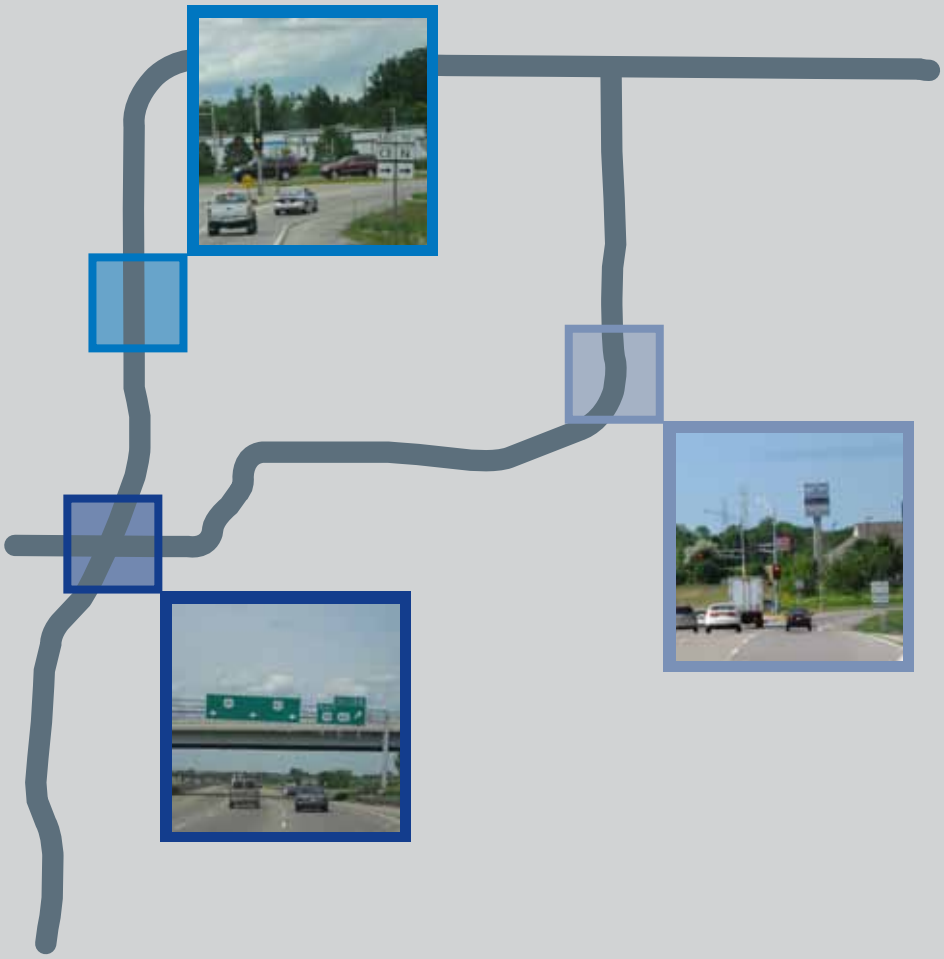
OPERATIONAL NEEDS ASSESSMENT

US 41 (CTH JJ/WIS 114 to CTH S) and WIS 441



FINAL REPORT

NOVEMBER 2011

PREPARED FOR

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Executive Summary

US 41/WIS 441 CORRIDOR FINAL REPORT

US 41 and WIS 441

November 2011

Winnebago, Outagamie, Calumet, and Brown Counties

WisDOT Project I.D. 1130-31-00

Submitted to:
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INTRODUCTION

Study Location

This report describes the short term improvements developed for selected interchanges along the US Highway 41 (US 41) and Wisconsin State Highway 441 (WIS 441) corridors. The subject interchanges are managed by the Wisconsin Department of Transportation's Northeast Region. The study area included Winnebago, Outagamie, Brown, and Calumet Counties. The interchanges for which short term improvements were developed impact the following communities listed below and seen on Exhibit 1:

Winnebago County

- City of Appleton
- City of Menasha
- City of Neenah
- Town of Clayton
- Town of Menasha

Brown County

- Town of Lawrence
- Town of Wrightstown
- Village of Wrightstown

Calumet County

- City of Appleton
- Town of Harrison

Outagamie County

- City of Appleton
- City of Kaukauna
- Town of Buchanan
- Town of Grand Chute
- Town of Greenville
- Town of Kaukauna
- Town of Vandenbroek
- Town of Wrightstown
- Village of Kimberly
- Village of Little Chute
- Village of Wrightstown

Study Purpose

The purpose of this study is to:

- Analyze how traffic moves through the study area. Collect traffic movement volumes and review signal timings. This information was used to develop design alternatives to improve traffic operations.
- Determine where crashes are prevalent. Analyze crash histories at all ramp terminals, interchanges, and roadway geometric features. This information was then used to prioritize the problematic crash areas and create design alternatives to improve safety for motorists.
- Define geometric deficiencies of existing highway characteristics such as physical conditions, alignment, bridge clearance, structural conditions, and ramp design.
- Evaluate environmental constraints throughout the corridor. A qualitative environmental impact screening can be found in the Operational Needs Assessment Report Appendix A. In this study the environmental screening details interchange specific concerns.

- Determine when demand will exceed capacity. Forecast future traffic volumes and evaluate using HCS, Synchro, Rodel, and Paramics. This information was taken into account to recommend future traffic operations. This is important in fixing key issues before the roadway faces congestion issues.
- Develop roadway solutions to address current and predicted problems. The improvement options and recommendations for short-term improvements have been tested by Paramics traffic simulation software to ensure proper function of the proposed design.

Study Interchanges

US 41 and WIS 441 are primary routes serving the Fox Cities area in northeastern Wisconsin. Both of these facilities are experiencing growing traffic volumes and increasing safety concerns. Within the study area both of these facilities are access-controlled freeways with no at-grade access. Exhibit 1 shows the study area includes eighteen interchanges:

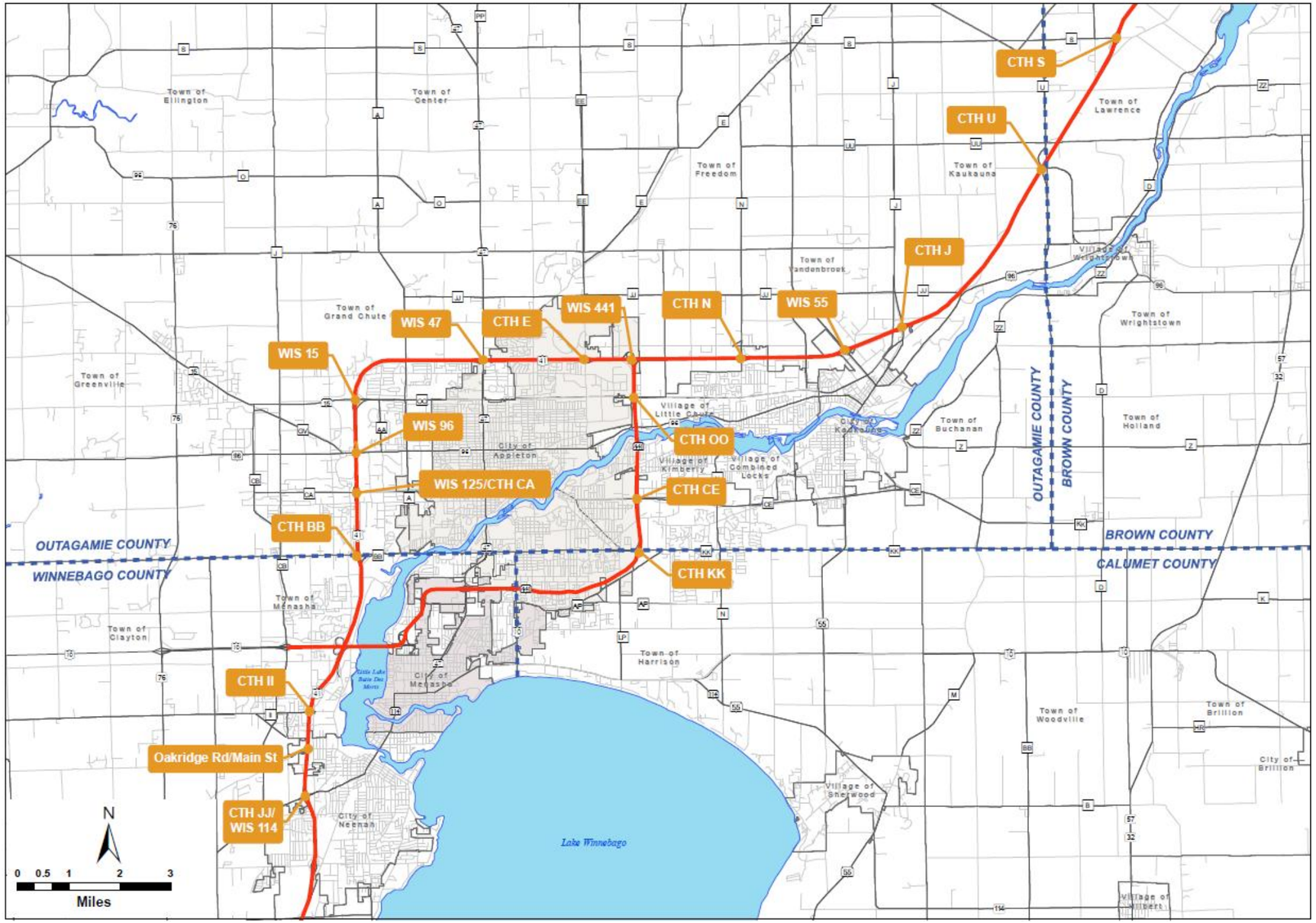
US 41 Corridor

- CTH JJ/WIS 114 (Winneconne Road)
- Oakridge Road/Main Avenue
- CTH II/Winchester Road
- CTH BB/Prospect Avenue
- WIS 125/CTH CA (College Avenue)
- WIS 96/Wisconsin Avenue
- WIS 15/Northland Avenue
- WIS 47/Richmond Street
- CTH E/Ballard Road
- WIS 441 System Interchange
- CTH N/Freedom Road
- STH 55/Delenglade Street
- CTH J/Lawe Street
- CTH U/County Line Road
- CTH S/Freedom Road

WIS 441 Corridor

- CTH KK (Calumet Street)
- CTH CE (College Avenue)
- CTH OO (Northland Avenue)

Exhibit 1 – Project Location Map



FORMULATION OF ALTERNATIVES

Short Term Improvement Alternatives

The main focus of short term improvements on these selected interchanges is to improve current and forecasted traffic operations and to address any major geometric deficiencies without the need for additional right-of-way or environmental studies. Many of these geometric deficiencies are contributing to safety problems for motorists utilizing the US 41 and WIS 441 corridors. These possible selected alternatives will improve operations and potentially decrease crash occurrences and severity. Design improvements were generally broken into alternatives:

Alternative 1 (Signalized): Any improvement that will impact the highway mainline safety or traffic operations.

Alternative 2 (Signalized): Any improvement that will impact the safety or traffic operations at the ramps as well as the ramp terminal intersections.

Alternative 3 (Signalized): Any improvement that will impact the safety or traffic operations at adjacent intersections on the interchange cross street.

Alternative 4 (Roundabout): Roundabout design evaluated for 2020 operational analysis.

Alternative 5 (Roundabout): Roundabout design evaluated for 2035 operational analysis.

Safety Considerations

The influence area for the safety analysis included the ramps, ramp terminal intersections, and the cross road including the intersections adjacent to the interchange. If a geometric deficiency was minor in nature and was not contributing to any safety or other operational problems generally no improvement was planned. For the geometric deficiencies that were contributing to safety issues, a redesign has been developed to correct the issue and increase the safety ratings in the impacted area.

Geometric Criteria

Table 1 below specifies the approach used to determine a numerical geometric rating for the interchanges studied within the US 41 and WIS 441 corridors. The purpose of the rating is to score existing interchange geometric deficiencies based on a series of criteria developed from technical standards. The eight criteria specified below were deemed to be most representative for interchange functionality. Each interchange is given a roadway score and a bridge score with maximum scores of 10 and 5, respectively, representing no current geometric deficiencies. The procedure used is identical to that found within the Backbone Interchange Needs Improvement Study[1] dated July, 2007.

[1] WisDOT I.D. No. 1111-11-99

Table 1 – Deficiency Scoring Sheet

Criteria	Acceptable (0 pt)	Poor (-1 pt)	Severe (-2 pt)	Score
1. Ramp Design Speed and Horizontal Alignment	✓			0
2. Ramp Merge / Diverge	✓			0
3. Stopping Sight Distance	✓			0
4. Intersection Skew / Intersection Sight Distance	✓			0
5. Access Control	✓			0
Roadway Score (Maximum of 10 Points)				10

1. Bridge Width	✓			0
2. Vertical Clearance	✓			0
3. Lateral Clearance Under Structures	✓			0
Bridge Score (Maximum of 5 Points)				5

Traffic Operations

Traffic operations were analyzed at the ramp terminal intersections, adjacent intersections to each side of the interchange area, and the merge and diverge areas of each interchange. The analysis was performed using peak hour traffic movements based on forecasts from the Northeast Travel Demand Model (NE TDM) for years 2020 & 2035. Synchro and Rodel were used to develop initial concepts with all alternatives then tested in Paramics with a 2020 and 2035 model for both a.m. and p.m. peak hours. The goal was for the system to operate efficiently through 2020 and then evaluate the useful life thereafter. To evaluate this, a Paramics model was tested at years 2023, 2025, 2028, 2030, and 2033 to evaluate when a system would fail.

Complete Streets

The "Complete Streets" State Statute 84.01(35) was approved in June 2009 as Act 28. Trans 75, in effect as of January 1, 2011, is the administrative rule used to further clarify and enforce the statute 84.01(35). The US 41/ WIS 441 Traffic Operation Analysis considered bicycle and pedestrian accommodations. Recommended improvements should incorporate accommodations depending on each specific interchange. Example: When adding a turn lane and moving a curb line, look to add recommended bike and pedestrian accommodations. Always work with the municipality where the interchange is located in for their concurrence and acceptance of maintenance of the accommodation.

<u>Complete Streets (Trans 75) Application</u>

The following roadway work has conditions that must be met:

- Resurface or recondition
    - Must adhere to FHWA policy on pedestrian bicycle accommodations
    - Retaining structural integrity or maintaining existing pavement structure (<4" = functional overlay)
    - Incorporate Trans 75 to the extent possible

- Pavement replacement, reconstruction, or new construction
    - Must incorporate Trans 75 unless a specific exception is made
    - If any of the following:
        - Moving curb lines
        - Purchasing right-of-way
        - Removing or replacing the pavement structural integrity (>4" = structural overlay)

INTERCHANGE REPORTS

For each interchange studied, a set of reports has been developed to compile the information evaluated to help develop alternatives. Below are the respective documents in each interchange report.

Green Sheet

The green sheet is a summary of the basic information for each interchange. It includes:

- 2008, 2020 and 2035 vehicle queue lengths
- 2008, 2020 and 2035 no-build levels of service
- Summary of the crash rates (2002-2006)
- Description of improvements in each alternative
- Levels of service per design alternative
- Predicted vehicle queue lengths for the 2020 and 2035 design alternatives
- Summary of the crash benefits
- Alternative cost summary
- Preliminary environmental screening of interchange area
- Roadway and deficiency ratings of existing condition
- Detailed crash types

Interchange Summary

The interchange summary encompasses all of the information that is relative to the deficiencies as well as the proposed short term improvements. All of the alternatives are described in detail and explanations are given for how the proposed designs address the current issue(s) at that specific location. A short comparison of the alternatives is also given to help make informed decisions on how to allocate resources to the different individual projects within the interchange area. There is a section on possible environmental factors and cost contained in this part of the report.

Interchange Traffic Operations Summary

The interchange traffic operations summary exhibit shows a general overview of where the traffic operations issues are predicted at 2020 and predicted at 2035. These exhibits show the recommended turn lane additions as well as lane additions that will be required to keep traffic flowing safely and with a reasonable level of service (LOS). This information supported the alternative to improve traffic operations.

Preliminary Cost Estimate Analysis

A cost estimate was calculated for short term improvement alternatives. These cost estimate sheets break down each alternative by item, description, and subtotal. A summary sheet is given showing each respective alternative's estimate.

In the analysis, the cost is broken down by roadway, structure, construction, right-of-way, and construction management cost. An incremental total is listed for each alternative and an accumulated total of the alternative as well as any other improvements from other alternatives (i.e. Alternative 2 has alternative 1 improvements incorporated in its design. If the cost of alternative 1 is $500,000 and the additional cost of alternative 2 is $1,000,000, with the cumulative cost of $1,500,000.)

In the green sheets, costs shown are by alternative while showing structure and right-of-way costs. Listed is the cumulative cost to show what each respective alternative would cost if selected.

Crash Benefit Analysis

A crash benefit was analyzed for each design alternative. These crash benefit sheets show the predicted reduction in crashes with the addition of the proposed short term improvements. The reduction data was taken from the information compiled for the WisDOT Backbone Study. The outputs are a predicted reduction in the number of crashes based on previous studies and data.

Geometric and Safety Deficiency Map

For each interchange a geometric and safety deficiency map was created. The map identifies geometric and structural deficiencies within the interchange area as well as the areas with numbers of high crashes or high crash severity rates. The existing roadways as well as existing right of way lines are shown on these exhibits as well.

Design Alternative Sheets

The design alternative sheets are the visual exhibit showing the locations and details of short term improvements proposed at any given interchange. Most of the interchanges contain three signalized design alternatives; however, some of the interchanges have only one or two signalized options. All interchanges have roundabout designs for 2020 and/ or 2035. The proposed line work on these exhibits is strictly for representational purposes and is not to be used in any construction documents. The improvements are also briefly described on these exhibits but are more formally described in the interchange report.

SUMMARY OF POSSIBLE INTERCHANGE SELECTIONS

The following interchanges have been evaluated based on existing safety and operational needs. Short-term improvement alternatives were developed and evaluated based on their cost effectiveness in improving the existing deficiencies identified in the Operational Needs Assessment Preliminary Report dated August 2008. A summary of the possible alternatives is presented in Table 2. Exhibit 2 is the implementation map depicting the interchange by interchange proposed year of implementation, useful life, and cost estimate.

Following Table 2 are the detailed interchange reports. Each section provides a green sheet, an interchange report, interchange traffic operations summary, preliminary cost estimate analysis, crash benefit analysis, geometric and safety deficiency map, and the design alternative sheets.

The designs and alternatives proposed are conceptual and should not be considered final. WisDOT will continue to monitor and evaluate the corridor in the future.

Table 2 – Interchange Alternatives

Interchange	Deficiencies[2]	Proposed Alternative	Cost Estimate	Suggested Year of Implementation	Useful Life	Notes
US 41 & STH 114 / Winneconne Ave	Geometry: Good Access: Poor Safety: Fair Operations: Fair	Alternative 2 • 2020 RAB improvements at NB and SB ramps • Tie into existing RAB @ Green Bay Rd	$3,386,000	2015 - 2017	2035+	• Green Bay Rd has an existing RAB • There is currently committed work to realign the NB ramp intersection • Operates acceptably beyond 2035
US 41 & Oakridge Rd / Main St	Geometry: Fair Access: Poor Safety: Good Operations: Good	Alternative 1 • Increase NB off ramp right turn bay storage length • Increase SB off ramp left turn bay storage length as well as reconstruct the horizontal curves	$157,000	2015 – 2017	2035+	• No on ramp access at this interchange • Without any further improvements, the ramps will have LOS A through 2035 • Operates acceptably beyond 2035
US 41 & CTH II / Winchester Rd	Geometry: Poor Access: Poor Safety: Fair Operations: Fair	Alternative 2 • Add second SBL at SB ramp terminal • Add continuous WBR from Green Bay Rd to NB ramp; second on ramp lane • Lane additions and extenstions at Green Bay Rd	$514,000 + $139,000 (Local Share)	2015 – 2017	2035 +	• A committed auxiliary lane from CTH II to US 10 system interchange is currently under construction • Alternative 2 would address local roadway operations at an additional local cost of $139,000 • Access issues remain with Alternative 2
US 41 & CTH BB / Prospect Ave	Geometry: Fair Access: Good Safety: Fair Operations: Poor	Alternative 2 • Extend NB and SB merge lengths to 1200' • Add EB and WB look ahead left turn for both ramps • Coordinate with local municipalities concerning American Dr and Northern Rd	$486,000 + Local Share	2015 – 2017	2028	• NB ramp terminal is offset • "Band aid" option that alleviates strain in the short term but issues remain at NB ramp terminal and American Dr • Heavy traffic flow on mainline causes issues with NB merge • Local improvements at American Dr and Northern Rd are required prior to 2028[3]

Good = Good Fair = Fair Poor = Poor

[2] Deficiencies are of existing conditions.
[3] Local improvements for American Dr and Northern Rd are necessary but not listed as part of this alternative. American Dr and Northern Rd will affect the ramp terminals.

Interchange	Deficiencies[2]	Proposed Alternative	Cost Estimate	Suggested Year of Implementation	Useful Life	Notes
US 41 & WIS 125 / CTH CA[4]	Geometry 🟡 Access 🟡 Safety 🔴 Operations 🔴	Alternative 1 • Auxiliary lanes SB and NB to and from WIS 96 • Multiple improvements to both the SB and NB ramp terminals	$2,470,000	2011	2020	• Project ID is 1130-35-71 • Backbone interchange that needs to be tied to WIS 96 • Improves ramps short term but does not address adjacent intersections • Access/ spacing issues remain at Nicolet Rd/ Mall Dr
US 41 & WIS 96 / Wisconsin Ave[4]	Geometry 🟡 Access 🔴 Safety 🔴 Operations 🟡	Alternative 1 • Auxiliary lanes SB and NB to and from WIS 125 • Improve traffic signal phasing at SB and NB ramps	$2,100,000	2011	2025	• Project ID is 1130-35-71 • Backbone interchange that needs to be tied to WIS 125 • Improves ramps short term but does not address adjacent intersection issues: NBL @ Westhill Blvd and SBL @ Greenville Dr
US 41 & STH 15 / Northland Ave	Geometry 🟡 Access 🟢 Safety 🔴 Operations 🔴	Alternative 1 • Lane modifications to NB and SB off ramps • Extend NB merge to 1000'	$302,000	2012 - 2014	2025	• "Band aid" option that addresses 2020 operational ramp issues and alleviates SB ramp crash issue • More significant improvements are necessary at this interchange but should be reviewed with the NW quadrant of Appleton and US 41 capacity needs in mind
US 41 & WIS 47 / Richmond St[4]	Geometry 🟡 Access 🔴 Safety 🟡 Operations 🟢	Alternative 2 • Extend NB and SB diverge and merge lanes • Bridge raised, redeck and expanded 6'	$7,900,000	2013	2033	• Project ID is 1130-33-00 • Does not provide room under bridges for 6 lanes on US 41 to outside (mainline US 41 lanes could currently be added inside if deemed necessary)
US 41 & CTH E / Ballard Rd	Geometry 🔴 Access 🟢 Safety 🔴 Operations 🔴	Alternative 2 • Extend NB diverge lane and SB merge lane • Additional turn lanes at NB and SB ramps • Look ahead left at each ramp terminal	$661,000	2012 – 2014	2025	• Constructed auxiliary lanes between CTH E and WIS 441 and NB right turn lane at Evergreen Dr • Improvements greatly improve the NB diverge • Both ramps continue to have operational issues (LOS D or worse)

🟢 = Good 🟡 = Fair 🔴 = Poor

[4] WIS 125, WIS 96, and WIS 47 interchange information per 2007 Earth Tech report via WisDOT

Interchange	Deficiencies[2]	Proposed Alternative	Cost Estimate	Suggested Year of Implementation	Useful Life	Notes
US 41 & WIS 441 System Interchange	Geometry 🟢 Access 🟢 Safety 🟢 Operations 🟢	No alternative necessary	N/A	N/A		• Substandard curves are very close to current standards • No short term benefit anticipated for cost
US 41 & CTH N / Freedom Rd	Geometry 🟡 Access 🔴 Safety 🟢 Operations 🟢	Alternative 1 • Extend NB and SB merge	$658,000	2012 - 2014	2035 +	• Access control issues remain at adjacent intersections • No major crash or operational issues other than the on ramps that are addressed in alternative 1
US 41 & STH 55 / Delanglade St[5]		RAB Alternative • RAB at both ramps and Maloney Rd	$5,900,000 (Cost includes entire reconstruction)	2014	2035 +	• Per Chuck Karow: We're in the negotiating phase with a consultant on the project for a tentative construction year 2014. • Project ID is 4650-08-71
US 41 & CTH J / Lawe St		RAB already implemented	N/A		2035 +	
US 41 & CTH U / County Line Rd	Geometry 🟡 Access 🔴 Safety 🟢 Operations 🟢	Alternative 2 • Weigh in Motion south of interchange at existing weigh station	$286,000 + Operating Cost	2018 - 2020	2035 +	• Cost includes initial cost and maintenance for over 12 year cycle but does not include operating cost • No major crash or operational issues other than the possible weaving issue with trucks entering the highway after the weigh station
US 41 & CTH S / Freedom Rd	Geometry 🟢 Access 🟡 Safety 🟢 Operations 🟢	Alternative 2 • Lengthen right turn bay storage for NB and SB ramps • Signalize both ramp terminals when warranted	$665,000	After 2025	2035 +	• Ramp terminals may warrant traffic signals by 2035 • Access control issues remain at adjacent intersections

🟢 = Good 🟡 = Fair 🔴 = Poor

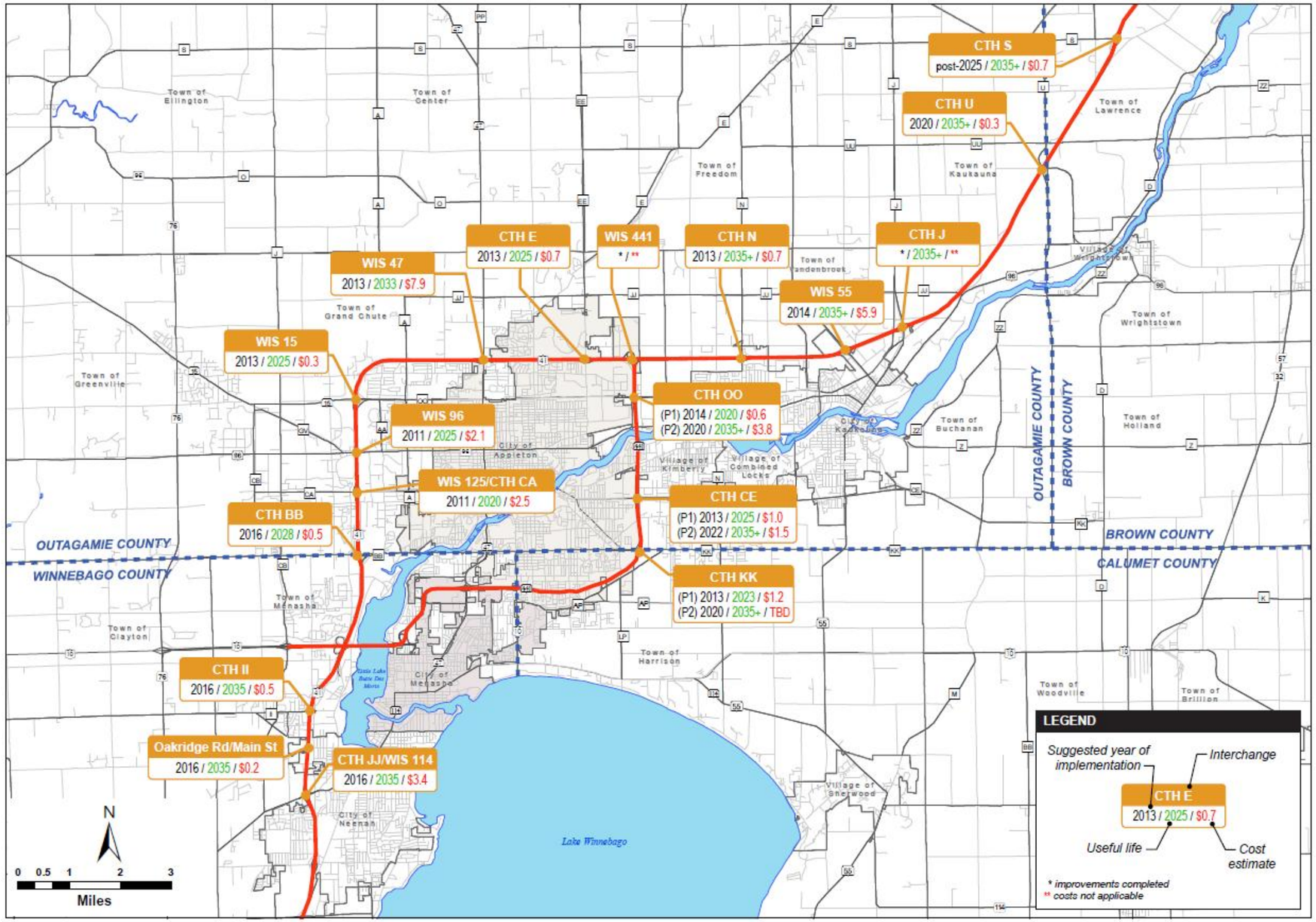
[5] STH 55 interchange information per OMNNI Associates and Chuck Karow, WisDOT

Interchange	Deficiencies[2]	Proposed Alternative	Cost Estimate	Suggested Year of Implementation	Useful Life	Notes
WIS 441 & CTH KK / Calumet St[6]	N/A	Committed HSIP project • Extend NB and SB merge • Additional NB ramp terminal left and right turn lanes	$1,200,000	2013	2023	• Project ID is 4685-12-71
WIS 441 & CTH CE / College Ave Phase 1	Geometry 🔴 Access 🟢 Safety 🟡 Operations 🟢	Alternative 1 • Extend NB and SB merge • Multiple additions and extensions at both ramp terminals	$1,071,000	2012 – 2014	2025	• NB ramp terminal addition in 2012 (Project ID 4685-26-71) should be evaluated with respect to the selected alternative as there may be repetitive improvements • Operational issues persist but there is improvement • Crash benefit per improvements is significant
WIS 441 & CTH CE / College Ave Phase 2	Geometry 🔴 Access 🟢 Safety 🟡 Operations 🟢	Alternative 2 • Additional turn lanes added at SB on and off ramp • Realign roadway WB from Eisenhower Dr to NB ramp due to additional LT in each direction at ramp terminals	$1,487,000	2021 - 2023	2035 +	• SB ramp queue length reduces from 1277' to 265' in PM • Bridge to stay intact but soil nailed wall is required for lane additions
WIS 441 & CTH OO / Northland Ave Phase 1	Geometry 🔴 Access 🔴 Safety 🟢 Operations 🟢	Alternative 1 • Extend SB merge to 800' and additional SB ramp improvements • Add right turn lane at NB and SB ramp terminals	$568,000	2012 - 2014	2020	• French Rd intersection starves the ramps therefore future improvements to French Rd are necessary
WIS 441 & CTH OO / Northland Ave Phase 2	Geometry 🔴 Access 🔴 Safety 🟢 Operations 🟢	Alternative 3 • Move French Rd access 800' to the east • SB on ramp, off ramp and ramp terminal improvements	$3,845,000	2018 - 2020	2035+	• Built after useful life of interchange improvements fail for phase 1

🟢 = Good 🟡 = Fair 🔴 = Poor

[6] CTH KK will be studied separately including multiple intersections throughout the southeast quadrant of the WIS 441 and CTH KK corridor therefore CTH KK was not evaluated farther here

Exhibit 2 – Implementation Schedule Map



US 41 & CTH JJ / WIS 114 (Winneconne Road)

US 41/441 Operational Analysis — US 41 and WIS 114/CTH JJ (Winneconne Ave)

Mainline Route	Crossroad
US 41	WIS 114/CTH JJ
Region	**Location**
Northeast	City of Neenah
Interchange Type	**Crossroad Function**
Diamond	Minor Arterial
Ramp Terminal	**Bridge Sufficiency**
Signalized	B-70-0123 = 95.5 B-70-0124 = 98.0
Bridge Hits	**Bridge Service Life**
	B-70-0123 built 1993 B-70-0124 built 1994

No-Build Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY South (NB)	FWY North (NB)	FWY North (SB)	FWY South (SB)	Total	Notes
LOS	2035	C (D)	-	D (D)	D (D)	-	-	C (D)	C (D)	C (C)	C (C)		AM Peak (PM Peak)
	2020	C (C)	-	D (D)	D (C)	D (D)	D (D)	C (C)	C (C)	C (C)	C (C)		
	existing	B (B)	-	C (C)	C (C)	C (D)	C (D)	B (B)	C (C)	C (C)	B (B)		
Queue	2035					-	-						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1500' SB = 1400'
	2020					201 (590)	503 (1486)						
	existing					151 (272)	688 (1305)						
Crashes	2002-2006	24	23	27	29	12	28	3	0	0	0	146	
	Severity	0.33	0.04	0.44	0.24	0.42	0.36	0.33	0.00	0.00	0.00	-	(INJ+FAT) / Total Crash
	Rate	75	61	75	91	0.30	0.56	12	0	0	0	-	Merge & Diverge = HMVMT Intersection = MEV

Improved Alternative Summary

Title	Description
Alternative 1	NB and SB on ramps extend acceleration lanes.SB intersection improvements
Alternative 2	2020 RAB. Unrelated to signal design.
Alternative 3	2035 RAB. Unrelated to signal design.

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
LOS	Alt. 1	B (C)	-	C (C)	C (C)	D (D)	C (D)	C (C)	C (C)	C (C)	C (C)		AM Peak (PM Peak)
	Alt. 2	B (C)	-	C (C)	C (C)	A (A)	A (A)	C (C)	C (C)	C (C)	C (C)		
	Alt. 3	B (C)	-	C (C)	C (C)	A (A)	A (A)	C (C)	C (C)	C (C)	C (C)		
Queue	Alt. 1					205 (790)	570 (1481)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1500' SB = 1400'
	Alt. 2					25 (25)	25 (75)						
	Alt. 3					25 (25)	25 (25)						

US 41/441 Operational Analysis — US 41 and WIS 114/CTH JJ (Winneconne Ave)

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
Crash Benefit	Alt. 1	9	-	12	8	-	-	-	-	-	-	29	Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35.000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands over five year period)
	Alt. 2	-	-	-	-	27	56	-	-	-	-	83	
	Alt. 3	-	-	-	-	27	56	-	-	-	-	83	

Alternative Construction Costs

	Total Cost	Structure Costs	ROW Costs
Alternative 1	$580,000	$0	$0
Alternative 2	$3,117,000	$0	$181,000
Alternative 3	$3,386,000	$0	$181,000

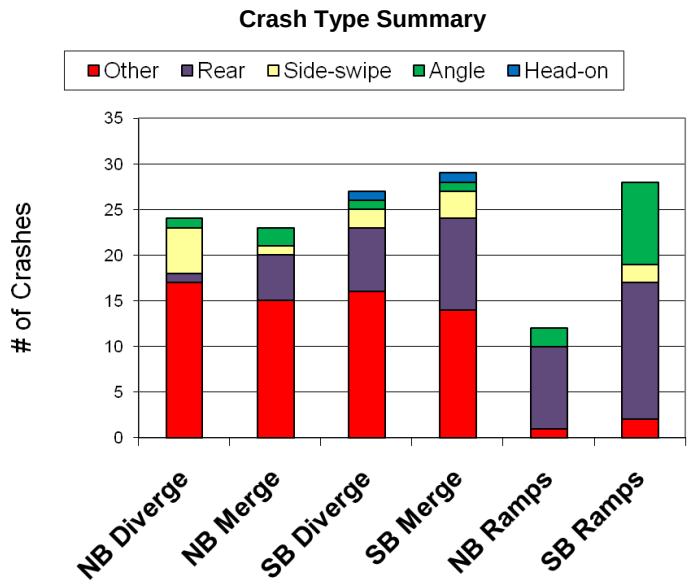
Preliminary Environmental Screening

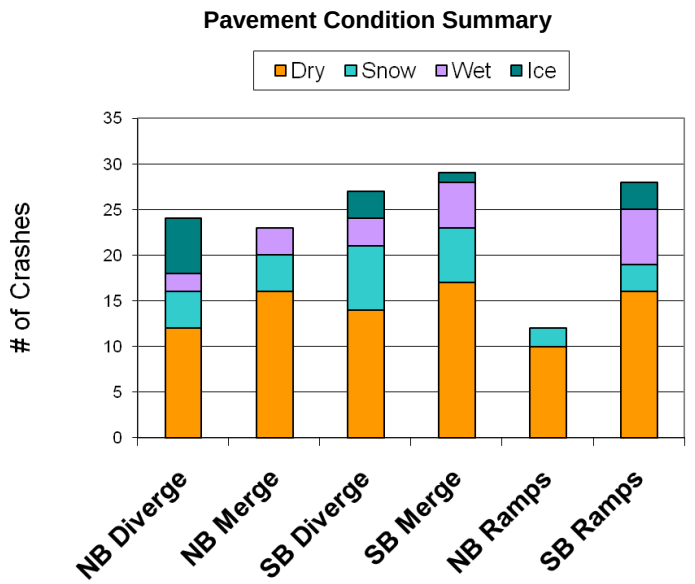
- A residential neighborhood is located adjacent to the interchange
- An unnamed stream crosses under US 41 near the interchange

Existing Geometric Deficiencies Rating

Freeway/Ramps	Score	Comments
Ramp Design Speed & Horizontal Alignment	Acceptable	
Ramps Merge / Diverge	Poor	SB and NB on ramp taper do not meet minimum standards.
Ramp Stopping Sight Distance	Poor	NB off ramp and SB on ramp crest curve K values do not meet new criteria min. standard.
Bridges		
Bridge Width	Acceptable	
Crossroad		
Intersection Skew / Intersection Sight Distance	Acceptable	
Geometric Deficiency Score	Roadway Geometric Score = 8 / 10	Bridge Geometric Score = 5 / 5

Detailed Crash Analysis





US 41 & WIS 114 (WINNECONNE AVENUE) INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the US 41 & WIS 114 (Winneconne Ave) interchange is to address the needs and deficiencies identified in the USH 41 Interstate Conversion Geometric Deficiencies Report dated February 2009. The following is a summary of the needs and deficiencies at the WIS 114 Interchange:

- High crash severity rate at the southbound US 41 merge
- High crash severity rate at the southbound US 41 diverge
- High crash severity rate at the northbound US 41 diverge
- Operational issues at the following locations:
    - Westbound right turn movement from Winneconne Avenue to northbound US 41 on ramp
    - Various turning movements at the Winneconne Avenue/Green Bay Road intersection

The primary need at the WIS 114 interchange is to improve the safety and operations at the ramp terminal intersections.

The following alternative has been developed with regard to safety and operations.

Alternative 1 –

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Improve merge taper horizontal and vertical geometrics for southbound US 41 on ramp
- Improve diverge taper horizontal and vertical geometrics for northbound US 41 off ramp
- Add an auxiliary right turn lane from southbound US 41 to southbound US 41 diverge
- Add receiving lane from eastbound Winneconne Ave. right turn to southbound US 41 on ramp
- Extend right and left turn lanes from 330' to 600' at southbound US 41 off ramp to Winneconne Avenue

The improvements in Alternative 1 will assist with crash severity problems at the southbound US 41 merge and diverge and the northbound US 41 diverge and will improve traffic flow between eastbound Winneconne Ave. free-flow right turn and westbound Winneconne Ave. signalized left turn to southbound US 41 on ramp.

Alternative 2

The Year 2020 roundabout alternative maintains a four-lane facility along Winneconne Avenue. Two-lane roundabouts would be provided at the northbound US-41 ramps and the southbound US-41 ramps. A three-lane roundabout currently exists at Green Bay Road. All movements are expected to operate at LOS B or better and experience acceptable queues and delays.

Surplus capacity of approximately 11%[1] is expected beyond the forecasted Year 2020 traffic conditions. A system of roundabouts at this location will allow for the use of right-in/right-outs at current and future driveway locations as U-Turns are accommodated within the roundabouts.

Alternative 3

The Year 2035 roundabout alternative maintains a four-lane facility along Winneconne Avenue. Two-lane roundabouts would be provided at the northbound US-41 ramps and the southbound US-41 ramps. A three-lane roundabout currently exists at Green Bay Road. All movements are expected to operate at LOS B or better and experience acceptable queues and delays.

Additional Deficiencies

Unprotected side slope grades steeper than 4:1 along portion of southbound US 41 off ramp. Recommend appropriate side slope grading according to WisDOT Facilities Development Manual (FDM) standards wherever possible during Alternative 1 ramp reconstruction and/or beam guard installations where necessary.

Northbound US 41 on ramp crest curve K value (K = 156) does not meet minimum WisDOT (FDM) standard (crest curve K = 185 for 55 mph design speed). The cost to improve ramp profile to meet this standard would exceed any potential safety return.

Access control distances between northbound US 41 and southbound US 41 ramp termini and side road intersections (commercial signalized driveway, west of southbound ramp termini and Green Bay Road, east of northbound ramp termini) do not meet minimum WisDOT (FDM) standard (1000'). The resulting cost and impact to local access throughout interchange area to meet this standard are too great to warrant serious consideration; thus no recommendations are suggested.

Comparison of Alternatives

The interchange alternatives were compared based on safety, traffic operations, cost and other factors:

Safety

Alternative 1 addresses the existing safety issue with crashes at the southbound US 41 diverge, southbound US 41 merge and northbound US 41 diverge by improving horizontal and vertical geometrics to allow smoother high speed transitions between mainline and ramps. Additionally, Alternative 1 will promote safer traffic movements between eastbound Winneconne Avenue free flow right turn and westbound Winneconne Avenue signalized left turn to southbound US 41 on ramp.

Traffic Operations

Alternative 1 allows more vehicles to turn right with each signal phase improving the level of service at the southbound US 41 on ramp terminal. All operations are under the assumption that the traffic signal phasing utilizes single ring TTI (Texas

[1] Determined by applying an equal percentage increase to all volumes at an intersection under the 50th CL until a leg failed. The lowest percent increase among the intersections was reported. Therefore, the remaining intersections at each interchange will have higher surplus capacity values.

Transportation Institute) phasing. Different signal phasing would require additional analysis to determine altered LOS and queue distances.

Environmental Factors

- A residential neighborhood is located near the interchange

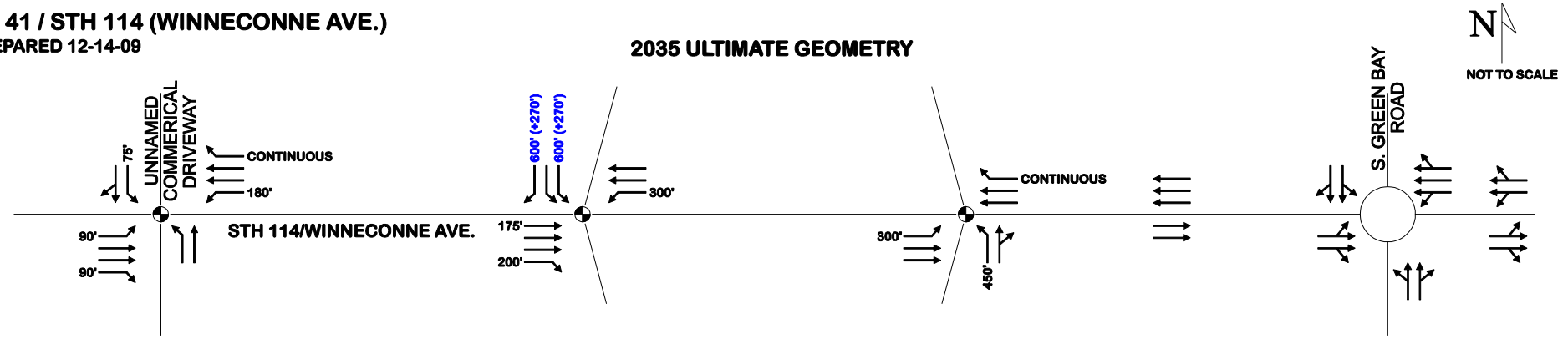
Complete Streets

There is an existing trail on north side of STH 114. Sidewalk was recently constructed on south side of STH 114 with WisDOT project in 2010 and with City roundabout projects in 2010 and 2012. Maintain existing accommodations as this is a major connection for City of Neenah bike and ped users. Green Bay Rd. is a major north-south route for Valley Transit bus service and Winneconne Rd is a major east-west route.

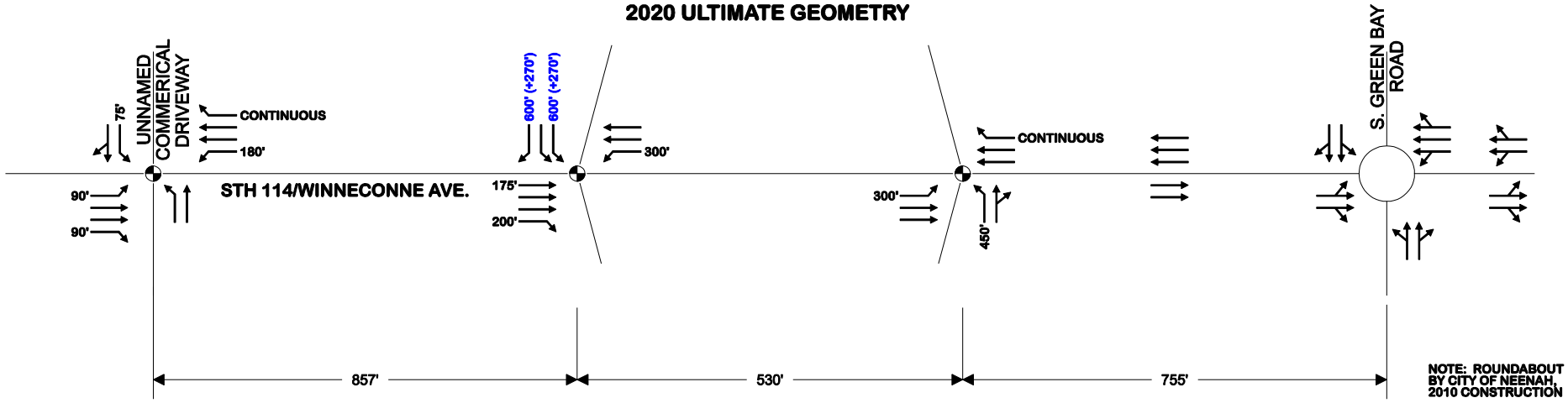
US 41 / STH 114 (WINNECONNE AVE.)

PREPARED 12-14-09

2035 ULTIMATE GEOMETRY



2020 ULTIMATE GEOMETRY



NOTE: ROUNDABOUT BY CITY OF NEENAH, 2010 CONSTRUCTION

XX'	BASE GEOMETRICS PLANNED TURN BAY LENGTH	→	BASE GEOMETRICS		TRAFFIC SIGNAL
(+XX')	ADDITIONAL TURN BAY LENGTH RECOMMENDED	- - →	ADDITIONAL IMPROVEMENT RECOMMENDED		STOP SIGN
(+XX')	ADDITIONAL TURN BAY LENGTH REQUIRED FOR 2035 VOLUMES	- - →	ADDITIONAL IMPROVEMENT REQUIRED FOR 2035 VOLUMES		OPERATIONAL PROBLEMS REMAIN

AADT

Existing - XX,XXX

2020 - XX,XXX

2035 - XX,XXX

US 41/WIS 441 Short-Term Improvement Cost Estimate
WIS 114/ Winneconne Ave.

	Roadway	Structure	Construction	R/W Cost	CM & Eng	Incremental Total	Total
Alternative 1	$ 348,000	$ -	$ 211,000	$ -	$ 21,000	$ 580,000	$ 580,000
Alternative 2	$ 1,794,000	$ -	$ 1,038,000	$ 181,000	$ 104,000	$ 3,117,000	$ 3,117,000
Alternative 3	$ 1,959,000	$ -	$ 1,133,000	$ 181,000	$ 113,000	$ 3,386,000	$ 3,386,000

Item	Item Description	Unit	Unit Price		
1	New Concrete Pavement[1]	SY		$65	Concrete, Base Aggregate, Crushed
2	New HMA Pavement[2]	SY		$50	HMA, Base Aggregate, Crushed
3	Sidewalk	SY		$35	
4	Curb and Gutter	LF		$20	
5	Earthwork	CY		$20	Cut or fill, based on observed topography, including ditches
6	Signal Pole Relocation	EA		$15,000	
7	Signal System	EA		$165,000	
8	Ramp Meter	EA		$75,000	
9	Ramp Meter- remove and reinstall	EA		$35,000	
10	Sign Bridge	EA		$100,000	
11	Drainage - Inlets/Manholes	EA		$700	
12	Drainage - Pipes/Culverts	LF		$50	
13	Drainage - Pipes/Culverts - extensions	LF		$100	
14	Concrete Barrier - 42"	LF		$70	
15	Retaining wall - non-structural (<5')	SF		$25	
16	Beam Guard	LF		$20	
17	Beam Guard End Absorbing Terminal	EA		$2,500	
18	Unique Items				Add Items unique to these locations,
19					that are too large to be covered in 'Road Incidentals'.
20					
	Subtotal				
	Road Incidentals[3]	LS		20%	removals, finishing, erosion, removals, lighting, etc
	Planning Level Contingency[3]	LS		20%	
	Signing & Pavement Marking[3]	LS		5%	
	Traffic Control - urban mainline[3,4]	LS		12%	assumed 100% unless other TC is entered
	Traffic Control - rural mainline[3,4]	LS		10%	enter percent of project on rural mainline
	Traffic Control - ramps[3,4]	LS		8%	enter percent of project on ramps
	Traffic Control - local roads[3,4]	LS		5%	enter percent on local roads
	Bridges - new and widening with substructure	SF	$ 140.00		Area of Bridge Deck
	Bridges - widening using existing substructure	SF	$ 100.00		Area of Bridge Deck
	Bridges - redecking	SF	$ 70.00		Area of Bridge Deck
	Retaining walls - structural	SF	$ 35.00		area of exposed wall face
	Mobilization[5]	LS		6%	
	CM & Engineering[6]	LS		10%	
	Right of Way				Site Specific
	Commercial Real Estate	SF			
	Residential Real Estate	SF			
	Commercial Relocation Cost	LS			
	Residential Relocation Cost	LS			
	Lighting	LS			

NOTES:

1. New Concrete Pavement consists of: Concrete Pavement 10", $50/SY; Base Aggregate, 6", $16/ton; Select Crushed, 12", $14/ton.
2. New HMA Pavement consists of: HMA, 5", $70/ton; Oil, $600/ton; Base Aggregate, 12", $16/ton; Select Crushed, 12", $14/ton
3. Lump Sum items are computed as a percentage of the roadway item costs. These do not include structural component costs.
4. Traffic Control is a lump sum, between 5% - 12%, weighted by the estimated construction cost on each roadway type.
5. Mobilization is computed as a percentage of the all item costs, including structural components.
6. Construction Management and Engineering are computed as a percentage of the total construction cost.

Preliminary Cost Estimate: US 41 at WIS 114/ Winneconne Ave.
Alternative 1

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	5,350	$347,750	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	1	$700	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$348,000**		
	Road Incidentals	LS	20%		$70,000	
	Planning Level Contingency	LS	20%		$70,000	
			0%			
	Signing & Pavement Marking	LS	5%		$17,000	
	Traffic Control - urban mainline	LS	12%	100%	$42,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$11,940	
	Construction Total			**$211,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$21,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$580,000**		

Preliminary Cost Estimate: USH 41 at WIS 114/ Winneconne Ave.
Alternative 2

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	16,850	$1,095,250	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	2,500	$87,500	
4	Curb and Gutter	LF	$20	10,500	$210,000	
5	Earthwork	CY	$20	14,600	$292,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	25	$17,500	
12	Drainage - Pipes/Culverts	LF	$50	1,825	$91,250	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$1,794,000**		
	Road Incidentals	LS	20%		$359,000	
	Planning Level Contingency	LS	20%		$359,000	
	Signing & Pavement Marking	LS	5%		$90,000	
	Traffic Control - urban mainline	LS	12%	49%	$105,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	37%	$53,000	
	Traffic Control - local roads	LS	5%	14%	$13,000	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$58,740	
	Construction Total			**$1,038,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$104,000**		
	Commercial Real Estate	SF	10,950	**$17**	$181,113	
	Residential Real Estate	SF	0%	**$9**	$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$181,000**		
	TOTAL COST			**$3,117,000**		

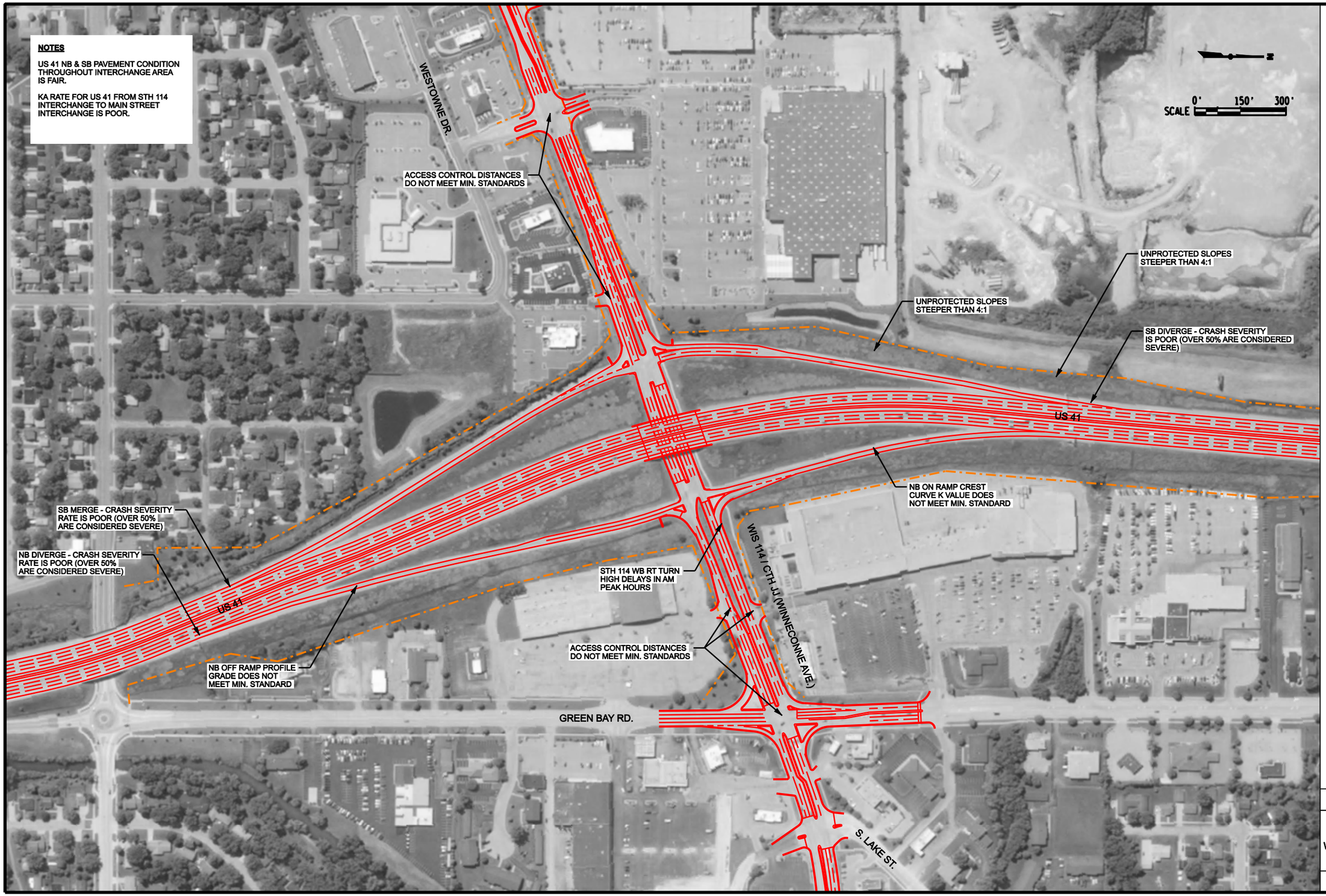
Preliminary Cost Estimate: USH 41 at WIS 114/ Winneconne Ave.
Alternative 3

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	18,650	$1,212,250	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	2,550	$89,250	
4	Curb and Gutter	LF	$20	11,250	$225,000	
5	Earthwork	CY	$20	16,100	$322,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	25	$17,500	
12	Drainage - Pipes/Culverts	LF	$50	1,855	$92,750	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$1,959,000**		
	Road Incidentals	LS	20%		$392,000	
	Planning Level Contingency	LS	20%		$392,000	
	Signing & Pavement Marking	LS	5%		$98,000	
	Traffic Control - urban mainline	LS	12%	49%	$115,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	37%	$58,000	
	Traffic Control - local roads	LS	5%	14%	$14,000	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$64,140	
	Construction Total			**$1,133,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$113,000**		
	Commercial Real Estate	SF	10,950	**$17**	$181,113	
	Residential Real Estate	SF	0%	**$9**	$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$181,000**		
	TOTAL COST			**$3,386,000**		

NOTES

US 41 NB & SB PAVEMENT CONDITION THROUGHOUT INTERCHANGE AREA IS FAIR.

KA RATE FOR US 41 FROM STH 114 INTERCHANGE TO MAIN STREET INTERCHANGE IS POOR.



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

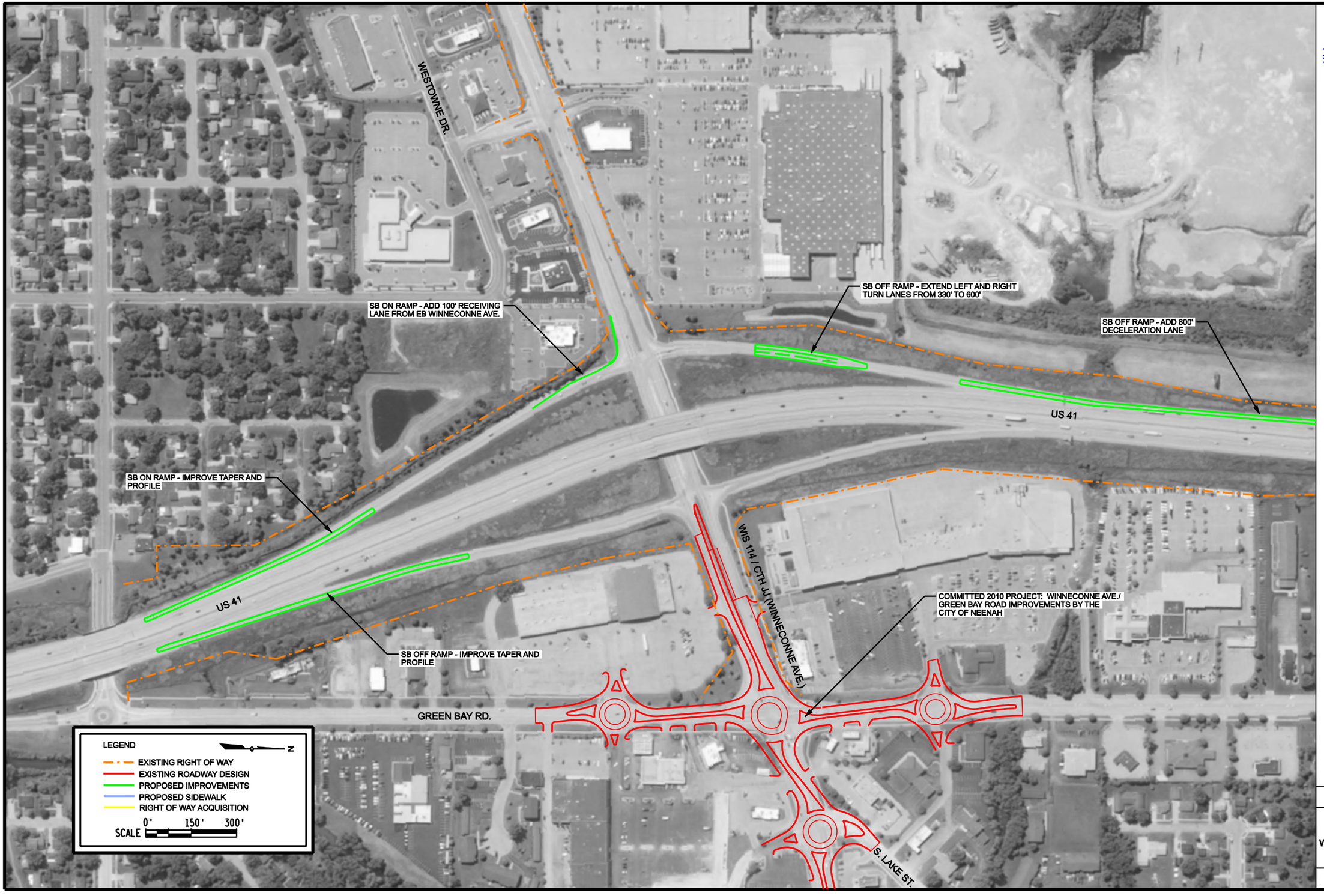
US 41 - STH 114 INTERCHANGE

GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

US 41/CTH JJ
WINNEBAGO COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

US 41 - STH 114 INTERCHANGE

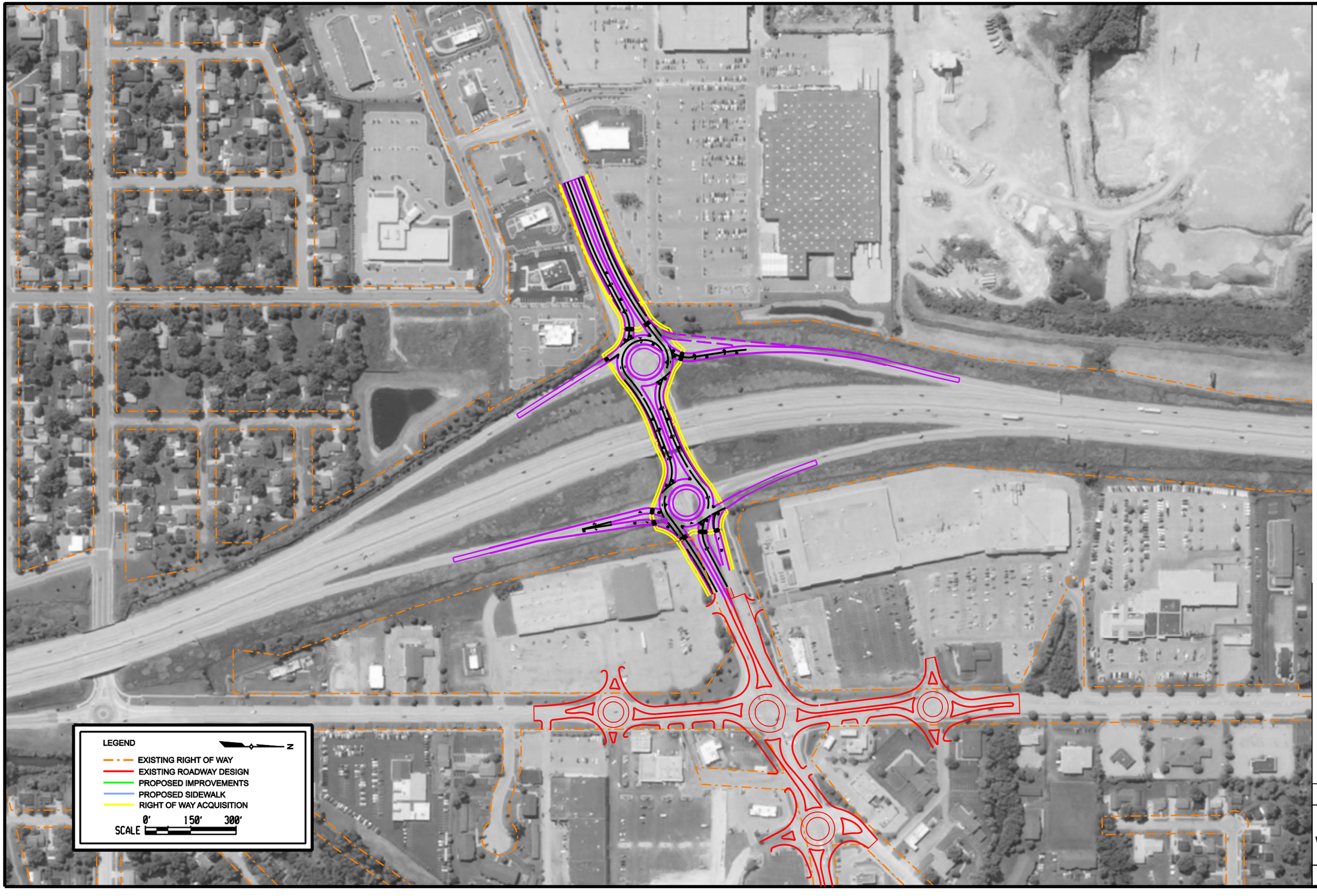
IMPROVEMENT ALTERNATIVE 1

HNTB

Exhibit

US 41/CTH JJ
WINNEBAGO COUNTY

Sheet 2 of 4



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

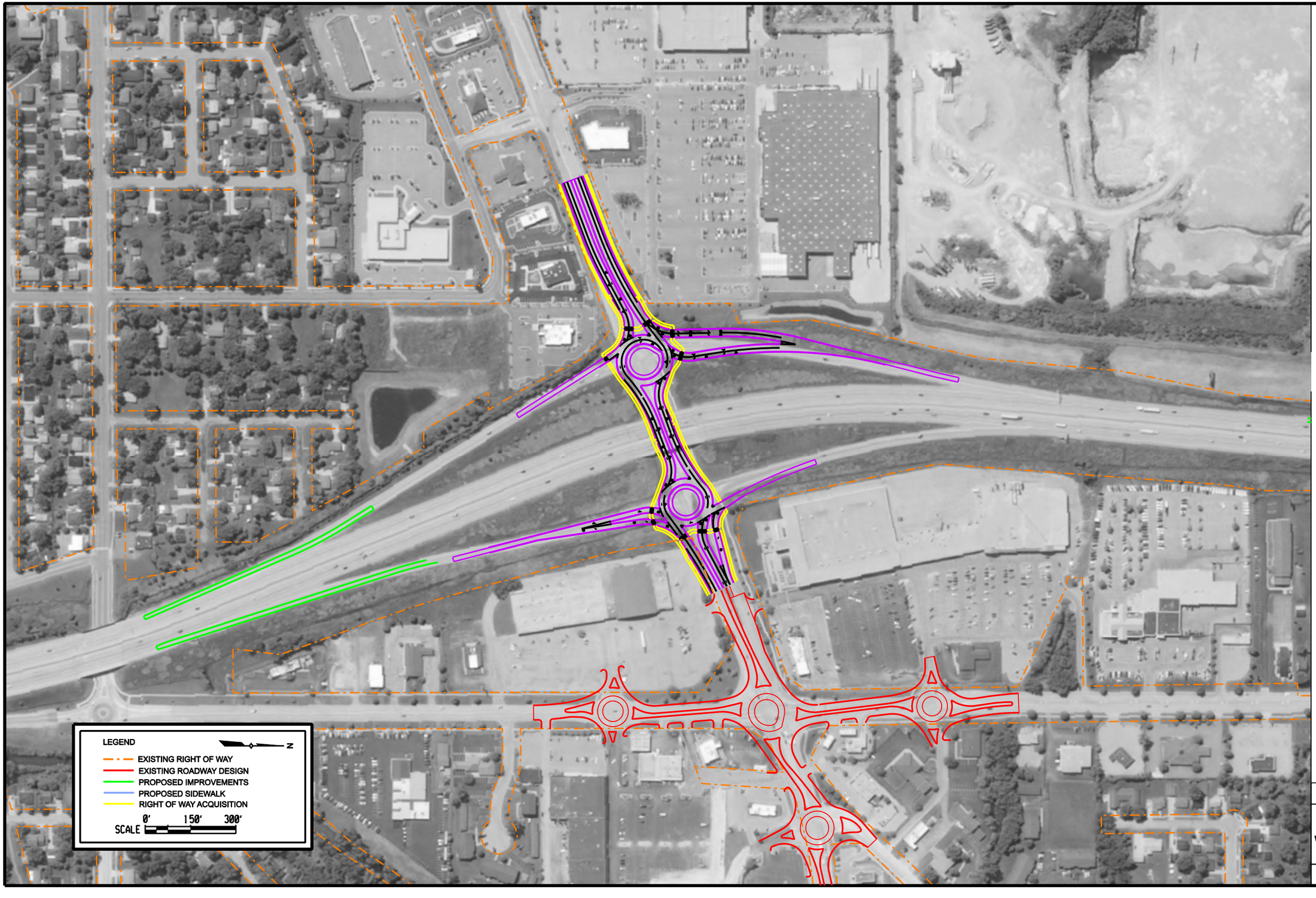
US 41 - STH 114 INTERCHANGE

2020 RAB IMPROVEMENT

HNTB

Exhibit

US 41/CTH JJ
WINNEBAGO COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

US 41 - STH 114 INTERCHANGE

2035 RAB IMPROVEMENT

HNTB

Exhibit

US 41/CTH JJ
WINNEBAGO COUNTY

US 41 & Oakridge Road / Main Avenue

US 41/441 Operational Analysis — US 41 and Main St/Oakridge Rd

Mainline Route	Crossroad
US 41	Main St/Oakridge Rd
Region	**Location**
Northeast	City of Appleton
Interchange Type	**Crossroad Function**
Partial Cloverleaf	Minor Arterial
Ramp Terminal	**Bridge Sufficiency**
Stop Controlled	B-70-0125 = 96.2 B-70-0126 = 98.2
Bridge Hits	**Bridge Service Life**
	B-70-0125 built 1994 B-70-0126 built 1994

No-Build Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY South (NB)	FWY North (NB)	FWY North (NB)	FWY South (SB)	Total	Notes
LOS	2035	n/a	-	n/a	-	A (A)	B (A)	C (D)	C (D)	D (D)	C (C)		AM Peak (PM Peak)
	2020	n/a	-	n/a	-	A (A)	A (A)	C (C)	C (C)	D (C)	C (C)		
	existing	n/a	-	n/a	-	A (A)	A (A)	C (C)	C (C)	C (C)	C (C)		
Queue	2035					-	-						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1100' SB = 1500'
	2020					109 (138)	79 (68)						
	existing					41 (62)	76 (62)						
Crashes	2002-2006	9	-	23	-	10	5	0	0	0	0	47	
	Severity	0.44	-	0.30	-	0.20	0.20	0.00	0.00	0.00	0.00	-	(INJ+FAT) / Total Crash
	Rate	26	-	59	-	0.74	0.26	0	0	0	0	-	Merge & Diverge = HMVMT Intersection = MEV

Improved Alternative Summary

Title	Description
Alternative 1	Extend SB and NB off ramps.
Alternative 2	Reconstruct interchange.
Alternative 3	2020 and 2035 RAB. Unrelated to signal design.

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
LOS	Alt. 1	n/a	-	n/a	-	A (A)	A (A)	C (C)	C (C)	D (C)	C (C)		AM Peak (PM Peak)
	Alt. 2	n/a	-	n/a	-	A (A)	A (A)	C (C)	C (C)	D (C)	C (C)		
	Alt. 3	n/a	-	n/a	-	A (A)	A (A)	C (C)	C (C)	D (C)	C (C)		
Queue	Alt. 1					56 (54)	54 (63)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1100' SB = 1500'
	Alt. 2					45 (49)	58 (70)						
	Alt. 3					25 (25)	50 (25)						

US 41/441 Operational Analysis — US 41 and Main St/Oakridge Rd

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
Crash Benefit	Alt. 1												Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35.000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands over a five year period)
	Alt. 2					17	9					26	
	Alt. 3					14	6					20	

Alternative Construction Costs

	Total Cost	Structure Costs	ROW Costs
Alternative 1	$157,000	$0	$0
Alternative 2	$9,437,000	$3,108,000	$0
Alternative 3	$5,481,000	$0	$0

Preliminary Environmental Screening

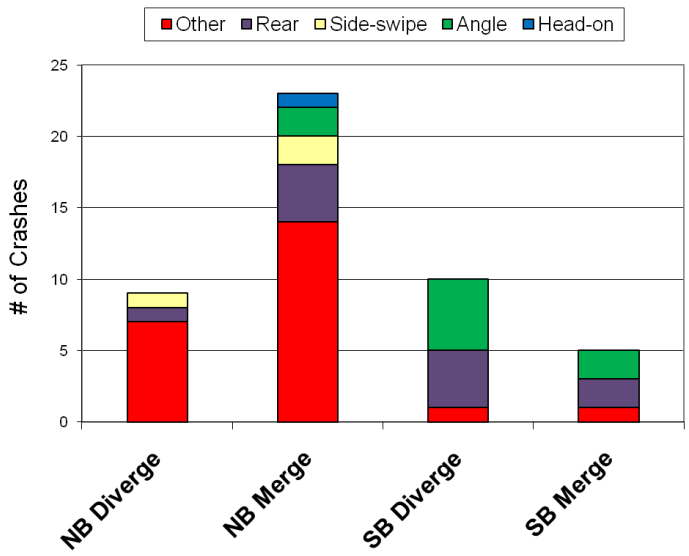
- Oak Hill Cemetery is located adjacent to interchange
- One closed LUST site is located within 50 yards of the interchange

Existing Geometric Deficiencies Rating

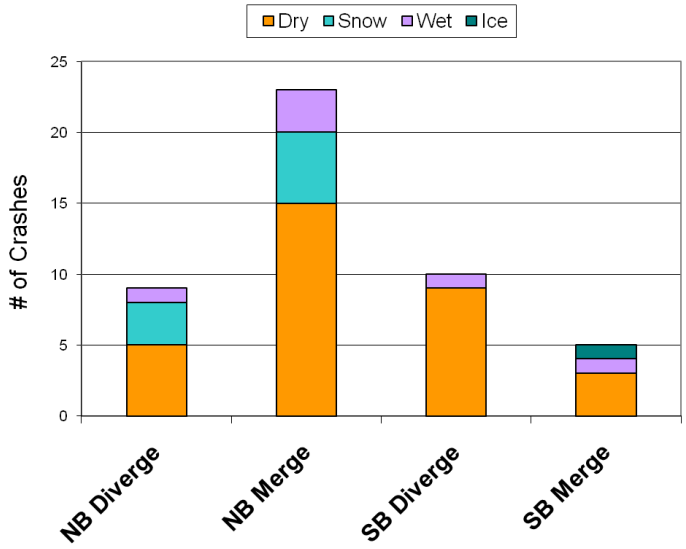
Freeway/Ramps	Score	Comments
Ramp Design Speed & Horizontal Alignment	Poor	SB off ramp does not meet standards
Ramps Merge / Diverge	Poor	SB off ramp does not meet standards
Ramp Stopping Sight Distance	Acceptable	
Bridges		
Bridge Width	Fair	Between minimum and desirable standards
Crossroad		
Intersection Skew / Intersection Sight Distance	Acceptable	
Geometric Deficiency Score	Roadway Geometric Score = 8 / 10	Bridge Geometric Score = 4 / 5

Detailed Crash Analysis

Crash Type Summary



Pavement Condition Summary



US 41 & OAKRIDGE ROAD/MAIN STREET INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the US 41 & Oakridge Road/Main Street interchange is to address the needs and deficiencies identified in the USH 41 Interstate Conversion Geometric Deficiencies Report dated February 2009. The following is a summary of the needs and deficiencies at the US 41 & Oakridge Road/Main Street interchange:

- Deficient horizontal alignment at the southbound US 41 merge and off ramp
- Access control distances are less than minimum standards
- Interchange does not provide full directional access (currently SB and NB off ramps only)
- Operational issues between NB ramp terminal and Green Bay Road intersection include:
    - Insufficient storage for eastbound Main Street RT and LT turning movements
    - Insufficient storage for southbound Green Bay Road RT and LT turning movements

The primary need at the Oakridge Road/Main Street interchange is to improve the safety and operations at the ramp terminal intersections.

The following alternatives have been developed based on an order of importance with regard to safety and operations, and should be considered cumulative with each other. The alternative analyses (LOS, queue lengths, etc) reflect this method. For example, Alternative 2 should only be considered as additive with Alternative 1.

Alternative 1 –

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Improve horizontal geometrics (first and second curve radii) for southbound US 41 off ramp
- Extend northbound off ramp RT turning bay storage length from 275' to 400'

The improvements in Alternative 1 will improve exiting movement from southbound US 41 auxiliary lane and contribute to efficient RT and LT turning movements from the northbound US 41 ramp terminal by reducing turning queue lengths anticipated for 2035 traffic volumes.

Alternative 2 -

This alternative upgrades the interchange to Interstate standards. It is necessary to relocate the interchange optimally within existing right of way constraints to replace the existing "trumpet loop" southbound US41 off ramp with a standard single lane exit ramp and terminal. The Oakridge Road and mainline US 41 alignments are reconfigured with the least impactful design criteria possible to minimize earthwork and maintain, if not improve, safety standards. A new interchange structure will be required as well as a widening of the structure at the US 41/North Street interchange (to accommodate mainline realignment). The northbound US 41 off ramp and terminal will also be replaced with a new standard exit ramp and terminal.

The length of both new ramps in Alternative 2 will be 1200'; greatly improving the turning queue lengths at the new signalized ramp terminals for anticipated 2035 traffic volumes.

Alternative 3

The Year 2020 and 2035 roundabout alternative provides a reduced cross section with a two-lane facility along Oakridge Road/Main Street. One-lane roundabouts are provided at the northbound and southbound US-41 off ramps, while a two-lane roundabout would be provided at Green Bay Road. All movements are expected to operate at LOS A and experience acceptable queues and delays. Surplus capacity of approximately 82%* is expected beyond the forecasted Year 2035 traffic conditions. A system of roundabouts at this location will allow for the use of right-in/right-outs at current and future driveway locations as U-Turns are accommodated within the roundabouts.

Additional Deficiencies

Unprotected side slope grades are steeper than 4:1 along portion of southbound and northbound US 41 mainline (north of interchange). Recommend appropriate side slope grading according to WisDOT Facilities Development Manual (FDM) standards wherever possible during Alternative 2 auxiliary lane and/or beam guard installations where necessary.

Access control distances between northbound US 41 ramp terminal and Green Bay Road do not meet minimum WisDOT (FDM) standard (1000'). The resulting cost and impact to local access throughout interchange area to meet this standard are too great to warrant serious consideration; thus no recommendations are suggested.

Comparison of Alternatives

The interchange alternatives were compared based on safety, traffic operations, cost and other factors:

Safety

Alternative 1 generally increases safety at the southbound US 41 diverge by improving horizontal and vertical geometrics to allow a smoother high speed transition between mainline and ramp. Additionally, the RT turn bay extension in Alternative 1 will also generally increase safety by reducing possibility of turning queue back-ups.

Alternative 2 generally increases safety at the southbound and northbound US 41 diverge by establishing standard horizontal and vertical geometrics to allow the smoothest possible high speed transition between mainline and ramp. The signalized ramp terminals will greatly improve safety throughout the interchange by providing the most management of turning queues.

Traffic Operations

Alternative 1 allows more lane storage at northbound US 41 off ramp right turn to Main Street.

Alternative 2 creates a longer stretch of two-lane westbound Oakridge Road travel before the existing lane drop, increasing driver decision time. The new signalized ramp terminals coupled with 1200' ramp lane lengths will reduce possibility of turning queue back-ups.

All operations are under the assumption that the traffic signal phasing utilizes single ring TTI (Texas Transportation Institute) phasing. Different signal phasing would require additional analysis to determine altered LOS and queue distances.

Environmental Factors

- A cemetery is located near the interchange (Oakhill Cemetary, 1201 Oakridge Road)

Complete Streets

Currently there are no ped or bike accommodations at this location. This interchange should consider wide 4-5' outside lanes to accommodate bikes on street when adding capacity and replacing the US 41 structure. Main St. from N. Lake St is an on-street route for bikes and connects to the CB Trail to the west via this interchange. Sidewalk on Main Street currently ends at Green Bay Rd and is in the NE and SE quadrants of the intersection. A pedestrian accommodation should be considered on the south side of the interchange at a minimum. A trail might be appropriate due to the large area of undeveloped land west of the church on Oakridge Rd and the cemetery in the NW quadrant. This should also be considered when replacing the US 41 structure. Green Bay Rd is a major north-south route for Valley Transit. Main St is the link to the Downtown Neenah Transit Center.

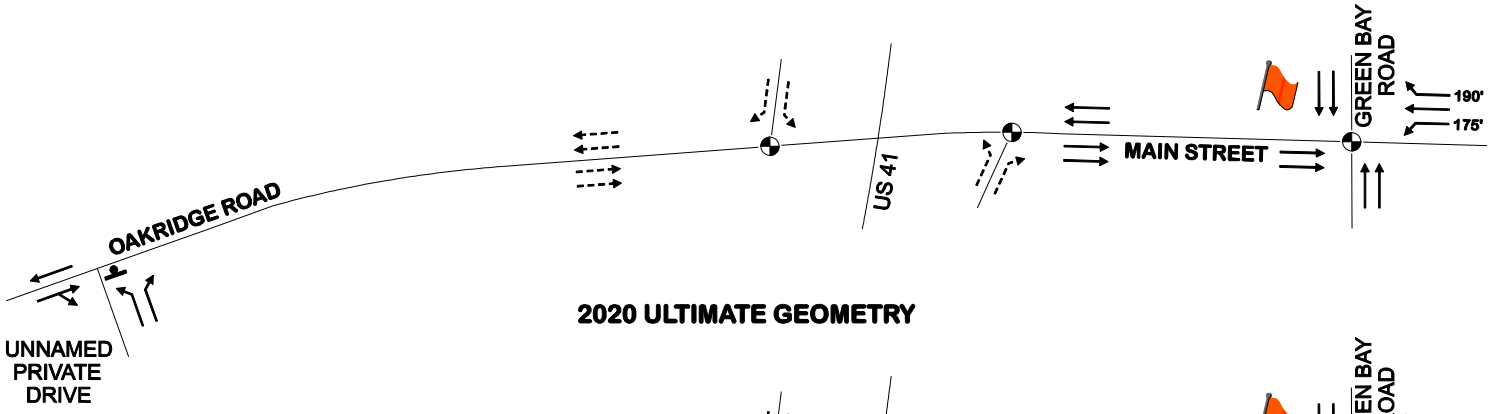
US 41 / OAKRIDGE RD.-MAIN ST.

PREPARED AUGUST, 2009

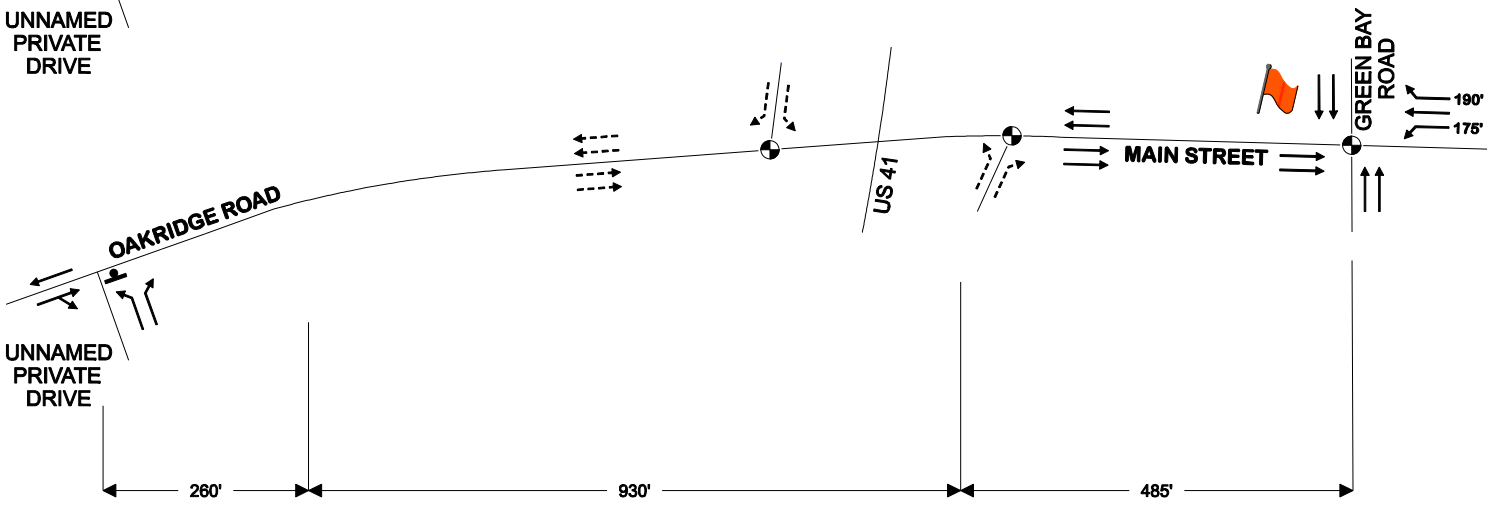
2035 ULTIMATE GEOMETRY

N

NOT TO SCALE



2020 ULTIMATE GEOMETRY



XX'	BASE GEOMETRICS PLANNED TURN BAY LENGTH	→	BASE GEOMETRICS		TRAFFIC SIGNAL
(+XX')	ADDITIONAL TURN BAY LENGTH RECOMMENDED	- - →	ADDITIONAL IMPROVEMENT RECOMMENDED		STOP SIGN
(+XX')	ADDITIONAL TURN BAY LENGTH REQUIRED FOR 2035 VOLUMES	- - →	ADDITIONAL IMPROVEMENT REQUIRED FOR 2035 VOLUMES		OPERATIONAL PROBLEMS REMAIN

AADT

Existing - XX,XXX

2020 - XX,XXX

2035 - XX,XXX

US 41/WIS 441 Short-Term Improvement Cost Estimate
Main St./Oakridge Rd.
(Improvement Alternative __)

	Roadway	Structure	Construction	R/W Cost	CM & Eng	Incremental Total	Total
Alternative 1	$ 94,000	$ -	$ 57,000	$ -	$ 6,000	$ 157,000	$ 157,000
Alternative 2	$ 1,625,000	$ 3,108,000	$ 4,276,000	$ -	$ 428,000	$ 9,437,000	$ 9,594,000
Alternative 3	$ 2,077,000	$ -	$ 1,238,000	$ 2,042,000	$ 124,000	$ 5,481,000	$ 5,481,000

Item	Item Description	Unit	Unit Price	
1	New Concrete Pavement[1]	SY	$65	Concrete, Base Aggregate, Crushed
2	New HMA Pavement[2]	SY	$50	HMA, Base Aggregate, Crushed
3	Sidewalk	SY	$35	
4	Curb and Gutter	LF	$20	
5	Earthwork	CY	$20	Cut or fill, based on observed topography, including ditches
6	Signal Pole Relocation	EA	$15,000	
7	Signal System	EA	$165,000	
8	Ramp Meter	EA	$75,000	
9	Ramp Meter- remove and reinstall	EA	$35,000	
10	Sign Bridge	EA	$100,000	
11	Drainage - Inlets/Manholes	EA	$700	
12	Drainage - Pipes/Culverts	LF	$50	
13	Drainage - Pipes/Culverts - extensions	LF	$100	
14	Concrete Barrier - 42"	LF	$70	
15	Retaining wall - non-structural (<5')	SF	$25	
16	Beam Guard	LF	$20	
17	Beam Guard End Absorbing Terminal	EA	$2,500	
18	Unique Items			Add Items unique to these locations,
19				that are too large to be covered in 'Road Incidentals'.
20				
	Subtotal			
	Road Incidentals[3]	LS	20%	removals, finishing, erosion, removals, lighting, etc
	Planning Level Contingency[3]	LS	20%	
	Signing & Pavement Marking[3]	LS	5%	
	Traffic Control - urban mainline[3,4]	LS	12%	assumed 100% unless other TC is entered
	Traffic Control - rural mainline[3,4]	LS	10%	enter percent of project on rural mainline
	Traffic Control - ramps[3,4]	LS	8%	enter percent of project on ramps
	Traffic Control - local roads[3,4]	LS	5%	enter percent on local roads
	Bridges - new and widening with substructure	SF	$ 140.00	Area of Bridge Deck
	Bridges - widening using existing substructure	SF	$ 100.00	Area of Bridge Deck
	Bridges - redecking	SF	$ 70.00	Area of Bridge Deck
	Retaining walls - structural	SF	$ 35.00	area of exposed wall face
	Mobilization[5]	LS	6%	
	CM & Engineering[6]	LS	10%	
	Right of Way			Site Specific
	Commercial Real Estate	SF		
	Residential Real Estate	SF		
	Commercial Relocation Cost	LS		
	Residential Relocation Cost	LS		
	Lighting	LS		

NOTES:

1. New Concrete Pavement consists of: Concrete Pavement 10", $50/SY; Base Aggregate, 6", $16/ton; Select Crushed, 12", $14/ton.
2. New HMA Pavement consists of: HMA, 5", $70/ton; Oil, $600/ton; Base Aggregate, 12", $16/ton; Select Crushed, 12", $14/ton
3. Lump Sum items are computed as a percentage of the roadway item costs. These do not include structural component costs.
4. Traffic Control is a lump sum, between 5% - 12%, weighted by the estimated construction cost on each roadway type.
5. Mobilization is computed as a percentage of the all item costs, including structural components.
6. Construction Management and Engineering are computed as a percentage of the total construction cost.

Preliminary Cost Estimate: US 41 at Main St./Oakridge Rd.
Alternative 1

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	1,450	$94,250	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$94,000**		
	Road Incidentals	LS	20%		$19,000	
	Planning Level Contingency	LS	20%		$19,000	
			0%			
	Signing & Pavement Marking	LS	5%		$5,000	
	Traffic Control - urban mainline	LS	12%	100%	$11,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$3,240	
	Construction Total			**$57,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$6,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$157,000**		

Preliminary Cost Estimate: USH 41 at Main St./Oakridge Rd.
Alternative 2

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	25,000	$1,625,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$1,625,000**		
	Road Incidentals	LS	20%		$325,000	
	Planning Level Contingency	LS	20%		$325,000	
			0%			
	Signing & Pavement Marking	LS	5%		$81,000	
	Traffic Control - urban mainline	LS	12%	100%	$195,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00	22200	$3,108,000	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$3,108,000**		
	Mobilization	LS	6%		$242,040	
	Construction Total			**$4,276,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$428,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$9,437,000**		

Preliminary Cost Estimate: USH 41 at segment 1

USH 41 & MAIN_OAKRIDGE (2020 & 2035)

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	19,000	$1,235,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	2,500	$87,500	
4	Curb and Gutter	LF	$20	11,700	$234,000	
5	Earthwork	CY	$20	16,400	$328,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	40	$28,000	
12	Drainage - Pipes/Culverts	LF	$50	2,784	$139,200	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25	1,000	$25,000	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$2,077,000**		
	Road Incidentals	LS	20%		$415,000	
	Planning Level Contingency	LS	20%		$415,000	
	Signing & Pavement Marking	LS	5%		$104,000	
	Traffic Control - urban mainline	LS	12%	82%	$204,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	18%	$30,000	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00	0	$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$70,080	
	Construction Total			**$1,238,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$124,000**		
	Commercial Real Estate	SF	7,950	**$17**	$131,493	
	Residential Real Estate	SF	0	**$9**	$0	
	Commercial Relocation Cost	LS	1	**$1,762,000**	$1,762,000	
	Residential Relocation Cost	LS	1	**$149,000**	$149,000	
	R/W Total			**$2,042,000**		
	TOTAL COST			**$5,481,000**		

NOTES

US 41 NB & SB PAVEMENT CONDITION THROUGHOUT INTERCHANGE AREA IS FAIR.

KA RATE FOR US 41 BETWEEN STH 114 INTERCHANGE AND MAIN STREET INTERCHANGE IS POOR.

MAINLINE PROFILE GRADE NORTH OF MAIN STREET INTERCHANGE IS POOR.

INTERCHANGE DOES NOT MEET STANDARD REQUIREMENT OF FULL DIRECTIONAL ACCESS (OFF RAMPS ONLY).

OAKRIDGE RD.

ACCESS CONTROL DISTANCES FROM THE SB RAMP TERMINAL INTERSECTION TO THE EAST AND WEST DRIVEWAY TEE INTERSECTIONS DO NOT MEET MINIMUM STANDARD

SB OFF RAMP - CREST CURVE K VALUE DOES NOT MEET MINIMUM STANDARD

SB OFF RAMP - FIRST AND NEXT HORIZONTAL CURVE RADII DO NOT MEET MINIMUM STANDARDS

US 41

NORTH ST.

SB US 41 - UNPROTECTED SLOPES STEEPER THAN 4:1

US 41

NB US 41 - UNPROTECTED SLOPES STEEPER THAN 4:1

ACCESS CONTROL DISTANCE FROM THE NB RAMP TERMINAL INTERSECTION TO THE S. GREEN BAY RD. INTERSECTION DOES NOT MEET MINIMUM STANDARD

S. GREEN BAY RD.

N. GREEN BAY RD.

MAIN ST.

SCALE 0' 150' 300'

WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

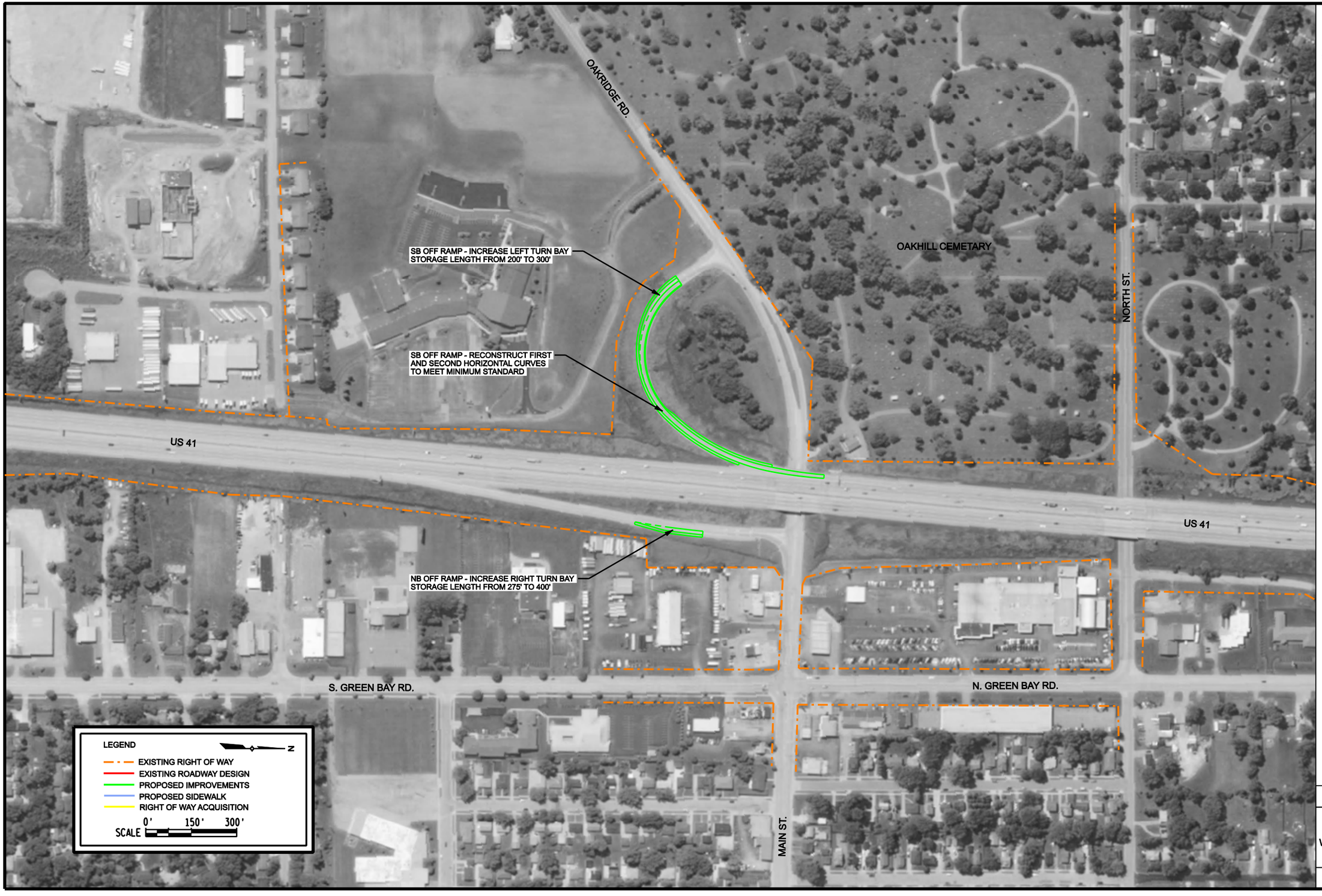
US 41 - MAIN STREET INTERCHANGE

GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

US 41/MAIN STREET
WINNEBAGO COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

US 41 - MAIN STREET INTERCHANGE

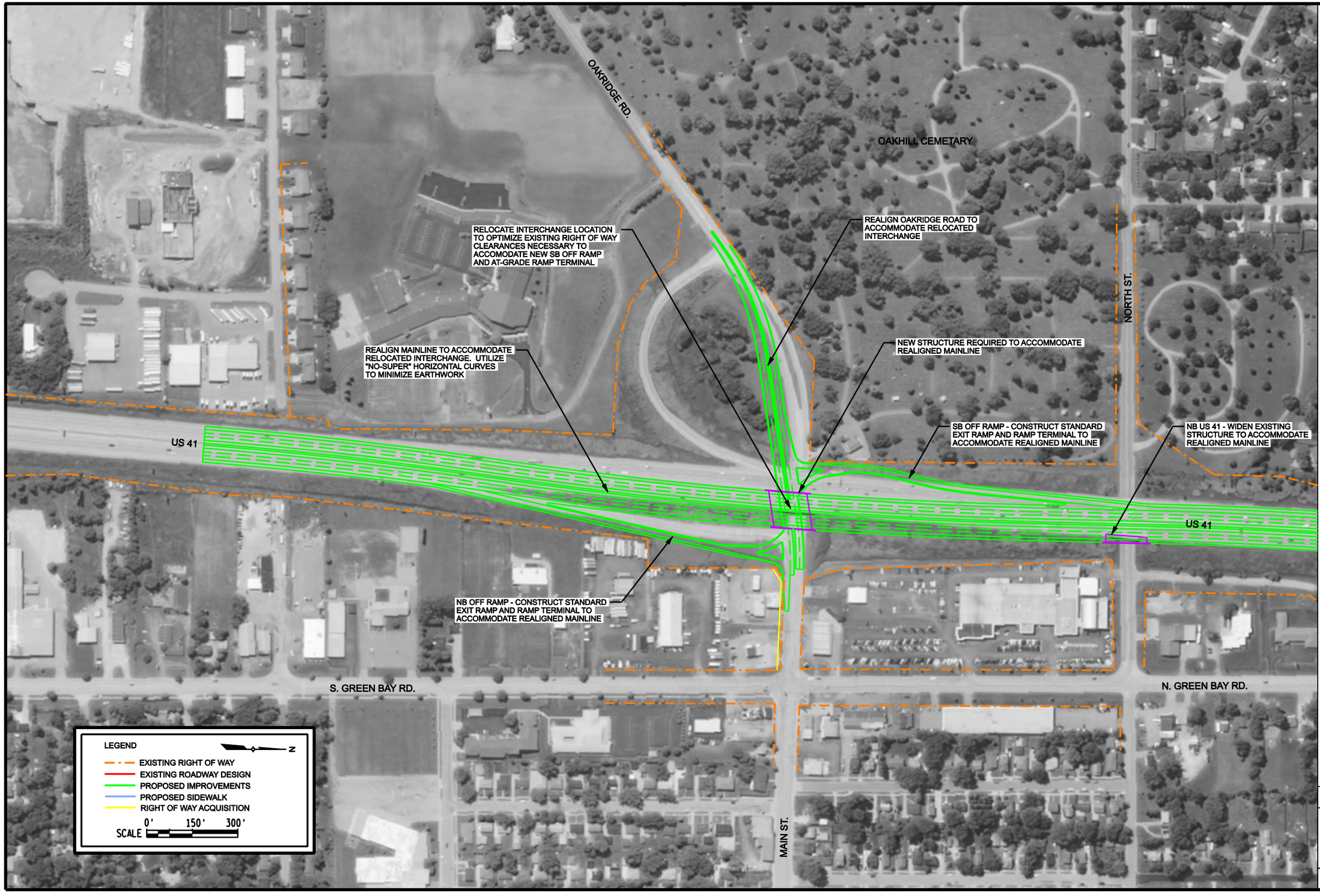
IMPROVEMENT ALTERNATIVE 1

HNTB

Exhibit

US 41/MAIN STREET
WINNEBAGO COUNTY

Sheet 2 of 4



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

US 41 - MAIN STREET INTERCHANGE

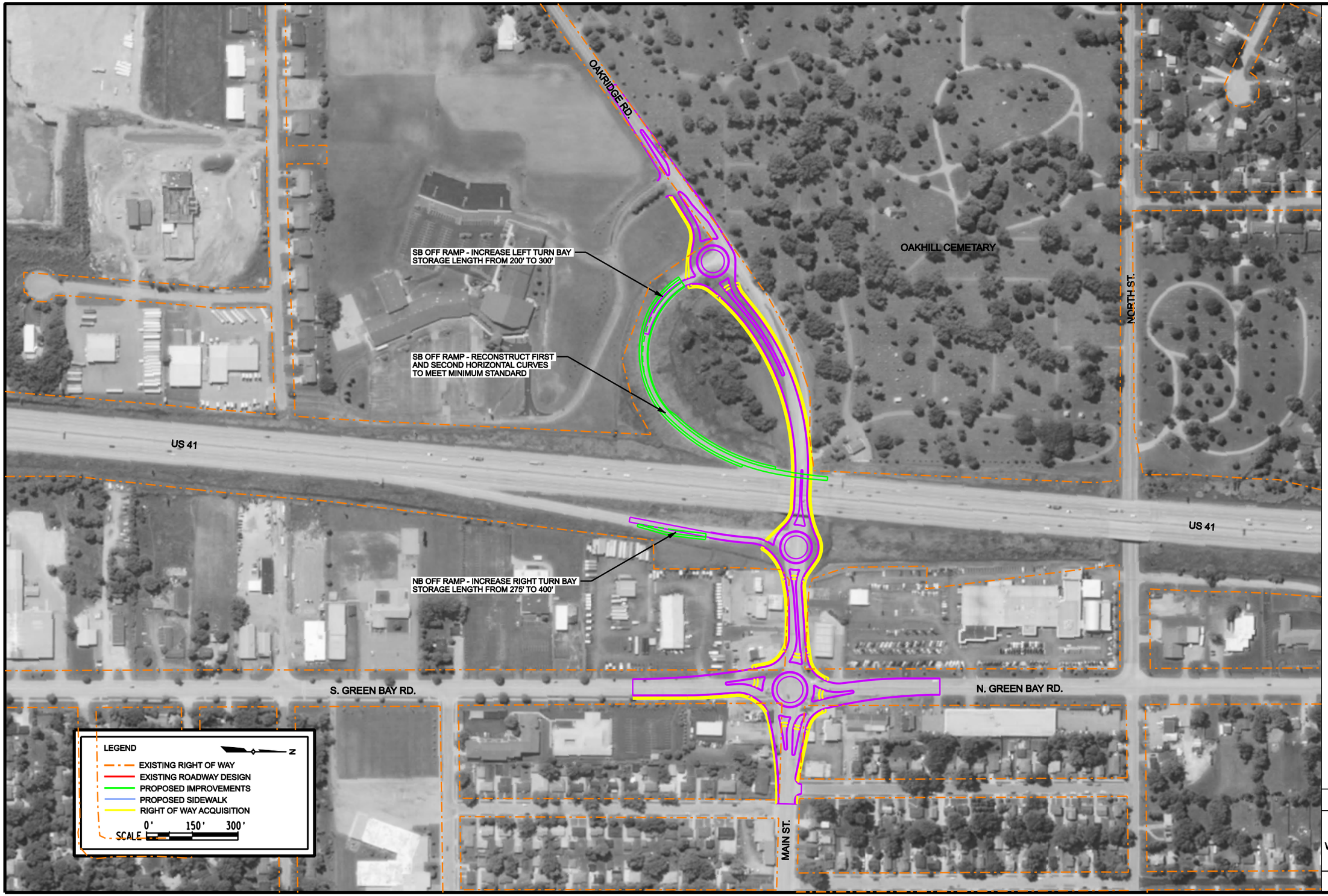
IMPROVEMENT ALTERNATIVE 2

HNTB

Exhibit

US 41/MAIN STREET
WINNEBAGO COUNTY

Sheet 3 of 4



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

US 41 - MAIN STREET INTERCHANGE

2020 AND 2035 RAB IMPROVEMENT

HNTB

Exhibit

US 41/MAIN STREET
WINNEBAGO COUNTY

Sheet 4 of 4

US 41 & CTH II / Winchester Road

US 41/441 Operational Analysis — US 41 and CTH II (Winchester Rd)

Mainline Route	Crossroad
US 41	CTH II
Region	**Location**
Northeast	Town of Menasha
Interchange Type	**Crossroad Function**
Diamond	Minor Arterial
Ramp Terminal	**Bridge Sufficiency**
Signalized	B-70-0129 = 98 B-70-0130 = 100
Bridge Hits	**Bridge Service Life**
	B-70-0129 built 1994 B-70-0130 built 1994

No-Build Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY South (NB)	FWY North (NB)	FWY North (SB)	FWY South (SB)	Total	Notes
LOS	2035	C (C)	aux	aux	aux	C (D)	D (D)	C (D)	B (C)	C (C)	D (D)		AM Peak (PM Peak)
	2020	C (C)	aux	aux	aux	C (D)	C (D)	C (C)	B (C)	C (B)	D (C)		
	existing	C (C)	B (C)	aux	aux	C (D)	C (D)	C (C)	C (C)	B (B)	C (C)		
Queue	2035					422 (1161)	1642 (367)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1000' SB = 1200'
	2020					429 (916)	838 (287)						
	existing					411 (716)	504 (288)						
Crashes	2002-2006	20	35	28	24	15	8	0*	0*	0*	0*	130	
	Severity	0.35	0.43	0.32	0.38	0.47	0.13	0.00	0.00	0.00	0.00	-	(INJ+FAT) / Total Crash
	Rate	60	90	66	60	.53	.25	0	0	0	0	-	Merge & Diverge = HMVMT Intersection = MEV

*Crash data from Strand USH 41 Interstate Conversion – Geometric Deficiencies report

Improved Alternative Summary

Title	Description
Alternative 1	Provide additional left turn lane and lengthen turn storage on SB off ramp based on 2020 analysis
Alternative 2	Lane additions to Green Bay Rd based on 2035 analysis
Alternative 3	2020 RAB. Unrelated to signal design.
Alternative 4	2035 RAB. Unrelated to signal design.

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
LOS	Alt. 1	C (C)	aux	aux	aux	C (D)	C (C)	C (C)	B (C)	C (B)	D (C)		AM Peak (PM Peak)
	Alt. 2	C (C)	aux	aux	aux	C (D)	C (C)	C (D)	B (C)	C (C)	D (D)		
	Alt. 3	C (C)	aux	aux	aux	A (A)	A (A)	C (C)	B (C)	C (B)	D (C)		
	Alt. 4	C (C)	aux	aux	aux	A (A)	A (A)	C (D)	B (C)	C (C)	D (D)		

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
Queue	Alt. 1					611 (354)	209 (145)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1000' SB = 1200'
	Alt. 2					307 (417)	236 (196)						
	Alt. 3					25 (50)	25 (25)						
	Alt. 4					25 (25)	25 (25)						
Crash Benefit	Alt. 1	14	27	18			7					66	Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35,000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands)
	Alt. 2	14	27	18		6	7					72	
	Alt. 3	14	27	18		37	8					104	
	Alt. 4	14	27	18		37	8					104	

Alternative Construction Costs

	Total Cost	Structure Costs	ROW Costs
Alternative 1	$285,000	$0	$0
Alternative 2	$653,000	$0	$20,000
Alternative 3	$6,101,000	$266,000	$886,000
Alternative 4	$6,432,000	$266,000	$961,000

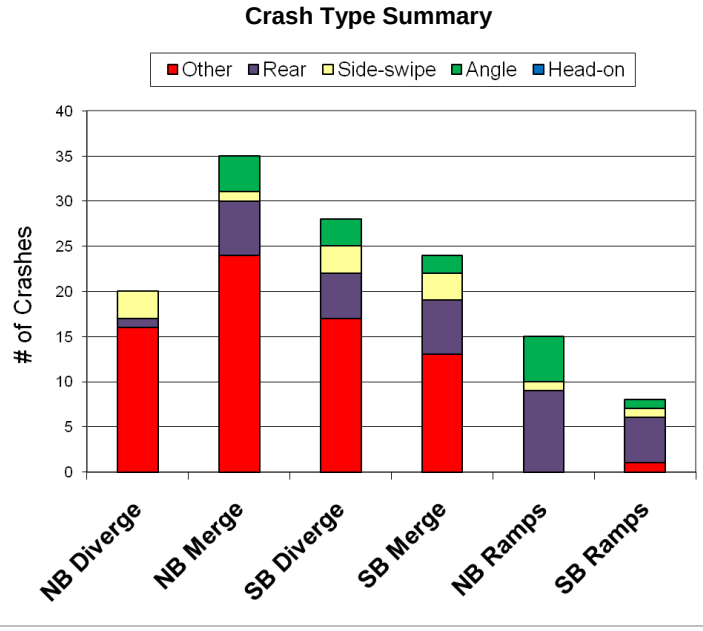
Preliminary Environmental Screening

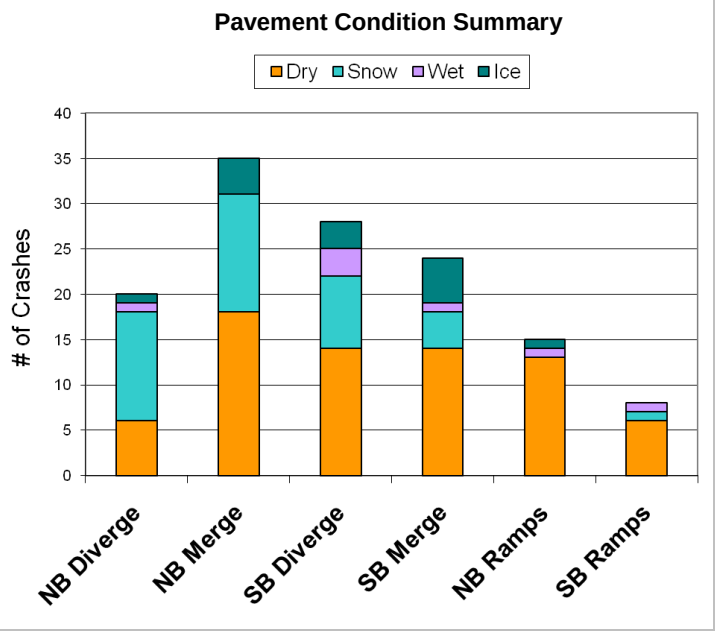
- An unnamed stream crosses under the interchange
- A historic Woodland archaeological site is located in the southeast quadrant of the interchange along CTH II, east of the railroad
- The interchange is located less than 4 miles away from an airport
- A residential neighborhood is located adjacent to the interchange

Existing Geometric Deficiencies Rating

Freeway/Ramps	Score	Comments
Ramp Design Speed & Horizontal Alignment	Poor	NB on and SB off ramps have a deficient radius for posted speed.
Ramps Merge / Diverge	Poor	NB and SB off ramps have acceleration lanes that do not meet minimum standard.
Ramp Stopping Sight Distance	Acceptable	
Crossroad		
Intersection Skew / Intersection Sight Distance	Acceptable	
Geometric Deficiency Score	Roadway Geometric Score = 7 / 10	Bridge Geometric Score = 5 / 5

Detailed Crash Analysis





US 41 & CTH II (WINCHESTER ROAD) INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the US 41 & CTH II (Winchester Road) interchange is to address the needs and deficiencies identified in the USH 41 Interstate Conversion Geometric Deficiencies Report dated February 2009. The following is a summary of the needs and deficiencies at the WIS 114 Interchange:

- High crash severity rate at the northbound US 41 on ramp.
- Vertical profile deficiencies along southbound US 41 ramps and northbound US 41 on ramp.
- Access control distance from the southbound ramp terminal intersection to the Springroad Drive/ CTH II (Winchester Road).
- Access distance from the northbound ramp terminal to the North Green Bay Road/ Winchester Avenue intersection does not meet minimum standard.
- Eastbound CTH II (Winchester Road) to Green Bay Road right turn movement has high delays.

The primary need at the CTH II (Winchester Road) interchange is to improve the safety and operations at the ramp terminal intersections.

The following alternatives have been developed based on an order of importance with regard to safety and operations, and should be considered cumulative with each other. The alternative analyses (LOS, queue lengths, etc) reflect this method. For example, Alternative 2 should only be considered in addition to Alternative 1.

Alternative 1

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Southbound off ramp add an additional 250' left turn lane.
- From Green Bay Rd to southbound on ramp, add a continuous westbound right turn lane.

Adding the left turn lanes for southbound US 41 off ramp will allow more vehicles to make left turns onto CTH II (Winchester Road). With no additions made to Green Bay Rd, this intersection will continue to have operational problems.

Alternative 2

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- All changes made in Alternative 1.
- Extend the southbound off ramp left and right turn lanes by 100' from the Alternative 1 proposed 250' for a total of 350' on each lane.
- Northbound on ramp add an additional lane.
- Green Bay Rd eastbound add a 190' left turn lane as well as make the right turn lane continuous
- Green Bay Rd northbound extends the left turn lane from 260' to 400'.
- Green Bay Rd southbound add a 250' right turn only lane

The Alternative 2 additions take into account the 2035 projected traffic. Green Bay Rd will continue to have operational issues in the PM peak hour even with the above mentioned additions to the intersection but will operate at a LOS D or better.

Southbound from the system interchange to CTH II and CTH II to Oakridge Road/ Main Street, there are existing auxiliary lanes. There is a committed northbound deceleration lane at the system interchange as a standalone HSIP project to be constructed in 2011. The deceleration lane extends back through the existing CTH II northbound merge therefore making it an auxiliary lane.

Alternative 2 Local

An alternative for local improvements has been detailed below. This alternative addresses operational problems at Green Bay Rd by making the following changes:

- Green Bay Rd eastbound add a 190' left turn lane as well as make the right turn lane continuous
- Green Bay Rd northbound extends the left turn lane from 260' to 400'.
- Green Bay Rd southbound add a 250' right turn only lane

This alternative will improve operations at the adjacent intersections only.

Alternative 3

The Year 2020 roundabout alternative maintains a four-lane facility and provides two-lane roundabouts along the corridor. All movements are expected to operate at LOS B or better and experience acceptable queues and delays. Surplus capacity of approximately 28%[1] is expected beyond the forecasted Year 2020 traffic conditions. A system of roundabouts at this location will allow for the use of right-in/right-outs at current and future driveway locations as U-Turns are accommodated within the roundabouts.

Alternative 4

The Year 2035 roundabout alternative maintains a four-lane facility and provides two-lane roundabouts along the corridor. All movements are expected to operate at LOS B or better and experience acceptable queues and delays.

The roundabout at CTH II (Winchester Road) and Zeh Avenue has been removed. Full access (standard intersection) was provided to Springroad Drive. The Green Bay Road intersection can only be shifted about 10' east before it impacts the adjacent industrial building. Therefore, the roundabout remained in the same location as previously shown; but it could be shifted the additional 10' during preliminary engineering. Part of the 2020 and 2035 roundabout designs fall within the historic woodland archaeological site boundary in the southeast quadrant (east of the railroad) as designated by the Wisconsin Historical Society.

[1] Determined by applying an equal percentage increase to all volumes at an intersection under the 50th CL until a leg failed; the lowest percent increase among the intersections was reported. Therefore, the remaining intersections at each interchange will have higher surplus capacity values.

Additional Deficiencies

Unprotected side slope grades steeper than 4:1 along portion of southbound and northbound US 41 mainline, south of interchange. Recommend appropriate side slope grading according to WisDOT Facilities Development Manual (FDM) standards wherever possible during Alternative 3 northbound US 41 off ramp reconstruction and/or beam guard installations where necessary.

Northbound US 41 on ramp crest curve K value (K = 121) does not meet minimum WisDOT (FDM) standard (crest curve K = 185 for 55 mph design speed). The cost to improve ramp profile to meet this standard would exceed any potential safety return.

Southbound US 41 off ramp crest curve K value (K = 157) does not meet minimum WisDOT (FDM) standard (crest curve K = 185 for 55 mph design speed). The cost to improve ramp profile to meet this standard would exceed any potential safety return.

Southbound US 41 on ramp sag curve K value (K = 100) does not meet minimum WisDOT (FDM) standard (sag curve K = 115 for 55 mph design speed). The cost to improve ramp profile to meet this standard would exceed any potential safety return.

Access control distances between the northbound US 41 ramp terminal and the Winchester Road/Green Bay Road intersection and between the southbound US 41 ramp terminal and the CTH II (Winchester Road) and Springroad Drive intersection do not meet minimum WisDOT (FDM) standard (1000'). The resulting cost and impact to local access throughout interchange area to meet this standard are too great to warrant serious consideration; thus no recommendations are suggested.

Comparison of Alternatives

The interchange alternatives were compared based on safety, traffic operations, cost and other factors:

Safety

Alternative 1 addresses the safety issues for vehicles decelerating on the US 41 mainline. Adding additional queue space allows for shorter overall vehicle queue distances reducing the possibility of rear end crashes.

Traffic Operations

Alternative 1 allow more vehicles to turn right and left with each signal phase at the southbound off ramp, as well as providing additional exclusive right turn lane and two left turn lanes thus greatly improving the level of service.

All operations are under the assumption that the traffic signal phasing utilizes single ring TTI (Texas Transportation Institute) phasing. Different signal phasing would require additional analysis to determine altered LOS and queue distances.

Environmental Factors

- A residential neighborhood is located near the interchange.
- Wetland indicator soils are located within the interchange area.
- Part of the proposed design for the 2020 and 2035 roundabout designs fall within the archaeological site boundary as designated by the Wisconsin Historical Society. This is addressed on the Green Sheet and can be seen on the aerial in the southeast quadrant (east of the railroad).

Complete Streets

This interchange is a key connection to the Winchester Trail, the Springroad School, the N. Lake Street Trail and the Trestle Trail. The Winchester Trail crosses from the north side at Springroad Dr and ends at the School. Any improvement here should not preclude bike and pedestrian accommodations on both sides of CTH II. As of now, the school enrollment area stops at US 41 but schools try to balance students within the district. Wide outside lanes should be considered for on-street bike accommodations through this interchange. Green Bay Road is a major north-south route for Valley Transit.

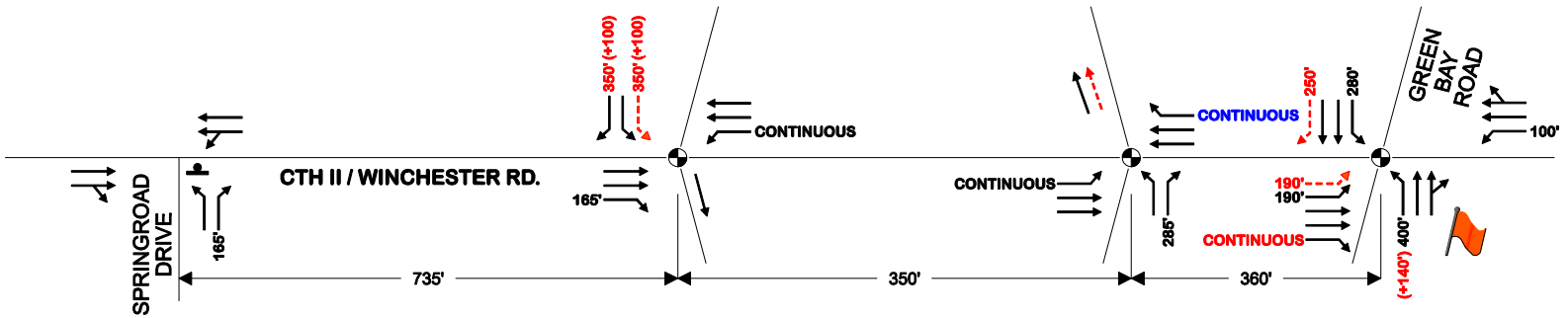
US 41 / CTH II (WINCHESTER RD.)

PREPARED 3-31-11

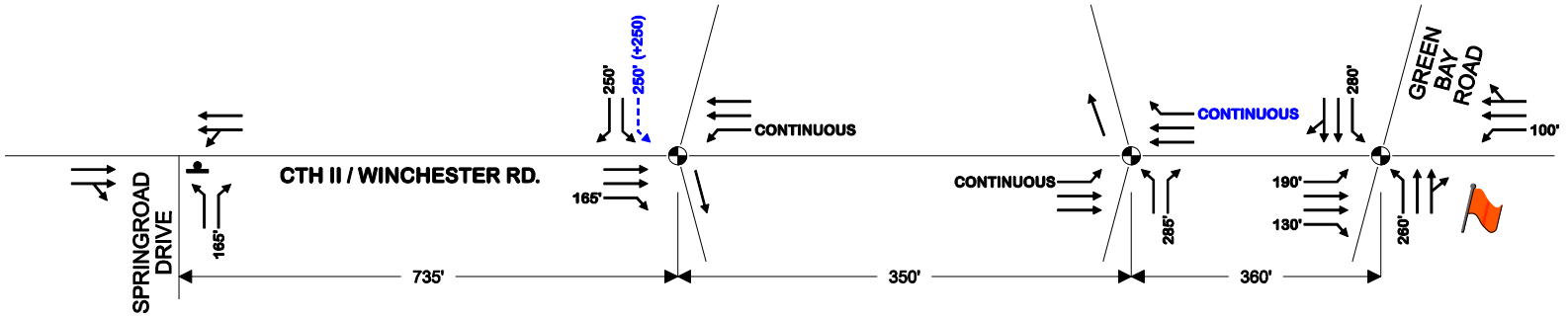
N

NOT TO SCALE

2035 ULTIMATE GEOMETRY



2020 ULTIMATE GEOMETRY



XX'	BASE GEOMETRICS PLANNED TURN BAY LENGTH	→	BASE GEOMETRICS		TRAFFIC SIGNAL
(+XX')	ADDITIONAL TURN BAY LENGTH RECOMMENDED	⇢	ADDITIONAL IMPROVEMENT RECOMMENDED		STOP SIGN
(+XX')	ADDITIONAL TURN BAY LENGTH REQUIRED FOR 2035 VOLUMES	⇢	ADDITIONAL IMPROVEMENT REQUIRED FOR 2035 VOLUMES		OPERATIONAL PROBLEMS REMAIN

AADT

Existing - XX,XXX

2020 - XX,XXX

2035 - XX,XXX

USH 41/WIS 441 Short-Term Improvement Cost Estimate
CTH II/Winchester Rd.

	Roadway	Structure	Construction	R/W Cost	CM & Eng	Incremental Total	Total
Alternative 1	$ 171,000	$ -	$ 104,000	$ -	$ 10,000	$ 285,000	$ 285,000
Alternative 2	$ 209,000	$ -	$ 126,000	$ 20,000	$ 13,000	$ 368,000	$ 653,000
Alternative 2 local*	$ 72,000	$ -	$ 43,000	$ 20,000	$ 4,000		$ 139,000
Alternative 3	$ 2,995,000	$ 266,000	$ 1,776,000	$ 886,000	$ 178,000	$ 6,101,000	$ 6,101,000
Alternative 3 local*	$ 1,464,000	$ -	$ 885,000	$ 663,000	$ 89,000		$ 3,101,000
Alternative 4	$ 3,148,000	$ 266,000	$ 1,870,000	$ 961,000	$ 187,000	$ 6,432,000	$ 6,432,000
Alternative 4 local*	$ 1,470,000	$ -	$ 888,000	$ 667,000	$ 89,000		$ 3,114,000

*Local cost estimates take into account only costs that would affect local traffic

Item	Item Description	Unit	Unit Price	
1	New Concrete Pavement[1]	SY	$65	Concrete, Base Aggregate, Crushed
2	New HMA Pavement[2]	SY	$50	HMA, Base Aggregate, Crushed
3	Sidewalk	SY	$35	
4	Curb and Gutter	LF	$20	
5	Earthwork	CY	$20	Cut or fill, based on observed topography, including ditches
6	Signal Pole Relocation	EA	$15,000	
7	Signal System	EA	$165,000	
8	Ramp Meter	EA	$75,000	
9	Ramp Meter- remove and reinstall	EA	$35,000	
10	Sign Bridge	EA	$100,000	
11	Drainage - Inlets/Manholes	EA	$700	
12	Drainage - Pipes/Culverts	LF	$50	
13	Drainage - Pipes/Culverts - extensions	LF	$100	
14	Concrete Barrier - 42"	LF	$70	
15	Retaining wall - non-structural (<5')	SF	$25	
16	Beam Guard	LF	$20	
17	Beam Guard End Absorbing Terminal	EA	$2,500	
18	Unique Items		$0	Add Items unique to these locations,
19				that are too large to be covered in 'Road Incidentals'.
20				
	Subtotal			
	Road Incidentals[3]	LS	20%	removals, finishing, erosion, removals, lighting, etc
	Planning Level Contingency[3]	LS	20%	
	Signing & Pavement Marking[3]	LS	5%	
	Traffic Control - urban mainline[3,4]	LS	12%	assumed 100% unless other TC is entered
	Traffic Control - rural mainline[3,4]	LS	10%	enter percent of project on rural mainline
	Traffic Control - ramps[3,4]	LS	8%	enter percent of project on ramps
	Traffic Control - local roads[3,4]	LS	5%	enter percent on local roads
	Bridges - new and widening with substructure	SF	$ 140.00	Area of Bridge Deck
	Bridges - widening using existing substructure	SF	$ 100.00	Area of Bridge Deck
	Bridges - redecking	SF	$ 70.00	Area of Bridge Deck
	Retaining walls - structural	SF	$ 35.00	area of exposed wall face
	Mobilization[5]	LS	6%	
	CM & Engineering[6]	LS	10%	
	Right of Way			Site Specific
	Commercial Real Estate	SF		
	Residential Real Estate	SF		
	Commercial Relocation Cost	LS		
	Residential Relocation Cost	LS		
	Lighting	LS		

NOTES:

1. New Concrete Pavement consists of: Concrete Pavement 10", $50/SY; Base Aggregate, 6", $16/ton; Select Crushed, 12", $14/ton.
2. New HMA Pavement consists of: HMA, 5", $70/ton; Oil, $600/ton; Base Aggregate, 12", $16/ton; Select Crushed, 12", $14/ton
3. Lump Sum items are computed as a percentage of the roadway item costs. These do not include structural component costs.
4. Traffic Control is a lump sum, between 5% - 12%, weighted by the estimated construction cost on each roadway type.
5. Mobilization is computed as a percentage of the all item costs, including structural components.
6. Construction Management and Engineering are computed as a percentage of the total construction cost.

Preliminary Cost Estimate: USH 41 at CTH II/Winchester Rd.
Alternative 1

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	2,100	$136,500	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20	675	$13,500	
5	Earthwork	CY	$20	200	$4,000	
6	Signal Pole Relocation	EA	$15,000	1	$15,000	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	3	$2,100	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$171,000**		
	Road Incidentals	LS	20%		$34,000	
	Planning Level Contingency	LS	20%		$34,000	
	Signing & Pavement Marking	LS	5%		$9,000	
	Traffic Control - urban mainline	LS	12%	100%	$21,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$5,880	
	Construction Total			**$104,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$10,000**		
	Commercial Real Estate	SF	$ 17.00		$0	
	Residential Real Estate	SF	$ 9.00		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$285,000**		

Preliminary Cost Estimate: USH 41 at CTH II/Winchester Rd.
Alternative 2

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	2,660	$172,900	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20	650	$13,000	
5	Earthwork	CY	$20	400	$8,000	
6	Signal Pole Relocation	EA	$15,000	1	$15,000	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$209,000**		
	Road Incidentals	LS	20%		$42,000	
	Planning Level Contingency	LS	20%		$42,000	
	Signing & Pavement Marking	LS	5%		$10,000	
	Traffic Control - urban mainline	LS	12%	100%	$25,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$7,140	
	Construction Total			**$126,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$13,000**		
	Commercial Real Estate	SF	**$17**	1200	$20,400	
	Residential Real Estate	SF	**$9**		$0	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	0		$0	
	R/W Total			**$20,000**		
	TOTAL COST			**$368,000**		

Preliminary Cost Estimate: USH 41 at CTH II/Winchester Rd.
Alternative 2 local*
*Local cost estimates take into account only costs that would affect local traffic

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	1,100	$71,500	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$72,000**		
	Road Incidentals	LS	20%		$14,000	
	Planning Level Contingency	LS	20%		$14,000	
	Signing & Pavement Marking	LS	5%		$4,000	
	Traffic Control - urban mainline	LS	12%	100%	$9,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$2,460	
	Construction Total			**$43,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$4,000**		
	Commercial Real Estate	SF	$17.00	1200	$20,400	
	Residential Real Estate	SF	$9.00	0	$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$20,000**		
	TOTAL COST			**$139,000**		

Preliminary Cost Estimate: USH 41 at Alternative 3

USH 41 & CTH II (Winchester) 2020

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement1	SY	$65	29,350	$1,907,750	
2	New HMA Pavement2	SY	$50		$0	
3	Sidewalk	SY	$35	3,650	$127,750	
4	Curb and Gutter	LF	$20	15,000	$300,000	
5	Earthwork	CY	$20	24,400	$488,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	40	$28,000	
12	Drainage - Pipes/Culverts	LF	$50	2,860	$143,000	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$2,995,000**		
	Road Incidentals	LS	20%		$599,000	
	Planning Level Contingency	LS	20%		$599,000	
	Signing & Pavement Marking	LS	5%		$150,000	
	Traffic Control - urban mainline	LS	12%	61%	$219,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	39%	$93,000	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00	1900	$266,000	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$266,000**		
	Mobilization	LS	6%		$115,560	
	Construction Total			**$1,776,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$178,000**		
	Commercial Real Estate	SF	$17.00	41,830	$691,868	
	Residential Real Estate	SF	$9.00	22,000	$194,480	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	0		$0	
	R/W Total			**$886,000**		
	TOTAL COST			**$6,101,000**		

Preliminary Cost Estimate: USH 41 at Alternative 3 local* USH 41 & CTH II (Winchester) 2020

*Local cost estimates take into account only costs that would affect local traffic

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement1	SY	$65	14,650	$952,250	
2	New HMA Pavement2	SY	$50		$0	
3	Sidewalk	SY	$35	1,460	$51,100	
4	Curb and Gutter	LF	$20	7,280	$145,600	
5	Earthwork	CY	$20	12,150	$243,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	15	$10,500	
12	Drainage - Pipes/Culverts	LF	$50	1,237	$61,850	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$1,464,000**		
	Road Incidentals	LS	20%		$293,000	
	Planning Level Contingency	LS	20%		$293,000	
	Signing & Pavement Marking	LS	5%		$73,000	
	Traffic Control - urban mainline	LS	12%	100%	$176,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$50,100	
	Construction Total			**$885,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$89,000**		
	Commercial Real Estate	SF	$ 17.00	37,200	$632,400	
	Residential Real Estate	SF	$ 9.00	3,415	$30,735	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$663,000**		
	TOTAL COST			**$3,101,000**		

Preliminary Cost Estimate: USH 41 at Alternative 4

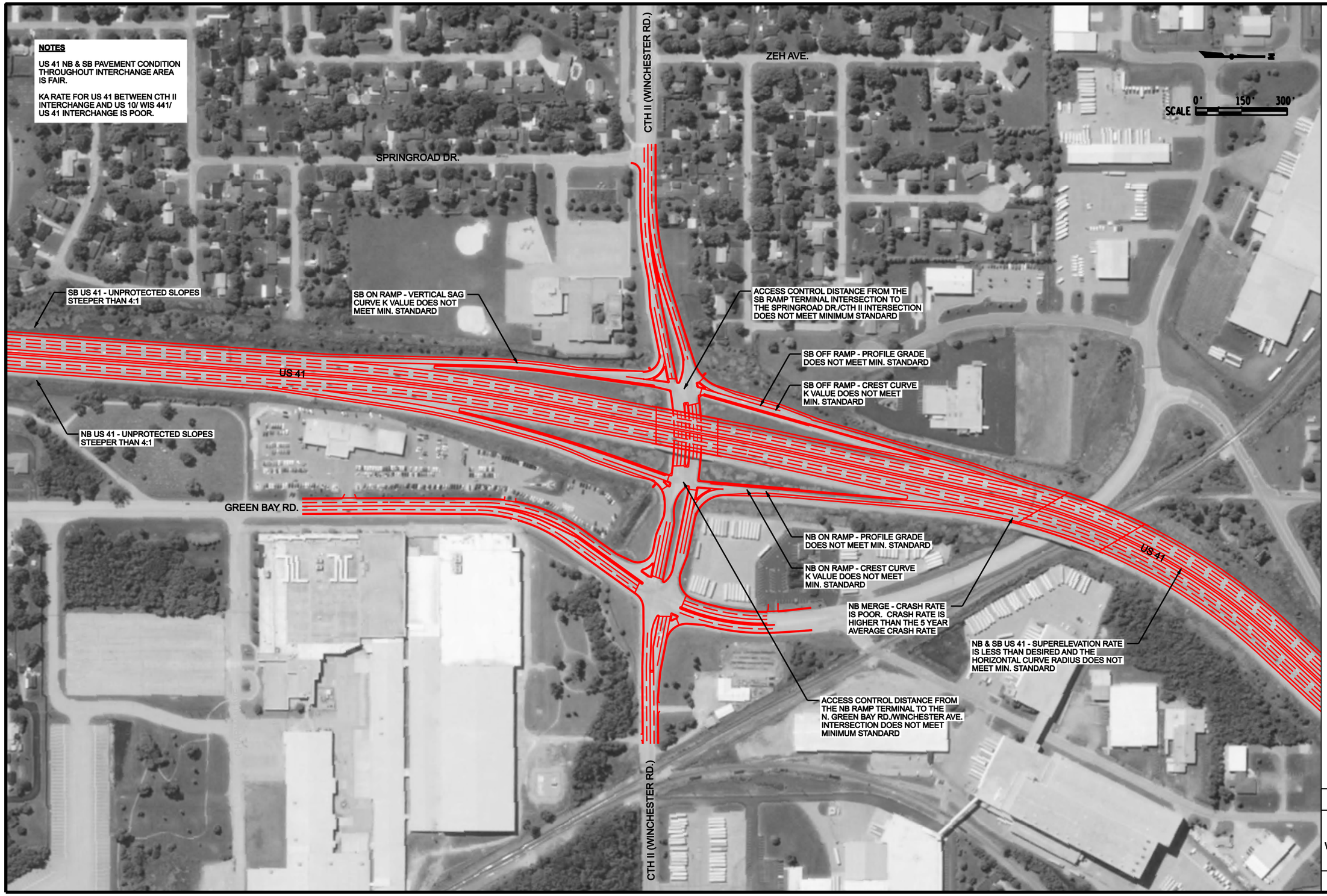
USH 41 & CTH II (Winchester) 2035

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement1	SY	$65	31,200	$2,028,000	
2	New HMA Pavement2	SY	$50	0	$0	
3	Sidewalk	SY	$35	3,600	$126,000	
4	Curb and Gutter	LF	$20	15,500	$310,000	
5	Earthwork	CY	$20	25,800	$516,000	
6	Signal Pole Relocation	EA	$15,000	0	$0	
7	Signal System	EA	$165,000	0	$0	
8	Ramp Meter	EA	$75,000	0	$0	
9	Ramp Meter- remove and reinstall	EA	$35,000	0	$0	
10	Sign Bridge	EA	$100,000	0	$0	
11	Drainage - Inlets/Manholes	EA	$700	40	$28,000	
12	Drainage - Pipes/Culverts	LF	$50	2,800	$140,000	
13	Drainage - Pipes/Culverts - extensions	LF	$100	0	$0	
14	Concrete Barrier - 42"	LF	$70	0	$0	
15	Retaining wall - non-structural (<5')	SF	$25	0	$0	
16	Lighting	LS		0		
17	Unique Items					
18						
19						
20						
	Roadway Total			**$3,148,000**		
	Road Incidentals	LS	20%		$630,000	
	Planning Level Contingency	LS	20%		$630,000	
	Signing & Pavement Marking	LS	5%		$157,000	
	Traffic Control - urban mainline	LS	12%	61%	$230,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	39%	$98,000	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00	1900	$266,000	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$266,000**		
	Mobilization	LS	6%		$120,660	
	Construction Total			**$1,870,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$187,000**		
	Commercial Real Estate	SF	$17.00	44,880	$762,960	
	Residential Real Estate	SF	$9.00	22,000	$198,000	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	0		$0	
	R/W Total			**$961,000**		
	TOTAL COST			**$6,432,000**		

Preliminary Cost Estimate: USH 41 at Alternative 4 local* USH 41 & CTH II (Winchester) 2035

*Local cost estimates take into account only costs that would affect local traffic

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement1	SY	$65	14,750	$958,750	
2	New HMA Pavement2	SY	$50		$0	
3	Sidewalk	SY	$35	1,440	$50,400	
4	Curb and Gutter	LF	$20	7,250	$145,000	
5	Earthwork	CY	$20	12,200	$244,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	15	$10,500	
12	Drainage - Pipes/Culverts	LF	$50	1,225	$61,250	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$1,470,000**		
	Road Incidentals	LS	20%		$294,000	
	Planning Level Contingency	LS	20%		$294,000	
	Signing & Pavement Marking	LS	5%		$74,000	
	Traffic Control - urban mainline	LS	12%	100%	$176,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$50,280	
	Construction Total			**$888,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$89,000**		
	Commercial Real Estate	SF	$17.00	37,440	$636,480	
	Residential Real Estate	SF	$9.00	3,420	$30,780	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	0		$0	
	R/W Total			**$667,000**		
	TOTAL COST			**$3,114,000**		



WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

US 41 - CTH II (WINCHESTER ROAD)

GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

US 41/CTH II
WINNEBAGO COUNTY

Sheet 1 of 5

SPRINGROAD DR.

CTH II (WINCHESTER RD.)

ZEH AVE.

US 41

SB OFF RAMP - ADD 250' LEFT TURN LANE
TO OUTSIDE OF EXISTING ROADWAY

GREEN BAY RD.

ADD CONTINUOUS RIGHT TURN LANE

US 41

COMMITTED PROJECT: NB MERGE AUXILARY
LANE BETWEEN CTH II AND WIS 441/ US 10

CTH II (WINCHESTER RD.)

LEGEND

N

EXISTING RIGHT OF WAY
EXISTING ROADWAY DESIGN
PROPOSED IMPROVEMENTS
PROPOSED SIDEWALK
RIGHT OF WAY ACQUISITION

SCALE 0' 150' 300'

WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

US 41 - CTH II (WINCHESTER ROAD)

IMPROVEMENT ALTERNATIVE 1

HNTB

Exhibit

US 41/CTH II
WINNEBAGO COUNTY

SPRINGROAD DR.

CTH II (WINCHESTER RD.)

ZEH AVE.

US 41

SB OFF RAMP - ADD 350' LEFT TURN LANE
TO OUTSIDE OF EXISTING ROADWAY
EXTEND RIGHT TURN LANE FROM 250' TO 350'

ADD 190' LEFT TURN LANE
ADD CONTINUOUS RIGHT TURN LANE

GREEN BAY RD.

EXTEND LEFT TURN LANE FROM 260' TO 400'

NB ON RAMP - ADD LANE

ADD 250' RIGHT TURN LANE

US 41

CTH II (WINCHESTER RD.)

LEGEND

N

EXISTING RIGHT OF WAY
EXISTING ROADWAY DESIGN
PROPOSED IMPROVEMENTS
PROPOSED SIDEWALK
RIGHT OF WAY ACQUISITION

SCALE 0' 150' 300'

WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

US 41 - CTH II (WINCHESTER ROAD)

IMPROVEMENT ALTERNATIVE 2

HNTB

Exhibit

US 41/CTH II
WINNEBAGO COUNTY

KUEHN CT

US 41

N. GREEN BAY RD

EHLERS RD

CTH II (WINCHESTER RD)

CTH II (WINCHESTER RD)

SPRING RD DR

US 41

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- PROPOSED STRUCTURES
- RIGHT OF WAY ACQUISITION

SCALE 0' 150' 300'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

USH 41 - CTH II INTERCHANGE

IMPROVEMENT ALTERNATIVE RAB 2020

HNTB

Exhibit

USH 41/CTH II
WINNEBAGO
COUNTY

KUEHN CT

US 41

N. GREEN BAY RD

EHLERS RD

CTH II (WINCHESTER RD)

CTH II (WINCHESTER RD)

SPRING RD DR

US 41

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- PROPOSED STRUCTURES
- RIGHT OF WAY ACQUISITION

SCALE 0' 150' 300'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

USH 41 - CTH II INTERCHANGE

IMPROVEMENT ALTERNATIVE RAB 2035

HNTB

Exhibit

USH 41/CTH II
WINNEBAGO
COUNTY

Sheet 5 of 5

US 41 & CTH BB / Prospect Avenue

US 41/441 Operational Analysis — US 41 and CTH BB (Prospect Ave)

Mainline Route	Crossroad
US 41	CTH BB
Region	**Location**
Northeast	Town of Menasha
Interchange Type	**Crossroad Function**
Diamond	Minor Arterial
Ramp Terminal	**Bridge Sufficiency**
Signalized	B-70-0135 = 98 B-70-0136 = 98
Bridge Hits	**Bridge Service Life**
	B-70-0135 built 1992 B-70-0136 built 1992

No-Build Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY South (NB)	FWY North (NB)	FWY North (SB)	FWY South (SB)	Total	Notes
LOS	2035	C (D)	D (F)	D (E)	D (D)	E (D)	F (D)	C (E)	C (E)	C (D)	C (D)		AM Peak (PM Peak)
	2020	C (C)	D (F)	C (D)	C (D)	D (D)	F (D)	C (C)	C (D)	C (C)	C (C)		
	existing	B (C)	C (D)	C (C)	C (C)	D (D)	D (D)	C (C)	C (C)	B (C)	C (C)		
Queue	2035					808 (1424)	1194 (1158)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1250' SB = 1300'
	2020					571 (1126)	1194 (1095)						
	existing					246 (218)	230 (150)						
Crashes	2002-2006	24	19	14	42	5	20	5	2	11	7	149	
	Severity	.21	.32	.07	.29	.20	.35	.40	.50	.45	.14	-	(INJ+FAT) / Total Crash
	Rate	69	56	39	114	.12	.52	25	9	32	21	-	Merge & Diverge = HMVMT Intersection = MEV

Improved Alternative Summary

Title	Description
Alternative 1	Lengthening NB and SB on ramps to 1200' based on 2020 analysis
Alternative 2	Adding EB and WB look ahead lefts onto NB and SB on ramps based on 2020 analysis
Alternative 3	Major roadway realignment with additional through lanes and turn lanes based on 2035 analysis
Alternative 4	2020 RAB. Unrelated to signal design.
Alternative 5	2035 RAB. Unrelated to signal design.

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
LOS	Alt. 1	C (C)	C (F)	C (D)	C (C)	D (D)	F (D)	C (C)	C (D)	C (C)	C (C)		AM Peak (PM Peak)
	Alt. 2	C (C)	C (F)	C (D)	C (C)	D (D)*	A (B)*	C (C)	C (D)	C (C)	C (C)		
	Alt. 3	C (D)	D (F)	D (E)	C (D)	D (D)	A (B)	C (E)	C (E)	C (D)	C (D)		
	Alt. 4	C (C)	D (F)	C (D)	C (D)	A (A)	A (A)	C (C)	C (D)	C (C)	C (C)		
	Alt. 5	C (D)	D (F)	D (E)	D (D)	A (A)	A (A)	C (E)	C (E)	C (D)	C (D)		

* LOS does not depict overall CTH BB interchange operations (See queue lengths)

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
Queue	Alt. 1					571 (1126)	1194 (1095)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1250' SB = 1300'
	Alt. 2					546 (1171)	1159 (335)						
	Alt. 3					346 (320)	343 (240)						
	Alt. 4					25 (25)	25 (50)						
	Alt. 5					25 (25)	25 (25)						
Crash Benefit	Alt. 1	-	6	-	12	-	-	-	-	-	-	18	Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35.000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands)
	Alt. 2	-	6	-	12	2	17	-	-	-	-	37	
	Alt. 3	-	6	-	12	4	34	-	-	-	-	56	
	Alt. 4	-	6	-	12	6	39	-	-	-	-	63	
	Alt. 5	-	6	-	12	6	39	-	-	-	-	63	

Alternative Construction Costs

	Total Cost	Structure Costs	ROW Costs
Alternative 1	$260,000	$0	$0
Alternative 2	$486,000	$0	$0
Alternative 3	$5,583,000	$270,000	$203,000
Alternative 4	$5,661,000	$93,000	$447,000
Alternative 5	$7,038,000	$93,000	$1,497,000

Preliminary Environmental Screening

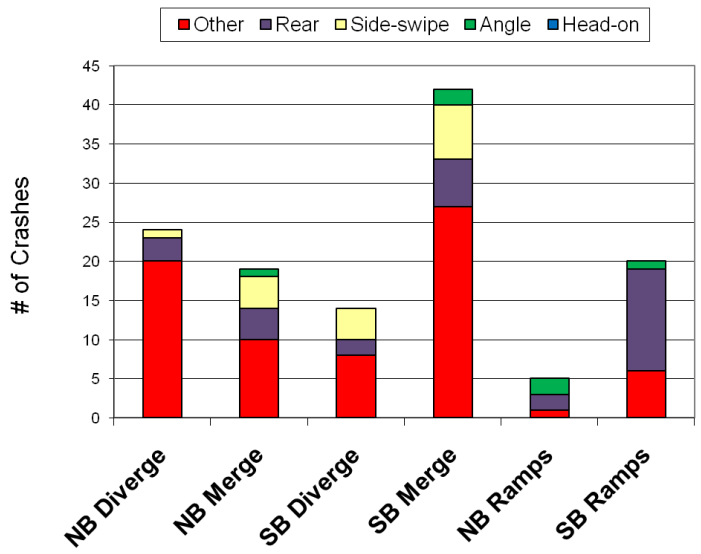
- A residential neighborhood is located adjacent to the interchange
- Identified wetlands are located near the interchange
- The interchange is located in a floodplain
- An unnamed stream crosses under the interchange
- The interchange is located approximately 2 miles from an airport

Existing Geometric Deficiencies Rating

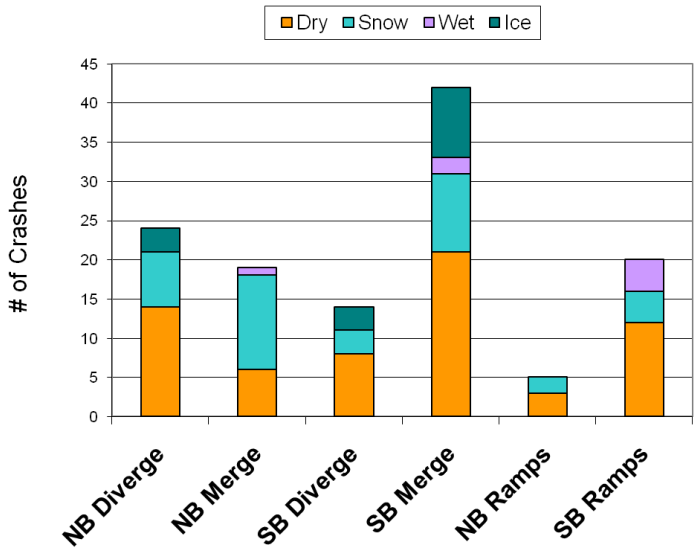
Freeway/Ramps	Score	Comments
Ramp Design Speed & Horizontal Alignment	Acceptable	
Ramps Merge / Diverge	Acceptable	
Ramp Stopping Sight Distance	Acceptable	
Bridges		
Bridge Width	Acceptable	
Crossroad		
Intersection Skew / Intersection Sight Distance	Acceptable	
Geometric Deficiency Score	Roadway Geometric Score = 9 / 10	Bridge Geometric Score = 4 / 5

Detailed Crash Analysis

Crash Type Summary



Pavement Condition Summary



US 41 & CTH BB (PROSPECT AVENUE) INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the US 41 & CTH BB (Prospect Ave) interchange is to address the needs and deficiencies identified in the USH 41 Interstate Conversion Geometric Deficiencies Report dated February 2009. The following is a summary of the needs and deficiencies at the CTH BB (Prospect Avenue) Interchange:

- High crash severity rate at the southbound US 41 merge and diverge locations
- Southbound US 41 off ramp grade does not meet minimum standards.
- Northbound and southbound US 41 on ramps taper does not meet minimum standard and does not include lane drop.
- Access control distance from northbound terminal intersection to Northern Rd intersection does not meet minimum standards.
- Access control distance from southbound terminal intersection to American Dr intersection does not meet minimum standards.
- Northbound and southbound ramps crest curve K value does not meet new criteria minimum standard.

The primary need at the CTH BB (Prospect Ave) interchange is to improve the safety and operations at the ramp terminal intersections.

The following alternatives have been developed based on an order of importance with regard to safety and operations, and should be considered cumulative with each other. The alternative analyses (LOS, queue lengths, etc) reflect this method. For example, Alternative 2 should only be considered in addition to Alternative 1.

Alternative 1

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Extend the northbound US 41 on ramp acceleration lane from 360 feet to 1200 feet.
- Extend the southbound US 41 on ramp acceleration lane from 360 feet to 1200 feet.

The improvements in Alternative 1 will improve safety and crash severity problems at the southbound and northbound US 41 merge locations.

Alternative 1 does not propose any ramp terminal improvements. 2020 and 2035 intersection operations are expected to be similar to the 2020 and 2035 Existing.

Alternative 2

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- All changes made in Alternative 1.
- Add a 250' look ahead left turn lane from westbound CTH BB (Prospect Ave) to the southbound US 41 on ramp.
- Add a 250' look ahead left turn lane from eastbound CTH BB (Prospect Ave) to the northbound US 41 on ramp.

- Extend left turn lane to 200' at the northbound US 41 off ramp and reconstruct island.

The improvements in Alternative 2 will reduce the left turn queue length at the northbound and southbound US 41 on ramps and reduce congestion. Extending the left turn lane for northbound US 41 off ramp will allow more vehicles to make left turns onto CTH BB (Prospect Ave).

Alternative 2 provides additional capacity approaching the interchange. However, the intersection of CTH BB and American Dr is expected to have severe congestion (Overall LOS F) in 2020 and 2035. Without intersection improvements, this intersection starves the interchange or hinders driver's ability to utilize the interchange. This starvation gives a false positive to ramp terminal operations. If vehicles are able to access the interchange, ramp terminal operations are expected to decrease.

Alternative 3

This alternative addresses operational problems at the interchange by making the following changes:

- All changes made in Alternatives 1 and 2.
- Realign CTH BB (Prospect Ave) to accommodate one additional eastbound and westbound through lanes. Four structures will have to be widened: box culvert west of American Dr intersection, both northbound and southbound US 41 bridges, and bridge east of Northern Rd.
- Add additional eastbound right turn lane just east of the northbound off ramp onto Northern Rd.
- Add additional 250' left turn lane from CTH BB (Prospect Ave) onto Northern Rd
- Reconstruct southbound off ramp intersection to accommodate additional roadway width and free flowing right turn lane onto CTH BB (Prospect Ave) and northbound on ramp right turn lane.
- Add an eastbound continuous right turn lane from American Dr to southbound US 41 on ramp.
- Add an additional westbound continuous left turn lane and a 300' left turn lane onto American Dr.
- CTH BB (Prospect Ave) Eastbound west of American Dr, add a 300' left turn lane and one exclusive 300' right turn lane. Extend box culvert to accommodate additional roadway width.
- Extend right turn lane to 400' and modify turn bay from American Dr onto CTH BB (Prospect Ave).
- Add additional right turn and thru lanes and reconstruct intersection to accommodate additional roadway width from Van Dyke Rd.

The improvements in Alternative 3 will reduce congestion on CTH BB (Prospect Ave) by greatly decreasing possibility of turning queues affecting westbound and eastbound through traffic.

Alternative 3, although expensive, addresses all traffic operation issues. All intersections are expected to operate at overall LOS D or better with ramp terminals at overall LOS B or better in both 2035 peaks. If Alternative 3 is constructed by 2020, all

intersections are expected to operate at overall LOS C or better with ramp terminals at overall LOS B or better.

Alternative 3 Local

An alternative for local improvements has been detailed below. This alternative addresses operational problems at American Dr and Northern Rd by making the following changes:

- Realign CTH BB (Prospect Ave) to accommodate one additional eastbound and westbound through lanes. There will have to two structures widens: box culvert west of American Dr intersection.
- Add additional 250' left turn lane from CTH BB (Prospect Ave) onto Northern Rd
- Add an eastbound continuous right turn lane from American Dr to southbound US 41 on ramp.
- Add an additional westbound continuous left turn lane and a 300' left turn lane onto American Dr.
- CTH BB (Prospect Ave) Eastbound west of American Dr, add a 300' left turn lane and one exclusive 300' right turn lane. Extend box culvert to accommodate additional roadway width.
- Extend right turn lane to 400' and modify turn bay from American Dr onto CTH BB (Prospect Ave).
- Add additional right and thru lane and reconstruct intersection to accommodate additional roadway width from Van Dyke Rd.

This alternative will improve operations at the adjacent intersections only.

Alternative 4

The 2020 roundabout alternative would require a four-lane facility to the west of the northbound US41 onramp and three-lane facility (2 westbound) to the east. Two-lane roundabouts would be provided along the corridor. All movements are expected to operate at LOS B or better and experience acceptable queues and delays. Surplus capacity of approximately 9%[1] is expected beyond the forecasted Year 2020 traffic conditions. A system of roundabouts at this location will allow for the use of right-in/right-outs at current and future driveway locations as U-Turns are accommodated within the roundabouts.

Alternative 5

The house in the southwest quadrant of the interchange (between the southbound US 41 on ramp and American Dr) will have access to the CTH BB (Prospect Ave) with the year 2020 roundabout. The year 2035 roundabout design has fewer impacts to the recently redeveloped land between mainline and the northbound US 41 off ramp. Also, with the 2035 roundabout design, the house access could only be located within the proposed eastbound to southbound semi-bypass lane, which would be unacceptable. Therefore, unless the lot is combining with adjacent parcels, it would need to be acquired under the year 2035 roundabout alternative.

[1] Determined by applying an equal percentage increase to all volumes at an intersection under the 50th CL until a leg failed; the lowest percent increase among the intersections was reported. Therefore, the remaining intersections at each interchange will have higher surplus capacity values.

Additional Deficiencies

The northbound US 41 on and off ramps and the southbound US 41 on and off ramps have existing crest curve K values that do not meet the minimum standard (crest curve K = 185 for 55 mph design speed) outlined in the WisDOT Facilities Development Manual 2009 (FDM). Northbound and southbound on ramps profiles may be improved during taper reconstruction in Alternative 1. The cost to improve the northbound and southbound off ramp profiles to meet the WisDOT FDM minimum crest curve K value standard would exceed any potential safety return.

There are existing superelevation rates of 5.0% for the northbound US 41 and southbound US 41 mainline horizontal curves located just south of the interchange. These superelevation rates do not meet the WisDOT FDM minimum standard of 5.5% for a 70 mph design speed. The cost to fix these superelevated sections would greatly outweigh any potential safety benefits.

Access control distances between northbound US 41 and southbound US 41 ramp terminal intersections and side road intersections (American Drive, west of southbound ramp terminal intersection and Northern Road, east of northbound ramp terminal intersection) do not meet minimum WisDOT FDM standard of 1000 feet. The resulting cost and impact to local access throughout interchange area to meet this standard are too great to warrant serious consideration; thus no recommendations are suggested.

The southbound US 41 off ramp profile includes an existing vertical tangent grade of 0.1%. This does not meet the minimum WisDOT FDM standard of 0.3%. The cost to improve the profile to meet this standard would exceed any potential safety return.

Comparison of Alternatives

The interchange alternatives were compared based on safety, traffic operations, cost and other factors:

Safety

Alternative 1 addresses the existing safety issue with crashes at the northbound and southbound US 41 merge by lengthening acceleration distance and adding a lane drop. The look ahead left turn lanes to the northbound and southbound US 41 on ramps in Alternative 2 increases interchange safety by improving traffic flow through the ramp terminal intersections. Alternative 3 generally increases safety throughout the interchange by providing more storage for vehicles by exclusive turn lanes and two through lanes.

Traffic Operations

Alternative 2 allows more vehicles to turn left with each signal phase improving the level of service at the northbound US 41 off ramp terminal. Alternative 2 also improves the level of service by reducing queue lengths at the other three ramp termini by adding look ahead lefts turning lanes to northbound and southbound US 41 on ramps. Alternative 3 creates the greatest traffic flow for both 2020 and 2035 improvement throughout the interchange area by providing two through lanes and adding exclusive right and left turn lanes.

All operations are under the assumption that the traffic signal phasing utilizes single ring TTI (Texas Transportation Institute) phasing. Different signal phasing would require additional analysis to determine altered LOS and queue distances.

Environmental Factors

- Residential neighborhoods are located near the interchange
- Identified wetlands are located near the interchange
- An unnamed stream crosses under the interchange
- The interchange is located in a floodplain
- The interchange is located approximately two miles from an airport

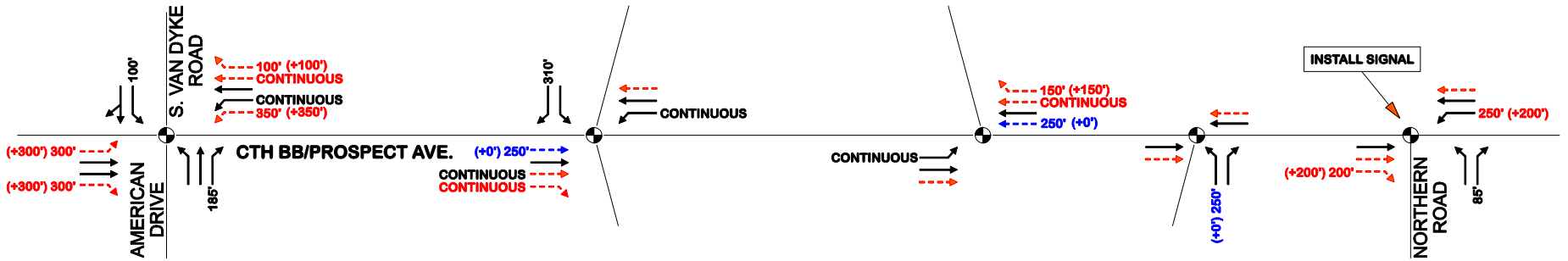
Complete Streets

This interchange should consider wide 4-5' outside lanes to accommodate bikes on street when adding capacity and replacing the structure east of Northern Rd and the structure west of American Dr. The City of Appleton Bike Plan suggests a trail in this area. The city should be consulted about the status of this area at the time of project programming. A trail exists on the east side of American Dr and crosses Prospect/CTH BB. All structures should accommodate long-term pedestrian accommodations. Currently the transit route passes by this location along American Dr/ Nicolet Dr / Van Dyke Rd intersection.

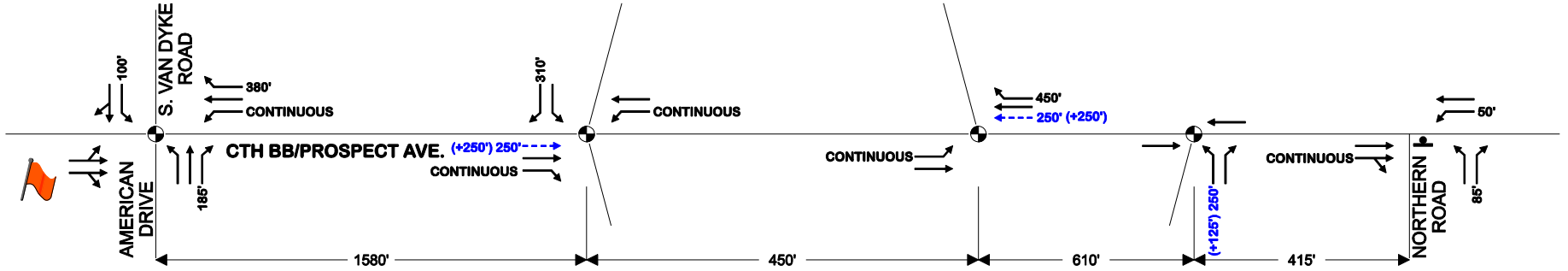
US 41 / CTH BB (PROSPECT AVE.)

PREPARED 3-31-11

2035 ULTIMATE GEOMETRY



2020 ULTIMATE GEOMETRY



XX'	BASE GEOMETRICS PLANNED TURN BAY LENGTH	→	BASE GEOMETRICS		TRAFFIC SIGNAL
(+XX')	ADDITIONAL TURN BAY LENGTH RECOMMENDED	⇢	ADDITIONAL IMPROVEMENT RECOMMENDED		STOP SIGN
(+XX')	ADDITIONAL TURN BAY LENGTH REQUIRED FOR 2035 VOLUMES	⇢	ADDITIONAL IMPROVEMENT REQUIRED FOR 2035 VOLUMES		OPERATIONAL PROBLEMS REMAIN

AADT

Existing - XX,XXX

2020 - XX,XXX

2035 - XX,XXX

US 41/WIS 441 Short-Term Improvement Cost Estimate
CTH BB/ Propect Ave.

	Roadway	Structure	Construction	R/W Cost	CM & Eng	Incremental Total	Total
Alternative 1	$ 157,000	$ -	$ 94,000	$ -	$ 9,000	$ 260,000	$ 260,000
Alternative 2	$ 136,000	$ -	$ 82,000	$ -	$ 8,000	$ 226,000	$ 486,000
Alternative 3	$ 2,064,000	$ 270,000	$ 1,264,000	$ 1,373,000	$ 126,000	$ 5,097,000	$ 5,583,000
Alternative 3 (local)*	$ 1,146,000	$ 270,000	$ 708,000	$ 121,000	$ 71,000		$ 2,316,000
Alternative 3 (multiuse path)	$ 2,835,000	$ 270,000	$ 1,729,000	$ 1,937,000	$ 173,000	$ 6,944,000	$ 7,430,000
Alternative 4	$ 3,095,000	$ 93,000	$ 1,842,000	$ 447,000	$ 184,000	$ 5,661,000	$ 5,661,000
Alternative 4 (local)*	$ 1,132,000	$ -	$ 684,000	$ 222,000	$ 68,000		$ 2,106,000
Alternative 5	$ 3,292,000	$ 93,000	$ 1,960,000	$ 1,737,000	$ 196,000	$ 7,278,000	$ 7,278,000
Alternative 5 (local)*	$ 1,244,000	$ -	$ 752,000	$ 1,212,000	$ 75,000		$ 3,283,000

*Local cost estimates take into account only costs that would affect local traffic.

Item	Item Description	Unit	Unit Price	
1	New Concrete Pavement[1]	SY	$65	Concrete, Base Aggregate, Crushed
2	New HMA Pavement[2]	SY	$50	HMA, Base Aggregate, Crushed
3	Sidewalk	SY	$35	
4	Curb and Gutter	LF	$20	
5	Earthwork	CY	$20	Cut or fill, based on observed topography, including ditches
6	Signal Pole Relocation	EA	$15,000	
7	Signal System	EA	$165,000	
8	Ramp Meter	EA	$75,000	
9	Ramp Meter- remove and reinstall	EA	$35,000	
10	Sign Bridge	EA	$100,000	
11	Drainage - Inlets/Manholes	EA	$700	
12	Drainage - Pipes/Culverts	LF	$50	
13	Drainage - Pipes/Culverts - extensions	LF	$100	
14	Concrete Barrier - 42"	LF	$70	
15	Retaining wall - non-structural (<5')	SF	$25	
16	Beam Guard	LF	$20	
17	Beam Guard End Absorbing Terminal	EA	$2,500	
18	Unique Items			Add Items unique to these locations,
19				that are too large to be covered in 'Road Incidentals'.
20				
	Subtotal			
	Road Incidentals[3]	LS	20%	removals, finishing, erosion, removals, lighting, etc
	Planning Level Contingency[3]	LS	20%	
	Signing & Pavement Marking[3]	LS	5%	
	Traffic Control - urban mainline[3,4]	LS	12%	assumed 100% unless other TC is entered
	Traffic Control - rural mainline[3,4]	LS	10%	enter percent of project on rural mainline
	Traffic Control - ramps[3,4]	LS	8%	enter percent of project on ramps
	Traffic Control - local roads[3,4]	LS	5%	enter percent on local roads
	Bridges - new and widening with substructure	SF	$ 140.00	Area of Bridge Deck
	Bridges - widening using existing substructure	SF	$ 100.00	Area of Bridge Deck
	Bridges - redecking	SF	$ 70.00	Area of Bridge Deck
	Retaining walls - structural	SF	$ 35.00	area of exposed wall face
	Mobilization[5]	LS	6%	
	CM & Engineering[6]	LS	10%	
	Right of Way Commercial Real Estate	SF		Site Specific
	Residential Real Estate	SF		
	Commercial Relocation Cost	LS		
	Residential Relocation Cost	LS		
	Lighting	LS		

NOTES:

1. New Concrete Pavement consists of: Concrete Pavement 10", $50/SY; Base Aggregate, 6", $16/ton; Select Crushed, 12", $14/ton.
2. New HMA Pavement consists of: HMA, 5", $70/ton; Oil, $600/ton; Base Aggregate, 12", $16/ton; Select Crushed, 12", $14/ton
3. Lump Sum items are computed as a percentage of the roadway item costs. These do not include structural component costs.
4. Traffic Control is a lump sum, between 5% - 12%, weighted by the estimated construction cost on each roadway type.
5. Mobilization is computed as a percentage of the all item costs, including structural components.
6. Construction Management and Engineering are computed as a percentage of the total construction cost.

Preliminary Cost Estimate: USH 41 at CTH BB/ Propect Ave.
Alternative 1

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	2,370	$154,050	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20	35	$700	
17	Beam Guard End Absorbing Terminal	EA	$2,500	1	$2,500	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$157,000**		
	Road Incidentals	LS	20%		$31,000	
	Planning Level Contingency	LS	20%		$31,000	
	Signing & Pavement Marking	LS	5%		$8,000	
	Traffic Control - urban mainline	LS	12%	100%	$19,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$5,340	
	Construction Total			**$94,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$9,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$260,000**		

Preliminary Cost Estimate: US 41 at CTH BB/ Propect Ave.
Alternative 2

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	1,110	$72,150	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20	815	$16,300	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000	3	$45,000	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	4	$2,800	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items	EA				
20						
	Roadway Total			**$136,000**		
	Road Incidentals	LS	20%		$27,000	
	Planning Level Contingency	LS	20%		$27,000	
	Signing & Pavement Marking	LS	5%		$7,000	
	Traffic Control - urban mainline	LS	12%	100%	$16,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$4,620	
	Construction Total			**$82,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$8,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$226,000**		

Preliminary Cost Estimate: US 41 at CTH BB/ Propect Ave.
Alternative 3

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	9,140	$594,100	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20	2,020	$40,400	
5	Earthwork	CY	$20	18,000	$360,000	
6	Signal Pole Relocation	EA	$15,000	34	$510,000	
7	Signal System	EA	$165,000	1	$165,000	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	16	$11,200	
12	Drainage - Pipes/Culverts	LF	$50	280	$14,000	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25	1,650	$41,250	
16	Beam Guard	LF	$20	885	$17,700	
17	Beam Guard End Absorbing Terminal	EA	$2,500	4	$10,000	
18	Lighting	LS				
19	Unique Items					
20	Large Box Culvert	SF	$150	2,000	$300,000	
	Roadway Total			**$2,064,000**		
	Road Incidentals	LS	20%		$413,000	
	Planning Level Contingency	LS	20%		$413,000	
	Signing & Pavement Marking	LS	5%		$103,000	
	Traffic Control - urban mainline	LS	12%	100%	$248,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00	2700	$270,000	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$270,000**		
	Mobilization	LS	6%		$86,820	
	Construction Total			**$1,264,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$126,000**		
	Commercial Real Estate	SF	$17.00	9725	$165,325	
	Residential Real Estate	SF	$9.00	4143	$37,287	
	Commercial Relocation Cost	LS	$1,170,100	1	$1,170,100	
	Residential Relocation Cost	LS	0		$0	
	*Mobil Gas Station, NE quad of American/ BB					
	R/W Total			**$1,373,000**		
	TOTAL COST			**$5,097,000**		

Preliminary Cost Estimate: US 41 at CTH BB/ Propect Ave.
Alternative 3 (local)*
*Local cost estimates take into account only costs that would affect local traffic.

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	6,315	$410,475	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20	2,020	$40,400	
5	Earthwork	CY	$20	7,200	$144,000	
6	Signal Pole Relocation	EA	$15,000	14	$210,000	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	6	$4,200	
12	Drainage - Pipes/Culverts	LF	$50	120	$6,000	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25	110	$2,750	
16	Beam Guard	LF	$20	885	$17,700	
17	Beam Guard End Absorbing Terminal	EA	$2,500	4	$10,000	
18	Lighting	LS				
19	Unique Items					
20	Large Culvert	SF	$150	2,000	$300,000	
	Roadway Total			**$1,146,000**		
	Road Incidentals	LS	20%		$229,000	
	Planning Level Contingency	LS	20%		$229,000	
	Signing & Pavement Marking	LS	5%		$57,000	
	Traffic Control - urban mainline	LS	12%	100%	$138,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00	2700	$270,000	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$270,000**		
	Mobilization	LS	6%		$55,380	
	Construction Total			**$708,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$71,000**		
	Commercial Real Estate	SF	$17.00	4930	$83,810	
	Residential Real Estate	SF	$9.00	4143	$37,287	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	0		$0	
	R/W Total			**$121,000**		
	TOTAL COST			**$2,316,000**		

Preliminary Cost Estimate: US 41 at CTH BB/ Propect Ave.
Alternative 3 (multiuse path)

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	9,140	$594,100	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	6,090	$213,150	
4	Curb and Gutter	LF	$20	2,020	$40,400	
5	Earthwork	CY	$20	25,560	$511,200	
6	Signal Pole Relocation	EA	$15,000	34	$510,000	
7	Signal System	EA	$165,000	1	$165,000	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	16	$11,200	
12	Drainage - Pipes/Culverts	LF	$50	440	$22,000	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70	275	$19,250	
15	Retaining wall - non-structural (<5')	SF	$25	8,445	$211,125	
16	Beam Guard	LF	$20	1,635	$32,700	
17	Beam Guard End Absorbing Terminal	EA	$2,500	7	$17,500	
18	Lighting	LS				
19	Unique Items					
20	Large Box Culvert	SF	$150	3,250	$487,500	
	Roadway Total			**$2,835,000**		
	Road Incidentals	LS	20%		$567,000	
	Planning Level Contingency	LS	20%		$567,000	
	Signing & Pavement Marking	LS	5%		$142,000	
	Traffic Control - urban mainline	LS	12%	100%	$340,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00	2700	$270,000	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$270,000**		
	Mobilization	LS	6%		$113,160	
	Construction Total			**$1,729,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$173,000**		
	Commercial Real Estate	SF	$17.00	32255	$548,335	
	Residential Real Estate	SF	$9.00	24249	$218,241	
	Commercial Relocation Cost	LS	$1,170,100	1	$1,170,100	
	Residential Relocation Cost	LS	$0.00	1	$0	
	R/W Total			**$1,937,000**		
	TOTAL COST			**$6,944,000**		

Preliminary Cost Estimate: USH 41 at Alternative 4

USH 41 & CTH BB (2020)

Item	Item Description	Unit		Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY		$65	28,350	$1,842,750	
2	New HMA Pavement[2]	SY		$50		$0	
3	Sidewalk	SY		$35	5,250	$183,750	
4	Curb and Gutter	LF		$20	17,400	$348,000	
5	Earthwork	CY		$20	24,500	$490,000	
6	Signal Pole Relocation	EA		$15,000		$0	
7	Signal System	EA		$165,000		$0	
8	Ramp Meter	EA		$75,000		$0	
9	Ramp Meter- remove and reinstall	EA		$35,000		$0	
10	Sign Bridge	EA		$100,000		$0	
11	Drainage - Inlets/Manholes	EA		$700	55	$38,500	
12	Drainage - Pipes/Culverts	LF		$50	3,840	$192,000	
13	Drainage - Pipes/Culverts - extensions	LF		$100		$0	
14	Concrete Barrier - 42"	LF		$70		$0	
15	Retaining wall - non-structural (<5')	SF		$25		$0	
16	Lighting	LS					
17	Unique Items						
18							
19							
20							
	Roadway Total				**$3,095,000**		
	Road Incidentals	LS		20%		$619,000	
	Planning Level Contingency	LS		20%		$619,000	
	Signing & Pavement Marking	LS		5%		$155,000	
	Traffic Control - urban mainline	LS		12%	58%	$215,000	
	Traffic Control - rural mainline	LS		10%	0%	$0	
	Traffic Control - ramps	LS		8%	23%	$57,000	
	Traffic Control - local roads	LS		5%	19%	$29,000	
	Bridges - new and widening with substructure	SF	$	140.00		$0	
	Bridges - widening using existing substructure	SF	$	100.00	925	$92,500	
	Bridges - redecking	SF	$	70.00		$0	
	Retaining walls - structural	SF	$	35.00		$0	
	Structure Total				**$93,000**		
	Mobilization	LS		6%		$107,190	
	Construction Total				**$1,842,000**		
	Const. Mngmt & Engineering Total	LS		10%	**$184,000**		
	Commercial Real Estate	SF		$17.00	22,300	$379,100	
	Residential Real Estate	SF		$9.00	7,500	$67,500	
	Commercial Relocation Cost	LS		0		$0	
	Residential Relocation Cost	LS		0		$0	
	R/W Total				**$447,000**		
	TOTAL COST				**$5,661,000**		

Preliminary Cost Estimate: USH 41 at Alternative 4 (local)* USH 41 & CTH BB (2020)

*Local cost estimates take into account only costs that would affect local traffic.

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	10,900	$708,500	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	1,420	$49,700	
4	Curb and Gutter	LF	$20	5,700	$114,000	
5	Earthwork	CY	$20	9,120	$182,400	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	20	$14,000	
12	Drainage - Pipes/Culverts	LF	$50	1,268	$63,400	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$1,132,000**		
	Road Incidentals	LS	20%		$226,000	
	Planning Level Contingency	LS	20%		$226,000	
	Signing & Pavement Marking	LS	5%		$57,000	
	Traffic Control - urban mainline	LS	12%	100%	$136,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$38,700	
	Construction Total			**$684,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$68,000**		
	Commercial Real Estate	SF	$17.00	9,065	$154,105	
	Residential Real Estate	SF	$9.00	7,495	$67,455	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	0		$0	
	R/W Total			**$222,000**		
	TOTAL COST			**$2,106,000**		

Preliminary Cost Estimate: USH 41 at Alternative 5

USH 41 & CTH BB (2035)

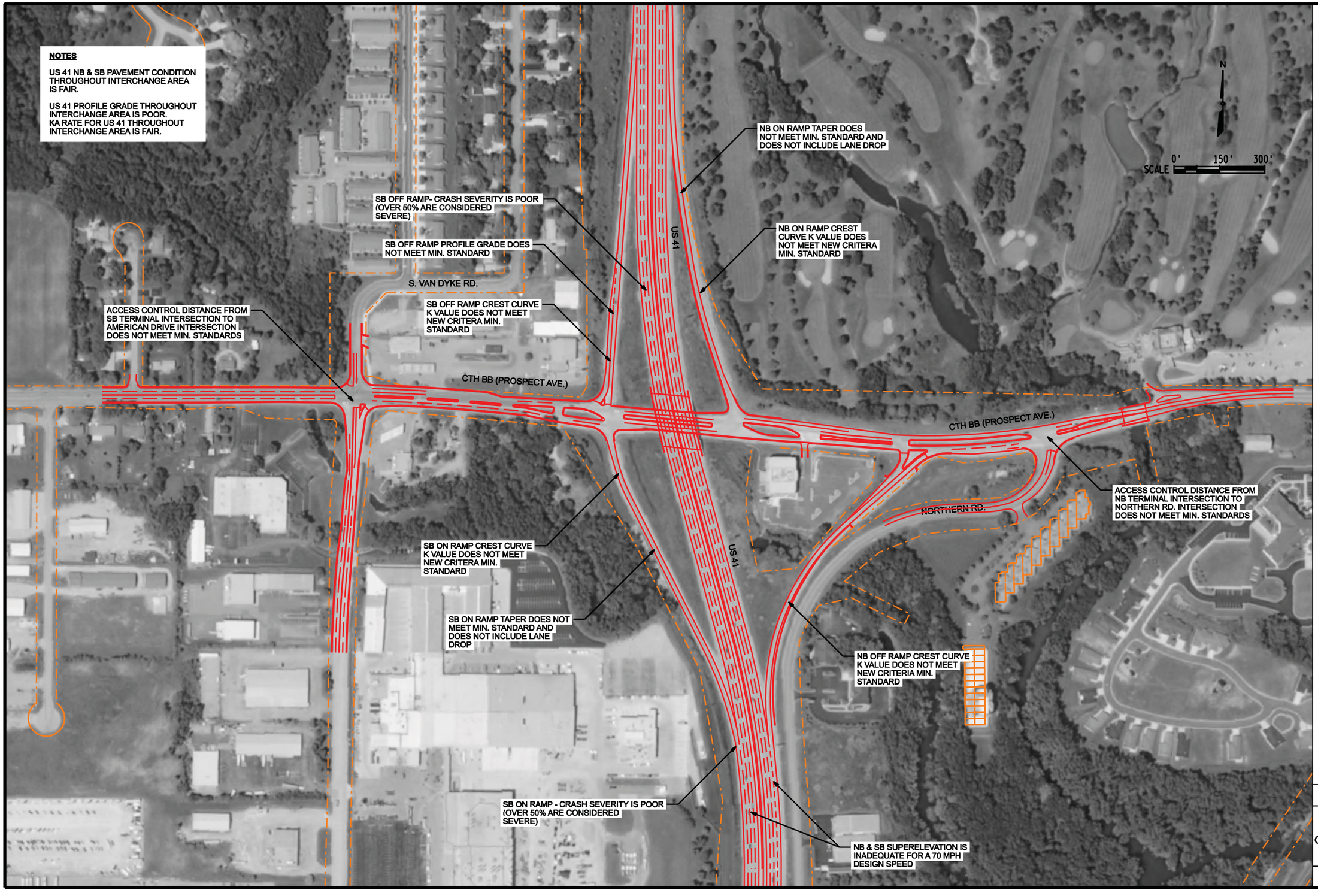
Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	30,500	$1,982,500	
2	New HMA Pavement[2]	SY	$50	0	$0	
3	Sidewalk	SY	$35	5,130	$179,550	
4	Curb and Gutter	LF	$20	18,170	$363,400	
5	Earthwork	CY	$20	26,620	$532,400	
6	Signal Pole Relocation	EA	$15,000	0	$0	
7	Signal System	EA	$165,000	0	$0	
8	Ramp Meter	EA	$75,000	0	$0	
9	Ramp Meter- remove and reinstall	EA	$35,000	0	$0	
10	Sign Bridge	EA	$100,000	0	$0	
11	Drainage - Inlets/Manholes	EA	$700	55	$38,500	
12	Drainage - Pipes/Culverts	LF	$50	3,905	$195,250	
13	Drainage - Pipes/Culverts - extensions	LF	$100	0	$0	
14	Concrete Barrier - 42"	LF	$70	0	$0	
15	Retaining wall - non-structural (<5')	SF	$25	0	$0	
16	Lighting	LS		0		
17	Unique Items					
18						
19						
20						
	Roadway Total			**$3,292,000**		
	Road Incidentals	LS	20%		$658,000	
	Planning Level Contingency	LS	20%		$658,000	
	Signing & Pavement Marking	LS	5%		$165,000	
	Traffic Control - urban mainline	LS	12%	58%	$229,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	23%	$61,000	
	Traffic Control - local roads	LS	5%	19%	$31,000	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00	925	$92,500	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$93,000**		
	Mobilization	LS	6%		$113,670	
	Construction Total			**$1,960,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$196,000**		
	Commercial Real Estate	SF	22,330	**$17**	$379,610	
	Residential Real Estate	SF	7,120	**$9**	$64,080	
	Commercial Relocation Cost	LS	1	**$1,052,400**	$1,052,400	
	Residential Relocation Cost	LS	150%	160000	$240,000	
	R/W Total			**$1,737,000**		
	TOTAL COST			**$7,278,000**		

Preliminary Cost Estimate: USH 41 at USH 41 & CTH BB (2035)

Alternative 5 (local)*

*Local cost estimates take into account only costs that would affect local traffic.

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	12,100	$786,500	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	1,300	$45,500	
4	Curb and Gutter	LF	$20	6,150	$123,000	
5	Earthwork	CY	$20	10,500	$210,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	20	$14,000	
12	Drainage - Pipes/Culverts	LF	$50	1,300	$65,000	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$1,244,000**		
	Road Incidentals	LS	20%		$249,000	
	Planning Level Contingency	LS	20%		$249,000	
	Signing & Pavement Marking	LS	5%		$62,000	
	Traffic Control - urban mainline	LS	12%	100%	$149,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$42,540	
	Construction Total			**$752,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$75,000**		
	Commercial Real Estate	SF	$17.00	5,590	$95,030	
	Residential Real Estate	SF	$9.00	7,120	$64,080	
	Commercial Relocation Cost*	LS	$1,052,400	1	$1,052,400	
	Residential Relocation Cost	LS	0		$0	
	*Citgo Gas Station, SE quad of American/ BB					
	R/W Total			**$1,212,000**		
	TOTAL COST			**$3,283,000**		



WISCONSIN DEPARTMENT OF TRANSPORTATION

MARCH 2011

US 41 - CTH BB INTERCHANGE

GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

US 41/CTH BB
OUTAGAMIE COUNTY

Sheet 1 of 6

NB ON RAMP - EXTEND ACCELERATION LANE FROM 360' TO 1200'

S. NICOLET RD.

S. VAN DYKE RD.

BEHM CT

CTH BB (PROSPECT AVE.)

US 41

CTH BB (PROSPECT AVE.)

NORTHERN RD.

US 41

AMERICAN DR.

SB ON RAMP - EXTEND ACCELERATION LANE FROM 360' TO 1200'

LEGEND

- EXISTING RIGHT OF WAY
- EXISTING ROADWAY DESIGN
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/ PATH
- RIGHT OF WAY ACQUISITION
- PROPOSED STRUCTURES

N

SCALE 0' 150' 300'

WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

US 41 - CTH BB INTERCHANGE

IMPROVEMENT ALTERNATIVE 1

HNTB

Exhibit

US 41/CTH BB
OUTAGAMIE COUNTY

Sheet 2 of 6

S. NICOLET RD.

S. VAN DYKE RD.

BEHM CT

US 41

CTH BB (PROSPECT AVE.)

CTH BB WB - ADD 250' LOOK AHEAD LEFT TURN

CTH BB EB - ADD 250' LOOK AHEAD LEFT TURN

NORTHERN RD.

NB OFF RAMP - LENGTHEN LEFT TURN BAY TO 200'

AMERICAN DR.

LEGEND

- EXISTING RIGHT OF WAY
- EXISTING ROADWAY DESIGN
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/ PATH
- RIGHT OF WAY ACQUISITION
- PROPOSED STRUCTURES

SCALE 0' 150' 300'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

US 41 - CTH BB INTERCHANGE

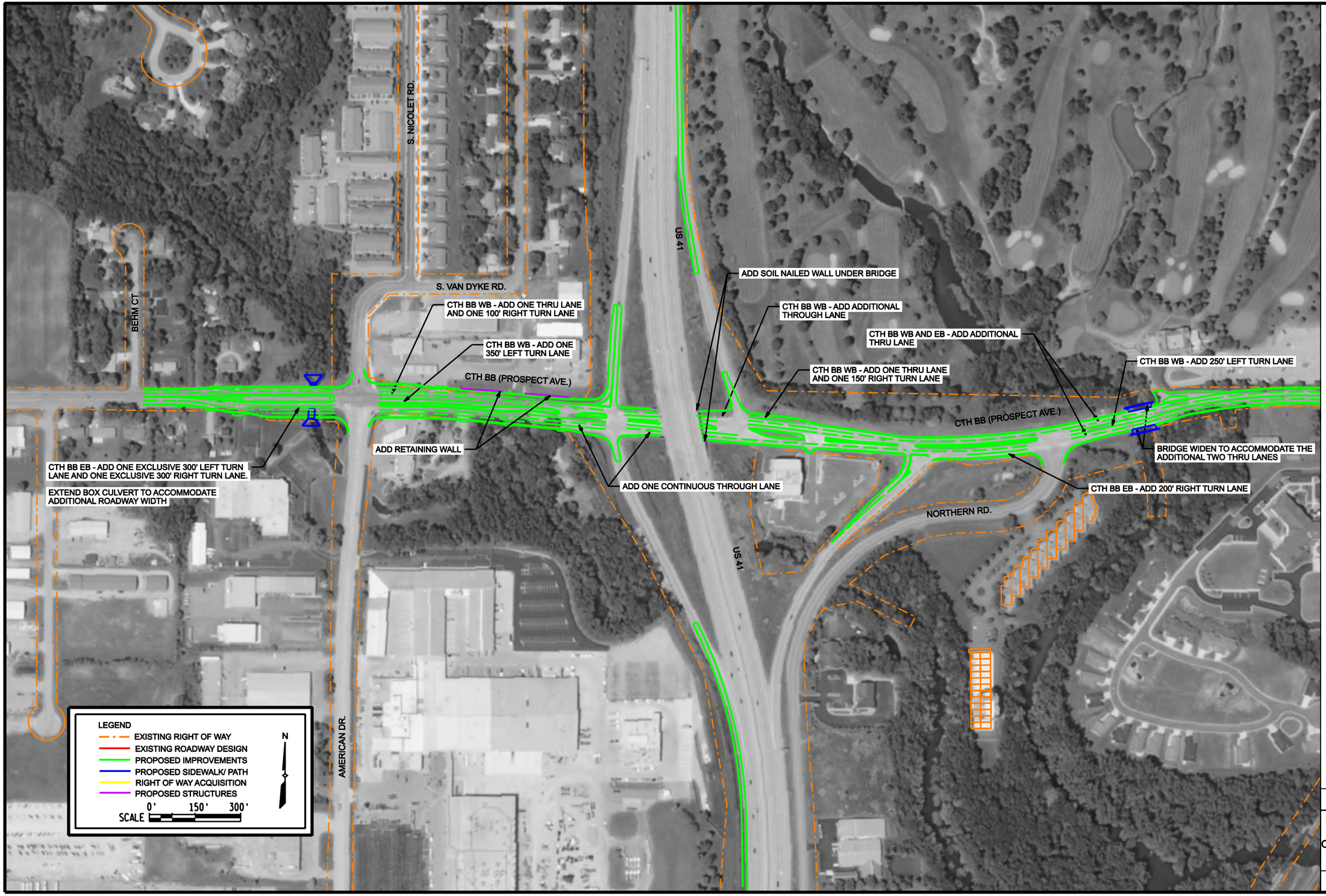
IMPROVEMENT ALTERNATIVE 2

HNTB

Exhibit

US 41/CTH BB
OUTAGAMIE COUNTY

Sheet 3 of 6



WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

US 41 - CTH BB INTERCHANGE
IMPROVEMENT ALTERNATIVE 3

HNTB

Exhibit

US 41/CTH BB
OUTAGAMIE COUNTY

Sheet 4 of 6

WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

US 41 - CTH BB INTERCHANGE

IMPROVEMENT ALTERNATIVE 3B - COMPLETE STREETS

BEHM CT

S. VAN DYKE RD.

US 41

CTH BB (PROSPECT AVE.)

ADD BEAM GUARD

CTH BB WB - ADD ONE THRU LANE AND ONE 100' RIGHT TURN LANE

CTH BB WB - ADD ONE 350' LEFT TURN LANE

ADD RETAINING WALL

ADD RETAINING WALL

CTH BB EB - ADD ONE EXCLUSIVE 300' LEFT TURN LANE AND ONE EXCLUSIVE 300' RIGHT TURN LANE.

EXTEND BOX CULVERT TO ACCOMMODATE ADDITIONAL ROADWAY WIDTH

POSSIBLE COMMERICAL AND RESIDENTIAL RELOCATION

USE 3' TERRACE TO REDUCE DISTANCE TO BUILDING

ADD ONE CONTINUOUS THROUGH LANE

CTH BB WB - ADD ADDITIONAL THROUGH LANE

CTH BB WB AND EB - ADD ADDITIONAL THRU LANE

CTH BB WB - ADD ONE THRU LANE AND ONE 150' RIGHT TURN LANE

CTH BB WB - ADD 250' LEFT TURN LANE

ADD RETAINING WALL

CTH BB (PROSPECT AVE.)

BRIDGE WIDEN TO ACCOMMODATE THE ADDITIONAL TWO THRU LANES

USE 3' TERRACE TO REDUCE DISTANCE TO BUILDING

CTH BB EB - ADD 200' RIGHT TURN LANE

ADD CONCRETE BARRIER AND BEAM GUARD UNDER BRIDGE

NORTHERN RD.

US 41

AMERICAN DR.

LEGEND

- EXISTING RIGHT OF WAY
- EXISTING ROADWAY DESIGN
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/ PATH
- RIGHT OF WAY ACQUISITION
- PROPOSED STRUCTURES

N

SCALE 0' 150' 300'

HNTB

Exhibit

US 41/CTH BB
OUTAGAMIE COUNTY

Sheet 4B of 6

S. VAN DYKE RD.

US 41

CTH BB (PROSPECT AVE.)

CTH BB (PROSPECT AVE.)

NORTHERN RD.

US 41

AMERICAN DR.

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- PROPOSED STRUCTURES
- RIGHT OF WAY ACQUISITION

SCALE 0' 150' 300'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

MARCH 2011

US 41 - CTH BB INTERCHANGE

IMPROVEMENT ALTERNATIVE RAB 2020

HNTB

Exhibit

US 41/CTH BB
OUTAGAMIE COUNTY

S. VAN DYKE RD.

CTH BB (PROSPECT AVE.)

US 41

CTH BB (PROSPECT AVE.)

NORTHERN RD.

US 41

AMERICAN DR.

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- PROPOSED STRUCTURES
- RIGHT OF WAY ACQUISITION

SCALE 0' 150' 300'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

MARCH 2011

US 41 - CTH BB INTERCHANGE

IMPROVEMENT ALTERNATIVE RAB 2035

HNTB

Exhibit

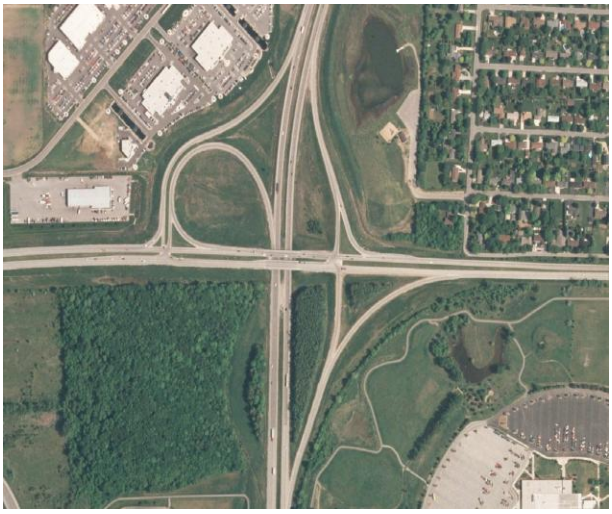
US 41/CTH BB
OUTAGAMIE COUNTY

Sheet 6 of 6

US 41 & WIS 15 / Northland Avenue

US 41/441 Operational Analysis — US 41 and WIS 15 (Northland Ave)

Mainline Route	Crossroad
US 41	WIS 15/CTH OO
Region	**Location**
Northeast	City of Appleton
Interchange Type	**Crossroad Function**
Partial Cloverleaf	Minor Arterial
Ramp Terminal	**Bridge Sufficiency**
Signalized	B-44-0177 = 97 B-44-0178 = 98
Bridge Hits	**Bridge Service Life**
None	B-44-0177 built 1997 B-44-0178 built 1997



No-Build Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY South (NB)	FWY North (NB)	FWY North (SB)	FWY South (SB)	Total	Notes
LOS	2035	-	D (F)	F (D)	-	-	-	B (E)	D (F)	E (D)	C (C)		AM Peak (PM Peak)
	2020	-	D (F)	F (D)	-	C (C)	E (F)	B (C)	C (E)	E (C)	C (B)		
	existing	-	C (D)	D (C)	-	A (B)	C (F)	B (C)	C (D)	D (C)	B (B)		
Queue	2035												Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1450 feet SB = 1825 feet
	2020					483 (776)	474 (476)						
	existing					155 (291)	408 (479)						
Crashes	2002-2006	11	16	6	4	9	53	0	35	34	0	168	
	Severity	0.09	0.63	0.50	0.50	0.33	0.36	0.00	0.29	0.29	0.00	-	(INJ+FAT) / Total Crash
	Rate	41	65	20	13	0.13	0.87	0	32	29	0	-	Merge & Diverge = HMVMT Intersection = MEV

Improved Alternative Summary

Title	Description
Alternative 1	Lane modifications to the northbound and southbound off ramps NB on ramp acceleration lane extension
Alternative 2	Two left turn lanes for EB traffic at the northbound ramp terminal, modification to the northbound onramp. Alt 2 has Alt 1 improvements built into proposal.
Alternative 3	Casaloma Drive and Blue Mound Road intersection improvements. Alt 3 has Alt 1 and Alt 2 improvements built into proposal.
Alternative 4	2020 RAB. Unrelated to signal design.
Alternative 5	2035 RAB. Unrelated to signal design.

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
LOS	Alt. 1	-	D (F)	F (D)	-	B (B)	C (D)	B (C)	C (E)	E (C)	C (B)		AM Peak (PM Peak)
	Alt. 2	-	D (F)	F (D)	-	B (B)	C (D)	B (C)	C (E)	E (C)	C (B)		
	Alt. 3	-	D (F)	F (D)	-	B (B)	C (D)	B (C)	C (E)	E (C)	C (B)		
	Alt. 4	-	D (F)	F (D)	-	A (A)	A (A)	B (C)	C (E)	E (C)	C (B)		
	Alt. 5	-	D (F)	F (D)	-	A (A)	B (A)	B (C)	C (E)	E (C)	C (B)		

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
Queue	Alt. 1					158 (370)	461 (334)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1450 SB = 1825
	Alt. 2					178 (375)	459 (334)						
	Alt. 3					178 (375)	459 (334)						
	Alt. 4					25 (25)	25 (25)						
	Alt. 5					25 (25)	25 (25)						
Crash Benefit	Alt. 1	-	8	-	-	7	45	-	-	-	-	60	Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35.000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands over a five year period)
	Alt. 2	-	8	-	-	7	45	-	-	-	-	60	
	Alt. 3	-	8	-	-	7	45	-	-	-	-	60	
	Alt. 4	-	-	-	-	17	107	-	-	-	-	124	
	Alt. 5	-	-	-	-	17	107	-	-	-	-	124	

Alternative Construction Costs

	Total Cost	Structure Costs	ROW Costs
Alternative 1	$302,000	$0	$0
Alternative 2	$1,361,000	$290,000	$0
Alternative 3	$2,335,000	$555,000	$0
Alternative 4	$14,693,000	$1,551,000	$512,000
Alternative 5	$18,560,000	$1,551,000	$1,093,000

Preliminary Environmental Screening

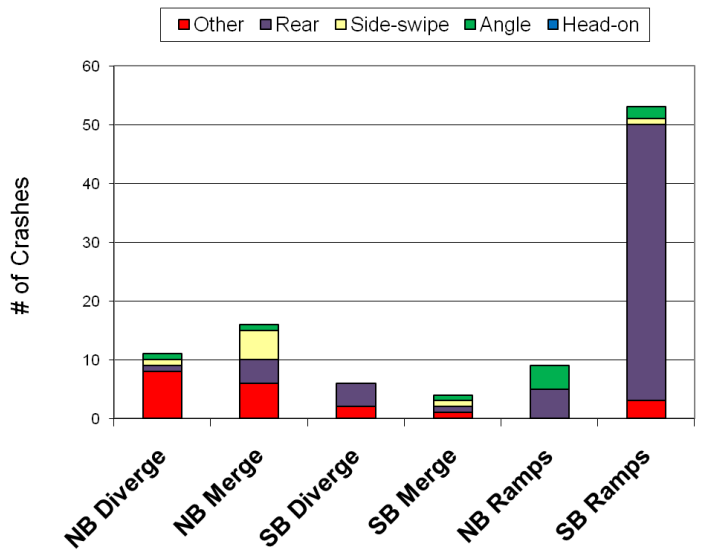
- A residential neighborhood is located near the interchange
- Identified wetlands are located near the interchange
- An unnamed stream crosses under the interchange
- A section 4(f) property is located adjacent to the interchange
- The interchange is located within 3 miles of an airport

Existing Geometric Deficiencies Rating

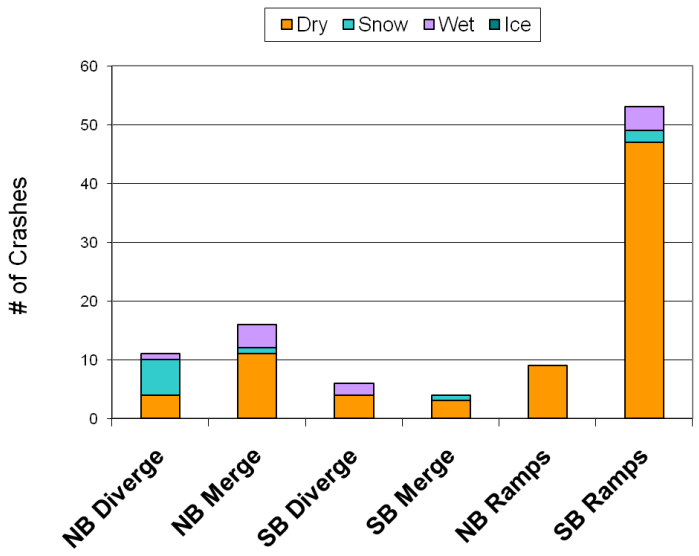
Freeway/Ramps	Score	Comments
Ramp Design Speed & Horizontal Alignment	Poor	SB off ramp taper begins within a mainline horizontal curve
Ramps Merge / Diverge	Poor	Deficient horizontal first curve radii on all four ramps
Ramp Stopping Sight Distance		FIELD VERIFIED
Bridges		
Bridge Width	Acceptable	
Crossroad		
Intersection Skew / Intersection Sight Distance	Acceptable	
Geometric Deficiency Score	Roadway Geometric Score = 8 / 10	Bridge Geometric Score = 5 / 5

Detailed Crash Analysis

Crash Type Summary



Pavement Condition Summary



US 41 & WIS 15 (NORTHLAND AVENUE) INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the US 41 & WIS 15 (Northland Ave) interchange is to address the needs and deficiencies identified in the USH 41 Interstate Conversion Geometric Deficiencies Report dated February 2009. The following is a summary of the needs and deficiencies at the WIS 15 (Northland Ave) Interchange:

- High crash rate at the southbound ramp terminal intersection
- High crash severity rate at the northbound US 41 merge location
- Operational issues at the following locations:
  - Eastbound left turn movement from WIS 15 (Northland Ave) to northbound US 41 on ramp
  - Southbound right movement at the US 41 southbound ramp terminal intersection
  - Northbound left movement at the US 41 northbound ramp terminal intersection

The primary need at the WIS 15 (Northland Ave) interchange is to improve the safety and operations at the ramp terminal intersections.

The following alternatives have been developed based on an order of importance with regard to safety and operations, and should be considered cumulative with each other. The alternative analyses (LOS, queue lengths, etc) reflect this method. For example, Alternative 2 should only be considered in addition to Alternative 1.

Alternative 1

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Add an additional left turn lane on the northbound off ramp.
- Add an additional right turn lane and extend right turn lane from 250 feet to 375 feet to the southbound off ramp.
- Extend the on ramp acceleration lane for northbound ramp from 750 feet to 1000 feet.

The improvements in Alternative 1 will reduce queue lengths on the off ramps and assist with crash severity problems at the northbound US 41 merge location. It is recommended that a traffic signal be installed at the southbound ramp terminal intersection for the right turn movement, southbound to westbound, and remove the existing yield sign. The signal would be coordinated with the existing traffic signals at the southbound ramp terminal intersection.

Further investigation is needed for potential removal of trees in the clear-zone with the recommendation made to the left turn at the US 41 northbound off ramp.

Alternative 2

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- All changes made in Alternative 1

- Add an additional left turn lane for eastbound WIS 15 (Northland Ave) traffic turning onto the northbound on ramp.
- Reconstruct the northbound on ramp with corrected horizontal alignment and improve signage.

The improvements in Alternative 2 will reduce the congestion on WIS 15 (Northland Ave) by decreasing the possibility of turning queues affecting eastbound through traffic. Alternative 2 will require the eastbound overpass to be widened approximately 11 feet for the construction of the second left turn lane.

Alternative 3

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- All changes made in Alternative 1 and 2.
- Add an additional northbound thru lane to Casaloma Dr.
- Extend the left turn lane from 200 feet to 280 feet northbound Casaloma Dr.
- Add an additional Casaloma Dr southbound right turn lane onto WIS 15 (Northland Ave.).
- Extend right turn lane to 375 feet on westbound WIS 15 (Northland Ave.) onto Casaloma Dr.
- Add additional eastbound WIS 15 (Northland Ave.) left turn lane to 260 feet and modify existing left turn lane.
- Add an additional westbound WIS 15 (Northland Ave.) left turn lane to 415 feet and modify existing left turn lane.
- Extend left turn lane from 200 feet to 250 feet southbound Blue Mound Rd onto WIS 15 (Northland Ave.).
- Extend left turn lane from 400 feet to 695 feet eastbound WIS 15 (Northbound Ave.) onto Blue Mound Rd.
- Extend westbound WIS 15 (Northbound Ave.) right turn lane from 250 feet to 350 feet onto Blue Mounds Dr.

The improvements in Alternative 2B will allow Casaloma Dr. and Blue Mound Dr. intersections to operate more effective. The Casaloma Dr. will have more queue space for the traffic from Fox Cities Baseball Stadium.

Alternative 4

The Year 2020 roundabout alternative requires a five-lane facility (3 westbound) between the two ramp terminals, but it maintains a four-lane facility east and west of the ramp terminals. Three-lane roundabouts would be provided at Casaloma Drive, the northbound US-41 ramps, and the southbound US-41 ramps. A two-lane roundabout would be provided at Bluemound Drive. All movements are expected to operate at LOS B or better and experience acceptable queues and delays. Surplus capacity of approximately 15%[1] is expected beyond the forecasted Year 2020 traffic conditions. A

[1] Determined by applying an equal percentage increase to all volumes at an intersection under the 50th CL until a leg failed. The lowest percent increase among the intersections was reported. Therefore, the remaining intersections at each interchange will have higher surplus capacity values

system of roundabouts at this location will allow for the use of right-in/right-outs at future driveway locations as U-Turns are accommodated within the roundabouts.

Alternative 5

The Year 2035 roundabout alternative requires a six-lane facility between the two ramp terminals as well as east and west of the ramp terminals. Three-lane roundabouts would be provided at Casaloma Drive, the northbound US-41 ramps, the southbound US-41 ramps, and Bluemound Drive. All movements are expected to operate at LOS C or better and experience acceptable queues and delays.

Additional Deficiencies

The northbound and southbound on ramp merge locations have existing horizontal curve radii of 1091 feet which is 4 feet less than the minimum outlined in the WisDOT Facilities Development Manual (FDM). The cost of redesigning the ramp to meet this standard would greatly outweigh any potential safety benefit outcomes.

The northbound diverge has an existing first curve radius of 573 feet which is less than the WisDOT FDM minimum of 1095 feet. Redesigning this curve is not recommended because of the following reasons: low existing crash and severity rate, high estimated cost, and existing signing. The current diverge has an advisory sign which advises drivers to reduce their speed to 45 mph before making the first horizontal curve.

The southbound diverge has a high crash severity rate although due to the low 5 year total crash rate of 6 crashes, no recommendations are suggested. The cost to flatten the existing horizontal curve radius with a radius of 849 feet to the 1095 foot standard would exceed any potential safety return.

This interchange experiences heavy traffic fluctuations due to the sporadic traffic to and from the Fox Cities Baseball Stadium located to the southwest of the interchange. Recent construction extended the left turn bay for eastbound traffic at the southbound ramp terminal intersection.

Comparison of Alternatives

The interchange alternatives were compared based on safety, traffic operations, cost and other factors:

Safety

Alternative 1 addresses the existing safety issue with crashes at the southbound ramp terminal intersection by moving vehicles away from the intersection more efficiently and faster. Alternative 2 addresses similar issues on WIS 15 (Northland Ave). Additionally, Alternative 1 will aid the crash severity problem at the northbound US 41 merge location.

Traffic Operations

Alternative 1 and 2 allow more vehicles to turn with each signal phase improving the level of service on the ramps and on WIS 15 (Northland Ave). Alternative 1 will increase the level of service at the northbound ramp terminal intersection to D and at the southbound ramp terminal intersection to B for design year 2020 (comparing to no-build conditions).

All operations are under the assumption that the traffic signal phasing utilizes single ring TTI (Texas Transportation Institute) phasing. Different signal phasing would require additional analysis to determine altered LOS and queue distances.

Environmental Factors

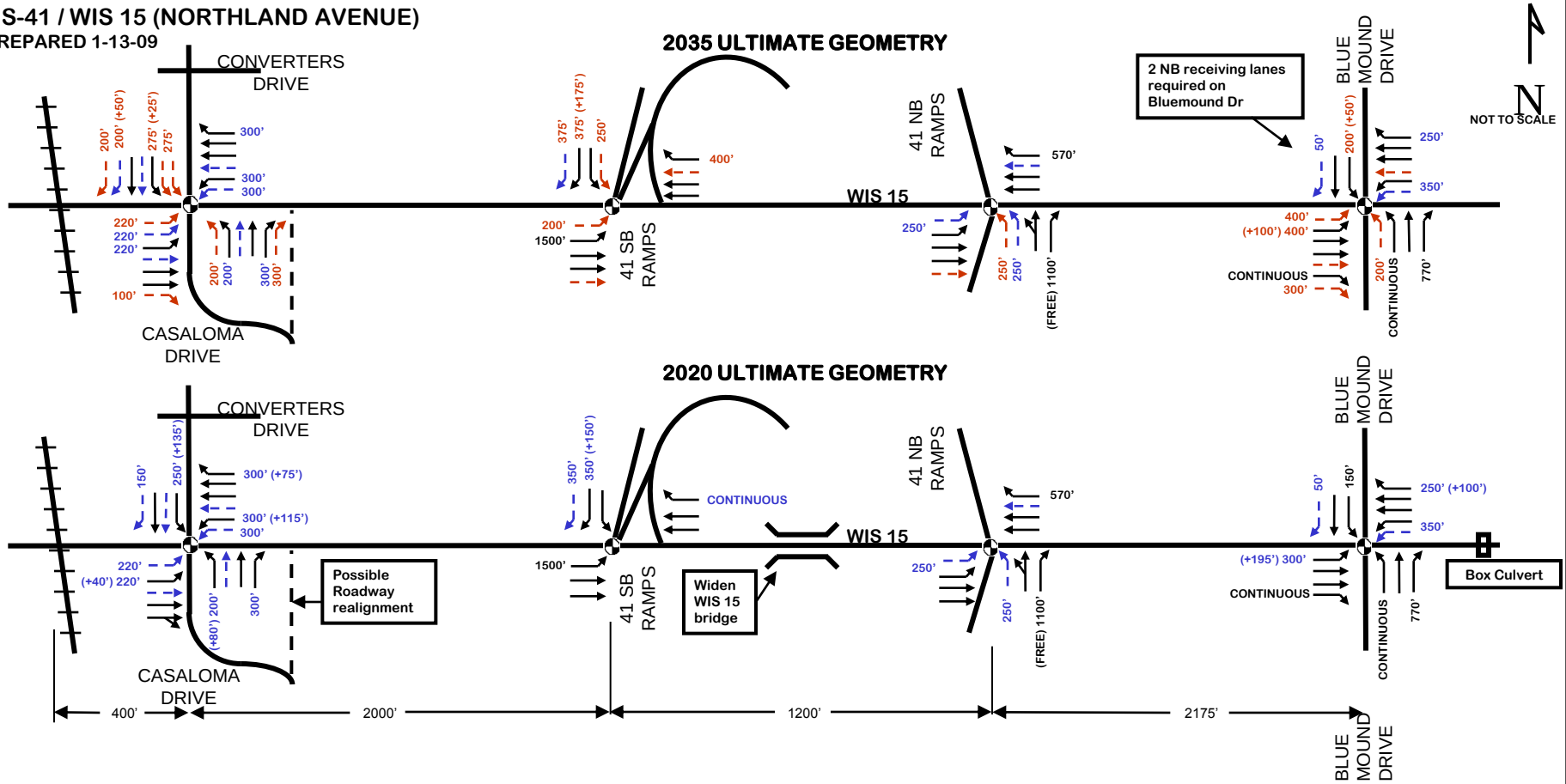
- A residential neighborhood is located near the interchange
- Identified wetlands are located near the interchange
- An unnamed stream crosses under the interchange
- A section 4(f) property is located adjacent to the interchange
- The interchange is located within 3 miles of an airport

Complete Streets

Currently there are no bike/ped accommodations at this interchange. However, the existing Pedestrian Overpass at Fox Cities Stadium / Fox Valley Technical College to the south and the overpass at Capitol Dr to the north provide bike/ped accommodations. When the long-term RAB improvements are programmed, sidewalks should be added to the plans. Bluemound Drive will be adding bike lanes and sidewalks with a future improvement project in the SE quadrant of this interchange. Bike lanes should be considered between the future roundabouts. The trail that crosses at the pedestrian overpass should be connected to Casaloma Dr. Currently transit does not serve this area directly.

US-41 / WIS 15 (NORTHLAND AVENUE)

PREPARED 1-13-09



XX' BASE GEOMETRICS PLANNED TURN BAY LENGTH	BASE GEOMETRICS	TRAFFIC SIGNAL
(+XX') ADDITIONAL TURN BAY LENGTH RECOMMENDED	ADDITIONAL IMPROVEMENT RECOMMENDED	STOP SIGN
(+XX') ADDITIONAL TURN BAY LENGTH REQUIRED FOR 2035 VOLUMES	ADDITIONAL IMPROVEMENT REQUIRED FOR 2035 VOLUMES	OPERATIONAL PROBLEMS REMAIN

AADT

Existing – 26,800

2020 – 34,100

2035 – 39,200

USH 41/WIS 441 Short-Term Improvement Cost Estimate
WIS 15/Northland Ave.
(Improvement Alternative __)

	Roadway	Structure	Construction	R/W Cost	CM & Eng	Incremental Total	Total
Alternative 1	$ 182,000	$ -	$ 109,000	$ -	$ 11,000	$ 302,000	$ 302,000
Alternative 2	$ 450,000	$ 290,000	$ 290,000	$ -	$ 29,000	$ 1,059,000	$ 1,361,000
Alternative 3	$ 415,000	$ 265,000	$ 267,000	$ -	$ 27,000	$ 974,000	$ 2,335,000
Alternative 4	$ 7,628,000	$ 1,551,000	$ 4,547,000	$ 512,000	$ 455,000	$ 14,693,000	$ 14,693,000
Alternative 5	$ 9,629,000	$ 1,551,000	$ 5,715,000	$ 1,093,000	$ 572,000	$ 18,560,000	$ 18,560,000

Item	Item Description	Unit	Unit Price	
1	New Concrete Pavement[1]	SY	$65	Concrete, Base Aggregate, Crushed
2	New HMA Pavement[2]	SY	$50	HMA, Base Aggregate, Crushed
3	Sidewalk	SY	$35	
4	Curb and Gutter	LF	$20	
5	Earthwork	CY	$20	Cut or fill, based on observed topography, including ditches
6	Signal Pole Relocation	EA	$15,000	
7	Signal System	EA	$165,000	
8	Ramp Meter	EA	$75,000	
9	Ramp Meter- remove and reinstall	EA	$35,000	
10	Sign Bridge	EA	$100,000	
11	Drainage - Inlets/Manholes	EA	$700	
12	Drainage - Pipes/Culverts	LF	$50	
13	Drainage - Pipes/Culverts - extensions	LF	$100	
14	Concrete Barrier - 42"	LF	$70	
15	Retaining wall - non-structural (<5')	SF	$25	
16	Beam Guard	LF	$20	
17	Beam Guard End Absorbing Terminal	EA	$2,500	
18	Unique Items			Add Items unique to these locations,
19				that are too large to be covered in 'Road Incidentals'.
20				
	Subtotal			
	Road Incidentals[3]	LS	20%	removals, finishing, erosion, removals, lighting, etc
	Planning Level Contingency[3]	LS	20%	
	Signing & Pavement Marking[3]	LS	5%	
	Traffic Control - urban mainline[3,4]	LS	12%	assumed 100% unless other TC is entered
	Traffic Control - rural mainline[3,4]	LS	10%	enter percent of project on rural mainline
	Traffic Control - ramps[3,4]	LS	8%	enter percent of project on ramps
	Traffic Control - local roads[3,4]	LS	5%	enter percent on local roads
	Bridges - new and widening with substructure	SF	$ 140.00	Area of Bridge Deck
	Bridges - widening using existing substructure	SF	$ 100.00	Area of Bridge Deck
	Bridges - redecking	SF	$ 70.00	Area of Bridge Deck
	Retaining walls - structural	SF	$ 35.00	area of exposed wall face
	Mobilization[5]	LS	6%	
	CM & Engineering[6]	LS	10%	
	Right of Way			Site Specific
	Commercial Real Estate	SF		
	Residential Real Estate	SF		
	Commercial Relocation Cost	LS		
	Residential Relocation Cost	LS		
	Lighting	LS		

NOTES:

1. New Concrete Pavement consists of: Concrete Pavement 10", $50/SY; Base Aggregate, 6", $16/ton; Select Crushed, 12", $14/ton.
2. New HMA Pavement consists of: HMA, 5", $70/ton; Oil, $600/ton; Base Aggregate, 12", $16/ton; Select Crushed, 12", $14/ton
3. Lump Sum items are computed as a percentage of the roadway item costs. These do not include structural component costs.
4. Traffic Control is a lump sum, between 5% - 12%, weighted by the estimated construction cost on each roadway type.
5. Mobilization is computed as a percentage of the all item costs, including structural components.
6. Construction Management and Engineering are computed as a percentage of the total construction cost.

Preliminary Cost Estimate: USH 41 at WIS 15/Northland Ave.
Alternative 1

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	2,000	$130,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20	330	$6,600	
5	Earthwork	CY	$20	1,200	$24,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	2	$1,400	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20	New Signal Pole	EA	$20,000	1	$20,000	
	Roadway Total			**$182,000**		
	Road Incidentals	LS	20%		$36,000	
	Planning Level Contingency	LS	20%		$36,000	
			0%			
	Signing & Pavement Marking	LS	5%		$9,000	
	Traffic Control - urban mainline	LS	12%	100%	$22,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$6,180	
	Construction Total			**$109,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$11,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$302,000**		

Preliminary Cost Estimate: USH 41 at WIS 15/Northland Ave.
Alternative 2

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	2,550	$165,750	
2	New HMA Pavement[2]	SY	$50	0	$0	
3	Sidewalk	SY	$35	0	$0	
4	Curb and Gutter	LF	$20	230	$4,600	
5	Earthwork	CY	$20	1,200	$24,000	
6	Signal Pole Relocation	EA	$15,000	3	$45,000	
7	Signal System	EA	$165,000	0	$0	
8	Ramp Meter	EA	$75,000	0	$0	
9	Ramp Meter- remove and reinstall	EA	$35,000	0	$0	
10	Sign Bridge	EA	$100,000	2	$200,000	
11	Drainage - Inlets/Manholes	EA	$700	2	$1,400	
12	Drainage - Pipes/Culverts	LF	$50	0	$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100	12	$1,200	
14	Concrete Barrier - 42"	LF	$70	120	$8,400	
15	Retaining wall - non-structural (<5')	SF	$25	0	$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$450,000**		
	Road Incidentals	LS	20%		$90,000	
	Planning Level Contingency	LS	20%		$90,000	
			0%			
	Signing & Pavement Marking	LS	5%		$23,000	
	Traffic Control - urban mainline	LS	12%	100%	$54,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00	2900	$290,000	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$290,000**		
	Mobilization	LS	6%		$32,820	
	Construction Total			**$290,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$29,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$1,059,000**		

Preliminary Cost Estimate: USH 41 at WIS 15/Northland Ave.
Alternative 3

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	5,100	$331,500	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20	3,100	$62,000	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000	1	$15,000	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	9	$6,300	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20	New Signal Pole	EA	$20,000		$0	
	Roadway Total			**$415,000**		
	Road Incidentals	LS	20%		$83,000	
	Planning Level Contingency	LS	20%		$83,000	
			0%			
	Signing & Pavement Marking	LS	5%		$21,000	
	Traffic Control - urban mainline	LS	12%	100%	$50,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00	2650	$265,000	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$265,000**		
	Mobilization	LS	6%		$30,120	
	Construction Total			**$267,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$27,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$974,000**		

Preliminary Cost Estimate: USH 41 at segment 1

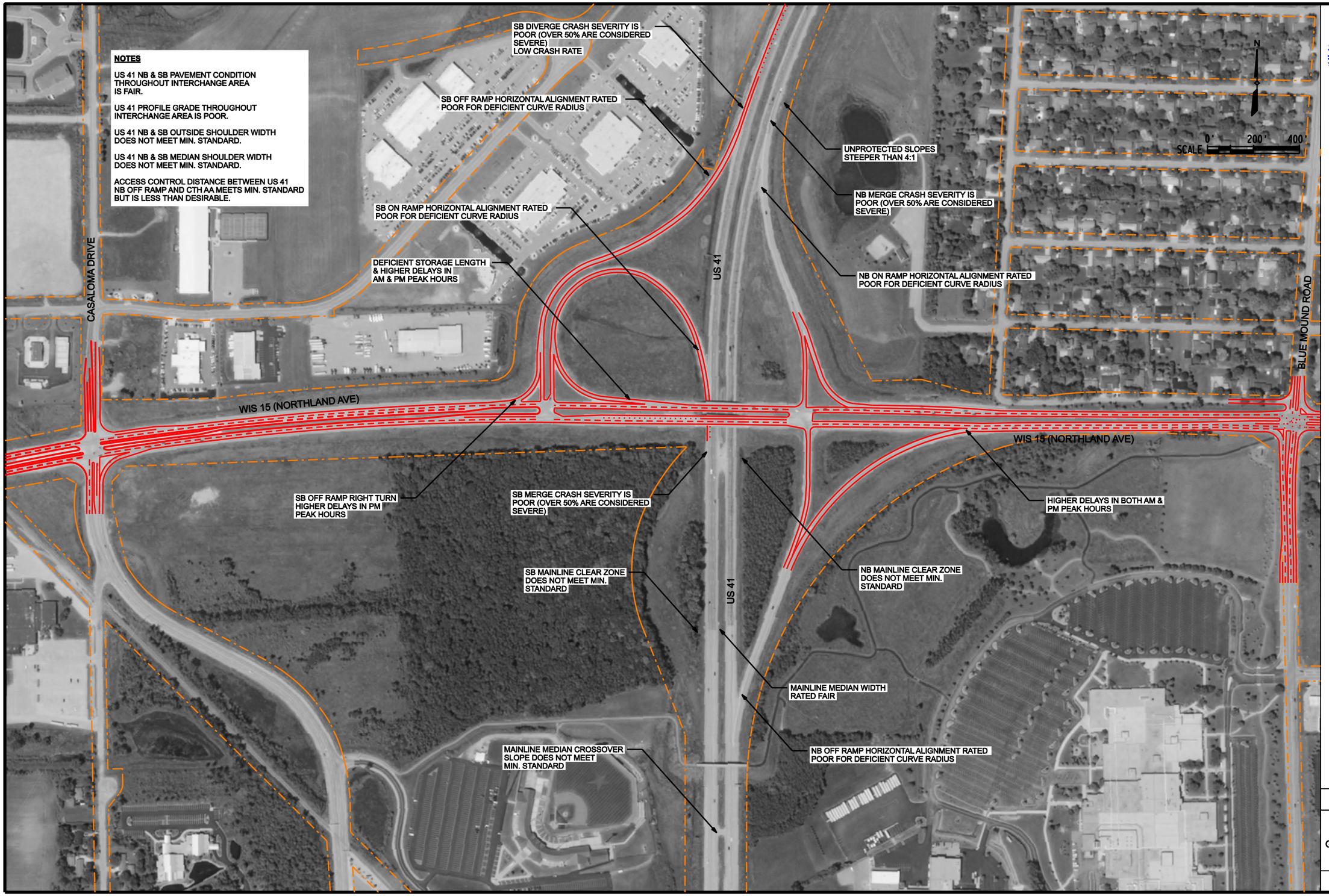
USH 41 & STH 15 (2020)

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	73,750	$4,793,750	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	8,900	$311,500	
4	Curb and Gutter	LF	$20	38,550	$771,000	
5	Earthwork	CY	$20	61,750	$1,235,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	110	$77,000	
12	Drainage - Pipes/Culverts	LF	$50	8,800	$440,000	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$7,628,000**		
	Road Incidentals	LS	20%		$1,526,000	
	Planning Level Contingency	LS	20%		$1,526,000	
	Signing & Pavement Marking	LS	5%		$381,000	
	Traffic Control - urban mainline	LS	12%	64%	$586,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	20%	$122,000	
	Traffic Control - local roads	LS	5%	16%	$61,000	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00	22150	$1,550,500	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$1,551,000**		
	Mobilization	LS	6%		$345,150	
	Construction Total			**$4,547,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$455,000**		
	Commercial Real Estate	SF	14,850	**$17**	$245,619	
	Residential Real Estate	SF	10,130	**$9**	$89,549	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	1	**$177,000**	$177,000	
	R/W Total			**$512,000**		
	TOTAL COST			**$14,693,000**		

Preliminary Cost Estimate: USH 41 at segment 1

USH 41 & STH 15 (2035)

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	96,850	$6,295,250	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	10,350	$362,250	
4	Curb and Gutter	LF	$20	42,000	$840,000	
5	Earthwork	CY	$20	78,300	$1,566,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	120	$84,000	
12	Drainage - Pipes/Culverts	LF	$50	9,620	$481,000	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$9,629,000**		
	Road Incidentals	LS	20%		$1,926,000	
	Planning Level Contingency	LS	20%		$1,926,000	
	Signing & Pavement Marking	LS	5%		$481,000	
	Traffic Control - urban mainline	LS	12%	64%	$740,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	20%	$154,000	
	Traffic Control - local roads	LS	5%	16%	$77,000	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00	22150	$1,550,500	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$1,551,000**		
	Mobilization	LS	6%		$411,270	
	Construction Total			**$5,715,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$572,000**		
	Commercial Real Estate	SF	46,920	**$17**	$776,057	
	Residential Real Estate	SF	15,800	**$9**	$139,672	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	1	**$177,000**	$177,000	
	R/W Total			**$1,093,000**		
	TOTAL COST			**$18,560,000**		



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

US 41 - WIS 15 INTERCHANGE

GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

US 41/WIS 15
OUTAGAMIE COUNTY

Sheet 1 of 6

EXTEND ON RAMP ACCELERATION LANE FROM 750' TO 1000'

EXTEND RIGHT TURN LANE FROM 250' TO 375' AND ADD ADDITIONAL RIGHT TURN LANE

CASALOMA DRIVE

US 41

BLUE MOUND ROAD

WIS 15 (NORTHLAND AVE)

WIS 15 (NORTHLAND AVE)

ADD ADDITIONAL LEFT TURN LANE

US 41

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED STRUCTURES
- COMMITTED PROJECTS
- RIGHT OF WAY ACQUISITION

SCALE 0' 200' 400'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

US 41 - WIS 15 INTERCHANGE

IMPROVEMENT ALTERNATIVE 1

HNTB

Exhibit

US 41/WIS 15
OUTAGAMIE COUNTY

NEW SIGN: LANE DROP/MERGE

PROVIDE TWO RECIEVING LANES AND MODIFY LANE DROPS

WIDEN BRIDGE BY 11'

TWO LEFT TURN LANES WITH QUEUEING SPACE OF 425'

CASALOMA DRIVE

US 41

BLUE MOUND ROAD

WIS 15 (NORTHLAND AVE)

WIS 15 (NORTHLAND AVE)

US 41

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED STRUCTURES
- COMMITTED PROJECTS
- RIGHT OF WAY ACQUISITION

SCALE 0' 200' 400'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

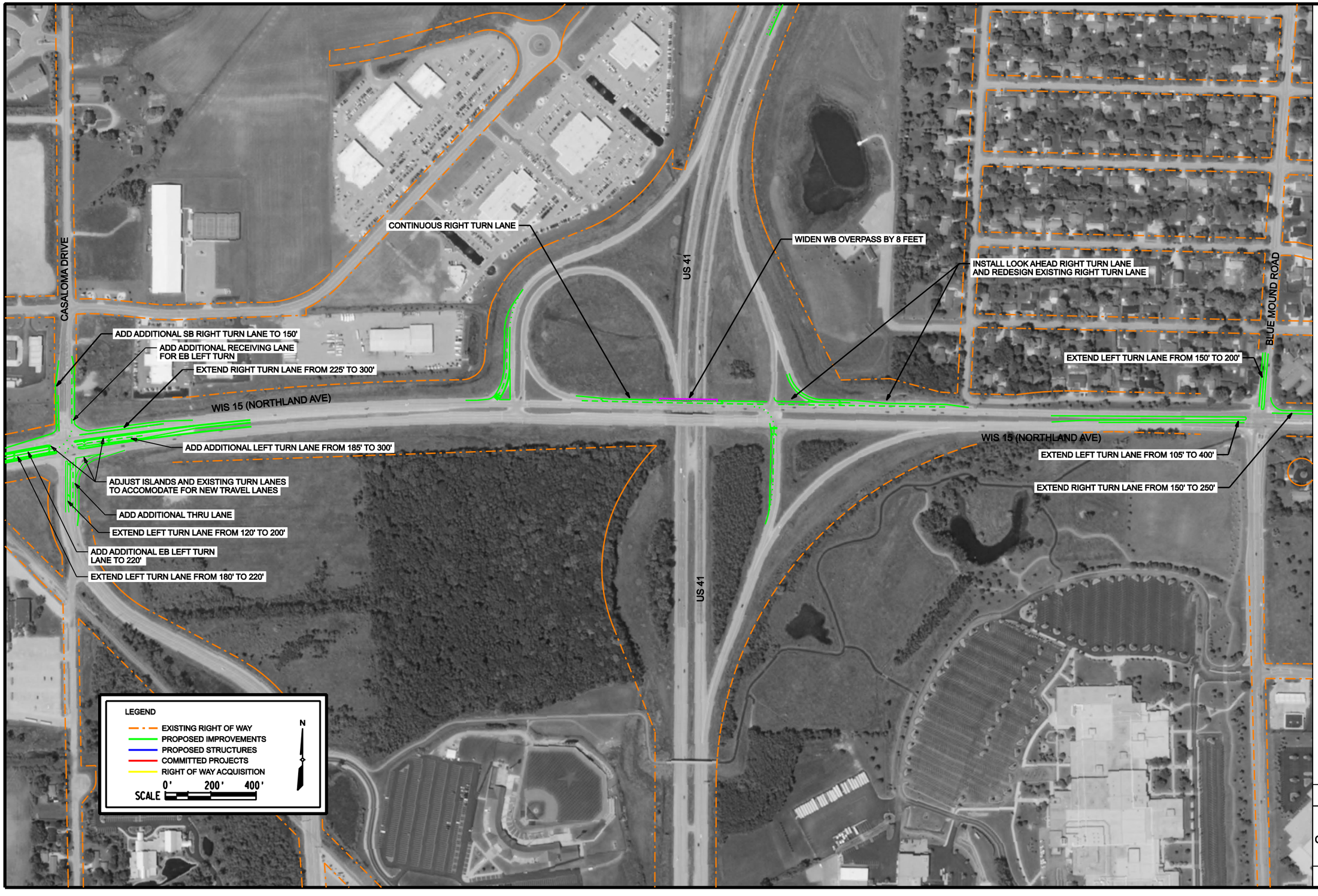
US 41 - WIS 15 INTERCHANGE

IMPROVEMENT ALTERNATIVE 2

HNTB

Exhibit

US 41/WIS 15
OUTAGAMIE COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

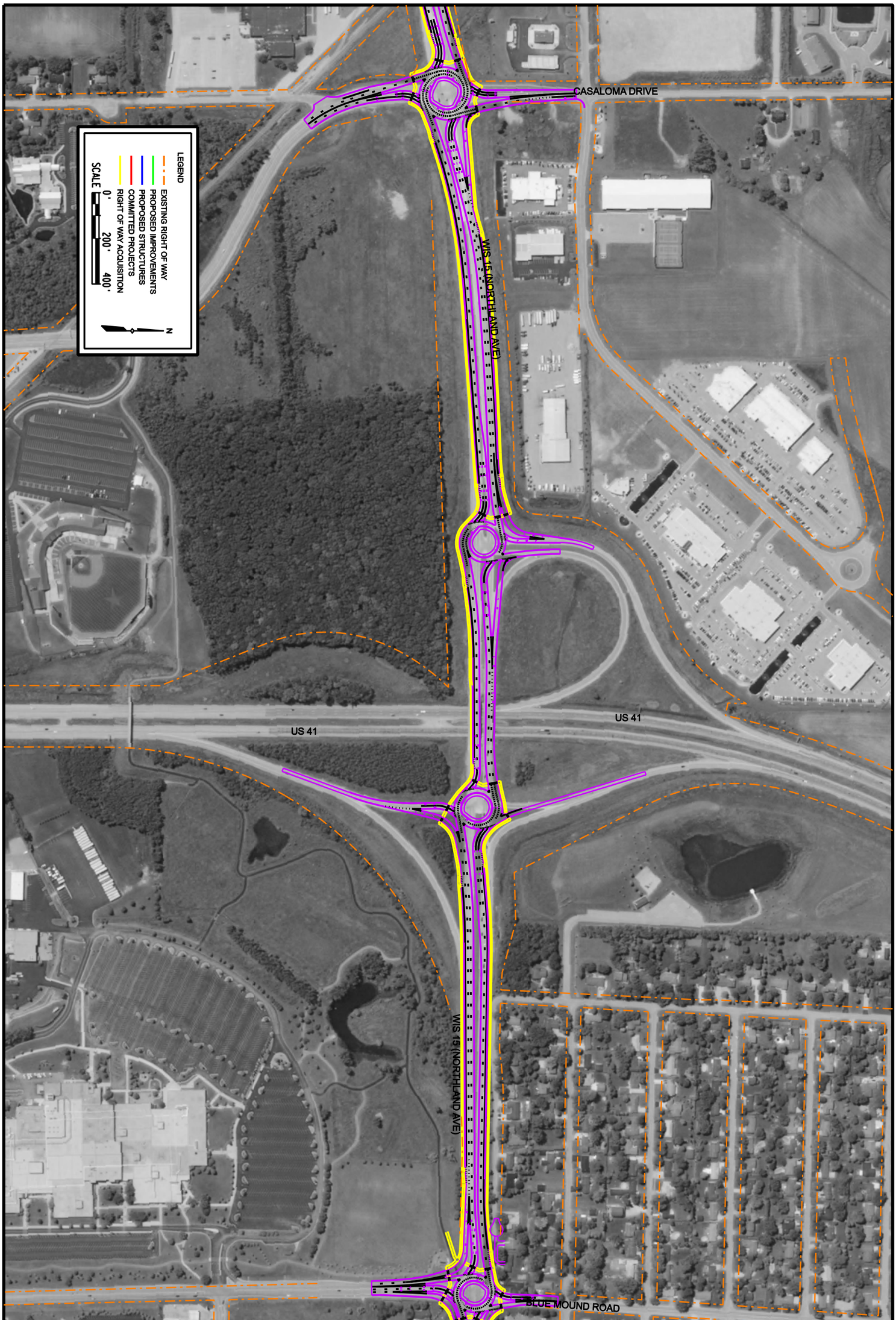
US 41 - WIS 15 INTERCHANGE

IMPROVEMENT ALTERNATIVE 3

HNTB

Exhibit

US 41/WIS 15
OUTAGAMIE COUNTY



US 41 - WIS 15 INTERCHANGE

2020 RAB IMPROVEMENT

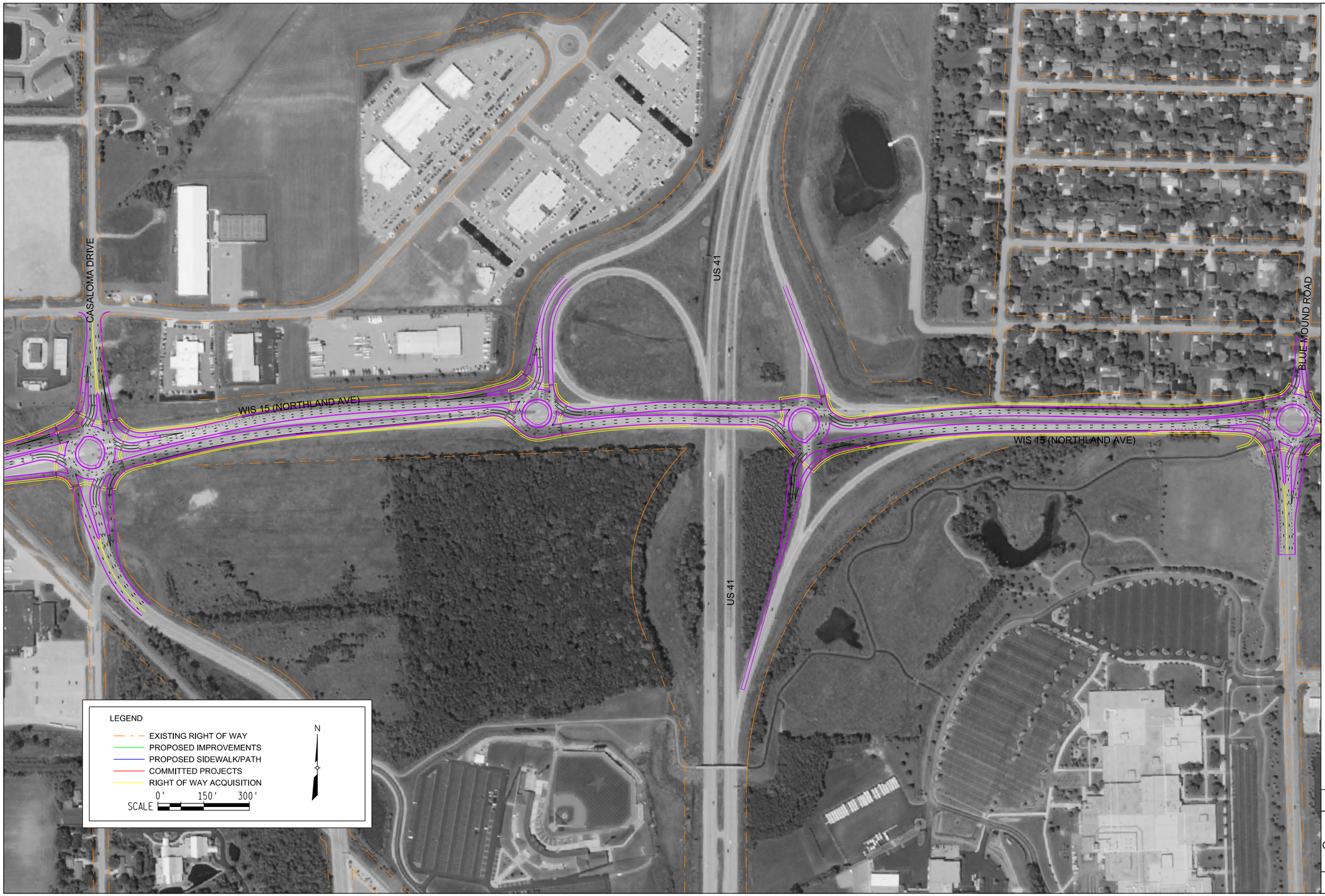
JANUARY 2010

HNTB

Exhibit

US 41/WIS 15
OUTAGAMIE COUNTY

Sheet 5 of 6



WISCONSIN DEPARTMENT OF TRANSPORTATION

NOVEMBER 2011

US 41 - WIS 15 INTERCHANGE

2035 RAB IMPROVEMENT

HNTB

Exhibit

US 41/WIS 15
OUTAGAMIE COUNTY

Sheet 6 of 6

US 41 & CTH E / Ballard Road

US 41/441 Operational Analysis — US 41 and CTH E (Ballard Rd)

Mainline Route	Crossroad
US 41	CTH E
Region	**Location**
Northeast	City of Appleton
Interchange Type	**Crossroad Function**
Diamond	Minor Arterial
Ramp Terminal	**Bridge Sufficiency**
Signalized	B-44-0172 = 94.6
Bridge Hits	**Bridge Service Life**
None	B-44-0172 built 1995

No-Build Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY West (NB)	FWY East (NB)	FWY East (SB)	FWY West (SB)	Total	Notes
LOS	2035	D (F)	aux	aux	F (E)	-	-	D (F)	D (F)	E (D)	D (D)		AM Peak (PM Peak)
	2020	D (E)	aux	aux	E (E)	F (F)	F (F)	C (E)	C (E)	D (C)	D (C)		
	existing	C (D)	C (E)	D (C)	D (D)	D (D)	F (D)	C (D)	C (D)	C (C)	C (C)		
Queue	2035					-	-						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1100' SB = 1070'
	2020					500 (1000)	587 (228)						
	existing					257 (212)	208 (145)						
Crashes	2002-2006	10	13	10	14	36	41	18	0	0	14	156	
	Severity	0.60	0.31	0.10	0.50	0.33	0.29	0.44	0.00	0.00	0.29	-	(INJ+FAT) / Total Crash
	Rate	39	53	46	61	0.75	0.90	39	0	0	28	-	Merge & Diverge = HMVMT Intersection = MEV

Improved Alternative Summary

Title	Description
Alternative 1	NB off ramp and SB on ramp extensions. Lane modifications to NB and SB off ramps
Alternative 2	Look ahead left turn lanes for NB and SB traffic on Ballard Road. Add northbound right turn lane at Evergreen Drive.
Alternative 3	2020 RAB. Unrelated to signal design.
Alternative 4	2035 RAB. Unrelated to signal design.

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
LOS	Alt. 1	B (C)	aux	aux	C (C)	D (F)	E (D)	C (E)	C (E)	D (C)	D (C)		AM Peak (PM Peak)
	Alt. 2	B (C)	aux	aux	C (C)	D (E)	E (D)	C (E)	C (E)	D (C)	D (C)		
	Alt. 3	B (C)	aux	aux	C (C)	A (A)	A (A)	C (E)	C (E)	D (C)	D (C)		
	Alt. 4	B (C)	aux	aux	C (C)	A (A)	A (A)	C (E)	C (E)	D (C)	D (C)		

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
Queue	Alt. 1					376 (1000)	282 (353)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1100' SB = 1070'
	Alt. 2					413 (992)	300 (382)						
	Alt. 3					25 (25)	25 (25)						
	Alt. 4					25 (75)	25 (25)						
Crash Benefit	Alt. 1	5	-	-	6	42	31	-	-	-	-	84	Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35.000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands over a five year period)
	Alt. 2	5	-	-	6	42	31	-	-	-	-	84	
	Alt. 3	-	-	-	-	69	72	-	-	-	-	141	
	Alt. 4	-	-	-	-	69	72	-	-	-	-	141	

Alternative Construction Costs

	Total Cost	Structure Costs	ROW Costs
Alternative 1	$319,000	$0	$0
Alternative 2	$661,000	$0	$0
Alternative 3	$7,853,000	$1,756,000	$387,000
Alternative 4	$8,156,000	$1,803,000	$543,000

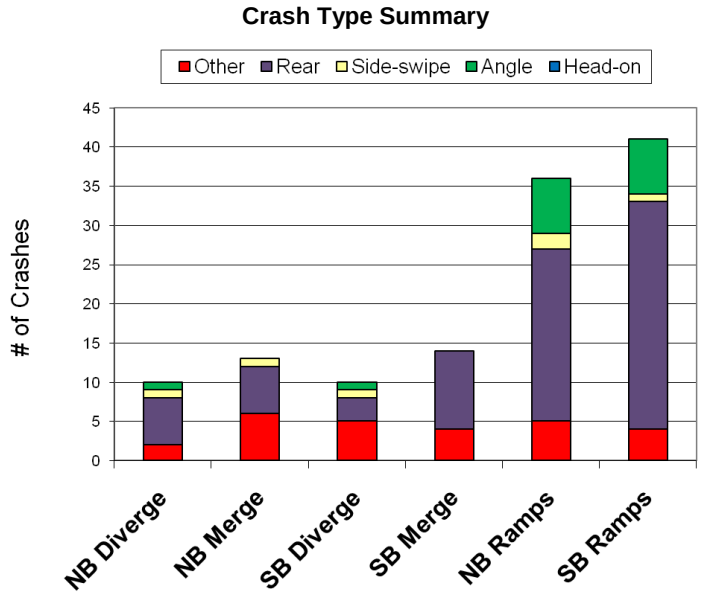
Preliminary Environmental Screening

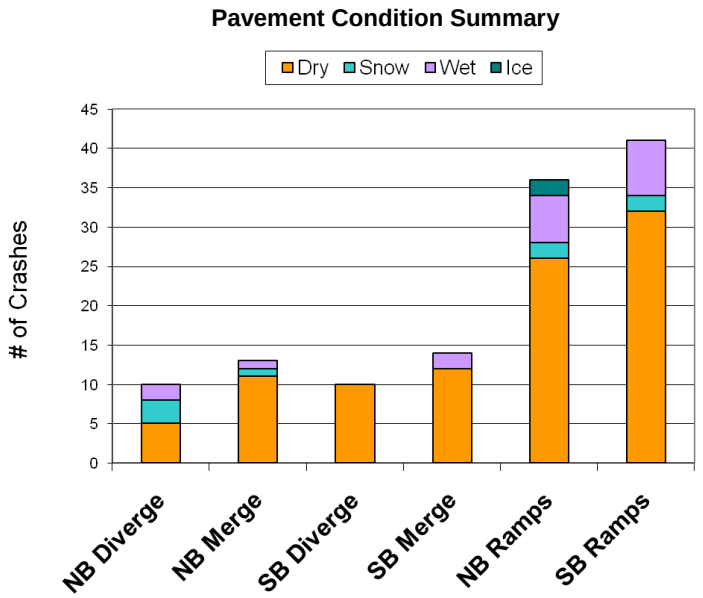
- A residential neighborhood is located adjacent to the interchange
- Possible environmental justice impacts
- Two streams and a chain of ponds are located near the interchange
- A historical Native American archaeological site exists on the west side of the interchange

Existing Geometric Deficiencies Rating

Freeway/Ramps	Score	Comments
Ramp Design Speed & Horizontal Alignment	Poor	Design speed of 50 mph on both off ramps
Ramps Merge / Diverge	Acceptable	
Ramp Stopping Sight Distance		FIELD VERIFIED
Bridges		
Bridge Width	Poor	Insufficient shoulder widths
Crossroad		
Intersection Skew / Intersection Sight Distance	Acceptable	
Geometric Deficiency Score	Roadway Geometric Score = 9 / 10	Bridge Geometric Score = 4 / 5

Detailed Crash Analysis





US 41 & CTH E (BALLARD ROAD) INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the CTH E (Ballard Rd) interchange is to address the needs and deficiencies identified in the US 41 Interstate Conversion Geometric Deficiencies Report dated February 2009. The following is a summary of the needs and deficiencies at the CTH E (Ballard Rd) Interchange:

- High crash rate at the ramp terminal intersections
- High crash rate at the southbound US 41 merge location
- Deficient vertical curve designs on the southbound on and off ramp as well as the northbound off ramp
- Insufficient vehicle queuing space:
  - Right turning vehicles on the southbound off ramp
  - Right and left turning vehicles on the northbound off ramp

The primary need at the CTH E (Ballard Rd) and US 41 interchange is to improve the safety at the ramp terminal intersections by improving traffic flow and level of service (LOS). LOS is expected to reach a grade of "F" at the ramp terminal intersections by 2020.

The following alternatives have been developed based on an order of importance with regard to safety and operations, and should be considered cumulative with each other. The alternative analyses (LOS, queue lengths, etc) reflect this method. For example, Alternative 2 should only be considered in addition to Alternative 1.

Alternative 1

This alternative addresses the operational and safety problems at this interchange by making the following changes:

- US 41 northbound off ramp: add an additional right turn lane and extend the existing right turn bay to a length of 300 feet
- US 41 southbound off ramp: add an additional right turn lane and extend the existing right turn bay to a length of 300 feet
- US 41 northbound off ramp: add an additional left turn lane and extend the existing left turn bay to a length of 500 feet
- Extend the northbound diverge deceleration distance from 300 feet to 1,400 feet
- Extend the southbound merge acceleration distance from 400 feet to 2,000 feet

The improvements in Alternative 1 will address operational issues at both ramp terminal intersections. It will also address crash severity problems at the southbound merge and northbound diverge locations. The auxiliary lanes between CTH E and WIS 441 have already been completed. Providing additional storage space on the ramps for turning vehicles will eliminate the potential for queues backing up onto the US 41 mainline.

Alternative 2

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- All changes made in Alternative 1
- Add a look-ahead left turn lane for southbound traffic at the southbound ramp terminal intersection
- Add a look-ahead left turn lane for northbound traffic at the northbound ramp terminal intersection

Alternative 2 will provide more vehicle storage space which will help to ensure left turning vehicle queues will not disrupt thru traffic traveling north and south on CTH E (Ballard Rd). The look-ahead lanes will also help to reduce congestion.

Alternative 3

The Year 2020 roundabout alternative maintains a four-lane facility along Ballard Road. Two-lane roundabouts would be provided at Capitol Drive and Evergreen Drive, while a three-lane roundabout would be provided at the northbound US-41 ramps and southbound US-41 ramps. All movements are expected to operate at LOS B or better and experience acceptable queues and delays. Surplus capacity of approximately 13%[1] is expected beyond the forecasted Year 2020 traffic conditions. A system of roundabouts at this location will allow for the use of right-in/right-outs at current and future driveway locations as U-Turns are accommodated within the roundabouts.

Alternative 4

The Year 2035 roundabout alternative maintains a four-lane facility along Ballard Road. Two-lane roundabouts would be provided at Capitol Drive and Evergreen Drive, while a three-lane roundabout would be provided at the northbound US-41 ramps and southbound US-41 ramps. All movements are expected to operate at LOS B or better and experience acceptable queues and delays.

Additional Deficiencies

Both off ramps have deficient crest vertical curves using a design speed of 55 miles per hour (mph) for a diamond interchange ramp. It is likely that the cost to increase the design speed by 5 mph would not provide significant safety impacts to the operations on the ramp. Additionally, the southbound on ramp has an existing crest curve designed for a maximum speed of 40 mph. This curve is near the intersection with CTH E (Ballard Rd) and does not perceive to be contributing to any crashes or operational issues.

Additional deficiencies are created with both alternatives by adding an additional right turn lane to the southbound off ramp. As more vehicles are diverted north from the ramp terminal intersection it causes the queue for northbound traffic at Evergreen

[1] Determined by applying an equal percentage increase to all volumes at an intersection under the 50th CL until a leg failed. The lowest percent increase among the intersections was reported. Therefore, the remaining intersections at each interchange will have higher surplus capacity values.

Drive and CTH E (Ballard Rd) to stretch back to the southbound ramp terminal intersection.

There are additional deficiencies on CTH E (Ballard Rd) at the intersections of Evergreen Drive and Capitol Drive not addressed in this report. It is estimated that those deficiencies will not effect operations of the US 41 ramps or mainline.

On both the northbound and southbound off ramps there are sight distance issues, but they are not significant enough to require construction. Also at the alternative 1 proposals, there could be issue with the widening of each approach due to the unprotected slopes. There would not be an issue with acquiring right-of-way, but another alternative would be a beam guard to protect the right-of-way encroachment.

Comparison of Alternatives

The interchange alternatives were compared based on safety, traffic operations, cost and other factors:

Safety

Alternative 1 addresses the safety issues for vehicles decelerating on the US 41 mainline. Adding additional queue space allows for shorter overall vehicle queue distances reducing the possibility of rear end crashes. Alternative 2 addresses similar safety issues on CTH E (Ballard Rd) by reducing the potential for queue lengths extending into adjacent intersections and interfering with through traffic. Additionally, Alternative 1 will fix the crash severity problem at the southbound merge and northbound diverge locations by extending the acceleration and deceleration lane lengths.

Traffic Operations

Both Alternatives 1 and 2 address operational issues at the ramp terminal intersections. This is done by adding or extending turn bays to more effectively move vehicles away from the interchange. Alternative 2 will increase the LOS at the ramp terminal intersections to a C or better at design year 2020. Increasing the southbound merge acceleration distance to 2,000 feet will improve the 2020 LOS to a C.

All operations are under the assumption that the traffic signal phasing utilizes single ring TTI (Texas Transportation Institute) phasing. Different signal phasing would require additional analysis to determine altered LOS and queue distances.

Cost

No additional right-of-way is required for either alternative and no structural costs are anticipated.

Environmental Factors

- A residential neighborhood is located adjacent to the interchange
- Possible environmental justice impacts
- Two streams and a chain of ponds are located near the interchange
- A historical Native American archaeological site exists on the west side of the interchange

Complete Streets

A trail currently connects Capitol Dr to CTH JJ on the east side of Ballard Rd and a sidewalk exists on the west side. Maintain all existing pedestrian accommodations at this interchange. Wide outside lanes should be added to accommodate bikes when adjusting curb lines. A future city project will give Ballard a road diet south of this interchange by reducing 4 lanes to 3 lanes with a TWLTL and add on-street bike lanes to Capitol Dr. Valley Transit has plans to extend a line to the park and ride lot in the NE quadrant of this interchange.

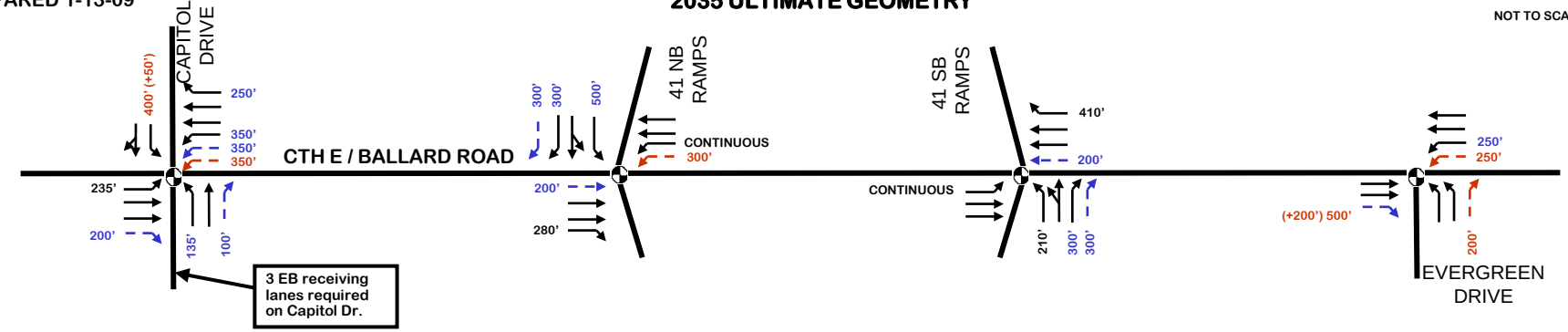
US 41 / CTH E (BALLARD ROAD)

PREPARED 1-13-09

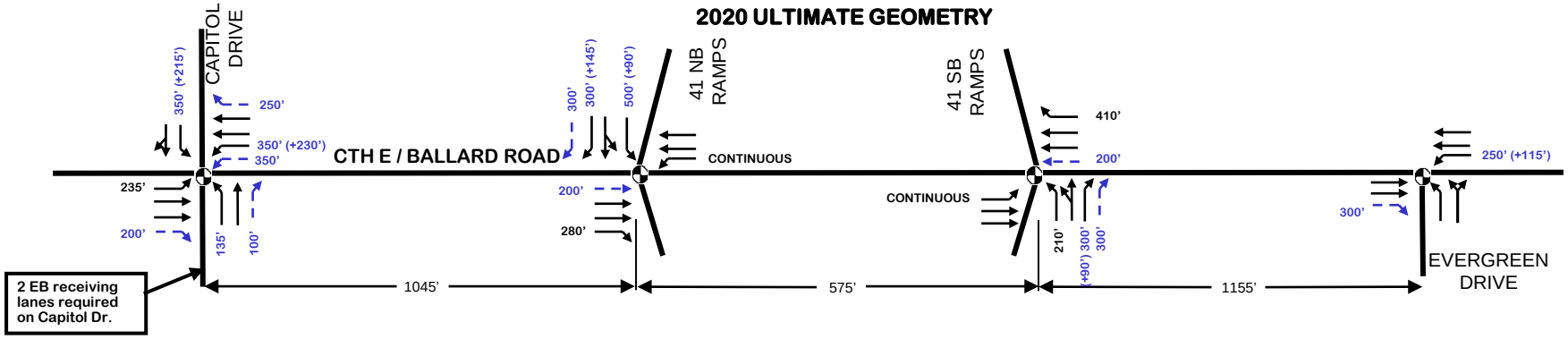
N

NOT TO SCALE

2035 ULTIMATE GEOMETRY



2020 ULTIMATE GEOMETRY



XX' BASE GEOMETRICS PLANNED TURN BAY LENGTH

(+XX') ADDITIONAL TURN BAY LENGTH RECOMMENDED

(+XX') ADDITIONAL TURN BAY LENGTH REQUIRED FOR 2035 VOLUMES

BASE GEOMETRICS

ADDITIONAL IMPROVEMENT RECOMMENDED

ADDITIONAL IMPROVEMENT REQUIRED FOR 2035 VOLUMES

TRAFFIC SIGNAL

STOP SIGN

OPERATIONAL PROBLEMS REMAIN

AADT

Existing – 13,900

2020 – 30,000

2035 – 36,600

USH 41/WIS 441 Short-Term Improvement Cost Estimate
CTH E/Ballard Rd.

	Roadway	Structure	Construction	R/W Cost	CM & Eng	Incremental Total	Total
Alternative 1	$ 191,000	$ -	$ 116,000	$ -	$ 12,000	$ 319,000	$ 319,000
Alternative 2	$ 198,000	$ -	$ 131,000	$ -	$ 13,000	$ 342,000	$ 661,000
Alternative 3	$ 3,413,000	$ 1,756,000	$ 2,088,000	$ 387,000	$ 209,000	$ 7,853,000	$ 7,853,000
Alternative 4	$ 3,474,000	$ 1,803,000	$ 2,124,000	$ 543,000	$ 212,000	$ 8,156,000	$ 8,156,000

Item	Item Description	Unit	Unit Price		
1	New Concrete Pavement[1]	SY		$65	Concrete, Base Aggregate, Crushed
2	New HMA Pavement[2]	SY		$50	HMA, Base Aggregate, Crushed
3	Sidewalk	SY		$35	
4	Curb and Gutter	LF		$20	
5	Earthwork	CY		$20	Cut or fill, based on observed topography, including ditches
6	Signal Pole Relocation	EA		$15,000	
7	Signal System	EA		$165,000	
8	Ramp Meter	EA		$75,000	
9	Ramp Meter- remove and reinstall	EA		$35,000	
10	Sign Bridge	EA		$100,000	
11	Drainage - Inlets/Manholes	EA		$700	
12	Drainage - Pipes/Culverts	LF		$50	
13	Drainage - Pipes/Culverts - extensions	LF		$100	
14	Concrete Barrier - 42"	LF		$70	
15	Retaining wall - non-structural (<5')	SF		$25	
16	Beam Guard	LF		$20	
17	Beam Guard End Absorbing Terminal	EA		$2,500	
18	Unique Items				Add Items unique to these locations,
19					that are too large to be covered in 'Road Incidentals'.
20					
	Subtotal				
	Road Incidentals[3]	LS		20%	removals, finishing, erosion, removals, lighting, etc
	Planning Level Contingency[3]	LS		20%	
	Signing & Pavement Marking[3]	LS		5%	
	Traffic Control - urban mainline[3,4]	LS		12%	assumed 100% unless other TC is entered
	Traffic Control - rural mainline[3,4]	LS		10%	enter percent of project on rural mainline
	Traffic Control - ramps[3,4]	LS		8%	enter percent of project on ramps
	Traffic Control - local roads[3,4]	LS		5%	enter percent on local roads
	Bridges - new and widening with substructure	SF	$ 140.00		Area of Bridge Deck
	Bridges - widening using existing substructure	SF	$ 100.00		Area of Bridge Deck
	Bridges - redecking	SF	$ 70.00		Area of Bridge Deck
	Retaining walls - structural	SF	$ 35.00		area of exposed wall face
	Mobilization[5]	LS		6%	
	CM & Engineering[6]	LS		10%	
	Right of Way				Site Specific
	Commercial Real Estate	SF			
	Residential Real Estate	SF			
	Commercial Relocation Cost	LS			
	Residential Relocation Cost	LS			
	Lighting	LS			

NOTES:

1. New Concrete Pavement consists of: Concrete Pavement 10", $50/SY; Base Aggregate, 6", $16/ton; Select Crushed, 12", $14/ton.
2. New HMA Pavement consists of: HMA, 5", $70/ton; Oil, $600/ton; Base Aggregate, 12", $16/ton; Select Crushed, 12", $14/ton
3. Lump Sum items are computed as a percentage of the roadway item costs. These do not include structural component costs.
4. Traffic Control is a lump sum, between 5% - 12%, weighted by the estimated construction cost on each roadway type.
5. Mobilization is computed as a percentage of the all item costs, including structural components.
6. Construction Management and Engineering are computed as a percentage of the total construction cost.

Preliminary Cost Estimate: USH 41 at CTH E/Ballard Rd.
Alternative 1

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	2,000	$130,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20	150	$3,000	
5	Earthwork	CY	$20	2,850	$57,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items	EA	$500	2	$1,000	Remove and replace road signs
20						
	Roadway Total			**$191,000**		
	Road Incidentals	LS	20%		$38,000	
	Planning Level Contingency	LS	20%		$38,000	
	Signing & Pavement Marking	LS	5%		$10,000	
	Traffic Control - urban mainline	LS	12%	100%	$23,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$6,540	
	Construction Total			**$116,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$12,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$319,000**		

Preliminary Cost Estimate: USH 41 at CTH E/Ballard Rd.
Alternative 2

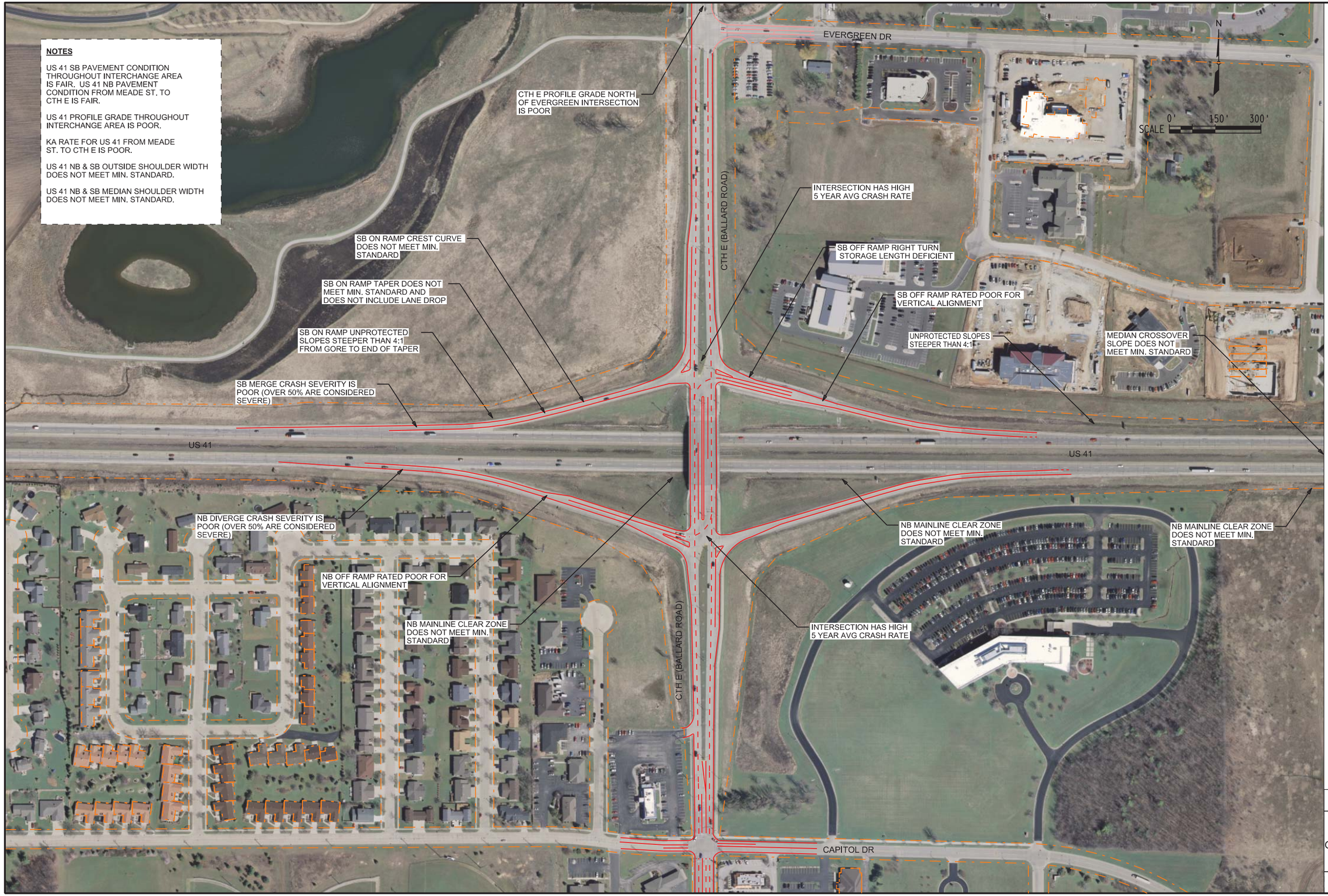
Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	1,100	$71,500	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20	850	$17,000	
5	Earthwork	CY	$20	900	$18,000	
6	Signal Pole Relocation	EA	$15,000	4	$60,000	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	2	$1,400	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Flume	EA	$500		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items	EA	$15,000	2	$30,000	Light Pole Relocation
20						
	Roadway Total			**$198,000**		
			$0			
	Road Incidentals	LS	20%		$40,000	
	Planning Level Contingency	LS	20%		$40,000	
			5%			
	Signing & Pavement Marking	LS	12%		$24,000	
	Traffic Control - urban mainline	LS	10%	100%	$20,000	
	Traffic Control - rural mainline	LS	8%	0%	$0	
	Traffic Control - ramps	LS	5%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
			$ 140.00			
	Bridges - new and widening with substructure	SF	$ 100.00		$0	
	Bridges - widening using existing substructure	SF	$ 70.00		$0	
	Bridges - redecking	SF	$ 35.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
			6%			
	Mobilization	LS	6%		$7,440	
	Construction Total			**$131,000**		
			10%			
	Const. Mngmt & Engineering Total	LS	10%	**$13,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$342,000**		

Preliminary Cost Estimate: USH 41 at CTH E/ Ballard Rd. (2020)
Alternative 3

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	32,850	$2,135,250	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	5,250	$183,750	
4	Curb and Gutter	LF	$20	16,400	$328,000	
5	Earthwork	CY	$20	27,200	$544,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	50	$35,000	
12	Drainage - Pipes/Culverts	LF	$50	3,730	$186,500	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$3,413,000**		
	Road Incidentals	LS	20%		$683,000	
	Planning Level Contingency	LS	20%		$683,000	
	Signing & Pavement Marking	LS	5%		$171,000	
	Traffic Control - urban mainline	LS	12%	55%	$225,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	30%	$82,000	
	Traffic Control - local roads	LS	5%	15%	$26,000	
	Bridges - new and widening with substructure	SF	$ 140.00	1820	$254,800	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00	21450	$1,501,500	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$1,756,000**		
	Mobilization	LS	6%		$217,578	
	Construction Total			**$2,088,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$209,000**		
	Commercial Real Estate	SF	11,220	**$17**	$185,579	
	Residential Real Estate	SF	1,530	**$9**	$13,525	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	1	**$188,000**	$188,000	
	R/W Total			**$387,000**		
	TOTAL COST			**$7,853,000**		

Preliminary Cost Estimate: USH 41 at CTH E/ Ballard Rd. (2020)
Alternative 4

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	33,100	$2,151,500	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	6,000	$210,000	
4	Curb and Gutter	LF	$20	16,950	$339,000	
5	Earthwork	CY	$20	27,550	$551,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	50	$35,000	
12	Drainage - Pipes/Culverts	LF	$50	3,750	$187,500	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$3,474,000**		
	Road Incidentals	LS	20%		$695,000	
	Planning Level Contingency	LS	20%		$695,000	
	Signing & Pavement Marking	LS	5%		$174,000	
	Traffic Control - urban mainline	LS	12%	55%	$229,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	30%	$83,000	
	Traffic Control - local roads	LS	5%	15%	$26,000	
	Bridges - new and widening with substructure	SF	$ 140.00	2150	$301,000	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00	21450	$1,501,500	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$1,803,000**		
	Mobilization	LS	6%		$222,270	
	Construction Total			**$2,124,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$212,000**		
	Commercial Real Estate	SF	11,220	**$17**	$185,579	
	Residential Real Estate	SF	0	**$9**	$0	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	1	**$357,000**	$357,000	
	R/W Total			**$543,000**		
	TOTAL COST			**$8,156,000**		



WISCONSIN DEPARTMENT OF TRANSPORTATION

OCTOBER 2011

US 41 - CTH E INTERCHANGE

GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

US 41/CTH E
OUTAGAMIE COUNTY

US 41 - CTH E INTERCHANGE
IMPROVEMENT ALTERNATIVE 1

OCTOBER 2011

WISCONSIN DEPARTMENT OF TRANSPORTATION

EVERGREEN DR

CTH E (BALLARD ROAD)

COMPELETED PROJECT: RIGHT TURN LANE ADDITION

EXTEND ON RAMP ACCELERATION LANE FROM 400' TO 2000'
**TAPER WILL END BEFORE MEADE ST OVERPASS

EXTEND TURN LANE FROM 210' TO 300' & ADD ADDITIONAL RIGHT TURN LANE

US 41

US 41

EXTEND OFF RAMP DECELERATION LANE FROM 300' TO 1400'

EXTEND LEFT TURN LANE FROM 400' TO 500'

EXTEND TURN LANE FROM 150' TO 300' & ADD ADDITIONAL RIGHT TURN LANE

COMPELETED PROJECT: AUXILARY LANES BETWEEN CTH E AND WIS 441

CTH E (BALLARD ROAD)

CAPITOL DR

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- COMMITTED PROJECTS
- RIGHT OF WAY ACQUISITION

N

SCALE 0' 150' 300'

HNTB

Exhibit

US 41/CTH E
OUTAGAMIE COUNTY

WISCONSIN DEPARTMENT OF TRANSPORTATION

OCTOBER 2011

US 41 - CTH E INTERCHANGE

IMPROVEMENT ALTERNATIVE 2

HNTB

Exhibit

US 41/CTH E
OUTAGAMIE COUNTY

EVERGREEN DR

CTH E (BALLARD ROAD)

US 41

US 41

CTH E (BALLARD ROAD)

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- PROPOSED STRUCTURES
- RIGHT OF WAY ACQUISITION

SCALE 0' 150' 300'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

OCTOBER 2011

US 41 - CTH E INTERCHANGE

2020 RAB IMPROVEMENT

HNTB

Exhibit

US 41/CTH E
OUTAGAMIE COUNTY

EVERGREEN DR

CTH E (BALLARD ROAD)

US 41

US 41

CTH E (BALLARD ROAD)

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- PROPOSED STRUCTURES
- RIGHT OF WAY ACQUISITION

SCALE 0' 150' 300'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

OCTOBER 2011

US 41 - CTH E INTERCHANGE

2035 RAB IMPROVEMENT

HNTB

Exhibit

US 41/CTH E
OUTAGAMIE COUNTY

Sheet 5 of 5

US 41 & WIS 441 System Interchange

US 41/441 Operational Analysis — US 41 and WIS 441 System Interchange

Mainline Route	Crossroad
US 41	WIS 441
Region	**Location**
Northeast	City of Appleton
Interchange Type	**Crossroad Function**
Partial Diamond and Partial Cloverleaf	Principal Arterial
Ramp Terminal	**Bridge Sufficiency**
Signalized	B-44-0129 = 100.0 B-44-0130 = 99.0
Bridge Hits	**Bridge Service Life**
	B-44-0129 built 1993 B-44-0130 built 1993

No-Build Conditions Operations

		Merge/Diverge						Freeway							
		US 41 NB Diverge	**US 41 NB Merge**	**US 41 SB Diverge**	**US 41 SB Merge**	**WIS 441 NB Diverge**	**WIS 441 SB Merge**	**US 41 West (NB)**	**US 41 East (NB)**	**US 41 East (SB)**	**US 41 West (SB)**	**WIS 441 South (NB)**	**WIS 441 South (SB)**	**Total**	**Notes**
LOS	**2035**	aux	aux	E (E)	F (F)	C (C)	C (D)	D (F)	C (E)	D (D)	E (D)	C (B)	B (C)		AM Peak (PM Peak)
	2020	aux	aux	D (D)	F (E)	C (B)	C (D)	C (E)	C (D)	C (C)	D (C)	B (B)	B (B)		
	existing	aux	aux	C (C)	F (D)	C (B)	B (C)	C (D)	C (C)	C (C)	C (C)	B (A)	A (B)		
Crashes	**2002-2006**	14	16	25	21	5	4	0	14	11	0	12	0	83	
	Severity	0.50	0.19	0.52	0.48	0.12	0.25	0.00	0.21	0.64	0.00	0.42	0.00	-	(INJ+FAT) / Total Crash
	Rate	65	79	102	76	39	27	0	27	23	0	34	0	-	Merge & Diverge = HMVMT Intersection = MEV

Improved Conditions Operations

		Merge/Diverge						Freeway							
		US 41 NB Diverge	**US 41 NB Merge**	**US 41 SB Diverge**	**US 41 SB Merge**	**WIS 441 NB Diverge**	**WIS 441 SB Merge**	**US 41 West (NB)**	**US 41 East (NB)**	**US 41 East (SB)**	**US 41 West (SB)**	**WIS 441 South (NB)**	**WIS 441 South (SB)**	**Total**	**Notes**
LOS	**Alt. 3**	-	-	-	-	-	-	-	-	-	-	-	-		AM Peak (PM Peak)
	Alt. 2	-	-	-	-	-	-	-	-	-	-	-	-		
	Alt. 1	-	-	-	-	-	-	-	-	-	-	-	-		
Crash Benefit	**Alt. 3**	-	-	-	-	-	-	-	-	-	-	-	-	-	Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35.000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands)
	Alt. 2	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Alt. 1	-	-	-	-	-	-	-	-	-	-	-	-	-	

Improved Alternative Summary	
Title	**Description**
Alternative 1	N\A
Alternative 2	N\A

Alternative Construction Costs			
	Total Cost	Structure Costs	ROW Costs
Alternative 1	$0	$0	$0
Alternative 2	$0	$0	$0
Alternative 3	$0	$0	$0

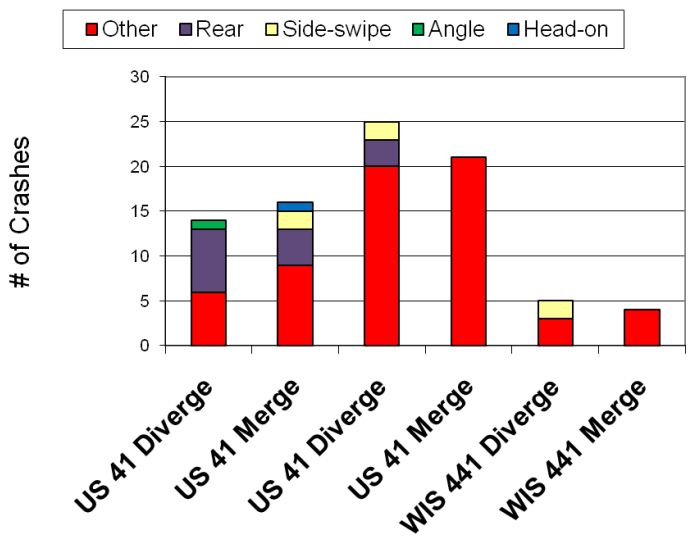
Preliminary Environmental Screening

- Possible environmental justice impacts
- Identified wetlands are located near the interchange
- Two unnamed streams are located near the interchange
- Section 4(f) property located near the interchange

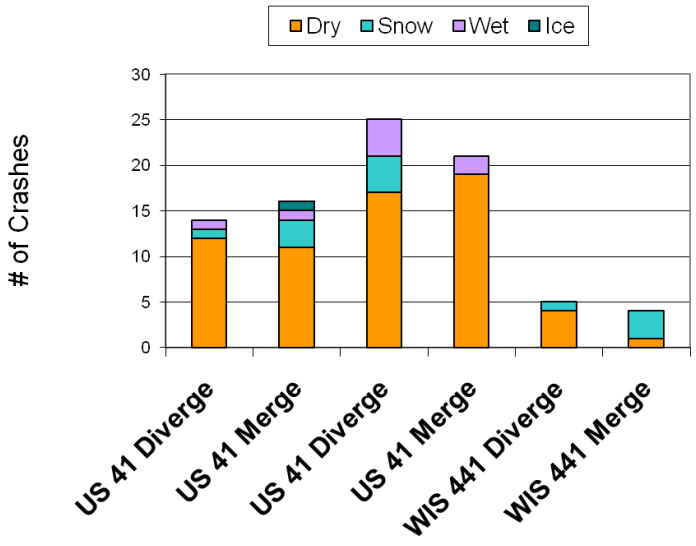
Existing Geometric Deficiencies Rating		
Freeway/Ramps	**Score**	**Comments**
Ramp Design Speed & Horizontal Alignment	Poor	SB off ramp first curve radius does not meet minimum standard.
Ramps Merge / Diverge	Acceptable	
Ramp Stopping Sight Distance	Acceptable	
Bridges		
Bridge Width	Acceptable	
Crossroad		
Intersection Skew / Intersection Sight Distance	N/A	
Geometric Deficiency Score	Roadway Geometric Score = 8 / 10	Bridge Geometric Score = 4 / 5

Detailed Crash Analysis

Crash Type Summary



Pavement Condition Summary



US 41 & WIS 441 SYSTEM INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the US 41 & WIS 441 System Interchange is to address the needs and deficiencies identified in the USH 41 Instate Conversion- Geometric Deficiency report dated February 2009. The following is a summary of the needs and deficiencies at the US 41 & WIS 441 System Interchange:

- US 41 northbound and southbound profile grade throughout interchange area is poor.
- US 41 northbound and southbound off ramps crash severity is poor, over 50% of crashes are considered severe.
- US 41 northbound and southbound on ramps have high crash rates.
- US 41 northbound and southbound both have areas where the clear zone does not meet minimum standard.
- US 41 northbound on and off ramps have a curve radius does not meet minimum standard.
- US 41 northbound contains unprotected side slopes steeper than 4:1.
- US 41 southbound off ramp first curve radius does not meet minimum standard.

The primary need at the US 41 & WIS 441 System Interchange is to improve traffic safety and operations of the merge and diverge locations as well as on ramps themselves. To fix these problems it would be necessarily large regarding projects which carry a very high cost to benefit ratio.

Committed Work

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Committed project for 2020: Auxiliary lanes for US 41 northbound and southbound traffic between CTH E (Ballard Rd.) and the US 41 & WIS 441 System Interchange.
- Committed project for 2020: Auxiliary lanes for WIS 441 northbound and southbound traffic between CTH OO (Northland Ave.) and the US 41 & WIS 441 System Interchange.
- Committed project for 2020: Ramp extension and add lighting on the US 41 southbound off ramp leading to WIS 441 southbound.
- Committed project for 2020: Concrete barrier for WIS 441 northbound to US 41 southbound.

The US 41 southbound off ramp onto WIS 441 southbound ramp first curve radius does not meet minimum standard. It is likely that the cost to fix the ramp curve will not provide significant safety impacts to the operations on the ramp. Between WIS 441 northbound to US 41 southbound a concrete barrier has been constructed to reduce the high crash rate.

The US 41 northbound off ramp onto WIS 441 southbound ramp and WIS 441 northbound off ramp onto US 41 northbound on ramp does not meet curve radius does not meet minimum standard. Redesigning these curves are not recommended because of the following reasons: high estimated cost and low crash benefit. The cost of redesigning the ramp to meet this standard would greatly outweigh any potential safety benefit outcomes. Therefore, any short term design recommendations for this interchange will be unnecessary due to the cost to benefit ratio.

NOTES

US 41 NB & SB PROFILE GRADE THROUGHOUT INTERCHANGE AREA IS POOR.

KA RATE FOR US 41 THROUGHOUT INTERCHANGE AREA IS POOR.

N

SCALE 0' 200' 400'

SB DIVERGE - CRASH SEVERITY (OVER 50% ARE CONSIDERED SEVERE) AND RATE ARE POOR

SB OFF RAMP - FIRST CURVE RADIUS DOES NOT MEET MIN. STANDARD

SB OFF RAMP - PROFILE GRADE DOES NOT MEET MIN. STANDARD

SB MERGE - CRASH RATE IS POOR

SB CLEAR ZONE DOES NOT MEET MIN. STANDARD

WIS 441

N. FRENCH RD

US 41

US 41

UNPROTECTED SLOPES STEEPER THAN 4:1

MEDIAN CROSSOVER SLOPE DOES NOT MEET MIN. STANDARD

NB DIVERGE - CRASH SEVERITY IS POOR (OVER 50% ARE CONSIDERED SEVERE)

NB OFF RAMP - CURVE RADIUS DOES NOT MEET MIN. STANDARD

NB CLEAR ZONE DOES NOT MEET MIN. STANDARD

NB MERGE - CRASH SEVERITY IS POOR (OVER 50% ARE CONSIDERED SEVERE)

NB ON RAMP - PROFILE GRADE DOES NOT MEET MIN. STANDARD

NB ON RAMP - CURVE RADIUS DOES NOT MEET MIN. STANDARD

WIS 441

WISCONSIN DEPARTMENT OF TRANSPORTATION

NOVEMBER 2009

US 41 - WIS 441 INTERCHANGE

GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

US 41/WIS 441
OUTAGAMIE COUNTY

Sheet 1 of 2

COMMITTED 2020 PROJECT:
ADD LIGHTING

COMMITTED 2020 PROJECT:
WIS 441 NORTH TO US 41
SOUTH CONCRETE
BARRIER

COMMITTED 2020 PROJECT: RAMP EXTENSION
US 41 SOUTH ONTO THE WIS 441 RAMP

US 41

WIS 441

N. FRENCH RD

US 41

COMMITTED 2020 PROJECT: AUXILARY LANES
BETWEEN CTH E (BALLARD RD) AND US 41/WIS 441

WIS 441

COMMITTED 2020 PROJECT: AUXILARY LANES BETWEEN
CTH OO (NORTHLAND AVE) AND US 41/ WIS 441

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- COMMITTED PROJECTS
- RIGHT OF WAY ACQUISITION

SCALE 0' 200' 400'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

NOVEMBER 2009

US 41 - WIS 441 INTERCHANGE

COMMITTED PROJECTS

HNTB

Exhibit

US 41/WIS 441
OUTAGAMIE COUNTY

Sheet 2 of 2

US 41 & CTH N / Freedom Road

US 41/441 Operational Analysis — US 41 and CTH N (Freedom Rd)

Mainline Route	Crossroad
US 41	CTH N
Region	**Location**
Northeast	City of Appleton
Interchange Type	**Crossroad Function**
Diamond	Minor Arterial
Ramp Terminal	**Bridge Sufficiency**
Signalized	B-44-0179 = 96.5
Bridge Hits	**Bridge Service Life**
	B-44-0179 built 2002

No-Build Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY West (NB)	FWY East (NB)	FWY East (SB)	FWY West (SB)	Total	Notes
LOS	2035	C (E)	D (F)	E (E)	E (D)	-	-	C (E)	C (E)	D (D)	D (D)		AM Peak (PM Peak)
	2020	C (D)	C (D)	D (D)	D (D)	C (C)	C (C)	C (D)	C (D)	C (C)	C (C)		
	existing	C (D)	C (C)	C (C)	C (C)	C (C)	C (C)	C (C)	C (C)	C (C)	C (C)		
Queue	2035					-	-						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1100' SB = 1150'
	2020					182 (271)	153 (184)						
	existing					201 (295)	120 (92)						
Crashes	2002-2006	9	8	14	10	16	17	14	22	10	11	131	
	Severity	0.44	0.38	0.43	0.20	0.44	0.41	0.21	0.50	0.40	0.64	-	(INJ+FAT) / Total Crash
	Rate	37	37	63	41	0.67	0.92	27	42	21	23	-	Merge & Diverge = HMVMT Intersection = MEV

Improved Alternative Summary

Title	Description
Alternative 1	Extend acceleration lanes for NB and SB on ramps.
Alternative 2	Realign Evergreen. Alt 2 has Alt 1 improvements built into proposal.
Alternative 3	2020 and 2035 RAB. Unrelated to signal design.

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
LOS	Alt. 1	C (D)	-	D (C)	-	C (C)	C (C)	C (D)	C (D)	C (C)	C (C)		AM Peak (PM Peak)
	Alt. 2	C (D)	-	D (C)	-	C (C)	C (C)	C (D)	C (D)	C (C)	C (C)		
	Alt. 3	C (D)	-	D (C)	-	A (A)	A (A)	C (D)	C (D)	C (C)	C (C)		

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
Queue	Alt. 1					149 (316)	186 (178)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1100' SB = 1150'
	Alt. 2					149 (316)	186 (178)						
	Alt. 3					25 (25)	25 (25)						
Crash Benefit	Alt. 1	-	3	-	2	-	-	-	-	-	-	5	Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35.000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands over a five year period)
	Alt. 2	-	3	-	2	-	-	-	-	-	-	5	
	Alt. 3	-	-	-	-	37	38	-	-	-	-	75	

Alternative Construction Costs

	Total Cost	Structure Costs	ROW Costs
Alternative 1	$658,000	$0	$0
Alternative 2	$1,297,000	$0	$224,000
Alternative 3	$3,850,000	$1,411,000	$4,000

Preliminary Environmental Screening

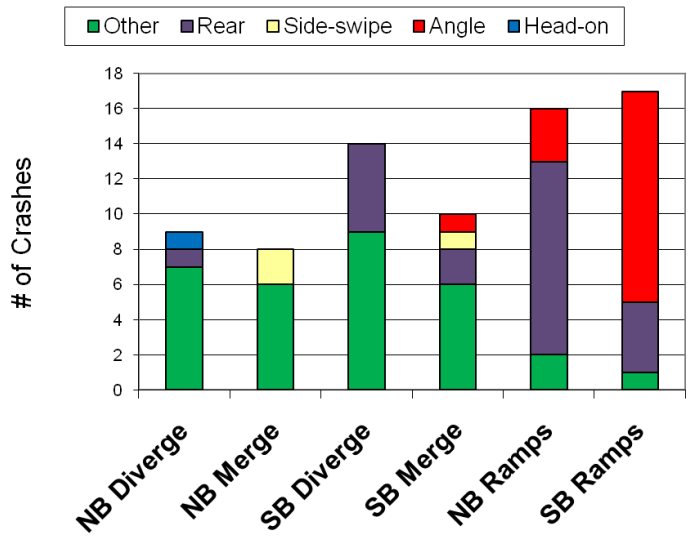
- A residential neighborhood is located near the interchange
- Possible environmental justice impacts
- An unnamed creek crosses under US 41 near the interchange
- A historic Euro-American archaeological site is located near the interchange

Existing Geometric Deficiencies Rating

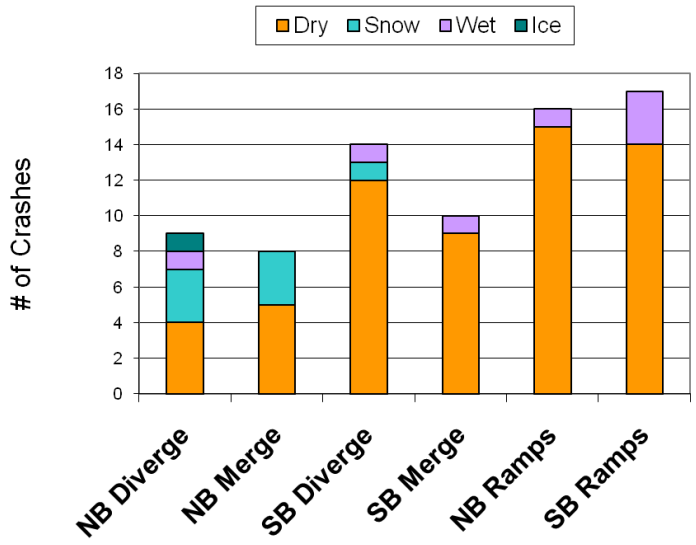
Freeway/Ramps	Score	Comments
Ramp Design Speed & Horizontal Alignment	Acceptable	
Ramps Merge / Diverge	Poor	NB and SB on ramps acceleration lane does not meet minimum standard.
Ramp Stopping Sight Distance	Acceptable	
Bridges		
Bridge Width	Acceptable	82.6'
Crossroad		
Intersection Skew / Intersection Sight Distance	Acceptable	
Geometric Deficiency Score	Roadway Geometric Score = 8 / 10	Bridge Geometric Score = 5 / 5

Detailed Crash Analysis

Crash Type Summary



Pavement Condition Summary



US 41 & CTH N (FREEDOM RD.) INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the US 41 & CTH N (Freedom Rd.) interchange is to address the needs and deficiencies identified in the USH 41 Instate Conversion- Geometric Deficiency report dated February 2009. The following is a summary of the needs and deficiencies at the CTH N (Freedom Rd.) Interchange:

- Northbound and southbound on ramp acceleration lanes do not meet minimum standard.
- At northbound on ramp to Moasis Dr., access control do not meet minimum standard.
- US 41 northbound and southbound outside shoulder width do not meet minimum standard.
- US 41 northbound and southbound median shoulder width do not meet minimum standard.

The primary need at the CTH N (Freedom Rd.) interchange is to improve operations of the ramp terminal intersections.

The following alternatives have been developed based on an order of importance with regard to safety and operations, and should be considered cumulative with each other. The alternative analyses (LOS, queue lengths, etc) reflect this method. For example, Alternative 2 should only be considered in addition to Alternative 1.

Alternative 1

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Extend acceleration lanes at northbound and southbound on ramp merge locations.

The improvements in Alternative 1 provide increased merging opportunities for the northbound and southbound on ramps.

Alternative 2

This alternative realigns the access at Evergreen due to the deficient approach angle and poor profile grade.

Alternative 3

The Year 2020 and 2035 roundabout alternative maintains a four-lane facility south of the southbound US 41 ramps intersection and it would allow a two-lane facility to the north. Two-lane roundabouts would be provided at northbound US 41 ramps and southbound US 41 ramps. All movements are expected to operate at LOS A or better

and experience acceptable queues and delays. Surplus capacity of approximately 72%[1] is expected beyond the forecasted Year 2020 traffic conditions. A system of roundabouts at this location will allow for the use of right-in/right-outs at current and future driveway locations as U-Turns are accommodated within the roundabouts.

Additional Deficiencies

There are additional deficiencies on CTH N (Freedom Rd.) not addressed at the intersection of Evergreen Drive. It is not expected that those deficiencies will effect operations of the US 41 ramps or mainline.

There are poor vertical alignment sections on the northbound portion of the mainline, it is not cost effective to reconstruct.

The CTH N (Freedom Rd.) turning lane onto northbound US 41 on ramp has an operation issue. Forecasted Year 2020 traffic conditions will need an additional 75 feet for an expected operation at LOS C. There is an issue with extending this right turning lane, due to the entrance of the McDonald's/ Mobil.

The existing sound barrier at the northbound on ramp proposed extension will be affected by the changes. A concrete barrier will most likely be necessary.

Comparison of Alternatives

The interchange alternatives were compared based on safety, traffic operations, cost and other factors:

Safety

Alternative 1 will address the existing safety problem of the northbound and southbound on ramps for vehicles queuing from the northbound ramp terminal intersection back onto the mainline.

Traffic Operations

Alternative 1 improves traffic operations at the ramp terminal intersections.

Environmental Factors

- A residential neighborhood is located near the interchange
- Possible environmental justice impacts
- An unnamed creek crosses under US 41 near the interchange
- A historic Euro-American archaeological site is located near the interchange

Complete Streets

The CTH N Interchange currently has sidewalks on both sides. Sidewalks currently extend north to Evergreen Drive, and accommodate a WisDOT Park and Ride. The sidewalks on the Northeast quadrant extend south along CTH N and provide access for Little Chute High School and Legion Park. Currently, north of Evergreen Drive CTH N

[1] Determined by applying an equal percentage increase to all volumes at an intersection under the 50th CL until a leg failed. The lowest percent increase among the intersections was reported. Therefore, the remaining intersections at each interchange will have higher surplus capacity values.

turns into a rural two lane highway with a wide shoulder for a bike accommodation. Future accommodations should include extending that bike accommodation into the four lane section south of Evergreen Drive into Little Chute.

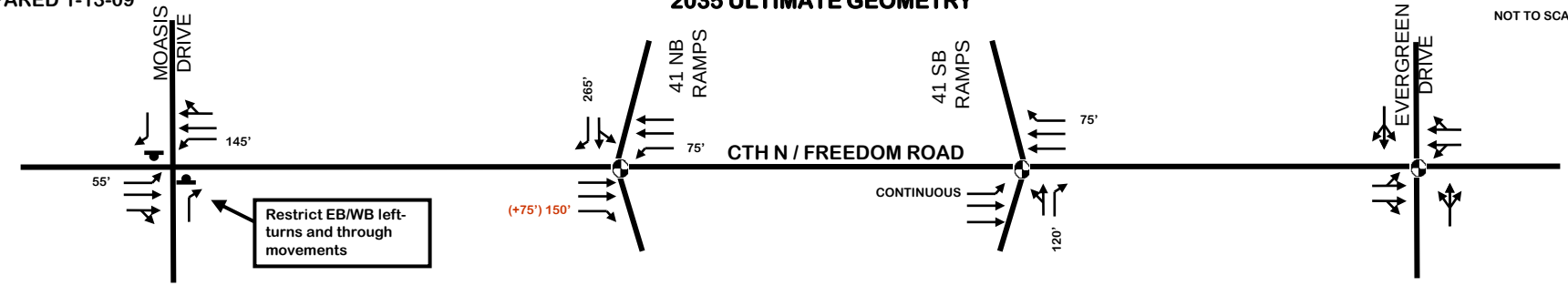
US 41 / CTH N (FREEDOM ROAD)

PREPARED 1-13-09

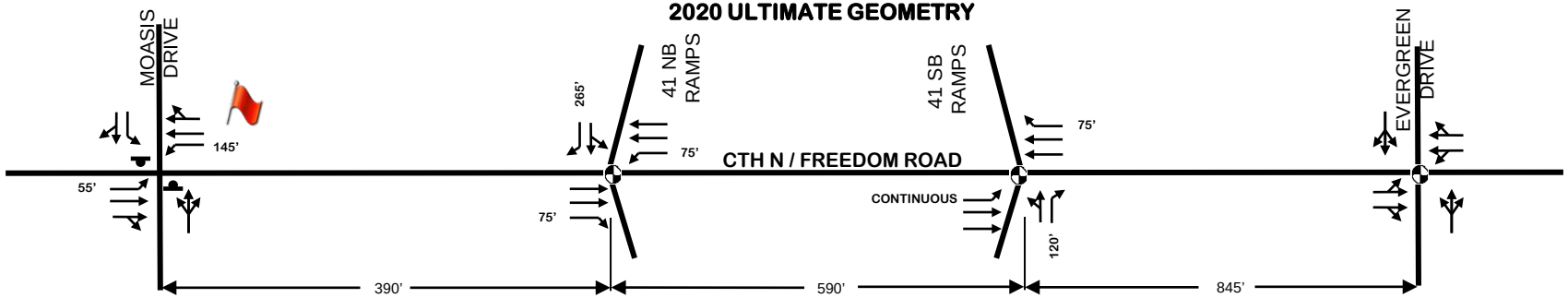
N

NOT TO SCALE

2035 ULTIMATE GEOMETRY



2020 ULTIMATE GEOMETRY



XX' BASE GEOMETRICS PLANNED TURN BAY LENGTH

(+XX') ADDITIONAL TURN BAY LENGTH RECOMMENDED

(+XX') ADDITIONAL TURN BAY LENGTH REQUIRED FOR 2035 VOLUMES

BASE GEOMETRICS

ADDITIONAL IMPROVEMENT RECOMMENDED

ADDITIONAL IMPROVEMENT REQUIRED FOR 2035 VOLUMES

TRAFFIC SIGNAL

STOP SIGN

OPERATIONAL PROBLEMS REMAIN

AADT

Existing – 10,800

2020 – 16,400

2035 – 18,300

USH 41/WIS 441 Short-Term Improvement Cost Estimate
CTH N/ Freedom Rd.
(Improvement Alternative __)

	Roadway	Structure	Construction	R/W Cost	CM & Eng	Incremental Total	Total
Alternative 1	$ 395,000	$ -	$ 239,000	$ -	$ 24,000	$ 658,000	$ 658,000
Alternative 2	$ 249,000	$ -	$ 151,000	$ 224,000	$ 15,000	$ 639,000	$ 1,297,000
Alternative 3	$ 1,430,000	$ 1,411,000	$ 914,000	$ 4,000	$ 91,000	$ 3,850,000	$ 3,850,000

Item	Item Description	Unit	Unit Price		
1	New Concrete Pavement[1]	SY		$65	Concrete, Base Aggregate, Crushed
2	New HMA Pavement[2]	SY		$50	HMA, Base Aggregate, Crushed
3	Sidewalk	SY		$35	
4	Curb and Gutter	LF		$20	
5	Earthwork	CY		$20	Cut or fill, based on observed topography, including ditches
6	Signal Pole Relocation	EA		$15,000	
7	Signal System	EA		$165,000	
8	Ramp Meter	EA		$75,000	
9	Ramp Meter- remove and reinstall	EA		$35,000	
10	Sign Bridge	EA		$100,000	
11	Drainage - Inlets/Manholes	EA		$700	
12	Drainage - Pipes/Culverts	LF		$50	
13	Drainage - Pipes/Culverts - extensions	LF		$100	
14	Concrete Barrier - 42"	LF		$70	
15	Retaining wall - non-structural (<5')	SF		$25	
16	Beam Guard	LF		$20	
17	Beam Guard End Absorbing Terminal	EA		$2,500	
18	Unique Items			$0	Add Items unique to these locations,
19				$0	that are too large to be covered in 'Road Incidentals'.
20				$0	
	Subtotal				
	Road Incidentals[3]	LS		20%	removals, finishing, erosion, removals, lighting, etc
	Planning Level Contingency[3]	LS		20%	
	Signing & Pavement Marking[3]	LS		5%	
	Traffic Control - urban mainline[3,4]	LS		12%	assumed 100% unless other TC is entered
	Traffic Control - rural mainline[3,4]	LS		10%	enter percent of project on rural mainline
	Traffic Control - ramps[3,4]	LS		8%	enter percent of project on ramps
	Traffic Control - local roads[3,4]	LS		5%	enter percent on local roads
	Bridges - new and widening with substructure	SF	$	140.00	Area of Bridge Deck
	Bridges - widening using existing substructure	SF	$	100.00	Area of Bridge Deck
	Bridges - redecking	SF	$	70.00	Area of Bridge Deck
	Retaining walls - structural	SF	$	35.00	area of exposed wall face
	Mobilization[5]	LS		6%	
	CM & Engineering[6]	LS		10%	
	Right of Way				Site Specific
	Commercial Real Estate	SF	$	17.00	
	Residential Real Estate	SF	$	9.00	
	Commercial Relocation Cost	SF	$	60.00	
	Residential Relocation Cost	SF	$	34.00	
	Lighting	LS			

NOTES:

1. New Concrete Pavement consists of: Concrete Pavement 10", $50/SY; Base Aggregate, 6", $16/ton; Select Crushed, 12", $14/ton.
2. New HMA Pavement consists of: HMA, 5", $70/ton; Oil, $600/ton; Base Aggregate, 12", $16/ton; Select Crushed, 12", $14/ton
3. Lump Sum items are computed as a percentage of the roadway item costs. These do not include structural component costs.
4. Traffic Control is a lump sum, between 5% - 12%, weighted by the estimated construction cost on each roadway type.
5. Mobilization is computed as a percentage of the all item costs, including structural components.
6. Construction Management and Engineering are computed as a percentage of the total construction cost.

Preliminary Cost Estimate: US 41 at CTH N/ Freedom Rd.
Alternative 1

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	6,070	$394,550	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$395,000**		
	Road Incidentals	LS	20%		$79,000	
	Planning Level Contingency	LS	20%		$79,000	
	Signing & Pavement Marking	LS	5%		$20,000	
	Traffic Control - urban mainline	LS	12%	100%	$47,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$13,500	
	Construction Total			**$239,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$24,000**		
	Commercial Real Estate	SF	1700%		$0	
	Residential Real Estate	SF	900%		$0	
	Commercial Relocation Cost	LS	6000%		$0	
	Residential Relocation Cost	LS	3400%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$658,000**		

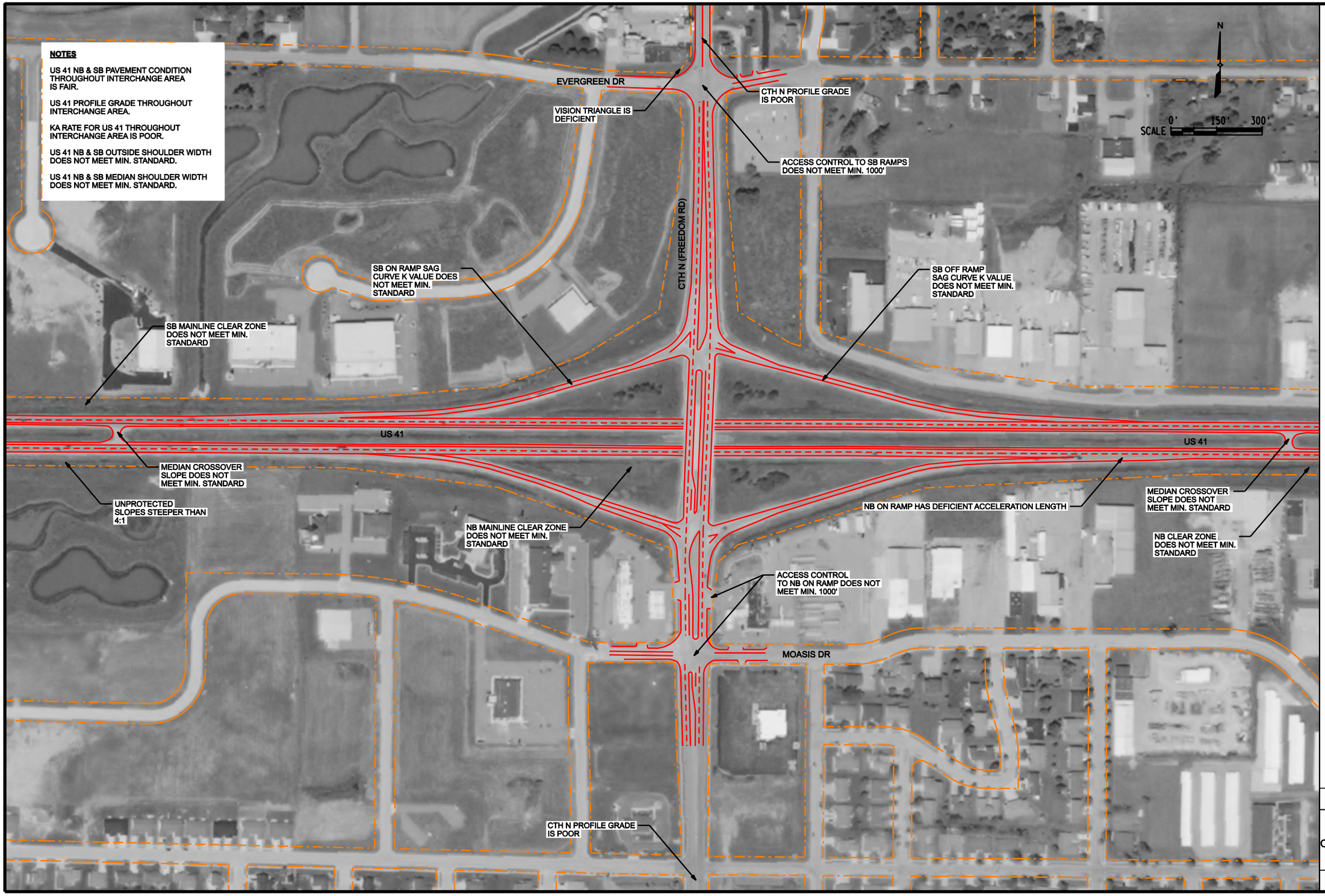
Preliminary Cost Estimate: US 41 at CTH N/ Freedom Rd.
Alternative 2

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	3,000	$195,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	400	$14,000	
4	Curb and Gutter	LF	$20	2,000	$40,000	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$249,000**		
	Road Incidentals	LS	20%		$50,000	
	Planning Level Contingency	LS	20%		$50,000	
	Signing & Pavement Marking	LS	5%		$12,000	
	Traffic Control - urban mainline	LS	12%	100%	$30,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$8,520	
	Construction Total			**$151,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$15,000**		
	Commercial Real Estate	SF	$ 17.00	13,200	$224,400	
	Residential Real Estate	SF	$ 9.00		$0	
	Commercial Relocation Cost	LS	$ 60.00		$0	
	Residential Relocation Cost	LS	$ 34.00		$0	
	R/W Total			**$224,000**		
	TOTAL COST			**$639,000**		

Preliminary Cost Estimate: USH 41 at segment 1

USH 41 & CTH N (2020 & 2035)

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	12,750	$828,750	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	2,200	$77,000	
4	Curb and Gutter	LF	$20	8,900	$178,000	
5	Earthwork	CY	$20	11,350	$227,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	30	$21,000	
12	Drainage - Pipes/Culverts	LF	$50	1,960	$98,000	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$1,430,000**		
	Road Incidentals	LS	20%		$286,000	
	Planning Level Contingency	LS	20%		$286,000	
	Signing & Pavement Marking	LS	5%		$72,000	
	Traffic Control - urban mainline	LS	12%	54%	$93,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	29%	$33,000	
	Traffic Control - local roads	LS	5%	17%	$12,000	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00	20150	$1,410,500	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$1,411,000**		
	Mobilization	LS	6%		$131,550	
	Construction Total			**$914,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$91,000**		
	Commercial Real Estate	SF	245	**$17**	$4,052	
	Residential Real Estate	SF	0%	**$9**	$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$4,000**		
	TOTAL COST			**$3,850,000**		



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

US 41 - CTH N INTERCHANGE

GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

US 41/CTH N
OUTAGAMIE COUNTY

EVERGREEN DR

CTH N (FREEDOM RD)

EXTEND SB ON RAMP ACCELERATION LANE FROM 360' TO 1100'

US 41

US 41

EXTEND NB ON RAMP ACCELERATION LANE FROM 360' TO 1000'

MOASIS DR

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- COMMITTED PROJECTS
- RIGHT OF WAY ACQUISITION

SCALE 0' 150' 300'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

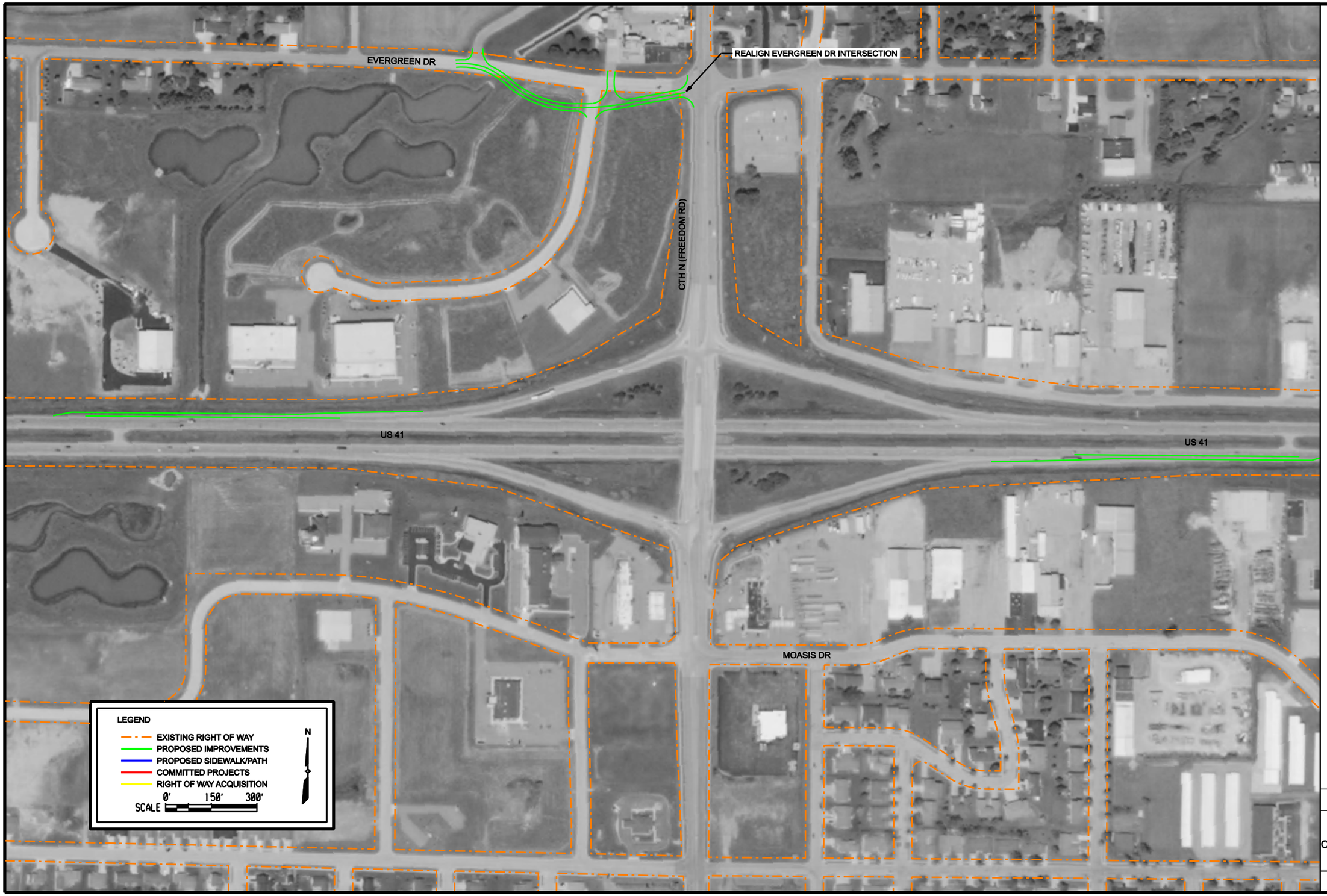
US 41 - CTH N INTERCHANGE

IMPROVEMENT ALTERNATIVE 1

HNTB

Exhibit

US 41/CTH N
OUTAGAMIE COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

US 41 - CTH N INTERCHANGE

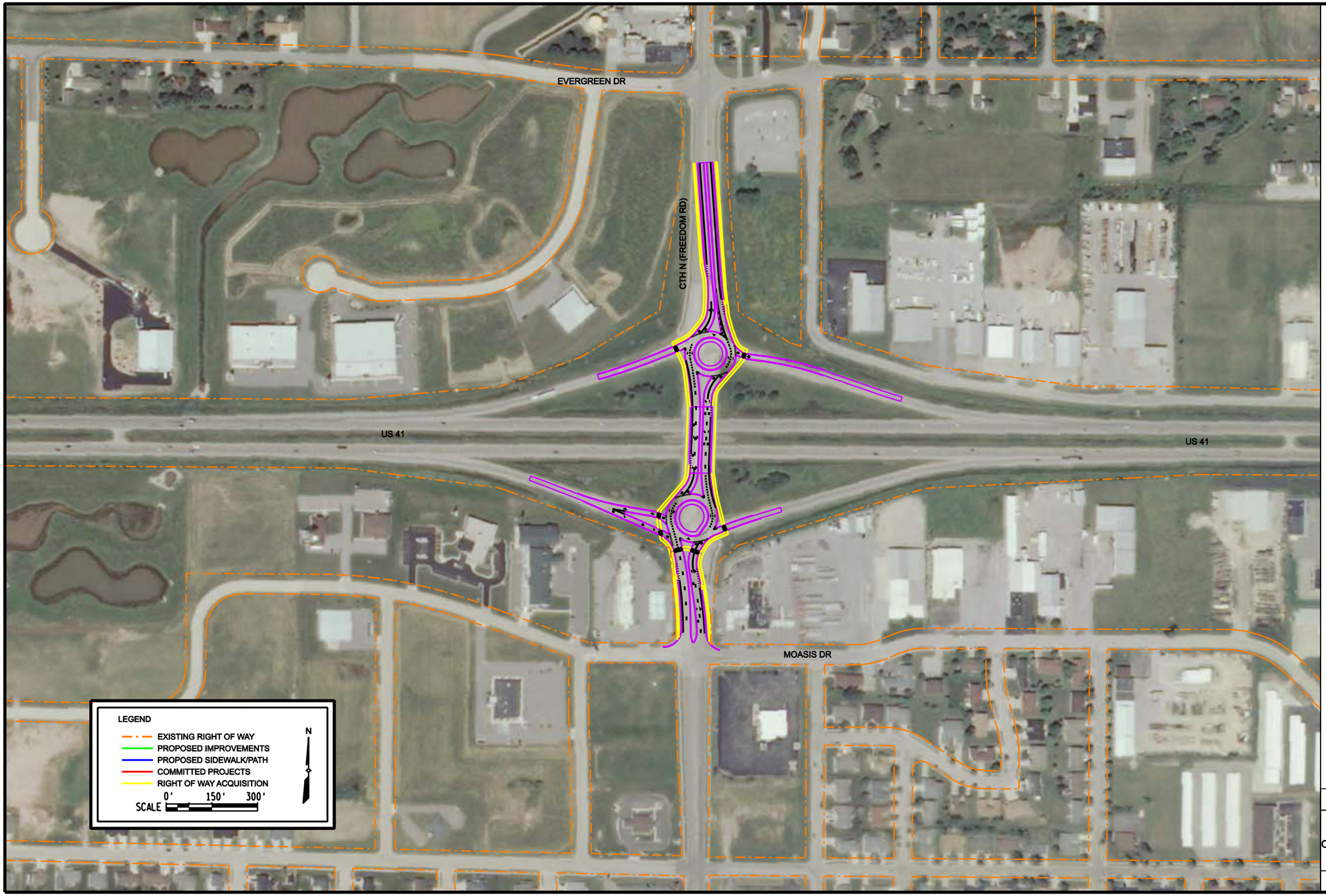
IMPROVEMENT ALTERNATIVE 2

HNTB

Exhibit

US 41/CTH N
OUTAGAMIE COUNTY

Sheet 3 of 4



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

US 41 - CTH N INTERCHANGE

2020 / 2035 RAB IMPROVEMENT

HNTB

Exhibit

US 41/CTH N
OUTAGAMIE COUNTY

Sheet 4 of 4

US 41 & CTH U / County Line Road

US 41/441 Operational Analysis — US 41 and CTH U (County Line Rd)

Mainline Route	Crossroad
US 41	CTH U
Region	**Location**
Northeast	Town of Wrightstown
Interchange Type	**Crossroad Function**
Diamond	Minor Arterial
Ramp Terminal	**Bridge Sufficiency**
Two-way Stop Controlled	B-44-0159 = 97 B-44-0160 = 99
Bridge Hits	**Bridge Service Life**
	B-44-0159 built 1999 B-44-0160 built 1999

No-Build Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY South (NB)	FWY North (NB)	FWY North (SB)	FWY South (SB)	Total	Notes
LOS	2035	C (E)	-	-	F (D)	-	-	C (D)	-	-	E (D)		AM Peak (PM Peak)
	2020	C (D)	-	-	D (C)	B (B)	B (B)	C (C)	-	-	D (C)		
	existing	C (C)	-	-	C (C)	A (B)	B (B)	C (B)	-	-	C (B)		
Queue	2035					-	-						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1125' SB = 1100'
	2020					58 (95)	68 (130)						
	existing					33 (33)	145 (83)						
Crashes	2002-2006	13	11	7	9	2	1	0	0	17	21	81	
	Severity	0.15	0.00	0.29	0.33	0.50	0.00	0	0	0.30	0.43	-	(INJ+FAT) / Total Crash
	Rate	75	63	40	51	0.25	0.12	0	0	20	28	-	Merge & Diverge = HMVMT Intersection = MEV

Improved Alternative Summary

Title	Description
Alternative 1	Extend Truck Weigh Station NB on ramp
Alternative 2	Weigh in Motion
Alternative 3	2020 and 2035 RAB. Unrelated to signal design.

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
LOS	Alt. 1	C (D)	-	-	D (C)	B (B)	B (B)	C (C)	-	-	D (C)		AM Peak (PM Peak)
	Alt. 2	C (D)	-	-	D (C)	B (B)	B (B)	C (C)	-	-	D (C)		
	Alt. 3	-	-	-	-	A (A)	A (A)	-	-	-	-		
Queue	Alt. 1					58 (95)	68 (130)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1125' SB = 1100'
	Alt. 2					58 (95)	68 (130)						
	Alt. 3					25 (25)	25 (25)						

US 41/441 Operational Analysis — US 41 and CTH U (County Line Rd)

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
Crash Benefit	Alt. 1	4	-	-	-	-	-	-	-	-	-	4	Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35.000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands over a five year period)
	Alt. 2	-	-	-	-	-	-	-	-	-	-	-	
	Alt. 3	-	-	-	-	5	1	-	-	-	-	6	

Alternative Construction Costs

	Total Cost	Structure Costs	ROW Costs
Alternative 1	$1,402,000	$370,000	$0
Alternative 2	$286,000*	$0	$0
Alternative 3	$4,442,000	$0	$0

*Does not include operating costs

Preliminary Environmental Screening

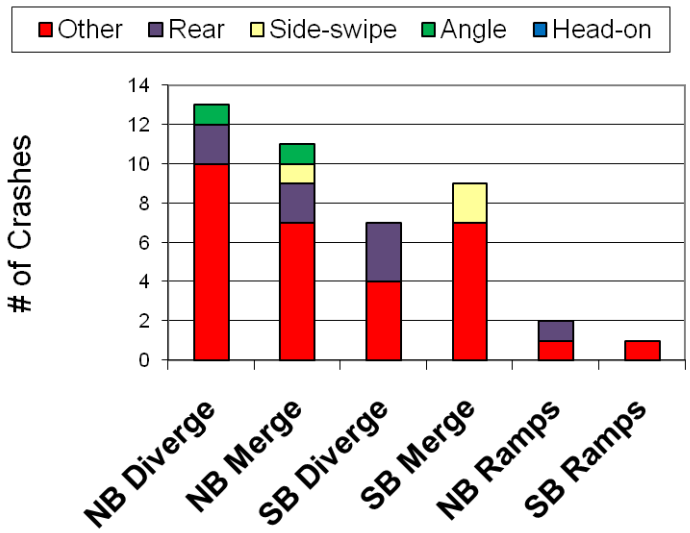
- Apple Creek flows along the west side of the interchange
- A historic Euro-American cabin/homestead exists west of the interchange
- Four hazardous waste generators and handlers are located near the interchange

Existing Geometric Deficiencies Rating

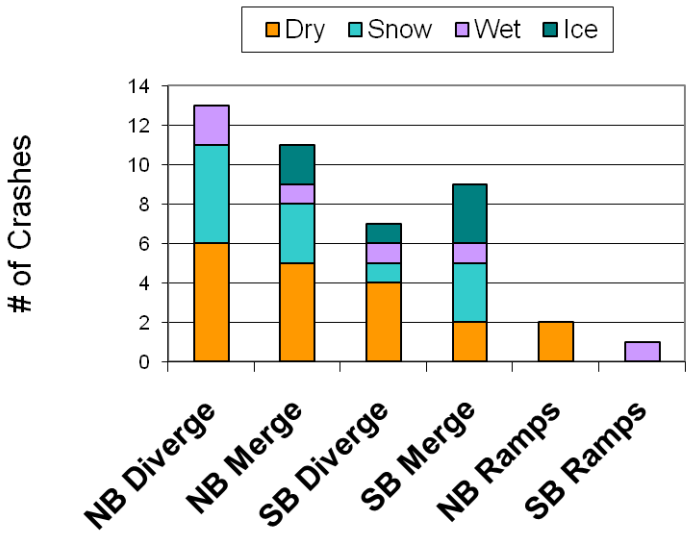
Freeway/Ramps	Score	Comments
Ramp Design Speed & Horizontal Alignment	Acceptable	SB off ramp first curve radius does not meet minimum standard.
Ramps Merge / Diverge	Acceptable	
Ramp Stopping Sight Distance	Poor	Vertical alignment issues.
Bridges		
Bridge Width	Acceptable	Outside shoulder widths do not meet minimum standard.
Crossroad		
Intersection Skew / Intersection Sight Distance	Acceptable	
Geometric Deficiency Score	Roadway Geometric Score = 8 / 10	Bridge Geometric Score = 4 / 5

Detailed Crash Analysis

Crash Type Summary



Pavement Condition Summary



US 41 & CTH U (COUNTY LINE ROAD) INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the US 41 & CTH U (County Line Rd.) interchange is to address the needs and deficiencies identified in the USH 41 Instate Conversion- Geometric Deficiency report dated February 2009. The following is a summary of the needs and deficiencies at the CTH U (County Line Rd.) Interchange:

- US 41 northbound and southbound profile grade throughout interchange is poor.
- Northbound on ramp crash severity is poor, over 50% of crashes are considered severe.
- Between the US 41 truck weight station exit and CTH U (County Line Rd.) northbound off ramp clear zone does not meet minimum standard.
- Unprotected side slopes steeper than 4:1 along the mainline.
- Southbound off ramp first horizontal curve radius and vertical sag curve do not meet minimum standard.
- Both northbound ramps and the southbound on ramp have crest curve K values that do not meet minimum standard.

The primary need at the CTH U (County Line Rd.) interchange is to improve vertical alignment at the ramp terminal intersections.

The following alternatives have been developed based on an order of importance with regard to safety and operations, and should be considered cumulative with each other. The alternative analyses (LOS, queue lengths, etc) reflect this method.

Alternative 1

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Add a northbound auxiliary lane to 3000 feet on US 41 between the truck weight station exit and CTH U (County Line Rd.)

This improvement will improve truck weight station exit merge by providing a longer weave section for on ramp traffic to enter US 41 mainline. There is approximately 1400 feet between the entrance and exit ramp gores between CTH U (County Line Rd) to Truck Weight Station exit. The Truck Weight Station on ramp is extended lane to 3000 feet due to the steep slope of the US 41 mainline and slow acceleration speed of the trucks from the truck weight station. The acceleration lane ends before the CTH U (County Line Rd.) northbound on ramp. The proposed northbound acceleration lane is a better choice than extending the on ramp acceleration lane because the two interchanges are so close to each other and the steep mainline.

Although this alternative may improve some issues, it may also cause issues by creating substandard conditions between the shoulder and the east frontage road. A barrier wall may be required.

Alternative 2

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Add a new sign on US 41 northbound for "Trucks use Right Lane for Weight In Motion (WIM) scale"
- Add a right lane piezoelectric plate WIM scale sensor.

The improvements in Alternative 2 increase sight distance and improve the weight station traffic flow with the flat grade of the WIM. The system uses both weight and vehicle credentials to determine the eligibility of a connected vehicle to bypass a weigh station. Automatic Vehicle Identification technology is used to identify individual vehicles and provide a link to their related credentials. WisDOT are evaluating a WIM as a long term alternative.

Alternative 3

The Year 2020 and 2035 roundabout alternative maintains a two-lane facility and provides one-lane roundabouts along the corridor. All movements are expected to operate at LOS A and experience acceptable queues and delays. Substantial surplus capacity is expected beyond the forecasted Year 2035 traffic conditions. A system of roundabouts at this location will allow for the use of right-in/right-outs at future driveway locations as U-Turns are accommodated within the roundabouts.

Additional Deficiencies

There are additional deficiencies on CTH U (County Line Rd.) not addressed at the intersections with the East and West Frontage Roads. It is not expected that these deficiencies will have an impact on the operations of the US 41 ramps and mainline.

Bridges B-44-159 and B-44-160 carry US 41 northbound and southbound traffic, have deficient lateral clearance by 0.2 feet. Widening of the bridge by 0.2 feet to meet the WisDOT Facilities Development Manual (FDM) minimum standard is not recommended due to the high cost to benefit ratio. This deficiency is not contributing to operational or safety problems on the bridge.

At the southbound off ramp and the northbound on ramp the shoulders have deficient side slopes steeper than 4:1. Recommend appropriate side slope grading according to WisDOT FDM standards wherever possible during Alternative 2 ramp reconstruction or beam guard installations where necessary.

Access control distances between US 41 ramp terminal intersections and adjacent intersections (East and West Frontage Roads and Mid Valley Dr.) do not meet the minimum WisDOT FDM standard of 1000 feet. The resulting cost and impact to local access throughout the interchange area to meet this minimum standard are too great to warrant serious consideration; therefore no recommendations are suggested.

Comparison of Alternatives

The interchange alternatives were compared based on safety, traffic operations, cost and other factors:

Safety

All alternatives address the safety issues resulting from crashes at the northbound and southbound ramps. Alternative 1 will address the weaving safety problem in the interchange area by the addition of the auxiliary lane. Alternative 2 will address the sight distance safety issues on the ramps.

Traffic Operations

Alternative 1 reduces the congestion of the mainline traffic caused by merging and diverging vehicles. Alternative 2 improves overall traffic operation on CTH U (County Line Rd.). Alternative 2 also improves traffic operations at the ramp terminal intersections.

All operations are under the assumption that the traffic signal phasing utilizes single ring TTI (Texas Transportation Institute) phasing. Different signal phasing would require additional analysis to determine altered LOS and queue distances.

Environmental Factors

- Apple Creek flows along the west side of the interchange
- A historic Euro-American cabin/homestead exists west of the interchange
- Four hazardous waste generators and handlers are located near the interchange

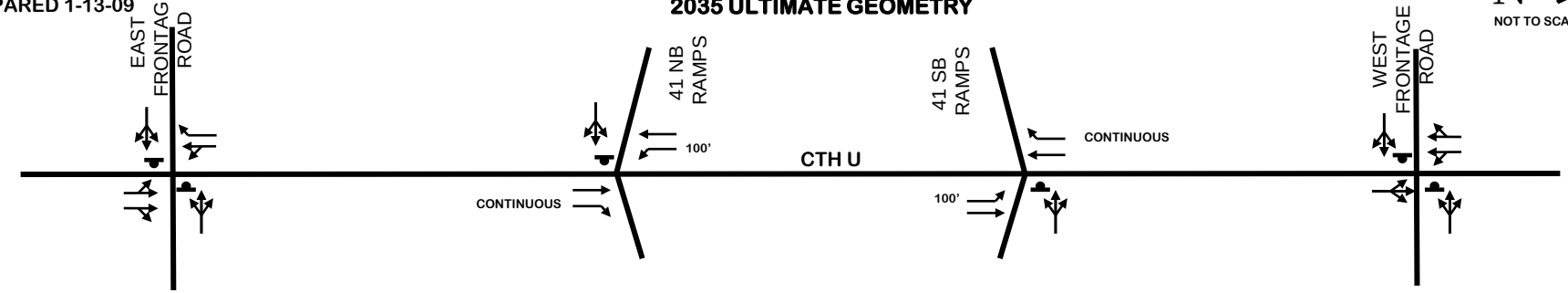
Complete Streets

CTH U is the county line between Outagamie and Brown Counties. Currently, this is a two lane highway that services Wrightstown and Hobart. Between WisDOT ramps, there is a wide shoulder for bike and pedestrian needs. However, this shoulder could be further widened to provide maximum distance between pedestrians and traffic. The 2010 Brown County Bike/Pedestrian Plan shows that sections of CTH U have bike accommodations. Future projects should continue the bike accommodations throughout. To the east, the development with the Village of Wrightstown will dictate whether or not pedestrian facilities need to be recommended

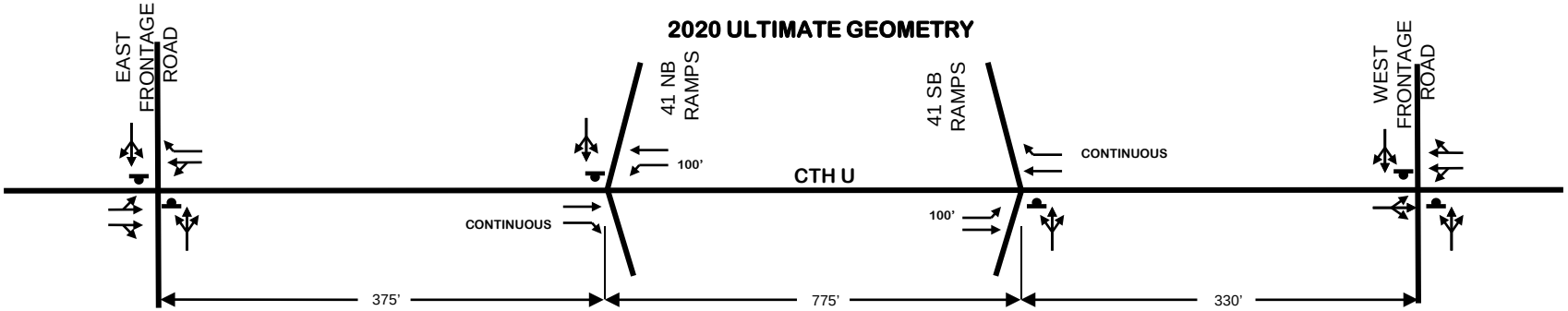
US 41 / CTH U
PREPARED 1-13-09

N
NOT TO SCALE

2035 ULTIMATE GEOMETRY



2020 ULTIMATE GEOMETRY



- BASE GEOMETRICS
- ADDITIONAL IMPROVEMENT RECOMMENDED
- XX' BASE GEOMETRICS PLANNED TURN BAY LENGTH
- (+XX') ADDITIONAL TURN BAY LENGTH RECOMMENDED
- TRAFFIC SIGNAL
- STOP SIGN

AADT
Existing – 4,700
2020 – 7,100
2035 – 7,700

US 41/WIS 441 Short-Term Improvement Cost Estimate
CTH U/County Line Rd.
(Improvement Alternative __)

	Roadway	Structure	Construction	R/W Cost	CM & Eng	Incremental Total	Total
Alternative 1	$ 361,000	$ 370,000	$ 610,000	$ -	$ 61,000	$ 1,402,000	$ 1,402,000
Alternative 2	$ 172,000	$ -	$ 104,000	$ -	$ 10,000	$ 286,000	$ 286,000
Alternative 3	$ 2,659,000	$ -	$ 1,556,000	$ 71,000	$ 156,000	$ 4,442,000	$ 4,442,000
Alternative 4	$ -	$ -	$ -	$ -	$ -	$ -	

Item	Item Description	Unit	Unit Price		
1	New Concrete Pavement[1]	SY		$65	Concrete, Base Aggregate, Crushed
2	New HMA Pavement[2]	SY		$50	HMA, Base Aggregate, Crushed
3	Sidewalk	SY		$35	
4	Curb and Gutter	LF		$20	
5	Earthwork	CY		$20	Cut or fill, based on observed topography, including ditches
6	Signal Pole Relocation	EA		$15,000	
7	Signal System	EA		$165,000	
8	Ramp Meter	EA		$75,000	
9	Ramp Meter- remove and reinstall	EA		$35,000	
10	Sign Bridge	EA		$100,000	
11	Drainage - Inlets/Manholes	EA		$700	
12	Drainage - Pipes/Culverts	LF		$50	
13	Drainage - Pipes/Culverts - extensions	LF		$100	
14	Concrete Barrier - 42"	LF		$70	
15	Retaining wall - non-structural (<5')	SF		$25	
16	Beam Guard	LF		$20	
17	Beam Guard End Absorbing Terminal	EA		$2,500	
18	Unique Items				Add Items unique to these locations,
19					that are too large to be covered in 'Road Incidentals'.
20					
	Subtotal				
	Road Incidentals[3]	LS		20%	removals, finishing, erosion, removals, lighting, etc
	Planning Level Contingency[3]	LS		20%	
	Signing & Pavement Marking[3]	LS		5%	
	Traffic Control - urban mainline[3,4]	LS		12%	assumed 100% unless other TC is entered
	Traffic Control - rural mainline[3,4]	LS		10%	enter percent of project on rural mainline
	Traffic Control - ramps[3,4]	LS		8%	enter percent of project on ramps
	Traffic Control - local roads[3,4]	LS		5%	enter percent on local roads
	Bridges - new and widening with substructure	SF	$ 140.00		Area of Bridge Deck
	Bridges - widening using existing substructure	SF	$ 100.00		Area of Bridge Deck
	Bridges - redecking	SF	$ 70.00		Area of Bridge Deck
	Retaining walls - structural	SF	$ 35.00		area of exposed wall face
	Mobilization[5]	LS		6%	
	CM & Engineering[6]	LS		10%	
	Right of Way				Site Specific
	Commercial Real Estate	SF			
	Residential Real Estate	SF			
	Commercial Relocation Cost	LS			
	Residential Relocation Cost	LS			
	Lighting	LS			

NOTES:

1. New Concrete Pavement consists of: Concrete Pavement 10", $50/SY; Base Aggregate, 6", $16/ton; Select Crushed, 12", $14/ton.
2. New HMA Pavement consists of: HMA, 5", $70/ton; Oil, $600/ton; Base Aggregate, 12", $16/ton; Select Crushed, 12", $14/ton
3. Lump Sum items are computed as a percentage of the roadway item costs. These do not include structural component costs.
4. Traffic Control is a lump sum, between 5% - 12%, weighted by the estimated construction cost on each roadway type.
5. Mobilization is computed as a percentage of the all item costs, including structural components.
6. Construction Management and Engineering are computed as a percentage of the total construction cost.

Preliminary Cost Estimate: US 41 at CTH U/County Line Rd.
Alternative 1

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	4,440	$288,600	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Multi Post Sign	EA	$25,000	1	$25,000	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20	320	$6,400	
17	Beam Guard End Absorbing Terminal	EA	$2,500	2	$5,000	
18	Lighting	LS				
19	Unique Items					
20	Beam Guard	LF	$30	1200	$36,000	
	Roadway Total			**$361,000**		
	Road Incidentals	LS	20%		$72,000	
	Planning Level Contingency	LS	20%		$72,000	
			0%			
	Signing & Pavement Marking	LS	5%		$18,000	
	Traffic Control - urban mainline	LS	12%	100%	$43,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00	3700	$370,000	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$370,000**		
	Mobilization	LS	6%		$34,500	
	Construction Total			**$610,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$61,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$1,402,000**		

Preliminary Cost Estimate: US 41 at CTH U/County Line Rd.
Alternative 2

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	1,100	$71,500	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Multi Post Sign	EA	$25,000	1	$25,000	
11	Drainage - Inlets/Manholes	EA	$700	1	$700	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20	Piezoelectric WIM	EA	$75,000	1	$75,000	cost includes initial cost and maintence for over 12 year cycle
	Roadway Total			**$172,000**		
	Road Incidentals	LS	20%		$34,000	
	Planning Level Contingency	LS	20%		$34,000	
			0%			
	Signing & Pavement Marking	LS	5%		$9,000	
	Traffic Control - urban mainline	LS	12%	100%	$21,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$5,880	
	Construction Total			**$104,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$10,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$286,000**		

Preliminary Cost Estimate: USH 41 at segment 1

USH 41 & CTH U (2020 & 2035)

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	24,750	$1,608,750	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	3,150	$110,250	
4	Curb and Gutter	LF	$20	16,200	$324,000	
5	Earthwork	CY	$20	21,750	$435,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	45	$31,500	
12	Drainage - Pipes/Culverts	LF	$50	2,982	$149,100	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$2,659,000**		
	Road Incidentals	LS	20%		$532,000	
	Planning Level Contingency	LS	20%		$532,000	
	Signing & Pavement Marking	LS	5%		$133,000	
	Traffic Control - urban mainline	LS	12%	37%	$118,000	
	Traffic Control - rural mainline	LS	10%	36%	$96,000	
	Traffic Control - ramps	LS	8%	27%	$57,000	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$88,080	
	Construction Total			**$1,556,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$156,000**		
	Commercial Real Estate	SF	0%	**$17**	$0	
	Residential Real Estate	SF	8,000	**$9**	$70,720	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$71,000**		
	TOTAL COST			**$4,442,000**		

Preliminary Cost Estimate: USH 41 at CTH U/County Line Rd.
Alternative 4

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65		$0	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20		$0	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20		$0	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$0**		
	Road Incidentals	LS	20%		$0	
	Planning Level Contingency	LS	20%		$0	
			0%			
	Signing & Pavement Marking	LS	5%		$0	
	Traffic Control - urban mainline	LS	12%	100%	$0	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$0	
	Construction Total			**$0**		
	Const. Mngmt & Engineering Total	LS	10%	**$0**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$0**		

NOTES

US 41 NB & SB PROFILE GRADE THROUGHOUT INTERCHANGE AREA IS POOR.

N

SCALE 0' 150' 300'

ACCESS CONTROL DISTANCE DOES NOT MEET MIN. STANDARD

SB ON RAMP CREST CURVE K VALUE DOES NOT MEET MIN. STANDARD

WEST FRONTAGE ROAD

SB OFF RAMP SAG CURVE K VALUE DOES NOT MEET MIN. STANDARD

SB OFF RAMP FIRST CURVE RADIUS DOES NOT MEET MIN. STANDARD

MEDIAN CROSSOVER SLOPE DOES NOT MEET MIN. STANDARD

US 41

CTH U (COUNTY LINE RD)

UNPROTECTED SIDE SLOPES STEEPER THAN 4:1

US 41

NB CLEAR ZONE DOES NOT MEET MIN. STANDARD

NB DIVERGE CRASH RATE IS POOR (OVER 50% OF CRASHES ARE CONSIDERED SEVERE)

NB OFF RAMP CREST CURVE K VALUE DOES NOT MEET MIN. STANDARD

ACCESS CONTROL DISTANCE DOES NOT MEET MIN. STANDARD

NB & SB BRIDGE OUTSIDE SHOULDER WIDTHS DO NOT MEET MIN. STANDARD

UNPROTECTED SIDE SLOPES STEEPER THAN 4:1

NB ON RAMP CREST CURVE K VALUE DOES NOT MEET MIN. STANDARD

EAST FRONTAGE ROAD

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- PROPOSED STRUCTURES
- RIGHT OF WAY ACQUISITION

N

SCALE 0' 150' 300'

WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

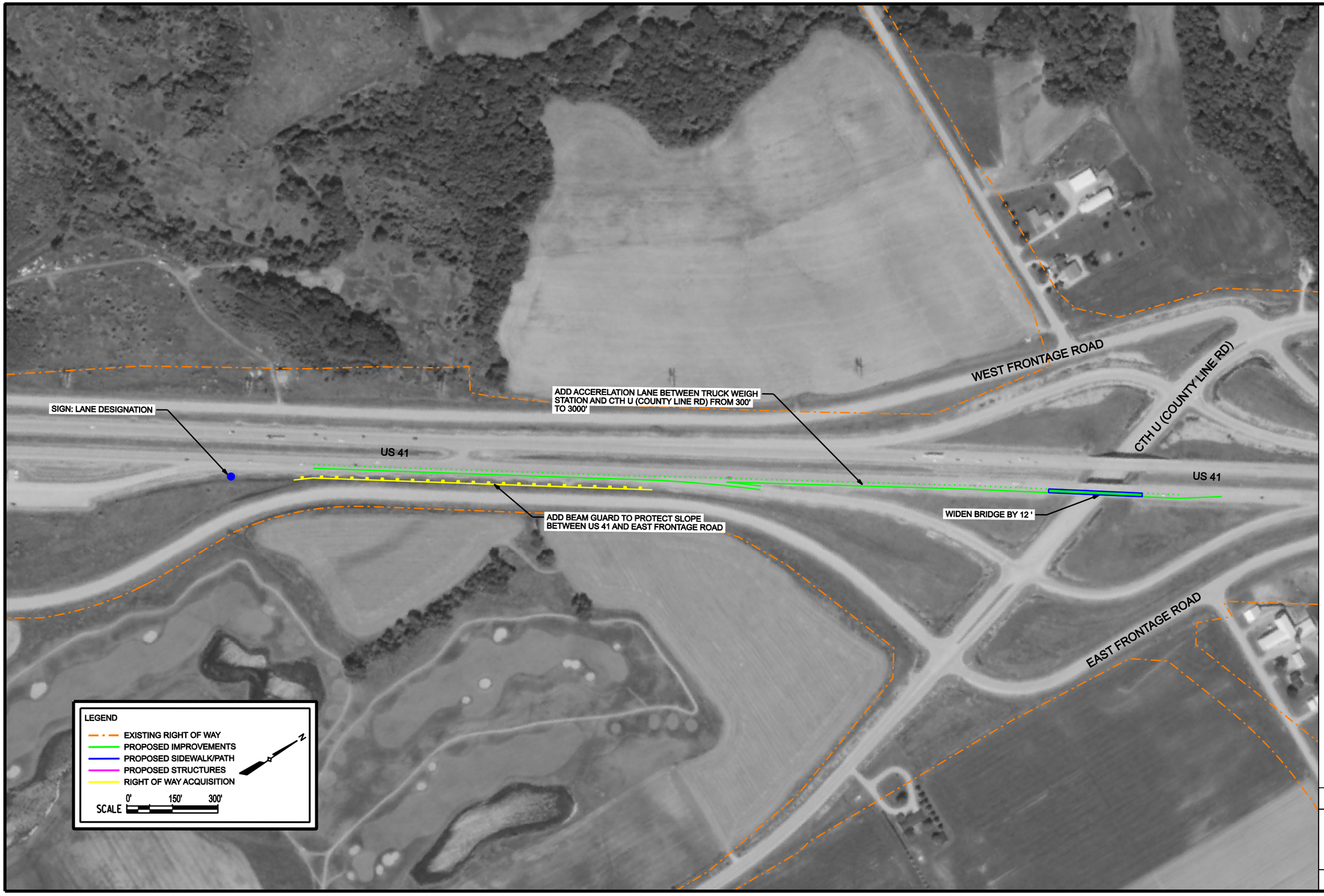
US 41 - CTH U INTERCHANGE

GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

US 41/CTH U
OUTAGAMIE
COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

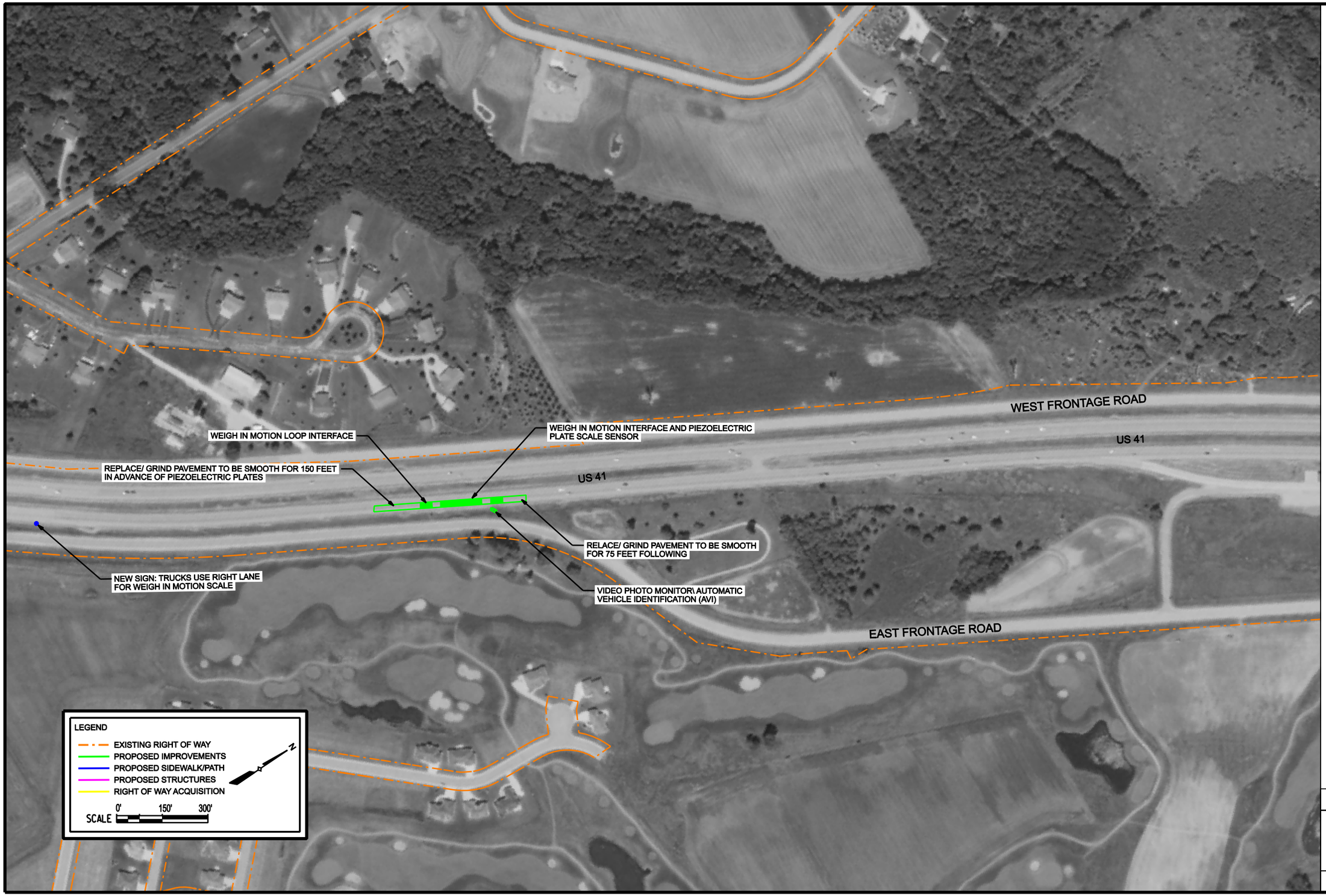
US 41 - CTH U INTERCHANGE\ TRUCK WEIGHT STATION EXTENDED ON RAMP
IMPROVEMENT ALTERNATIVE 1

HNTB

Exhibit

US 41/CTH U
OUTAGAMIE
COUNTY

Sheet 2 of 4



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

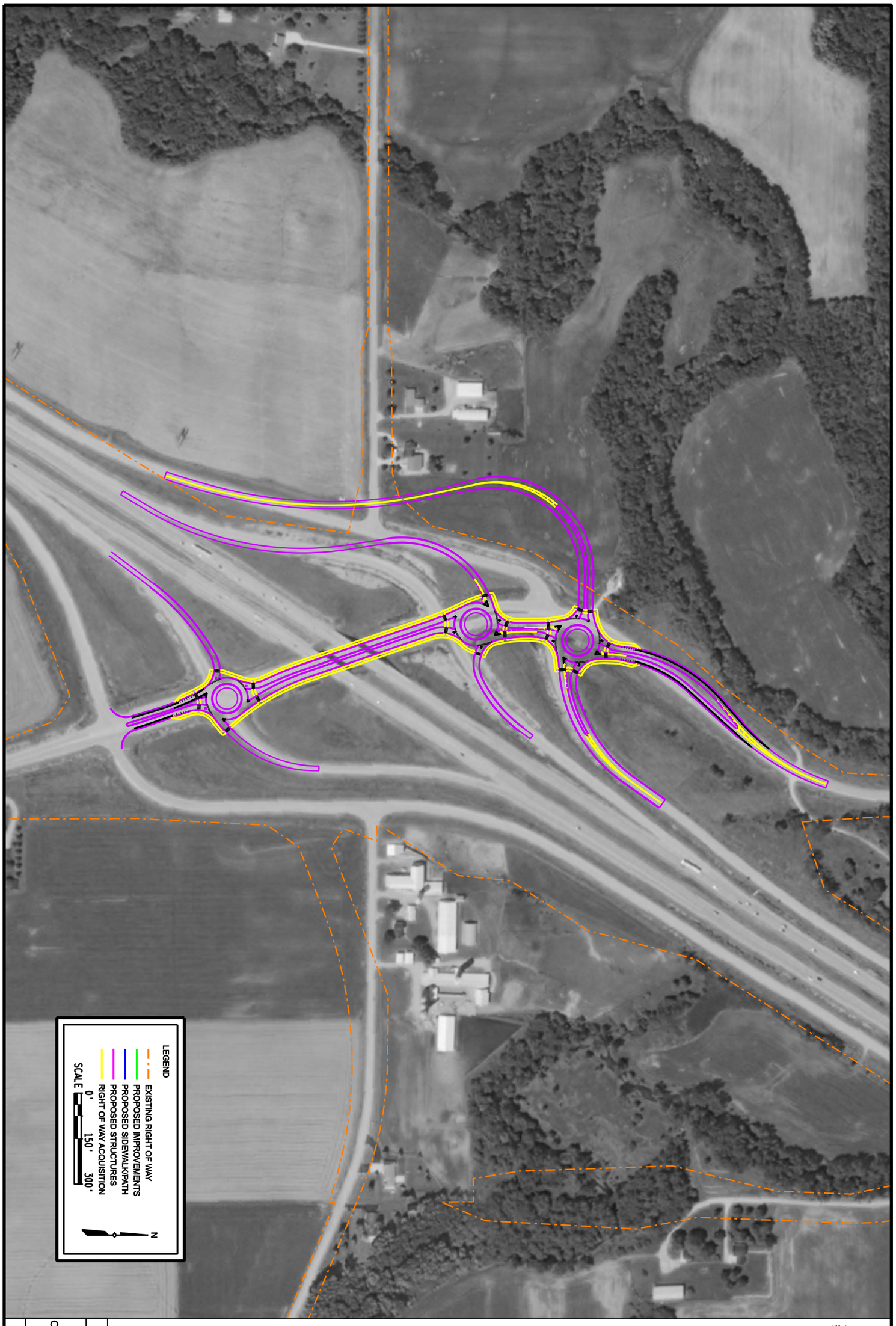
US 41 - CTH U INTERCHANGE\ TRUCK WEIGH STATION
IMPROVEMENT ALTERNATIVE 2

HNTB

Exhibit

US 41/CTH U
OUTAGAMIE
COUNTY

Sheet 3 of 4



US 41 - CTH U INTERCHANGE

2020 / 2035 RAB IMPROVEMENT

JANUARY 2010

HNTB

Exhibit

US 41/CTH E
OUTAGAMIE COUNTY

Sheet 4 of 4

US 41 & CTH S / Freedom Road

US 41/441 Operational Analysis — US 41 and CTH S (Freedom Rd)

Mainline Route	Crossroad
US 41	CTH S
Region	**Location**
Northeast	Town of Lawrence
Interchange Type	**Crossroad Function**
Diamond	Minor Arterial
Ramp Terminal	**Bridge Sufficiency**
Stop Controlled	B-05-0162 = 99.0
Bridge Hits	**Bridge Service Life**
	B-05-0162 built 1993

No-Build Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY South (NB)	FWY North (NB)	FWY North (SB)	FWY South (SB)	Total	Notes
LOS	2035	C (C)	D (C)	C (D)	C (D)	F (F)	F (F)	C (E)	E (D)	C (D)	D (D)		AM Peak (PM Peak)
	2020	C (C)	C (C)	C (C)	C (C)	D (C)	D (D)	C (C)	D (C)	C (C)	D (C)		
	Existing	C (B)	C (B)	B (C)	B (B)	B (B)	B (B)	C (B)	B (C)	C (B)	B (B)		
Queue	2035					218 (294)	209 (442)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1150' SB = 1200'
	2020					129 (196)	138 (180)						
	Existing					68 (63)	111 (116)						
Crashes	2002-2009	21	20	23	25	1	2	25	38	30	23	208	
	Severity	.52	.35	.43	.48	.18	.35	.36	.42	.43	.43		(INJ+FAT) / Total Crash
	Rate	37	35	37	45	0	.50	41	66	52	37		Merge & Diverge = HMVMT Intersection = MEV

Improved Alternative Summary

Title	Description
Alternative 1	Ramp terminals: lengthen off ramp right turn storage based on 2020 analysis
Alternative 2	Ramp terminals: Signalize based on 2035 analysis
Alternative 3	2020 and 2035 RAB. Unrelated to signal design.

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
LOS	Alt. 1	C (C)	C (C)	C (C)	C (C)	D (C)	D (D)	C (C)	D (C)	C (C)	D (C)		AM Peak (PM Peak)
	Alt. 2	C (C)	D (C)	C (D)	C (D)	D (C)	D (C)	C (E)	E (D)	C (D)	D (D)		
	Alt. 3	C (C)	C (C)	C (C)	C (C)	A (A)	A (A)	C (C)	D (C)	C (C)	D (C)		
Queue	Alt. 1					118 (258)	101 (175)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1150' SB = 1200'
	Alt. 2					272 (313)	236 (296)						
	Alt. 3					25 (25)	25 (25)						

US 41/441 Operational Analysis — US 41 and CTH S (Freedom Rd)

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
Crash Benefit	Alt. 1											0	Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35.000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands over an eight year period)
	Alt. 2						1					1	
	Alt. 3						3					3	

Alternative Construction Costs

	Total Cost	Structure Costs	ROW Costs
Alternative 1	$100,000	$0	$0
Alternative 2	$665,000	$0	$0
Alternative 3	$5,183,000	$961,000	$266,000

Preliminary Environmental Screening

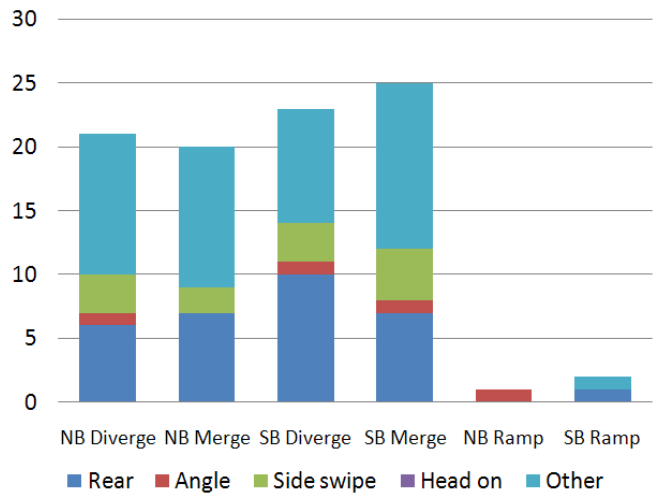
- DNR designated wetlands are located on the west and northeast sides of the interchange along Ashwaubenon Creek.
- An unknown prehistoric campsite/village has been identified southwest of the interchange along US 41.

Existing Geometric Deficiencies Rating

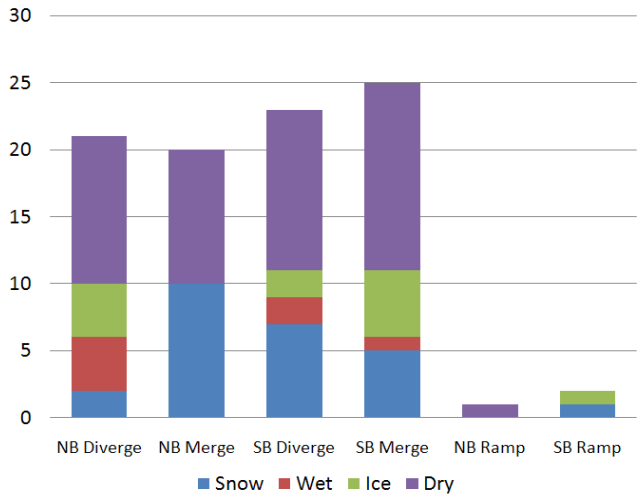
Freeway/Ramps	Score	Comments
Ramp Design Speed & Horizontal Alignment	Acceptable	
Ramps Merge / Diverge	Poor	NB and SB ramps have high crash severity
Ramp Stopping Sight Distance	Acceptable	
Bridges		
Bridge Width	Acceptable	
Crossroad		
Intersection Skew / Intersection Sight Distance	Acceptable	
Geometric Deficiency Score	Roadway Geometric Score = 8 / 10	Bridge Geometric Score = 4 / 5

Detailed Crash Analysis

Crash Type Summary



Pavement Condition Summary



US 41 & CTH S (FREEDOM ROAD) INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the US 41 & CTH S (Freedom Road) interchange is to address the needs and deficiencies identified in the US 41-WIS 441 Operation Needs Assessment Summary report dated March 2011. The following is a summary of the needs and deficiencies at the CTH S Interchange:

- Bridge vertical clearance that is less than desired.
- Access control between ramps and adjacent intersections being less than desired.
- High crash rates or severity at the southbound off ramp, southbound ramp terminal, and the northbound on ramp.

Although the bridge is vertically deficient, it is only by 0.05' therefore does not warrant an improvement. The high crash rate is due to three injury crashes out of five over the course of eight years rather than a large number of crashes. The high severity rate is the same issue where almost half of the crashes were injuries, but there was an average of about 3 crashes a year at both ramp locations.

The primary need at the CTH S (Freedom Road) interchange is to improve the safety and operations at the ramp terminal intersections.

The following alternatives have been developed based on an order of importance with regard to safety and operations, and should be considered cumulative with each other. The alternative analyses (LOS, queue lengths, etc) reflect this method. For example, Alternative 2 should only be considered in addition to Alternative 1.

Alternative 1

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Extend off ramp right turn storage by 75 feet (Southbound off ramp) and 150 feet (Northbound off ramp)
- Provide a continuous westbound right turn lane approaching Mid Valley Drive

Alternative 1 lengthens right turn storage on both off ramps. During 2020, off ramp left turning traffic is expected to experience an increase in delay due to an increase in conflicting traffic. Both off ramp approaches are expected to operate at LOS D. During 2035, LOS is expected to operate at LOS F.

Alternative 2

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- All changes made in Alternative 1.
- Signalize northbound and southbound ramp terminals
- Provide left turn storage at Mid Valley Drive on the eastbound, westbound and southbound approaches.

The signalization improvement in Alternative 2 develops vehicle platoons and gaps in traffic. With these gaps, adjacent intersection cross streets (French and Mid Valley) have the opportunity to conduct turning movements. The HCM method (calculation) of determining levels of service (LOS) does not consider gaps that are created by signalization. Therefore, LOS F on the northbound approach of French Road is conservative and better operations are expected.

During 2035, ramp terminal traffic warrants the use of traffic signals. Under signal control, the ramp terminals during both peak hours are expected to operate at overall LOS B or better. All way stop control is proposed at French Road. All way stop provides north/south traffic with the opportunity to traverse the intersection. Eastbound traffic may have a tendency to queue to the northbound off ramp during the PM peak hour.

At the time of this report, these are the best alternatives. However, if US 41 mainline is deemed to be expanded to a six lane highway, the bridge may need to be constructed. If the bridge needs to be reconstructed, the interchange may function better as a SPUI.

Alternative 2 Local

An alternative for local improvements has been detailed below. This alternative addresses operational problems at Mid Valley Dr by making the following change:

- Provide left turn storage at Mid Valley Drive on the eastbound, westbound and southbound approaches

This alternative will improve operations at the adjacent intersections only.

Alternative 3

The Year 2020 and 2035 roundabout alternative maintains a two-lane facility and provides one-lane roundabouts along the corridor. All movements are expected to operate at LOS A and experience acceptable queues and delays. Substantial surplus capacity[1] is expected beyond the forecasted Year 2035 traffic conditions. A system of roundabouts at this location will allow for the use of right-in/right-outs at future driveway locations as U-Turns are accommodated within the roundabouts.

Comparison of Alternatives

The interchange alternatives were compared based on safety, traffic operations, cost and other factors:

Safety

The crash severity has been high in the past due to a number of injury crashes, but there is not a large sum of crashes. Therefore, there has not been a safety issue at this interchange nor there will be one in the future.

[1] Determined by applying an equal percentage increase to all volumes at an intersection under the 50th CL until a leg failed; the lowest percent increase among the intersections was reported. Therefore, the remaining intersections at each interchange will have higher surplus capacity values.

Traffic Operations

Both alternatives reduce congestion for the respective projected traffic. In 2035, the ramps fail without any adjustments, but they are LOS D or better with minor adjustments.

All operations are under the assumption that the traffic signal phasing utilizes single ring TTI (Texas Transportation Institute) phasing. Different signal phasing would require additional analysis to determine altered LOS and queue distances.

Environmental Factors

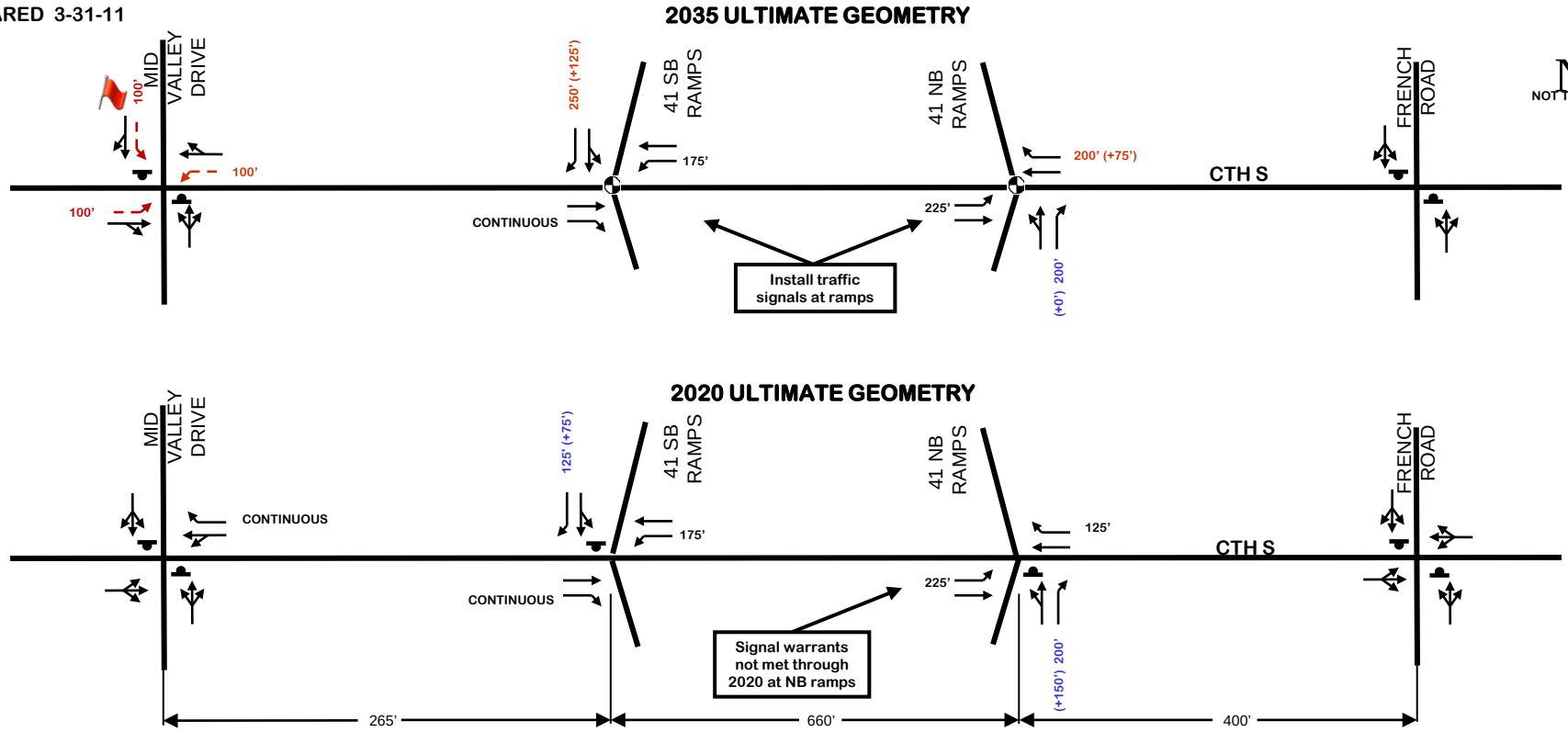
DNR designated wetlands are located on the west and northeast sides of the interchange along Ashwaubenon Creek. An unknown prehistoric campsite/village has been identified southwest of the interchange along US 41.

Complete Streets

The CTH S Interchange is located just outside the Green Bay Metropolitan Planning Area. Future growth in the Green Bay area may require communication with the Green Bay Metropolitan Planning Organization (MPO) to determine proper bike/pedestrian accommodations. The overpass itself contains a very wide outside lane to accommodate bike and pedestrian traffic. Initial additions should include wider shoulders on CTH S to accommodate an anticipated increase in bicycle traffic. WisDOT also has a Park and Ride in the Southwest quadrant that may be getting extended and resurfaced as part of WisDOT project 1130-44-00.

US 41 / CTH S

PREPARED 3-31-11



XX' BASE GEOMETRICS PLANNED TURN BAY LENGTH

(+XX') ADDITIONAL TURN BAY LENGTH RECOMMENDED

(+XX') ADDITIONAL TURN BAY LENGTH REQUIRED FOR 2035 VOLUMES

BASE GEOMETRICS

ADDITIONAL IMPROVEMENT RECOMMENDED

ADDITIONAL IMPROVEMENT REQUIRED FOR 2035 VOLUMES

TRAFFIC SIGNAL

STOP SIGN

OPERATIONAL PROBLEMS REMAIN

USH 41/WIS 441 Short-Term Improvement Cost Estimate
CTH S

	Roadway	Structure	Construction	R/W Cost	CM & Eng	Incremental Total	Total
Alternative 1	$ 60,000	$ -	$ 36,000	$ -	$ 4,000	$ 100,000	$ 100,000
Alternative 2	$ 338,000	$ -	$ 206,000	$ -	$ 21,000	$ 565,000	$ 665,000
Alternative 2 local*	$ 108,000	$ -	$ 66,000	$ -	$ 7,000		$ 181,000
Alternative 3	$ 2,362,000	$ 961,000	$ 1,449,000	$ 266,000	$ 145,000	$ 5,183,000	$ 5,183,000
Alternative 3 local*	$ 1,200,000	$ -	$ 725,000	$ 170,000	$ 73,000		$ 2,168,000

*Local cost estimates take into account only costs that would affect local traffic

Item	Item Description	Unit	Unit Price	
1	New Concrete Pavement[1]	SY	$65	Concrete, Base Aggregate, Crushed
2	New HMA Pavement[2]	SY	$50	HMA, Base Aggregate, Crushed
3	Sidewalk	SY	$35	
4	Curb and Gutter	LF	$20	
5	Earthwork	CY	$20	Cut or fill, based on observed topography, including ditches
6	Signal Pole Relocation	EA	$15,000	
7	Signal System	EA	$165,000	
8	Ramp Meter	EA	$75,000	
9	Ramp Meter- remove and reinstall	EA	$35,000	
10	Sign Bridge	EA	$100,000	
11	Drainage - Inlets/Manholes	EA	$700	
12	Drainage - Pipes/Culverts	LF	$50	
13	Drainage - Pipes/Culverts - extensions	LF	$100	
14	Concrete Barrier - 42"	LF	$70	
15	Retaining wall - non-structural (<5')	SF	$25	
16	Beam Guard	LF	$20	
17	Beam Guard End Absorbing Terminal	EA	$2,500	
18	Unique Items		$0	Add Items unique to these locations,
19				that are too large to be covered in 'Road Incidentals'.
20				
	Subtotal			
	Road Incidentals[3]	LS	20%	removals, finishing, erosion, removals, lighting, etc
	Planning Level Contingency[3]	LS	20%	
	Signing & Pavement Marking[3]	LS	5%	
	Traffic Control - urban mainline[3,4]	LS	12%	assumed 100% unless other TC is entered
	Traffic Control - rural mainline[3,4]	LS	10%	enter percent of project on rural mainline
	Traffic Control - ramps[3,4]	LS	8%	enter percent of project on ramps
	Traffic Control - local roads[3,4]	LS	5%	enter percent on local roads
	Bridges - new and widening with substructure	SF	$ 140.00	Area of Bridge Deck
	Bridges - widening using existing substructure	SF	$ 100.00	Area of Bridge Deck
	Bridges - redecking	SF	$ 70.00	Area of Bridge Deck
	Retaining walls - structural	SF	$ 35.00	area of exposed wall face
	Mobilization[5]	LS	6%	
	CM & Engineering[6]	LS	10%	
	Right of Way Commercial Real Estate	SF	$ 17.00	Site Specific
	Residential Real Estate	SF	$ 9.00	
	Commercial Relocation Cost	SF		
	Residential Relocation Cost	SF		
	Lighting	LS		

NOTES:

1. New Concrete Pavement consists of: Concrete Pavement 10", $50/SY; Base Aggregate, 6", $16/ton; Select Crushed, 12", $14/ton.
2. New HMA Pavement consists of: HMA, 5", $70/ton; Oil, $600/ton; Base Aggregate, 12", $16/ton; Select Crushed, 12", $14/ton
3. Lump Sum items are computed as a percentage of the roadway item costs. These do not include structural component costs.
4. Traffic Control is a lump sum, between 5% - 12%, weighted by the estimated construction cost on each roadway type.
5. Mobilization is computed as a percentage of the all item costs, including structural components.
6. Construction Management and Engineering are computed as a percentage of the total construction cost.

Preliminary Cost Estimate: USH 41 at CTH S
Alternative 1

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	800	$52,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20	200	$4,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20	75	$1,500	
17	Beam Guard End Absorbing Terminal	EA	$2,500	1	$2,500	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$60,000**		
	Road Incidentals	LS	20%		$12,000	
	Planning Level Contingency	LS	20%		$12,000	
	Signing & Pavement Marking	LS	5%		$3,000	
	Traffic Control - urban mainline	LS	12%	100%	$7,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$2,040	
	Construction Total			**$36,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$4,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$100,000**		

Preliminary Cost Estimate: USH 41 at CTH S
Alternative 2

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	2,225	$144,625	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20	500	$10,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000	1	$165,000	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20	663	$13,260	
17	Beam Guard End Absorbing Terminal	EA	$2,500	2	$5,000	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$338,000**		
	Road Incidentals	LS	20%		$68,000	
	Planning Level Contingency	LS	20%		$68,000	
	Signing & Pavement Marking	LS	5%		$17,000	
	Traffic Control - urban mainline	LS	12%	100%	$41,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$11,640	
	Construction Total			**$206,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$21,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$565,000**		

Preliminary Cost Estimate: USH 41 at CTH S

Alternative 2 local*

*Local cost estimates take into account only costs that would affect local traffic

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	1,225	$79,625	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20	500	$10,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20	663	$13,260	
17	Beam Guard End Absorbing Terminal	EA	$2,500	2	$5,000	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$108,000**		
	Road Incidentals	LS	20%		$22,000	
	Planning Level Contingency	LS	20%		$22,000	
	Signing & Pavement Marking	LS	5%		$5,000	
	Traffic Control - urban mainline	LS	12%	100%	$13,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$3,720	
	Construction Total			**$66,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$7,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$181,000**		

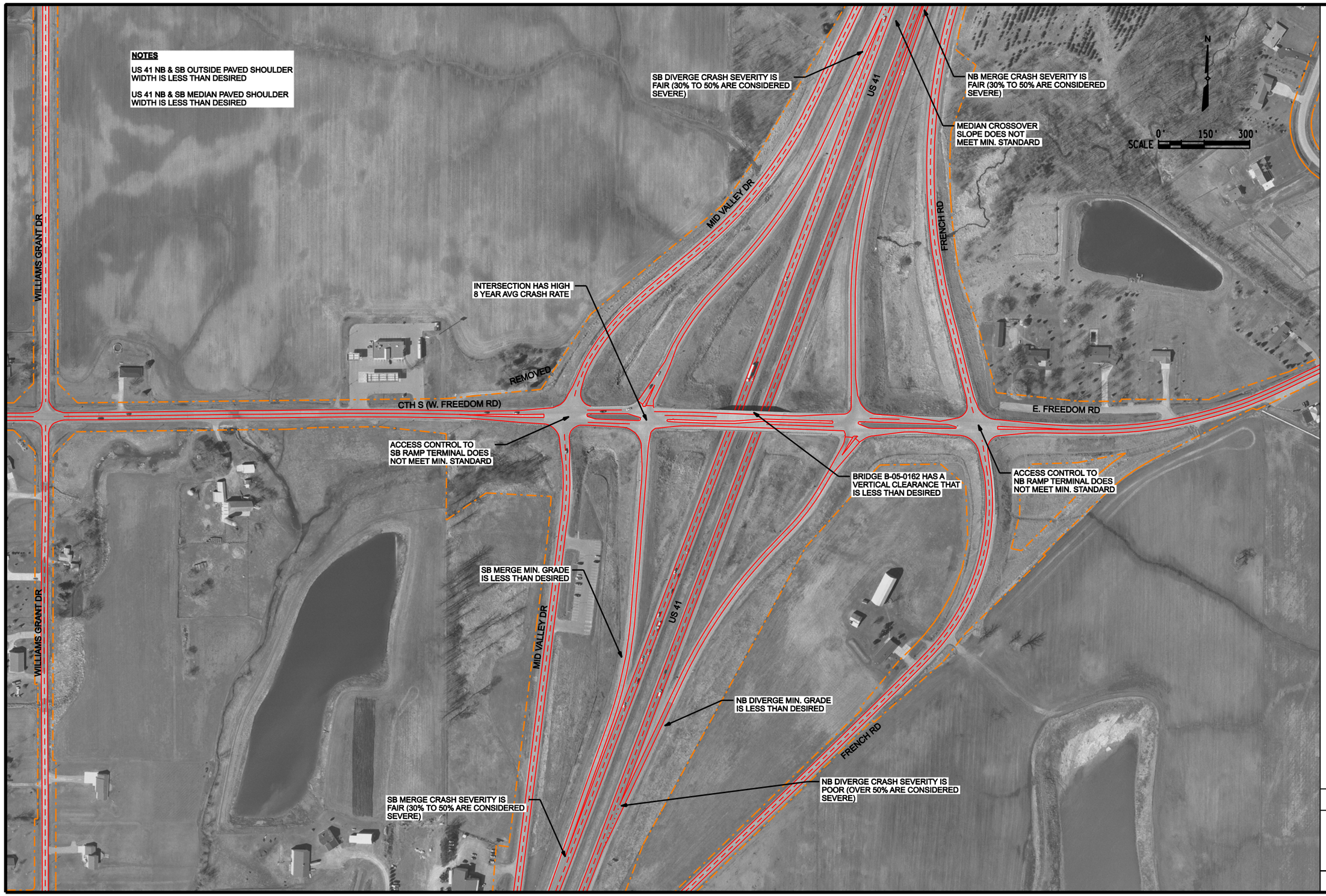
Preliminary Cost Estimate: USH 41 at Alternative 3

USH 41 & CTH S (2020)

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	22,900	$1,488,500	
2	New HMA Pavement[2]	SY	$50	0	$0	
3	Sidewalk	SY	$35	2,500	$87,500	
4	Curb and Gutter	LF	$20	12,350	$247,000	
5	Earthwork	CY	$20	19,250	$385,000	
6	Signal Pole Relocation	EA	$15,000	0	$0	
7	Signal System	EA	$165,000	0	$0	
8	Ramp Meter	EA	$75,000	0	$0	
9	Ramp Meter- remove and reinstall	EA	$35,000	0	$0	
10	Sign Bridge	EA	$100,000	0	$0	
11	Drainage - Inlets/Manholes	EA	$700	40	$28,000	
12	Drainage - Pipes/Culverts	LF	$50	2,518	$125,900	
13	Drainage - Pipes/Culverts - extensions	LF	$100	0	$0	
14	Concrete Barrier - 42"	LF	$70	0	$0	
15	Retaining wall - non-structural (<5')	SF	$25	0	$0	
16	Lighting	LS		0		
17	Unique Items					
18						
19						
20						
	Roadway Total			**$2,362,000**		
	Road Incidentals	LS	20%		$472,000	
	Planning Level Contingency	LS	20%		$472,000	
	Signing & Pavement Marking	LS	5%		$118,000	
	Traffic Control - urban mainline	LS	12%	55%	$156,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	30%	$57,000	
	Traffic Control - local roads	LS	5%	15%	$18,000	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00	13,725	$960,750	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$961,000**		
	Mobilization	LS	6%		$135,225	
	Construction Total			**$1,449,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$145,000**		
	Commercial Real Estate	SF	$17.00		$0	
	Residential Real Estate	SF	$9.00		$0	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	0		$0	
	R/W Total			**$266,000**		
	TOTAL COST			**$5,183,000**		

Preliminary Cost Estimate: USH 41 at USH 41 & CTH S (2020)
Alternative 3 local*
*Local cost estimates take into account only costs that would affect local traffic

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	12,230	$794,950	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	960	$33,600	
4	Curb and Gutter	LF	$20	5,200	$104,000	
5	Earthwork	CY	$20	9,850	$197,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	20	$14,000	
12	Drainage - Pipes/Culverts	LF	$50	1,122	$56,100	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$1,200,000**		
	Road Incidentals	LS	20%		$240,000	
	Planning Level Contingency	LS	20%		$240,000	
	Signing & Pavement Marking	LS	5%		$60,000	
	Traffic Control - urban mainline	LS	12%	100%	$144,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$41,040	
	Construction Total			**$725,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$73,000**		
	Commercial Real Estate	SF	$17.00		$0	
	Residential Real Estate	SF	$9.00	18,860	$169,740	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	0		$0	
	R/W Total			**$170,000**		
	TOTAL COST			**$2,168,000**		



WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

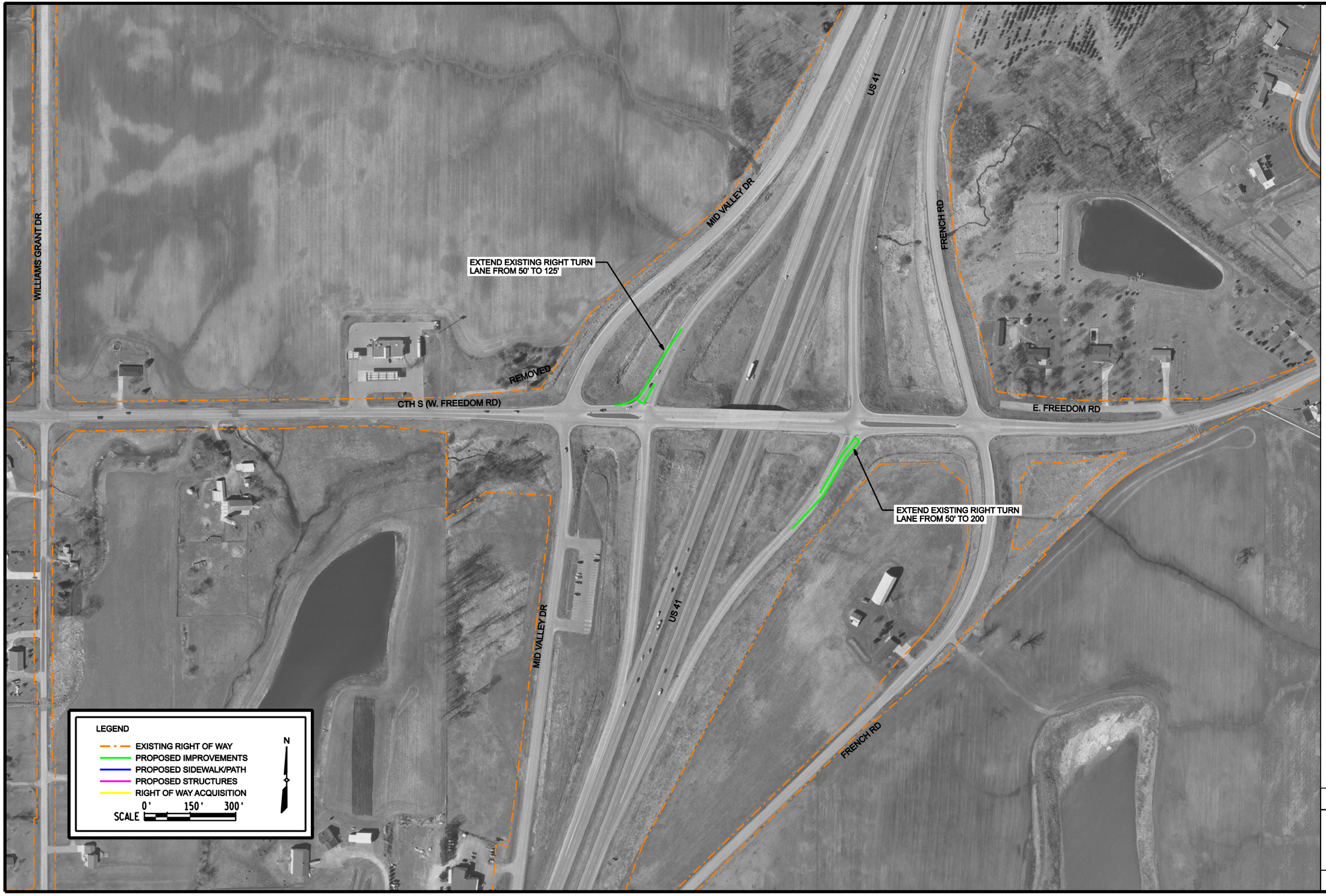
US 41 - CTH S INTERCHANGE

GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

US 41/CTH S
BROWN
COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

US 41 - CTH S INTERCHANGE

IMPROVEMENT ALTERNATIVE 1

HNTB

Exhibit

US 41/CTH S
BROWN
COUNTY

WILLIAMS GRANT DR

MID VALLEY DR

US 41

FRENCH RD

EXTEND EXISTING RIGHT TURN LANE FROM 125' TO 250'

RE-STRIPE 100' LEFT TURN LANE

ADD 100' LEFT TURN LANE

REMOVED

CTH S (W. FREEDOM RD)

EXTEND EXISTING RIGHT TURN LANE FROM 125' TO 200'

E. FREEDOM RD

ADD 100' LEFT TURN LANE

INSTALL TRAFFIC SIGNALS AT RAMPS

MID VALLEY DR

US 41

FRENCH RD

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- PROPOSED STRUCTURES
- RIGHT OF WAY ACQUISITION

SCALE 0' 150' 300'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

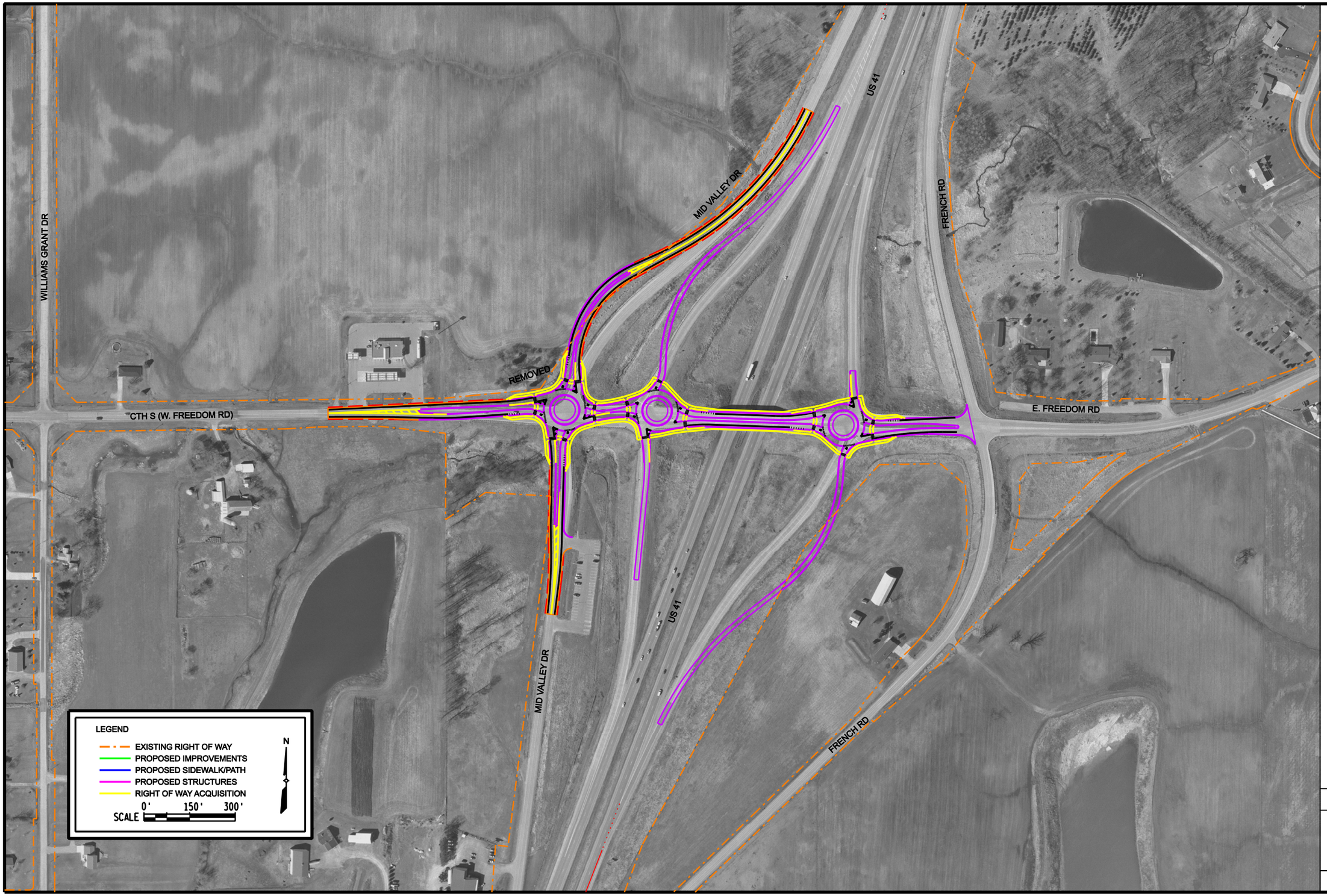
US 41 - CTH S INTERCHANGE

IMPROVEMENT ALTERNATIVE 2

HNTB

Exhibit

US 41/CTH S
BROWN
COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JUNE 2011

US 41 - CTH S INTERCHANGE

IMPROVEMENT ALTERNATIVE RAB 2020 & 2035

HNTB

Exhibit

US 41/CTH S
BROWN
COUNTY

Sheet 4 of 4

WIS 441 & CTH CE (College Avenue)

US 41/441 Operational Analysis — WIS 441 and CTH CE (College Ave)

Mainline Route	Crossroad
WIS 441	CTH CE
Region	**Location**
Northeast	City of Appleton
Interchange Type	**Crossroad Function**
Diamond	Minor Arterial
Ramp Terminal	**Bridge Sufficiency**
Signalized	B-44-0122 = 100 B-44-0123 = 100
Bridge Hits	**Bridge Service Life**
	B-44-0122 built 1992 B-44-0123 built 1992

No-Build Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY South (NB)	FWY North (NB)	FWY North (SB)	FWY South (SB)	Total	Notes
LOS	2035	C (D)	F (D)	C (E)	C (D)	-	-	B (C)	D (C)	C (D)	C (C)		AM Peak (PM Peak)
	2020	C (C)	F (C)	C (D)	C (C)	C (F)	F (E)	B (C)	C (B)	C (C)	B (B)		
	existing	B (C)	D (C)	B (C)	B (B)	D (F)	D (C)	B (B)	C (B)	B (C)	B (B)		
Queue	2035					-	-						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1320' SB = 1200'
	2020					147 (286)	1219 (1279)						
	existing					95 (291)	240 (742)						
Crashes	2002-2006	8	9	4	9	37	41	0	0	14	12	134	
	Severity	.25	.44	.25	.44	.30	.49	0	0	.36	.42	-	(INJ+FAT) / Total Crash
	Rate	41	40	21	54	.60	.61	0	0	35	34	-	Merge & Diverge = HMVMT Intersection = MEV

Improved Alternative Summary

Title	Description
Alternative 1	Extend the acceleration lanes for NB and SB on ramps, and improvements to NB and SB off ramps.
Alternative 2	Realignment of roadway westbound direction from Eisenhower Dr to NB ramps and additional left turn on to SB on ramp. Alt 2 has Alt 1 improvements built into proposal.
Alternative 3	2020 RAB. Unrelated to signal design.
Alternative 4	2035 RAB. Unrelated to signal design.

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
LOS	Alt. 1	-	F (C)	-	C (C)	C (D)	D (F)	B (C)	C (B)	C (C)	B (B)		AM Peak (PM Peak)
	Alt. 2	-	F (C)	-	C (C)	C (D)	D (D)	B (C)	C (B)	C (C)	B (B)		
	Alt. 3	-	F (C)	-	C (C)	A (A)	A (A)	B (C)	C (B)	C (C)	B (B)		
	Alt. 4	-	F (C)	-	C (C)	A (A)	A (A)	B (C)	C (B)	C (C)	B (B)		

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
Queue	Alt. 1					126 (347)	268 (1277)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1320' SB = 1200'
	Alt. 2					117 (234)	196 (265)						
	Alt. 3					25 (25)	25 (25)						
	Alt. 4					25 (25)	25 (25)						
Crash Benefit	Alt. 1	8	10	-	4	37	25	-	-	-	-	84	Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35.000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands over a five year period)
	Alt. 2	8	10	-	4	84	54	-	-	-	-	160	
	Alt. 3	-	-	-	-	66	104	-	-	-	-	170	
	Alt. 4	-	-	-	-	66	104	-	-	-	-	170	

Alternative Construction Costs

	Total Cost	Structure Costs	ROW Costs
Alternative 1	$1,071,000	$0	$0
Alternative 2	$2,558,000	$103,000	$0
Alternative 3	$9,636,000	$0	$334,000
Alternative 4	$10,359,000	$0	$392,000

Preliminary Environmental Screening

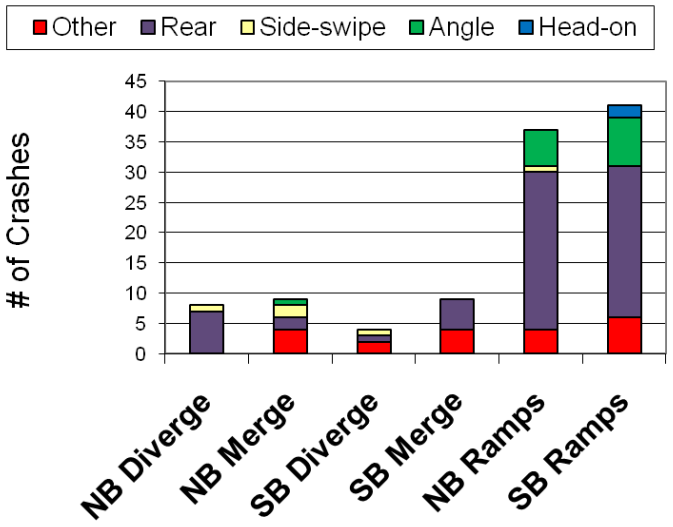
- A residential neighborhood is located adjacent to the interchange
- Possible environmental justice impacts
- An unnamed stream crosses under US 41 near the interchange

Existing Geometric Deficiencies Rating

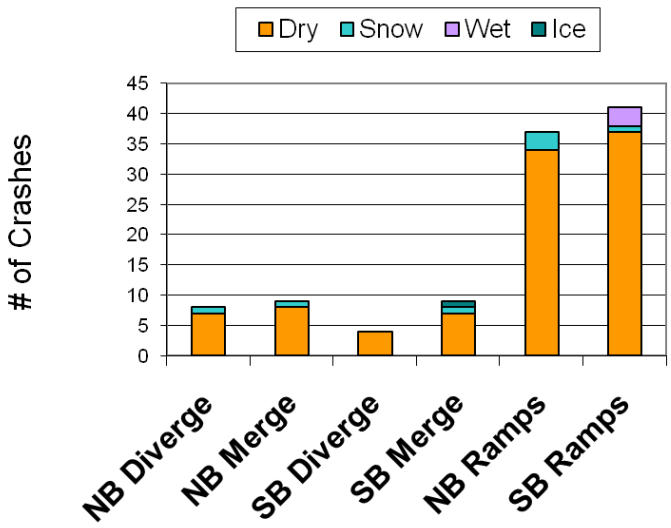
Freeway/Ramps	Score	Comments
Ramp Design Speed & Horizontal Alignment	Poor	NB on ramp has a deficient radius for posted speed.
Ramps Merge / Diverge	Poor	NB and SB off ramps have acceleration lanes that do not meet minimum standard.
Ramp Stopping Sight Distance	Acceptable	
Crossroad		
Intersection Skew / Intersection Sight Distance	Acceptable	
Geometric Deficiency Score	Roadway Geometric Score = 8 / 10	Bridge Geometric Score = 5 / 5

Detailed Crash Analysis

Crash Type Summary



Pavement Condition Summary



WIS 441 & CTH CE (COLLEGE AVE) INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the WIS 441 & CTH CE (College Ave.) interchange is to address the needs and deficiencies identified in the US 41-WIS 441 Operational Needs Assessment Summary report dated August 2008. The following is a summary of the needs and deficiencies at the CTH CE (College Ave.) Interchange:

- Northbound ramp terminal intersection is at a LOS "F" during the PM peak hour.
- Northbound and southbound on ramps have deficient acceleration lane length.
- All four ramps have deficient vertical alignments.
- Northbound on ramp has a deficient horizontal curve radius for posted speed.
- Northbound on and off ramps have ditch profiles near flat.
- WIS 441 northbound and southbound bridges have a vertical clearance that is less than desired.
- WIS 441 northbound and southbound mainline, south and north of CTH CE (College Ave.) have poor vertical alignment.
- WIS 441 northbound and southbound mainline, south of CTH CE (College Ave.), has a poor rated cross section.

The primary needs at the CTH CE (College Ave.) interchange are to improve operations at the ramp terminal intersections and the on ramp merge locations.

The following alternatives have been developed based on an order of importance with regard to safety and operations, and should be considered cumulative with each other. The alternative analyses (LOS, queue lengths, etc) reflect this method. For example, Alternative 2 should only be considered in addition to Alternative 1.

Alternative 1

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Extend the acceleration lane on the southbound on ramp from 600 feet to 1000 feet.
- Extend the right turn lane from CTH CE (College Ave) to the southbound on ramp from 100 feet to 300 feet and adjust the lane drops.
- Extend the right turn lane from 225 feet to 300 feet and the left turn lanes from 210 feet to 475 feet on the southbound off ramp.
- Reconstruct the northbound on ramp with corrected horizontal alignment.
- Extend the acceleration lane on the northbound on ramp from 500 feet to 650 feet; end before the bridge, which is 670 feet from the ramp.
- Add an additional 350 foot right turn lane to the northbound off ramp.
- Add beam guard where additional turn lane is to protect slope.
- Adjust the median islands at both ramp terminal intersections as needed due to other ramp terminal intersection improvements.

The improvements in Alternative 1 will allow both the northbound and southbound off ramps to operate more efficiently by reducing queue lengths and improving the LOS. The improvements to the northbound and southbound on ramps will not improve the LOS at the 2020 design year due to future congestion on WIS 441. To improve the

LOS, additional mainline lanes will be required to increase capacity. The modifications to the on ramps will improve roadway safety as traffic volumes grow in the future.

Alternative 2

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- All changes made in Alternative 1.
- Add a second receiving lane to the southbound on ramp and adjust the lane drops.
- Adjust the median island to provide an adequate turning radius for traffic turning onto the southbound on ramp.
- Add the eastbound CTH CE (College Ave) through lane 450 feet from the southbound ramp terminal intersection.
- Add a 500 foot left turn lane from westbound CTH CE (College Ave) to the southbound on ramp.
- Add an additional 1960' through lane on westbound CTH CE (College Ave) to the southbound ramp terminal intersection.
- Construct a new 500 foot right turn lane from westbound CTH CE (College Ave) to the northbound on ramp to accommodate for the widened road.
- Realign sidewalk/path to accommodate for the widened road and other intersection improvements.
- Add a third 400 foot left turn lane eastbound CTH CE (College Ave) from the southbound ramp terminal intersection.
- Extend westbound CTH CE (College Ave) left turn lane from 75 feet to 175 feet to Kensington Drive.

The improvements in Alternative 2 will allow more vehicles to make left turns from CTH CE (College Ave.) to the southbound on ramp. Additional westbound through lanes allow more traffic to move through the ramp terminal intersections during one signal cycle. These improvements at both ramp terminal intersections will operate more efficiently.

Alternative 3

The Year 2020 roundabout alternative maintains a four-lane facility to the west of the southbound WIS 441 ramps, and it requires a five-lane facility (3 eastbound) to the east. Three-lane roundabouts would be provided at Eisenhower Drive, the northbound WIS 441 ramps, and the southbound WIS 441 ramps, while a two-lane roundabout would be provided at Kensington Drive. All movements are expected to operate at LOS A or better and experience acceptable queues and delays. Surplus capacity of approximately 16%[1] is expected beyond the forecasted Year 2020 traffic conditions. A system of roundabouts at this location will allow for the use of right-in/right-outs at future driveway locations as U-Turns are accommodated within the roundabouts.

Alternative 4

The Year 2035 roundabout alternative maintains a four-lane facility to the west of the southbound WIS 441 ramps, and it requires a six-lane facility to the east. Three-lane

[1] Determined by applying an equal percentage increase to all volumes at an intersection under the 50th CL until a leg failed. The lowest percent increase among the intersections was reported. Therefore, the remaining intersections at each interchange will have higher surplus capacity values.

roundabouts would be provided at Eisenhower Drive, the northbound WIS 441 ramps, and the southbound WIS 441 ramps, while a two-lane roundabout would be provided at Kensington Drive. All movements are expected to operate at LOS A or better and experience acceptable queues and delays.

Eisenhower Drive is currently being investigated under a study by the city with assistance from OMNNI Associates, Inc. OMNNI found, through public involvement, that a multilane roundabout is being discouraged by the city.

Additional Deficiencies

There are additional deficiencies on CTH CE (College Ave.) not addressed at the intersections of Kensington Drive and Eisenhower Drive. It is not expected that those deficiencies will effect operations of the WIS 441 ramps or mainline.

The access control distance to Kensington Drive is less than the 1320 foot minimum required distance. Design changes are not suggested because it has no significant impact on the interchange.

The ditch profiles are near flat on the sections of this interchange near the northbound and southbound on ramp tapers. This problem has not been addressed in any alternatives, but should be noted as a deficiency that could be addressed during future projects. At the current time however, it is not causing any safety or operational problems.

The vertical alignment on the northbound and southbound mainline directly north and south of the CTH CE (College Ave.) overpass is poor. Fixing the crest curve would require a complete re-design and reconstruction of the mainline. This poor vertical alignment has not contributed to any major safety concerns in this area. Fixing this deficiency is not recommended due to the high cost-to-benefit ratio. Both structures are within the minimum height but not the desired.

Comparison of Alternatives

The interchange alternatives were compared based on safety, traffic operations, cost and other factors:

Safety

Alternative 1 addresses safety issues at northbound and southbound ramps in the interchange area. These locations include both on ramp merge locations, as well as excessive queues at the ramp terminal intersections. The improvements made to these locations will improve the roadway safety. Alternative 2 includes the addition of extra lanes on CTH CE (College Ave) as well as the southbound on ramp. These extra lanes will allow for more traffic to safely move through the interchange area and relieve traffic stress on an overstressed facility.

Traffic Operations

Alternative 1 focuses on improving traffic operations at the ramp terminal intersections as well as the on ramp merge locations. The improvements made at these locations will help traffic operate more efficiently, especially at the northbound ramp terminal intersection which currently has a failing LOS in the evening peak hour.

Alternative 2 increases the traffic capacity of CTH CE (College Ave) by the addition of through lanes that extend to Eisenhower Dr. This will allow traffic to efficiently move through of the interchange area without effecting turning vehicles.

Environmental Factors

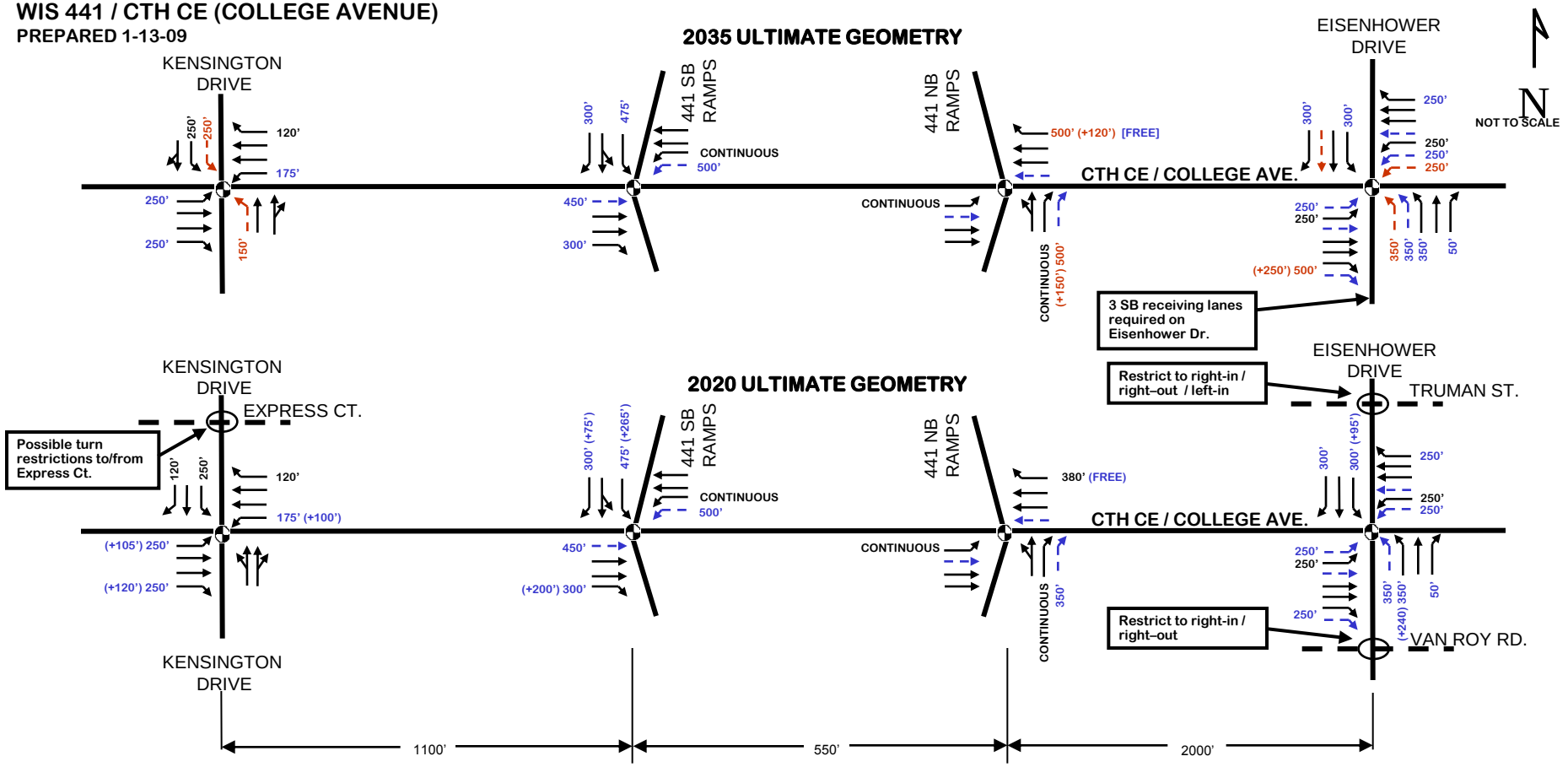
- A residential neighborhood is located adjacent to the interchange
- Possible environmental justice impacts
- An unnamed stream crosses under US 41 near the interchange

Complete Streets

CTH CE is the current location of the CE Trail. This trail connection should never be compromised. It is a major bike/ped accommodation along East College Ave. CTH CE also has bus routes provided by Valley Transit on both the east and west sides of the interchange. Future additions could consider on street bike accommodations.

WIS 441 / CTH CE (COLLEGE AVENUE)

PREPARED 1-13-09



XX' BASE GEOMETRICS PLANNED TURN BAY LENGTH

(+XX') ADDITIONAL TURN BAY LENGTH RECOMMENDED

(+XX') ADDITIONAL TURN BAY LENGTH REQUIRED FOR 2035 VOLUMES

BASE GEOMETRICS

ADDITIONAL IMPROVEMENT RECOMMENDED

ADDITIONAL IMPROVEMENT REQUIRED FOR 2035 VOLUMES

TRAFFIC SIGNAL

STOP SIGN

OPERATIONAL PROBLEMS REMAIN

AADT

Existing – 34,900

2020 – 46,800

2035 – 51,500

USH 41/WIS 441 Short-Term Improvement Cost Estimate
CTH CE/College Ave.
(Improvement Alternative __)

	Roadway	Structure	Construction	R/W Cost	CM & Eng	Incremental Total	Total
Alternative 1	$ 643,000	$ -	$ 389,000	$ -	$ 39,000	$ 1,071,000	$ 1,071,000
Alternative 2	$ 723,000	$ 130,000	$ 576,000	$ -	$ 58,000	$ 1,487,000	$ 2,558,000
Alternative 3	$ 5,679,000	$ -	$ 3,294,000	$ 334,000	$ 329,000	$ 9,636,000	$ 9,636,000
Alternative 4	$ 6,084,000	$ -	$ 3,530,000	$ 392,000	$ 353,000	$ 10,359,000	$ 10,359,000
Alternative 5*	$ 2,788,000	$ -	$ 1,618,000	$ -	$ 162,000	$ 4,568,000	$ 4,568,000

* If 2020 RAB has roadway from Eisenhower to NB ramps removed

Item	Item Description	Unit	Unit Price	
1	New Concrete Pavement[1]	SY	$65	Concrete, Base Aggregate, Crushed
2	New HMA Pavement[2]	SY	$50	HMA, Base Aggregate, Crushed
3	Sidewalk	SY	$35	
4	Curb and Gutter	LF	$20	
5	Earthwork	CY	$20	Cut or fill, based on observed topography, including ditches
6	Signal Pole Relocation	EA	$15,000	
7	Signal System	EA	$165,000	
8	Ramp Meter	EA	$75,000	
9	Ramp Meter- remove and reinstall	EA	$35,000	
10	Sign Bridge	EA	$100,000	
11	Drainage - Inlets/Manholes	EA	$700	
12	Drainage - Pipes/Culverts	LF	$50	
13	Drainage - Pipes/Culverts - extensions	LF	$100	
14	Concrete Barrier - 42"	LF	$70	
15	Retaining wall - non-structural (<5')	SF	$25	
16	Beam Guard	LF	$20	
17	Beam Guard End Absorbing Terminal	EA	$2,500	
18	Unique Items			Add Items unique to these locations,
19				that are too large to be covered in 'Road Incidentals'.
20				
	Subtotal			
	Road Incidentals[3]	LS	20%	removals, finishing, erosion, removals, lighting, etc
	Planning Level Contingency[3]	LS	20%	
	Signing & Pavement Marking[3]	LS	5%	
	Traffic Control - urban mainline[3,4]	LS	12%	assumed 100% unless other TC is entered
	Traffic Control - rural mainline[3,4]	LS	10%	enter percent of project on rural mainline
	Traffic Control - ramps[3,4]	LS	8%	enter percent of project on ramps
	Traffic Control - local roads[3,4]	LS	5%	enter percent on local roads
	Bridges - new and widening with substructure	SF	$ 140.00	Area of Bridge Deck
	Bridges - widening using existing substructure	SF	$ 100.00	Area of Bridge Deck
	Bridges - redecking	SF	$ 70.00	Area of Bridge Deck
	Retaining walls - structural	SF	$ 35.00	area of exposed wall face
	Mobilization[5]	LS	6%	
	CM & Engineering[6]	LS	10%	
	Right of Way			Site Specific
	Commercial Real Estate	SF		
	Residential Real Estate	SF		
	Commercial Relocation Cost	LS		
	Residential Relocation Cost	LS		
	Lighting	LS		

NOTES:

1. New Concrete Pavement consists of: Concrete Pavement 10", $50/SY; Base Aggregate, 6", $16/ton; Select Crushed, 12", $14/ton.
2. New HMA Pavement consists of: HMA, 5", $70/ton; Oil, $600/ton; Base Aggregate, 12", $16/ton; Select Crushed, 12", $14/ton
3. Lump Sum items are computed as a percentage of the roadway item costs. These do not include structural component costs.
4. Traffic Control is a lump sum, between 5% - 12%, weighted by the estimated construction cost on each roadway type.
5. Mobilization is computed as a percentage of the all item costs, including structural components.
6. Construction Management and Engineering are computed as a percentage of the total construction cost.

Preliminary Cost Estimate: WIS 441 at CTH CE/College Ave.
Alternative 1

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	7,000	$455,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	75	$2,625	
4	Curb and Gutter	LF	$20	1,725	$34,500	
5	Earthwork	CY	$20	1,500	$30,000	
6	Signal Pole Relocation	EA	$15,000	7	$105,000	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	5	$3,500	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$25	500	$12,500	
17	Beam Guard End Absorbing Terminal	EA	$25	2	$50	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$643,000**		
	Road Incidentals	LS	20%		$129,000	
	Planning Level Contingency	LS	20%		$129,000	
	Signing & Pavement Marking	LS	5%		$32,000	
	Traffic Control - urban mainline	LS	12%	100%	$77,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$22,020	
	Construction Total			**$389,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$39,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$1,071,000**		

Preliminary Cost Estimate: WIS 441 at CTH CE/College Ave.
Alternative 2

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	4,870	$316,550	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	800	$28,000	
4	Curb and Gutter	LF	$20	3,800	$76,000	
5	Earthwork	CY	$20	2,500	$50,000	
6	Signal Pole Relocation	EA	$15,000	3	$45,000	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000	2	$200,000	
11	Drainage - Inlets/Manholes	EA	$700	10	$7,000	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$25		$0	
17	Beam Guard End Absorbing Terminal	EA	$25		$0	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$723,000**		
	Road Incidentals	LS	20%		$145,000	
	Planning Level Contingency	LS	20%		$145,000	
	Signing & Pavement Marking	LS	5%		$36,000	
	Traffic Control - urban mainline	LS	12%	100%	$87,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00	3715	$130,025	
	Structure Total			**$130,000**		
	Mobilization	LS	6%		$32,582	
	Construction Total			**$576,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$58,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$1,487,000**		

Preliminary Cost Estimate: USH 41 at segment 1 STH 441 & CTH CE (2020)

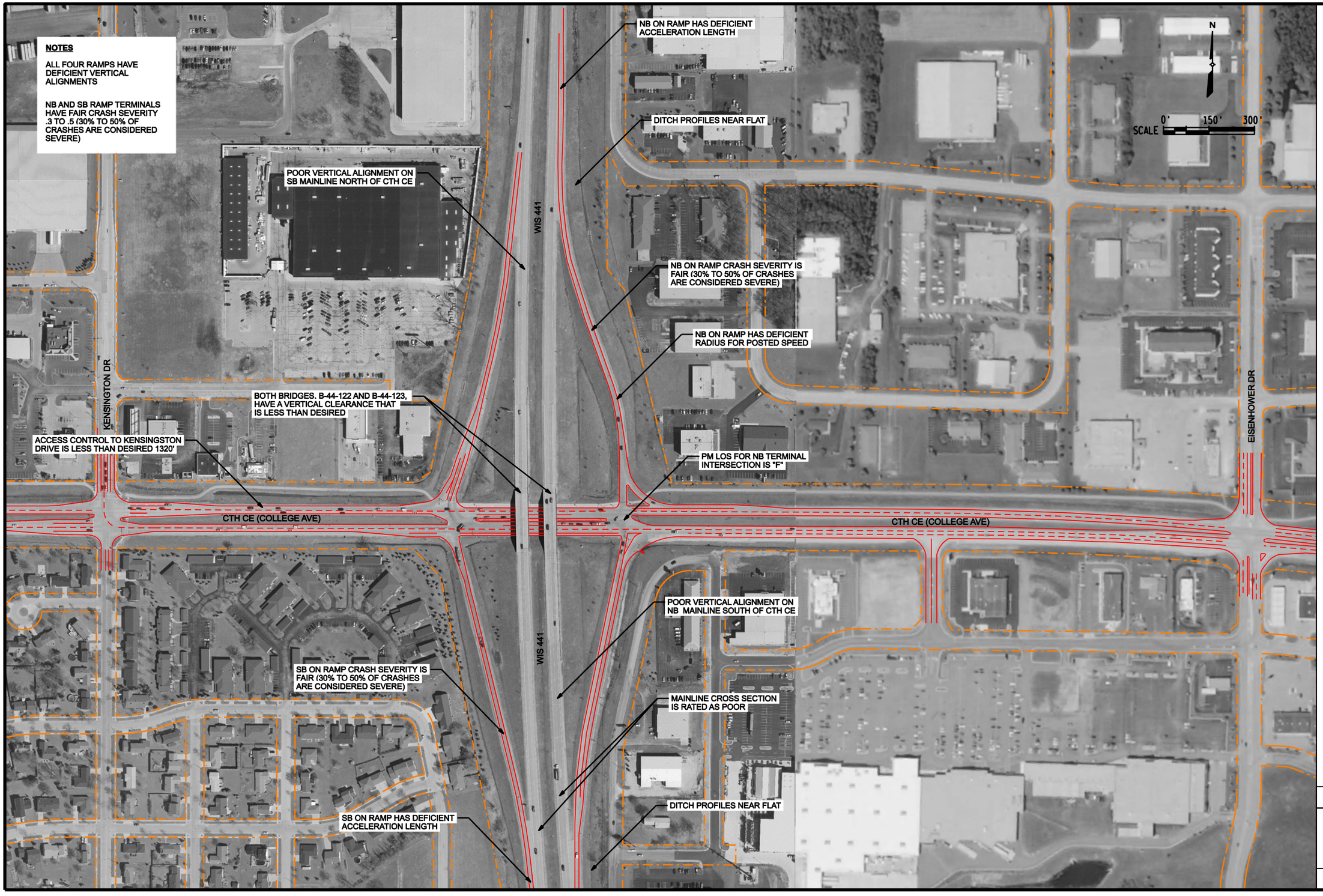
Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	54,850	$3,565,250	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	8,450	$295,750	
4	Curb and Gutter	LF	$20	28,200	$564,000	
5	Earthwork	CY	$20	45,750	$915,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	75	$52,500	
12	Drainage - Pipes/Culverts	LF	$50	5,720	$286,000	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$5,679,000**		
	Road Incidentals	LS	20%		$1,136,000	
	Planning Level Contingency	LS	20%		$1,136,000	
	Signing & Pavement Marking	LS	5%		$284,000	
	Traffic Control - urban mainline	LS	12%	55%	$375,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	29%	$132,000	
	Traffic Control - local roads	LS	5%	16%	$45,000	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$186,480	
	Construction Total			**$3,294,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$329,000**		
	Commercial Real Estate	SF	20,200	**$17**	$334,108	
	Residential Real Estate	SF	0	**$9**	$0	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	0		$0	
	R/W Total			**$334,000**		
	TOTAL COST			**$9,636,000**		

Preliminary Cost Estimate: USH 41 at segment 1 STH 441 & CTH CE (2035)

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	59,600	$3,874,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	8,250	$288,750	
4	Curb and Gutter	LF	$20	29,350	$587,000	
5	Earthwork	CY	$20	49,300	$986,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	75	$52,500	
12	Drainage - Pipes/Culverts	LF	$50	5,910	$295,500	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$6,084,000**		
	Road Incidentals	LS	20%		$1,217,000	
	Planning Level Contingency	LS	20%		$1,217,000	
	Signing & Pavement Marking	LS	5%		$304,000	
	Traffic Control - urban mainline	LS	12%	55%	$402,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	29%	$141,000	
	Traffic Control - local roads	LS	5%	16%	$49,000	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$199,800	
	Construction Total			**$3,530,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$353,000**		
	Commercial Real Estate	SF	23,720	**$17**	$392,329	
	Residential Real Estate	SF	0%	**$9**	$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$392,000**		
	TOTAL COST			**$10,359,000**		

Preliminary Cost Estimate: USH 41 at segment 1 STH 441 & CTH CE (2020)

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	26,950	$1,751,750	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	4,000	$140,000	
4	Curb and Gutter	LF	$20	13,650	$273,000	
5	Earthwork	CY	$20	22,400	$448,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	40	$28,000	
12	Drainage - Pipes/Culverts	LF	$50	2,938	$146,900	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$2,788,000**		
	Road Incidentals	LS	20%		$558,000	
	Planning Level Contingency	LS	20%		$558,000	
	Signing & Pavement Marking	LS	5%		$139,000	
	Traffic Control - urban mainline	LS	12%	55%	$184,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	29%	$65,000	
	Traffic Control - local roads	LS	5%	16%	$22,000	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$91,560	
	Construction Total			**$1,618,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$162,000**		
	Commercial Real Estate	SF	0	**$17**	$0	
	Residential Real Estate	SF	0	**$9**	$0	
	Commercial Relocation Cost	LS	0		$0	
	Residential Relocation Cost	LS	0		$0	
	R/W Total			**$0**		
	TOTAL COST			**$4,568,000**		



WISCONSIN DEPARTMENT OF TRANSPORTATION

NOVEMBER 2009

WIS 441 - CTH CE INTERCHANGE

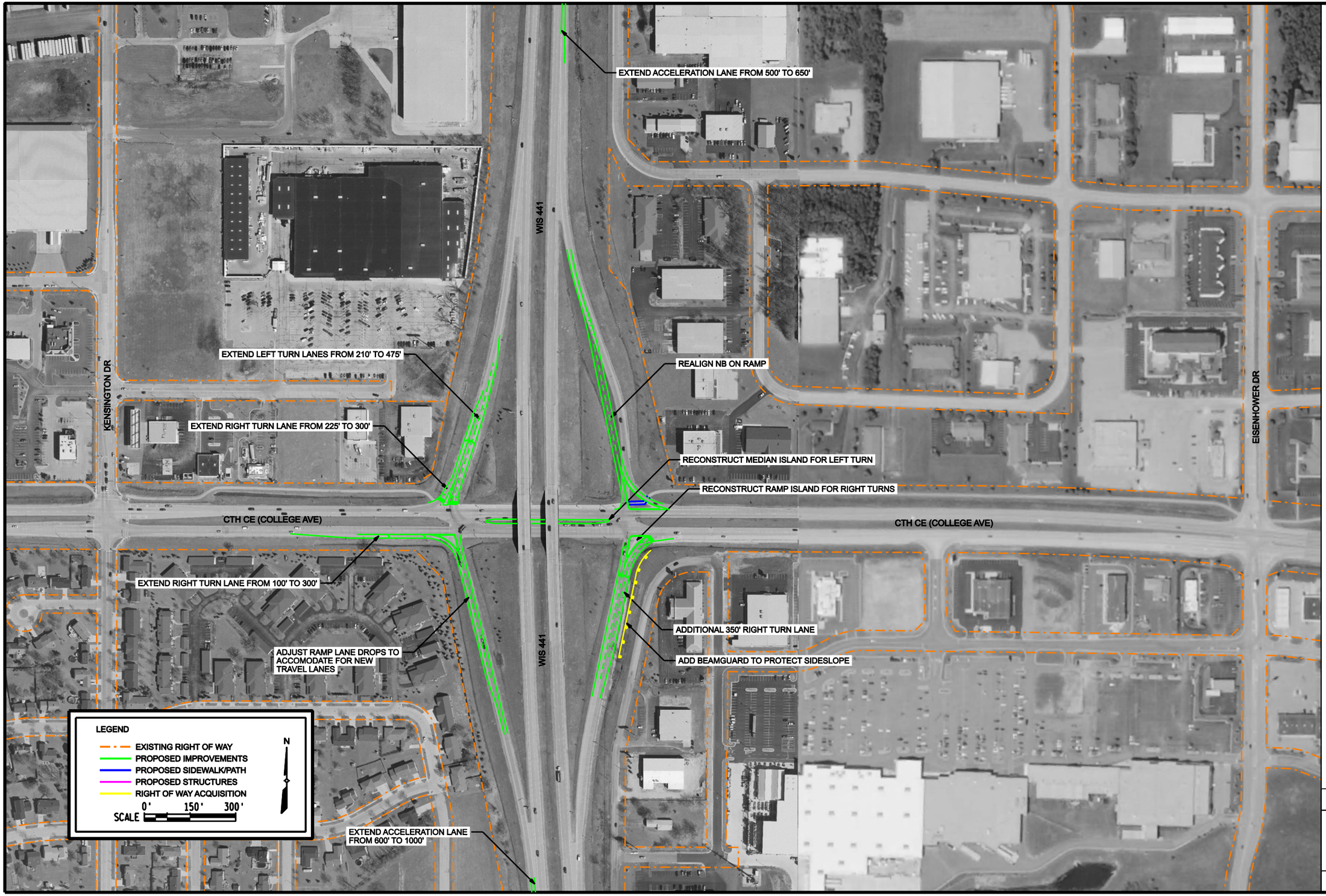
GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

WIS 441/CTH CE
OUTAGAMIE
COUNTY

Sheet 1 of 5



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

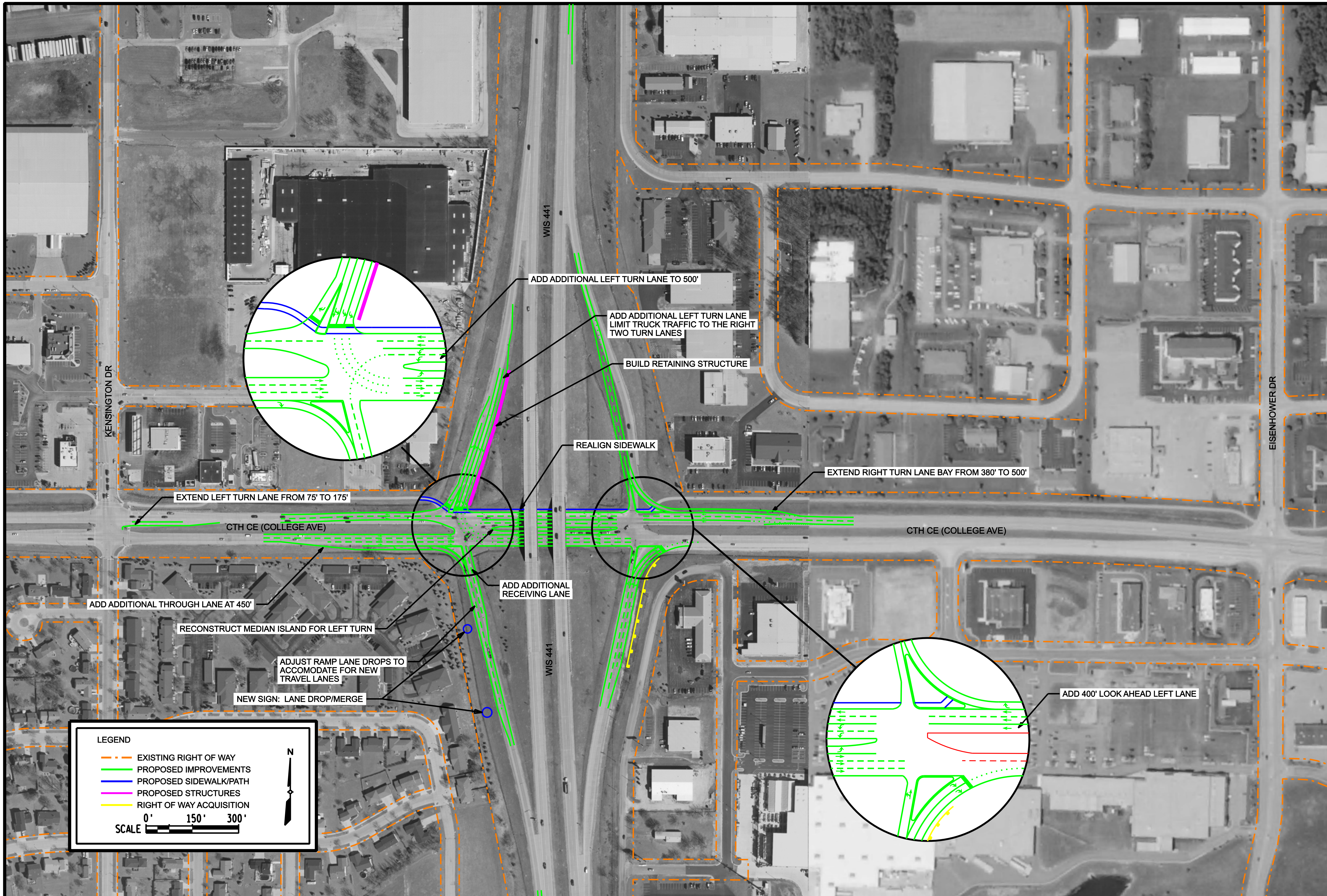
WIS 441 - CTH CE INTERCHANGE

IMPROVEMENT ALTERNATIVE 1

HNTB

Exhibit

WIS 441/CTH CE
OUTAGAMIE
COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

WIS 441 - CTH CE INTERCHANGE

IMPROVEMENT ALTERNATIVE 2

HNTB

Exhibit

WIS 441/CTH CE
OUTAGAMIE
COUNTY

Sheet 3 of 5

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- PROPOSED STRUCTURES
- RIGHT OF WAY ACQUISITION

SCALE 0' 150' 300'

N

WISCONSIN DEPARTMENT OF TRANSPORTATION

NOVEMBER 2011

WIS 441 - CTH CE INTERCHANGE

2020 RAB IMPROVEMENT

HNTB

Exhibit

WIS 441/CTH CE
OUTAGAMIE
COUNTY

WIS 441 - CTH CE INTERCHANGE

2035 RAB IMPROVEMENT

JANUARY 2010

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- PROPOSED STRUCTURES
- RIGHT OF WAY ACQUISITION

N

SCALE 0' 150' 300'

HNTB

Exhibit

WIS 441/CTH CE
OUTAGAMIE
COUNTY

WIS 441 & CTH OO (Northland Avenue)

US 41/441 Operational Analysis — WIS 441 and CTH OO (Northland Ave)

Mainline Route	Crossroad
WIS 441	CTH OO
Region	**Location**
Northeast	City of Appleton
Interchange Type	**Crossroad Function**
Diamond	Minor Arterial
Ramp Terminal	**Bridge Sufficiency**
Signalized	B-44-0127 = 100 B-44-0128 = 100
Bridge Hits	**Bridge Service Life**
5 – Eastern most pier	B-44-0127 built 1993 B-44-0128 built 1993

No-Build Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY South (NB)	FWY North (NB)	FWY North (SB)	FWY South (SB)	Total	Notes
LOS	2035	D (C)	aux	aux	D (F)	-	-	D (C)	C (B)	B (C)	C (D)		AM Peak (PM Peak)
	2020	D (C)	aux	aux	C (D)	D (C)	C (D)	C (B)	B (B)	B (B)	C (C)		
	existing	C (B)	B (B)	B (B)	B (D)	B (C)	B (A)	C (B)	B (A)	A (B)	B (C)		
Queue	2035					-	-						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1450' SB = 1100'
	2020					1219 (1244)	247 (155)						
	existing					208 (293)	97 (67)						
Crashes	2002-2006	10	5	3	28	22	26	14	12	-	-	120	
	Severity	0.40	0.80	1.00	0.32	0.27	0.31	0.36	0.42	-	-	-	(INJ+FAT) / Total Crash
	Rate	51	23	25	128	0.32	0.51	35	34	-	-	-	Merge & Diverge = HMVMT Intersection = MEV

Improved Alternative Summary

Title	Description
Alternative 1	Extend SB off ramp acceleration lane and add queue space to NB/ SB ramps.
Alternative 2	Add additional lanes and add traffic signal at French Rd. Extend RT turn lane at NB and SB on ramps. Alt 2 has Alt 1 improvements built into proposal.
Alternative 3	Reconstruct and relocate French Rd. intersection. Alt 3 has Alt 1 and Alt 2 improvements built into proposal.
Alternative 4	2020 RAB. Unrelated to signal design.
Alternative 5	2035 RAB. Unrelated to signal design.

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
LOS	Alt. 1	D (C)	aux	aux	B (C)	D (D)	D (C)	C (B)	B (B)	B (B)	C (C)		AM Peak (PM Peak)
	Alt. 2	D (C)	aux	aux	B (C)	D (D)	D (C)	C (B)	B (B)	B (B)	C (C)		
	Alt. 3	D (C)	aux	aux	B (C)	D (D)	D (C)	C (B)	B (B)	B (B)	C (C)		
	Alt. 4	D (C)	aux	aux	B (C)	A (A)	A (A)	C (B)	B (B)	B (B)	C (C)		
	Alt. 5	D (C)	aux	aux	B (C)	B (A)	B (A)	C (B)	B (B)	B (B)	C (C)		

Improved Conditions Operations

		NB Diverge	NB Merge	SB Diverge	SB Merge	NB Ramp	SB Ramp	FWY East (NB)	FWY East (SB)	FWY West (NB)	FWY West (SB)	Total	Notes
Queue	Alt. 1					1217 (342)	176 (122)						Max Length of Queue AM (PM) Distance from Terminal to Gore: NB = 1450' SB = 1100'
	Alt. 2					550 (332)	243 (100)						
	Alt. 3					550 (332)	243 (100)						
	Alt. 4					50 (50)	25 (25)						
	Alt. 5					25 (25)	50 (25)						
Crash Benefit	Alt. 1	-	-	-	9	23	-	-	-	-	-	32	Crash Benefits calculated by: Reduction in PD Crashes *7,000 + Reduction in INJ Crashes *35.000 + Reduction in FAT Crashes *70,000 (Benefits expressed in thousands over a five year period)
	Alt. 2	-	-	-	9	23	-	-	-	-	-	32	
	Alt. 3	-	-	-	9	29	-	-	-	-	-	38	
	Alt. 4	-	-	-	-	37	47	-	-	-	-	84	
	Alt. 5	-	-	-	-	37	47	-	-	-	-	84	

Alternative Construction Costs

	Total Cost	Structure Costs	ROW Costs
Alternative 1	$568,000	$0	$0
Alternative 2	$1,253,000	$0	$0
Alternative 3	$3,845,000	$0	$711,000
Alternative 4	$4,976,000	$88,000	$60,000
Alternative 5	$5,461,000	$122,000	$76,000

Preliminary Environmental Screening

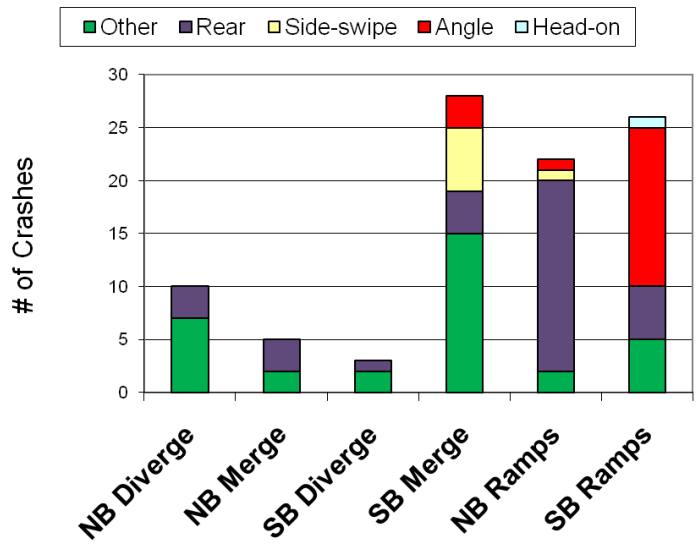
- An unnamed stream crosses under the interchange
- Upland habitat is located near the interchange
- A prehistoric campsite/village exists near the interchange
- One closed LUST site is located within 50 yards of the interchange

Existing Geometric Deficiencies Rating

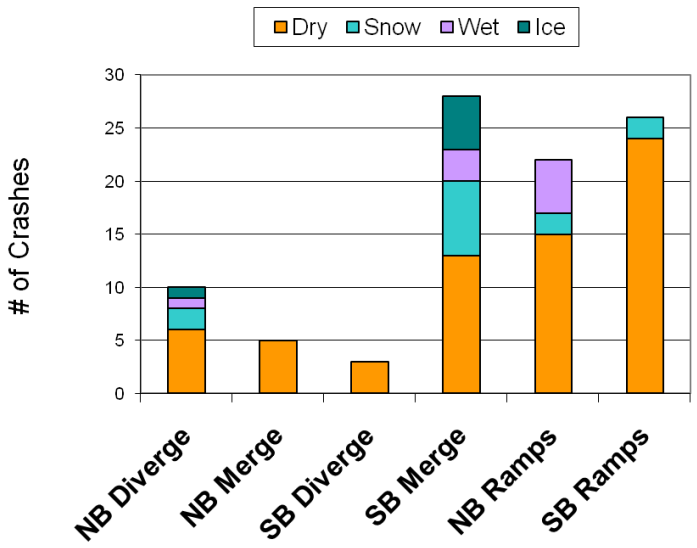
Freeway/Ramps	Score	Comments
Ramp Design Speed & Horizontal Alignment	Poor	SB on and off ramp horizontal alignment rated poor for deficient radius and superelevation.
Ramps Merge / Diverge	Poor	SB on and off ramps have deficient acceleration lane length.
Ramp Stopping Sight Distance	Acceptable	
Bridges		
Bridge Width	Acceptable	
Crossroad		
Intersection Skew / Intersection Sight Distance	Acceptable	
Geometric Deficiency Score	Roadway Geometric Score = 7 / 10	Bridge Geometric Score = 5 / 5

Detailed Crash Analysis

Crash Type Summary



Pavement Condition Summary



WIS 441 & CTH OO (NORTHLAND AVENUE) INTERCHANGE

Alternatives Considered

The goal of the short term alternatives for the WIS 441 & CTH OO (Northland Ave.) interchange is to address the needs and deficiencies identified in the US 41-WIS 441 Operation Needs Assessment Summary report dated August 2008. The following is a summary of the needs and deficiencies at the CTH OO (Northland Ave.) Interchange:

- High crash severity rate at the northbound on ramp merge and southbound off ramp diverge locations.
- High crash rate at the southbound on ramp merge location.
- High numbers of crashes are occurring at the northbound ramp terminal intersection.
- Northbound and southbound on ramps have deficient acceleration length ramp tapers.
- Southbound on and off ramps have deficient horizontal curve radii and superelevation rates.
- All four ramps have deficient vertical alignments.

The primary need at the CTH OO (Northland Ave.) interchange is to improve traffic safety at the southbound merge. The other issue that needs to be addressed is the traffic operations and safety at both of the ramp terminal intersections.

The following alternatives have been developed based on an order of importance with regard to safety and operations, and should be considered cumulative with each other. The alternative analyses (LOS, queue lengths, etc) reflect this method. For example, Alternative 2 should only be considered in addition to Alternative 1.

Alternative 1

This alternative addresses the operational and safety problems at the interchange by making the following change:

- Committed project for 2020: Auxiliary lanes for US 41 northbound and southbound between CTH OO (Northland Ave.) and the northern US 41 System Interchange.
- Extend the acceleration lane on the southbound on ramp from 600 feet to 800 feet, end before bridge.
- Extend the right turn lane on the southbound off ramp from 120 feet to 350 feet.
- Extend the two left turn lanes on the northbound off ramp from 315 feet to 425 feet.
- Add an additional 400 foot right turn lane and extend existing right turn lane on the northbound off ramp from 160 feet to 400 feet.
- Add a sign bridge on the northbound off ramp for lane designation.

The improvements in Alternative 1 will help solve the crash severity problem at the southbound US 41 merge location. It will also help with traffic operations at both of the ramp terminal intersection approaches. The potential for queuing vehicles backing up through the northbound ramp terminal intersection is also drastically reduced.

By 2020 auxiliary lanes will be constructed between CTH OO (Northland Ave.) and the North US 41 System Interchange. These auxiliary lanes will help to reduce the existing crash severity problem with the southbound off ramp and northbound on ramp.

Alternative 2

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- All changes made in Alternative 1.
- Adjust the median island for the extension of the left turn lane from 120 feet to 200 feet traveling from CTH OO (Northland Ave) to French Rd.
- Add an additional 200 foot left turn lane for traffic traveling from CTH OO (Northland Ave) to French Rd.
- Provide two receiving lanes on northbound French Rd. to accommodate traffic coming from the additional left turn lanes on CTH OO (Northland Ave.).
- Extend the right turn lane from CTH OO (Northland Ave) to the northbound on ramp from 50 feet to 200 feet.
- Add an additional westbound through lane.
- Extend the right turn lane from CTH OO (Northland Ave) to the southbound on ramp from 275 feet to 400 feet.
- Extend southbound on ramp acceleration lane from 190 feet to 385 feet.
- Add a 225 foot right turn lane for traffic coming from French Rd turning onto CTH OO (Northland Ave).
- Install traffic signals at the intersection of French Rd. and CTH OO (Northland Ave.)

The improvements in Alternative 2 will improve traffic operations on CTH OO (Northland Ave.) and improve safety for traffic at the intersection with French Rd. The addition of and extending of existing turn lanes will reduce potential for queues to impact traffic moving through the interchange area.

Adding the recommended additional lanes will move more vehicles away from the intersection with each signal phase, improving the efficiency of the interchange area. The addition of a traffic signal at the CTH OO (Northland Ave.) and French Rd. intersection is justified because of the growing traffic volumes in the area. Implementing dual left turns for eastbound CTH OO (Northland Ave.) traffic turning onto French Rd. further justifies the installation of a traffic signal controlled intersection. This movement would not be able to operate efficiently without a signal. The proposed dual right turn lanes from the northbound off ramp to CTH OO (Northland Ave.) would also not be able to operate at full capacity without the addition of a traffic signal at French Rd.

Alternative 3

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- All changes made in Alternatives 1 and 2, except for adjustment to the median and French Rd. improvements which will be readdressed in Alternative 3.
- Redesign and relocation the French Rd. intersection east of the northbound terminal from 525 feet to 1000 feet.
- Add a new box culvert under the French Rd.

The improvements in Alternative 3, will allow traffic to operate more efficiently and the intersection will meet the minimum standards for the access control. The CTH OO (Northland Ave.) will have less congestion with the redesign of the intersection.

Alternative 4

The Year 2020 roundabout alternative maintains a four-lane facility and provides two-lane roundabouts along the corridor. All movements are expected to operate at LOS B or better and experience acceptable queues and delays. Surplus capacity of approximately 13%[1] is expected beyond the forecasted Year 2020 traffic conditions. A system of roundabouts at this location will allow for the use of right-in/right-outs at future driveway locations as U-Turns are accommodated within the roundabouts.

Alternative 5

The Year 2035 roundabout alternative maintains a four-lane facility and provides two-lane roundabouts along the corridor. All movements are expected to operate at LOS B or better save the southbound ramp terminal which has delays that hinder other movements throughout the corridor when reviewed in Paramics. A system of roundabouts at this location will allow for the use of right-in/right-outs at future driveway locations as U-Turns are accommodated within the roundabouts.

Additional Deficiencies

The eastern most pier of the northbound US 41 bridge, B-44-127, has been struck by vehicles leaving the traffic lanes five times since constructed. The substructure can be protected by placing a crash barrier device between the roadway and the bridge piers to protect the piers from being damaged in the event of a collision. Another alternative would be to create a larger clear zone between the substructure and the traffic lanes. This option, however, is not recommended because the amount of work required to relocate all six traffic lanes and modify the structure to span this new extended distance would have an extremely high cost to benefit ratio.

Northbound and southbound WIS 441 mainline is rated fair with respect to vertical alignment. In order to fix these vertical alignment issues the mainline would require complete reconstruction. This is not recommended due to the high cost to benefit ratio.

All four ramps are rated poor with respect to vertical alignment (design speed less than posted speed). Similar to the mainline vertical alignment issue, reconstruction is not recommended due to high cost to benefit ratio.

Comparison of Alternatives

The interchange alternatives were compared based on safety, traffic operations, cost and other factors:

[1] Determined by applying an equal percentage increase to all volumes at an intersection under the 50th CL until a leg failed. The lowest percent increase among the intersections was reported. Therefore, the remaining intersections at each interchange will have higher surplus capacity values.

Safety

Alternative 1 addresses the existing safety issue with deficient acceleration length at the US 41 southbound merge location. It also addresses the crash problem at the northbound ramp terminal by redesigning the lane configuration.

Alternative 2 will help with queuing vehicle safety issues on CTH OO (Northland Ave.) between the northbound ramp terminal intersection and French Rd. Traffic signals at the French Rd. intersection will effectively move vehicles away from the northbound ramps assuming these signals will be appropriately coordinated with the traffic signals at the ramp terminals.

Alternative 3 will allow French Rd. to operate more efficiently. Also, the intersection will meet current access control standards.

Traffic Operations

Alternative 1 focuses on improving traffic operations at the ramp terminal intersections as well as the southbound on ramp merge location. To obtain an LOS of C for the southbound merge, the acceleration lane is extended to 1700 feet. Alternative 2 increases the eastbound traffic capacity of (CTH OO Northland Ave) by the addition of the right lane onto the northbound French Rd. This will allow traffic to efficiently move in and out of the French Rd. Alternative 3 improves the French Rd intersection access control.

Environmental Factors

- An unnamed stream crosses under the interchange
- Upland habitat is located near the interchange
- A prehistoric campsite/village exists near the interchange
- One closed Leaking Underground Storage Tank (LUST) site is located within 50 yards of the interchange

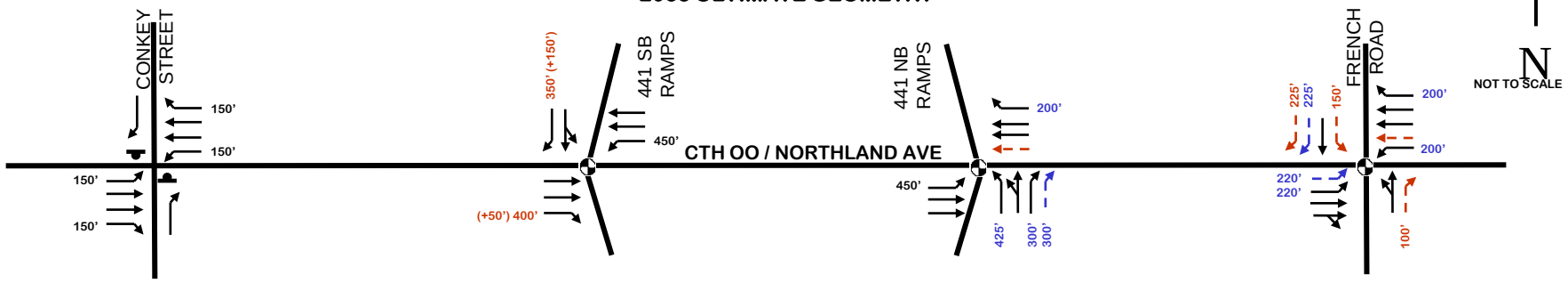
Complete Streets

Development is on both sides of this interchange. Currently there are no bike/ ped accommodations to the east from WIS 441 to Washington Street. This section of road way could warrant a road diet to accommodate on street biking. To the west there is no sidewalk from WIS 441 to Conkey Street. Future considerations should consider sidewalk and bike accommodations throughout the entire area.

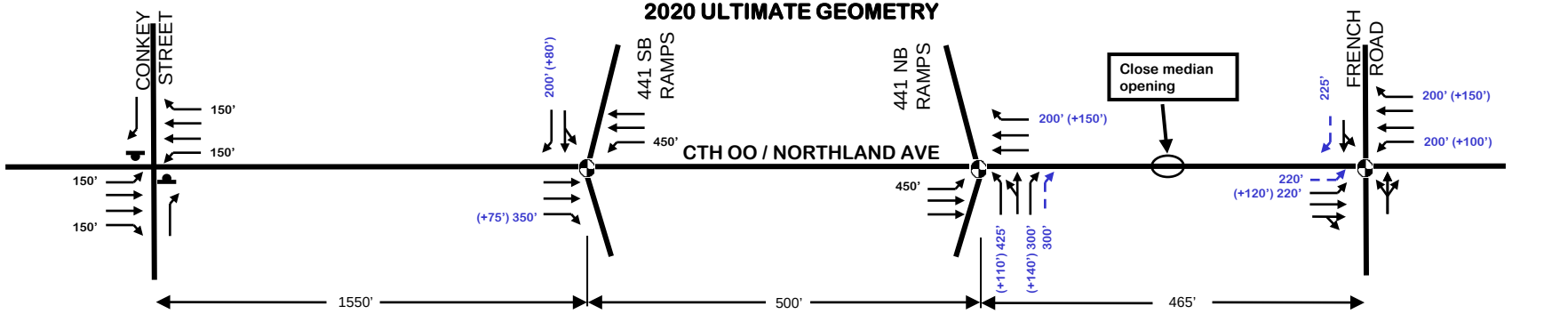
WIS 441 / CTH OO (NORTHLAND AVENUE)

PREPARED 1-13-09

2035 ULTIMATE GEOMETRY



2020 ULTIMATE GEOMETRY



XX' BASE GEOMETRICS PLANNED TURN BAY LENGTH	BASE GEOMETRICS	TRAFFIC SIGNAL
(+XX') ADDITIONAL TURN BAY LENGTH RECOMMENDED	ADDITIONAL IMPROVEMENT RECOMMENDED	STOP SIGN
(+XX') ADDITIONAL TURN BAY LENGTH REQUIRED FOR 2035 VOLUMES	ADDITIONAL IMPROVEMENT REQUIRED FOR 2035 VOLUMES	OPERATIONAL PROBLEMS REMAIN

AADT

Existing – 22,700

2020 – 28,300

2035 – 31,300

US 41/WIS 441 Short-Term Improvement Cost Estimate
CTH OO/Northland Ave.

	Roadway	Structure	Construction	R/W Cost	CM & Eng	Incremental Total	Total
Alternative 1	$ 341,000	$ -	$ 206,000	$ -	$ 21,000	$ 568,000	$ 568,000
Alternative 2	$ 412,000	$ -	$ 248,000	$ -	$ 25,000	$ 685,000	$ 1,253,000
Alternative 3	$ 1,376,000	$ -	$ 831,000	$ 711,000	$ 83,000	$ 3,001,000	$ 3,845,000
Alternative 4	$ 2,915,000	$ 88,000	$ 1,739,000	$ 60,000	$ 174,000	$ 4,976,000	$ 4,976,000
Alternative 5	$ 3,177,000	$ 122,000	$ 1,896,000	$ 76,000	$ 190,000	$ 5,461,000	$ 5,461,000

Item	Item Description	Unit	Unit Price	
1	New Concrete Pavement[1]	SY	$65	Concrete, Base Aggregate, Crushed
2	New HMA Pavement[2]	SY	$50	HMA, Base Aggregate, Crushed
3	Sidewalk	SY	$35	
4	Curb and Gutter	LF	$20	
5	Earthwork	CY	$20	Cut or fill, based on observed topography, including ditches
6	Signal Pole Relocation	EA	$15,000	
7	Signal System	EA	$165,000	
8	Ramp Meter	EA	$75,000	
9	Ramp Meter- remove and reinstall	EA	$35,000	
10	Sign Bridge	EA	$100,000	
11	Drainage - Inlets/Manholes	EA	$700	
12	Drainage - Pipes/Culverts	LF	$50	
13	Drainage - Pipes/Culverts - extensions	LF	$100	
14	Concrete Barrier - 42"	LF	$70	
15	Retaining wall - non-structural (<5')	SF	$25	
16	Beam Guard	LF	$20	
17	Beam Guard End Absorbing Terminal	EA	$2,500	
18	Unique Items			Add Items unique to these locations,
19				that are too large to be covered in 'Road Incidentals'.
20				
	Subtotal			
	Road Incidentals[3]	LS	20%	removals, finishing, erosion, removals, lighting, etc
	Planning Level Contingency[3]	LS	20%	
	Signing & Pavement Marking[3]	LS	5%	
	Traffic Control - urban mainline[3,4]	LS	12%	assumed 100% unless other TC is entered
	Traffic Control - rural mainline[3,4]	LS	10%	enter percent of project on rural mainline
	Traffic Control - ramps[3,4]	LS	8%	enter percent of project on ramps
	Traffic Control - local roads[3,4]	LS	5%	enter percent on local roads
	Bridges - new and widening with substructure	SF	$ 140.00	Area of Bridge Deck
	Bridges - widening using existing substructure	SF	$ 100.00	Area of Bridge Deck
	Bridges - redecking	SF	$ 70.00	Area of Bridge Deck
	Retaining walls - structural	SF	$ 35.00	area of exposed wall face
	Mobilization[5]	LS	6%	
	CM & Engineering[6]	LS	10%	
	Right of Way		0%	Site Specific
	Commercial Real Estate	SF	$ 17.00	
	Residential Real Estate	SF	$ 9.00	
	Commercial Relocation Cost	LS	$ 60.00	
	Residential Relocation Cost	LS	$ 34.00	
	Lighting	LS		

NOTES:

1. New Concrete Pavement consists of: Concrete Pavement 10", $50/SY; Base Aggregate, 6", $16/ton; Select Crushed, 12", $14/ton.
2. New HMA Pavement consists of: HMA, 5", $70/ton; Oil, $600/ton; Base Aggregate, 12", $16/ton; Select Crushed, 12", $14/ton
3. Lump Sum items are computed as a percentage of the roadway item costs. These do not include structural component costs.
4. Traffic Control is a lump sum, between 5% - 12%, weighted by the estimated construction cost on each roadway type.
5. Mobilization is computed as a percentage of the all item costs, including structural components.
6. Construction Management and Engineering are computed as a percentage of the total construction cost.

Preliminary Cost Estimate: US 41 at CTH OO/Northland Ave.
Alternative 1

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	3,000	$195,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20		$0	
5	Earthwork	CY	$20	500	$10,000	
6	Signal Pole Relocation	EA	$15,000	2	$30,000	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000	1	$100,000	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20	150	$3,000	
17	Beam Guard End Absorbing Terminal	EA	$2,500	1	$2,500	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$341,000**		
	Road Incidentals	LS	20%		$68,000	
	Planning Level Contingency	LS	20%		$68,000	
	Signing & Pavement Marking	LS	5%		$17,000	
	Traffic Control - urban mainline	LS	12%	100%	$41,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$11,640	
	Construction Total			**$206,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$21,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$568,000**		

Preliminary Cost Estimate: US 41 at CTH OO/Northland Ave.
Alternative 2

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	2,000	$130,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20	350	$7,000	
5	Earthwork	CY	$20	150	$3,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000	1	$165,000	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000	1	$100,000	
11	Drainage - Inlets/Manholes	EA	$700	7	$4,900	
12	Drainage - Pipes/Culverts	LF	$50		$0	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20	125	$2,500	
17	Beam Guard End Absorbing Terminal	EA	$2,500		$0	
18	Lighting	LS				
19	Unique Items	EA				
20						
	Roadway Total			**$412,000**		
	Road Incidentals	LS	20%		$82,000	
	Planning Level Contingency	LS	20%		$82,000	
	Signing & Pavement Marking	LS	5%		$21,000	
	Traffic Control - urban mainline	LS	12%	100%	$49,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$14,040	
	Construction Total			**$248,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$25,000**		
	Commercial Real Estate	SF	0%		$0	
	Residential Real Estate	SF	0%		$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$0**		
	TOTAL COST			**$685,000**		

Preliminary Cost Estimate: USH 41 at CTH OO/Northland Ave. at French Rd intersection (moved east)
Alternative 3

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	12,200	$793,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35		$0	
4	Curb and Gutter	LF	$20	4,000	$80,000	
5	Earthwork	CY	$20	24,400	$488,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700		$0	
12	Drainage - Pipes/Culverts	LF	$50	90	$4,500	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Beam Guard	LF	$20	250	$5,000	
17	Beam Guard End Absorbing Terminal	EA	$2,500	2	$5,000	
18	Lighting	LS				
19	Unique Items					
20						
	Roadway Total			**$1,376,000**		
	Road Incidentals	LS	20%		$275,000	
	Planning Level Contingency	LS	20%		$275,000	
	Signing & Pavement Marking	LS	5%		$69,000	
	Traffic Control - urban mainline	LS	12%	100%	$165,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	0%	$0	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00		$0	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$0**		
	Mobilization	LS	6%		$47,040	
	Construction Total			**$831,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$83,000**		
	Commercial Real Estate	SF	$ 17.00	16,000.00	$272,000	
	Residential Real Estate	SF	$ 9.00	21,000.00	$189,000	
	Commercial Relocation Cost	LS	$ 50,000.00		$0	
	Residential Relocation Cost	LS	$ 125,000.00	2.00	$250,000	
	R/W Total			**$711,000**		
	TOTAL COST			**$3,001,000**		

Preliminary Cost Estimate: USH 41 at CTH 00/ Northland Ave (2020)
Alternative 4

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	27,400	$1,781,000	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	4,450	$155,750	
4	Curb and Gutter	LF	$20	15,650	$313,000	
5	Earthwork	CY	$20	23,400	$468,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	45	$31,500	
12	Drainage - Pipes/Culverts	LF	$50	3,312	$165,600	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$2,915,000**		
	Road Incidentals	LS	20%		$583,000	
	Planning Level Contingency	LS	20%		$583,000	
	Signing & Pavement Marking	LS	5%		$146,000	
	Traffic Control - urban mainline	LS	12%	78%	$273,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	22%	$51,000	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00	875	$87,500	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$88,000**		
	Mobilization	LS	6%		$103,410	
	Construction Total			**$1,739,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$174,000**		
	Commercial Real Estate	SF	3,620	**$17**	$59,875	
	Residential Real Estate	SF	0%	**$9**	$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$60,000**		
	TOTAL COST			**$4,976,000**		

Preliminary Cost Estimate: USH 41 at CTH 00/ Northland Ave (2035)
Alternative 5

Item	Item Description	Unit	Unit Price	Quantity	Total	Comments
1	New Concrete Pavement[1]	SY	$65	29,850	$1,940,250	
2	New HMA Pavement[2]	SY	$50		$0	
3	Sidewalk	SY	$35	4,600	$161,000	
4	Curb and Gutter	LF	$20	17,600	$352,000	
5	Earthwork	CY	$20	25,600	$512,000	
6	Signal Pole Relocation	EA	$15,000		$0	
7	Signal System	EA	$165,000		$0	
8	Ramp Meter	EA	$75,000		$0	
9	Ramp Meter- remove and reinstall	EA	$35,000		$0	
10	Sign Bridge	EA	$100,000		$0	
11	Drainage - Inlets/Manholes	EA	$700	50	$35,000	
12	Drainage - Pipes/Culverts	LF	$50	3,530	$176,500	
13	Drainage - Pipes/Culverts - extensions	LF	$100		$0	
14	Concrete Barrier - 42"	LF	$70		$0	
15	Retaining wall - non-structural (<5')	SF	$25		$0	
16	Lighting	LS				
17	Unique Items					
18						
19						
20						
	Roadway Total			**$3,177,000**		
	Road Incidentals	LS	20%		$635,000	
	Planning Level Contingency	LS	20%		$635,000	
	Signing & Pavement Marking	LS	5%		$159,000	
	Traffic Control - urban mainline	LS	12%	78%	$297,000	
	Traffic Control - rural mainline	LS	10%	0%	$0	
	Traffic Control - ramps	LS	8%	22%	$56,000	
	Traffic Control - local roads	LS	5%	0%	$0	
	Bridges - new and widening with substructure	SF	$ 140.00		$0	
	Bridges - widening using existing substructure	SF	$ 100.00	1215	$121,500	
	Bridges - redecking	SF	$ 70.00		$0	
	Retaining walls - structural	SF	$ 35.00		$0	
	Structure Total			**$122,000**		
	Mobilization	LS	6%		$114,210	
	Construction Total			**$1,896,000**		
	Const. Mngmt & Engineering Total	LS	10%	**$190,000**		
	Commercial Real Estate	SF	4,610	**$17**	$76,249	
	Residential Real Estate	SF	0%	**$9**	$0	
	Commercial Relocation Cost	LS	0%		$0	
	Residential Relocation Cost	LS	0%		$0	
	R/W Total			**$76,000**		
	TOTAL COST			**$5,461,000**		

NOTES:

NB PAVEMENT IN POOR CONDITION
NORTH OF CTH OO. IRI >2 MAXIMUM
ALL OTHER PAVEMENT IN FAIR CONDITION

NB AND SB MAINLINE HAVE
DEFICIENT SHOULDER WIDTHS.
RIGHT SIDE PAVED SHOULDER <10' MIN
MEDIAN PAVED SHOULDER <4' MIN
CLEAR ZONE DISTANCE <32' DESIRABLE

ALL RAMPS RATED POOR
FOR VERTICAL ALIGNMENT
DESIGN SPEEDS TOO GREAT
FOR THEIR VERTICAL CURVATURE

CTH OO (NORTHLAND AVE)

N

SCALE 0' 150' 300'

SB RAMP TERMINAL INTERSECTION CRASH SEVERITY IS FAIR (30% TO 50% OF CRASHES ARE CONSIDERED SEVERE)

NB AND SB VERTICAL ALIGNMENT RATED FAIR

SB OFF RAMP CRASH SEVERITY IS POOR (MORE THAN 50% OF CRASHES ARE CONSIDERED SEVERE)

SB OFF RAMP HORIZONTAL ALIGNMENT RATED POOR FOR DEFICIENT SUPERELEVATION

MAINLINE ACCESS CONTROL RATED POOR BETWEEN US 41 RAMPS AND CTH OO RAMPS LESS THAN MIN 1500'

SB ON RAMP HORIZONTAL ALIGNMENT RATED POOR FOR DEFICIENT RADIUS AND SUPERELEVATION (55 MPH DESIGN)

SB ON RAMP CRASH RATE IS POOR (MORE THAN 73 CRASHES PER HMVMT)

SB ON RAMP HAS DEFICIENT ACCELERATION LENGTH

WIS 441

WIS 441

NB OFF RAMP CRASH SEVERITY IS FAIR (30% TO 50% OF CRASHES ARE CONSIDERED SEVERE)

NB AND SB MAINLINE CRASH SEVERITY IS FAIR BETWEEN CTH CE AND CTH OO (30% TO 50% OF CRASHES ARE CONSIDERED SEVERE)

NB ON RAMP HAS DEFICIENT ACCELERATION LENGTH

NB ON RAMP CRASH SEVERITY IS POOR (MORE THAN 50% OF CRASHES ARE CONSIDERED SEVERE)

5 SUBSTRUCTURE HITS ON THE EASTERN PIER

FRENCH ROAD

ACCESS CONTROL TO N. FRENCH RD LESS THAN MIN 1000'

CTH OO (NORTHLAND AVE)

WISCONSIN DEPARTMENT OF TRANSPORTATION

NOVEMBER 2009

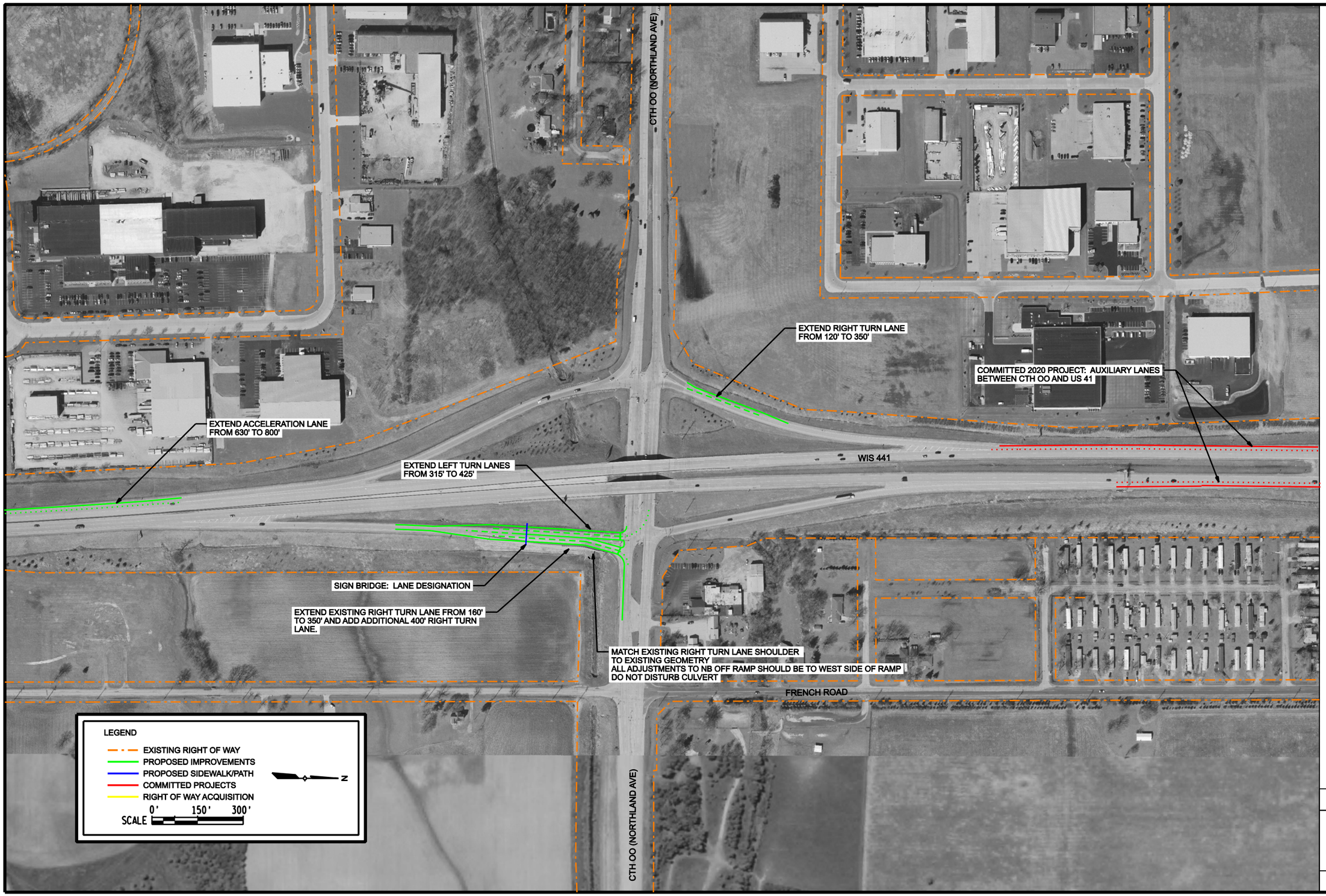
WIS 441 - CTH OO INTERCHANGE

GEOMETRIC AND SAFETY DEFICIENCY MAP

HNTB

Exhibit

WIS 441/CTH OO
WINNEBAGO &
CALUMET COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

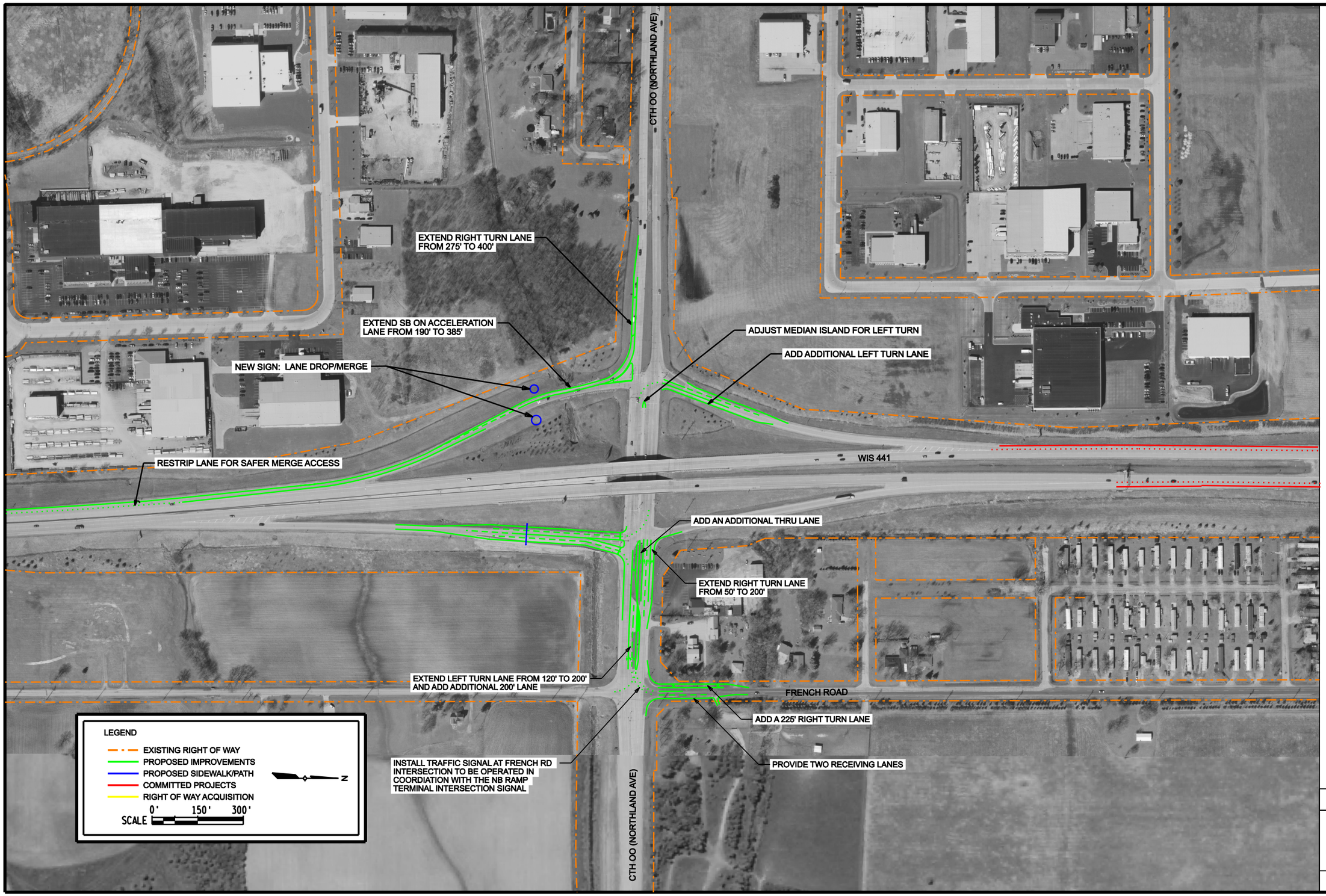
WIS 441 - CTH OO INTERCHANGE

IMPROVEMENT ALTERNATIVE 1

HNTB

Exhibit

WIS 441/CTH OO
WINNEBAGO &
CALUMET COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

WIS 441 - CTH OO INTERCHANGE

IMPROVEMENT ALTERNATIVE 2

HNTB

Exhibit

WIS 441/CTH OO
WINNEBAGO &
CALUMET COUNTY

WIS 441 - CTH OO INTERCHANGE

IMPROVEMENT ALTERNATIVE 3

JUNE 2011

CTH OO (NORTHLAND AVE)

WIS 441

CLOSE ACCESS

CLOSE ACCESS

FRENCH ROAD

NEW BOX CULVERT

DRIVEWAY ACCESS

NEW BOX CULVERT

NEW BOX CULVERT

FRENCH ROAD MOVED EAST FROM 525' TO 1300' FROM THE NB TERMINAL WITH DESIGN SPEED OF 45 MPH

CTH OO (NORTHLAND AVE)

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- COMMITTED PROJECTS
- RIGHT OF WAY ACQUISITION

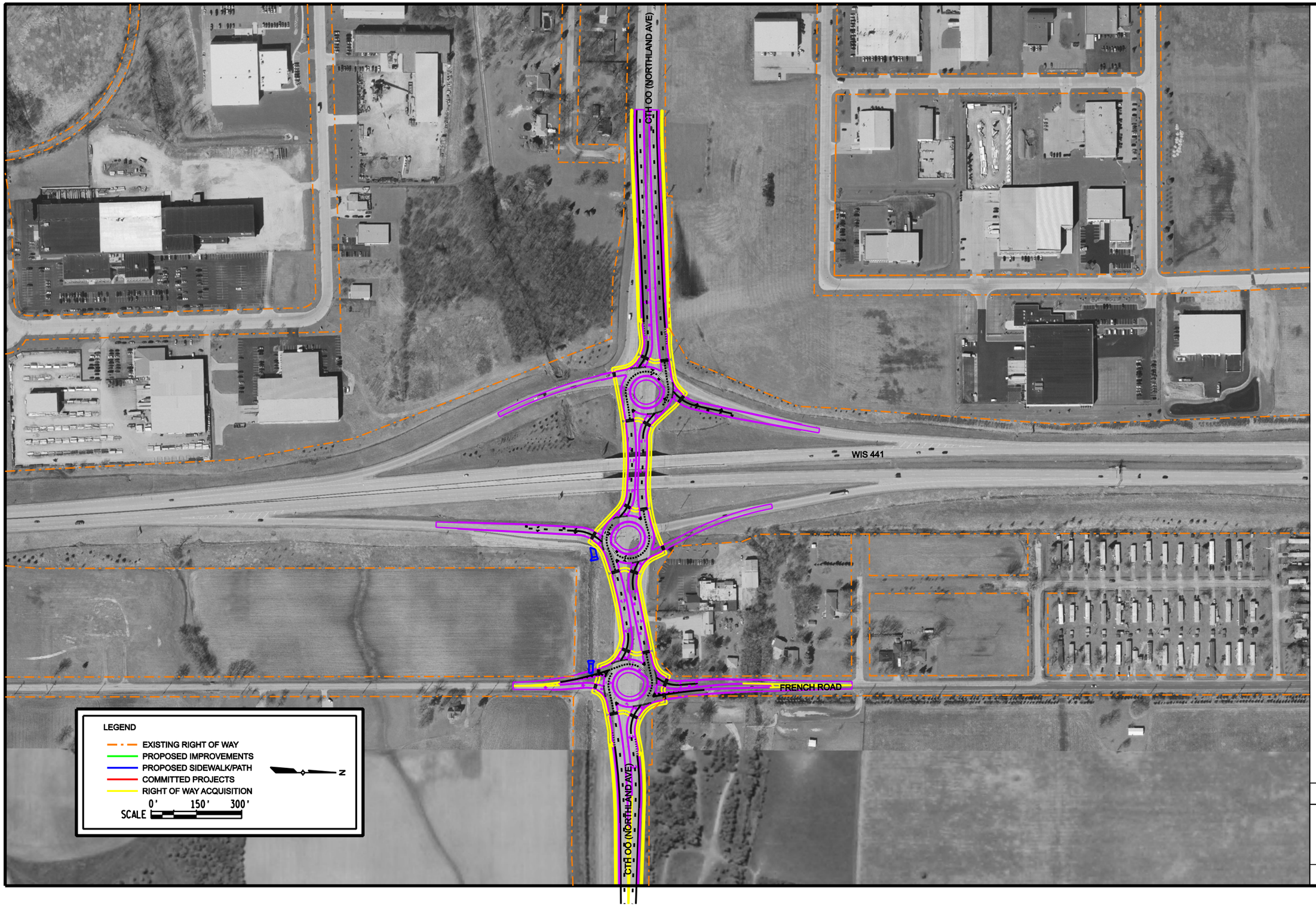
N

SCALE 0' 150' 300'

HNTB

Exhibit

WIS 441/CTH OO
WINNEBAGO &
CALUMET COUNTY



WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

WIS 441 - CTH OO INTERCHANGE

2020 RAB IMPROVEMENT

HNTB

Exhibit

WIS 441/CTH OO
WINNEBAGO &
CALUMET COUNTY

Sheet 5 of 6

CTH OO (NORTHLAND AVE)

WIS 441

FRENCH ROAD

CTH OO (NORTHLAND AVE)

LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED IMPROVEMENTS
- PROPOSED SIDEWALK/PATH
- COMMITTED PROJECTS
- RIGHT OF WAY ACQUISITION

N

SCALE 0' 150' 300'

WISCONSIN DEPARTMENT OF TRANSPORTATION

JANUARY 2010

WIS 441 - CTH OO INTERCHANGE

2035 RAB IMPROVEMENT

HNTB

Exhibit

WIS 441/CTH OO
WINNEBAGO &
CALUMET COUNTY

Sheet 6 of 6