

SECTION 2 Alternatives

Introduction

Section 2 describes the range of alternatives developed to address the key purpose and need factors identified in Section 1. Section 2 evaluates the alternatives, identifies reasonable alternatives retained for detailed study, and explains why other alternatives were eliminated from further consideration.

2.1 Description of Initial Range of Alternatives

2.1.1 Alternative A: No Build

The No Build Alternative would maintain the existing four-lane freeway and all of the interchanges as they are. There would be no capacity improvements to the US 41 mainline and no improvements would be made to the existing interchanges at US 41/Velp Avenue, I-43, or County M. No improvements to substandard bridge clearances or other deficiencies would be made. Over time, minimal improvements would be made that attempt to maintain current service levels, repair/rehabilitate existing structures, keep the driving surface in good condition, and address safety concerns at spot locations.

2.1.2 Build Alternatives

Build Alternatives B, C, D and E include a range of options for improving traffic capacity, traffic operations and safety on the US 41 freeway mainline and its interchanges. The main difference among the Build Alternatives occurs in the area between US 141/Velp Avenue and I-43 where various improvement levels are being considered, including full reconfiguration of the US 41/I-43 System Interchange.

Improvements that are common to all of the Build Alternatives include the following. These improvements are illustrated on Exhibits 2-1 through 2-4.

- Widen the US 41 freeway mainline from 4 to 6 lanes and add auxiliary lanes along northbound and southbound US 41.
- Reconstruct the US 141/Velp Avenue interchange including roundabouts at the ramp terminals and at the US 141/Velp Avenue and Memorial Drive intersection.
- Construct new bridges over US 141/Velp Avenue, Canadian National (CN) Railroad, Wietor Drive, I-43, and Duck Creek.
- Build bicycle and pedestrian accommodation on the west side of the US 41 bridge over Duck Creek.
- Maintain access to Wietor Wharf Park via existing Wietor Drive.
- Construct new box culvert for Beaver Dam Creek and realign Beaver Dam Creek to avoid impacts to Lehner Park, and minimize need for retaining walls.
- An option of building a 5-legged roundabout with a 2-lane west frontage road paralleling the west side of US 41 from US 141/Velp Avenue to just south of the CN Railroad, and then going along the south side of the railroad tracks in order to connect to the existing cul-de-sac at the northerly terminus of Memorial Drive on the east side of US 41.
- Replace the County EB/Lakeview Drive and County M bridges over US 41.
- Build storm water detention ponds along US 141/Velp Avenue and County EB/Lakeview Drive.
- Reconstruct the County M interchange including roundabouts at the ramp terminals and at the County M/frontage road intersections.
- Maintain the existing separation distance between the US 41 mainline and the frontage roads from I-43 to County M. While the existing separation distance does not meet desirable design

standards (see EIS Section 1), moving the frontage roads would result in substantial additional environmental impacts to wetlands and abutting development.

Section 2.1.3 through 2.1.6 focuses on the section of US 41 from US 141/Velp Avenue to I-43.

2.1.3 Alternative B: US 41 expansion with minor ramp improvements to I-43/US 41 interchange

An overview of Alternative B is provided in Exhibit 2-1. Key design features include the following:

- Expand US 41 along its existing alignment from US 141/Velp Avenue to I-43.
- Extend the on and off ramps at the US 141/Velp Avenue interchange and realign them slightly to meet current design standards and accommodate roundabouts at the interchange ramp terminals.
- Construct an outside auxiliary lane along northbound and southbound US 41 between the US 141/Velp Avenue and I-43 interchanges to improve traffic weaving conditions.
- Make minor improvements to existing ramp geometry at the I-43/US 41 System Interchange to accommodate the wider US 41 mainline.
- Maintain access from US 141/Velp Avenue to I-43 via US 41 as it is today.

2.1.4 Alternative C: US 41 expansion with C/D roadways between US 141/Velp Avenue and I-43

An overview of Alternative C is provided in Exhibit 2-2. Key design features include the following:

- Expand US 41 along its existing alignment from US 141/Velp Avenue to I-43.
- Construct Collector-Distributor (C/D) roads on both sides of US 41 between US 141/Velp Avenue and I-43. The C/D roads would accommodate traffic weaving movements rather than having those movements occur on the US 41 freeway mainline.
- Extend the on and off ramps at the US 141/Velp Avenue interchange and realign them slightly to meet current design standards and accommodate roundabouts at the interchange ramp terminals.
- Make minor improvements to existing indirect loop ramp geometry at the I-43/US 41 System Interchange to accommodate the wider US 41 mainline. Additional lighting along with enhanced signing and marking will be added to mitigate the tight loop ramps.
- Improve the semi-directional ramp from southbound US 41 to southbound I-43 to a 60 mph design speed, and the directional ramp from northbound I-43 to northbound US 41, to a 70 mph design speed.
- Maintain access from US 141/Velp Avenue to I-43 via US 41 as it is today.

2.1.5 Alternative D: US 41 expansion with C/D roadways between US 141/Velp Ave and I-43 with Freeway Split Configuration

An overview of Alternative D is provided in Exhibit 2-3. Key design features included the following:

- Main difference between Alternative C and D is that under Alternative D, US 41 mainline would be reconstructed on a revised alignment that would allow for a left exit ramp for southbound US 41 to southbound I-43 within the existing interchange footprint.
- Construct Collector-Distributor (C/D) roads on both sides of US 41 between US 141/Velp Avenue and I-43. The C/D roads would accommodate traffic weaving movements rather than having those movements occur on the US 41 freeway mainline.
- Extend the on and off ramps at the US 141/Velp Avenue interchange and realign them slightly to meet current design standards and accommodate roundabouts at the interchange ramp terminals.

- Make minor improvements to existing indirect loop ramp geometry at the I-43/US 41 System Interchange to accommodate the wider US 41 mainline. Additional lighting along with enhanced signing and marking will be added to mitigate the tight loop ramps.
- Improve the semi-directional ramp from southbound US 41 to southbound I-43, and the directional ramp from northbound I-43 to northbound US 41, to a 70 mph design speed.
- Maintain access from US 141/Velp Avenue to I-43 via US 41 as it is today.

2.1.6 Alternative E: US 41 expansion with full reconfiguration of I-43/US 41 interchange

An overview of Alternative E is provided in Exhibit 2-4. Key design features included the following:

- Expand US 41 including a revised northbound alignment, and a raised northbound gradeline, to accommodate the southbound US 41 to southbound I-43 ramp within the existing interchange footprint and the northbound I-43 to southbound US 41 flyover ramp piers and foundations.
- Reconstruct I/43/US 41 System Interchange with high-speed direct ramps (all loop ramps eliminated)
- Eliminate existing access between US 141/Velp Avenue and I-43 via US 41; Atkinson Avenue or an alternate route would be used to access southbound I-43 from US 141/Velp Avenue or to access US 141/Velp Avenue from northbound I-43.

2.2 Alternatives Evaluation and Screening

This subsection evaluates the alternatives described in Section 2.1 in terms of the following criteria as applicable. The alternatives retained for detailed study are also identified.

Ability to address key purpose and need factors

Detailed information on purpose and need is provided in EIS Section 1. Key purpose and need factors considered in this alternatives evaluation are listed below. **A comparison among the alternatives for these factors is provided in Figure 2-1.**

- System linkage and route importance
- Traffic and truck volumes
- Traffic operations
- Geometric deficiencies
- Safety

Environmental Impacts

Detailed information on environmental impacts is provided in EIS Section 3. Key impacts considered in this alternatives evaluation include construction cost, new right-of-way acquisition, residential and business displacements, stream crossings, wetlands, and public use land acquisition as applicable.

Input from Local Officials and the Public

Views of local officials and the public are based on the local officials meeting and a public information meeting held on March 3, 2010 and the public information meeting held on August 18, 2010 at which versions of the alternatives described in Section 2.1 were presented. In addition, there were two public informational meetings for this project prior to the determination that an EIS would be prepared. One public informational meeting was held on March 27, 2007, to inform the public of the proposed project, along with a range of alternatives for Weitor Wharf Park access. A second public informational meeting was held on November 27, 2007 to give the public an update on the proposed project design, along with introducing roundabouts at the US 141/Velp Avenue interchange. Local officials meetings were held in advance of each public information meeting to obtain input on project design features and other aspects in preparation for the public information meetings.

Interchange Access Justification Report

As discussed in EIS Section 1, US 41 is planned for future conversion to an Interstate Highway and I-43 is an existing Interstate Highway. Design standards for the Interstate System including any changes in access are governed by the Federal Highway Administration (FHWA) in accordance with 23 CFR Part 625, *Design Standards for Highways*. Under its policy guidance, FHWA evaluates requests for additional and revised access to the Interstate System. The intent is to protect the operation, safety and capacity of the Interstate System.

Proposed changes to the Interstate System are documented through an *Interchange Access Justification Report* (IAJR) that is reviewed and approved by FHWA. The IAJR for the US 41 corridor in Brown County was prepared by WisDOT and submitted to FHWA in March 2010.

FHWA reviewed the build alternatives presented in the IAJR to determine their compatibility with future conversion of US 41 to an Interstate Highway. FHWA provided its findings on June 21, 2010, agreeing that Alternative B be dropped from further consideration, and recommending that Alternatives C, D, and E be retained for further development and consideration in the project's EIS phase. The following recommendations were made for Alternatives C and D:

- The southbound US 41 to southbound I-43 directional ramp should be designed to provide a minimum design speed of 50-60 mph.
- The northbound I-43 to northbound US 41 directional ramp should be designed to provide a minimum design speed of 50-60 mph.
- The design speed for the existing loop ramps meets minimum design standards, however a higher design speed is desirable, because these ramps are part of the US 41/I-43 system interchange.

2.2.1 Alternative A: No Build

The No Build Alternative would not be compatible with system linkage and route importance. US 41 is designated as a backbone highway under *Connections 2030* and as a National Highway System route. US 41 and I-43 are designated long truck routes allowing trucks up to 65 feet in length to use these highways. The US 41/I-43 interchange is a major System Interchange (freeway to freeway interchange).

The No Build Alternative would not provide additional freeway mainline capacity, which is needed to accommodate design year (2035) traffic volumes and high truck volumes that comprise approximately 10.9% of the AADT on US 41 and I-43.

The No Build Alternative would not provide an acceptable operational Level of Service (LOS) in design year 2035. Backbone highways require a minimum of LOS C. Without improvements, southbound US 41 south of the US 141/Velp Avenue interchange will operate at LOS E in the AM peak and northbound US 41 at the I-43 interchange will operate at LOS F in the PM peak. Westbound I-43 east of Military Avenue will operate at LOS F in the PM peak.

The No Build Alternative would not address existing geometric deficiencies. Existing deficiencies include insufficient capacity/substandard roadway geometry, grade separation structures with substandard vertical clearance, interchange on and off ramps that are too short, tight loop ramps at the I-43 interchange that have an undesirable design speed less than 50% of the freeway mainline design speed, insufficient traffic weaving distance on US 41 from US 141/Velp Avenue to I-43, and insufficient distance between interchange ramps and cross roads.

The No Build Alternative would not address the high crash rate on US 41 from US 141/Velp Avenue to I-43 which exceeds the statewide average crash rate for similar freeways. It would also fail to address the high ramp crash rates at the I-43 interchange where the total rates and injury/fatal crash rates are well above the statewide average ramp crash rates. Safety concerns due to insufficient traffic weaving distances on northbound and southbound US 41 from US 141/Velp Avenue to I-43 would not be addressed.

Further, the No Build Alternative would be incompatible with the regional and local plans that include the US 41 expansion project. The plans include the *Green Bay Metropolitan Planning Organization Long-*

Range Transportation Plan completed in November 2005 and amended in 2007, and the *Brown County Comprehensive Plan* completed by the Brown County Planning Commission in October 2004.

Because the No Build Alternative does not address the project's key purpose and need factors, it is not a viable alternative and has been eliminated from further consideration. The No Build Alternative serves as a baseline for comparison to the Build Alternatives.

2.2.2 Alternative B: US 41 expansion with minor ramp improvements to I-43/US 41 interchange (Eliminated from further consideration)

Proposed improvements under Alternative B would not be compatible with system linkage and route importance as it does not meet FHWA expectations for future interstate conversion.

The US 41 traffic operation analysis indicates that Alternative B would improve traffic operations when compared to the No Build Alternative. Specifically, the traffic operations analysis indicates the following for the design year 2035:

- Traffic operations in the AM and PM peak hours would be at LOS C or better and no freeway segments would have operations at LOS F.
- Segments that would have operations at LOS D or E include the following:
 - US 41 southbound basic segment north of County M (LOS D in AM peak hour)
 - US 41 northbound basic segment north of County M (LOS D in PM peak hour)
 - US 41 northbound merge segment at County M (LOS D in PM peak hour)
 - I-43 northbound merge and basic segments from Atkinson Avenue to US 41 (LOS D in PM peak hour)
 - I-43 northbound diverge segment from Atkinson Avenue to US 41 (LOS E in PM peak hour)

Alternative B includes adding a lane to the weaving sections on US 41 between US 141/Velp Avenue and I-43. This improves freeway operations of the northbound weave to LOS C in the PM peak hour compared to LOS F for the No Build Alternative.

Alternative B does not fully address geometric deficiencies or safety concerns on US 41. It would not improve the tight loop ramps at the I-43 interchange. The speed differential between the freeway mainline and the loop ramps is less than desirable which increases the potential for vehicles to run off the road if speed isn't sufficiently reduced to negotiate the controlling loop ramp radius. The loop ramps have a substandard superelevation (banking of the curved roadway so it can be safely maneuvered at reasonable speeds). The loop ramps also have substandard shoulder widths.

Extending and realigning the US 141/Velp Avenue interchange ramps would reduce the traffic weaving distance on US 41 between this interchange and the I-43 interchange. The northbound weaving distance would be reduced by approximately 150 feet and the southbound weaving distance by about 90 feet. The crash rates for the traffic weaving sections are above the statewide average crash rate. Therefore, reducing the weaving distance would likely increase the potential for crashes along these weaving segments.

The speed differential between the median lane and the outside lane of the US 41 northbound traffic weaving section ranges between 24 and 35 mph in the 2035 PM peak hour. For the US 41 southbound weave, the speed differential ranges between 13 and 30 mph in the 2035 AM peak hour. With vehicles travelling at different speeds in a substandard weaving section it is anticipated to increase the amount of accidents between US 141/Velp Avenue and I-43 interchange.

Alternative B would retain existing access between US 141/Velp Avenue and I-43 via US 41.

Alternative B is estimated to be the least expensive to construct (\$140 million). It would require approximately 6 new acres of right-of-way and would displace 13 homes and one business. Two stream crossings are required (Beaver Dam Creek and Duck Creek). Wetland impacts would be approximately 42 acres. Right-of-way acquisition would be required from 3 public use land parcels, for a total of approximately 2.6 acres.

Input from local officials and the public at the March 3, 2010 meeting indicated general support for Alternative B because it would maintain existing access between US 141/Velp Avenue and I-43. There were safety concerns with Alternative B because it would not address traffic weaving and would retain the tight loop ramps at the I-43 interchange. There was also lack of support for Alternative B because it would not be compatible with future conversion of US 41 to an Interstate Highway.

This alternative has been eliminated from further consideration as a reasonable build alternative because it does not address the operational and safety issues resulting from the short weaving section along the US 41 mainline. The IAJR dated March 25, 2010 includes a statement that Alternative B no longer be included as an alternative for further study.

2.2.3 Alternative C: US 41 expansion with C/D roadways between US 141/Velp Avenue and I-43

Proposed improvements under Alternative C would be compatible with system linkage and route importance and would provide additional capacity on US 41, which is needed to accommodate design year (2035) traffic volumes.

Alternative C does not fully address geometric deficiencies on US 41. This alternative would not eliminate the tight loop ramps at the I-43 interchange, and would have all of the same geometric-associated safety concerns about the tight loop ramps as Alternative B, except that the ramp entry and exit points are separated from mainline US 41.

The US 41 traffic operation analysis indicates that Alternative C would improve traffic operations compared to the No Build Alternative or Alternative B. Specifically, the traffic operations analysis indicates the following for the design year 2035:

- Traffic operations in the AM and PM peak hours would be at LOS C or better and no freeway segments would have operations at LOS E or LOS F.
- The following segments would experience congestion at LOS D:
 - US 41 southbound basic segment at County M and north of County M (AM peak hour)
 - US 41 northbound basic segment at County M and north of County M (PM peak hour)
 - US 41 northbound merge segment at County M (PM peak hour)
 - I-43 northbound basic and diverge segments between Atkinson Avenue and US 41 (PM peak hour)

The addition of C/D roadways under Alternative C improves safety and traffic operations by removing traffic weaving movements from the US 41 freeway mainline, compared to the No Build Alternative or Alternative B. The weaving between exiting and entering vehicles from both the US 141/Velp Avenue interchange and the I-43 interchange would occur on a two lane C/D roadway, prior to merging onto the US 41 mainline. With lower speeds and traffic volumes on the C/D roadways, it is reasonable to assume that there would be fewer and less severe crashes. Weaving segments on the C/D roadways would operate at LOS C or better in the AM and PM peak hours.

The speed differential between the median lane and the outside lane of the northbound C/D road ranges between 5 and 21 mph in the PM peak hour and the speed differential for the southbound C/D roadway ranges between 15 and 26 mph in the AM peak hour. These speed differentials are less than the speed differentials that would occur with Alternative B where traffic weaving takes place on the US 41 mainline.

Alternative C would retain existing access between US 141/Velp Avenue and I-43 via US 41.

Alternative C is estimated to cost about \$190 million to construct. It would require approximately 27 new acres of right-of-way, 14 residential displacements and one business displacement. Three stream crossings would be required (one for Beaver Dam Creek and two crossing locations for Duck Creek). Wetland impacts for Alternative C would be approximately 51 acres. Right-of-way acquisition would be required from 6 public use land parcels, for a total of approximately 14.8 acres.

Input from local officials and the public at the March 3, 2010 and August 18, 2010 meetings indicated general support for Alternative C because it would maintain existing access between US 141/Velp Avenue and I-43. There was further support for Alternative C because it would be compatible with future conversion of US 41 to an Interstate Highway. There were safety concerns with Alternative C because it would retain the tight loop ramps at the I-43 interchange.

Based on the IAJR, FHWA requested that the directional ramp at the I-43 interchange (NB I-43 to NB US 41 ramp) and the semi-directional ramp at the I-43 interchange (SB US 41 to SB I-43 ramp) be designed to a minimum 50-60 mph design speed. FHWA also noted that while the loop ramps at the I-43 interchange meet minimum design standards, a higher design speed is desirable for the US 41/I-43 System Interchange. FHWA recommended that alternative C be retained for further development and consideration in the project's EIS phase.

2.2.4 Alternative D: US 41 expansion with C/D roadways between US 141/Velp Ave and I-43 with Freeway Split Configuration

Proposed improvements under Alternative D would be compatible with system linkage and route importance and would provide additional capacity on US 41, which is needed to accommodate design year (2035) traffic volumes.

Alternative D does not fully address geometric deficiencies on US 41. This alternative would not eliminate the tight loop ramps at the I-43 interchange, and would have all of the same geometric-associated safety concerns about the tight loop ramps as Alternative B, except that the ramp entry and exit points are separated from mainline US 41.

Freeway operations for Alternative D would be the same as those under Alternative C. The main difference between these alternatives is that the US 41 mainline would be constructed on a revised alignment that would allow for a left exit ramp for southbound US 41 to southbound I-43, which would reduce the amount of impacts west of US 41 compared to Alternative C. This revised alignment would involve raising the grade of southbound US 41 mainline considerably from just north of the CN Railroad to north of Duck Creek to allow for the construction of a bridge for the southbound US 41 ramp to southbound I-43 ramp over the northbound US 41 mainline.

The C/D roadways would improve safety compared to the No Build Alternative or Alternative B. With lower speeds and traffic volumes on the C/D roadways, it is reasonable to assume that there would be fewer and less severe crashes.

Alternative D would retain existing access between US 141/Velp Avenue and I-43 via US 41.

Alternative D is estimated to cost about \$205 million to construct. It would require approximately 26 new acres of right-of-way, 14 residential displacements and one business displacement. Two stream crossings would be required (Beaver Dam Creek and Duck Creek with a minor channel realignment of Beaver Dam Creek). Wetland impacts for Alternative D would be approximately 57 acres. Right-of-way acquisition would be required from 5 public use land parcels, for a total of approximately 9.4 acres.

Input from local officials and the public at the March 3, 2010 and August 18, 2010 meetings indicated general support for Alternative D because it would maintain existing access between US 141/Velp Avenue and I-43. There was further support for Alternative D because it would be compatible with future conversion of US 41 to an Interstate Highway. There were safety concerns with Alternative D because it would retain the tight loop ramps at the I-43 interchange.

Based on the IAJR, FHWA requested that the directional ramp at the I-43 interchange (NB I-43 to NB US 41 ramp) and the semi-directional ramp at the I-43 interchange (SB US 41 to SB I-43 ramp) be designed to a minimum 50-60 mph design speed. FHWA also noted that while the loop ramps at the I-43 interchange meet minimum design standards, a higher design speed is desirable for the US 41/I-43

System Interchange. FHWA recommended that alternative D be retained for further development and consideration in the project's EIS phase.

2.2.5 Alternative E: US 41 expansion with full reconfiguration of I-43/US 41 interchange

Proposed improvements under Alternative E would be compatible with system linkage and route importance and would provide additional capacity on US 41, which is needed to accommodate design year (2035) traffic volumes. Eliminating the tight loop ramps at the I-43 interchange would be desirable for a System Interchange.

The US 41 traffic operation analysis indicates that Alternative E would improve traffic operations compared to the No Build Alternative and Alternative B. Specifically, the traffic operations analysis indicates the following for the design year 2035:

- Traffic operations in the AM and PM peak hours would be at LOS C or better and no freeway segments would have operations at LOS E or LOS F.
- The following segments would experience congestion at LOS D:
 - US 41 southbound basic segment at County M and north of County M (AM peak hour)
 - US 41 northbound basic segment at County M and north of County M (PM peak hour)
 - US 41 northbound merge segment at County M (PM peak hour)

Alternative E is the only alternative that offers high-speed direct ramps to replace the existing tight loop ramps at the US 41/I-43 interchange. The high-speed direct ramps at the US 41/I-43 System Interchange provide free-flow movements for regional traffic. In addition, the high-speed direct ramps would address the safety concerns described previously for Alternatives B, C, and D, associated with tight loop ramps and weaving.

Alternative E would remove existing access between US 141/Velp Avenue and I-43 via US 41. Removal of the northbound US 141/Velp Avenue to southbound I-43 connection and the northbound I-43 to southbound US 141/Velp Avenue connection is expected to reduce the amount of traffic on I-43 between Atkinson Avenue and US 41. However, it will increase the amount of traffic along US 141/Velp Avenue from Atkinson Drive to US 41, by approximately 500 vehicles in the 2035 AM peak hour and 1,100 vehicles in the 2035 PM peak hour.

Alternative E is estimated to cost about \$215 million to construct. It would require approximately 34 new acres of right-of-way, 14 residential displacements and one business displacement. Two stream crossings would be required (Beaver Dam Creek and Duck Creek). Wetland impacts for Alternative E would approximately 57 acres. Right-of-way acquisition would be required from 5 public use land parcels, for a total of approximately 12.2 acres.

Input from local officials and the public at the March 3, 2010 and August 18, 2010 meetings indicated general support for Alternative E because it would address long-term traffic mobility and safety concerns. In addition, Alternative E was supported because it would be compatible with future conversion of US 41 to an Interstate Highway. The main opposition to Alternative E was that it would eliminate existing access between US 141/Velp Avenue and I-43 via US 41. Some people asked whether Alternative E could be refined to include this access, but further analysis indicated this access cannot be accommodated because of the grade differential between US 141/Velp Avenue and the ramps for US 41 northbound to I-43 southbound and I-43 northbound to US 41 southbound.

Based on the IAJR, FHWA recommended that Alternative E be retained for further development and consideration in the project's EIS phase. There were no concerns with the proposed design of this alternative relative to future conversion of US 41 to an Interstate Highway.

**Figure 2-1
Alternatives Comparison to Key Purpose and Need Factors**

Purpose & Need Factors	Alternative A ¹ No Build (ELIMINATED FROM FURTHER STUDY) ²	Alternative B ¹ US 41 expansion with minor ramp improvements to I-43/US 41 Interchange (ELIMINATED FROM FURTHER STUDY) ³	Alternative C ¹ US 41 expansion with C/D roadways between Velp Avenue and I-43	Alternative D ¹ US 41 expansion with C/D roadways between Velp Avenue and I-43 with Freeway Split Configuration	Alternative E ¹ US 41 expansion with full reconfiguration of I-43/US 41 interchange
System Linkage/Route Importance <ul style="list-style-type: none"> • Backbone Highway (US 41) • NHS route (US 41) • Long truck route (US 41 and I-43) • US 41/I-43 = Systems Interchange (freeway to freeway interchange) • Future conversion to Interstate Highway (US 41) 	Not addressed	Minor improvements to US 41/I-43 Systems Interchange Not compatible for future Interstate conversion	Improvements to US 41/I-43 Systems Interchange Compatible for future Interstate conversion	Improvements to US 41/I-43 Systems Interchange Compatible for future Interstate conversion	High speed ramps at US 41/I-43 interchange provide free-flow movements for regional traffic Compatible for future Interstate conversion
Traffic Volumes (Design Year 2035) (60,000 AADT threshold for 4-lane backbone highways) <ul style="list-style-type: none"> • US 41: 80,500 – 97,700 AADT • I-43: 55,700 AADT 	Not addressed	Proposed 6-lane US 41 freeway mainline meets design standard	Proposed 6-lane US 41 freeway mainline meets design standard	Proposed 6-lane US 41 freeway mainline meets design standard	Proposed 6-lane US 41 freeway mainline meets design standard
Truck Volumes (Design Year 2035) (High truck volumes contribute to congestion) <ul style="list-style-type: none"> • US 41: 10.9% of AADT • I-43: 11% of AADT • US 141/Velp Avenue: 5.7% of AADT 	Not addressed	Tight loop ramps at I-43 interchange undesirable for high truck volumes Additional US 41 mainline capacity benefits truck traffic	Tight loop ramps at I-43 interchange undesirable for high truck volumes Additional US 41 mainline capacity benefits truck traffic	Tight loop ramps at I-43 interchange undesirable for high truck volumes Additional US 41 mainline capacity benefits truck traffic	High speed ramps at US 41/I-43 interchange provide maximum benefits for truck traffic Additional US 41 mainline capacity benefits truck traffic
Traffic Operations (LOS C required for backbone highways) <ul style="list-style-type: none"> • SB US 41 south of US 141/Velp Avenue = LOS E in AM peak • SB US 41 from US 141/Velp Avenue to County M = LOS D in AM peak • NB US 41 from Mason St. to County M = LOS F in PM peak • NB I-43 south of US 41 = LOS F in PM peak 	Not addressed	Some operations below LOS C	Operations at LOS C or better	Operations at LOS C or better	Operations at LOS C or better
Geometric Deficiencies <ul style="list-style-type: none"> • Insufficient capacity/substandard roadway geometry • Grade separation structures have substandard vertical clearance • Interchange on and off ramps too short • Tight loop ramps at I-43 interchange have design speed less than 50% of freeway mainline design speed⁴ • Insufficient traffic weaving distance (US 41 from US 141/Velp to I-43) • Insufficient distance between interchange ramps and cross roads • Insufficient frontage road separation (US 41 from I-43 to County M) 	Not addressed	Does not improve tight loop ramps at I-43 interchange Does not address insufficient weaving distance between US 141/Velp Avenue and I-43 Does not address insufficient frontage road separation between I-43 and County M along northbound US 41 Other geometric deficiencies addressed	Does not improve design speeds for tight loop ramps at I-43 interchange Improves design speed for ramp from southbound US 41 to southbound I-43 to 60 mph and from northbound I-43 to northbound US 41 to 70 mph C/D roads remove weaving movements from US 41 mainline Does not address insufficient frontage road separation between I-43 and County M along northbound US 41 Provides desirable 800 ft. spacing between northbound US 41 merge points for the CD road and northbound I-43. Other geometric deficiencies addressed	Does not improve design speeds for tight loop ramps at I-43 interchange Improves design speed for ramps from southbound US 41 to southbound I-43 and from northbound I-43 to northbound US 41 to 70 mph C/D roads remove weaving movements from US 41 mainline Does not address insufficient frontage road separation between I-43 and County M along northbound US 41 Provides desirable 800 ft. spacing between northbound US 41 merge points for the CD road and northbound I-43. Other geometric deficiencies addressed	High speed ramps replace existing tight loop ramps at US 41/I-43 interchange Does not address insufficient frontage road separation between I-43 and County M along northbound US 41 Other geometric deficiencies addressed
Access Access between US 141/Velp Ave. and I-43 via US 41	Provided	Provided	Provided	Provided	Eliminated
Safety (Statewide crash rate comparison = 83.7 crashes per HMVMT) <ul style="list-style-type: none"> • NB US 41 from US 141/Velp Ave. to I-43 = 101.4 per HMVMT • SB US 41 from I-43 to US 141/Velp Ave. = 169.7 per HMVMT 	Not addressed	Does not separate out mainline traffic for NB and SB US 41 weaving sections between US 141/Velp Ave. and I-43. Otherwise, improves safety	Improves safety	Improves safety	Improves safety
NOTES:					
<ol style="list-style-type: none"> Proposed improvements common to all of the Build Alternatives include the following: <ul style="list-style-type: none"> • Widen the US 41 freeway mainline from 4 to 6 lanes (Memorial Drive to County M). • Reconstruct the US 141/Velp Avenue interchange with roundabouts at the interchange ramp terminals and at the US 141 (Velp Avenue)/Memorial Drive intersection. • Build new bridges over US 141/Velp Avenue, Canadian National Railroad, I-43, Wieler Drive, and Duck Creek • Replace the County EB/Lakeview Drive and County M bridges over US 41. • Reconstruct the County M interchange and construct roundabouts at the interchange ramp terminals and frontage road intersections with County M. • Build two-lane west side frontage road between US 141/Velp Avenue and the Memorial Drive cul-de-sac located east of US 41. • Build bicycle and pedestrian accommodation on the west side of the US 41 bridge over Duck Creek. • Build stormwater detention ponds adjacent to Velp Avenue and Lakeview Drive. Because the No Build Alternative does not address the project's key purpose and need factors, it is not a viable alternative and has been eliminated from further consideration. This alternative has been eliminated from further consideration as a reasonable build alternative because it does not address the operational and safety issues resulting from the short weaving section along the US 41 mainline. Per WisDOT FDM Chapter 11-30-1, the ramp design speed for freeway to freeway interchanges should be in the upper range or 85% of the freeway mainline design speed (within 10 mph of the mainline design speed). 					

2.3 Other Alternatives Considered

2.3.1 US 41 Expansion with the US 141/Velp Avenue Interchange Removed

This alternative involved expansion of US 41 mainline facilities from four lanes to six lanes within its existing alignment and included removing the US 141/Velp Avenue Interchange access to US 41, with no changes to the US 41/I-43 System Interchange ramps. See Figure 2-2.

Removal of the US 141/Velp Avenue interchange was evaluated because the existing close spacing between the US 41/Velp Avenue interchange and the US 41/I-43 interchange does not meet current design standards and is not desirable for a future Interstate facility. There are also safety concerns due to traffic weaving movements between the interchanges.

Figure 2-2 - US 41/Velp Ave Interchange Removed



Source: US 41 EIS Traffic Operations Modeling Draft Report. Strand Associates®, January 2010.

According to the US 41 Traffic Operations Report prepared for WisDOT by Strand Associates in 2010, removal of the US 41 and US 141/Velp Avenue interchange would cause substantial traffic diversion to the US 41/WIS 29 interchange and the I-43/Atkinson Avenue interchange. Intersection operations would be adversely affected by the additional traffic in design year 2035. Freeway operations south of WIS 29 would also be adversely affected due to the heavy delays experienced at the northbound US 41 and WIS 29 ramp terminal intersection. Removal of the US 141/Velp Avenue interchange would also likely result in substantial local impacts such as:

- Loss of business along US 141/Velp Avenue
- Longer trips for roadway users
- Delayed response time for emergency vehicles
- Longer snow removal routes (US 141/Velp Avenue is the primary access point for Brown County)
- Loss of I-43 as an alternative route for traffic incident management

WisDOT and FHWA have determined that this alternative be eliminated from further consideration based on the traffic operations analysis, and substantial impacts to regional and local traffic mobility/travel patterns that would occur if this existing freeway access is removed.

2.3.2 Transportation System Management

Transportation System Management (TSM) is the application of low cost improvements that maximize the efficiency of the existing highway system while minimizing social and environmental impacts. The US 41 Project scope includes Intelligent Transportation System (ITS) elements should the need for ITS applications become identified. The design team has specifically considered the use of ramp metering, ramp gates, High Occupancy Vehicle (HOV) lanes or High Occupancy Toll (HOT) lanes, permanent ITS cameras and variable messages boards along the corridor. The use of permanent cameras and dynamic signs will assist the driving public with the status of roadway conditions and will be implemented to assist with roadway efficiencies.

Specific TSM measures under consideration include the following:

- A 14-16.75 foot inside shoulder that could be a future HOV or HOT lane.
- Interchange ramp slopes, acceleration distances and right-of-way will be designed and provided to accommodate future ramp metering that could be implemented in the future if needed without additional impacts to the surrounding properties.
- Ramp gates will be provided to allow emergency responders to quickly close ramps in the event of an incident on the freeway.
- Permanent ITS cameras and changeable message boards will be used at various locations along the corridor to monitor and provide information on traffic conditions and incidents.

Incorporating TSM measures into the project will help improve traffic operations and safety to some extent, but would not address system linkage and route importance, traffic demand, geometric deficiencies or safety concerns discussed in EIS Section 1. Therefore, the TSM alternative is not a viable stand-alone alternative for meeting project purpose and need.

2.3.3 Transportation Demand Management

Transportation Demand Management (TDM) strives to reduce the number of automobile trips through increased transit ridership and other strategies such as use of carpooling and park-ride lots. In the Green Bay metropolitan area, bus transit is used to the extent available and some employers are able to offer flexible hours to reduce peak hour traffic.

WisDOT maintains a statewide RIDESHARE program to encourage commuters to use carpooling and to encourage employers to provide commuting incentives. The program includes on line registration for matching carpool and bicycle commuters. Information on park-ride facilities is also provided and many of the state's park-ride facilities have overnight parking, bike racks, telephones and shelters. Employers are encouraged to provide carpool incentives, participate in employee commuter tax benefits and provide flexible work hours. There are several existing park-ride lots in the US 41 corridor and WisDOT is proposing additional lots at locations with the highest use potential, including the County M interchange.

TDM measures have limited potential to alleviate traffic congestion in the US 41 corridor, but would provide alternative travel options. TDM measures would not address system linkage and route importance, traffic demand, geometric deficiencies or safety concerns discussed in EIS Section 1. Therefore, the TDM alternative is not a viable stand-alone alternative for meeting project purpose and need.

2.3.4 Other Transportation Modes

Mass Transit

The City of Green Bay has bus service but not along the US 41 corridor. Greyhound and Jefferson bus lines provide inter-city bus service in the region.

Passenger Rail Service

There is no passenger rail service at this time within the Green Bay metropolitan area. The *Midwest Regional Rail Initiative Report* indicates that rail service for the Green Bay area may be available by 2017 at the very earliest as a part of the Chicago-Milwaukee-St. Paul/Green Bay route.

Pedestrian and Bicycle Connections

WisDOT's design guidelines for the US 41 corridor include providing accommodations for pedestrians and bicyclists at freeway underpass and overpass locations where practicable. WisDOT and the Village of Howard are discussing conceptual plans for providing bicycle and pedestrian accommodations at locations such as the Duck Creek crossings. Discussions are also being held with the Green Bay Metropolitan Sewerage District (GBMSD) concerning use of a GBMSD maintenance road for bicycle and pedestrian traffic.

The US 41 project provides opportunities for enhancing multi-modal transportation and WisDOT is committed to including project design features that enhance transit, pedestrian and bicycle travel where possible and practicable. While a substantial increase in bus, rail, pedestrian and bicycle travel would potentially reduce the number of auto trips in the US 41 corridor, this reduction would not address the need for additional capacity on US 41, existing highway deficiencies, or safety concerns. Therefore other transportation modes is not a viable stand alone solution for addressing project purpose and need.

2.4 Selection of Preferred Alternative

Build alternatives C, D and E described in the EIS remain under consideration. WisDOT and FHWA will identify a preferred alternative after reviewing input received at the public hearing and during the public comment period for the EIS. The selected alternative will be based on engineering and environmental factors, input from the public, local officials, and state and federal review agencies. Selection of the preferred alternative will also be done in accordance with the Clean Water Act Section 404(b)(1) *Guidelines for Specification of Disposal Sites for Dredged or Fill Material* (40 CFR Part 230), administered by the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers. The guidelines state that dredged or fill material should not be discharged into aquatic ecosystems, including wetlands, unless no other practicable alternatives are demonstrate, that such discharge will not have unacceptable adverse impacts, and that all practicable measures to minimize adverse effects are undertaken.

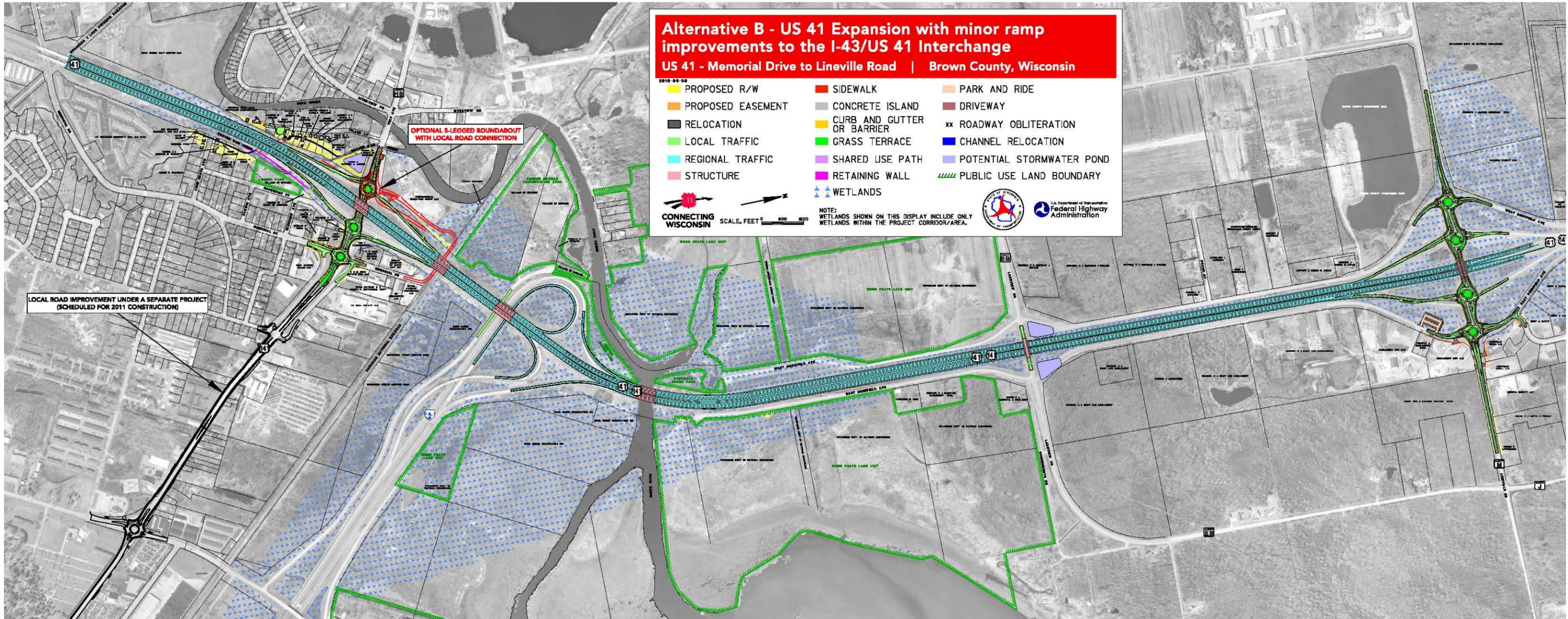


Exhibit 2-1

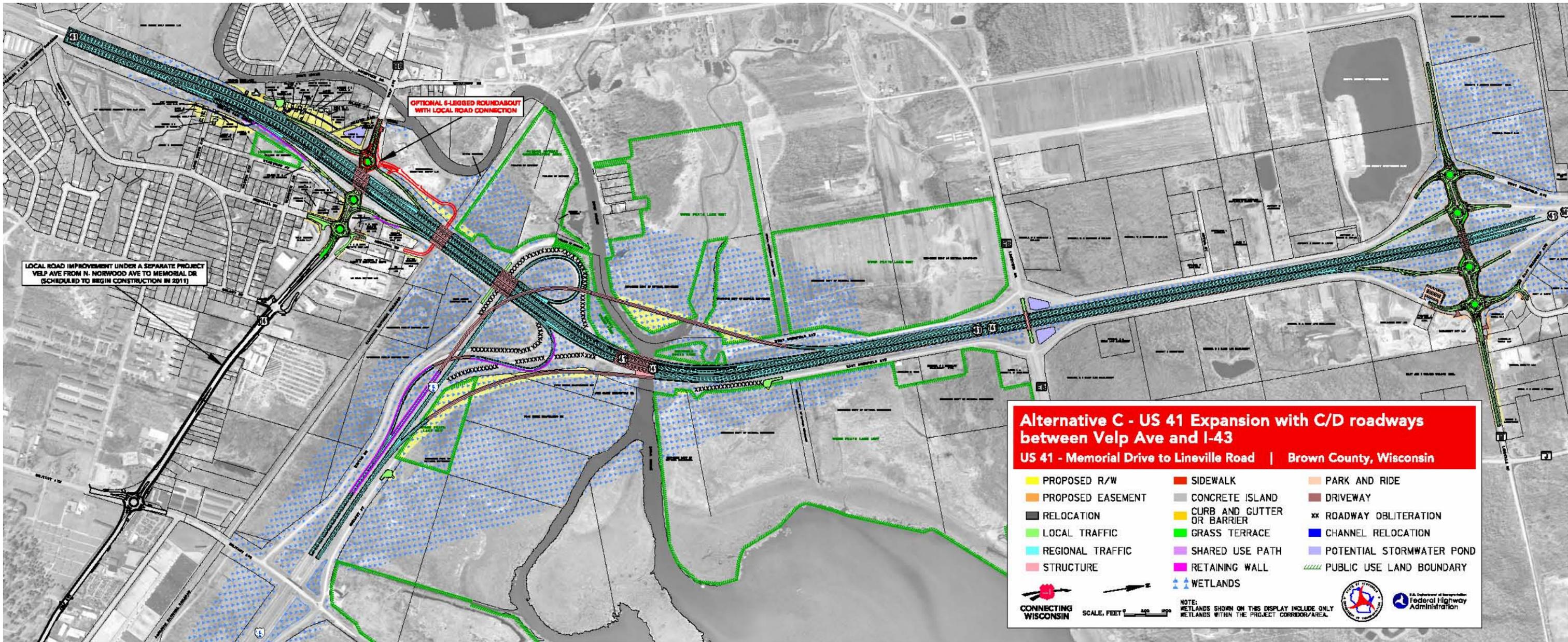


Exhibit 2-2

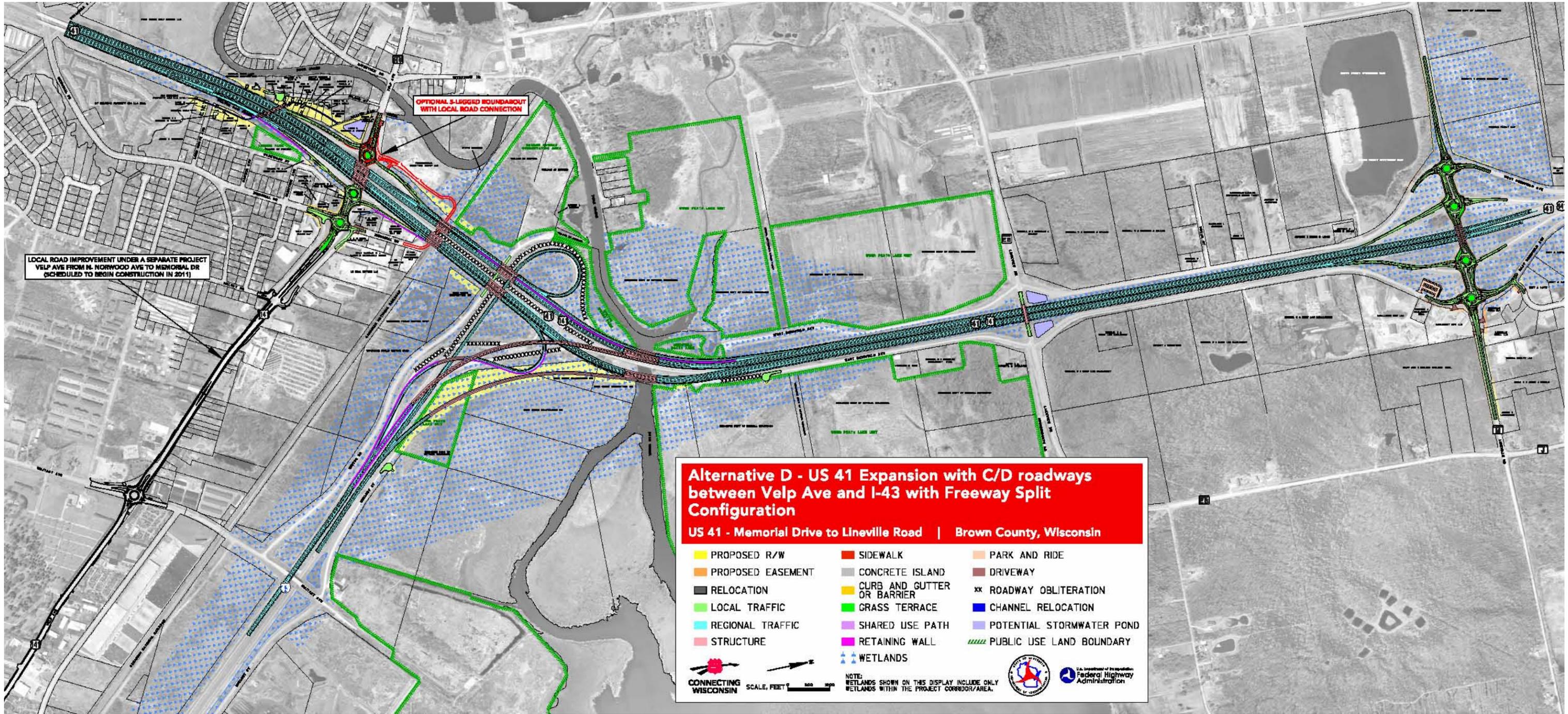


Exhibit 2-3

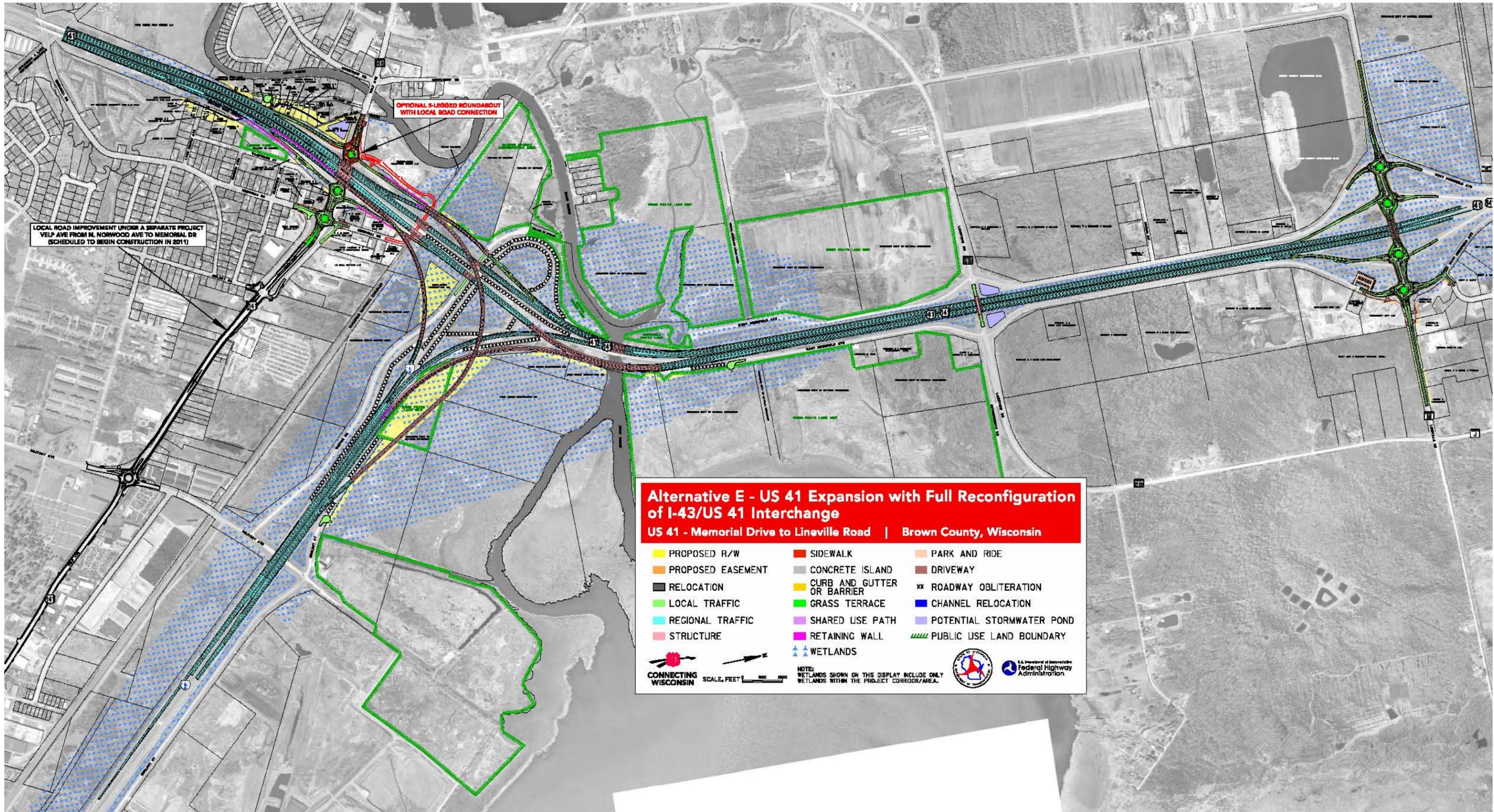


Exhibit 2-4