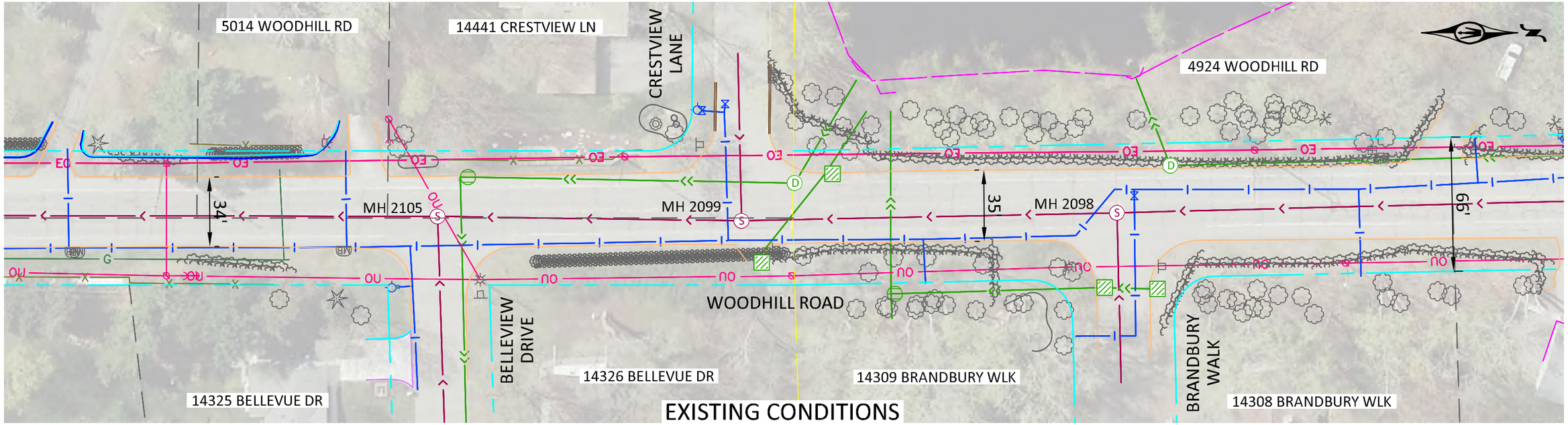
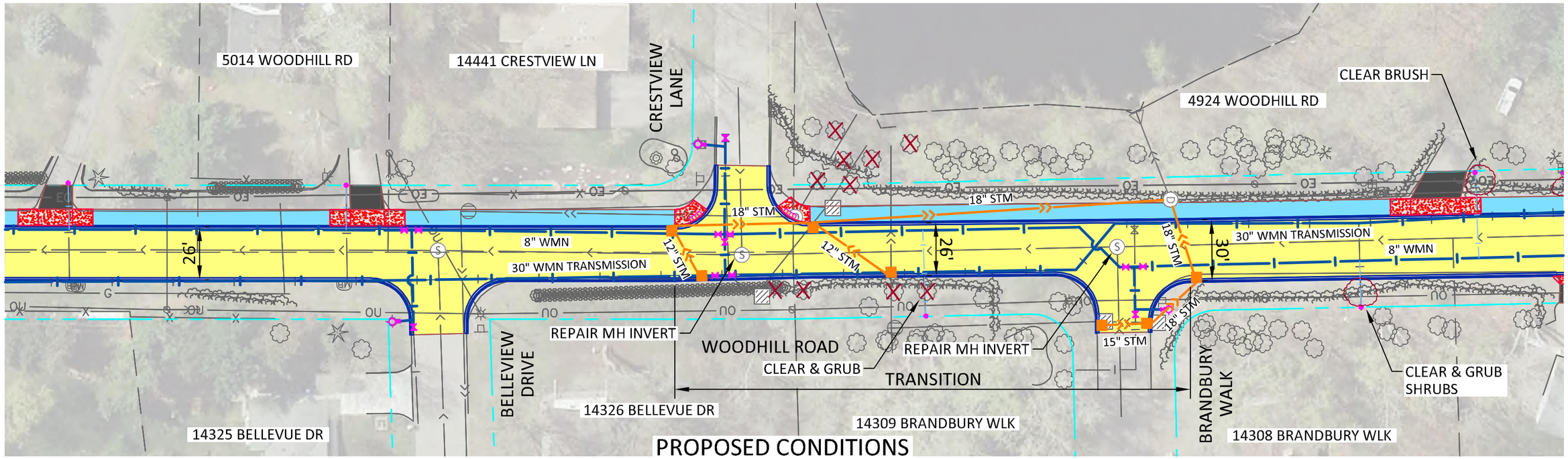
CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
EXISTING - PROPOSED CONDITIONS

FIGURE 7





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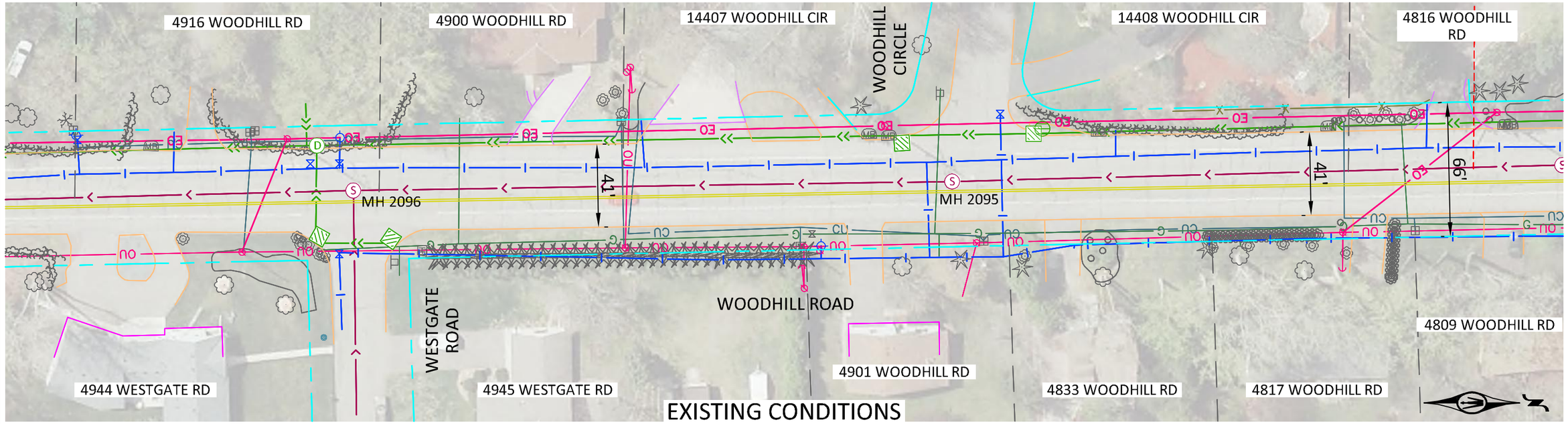
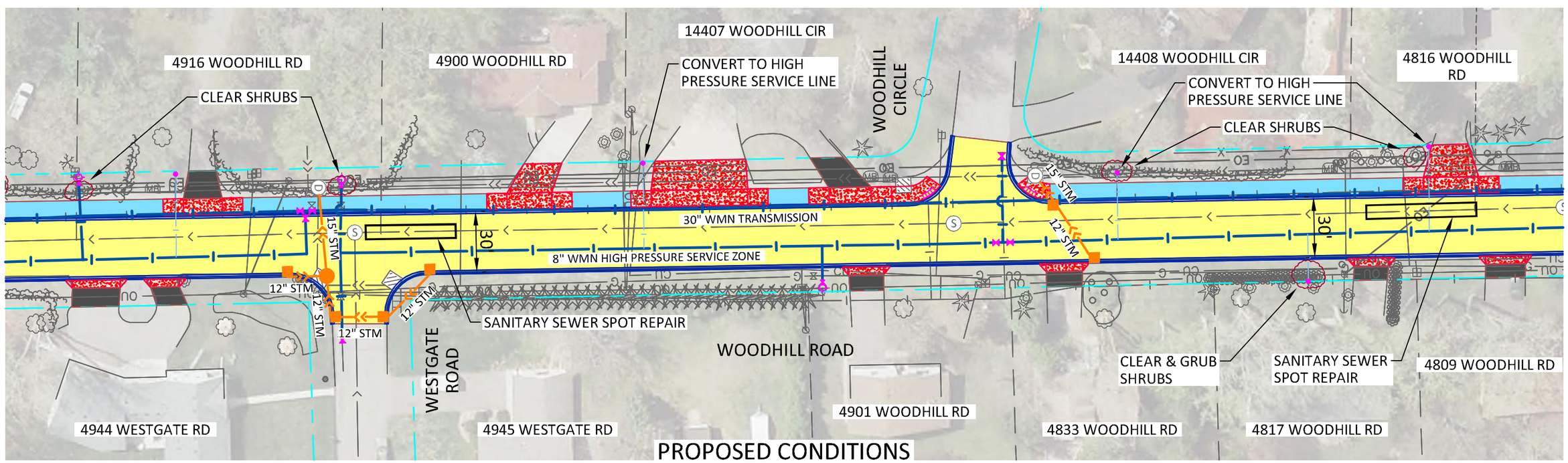
CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
EXISTING - PROPOSED CONDITIONS

FIGURE 8



EXISTING CONDITIONS



PROPOSED CONDITIONS

0 50 100

SCALE FEET

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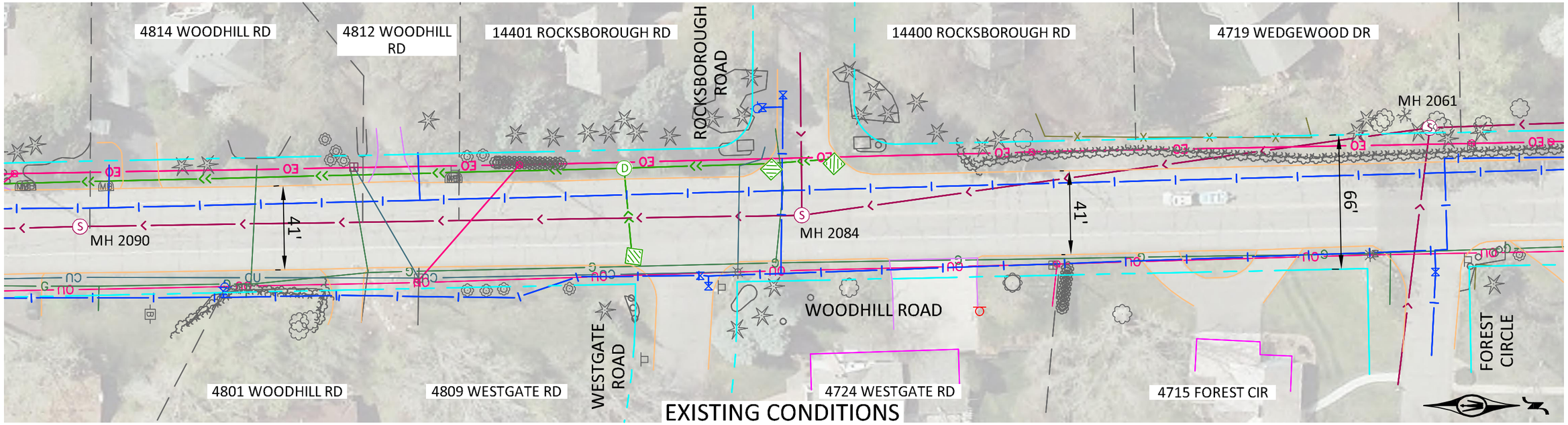
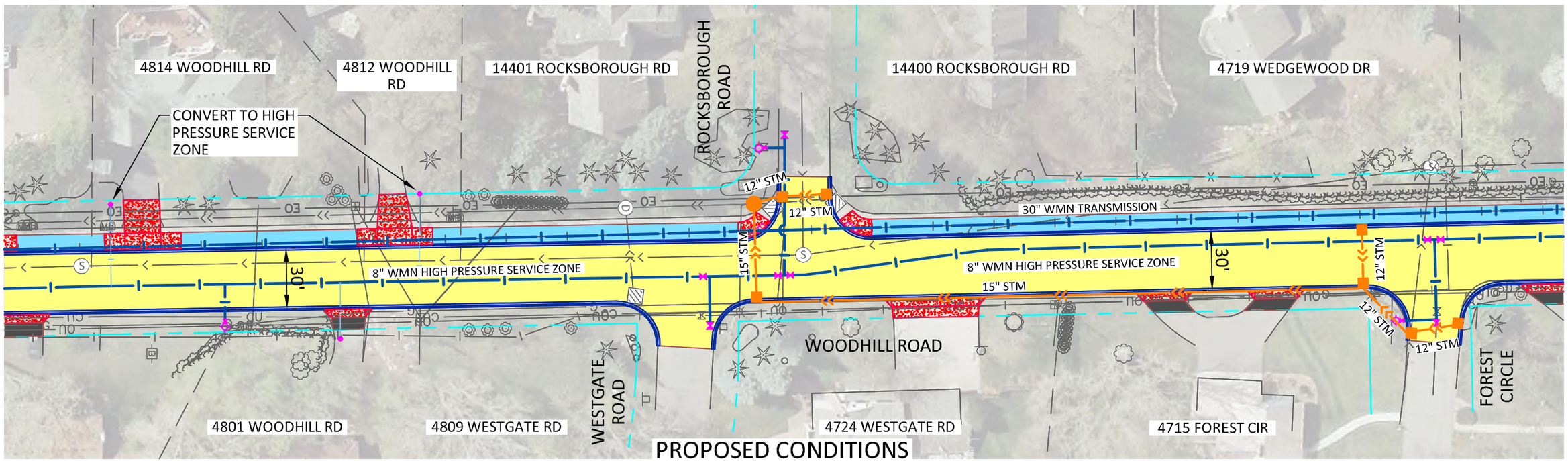
CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
EXISTING - PROPOSED CONDITIONS

FIGURE 9





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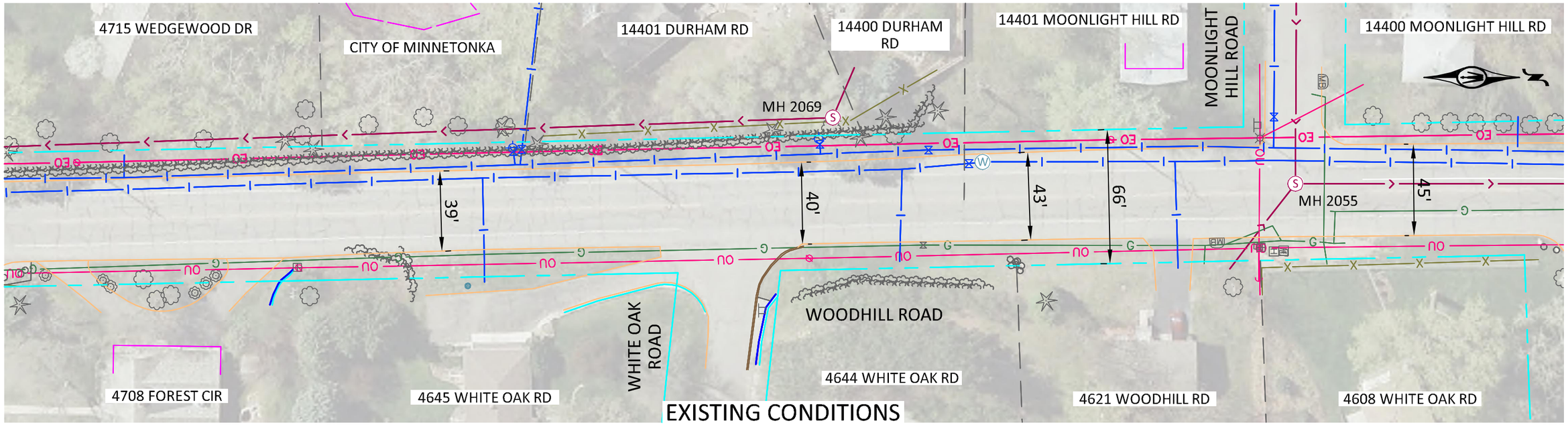
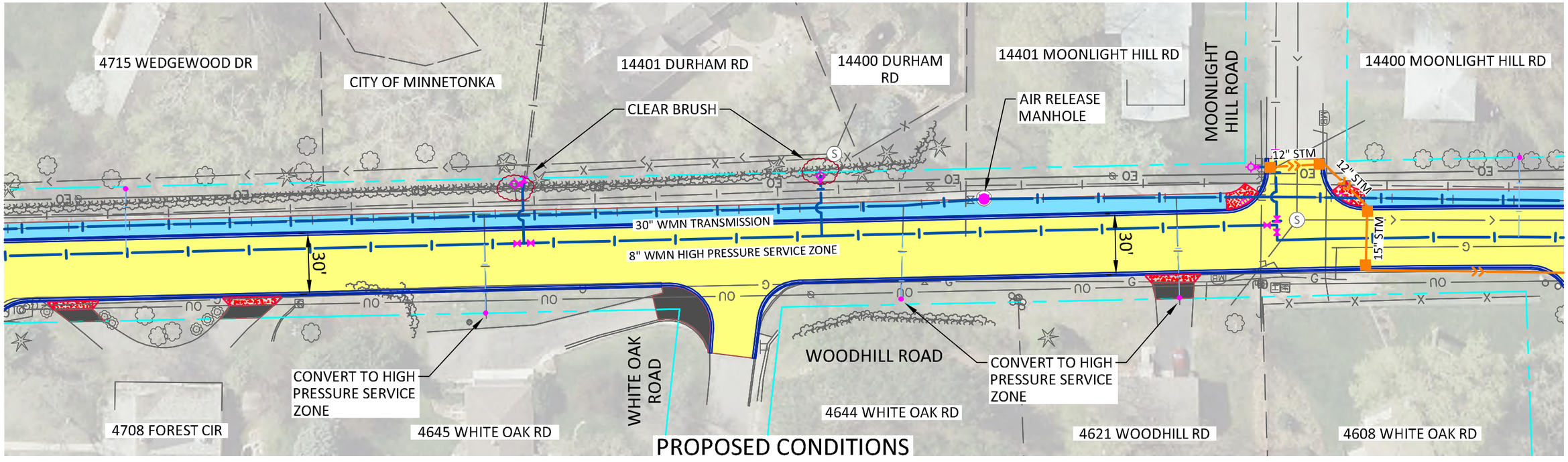
CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
EXISTING - PROPOSED CONDITIONS

FIGURE 10





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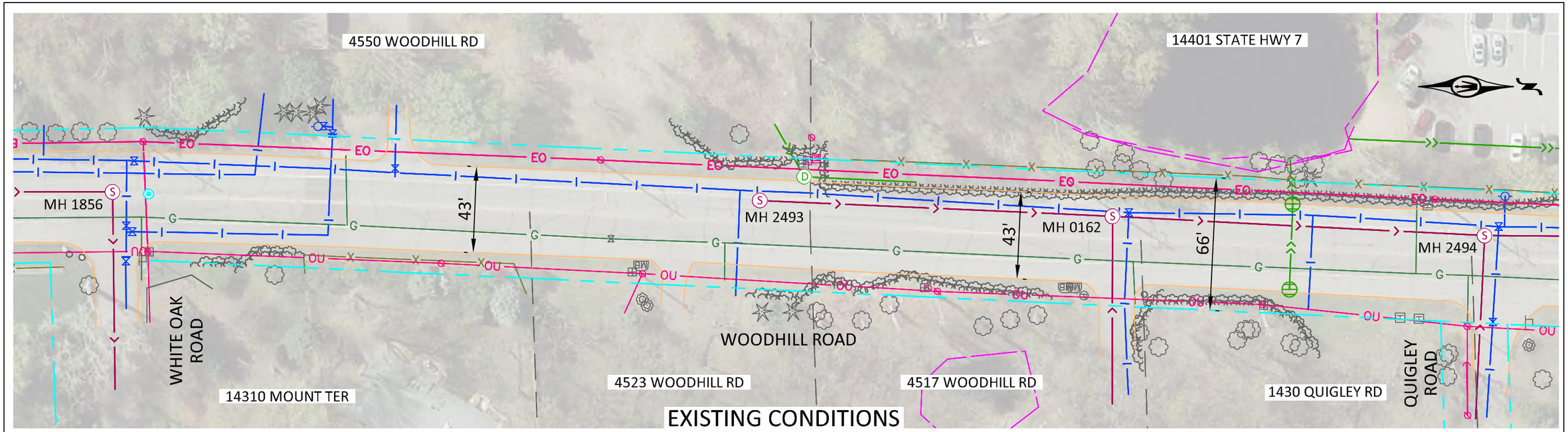
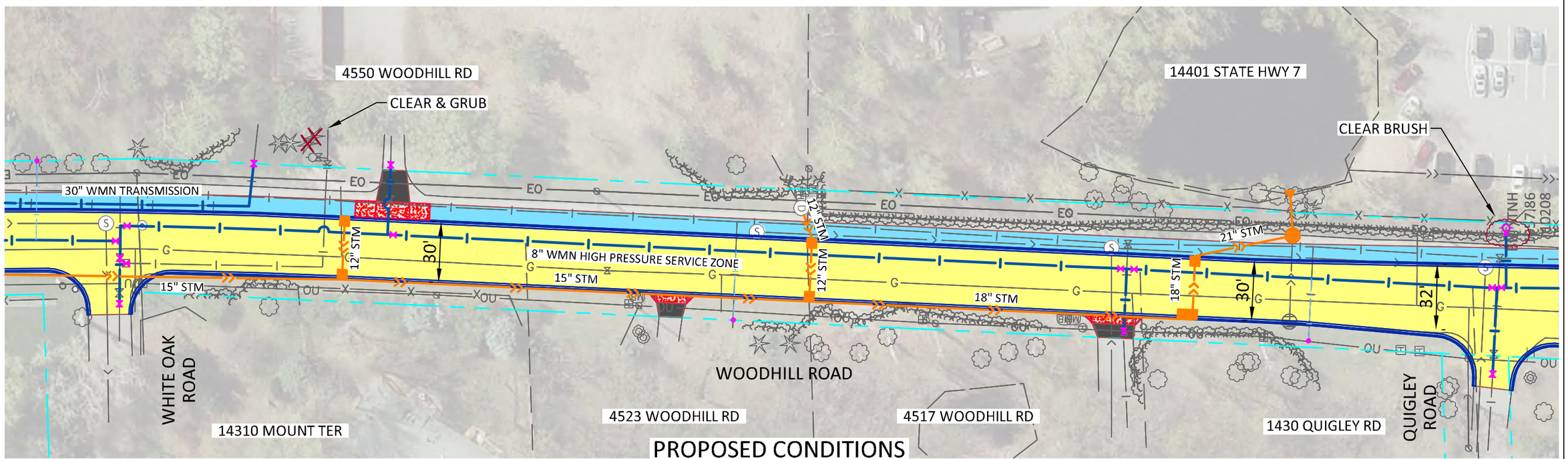
CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
EXISTING - PROPOSED CONDITIONS

FIGURE 11





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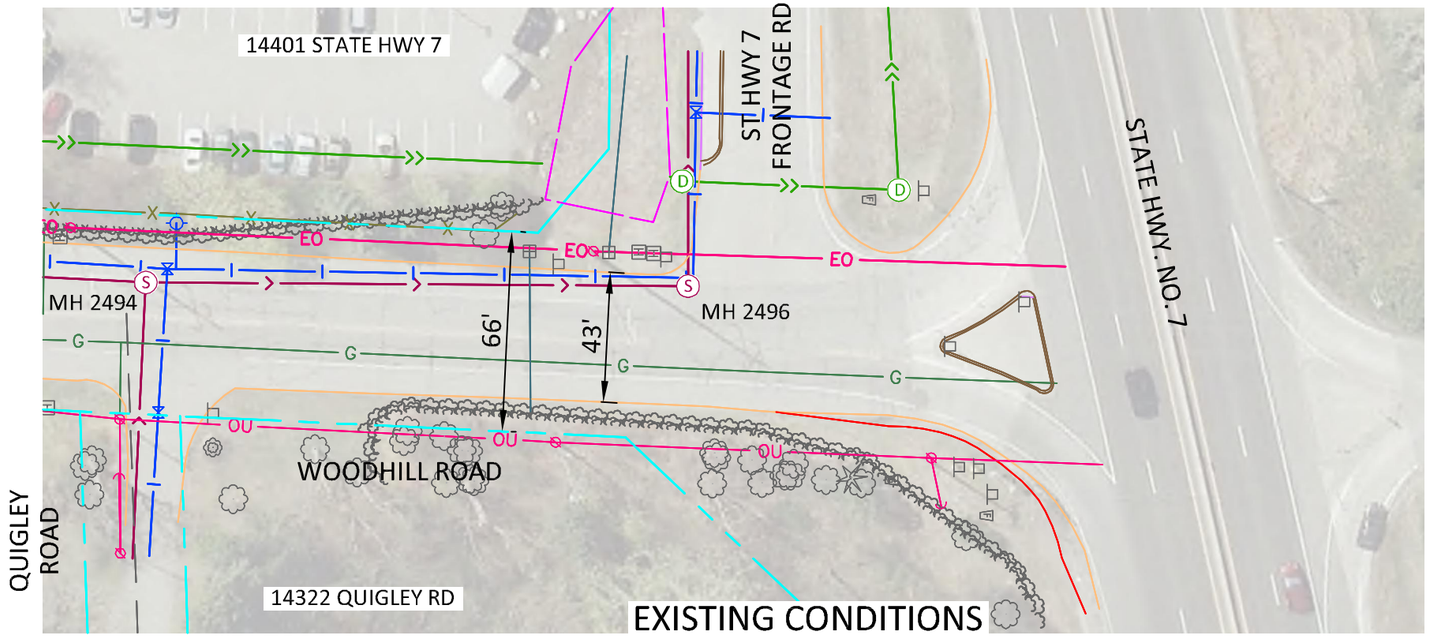
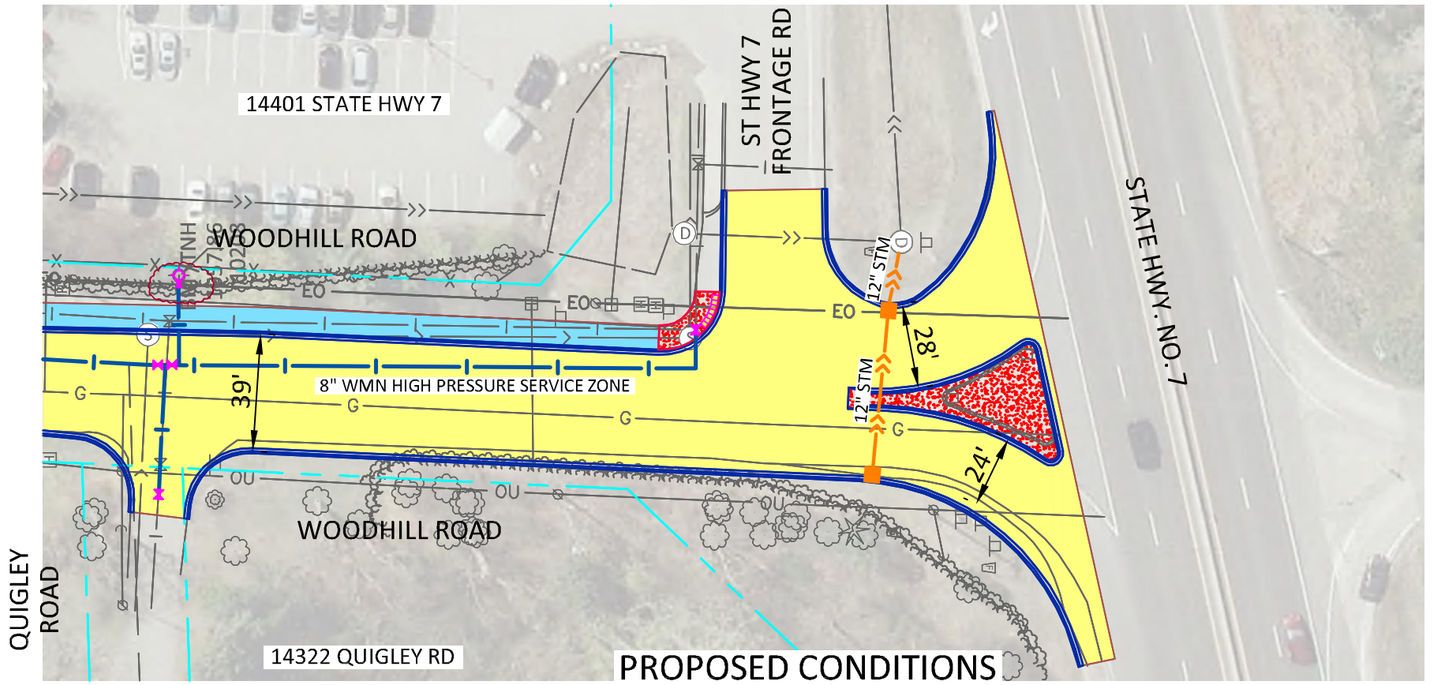
CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
EXISTING - PROPOSED CONDITIONS

FIGURE 12





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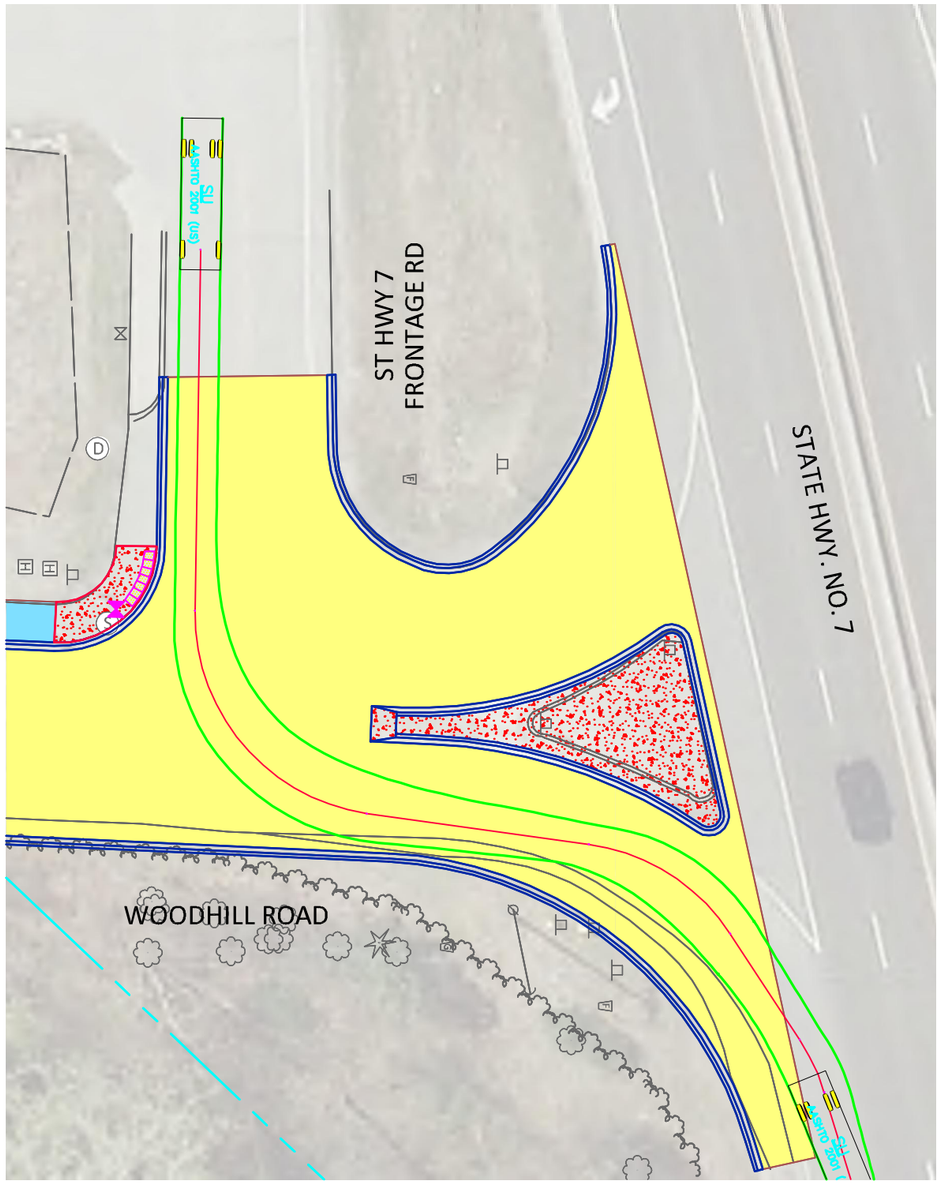
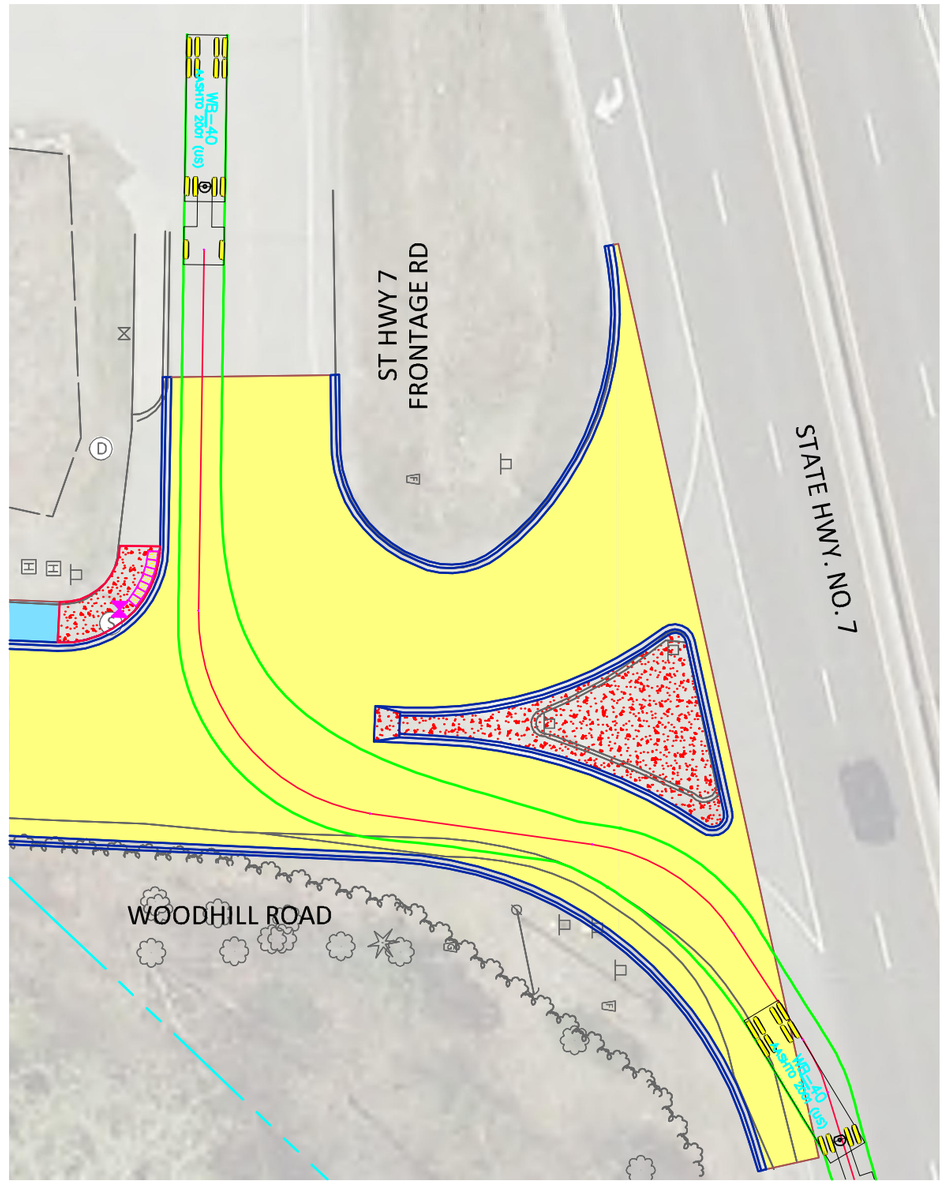
CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
EXISTING - PROPOSED CONDITIONS

FIGURE 13





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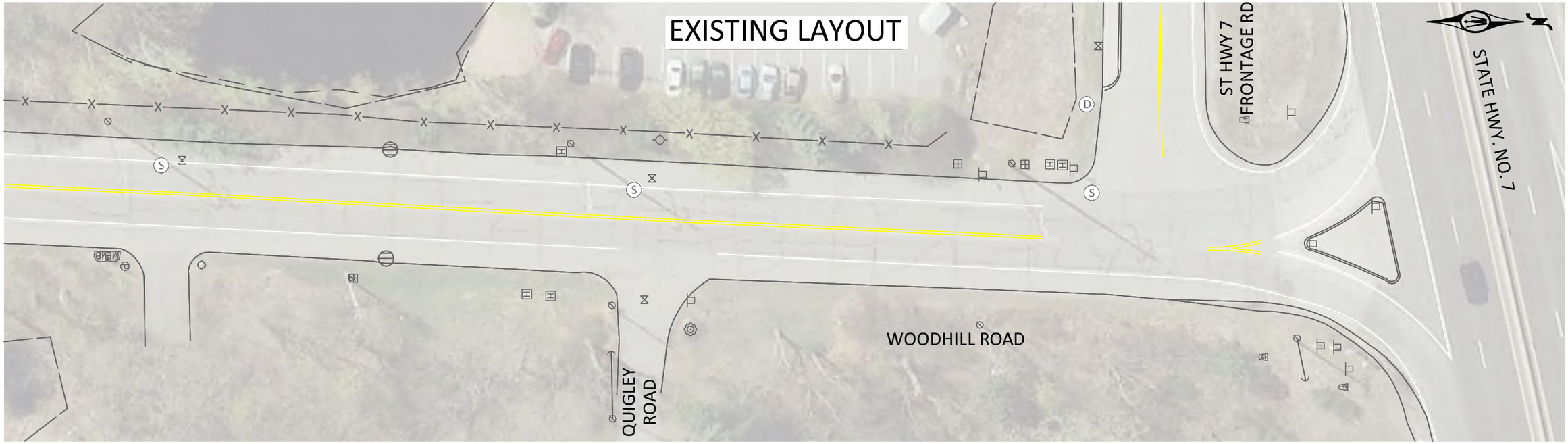
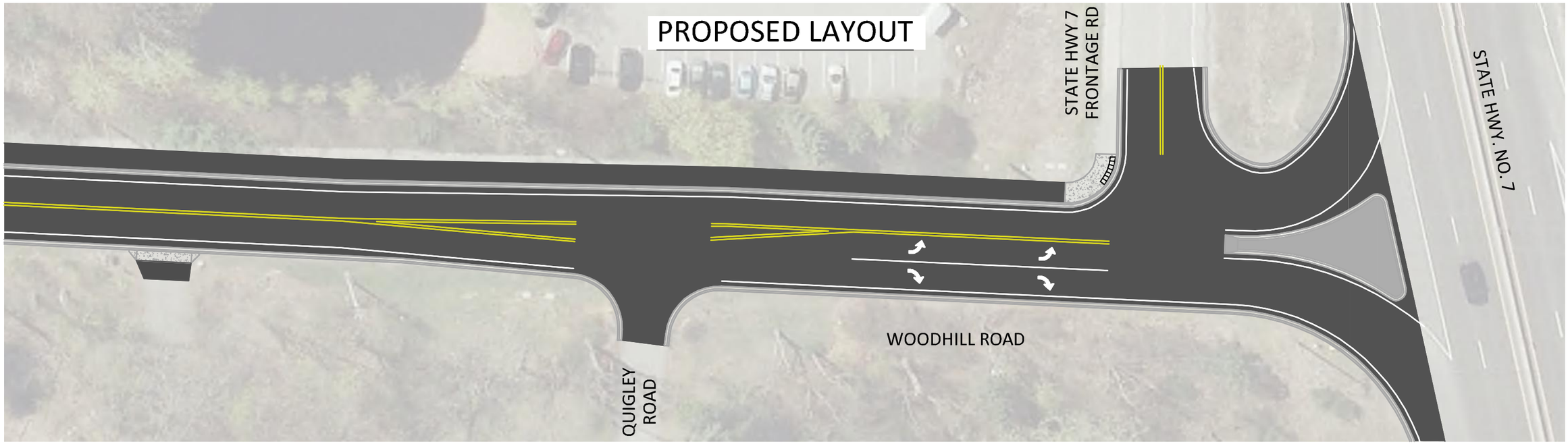
City of minnetonka

CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
TURNING MOVEMENTS

FIGURE 14





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CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
SOUTH FRONTAGE ROAD
PRELIMINARY TURN LANE LAYOUT

Appendix C: Neighborhood Meeting & Public Input

BOLTON & MENK
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12224 Nicollet Avenue
Burnsville, MN 55337-1649

Ph: (952) 890-0509
Fax: (952) 890-8065
Bolton-Menk.com

MEMORANDUM

Date: September 29, 2017

To: Chris LaBounty, P.E., Engineering Project Manager

From: Mike Waltman, P.E., Principal Engineer

Subject: Summary of Woodhill Road Neighborhood Meeting
2018 Woodhill Road Improvements

A neighborhood meeting was held on September 28th at the Minnetonka Community Center for the above referenced project. A presentation was given to review the capital improvement program, project development considerations, scope of the proposed improvements, and project schedule. Following the presentation, questions were taken from the public and addressed by city staff. The following is intended as a summary of questions/comments (Q) and responses (R):

Q: Will there be notifications prior to access restrictions?
R: Generally access will be provided before work starts and after work ends each day. In some cases, such as when concrete is installed, access restrictions will occur. Yes, prior to concrete work notifications will be given.

Q: Are 7 am to 10 pm the typical working hours?
R: They are the standard allowed hours for city projects, however most contractors tend to work from 7 am until about 7 pm. In some cases, such as when unforeseen conditions are encountered during the day, contractors have worked until 10 pm on past projects though it has not been typical.

Q: Who owns the existing retaining walls on the west side of Woodhill Road? The wall has fallen multiple times and ownership should be determined.
R: The walls are not planned to be impacted by the project, though their ownership will be researched. Once ownership is determined, the walls will be further evaluated if owned by the city.

Q: Lately a lot of particulate matter has come through the water system to our house. Will this project solve that?
R: It is hard to say. The watermain pipes to be replaced have been in Woodhill Road for quite a while, so their replacement might help, but there are a number of things that could potentially cause that.

Q: We understand Xcel Energy will be replacing their overhead power lines on the east side of Woodhill Road between November and April. Will there be power outages during that time that will affect properties, specifically the facility at Atrium Way? Our heat is powered by electricity.
R: Xcel Energy will coordinate the power switchover between the old and new system, however usually the old line remains active to serve properties until the new line is operational. Once the new line is energized, Xcel will coordinate switchovers. We will confirm with Xcel that any

short duration outages will be conducted in a manner to avoid significant issues such as loss of heat during winter.

Q: Why are the transmission lines on the west side of Woodhill Road not being buried?
R: Xcel Energy's policy is not to bury transmission lines. We understand it cannot be done due to their voltage.

Q: Are there any parking restrictions proposed?
R: There are no new parking restrictions proposed. It is the intent that Woodhill will function like it does today, with a narrow and lightly used parking space outside the drive lanes. If parking becomes a problem, the City will review the issue at that time based on its standard process for review of parking restrictions.

Q: Years ago, the centerline of Woodhill Road was offset to one side. Will you be doing the same?
R: We considered it but through evaluation determined the proposed section is most appropriate with centerline centered between the two curbs.

Q: We understand the footprint is the same as the existing, but will (motorist) speed increase or decrease?
R: While we can't say whether people will drive slower or faster, the roadway portion of the corridor will be narrower as we reconfigure the space. Typically, this ends up making people drive slower.

Q: Is there any speed limit change proposed?
R: No, it is proposed to remain at 30 MPH.

Q: Are you going to add more speed limit signs?
R: Their placement will be reviewed, though more signs don't always equal improved compliance.

Q: Would the school be better served with the trail on the east side of Woodhill Road?
R: During evaluation of placing the trail on the east or west side, we contacted the school to gain an understanding of their needs and desires. From the School District, we understand they see Woodhill Road as a barrier to walkers to school and they do not expect or anticipate walkers from Woodhill Road no matter the side of the roadway the trail is proposed on. Additionally, the trail on the west side of Woodhill Road would serve the residential properties between Woodhill Road and Williston Road who otherwise would not have access to a pedestrian facility. Properties on the east side of Woodhill Road most commonly have access to Woodridge Road, which has a north-south pedestrian facility, without need for crossing of a collector roadway.

Q: Rocksborough Road is a main school bus route. Will this access route be maintained for busses during construction?
R: Generally, yes. We will coordinate bus routes and any necessary temporary relocations of bus stops or routes will be communicated to residents during construction.

Q: Woodhill Road traffic is different than Williston Road traffic. It seems like the proposed road and sidewalk are being proposed like Williston Road's conditions. Are you pushing kids on to the narrower shoulder? There are a lot of kids on bikes. Are you pushing them onto the shoulder?

R: No, we hope they can use the proposed trail behind the curb barrier. An 8' trail should also allow for bicycle traffic. Type A, advanced bicyclists may still use the road, but we anticipate kids will and encourage them to use the trail.

Q: I'm concerned about conflicts between cars backing out of driveways and bicycles. What if I hit one?
R: The trail is proposed to be placed essentially in place of the existing shoulder, so sight lines for potential bicyclists should be similar to existing. We would ask people backing out of their driveway to use caution and look for bicycles.

Q: Will the city paint crosswalks with the project?
R: No, but we will count pedestrians after completion of the project to gauge the need for crosswalks. Painting crosswalks is not always safer, and we want to paint them where appropriate.

Q: I'm concerned about the traffic volume on Woodhill Road and the proposed narrower footprint. Have you considered how it will work with vehicles parked across from each other?
R: We have considered parking levels and have not observed much parking on Woodhill Road. (Question reflected to group) Are people seeing much parking on Woodhill Road? (Vocal group consensus in response) No.

Q: There are no lights on Westgate Road, are there some on Woodhill Road? Will existing lights be put back? Additional lights would help kids get to and from school, benefit traffic, and reduce crime.
R: There are some existing lights scattered on intersection corners and an existing system south of Atrium Way. Existing lights are proposed to be reinstalled at intersection corners. If there is a desire for additional street lighting, the city has a petition process in place where residents can request street lights.

Q: Will you keep castings out of the vehicle wheel paths?
R: That will be our intent through design. Some existing castings are proposed to remain, however.

Q: What is the project cost?
R: Over $8.5 million.

Q: Can MnDOT change the yield sign at Highway 7 to a merge sign?
R: The city is actively discussing the access from Woodhill Road to Highway 7 with MnDOT, including why the acceleration lane was eliminated with MnDOT's Highway 7 mill and overlay project about five years ago. We will work with MnDOT to have the correct signage and appropriate access in place.

Q: I see there is no change proposed at the Excelsior Boulevard and Woodhill Intersection. It is unsafe. Left turns from Woodhill Road are challenging during rush hour onto Excelsior Boulevard.
R: No improvements to the County Road are proposed within the scope of this project.

Q: There seems to be a lot more trucks on Woodhill Road since the condos and apartments came in. Are there signage changes or other measures proposed to minimize trucks?

R: Traffic calming measures such as the road width changes are proposed, but we cannot restrict trucks from a public collector road with signage.

Q: Is the pavement thick enough for trucks?
R: Yes, it is designed to accommodate the existing truck traffic.

Q: Is there any consideration of crosswalks for east to west crossings?
R: There are no painted crosswalks proposed with the project. Crossings will be evaluated after construction based on observed use and city policy.

Q: How many trees will be removed?
R: Over 25, fewer than 50. The goal is to reduce the number of tree removals proposed through the design process.

Q: Can working hours be restricted further? I am concerned about the impacts of construction activity until 10 pm.
R: Work does not typically go until 10 pm. Most often contractors only choose to work that late due to emergencies and unforeseen conditions. If we restrict working hours, we feel it could have project cost impacts.

Q: Can you restrict low boy and equipment usage on side streets?
R: We can look into that and take this into consideration.

Q: Are parking restrictions going to be enforced at night? Currently, we can't park on side streets at night.
R: We will talk to the Public Safety Department about exceptions.

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: Oliver Lange
Address: 4900 Woodhill road
[redacted]

Comments:

Current neighborhood water drains into my yard however There is no drainage out. Drainage was blocked by construction of my southerly neighbors driveway. Must have been done many years ago. but would like to get tied into drainage down to the pond.

My home sits below the roadway the walkway will pose a blind spot issue for me ~~exit~~ exiting the driveway with downhill bikers it could become a safety issue.

Additional lighting needs to be added to Woodhill. With the ~~amount~~ a pedestrian traffic ~~would be~~ it is difficult to see them and to be able to see the to road.

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: Paul & Justina Miller [redacted]
Address: 5110 Woodhill Rd.
Mtka, Mn. 55345

Comments:

There is a culvert that runs water between 5718 and 5728 onto our property. We also get water runoff from Beacon Hill Road. We are concerned about the amount of water & sediment that will end up on our property. Can the water be diverted to the holding pond south of us, on atrium Way & Woodhill Rd.?

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: Wendi Antoun
Address: 14407 Woodhill Cir
[redacted]

Comments:

Mail box location temporary and permanent - where? We live on West side + they are on our property right now.

Our yard was a [redacted] slope to street. How will it be finished w/ trail? Will there be grading done or a retaining wall?

Limit parking on Westgate to single side during construction. Street is narrow and curved. Could be a crash or two situation

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: Kathy Redman
Address: 4645 White Oak Rd
[redacted]

Comments:

Sprinkler system at road's edge along Woodhill. We have a map available.

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: Jean + Dave Jorlett
Address: 14322 Quigley Rd
[redacted]

Comments:

(1) David Jorlett teaches voice lessons in our home — lessons are 30 min - 1 hr during day and into evening until as late as 8:30 pm some days. Where would people park? Now they park on Quigley + in our driveway which enters off Quigley.

(2) We would like our power line buried.

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: Pat Peterson
Address: 17401 Atrium Way #129
[redacted]

Comments:
Hooray! Woodhill really needs a face lift. Hopefully, with State (H.W.7) and city will work together to fill the axle bending pot hole on the approach to H.W.7 from Woodhill.

Perhaps with re-configuring the access lane, the pot hole will be eliminated

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: Jill + Gary Joyce
Address: 4941 Westgate

[redacted]

Comments: We have sprinklers!

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: [redacted]
Address: [redacted] Bellevue

Comments:

Solar powered speed limit signs? The speeding is out of control. This will likely make it worse. Increased enforcement? Please do something.

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: Sandra & Tom Wright
Address: 4060 Amegata Ln
[redacted]

Comments:
I am interested in learning more about how Woodhill & Hwy 7 East will merge. It is a scary experience many mornings. If MNDot wants to hear from community members, they are welcome to contact us.

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: Michelle Gronemeyer T[redacted]
Address: 5139 Woodhill Rd E[redacted]

Comments:

- We have an underground sprinkler system

- Wondering what will happen to our mailbox – it is a large stone structure (not your typical mailbox structure)

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: Gail Bollis
Address: 14401 Hwy 7
Minnetonka

[redacted]

Comments:

General Store access
Call to discuss.
Oct. + Nov. Busy Time

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

WORK HRS
PARKING
CUTOVERS

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: GREG CLARK
Address: 14406 MONTICELLO HILL

[redacted]

Comments:

* WORK HOURS SHOULD BE RESTRICTED TO NO LATER THAN 7:00 PM
* NO CONSTRUCTION PARKING OUTSIDE CONTRACT LIMITS NO PARKING ON SIDE STREETS

5:00 pm, Minnetonka Community Center
September 28, 2017

City of minnetonka
Where quality is our nature

Comment Card

Woodhill Road Informational Meeting
September 28, 2017
5:00 pm, Minnetonka Community Center

Name: Bruce Bollig
Address: 4517 WoodHill RD
[redacted]

Comments:

thanks you For ADressing the Storm swere drain pipe For pond Area So I dont Have to pump Or get Flooded out on Heavy Rains

5:00 pm, Minnetonka Community Center
September 28, 2017

City of Minnetonka
2018 Woodhill Road Improvements
Public Informational meeting

Time: 5:00 PM
Date: September 28, 2017
Location: Minnetonka Community Center

City of minnetonka
Where quality is our nature

Name	Address	Phone or Email (Optional)
Terry Roberts	4917 Beacon Hill Road	[redacted]
Bruce Bollig	4517 Woodhill RD	
Sharon Hepp	4634 White Oak Rd	
Michelle Gronemeyer	5139 Woodhill Rd	
Mike Zimmerman	4814 Woodhill Rd	
TOM WRIGHT	14060 STONEGATE LN	
Dick & Linda House	14309 Brandbury Walk	
Kathy Redman/Chris Low	4645 White Oak Road	
Michael McSwiggen	14501 Atrium way	
JACKIE RICHENS	14501 Atrium Way	
Maskell Shuba	4730 FOREST CIRCLE	
Paul Miller	5110 Woodhill Rd	
Jill Joyce	4944 Westgate Rd	
Beth Michaelis	14022 Bellevue Dr.	
Wendi Antoun	14407 Woodhill Rd	
Bev Serviss	14441 Crestview Ln	
Diana Nelson	14481 Crestview Ln	
Ginger Guggenberger	4851 Westminster Rd	
Monte White	14400 Durham Rd	
Thomas Suess	5229 Woodhill Rd	
Susan Klein	5021 Beacon Hill Rd	
Justina Miller	5110 Woodhill Rd.	

City of Minnetonka
2018 Woodhill Road Improvements
Public Informational meeting

City of minnetonka
Where quality is our nature

Time: 5:00 PM
Date: September 28, 2017
Location: Minnetonka Community Center

Name	Address	Phone or Email (Optional)
Larry Lutz	14419 Woodhill Circle	[redacted]
Jendoiska	5014 Woodhill Rd	
Dorothy Zapos	5107 Woodhill Rd	
Yvonne Lutz	14419 Woodhill Circle	
Greg Sichenedy	4809 Woodhill Rd	
Marilyn Sichenedy	"	
Jeff Bjerschbach	14015 Windsor Rd	
David Knight	5121 Glenview Dr.	
HENRY NELSON	4717 FOREST CIRCLE	

City of Minnetonka
2018 Woodhill Road Improvements
Public Informational meeting

City of minnetonka
Where quality is our nature

Time: 5:00 PM
Date: September 28, 2017
Location: Minnetonka Community Center

Name	Address	Phone or Email (Optional)
Frank Mallen, Pamela Malle	14501 Atrium Way #227	[redacted]
Tim [illegible]	4637 White [illegible]	
Jeff & Kathy Dickhut	4901 Woodhill Rd	
Betsy Von Dyke	5028 Woodhill Rd	
BOB WADDELL	4859 WESTGATE ROAD	
JOHN Shepard	14501 ATRium Way	
W. M. Montgomery	14601 Atrium Way apt 333	
Patricia Peterson	14401 Atrium Way #12 [illegible]	
Gail Bollis Chris Bollis	14401 Hwy 7 [illegible]	
Stephen Ewing	14240 Stoneyridge Lane	
[illegible] Lang + [illegible] Daly	4900 Woodhill [illegible]	
GREG CLARK	14409 MOONLIGHT HILL RD	
Sindi Edenhu[illegible]	14401 Atrium Way #12[illegible]	
Sandra Wright	1406[illegible] S[illegible] Ln	
[illegible] Nelson	4942 Westgate Rd	
Kaitlin Gould	[illegible]04 Glenview Dr.	
W[illegible] Ca[illegible]	5021 Beacon Hill Rd.	
Don Hannan	14201 Glenridge Rd.	
D. L[illegible]nderson & Ed [illegible]	4847 Westgate Rd.	
Wade Nelson	5100 Woodhill Rd	
Kyle Nelson	14336 Bellevue	
Jean Jolett	14322 Quigley Rd	

City of Minnetonka
2018 Woodhill Road Improvements
Public Informational meeting

City of minnetonka — Where quality is our nature

Time: 5:00 PM
Date: September 28, 2017
Location: Minnetonka Community Center

Name	Address	Phone or Email (Optional)
Tom & Sandi Mooney	5128 Woodhill Rd	[redacted]
Greg & Bev Skriggs	14441 Crestview Lane	
Alfie Chouhan	4509 Woodhill Rd.	
Kim Nelson	4717 Forest Circle	
Dennis Anderson	4723 " "	

Appendix D: Trail Location Considerations

BOLTON & MENK
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12224 Nicollet Avenue
Burnsville, MN 55337-1649

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Bolton-Menk.com

MEMORANDUM

Date: September 18, 2017

To: Chris LaBounty, P.E., Engineering Project Manager

From: Mike Waltman, P.E., Principal Engineer

Subject: Trail Alternatives Analysis – East Side vs West Side
2018 Woodhill Road Improvements

Background

Street & utility improvements are proposed to occur along Woodhill Road from Excelsior Blvd to Hwy 7 in 2018. Bolton & Menk is currently completing a feasibility study of improvements related to this project, including a proposed off-roadway trail connection along Woodhill Road. Trail improvements have been considered by Bolton & Menk along both sides of Woodhill Road to preliminarily identify impacts associated with both alternatives and enable identification of a preferred route by decision makers.

Existing Conditions

The full project area is about 6000 feet long. Traffic volumes along Woodhill Road range from an Average Daily Traffic (ADT) counts range from 3,161 near Highway 7 to 4,145 near Excelsior Blvd. Existing sidewalk is in place at the south end of the project corridor, between Excelsior Blvd and Tree Street, on both sides of Woodhill. The sidewalk continues on the west side of the roadway only from Tree Street to Atrium Way. North of Atrium Way, no existing pedestrian facilities are in place on either side of Woodhill Road.

The existing roadway is comprised of both urban (with curb/gutter) and rural (no curb, ditches) segments, and varies in width along its length. Table 1 summarizes these conditions.

Table 1: Woodhill Road Existing Conditions

Limits From/To	Length	Approx. Existing Road Width	Existing Curb/Gutter?
Excelsior Boulevard to Tree Street	550'	36'	Yes
Tree Street to Atrium Way	490'	37.5'	Yes
Atrium Way to Glenview Drive	520'	36'	No
Glenview Drive to Brandbury Walk	890'	35'	No
Brandbury Walk to Westgate Road (south)	350'	41'	No
Westgate Road (south) to Westgate Road (north)	900'	41'	No
Westgate Road (north) to White Oak Road (south)	800'	40.5'	No
White Oak Road (south) to White Oak Road (north)	420'	45'	No
White Oak Road (north) to Quigley Road	690'	43'	No
Quigley Road to Highway 7	300'	43'	No

Considerations

Given the traffic volumes along Woodhill Road, presence of a heavily used park near Excelsior Blvd, and adjacent residential land uses in the area, installation of a trail is appropriate to remove pedestrians from walking in the roadway. City Staff provided direction to evaluate trail alternatives along both sides of Woodhill Road, to identify comparable benefits to the two options. Preliminary layouts were developed for both alternatives.

Several considerations factored into development of layouts for the two alternatives. Those include:

- ✓ The retrofit of pedestrian facilities to established roadway corridors almost always results in impacts to trees, landscaping, retaining walls, and other residential amenities. While all trail alternatives considered involved the facilities remaining within the public right-of-way, not on any private property, these impacts can be perceived by property owners as an impact on private property. Therefore, it is desirable to minimize impacts to trees, landscaping, retaining walls, etc. Trail alternatives were developed with the goal of minimizing such impacts.

- ✓ North of Tree Street / Atrium Way where no pedestrian facilities exist the existing roadway total footprint (drive lanes + shoulders) is relatively wider. Consideration was given to and ultimately implemented in adjustment of the overall roadway width – generally reducing it to provided adequate space behind proposed curbs for pedestrian facilities. By matching the proposed total footprint (roadway + shoulders + proposed trail) to the existing roadway total footprint, impacts to trees and other features could be more easily avoided. An iterative process in cooperation with and review by City Staff was implemented whereby impacts were identified and adjustments (reductions) to the proposed roadway footprint were made.

- ✓ To minimize impacts on one side of Woodhill versus the other, layouts were developed whereby the proposed corridor's paved footprint was centered over the existing paved footprint. In many cases due to similar existing and proposed footprint widths, the proposed back of trail approximately matches the edge of exiting pavement and on the opposite side the proposed back of curb approximately matches the other edge of existing pavement. These conditions were most typical but not absolute, as some inconsistencies in the existing corridor footprint hindered matching of edges in all locations.

- ✓ An origins/destinations review and analysis was completed by Bolton & Menk as well as City Staff to consider likely users of proposed pedestrian facilities. Particular focus was given to how the trail would better benefit users if it were located on the west versus the east side of Woodhill Road. This discussion and analysis yielded the following primary considerations:

    - Glen Lake Elementary is located a ¼ mile east of Woodhill Road. Bellevue Drive and Brandbury Walk are the most direct routes to the school from Woodhill Road. It was discussed that directing pedestrians to one of these two east-west roadways for crossing Woodhill would be ideal, perhaps with future crossing enhancements if warranted based on pedestrian/user volumes, as opposed to unguided crossing of Woodhill Road. It was discussed such guidance to the enhanced crossings could be

more easily accomplished with the trail along the West side of Woodhill Road.

- Glen Lake Park is located adjacent to Woodhill Road between Tree Street and Excelsior Blvd. Similar to the crossing considerations given to those with a Glen Lake Elementary destination, users with Glen Lake Park as a destination could be better guided to Tree Street for crossing with a trail along the west side of Woodhill Road. Future enhancements to the crossing could be given if pedestrian/user volumes prove high enough to warrant such enhancements.

- Single family homes exist both to the west (between Woodhill and Williston) and east (between Woodhill and Woodridge/Excelsior). It is anticipated that pedestrians west of Williston and east of Woodridge would typically use those north-south corridors rather than travel to Woodhill.

Proposed Trail Improvement Option 1 – Trail on East Side

Proposed Trail Option 1 consists of installing a new 8 foot wide trail along the east side of Woodhill Road from Tree Street to Hwy 7. The existing sidewalk would remain from Excelsior Blvd to Tree Street, to create a continuous pedestrian facility between Excelsior Blvd to Hwy 7.

A list of "pros and cons" for Option 1 (East Side) was generated to aid in the selection process.

Pros:

- ✓ The trail on the east side will have fewer conflict points with driveways. The Option 1 trail will cross twenty driveways, which is three fewer than Option 2.
- ✓ Direct connection to Glen Lake Park without crossing of Woodhill near the park, though it is acknowledged users may need to cross Woodhill elsewhere to reach the trail if they originate from west of Woodhill Road.

Cons:

- Requires crossing at an uncontrolled location on Woodhill Road near the South Frontage Road and/or Hwy 7 intersections.
- Results in residential property between Woodhill Road and Williston Road not having a dedicated north/south route without crossing a major road.

Proposed Trail Improvement Option 2 – Trail on West Side

Proposed Trail Option 2 consists of installing a new 8-foot-wide trail along the west side of Woodhill Road from Tree Street to Hwy 7. Similar to Option 1, the existing sidewalk would remain from Excelsior Blvd to Tree Street, to create a continuous pedestrian facility between Excelsior Blvd to Hwy 7.

A list of pros and cons for Option 2 (west side) was generated to aid in the selection process.

Pros:

- ✓ The trail along the west side allows controlled routing of pedestrians to enhanced pedestrian crossings of Woodhill Road, should they be improved in the future based on City crossing enhancement guidelines. Potential intersections for future enhancement

evaluation include Tree Street and Brandbury Walk.

- ✓ Location of the trail on the west side aligns better with the South Frontage Road at Highway 7, as the South Frontage Road tees into Woodhill Road from the west. Crossing of Woodhill near Hwy 7 is not required if the trail is on the west side of the roadway.
- ✓ Aligns better with existing facilities near Excelsior Blvd – trail on west side does not require crossing of Woodhill Road to reach the push button controlled crossing of Excelsior Blvd.
- ✓ Placement of the trail on the west side creates more separation between drive lanes and steep slopes along the west side of Woodhill Road north of Crestview Lane, across from Brandbury Walk.
- ✓ Placement of the trail on the west side creates more separation between drive lanes and poles for overhead transmission power lines, which are to remain on the west side of the roadway.
- ✓ The trail on the west side will have fewer conflict points with side streets. The Option 2 trail will cross five streets, which is four less than Option 1.
- ✓ The west side of Woodhill Road has existing lighting units between Tree Street and Atrium Way, which would provide lighting for the trail in that block. A trail along the east side in this block would not be lit.
- ✓ Trail along the west side provides closer access to more residential units, particularly due to the higher residential density developments west of Woodhill Road near Excelsior Blvd, Tree Street, and Atrium Way.
- ✓ There are fourteen mailboxes on the west side of Woodhill Road, seven fewer than the east side. Mailboxes may need to be relocated and coordinated with homeowners, thus are a conflict with the proposed trail to some degree. The west trail option provides fewer of these potential conflicts.

Cons:

- Resulting westerly curb lines in conflict with some sanitary manhole castings, necessitating additional modifications.

Recommendations

Based on the analysis outlined above, we have the following recommendations for consideration by the City:

1. The Woodhill Road traffic volumes and lack of existing pedestrian facilities make it a suitable candidate for addition of a new multi-use trail.

2. Trail Option 2 (West Side) is recommended for final design based on the benefits outlined.

3. The proposed roadway widths, slopes, and elevations be refined through final design to minimize impacts to adjacent steep slopes, retaining walls, trees, and driveways.

4. The potential for future additions of crossings, with push buttons, should be considered in the final geometric design of Woodhill Road. While all pedestrian ramps could not be geometrically

design for future Woodhill crossings at this time without unintentionally encouraging such crossings now, curb lines and grading efforts could be completed in a manner generally consistent with future enhancements.

5. Pedestrian crossings of Woodhill Road at uncontrolled locations are likely inevitable to some degree, however they should not necessarily be encouraged. Actual pedestrian crossing volumes (demand) should be reviewed by a professional engineer and compared to adopted City guidelines for pedestrian enhancements. If volumes are high enough to meet warrants/guidelines for enhancements, those improvements should be considered in the future by the City in the context of citywide needs/priorities and its limited budget.

Attachments:

A. Layout of Proposed Trail Options 1 & 2 as of 8/14/17
B. Origin/destination analysis memo & figure

LEGEND

- CONSTRUCTION LIMITS
- 8' BITUMINOUS TRAIL
- PROPOSED ROADWAY
- PROPOSED RETAINING WALL
- PROPOSED BITUMINOUS DRIVEWAY
- PROPOSED CONCRETE MEDIAN / SIDEWALK / DRIVEWAY
- EXISTING SECTION LINES
- EXISTING RIGHT-OF-WAY LINES
- EXISTING PROPERTY LINES
- EXISTING EASEMENT LINES
- TREE REMOVAL
- EXISTING SIDEWALK

HORZ. SCALE 0 100 200 FEET

VERT. SCALE 0 40 80 FEET

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OPTION 1

TRAIL ALONG EAST SIDE

CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
8/10/2017

LEGEND

CONSTRUCTION LIMITS	EXISTING SECTION LINES
8' BITUMINOUS TRAIL	EXISTING RIGHT-OF-WAY LINES
PROPOSED ROADWAY	EXISTING PROPERTY LINES
PROPOSED RETAINING WALL	EXISTING EASEMENT LINES
PROPOSED BITUMINOUS DRIVEWAY	TREE REMOVAL
PROPOSED CONCRETE MEDIAN / SIDEWALK / DRIVEWAY	EXISTING SIDEWALK

HORZ. SCALE 0 100 200 FEET

VERT. SCALE 0 40 80 FEET

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OPTION 2
TRAIL ALONG WEST SIDE

CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
8/10/2017

BOLTON & MENK
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MEMORANDUM

Date: October 2, 2017

To: Chris LaBounty, P.E., Engineering Project Manager, City of Minnetonka

From: Mike Waltman, P.E., Principal Engineer
Jacob Bongard, P.E., P.T.O.E., Transportation Project Engineer
Mike Larson, E.I.T., Transportation Design Engineer

Subject: Pedestrian Traffic Generation Memorandum
2018 Woodhill Road Improvements

Introduction

In conjunction with the 2018 Woodhill Road Improvements Project, an evaluation of pedestrian volumes and crossing locations at Woodhill Road was conducted to gain an understanding of the pedestrian activity within the project area and to identify any potential locations for marked crossings. No pedestrian count data is currently available, thus, several assumptions must be made to estimate the area's pedestrian activity.

Methodology

Due to the lack of pedestrian data and walkable areas adjacent to Woodhill Road in the project area, several assumptions must be made in order to estimate the number of pedestrians crossing Woodhill Road and where the crossings will most likely be made. The assumptions of this evaluation review the most likely pedestrian destinations, what areas are the pedestrians originating from, and how many pedestrians can be reasonably expected.

Firstly, destinations, or attraction sites, must be identified near the project area. Since the objective is to identify pedestrian traffic crossing Woodhill Road from west to east, the destination sites must be east of Woodhill Road. The two major sites identified as part of this study are Glen Lake Park and Glen Lake Elementary School. Thomas Berlin, Transportation Support Specialist for Hopkins Schools, was contacted and indicated that Woodhill Road acts as the boundary of where students are expected to walk to Glen Lake Elementary School. Therefore, school officials do not expect children to walk along or cross Woodhill Road to attend Glen Lake Elementary School. The addition of a trail adjacent to the roadway is not expected to trigger a change to the school boundary, thus, students walking to school are not expected to impact the pedestrian movements either in the day of opening or in the future.

Second, a preferable walking distance must be assumed as the maximum distance people would elect to walk to the two sites rather than drive. According to a USDOT study conducted in 2012, the majority of pedestrians are willing to walk up to one-half mile to a city park. This distance is reduced to one-third of a mile due to the assumption that most trips to and from the park would include small children. Therefore, a tabulation of all households/parcels within one-third mile walking distance from the trip destinations was performed.

Finally, an assumption must be made concerning the number of pedestrian trips generated by the households within the walkable zone. Data obtained from the US Census Bureau indicates an average household size of 2.24 persons per household. Additionally, the 2030 City of Minnetonka Comprehensive Plan records that roughly 30% of homes had children under the age of 18 in the year 2000. For the purposes of this study, 3 persons per household was assumed.

Findings

It was found that nine parcels are within the one-third mile walking distance to the school and 29 parcels are within the preferred walking distance to the park. All parcels walkable to the school are single home residences. However, of the 29 parcels walkable to the city park, 25 are single home residences, two are multi-level senior living apartment complexes, and two are multi-level apartment complexes with approximately 115 units and between 60-80 units. It was assumed that the majority of trips to the park and school would include at least one child, and that as many as 30 pedestrian trips will be generated from the senior living complexes to the Glen Lake Activity Center, located in the southwest corner of the park. Note that it was also assumed that apartment units are capable of generating the same number of pedestrian trips as a single family household. See **Appendix A** for a figure of the parcels within the walkable zones and the probable walking routes.

The approximated number of daily pedestrian trips generated, assuming all potential trips occur in a single day, are as follows:

- 12 potential daily pedestrian trips to and from school, crossing at Bellvue Drive or Brandbury Drive
- 6 potential daily pedestrian trips to and from school, crossing at Westgate Road
- 390-430 potential daily pedestrian trips to and from the park, crossing at Tree Street (A marked crosswalk is located at Excelsior Blvd., one block south of Tree Street, that would likely accommodate a portion of these trips)

Conclusion

An analysis of potential pedestrian traffic and crossing locations was conducted within the Woodhill Road area. Pedestrian data was unavailable and caused several assumptions be made including, pedestrian origins and destinations, pedestrian travel distances, number of persons per household, and households most likely to use the park based on age.

The findings identified above provide insight into the scale and number of pedestrian crossings that could potentially cross at each location during the busiest days of the year. Based upon these findings, an additional review including field pedestrian counts should be completed at the Woodhill Road at Tree Street intersection following the completion of the construction project to determine whether the location would benefit from additional pedestrian crossing treatments. The crossings identified north of this location are not expected to regularly serve high pedestrian volumes due to the walking boundary for Glen Lake Elementary identified as Woodhill Road.

Appendix A
Pedestrian Walkable Households

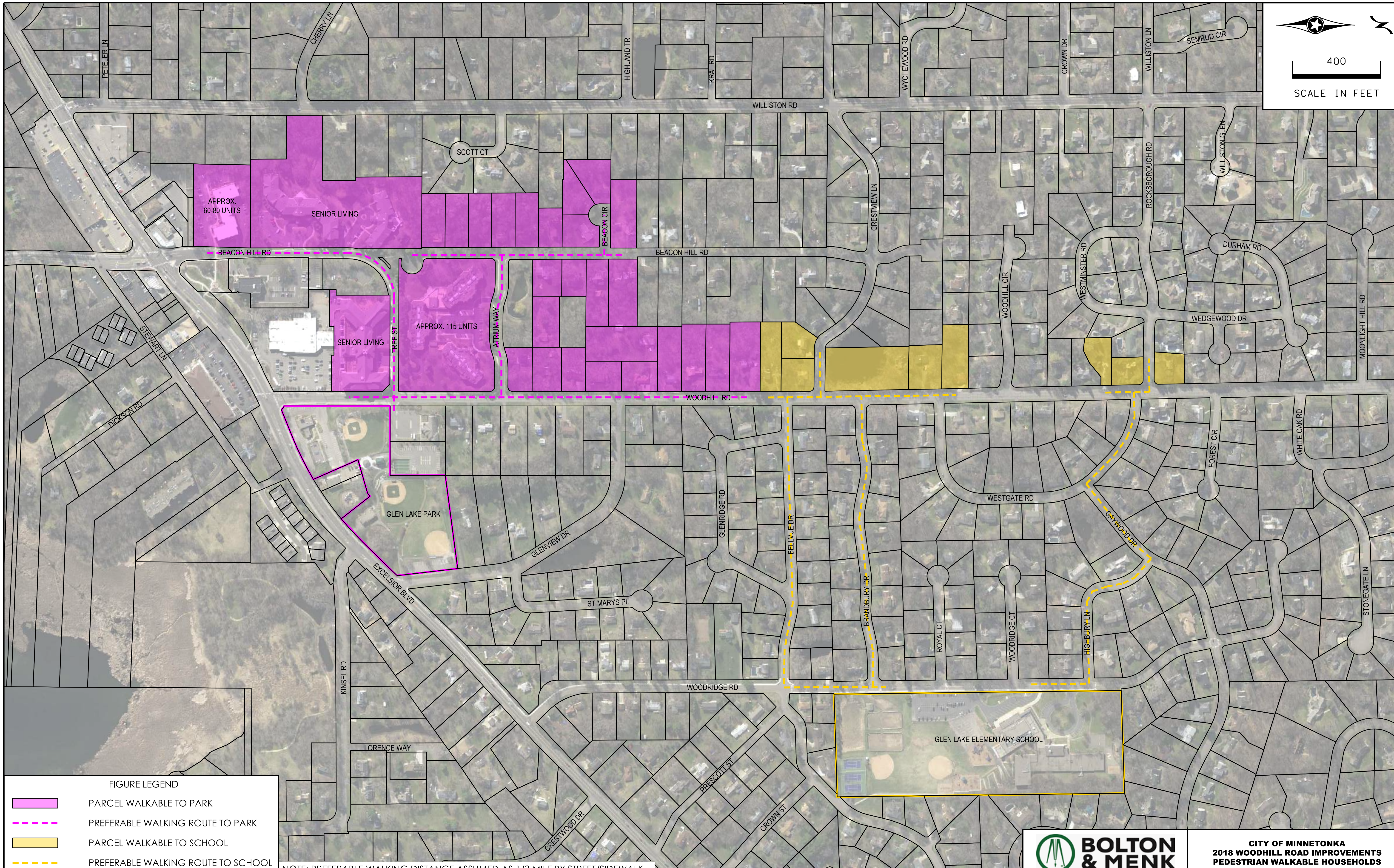

FIGURE LEGEND

- PARCEL WALKABLE TO PARK
- PREFERABLE WALKING ROUTE TO PARK
- PARCEL WALKABLE TO SCHOOL
- PREFERABLE WALKING ROUTE TO SCHOOL

NOTE: PREFERABLE WALKING DISTANCE ASSUMED AS 1/3 MILE BY STREET/SIDEWALK

BOLTON & MENK

CITY OF MINNETONKA
2018 WOODHILL ROAD IMPROVEMENTS
PEDESTRIAN WALKABLE HOUSEHOLDS

Appendix E: Woodhill Street Lighting Alternatives

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MEMORANDUM

Date: September 18, 2017

To: Chris LaBounty, P.E., Engineering Project Manager

From: Mike Waltman, P.E., Principal Engineer
Jeremy Melquist, E.I.T., Traffic Design Engineer

Subject: Photometric Analysis Summary
2018 Woodhill Road Improvements, City of Minnetonka

Introduction

As part of the Woodhill Road Improvements project, Bolton & Menk conducted photometric analyses of three different lighting alternatives between Excelsior Blvd and Atrium Way.

Woodhill Road is currently lit by alternating 20' tall high pressure sodium (HPS) lighting units between Excelsior Blvd and Tree Street. The units are spaced about 200' apart on each side of the road, or about every 100' along the roadway with respect to lights on both sides. Between Tree Street and Atrium Way the corridor is lit by 8' tall poles with HPS luminaires, spaced about 100' apart, located on the west side of the roadway only.

Per the City's Public Works Staff, it should also be noted the existing lighting units on the west side of Woodhill Road between Excelsior Blvd and Tree Street are inaccessible for maintenance due to overhead transmission lines. Overhead transmission lines require sufficient clearance be provided for safety purposes. The City's Public Works Staff has noted the maintenance of the luminaires atop the poles is too close to or within the clearance limits. In response to this concern and potential for impact to the lighting system due to other construction, review of the existing lighting conditions and potential improvements was investigated. Additionally, Public Works has noted they are unable to find repair parts for the tip down lights between Tree Street and Atrium Way.

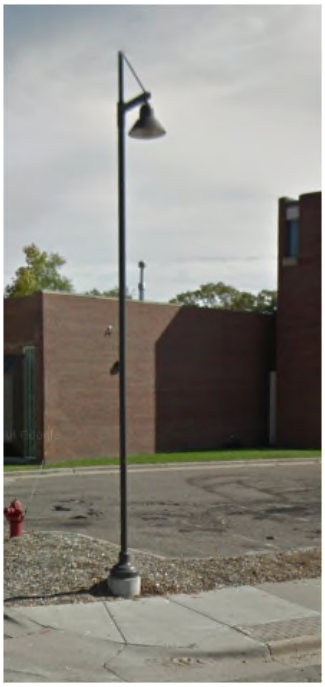


Figure 1: Existing Lighting Unit
Excelsior Blvd to Atrium Way
20' Mounting Height

Figure 2: Existing Lighting Unit
Atrium Way to Tree Street
8' Assumed Mounting Height

Methodology & Guidelines

A *photometric analysis* is a computer simulated lighting model that determines if a proposed lighting layout will be sufficient for the type of roadway and surrounding land use in which it is proposed to be constructed. A photometric analysis model quantifies lighting levels in two ways:

1. 'Average lighting level' which is the light level (brightness) of the area analyzed. This is quantified in foot-candles (fc).
2. 'Uniformity Ratio' which describes the consistency of light levels throughout the corridor, thereby identifying if a roadway has bright and dark spots. The uniformity ratio is calculated as the average lighting level divided by the minimum lighting level.

Most agencies utilize the lighting guidelines/standards set forth by the Minnesota Department of Transportation (MnDOT) Lighting Design Manual[1]. The manual recommends an average lighting level of 0.8 foot-candles and a maximum uniformity ratio of 4:1 (average: minimum) for the roadway and sidewalks on Woodhill Road. Typically, the roadway is the priority for street lighting as opposed to trails and sidewalks, though priorities can vary between different stakeholders and communities.

Existing Conditions

Existing lighting levels can be seen in ***Attachment A***. These lighting levels do not meet MnDOT's minimum recommendations for the roadway.

- The lighting levels on the roadway from Excelsior Blvd to Tree Street were: 0.8 fc average and N/A for the uniformity ratio.
- The lighting levels on the roadway from Tree Street to Atrium Way were: 0.3 fc average and N/A for the uniformity ratio.
- The "N/A" uniformity ratio indicated that there are parts of the roadway that are not lit (0 fc), which does not allow calculation of a uniformity ratio, essentially making it infinite as a result of division by zero.

Proposed Alternatives

Option 1

Option 1A consists of relocating the existing lighting units from the west side of the roadway to the east side of the roadway, and retaining the existing lighting units on the east side of the roadway in place. In essence, this would eliminate the 'alternating' lights from one side of the street to the other, placing all lights on the east side at about 100' spacing. Option 1A lighting levels are shown in ***Attachment B***.

Option 1B is consistent with the Option 1A components, however it would also include replacing the existing HPS lighting units with new LED fixtures. Option 1B lighting levels are shown in ***Attachment C***.

Neither Options 1A or 1B meet MnDOT's minimum lighting level guidelines. However, these options do provide similar lighting levels to the existing conditions and eliminate the potential hazard of working under the overhead transmission lines for routine maintenance. The lighting levels on the roadway ranged from 0.4 – 0.7 fc average and 'N/A' for the uniformity ratio. Similar to the existing condition, the 'N/A' ratio is a result of parts of the roadway not being lit (measured 0.0 fc).

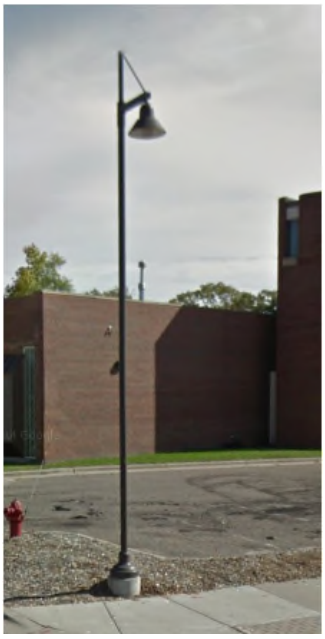


Figure 3: Example existing Lighting Unit To be relocated for option 1

[1]MnDOT Lighting Design Manual - http://www.dot.state.mn.us/trafficeng/lighting/2010_Roadway%20Lighting_Design_Manual2.pdf

Option 2

Option 2 consists of removing all existing lighting units from both sides of Woodhill Road, between Excelsior Blvd and Atrium Way, and replacing them with new, taller poles on the east side of Woodhill Road only. The new poles would be equipped with new LED lighting units but otherwise would the same style aesthetically as the existing lighting unit. The poles would have a 25 foot mounting height, which is 5' taller than the existing 20' tall poles. The taller poles proposed in this option are intended to offset the loss of lighting associated with removal of poles from the west side of the corridor.

Option 2 lighting levels are shown in ***Attachment D***. These lighting levels meet MnDOT's minimum recommendations for the roadway and the east sidewalk. The lighting levels on the roadway were 0.9 fc average and ranged from 4.5:1 to 3:1 for the uniformity ratios.

Some overhead power lines exist on the east side of the roadway between Tree Street and Atrium Way. These overhead lines are proposed to be buried with the project. If for some reason these are not buried, it is recommended the Option 2 pole heights could be installed without conflict with overhead power.

Option 3

Option 3 alternatives are consistent with Option 2, however they include pedestrian scale lighting on the west side of Woodhill Road in addition to the new taller poles on the east side.

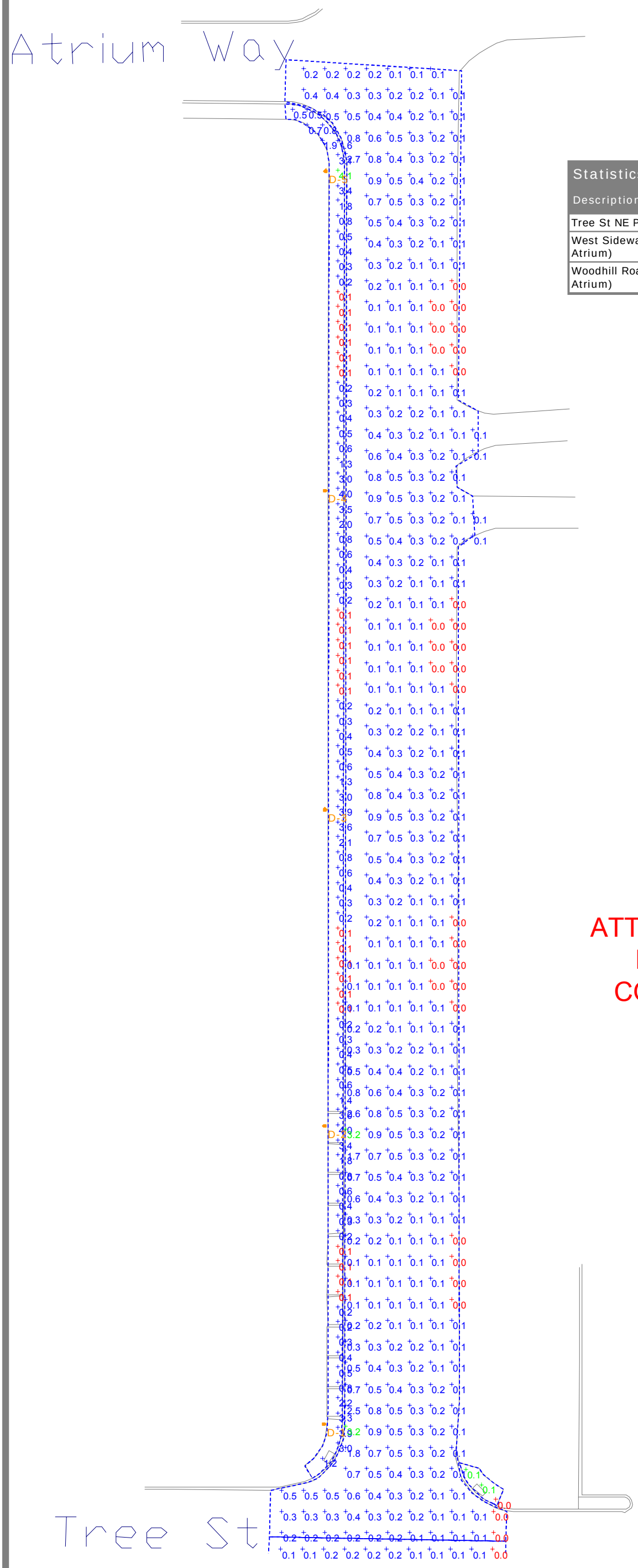
Option 3A proposes the addition of LED pedestrian bollards on the west side of the roadway. Option 3A lighting levels are shown in **Attachment E**.

Option 3B proposes the addition of 8' tall poles with LED luminaires on the west side of the roadway. These 8' tall poles (or slightly taller if desired by the City) would be aesthetically similar to the existing 20' tall lighting units between Excelsior Blvd and Tree St, except at the shorter mounting height. Option 3B lighting levels are shown in ***Attachment F*.**

Both Option 3A and 3B lighting levels meet MnDOT's lighting recommendations. The lighting levels on the roadway ranged from 0.9 – 1.0 fc average and 3.3:1 to 3:1 for the uniformity ratio. The lighting levels on the sidewalks ranged from 0.9 – 1.1 fc average and 3.7:1 to 1.7:1 for the uniformity ratio.

Figure 4: Example Option 3A Pedestrian Bollard. Other styles could be utilized if desired by the City, with minimal impact on the lighting analysis results.

[1]MnDOT Lighting Design Manual - http://www.dot.state.mn.us/trafficeng/lighting/2010_Roadway%20Lighting_Design_Manual2.pdf



Statistics

Description	Avg	Max	Min	Avg/Min
Tree St NE Ped Ramp	0.1 fc	0.1 fc	0.0 fc	N/A
West Sidewalk (Tree to Atrium)	1.0 fc	4.1 fc	0.1 fc	10.0:1
Woodhill Road (Tree to Atrium)	0.3 fc	3.2 fc	0.0 fc	N/A

ATTACHMENT A: EXISTING CONDITIONS

Note

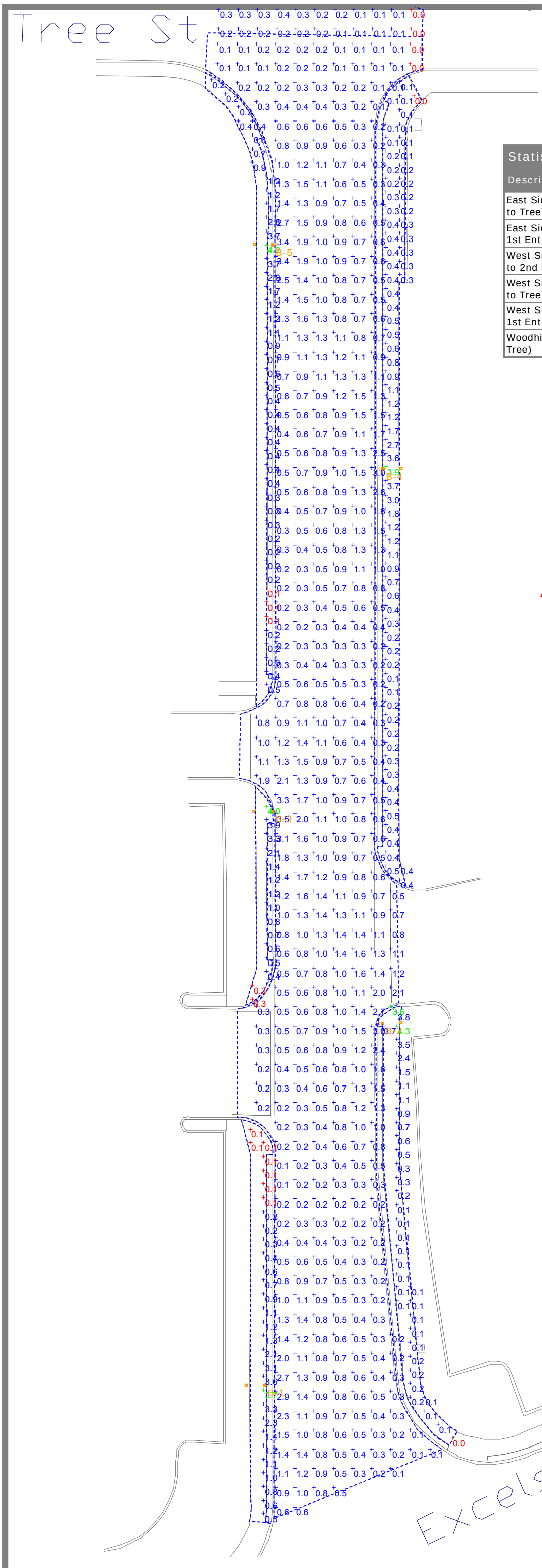
1. D1-D5 ARE THE EXISTING LIGHT LOCATIONS

VISUAL

WOODHILL ROAD
EXISTING LIGHTING LEVELS
MINNETONKA, MN

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary



Statistics

Description	Avg	Max	Min	Avg/Min
East Sidewalk (1st Entrance to Tree)	0.6 fc	3.9 fc	0.0 fc	N/A
East Sidewalk (Excelsior to 1st Entrance)	0.8 fc	4.3 fc	0.0 fc	N/A
West Sidewalk (1st Entrance to 2nd Entrance)	1.4 fc	4.0 fc	0.3 fc	4.7:1
West Sidewalk (2nd Entrance to Tree)	0.9 fc	4.2 fc	0.1 fc	9.0:1
West Sidewalk (Exelsior to 1st Entrance)	1.1 fc	3.7 fc	0.1 fc	11.0:1
Woodhill Rd (Excelsior to Tree)	0.8 fc	3.6 fc	0.0 fc	N/A

ATTACHMENT A: EXISTING CONDITIONS

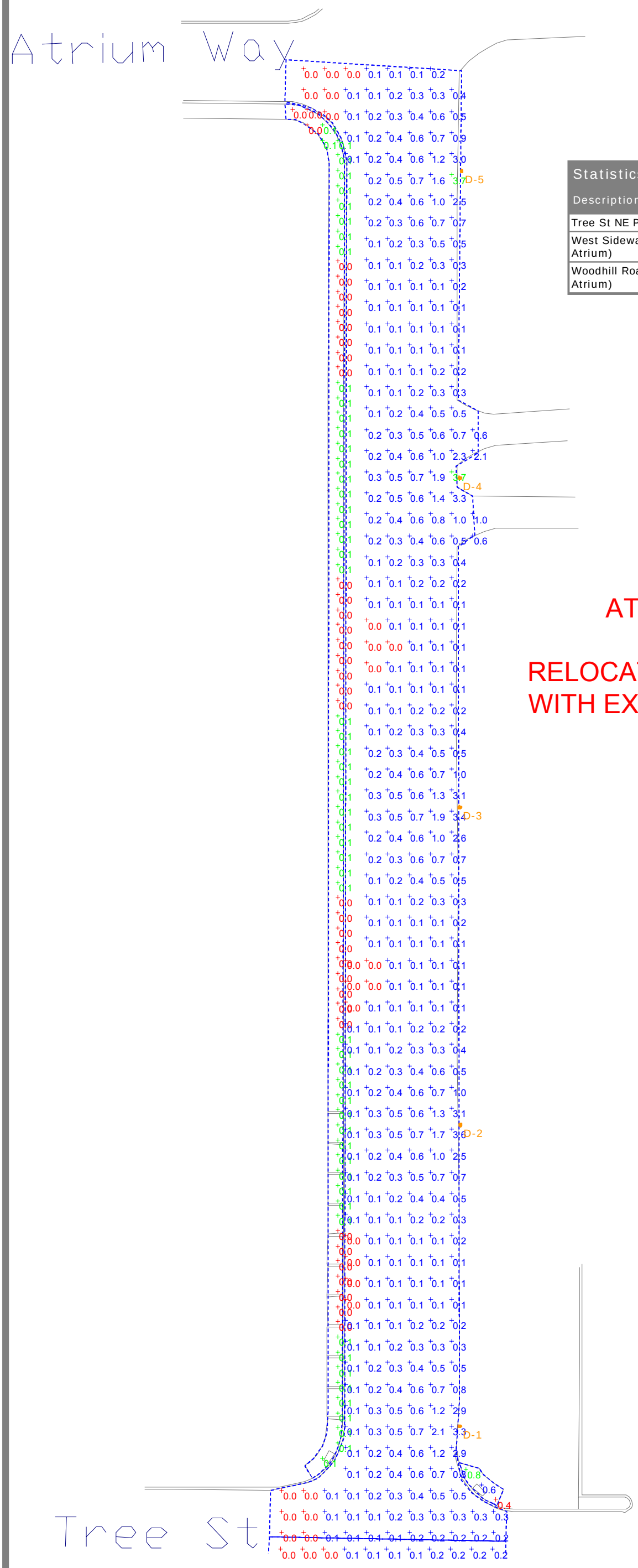
VISUAL

WOODHILL ROAD
EXISTING LIGHTING LEVELS
MINNETONKA, MN

Note
1. B1-B5 ARE THE EXISTING LIGHT LOCATIONS

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary



Statistics				
Description	Avg	Max	Min	Avg/Min
Tree St NE Ped Ramp	0.6 fc	0.8 fc	0.4 fc	1.5:1
West Sidewalk (Tree to Atrium)	0.1 fc	0.1 fc	0.0 fc	N/A
Woodhill Road (Tree to Atrium)	0.4 fc	3.7 fc	0.0 fc	N/A

ATTACHMENT B:
OPTION 1A
RELOCATE EXISTING POLES WITH EXISTING LUMINAIRES

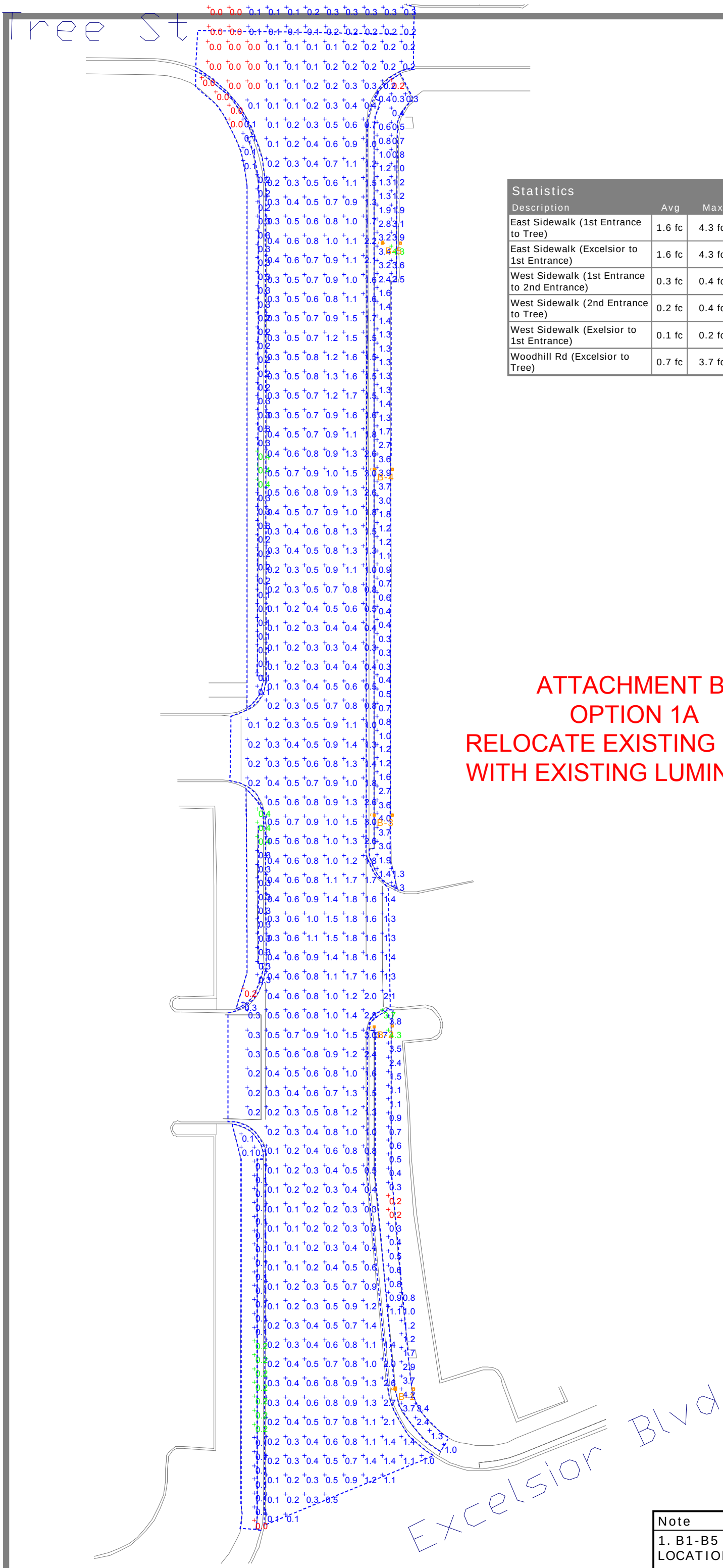
Note
1. D1-D5 ARE THE LIGHT LOCATIONS

VISUAL

WOODHILL ROAD
OPTION 1 LIGHTING LEVELS
WITH EXISTING LUMINAIRES
MINNETONKA, MN

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary



Statistics

Description	Avg	Max	Min	Avg/Min
East Sidewalk (1st Entrance to Tree)	1.6 fc	4.3 fc	0.2 fc	8.0:1
East Sidewalk (Excelsior to 1st Entrance)	1.6 fc	4.3 fc	0.2 fc	8.0:1
West Sidewalk (1st Entrance to 2nd Entrance)	0.3 fc	0.4 fc	0.2 fc	1.5:1
West Sidewalk (2nd Entrance to Tree)	0.2 fc	0.4 fc	0.0 fc	N/A
West Sidewalk (Exelsior to 1st Entrance)	0.1 fc	0.2 fc	0.0 fc	N/A
Woodhill Rd (Excelsior to Tree)	0.7 fc	3.7 fc	0.0 fc	N/A

ATTACHMENT B:
OPTION 1A
RELOCATE EXISTING POLES WITH EXISTING LUMINAIRES

VISUAL

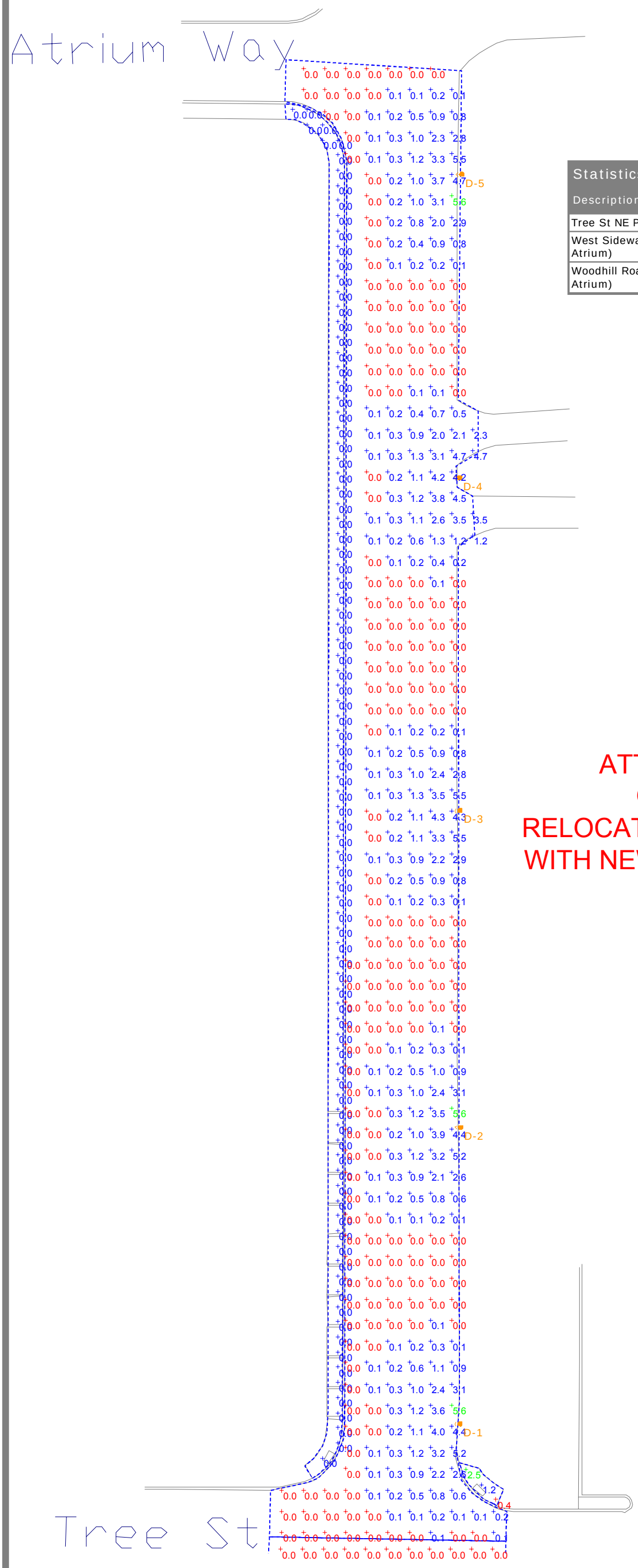
WOODHILL ROAD
OPTION 1 LIGHTING LEVELS
WITH EXISTING LUMINAIRES
MINNETONKA, MN

Note

1. B1-B5 ARE THE LIGHT LOCATIONS

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary



Statistics				
Description	Avg	Max	Min	Avg/Min
Tree St NE Ped Ramp	1.4 fc	2.5 fc	0.4 fc	3.5:1
West Sidewalk (Tree to Atrium)	0.0 fc	0.0 fc	0.0 fc	N/A
Woodhill Road (Tree to Atrium)	0.6 fc	5.6 fc	0.0 fc	N/A

ATTACHMENT C:
OPTION 1B
RELOCATE EXISTING POLES WITH NEW LED LUMINAIRES

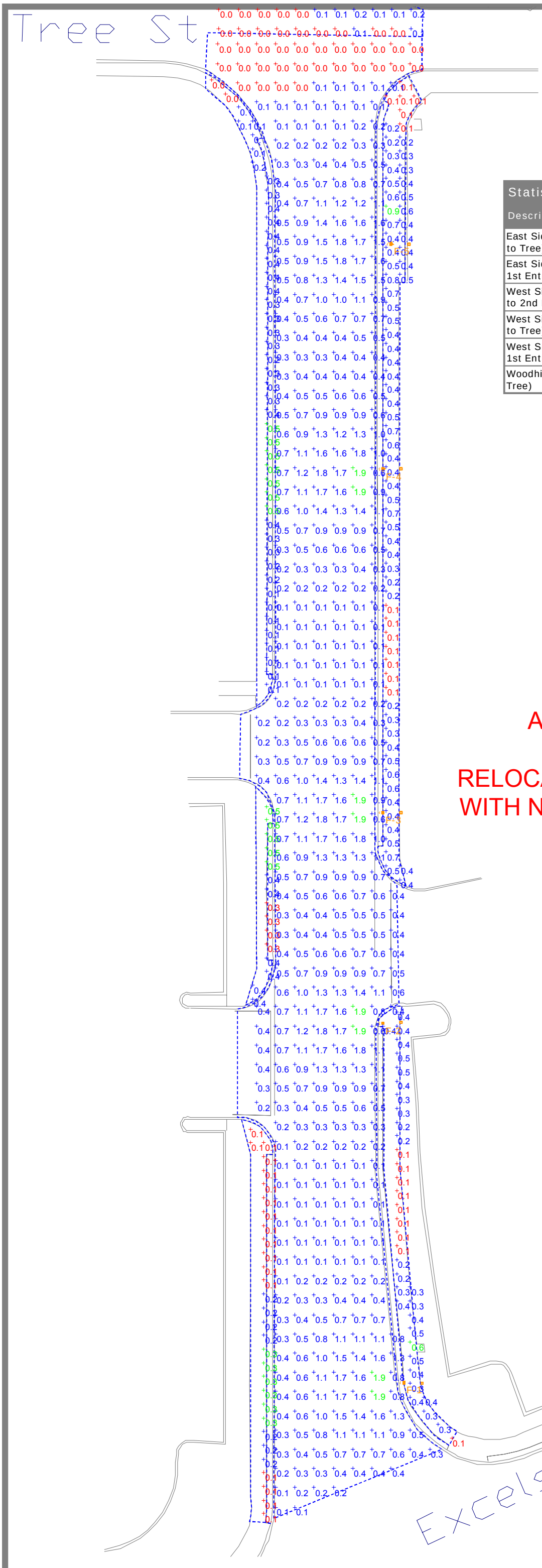
Note
1. D1-D5 ARE THE LIGHT LOCATIONS

VISUAL

WOODHILL ROAD
OPTION 1 LIGHTING LEVELS
WITH LED LUMINAIRES
MINNETONKA, MN

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary



Statistics

Description	Avg	Max	Min	Avg/Min
East Sidewalk (1st Entrance to Tree)	0.4 fc	0.9 fc	0.1 fc	4.0:1
East Sidewalk (Excelsior to 1st Entrance)	0.3 fc	0.6 fc	0.1 fc	3.0:1
West Sidewalk (1st Entrance to 2nd Entrance)	0.4 fc	0.5 fc	0.3 fc	1.3:1
West Sidewalk (2nd Entrance to Tree)	0.3 fc	0.5 fc	0.0 fc	N/A
West Sidewalk (Exelsior to 1st Entrance)	0.2 fc	0.3 fc	0.1 fc	2.0:1
Woodhill Rd (Excelsior to Tree)	0.6 fc	1.9 fc	0.0 fc	N/A

ATTACHMENT C:
OPTION 1B
RELOCATE EXISTING POLES WITH NEW LED LUMINAIRES

VISUAL

WOODHILL ROAD
OPTION 1 LIGHTING LEVELS
WITH LED LUMINAIRES
MINNETONKA, MN

Note

1. F1-F5 ARE THE LIGHT LOCATIONS

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary

Statistics

Description	Avg	Max	Min	Avg/Min
Tree St NE Ped Ramp	0.7 fc	0.7 fc	0.7 fc	1.0:1
West Sidewalk (Tree to Atrium)	0.6 fc	0.7 fc	0.3 fc	2.0:1
Woodhill Road (Tree to Atrium)	0.9 fc	1.8 fc	0.3 fc	3.0:1

Schedule

Symbol	Quantity	Manufacturer	Catalog Number	Lumens Per Lamp	Light Loss Factor	Wattage
	13	ARCHITECTURAL AREA LIGHTING	UCL-T3-56LED-3K-700	7972	0.71	129.3

ATTACHMENT D:
OPTION 2
NEW 25' POLES & LED

VISUAL

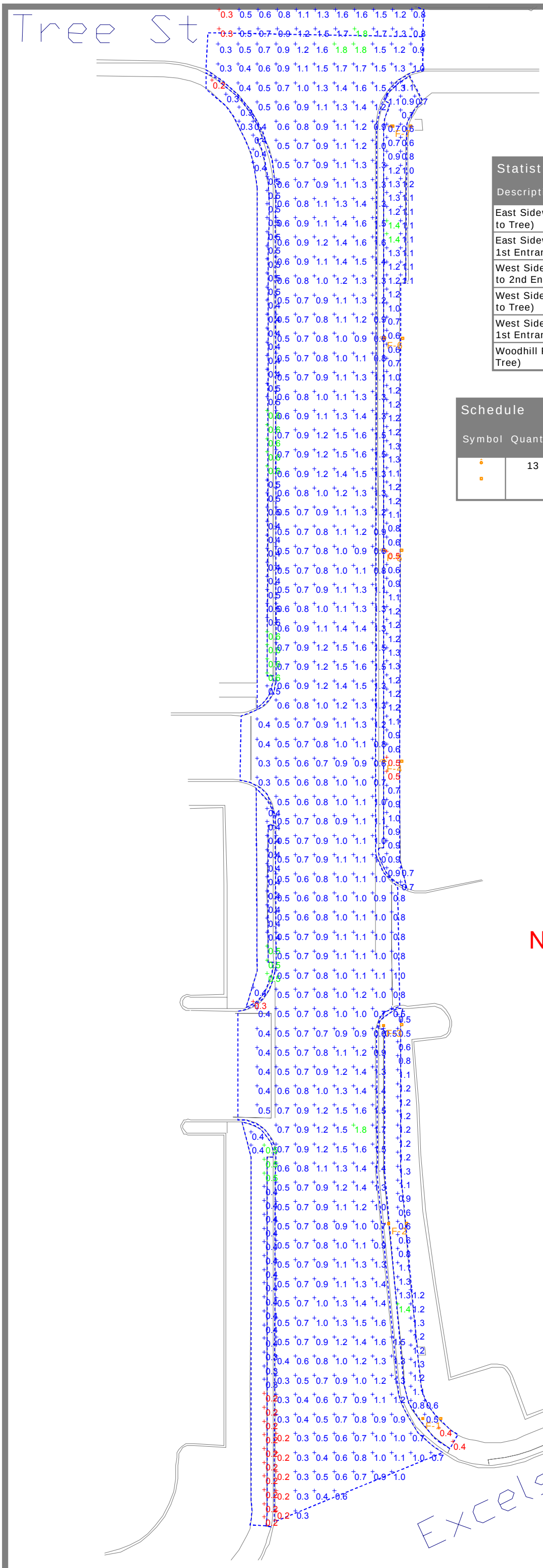
WOODHILL ROAD
OPTION 2 LIGHTING LEVELS
MINNETONKA, MN

Note

1. F8-F13 ARE THE LIGHT LOCATIONS (MOUNTED AT 25 FT)

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary



Statistics

Description	Avg	Max	Min	Avg/Min
East Sidewalk (1st Entrance to Tree)	1.0 fc	1.4 fc	0.5 fc	2.0:1
East Sidewalk (Excelsior to 1st Entrance)	1.0 fc	1.4 fc	0.4 fc	2.5:1
West Sidewalk (1st Entrance to 2nd Entrance)	0.4 fc	0.5 fc	0.3 fc	1.3:1
West Sidewalk (2nd Entrance to Tree)	0.5 fc	0.6 fc	0.2 fc	2.5:1
West Sidewalk (Exelsior to 1st Entrance)	0.3 fc	0.5 fc	0.2 fc	1.5:1
Woodhill Rd (Excelsior to Tree)	0.9 fc	1.8 fc	0.2 fc	4.5:1

Schedule

Symbol	Quantity	Manufacturer	Catalog Number	Lumens Per Lamp	Light Loss Factor	Wattage
	13	ARCHITECTURAL AREA LIGHTING	UCL-T3-56LED-3K-700	7972	0.71	129.3

ATTACHMENT D:
OPTION 2
NEW 25' POLES & LED

VISUAL

WOODHILL ROAD
OPTION 2 LIGHTING LEVELS
MINNETONKA, MN

Note

1. F1-F7 ARE THE LIGHT LOCATIONS (MOUNTED AT 25 FT)

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary

Statistics

Description	Avg	Max	Min	Avg/Min
Tree St NE Ped Ramp	0.7 fc	0.7 fc	0.7 fc	1.0:1
West Sidewalk (Tree to Atrium)	1.0 fc	6.2 fc	0.6 fc	1.7:1
Woodhill Road (Tree to Atrium)	0.9 fc	1.8 fc	0.3 fc	3.0:1

Schedule

Symbol	Quantity	Manufacturer	Catalog Number	Lumens Per Lamp	Light Loss Factor	Wattage
	20	ARCHITECTURAL AREA LIGHTING	UCB-FLR--12LED-BW	703	0.71	33
	13	ARCHITECTURAL AREA LIGHTING	UCL-T3-56LED-3K-700	7972	0.71	129.3

ATTACHMENT E:
OPTION 3A
NEW 25' POLES WITH LED
& NEW PED BOLLARDS

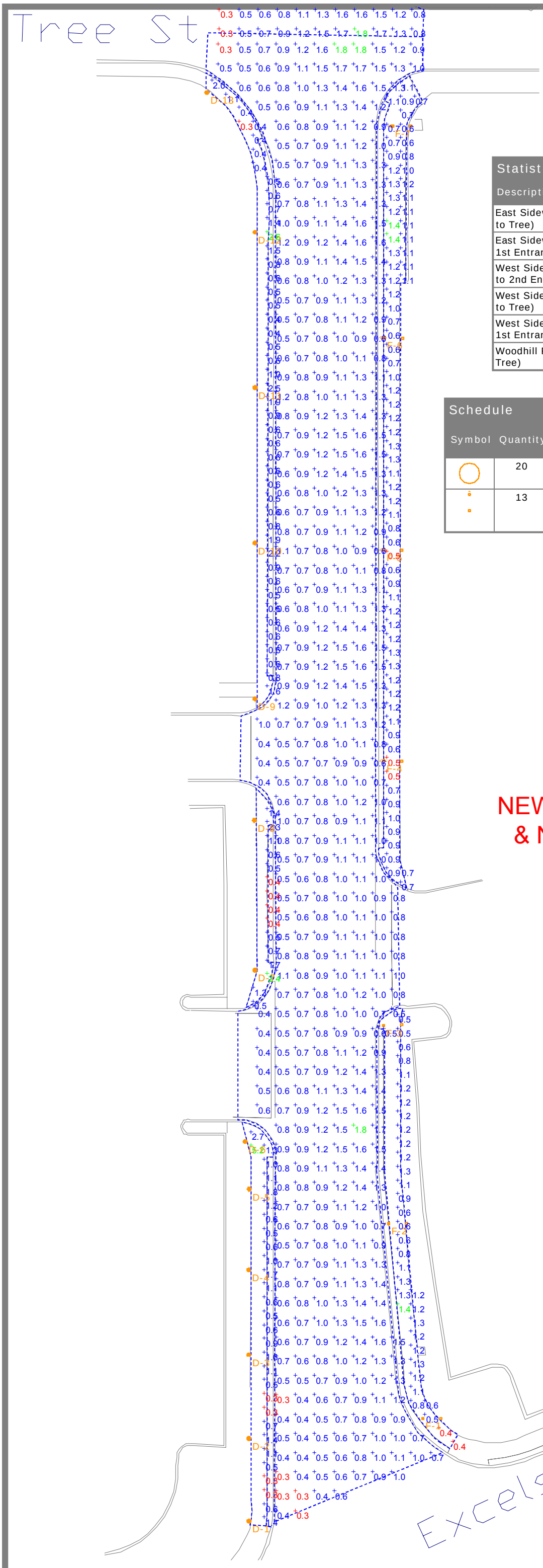
WOODHILL ROAD
OPTION 3 LIGHTING LEVELS
WITH PEDESTRIAN BOLLARD LIGHTING
MINNETONKA, MN

Note

1. F8-F13 ARE THE LIGHT LOCATIONS MOUNTED AT 25 FT.
2. D14-D20 ARE THE BOLLARD LOCATIONS MOUNTED AT 3 FT

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary



Statistics

Description	Avg	Max	Min	Avg/Min
East Sidewalk (1st Entrance to Tree)	1.0 fc	1.4 fc	0.5 fc	2.0:1
East Sidewalk (Excelsior to 1st Entrance)	1.0 fc	1.4 fc	0.4 fc	2.5:1
West Sidewalk (1st Entrance to 2nd Entrance)	1.0 fc	2.4 fc	0.4 fc	2.5:1
West Sidewalk (2nd Entrance to Tree)	0.9 fc	2.6 fc	0.3 fc	3.0:1
West Sidewalk (Exelsior to 1st Entrance)	1.1 fc	5.2 fc	0.3 fc	3.7:1
Woodhill Rd (Excelsior to Tree)	1.0 fc	1.8 fc	0.3 fc	3.3:1

Schedule

Symbol	Quantity	Manufacturer	Catalog Number	Lumens Per Lamp	Light Loss Factor	Wattage
	20	ARCHITECTURAL AREA LIGHTING	UCB-FLR-12LED-BW	703	0.71	33
	13	ARCHITECTURAL AREA LIGHTING	UCL-T3-56LED-3K-700	7972	0.71	129.3

ATTACHMENT E:
OPTION 3A
NEW 25' POLES WITH LED
& NEW PED BOLLARDS

Note

1. F1-F7 ARE THE LIGHT LOCATIONS MOUNTED AT 25 FT.
2. D1-D13 ARE THE BOLLARD LOCATIONS MOUNTED AT 3 FT

VISUAL

WOODHILL ROAD
OPTION 3 LIGHTING LEVELS
WITH PEDESTRIAN BOLLARD LIGHTING
MINNETONKA, MN

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary

Statistics

Description	Avg	Max	Min	Avg/Min
Tree St NE Ped Ramp	0.7 fc	0.8 fc	0.7 fc	1.0:1
West Sidewalk (Tree to Atrium)	1.0 fc	2.4 fc	0.6 fc	1.7:1
Woodhill Road (Tree to Atrium)	1.0 fc	1.8 fc	0.4 fc	2.5:1

Schedule

Symbol	Quantity	Manufacturer	Catalog Number	Lumens Per Lamp	Light Loss Factor	Wattage
	18	ARCHITECTURAL AREA LIGHTING	UCS-ANG-12LED-BW 5100K	1085	0.71	32
	13	ARCHITECTURAL AREA LIGHTING	UCL-T3-56LED-3K-700	7972	0.71	129.3

ATTACHMENT F:
OPTION 3B
NEW 25' POLES WITH LED & NEW PED SCALE LIGHTING

VISUAL

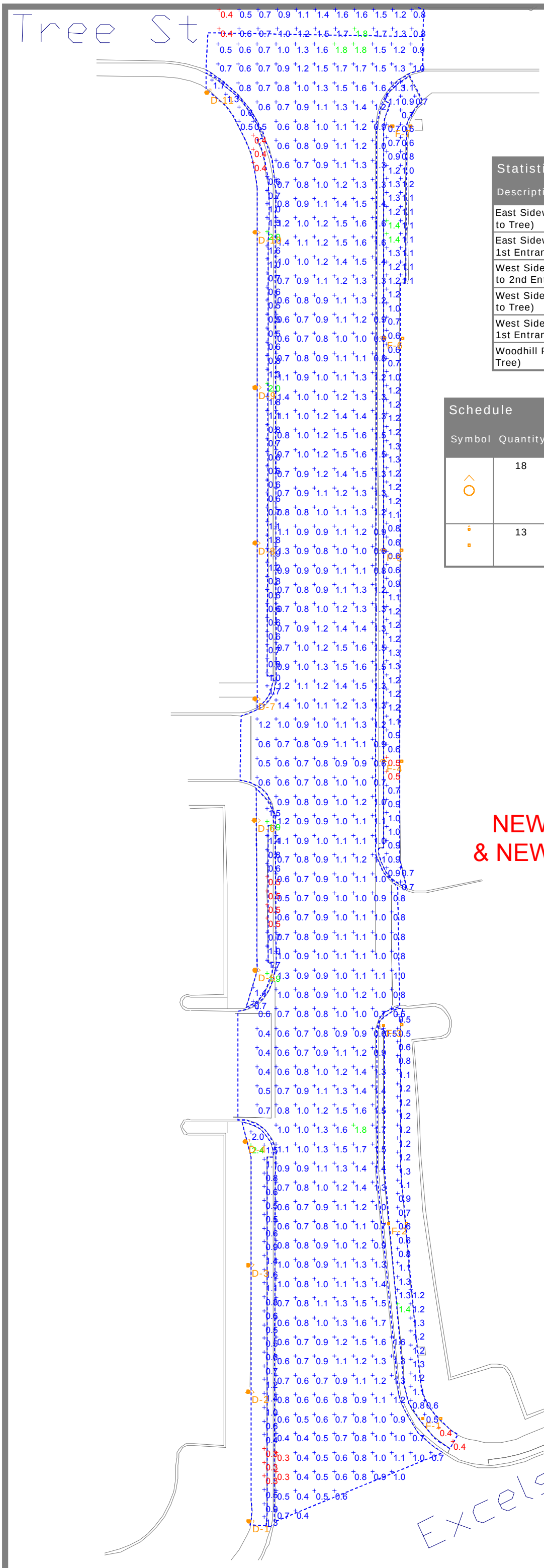
WOODHILL ROAD
OPTION 3 LIGHTING LEVELS
WITH PEDESTRIAN SCALE LIGHTING
MINNETONKA, MN

Note

1. F8-F13 ARE THE LIGHT LOCATIONS MOUNTED AT 25 FT.
2. D12-D18 ARE THE LIGHT LOCATIONS MOUNTED AT 8 FT

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary



Statistics

Description	Avg	Max	Min	Avg/Min
East Sidewalk (1st Entrance to Tree)	1.0 fc	1.4 fc	0.5 fc	2.0:1
East Sidewalk (Excelsior to 1st Entrance)	1.0 fc	1.4 fc	0.4 fc	2.5:1
West Sidewalk (1st Entrance to 2nd Entrance)	1.0 fc	1.9 fc	0.5 fc	2.0:1
West Sidewalk (2nd Entrance to Tree)	0.9 fc	2.0 fc	0.4 fc	2.3:1
West Sidewalk (Exelsior to 1st Entrance)	0.9 fc	2.4 fc	0.3 fc	3.0:1
Woodhill Rd (Excelsior to Tree)	1.0 fc	1.8 fc	0.3 fc	3.3:1

Schedule

Symbol	Quantity	Manufacturer	Catalog Number	Lumens Per Lamp	Light Loss Factor	Wattage
	18	ARCHITECTURAL AREA LIGHTING	UCS-ANG-12LED-BW 5100K	1085	0.71	32
	13	ARCHITECTURAL AREA LIGHTING	UCL-T3-56LED-3K-700	7972	0.71	129.3

ATTACHMENT F:
OPTION 3B
NEW 25' POLES WITH LED
& NEW PED SCALE LIGHTING

Note

1. F1-F7 ARE THE LIGHT LOCATIONS MOUNTED AT 25 FT.
2. D1-D11 ARE THE LIGHT LOCATIONS MOUNTED AT 8 FT

VISUAL

WOODHILL ROAD
OPTION 3 LIGHTING LEVELS
WITH PEDESTRIAN SCALE LIGHTING
MINNETONKA, MN

Designer
JMM
Date
8/11/2017
Scale
1:35
Drawing No.

Summary

Services Provided:

Civil and Municipal Engineering
Water and Wastewater Engineering
Traffic and Transportation Engineering
Aviation Planning and Engineering
Water Resources Engineering
Coatings Inspection Services
Landscape Architecture Services
Surveying and Mapping
Geographic Information System Services

Funding Assistance

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