

SEGMENT 8 - WIS 441: EAST OF US 10 TO FOX RIVER BRIDGE NORTH ABUTMENT (4.253 MILES)

8.1 Existing Conditions

Traffic and Operations Summary

Mainline traffic forecasts were developed for each section of segment 8 through consultation with WisDOT Traffic Forecasting section. The K30 hourly volume projections developed using the Northeast Region travel demand model for year 2038 indicate two to three lanes each direction, with residual hourly capacities of less than 325 vehicles per hour in two lane sections. Traffic Analysis Forecasting Information System (TAFIS) generated K30 projections indicate very similar results. For system continuity, three lanes each direction is recommended. Additional detail concerning the traffic forecasts is available in the Traffic Forecasting Methodology memo in Appendix 1.

Safety Summary

Table 8-1 below identifies the segments that exceed statewide averages for the same three year period.

Table 8-1: Segment 8 – WIS 441 Crash Data

SECTION	CRITERIA	3-YEAR AVERAGE RATE*	SEGMENT RATE*
Oneida St (USH 10) to CTH KK (MM 5.8 to MM 7.6)	Total fatal and incapacitating crashes	1.7 (Urban)	6.1
CTH KK to CTH CE (MM 7.6 to MM 8.6)	Total fatal and incapacitating crashes	1.7 (Urban)	7.8
CTH CE to CTH OO (MM 8.6 to MM 10.6)	Total fatal and incapacitating crashes	1.7 (Urban)	15.5

* 3-Year Average Rate (2005-2007) represents the Wisconsin statewide average number of crashes per 100 million vehicle miles traveled for urban and rural facilities. The Segment Rate represents the actual number of crashes per 100 million vehicle miles traveled for the mainline section listed.

Roadway Summary

The WIS 441 project has existing geometric deficiencies that require action. Table 8-2 on the next page identifies the deficiencies.

Table 8-2: Segment 8 – Roadway Geometric Deficiencies

SECTION	MILE MARKER	CRITERIA	ACTUAL VALUE
4800' east of USH 10 to CTH KK (MM 5.5 to MM 6.0)	6.0 to 6.3	Superelevation R = 3820' Desired SE = 4.6%	SE = 4.0% Appropriate speed = 65 mph
	7.1 to 8.0	Superelevation R = 3820' Desired SE = 4.6%	SE = 4.1% Appropriate speed = 65 mph
	5.4 to 5.7	Superelevation R = 3756' Desired SE = 4.7%	SE = 4.0% Appropriate speed = 65 mph
	6.2	Min. Vertical Grade = 0.5% desired, 0.3% min.	0.38%
	6.3	Min. Vertical Grade = 0.5% desired, 0.3% min.	0.13%
	6.5 to 6.8	Min. Vertical Grade = 0.5% desired, 0.3% min.	0.33%
	7.0 to 7.2	Min. K Crest = 401	226
	7.4 to 7.5	Min. Vertical Grade = 0.5% desired, 0.3% min.	0.44%
	7.6 to 7.8	Min. K Crest = 401	335
	4.1	Min. K Crest = 401	327
	4.3 to 4.4	Min. Vertical Grade = 0.5% desired, 0.3% min.	0.34%
	4.5 to 4.7	Min. K Crest = 401	242
	4.9 to 5.2	Min. Vertical Grade = 0.5% desired, 0.3% min.	0.33%
	5.4	Min. Vertical Grade = 0.5% desired, 0.3% min.	0.13%
	5.5	Min. Vertical Grade = 0.5% desired, 0.3% min.	0.38%
CTH KK to CTH CE (MM 2.9 to MM 8.8)	3.7 to 4.6	Superelevation R = 5729' Desired SE = 3.4%	SE = 3.0% Appropriate speed = 65 mph
	8.2 to 8.3	Min. Vertical Grade = 0.5% desired, 0.3% min.	0.42%
	8.6 to 8.8	Min. K Crest = 401	325
	2.9 to 3.2	Min. K Crest = 401	325
CTH CE north of abutment of B-44-126 (MM 2.2 to MM 10.2)	9.2 to 9.3	Superelevation R = 11459' Desired SE = 2.0% (RC)	SE = NC Appropriate speed = 60 mph
	9.4 to 9.5	Superelevation R = 5730' Desired SE = 3.4%	SE = 3.0% Appropriate speed = 65 mph
	2.2 to 2.3	Superelevation R = 5714' Desired SE = 3.4%	SE = 3.0% Appropriate speed = 65 mph
	9.0 to 9.2	Min. K Crest = 401	288
	9.2 to 9.3	Min. Vertical Grade = 0.5% desired, 0.3% min.	0.40%
	10.0 to 10.2	Min. K Crest = 401	277

SECTION	MILE MARKER	CRITERIA	ACTUAL VALUE
CTH CE north of abutment of B-44-126 (MM 2.2 to MM 10.2)	2.4 to 2.6	Min. Vertical Grade = 0.5% desired, 0.3% min.	0.40%
	2.6 to 2.7	Min. K Crest = 401	288

Structures Summary

Bridges

Summary of existing bridge conditions from Highway Structure Information are shown in Table 8-3 (page 8-4) and include 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 July 16, 2013.

Summary of existing bridge geometry is shown in Table 8-4 (page 8-5) 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 8-3: Segment 8 – 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-08-024	6.3	Telulah Ave over STH 441	Prestressed Concrete Deck Girder	1992	N/A	N/A	Original	7	7	7	94	23
B-08-025	7.1	STH 441 NB over Lake Park Road	Prestressed Concrete Deck Girder	1993	N/A	N/A	Original	7	7	7	100	23
B-08-026	4.6	STH 441 SB over Lake Park Road	Prestressed Concrete Deck Girder	1993	N/A	N/A	Original	7	7	7	100	23
B-08-027	7.7	WIS 441 NB Over County KK	Prestressed Concrete Deck Girder	1993	N/A	N/A	Original	7	7	7	99	21
B-08-028	4.0	WIS 441 SB Over County KK	Prestressed Concrete Deck Girder	1993	N/A	N/A	Original	7	7	7	99	21
B-44-137	8.3	WIS 441 over Drainage Way	Box Culvert	1991	N/A	N/A	Original	7	7	8	75.5	20
B-44-122	8.7	WIS 441 NB Over County CE	Prestressed Concrete Deck Girder	1992	N/A	N/A	Original	7	8	8	100	22
B-44-123	3.0	WIS 441 NB Over County CE	Prestressed Concrete Deck Girder	1992	N/A	N/A	Original	7	8	8	100	22
B-44-124	9.2	Fox River Valley Railroad over WIS 441	Continuous Steel Deck Girder	1992	N/A	N/A	Original	8	8	8	N/A	N/A
B-44-125	9.4	Newberry Street over STH 441	Prestressed Concrete Deck Girder	1992	N/A	N/A	Original	7	8	7	83	22
B-44-126	9.9	WIS 441 Over STH 96 – Fox River – CNW Railroad	Prestressed Concrete Deck Girder	1992	N/A	N/A	Original	7	7	7	94	23

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 8-4: Segment 8 - 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-08-024	6.3	Telulah Ave over STH 441	Prestressed Concrete Deck Girder	54	16.09	NC	32.0	207.33	2	106.0/99.5	4o 40' RF	2-14' lanes with 2.5' curb and gutter along each side of the roadway
B-08-025	7.1	STH 441 NB over Lake Park Road	Prestressed Concrete Deck Girder	45	15.9	4.0 LT	40	139.08	3	30.5/75.5/30.5	25o 16' LF	End Span: 2:1 slope paving
B-08-026	4.6	STH 441 SB over Lake Park Road	Prestressed Concrete Deck Girder	45	15.4	4.0 LT	40	139.08	3	30.5/75.5/30.5	25o 44' LF	Middle Span: 4-11' lanes with curb and gutter and 8' terrace each side
B-08-027	7.7	WIS 441 NB Over County KK	Prestressed Concrete Deck Girder	45	16.7	4.1 LT	40.0	163.58	2	86.5/75.0	15o 38' RF	End Span: 2:1 slope paving
B-08-028	4.0	WIS 441 SB Over County KK	Prestressed Concrete Deck Girder	45	16.7	4.1 LT	40.0	163.58	2	74.5/87.0	15o 38' RF	End Span: 2:1 slope paving
B-44-137	8.3	WIS 441 over Drainage Way	Box Culvert	N/A	N/A	NC	202.0	22.25	2	10.75/10.75	29o 00' LF	Middle Span: 4-11' lanes with curb and gutter and 8' terrace each side
B-44-122	8.7	WIS 441 NB Over County CE	Prestressed Concrete Deck Girder	45	16.5	NC	40.0	182.83	2	90.5/90.5	No Skew	End Span: 2:1 slope paving
B-44-123	3.0	WIS 441 NB Over County CE	Prestressed Concrete Deck Girder	45	16.73	NC	40.0	182.83	2	90.5/90.5	No Skew	End Span: 2:1 slope paving with 11' terrace, 3-12' lanes with c&g each side (includes left turn lane), 15' median
B-44-124	9.2	Fox River Valley Railroad over WIS 441	Continuous Steel Deck Girder	90	16.58	None	18.0	150.00	2	75.0/75.0	10o 00' LF	End Span: 2-12' lanes with c&g each side, 2:1 slope paving with 11' terrace
B-44-125	9.4	Newberry Street over STH 441	Prestressed Concrete Deck Girder	45	16.74	NC	44.0	164.3	2	79.5/79.5	27o 50' LF	End Span: 2:1 slope paving with 11' terrace, 2-12' lanes with c&g each side, 15 median
B-44-126	9.9	WIS 441 Over STH 96 – Fox River – CNW Railroad	Prestressed Concrete Deck Girder	48 and 72	28.0 (STH 96) 23.5' (CNW RR)	NC	40.0/40.0	1626.1	11	135.0/162.0/162.0/ 162.0/162.0/162.0/	No Skew	End Span: 3-12' lanes with c&g each side (includes left turn lane), 2:1 slope paving with 11' terrace

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

Impacts within Segment 8 mainly consist of “low” and “medium” impact items. Low impact items generally include potential impacts on agriculture, upland habitat, and airports as the majority of the segment is developed and consists of residential, commercial, or industrial land uses.

Medium impact items generally include potential impacts on economic resources, environmental justice, natural resources, air quality, noise, and the ever present potential for erosion, storm water, and historic 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.

High impact items include impacts on archaeological resources, community and residential, wetlands, streams, upland habitat, and aesthetics. General discussion about these impacts can be seen below. Further information on environmental impacts can be seen in the Pre-NEPA Environmental Screening located in Appendix 4.

East of US 10 to County KK (Calumet Street)

No environmental factors are rated as “high” impact.

County KK (Calumet Street) to County CE (College Avenue)

Archaeological Resources

An unknown historic archaeological site exists in the northwest quadrant of the County KK and WIS 441 interchange. The current status of the site is unknown and additional investigations may need to be completed. (Wisconsin Historic Preservation Database, 2008) WisDOT may have more detailed records of the archaeological site related to the original construction of the interchange. An archaeological review should be completed for any work outside the established right of way or previously surveyed area.

Initial analysis indicates a high potential for archaeological sites in the area due previous archaeological finds in the area. The Section 106 process would be fulfilled under the screening list process.

County CE (College Avenue) to the north Fox River bridge abutment

Community and Residential

Residential property adjacent to WIS 441 is primarily located east and west of WIS 441 between W. 4th Street and WIS 96. Conceptual design of the potential WIS 441 expansion through this area suggests a design that would likely require the acquisition of 52 residences. Strip acquisition of property from three other residential properties would also be needed to accommodate the future highway footprint and clear zones. Added infrastructure improvements such as retaining walls could be used to minimize impacts to residential property and should be considered in later stages of design.

The removal of houses on either side of WIS 441 will also have an impact on the neighborhoods located adjacent to the highway. Removing the homes will create new views of a major highway that were not previously there for homes that are located on the west side of N. Bay Ridge Road and on the east side of N. Wellhouse Drive. These types of impacts could be mitigated with the construction of noise walls or other improvements that would block views to the highway. It is recommended that the local public within the impacted neighborhoods be involved in the development of solutions to mitigate the impacts on the neighborhood.

Additionally, the Canadian National Railway bridge over WIS 441 just south of W. 4th Street will have to be reconstructed and lengthened to span across the desired highway width. Any potential shifts in the railroad alignment that would require additional right-of-way as a result of the bridge reconstruction could impact residences to the north of the railroad.

In the event of having to acquire residential property, WisDOT will have to adhere to the residential relocation process described in Sec. 32.185 – 32.27 of the Wisconsin Statutes.

Wetlands

Based on examination of aerial photography and WDNR mapping, one delineated wetland is located in the northwest quadrant of the County CE interchange. The WDNR classifies the wetland as a forested wetland. (WDNR Wisconsin Wetland Inventory, 2013) Analysis of aerial imagery indicates that this wetland may have degraded over time as development has encroached and much of the forested area that used to exist in this area has been removed.

Conceptual design of the potential reconfiguration of the County CE interchange indicates a potential impact to the identified wetland. It is likely that impacts to the wetland could be minimized if not avoided with alterations to the ramp design or the inclusion of improvements that can minimize the interchange footprint, such as retaining walls. Special considerations will have to be made to address drainage in a way that would minimize impacts on nearby wetlands and streams. Impacts to wetland habitat should be assessed in coordination with the WDNR and the U.S. Fish & Wildlife Service.

Streams and Floodplains

The Fox River crosses under WIS 441 between County CE and the north Fox River bridge abutment. (WDNR Surface Water Data Viewer, 2013) Conceptual highway design indicates that the bridge across the Fox River will have to be expanded to accommodate six lanes. A Section 404 permit will be required for any work done within the Fox River. Preliminary analysis of the bridge design concludes that the navigable channel within the Fox River will not be impacted by the bridge expansion.

Migratory bird nests may exist on bridges and fish habitat may be present in the bridge. Impacts to streams, floodplains, and habitat should be assessed in coordination with the WDNR, USACE, and the U.S. Fish & Wildlife Service.

Upland Habitat

Aerial photography indicates the property adjacent to WIS 441 within this section is mostly developed or has been tilled for farming and that little natural upland habitat exists. A small forested area is located adjacent to WIS 441 on the north bank of the Fox River. Impacts to the forested area are likely due to the expansion of the bridge across the Fox River.

Archaeological Resources

A prehistoric village site exists on the north bank of the Fox River and is adjacently located to WIS 441 on the east and west sides. The current status of the site is unknown. (Wisconsin Historic Preservation Database, 2008) WisDOT may have more detailed records of the archaeological site related to the original construction of WIS 441. An archaeological review should be completed for any work outside the established right of way or previously surveyed area.

Initial analysis indicates a high potential for archaeological sites in the area due previous archaeological finds in the area. The Section 106 process would be fulfilled under the screening list process.

Aesthetics

Expanding the bridge over the Fox River and the removal of homes along WIS 441 between 4th Street and WIS 96 would alter the built environment significantly. The potential project would directly impact those who would have a view of the bridge from their homes along the Fox River. Additionally, removing homes that are currently adjacent to WIS 441 will create new views of a major highway for homes that are located on the on the west side of N. Bay Ridge Road and on the east side of N. Wellhouse Drive. It is recommended that a CSD process be implemented that includes participation from the local public within the impacted neighborhoods to develop solutions to mitigate the impacts on the neighborhood.

8.2 Expansion Design Concept

Mainline Segment 8

For ease in discussion, Segment 8 – WIS 441: East of US 10 to South of US 41/WIS 441 North System Interchange was broken into mainline sections with limits at interchange cross roads.

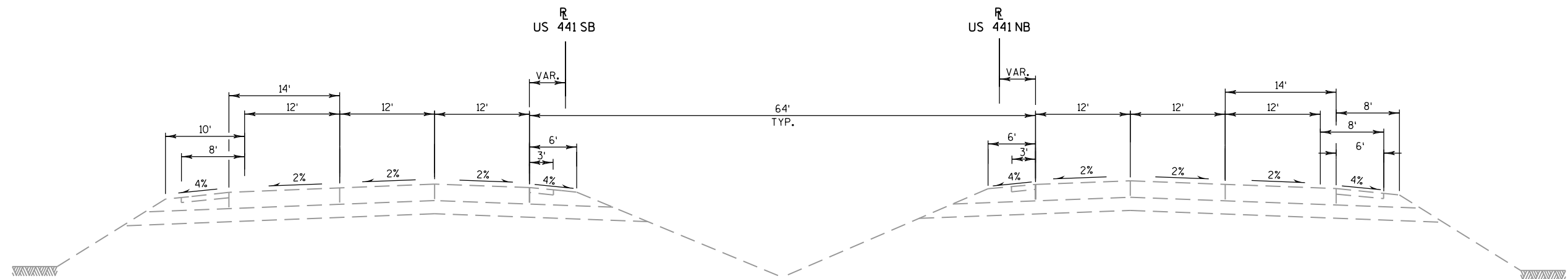
Section 1: East of US 10 to County KK Interchange

WIS 441 Alignment

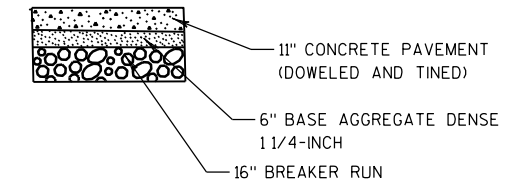
The section of WIS 441 begins approximately 4800' east of the structures over USH 10 and proceeds eastward to the County KK interchange. This segment of STH 441 is on existing alignment with the additional expansion lanes placed within the median.

WIS 441 Typical Section

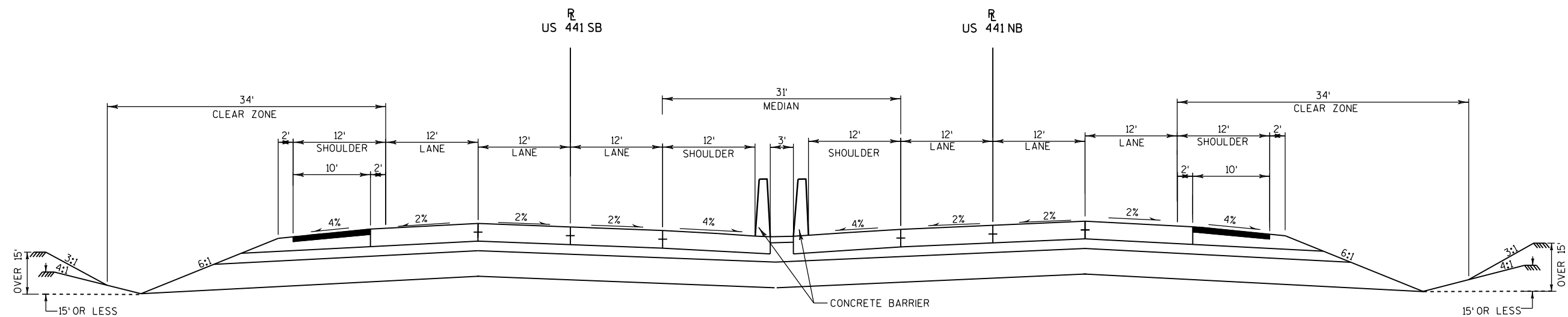
The mainline typical section east of US 10 consists of a 31.0' median (12' inside shoulders with 56-inch single face barriers and 3' between the back of the barriers). The northbound and southbound are comprised of 3 – 12' lanes and 12' outside shoulders with 42-inch single face barrier at the Telulah Avenue overpass. This typical section is based on the typical sections for WIS 441 currently under design, from US 41 to east of US 10. Refer to Figure 8-1 (page 8-10) for Typical Section.



TYPICAL EXISTING SECTION
WIS 441 (EAST OF USH 10 TO COUNTY KK INTERCHANGE)



NOTE: THE ASSUMED SECTION USED FOR COST ESTIMATE PURPOSES.



DESIRABLE PROPOSED SECTION
WIS 441 (EAST OF USH 10 TO COUNTY KK INTERCHANGE)

WIS 441 Ramps and Auxiliary Lanes

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

Refer to Exhibit 8-2 thru Exhibit 8-4 (page 8-15 thru 8-17) for further discussion on County KK southbound on-ramp parallel type configuration (8-1-A).

Refer to Exhibit 8-3 and Exhibit 8-4 (pages 8-16 and 8-17) for further discussion on County KK northbound off-ramp parallel type configuration (8-1-B).

Frontage Roads

There are no significant frontage roads along this stretch of WIS 441.

Addressing Geometric Deficiencies

All geometric deficiencies are anticipated to be corrected during the long-term improvement expansion project. Refer to Exhibit 8-1 through Exhibit 8-3 (pages 8-14 through 8-16 respectively) for discussion on deficient vertical grades (8-1-C), (8-1-D), (8-1-E), (8-1-F), (8-1-G), (8-1-H), (8-1-I) and (8-1-J) located along WIS 441 mainline. Refer to Exhibit 8-1 and Exhibit 8-3 (pages 8-14 and 8-16 respectively) for deficient horizontal curve superelevation (8-1-K), (8-1-L), and (8-1-M). Refer to Exhibit 8-2, Exhibit 8-3 and Exhibit 8-4 (pages 8-15, 8-16, and 8-17) for discussion on the deficient vertical curve (8-1-N), (8-1-O), (8-1-P) and (8-1-Q).

Right-of-way Impacts

Refer to Exhibit 8-1 (page 8-14) for additional discussion on right of way impacts (8-1-R). Conceptual plans show minor right of way impacts, however a detailed design that incorporates vertical design and slope intercepts may identify additional locations for concrete barrier or beam guard used with steeper slopes to minimize right of way impacts. Based upon future cost analysis, it may be economical to purchase additional strip acquisitions.

Utilities

The following utilities are shown on Exhibit 8-1 (page 8-14):

- The City of Appleton has a sanitary sewer crossing WIS 441 at S. Kernan Avenue (8-1-S).
- The City of Appleton has two (12-inch and 36-inch) water mains crossing WIS 441 at S. Kernan Avenue (8-1-T).
- The City of Appleton has buried electric cable for lighting crossing WIS 441 along the east side of S. Kernan Avenue (8-1-U).
- Time Warner has an overhead facility crossing WIS 441 at S. Kernan Avenue (8-1-V).

- ATT has buried cable crossing WIS 441 along the west side of S. Kernan Avenue (8-1-W).
- WE Energies has a buried gas crossing WIS 441 along the east side of S. Kernan Avenue (8-1-X).
- The City of Appleton has a 12-inch sanitary sewer crossing WIS 441 at Telulah Avenue (8-1-Y).
- Time Warner has an underground facility crossing WIS 441 at Telulah Avenue (8-1-Z).
- The City of Appleton has a 12-inch water main crossing WIS 441 approximately 1030 feet northeast of Telulah Avenue (8-1-AA).
- The City of Appleton has a 8-inch sanitary sewer crossing WIS 441 approximately 1030 feet northeast of Telulah Avenue (8-1-AB).

The following utilities are shown on Exhibit 8-2 (page 8-15):

- The City of Appleton has a 12-inch water main crossing WIS 441 approximately 1030 feet northeast of Telulah Avenue (8-1-AA).
- The City of Appleton has a 8-inch sanitary sewer crossing WIS 441 approximately 1030 feet northeast of Telulah Avenue (8-1-AB).
- The City of Appleton has a 10-inch sanitary sewer crossing WIS 441 approximately 1850 feet northeast of Telulah Avenue (8-1-AC).
- American Transmission Company has a multi circuit overhead line crossing WIS 441 1540' southwest of Lake Park Rd (8-1-AD)

The following utilities are shown on Exhibit 8-3 (page 8-16):

- The City of Appleton has a 10-inch sanitary sewer crossing WIS 441 at Lake Park Road (8-1-AE).
- The City of Appleton has a 12-inch water main crossing WIS 441 at Lake Park Road (8-1-AF).
- ATT-TGC has an existing fiber optic cable in conduit crossing WIS 441 along the northeast side of Lake Park Road (8-1-AG).
- The City of Appleton has a sanitary sewer crossing WIS 441 1750 feet from Lake Park Road (8-1-AH)
- The City of Appleton has a water main crossing WIS 441 1750 feet from Lake Park Road (8-1-AI)

The following utilities are shown on Exhibit 8-4 (page 8-17):

- Time Warner has an underground facility crossing WIS 441 south of County KK (8-1-AJ)

- ATT has buried cable crossing WIS 441 located behind the sidewalk on the south side of Calumet Street/County KK (8-1-AK).
- TDS Metrocom has buried facilities crossing WIS 441 along the south side of County KK (8-1-AL).
- WE Energies has buried electric crossing WIS 441 at County KK (8-1-AM).
- WE Energies has a buried gas crossing at County KK (8-1-AN).

Further Analysis Recommendations

Refer to Exhibit 8-1 through Exhibit 8-3 (pages 8-14 through 8-16 respectively) for further discussion regarding noise walls (8-1-AO).

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RIGHT-OF-WAY IMPACTS (8-1-R): WIS 441 NORTHBOUND REQUIRES APPROXIMATELY 0.11 ACRES OF ADDITIONAL RIGHT-OF-WAY. THERE WILL BE NO SIGNIFICANT IMPACTS WITH THIS CONCEPTS.

UTILITIES (8-1-S): THE CITY OF APPLETON HAS A SANITARY SEWER CROSSING WIS 441 AT S. KERNAN AVENUE.

UTILITIES (8-1-T): THE CITY OF APPLETON HAS TWO (12-INCH AND 36-INCH) WATER MAINS CROSSING WIS 441 AT S. KERNAN AVENUE.

UTILITIES (8-1-U): THE CITY OF APPLETON HAS BURIED ELECTRIC CABLE FOR LIGHTING CROSSING WIS 441 ALONG THE EAST SIDE OF S. KERNAN AVENUE.

UTILITIES (8-1-V): TIME WARNER HAS AN OVERHEAD FACILITY CROSSING WIS 441 AT S. KERNAN AVENUE.

UTILITIES (8-1-W): ATT HAS BURIED CABLE CROSSING WIS 441 ALONG THE WEST SIDE OF S. KERNAN AVENUE.

UTILITIES (8-1-X): WE ENERGIES HAS A BURIED GAS CROSSING WIS 441 ALONG THE EAST SIDE OF S. KERNAN AVENUE.

UTILITIES (8-1-Y): THE CITY OF APPLETON HAS A 12-INCH SANITARY SEWER CROSSING WIS 441 AT TELULAH AVENUE.

UTILITIES (8-1-Z): TIME WARNER HAS AN UNDERGROUND FACILITY CROSSING WIS 441 AT TELULAH AVENUE.

UTILITIES (8-1-AA): THE CITY OF APPLETON HAS A 12-INCH WATER MAIN CROSSING WIS 441 APPROXIMATELY 1030 FEET NORTHEAST OF TELULAH AVENUE.

UTILITIES (8-1-AB): THE CITY OF APPLETON HAS A 8-INCH SANITARY SEWER CROSSING WIS 441 APPROXIMATELY 1030 FEET NORTHEAST OF TELULAH AVENUE.

FURTHER ANALYSIS RECOMMENDATIONS (8-1-AO): FURTHER REVIEW OF THE ROADWAY SECTION IN THE NOISE WALL LOCATIONS IS NEEDED TO MAKE SURE THAT THE NOISE WALLS ARE LOCATED FAR ENOUGH OUTWARD TO ALLOW ROOM FOR DRAINAGE DITCHES WHILE AVOIDING RIGHT-OF-WAY IMPACTS.



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WIS 441 COUNTY KK SOUTHBOUND ON-RAMP (8-1-A): THE COUNTY KK SOUTHBOUND ON-RAMP IS A PARALLEL TYPE CONFIGURATION. THE RAMP CONSIST OF THREE LANES AT THE RAMP TERMINAL AND NARROWS DOWN TO A SINGLE LANE PRIOR TO MERGING ONTO WIS 441. DUE TO THE RAMP GEOMETRY EXTENDING OVER LAKE PARK RD, STRUCTURE B-08-026 WILL HAVE TO BE RECONSTRUCTED.

UTILITIES (8-1-AA): THE CITY OF APPLETON HAS A 12-INCH WATER MAIN CROSSING WIS 441 APPROXIMATELY 1030 FEET NORTHEAST OF TELULAH AVENUE.

UTILITIES (8-1-AB): THE CITY OF APPLETON HAS A 8-INCH SANITARY SEWER CROSSING WIS 441 APPROXIMATELY 1030 FEET NORTHEAST OF TELULAH AVENUE.

UTILITIES (8-1-AC): THE CITY OF APPLETON HAS A 10-INCH SANITARY SEWER CROSSING WIS 441 APPROXIMATELY 1850 FEET NORTHEAST OF TELULAH AVENUE.

UTILITIES (8-1-AD): AMERICAN TRANSMISSION COMPANY HAS A MULTICIRCUIT OVERHEAD LINE CROSSING WIS 441 1540'±₃₂ SOUTHWEST OF LAKE PARK RD.

FURTHER ANALYSIS RECOMMENDATIONS (8-1-AO): FURTHER REVIEW OF THE ROADWAY SECTION IN THE NOISE WALL LOCATIONS IS NEEDED TO MAKE SURE THAT THE NOISE WALLS ARE LOCATED FAR ENOUGH OUTWARD TO ALLOW ROOM FOR DRAINAGE DITCHES WHILE AVOIDING RIGHT-OF-WAY IMPACTS.

GEOMETRIC DEFICIENCY (8-1-O):
APPROXIMATE END OF
DEFICIENT PROFILE K-VALUE
ACTUAL = 242
DESIRED = 566

GEOMETRIC DEFICIENCY (8-1-H):
APPROXIMATE START OF
DEFICIENT VERTICAL GRADE
ACTUAL = 0.33%
DESIRED = 0.5%
MINIMUM = 0.3%

GEOMETRIC DEFICIENCY (8-1-N):
APPROXIMATE START OF
DEFICIENT PROFILE K-VALUE
ACTUAL = 226
DESIRED = 566

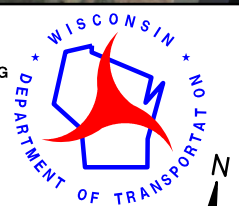
GEOMETRIC DEFICIENCY (8-1-F):
APPROXIMATE END OF
DEFICIENT VERTICAL GRADE
ACTUAL = 0.33%
DESIRED = 0.5%
MINIMUM = 0.3%

GEOMETRIC DEFICIENCY (8-1-H):
APPROXIMATE END OF
DEFICIENT VERTICAL GRADE
ACTUAL = 0.33%
DESIRED = 0.5%
MINIMUM = 0.3%

GEOMETRIC DEFICIENCY (8-1-F):
APPROXIMATE START OF
DEFICIENT VERTICAL GRADE
ACTUAL = 0.33%
DESIRED = 0.5%
MINIMUM = 0.3%

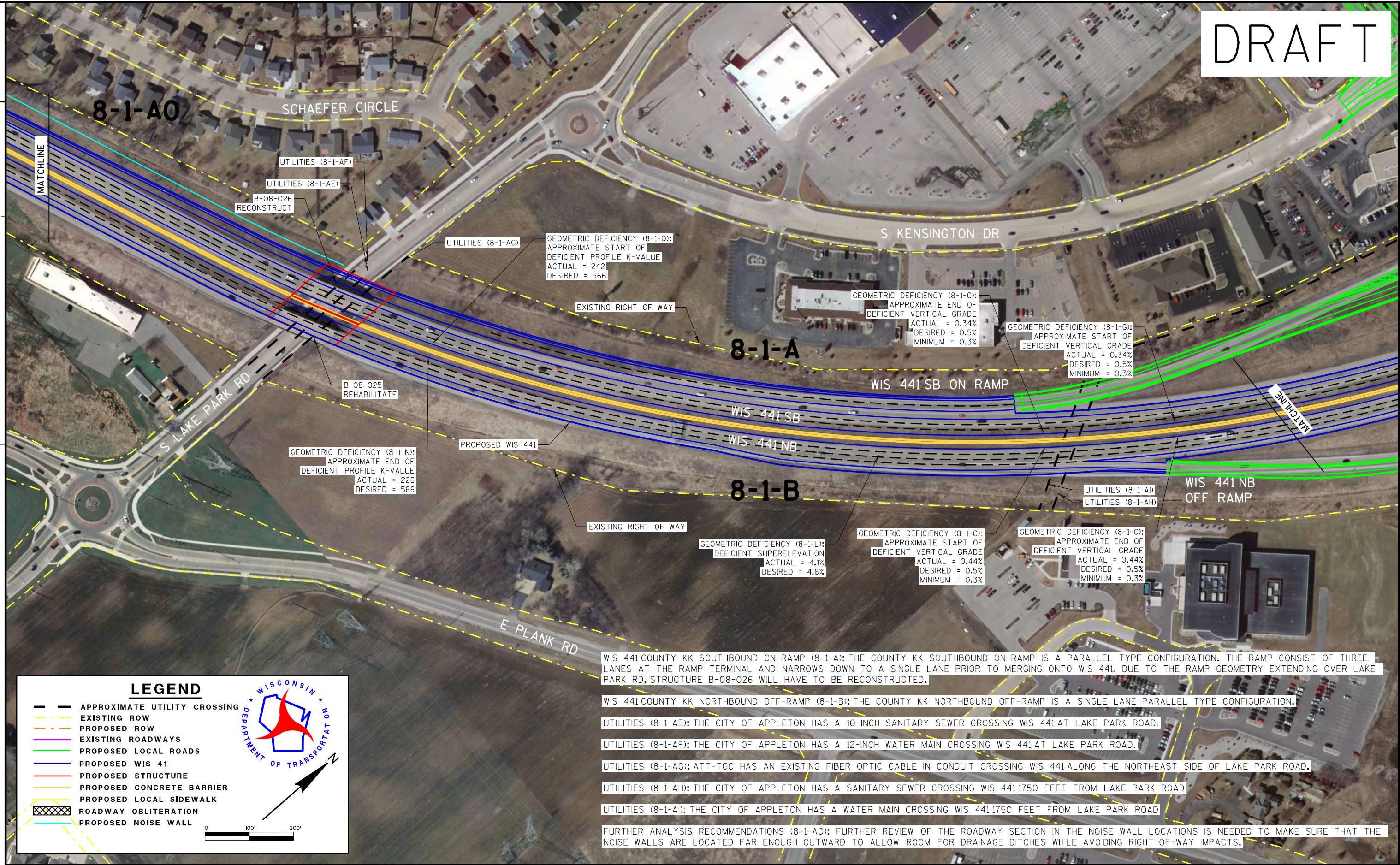
LEGEND

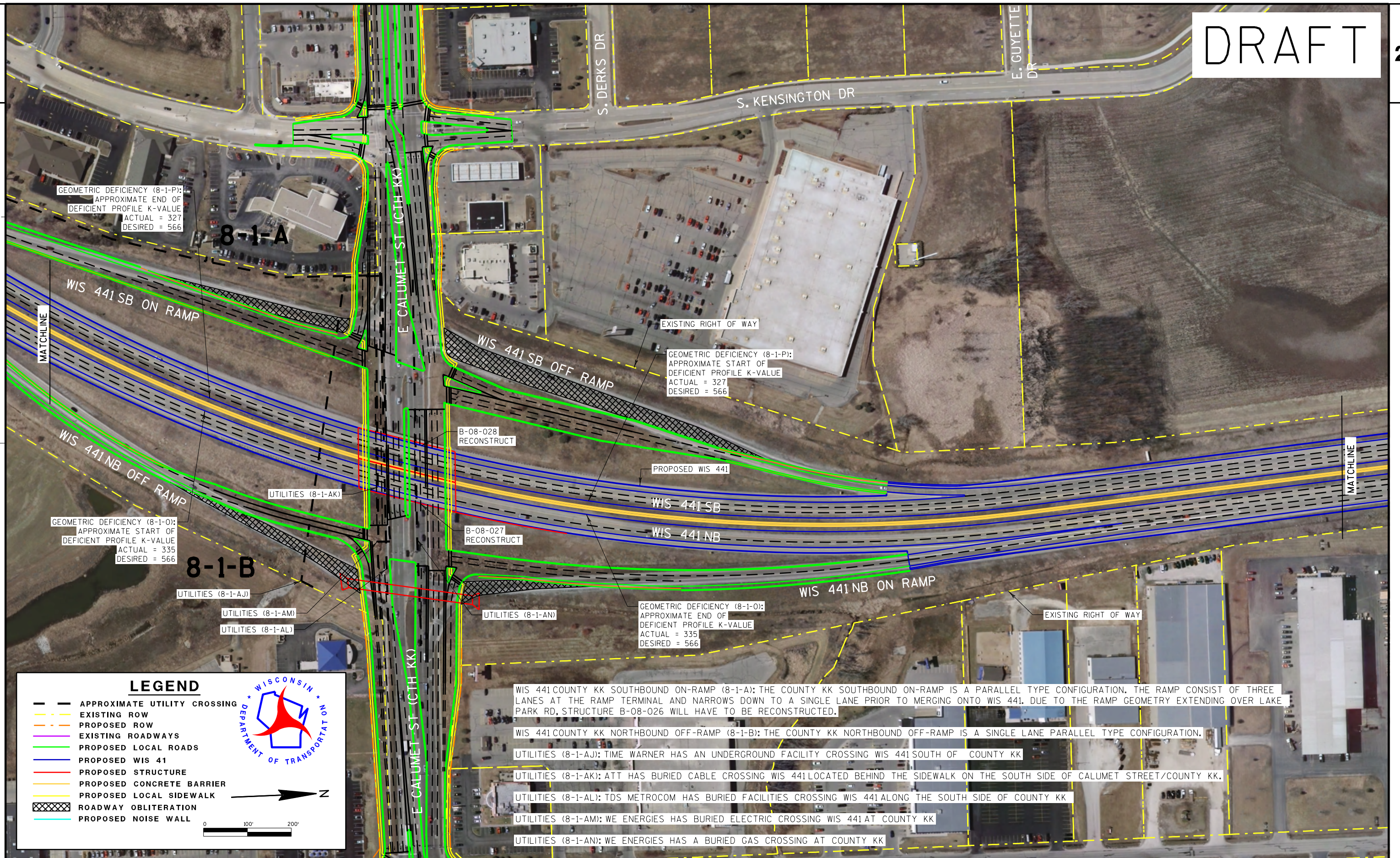
- APPROXIMATE UTILITY CROSSING
- EXISTING ROW
- PROPOSED ROW
- EXISTING ROADWAYS
- PROPOSED LOCAL ROADS
- PROPOSED WIS 41
- PROPOSED STRUCTURE
- PROPOSED CONCRETE BARRIER
- PROPOSED LOCAL SIDEWALK
- ROADWAY OBLITERATION
- PROPOSED NOISE WALL



N

0 100' 200'





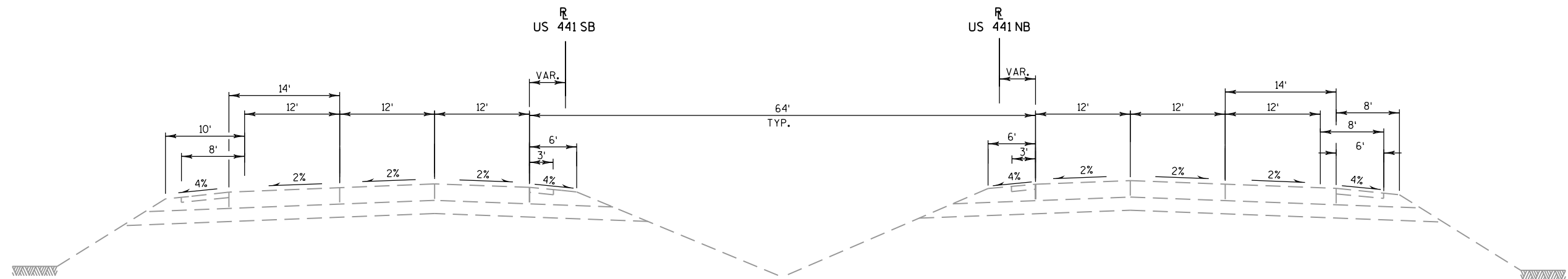
Section 2: County KK Interchange to County CE Interchange

WIS 441 Alignment

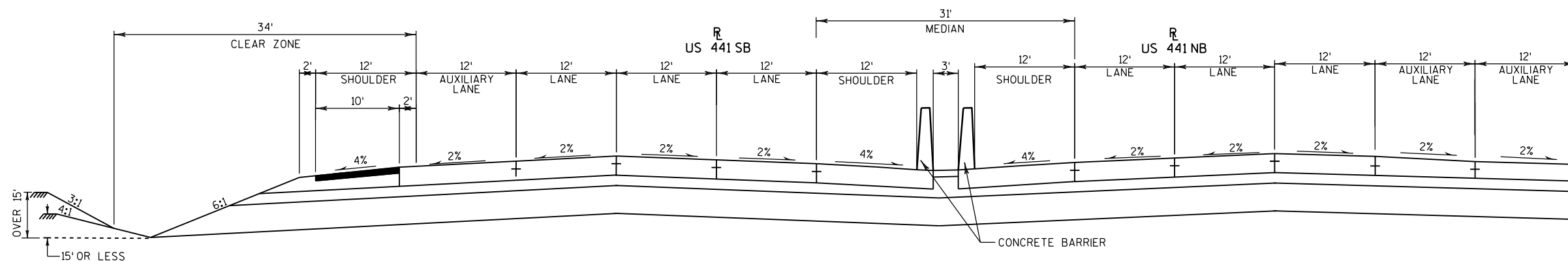
The section of WIS 441 begins at the County KK interchange and proceeds eastward to the County CE interchange. This segment of WIS 441 is on existing alignment with the additional expansion lanes placed within the median.

WIS 441 Typical Section

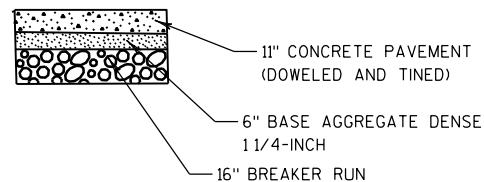
The mainline typical section east of US 10 consists of a 31.0' median (12' inside shoulders with 56-inch single face barriers and 3' between the back of the barriers). The northbound and southbound are comprised of 3 – 12' lanes and 12' outside shoulders. A 12' auxiliary lane is provided for both northbound and southbound WIS 441 between County KK and County CE. 42" barrier is needed in locations where noise walls are located within the clear zone and where retaining walls are required. This typical section is based on the typical sections for WIS 441 currently under design, from US 41 to east of US 10. Refer to Figure 8-2 (page 8-19) for Typical Section.



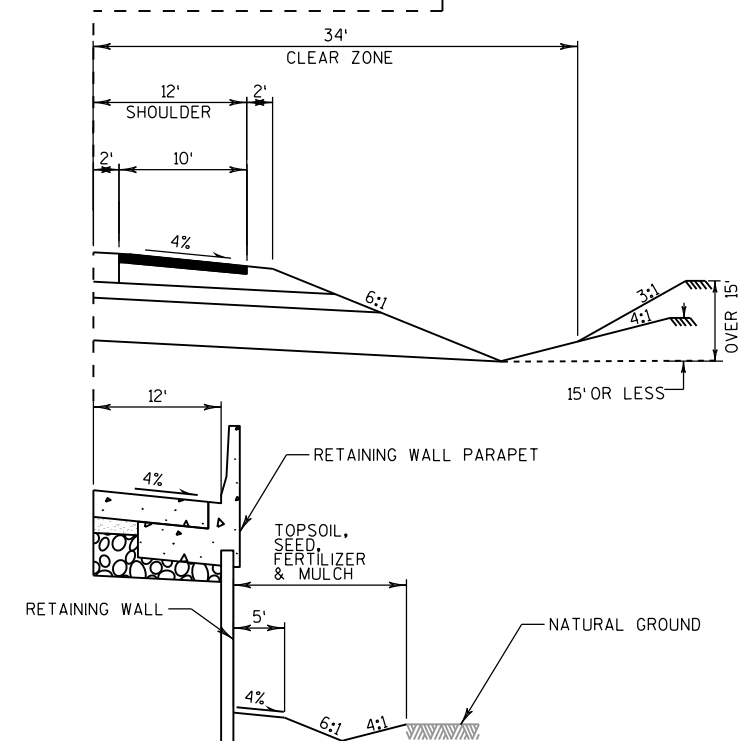
TYPICAL EXISTING SECTION
WIS 441 (COUNTY KK INTERCHANGE TO COUNTY CE INTERCHANGE)



DESIRABLE PROPOSED SECTION
WIS 441 (COUNTY KK INTERCHANGE TO COUNTY CE INTERCHANGE)



NOTE: THE ASSUMED SECTION USED FOR COST ESTIMATE PURPOSES.



WIS 441 Ramps and Auxiliary Lanes

Refer to Exhibit 8-5 (page 8-22) for further information on County KK northbound on-ramp parallel ramp and dual auxiliary lane configuration (8-2-A).

Refer to Exhibit 8-5 (page 8-22) for further information on County KK southbound off-ramp parallel ramp and auxiliary lane configuration (8-2-B).

Refer to Exhibit 8-5 thru Exhibit 8-7 (pages 8-22 thru 8-24) for further discussion on the single south bound auxiliary lane and dual northbound auxiliary lanes (8-2-C).

Refer to Exhibit 8-6 and Exhibit 8-7 (page 8-23 and page 8-24) for further information on County CE southbound on-ramp parallel ramp and auxiliary lane configuration (8-2-D).

Refer to Exhibit 8-6 and Exhibit 8-7 (page 8-23 and page 8-24) for further information on County CE northbound off-ramp parallel ramp and dual auxiliary lane configuration (8-2-E).

Frontage Roads

There are no significant frontage roads along this stretch of WIS 441.

Addressing Geometric Deficiencies

All geometric deficiencies are anticipated to be corrected during the long-term improvement expansion project. Refer to Exhibit 8-6 (page 8-23) for discussion on a deficient vertical grade (8-2-F) located along WIS 441 mainline. Refer to Exhibit 8-5 (page 8-22) for deficient horizontal curve superelevation (8-2-G). Refer to Exhibit 8-6 and Exhibit 8-7 (pages 8-23 and 8-24 respectively) for discussion on the deficient vertical curves (8-2-H) and (8-2-I).

Right-of-way Impacts

Conceptual plans do not show any right of way impacts, however a detailed design that incorporates vertical design and slope intercepts may identify additional locations for concrete barrier or beam guard used with steeper slopes to minimize right of way impacts. Based upon future cost analysis, it may be economical to purchase additional strip acquisitions.

Utilities

The following utilities are shown on Exhibit 8-7 (page 8-24):

- WE Energies has buried electric crossing WIS 441 200 feet south of County CE (8-2-J).
- ATT has buried cable crossing WIS 441 located behind the sidewalk on the north side of College Avenue/ County CE (8-2-K).

Further Analysis Recommendations

Refer to Exhibit 8-6 (page 8-23) for further discussion regarding noise walls (8-2-L).

Refer to Exhibit 8-6 (page 8-23) for discussion regarding recommended further analysis to determine if the roadway vertical profile near Speel School Road can be adjusted to minimize retaining wall heights and costs (8-2-M).

DRAFT

WIS 441 COUNTY CE RAMPS (8-2-C): THERE IS A SINGLE SOUTHBOUND AUXILIARY LANE AND DUAL NORTHBOUND AUXILIARY LANES BETWEEN COUNTY KK AND COUNTY CE.

WIS 441 COUNTY CE SOUTHBOUND ON-RAMP (8-2-D): THE COUNTY CE SOUTHBOUND ON-RAMP IS A DUAL LANE PARALLEL TYPE CONFIGURATION WITH A SINGLE AUXILIARY LANE.

WIS 441 COUNTY CE NORTHBOUND OFF-RAMP (8-2-E): THE COUNTY CE NORTHBOUND OFF-RAMP IS A PARALLEL TYPE CONFIGURATION WITH DUAL AUXILIARY LANES. THE INSIDE AUXILIARY LANE IS A CHOICE LANE FOR EXITING AT COUNTY CE OR A DROP LANE TO WIS 441.

FURTHER ANALYSIS RECOMMENDATIONS (8-2-L): FURTHER REVIEW OF THE ROADWAY SECTION IN THE NOISE WALL LOCATIONS IS NEEDED TO MAKE SURE THAT THE NOISE WALLS ARE LOCATED FAR ENOUGH OUTWARD TO ALLOW ROOM FOR DRAINAGE DITCHES WHILE AVOIDING RIGHT-OF-WAY IMPACTS.

FURTHER ANALYSIS RECOMMENDATIONS (8-2-M): FURTHER REVIEW IS RECOMMENDED TO DETERMINE IF THE ROADWAY VERTICAL PROFILE NEAR SPEEL SCHOOL ROAD CAN BE ADJUSTED TO MINIMIZE RETAINING WALL HEIGHTS AND COSTS.

GEOMETRIC DEFICIENCY (8-2-I):
APPROXIMATE END OF DEFICIENT PROFILE K-VALUE
ACTUAL = 325
DESIRED = 566

GEOMETRIC DEFICIENCY (8-2-H):
APPROXIMATE START OF DEFICIENT PROFILE K-VALUE
ACTUAL = 325
DESIRED = 566

GEOMETRIC DEFICIENCY (8-2-F):
APPROXIMATE END OF DEFICIENT VERTICAL GRADE
ACTUAL = 0.42%
DESIRED = 0.5%
MINIMUM = 0.3%

GEOMETRIC DEFICIENCY (8-2-F):
APPROXIMATE START OF DEFICIENT VERTICAL GRADE
ACTUAL = 0.42%
DESIRED = 0.5%
MINIMUM = 0.3%

LEGEND

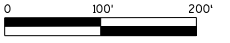
- APPROXIMATE UTILITY CROSSING
- - - EXISTING ROW
- - - PROPOSED ROW
- - - EXISTING ROADWAYS
- - - PROPOSED LOCAL ROADS
- - - PROPOSED WIS 41
- - - PROPOSED STRUCTURE
- - - PROPOSED CONCRETE BARRIER
- - - PROPOSED LOCAL SIDEWALK
- XXXX ROADWAY OBLITERATION
- - - PROPOSED NOISE WALL



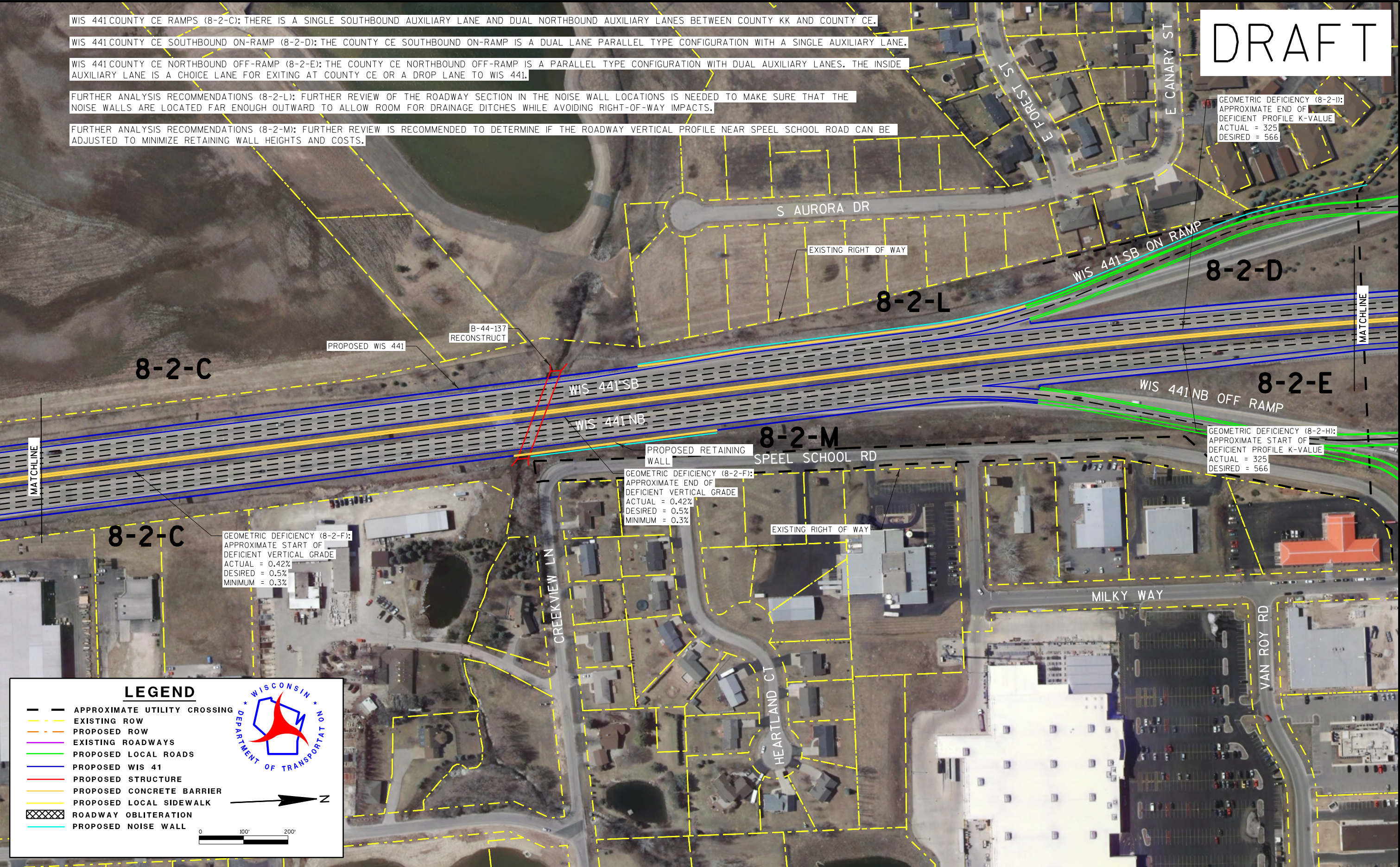
WISCONSIN
DEPARTMENT OF TRANSPORTATION



N



0 100' 200'



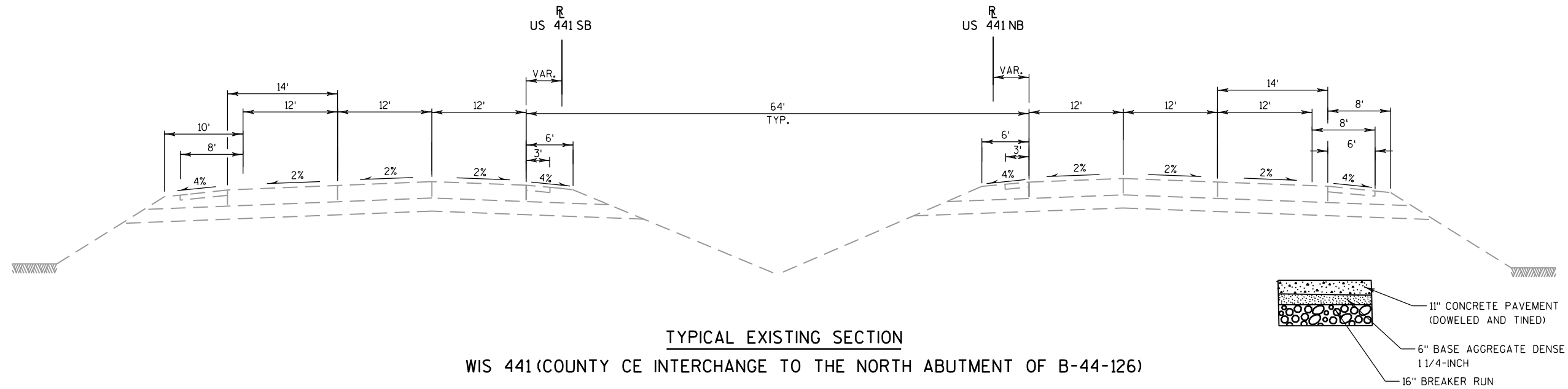
Section 3: County CE Interchange to the north abutment of structure B-44-126 over the Fox River and CN Railroad

WIS 441 Alignment

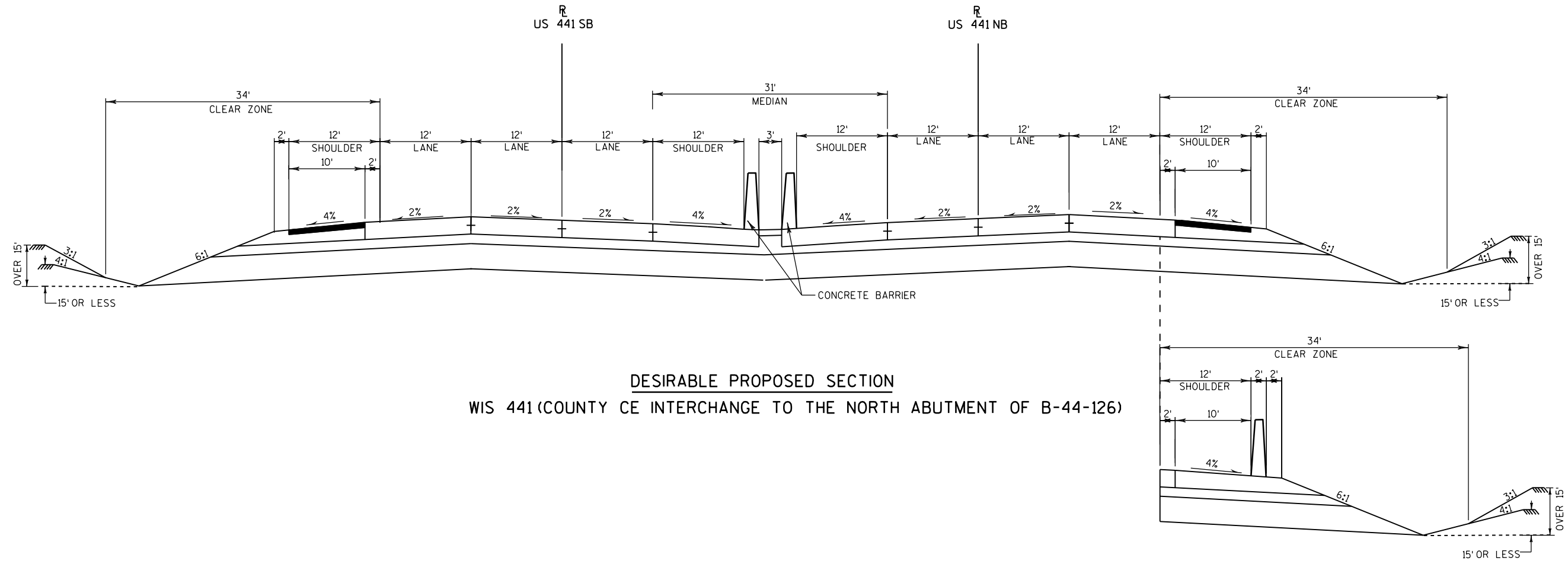
The section of WIS 441 begins at the County CE interchange and proceeds northward to the north abutment of structure B-44-124 over the Fox River and CN Railroad. This segment of WIS 441 is on existing alignment with the additional expansion lanes placed on the outside.

WIS 441 Typical Section

The mainline typical section east of US 10 consists of a 31.0' median (12' inside shoulders with 56-inch single face barriers and 3' between the back of the barriers). The northbound and southbound are comprised of 3 – 12' lanes and 12' outside shoulders with 42-inch single face barrier from 400 feet south of the Fox River Valley Railroad to Newberry Street and in locations where the noise walls are located within the clear zone. Refer to Figure 8-3 (page 8-26) for Typical Section.



NOTE: THE ASSUMED SECTION USED FOR COST ESTIMATE PURPOSES.



WIS 441 Ramps and Auxiliary Lanes

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

Refer to Exhibit 8-8 and Exhibit 8-9 (pages 8-29 and 8-30 respectively) for further information on County CE northbound on-ramp and southbound off-ramp parallel ramp and auxiliary lane configuration (8-3-A).

Refer to Exhibit 8-10 (page 8-31) for further information on County OO northbound off-ramp parallel ramp configuration (8-3-B).

Frontage Roads

There are no significant frontage roads along this stretch of WIS 441.

Addressing Geometric Deficiencies

All geometric deficiencies are anticipated to be corrected during the long-term improvement expansion project. Refer Exhibit 8-8 and Exhibit 8-9 (pages 8-29 and 8-30 respectively) for discussion on deficient vertical grades (8-3-C) and (8-3-D) located along WIS 441 mainline. Refer to Exhibit 8-8 and Exhibit 8-9 (pages 8-29 and 8-30 respectively) for deficient horizontal curve superelevation (8-3-E), (8-3-F) and (8-3-G). Refer to Exhibit 8-8 and Exhibit 8-10 (pages 8-29 and 8-31) for discussion on the deficient vertical curves (8-3-H), (8-3-I), (8-3-J) and (8-3-K).

Right-of-way Impacts

Significant residential relocations will be required along this segment between Newberry Street and the Fox River.

Refer to Exhibit 8-9 and Exhibit 8-10 (pages 8-30 and 8-31 respectively) for discussion of right of way impacts along WIS 441 northbound to adjacent residential properties (8-3-L) and (8-3-M).

Utilities

The following utilities are shown on Exhibit 8-8 (page 8-29):

- WE Energies has overhead electric crossing WIS 441 at Fox Valley River Railroad, 1100 feet south of Newberry St (8-3-N).

The following utilities are shown on Exhibit 8-9 (page 8-30):

- WE Energies has buried electric within the WIS 441 right of way south of the Fox River (8-3-O).

The following utilities are shown on Exhibit 8-10 (page 8-31):

- WE Energies has buried electric within the WIS 441 right of way south of the Fox River (8-3-O).
- ATT-TCG has buried cable crossing WIS 441 located behind the sidewalk on the south side of WIS 96/Wisconsin Avenue/Main Street (8-3-P).

- WE Energies has buried gas crossing WIS 441 at WIS 96 (8-3-Q).
- WE Energies has buried electric crossing WIS 441 along the north side of WIS 96 (8-3-R).
- ATC Legacy has buried fiber optic crossing WIS 441 at the CN Railroad north of WIS 96 (8-3-S).
- Time Warner has an underground facility crossing WIS 441 along the north side of WIS 96 (8-3-T).

Further Analysis Recommendations

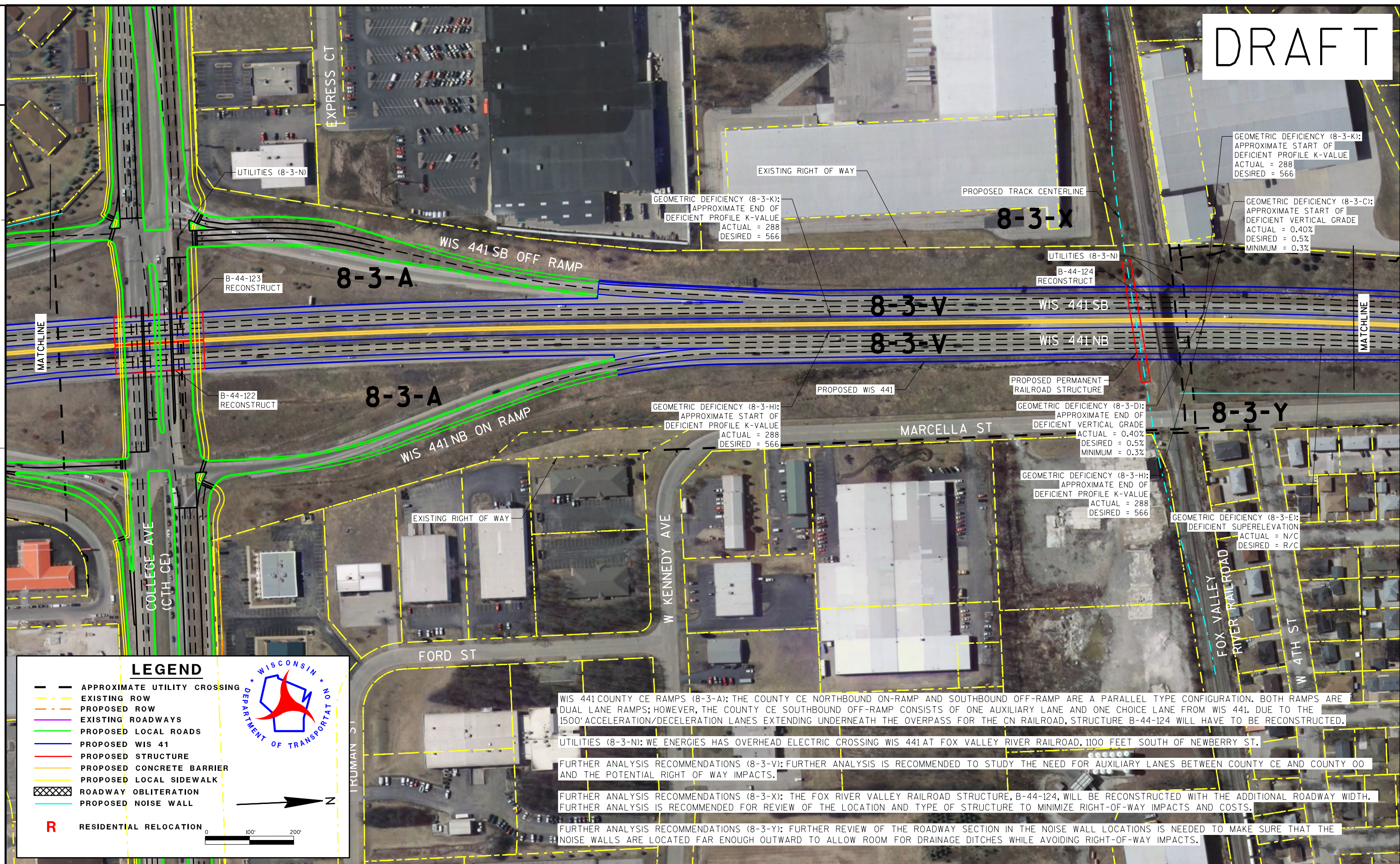
Refer to Exhibit 8-9 and Exhibit 8-10 (pages 8-30 and 8-31 respectively) for recommended further analysis to study the need for pedestrian/bike accommodations across structure B-44-126 (8-3-U).

Refer to Exhibit 8-8 thru Exhibit 8-10 (pages 8-29 thru 8-31) for discussion on recommended further analysis to be done to determine the need for auxiliary lanes between County CE and County OO and the potential right of way impacts. (8-3-V).

Significant residential relocations will be required in this segment between Newberry Street and the Fox River. Refer to Exhibit 8-9 and Exhibit 8-10 (pages 8-30 and 8-31 respectively) for recommended further analysis for the roadway alignments included in Appendix 20, to determine if any refinements to the WIS 441 conceptual layout could minimize the impacts to the adjacent properties and reduce construction/real estate costs (8-3-W).

The Fox River Valley Railroad Structure, B-44-124 will be reconstructed to accommodate the additional roadway width. The current bridge offset for the new structure shown in Appendix 21 is 50 feet. Refer to Exhibit 8-8 (page 8-29) for discussion of further analysis to look at the type of structure and tightening up the distance between the existing and new structure to minimize right-of-way impacts and costs (8-3-X).

Refer to Exhibit 8-8 through Exhibit 8-10 (pages 8-29 thru 8-31) for further discussion regarding noise walls (8-3-Y).



WIS 441 COUNTY CE RAMPS (8-3-A): THE COUNTY CE NORTHBOUND ON-RAMP AND SOUTHBOUND OFF-RAMP ARE A PARALLEL TYPE CONFIGURATION. BOTH RAMPS ARE DUAL LANE RAMPS; HOWEVER, THE COUNTY CE SOUTHBOUND OFF-RAMP CONSISTS OF ONE AUXILIARY LANE AND ONE CHOICE LANE FROM WIS 441. DUE TO THE 1500' ACCELERATION/DECELERATION LANES EXTENDING UNDERNEATH THE OVERPASS FOR THE CN RAILROAD, STRUCTURE B-44-124 WILL HAVE TO BE RECONSTRUCTED.

RIGHT-OF-WAY IMPACTS (8-3-L): WIS 441 NORTHBOUND REQUIRES APPROXIMATELY 6.0 ACRES OF ADDITIONAL RIGHT-OF-WAY. THERE WILL BE SIGNIFICANT RESIDENTIAL RELOCATIONS WITH THIS CONCEPT. BETWEEN NEWBERRY STREET AND THE FOX RIVER THERE IS APPROXIMATELY 26 RESIDENTIAL RELOCATIONS AND 2 RESIDENTIAL REQUIRING MINOR RIGHT-OF-WAY ACQUISITION.

RIGHT-OF-WAY IMPACTS (8-3-M): WIS 441 SOUTHBOUND REQUIRES APPROXIMATELY 5.6 ACRES OF ADDITIONAL RIGHT-OF-WAY. THERE WILL BE SIGNIFICANT RESIDENTIAL RELOCATIONS WITH THIS CONCEPT. BETWEEN NEWBERRY STREET AND THE FOX RIVER THERE IS APPROXIMATELY 26 RESIDENTIAL RELOCATIONS AND 1 RESIDENTIAL REQUIRING MINOR RIGHT-OF-WAY ACQUISITION.

UTILITIES (8-3-O): WE ENERGIES HAS BURIED ELECTRIC WITHIN THE WIS 441 RIGHT OF WAY SOUTH OF THE FOX RIVER.

FURTHER ANALYSIS RECOMMENDATIONS (8-3-U): FURTHER ANALYSIS IS RECOMMENDED TO STUDY THE NEED FOR PEDESTRIAN/BIKE ACCOMMODATIONS ACROSS STRUCTURE B-44-126.

FURTHER ANALYSIS RECOMMENDATIONS (8-3-V): FURTHER ANALYSIS IS RECOMMENDED TO STUDY THE NEED FOR AUXILIARY LANES BETWEEN COUNTY CE AND COUNTY OO AND THE POTENTIAL RIGHT OF WAY IMPACTS.

FURTHER ANALYSIS RECOMMENDATIONS (8-3-W): FURTHER ANALYSIS IS RECOMMENDED TO DETERMINE ALTERNATIVES FOR THE ROADWAY HORIZONTAL ALIGNMENT AND VERTICAL TO MINIMIZE COSTS AND RIGHT-OF-WAY IMPACTS.

FURTHER ANALYSIS RECOMMENDATIONS (8-3-Y): FURTHER REVIEW OF THE ROADWAY SECTION IN THE NOISE WALL LOCATIONS IS NEEDED TO MAKE SURE THAT THE NOISE WALLS ARE LOCATED FAR ENOUGH OUTWARD TO ALLOW ROOM FOR DRAINAGE DITCHES WHILE AVOIDING RIGHT-OF-WAY IMPACTS.

GEOMETRIC DEFICIENCY (8-3-D):
APPROXIMATE START OF
DEFICIENT VERTICAL GRADE
ACTUAL = 0.40%
DESIRED = 0.5%
MINIMUM = 0.3%

GEOMETRIC DEFICIENCY (8-3-G):
DEFICIENT SUPERELEVATION
ACTUAL = 3.0%
DESIRED = 3.4%

UTILITIES (8-3-D)

PROPOSED WIS 441

PROPOSED RIGHT-OF-WAY

EXISTING RIGHT OF WAY

SN-44-2

8-3-A

8-3-Y

8-3-M

8-3-U

8-3-U

8-3-A

8-3-V

8-3-W

8-3-V

8-3-W

8-3-Y

8-3-L

PROPOSED RIGHT-OF-WAY

B-44-125
RECONSTRUCT

GEOMETRIC DEFICIENCY (8-3-C):
APPROXIMATE END OF
DEFICIENT VERTICAL GRADE
ACTUAL = 0.40%
DESIRED = 0.5%
MINIMUM = 0.3%

GEOMETRIC DEFICIENCY (8-3-F):
DEFICIENT SUPERELEVATION
ACTUAL = 3.0%
DESIRED = 3.4%

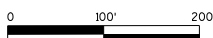
EXISTING RIGHT OF WAY

SN-44-1

LEGEND

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

R RESIDENTIAL RELOCATION





Structures

Bridges

Summary of potential bridge geometry is shown in Table 8-5 (page 8-33) and includes bridge number, mile marker, bridge name, existing bridge age in 2013, girder type, girder depth, desired vertical clearance, minimum vertical clearance, anticipated 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. See Appendix 20 for additional concepts for B-44-126 (WIS 441 Over STH 96 – Fox River – CNW Railroad) and Appendix 21 for additional concepts for B-44-124 (Fox River Valley Railroad over WIS 441).

Noise Walls

Noise walls for *Section 1: East of US 10 to County KK Interchange* are shown in Segment 8 Exhibits along Northbound WIS 441 from east of US 10 to just south of Lake Park Road with a gap at Telulah Avenue. Noise walls are also shown along Southbound WIS 441 from east of US 10 to Lake Park Road with a gap at Telulah Avenue. The future NEPA study will access future noise wall requirements.

Noise walls for *Section 2: County KK Interchange to County CE Interchange* are shown in Segment 8 Exhibits along Northbound WIS 441 from just south of Creekview Lane to just north of Heartland Court. Noise walls are also shown along Southbound WIS 441 from just south of Heartland Court to County CE. The future NEPA study will access future noise wall requirements.

Noise walls for *Section 3: County CE Interchange to the north abutment of structure B-44-126 over the Fox River and CN Railroad* are shown in Segment 8 Exhibits along Northbound WIS 441 from the Fox River Valley Railroad Bridge to the Fox River with a gap at Newberry Street. Noise walls are also shown along Southbound WIS 441 from just south of Newberry St to the Fox River with a gap at Newberry Street. The future NEPA study will access future noise wall requirements.

Table 8-5: Segment 8 – 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-08-024	6.3	Telulah Ave over STH 441	26	Prestressed Concrete Deck Girder	54	16.75	16.00 or ES	16.09	NC	32.0	207.33	2	106.0/99.5	4o 40' RF	2-14' lanes with 2.5' curb and gutter along each side of the roadway	Bridge rehabilitation with retaining wall additions at abutments along STH 441 under bridge
B-08-025	7.1	STH 441 NB over Lake Park Road	25	Prestressed Concrete Deck Girder	45	15.25	14.50 or ES	15.9	4.0 LT	40.0	139.08	3	30.5/75.5/30.5	25o 16' LF	End Span: 2:1 slope paving	Bridge rehabilitation /widening
B-08-026	4.6	STH 441 SB over Lake Park Road	25	Prestressed Concrete Deck Girder	45	15.25	14.50 or ES	15.4	4.0LT	40.0	139.08	3	30.5/75.5/30.5	25o 44' LF	Middle Span: 4-11' lanes with curb and gutter and 8' terrace each side	Reconstruction since new cross section does not fit under the existing structure
B-08-027	7.7	WIS 441 NB Over County KK	26	Prestressed Concrete Deck Girder	45	16.75	16.00 or ES	16.7	4.7 LT	60.0	222.0	2	111.0/111.0	15o 38' RF	End Span: 2:1 slope paving	Reconstruction since new cross section does not fit under the existing structure
B-08-028	4.0	WIS 441 SB Over County KK	26	Prestressed Concrete Deck Girder	45	16.75	16.00 or ES	16.7	4.7 LT	60.0	222.0	2	111.0/111.0	15o 38' RF	End Span: 2:1 slope paving	Reconstruction since new cross section does not fit under the existing structure
B-44-137	8.3	WIS 441 over Drainage Way	27	Box Culvert	N/A	N/A	N/A	N/A	NC	202.0	22.25'	2	11.13/11.13	29o 00' LF	N/A	Reconstruction since new cross section does not fit under the existing structure
B-44-122	8.7	WIS 441 NB Over County CE	26	Prestressed Concrete Deck Girder	45	16.75	16.00 or ES	16.5	NC	60.0	202.0	2	101.0/101.0	No Skew	End Span: retaining wall with terrace area, 3-12' thru lanes and 2-12' left turn lanes with c&g each side, 12' median	Reconstruction since new cross section does not fit under the existing structure
B-44-123	3.0	WIS 441 NB Over County CE	26	Prestressed Concrete Deck Girder	45	16.75	16.00 or ES	16.73	NC	60.0	202.0	2	101.0/101.0	No Skew	End Span: retaining wall with terrace area, 3-12' thru lanes and 2-12' left turn lanes with c&g each side, 12' median	Reconstruction since new cross section does not fit under the existing structure
B-44-124	9.2	Fox River Valley Railroad over WIS 441	26	Continuous Steel Deck Girder	90	16.75	16.00 or ES	16.58	None	18.0	150.0	2	75.0/75.0	10o 00' LF	20' Railroad	Reconstruction since new cross section does not fit under the existing structure See Appendix 21 for further details
B-44-125	9.4	Newberry Street over STH 441	26	Prestressed Concrete Deck Girder	45	16.75	16.00 or ES	16.74	NC	44.0	164.3	2	79.5/79.5	27o 50' LF	2-12' lanes with 8' shoulders and 2.5' curb and gutter along each side	Reconstruction since new cross section does not fit under the existing structure
B-44-126	9.9	WIS 441 Over STH 96 – Fox River – CNW Railroad	29	Continuous Steel Deck Girder	48 & 72	16.75' (STH 96)	16.00 or ES (STH 96)	28.0' (STH 96) 23.5' (CNW RR)	N/C	40.0/40.0	1626.1	11	135.0/162.0/162.0/ 162.0/162.0/162.0/ 162.0/162.0/130.0/ 115.0/115.0	No Skew	End Span: 2:1 slope paving; Span 1-6: Fox River; Span 7: Ground; Span 8: 2-12' lanes with curb and gutter in each direction; Span 9: Ground; Span 10: Ground; Span 11: ditches with Railroad and 2:1 slope paving	Bridge rehabilitation/deck replacement/widening See Appendix 20 for further details

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

Interchanges

County KK Interchange

Interchange Alternative Summary

A Technical Memorandum dated August 12, 2008 was prepared using the backbone study methodology for the WIS 441/County KK Interchange Evaluation (see Appendix 16). The study evaluated three alternatives, one short-term year 2020 alternative 1, and two long-term roundabout alternatives 2 and 3 for 2035 traffic volumes. The following is a brief description of the alternatives:

- Alternative 1 optimizes the ramp terminal intersections while providing dual right turn lanes for both off ramp locations.
- Alternative 2 consists of providing two-lane roundabouts at the ramp terminals and traditional intersection improvements at County KK/Kensington Drive and County KK/Stoney Brook Road intersections.
- Alternative 3 is similar to Alternative 2, although provides roundabout intersections for County KK/Kensington Drive and County KK/Stoney Brook Road.

The 2008 backbone study recommended Alternative 2 as the best option to address the LOS, queues, and provide a safety benefit for the WIS 441/County KK Interchange. Further analysis by Ommni Associates indicated that Alternative 2 would have larger roundabouts with further right-of-way impacts when the adjacent intersections were included in the analysis.

Within the WIS 441/County KK Corridor Expansion Study dated June 2012, a more close review of the study area comprised of County KK and several adjacent corridors that interact with each other were evaluated for 2035 traffic volumes (see Appendix 17). The study area corridors were County CE, County KK, County AP (Plank Road), Kensington Drive, Eisenhower Drive, County LP (Lake Park) and US 10. The County KK corridor was identified as an area with large traffic growth. This growth combined with current roadway access is anticipated to severely degrade traffic operations for the corridor. The study evaluated the County KK interchange for 2035 traffic volumes using conventional and roundabout intersections as well as high efficiency interchanges such as a single point urban interchange (SPUI) and diverging diamond interchange (DDI). In addition, the study investigated a new freeway crossing between County KK and County CE to relieve the County KK corridor.

The County KK corridor 2035 conventional signalized alternative recommends intersection improvements at the following cross roads:

- Kensington Drive,
- WIS 441 Southbound Ramps,
- WIS 441 Northbound Ramps,
- Stoney Brook Road,
- Eisenhower Drive,

- Coop Road,
- Main Street,
- Noe Road, and
- County N

These improvements are shown within the WIS 441/County KK Corridor Expansion Study dated June 2012 (see Appendix 17).

The County KK Single Point Urban Interchange (SPUI), a high-efficiency interchange alternative, was evaluated at the WIS 441/County KK Interchange. This alternative is the most expensive option evaluated since it will require additional improvements along WIS 441. The SPUI requires new WIS 441 structures over County KK. The structures will have a deeper girder depth resulting in roadway approach work along WIS 441. Similar to the conventional signalized alternative, additional intersection improvements at cross road locations (see above list) will be required. Although, County KK queues as they approach the interchange will be less with this high-efficiency interchange and may optimize the cross road intersections further.

The County KK Diverging Diamond Interchange (DDI), a high-efficiency interchange alternative, was evaluated at the WIS 441/County KK Interchange. This alternative is less expensive than the SPUI alternative mentioned above. It is comparable in cost to the conventional signalized interchange, but due to less pavement area with more efficient operations, is less expensive. Additional improvements at cross road locations (see above list) will be required. Similar to the SPUI, cross road intersections may be optimized further due to less queue length on County KK interchange approaches.

During 2012, a Highway Safety Improvement Program (HSIP) project was performed at the County KK interchange. Additional right-turn lane and turn storage bay extension were provided at the ramp terminals.

During 2013, the intersection of County KK and Coop Road will be made a signalized intersection.

2038 traffic volumes were developed for the County KK interchange, consistent with the planning horizon for all interchanges being evaluated with this US 41/WIS 441 Operational Needs Study report. Three traditional interchange concepts were developed to balance traffic operations, safety, access standards and real estate considerations.

- Alternative 4 – Diamond Interchange with full access signalized intersections
- Alternative 5 – Diamond Interchange with Left-In/Right-In/Right-Out Access at South Kensington Drive and Stoney Brook Road
- Alternative 6 – Diamond Interchange with Right-In/Right-Out Access at South Kensington Drive and Stoney Brook Road

Alternative 4, a long-term alternative, improves all projected operational problems through Year 2038. The only potential safety issue will be the weaving movement between the northbound off

ramp free flow right turn and eastbound County KK traffic trying to turn right at Stoney Brook Road. Alternative 4 suggests the following:

- Reconstruction of County KK to provide three thru lanes from South Kensington Drive to County KK.
- Reconstruct both on ramps to have three lanes for a portion of the ramp.
- Capacity improvements at the Kensington Drive, Southbound Ramp, Northbound Ramp, Stoney Brook Road, Eisenhower Drive, and Coop Road intersections.

Alternative 5 (refer to Figure 8-4 on page 8-41 for Interchange Layout and refer to Appendix 15 for operational analysis), a long-term alternative, improves all of the project operational issues through Year 2038. The only potential safety issue will be the weaving movement between the northbound off ramp free flow right turn and eastbound County KK traffic trying to turn right at Stoney Brook Road. Alternative 5 suggests the following:

- Reconstruction of County KK to provide three thru lanes from Lake Park Road to Eisenhower Drive.
- Reconstruct both on ramps to have three lanes for a portion of the ramp.
- Restrict the Kensington Drive and Stoney Brook Road intersections to left-in/right-in/right-out only.
- Construct a new backage road from Kensington Drive, via Heidman Drive, to Lake Park Road
- Capacity improvements at the Lake Park Road, Kensington Drive, Southbound Ramp, Northbound Ramp, Stoney Brook Road, Eisenhower Drive, and Coop Road intersections.

In addition, the following intersection improvements are identified:

The County KK and Lake Park Road intersection improvements include:

- The westbound left turn lane would be modified to a dual left turn lane and lengthened by 100' from 200' to 300'.
- The westbound right turn lane would be modified to a continuous right turn lane.
- The southbound left turn lane would be modified to a dual left turn lane and lengthened by 165' from 60' to 225'.
- The eastbound left turn lane would be lengthened by 125' from 75' to 200'.
- The eastbound right turn lane would be lengthened by 200' from 150' to 350'.
- The northbound left turn lane would be modified to a dual left turn lane and lengthened by 125' from 150' to 275'.
- The northbound right turn lane would be lengthened by 100' from 150' to 250'.

The County KK and South Kensington Drive intersection improvements include:

- The westbound left turn lane would be modified to a dual left turn lane and lengthened by 175' from 150' and 325'.
- The westbound right turn lane would be lengthened by 25' to 200'.
- The southbound left turn lane would be eliminated.
- The southbound thru lane would be eliminated.
- The southbound right turn lane would be modified to a dual right turn lane and would be continuous with the two existing southbound lanes to form a right out only movement.
- The eastbound left turn lane would be lengthened by 150' from 150' to 300'.
- The eastbound right turn lane would be lengthened by 50' from 225' to 275'.
- The northbound left turn would be eliminated.
- The northbound thru lane would be eliminated.
- The northbound right turn lane would be modified to a dual right turn lane and would be continuous with the two existing northbound lanes to form a right out only movement.

The County KK and Southbound WIS 441 Ramp intersection improvements include:

- The westbound left turn lane would be modified to a triple left turn lane and lengthened by 90' from 150' to 240'.
- The southbound left turn lane would be modified to a dual left turn lane and shortened by 275' from 625' to 350'.
- The southbound right turn lane would be modified to a dual right turn lane and lengthened by 325' from 100' to 425'.
- Dual 200' eastbound look ahead left turn lanes would be added.
- The eastbound right turn lane would be modified to a dual right turn lane and lengthened by 50' from 150' to 200'.

The County KK and Northbound WIS 441 Ramp intersection improvements include:

- Dual 300' westbound look ahead left turn lanes would be added.
- The westbound right turn lane would be modified to a dual right turn lane and would be shortened by 225' from 500' to 275'.
- The eastbound left turn lane would be modified to a triple left turn lane and would be lengthened by 140' from 100' to 240'.
- A 350' northbound left turn lane would be added.
- The northbound left turn lane would be modified to a free flow right turn lane and be lengthened by 175' from 100' to 275'.

The County KK and Stoney Brook Road intersection improvements include:

- The westbound left turn lane would be lengthened by 75' from 275' to 350'.

- A 350' westbound right turn lane would be added.
- The southbound left turn lane would be eliminated.
- The southbound thru lane would be eliminated.
- The southbound right turn lane would be modified to a dual right turn lane and would be continuous with the two existing southbound lanes to form a right-out only movement.
- The eastbound left turn lane would be modified to a dual left turn lane and would be lengthened by 75' from 325' to 400'.
- The eastbound right turn lane would be modified to a shared thru-right lane and would be continuous from the free flow right turn lane at the northbound ramp intersection.
- The northbound left turn lane would be eliminated.
- The northbound thru lane would be eliminated.
- The northbound right turn lane would be modified to be continuous with the existing northbound thru lane to form a right-out only movement.

The County KK and Eisenhower Drive intersection improvements include:

- The westbound left turn lane would be modified to a dual left turn lane and lengthened by 50' from 225' to 275'.
- A 275' westbound right turn lane would be added.
- The southbound left turn lane would be modified to a dual left turn lane and would be lengthened by 150' from 175' to 325'.
- Two additional southbound thru lanes would be added.
- The southbound right turn lane would be lengthened by 150' from 175' to 325'.
- The eastbound left turn lane would be modified to a triple left turn lane and would be shortened 25' from 375' to 350'.
- The eastbound right turn lane would be modified to a continuous right turn from the Stoney Brook Road intersection.
- The northbound left turn lane would be modified to a triple left turn lane and lengthened 50' from 350' to 400'.
- Two additional northbound thru lanes would be added.
- The northbound right turn lane would be lengthened by 50' from 125' to 150'.

The County KK and Coop Road intersection improvements include:

- A 225' westbound left turn lane.
- A 150' eastbound left turn lane.
- A continuous eastbound right turn lane from Eisenhower Drive to Coop Road.

- A 115' northbound right turn lane.

Alternative 6, a long-term alternative, provides additional capacity along the corridor and converts the South Kensington Drive and Stoney Brook intersections to right-in/right-out intersections. Operational issues would still remain at the Kensington Drive and Stoney Brook Road intersections. Alternative 6 suggests the following:

- Add two additional thru lanes for a total of the thru lanes in each direction from Lake Park Road to Eisenhower Drive.
- Construct a backage road from South Kensington Drive to Lake Park Road.
- Convert the Kensington Drive and Stoney Brook Road intersections from a full access signalized intersection to a right-in/right-out intersection.
- Provide additional intersection capacity a Lake Park Road, the Southbound US 441 Ramps, the Northbound US 441 ramps, Eisenhower Drive, and Coop Road.

Alternative Represented in Expansion Design Concept

Alternative 5 from the recent 2038 analysis is represented in the expansion design concept (see Figure 8-5). Figure 8-5 (page 8-42) is a line diagram indicating the Year 2038 traditional intersection improvements required.

Traffic Operations

Year 2038 traffic analysis was conducted at the County KK interchange intersections using the geometrics presented in Alternative 5. A summary of the Year 2038 intersection operating conditions is provided in Table 8-6.

Table 8-6: County KK Interchange Intersection Level of Service (LOS)

County KK Intersection	Intersection Type	Peak Hour LOS by Intersection	
		AM	PM
Lake Park Road	Traffic Signal	C	D
South Kensington Drive	Traffic Signal	C	C
WIS 441 Southbound Ramps	Traffic Signal	C	C
WIS 441 Northbound Ramps	Traffic Signal	C	B
Stoney Brook Road	Traffic Signal	A	C
Eisenhower Drive	Traffic Signal	D	D
Coop Road	Traffic Signal	B	B

Right-of-way Impacts

Alternative 5 would potentially relocate three commercial businesses and fourteen residences. The potential relocations are:

- 12 residences along the new backage road between South Kensington Drive and Lake Park Road.
- The doctors' office in the southwest corner of the County KK/Lake Park Road intersection.

- The McDonald's restaurant in the southwest corner of the County KK/South Kensington Drive intersection.
- The Associated Bank in the northeast corner of the County KK/Eisenhower Drive intersection.

Alternative 5 would also have significant impacts to several parking lots throughout the interchange area including the FNB Bank, Advance Auto Parts, Buffalo Wild Wings, strip mall on north side of County KK west of Kensington Drive, US Bank, Tom's Drive Inn, Walgreens, Fox Communities Credit Union, strip mall in northwest corner of County KK/Southbound WIS 441 ramp intersection, Chase Bank, Kohl's, Dunkin' Donuts, Arby's, Anchor Bank, a vacant car dealer in the southeast corner of the County KK/Eisenhower Drive intersection, KK Centre, Tractor Supply, and the Stone Yard.

Access

With Alternative 5 access at the County KK intersection with South Kensington Drive and Stoney Brook Road would be changed from a full access signalized intersection to a signalized intersection that restricts access to the side roads to left-in, right-in, and right-out. Traffic wanting to continue thru or turn left off of the side road would need to use backage roads to either Lake Park Road or Eisenhower Drive where there would be a full access intersection.

Two cul-de-sacs would be added on Sunray Ct along the new backage road between Kensington Drive and Lake Park Road.

Several commercial driveways would lose full access along Lake Park Road and Eisenhower Drive because the driveway would be along a left turn lane with a raised median.

Complete Streets

Alternative 5 includes sidewalks along both sides of County KK, Lake Park Road, South Kensington Drive, Stoney Brook Road north of County KK, and Eisenhower Drive. A 16' wide outside lane is identified along both sides of County KK, Lake Park Road, Stoney Brook Road, and Eisenhower Drive to provide bicycle accommodations.

Further Analysis Recommendations

Prior to 2035, the existing roundabouts located at County LP/Kensington and County LP/County AP may need additional capacity and intersections at Eisenhower/Emons and Eisenhower/County AP should be monitored for Intersection Control Modifications. These intersections should be further evaluated to determine what year improvements are needed.

Coordination with local officials will be required prior to selecting a preferred alternative for the County KK corridor, including the WIS 441 interchange. This should include further analysis of options, including a DDI alternative, within the future NEPA study project.

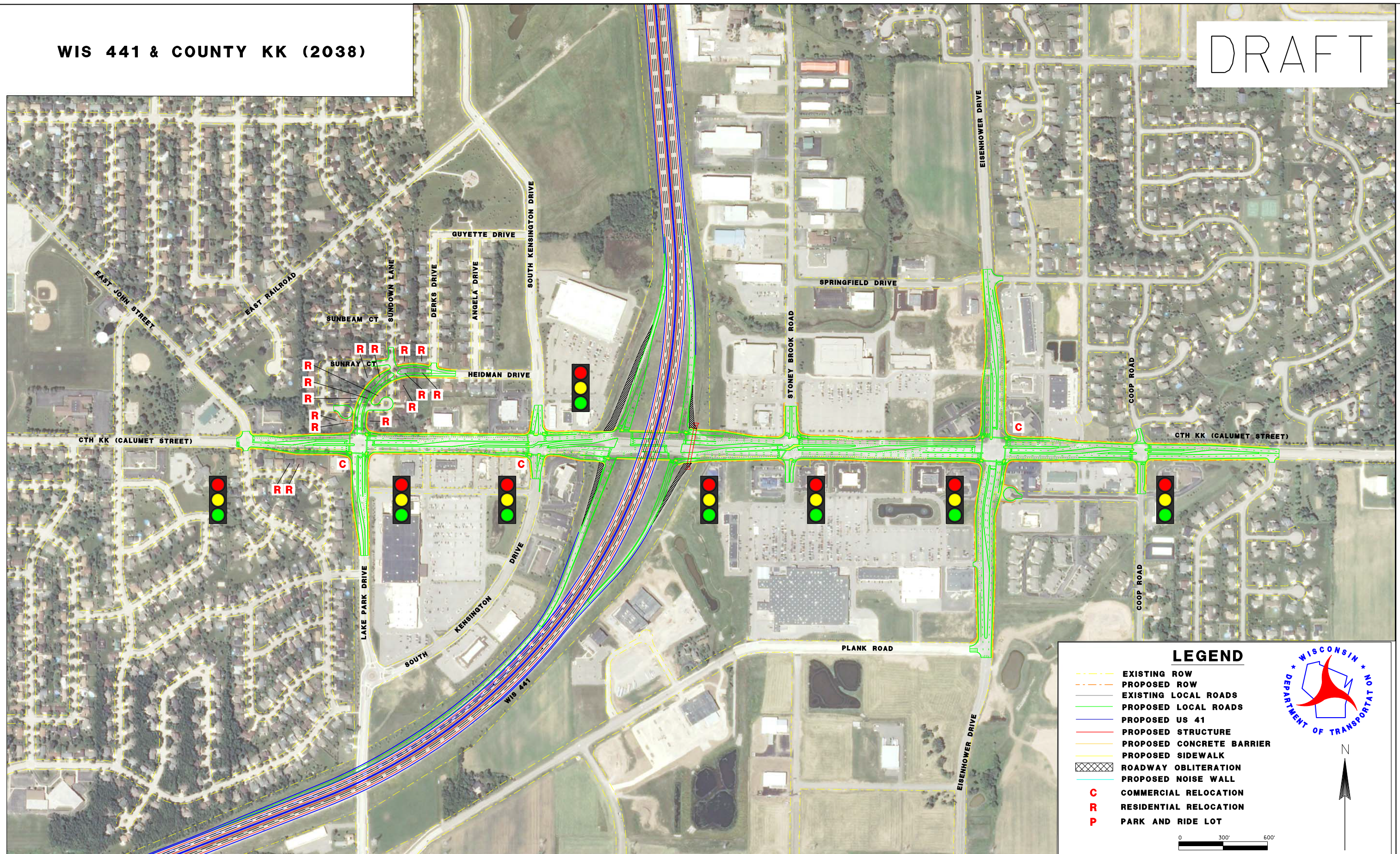
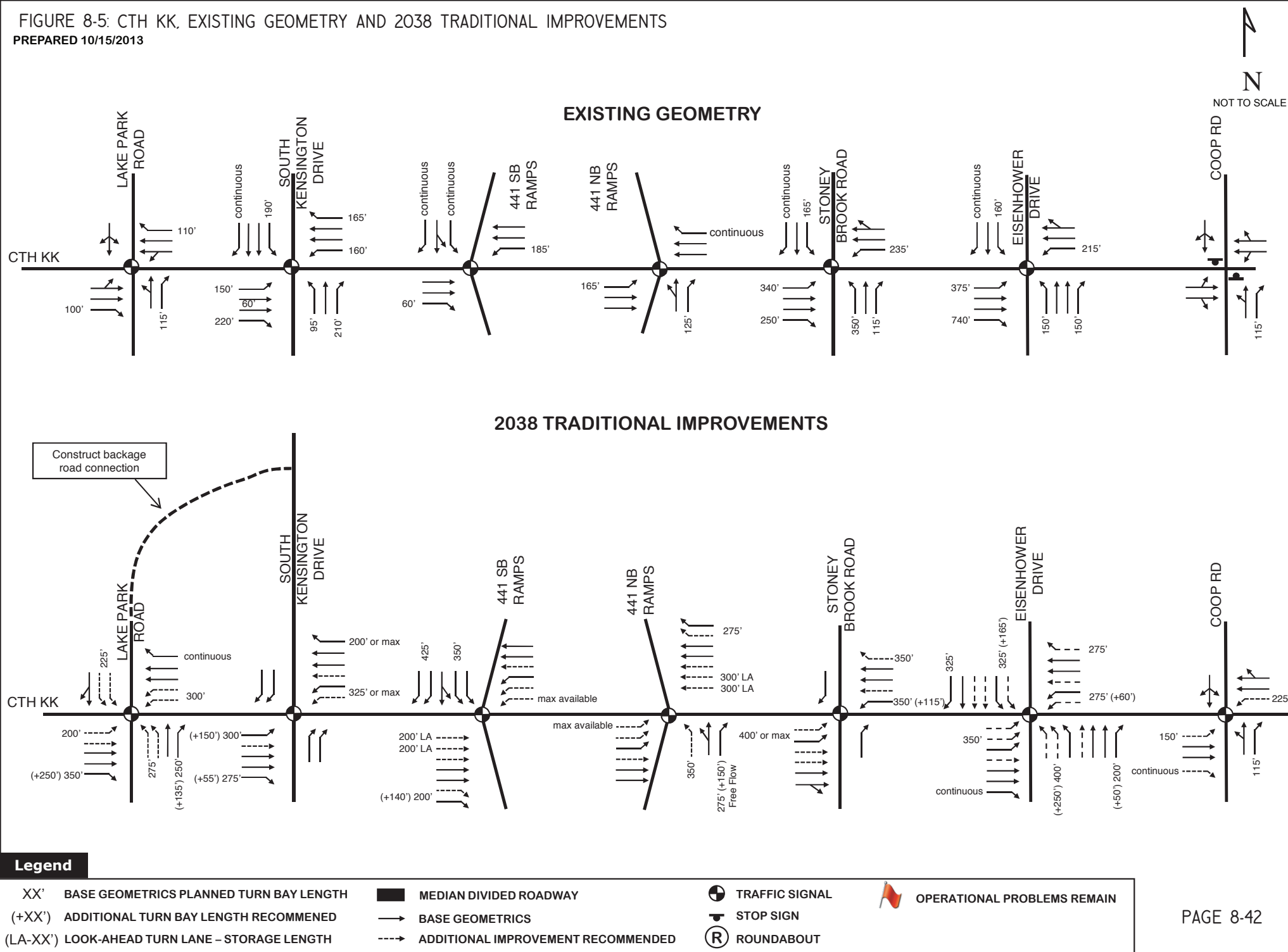


FIGURE 8-5: CTH KK, EXISTING GEOMETRY AND 2038 TRADITIONAL IMPROVEMENTS

PREPARED 10/15/2013



County CE Interchange

Interchange Alternatives Summary

Four short-term improvement alternatives (Alternatives 1 thru 4) for the County CE Interchange were developed within the Operational Needs Assessment Phase I Final Report dated November 2011 (see Appendix 14). Alternative 1 addresses existing safety and operational issues of the WIS 441 and County CE Interchange by improving the on-ramp acceleration lanes and improving the off-ramp terminal intersections. Alternative 2, in addition to Alternative 1 improvements, addresses traffic operations by improving County CE and interchange on-ramps and turn lane approaches along County CE. Alternatives 3 and 4 developed roundabout options for the County CE intersections at the ramp terminals and the frontage road Eisenhower Drive.

The long-term improvement for Alternative 5, as shown in Figure 8-6 (page 8-46), provides an additional lane in both the eastbound and westbound direction through the ramp terminal intersections and ties into the currently proposed roundabout at Eisenhower Drive. Additionally the following intersection improvements are identified:

The County CE and WIS 441 Northbound ramp intersection improvements include:

- The westbound single right-turn lane was modified to a dual right-turn lane.
- A 350' westbound look-ahead left-turn lane was added.
- A 250' eastbound left-turn lane was added to the existing continuous left-turn lane.
- A northbound left-turn lane (200') was added to the combined thru and left-turn lane.

The County CE and WIS 441 Southbound ramp intersection improvements include:

- A 300' westbound left-turn lane was added to the existing continuous left-turn lane.
- The southbound single right-turn lane was modified a dual right-turn lane and lengthened from 225' to 250' long.
- The existing southbound left turn lane was lengthened to 350' and an additional 350' southbound left-turn lane was added.
- The westbound 325' long look-ahead left-turn lane was added.
- The existing eastbound 140' long right-turn lane was increased to 300' long right-turn lane.

The County CE and Kensington Drive intersection improvements include:

- The westbound right-turn lane was increased from 125'to be a continuous lane.
- The southbound combined thru and left-turn lane was modified to a dedicated left-turn lane creating a 325' long dual left-turn lane.
- The southbound right-turn lane was modified to a combined thru and right-turn lane
- The eastbound single 125' long right-turn lane was modified to a 325' long right-turn lane.

- An additional northbound thru lane was incorporated.
- The northbound combined thru and left-turn lane was modified to a 150' long left-turn lane and dedicated thru lane.

The County CE and Eisenhower Drive intersection improvements include:

- A proposed roundabout to be constructed by Outagamie County.

Alternative Represented in Expansion Design Concept

Alternative 5 works operationally and represents the reasonable upper limit alternative interchange cost. Alternative 5 is currently shown in the planning study exhibits but should be further evaluated within the future NEPA study for effectively minimizing impacts while meeting interchange safety and operational needs. Figure 8-7 (page 8-47) is a line diagram indicating Year 2038 traditional intersection improvements required.

Traffic Operations

Year 2038 traffic analysis was conducted at the County CE interchange intersections using the geometrics presented in Alternative 5. A summary of the Year 2038 intersection operating conditions is provided in Table 8-7.

Table 8-7: County CE Interchange Intersection Level of Service (LOS)

County KK Intersection	Intersection Type	Peak Hour LOS by Intersection	
		AM	PM
Kensington Drive	Traffic Signal	C	C
WIS 441 Southbound Ramps	Traffic Signal	C	C
WIS 441 Northbound Ramps	Traffic Signal	C	B

Right-of-way Impacts

Alternative 5 would potentially require the relocation of 5 residences. The potential relocations are:

- The residence in the southwest corner of the County CE/Kensington intersection
- The first 4 residences on the east side of Kensington south of County CE

Access

Alternative 5 would require the removal of the signal at the Kensington Drive/Express Court intersection because the southbound left turn lanes for the County CE/Kensington Drive intersection would extend through the Kensington Drive/Express Court intersection. Express Court would be converted to a commercial driveway with right in – right out access. In addition, a new access road would be constructed on the Menards parcel that would add an additional lane at the Kensington Drive/Warehouse Road intersection to provide full access to the parcels that currently use Express Court to access Kensington Drive.

Complete Streets

Alternative 5 includes sidewalk on the south side of County CE, and both sides of Kensington Drive to provide bicycle accommodations. The existing CE Trail along the north side would potentially be replaced for the length of the project. A 16' wide outside lane is identified for both sides of County CE, and Kensington Drive to provide bicycle accommodations.

Further Analysis Recommendations

This interchange is part of an overall study area including County KK corridor and improvements should be evaluated as part of an overall study area. Post-construction analysis of the County CE and Eisenhower multi-lane roundabout is also recommended for determining the level of interaction between that intersection and the County CE interchange with WIS 441.

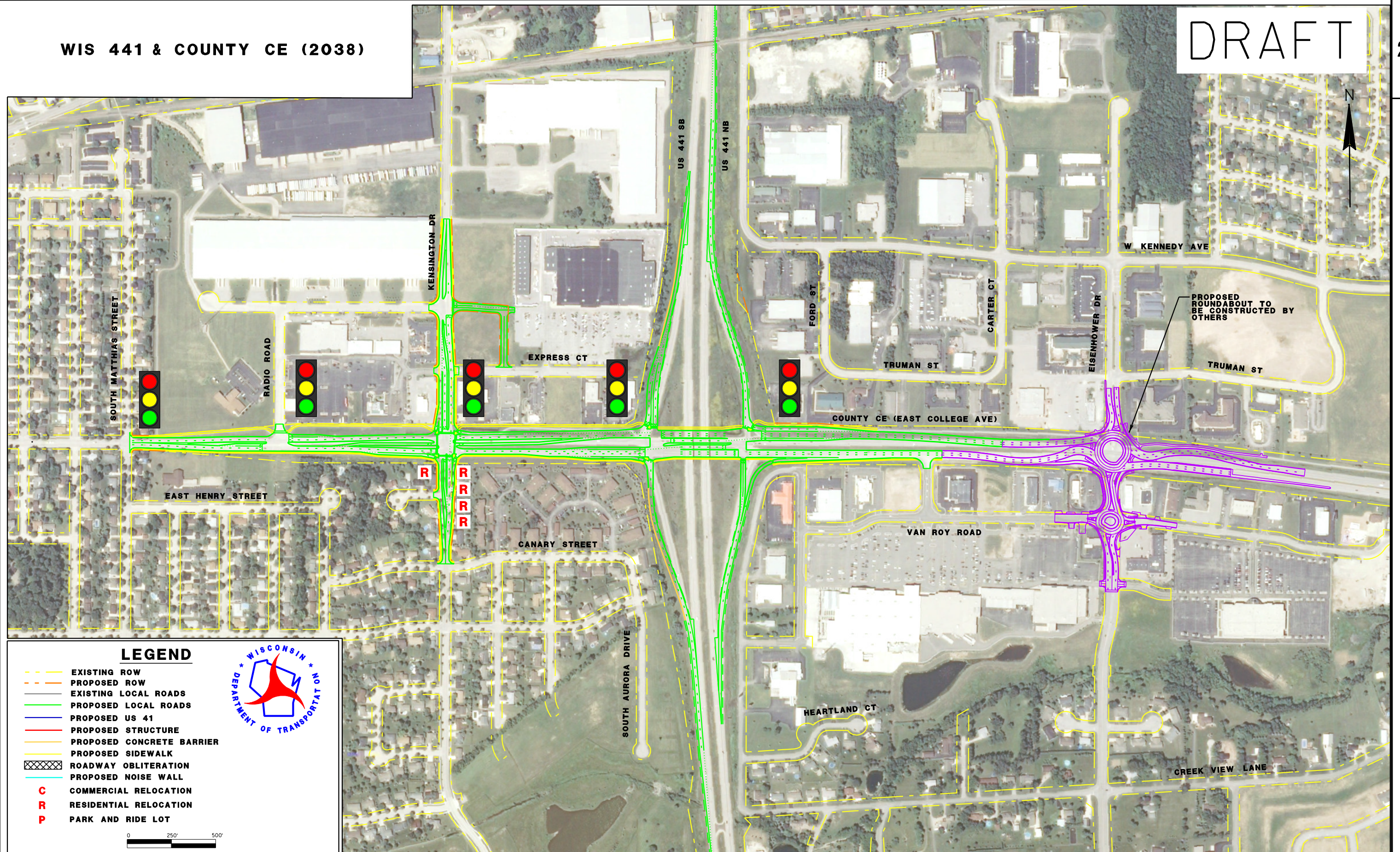
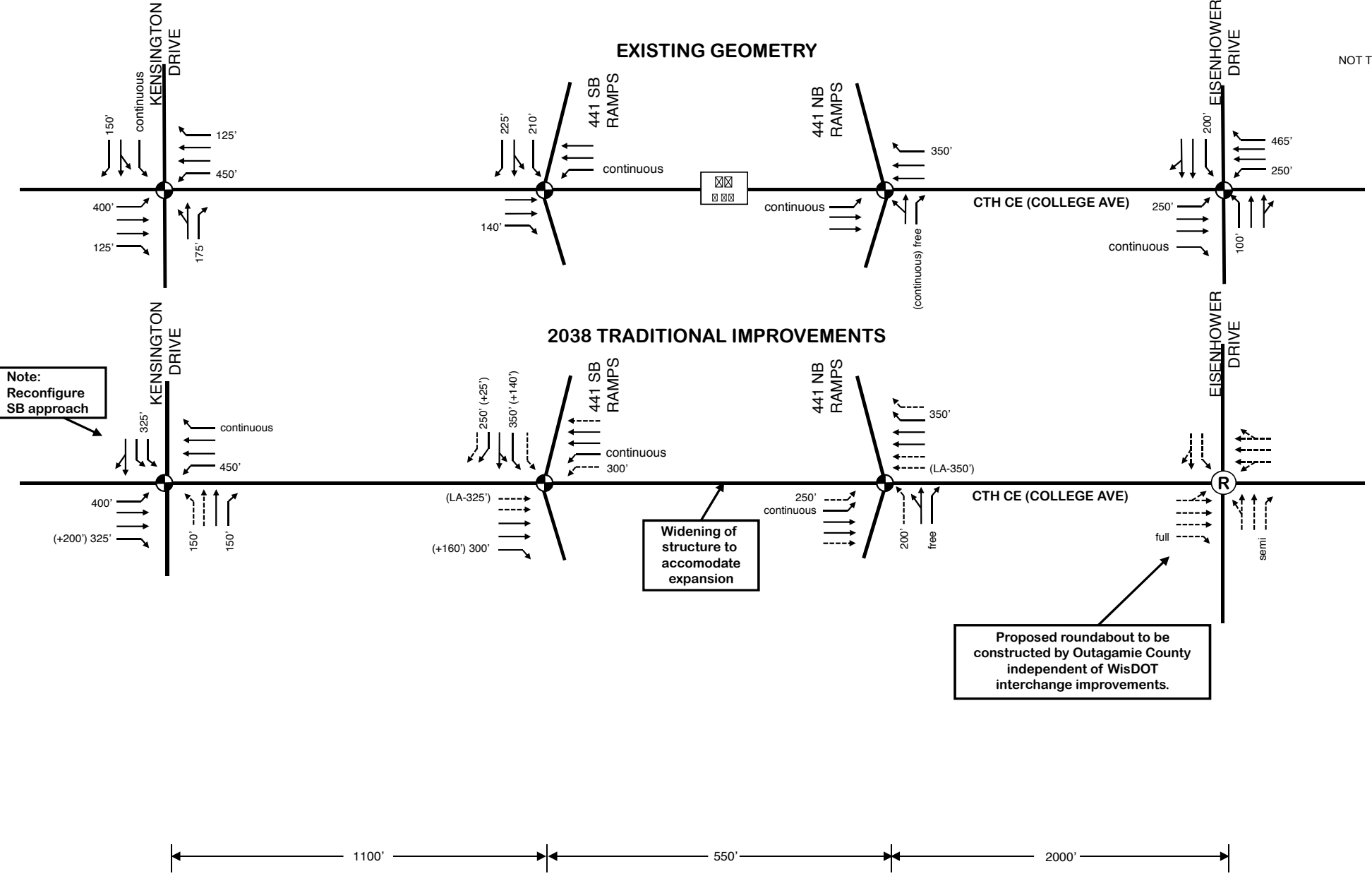


FIGURE 8-7: CTH CE, EXISTING GEOMETRY AND 2038 TRADITIONAL IMPROVEMENTS
PREPARED 10/21/2013



Legend		
XX'	BASE GEOMETRICS PLANNED TURN BAY LENGTH	MEDIAN DIVIDED ROADWAY
(+XX')	ADDITIONAL TURN BAY LENGTH RECOMMENDED	BASE GEOMETRICS
(LA-XX')	LOOK-AHEAD TURN LANE - STORAGE LENGTH	ADDITIONAL IMPROVEMENT RECOMMENDED
		TRAFFIC SIGNAL
		STOP SIGN
		ROUNDABOUT
		OPERATIONAL PROBLEMS REMAIN

8.3 Cost Summary

Table 8-8 below summarizes the costs for Segment 8. Individual one page cost summaries using the US 41 Majors cost estimating worksheets are included for each WIS 441 mainline segment and Interchange. See Appendix 6 for a detailed breakdown of these cost estimating worksheets.

Table 8-8: Segment 8 – Cost Summary

MAINLINE SEGMENT LIMITS/INTERCHANGE	SHORT-TERM COSTS*	LONG-TERM COSTS*	TOTALS
WIS 441: East of US 10 to South of US41/WIS 441 North System Interchange			
Major Roadway Items		\$30,519,000	
Allowance Items		\$18,241,000	
Structures		\$29,722,000	
Special Construction Elements		\$21,648,000	
Context Sensitive Solutions (CSS)		\$5,007,000	
Scope Change Allowance Items		\$25,233,000	
Project Delivery Allowance Items		\$45,239,000	
External Costs and Risk Assessment		\$23,130,000	\$198,739,000
County KK Interchange			
Long-Term Alternative 7			
Major Roadway Items		\$8,783,000	
Allowance Items		\$5,249,000	
Structures		\$702,000	
Special Construction Elements		\$0	
Context Sensitive Solutions (CSS)		\$737,000	
Scope Change Allowance Items		\$3,713,000	
Project Delivery Allowance Items		\$6,657,000	
External Costs and Risk Assessment		\$1,702,000	\$27,543,000
County CE Interchange			
Long-Term Alternative 5			
Major Roadway Items		\$6,064,000	
Allowance Items		\$3,626,000	
Structures		\$0	
Special Construction Elements		\$0	
Context Sensitive Solutions (CSS)		\$485,000	
Scope Change Allowance Items		\$2,442,000	
Project Delivery Allowance Items		\$4,377,000	
External Costs and Risk Assessment		\$1,119,000	\$18,113,000
Segment 8 Total	\$0	\$244,395,000	\$244,395,000

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