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City of Ramsey

Trott Brook North Infrastructure Study

September 2021

Analysis and Report

Submitted by:

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I. INTRODUCTION

The City of Ramsey has identified the need to prepare for the development of an area generally located north of Trott Brook, south of 175th Avenue, between Nowthen Boulevard and Variolite Street (see Figure 1). The proposed development area is not serviced with municipal utilities, therefore a general review of the entire service area north of Trott Brook was performed. In addition, transportation improvements were reviewed for the intersection of 173rd Avenue and County Road 5/Nowthen Boulevard, which will serve as the primary access point for the proposed development area.

Based on the current zoning map (January 2020), the area is zoned R-1 MUSA.

II. PRELIMINARY CONSIDERATIONS

Required public utility improvements are based on information contained in the City's Sanitary Sewer (Figure 2) and Water System (Figure 3) Comprehensive Plans. The trunk sanitary sewer and water system improvements are considered as base requirements for development of this area.

The roadway improvements reviewed are consistent with concept plans received for the developments. The anticipated roadway improvements along Nowthen Boulevard are also consistent with Anoka County standards. The roadway geometrics may require additional analysis if the proposed land uses change.

III. DESIGN CONSIDERATIONS

The design of the trunk sanitary sewer system is based on flow projections and rates detailed in the Comprehensive Sanitary Sewer Plan and the current City Zoning Map (dated January 2020). See Figure 4 for the City Zoning Map used for this analysis. Capacity limitations were analyzed at key points in the system.

IV. DEVELOPMENT CONCEPTS

Two potential developments are being considered for the area north of Trott Brook, west of Nowthen Boulevard. The specific properties being evaluated for this study include:

Hunt Addition: A 35.5-acre parcel between 173rd Avenue and 175th Avenue, west of Nowthen Boulevard. The Hunt Addition currently proposes to include 77 single family lots with the development traffic using both 173rd Avenue and 175th Ave NW to access Nowthen Boulevard.

Makowsky Addition: An approximate 200-acre parcel directly north of Trott Brook between Nowthen Boulevard and Variolite Street. The Makowsky Addition currently proposes to include 270 single family lots with development traffic accessing Nowthen Boulevard at 173rd Avenue, with an additional site access along Variolite Street approximately 1800 feet north of Trott Brook.

Three development scenarios were reviewed:

- The Hunt Addition develops as a stand-alone project (Figure 5A),
- The Hunt Addition and a portion of the Makowsky Addition develop simultaneously (Figure

5B), and

- The Hunt Addition and all of the Makowsky Addition develop simultaneously (Figure 5C).

In relation to proposed infrastructure improvements, it appears that the trunk facility extensions will be similar whether part or all of the Makowsky property develops.

V. TRUNK & LATERAL SANITARY SEWER SYSTEM

The primary area of analysis is depicted in the City's Comprehensive Sanitary Sewer Plan as District R22 (see Figure 2). Based on the City's Sanitary Sewer Comprehensive Plan, the area will be served by the 21-inch main line located south of Trott Brook in the Variolite Street right of way. The Comprehensive Plan depicts the flows being directed to an existing lift station located in the Brookfield Estates Addition, along 168th Circle, just west of Olivine Street.

Lift Station Considerations

The City has indicated that alternative means of conveyance to the Variolite system should be analyzed, as the existing lift station appears to be at or near capacity. A review of the Comprehensive Plan indicates the lift station was initially sized for a portion of the sewer district, with upgrades required in the future if larger areas were to be serviced.

Pumping data received from the City for June of 2021 indicates the existing duplex pumping station experiences an average of 44 starts per day, with the average run time being 2.59 minutes per start. Based on the pumping data, the lift station has adequate capacity to accommodate flows from undeveloped properties located east of Nowthen Boulevard, along with flows from the new developments.

Rather than upgrade the lift station to serve the entire area north of Trott Brook, the City indicated their preference is to construct a new lift station on the north side of Trott Brook. The new lift station would serve the area located north of Trott Brook as shown in green on Figure 2. There are several reasons to consider construction of a new lift station rather than continuing to add flows to the existing facility:

- The depth of the existing lift station makes it difficult to maintain with the City's equipment. The City has expressed concern with adding more flow to the station, which may result in more frequent maintenance of the facility.
- Installation of a new lift station limits the number of impacted properties if the existing facility failed due to flooding, lightning strikes, etc.

For these reasons, we have assumed new developments would be directed away from the existing lift station to the extent practical.

Hunt Addition Only

Sanitary sewer service for the Hunt Addition was analyzed based on the proposed concept plan for the site. When fully developed, the flows from the site will be approximately 18,000 GPD average daily flow and approximately 67,000 GPD peak flow. The flow will ultimately be connected to a gravity system that is proposed to traverse the Makowsky property. An interim system will be required until such time as the Makowsky property develops.

The interim service is anticipated to be routed to the same manhole that serves the new

elementary school, located east of Nowthen Boulevard. A gravity line along Nowthen Boulevard was analyzed and found to be not feasible due to a large culvert located at Trott Brook. Although alternative means, such as an inverted siphon could be used to cross the creek via gravity, the capital costs and resulting potential maintenance costs, made this option not feasible.

The interim service is recommended to include a lift station with a forcemain discharging to the manhole south of Trott Brook located along Nowthen Boulevard.

We reviewed the gravity sewer along 170th Trail, Olivine Street and 168th Circle. Based upon both existing and future flows from the area, adequate capacity in the gravity main exists to allow for the Hunt Addition connection to occur. As reviewed previously, the existing lift station has capacity to accommodate the additional flows on a temporary basis.

See Figure 6A for anticipated improvements.

Hunt Addition and Makowsky Addition

With the Hunt Addition and the Makowsky Addition developing simultaneously, a new lift station and forcemain would be required. This would be required if either a portion or all of the Makowsky property develops. The lift station is assumed to be located near the southwest portion of the Makowski property, with the forcemain then installed along Variolite Street.

The gravity sewer through the Makowsky Addition should be placed at an adequate depth to allow for the Hunt Addition to be served by the system. The main line should also be sized to account for areas north of Trott Brook, east of Nowthen Boulevard. The lift station should also be sized to accommodate the ultimate service area, which includes all areas north of Trott Brook.

See Figures 6B and 6C for anticipated improvements.

VI. WATERMAIN

Based on the City's Comprehensive Plan, a trunk 12-inch watermain loop is proposed to extend along Nowthen Boulevard to 175th Avenue, along 175th Avenue to Variolite Street, and along Variolite Street. The watermains are a portion of the North Central Loop.

Hunt Addition

For the Hunt Addition, we assumed the trunk watermain would extend along Nowthen Boulevard to 175th Street and along 175th Street to the westerly edge of the Hunt Addition. The lateral watermains within the development will provide the interim looping of the system.

See Figure 6A for anticipated improvements.

Hunt Addition and Makowsky Addition

If both properties develop, we assumed the watermain would be installed along Nowthen Boulevard from south of Trott Brook to 175th Avenue, along 175th Avenue to the westerly edge of the Hunt Addition. The trunk line along Variolite Street was installed as a portion of the recently completed roadway reconstruction project. The lateral watermains within the developments will provide the interim looping of the system.

There will be a segment of watermain along 175th Avenue to be installed to complete the North Central Loop. This could be completed in conjunction with these improvements or completed

separately at a future date.

The watermain improvements are shown on Figures 6B and 6C.

VII. ROADWAY IMPROVEMENTS

The majority of the internal site roadways will be constructed as the developments are constructed. The primary access point will be 173rd Avenue at Nowthen Boulevard.

Supplemental access points will be along 175th Avenue for the Hunt Addition and along Variolite Street for the Makowsky Addition. These supplemental accesses are anticipated to have low traffic volumes and will access onto roadways with less than 1,000 ADT per 2019 traffic count data. Additionally, sight distances are adequate for turning movements into and out of the developments. The supplemental access points appear adequate from both roadway capacity and safety perspectives.

Hunt Addition

A traffic analysis was completed which includes requirements for the ultimate improvements needed assuming both properties develop. Considering recommendations from the analysis, if the Hunt property develops independently, the following improvements will be required:

- Construction of a left turn lane along Nowthen Boulevard,
- Construction of 173rd Avenue to the internal access road for the development,
- Construction of a right turn lane and left turn lane for eastbound traffic at Nowthen Boulevard, and
- Construction of a temporary cul-de-sac at the west end of 173rd Avenue.

Hunt Addition and Makowsky Addition

If the developments occur simultaneously, the improvements are anticipated to include:

- Construction of a left turn lane along Nowthen Boulevard, and
- Construction of a right turn lane and left turn lane for eastbound traffic at Nowthen Boulevard.

EAW Process

The developer for the Makowsky property is completing a traffic study as a portion of the EAW process. The traffic study they are completing may identify and recommend additional roadway improvements within the general project area.

The roadway improvements are depicted on Figure 7. The traffic analysis is also attached for reference.

VIII. ASSUMPTIONS

a. Right-of-Way Requirements

We have assumed that most of the required improvements will be development driven and right of way will be secured through the platting process. During the development review process, the City should review the right of way required and secure needed easements. Various other utility easements may also be required, depending upon how the combined sites develop.

b. Jurisdictional Authority/Approvals/Permits

As the project moves from the planning stages to design and construction, permits will be required from various agencies. The following agencies will be permitting entities for considered improvements:

- Minnesota Department of Transportation State Aid: Variolite Street is a State Aid route,
- Anoka County: Nowthen Boulevard is a county roadway,
- Minnesota Pollution Control Agency: NPDES Storm Water Permit,
- Minnesota Pollution Control Agency: Sanitary Sewer Extension Permit,
- Minnesota Department of Health (MDH): Watermain Extension,
- Minnesota Department of Natural Resources (MNDNR): Dewatering, and
- Lower Rum River Watershed Management Organization: Storm Water related.

IX. ADDITIONAL IMPROVEMENT CONSIDERATIONS

Street Lighting

No costs are included in this report for street lighting.

Trails/Sidewalks

No trails or sidewalks are included in this analysis.

Landscaping

The improvements considered with this report include a very utilitarian landscaping approach to the area. Features, such as trees, shrubs, decorative features, and monuments are not included in the estimated project costs.

Right of Way and Easements

We assumed that required rights of way would be dedicated as a portion of the development process, and no costs are included in the project costs for acquisitions.

X. COST CONSIDERATIONS

The estimated project costs are summarized below. Costs were developed based upon similar types of projects completed previously, with adjustments for inflation.

Improvement	Hunt Addition	Hunt Addition plus ½ Makowsky Addition	Hunt Addition plus Makowsky Addition
Road & Storm (173 rd Street Perm)	\$251,000	\$251,000	\$251,000
Road & Storm (173 rd Street Temp)	\$156,000	\$0	\$0
Roadway & Storm (County Road)	\$312,000	\$312,000	\$312,000
Sanitary Sewer	\$219,000	\$1,250,000	\$1,455,000
Lift Station	\$585,000	\$975,000	\$975,000
Force main	\$386,000	\$387,000	\$387,000
Water System	\$811,000	\$811,000	\$811,000
TOTAL	\$2,720,000	\$3,986,000	\$4,191,000

The costs shown above are considered project costs and include 30% contingencies and project development costs. Project development costs include administrative, engineering, and fiscal related costs.

Future watermain improvements will be required to complete a loop along 175th Avenue. The costs associated with completing the loop are estimated at \$745,000.

XI. CONCLUSION

The information presented in this report is intended to allow for discussions with property owners and developers, as well as allow the City to begin considering funding options.

XII. ATTACHMENTS

Several attachments are included in the appendix of this report. The attachments are meant to serve as discussion documents related to assumptions made in preparation of the report.

Appendix A: Figures

Figure 1: Study Area

Figure 2: Sanitary Sewer Comprehensive Plan Update

Figure 3: Water System Comprehensive Plan Update

Figure 4: City Zoning Map

Figures 5A, 5B, and 5C: Development Scenarios

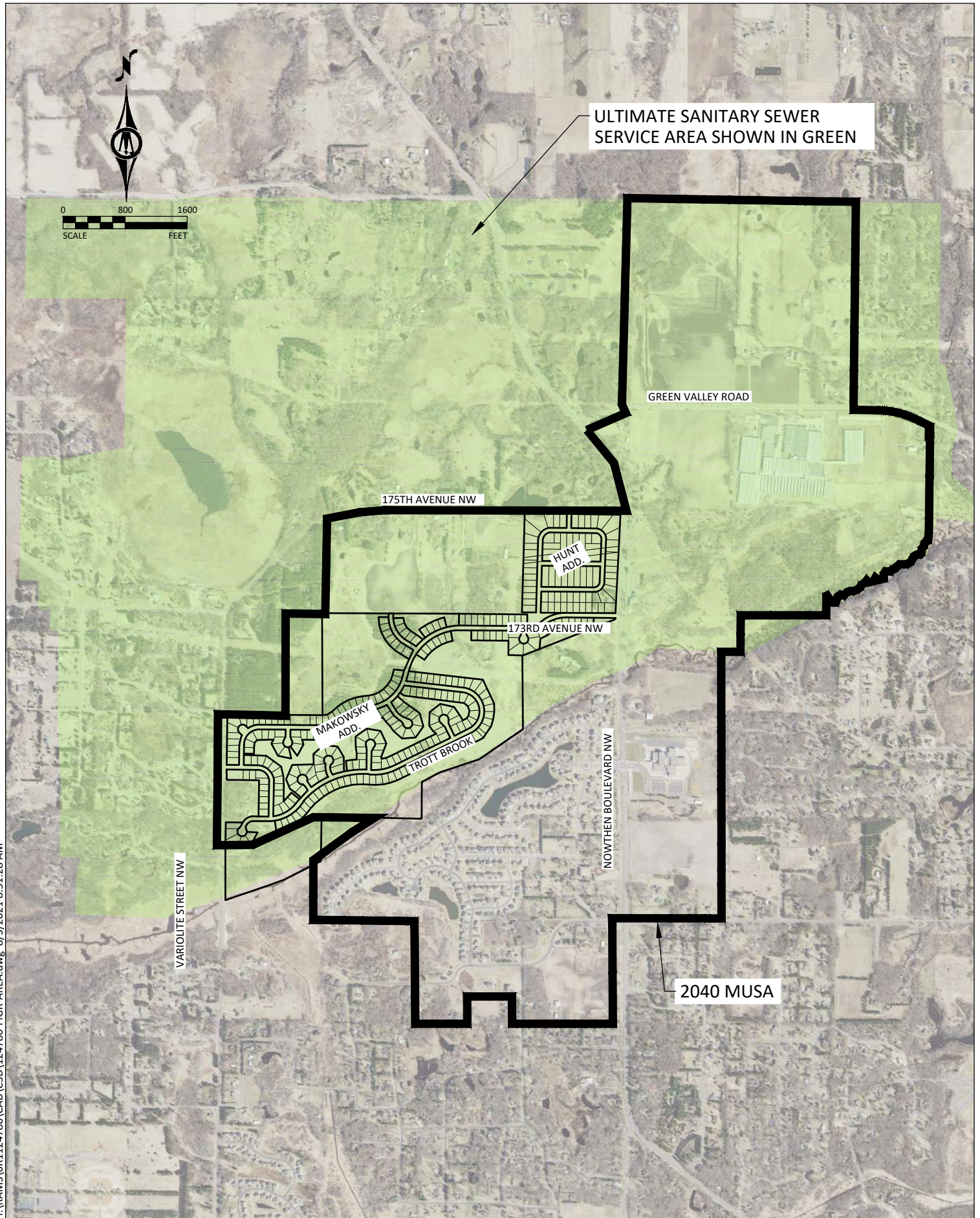
Figures 6A, 6B, and 6C: Sanitary Sewer and Water Improvements

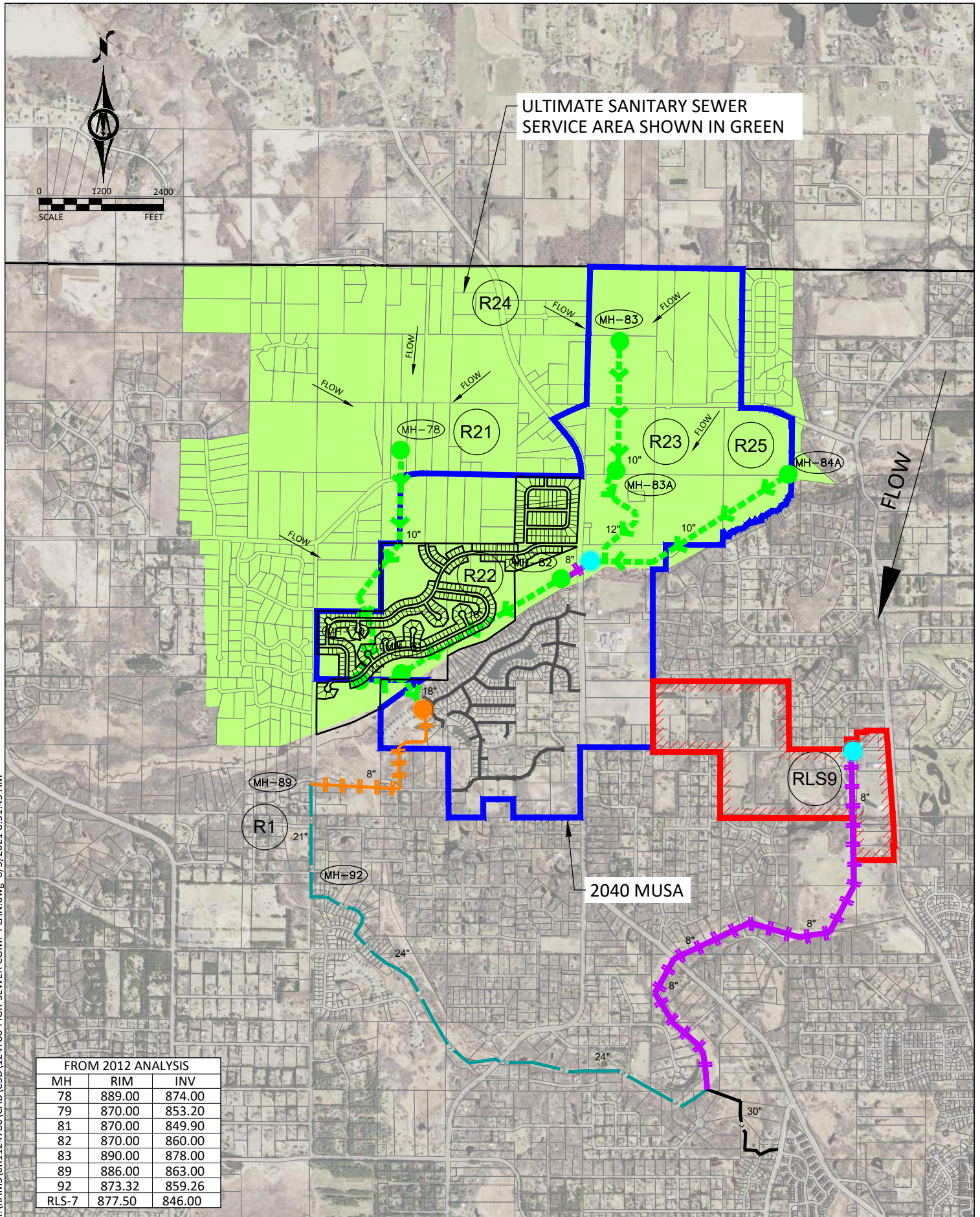
Figure 7: Roadway Improvements

Appendix B: Traffic Report

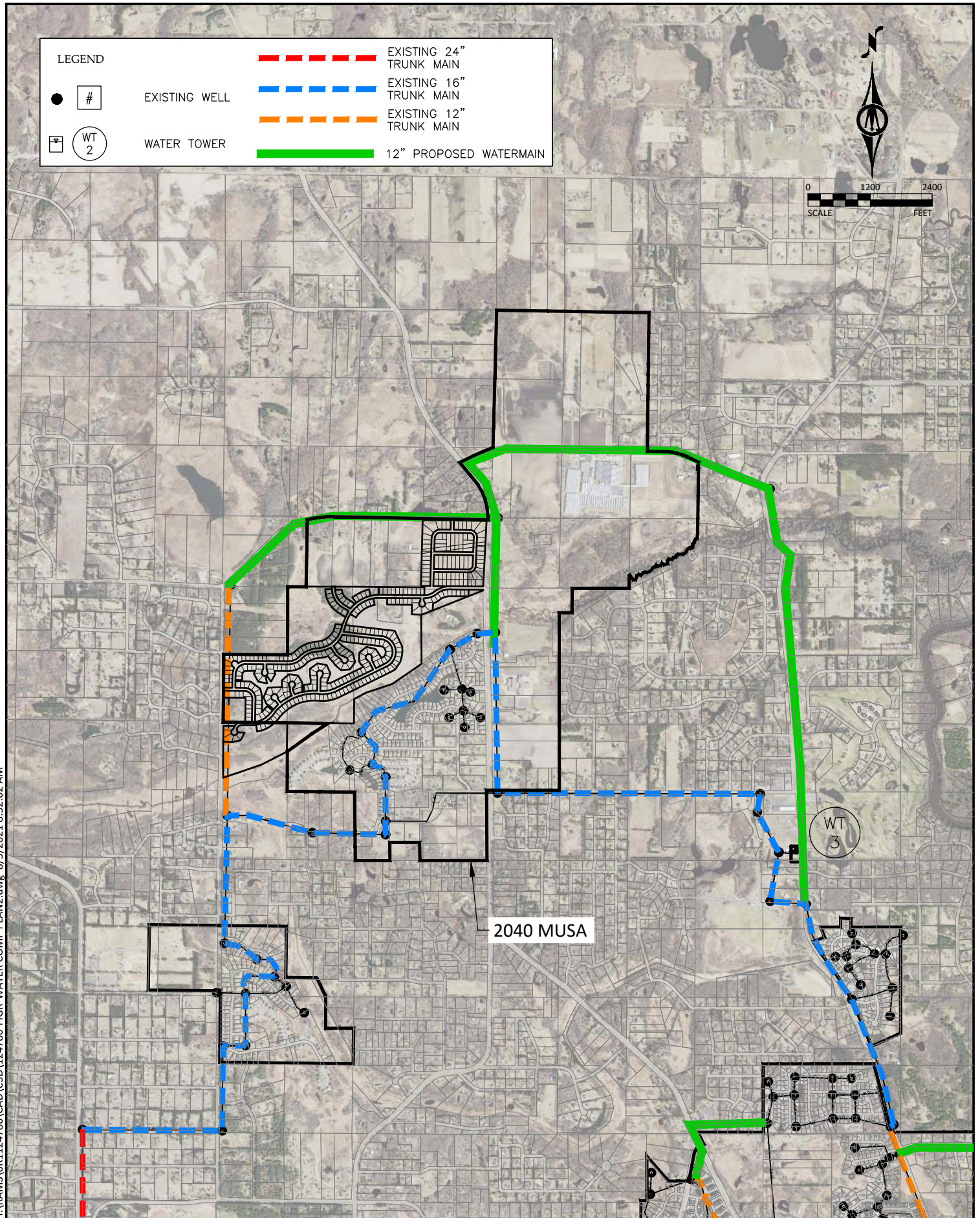
Trott Brook Traffic Analysis, Dated June 21, 2021

Appendix A: Figures

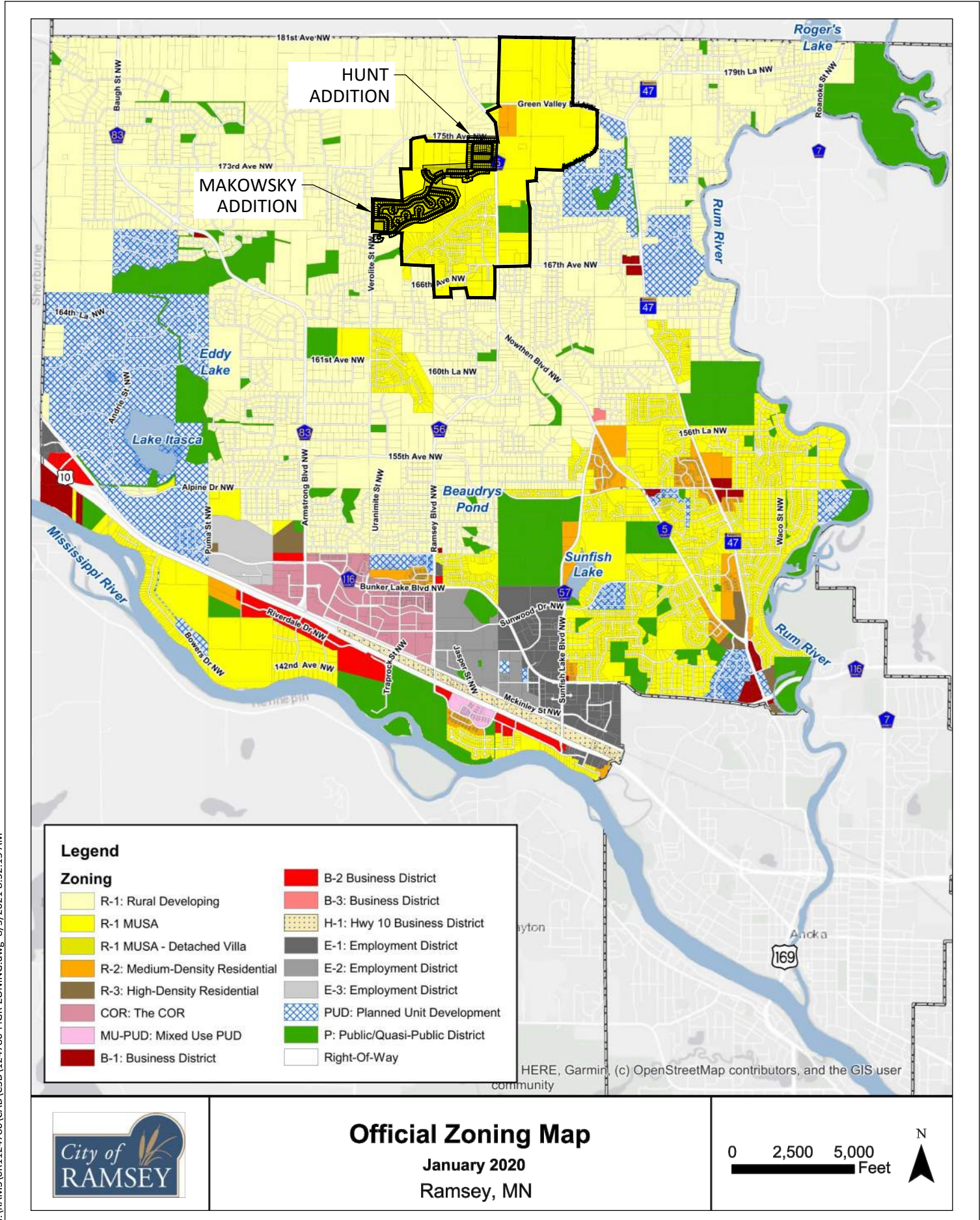


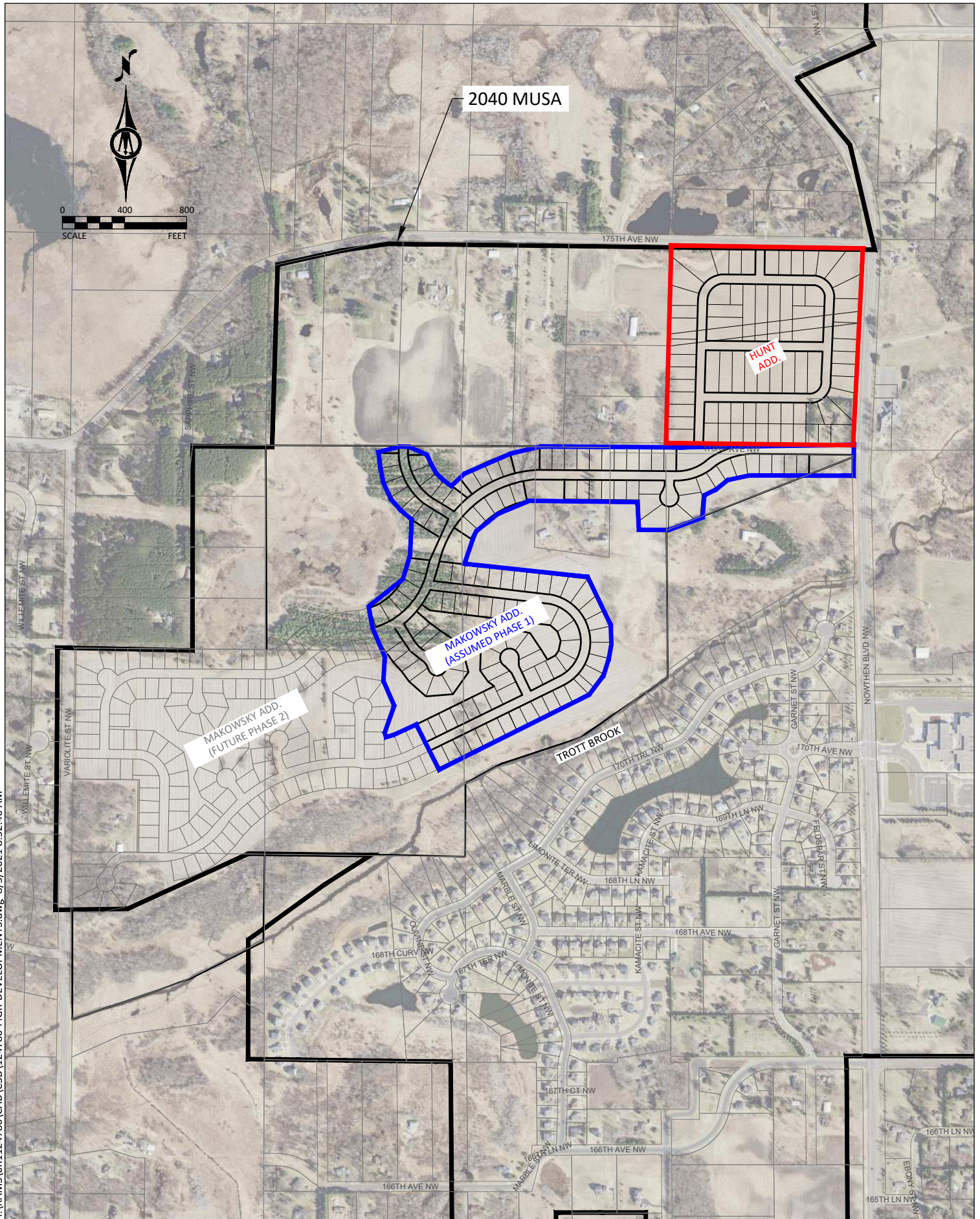


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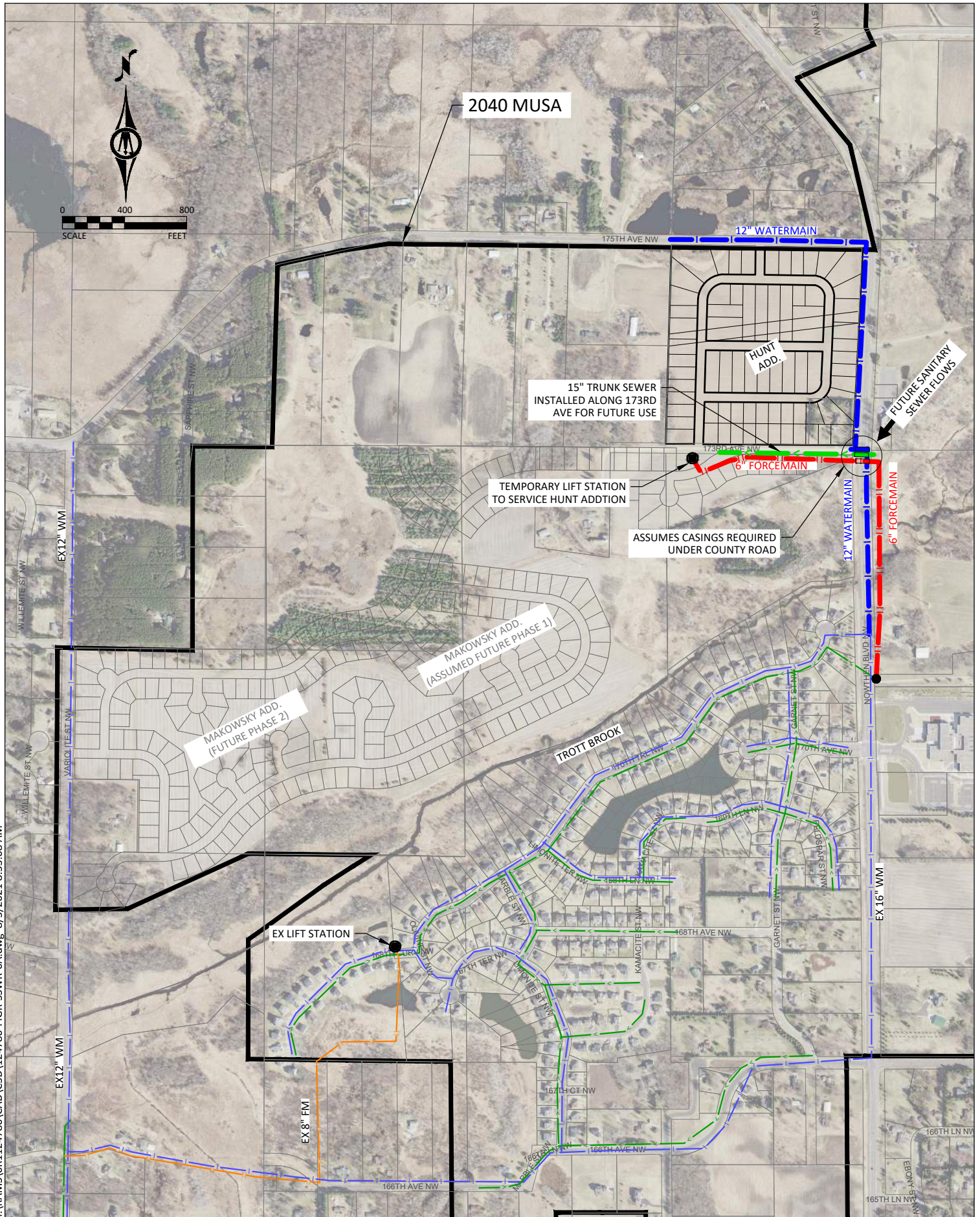


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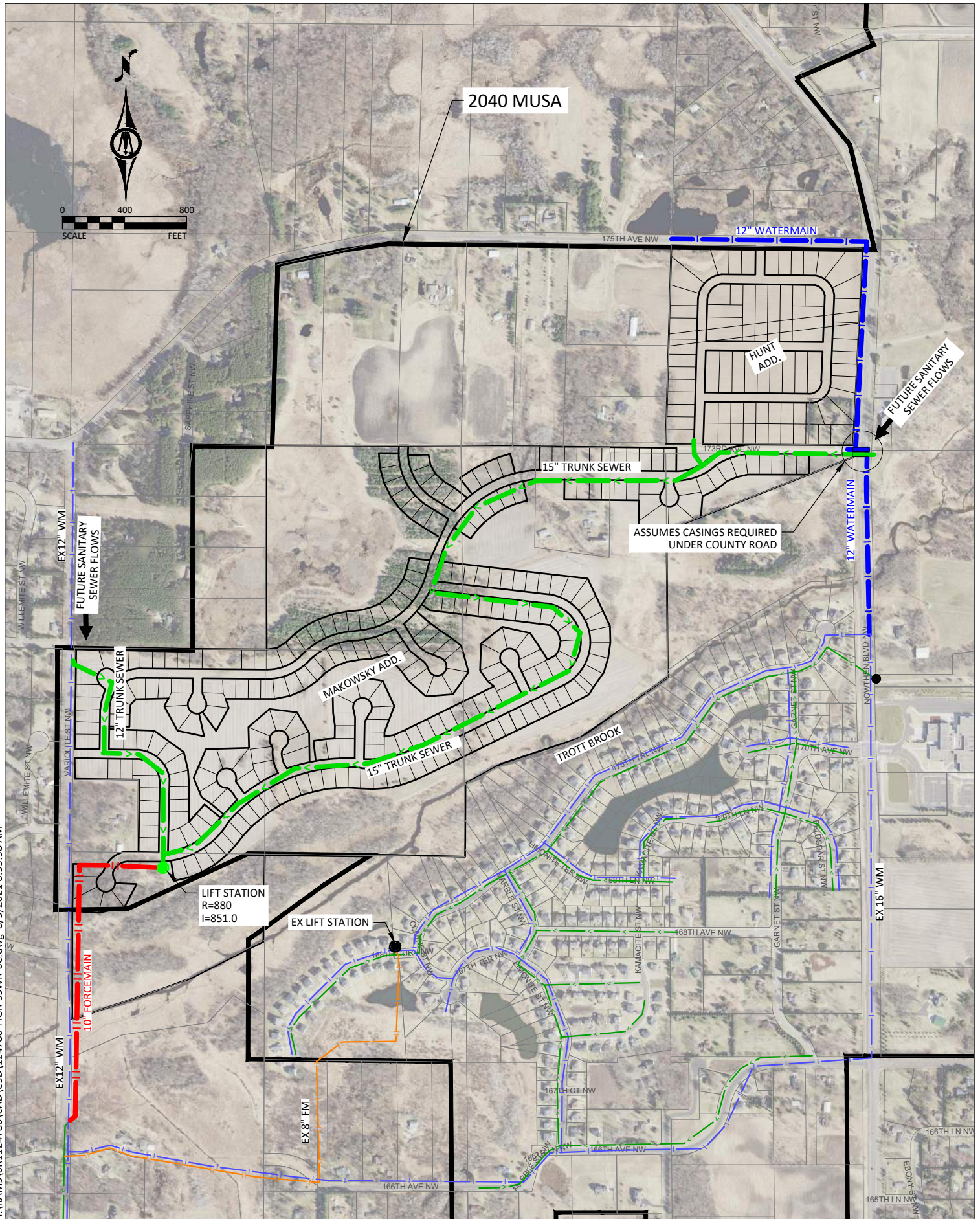




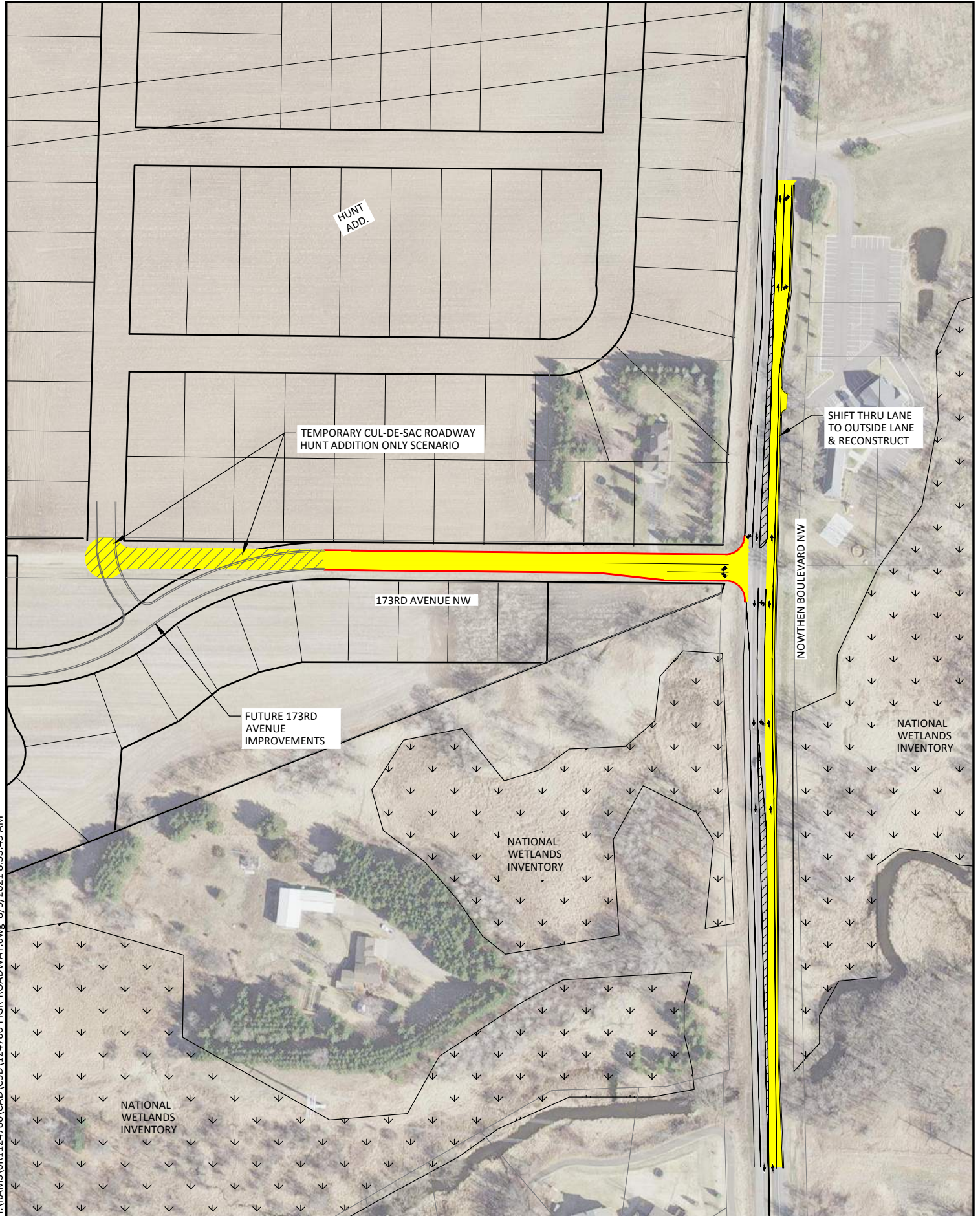
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Appendix B: Traffic Report



**BOLTON
& MENK**

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MEMORANDUM

Date: June 21, 2021
To: Kevin Kielb, P.E.
From: Bryan Nemeth, P.E.
Subject: Trott Brook Traffic Analysis
City of Ramsey
Project No.: 0R1.124780

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

Bryan T. Nemeth, P.E., PTOE

43354
Reg. No.

June 21, 2021
Date

Introduction

A high-level traffic review was conducted on the proposed developments off of 173rd Avenue West, west of CSAH 5 (Nowthen Boulevard) in the City of Ramsey. The purpose of the review was to identify potential traffic impacts and/or additional considerations.

Site Considerations

- The proposed Makowsky Addition development is located southwest of the 173rd Ave NW and CSAH 5 (Nowthen Blvd) intersection. Additionally, there is another proposed residential development (Hunt Addition) located on the northwest corner. The two lot concepts/site plans are attached.
- The Makowsky Addition development currently proposes to include 270 single family lots with all of the development traffic accessing Nowthen Blvd at 173rd Ave NW (at least until more development occurs to the north).
- The Hunt Addition currently proposes to include 79 single family lots with the development traffic using both 173rd Ave NW and County Road (CR) 63 (175th Ave NW) to access Nowthen Blvd.
- CSAH 5 (Nowthen Blvd) is classified as an A-Minor Arterial Expander with a 55 mile per hour speed limit. It is a two-lane undivided roadway with no curb and gutter. At 173rd Ave NW, there is a 180-foot southbound right turn lane, while the northbound approach includes a left turn bypass lane.
- With a speed limit of 55 mph, the required sight distance for a left turn out from 173rd Ave NW is 610 feet and the required sight distance for a right turn out is 520 feet. Sight lines are considered to be acceptable due to no horizontal and minimal vertical curves within the sight triangles.

- With the roadway designated as a minor arterial, the current access spacing for full access intersections is 1/2 mile. 173rd Ave NW is located ¼ mile south of 174th Lane NW and 0.35 miles north of 170th Ave NW. No changes to access spacing or movements is anticipated at this time due to property access considerations.

Safety Review

- Three crashes have been reported at or near the intersection of 173rd Ave NW and Nowthen Blvd in the last ten years. One was a run-off road crash, one involved a collision with a deer, and the final was a collision with some construction equipment. Another crash involving a collision with a deer occurred south of the intersection. None of the crashes indicate a need for intersection modifications.

Trip Generation

- The ITE Trip Generation 10th edition manual was used to estimate the trips generated from the developments. According to the proposed plan there are a total of 270 residential units from Makowsky Addition and 79 units as part of the Hunt Addition. ITE code 210, Single Family Homes is the most similar category to describe the development. The calculated trips generated from the site are provided below.

270 Units	Trip Rate	Entering	Exiting	Total
Daily	9.44	1,274	1,274	2,550
AM Peak	0.74	50	150	200
PM Peak	0.99	168	99	267

79 Units	Trip Rate	Entering	Exiting	Total
Daily	9.44	373	373	746
AM Peak	0.74	15	44	58
PM Peak	0.99	49	29	78

- The existing travel pattern is primarily to the south in the morning and from the south in the afternoon/evening. For estimation purposes, it is estimated that 80% of traffic goes to/comes from the south. The following details the estimated turning movements based off of the information at 173rd Ave NW/Nowthen Blvd. It is estimated that 27 units from the Hunt Addition use 175th Ave NW instead. Traffic is estimated with a 70/30 split on CSAH 5.

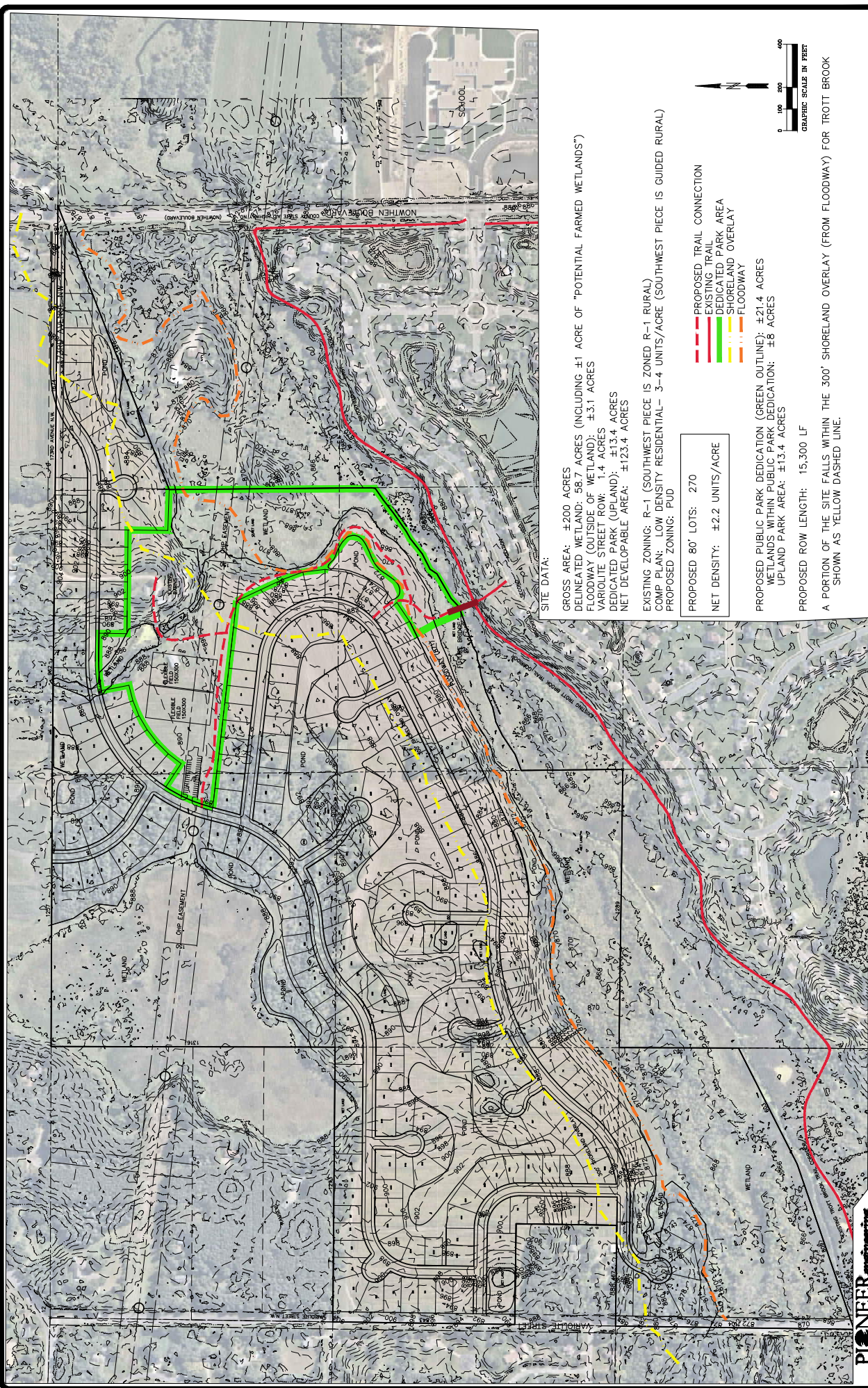
	ENTERING		EXITING		ON CSAH 5	
	SB Right	NB Left	EB Right	EB Left	NB Through	SB Through
AM Peak Hour	12	48	143	36	149	347
PM Peak Hour	40	161	94	24	521	223
Weekday	304	1,216	1,216	304	3,100	3,100

Turn Lanes

- Right turn lanes may be justified based on traffic volumes in the direction of the turning movement, roadway speed, daily volume, and in the interest of traffic safety. Since there is already a southbound right turn lane, analysis of need was not determined.
- Left turn lanes may be justified based on traffic volumes in each direction, the number of lanes, and the number of left turns during the peak hour of the day. Based on NCHRP 457: Evaluating Intersection Improvements: An Engineering Study Guide, a left turn treatment would be warranted. The MnDOT Road Design Manual indicates that a left turn lane should be provided on a rural highway when the access is to a public road. A left turn lane is also considered to be warranted on a rural, three-leg intersection, with two lanes on a major roadway according to NCHRP 745: Left-Turn Accommodations at Unsignalized Intersections, given the volume of left turns and the traffic on CSAH 5 during the peak hour.
- Given the size of the development and the volume of opposing traffic, left turn storage should be provided for approximately two vehicles.
- With a 12-foot left turn lane, the roadway speed limit at 55 mph, the storage need, and the preference to not have traffic in the through lane impacted by a slowing left turn vehicle given the two-lane roadway, a left turn lane is recommended to be 565 feet long (385' turn lane plus 180' taper).
- Given the constraints due to Trott Brook, it is recommended that any roadway widening to form a left turn lane be developed north of Trott Brook, approximately 750 feet to the south. Given these constraints, a left turn lane may not be properly developed even if traffic slows by 10 mph in the through lane (50' for vehicles, 170' full width turn lane for deceleration, 180' taper, plus 660' to develop turn lane at speed:1) which would match the design for the southbound right turn lane.
- The current southbound right turn lane of 360 feet (full lane plus taper) is considered to be appropriate for 55 mph given a 10-mph slowdown in the through lane.
- Separate turn lanes for the eastbound left and right turns on 173rd Ave NW are not required to provide acceptable service levels (LOS C, 16 sec/vehicle average delay in the PM peak), but the separation of turn movements would be recommended due to driver impatience with the amount of right turning vehicles that could potentially be impacted by one left turning vehicle.

Conclusions

- A northbound left turn lane should be provided if the design can be accommodated since it is justified based on multiple factors, guidance, and manuals.
- If a northbound left turn lane cannot be provided due to environmental or other constraints the current bypass lane may be considered acceptable, but an exclusive left turn lane is “the most effective and safe way to separate the left-turning for the through traffic streams” according to the MnDOT Road Design Manual.
- An eastbound left and eastbound right turn lane approaching CSAH 5 (Nowthen Blvd) is recommended.



SITE DATA:
 GROSS AREA: ±200 ACRES
 DELINEATED WETLAND: 58.7 ACRES (INCLUDING ±1 ACRE OF "POTENTIAL FARMED WETLANDS")
 FLOODWAY (OUTSIDE OF WETLAND): ±3.1 ACRES
 VARIOLITE STREET ROW: 1.4 ACRES
 DEDICATED PARK (UPLAND): ±13.4 ACRES
 NET DEVELOPABLE AREA: ±123.4 ACRES

EXISTING ZONING: R-1 (SOUTHWEST PIECE IS ZONED R-1 RURAL)
 COMP PLAN: LOW DENSITY RESIDENTIAL- 3-4 UNITS/ACRE (SOUTHWEST PIECE IS GUIDED RURAL)
 PROPOSED ZONING: PUD

PROPOSED 80' LOTS: 270
 NET DENSITY: ±2.2 UNITS/ACRE

- PROPOSED TRAIL CONNECTION
- EXISTING TRAIL
- DEDICATED PARK AREA
- SHORELAND OVERLAY
- FLOODWAY

PROPOSED PUBLIC PARK DEDICATION (GREEN OUTLINE): ±21.4 ACRES
 WETLANDS WITHIN PUBLIC PARK DEDICATION: ±8 ACRES
 UPLAND PARK AREA: ±13.4 ACRES

PROPOSED ROW LENGTH: 15,300 LF

A PORTION OF THE SITE FALLS WITHIN THE 300' SHORELAND OVERLAY (FROM FLOODWAY) FOR TROTT BROOK
 SHOWN AS YELLOW DASHED LINE.

PIONEER Engineering
 1000 University Ave., Suite 200
 St. Louis, MO 63102
 Phone: (636) 441-9114
 Fax: (636) 441-9188
 www.pioneereng.com

These plans and data were prepared by
 the undersigned professional engineer
 in accordance with the laws and
 regulations of the State of Missouri.

Project No. 22200000000000000000
 Date: 08/20/2024
 Drawn: [Name]
 Checked: [Name]
 Title: [Title]

CONCEPT PLAN 9

EXCELSIOR GROUP
 1660 HIGHWAY 160 SOUTH SUITE 400
 SAINT LOUIS PARK, MINNESOTA 55416

TROTT BROOK PROPERTY
 HANSEL, MINNESOTA

Site Data

Site Area - Gross	35.5 Acres
Wetland	0.7 Acres
Wetland Buffer	0.2 Acres
Site Area - Net <i>(less wetland & wetland buffer)</i>	34.7 Acres
Easement <i>(not buildable)</i>	2.1 Acres
Buildable Area <i>(less wetland, wetland buffer, & easement)</i>	32.6 Acres
Floodplain Area to Mitigate	1.5 Acres

Concept Data

Unit Count	79
Density - Gross / Net	2.2 / 2.3
Minimum lot size	10,890 Sq. Ft.
Minimum lot width / Corner lot	80' / 90'
Front Building Setback	30'
Rear Building Setback	30'
Side Setback Street / Interior	30' / 10'
Wetland Buffer	16.5'
Buffer Requirements <i>(required along existing residential properties)</i>	45' no berm 35' berm

Legend

-  Floodplain (FEMA)
-  Wetland and Wetland Buffer (NWI)
-  Stormwater

