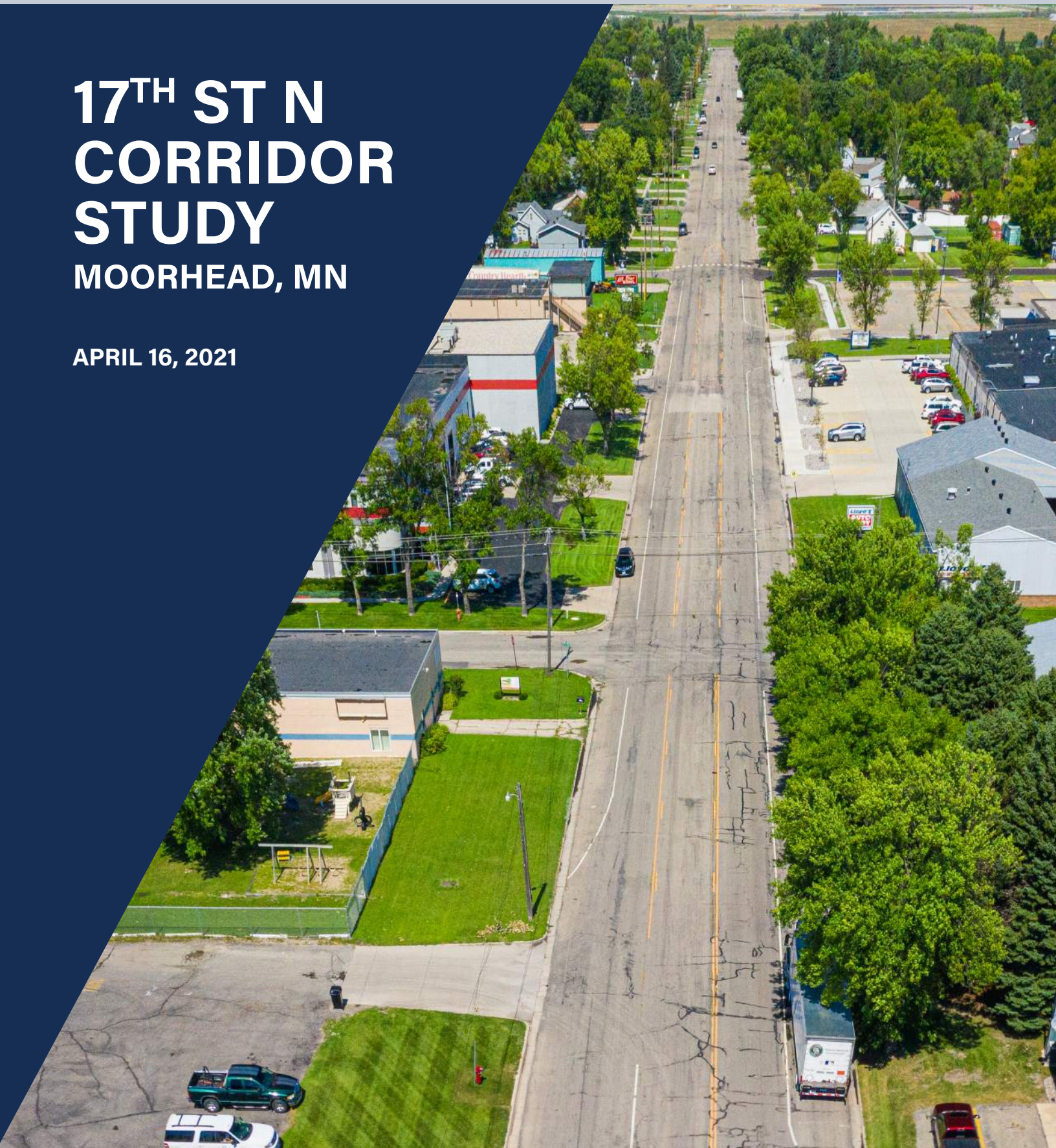


17TH ST N CORRIDOR STUDY MOORHEAD, MN

APRIL 16, 2021



REIMAGINE 17TH STREET

17th Street N Corridor Study Final Report



The preparation of this document was funded in part by the United States Department of Transportation with funding administered through the North Dakota Department of Transportation, the Federal Highway Administration, and the Federal Transit Administration. Additional funding was provided through local contributions from the City of Moorhead. The United States Government and the States of North Dakota and Minnesota assume no liability for the contents or use thereof.

This document does not constitute a standard, specification, or regulation. The United States Government, the States of North Dakota and Minnesota, and the Fargo-Moorhead Metropolitan Council of Governments do not endorse products or manufacturers. Trade or manufacturers' names may appear herein only because they are considered essential to the objective of this document. Prepared for: Fargo-Moorhead Metropolitan Council of Governments.

Table of Contents

I.	Introduction	4
II.	Agency & Public Involvement	6
III.	Existing Conditions.....	8
	Previous Studies Overview	8
	Previous and Planned Projects	9
	Demographics and Trends	9
	Transportation System Characteristics.....	13
	Signal Warrant Analysis	27
IV.	Purpose & Need Framework.....	29
	Purpose	29
	Need	29
V.	Study Goals and Objectives	31
VI.	Identification and Evaluation of Alternatives	33
	Segment 1	33
	Segment 2	36
	Segment 2 Sidewalk Alignment Options.....	43
	Technical Evaluation of Alternatives.....	46
VII.	Public and Agency Input	47
	Public Engagement Plan.....	47
	Communication Strategies.....	47
	Study Review Committee Input	47
	Public Input	47
	Project Website.....	48
VIII.	Recommended Alternative	52
	Recommended Alternative: Segment 1 (1 st Ave to 4 th Ave)	52
	Recommended Alternative: Segment 2 (4 th Ave to 15 th Ave).....	53
	Segment 2 Sidewalk Alignment Recommendation.....	54
	Other Corridor Considerations	54
IX.	Next Steps	55

Figures

Figure 1 – Corridor Study Area.....	5
Figure 2 - Future Projects.....	10
Figure 3 - Existing Land Use	14
Figure 4 - Future Land Use	15
Figure 5 - Crash History.....	21
Figure 6 - Access Inventory	24
Figure 7 – Ped and Bike Connections.....	26
Figure 8 - Transit Service.....	28
Figure 9 – Alternative 1A Typical Section	34
Figure 10 – Alternative 1B Typical Section.....	35
Figure 11 – Segment 1 No Build Typical Section.....	36
Figure 12 – Alternative 2A Typical Section	37
Figure 13 – Alternative 2B Typical Section.....	38
Figure 14 – Alternative 2C Typical Section.....	39
Figure 15 – Alternative 2D Typical Section	40
Figure 16 – Alternative 2E Typical Section.....	41
Figure 17 – Segment 2 No Build Typical Section.....	42
Figure 18 – Existing Sidewalks Setback	43
Figure 19 – Sidewalk Crossing Option 1.....	44
Figure 20 – Sidewalk Crossing Option 2.....	45
Figure 21 – Public Input Summary from August 2020	50
Figure 22 –Segment 1 Recommended Alternative	52
Figure 23 –Segment 2 Recommended Alternative	53

Appendices

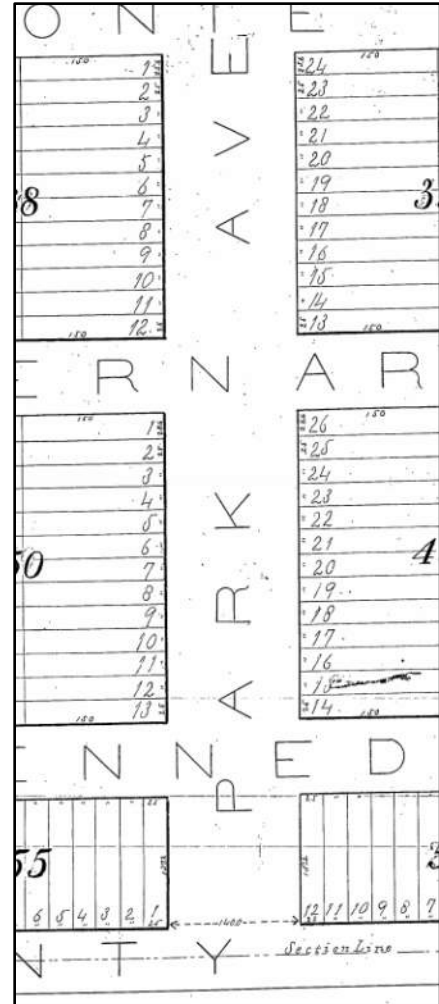
- Appendix A – Public Engagement Plan
- Appendix B – Existing Conditions
- Appendix C – Purpose and Need
- Appendix D – Goals and Objectives
- Appendix E – Alternatives
- Appendix F – Opinions of Probable Cost
- Appendix G – Traffic Analysis
- Appendix H – Evaluation Matrix
- Appendix I – Public Engagement Summaries

I. Introduction

The Fargo-Moorhead Metropolitan Council of Governments (Metro COG) and the City of Moorhead worked with the community to identify multimodal transportation improvements on 17th Street N between 1st Avenue N and 15th Avenue N (Figure 1). 17th Street N is a collector roadway that extends from the downtown Moorhead business area at 1st Avenue N to the recently improved intersection at 15th Avenue N within the primarily residential area.

A unique characteristic of the 17th Street N corridor is its 140 feet of platted right-of-way and approximately 60 feet of curb-to-curb pavement. The first known plat for this corridor, originally named Park Avenue, was recorded in December of 1881 as part of Elder’s First Addition. The name remained Park Avenue through subsequent plats until 1936 when outlots completing the 140-foot right-of-way platting were recorded with the modern name of 17th Street N.

It has numerous private driveways and several local access points. The 17th Street N corridor is an important north-south connection facilitating travel between local residential streets to 1st Avenue N and 15th Avenue N and ultimately providing connections to US Highway 75 and US Highway 10. The corridor serves multiple transportation users including automobiles, freight, transit, pedestrians, and bicyclists.



Originally platted in 1881 with the name Park Avenue, a unique characteristic of 17th Street N is its 140' of right-of-way



Figure 1 – Corridor Study Area

For ease in describing key study area needs in more depth, the corridor is split into a north segment and a south segment based on their different settings and needs.

Segment 1 – 1st Avenue N to 4th Avenue N, the commercial and institutional segment, is generally characterized by a low speed (30 mile per hour), three-lane urban section with a center left turn lane and on-street parking on both sides of the roadway. Pedestrian facilities are incomplete and limited. The Park Christian School zone

along the corridor generates high peak hour volumes of bus, student driver, and parent drop off and pick up traffic. D-S Beverages generates heavy commercial truck traffic between the beverage distribution location just north of 2nd Avenue and US Highway 10. Traffic generation is further increased by direct access to 1st Avenue N and close proximity access to US Highway 10.



Transition from three-lane to two-lane section near 4th Ave N

Segment 2 – 4th Avenue N to 15th Avenue N, the residential segment with primarily single-family homes, is a low-speed (30 mile per

hour), two-lane urban section with on-street parking on both sides of the roadway. The pedestrian network includes a continuous and connected sidewalk throughout; however several pedestrian ramps are missing or not Americans with Disabilities Act-compliant. The far northern part of this segment, from approximately 10th Avenue N to 15th Avenue N, falls within a 500-year floodplain. Drainage is an issue in this area as sections of curb and gutter have settled, there are limited number of inlets along the corridor, and the boulevard slopes are very flat. The segment is a local traffic trip generator as it serves connections to several single-family, multiple vehicle households. North of 15th Avenue N, the zoned Industrial area would be most conveniently served by US Highway 75 and 15th Avenue N (County Road 83) and should result in little to no heavy truck traffic on 17th Street N.

The remainder of the study report is organized into sections to provide context on the study background and purpose, agencies involved, existing and future conditions, improvement options, and recommendations. Some of these areas have standalone summary documents which are referenced in this report.

II. Agency & Public Involvement

Agency coordination and public involvement were key components to the successful development of the 17th Street N Corridor Study recommendations. This required early and continuous involvement of all affected interests identified during the initial stages of the project. To document these different agencies, groups, and interests and to define their roles and goals in the project, a Public Engagement Plan was developed. The Public Engagement Plan is included in **Appendix A**.

The study was led by a Project Management Team (PMT) and a Study Review Committee (SRC). The PMT was comprised of Metro COG and City of Moorhead staff and guided the study schedule, process, and deliverables. It included:

- Luke Champa, Project Manager, Metro COG
- Dan Farnsworth, Transportation Planner, Metro COG
- Jonathan Atkins, Traffic Engineer, City of Moorhead
- Robin Huston, City Planner, City of Moorhead
- Cody Christianson, Project Manager, Bolton & Menk, Inc.
- Jim Mertz, Project Planner, Bolton & Menk, Inc.
- Connor Cox, Project Planner, Toole Design

The SRC was comprised of planning and engineering staff from the City of Moorhead, Metro COG, NDDOT, FHWA, MATBUS, Moorhead Public Service, and Park Christian School. It included:

- Luke Champa, Project Manager, Metro COG
- Dan Farnsworth, Transportation Planner, Metro COG

- Jonathan Atkins, Traffic Engineer, City of Moorhead
- Robin Huston, City Planner, City of Moorhead
- Steve Moore, Public Works Director, City of Moorhead
- Lori Van Beek, Transit Manager, City of Moorhead
- Travis Schmidt, General Manager, Moorhead Public Service
- Michael Levang, Junior/Senior High Principal, Park Christian School
- Wayne Zacher, Local Government Division, NDDOT
- Kristen Sperry, Planning and Environmental Program Manager, FHWA
- Cody Christianson, Project Manager, Bolton & Menk, Inc.
- Jim Mertz, Project Planner, Bolton & Menk, Inc.
- Connor Cox, Project Planner, Toole Design
- Andrew Krog, Design Engineer, Bolton & Menk, Inc.

The SRC met 3 times over the course of the 12-month process to review the technical analysis and public involvement and provided recommendations to the Metro COG Policy Board and the Moorhead City Council.

Public and agency input was also important to the study and is described in more detail in Section VII and copies of meeting summaries are in **Appendix I**.

III. Existing Conditions

At the onset of the project a comprehensive analysis of past, present, and future conditions along the corridor was completed. Existing and no-build (2045) conditions were documented and assembled into a detailed Existing and No-Build Conditions Memorandum, **Appendix B**. The study team's existing condition analysis examined the following areas:

- Corridor History
- Previous studies overview
- Demographics and trends
- Transportation system characteristics
- Study area characteristics
- Land use and major traffic generators
- Existing and no-build traffic conditions
- Crash history
- Access
- Pedestrian and bicycle
- Transit
- Social, environmental, and economic (SEE) resources
- Summary of issues

Previous Studies Overview

To ensure that the 17th Street N recommendations complied with goals and objectives of prior planning efforts, the study team conducted a thorough review of corresponding local and regional plans. A summary of each prior study's goals was developed as they apply to 17th Street N. Plans reviewed as part of the existing conditions analysis included:

- City of Moorhead Comprehensive Plan Addendum (November 2009)
- Fargo-Moorhead Metropolitan Bicycle and Pedestrian Plan (February 2017)
- Moorhead Downtown Master Plan (December 2020)
- 1st Avenue North: A Review of the Corridor from the Red River to 21st Street (November 2008)
- 2045 Fargo-Moorhead Metropolitan Transportation Plan (November 2019)
- Fargo-Moorhead Metropolitan Area 2016-2020 Transit Development Plan (December 2016)

- City of Moorhead Arts and Culture Framework Development Plan (February 2019)
- City of Moorhead ADA Transition Plan for Public Right-of-Way (July 2018)
- Fargo/West Fargo Parking and Access Study (December 2018)

Previous and Planned Projects

To identify capital improvement projects completed, planned, or programmed within and around the study area the study team reviewed the Metro COG 2020-2023 Transportation Improvement Program and the Moorhead 2020-2025 Capital Improvement Plan. **Figure 2** identifies future projects in the study area as depicted in the Capital Improvement Plan. The projects include:

- 17th Street N Rehabilitation from 1st Avenue N to 15th Avenue N, Planned 2022
- 15th Avenue N Rehabilitation, Completed 2019
- 4th Avenue N Rehabilitation from 14th Street N to 17th Street N, Planned 2022

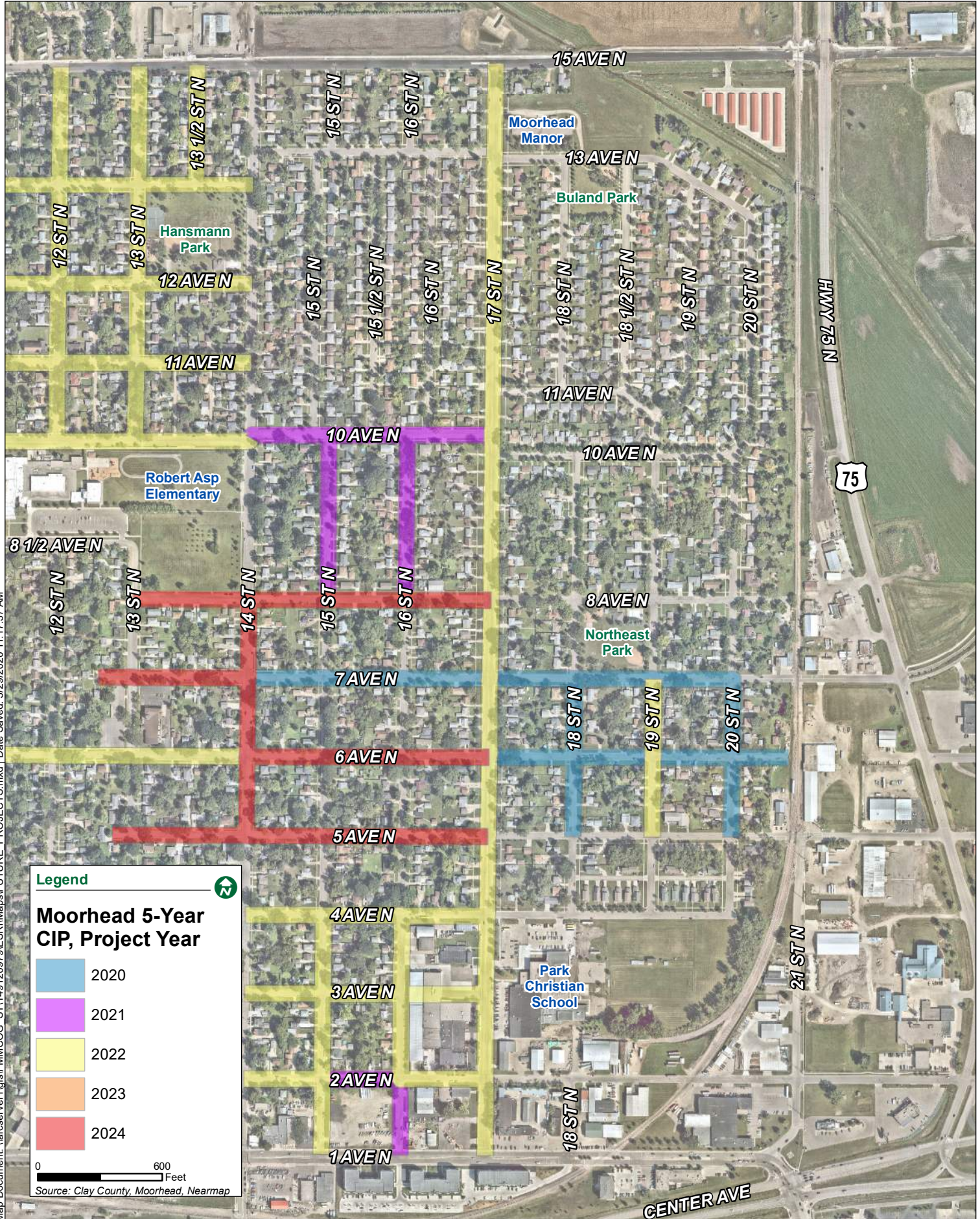
Demographics and Trends

This section provides an overview of past and projected demographics in the area, to demonstrate how growth has and will impact demand for facilities.

Population and Households

The City of Moorhead has experienced significant and steady growth since 2000. Between 2000 and 2018, the population of the City increased by 31.6%. Based on forecasts developed by the Metro COG in the 2016 Fargo-Moorhead Demographic Forecasts, the population is expected to continue rising and increase 39% by 2045. This growth rate is higher than that of Minnesota. **Table 1** shows the population, number of households, and persons per household for the City of Moorhead.

Growth rates equivalent to those seen in Moorhead have important implications on local transportation systems, including residential roadways such as 17th Street N. Rapid growth can increase rates of travel to Park Christian School and local businesses in the area. The 17th Street corridor is an important commuter route as it provides a direct north-south connection for many residents living in the area. As population increases, it is possible that demand for the roadway, public transportation, and improved bicycle/pedestrian facilities will increase.



Map Document: \\arcserver\lgis\FMMCOG_STT\49120979\ESRI\Map\Map\FUTURE_PROJECTS.mxd | Date Saved: 5/29/2020 11:17:37 AM

Table 1: City of Moorhead – Population and Households					
Category	2000	2010	2018	2045 ⁴	% Change 2000-2018
Population	32,177 ¹	38,065 ²	42,359 ³	58,870	31.6%
Households	12,180 ²	15,274 ²	15,999 ³	22,560	31.4%
Persons per Household	2.43 ²	2.41 ²	2.42 ³	2.47	~0%

¹Source: City of Moorhead Comprehensive Plan Update (2009)

²Source: U.S. Census Bureau

³Source: American Community Survey (5-year estimates 2014-2018)

⁴Source: 2016 Fargo-Moorhead Demographic Forecasts

Age

Like population, age distribution (**Table 2**) has the capacity to affect transportation usage and demand. In 2018, the median age in Moorhead was approximately 30 years old. This is younger than both Clay County and Minnesota. In 2018, the largest population cohort in Moorhead was between 20-24 years old. This is likely partially due to the colleges and universities in the Fargo-Moorhead Metropolitan Area. The large number of college-aged students in the City contributes to this younger median age. According to the Fargo-Moorhead Long Range Transportation Plan, this age cohort is the most likely to commute via public transportation. This leads to greater demand for public transportation and other alternate forms of transportation in Moorhead than in the rest of Clay County.

About 23% of Moorhead’s population was under 18 in 2018. While this percentage is smaller than the percentage of Clay County residents that were under 18, it is still indicative of the importance of pedestrian/bicycle safety and programs such as Safe Routes to School. About 12% of City residents are over 65 years old. This cohort of residents typically shows greater demand for public transit and services such as dial-a-ride transit.

Table 2 – Age Distribution, 2018		
Age	Moorhead	Clay County
Under 5	2,964	4,513
5-9	2,732	4,288
10-14	2,439	3,956
15-19	4,070	5,446
20-24	5,713	6,527
25-29	3,378	4,430
30-34	3,168	4,487
35-39	2,603	3,979
40-44	2,076	3,440
45-49	1,974	3,409

50-54	1,947	3,414
55-59	2,408	3,663
60-64	1,869	3,172
65-69	1,461	2,506
70-74	1,089	1,663
75-79	764	1,388
80-85	670	1,065
85 and Over	1,070	1,455
Median Age	29.9	32.5
% Under 18	22.6%	24.1%
% Over 65	11.9%	12.9%

Source: US Census Bureau – ACS 5-year Estimates (2014-2018)

Employment

The Minnesota Department of Employment and Economic Development (DEED) estimates approximately 14,329 jobs exist in the City of Moorhead as of 2019. The average weekly earnings are \$796 per week. The largest industries are education and health services; trade, transportation, and utilities; and retail trade. 43.7% of workers are employed in the education and health services industry. 20% of workers are employed in the trade, transportation, and utilities industry which could indicate increased demand for efficient roadways. Job growth is expected in the City as population increases. This may put strain on commuter routes, such as 17th Street N, if the City does not work to increase roadway efficiency and multimodal transportation options.

In 2018, the majority of Moorhead employees either drove alone or carpooled to work (**Table 3**). This high reliance on driving single-occupancy vehicles could mean greater numbers of automobile trips as population in the City increases, placing greater demand on the existing transportation infrastructure. Currently, only 5.5% of employees rely on public transportation, bike, or walk to work. This share could increase as Moorhead executes various plans to improve multimodal transportation in the City.

Table 3 – Means of Transportation to Work, 2018		
Means	City of Moorhead	Clay County
Drove Alone	79.5%	79.6%
Carpooled	7.7%	8.3%
Transit	1.4%	1.0%

Walked	3.4%	3.1%
Bicycle	0.7%	0.6%
Other Means	0.9%	0.8%
Worked at Home	6.3%	6.6%
Mean Travel Time to Work (Minutes)	17.3	19.6

Source: US Census Bureau – ACS 5-year Estimates (2014-2018)

Transportation System Characteristics

In the context of the overall transportation system, 17th Street N serves as a collector roadway providing a key connection from 1st Avenue N to 15th Avenue N and ultimately providing connections to US Highway 75 and US Highway 10. The connection to 1st Avenue N and associated land uses such as D-S Beverages, Burger Time, Stenerson Bros. Lumber, and Park Christian School influence traffic and use of the 17th Street N corridor.

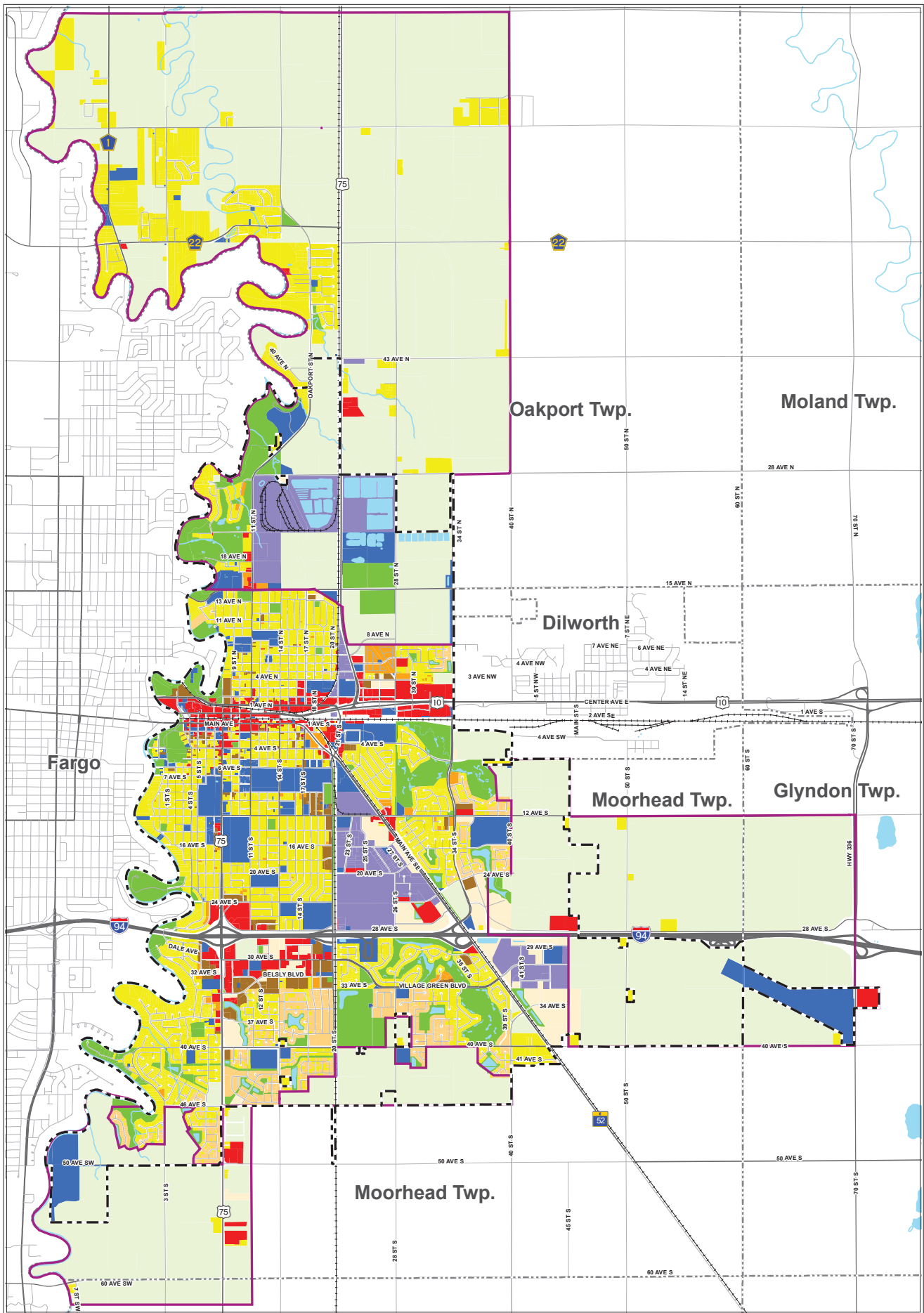
Land Use and Major Traffic Generators

Existing and future land uses, as well as major traffic generators, within in the study area are shown on **Figures 3 and 4** and described below.

Existing Land Use Patterns

Segment 1 – 1st Avenue N to 4th Avenue N, the commercial and institutional segment, is primarily zoned Community Commercial and Public/Institutional. These zoning districts are associated with adjacent local businesses and Park Christian School. The southern extent of the study area touches the Mixed-Use development area along the south side of 1st Avenue N.

Segment 2 – 4th Avenue N to 15th Avenue N, the residential segment is primarily Low Density Residential and mostly made up of single-family homes. A few multi-family housing units and two local parks exist within 2-3 blocks adjacent on either side of the 17th Street N study corridor. At the north end, on the northeast quadrant of 17th Street N and 13th Avenue N is a zone of High Density Residential that is home to Moorhead Manor, an assisted living facility that provides an intermediate level of care for residents who cannot safely live independently including senior care. The north end of the study corridor touches an area currently zoned as Agricultural on the north side of the north end of 15th Avenue N (County Road 83).



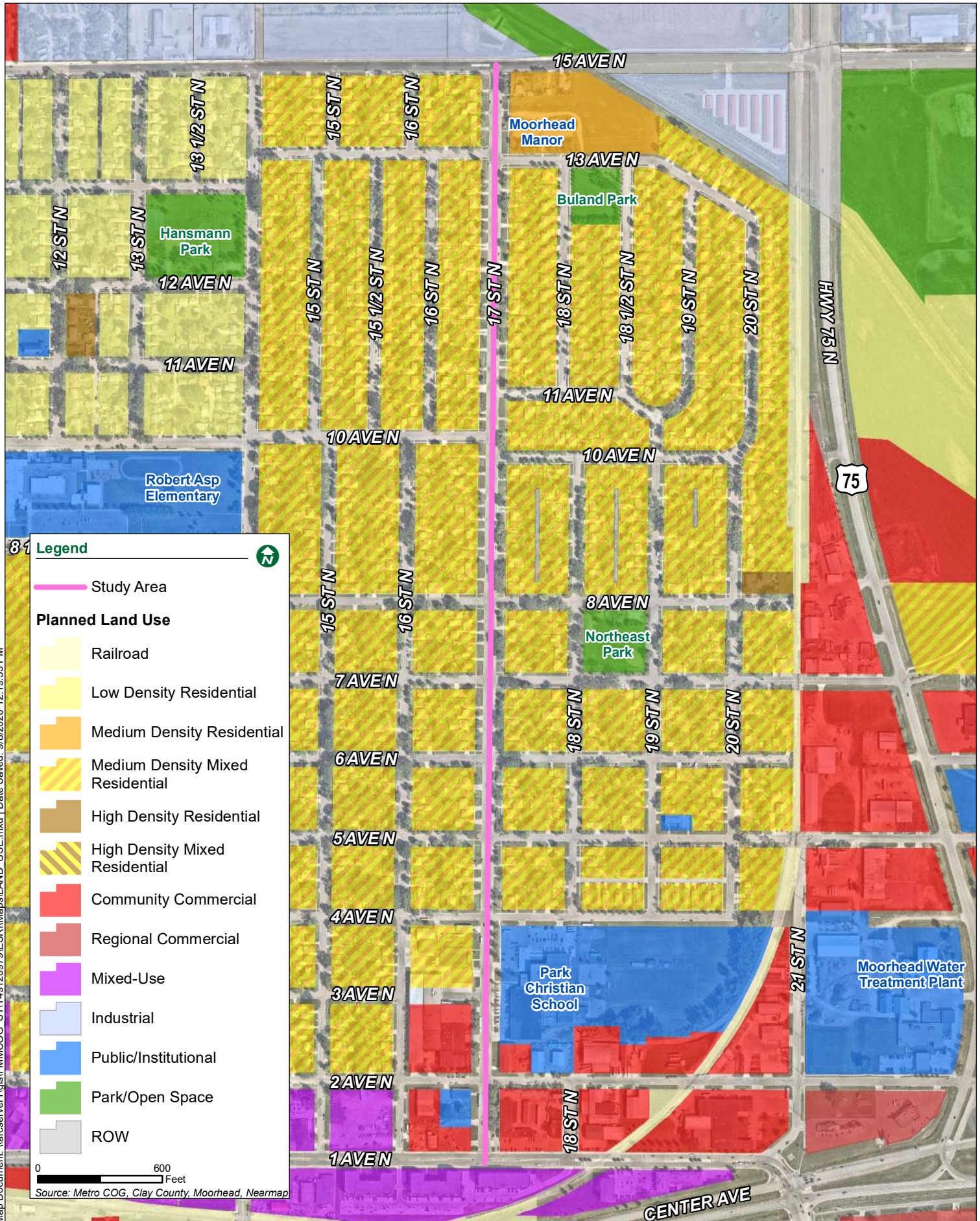
Existing Land Use

2009 Comprehensive Plan Addendum
City of Moorhead, Minnesota
















- | | |
|----------------------------|----------------------------------|
| Moorhead City Boundary | Commercial |
| Growth Area Boundaries | Industrial |
| Other Municipal Boundary | Parks/Open Space |
| Agricultural | Public/Semi-Public/Institutional |
| Low Density Residential | Vacant Platted Residential |
| Medium Density Residential | Vacant |
| High Density Residential | Open Water |

Figure 3



Map Document: \\arcserver\lgis\FMMCOG_STT\49120979\ESRI\Map\LAND_USE.mxd | Date Saved: 9/8/2020 12:19:53 PM

Legend

-  Study Area
- Planned Land Use**
-  Railroad
-  Low Density Residential
-  Medium Density Residential
-  Medium Density Mixed Residential
-  High Density Residential
-  High Density Mixed Residential
-  Community Commercial
-  Regional Commercial
-  Mixed-Use
-  Industrial
-  Public/Institutional
-  Park/Open Space
-  ROW

0 600 Feet
 Source: Metro COG, Clay County, Moorhead, Nearmap

Future Land Use Patterns

Segment 1 – *1st Avenue N to 4th Avenue N, the commercial and institutional segment*, will only see a proposed land use change at the southwest quadrant of 17th Street N and 4th Avenue N, which is currently zoned Commercial and is proposed to be zoned Medium Density Mixed Residential. The 2009 Comprehensive Plan Addendum defines Medium Density Residential as a density of 4 to 10 units per acre. The remainder of this study area segment will remain primarily a mix of Community Commercial and Public/Institutional with the southern extent also remaining Mixed Use development along the south side of 1st Avenue N.

Segment 2 – *4th Avenue N to 15th Avenue N, the residential segment*, will see zoning changes throughout the segment from Low Density Residential to Medium Density Mixed Residential, as proposed in the 2009 Comprehensive Plan Addendum. This zoning update will provide for growth in residential density to support the developing Community Commercial and Mixed-Use areas along 1st Avenue N and the nearby downtown. The northeast quadrant of 17th Street N and 13th Avenue N, that is home to the Moorhead Manor, is proposed to be changed from High Density Residential to Medium Density Residential. At the north end of the study corridor, north of 15th Avenue N, the existing Agricultural zone is proposed to be changed to Industrial.

Major Traffic Generators

Segment 1 – *1st Avenue N to 4th Avenue N, the commercial and institutional segment*, results in a dense concentration of uses that drive major local and regional traffic. Traffic generation is further increased by direct access to 1st Avenue N and close proximity access to US Highway 10.

The Park Christian School zone generates high peak hour volumes of bus, student driver, and parent drop off and pick up traffic along the corridor. D-S Beverages generates heavy commercial truck traffic between the location just north of 2nd Avenue and US Highway 10.

Segment 2 – *4th Avenue N to 15th Avenue N, the residential segment* is a major local traffic trip generator as it serves connections to several single-family, multiple vehicle households. North of 15th Avenue N, the zoned Industrial area would be most conveniently served by US Highway 75 and 15th Avenue N (County Road 83) and should result in little to no heavy truck traffic on 17th Street N.

Existing Traffic Operations

Turning movement count data was collected along 17th Street N at the intersections of 15th Avenue, 8th Avenue, and 1st Avenue in September 2020. Park Christian School was in session when the count was taken. The traffic counts were compared to previous count data available to determine if modifications were to be made to the data or if the count was reflective of

normal traffic. Traffic volumes at 15th Avenue were found to be normal, but the traffic volumes at 8th Avenue and 1st Avenue were found to be lower than previous count data indicated so these counts were increased accordingly.

An analysis of existing AM and PM peak hour intersection operations was completed in Synchro/SimTraffic. All intersections in the study area are stop controlled. 15th Avenue at the north extent and 1st Avenue at the south extent of the study area have stop controls that stop traffic on 17th Street N and give right of way to the east-west Minor Arterial roadways. 8th Avenue at 17th Street N is all way stop controlled. All other intersections are side street stop controlled giving right of way to 17th Street N traffic.

The average intersection delay is a volume-weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from Level of Service (LOS) A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D are generally perceived to be acceptable to drivers. LOS E indicates that an intersection is operating at, or very near, its capacity and that travelers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity resulting in substantial delays. **Table 4** shows the intersection delay as well as the maximum delay of all movements at each intersection.

Table 4 – Existing Traffic Operations Analysis				
Intersection	Peak Hour	Intersection (Delay* - LOS)	Maximum Movement	
			Mvmt	Delay* - LOS
1st Ave & 17th St <i>Two-Way Stop Controlled</i>	AM	3 - A	SBL	26 - D
	PM	2 - A	SBL	22 - C
17th St & 8th Ave <i>All-Way Stop Controlled</i>	AM	6 - A	WBT	8 - A
	PM	6 - A	NBT	7 - A
17th St & 15th Ave <i>Two-Way Stop Controlled</i>	AM	2 - A	NBL	9 - A
	PM	2 - A	NBL	11 - B

*Delay is in seconds per vehicle

Based on the existing conditions operational analysis, all intersections operate with LOS A overall. The southbound left at 1st Avenue and 17th Street N operates with LOS D during the AM peak hour and LOS C during the PM peak hour. All other movements operate with LOS A or B. The maximum eastbound left turn queue at the intersection of 1st Avenue and 17th Street N extends beyond the channelized turn lane during the AM peak hour. The maximum eastbound left turn queue extends 150 ft where the storage length is 120 ft. The average queue extends 50 ft. Additionally, due to the close proximity of driveways along the southbound approach of

the 1st Avenue and 17th Street N intersection, the maximum southbound left turn queue and average southbound right turn queue block driveways. All other queues are acceptable.

Future No-Build Traffic Conditions

Traffic forecasts were developed analyzing historical growth, household/population/employment projections anticipated for the area, and future land use projections using the traffic forecasting methodology detailed in this Study's Traffic Forecasting Memorandum. Forecasted 2045 AM and PM peak hour intersection operations were also completed in Synchro/SimTraffic. The results are show in **Table 5**.

Table 5 – 2045 No Build Traffic Operations Analysis				
Intersection	Peak Hour	Intersection (Delay* - LOS)	Maximum Movement	
			Mvmt	Delay* - LOS
1st Ave & 17th St <i>Two-Way Stop Controlled</i>	AM	6 - A	SBL	113 - F
	PM	4 - A	SBL	56 - F
17th St & 8th Ave <i>All-Way Stop Controlled</i>	AM	5 - A	WBT/SBT	6 - A
	PM	5 - A	NBL	6 - A
17th St & 15th Ave <i>Two-Way Stop Controlled</i>	AM	3 - A	NBL	12 - B
	PM	2 - A	NBL	14 - B

*Delay is in seconds per vehicle

The results of the 2045 No Build operational analysis indicate that the intersection delay overall remains acceptable with LOS A during both peak hours at all three intersections analyzed. The southbound left movement at 1st Avenue and 17th Street N is anticipated to operate with LOS F during both peak hours with an average delay of nearly two minutes per vehicle during the AM peak hour and nearly one minute per vehicle during the PM peak hour. All other movements operate with LOS C or better. The maximum eastbound left turn queue at the intersection of 1st Avenue and 17th Street N extends beyond the channelized turn lane during the AM peak hour. The maximum eastbound left turn queue extends 200 ft where the storage length is 120 ft. The average queue extends 75 ft. Additionally, the average southbound queues at the 1st Avenue and 17th Street N intersection block driveways along 17th St N at. All other queues are acceptable.

Crash History

A crash analysis was completed for the study area to understand the existing safety concerns. A segment crash analysis was completed for the 17th Street N corridor from 1st Ave N to 15th Ave N in addition to intersection crashes. Crash data from the most recent five years (2015-2019) was evaluated. The crash history is summarized in **Figure 5**.

The key results of the crash analysis for the timeframe between 2015-2019 include:

- 13 intersection crashes
- 9 of the 13 crashes were right angle crashes
- There were no reported fatal crashes
- There was one reported non-fatal severe crash
- There were no reported pedestrian or bicycle crashes
- The intersection of 1st Ave N and 17th Street N operates outside the normal range compared to similar intersection statewide for total crash rate as well as fatal and serious crash rate with one serious injury crash.
- All other intersections operate within the normal range compared to similar intersections statewide.
- The overall corridor operates within the normal range compared to other two lane roadways with similar AADT.

A ten-year (2010-2019) crash analysis was completed for fatal crashes in addition to crashes involving a pedestrian and/or bicycle. There was a possible injury bicycle crash at the intersection of 1st Ave N and 17th Street N in 2011. The bicyclist was crossing 17th Street N and was hit by a vehicle along southbound 17th Street N attempting to turn right onto 1st Ave N. There is a sidewalk along the north side of 1st Ave N where the bicyclist was crossing, but the crosswalk is not marked. There were no reported fatal crashes or pedestrian crashes in the last ten years.

Tables 6 and 7 below summarize the total crash rate findings for the intersections and segment overall.

Table 6 – Intersection Crash Summary (2015-2019)						
Intersection	Total Crashes	Severe Crashes (K + A)	Actual Crash Rate*	Statewide Average	Critical Rate**	Critical Index***
1st Ave N & 17th St N	7	1	0.29	0.09	0.27	1.09
2nd Ave N & 17th St N	1	0	0.16	0.09	0.47	0.33
4th Ave N & 17th St N	1	0	0.19	0.09	0.52	0.36
6th Ave N & 17th St N	1	0	0.23	0.09	0.57	0.40

7th Ave N & 17th St N	1	0	0.17	0.09	0.50	0.35
8th Ave N & 17th St N	1	0	0.23	0.24	0.96	0.24
11th Ave N & 17th St N	1	0	0.50	0.09	0.88	0.57

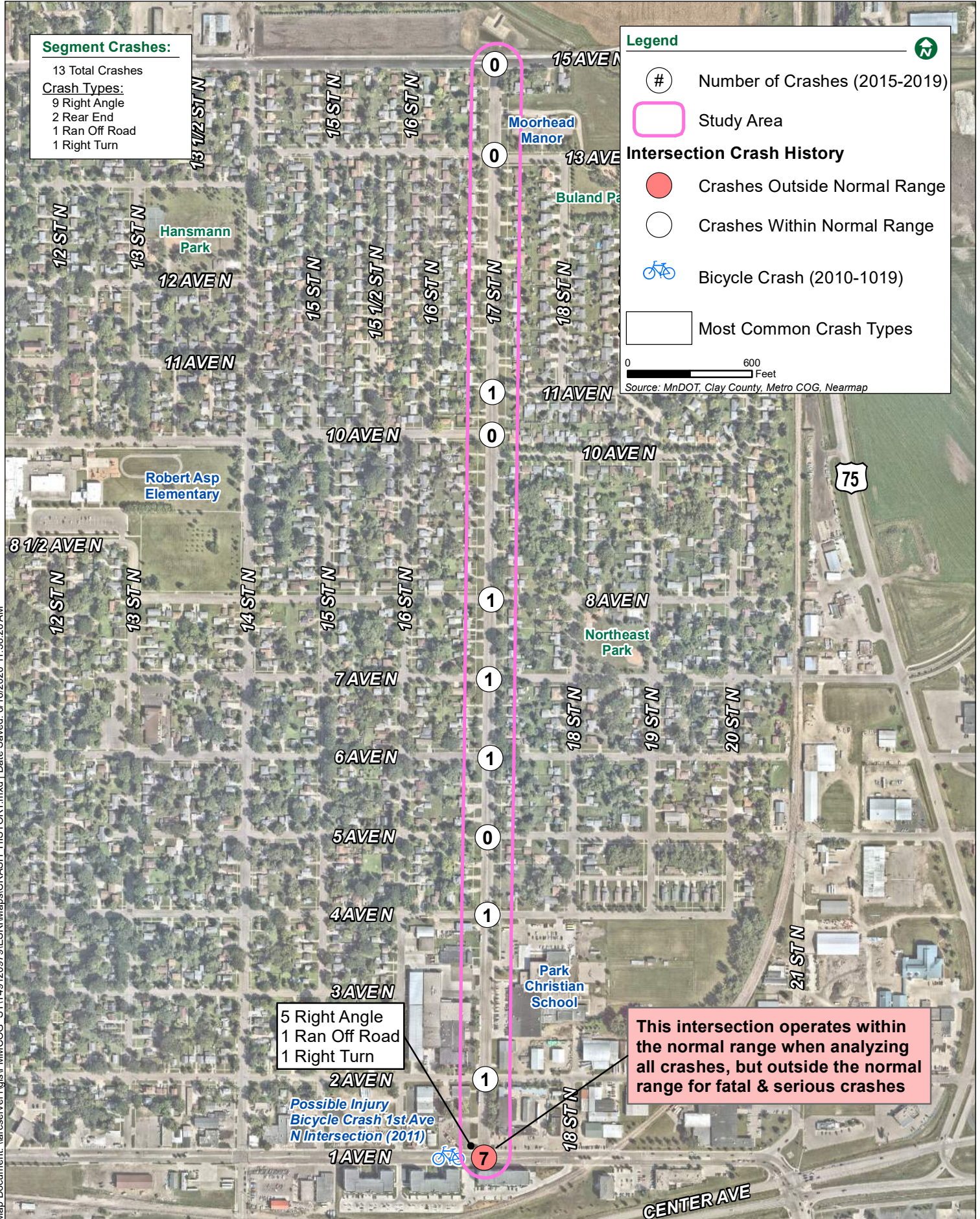
Table 7 – Segment Crash Summary (2015-2019)

Segment	Total Crashes	Severe Crashes (K + A)	Actual Crash Rate*	Statewide Average	Critical Rate**	Critical Index***
17th St N from 1st Ave N to 15th Ave N	13	1	2.09	1.32	2.59	0.81

***Crash Rate** – The number of crashes per million entering vehicles.

****Critical Rate** – A statistical comparison based on similar intersections statewide.

*****Critical Index** – Reports the magnitude of the difference between the crash rate and the critical rate. If the critical index is greater than 1 this indicates that the intersection is operating outside the expected range when compared to similar intersection statewide.



Corridor Access

The “Fargo/West Fargo Parking and Access Study” outlines recommended access spacing for various roadway types. While 17th Street N is located within the City of Moorhead, the access study provides guidance that is applicable to the project corridor. The primary, secondary, and private accesses are identified in **Figure 6**. The “Fargo/West Fargo Parking and Access Study” provides recommended spacing between signals, unsignalized full accesses, right-in/right-outs, and driveways based on roadway type.

The access study identifies seven roadway types: regional arterial, commercial arterial, mixed use arterial, mixed use collector, residential collector, mixed use neighborhood, and residential neighborhood. The functional classification of 17th Street N is a collector, but the land use changes at 4th Ave N with the south portion of the corridor serving commercial and public/institutional uses and the northern portion serving residential homes. Based on the land uses, segment 1, 17th Street N from 1st Ave N to 4th Ave N, was analyzed as a mixed-use collector roadway and segment 2, 17th Street N from 4th Ave N to 15th Ave N, was analyzed as a residential collector. The recommended spacing between unsignalized full access intersections is 300-400 feet for both roadway types. **Table 8** shows the spacing between intersections along 17th Street N.

Table 8 – Full Access Intersection Spacing			
Full Access Intersections	Actual Spacing (ft)	Recommended Spacing (ft)	Meets Spacing Recommendation
1st Ave N to 2nd Ave N	330	300 - 400	Yes
2nd Ave N to 3rd Ave N	365	300 - 400	Yes
3rd Ave N to 4th Ave N	340	300 - 400	Yes
4th Ave N to 5th Ave N	340	300 - 400	Yes
5th Ave N to 6th Ave N	340	300 - 400	Yes
6th Ave N to 7th Ave N	340	300 - 400	Yes
7th Ave N to 8th Ave N	350	300 - 400	Yes
8th Ave N to 10th Ave N	660	300 - 400	Yes
10th Ave N to 11th Ave N	170	300 - 400	No
11th Ave N to 13th Ave N	1080	300 - 400	Yes
13th Ave N to 15th Ave N	380	300 - 400	Yes

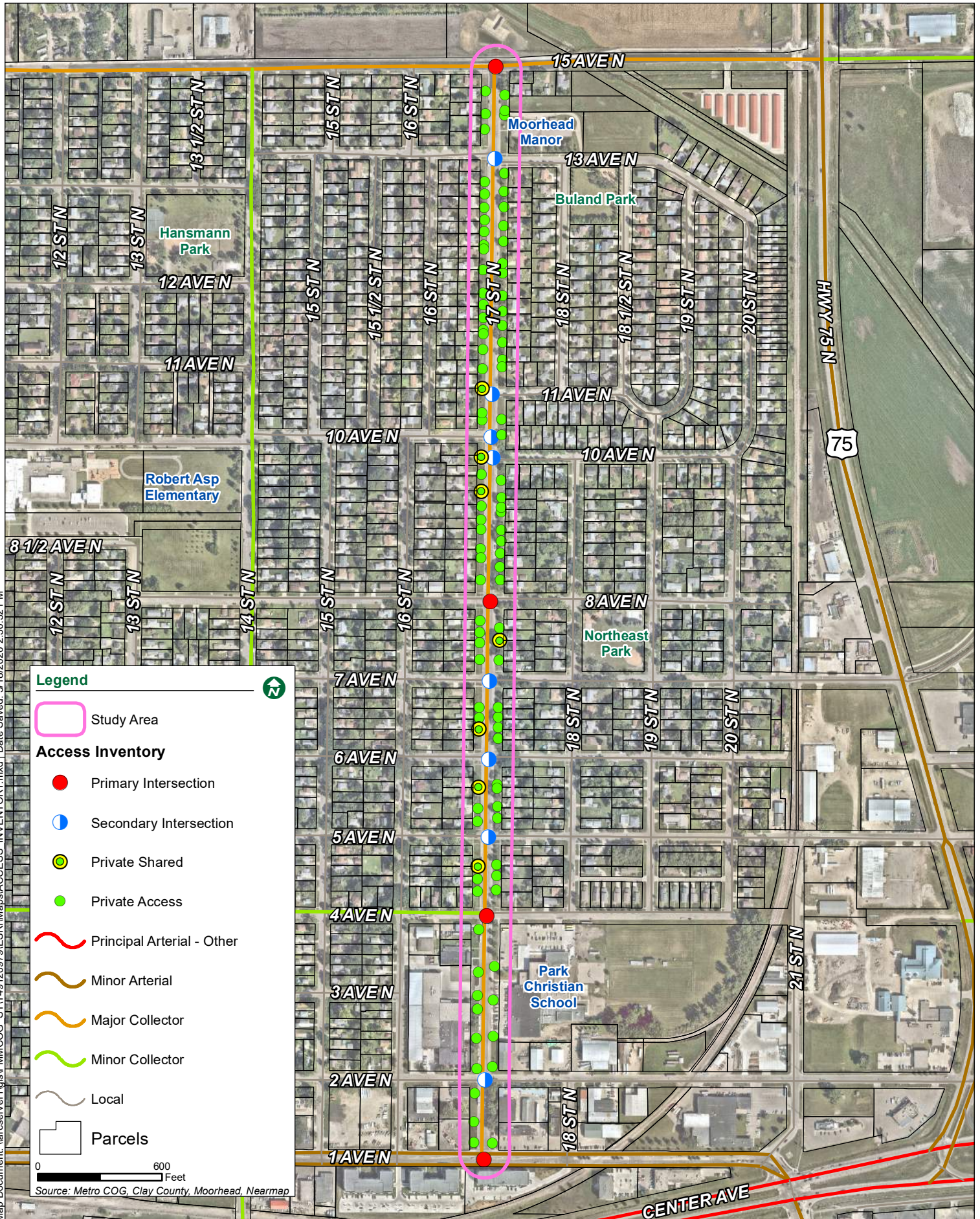
Table 8 shows that the recommended spacing is met between all full access intersection except between 10th Ave N and 11th Ave N. It should be noted that the intersections of 10th Ave N and 13th Ave N are offset. The 10th Ave N intersection approaches are offset by approximately 100 ft. The 13th Ave N intersection approaches are offset by approximately 40 ft.

The spacing between driveways was also analyzed along 17th Street N. The recommended driveway spacing differs between the two roadway types. For a mixed-use collector roadway, driveways are recommended to be spaced 200 ft apart. For a residential collector roadway, driveways are recommended to be spaced 50-100 ft apart. **Table 9** shows the spacing between driveways along 17th Street N. Since there were multiple driveways between each intersection a range in spacing reflecting the shortest to longest distance was listed.

Table 9 – Driveway Spacing			
Intersections	Actual Driveway Spacing (ft)	Recommended Driveway Spacing (ft)	Meets Spacing Recommendation
1st Ave N to 2nd Ave N	30-115	200	No
2nd Ave N to 3rd Ave N	20-110	200	No
3rd Ave N to 4th Ave N	20-200	200	No
4th Ave N to 5th Ave N	30-110	50-100	No
5th Ave N to 6th Ave N	40-105	50-100	No
6th Ave N to 7th Ave N	30-110	50-100	No
7th Ave N to 8th Ave N	30-70	50-100	No
8th Ave N to 10th Ave N	30-85	50-100	No
10th Ave N to 11th Ave N	15-90	50-100	No
11th Ave N to 13th Ave N	5-105	50-100	No
13th Ave N to 15th Ave N	55-190	50-100	Yes

Table 9 indicates that the only segment along 17th Street N with all driveways spaced such that they meet the recommendation for the designated roadway type is between 13th Ave N and 15th Ave N.

The MnDOT Access Management Manual was also utilized to evaluate the corridor spacing. MnDOT provides guidance based on facility type and environment. For an urban collector the recommended spacing between two primary full access intersections is 660 ft. For a collector in an urban core environment the recommended spacing is 300-660 ft. For collector roadways there is not a specific driveway spacing recommended.



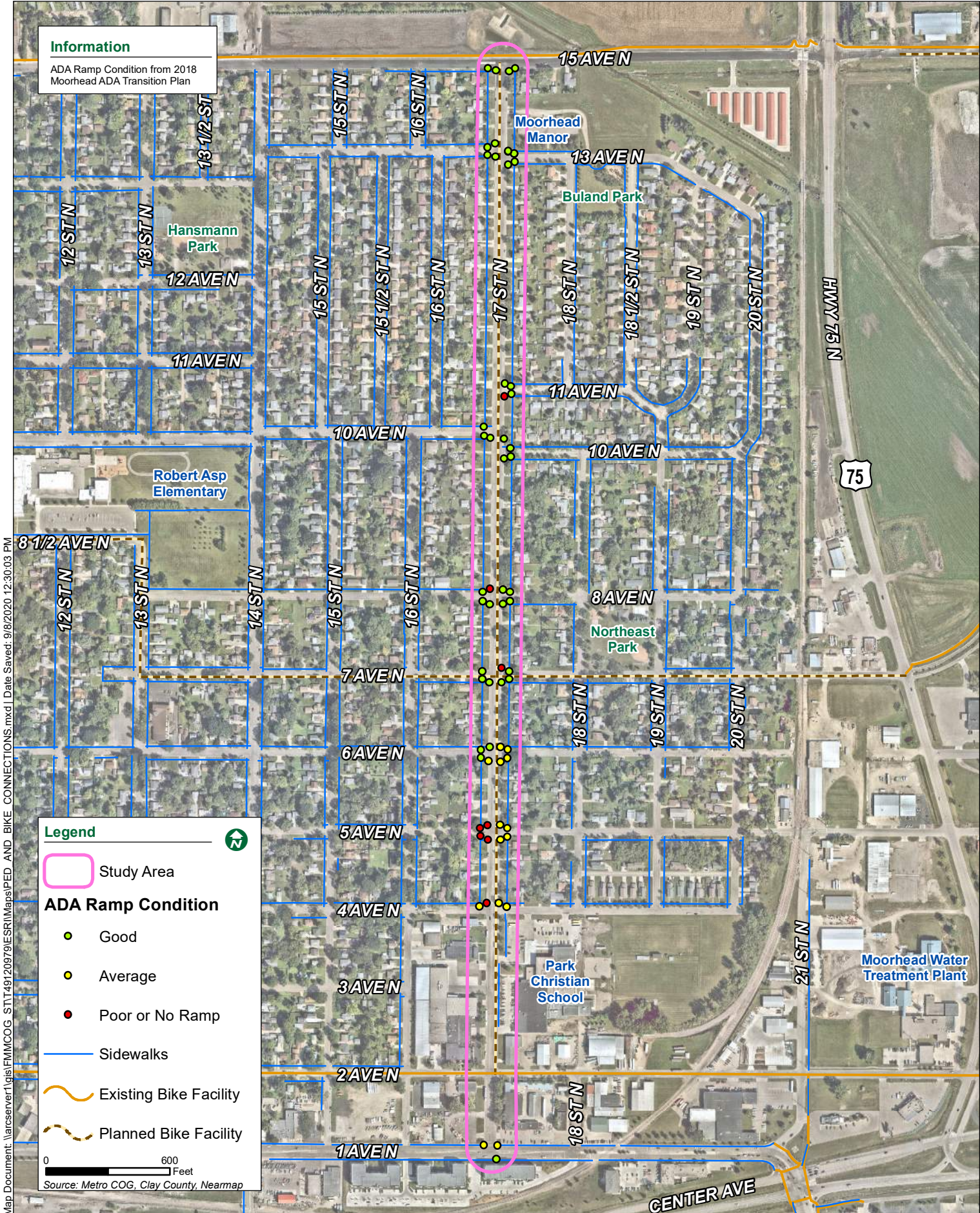
Pedestrian and Bicycle Connections

Existing and planned pedestrian and bicycle connections along the 17th Street N corridor are shown in **Figure 7**. A planned bicycle facility on 17th Street N would connect to two local bicycle facilities at 2nd Ave N and 15th Ave N. These two facilities connect the corridor to the Red River, commercial and employment opportunities in downtown Moorhead, Fargo, Dilworth, and North Dakota State University.

Additionally, the planned facility on 17th Street N would improve connections for bicycle commuters and recreational bicyclists between 2nd Avenue N and 15th Avenue N, another critical north-south link in North Moorhead. There is also a planned bicycle facility along 7th Ave N which would cross 17th Street N and further improve bicycle connections in the area.

17th Street N includes pedestrian sidewalks from 4th Ave N to 15th Ave N, running along the residential section of the corridor. Pedestrian facilities do not exist along the corridor from 1st Ave N to 4th Ave N except for recent improvements near Park Christian School. There are several instances of ADA pedestrian ramps in poor condition or absent at intersections along 17th St. These are listed below:

- Northwest corner of 17th Street N and 4th Ave, crossing 17th Street N
- Northwest and Southwest corners of 17th St and 5th Ave, crossing 17th Street N and 5th Ave N
- Northeast corner of 17th Street N and 7th Ave, crossing 17th Street N
- Northwest corner of 17th Street N and 8th Ave, crossing 17th Street N
- Southeast corner of 17th Street and 11th Ave, crossing 17th Street N



Transit Service

MATBUS, Fargo-Moorhead Metropolitan Area’s public transportation service, offers 23 fixed routes, in addition to door-to-door services for people with disabilities and senior citizens.

Figure 8 shows the transit routes and bus stops offered along and near the 17th Street N corridor. Route 4, which runs along 17th Street from 7th Ave N to 13th Ave N, operates Monday through Friday from 6:15 AM to 11:15 PM and Saturdays from 7:15 AM to 11:15 PM. Service along the route is scheduled for every 30 minutes. The route runs Northbound along 17th St, turning onto the corridor at 7th Ave and stopping five times before turning off the corridor at 13th Ave. Route 4 connects the corridor to both downtown Moorhead and downtown Fargo. From here, transit riders can reach many important destinations in the cities, including Minnesota State University – Moorhead, North Dakota State University, and the West Acres Shopping Center.

In May 2020, an extra bus was temporarily added to Route 4 during peak ridership hours – 10:00 AM to 7:00 PM – to assist riders in socially distancing while on the bus. Having trips available every 20 minutes, instead of every 30 minutes, allows riders to have more options for travel times and prevents crowding on buses.

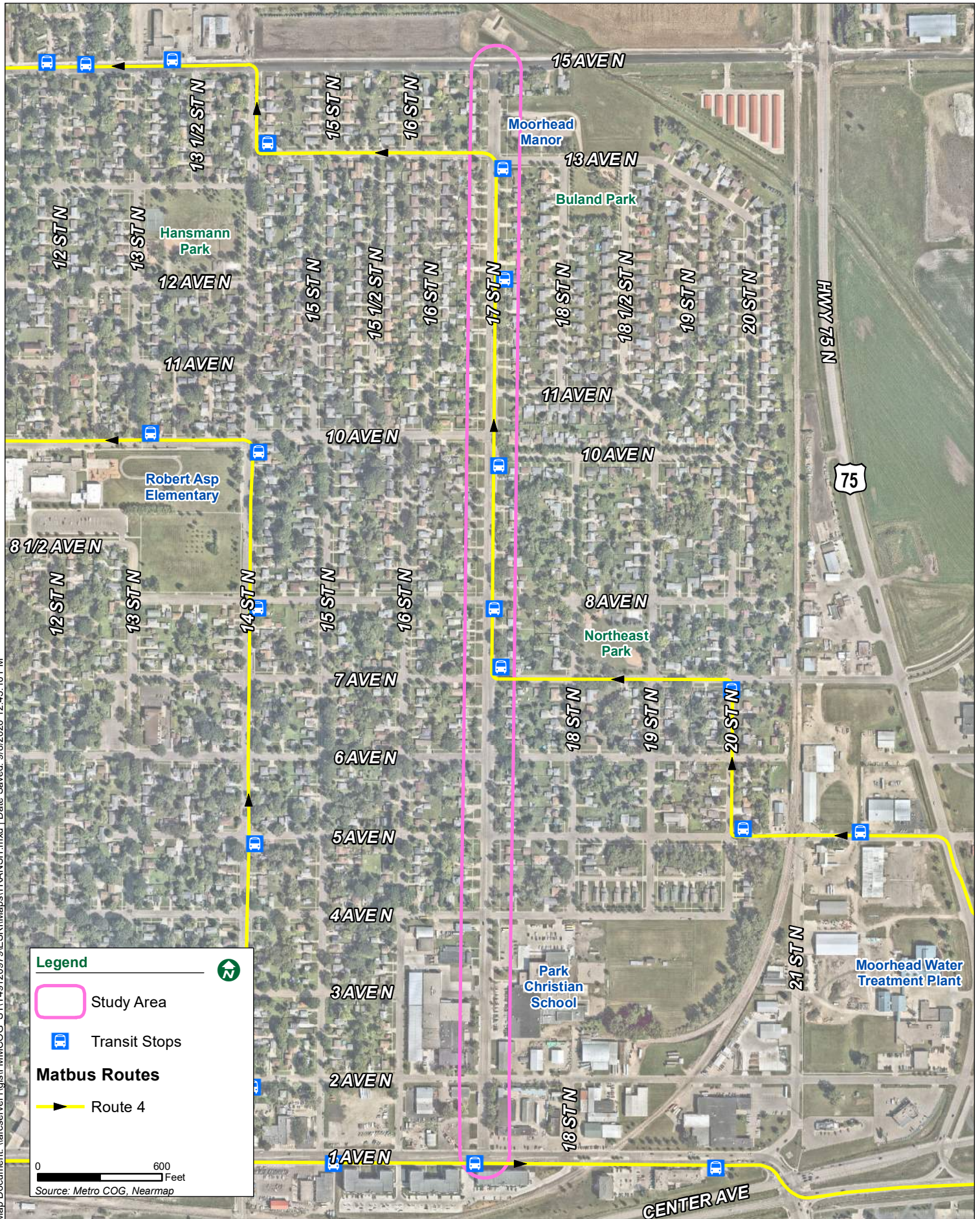
Maintenance

The existing pavement typical section on the 17th Street N corridor is approximately 60 feet curb-to-curb from 1st Ave N to 15th Ave N. This width provides unique challenges compared to similar two and three-lane roadways in the city. Existing bituminous surface maintenance requires more materials, time, and cost. Likewise, winter roadway maintenance requires additional sand/salt material and snowplow trips compared to similar roadways.

Signal Warrant Analysis

A signal warrant analysis was completed at the intersections of 1st Avenue N and 15th Avenue N with 17th Street N. Both existing and 2045 forecasted volumes were analyzed. The signal warrant analysis indicated that signals are not justified at either location with existing or 2045 traffic volumes.

At the intersection of 17th Street N and 15th Avenue N both the mainline and minor street volumes are too low to justify a traffic signal. At the intersection of 17th Street N and 1st Avenue N, the mainline volumes are high enough with nine hours meeting the mainline volume threshold for warrant 1A, however, the minor street volumes are too low to justify a traffic signal. The results of the signal warrant analysis are shown in **Appendix B**.



IV. Purpose & Need Framework

Purpose

Metro COG and the City of Moorhead desire to define a comprehensive vision for 17th Street in preparation for the 2022 street rehabilitation project. The purpose of the 17th Street N Corridor Study is to:

- Identify context-sensitive transportation improvements that will safely accommodate all users
- Provide efficient mobility and access for all modes of travel
- Preserve community connections
- Encourage economic vitality
- Future improvements should also include financially responsible infrastructure that is compatible with the natural and built environment

To achieve these goals the study’s primary structure included defining the issues and potential opportunities along the corridor, establishing the corridor vision and goals, and developing and evaluating potential multimodal infrastructure improvement alternatives.

Need

Study partners aimed to address the following needs for 17th Street N in the City of Moorhead:

Modal Interrelationships

WALKABILITY/BIKEABILITY

Within and connecting to the study area, there are many destinations for pedestrians and bicyclists to travel to/from. The study area is served by an incomplete and mostly non-ADA compliant pedestrian sidewalk system and two east-west local bicycle facility connections that intersect 17th Street N at 15th and 2nd Avenue N. These bicycle facility connections provide both pedestrian and bicycle connections to and from 17th Street N. Complete descriptions of existing facilities and maps illustrating the existing and planned network of sidewalks and trails can be found in the 17th Street N Corridor Study Existing Conditions Report – **Appendix B.**



TRANSIT SERVICE

MATBUS, Fargo-Moorhead Metropolitan Area’s public transportation service, offers Route 4, which runs along 17th Street from 7th Ave N to 13th Ave N. Route 4 connects the corridor to both downtown Moorhead and downtown Fargo. Current stops along 17th Street are unimproved and do not contain any amenities such as shelters, benches, lighting, or bus bulbs. The lack of ADA accommodations near bus stop locations limits the accessibility to the transit service.

HEAVY COMMERCIAL VEHICLE MOVEMENTS

A few heavy commercial vehicle generating businesses/developments have been identified in the south end of study corridor (Segment 1). According to 2019 traffic data, heavy commercial vehicles account for approximately 9 to 12 percent of all trips on 17th Street N.



Vehicle Mobility

The 17th Street N corridor is an important north-south connection facilitating travel between local residential streets to 1st Avenue N (a Minor Arterial roadway) and 15th Avenue N (a Major Collector roadway). Future improvements must ensure the efficient mobility of vehicles through the corridor.

Vehicle Safety

Developed alternatives need to ensure the safe operation of vehicles along the corridor. The corridor study examined all segments of 17th Street N and its intersections for existing and future safety concerns. Alternatives developed need to provide safe vehicle transportation.

Infrastructure Conditions

PAVEMENT/MAINTENANCE REDUCTION

The existing pavement typical section on the 17th Street N corridor is approximately 60 feet curb-to-curb from 1st Ave N to 15th Ave N. The entire platted right-of-way is approximately 140 feet. This excessive width is nearly double the widths of similar adjacent roadways and provides unique challenges compared to similar two and three-lane roadways in the city. Existing bituminous surface maintenance requires more materials, time, and cost. Likewise, winter roadway maintenance requires additional sand/salt material and snowplow trips compared to similar roadways.

DRAINAGE CONCERNS

Drainage is an issue in this area as sections of curb and gutter have settled, there are a limited number and inconsistent inlets along the corridor, and the boulevard slopes are very flat. Areas of ponding occur during spring melt and storm events.

See **Appendix C** for additional considerations, potential SEE (social, economic, and environmental) factors, and the full Purpose & Need Statement.

V. Study Goals and Objectives

Table 2 outlines the goals and objectives for the 17th Street N Corridor Study. The goals and objectives are intended to align with regional and local transportation plans as much as possible. They build off the existing conditions, issues and needs outlined in the Purpose and Need Framework, and define desired results or outcomes. Multiple objectives for each goal exist to provide additional details on how the goal can be achieved. The goals and objectives were used as the framework to guide the identification and evaluation of improvement options within the study area.

Table 2 – Goals and Objectives

Goal	Objective
Safely accommodate all users (motor vehicles, freight, transit, pedestrians, bicyclists)	Eliminate serious injury crashes
	Reduce all crashes in both frequency and severity
	Provide safe pedestrian and bicycle facilities along 17 th Street N and at all crossings
Provide efficient mobility and access for all modes of travel	Provide acceptable system reliability serving existing and planned growth
	Manage access consistent with roadway functional class and access spacing guidelines when applicable
	Provide a connected transportation system that accommodates trips consistent with roadway functional class
	Accommodate business delivery and freight needs
	Accommodate future transit plans and needs

	Provide convenient access for pedestrians and bicyclists to serve demand
	Provide convenient access for vulnerable populations including youth and elderly
Develop a financially responsible infrastructure implementation plan	Develop projects and phasing that meet schedule and funding constraints
	Minimize right-of-way costs
	Minimize maintenance and lifecycle costs
	Maximize benefit-cost of improvements
	Maximize potential to secure competitive funding

Preserve community connections and economic vitality	Provide reasonable access and connectivity for businesses and neighborhoods
	Maintain sustainable access for local trips into/out of Downtown Moorhead and to/from Highway 10
	Support existing and future land use plans
	Serve the neighborhood livability for all populations including elderly and youth
	Seek consistency with regional and local plans
Provide infrastructure improvements compatible with the natural and built environment	Avoid, minimize, and mitigate impacts to the built environment
	Avoid, minimize, and mitigate impacts to sensitive environmental resources.
	Avoid, minimize, and mitigate impacts for flood risks and stormwater issues.

VI. Identification and Evaluation of Alternatives

Before developing alternatives for the 17th Street North corridor, the project team evaluated existing conditions (Section III), identified key transportation issues, and engaged community members and the general public to understand the needs and priorities for the corridor (Section VII). Following the technical analysis and public involvement, the project team identified a series of preliminary concepts for each segment of the corridor. A meeting was held with the consultant team, Metro COG, and City of Moorhead staff to review and vet the preliminary concepts. Several of the preliminary concepts were eliminated from further consideration due to a number of factors, including:

- Did not achieve project goals
- Did not achieve goals and priorities of community members
- Did not achieve broader City goals
- Cost and/or construction feasibility

After vetting the preliminary concepts, the project team narrowed down the viable alternatives and developed typical sections and conceptual plan layouts for each alternative. Two alternatives were developed for Segment 1, and five alternatives were developed for Segment 2. Typical sections of each alternative are shown and described on the following pages. Plan layouts of each alternative are shown in **Appendix E**.

Each alternative’s probable costs are based on MnDOT 2019 statewide average bid prices. To develop planning-level opinions of probable costs, it was necessary to make some assumptions about construction. The opinions of probable costs include typical construction materials and costs such as excavation, grading, base, pavement, pavement markings, and signing and markings. They also include the construction of new curb extensions as well as new ADA-compliant curb ramps at each intersection.

Each alternative includes a range for the opinions of probable costs. The high end of the range includes an allowance for design and engineering. Each opinion of probable cost also includes a 25% contingency that may account for unexpected costs or unknown project-specific cost items at this planning-level phase. These opinions of probable costs also include lump sum allowances for construction cost incidentals such as landscaping/ turf establishment, drainage/utilities, and erosion and sediment control. Individual project costs may vary; these opinions of probable costs are only intended to be used at a planning level and should be refined throughout project development.

Segment 1

Two alternatives were developed for Segment 1, and the basic characteristics of each alternative are described below. All of the alternatives feature curb extensions at some intersections which are not shown in the typical sections below. Some intersection corners in Segment 1 do not have curb extensions because of the need to accommodate large truck turning movements which made curb

extensions unviable. Curb extensions are shown in the plan view layouts for each alternative, which can be found in **Appendix E**.

Alternative 1A – Path and Sidewalk

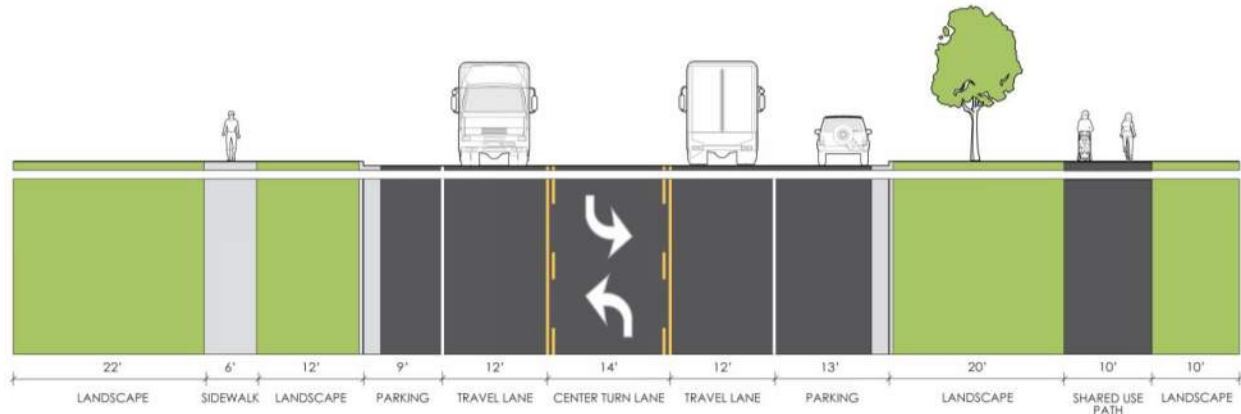


Figure 9 – Alternative 1A Typical Section

ALTERNATIVE 1A OVERVIEW:

- 10' shared use path on the east, connects with the path in front of Park Christian School
- 6' sidewalk on the west
- Curb extensions along 17th Street, but not on cross streets
- Existing travel lanes and parking lanes remain unchanged
- Marked crosswalks at each intersection

ALTERNATIVE 1A OPINIONS OF PROBABLE COSTS

The planning-level opinions of probable costs to implement Alternative 1A are \$850,000-\$980,000. The opinions of probable costs include the cost of resurfacing the roadway, adding curb extensions, rebuilding all driveway aprons on the east side, constructing a shared use path and a sidewalk, new ADA-compliant curb ramps, striping, signing and marking, and a 25% contingency for unexpected costs. The higher end of the range includes the costs for roadway design and engineering. More information on the opinions of probable costs is provided in **Appendix F**.

Alternative 1B – Path, Sidewalk, and Buffered Bike Lanes

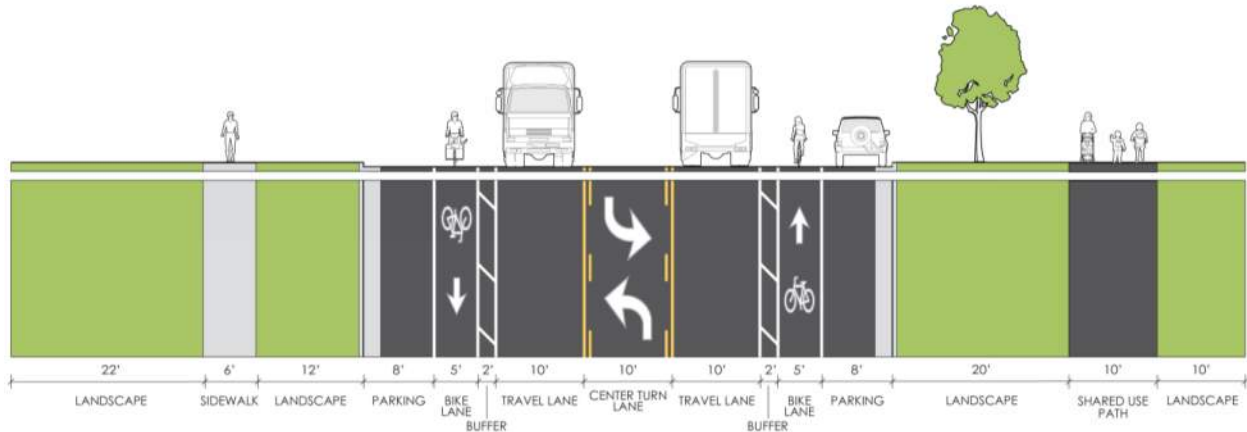


Figure 10 – Alternative 1B Typical Section

ALTERNATIVE 1B OVERVIEW:

- On-street buffered bike lanes
- 10' shared use path on the east, connects with the path in front of Park Christian School
- 6' sidewalk on the west
- Curb extensions along 17th Street, but not on cross streets
- Travel lanes and parking lanes narrowed
- Marked crosswalks at each intersection

ALTERNATIVE 1B OPINIONS OF PROBABLE COSTS

The planning-level opinions of probable costs to implement Alternative 1B are \$910,000-\$1,040,000. The estimate includes the cost of resurfacing the roadway, adding curb extensions, rebuilding all driveway aprons on the east side, constructing a shared use path and a sidewalk, new ADA-compliant curb ramps, striping, signing and marking, and a 25% contingency for unexpected costs. The higher end of the opinions of probable costs range includes the costs for roadway design and engineering. More information on the opinions of probable costs is provided in **Appendix F**.

Segment 1 – No Build

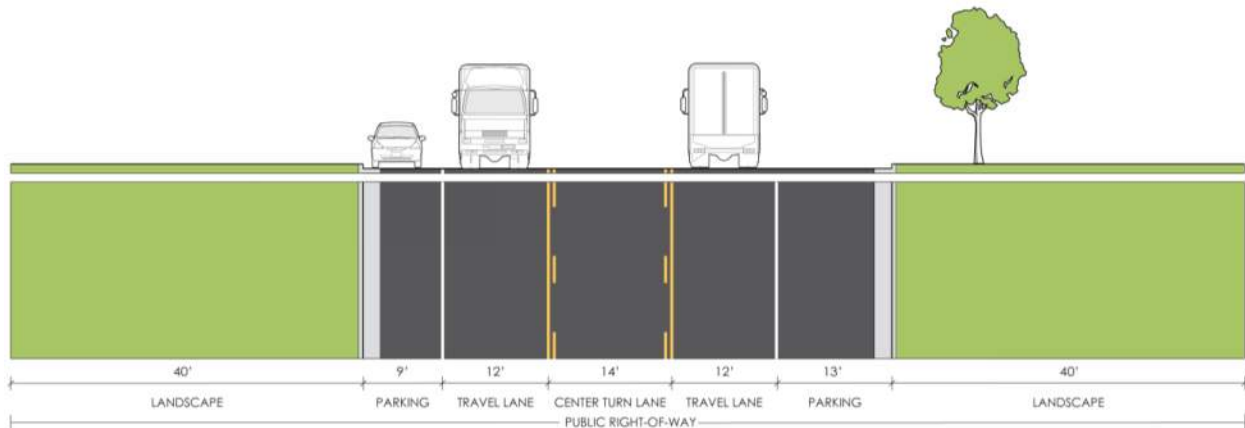


Figure 11 – Segment 1 No Build Typical Section

SEGMENT 1 – NO BUILD OVERVIEW:

- No changes to existing conditions
- Parking on both sides of street
- 14' center turn lane
- No sidewalk or on either side of street
- No bike facility
- No curb extensions

SEGMENT 1 - NO BUILD OPINIONS OF PROBABLE COSTS

The planning-level opinions of probable costs to implement the no build option are \$560,000-\$650,000. The estimate includes the cost of resurfacing the roadway, restriping the roadway to match existing conditions, replacing existing sidewalk curb ramps with new, ADA-compliant curb ramps, and a 25% contingency for unexpected costs. The higher end of the opinions of probable costs range includes the costs for roadway design and engineering. More information on the opinions of probable costs is provided in **Appendix F**.

Segment 2

Five alternatives were developed for Segment 2, and the basic characteristics of each alternative are described below. All of the alternatives feature curb extensions at all intersections which are not shown in the typical sections below. Curb extensions are shown in the plan view layouts for each alternative, which can be found in **Appendix E**.

Alternative 2A – Buffered Bike Lanes

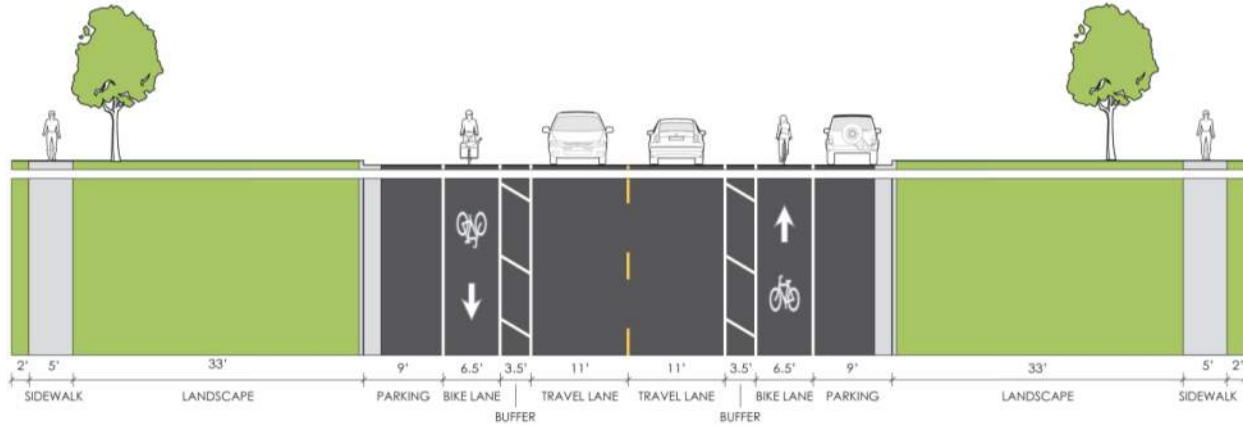


Figure 12 – Alternative 2A Typical Section

ALTERNATIVE 2A OVERVIEW:

- On-street buffered bike lanes
- Curb extensions at each intersection
- Marked crosswalks at each intersection
- On-street parking retained on both sides of the street
- Existing travel lanes narrowed

ALTERNATIVE 2A OPINIONS OF PROBABLE COSTS

The planning-level opinions of probable costs to implement Alternative 2A are \$2,420,000-\$2,780,000. The estimate includes the cost of resurfacing the roadway, adding curb extensions, new ADA-compliant curb ramps, striping, signing and marking, and a 25% contingency for unexpected costs. The higher end of the opinions of probable costs range includes the costs for roadway design and engineering. More information on the opinions of probable costs is provided in **Appendix F**.

Alternative 2B – Center Median and Path

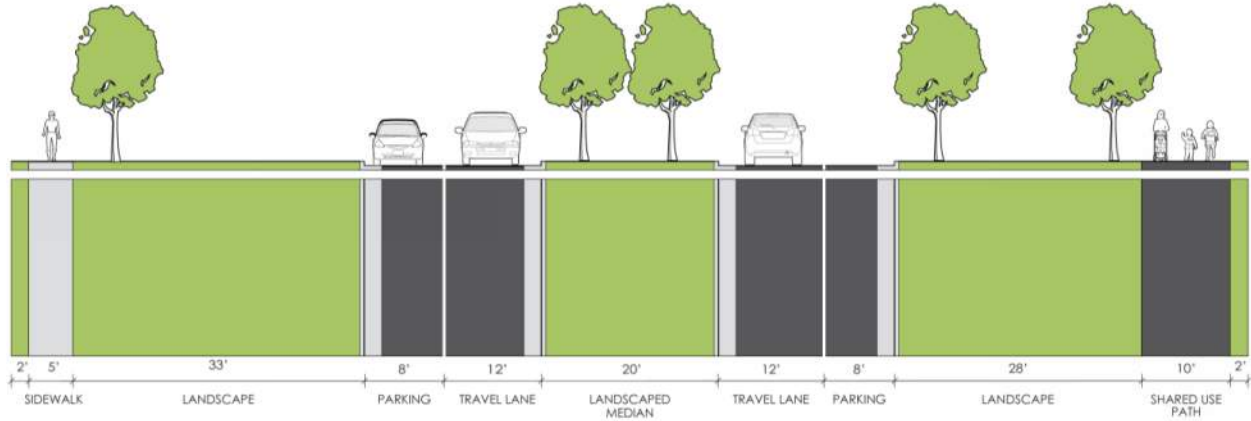


Figure 13 – Alternative 2B Typical Section

ALTERNATIVE 2B OVERVIEW:

- 20' landscaped median in the center of the street
- 10' shared use path replaces sidewalk on the east
- Curb extensions at each intersection
- Marked crosswalks at each intersection
- On-street parking retained on both sides of the street
- Shared use path may impact some existing trees; path alignment could meander to minimize impacts to high-quality mature trees

ALTERNATIVE 2B OPINIONS OF PROBABLE COSTS

The planning-level opinions of probable costs to implement Alternative 2B are \$3,190,000-\$3,660,000. The estimate includes the cost of resurfacing the roadway, adding curb extensions, constructing a center median, constructing a shared use path, rebuilding driveway aprons on the east side, new ADA-compliant curb ramps, striping, signing, and marking, and a 25% contingency for unexpected costs. The higher end of the opinions of probable costs range includes the costs for roadway design and engineering. More information on the opinions of probable costs is provided in **Appendix F**.

Alternative 2C – Center Median and Shared Lanes

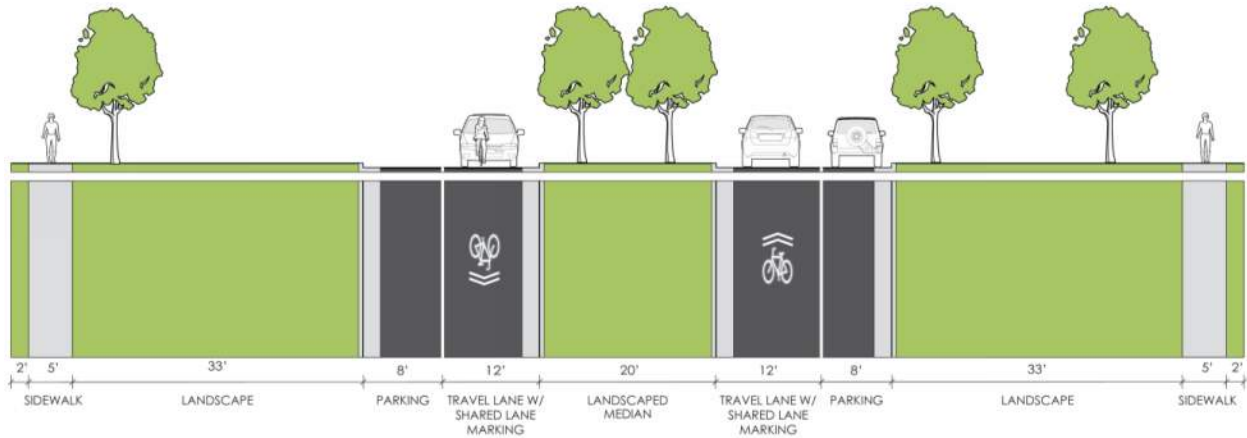


Figure 14 – Alternative 2C Typical Section

ALTERNATIVE 2C OVERVIEW:

- 20' landscaped median in the center of the street
- Shared lane markings (shared travel lane for bicyclists and motorists)
- Curb extensions at each intersection
- Marked crosswalks
- On-street parking retained on both sides of the street

ALTERNATIVE 2C OPINIONS OF PROBABLE COSTS

The planning-level opinions of probable costs to implement Alternative 2C are \$2,870,000-\$3,300,000. The estimate includes the cost of resurfacing the roadway, constructing a center median, adding curb extensions, new ADA-compliant curb ramps, striping, signing and marking, and a 25% contingency for unexpected costs. The higher end of the opinions of probable costs range includes the costs for roadway design and engineering. More information on the opinions of probable costs is provided in **Appendix F**.

Alternative 2D – Path and Center Turn Lane

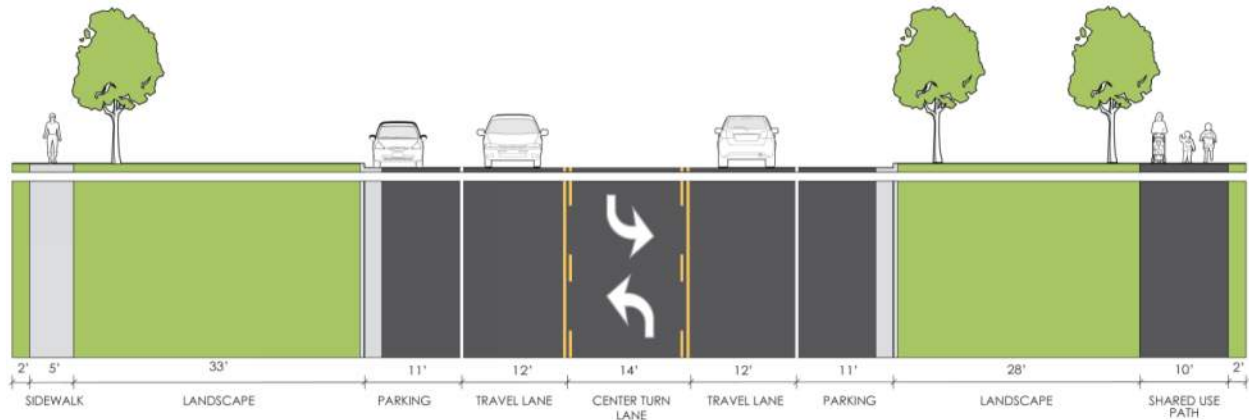


Figure 15 – Alternative 2D Typical Section

ALTERNATIVE 2D OVERVIEW:

- 10' shared use path replaces sidewalk on the east
- Curb extensions at each intersection
- Existing travel lanes narrowed
- Existing parking lanes retained
- Marked crosswalks at each intersection
- Shared use path may impact some existing trees; path alignment could meander to minimize impacts to high-quality mature trees

ALTERNATIVE 2D OPINIONS OF PROBABLE COSTS

The planning-level opinions of probable costs to implement Alternative 2D are \$2,730,000-\$3,140,000. The estimate includes the cost of resurfacing the roadway, adding curb extensions, constructing a shared use path, rebuilding driveway aprons on the east side, new ADA-compliant curb ramps, striping, signing and marking, and a 25% contingency for unexpected costs. The higher end of the opinions of probable costs range includes the costs for roadway design and engineering. More information on the opinions of probable costs is provided in **Appendix F**.

Alternative 2E – Path and Buffered Bike Lanes

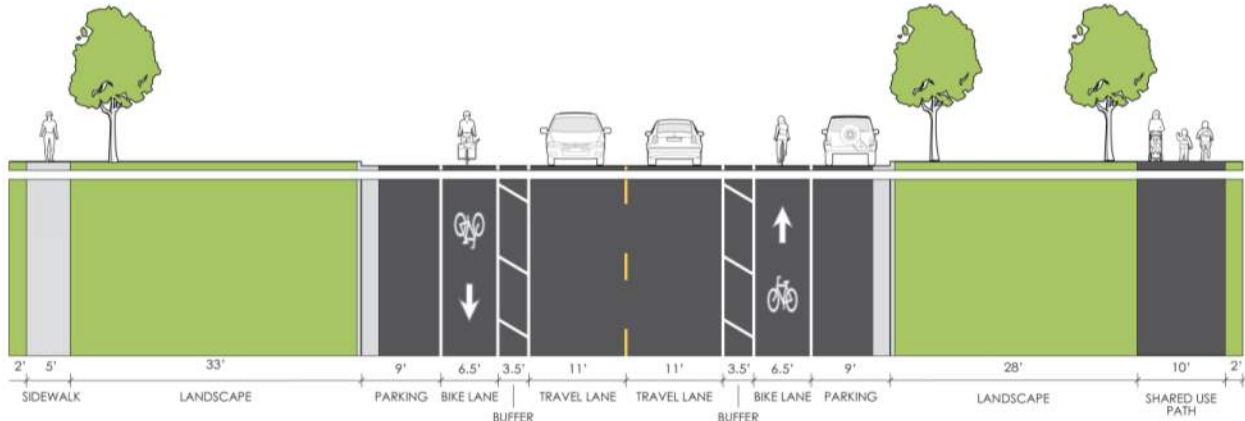


Figure 16 – Alternative 2E Typical Section

ALTERNATIVE 2E OVERVIEW:

- 10' shared use path replaces sidewalk on the east
- On-street buffered bike lanes
- Curb extensions at each intersection
- Marked crosswalks at each intersection
- On-street parking retained on both sides of the street
- Existing travel lanes narrowed
- Shared use path may impact some existing trees; path alignment could meander to minimize impacts to high-quality mature trees

ALTERNATIVE 2E OPINIONS OF PROBABLE COSTS

The planning-level opinions of probable costs to implement Alternative 2E are \$2,760,000-\$3,180,000. The estimate includes the cost of resurfacing the roadway, adding curb extensions, constructing a shared use path, rebuilding driveway aprons on the east side, new ADA-compliant curb ramps, striping, signing, and marking, and a 25% contingency for unexpected costs. The higher end of the opinions of probable costs range includes the costs for roadway design and engineering. More information on the opinions of probable costs is provided in **Appendix F**.

Segment 2 – No Build

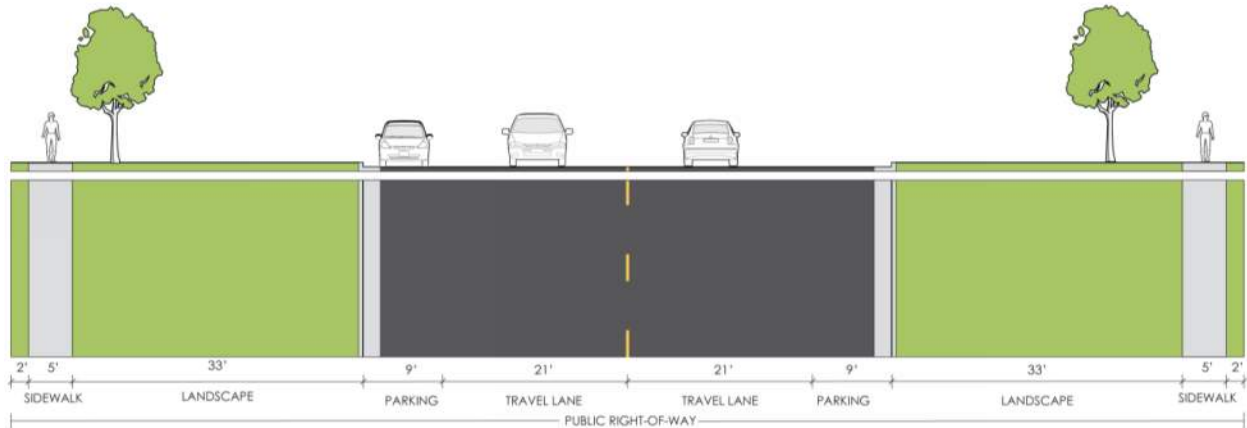


Figure 17 – Segment 2 No Build Typical Section

SEGMENT 2 – NO BUILD OVERVIEW:

- No changes to existing conditions
- Parking on both sides of the street
- Very wide, 21' travel lanes
- Sidewalks on both sides of the street
- No bike facility
- No curb extensions

SEGMENT 2 - NO BUILD OPINIONS OF PROBABLE COSTS

The planning-level opinions of probable costs to implement the no build option are \$1,960,000-\$2,250,000. The estimate includes the cost of resurfacing the roadway, restriping the roadway to match existing conditions, replacing existing sidewalk curb ramps with new, ADA-compliant curb ramps, and a 25% contingency for unexpected costs. The higher end of the opinions of probable costs range includes the costs for roadway design and engineering. More information on the opinions of probable costs is provided in **Appendix F**.

Segment 2 Sidewalk Alignment Options

Throughout the 17th Street North corridor, the sidewalks are set back approximately 33' from the curb, creating a very wide boulevard space. This extra-wide boulevard space translates to sidewalk infrastructure set back farther from the street compared to most intersecting streets.

At intersections, the stop signs on cross streets are located in front of the crosswalks due to the distance between the curb and the sidewalks. This configuration creates potential pedestrian safety issues because vehicles on cross streets drive over the pedestrian crossing location before stopping. The project team developed a potential alternative treatment (Option 2) that could mitigate the pedestrian safety challenges associated with the existing sidewalk crossing location.

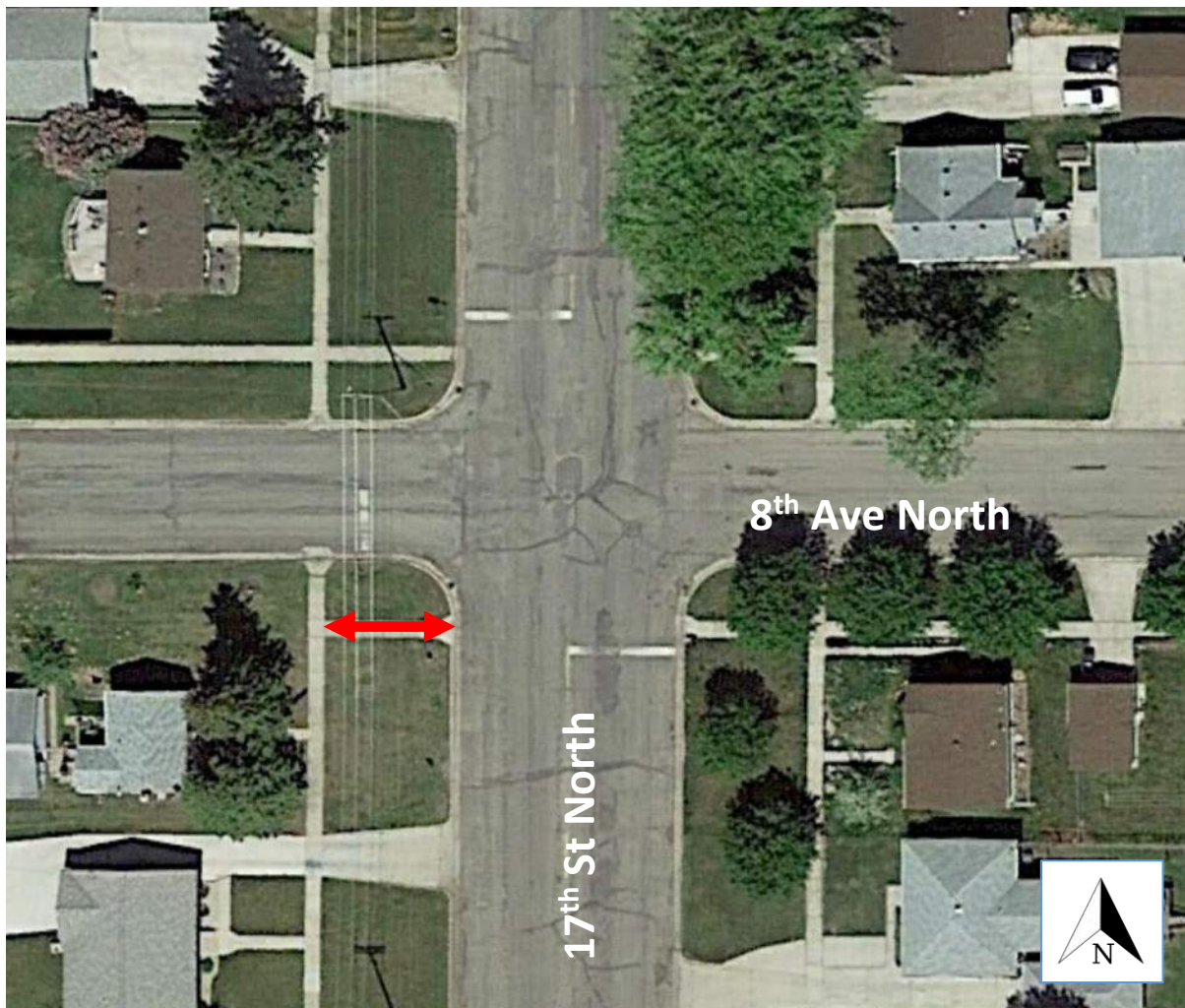


Figure 18 – Existing sidewalks Setback
Approx. 33' from the curb, as shown by the red arrow

Option 1: Existing Sidewalk Crossing Location

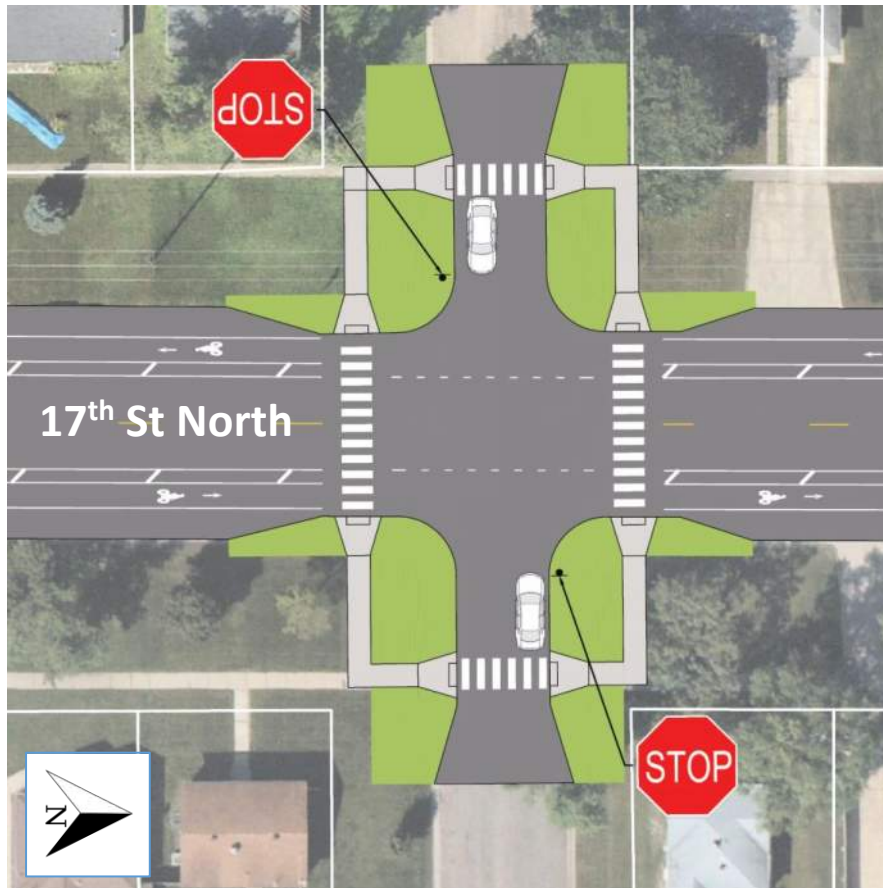


Figure 19 – Sidewalk Crossing Option 1

OPTION 1 OVERVIEW:

- Sidewalk crossing location is located farther away from 17th St (same alignment as existing sidewalks)
- Pedestrians in crosswalks are less visible to people driving on 17th St because they are located farther from the intersections
- Stop signs located in front of the crosswalks; cars drive through the crosswalks before stopping

OPTION 1 OPINIONS OF PROBABLE COSTS

Since the sidewalk alignment in Option 1 is the same as existing conditions, it does not require any additional costs to implement. The cost for Option 1 is included in the opinions of probable costs for each alternative.

Option 2: Sidewalk Bend-In Alternative

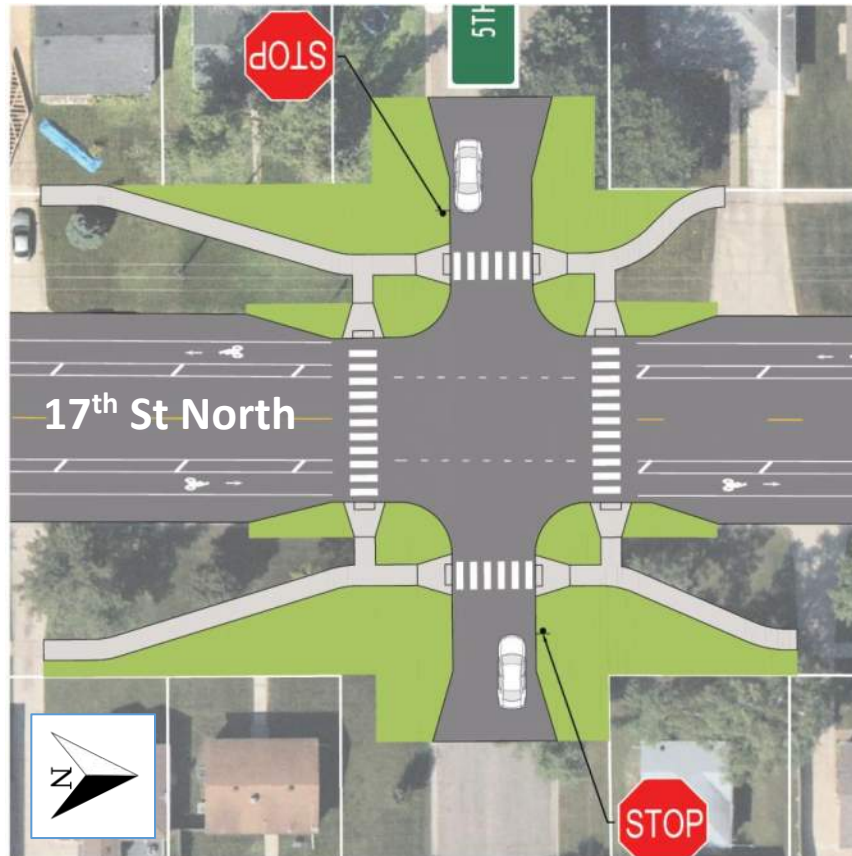


Figure 20 – Sidewalk Crossing Option 2

OPTION 2 OVERVIEW:

- Sidewalk bends in closer to 17th St at intersections (existing sidewalks would be removed near intersections and new sidewalks would be constructed)
- Pedestrians in crosswalks would be more visible to people driving on 17th St because they are located closer to the intersection
- Stop signs are located behind the crosswalks; cars required to stop before driving through the crosswalk

OPTION 2 OPINIONS OF PROBABLE COSTS

The opinion of probable costs for implementing the sidewalk bend-in alternative is approximately \$50,000 per intersection. The opinion of probable costs assumes the construction of curb extensions, so the cost to implement Option 2 in tandem with an alternative with curb extensions would cost less. More information on the opinions of probable costs is provided in **Appendix F**.

Technical Evaluation of Alternatives

The project team evaluated each of the alternatives in Segment 1 and Segment 2 based on a set of technical evaluation criteria. The evaluation criteria were developed based on the overall project goals, which included five main categories:

- Safety
- Mobility
- Cost
- Sustainability
- Environmental Impacts

Criteria		Segment 1		
		No Build	Shared Use Path	Buffered Bike Lanes
Evaluation Matrix Goals	Safety	0	+	++
	Mobility	0	+	+
	Cost	0	+	+
	Sustainability	0	+	+
	Environmental Impacts	-	+	+

Criteria		Segment 2					
		No Build	Buffered Bike Lanes	Median w/ Shared Use Path	Median w/ Shared Roadway	Buffered Bike Lanes w/ Shared Use Path	3-Lane Roadway w/ Shared Use Path
Evaluation Matrix Goals	Safety	0	++	+	++	++	++
	Mobility	0	++	+	+	++	+
	Cost	0	+	0	+	+	+
	Sustainability	0	+	0	0	+	+
	Environmental Impacts	-	+	++	++	+	+

Legend			
-	0	+	++
Does Not Meet Measure	Minimally Meets Measure	Meets Measure	Exceeds Measure

A summary of the technical evaluation matrix is shown above. A more detailed technical evaluation matrix is shown in **Appendix H**, which includes individual objectives and goals for each evaluation category.

VII. Public and Agency Input

Public and agency input was collected throughout the study and described in the sections below.

Public Engagement Plan

At the onset of the study the project team completed a Public Engagement Plan to guide public input activities. With uncertainty due to the COVID-19 pandemic, this plan was designed to provide flexibility of engagement tactics.

Communication Strategies

Multiple communication strategies were used to inform the public of their engagement opportunity.

- Study announcement postcards were sent to addresses adjacent to the project corridor to inform them of the project.
- An expanded mailing to all assumed regular corridor users were sent to around 325 for the first and second open house.
- Facebook posts were boosted and shared by multiple organizations including Metro COG, City of Moorhead, and Downtown Moorhead, inc.
- Text to subscribe and email blasts were used. Throughout the project 88 total subscribers received email updates and information.

Study Review Committee Input

The Study Review Committee (SRC) met 3 times throughout the study but was consulted frequently to review the technical analysis and public involvement and provide study guidance. Two SRC surveys were conducted in connection with the first two public input opportunities.

Public Input

Three public input opportunities were collected in the fall and winter of 2020 and the spring of 2021 to gather input on existing conditions, study goals, and the full range of concepts identified, screened, and evaluated. Due to COVID-19 measures, all input opportunities were held online in which attendees could watch an informational video, join a live virtual meeting, or view a recording of a virtual meeting and provide feedback via online comment cards, mailed surveys, or directly contacting project staff. Each public input opportunity included a two-to-three-week public comment period and numerous participation options.

Appendix I provides copies of the information shared at the meetings and complete reports of public input received.

Project Website

The project team configured a project website that provided a public-facing platform to disseminate project information, provide alternative descriptions, view recorded virtual open houses, and complete online surveys. The website was updated frequently to reflect the project stages.



August 7 – 31, 2020 Public Input Opportunity

Members of the community were able to watch an informational video, provide comments, and take a survey on what they saw as the biggest opportunities/challenges along the corridor. There were 183 surveys completed. Also presented was a toolbox of potential solutions that could be implemented along the corridor. Educational materials about these solutions were presented in the informational video along with detailed advantages and disadvantages of the concepts.

Roadway Options			
Ped/Bike Improvement Options	What is it?	Benefits	Challenges
<p>School Zone Speed Limit</p>	<p>This is a lower speed limit within a school zone, determined based on an engineering or traffic investigation. The slower speed limit is only in effect during opening or closing school hours. Any speeding in the area is subject to a double fine.</p>	<ul style="list-style-type: none"> - Reduces speed during school start/end time - Establishes clear route for biking/walking to and from school - Increases driver awareness of school zone 	<ul style="list-style-type: none"> - Signage alone does not result in lower speeds and increased driver attention - Slowing down and speeding up when entering and exiting the school zone can degrade traffic safety
<p>High-Visibility Crosswalk Markings</p>	<p>High-visibility crosswalk markings use ladder markings to increase the visibility of a crossing location for drivers. They can include stop bars to indicate where vehicles should stop near intersections.</p>	<ul style="list-style-type: none"> - Increases visibility of pedestrian crossing paths - Potential to decrease vehicle speed 	<ul style="list-style-type: none"> - Not shown to reduce crashes - Speeds increase over time as marking wear down

The First Public Input Opportunity provided a toolbox of potential solutions for members of the public to evaluate

Moorhead seeks input to update widest residential street

Moorhead city leaders and historians explore what led to the strange street's size.

Written By: [Barry Amundson](#) | 8:00 am, Aug. 29, 2020



This shows the 60-foot-wide, mostly residential 17th Street North in Moorhead, which is being studied for improvements.
David Samson / The Forum

MOORHEAD — Many people have wondered why a one-mile stretch of 17th Street North in Moorhead is so wide.

A Fargo Forum Newspaper article from August 29, 2021 highlighted the project and requested input from the public

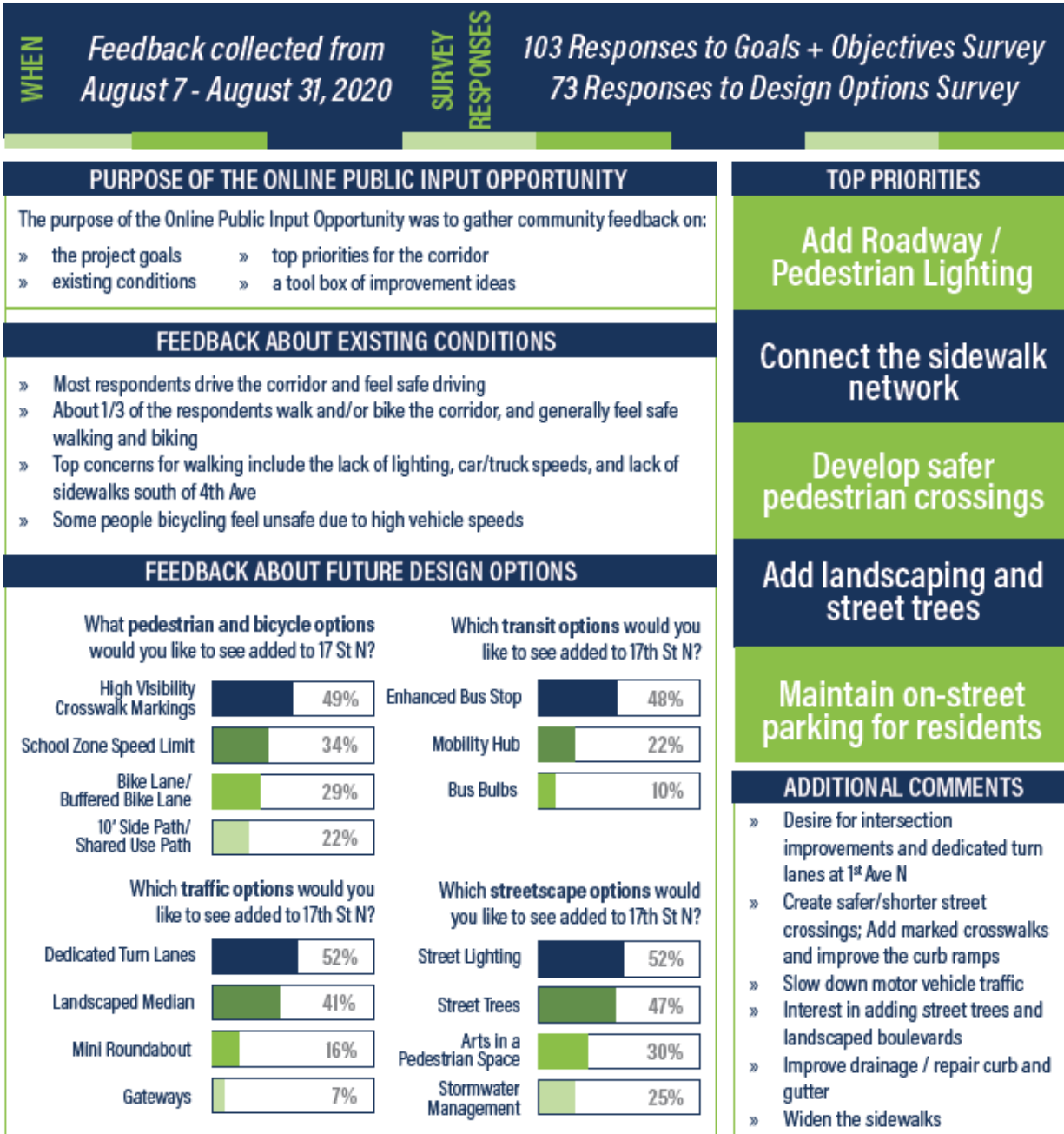
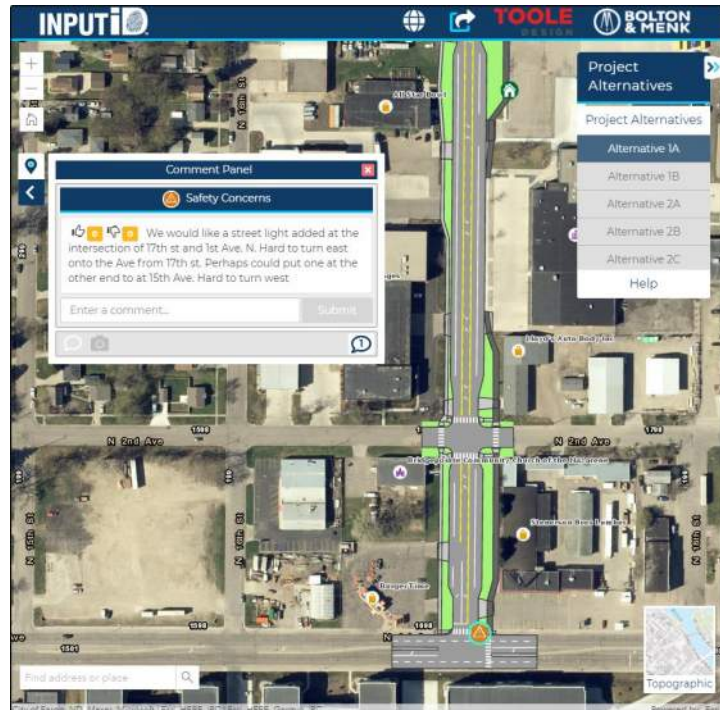


Figure 21 – Public Input Summary from August 2020

November 30 – December 21, 2020 Public Input Opportunity

Members of the community were able to learn about the proposed 17th St N corridor alternatives, take a survey on which alternatives or portions thereof that they prefer, and provide additional feedback. There were 135 surveys completed. Metro COG also hosted a virtual open house via Zoom Video Communications on Wednesday, December 16th from 4:00 p.m. to 5:00 p.m. Members of the 17th St N Corridor Study project team presented project background, corridor alternatives, and the project's next steps. There was a live question and answer session with the opportunity to provide direct feedback to the corridor study team on the corridor alternatives. In total the second online survey received responses from 137 members of the public.



The comment-mapping tool, INPUTiD, was used to display alternative layouts and receive public comments.

February 4 – 18, 2021 Public Input Opportunity

The results of prior engagement efforts for Segment 2 (residential segment) determined that members of the public would like to maintain the corridor's existing curb-to-curb width, on-street parking, and driveway access. Respondents also wanted to add traffic calming (reduce vehicle speed), improve pedestrian crossings, and add bicycle trail connections. Metro COG and the study team developed two additional concepts for Segment 2 based upon feedback received that meets these requirements. These additional concepts are Alternatives 2D and 2E. The public was asked to provide feedback on each alternative by completing a survey or contacting the project team directly. In total the third online survey received responses from 84 members of the public.

VIII. Recommended Alternative

The recommendations for each segment are described in the following sections. The recommendations were based on the technical evaluation completed by the project team, community and stakeholder feedback, and agency support from the City of Moorhead and Metro COG.

Recommended Alternative: Segment 1 (1st Ave to 4th Ave)

The recommended alternative in Segment 1 is Alternative 1B. Alternative 1B retains on-street parking on both sides of the street, retains the center turn lane, adds a sidewalk connection on the west side of the street, adds a shared use path on the east side of the street that connects to the existing shared use path outside of Park Christian School, and adds on-street buffered bike lanes in each direction.

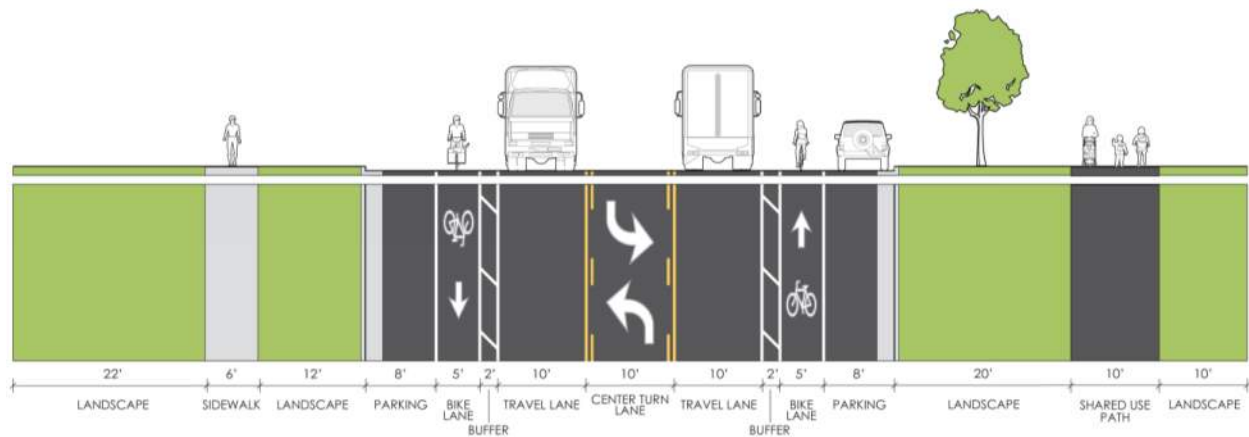


Figure 22 – The recommended alternative for Segment 1 is Alternative 1B

Alternative 1B is recommended in Segment 1 for the following reasons:

- Achieves a majority of the study goals
- Increases pedestrian connectivity by adding a sidewalk and path between 1st Avenue and 4th Avenue
- Provides better access to Park Christian School with the addition of a path
- Increases pedestrian safety by adding curb extensions, which shortens pedestrian crossing distances, increases the visibility of pedestrians, and reduces motor vehicle speeds
- Achieves broader City goals (2008 Comprehensive Plan) of adding on-street bike lanes in Moorhead
- Scores the highest in the technical evaluation matrix

Community member and stakeholder feedback is supported in the recommended alternative:

- Retains parking on both sides of the street
- Removes curb extensions where they would interfere with truck turning movements to access businesses, such as at 2nd Avenue
- Slows motor vehicle speeds (through curb extensions and narrower travel lanes)
- Accommodates large trucks for businesses

Recommended Alternative: Segment 2 (4th Ave to 15th Ave)

The recommended alternative in Segment 2 is Alternative 2E. Alternative 2E retains on-street parking on both sides of the street, adds a shared use path on the east side of the street that connects to the proposed shared use path in Segment 1, and adds on-street buffered bike lanes in each direction which also connect to the proposed buffered bike lanes in Segment 1.

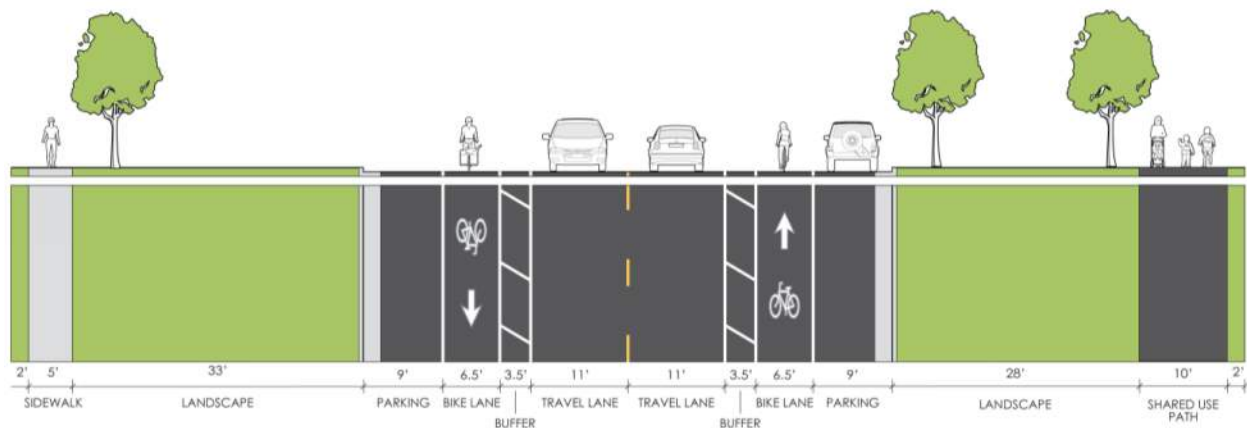


Figure 23 – The recommended alternative for Segment 2 is Alternative 2E

Alternative 2E is recommended in Segment 2 for the following reasons:

- Achieves a majority of the study goals
- Increases pedestrian safety by adding curb extensions, which shortens pedestrian crossing distances, increases the visibility of pedestrians, and reduces motor vehicle speeds
- Achieves broader City goals (2008 Comprehensive Plan) of adding on-street bike lanes in Moorhead
- Provides a path connection to the existing path along 15th Avenue
- Scores the highest in the technical evaluation matrix

Community member and stakeholder feedback is supported in the recommended alternative:

- Retains parking on both sides of the street
- Adds a shared use path on the east side of the street
- Removes a center median, which would restrict driveway access
- Slows motor vehicle speeds (through curb extensions and narrower driving lanes)

Segment 2 Sidewalk Alignment Recommendation

The sidewalk bend-in alternative (Option 2) is recommended at select intersections along Segment 2 due to its safety benefits for people walking along 17th Street and crossing the intersecting streets. It is recommended to be implemented at intersections with higher pedestrian activity, and thus a greater need for pedestrian safety improvements. The specific intersections that this option is recommended for requires further study and may be determined during the project's design process.

Option 2 had more support from community members, with 51% of survey participants voting to “Support” or “Strongly Support” this option, while 17% were “Neutral” and 29% either “Opposed” or “Strongly Opposed” the option. Option 2 was also supported by City of Moorhead staff and Metro COG staff.

Other Corridor Considerations

Through the public comment received, the following improvements should also be considered for the 17th Street corridor:

- Additional roadway lighting
- Improved drainage
- Additional street trees and landscaping
- Continue to monitor traffic and safety conditions at the intersection of 1st Avenue N and 17th Street to determine if a traffic signal may be warranted in the future.

IX. Next Steps

The purpose of the 17th Street N Corridor Study is to develop a plan for improvements to 17th Street N which will guide what may be included in the 2022 rehabilitation project along 17th Street. The concepts developed as part of this study are high-level and will need additional refinement through preliminary and final design. Environmental review and permitting will also be required with exact requirements based on the scope of the project and the funding source. As future projects may turn from plan to reality, they will move forward as part of the City’s CIP process, which involves additional public engagement specific to the project area and timing. The following issues will need further vetting during preliminary design:

- Transition of bikeway facilities at project termini,
- Roadway and pedestrian lighting, depending on project budget,
- Routing of shared use path to avoid mature trees, and
- Prioritizing intersections for recommended sidewalk treatments, if required by budget.

The improvement options identified and alternatives recommended in this study will help the City of Moorhead continue to maintain a better functioning, greater mobility, and safer collector roadway.

The City of Moorhead should also anticipate the annual maintenance needs of the painted buffered bicycle lanes and ensure that is incorporated into the appropriate budgets. Maintaining the high visibility of the bicycle lanes will ensure a safe, reliable on-street bicycle facility.

Study partners must continue to work together to further plan, obtain funding, design, and implement the recommended improvement projects. All partners have an active role in implementing these improvements. All competitive funding sources should be considered. Agencies should also update their comprehensive and transportation plans to include these findings to better leverage funding sources. Funding sources that may be applicable to future projects along 17th Street include:

- Transportation Alternatives (TA) funding program is specifically for the small-scale active transportation projects like pedestrian and bicycle facilities. The TA funding program uses a competitive application process, but the shared use path recommended on the corridor would be an excellent candidate for this fund option.
- MnDOT Safe Routes to School grants and funding program is specifically for Safe Routes to School projects. These funds are subject to change as funding allocations to MnDOT change. These grant programs are also competitive. The rapid flashing beacons recommended near Park Christian School and the enhanced crosswalks would be an excellent candidate for this fund option.
- Local Road Improvement Program (LRIP) provides funding for capital construction costs only. The amount allocated to the fund and available to projects is done in every other year through the Minnesota bonding process. This funding program uses a competitive application process for each of its three project categories with a maximum award of \$1.25 M (as of the last solicitation). The next application process will likely not occur until 2022.