2018 Multi-Modal Study

City of Burnsville

February 15, 2019

Prepared by: Stonebrooke Engineering

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

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Date: February 15, 2019
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STUDY PURPOSE AND NEED

The City of Burnsville is an active community seeking a plan to improve and add to its multi-modal system to provide its residents with multiple and safe transportation options throughout the city to many points of interest including parks, schools, restaurants, transit and retail destinations. The city understands the growing need for these transportation amenities as people are increasingly seeking healthier lifestyles for many reasons; better physical health, financial benefits, and a greater sense of community and connectivity in their neighborhoods and surrounding area.

While providing these multi-modal amenities is key to creating a strong and healthy community, it is also important to consider the existing transportation infrastructure and vehicular transportation needs to provide a safe and balanced system that meets the expectations and needs of all users.

The city has an existing off-road trail and sidewalk system that provides both bicyclists and pedestrians with safe and comfortable accommodations. As community bicycling becomes more popular, the city has identified a need for on-street bicycle lanes.

The purpose of this study is to:

- Evaluate segments of roadway within the existing city system for potential on-street and shared use bike lanes based on existing roadway characteristics, including existing roadway, shoulder and parking lane widths, traffic volumes, crash history, presence of adjacent off-road facilities, proximity to points of interest and ties to other jurisdictions' systems.
- Identify a public outreach process that will also help identify potential implementation locations.
- Recommend and rank, with input from the city and the public, potential options for bike lane implementation locations the city can seamlessly incorporate into its system.
- Provide information and details for design and construction elements.
- Provide a preliminary cost to implement the recommended implementation segments.

Background Information

Generally, the information used in preparing this report includes the following:

- City of Burnsville GIS inventory data
    - Existing trail and sidewalk widths and pavement types
    - Planned loops and City bike and pedestrian shared use routes
        - Grand Loop map (see **Appendix A**)
        - Lac Lavon route (see **Appendix A**)
    - Existing roadway widths and pavement types
    - Existing roadway posted speeds
    - Existing roadway route type
    - Proposed trails and priority of implementation
- Burnsville Draft 2040 Comprehensive Plan
- Proposed city multi-modal project concept layouts – Lake Marion Greenway and trail construction connecting Rose Bluff neighborhood to Rudy Kraemer Nature Preserve Trails

- Field collected data
- Minnesota Crash Mapping Analysis Tool – 2011-2015 Crash Data
- Minnesota State Aid Standards
- MnDOT Bikeway Design Standards
- Minnesota Standard Signs Summary
- Discussions with city staff

EXISTING CONDITIONS

The city does not currently have any dedicated on-street or shared use bike lanes in its system. The existing city trail/shared use path system provides many routes, but there are some gaps within the system that have the potential to be connected by using dedicated on-street and shared use bike lanes. Existing street paved widths could be utilized for proposed on-street and shared bike lanes to make these connections and potentially close loops for bicyclists within the system.

Existing System Map

The existing system map with city walk/trail/shared use path loops and routes is shown in **Appendix A**. The planned city trail systems of the Grand Loop and Lac Lavon route are also identified on the map. The map also identifies existing paved trails, sidewalks and points of interest.

Figure 1 and **Figure 2** are images of a study intersection at Cliff Rd and West River Hills Dr.

Figure 1

Figure 2

Figure 3 shows an image of the small section of the inplace trail near Crystal Lake off of Lac Lavon Drive.

Figure 3

Figure 4 and **Figure 5** are images of existing pedestrian sidewalks along Lac Lavon Drive. This is a 2-lane roadway with wide shoulders.

Figure 4

Figure 5

The photos shown in **Figures 1-5** represent typical existing intersection types and road lane configurations within the city that could potentially be converted to support dedicated or shared use bike lanes as needed to provide a connected city system.

Identifying locations for closing loops within the existing system is one of the city's main goals for this study. In discussions with the city, east-west connections are lacking in the current system, as seen on the Existing City System Map in **Appendix A**. These connections are generally difficult to make due to the types of roads that traverse the major north-south corridor of 35W through the city, including:

- Principle Arterials: Trunk Highway 13 and County Road 42
- Minor Arterials: Cliff Road, Burnsville Parkway and McAndrews Road (County Road 38)
- Major Collectors: Crystal Lake Road
- Municipal State Aid route: Southcross Drive

These roads have relatively high traffic volumes, or AADTs (average annual daily traffic), which are typically 4-lane roadways with little or no shoulder width available and would not provide safe routes for even experienced bicyclists. It is also important to note that some of the roads listed above are Dakota County roads. Dakota County currently has a pedestrian and bike study underway. According to the draft study, the County seems to favor creating a greater network of off-street shared use paths versus implementing on-street facilities on their County roads for a variety of reasons, but would consider on-street facilities if off-street is not feasible. While utilizing these roads for on-street bike lanes would provide ideal east-west system connections, factors such as high AADTs and minimal existing shoulder widths were closely considered when deciding on study locations.

Existing Safety Data

Another major consideration when evaluating potential on-street bicycle facilities is historical crash data and overall corridor and intersection safety for both motorists and non-motorists.

Citywide crash data was obtained from The Minnesota Crash Mapping Analysis Tool (MnCMAT) for the years 2011 through 2015. In the 5-years analyzed there were 32 crashes in the City of Burnsville that involved bicycles; this correlates to approximately 0.6% of all crashes within the City. The 32 crashes involving bicycles all occurred at intersections and all 32 resulted in injuries, with 5 of them being classified as incapacitating or serious injuries.

The crash data was also used to determine key intersection locations where existing conditions have safety concerns. While these locations would not preclude a bike route, extra measures should be evaluated and taken into consideration when including an already high crash intersection.

One measure to assess the safety performance at intersections is the crash rate, which is displayed as the number of crashes per million entering vehicles (MEV). The observed crash rate at an intersection can be compared to a statewide crash rate at similar type intersections to see if it is operating as it is expected. A critical crash rate is also considered to be a highly effective technique for identifying hazardous locations. The critical crash rate accounts for key variables such as design of the facility, type of intersection control, amount of exposure and the random nature of crashes. The concept suggests that if an observed crash rate is above the critical rate then the location is considered to be unsafe and that there is a high probability that conditions at the site are contributing to the higher crash rate, in this case the critical index would be greater than 1.0.

Table 1 shows these crash rates for each identified major intersection along with the number of bike/pedestrian crashes. The data identifies 8 intersections where the critical index exceeds 1.0, indicating a site-specific crash problem.

Table 1 - Intersection Crash Data 2011-2015

Intersection	Statewide Average Crash Rate1,2	Observed Crash Rate	Critical Crash Rate	Critical Index	Bike/Ped Crashes
150th St and Burnhaven Dr	0.32	0.55	0.60	**0.92**	0/0
Burnsville Pkwy and 35W East Ramp	0.70	0.18	1.05	**0.17**	1/1
Burnsville Pkwy and 35W West Ramp	0.70	0.29	1.06	**0.27**	0/0
Burnsville Parkway and CSAH 11	0.52	0.92	0.86	**1.07**	1/1
Burnsville Pkwy and CSAH 42	0.45	0.68	0.65	**1.05**	1/0
Burnsville Parkway and Judicial Rd	0.18	0.42	0.46	**0.91**	1/0
Burnsville Pkwy and Parkwood Dr	0.35	0.55	0.69	**0.80**	0/0
Burnsville Pkwy and Portland Ave	0.18	0.59	0.44	**1.34**	0/0
Burnsville Pkwy and Southcross Dr	0.35	0.39	0.74	**0.53**	1/0
Burnsville Pkwy and Upton Ave	0.18	0.16	0.47	**0.34**	0/0
CSAH 5 and 143rd St	0.52	0.08	0.84	**0.10**	0/0
CSAH 5 and 150th St	0.52	0.43	0.88	**0.49**	0/0
CSAH 5 and 155th St	0.18	0.21	0.43	**0.49**	0/0
CSAH 5 and Highland Dr	0.18	0.36	0.40	**0.90**	0/0
CSAH 5 and Williams (Greenwood) Dr	0.70	0.45	1.00	**0.45**	0/0
CSAH 11 and 122nd St	0.52	0.45	0.96	**0.47**	1/0
CSAH 11 and 130th St	0.18	0.71	0.51	**1.39**	0/0
CSAH 11 and 134th St	0.18	0.52	0.39	**1.33**	0/0
CSAH 11 and CSAH 42	0.45	0.81	0.67	**1.21**	0/1
CSAH 11 and Evergreen Dr	0.18	0.61	0.53	**1.15**	0/0
CSAH 46 and Lac Lavon Dr	0.45	0.32	0.70	**0.46**	0/0
Judicial Rd and CSAH 42	0.45	0.52	0.66	**0.79**	0/0
McAndrews Rd and Parkwood Dr	0.18	0.14	0.38	**0.37**	0/0
McAndrews Rd and Portland Ave	0.70	0.17	1.05	**0.16**	0/0
Portland Ave and CSAH 42	0.70	0.70	0.97	**0.72**	0/0
TH 13 and CSAH 11	0.45	0.79	0.67	**1.18**	0/0
TH 13 and Parkwood Dr	0.45	0.66	0.68	**0.97**	1/0
TH 13 and River Hills Drive	0.45	0.22	0.71	**0.31**	0/0

[1] Statewide Crash rates (CR) for thru-stop, all-way stop and signal are from MnDOT 2015 Traffic Safety Toolkit, 3 Years of Data

[2] Roundabout CR from *"A Study of the Traffic Safety at Roundabouts in Minnesota"* released by MnDOT in 2017.

PROPOSED MULTI-MODAL STUDY LOCATIONS

Existing roadway segments to study and evaluate for implementing on-street bike lanes were identified based on some key factors:

- Connections to existing route loops, trails and outside jurisdictions' systems
    - Making connections to existing facilities helps to close gaps and create a complete system within the city.
- Existing lane configuration and roadway width
    - 2-lane roadways with wide outside shoulders or parking lanes could be utilized
    - 3-lane roadways may have been converted from a 4-lane section and provide shoulder width
    - 4-lane roadways typically have heavier traffic and may not include outside lane or shoulder width required for a dedicated bike lane
        - Minnesota Administrative Rules and design standards must be followed for all Municipal State Aid (MSA) streets. These standards are summarized in **Table 2**.
- Presence of off-street facility
    - An existing wide shared use path along a segment is likely a low priority for an on-street bike lane since a safe, off-street multi-modal facility is already present.
- Safety
    - The traffic safety data summarized in **Table 1** was evaluated for potential safety concerns at study locations.
- Public outreach and city council input
    - The community had the opportunity to weigh in on proposed on-street bike lane locations at an open house and provide input via a project website hosted by the city.
    - Project representatives presented to the city council four pilot project location options for prioritizing the implementation of on-street bike lanes in the 2019 construction season.

Field Assessment Data Collection

The characteristics below were collected in the field at the study segment locations:

- Segment/Intersection
- Face of Curb to Face of Curb Street Width
- Roadway Pavement Type
- Travel Lane Width
- Shoulder Width
- Bike Lane Width
- Median Width
- Trail Width

- Trail Pavement Type
- Trail Condition
- Parking Lane Width
- Type of Parking (i.e. parallel or diagonal)
- Control Type (at intersections)
- Existing Signs
- Typical User (based on nearby points of interest, assumed comfort level of rider)
- Connection to Other Jurisdictions' Facilities

Appendix C has the full dataset of field information collected for all study segments. Field data was supplemented with available city GIS data such as roadway width, speed limits and trail and sidewalk information.

Data Analysis of Study Locations

Once all the study segment data was collected it was then analyzed and reviewed for potential locations to implement on-street bike lanes. Locations chosen were based on data collected in the field and the needs of the city. From that criteria four potential locations for pilot projects were identified where dedicated and shared use on-street bike lanes could be implemented. These locations were prioritized and are identified in the Multi-Modal Study Proposed Implementation Map in **Appendix B**.

In addition to the roadway segments that were studied, intersections connecting these segments were also studied. The intersections studied were chosen because they connect significant city roadway segments, generally have high AADTs and have potential safety concerns due to high volumes of traffic interacting with pedestrians and bicyclists.

During the field assessment travel lane width and shoulder width were measured as well as parking lane widths and the type of parking. Segments with existing shoulders and parking lanes are natural considerations for introducing on-street bike lanes since the width is available and these roads tend to have lower traffic volumes, have lower posted speeds and feel overall more comfortable for users. The downside to introducing bike lanes where there is currently parking is that some or all parking would potentially need to be eliminated to incorporate the bike facility.

At intersections median widths were collected if there were pedestrian crossings. Intersection control type was also identified (i.e. signal or stop control).

The data collection segments, pilot project options and select intersection evaluations are identified and summarized in the following sections of this report.

Data Summary

The city plans to incorporate data collected during this study to supplement their GIS system data. This information may include roadway features and proposed bike lane implementation recommendations.

MULTI-MODAL STUDY IMPLEMENTATION LOCATIONS

Multi-Modal Study Proposed Implementation Map

The Multi-Modal Study Proposed Implementation Map is shown in **Appendix B**. The map shows on-street bike lane types that could potentially be applied to the segments studied based on the data analysis of the field data collected and the design standards used.

The field data collected and used for analysis is summarized in **Appendix C** for all locations studied.

Design Standards for On-Street Bike Lane Implementation

Minnesota State Aid Standards

Minnesota Administrative Rules and State Aid Design Standards will apply to all Municipal State Aid (MSA) routes within the City. Rule 8820.9951 Minimum Design Standards, On-Road Bicycle Facilities for Urban; Reconditioning Projects applies to this study for implementing on-street and shared use bicycle lanes on the existing roadways. City of Burnsville MSA routes where these design standards apply are shown in **Appendix D**.

City of Burnsville Standards

The city initially recommended 12' wide vehicle driving lanes when considering locations to utilize the existing on-street widths available for adding bike lanes. State Aid Standards allow for narrower driving lanes along MSA routes, depending on the design speed and AADT, as shown below in Table 2. 12' wide driving lanes were used for evaluating possible on-street or shared use bicycle lane implementation locations where possible. Many of the locations analyzed for potential on-street bike lanes could be considered only if 11' wide driving lanes were used. During the analysis we found that using 11' wide driving lanes would provide more route options for utilizing dedicated bike lanes versus shared lanes. **Table 2** summarizes the Minnesota State Aid Rules for bikeway design.

Table 2 - Minnesota State Aid Bike Lane Design

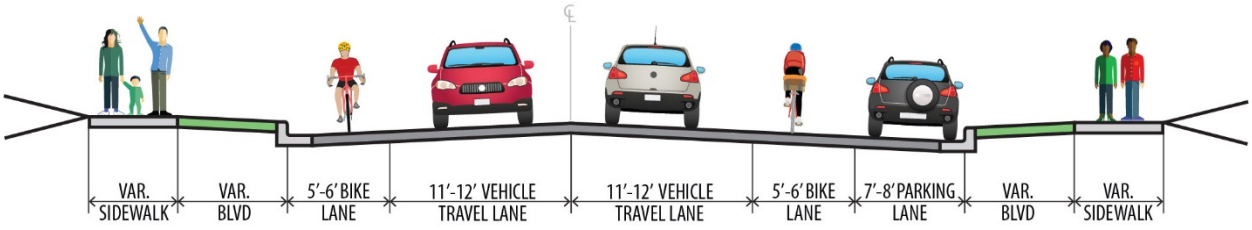
8820.9951 Minimum Design Standards, On-Road Bicycle Facilities for Urban; Reconditioning Projects.				
Number of Through Lanes and Present Traffic Volume	**Design Speed**	**Lane Width**	**Bikeway Design**	
	(mph)	**(Feet)**	**(AADT)**	**(Feet)**
Two Lane with AADT<10,000	25-30	10-11'	< 1,000	SL
			1,000-5,000	WOL 14-16 or BL 5-6
			5,000-10,000	BL 5-6
	35-45	10-11'	< 500	SL or BL 5-6
			500 - 10,000	BL 5-6 or PS 8
	50 or over	11-12'	<10,000	BL 6 or PS 8 or SUP
Two Lane with AADT > 10,000	25-30	10-11'	>10,000	BL 5-6
	35-45	10-11'	>10,000	BL 5-6 or PS 8 or SUP
	50 or over	11-12'	>10,000	BL 5-6 or PS 8-10 or SUP
Four-Lane with AADT < 10,000	25-30	10-11'	< 10,000	WOL 14-16 or BL 5-6
	35-45	10-11'	< 10,000	BL 5-6
	50 or over	11-12'	< 10,000	BL 5-6 or PS 8 or SUP
Four-Lane with AADT > 10,000	35-45	10-11'	>10,000	BL 6 or PS 8-10 or SUP
	50 or over	11-12'	>10,000	BL 6 or PS 8-10 or SUP

(SL = shared lane; BL = bicycle lane; WOL = wide outside lane; PS = paved shoulder; SUP = shared use path)
Source: Minnesota Administrative Rules, Chapter 8820 https://www.revisor.mn.gov/rules/8820.9951/\

Proposed On-Street Bike Lane Details

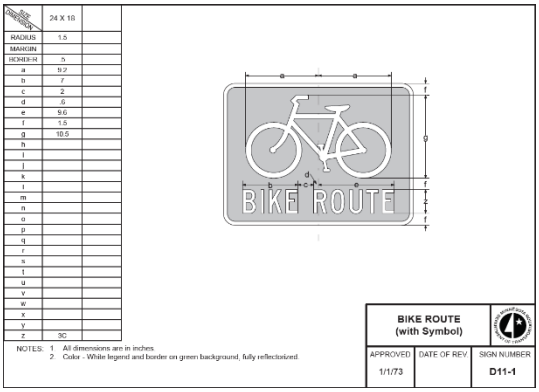
Dedicated On-Street Bike Lanes

- Proposed Typical Section

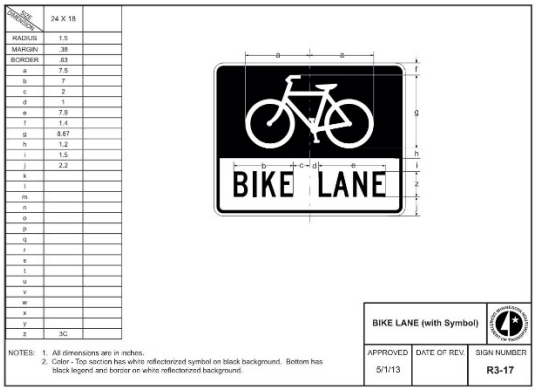


DEDICATED ON-STREET BIKE LANES

- Bike Lane/Route Signs
    - City may use D11-1 BIKE ROUTE sign, size 24” x 18”, white on green
        - Bike Route signs are Guide Signs used to communicate with bicyclists

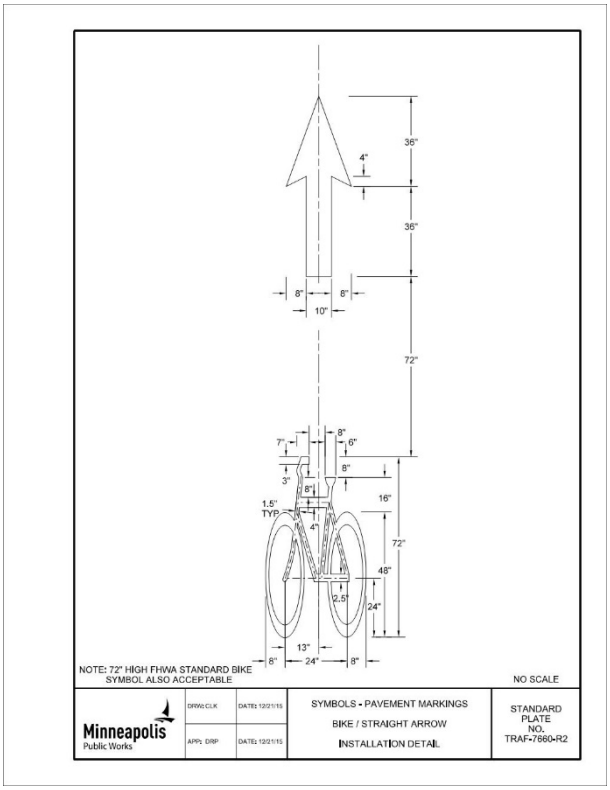


    - City may use R3-17, size 24” x 18”, black on white
        - Regulatory sign used to communicate with vehicles that there is a bike lane on the roadway



    - Frequency and spacing guidance for these signs are provided in the MNMUTCD section 9B.4.

- Bike Lane Pavement Message and Pavement Markings
    - Detail/Spec
        - The example below is recommended for a standard bike lane pavement marking within dedicated bike lanes and is a City of Minneapolis standard plate that could be adopted by the City of Burnsville.



    - Frequency and spacing guidance for this marking is provided in the MNMUTCD section 9C.4.

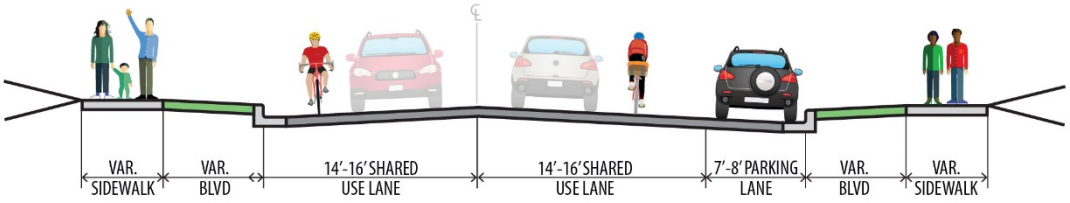
    - **Figure 7** and **Figure 8** show examples of on-street dedicated bike lanes.

Figure 7

Figure 8

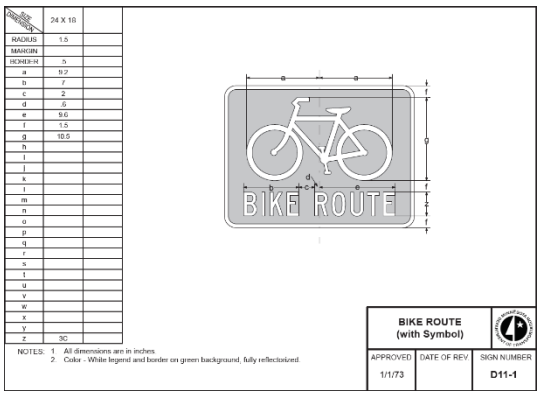
Shared Use On-Street Bike Lanes

- Proposed Typical Section

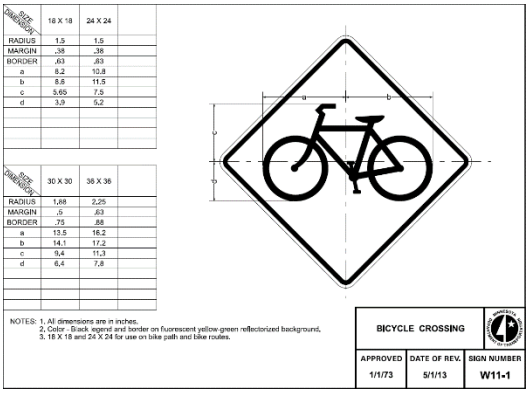


SHARED USE LANES

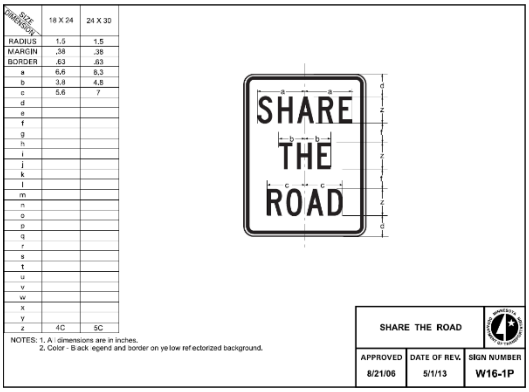
- Bike Lane/Route Signs
  - City may use D11-1 BIKE ROUTE sign, size 24" x 18", white on green
    - Bike Route signs are Guide Signs used to communicate with bicyclists



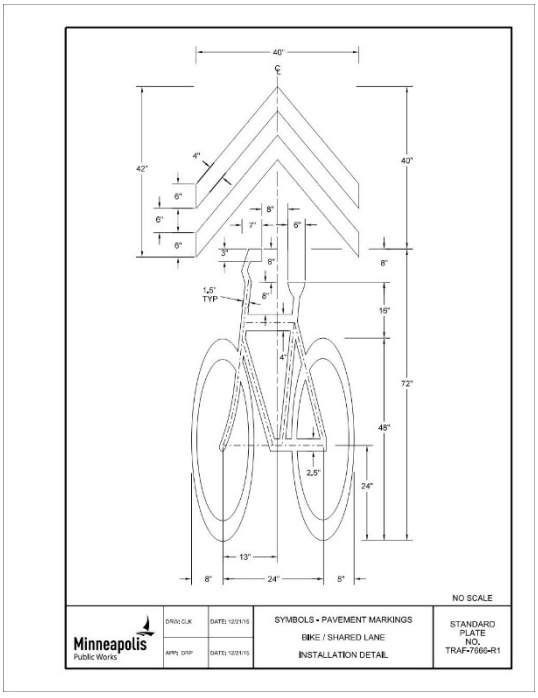
  - City may use W11-1 BIKE CROSSING sign, size 24" x 24", black on yellow-green



- City may use W16-1p SHARE THE ROAD sign, size 24” x 18”, black on yellow-green



- Bike Lane Pavement Message and Pavement Markings
  - City Standard Detail/Spec
    - The example below is recommended for a standard shared lane pavement marking (sharrow) within shared use lanes and is a City of Minneapolis standard plate that could be adopted by the City of Burnsville.



- **Figure 9** and **Figure 10** show examples of sharrows used on a shared use road.

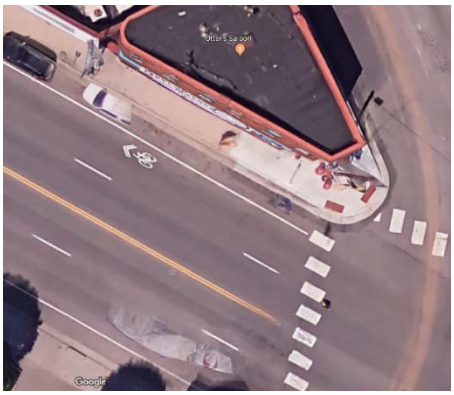


Figure 9

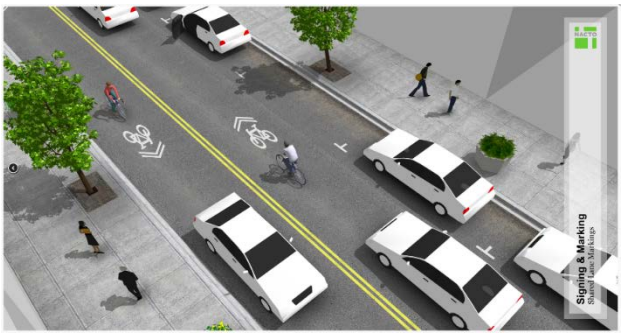


Figure 10

Intersection Treatments and Safety Enhancement

The city has expressed interest in exploring intersection treatments to enhance driver awareness and bicyclists' safety. One method considered was bike lane colored conflict zones in which potential conflict areas between vehicles and bikes is marked with green blocks. During the field analysis intersections were evaluated to determine where the green markings would work best across intersections to project the bike lane delineation through the intersection.

Below is an example of green block striping at the intersection of Lyndale Avenue and Groveland Avenue in Minneapolis. The markings emphasize to both motorists and bicyclists the path of bicycles through the intersection.

Figure 11 shows an example of a green block striping colored conflict zone at the intersection of Lyndale Ave and Groveland Ave in Minneapolis.

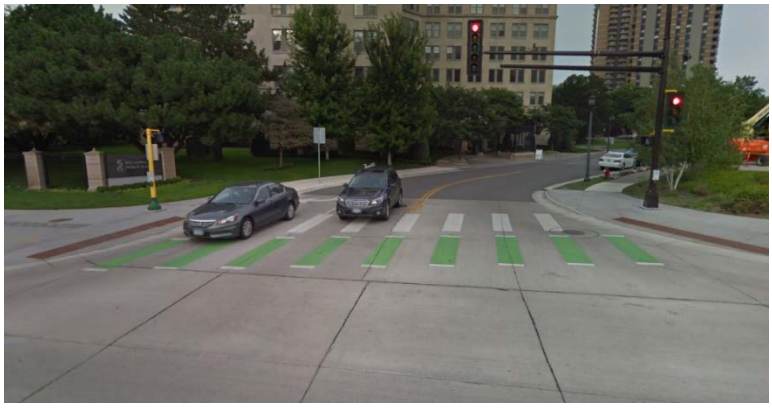


Figure 11

The intersection of Southcross Drive and Portland Avenue in Burnsville is a potential candidate for a bike lane colored conflict zone. This intersection was chosen because of its central location in the proposed city Grand Loop route and available width for dedicated bike lanes. Providing treatments at intersections where conflicts may occur between vehicles and bikes can help to increase driver awareness and highlight the presence of bikes.

Figure 12 shows an example of what the green striping on the intersection of Portland Avenue and Southcross Drive would look like in the field.

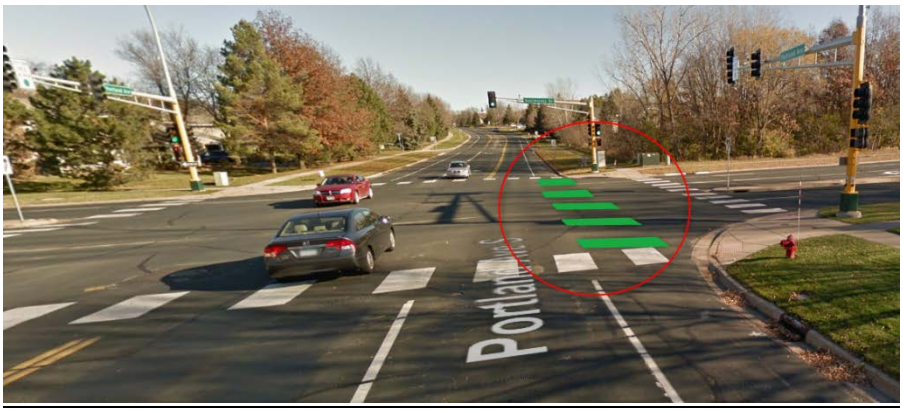


Figure 12

The city had initially shown interest in using green striping and blocking at the intersection of Burnhaven Drive and Southcross Drive due to potential future development near the mall and the multi-modal traffic the development may generate. This location was ruled out as a candidate in its existing configuration since the Burnhaven Drive segment near the intersection has an existing 4-lane configuration and an existing posted speed of 35 miles per hour. According to the State Aid design standards in **Table 2**, utilizing a shared use lane is not allowed for 4-lane roadways with speeds over 30 miles per hour, regardless of AADT. This segment of Burnhaven Drive could perhaps be studied in the future to determine if the roadway could be converted to a 2-lane roadway, which would allow a wide outside shoulder or bike lane.

Other methods for enhancing intersection safety and bicycle awareness includes signage where a bike lane continues at a right turn lane development. Using linear dotted pavement markings along continued bike lanes at vehicle crossing points near the beginning of the turn lane helps to draw attention to drivers that they need to be aware of the potential conflict.

When adding bike lanes, it is also important to check that inplace catch basin inlet grates are bike safe since the bicyclist may utilize the gutter when riding along a bike lane facility. Bike safe means that, when installed correctly, the catch basin grate openings will not allow a bike wheel to get stuck while riding on top of it. Neenah Foundry grates that are bike safe include R-3250 and R-3250 CL for B-style curb and gutter. These correlate to MnDOT Standard grate castings 814A, 816 and 817

PUBLIC OUTREACH

Online Public Input

The city developed a project website that allowed visitors to leave comments and provide information on the type of rider they are, how they use the existing multi-modal facilities and other pieces of information that helped provide feedback for the study. The website was open for feedback for one month in October 2018.

The online public comment period showed that the community was generally supportive of the city implementing multi-modal facilities to connect gaps in the existing system and to various points of interest. The feedback showed about a 50/50 split for supporting on-street bike facilities as a connection method. Many comments were centered around an understanding of the need for more multi-modal connections but expressed varying levels of concern for safety of bicyclists sharing lanes with vehicles or riding adjacent to traffic in busy areas.

Public Meetings

A community open house was held on October 24, 2018 to give project representatives a chance to provide information to the public about the study, explain the background of the study purpose and need and present the proposed bike lane implementation map and supporting information. Community members had the opportunity to speak with project representatives in person, ask questions about the multi-modal study, learn about on-street bike facilities and provide feedback on their own suggestions of what they would like to see in their neighborhoods and city streets for multi-modal options.

The themes of the public open house feedback were similar to what was gathered from the website feedback: there is a need for connections within the city's system and to outside jurisdictions' trail systems and safety is paramount. Several attendees noted they were avid bicyclists and would utilize on-street facilities if provided, and preferred dedicated bike lanes over shared lanes with vehicles, or wide outside lanes. Attendees also weighed in on the elimination of parking lanes at some locations where parking lanes would potentially be converted to on-street bike lanes. Generally, the public would not be in favor of losing parking lanes to incorporate on-street bike lanes.

Project representatives also solicited feedback from elected officials. A brief presentation was made to council members on December 11, 2018 during a city council work session to explain the study and provide information on the data collected and costs for potential pilot project locations of on-street bike lane implementation. An overview of potential pilot project locations is presented in the following section. The council also had the opportunity to query the project team. The council decided to explore two of the four pilot project options presented for potential implementation during the 2019 construction season.

POTENTIAL PILOT PROJECT OPTIONS

The city decided to evaluate four segments identified in the study as potential bike lane pilot projects based on location, connection of gaps in the existing route system, public feedback, city council input and cost. The city elected to focus the pilot project options in locations that would allow for dedicated bike lanes versus shared use lanes based on public and city council feedback. See **Appendix E** for a typical section of each pilot project.

Pilot Project Option 1

West River Hills Drive between Highway 13 and Cliff Road

This segment was chosen as a pilot project option because implementation of bike lanes would

- Provide a short yet important connection between two major roads (Cliff Road and Highway 13).
- Connect nearby neighborhoods to the retail shops and restaurants located along the east side of the segment.
- Be incorporated into a 2019 city construction project.
    - The city is planning a pavement rehabilitation project along this stretch and determined this a good opportunity to incorporate bike lanes on a project where pavement marking would already need to occur.

Some of the challenges of incorporating bike lanes along this stretch are

- Existing street widths.
    - The existing curb to curb street widths would require shared lanes to be used unless roadway widening was performed in some locations within the segment.
    - An existing median could be narrowed to provide extra width for dedicated bike lanes.
    - Existing thru and turn lane widths in this segment can be narrowed to provide width for bike lanes.
- Intersection treatments.
    - The segment is flanked by two busy intersections and may require special signing and striping design to enhance safety.

Pilot Project Option 2

Lac Lavon Drive between County Road 46 and County Road 42

This segment is an ideal candidate for on-street bike lanes due to

- Parks located on either side of the roadway.
    - Crystal Lake, Keller Lake and Lac Lavon Park surround the corridor.
- Presence of wide shoulders and parking lanes.
- Potential for all rider abilities and comfort levels.

    - Bike lanes in this area provide a great option for the users to experience the city parks and lakes. The corridor currently includes sidewalks on both sides of the road and wide shoulders.
- Connections to surrounding neighborhoods.

Some of the challenges of incorporating bike lanes along this stretch are

- Loss of existing parking.
    - The corridor currently allows parking along certain stretches and restricts parking in other locations.
    - The available street curb to curb width would allow for two vehicle driving lanes, two bike lanes and one parking lane. This means that parking would only be allowed on one side of the road. Currently, parking is allowed on both sides of the road for some stretches.
- Cost.
    - Implementing this corridor has a high cost due to its length.
    - Intersection treatments at busy intersections of Southcross Drive and County Road 42.

Pilot Project Option 3

Williams Drive between Judicial Road and Morgan Avenue

Williams Drive is set up nicely for on-street, dedicated bike lanes for the following reasons:

- Existing wide shoulders
- Parking is currently restricted for most of the corridor
- Low posted speed limit
- Proximity to a recent off-street trail project

Challenges with this corridor include a short stretch of narrow shoulder from Abbott Circle to Rose Bluff Blvd. The shoulder is too narrow to support a continuous dedicated bike lane on the north side of Williams Drive to Rose Bluff Blvd, which is the connection point of the off-street trail down into the Rudy Kramer Nature Preserve that was constructed in 2018. A potential future solution to address this would be to build an off-street shared use path that would connect the bike lane along Williams Drive to the off-street trail in the Rose Bluff neighborhood.

Pilot Project Option 4

Judicial Road between Burnsville Parkway and Williams Drive

This pilot project location was considered because it is in a residential area with available width in the existing roadway for two thru lanes, two bike lanes and one parking lane. The shared use path that circles Sunset Pond is adjacent to this corridor as well. The Sunset Pond area and path were identified during the public process as points of interest, especially for bicyclists who enjoy riding on an off-street facility.

The downside of introducing bike lanes in this stretch is loss of parking. Currently, parking is allowed on either side of Judicial Road. This would be reduced to one parking lane, like pilot project option 2 along Lac Lavon Drive.

Pilot Project Options Safety Considerations

While the pilot project segments are ideal for existing widths and locations, it is important to consider any existing safety issues that might exist within the corridors and adjacent intersections.

Crash Data for each pilot project location was obtained from The Minnesota Crash Mapping Analysis Tool (MnCMAT) for the years 2011 through 2015.

The crash data was used to calculate crash rates along the whole segment, excluding the intersections on each end which can be found in the existing data section above. Crash rate for each roadway segment is displayed as the number of crashes per million vehicle-miles (MEV). The observed crash rate for the segment can be compared to a statewide crash rate for similar segments to see if it is operating as it is expected. A critical crash rate is also considered to be a highly effective technique for identifying hazardous segments as described in the existing crash data section.

Table 3 shows crash rates for each pilot project location segment along with the number of bike/pedestrian crashes along that segment. The data identifies 1 segment where the critical index exceeds 1.0, indicating a segment-specific crash problem.

Table 3 – Pilot Project Option Segment Crash Data 2011-2015

Potential Pilot Project	Segment	Statewide Average Crash Rate [1]	Observed Crash Rate	Critical Crash Rate	Critical Index	Bike/Ped Crashes
1	W River Hills Dr (Cliff Rd E to TH 13)	1.95	2.28	4.95	**0.46**	0/0
2	Lac Lavon Dr (CSAH 42 to CSAH 46)	1.80	1.15	2.66	**0.43**	1/0
3	Williams Dr (Morgan Ave S to Judicial Rd)	1.95	0.50	2.74	**0.18**	0/0
4	Judicial Rd (Williams Dr to Burnsville Pkwy)	1.32	2.94	2.64	**1.11**	1/0

[1] Statewide Crash rates (CR) are from MnDOT 2015 Traffic Safety Toolkit, 5 Years of Data, based on road design, # lanes, median type, and environment

Pilot Project Options Cost Estimates

Cost estimates were developed for the four options for pilot project locations. Quantities were pulled for proposed items on the dedicated and shared use lane sections of each pilot project location to determine an estimated implementation cost. **Table 4** shows unit prices used to determine construction

costs. Unit prices were determined based on a combination of information from the city and MnDOT average bid prices for comparable items identified.

Table 4 – Unit Prices

Item	Units	Unit Cost
Remove 4" Striping	LIN FT	$0.80
4" Solid Line (White) (Epoxy)	LIN FT	$0.50
4" Double Solid Line (Yellow) (Epoxy)	LIN FT	$1.00
Bike Symbol and Arrow Pavement Marking (Epoxy)*	EA	$200.00
Sharrow Pavement Marking (Epoxy)*	EA	$200.00
Bike Crossing/Traffic Sign	EA	$150.00
Share the Road Sign	EA	$120.00
Bike Lane Sign/Bike Route Sign	EA	$150.00
Bike Lane Ahead and End Sign	EA	$90.00
Right Lane Must Turn Right	EA	$200.00
No Parking Sign (18X18)	EA	$80.00
Salvage Sign	EA	$50.00

*Pricing based off MnDOT's Pavement Marking Characters Areas with average price per square foot applied. http://www.dot.state.mn.us/trafficeng/pavement/typicaldetail/characterareas.pdf

Table 5 presents the estimated construction costs of each pilot project for the implementation of striping, signage and other pay items shown in **Table 4** needed to implement the recommended on-street bike lanes. It should be noted that these estimated costs reflect construction costs only and do not include engineering costs for any detailed design or engineering plans.

Table 5 – Estimated Pilot Project Costs

Pilot Project Option	Estimated Cost
Option 1 - W River Hills Dr (Cliff Rd E to TH 13)	$10,000
Option 2 - Lac Lavon Dr (CSAH 42 to CSAH 46)	$47,000
Option 3 - Williams Dr (Morgan Ave S to Judicial Rd)	$8,000
Option 4 - Judicial Rd (Williams Dr to Burnsville Pkwy)	$49,000

The City has considered the pilot project information and options presented above. During the city council work session on December 11, 2018, elected officials chose to explore options 1 and 2 for prioritizing implementation and potentially incorporating into 2019 construction season.

Future Projects

Many of these proposed pilot projects have connections to planned future projects throughout the city per the proposed Burnsville 2040 Comprehensive Plan and city input. Some of the planned multi-modal projects are:

- Lake Marion Greenway
    - The Lake Marion Greenway project will provide a connection to the City of Savage's trail on the west end of the proposed greenway and meets up with the city's Grand Loop on the east side.
- Rose Bluff Trail
    - Rose Bluff Trail was constructed in 2018 and begins on its south end within the Rose Bluff neighborhood near west limit of Burnsville just north of Williams Drive to the Rudy L. Kramer Nature Preserve trail system within the nature preserve.
- 35W bridge reconstruction over the Minnesota River
    - MnDOT is the lead agency on this project. The reconstructed 35W bridge will include multi-modal components and create a connection from Burnsville to the trail system in Bloomington just north of the Minnesota River and to the proposed MN Valley State Trail.

The city could consider implementing on-street bike lanes to connect to these future projects as street maintenance or reconstruction projects are planned.

RECOMMENDATIONS AND CONCLUSIONS

On-street bicycle lanes provide flexibility for riders to more easily traverse city streets where an off-road shared use path is not provided. Utilizing the existing city street widths to implement on-street bike lanes is a cost-effective, minimally invasive option to providing another multi-modal option within the community. The following remarks and recommendations are presented for consideration:

- It is recommended that all on-street bike lanes or shared bike lane implementation be in accordance with State Aid Rules and is a requirement for all MSA routes.
- It is recommended that the city consider the pilot project options identified herein for initial implementation of the on-street bike lanes. These locations have existing wide shoulders or parking and lower AADTs and provide connections to points of interest within the city and connections to other jurisdictions' systems as identified through data collection and the public outreach process.
- It is recommended that the city consider studying further select roadway segments for conversion from 4-lane to 2-lane or 3-lane roadways to achieve width to incorporate dedicated on-street bike lanes to make critical multi-modal connections.

APPENDICES

APPENDIX A: EXISTING SYSTEMS MAP

APPENDIX B: MULTI-MODAL STUDY LOCATION AND PROPOSED IMPLEMENTATION MAP

APPENDIX C: MULTI-MODAL STUDY FIELD ASSESSMENT DATA

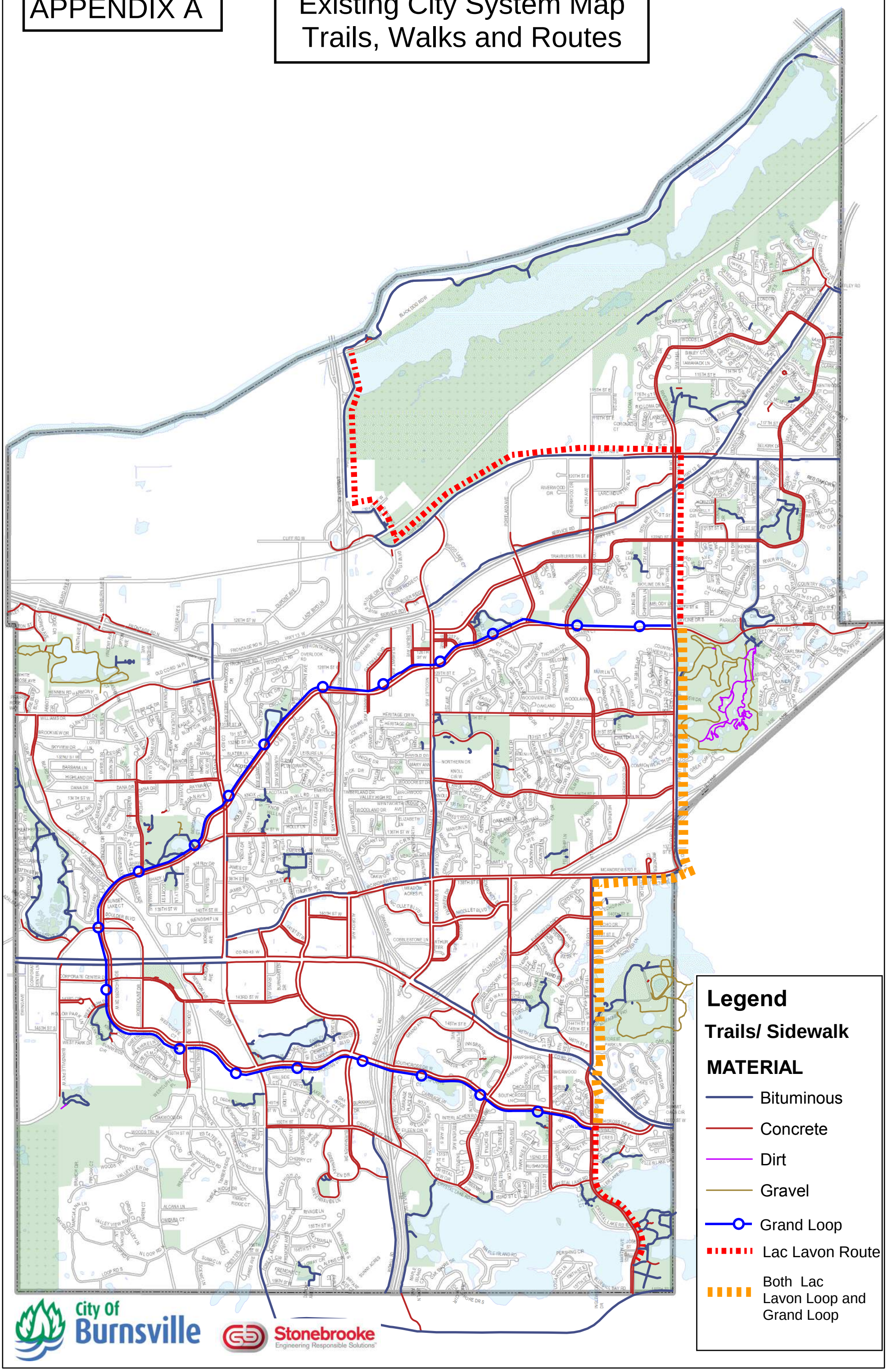
APPENDIX D: CITY OF BURNSVILLE MUNICIPAL STATE AID ROUTES

APPENDIX E: PROPOSED PILOT PROJECT TYPICAL SECTIONS

APPENDIX F: DETAILED PILOT PROJECT OPTIONS COST ESTIMATE

APPENDIX A

Existing City System Map
Trails, Walks and Routes



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Appendix B

Multi-Modal Study
Proposed Implementation Map

Legend

- Potential Dedicated Bike Lane Study Area
- Potential Shared Use Lane Study Area 2 lane Roadway
- Potential Shared Use Lane Study Area 4 Lane Roadway
- Potential Shared Use Lane Study Area 2 lane Roadway with Center Lane
- Off- Street Facility
- Trails
- Sidewalk
- X → Study Section, Refer to spreadsheet for I.D. and Data in Appendix B
- ○ Study Intersections, Refer to spreadsheet for I.D. and Data

Proposed MN Valley State Trail (Bloomington)

Minnesota River Greenway

City of Bloomington

Pilot Project Option 1

Pilot Project Option 4

Pilot Project Option 3

35W Bridge Reconstruction

Cliff Fen Trail

Cliff Rd

Portland Ave

Dupont Ave

Travelers Trail

Burnsville Pkwy

Frontage Rd

Williams Dr

Judicial Rd

Upton Ave

Highland Dr

Burnsville Pkwy

Civic Center Pkwy

Nicollet Ave

Nicollet Blvd

McAndrews Rd

Rosemount Dr

Corporate Center Dr

Grand Ave

Southcross Dr

Portland Ave

Crystal Lake Rd

Lac Lavon Dr

Pilot Project Option 2

Proposed Lake Marion Greenway

Apple Valley Bituminous Trails

City of Eagan

City of Apple Valley

City of Savage

City of Lakeville

Minnesota River

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Appendix C

Burnsville Multi-Modal Data Collection Sheet - Segment Data

Pilot Project Option	Roadway/ Segment ID	Type of Bike Lane Proposed	Approximate Segment Length (Mile)	Existing Street Width (curb to curb)	Existing Lane Width (Feet)	Speed Limit (mph)	Existing Shoulder Width	Existing Signs	Sign Type	On Street Parking	Type of Parking	Existing Parking Lane Width	Existing Median Present	Existing Median Width	Roadway Pavement Type	Typical User	Connection to Other Jurisdictions	AADT (veh/day)
							Nicollet Ave											
	N1	Off Street	0.62		13.5	35	No	No	NA	No	NA	NA	Yes	7'	Bituminous	Experienced	No	3200
	N2	Off Street	0.63		13.5	40	No	No	NA	No	NA	NA	Yes	Vary in size	Bituminous	Experienced	No	8100-22800
	N3	Off Street	0.38		13	40	No	No	NA	No	NA	NA	Yes	Vary in size	Bituminous	Experienced	No	8100-22801
							McAndrews Rd											
	M1	Off Street	0.22		12	45	No	No	NA	No	NA	NA	Yes	6' and 17'	Bituminous	Experienced	No	19400
	M2	Off Street	0.25		12	45	No	No	NA	No	NA	NA	No	NA	Bituminous	Experienced	No	19400
	M3	Off Street	0.46		12	45	No	No	NA	No	NA	NA	No	NA	Bituminous	Experienced	No	19400
							Portland Ave											
	P1	Dedicated Lane	0.47	35	10.5	35	7'	Yes	No Parking	No	NA	NA	No	NA	Bituminous	Novice	No	1950
	P2	Off Street	0.15		18	35	No	No	NA	No	NA	NA	Yes	10'	Bituminous	Experienced	No	3250
	P3	Dedicated Lane	0.96	56	12.5	40	8'	Yes	No Parking	No	NA	NA	Center lane	15'	Bituminous	Novice	No	6800-7900
	P4	Dedicated Lane	0.35	53	11	35	SB - 10' , NB - 8'	Yes	No Parking	No	NA	NA	Center lane	15'	Bituminous	Novice	No	7500
	P5	Dedicated Lane	0.60	44	12	30	No	No	NA	Yes	Parallel	SB - 9.5', NB - 10'	No	NA	Bituminous	Novice	No	3100
							Crystal Lake Rd											
	CL 1	Shared Use Lane	0.32	41	20.5	30	No	No	NA	Yes	Parallel	No designated lane	No	NA	Bituminous	Novice	No	Not available
	CL 2	Shared Use Lane	0.30	30	13.5	30	No	No	NA	Yes	Parallel	No designated lane	No	NA	Bituminous	Novice	No	Not available
	CL 3	Shared Use Lane	0.14	30	13.5	30	No	No	NA	Yes	Parallel	No designated lane	No	NA	Bituminous	Novice	No	Not available
	CL 4	Dedicated Lane	0.74	40	12	30	SB - 7' , NB - 8'	Yes	No Parking	No	NA	NA	No	NA	Bituminous	Novice	No	2150-7400
	CL 5	Dedicated Lane	0.10	53	13	35	EB - 7.6' , WB - 8'	Yes	No Parking	No	NA	NA	Center lane	14'	Bituminous	Novice	No	7400
							150th St											
	150 1	Dedicated Lane	0.38	47	13.5	40	No	No	NA	Yes	Parallel	10'	No	NA	Bituminous	Novice	No	3050
	150 2	Dedicated Lane	0.58	40	12	30	No	No	NA	Yes	Parallel	WB - 11' , EB -10'	No	NA	Bituminous	Novice	No	2000
							Judicial Rd											
	J1	Dedicated Lane	0.54	44	12	30	No	No	NA	Yes	Parallel	NB - 9' , SB - 10'	No	NA	Bituminous	Novice	No	1300
4	J2	Dedicated Lane	0.75	40	11	35	No	Yes	No Parking	No	NA	NA	No	NA	Bituminous	Novice	No	2600
4	J3	Dedicated Lane	0.46	40	SB - 11, NB - 13	35	SB - 9', NB - 7'	Yes	No Parking	No	NA	NA	No	NA	Bituminous	Novice	No	2600
	J4	Shared Use Lane	0.8	28	10	30	No	No	NA	No	NA	NA	No	NA	Bituminous	Novice	No	
							143rd St											
	143 1	Dedicated Lane	0.44	40	12	30	No	No	NA	Yes	Parallel	EB - 8', WB - 7.5'	No	NA	Bituminous	Novice	No	Not available
	143 2	Shared Use Lane	0.55	44	20.5	30	No	No	NA	No	NA	NA	No	NA	Bituminous	Novice	No	Not available
							County Road 5											
	CR5 1	Off Street	0.35		12	45	No	No	NA	No	NA	NA	Yes	Vary in size	Bituminous	Experienced	No	13700
	CR5 2	Off Street	0.43		11	45	No	No	NA	No	NA	NA	Yes	Vary in size	Bituminous	Experienced	No	15100
	CR5 3	Off Street	0.17		11	40	No	No	NA	No	NA	NA	Yes	6'	Bituminous	Experienced	No	14400
							Williams Dr											
3	W1	Dedicated Lane	0.58	53	12.5	40	8'	Yes	No Parking	No	NA	NA	Center lane	15'	Bituminous	Novice	Savage	9400
3	W2	Dedicated Lane	0.40	53	12.5	40	8'	Yes	No Parking	No	NA	NA	Center lane	15'	Bituminous	Novice	Savage	14700
							Frontage Rd											
	F1	Shared Use Lane	0.60	33	16.5	35	No	No	NA	No	NA	NA	No	NA	Bituminous	Experienced	No	Not available
	F2	Shared Use Lane	0.71	33	16.5	35	No	No	NA	No	NA	NA	No	NA	Bituminous	Experienced	No	Not available
	F3	Shared Use Lane	1.13	30	13.3	30-40	No	Yes	No Parking	No	NA	NA	No	NA	Bituminous	Novice	No	Not available
							Highland Dr											
	H1	Shared Use Lane	0.58	32	14	30	No	No	NA	No	NA	NA	No	NA	Bituminous	Novice	No	Not available
	H2	Dedicated Lane	0.50	41	WB - 13 , EB - 12	30	No	No	NA	Yes	Parallel	WB - 6' , EB 7'	No	NA	Bituminous	Novice	No	Not available
							Upton Ave											
	U1	Dedicated Lane	0.55	44	13	30	No	No	NA	Yes	Parallel	9'	No	NA	Bituminous	Novice	No	1550
	U2	Shared Use Lane	0.59	30	13.5	30	No	No	NA	No	NA	NA	No	NA	Bituminous	Novice	No	Not available
							126th St											
	126 1	Shared Use Lane	0.31	40	18	35	No	No	NA	No	NA	NA	No	NA	Bituminous	Novice	No	3750

Appendix C

Burnsville Multi-Modal Data Collection Sheet - Segment Data

Pilot Project Option	Roadway/ Segment ID	Type of Bike Lane Proposed	Approximate Segment Length (Mile)	Existing Street Width (curb to curb)	Existing Lane Width (Feet)	Speed Limit (mph)	Existing Shoulder Width	Existing Signs	Sign Type	On Street Parking	Type of Parking	Existing Parking Lane Width	Existing Median Present	Existing Median Width	Roadway Pavement Type	Typical User	Connection to Other Jurisdictions	AADT (veh/day)
								Dupont Ave										
	D1	Dedicated Lane	0.58	40	14	35	6'	Yes	No Parking	No	NA	NA	No	NA	Bituminous	Novice	No	6700
								Cliff Rd										
	C1	Shared Use Lane	0.24	40	11	30	No	Yes	No Parking	No	NA	NA	No	NA	Bituminous	Experienced	No	16100
								Travelers Trail W										
	T1	Shared Use Lane	0.78	35	12.5	30-35	No	Yes	No Parking	No	NA	NA	No	NA	Bituminous	Novice	No	Not available
	T2	Shared Use Lane	0.45	56	13	35	No	No	NA	No	NA	NA	No	NA	Bituminous	Experienced	No	Not available
	T3	Dedicated Lane	0.43	44	13	35	No	No	NA	Yes	Parallel	8.6'	No	NA	Bituminous	Novice	No	Not available
								122nd St										
	122 1	Dedicated Lane	0.58	40	13	35	No	Yes	Park Sign	Yes	Parallel	7'	No	NA	Bituminous	Novice	No	Not available
	122 2	Dedicated Lane	0.50	40	12	30	No	No	NA	Yes	Parallel	8'	No	NA	Bituminous	Novice	No	Not available
								River Hills Dr										
	R1	Dedicated Lane	0.85	40	13	30	No	No	NA	Yes	Parallel	7'	No	NA	Bituminous	Novice	No	2600
	R2	Dedicated Lane	0.93	40	12	30	No	No	NA	Yes	Parallel	8'	No	NA	Bituminous	Novice	No	2100-2650
	R3	Dedicated Lane	1.44	40/44	12	30	No	No	NA	Yes	Parallel	8'	No	NA	Bituminous	Novice	No	1800-2900
	R4	Shared Use Lane	0.22	24 NB, 24 SB	11	30	No	No	NA	No	NA	NA	Yes	7'	Bituminous	Experienced	No	4150
1	R5	Dedicated Lane	0.24	44	12	30	No	No	NA	No	NA	NA	Center lane	18'	Bituminous	Experienced	No	4800
								Parkwood Dr										
	PW 1	Off Street	0.17		11	35	No	No	NA	No	NA	NA	No	NA	Bituminous	Experienced	No	6900
	PW 2	Dedicated Lane	0.44	44	SB - 12 , NB- 13	40	No	No	NA	Yes	Parallel	SB - 10', NB - 9'	No	NA	Bituminous	Novice	No	5100
	PW 3	Dedicated Lane	0.58	44	12	30	No	No	NA	Yes	Parallel	10'	No	NA	Bituminous	Novice	No	2500
	PW 4	Dedicated Lane	0.60	44	13	30	No	No	NA	Yes	Parallel	9'	No	NA	Bituminous	Novice	No	2750
	PW 5	Dedicated Lane	0.71	44	SB - 12 , NB - 13	30	No	No	NA	Yes	Parallel	SB - 10' , NB - 9'	No	NA	Bituminous	Novice	No	3200
								130th St										
	130 1	Dedicated Lane	0.96	40	WB - 12 , EB - 13	30	No	No	NA	Yes	Parallel	WB - 8' , EB - 7'	No	NA	Bituminous	Novice	No	2450
	130 2	Dedicated Lane	0.50	44	WB - 12 , EB - 13	30	No	No	NA	Yes	Parallel	WB - 10' , EB - 9'	No	NA	Bituminous	Novice	No	1950
								Civic Center Pkwy										
	CC 1	Dedicated Lane	0.72	39	12.5	30	7'	Yes	No Parking	No	NA	NA	Yes	9'	Bituminous	Novice	No	Not available
								134th St										
	134 1	Dedicated Lane	1.20	44	EB - 12 , WB - 13	30	No	No	NA	Yes	Parallel	EB - 10' , WB - 9'	No	NA	Bituminous	Novice	No	3550
	134 2	Dedicated Lane	0.29	44	EB - 12 , WB - 13	30	No	No	NA	Yes	Parallel	EB - 10' , WB - 9'	No	NA	Bituminous	Novice	No	4800
								Burnsville Pkwy										
	B1	Off Street	0.54		18	35	No	Yes	No Parking	No	NA	NA	No	No	Bituminous	Novice	No	2250
	B2	Off Street	0.68		18	30	No	No	NA	Yes	Parallel	6'	No	No	Bituminous	Novice	Apple Valley and Egan	2250
								Lac Lavon Dr										
2	LL 1	Dedicated Lane	1.15	41-46	12	35	No	No	NA	Yes	Parallel	SB - 8'-10', NB - 8'-10'	No	NA	Bituminous	Novice	Lakeville	6000
								Nicollet Blvd										
	NB 1	Shared Use Lane	0.5	51	12	30	No	No	NA	No	NA	NA	Yes	10'	Bituminous	Experienced	No	7600
								Grand Ave										
	G 1	Shared Use Lane	15	33	15	40	No	No	NA	No	NA	NA	No	NA	Bituminous	Novice	No	1450
								145th St										
	145 1	Dedicated Lane	13	44	12	35	No	No	NA	Yes	Parallel	10'	No	NA	Bituminous	Novice	No	1750
								Plymouth Ave										
	PL 1	Shared Use Lane	0.5	59	12.5	35	No	No	NA	No	NA	NA	Yes	6'	Bituminous	Experienced	No	2950
								Burnhaven Dr										
	BH 1	Off Street	0.37		12	35	No	No	NA	No	NA	NA	Yes	Vary in size	Bituminous	Experienced	No	5100-9100
	BH 2	Off Street	0.80		13	35	No	No	NA	No	NA	NA	Yes	Vary in size	Bituminous	Experienced	No	5700-9500
	BH 3	Off Street	0.44		13	35	No	No	NA	No	NA	NA	Yes	Vary in size	Bituminous	Experienced	No	4250

Appendix C

Burnsville Multi-Modal Data Collection Sheet - Segment Data																		
Pilot Project Option	Roadway/ Segment ID	Type of Bike Lane Proposed	Approximate Segment Length (Mile)	Existing Street Width (curb to curb)	Existing Lane Width (Feet)	Speed Limit (mph)	Existing Shoulder Width	Existing Signs	Sign Type	On Street Parking	Type of Parking	Existing Parking Lane Width	Existing Median Present	Existing Median Width	Roadway Pavement Type	Typical User	Connection to Other Jurisdictions	AADT (veh/day)
Corporate Center Dr																		
	CCD 1	Shared Use Lane	0.50	33	15	30	No	No	NA	Yes	Parallel	NA	No	NA	Bituminous	Novice	No	Not available
Evergreen Dr																		
	E 1	Dedicated Lane	0.56	43	12	35	No	Yes	Crosswalk	Yes	Parallel	8'	No	NA	Bituminous	Novice	No	Not available
155th St W																		
	155 1	Shared Use Lane	0.67	27	10	30	No	Yes	No Shoulder	No	NA	NA	No	NA	Bituminous	Novice	No	Not available
Chowen Ave S																		
	CH 1	Shared Use Lane	0.21	40	18.5	30	No	No	NA	Yes	Parallel	NA	No	NA	Bituminous	Novice	No	Not available

Appendix C

Burnsville Multi-Modal Data Collection Sheet - Intersections									
Intersection	Shoulder Width	Trail Width	Existing Signs	Intersection Control Type	Median Present	Median Width	Pedestrian Crossings	Typical User	Notes
1 (Portland and CR 42)	None	NA	None	Signal	Yes	Nicollet 5' and Portland 3.5'	Yes	Experienced	
2 (Burnhaven and Crystal Lake)	None	NA	None	Roundabout	Yes	NA	Yes	Novice	Sidewalks and crosswalks present around the whole outside of the roundabout.
3 (Southcross and Burnhaven)	None	NA	None	Signal	Yes	Burnhaven 13' Southcross about 35'	Yes	Experienced	
4 (150th St and CR 5)	None	NA	None	Signal	Yes	CR 5 6'	Yes	Novice	
5 (CR 42 and Nicollet Ave)	None	NA	None	Signal	Yes	Vary in Size	Yes	Experienced	Busy Intersection
6 (CR 42 and Burnhaven Dr)	None	NA	None	Signal	Yes	Burnhaven 13' , CR 42 13'	Yes	Experienced	Very Busy Intersection
7 (McAndrews Rd and Nicollet Ave)	None	NA	None	Signal	Yes	McAndrews 6' , Nicollet 5'		Experienced	Busy Intersection
8 (Burnsville Pkwy and CR 5)	None	NA	None	Signal	Yes	Both 6'	Yes	Experienced	
9 (Nicollet Ave and Highway 13)	None	NA	None	Signal	Yes	Both 5.5'	Yes	Experienced	
10 (Highway 13 and Portland Ave)	None	NA	None	Signal	Yes	Portland 5.3'	Yes	Experienced	
11 (122nd St and County Road 11)	None	NA	None	Signal	None	NA	Yes	Novice	
12 (Cliff Rd and River Hill Dr)	None	NA	None	Signal	Yes	Cliff 5.5'	Yes	Experienced	
13 (Highway 13 and River Hill Dr)	None	NA	None	Signal	Yes	Highway 13 6'	Yes	Experienced	
14 (Roundabout Portland Ave)	None	NA	None	Roundabout	Yes	NA	No	Novice	Only side walk on the NE corner of the roundabout
15 (Portland Ave and Nicollet Blvd)	None	NA	None	Roundabout	Yes	NA	Yes	Novice	Side walks and cross walks present around the whole outside of the roundabout.
16 (Portland Ave and Southcross Dr)	Portland Ave 10'	NA	None	Signal	Yes	Southcross 6'	Yes	Novice	

APPENDIX D

City of Burnsville

- MSA
- City Street
- State
- County
- Private

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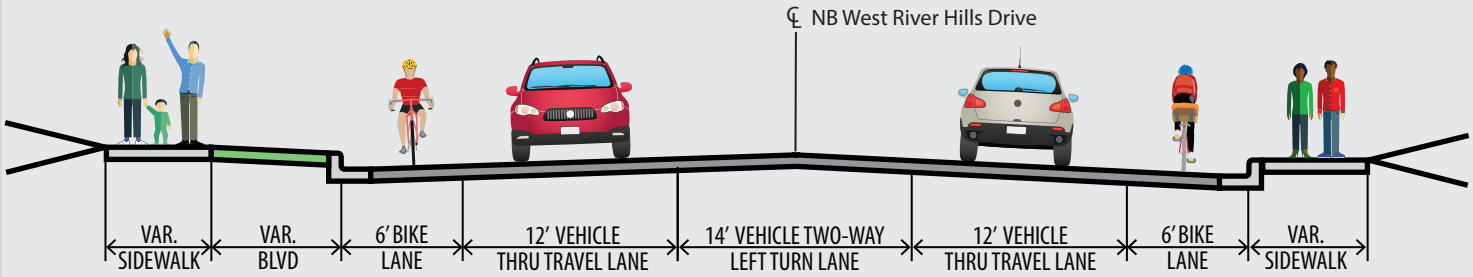
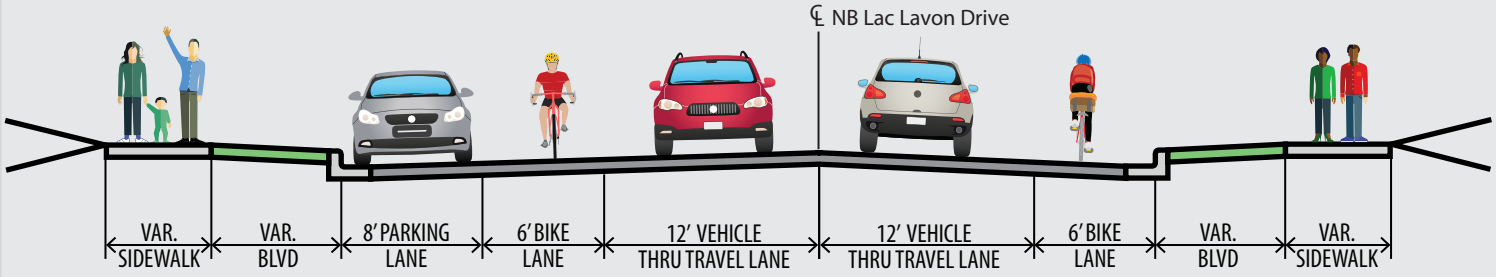
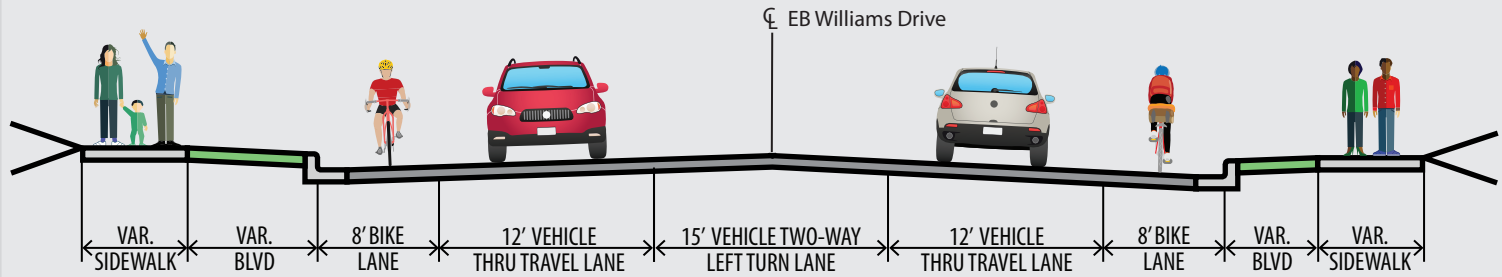
Appendix E



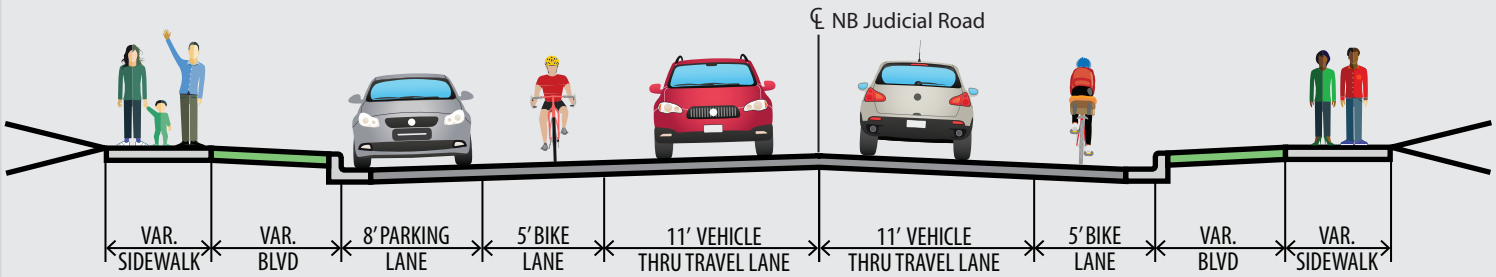
Proposed Typical Section - Pilot Project Option 1
West River Hills Drive between Highway 13 and Cliff Road



Proposed Typical Section - Pilot Project Option 2
Lac Lavon Drive between County Road 46 and County Road 42



Proposed Typical Section - Pilot Project Option 3
Williams Drive between Judicial Road and Morgan Avenue



Proposed Typical Section - Pilot Project Option 4
Judicial Road between Burnsville Parkway and Williams Drive

Appendix F

Pilot Project Options Detailed Cost Estimate			Option 1 - West River Hills Drive (1)		Option 2 - Lac Lavon Drive		Option 3 - Williams Drive		Option 4 - Judicial Road	
	UNIT	UNIT PRICE	TOTAL QUANTITY	TOTAL ITEM COST	TOTAL QUANTITY	TOTAL ITEM COST	TOTAL QUANTITY	TOTAL ITEM COST	TOTAL QUANTITY	TOTAL ITEM COST
ITEM										
Remove 4" Striping	LIN FT	$0.80	0	$0.00	20214	$16,171.20	0	$0.00	21760	$17,408.00
4" Solid Line (White) (Epoxy)	LIN FT	$0.50	2103	$1,051.50	15164	$7,582.00	0	$0.00	16320	$8,160.00
4" Double Solid Line (Yellow) (Epoxy)	LIN FT	$1.00	0	$0.00	5050	$5,050.00	0	$0.00	5440	$5,440.00
Bike Symbol and Arrow Pavement Marking (Epoxy)	EA	$200.00	4	$800.00	20	$4,000.00	14	$2,800.00	20	$4,000.00
Sharrow Pavement Marking (Epoxy)	EA	$200.00	4	$800.00	0	$0.00	0	$0.00	0	$0.00
Bike Crossing/Traffic Sign	EA	$150.00	2	$300.00	0	$0.00	3	$450.00	0	$0.00
Share the Road Sign	EA	$120.00	2	$240.00	0	$0.00	3	$360.00	0	$0.00
Bike Lane Sign/Bike Route Sign	EA	$150.00	6	$900.00	18	$2,700.00	14	$2,100.00	15	$2,250.00
Bike Lane Ahead and End Sign	EA	$90.00	2	$180.00	2	$180.00	2	$180.00	2	$180.00
Right Lane Must Turn Right	EA	$200.00	2	$400.00	0	$0.00	0	$0.00	0	$0.00
No Parking Sign (18X18)	EA	$80.00	0	$0.00	9	$720.00	0	$0.00	7	$560.00
Salvage Sign	EA	$50.00	0	$0.00	7	$350.00	0	$0.00	0	$0.00
Mobilization & Traffic Control (Figure 10% total)	LS			$468.00		$2,059.00		$589.00		$2,059.00
Subtotals				$5,139.50		$38,812.20		$6,479.00		$40,057.00
Contingency (20%) **(1)**				$2,569.75		$7,762.44		$1,295.80		$8,011.40
TOTALS				$7,709.25		$46,574.64		$7,774.80		$48,068.40
				$8,000.00		$47,000.00		$8,000.00		$49,000.00
Notes:				(round up to $10,000)						

(1) City directed to provide higher contingency (50%) for location due to unknown of having to move curb lines, intersection treatments, etc.

- West River Hills Drive is slated for 2019 pavement rehab, so no pavement marking removal was accounted for.
- Only pavement markings that are additional for bike lanes were accounted for (bike symbols and 4" white edge line).
- Remove 4" striping includes double length for removing double solid yellow centerlines.