CENTER AVENUE (RED RIVER TO 8TH STREET) MOORHEAD, MN PRELIMINARY ENGINEERING

Stantec

Moorhead Center Avenue Alternative Analysis Summary

January 2018

Project Background

Center Ave is an essential connection joining downtown Moorhead, Minnesota and downtown Fargo, North Dakota. Due to poor pavement conditions, a 2-inch mill & overlay from the Red River to 8th Street has been programmed into the City's 5-year pavement asset management plan for construction in 2019.

Center Avenue is primarily comprised of two existing typical section configurations. These configurations include a 4-lane section from the Center Avenue bridge to 6th Street, and a 5-lane section with a shared center turn lane from 6th Street to 8th Street. Right of way along the corridor varies from 80 feet to approximately 90 feet.

A preliminary engineering study is being conducted to consider opportunities to improve pavement condition, address documented safety issues related to a lack of turn lanes and alignment shifts, create a complete streets corridor to serve all modes of transportation, and accommodate existing and future traffic capacity needs to the future year 2040.

Although most curb and gutter and sidewalk along the project corridor will remain, specific sections of curb and gutter will be replaced to address existing deficiencies and geometric issues. Sidewalks will be upgraded as needed to ensure ADA compliance and bridge improvements for pedestrians will be incorporated. Landscape and lighting improvements will be considered to enhance the downtown pedestrian experience.

Alternatives and Sub-Alternatives

After receiving input from the public and various stakeholders, three alternatives and two additive alternatives were developed for further consideration. Additive alternatives are additional items that can accompany any of the alternatives. For this project, the additive alternatives consist of realigning 4th Street and removing the traffic signal at 7th Street. A warrant analysis at 7th Street indicated the signal was not necessary for successful intersection operations. Therefore, each alternative was analyzed without the traffic signal and this additive alternative is not included in the comparison matrix.

Due to roadway width restrictions, on street parking and designated bike lanes can not be incorporated simultaneously. Alternative A encompasses designated bike lanes and Alternative B provides on street parking with a wide outside lane for motorists and bicyclists. All three alternatives include re-striping the bridge as one travel lane in each direction, designated bike lanes in each direction, and a striped median. The striped median will become an eastbound to northbound left turn lane at 4th Street. A detailed description of each alternative and additive alternative as well as a corresponding layout drawing are included below and attached.

No Build – Do nothing, pavement conditions would continue to deteriorate creating long term issues.

Alternative A (Designated Bike Lanes) – Mill & Overlay along with re-striping Center Avenue across the Red River Bridge to 8th Street. East of 4th Street, the existing section will be re-striped to a 3-lane section with one lane in each direction, a center left turn lane, and designated bike lanes in each direction. The bike lanes will end at 7th Street and signage will direct bicyclists to travel north. 7th Street will be re-striped to a 3-lane section with designated bike lanes traveling in each direction.

Between 7th and 8th Street the roadway will be striped with a center turn lane, and two through lanes in the westbound direction. The outside westbound through lane will become a drop right turn lane at 7th Street. Eastbound, between 7th and 8th Street, Center Avenue will have one through lane and one shared right turn/through lane on the outside eastbound lane. The north, south and east legs of the intersection of Center Avenue and 8th Street will be unchanged.

Other items for consideration with this alternative are closing or relocating the Moorhead Center Mall access by Thai Orchid and closing the access into United Sugars to alleviate sight distance concerns at these locations.

Alternative B (On-Street Parking/Wide Outside Lane) – Mill & Overlay along with re-striping Center Avenue across the Red River Bridge to 8th Street. East of 4th Street, the existing section will be re-striped to a 3-lane section with one lane in each direction, a center left turn lane, and on street parking on the north side where sufficient roadway width allows. Between 4th Street and 7th Street, both through lanes will be 14 feet wide to accommodate motorists and bicyclists in the roadway. If this alternative is chosen, and State Aid funds are used, a design variance will be needed to construct the wide outside lanes. At 7th Street, signage will direct bicyclists to travel north. 7th Street will be re-striped to a 3-lane section with designated bike lanes traveling in each direction.

Between 7th and 8th Street the roadway will be striped with a center left turn lane, and one shared right turn/through lane in the westbound direction. Eastbound, between 7th and 8th Street, Center Avenue will have one through lane and one shared right turn/through lane on the outside eastbound lane. East of the 8th Street intersection, the outside westbound through lane would become a drop right turn lane to go north at 8th Street. As part of this alternative, the access to the Moorhead Center Mall by Thai Orchid and the access to United Sugars would be closed to maximize on-street parking.

Alternative C (Mill & Overlay Only) – Mill & Overlay, re-striping the Center Avenue bridge, pedestrian improvements, and ADA compliance enhancements. Existing lane configuration and curb & gutter, except for ADA improvements, will remain unchanged.

Additive Alternative 1 (Realigning 4th Street) – Realign 4th Street to create a perpendicular crossing at Center Avenue. Remove the existing traffic signal at 4th street and install a new one at the proposed location. 4th street will continue to utilize two through lanes with turn lanes where applicable. Existing pavement on the northeast and southeast sides of the Center Avenue and 4th Street Intersection will be removed.

Additive Alternative 2 (Remove 7th Street Traffic Signal) – Warrant analysis shows the 7th Street signal is not necessary. It would be removed and replaced with a stop sign at 7th Street. This could be paired with any of the base alternatives.

Alternative Analysis

An alternative analysis matrix was completed for each of the alternatives and additive alternative 1 that includes a preliminary review of project impacts, future traffic operational analyses and planning level costs. The alternative matrix is attached to this memo.

ALTERNATIVE ANALYSIS ATTACHMENTS:

ALTERNATIVE COMPARISON MATRIX
PRELIMINARY ALTERNATIVE LAYOUTS

Stantec

Moorhead Center Avenue Alternative Analysis Summary

January 2018

Moorhead Center Avenue (Red River to 8th Street) - Alternative Analysis Matrix

Alternatives	2040 Future Intersection LOS[1]				Capacity Range for Various Roadway Facility Types (AADT)[3]	Meets 2040 Future Capacity Needs[4]	Addresses Geometric Issues	Crash Reduction[5]	Transit Impacts	Bicycle Impacts	Pedestrian Impacts	Parking Improvements	Access Modifications		Tree Impacts	Preliminary Cost
	4th Street (AM/PM)	5th Street (AM/PM)	7th Street (AM/PM)	8th Street (AM/PM)									Thai Orchid Access	United Sugars Access		
No Build Do Nothing	LOS A/B	LOS B/B	LOS B/B	LOS B/C	18,000 - 21,000 (4-Lane Roadway)	Yes V/C = 0.55	Changes Nothing	Changes Nothing	Changes Nothing	Changes Nothing	Changes Nothing	Changes Nothing	Do Nothing	Do Nothing	0	$0.00
Alternative A[2] Mill & Overlay + 3-Lane + Bike Lanes	LOS C/B	LOS B/B	LOS A/A	LOS B/B	14,000 - 16,000 (3-Lane Roadway)	Yes V/C = 0.73	Straightens Alignment by Removing Roadway Shifts	Projected crash reduction of 24%	Buses Delay Traveling Lane at Stops, Bus Bump-out is Removed	Creates Designated Bike Lanes	Encourages Bicyclists to use Roadway Instead of Sidewalks, ADA Compliance	Changes Nothing	Consideration to Do Nothing, Relocate or Close - Relocate/Close Fixes Sight Distance Issues and Reduces the Number of Accesses & Conflict Points to Enhance Safety	Consideration to Do Nothing, Relocate or Close - Relocate/Close Fixes Sight Distance Issues and Reduces the Number of Accesses & Conflict Points to Enhance Safety	1	$975,071.95
Alternative B[2] Mill & Overlay + 3-Lane + Parking/Wide Outside Lanes	LOS C/C	LOS B/B	LOS A/A	LOS B/B	14,000 - 16,000 (3-Lane Roadway)	Yes V/C = 0.73	Straightens Alignment by Removing Roadway Shifts	Projected crash reduction of 24%	Buses Delay Traveling Lane at Stops, Bus Bump-out is Removed	Creates Share the Road Facility	Encourages Bicyclists to use Roadway Instead of Sidewalks, ADA Compliance	Adds 39 On-Street Parking Spaces	Close - Fixes Sight Distance Issues and Reduces the Number of Accesses & Conflict Points to Enhance Safety	Close - Fixes Sight Distance Issues and Reduces the Number of Accesses & Conflict Points to Enhance Safety	1	$816,055.70
Alternative C[2] Mill & Overlay + Re-Stripe to Existing	LOS B/C	LOS B/B	LOS A/A	LOS B/C	18,000 - 21,000 (4-Lane Roadway)	Yes V/C = 0.73	Changes Nothing	Changes Nothing	Changes Nothing	Changes Nothing	Changes Nothing	Changes Nothing	Do Nothing - Nothing Changes	Do Nothing - Nothing Changes	0	$556,080.95
Additive Alternative 1 Realign 4th Street	LOS C/B	N/A	N/A	N/A	N/A	N/A	Aligns Intersection to be Perpendicular	Creates a Perpendicular Intersection, No History of High Crash Volumes	Bus Route can Remain on 4th Street	Safer for Bicyclists to be Seen	Safer for Pedestrians to be Seen	Removes Parking Spaces	Do Nothing - Nothing Changes	Do Nothing - Nothing Changes	18	$774,166.20[6]

Notes:

(1) Level of Service (LOS) is a term used to describe the operating conditions of a roadway based on factors such as speed, travel time, maneuverability, delay, and safety. LOS is measured in seconds of delay per vehicle at the intersection and can range from LOS A though LOS E. LOS D is the standard acceptable rating; however, LOS C is the goal for rural areas and smaller cities. LOS results shown represent the overall operations for the intersection in the AM and PM peak hours for year 2040 traffic volumes.

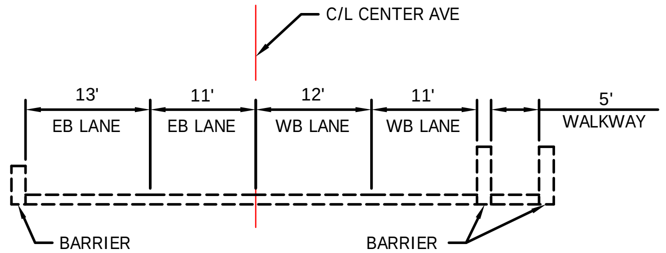
(2) Alternatives A, B, and C include Additive Alternative 2, the removal of the 7th Street signal, in the LOS calculations and cost estimate prices.

(3) AADT stands for Average Annualized Daily Traffic.

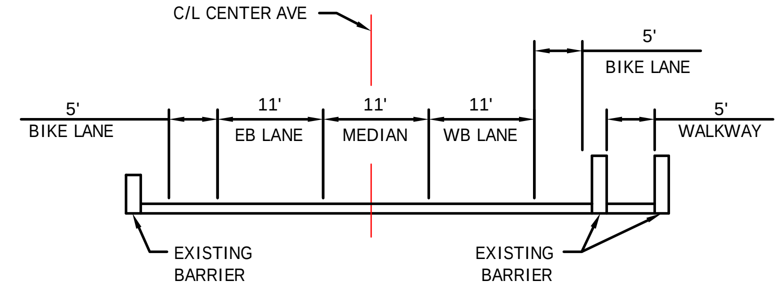
(4) V/C ratios are the volume divided by the capacity of the road. Anything over 1.0 is considered over capacity. The Highest projected volume in 2040 is 11,600 AADT.

(5) Calculated crash reductions are based on the 2008 FHWA Desktop Reference for Crash Reduction Factors for the transition of a 4-lane to a 3-lane section with a continuous left turn lane. The total number of crashes over 10 years (2006-2015) was 97 crashes.

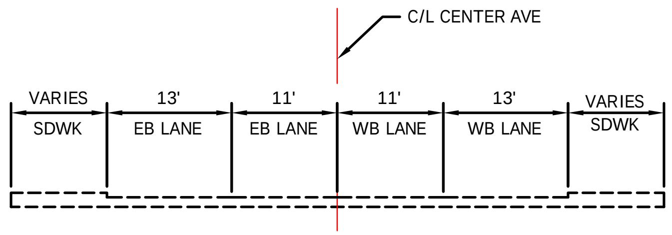
(6) Additive Alternative 1 cost would be in addition to any of the three alternatives being considered and could be included with this project or constructed independently at a later date.



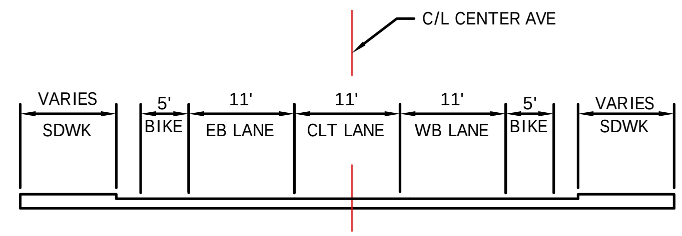
EXISTING BRIDGE TYPICAL SECTION



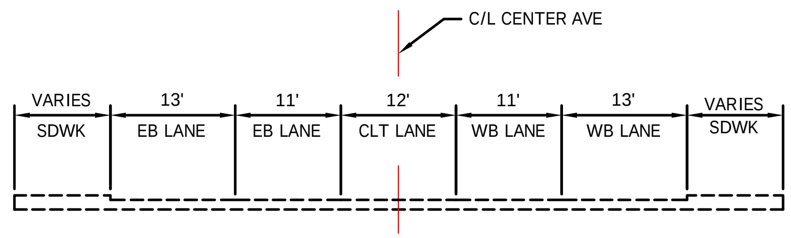
PROPOSED BRIDGE TYPICAL SECTION



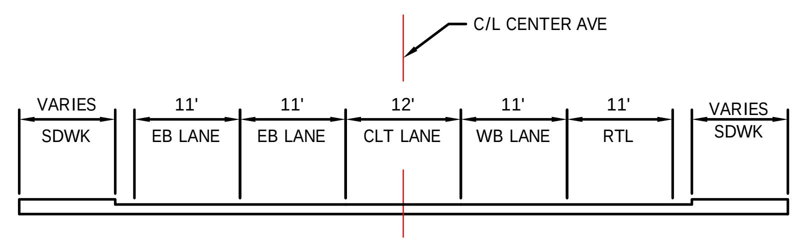
EXISTING 4-LANE TYPICAL SECTION



PROPOSED 3-LANE TYPICAL SECTION W/BIKE LANES



EXISTING 5-LANE TYPICAL SECTION



PROPOSED 5-LANE TYPICAL SECTION

ALTERNATIVE DEVELOPMENT A - CONSTRUCTION NOTES:

RE-STRIPING CENTER AVENUE ACROSS THE RED RIVER BRIDGE THEN MILL AND OVERLAY AND RE-STRIPING FROM 4TH STREET TO 8TH STREET AS A 3-LANE FACILITY. THE 2-LANE SECTION ACROSS THE BRIDGE WILL BE ONE EASTBOUND THROUGH LANE AND ONE WESTBOUND THROUGH LANE WITH DEDICATED BIKE LANES AND A STRIPED MEDIAN. THE STRIPED MEDIAN WILL BECOME AN EASTBOUND LEFT TURN LANE AT 4TH STREET. EAST OF 4TH STREET, THE EXISTING SECTION WILL BE RE-STRIPED TO A 3-LANE SECTION WITH ONE LANE IN EACH DIRECTION, A CENTER LEFT TURN LANE, AND DEDICATED BIKE LANES IN EACH DIRECTION.

BIKE LANES END AT 7TH STREET WITH SIGNAGE TO GO NORTH ON 7TH STREET. NOTE: A BICYCLE RIDING IN THE ROADWAY - EVEN IN A BIKE LANE - WISHING TO TAKE A LEFT TURN SHOULD DO SO IN THE CENTER LEFT TURN LANE TO TURN NORTH, EVEN WITHOUT A SIGNAL THEY WOULD NEED TO FOLLOW THE SAME RULES OF THE ROADWAY AND TURN LEFT IN THE CENTER LEFT TURN LANE AND YIELD TO ON-COMING TRAFFIC.

MODIFY RAILING ON SOUTH SIDE OF BRIDGE TO MEET MINIMUM HEIGHT REQUIREMENTS

DURING THE REVIEW PERIOD, NO EASTBOUND TO SOUTHBOUND TRAFFIC QUEUING AT THE INTERSECTION OF CENTER AVENUE AND 5TH STREET WAS OBSERVED DURING AM AND PM PEAK HOURS WHEN A TRAIN WAS PRESENT. THE ADDITION OF A RIGHT TURN LANE AND/OR ITS LENGTH IS BEING DETERMINED.

BETWEEN 7TH AND 8TH STREET: A CENTER LEFT TURN LANE. TWO THROUGH LANES IN THE WESTBOUND DIRECTION WITH THE OUTSIDE WESTBOUND THROUGH LANE BECOMING A DROP RIGHT TURN LANE AT 7TH STREET. ONE THROUGH LANE AND ONE SHARED RIGHT TURN/THROUGH LANE IN THE EASTBOUND DIRECTION. THE NORTH, SOUTH AND EAST LEGS OF THE INTERSECTION OF CENTER AVENUE AND 8TH STREET STAY THE SAME AS THEY ARE TODAY.

FIX THE TWO JOGS IN THE CENTER AVENUE ALIGNMENT EAST OF THE 4TH STREET INTERSECTION AND AT 6TH STREET. THIS ALIGNMENT SHIFT CAN EASILY BE CORRECTED BECAUSE OF THE TRANSITION FROM A 4-LANE TO 3-LANE SECTION.

EXTEND THE CURB LINE AND SIDEWALK FURTHER TO THE SOUTH ON THE NORTH SIDE OF CENTER AVENUE BETWEEN 7TH AND 8TH STREET TO FIX ISSUES WITH SIDEWALK WIDTHS AT THIS LOCATION. THIS CAN BE DONE WITH THE CHANGE FOR ONLY ONE THROUGH LANE IN THE WESTBOUND DIRECTION.

REMOVE THE BUS PULL OUT ALONG THE NORTH SIDE OF CENTER AVENUE AS IT IS NOT DESIRED BY TRANSIT. THIS WOULD PULL THE SIDEWALK AND CURB LINE TO THE SOUTH AT THIS LOCATION.

Plot Date: 01/04/2018 - 10:56am
Drawing name: C:\pw_stn_transportation\dms78897\193803913_LO_A_sheets.dwg
Xrefs:, 193803913_XSXI, Center Ave Existing, 193803913_XSAP, 193803913_CL_A, 193803913_XSNO_A, 193803913_TS

MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT A

CITY OF MOORHEAD, MN

PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018   PROJ. NO.: 193803913   FIGURE: DRAFT A-1

Stantec

MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT A

CITY OF MOORHEAD, MN

PLANNING & PRELIMINARY ENGINEERING STUDY

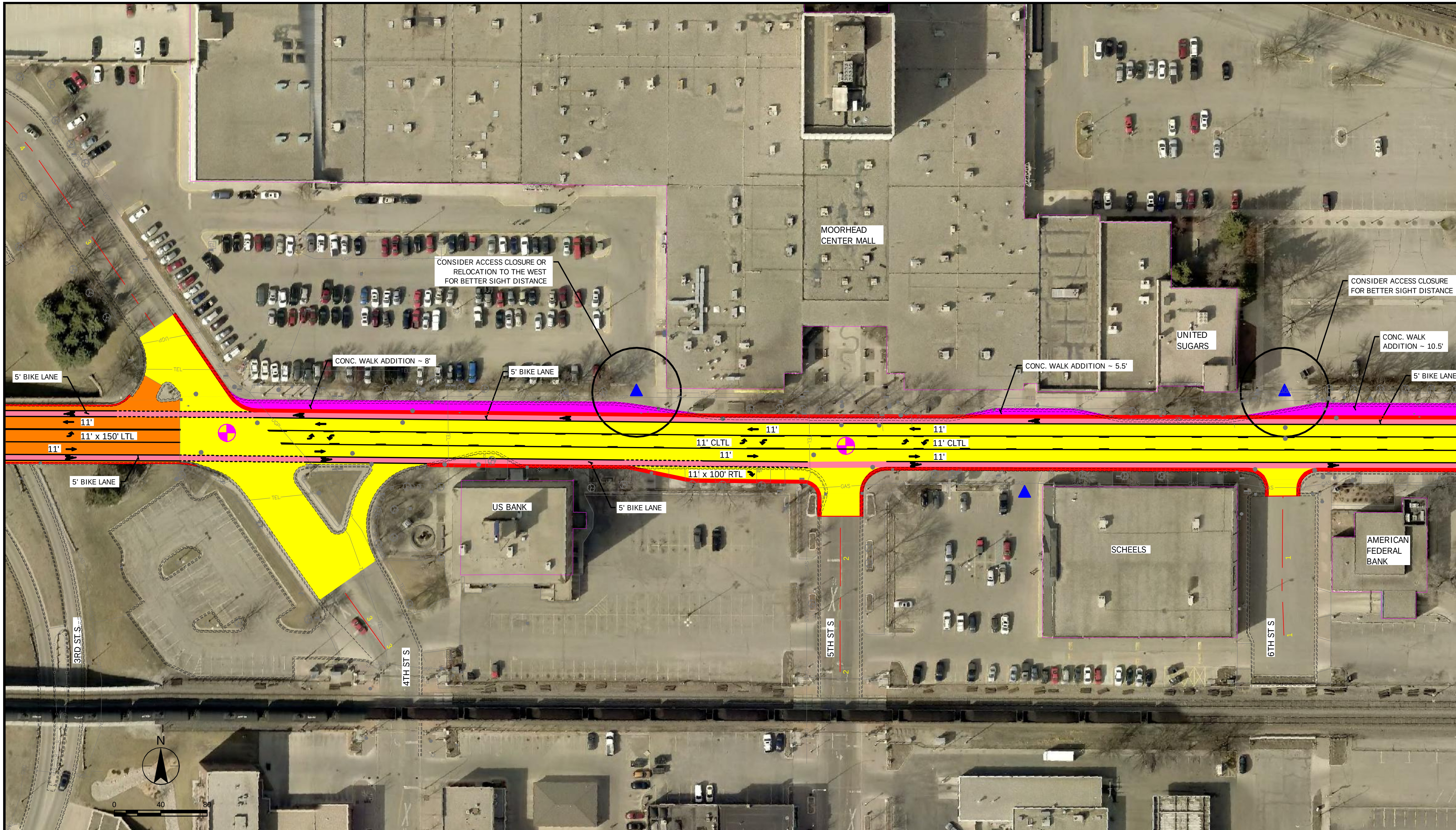
DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT A-2

MOORHEAD MINNESOTA

Stantec

LEGEND

- BIKE LANE
- BRIDGE (EXISTING)
- PROPOSED ROADWAY (MILL & OVERLAY)
- SIDEWALK
- SHOULDER
- CURB/BARRIER
- EXISTING MANHOLE OR CATCH BASIN
- EXISTING TRAFFIC SIGNAL SYSTEM
- POINT OF ACCESS
- PROPOSED CURB & GUTTER
- EXISTING CURB & GUTTER



MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT A

CITY OF MOORHEAD, MN

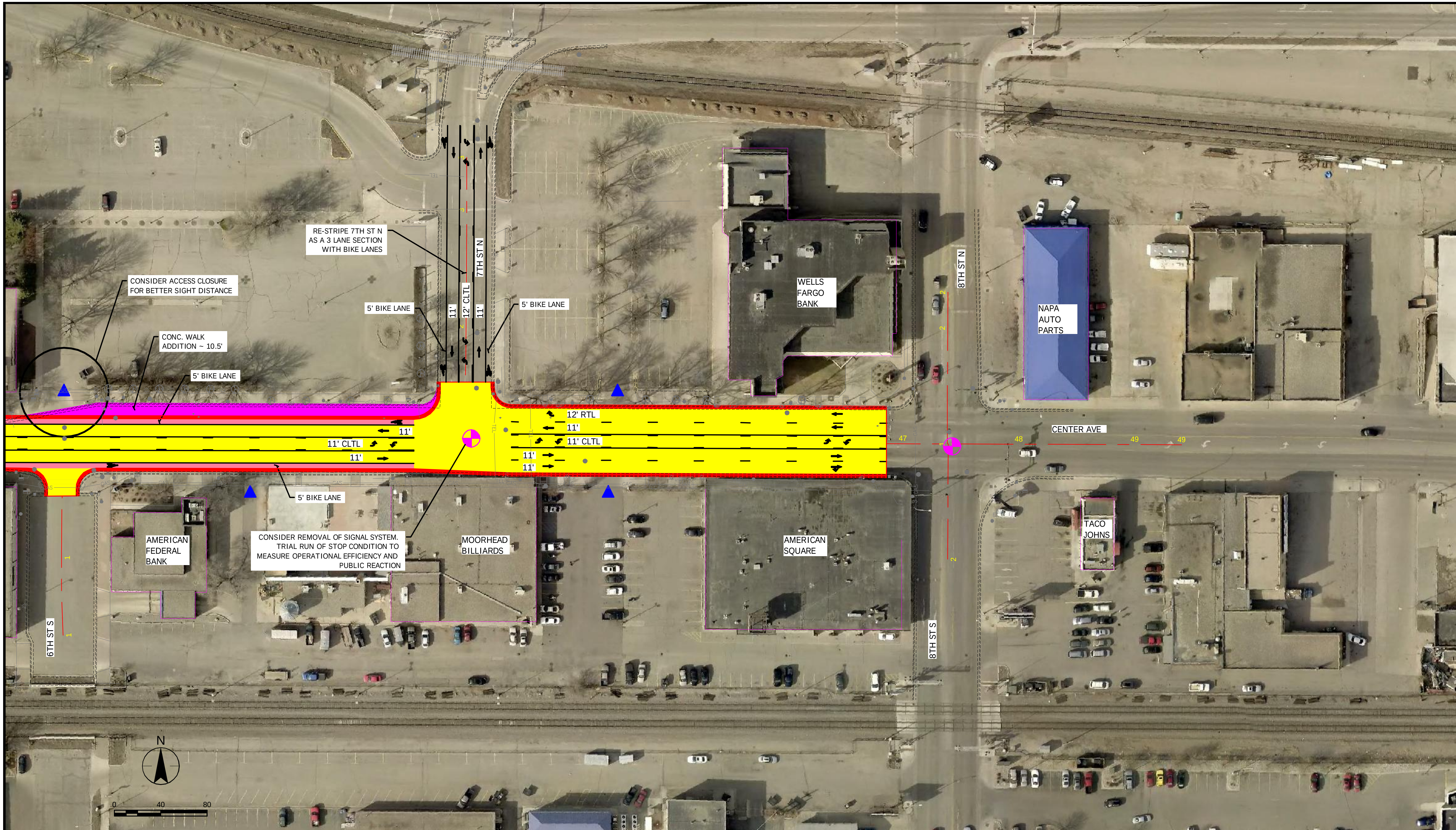
PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT A-3

Stantec

LEGEND

- BIKE LANE
- BRIDGE (EXISTING)
- PROPOSED ROADWAY (MILL & OVERLAY)
- SIDEWALK
- SHOULDER
- CURB/BARRIER
- EXISTING MANHOLE OR CATCH BASIN
- EXISTING TRAFFIC SIGNAL SYSTEM
- POINT OF ACCESS
- PROPOSED CURB & GUTTER
- EXISTING CURB & GUTTER



MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT A

CITY OF MOORHEAD, MN

PLANNING & PRELIMINARY ENGINEERING STUDY

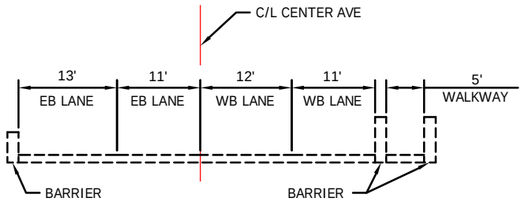
DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT A-4

Stantec

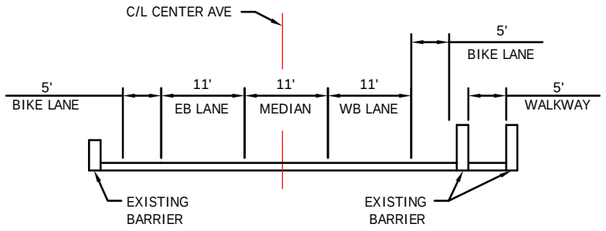
LEGEND

BIKE LANE	SIDEWALK
BRIDGE (EXISTING)	SHOULDER
PROPOSED ROADWAY (MILL & OVERLAY)	CURB/BARRIER
EXISTING MANHOLE OR CATCH BASIN	PROPOSED CURB & GUTTER
EXISTING TRAFFIC SIGNAL SYSTEM	EXISTING CURB & GUTTER
POINT OF ACCESS	

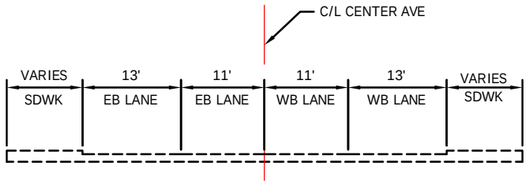
Plot Date: 01/04/2018 - 10:57am
Drawing name: C:\pw_stn_transportation\dms78897\193803913_LO_A_sheets.dwg
Xrefs:, 193803913_XSXI, Center Ave Existing, 193803913_XSAP, 193803913_CL_A, 193803913_XSNO_A, 193803913_TS



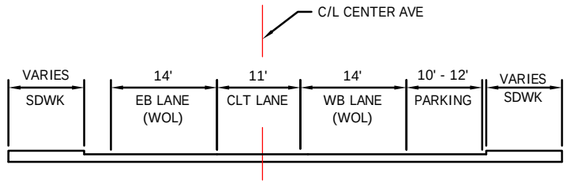
EXISTING BRIDGE TYPICAL SECTION



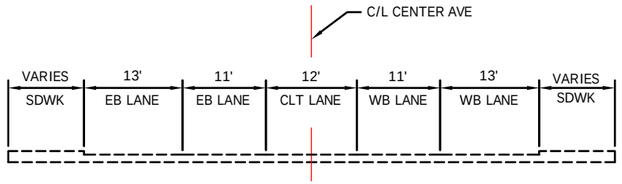
PROPOSED BRIDGE TYPICAL SECTION



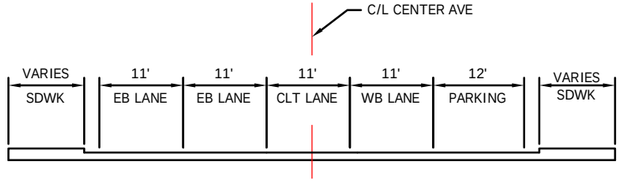
EXISTING 4-LANE TYPICAL SECTION



PROPOSED 3-LANE TYPICAL SECTION W/PARKING



EXISTING 5-LANE TYPICAL SECTION



PROPOSED 4-LANE TYPICAL SECTION
W/PARKING

ALTERNATIVE DEVELOPMENT B - CONSTRUCTION NOTES:

RE-STRIPING CENTER AVENUE ACROSS THE RED RIVER BRIDGE THEN MILL AND OVERLAY AND RE-STRIPING FROM 4TH STREET TO 8TH STREET AS A 3-LANE FACILITY WITH WIDE OUTSIDE LANES TO ACCOMMODATE BICYCLE TRAFFIC AND ON-STREET PARKING ALONG THE NORTH SIDE OF CENTER AVE. THE 2-LANE SECTION ACROSS THE BRIDGE WILL BE ONE EASTBOUND THROUGH LANE AND ONE WESTBOUND THROUGH LANE WITH DEDICATED BIKE LANES AND A STRIPED MEDIAN. THE STRIPED MEDIAN WILL BECOME AN EASTBOUND LEFT TURN LANE AT 4TH STREET. EAST OF 4TH STREET, THE EXISTING SECTION WILL BE RE-STRIPED TO A 3-LANE SECTION WITH ONE LANE IN EACH DIRECTION, A CENTER LEFT TURN LANE, AND ON STREET PARKING ON THE NORTH SIDE WHERE SUFFICIENT ROADWAY WIDTH ALLOWS. THE ROADWAY WILL ACCOMMODATE WIDE OUTSIDE LANES TO ACCOMMODATE BICYCLISTS UNTIL 7TH STREET. THE WIDE OUTSIDE LANES TO ACCOMMODATE BICYCLISTS WILL BE PENDING APPROVAL OF A VARIANCE IF STATE AID FUNDS ARE USED TO CONSTRUCT THE PROJECT.

AT 7TH STREET, SIGNAGE WILL DIRECT BICYCLISTS TO TRAVEL NORTH. 7TH STREET WILL BE RE-STRIPED TO A 3-LANE SECTION WITH DESIGNATED BIKE LANES TRAVELING IN EACH DIRECTION. NOTE: A BICYCLE RIDING IN THE ROADWAY - EVEN IN A BIKE LANE - WISHING TO TAKE A LEFT TURN SHOULD DO SO IN THE CENTER LEFT TURN LANE TO TURN NORTH, EVEN WITHOUT A SIGNAL THEY WOULD NEED TO FOLLOW THE SAME RULES OF THE ROADWAY AND TURN LEFT IN THE CENTER LEFT TURN LANE AND YIELD TO ON-COMING TRAFFIC.

MODIFY RAILING ON SOUTH SIDE OF BRIDGE TO MEET MINIMUM HEIGHT REQUIREMENTS

DURING THE REVIEW PERIOD, NO EASTBOUND TO SOUTHBOUND TRAFFIC QUEUING AT THE INTERSECTION OF CENTER AVENUE AND 5TH STREET WAS OBSERVED DURING AM AND PM PEAK HOURS WHEN A TRAIN WAS PRESENT. THE ADDITION OF A RIGHT TURN LANE AND/OR ITS LENGTH IS BEING DETERMINED.

BETWEEN 7TH AND 8TH STREET: CENTER LEFT TURN LANE. ONE THROUGH LANE IN THE WESTBOUND DIRECTION. ONE THROUGH LANE AND ONE SHARED RIGHT TURN/THROUGH LANE IN THE EASTBOUND DIRECTION. EAST OF THE 8TH STREET INTERSECTION, THE OUTSIDE WESTBOUND THROUGH LANE WOULD BECOME A DROP RIGHT TURN LANE TO GO NORTH AT 8TH STREET. ADD ON-STREET PARALLEL PARKING ALONG THE NORTH SIDE OF CENTER AVENUE.

LOOK TO IDENTIFY ANY LOCATIONS WHERE ON-STREET PARKING IS FEASIBLE. DIAGONAL PARKING CANNOT BE CONSIDERED ALONG THE CENTER AVENUE CORRIDOR AS IT DOES NOT MEET STATE-AID STANDARDS.

FIX THE TWO JOGS IN THE CENTER AVENUE ALIGNMENT EAST OF THE 4TH STREET INTERSECTION AND AT 6TH STREET. THIS ALIGNMENT SHIFT CAN EASILY BE CORRECTED BECAUSE OF THE TRANSITION FROM A 4-LANE TO 3-LANE SECTION.

REMOVE THE BUS PULL OUT ALONG THE NORTH SIDE OF CENTER AVENUE AS IT IS NOT DESIRED BY TRANSIT. THIS WOULD PULL THE SIDEWALK AND CURB LINE TO THE SOUTH AT THIS LOCATION.

MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT B

CITY OF MOORHEAD, MN

PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT B-1

MOORHEAD MINNESOTA

Stantec

MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT B

CITY OF MOORHEAD, MN

PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT B-2

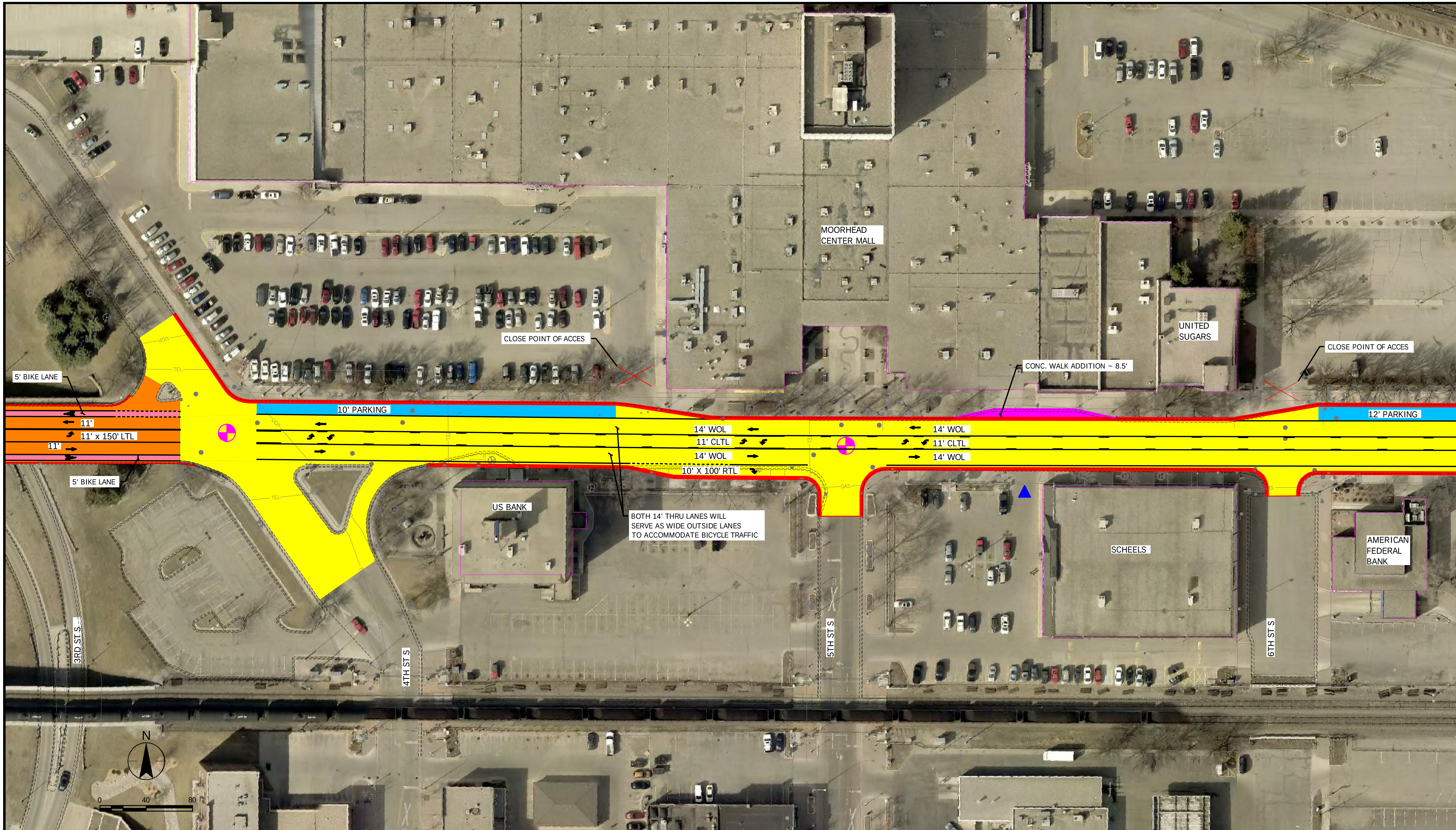
MOORHEAD MINNESOTA

Stantec

LEGEND

BIKE LANE	SIDEWALK	EXISTING MANHOLE OR CATCH BASIN	PROPOSED CURB & GUTTER
BRIDGE (EXISTING)	SHOULDER	EXISTING TRAFFIC SIGNAL SYSTEM	EXISTING CURB & GUTTER
PROPOSED ROADWAY (MILL & OVERLAY)	CURB/BARRIER	POINT OF ACCESS	

Plot Date: 01/04/2018 - 11:40am
Drawing name: C:\pw_stn_transportation\dms78897\193803913_LO_B_sheets.dwg
Xrefs:, 193803913_XSXI, Center Ave Existing, 193803913_XSNO_B, 193803913_CL_B, 193803913_TS



MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT B

CITY OF MOORHEAD, MN

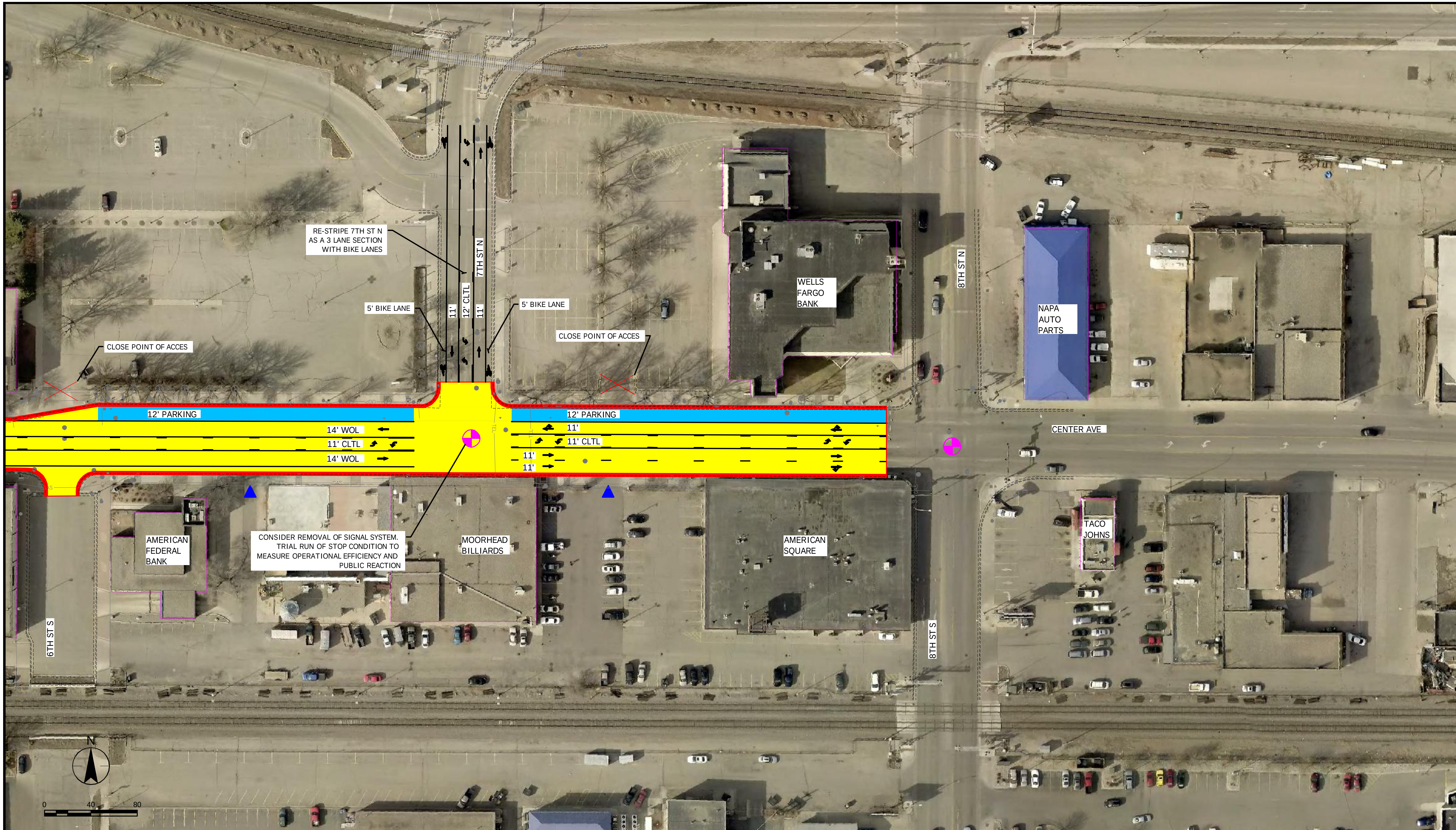
PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT B-3

Stantec

LEGEND

BIKE LANE	SIDEWALK	EXISTING MANHOLE OR CATCH BASIN
BRIDGE (EXISTING)	SHOULDER	EXISTING TRAFFIC SIGNAL SYSTEM
PROPOSED ROADWAY (MILL & OVERLAY)	CURB/BARRIER	POINT OF ACCESS
PROPOSED CURB & GUTTER	EXISTING CURB & GUTTER	



MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT B

CITY OF MOORHEAD, MN

PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT B-4

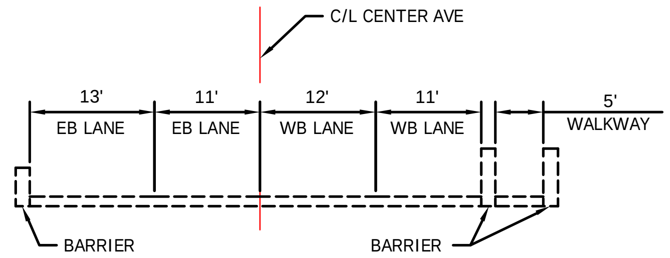
MOORHEAD MINNESOTA

Stantec

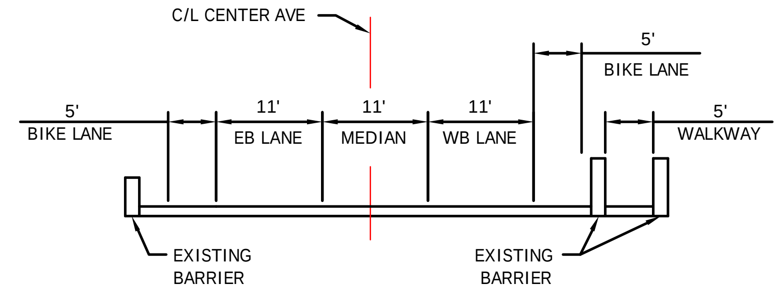
LEGEND

- BIKE LANE
- BRIDGE (EXISTING)
- PROPOSED ROADWAY (MILL & OVERLAY)
- SIDEWALK
- SHOULDER
- CURB/BARRIER
- EXISTING MANHOLE OR CATCH BASIN
- EXISTING TRAFFIC SIGNAL SYSTEM
- POINT OF ACCESS
- PROPOSED CURB & GUTTER
- EXISTING CURB & GUTTER

Plot Date: 01/04/2018 - 11:40am
Drawing name: C:\pw_stn_transportation\dms78897\193803913_LO_B_sheets.dwg
Xrefs:, 193803913_XSXI, Center Ave Existing, 193803913_XSNO_B, 193803913_CL_B, 193803913_TS



EXISTING BRIDGE TYPICAL SECTION



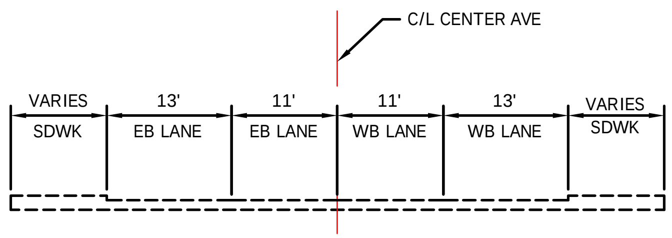
PROPOSED BRIDGE TYPICAL SECTION

ALTERNATIVE DEVELOPMENT C - CONSTRUCTION NOTES:

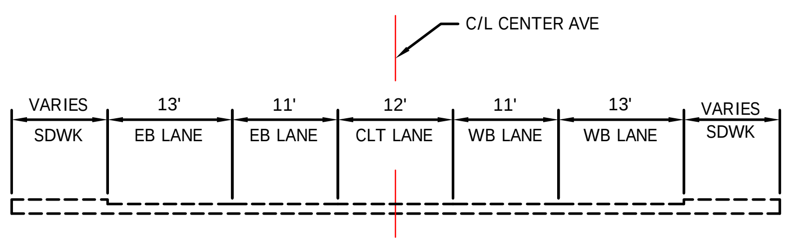
MILL AND OVERLAY ALONG WITH RE-STRIPING THE CENTER AVENUE BRIDGE. THE BRIDGE WILL BE RE-STRIPED TO ONE TRAVEL LANE IN EACH DIRECTION, DESIGNATED BIKE LANES IN EACH DIRECTION AND A STRIPED MEDIAN. THE STRIPED MEDIAN WILL BECOME AN EASTBOUND TO NORTHBOUND LEFT TURN LANE AT 4TH STREET.

ADA COMPLIANCE ENHANCEMENTS AND PEDESTRIAN IMPROVEMENTS

MODIFY RAILING ON SOUTH SIDE OF BRIDGE TO MEET MINIMUM HEIGHT REQUIREMENTS



EXISTING 4-LANE TYPICAL SECTION



EXISTING 5-LANE TYPICAL SECTION

MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT C

CITY OF MOORHEAD, MN

PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT C-1

MOORHEAD MINNESOTA

Stantec

Plot Date: 01/04/2018 - 10:46am
Drawing name: C:\pw_stn_transportation\dms78897\193803913_LO_C_sheets.dwg
Xrefs:, 193803913_CL_C, 193803913_XSXI, Center Ave Existing, 193803913_XSNO_C, 193803913_XSAP, 193803913_TS

MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT C

CITY OF MOORHEAD, MN

PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT C-2

Stantec

LEGEND

BITUMINOUS MILL & OVERLAY	EXISTING MANHOLE OR CATCH BASIN
BRIDGE (EXISTING)	EXISTING TRAFFIC SIGNAL SYSTEM
EXISTING CURB & GUTTER	POINT OF ACCESS

Plot Date: 01/04/2018 - 10:46am
Drawing name: C:\pw_stn_transportation\dms78897\193803913_LO_C_sheets.dwg
Xrefs:, 193803913_CL_C, 193803913_XSXI, Center Ave Existing, 193803913_XSNO_C, 193803913_XSAP, 193803913_TS

MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT C

CITY OF MOORHEAD, MN

PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT C-3

MOORHEAD MINNESOTA

Stantec

LEGEND

- BITUMINOUS MILL & OVERLAY
- BRIDGE (EXISTING)
- EXISTING CURB & GUTTER
- EXISTING MANHOLE OR CATCH BASIN
- EXISTING TRAFFIC SIGNAL SYSTEM
- POINT OF ACCESS

Plot Date: 01/04/2018 - 10:46am
Drawing name: C:\pw_stn_transportation\dms78897\193803913_LO_C_sheets.dwg
Xrefs:, 193803913_CL_C, 193803913_XSXI, Center Ave Existing, 193803913_XSNO_C, 193803913_XSAP, 193803913_TS

MOORHEAD - CENTER AVENUE - DRAFT ALTERNATIVE DEVELOPMENT C

CITY OF MOORHEAD, MN

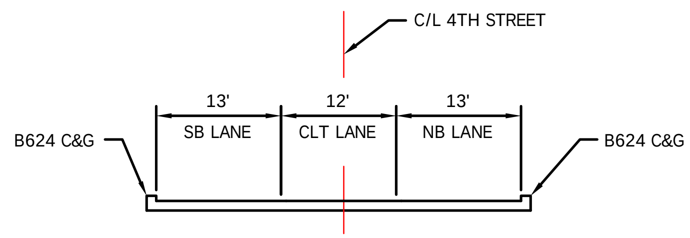
PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT C-4

Stantec

LEGEND

- BITUMINOUS MILL & OVERLAY
- BRIDGE (EXISTING)
- EXISTING CURB & GUTTER
- EXISTING MANHOLE OR CATCH BASIN
- EXISTING TRAFFIC SIGNAL SYSTEM
- POINT OF ACCESS



PROPOSED 3-LANE TYPICAL SECTION

ADDITIVE ALTERNATIVE 1 - CONSTRUCTION NOTES:

RE-ALIGN 4TH STREET TO CREATE A PERPENDICULAR CROSSING AT CENTER AVE. REMOVE THE EXISTING TRAFFIC SIGNAL AT 4TH STREET AND INSTALL A NEW TRAFFIC SIGNAL AT THE PROPOSED LOCATION. 4TH STREET WILL CONTINUE TO UTILIZE TWO THROUGH LANES WITH TURN LANES WHERE APPLICABLE. EXISTING PAVEMENT ON THE NORTHEAST AND SOUTHEAST SIDES OF THE CENTER AVENUE AND 4TH STREET INTERSECTION WILL BE REMOVED.

Plot Date: 01/04/2018 - 11:14am
Drawing name: C:\pw_stn_transportation\dms78897\193803913_alt add 1_sheets.dwg
Xrefs:, 193803913_XSXI, Center Ave Existing, 193803913_TS, 193803913_XSNO_ALT ADD 1, 193803913_CL_ALT ADD 1

MOORHEAD - CENTER AVENUE - DRAFT ADDITIVE ALTERNATIVE 1

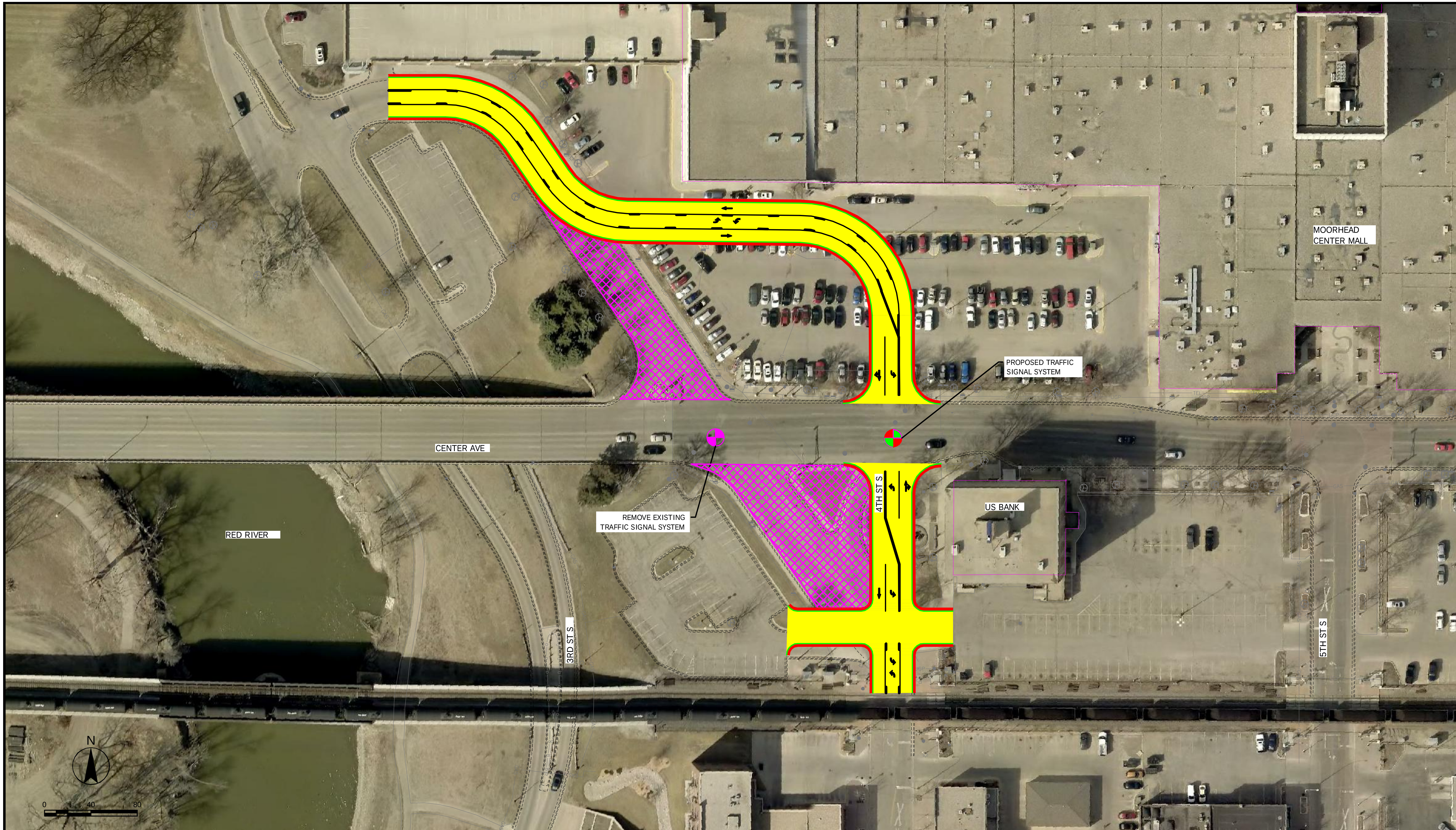
CITY OF MOORHEAD, MN

PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT 1-1

MOORHEAD MINNESOTA

Stantec



MOORHEAD - CENTER AVENUE - DRAFT ADDITIVE ALTERNATIVE 1

CITY OF MOORHEAD, MN

PLANNING & PRELIMINARY ENGINEERING STUDY

DATE: 1/3/2018 PROJ. NO.: 193803913 FIGURE: DRAFT 1-2

Stantec

LEGEND

BIKE LANE	SIDEWALK	EXISTING MANHOLE OR CATCH BASIN	PROPOSED CURB & GUTTER
BRIDGE (EXISTING)	SHOULDER	EXISTING TRAFFIC SIGNAL SYSTEM	EXISTING CURB & GUTTER
PROPOSED ROADWAY (MILL & OVERLAY)	CURB/BARRIER	POINT OF ACCESS	REMOVE EXISTING PAVEMENT

Plot Date: 01/04/2018 - 11:14am