MITCHELL AREA MASTER TRANSPORTATION PLAN

MITCHELL
Master Transportation Plan

MAY 2023

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Executive Summary

The City of Mitchell completed the *Forward 2040 Community Vision and Strategic Action Plan* in 2019 to help frame a shared vision and direction for the Mitchell area. Five strategic pillars were developed to support the preferred 'Future Shared' vision and include:

- Enhance Mitchell's recreation, tourism, and place-making
- Foster a supportive and inclusive community culture
- Create an educational hotspot emphasizing innovation opportunities
- Position Mitchell as a regional leadership center
- Strengthen the technology, agriculture, and other industry clusters around Mitchell.

Transportation plays an important role in this 'Future Shared' vision, from providing safe and efficient mobility for commuters, tourists, and industry or supporting a connected community through enhanced multimodal opportunities and eliminating barriers for travel. This vision was an important first step when shaping the Mitchell Area Master Transportation Plan (MTP) process and public engagement opportunities.

The purpose of the Mitchell Area MTP is to:

- **Establish a snapshot of baseline conditions.** This identifies transportation issues and needs the study area currently faces through data collection, analysis, and stakeholder input.
- **Establish recommendations for future improvements.** This includes a set of recommended street, bicycle, pedestrian, and transit improvement projects and a set of standards and policy recommendations to provide for safe and efficient management and growth of the transportation system.

The Mitchell Area MTP focuses on improvements within an approximate two-mile buffer around the Mitchell city limits.

A Study Advisory Team was organized to guide the study and provide incremental input and feedback at key study milestones. This team consisted of City of Mitchell staff and elected officials, Davison County staff, and South Dakota Department of Transportation (SDDOT) staff across a variety of multimodal transportation disciplines.

The Mitchell Area MTP vision was developed through input received from the community and stakeholders and guidance from the Study Advisory Team. The vision articulates goals and objectives for the transportation system while guiding future transportation decision-making based on the values of the community.

Mitchell Area MTP Vision:

The Mitchell Area MTP provides a guide for a safe, efficient, and reliable transportation system that is accessible for all users and supports a growing community by promoting local economic development goals.

Plan Components

The Mitchell Area MTP focuses on three key elements:

1. Gaining an **understanding** of Mitchell area transportation issues and needs through public engagement, review of existing and future conditions
2. Developing **standards and projects** through a series of 'plans' to address the identified issues and needs
3. Developing an **Implementation Plan** to present a feasible path to implement MTP recommendations

Key elements and associated sections of the MTP include:

1. **Understanding**
   - Public Engagement
   - Community Profile
   - Baseline Conditions
   - Issues and Needs
2. **Standards and Project Development**
   - Major Roads Plan
   - Pavement Management Plan
   - Bicycle and Pedestrian Plan
   - Transit Plan
   - Traffic Signal System Plan
3. **Implementation Plan**
   - Prioritized Project Recommendations

Findings and Recommendations

Each chapter of the Mitchell Area MTP is an integral part in shaping findings, guidance, and long-range recommendations for the Mitchell area transportation network. Each sub-plan within the Standards and Project Development lays the foundation for various modes of travel and managing the existing road network. Everything is tied together through the Implementation Plan, which includes a prioritized list of recommended projects and next steps to help guide the City of Mitchell and other area agencies in multimodal transportation planning and decision-making.

A funding analysis was developed to assess historical transportation funding by the City of Mitchell and compare it to planning-level costs associated with projects developed to address identified transportation-related issues and needs. It was found that project recommendation costs exceeded forecasted transportation funding upwards of nearly $8 million through Year 2029 and another $23.5 million between Years 2030 and 2039. This highlights the importance of external funding sources to help fill this gap and spread transportation dollars across projects for all modes of travel. Recommended external funding sources include:

- State of South Dakota grants
- U.S. Department of Transportation discretionary grants
- Cost-share agreements with Davison County for reconstruction and jurisdictional transfer of Davison County highways within the Mitchell growth area

Fostering partnerships with other area agencies and supporting a collaborative process with organizations, community groups, and transportation stakeholders will be important when pursuing these external funding sources. The Mitchell Area MTP provides the framework to support this process and ultimately help the City of Mitchell reach their vision of the future transportation network.

1 Introduction

The City of Mitchell completed the *Forward 2040 Community Vision and Strategic Action Plan* in 2019 to help frame a shared vision and direction for the Mitchell area. Five strategic pillars were developed to support the preferred 'Future Shared' vision and include:

- Enhance Mitchell's recreation, tourism, and place-making
- Foster a supportive and inclusive community culture
- Create an educational hotspot emphasizing innovation opportunities
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The Mitchell Area MTP focuses on improvements within an approximate two-mile buffer around the Mitchell city limits as shown in **Figure 1**.

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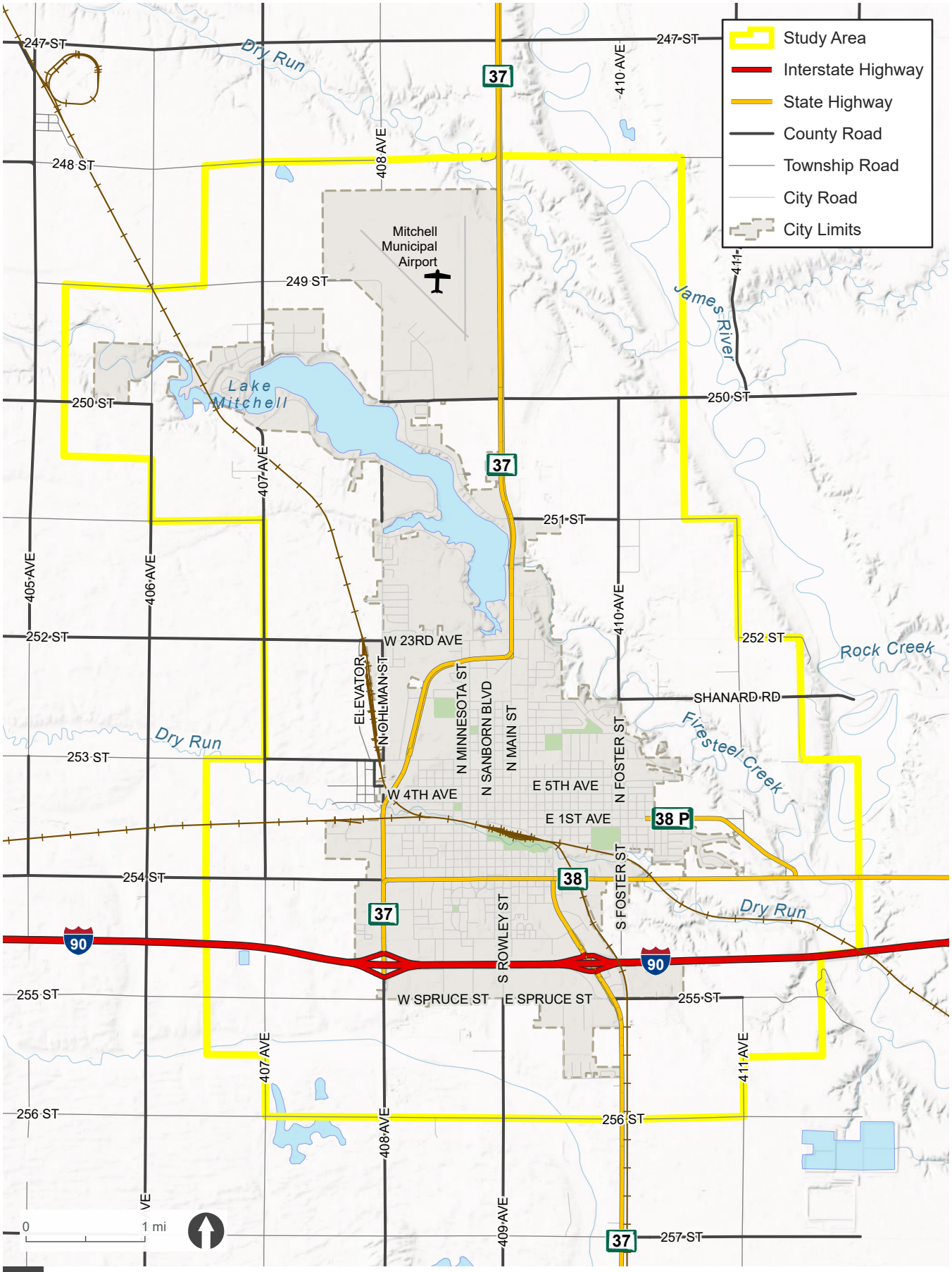
The purpose of the Mitchell Area MTP is to:

- **Establish a snapshot of baseline conditions.**
  This identifies transportation issues and needs the study area currently faces through data collection, analysis, and stakeholder input.
- **Establish recommendations for future improvements.**
  This includes a set of recommended street, bicycle, pedestrian, and transit improvement projects and a set of standards and policy recommendations to provide for safe and efficient management and growth of the transportation system.



STUDY AREA

FIGURE 1

MITCHELL, SD | MASTER TRANSPORTATION PLAN

2 Purpose, Goals, and Objectives

The Mitchell Area MTP vision was developed through input received from the community and stakeholders during engagement activities and guidance from the Study Advisory Team. The vision articulates goals and objectives for the transportation system while guiding future transportation decision-making based on the values of the community.

Vision:

The Mitchell Area MTP provides a guide for a safe, efficient, and reliable transportation system that is accessible for all users and supports a growing community by promoting local economic development goals.

Table 1 presents MTP goals and objectives. The goals articulate important emphasis areas for the MTP to address. Objectives are specific and actionable items that the MTP should promote.

Table 1: MTP Goals and Objectives

GOAL	OBJECTIVE
Economic	Improve multimodal connectivity and reliability to commercial, industrial, and recreational land uses to support the economic vitality of the area
Accessibility	Provide for multimodal travel through a connected transportation network
Efficiency and Reliability	Limit recurring congestion and provide reliable transportation corridors
Safety	Reduce the frequency of vehicle, bicycle, and pedestrian crashes
Bicycle and Pedestrian Connectivity	Improve bicycle and pedestrian connectivity and route continuity
Maintaining the Current System	Devote sufficient resources and plan for maintaining the transportation system in a state of good repair
Placemaking	Support city development goals through street network improvements and proposed policies and standards

Sanborn Boulevard

3 Plan Components

The Mitchell Area MTP focuses on three key elements:

1. Gaining an **understanding** of Mitchell area transportation issues and needs through public engagement, review of existing and future conditions
2. Developing **standards and projects** through a series of 'plans' to address the identified issues and needs
3. Developing an **Implementation Plan** to present a feasible path to implement MTP recommendations

Key elements and associated sections of the MTP include:

1. Understanding

- Public Engagement
- Community Profile
- Baseline Conditions
- Issues and Needs

2. Standards and Project Development

- Major Roads Plan
- Pavement Management Plan
- Bicycle and Pedestrian Plan
- Transit Plan
- Traffic Signal System Plan

3. Implementation Plan

- Prioritized Project Recommendations

Main Street, Downtown Mitchell

4 Community Profile

4.1 Population Growth

The population of Mitchell has seen moderate growth over the past 30 years, growing at a rate of 0.4 percent per year since 1990 as shown in **Table 2**. The largest growth period Mitchell experienced was between 1990 and 2000 when the community added nearly 900 residents. Mitchell averaged just under 500 new residents each decade between 2000 and 2020.

Table 2: Mitchell Population Growth, 1990 – 2020

YEAR	POPULATION	PERCENT CHANGE
1990	13,798	-
2000	14,691	6.5%
2010	15,254	3.8%
2020	15,660	2.7%

Source: U.S. Census Bureau Decennial Census, 1990 – 2020

4.2 Housing Characteristics

Housing characteristics are a key determinant in travel demand as the makeup of occupants, housing type, and spatial distribution of residents dictates the travel needs of the population. Data from the American Community Survey summarized in **Table 3**.

Table 3: Housing Characteristics for Mitchell Residents

HOUSING CHARACTERISTIC	
Households	7,086
Average Household Size	2.05
Percent Owner-Occupied	56%
Percent Renter-Occupied	44%

Source: American Community Survey 2020 5-Year Estimates

4.3 Employment Characteristics

Employment characteristics are a second key determinant in travel demand and support the economic needs of both Mitchell residents and the surrounding area. A summary of Mitchell's employment by industry is shown in **Table 4**.

Table 4: Employment by Industry (Top 6)

INDUSTRY	PERCENT OF WORKERS
Educational, health care, and social assistance services	23%
Manufacturing	12%
Retail trade	12%
Arts, entertainment, recreation, and accommodation and food services	12%
Finance, insurance, and real estate	10%
Construction	7%

Source: American Community Survey 2020 5-Year Estimates

4.4 Commuting Characteristics

Mitchell area commuting characteristics from the American Community Survey 2020 are summarized in the following tables:

- Means of travel to/from work **(Table 5)**
- Vehicles available to Mitchell workers **(Table 6)**
- Time of commute departures **(Table 7)**
- Travel time to work **(Table 8)**

This data highlights the importance of vehicular transportation throughout the Mitchell area as well as opportunities to continue to improve multimodal transportation elements such as public transportation and bicycle/pedestrian facilities. Generally, the commute windows are short with most Mitchell workers departing for work within or around the 7-8 a.m. hour and nearly 80 percent of the trips taking 14 minutes or less.

From a regional perspective, the U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) Program provides a look at inflow and outflow travel for employment within the Mitchell city limits. For year 2019 (see **Figure 2**), there were slightly more people commuting to Mitchell for employment (5,584) than those that live and work in Mitchell (5,310). The data also shows approximately 3,320 Mitchell residents leaving Mitchell for employment. This indicates that overall, Mitchell is a regional employment center that attracts workers from the surrounding region.

Table 5: Means of Travel to/from Work

MEANS OF TRAVEL	PERCENT OF WORKERS
Personal Vehicle	89%
Drove Alone	84%
Carpool	5%
Public Transportation	2%
Walk	3%
Bicycle	<1%
Other	2%
Worked from Home	3%

Source: American Community Survey 2020 5-Year Estimates

Table 6: Vehicles Available to Mitchell Workers

VEHICLES AVAILABLE	PERCENT OF WORKERS
None	2%
1	23%
2	36%
3 or more	39%

Source: American Community Survey 2020 5-Year Estimates

Table 7: Time of Commute Departures (Home to Work)

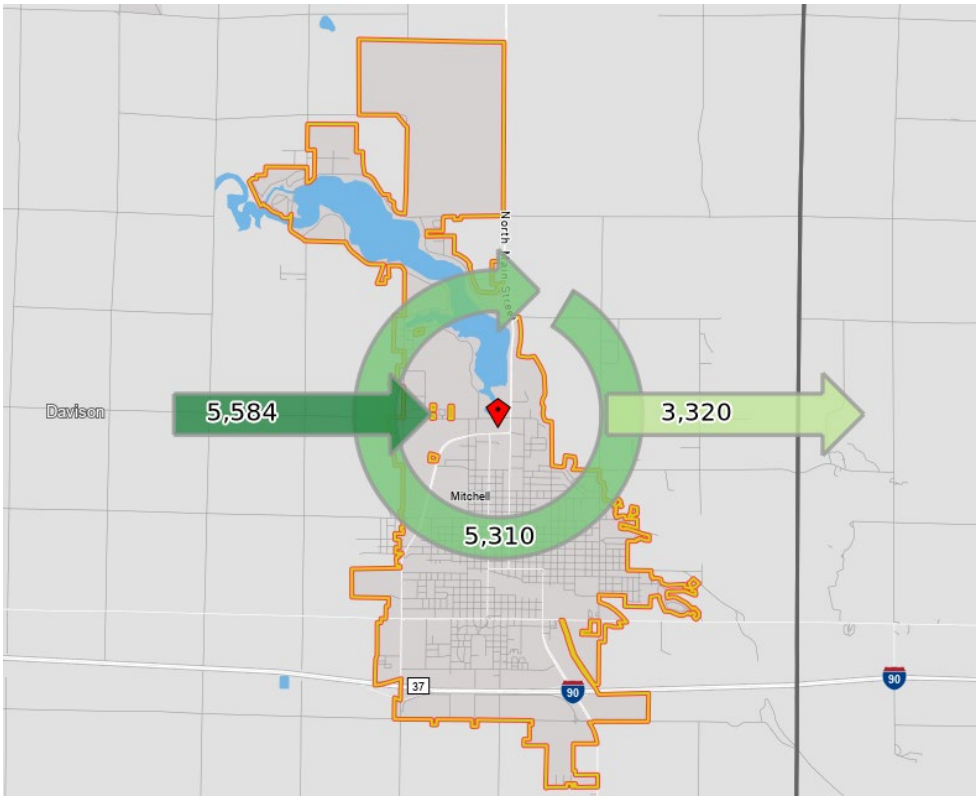
TIME OF DEPARTURE	PERCENT OF WORKERS
12 – 6 a.m.	13%
6 – 7 a.m.	12%
7 – 8 a.m.	33%
8 – 9 a.m.	16%
9 – 12 a.m.	26%

Source: American Community Survey 2020 5-Year Estimates

Table 8: Travel Time to Work

TRAVEL TIME TO WORK	PERCENT OF WORKERS
Less than 10 minutes	53%
10 to 14 minutes	26%
15 to 19 minutes	10%
20 to 59 minutes	7%
60 or more minutes	4%

Source: American Community Survey 2020 5-Year Estimates



Source: 2019 Longitudinal Employer-Household Dynamics https://onthemap.ces.census.gov/

Figure 2: Commuting Inflow and Outflow for Mitchell (Year 2019)

5 Public Engagement

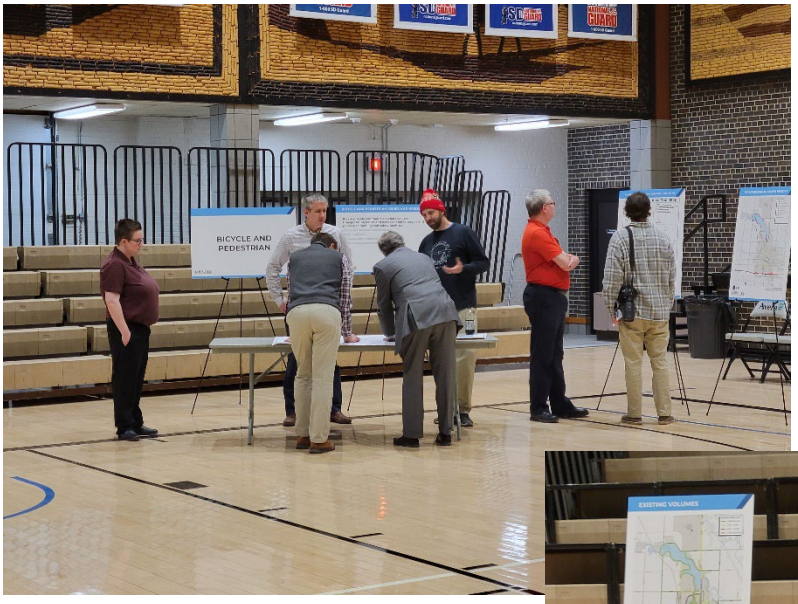
Public engagement was an integral part of the MTP development with multiple events held throughout the planning process, including:

- Travel survey
- Public open houses
- Stakeholder meetings

Feedback received during these events guided development of MTP goals, objectives, and recommendations. A summary of each public engagement event is provided in **Appendix A**.

5.1 Travel Survey

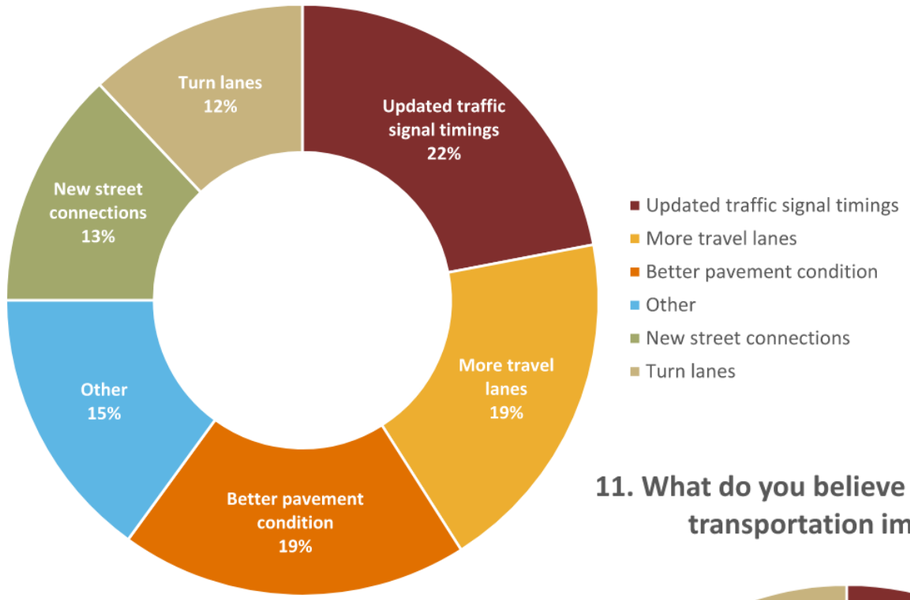
The MTP Travel Survey was an online-survey conducted in conjunction with the first public open house to help the study team identify transportation-related issues and needs. Respondents also had the opportunity to provide feedback on study objectives and goals. The survey collected 469 responses. Three questions that frame transportation-related issues and needs with outcome-related responses are summarized in **Figure 3**.



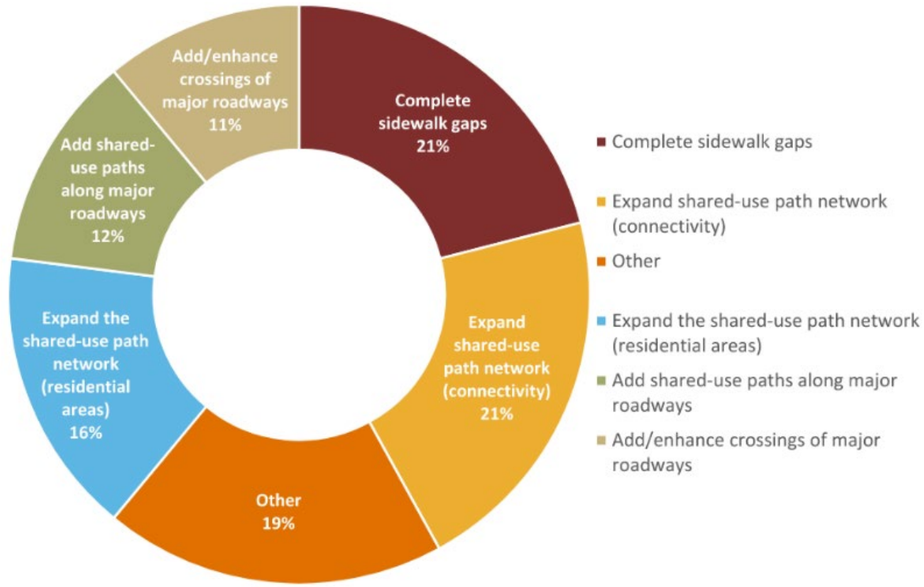
Public Open House #1: January 27, 2022

Figure 3: Travel Survey Question and Responses

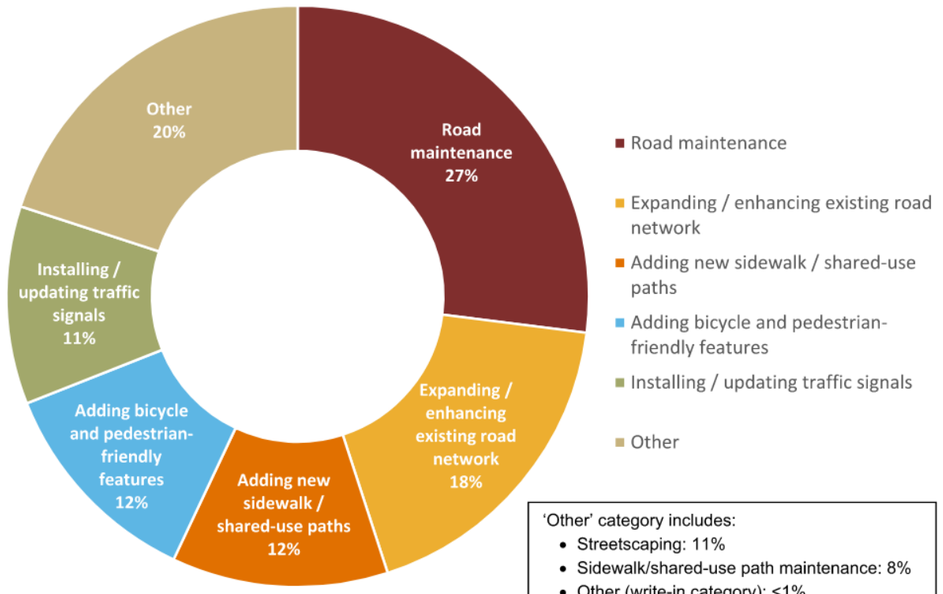
4. What improvements do you feel are necessary to enhance the street network in Mitchell?



8. Which of the following do you believe would most improve the bicycle and pedestrian network?



11. What do you believe are the top budget priorities for transportation improvements in Mitchell?



'Other' category includes:
- Streetscaping: 11%
- Sidewalk/shared-use path maintenance: 8%
- Other (write-in category): <1%

5.2 Public Involvement

Two public open house events were held during the MTP development process. These events invited the community to visit with study staff to learn more about the planning process and provide input on transportation-related issues and needs, goals and priorities of the study, and potential strategies for implementation.

5.2.1 Open House #1

Open House #1 was held on January 27, 2022, at the Corn Palace in Mitchell. This event informed the community on the planning process and provided opportunities to share input regarding transportation-related issues and needs and study objectives and priorities. The Open House event had approximately nine in-person attendees and 78 unique users on the study website's public open house page.

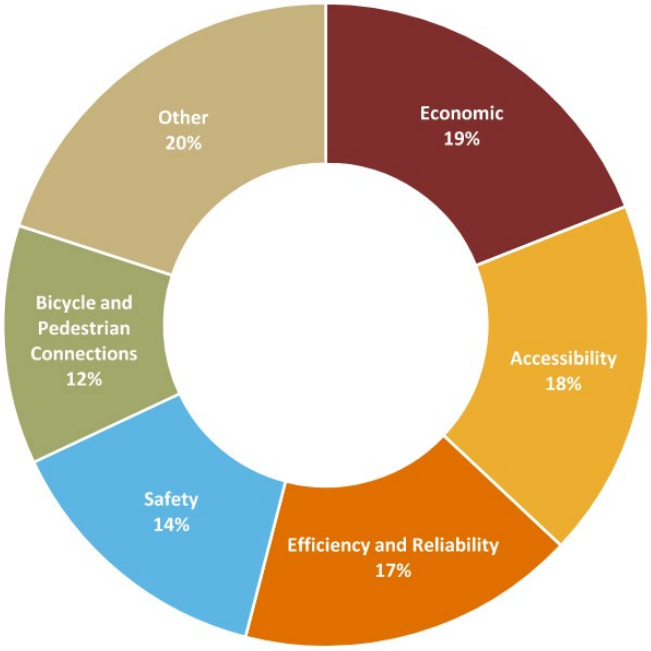
Transportation-related issues and needs identified by attendees focused on four key areas:

- Roadway segments
- Intersections
- Bicycle and pedestrian
- Area-wide or long-range considerations

The survey question "What goals or characteristics of the Mitchell transportation system should the Master Transportation Plan focus on?" was asked through the survey, and the public open house, and at stakeholder meetings. The compiled results from all three opportunities are summarized in **Table 9**.

Table 9: MTP Goals and Objectives

GOAL	PERCENT SELECTED
Economic	19%
Accessibility	18%
Efficiency and Reliability	17%
Safety	14%
Bicycle and Pedestrian Connectivity	12%
Resiliency	7%
Innovation	7%
Placemaking	6%



5.2.2 Open House #2

Open House #2 was held on March 20, 2023, at the Corn Palace in Mitchell. There were 13 in-person attendees, plus Study Advisory Team members, and 66 unique users visiting the study website during the comment period. The event informed the community of preliminary recommendations and requested feedback related to:

- Long-range transportation projects and priorities
- Allocation of future funding to the various transportation elements
- Anticipated gap in funding between forecasted revenue and preliminary project recommendations

Multimodal safety, multimodal connectivity, travel route reliability and blocked railroad crossings, traffic signal timing, and future projects were the most frequently commented topics. Much of the feedback confirmed recommended transportation projects and priorities. Several comments included additional considerations or suggestions for the study team when transitioning from project planning to study and design.

5.2.3 Stakeholder Meetings

A series of stakeholder meetings were held in conjunction with both public open house events. Stakeholders were identified by the Study Advisory Team and included City of Mitchell and Davison County departments not represented on the Study Advisory Team, business owners, property owners, multimodal transportation advocates, and community leaders interested in the area's transportation network. The purpose of these stakeholder meetings aligned with the purpose of each public meeting but provided an opportunity for informal small-group discussion with the Study Advisory Team.

Public Open House #2: March 20, 2023

6 Baseline Conditions

6.1 Existing Road Network

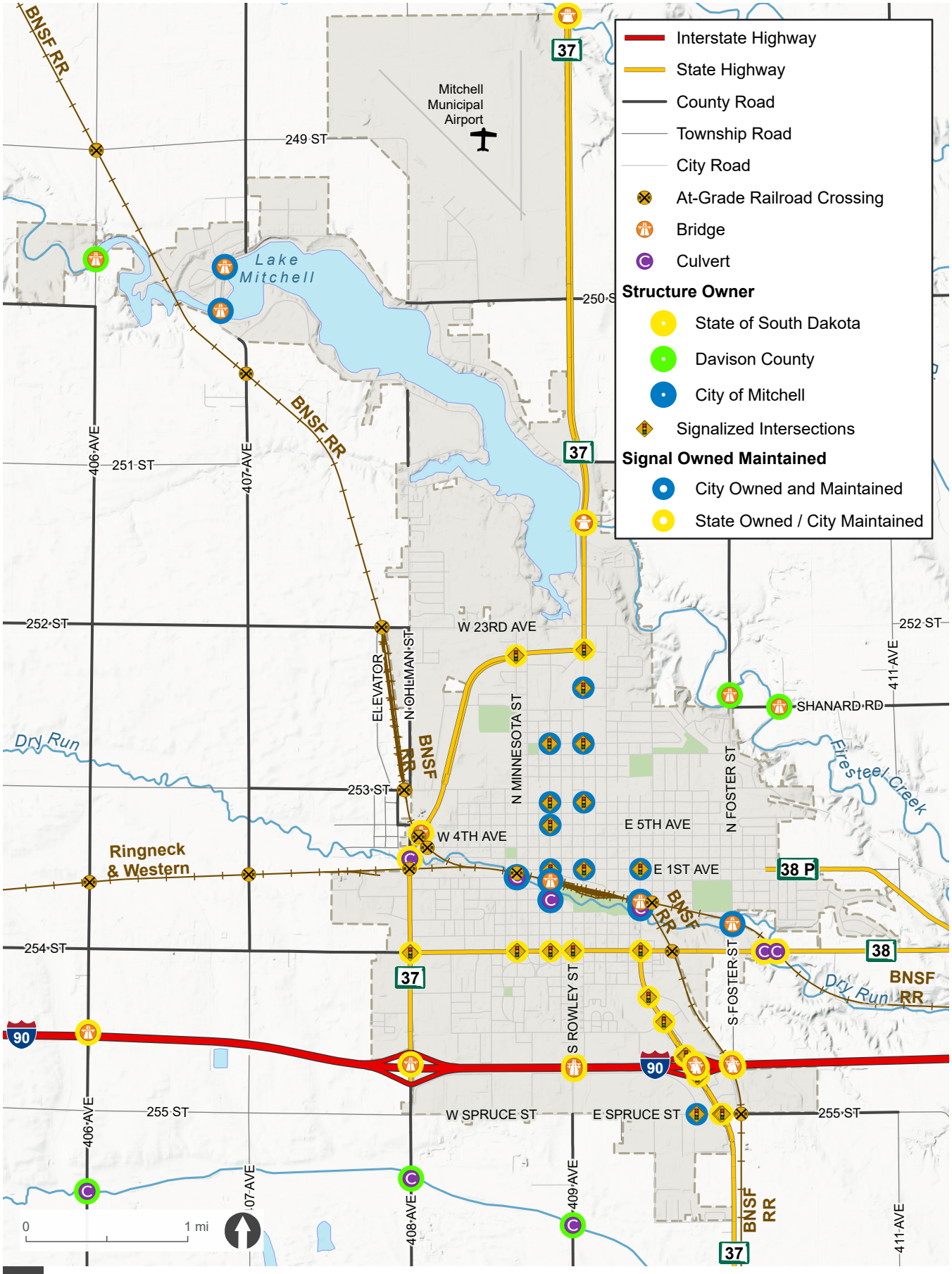
The existing Mitchell area road network shown in **Figure 4** reflects the current roadway jurisdiction responsible for ownership and maintenance of the street section. The City of Mitchell currently owns approximately 120 centerline miles of roadway based on 2021 data. The map also shows existing railroad crossings, bridges, and traffic signals.

Public roadways are classified based on its access and mobility function within the network using the Federal Functional Classification. This process is used to establish a hierarchical balance of varying degrees of mobility and access throughout the transportation network. The classification and any subsequent changes are approved by the Federal Highway Administration (FHWA). The existing Federal Functional Classification is shown in **Figure 5**.

Mobility refers to the efficiency of vehicular and freight movement.

Accessibility refers to the degree to which adjacent property can be accessed by vehicles, bicyclists, and pedestrians.

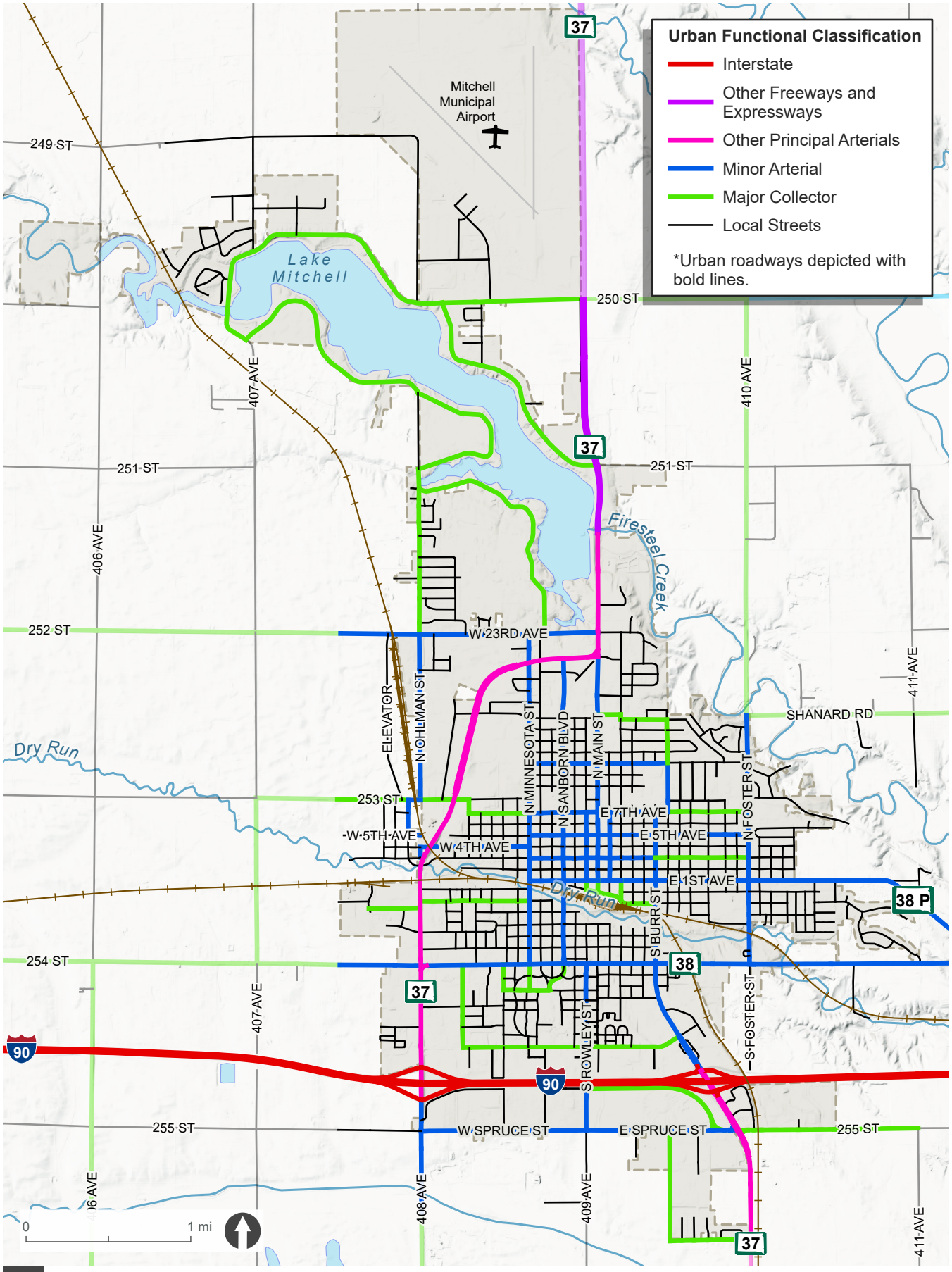
Burr Street Grade Separated Railroad Crossing, North of Havens Avenue



EXISTING ROAD NETWORK

FIGURE 4

MITCHELL, SD | MASTER TRANSPORTATION PLAN



FEDERAL FUNCTIONAL CLASSIFICATION

FIGURE 5

MITCHELL, SD | MASTER TRANSPORTATION PLAN

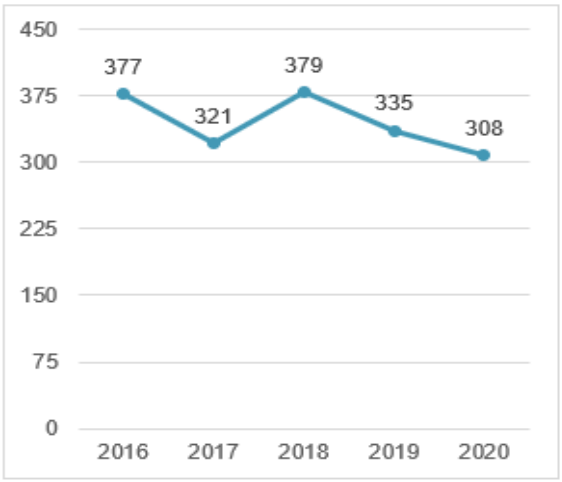
6.2 Safety Review

A crash history review was conducted to evaluate transportation safety conditions throughout the MTP study area. The safety review focused on crashes associated with intersections, select roadway segments, bicyclists and pedestrians, and railroad crossings.

The analysis used data sourced from the State of South Dakota crash database of reported crashes for the years 2016 through 2020. Additional information is provided in the *Crash History Review Memo* in **Appendix B**.

6.2.1 Mitchell Area Crash Summary

A total of 1,720 crashes were reported for years 2016 through 2020 within the MTP study area. Total crashes have fluctuated annually, as shown in **Figure 6**. It should be noted that 2020 coincided with the COVID-19 Public Health Pandemic that saw shelter-in-place orders and changes in daily work and travel habits.

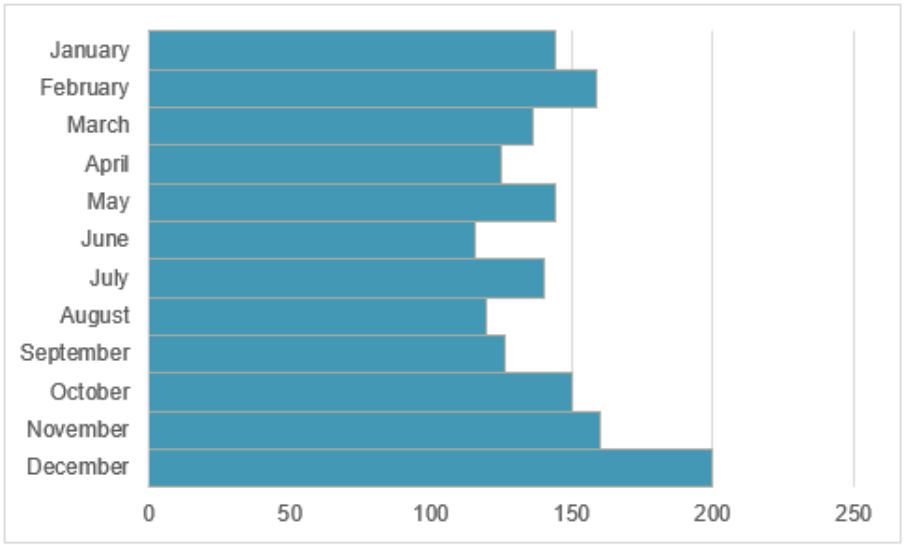


Source: SDDOT

Figure 6: Mitchell Area Annual Crashes (2016 – 2020)

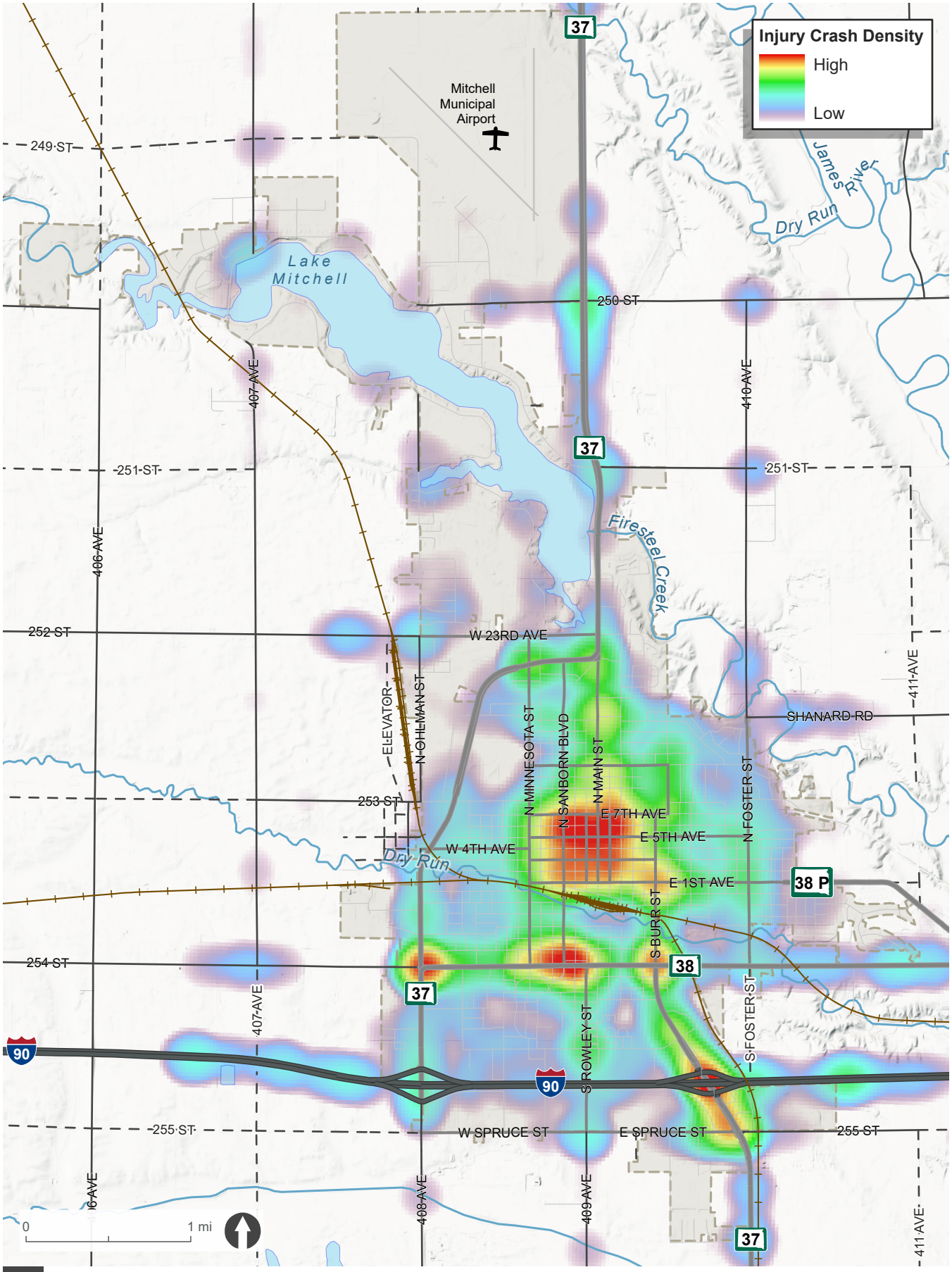
Crashes by month are summarized in **Figure 7**. The winter months of October through February exhibit the highest crash frequencies. Winter weather is a time of heightened crash risk due to snow and ice road conditions and shortened daylight hours. The months with the lowest frequency crashes include April, June, August, and September.

Crash density for the study area is shown in **Figure 8** . Areas with higher crash density are consistent with high volume and levels of conflict, such as the downtown area and the Havens Avenue and Burr Street corridors.



Source: SDDOT

Figure 7: Mitchell Area Crashes by Month (2016 – 2020)



CRASH HISTORY (2016 - 2020)

FIGURE 8

MITCHELL, SD | MASTER TRANSPORTATION PLAN

Study area crashes sorted by injury severity and type (manner) of crash are shown in **Table 10** and **Table 11** respectively. Approximately 16 percent of the reported crashes resulted in an injury with the remaining 84 percent were property damage only (PDO). The most common crash types were single vehicle (41 percent), angle (34 percent), and rear-end (20 percent).

Table 10: Mitchell Area Crashes by Severity (2016 – 2020)

INJURY SEVERITY	CRASHES	PERCENT OF CRASHES
Fatal Injury	1	<0.1%
Incapacitating Injury	24	1.4%
Non-Incapacitating Injury	106	6.2%
Possible Injury	142	8.3%
No Injury	1,447	84.1%
Total Crashes	**1,720**	

Table 11: Mitchell Area Crashes by Manner of Crash (2016 – 2020)

MANNER OF CRASHES	CRASHES	PERCENT OF CRASHES
Single Vehicle	701	41%
Angle	584	34%
Rear End	339	20%
Sideswipe	93	5%
Head-on	3	<1%
Total Crashes	**1,720**	

6.2.2 Intersections

Intersection crash history was reviewed to identify locations that may benefit from safety improvements. Crashes occurring within a 250-foot radius of an intersection were categorized as an intersection crash for this review. Intersections were reviewed using two methods:

- **Crash frequency:** number of crashes occurring at an intersection
- **Crash rate:** accounts for crash frequency and traffic volumes entering an intersection to provide a normalized measure in terms of crashes per million entering vehicles (MEV)

A summary of intersections with six or more reported crashes is provided in **Table 12**.

Major corridors exhibiting several high frequency crash intersections include:

- SD37 (Burr Street and Ohlman Street)
- SD38 (Havens Avenue)
- Sanborn Boulevard
- 1st Avenue

Table 12: Mitchell Area Intersection Crash Rates (2016 – 2020)

RANK	INTERSECTION	TRAFFIC CONTROL DEVICE	TOTAL CRASHES	INJURY SEVERITY				DAILY ENTERING VOLUME	CRASH RATE CRASHES/ MEV
				Major*	Minor*	Possible	PDO		
1	SD37 & Minnesota Street	Signal	17	1	3	2	11	7,300	1.29
2	Kimball Street & 7th Avenue	TWSC	16	1	0	2	13	7,700	1.14
3	SD37 (Ohlman Street) & Havens Avenue	Signal	28	0	1	4	23	15,500	0.99
4	SD37 (Burr Street) & I-90 WB RTI	Signal	26	0	1	3	22	15,000	0.95
5	470th Avenue & 249th Street	TWSC	1	1	0	0	0	600	0.91
6	SD37 (Burr Street) & I-90 EB RTI	Signal	23	2	1	1	19	13,900	0.91
7	SD37 & National Guard Road	TWSC	8	1	2	0	5	4,900	0.90
8	SD37 (Burr Street) & Spruce Street	Signal	21	0	0	2	19	13,100	0.88
9	Sanborn Boulevard & Havens Avenue	Signal	24	0	1	1	22	16,500	0.80
10	Duff Street & 5th Avenue	TWSC	6	1	0	1	4	4,200	0.78
11	Sanborn Boulevard & 1st Avenue	Signal	17	0	2	2	13	13,200	0.70
12	Ohlman Street & 23rd Avenue	TWSC	5	0	0	0	5	3,900	0.70
13	Main Street & West 15th Avenue	TWSC	9	0	0	1	8	7,300	0.67
14	Burr Street & 1st Avenue	Signal	11	0	2	0	9	9,500	0.63
15	Foster Street & 1st Avenue	TWSC	6	0	0	2	4	5,200	0.63
16	Main Street & 1st Avenue	Signal	7	0	0	0	7	6,100	0.63
17	SD38 (Havens Avenue) & Burr Street	Signal	20	0	0	5	15	18,200	0.60
18	Rowley Street & Norway Avenue	AWSC	8	0	0	2	6	8,300	0.53
19	Sanborn Boulevard & 7th Avenue	Signal	10	0	1	2	7	10,500	0.52
20	SD37 & Sanborn Boulevard	TWSC	7	0	1	0	6	7,400	0.52

AWSC: All-Way Stop Control; TWSC: Two-Way Stop Control

* Incapacitating injuries are referred to as Major Injury, non-incapacitating injuries are referred to as Minor Injury

No fatal crashes were reported within the study area

Foster Street & 1st Avenue Intersection

6.2.3 Bicycle and Pedestrian

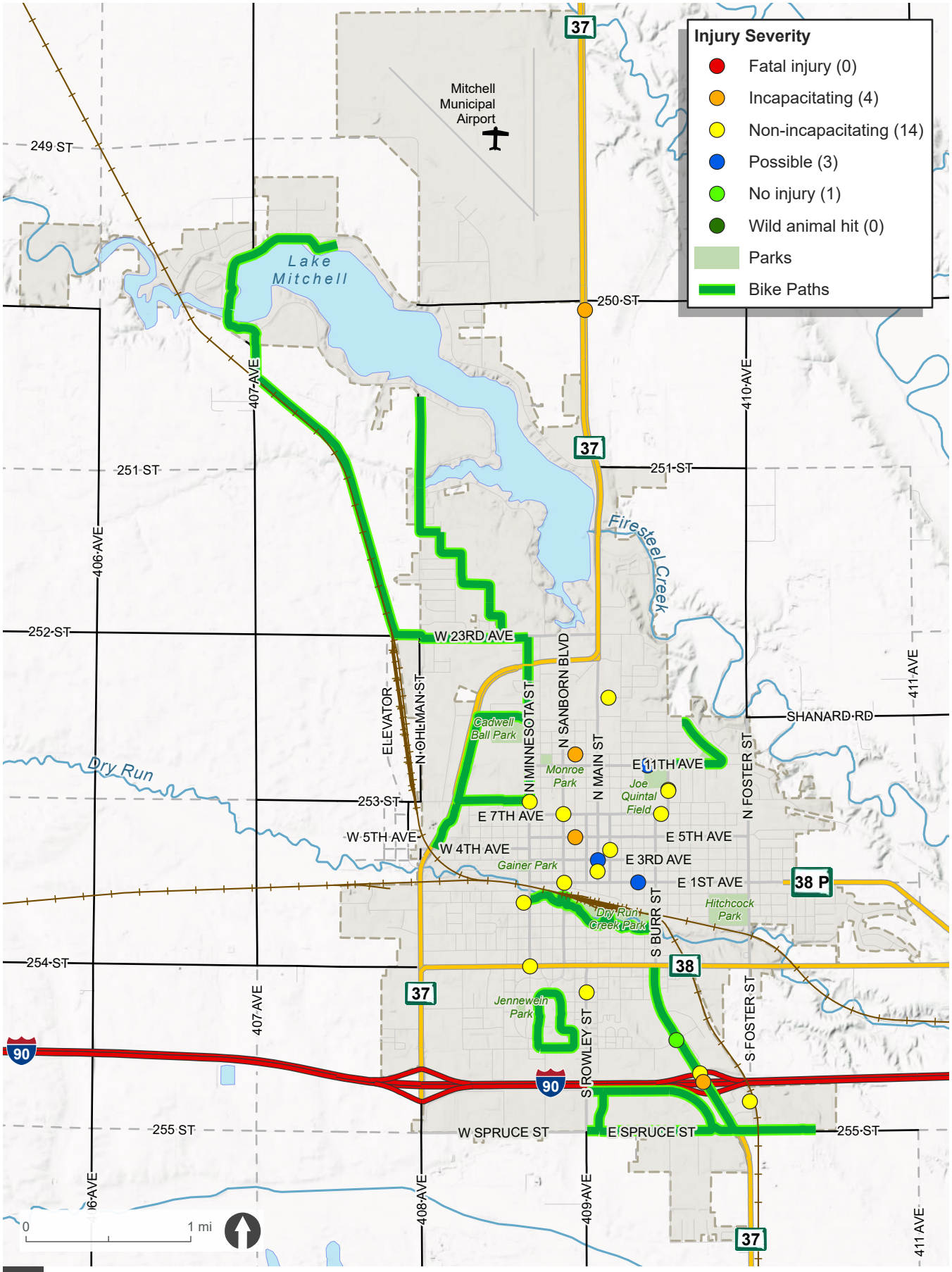
Bicycle and pedestrian related crashes, categorized by injury severity, are shown in **Figure 9**. In total, 22 occurred within the study area from 2016 through 2020. Crashes were most frequent within the Mitchell core area and along the Burr Street corridor. All but one crash resulted in an injury, highlighting the high potential for injuries in vehicle crashes with bicyclists and pedestrians. Four crashes, 18 percent, resulted in a serious injury.

6.2.4 Railroad Crossings

Five crashes were reported at rail crossings from 2016 through 2020 and are summarized in **Table 13**. No injury crashes were reported. The dispersion of crashes across four rail crossing locations illustrates the often-random nature of rail crossing crashes, even in urban areas with high traffic volumes. It is important to continually improve crossings through a systematic and opportunistic process of identifying and addressing potential conflicts with trains.

Table 13: Rail Crossing Crashes (2016 – 2020)

ROADWAY	CROSSING LOCATION	CROSSING NUMBER	RAILROAD	TOTAL CRASHES	TRAINS / DAY	CROSSING CONTROL
8th Ave	West of Ohlman St	386033E	BNSF	1	2	Active-flashing lights (mast mounted) and gate arms
SD37	Between 3rd Ave and Hanson Ave	386036A	BNSF	1	2	Active-flashing lights (mast and cantilever mounted)
SD38	East of Capitol St	382397R	BNSF	2	2	Active-flashing lights (mast and cantilever mounted)
Spruce St	East of Mall Dr	382394V	BNSF	1	2	Active -flashing lights (mast mounted)



BICYCLE AND PEDESTRIAN CRASHES (2016 - 2020)

FIGURE 9

MITCHELL, SD | MASTER TRANSPORTATION PLAN

6.3 Existing and Future Traffic Volumes

Existing daily traffic volumes were based on roadway segment counts collected by the SDDOT between 2017 and 2022 as part of their annual count programs. SDDOT-derived countywide growth rates and seasonal factors were used to factor all historical counts to a common 2022 Existing Conditions year.

Twelve-hour intersection turning movement counts were collected in 2021 at 10 intersections identified by the Study Advisory Team. The SDDOT also provided intersection turning movement counts at additional intersections on state routes. These counts followed a similar factoring process as the daily segment volumes and are the basis of morning and afternoon peak hour volumes.

Future-year traffic volumes were developed to assess future operational needs and identify potential solutions. Existing condition traffic volumes were forecasted to years 2032 and 2045 using historical count data, SDDOT-derived growth rates, future land use, anticipated development, and population trends. Through discussions with the City of Mitchell, future growth is anticipated throughout the area, as shown in **Figure 10**, with higher traffic generating land uses anticipated on the west and south sides of Mitchell. Traffic volume growth rates, or the anticipated pace of traffic volume increases, are higher in these areas compared to other areas of Mitchell.

Daily segment traffic volumes are shown in the following figures:

- Existing Daily Traffic Volumes **(Figure 11)**
- 2045 Planning Horizon Daily Traffic Volumes **(Figure 12)**

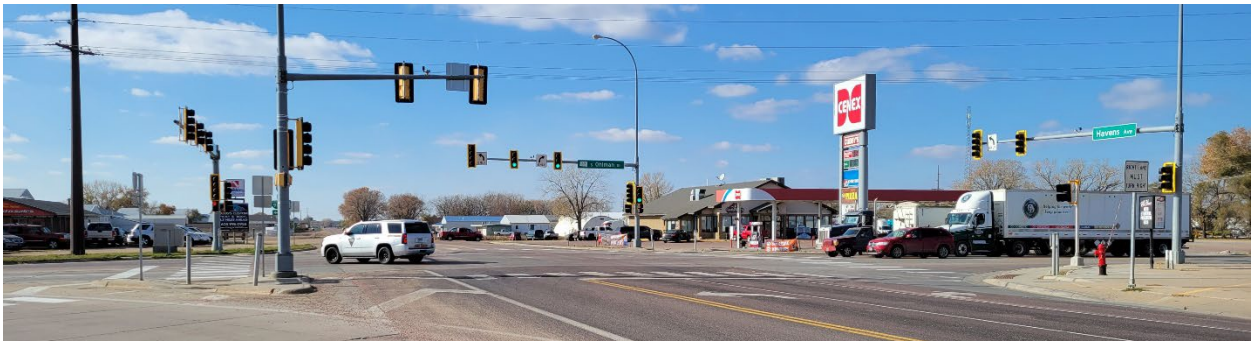
Intersection peak hour volumes are provided in the *Traffic Forecasts Memo* in **Appendix C**.

Supplemental Traffic Forecast Scenarios

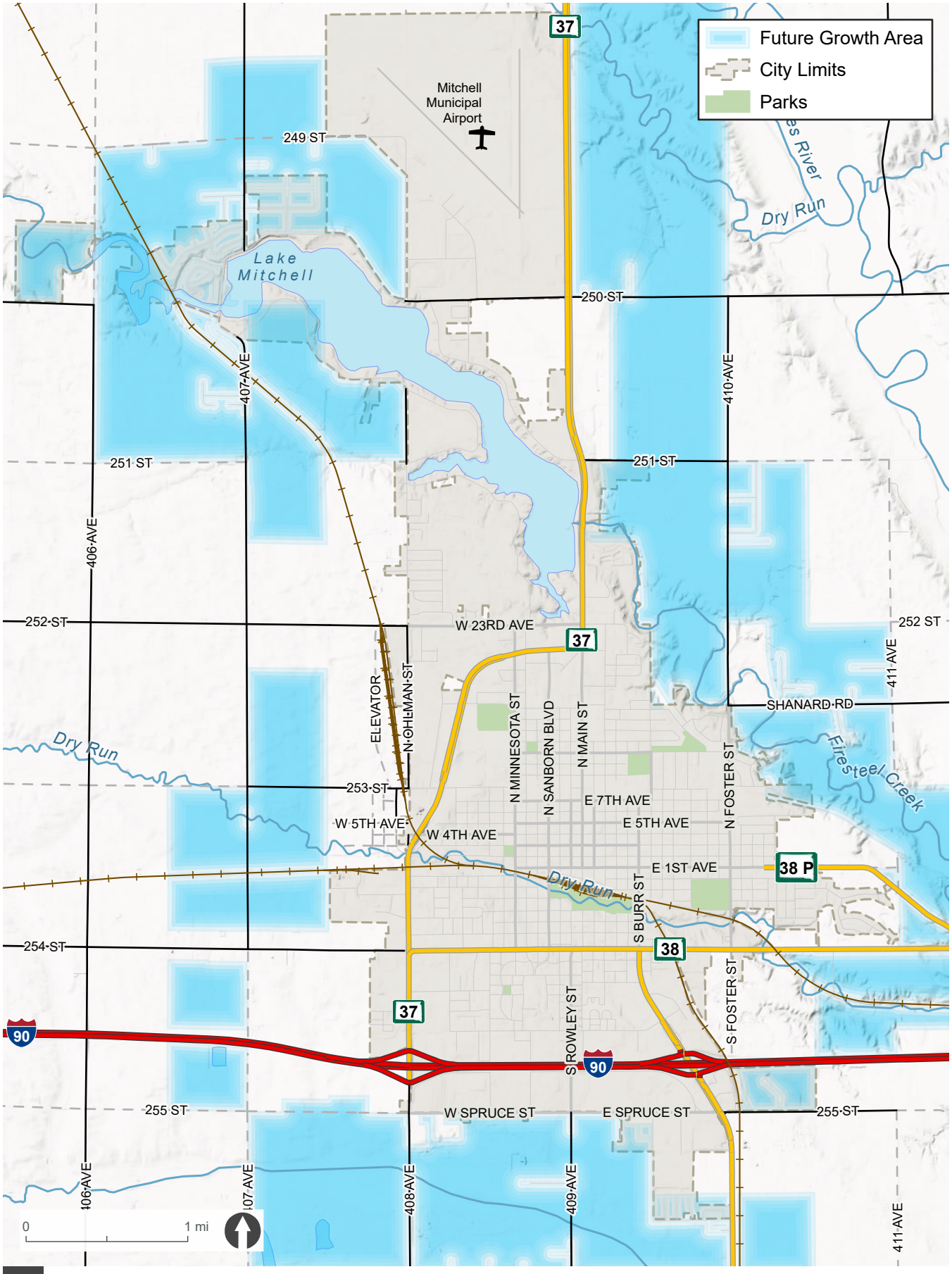
Special sub-area scenarios were developed to assess potential changes in the future transportation network and/or high-volume traffic generators:

- Foster Street extension across I-90 between Havens Avenue and Spruce Street
- Mattie Street extension to Havens Avenue
- Hospital relocation to Spruce Street

Additional information on these special scenarios is provided in the **Special Scenarios** chapter.



Ohlman Street (SD37) & Havens Avenue (SD38) Intersection

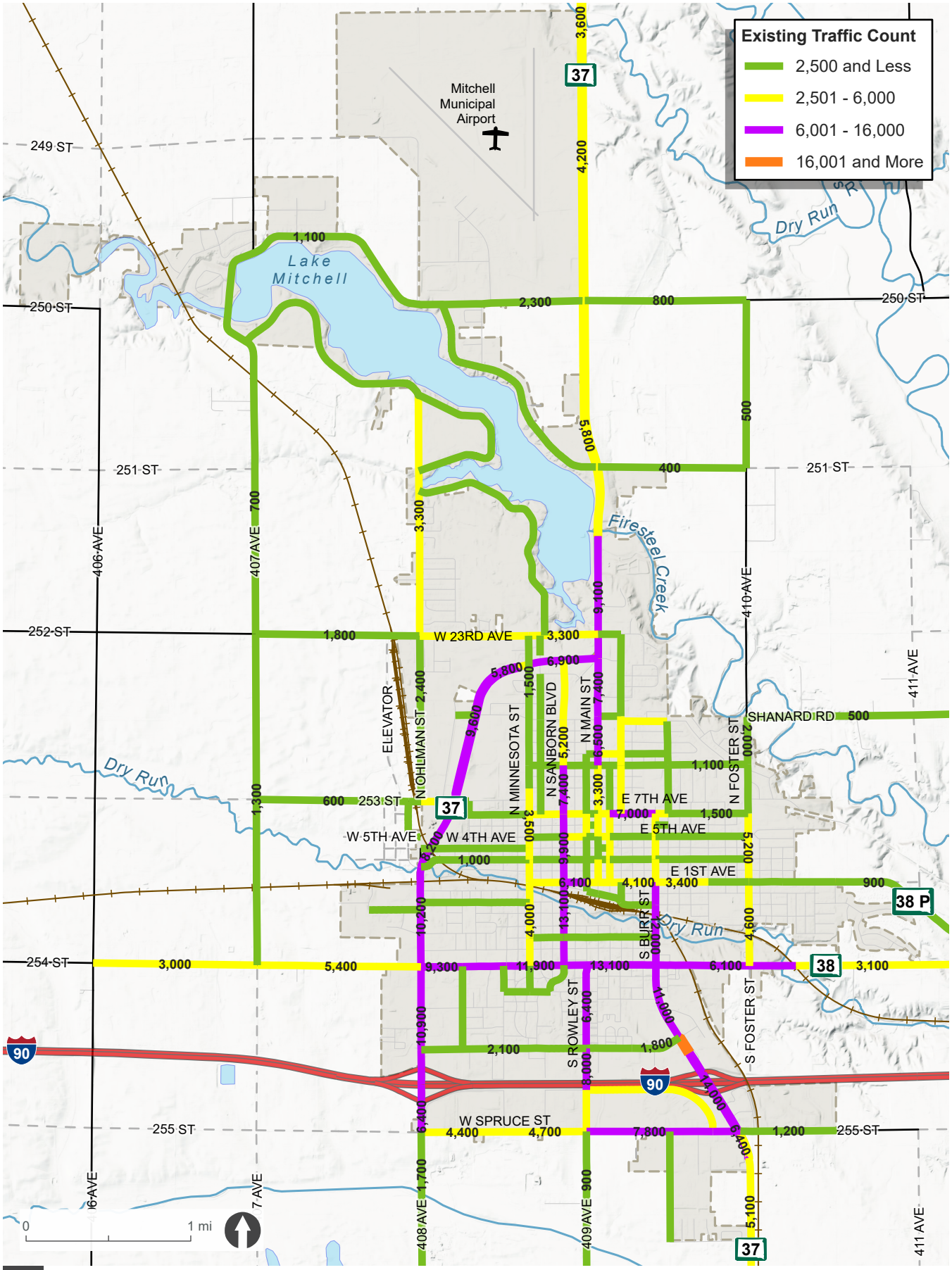


MITCHELL
Master Transportation Plan

MITCHELL GROWTH AREAS

FIGURE 10

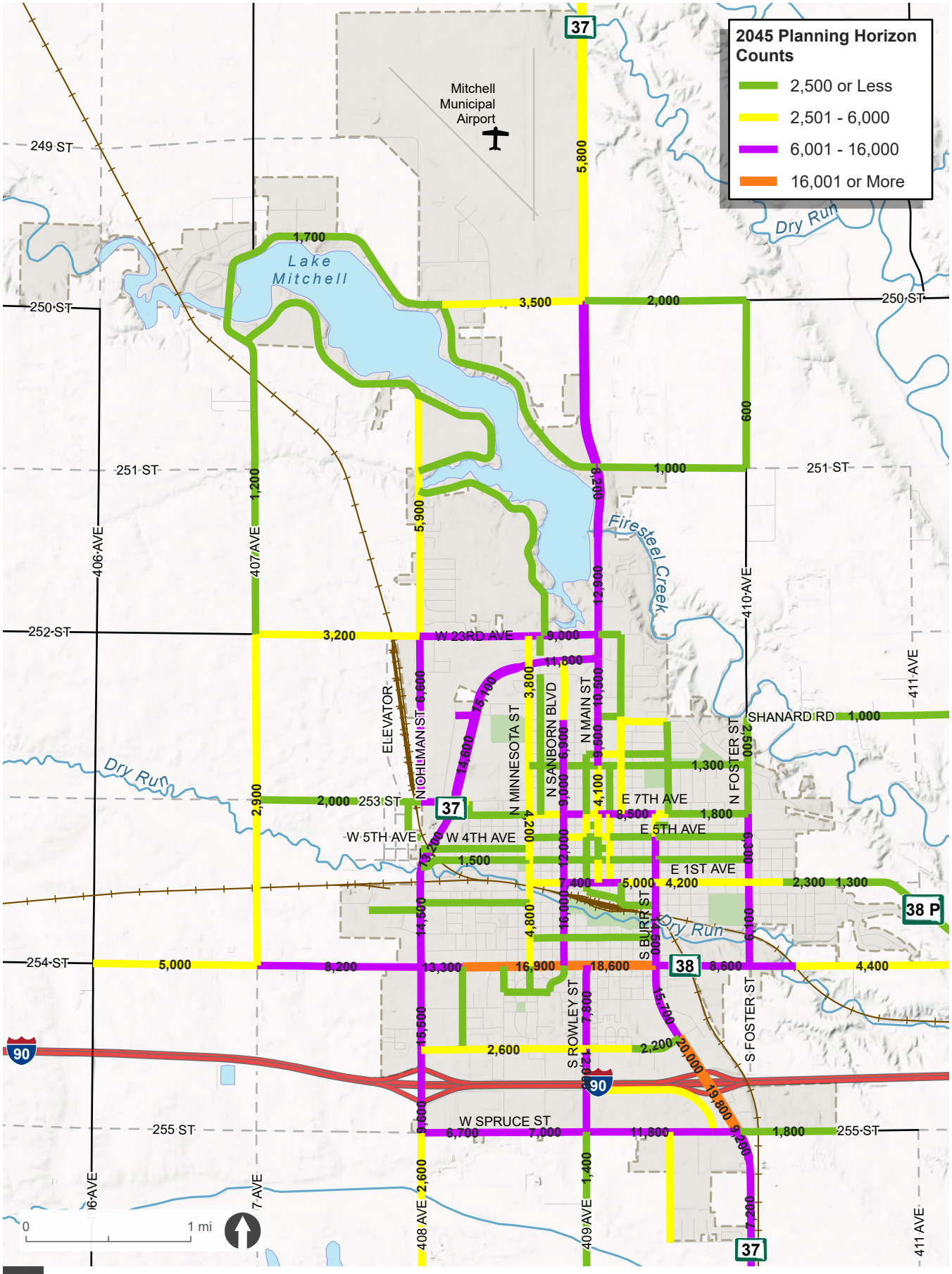
MITCHELL, SD | MASTER TRANSPORTATION PLAN



2022 EXISTING DAILY TRAFFIC VOLUMES

FIGURE 11

MITCHELL, SD | MASTER TRANSPORTATION PLAN



2045 PLANNING HORIZON DAILY TRAFFIC VOLUMES

FIGURE 12

MITCHELL, SD | MASTER TRANSPORTATION PLAN

6.4 Existing and Future Traffic Operations

An analysis of existing and future-year traffic volumes was conducted to identify areas of recurring peak period congestion. The analysis considered both daily segment volumes and intersection peak hour turning movement volumes where available.

A typical measure of traffic operations, or quality of service, is Level of Service (LOS). This measure is presented by a letter grade that describes levels of congestion, ranging from LOS A (free-flowing conditions) to LOS F (stopped / heavily delayed traffic). The LOS goal for Mitchell area roadways and intersections is LOS C or better.

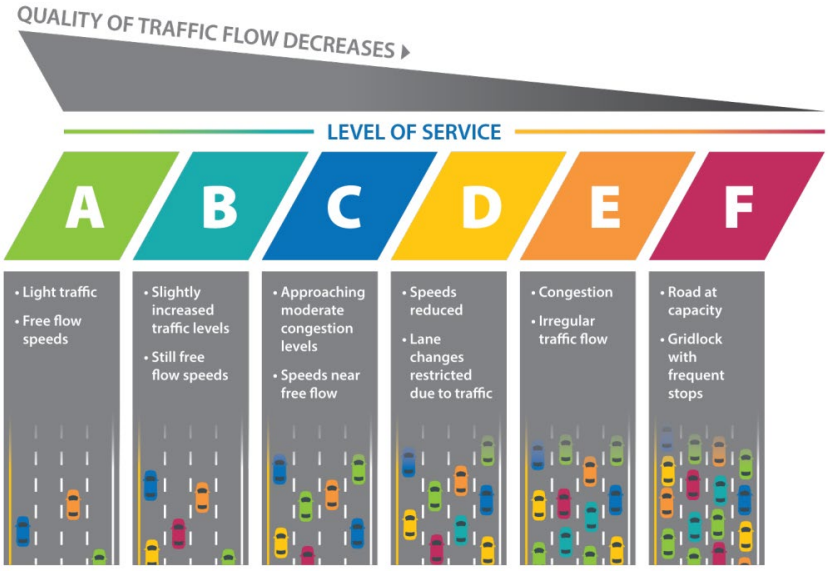


Figure 13: Level of Service Descriptions

The analysis incorporated three timeframes: 2022 Existing Conditions, 2032 Interim Conditions, and the 2045 Planning Horizon. This analysis reflects a 'No Build' or 'do nothing' condition where traffic volumes continue to grow in future years, but no capacity improvements are incorporated. Traffic operations analysis memos are provided in **Appendix C**.

6.4.1 Roadway Segments

The roadway segment LOS analysis was based on capacity thresholds for different roadway cross-sections presented in *SDDOT Road Design Manual* Table 15-10. **Table 14** shows planning-level daily volume ranges to achieve acceptable LOS C / D roadway segment operations.

Table 14: Total Number of Lanes and Daily Traffic Volumes (LOS C / D)

TOTAL NUMBER OF LANES	DAILY TRAFFIC VOLUME
2	< 6,000
3	6,000 to 16,000
4	-
5	16,000 to 30,000
6	> 30,000

Source: Modified from SDDOT Road Design Manual, Table 15-10

The planning-level roadway segment capacity analysis is based on a volume to capacity ratio using existing/forecasted volumes and the upper values shown in **Table 14** for the applicable number of lanes. Segment LOS is provided in **Figure 14** (existing conditions) and **Figure 15** (2045 Planning Horizon). **Table 15** summarizes the progression of major roadway segments to LOS E (orange shading) and LOS F (red shading) by Year 2045.

Table 15: Major Roadway Corridor Segments with Year 2045 LOS E or F

CORRIDOR SEGMENT	FROM	TO	EXISTING CONDITIONS	2032 INTERIM CONDITIONS	2045 PLANNING HORIZON
23rd Ave	Ohlman St	SD37	-	LOS F	LOS F
Ohlman St	Harmon Dr	23rd Ave	-	-	LOS E
Ohlman St	23rd Ave	8th Ave	-	-	LOS F
7th Ave	Sanborn Blvd	Burr St	LOS F*	LOS F	LOS F*
1st Ave	Sanborn Blvd	Burr St	LOS F*	LOS F	LOS F*
Burr St	5th Ave	1st Ave	LOS E*	LOS E / F	LOS F*
Foster St	7th Ave	Havens Ave (SD38)	LOS E*	LOS E / F*	LOS F
Minnesota Ave	4th Ave	Ash Ave	-	LOS E*	LOS E / F*
254th St (Havens Ave)	406th Ave	Ohlman St (SD37)	LOS E	LOS F	LOS F
Rowley St	Havens Ave	Spruce St	LOS E / F	LOS F	LOS F
Ohlman St (SD37)	I-90 WB RTI	I-90 EB RTI	-	-	LOS E
SD38	Norway Ave	South Mitchell Limits	-	LOS E	LOS F

* Corridor segments reflect major intersection to major intersection; intermittent segments operate better than LOS E or F

Most roadways in the Mitchell area currently operating, and are expected to continue operating, at acceptable LOS levels. The corridors identified with LOS E and F are typically 2-lane roadways and may benefit from improvements ranging from turn lane or traffic control modifications at isolated intersections to corridor-wide improvements such as a 3-lane section.

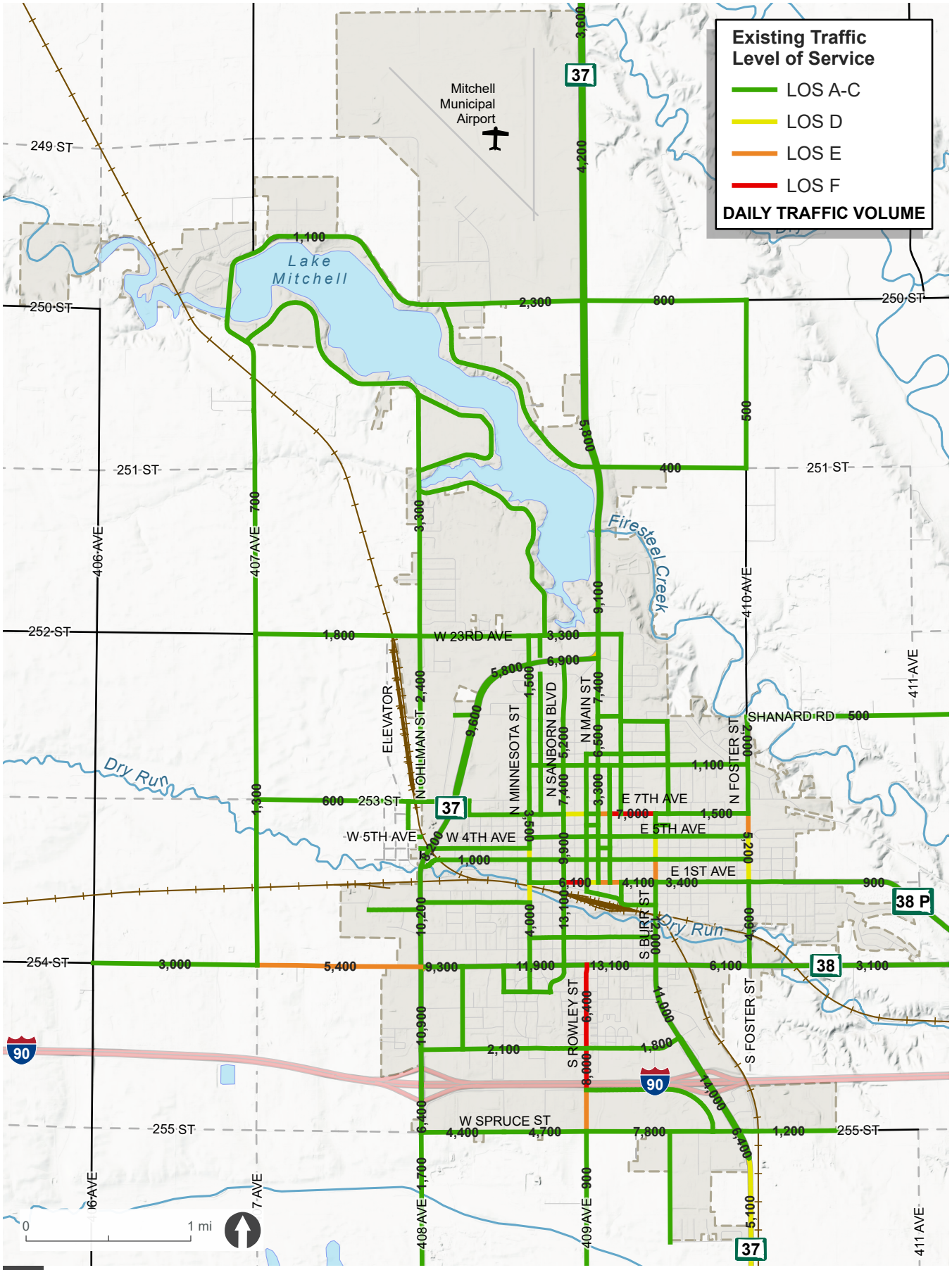
6.4.2 Intersections

Mitchell area intersections identified by the Study Advisory Team were analyzed with morning and afternoon peak hour traffic volumes to identify existing and potential future-year operational deficiencies. **Table 16** summarizes the progression analyzed intersections to LOS E or worse, in terms of overall intersection delay, by Year 2045.

Table 16: Analysis Intersections with Year 2045 LOS E or F

INTERSECTION	EXISTING CONDITIONS	2032 INTERIM CONDITIONS	2045 PLANNING HORIZON
Rowley St & Norway Ave	-	-	LOS E
Ohlman St & 23rd Ave	-	-	LOS F
SD37 (Ohlman St) & I-90 WB RTI (Exit 330)	-	-	LOS F
SD37 (Ohlman St) & I-90 EB RTI (Exit 330)	-	LOS F	LOS F*
SD37 & 23rd Ave	-	LOS F	LOS F
SD37 & Sanborn Blvd	-	-	LOS E

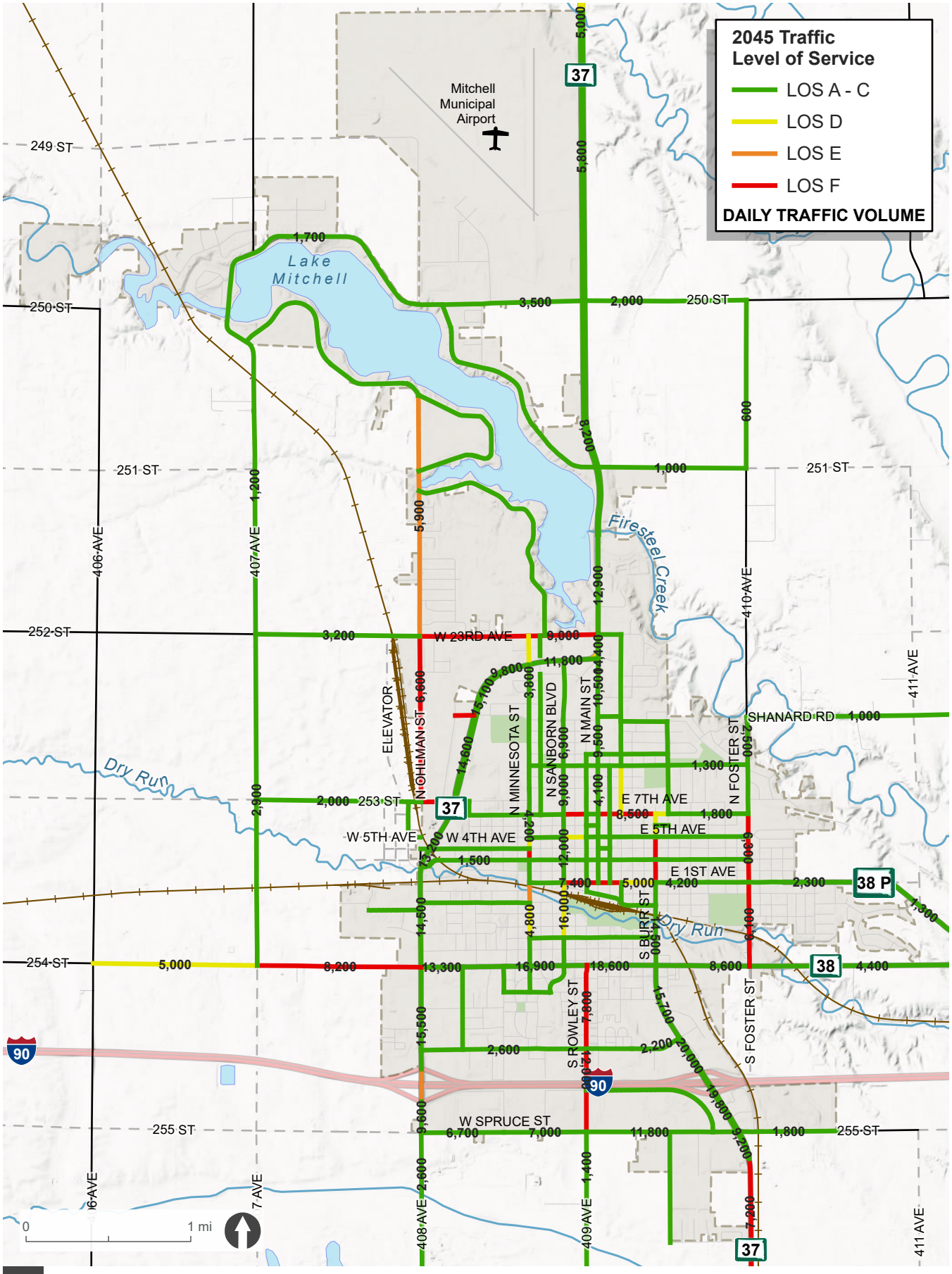
LOS based on overall intersection delay, with intersection LOS E or F in the morning and/or afternoon peak hour



2022 EXISTING ROADWAY SEGMENT LOS

FIGURE 14

MITCHELL, SD | MASTER TRANSPORTATION PLAN



2045 PLANNING HORIZON ROADWAY SEGMENT LOS

FIGURE 15

6.5 Origin-Destination Analysis

An origin-destination (O/D) analysis was conducted to evaluate vehicle travel patterns throughout the Mitchell area based on location-based service data for years 2016 through 2021. The O/D analysis uses StreetLight data, which aggregates anonymized location-based service data sourced from mobile phones to provide high-level routing information. Using this data, scenarios were developed to better understand how individuals travel within the community given certain seasonal and/or community-wide events:

- **Daily traffic scenarios:** average day when school is in session during the months of March, April, September, and October
- **Daily/weekend summer traffic scenarios:** average day or weekend day between mid-May and mid-August
- **Corn Palace Days traffic scenarios:** average day during Corn Palace festival event days
- **Sturgis Motorcycle Rally traffic scenarios:** average day during the peak travel period, including up to one week before and one week after the official Rally dates
- **Dakotafest traffic scenarios:** average day during Dakotafest event days

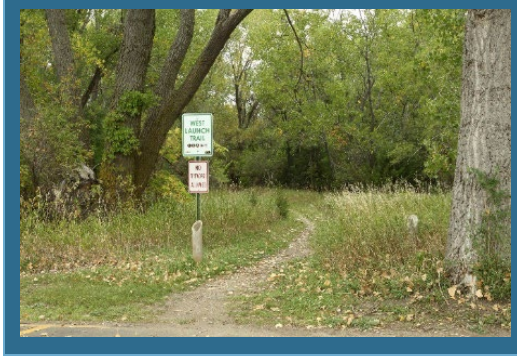
Figures illustrating travel patterns for each scenario are found in **Appendix D**. Key findings from the analysis include:

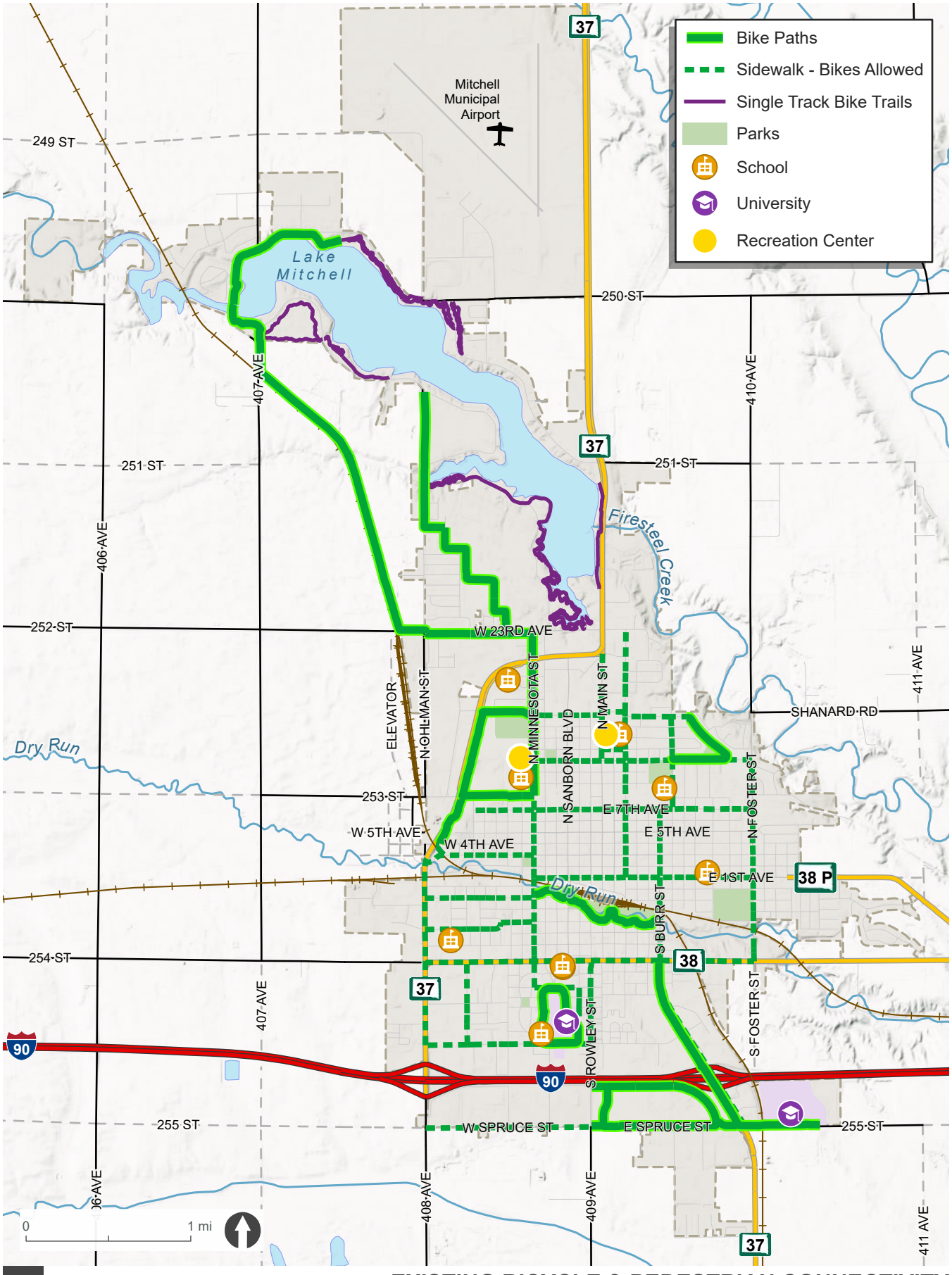
1. **Daily Traffic**
    - Mitchell is a regional destination for 'External' travel entering the Mitchell area
    - Approximately 60 percent of traffic entering the area is stopping in Mitchell
2. **Sturgis Motorcycle Rally Traffic**
    - Similar 'External' travel patters as shown in the Daily Traffic scenario, but overall volumes are higher, and destinations are more localized to areas along I-90
3. **Daily Truck Traffic**
    - I-90 truck traffic generally passes through the Mitchell area without stopping
    - SD37 truck traffic is more likely to stop in Mitchell
    - SD37 bypass is most used for pass-through truck traffic
        i. Other routes include Main Street and Spruce Street
4. **Downtown Traffic**
    - Burr Street is the highest volume route between I-90 and downtown Mitchell
    - Sanborn Boulevard and Main Street also common, but 50% less than Burr Street
    - Corn Palace Days traffic followed similar O/D patterns as a typical day
5. **Lake Mitchell – Summer Weekend Traffic**
    - SD37, Main Street, Burr Street, and Foster Street are common north/south corridors for travel between the I-90 interchange area and Lake Mitchell
    - 252nd Street corridor is the predominant east/west route to/from Betts Road
6. **Dakotafest**
    - Dakotafest traffic predominantly stays along the I-90 corridor

6.6 Multimodal Network

6.6.1 Bicycle and Pedestrian System

The City of Mitchell has a robust network of multimodal facilities, including bike trails, shared use paths, and sidewalks. **Figure 16** shows the existing bicycle and pedestrian network and public amenities such as schools, hospitals, and recreation centers. Further description of the existing bicycle and pedestrian facilities found in the Mitchell area is below.

SIDEWALKS 	Sidewalks are the foundation of a well-connected multimodal system and encourage active mobility. Sidewalks are generally geared towards pedestrian use, but the City of Mitchell has identified several sidewalk segments for mixed pedestrian and bicycle use to improve route connectivity and continuity. General sidewalk coverage within Mitchell is good, but gaps exist throughout the city. The City of Mitchell currently spends approximately $100,000 per year on sidewalk infill.
SHARED USE PATHS 	Shared use paths are multiuse facilities typically separated from the roadway and provide a low-stress facility for pedestrians, bicyclists, and other non-motorized rolling users. Shared use paths are located throughout the Mitchell area.
SINGLE TRACK BIKE TRAILS 	Single track bike trails are unpaved facilities used for recreational purposes, namely mountain biking. Single track bike trails in the Mitchell area are predominantly located around Lake Mitchell.



EXISTING BICYCLE & PEDESTRIAN CONNECTIVITY

FIGURE 16

MITCHELL, SD | MASTER TRANSPORTATION PLAN

6.6.2 Transit System

An area's transit demand is estimated using a transit demand index based on factors such as demographics, land use, and vehicle ownership. The current transit demand index for the Mitchell area is shown in **Figure 17**. The red shading indicates areas with the highest transit demand, followed by yellow and green, while the blue shading shows areas with the lowest transit demand. The highest levels of transit demand (red) are throughout the downtown / central core area and along the Sanborn Boulevard corridor between 1st Avenue and 15th Avenue. These areas exhibit higher levels of population and employment density. Areas surrounding downtown typically exhibit the next highest levels of transit demand (orange and yellow).

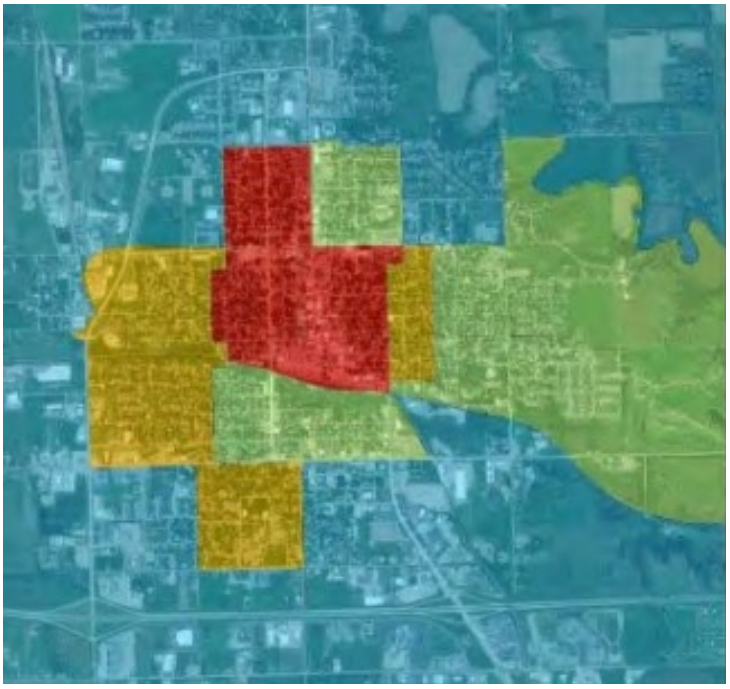


Figure 17: Mitchell Area Transit Demand Index

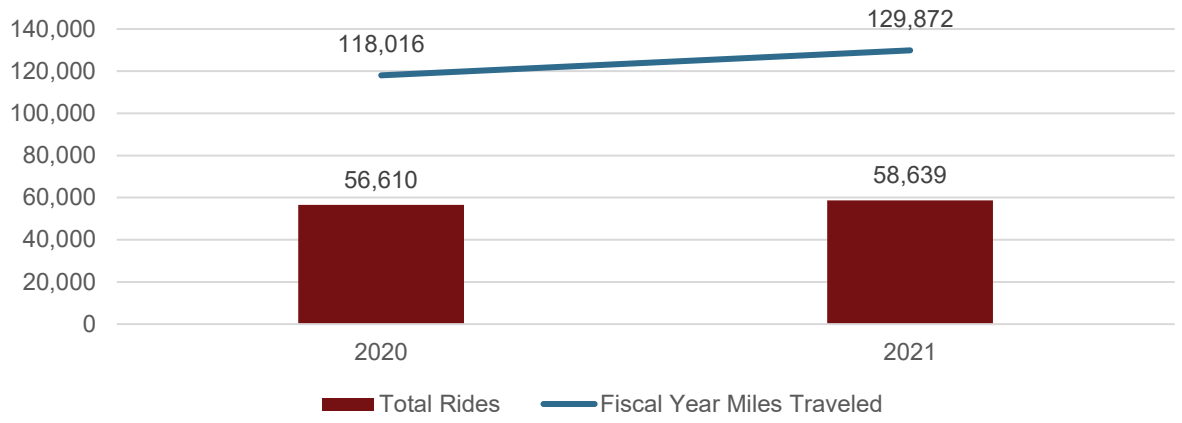
Existing transit service within the Mitchell Area is operated by Palace Transit, which is one of the few transit agencies in South Dakota that is city-owned and operated. Key Palace Transit operations information is summarized in **Table 17**.

Table 17: Palace Transit Operations Information

Operating Hours	Monday Through Friday: 5:30 a.m. - 6 p.m. Saturday: 7 a.m. - 4 p.m. Sunday: No Service
Trip Scheduling	Monday through Friday: 7 a.m. - 5 p.m. Pre-scheduled rides: reservations must be made by 4 p.m. the business day before the scheduled trip Same day rides: rides scheduled outside of the pre-scheduled ride time are considered same-day rides
Fare	$2 to $3 per one-way trip for pre-scheduled rides $10 per one-way trip for same day rides Children under 3 years ride for free with a paying adult

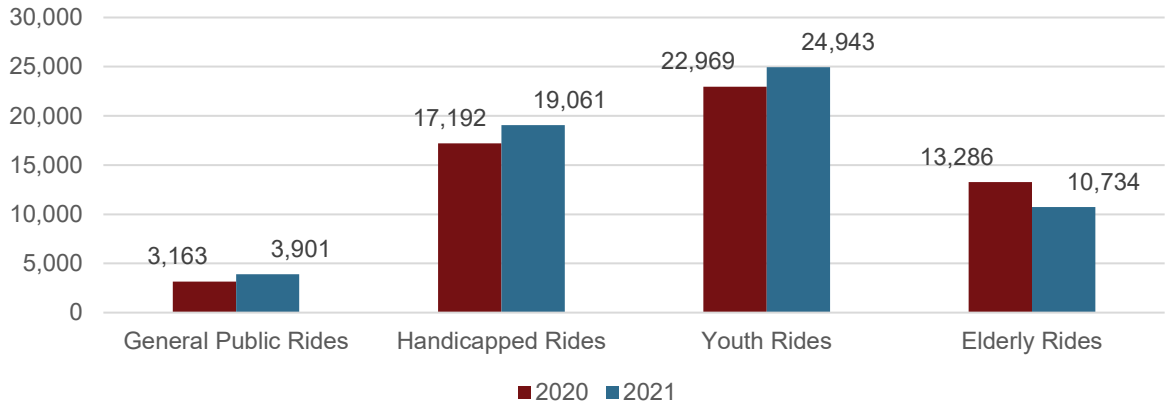
Source: Palace Transit

Ridership has been steadily increasing over the last several years, even with the COVID-19 pandemic. **Figure 18** illustrates an increase of approximately 2,000 riders and 10,000 miles traveled between 2020 and 2021. Palace Transit serves a vital role in the Mitchell area, most frequently serving student, persons with disabilities or specific transportation needs, commuter, elderly, and youth ridership. Most common rider type and trip purpose are shown in **Figure 19** and **Figure 20**, respectively.



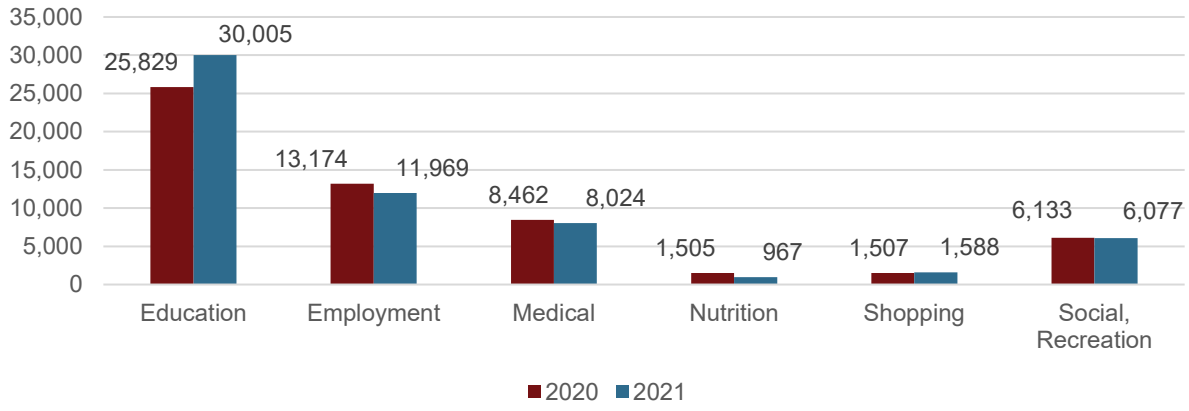
Source: Palace Transit

Figure 18: Total Ridership and Miles Traveled for Palace Transit, 2020-2021



Source: Palace Transit

Figure 19: Rider Type for Palace Transit, 2020-2021



Source: Palace Transit

Figure 20: Trip Purpose for Palace Transit Users, 2020-2021

6.6.3 Airport

The Mitchell Municipal Airport is classified as a Large General Aviation airport by the SDDOT and has one fixed base operator. Originally constructed in 1945, the airport serves approximately 4,000 enplanements annually. The peak season is during hunting season. The nearest commercial airport is Joe Foss Regional Airport in Sioux Falls.

6.6.4 Rail

Rail lines cross through Mitchell in the north/south direction on the western and southeastern sides of the city and in the east-west direction through the city. Most of these lines are owned and operated by Burlington Northern Santa Fe Railway (BNSF) as part of connections with Aberdeen, Canton, and Yankton, SD. The east/west rail that extends west from the BNSF line is owned and operated by Ringneck and Western and is part of a connection to Rapid City, SD.

Existing at-grade railroad crossings within the Mitchell Area, previously shown in **Figure 4**, were reviewed to understand current conditions and identify potential modifications that can be considered with future projects. **Table 18** lists the crossings within or near the City of Mitchell, current devices, and suggested modifications from a desktop review conducted as part of this MTP.

Table 18: Mitchell Area Railroad Crossing Review Summary

CROSSING DOT#	STREET NAME	RAILROAD	CURRENT DEVICES	SUGGESTED MODIFICATIONS AND NOTES
382397R	Havens Ave	BNSF	Cantilever Flashing Lights	Add detectable warning devices to sidewalk Review need for gates
386033E	8th Ave	BNSF & Yard	Gates & Flashers	Add W10-4 signs
386030J	3rd Ave	BNSF	Crossbucks w/Yield	Review detectable warning locations with proximity to tracks Eastbound approach has blind curve Tracks are superelevated, consider reprofiling roadway Review need for gates
386036A	Ohlman St	Ringneck & Western	Old Cantilever Flashing Lights	Add detectable warning devices to sidewalk Two-way left turn lane should be a closed median 60 ft on each approach Review need for gates Update RR signal cantilever equipment
386029P	Minnesota St	BNSF	Flashing Lights	Add detectable warning devices to sidewalk Review need for gates Update RR signal cantilever equipment
394636X	23rd St	BNSF	Cantilever Flashing Lights & Gates w/ Side Lights	No modifications identified
386031R	4th Ave	BNSF	Flashing Lights	Review detectable warning and stop bar locations with proximity to tracks
386037G	407th Ave	Ringneck & Western	Crossbucks w/ Yield	Add RxR markings NB & SB approaches
386038N	406th Ave	Ringneck & Western	Crossbucks	Crossing within existing rural intersection Review need for signals
382394V	Spruce St	BNSF	Flashing Lights w/ Side Lights	Review need for gates Cantilever signals and gates needed for road widening and sidewalks
394639T	407th Ave	BNSF	Flashing Lights & Gates	No modifications identified

Desktop review conducted in 2021 using field photos and Google Street View

6.7 Pavement Condition

Conditions of roadway pavement within the City of Mitchell were reviewed based on pavement condition index (PCI) data collected in 2022. Data for 115 centerline miles of road was collected and reported in terms of PCI, which is a metric used to assess pavement health based on a scale of 0 to 100, with 100 being excellent condition. **Table 19** describes the PCI ratings.

Table 19: Pavement Condition Index Descriptions

PCI RANGE	DESCRIPTION	RELATIVE REMAINING LIFE	DEFINITION
85-100	Excellent	15 to 25 Years	"Like new" condition. Little to no maintenance required when new; routine maintenance such as crack and joint sealing.
70-85	Very Good	12 to 20 Years	Routine maintenance such as patching and crack sealing with surface treatment such as seal coats or slurries.
60-70	Good	10 to 15 Years	Heavier surface treatments, chip seals, and thin overlays. Localized panel replacements for concrete.
40-60	Fair	7 to 12 Years	Heavy surface-based inlays or overlays with localized repairs. Moderate to extensive panel replacements.
25-40	Poor	5 to 10 Years	Sections will require very thick overlays, surface replacement, base reconstruction, and possible subgrade stabilization.
0-25	Very Poor	0 to 5 Years	High percentage of full reconstruction.

Source: Infrastructure Management Services (IMS)

The systemwide PCI score for the City of Mitchell was calculated as 63, indicating that Mitchell's pavement averages in the 'Good' condition. **Figure 21** and **Figure 22** show the Mitchell roadway network-wide PCI distribution and segment PCI results, respectively. Segments rated as being in Poor condition are spread throughout the community, while locations of Excellent and Very Good pavement are located mainly in the eastern and northern parts of the city. Additional maps and charts related to the pavement data collection and condition assessment are provided in **Appendix E**.

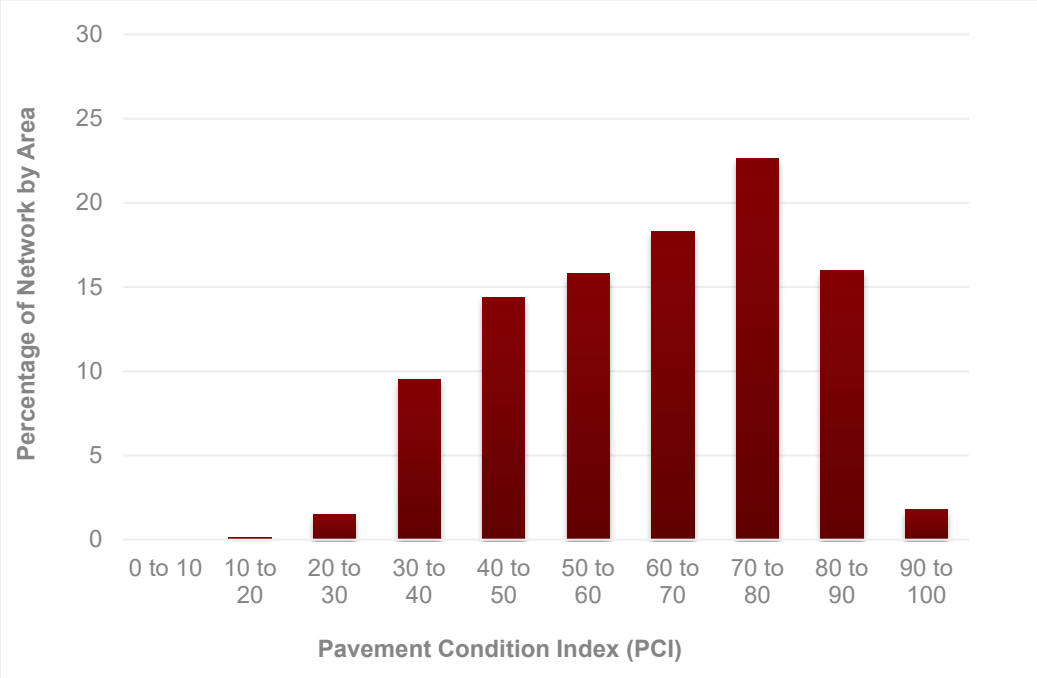
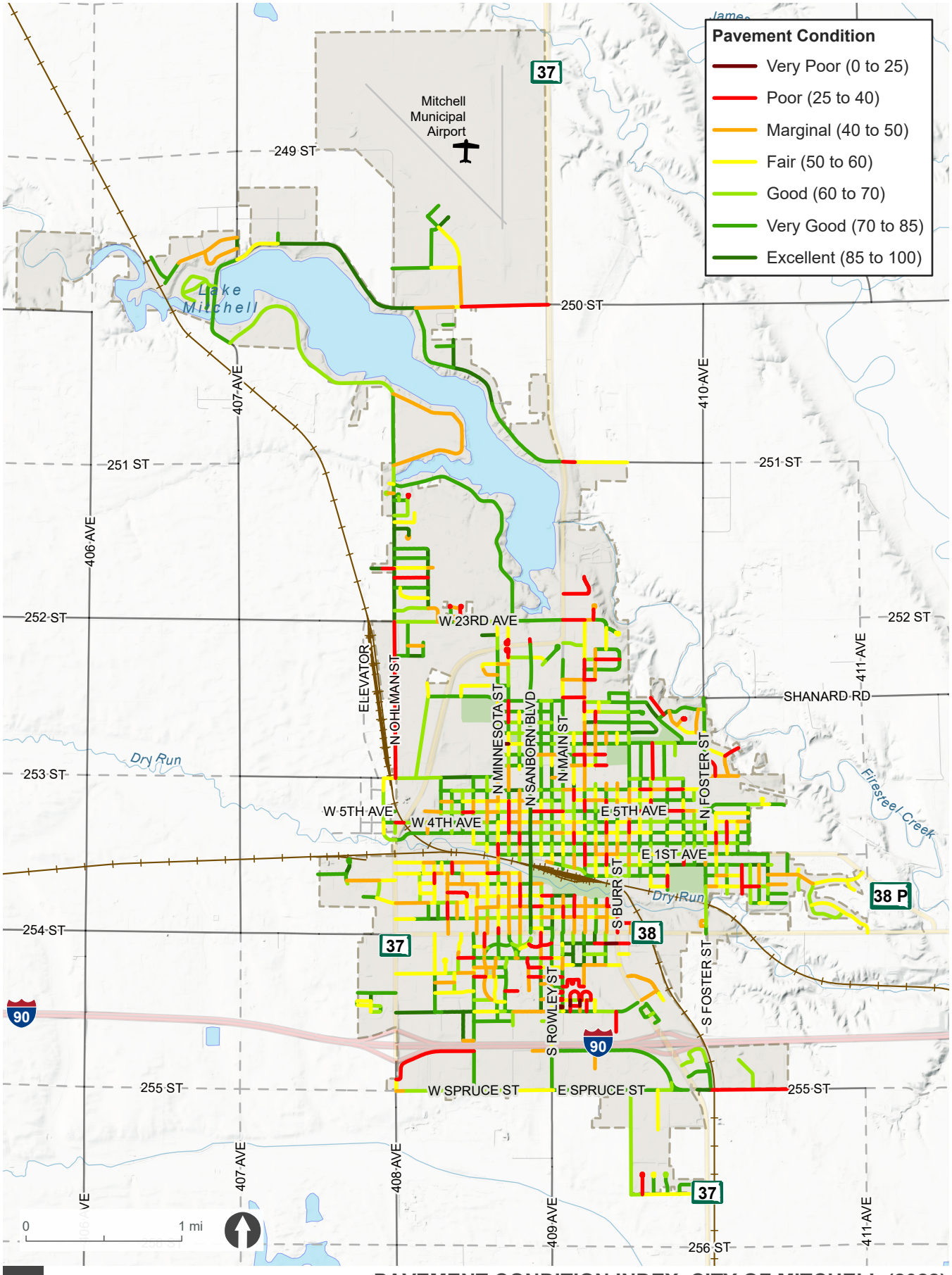


Figure 21: Mitchell Roadway Network PCI Distribution



PAVEMENT CONDITION INDEX, CITY OF MITCHELL (2022)

MITCHELL Master Transportation Plan

FIGURE 22

MITCHELL, SD | MASTER TRANSPORTATION PLAN

6.8 Bridges

Mitchell area bridges and culverts greater than 20 feet in length were previously shown in **Figure 4**. Current bridge status, as of the 2022 bridge inspection reports and planned improvements for City of Mitchell owned and maintained bridges are shown in **Table 20**.

Table 20: City of Mitchell Bridge Summary

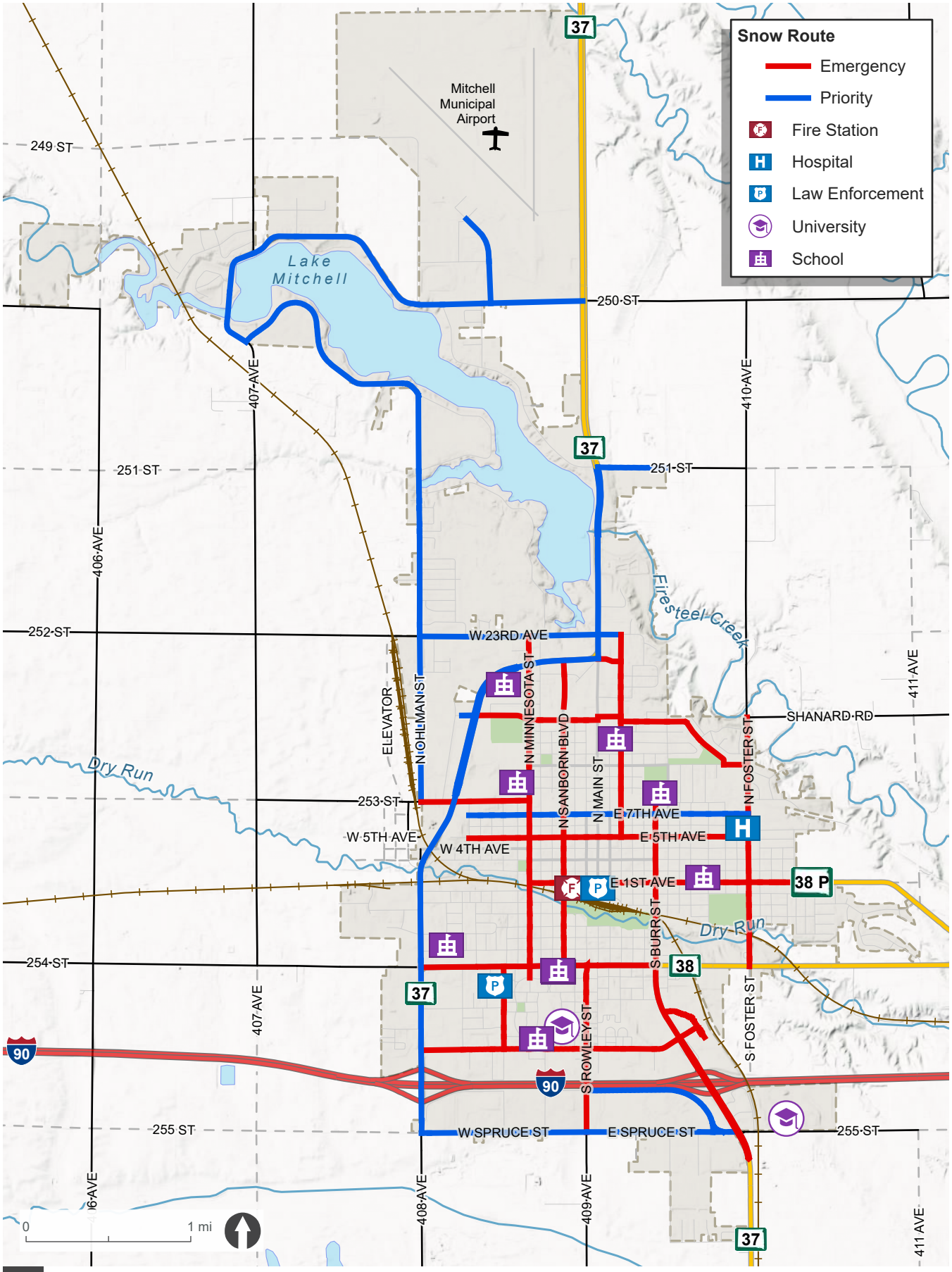
BRIDGE #	TYPE	YEAR BUILT	ROUTE	CROSSING	CONDITION	NOTES
18-129-060	Bridge	2000	Harmon Drive	Lake Mitchell Canal	Poor	Posted 50% of legal load
18-129-061	Bridge	2015	Harmon Drive	Firesteel Creek	Good	
18-147-095	Culvert	1976	Minnesota Street	Dry Run Creek	Fair	
18-149-095	Bridge	2001	Sanborn Boulevard	BNSF Railroad	Fair	
18-149-096	Culvert	2001	Sanborn Boulevard	Dry Run Creek	Good	
18-154-098	Culvert	1990	Burr Street	Dry Run Creek	Good	
18-160-099	Bridge	1999	Foster Street	Dry Run Creek / State Owned RR	Fair	2022 rehabilitation project

City of Mitchell 2022 Bridge Inspection Reports

6.9 Emergency Snow Routes

The City of Mitchell developed a network of Emergency and Priority Snow Routes to provide access to critical facilities and infrastructure during adverse winter weather conditions, as shown in **Figure 23**. During snow events of two inches or more of snow accumulation, parking is prohibited on 'Emergency' routes until the accumulation ends and the street is cleared.

Harmon Drive, Firesteel Creek Bridge



EMERGENCY SNOW ROUTES

FIGURE 23

MITCHELL, SD | MASTER TRANSPORTATION PLAN

6.10 Freight System

6.10.1 Highway Freight

Highway freight facilities account for most freight movements within the region. The need to maintain efficient freight connections is highlighted by the proximity of I-90, SD37 and SD38 to the Mitchell area.

The City of Mitchell has established truck routes in Section 7-7-6 (Size, Weight, and Loads) of the Mitchell City Code, as follows:

- **N Sanborn Boulevard**, from SD37 to SD38
- **SD37**, from W 4th Avenue to W Spruce Street
- **S Rowley Street**, from SD 38 to W Spruce Street
- **S Burr Street**, from SD38 to E Spruce Street
- **E 1st Avenue**, from N Sanborn Boulevard to Mattie Street
- **SD38**, from SD37 to S Foster Street

Most common truck routes throughout the Mitchell area from the O/D analysis include I-90, SD37, and SD38. Common local routes include Burr Street, Havens Avenue, Sanborn Boulevard, Main Street, and Spruce Street.

6.10.2 Rail Freight

Existing rail freight facilities within the Mitchell Area are operated by BNSF Railway and Ringneck & Western Railroad. As agriculture plays a significant role in South Dakota's economy, many of the commodities moved by rail are related to this industry which highlights the importance of maintaining efficient connections between rail and other freight facilities. There is currently a 110-car shuttle facility along the BSNF line, just west of Ohlman Street between 23rd Avenue and 8th Avenue.

6.10.3 Air Freight

The Mitchell Municipal Airport does not currently serve freight/air cargo operations as indicated in the *2020 South Dakota State Aviation System Plan*. The nearest air facilities that serve freight/air cargo operations are the Huron Regional Airport and Sioux Falls Regional/Joe Foss Field airport.

6.10.4 Pipelines

The National Pipeline Mapping System identifies two pipelines within Davison County, and both are near the Mitchell Area:

- **Gas transmission line** operated by Northern Natural Gas Company; runs along SD38 and 410th Avenue in southeast Mitchell
- **Hazardous liquid line** operated by Nustar Pipeline Operating Partnership runs across the northeast corner of Davison County

7 Issues and Needs Summary

Overarching issues and needs, as identified through the public and stakeholder engagement and Baseline Conditions analysis, for the Mitchell area transportation network are summarized as follows:

7.1.1 Traffic Safety

Intersections with high crash frequency and rates tend to be located along corridors with higher traffic volumes and often correlate with corridors and intersections showing future congestion-related needs.

- Turn lanes, modifications to intersection traffic control, and traffic calming were commonly identified needs.
- Safety was an integral part of many comments geared towards other elements of the transportation network. Collectively, these comments establish a need to address existing safety issues and proactively plan for and implement strategies to address future safety needs through projects, design guidance, policies, and prioritized recommendations.

7.1.2 Traffic Operations

Mitchell exhibits a solid foundation of high-capacity multilane roads through I-90, SD37, Havens Avenue, Burr Street, and Sanborn Avenue. It will be important to manage traffic operations and prioritize improvements for these facilities to best support both regional and local travel and minimize route diversion to other roads not suited for high volumes.

- Future condition intersection and corridor capacity needs are predominantly located along existing 2-lane roadways.

7.1.3 Bicycle and Pedestrian Travel

Route connectivity, route continuity, safety, and desire for additional multimodal opportunities were common themes for bicycle and pedestrian travel. 95 percent of Mitchell area crashes involving bicyclists and pedestrians resulted in an injury, highlighting the importance of safe crossings and multimodal facilities.

- Improve route connectivity and continuity throughout the Mitchell area via on- and off-street facilities.
- Link schools, parks, community centers, and key destinations.
- Support a cohesive and active community by continuing to review and remove impediments to crossing major roads through crossing improvements.
- Determine appropriate facility types based on roadway speed, volume, and continuity needs.

Burr Street between 1st Avenue and Havens Avenue

7.1.4 Transit

Palace Transit has experienced increased ridership in recent years and is recognized for their customer service and high-quality transit service. However, limitations with their current technology and being a demand response service were noted as areas for improvement and growth.

- Fixed route service feasibility
- Technology enhancements

7.1.5 Pavement Management

Current pavement condition was measured in the 'Good' category with a PCI at 63.

- Gain an understanding of current pavement condition, identify funding needs to maintain or improve current network PCI, and develop a plan for next steps and long-range priorities.

7.1.6 Long-Range Needs

Several long-range needs were identified by the Study Advisory Team, public, and stakeholders. In several instances, these needs are associated with high-cost projects that will require a systematic process to assess feasibility, plan, design, and construct over several years. The MTP is an ideal location to document these needs and identify next steps.

- Foster Street extension from Havens Avenue to Spruce Street, across I-90
- East bypass route, linking SD37 north of Mitchell with I-90 Exit 335
- Understand potential impacts and solutions if the hospital were to relocate south of I-90 in the future.

7.1.7 Transportation Planning Framework

A key element of transportation planning is establishing a framework to identify, prioritize, and implement projects to address identified needs. This was a primary need identified by the Study Advisory Team for the Mitchell area, and included the development of:

- Major Roads Plan to prioritize routes throughout the Mitchell Area
- Jurisdictional transfer guidance that identifies candidate roadways and how/when the transfer should occur
- Design guidelines to support the Major Roads Plan
- An implementation plan that plans for and integrates multimodal elements into future projects.

7.1.8 Other Transportation Needs

- **Traffic Signals:** Identify a plan to systematically evaluate and improve traffic signals throughout the area, particularly with regard to responsiveness of signal operations to current traffic patterns and route priorities.
- **Freight:** Maintain good access to I-90 and prioritizing regional and local truck routes guides allocation of resources and supports an efficient freight network to support the area economy.
- **Railroad Crossings:** Several rail crossings within the Mitchell Area have aging infrastructure that should be updated to current standards.

8 Major Roads Plan

The Mitchell Area Major Roads Plan provides a comprehensive, prioritized multimodal framework for improving and maintaining Mitchell area roadways for the next 20+ years. The Major Roads Plan serves as a guide for future development and transportation projects to facilitate orderly growth and support multimodal travel. It is for City of Mitchell use and does not replace nor should be confused with the federal roadway functional classification.

The Major Roads Plan provides a long-range, comprehensive vision of all public roadways within the Mitchell area across state, city, county, and township jurisdictions. Each roadway plays an important role in addressing transportation-related needs throughout the area. In the Major Roads Plan, roadways are categorized to establish a hierarchy for prioritization of transportation elements within the MTP.

Within the Major Roads Plan, there are several route priorities that build upon the categorized roadways. Each route serves a unique purpose, but when viewed collectively, they support the overarching prioritization of roadways and play a key role in design, maintenance, and daily operations.

- **Truck Routes:** prioritized truck routes for regional freight movement within and through Mitchell
- **Emergency Routes:** City of Mitchell emergency snowplow routes to support emergency route prioritization and link critical infrastructure
- **Tourist Routes and Gateway Corridors**: high-volume routes within the community, connecting area entry/exit points with popular destinations
- **Candidate Roadways for Jurisdictional Realignment:** roadways in transitioning areas that may benefit from a change in jurisdiction

8.1 Goals and Objectives

The Major Roads Plan was developed to address the following goals and objectives:

1. Maintain and improve the overall transportation network, utilizing and building upon existing investments
2. Support multimodal mobility goals, traffic volumes, and roadway function
3. Guide planning of future roadways
4. Maintain and improve route connectivity and continuity of similar facilities
5. Evaluate and support route purpose and other transportation needs, such as:
    a. Truck routes
    b. Emergency routes
    c. Tourist routes and gateway corridors
    d. Mobility and land access relationships
    e. Connectivity between high-demand origins and destinations
6. Assign prioritization of parallel or duplicate routes
7. Provide appropriate roadway jurisdiction based on traffic demand and development
8. Provide appropriate roadway surfacing based on traffic demand
9. Maximize benefits of the existing state highway network for local and regional trips (high-capacity corridors)

8.2 Roadway Categories

The basis for road categories within the Major Roads Plan follows similar methodology to the functional classification hierarchy. The relationship between mobility and access is the foundation of this hierarchy, with other considerations such as trip length and purpose, speed limit, traffic volumes (capacity), and vehicle mix also playing a role in the categorization. **Table 21** summarizes the following Major Roads Plan categories:

- Interstate
- Regional Arterial
- Local Arterial
- Collector
- Local

The Mitchell Area Major Roads Plan is shown in **Figure 24**.

8.3 Truck Routes

The Major Roads Plan primary truck routes maintain connectivity to the regional freight system while avoiding impediments to the local road network. These routes establish corridors with special considerations associated with planning and design such as land uses served, right-of-way width, and the ability to accommodate trucks via appropriate lane widths, turning radii, traffic control, and roadway pavement section.

The Major Roads Plan primary truck routes map builds upon Mitchell City Code Section 7-7-6 (Size, Weight, and Loads) to incorporate Interstate, Regional Arterial, and Local Arterial roadways as shown in **Figure 25**. These routes support regional freight movement within and through the Mitchell area.

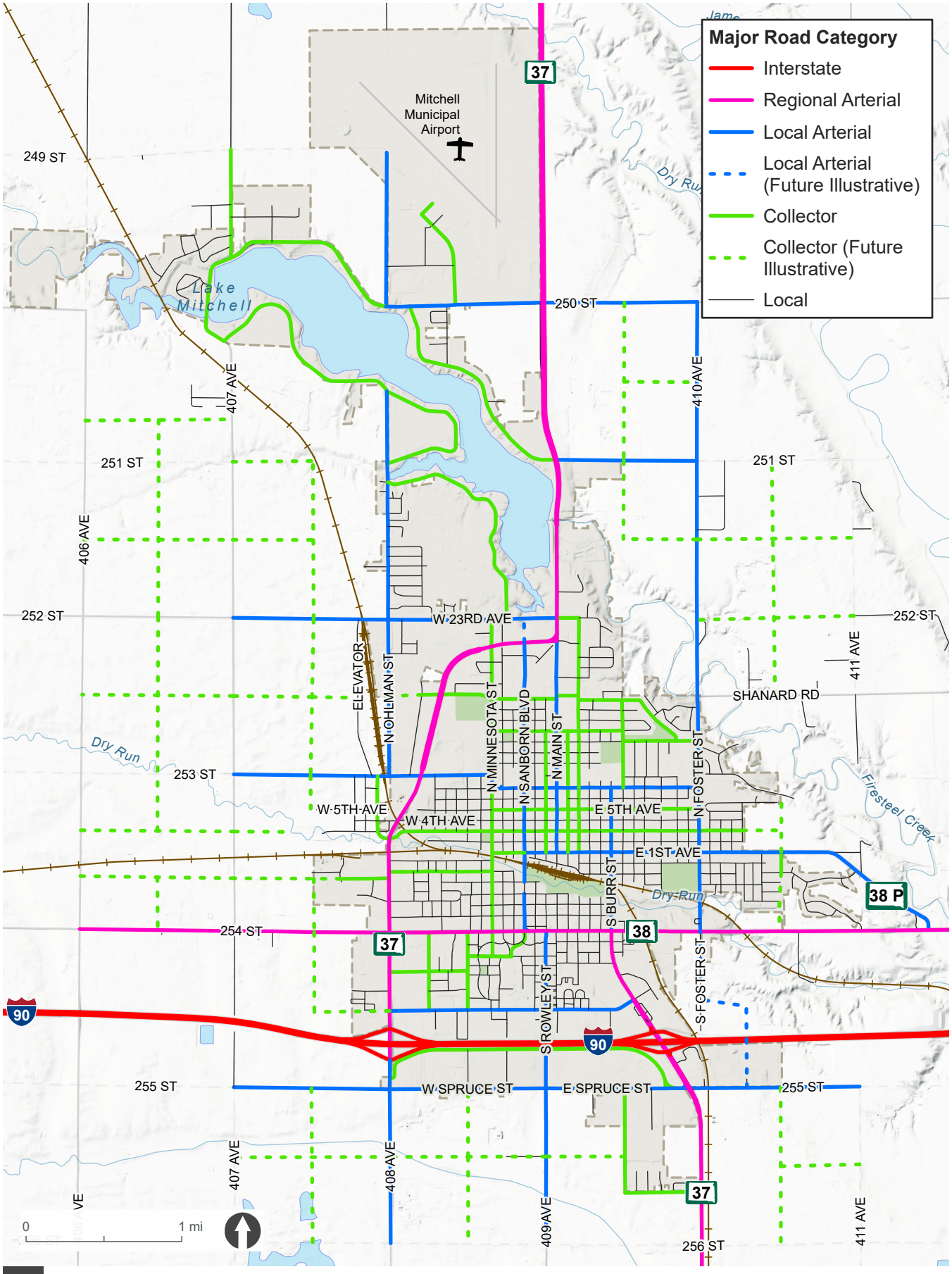
8.4 Emergency Snow Routes

As development occurs, it is recommended that future arterial and collector streets are prioritized when expanding the emergency snow route network.

Burr Street (SD37) & Spruce Street Intersection

Table 21: Mitchell Area Major Roads Plan Categories

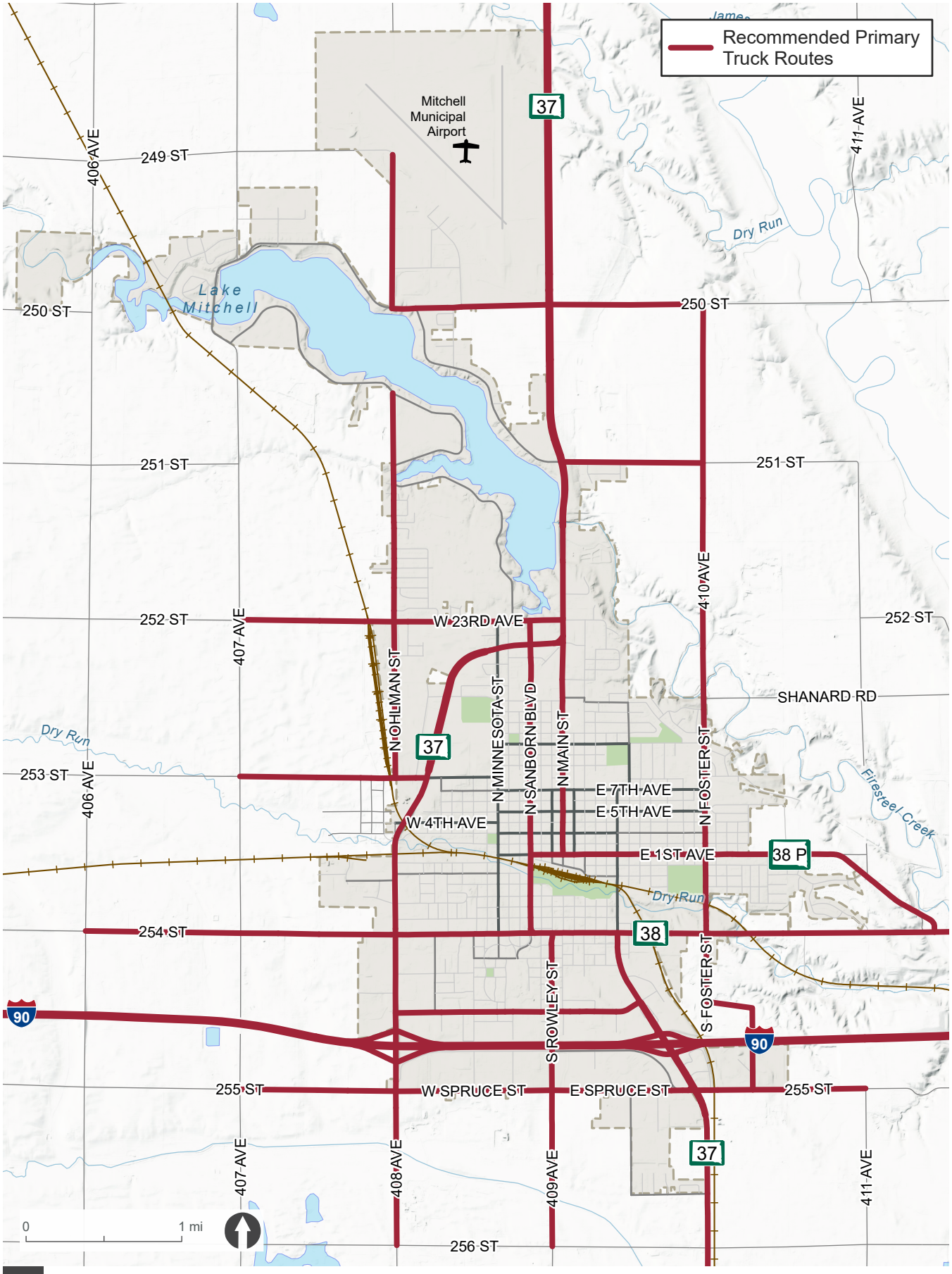
ROADWAY CATEGORY	MOBILITY LEVEL	CHARACTERISTICS	TRAFFIC CAPACITY	TYPICAL JURISDICTION	EXAMPLE
Interstate	**Highest**	• Divided, limited access facility with no direct property access and no at-grade crossings or intersections • Free-flow travel • Grade-separated interchanges • National importance with long trip lengths • High speeds	**Highest**	State	*Interstate 90*
Regional Arterial	**High,** mobility is favored over access	• Supports regional connectivity, typically extensions of state highway routes through Mitchell • Part of a network to facilitate medium to longer distance inter and intra-city travel • High to moderate speeds • Supports truck and emergency routes • Cornerstone of high-capacity routes within the city	**High** Typically includes multiple lanes in each direction	State or local	*Ohlman Street* *Havens Avenue*
Local Arterial	**High,** mobility is favored over access, but may exhibit greater access density than Regional Arterial	• Facilitates medium distance trips, primarily with origin and/or destination within Michell • Local connectivity between Regional Arterials, Collectors, and Local streets • Augments the Regional Arterial system by providing additional arterial route options throughout the city • Moderate speeds • Supports truck and emergency routes	**High** May include multiple lanes or a single lane in each direction Prioritized route compared to Collector and Local streets	Local	*Sanborn Boulevard* *Foster Street* *Spruce Street*
Collector	**Balanced** access and mobility	• Link between Arterial and Local streets • Supports subarea traffic circulation and can help prioritize local routes • Moderate to low speeds	**Moderate to Low** Single lane in each direction Prioritized route compared to Local streets	Local	*Minnesota Avenue* *3rd, 5th, 11th Avenue* *Harmon Drive*
Local	**Low,** prioritizes access over mobility	• Provides direct property access • Short trip lengths • Low speeds • Most common roadway category	**Lowest**	Local	*Elm Street* *Wisconsin Street*



MITCHELL AREA MAJOR ROADS PLAN

FIGURE 24

MITCHELL, SD | MASTER TRANSPORTATION PLAN



MITCHELL Master Transportation Plan

RECOMMENDED MAJOR ROADS PLAN
PRIMARY TRUCK ROUTES

FIGURE 25

8.5 Gateway Corridors

Mitchell Area Gateway Corridors designate select corridors of importance to Mitchell's role as a regional destination. These high-visibility corridors provide visitors the first and last impression of Mitchell and help characterize their overall thoughts on the ease (or difficulty) of driving within the community during their visit.

The Major Roads Plan focuses on three key elements of a Mitchell Area Gateway Corridor:

1. Entryway locations to the community
2. Routes connecting popular tourist (visitor) destinations
3. Consistent roadway features to meet driver expectancy as a regional destination

Recommended Mitchell Area Gateway Corridors are shown in **Figure 26**.

8.5.1 Gateway Corridor Review Key Findings

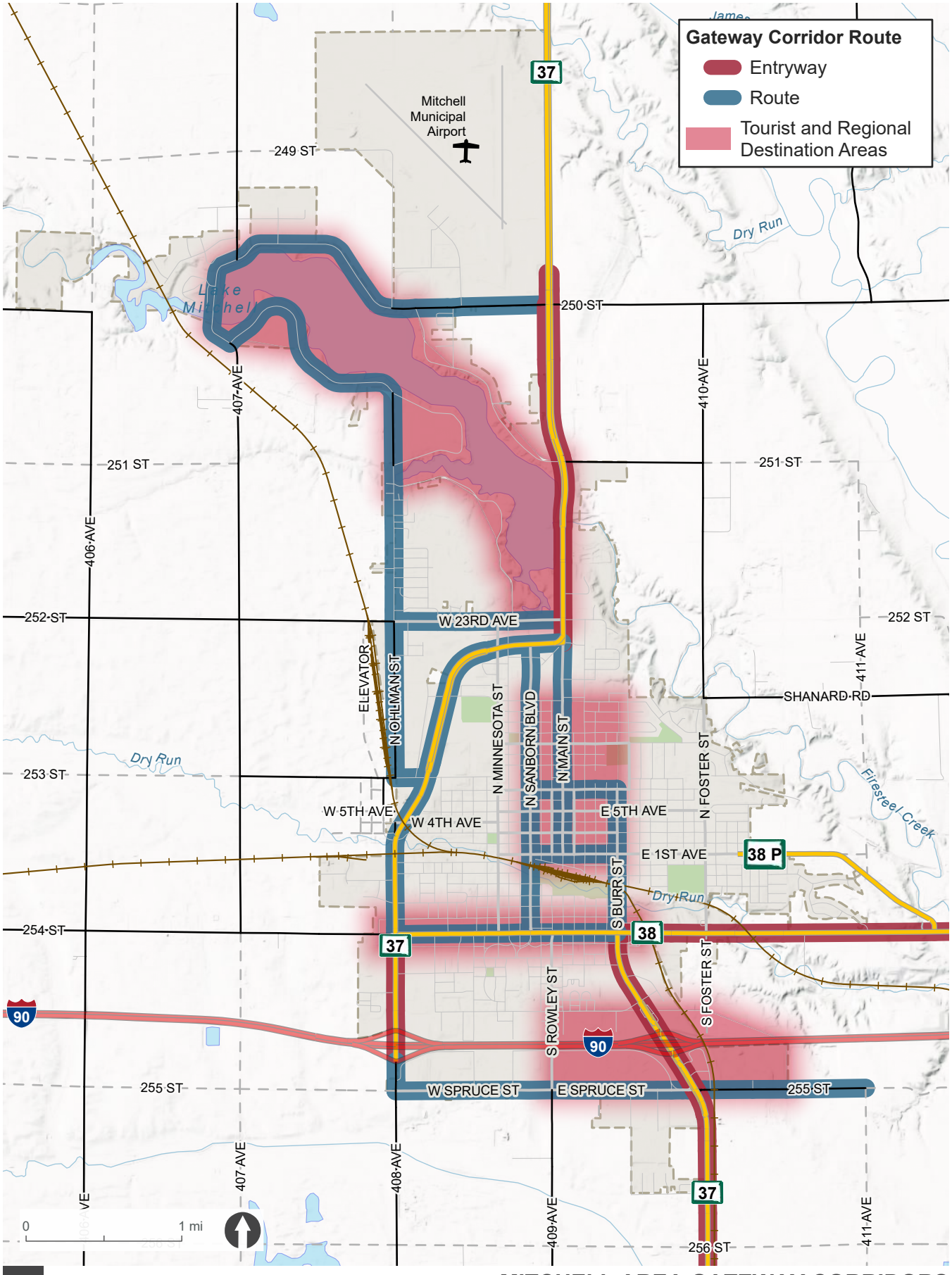
Potential gateway corridors were first identified through a review of traffic patterns, roadway capacity, and community input via:

- Origin-destination travel routes during the tourist season and special events
- Daily traffic volumes to identify high-volume corridors
- Roadway cross-sections to identify high-capacity corridors
- Public, stakeholder, and Study Advisory Team input

When coupled with the three key elements of a Mitchell Area Gateway Corridor, the following findings emerged within the designation process:

- High volume entry/exit points include:
  - I-90 interchanges (Ohlman Street and Burr Street)
  - SD37 north of Mitchell
  - SD37 south of Mitchell
  - Other, lower-volume regional entry/exit points include: SD38 (east), 250th Street (east), 254th Street (west), 408th Avenue (south)
- Tourist and other popular destinations are primarily focused to three areas:
  - Lake Mitchell (northwest area)
  - Downtown/central business district
  - Southeast commercial area (Burr Street / Havens Avenue / Spruce Street corridors)
- Logical gateway corridor travel routes generally align with the Regional and Local Arterial network outlined in the Major Roads Plan. However, not all Local Arterial roadways facilitate high volumes of regional travel.

In general, popular tourist and visitor destinations are directly accessible to/from the Regional and Local Arterial network. For those not directly adjacent to an Arterial roadway, Collector roadways provide access.



MITCHELL AREA GATEWAY CORRIDORS

FIGURE 26

MITCHELL, SD | MASTER TRANSPORTATION PLAN

8.5.2 Gateway Corridor Characteristics

Mitchell Area Gateway Corridor routes should incorporate consistent design elements along the route to meet driver expectations and community goals as a regional destination, which could include:

- Cross-sectional features, such as consistent number of lanes, lane width, colored or decorative concrete elements, sidewalks and shared-use paths, etc.
- Traffic signal and lighting elements, such as decorative poles and light features, traffic signal heads and timing practices, etc.
- Wayfinding signs
- Streetscaping and landscaping
- Multimodal features such as transit stops, sidewalk/shared-use path connectivity along corridor and to/from destinations, etc.

These routes also provide opportunities to incorporate unique features or landmarks that create a positive and welcoming feeling for visitors and a sense of place within the community.

The entryway segment of a Gateway Corridor is slightly different than the rest of the corridor in that it includes a defined entry/exit point and the initial installation of focused wayfinding signage to popular destinations. This segment also serves as a transition from a rural area into the Gateway Corridor and establishes the distinct character of the route.

It is recommended that Gateway Corridor design and character guidelines be developed to help guide both public and private improvements along these corridors.

8.6 Candidate Roadways for Jurisdictional Transfer

Roadway jurisdiction determines whether a road falls under state, county, city, or township level of responsibility. With continued development and changing traffic patterns, it is advantageous to periodically review roadway jurisdiction throughout the Mitchell area to provide the proper levels of roadway ownership, operations, and maintenance.

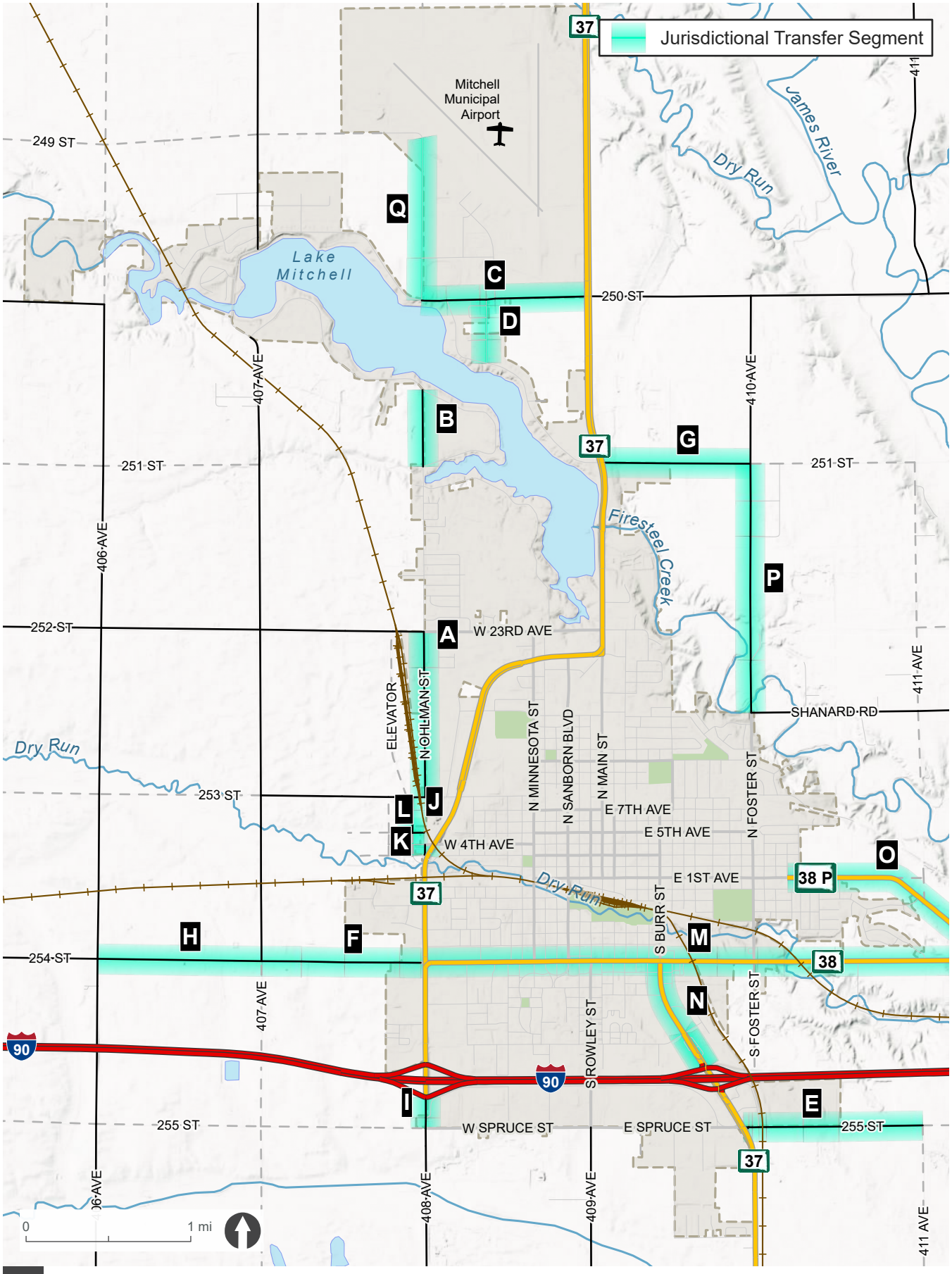
Candidate roadways for jurisdictional transfer within the Mitchell area are shown in **Table 22** and **Figure 27**. Priority tiers were based on Study Advisory Team input, timeline of transportation needs and potential projects, and other considerations associated with jurisdictional transfer:

- **Tier 1:** High priority to address existing needs
- **Tier 2:** Medium priority or priority based on future development timeline
- **Tier 3:** Low priority or long-range needs

Table 22: Candidate Roadways for Jurisdictional Transfer

PRIORITY TIER	MAP INDEX	SEGMENT	TRANSFER TYPE
Tier 1	A	Ohlman Street: 8th Avenue to 23rd Avenue	County to City
	B	Ohlman Street: Between South Harmon Drive intersections	County to City
	C	National Guard Road: North Harmon Drive to SD37	County to City
	D	Fiala Road: National Guard Road to North Harmon Drive	County to City
	E	Spruce Street: SD37 to 411th Avenue	County to City
	F	254th Street/Havens Avenue: 407th Avenue to Ohlman Street	County to City
Tier 2	G	38th Street: SD37 to Foster Street	County to City
	H	254th Street/Havens Avenue: 406th Avenue to 407th Avenue	County to City
	I	408th Avenue: I-90 interchange to Spruce Street	County to City
	J	Lytle Street: 3rd Avenue to 8th Avenue	County to City
	K	Ohlman Street: 3rd Avenue to 4th Avenue	County to City
	L	5th Avenue: Lytle Street to Ohlman Street	County to City
Tier 3	M	Havens Avenue/SD38: within city limits and east to SD38P	State to City
	N	Burr Street: I-90 interchange to Havens Avenue	State to City
	O	SD38P: Wallace Street to SD38	State to City
	P	Foster Street: Shanard Road to 38th Street/251st Street	County to City
	Q	Ohlman Street: North Harmon Drive to 249th Street	County to City

Implementing a jurisdictional transfer involves several considerations. Ultimately, both the transferring and receiving agencies need to come to an agreement of what is involved. The **Roadway Standards and Guidelines** chapter further describes these considerations and describes a recommended process to facilitate jurisdictional transfer of a roadway.



See Master Transportation Plan text for segment limits and priority tier.

CANDIDATE ROADWAYS FOR JURISDICTIONAL TRANSFER

FIGURE 27

MITCHELL, SD | MASTER TRANSPORTATION PLAN

9 Roadway Standards and Guidelines

This chapter presents design standards, guidelines for design, traffic control, traffic analysis, and access management and jurisdictional transfer guidance for the Mitchell area. In most cases, the standards and guidelines presented in this section reference other documents to support applicability to Mitchell area roadways. Those documents should be consulted for further information.

9.1 Design Standards

City of Mitchell design standards are presented in Chapter 3 Design Standards of Mitchell City Code of Ordinances, Title 11 Subdivision Regulations. Supporting information is also provided in Title 8 Public Ways and Property. These standards apply to all public improvements within the City of Mitchell incorporated area except where superseded by federal or state requirements.

9.2 Design Guidelines

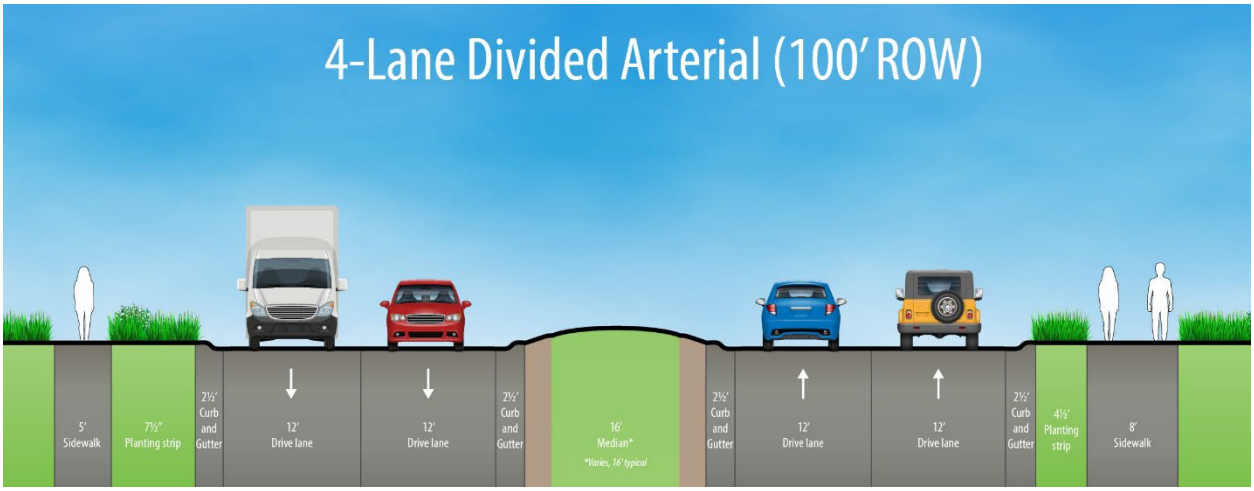
Resources to support City of Mitchell Design Standards and guide roadway design include:

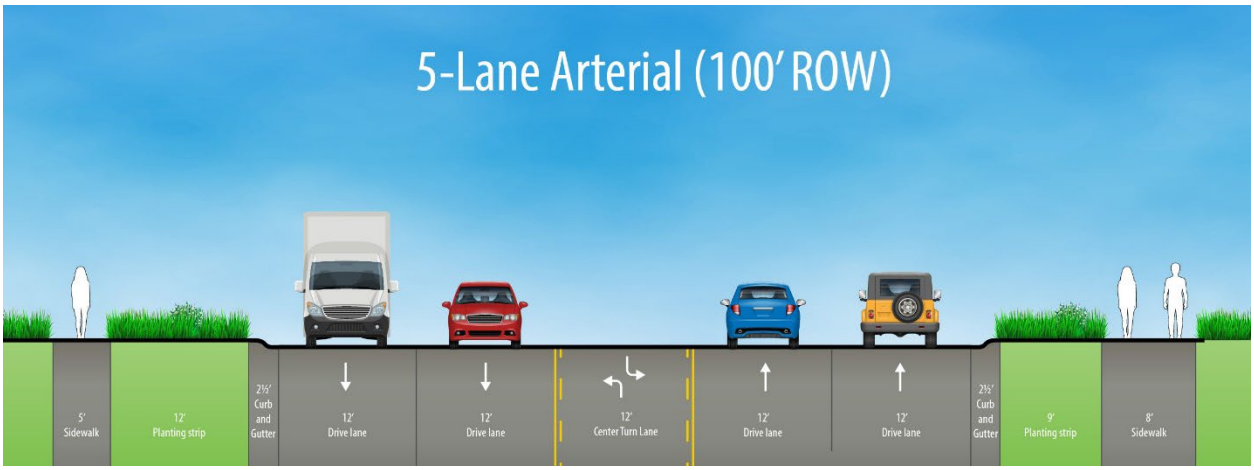
- *SDDOT Road Design Manual*
- *SDDOT Local Roads Plan*
- *American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets*

9.2.1 Typical Sections for New or Reconstructed Roadways

Typical sections corresponding to Major Roads Plan categories for new and reconstructed roadways are provided in **Figure 28** through **Figure 30**. Typical right-of-way (ROW) width for City of Mitchell streets is 66 feet. Typical sections were also developed for arterial roadways with an 80-foot and 100-foot ROW width.

Spruce Street 3-Lane Roadway Section





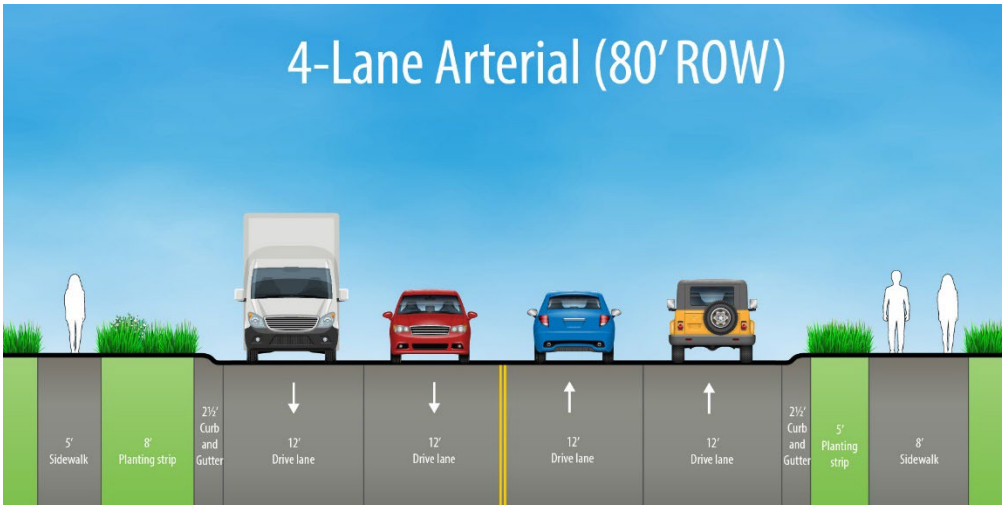


Figure 28: Multilane Arterial Typical Sections

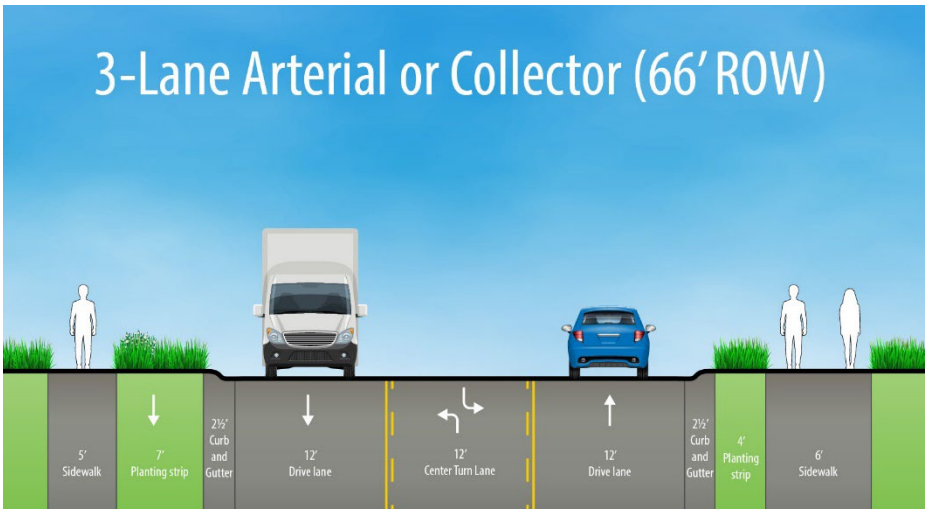


Figure 29: 3-Lane Arterial and Collector Typical Section

A narrower, 31-foot, 2-Lane Collector and Local roadway section may be considered within industrial and commercial areas. A 31-foot roadway section requires City approval.

31-foot roadway section includes 2 13-foot travel lanes and outside 2.5-foot curb and gutter. No on-street parking is allowed.

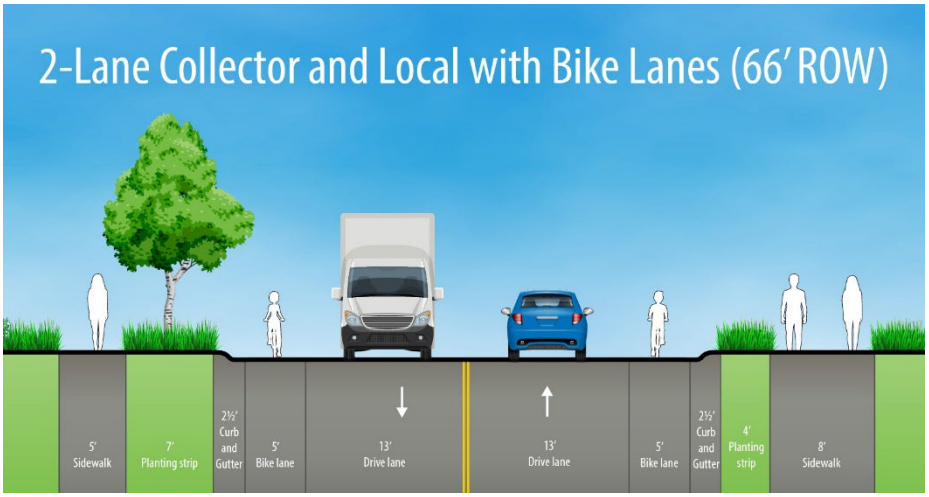


Figure 30: 2-Lane Collector and Local Typical Sections

9.2.2 Turn Lanes

Installation of turn lanes at intersections and driveway access points often provide operational and safety benefits by removing turning vehicles from the through lanes. The *SDDOT Road Design Manual, Chapter 15,* provides guidance on when and where to install turn lanes on the major roadway at unsignalized intersections, based on:

1. Vehicular volume
2. Crash experience
3. Special cases
    a. Railroad crossings
    b. Geometric/safety concerns
    c. Non-traversable median (left turn lanes only)

These criteria are applicable to the unsignalized movements at a two-way stop-control intersection.

The need for turn lanes on stop-controlled approaches is typically based on operational analysis. At stop-controlled approaches where there is a high right turn volume, it is often advantageous to split the left turn and right turn movements so a left turn vehicle waiting for a gap in traffic does not block right turn traffic.

Turn lanes at signalized intersections are determined by operational analysis. Installation of a left turn lane is generally advantageous to operations and safety even if not required to meet a target intersection operations measure.

9.3 Traffic Control Guidelines

The *Manual on Uniform Traffic Control Devices* (MUTCD) provides extensive guidance on the use of traffic control devices, such as signs, pavement markings, and traffic signals. An engineering study should be conducted to determine the appropriate traffic control device using methodologies and warrants outlined in the MUTCD. The following summarizes considerations for intersection and crossing control beyond STOP or YIELD control on just the minor street approach(es).

9.3.1 Multi-Way Stop Signs (All-Way Stop-Control)

Multi-way stop control is advantageous when traffic volumes are nearly equal on the two intersecting roadways. The installation of multi-way stop should be based on engineering study with the following considerations:

- **Interim measure:** at an intersection where traffic signals are justified
- **Crash records:** five or more crashes in a 12-month period that are susceptible to correction by installation of all-way stop-control
- **Vehicular traffic volumes:** thresholds that account for entering vehicles from major and minor approaches for an 8-hour period of the day and minor-street vehicular delay

Other considerations include left turn conflicts, vehicle/pedestrian conflicts, restricted views (sight distance), and intersections of two similar streets.

9.3.2 Traffic Signals

In locations where traffic signals are being considered (for either installation or removal), the MUTCD presents nine traffic signal warrants for analysis:

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour
- Warrant 4, Pedestrian Volume
- Warrant 5, School Crossing
- Warrant 6, Coordinated Signal System
- Warrant 7, Crash Experience
- Warrant 8, Roadway Network
- Warrant 9, Intersection Near a Grade Crossing

The installation of a traffic signal should be based on engineering judgement after a thorough evaluation of the specific installation, considering site conditions and the overall context. The MUTCD also notes that "the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal" (MUTCD 2009 4.C.01.03).

9.3.3 Protected Left Turn Phasing at Traffic Signals

There are five options for left turn phasing at a signalized intersection:

- Permitted (green ball or flashing yellow arrow)
- Protected (green arrow)
- Protected-permitted (green arrow followed by green ball or flashing yellow arrow, or vice-versa)
- Split phasing (where all movements on one approach have the right of way)
- Prohibited

Implementing the appropriate left turn phasing at a signalized intersection is important for both intersection operations and safety. *NCHRP Report 812, Signal Timing Manual, Second Edition*, Exhibit 4-16, provides left turn phasing guidelines to help select the least-restrictive left turn phasing at a signalized intersection based on a variety of variables. It is recommended this flow-chart be reviewed when determining left turn phasing at Mitchell area signalized intersections.

9.4 Traffic Analysis Guidelines

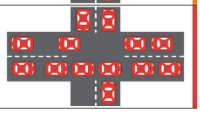
9.4.1 Level of Service (LOS)

Operational performance of highways is evaluated in terms of quality of service, which describes how well a transportation facility operates from a traveler's perspective. Quality of service is typically measured as 'Level of Service' (LOS), which is presented by a letter grade ranging from LOS A (free-flowing conditions) to LOS F (stopped / heavily delayed traffic). **Figure 31** provides a summary of LOS measures for different roadway facilities pertinent to the Mitchell area.

Traffic operational analyses should be conducted in accordance with the current edition of:

- *SDDOT Road Design Manual*
- *Highway Capacity Manual (Transportation Research Board)*

The recommended minimum operating condition for Mitchell area intersections and roadway segments, for both existing and future-year planning horizon traffic volumes, is LOS C.

	Unsignalized Intersection	Signalized Intersection	
A	Queuing is rare **Intersection Control Delay:** ≤10 seconds/vehicle	Very minimal queuing; excellent corridor progression and/or short cycle lengths **Intersection Control Delay:** ≤10 seconds/vehicle	
B	Occasional queuing **Intersection Control Delay:** >10–15 seconds/vehicle	Some queuing; good corridor progression and/or short cycle lengths **Intersection Control Delay:** >10–20 seconds/vehicle	
C	Regular queuing **Intersection Control Delay:** >15–25 seconds/vehicle	Regular queuing; not all demand may be serviced on some cycles (cycle failure) **Intersection Control Delay:** >20–35 seconds/vehicle	
D	Queue lengths increased **Intersection Control Delay:** >25–35 seconds/vehicle	Queue lengths increased; routine cycle failures **Intersection Control Delay:** >35–55 seconds/vehicle	
E	Significant queuing **Intersection Control Delay:** >35–50 seconds/vehicle	Long queues, congested conditions; majority of cycles fail **Intersection Control Delay:** >55–80 seconds/vehicle	
F	Volume to capacity ratio approaches 1.0; very long queues **Intersection Control Delay:** >50 seconds/vehicle	Volume to capacity ratio near 1.0; very long queues, almost all cycles fail **Intersection Control Delay:** >80 seconds/vehicle	

LOS Measures and Definitions: Highway Capacity Manual and SDDOT Road Design Manual

Note: Unsignalized intersection control delay shown for overall (or weighted) intersection delay, which accounts for the zero delay of the high-volume through movement on the major roadway. Two-way stop-control delay (TWSC) is measured from the worst-case stop-controlled approach with the same average delay (seconds/vehicle) thresholds.

Figure 31: Intersection Level of Service (LOS) Descriptions

9.4.2 Traffic Impact Studies

A traffic impact study (TIS) is an objective analysis of safety and operational impacts to the surrounding roadway network due to the generation of traffic or shifts in travel patterns from planned development or modified use. Information provided in a TIS aids government agencies in their decision on access permits, roadway improvement needs, and changes to traffic control within the study area associated with the proposed development.

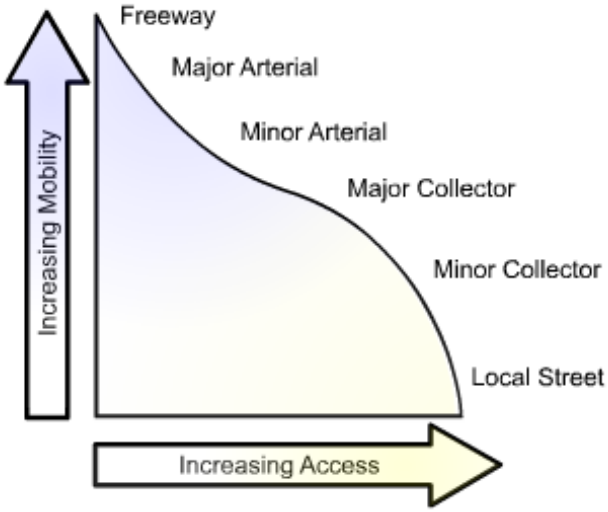
The preparation of a TIS is the responsibility of the developer and prepared by a licensed design professional with experience in transportation planning or traffic engineering. The City of Mitchell, or other government agencies with jurisdiction of the potentially impacted roadways, will determine applicable trip-generation thresholds for when a TIS is required. The recommended TIS methodology, expectations, and report format and content are presented in the *SDDOT Road Design Manual, Chapter 17,* and should be confirmed with the reviewing agency or agencies prior to starting the TIS.

9.5 Access Management Guidelines

Access management is an important consideration for providing safe and efficient ways of turning to and from streets and highways. The Transportation Research Board's *Access Management Manual* identifies several key access management principles applicable to the Mitchell area:

1. Provide a specialized roadway system
2. Limit direct access to major roadways
3. Promote intersection hierarchy
4. Locate signals to favor through movements
5. Preserve the functional area of intersections and interchanges
6. Limit the number of conflict points
7. Separate conflict areas
8. Remove turning vehicles from through-traffic lanes

Figure 32 illustrates the balance between access and mobility and the relationship with Major Roads Plan roadway categories.



Adapted from FHWA Office of Operations – Access Management

Figure 32: Major Roads Plan Access and Mobility Relationship

Recommended access management resources include:

- *Transportation Research Board Access Management Manual, 2nd Edition*
- *SDDOT Road Design Manual, Chapter 17 Access Management*

9.5.1 Jurisdictional Considerations

Access requirements for area roadways not under the City of Mitchell jurisdiction should be reviewed when considering new access:

- State of South Dakota: *SDDOT Road Design Manual Chapter 17* and *South Dakota Administrate Rules Chapter 70:09:02*
- Davison County: *Davison County Master Transportation Plan*

9.5.2 Intersection Functional Area

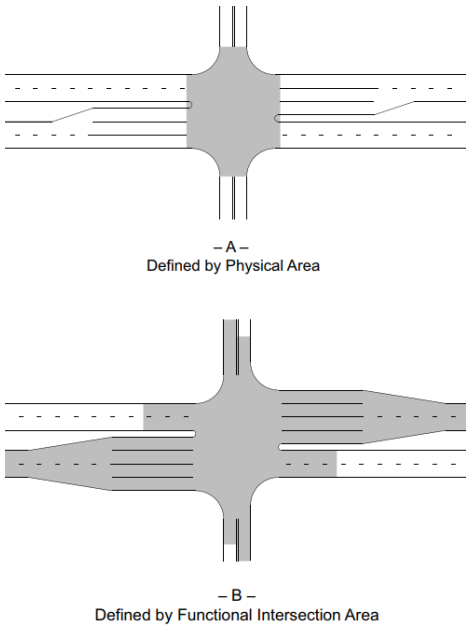
A core element of access location, spacing, and management is intersection functional area (see **Figure 33** and **Figure 34**). *AASHTO* states: 'Ideally, driveways should not be located within the functional area of an intersection or in the influence area of an adjacent driveway'.

It is important to protect the major intersection's functional area by restricting access upstream and downstream of the physical intersection. This provides a more sequential order of tasks for motorists approaching and traveling through the intersection physical area by limiting conflicts and simplifying the perception–reaction–maneuver process. In situations where access within the intersection functional area cannot be avoided, movements should be restricted to right-in right-out.

Methodology and values to calculate intersection functional area are provided in *SDDOT Road Design Manual Chapter 17*.

Intersection Area

Intersections consist of two components: A) physical area and B) functional area

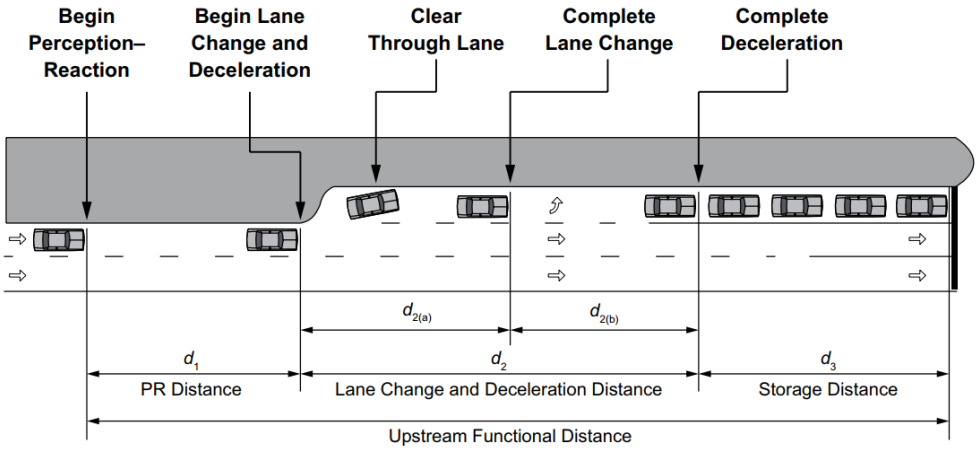


Source: AASHTO A Policy on Geometric Design of Highways and Streets, 7th Edition (2018)

Figure 33: Intersection Area

Intersection Functional Area Elements

The functional area upstream of the physical intersection accounts for 1) distance traveled during the perception-reaction time, 2) deceleration distance while the driver maneuvers to a stop, and 3) queue storage. Downstream functional area accounts for stopping sight distance and is shorter than the upstream functional area **(Figure 34)**.



Source: AASHTO A Policy on Geometric Design of Highways and Streets, 7th Edition (2018)

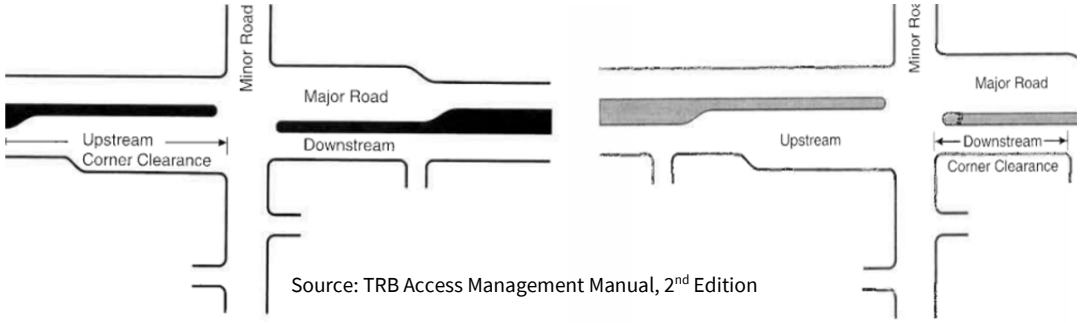
Figure 34: Intersection Functional Area Elements

9.5.3 Corner Clearance

Corner clearance is the minimum distance between a new access and the nearest crossroad intersection. It should provide drivers with adequate perception-reaction time to assess potential downstream conflicts and is aimed at preventing the location of driveways within the functional area of an intersection.

Upstream corner clearance is based on the upstream functional area of the intersection. Downstream corner clearance is based on stopping sight distance.

It is recommended all proposed access locations be evaluated for corner clearance. Recommended guidelines are provided in **Figure 35**.



Source: TRB Access Management Manual, 2nd Edition

SPEED (MPH)	UPSTREAM CORNER CLEARANCE (FEET)	DOWNSTREAM CORNER CLEARANCE (FEET)[2]
20	115 + queue1	115
25	160 + queue1	155
30	215 + queue1	200
35	300 + queue1	250
40	380 + queue1	305
45	460 + queue1	360
50	550 + queue1	425
55	645 + queue1	495

See SDDOT Road Design Manual Chapter 17 for additional information

Corner clearance is measured from the closest edge of pavement (intersection) to closest edge of pavement (proposed access)

Upstream Corner Clearance: equal or exceed the upstream functional area (d1+d2+d3)

[1] Analysis measured queue is applicable for signalized intersections

Downstream Corner Clearance: equal or exceed the stopping sight distance

[2] Stopping sight distance assumes level terrain

Figure 35: Corner Clearance

9.6 Jurisdictional Transfer

Jurisdictional transfer is when ownership of a roadway is transferred from one roadway agency to another. For each agency having roadway jurisdiction/ownership, there may be a significant amount of cost associated with a transfer. It is typical for a roadway to be brought "up to standards" or 'acceptable condition' by one or both parties involved in the transfer.

The overall objective of jurisdictional transfer is to provide for roadway ownership, operations, and maintenance at the proper jurisdictional level. Properly aligned roads provide the correct level of service and better align with user expectations for maintenance, operations, safety, and ride quality. It also provides efficiencies for transportation costs associated with constructing, operating, and maintaining the transportation network.

9.6.1 Jurisdictional Transfer Criteria

In the Mitchell area, the following criteria should be considered in determining whether a roadway jurisdictional transfer is warranted:

System Continuity

- Is the roadway currently located within the boundary of a municipality?
- Is the roadway located adjacent and parallel to the boundary of a municipality?
- Is the roadway currently located within a municipal growth area?
- Is land on both sides annexed or planned to be annexed by the municipality?

Roadway Characteristics

- Does adjacent development contain urban roadway characteristics?
- Is there a desire for additional roadway amenities (sidewalks/shared-use paths)?
- Is there a need for public utilities?
- Are traffic volumes greater than 250 ADT (for Township gravel roadway)?
- Are traffic volumes greater than 2,500 ADT (for 2-lane County asphalt roadway)?

Roadway Classification

- How is the roadway functioning?
    - What types of trips is it serving?
    - What types of vehicles are using the roadway?
- What jurisdiction is best equipped to maintain the roadway?

Streamlined Maintenance and Funding Opportunities

- Is the segment an island or peninsula surrounded by a different jurisdiction?
- Would efficiency in maintenance and operation be improved with a transfer?
- What is the timeline for the next major investment?

Future Planning Documents

- Is the roadway in future growth areas identified in comprehensive plans?
- What is the timeline of growth in the area and potential annexation?
    - Does this align with the roadway segments next major investment?

Political Desire

- Are there special political considerations for a jurisdictional transfer?

While not an exhaustive set of criteria to identify road jurisdiction transfers, this list provides guidance for agencies considering whether a road may be better suited to be operated and maintained by a different agency. Ultimately, each agency must be agreeable to the transfer of jurisdiction to provide a level of service that is equitable from a resource and economic perspective.

9.6.2 Jurisdictional Transfer Process

The transfer of jurisdiction can be formalized in multiple ways including by Memorandum of Understanding, assignment of easement or right-of-way, or by other agreement as deemed necessary by the legal counsel of the state/city/county/township and should be considered on a case-by-case basis. In all cases, the agency/jurisdiction must be agreeable for the transfer of jurisdiction of a particular road facility.

A Life-Cycle Cost Analysis spreadsheet used by the SDDOT for determining the value of a roadway segment considered for jurisdictional transfer is included in the *Jurisdictional Transfer Guidance Memo* in **Appendix F**. The worksheet is used to determine the present worth of the roadway, accounting for future maintenance and upkeep costs over the specified analysis period.

Ohlman Street & 23rd Avenue Intersection

10 Pavement Maintenance Plan

The Pavement Maintenance Plan provides guidance to maintain the existing roadway network, with consideration to budget and flexibility in selecting projects. The plan identifies two funding scenarios to maintain or increase average network pavement conditions and identifies high priority roadway segments to address within the next five years.

10.1 Network Condition Goals

The pavement condition survey completed in summer 2022 by Infrastructure Management Services (IMS) provides a 'snapshot' of the current pavement condition and serves as the basis for determining a maintenance plan for the City of Mitchell. The survey assigned pavement condition ratings to roadway segments in terms of Pavement Condition Index (PCI) and International Roughness Index (IRI).

Pavement Condition Rating (PCI)

Rating of the pavement's overall condition based on measured and quantified surficial distress.

International Roughness Index (IRI)

Rating of the pavement's overall condition based on measured and quantified roughness.

The City of Mitchell's paved roadways are generally in good condition. IMS provided benchmark metrics as part of discussions with the city, which were incorporated as goals for the roadway network.

Network Average PCI:

- City of Mitchell average network PCI is 63
- IMS national average: 60 to 70

Network Average PCI Goal:

Maintain existing PCI (63) and work towards increasing to 70

Percent of Excellent: portion of roads that score above a PCI of 85

- City of Mitchell percent of excellent: 7%

This metric indicates if an agency has been investing in the network at a rate that would maintain the current overall PCI. The City of Mitchell is currently at 7 percent of roadways in the Excellent category, which may indicate a need to increase investment.

Percent of Excellent Goal:

Maintain a minimum of 15% of the network falling in the Excellent category

Backlog: portion of roads that are rated "Very Poor" and "Poor" and fall below a PCI of 40

- City of Mitchell backlog: 10%

Backlog Goal:

Maintain a maximum 10% of the network falling in the backlog category

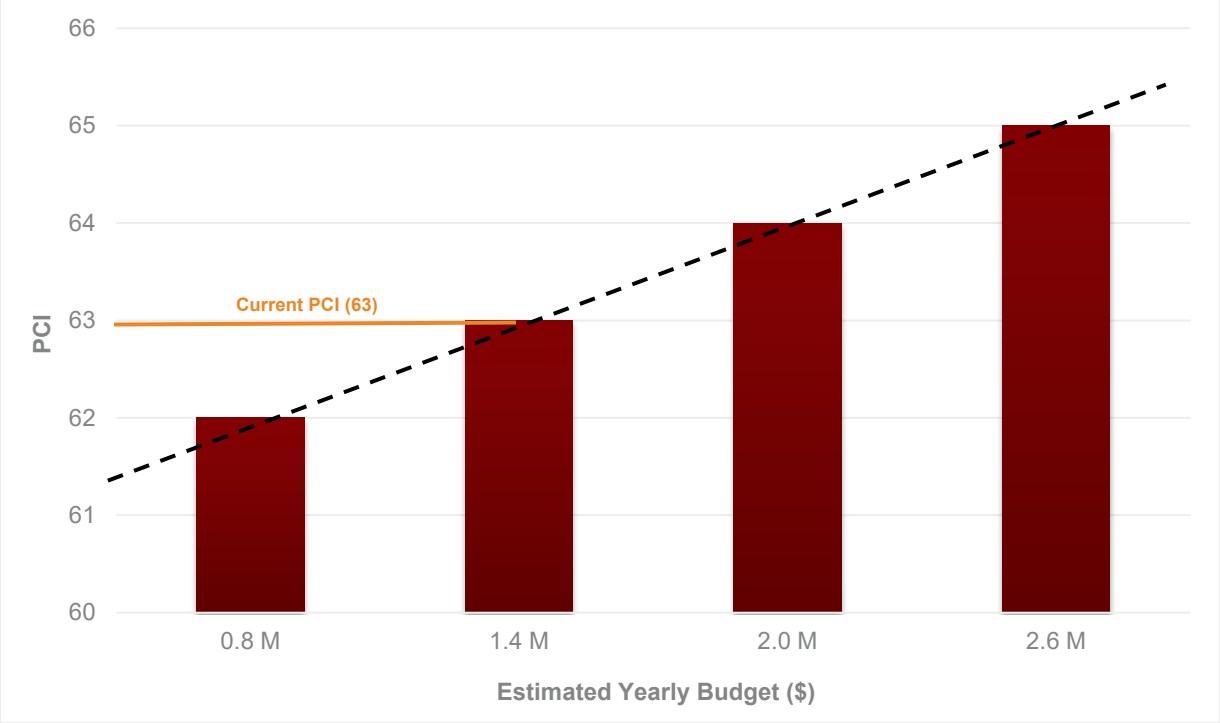
This metric represents the major surfacing work for the City of Mitchell, such as full reconstruction, partial reconstruction, and surface removals. Generally, a healthy agency will have less than 10 percent of their network in the backlog category. Twelve to 15 percent represents a realistic target for most agencies with 15 percent typically being the maximum recommendation. As soon as an agency approaches and/or exceeds 20 percent backlog, the major surfacing work can escalate as it accumulates faster than funding can be invested into the system.

10.2 5-Year Maintenance and Rehabilitation Plan Scenarios

A 5-year maintenance and rehabilitation (M&R) program was generated from the provided IMS "Fix All' activity list to determine the anticipated annual costs to maintain the network's overall condition as well as determine a list of suggested projects that may be considered as part of each year's capital improvement plan (CIP) planning process. Two scenarios were developed:

- **Maintain Existing PCI:** scenario maintains the existing road network to a level equal to the current condition (weighted average PCI of 63)
    - Estimated budget: $1.4 million/year
- **Increase PCI by One Annually:** scenario increases the network's overall PCI by one point each year over the 5-year maintenance program
    - Estimated budget: $2 million/year

Figure 36 shows the estimated impact on the overall network PCI based on various yearly budget scenarios.



Note: Scenarios for 1 PCI decrease (-1) and 2 PCI increase (+2) estimated from linear progression of year budget

Figure 36: Overall Network PCI for Various Budge t Scenarios

The 'Maintain Existing PCI' budgetary scenario is recommended as the baseline scenario for project planning and serves as the basis for the funding analysis later in the report.

10.3 Recommended Projects

The pavement condition survey results and 'Maintain Existing PCI' budgetary scenario were used as guides to determine the recommended next step, or activity, of a roadway segment and in the project selection process. This process provides the flexibility to the City of Mitchell to consider a variety of factors when selecting CIP projects.

Roadway segments with an established PCI need were grouped into two categories: M&R projects and Major Rehabilitation projects. The segments were further sub-divided by Major Road Plan arterial, collector, and local roadway categories.

- **M&R projects** were selected based on pavement segments that fell within the 60 to 70 PCI range or were expected to deteriorate to that range within the next five years. It is recommended these projects be prioritized before their continued deterioration places them into a Major Rehabilitation activity.
- **Major Rehabilitation projects** were based on segments with a PCI less than 60, and include moderate to thick mill and overlays, base rehabilitation, or full depth reconstruction activities.

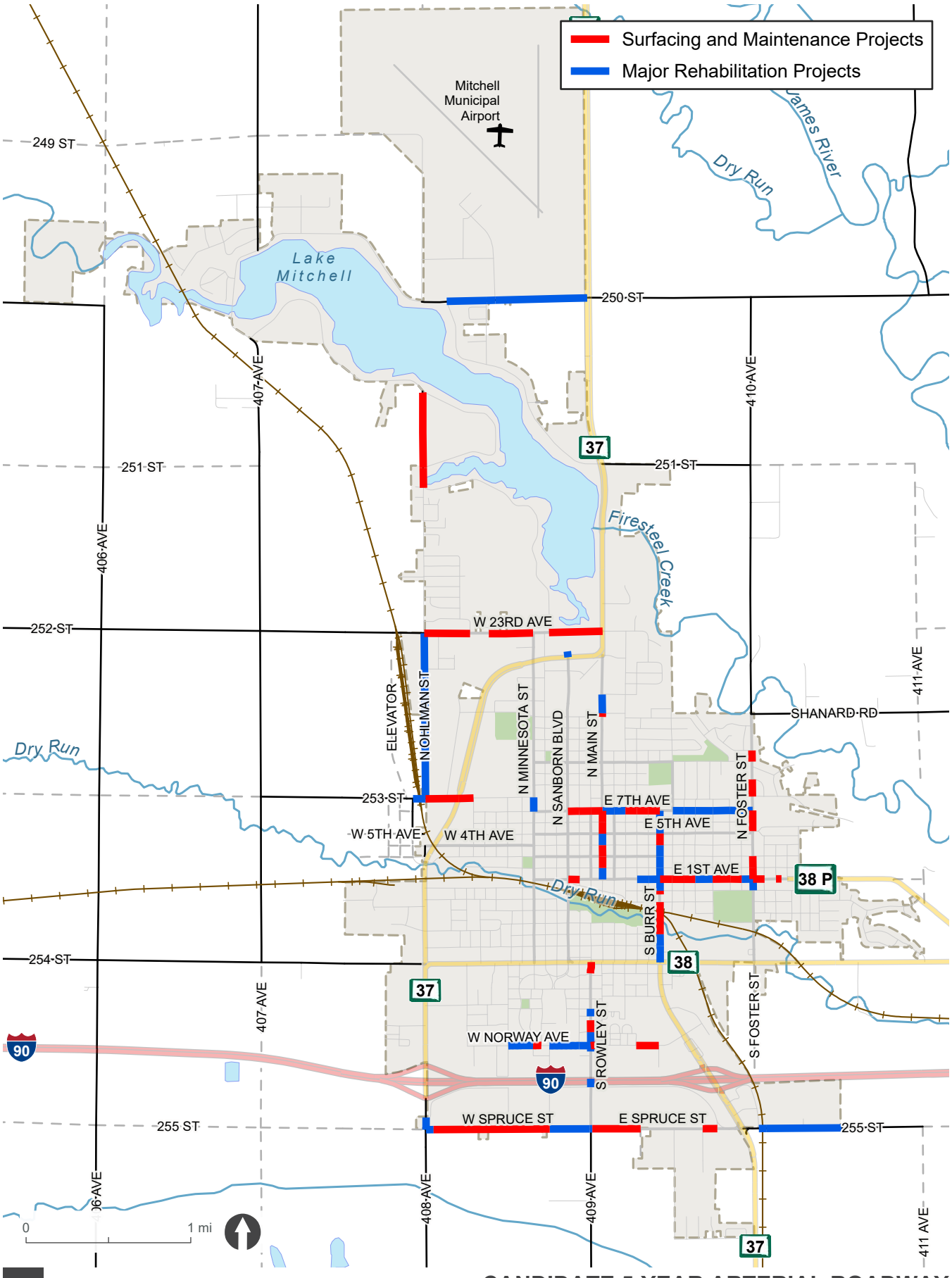
Figure 37 through **Figure 39** present recommended M&R and Major Rehabilitation projects for further consideration within the 5-year planning window. It is recommended that M&R projects are addressed within the 5-year planning window. Major Rehabilitation projects are recommended for a more moderate approach to prevent further deterioration into a full depth reconstruction need as well as to prevent an increase to the backlog.

The figures support a flexible process for selecting projects as part of the annual CIP planning process. In many instances, identified corridors show a combination of M&R and Major Rehabilitation activities that vary from segment to segment. There are also several isolated, short segments shown in the figures, but not listed in the corridor tables, which may need addressed on a case-by-case basis. Specific segment needs and potential treatments should be cross-referenced in the pavement condition survey results provided in **Appendix E**.

10.4 Other Recommendations

Additional pavement management recommendations include:

- Resurvey roadway pavement condition every three to five years
    - Builds additional data points to identify roadway treatment trends, refine maintenance strategies, and quantify performance measures
    - Provides current data to update the 5-year pavement management plan or prioritized list of projects
- Coordinate pavement condition surveys with other South Dakota communities to leverage economies of scale and reduce mobilization costs
- Adjust and maintain funding to support the pavement management goals identified in this MTP

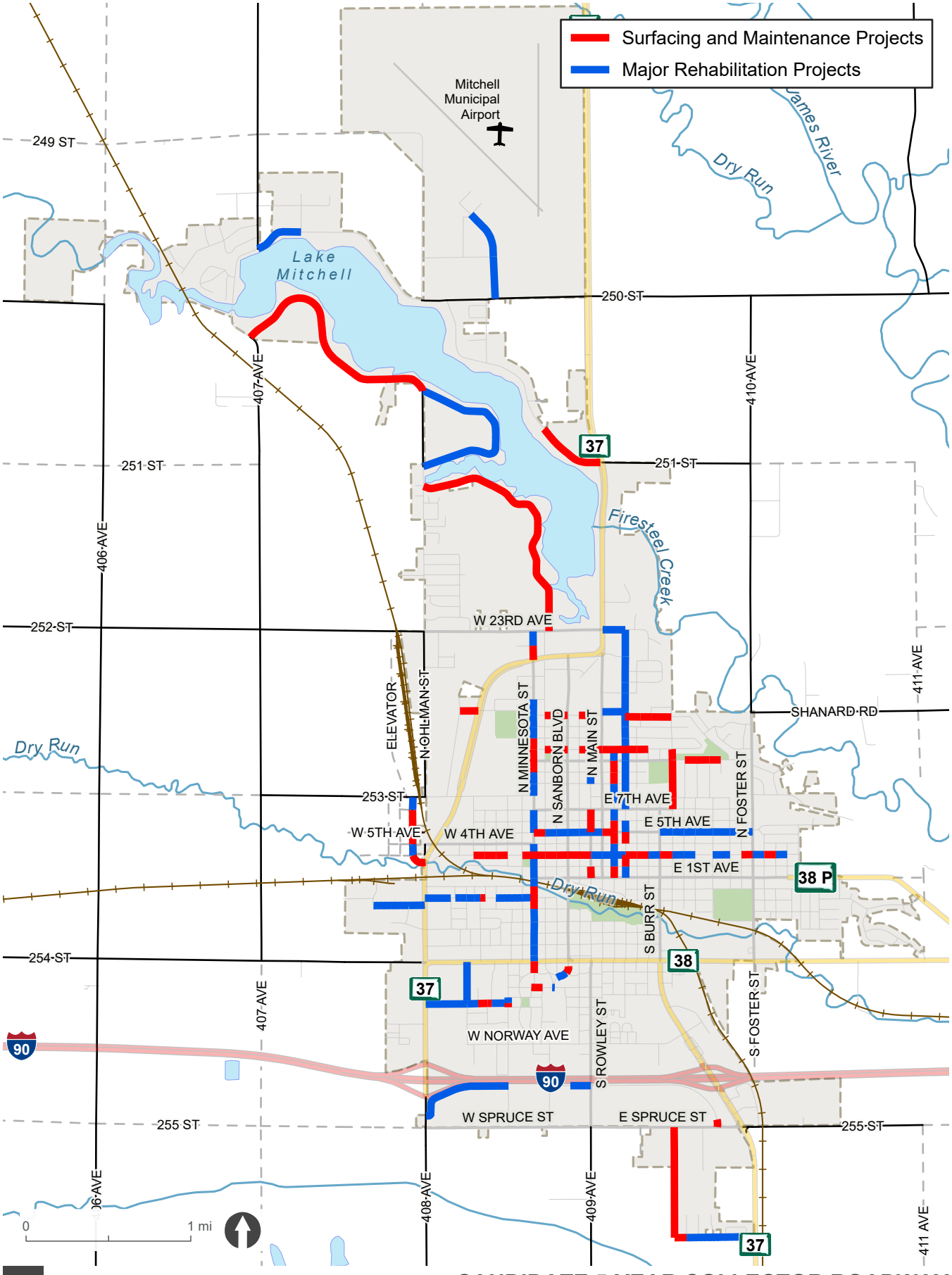


MITCHELL Master Transportation Plan

CANDIDATE 5-YEAR ARTERIAL ROADWAY M&R AND MAJOR REHABILITATION PROJECTS

FIGURE 37

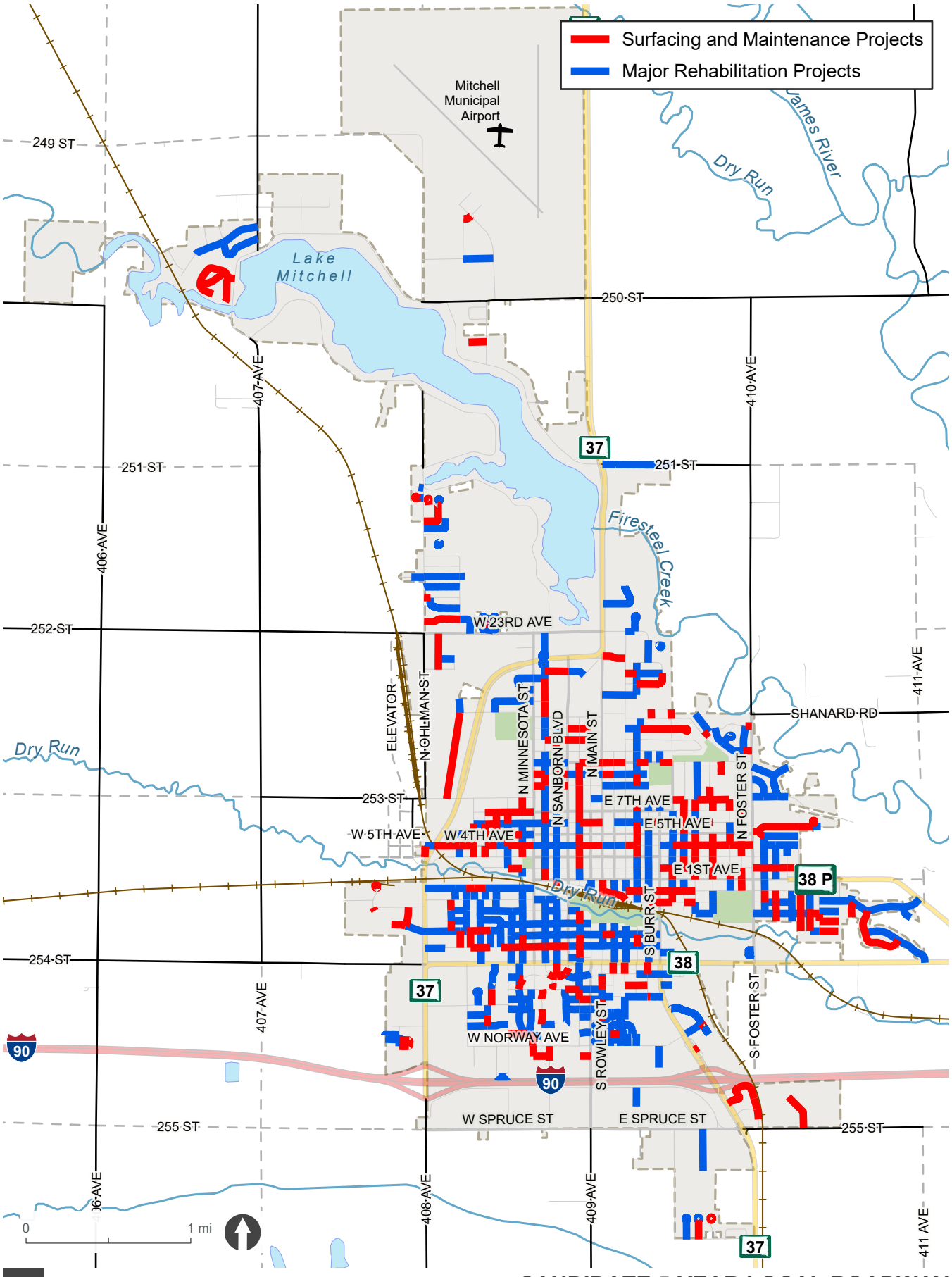
MITCHELL, SD | MASTER TRANSPORTATION PLAN



HDR MITCHELL Master Transportation Plan

CANDIDATE 5-YEAR COLLECTOR ROADWAY M&R AND MAJOR REHABILITATION PROJECTS

FIGURE 38



CANDIDATE 5-YEAR LOCAL ROADWAY M&R AND MAJOR REHABILITATION PROJECTS

FIGURE 39

11 Traffic Signal System Plan

Traffic signals are a critical element of transportation systems, enabling safe and efficient movement of the traveling public. The Traffic Signal System Plan identifies recommendations across six key categories of a traffic signal system: management, traffic monitoring, traffic signal design, traffic signal timing practices, infrastructure, and preventative maintenance. Recommendations are prioritized to provide the City of Mitchell flexibility in implementing a systematic, and opportunistic, approach to improving the traffic signal system.

Locations of Mitchell area traffic signals are shown in **Figure 40**, and include:

- 13 traffic signals owned/maintained by City of Mitchell
- 12 traffic signals owned by SDDOT and maintained by City of Mitchell

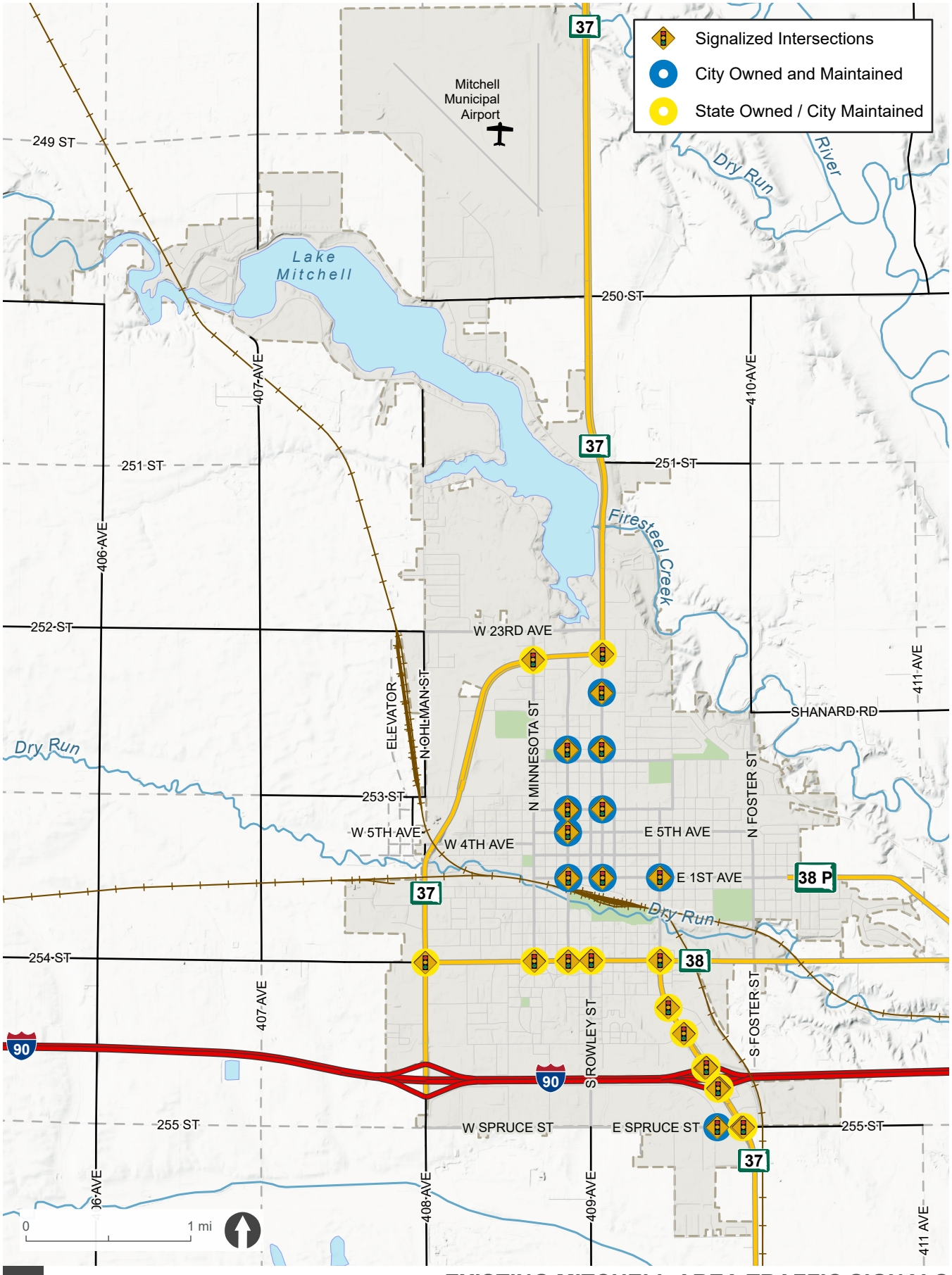
A comprehensive review of the City of Mitchell's traffic signal system was conducted as part of this MTP and included an assessment of the system's management, operations, methods, and equipment. Current practices were compared to national best practices and SDDOT traffic signal policies, operations, and standards.

Traffic Signal System Plan recommendations focus on the following categories:

- **Management:** planning, oversight, funding, outreach
- **Traffic Monitoring:** data collection, data archiving
- **Traffic Signal Timing Practices:** tools, timing plans, implementation
- **Traffic Signal Design:** geometry, detectors, wiring
- **Infrastructure:** controller type, software, firmware, communications
- **Preventative Maintenance:** reliability, frequency, training

Additional details on the traffic signal system assessment, including the City of Mitchell's results from the Institute of Transportation Engineers (ITE) Traffic Signal Benchmarking Self-Assessment and the Federal Highway Administration (FHWA) Traffic Signal Systems Capability Maturity Framework survey, and recommendations are provided in **Appendix G**.

Traffic Signal Cabinet at Burr Street & 1st Avenue Intersection



EXISTING MITCHELL AREA TRAFFIC SIGNALS

FIGURE 40

MITCHELL, SD | MASTER TRANSPORTATION PLAN

11.1 Traffic Signal Management

It is recommended that the City of Mitchell consider developing a Traffic Signal Management Plan to document and connect traffic signal system-related goals, objectives, strategies, and performance measures. This will help the city strategically connect activities related to traffic signal design, operations, maintenance, and management with the overall goals and objectives for the traffic signal network.

The FHWA Office of Operations provides guidance on Traffic Signal Management Plans for additional information.

11.2 Traffic Monitoring

Traffic signal timings and warrants (for installation or removal of a traffic signal) should be based on actual traffic volumes. It is recommended the City of Mitchell consider funding and implementing a traffic count program to collect intersection turning movement counts as follows:

- **High priority signalized intersections**
  - Major or high-volume signalized intersections: every 3-5 years
  - Coordinated corridor signalized intersections: every 3-5 years
- **Low priority signalized intersections**
  - Isolated, low-volume signalized intersections: every 5-7 years

Counts should be collected in 15-minute intervals to identify daily peak and off-peak periods. For traffic signals on state routes, a count program should be coordinated with the SDDOT.

11.3 Traffic Signal Timing

Efficient traffic signal operations are a byproduct of good signal timing practices and quality detection. Traffic volumes and patterns change throughout a day and over long time periods, requiring differing traffic signal timings.

A well-timed free operation timing plan with reliable detection can typically handle traffic volumes below saturated conditions. However, as intersections and/or corridors approach congested/saturated conditions, semi-actuated or coordinated timing plans typically operate more efficiently. Actuated (free operation) and semi-actuated signal operations are most responsive to real-time traffic volumes and arrivals based on detector actuations.

Detection is a critical component of traffic signal operation. Detectors provide the traffic signal controller with the information necessary to determine the servicing of roadway users. Use of detection allows timings to only serve side streets when traffic is present, thus maximizing green time on the main street and minimizing overall delay.

Traffic signal operations should follow *NCHRP Report 812: Signal Timing Manual* as best practice. Clearance interval timings shall follow *NCHRP Report 731: Guidelines for Timing Yellow and All-Red Intervals at Signalized Intersections*.

It is recommended that collected counts be utilized to update signal timings to include off-peak free operations and peak hour time-of-day timing plans for increased operational efficiency. These plans should be updated periodically in conjunction with intersection turning movement counts, notable changes to traffic patterns, or new equipment is installed that enhances traffic signal functionality.

11.4 Traffic Signal Design

Mitchell area traffic signal design should consider the following when developing traffic signal layouts and determining equipment needs:

- Refer to local/state practices, guidelines, and policies to select detection technology
- Consider future conditions while maintaining consistency with agency objectives and needs
- Setback detectors should be placed so that the signal avoids displaying a yellow indication for a vehicle in the dilemma zone
- Wiring and cabinet equipment should support independent operation of each crosswalk
- Controllers should be configured to account for time-related operational needs, such as time-of-day signal timing plans
- Americans with Disabilities Act (ADA) compliant Accessible Pedestrian Signals (APS) and pedestrian ramps should be provided

11.5 Infrastructure

It is recommended that new and replacement traffic signal controllers, cabinets and components, battery backup systems, pushbutton systems, and vehicular detection systems be the City of Mitchell's preferred technology for ease of operation and maintenance.

Replacement stock should be purchased and stored for replacement of cabinets, controllers, load switches, flash transfer relays, detector cards, malfunction management units with conflict monitor cards, pushbuttons, pedestrian heads, signal heads, LED inserts, tunnel visors, backplates, mounting hardware, battery backup components, detection system components, and others as deemed necessary. Quantities should be evaluated based on history of need.

11.6 Preventative Maintenance

Preventative maintenance is the regular and routine maintenance of equipment and assets to keep them running and prevent costly unplanned downtime because of unexpected equipment failure. A successful maintenance strategy requires planning and scheduling equipment maintenance before a problem occurs.

Benefits of preventive maintenance include:

1. Lengthen asset lifespan
2. Lower risk of malfunctions or breakdowns
3. Increase operational efficiency
4. Decrease unplanned downtime
5. Boost citizen satisfaction
6. Save money

Standard Operating Procedures (SOPs) are an effective way to document maintenance (and operational) procedures and support consistency.

Minnesota Street & SD37 Intersection

Recommended SOPs for consideration are provided in **Appendix G**, and include:

1. Installation and Maintenance of Traffic Control Devices
2. Placement of Portable STOP or YIELD signs
3. After hours call-out procedures for Traffic Signals

Recommended minimum maintenance standards and frequency are defined in the SOP for Installation and Maintenance of Traffic Control Devices.

The existing asset inventory already created by city staff should be entered into an asset-tracking or spreadsheet-style software and updated to track age of existing infrastructure. This asset inventory should be used to plan for the capital replacement of aging traffic signal infrastructure.

It is recommended that the City of Mitchell develop minimum qualifications and certifications for maintenance staff to provide proper training of staff assigned to work in the field and on traffic signal infrastructure. The International Municipal Signal Association (IMSA) is the most regarded name in public safety related to traffic signals, delivering quality certification programs and connecting the traffic signal industry through membership. It is recommended that city staff involved in signal maintenance and operations:

1. Join IMSA
2. Attend either the online or in-person IMSA Certification Program
3. Obtain, at a minimum, the Traffic Signal Field Technician Level II certification
    a. Others recommended certifications include Traffic Signal Bench Technician, Work Zone Temporary Traffic Control Technician, and Signs and Pavement Markings Technician Level 1
4. Maintain certification by meeting all renewal requirements

11.7 Recommended Priorities

The recommended Traffic Signal System Plan priorities include:

- Complete a comprehensive Traffic Signal Management Plan that defines a vision, mission, goals, and objectives
- Implement a traffic count program that counts high-priority signalized intersections every 3-5 years and low-priority intersections every and 5-7 years
- Install vehicular detection systems at more major signalized intersections. Detection installation should be prioritized with major signaled intersections on arterial roadways being equipped first. Detection should then be installed at more minor signalized intersections along collectors and other minor roadways.
- Utilize collected traffic counts and develop new signal timings that include off-peak free operations and peak hour time-of-day timing plans for increased operational efficiency
- Continue to install battery backups at all signalized intersections
- Replace aging infrastructure with products from the same manufacturer for consistency across signalized intersections
- Obtain training and certifications for staff involved in signal operations and maintenance

12 Bicycle and Pedestrian Plan

The Bicycle and Pedestrian Plan identifies recommendations for pedestrian, bicycle, and trail route continuity, connectivity, and crossing improvements for the Mitchell area, by:

- *Providing a framework to address multimodal needs through strategies, standards, and projects*
- *Identifying future projects, costs, and priorities*

12.1 Framework

The study team received considerable bicycle and pedestrian-related feedback that centered on two overarching themes: 1) Route Connectivity and Continuity and 2) Crossings. Based on this feedback, the Bicycle and Pedestrian Plan framework consists of the following:

- **Route Connectivity and Continuity**
  - Complete network gaps (sidewalk, shared-use paths, on-street facilities, etc.) to provide facility continuity along a route and connectivity to other facilities and high-demand destinations
  - Expand the shared-use path network to support multimodal mobility and accessibility for the preferred facility type identified through stakeholder and public input
- **Crossings**
  - Provide safe crossing opportunities where bicycle and pedestrian facilities cross major streets
  - Prioritize crossing improvements for pedestrians at schools, parks, public amenities, downtown core, and connections to other routes

Ultimately, these goals help identify short-term and long-range projects, establish priorities, and facilitate mutually beneficial partnerships for reconstruction projects, maintenance, and regional connectivity.

Shared Use Path, Cabela Drive to Spruce Street

12.2 Resources

Recommended national state-of-the-practice guidance documents to help guide implementation of recommendations include:

- *FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*
- *FHWA Manual on Uniform Traffic Control Devices (MUTCD)*
- *National Association of City Transportation Officials (NACTO) Designing for All Ages and Abilities*
- *FHWA Small Town and Rural Multimodal Networks*
- *FHWA Bikeway Selection Guide*
- *SDDOT Road Design Manual*

12.3 Route Connectivity and Continuity

12.3.1 Shared Use Paths

Shared use paths are multiuse facilities separated from the roadway and provide a low-stress facility for people walking, bicycling, and rolling. They were identified as the preferred bicycle facility by study stakeholders and the public, and are an attractive solution for several reasons:

- Provide space for both pedestrians and bicyclists
- Comfortable for cautious bicyclists and children
- Often require minimal (or no) additional right-of-way
- Provide connections and access to adjacent land uses
- Function similarly to a sidewalk

Standard shared use path width is 8 feet and 10 feet (8 feet minimum) for city and SDDOT jurisdiction, respectively. Expanding to 10 or 12-foot pathways is recommended in high pedestrian/bicycle traffic areas, when the path is located at the back-of-curb, and where feasible. **Figure 41** shows an example shared use path. Shared use paths can be attached or detached depending on the roadway section. However, detached provides more pedestrian and bicyclist comfort and protection from roadway traffic.

Shared-use Path Design Guidance

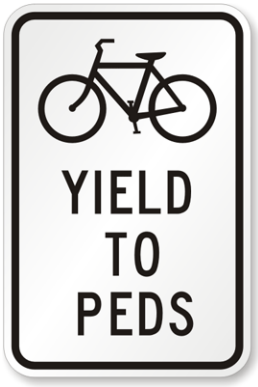
Path Width: 8 feet (minimum)

Surfacing: Concrete or asphalt (hard-surfaced, all-weather path)

Due to the mixed-use environment of shared use paths with both pedestrians and bicyclists, signage indicating that bicyclists must yield to pedestrians should be used throughout the network. Conflicts between vehicles and bicyclists/pedestrians at driveways should also be considered during design.

Source: Maricopa Association of Governments

Figure 41. Shared Use Path Example



Source: MUTCD

Yield to Pedestrians Sign (R9-6)

12.3.2 On-Street Bicycle Facilities

On-street bicycle facilities have been proposed in addition to shared use path network improvements and provide the following benefits to Mitchell area bicycle connectivity:

- Improves bicycle friendliness on low volume, low speed roadways
- Provides bicycle connectivity between other bicycle-friendly facilities (i.e., shared use paths)
- Completes bicycle network

Recommended facilities were tailored to fit the context of the Mitchell area, including existing street and right-of-way width, traffic speeds, volumes, and land use. **Figure 42** shows examples of recommended bicycle facilities.

On-Street Bicycle Facility Design Guidance

Bike Lane Width: 6 feet (desired)

Buffered Bike Lane Widths: 18-inch buffer (minimum)

Paved Shoulder Width: 5-10 feet (based on speed and vehicle volume)

Marking Frequency: Start of each block and intervals of 250 feet or less

Source: City of Sioux Falls, SD

Conventional Bike Lane

Source: City of Corvallis, OR

Buffered Bike Lane

Source: Small Town and Rural Design Guide

Bicycle Boulevard

Paved Shoulder

Figure 42. On-Street Bicycle Facility Examples

12.3.3 Shared Roadway

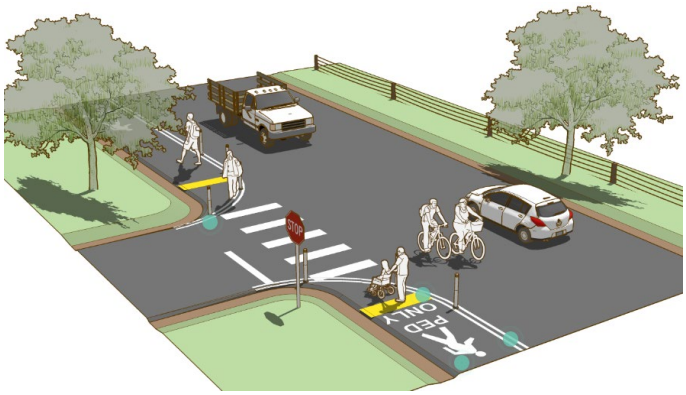
Shared Roadway Design Guidance

Pedestrian Lane Width: minimum of 5 feet

Pedestrian Lane Marking Frequency: Start of each block and intervals of 250 feet or less

Shared roadways serve pedestrians, bicyclists, and vehicles in a slow-speed travel area. Ideal shared roadways have low speeds (20 mph or below), low traffic volumes (below 2,000 vehicles/day), and no centerline markings. Similar roadways with slightly higher speeds and/or traffic volumes may be candidates for designated pedestrian areas or pedestrian lane. Local residential roadways are the best options where sidewalks or shoulders are not available. Pedestrian on Roadway warning signs (MUTCD W11-2) are recommended to alert vehicles of the shared roadway status. Examples of shared roadways are shown in **Figure 43**.

Mixed Traffic



Pedestrians in Designated Area (Pedestrian Lane)

Source: Small Town and Rural Design Guide

Figure 43. Shared Roadway Examples

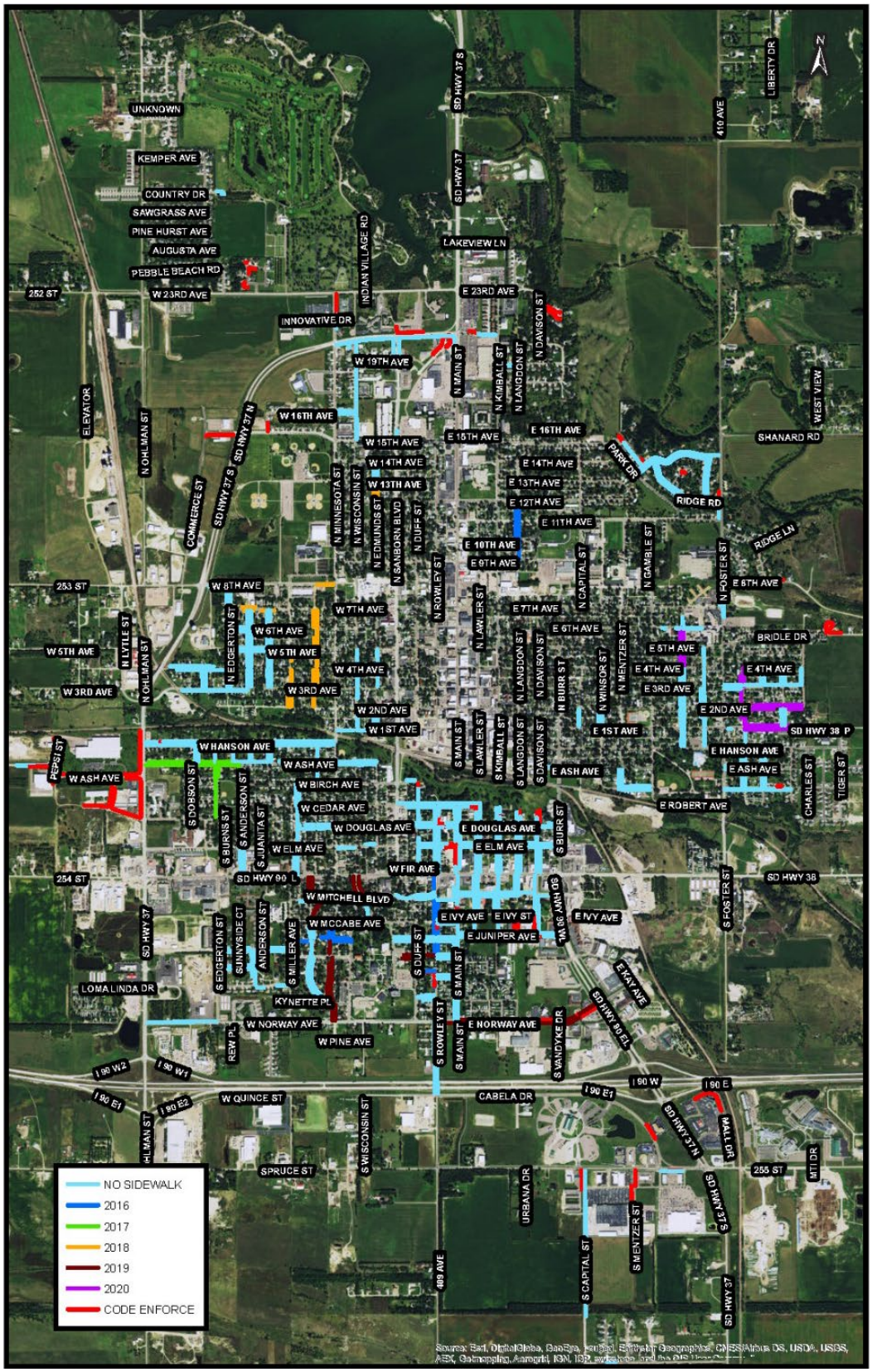
12.3.4 Sidewalk Network

Sidewalk Design Guidance

Sidewalk Width: 5 feet (with boulevard) or 6 feet (back of curb)

The City of Mitchell has developed a sidewalk infill plan to improve sidewalk connectivity throughout the community. Projects are identified annually, both through a budget provided by City Council and in conjunction with other planned roadway projects. On average, the city spends approximately $100,000 per year for sidewalk infill projects. Property owners are typically assessed for sidewalk gaps and city funds go to ADA needs associated with the project. Several locations have been addressed since publishing the initial 5-Year Sidewalk Infill Map, shown in **Figure 44**.

It is recommended this plan continue to incrementally improve sidewalk connectivity. Sidewalk recommendations within this Bicycle and Pedestrian Plan focus on key sidewalk gaps recommended by stakeholder outreach and city input. Other missing sidewalk segments should be prioritized based on proximity to schools, parks, public amenities, downtown core, and connectivity to other routes. A formalized sidewalk prioritization methodology should be developed by identifying priorities and/or scoring each sidewalk segment. Prioritization criteria may include speed, street classification, crash data, transit routes, low vehicle ownership, and urban centers/neighborhood commercial areas. FHWA provides detailed information on how to create a prioritized sidewalk methodology on the Pedestrian Safety Guide and Countermeasure Selection System website.



Source: City of Mitchell

Figure 44. Five-Year Sidewalk Infill Map

12.3.5 Recommendations

The following recommendations were developed using national best practice analysis of the existing multimodal network, traffic volumes, roadway speeds, and roadway context. Proposed facilities were determined using *NACTO Designing for All Ages and Abilities*, using speed and vehicle volumes to determine the best facility type for each roadway. **Figure 45** shows the NACTO guidance used to select facilities.

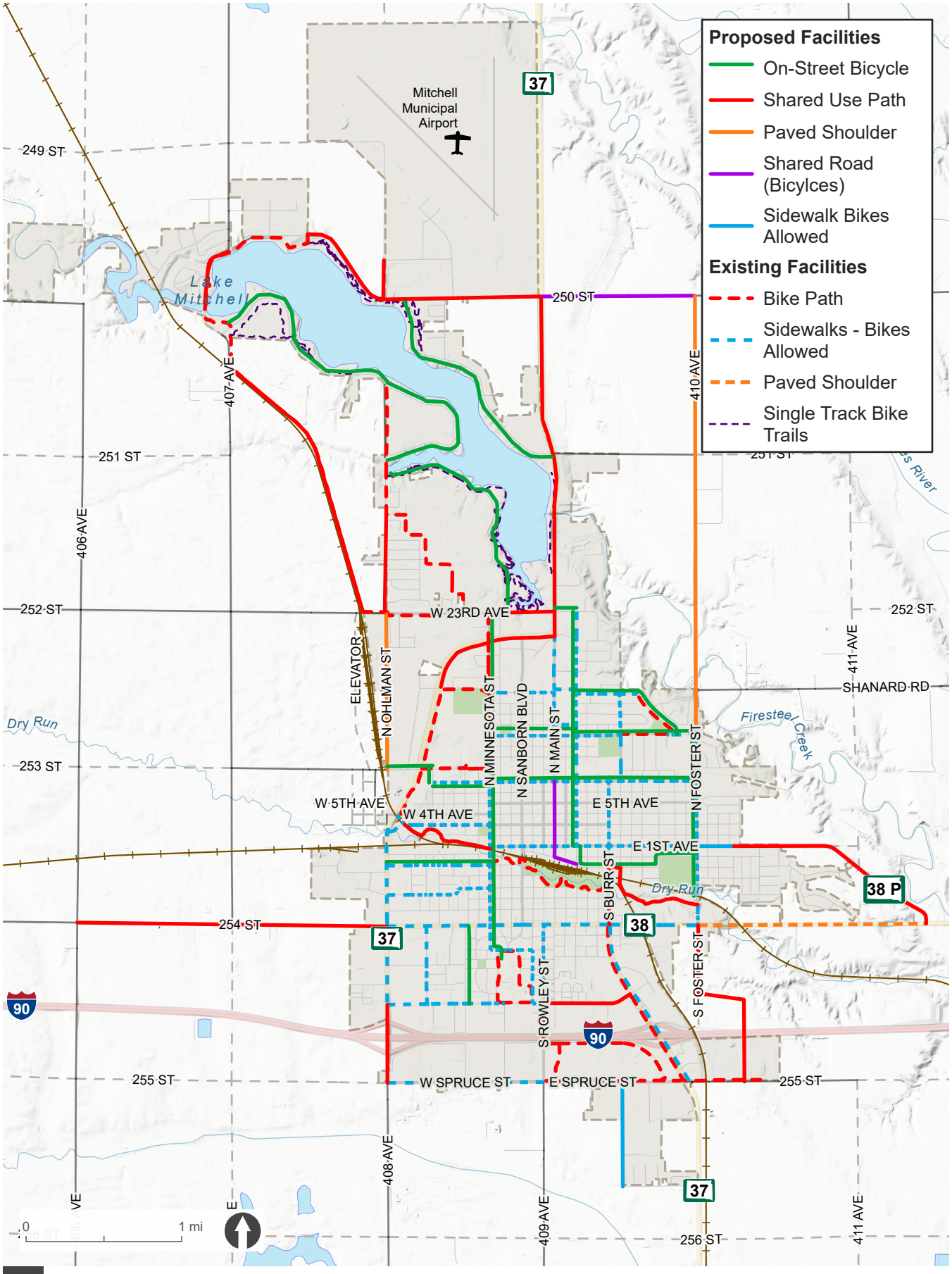
Contextual Guidance for Selecting All Ages & Abilities Bikeways

Roadway Context				All Ages & Abilities Bicycle Facility
Target Motor Vehicle Speed*	Target Max. Motor Vehicle Volume (ADT)	Motor Vehicle Lanes	Key Operational Considerations	
Any		*Any*	*Any of the following:* high curbside activity, frequent buses, motor vehicle congestion, or turning conflicts‡	**Protected Bicycle Lane**
< 10 mph	Less relevant	No centerline, or single lane one-way	Pedestrians share the roadway	**Shared Street**
≤ 20 mph	≤ 1,000 – 2,000		< 50 motor vehicles per hour in the peak direction at peak hour	**Bicycle Boulevard**
≤ 25 mph	≤ 500 – 1,500			
	≤ 1,500 – 3,000	Single lane each direction, or single lane one-way	Low curbside activity, or low congestion pressure	**Conventional or Buffered Bicycle Lane, or Protected Bicycle Lane**
	≤ 3,000 – 6,000			**Buffered or Protected Bicycle Lane**
	Greater than 6,000			**Protected Bicycle Lane**
	Any	Multiple lanes per direction		
Greater than 26 mph†	≤ 6,000	Single lane each direction	Low curbside activity, or low congestion pressure	**Protected Bicycle Lane, or Reduce Speed**
		Multiple lanes per direction		**Protected Bicycle Lane, or Reduce to Single Lane & Reduce Speed**
	Greater than 6,000	*Any*	*Any*	**Protected Bicycle Lane, or Bicycle Path**
High-speed limited access roadways, natural corridors, or geographic edge conditions with limited conflicts		*Any*	High pedestrian volume	**Bike Path with Separate Walkway or Protected Bicycle Lane**
			Low pedestrian volume	**Shared-Use Path or Protected Bicycle Lane**

Source: *NACTO Designing for All Ages and Abilities – Contextual Guidance for High-Comfort Bicycle Facilities*

Figure 45. NACTO Contextual Guidance for Selecting All Ages & Abilities Bikeways

Figure 46 shows proposed locations for shared use paths and trails, **Table 23** describe the proposed improvements at each location, and **Table 24** details the estimated cost information for all proposed improvements.



BICYCLE AND PEDESTRIAN NETWORK PLAN

MITCHELL Master Transportation Plan

FIGURE 46

MITCHELL, SD | MASTER TRANSPORTATION PLAN

Table 23. Bicycle and Pedestrian Project Recommendations

ROAD NAME	FACILITY TYPE	DAILY VOLUME	SPEED (MPH)	EXISTING PEDESTRIAN FACILITIES
Dry Run Creek Area				
Dry Run Creek from Ohlman St to Minnesota St; lighting*	Shared Use Path	n/a	n/a	No
Dry Run Creek from Burr St to Foster St; lighting*	Shared Use Path	n/a	n/a	No
Burr St from Havens Ave to 1st Avenue	Shared Use Path	12,00	30	Yes
Lake Mitchell Area				
Ohlman St from Kemper Ave to 23rd Ave	Shared Use Path	3,300	30	No
23rd Ave from Minnesota St to SD37	Shared Use Path	3,100	40	No
Adjacent to railroad tracks west of Lake Mitchell	Shared Use Path (all-weather)	n/a	n/a	Yes (aggregate)
National Guard Road from Ohlman St to SD37	Shared Use Path	2,300	25, 35	No
N Harmon Dr from National Guard Rd to SD37**	Bicycle Boulevard#	1,100	25	No
N Harmon Dr from Liveasy Ln to Ohlman St	Shared Use Path	1,100	35	No
N Harmon Dr / Navin Rd (northwest Lake Mitchell)	Shared Use Path	2,500 or less	25	No
W and S Harmon Dr Along Lake Mitchell**	Bicycle Boulevard#	1,100	25	No
Indian Village Rd around Lake Mitchell**	Bicycle Boulevard#	1,100	25	No
Ohlman St from N Harmon Dr to Industrial Rd	Shared Use Path	n/a	25	No/Partial
Mitchell Growth Area Corridors				
National Guard Rd from SD37 to Foster St	Shared Roadway#; Shared Use Path (long-term)	400-1,100	45, 35	No
Foster St from National Guard Rd to 11th Ave	Shared Roadway#; Paved Shoulder (long-term)	n/a	n/a	No
SD38P from Wallace St SD38	Shared Use Path	900	40	No
Havens Ave from 406th Ave to SD37 (Ohlman St)	Shared Use Path	3,000-5,400	n/a	No
Ohlman St from 8th Ave to 23rd Ave	Paved Shoulder	2,400	45	No
1st Ave from Foster Street to Wallace Street	Sidewalk	4,400	25, 40	No/Partial
I-90 Corridor Area				
Norway Ave from Rowley St to Burr St	Shared Use Path	1,800	25	No
Rowley St Under I-90	Shared Use Path	8,000	35	No
Capital St from Spruce St to Carl Rd	Sidewalk	2,500	25	No
Long-Range I-90 Crossings				
Foster St from Havens Ave to Spruce St	Shared Use Path	n/a	n/a	No
Ohlman St from Norway Ave to Spruce St	Shared Use Path	6,400, 1,700	50	No
SD37 Corridor				
SD37 from Main St to National Guard Rd	Shared Use Path	9,100 & 5,800	35, 55, 60	No
SD37 from 15th Ave to Main St	Shared Use Path	5,800-9,600	45, 55	No

ROAD NAME	FACILITY TYPE	DAILY VOLUME	SPEED (MPH)	EXISTING PEDESTRIAN FACILITIES
Mitchell Core Bicycle Network				
Main Street from 7th Ave to Railroad Ave (To Ash St Bicycle Boulevard when installed)	Shared Roadway## Bike Lane (long-term option)	2,500-6,000	20	Yes
Kimball St from 1st Ave to 23rd Ave 23rd Ave from Main St to Kimball St	Bike Lane	2,500-6,000	25	Yes
12th Ave from Minnesota St to Kimball St 11th Ave from Kimball St to Foster St	Bike Lane	Low-1,100	25	Yes
8th Ave from Ohlman St to Edgerton St Edgerton St from 8th Ave to 7th Ave	Bike Lane	N/A	25	No
7th Ave from Edgerton St to Minnesota St	Bike Lane	2,500 or less	25	Partial
7th Ave from Minnesota St to Burr St	Buffered Bike Lane	2,500-7,000	25	Yes
7th Ave from Burr St to Foster St	Bike Lane	1,500	25	Yes
Ash St from Ohlman St to Minnesota St	Bicycle Boulevard	n/a	25	Yes
Ash/Hanson St from Kimball St/1st Ave to Foster St	Bicycle Boulevard	n/a	25	Yes
Minnesota St from 23rd Ave to McCabe St	Bike Lane	1,500-4,000	25	Yes
Miller Ave from Norway Ave to Havens Ave	Bike Lane	n/a	25	Yes
Foster St from Dry Run Creek to 11th Ave	Bike Lane	2,000-5,200	25	Yes/ No 8th Ave to 11th Ave
15th Ave/Park Dr from Kimball St to 11th Ave	Bike Lane	3,500	25	Yes

*Note: Lighting was only calculated for shared use path extensions along Dry Run Creek, estimated at 100-foot spacing.

**Note: Harmon Dr and Indian Village Rd around Mitchell Lake recommended as Bicycle Boulevard due to existing speed limit (25 mph). Consider designating a pedestrian area separated from traffic, and/or reducing speeds to 15 or 20 mph for a shared roadway.

Designate pedestrian area on roadway (bicycles share lane with vehicular traffic)

Pedestrians accommodated via sidewalk or designated pedestrian areas (bicycles share lane with vehicular traffic)

Table 24. Estimated Bicycle and Pedestrian Recommendation Costs

DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
8' Concrete Shared Use Path	LINEAR FEET	85,000	$100	$8,400,000
Bike Lanes	MILES	8.1	$135,000	$1,190,000
Buffered Bike Lanes	MILES	0.8	$185,000	$150,000
Bicycle Boulevard (Includes Traffic Calming, Signing and Striping)	MILES	4.7	$250,000	$1,800,000
Paved Shoulder (Includes Signing and Striping)	MILES	4.9	$115,000	$440,000
Shared Roadway (Includes Signing and Striping)	MILES	5.0	$10,500	$20,000
5' Concrete Sidewalk	LINEAR FEET	5,250	$75	$360,000
Pedestrian Scale Lighting	MILES	1.5	$400,000	$600,000
Total				**$12,960,000**

12.4 Controlled and Uncontrolled Crossings

Locations identified for crossing improvements include key intersections of the existing multimodal network, areas near schools, parks, public amenities, and the downtown area. Additionally, recommended city-wide policies to upgrade pedestrian and bicycle crossings to meet best practices are outlined below. Crossing improvements should be prioritized at pedestrian and bicycle crash locations, high-volume pedestrian locations, parks, schools, city services, and the downtown core.

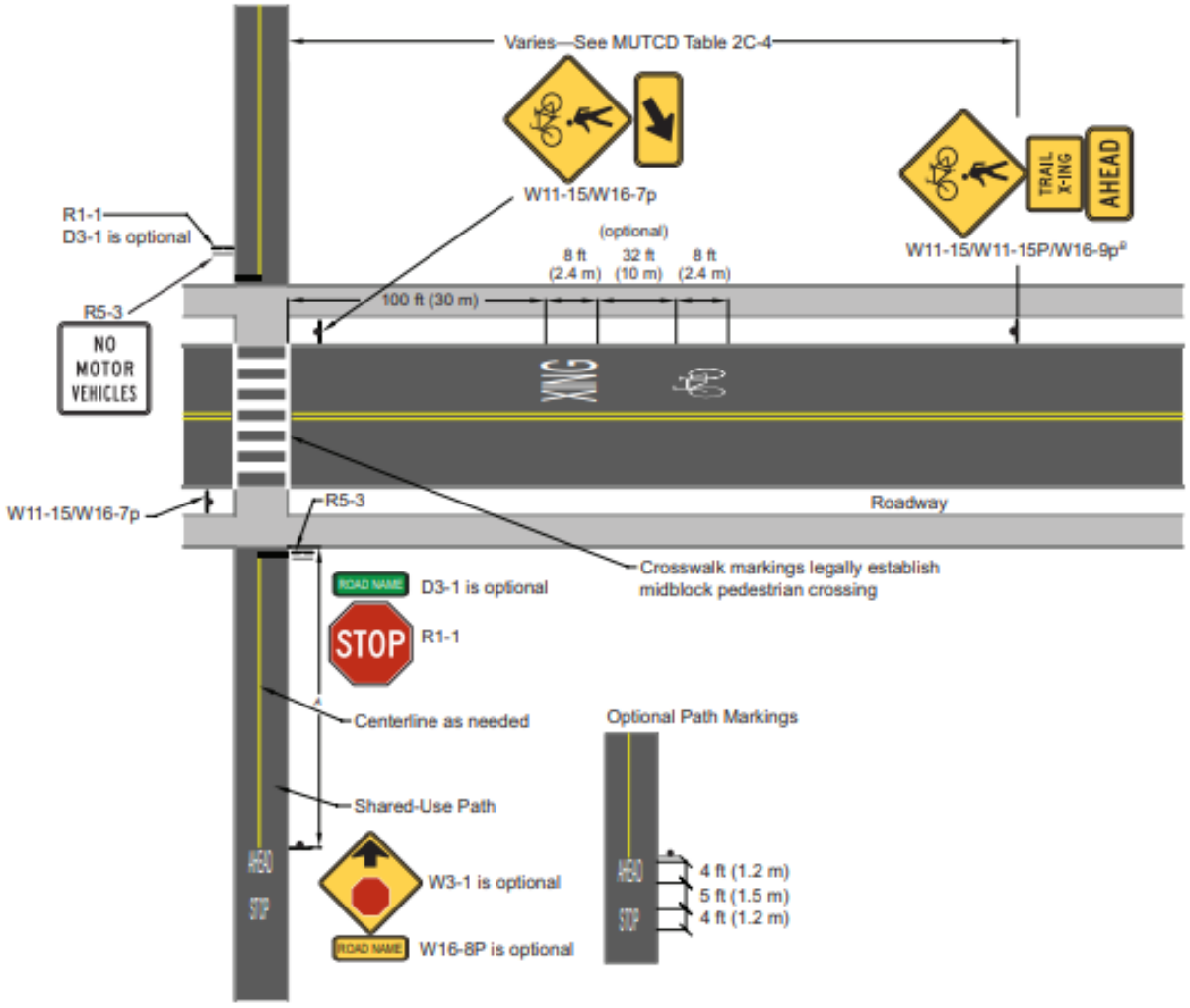
12.4.1 Crossing Treatments

Bicycle and pedestrian crossing standards across the city should include outfitting all pedestrian crossings with continental crosswalks, detectable warning surfaces (truncated domes), all-way stops near schools, parks, and other public amenities, and pedestrian count-down timers at traffic signals with pedestrian crossings. It is recommended to conduct multiway stop sign engineering studies at all proposed multiway stop locations to determine if pedestrian and vehicle volumes support installation of multiway stops signs or if adding pedestrian warning signs would be more appropriate to facilitate pedestrian crossings.

For each potential strategy, descriptions and key considerations are noted to help provide a generalized foundation for implementation feasibility and benefits/drawbacks that were considered when reviewing specific locations within the study area. The list of potential crossing enhancement strategies assumes baseline implementation of curb ramps, pedestrian signals at signalized intersections, lighting, crosswalk pavement markings, and signs per SDDOT standards and MUTCD guidance and only focuses on crossing enhancements beyond those items. **Figure 47** shows an example of this baseline intervention.

Continental Crosswalk, ADA Accessible Curb Ramps, and Detectable Warning Surfaces at Sanborn Boulevard & 1st Avenue Intersection

Pedestrian Countdown Signal



Source: MUTCD

Figure 47. Uncontrolled Crossing with Crosswalks, Pavement Markings and Warning Signs

Table 25 through **Table 29** present a compilation of crossing enhancement strategies from the following sources:

- *Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE)*
- *FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*
- *National Association of City Transportation Officials (NACTO) Urban Street Design Guide*
- *NACTO Designing for All Ages and Abilities*
- *City of Boulder Pedestrian Crossing Treatment Installation Guidelines*
- *Rapid City Area MPO 2020 Bicycle and Pedestrian Plan*
- *Manual on Uniform Traffic Control Devices (MUTCD)*
- *Safe Travel for Every Pedestrian Decision Guide and Best Practices – Uncontrolled Intersections and Mid-Block Crossings*

Table 25: Roadway Strategies

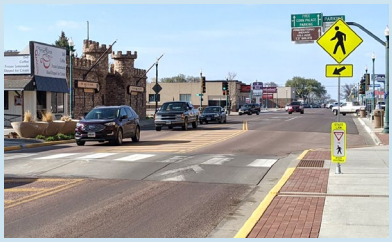
TREATMENT	DESCRIPTION	KEY CONSIDERATIONS
Curb Extension Bulb-out Bump-out 	Extension of sidewalk space into the street, narrowing the effective street width at the pedestrian crossing. Considered at intersection and midblock locations where there is high crossing activity, and no travel lane conflicts. Typical application in locations with on-street parking.	Shortens crossing distance, decreasing pedestrian exposure to vehicular conflicts. Provides opportunity to increase sidewalk space. Improves pedestrian visibility. Lowers vehicle speeds (turning and through traffic). Allows for traffic control and warning devices to be placed closer to travel lane. Provides opportunity to store and treat stormwater runoff. May reduce available area for on-street parking.
Pedestrian Refuge Island Median Islands Crossing Islands  Source: NACTO Urban Street Design Guide	Raised island in the center of a street, separating opposing lanes of traffic. Cutouts for pedestrian access provides a refuge area for pedestrians crossing the street. Used in locations on single-lane or multi-lane streets where there is a defined midblock crossing desire line or at intersections.	Facilitates a two-stage crossing, where pedestrians can focus on each direction of traffic separately. Refuge area provides pedestrians with a better view of oncoming traffic and allows drivers to see pedestrians more easily. Can help split multi-lane roads into manageable crossing segments and supplement other pedestrian facility treatments.
Raised Crosswalks 	Speed tables outfitted with crosswalk markings and signage to facilitate pedestrian crossings. Crosswalk provides pedestrians with a level street crossing. Applied in locations where modal hierarchy is desired to promote better bicycle and pedestrian yielding compliance by drivers.	Channelizes pedestrians to an enhanced crossing location. Slows vehicular travel speeds. Improves pedestrian visibility and accessibility. Consider impacts to snowplows, emergency services, transit, and drainage.

Table 26: Signal and Sign Strategies

TREATMENT	DESCRIPTION	KEY CONSIDERATIONS
Rectangular Rapid Flashing Beacons (RRFB) 	Pedestrian-actuated conspicuity enhancement. Rapid flashing LED lights post-mounted between a pedestrian crossing warning sign and down arrow sign. Beacons may be push-button or passive pedestrian detection activated. Typically applied on two or four-lane streets at midblock or unsignalized intersection approach crossings that meet established evaluation criteria.	RRFB supplements a crosswalk, the crosswalk assigns right-of-way to the pedestrian Increased driver yielding compliance. Solar panels reduce energy costs associated with the device. Wireless capabilities reduce installation cost. Compliance with pedestrians pushing the button can be an issue.
Pedestrian Hybrid Beacon High Intensity Activated Crosswalk (HAWK)  Source: Google Street View	Pedestrian-actuated beacon used to warn and control traffic at an unsignalized, marked crosswalk. When actuated, the beacon displays a yellow indication followed by a solid red. During pedestrian clearance, the driver sees a flashing red 'wig-wag' pattern until the clearance interval has ended and the signal goes dark. Often considered along higher speed multi-lane streets and where criteria are met.	Reduces pedestrian-vehicle conflicts and increases driver compliance to pedestrians in the crosswalk. Reduces vehicle delay when compared to a standard pedestrian traffic signal. Can incorporate with coordinated intersection traffic signals. Warrants for application provided in Manual of Uniform Traffic Control Devices Chapter 4f. Compliance with pedestrians pushing the button can be an issue.
Automated Pedestrian Detection	Detection devices sense when a pedestrian is waiting at a crosswalk and communicates with the traffic signal to actuate a pedestrian WALK phase. Some detection technology can extend a pedestrian clearance time for pedestrians that need additional time to cross.	Detection technology: microwave and infrared. Detection can operate on a delay to minimize false calls. Improves compliance with activating and/or waiting for a WALK indication or flashing beacon.
"State Law – Yield to Pedestrians Within Crosswalk" Signs 	MUTCD sign R1-6. In-street sign to remind road users of laws regarding right-of-way at an unsignalized pedestrian crosswalk.	Effective in identifying crosswalk locations. Increased driver yielding compliance.

Table 27: Traffic Signal Phasing Strategies

TREATMENT	DESCRIPTION	KEY CONSIDERATIONS
Protected Left Turn or Right Turn Phasing; Prohibit Right Turn on Red 	Protected left or right turn phasing (solid turn arrow) to prohibit vehicles to turn into a crosswalk with a pedestrian-actuated WALK indication. Prohibiting right turn on red only allows right turns during a green indication. MUTCD sign R10-11.	Helps reduce conflicts between turning vehicles and pedestrians. NCHRP 812 provides protected-permitted left turn phasing guidance. Right turn on red prohibitions can help reduce conflicts, but challenges include compliance and intersection vehicular operations.
Pedestrian 'Scramble' Phase  Source: Google Earth	Dedicated pedestrian phase that prohibits all vehicles from entering to allow pedestrians to cross directly to any intersection quadrant (diagonally or perpendicular), instead of crossing one intersection leg at a time.	Increases pedestrian visibility. Reduces conflicts between vehicles and pedestrians. Reduces pedestrian crossing time and exposure. Can program controller to only run 'scramble' phase during certain times of day or special occasions.
Leading Pedestrian Interval 	Provides pedestrians a 3-7 second head-start prior to a green indication for vehicles on the parallel street. Typically applied in locations with high pedestrian – turning vehicle conflicts or vulnerable pedestrian populations.	Increases pedestrian visibility for turning vehicles and driver yield compliance to pedestrians in the crosswalk. Helps reduce conflicts between turning vehicles and pedestrians.

Table 28: Grade Separation Strategies

TREATMENT	DESCRIPTION	KEY CONSIDERATIONS
Grade-Separated Crossing (Overpass/Underpass)  Source: North Carolina DOT	Pedestrian and bicycle-only overpass or underpass of a street or topographical barrier. Provides separation of pedestrians and bicyclists from motor vehicle traffic, normally where no other pedestrian facility is available. Typically applied in locations with defined pedestrian or bicycle route that extends across a major barrier.	Uninterrupted flow of pedestrian movement separated from vehicular traffic. Pedestrian compliance (use grade-separation instead of just crossing at-grade) Cost, footprint, and visual impacts

Table 29: Crossing Location Strategies

TREATMENT	DESCRIPTION	KEY CONSIDERATIONS
Midblock Crossing Locations  Source: University of Louisville	Considered at mid-block locations where there is a significant pedestrian desire route. Often combined with other features, such as a median island to provide a two-stage crossing, curb extensions, RRFB system, or pedestrian hybrid beacon system.	Creates safer and more predictable crossing locations in areas not well served by the existing traffic network. Yielding compliance by motorists can be an issue without supplemental features. Multilane and/or high-speed crossings often need to be supplemented with additional features. Visibility between cars and pedestrians is important.

12.4.2 Crossing Distances

As redevelopment and new roads are constructed in Mitchell, mid-block crossings should be considered when intersection spacing is larger than a quarter mile, however crossing spacing is preferred for 1/8 of a mile in high-pedestrian areas such as schools, parks, public services, commercial and downtown areas, among others. **Figure 48** shows a schematic showing crossing distances and types of improvements based on the roadway context.

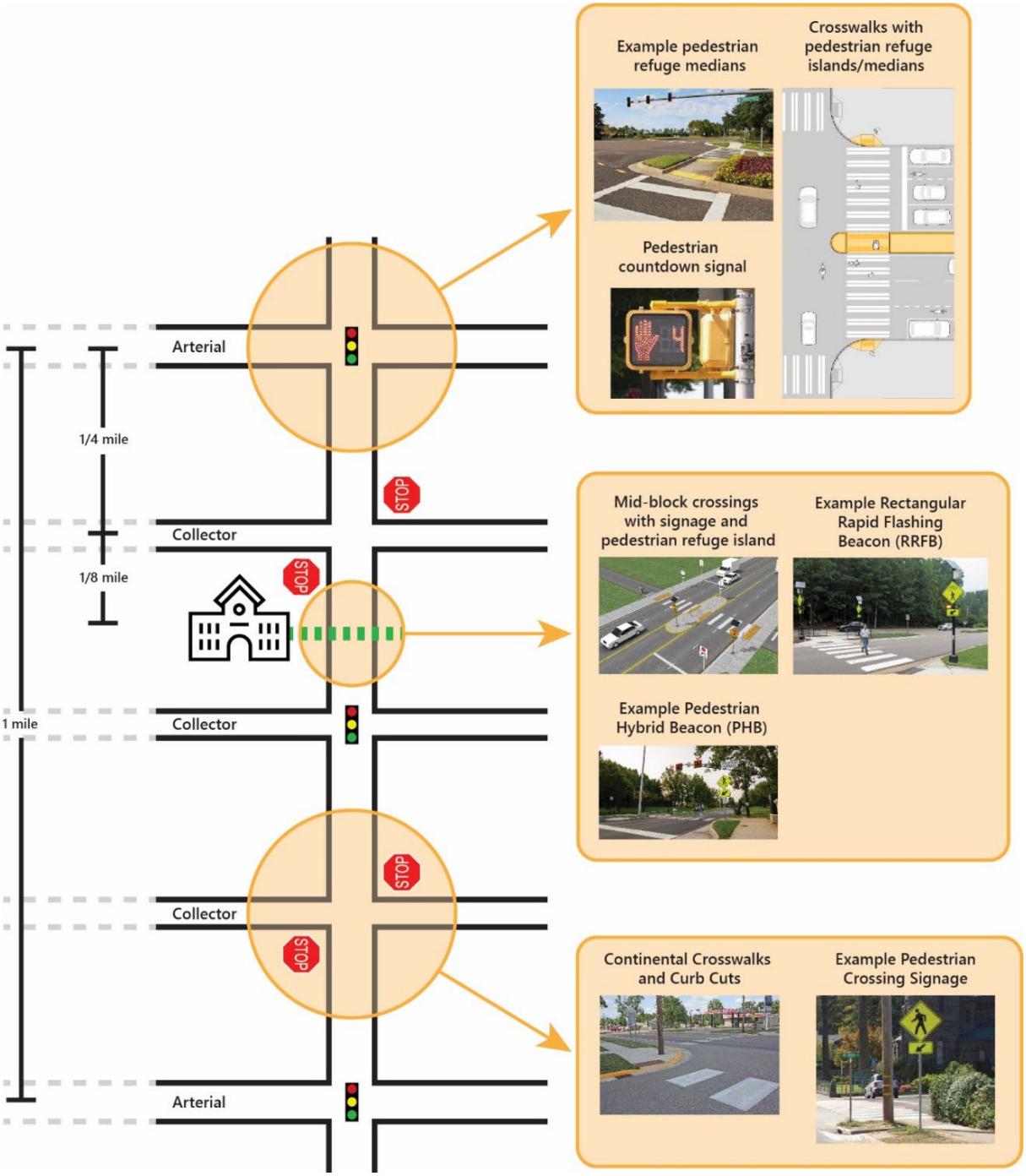


Figure 48. Crossing Distance Scheme and Types of Improvements

12.4.3 Crossing Improvements Screening

Planning-level policies and spot location improvements were determined using the *FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*, shown in **Figure 49**. This guide reflects candidate improvements, or countermeasures, for further consideration given the existing crossing characteristics. Additional study may be required prior to implementation, such as reviewing warrants prior to installing a pedestrian hybrid beacon (HAWK) or all-way stop control or traffic signals at intersections. Specific safety issues that may be addressed by each countermeasure are summarized in **Figure 50**.

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	● 2 4 5 6	● 5 6 7 9	○ 5 6 ● 9	● 4 5 6	● 5 6 7 9	○ 5 6 ● 9	● 4 5 6 7 9	○ 5 6 7 9	○ 5 6 ● 9
3 lanes with raised median (1 lane in each direction)	● 2 3 4 5 7 9	● ○ 5 7 9	○ ○ 5 ● 9	○ 3 4 5 7 9	○ ○ 5 ● 9	○ ○ 5 ● 9	○ ○ 4 5 7 9	○ ○ 5 ● 9	○ ○ 5 ● 9
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	● 2 3 4 5 6 7 9	● ○ 5 6 7 9	○ ○ 5 6 ● 9	○ 3 4 5 6 7 9	○ ○ 5 6 ● 9	○ ○ 5 6 ● 9	○ ○ 4 5 6 7 9	○ ○ 5 6 ● 9	○ ○ 5 6 ● 9
4+ lanes with raised median (2 or more lanes in each direction)	● ○ 5 7 8 9	● ○ 5 7 8 9	○ ○ 5 8 ● 9	○ ○ 5 7 8 9	○ ○ 5 ● 8 9	○ ○ 5 8 ● 9	○ ○ 5 ● 8 9	○ ○ 5 8 ● 9	○ ○ 5 8 ● 9
4+ lanes w/o raised median (2 or more lanes in each direction)	● ○ 5 6 7 8 9	○ ○ 5 6 7 8 9	○ ○ 5 6 8 ● 9	○ ○ 5 6 7 8 9	○ ○ 5 6 ● 8 9	○ ○ 5 6 8 ● 9	○ ○ 5 6 ● 8 9	○ ○ 5 6 8 ● 9	○ ○ 5 6 8 ● 9

Given the set of conditions in a cell,

\# Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.

● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.

○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian refuge island
7 Rectangular Rapid-Flashing Beacon (RRFB)**
8 Road Diet
9 Pedestrian Hybrid Beacon (PHB)**

AADT: Average Annual Daily Traffic

Source: *FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*

Figure 49. Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations

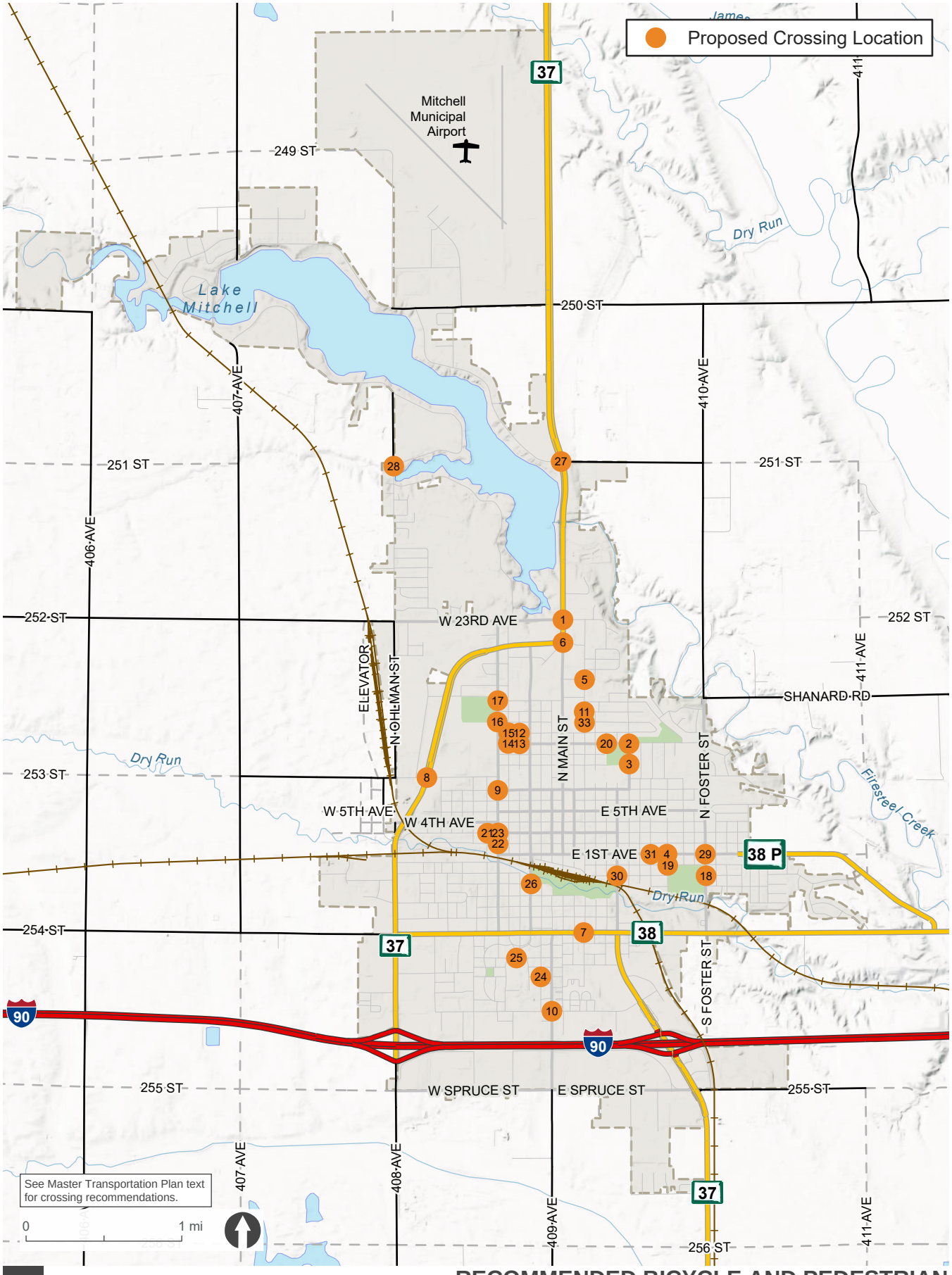
Pedestrian Crash Countermeasure for Uncontrolled Crossings	Safety Issue Addressed				
	Conflicts at crossing locations	Excessive vehicle speed	Inadequate conspicuity/ visibility	Drivers not yielding to pedestrians in crosswalks	Insufficient separation from traffic
Crosswalk visibility enhancement	✓	✓	✓	✓	✓
High-visibility crosswalk markings*	✓		✓	✓	
Parking restriction on crosswalk approach*	✓		✓	✓	
Improved nighttime lighting*	✓		✓		
Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line*	✓		✓	✓	✓
In-Street Pedestrian Crossing sign*	✓	✓	✓	✓	
Curb extension*	✓	✓	✓		✓
Raised crosswalk	✓	✓	✓	✓	
Pedestrian refuge island	✓	✓	✓		✓
Pedestrian Hybrid Beacon	✓	✓	✓	✓	
Road Diet	✓	✓	✓		✓
Rectangular Rapid-Flashing Beacon	✓		✓	✓	✓

Source: *FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*

Figure 50. Safety Issues Addressed by Pedestrian Crash Countermeasures at Uncontrolled Crossings

12.4.4 Crossing Recommendations

Crossing locations were identified by the City of Mitchell, the public, and analysis of key crossing locations along the bicycle and pedestrian network. **Figure 51** shows proposed locations for controlled crossings, **Table 30** describes the proposed improvements at each location, and **Table 31** details the estimated cost information for all proposed improvements.



RECOMMENDED BICYCLE AND PEDESTRIAN CROSSING IMPROVEMENT LOCATIONS

FIGURE 51

Table 30. Key Pedestrian Crossing Improvements

ID	RECOMMENDATIONS	ROAD NAMES	NO. OF LANES	SPEED >25 MPH	DAILY VOLUME >9,000
1	Crosswalks, pavement markings and warning signs and construct ADA ramps	23rd Ave and Main St	4	X	X
2	Crosswalks, pavement markings and warning signs	Capital St and 11th Ave	2		
3	Crosswalk, pavement markings and warning signs and construct ADA ramp at in front of school	Capital St between 11th Ave and 8th Ave	2		
4	Crosswalk, pavement markings, warning signs and detectable warning surfaces; review traffic signal and multi-way stop control warrants*	1st Ave and Gamble St	2		
5	Crosswalks, pavement markings and warning signs and add detectable warning surfaces	Kimball St and Green Dr	2		
6	Crosswalks, pavement markings and warning signs, construct ADA ramp, and add detectable warning surfaces	SD37 and Main St	5	X	X
7	Pedestrian Hybrid Beacon (HAWK)	Havens Ave and Kimball St (vicinity)	5	X	X
8	Crosswalk, pavement markings and warning signs on the east side of SD-37 and add detectable warning surfaces	SD37 and 8th Ave	6	X	
9	Crosswalks, pavement markings and warning signs	7th Ave and Minnesota St	2		
10	Crosswalks, pavement markings and warning signs	Norway Ave and Rowley St	2	X	
11	Crosswalks, pavement markings and warning signs, construct ADA ramp on west side of Kimball St, add detectable warning surfaces	Kimball St and 14th Ave	2		
12	Crosswalk, pavement markings, warning signs and detectable warning surfaces; review multi-way stop control warrants*	12th Ave and Edmunds St	2		
13	Crosswalk, pavement markings, warning signs, ADA ramps and detectable warning surfaces; review multi-way stop control warrants*	11th Ave and Edmunds St	2		
14	Crosswalk, pavement markings, warning signs and detectable warning surfaces; review multi-way stop control warrants*	11th Ave and Wisconsin St	2		
15	Crosswalk, pavement markings, warning signs and detectable warning surfaces; review multi-way stop control warrants*	12th Ave and Wisconsin St	2		
16	Crosswalk, pavement markings and warning signs; review multi-way stop control warrants*	Minnesota St and 13th Ave	3		
17	Crosswalk, pavement markings and warning signs	Minnesota St and 15th Ave	2		
18	Crosswalks, pavement markings and warning signs	Foster St and Ash Ave	2		
19	Crosswalks, pavement markings and warning signs and add detectable warning surfaces	Gamble St and Hanson Ave	2		
20	Crosswalks, pavement markings and warning signs, construct ADA ramp on south side of Davison St, add detectable warning surfaces	11th Ave and Davison St	2		

ID	RECOMMENDATIONS	ROAD NAMES	NO. OF LANES	SPEED >25 MPH	DAILY VOLUME >9,000
21	Crosswalks, pavement markings and warning signs and add detectable warning surfaces	3rd Ave and Montana St	2		
22	Crosswalk, pavement markings and warning signs; review multi-way stop control warrants*	2nd Ave and Minnesota St	2		
23	Crosswalk, pavement markings and warning signs; review multi-way stop control warrants*	3rd Ave and Minnesota St	2		
24	Crosswalks, pavement markings and warning signs	Duff St and Andrews St	2		
25	Crosswalks, pavement markings and warning signs, construct ADA ramp on the east side of University Blvd, add detectable warning surface	McCabe St and Court Merrill St/University Blvd	2		
26	Crosswalk, pavement markings and warning signs	Sanborn Blvd and Birch Ave	4		
27	Crosswalk, pavement markings and warning signs and Pedestrian Hybrid Beacon (HAWK)	Main St and Harmon Dr	4	X	
28	Crosswalk, pavement markings and warning signs and add detectable warning surface	Harmon Dr and Ohlman St	2	X	
29	Crosswalk, pavement markings and warning signs	1st Ave and Foster St	2		
30	Pedestrian Hybrid Beacon (HAWK)	Burr St and Ash Ave	4	X	X
31	Crosswalk, pavement markings and warning signs; review multi-way stop control warrants*	1st Ave and Mentzer St	2		
32	Crosswalk, pavement markings, warning signs and detectable warning surfaces; review multi-way stop control warrants*	13th Ave and Kimball St	2		
33	Crosswalk, pavement markings and warning signs; review multi-way stop control warrants*	Norway Ave and Wisconsin St	2		

* Note: Multi-way (all-way) stop-control is recommended for further consideration at prioritized crossing locations for pedestrians at schools, parks, public amenities, downtown core, and connections to other routes. A multi-way stop engineering study is recommended at each potential location during the planning and design phase of a project to determine if pedestrian and vehicle volumes support installation of multi-way stops signs or if adding pedestrian warning signs would be more appropriate to facilitate pedestrian crossings.

Table 31. Proposed Crossing Improvement Estimated Costs

DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
Crosswalks, Pavement Markings and Warning Signs	EACH	86	$3,000	$258,000
Construct ADA Ramp	EACH	11	$10,000	$110,000
Add Detectable Warning Surface (Truncated Domes)	EACH	49	$500	$24,500
Pedestrian Hybrid Beacon (HAWK)	EACH	3	$300,000	$900,000
			Total	**$1,292,500**

12.5 Other Features

12.5.1 Pedestrian and Trail Lighting

Lighting along trails and shared use paths are recommended to be placed every 100 feet. Cost estimates were only calculated for Dry Run Creek paths to match the lighting to be constructed along the current path, which was awarded a grant from the South Dakota Land and Water Conservation Fund in 2020. The 1.5 miles of new shared use path along Dry Run Creek (Dry Run Creek from Ohlman St to Minnesota St and Dry Run Creek from Burr St to Foster St) is estimated to cost $600,000. A city-wide evaluation of pedestrian and trail lighting needs should be completed to identify gaps and to prioritize funding locations.

12.5.2 Trail and Facility Amenities

Other trail and facility amenities such as parking lots, signage and wayfinding, stations (such as water fountains, bicycle maintenance, etc.) should be reviewed on a case-by-case basis as demand and community desire is voiced. For a comprehensive overview of the needed amenities, a city-wide study should be completed.

12.5.3 Downtown

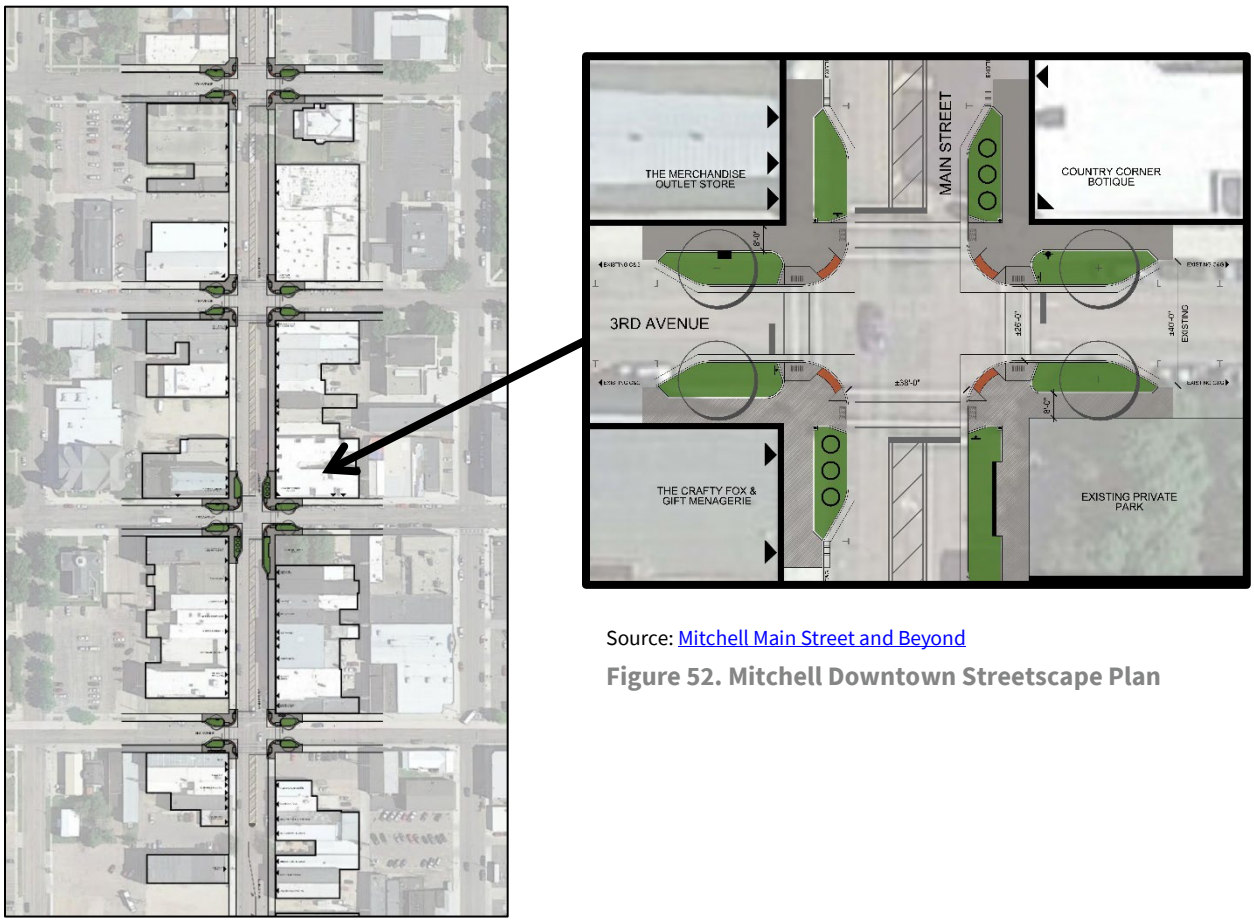
12.5.3.1 DOWNTOWN STREETSCAPE PLAN

The Mitchell Main Street and Beyond organization is currently leading a revitalization of the Business Improvement District (BID). This project includes updating the five-year-old streetscape plan and aims to generate additional funds and improve quality of life within the historic district. These improvements include pedestrian and streetscape elements, such as new planters and curb extensions along Main Street. The BID projects to raise about $45,000 per year, with a portion of the funds to be put towards a grant improvement program for BID occupants. **Figure 52** shows the BID streetscape plan.

City policy for the downtown district should prioritize people walking, biking, and rolling. This includes reviewing the following elements in conjunction with each project:

- Bulb-outs to shorten pedestrian crossing distances at intersections and mid-block crossings
- All-way (multiway) stop control where traffic signals are not warranted
- Pedestrian countdown timers at all traffic signals
- Mid-block crossings, where warranted
- High-visibility continental crosswalks at all crossing locations
- Bicycle parking
- Urban realm amenities such as benches, planters, water fountains, and trash cans where right-of-way is available

Parklets are another way to add space back to pedestrians, while only taking on-street parking from a couple spots. Parklets can be used as patio seating, bicycle parking, among other creative ideas to serve the community.



Source: Mitchell Main Street and Beyond

Figure 52. Mitchell Downtown Streetscape Plan

12.5.3.2 DOWNTOWN BICYCLE FACILITIES

The current City policy for bicycles through downtown Mitchell is to dismount and walk bicycles on the sidewalks. With the recent Downtown Streetscape Plan described above, Main Street is more conducive for bicycle travel, particularly with all way stops, bulb-outs, and removal of the center left turn lane.

The short-term recommendation is to designate existing Main Street lanes as a shared roadway for bicycles and vehicles between 1st Avenue and 7th Avenue. Modifications would include signing and striping to indicate that bicycles are allowed in the travel way.

A long-range recommendation is to install bike lanes on Main Street by using existing pavement currently allocated to the center striped median and turn lanes. Bike lanes are the preferred option due to speed and vehicle volumes on Main Street, but changes to those conditions could prolong the shared roadway operation. Bicyclists using Main Street can connect to east-west facilities on 1st Avenue and 7th Avenue and continue north-south past the downtown core using other adjacent parallel facilities.

13 Transit Plan

The Transit Plan identifies recommendations to improve Palace Transit service offerings and further enhance the customer experience based on stakeholder and public feedback received through the study's engagement opportunities.

13.1 Strengths and Challenges

Several strengths and challenges were identified throughout the public engagement process and are summarized as follows:

- Strengths
  - Customer service
  - High-quality transit service
  - Coordination with other local transit agencies
  - Coordination with area emergency response and traffic services
- Challenges
  - Current software functionality limitations
  - No fixed route service

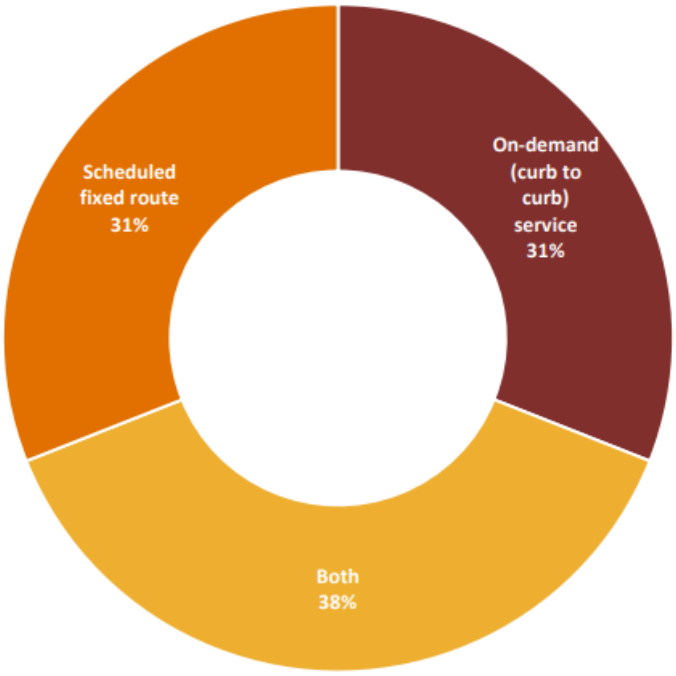


Figure 53. Results of Travel Survey Question Regarding Transit Service Preferences

The MTP travel survey included a question about transit service preferences, shown in **Figure 53**. It was found that nearly 70 percent were in favor of a potential fixed route service.

13.2 Service Concepts

A common way of thinking about transit is the difference between "ridership" and "coverage." In one scenario, an agency is focused on increasing ridership, so transit service is focused on routes that connect the most people to the most places. Densely packed corridors in which multistory buildings and walkable development are prominent create an environment favorable to transit.

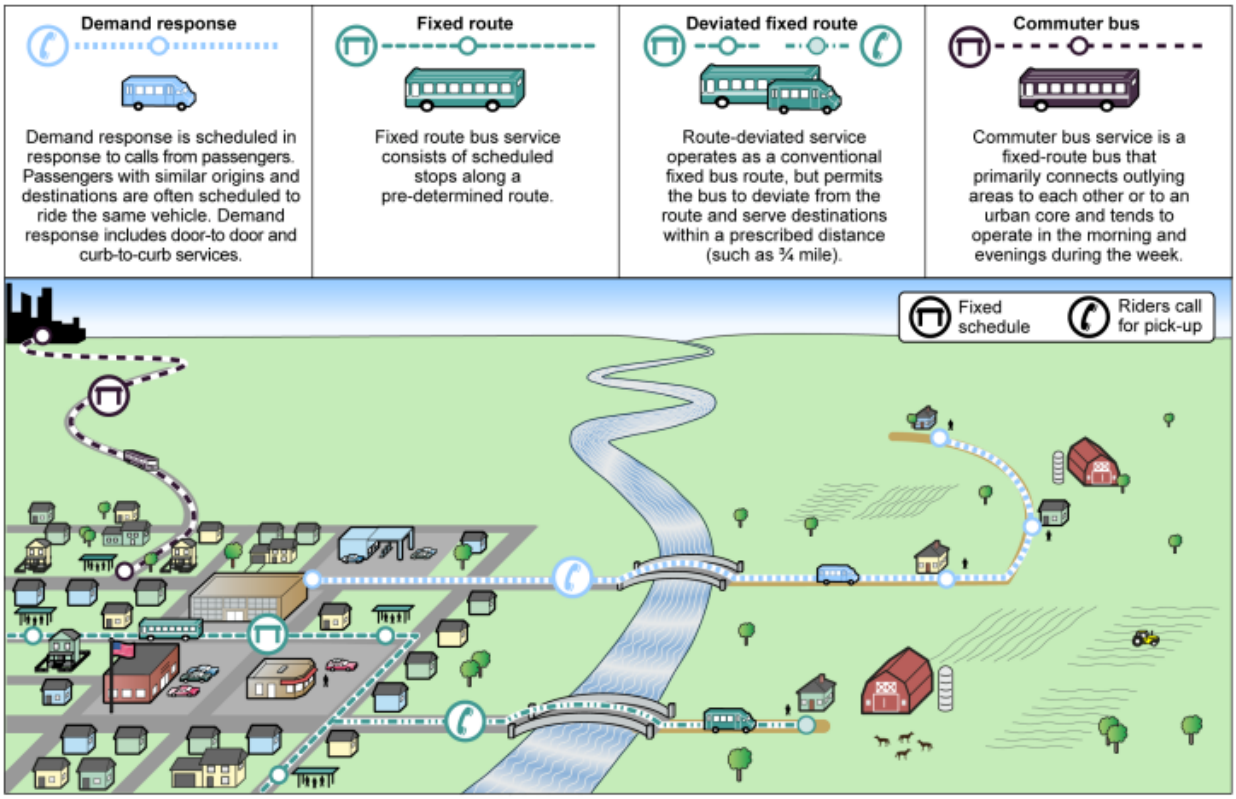
Key considerations in transit planning

- Population and employment density
- Transit dependency indicators
  - Poverty
  - Access to personal automobiles
  - Senior populations
  - Youth populations

In another scenario, a focus on coverage emphasizes providing some transit to the most locations. Not as many people are likely to use transit in this scenario, but it will be there for those who need it most. Access to transit is emphasized over speed or directness. This scenario is more costly since transit vehicles meander to hard-to-serve locations to

pick up and drop off a minimal number of riders. Those who are unable to drive or do not have access to a car are the focus.

Various potential transit service offerings are shown in **Figure 54**. Palace Transit currently offers demand-response service, but public feedback has expressed interest in fixed route or deviated fixed route service. Jefferson Lines currently provides intercity transit services to the Mitchell area.



Source: U.S. Government Accountability Office, GAO-14-589

Figure 54. Types of Transit Service Offerings

13.3 Recommendations

The Transit Plan recommendations focus on five key initiatives to improve Palace Transit service offerings and further enhance the customer experience:

1. Improve how transit operates
2. Assess street infrastructure to support transit
3. Improve customer information
4. Engage with technology
5. Continue to partner to support access opportunity

These five initiatives are supported through the following recommendations.

13.3.1 Service Recommendations

- Explore feasibility of Sunday service
- Identify locations for bus stops that are well-lit and easily access by existing pedestrian infrastructure

- Evaluate new technology to improve communications, transit routing, scheduling, and notice of special events or changes of service

13.3.2 Transit Development Plan

Transit Development Plan

Cost: $75,000 – $150,000

Study Duration: 12 months

A transit development plan is recommended to help Palace Transit create an implementable and fundable plan for the future of public transit in the Mitchell area. These studies are beneficial to agencies assessing feasibility, benefits, and drawbacks of expanded service, fixed routes, mobility on demand, or a combination of services. The study would assess current service and develop potential options based on current and anticipated future use. Study steps typically include:

1. Data collection
2. Baseline conditions
3. Goals and objectives
4. Scenario development and analysis
5. Recommendations, implementation plan, and financial plan

A peer system comparison is recommended as part of Step 2, Baseline Conditions. This provides a comparison to transit systems in similar size communities and brings valuable information on best practices and lessons learned pertinent to Palace Transit. The Baseline Conditions also typically includes a robust public involvement component through public surveys and focus groups to help guide the study.

Recommended scenarios for the transit development plan include:

- Baseline / no changes
- Mobility on demand
- Expand existing service
- Fixed route bus service
- Combination of services

13.3.3 Fixed Route Feasibility Study

Fixed Route Feasibility Study

Cost: varies based on duration, route/trip frequency, initial capital costs, and operating costs

Study Duration: 3 – 6 months

A 3 to 6-month pilot project to test the feasibility of a fixed route transit concept in the Mitchell market is another option for further consideration. A pilot project would provide Palace Transit the opportunity to adjust the route, stop locations, payment methods, and other logistics based on feedback from operators, passengers, and other members of the community.

The following steps are recommended to launch the pilot project:

1. Identify pilot route, stop locations, and operations
2. Define success
3. Advertise to the community

4. Launch and operate the pilot
5. Complete community engagement
6. Assess results and determine next steps

Upon completion of a pilot project, the agency should evaluate any lessons learned and determine a path forward. If the project is successful and it is confirmed that there is sufficient ridership demand to support a fixed route, a long-term fixed route implementation plan can be developed.

13.3.4 Scheduling Software Working Group

It is recommended that Palace Transit should convene a working group across partner agencies within South Dakota to evaluate and consider procuring new technology. In addition, the working group can reach out to peer agencies with successful software implementation to gather information. SDDOT will be able to maximize the efforts of this working group by potentially using the findings to implement new software at multiple transit agencies that would benefit from upgraded technology. This working group approach has been successful in other parts of the country as it combines the efforts of multiple small entities to find a solution to a common problem.

Palace Transit Bus at the Burr Street & 1st Avenue Intersection

14 Special Scenarios

Three special scenarios were identified by the Study Advisory Team for additional analysis:

- Foster Street extension
  - Across I-90, from SD38 (Havens Avenue) to Spruce Street
- Mattie Street connection
  - Charles Avenue to SD38 (Havens Avenue)
- Hospital relocation
  - East of Rowley Street, between Cabela Drive and Spruce Street

In each of the scenarios, anticipated development and changes in traffic patterns were accounted for in the forecasted traffic volumes. The following includes a summary of findings for each scenario.

14.1 Foster Street Extension Scenario

14.1.1 Description

- Extend Foster Street southward from SD38 (Havens Avenue) to Spruce Street
  - Includes a crossing of I-90, but no new access (interchange) with I-90
- North connection: existing SD38 & Foster Street intersection
- South connection: to be determined, likely east of Mitchell Technical College

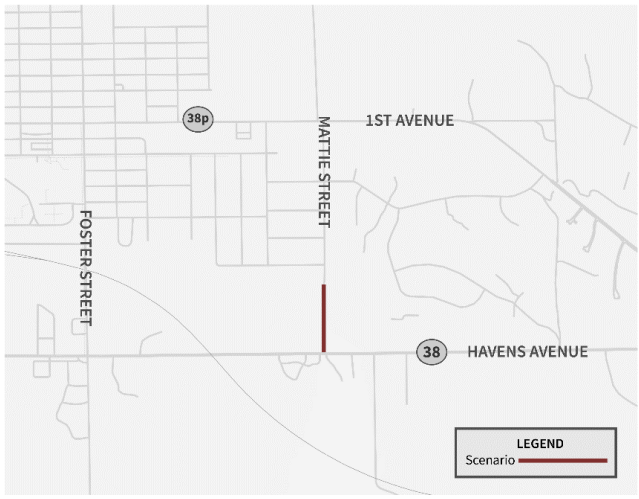
14.1.2 Findings

- Provides a new connection to Spruce Street and areas south of I-90, east of railroad tracks
  - Improves reliability to this area by creating a redundant connection that does not require traveling through an at-grade railroad crossing
- Future corridor traffic demand likely centers on volumes associated with Mitchell Technical College, Dakotafest, and future development east of the railroad tracks
  - Estimated 2045 daily segment volume: 3,000 – 5,000 vehicles
- No capacity needs to modify the existing SD37 & Spruce Street intersection were identified through the traffic operations analysis
- Spruce Street railroad crossing reliability (potential for train blocking the crossing) will have a dampening effect on traffic demand for this connection between eastern Mitchell (north of I-90) and the Spruce Street corridor west of SD37

14.2 Mattie Street Connection Scenario

14.2.1 Description

- Extend Mattie Street southward from Charles Avenue to SD38 (Havens Avenue)



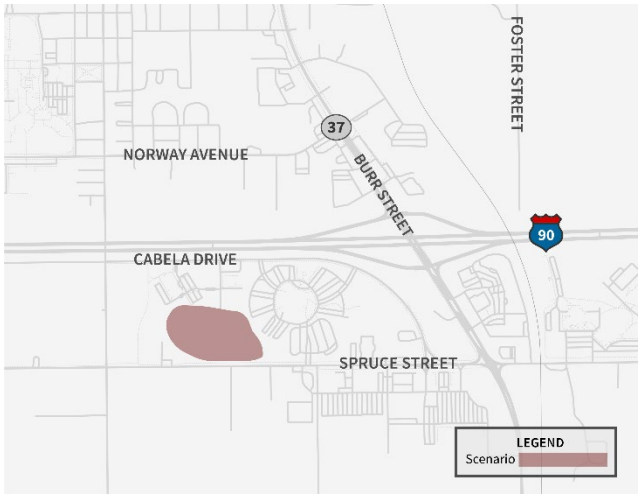
14.2.2 Findings

- Minor shifts in area traffic patterns are anticipated due to traffic using this connection
  - Estimated 2045 daily segment volumes: 1,500 vehicles
- No capacity needs were identified to modify existing intersection configurations or traffic control
- SD38 (Havens Avenue) & Mattie Street intersection anticipated to open as a two-way stop-control intersection with a stop sign on just the Mattie Street approach

14.3 Hospital Relocation Scenario

14.3.1 Description

- Existing hospital is relocated from Foster Street & 7th Avenue intersection area to the area east of Rowley Street, between Cabela Drive and Spruce Street



14.3.2 Findings

- Area roadways generally have ample capacity to absorb traffic increases from the new hospital
  - Burr Street has greatest available capacity as a multilane roadway, followed by Ohlman Street
  - Rowley Street, which is the closest north/south road to the potential hospital with an I-90 crossing, exhibits long-range capacity needs
- Future projects presented in the **Implementation Plan** accommodate the forecasted traffic volumes with no additional modifications
- Daily trips generated by a new hospital were estimated at up to 2,200 vehicles depending on provided services

15 Funding Analysis

The Funding Analysis chapter provides a summary of funding trends and options for the City of Mitchell, with the goal of identifying typical transportation revenues and expenditures going forward. The future funding scenario developed in this chapter serves as the basis for timing of recommended improvements as part of the MTP.

The funding analysis reviewed current and previous CIPs and budgets for the city, which included state and federal funding. A series of funding projections were then developed through the year 2045. The resulting projects of annual transportation revenues and expenditures were grouped into the following time bands:

- **Short-term:** 2024 – 2029 (<2030)
- **Mid-term:** 2030 - 2039
- **Long-term:** 2040 – 2045 (2040+)

Recommended improvements identified in the **Implementation Plan** will be scheduled according to the short-term, mid-term, and long-range time bands based on a series of factors, namely the improvement's priority in addressing local needs, estimated cost, and ability to plan, design, and construct the project within the respective time band.

15.1 Funding Sources

Funds spent on the City of Mitchell transportation system are from a variety of local, state, and federal sources, with local funds being the main source.

15.1.1 Local Funding Sources

The City of Mitchell 2nd Penny Sales Tax provides most of the funding spent on the transportation system while additional sources supplement that funding.

- **2nd Penny Sales Tax:** general fund revenue from City of Mitchell sales tax
- **County Wheel Tax:** revenues from Davison County's wheel tax fund
- **Prorate License Fees:** revenue from Davison County commercial vehicle license fees
- **Motor Vehicle License Fees:** revenue from Davison County motor vehicle license fees

15.1.2 State Funding Sources

State funding for highway and bridge projects is available through several sources, including:

- **Local Government Highway and Bridge Fund:** revenue from the State's Local Government Highway and Bridge Fund
- **State Grants:** revenue from State grants and reimbursements
- **Surface Transportation Program (STP) Funds:** SDDOT allocates funds to Class I cities, defined as those with a population greater than 5,000, through a formula-based approach that accounts for population, number of state and federal route lane miles, land mass, and fringe development

15.1.3 Federal Funding Sources

Federal transportation funding dollars are allocated to the SDDOT, and include:

- **Surface Transportation Block Grant Program (STBG):** funding for state or local use for projects on any federal-aid highway or bridge project on any public road, pedestrian and bicycle infrastructure, and transit capital projects
- **National Highway Performance Program (NHPP):** funding to support the condition and performance of the National Highway System (NHS), to construct new facilities on the NHS, and to ensure investment of federal-aid funds in highway construction are directed to support progress towards achievement of performance targets established in a state's asset management plan for the NHS. NHS corridors in the study area are I-90 and SD37.
- **Highway Safety Improvement Program (HSIP):** funding for projects aimed at achieving a significant reduction in traffic fatalities and serious injuries on all public roadways, including non-state-owned public roads
- **Transportation Alternative Projects (TAP):** funding for smaller-scale alternative transportation projects including pedestrian and bicycle facilities, recreational trails, safe routes to school projects, historic preservation and vegetation management, and environmental mitigation related to stormwater and habitat connectivity
- **Federal Transit Administration (FTA) Funds:** STP funding available for public transportation administrative and operating cost assistance through the Federal Transit Administration (Section 5311 Program).
- **U.S. Department of Health and Human Services Funds:** Older Americans Act (OAA) Title III B Supportive Services program for public transportation administrative and operating cost assistance to make transportation affordable and accessible
- **Federal Discretionary Grants:** grants administered by the U.S. Department of Transportation are available through a competitive process for a variety of transportation project types, subject to eligibility of the respective grant program

15.2 Historic Transportation Funding

Transportation-related revenues and expenditures for the years 2017 through 2021 were reviewed to establish baseline funding trends used to forecast future funding levels.

15.2.1 Historical Transportation Revenues

Historical transportation program revenues were primarily from the 2nd Penny Sales Tax, as shown in **Table 32**. State funding sources through STP and Local Government Highway and Bridge Fund provide approximately $1million to the Mitchell transportation program.

15.2.2 Historical Transportation Expenditures

Historical transportation program expenditures between 2017 and 2021 are summarized in **Table 33**. Typically, employee compensation and street and sidewalk capital improvements were the two largest expenditure types, followed by pavement management, operations, and maintenance.

Table 32. Transportation Program Revenues for City of Mitchell (2017 – 2021)

REVENUE SOURCE	2017 (YOR $)	2018 (YOR $)	2019 (YOR $)	2020 (YOR $)	2021 (YOR $)
2nd Penny Sales Tax*	*$5,473,000*	*$5,725,000*	*$5,645,000*	*$5,616,000*	*$6,188,000*
2nd Penny Sales Tax – Transportation Projects**	$3,532,000	$4,353,000	$4,783,000	$3,562,000	$3,130,000
Surface Transportation Funds	$678,000	$548,000	$517,000	$585,000	$634,000
Local Government Highway and Bridge Fund	$381,000	$405,000	$409,000	$422,000	$434,000
County Wheel Tax	$1	$1	$1	$1	$1
Prorate License Fees	$14,000	$15,000	$15,000	$15,000	$16,000
Motor Vehicle License Fees	$122,000	$121,000	$123,000	$125,000	$129,000
Grants / Other	-		$70,000	$654,000	$85,000

Year of Revenue

* Total 2nd Penny Sales Tax revenue. The portion of this revenue applied to transportation projects is determined through the annual budgetary process.

** Estimated based on: 'Total Transportation Program Expenditures' – all other revenue categories

Table 33. Transportation Program Expenditures for City of Mitchell (2017 – 2021)

EXPENDITURE SOURCE	2017 (YOE $)	2018 (YOE $)	2019 (YOE $)	2020 (YOE $)	2021 (YOE $)
Street and Sidewalk Capital Improvements	$1,632,000	$2,239,000	$2,093,000	$1,241,000	$636,000
Pavement Management	$265,000	$433,000	$281,000	$686,000	$484,000
Staff Resources	$1,915,000	$1,943,000	$2,138,000	$2,282,000	$2,062,000
Operations and Maintenance	$626,000	$340,000	$950,000	$540,000	$852,000
Equipment	$19,000	$224,000	$204,000	$359,000	$91,000
Street Lighting	$270,000	$263,000	$251,000	$255,000	$303,000
Total Transportation Program Expenditures	**$4,727,000**	**$5,443,000**	**$5,917,000**	**$5,363,000**	**$4,429,000**

Year of Expenditure

15.2.3 Historical Transportation Dollar Allocations

Transportation investments can be categorized based on project type. For the purposes of the MTP, transportation improvements are grouped according to how they impact the transportation system. The two categories considered in this MTP include:

- **System Expansion:** expands the transportation system through the construction of a new facility or expands an existing facility through an improvement like widening or new turn lanes (Street and Sidewalk Capital Improvements expenditures)
- **System Preservation:** preserves the transportation system through maintenance efforts that repair or rehabilitate existing infrastructure (Pavement Management and Operations and Maintenance expenditures)

Table 34 shows how Mitchell has spent past transportation dollars on system expansion and preservation projects from 2017 through 2021. Over the five-year timeframe, approximately 51 percent of the transportation program is spent directly on System Expansion and System Preservation

projects. Years 2017 through 2019 all exceeded 50 percent of the program funding, while 2020 and 2021 have dipped below 50 percent.

The System Expansion / System Preservation split is approximately 59 / 41 percent over the five years. However, it should be noted that city staff performs most of the system preservation activities, at a cost-savings benefit to the city, and staff resources are not included in these numbers.

Table 34. Historic City of Mitchell Spending on Capital Improvements and Operations and Maintenance (2017 – 2021)

EXPENDITURE SOURCE	2017 (YOE $)	2018 (YOE $)	2019 (YOE $)	2020 (YOE $)	2021 (YOE $)	TOTAL
System Expansion (Street and Sidewalk Capital Improvements)	$1,632,000	$2,239,000	$2,093,000	$1,241,000	$636,000	**$7,841,000**
System Preservation (Pavement Management, Operations and Maintenance)	$891,000	$773,000	$1,231,000	$1,226,000	$1,336,000	**$5,457,000**
Total	**$2,523,000**	**$3,012,000**	**$3,324,000**	**$2,467,000**	**$1,972,000**	**$13,298,000**
Percentage of Transportation Program	*53%*	*55%*	*56%*	*46%*	*44%*	*51%*

Year of Expenditure

Future-year System Expansion and System Preservation project funding will be estimated at 55 percent of the total transportation program budget, with the expansion / preservation split more balanced compared to past trends.

15.3 Future Transportation Funding

A future funding scenario was developed to estimate transportation funding available to the City of Mitchell through the year 2045. This scenario will be used as a cost constraint to project prioritization in the **Implementation Plan**. Planning-level funding levels are presented in terms of the time bands described earlier in the chapter. **Table 35** shows the sum of forecasted revenues by time band. Assumptions for the future funding scenario include:

- A 3.5% annual growth factor was applied for local revenues, reflective of estimated tax base growth
    - The 2nd Penny Sales Tax portion allocated to transportation projects was averaged over the last five years to establish a baseline
- STP, Local Government Highway and Bridge fund, and license fees were grown at 1.5% annually
- Grant funding was averaged over the last five years to establish a baseline and then grown by 1.5% annually
    - Assumption accounts for continued application and periodic award of grants

Applying the future-year revenue allocations described in the Historical Funding Trends section yields funding levels shown in **Table 36**.

It should be noted that project costs have recently increased at rates higher that the estimated funding growth. If this trend continues and transportation funding does not match increases in project costs, the buying power of each year's program will decrease compared to the previous year.

Table 35. Transportation Program Forecasted Revenues by Time Band

REVENUE SOURCE	ANNUAL % INCREASE	SHORT-TERM 2024-2029 (YOR $)	MID-TERM 2030-2039 (YOR $)	LONG-RANGE 2040-2045 (YOR $)
2nd Penny Sales Tax*	*3.5%*	*$45,000,000*	*$100,000,000*	*$78,000,000*
2nd Penny Sales Tax – Transportation Projects	3.5%	$28,000,000	$62,000,000	$49,000,000
Surface Transportation Funds	1.5%	$4,100,000	$7,800,000	$5,200,000
Local Government Highway and Bridge Fund	1.5%	$2,900,000	$5,300,000	$3,600,000
Prorate License Fees	1.5%	$100,000	$200,000	$200,000
Motor Vehicle License Fees	1.5%	$900,000	$1,500,000	$1,000,000
Grants / Other	1.5%	$1,800,000	$3,300,000	$2,300,000
Total		**$37,800,000**	**$80,100,000**	**$61,300,000**

Year of Revenue

* Total 2nd Penny Sales Tax revenue. The portion of this revenue applied to transportation projects is determined through the annual budgetary process.

Table 36. Forecasted Funding Allocations by Time Band

EXPENDITURE SOURCE	SHORT-TERM 2024-2029 (YOE $)	MID-TERM 2030-2039 (YOE $)	LONG-RANGE 2040-2045 (YOE $)	TOTAL (YOE $)
System Expansion (Street and Sidewalk Capital Improvements)	$12,500,000	$26,500,000	$21,000,000	**$60,000,000**
System Preservation (Pavement Management, Operations and Maintenance)	$8,500,000	$17,500,000	$14,000,000	**$40,000,000**
Total	**$21,000,000**	**$44,000,000**	**$35,000,000**	**$100,000,000**
Percentage of Transportation Program	*56%*	*55%*	*57%*	*56%*

Year of Expenditure

15.4 Additional Funding Sources

It is recommended the City of Mitchell investigate additional funding sources to supplement local and state funding. Examples of potential sources are listed in the following.

15.4.1 Grants Administered through U.S. Department of Transportation

There are several discretionary programs administered by the U.S. Department of Transportation (USDOT) modified or created through the Infrastructure Investment and Jobs Act (IIJA). Four discretionary grant programs recommended for City of Mitchell type projects include:

- Rebuilding American Infrastructure with Sustainability and Equity (RAISE), Local and Regional Project Assistance
    - Eligible projects: bridges, public transit, highways and roads, surface transportation at airports, and culvert replacement and habitat improvements
    - $1 M minimum grant
    - Rural applications would be for 100% of the estimated cost
    - Requires a benefit/cost analysis

- Bridge Investment Program
  - Eligible projects: bridges
  - Requires a benefit/cost analysis
- Rural Surface Transportation Program
  - Eligible projects: bridges, highways and roads, highway freight, and highway safety
  - Requires a benefit/cost analysis
- Reconnecting Communities Pilot Program
  - Focus on improving mobility, access, economic development and connectivity where a barrier was created by the construction of a highway, rail, or other facility
  - Planning and capital grants available
- Safe Streets and Roads for All Program (SS4A)
  - Eligible projects: highway safety (planning and/or project implementation)
  - Focused on preventing fatalities and serious injuries
  - Need to develop a local safety plan
  - Benefit/cost analysis is not required

A full list of grant programs authorized under the USDOT, such as the National Significant Freight and Highway Projects Program (INFRA), is available here: Bipartisan Infrastructure Law Grant Programs | US Department of Transportation.

FHWA also provides a summary of pedestrian and bicycle funding opportunities through U.S. Department of Transportation surface transportation funding programs here: Pedestrian and Bicycle Funding Opportunities: U.S. Department of Transportation Transit, Safety, and Highway Funds (dot.gov).

15.4.2 Grants Administered through SDDOT

- Bridge Improvement Grant (BIG) Fund
- Transportation Alternatives
- Highway Safety Improvement Projects (HSIP)
- State Planning and Research Program
- Transportation Economic Development Grants

15.4.3 State of South Dakota Loan Programs

- **State Infrastructure Bank (SIB) Loans:** 0% interest loans of federal funds for federal-aid route projects
- **State Highway Fund Loans (SHFL):** industrial or agricultural business-related projects on non-federal-aid routes for counties and Class I cities

15.4.4 Community and Organizational Grants

It is recommended the City of Mitchell pursue community and organizational grants that fit with desire goals and projects. It is recommended that the city partner with local organizations and advocacy groups, such Palace City Pedalers, for mode-specific grants.

16 Implementation Plan

The Implementation Plan reflects feasible project recommendations for the Mitchell area transportation network over the next 20+ years. Recommendations were developed through a collaborative process to address long-range transportation needs, consisting of direction provided through study goals and objectives, Study Advisory Team guidance, and public and stakeholder input.

Implementation Plan recommendations are framed around time bands described in the Funding Analysis chapter of the MTP:

- **Short-term:** <2030
- **Mid-term:** 2030 - 2039
- **Long-term:** 2040+

Supplementing the recommended implementation timing schedule are planning-level estimated costs, shown for both 2023 (2023 $) and year of expenditure (YOE) dollars. Project construction costs are assumed to grow at 3 percent, compounded annually. Costs are shown in a middle year of each time band (e.g., 2030-2039 costs are escalated to year 2035). Unit costs used to estimate planning-level project costs for recommended roadway and bicycle and pedestrian network improvements are shown in **Table 37.**

Table 37. Project Unit Cost Assumptions

	IMPROVEMENT TYPE	COST (2023 $)	UNIT
Roadway	New 2-lane rural paved roadway (with shoulders)	$3,500,000	per mile
	2-lane urban roadway (new / full reconstruction)	$3,500,000	per mile
	3-lane urban roadway (new / full reconstruction)	$5,000,000	per mile
	5-lane urban roadway (new / full reconstruction)	$7,500,000	per mile
	Add turn lane at urban intersection	$400,000	per turn lane
	Add turn lane at rural intersection	$250,000	per turn lane
	Intersection reconstruction	$1,500,000	per intersection
	New traffic signal	$400,000	per signal
	Traffic signal upgrades	$75,000	per signal
	New bridge over Interstate (tie-in to tie-in)	$12,000,000	per crossing
	Raised median retrofit	$100,000	per 100 linear feet
Bicycle and Pedestrian	Shared use path	$100	per linear foot
	Bicycle lanes	$135,000	per mile
	Buffered bicycle lanes	$185,000	per mile
	Bicycle boulevard	$250,000	per mile
	Paved shoulder	$115,000	per mile
	Shared roadway	$10,500	per mile
	Sidewalk	$75	per linear foot
	Pedestrian scale lighting	$400,000	per mile

16.1 Recommended Projects

16.1.1 Intersection and Corridor Projects

- Map: **Figure 55**
- Intersection projects: **Table 38**
- Corridor projects: **Table 39**

Project summary sheets for most intersection and corridor projects are provided in **Appendix H**. These summary sheets include a description and long-range vision of the respective corridor(s), summary of needs to be addressed by future projects, major intersection improvement information, and additional discussion of recommendations and timeline of improvements. Intersection projects that are a part of a corridor summary sheet are noted in the 'Corridor Project Cross-Reference' column.

Corridor projects assume construction of sidewalk, but do not include shared use path identified in the Bicycle and Pedestrian Corridor projects. For new or reconstructed corridors with a new shared use path, the total project cost could be estimated by adding the corridor project cost with the shared use path cost.

16.1.2 Bicycle and Pedestrian Projects

- Map: **Figure 56**
- 'Standalone' projects: **Table 40**
- 'Part of Corridor Project' projects: **Table 41**
- 'Mitchell Core Bicycle Network' projects: **Table 42**

Bicycle and pedestrian projects were broken into three categories:

- **'Standalone'** projects are those that are not part of an identified corridor or intersection project.
- **'Corridor'** projects are those that are along a roadway corridor identified for improvements. The roadway corridor project should be cross-referenced as part of the planning process.
- **'Mitchell Core Bicycle Network'** projects are on-street projects, such as bike lanes, throughout the developed Mitchell core area.

16.1.3 Illustrative Projects

- Map: **Figure 55**
- Project table: **Table 43**

Illustrative projects represent long-range needs. These projects are not part of a constrained prioritization of short-, mid-, and long-range projects due to overall cost, multijurisdictional coordination needs, and/or complexity of the process. Once a commitment to move forward with one of the projects is established, individual steps can be inserted into the prioritized list of projects and City of Mitchell CIP.

16.1.4 'Watch' Corridors

- Map: **Figure 55**
- Corridors: **Table 44**

The daily volume capacity analysis identified several corridors where improvements may be needed in the future if traffic volumes continue to grow. Capacity solutions range from turn lanes at isolated locations, such as high-volume access points or major intersections, to a 2-lane to 3-lane conversion with a continuous left turn lane. However, a full 3-lane section may not be practical or feasible in some areas due to width limitations or multimodal goals for the corridor and thus should be monitored and addressed when/if needs arise.

Two locations are along SD37 where potential future development may generate long-range needs for modification roadway segment and/or intersection modifications. In these instances, development and traffic volumes should be monitored to proactively identify improvements.

16.1.5 Bridge Projects

- Projects: **Table 45**

16.1.6 Pavement Management Projects

- Map: **Figure 57**

Candidate 5-year M&R and Major Rehabilitation projects for arterial, collector, and local roadways are shown in **Figure 57**. It is recommended that the M&R projects shown in the figure be programmed within the next five years. Major Rehabilitation projects are recommended to be implemented through a more moderate approach with the goal of preventing deterioration into a full depth reconstruction need and prevent an increase to backlog. The figure identifies candidate Major Rehabilitation segments for further consideration within the next five years.

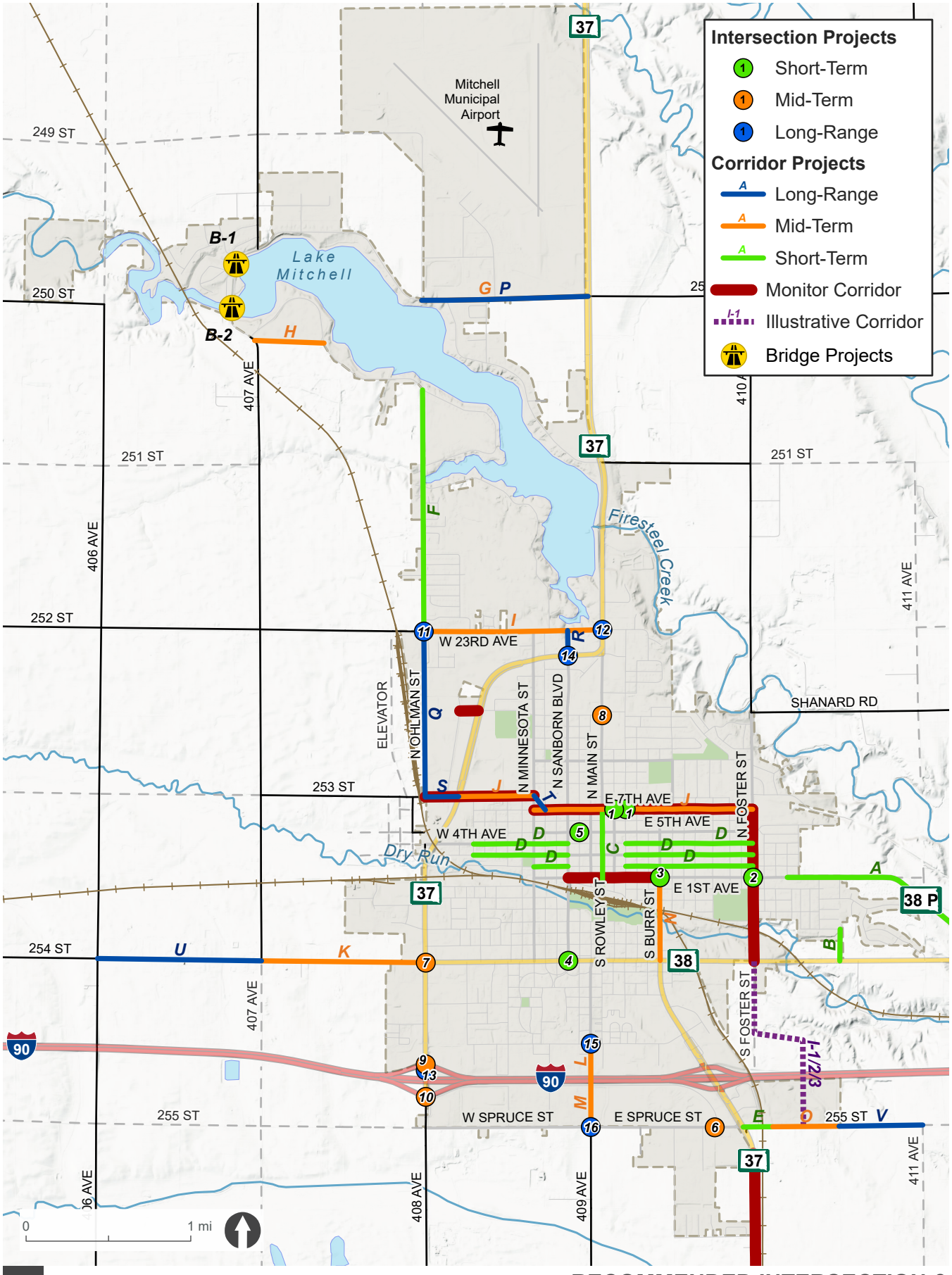
16.1.7 Programmatic Projects

Sidewalk, traffic signal, and bicycle/pedestrian improvement recommendations reflect a programmatic and opportunistic approach. It is important to support flexibility with these improvements to maximize resources, such as implementing improvements as part of a larger project, tying similar projects together by area or type of project to encourage better bid prices, or support a proactive approach where the city can anticipate needs and allocate funding where appropriate.

- **Sidewalk program**: refer to the Sidewalk Network section of the **Bicycle and Pedestrian Plan** for guidance on establishing sidewalk goals and priorities
    - **Recommendation**: maintain current funding of approximately $100,000 per year

- **Traffic signal improvements:** refer to the **Traffic Signal System Plan** for traffic signal network enhancements recommendations
    - **Recommendation:** provide approximately $100,000 per year to incrementally improve signal infrastructure and technology at one to three signals per year

- **Bicycle and pedestrian crossing improvements:** refer to **Table 30** of the **Bicycle and Pedestrian Plan** for recommended crossing projects
    - **Recommendation:** provide approximately $60,000 per year to incrementally improve key crossings

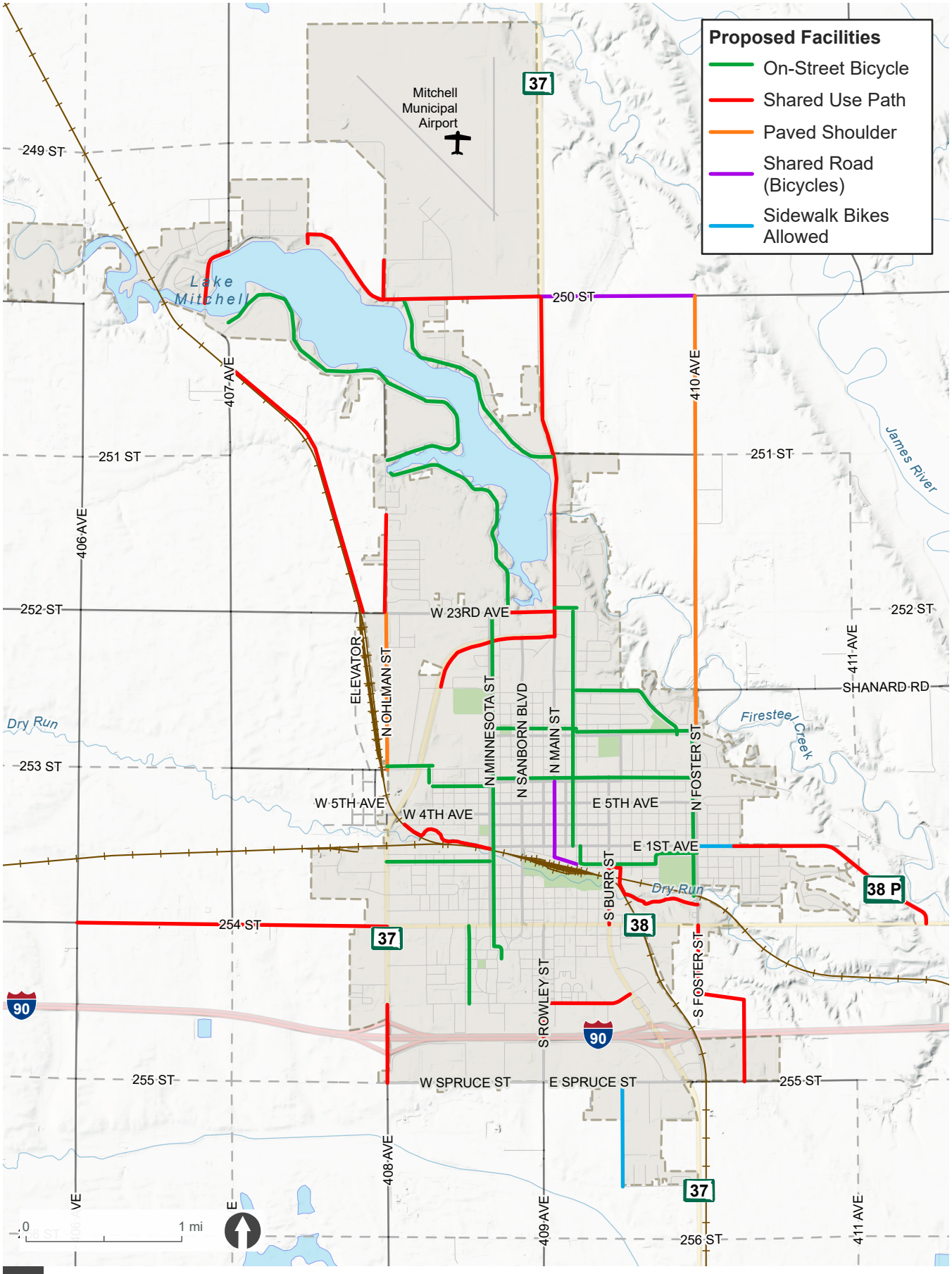


HDR MITCHELL Master Transportation Plan

RECOMMENDED INTERSECTION & CORRIDOR PROJECTS

FIGURE 55

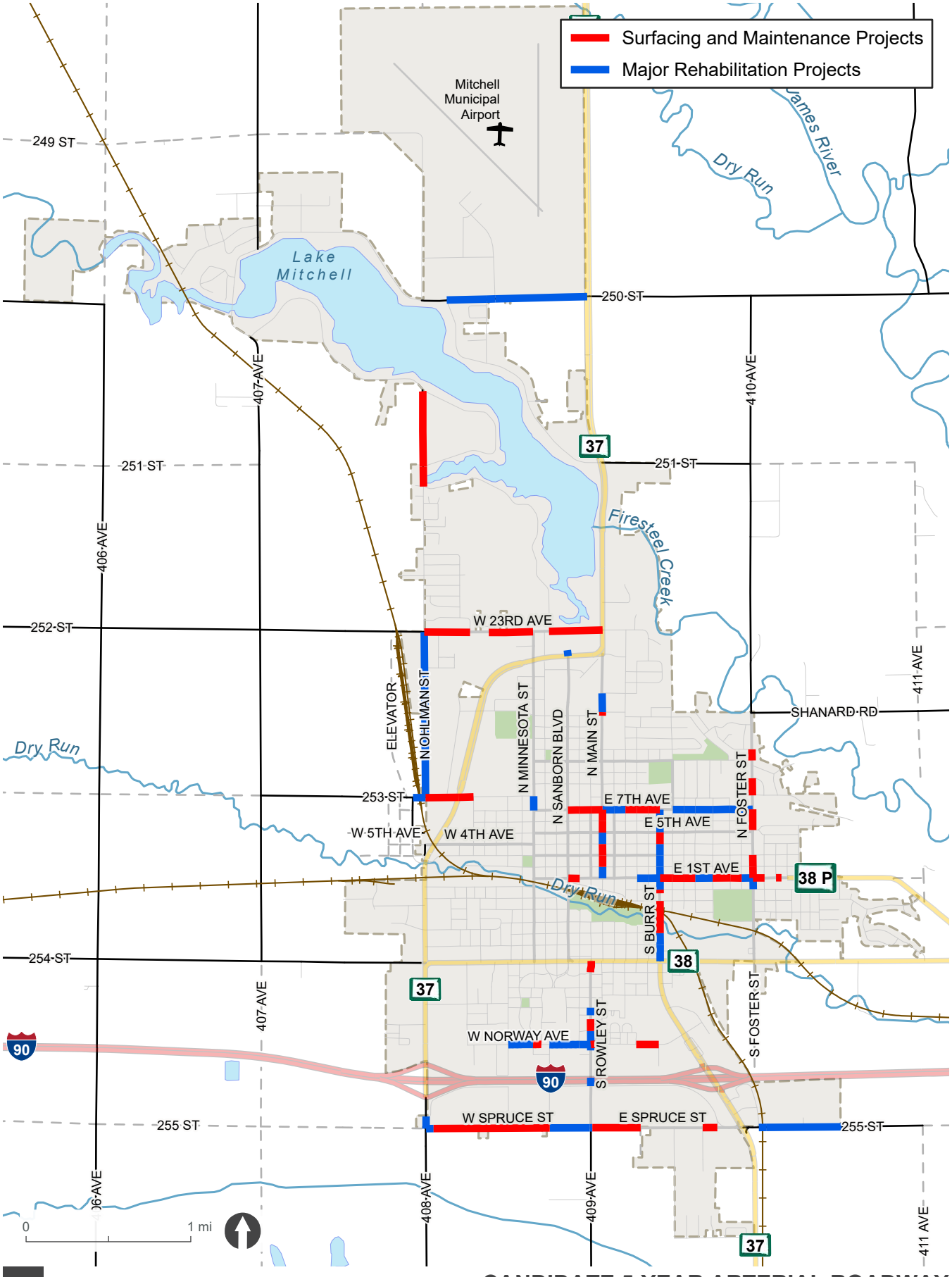
MITCHELL, SD | MASTER TRANSPORTATION PLAN



MITCHELL Master Transportation Plan

RECOMMENDED BICYCLE AND PEDESTRIAN PROJECTS

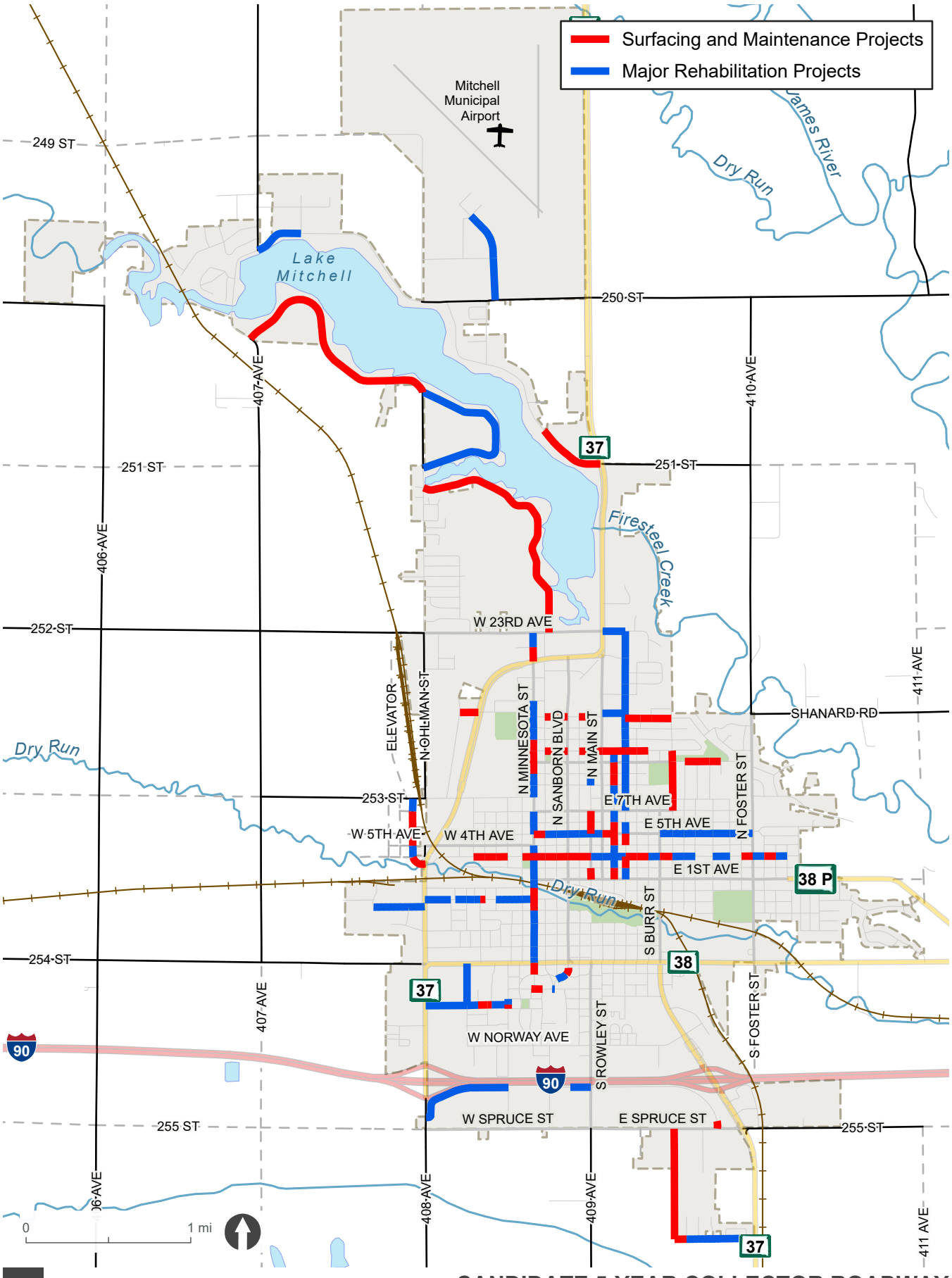
FIGURE 56



MITCHELL Master Transportation Plan

CANDIDATE 5-YEAR ARTERIAL ROADWAY M&R AND MAJOR REHABILITATION PROJECTS

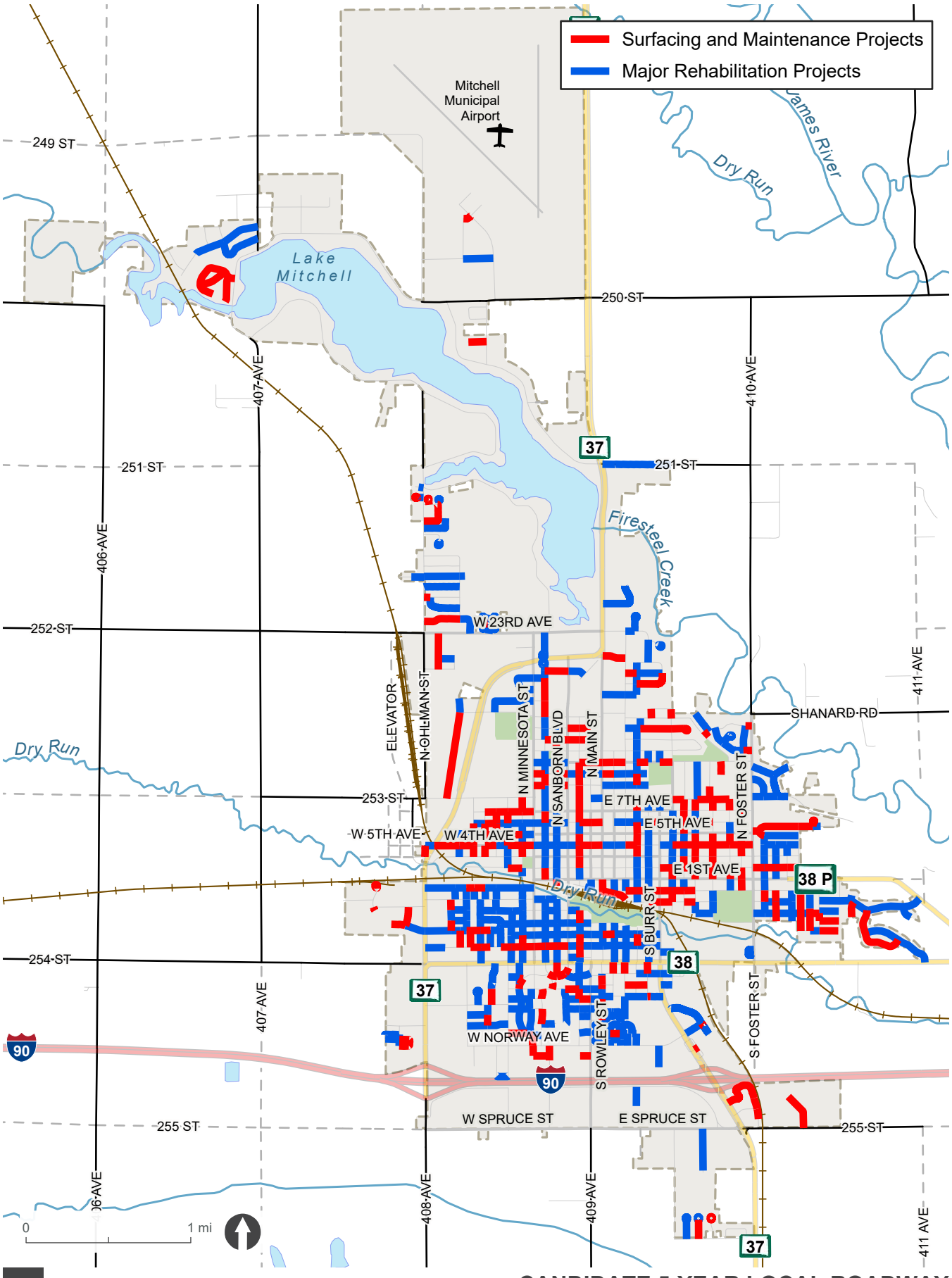
FIGURE 57-1



HDR MITCHELL Master Transportation Plan

CANDIDATE 5-YEAR COLLECTOR ROADWAY M&R AND MAJOR REHABILITATION PROJECTS

FIGURE 57-2



HDR MITCHELL Master Transportation Plan

CANDIDATE 5-YEAR LOCAL ROADWAY M&R AND MAJOR REHABILITATION PROJECTS

FIGURE 57-3

Table 38. Intersection Projects

INDEX	INTERSECTION	PROJECT TYPE	PRIORITY	TYPE	COST (2023 $)	COST (YOE)	CORRIDOR PROJECT CROSS-REFERENCE
1	7th Avenue & Kimball Street 7th Avenue & Lawler Street	Traffic Control	Short-Term	Safety	$10,000	$10,000	B-B
2	Foster Street & 1st Avenue	Traffic Control, Access Management, and Traffic Calming	Short-Term	Safety	$500,000	$600,000	A-A
3	Burr Street & 1st Avenue	Traffic Signal Modifications	Short-Term	Safety	$100,000	$115,000	N
4	Sanborn Boulevard & Havens Avenue	Traffic Signal Modifications	Short-Term	Safety	$50,000	$60,000	
5	5th Avenue & Duff Street	Intersection Modifications	Short-Term	Safety	$300,000	$340,000	
6	Spruce Street & Wal-Mart RIRO	Spruce Street Median	Mid-Term	Safety	$450,000	$650,000	
7	Havens Avenue & SD37	Traffic Signal and Access	Mid-Term	Safety	$500,000	$735,000	K
8	Main Street & 15th Avenue	Intersection Study	Mid-Term	Safety	$100,000	$145,000	
9	Ohlman Street & I-90 Exit 330 Westbound Ramp Terminal Intersection	Turn Lanes	Mid-Term	Traffic	$400,000	$600,000	
10	Ohlman Street & I-90 Exit 330 Eastbound Ramp Terminal Intersection	Turn Lanes and Traffic Signal	Mid-Term	Traffic	$800,000	$1,200,000	
11	23rd Avenue & Ohlman Street	Traffic Signal (if applicable)	Long-Range	Traffic and Safety	$400,000	$700,000	F, I, Q
12	23rd Avenue & SD37	Traffic Signal	Long-Range	Traffic and Safety	$400,000	$700,000	I
13	Ohlman Street & I-90 Exit 330 Westbound Ramp Terminal Intersection	Traffic Signal	Long-Range	Traffic and Safety	$400,000	$700,000	
14	SD37 & Sanborn Boulevard	Traffic Signal	Long-Range	Traffic and Safety	$400,000	$700,000	
15	Rowley Street & Norway Avenue	Traffic Signal	Long-Range	Traffic and Safety	$400,000	$700,000	L
16	Rowley Street & Spruce Street	Traffic Signal (if applicable)	Long-Range	Traffic and Safety	$400,000	$700,000	M

Short-Term (<2030) Mid-Term (2030-2039) Long-Range (2040+)

Table 39. Roadway Corridor Projects

INDEX	CORRIDOR	LIMITS	PROJECT TYPE	PRIORITY	COST (2023 $)	COST (YOE)	JURISDICTION NOTES
A	SD38P	Wallace Street to SD38	Urban Reconstruction	Short-Term	$7,000,000	$8,000,000	SDDOT project; Transfer to City
B	Mattie Street	Charles Avenue to SD38 (Havens Avenue)	2-Lane Urban Construction	Short-Term	$700,000	$800,000	
C	Main Street	7th Avenue to Railroad Street	Downtown Intersection Improvements	Short-Term	$1,500,000	$2,000,000	
D	2nd / 3rd / 4th Avenue	SD37 and Foster Street (varies)	One-Way to Two-Way Conversion	Short-Term	$100,000	$150,000	
E	Spruce Street	SD37 (Burr Street) to west Mitchell Technical College access	5-Lane Urban Reconstruction	Short-Term	$1,200,000	$1,400,000	City/County cost share; Transfer to City
F	Ohlman Street	S Harmon Drive to 23rd Avenue	3-Lane Urban Reconstruction	Short-Term	$7,500,000	$8,500,000	City/County cost share; Transfer to City
G	National Guard Road	Ohlman Street to SD37	3-Lane Urban Construction *(Partial - One Side Only)*	Mid-Term	$3,500,000	$5,200,000	
H	West Harmon Drive Connection	Navin Road to West Harmon Drive	2-Lane Urban Construction	Mid-Term	$1,500,000	$2,200,000	
I	23rd Avenue	Ohlman Street to SD37	3-Lane Urban Reconstruction *Includes Ohlman Street intersection*	Mid-Term	$5,600,000	$8,200,000	
J	8th/7th Avenue	SD37 to Foster Street	Traffic Calming	Mid-Term	$550,000	$800,000	
K	Havens Avenue	407th Avenue to SD37 (Ohlman Street)	3-Lane Urban Reconstruction *Includes 407th Avenue intersection*	Mid-Term	$5,800,000	$8,500,000	City/County cost share; Transfer to City
L	Rowley Street	Norway Avenue to I-90 Bridge	3-Lane Urban Construction *(Remaining Urban Section Elements) Includes Norway Avenue intersection*	Mid-Term	$550,000	$800,000	
M	Rowley Street	I-90 Bridge to Spruce Street	3-Lane Urban Reconstruction *Includes Spruce Street intersection*	Mid-Term	$1,250,000	$1,800,000	
N	Burr Street	1st Avenue to Havens Avenue	Corridor Study	Mid-Term	$50,000	$75,000	
O	Spruce Street	W Mitchell Technical College access to ½-mile west of 411th Avenue	5-Lane Urban Reconstruction	Mid-Term	$3,750,000	$5,500,000	City/County cost share; Transfer to City
P	National Guard Road	Ohlman Street to SD37	3-Lane Urban Construction *(Remaining Urban Section Elements)*	Long-Range	$3,500,000	$6,500,000	City/County cost share; Transfer to City
Q	Ohlman Street	23rd Avenue to 8th Avenue	3-Lane Urban Reconstruction *Includes 8th Avenue intersection*	Long-Range	$5,000,000	$9,000,000	City/County cost share; Transfer to City
R	Sanborn Boulevard	SD37 to 23rd Avenue	3-Lane Urban Construction	Long-Range	$750,000	$1,500,000	
S	8th Avenue	Ohlman Street to SD37	3-Lane Urban Reconstruction	Long-Range	$1,400,000	$2,500,000	
T	7th Avenue to 8th Avenue Diagonal Connector	Minnesota Street to Wisconsin Street	3-Lane Urban Reconstruction with Diagonal Connection	Long-Range	$1,300,000	$2,500,000	
U	Havens Avenue	406th Avenue to 407th Avenue	3-Lane Urban Reconstruction *Includes 406th Avenue intersection*	Long-Range	$5,500,000	$10,000,000	City/County cost share; Transfer to City
V	Spruce Street	½-mile west of 411th Avenue to 411th Avenue	3-Lane Urban Reconstruction	Long-Range	$2,500,000	$4,500,000	City/County cost share; Transfer to City

Short-Term (<2030) Mid-Term (2030-2039) Long-Range (2040+)

Table 40. Bicycle and Pedestrian Projects (Standalone Projects)

CORRIDOR	LIMITS	PROJECT TYPE	LENGTH (MI)	MITCHELL AREA	PRIORITY	COST (2023 $)	COST (YOE)
Dry Run Creek	Ohlman Street to Minnesota Street	Shared Use Path; Lighting	0.65	Dry Run Creek	Short-Term	$600,000	$700,000
Dry Run Creek	Burr Street to Foster Street	Shared Use Path; Lighting	0.9	Dry Run Creek	Short-Term	$835,000	$965,000
North Harmon Drive	National Guard Road to SD37	Bicycle Boulevard or Shared Roadway *(with designated pedestrian area)*	1.5	Lake Mitchell	Short-Term	$375,000	$435,000
West and South Harmon Drive	West and South of Lake Mitchell	Bicycle Boulevard or Shared Roadway *(with designated pedestrian area)*	2.5	Lake Mitchell	Short-Term	$625,000	$725,000
Indian Village Road	West and South of Lake Mitchell	Bicycle Boulevard or Shared Roadway *(with designated pedestrian area)*	1.5	Lake Mitchell	Short-Term	$375,000	$435,000
1st Avenue	Foster Street to Wallace Street	Sidewalk	0.25	Mitchell Growth Area	Short-Term	$100,000	$115,000
Norway Avenue	Rowley Street to Burr Street	Shared Use Path	0.6	I-90 Corridor	Short-Term	$325,000	$375,000
Capital Street	Spruce Street to Carl Road	Sidewalk	0.7	Mitchell Growth Area	Short-Term	$275,000	$320,000
Main Street	7th Avenue to Railroad Avenue (to Ash Street)	Shared Roadway *(Pedestrians on sidewalk)*	0.65	Mitchell Core Bicycle Network	Short-Term	$10,000	$15,000
Adjacent to Railroad Tracks West of Lake Mitchell	23rd Avenue to West Harmon Drive	Shared Use Path *(Convert to all-weather surfacing)*	1.85	Lake Mitchell	Mid-Term	$975,000	$1,400,000
North Harmon Drive	Liveasy Lane (connection to existing path) to Ohlman Street	Shared Use Path	0.75	Lake Mitchell	Mid-Term	$400,000	$590,000
North Harmon Drive/Navin Road	Northwest Lake Mitchell	Shared Use Path	0.4	Lake Mitchell	Mid-Term	$215,000	$315,000
Ohlman Street	North Harmon Drive to Industrial Road	Shared Use Path	0.25	Lake Mitchell	Mid-Term	$135,000	$200,000
National Guard Road	SD37 to Foster Street	Shared Roadway *(Bicycles)*	1.0	Mitchell Growth Corridor	Long-Range	$10,000	$20,000
Foster Street	National Guard Road to 11th Avenue	Paved Shoulders	2.8	Mitchell Growth Corridor	Long-Range	$325,000	$585,000
Ohlman Street	Norway Avenue to Spruce Street	Shared Use Path	0.5	Long-Range I-90 Crossing	Long-Range	$265,000 + structure costs	$480,000 + structure costs

Short-Term (<2030) Mid-Term (2030-2039) Long-Range (2040+)

Table 41. Bicycle and Pedestrian Projects (Corridor Projects)

CORRIDOR	LIMITS	PROJECT TYPE	LENGTH (MI)	MITCHELL AREA	PRIORITY	COST (2023 $)	COST (YOE)	CORRIDOR PROJECT CROSS-REFERENCE
Ohlman Street	Kemper Avenue to 23rd Avenue	Shared Use Path	0.65	Lake Mitchell	Short-Term	$350,000	$400,000	F
SD38P	Wallace Street to SD38	Shared Use Path	1.45	Mitchell Growth Area	Short-Term	$765,000	$890,000	SDDOT project
Rowley Street	Norway Avenue to Cabela Drive	Shared Use Path	0.25	I-90 Corridor Area	Short-Term	$135,000	$160,000	L
SD37	15th Avenue to National Guard Road	Shared Use Path	3.1	SD37 Corridor	Short-Term	$1,675,000	$1,950,000	SDDOT project
Havens Avenue	407th Avenue to SD37 (Ohlman Street)	Shared Use Path	1.0	Mitchell Growth Corridor	Mid-Term	$525,000	$775,000	K
Burr Street	Havens Avenue to 1st Avenue	Shared Use Path	0.25	Dry Run Creek	Mid-Term	$135,000	$200,000	N
23rd Avenue	Minnesota Street to SD37	Shared Use Path	0.45	Lake Mitchell	Mid-Term	$240,000	$350,000	I
National Guard Road	Ohlman Street to SD37	Shared Use Path	1.0	Lake Mitchell	Mid-Term	$525,000	$775,000	G
Havens Avenue	406th Avenue to 407th Avenue	Shared Use Path	1.0	Mitchell Growth Area	Long-Range	$525,000	$950,000	U
Ohlman Street	23rd Avenue to 8th Avenue	Paved Shoulders	1.0	Mitchell Growth Area	Long-Range	$115,000	$210,000	Q

Short-Term (<2030) Mid-Term (2030-2039) Long-Range (2040+)

Table 42. Bicycle and Pedestrian Projects (Mitchell Core Bicycle Network)

CORRIDOR	LIMITS	PROJECT TYPE	LENGTH (MI)	MITCHELL AREA	PRIORITY	COST (2023 $)	COST (YOE)
Kimball Street 23rd Avenue	1st Avenue to 23rd Avenue Main Street to Kimball Street	Bike Lane	1.5 0.15	Mitchell Core Bicycle Network	Mid-Term	$205,000 $20,000	$300,000 $30,000
12th Avenue 11th Avenue	Minnesota Street to Kimball Street Kimball Street to Foster Street	Bike Lane	0.55 0.8	Mitchell Core Bicycle Network	Mid-Term	$75,000 $110,000	$110,000 $160,000
8th Avenue Edgerton Street 7th Avenue 7th Avenue	Ohlman Street to Edgerton Street 8th Avenue to 7th Avenue Edgerton Street to Minnesota Street Burr Street to Foster Street	Bike Lane	0.3 0.1 0.4 0.55	Mitchell Core Bicycle Network	Mid-Term	$40,000 $15,000 $55,000 $75,000	$60,000 $20,000 $80,000 $110,000
7th Avenue	Minnesota Street to Burr Street	Buffered Bike Lane	0.75	Mitchell Core Bicycle Network	Mid-Term	$140,000	$205,000
Ash Street	Ohlman Street to Minnesota Street	Bicycle Boulevard	1.0	Mitchell Core Bicycle Network	Mid-Term	$250,000	$365,000
Ash/Hanson Street	Kimball Street/1st Avenue to Foster Street	Bicycle Boulevard	0.65	Mitchell Core Bicycle Network	Mid-Term	$165,000	$240,000
Minnesota Street	23rd Avenue to McCabe Street	Bike Lane	2.25	Mitchell Core Bicycle Network	Mid-Term	$305,000	$450,000
Miller Avenue	Norway Avenue to Havens Avenue	Bike Lane	0.5	Mitchell Core Bicycle Network	Mid-Term	$70,000	$105,000
Foster Street	Dry Run Creek to 11th Avenue	Bike Lane	1.05	Mitchell Core Bicycle Network	Mid-Term	$140,000	$205,000
15th Avenue / Park Drive	Kimball Street to 11th Avenue	Bike Lane	0.75	Mitchell Core Bicycle Network	Mid-Term	$100,000	$150,000

Short-Term (<2030) Mid-Term (2030-2039) Long-Range (2040+)

Table 43. Illustrative Projects

INDEX	CORRIDOR	LIMITS	PROJECT TYPE	PRIORITY	COST (2023 $)	COST (YOE) (LONG-RANGE)
I-1	Foster Street Extension	SD38 (Havens Avenue) to Spruce Street	Feasibility Study Grade separation of Foster Street over/under I-90 Grade separation over/under BNSF Railway tracks, south of I-90 Roadway and multimodal components	Illustrative	$150,000	$275,000
I-2	Foster Street Extension (Roadway)	SD38 (Havens Avenue) to Spruce Street	Urban Construction; I-90 or BNSF Railway grade separation	Illustrative	$18,500,000	$33,000,000
I-3	Foster Street Extension (Shared Use Path)	SD38 (Havens Avenue) to Spruce Street	Shared Use Path *(In conjunction with I-90 or BNSF Railway grade separation)*	Illustrative	$800,000 + structure costs	$1,300,000 + structure costs
I-4	East Bypass	SD37 to SD38	Feasibility Study	Illustrative	$100,000	$180,000
I-5	Burr Street	1st Avenue to Havens Avenue	Multimodal Corridor Improvements	Illustrative	Based on study recommendations	Based on study recommendations

Table 44. 'Watch' Corridors

INDEX	CORRIDOR	LIMITS	PROJECT TYPE	PRIORITY
A-A	Foster Street	7th Avenue to SD38 (Havens Avenue)	Monitor for 3-lane urban section or 2-lane section with turn lanes at major intersections	Monitor corridor
B-B	8th/7th Avenue	8th Avenue: Ohlman Street to Minnesota Street 7th Avenue: Minnesota Street to Foster Street	Monitor for 3-lane urban section or 2-lane section with turn lanes at major intersections	Monitor corridor
C-C	1st Avenue	Sanborn Boulevard to Burr Street	Monitor for 3-lane urban section or 2-lane section with turn lanes at major intersections	Monitor corridor
D-D	SD37	Spruce Street south	Monitor for multilane section and/or intersection turn lanes	Monitor corridor
E-E	15th Avenue	Commerce Street to SD37	Monitor SD37 & 15th Avenue intersection and Commerce Street & 15th Avenue intersection for turn lane and/or traffic control needs associated with future development	Monitor corridor

Table 45. Bridge Projects

INDEX	BRIDGE #	TYPE	YEAR BUILT	ROUTE	CROSSING	MAJOR ROADS PLAN DESIGNATION	NEEDS	CONDITION	10-YEAR PROJECT	COST (2023 $)	COST (YOE)
B-1	18-129-060	Bridge	2000	Harmon Drive	Lake Mitchell Canal	Collector	Posted 50% of Legal Load	Poor	Replacement	$1,800,000	$1,900,000
B-2	18-129-061	Bridge	2015	Harmon Drive	Firesteel Creek	Collector		Good	Polymer overlay; (Spall & Rail Repairs)	$400,000	$400,000

16.2 Supporting Recommendations

16.2.1 Roundabouts or Signalized Intersections

There are multiple major intersections that have a short- or mid-term reconstruction project followed by a separate long-range signalization project. This phasing addresses intersection operation needs in an incremental fashion, where additional measures can be implemented as volumes increase. The long-range need for traffic signals at many locations are highly dependent on timeline and density of development.

Consideration should be given to intersection type when planning the reconstruction project, whether the long-range intersection type is more of a traditional intersection or a roundabout. A roundabout brings several key benefits if constructed in lieu of a traffic signal:

- No traffic signal materials, installation, and maintenance costs
- Roundabouts have capacity to grow with traffic volumes
- Roundabouts best handle off-peak traffic volumes, as traffic signals are generally inefficient during low-volume and off-peak conditions
- Roundabouts provide safety benefits associated with reducing fatal and injury crashes compared to stop-controlled and signalized intersections

If a roundabout is constructed as part of the initial project, the traffic signal project would then be removed from the list of future projects.

Two intersections were identified in the project summaries as candidate locations for a roundabout:

- 23rd Avenue & Ohlman Street
- Rowley Avenue & Spruce Street

Other intersections should also be reviewed during the project planning phase.

16.2.2 State Highway Projects

Select projects on SDDOT-jurisdiction roadways were included in the project tables, but SDDOT-related costs were excluded from budgetary totals when considering a fiscally constrained plan. These instances are noted in the project tables.

16.2.3 Jurisdictional Transfer Projects

Candidate corridor projects for jurisdictional transfer were noted in the project tables to encourage consideration of a cost-share to bring the roadway up to good or long-range condition and jurisdictional transfer to the City of Mitchell.

16.2.4 Planning for the Project Development Process

It is important to understand the typical project development process for larger projects and account for the timeline to plan, study, evaluate, and design the future project. An overview of this process is highlighted in **Figure 58**. This process was a key consideration when considering project priorities and assigning a time band that is both feasible and attainable for successful implementation.

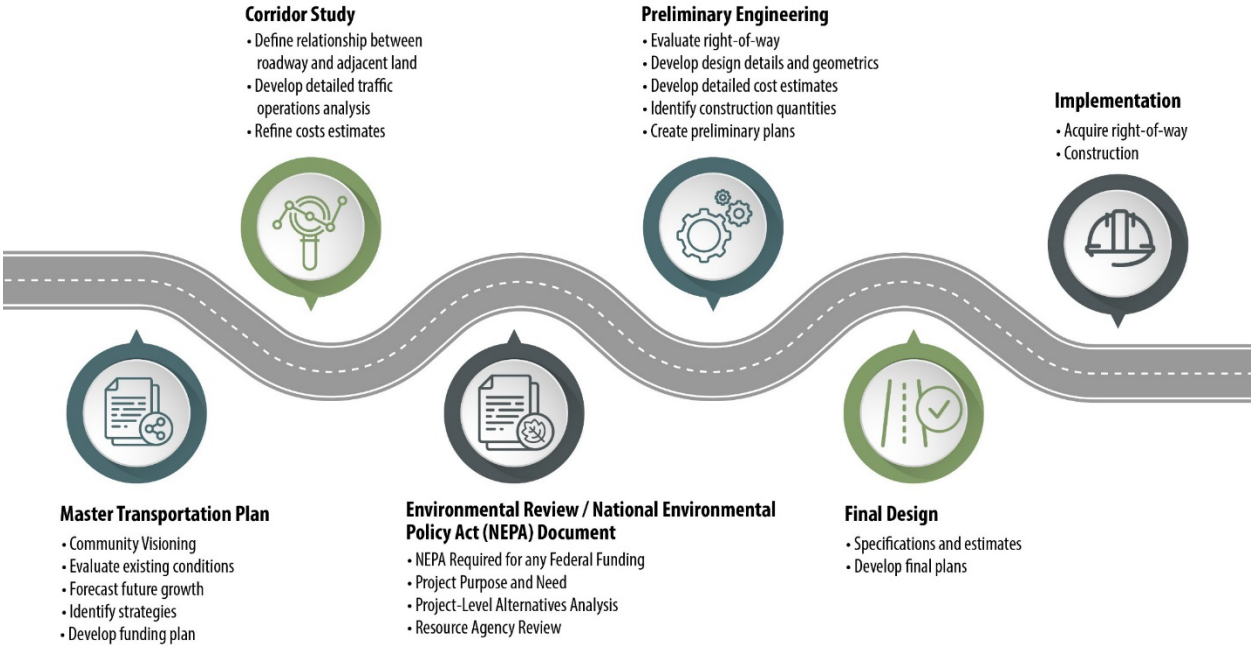


Figure 58. Typical Project Development Process

16.3 Project Cost Scenarios and Funding Gap

Two project cost scenarios were developed to assess feasibility of implementing MTP project recommendations. One scenario assumes 100 percent City of Mitchell funding to reconstruct existing Davison County-jurisdiction highways in the Mitchell growth areas (i.e., Ohlman Street north of 8th Avenue, Havens Avenue west of Ohlman Street). The second scenario assumes 50 percent funding from external sources, such as a cost-share with Davison County and/or grant awards, to reconstruct these highways. Jurisdictional transfer from Davison County to City of Mitchell is assumed to occur in conjunction with the reconstruction project.

The following tables present the project cost and funding scenarios for the short-term and mid-term time bands, assuming 100 percent City funding **(Table 46)** and 50% City / 50% external sources **(Table 47)**. Programmatic funding recommendations were incorporated for pavement management, sidewalk, and traffic signal costs. Funding estimates were based on the system expansion and preservation funding estimates in **Table 36**. No grant funding was assumed in these tables' funding estimates.

The funding comparison highlights three key findings related to the feasibility of implementing MTP project recommendations:

1. Forecasted gap in project costs vs. project funding
2. Importance of agency coordination for reconstructing or construction roadways in multi-jurisdictional areas, particularly related to the benefits associated with jurisdictional transfer, cost share agreements to spread costs, and organized pursuits of grant funding
3. Importance of grant funding

Table 46. Project Cost vs. Forecasted Funding (100% City-Funding to Reconstruct Davison County Highways within Mitchell Growth Area)

Projects	SHORT-TERM 2024-2029 (YOE $)	MID-TERM 2030-2039 (YOE $)	Assumptions and Notes
Intersections	$1,130,000	$1,530,000	*Project tables*
Corridor Segments	$11,050,000	$33,075,000	*Project tables* *100% City funding to reconstruct Davison County Highways*
Bicycle and Pedestrians	$5,070,000	$7,930,000	*Project tables*
Pavement Management	$9,740,000	$20,560,000	*$1.4 M/year*
Traffic Signal Enhancements	$700,000	$1,470,000	*$100,000/year*
Sidewalk Program	$700,000	$1,470,000	*$100,000/year*
Bridges	$700,000	$1,470,000	*$100,000/year*
Total	**$29,090,000**	**$67,505,000**	
Annual Cost	**$4,850,000**	**$6,750,000**	
Forecasted Funding Allocation for Projects	*$21,000,000*	*$44,000,000*	*Source: Table 36. Forecasted Funding Allocations by Time Band*

Year of Expenditure

Comparison assumes all project costs paid for by City of Mitchell budget funding. Grant funding would be in addition to the 'Forecasted Funding Allocation for Projects'.

Table 47. Project Cost vs. Forecasted Funding (50% City of Mitchell / 50% External Sources)

Projects	SHORT-TERM 2024-2029 (YOE $)	MID-TERM 2030-2039 (YOE $)	Assumptions and Notes
Intersections	$1,130,000	$1,530,000	*Project tables*
Corridor Segments	$7,000,000	$23,475,000	*Project tables* *50% City/50% external sources to reconstruct Davison County Highways*
Bicycle and Pedestrians	$5,070,000	$7,930,000	*Project tables*
Pavement Management	$9,740,000	$20,560,000	*$1.4 M/year*
Traffic Signal Enhancements	$700,000	$1,470,000	*$100,000/year*
Sidewalk Program	$700,000	$1,470,000	*$100,000/year*
Bridges	$700,000	$1,470,000	*$100,000/year*
Total	**$25,040,000**	**$57,905,000**	
Annual Cost	**$4,175,000**	**$5,790,000**	
Forecasted Funding Allocation for Projects	*$21,000,000*	*$44,000,000*	*Source: Table 36. Forecasted Funding Allocations by Time Band*

Year of Expenditure

Comparison assumes all project costs paid for by City of Mitchell budget funding. Grant funding would be in addition to the 'Forecasted Funding Allocation for Projects'.

16.3.1 Forecasted Gap in Project Costs vs. Project Funding

Both **Table 46** and **Table 47** highlight the forecasted gap between project costs and project funding allocated directly from the City of Mitchell budget. Additional funding through new and/or supplemental sources will be required to close this gap and implement MTP project recommendations.

16.3.2 Jurisdictional Transfer and Cost-share Agreements

Implementing jurisdictional transfer and cost-share agreements with Davison County when reconstructing Davison County highways within the Mitchell growth area provides a notable benefit for future City of Mitchell budgetary needs and creates a more feasible scenario in achieving MTP project recommendations. For example, the mid-term 50% City / 50% external sources scenario is nearly $10 M less than the 100 percent funding scenario due to the external funding when reconstructing National Guard Road, Havens Avenue (407th Avenue to SD37) and Spruce Street (Mitchell Technical College access to ½-mile point).

16.3.3 Grant Funding

Grant funding will be an important element in bridging the gap between forecasted project costs and funding. The award of even one or two corridor reconstruction grants would have a significant benefit on long-range budgetary needs, similar to what is shown in the 50% City / 50% external sources scenario.

16.4 Recommended Projects to Consider for U.S. Department of Transportation Discretionary Grant Funding

Recommended projects to pursue U.S. Department of Transportation discretionary grant funding are shown in **Table 48**. These projects exhibit elements conducive to grant opportunities, such as multi-jurisdictional importance in the regional transportation network, multimodal connectivity, long-range operations and safety, freight movement, and economic development. Recommended U.S. Department of Transportation discretionary grant programs for the City of Mitchell include:

- Rural Surface Transportation Program
- Reconnecting Communities Pilot Program
- Safe Streets and Roads for All (SS4A) Program

These grants typically have minimum funding levels, so it may be beneficial to package multiple projects together that address area, corridor, or similar types of needs to meet requirements. Further, incorporating multimodal elements and addressing multiple key needs associated with a specific grant are often beneficial during the selection process. **Table 48** includes the project index reference of other applicable projects that should be considered when developing a grant application project.

It is important to position for grants ahead of a Notice of Funding Opportunity (NOFO) being published. This allows for developing initial grant application components and identify which grants may be the best fit for the desired projects. Further, this encourages flexibility to meet any new or modified requirements presented in the current NOFO. City of Mitchell should also weigh any additional requirements associated with the application and delivering the project, as those requirements may be beyond the typical project duties and reflect an additional cost.

Table 48. Recommended Projects to Consider for U.S. Department of Transportation Discretionary Grant Funding

Project	Project Index Reference	Rural Surface Transportation Program	Reconnecting Communities Pilot Program	Safe Streets and Roads for All (SS4A) Program
Havens Ave *406th Ave – Ohlman St*	K, U, Bike/Ped	X		X
Burr St *Study and Implementation* *1st Ave – Havens Ave*	N, I-5, Bike/Ped		X	X
Foster St Extension *Study and Implementation*	I-1, I-2, Bike/Ped		X	
8th Ave / 7th Ave *Consider all projects along corridor* *Ohlman St – Foster St*	1, J, T, 'Watch', Bike/Ped			X
1st Ave & Foster St Intersection Area *Consider all projects in area*	2, 'Watch', Bike/Ped			X
23rd Avenue *Ohlman St – SD37*	11, 12, I, R, Bike/Ped	X		X
Ohlman St *23rd Ave – 8th Ave* *8th Ave – SD37*	Q, Bike/Ped	X		X
Spruce St *RR crossing to 411th Ave*	O, V, Bike/Ped	X		X
National Guard Rd *Ohlman St – SD37*	G, P, Bike/Ped	X		X
Mitchell Core Bicycle Network	Bike/Ped			X
Combined Multimodal Projects *Combine area or similar multimodal projects to address 'area' or 'corridor' type need*	Bike/Ped			X

Project Index Reference:

Number: see recommended Intersection Projects
Letter: see recommended Corridor Projects and Illustrative Projects
'Watch': see recommended 'Watch' Corridors
Bike/ped: see recommended Bicycle and Pedestrian Projects

16.5 Recommended Progress Monitoring and Transparency

It is recommended that the City of Mitchell monitor progress of recommendations within the Mitchell Area Master Transportation plan, with consideration to the following:

1. Post the Mitchell Area MTP to the City of Mitchell website
2. Track progress of implementing Mitchell Area MTP recommendations
3. Complete a review of the Mitchell Area MTP document, at minimum, every five years
4. Update the Mitchell Area MTP document as needed to reflect modified policies and changed conditions
5. Incorporate policy and design guidance recommendations into local policy and procedures
6. Assess new technologies to improve safety and operations of the multimodal transportation network

Appendix A: Public Engagement Summary

Appendix B: Crash History Review Memo

Appendix C: Traffic Forecasts and Operations Analysis Memos

Appendix D: Origin-Destination Summary Memo

Appendix E: Pavement Data Collection Information

Appendix F: Jurisdictional Transfer Guidance Memo

Appendix G: Traffic Signal Review Memo

Appendix H: Project Summary Sheets