



Preliminary Engineering Report

2022 Trunk Watermain Improvements

City of Hopkins

BMI Project No. 0T1.123683

Submitted by:

Bolton & Menk, Inc.
12224 Nicollet Avenue
Burnsville, MN 55337
P: 952-890-0509
F: 952-890-8065



BOLTON & MENK

Certification

Preliminary Engineering Report

For

2022 Trunk Watermain Improvements

City of Hopkins
Hopkins, MN
BMI OT1.123683

September 2021

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:



Mitchell R. Hoeft, P.E.
License No. 50850

Date: 09/17/2021

Reviewed By:



Michael J. Waltman, P.E.
License No. 48696

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I. Executive Summary

A. BACKGROUND INFORMATION

The Hopkins City Council ordered preparation of this Preliminary Engineering Report to better understand costs and construction impacts associated with various water system upgrades along the TH 7 corridor. In general, the goal of the project is to preserve the investments Hopkins has made in its infrastructure while providing upgrades to its water system leaving the municipal treatment plant. The preliminary design report has been completed to identify the appropriate improvements needed as well as the associated project costs and preliminary estimated assessments.

B. PROPOSED IMPROVEMENTS

The proposed improvements are depicted in Figures A1 through A7. Improvements considered as part of this report include full replacement/rehabilitation of the trunk watermain running along the TH 7 North Service Drive from 17th Ave to 5th Ave, replacement/rehabilitation of the trunk watermain running along Robinwood Lane from the water treatment plant to TH 7, and replacement/capacity upgrades to several watermain crossing along TH 7. These crossings include crossing 17th Ave on the south side of TH 7, as well as TH 7 crossings at 17th Ave N, 15th Ave N, 13th Ave N, 12th Ave N, 9th Ave N, and 5th Ave N.

This report investigates four utility improvement methods, including three ‘trenchless’ methods as well as the traditional open excavation method. Different portions of the project area were found to have layout features attractive to different construction methodologies. The proposed trunk watermain improvements including a mixture of trenchless cured in place pipe (CIPP) rehabilitation, trenchless horizontal directional drilling (HDD) replacement, and a relatively small segment of open excavation as illustrated in the Appendix A figures.

To understand how the water system will function during and post construction, water distribution system modeling was completed. Upon completion of the water system modeling, it was found that upgrades to the 9th Ave and 13th Ave crossings were not critical and did not provide sufficient value to the system to a degree that would justify reinvestment in the infrastructure. Improvements to the 9th and 13th Ave crossings of TH 7 were therefore eliminated from further consideration in this project scope.

Proposed Base Improvements Include:

- HDD replacement of watermain across TH 7 just east of Hopkins Crossroad / 17th Ave N, and HDD replacement of watermain across Hopkins Crossroad / 17th Ave N just south of TH 7.
- Open cut replacement of the watermain from Hopkins Crossroad to Robinwood Lane along the north side of TH 7.
- HDD replacement of watermain along North Service Drive from Robinwood Lane to 12th Ave N.

- CIPP lining rehabilitation of the existing watermain along Robinwood Lane as well as the watermain along the North Service Drive from 12th Ave N to 5th Ave N.
- HDD replacement of the watermain crossings of TH 7 located at 15th Ave N and 5th Ave N.

Proposed Optional ‘Add Alternative’ Improvements Include:

- HDD replacement of the watermain crossing of TH 7 located at 12th Ave N as funding allows.

Improvements evaluated in this report but not proposed at this time:

- HDD replacement of the watermain crossings of TH 7 located at 13th Ave N and 9th Ave N.

C. ESTIMATED COSTS

Cost estimates have been prepared for addressing the varying needs of all areas reviewed. Detailed cost estimates are provided in Appendix C and summarized below in Table ES-1.

Table ES-1: Preliminary Estimated Cost of 2022 Trunk Watermain Improvements	
Base Project Improvements	
Mainline Truck Watermain (Including TH 7 & 17th Ave Crossings)	\$3,469,000
15th Ave N. Crossing	\$138,000
5th Ave N. Crossing	\$288,000
Total Base Project Costs	\$3,895,000
Alternative Project Improvements	
Add Alternative - 12 th Ave N. Crossing	\$151,000
Total Estimated Project Cost: Base + Alternative Improvements	\$4,046,000

II. Project Introduction

This report examines the proposed watermain improvements along and adjacent to Trunk Highway 7. More specifically, the watermain considered for replacement/rehabilitation are located:

Base Improvements

- Along the north side of TH 7 and North Service Drive, from 17th Ave N / CSAH 73 to 5th Ave N
- Crossing 17th Ave N on the south intersection leg with TH 7
- Crossing TH 7 on the east intersection leg with 17th Ave N
- Crossing TH 7 at Robinwood Ln / 15th Ave N
- Crossing TH 7 on the east intersection leg with 5th Ave N
- Along Robinwood Ln, from North Service Drive (paralleling TH 7) to the water treatment facility entrance

Optional Add Alternative Improvements

- Crossing of TH 7 at 12th Ave N

III. Background

The City of Hopkins is served by one water treatment facility located adjacent to the project site at the northerly limit of Robinwood Lane. The treatment facility collects water from several nearby wells and distributes the water through a 16" – 18" trunk watermain loop. The loop, which has a northerly limit along TH 7 throughout the project area, is fed by a single 18" trunk watermain leaving the water treatment facility along Robinwood Lane. Should the Robinwood Lane 18" watermain or perhaps portions of the 16" - 18" trunk watermain loop fail suddenly, such as during a spring thaw break as are not entirely uncommon in Minnesota, it is conceivable that immediate and unforeseen water shortages would follow in addition to costly repair.

Recognizing the magnitude of such a break, the City of Hopkins set out in 2016 to characterize the probability of a critical watermain break through evaluation of the pipe condition at various locations in Hopkins. A report was published in October 2016 by Echologics following leak detection, condition assessment, and remaining service life estimation of the trunk watermain. The condition assessment efforts used sounding pulses and associated studies to identify areas of reduced pipe wall thickness. Areas identified of lesser wall thickness would indicate a watermain is nearing its failure point.

An estimated 1,724 feet (28%) of 6,216 feet of critical watermain tested throughout the City had lost more than 30% of the effective pipe wall thickness and appeared to be in poor condition. The report also noted this pipe had exceeded its useful life based on the remaining wall thickness measured using acoustic technology, and therefore suggested replacement or rehabilitation be pursued. Below are two figures from the report illustrating the segments tested and tabulated in this project area.



Segment	Site/Street	Distance (ft)	Pipe Material	Internal Diameter (in)	Nominal Thickness (in)	Remaining Thickness (in)	% Change from Nominal
1	Robinwood Ln	483	CI	16	0.63	0.61	-3%
2	Robinwood Ln	424	CI	16	0.63	0.56	-11%
3	North Service Rd	502	CI	16	0.63	0.62	-2%
4	North Service Rd	666	CI	16	0.63	0.42	-33%
5	North Service Rd	344	CI	16	0.63	0.40	-37%

The 2022 Trunk Watermain Improvements project was placed in the City of Hopkins Capital Improvement Plan shortly after the 2016 study. The feasibility study and report has been completed to better identify the infrastructure improvements needed in the proposed project area, to better define costs associated with the improvements and will be used as the basis for final design.

IV. Existing Conditions

A. WATERMAIN

An existing layout and condition of the water main was determined from record drawings, discussions with City staff, and the City's GIS database. The trunk watermain is comprised of 16" and 18" cast iron pipe (CIP) material. CIP is a common watermain material, however upon reaching its useful life tends to fail abruptly. Because it is so brittle, as the soils around

the pipe move slowly over decades, CIP cannot support shearing forces and ultimately breaks. CIP portions of the watermain system were installed in the 1950s and 1960s. CIP installed around this time period was also occasionally installed with lead-packed fittings. Within the project area, most of the watermain was installed between 1954 and 1957, making those segments 65 to 68 years old when the project is being considered for construction in 2022. In general, watermain is typically expected to last 60 to 80 years by industry standards.

Watermain crossings of TH 7 are partially inside steel casings. Casings are commonly used as a conduit through which watermain can be relatively simply removed and replaced under overlying critical infrastructure such as highways and railroads. However, in this area TH 7 has been widened over time and as a result the casings are of insufficient length to provide benefit in this regard; so new TH 7 watermain crossings must also be considered, with the potential for pipe upsizing and regional capacity improvements.

The final proposed watermain improvements are discussed later in this report.

B. STREETS

TH 7 is a roadway under MnDOT jurisdiction. It is currently in fair to good condition following recent overlay and signal improvement projects by MnDOT. Reconstruction or impact to the roadway may not be permitted by MnDOT and would be costly. West of TH 169, the City has seven watermain crossings under TH 7, six of which are within the project limits for consideration of improvements.

North Service Drive was reconstructed in 2011 from 500' east of 12th Avenue to the TH 7 slip ramp near 5th Ave N. This segment of roadway will not be scheduled for full depth reconstruction for another 40 to 50 years.

Robinwood Lane and Elmo Service Rd were reconstructed in 1994 and in fair condition., The next year in 1995, North Service Drive was reconstructed from Elmo Service Road, through 12th Ave N, to the Eisenhower Community Center entrance was reconstructed in 1995. These roadways will not be scheduled for reconstruction for another 30 to 40 years.

Given the age and relatively good condition of the project area roadways, it is advantageous to minimize full depth pavement impacts associated with utility work. These roadways may candidate partial depth mill and overlay improvements before which it would be ideal to have underlying utility work completed.

V. Proposed Watermain Improvements

A. TRUNK WATERMAIN IMPROVEMENTS EVALUATED

Four methods of replacing or rehabilitating the trunk watermain were evaluated as part of the feasibility study effort to determine the most cost effective and constructable solution for completing this project. A brief description on each construction method and the respective work stages can be found below.

- Traditional, Open Cut Replacement

This method would utilize traditional excavation of the roadway and green spaces above the watermain and subsequent restoration. The street reconstruction costs associated with this alternative increase project costs compared to other methods. This is the most common watermain replacement method as it is often timed with other street or utility needs. In that case, this option often provides the 'best value' improvement method as improvements are gained in areas of necessary utility as well as street

improvements.

The project area roadways overlying the trunk watermain in this area as well as the crossings of TH 7 are not in need of substantial improvement, however. Most roadway segments have received rehabilitation or reconstruction within the past 10 years and therefore additional value is not substantially gained through open cut utility replacement and subsequent street reconstruction.

- Cured-In-Place-Pipe (CIPP) Rehabilitation

CIPP watermain rehabilitation involves the construction of a structural felt/fiberglass liner inside the existing watermain. While considered a rehabilitation, the finished product is effectively a new watermain inside the existing watermain host pipe. This method is most commonly used on watermain pipes greater than or equal to 8 inches where the economics of this specialized process (and available contractors) tends to become competitive with other alternatives.



The process of constructing a CIPP watermain system includes:

- a. Installation of a temporary water distribution system
- b. Excavation and shoring of access pits needed for cleaning and liner insertion.
- c. Draining of potable water, pipe cleaning, and televised inspection of the empty main to verify cleaning process and identify underground locations which may impact the functionality of the liner.
- d. Additional relatively small excavations along the watermain to remove deficiencies identified during televising, at locations where new valves are desired, at connection points to other mains, at connections to hydrant leads, at large diameter service connections, and at significant horizontal/vertical bends in the main. As mentioned previously, these locations also function as access points for liner installation, pressure testing, and chlorination.
- e. Insertion of an epoxy resin coated fabric 'sock' into the watermain.
- f. Curing of the resin coated fabric by blowing in and recycling steam or heated water through the watermain.
- g. Televised inspection of the lined watermain for quality control and reinstatement of small diameter service lines inside the main, which are re-opened via robotic drilling from the inside through new liner.
- h. Reconnection of adjacent watermains and installations of water features in

access pits.

- i. Filling the new main with water, chlorinating, and subsequently performing standard pressure and bacteria testing on the watermain before placing the main back in service.
- j. Removal of the temporary water system and restoration of the small excavation areas.

As compared to other methods, watermain lining greatly reduces excavation and pit size needs compared to the other construction methods. The photo above illustrates a watermain lining excavation pit in a dense urban setting. There is no lengthy pit required for drilling or bursting equipment, nor a long swathe of roadway that must be occupied by pipe about to be installed. While considered a rehabilitation method, the final pipe is structurally sound and reliable for decades to come.



- Horizontal Directional Drilling (HDD) Replacement

Horizontal Directional Drilling (HDD) is a minimally disruptive method of installing underground pipelines through trenchless methods. The process involves an HDD rig pushing steel pilot rods into the ground to create a new path/alignment for the future watermain piping. After the rods are pushed through the ground in the proper alignment, reaming heads are pulled back to create a hole in the soil to provide room to pull a new pipeline in. Lastly a new pipeline is pulled through the open void in the soil to create a completed trenchless pipeline installation. The complete process of horizontal directional drilled watermain system installation includes:

- a. Removal of pavement or hard surfaces needed to set drilling equipment and prepare for the drill.
- b. Pushing steel pilot rods into the soil to create the new pipe alignment.
- c. Pre-reaming the new pipe alignment to compact soils and create a void needed to support the pipe pull back.
- d. Pulling of new fused pipe material (typically PVC or HDPE) back through the previously created void in the soil.
- e. Pressure testing and CCTV of the new pipeline system.
- f. Excavation based reconnection of existing watermain features (tees, valves, service connections, pits).
- g. Chlorination and bacteria testing of new watermain.
- h. Abandonment of existing watermain utilities.
- i. Restoration of access pits and site disturbances.



In terms of benefits compared to other trenchless methods, the use of the HDD technology allows watermain to be constructed on a new alignment as opposed to being confined to the exact existing watermain location. This means construction excavation locations can more readily be chosen in ideal locations, such as outside of the intersections and eliminating the need to close critical stretches of roadway. The use of HDD technology also allows the existing watermain to remain in service during construction, vastly reducing the temporary watermain needs during construction.

- Pipe Bursting Replacement

Pipe Bursting is a trenchless method of replacing buried pipelines (such as sewer, water, gas) by which the existing pipe is fractured opened and forced outward by a bursting tool. A hydraulic or pneumatic expansion head (part of the bursting tool) is pulled through the existing pipeline fracturing the existing pipeline to make room for a new pipe to be pulled into its place. Lastly and new fused pipeline (typically HDPE or PVC) is pulled into place in the existing pipe alignment, effectively replacing the existing pipeline. This process is typically achieved using cables and a winch. The pipe bursting method also allows for the upsizing of pipe diameters to achieve additional pipeline capacity where needed. The complete process of pipe bursting watermain system includes:

- Installation of a temporary water distribution system
- Excavation and shoring of access pits needed to complete the pipe bursting process.
- Draining of potable water and televised inspection of the empty main to verify underground locations which may impact the pipe bursting process.
- Additional relatively small excavations along the watermain to temporarily disconnect water features that may be damaged during the bursting process.



These locations include valves, connection points to other mains, connections to hydrant leads, service connections.

- Pipe bursting of the existing watermain.
- Televised inspection of the bursted watermain for quality control purposes.
- Reconnection of adjacent watermain disconnects and installations of new water features in access pits (valves, service connections, hydrant leads, etc).

- h. Filling the new main with water, chlorinating, and subsequently performing standard pressure and bacteria testing on the watermain before placing the main back in service.
- i. Removal of the temporary water system and restoration of the small excavation areas.

B. BASE IMPROVEMENTS – RECOMMENDED IMPROVEMENTS

Different portions of the project were found to have layout features attractive to different trenchless methodologies. Benefits and detriments associated with the various methods yielded proposed trunk watermain base improvements including a mixture of CIPP rehabilitation and HDD replacement, as illustrated in the Appendix A figures.

The project is planned in multiple stages (phases) to accommodate temporary water service needs, limit traffic disruptions, and yield cost effective infrastructure and minimally impactful to Hopkins's residents. A preliminary staging plan is also included in Appendix D. The proposed improvements are summarized in narrative form by preliminary planned construction stage as follows.

Stage 1 improvements include:

- HDD replacement of watermain across TH 7 just east of Hopkins Crossroad / 17th Ave N, and HDD replacement of watermain across Hopkins Crossroad / 17th Ave N just south of TH 7. Excavation pits associated with these trenchless watermain replacements were selected to minimize disruption of the overlying pavements and avoid associated traffic impacts. The work will be visible in grass, trail, and sidewalk areas outside of the roadway. The existing watermain through this intersection is proposed to be abandoned in place and grout filled.
- Open cut replacement of the watermain from Hopkins Crossroad to Robinwood Lane along the north side of TH 7. Trenchless replacement or rehabilitation for this section of watermain was also considered, however open excavation would be required at each end and an intermediate hydrant. Further, there is no roadway over this section of watermain to be saved which would justify the additional watermain replacement costs associated with trenchless methods. A bituminous trail overlying the watermain including replacement of the pedestrian trail above the watermain will be removed and replaced.
- Stage 1 will also include HDD upgrades of the watermain crossings located 15th Ave N and 5th Ave N. These upgrades will help supply water across TH 7 needed to supply temporary water to support Stage 2A and 2B construction.

Stage 2A improvements include:

- HDD of new watermain from Robinwood Lane to 12th Ave N. CIPP lining of this section was also closely considered, however that method would require open excavation of valves located within 12th Ave N just north of its intersection with TH 7. This excavation and temporary closure of 12th Ave N lanes is planned to be avoided by the proposed HDD of watermain along a new alignment. The existing watermain is proposed to be abandoned in place and grout filled.

- Stage 2A will also include the horizontal directional drilling of the watermain crossing upgrades at 12th Ave N should that optional crossing be added to the overall project.

Stage 2B improvements include:

- CIPP lining rehabilitation of the existing watermain along Robinwood Lane as well as the watermain along the North Service Drive from 12th Ave N to 5th Ave N.

C. OPTIONAL “ADD ALTERNATE” IMPROVEMENTS – TH 7 WATERMAIN CROSSING AT 12TH AVE N

Watermain crossing upgrades at 12th Ave N are also being proposed at this time for final design and bidding consideration. Although modeling suggested this crossing does not directly support critical flow or pressure to the system, upgrading the crossing at 12th Ave N does provide redundancy/resiliency system benefits. Should a crossing of TH 7 temporarily ‘go down’, the 12th Ave N crossing of TH 7 will help mitigate fire flow losses until a repair can be made.

As with the other base crossing improvements, a horizontal directional drilling approach is proposed to install new casings containing watermain across TH 7. Drilling of these crossings will also allow replacement of the existing 6-inch crossings with larger 8-inch crossings that provide more capacity and fire flow to nearby neighborhoods.



Use of the HDD approach for both the TH 7 crossing and mainline trunk watermain at 12th Ave N allows watermain work to be completed outside of the 12th Ave N / N Service Dr / TH 7 intersection. Instead, the excavations necessary for the trenchless method are proposed to be located within the green space located to the east.

D. TRAFFIC CONTROL CONSIDERATIONS

The proposed improvements seek to limit the impacts to the traveling public, however some areas will require pavement excavation and temporary traffic control. The following impacts were considered significant and avoided in full, however:

- No impact to 12th Avenue N pavement is proposed which would otherwise require intersection or lane closures.
- No excavations within TH 7 are proposed which would otherwise require lane shifts, crossovers, or other impactful temporary traffic control.
- No excavations are planned that will have significant impact on access to the Eisenhower Community Center and Elementary School property.

Small excavations within the following roadways will be required, but at least one lane will remain open in each direction. As such, the chosen methods have minimized impacts to traffic at:

- 17th Ave N, just south of TH 7
- 5th Ave N at Wayside Rd

Finally, in some locations the existing watermain configuration mandates excavation regardless of methodology chosen, resulting in some traffic impacts. These include:

- Excavation to existing valves in Oak Ridge Rd in close proximity to TH 7 are to be minimized, and these valves will be relocated to adjacent green space and out of the intersection. A temporary closure lasting approximately 3 weeks is anticipated for Oak Ridge Road, though the intersection with TH 7 will remain open. The duration and location of this closure will be reviewed to be further minimized during final design.
- Along Robinwood Lane, excavations will be required to reconnect service lines to the CIPP rehabilitated trunk main. Similarly, some excavation and surface disruption is anticipated for installation of a temporary, parallel trunk main. Robinwood Lane is planned to remain open to traffic, however.
- A temporary closure to through traffic is planned along North Service Drive from Robinwood Lane to 12th Avenue. Access will be maintained for the Brentwood Park Townhomes.
- Excavations will be required along North Service Drive that will close the roadway to through traffic between TH 7 and 12th Ave N. Access will be maintained to properties along North Service Drive during construction.

E. TEMPORARY WATER DISTRIBUTION NEEDS & MODELING

Water modeling work was completed to determine temporary water needs of the system during construction. In parallel to that effort, a review the impact of the proposed improvements on the water system was also completed to gauge the necessity of the TH 7 watermain crossings.

The base and alternative trunk watermain system improvements contemplate temporarily removing from service critical segments of the distribution system adjacent to the City's water treatment facility. To ensure service during and following construction the City's existing water distribution system model was utilized to evaluate five scenarios:

- Existing Conditions
- Stage 1 mains out of service, inclusive of all add alternative optional segments
- Stage 2A mains out of service and temporary water distribution measures, inclusive of all add alternative optional segments
- Stage 2B mains out of service and temporary water distribution measures
- Proposed Conditions inclusive of all improved and existing segments

Upon completion of the modeled scenarios, it was found that the proposed improvements and staged construction do not significantly impact the water distribution system. A reduction in modeled fire flows was observed during certain phases of construction, but the reductions were not a substantial portion of the anticipated flow and would not be substantially remedied by the use of additional, reasonable temporary water distribution components.

Modeling was also completed to determine which watermain crossings of TH 7 are most critical. The City's water model was updated to account for watermain improvements completed by 2005. A model version was also created to analyze the 'futures' conditions to account for watermain improvements planned in 'The Avenues' neighborhoods in coming years, as planned in the City's Capital Improvement Plan. Multiple scenarios of this 'futures' model version were investigated and it was determined that the TH 7 crossings at 17th Ave N, 15th Ave N, and 5th Ave N are most critical to achieve industry standard minimums for fire flow. An additional crossing (12th Ave N) would assist with supplying additional redundancy of the water system in case of future failure.

Figures developed from the modeling process are illustrated in Figures B1 to B9 of Appendix B.

F. TURF & LANDSCAPING RESTORATION

A vast majority of the proposed improvements occur within public right of way. Turf areas disturbed by utility construction will be graded to match existing grades and will be restored with seed and mulch (hydroseed). In certain situations where turf disturbances encroach on a property owners' yard, sod may be used to restore those areas.

Landscaping within the project area will be protected where feasible. Landscaping that is within the right-of-way and/or cannot be protected will either be salvaged and reinstalled by the contractor or will be the owner's responsibility. Items including, but not limited to walls, fences, and pavers, will be salvaged and reinstalled by the contractor. The engineer will coordinate with individual homeowners on landscape impacts to items including, but not limited to plantings, decorative rock, and decorative pavers for removal and relocation by the homeowner.

VI. Public Informational Meeting

A public informational meeting is planned for November 2021. The project team will present the scope of the project with a discussion of existing and proposed utility conditions and project schedule. Recognizing the project is not proposed to be funded by special assessments, much of the discussion will focus on what residents can expect to see during construction. Attendees will be encouraged to provide feedback on the project, with particular focus on elements of the construction process they feel should be considered. This input will be taken into consideration as project plans are finalized in December/January.

VII. Estimated Costs

Estimated project costs for the 2022 Trunk Watermain Improvements (are itemized in Appendix C and are summarized in Table 1 below. Estimated project costs presented in this report include the estimated construction cost, a 15 percent contingency factor and indirect costs estimated at 21 percent, include legal, engineering, administrative and fiscal costs. Final construction costs will be determined by using low-bid construction costs of the proposed work.

Table 1: Preliminary Estimated Cost of 2022 Trunk Watermain Improvements	
Base Project Improvements	
Mainline Truck Watermain (Including TH 7 & 17th Ave Crossings)	\$3,469,000
15th Ave N. Crossing	\$138,000
5th Ave N. Crossing	\$288,000
Total Base Project Costs	\$3,895,000
Alternative Project Improvements	
Add Alternative - 12 th Ave N. Crossing	\$151,000
Total Estimated Project Cost: Base + Alternative Improvements	\$4,046,000

These cost estimates are based upon public construction cost information. Because 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.

Following the pandemic of 2020, commodity prices have been volatile in the months preceding this report being published. In spring and summer of 2021, the significant swings of lumber prices were widely publicized in mainstream and social media platforms. Similarly, though not quite to the same degree, the availability and costs of HDPE, PVC, and iron pipe prices became volatile in 2021 but appear to be stabilizing. Estimated costs presented in this report represent observations of competitive prices based on similar work bid and performed outside of those dynamic market conditions and do not account for excessive inflationary impacts. Nevertheless, to help mitigate and protect against unforeseeable material shortages or similar issues, as part of the project design and administration it is intended to competitively bid multiple pipe materials against each other where reasonable and feasible (i.e. HDPE pipe vs PVC pipe).

VIII. Special Assessments

Special assessments are not a proposed funding source for this watermain replacement / rehabilitation project.

IX. Right-Of-Way/Easements/Permits

The majority of the proposed improvements will be limited to the existing street ROW under the jurisdiction of the City of Hopkins. Crossings of TH 7 will involve work in public right of way under the jurisdiction of MnDOT. Similarly, some work in the frontage roads may be within right of way administered by MnDOT. Permits for work in MnDOT right of way will be required and secured as part of the final design process.

Permanent easements are not proposed as part of the project. Temporary easements or right of entry may be required for temporary grading disruption and subsequent restoration in some relatively small areas on adjacent property, such as adjacent to watermain excavations on North Service Drive adjacent to the Eisenhower Community Center property. This work will be coordinated with the Hopkins School District to garner necessary access permission to complete the required public watermain work and restoration.

Permits will also be required from the Minnesota Pollution Control Agency for grading (National Pollutant Discharge Elimination System permit), Minnesota Department of Health for Water Main Replacement, and from the Minnehaha Creek Watershed District for erosion and sediment control.

X. Project Schedule

The following schedule is proposed for this project:

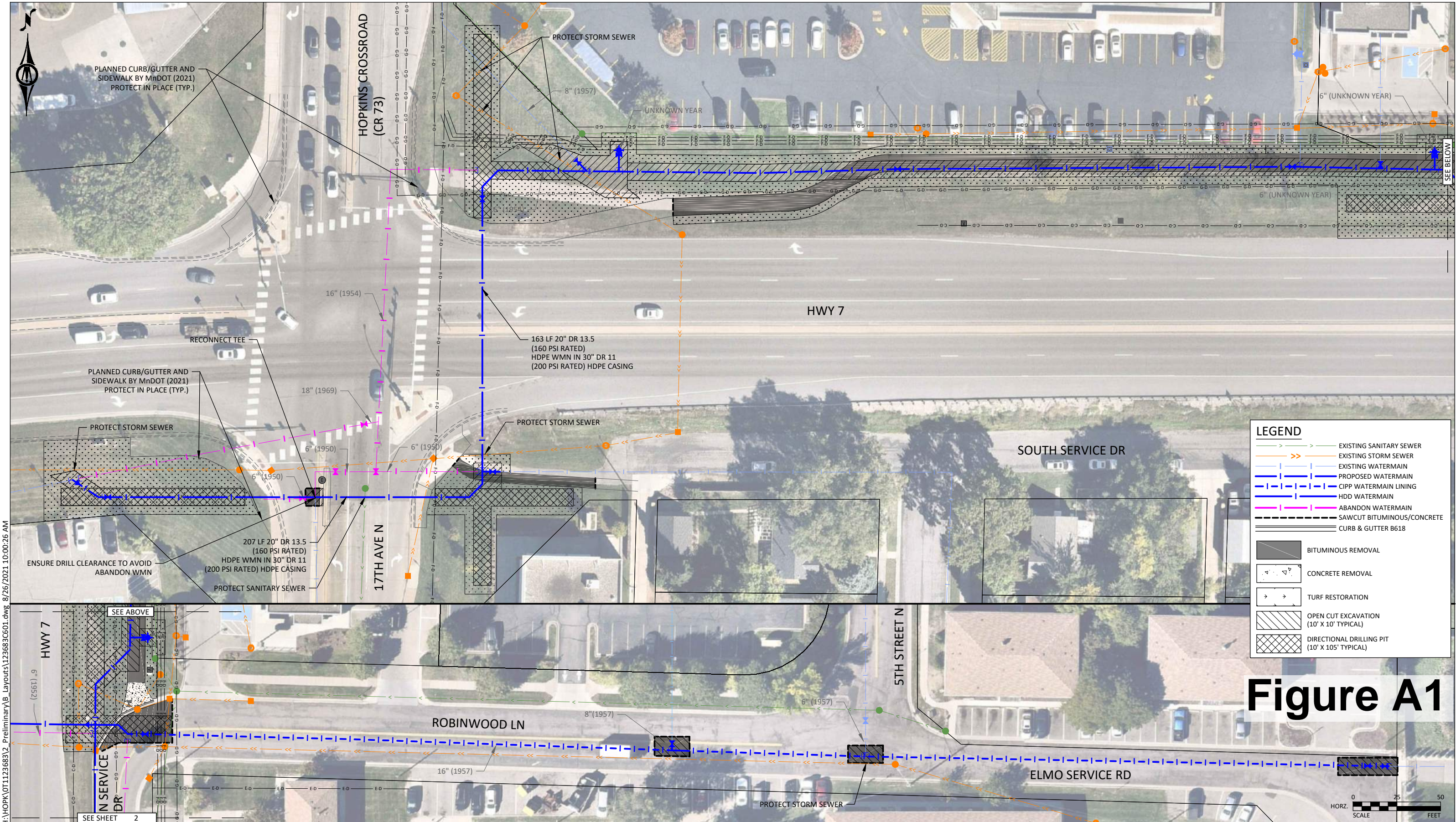
City Council Work Session.....	September 14, 2021
Final Design.....	October, 2021 – January, 2022
Public Informational Meeting	November, 2021
Present Final Plans to City Council / Authorize Ad for Bids	January 18, 2022
Open Bids	February 18, 2022
Accept Bids / Award Contract	March 1, 2022
Construction.....	May 2022 – October 2022

XI. Feasibility & Recommendation

The proposed base improvements identified in this report are recommended to proceed to final design and subsequently construction per the schedule above. It is recommended the City proceed with the optional ‘add alternative’ TH 7 crossing with this project should City funding allow, or programmed with future street and utility improvements immediately south of TH 7.

From an engineering standpoint, this project is feasible, cost effective, and necessary and can best be accomplished by letting competitive bids for the work. The City, its financial consultant, and the persons assessed will have to determine the economic feasibility of the proposed improvements.

Appendix A: Preliminary Project Layout Figures



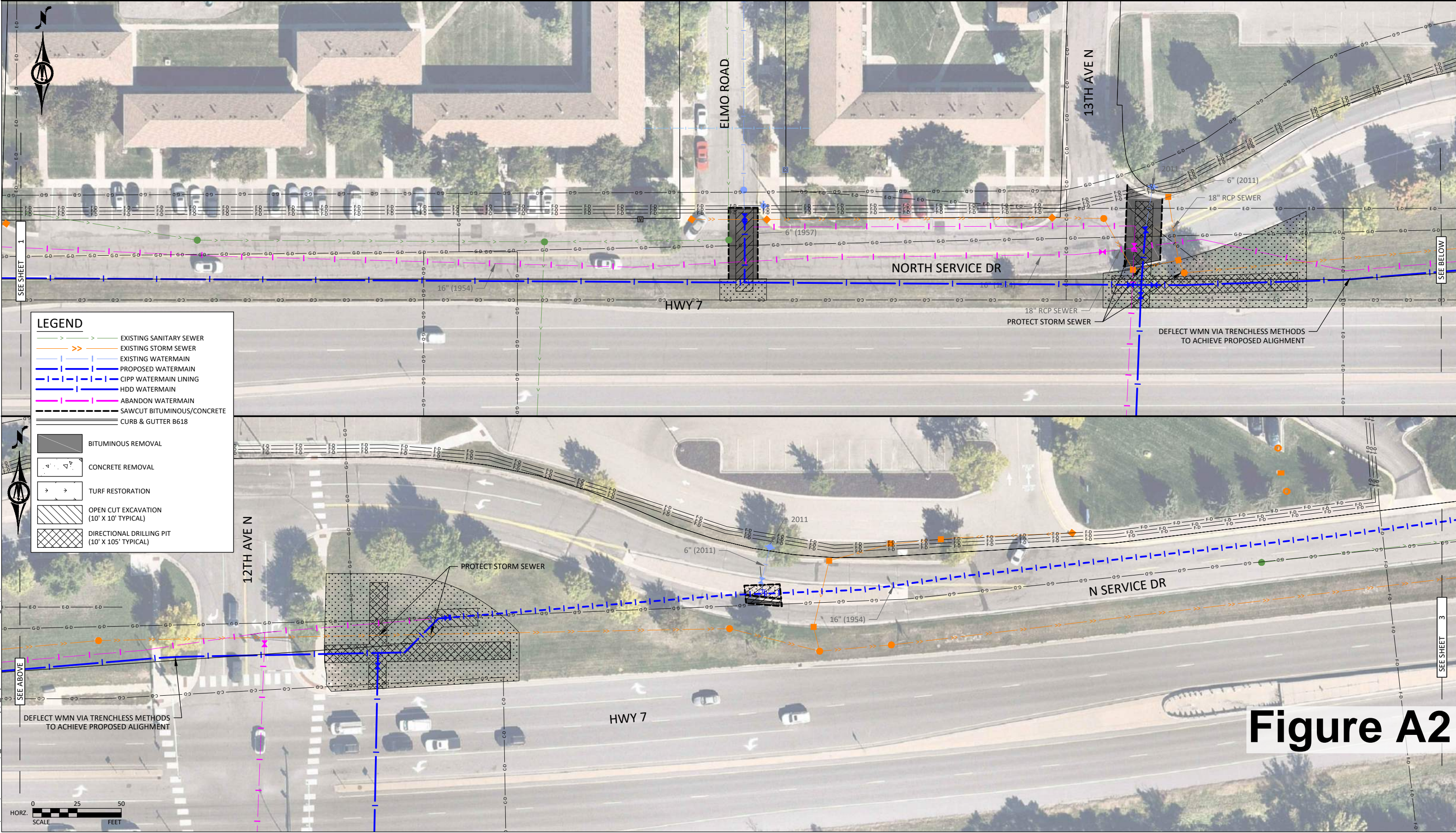


Figure A2

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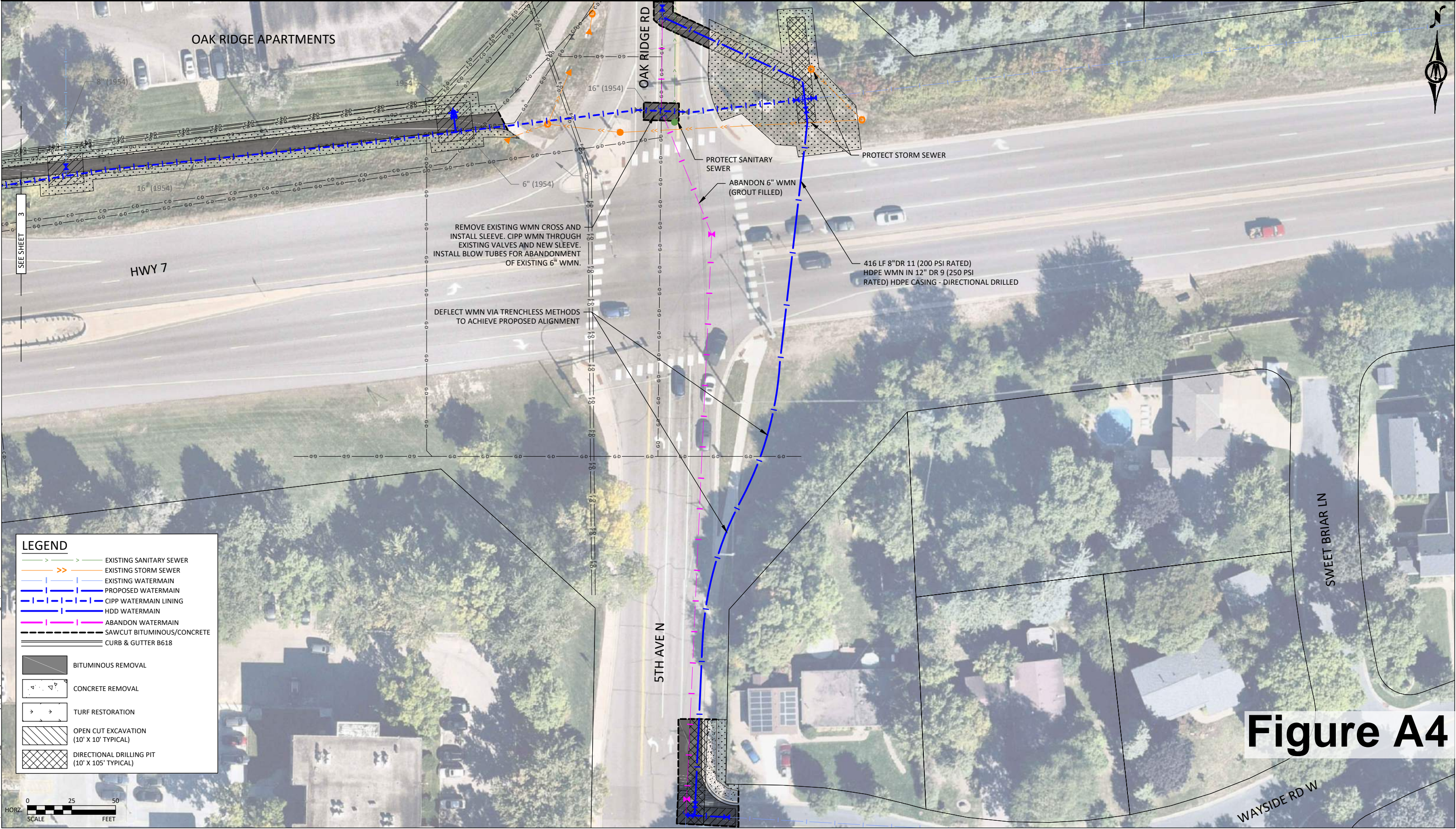
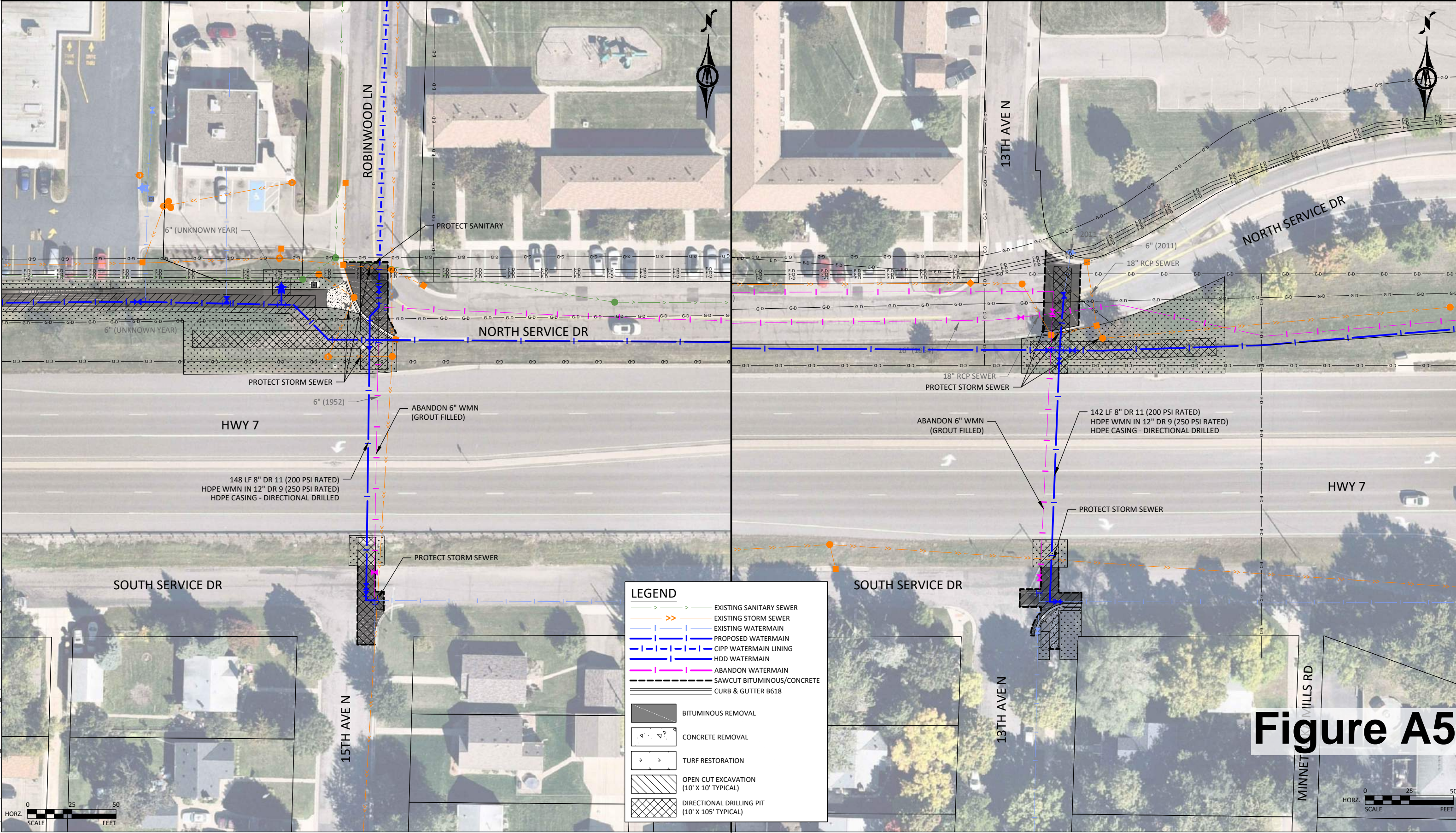


Figure A4

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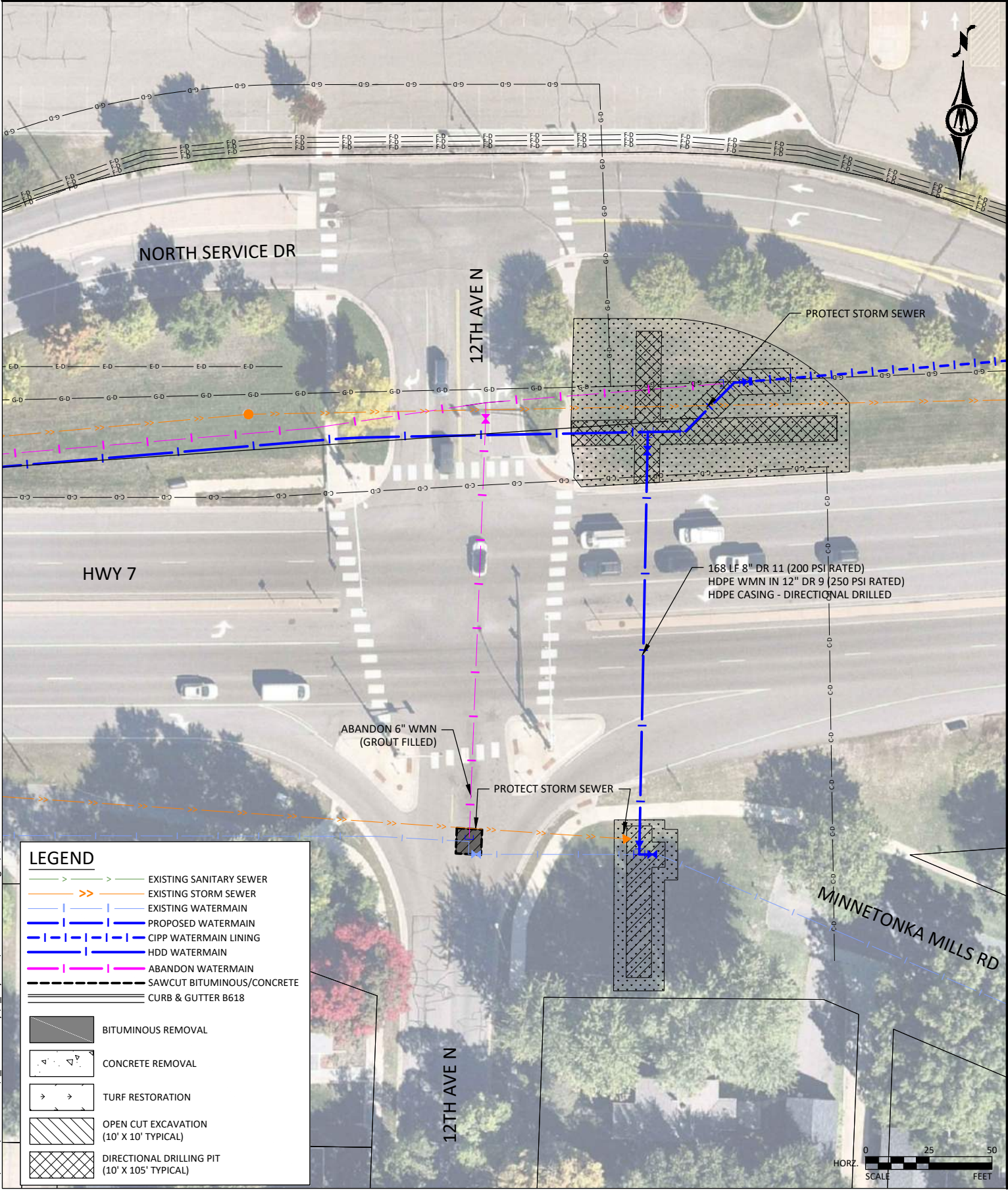
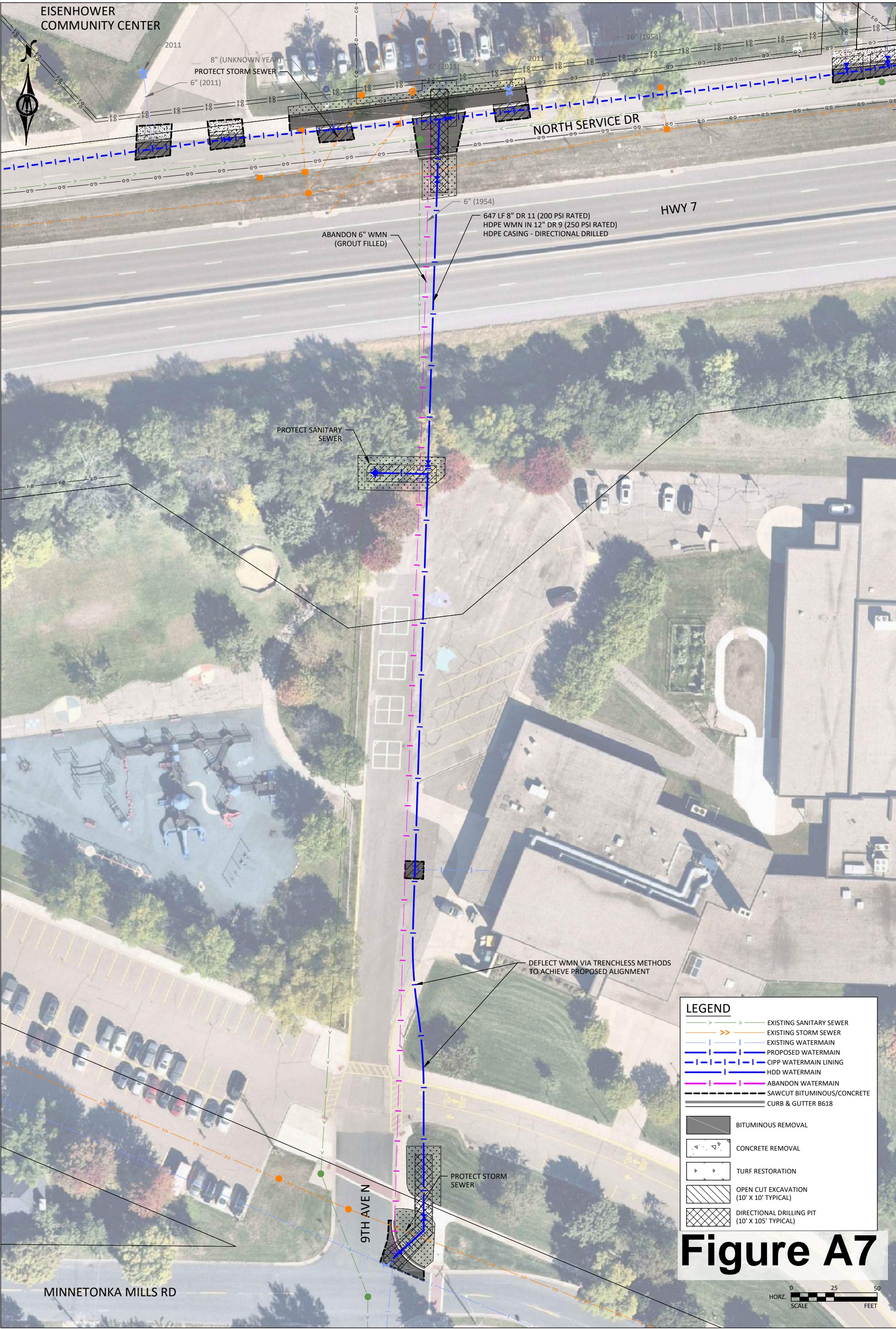


Figure A6



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Appendix B: Water Distribution System Mapping Figures

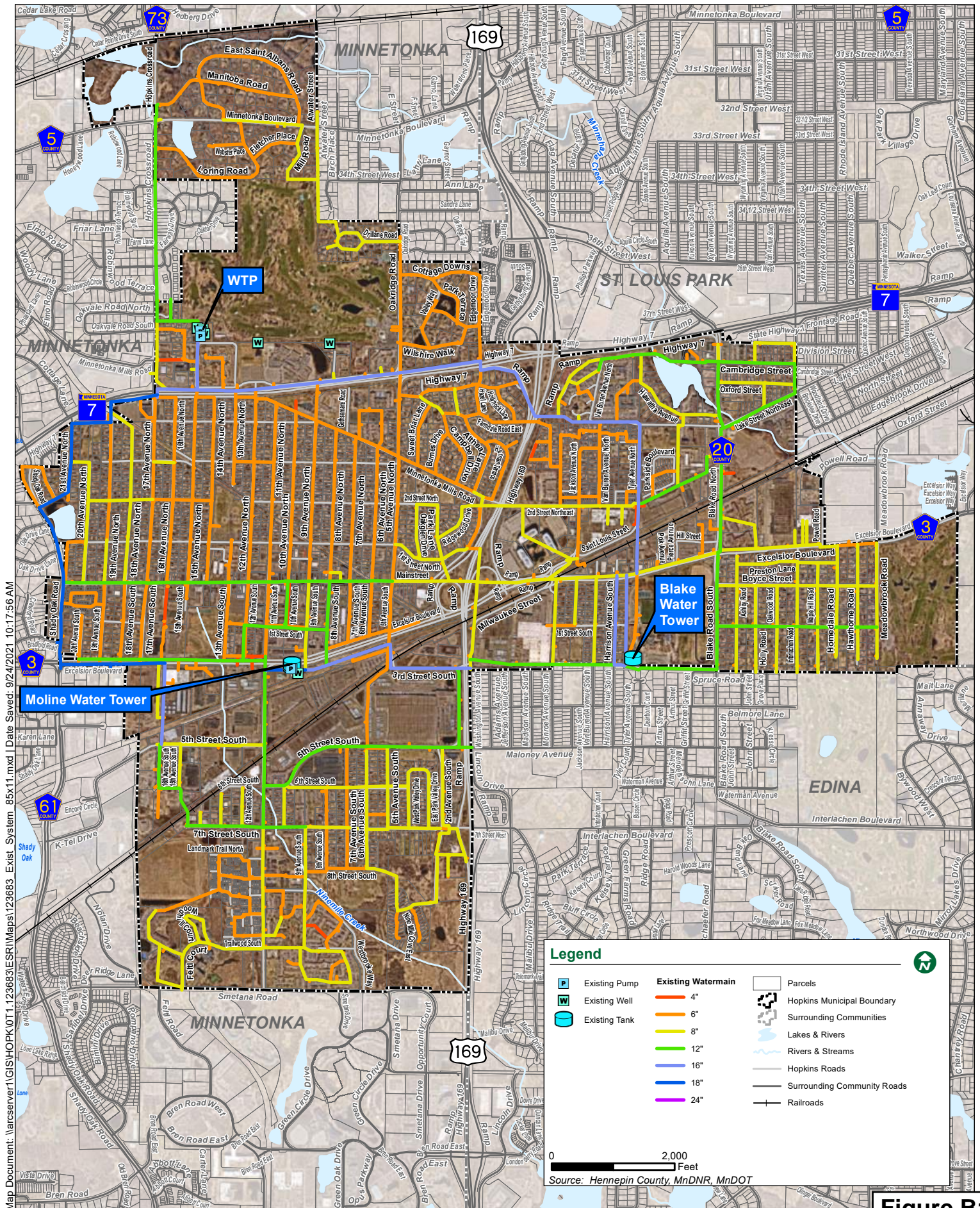


Figure B1

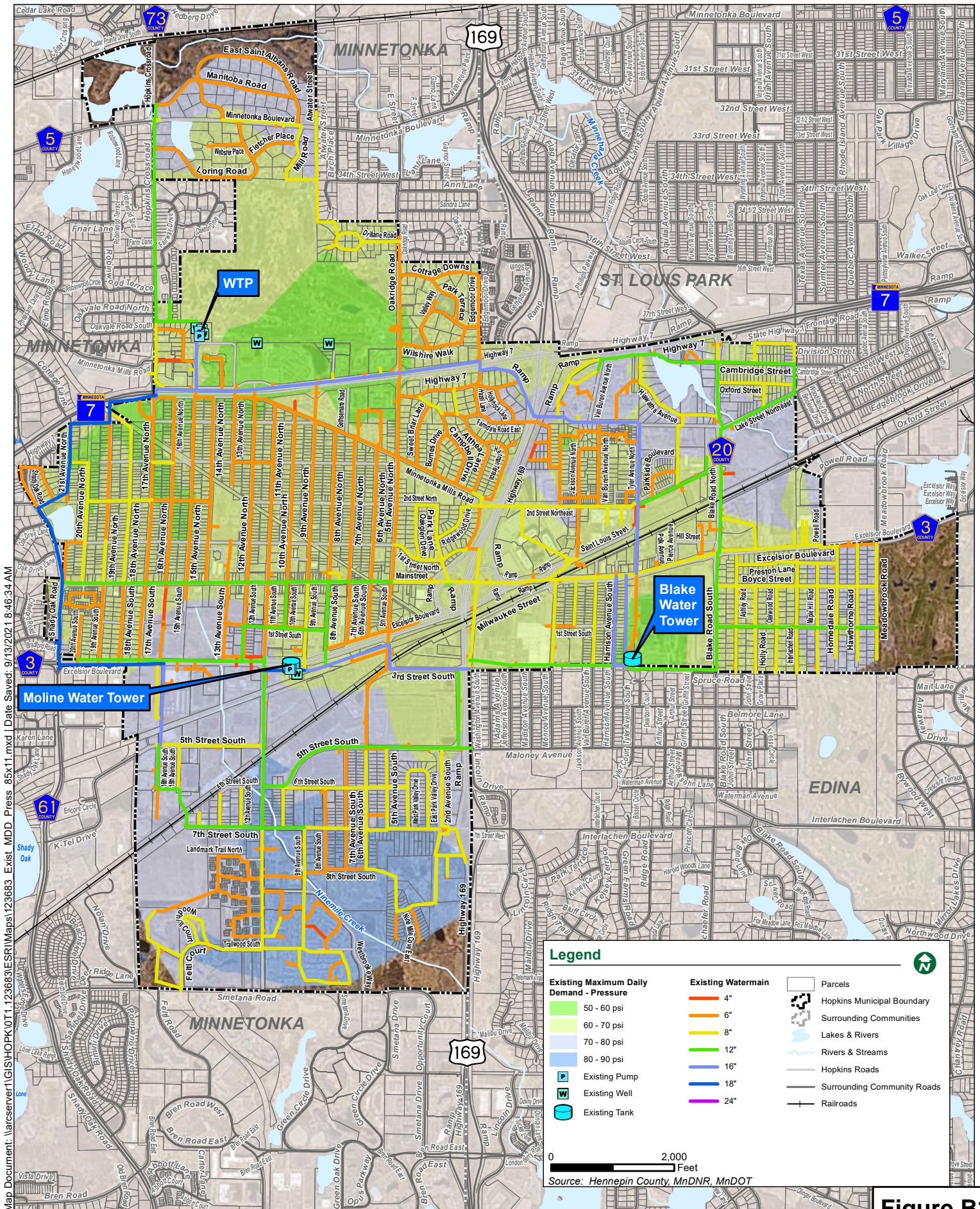


Figure B2

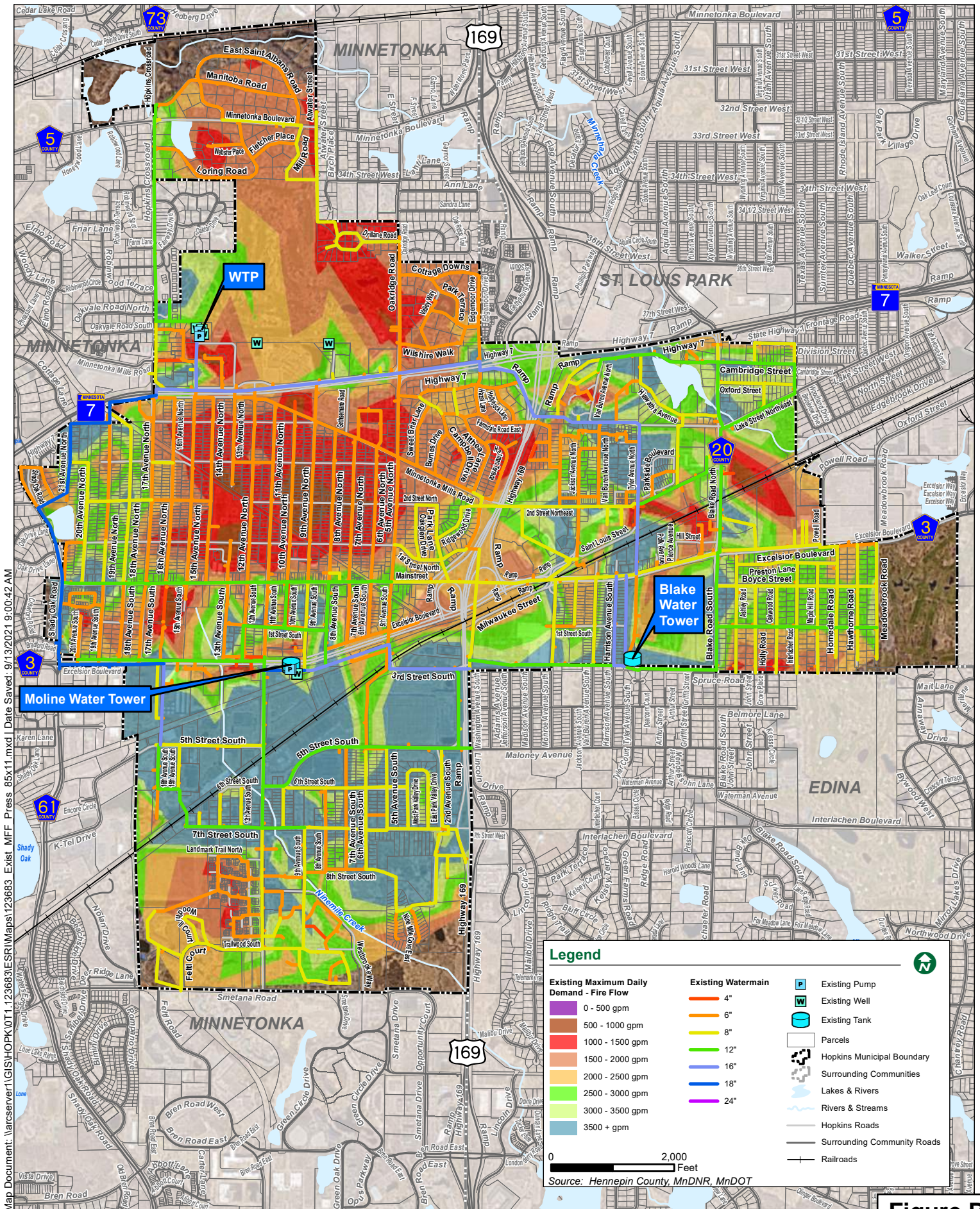


Figure B3

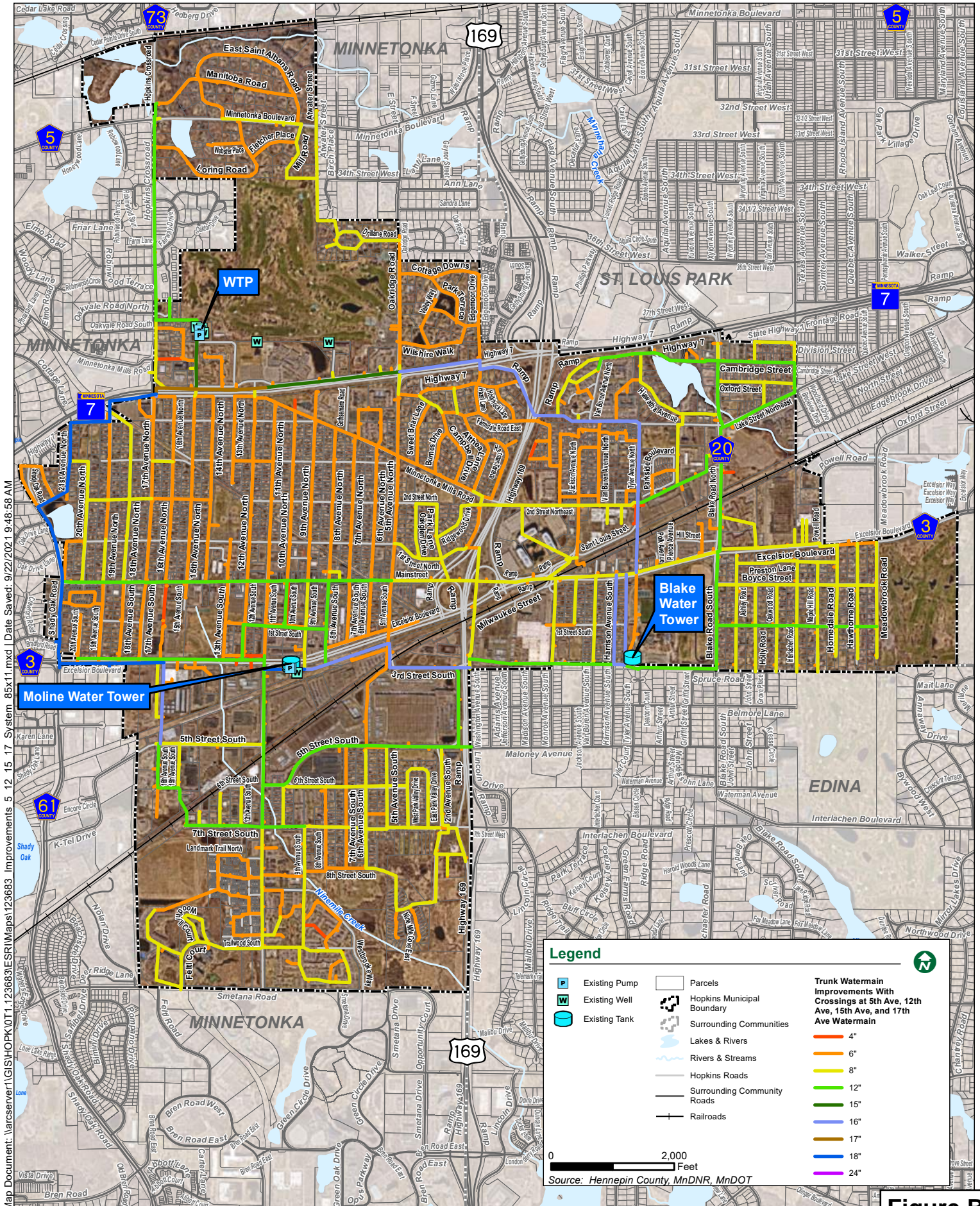


Figure B4

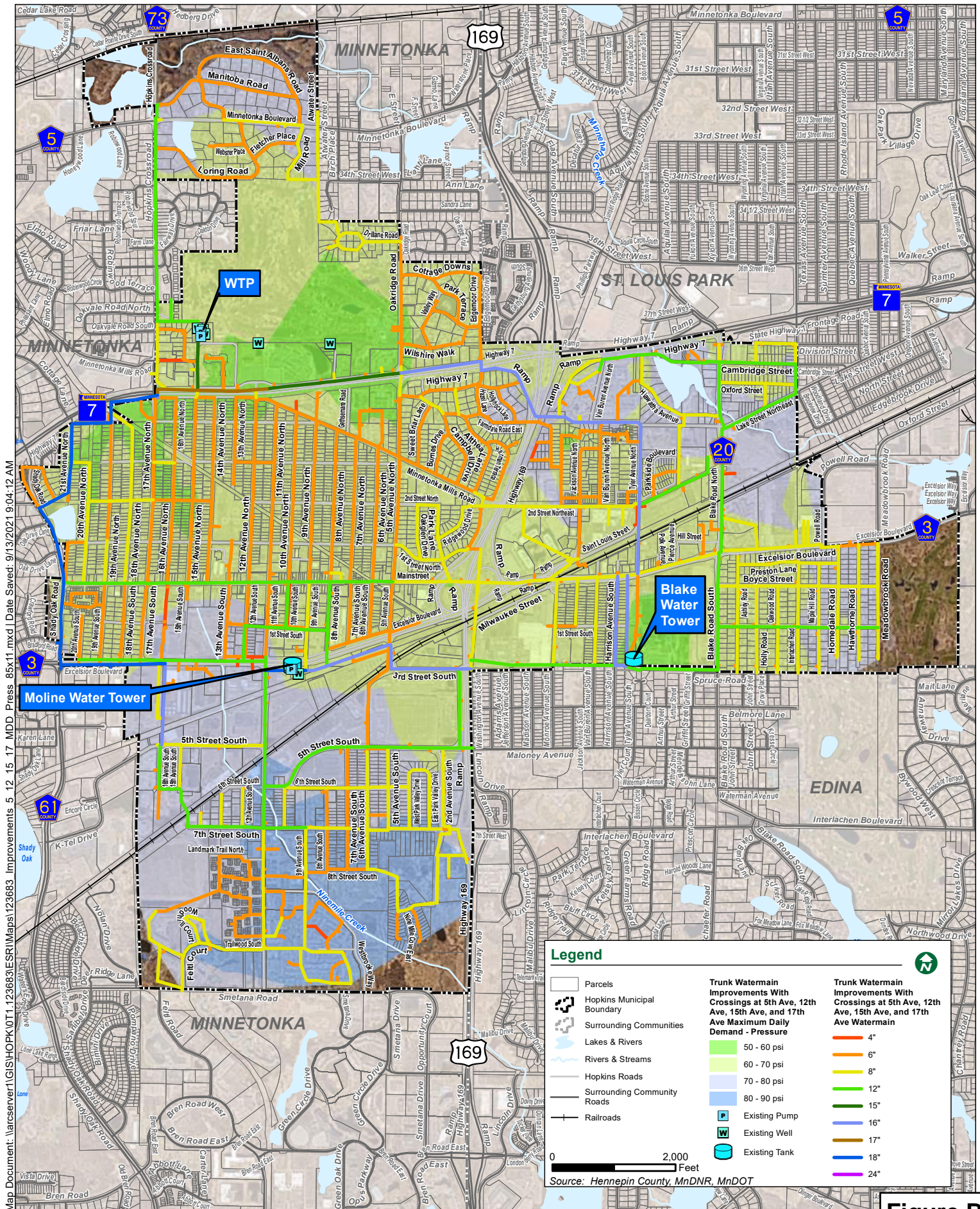
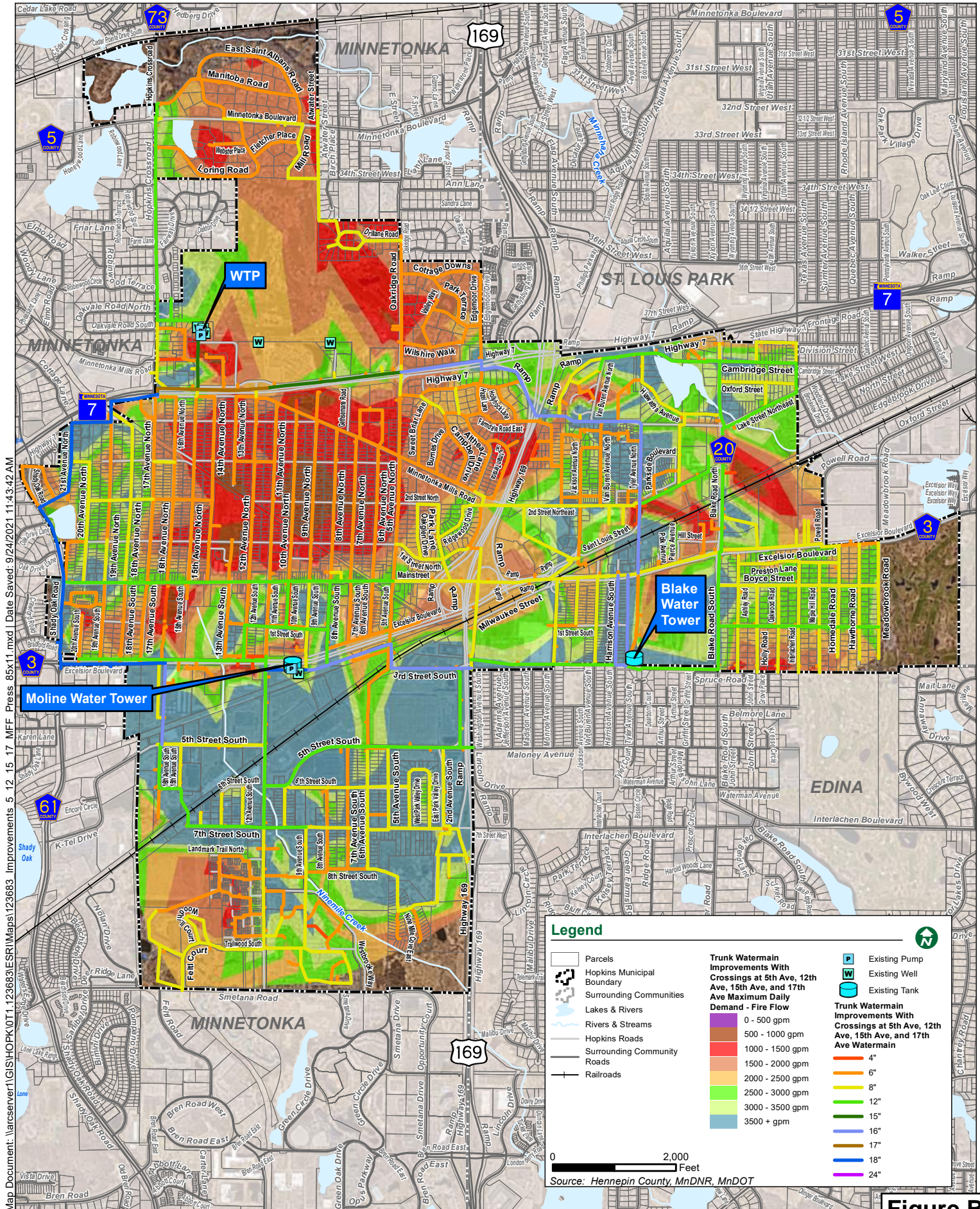


Figure B5



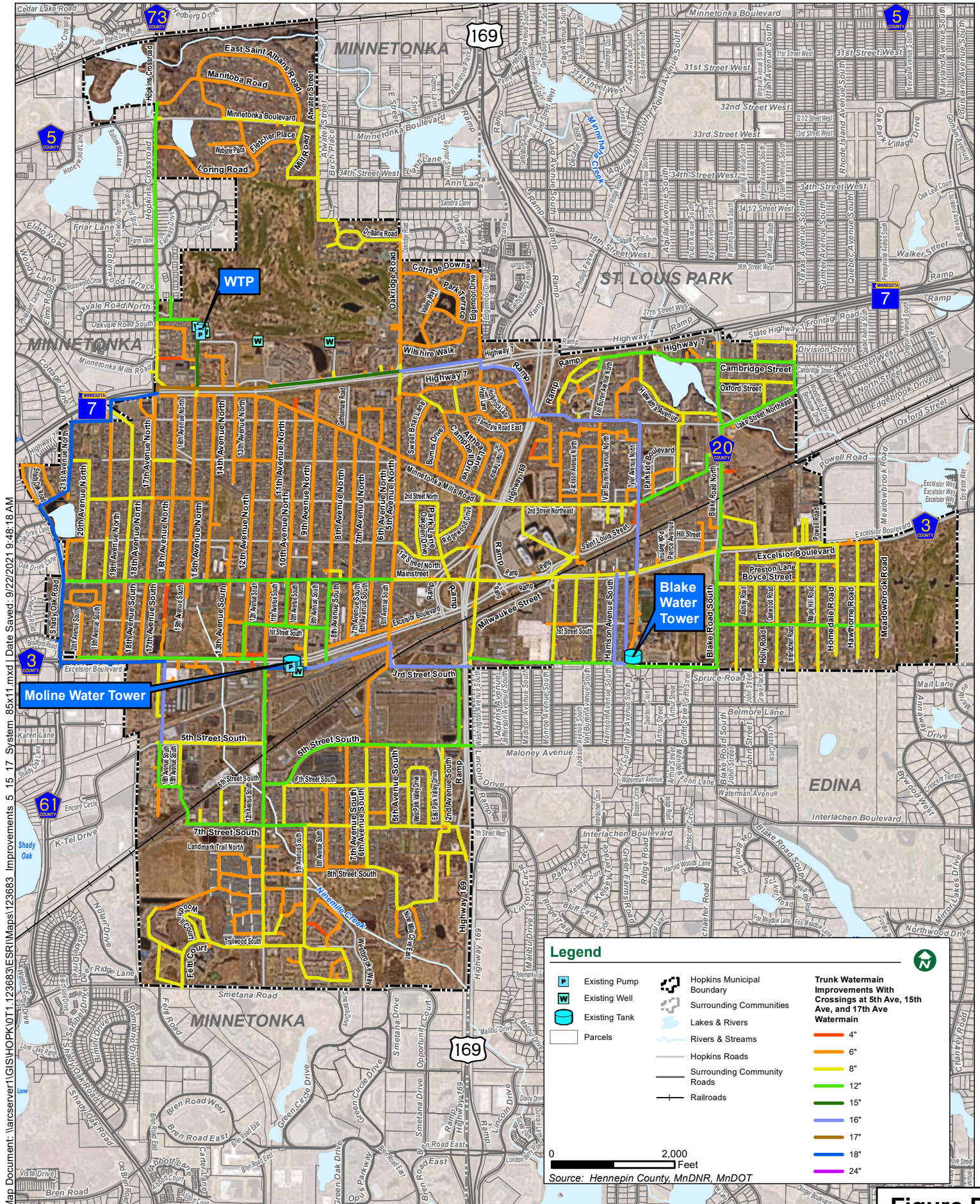


Figure B7

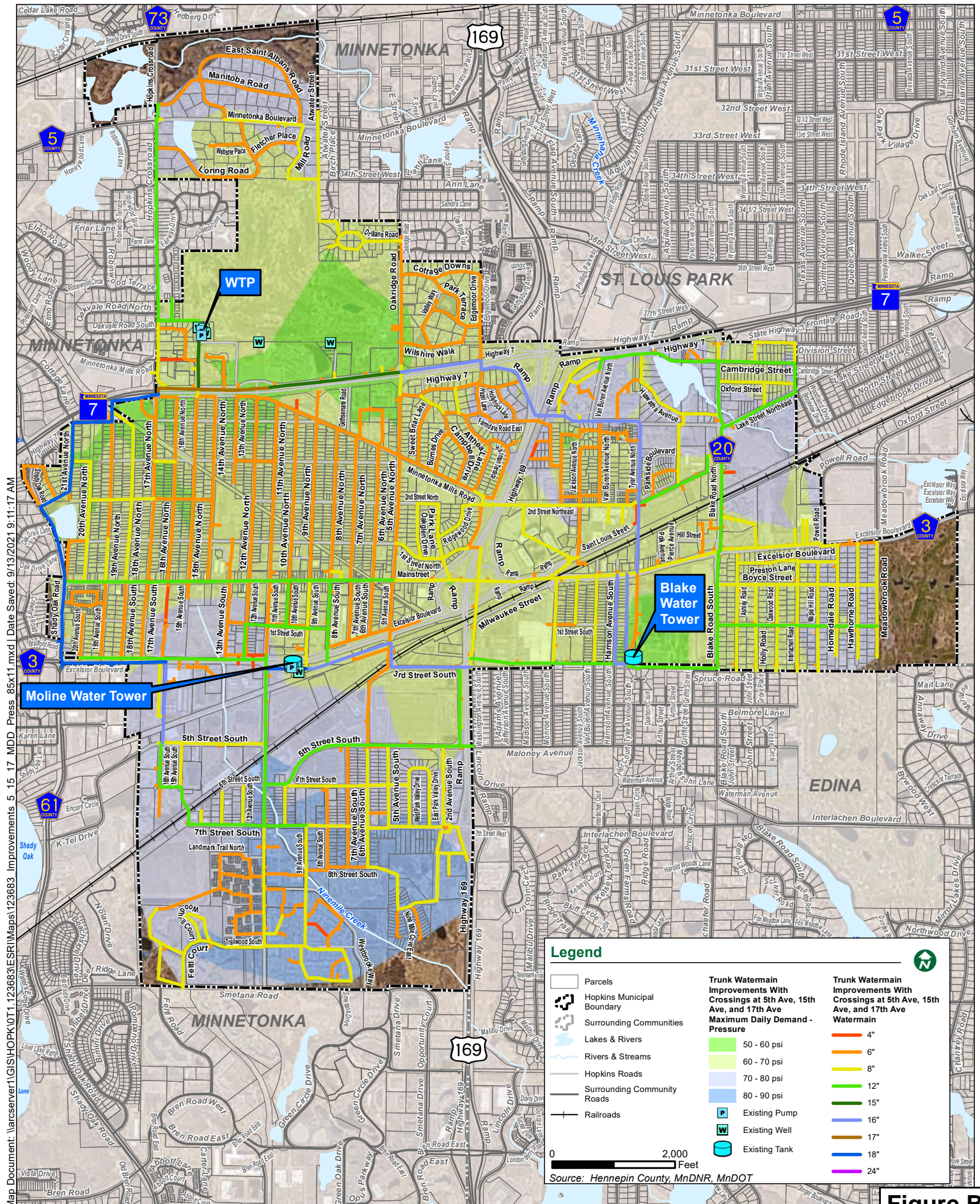


Figure B8

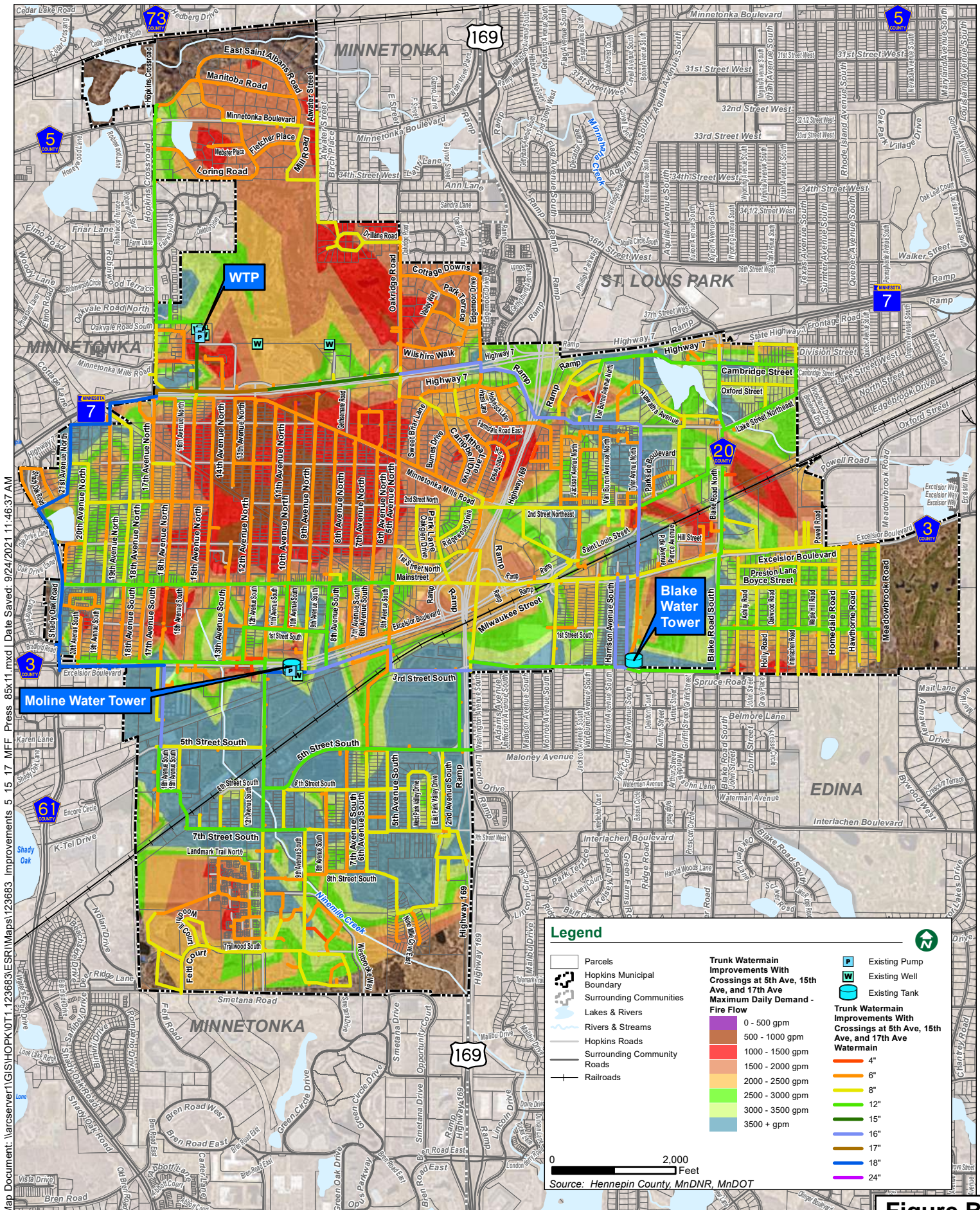


Figure B9

Appendix C: Preliminary Estimate of Project Cost

PRELIMINARY ENGINEER'S ESTIMATE

2022 TRUNK WATERMAIN IMPROVEMENTS
CITY PROJECT NO.
CITY OF HOPKINS, MN
BMI PROJECT NO. 0T1.123683



Date: 7/29/2021

				Mainline Trunk Watermain		15th Ave		13th Ave		12th Ave		9th Ave		5th Ave		Total - All Segments	
Item	Notes	Unit	Estimated Unit Price	Estimated Quantity	Amount	Estimated Quantity	Amount	Estimated Quantity	Amount	Estimated Quantity	Amount	Estimated Quantity	Amount	Estimated Quantity	Amount	Total Estimated Quantity	Amount
MOBILIZATION		LUMP SUM	\$150,000.00	0.75	\$112,500	0.05	\$7,500	0.05	\$7,500	0.05	\$7,500	0.05	\$7,500	0.05	\$7,500	1	\$150,000
REMOVE HYDRANT		EACH	\$1,000.00	4	\$4,000							1	\$1,000			5	\$5,000
ADJUST CASTING		EACH	\$1,000.00	2	\$2,000											2	\$2,000
REMOVE CURB AND GUTTER		LIN FT	\$5.00	370	\$1,850			34	\$170			35	\$175	58	\$290	497	\$2,485
SAWING BIT PAVEMENT (FULL DEPTH)		LIN FT	\$3.00	1120	\$3,360	86	\$258	100	\$300	40	\$120	102	\$306	206	\$618	1654	\$4,962
SAWING CONCRETE PAVEMENT (FULL DEPTH)		LIN FT	\$6.00	182	\$1,092			6	\$36			18	\$108	18	\$108	224	\$1,344
REMOVE WATERMAIN		LIN FT	\$10.00	1122	\$11,220	22	\$220	5	\$50	5	\$50	16	\$160	29	\$290	1199	\$11,990
ABANDON 6" WATERMAIN		LIN FT	\$10.00	187	\$1,870	145	\$1,450	158	\$1,580	173	\$1,730	652	\$6,520	403	\$4,030	1718	\$17,180
ABANDON 16" WATERMAIN		LIN FT	\$20.00	1300	\$26,000											1300	\$26,000
ABANDON 18" WATERMAIN		LIN FT	\$22.00	175	\$3,850											175	\$3,850
REMOVE CONCRETE STORM SEWER		LIN FT	\$15.00	675	\$10,125	75	\$1,125	65	\$975	35	\$525	30	\$450	25	\$375	905	\$13,575
REMOVE CONCRETE PAVEMENT		SQ YD	\$10.00	75	\$750							10	\$100			85	\$850
REMOVE BITUMINOUS PAVEMENT		SQ YD	\$8.00	602	\$4,816	59	\$472	52	\$416	12	\$96	29	\$232			754	\$6,032
REMOVE CONCRETE WALK		SQ YD	\$10.00	37	\$370			18	\$180					37	\$370	92	\$920
REMOVE BITUMINOUS WALK		SQ FT	\$1.00	9235	\$9,235									168	\$168	9403	\$9,403
BITUMINOUS PATCH		SQ YD	\$125.00	557	\$69,625	59	\$7,375	52	\$6,500	12	\$1,500	29	\$3,625	168	\$21,000	877	\$109,625
CONNECT TO EXISTING STORM MANHOLE		EACH	\$2,000.00	6	\$12,000	2	\$4,000	1	\$2,000					1	\$2,000	10	\$20,000
RC PIPE STORM SEWER (UNKNOWN SIZE)		LIN FT	\$100.00	675	\$67,500	75	\$7,500	65	\$6,500	35	\$3,500	30	\$3,000	25	\$2,500	905	\$90,500
6" GATE VALVE & BOX		EACH	\$2,000.00	9	\$18,000									3	\$6,000	12	\$24,000
8" GATE VALVE & BOX		EACH	\$3,000.00	4	\$12,000	1	\$3,000	1	\$3,000	1	\$3,000	3	\$9,000	2	\$6,000	12	\$36,000
10" GATE VALVE & BOX		EACH	\$3,750.00	1	\$3,750											1	\$3,750
16" GATE/BUTTERFLY VALVE & BOX		EACH	\$10,000.00	13	\$130,000			1	\$10,000	1	\$10,000					15	\$150,000
WATERMAIN CONNECTION PIT		EACH	\$7,000.00	19	\$133,000			1	\$7,000	1	\$7,000	3	\$21,000	1	\$7,000	25	\$175,000
WATERMAIN INSTALLATION PIT		EACH	\$12,500.00	7	\$87,500	2	\$25,000	2	\$25,000	2	\$25,000	2	\$25,000	2	\$25,000	17	\$212,500
CONNECT TO EXISTING WATERMAIN		EACH	\$2,000.00	13	\$26,000	1	\$2,000	1	\$2,000	1	\$2,000	1	\$2,000	2	\$4,000	19	\$38,000
LINING WATERMAIN - 16" CIPP		LIN FT	\$225.00	2697	\$606,825			18	\$4,050							2715	\$610,875
6" WATERMAIN DUCTILE IRON CL 52 (HYDRANT CONNECTIONS)		LIN FT	\$70.00	95	\$6,650							50	\$3,500			145	\$10,150
8" WATERMAIN DUCTILE IRON CL 52		LIN FT	\$80.00	55	\$4,400	16	\$1,280	5	\$400	5	\$400	5	\$400	124	\$9,920	210	\$16,800
10" WATERMAIN DUCTILE IRON CL 52		LIN FT	\$120.00	5	\$600											5	\$600
16" WATERMAIN DUCTILE IRON CL 52 (HOPKINS X-ROAD TO ROBINWOOL		LIN FT	\$210.00	590	\$123,900											590	\$123,900
18" WATERMAIN DUCTILE IRON CL 52		LIN FT	\$250.00	5	\$1,250											5	\$1,250
16" WATERMAIN FPVC (C900) (PIT RECONNECTIONS)		LIN FT	\$225.00	416	\$93,600											416	\$93,600
8"HDPE WATERMAIN CARRIER PIPE (DR 11) (HWY 7 CROSSINGS)		LIN FT	\$50.00			148	\$7,400	142	\$7,100	168	\$8,400	647	\$32,350	416	\$20,800	1521	\$76,050
16"HDPE WATERMAIN (DR 11) - (HDD - ROBINWOOD-12TH)		LIN FT	\$265.00	1090	\$288,850											1090	\$288,850
12" HDPE CASING PIPE (DR 9) - (HWY 7 CROSSINGS)		LIN FT	\$175.00			148	\$25,900	142	\$24,850	168	\$29,400	647	\$113,225	416	\$72,800	1521	\$266,175
30" HDPE CASING PIPE (DR 11) (HOPKINS X-ROAD CROSSING)		LIN FT	\$325.00	370	\$120,250											370	\$120,250
20" HDPE CARRIER PIPE (DR 13.5) (HOPKINS X-ROAD CROSSING)		LIN FT	\$150.00	370	\$55,500											370	\$55,500
18" ID WATERMAIN PIPE (TBD) (CONNECTION ON SW CORNER OF HOPKIN		LIN FT	\$350.00	34	\$11,900											34	\$11,900
TEMPORARY WATER SERVICE		LUMP SUM	\$200,000.00	1	\$200,000											1	\$200,000
INSTALL HYDRANT		EACH	\$5,500.00	4	\$22,000							1	\$5,500			5	\$27,500
WATERMAIN FITTINGS		POUND	\$10.00	9134	\$91,340	144	\$1,440	102	\$1,020	87	\$870	289	\$2,890	129	\$1,290	9885	\$98,850



Date: 7/29/2021

				Mainline Trunk Watermain		15th Ave		13th Ave		12th Ave		9th Ave		5th Ave		Total - All Segments	
Item	Notes	Unit	Estimated Unit Price	Estimated Quantity	Amount	Estimated Quantity	Amount	Estimated Quantity	Amount	Estimated Quantity	Amount	Estimated Quantity	Amount	Estimated Quantity	Amount	Total Estimated Quantity	Amount
ROBOTICALLY RECONNECT WATER SERVICE CONNECTION		EACH	\$500.00	2	\$1,000											2	\$1,000
6" CONCRETE WALK		SQ YD	\$130.00	37	\$4,810							10	\$1,300	37	\$4,810	84	\$10,920
BITUMINOUS WALK		SQ FT	\$4.00	1027	\$4,108											1027	\$4,108
CONCRETE CURB & GUTTER DESIGN B618		LIN FT	\$30.00	370	\$11,100											370	\$11,100
CONCRETE PAVEMENT		SQ YD	\$125.00	75	\$9,375											75	\$9,375
TRUNCATED DOMES		SQ FT	\$50.00	48	\$2,400											48	\$2,400
TRAFFIC CONTROL		LUMP SUM	\$50,000.00	0.75	\$37,500	0.05	\$2,500	0.05	\$2,500	0.05	\$2,500	0.05	\$2,500	0.05	\$2,500	1	\$50,000
HYDROSEEDING		SQ YD	\$5.00	3650	\$18,250	20	\$100	85	\$425	495	\$2,475	295	\$1,475	530	\$2,650	5075	\$25,375
TOPSOIL BORROW SPECIAL		CU YD	\$40.00	615	\$24,600	5	\$200	15	\$600	85	\$3,400	50	\$2,000	90	\$3,600	860	\$34,400
CROSSWALK MARKING - EPOXY		SQ FT	\$10.00											54	\$540	54	\$540
4" SOLID LINE MULTI-COMPONENT		LIN FT	\$2.50	20	\$50									80	\$200	100	\$250
4" DOUBLE SOLID LINE MULTI-COMPONENT		LIN FT	\$2.00	20	\$40									10	\$20	30	\$60
PAVEMENT MESSAGE MULTI-COMPONENT		EACH	\$500.00											2	\$1,000	2	\$1,000
SUBTOTAL				\$2,493,000		\$99,000		\$115,000		\$109,000		\$245,000		\$207,000		\$3,268,000	
15% CONTINGENCY				\$ 374,000		\$ 15,000		\$ 17,000		\$ 16,000		\$ 37,000		\$ 31,000		\$ 490,000	
ESTIMATED CONSTRUCTION COST				\$ 2,867,000		\$ 114,000		\$ 132,000		\$ 125,000		\$ 282,000		\$ 238,000		\$ 3,758,000	
21% INDIRECT COSTS				\$ 602,000		\$ 24,000		\$ 28,000		\$ 26,000		\$ 59,000		\$ 50,000		\$ 789,000	
TOTAL ESTIAMTED PROJECT COST				\$ 3,469,000		\$ 138,000		\$ 160,000		\$ 151,000		\$ 341,000		\$ 288,000		\$ 4,547,000	

Appendix D: Final Recommended Proposed Improvements Map

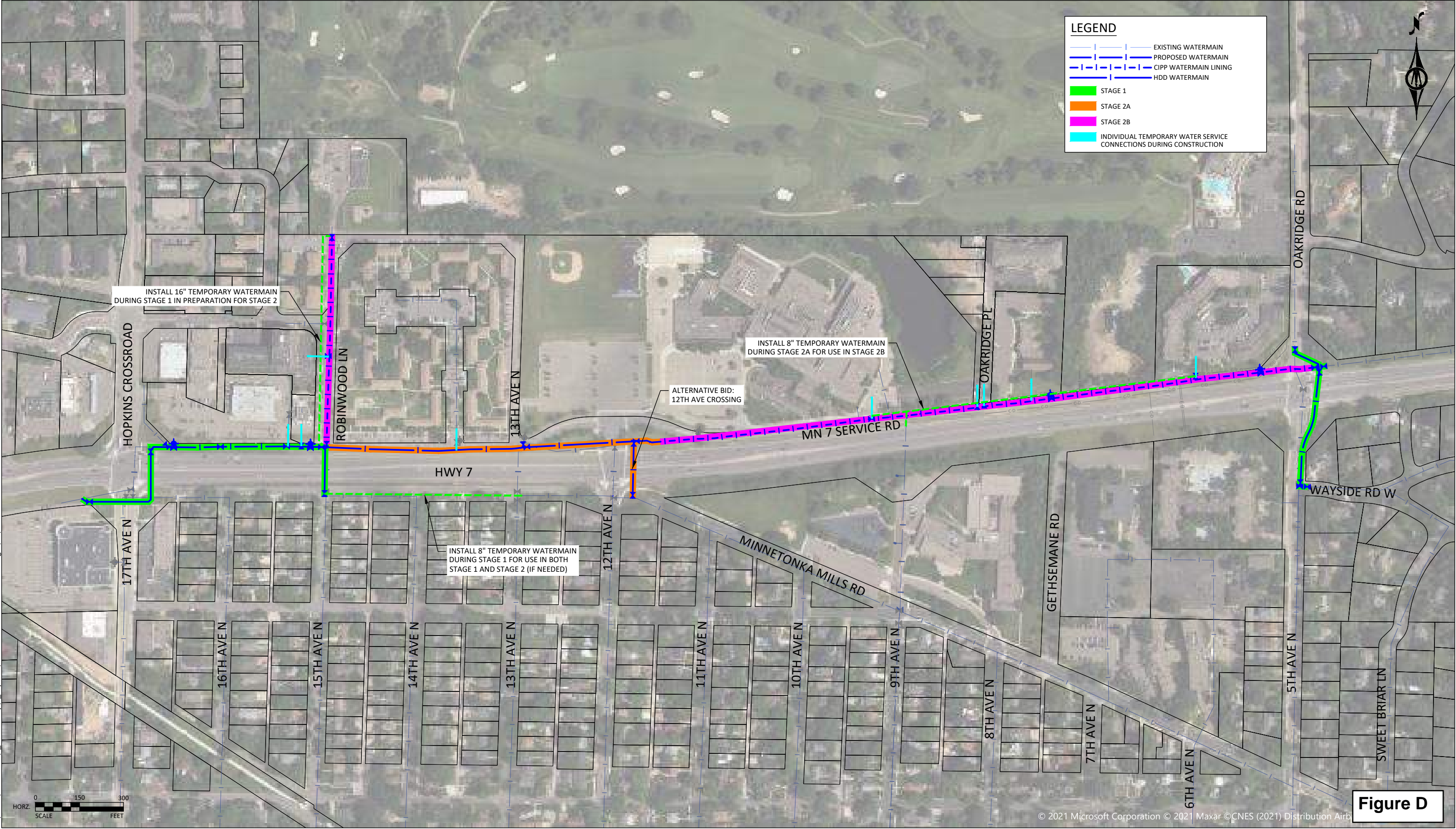


Figure D

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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