



Memorandum

SRF No. 15203

To: Kurt Ulrich
City Administrator

From: Tom Sachi, PE, Associate
Ashley Sherry, Engineer

Date: January 6, 2022

Subject: Trott Brook Crossing EAW Traffic Study Review

Introduction

As requested, SRF has completed a traffic study for the proposed Trott Brook Crossing Housing Development in the City of Ramsey, MN (see Figure 1: Project Location). The main objectives of this study are to review existing traffic operations within the study area, evaluate impacts of the proposed and adjacent development under future conditions, and recommend any necessary improvements to accommodate the proposed development. The following information provides the assumptions, analysis, and recommendations offered for consideration.

Existing Conditions

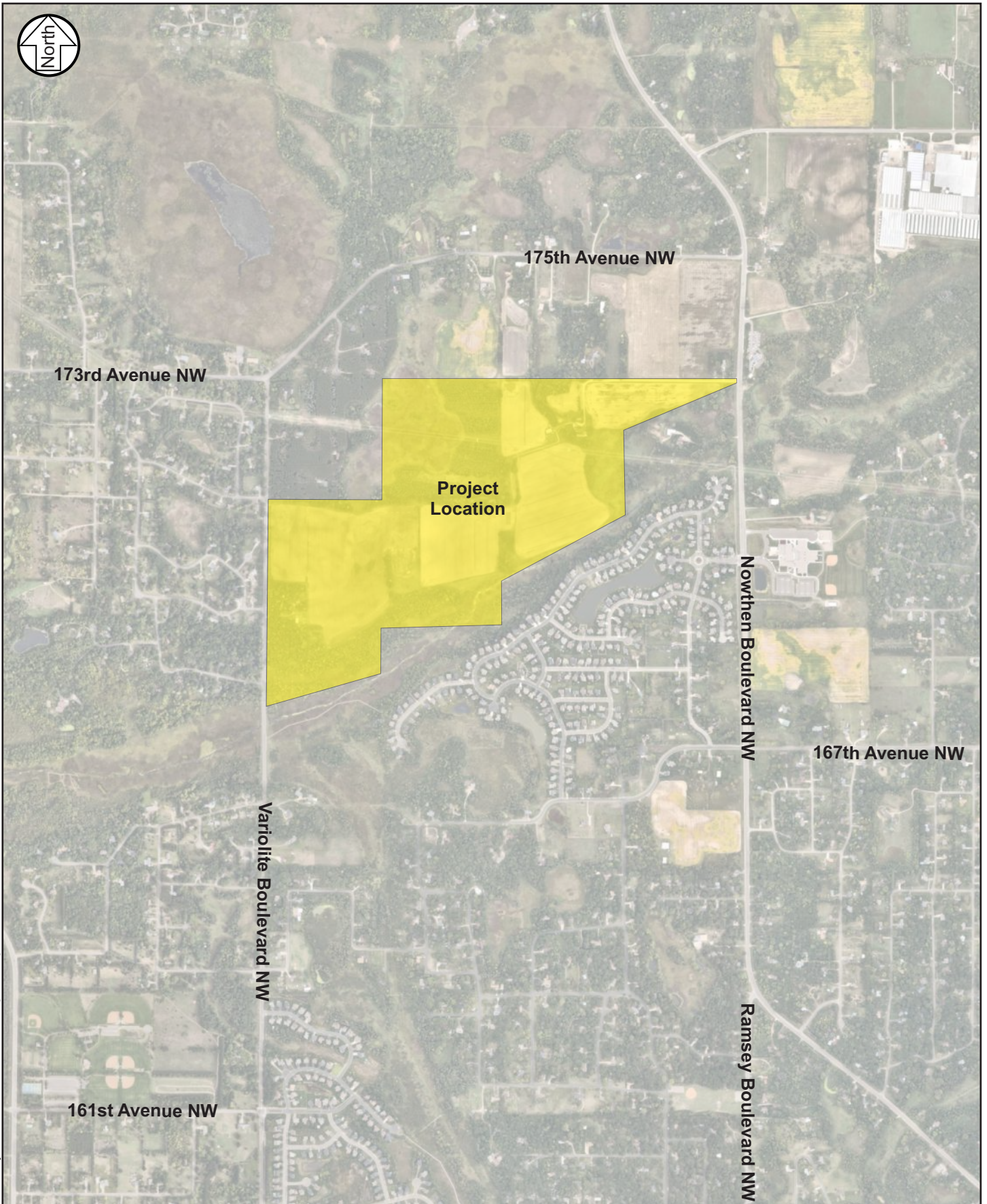
Existing conditions were reviewed to establish a baseline to identify any future impacts associated with the proposed development. The evaluation of existing conditions includes a review of traffic volumes, roadway characteristics, and an intersection capacity analysis, which are summarized in the following sections.

Data Collection

Vehicle turning movement and pedestrian/bicyclist counts were collected by SRF during the weeks of October 18, 2021 and November 15, 2021 at the following intersections during the a.m. and p.m. peak periods:

- Variolite Street NW / Alpine Drive
- Variolite Street NW / 161st Avenue NW
- Variolite Street NW / 173rd Avenue NW
- Nowthen Boulevard NW / 167th Avenue NW
- Nowthen Boulevard NW / 173rd Avenue NW
- Nowthen Boulevard NW / 175th Avenue NW
- Nowthen Boulevard NW / Ramsey Boulevard NW

The turning movement counts were modified based on historical turning movement counts and historical average daily traffic counts to reflect typical year 2021 conditions (i.e. non COVID impacted).



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Project Location

Trott Brook Crossing EAW Traffic Study
Ramsey, MN

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Figure 1

Roadway Characteristics

A field assessment was completed to identify various roadway characteristics within the transportation system study area, such as functional classification, general configuration, and posted speed limit. A summary of these roadway characteristics is shown in Table 1.

Table 1. Existing Roadway Characteristics

Roadway	Functional Classification ⁽¹⁾	General Configuration	Posted Speed Limit (mph)
Nowthen Boulevard NW	A Minor Connector	2-lane undivided	55
Variolite Street NW	Major Collector ⁽²⁾	2-lane undivided	50
Alpine Drive NW	Major Collector ⁽²⁾	2-lane undivided	45
175th Avenue NW	Major Collector	2-lane undivided	50
167th Avenue NW	Major Collector ⁽²⁾	2-lane undivided	50

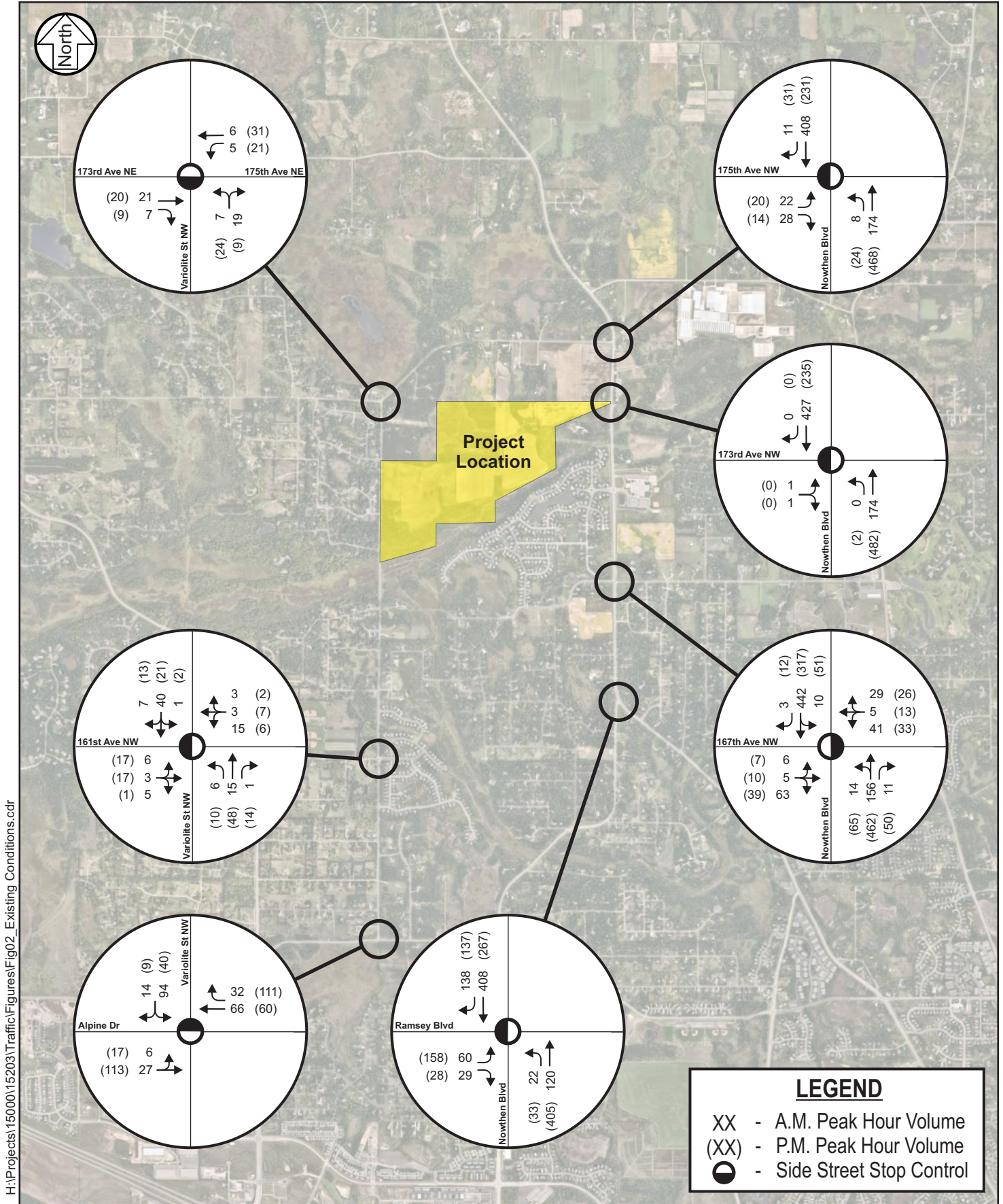
(1) Functional Classification based on the City of Ramsey's 2040 Comprehensive Plan.

(2) Indicates a proposed functional classification in the City of Ramsey's 2040 Comprehensive Plan.

From a traffic control perspective, all the study intersections are unsignalized with side-street stop control. Existing geometrics, traffic controls, and traffic volumes in the study area are shown in Figure 2.

Intersection Capacity Analysis

An intersection capacity analysis was completed using Synchro/SimTraffic software to establish a baseline condition to which future traffic operations could be compared. Capacity analysis results identify a Level of Service (LOS) which indicates how well an intersection is operating. Intersections are graded from LOS A through LOS F. The LOS results are based on average delay per vehicle, which correspond to the delay threshold values shown in Table 2. LOS A indicates the best traffic operation, while LOS F indicates an intersection where demand exceeds capacity. Overall intersection LOS A through LOS D is generally considered acceptable based on MnDOT guidelines.



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Existing Conditions

Trott Brook Crossing EAW Traffic Study
Ramsey, MN

Figure 2

Table 2. Level of Service Criteria for Signalized and Unsignalized Intersections

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	Unsignalized Intersection Average Delay/Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

For side-street stop/yield-controlled intersections, special emphasis is given to providing an estimate for the level of service of the side-street approach. Traffic operations at an unsignalized intersection with side-street stop/yield control can be described in two ways. First, consideration is given to the overall intersection level of service. This takes into account the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the minor approach. Since the mainline does not have to stop, the majority of delay is attributed to the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience high-levels of delay (i.e., poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service.

Results of the existing intersection capacity analysis shown in Table 3 indicate that the study intersections currently operate at an acceptable overall LOS A during the a.m. and p.m. peak hours with the existing geometric layout and traffic controls. No significant queuing or delays issues were identified.

Table 3. Existing Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Variolite Street NW / Alpine Drive ⁽¹⁾	A/A	4 sec.	A/A	3 sec.
Variolite Street NW / 161st Avenue NW ⁽¹⁾	A/A	4 sec.	A/A	6 sec.
Variolite Street NW / 173rd Avenue NW ⁽¹⁾	A/A	2 sec.	A/A	2 sec.
Nowthen Boulevard NW / Ramsey Boulevard NW ⁽¹⁾	A/A	7 sec.	A/C	15 sec.
Nowthen Boulevard NW / 167th Avenue NW ⁽¹⁾	A/A	6 sec.	A/B	13 sec.
Nowthen Boulevard NW / 173rd Avenue NW ⁽¹⁾	A/A	4 sec.	A/A	4 sec.
Nowthen Boulevard NW / 175th Avenue NW ⁽¹⁾	A/A	5 sec.	A/A	6 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS. The delay shown represents the worst side-street approach delay.

Proposed Development

The proposed Trott Brook Crossing development, shown in Figure 3, is proposed to be constructed in the southwest quadrant of the Nowthen Boulevard NW and 173rd Avenue NW intersection. The site is expected to include 270 single family units. Access to the development is proposed to be constructed on Variolite Street NW approximately 500 feet north of 169th Lane NW. A second access will be shared with the adjacent North Brook Meadows housing development on 173rd Avenue NW.

Traffic Forecasts

To identify potential impacts associated with the proposed development, traffic forecasts for year 2026 and 2040 conditions were developed to understand both short-term and long-term conditions. The no build conditions take into account traffic generated by the adjacent North Brook Meadow development and background traffic growth. The build conditions will take into account traffic generated by the proposed Trott Brook Crossing development, adjacent North Brook Meadow development and background traffic growth.

Background Growth

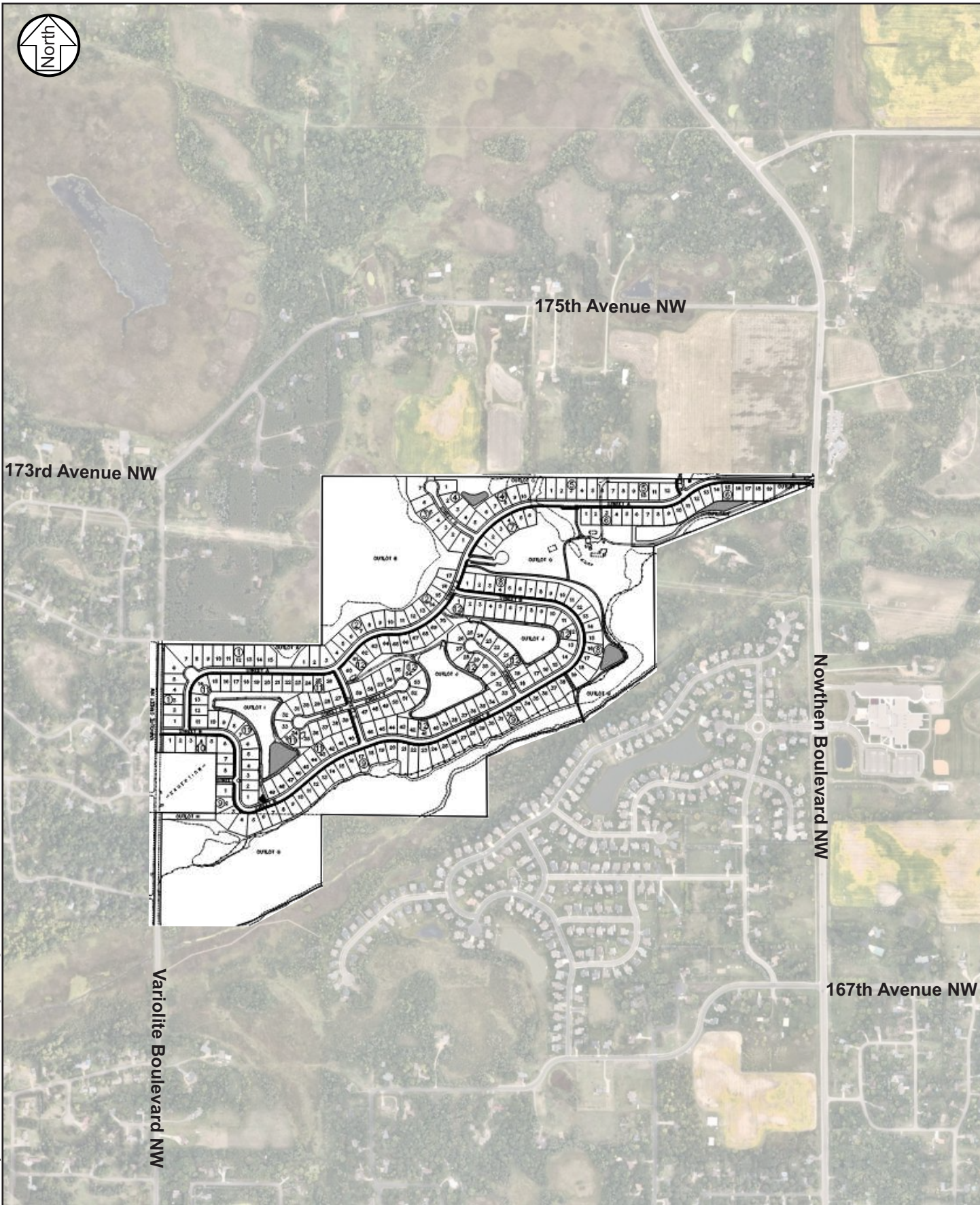
Based on existing area growth patterns and historical ADT volumes, a conservative annual growth rate of one (1) percent was applied to the existing peak hour volumes to develop year 2026 and 2040 background traffic forecasts.

Adjacent Developments

There is one known development planned in this area. The North Brook Meadows development, located immediately north of the proposed development, consists of 77 single family housing units. A shared access with the proposed development is provided on 173rd Ave NW. As part of the adjacent development plan, the North Brook Meadows development is expected to have a second access approximately 750 feet to the west of the Nowthen Boulevard NW and 175th Avenue NW intersection. For the purpose of this study, the adjacent development was assumed to be completed by the year 2025.

Trip Generation

To account for traffic impacts associated with the proposed and adjacent development, trip generation estimates for the proposed land uses were developed for the a.m. and p.m. peak hours as well as on a daily basis. These estimates, shown in Table 4, were developed using the *Institute of Transportation Engineers (ITE) Trip Generation Manual, Tenth Edition*. Note that no multi-use or pass-by reductions were applied due to the residential nature of the proposed development.



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Site Plan

Trott Brook Crossing EAW Traffic Study
Ramsey, MN

Figure 3

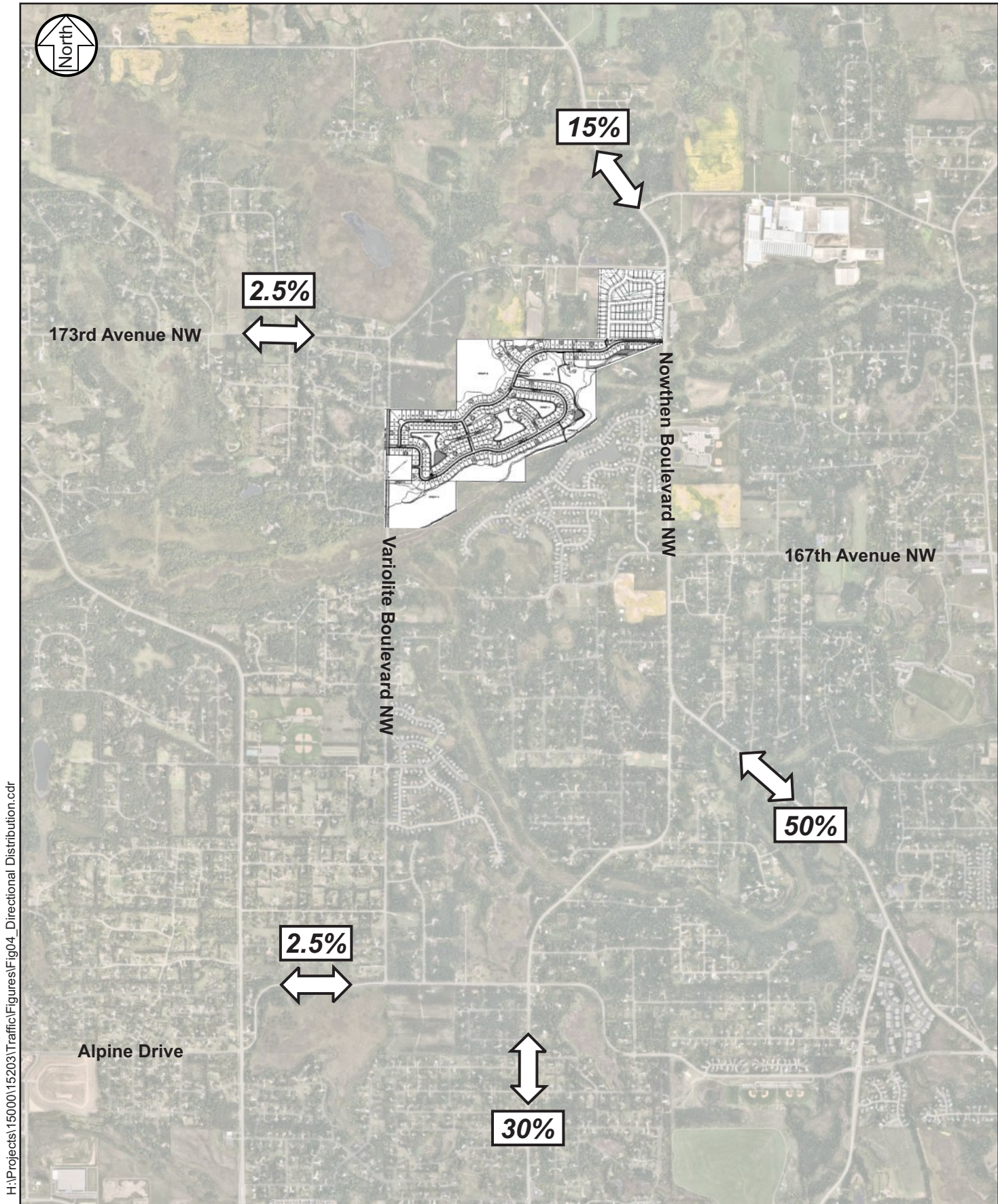
Table 4. Trip Generation Estimate

Land Use Type (ITE Code)	Size	A.M. Peak Hour Trips		P.M. Peak Hour Trips		Daily Trips
		In	Out	In	Out	
North Brook Meadows						
Single-Family Detached Housing (210)	77 DU	14	43	48	28	727
Trott Brook Crossing						
Single-Family Detached Housing (210)	270 DU	50	150	168	99	2,549
	Total Trips	64	193	216	127	3,276

(1) General Table Nomenclature: DU: Dwelling Units

Results of the trip generation estimate indicates that the adjacent North Brook Meadow development is expected to generate approximately 57 a.m. peak hour, 76 p.m. peak hour, and 727 daily vehicles trips. The proposed Trott Brook Crossing development is expected to generate approximately 200 a.m. peak hour, 267 p.m. peak hour, and 2,549 daily vehicles trips.

The trips generated were distributed to the study area based on the directional distribution shown in Figure 4, which was developed based on existing travel patterns and engineering judgement. The resultant year 2026 and 2040 no build traffic forecasts, which include general area background growth and adjacent development trips, are shown in Figures 5 and 6, respectively. The resultant year 2026 and 2040 build traffic forecasts, which include general area background growth, adjacent development trips, and traffic generated by the proposed development, are show in Figures 7 and 8, respectively.



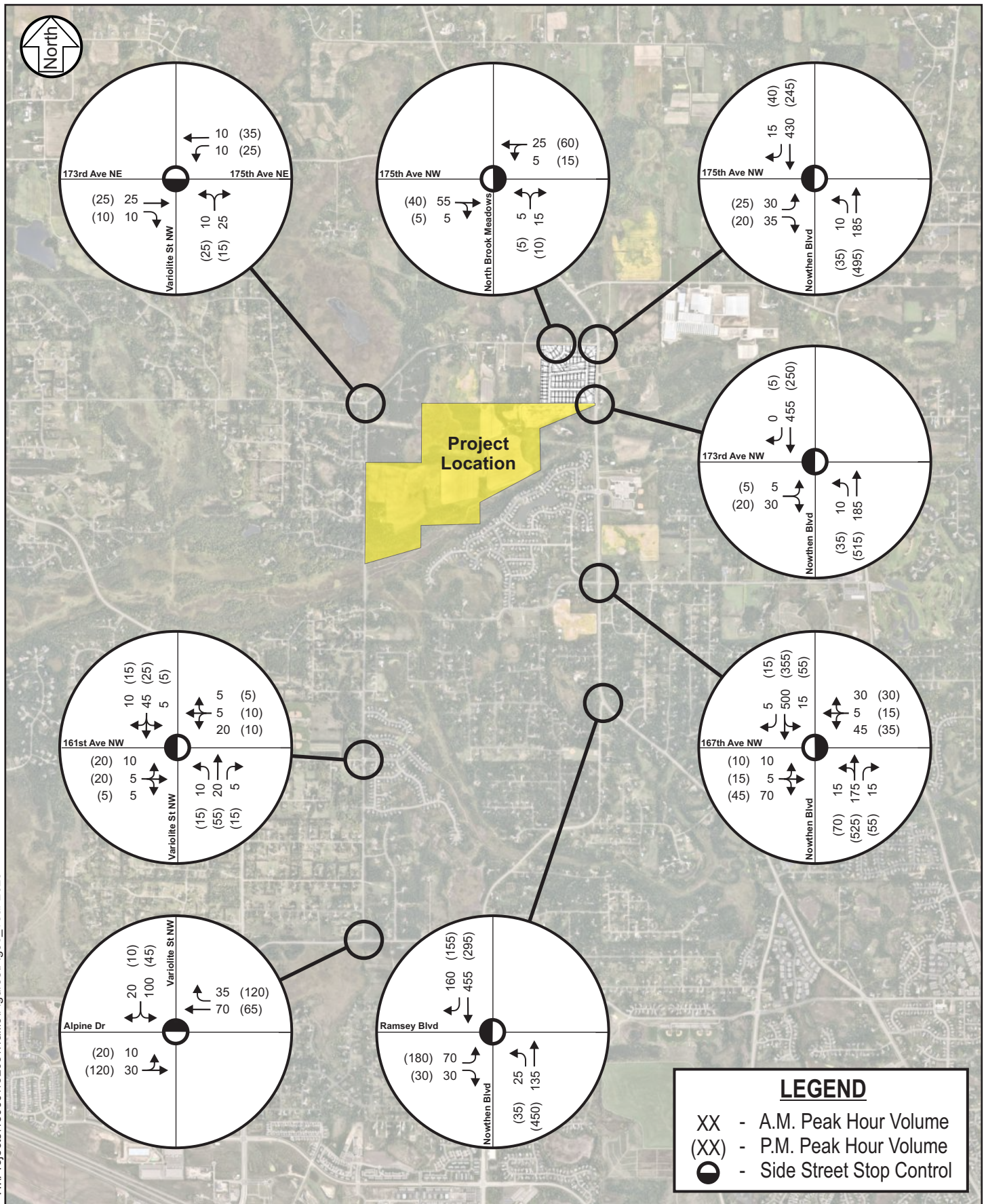
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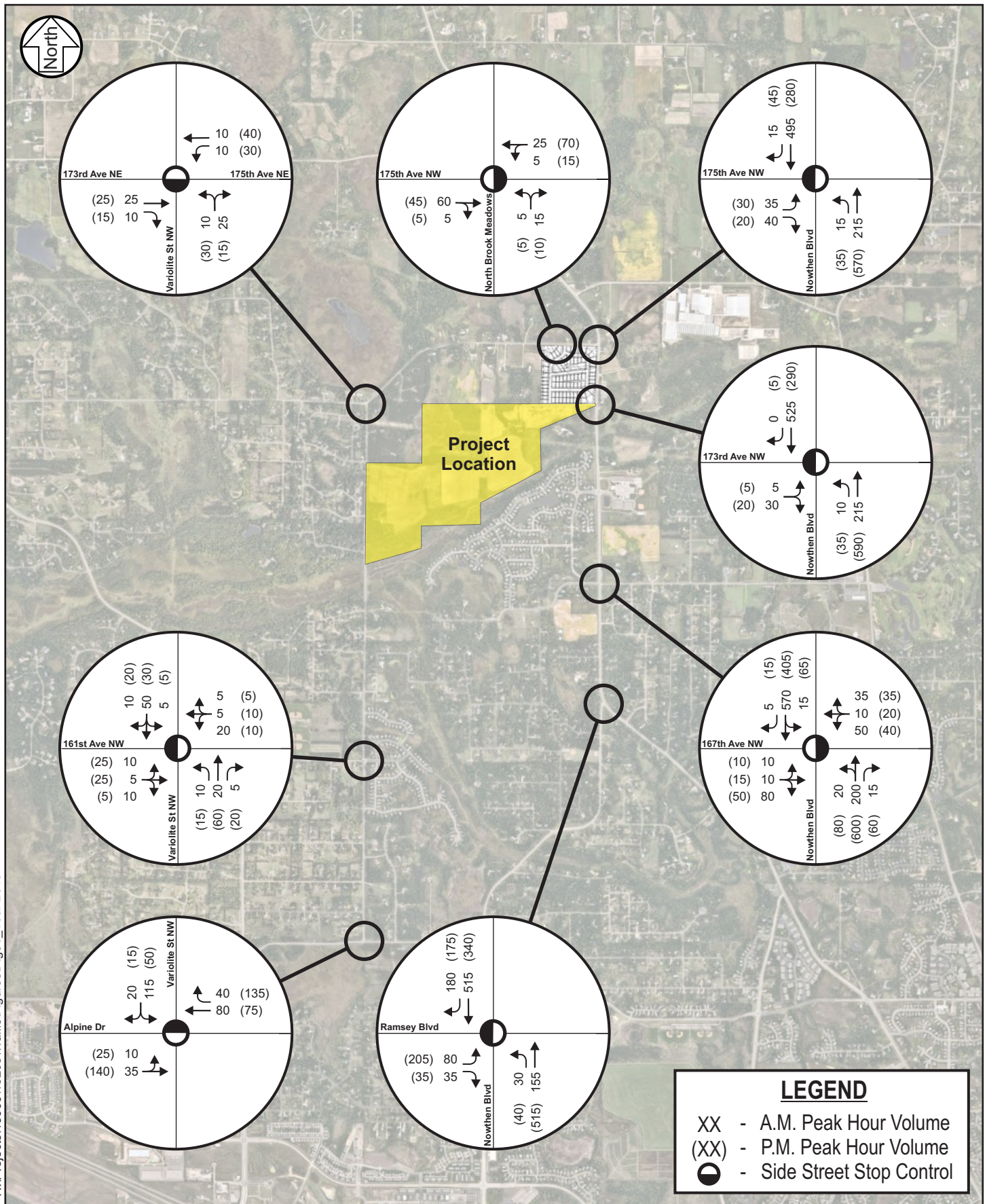


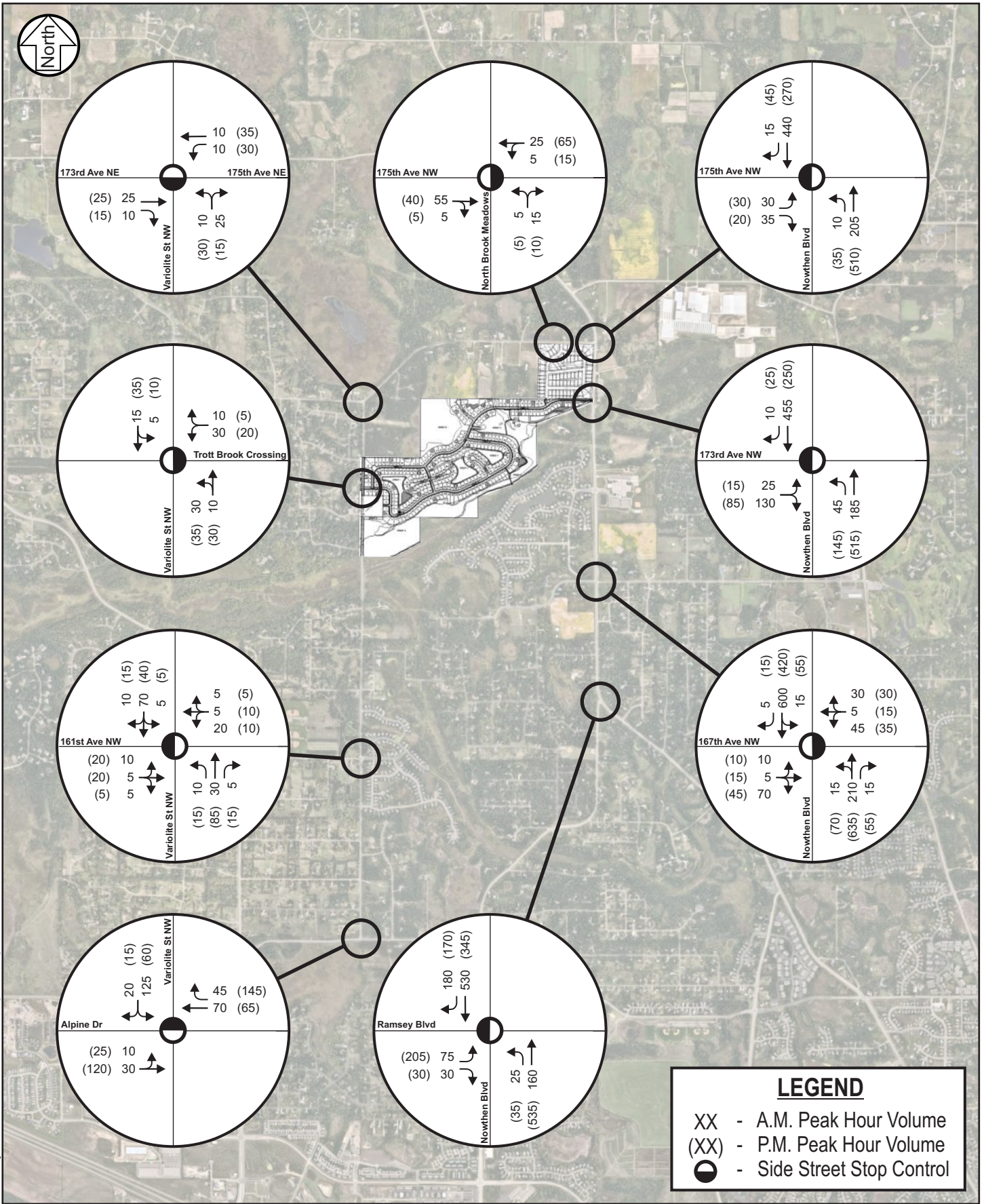
Directional Distribution
 Trott Brook Crossing EAW Traffic Study
 Ramsey, MN

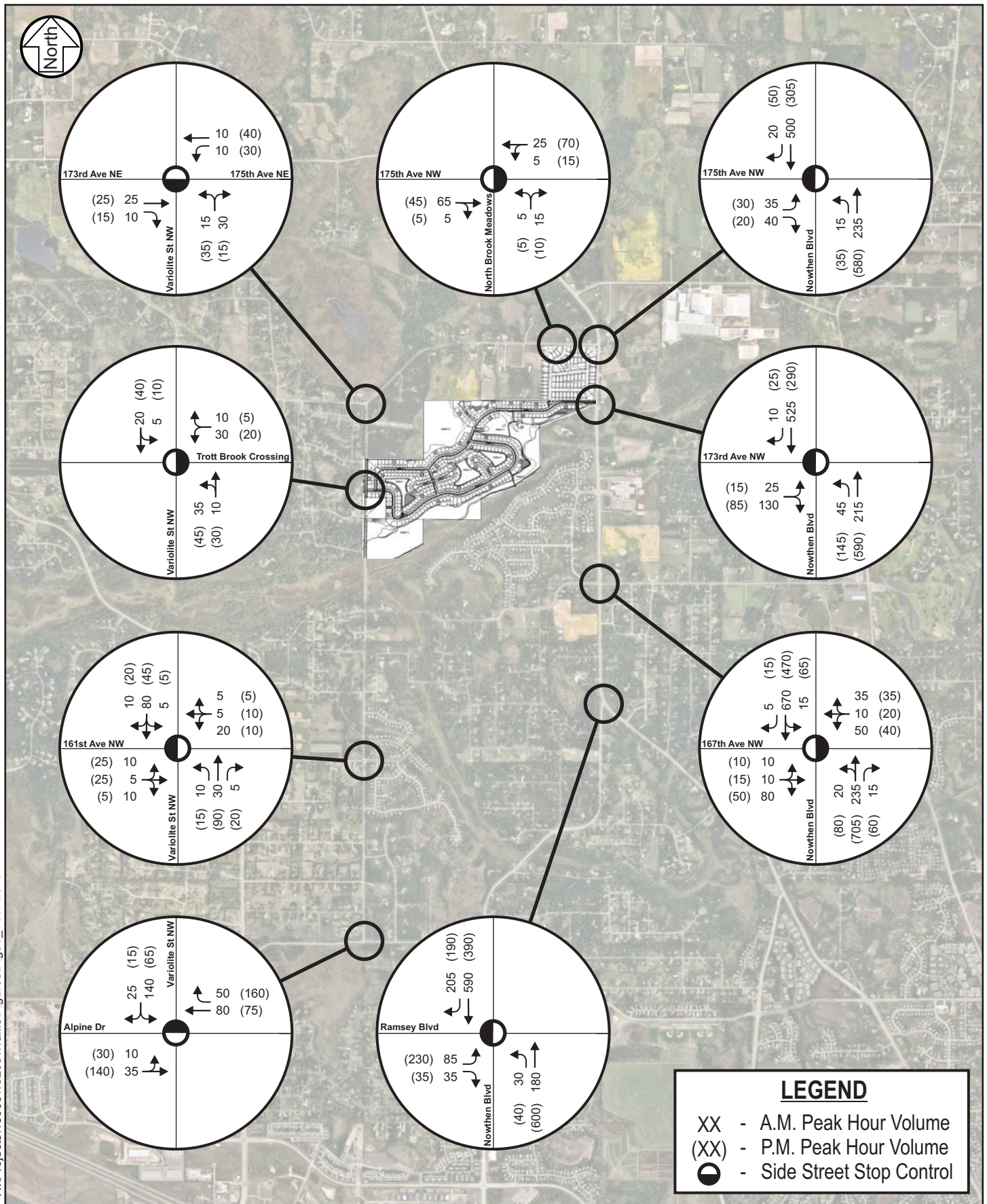
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Figure 4









No Build Conditions

To determine how the study intersections and site accesses will operate under year 2026 and 2040 no build conditions, an intersection capacity analysis was completed using Synchro/SimTraffic software. The no build conditions analyzed impacts from background traffic growth and the adjacent North Brook Meadows development.

Year 2026 No Build Conditions

Results of the year 2026 no build conditions intersection capacity analysis shown in Table 5 indicates that the study intersections are expected to continue operating at an acceptable overall LOS A during the a.m. and p.m. peak hours with the proposed roadway geometry and traffic controls.

Table 5. Year 2026 No Build Conditions Peak Hour Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Variolite Street NW / Alpine Drive ⁽¹⁾	A/A	4 sec.	A/A	4 sec.
Variolite Street NW / 161st Avenue NW ⁽¹⁾	A/A	4 sec.	A/A	5 sec.
Variolite Street NW / 173rd Avenue NW ⁽¹⁾	A/A	2 sec.	A/A	2 sec.
Nowthen Boulevard NW / Ramsey Boulevard NW	A/A	9 sec.	A/C	19 sec.
Nowthen Boulevard NW / 167th Avenue NW ⁽¹⁾	A/A	6 sec.	A/C	17 sec.
Nowthen Boulevard NW / 173rd Avenue NW ⁽¹⁾	A/A	4 sec.	A/A	4 sec.
Nowthen Boulevard NW / 175th Avenue NW ⁽¹⁾	A/A	4 sec.	A/A	6 sec.
175th Avenue NW / North Brook Meadow ⁽¹⁾	A/A	3 sec.	A/A	6 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS. The delay shown represents the worst side-street approach delay.

The following information summarizes the operational and/or queuing issues that warrant consideration as traffic volumes increase.

- **Nowthen Boulevard NW / Ramsey Boulevard NW**
 - The side-street delay in the eastbound direction is nine (9) seconds for the a.m. peak and 19 seconds for the p.m. peak hour. The 95th percentile queues in the eastbound direction are expected to be approximately 50 feet during the a.m. peak hour and 120 feet during the p.m. peak hour.
 - Side-street delay is expected to increase by approximately two (2) seconds per vehicle during the a.m. peak and four (4) seconds per vehicle during the p.m. peak as compared to existing conditions.

- **Nowthen Boulevard NW / 167th Avenue NW**

- Side-street delay is expected to increase by approximately four (4) seconds per vehicle during the p.m. peak as compared to existing conditions.

The remaining intersections had minimal changes to their traffic operations. Based on the year 2026 no build condition operations analysis, no geometric or traffic control changes are needed to accommodate the North Brook Meadow development from an intersection capacity perspective.

Year 2040 No Build Conditions

Results of the year 2040 no build conditions intersection capacity analysis shown in Table 6 indicates that the study intersections are expected to continue operating at an acceptable overall LOS B or better during the a.m. and p.m. peak hours with the proposed roadway geometry and traffic controls.

Table 6. Year 2040 No Build Conditions Peak Hour Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Variolite Street NW / Alpine Drive ⁽¹⁾	A/A	4 sec.	A/A	5 sec.
Variolite Street NW / 161st Avenue NW ⁽¹⁾	A/A	5 sec.	A/A	5 sec.
Variolite Street NW / 173rd Avenue NW ⁽¹⁾	A/A	2 sec.	A/A	2 sec.
Nowthen Boulevard NW / Ramsey Boulevard NW	A/B	12 sec.	B/E	43 sec.
Nowthen Boulevard NW / 167th Avenue NW ⁽¹⁾	A/A	9 sec.	A/E	48 sec.
Nowthen Boulevard NW / 173rd Avenue NW ⁽¹⁾	A/A	4 sec.	A/A	5 sec.
Nowthen Boulevard NW / 175th Avenue NW ⁽¹⁾	A/A	5 sec.	A/A	8 sec.
175th Avenue NW / North Brook Meadow ⁽¹⁾	A/A	3 sec.	A/A	5 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS. The delay shown represents the worst side-street approach delay.

The delays and queuing during the a.m. and p.m. peaks hour are expected to worsen as area development occurs. The following information summarizes the operational and/or queuing issues that warrant consideration as traffic volumes increase.

- **Nowthen Boulevard NW / Ramsey Boulevard NW**

- The side-street delay in the eastbound direction is 12 seconds for the a.m. peak and 43 seconds for the p.m. peak hour. The 95th percentile queues in the eastbound direction are expected to be approximately 65 feet during the a.m. peak hour and 245 feet during the p.m. peak hour.
- Side-street delay is expected to increase by approximately five (5) seconds per vehicle during the a.m. peak and 28 seconds per vehicle during the p.m. peak as compared to existing conditions.

- **Nowthen Boulevard NW / 167th Avenue NW**

- The side-street delay in the westbound direction is nine (9) seconds for the a.m. peak and 48 seconds for the p.m. peak hour. The 95th percentile queues in the westbound direction are expected to be approximately 50 feet during the a.m. peak hour and 160 feet during the p.m. peak hour. The 95th percentile queues in the eastbound direction are expected to be approximately 60 feet during the a.m. peak hour and 75 feet during the p.m. peak hour.
- Side-street delay is expected to increase by approximately three (3) seconds per vehicle during the a.m. peak and 35 seconds per vehicle during the p.m. peak as compared to existing conditions.

The remaining intersections had minimal changes to their traffic operations. Based on the year 2040 no build condition operations analysis, no geometric or traffic control changes are needed to accommodate the background growth from an intersection capacity perspective.

Future Build Conditions

To determine how the study intersections and site access will operate under year 2026 and 2040 build conditions, an intersection capacity analysis was completed using Synchro/SimTraffic software. The build conditions analyzed the proposed Trott Brook Crossing development and the adjacent North Brook Meadows development.

Year 2026 Build Conditions

Results of the year 2026 build conditions intersection capacity analysis shown in Table 7 indicates that the study intersections are expected to continue operating at an acceptable overall LOS B or better during the a.m. and p.m. peak hours with the proposed roadway geometry and traffic controls.

Table 7. Year 2026 Build Conditions Peak Hour Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Variolite Street NW / Alpine Drive ⁽¹⁾	A/A	5 sec.	A/A	4 sec.
Variolite Street NW / 161st Avenue NW ⁽¹⁾	A/A	4 sec.	A/A	6 sec.
Variolite Street NW / Trott Brook Crossing	A/A	4 sec.	A/A	6 sec.
Variolite Street NW / 173rd Avenue NW ⁽¹⁾	A/A	2 sec.	A/A	3 sec.
Nowthen Boulevard NW / Ramsey Boulevard NW	A/B	11 sec.	B/E	39 sec.
Nowthen Boulevard NW / 167th Avenue NW ⁽¹⁾	A/A	8 sec.	A/D	29 sec.
Nowthen Boulevard NW / 173rd Avenue NW ⁽¹⁾	A/A	7 sec.	A/A	6 sec.
Nowthen Boulevard NW / 175th Avenue NW ⁽¹⁾	A/A	5 sec.	A/A	9 sec.
175th Avenue NW / North Brook Meadow ⁽¹⁾	A/A	3 sec.	A/A	5 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS. The delay shown represents the worst side-street approach delay.

While the intersections are expected to operate acceptably overall, there are side-street delays that reach a LOS E at the Nowthen Boulevard and Ramsey Boulevard intersection. The following information summarizes the operational and/or queuing issues that warrant consideration as traffic volumes increase.

- **Nowthen Boulevard NW / Ramsey Boulevard NW**

- The side-street delay in the eastbound direction is 12 seconds for the a.m. peak and 39 seconds for the p.m. peak hour. The 95th percentile queues in the eastbound direction are expected to be approximately 60 feet during the a.m. peak hour and 250 feet during the p.m. peak hour.
- Side-street delay is expected to increase by approximately two (2) seconds per vehicle during the a.m. peak and 20 seconds per vehicle during the p.m. peak as compared to year 2026 no build conditions.

- **Nowthen Boulevard NW / 167th Avenue NW**

- The side-street delay in the westbound direction is eight (8) seconds for the a.m. peak and 29 seconds for the p.m. peak hour. The 95th percentile queues in the eastbound and westbound directions are expected to be less than 100 feet during both the a.m. and p.m. peak hours.
- Side-street delay is expected to increase by approximately two (2) seconds per vehicle during the a.m. peak and 12 seconds per vehicle during the p.m. peak as compared to year 2026 no build conditions.

- **Nowthen Boulevard NW / 173rd Avenue NW (Proposed Access)**

- The side-street delay in the eastbound direction is seven (7) seconds for the a.m. peak and six (6) seconds for the p.m. peak hour. The 95th percentile queues in the eastbound direction are expected to be approximately 75 feet during the a.m. peak hour and 60 feet during the p.m. peak hour.

The remaining intersections had minimal changes to their traffic operations compared to year 2026 no build conditions. While the side-street delays along Ramsey Boulevard NW are expected to reach nearly 40 seconds, this type of delay is not uncommon during the p.m. peak hour for side-streets in developing or developed areas and no traffic control or geometric mitigation would be necessary for year 2026 build conditions.

Year 2040 Build Conditions

Results of the year 2040 build conditions intersection capacity analysis shown in Table 8 indicates that the study intersections are expected to continue operating at an overall LOS C or better during the a.m. and p.m. peak hours with the proposed roadway geometry and traffic controls.

Table 8. Year 2040 Build Conditions Peak Hour Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Variolite Street NW / Alpine Drive ⁽¹⁾	A/A	5 sec.	A/A	4 sec.
Variolite Street NW / 161st Avenue NW ⁽¹⁾	A/A	5 sec.	A/A	6 sec.
Variolite Street NW / Trott Brook Crossing	A/A	4 sec.	A/A	6 sec.
Variolite Street NW / 173rd Avenue NW ⁽¹⁾	A/A	2 sec.	A/A	3 sec.
Nowthen Boulevard NW / Ramsey Boulevard NW	A/C	15 sec.	C/F	86 sec.
Nowthen Boulevard NW / 167th Avenue NW ⁽¹⁾	A/B	10 sec.	B/F	57 sec.
Nowthen Boulevard NW / 173rd Avenue NW ⁽¹⁾	A/A	7 sec.	A/A	6 sec.
Nowthen Boulevard NW / 175th Avenue NW ⁽¹⁾	A/A	5 sec.	A/A	8 sec.
175th Avenue NW / North Brook Meadow ⁽¹⁾	A/A	3 sec.	A/A	5 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS. The delay shown represents the worst side-street approach delay.

While the intersections are expected to operate acceptably overall, there are side-street delays that reach a LOS F at the Nowthen Boulevard NW intersections with Ramsey Boulevard NW and 167th Avenue NW. The following information summarizes the operational and/or queuing issues that warrant consideration as traffic volumes increase.

- **Nowthen Boulevard NW / Ramsey Boulevard NW**

- The side-street delay in the eastbound direction is 15 seconds for the a.m. peak and 86 seconds for the p.m. peak hour. The 95th percentile queues in the eastbound direction are expected to be approximately 80 feet during the a.m. peak hour and 425 feet during the p.m. peak hour.
- Side-street delay is expected to increase by approximately three (3) seconds per vehicle during the a.m. peak and 43 seconds per vehicle during the p.m. peak as compared to year 2040 no build conditions.

- **Nowthen Boulevard NW / 167th Avenue NW**

- The side-street delay in the westbound direction is 10 seconds for the a.m. peak and 57 seconds for the p.m. peak hour. The 95th percentile queues in the westbound direction are expected to be approximately 55 feet during the a.m. peak hour and 145 feet during the p.m. peak hour. The 95th percentile queues in the eastbound direction are expected to be approximately 65 feet during the a.m. peak hour and 80 feet during the p.m. peak hour.
- Side-street delay is expected to increase by approximately one (1) second per vehicle during the a.m. peak and nine (9) seconds per vehicle during the p.m. peak as compared to year 2040 no build conditions.

- **Nowthen Boulevard NW / 173rd Avenue NW (Proposed Access)**
 - The side-street delay in the eastbound direction is seven (7) seconds for the a.m. peak and six (6) seconds for the p.m. peak hour. The 95th percentile queues in the eastbound direction are expected to be less than 75 feet, or three (3) vehicles, during the a.m. and p.m. peak hours.

Other Considerations and Mitigation

SRF is currently engaged with Anoka County on a planning study of Nowthen Boulevard NW and the impacts of potential interchanges along TH 10. Given the planning level nature of the study, it is outside of the scope of the detailed traffic impacts from this housing development. However, as part of the study, a crash review was completed at the Nowthen Boulevard NW intersections with Ramsey Boulevard NW and 167th Avenue NW. At both intersections, the observed crash rate is noted to be above the critical crash rate, indicating that there is statistical significance to the crashes and that mitigation should occur. This mitigation would be outside of the scope of the traffic impact study but will play a role in the long-term traffic operations along the corridor. Additionally, this study is considering the impacts on traffic volumes if/when interchanges along TH 10 are constructed. These impacts may change travel behavior and result in additional volume along Nowthen and Ramsey Boulevards NW, furthering a need for long-term mitigation.

Based in the impacts documented above, in short-term conditions there is not expected to be a need for either geometric or traffic control mitigation at the study intersections as a result of the proposed development. While there is an increase in side-street delays at the Nowthen Boulevard NW and Ramsey Boulevard NW intersection, the overall intersection is still expected to operate under capacity and side-street delays of that magnitude are not uncommon in developing areas. Additionally, at the site access locations along Variolite Street and Nowthen Boulevard NW, there is not expected to be any issues with vehicles entering/exiting the proposed development.

Under long-term conditions, there could be consideration of traffic control changes or geometric improvements at the Nowthen Boulevard NW intersections with Ramsey Boulevard NW and 167th Avenue NW. The increase or delay at these intersections is a result of a combination of both background and adjacent development traffic and traffic related to the proposed development. As noted within the year 2040 no build conditions, side-street delays were already reaching LOS E conditions regardless of the proposed development. However, as noted above, a planning level study is being completed to determine the long-term configuration of Nowthen Boulevard NW and potential improvements will be detailed within that study.

A preliminary review completed as part of this study indicates that the potential improvements at 167th Avenue NW could include eastbound and westbound right-turn lanes and northbound and southbound left-turn lanes. At the Nowthen Boulevard NW and Ramsey Boulevard NW intersection, a traffic control modification to a roundabout could be considered. These improvements would reduce delays and queues to acceptable overall levels.

Site Plan Review

A review of the proposed development site plan was completed to identify any issues and provide potential improvements for consideration with regard to sight distance, access, and circulation. Based on this review, it is recommended to limit any sight distance impacts from future landscaping and signing at street corners within the neighborhood. As the site plan is refined, vehicle turning paths should be reviewed to ensure trucks (delivery, refuse) are able to navigate the development site. Internal roadway traffic controls should include side-street stop controls along side-streets to 173rd Avenue. Other internal roadways can either be side-street stop or uncontrolled, depending on City preference.

Summary and Conclusions

The following study conclusions and recommendations are offered for consideration:

- 1) Results of the existing intersection capacity analysis indicate that the study intersections currently operate at an acceptable overall LOS A during the a.m. and p.m. peak hours with the existing geometric layout and traffic controls. No significant queuing issues were identified.
- 2) The proposed development includes a 270 single family housing development.
 - a. Access to the development is proposed to be constructed on Variolite Street NW approximately 500 feet north of 169th Lane NW. A second access will be shared with the adjacent North Brook Meadows housing development on 173rd Avenue NW.
 - b. The North Brook Meadows housing development is an adjacent development of 77 single family homes.
- 3) The proposed Trott Brook Crossing development is expected to generate approximately 200 a.m. peak hour, 267 p.m. peak hour, and 2,549 daily vehicles trips.
- 4) The adjacent North Brook Meadow development is expected to generate approximately 57 a.m. peak hour, 76 p.m. peak hour, and 727 daily vehicles trips.
- 5) Results of the year 2026 and year 2040 no build capacity analysis indicate that the study intersections are expected to continue operating at an acceptable overall LOS B or better during the a.m. and p.m. peak hours.
 - a. During the year 2040 no build p.m. peak hour, the side-street delays at the Nowthen Boulevard NW and Ramsey Boulevard NW intersection are expected to reach a LOS E, 43 seconds, and side-street delays at the Nowthen Boulevard NW and 167th Avenue NW intersection are expected to reach a LOS E, 48 seconds.
 - b. Delays of this magnitude are not uncommon for side-street approaches in developing or developed areas.
- 6) No roadway changes or mitigation are anticipated to be needed to accommodate the background traffic forecasts from an intersection capacity perspective.

- 7) Results of the year 2026 build capacity analysis indicate that the study intersections are expected to continue operating at an acceptable overall LOS B or better during the a.m. and p.m. peak hours.
 - a. The side-street delays at the Nowthen Boulevard NW and Ramsey Boulevard NW intersection are expected to reach a LOS E, 39 seconds, and side-street delays at the Nowthen Boulevard NW and 167th Avenue NW intersection are expected to reach a LOS D, 29 seconds.
 - b. Delays of this magnitude are not uncommon for side-street approaches in developing or developed areas.
 - c. No queuing or delay issues are expected at the site access roadways for the proposed development.
- 8) Results of the year 2040 build capacity analysis indicate that the study intersections are expected to continue operating at an acceptable overall LOS C or better during the a.m. and p.m. peak hours.
 - a. The side-street delays at the Nowthen Boulevard NW and Ramsey Boulevard NW intersection are expected to reach a LOS F, 86 seconds, and side-street delays at the Nowthen Boulevard NW and 167th Avenue NW intersection are expected to reach a LOS F, 57 seconds.
 - b. No queuing or delay issues are expected at the site access roadways for the proposed development.
- 9) In short-term conditions there is not expected to be a need for either geometric or traffic control mitigation at the study intersections as a result of the proposed development.
- 10) Under long-term conditions, there could be consideration of traffic control changes or geometric improvements at the Nowthen Boulevard NW intersections with Ramsey Boulevard NW and 167th Avenue NW.
 - a. The increase or delay at these intersections is a result of a combination of both background and adjacent development traffic and traffic related to the proposed development. As noted within the year 2040 no build conditions, side-street delays were already reaching LOS E conditions regardless of the proposed development.
 - b. However, as noted previously, a planning level study for Nowthen Boulevard NW is being completed to determine the long-term configuration of Nowthen Boulevard NW and potential improvements will be detailed within that study.
- 11) A preliminary review completed as part of this study indicates that the potential improvements at 167th Avenue NW could include eastbound and westbound right-turn lanes and northbound and southbound left-turn lanes. At the Nowthen Boulevard NW and Ramsey Boulevard NW intersection, a traffic control modification to a roundabout could be considered. These improvements would reduce delays and queues to acceptable overall levels.

EAW Comparison

In comparison to the EAW Traffic Study submitted September 3, 2021, the traffic volumes collected by SRF in October and November of 2021 indicate higher volumes along Nowthen Boulevard NW. This is likely a result of data collected in July of 2021 by the EAW study not including the volumes generated by the elementary school along Nowthen Boulevard NW.

With the additional volume added to the study intersections, particularly Nowthen Boulevard NW intersections with 167th Avenue NW and Ramsey Boulevard NW, the level of service and delays are worse as compared to the previous study. The previous study did not identify any necessary improvements at intersections under either no build or build conditions.

As noted within this study, there are potential improvements required at the Nowthen Boulevard NW intersections with 167th Avenue NW and Ramsey Boulevard NW as a result of the additional background growth within the study area and existing safety issues. The issues are expected to worsen as a result of the proposed development, however, the proposed development is not solely responsible for the degradation of the delays from existing conditions. Additionally, further impacts are currently being studied as part of a Nowthen Boulevard NW Planning study regarding interchanges along TH 10.