

SEGMENT 3 - US 41: NORTH OF WIS 96 STRUCTURES TO SOUTH OF WIS 15 STRUCTURES (0.965 MILES)

3.1 Existing Conditions

Traffic and Operations Summary

Mainline traffic forecasts were developed for segment 3 through consultation with WisDOT Traffic Forecasting section. The K30 hourly volume projections developed using the Northeast Region travel demand model for year 2038 indicate three lanes each direction, with residual hourly capacities of over 700 vehicles per hour. Traffic Analysis Forecasting Information System (TAFIS) generated K30 projections indicate a need for three lanes, with residual capacity of over 900 vehicles per hour. Additional detail concerning the traffic forecasts is available in the Traffic Forecasting Methodology memo in Appendix 1.

Safety Summary

The US 41 Interstate Conversion study documented no safety issues in this segment.

Roadway Summary

The US 41 Interstate Conversion project has quantified existing geometric deficiencies that require action. Table 3-1 below identifies the deficiencies.

Table 3-1: Segment 3 – Roadway Geometric Deficiencies

SECTION	MILE MARKER	CRITERIA	ACTUAL VALUE
WIS 96 to WIS 15 (MM 138.0 to 139.0)	138.8 to 139.0	Min. Vertical Grade = 0.5% Desired = 0.3% Min.	0.21%

Structures Summary

Bridges

Summary of existing bridge conditions from Highway Structure Information is shown in Table 3-2 (page 3-2) and includes bridge number, mile marker, bridge name, girder type, year built, year widened or raised, overlay or new deck year, current deck state, national bridge index values for deck, superstructure and substructure, sufficiency rating and inventory ratings as of October 31, 2012.

Summary of existing bridge geometry is shown in Table 3-3 (page 3-3) and includes bridge number, mile marker, bridge name, girder type, girder depth in inches, vertical clearance, superelevation and direction of super, clear bridge width, bridge length, number of spans, span configuration, bridge skew and cross road typical section.

Table 3-2: Segment 3 – Summary of Existing Bridge Conditions

BRIDGE NUMBER	MILE MARKER (MM)	BRIDGE NAME	GIRDER TYPE	YEAR BUILT	YEAR WIDENED OR RAISED	YEAR OVERLAY OR NEW DECK	CURRENT DECK STATE	NBI ¹ DECK	NBI ¹ SUPER	NBI ¹ SUB	SUFFICIENCY RATING ²	INVENTORY RATING ³
B-44-0162	138.3	US 41 SB Bridge Over Fox Valley Railroad	Continuous Steel Deck Girder	1992	N/A	N/A	Original	7	7	8	98	22
B-44-0161	138.3	US 41 NB Bridge Over Fox Valley Railroad	Continuous Steel Deck Girder	1992	N/A	N/A	Original	7	8	8	98	22
B-44-0190	138.7	Bicycle Pedestrian Bridge Over US 41	Continuous Steel Deck Girder	2002	N/A	N/A	Original	8	8	8	Ped	Ped

1 The Federal Highway Administration (FHWA) Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Coding Guide) is the basis for the National Bridge Inventory (NBI) Inspection. Each bridge component, i.e. deck, superstructure, or substructure, is assigned a numeric rating code ranging from 9 to 0, with 9 being “excellent condition” and 0 being “failed condition”. A bridge becomes structurally deficient when the condition of the deck, superstructure, or substructure condition is 4 or less.

2 Following a thorough review of the deck, superstructure and substructure, bridges are assigned a "sufficiency rating" number between one and 100. The rating takes into account some 75 factors reviewed during a bridge inspection and also considers a bridge's age, length and width, and the average amount of traffic the bridge handles. WisDOT uses the sufficiency ratings to help prioritize bridge improvements. A bridge with a sufficiency rating of 80 or less is eligible for bridge rehabilitation funding. A bridge with a sufficiency rating of 50 or less is eligible for replacement funding. Each year, all states including Wisconsin are required to submit a report to the FHWA that reviews the condition of its bridges.

3 The FHWA currently requires that two capacity ratings, referred to as the Inventory Rating and Operating Rating be submitted with the NBI file. The Inventory Rating is the load level that a structure can safely sustain for an indefinite period. The Operating Rating is the absolute maximum permissible load level to which a structure may be subjected. The FHWA requires that the standard AASHTO HS truck or lane loading be used as the vehicle when load rating with the Load Factor Rating method (LFR) and that the AASHTO HL-93 loading be utilized as the vehicle when load rating with the Load and Resistance Factor method (LRFR). The above table is shown in LFR using the AASHTO HS truck standard. Bridges are not eligible for replacement unless the Inventory Rating is HS10 or less.

Table 3-3: Segment 3 – Summary of Existing Bridge Geometry

BRIDGE NO.	MILE MARKER (MM)	BRIDGE NAME	GIRDER TYPE	GIRDER DEPTH (INCHES)	VERTICAL CLEARANCE (FEET)	SUPER-ELEVATION %	BRIDGE CLEAR WIDTH (FEET)	BRIDGE LENGTH (FEET)	NUMBER OF SPANS	SPAN CONFIGURATION (FEET)	BRIDGE SKEW	LOCAL ROAD TYPICAL SECTION
B-44-0162	138.3	US 41 SB Bridge Over Fox Valley Railroad	Continuous Steel Deck Girder	33	23.32	NC	59	214.95	3	64.0/79.0/64.0	44o 37' 03" LF	End Spans: 2:1 slope paving; Middle Span: Railroad with ditches and back slopes
B-44-0161	138.3	US 41 NB Bridge Over Fox Valley Railroad	Continuous Steel Deck Girder	33	23.51	NC	59	214.95	3	64.0/79.0/64.0	44o 37' 03" LF	End Spans: 2:1 slope paving; Middle Span: Railroad with ditches and back slopes
B-44-0190	138.7	Bicycle Pedestrian Bridge Over US 41	Continuous Steel Deck Girder	36	19.00	NC	10	222.0	2	110.0/110.0	No Skew	10' Multi-use pathway

Legend:
RT = Superelevation Right
NC = Normal Crown
LT = Superelevation Left
LF = Left Forward
RF = Right Forward
N/A = Not Applicable
c&g = Curb and Gutter

Pre-NEPA Environmental Screening Summary

North of WIS 96 Structures to South of WIS 15 Structures

Impacts within Segment 3 consist of “low” and “medium” impact items. No “high” impact items were identified within Segment 3. Low impact items generally include potential impacts on economic development and business, agriculture, wetlands, and open water.

Medium impact items generally include potential impacts on community and residential resources, environmental justice, upland habitat, streams and floodplains, air quality, noise, airports, and the ever present potential for erosion, storm water, historic, and archaeological impacts. Even though the perceived risk of impact is considered medium, further consideration will be needed to gain a better understanding of any imminent impacts, their severity, and mitigation or avoidance measures. Further information on environmental impacts can be seen in the Pre-NEPA Environmental Screening located in Appendix 4.

3.2 Expansion Design Concept

Mainline Segment 3

For ease in discussion, Segment 3 – US 41: North of WIS 96 Structures to South of WIS 15 Structures was broken into mainline sections with limits at interchange cross roads.

Section 1: US 41 North of WIS 96 Structures to South of WIS 15 Structures

US 41 Alignment

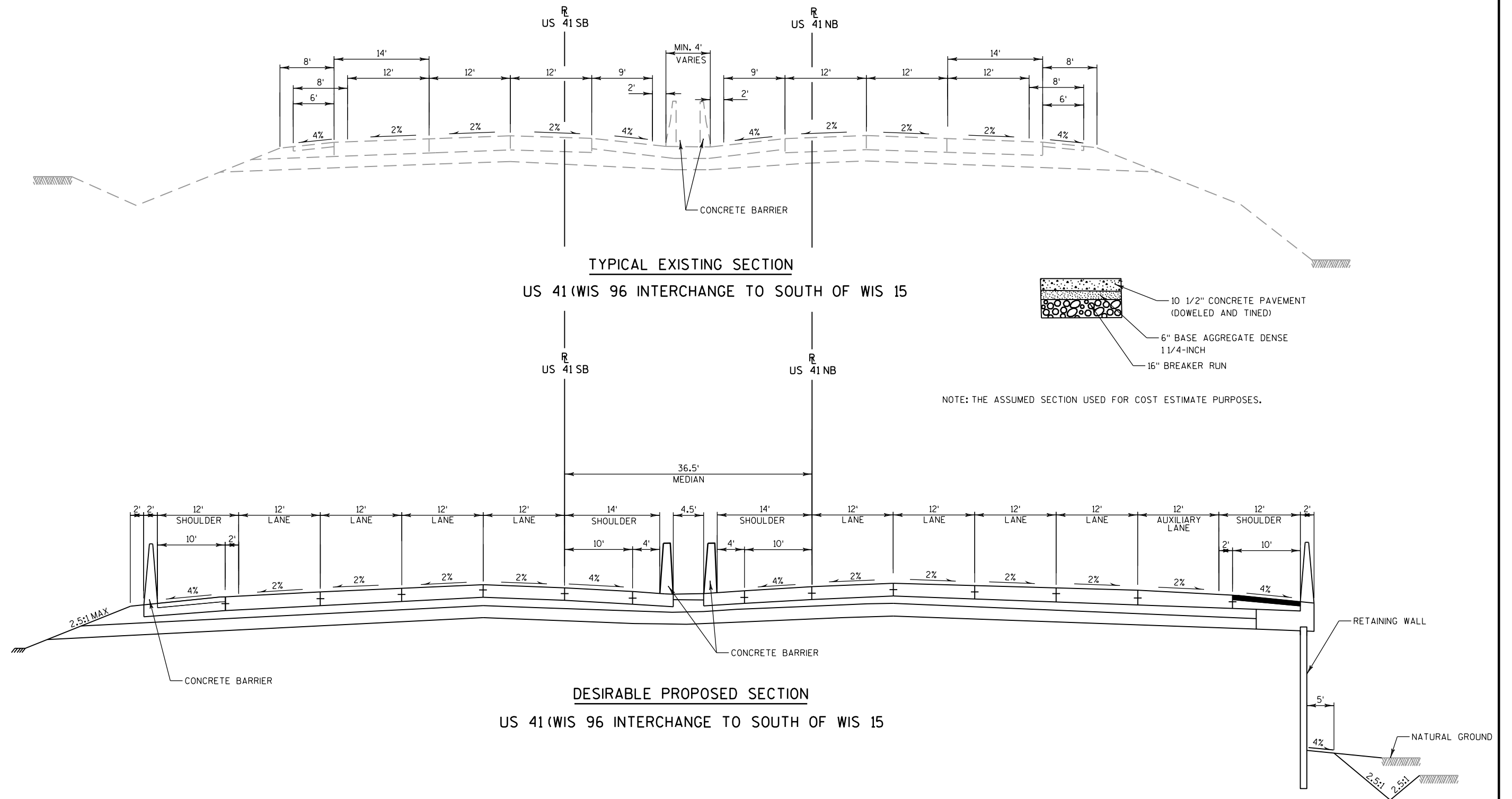
This section of US 41 from WIS 96 to WIS 15 is shown on existing alignment.

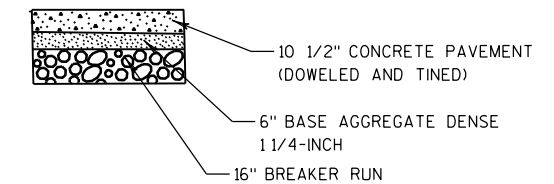
US 41 Typical Section

Between WIS 96 and WIS 15 Interchanges, the mainline typical section consists of a 36.5' median (14' inside shoulders with 56-inch single face barriers). Northbound US 41 has 4 – 12' lanes and 1 – 12' auxiliary lane between WIS 96 and WIS 15 Interchanges. Southbound US 41 has 4 – 12' lanes with the outside lane becoming the additional lane southbound originating from the WIS 15 on-ramp. Both northbound and southbound US 41 have 12' outside shoulders with 42-inch single face barrier or retaining walls for portions of the section with tight right-of-way constraints. Refer to Figure 3-1 (page 3-5) for Typical Section.

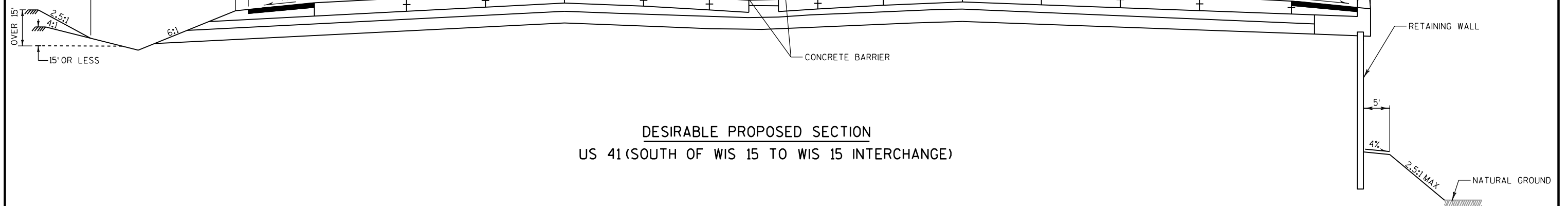
Just south of the WIS 15 Interchange, the mainline typical section consists of a 36.5' median (14' inside shoulders with 56-inch single face barriers), 4 – 12' lanes in both directions with 1 – 12' auxiliary lane northbound. Southbound US 41 has a 12' outside shoulder with traversable ditch slopes. Northbound US 41 has a 12' outside shoulder with retaining wall to minimize impacts to adjacent commercial properties. Refer to Figure 3-2 (page 3-6) for Typical Section.

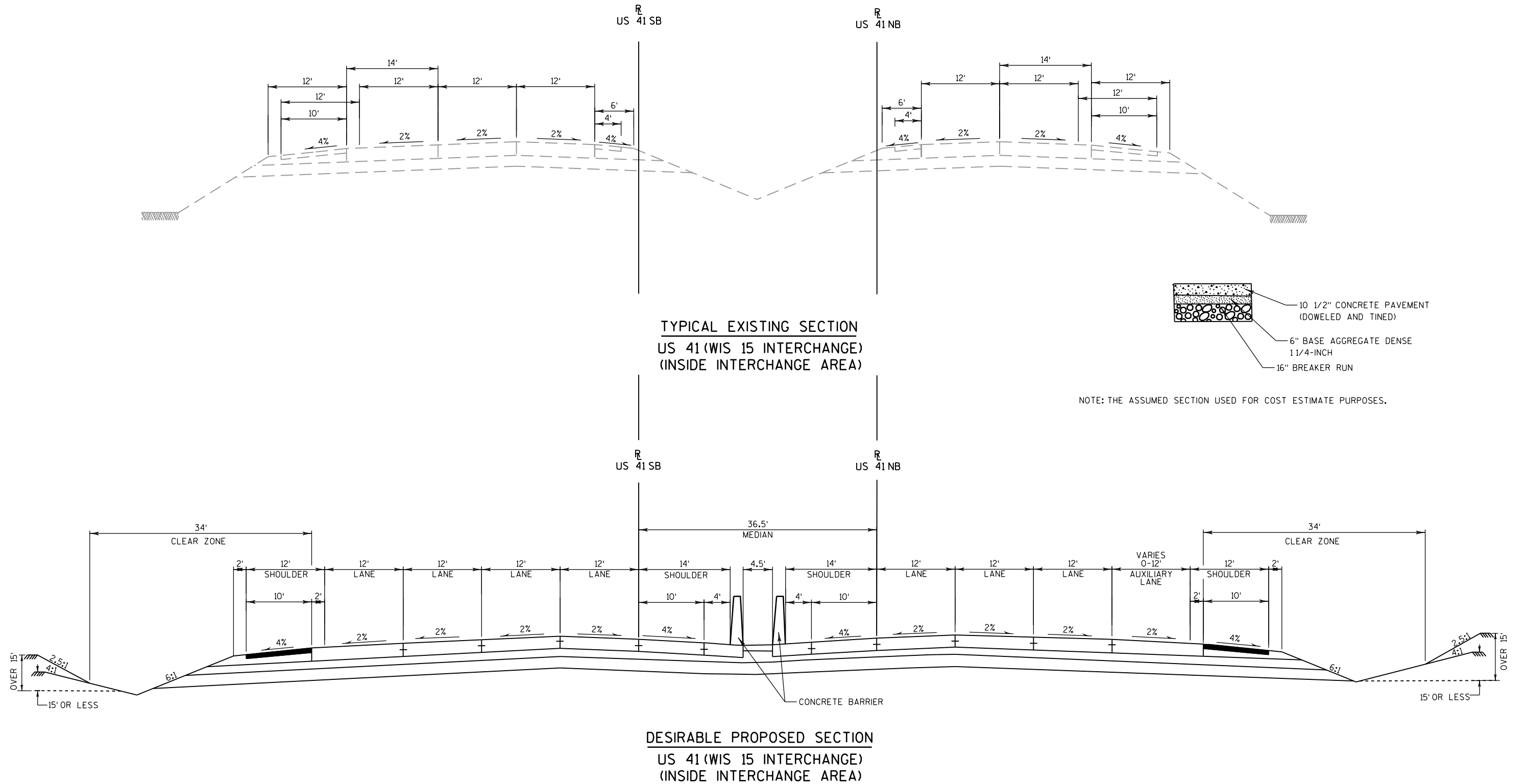
Within the WIS 15 Interchange area, the mainline typical section consists of a 36.5' median (14' inside shoulders with 56-inch single face barriers), 4 – 12' lanes in both directions, and 12' outside shoulders. Refer to Figure 3-3 (page 3-7) for Typical Section.





NOTE: THE ASSUMED SECTION USED FOR COST ESTIMATE PURPOSES.





US 41 Ramps and Auxiliary Lanes

Review all exit ramp configurations for single or dual lane needs.

Refer to Exhibit 3-1 (page 3-9) for further discussion on WIS 96 northbound on ramp configuration (3-1-A).

Refer to Exhibit 3-1 (page 3-9) for further discussion on WIS 96 southbound off ramp and auxiliary lane configuration (3-1-B). Refer to Figure 2-8 for line diagram showing the WIS 96 ramp requirements.

Frontage Roads & Multi-Use Paths

Refer to Exhibit 3-1 (page 3-9) for discussion on North Westfield Drive frontage road (3-1-C).

Refer to Exhibit 3-2 (page 3-10) for discussion on US 41 typical section impacts to pedestrian bridge B-44-190 (3-1-D).

Addressing Geometric Deficiencies

All geometric deficiencies are anticipated to be corrected during the long-term improvement expansion project. Refer to Exhibit 3-2 (page 3-10) for discussion on deficient vertical grade from MM 138.8 to 139.0 (3-1-E).

Right-of-Way Impacts

Refer to Exhibit 3-1 (page 3-9) for discussion on right-of-way along US 41 northbound mainline (3-1-F).

Refer to Exhibit 3-1 (page 3-9) for discussion on right-of-way impacts along WIS 96 northbound on-ramp (3-1-G).

Utilities

Refer to Exhibit 3-1 (page 3-9) for WE Energies underground electric line crossing approximately at WIS 96 (3-1-H).

Further Analysis Recommendations

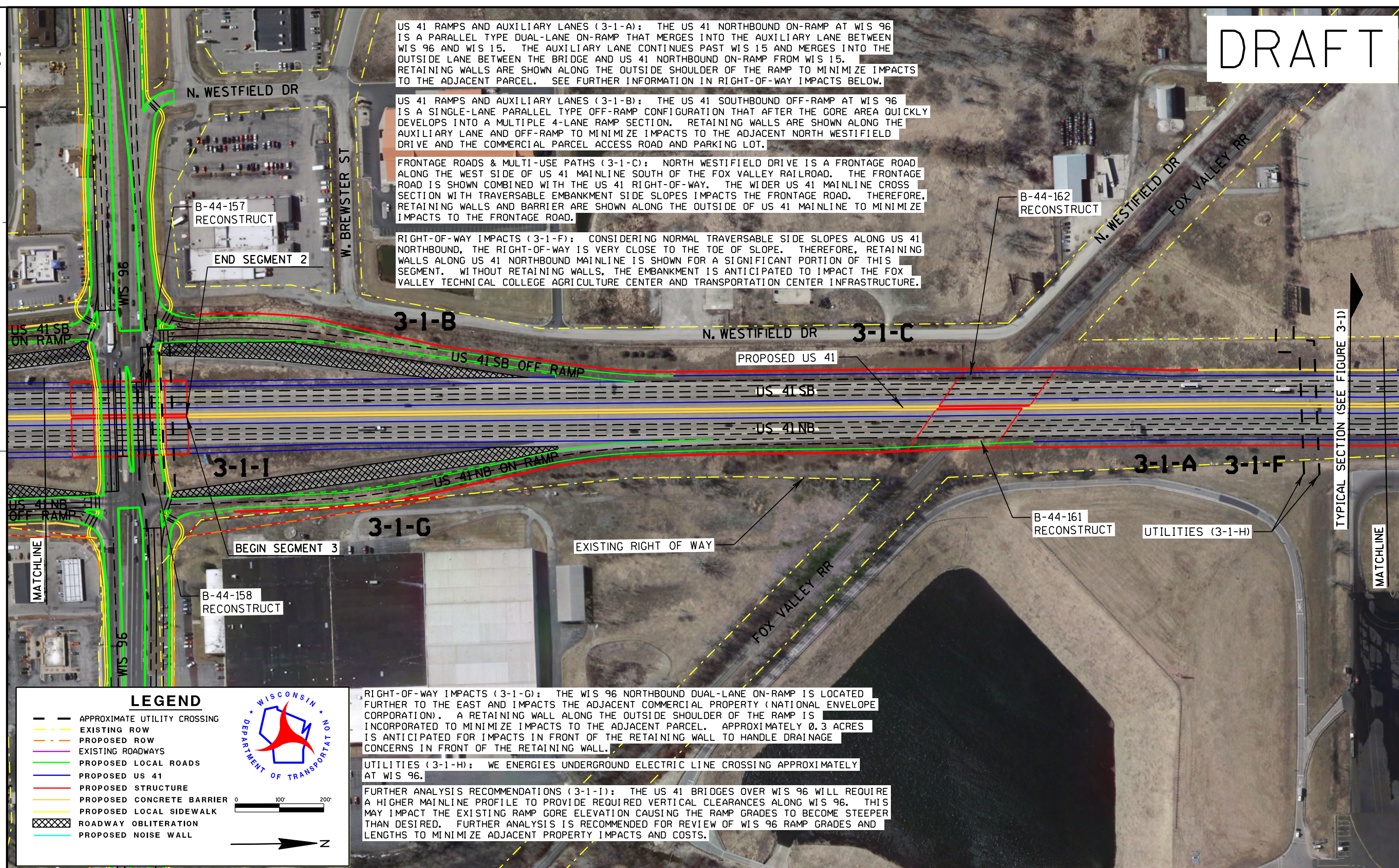
Refer to Exhibit 3-1 (page 3-9) for discussion on US 41 bridges over WIS 96 and ramp requirements for further analysis recommendations (3-1-I).

US 41 RAMPS AND AUXILIARY LANES (3-1-A): THE US 41 NORTHBOUND ON-RAMP AT WIS 96 IS A PARALLEL TYPE DUAL-LANE ON-RAMP THAT MERGES INTO THE AUXILIARY LANE BETWEEN WIS 96 AND WIS 15. THE AUXILIARY LANE CONTINUES PAST WIS 15 AND MERGES INTO THE OUTSIDE LANE BETWEEN THE BRIDGE AND US 41 NORTHBOUND ON-RAMP FROM WIS 15. RETAINING WALLS ARE SHOWN ALONG THE OUTSIDE SHOULDER OF THE RAMP TO MINIMIZE IMPACTS TO THE ADJACENT PARCEL. SEE FURTHER INFORMATION IN RIGHT-OF-WAY IMPACTS BELOW.

US 41 RAMPS AND AUXILIARY LANES (3-1-B): THE US 41 SOUTHBOUND OFF-RAMP AT WIS 96 IS A SINGLE-LANE PARALLEL TYPE OFF-RAMP CONFIGURATION THAT AFTER THE GORE AREA QUICKLY DEVELOPS INTO A MULTIPLE 4-LANE RAMP SECTION. RETAINING WALLS ARE SHOWN ALONG THE AUXILIARY LANE AND OFF-RAMP TO MINIMIZE IMPACTS TO THE ADJACENT NORTH WESTFIELD DRIVE AND THE COMMERCIAL PARCEL ACCESS ROAD AND PARKING LOT.

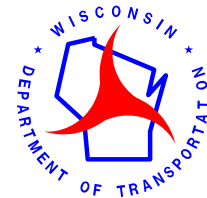
FRONTAGE ROADS & MULTI-USE PATHS (3-1-C): NORTH WESTFIELD DRIVE IS A FRONTAGE ROAD ALONG THE WEST SIDE OF US 41 MAINLINE SOUTH OF THE FOX VALLEY RAILROAD. THE FRONTAGE ROAD IS SHOWN COMBINED WITH THE US 41 RIGHT-OF-WAY. THE WIDER US 41 MAINLINE CROSS SECTION WITH TRAVERSABLE EMBANKMENT SIDE SLOPES IMPACTS THE FRONTAGE ROAD. THEREFORE, RETAINING WALLS AND BARRIER ARE SHOWN ALONG THE OUTSIDE OF US 41 MAINLINE TO MINIMIZE IMPACTS TO THE FRONTAGE ROAD.

RIGHT-OF-WAY IMPACTS (3-1-F): CONSIDERING NORMAL TRAVERSABLE SIDE SLOPES ALONG US 41 NORTHBOUND, THE RIGHT-OF-WAY IS VERY CLOSE TO THE TOE OF SLOPE. THEREFORE, RETAINING WALLS ALONG US 41 NORTHBOUND MAINLINE IS SHOWN FOR A SIGNIFICANT PORTION OF THIS SEGMENT. WITHOUT RETAINING WALLS, THE EMBANKMENT IS ANTICIPATED TO IMPACT THE FOX VALLEY TECHNICAL COLLEGE AGRICULTURE CENTER AND TRANSPORTATION CENTER INFRASTRUCTURE.



LEGEND

- APPROXIMATE UTILITY CROSSING
- EXISTING ROW
- PROPOSED ROW
- EXISTING ROADWAYS
- PROPOSED LOCAL ROADS
- PROPOSED US 41
- PROPOSED STRUCTURE
- PROPOSED CONCRETE BARRIER
- PROPOSED LOCAL SIDEWALK
- XXXXX ROADWAY OBLITERATION
- PROPOSED NOISE WALL



0 100' 200'



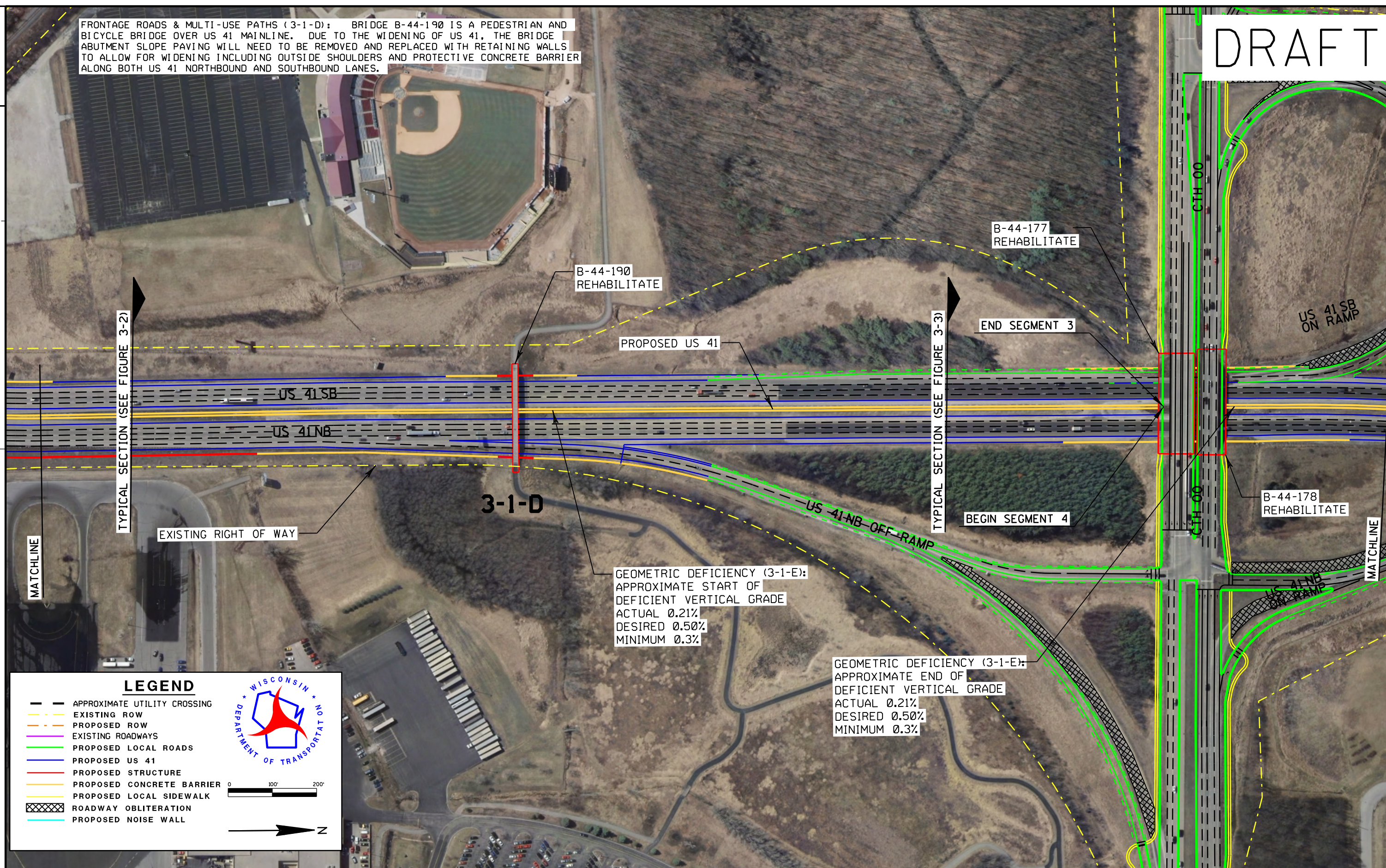
RIGHT-OF-WAY IMPACTS (3-1-G): THE WIS 96 NORTHBOUND DUAL-LANE ON-RAMP IS LOCATED FURTHER TO THE EAST AND IMPACTS THE ADJACENT COMMERCIAL PROPERTY (NATIONAL ENVELOPE CORPORATION). A RETAINING WALL ALONG THE OUTSIDE SHOULDER OF THE RAMP IS INCORPORATED TO MINIMIZE IMPACTS TO THE ADJACENT PARCEL. APPROXIMATELY 0.3 ACRES IS ANTICIPATED FOR IMPACTS IN FRONT OF THE RETAINING WALL TO HANDLE DRAINAGE CONCERNS IN FRONT OF THE RETAINING WALL.

UTILITIES (3-1-H): WE ENERGIES UNDERGROUND ELECTRIC LINE CROSSING APPROXIMATELY AT WIS 96.

FURTHER ANALYSIS RECOMMENDATIONS (3-1-I): THE US 41 BRIDGES OVER WIS 96 WILL REQUIRE A HIGHER MAINLINE PROFILE TO PROVIDE REQUIRED VERTICAL CLEARANCES ALONG WIS 96. THIS MAY IMPACT THE EXISTING RAMP GORE ELEVATION CAUSING THE RAMP GRADES TO BECOME STEEPER THAN DESIRED. FURTHER ANALYSIS IS RECOMMENDED FOR REVIEW OF WIS 96 RAMP GRADES AND LENGTHS TO MINIMIZE ADJACENT PROPERTY IMPACTS AND COSTS.

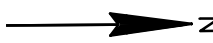
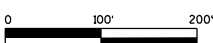
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FRONTAGE ROADS & MULTI-USE PATHS (3-1-D): BRIDGE B-44-190 IS A PEDESTRIAN AND BICYCLE BRIDGE OVER US 41 MAINLINE. DUE TO THE WIDENING OF US 41, THE BRIDGE ABUTMENT SLOPE PAVING WILL NEED TO BE REMOVED AND REPLACED WITH RETAINING WALLS TO ALLOW FOR WIDENING INCLUDING OUTSIDE SHOULDERS AND PROTECTIVE CONCRETE BARRIER ALONG BOTH US 41 NORTHBOUND AND SOUTHBOUND LANES.



LEGEND

- APPROXIMATE UTILITY CROSSING
- - - EXISTING ROW
- - - PROPOSED ROW
- - - EXISTING ROADWAYS
- - - PROPOSED LOCAL ROADS
- - - PROPOSED US 41
- - - PROPOSED STRUCTURE
- - - PROPOSED CONCRETE BARRIER
- - - PROPOSED LOCAL SIDEWALK
- XXXXX ROADWAY OBLITERATION
- - - PROPOSED NOISE WALL



Structures

Bridges

Summary of potential bridge geometry is shown in Table 3-4 and includes bridge number, mile marker, bridge name, existing bridge age in 2013, girder type, girder depth, desired vertical clearance, minimum vertical clearance, potential vertical clearance, superelevation and direction of curve, clear bridge width, bridge length, number of spans, span configuration, bridge skew, local road typical section, and design recommendations.

Table 3-4: Segment 3 – Summary of Potential Bridge Geometry

BRIDGE NO.	MILE MARKER (MM)	BRIDGE NAME	AGE IN 2013	GIRDER TYPE	GIRDER DEPTH (INCH)	DESIRED VERT. CLEAR (FEET)	MIN. VERT. CLEAR (FEET)	VERT. CLEAR (FEET)	SUPER % & DIR.	BRIDGE CLEAR WIDTH (FEET)	BRIDGE LENGTH (FEET)	NO. OF SPANS	SPAN CONFIG. (FEET)	BRIDGE SKEW	LOCAL ROAD TYPICAL SECTION	DESIGN RECOMMENDATIONS
B-44-0162	138.3	US 41 SB Over Fox Valley Railroad	26	Continuous Steel Deck Girder	36	23.30	23.00	23.30	NC	74	218.00	3	65.5/79.0/65.5	44° 37' 03"LF	End Spans: 2:1 Slope paving; Middle Span: railroad with ditches	Reconstruction since ratio of reconstruction to rehabilitation costs is very low.
B-44-0161	138.3	US 41 NB Over Fox Valley Railroad	26	Continuous Steel Deck Girder	36	23.30	23.00	23.30	NC	86	218.00	3	65.5/79.0/65.5	44° 37' 03"LF	End Spans: 2:1 Slope paving; Middle Span: railroad with ditches	Reconstruction since ratio of reconstruction to rehabilitation costs is very low.
B-44-0190	138.7	Bicycle Pedestrian Over US 41	16	Continuous Steel Deck Girder	36	17.75	17.00 or ES	18.89	NC	10	222.00	2	110.0/110.0	No Skew	10' Multi-use pathway	Rehabilitation assumes that bridge will have barrier retaining earth on SB side and a full height retaining wall along the NB side in front of the existing abutments.

Legend:

ES = Exception to Standard

RT = Superelevation Right

NC = Normal Crown

LT = Superelevation Left

LF = Left Forward

RF = Right Forward

N/A = Not Applicable

c&g = Curb and Gutter

3.3 Cost Summary

Table 3-5 below summarizes the long-term alternative costs for Segment 3. Individual one page cost summaries using the US 41 Majors cost estimating worksheets are included for each US 41 mainline segment and Interchange. See Appendix 6 for a detailed breakdown of these cost estimating worksheets by segment or interchange.

Table 3-5: Segment 3 – Cost Summary

MAINLINE SEGMENT LIMITS/INTERCHANGE	SHORT-TERM COSTS*	LONG-TERM COSTS*	TOTALS
North of WIS 96 Structures to South of WIS 15 Structures			
Major Roadway Items		\$6,602,000	
Allowance Items		\$3,947,000	
Structures		\$8,444,000	
Special Construction Elements		\$0	
Context Sensitive Solutions (CSS)		\$950,000	
Scope Change Allowance Items		\$4,786,000	
Project Delivery Allowance Items		\$8,580,000	
External Costs and Risk Assessment		\$2,193,000	\$35,502,000
Segment 3 Total	\$0	\$35,502,000	\$35,502,000

**Costs are shown in 2013 dollars with no future year construction or material cost increases from inflation included.*