



COUNTY ROAD 9 & 179TH STREET

Corridor Study



Lakeville
MINNESOTA



November 2019

SRF No. 12306

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Executive Summary

Background/Introduction

For nearly two decades, Dakota County and the City of Lakeville have been planning for an East-to-West roadway that would help accommodate an area wide system and travel network. The Dakota County East-West Corridor Preservation Study was completed in June 2003. This study assessed the transportation system needs for the rapidly growing area in the Lakeville, Farmington and Empire Township communities in southern Dakota County. The East-West Corridor Preservation Study addressed east-west transportation system deficiencies and identified preservation corridors for future east-west roadway connections. Five preservation corridors were identified and adopted by the affected communities. 179th Street was the corridor identified within Lakeville; it was identified as a corridor to preserve for future east-west arterial roadway system connectivity between I-35 on the west and TH 3 on the east. This will serve as a key East-West roadway within the Dakota County transportation system, significantly improving efficient mobility.

Dakota County and the City of Lakeville have partnered on the current County Road 9 and 179th Street Corridor Study to coordinate planning efforts and identify required improvements to serve as a basis for the jurisdictional transfer of two roadway segments in the City of Lakeville - County Road 9 (Dodd Boulevard) and 179th Street between Highview Avenue and Pilot Knob Road. The planned improvements to these two roadways will provide for improved safety, traffic operations and increasing traffic levels that can better serve the region in the future.

The County Road 9 and 179th Street Corridor Study includes preliminary feasibility study and analysis of intersection and roadway improvements, preliminary engineering designs, necessary surveying and cost estimates to better inform Dakota County and the City of Lakeville on how the two roadway segments need to be improved to meet anticipated future traffic demands.

The jurisdictional transfer limits of County Road 9 (Dodd Boulevard) and future County Road 9 (179th Street) are from Highview Avenue to Pilot Knob Road. The focus of the preliminary feasibility study and traffic analysis is from Gerdine Path to Dodd Lane along Dodd Boulevard, including intersection improvement analysis at Dodd Boulevard and Cedar Avenue; and the 179th Street segment from Cedar Avenue through the Flagstaff Avenue intersection (see **Figure 1**).

Study Objectives and Major Tasks

The key outcome of the County Road 9 and 179th Street Corridor Study was to identify, technically evaluate, and develop visual concepts for geometric design layouts of Dodd Boulevard and 179th Street. The Study evaluated existing and future transportation conditions, including:

- Jurisdictional Classification
- Functional Classification
- Trail/Sidewalk Systems
- Natural Resource Constraints
- Corridor Access

- Safety
- Traffic Analysis
- Roadway Design Needs

The County Road 9 and 179th Street Corridor Study began in January 2019 as a cooperative effort between Dakota County and Lakeville. SRF Consulting Group (SRF) was retained to assist with technical analysis, public engagement, and corridor design recommendations for the two corridors within the study limits.

The study partners and consultant team collaboratively engaged the public during the process to understand their perspective regarding roadway needs, issues, and opportunities. The resultant recommendations contained herein were developed with input from the public and fortified by the technical analysis. The sections that follow provide an overview of the input received from the public, outcomes of the analysis, and final recommendations to be implemented with upcoming programmed or planned projects.

Dakota County/Lakeville Planned Improvement Projects

Based on the results of the Corridor Study, Dakota County and the City of Lakeville are partnering on several projects along 179th Street and Dodd Boulevard over the next few years to improve intersection operations, make safety improvements and provide for increasing traffic levels. The reconstruction of 179th Street from Cedar Avenue to Fieldfare Way is programmed to begin in the Spring/Summer of 2020. Proposed improvements include:

- a) reconstruction to a two-lane divided highway;
- b) roundabout at the 179th Street/Flagstaff Avenue intersection;
- c) dedicated turn lanes at intersections; and
- d) geometric modifications to meet County roadway standards.

179th Street will be constructed and extended between Fieldcrest Avenue and Pilot Knob Road by November 2020 through a private development agreement with the City of Lakeville. In 2022, improvements are programmed along 179th Street and Dodd Boulevard. The 179th Street improvements include the extension and realignment of 179th Street as a four-lane divided roadway west of Cedar Avenue connecting with Dodd Boulevard at Hayes Avenue. In conjunction with the realignment, the existing Dodd Boulevard roadway will be removed between Hayes Avenue and 175th Street.

The Dodd Boulevard improvements include reconstruction between Gerdine Path and Dodd Lane to meet City collector roadway standards. The programmed improvements include:

- a) reconstruction and widening of the roadway to a two-lane undivided urban road (i.e., curbs installed), with turn lanes;
- b) pedestrian trails along the north and south side of the roadway; and
- c) potential traffic calming measures will be reviewed during preliminary design (i.e., raised median in the center of the road, curb “bump outs” at intersections, mid-block pedestrian/bicycle crossing(s), etc.).

Additionally, upon completion of the 179th Street and Dodd Boulevard improvements, the traffic signal at Cedar Avenue and Dodd Boulevard will be removed and replaced by a 3/4 directional access intersection (consistent with County design standards). The intersection will allow all movements from Cedar Avenue onto Dodd Boulevard, but will restrict access to right turns only from Dodd Boulevard to Cedar Avenue.

Following completion of the transportation improvement projects, the City and County will transfer jurisdiction (who owns and maintains the roads) of 179th Street (will become a County roadway) and Dodd Boulevard (will become a City roadway). This ownership and oversight change of the two roadways will indicate who plows the road, maintains the road, etc.

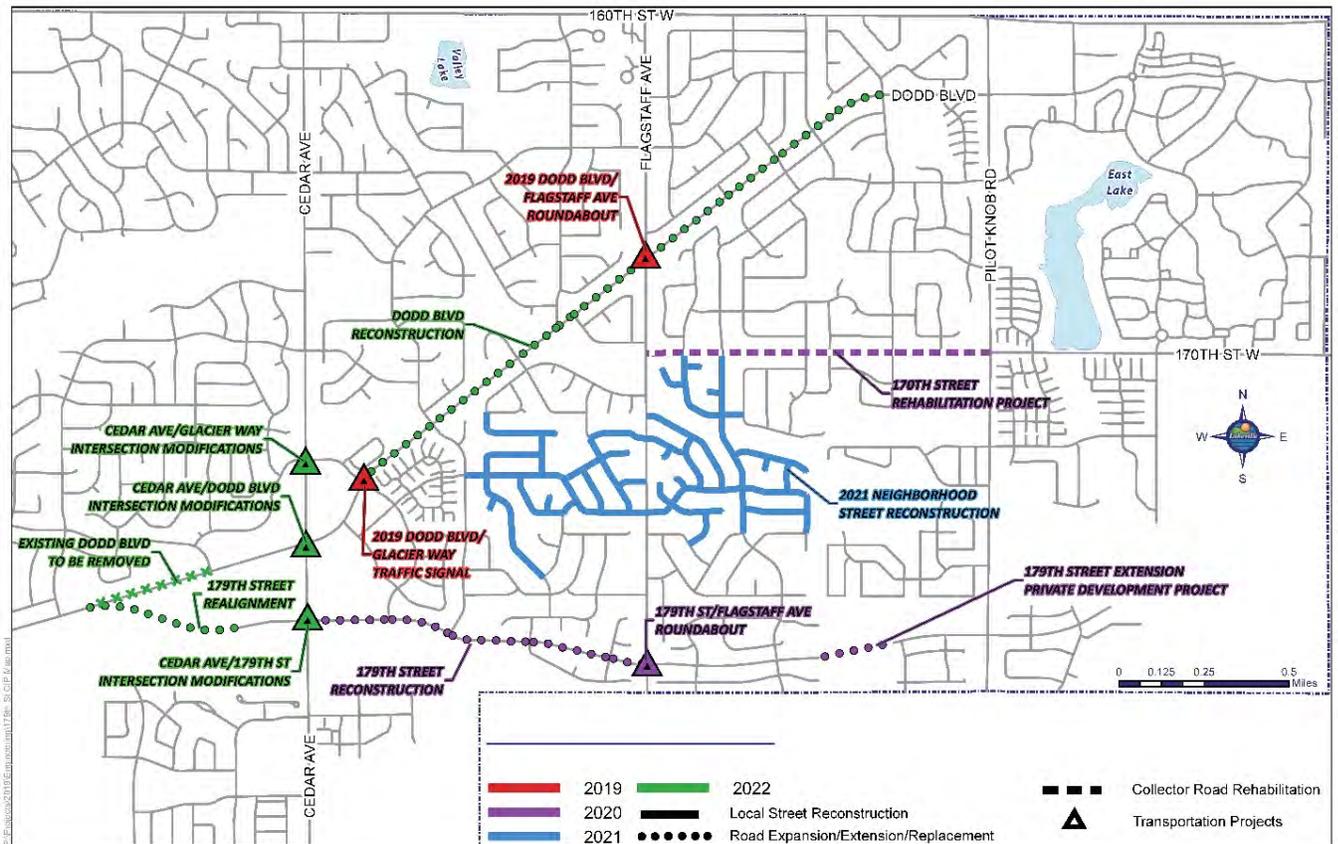
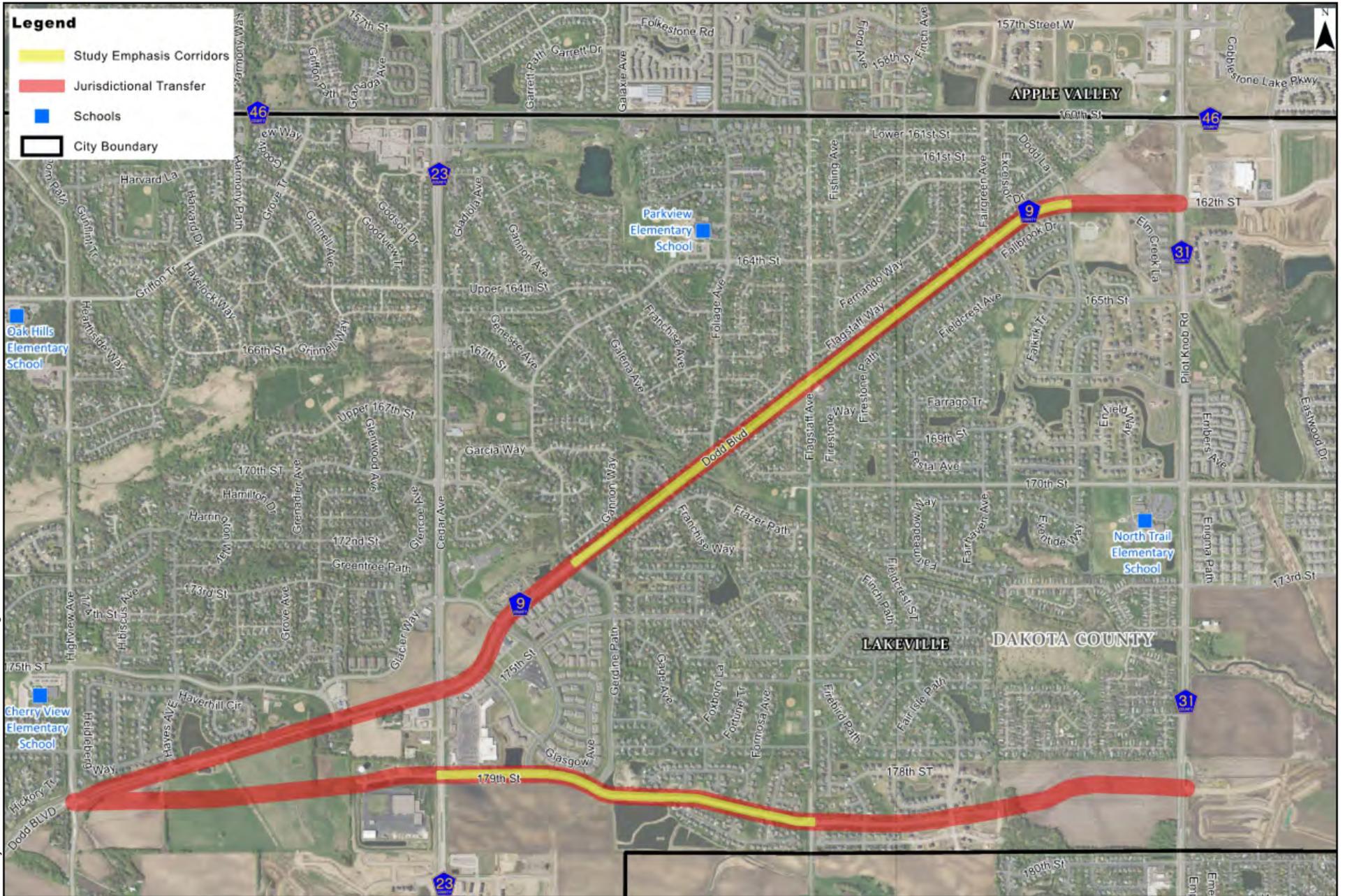


Exhibit 1. Planned Transportation Improvement Projects

The documentation contained herein supports the improvement projects outlined for Dodd Boulevard and 179th Street within the limits of this study.

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Public Engagement

The intent of public engagement for the Corridor Study has been to bring people together to inform, educate, and engage area stakeholders – including landowners, businesses, and the public at-large – regarding the proposed jurisdictional transfer and improvements to these two roadway segments.

At the outset of the study, a Public Engagement Plan was developed to determine engagement goals, identify stakeholders, address key considerations, and determine appropriate outreach strategies. This section summarizes the engagement activities that occurred, the input requested from stakeholders, and key themes that have been identified during the process. Dakota County, the City of Lakeville and the consultant team were committed to implementing thoughtful, effective, and convenient public engagement to help shape the improvement recommendations and design outcomes.

Engagement Goals

An “involved-collaboration” engagement approach was applied with the following goals:

- Facts are clear, concise, and accessible
- Project partners use consistent messaging and proactive communication
- Technology is leveraged to reach people
- Community partners are engaged throughout the project
- The need for the project, its scope, and the difference from previous planning studies are made clear to the public
- Clearly demonstrate how public input influences project development
- Build consensus and acceptance of the corridor designs/improvements

Outreach Tools

To meet the goals outlined above, the study partners used a variety of methods to build credibility, educate the community, and foster support for the study. A summary of each tool (or activity) is provided below. All outreach materials, including handouts, invitations and presentation boards are available on the study website.

Study Website

A study-specific website was established to inform the public about the background and purpose, study schedule, opportunities for public participation and serve as a repository for meeting materials, contact information and showcasing the study area map. The website provided an additional tool for agency staff, stakeholders, and the community to track milestones as the study progressed.

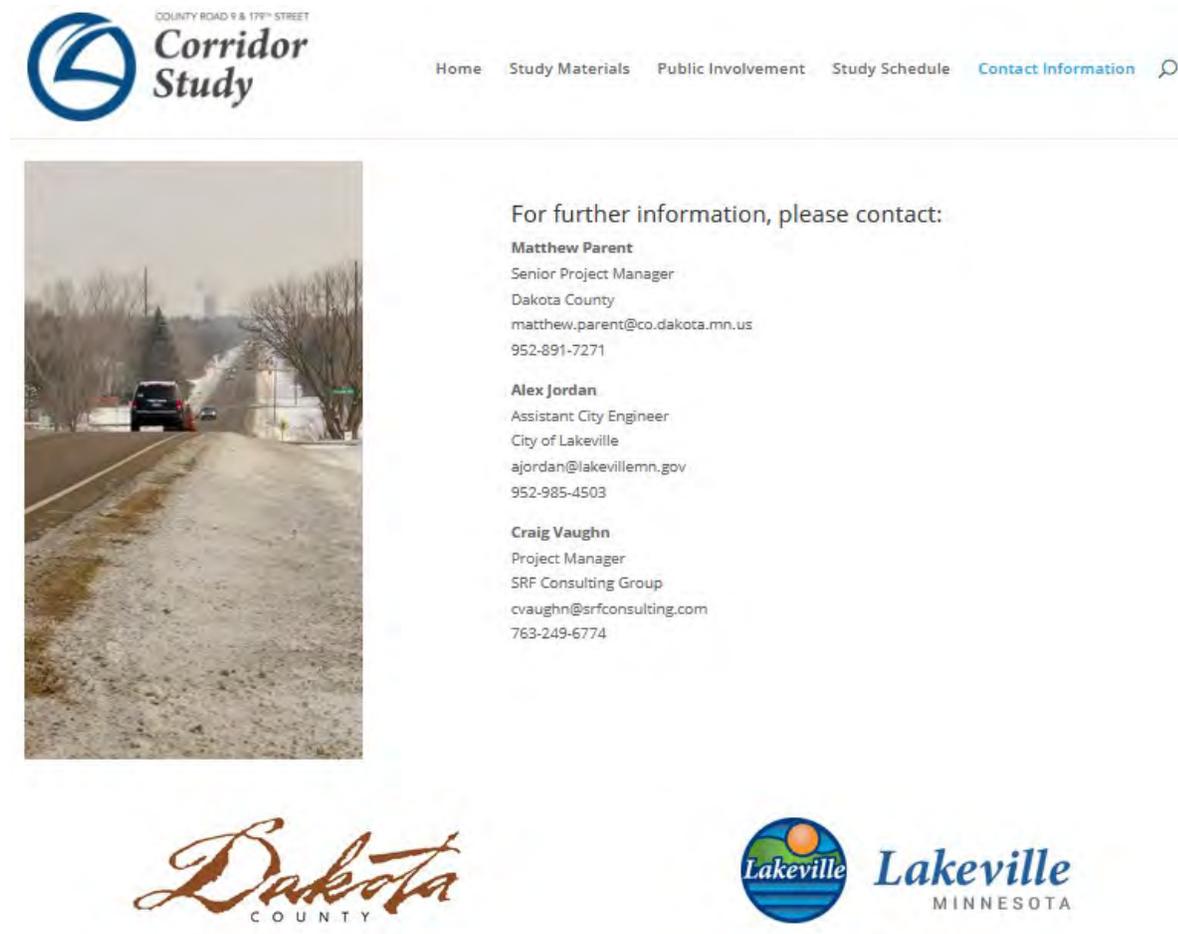


Exhibit 2. Project Websites: <https://cr9-179thstudy.com>
<https://www.co.dakota.mn.us/Transportation/PlannedConstruction/CR9-179thSt/Pages/default.aspx>

Open Houses

Two public open houses were held at key milestones during the study. These meetings provided the study team an in-person opportunity to present information to members of the public, collect feedback and answer questions regarding key aspects of the design and analysis of the corridors. Display boards, surveys, comment forms, visualizations, and corridor layouts were used. The open house meetings were held at the Lakeville Central Maintenance Facility near the study area.

The first public open house was held early in the study process (March 12, 2019). The first open house introduced the project, its purpose, and provided an overview of known existing conditions. The public was asked to share feedback and comments regarding their thoughts of the two roadways and corridor trail needs, plus opportunities for varying improvements.

The second public open house (August 1, 2019) offered an opportunity for residents to review and provide input on the draft corridor concepts for Dodd Boulevard and 179th Street. Community members were encouraged to fill out comment forms, add comments to corridor layouts, and view visualization models that demonstrated potential changes to the corridor. Attendees expressed concerns about increased speed limits on these roadway segments, impacts on school bus routes, potential property impacts, access modifications at Gerdine Path/Fieldfare Way/Fieldcrest Avenue/Fulda Trail, and potential increases in traffic noise. Additional opportunities identified at this meeting included more sidewalks and marked crosswalks.

Visualizations

At the second open house meeting (August 1), visualizations were presented to provide attendees an opportunity to see how the corridors will look under reconstructed conditions. These visualization videos were an eye-catching and effective use of technology that helped residents conceptualize proposed changes.

- 179th Street: Cedar Avenue through Flagstaff Avenue
 - <https://www.youtube.com/watch?v=NMIIgdqaN2c>
- Dodd Boulevard: Cedar Avenue through Dodd Lane
 - <https://www.youtube.com/watch?v=0ib1Gcez0Zw>

Survey

To identify and gather the needs, concerns, and desires of the public as well as document their input, a survey was conducted near the beginning of the study coinciding with the first open house meeting. The survey was conducted online using “SurveyMonkey.” This allowed the public an additional opportunity to share their thoughts if that was the preferred method of communicating with them or if they were unable to attend in person engagement. Paper copies were provided at the open house meeting as well for those not inclined to use the internet.

The survey was available from March 7, 2019 to March 29, 2019. Over 200 members of the community participated. A summary of responses is provided below.

Exhibit 3. Survey Summary



What are the issues that you experience along County Road 9 (Dodd Blvd)?

- **1st choice: Safety (58%)**
- 2nd choice: Poor Intersection Congestion & Long Delays (56%)
- 3rd choice: Confusion at Intersections (48%)
- 4th choice: Need for Walking & Biking Improvements (46%)

Are there any other specific areas of concern along County Road 9 or 179th Street?

- **1st choice: Dangerous Intersection (29%)**
- 2nd choice: Poor Pavement Condition (16%)
- 3rd choice: High Traffic Speeds (16%)
- 4th choice: Traffic Congestion (15%)

What are the issues that you experience along 179th Street?

- **1st choice: Safety (49%)**
- 2nd choice: Roadway Surface Conditions (46%)
- 3rd choice: Speeding (41%)
- 4th choice: Confusion at Intersections (36%)

Do you have any additional thoughts on the County Road 9 & 179th Street Corridor Study?

- **1st choice: Widen Roadway (23%)**
- 2nd choice: Connect to Pilot Knob (10%)
- 3rd choice: Upgrade 179th & Flagstaff (8%)
- 4th choice: Build Roundabout (8%)

Newsletters and Social Media Posts

Newsletters and social media posts were shared with area stakeholders in advance of both open houses. The newsletter addressed why the study was needed, what was happening, and how to stay involved. The newsletter also served as an invitation to both open houses and was sent only to property owners adjacent to Dodd Boulevard and 179th Street within the study limits. In addition to the newsletter, the open houses were promoted using the City of Lakeville and Dakota County's social media pages (Facebook, Twitter, and Instagram where available) and the Nextdoor app. The social media outreach was very successful for reaching a broad audience and notifying of in person open houses and directing the public to the study website.

Technical Corridor Assessment

The technical corridor assessment provides a baseline to understand how the corridors currently function and interact with their surroundings. This chapter presents information on corridor roadway system context (jurisdictional and functional classification), trail and preliminary natural resource inventory, access information, and crash data. Also, contained herein is a summary of the existing and future traffic volumes and operations, roadway geometrics, traffic controls, and considerations reviewed to select the corridor design configuration.

Jurisdictional Classification

The County and City are collaborating on this study to ensure the jurisdictional transfer of Dodd Boulevard and 179th Street can occur with the proper roadway system vision in mind - Dodd Boulevard as a City collector roadway and 179th Street serving as the major County East-to-West roadway that helps accommodate an area wide system and travel network. The jurisdictional transfer limits of County Road 9 (Dodd Boulevard) and future County Road 9 (179th Street) are from Highview Avenue to Pilot Knob Road.

The hierarchy of jurisdictional classification is typically established so that higher-volume, regional corridors carrying inter-county traffic are maintained by the state (e.g., interstates and state trunk highways), while intermediate volume corridors with intra-county traffic (e.g., county roads) are maintained by the counties. Roadways serving local traffic (e.g. city streets and township roads) should be maintained by the municipalities or townships. **Figure 2** shows the existing jurisdictional classification of the roadways within the study area.

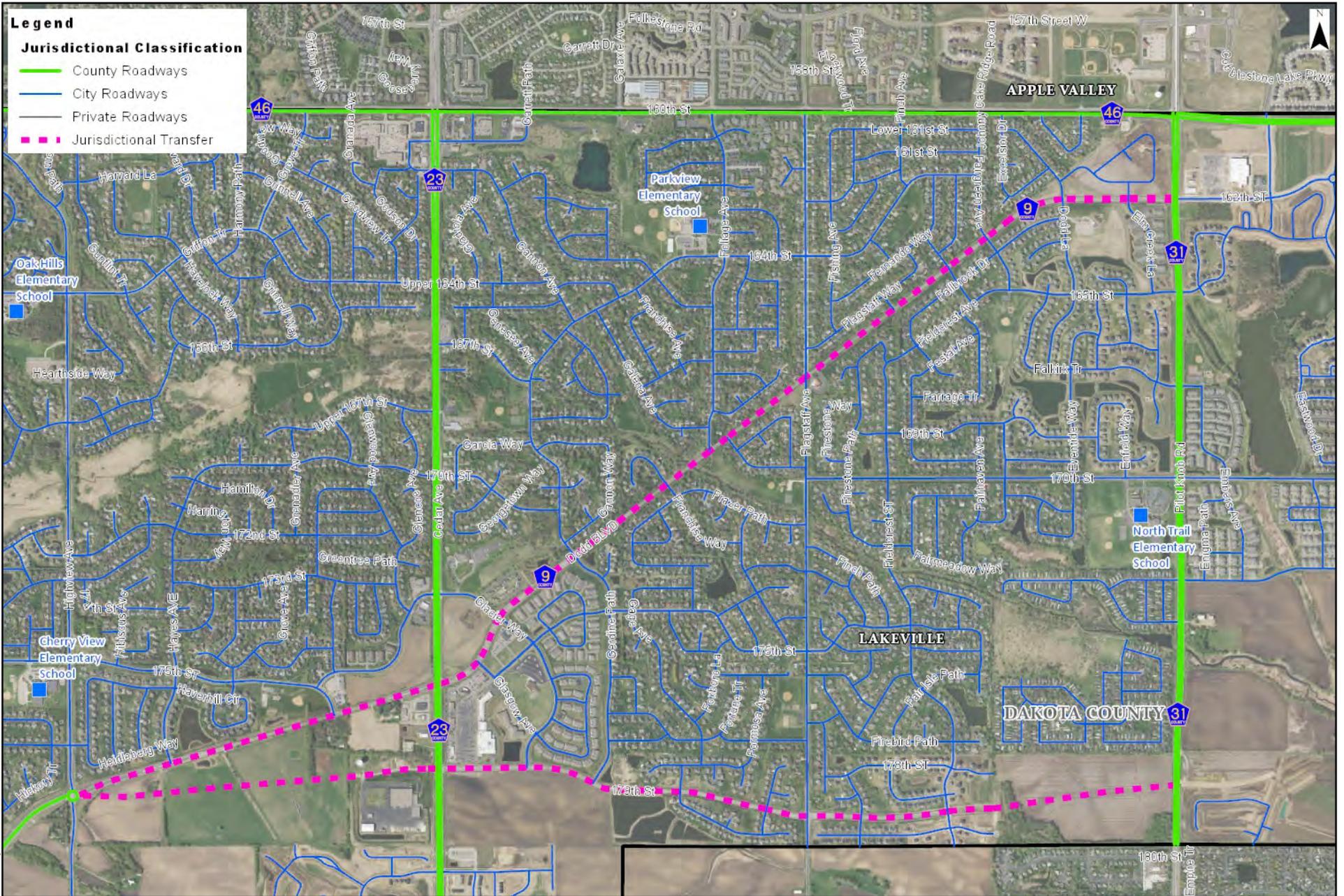
Functional Classification

The functional classification system defines both the function and role of a roadway within the hierarchy of an overall roadway system. This system is used to create a roadway network that collects and distributes traffic from neighborhoods ultimately to the state or interstate highway system. Functional classification planning works to manage mobility, access, and jurisdictional alignment of routes.

A roadway's functional classification is based on several factors, including:

- Trip characteristics: length of route, type and size of activity centers, and route continuity.
- Access to regional population centers, activity centers, and major traffic generators.
- Proportional balance of access, ease of approaching or entering a location.
- Proportional balance of mobility and ability to move without restrictions.
- Continuity between travel destinations.
- Relationship with neighboring land uses.
- Eligibility for state and federal funding.

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The functional classification system is divided into four major categories: Principal Arterials, Minor Arterials, Collectors (major and minor) and local roadways. **Figure 3** shows the existing functional classification system of the roadways within the study area, along with the anticipated changes after jurisdictional transfer of Dodd Boulevard and 179th Street. Dodd Boulevard will become the major collector and 179th Street the A-minor arterial roadway following completion of the improvements and transfer of jurisdiction.

Local Trail/Sidewalk Inventory

Numerous multimodal trails and sidewalks exist within the study area. **Figure 4** provides an overall map of the study area and identifies the multimodal system. There are varying multimodal system classifications: regional trails, off-street bikeways, and sidewalks/trails. All the trails and sidewalks in the immediate area of the two corridors are city and county facilities. The primary purpose of these facilities is to support local pedestrian/bicycle activity in and around the neighborhoods by providing access to parks, schools, commercial areas, and regional trails.

The broader regional trail system provides direct connections to other regional or state trails, or destination-based service to regional populations. This regional system is developed in coordination with the Regional Bicycle Transportation Network (RBTN) of trails. Cities are cognizant of the RBTN system too for planning their comprehensive network of trail connectivity. It is important to understand trail network gaps as roadway projects are being developed so that they can be filled in, where appropriate. The concept design layouts contained herein indicate that trails will be added that fill these gaps.

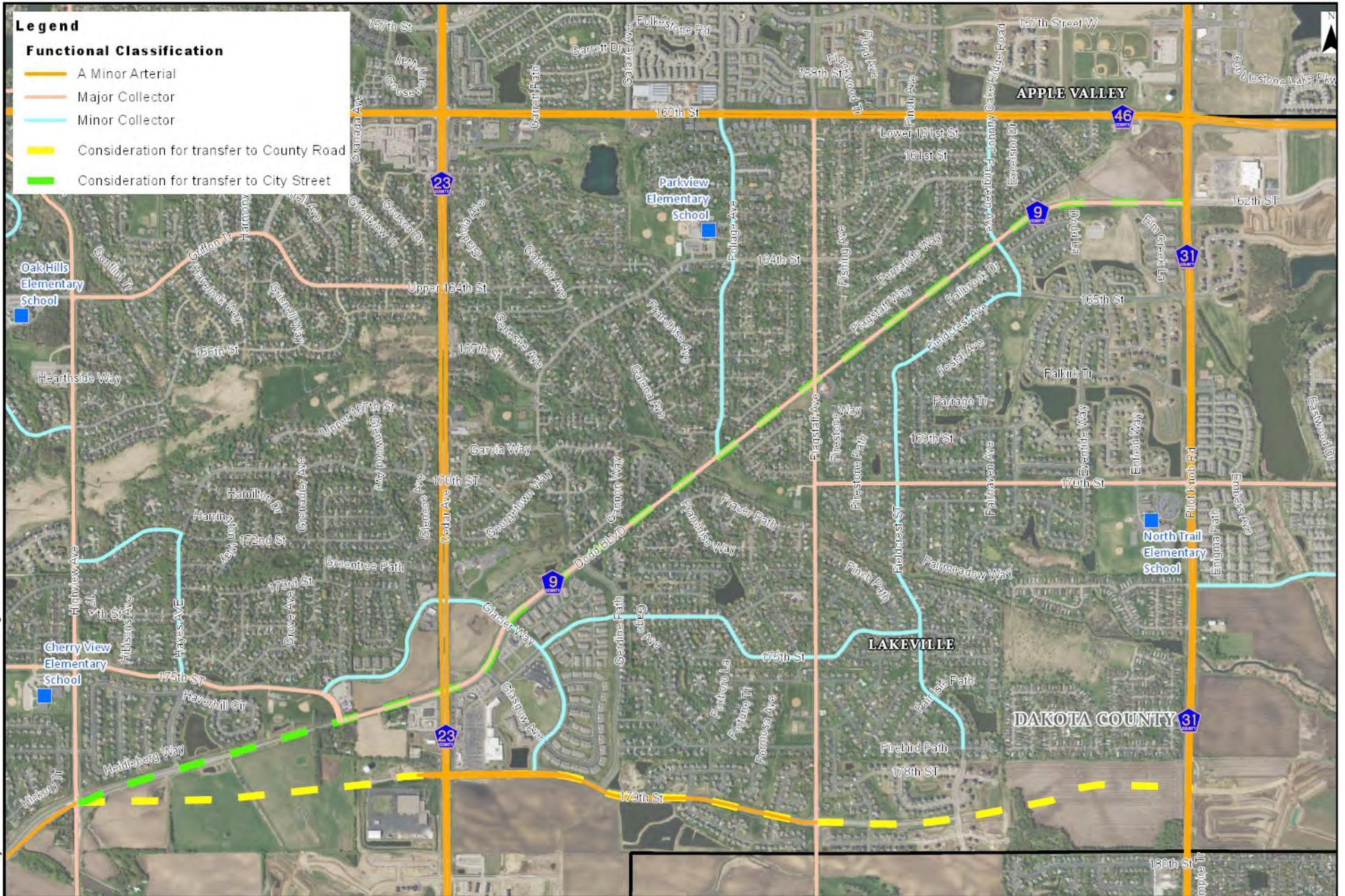
Preliminary Natural Resource Inventory

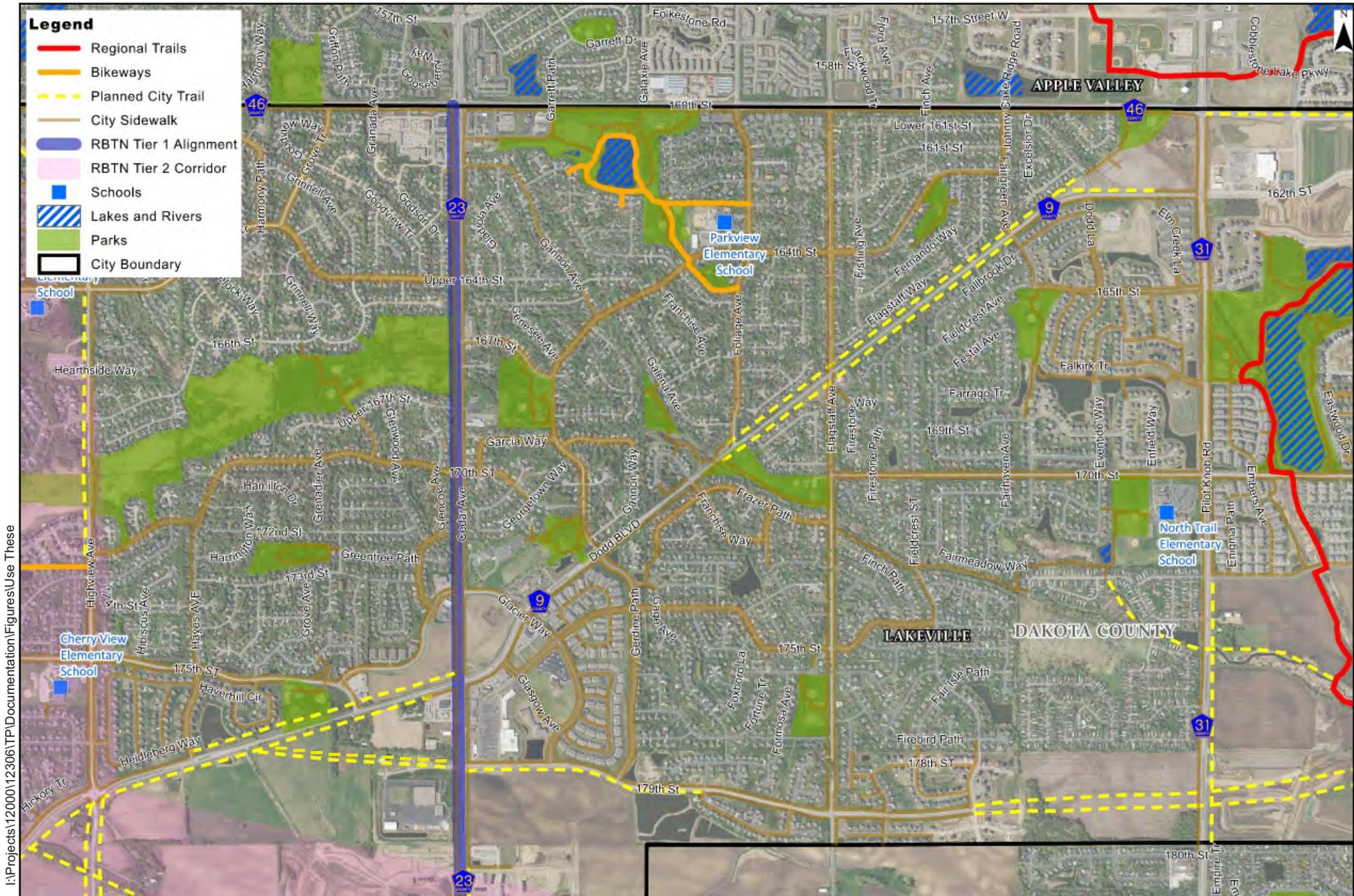
This section highlights natural resources that exist within the study area. The purpose of this high-level planning review is to understand if there are potential constraints to the reconstruction of Dodd Boulevard or 179th Street within the defined project limits. This information is not all inclusive and must be verified with additional detailed wetland inventory (being conducted as part of this effort too) and appropriate site inspection for potential contamination (modified Phase I environmental site assessment being conducted).

An in-depth social, economic and environmental resource analysis was not conducted as part of this effort. The purpose of this evaluation was to perform a preliminary inventory and assessment of potential impacts to guide the development of corridor concept designs. This impact assessment was generally based on environmental factors addressed in the environmental review process for roadway projects and utilized available desktop resources including aerial photography, geographic information systems (GIS), local and regional planning documents, and other available resources. It is important to note that this analysis does not attempt to quantify specific project impacts. Additional social, economic and environmental analyses, including quantifying environmental impacts where necessary, will be completed for any proposed improvements reviewed under the National Environmental Policy Act (NEPA) and/or Minnesota Environmental Policy Act (MEPA), if necessary, at the time of project design and development.

Review of the information in **Figure 5** indicates there are no substantial natural resource constraints that will limit the concept designs adjacent to the two corridors under consideration.

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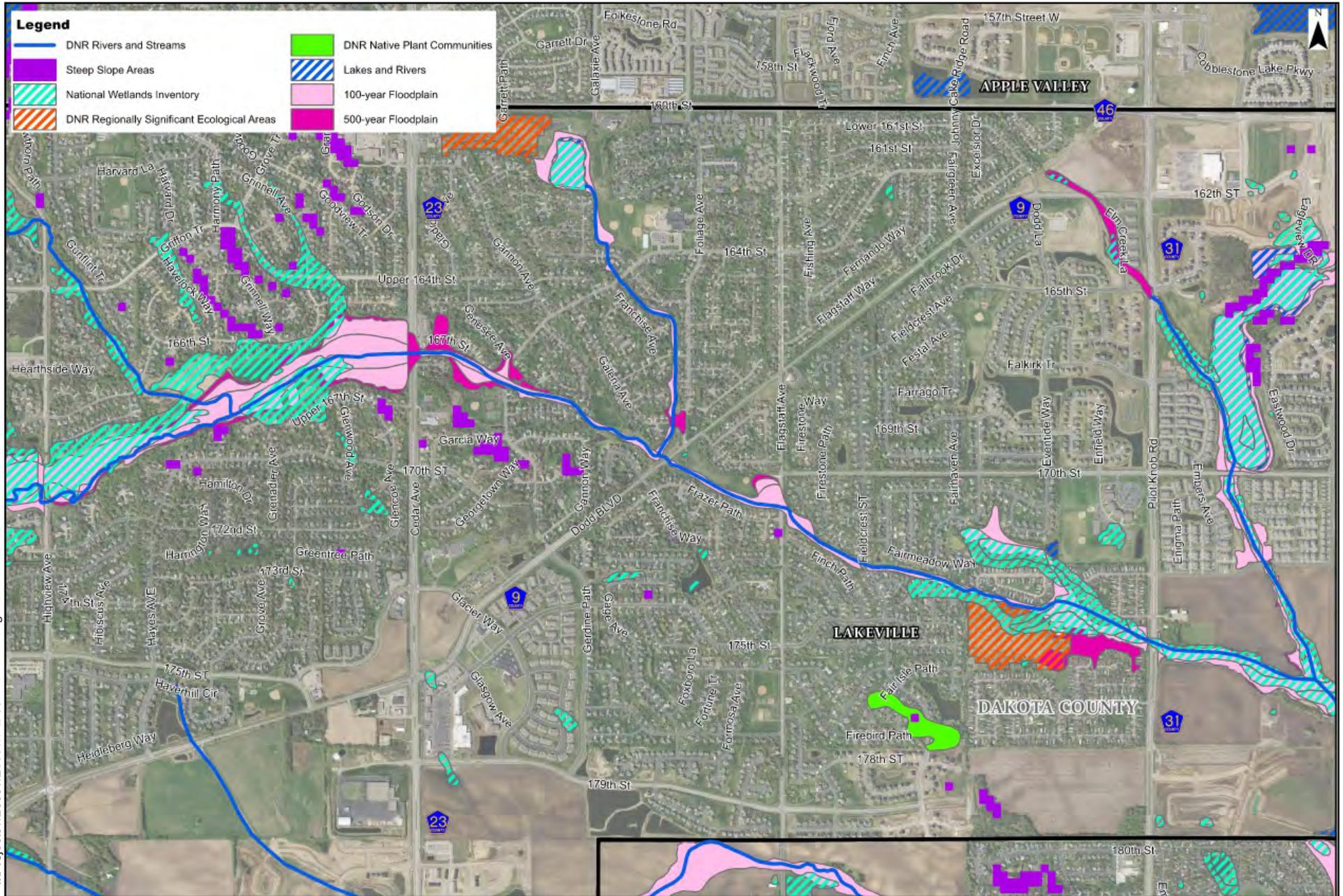


Existing Multimodal System
 CR 9 & 179th Street Corridor Study
 Dakota County

12306
 November 2019

Figure 4

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Access Inventory

Dakota County maintains access spacing and access configuration guidelines and notes to provide guidance in making decisions regarding type and location of access along the Dakota County roadway system. The overall intention of the access guidelines is to ensure the County roadways help to provide a transportation system that minimizes the potential for safety issues while maximizing system efficiency. Because Dodd Boulevard is currently a county roadway and 179th Street will become a county roadway, the corresponding access guidance was reviewed to understand the current access conditions and considerations for future conditions.

Table 1. Current Access Spacing Summary

Corridor Segment	Existing						County Guidance			
	From	To	Existing ADT	Cross Section	Length (mi)	# Access	Full Movement	Partial Movement	# Access per 1/4 mile	Compliance (County)
Dodd Blvd	Cedar Ave	Glasgow Ave	11,900	Divided	0.13	2	1/4 mile	1/8 mile	2.9	meets standard
	Glasgow Ave	Glacier Way	11,900	Divided	0.13	2	1/4 mile	1/8 mile	2.9	meets standard
	Glacier Way	Gerdine Path	11,900	Divided	0.27	2	1/4 mile	1/8 mile	1.9	meets standard
	Gerdine Path	Galleon Circle	11,900	Undivided	0.31	2	1/4 mile	NA	1.6	meets standard
	Galleon Circle	Foliage Ave	11,900	Undivided	0.15	2	1/4 mile	NA	3.3	exceeds the standard
	Foliage Ave	Flagstaff Ave	11,900	Undivided	0.33	5	1/4 mile	NA	3.8	exceeds the standard
	Flagstaff Ave	Finesse Way	9,200	Undivided	0.3	4	1/4 mile	NA	3.3	exceeds the standard
	Finesse Way	Farcy Way	9,200	Undivided	0.19	2	1/4 mile	NA	2.6	meets standard
	Farcy Way	Fairgreen Ave	9,200	Undivided	0.13	2	1/4 mile	NA	3.8	exceeds the standard
	Fairgreen Ave	Dodd Lane	9,200	Undivided	0.24	2	1/4 mile	NA	2.1	meets standard
179th Street	Cedar Ave	Glacier Way	7,500	Divided	0.24	3	1/8 mile	NA	1.6	meets standard
	Glacier Way	Gerdine Path	6,400	Undivided	0.19	2	1/8 mile	NA	1.3	meets standard
	Gerdine Path	Fulda Trail	6,400	Undivided	0.24	2	1/8 mile	NA	1.0	meets standard
	Fulda Trail	Flushing Hills Lane	6,400	Undivided	0.24	2	1/8 mile	NA	1.0	meets standard
	Flushing Hills Lane	Flagstaff Ave	6,400	Divided	0.11	2	1/8 mile	NA	2.3	exceeds the standard
	Flagstaff Ave	Fieldfare Way	NA	Undivided	0.15	2	1/8 mile	NA	1.7	meets standard
	Fieldfare Way	Fieldcrest Ave	NA	Undivided	0.23	2	1/8 mile	NA	1.1	meets standard

The access assessment in **Table 1** considers 179th Street with its slower speed under current conditions (40-45 mph); **Figure 6** presents the access inventory graphically along the two study corridors. It is understood that 179th Street will be reevaluated for a potential speed limit change through a speed study following all transportation system improvements being implemented in the coming years. This will adjust the full movement intersection spacing to a recommended 1/4 mile; however, there are existing intersections along this stretch of roadway that are within this access spacing. Further study was conducted as part of this feasibility/corridor study that informs access recommendations as part of the design. It is the County's goal to support the local street and circulation system by working with cities to interconnect local streets as appropriate to support the proper balance of access to the County road system.

Crash Data

To identify potential traffic safety issues in the study area, approximate three-year crash history (most recent/complete data set at the time data was analyzed – 2016 to June 2018) was obtained and evaluated (see **Figure 7**). A safety analysis was conducted for intersections along the two subject corridors where crashes occurred; this analysis was used to inform the corridor/ intersection design development process. Intersection crash rates were evaluated to determine if any identified crash issues are associated with intersection design/control or the overall design of the intersection/roadway.

Safety Analysis

The intersection safety analysis included calculating intersection crash rates to assist in identifying geometric or traffic control deficiencies. The first step in the safety evaluation was to review intersection crash rates. The purpose of reviewing crash rates is to determine the statistical significance of the number of crashes at each intersection. Crash rates were calculated and then compared to typical crash rates for intersections with similar characteristics. Published statewide average crash rates from MnDOT were referenced for comparison purposes. A higher than statewide average crash rate does not necessarily indicate a crash problem.

The critical crash rate is calculated to determine the statistical significance of the crashes at locations that experienced above average crash rates. If the calculated crash rate is below the critical crash rate, crashes that occurred are likely due to the random nature of crashes and not necessarily a geometric design or traffic control issue. A crash rate that is higher than the critical crash rate is an indication of a geometric design or traffic control issue and warrants further evaluation. The critical index is the actual crash rate divided by the critical crash rate. A critical index greater than 1.0 indicates that the actual crash rate is greater than the critical crash rate.

An intersection crash summary including the total number of crashes, total number of severe (fatal and A-severity) crashes, the actual crash rate, the statewide average crash rate, the critical crash rate, and the critical index is shown in **Table 2**.

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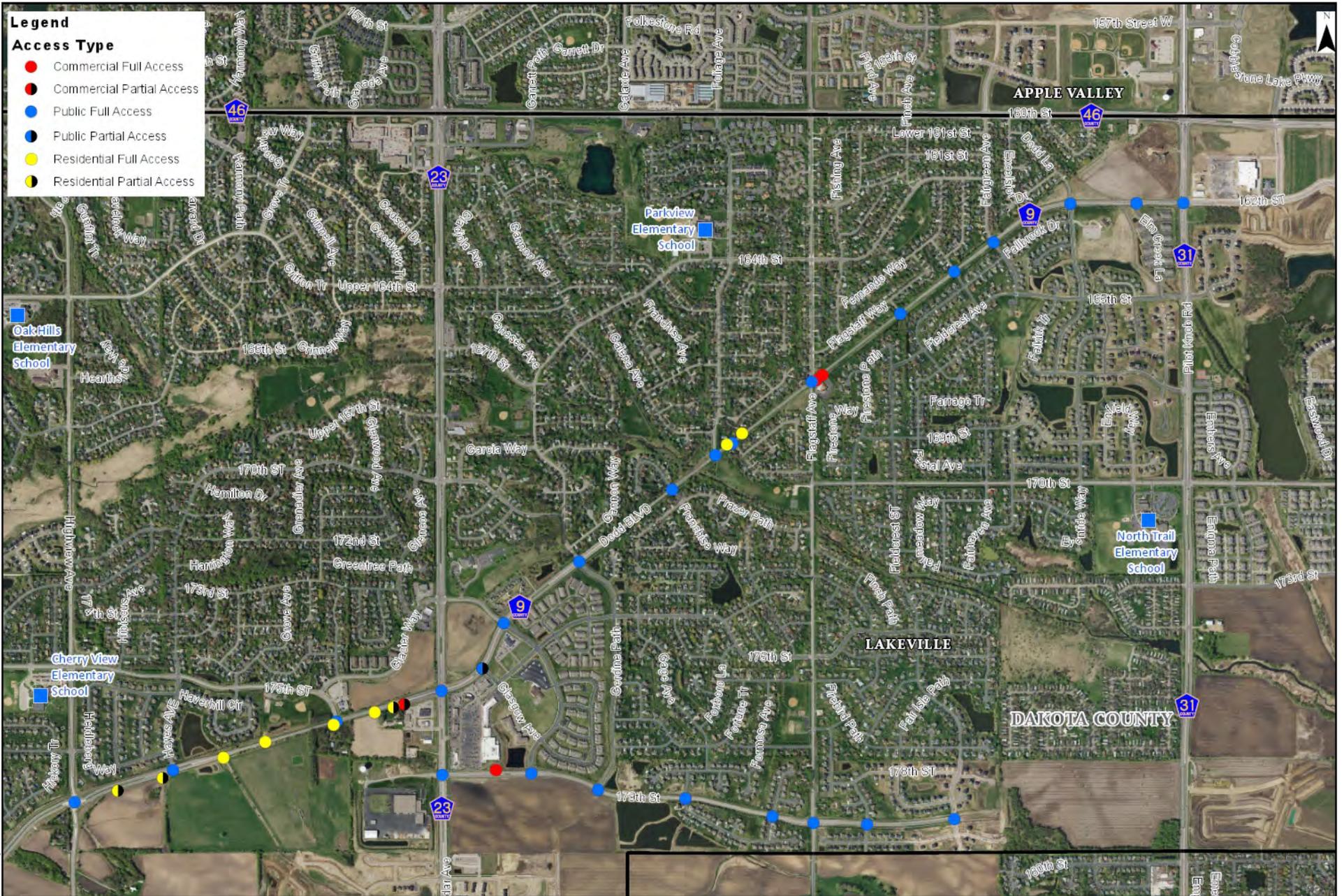


Table 2. Intersection Crash Summary

Intersection	Total Crashes	Severity		Expected Crash Rate*	Calculated Crash Rate	Critical Crash Rate	Critical Crash Rate Index
		Fatal	Suspected Serious Injury (A)				
Dodd Blvd/Cedar Ave	22			0.47	0.64	0.78	0.83
Dodd Blvd/Glasgow Ave**	7			0.19	0.57	0.54	1.04
Dodd Blvd/Glacier Way**	9			0.19	0.61	0.51	1.20
Dodd Blvd/Foliage Ave	1			0.19	0.08	0.54	0.15
Dodd Blvd/Flagstaff Ave**	12			0.34	0.72	0.75	0.97
Dodd Blvd/Fairgreen Ave	2			0.19	0.19	0.58	0.33
Dodd Blvd/Pilot Knob Rd	17			0.47	0.46	0.77	0.60
179th St/Cedar Ave	8			0.47	0.33	0.84	0.39
179th St/Glacier Way	1			0.19	0.16	0.71	0.23
179th St/Gerdine Path	1			0.19	0.15	0.70	0.22
179th St/Fulda Trail	1			0.19	0.16	0.71	0.22
179th St/Flushing Hills Ct	1			0.19	0.16	0.71	0.22
179th St/Flagstaff Ave	8		1	0.19	1.08	0.66	1.63

Data for years January 2016-July 2018

* Expected 3-year rates from MnDOT's 2015 Intersection Green Sheets

** Crash rate calculated based on conditions prior to 2019 improvements

Crash Rate < Expected Crash Rate

Expected Crash Rate < Crash Rate < Critical Crash Rate

Crash Rate > Critical Crash Rate

Three of the key intersections experienced a crash rate greater than the critical crash rate, indicating a strong likelihood of a geometric design, access, or traffic control issue - Dodd Boulevard/Glasgow Avenue (converted to a 3/4 directional access intersection in 2019), Dodd Boulevard/Glacier Way (converted to a traffic signal controlled intersection in 2019), and 179th Street/Flagstaff Avenue (programmed for roundabout construction in 2020). Another intersection, Dodd Boulevard/Flagstaff Avenue was very near the critical crash rate; this intersection was updated to a roundabout in 2019. This demonstrates the foresight the City and County have regarding being responsive to safety (and operational) issues. It is also worth noting that the intersection of Cedar Avenue/Dodd Boulevard will be converted from a traffic signal to directionally controlled access (3/4 access), which will improve safety.

Traffic Analysis

A traffic analysis was completed to help guide the transportation study of the County Road 9 and 179th Street Corridor Study. The traffic analysis consisted of analyzing existing traffic conditions, developing future traffic forecasts, analyzing future traffic conditions, and evaluating cross-section and traffic control alternatives. The following summarizes the results of the traffic operations analyses. All detailed operational analyses and results are provided in **Appendix A**.

Existing Conditions

Data Collection

Weekday peak period turning movement counts were collected in February 2019 at key intersections within the study limits - from Gerdine Path to Dodd Lane along Dodd Boulevard, including intersection improvement analysis at Dodd Boulevard and Cedar Avenue; and from Cedar Avenue through the Flagstaff Avenue intersection for 179th Street. Existing traffic volumes, intersection geometry, and traffic controls at the key study intersections are provided in **Appendix A**.

Intersection Operations Analysis

An intersection operations analysis was completed to quantify how traffic operates along the Dodd Boulevard and 179th Street corridors under existing conditions. Intersection operations analysis results identify a Level of Service (LOS) that indicates how well an intersection is functioning; intersections are ranked from LOS A through LOS F. Existing intersection operations results are provided in **Appendix A**.

Most intersections currently operate at an overall acceptable LOS D or better during the a.m. and p.m. peak hours with existing intersection geometry and traffic control; however, the following intersections experience longer delays:

- Dodd Boulevard/Glacier Way – Side-street operates at LOS E during the p.m. peak hours¹
- Dodd Boulevard/Galleon Circle – Side-street operates at LOS E during the p.m. peak hour
- Dodd Boulevard/Flagstaff Avenue – All-way stop control intersection operates at LOS E and LOS F during the a.m. and p.m. peak hours, respectively²
- Dodd Boulevard/Fairgreen Avenue – Side-street operates at LOS E during the a.m. and p.m. peak hours

¹ Operations analysis conducted prior to 2019 traffic signal improvement.

² Operations analysis conducted prior to 2019 roundabout improvement.

Traffic Forecasts

To understand the future needs of the two roadway corridors, year 2040 daily traffic forecasts were developed using the Metropolitan Council's Regional Activity-Based Travel Demand Model (TDM). Year 2040 turning movement forecasts were developed using the daily traffic forecasts, as well as existing turning movements and roadway geometrics.

Two 2040 build scenarios were tested for this study:

1. Year 2040 Base Build – this scenario assumed reconstruction of 179th Street and its extension east beyond Pilot Knob Road to future Diamond Path as a 55 mph two-lane divided highway with turn lanes at intersections.
2. Year 2040 Build Sensitivity – this scenario assumed the reconstruction of 179th Street and its extension east beyond Pilot Knob Road to Trunk Highway (TH) 3 as a 55 mph two-lane divided highway with turn lanes at intersections. This scenario was completed to evaluate the traffic impacts if 179th Street were extended further to TH 3 in the future and potential cross-section needs to accommodate the additional traffic.

Roadway network conditions assumed in both travel demand model build scenarios:

- Removal/disconnection of existing Dodd Boulevard from east of Highview Avenue to 175th Street
- Realignment/new construction of 179th Street as a four-lane divided roadway from east of Highview Avenue to Cedar Avenue
- Removal of the traffic signal and conversion to 3/4 directional access at the Dodd Boulevard/Cedar Avenue intersection
- Reduction of speed limit from 55 mph to 35 mph along Dodd Boulevard (note the 35 mph speed reduction is not a design speed; it is a modeled speed to assess potential travel choice)
- Addition of turn lanes at major intersections

The daily traffic forecasts aided the development of year 2040 peak hour turning movement forecasts needed to evaluate year 2040 traffic operations at each study intersection. Daily traffic forecasts and turning movement forecasts for the year 2040 Base Build condition (agreed upon future forecasts for base analysis) are provided in **Appendix A**.

Year 2040 No-Build Intersection Operations Analysis

A year 2040 no-build intersection operations analysis was completed to evaluate how the study intersections are expected to operate in the future if no geometric or traffic control changes are made. The intersections were evaluated with the existing geometry and traffic control, and year 2040 turning movements. The exceptions were as follows:

- Existing Dodd Boulevard/Flagstaff Avenue was assumed to be a single-lane roundabout.
- Dodd Boulevard/Glacier Way intersection assumed a traffic signal.
- Dodd Boulevard/Cedar Avenue intersection was assumed to be 3/4 access.
- Dodd Boulevard/Glasgow Avenue intersection was assumed to be 3/4 access.

The no-build operations analysis is summarized as follows:

- The 179th Street/Flagstaff Avenue intersection is expected to fail (LOS F) by year 2040 with the existing side-street stop control.
 - Queues from this intersection are expected to spillback through adjacent intersections during both the a.m. and p.m. peak hours, which results in poor operations.
- Southbound left-turn at Cedar Avenue/179th Street is not expected to have enough capacity to accommodate the heavy movement from southbound Cedar Avenue onto eastbound 179th Street in the p.m. peak hour.
 - This movement is expected to queue back to adjacent intersections and cause operational issues at the intersections to the north on Cedar Avenue.
- There is limited capacity for minor approaches at the Dodd Boulevard/Cedar Avenue intersection during the p.m. peak hour.

Based on the significant poor operations at the 179th Street/Flagstaff Avenue and Cedar Avenue/179th Street intersection that impact adjacent intersections, a modified no-build operations analysis was completed to understand the operations at the other study intersections if improvements are made to allow traffic to reach the intersections. The modified no-build analysis included:

- A signal was assumed at the 179th Street/Flagstaff Avenue intersection to allow vehicles to pass through the intersection and reach adjacent intersections.
- Dual southbound left-turn lanes from southbound Cedar Avenue onto eastbound 179th Street.

The results of the modified no-build traffic operations indicate that 179th Street will operate more efficiently if the 179th Street/Flagstaff Avenue intersection is improved, but there are still operational deficiencies. Build conditions were analyzed and are presented in the following section that indicate necessary improvements to achieve comprehensive acceptable conditions.

Year 2040 Cross-Section Alternatives Evaluation

The first step in the alternative evaluation process was to determine the cross-section of Dodd Boulevard and 179th Street. The initial determination of number of through lanes required was based on the year 2040 forecasted AADTs. The 2040 forecasted AADTs are summarized below:

- Year 2040 Base Build (179th Street extended to Diamond Path)
 - Dodd Boulevard: 9,700 to 11,000 between Gerdine Path and Dodd Lane
 - 179th Street: 11,900 between Gerdine Path and Flagstaff Avenue
- Year 2040 Build Sensitivity (179th Street extended to TH 3)
 - Dodd Boulevard: 9,200 to 10,500 between Gerdine Path and Dodd Lane
 - 179th Street: 14,600 between Gerdine Path and Flagstaff Avenue

These AADTs were compared to planning AADT capacities for different roadway types to understand the needs of the corridor at a high level. The planning-level capacities that were used to assist with determining the roadway cross-section are shown in **Table 3**.

Table 3. Planning-Level Roadway Capacities

Roadway Type	Planning-Level Daily Capacity (AADT)	Approaching Capacity (85% AADT)
Two-lane undivided urban	10,000	8,500
Three-lane (two-lane with turn lanes)	17,000	14,450
Four-lane undivided urban	22,000	18,700
Five-lane urban (four-lane with turn lanes)	32,000	27,200

The daily forecasts indicate that the roadways would be over capacity for a two-lane roadway, but within capacity constraints for a three-lane roadway; therefore, a three-lane roadway was recommended for alternative evaluation. A three-lane roadway was evaluated to understand delays on the side-streets for vehicles trying to turn into the traffic flow on Dodd Boulevard and 179th Street, and to understand if the intersections would operate acceptably.

Year 2040 Build Traffic Operations Analysis

A year 2040 build traffic operations analysis was completed to affirm the three-lane corridor configuration for Dodd Boulevard and 179th Street, and to determine appropriate traffic control and intersection geometry throughout.

Based on the outcomes from the no build analysis, several geometric assumptions were made to begin the build traffic operations analysis - as follows:

- Dodd Boulevard and 179th Street were assumed with a three-lane roadway within the study limits (where appropriate). Right-turn lanes were also assumed at most intersections along 179th Street and specific intersections along Dodd Boulevard based on turning volumes, the posted speed limit, and land use considerations.
- Cedar Avenue was converted from a four-lane to six-lane roadway. Converting Cedar Avenue to six lanes is not recommended or planned now; this update to the model allowed the travel demand to reach the study intersections so they could be evaluated fully. The County’s long-term plan is to extend six lanes to 185th Street - yet it is not programmed in a capital improvement plan.
- Intersection of 179th Street/Gerdine Path was converted to right-in/right-out (RIRO). This was done to reduce cut through traffic along Gerdine Path due to significant driveway accesses along Gerdine Path between 179th Street and Dodd Boulevard.
- Intersection of 179th Street/Flushing Hills Court was converted to RIRO. This was done because the queues are expected to spillback from the 179th Street/Flagstaff Avenue intersection.

The results of the 2040 build traffic operations analysis are provided in **Appendix A**. All intersections are expected to operate acceptably overall with the geometric changes assumed above - a three-lane cross-section will provide acceptable operations.

179th Street/Flagstaff Avenue Intersection Traffic Control Evaluation

Once it was determined that a three-lane cross-section would provide acceptable operations under year 2040 conditions, the recommended traffic control at 179th Street/Flagstaff Avenue was further reviewed. The no-build traffic operations indicate that the existing side-street stop control will not provide acceptable operations; and further review as an all-way stop control (AWSC) intersection indicate unacceptable operations. Therefore, a traffic signal and roundabout were evaluated.

The roundabout was analyzed assuming a single-lane roundabout on all four approaches and the signal was analyzed assuming a left-turn lane, thru lane, and right-turn lane on all four approaches. The operations analysis results indicate a roundabout is expected to operate more efficiently during both peak hours, with approximately 10 seconds less delay overall (40-50% more efficient). In addition, the operational benefits of a roundabout include:

- Roundabouts provide a safety benefit compared to traffic signals. Roundabouts have shown over an 80 percent reduction in fatal and serious injury crashes.
- The footprint of the roundabout is approximately 10 percent smaller than a traffic signal due to turn lanes needed for a traffic signal.
- The cost of a roundabout is approximately 16 percent less compared to a traffic signal due to the smaller footprint and not needing signal equipment.
- Future traffic volumes are forecasted to be balanced among all approaches.

Exhibit 4. 179th Street/Flagstaff Avenue Intersection Traffic Control Physical Space Needs

Roundabout



Traffic Signal



While the roundabout is approximately 10 percent smaller than a traffic signal due to turn lanes needed for a traffic signal, it impacts 4 properties, with the signal impacting 2 properties.

Based on the overall benefits discussed above, it is recommended to implement a roundabout at the 179th Street/Flagstaff Avenue intersection.

Corridor Design Development

The key outcome of this study was to identify, technically evaluate, and develop visual concepts for geometric design layouts of Dodd Boulevard and 179th Street. These concept geometric design layouts can then be carried forward for further final design consideration. Note that the 179th Street corridor segment identified herein is being carried forward through final design for construction in 2020. The following sections summarize the design considerations reviewed as part of this corridor study and identify which are being incorporated now with 179th Street design and which will be considered soon with further public engagement and final design of Dodd Boulevard.

Dodd Boulevard

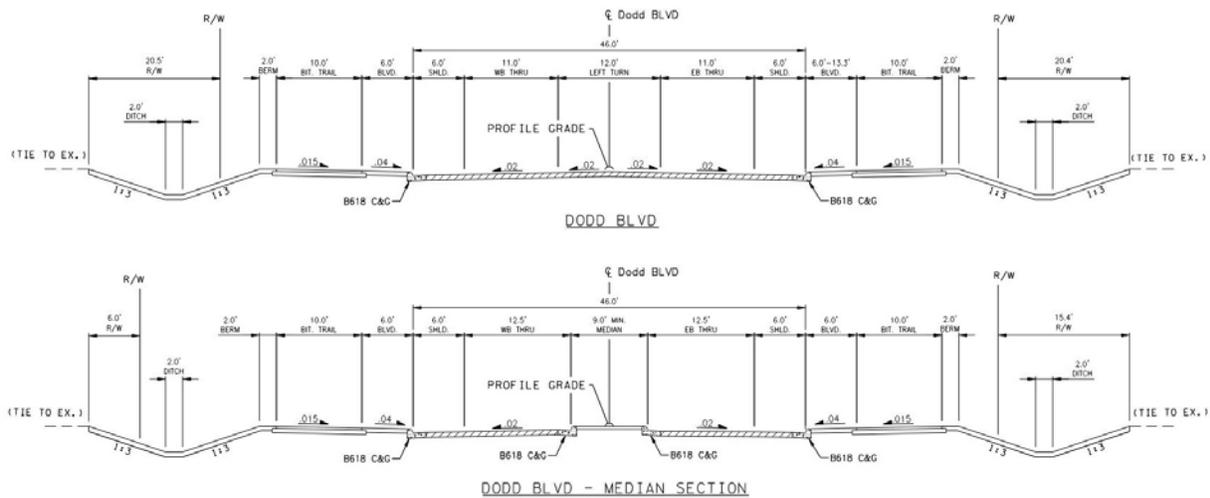
The corridor concept design process was multifaceted using a range of inputs, including technical analysis, public comments, community comprehensive plans, adjacent land use considerations, corridor vision, design parameters, and direction from the project management team (PMT) members (County and City staff).

The study team facilitated PMT meetings at which technical information was shared and design parameters were discussed. These meetings were brainstorming sessions meant to consider various options and potential solutions. After review and refinement with the PMT, the concepts were presented in “plan view” layout form to the public at the second open house in August. See **Appendix B** for design layout illustrations.

Design Parameters

- Two-lane undivided urban road (i.e., curbs installed), with turn lanes
- Shoulder space on curb edge
- Pedestrian trails along the north and south side of the roadway
- 35-45 mph design speed
- Consider direct residential access limits
- Potential gateway entry treatments with center median
- Potential traffic calming design elements (i.e., raised median, bump outs, mid-block crossings)

Exhibit 5. Dodd Boulevard Typical Cross Section



Design Considerations

Several key design considerations were reviewed throughout the corridor study and design development process. Further public engagement and final design consideration is needed for each of the items discussed below.

Creek Crossing between Galleon Circle and Foliage Avenue

Existing culverts are located between Galleon Circle and Foliage Avenue that allow the North Creek and pedestrian traffic to cross Dodd Boulevard. This location was a key design consideration for several reasons:

- Creek crossing and structure replacement needs
- Trail crossing underpass next to the creek crossing
- Grade difference from roadway to the adjacent trail area
- Roadway width through this area

To minimize impacts to the existing culverts, floodplain, and park the roadway width was minimized and corridor operations were maintained through this area by shortening the left-turn lanes to Galleon Circle and Foliage Avenue on either side of the North Creek crossing.

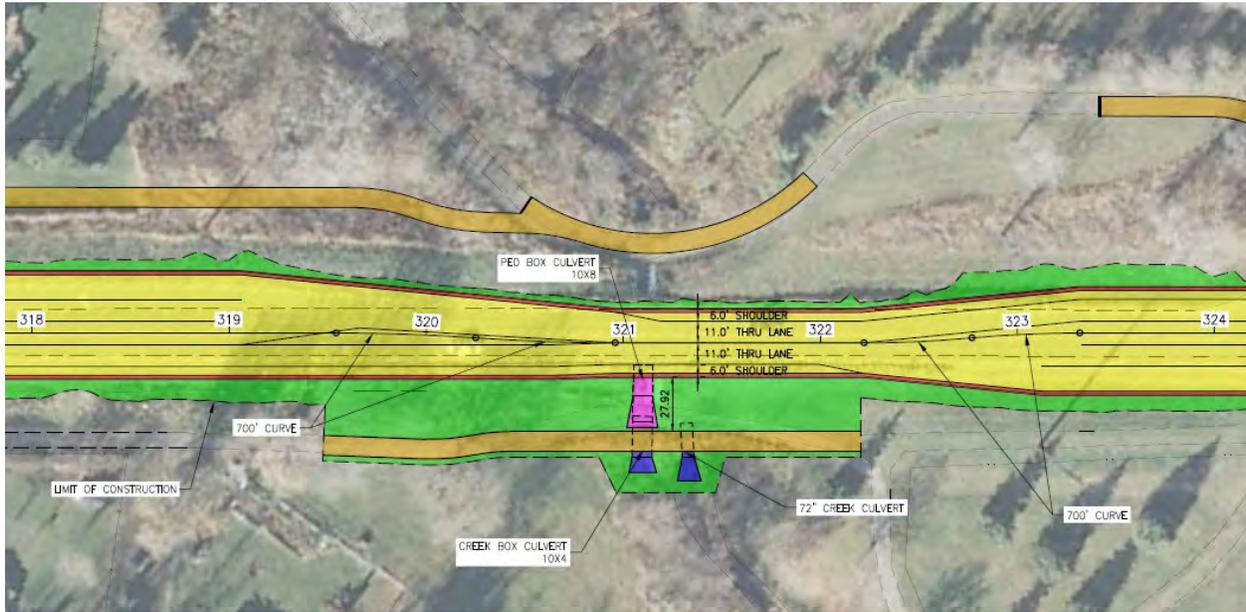


Exhibit 6. North Creek Crossing of Dodd Boulevard

Direct Residential Access Restriction

Direct driveway access for residential properties is not permitted onto major collector roadways. Two existing properties have direct driveway access onto Dodd Boulevard near the Foliage Avenue intersection. The City and County intend to coordinate with these property owners during the Dodd Boulevard project development to potentially relocate these driveways to adjacent residential side-streets. The graphic below illustrates a concept for how this can be done. Relocating the driveways onto the adjacent side streets would improve safety and traffic operations along Dodd Boulevard by minimizing turning movement and vehicular conflicts along the higher traveled roadway.

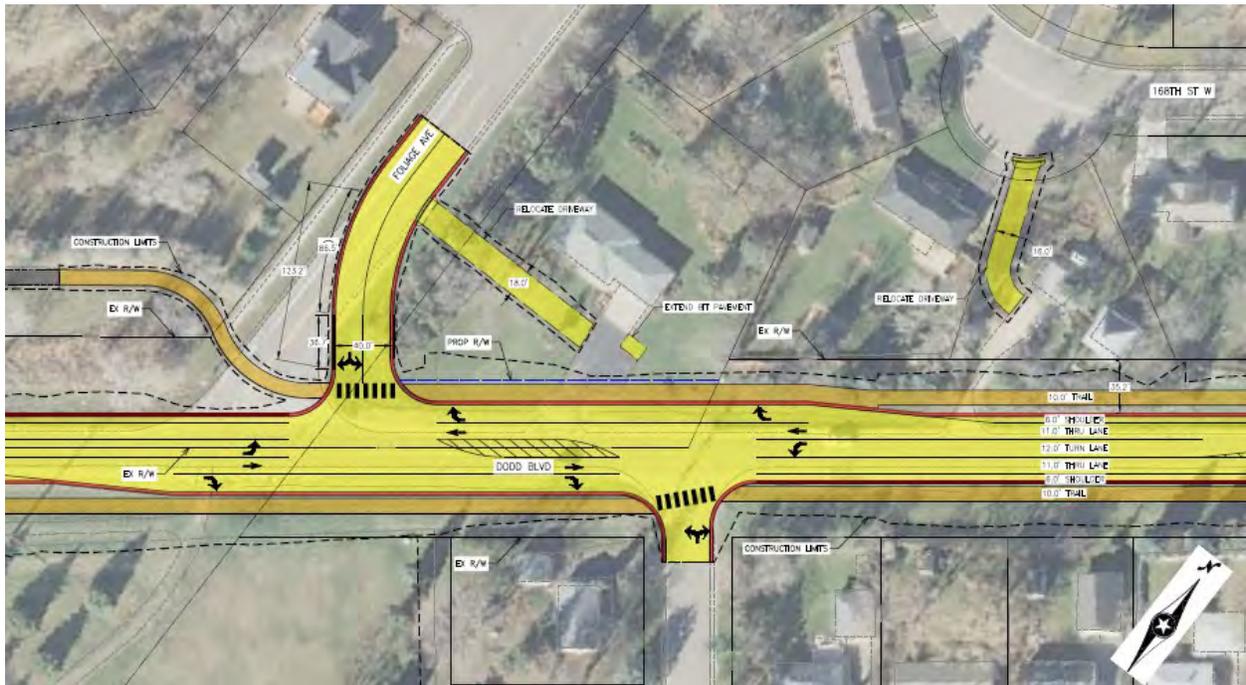


Exhibit 7. Potential Residential Access Removal Concept from Dodd Boulevard

Potential Traffic Calming Design Elements

Dodd Boulevard will be reclassified as a local major collector roadway once the jurisdictional transfer is complete between the County and City for Dodd Boulevard and 179th Street. Traffic calming design elements were considered given the jurisdictional transfer, with the goal to create a more local roadway feeling, and potential reduced speed along Dodd Boulevard to 35-45 mph. Three potential options were presented to the public as part of the second open house held in August 2019 - raised median in the center of the road, curb “bump outs” at intersections, and mid-block pedestrian/bicycle crossing(s). No direct feedback was requested on the potential elements, but impromptu feedback was received. Further public engagement and detailed final design consideration is needed before any alternatives are recommended.

Exhibit 8. Traffic Calming Examples for Dodd Boulevard

Raised Median



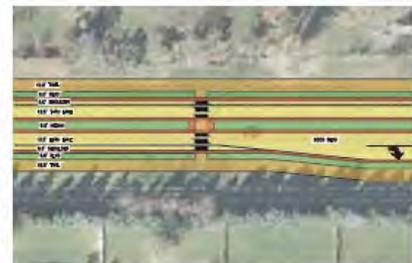
- Creates spaces for non-auto use
- Reduces optical width
- Provides ideal places for trees, flowers, etc.

Curb Bump Outs



- Reduced optical width at intersections
- Reduces pedestrian crossing length
- Provides a haven for pedestrians waiting to cross the street

Mid-Block Crossing



- Reduces optical width
- Creates spaces for non-auto use
- Provides a safe refuge for pedestrians as they cross the roadway

179th Street

The 179th Street corridor design was carried along further than the Dodd Boulevard corridor due to the programmed reconstruction in 2020. Therefore, the concept designs developed as part of this corridor study were carried into preliminary and final design immediately following agreement by the study partners.

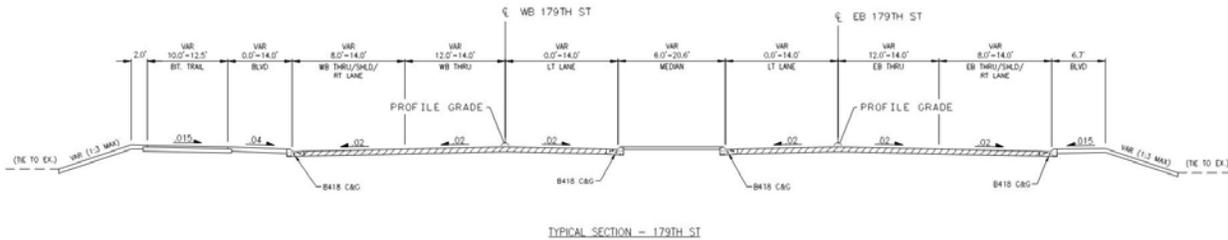
The design development process was the same; discussing design elements at facilitated PMT meetings where technical information was shared, and design parameters discussed. After review and refinement with the PMT, the concepts were presented in “plan view” layout form to the public at the second open house in August to obtain direct feedback for refinement. See **Appendix C** for design layout illustrations.

Design Parameters

- Reconstructed two-lane divided urban roadway, with turn lanes at all intersections
- Geometric modifications of roadway cross section to meet County roadway standards (i.e., shoulder width, design speed, access spacing, etc.)
- Maintain, or improve, multipurpose trails

- 55 mph design speed
- Roundabout traffic control at 179th Street/Flagstaff Avenue
- Minimize wetland impacts

Exhibit 9. 179th Street Typical Cross Section



Design Considerations

Several key design considerations were reviewed throughout the corridor study and design development process. The items described below were evaluated and agreed upon prior to moving ahead with final design.

Horizontal Alignment

Several existing horizontal curves along 179th Street do not meet the 55 mph design speed desired of the future County roadway designation. Therefore, alternative alignment modifications were evaluated with the study. Realigning the deficient areas will result in right-of-way impacts to adjacent property. Minimizing right-of-way impacts is a goal of the project, while balancing cost with environmental considerations (i.e., wetland impacts, personal property impacts, etc.). The most impactful horizontal alignment modification was needed near the intersection of 179th Street/Gerdine Path due to the existing back to back horizontal curves.

This intersection area also has two existing stormwater retention ponds and wetland areas within the potential impact zone. Four varying alignments were considered, along with four high-level evaluation criteria:

- Curve length (curve comfortability)
- Safety (design impacts on safety)
- Right of way impacts (impacts to nearby properties)
- Design (potential for soil correction needs)

The graphic below illustrates the alignments considered and the evaluation conducted. The magenta alignment pictured provides the least impactful and most desirable alternative and was selected to move forward in design.

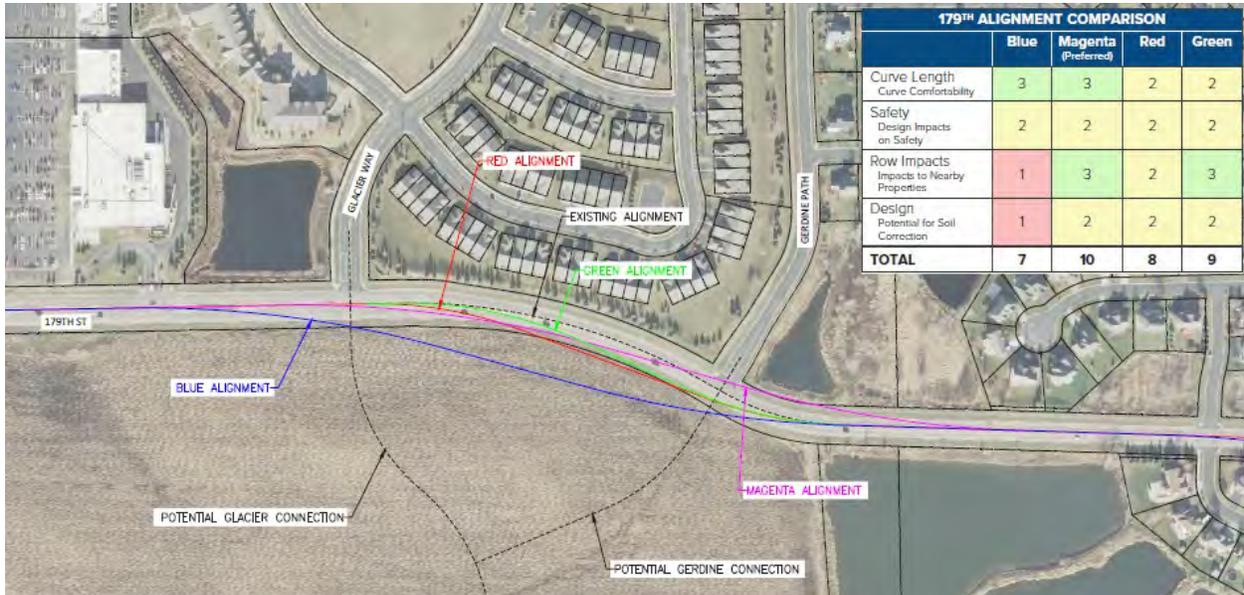


Exhibit 10. 179th Street Horizontal Alignment Alternatives (near Gerdine Path)

179th Street/Flagstaff Avenue Roundabout

179th Street is ultimately planned to be extended further east to TH 3, consistent with Dakota County’s 2040 Transportation Plan. Traffic volumes are forecasted to increase when this extension occurs. A sensitivity analysis was completed to “right-size” the roundabout at 179th Street/Flagstaff Avenue and create a design that is flexible allowing for expansion if needed in the future. It was determined that the eastbound/westbound movements are the most significant difference between the base condition of 179th Street extended to Diamond Path and the Build Sensitivity condition with 179th Street extended to TH 3.

Ultimately it was recommended to construct the roundabout such that it can be converted to a 2x1 roundabout with two lanes through the intersection in the eastbound and westbound directions if needed in the future. This can be done by widening the approaches and striping them out so they are not used as a lane and bringing in the noses of the splitter islands towards the central island to limit it so there is only one lane through the roundabout. The striping and splitter islands can be modified in the future to carry two lanes through the roundabout when conversion is needed operationally. The graphic below presents the two built conditions.

179th Street Access Management

Consistent with Dakota County's Access Management guidelines, 179th Street was reviewed to determine if any of the existing access locations should be considered for access restriction or modification. It is understood that 179th Street will be reevaluated for a potential speed limit change through a speed study following all transportation system improvements being implemented in the coming years. The potential speed limit increase may adjust the full movement intersection spacing to a recommended 1/4 mile. There are existing intersections along 179th Street that are spaced shorter than this guidance. It is the County's goal to support the local street and circulation system by working with cities to ensure negative impacts are avoided due to unnecessary access restriction if supported by operations analysis and the proper balance of access to the County road system can be achieved.

Beyond the County access guidance, detailed traffic operations analysis and land use was considered. Based on these factors, the following was recommended:

- Convert the intersection of 179th Street/Gerdine Path to right-in/right-out (RIRO). Recommended to reduce cut-through traffic along Gerdine Path due to significant residential driveway accesses on Gerdine Path between Dodd Blvd and 179th St.
- Convert the intersection of 179th Street/Flushing Hills Court to RIRO. Recommended because the queues are expected to spillback from the 179th Street/Flagstaff Avenue intersection.

The intersection of 179th Street/Fieldfare Way (east of Flagstaff Avenue) is not recommended for initial modification upon reconstruction. This intersection is within the 1/4 mile spacing guidance for Dakota County full access intersections; however, the traffic operations analysis indicates that queues from the 179th Street/Flagstaff Avenue intersection are not expected to extend back to this intersection impacting safety or its operations. There are other situational factors too that merit keeping the full access intersection and monitoring it into the future as traffic volumes increase and the other transportation system improvements are constructed.

- The speeds through this intersection are likely to be less than the speed limit due to its proximity to the roundabout at 179th Street/Flagstaff Avenue.
- Side-street traffic volumes are expected to be minimal during peak hour conditions.

The interim build condition proposes to keep this intersection full access and the ultimate build condition (if necessary) recommends that this intersection be restricted to RIRO. Dakota County should continue to monitor the intersection for safety, operations, and alternative available roadway connections to determine when/if access modifications should be implemented.

Project Costs

Planning-level project costs were developed for the roadway improvements contained herein to understand the investments needed along Dodd Boulevard and 179th Street. **Appendix D** contains the planning-level cost estimates for each roadway.

Appendix A. Traffic Analysis Technical Memorandum



County Road 9 and 179th Street Corridor Study Memorandum

A traffic analysis was completed to help guide the transportation study of the County Road 9 and 179th Street Corridor Study. The traffic analysis consisted of analyzing existing traffic conditions, developing future traffic forecasts, analyzing future traffic conditions, and evaluating cross-section and traffic control alternatives.

Existing Traffic Conditions

Data Collection

Weekday peak period turning movement counts were collected in February 2019 at the following intersections:

- Dodd Boulevard/Gerdine Path
- Dodd Boulevard/Galleon Circle
- Dodd Boulevard/Foliage Avenue
- Dodd Boulevard/Finesse Way
- Dodd Boulevard/Fairgreen Avenue
- Dodd Boulevard/Dodd Lane
- 179th Street/Cedar Avenue
- 179th Street/Glacier Way
- 179th Street/Gerdine Path
- 179th Street/Fulda Trail
- 179th Street/Flushing Hills Lane
- 179th Street/Flagstaff Avenue

Dakota County provided historical counts for the following intersections:

- Dodd Boulevard/Cedar Avenue
- Dodd Boulevard/Glasgow Avenue
- Dodd Boulevard/Glacier Way
- Dodd Boulevard/Flagstaff Avenue
- Cedar Avenue/179th Avenue
- Cedar Avenue/Glacier Way

The study limits are from Gerdine Path to Dodd Lane along Dodd Boulevard, including intersection improvement analysis at Dodd Boulevard and Cedar Avenue; and from Cedar Avenue through the Flagstaff Avenue intersection for 179th Street. The other intersections listed with the data collection were included in the traffic analysis to fully understand operations in the area.

These counts were compared to MnDOT annual average daily traffic (AADT) volumes to ensure the turning movement counts collected are representative of a typical day. Existing traffic volumes, intersection geometry, and traffic controls at the key study intersections are shown in Figure 1 and Figure 2.



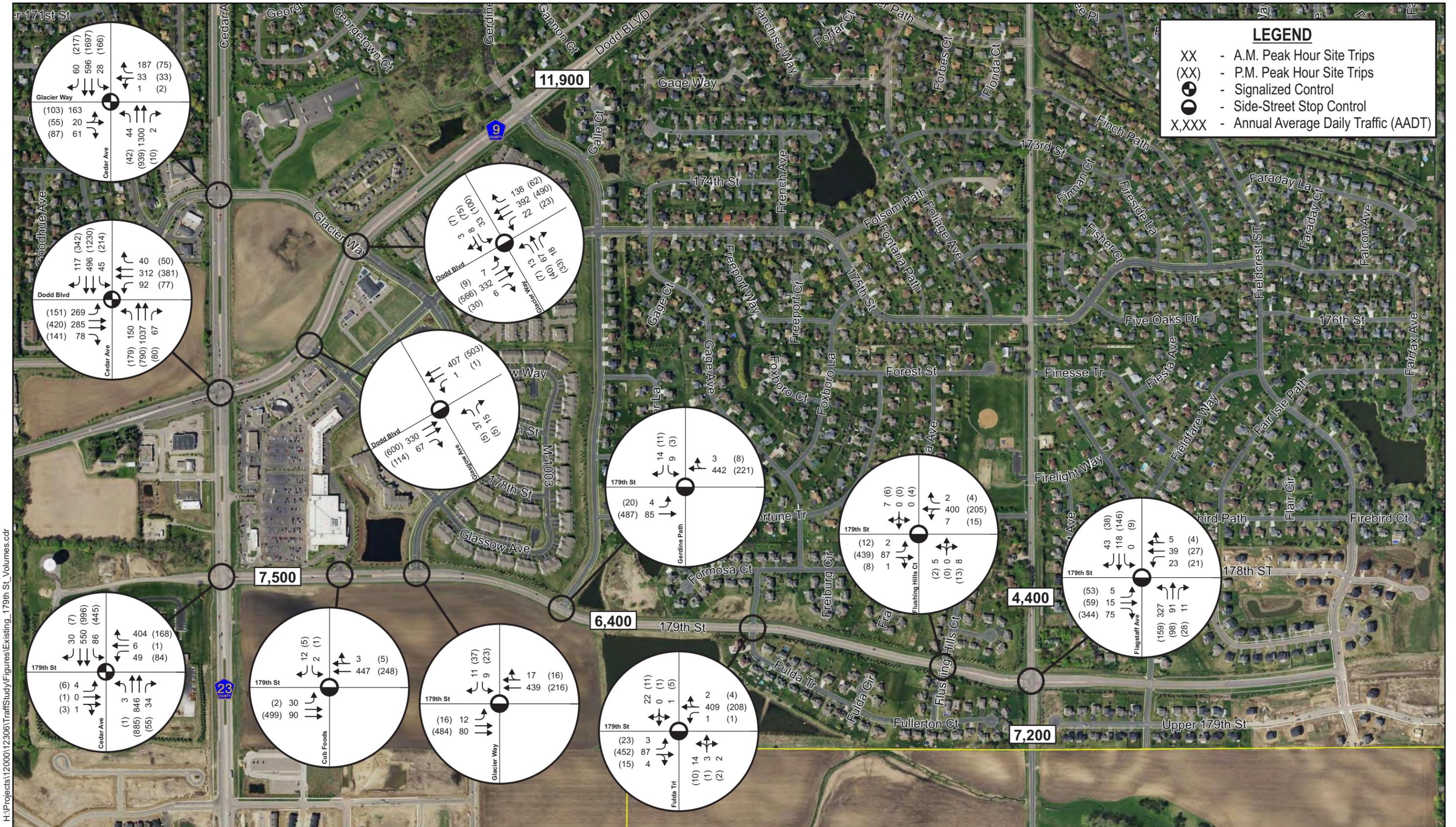
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Dodd Boulevard Existing Conditions
 CR 9 & 179th Street Corridor Study
 Dakota County

12306
 October 2019

Figure 1



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Dodd Boulevard and 179th Street Existing Conditions

CR 9 & 179th Street Corridor Study

Dakota County

12306
October 2019

Figure 2

Intersection Operations Analysis

An intersection operations analysis was completed to quantify how traffic operates along the 179th Street and Dodd Boulevard corridors under existing conditions. PTV VISSIM software was used to evaluate traffic operations, which implements the Highway Capacity Manual 6th Edition methodologies. Intersection operations analysis results identify a Level of Service (LOS) that indicates how well an intersection is functioning. Intersections are ranked from LOS A through LOS F. The LOS results are based on the average delay per vehicle, which corresponds to the delay threshold values shown in Table 1. LOS A indicates the best traffic operations and LOS F indicates an intersection where demand exceeds capacity. Overall, intersections with LOS A through LOS D are operating under capacity and acceptably.

Table 1. Level of Service Criteria for Signalized and Unsignalized Intersections and Roundabouts

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	Unsignalized Intersection & Roundabout 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

Traffic operations at an unsignalized intersection with side-street stop control can be described in two ways. First, consideration is given to the overall intersection level of service. This considers 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 approaches. Since the mainline does not have to stop, most of the delay is attributed to the minor approaches. It is typical of intersections with higher mainline traffic volumes to experience increased levels of delay (i.e. poor levels of service) on the minor approaches, but an acceptable overall intersection level of service during peak hour conditions. Existing intersection operations results are shown in Table 2.

Table 2. Existing Operations

Intersection	Delay (sec)		Level of Service (LOS)	
	A.M.	P.M.	A.M.	P.M.
Dodd Boulevard/Cedar Avenue	30	33	C	C
Dodd Boulevard/Glasgow Avenue ⁽¹⁾	1/14	1/14	A/B	A/B
Dodd Boulevard/Glacier Way ⁽¹⁾	4/30	7/43	A/D	A/E
Dodd Boulevard/Gerdine Path ⁽¹⁾	4/27	3/31	A/D	A/D
Dodd Boulevard/Galleon Circle ⁽¹⁾	2/27	3/47	A/D	A/E
Dodd Boulevard/Foliage Avenue ⁽¹⁾	2/12	3/17	A/B	A/C
Dodd Boulevard/Flagstaff Avenue	37	64	E	F
Dodd Boulevard/Finesse Way ⁽¹⁾	1/17	1/18	A/C	A/C
Dodd Boulevard/Fairgreen Avenue ⁽¹⁾	5/36	5/36	A/E	A/E
Dodd Boulevard/Dodd Lane ⁽¹⁾	2/23	1/18	A/C	A/C
179th Street/Cedar Avenue	13	26	B	C
179th Street/Glacier Way ⁽¹⁾	1/9	1/12	A/A	A/B
179th Street/Gerdine Path ⁽¹⁾	1/9	1/10	A/A	A/B
179th Street/Fulda Trail ⁽¹⁾	1/13	2/19	A/B	B/C
179th Street/Flushing Hills Lane ⁽¹⁾	1/10	2/13	A/B	A/B
179th Street/Flagstaff Avenue ⁽¹⁾	5/20	12/23	A/C	B/C
Cedar Avenue/Glacier Way	12	15	B	B/C

1) Delay and LOS is the worst approach following by overall intersection operations.

Results of the existing intersection operations analysis shown in Table 2 indicate most intersections currently operate at an overall acceptable LOS D or better during the a.m. and p.m. peak hours with existing intersection geometry and traffic control; however, the following intersections experience longer delays:

- Dodd Boulevard/Glacier Way – Side-street operates at LOS E during the p.m. peak hours
- Dodd Boulevard/Galleon Circle – Side-street operates at LOS E during the p.m. peak hour
- Dodd Boulevard/Flagstaff Avenue – All-way stop control intersection operates at LOS E and LOS F during the a.m. and p.m. peak hours, respectively
- Dodd Boulevard/Fairgreen Avenue – Side-street operates at LOS E during the a.m. and p.m. peak hours

Traffic Forecasts

To understand the future needs of the two corridors, year 2040 daily traffic forecasts were developed using the Metropolitan Council's Regional Activity-Based Travel Demand Model (TDM). Year 2040 turning movement forecasts were developed using the daily traffic forecasts, as well as existing turning movements and roadway geometrics.

Assumptions

To develop accurate forecasts, land use and transportation network assumptions need to be updated based on current assumptions. The assumptions that were used as part of this study are described below.

Land Use

Year 2040 land use development assumptions from the City of Lakeville's 2040 Comprehensive Plan were used as TDM inputs for this study. These development assumptions were allocated to a refined transportation analysis zone (TAZ) structure while preserving consistency with Met Council's regional and local development totals for household and employment growth. Year 2040 development assumptions were reviewed by the County and City for reasonableness and ultimately applied for all year 2040 build scenarios.

Transportation Network

The TDM roadway network developed for the City of Lakeville's Comprehensive Plan update was utilized for this study. Roadway functional classification and number of lanes were reviewed in this network for correctness. Local network detail was added to support the refined TAZ structure, land use development, and travel pattern changes resulting from the potential build conditions.

Two 2040 build scenarios were tested for this study:

1. Year 2040 Base Build – this scenario assumed reconstruction of 179th Street and its extension to future Diamond Path as a 55 mph three-lane roadway.
2. Year 2040 Build Sensitivity – this scenario assumed the reconstruction of 179th Street and its extension to Trunk Highway (TH) 3 as a 55 mph three-lane facility. This scenario was completed to evaluate the traffic impacts if 179th Street were extended further to TH 3 in the future and potential cross-section needs to accommodate the additional traffic.

Roadway network conditions assumed in both build scenarios:

- Removal/disconnection of existing Dodd Boulevard from east of Highview Avenue to 175th Street
- Realignment/new construction of 179th Street as a four-lane divided roadway from east of Highview Avenue to 179th Street

- $\frac{3}{4}$ access at the Dodd Boulevard/Cedar Avenue intersection
- Reduction of speed limit from 55 mph to 35 mph along Dodd Boulevard
- Addition of turn lanes at major intersections

Forecast Methodology

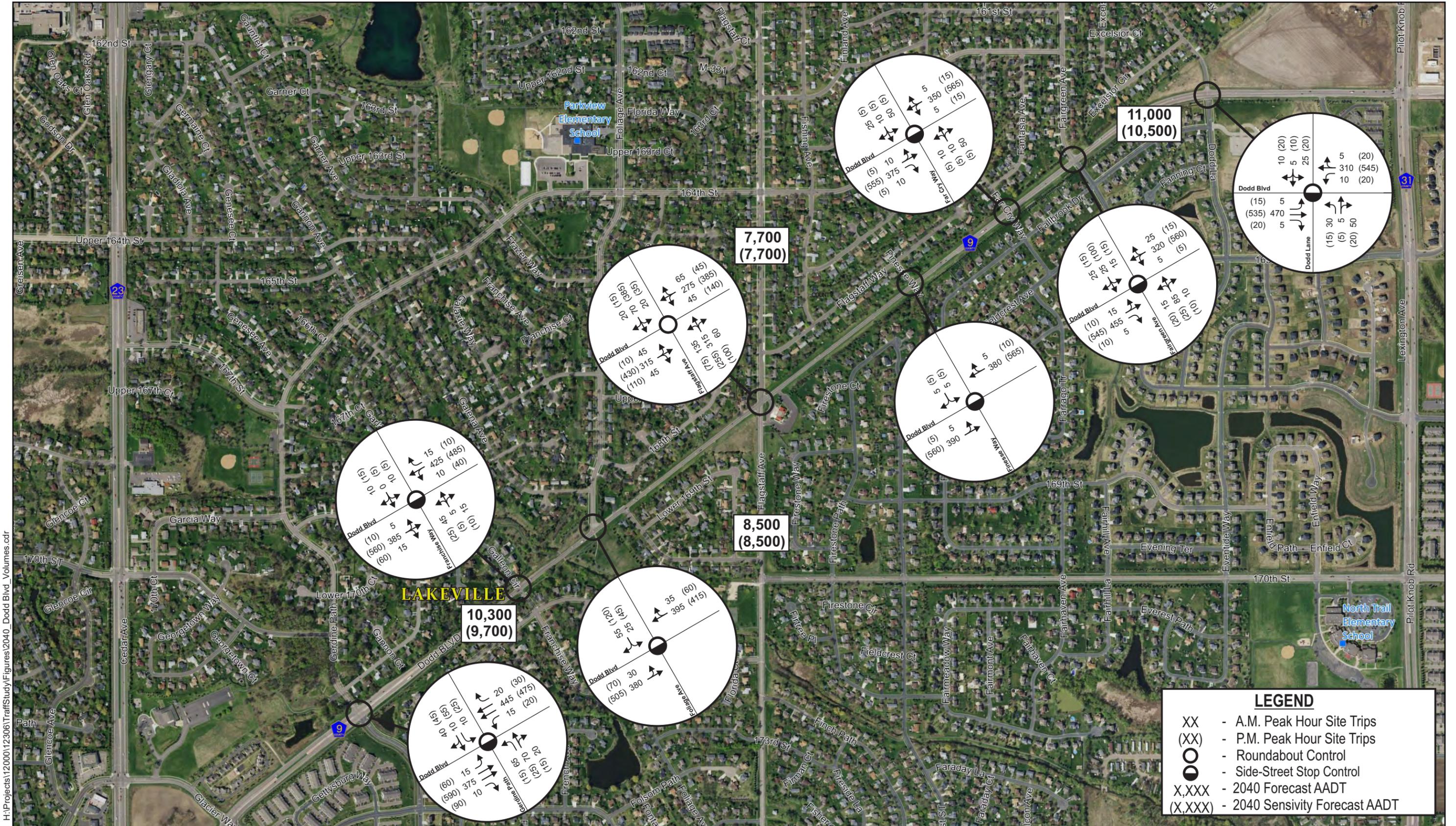
Daily Traffic Forecasts

The Year 2014 model network was used for validation and compared against MnDOT's observed traffic volumes (counts). Focus was given to roadways in the study area and the surrounding major county facilities due to the localized nature of this study. Travel demand models provide an estimation of traffic prediction that includes simplifications in the interactions between land use, roadway network, and travelers' behavior. With the uncertainty that comes with the modeling process, the model results should be considered estimates with some margin of error. MnDOT's current standard is to consider a precision of +/- 15 percent and decision-makers should be aware of the uncertainty in forecasts and whether that margin of error would affect outcomes or the recommended design. Daily traffic forecasts for this study were developed using National Cooperative Highway Research Program (NCHRP) adjustment standards to account for any residual error present in the model after validation.

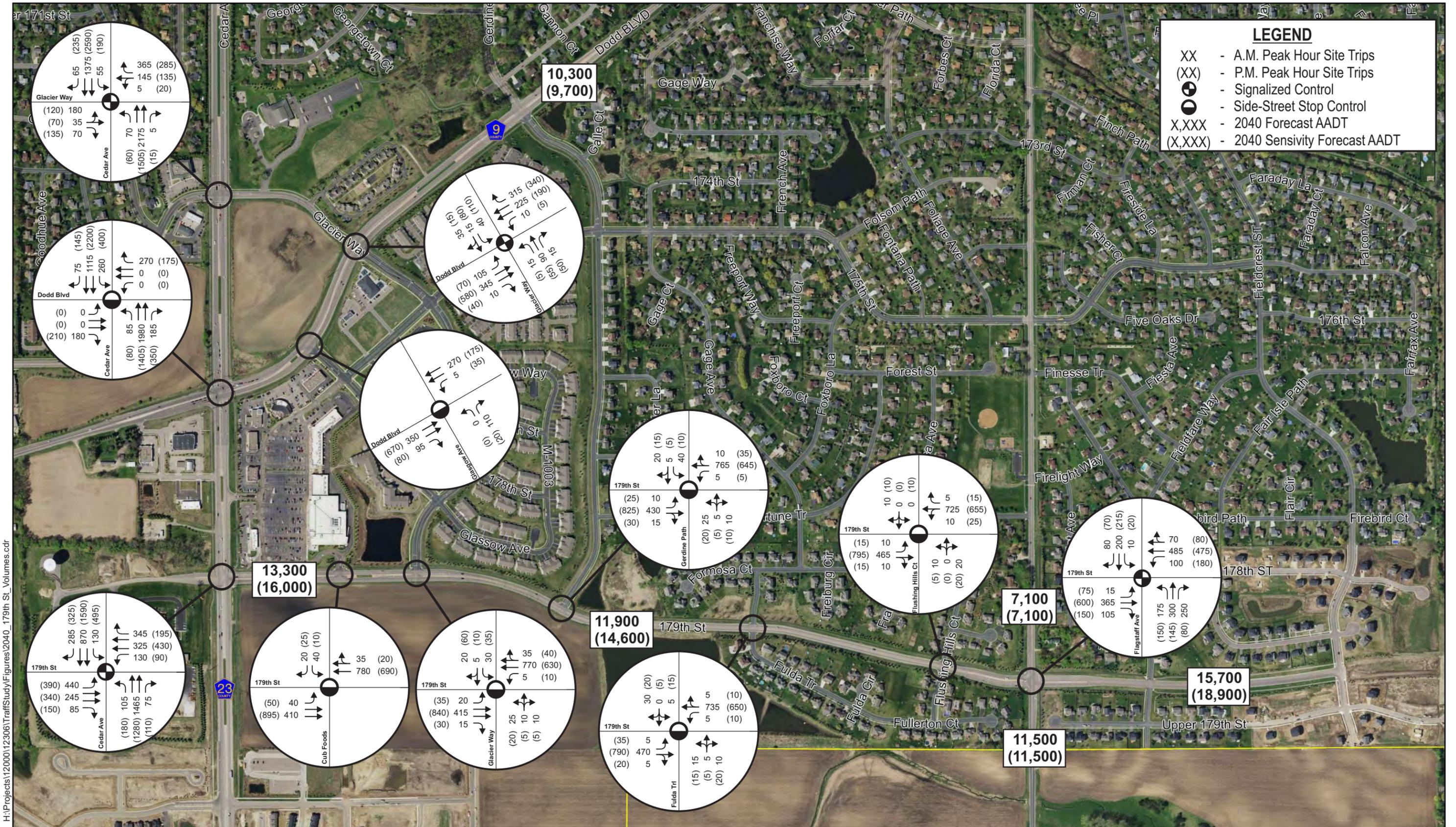
Turning Movement Forecasts

The daily traffic forecasts aided the development of year 2040 peak hour turning movement forecasts needed to evaluate year 2040 traffic operations at each study intersection. First, traffic volume growth on intersection approaches were calculated using the daily traffic forecasts and MnDOT's observed traffic volumes (counts). For intersection approaches where MnDOT data was not available, existing traffic volumes were estimated from existing turning movement volumes and land use. Using this growth, an iterative algorithm that inputs existing turning movements, peak hour percentages and geometric changes helped develop year 2040 peak hour turning movement forecasts. The developed turning movement forecasts accounted for the $\frac{3}{4}$ access conversions at the Dodd Boulevard/Cedar Avenue and Dodd Boulevard/Glasgow Avenue intersections. The forecasts were then balanced between intersections and checked for reasonableness.

Daily traffic forecasts and turning movement forecasts for 2040 Base Build (agreed upon future forecasts for base analysis) are shown in Figure 3 and Figure 4.



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Year 2040 No-Build Intersection Operations Analysis

A year 2040 no-build intersection operations analysis was completed to evaluate how the study intersections are expected to operate in the future if no geometric or traffic control changes are made. The intersections were evaluated with the existing geometry and traffic control, and year 2040 turning movements. The exceptions were as follows:

- Existing Dodd Boulevard/Flagstaff Avenue was assumed to be a single-lane roundabout with the construction underway in 2019.
- Dodd Boulevard/Glacier Way intersection assumed a traffic signal with the construction of one in 2019.
- Dodd Boulevard/Cedar Avenue intersection was assumed to be $\frac{3}{4}$ access.
- Dodd Boulevard/Glasgow Avenue intersection was assumed to be $\frac{3}{4}$ access.

The year 2040 no-build operation results are summarized in Table 3.

Table 3. 2040 No-Build Operations

Intersection	Delay (sec)		Level of Service (LOS)	
	A.M.	P.M.	A.M.	P.M.
Dodd Boulevard/Cedar Avenue	11	77	B	E
Dodd Boulevard/Glasgow Avenue ⁽¹⁾	2/7	1/7	A/A	A/A
Dodd Boulevard/Glacier Way	8	36	A	D
Dodd Boulevard/Gerdine Path ⁽¹⁾	6/28	10/30	A/D	B/D
Dodd Boulevard/Galleon Circle ⁽¹⁾	3/26	3/35	A/D	A/D
Dodd Boulevard/Foliage Avenue ⁽¹⁾	2/18	7/38	A/C	A/E
Dodd Boulevard/Flagstaff Avenue	5	8	A	A
Dodd Boulevard/Finesse Way ⁽¹⁾	1/18	1/23	A/C	A/C
Dodd Boulevard/Fairgreen Avenue ⁽¹⁾	8/57	16/127	A/F	C/F
Dodd Boulevard/Dodd Lane ⁽¹⁾	3/29	3/34	A/D	A/D
179th Street/Cedar Avenue	58	170	E	F
179th Street/Glacier Way ⁽¹⁾	44/126	57/86	E/F	F/F
179th Street/Gerdine Path ⁽¹⁾	81/156	100/75	F/F	F/F
179th Street/Fulda Trail ⁽¹⁾	119/46	140/66	F/F	F/F
179th Street/Flushing Hills Lane ⁽¹⁾	162/61	157/103	F/F	F/F
179th Street/Flagstaff Avenue ⁽¹⁾	155/>3 min	122/>3 min	F/F	F/F
Cedar Avenue/Glacier Way	53	134	D	F

1) Delay and LOS is the worst approach following by overall intersection operations.

The no-build operations analysis is summarized as follows:

- The 179th Street/Flagstaff Avenue intersection is expected to fail by year 2040 with the existing side-street stop control.
 - Queues from this intersection are expected to spillback through adjacent intersections during both the a.m. and p.m. peak hours, which results in poor operations along 179th Street.
- Southbound left-turn at Cedar Avenue/179th Street is not expected to have enough capacity to accommodate the heavy movement from southbound Cedar Avenue onto eastbound 179th Street in the p.m. peak hour.
 - This movement is expected to queue back to adjacent intersections and cause operational issues at the intersections to the north on Cedar Avenue.
- There is limited capacity for minor approaches at the Dodd Boulevard/Cedar Avenue intersection during the p.m. peak hour.

Based on the significant poor operations at the 179th Street/Flagstaff Avenue and Cedar Avenue/179th Street intersection that impact adjacent intersections, a modified no-build operations analysis was completed to understand the operations at the other study intersections if improvements are made to allow traffic to reach the intersections. The modified no-build analysis included:

- A signal was assumed at the 179th Street/Flagstaff Avenue intersection to allow vehicles to pass through the intersection and reach adjacent intersections.
- Dual southbound left-turn lanes from southbound Cedar Avenue onto eastbound 179th Street.

The year 2040 no-build operation results with these modifications are summarized in Table 4.

Table 4. 2040 No-Build Operations with Modifications

Intersection	Delay (sec)		Level of Service (LOS)	
	A.M.	P.M.	A.M.	P.M.
Dodd Boulevard/Cedar Avenue	17	22	B	C
Dodd Boulevard/Glasgow Avenue ⁽¹⁾	3/7	1/7	A/A	A/A
Dodd Boulevard/Glacier Way	8	9	A	A
Dodd Boulevard/Gerdine Path ⁽¹⁾	5/27	5/36	A/D	A/E
Dodd Boulevard/Galleon Circle ⁽¹⁾	3/28	4/57	A/D	A/F
Dodd Boulevard/Foliage Avenue ⁽¹⁾	3/20	9/50	A/C	A/F
Dodd Boulevard/Flagstaff Avenue	5	9	A	A
Dodd Boulevard/Finesse Way ⁽¹⁾	1/17	1/21	A/C	A/C
Dodd Boulevard/Fairgreen Avenue ⁽¹⁾	8/57	21/>3 min	A/F	C/F
Dodd Boulevard/Dodd Lane ⁽¹⁾	3/25	3/38	A/D	A/E
179th Street/Cedar Avenue	43	65	D	E
179th Street/Glacier Way ⁽¹⁾	3/32	3/35	A/D	A/D
179th Street/Gerdine Path ⁽¹⁾	4/39	4/34	A/E	A/D
179th Street/Fulda Trail ⁽¹⁾	2/30	3/33	A/D	A/D
179th Street/Flushing Hills Lane ⁽¹⁾	2/20	4/40	A/C	A/E
179th Street/Flagstaff Avenue	18	28	B	C
Cedar Avenue/Glacier Way	39	75	D	E

1) Delay and LOS is the worst approach following by overall intersection operations.

The results of the modified no-build traffic operations indicate that 179th Street will operate more efficiently if the 179th Street/Flagstaff Avenue intersection is improved, but there are still operational deficiencies. The modified no-build traffic operations are summarized as follows:

- Four intersections on Dodd Boulevard are expected to have side-street approaches that operate at LOS E or F during the p.m. peak hour - Dodd Boulevard/Gerdine Path, Dodd Boulevard/Galleon Avenue, Dodd Boulevard/Foliage Avenue, and Dodd Boulevard/Dodd Lane. These are low-volume movements and the delay for these approaches is less than one minute.
- The 179th Street/Cedar Avenue signalized intersection are expected to operate at LOS E during the p.m. peak hour.
- Two intersections on 179th Street are expected to have side-street approaches that operate at LOS E during the a.m. and p.m. peak hours - 179th Street/Gerdine Path and 179th

Street/Flushing Hills Lane. These are low-volume movements and the delay for these approaches is less than one minute.

- The southbound approach at the Dodd Boulevard/Fairgreen Avenue intersection is expected to operate at LOS F during both the a.m. and p.m. peak hours. The delay during the p.m. peak hour is greater than three minutes.

Year 2040 Cross-Section Alternatives Evaluation

The first step in the alternative evaluation process was to determine the cross-section of Dodd Boulevard and 179th Street. The initial determination of number of through lanes required was based on the year 2040 forecasted AADTs. The 2040 forecasted AADTs are summarized below:

- Year 2040 Base Build (179th Street extended to Diamond Path)
 - Dodd Boulevard: 9,700 to 11,000 between Gerdine Path and Dodd Lane
 - 179th Street: 11,900 between Gerdine Path and Flagstaff Avenue
- Year 2040 Build Sensitivity (179th Street extended to TH 3)
 - Dodd Boulevard: 9,200 to 10,500 between Gerdine Path and Dodd Lane
 - 179th Street: 14,600 between Gerdine Path and Flagstaff Avenue

These AADTs were compared to planning AADT capacities for different roadway types to understand the needs of the corridor at a high level. The planning-level capacities that were used to assist with determining the roadway cross-section are shown in Table 5.

Table 5. Planning Level Roadway Capacities

Roadway Type	Planning-Level Daily Capacity (AADT)	Approaching Capacity (85% AADT)
Two-lane undivided urban	10,000	8,500
Three-lane (two-lane with turn lanes)	17,000	14,450
Four-lane undivided urban	22,000	18,700
Five-lane urban (four-lane with turn lanes)	32,000	27,200

The daily forecasts indicate that the roadways would be over capacity for a two-lane roadway, but within capacity constraints for a three-lane roadway; therefore, a three-lane roadway was recommended for alternative evaluation. A three-lane roadway was evaluated to understand delays on the side-streets for vehicles trying to turn into the traffic flow on Dodd Boulevard and 179th Street, and to understand if the intersections would operate acceptably.

Year 2040 Build Traffic Operations Analysis

A year 2040 build traffic operations analysis was completed to affirm the three-lane corridor configuration for Dodd Boulevard and 179th Street, and to determine appropriate traffic control and intersection geometry throughout.

Based on the outcomes from the no build analysis, several geometric assumptions were made to begin the build traffic operations analysis - as follows:

- Dodd Boulevard and 179th Street were assumed with a three-lane roadway within the study limits (where appropriate). Right-turn lanes were also assumed at most intersections along 179th Street and specific intersections along Dodd Boulevard based on turning volumes, the posted speed limit, and land use considerations.
- Cedar Avenue was converted from a four-lane to six-lane roadway. Converting Cedar Avenue to six lanes is not recommended now; this update to the model allowed the travel demand to reach the study intersections so they could be evaluated fully.
- Intersection of 179th Street/Gerdine Path was converted to right-in/right-out (RIRO). This was done to reduce pass-by traffic along Gerdine Path due to significant driveway accesses.
- Intersection of 179th Street/Flushing Hills Court was converted to RIRO. This was done because the queues are expected to spillback from the 179th Street/Flagstaff Avenue intersection.

The results of the 2040 build traffic operations analysis are shown in Table 6.

Table 6. 2040 Build Operations

Intersection	Delay (sec)		Level of Service (LOS)	
	A.M.	P.M.	A.M.	P.M.
Dodd Boulevard/Cedar Avenue	6	6	A	A
Dodd Boulevard/Glasgow Avenue ⁽¹⁾	2/7	1/7	A/A	A/A
Dodd Boulevard/Glacier Way	9	9	A	A
Dodd Boulevard/Gerdine Path ⁽¹⁾	5/26	5/37	A/D	A/E
Dodd Boulevard/Galleon Circle ⁽¹⁾	3/25	3/45	A/D	A/E
Dodd Boulevard/Foliage Avenue ⁽¹⁾	2/16	5/31	A/C	A/D
Dodd Boulevard/Flagstaff Avenue	5	11	A	B
Dodd Boulevard/Finesse Way ⁽¹⁾	1/15	1/27	A/C	A/D
Dodd Boulevard/Fairgreen Avenue ⁽¹⁾	8/58	19/172	A/F	C/F
Dodd Boulevard/Dodd Lane ⁽¹⁾	3/25	3/36	A/D	A/E
179th Street/Cedar Avenue	37	48	D	D
179th Street/Glacier Way ⁽¹⁾	4/38	3/45	A/E	A/E
179th Street/Gerdine Path ⁽¹⁾	1/16	2/15	A/C	A/C
179th Street/Fulda Trail ⁽¹⁾	3/34	3/42	A/D	A/E
179th Street/Flushing Hills Lane ⁽¹⁾	1/13	2/20	A/B	A/C
179th Street/Flagstaff Avenue	21	26	C	C
Cedar Avenue/Glacier Way	23	26	C	C

1) Delay and LOS is the worst approach following by overall intersection operations.

The 2040 build traffic operations analysis results indicate the following:

- All intersections are expected to operate acceptably overall with the geometric changes assumed above. A three-lane cross-section will provide acceptable operations.
- Two intersections on Dodd Boulevard are expected to have side-street approaches that operate at LOS E during the p.m. peak hour - Dodd Boulevard/Gerdine Path and Dodd Boulevard/Galleon Avenue. These are low-volume movements and the delay for these approaches is less than one minute.
- Two intersections on 179th Street are expected to have side-street approaches that operate at LOS F during the p.m. peak hour - 179th Street/Glacier Way and 179th Street/Fulda Trail. These are low-volume movements and the delay for these approaches are at or below one and a half minutes.

- The southbound approach at the Dodd Boulevard/Fairgreen Avenue intersection is expected to operate at LOS F during both the a.m. and p.m. peak hours. The delay during the p.m. peak hour is almost three minutes for the southbound approach. The delay for this approach may ultimately not get this high in the future because vehicles may currently be diverting to Fairgreen Avenue to avoid the longer delay and queues at the Dodd Boulevard/Flagstaff Avenue intersection. The Dodd Boulevard/Flagstaff Avenue intersection will be open as a single-lane roundabout in 2020, which is expected to operate at LOS B under year 2040 conditions - anticipating less incentive to divert.

179th Street/Flagstaff Avenue Intersection Traffic Control Evaluation

Once it was determined that a three-lane cross-section would provide acceptable operations under year 2040 conditions, the recommended traffic control at 179th Street/Flagstaff Avenue was further reviewed. The no-build traffic operations indicate that the existing side-street stop control will not provide acceptable operations, and a review of turning movement volumes also indicate all-way stop control (AWSC) will not provide acceptable operations. Therefore, a traffic signal and roundabout were evaluated.

The roundabout was analyzed assuming a single-lane roundabout on all four approaches and the signal was analyzed assuming a left-turn lane, thru lane, and right-turn lane on all four approaches. The resultant year 2040 traffic operations are shown in Table 7.

Table 7. 2040 Traffic Operations at 179th Street/Flagstaff Avenue

Alternative	Delay (sec)		Level of Service (LOS)	
	A.M.	P.M.	A.M.	P.M.
Signal	21	26	C	C
Roundabout	11	15	B	C

The operations analysis results indicate a roundabout is expected to operate more efficiently during both peak hours, with approximately 10 seconds less delay overall (40-50% more efficient). In addition, the operational benefits of a roundabout include:

- Roundabouts provide a safety benefit compared to traffic signals. Roundabouts have shown over an 80 percent reduction in fatal and serious injury crashes.
- The footprint of the roundabout is approximately 10 percent smaller than a traffic signal due to turn lanes needed for a traffic signal.
- The cost of a roundabout is approximately 16 percent less compared to a traffic signal due to the smaller footprint and not needing signal equipment.
- Future traffic volumes are forecasted to be balanced among all approaches.

Roundabout



Traffic Signal



While the roundabout is approximately 10 percent smaller than a traffic signal due to turn lanes needed for a traffic signal, it impacts 4 properties, with the signal impacting 2 properties.

Based on the overall benefits discussed above, it is recommended to implement a roundabout at the 179th Street/Flagstaff Avenue intersection.

Roundabout Design

179th Street is ultimately planned to be extended further east to TH 3. Traffic volumes are forecasted to increase if this extension occurs. A sensitivity analysis was completed to “right-size” the roundabout at 179th Street/Flagstaff Avenue, and create a design that is flexible allowing for expansion if needed in the future. The sensitivity analysis traffic operations assumed 179th Street is extended to TH 3 under year 2040 conditions (Year 2040 Build Sensitivity forecasts).

Table 8 presents a comparison of the two-traffic volume turning movements under consideration with the varying conditions (Base Build versus Build Sensitivity). The eastbound/westbound movements are the most significant difference.

Table 8. 179th Street/Flagstaff Avenue 2040 Turning Movement Forecasts

Turning Movement	A.M.		P.M.	
	179th Street to Diamond Path (Base Build)	179th Street to TH 3 (Build Sensitivity)	179th Street to Diamond Path (Base Build)	179th Street to TH 3 (Build Sensitivity)
NBL	175	185	150	165
NBT	300	285	145	130
NBR	250	275	80	70
SBL	10	15	20	20
SBT	200	190	215	195
SBR	80	95	70	85
EBU	20	20	20	20
EBL	15	20	75	90
EBT	365	525	600	690
EBR	105	115	150	170
WBL	100	90	180	195
WBT	485	560	475	660
WBR	70	75	80	90

Three different geometric conditions were reviewed with the roundabout:

- Single-lane roundabout
- 2x1 roundabout with the outside eastbound and westbound lanes dropping as a right-turn at the roundabout
- 2x1 roundabout that carries two eastbound and westbound lanes through the roundabout

The results of the analysis are summarized in Table 9.

Table 9. 179th Street/Flagstaff Avenue Traffic Volume Sensitivity Test

Roundabout Geometry	Delay (sec)		Level of Service (LOS)	
	A.M.	P.M.	A.M.	P.M.
Single-Lane Roundabout	25	52	D	F
2x1 Roundabout (EB/WB right-lane drop)	22	23	C	C
2x1 Roundabout (2 lanes through EB/WB)	15	8	C	A

The results indicate that a single-lane roundabout is expected to fail under the p.m. peak if 179th Street is extended to TH 3. Developing a second lane eastbound and westbound in some fashion will help provide acceptable operations.

While the overall delay is acceptable with the eastbound and westbound right-lane drop geometry, one approach fails (LOS F) during the a.m. and p.m. peak hours with queues extending over 700 feet. Developing two lanes prior to the roundabout and carrying them through the roundabout provides the most efficient operations without any of the approaches failing.

Based on this sensitivity test, it is recommended to construct the roundabout such that it can be converted to a 2x1 roundabout with two lanes through the intersection in the eastbound and westbound directions if needed in the future. This can be done by widening the approaches and striping them out so they are not used as a lane and bringing in the noses of the splitter islands towards the central island to limit it so there is only one lane through the roundabout. The striping and splitter islands can be modified in the future to carry two lanes through the roundabout when conversion is needed operationally.

Opening Year Analysis

An opening year analysis was completed for the 179th Street/Flagstaff Avenue intersection to determine the recommended traffic control and geometry when the project opens in 2020/2021. The alternatives evaluated are:

- Side-street stop control (no build)
- All-way stop control (AWSC) with the existing geometry
- Single-lane roundabout

The results of the opening year analysis are shown in Table 10.

Table 10. 179th Street/Flagstaff Avenue Year of Opening Operations

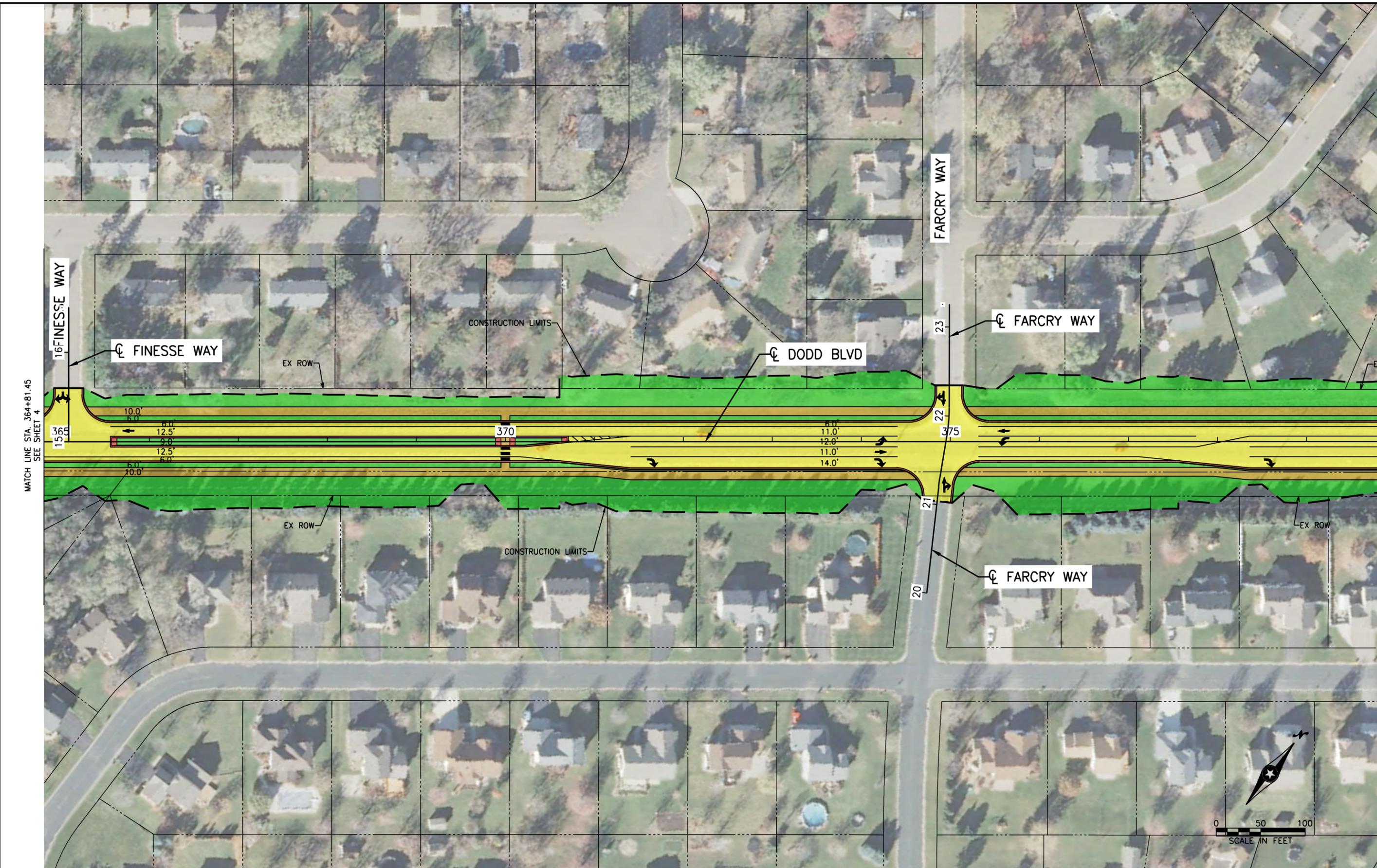
Alternative	Delay (sec)		Level of Service (LOS)	
	A.M.	P.M.	A.M.	P.M.
Side-Street Stop Control	26/46	139/>3 min	D/E	F/F
All-Way Stop Control	30	62	D	F
Single-Lane Roundabout	4	5	A	A

The operations analysis indicates that side-street stop control and AWSC are expected to fail upon opening day, while a single-lane roundabout is expected to operate with LOS A. Based on this, and the comments that follow, it is recommended to construct the roundabout as part of the project and have the roundabout in place opening day.

- A significant shift in traffic is expected once 179th Street extends to Pilot Knob Road and the connection of 179th Street is made to Highview Avenue. It is understood that the connection of 179th Street to Highview Avenue may not coincide with this construction project, but planning for it is necessary.
- The existing 179th Street/Flagstaff Avenue intersection is a large intersection with multiple lanes on each approach, which can be confusing to drivers to determine who has the right-of-way to proceed through the intersection when there are many lanes.
- A single-lane roundabout is “warranted” and will provide acceptable operations for ten plus years.
- A roundabout will also help facilitate U-turns from the adjacent intersection(s) that may be restricted accesses onto 179th Street (RIRO).
- Construction costs are lower including the roundabout in the 2020/2021 construction project compared to completing it as part of a separate project later.

Appendix B. Dodd Boulevard Concept Design Layout Details

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 Date: / / License # 45427

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 COUNTY PROJECT NO. _____
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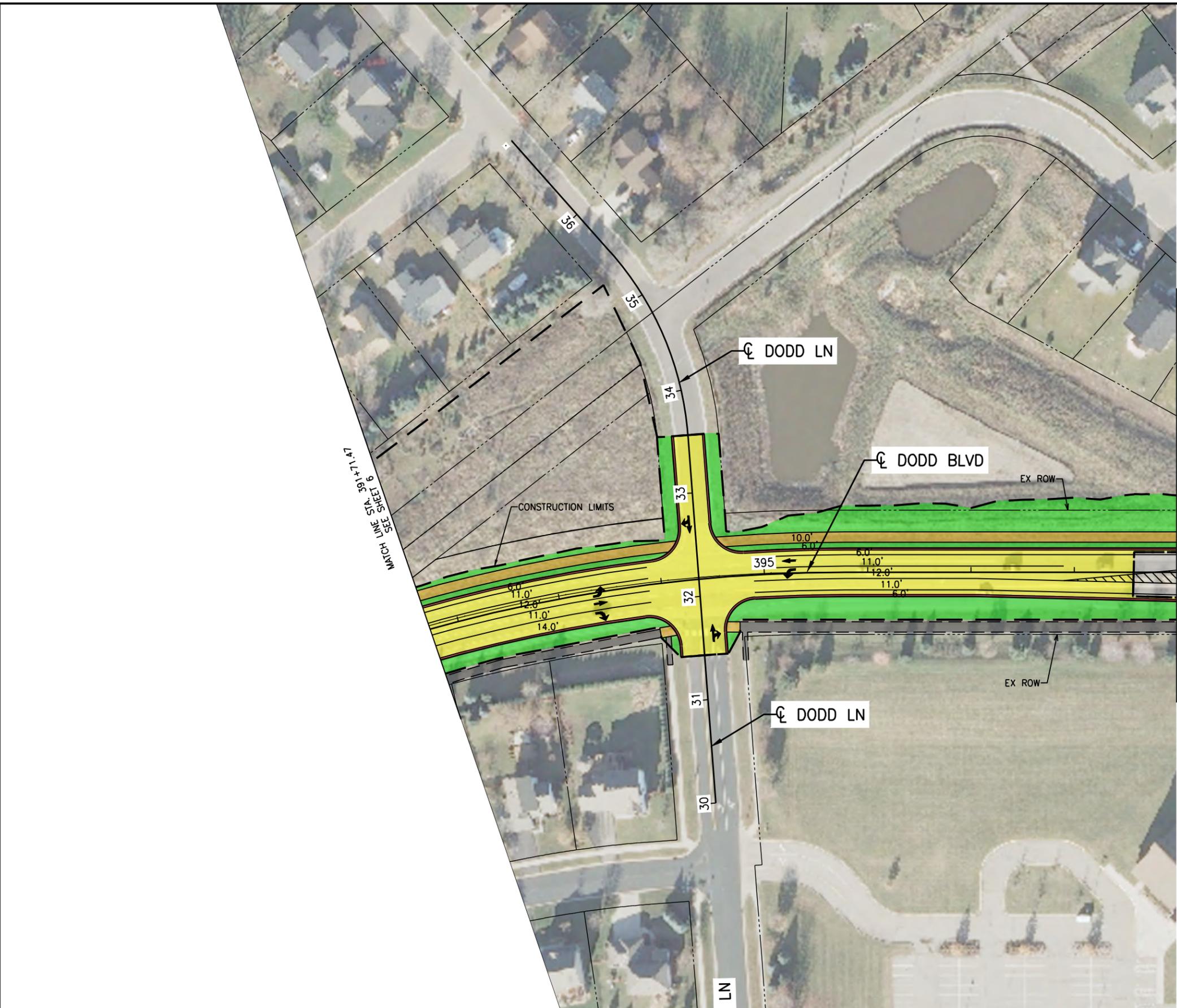
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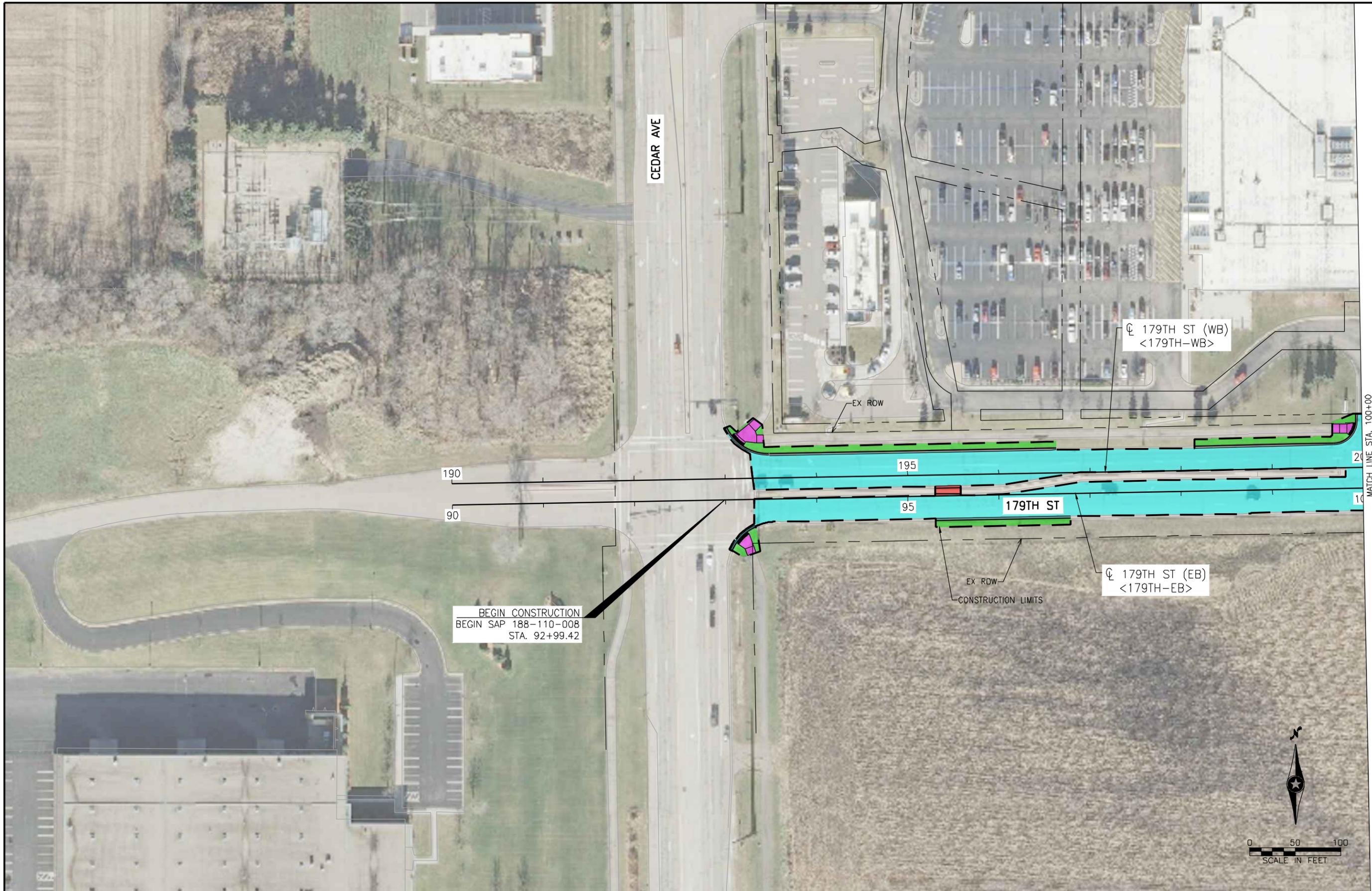
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Appendix C. 179th Street Design Layout Details



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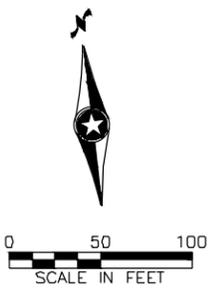
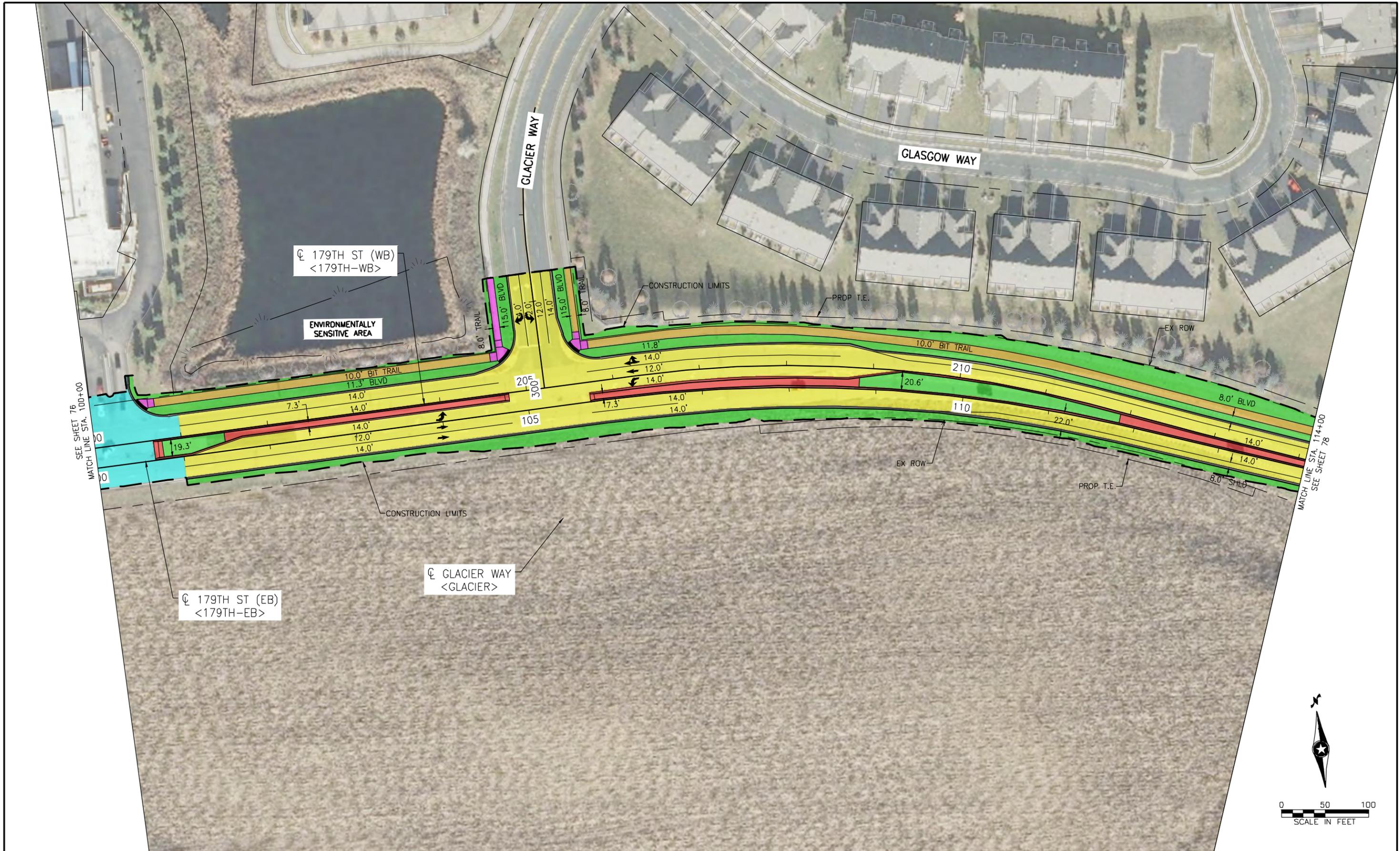
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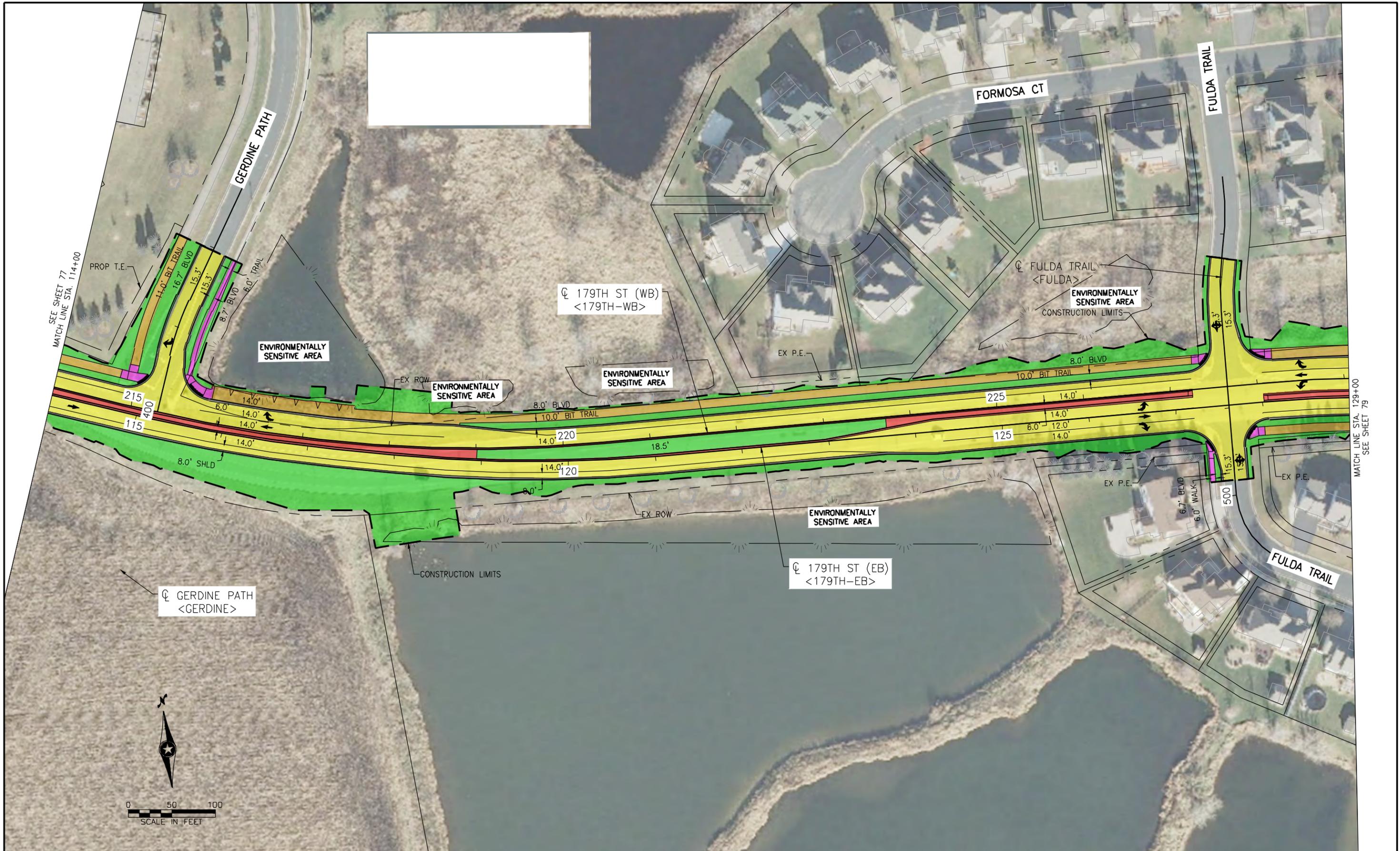
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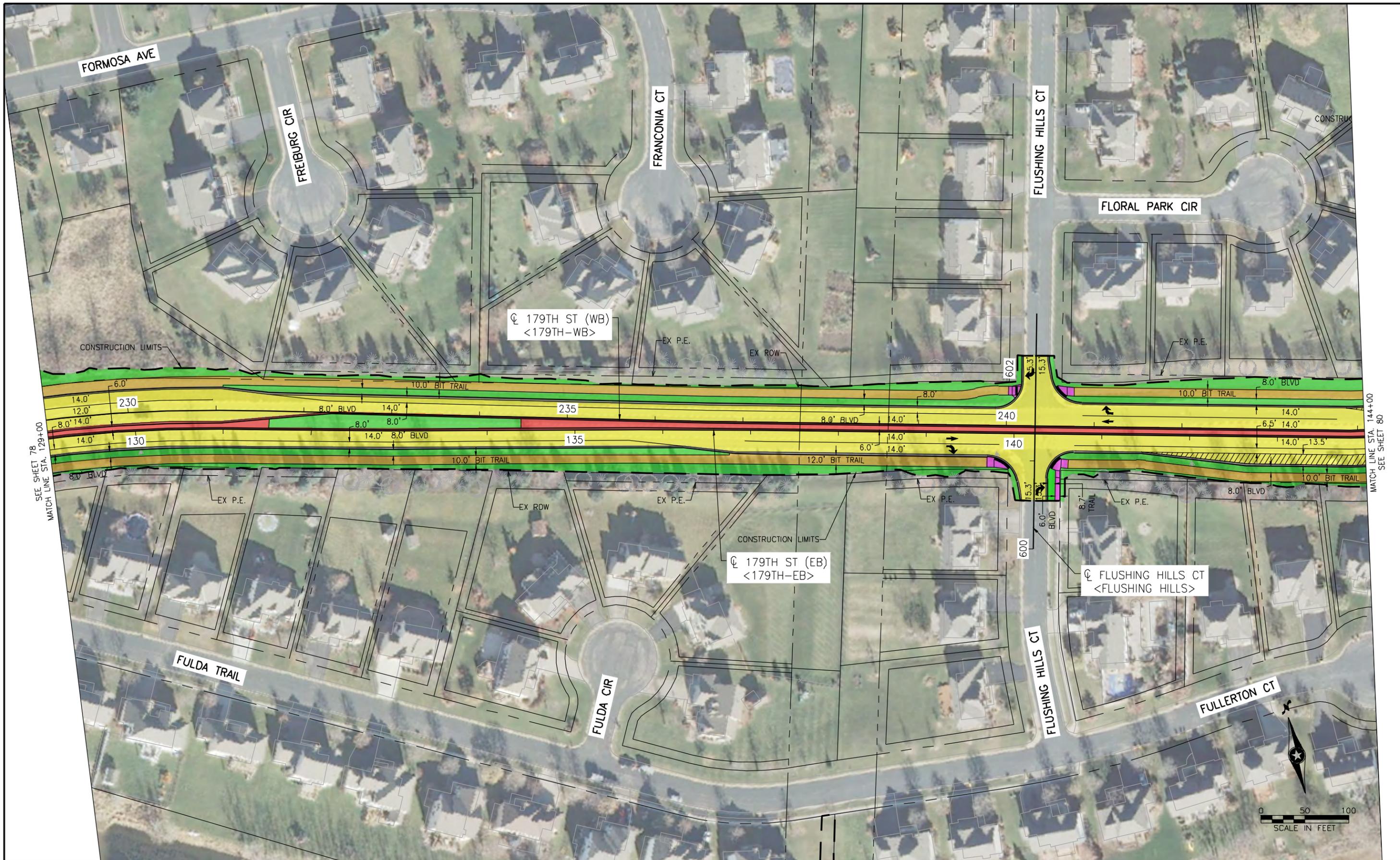
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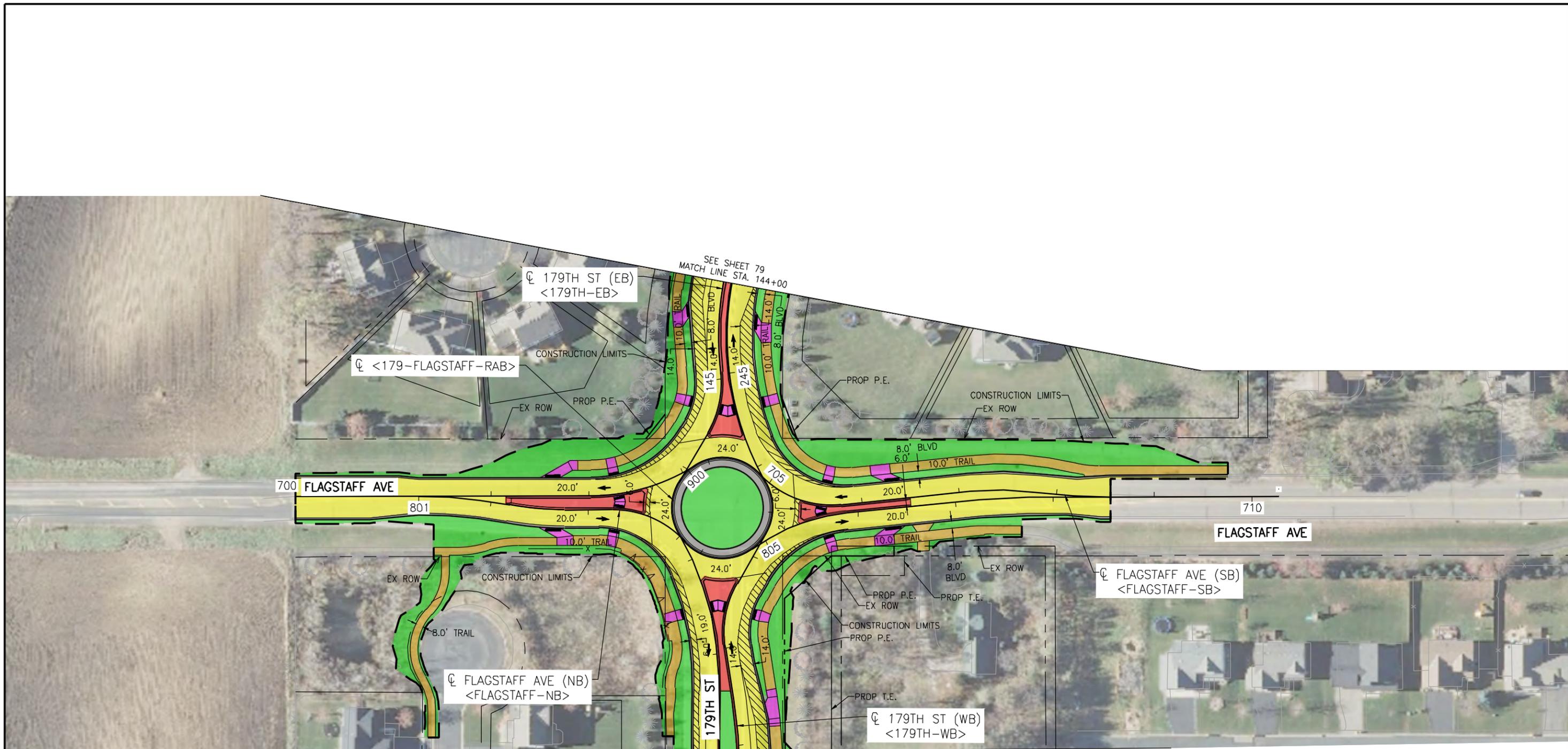
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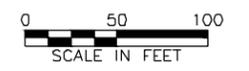


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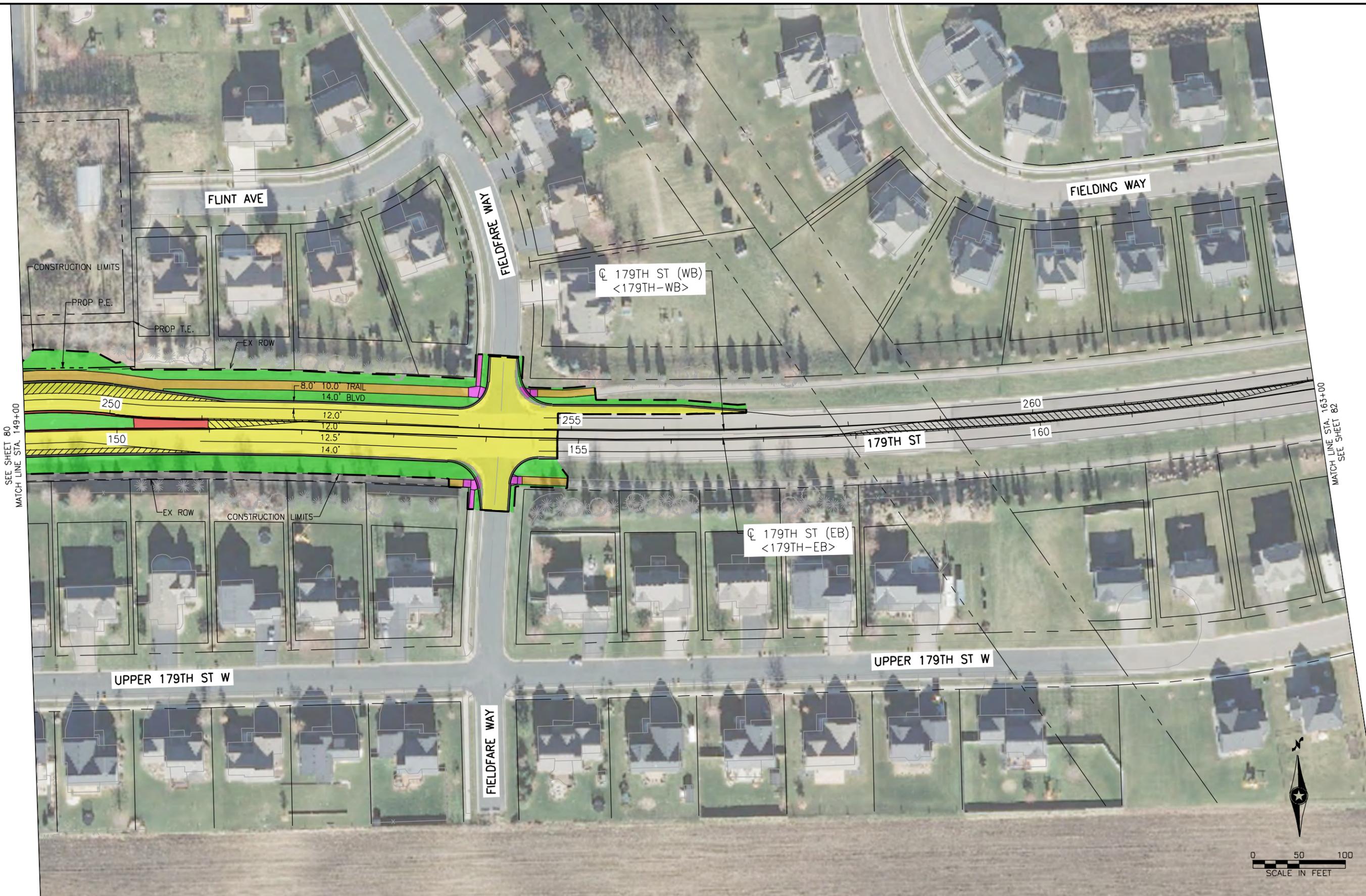
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MATCH LINE STA. 163+00
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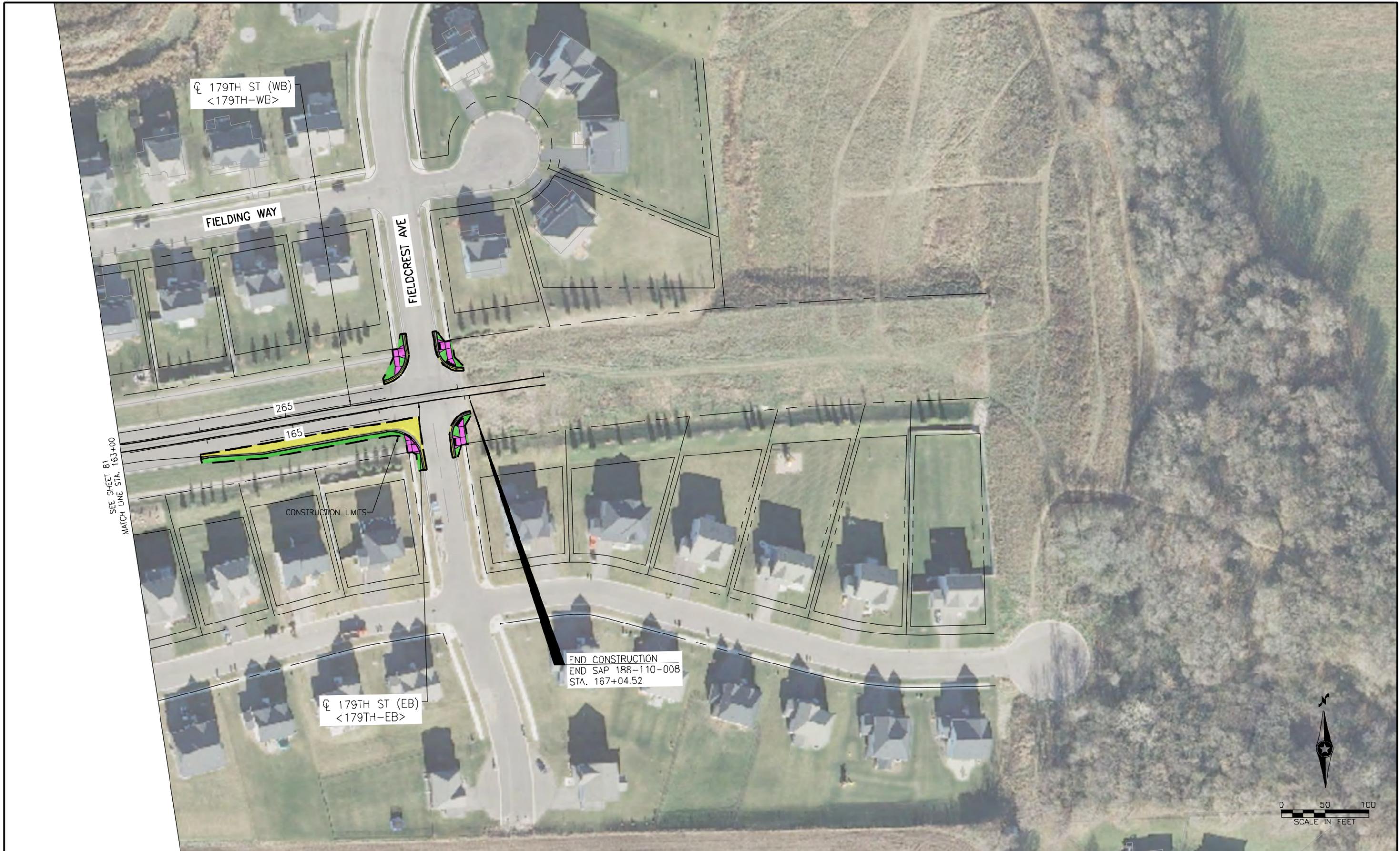
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☉ 179TH ST (WB)
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FIELDING WAY

FIELDCREST AVE

265

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CONSTRUCTION LIMITS

END CONSTRUCTION
END SAP 188-110-008
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☉ 179TH ST (EB)
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Appendix D. Planning-Level Cost Estimates



Dodd Blvd or (CSAH 9) Corridor Study

Concept Cost Estimate (based upon 2018 bid price information)

Prepared By: SRF Consulting Group, Inc., **November 11, 2019**

				179th Street	
ITEM DESCRIPTION	UNIT	UNIT PRICE	EST. QUANTITY	EST. AMOUNT	
PAVING AND GRADING COSTS					
GrP 1a	2106 Excavation - common & subgrade	cu. vd.	\$8.00	45,300	\$362,400
GrP 2a	2106 Common Embankment (CV)	cu. vd.	\$5.00	42,000	\$210,000
GrP 2d	2106 Granular Subgrade (CV)	cu. vd.	\$20.00	18,900	\$378,000
GrP 3a	Mainline Pavement	(1) (3) sq. vd.	\$36.00	38,200	\$1,375,200
GrP 3h	Driveway Pavement	(1) sq. vd.	\$20.00	200	\$4,000
GrP 4a	Concrete Walk / Trail / Median	(2) sq. vd.	\$50.00	1,200	\$60,000
GrP 4b	Bituminous Walk / Trail	(2) sq. vd.	\$35.00	15,500	\$542,500
GrP 4c	ADA Pedestrian Curb Ramp	each	\$1750.00	30	\$52,500
GrP 5	Concrete Curb and Gutter	lin. ft.	\$25.00	18,000	\$450,000
GrP 7	Pavement Edge Drains	lin. ft.	\$8.00	7,500	\$60,000
GrP 8a	Removals - Pavement	sq. vd.	\$6.00	33,400	\$200,400
GrP 8c	Removals - Drainage	l.s.	\$50,000	1	\$50,000
SUBTOTAL PAVING AND GRADING COSTS:					\$3,745,000
DRAINAGE, UTILITIES AND EROSION CONTROL					
Dr 3	Water Quality Ponds	l.s.	\$250,000	1	\$250,000
Dr 5	Drainage - urban	35%			\$1,311,000
Dr 7	Turf Establishment & Erosion Control	8%			\$300,000
Dr 8	Landscaping	1%			\$38,000
SUBTOTAL DRAINAGE, UTILITIES AND EROSION CONTROL					\$1,899,000
RETAINING WALLS & OTHER MINOR STRUCTURAL COSTS					
	Box Culvert - 10x8	(4) lin. ft.	\$1,200	30	\$36,000
	Box Culvert 10x4	(4) lin. ft.	\$1,000	20	\$20,000
	Box Culvert - End	(4) each	\$22,000	2	\$44,000
SUBTOTAL RETAINING WALLS & OTHER MINOR STRUCTURAL COSTS:					\$100,000
SIGNAL AND LIGHTING COSTS					
SGL 3	At Grade Intersection Lighting (permanent - non signalized)	each	\$10,000	11	\$110,000
SGL 4	Mainline Lighting (permanent)	mile	\$200,000	1.6	\$320,000
SUBTOTAL SIGNAL AND LIGHTING COSTS:					\$430,000
SIGNING & STRIPING COSTS					
SGN 1	Mainline Signing (C&D)	mile	\$35,000	1.6	\$56,000
SGN 2	Mainline Striping	mile	\$5,000	1.6	\$8,000
SUBTOTAL SIGNING & STRIPING COSTS:					\$64,000
SUBTOTAL CONSTRUCTION COSTS:					\$6,238,000
MISCELLANEOUS COSTS					
M 1	Mobilization	5%			\$312,000
M 2	Non Quantified Minor Items	3%			\$188,000
M 7	Temporary Pavement & Drainage	2%			\$125,000
M 8	Traffic Control	3%			\$188,000
SUBTOTAL MISCELLANEOUS COSTS:					\$813,000
ESTIMATED TOTAL CONSTRUCTION COSTS without Contingency:					\$7,051,000
1	Contingency or "risk"	20%			\$1,411,000
ESTIMATED TOTAL CONSTRUCTION COSTS PLUS CONTINGENCY:					\$8,462,000
OTHER PROJECT COSTS:					
DESIGN ENG. & CONSTRUCTION ADMIN.		Lump Sum	20%		\$1,693,000
SUBTOTAL OTHER PROJECT COSTS					\$1,693,000
TOTAL PROJECT COST					\$10,155,000
INFLATION COST (CURRENT YR. TO YR. OF OPENING)					
	Years	4%	3		\$1,268,000
TOTAL PROJECT COST (OPENING YEAR DOLLARS)					\$11,423,000

NOTE: Cost Estimate does not include wetland mitigation, R/W acquisitions, and utility agreements
 (1) Includes aggregate base class 5 (estimated section 9" bit over 7" class 5)
 (2) Includes aggregate base class 5.
 (3) Does not include pavement edge drains, see separate item
 (4) Does not include excavation or backfill.



CR 9 & 179th Street Corridor Study

Concept Cost Estimate (based upon 2018 bid price information)

Prepared By: SRF Consulting Group, Inc., June 28, 2019

				179th Street	
ITEM DESCRIPTION		UNIT	UNIT PRICE	EST. QUANTITY	EST. AMOUNT
PAVING AND GRADING COSTS					
GrP 1a	2106 Excavation - common & subgrade	cu. yd.	\$8.00	31,500	\$252,000
GrP 2a	2106 Common Embankment (CV)	cu. yd.	\$5.00	6,000	\$30,000
GrP 2d	2106 Granular Subgrade (CV)	cu. yd.	\$20.00	15,200	\$304,000
GrP 3a	Mainline Pavement	(1) sq. yd.	\$36.00	34,000	\$1,224,000
GrP 4a	Concrete Walk / Trail / Median	(2) sq. yd.	\$50.00	4,400	\$220,000
GrP 4b	Bituminous Walk / Trail	(2) sq. yd.	\$35.00	9,200	\$322,000
GrP 4c	ADA Pedestrian Curb Ramp	each	\$1750.00	20	\$35,000
GrP 5	Concrete Curb and Gutter	lin. ft.	\$25.00	22,600	\$565,000
GrP 7	Pavement Edge Drains	lin. ft.	\$8.00	12,700	\$101,600
GrP 8a	Removals - Pavement	sq. yd.	\$6.00	50,300	\$301,800
GrP 8c	Removals - Drainage	l.s.	\$110,000	1	\$110,000
SUBTOTAL PAVING AND GRADING COSTS:					\$3,465,400
DRAINAGE, UTILITIES AND EROSION CONTROL					
Dr 3	Water Quality Ponds	l.s.	\$50,000	1	\$50,000
Dr 5	Drainage - urban	20%			\$694,000
Dr 7	Turf Establishment & Erosion Control	8%			\$278,000
Dr 8	Landscaping	1%			\$35,000
SUBTOTAL DRAINAGE, UTILITIES AND EROSION CONTROL					\$1,057,000
RETAINING WALLS & OTHER MINOR STRUCTURAL COSTS					
RW 28	Large Block Gravity Wall	sq. ft.	\$48	625	\$30,000
SUBTOTAL RETAINING WALLS & OTHER MINOR STRUCTURAL COSTS:					\$30,000
SIGNAL AND LIGHTING COSTS					
SGL 3	At Grade Intersection Lighting (permanent - non signalized)	each	\$10,000	16	\$160,000
SGL 4	Mainline Lighting (permanent)	mile	\$200,000	1.0	\$200,000
SUBTOTAL SIGNAL AND LIGHTING COSTS:					\$360,000
SIGNING & STRIPING COSTS					
SGN 1	Mainline Signing (C&D)	mile	\$35,000	1.0	\$35,000
SGN 2	Mainline Striping	mile	\$5,000	1.0	\$5,000
SUBTOTAL SIGNING & STRIPING COSTS:					\$40,000
SUBTOTAL CONSTRUCTION COSTS:					\$4,952,400
MISCELLANEOUS COSTS					
M 1	Mobilization	5%			\$248,000
M 2	Non Quantified Minor Items	3%			\$149,000
M 7	Temporary Pavement & Drainage	2%			\$100,000
M 8	Traffic Control	3%			\$149,000
SUBTOTAL MISCELLANEOUS COSTS:					\$646,000
ESTIMATED TOTAL CONSTRUCTION COSTS without Contingency:					\$5,598,400
1	Contingency or "risk"	20%			\$1,120,000
ESTIMATED TOTAL CONSTRUCTION COSTS PLUS CONTINGENCY:					\$6,718,400
OTHER PROJECT COSTS:					
DESIGN ENG. & CONSTRUCTION ADMIN.		Lump Sum	20%		\$1,344,000
SUBTOTAL OTHER PROJECT COSTS					\$1,344,000
TOTAL PROJECT COST					\$8,062,400
INFLATION COST (CURRENT YR. TO YR. OF OPENING)					
	Years	4%		1	\$322,500
TOTAL PROJECT COST (OPENING YEAR DOLLARS)					\$8,384,900

NOTE: Cost Estimate does not include wetland mitigation, R/W acquisitions, and utility agreements.
(1) Includes aggregate base class 5 (estimated section 9" bit over 7" class 5).
(2) Includes aggregate base class 5.