APPENDIX D

Alternatives Screening Technical Report

US 51 (Stoughton Road) North Study Technical Report

Alternatives Screening Technical Report

November 2024

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1.0 Introduction

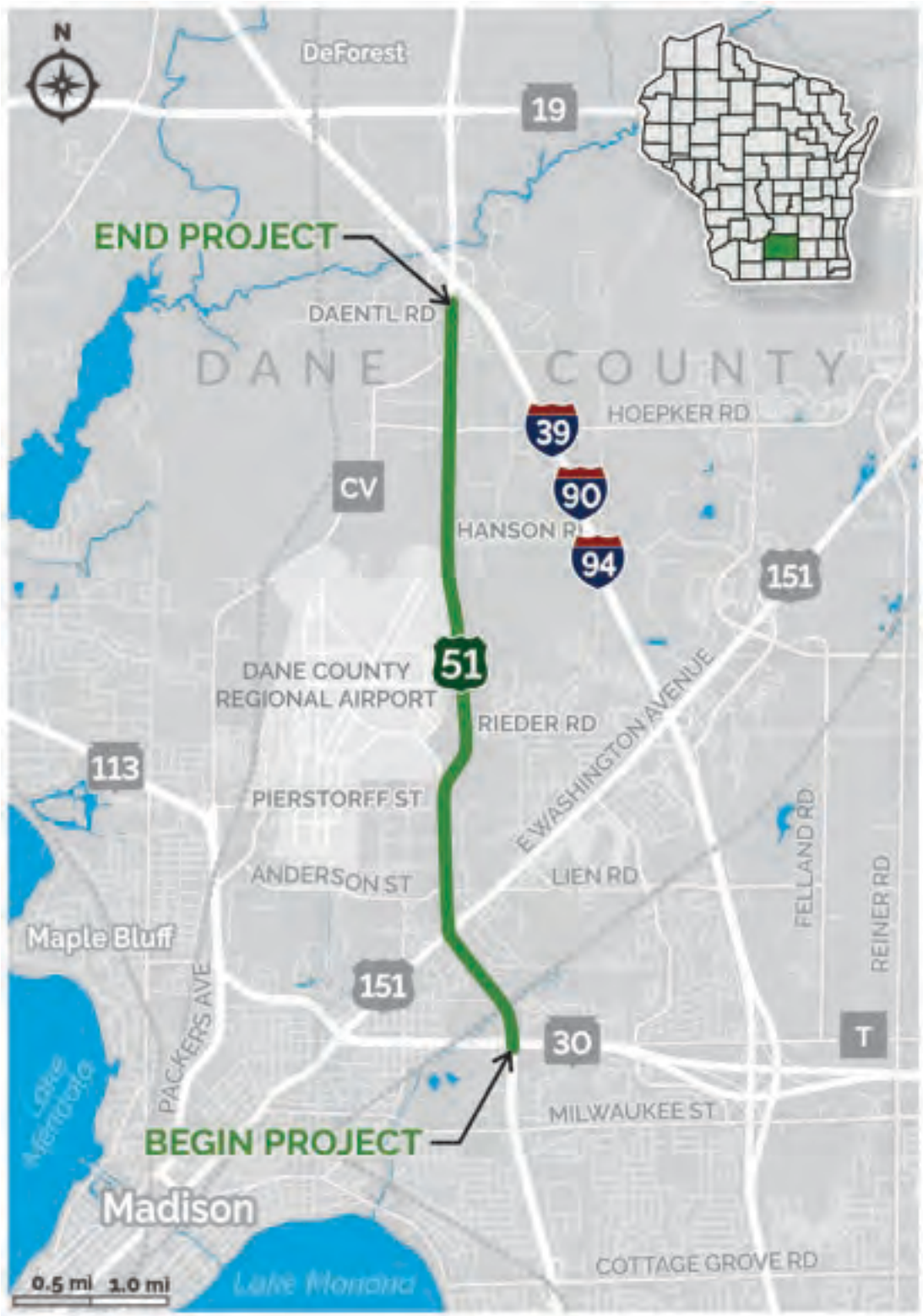
1.1. Study Overview

The Wisconsin Department of Transportation (WisDOT) is evaluating the reconstruction of US Highway (US) 51/Stoughton Road, referred to as US 51 hereafter. The study's limits span from Wisconsin State Highway (WIS) 30 in the city of Madison to Interstate (I) 39/90/94 in the town of Burke, a length of approximately 5.5 miles. The study corridor is located in central Dane County, Wisconsin, see Figure 1. The US 51 North Study is part of the broader US 51 corridor, providing regional and statewide transportation mobility throughout Wisconsin. US 51 is one of the busiest north-south routes in the city of Madison, serving as a vital arterial highway on the city's east side, providing links to I-39/90/94, US 151/East Washington Avenue, WIS 30 and US 12/18. US 51 provides access to numerous industrial, residential and commercial business developments, schools, medical facilities and recreational areas. US 51 is a National Highway System route and is identified as a principal arterial. Interchanges are located at both ends of the study corridor, WIS 30 to the south and I-39/90/94 to the north. There are 14 at-grade intersections on US 51 along the study corridor, including the two WIS 30 ramp terminals. The I-39/90/94 ramp terminals are being studied as part of the I-39/90/94 Corridor Study (US 12/18 in Madison to US 12/WIS 16 in Wisconsin Dells).

The study corridor has three distinct sections, each with its own characteristics.

- **South Section:** The south section extends from just south of the WIS 30 interchange to just south of the US 151 intersection. It transitions from an urban typical section with curb and gutter on the south end to a more rural section with outside shoulders north of Commercial Avenue until US 151 where it transitions back to an urban section. This section has three travel lanes in each direction and has the highest traffic volumes along the corridor. There is bicycle and pedestrian use in the area, primarily crossing US 51 at the Commercial Avenue intersection. Land use in the area includes commercial and manufacturing businesses as well as residential. The speed limit is 45 mph in this section.
- **Central Section:** The central section extends from just south of the US 151 intersection through Pierstorff Street. It has an urban typical section with curb and gutter and 2-to-3 travel lanes in each direction. There is considerable bicycle and pedestrian use due to nearby neighborhoods and Madison College in the area. Land uses are primarily commercial business and the Truax campus of Madison College. The speed limit for this section is 35 mph from US 151 through Anderson Street, where it transitions to 45 mph.
- **North Section:** The north section extends from north of Pierstorff Street to the study limits just south of the I-39/90/94 interchange. It has a rural typical section with two travel lanes in each direction separated by a grassy median. Land use in the area is dominated by the Dane County Regional Airport (DCRA). Other land uses present include industrial and commercial uses, open space, farmland and a roughly 50-acre solar farm. The speed limit in this section is 45 mph except from north of Pierstorff Street to south of Hoepker Road where it increases to 55 mph.

Figure 1: Study Location Map



1.2. Purpose and Need

1.2.1. Study Purpose

The purpose of the US 51 North Study is to accommodate existing and future travel demand with a focus on safety issues that affect travel on US 51.

1.2.2. Study Needs

The need for transportation improvements throughout the study corridor is demonstrated through the following factors:

- Safety: high crash rates and limited facilities for bicycles and pedestrians
- Travel Demand and Traffic Operations: poor operations for existing and future traffic
- Roadway and Geometric Deficiencies: deteriorating pavement conditions and roadway design deficiencies including substandard horizontal curves, inconsistent roadway cross-sections and lack of bicycle and pedestrian accommodations

A detailed purpose and need report can be found in the study's environmental assessment (EA) – Appendix C: Purpose and Need Report.

2.0 Alternatives Screening

A range of alternatives was developed for the US 51 North Study to address the study's purpose and need factors. The study team developed alternatives specific to the mainline for the corridor that were based on the purpose and need for the mainline. The study team also developed a series of concepts for intersections along the corridor, which were further developed as part of a five-step alternative screening process.

The alternatives developed were screened based on how well each met the purpose and need of the study while considering impacts, costs and stakeholder feedback received.

2.1. No Build Alternative

The No Build alternative would consist of pavement maintenance along the corridor in order to keep the pavement in an acceptable condition.

This alternative would not address the operational or safety issues identified in the study's purpose and need. Many intersections would continue to operate at a substandard level of service, with traffic conditions continuing to deteriorate into the future. There would continue to be discontinuous bike and pedestrian facilities, as well as geometric deficiencies.

The No Build alternative would not address the purpose and need for the study; however, it will be retained to serve as a baseline for comparison.

2.2. Mainline and Screening Process

Mainline alternatives to address the study's purpose and need were developed independent of the intersection alternatives, which are discussed in Section 2.5. The typical sections for the mainline, shown in Attachment A, were driven by the Study Needs throughout the corridor, including:

- Addressing substandard horizontal curves
- Addressing inconsistent mainline cross-sections
- Locations of Dane County Regional Airport (DCRA) runway protection zones (defined in Section 2.3.1)
- Accommodating bicycles and pedestrians

The Study Needs (Section 1.2.2) did not identify a need for mainline capacity expansion. Traffic analysis indicates traffic volumes will gradually increase over time at 0.8% per year in this section of US 51. This is based on the Dane County regional travel demand model, which uses population and economic development trends identified by the Greater Madison MPO in its Connect Greater Madison 2050 RTP. The forecasted traffic along the US 51 mainline does not identify the need for additional travel lanes. Instead, the study will address safety and operational needs along the corridor by focusing on improvements at the intersections.

2.3. Mainline Alternatives

WisDOT began identifying mainline alternatives by first developing conceptual-level intersection alternatives; this process is detailed in Section 2.8. Mainline alternatives consistent with the study's purpose and need were then developed to effectively connect the conceptual intersection alternatives in a way that would address the inconsistent roadway cross-sections. To minimize impacts, WisDOT generally maintained all alternatives on existing alignment.

This section will first discuss corridor wide bicycle and pedestrian accommodations that were considered. These bicycle and pedestrian accommodations could be included in any of the mainline alternatives. Following the bicycle and pedestrian accommodations descriptions, the alternatives considered for the mainline will then be described.

Mainline alternatives are described using typical sections in the report to aid reader understanding of the mainline lane configurations. Detailed drawings of the typical sections described below can be found in Attachment A.

2.3.1. Bicycle and Pedestrian Accommodations adjacent to the Mainline

Addressing the safety for bicycles and pedestrians along and across US 51 is one of this study's stated needs. This is tied to a lack of accommodations on the corridor. The study team analyzed three alternatives that would improve bicycle and pedestrian safety and access on the US 51 corridor:

No Added Facilities

US 51 would have no new marked bicycle facilities and no new pedestrian facilities. Any existing facilities would be replaced in kind. This alternative would provide wide paved shoulders in some areas that could accommodate bicyclists.

Corridor Wide Shared-Use Path

This alternative would construct a 10-foot shared-use path along the east side of US 51 for the entire length of the study corridor from WIS 30 through the County CV/Anderson Road intersection. The east side was determined to be the best location based on feedback obtained during a Bicycle and Pedestrian Workshop held to identify bicycle and pedestrian needs on the corridor and brainstorm potential solutions to address those needs. The east side was identified because it would allow for connections to be made to neighborhoods directly adjacent to the corridor.

The shared-use path would begin at the southern end of the study corridor, where it would connect to a new bicycle and pedestrian bridge that would be constructed over US 51 just south of the WIS 30 interchange. The bicycle and pedestrian bridge would connect to the city of Madison's Marsh View Path on the west side of US 51 providing connectivity into the existing network and to the new 10-foot shared-use path that would be constructed on the east side of US 51. From the bicycle and pedestrian bridge just south of WIS 30, the path would continue north to US 151. At US 151, a second bicycle and pedestrian bridge would be constructed on the east side of the intersection. The path would then continue north along the east side of US 51 through the County CV/Anderson Road intersection where it would connect to a shared-use path proposed as part of the I-39/90/94 Corridor Study.

This alternative was not identified as the preferred alternative because it was not supported by the DCRA and the Federal Aviation Administration (FAA).

Shared-Use Path excluding the area adjacent to the Dane County Regional Airport Property

This alternative would construct a 10-foot shared-use path along the east side of the US 51 North corridor except for the section from Kinsman Boulevard to Hoepker Road. This section was gapped based on comments/coordination with DCRA and FAA.

DCRA owns the majority of the land on both sides of US 51 between Pierstorff Street and Hoepker Road. This property contains two Runway Protection Zones (RPZs) that cross this section of US 51 (See Figure 2 below). RPZ's are a trapezoidal area off the end of an airport runway that serve to protect people and property on the ground. According to the FAA, it is desirable to clear the entire RPZ of all above-ground objects and avoid introducing any new land uses. DCRA and the FAA consider the introduction of a shared-use path to be a new land use and have indicated they will not support construction of a shared-use path within an RPZ or releasing property for the construction a shared-use path in this area. Additional information specific to coordination with DCRA and FAA is included in the study's EA.

The east side of US 51 was determined to be the best location for the shared-use path based on feedback obtained during a Bicycle and Pedestrian Workshop held to identify bicycle and pedestrian needs on the corridor and brainstorm potential solutions to address those needs. The east side was identified because it would allow for connections to be made to neighborhoods directly adjacent to the corridor.

The shared-use path would begin at the southern end of the study corridor where it would connect to a new bicycle and pedestrian bridge that would be constructed over US 51 just south of the WIS 30 interchange. The bicycle and pedestrian bridge would connect to the city of Madison's Marsh View Path on the west side of US 51 providing connectivity into the existing network and to the new 10-foot shared-use path that would be constructed on the east side of US 51. From the bicycle and pedestrian bridge just south of WIS 30, the path would continue north to US 151. At US 151, a second bicycle and pedestrian bridge would be constructed on the east side of the intersection. The path would then continue north to Kinsman Boulevard before transitioning to on-street bicycle accommodations. This section would have 5-foot paved shoulders with no marked bicycle lanes. The shared-path was not extended from Kinsman Boulevard to Pierstorff Street because Pierstorff Street does not have any bicycle and pedestrian facilities while Kinsman Boulevard has sidewalk and on-street bike lanes that connect to the city of Madison's existing bicycle and pedestrian network. North of Pierstorff Street to Hoepker Road an 8-foot paved shoulder would provide bicycle accommodations. A shared-use path would also be constructed from Hoepker Road through the County CV/Anderson Road intersection on the east side of US 51 where it would connect to a shared-use path proposed as part of the I-39/90/94 Corridor Study.

WisDOT identified this alternative as the preferred alternative because it would add the desired bicycle and pedestrian accommodations along the majority of US 51, did not affect RPZ areas or property owned by DCRA and was supported by DCRA and FAA. Paved shoulders would accommodate bicycles in these areas. Exhibits showing the bicycle and pedestrian accommodations for the preferred alternative can be found in Attachment D.

Figure 2: Runway Protection Zones within the Corridor

2.3.2. South Section: South of WIS 30 to US 151

This section of US 51 has the highest vehicle traffic volumes along the corridor, with annual average daily traffic (AADT) volumes ranging between 24,790 – 47,280 in 2022. The existing roadway in this area transitions from an urban typical section with curb and gutter on the south end to a more rural section with outside gravel shoulders north of Commercial Avenue until US 151 where it transitions back to an urban section. This section has three 12-foot travel lanes in each direction. There is notable bicycle and pedestrian use in the area, primarily crossing US 51 at the Commercial Avenue intersection.

The table below contains a description of the preferred alternative typical section for the mainline section of US 51 from south of WIS 30 to US 151. These typical sections have been included in the preferred alternative.

Note the reader should assume north is up in the typical section. Maps showing the preferred alternative for these sections of the corridor can be found in Attachment D. More detailed typical sections can be found in Attachment A.

Section of US 51	Preferred Alternative	Proposed Typical Section
South Section: South of WIS 30 to Commercial Avenue	Urban cross-section with 6 total lanes (3 in each direction); 12-foot lanes; 12-foot northbound auxiliary lane;10-foot shared-use path on east side	
• This alternative would reconstruct the US 51 mainline; it would maintain the existing number of mainline travel lanes and provide a consistent urban cross-section. An auxiliary lane would be added on northbound US 51 from WIS 30 to Commercial Avenue to improve traffic operations. The speed limit in this section would be reduced with this alternative from 45 mph to 40 mph to potentially increase safety and comfort level for bicycles and pedestrians crossing US 51 at the Commercial Avenue/Lexington Avenue and US 151 intersections. • A shared-use path would be constructed on the east side of US 51. A bicycle and pedestrian bridge would be constructed just south of the US 51 and WIS 30 interchange. This bridge would connect to the city of Madison's Marsh View Path on the west side of US 51 and the new shared-use path on the east side. • A shared-use path would be constructed along the east side of Commercial Avenue east of US 51 to Nakoosa Trail. • No on-street bike lanes would be provided.		

Section of US 51	Preferred Alternative	Proposed Typical Section
South Section: Commercial Avenue to US 151	Urban cross-section with 6 total lanes (3 in each direction); 12-foot lanes; 10-foot shared-use path on east side	
• This alternative would reconstruct the US 51 mainline; it would maintain the existing number of mainline travel lanes and provide a consistent urban cross-section. The speed limit in this section would be reduced with this alternative from 45 mph to 40 mph to potentially increase safety and comfort level for bicycles and pedestrians crossing US 51 at the Commercial Avenue/Lexington Avenue and US 151 intersections. • A shared-use path would be constructed on the east side of US 51. • The shared-use path would connect into the Mayfair neighborhood just north of Commercial Avenue. • No on-street bike lanes would be provided.		

2.3.3. Central Section: US 151 to Pierstorff Street

This section of US 51 has traffic volumes ranging between 13,300 – 24,050 AADT (2022). Bicycle and pedestrian activity occur in this area due in part to its proximity to nearby neighborhoods and Madison College. The existing roadway in this area consists of an urban section with two 12-foot travel lanes in the northbound direction. In the southbound direction there are two 12-foot travel lanes from Pierstorff Street to Anderson Street there are three 12-foot travel lanes from Anderson Street to US 151.

The tables below contain a description of the preferred alternative typical sections for the mainline sections of US 51 from US 151 to Pierstorff Street.

Note the reader should assume north is up in the typical section. Maps showing the preferred alternative for these sections of the corridor can be found in Attachment D. More detailed typical sections can be found in Attachment A.

Section of US 51	Preferred Alternative	Proposed Typical Section
Central Section: US 151 to Anderson Street	Urban cross-section with 5 - 6 total lanes (3 southbound, 2 - 3 northbound);12-foot lanes; 10-foot shared-use path on both sides	
• This alternative would reconstruct the US 51 mainline; it would maintain the existing urban cross-section and the existing number of mainline travel lanes on southbound US 51; a third northbound lane north of US 151 would be added that would transition into a turn lane at Anderson Street. • Due to the bicycle and pedestrian activities that occur in this area, a shared-use path would be provided on both the east and west sides of US 51. The shared-use path on the west side of US 51 in this area is provided due to the high volume of bicycles and pedestrians in this area. • A bicycle and pedestrian bridge would be constructed on the east side of the US 51 and US 151 intersection, connecting to the shared-use path. • No on-street bike lanes would be provided on US 51, but the existing bike lanes on US 151 and Anderson Street would remain in this area.		

Section of US 51	Preferred Alternative	Proposed Typical Section
Central Section: Anderson Street to Kinsman Boulevard	Urban cross-section with 4 total lanes (2 in each direction); 12-foot lanes; 10-foot shared-use path on east side	
• This alternative would reconstruct the US 51 mainline and would maintain the existing number of mainline travel lanes and the existing urban cross-section. • A shared-use path would be constructed on the east side of US 51. • No on-street bike lanes would be provided on US 51, but the existing bike lanes on Kinsman Boulevard would be maintained through the intersection.		

- An enhanced mid-block bicycle/pedestrian crossing of US 51 north of Anderson Street near Orin Road that connects to Madison College. High visibility crosswalks and flashing beacons are examples of enhanced crossings that could be provided. The specific type of enhancement would be determined during final design.

Section of US 51	Preferred Alternative	Proposed Typical Section
Central Section: Kinsman Boulevard to Pierstorff Street	Urban cross-section with 4 total lanes (2 in each direction); 12-foot lanes with 5-foot paved shoulders to accommodate bikes	

- This alternative would reconstruct this section of US 51. It would maintain the existing number of mainline travel lanes and the existing urban cross-section.
- The median opening just south of existing Pierstorff Street would be closed with this alternative to improve safety.
- The 5-foot paved shoulders would accommodate bicyclists. The shared-path was not extended to Pierstorff Street because Pierstorff Street does not have any bicycle and pedestrian facilities while Kinsman Boulevard has sidewalk and on-street bike lanes that connect to the city of Madison's existing bicycle and pedestrian network.

2.3.4. North Section: Pierstorff Street to South of I-39/90/94

The north section of the US 51 corridor has traffic volumes ranging between 13,360 – 24,160 AADT (2022). The existing roadway in this area includes a rural typical section, with two 12-foot lanes in each direction and 8-foot paved outside shoulders. DCRA owns the majority of land on both sides of US 51 from north of Pierstorff Street to Hoepker Road.

This section of the corridor passes through two RPZs, one located between Pierstorff Street and Rieder Road and the other located further north near Hanson Road (See Figure 2). Any improvements that would change the roadway configuration within an RPZ may require an RPZ Analysis be completed.

An RPZ analysis is a process overseen by the FAA for identifying, evaluating and documenting potential changes within RPZ. For roadway projects, it involves developing a range of alternatives and identifying a preferred alternative that is acceptable to the airport sponsor that attempts to minimize impacts of land use within an RPZ, avoid introducing new land uses, and mitigates risk to people and property on the ground. As part of the mainline alternative development process, WisDOT coordinated with the airport to initiate an RPZ analysis for the two RPZs on the corridor.

RPZ between Pierstorff Street and Rieder Road

WisDOT developed three alignment alternatives for the RPZ between Pierstorff Street and Rieder Road. Due to the location of US 51 in this area and the proximity to neighborhoods it was determined that the range of alternatives developed would remain close to the existing alignment. This section of the US 51 corridor includes a substandard horizontal "s-curve" between Pierstorff Street and Rieder Road that is associated with a historical crash trend.

Between 2017 – 2021, there were fifteen crashes along this stretch of curved highway. One of the crashes was a fatal motorcycle crash caused by the driver failing to negotiate the northbound US 51 roadway curve. Correcting this geometric deficiency would improve safety on the US 51 corridor.

The three different alignment alternatives included maintaining the existing alignment, flattening the horizontal curve to meet standards and shifting the alignment further from the airport runway and flattening the horizontal curve to meet standards while keeping the alignment close to the existing alignment as possible. Leo Circle is a stop-controlled local road located less than 150 feet east of the existing Pierstorff Street intersection and is parallel to US 51 in the area. It provides access to Pierstorff Street for three properties that would otherwise be landlocked.

Maintain the Existing Alignment

This alternative would not address the safety issues related to the substandard curve and would not require any changes within the RPZ.

Flatten Horizontal Curve and Shift Alignment Further from Airport Runway

This alternative would flatten the horizontal curves to meet desirable standards and shift the US 51 alignment east, further away from the end of the airport runway. This alternative would require the largest amount of right of way from the airport to construct and would require right-of-way acquisition within the RPZ. In addition, Leo Circle would need to be relocated approximately 300 feet east on a new alignment.

Flatten the Horizontal Curve and Keep Alignment Close to Existing

This alternative would flatten the horizontal curves to desirable standards while keeping the mainline alignment as close to existing as possible. This alternative would require right of way from the airport, but not from within the existing RPZ. In addition, it would impact but maintain Leo Circle near its current location (See Figure 3).

Figure 3: RPZ and Proposed Alternative for S-Curve Alignment

After coordinating with DCRA and other stakeholders, WisDOT identified this alternative as the preferred alternative because it would address the safety concerns associated with the substandard curve while minimizing environmental and right of way impacts. DCRA provided feedback supporting the WisDOT-identified preferred alternative in this section of the corridor. WisDOT then coordinated with FAA to determine if the preferred alternative would require any additional analysis for the minimal roadway changes within the RPZ. FAA responded that no additional RPZ analysis was necessary to move forward with the alternative.

RPZ near Hanson Road

WisDOT developed several alignment alternatives for the RPZ near Hanson Road, including alternatives ranged from minor alignment adjustments to substantial shifts of nearly 700 feet to the east at Hanson Road to extend the distance between US 51 the airport runway end. A tunnel alternative was also investigated for US 51 that would run

from 1,200 feet south of Hanson Road to 1,500 feet north of Hanson Road to minimize RPZ impacts; however, the tunnel alternative is cost prohibitive, requires right of way acquisition and eliminates Hanson Road access to US 51.

After evaluation and coordination with DCRA and other stakeholders, WisDOT identified an alternative that would maintain the existing US 51 alignment as the preferred alternative in this location. This alternative would have minimal changes to the roadway configuration and have no property acquisition or new land uses introduced within the RPZ. DCRA provided feedback supporting the WisDOT-identified preferred alternative in this section of the corridor. WisDOT then coordinated with FAA to determine if the preferred alternative would require any additional analysis for the minimal roadway changes within the RPZ. FAA responded that no additional RPZ analysis was necessary to move forward with the alternative.

The tables below contain a description of the preferred alternative typical section for the mainline sections of US 51 from Pierstorff Street to south of I-39/90/94. Note, the reader should assume north is up in the typical section. Maps showing the preferred alternative for these sections of the corridor can be found in Attachment D. More detailed typical sections can be found in Attachment A.

Section of US 51	Preferred Alternative	Proposed Typical Section
North Section: Pierstorff Street to Hoepker Road	Rural cross-section with 4 total lanes (2 in each direction); 12-foot lanes with 10-foot outside shoulders (8-foot paved) to accommodate bikes	
• This alternative would reconstruct this section of US 51, it would maintain the existing number of mainline travel lanes and the existing rural cross-section. • The 8-foot outside paved shoulders would accommodate bicyclists. A shared-use path was not included in this section because it was not supported by DCRA or FAA.		

Section of US 51	Preferred Alternative	Proposed Typical Section
North Section: Hoepker Road to County CV/Anderson Road	Rural cross-section with 4 total lanes (2 in each direction); 12-foot lanes with 10-foot outside shoulders (8-foot paved); 10-foot shared-use path on the east side	

- This alternative would reconstruct this section of US 51, it would maintain the existing number of mainline travel lanes and the existing rural cross-section.
- A shared-use path would be constructed on the east side of US 51.
- Sidewalk would be constructed to connect to existing sidewalk on Hoepker Road east of US 51.

Section of US 51	Preferred Alternative	Proposed Typical Section
North Section: County CV/Anderson Road to south of I-39/90/94	Rural cross-section with 4 total lanes (2 in each direction); 12-foot lanes with 10-foot outside shoulders (8-foot paved); 12-foot northbound and southbound auxiliary lanes;10-foot shared-use path on the east side	

- This alternative would reconstruct this section of US 51, it would maintain the existing number of mainline travel lanes, the southbound auxiliary lane and the existing rural cross-section. An auxiliary lane would be added on northbound US 51 from Anderson Road that would match into the preferred alternative identified for the I-39/90/94 and US 51 interchange in WisDOT's I-39/90/94 Corridor study.
- A shared-use path would be constructed on the east side of US 51 that would connect to a future shared-use path being considered as part of WisDOT's I-39/90/94 Corridor Study.

2.4. Mainline Summary

The proposed alignment and typical sections for the preferred alternative, described in Section 2.3 above, meet the purpose and need of the study. Changes to the S-curve between Pierstorff Street and Rieder Road to meet standards would improve safety. The proposed typical sections would accommodate the existing and future traffic volumes. Additional facilities would be provided for bicycles and pedestrians while balancing the needs and requirements of the airport. Impacts from the mainline preferred alternative include:

- 1.11 acres of right of way
- 1.02 acres of wetland impacts
- No relocations

2.5. Intersection Alternatives

The US 51 North Study evaluated 13 intersections including one interchange within the study limits. Concepts were developed for the interchange and intersections to address the study's purpose and need. Concepts for each location varied in number to accommodate the size and complexity of the intersecting and adjacent roadways. The US 51 and Daentl Road intersection is located on the north end of the study limits, however due to proximity to the I-39/90/94 interchange, the intersection is being evaluated as part of the separate WisDOT I-39/90/94 Corridor Study.

2.6. Intersection Alternatives Development and Screening Process

To foster informed decision-making, WisDOT objectively evaluated a reasonable range of alternatives that would meet the study's purpose and need. The alternative development and screening process for the study corridor intersections was completed in five phases. The purpose of the development and screening process was to narrow down the broad range of intersection alternatives and identify a preferred alternative in each location, which is the alternative that that best addressed the study's purpose and need while considering the impacts, costs and stakeholder feedback received.

The five-phase process included the following:

- Phase I: Early stakeholder outreach including a public involvement meeting (PIM) and committee meetings to help identify corridor needs. A broad range of high-level alternative concepts that could potentially address the study's purpose and need components that focus on intersection safety and operations were developed. A total of 44 initial concepts were developed, 36 advanced to Phase II. The detailed purpose and need report can be found in the study's EA – Appendix C: Purpose and Need Report
- Phase II: An initial engineering evaluation of the remaining conceptual alternatives and stakeholder feedback was gathered to refine and narrow down which concepts to carry forward. There were 28 concepts that advanced to Phase III.
- Phase III: Further refined the alternative concepts. Screening criteria based on the study's purpose and need was developed and applied to intersections that had either several or more complex concepts to help determine which concepts warranted further investigation. Feedback received from committee meetings and the second public involvement meeting (PIM 2) was also used to narrow down the concepts. There were 22 concepts that advanced to Phase IV.
- Phase IV: Development of detailed alternatives and impacts based on the remaining concepts. Detailed screening criteria were developed and applied to intersections with more complex alternatives to help identify the most promising options. There were 18 alternatives that advanced to Phase V.
- Phase V: Identified a preferred alternative for each location based on detailed criteria and feedback from stakeholders and the third public involvement meeting (PIM 3).

Figure 4 shows the five-phase intersection development process and illustrates how the 44 original concepts were narrowed down, or screened, within each phase until only the preferred intersection alternatives remained. The timeline for concept and alternative screening can be seen in Figure 5. Table 1 lists the intersection concepts and alternatives that were considered for the study, denoting what phase each alternative was eliminated from further consideration.

Figure 4: Intersection Alternative Development Process

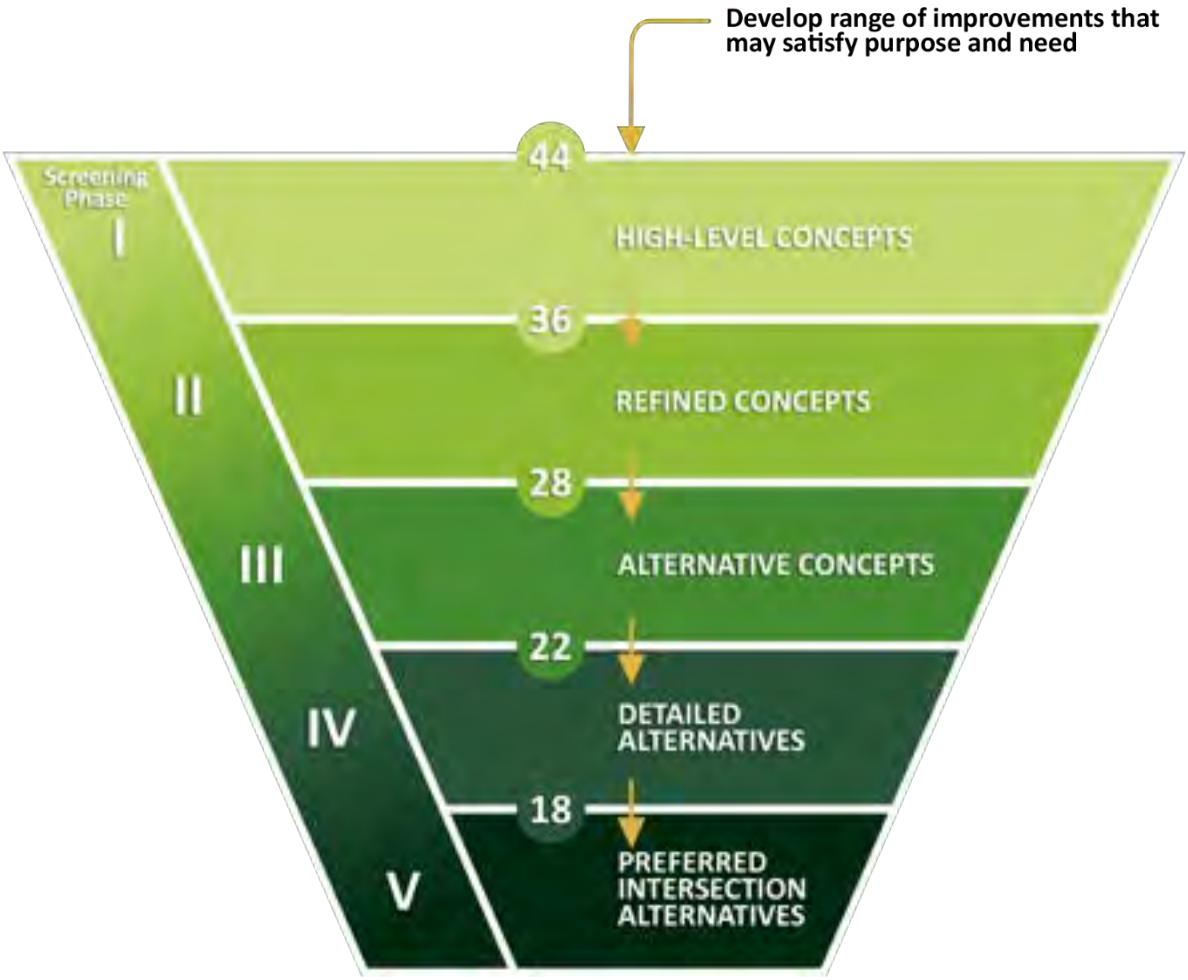
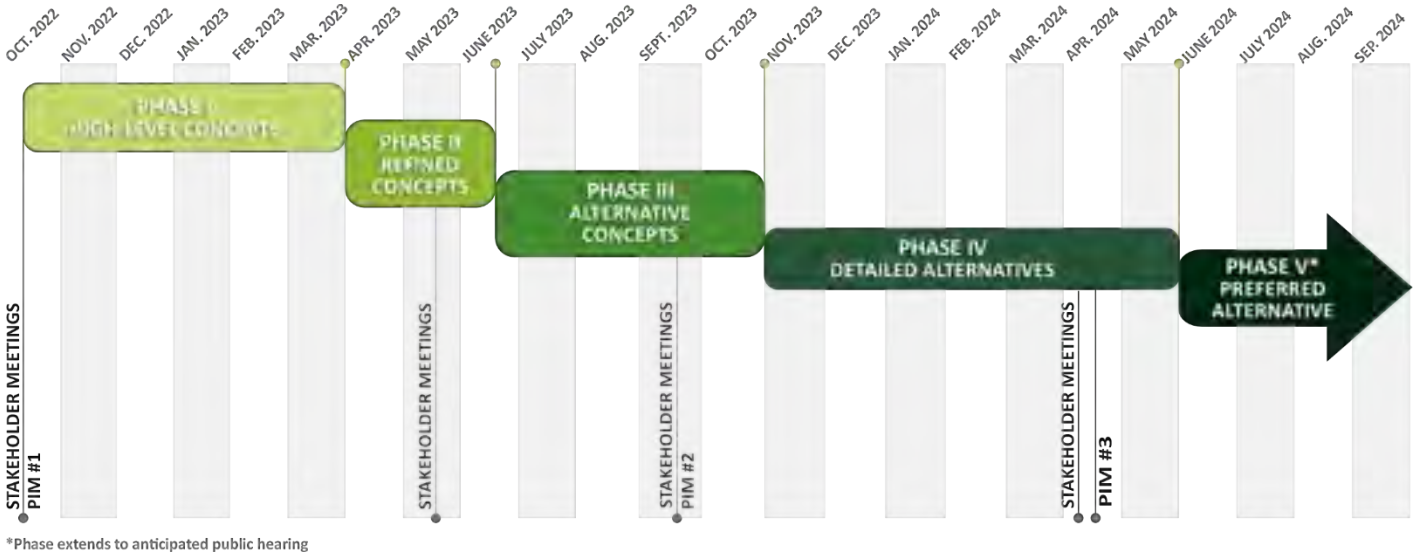


Figure 5: Intersection Alternative Development Timeline



*Phase extends to anticipated public hearing

Table 1: Summary of Intersection Alternatives

INTERSECTION	High Level Concepts PHASE I *Oct. 2022 Mar. 2023*	Refined Concepts PHASE II *April. 2023 June. 2023*	Alternative Concepts PHASE III *June. 2023 Oct. 2023*	Detailed Alternatives PHASE IV *Nov. 2023 May. 2024*	Preferred Alternative PHASE V *June. 2024 Dec. 2024*
COUNTY CV	Ex. Cond. Improved Roundabout	Ex. Cond. Improved	Ex. Cond. Improved	Ex. Cond. Improved	Ex. Cond. Improved
ACKER ROAD	Ex. Cond. Improved Right-In/Right-Out Restricted Left Remove Access	Ex. Cond. Improved	Ex. Cond. Improved	Ex. Cond. Improved	**Ex. Cond. Improved**
HOEPKER ROAD	Ex. Cond. Improved Roundabout Interchange	Ex. Cond. Improved Roundabout	Ex. Cond. Improved Roundabout	Ex. Cond Improved Roundabout	Ex. Cond. Improved Roundabout
HANSON ROAD	Ex. Cond. Improved Signalized Roundabout Full Access Right-In/Right-Out Restricted Left	Roundabout Full Access Right-In/Right-Out Restricted Left	Roundabout Full Access Restricted Left	Full Access Restricted Left	**Full Access**
AMELIA EARHART DR	Ex. Cond. Improved	Ex. Cond. Improved	Ex. Cond. Improved	Ex. Cond. Improved	Ex. Cond. Improved
RIEDER ROAD	Ex. Cond. Improved Ex. Cond. Imp. RCUT	Ex. Cond. Improved Ex. Cond. Imp. RCUT	Ex. Cond. Improved Ex. Cond. Imp. RCUT	Ex. Cond. Improved Ex. Cond. Imp RCUT	**Ex. Cond. Improved** Ex. Cond. Imp RCUT
PIERSTORFF STREET	Ex. Cond. Improved	Ex. Cond. Improved	Ex. Cond. Improved	Ex. Cond. Improved	Ex. Cond. Improved
KINSMAN BOULEVARD	Ex. Cond. Improved Roundabout	Ex. Cond. Improved Roundabout	Ex. Cond. Improved Roundabout	Ex. Cond. Improved Roundabout	**Ex. Cond. Improved** Roundabout
ANDERSON STREET	Ex. Cond. Improved Roundabout	Ex. Cond. Improved	Ex. Cond. Improved	Ex. Cond. Improved	Ex. Cond. Improved
US 151 (EAST WASHINGTON AVENUE)	Ex. Cond. Improved Quadrant (NE-1) Quadrant (NE-2) Quadrant (NW) Quadrant (SE-1) Quadrant (SE-2) Quadrant (SW) Displaced Left Jughandle Tight Diamond DDI RAB with EWA Over SPUI Grade Sep. RAB Squareabout	Ex. Cond. Improved Quadrant (NE-1) Quadrant (NE-2) Quadrant (NW) Quadrant (SE-1) Quadrant (SE-2) Quadrant (SW) Displaced Left Jughandle Tight Diamond DDI RAB with EWA Over SPUI Grade Sep. RAB Squareabout	Ex. Cond. Improved Quadrant (SW) Jughandle Tight Diamond RAB with EWA Over SPUI Grade Sep. RAB Squareabout	Ex. Cond. Improved Quadrant (SW) Jughandle Tight Diamond	**Ex. Cond. Improved** Jughandle
LEXINGTON/ COMMERCIAL AVENUE	Ex. Cond. Improved Partial Cloverleaf Right-In/Right-Out Three-Legged	Ex. Cond. Improved Partial Cloverleaf Right-In/Right-Out Three-Legged	Ex. Cond. Improved Partial Cloverleaf Right-In/Right-Out Three-Legged	Ex. Cond. Improved Right-In/Right-Out Three-Legged	Ex. Cond. Improved Three-Legged
WIS 30 INTERCHANGE	Ex. Cond. Improved Interchange DDI	Ex. Cond. Improved Interchange DDI	Ex. Cond. Improved Interchange DDI	Ex. Cond. Improved Interchange DDI	**Ex. Cond. Improved Interchange** DDI

Text shown in **bold green** identifies the preferred alternative.

2.7. Phase I High-Level Intersection Concepts

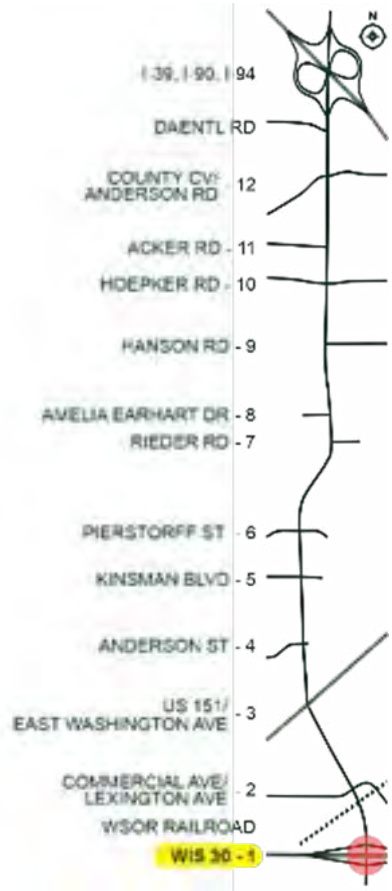
Phase I involved the creation of a range of high-level concepts that could potentially address the study's purpose and need. Preliminary layouts for each concept were developed and an initial evaluation of potential bicycle and pedestrian needs was conducted. An initial review of the concepts was completed to identify issues or concerns that would justify dismissing a concept, including reviewing the feasibility of the concepts based on projected future traffic volumes.

This section includes a list of concepts developed for intersections along the study corridor. If a concept was eliminated during Phase I, a description of that concept is included in Section 2.7. If a concept was advanced to Phase II analysis, a description of the concept is included in Section 2.8. Additional design and traffic analysis was completed during Phase II and this additional design allowed for concept descriptions to be more defined than if they were included in Section 2.7.

2.7.1. WIS 30 Interchange

The existing US 51 and WIS 30 interchange is a standard diamond interchange with separated left-turn ramps and signals at the ramp terminals. The US 51 and WIS 30 interchange facilitates the flow of traffic between the two roadways, providing access to nearby residential areas, commercial businesses and industrial zones. This interchange provides a connection to I-39/90/94 to the east and serves as a critical intersection for regional transportation. US 51 through the interchange includes three travel lanes in each direction with dual left and single right-turn lanes onto WIS 30. Figure 6 shows the location of the WIS 30 interchange within the corridor.

Figure 6: Location of the WIS 30 Interchange within the Corridor



Two concepts were generated at this location:

- Existing Conditions Improved (Signalized Interchange)
- Diverging Diamond Interchange

A detailed description of these concepts can be found in Section 2.8.1 (Phase II Intersection Concepts).

Phase I Analysis Conclusion for WIS 30 Intersection

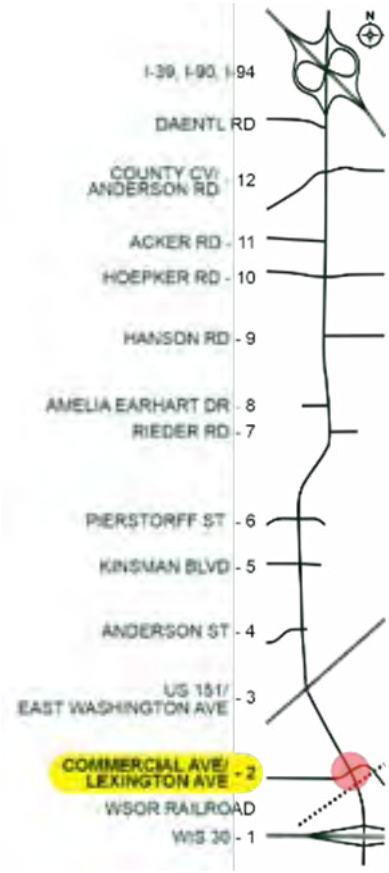
During Phase I both the Existing Condition Improved and DDI concepts were advanced to Phase II for further screening and analysis.

2.7.2. Commercial Avenue/Lexington Avenue Intersection

The existing US 51 and Commercial Avenue/Lexington Avenue intersection is signalized and provides access to neighborhoods and commercial and industrial businesses. US 51 consists of three lanes in each direction as well as designated turn lanes. Eastbound Lexington/Commercial Avenue has a single through lane, designated left turn lane and right turn lane. Westbound Commercial Avenue includes a single through lane, dual left-turn lanes and a right-turn lane. There is an at-grade railroad crossing of the Wisconsin & Southern Railroad (WSOR) located approximately 350 feet to the south of the intersection. The rail crossing is currently protected only by warning lights and does not have gate arms. There are up to four train crossings per week. Bicycle lanes are present on the west leg of the intersection along Lexington Avenue but do not extend through the intersection and there are no pedestrian facilities in this area. Drainage concerns have been noted along Commercial Avenue and Lexington Avenue in the area. Figure 7 shows the location of the Commercial Avenue/Lexington Avenue intersection within the corridor.

The city of Madison is exploring the potential for intercity rail service that would use the WSOR rail line, which may result in more frequent and higher-speed train crossings.

Figure 7: Location of the Commercial Avenue/Lexington Avenue Intersection within the Corridor



Four concepts were developed at this location:

- Existing Conditions Improved (Signalized Intersection) with an at-grade crossing of WSOR railroad
- Partial Cloverleaf Interchange – with a grade-separated WSOR railroad crossing
- Right In/Right Out Intersection – with a grade-separated crossing of WSOR railroad
- Three-Legged Intersection – with a grade-separated crossing of WSOR railroad

A detailed description of these concepts can be found in Section 2.8.2 (Phase II Intersection Concepts).

Phase I Analysis Conclusion for Commercial Avenue/Lexington Avenue

During Phase I all four concepts were advanced to Phase II for further screening and analysis.

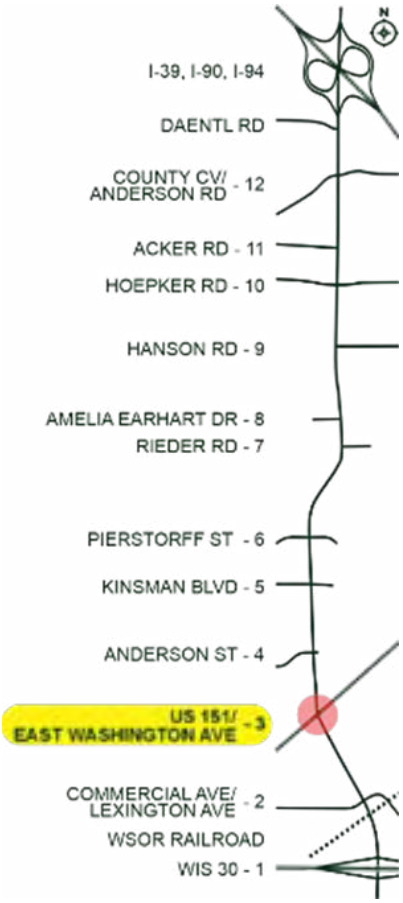
2.7.3. US 151/East Washington Avenue Intersection

The existing US 151 and US 51 intersection is signalized and provides access to nearby neighborhoods and commercial businesses. In the northbound direction, US 51 has three travel lanes south of the intersection and two travel lanes north of the intersection. There is a single left turn lane and dual right turn lanes. In the southbound direction, US 51 has three travel lanes in each direction with dual left turn lanes and a single right turn lane. This intersection has an undesirable intersection angle that creates sightline issues and causes safety concerns. The

pavement is deteriorated and is reaching the end of its design life. Sidewalks are located on both sides of US 51 north of the intersection and on both sides of US 151 east and west of the intersection. Pedestrian crossings are located on north, south and west legs and bicycle lanes are provided for eastbound and westbound movements on US 151.

Due to the complexity of this intersection, multiple concepts were considered to address operational and safety issues. Figure 8 shows the location of the US 151/East Washington Avenue intersection within the corridor.

Figure 8: Location of the US 151/East Washington Avenue Intersection within the Corridor



Fifteen concepts were developed at this location:

- Existing Conditions Improved (Signalized Intersection)
- Quadrant (NE-1) Intersection
- Quadrant (NE-2) Intersection
- Quadrant (NW) Intersection
- Quadrant (SE-1) Intersection
- Quadrant (SE-2) Intersection
- Quadrant (SW) Intersection
- Displaced Left Intersection

- Jughandle Intersection
- Tight Diamond Interchange
- Diverging Diamond Interchange
- Roundabout Intersection with US 151 Over US 51
- Single Point Urban Interchange
- Grade Separated Roundabout Intersection
- Grade Separated Squareabout Intersection

A detailed description of these concepts can be found in Section 2.8.3 (Phase II Intersection Concepts).

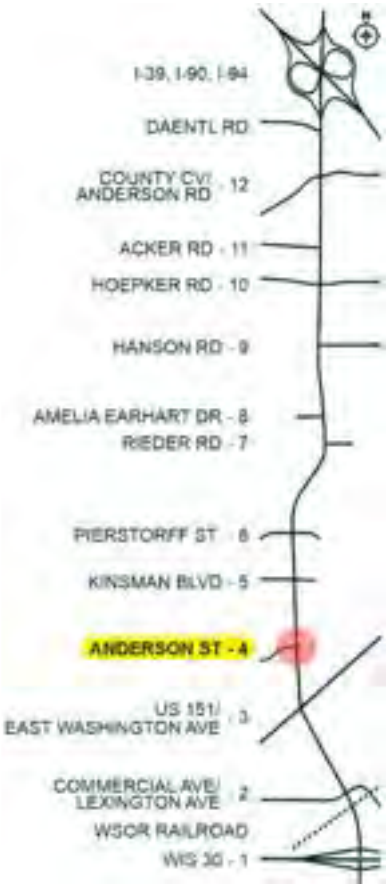
Phase I Analysis Conclusion for US 151 Intersection

All 15 concepts were advanced to Phase II for further screening and analysis.

2.7.4. Anderson Street Intersection

The US 51 and Anderson Street intersection is signalized and provides access to nearby neighborhoods, commercial businesses and Madison College. US 51 through this intersection is a four-lane roadway with right- and left turn lanes. Anderson Street intersects with US 51 on the west side of the intersection and North Stoughton Service Road intersects on the east side. Anderson Street has two travel lanes westbound and a one lane eastbound at the intersection with left and right turn lanes. The North Stoughton Service Road has one lane in each direction with a shared through left lane and a right turn lane at the intersection. There are existing pedestrian crossings at all four legs of the intersection. There are pedestrian accommodations on both sides of Anderson Street and the North Stoughton Service Road, including a shared-use path along the south of and on both sides of the roadway. These connect to existing sidewalks on US 51 to the south. Figure 9 shows the location of the Anderson Street intersection within the corridor.

Figure 9: Location of the Anderson Street Intersection within the Corridor



Two concepts were developed at this location:

- Existing Conditions Improved (Signalized Intersection)
- Roundabout Intersection

The Roundabout Intersection Concept was dismissed during Phase I. This concept would reconstruct the US 51 and Anderson Street intersection to a two-lane roundabout. The concept would not allow for coordinated traffic control at the intersection, which is important due to the high traffic volumes and proximity of the US 151 intersection to the south. There is also a high volume of bicycle and pedestrian traffic at the Anderson Street intersection and the roundabout concept would not include controlled crossings for bicyclists and pedestrians. In addition, Madison Metro Transit plans to operate the East-West bus rapid transit route through the Anderson Street Intersection. This route includes signal priority for busses. Signal priority is not possible with a roundabout. A detailed description of the Existing Conditions improved concept can be found in Section 2.8.4 (Phase II Intersection Concepts).

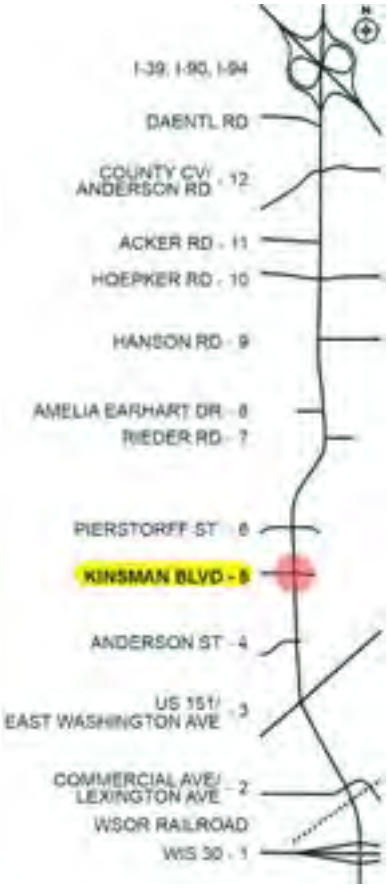
Phase I Analysis Conclusion for Anderson Street

The Phase I analysis concluded the Existing Conditions Improved concept would be advanced to Phase II for further screening and analysis.

2.7.5. Kinsman Boulevard Intersection

The intersection of Kinsman Boulevard and US 51 is currently a signalized intersection. US 51 has two travel lanes in each direction with single lane left- and right turn lanes. Kinsman Boulevard has two travel lanes in each direction with dedicated turn lanes for traffic travelling to US 51. Sidewalks are present on the south side of Kinsman Boulevard east of US 51 and on both sides west of US 51. Pedestrian crossings are located on the west and south legs of the intersection and bicycle lanes are provided for eastbound and westbound movements. See Figure 10 for the location of the Kinsman Boulevard on intersection within the corridor.

Figure 10: Location of the Kinsman Boulevard Intersection within the Corridor



Two concepts were developed at this location:

- Existing Conditions Improved (Signalized Intersection)
- Roundabout Intersection

A detailed description of these concepts can be found in Section 2.8.5 (Phase II Intersection Concepts).

Phase I Analysis Conclusion for Kinsman Boulevard

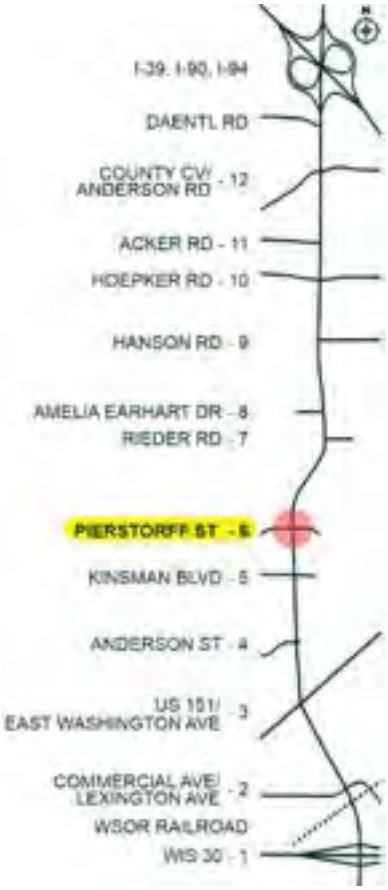
The Phase I analysis concluded that both concepts would be advanced to Phase II for further screening and analysis.

2.7.6. Pierstorff Street Intersection

The intersection of Pierstorff Street and US 51 is divided and unsignalized (stop controlled) with right-in/right-out only access onto US 51 for eastbound and westbound traffic. US 51 has two travel lanes in each direction and allows for right turn only movements onto Pierstorff Street. There are two small median openings for non-motorized US 51 crossings. However, there are no additional bicycle or pedestrian facilities at this intersection or along Pierstorff Street.

Leo Circle is a stop-controlled local road located less than 150 feet east of the US 51 and the Pierstorff Street intersection. Leo Circle is a local roadway that provides access to Pierstorff Street for three properties that would otherwise be landlocked. Figure 11 shows the location of the Pierstorff Street intersection within the corridor.

Figure 11: Location of the Pierstorff Street Intersection within the Corridor



One concept was evaluated at this location since there are no existing or anticipated future safety or operational issues with the existing configuration.

- Existing Conditions Improved (Right In/Right Out Intersection)

A detailed description of this concept can be found in Section 2.8.6 (Phase II Intersection Concepts).

Phase I Analysis Conclusion for Pierstorff Street

The Phase I analysis concluded that the Existing Conditions Improved (Right In/Right Out) concept would be advanced to Phase II for further screening and analysis.

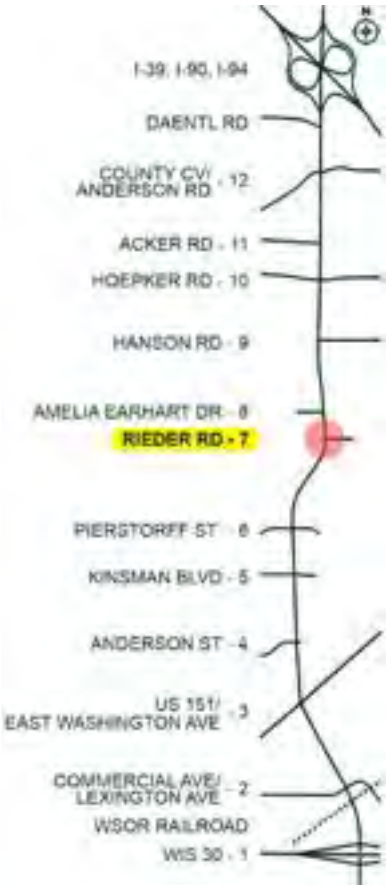
2.7.7. Rieder Road Intersection

The intersection of Rieder Road and US 51 is currently a stop-controlled intersection that provides access to nearby neighborhoods. US 51 includes two travel lanes in each direction. Rieder Road intersects US 51 on the east side only and includes one travel lane in each direction. There is a dedicated and separated right turn lane for northbound access to Rieder Road. Access to Rieder Road from southbound US 51 has a dedicated left turn lane. There is no access from Rieder Road to southbound US 51. In the existing condition, vehicles on Rieder Road access southbound US 51 by turning right onto northbound US 51 and making a U-Turn at the Amelia Earhart Drive intersection. There are no existing bicycle or pedestrian facilities at this intersection.

There are no existing or anticipated future safety or operational issues with this configuration.

The Rieder Road intersection is located just north of an existing RPZ for the DCRA. Figure 12 shows the location of the Rieder Road intersection within the corridor.

Figure 12: Location of the Rieder Road Intersection within the Corridor



Two concepts were developed at this location:

- Existing Conditions Improved (Side Road Stop Intersection with Restricted Left Turn from Side Road)
- Existing Conditions Improved with Restricted Crossing U-Turn (RCUT)

A detailed description of these concepts can be found in Section 2.8.7 (Phase II Intersection Concepts).

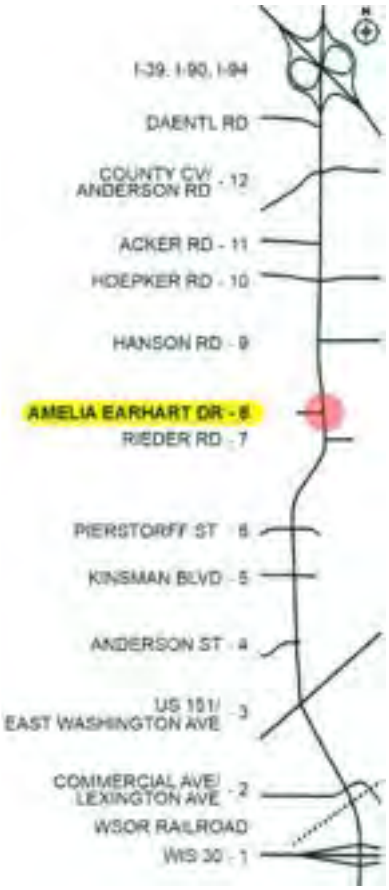
Phase I Analysis Conclusion for Rieder Road

The Phase I analysis concluded that both concepts would advance to the Phase II for further screening and analysis.

2.7.8. Amelia Earhart Drive Intersection

Amelia Earhart Drive intersects US 51 on the west side of the roadway and provides access to commercial and airport properties. US 51 has two travel lanes in each direction with left and right turn lanes. Amelia Earhart Drive has one lane in each direction. Amelia Earhart Drive is used for U-Turn movements by vehicles turning northbound onto US 51 from Rieder Road. There are no existing bicycle or pedestrian facilities in this area. Figure 13 shows the location of the Amelia Earhart Drive intersection within the corridor.

Figure 13: Location of the Amelia Earhart Drive Intersection within the Corridor



One concept was developed at this location since there are no existing or anticipated future safety or operational issues with the existing configuration.

- Existing Conditions Improved

A detailed description of his concept can be found in Section 2.8 (Phase II Intersection Concepts).

Phase I Analysis Conclusion for Amelia Earhart Drive

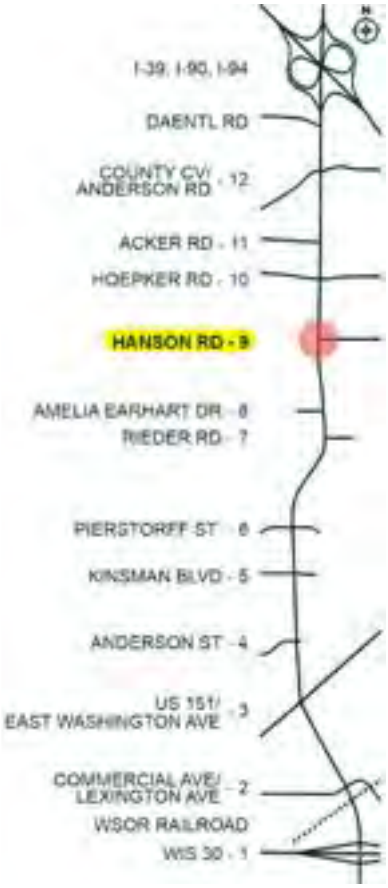
The Phase I analysis concluded that the Existing Conditions Improved concept would be advanced to Phase II for further screening and analysis.

2.7.9. Hanson Road Intersection

Hanson Road intersects US 51 on the east side of the roadway and provides access to commercial and industrial businesses and medical facilities. US 51 has two travel lanes in each direction and Hanson Road has one travel lane in each direction. The intersection of Hanson Road and US 51 is currently an unsignalized intersection that provides full access to US 51. Vehicles traveling westbound on Hanson Road must turn right at a stop sign for northbound US 51 or must cross the divided highway for southbound US 51. There are no existing bicycle or

pedestrian facilities at this intersection. The Hanson Road intersection is within an existing RPZ for the DCRA. Figure 14 shows the location of the Hanson Road intersection within the corridor.

Figure 14: Location of the Hanson Road Intersection within the Corridor



Six concepts were developed at this location:

- Existing Conditions Improved (Side Road Stop Intersection)
- Signalized Intersection
- Roundabout Intersection
- Full Access Intersection
- Right In/Right Out Intersection
- Southbound US 51 Left-Turn Restricted Intersection

The Existing Conditions Improved (Side Road Stop Intersection) concept was dismissed during Phase I. This concept would reconstruct the intersection to improve the roadway, while maintaining the existing configuration at the intersection. This concept was dismissed after an initial traffic review identified operational concerns.

The Signalized Intersection was dismissed during Phase I. This concept would reconstruct the Hanson Road intersection and install traffic signals to improve the westbound left turn operations onto US 51. An initial traffic review was completed, which indicated WisDOT criteria for installation of a traffic signal in this location would not be met. In addition, this concept would require signals/lighting within the RPZ and impact property owned by DCRA.

A detailed description of the remaining concepts can be found in Section 2.8.9 (Phase II Intersection Concepts).

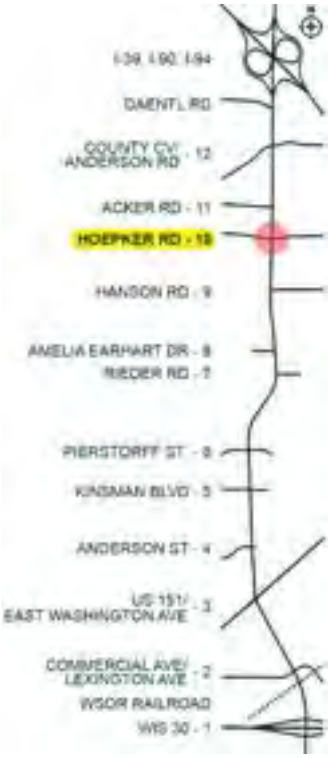
Phase I Analysis Conclusion for Hanson Road

The Existing Conditions Improved and Signalized Intersection concepts were dismissed during Phase I. The Roundabout Intersection, Full Access Intersection, Right In/Right Out Intersection and Southbound US 51 Left Turn Restricted Intersection were advanced to the Phase II analysis.

2.7.10. Hoepker Road Intersection

The intersection of US 51 and Hoepker Road is currently a signalized intersection that provides access to commercial and industrial businesses. US 51 has two lanes in each direction with left- and right turn lanes onto Hoepker Road. Hoepker Road has one travel lane in each direction with separated left- and right turn lanes onto US 51. There are no existing bicycle or pedestrian facilities at this intersection. Figure 15 shows the location of the Hoepker Road intersection within the corridor.

Figure 15: Location of the Hoepker Road Intersection within the Corridor



Three concepts were developed at this location:

- Existing Conditions Improved (Signalized Intersection)
- Roundabout Intersection
- Diamond Interchange

The Diamond Interchange Concept was dismissed during Phase I. This concept would construct a standard diamond interchange with Hoepker Road reconstructed to cross over US 51. US 51 traffic would travel free-flow under the new Hoepker Road bridge. Either roundabouts or signalized intersections at the ramp terminals would

provide access to Hoepker Road. Traffic volumes did not require an interchange and the impacts and costs of the concept would be substantially higher than the other concepts.

A detailed description of the Existing Conditions Improved and Roundabout concepts can be found in Section 2.8.10 (Phase II Intersection Concepts).

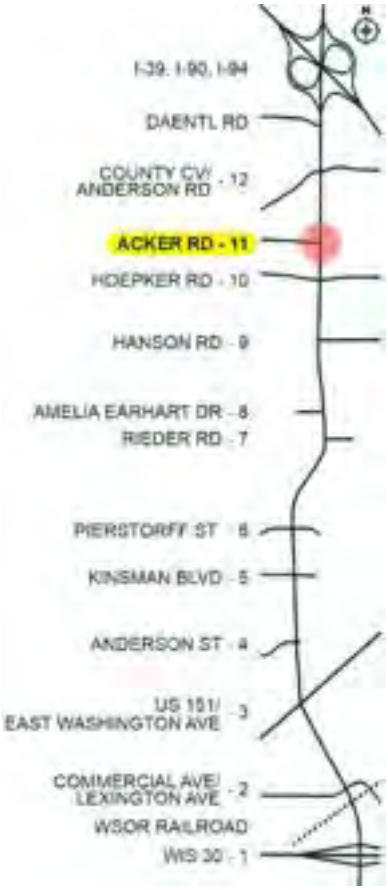
Phase I Analysis Conclusion for Hoepker Road

The Phase I analysis carried forward the Existing Condition Improved and the Roundabout concepts to the Phase II analysis for Hoepker Road. The Diamond Interchange concept was eliminated because traffic demand did not require an interchange and the impacts would be greater than the other concepts under consideration.

2.7.11. Acker Road Intersection

Acker Road intersects US 51 from the west side of the roadway only and provides access to commercial businesses. US 51 has two travel lanes in each direction with left- and right turn lanes onto Acker Road. Acker Road has one travel lane in each direction. The intersection of Acker Road and US 51 is currently an unsignalized and full access intersection. There are no existing bicycle or pedestrian facilities. Figure 16 shows the location of the Acker Road intersection within the corridor.

Figure 16: Location of the Acker Road Intersection within the Corridor



Four concepts were developed for this location:

- Existing Conditions Improved (Side Road Stop Intersection)
- Right In/Right Out Intersection
- Restricted Left-Turn from Side Road Intersection
- Remove Access

The Existing Conditions Improved concept would maintain full access at Acker Road, while the other 3 concepts would restrict access in some form. The restricted access concepts (Right In/Right Out, Restricted Left Turn from Side Road and Remove Access) were dismissed during Phase I. The Right In/Right Out concept would close the median to make Acker Road a right in/right out intersection. The Restricted Left Turn from Side Road concept would restrict left turn access from US 51 northbound to Acker Road and the Remove Access concept would construct a cul-de-sac on Acker Road to restrict all access to US 51. While each of these concepts would improve safety by reducing conflict points there is no existing safety issue at the intersection and the reduced access may negatively impact businesses on Acker Road.

A detailed description of the Existing Conditions Improved concept can be found in Section 2.8.11 (Phase II Intersection Concepts).

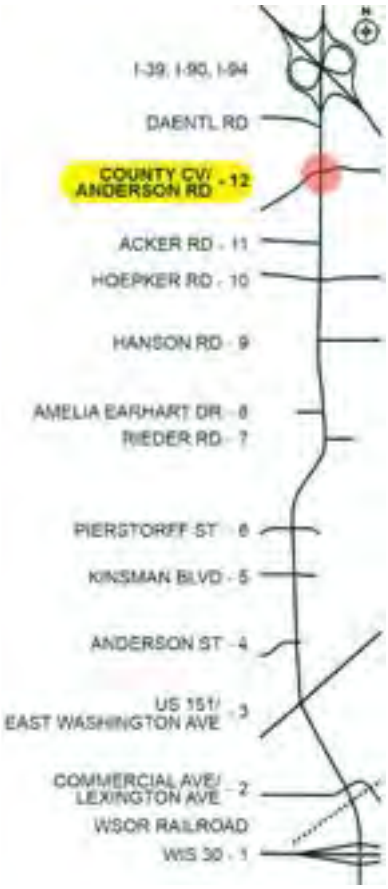
Phase I Analysis Conclusion for Acker Road

The Phase I analysis concluded that the Existing Conditions Improved concept would be advanced to Phase II for further screening and analysis.

2.7.12. County CV/Anderson Road Intersection

The intersection of County CV/Anderson Road and US 51 is currently a signalized intersection. US 51 has two travel lanes in each direction with separated turn lanes onto County CV and Anderson Road. An auxiliary lane extends southbound from I-39/90/94 to County CV. The west leg of the intersection is County CV, a minor arterial roadway and the east leg of the intersection is Anderson Road. County CV intersects US 51 with one travel lane in each direction and separated dual left and single right turn lanes. Anderson Road intersects US 51 with one travel lane in each direction and separated northbound and southbound turn lanes. There is a deficient vertical grade on US 51 that affects sight distance at the intersection. There are no existing bicycle or pedestrian facilities. Figure 17 shows the location of the County CV/Anderson Road within the corridor. The intersection abuts the study limits of the I-39/90/94 Corridor Study.

Figure 17: Location of the County CV/Anderson Road Intersection within the Corridor



Two concepts were developed at this location:

- Existing Conditions Improved (Signalized Intersection)
- Roundabout Intersection

The Roundabout Intersection concept was dismissed during Phase I. This concept would reconstruct the US 51 and County CV/Anderson Road intersection to a two-lane roundabout. An initial traffic review indicated operational concerns with this concept.

A detailed description of the Existing Conditions Improved concept can be found in Section 2.8.12 (Phase II Intersection Concepts).

Phase I Analysis Conclusion for County CV/Anderson Road

The Phase I analysis concluded that the Existing Conditions Improved concept would be advanced to Phase II for further screening and analysis.

2.8. Phase II Refined Intersection Concepts

During Phase II, additional development and analysis was completed on the remaining concepts. The intersection layouts were refined, potential bicycle and pedestrian accommodations were further developed and potential access changes were investigated. Initial traffic models for the concepts were developed to identify potential operational concerns and or areas where additional travel or turn lanes would be needed.

These refined concepts were presented at the second round of committee meetings and meetings with the city of Madison. Feedback from these meetings helped to narrow down the intersection concepts that would advance to Phase III.

2.8.1. WIS 30 Interchange

The Existing Conditions Improved (Signalized Diamond Interchange) concept and the Diverging Diamond Interchange concept were carried forward to the Phase II analysis for the WIS 30 interchange.

Existing Conditions Improved (Signalized Diamond Interchange)

This concept would reconstruct the US 51 and WIS 30 interchange maintaining a similar configuration to the existing condition. The ramp intersections would remain signalized but would be expanded as needed to address traffic safety and operational concerns. Improvements would include enhancing the ramp terminal intersections by adding and extending turn lanes on both the eastbound and westbound off-ramps, signalizing the free-flow right turn from the eastbound WIS 30 off ramp to southbound US 51, adding an auxiliary lane in the northbound direction between WIS 30 and Commercial Avenue and optimizing signal timings.

Signal timing optimization synchronizes groups of traffic signals so that vehicles on a primary route can travel through multiple traffic signals without stopping. It can also reduce vehicle wait times at individual intersections by adjusting the length of green lights to match demand. Signal timings would be optimized to improve the coordination between the interchange and surrounding roadways to improve traffic movements and minimize delays.

A detailed exhibit of this concept can be found in Attachment B.

This concept is anticipated to have minor right of way impacts and there is potential for minor wetland impacts.

This concept was advanced to Phase III for further screening and analysis.

Diverging Diamond Interchange

This concept would reconstruct the existing diamond interchange to a diverging diamond interchange (DDI). The DDI is based on a standard diamond interchange with a shift in the roadway traffic between the interchange signals to safely and efficiently to accommodate a high volume of left turn movements. Within the interchange, traffic on the highway briefly drives on the left side of the road to allow left turn movements to occur without crossing oncoming traffic or stopping. Overhead signs, pavement marking and traffic signals would guide drivers through the intersection. The DDI would improve safety by reducing conflict points because left turning traffic would no longer cross opposing lanes of traffic. Pedestrian and bicycle safety would be improved with dedicated paths and signals. An example DDI is included as Figure 18.

Figure 18 Diverging Diamond Interchange

With this concept, WIS 30 would remain elevated above US 51. The interchange traffic signals would be located on US 51. A detailed exhibit of this concept can be found in Attachment B.

This concept is anticipated to have minor right of way impacts and there is potential for minor wetland impacts.

This concept was advanced to Phase III for further screening and analysis.

Phase II Analysis Conclusion for WIS 30

After completing additional analysis and reviewing stakeholder feedback, both the Existing Conditions Improved and DDI concepts were determined to be feasible and advanced to Phase III.

2.8.2. Commercial Avenue/Lexington Avenue Intersection

The Existing Conditions Improved, Partial Cloverleaf, Right In/Right Out and Three-Legged intersection concepts were carried forward to the Phase II analysis for the Commercial Avenue/Lexington Avenue Intersection.

Existing Conditions Improved (Signalized Intersection)

This concept would reconstruct the US 51 and Commercial Avenue/Lexington Avenue intersection, maintaining a similar configuration to the existing condition. The intersection would remain signalized and turn lanes would be added and extended as needed to enhance overall traffic operations. The railroad crossing would remain at-grade, with crossing gates installed to improve safety conditions. The intersection of Commercial Avenue and North Stoughton Service Road would be realigned slightly to the west to meet minimum intersection spacing standards between the frontage road and US 51. The roadway profile on Lexington Avenue and Commercial Avenue would be raised to help mitigate flooding issues on these two roadways. See Attachment B for a detailed exhibit of this concept.

One driveway entrance would need to be closed or relocated in the southwest quadrant of the intersection.

This concept was advanced to Phase III for further screening and analysis.

Partial Cloverleaf Interchange

This concept would construct bridges elevating US 51 over the railroad corridor and Commercial Avenue/Lexington Avenue. Traffic on US 51 would have free-flow movements, meaning they would no longer need to stop at these locations. Interchange ramps would be provided to access Lexington and Commercial Avenues. The roadway profile on Commercial Avenue/Lexington Avenue would be raised to help mitigate flooding issues on those two roadways. See Attachment B for a detailed exhibit.

This concept is anticipated to have larger impacts than the other concepts. It would require several acres of right of way to construct and impact wetlands and Brigham Park. It would impact several commercial business properties and multi-family residential properties, including requiring at least one potential commercial building relocation and several driveway relocations. It would also impact high-voltage electric lines that run parallel to the railroad and cross the US 51 corridor, requiring relocation of those utilities. The partial cloverleaf interchange also creates a short weave maneuver for traffic entering southbound US 51 from Lexington Avenue/Commercial Avenue wanting to go to eastbound WIS 30, which could result in traffic safety and operations concerns.

This concept was advanced to Phase III for further screening and analysis.

Right In/Right Out Intersection

The Right In/Right Out concept would construct bridges to bring US 51 over the existing railroad corridor and a newly constructed roadway that would connect Lexington Avenue and Commercial Avenue. Traffic on US 51 would have free-flow movements. Northbound and southbound US 51 would access Lexington Avenue and Commercial Avenue using newly constructed right-in and right-out intersections located either north or south of the new roadway. Bicycles and pedestrians would be accommodated under US 51 along the newly constructed roadway connecting Lexington Avenue and Commercial Avenue. The roadway profile on Lexington Avenue and Commercial Avenue would be raised to help mitigate flooding issues on these two roadways. See Attachment B for a detailed exhibit.

This concept would require right of way to construct and would impact wetlands. It would also require one commercial driveway relocation and relocation of high-voltage electric lines that run parallel to the railroad corridor.

This concept was advanced to Phase III for further screening and analysis.

Three-Legged Intersection

The Three-Legged Intersection concept would construct bridges to bring US 51 over the existing railroad corridor and a new roadway connecting Commercial Avenue/Lexington Avenue. Commercial Avenue would be extended north to intersect US 51 at a new signalized intersection, with access to and from US 51 provided by this intersection. Bicycles and pedestrians would be accommodated under US 51 along the newly constructed roadway connecting Lexington Avenue and Commercial Avenue. The roadway profile on Lexington Avenue and Commercial Avenue would be raised to help mitigate flooding issues on these two roadways. See Attachment B for a detailed exhibit.

This concept would require right of way to construct and would have larger wetland impacts than other concepts considered in this location. The relocation of one commercial driveway and the relocation of high-voltage electric lines that run parallel to the railroad corridor and cross US 51 right of way would also be required.

This concept was advanced to Phase III for further screening and analysis.

Phase II Analysis Conclusion for Commercial Avenue/Lexington Avenue

After completing additional analysis and reviewing stakeholder feedback, the Existing Conditions Improved, Partial Cloverleaf, Right In/Right Out and Three-Legged intersection concepts were determined feasible and advanced to Phase III.

2.8.3. US 151/East Washington Avenue Intersection

Fifteen concepts were carried forward to the Phase II analysis at US 51 and US 151:

- Existing Conditions Improved (signalized intersection)
- Quadrant (NE-1) Intersection
- Quadrant (NE-2) Intersection
- Quadrant (NW) Intersection
- Quadrant (SE-1) Intersection
- Quadrant (SE-2) Intersection
- Quadrant (SW) Intersection
- Displaced Left Intersection
- Jughandle Intersection
- Tight Diamond Interchange
- Diverging Diamond Interchange
- Roundabout Intersection with US 151 Over US 51
- Single Point Urban Interchange
- Grade Separated Roundabout Intersection
- Grade Separated Squareabout Intersection

Existing Conditions Improved (Signalized Intersection)

This concept would reconstruct the US 51 and US 151 intersection, maintaining a similar configuration to the existing. The intersection would remain signalized and the alignment would be shifted to correct the deficient

intersection angle. Additional mainline travel and turn lanes would be constructed to provide adequate storage and capacity. Signal timings would also be optimized. A detailed exhibit of this concept can be found in Attachment B.

This concept has lower anticipated impacts compared to other concepts, including the number of anticipated relocations. It would also maintain a familiar urban feel that the city of Madison is in favor of. However, there are concerns that crash trends would not be addressed with a similar intersection configuration and that there would be longer crossings for bicycles and pedestrians than exist today due to additional lanes.

This concept was advanced to Phase III for further screening and analysis.

Quadrant Intersections

A quadrant intersection removes the left turns from a four-legged “main” intersection to a new quadrant roadway constructed between two legs of the main intersection. The quadrant roadway would add two three-legged intersections in addition to the main four-legged intersection. Quadrant roadway intersections can improve traffic safety and capacity by reducing conflict points and signal timing phases at the main intersection. The design is intended for intersections where large arterial routes meet in an area of dense development and high pedestrian volume. In addition, it may be possible to develop the inside of the quadrant roadway for commercial or residential purposes.

There is the potential for driver confusion due to the unconventional intersection type and reduced vehicle storage and weaving distances can result from the addition of the new closely spaced quadrant intersections. Figure 19 shows an example quadrant intersection.

Figure 19: Quadrant Intersection

Quadrant (NE-1) Intersection

This concept would construct a quadrant roadway in the northeast quadrant of the existing intersection. The connection to US 51 would be signalized and located approximately midway between US 151 and Anderson Street.

The connection to US 151 would utilize the existing signalized intersection at Mendota Street. A detailed exhibit of this concept can be found in Attachment B.

This concept would result in several access changes, with the most impactful being the required access changes at the existing Ridgeway Avenue access to Mendota Street. This is the only outlet to the residences in that area. In order to maintain access for the Ridgeway neighborhood, a new local road connection from the quadrant roadway to the North Stoughton Service Road and from Ridgway Avenue to Lien Road would be required. This would result in removing the North Stoughton Service Road access to US 51, which would not be compatible with the city of Madison's Bus Rapid Transit (BRT) route. It would also have potential impacts to Reindahl Park. In addition, this concept would also result in several potential residential relocations along Mendota Steet as well as potential commercial business relocations due to the new roadway connections and potential driveway closures.

The Quadrant NE-1 concept was dismissed in Phase II because of the potential property and access impacts, including impacts to Reindahl Park and the city of Madison's planned BRT service.

Quadrant (NE-2) Intersection

This concept would construct a quadrant roadway in the northeast quadrant of the existing intersection. The connection to US 51 would be signalized and be located approximately midway between US 151 and Anderson Street. The connection to US 151 would be signalized and located approximately midway between US 51 and Mendota Street. A detailed exhibit of this concept can be found in Attachment B.

This concept would impact commercial property resulting in access restrictions and some anticipated business relocations. In addition, the new closely spaced quadrant intersections would result in limited vehicle storage and weaving concerns on US 51 and US 151.

The Quadrant (NE-2) concept was dismissed in Phase II because of impacts to commercial properties and the safety and operational concerns due to the closely spaced quadrant intersections.

Quadrant (NW) Intersection

This concept would construct a quadrant roadway in the northwest quadrant of the existing intersection. The connection to US 51 would be signalized and located approximately midway between US 151 and Anderson Street and the connection to US 151 would be signalized and utilize the existing intersection at Schmedeman Avenue. The Rowland Avenue access to US 151 would be closed because it is located within the quadrant roadway. In addition, the Ridgeway Avenue access to Schmedeman Avenue would be removed and two new intersections along the quadrant roadway would be needed, one at Rowland Avenue and one to connect to Graceland Avenue. A detailed exhibit of this concept can be found in Attachment B.

This concept would impact residential properties in the Hawthorne Truax neighborhood, an environmental justice community, which would result in several potential relocations. The new roadway and resulting access changes would disrupt the layout and the flow of the neighborhood.

The Quadrant (NW) concept was dismissed due to the impacts to the Hawthorne Truax neighborhood. In addition, the city of Madison did not support this concept.

Quadrant (SE-1) Intersection

This concept would construct a quadrant roadway in the southeast quadrant of the existing intersection. The connection to US 51 would be signalized and located approximately 600 feet south of US 151. The connection to US 151 would be signalized and located approximately midway between US 51 and Mendota Street. One new intersection along the quadrant roadway would be needed at MacArthur Road, which would have access removed from US 151. A detailed exhibit of this concept can be found in Attachment B.

This concept would impact residences and businesses in the Mayfair neighborhood that would require several potential relocations. The new roadway and resulting access changes would also disrupt the layout and the flow of

the neighborhood. In addition, traffic analysis indicated the southeast quadrant was the least favorable location for a quadrant roadway.

The Quadrant (SE-1) concept was dismissed during Phase II due to impacts to the Mayfair neighborhood.

Quadrant (SE-2) Intersection

This concept would construct a quadrant roadway in the southeast quadrant of the existing intersection. The connection to US 51 would be signalized and located approximately 600 feet south of US 151. The connection to US 151 would utilize the existing signalized intersection at Mendota Street. Two additional intersections along the quadrant roadway would be needed, one at MacArthur Road and one at Mendota Street. The MacArthur Road access to US 151 would be closed because it is located within the quadrant roadway. A detailed exhibit of this concept can be found in Attachment B.

Similar to the Quadrant (SE-1) concept, this concept impacts residences and businesses in the Mayfair neighborhood that would require several potential relocations and the new roadway and resulting access changes would disrupt the layout and the flow of the neighborhood. Due to the extension of the quadrant roadway to Mendota Street, these impacts would be larger than the Quadrant (SE-1) concept. In addition, Quadrant (SE-2) concept would increase traffic at the existing US 151 and Mendota Street intersection, causing potential operational concerns.

The Quadrant (SE-2) concept was eliminated during Phase II due to impacts to the Mayfair neighborhood and operational concerns at Mendota Street.

Quadrant (SW) Intersection

This concept would construct a quadrant roadway in the southwest quadrant of the existing intersection. The connection to US 51 would be signalized and located approximately 600 feet south of US 151. The connection to US 151 would be signalized and would be located across from Schmedeman Avenue. The North Stoughton Service Road access to US 151 would be removed because it falls within the quadrant roadway. A detailed exhibit of this concept can be found in Attachment B.

This concept would include impacts to access points and commercial businesses along US 151 that would result in several potential relocations, however this quadrant concept received the most stakeholder support while having the fewest anticipated impacts to adjacent properties.

This concept was advanced to Phase III for further screening and analysis.

Displaced Left Intersection

A displaced left turn intersection removes left turns from the main intersection by shifting traffic to a newly constructed secondary signalized intersection located upstream of the main intersection. Left turning vehicles would first cross to the opposite side of the roadway at the secondary signalized intersection and then proceed to the main signal via a new roadway connection that is separated from but parallel to the mainline. At the main signal, vehicles complete the left turn at the same time as through traffic because they are no longer in conflict with one another. Displaced left turn intersections can improve traffic safety and operations by reducing the number of conflict points and signal phases at the main intersection. Figure 20 shows and example of a Displaced Left intersection.

Figure 20: Displaced Left Intersection

This concept would construct displaced left turn lanes on US 151 for traffic wanting to make left turns onto US 51. MacArthur Road, Rowland Avenue and North Stoughton Service Road access to US 151 would be removed due to the larger footprint of the intersection. A detailed exhibit of this concept can be found in Attachment B.

This concept would result in impacts to access points and commercial businesses along US 151 that would result in several anticipated relocations. There are also traffic safety and operations concerns due reduced vehicle storage and weaving distances resulting from the addition of the new signalized intersections on US 151. Crossing the intersection could also be more challenging for bicycle and pedestrians due longer crossing lengths on US 151 and the likelihood for speeds to increase due to the long sweeping right turn movements from US 51. There is the potential for driver confusion due to the unconventional intersection type.

This concept was dismissed in Phase II due to the large potential impacts to commercial businesses along US 151, traffic safety and operations concerns and more challenging crossings for bicycles and pedestrians.

Jughandle Intersection

A jughandle is a type of intersection that eliminates specific left turns at a main intersection by redirecting vehicles to a new jughandle roadway constructed between two legs of the main intersection. It is similar to a quadrant intersection, but a bridge would allow traffic to flow freely under the main intersection in one direction. Jughandle intersections improve traffic safety and operations at the main intersection by removing left turning vehicles. They also reduce the crossing distances at the main intersection for bicycles and pedestrians. Figure 21 shows an example of a jughandle intersection.

Figure 21: Jughandle Intersection

This concept would construct a jughandle in the southwest quadrant of the existing intersection. The connection to US 51 would be signalized and located approximately 600 feet south of US 151. The connection to US 151 would be signalized and would be located between US 51 and Schmedeman Avenue. The southbound lanes of US 51 would go underneath US 151, which would remove the two busiest left turning movements from the main intersection. The Rowland Avenue access and North Stoughton Service Road access to US 151 would be removed because they are located within the footprint of the jughandle roadway.

A detailed exhibit of this concept can be found in Attachment B.

This concept would include large impacts to commercial businesses and access points that would result in several potential relocations. There is also the potential for driver confusion due to the unconventional intersection type.

This concept was advanced to Phase III for further screening and analysis.

Tight Diamond Interchange

This concept would reconstruct US 51 and US 151 intersection as a tight diamond interchange. US 51 would be lowered to go under US 151 and would be a free-flow movement. US 151 would be slightly raised to accommodate drainage. Access between the two roadways would come from two new signalized ramp intersections located on US 151. Due to the proximity of MacArthur Road, North Stoughton Service Road and Rowland Avenue to the new interchange, access to US 151 for these side roads would be closed. A detailed exhibit of this concept can be found in Attachment B.

This concept would improve safety and operations by separating the US 51 and US 151 through traffic, which would reduce vehicle conflicts and increase capacity. It would also improve bicycle and pedestrian crossings on US 151. However, this concept would require access closures for properties near the interchange due to the difference

in roadway elevation to bring US 51 under US 151, which would result in several potential business relocations. This would also result in a short distance between the Anderson Street and new interchange ramps, which would restrict eastbound US 151 vehicles from turning left at Anderson Street. This is a high-volume movement that allows access to the airport and Madison College from destinations to the east.

Lowering US 51 underneath US 151 would also impact business visibility and have potential underground utility and drainage impacts.

This concept was advanced to Phase III for further screening and analysis.

Diverging Diamond Interchange

The DDI concept is described in the WIS 30 concept summary. With this concept, US 51 would be elevated above US 151, allowing US 51 through movements to be free-flow. The interchange traffic signals would be located on US 151. Due to the proximity of MacArthur Road, North Stoughton Service Road and Rowland Avenue to the new interchange, access to US 151 for these side roads would be restricted or closed. A detailed exhibit of this concept can be found in Attachment B.

The DDI would improve safety and operations by separating the US 51 and US 151 through traffic and by allowing free-flow left turns onto US 51.

However, this concept would require access closures for properties near the interchange due to the difference in roadway elevation to bring US 51 over US 151, which would result in several potential business relocations. This would also result in a short distance between the Anderson Street and new interchange ramps, which would restrict eastbound US 151 vehicles from turning left at Anderson Street. This is a high-volume movement that allows access to the airport and Madison College from destinations to the east. In addition, bicycle and pedestrian crossings can be more challenging than some other interchange concepts due to uncontrolled crossings.

The concept was dismissed in Phase II due to large impacts to commercial businesses, access restrictions and the more challenging crossings for bicycles and pedestrians. In addition, the concept is less familiar to drivers, which could create some driver confusion. Finally, stakeholders, including the city of Madison, were not supportive of this concept.

Roundabout Intersection with US 151 Over US 51

This concept would construct a roundabout intersection with US 151 over US 51. Through traffic on US 151 would travel over US 51 on a bridge as a free-flow movement and US 51 mainline and turning traffic would utilize a two-lane roundabout beneath the bridge. A detailed exhibit of this concept can be found in Attachment B.

This concept would reduce access restrictions along US 51 compared to other grade-separated concepts. It also maximizes the weaving distance for the section of US 51 from US 151 to Anderson Street.

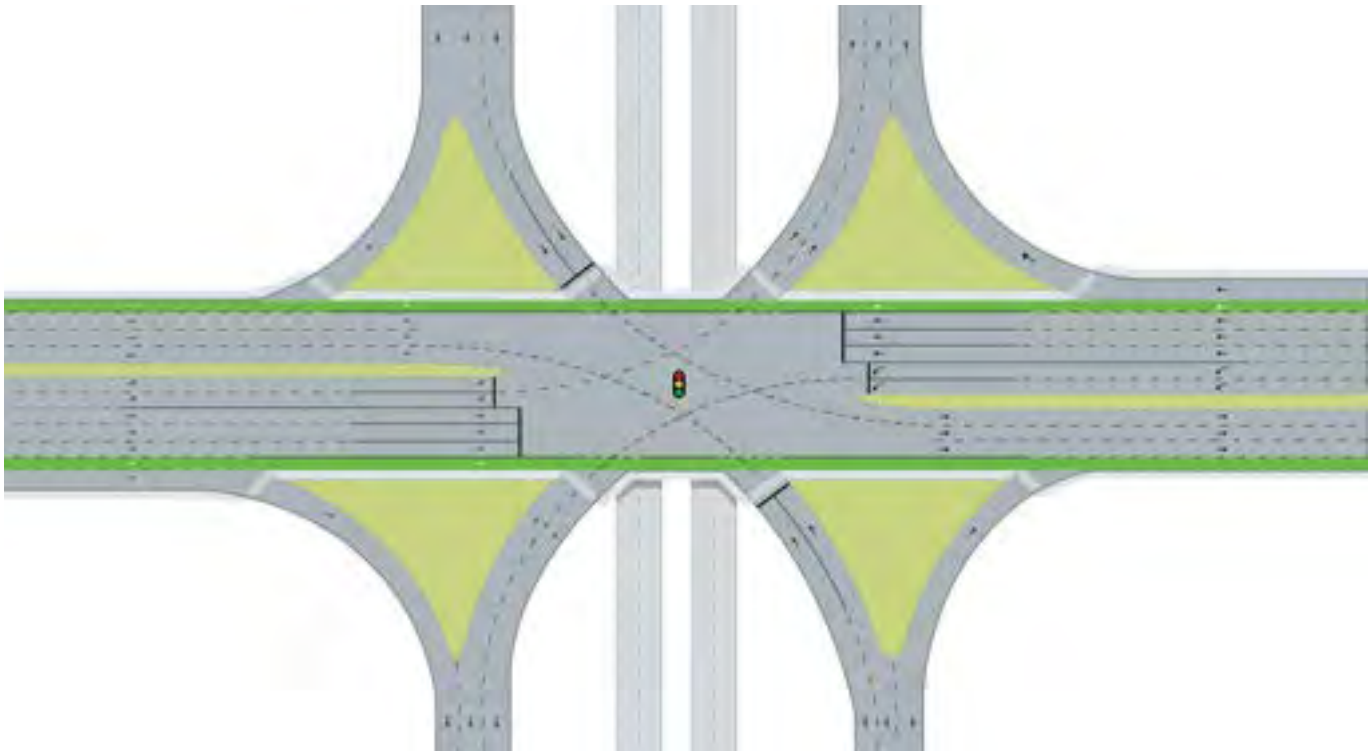
However, there is the potential for traffic back-ups along US 51 at the approaches to the roundabout and there would be weaving concerns along US 151 between US 51 and Mendota Street. In addition, potential impacts to commercial business and access points along US 151 could result in several potential relocations. Bicycle and pedestrian movements would also occur at the uncontrolled crossings of the roundabout.

This concept was advanced to Phase III for further screening and analysis.

Single Point Urban Interchange

A single point urban interchange (SPUI) is similar to a diamond interchange but allows opposing left turns to proceed simultaneously by combining the two ramp intersections of a diamond interchange into one single intersection. This provides increased traffic capacity compared to a diamond interchange. Figure 22 below shows an example of a SPUI.

Figure 22 Single Point Urban Interchange (SPUI)



This concept would construct a SPUI at the US 51 and US 151 intersection. US 51 would be raised to go over US 151 and would be a free-flow movement. US 151 would be raised slightly to accommodate drainage. Access between the two roadways would come from a new signalized intersection located on US 151. Due to the proximity of MacArthur Road, North Stoughton Service Road and Rowland Avenue to the new interchange, access to US 151 for these side roads would be closed. A detailed exhibit of this concept can be found in Attachment B.

This concept would improve safety and operations by separating the US 51 and US 151 through traffic, which would reduce vehicle conflicts and increase capacity. However, this concept would require access closures for properties near the interchange due to the difference in roadway elevation to raise US 51 over US 151, which would result in several potential business relocations. This would also result in a short distance between the Anderson Street and new interchange ramps, which would restrict eastbound US 151 vehicles from turning left at Anderson Street. This is a high-volume movement that allows access to the airport and Madison College from destinations to the east.

This concept was advanced to Phase III for further screening and analysis.

Grade Separated Roundabout Intersection

The grade-separated roundabout concept consists of an intersection where the turning movements go through a two-lane roundabout that would be elevated above the US 51 and US 151 through movements. The through movements would be controlled by a two-phase signalized intersection. Traffic safety and operations would be improved by separating the through and turning movements. A detailed exhibit showing this concept can be found in Attachment B.

This concept would include impacts to commercial businesses and access points along US 51 and US 151 due to the elevation difference between the roundabout and the US 51 and US 151 mainline. This would result in several potential business relocations. Lowering US 51 and US 151 would also impact business visibility and have higher potential underground utility and drainage impacts than other concepts.

In addition, there is the potential traffic back-ups along US 51 and US 151 at the approaches to the roundabout as well as weaving concerns along US 51 and US 151 that could restrict access for some movements to Mendota Street, Anderson Street and Schmedeman Avenue.

This concept was advanced to Phase III for further screening and analysis.

Grade Separated Squareabout Intersection

The grade-separated squareabout concept is a hybrid between a roundabout and a signalized intersection. The concept includes an intersection where all turning movements go through a squareabout that would be elevated above the US 51 and US 151 through movements. The through movements would be controlled by a two-phase signalized intersection. Traffic safety and operations are improved by separating the through and turning movements at the intersection.

This concept would include large impacts to commercial businesses and access points along US 51 and US 151 due to the elevation difference between the squareabout and the US 51 and US 151 mainline. This could result in several potential business relocations. Lowering US 51 and US 151 would also impact business visibility and have higher potential underground utility and drainage impacts than other concepts.

In addition, there is the potential traffic back-ups along US 51 and US 151 at the approaches to the squareabout and weaving concerns along US 51 and US 151 that could restrict access for some movements to Mendota Street, Anderson Street and Schmedeman Avenue.

This concept was advanced to Phase III for further screening and analysis.

Phase II Analysis Conclusion for US 151

After completing additional analysis and reviewing stakeholder feedback, the following eight concepts were determined feasible and advanced to Phase III:

- Existing Conditions Improved (signalized intersection)
- Quadrant (SW) Intersection
- Jughandle Intersection
- Tight Diamond Interchange
- Roundabout Intersection with US 151 Over US 51
- Single Point Urban Interchange
- Grade Separated Roundabout Intersection
- Grade Separated Squareabout Intersection

2.8.4. Anderson Street Intersection

The Existing Conditions Improved (Signalized Intersection) was advanced to Phase II analysis.

Existing Conditions Improved (Signalized Intersection)

This concept would reconstruct the intersection, maintaining a similar configuration to the existing condition. The intersection would remain signalized, turn lanes would be extended to provide additional storage and signal timings would be optimized. A detailed exhibit of this concept can be found in Attachment B.

There are no access or environmental impacts associated with this concept as the proposed improvement would occur within the existing right of way. This concept would also allow for signal coordination between the Anderson Street intersection and the US 151 intersection to the south.

Phase II Analysis Conclusion for Anderson Street

The Existing Conditions Improved concept was the only concept advance to Phase II at Anderson Street. After completing additional analysis and reviewing stakeholder feedback, this concept was determined feasible and moved forward.

There were no issues or concerns identified during the additional development, analysis and outreach conducted in subsequent Phases and as a result, the Existing Conditions Improved concept advanced through to Phase V and was identified as the preferred alternative.

2.8.5. Kinsman Boulevard Intersection

The Existing Conditions Improved concept and the Roundabout concept were advanced to the Phase II analysis at Kinsman Boulevard.

Existing Conditions Improved (Signalized Intersection)

This concept would reconstruct the intersection, maintaining a similar configuration to the existing condition. The intersection would remain signalized, turn lanes would be extended to provide additional storage and signal timings would be optimized. Additional improvements include providing offset left turn lanes to improve visibility for left turning vehicles. A detailed exhibit of this concept can be found in Attachment B.

This concept is anticipated to require minor right of way to construct.

After completing additional analysis and reviewing stakeholder feedback, this concept was determined to be feasible and advanced to Phase III.

Roundabout Intersection

The intersection of US 51 and Kinsman Boulevard would be reconstructed as a multi-lane roundabout. It would include two mainline travel lanes in each direction on US 51 and one lane of travel in each direction on Kinsman Boulevard. A shared-use path system with crosswalks would be installed around the roundabout to be used by bicyclists and pedestrians. A detailed exhibit of this concept can be found in Attachment B

This concept is anticipated to require minor right of way to construct.

After completing additional analysis and reviewing stakeholder feedback, this concept was determined to be feasible and advanced to Phase III.

Phase II Analysis Conclusion for Kinsman Boulevard

After completing additional analysis and reviewing stakeholder feedback, both the Existing Conditions Improved and Roundabout concepts were determined to be feasible and advanced to Phase III.

2.8.6. Pierstorff Street Intersection

The Existing Conditions Improved (Right In/Right Out Intersection) was advanced to Phase II analysis.

Existing Conditions Improved (Right-in/Right Out Intersection)

This concept would reconstruct Pierstorff Street to a similar configuration as existing condition. Improvements would include extended turn lanes and improved median cut-outs for non-motorized vehicles. A detailed exhibit of this concept can be found in Attachment B.

No impacts are anticipated for this intersection concept.

Phase II Analysis Conclusion for Pierstorff Street

The Existing Conditions Improved concept was the only concept to advance to Phase II at Pierstorff Street. After completing additional analysis and reviewing stakeholder feedback, this concept was determined feasible and moved forward.

There were no issues or concerns identified during the additional development, analysis and outreach conducted in subsequent Phases and as a result, the Existing Conditions Improved concept advanced through to Phase V and was identified as the preferred alternative.

2.8.7. Rieder Road Intersection

The Existing Conditions Improved concept and the Existing Conditions Improved RCUT concept were advanced to the Phase II analysis at Rieder Road.

Existing Conditions Improved

This concept would reconstruct the existing Rieder Road intersection maintaining the existing access and configuration. A detailed exhibit of this concept can be found in Attachment B.

This concept has no anticipated impacts.

After completing additional analysis and reviewing stakeholder feedback, this concept was determined to be feasible and advanced to Phase III.

Existing Conditions Improved with Restricted U-Turn Crossing (RCUT)

This concept would reconstruct the existing Rieder Road intersection, maintaining the existing access and configuration and adding a yield controlled Restricted Crossing U-turn (RCUT) approximately 900 feet to the north of the intersection. The inclusion of an RCUT in this concept would allow US 51 northbound vehicles to make a U-turn to southbound US 51 in advance of the Amelia Earhart Drive intersection (where these U-turns have been observed). The RCUT would reduce US 51 northbound to southbound U-turns at the Amelia Earhart Drive intersection. A detailed exhibit of this concept can be found in Attachment B.

This concept would require minor right of way from DCRA to construct. A potential concern with this concept is the unfamiliarity of drivers with the RCUT configuration.

After completing additional analysis and reviewing stakeholder feedback, this concept was determined to be feasible and advanced to Phase III.

Phase II Analysis Conclusion for Rieder Road

After completing additional analysis and reviewing stakeholder feedback, both the Existing Conditions Improved and Existing Conditions Improved with RCUT concepts were determined to be feasible and advanced to Phase III.

2.8.8. Amelia Earhart Drive Intersection

The Existing Conditions Improved was advanced to Phase II analysis.

Existing Conditions Improved

This concept would reconstruct the US 51 and Amelia Earhart Drive intersection. Existing access at the intersection would be maintained. Additionally, this concept would add a southbound right-turn lane on the north leg of the intersection and extend the length of the left turn lane on the south leg of the intersection. A detailed exhibit of this concept can be found in Attachment B.

No impacts are anticipated for this intersection concept.

Phase II Analysis Conclusion for Amelia Earhart Drive

The Existing Conditions Improved concept was the only concept to advance to Phase II at Amelia Earhart Drive. After completing additional analysis and reviewing stakeholder feedback, this concept was determined feasible and moved forward.

There were no issues or concerns identified during the additional development, analysis and outreach conducted in subsequent Phases and as a result, the Existing Conditions Improved concept advanced through to Phase V and was identified as the preferred alternative.

2.8.9. Hanson Road Intersection

Four concepts were carried forward to the Phase II analysis at Hanson Road:

- Roundabout Intersection
- Full Access Intersection
- Right In/Right Out Intersection
- Southbound US 51 Left-Turn Restricted Intersection

Roundabout Intersection

This intersection concept would reconstruct the Hanson Road intersection to a two-lane roundabout. A detailed exhibit of this concept can be found in Attachment B. This design would reduce conflict points at the intersection while providing full access. However, this concept would slow speeds on US 51, require lighting within an RPZ and impact existing right of way owned by DCRA.

After completing additional analysis and reviewing stakeholder feedback, this concept was determined to be feasible and advanced to Phase III.

Full Access Intersection

This concept would reconstruct Hanson Road in a similar configuration as existing condition. Improvements would include providing median protected acceleration and deceleration lanes and adding turn lanes on northbound US 51 and Hanson Road. A detailed exhibit of this concept can be found in Attachment B.

No access or right of way impacts are anticipated for this intersection concept, however the southbound acceleration lane may impact the size and location of the median opening at the private airport access road located south of the intersection.

After completing additional analysis and reviewing stakeholder feedback, this concept was determined to be feasible and advanced to Phase III.

Right In/Right Out Intersection

This intersection concept would reconstruct the US 51 and Hanson Road intersection and close the median between northbound and southbound US 51. It would remove access to Hanson Road from southbound US 51 and allow right-in/right-out access to Hanson Road from northbound US 51. A right turn lane would be constructed for northbound US 51. This concept would reduce conflict points at the intersection. A detailed exhibit of this concept can be found in Attachment B.

No right of way or environmental impacts are anticipated with this concept. By limiting access, traffic on Hanson Road would have to find alternate routes to access southbound US 51.

The Right-in/Right-out concept was dismissed during Phase II because stakeholder feedback strongly supported maintaining the access from Hanson Road to southbound US 51 for existing businesses and the proposed Madison Metro transit storage facility.

Southbound US 51 Left-Turn Restricted Intersection

This intersection concept would reconstruct the US 51 and Hanson Road intersection with the southbound US 51 left turn lane onto Hanson Road removed. Right turn lanes would be added on northbound US 51 and eastbound Hanson Road. This concept improves the acceleration length for left turning traffic from Hanson Road to southbound US 51. A detailed exhibit of this concept can be found in Attachment B.

With this concept, there would be no anticipated right of way or environmental impacts and safety would be improved due to the reduction of conflict points at the intersection. This restricted access results in longer travel times for vehicles to access Hanson Road from southbound US 51.

After completing additional analysis and reviewing stakeholder feedback, this concept was determined to be feasible and advanced to Phase III.

Phase II Analysis Conclusion for Hanson Road

After completing additional analysis and reviewing stakeholder feedback, the Roundabout Intersection, Full Access Intersection and Southbound US 51 Left-Turn Restricted Intersection concepts were determined feasible and advanced to Phase III.

2.8.10. Hoepker Road Intersection

The Existing Conditions Improved (Signalized Intersection) concept and the Roundabout Intersection concept were advanced to the Phase II analysis at Hoepker Road.

Existing Conditions Improved (Signalized Intersection)

This concept would reconstruct the intersection, maintaining a similar configuration to the existing condition. The intersection would remain signalized, turn lanes would be added and extended to provide additional storage and signal timings would be optimized. A detailed exhibit of this concept can be found in Attachment B.

This concept is anticipated to require minimal right of way to construct and one business access in the southwest quadrant of the intersection would be removed or restricted.

After completing additional analysis and reviewing stakeholder feedback, this concept was determined to be feasible and advanced to Phase III.

Roundabout Intersection

The intersection of US 51 and Hoepker Road would be reconstructed as a multi-lane roundabout. It would include two mainline travel lanes in each direction on US 51 and Hoepker Road. A shared use path system with crosswalks would be installed around the roundabout to be used by bicyclists and pedestrians. A detailed exhibit of this concept can be found in Attachment B.

No right of way impacts are anticipated and one business access in the southwest quadrant of the intersection would be removed or restricted.

After completing additional analysis and reviewing stakeholder feedback, this concept was determined to be feasible and advanced to Phase III.

Phase II Analysis Conclusion for Hoepker Road

After completing additional analysis and reviewing stakeholder feedback, both the Existing Conditions Improved and Roundabout concepts were determined to be feasible and advanced to Phase III.

2.8.11. Acker Road Intersection

The Existing Conditions Improved (Side Road Stop Intersection) concept was advanced to the Phase II analysis at Acker Road.

Existing Conditions Improved (Side Road Stop Intersection)

This concept would reconstruct the intersection, maintaining a similar configuration to the existing condition. Turn lanes on US 51 would be extended to provide additional storage. A detailed exhibit of this concept can be found in Attachment B.

There would be no right of way, environmental, or access impacts for this concept and no existing or anticipated future safety or operational concerns.

Phase II Analysis Conclusion for Acker Road

The Existing Conditions Improved concept was the only concept to advance to Phase II at Acker Road. After completing additional analysis and reviewing stakeholder feedback, this concept was determined feasible and moved forward.

There were no issues or concerns identified during the additional development, analysis and outreach conducted in subsequent Phases and as a result, the Existing Conditions Improved concept advanced through to Phase V and was identified as the preferred alternative.

2.8.12. County CV/Anderson Road Intersection

The Existing Conditions Improved (Signalized Intersection) concept was advanced to the Phase II analysis at County CV/Anderson Road. Due to the proximity of the intersection to the I-39/90/94 interchange, the study team coordinated with the I-39/90/94 study on alternative development and traffic analysis during Phase II and subsequent phases.

Existing Conditions Improved (Signalized Intersection)

This concept would reconstruct the intersection, maintaining a similar configuration to the existing condition. The intersection would remain signalized, turn lanes would be extended to provide additional storage. Signal timings would be optimized and geometric improvements to the vertical profile of the roadway would be made to improve

visibility. An auxiliary lane would be added to northbound US 51 that would match into the preferred alternative identified for the I-39/90/94 and US 51 interchange in WisDOT's I-39/90/94 Corridor study. A detailed exhibit of this concept can be found in Attachment B.

This concept is anticipated to have no right of way or access impacts. It would allow for signal coordination between the County CV intersection and the Hoepker Road intersection to the south.

Phase II Analysis Conclusion for County CV/Anderson Road

The Existing Conditions Improved concept was the only concept to advance to Phase II at County CV/Anderson Road. After completing additional analysis and reviewing stakeholder feedback, this concept was determined feasible and moved forward.

There were no issues or concerns identified during the additional development, analysis and outreach conducted in subsequent Phases and as a result, the Existing Conditions Improved concept advanced through to Phase V and was identified as the preferred alternative.

2.9. Phase III Alternative Intersection Concepts

In Phase III, the intersection concepts, bicycle and pedestrian accommodations, potential access closures and traffic models were refined. Vertical profiles were also developed in more detail for each concept.

A screening matrix was developed to assist in the evaluation of the concepts at the US 151 and the Commercial Avenue/Lexington Avenue intersections, and WIS 30 interchange. This was done due to the number and complexity of the concepts under consideration at these locations. The matrix evaluated the concepts at a high level based on five main categories:

- Safety – How well the concept would address safety for vehicles, bicycles and pedestrians
- Operations – How well the concept would improve traffic operations
- Engineering – How well the concept addresses infrastructure deficiencies
- Impacts – Impacts that would result from implementation of the concept
- Community & Collaboration – Stakeholder feedback and how well the concept aligns with community plans

The initial screening results were presented at the third round of committee meetings and meetings with the city of Madison. Feedback from these meetings helped to narrow down the intersection concepts that were presented at PIM 2, held in September 2023. In addition, the feedback from these meetings along with the feedback received from PIM 2 helped determine which concepts would be carried forward for more detailed design and analysis in Phase IV.

The Phase II analysis identified a single concept to be carried forward at Anderson Street, Pierstorff Street, Amelia Earhart Drive, Acker Road and County CV. There were no issues or concerns identified during the additional development, analysis and outreach conducted in subsequent Phases. These intersections are not included in the Phase III through Phase IV documentation.

2.9.1. WIS 30 Interchange

Based on the Phase III analysis and the feedback received, it was determined that the Existing Condition Improved and the DDI concepts warranted further analysis and both were moved to Phase IV.

2.9.2. Commercial Avenue/Lexington Avenue Intersection

The Existing Conditions Improved, Partial Cloverleaf, Right In/Right Out and Three-Legged intersection concepts were carried forward to the Phase III analysis for the Commercial Avenue/Lexington Avenue Intersection.

After completing additional analysis and screening, the Partial Cloverleaf concept was dismissed because it provided similar safety and operational benefits as other interchange concepts but had substantially higher impacts. In addition, this concept had a lower ranking in the screening matrix and was less favorable to stakeholders than similar concepts.

Based on the Phase III analysis and the feedback received, it was determined the Existing Conditions Improved, Right In/Right Out and Three-Legged concepts warranted further analysis and were carried forward to Phase IV.

2.9.3. US 151/East Washington Avenue Intersection

Eight concepts were carried forward to the Phase III analysis at US 51 and US 151:

- Existing Conditions Improved (signalized intersection)
- Quadrant (SW) Intersection
- Jughandle Intersection
- Tight Diamond Interchange
- Roundabout Intersection with US 151 Over US 51
- Single Point Urban Interchange
- Grade Separated Roundabout Intersection
- Grade Separated Squareabout Intersection

After completing additional analysis and screening, three concepts were dismissed in Phase III analysis:

- Roundabout Intersection with US 151 Over US 51
- Single Point Urban Interchange
- Grade Separated Roundabout Intersection
- Grade Separated Squareabout Intersection

The Roundabout Intersection with US 151 over US 51 concept was dismissed because of operational and safety concerns related to long queues leading to the roundabout. It would remove access to nearby sideroads and business along US 51 and would have uncontrolled crossings for bicyclist and pedestrians. It also had a lower ranking in the screening matrix and was less favorable to stakeholders.

The Single Point Urban Interchange concept was dismissed because it is a similar concept to the Tight Diamond Interchange, but it would have larger anticipated impacts and was not as accommodating to bicycles and pedestrians. In addition, the city of Madison did not support this alternative.

The Grade Separated Roundabout concept was dismissed because of potential impacts to access, utilities and drainage both along US 51 and US 151. Lowering both US 51 and US 151 would impact access to nearby side roads and commercial businesses, resulting in several potential relocations. There would also be larger utility and drainage impacts than the other concepts. In addition, this concept had a lower ranking in the screening matrix and was less favorable to stakeholders.

The Grade Separated Squareabout concept was eliminated because of potential impacts to access, utilities and drainage both along US 51 and US 151. Lowering both US 51 and US 151 would impact access to nearby side roads and commercial businesses, resulting in several potential relocations. There would also be larger utility and drainage impacts than the other concepts. In addition, this concept had a lower ranking in the screening matrix.

Based on the Phase III analysis and the feedback received, the Existing Conditions Improved, Quadrant (SW) Intersection, Jughandle Intersection and Tight Diamond Interchange concepts were determined to warrant further analysis and were advanced to Phase IV.

2.9.4. Kinsman Boulevard Intersection

Based on the Phase III analysis and the feedback received, it was determined that the Existing Conditions Improved and the Roundabout concepts warranted further analysis and both were advanced to Phase IV.

2.9.5. Rieder Road Intersection

Based on the Phase III analysis and the feedback received, it was determined that the Existing Conditions Improved and the Existing Conditions Improved RCUT concepts warranted further analysis and both were advanced to Phase IV.

2.9.6. Hanson Road Intersection

The Roundabout Intersection, Full Access Intersection and Southbound US 51 Left-Turn Restricted Intersection concepts were carried forward to the Phase III analysis for the Hanson Road intersection.

The Roundabout Intersection concept was eliminated in Phase III based of feedback from DCRA. The airport did not support the concept because it would have right of way impacts to DCRA property and would require lighting within an RPZ.

Based on the Phase III analysis and the feedback received, it was determined that the Full Access Intersection and Southbound US 51 Left-Turn Restricted Intersection concepts warranted further analysis and were advanced to Phase IV.

2.9.7. Hoepker Road Intersection

Based on the Phase III analysis and the feedback received, it was determined that the Existing Conditions Improved and the Roundabout alternatives warranted further analysis and both were advanced to Phase IV.

2.10. Phase IV Detailed and Recommended Intersection Alternatives

Concepts that made it to Phase IV underwent a more detailed level of design and analysis and will be referenced as alternatives for the remainder of this report. The additional design and analysis allowed WisDOT to better compare the remaining alternatives and quantify their impacts. Predictive safety analysis and more detailed traffic modeling was completed, construction costs were estimated, constructability was considered and updated public and stakeholder feedback was considered for all intersections analyzed in Phase IV. In addition, more detailed bicycle and pedestrian accommodations were developed as well as potential new local road connections due to access closures for alternatives at the US 151 intersection.

The screening matrix developed in Phase III for the WIS 30 interchange and the Commercial Avenue/Lexington Avenue and US 151 intersections was further refined by completing additional analysis on safety and traffic operations. Additional public and stakeholder input was also included during Phase IV. The alternatives at each location were evaluated based on the refined screening criteria to determine a ranking within the matrix that was used to help determine a recommended intersection alternative. The alternatives that have more green within each row were ranked higher. The screening matrix is included as Attachment C.

Phase IV also identified a recommended alternative for each intersection. The recommended alternative was the alternative that WisDOT felt best addressed the study purpose and need considering impacts and costs. The recommended alternative and the potential impacts for each intersection were presented for comment and consideration at the fourth round of committee meetings and at PIM 3, which was held in April 2024. The feedback from these meetings helped determine which concepts would be carried forward to Phase V and identified as the preferred alternative.

2.10.1. WIS 30 Interchange

The Existing Conditions Improved and the DDI alternatives were carried forward to the Phase IV analysis for the WIS 30 interchange. After completing additional design, analysis and screening, both alternatives were determined to be feasible and advanced to Phase V.

Notable impacts identified during Phase IV:

Existing Conditions Improved

- 0.5 acres of right of way
- 0.5 acres of wetland

DDI

- 0.2 acres of right of way
- 0.4 acres of wetland

The Existing Conditions Improved was identified as the recommended alternative because it provided similar traffic operations to the DDI but had improved safety for bicycles and pedestrians due to less travel lanes crossed, provided more familiar movements for vehicles, bicycles, and pedestrians and was supported by the city of Madison.

2.10.2. Commercial Avenue/Lexington Avenue Intersection

The Existing Conditions Improved, Right In/Right Out and Three-Legged intersection alternatives were carried forward to the Phase IV analysis for the Commercial Avenue/Lexington Avenue intersection.

The Right In/Right Out alternative was dismissed during Phase IV after additional design identified geometric concerns with matching into existing elevations that would result in larger impacts to adjacent properties than the other alternatives. This alternative was dismissed prior to the development of the more detailed screening matrix at the Commercial Avenue/Lexington Avenue intersection.

Notable impacts identified during Phase IV:

Existing Conditions Improved

- 1.5 acres of right of way
- 0.9 acres of wetland
- 1 potential driveway closure/relocation

3-Legged Intersection

- 4.6 acres of right of way
- 6.3 acres of wetland
- 1 potential driveway closure/relocation
- Requires high-voltage utility relocation due to bridging US 51 over railroad tracks
- Substantially higher cost than Existing Conditions Improved alternative due to bridging US 51 over railroad tracks

The Existing Conditions Improved and Three-Legged alternatives were determined feasible and carried forward to Phase V. The Existing Conditions Improved was identified as the recommended alternative because it provided similar safety and traffic operations to the Three-Legged intersection but had lower impacts and costs.

2.10.3. US 151/East Washington Avenue Intersection

The Existing Conditions Improved, Quadrant (SW), Jughandle and Tight Diamond Interchange alternatives were carried forward to the Phase IV analysis for the US 151 intersection. The Phase IV analysis eliminated the Quadrant (SW) and the Tight Diamond Interchange alternatives.

The Quadrant (SW) alternative was eliminated after additional design and analysis identified potential safety and operations concerns if the area within the quadrant roadway was to re-develop, which was an important factor for city of Madison support for the alternative. In addition, this alternative did not receive support from stakeholders. This alternative was dismissed prior to the development of the more detailed screening matrix at the US 151 intersection.

The Tight Diamond Interchange alternative was eliminated because it would remove access to and require the relocation of several commercial properties, it would impact access to Anderson Street due to the grade separation and short weaving distance and it would remove access to nearby sideroads. In addition, this alternative did not receive support from stakeholders. This alternative was dismissed prior to the development of the more detailed screening matrix at the US 151 intersection.

Notable impacts identified during Phase IV:

Existing Conditions Improved

- 4.0 acres of right of way
- 6 potential relocations (4 commercial business / 2 residential)
- 3 side road closures (MacArthur Road, Rowland Avenue, North Stoughton Service Road)
- Schmedeman Avenue restricted to right in/right out access
- US 51 median north of US 151 would be closed
- 16 potential driveway closures/relocations

Jughandle

- 11 acres of right of way
- 13 potential relocations (11 commercial business/2 residential)
- 3 side road closures (MacArthur Road, Rowland Avenue, North Stoughton Service Road)
- Schmedeman Avenue restricted to right in/right out access
- US 51 median north of US 151 would be closed
- 23 potential driveway closures/relocations
- Large utility/drainage impacts due to lowering southbound US 51 under US 151
- Substantially higher costs than Existing Conditions Improved alternative due to lowering southbound US 51 under US 151

The Existing Conditions Improved and Jughandle alternatives were determined feasible and carried forward to Phase V. The Jughandle was identified as the recommended alternative because it provided better safety and operations at the US 51 and US 151 intersection, provided shorter crossings for bicycles and pedestrians and provided excess intersection capacity for fluctuations in traffic volumes.

2.10.4. Kinsman Boulevard Intersection

The Existing Conditions Improved and Roundabout alternatives were carried forward to the Phase IV analysis for Kinsman Boulevard. After completing additional design and analysis, both alternatives were determined to be feasible and advanced to Phase V.

Notable impacts identified during Phase IV:

Existing Conditions Improved

- 0.1 acres of right of way

Roundabout

- 0.2 acres of right of way

The Existing Conditions Improved was identified as the recommended alternative because it would provide similar traffic operations to the Roundabout but is anticipated to result in lower overall crashes, would provide controlled crossings for bicycles and pedestrians and had more stakeholder support.

2.10.5. Rieder Road Intersection

The Existing Conditions Improved and the Existing Conditions Improved RCUT were carried forward to Phase IV at Rieder Road.

Notable impacts identified during Phase IV:

Existing Conditions Improved

- No anticipated impacts

Existing Conditions Improved RCUT

- 0.2 acres of right of way

Both options were carried forward to Phase V. Since the improvements at the Rieder Road intersection are the same, a recommended alternative was not identified between the two but feedback was solicited on whether to include an RCUT north of the intersection at the April 2024 PIM.

2.10.6. Hanson Road Intersection

The Full Access Intersection and Southbound US 51 Left -Turn Restricted Intersection alternatives were determined feasible and advanced to Phase IV. After completing additional design and receiving additional feedback, the US 51 Left-Turn Restricted Intersection was dismissed from further consideration because the restricted access to Hanson Road was not preferred by stakeholders and DCRA.

Phase IV identified the Full Access Intersection as the only concept to move forward. As a result, this alternative advanced through to Phase V and was identified as the preferred alternative.

There are no anticipated impacts for this alternative.

2.10.7. Hoepker Road Intersection

The Existing Conditions Improved and Roundabout alternatives were carried forward to the Phase IV analysis for Hoepker Road. After completing additional design and analysis, both alternatives were determined to be feasible and advanced to Phase V.

Notable impacts for the remaining alternatives include:

Existing Conditions Improved

- < 0.1 acres of right of way
- 1 potential driveway closure/relocation

Roundabout

- 1 potential driveway closure/relocation

The Existing Conditions Improved was identified as the recommended alternative because it would provide similar traffic operations to the Roundabout but is anticipated to result in lower overall crashes, would provide controlled crossings for bicycles and pedestrians and had more stakeholder support.

2.11. Phase V Intersection Preferred Alternatives

Phase V identified a preferred alternative for all intersections within the corridor by thoroughly evaluating all anticipated impacts and considering feedback from the public and stakeholders throughout the alternative development process. For locations that advanced more than one alternative to Phase V, the feedback received during the outreach associated with PIM 3 was a key factor in the identification of the preferred alternative. WisDOT considers the preferred alternative the alternative that best address the study's purpose and need, considering the potential impacts, costs and feedback received.

Impacts for the preferred alternative were updated based on refinements that occurred as the result of stakeholder feedback received during and after PIM 3. A summary of the impacts of the preferred alternative can be found in the study's EA. Exhibits showing the preferred alternative are included in Attachment D.

2.11.1. WIS 30 Interchange

The Existing Conditions Improved and the DDI alternatives were carried forward to Phase V for the WIS 30 interchange. After reviewing feedback during outreach for PIM 3, the recommended alternative, Existing Conditions Improved, was identified as the preferred alternative.

The Existing Conditions Improved alternative at WIS 30 was modified from what was presented at PIM 3. The detailed traffic analysis was further refined for the preferred alternative, and the analysis determined that the northbound US 51 right turn lane to eastbound WIS 30 would need to be converted from a signalized movement to a free-flow movement in order to meet acceptable traffic operations. Protected bicycle/pedestrian crossings of free flow right turn lanes on the east side of the interchange would be included at this location to enable safe crossings of these free flow movements. Bicycle/Pedestrian actuated signals and flashing beacons are examples of enhanced crossings that could be provided. The specific type of protected crossing would be determined during final design.

The Existing Conditions Improved alternative would maintain a similar configuration to the existing diamond interchange and bicycle and pedestrian accommodations would be added. The ramp intersections would remain signalized and the WIS 30 bridges over US 51 would not be impacted. Additional lanes are proposed to address interchange safety and operations concerns. Existing turn lanes would also be lengthened as needed to improve traffic safety and operations.

After the preferred alternative was identified, WisDOT met with the city of Madison to revisit bicycle and pedestrian accommodations at this interchange. The city requested that a bicycle and pedestrian bridge be constructed to cross US 51 just south of WIS 30. The bicycle and pedestrian bridge would connect to the city of Madison's Marsh View Path on the west side of US 51 providing connectivity into the existing network and to the new 10-foot shared-use path that would be constructed on the east side of US 51. The bicycle and pedestrian bridge has been included in the preferred alternative at this location, however, construction of the bridge would be dependent on a funding agreement with the city of Madison. If a funding agreement does not occur, WisDOT would not construct the bridge and an at-grade crosswalk would be included.

Proposed changes include:

- Interchange Layout
    - Additional third westbound WIS 30 left turn lane to southbound US 51
    - Additional second eastbound WIS 30 left turn lane to northbound US 51

- Additional second eastbound right turn lane to southbound US 51
- Convert northbound US 51 right turn lane to eastbound WIS 30 to a free-flow movement (currently signalized)
- Signalized eastbound WIS 30 to southbound US 51 right turn (currently free-flow movement)
- Northbound auxiliary lane on US 51 added between westbound WIS 30 off-ramp and Commercial Avenue
- Optimized traffic signal timings

Bicycle and pedestrian accommodations

- Bicycle/pedestrian structure over US 51 south of WIS 30 – connection into Marsh View Path on west side of US 51
- Shared-use path added along east side of US 51
- Protected bicycle/pedestrian crossings of free-flow right turn lanes on the east side of the interchange.

Figure 23 shows the preferred alternative for the WIS 30 interchange.

Figure 23: Preferred Alternative for the WIS 30 Interchange

The Existing Conditions Improved alternative was identified as the preferred alternative because it addresses the interchange needs and provides similar traffic operations to the DDI but had improved safety for bicycles and pedestrians due to less travel lanes crossed and provides more familiar movements for vehicles, bicycles and pedestrians. Stakeholder feedback supported this alternative.

2.11.2. Commercial Avenue/Lexington Avenue Intersection

The Existing Conditions Improved and Three-Legged alternatives were carried forward to Phase V for the Commercial Avenue/Lexington Avenue intersection. After reviewing feedback during outreach received from PIM 3, the recommended alternative, Existing Conditions Improved, was identified as the preferred alternative.

The Existing Conditions Improved alternative would maintain a similar configuration to the existing intersection. Bicycle and pedestrian accommodations would be added to the intersection. The intersection would remain signalized and additional lanes are proposed to address intersection safety and operations concerns. Existing turn

lanes would also be lengthened as needed to improve traffic safety and operations. The railroad crossing located approximately 400 feet south of the intersection would remain at-grade and new crossing signals and gates will be added. The roadway profile on Commercial Avenue/Lexington Avenue would be raised to help mitigate flooding issues on these two roadways.

Proposed changes would include:

- Intersection Layout
    - Additional second northbound US 51 left turn lane to westbound Lexington Avenue
    - Additional second southbound US 51 left turn lane to eastbound Commercial Avenue
    - Northbound auxiliary lane on US 51 added between westbound WIS 30 off-ramp and Commercial Avenue
    - Optimized traffic signal timings
- Side Roads
    - Realigns Lexington Avenue/North Stoughton Service Road to the west to meet intersection spacing standards
    - Adds second eastbound and westbound travel lane on Lexington Avenue
- Bicycle and Pedestrian Accommodations
    - Crosswalks added to all four legs of intersection (currently none)
    - Shared-use path added along east side of US 51
    - Shared-use path added along east side of Commercial Avenue to Nakoosa Trail
    - Sidewalk added on both sides of Lexington Avenue to construction limits

Figure 24 shows the preferred alternative for the Commercial Avenue/Lexington Avenue intersection.

Figure 24: Preferred Alternative for the Commercial Avenue/Lexington Avenue Intersection

The Existing Conditions Improved was identified as the preferred alternative because it addresses the intersection needs, provides similar safety and traffic operations to the 3-Legged Intersection but has substantially lower impacts and costs. Traffic analysis determined there were no operational concerns with the at-grade crossing of the railroad tracks if passenger rail did utilize the rail line in the future. Stakeholder feedback generally favored this alternative.

2.11.3. US 151/East Washington Avenue Intersection

The Existing Conditions Improved and Jughandle alternatives were carried forward to Phase V for the US 151/East Washington Avenue intersection. After reviewing feedback during outreach for PIM 3 the Existing Conditions Improved was identified as the preferred alternative.

The Existing Conditions Improved alternative at US 151 was modified from what was presented at PIM 3. Based on the feedback received and additional discussions regarding safety, operations and impacts, the proposed access closures at

MacArthur Road and Rowland Avenue were changed to right in/right out access, the same as currently exists today. There are no existing safety or operational concerns at these intersections and keeping these access points open would result in 3 fewer relocations (1 commercial business, 2 residential). In addition, the city of Madison strongly supported maintaining access at these locations.

In addition, the Schmedeman Avenue intersection was modified from right in/right out access to allow for vehicles travelling eastbound on US 51 to make a left-in to Schmedeman Avenue. There are no operational concerns with allowing the left-in access and the city of Madison strongly supported allowing access to the businesses on Schmedeman Avenue.

Finally, after the preferred alternative was identified, WisDOT met with the city of Madison to revisit bicycle and pedestrian accommodations included with the Existing Conditions Improved alternative at this intersection. To better accommodate the shared-use path included on the east side of US 51, the city of Madison requested that a bicycle and pedestrian bridge be constructed to cross the east leg of US 151, connecting the shared-use path north and south of US 151. A bicycle and pedestrian bridge has been included in the preferred alternative at this location, however, construction of the bridge would be dependent on a funding agreement with the city of Madison. If a funding agreement does not occur, WisDOT would not construct the bridge and the at-grade crosswalk would connect the path across the intersection.

The Existing Conditions Improved alternative would maintain a similar configuration to the existing intersection and bicycle and pedestrian accommodations will be added. The intersection would remain signalized and additional mainline travel lanes and intersection turning lanes are proposed to address safety and operations concerns. Existing turn lanes would also be lengthened as needed to improve traffic safety and operations.

Proposed changes would include:

- Intersection Layout
    - Improved intersection angle (skew) to meet standards to improve visibility
    - Additional third northbound US 51 travel lane north of US 151
    - Additional third southbound US 51 left turn lane to eastbound US 151
    - Additional third westbound US 151 left turn lane to southbound US 51
    - Optimized traffic signal timings
    - US 51 median north of US 151 would be closed; no left turns allowed
- Side Road Access
    - North Stoughton Service Road access to US 151 closed; access rerouted west along Prairie Avenue to new local roadway connection across from Schmedeman Avenue
    - Access at Schmedeman Avenue restricted; southbound left turn from Schmedeman Avenue to eastbound US 151 or from westbound US 151 to new local road would not be allowed
- Bicycle and Pedestrian Accommodations
    - Crosswalks added to all four legs of intersection (currently no crosswalk on east leg)
    - Shared-use path added along east side of US 51
    - Shared-use path added on west side of US 51 north of US 151
    - Bicycle/pedestrian structure over US 151 east of US 51 connecting shared-use path

Figure 25 shows the preferred alternative for the US 151/East Washington Avenue intersection.

Figure 25: Preferred Alternative for the US 151/East Washington Avenue Intersection

The Phase IV analysis identified the Jughandle alternative as the recommended alternative. The Jughandle provided better safety and operations at the intersection, but also had larger impacts, including more potential relocations and access changes. Feedback received from PIM 3 was not supportive of the Jughandle alternative. Further, the city of Madison identified a partial grade separated intersection was not consistent with the local vision for this portion of the city. The city's future vision for the area includes re-developing the area into mixed use with all roadway crossings at grade. Due to feedback received during and following the PIM 3, the Existing Conditions Improved alternative has been identified as the preferred alternative.

The Existing Conditions Improved has been identified as the preferred alternative because stakeholder feedback strongly favored this alternative. It addresses operations needs and improves vehicle safety by eliminating the deficient intersection skew angle. It also improves bicycle and pedestrian safety by providing crosswalks on all four legs of the intersection and a bicycle and pedestrian overpass east of US 51. It also has substantially lower impacts and costs than the Jughandle alternative. Additional modifications to the Existing Conditions Improved alternative were made as noted above based on feedback received during and following PIM 3.

2.11.4. Anderson Street Intersection

The Existing Conditions Improved alternative would maintain a similar configuration to the existing intersection and bicycle and pedestrian accommodations would be added. The intersection would remain signalized and the number of mainline travel lanes and intersection turn lanes will remain the same. Existing turn lanes would be lengthened as needed to improve traffic safety and operations.

Proposed changes include:

- Intersection
    - Optimized traffic signal timings
- Bicycle and Pedestrian Accommodations
    - Shared-use path added along east side of US 51
    - Shared-use path added along west side of US 51 south of Anderson Street

Figure 26 shows the preferred alternative for the Anderson Street intersection.

Figure 26: Preferred alternative for the Anderson Street Intersection

The Existing Conditions Improved alternative was identified as the preferred alternative because there is no anticipated right of way, environmental or access impacts and no existing or anticipated future safety or operational concerns that could not be addressed with the minor improvements proposed. This was the only alternative carried forward from the Phase I analysis and there were no issues or concerns identified during the additional development, analysis and outreach conducted in subsequent Phases.

2.11.5. Kinsman Boulevard Intersection

The Existing Conditions Improved and Roundabout alternatives were carried forward to Phase V for the Kinsman Boulevard intersection. After reviewing feedback during outreach for PIM 3, the recommended alternative, Existing Conditions Improved, was identified as the preferred alternative.

The Existing Conditions Improved alternative would maintain a similar configuration to the existing intersection and bicycle and pedestrian accommodations will be added. The intersection would remain signalized and the number of

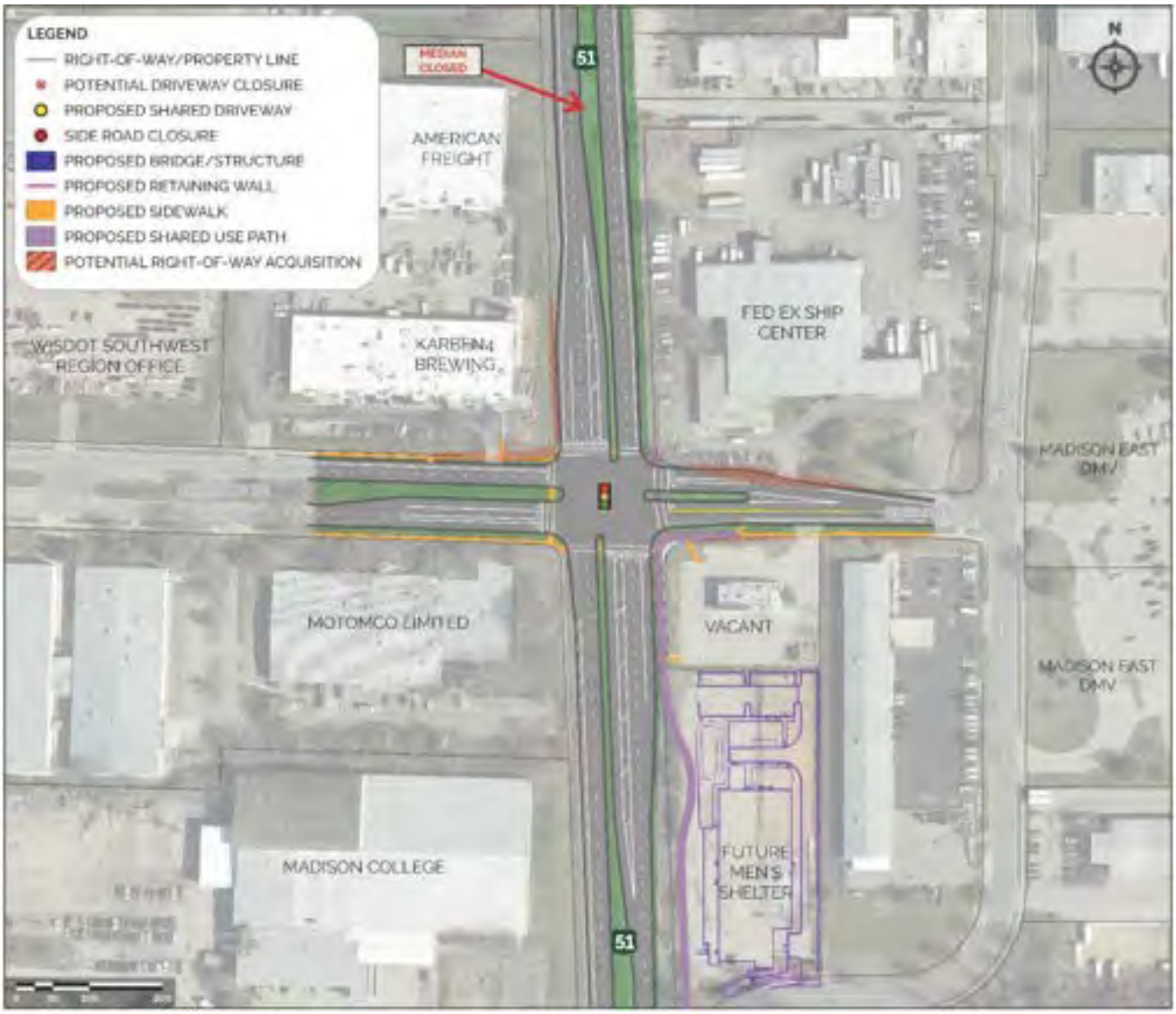
mainline travel lanes and intersection turn lanes would remain the same. Existing turn lanes would be lengthened as needed to improve traffic safety and operations. Paved shoulders would be added to accommodate bicycles on US 51 north of Kinsman Boulevard.

Proposed changes include:

- Intersection Layout
    - Offset left turn lanes on US 51 and Kinsman Boulevard to improve visibility for left turning vehicles
    - Optimized traffic signal timings
- Bicycle and Pedestrian Accommodations
    - Crosswalks added on all four legs of intersection (currently only on 2 legs)
    - Shared-use path added along east side of US 51 south of Kinsman Boulevard
    - Bike lanes on Kinsman Boulevard extended through the US 51 intersection

Figure 27 shows the preferred alternative for the Kinsman Boulevard intersection.

Figure 27: Preferred Alternative for the Kinsman Boulevard Intersection



The Existing Conditions Improved has been identified as the preferred alternative because it would address the intersection needs, is anticipated to result in lower overall crashes than the Roundabout Intersection and would provide controlled crossings for bicycles and pedestrians. Stakeholder feedback supported this alternative.

2.11.6. Pierstorff Street Intersection

The preferred alternative identified in Phase V at Pierstorff Street is the Existing Conditions Improved alternative. The Existing Conditions Improved alternative will maintain a similar configuration to the existing right-in/right-out intersection. The intersection will remain unsignalized and the number of mainline travel lanes will remain the same. A northbound US 51 right turn lane would be added to improve traffic safety and operations. Paved shoulders on US 51 would accommodate bicycles and the paved median cut-outs for bicycles will be maintained.

Figure 28 shows the preferred alternative for the Pierstorff Street intersection.

Figure 28: Preferred alternative for the Pierstorff Street Intersection

The Existing Conditions Improved has been identified as the preferred alternative because there is no anticipated right of way, environmental, or access impacts and no existing or anticipated future safety or operational concerns. This was the only alternative carried forward from the Phase I analysis and there were no issues or concerns identified during the additional development, analysis and outreach conducted in subsequent Phases.

2.11.7. Rieder Road Intersection

The Existing Conditions Improved and the Existing Conditions Improved RCUT were carried forward to Phase V for the Rieder Road intersection. After reviewing feedback during outreach for PIM 3 and having additional discussions regarding safety and traffic operations, the Existing Conditions Improved alternative has been identified as the preferred alternative.

The Existing Conditions Improved alternative would maintain the configuration of the existing unsignalized left turn restricted intersection. The number of mainline travel lanes and intersection turns lanes would remain the same and paved shoulders on US 51 would accommodate bicycles.

Figure 29 shows the preferred alternative for the Rieder Road intersection.

Figure 29: Preferred Alternative for the Rieder Road Intersection

The Existing Conditions Improved was identified as the preferred alternative because it was determined that the RCUT was not needed due to no existing or anticipated future safety or operational concerns at this intersection or at Amelia Earhart Drive.

2.11.8. Amelia Earhart Drive Intersection

The preferred alternative identified in Phase V at Amelia Earhart Drive is the Existing Conditions Improved alternative. The Existing Conditions Improved alternative would maintain a similar configuration to the existing full access intersection. The intersection would remain unsignalized and the number of mainline travel lanes would remain the same. A southbound US 51 right turn lane would be added and the northbound US 51 left turn lane would be lengthened to improve traffic safety and operations. Paved shoulders on US 51 would accommodate bicycles.

Figure 30 shows the preferred alternative for the Amelia Earhart Drive intersection.

Figure 30: Preferred Alternative for the Amelia Earhart Drive Intersection

The Existing Conditions Improved has been identified as the preferred alternative because there is no anticipated right of way, environmental, or access impacts and no existing or anticipated future safety or operational concerns. This was the only alternative carried forward from the Phase I analysis and there were no issues or concerns identified during the additional development, analysis and outreach conducted in subsequent Phases.

2.11.9. Hanson Road Intersection

The preferred alternative identified in Phase V at Hanson Road is the Full Access alternative. The Full Access alternative would maintain a similar configuration to the existing full access intersection. The intersection would remain unsignalized and the number of mainline travel lanes would remain the same. Acceleration, deceleration and turning lanes would be added and existing turn lanes would be lengthened as needed to improve traffic safety and operations. Paved shoulders on US 51 would accommodate bicycles.

Proposed changes would include:

- Intersection
    - Adds a median protected deceleration lane for southbound US 51 left turns to Hanson Road
    - Adds a median protected acceleration lane for vehicles turning left from Hanson Road to southbound US 51
    - Adds a northbound US 51 right turn lane to Hanson Road
    - Adds dedicated left and right turn lanes on Hanson Road

Figure 31 shows the preferred alternative for the Hanson Road intersection.

Figure 31: Preferred Alternative for the Hanson Road Intersection

The Full Access alternative has been identified as the preferred alternative because it would address the intersection needs and there is no anticipated right of way, environmental, or access impacts. This is the alternative that received the most stakeholder support throughout the alternatives development process and was the only alternative carried forward from the Phase IV analysis.

2.11.10. Hoepker Road Intersection

The Existing Conditions Improved and Roundabout alternatives were carried forward to Phase V for the Hoepker Road intersection. After reviewing feedback during outreach for PIM 3, the recommended alternative, Existing Conditions Improved, was identified as the preferred alternative.

The Existing Conditions Improved alternative would maintain a similar configuration to the existing intersection and bicycle and pedestrian accommodations would be added. The intersection would remain signalized and the number of mainline travel lanes would remain the same. Turn lanes would be added and existing turn lanes would be

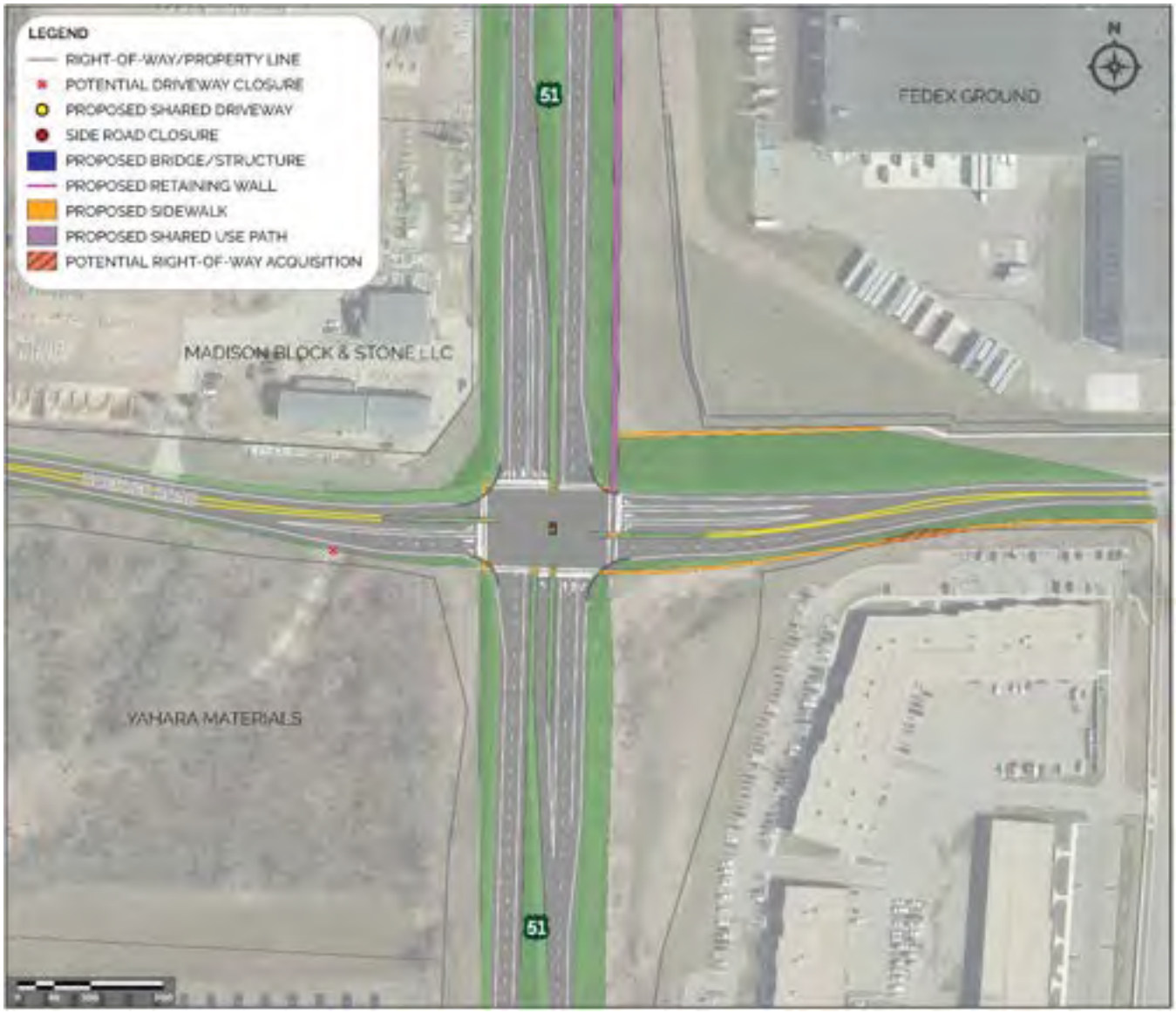
lengthened as needed to improve traffic safety and operations. Paved shoulders would accommodate bicycles on US 51 south of Hoepker Road.

Proposed changes would include:

- Intersection
    - Adds a second left turn lane from southbound US 51 to eastbound Hoepker Road
    - Optimized signal timings
- Bicycle and Pedestrian Accommodations
    - Provides crosswalks on all four legs of intersection (currently none)
    - Shared-use path added along east side of US 51 north of Hoepker Road
    - Adds sidewalk on east side of US 51 to connect into existing network on Hoepker Road

Figure 32 shows the preferred alternative for the Hoepker Road intersection.

Figure 32: Preferred Alternative for the Hoepker Road Intersection



The Existing Conditions Improved has been identified as the preferred alternative because it would address the intersection needs, is anticipated to result in lower overall crashes than the Roundabout Intersection and would provide controlled crossings for bicycles and pedestrians. Stakeholder feedback supported this alternative.

2.11.11. Acker Road Intersection

The preferred alternative identified in Phase V at Acker Road is the Existing Conditions Improved alternative. The Existing Conditions Improved alternative would maintain a similar configuration to the existing full access intersection. The intersection would remain unsignalized and the number of mainline travel lanes and intersection turn lanes would remain the same. Existing turn lanes would be lengthened as needed to improve traffic safety and operations. A shared-use path would be added on the east side of US 51.

Figure 33 shows the preferred alternative for the Acker Road intersection.

Figure 33: Preferred Alternative for the Acker Road Intersection

The Existing Conditions Improved has been identified as the preferred alternative because there would be no anticipated right of way, environmental, or access impacts and no existing or anticipated future safety or operational concerns. This was the only alternative carried forward from the Phase I analysis and there were no issues or concerns identified during the additional development, analysis and outreach conducted in subsequent Phases.

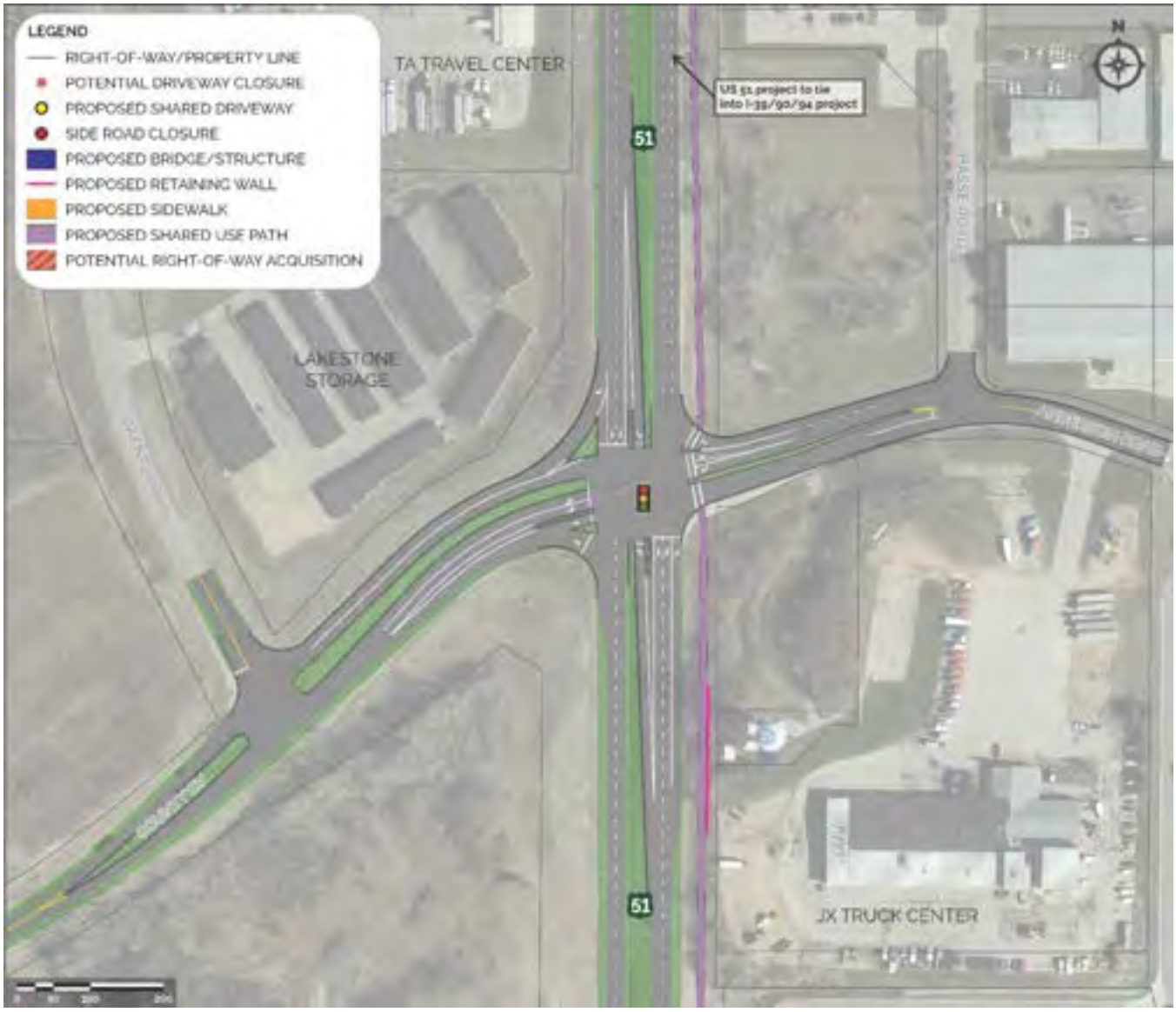
2.11.12. County CV/Anderson Road Intersection

The preferred alternative identified in Phase V at County CV/Anderson Road is the Existing Conditions Improved alternative. The Existing Conditions Improved alternative would maintain a similar configuration to the existing intersection and bicycle and pedestrian accommodations would be added. The intersection would remain signalized and the number of mainline travel lanes, intersection turn lanes and the southbound US 51 auxiliary lane would remain the same. Existing turn lanes would be lengthened as needed to improve traffic safety and operations and traffic signals would be optimized. An auxiliary lane would be added to northbound US 51 from Anderson Road that

would match into the preferred alternative identified for the I-39/90/94 and US 51 interchange in WisDOT's I-39/90/94 Corridor Study. The vertical profile would be adjusted to meet standards for improved visibility. Bicycle accommodations include a crosswalk added on the east leg of the intersection and a shared-use path added along the east side of US 51 that would tie into the shared-use path proposed as part of WisDOT's I-39/90/94 Corridor Study.

Figure 34 shows the preferred alternative for the County CV/Anderson Road intersection.

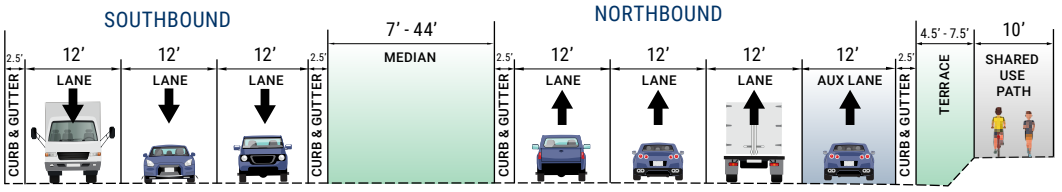
Figure 34: Preferred Alternative for the County CV/Anderson Road Intersection



The Existing Conditions Improved was identified as the preferred alternative because there is no anticipated right of way, environmental, or access impacts and no existing or anticipated future safety or operational concerns that could not be addressed by the minor improvements proposed. This was the only alternative carried forward from the Phase I analysis and there were no issues or concerns identified during the additional development, analysis and outreach conducted in subsequent Phases.

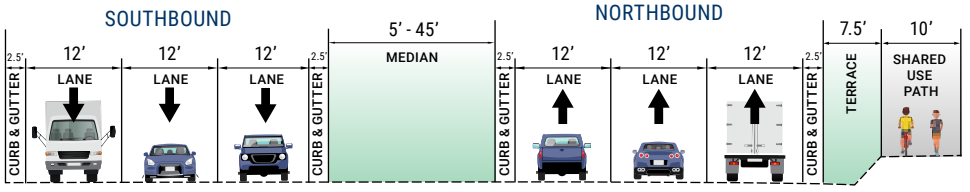
ATTACHMENT A

Typical Sections



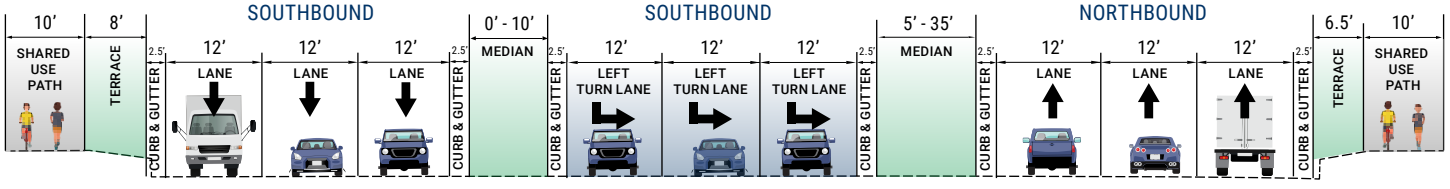
South of **WIS 30** to **Commercial Avenue**

South Section



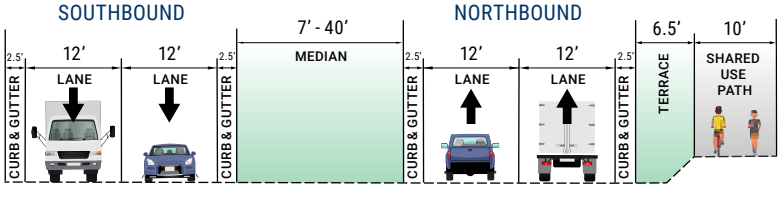
Commercial Avenue to **US 151 (East Washington Avenue)**

South Section



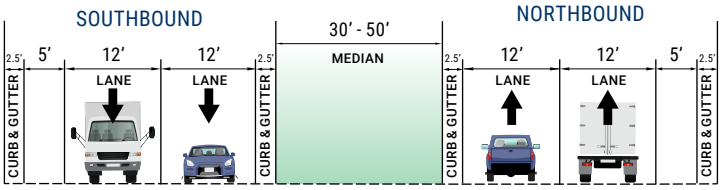
US 151 (East Washington Avenue) to **Anderson Street**

Central Section



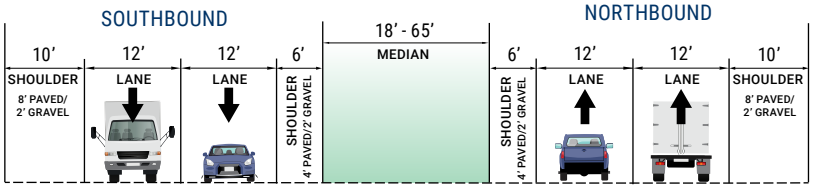
Anderson Street to **Kinsman Boulevard**

Central Section



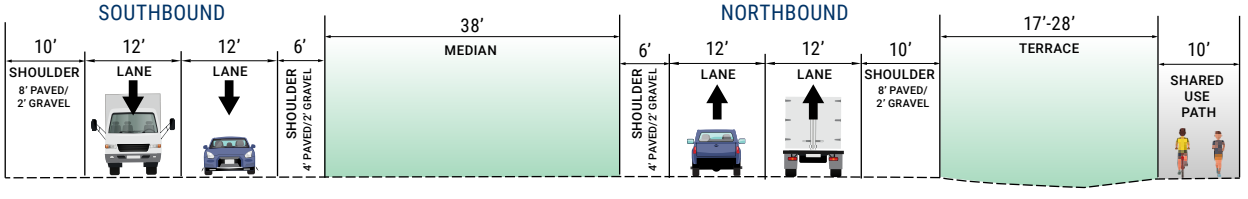
Kinsman Boulevard to **Pierstorff Street**

Central Section



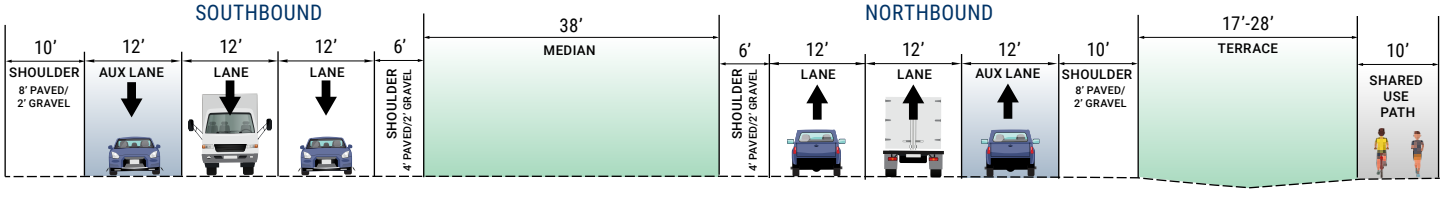
Pierstorff Street to **Hoepker Road**

North Section



Hoepker Road to **CTH CV**

North Section

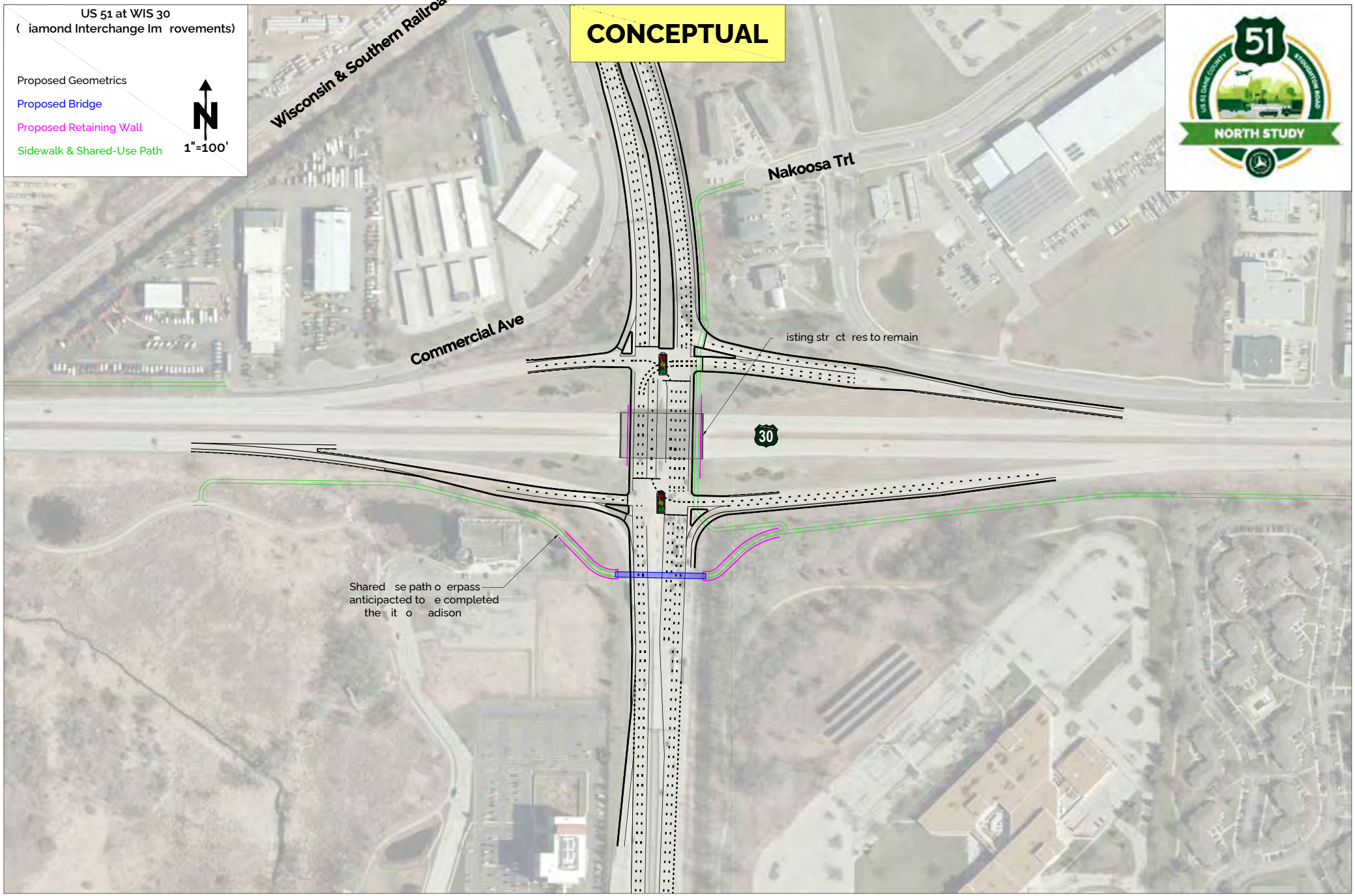


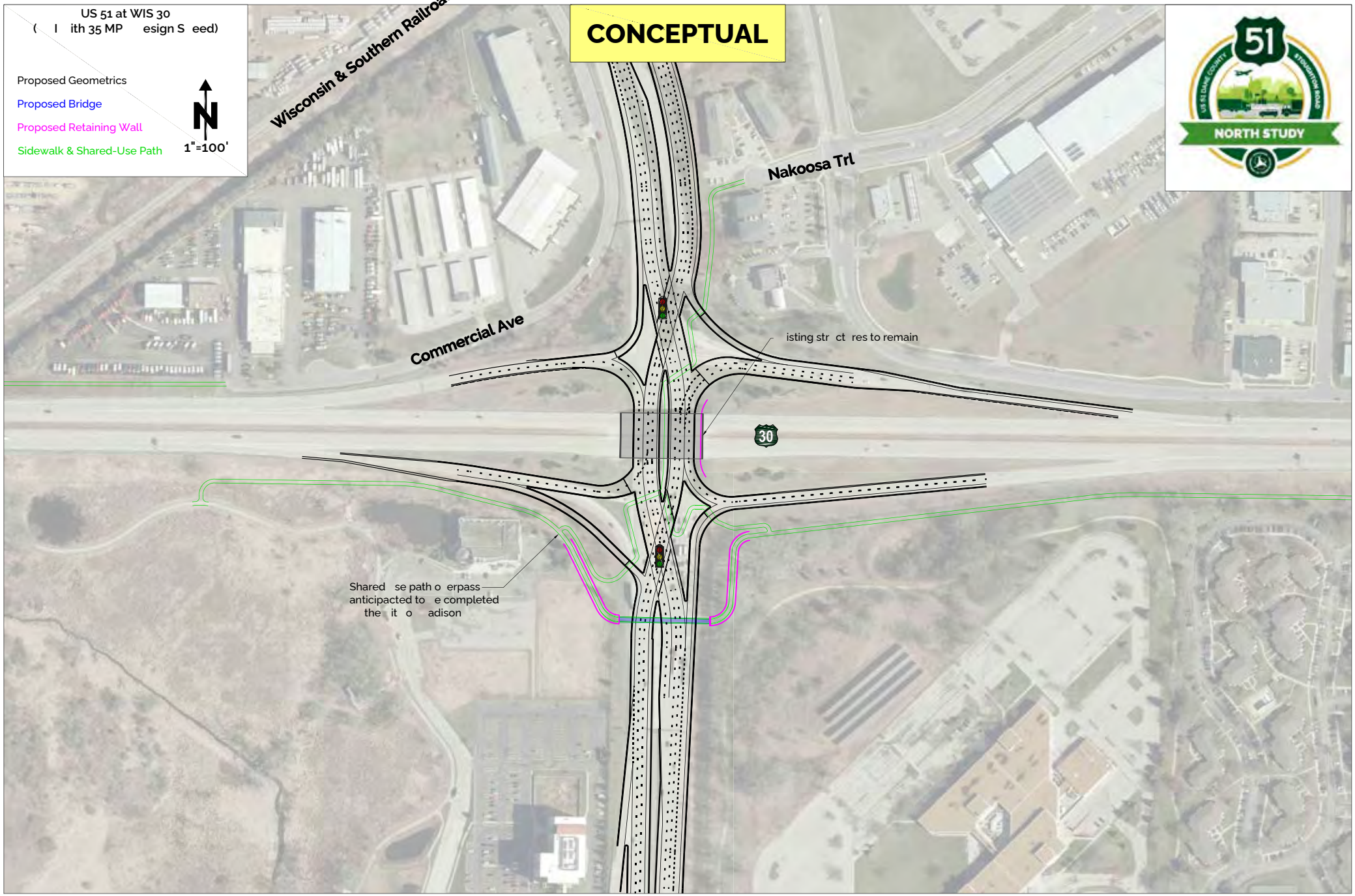
CTH CV to **South of I-39/90/94**

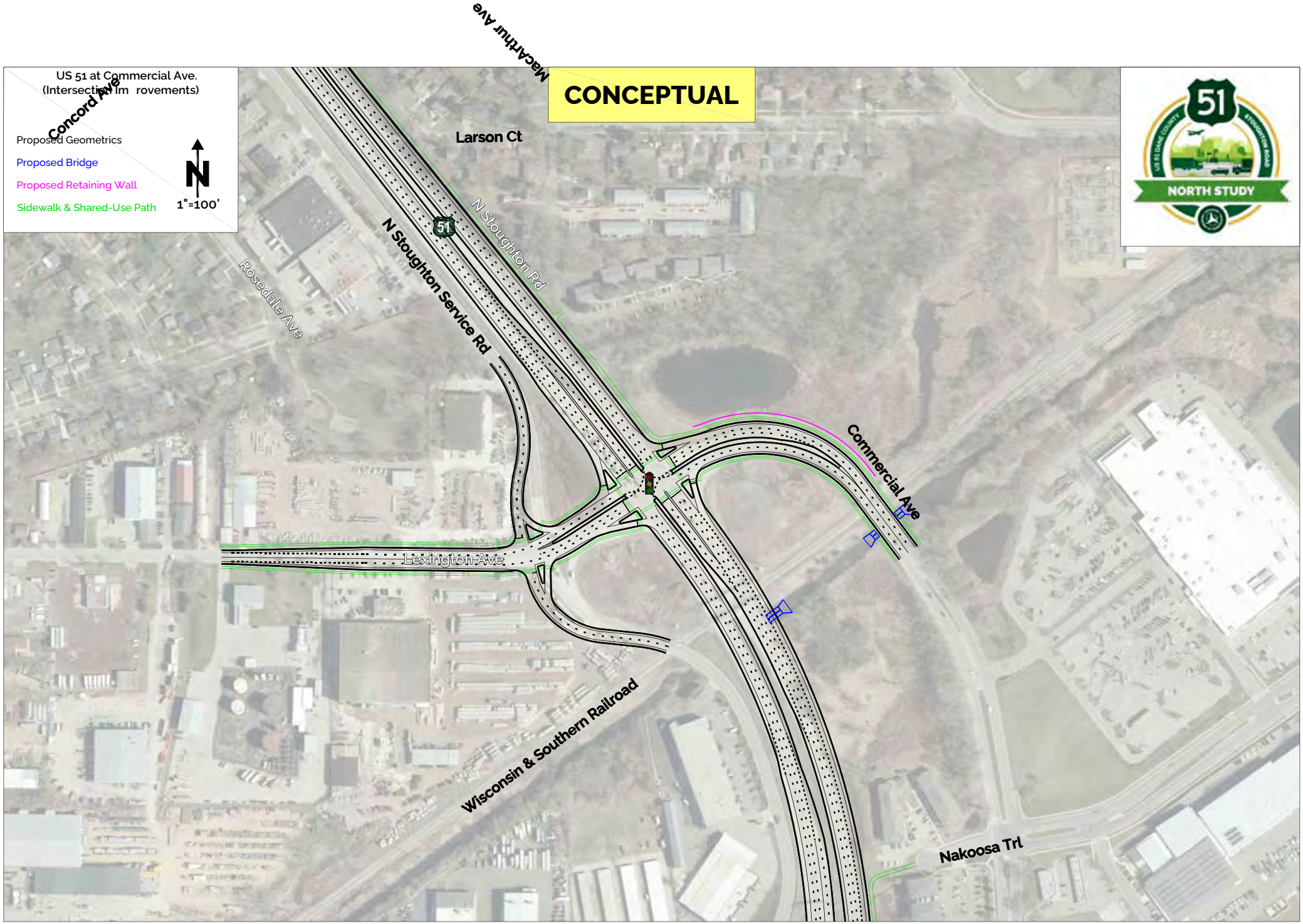
North Section

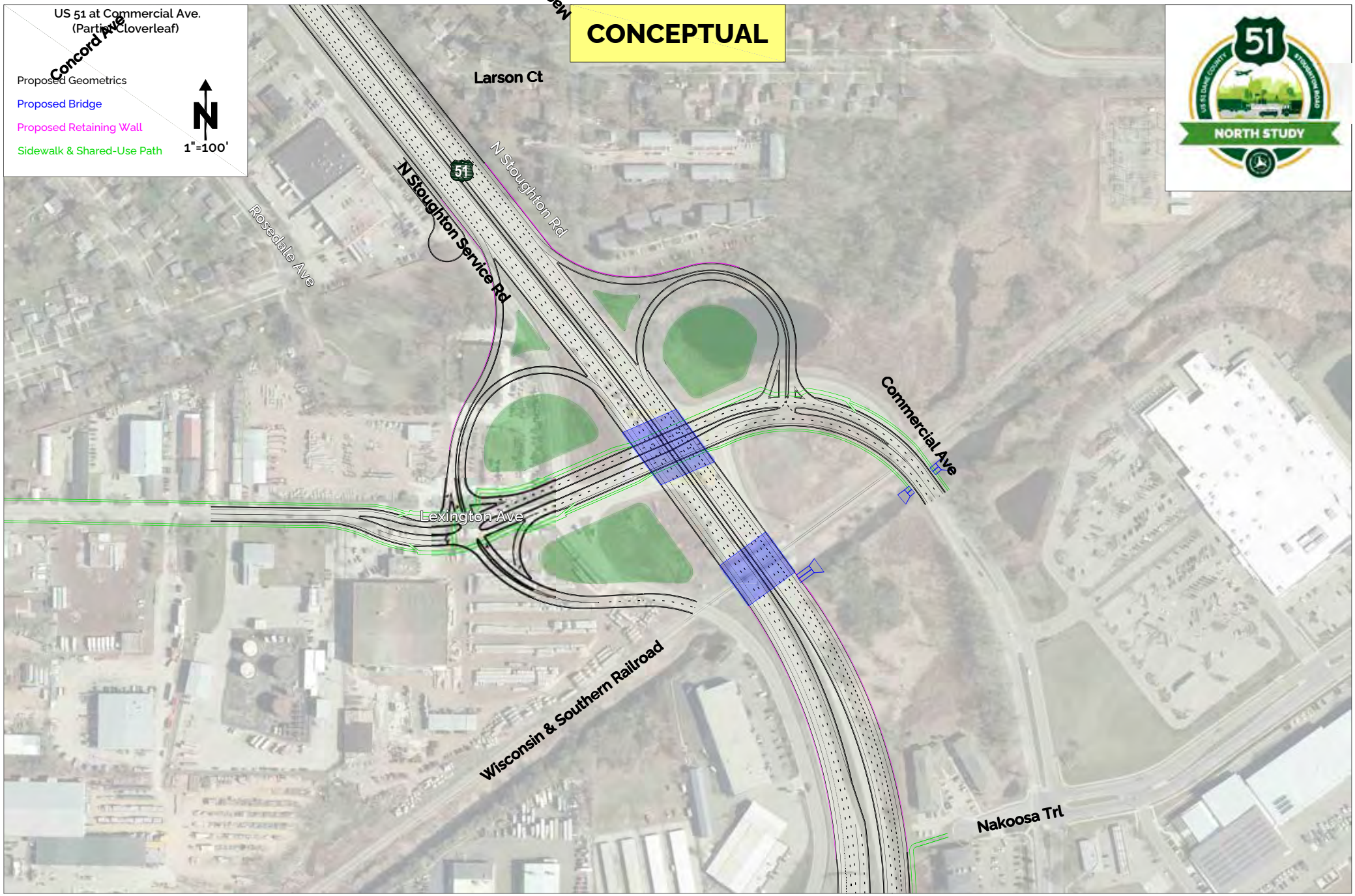
ATTACHMENT B

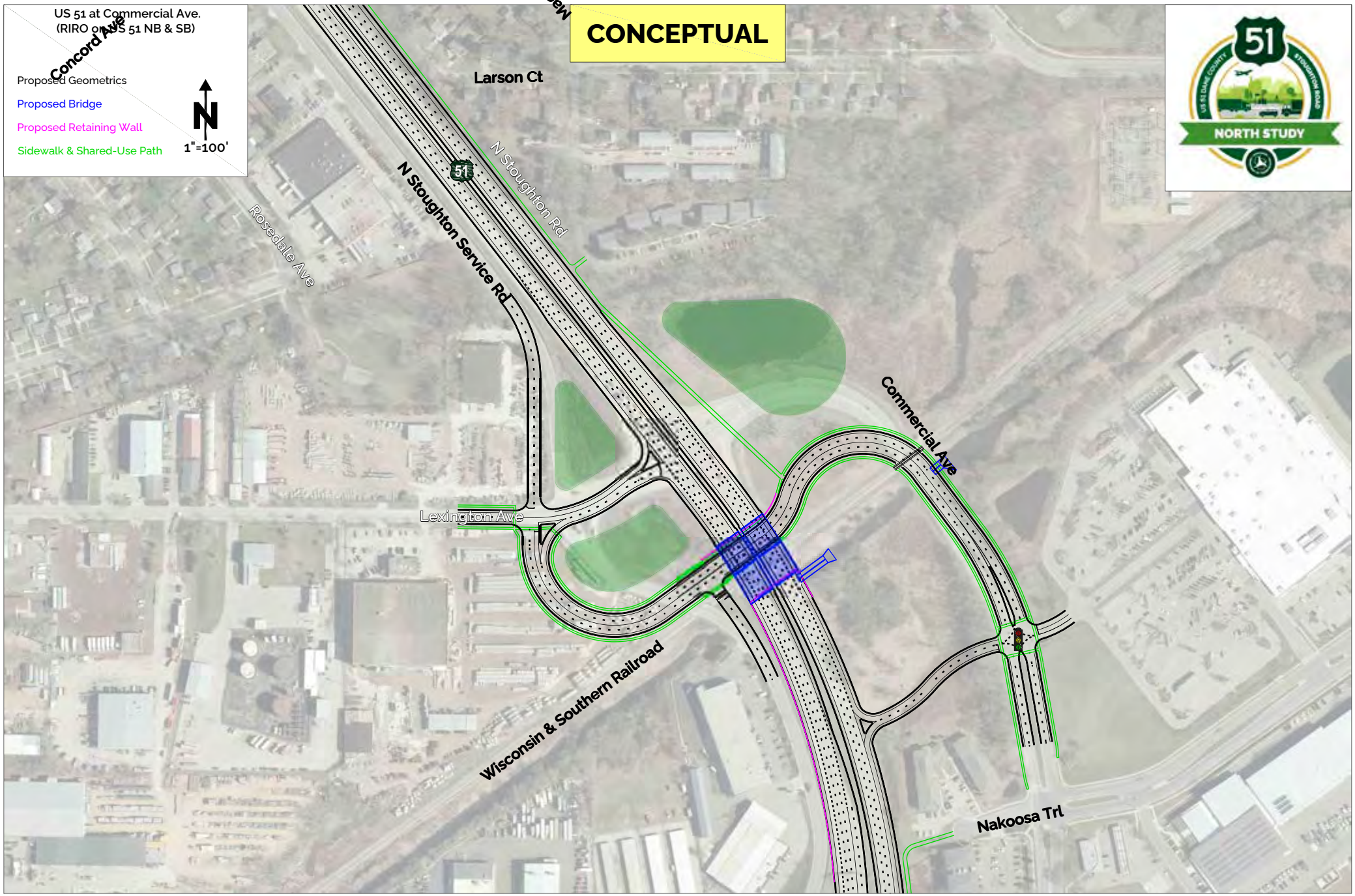
Concept Exhibits

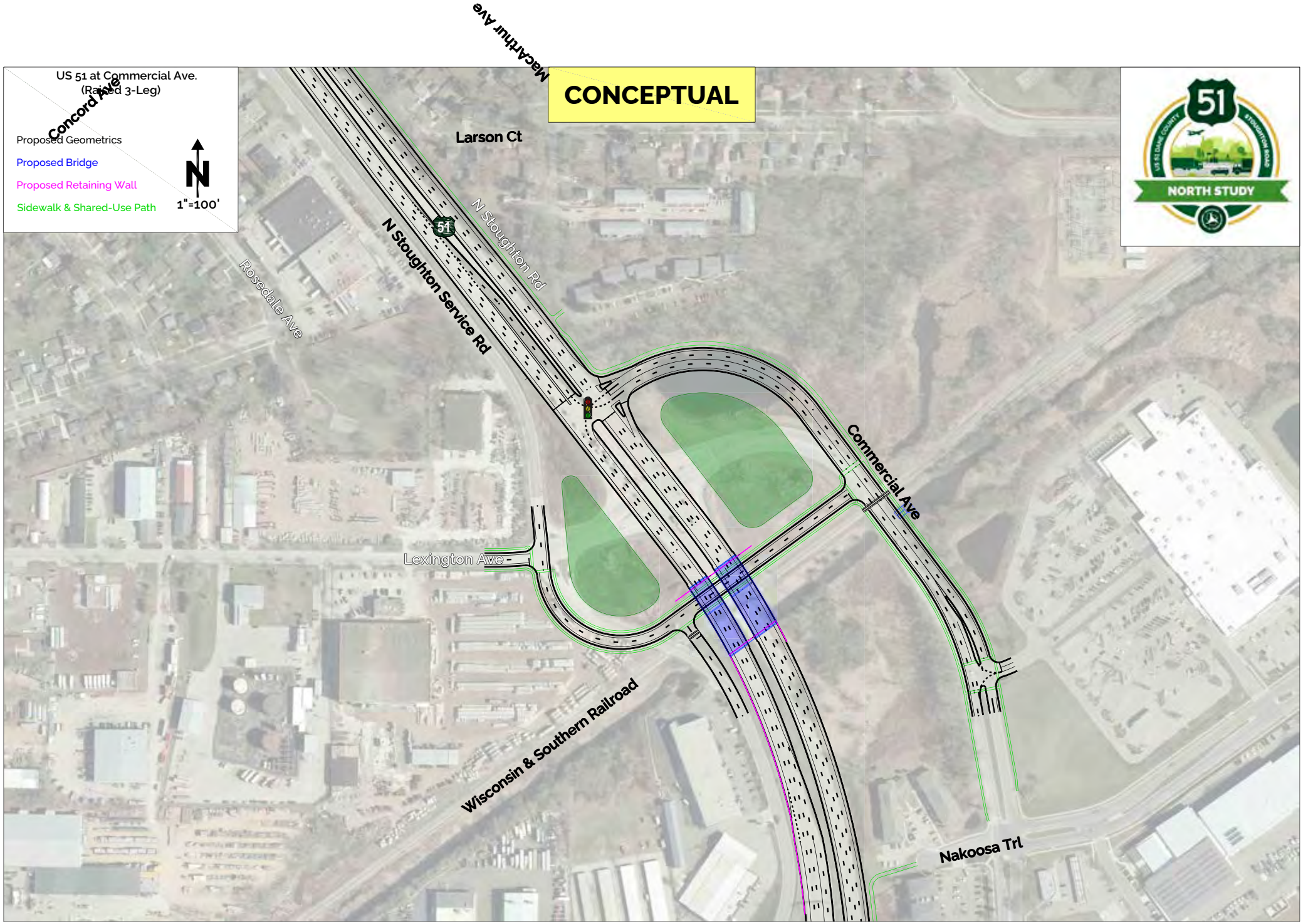

US 51 at WIS 30
(iamond Interchange Im rovements)
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'
CONCEPTUAL
Wisconsin & Southern Railroad
Nakoosa Trl
Commercial Ave
isting str ct res to remain
30
Shared se path o erpass
anticipacted to e completed
the it o adison
51
NORTH STUDY


US 51 at WIS 30
(I ith 35 MP esign S eed)
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
1"=100'
CONCEPTUAL
Wisconsin & Southern Railroad
Nakoosa Trl
Commercial Ave
isting str ct res to remain
30
Shared se path o erpass
anticipacted to e completed
the it o adison
51
NORTH STUDY


US 51 at Commercial Ave.
(Intersection Improvements)
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'
CONCEPTUAL
NORTH STUDY
Concord Ave
MacArthur Ave
Larson Ct
N Stoughton Rd
N Stoughton Service Rd
51
Rosedale Ave
Commercial Ave
Lexington Ave
Wisconsin & Southern Railroad
Nakoosa Trl


US 51 at Commercial Ave.
(Partial Cloverleaf)
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'
CONCEPTUAL
NORTH STUDY
Concord Ave
MacArthur Ave
Larson Ct
N Stoughton Rd
N Stoughton Service Rd
51
Rosedale Ave
Commercial Ave
Lexington Ave
Wisconsin & Southern Railroad
Nakoosa Trl


US 51 at Commercial Ave.
(RIRO on US 51 NB & SB)
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'
CONCEPTUAL
NORTH STUDY
MacArthur Ave
Concord Ave
Larson Ct
N Stoughton Rd
N Stoughton Service Rd
51
Rosedale Ave
Commercial Ave
Lexington Ave
Wisconsin & Southern Railroad
Nakoosa Trl


US 51 at Commercial Ave.
(Raised 3-Leg)
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'
CONCEPTUAL
NORTH STUDY
MacArthur Ave
Concord Ave
Larson Ct
N Stoughton Rd
N Stoughton Service Rd
Rosedale Ave
Commercial Ave
Lexington Ave
Wisconsin & Southern Railroad
Nakoosa Trl

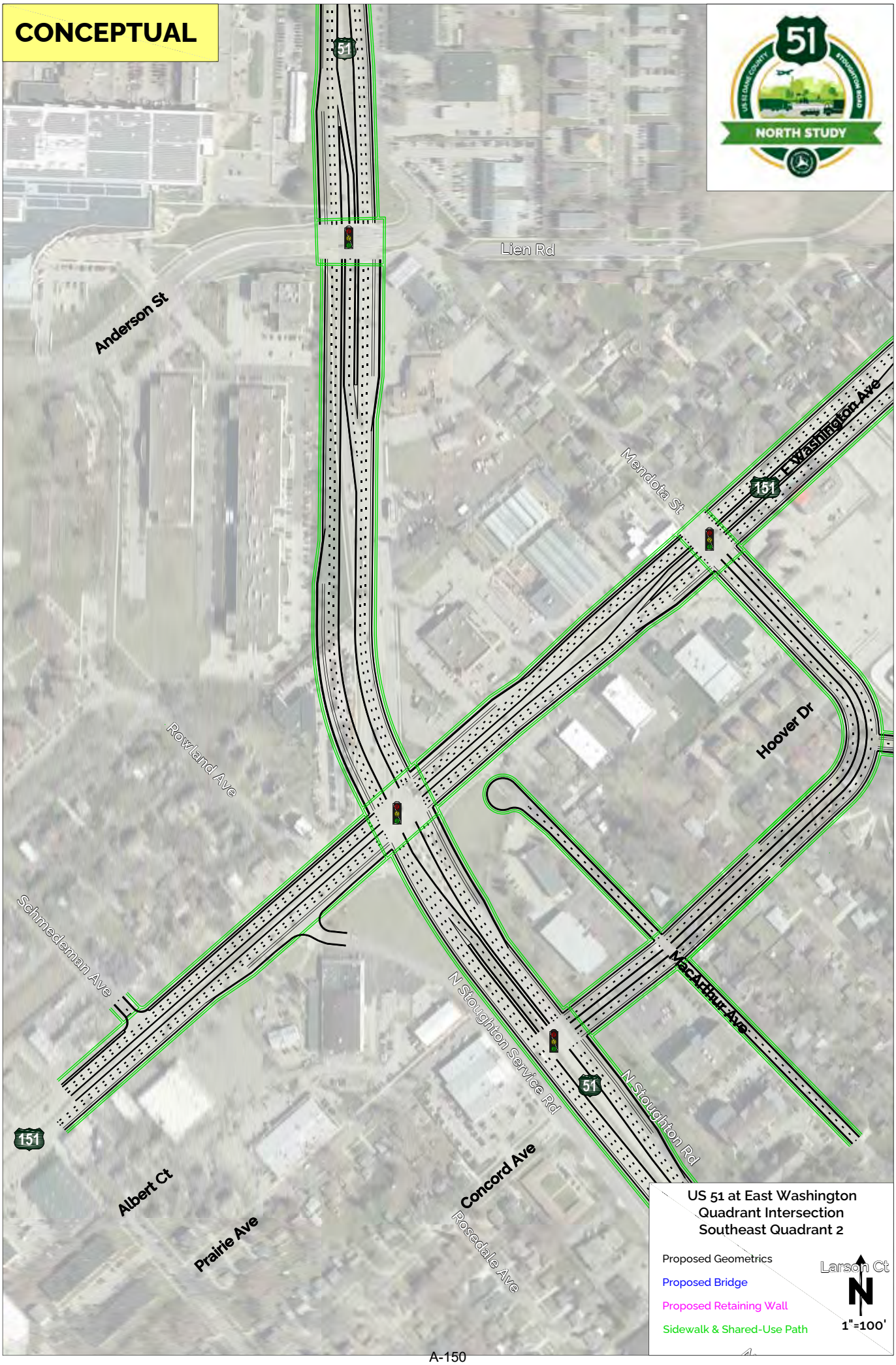

CONCEPTUAL
51
NORTH STUDY
Lien Rd
Anderson St
A
A
E Washington
151
Mendota St
Rowland Ave
Hoover Dr
Schmedeman Ave
MacArthur Ave
N Stoughton Service Rd
N Stoughton Rd
51
151
Albert Ct
Concord Ave
Prairie Ave
Rosedale Ave
Section A-A
US 51 at East Washington
Conventional Intersection
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
1"=100'


CONCEPTUAL
NORTH STUDY
51
Lien Rd
Anderson St
Mendota St
E Washington
151
Rowland Ave
Hoover Dr
Schmedeman Ave
MacArthur Ave
N Stoughton Service Rd
N Stoughton Rd
Albert Ct
Concord Ave
Prairie Ave
Rosedale Ave
US 51 at East Washington
Quadrant Intersection
Northeast Quadrant 1
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'

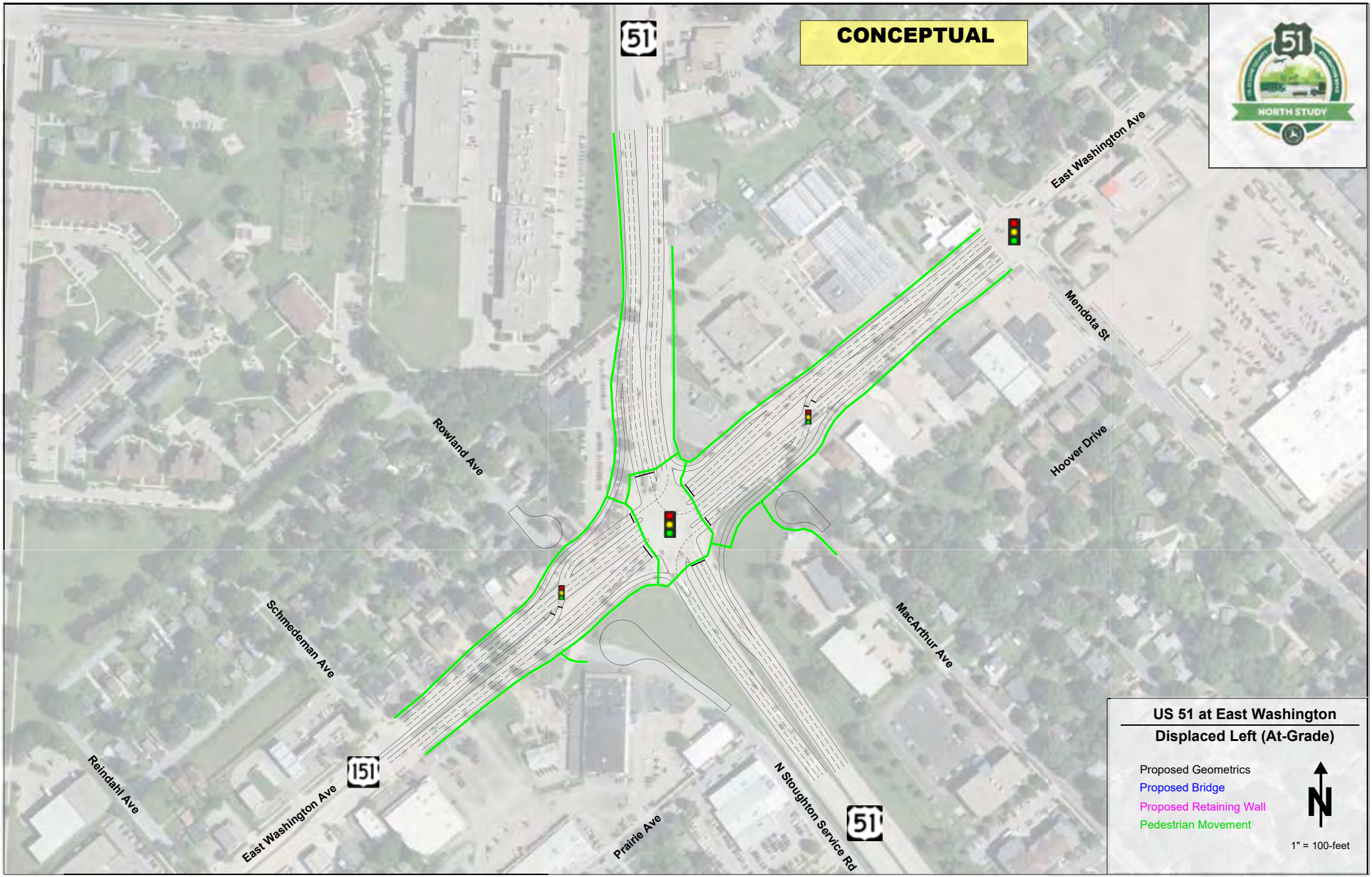

CONCEPTUAL
51
NORTH STUDY
Lien Rd
Anderson St
Mendota St
151
E Washington
Rowland Ave
Hoover Dr
Schmedeman Ave
MacArthur Ave
N Stoughton Service Rd
N Stoughton Rd
51
151
Albert Ct
Concord Ave
Prairie Ave
Rosedale Ave
US 51 at East Washington
Quadrant Intersection
Northeast Quadrant 2
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'


CONCEPTUAL
51
NORTH STUDY
Lien Rd
Anderson St
Mendota St
E Washington
151
Hoover Dr
Rowland Ave
Schmedeman Ave
MacArthur Ave
N Stoughton Service Rd
N Stoughton Rd
51
151
Albert Ct
Concord Ave
Prairie Ave
Rosedale Ave
US 51 at East Washington
Quadrant Intersection
Northwest Quadrant
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'


CONCEPTUAL
NORTH STUDY
Lien Rd
Anderson St
Mendota St
E Washington
Rowland Ave
Hoover Dr
Schmedeman Ave
N Stoughton Service Rd
MacArthur Ave
N Stoughton Rd
Albert Ct
Concord Ave
Prairie Ave
Rosedale Ave
US 51 at East Washington
Quadrant Intersection
Southeast Quadrant 1
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
1"=100'

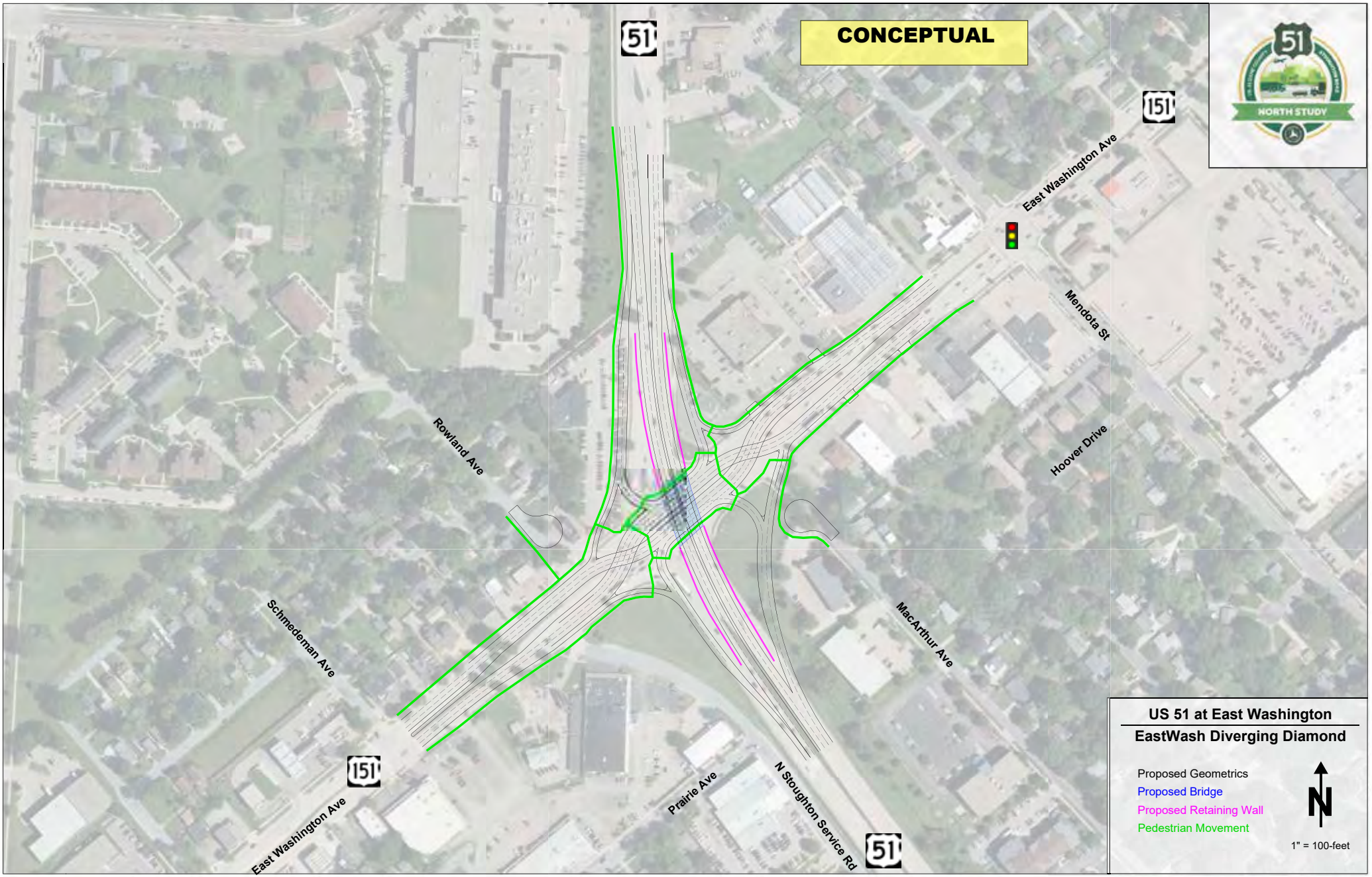

CONCEPTUAL
51
NORTH STUDY
Lien Rd
Anderson St
E Washington Ave
151
Mendota St
Hoover Dr
Rowland Ave
Schmedeman Ave
N Stoughton Service Rd
MacArthur Ave
51
N Stoughton Rd
151
Albert Ct
Concord Ave
Prairie Ave
Rosedale Ave
Larson Ct
US 51 at East Washington
Quadrant Intersection
Southeast Quadrant 2
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'

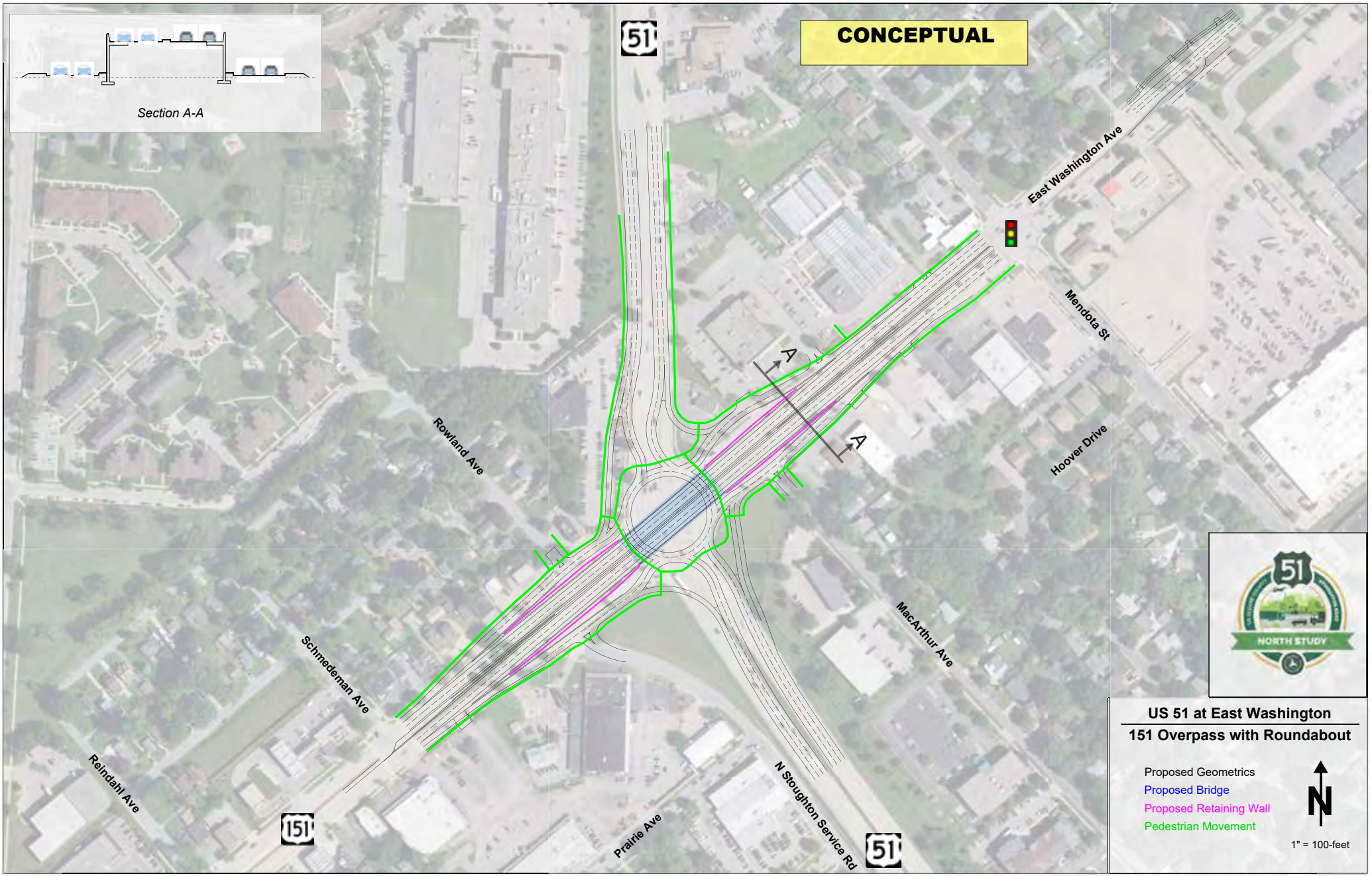

CONCEPTUAL
51
NORTH STUDY
Lien Rd
Anderson St
Mendota St
E Washington
151
Rowland Ave
Hoover Dr
Schmedeman Ave
MacArthur Ave
N Stoughton Service Rd
N Stoughton Rd
A
A
51
151
Albert Ct
Concord Ave
Prairie Ave
Rosedale Ave
Section A-A
Section A-A with Median LTL
US 51 at East Washington
Quadrant Intersection
Southwest Quadrant
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'


CONCEPTUAL
51
NORTH STUDY
East Washington Ave
Mendota St
Hoover Drive
MacArthur Ave
Rowland Ave
Schmedeman Ave
Reindahl Ave
East Washington Ave
151
Prairie Ave
N Stoughton Service Rd
51
US 51 at East Washington
Displaced Left (At-Grade)
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 100-feet

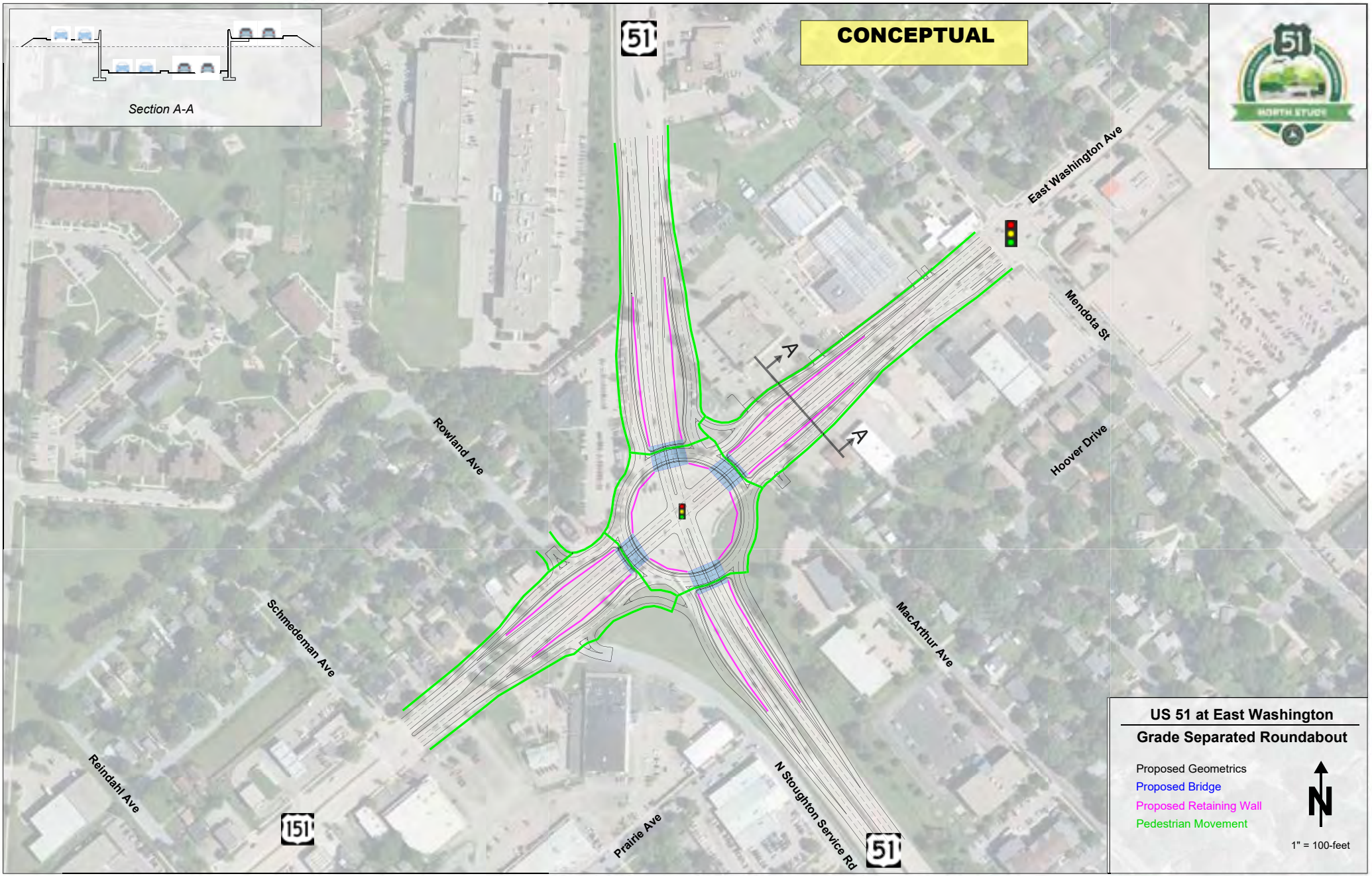

CONCEPTUAL
51
NORTH STUDY
Lien Rd
Anderson St
E Washington
151
Mendota St
Hoover Dr
Rowland Ave
Schmedeman Ave
MacArthur Ave
N Stoughton Service Rd
N Stoughton Rd
51
151
Albert Ct
Concord Ave
Prairie Ave
Rosedale Ave
A
A
Section A-A
Section A-A with LTLs
US 51 at East Washington
Jughandle Interchange
Southwest Quadrant
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'


CONCEPTUAL
51
NORTH STUDY
Section A-A
Lien Rd
Anderson St
A
A
E Washington
151
Mendota St
Hoover Dr
Rowland Ave
Schmedeman Ave
B
B
MacArthur Ave
N Stoughton Service Rd
51
N Stoughton Rd
151
Albert Ct
Concord Ave
Prairie Ave
Rosedale Ave
Section B-B
US 51 at East Washington
Tight Diamond
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'

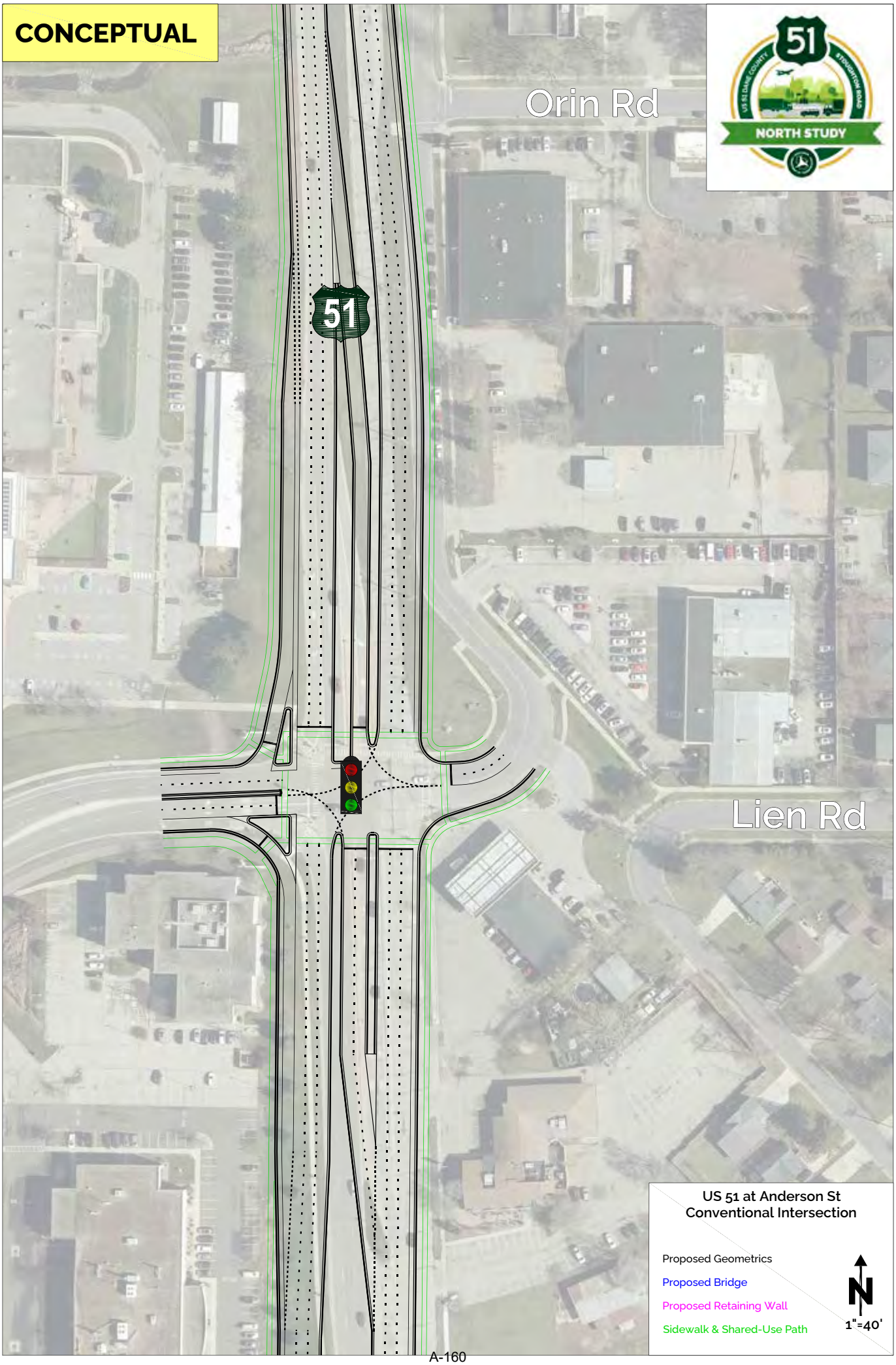

CONCEPTUAL
51
151
East Washington Ave
Mendota St
Hoover Drive
MacArthur Ave
N Stoughton Service Rd
Prairie Ave
Rowland Ave
Schmedeman Ave
East Washington Ave
151
51
NORTH STUDY
US 51 at East Washington
EastWash Diverging Diamond
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 100-feet

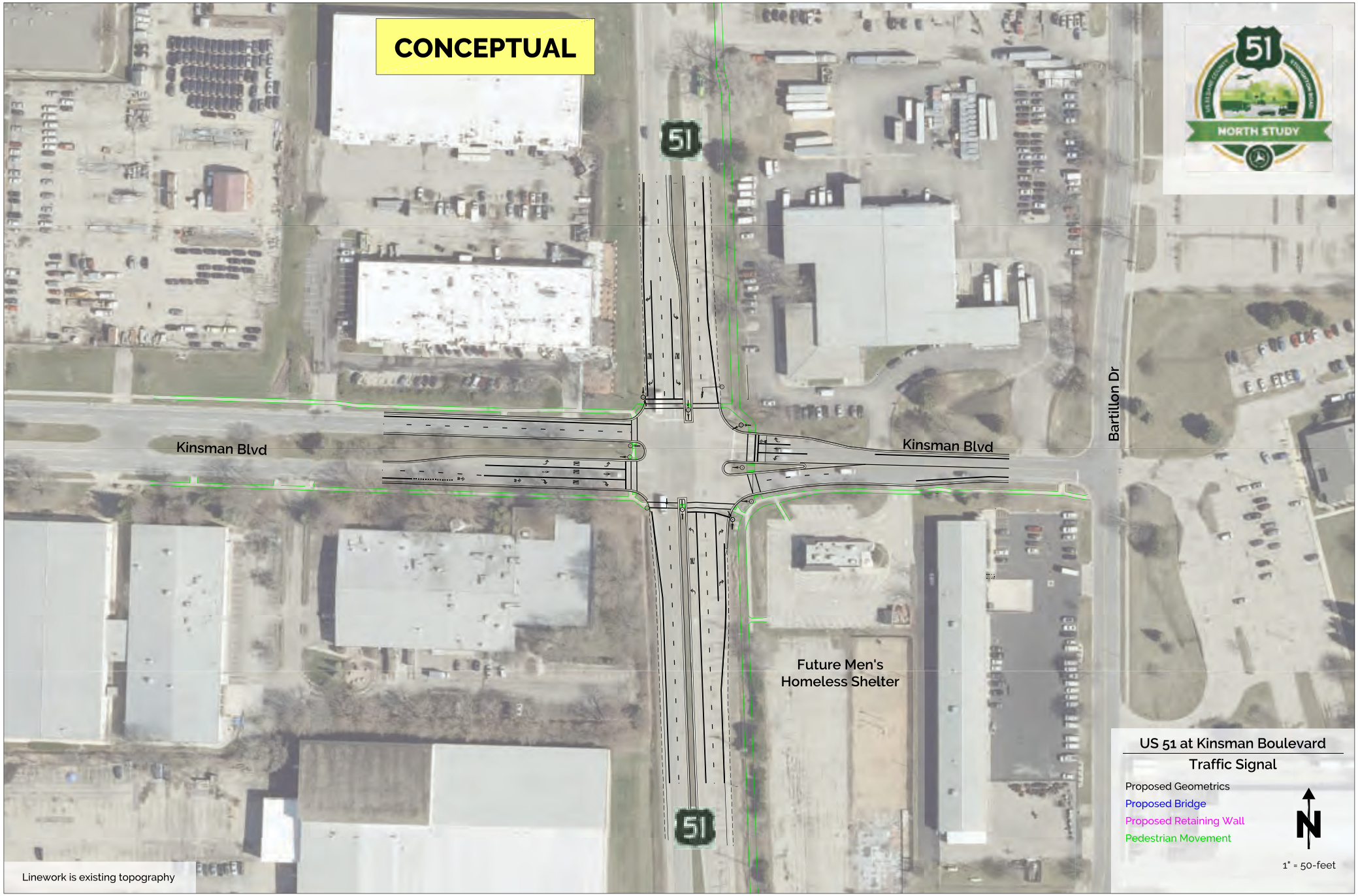

CONCEPTUAL
Section A-A
51
East Washington Ave
Mendota St
Hoover Drive
Rowland Ave
A
A
Schmedeman Ave
MacArthur Ave
Reindahl Ave
151
Prairie Ave
N Stoughton Service Rd
51
NORTH STUDY
US 51 at East Washington
151 Overpass with Roundabout
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 100-feet


CONCEPTUAL
51
NORTH STUDY
Section A-A
Lien Rd
Anderson St
A
A
E Washington
151
Mendota St
Rowland Ave
Hoover Dr
Schmedeman Ave
B
B
MacArthur Ave
N Stoughton Service Rd
51
N Stoughton Rd
151
Albert Ct
Concord Ave
Prairie Ave
Rosedale Ave
Section B-B
US 51 at East Washington
Single Point Urban Interchange
(US 151 Over)
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=100'


CONCEPTUAL
Section A-A
51
East Washington Ave
Mendota St
Hoover Drive
Rowland Ave
Schmedeman Ave
MacArthur Ave
Reindahl Ave
151
Prairie Ave
N Stoughton Service Rd
51
A
A
US 51 at East Washington
Grade Separated Roundabout
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 100-feet


CONCEPTUAL
Section A-A
51
East Washington Ave
Mendota St
Hoover Drive
Rowland Ave
Schmedeman Ave
MacArthur Ave
Reindahl Ave
151
Prairie Ave
N Stoughton Service Rd
51
A
A
US 51 at East Washington
Grade Sep. - SquareAbout
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 100-feet


CONCEPTUAL
Orin Rd
51
NORTH STUDY
Lien Rd
US 51 at Anderson St
Conventional Intersection
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Sidewalk & Shared-Use Path
N
1"=40'

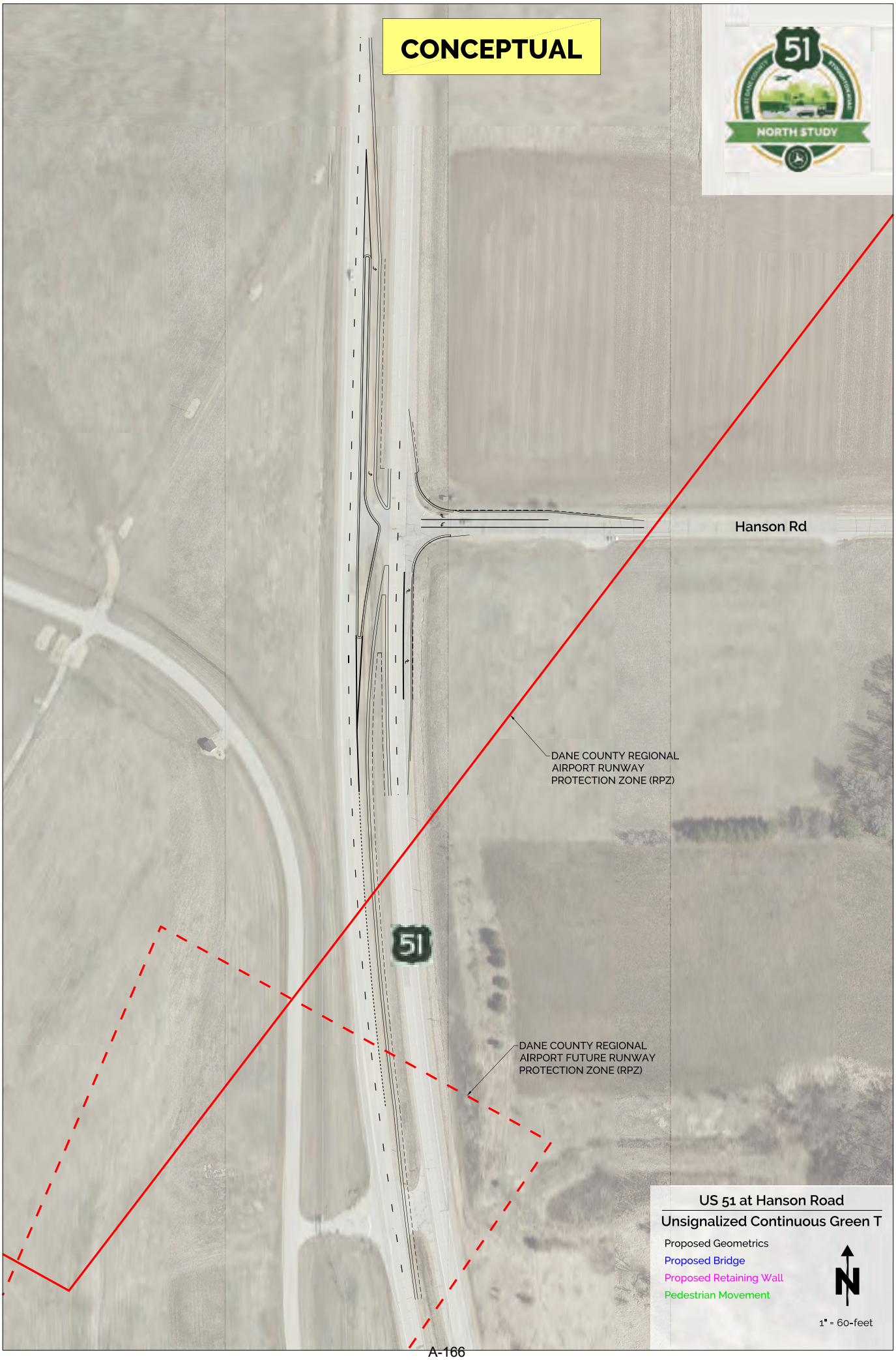

CONCEPTUAL
51
MORTH STUDY
Kinsman Blvd
Kinsman Blvd
Bartillon Dr
Future Men's
Homeless Shelter
51
US 51 at Kinsman Boulevard
Traffic Signal
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 50-feet
Linework is existing topography

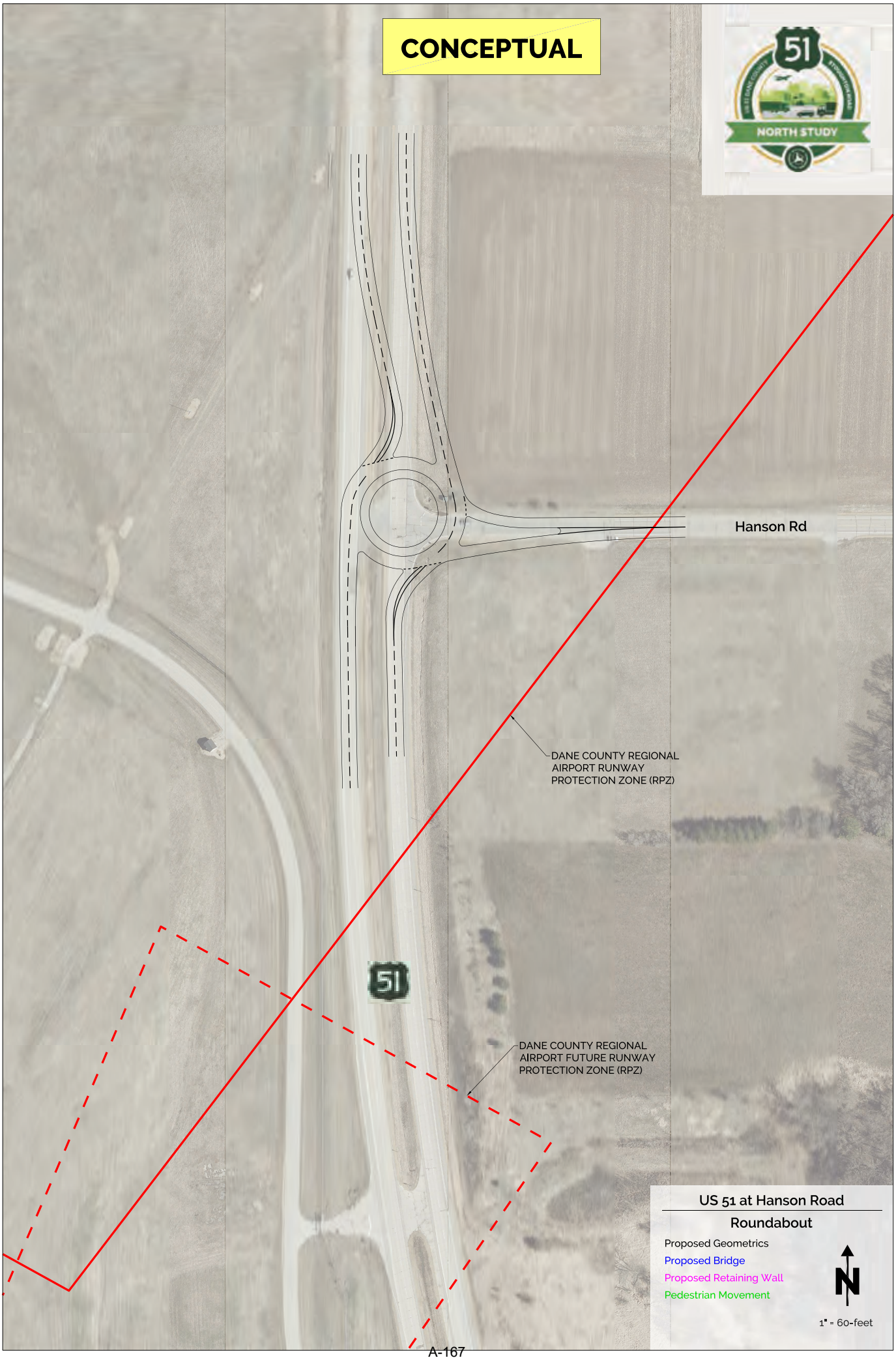

CONCEPTUAL
51
NORTH STUDY
Kinsman Blvd
Kinsman Blvd
Bartillon Dr
Future Men's
Homeless Shelter
51
US 51 at Kinsman Boulevard
Roundabout
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 50-feet

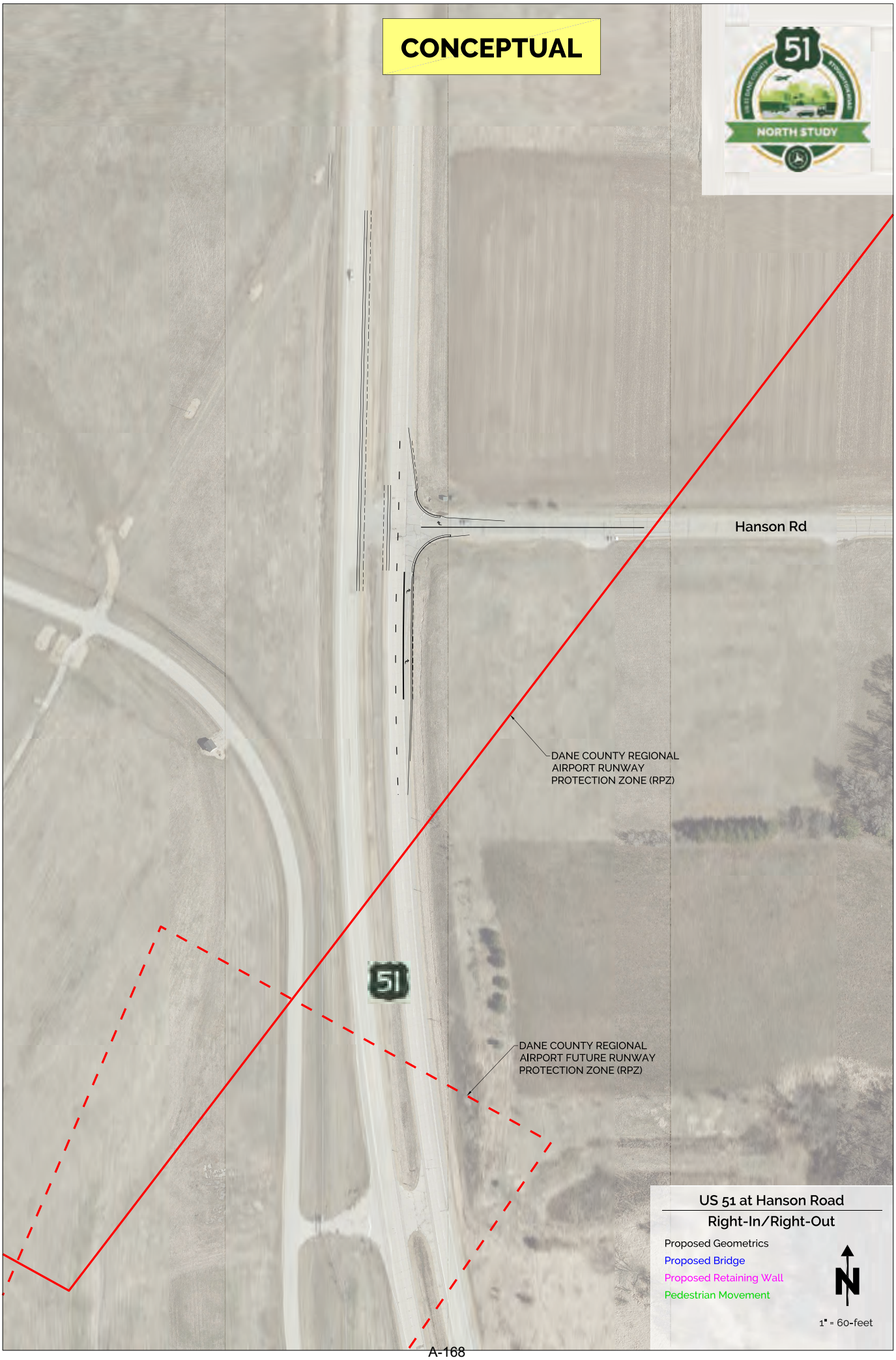

CONCEPTUAL
Leo Cir
Pierstorff St
Pierstorff St
Bartillon Dr
51
NORTH STUDY
US 51 at Pierstorff Street
Right-In/Right-Out
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 50-feet
Linework is existing topography

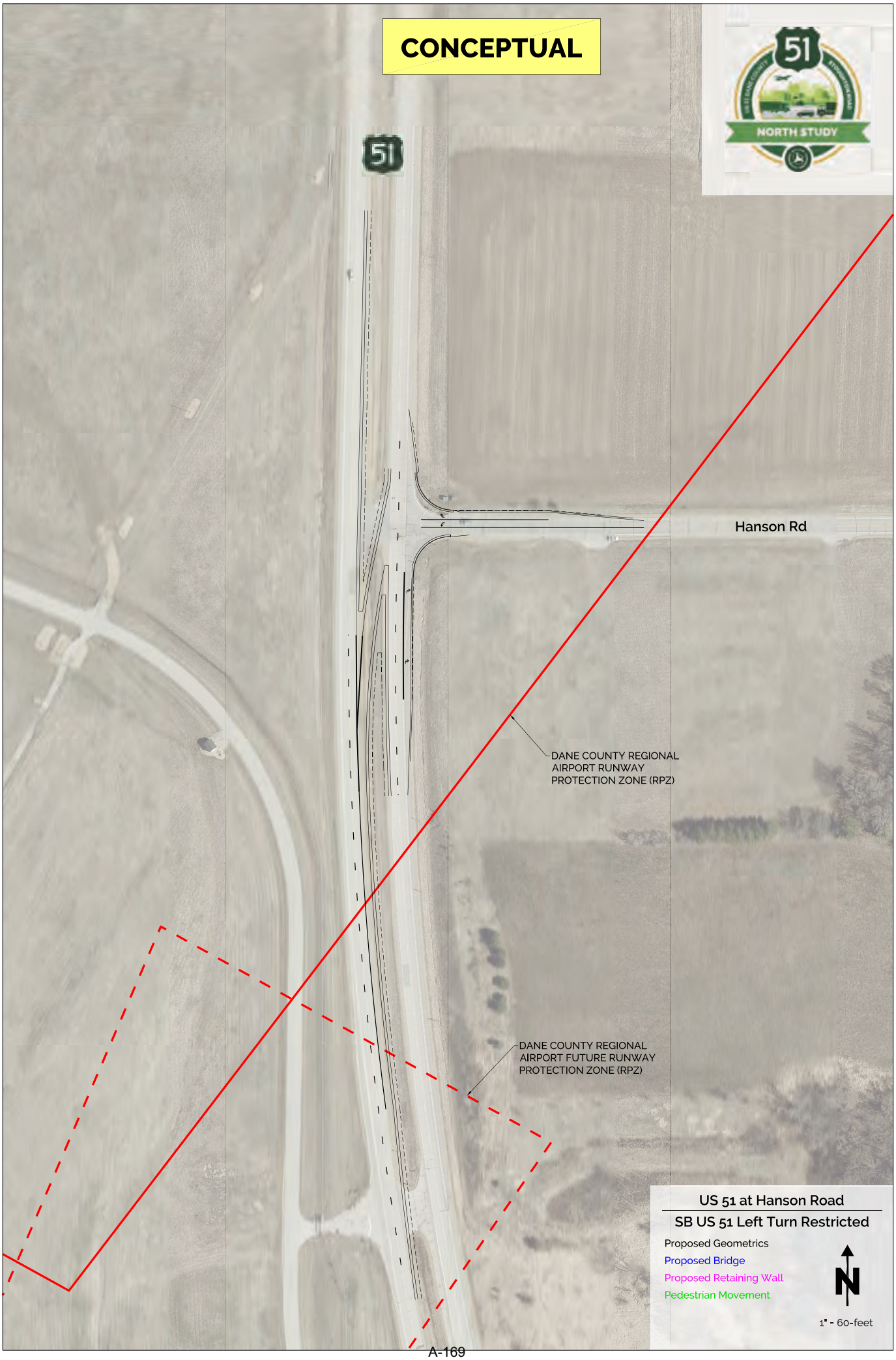

CONCEPTUAL
51
NORTH STUDY
Rieder Rd
51
US 51 at Rieder Road
J-Turn
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 50-feet


CONCEPTUAL
51
NORTH STUDY
Amelia Earhart Dr
51
51
US 51 at Amelia Earhart Drive
Minor Road Stop Control
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 50-feet
Linework is existing topography


CONCEPTUAL
51
NORTH STUDY
Hanson Rd
DANE COUNTY REGIONAL
AIRPORT RUNWAY
PROTECTION ZONE (RPZ)
51
DANE COUNTY REGIONAL
AIRPORT FUTURE RUNWAY
PROTECTION ZONE (RPZ)
US 51 at Hanson Road
Unsignalized Continuous Green T
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 60-feet

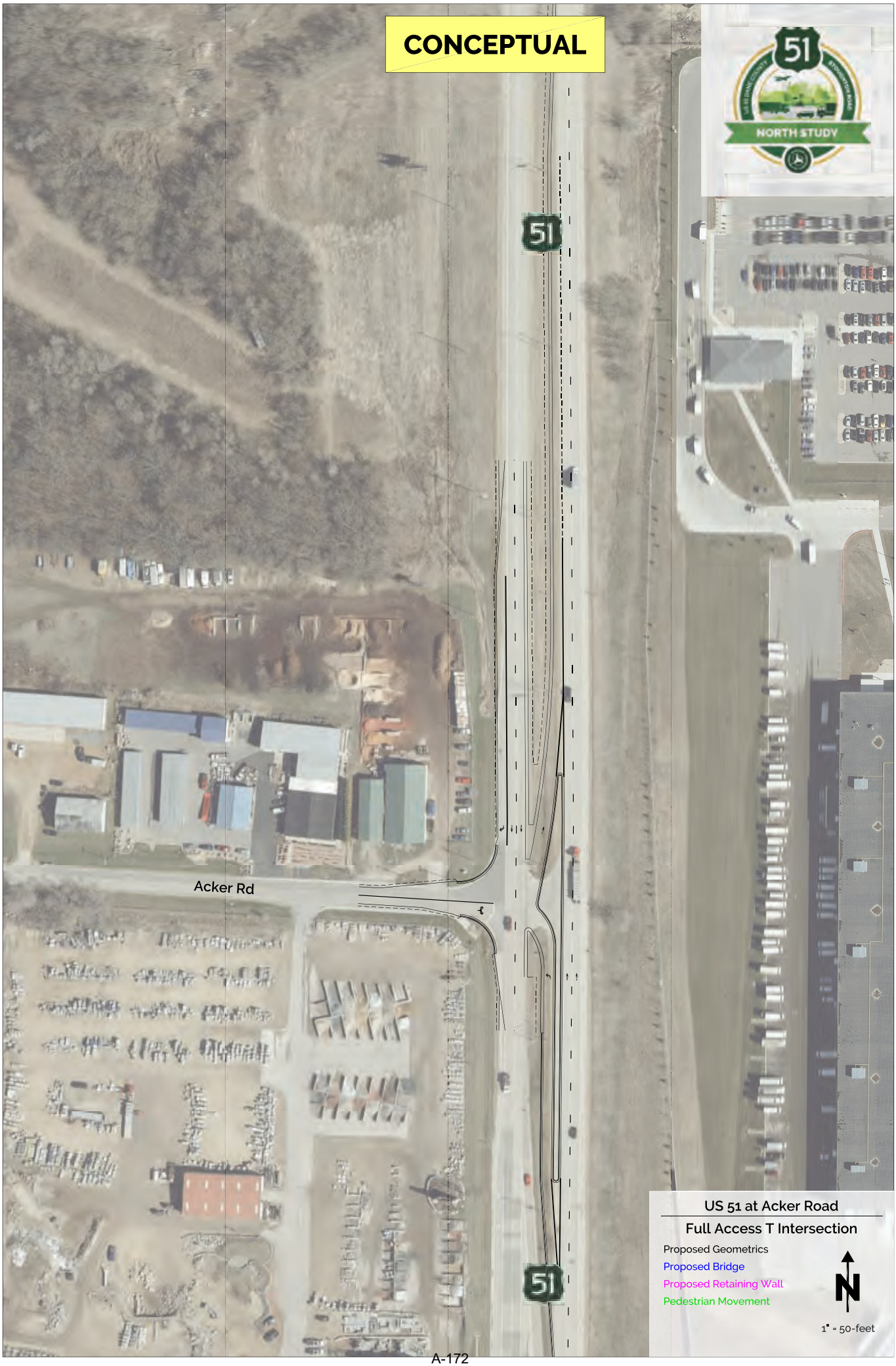

CONCEPTUAL
51
NORTH STUDY
Hanson Rd
DANE COUNTY REGIONAL
AIRPORT RUNWAY
PROTECTION ZONE (RPZ)
51
DANE COUNTY REGIONAL
AIRPORT FUTURE RUNWAY
PROTECTION ZONE (RPZ)
US 51 at Hanson Road
Roundabout
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 60-feet


CONCEPTUAL
NORTH STUDY
Hanson Rd
DANE COUNTY REGIONAL
AIRPORT RUNWAY
PROTECTION ZONE (RPZ)
51
DANE COUNTY REGIONAL
AIRPORT FUTURE RUNWAY
PROTECTION ZONE (RPZ)
US 51 at Hanson Road
Right-In/Right-Out
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 60-feet


CONCEPTUAL
51
NORTH STUDY
51
Hanson Rd
DANE COUNTY REGIONAL
AIRPORT RUNWAY
PROTECTION ZONE (RPZ)
DANE COUNTY REGIONAL
AIRPORT FUTURE RUNWAY
PROTECTION ZONE (RPZ)
US 51 at Hanson Road
SB US 51 Left Turn Restricted
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 60-feet


CONCEPTUAL
51
Acker Rd
NORTH STUDY
Hoepker Rd
Hoepker Rd
Ronald Reagan Avenue
John Wall Drive
51
US 51 at Hoepker Road
Traffic Signal
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 100-feet


CONCEPTUAL
NORTH STUDY
Acker Rd
Hoepker Rd
Hoepker Rd
Ronald Reagan Avenue
John Wall Drive
51
51
US 51 at Hoepker Road
Roundabout
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 100-feet


CONCEPTUAL
51
NORTH STUDY
51
Acker Rd
51
US 51 at Acker Road
Full Access T Intersection
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 50-feet


CONCEPTUAL
51
NORTH STUDY
Anderson Rd
County CV
51
US 51 at County Road CV
Traffic Signal
Proposed Geometrics
Proposed Bridge
Proposed Retaining Wall
Pedestrian Movement
N
1" = 50-feet

ATTACHMENT C

Detailed Screening Matrix

US 51 / STH 30 Interchange Alternatives	Operations	Vehicle Safety	Bike/Ped Safety	Engineering	Community & Collaboration	Impacts	
No Build Conditions	No improvements to existing	No improvements to existing	Existing interchange does not provide any bike and pedestrian facilities	No changes, but deficiencies are not prevalent here	N/A		
Existing Conditions Improved	With added capacity on ramps, operations are averags at a low LOS C.	Lower likelihood to mitigate rear end collisions and weaving	Potential to provide future connection to shared-use path on south side of STH 30, Autumn Ridge path, and to American Family complex	Minimal improvements with lower cost			
Diverging Diamond Interchange (DDI)	Improved LOS and V/C with DDI allowing left turns to go same time as through movements. Fewer conflict points.	Fewer conflict points and higher likelihood to mitigate rear end collisions	Same as conventional improvements, but not as bike/ped friendly due to more uncontrolled crossings and crossing US 51	Improvements to left turns at interchange with DDI, but highest cost for alternatives	More support by BPD and public comment for DDI; however no strong opinions	Minimal impacts, slightly higher impacts to wetlands and utilities	1

Ranking of Alternatives	Very High	High	Medium	Low	Very Low

The alternatives at each location were evaluated based on the refined screening criteria to determine a ranking within the matrix that was used to help determine a recommended intersection alternative. The alternatives that have more green within each row were ranked higher.

Commercial / Lexington Avenue Alternatives	Operations	Vehicle Safety	Bike/Ped Safety	Engineering	Community & Collaboration	Impacts	
No Build Conditions	No improvements to existing intersection or railroad crossing	Higher number of conflict points and crash trends	Existing intersection does not address bike and pedestrian accessibility	No changes, but deficiencies are not prevalent here			
Existing Conditions Improved	Minimal improvements to existing condition. Revised lane configuration and some added capacity. Improved railroad crossing.	Highest number of conflict points and highest exposure factor. Improved railroad crossing with gates.	Highest number of conflict points and all crossings are at grade passing through US 51 intersection; however there are improvments				
Three-Legged with RR Grade Separation							

Ranking of Alternatives	Very High	High	Medium	Low	Very Low

The alternatives at each location were evaluated based on the refined screening criteria to determine a ranking within the matrix that was used to help determine a recommended intersection alternative. The alternatives that have more green within each row were ranked higher.

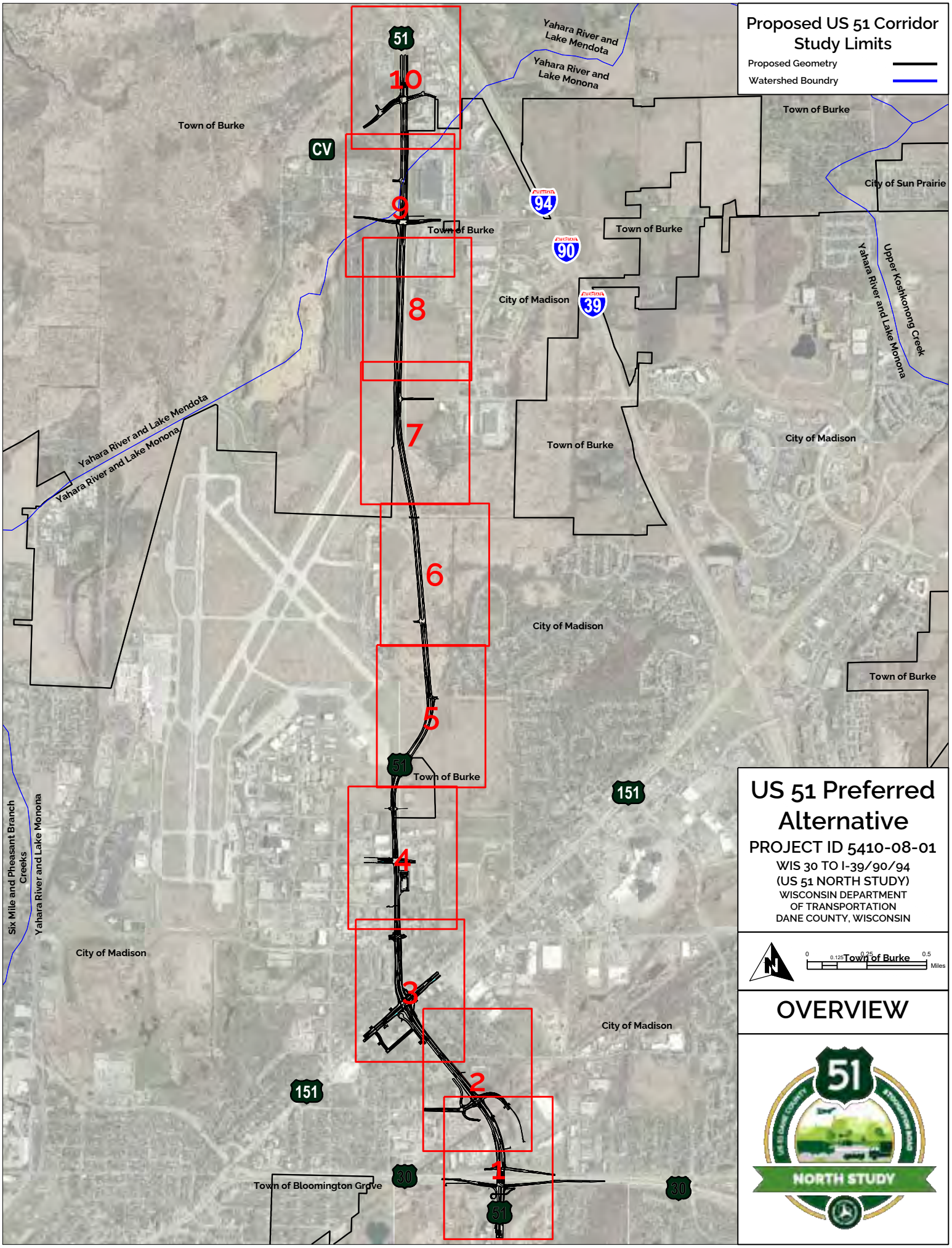
East Washington Avenue Alternatives	Operations	Vehicle Safety	Bike/Ped Safety	Engineering	Community & Collaboration	Impacts	
No Build	Does not address future traffic demands, high conflicting delay during PM hours, and highest conflicting volumes.	High number of conflict points and exposure factor for turning vehicles. Rear end collisions higher.	Average number of conflict points, absence of a NE to SE crossing.		N/A		
Existing Conditions Improved	Average conflicting delay during AM and PM hours. Lower overall LOS without much room for added capacity.		High number of conflict points, average number of multi-staged crossings, longer crossings for all movements.	Addresses geometric deficiencies and pavement condition. Lowest cost and construction complexity.			
Jughandle	Average conflicting delay during AM and PM hours. Best overall LOS and available additional capacity.	Average number of conflict points and exposure factor for turning vehicles and average likelihood to mitigate rear end collisions.	Half the number of conflict points, average number of multi-staged crossings, shorter crossings with option for crossing EWA without crossing traffic	Addresses geometric deficiencies and pavement condition. Highest cost and very hight level of construction complexity.			

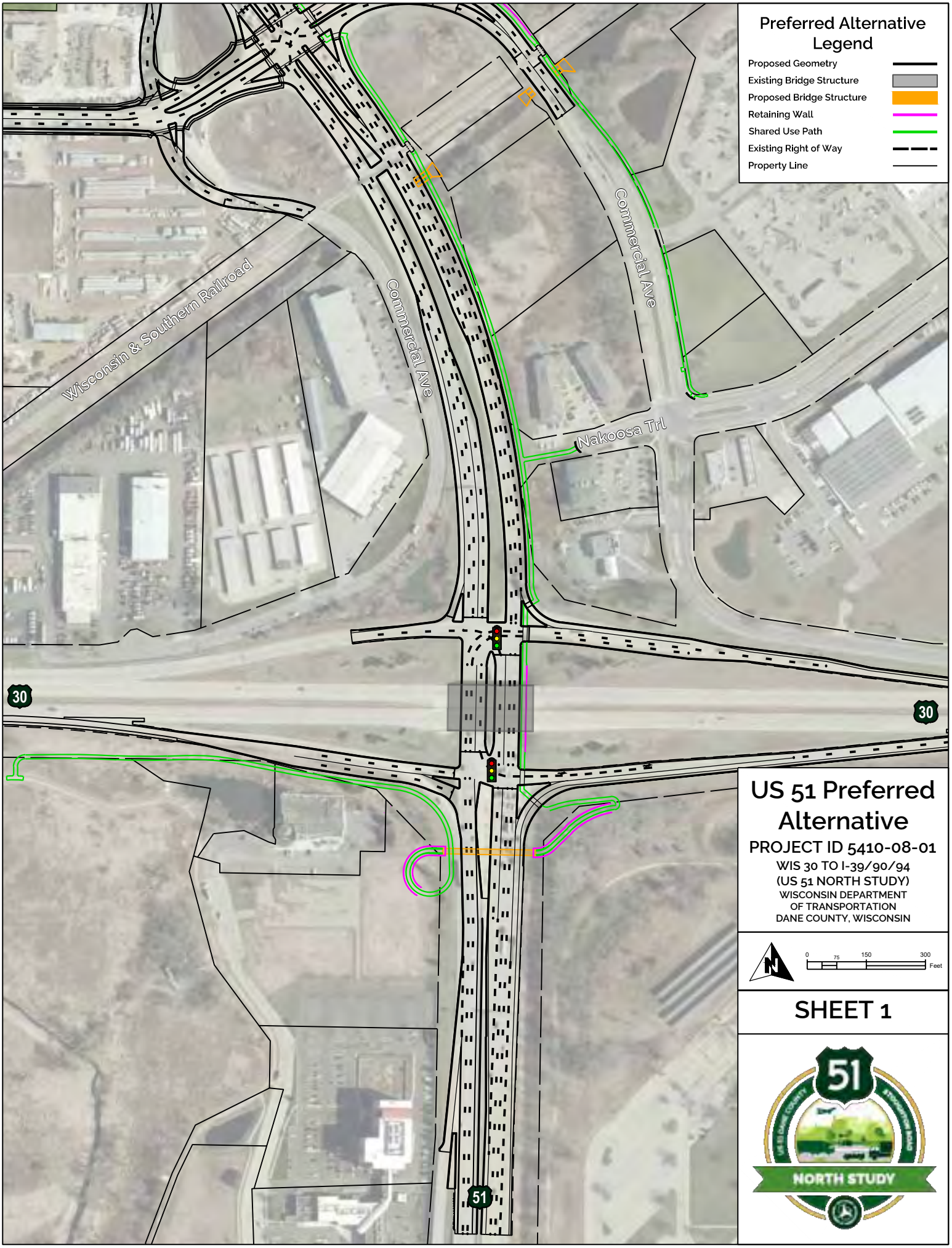
Ranking of Alternatives	Very High	High	Medium	Low	Very Low

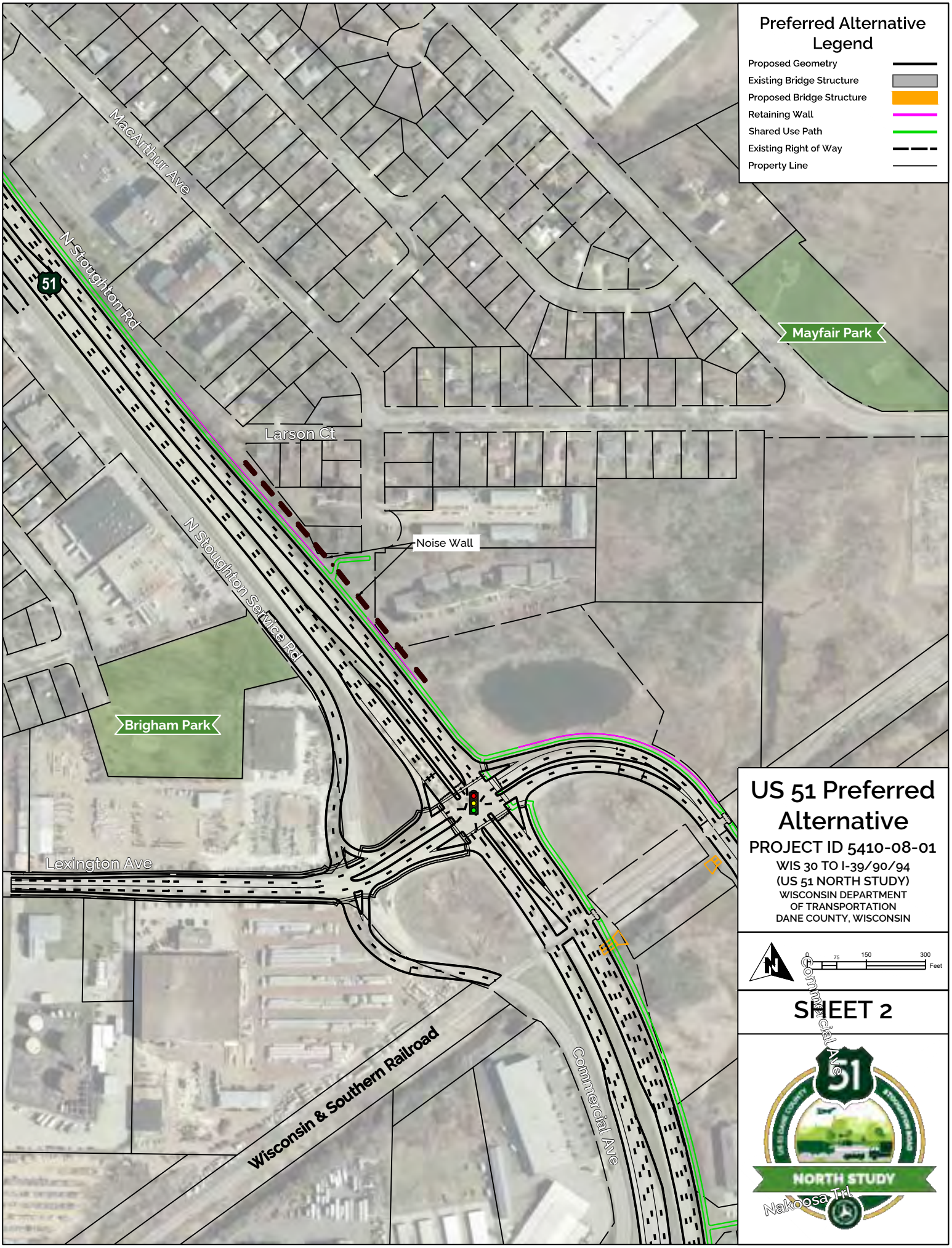
The alternatives at each location were evaluated based on the refined screening criteria to determine a ranking within the matrix that was used to help determine a recommended intersection alternative. The alternatives that have more green within each row were ranked higher.

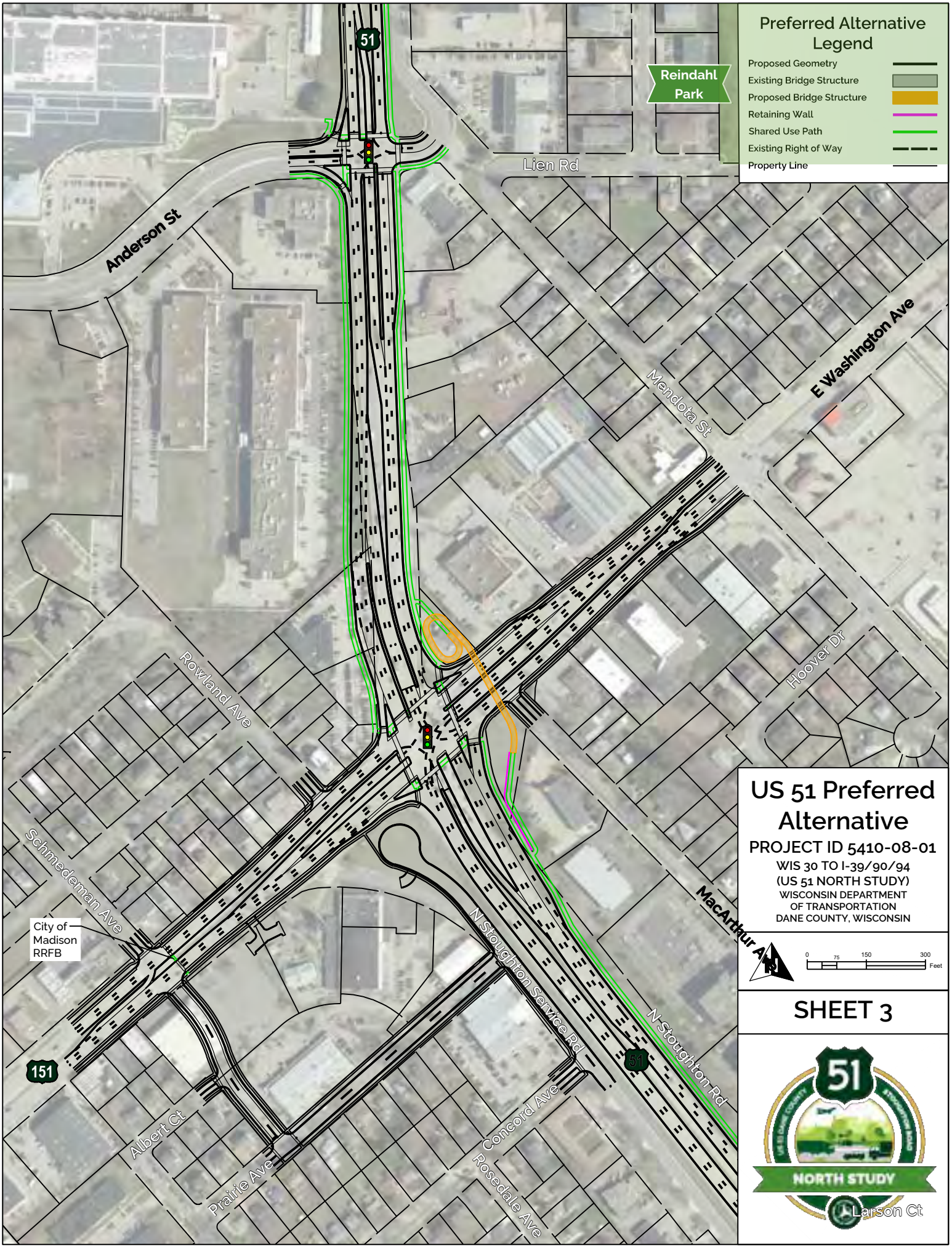
ATTACHMENT D

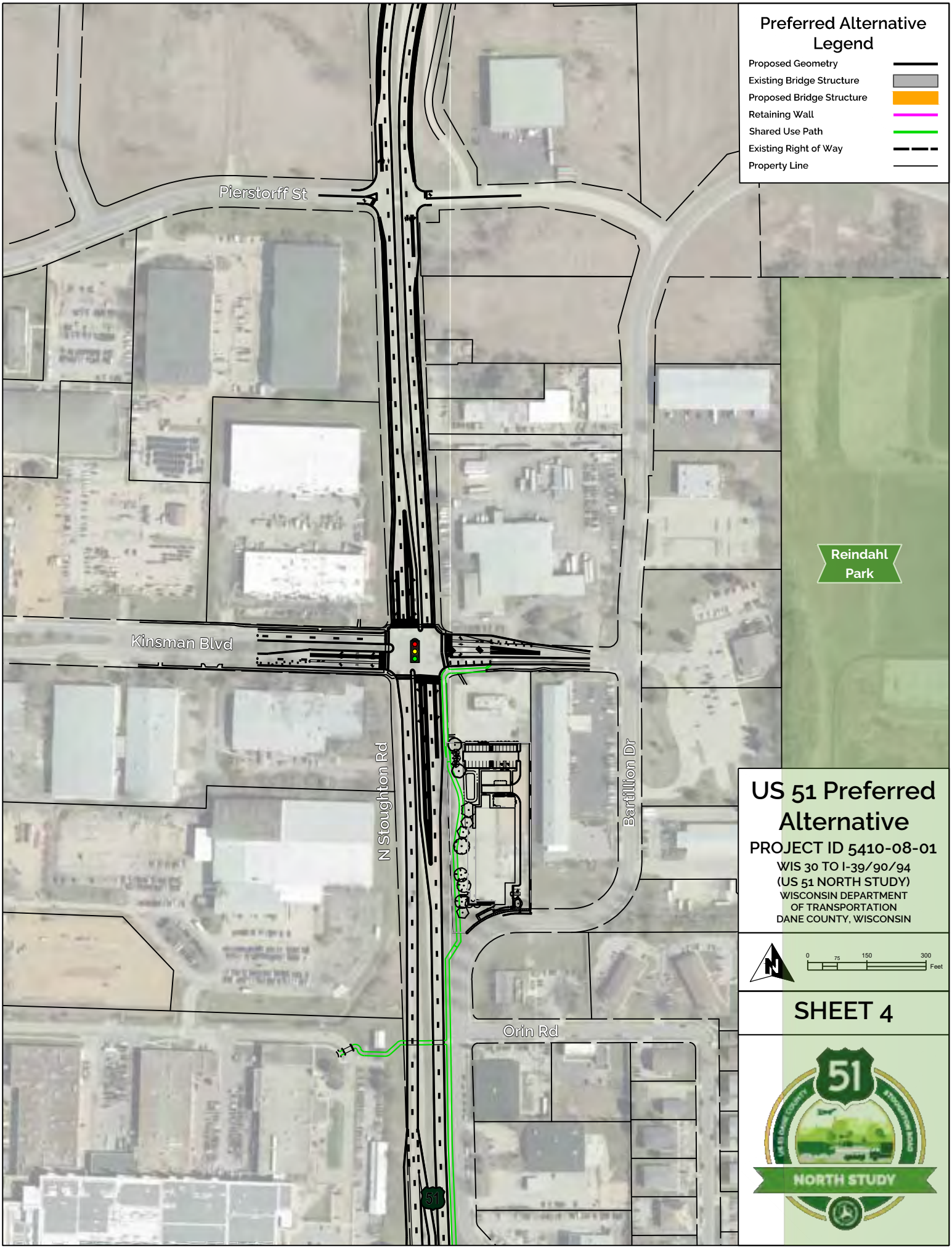
Study Overview

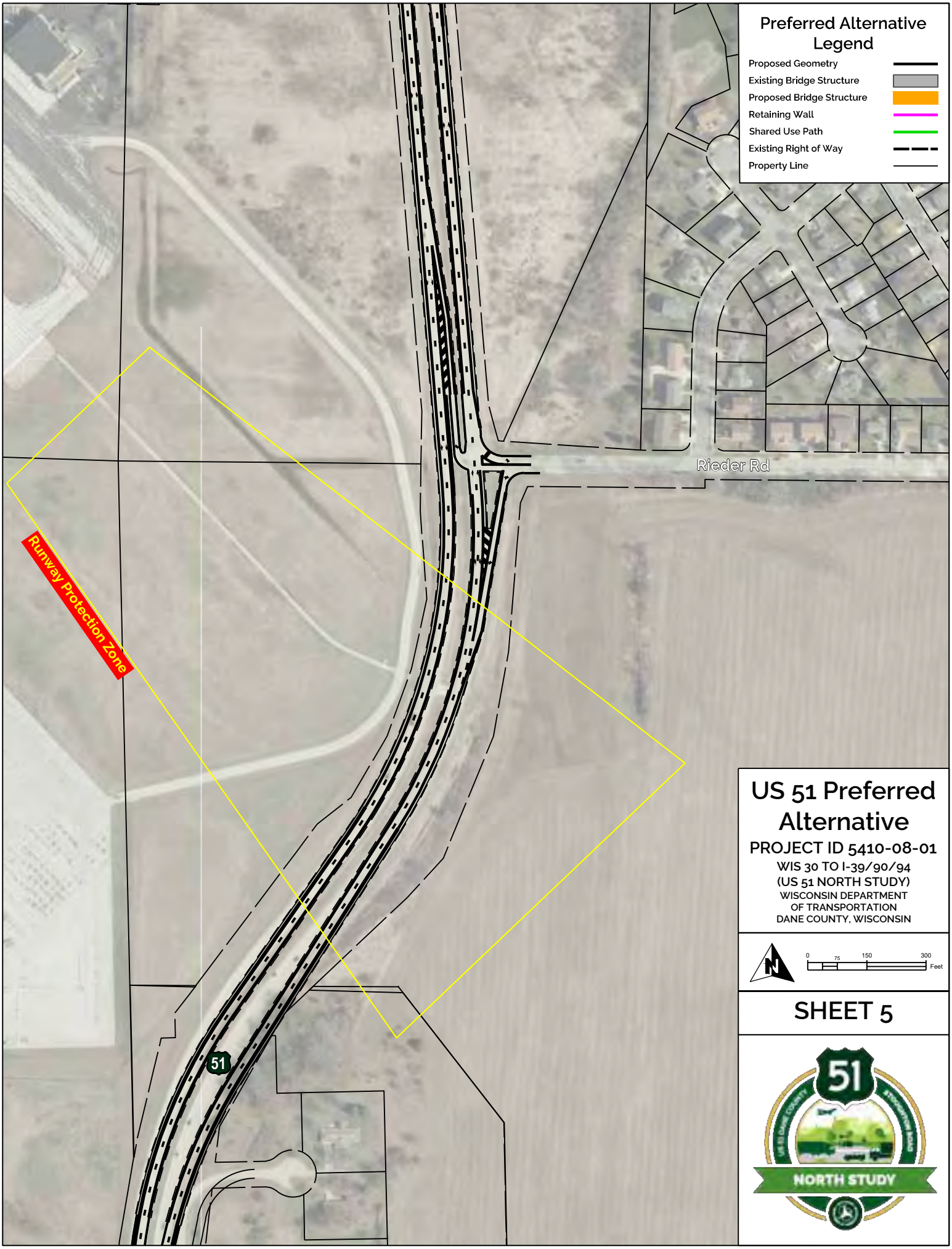

Proposed US 51 Corridor Study Limits
Proposed Geometry
Watershed Boundry
US 51 Preferred Alternative
PROJECT ID 5410-08-01
WIS 30 TO I-39/90/94
(US 51 NORTH STUDY)
WISCONSIN DEPARTMENT OF TRANSPORTATION
DANE COUNTY, WISCONSIN
0 0.125 0.25 0.5 Miles
OVERVIEW
NORTH STUDY
10
9
8
7
6
5
4
3
2
1
Town of Burke
City of Madison
City of Sun Prairie
Town of Bloomington Grove
Yahara River and Lake Mendota
Yahara River and Lake Monona
Upper Koshkonong Creek
Six Mile and Pheasant Branch Creeks
51
CV
94
90
39
151
30

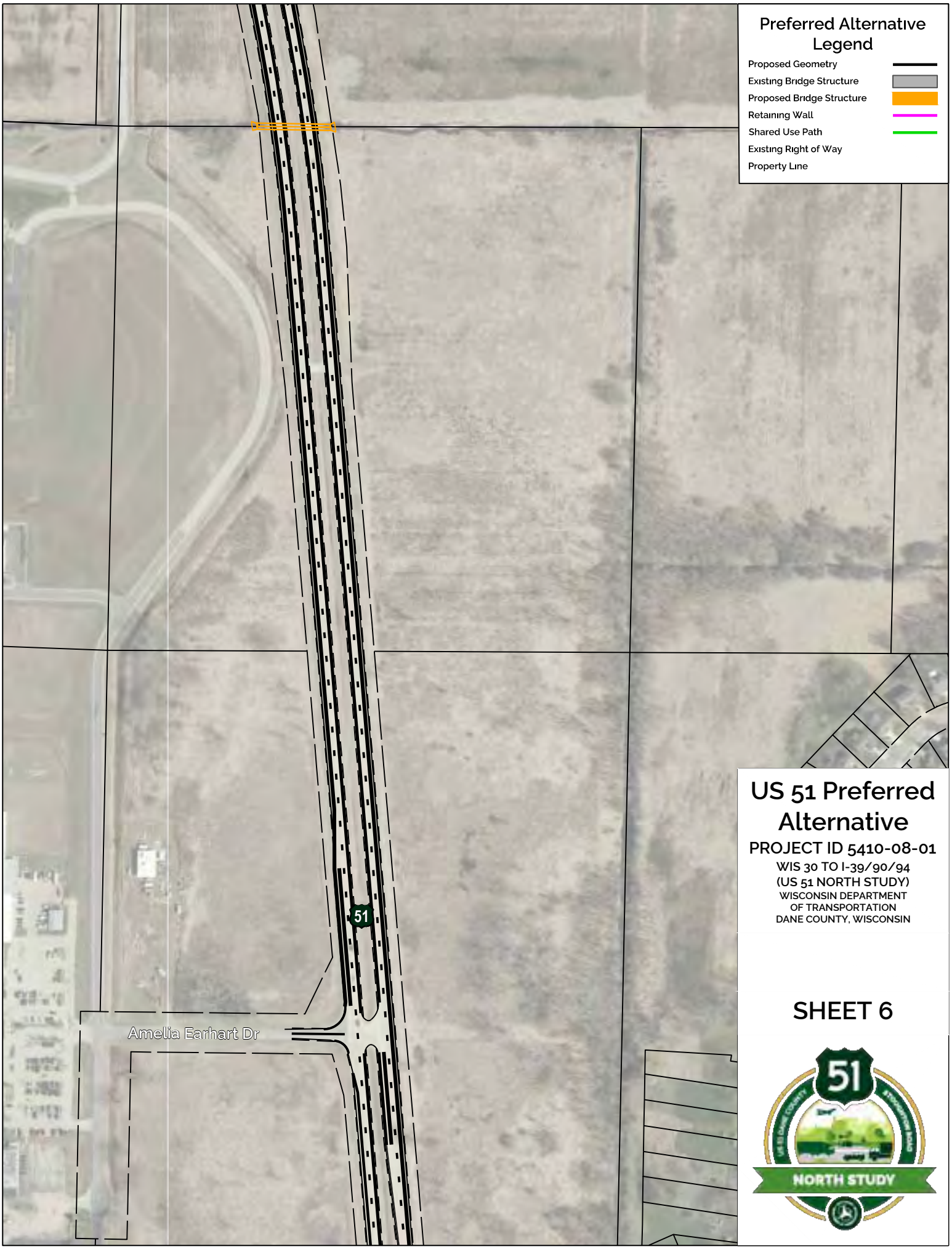

Preferred Alternative Legend
Proposed Geometry
Existing Bridge Structure
Proposed Bridge Structure
Retaining Wall
Shared Use Path
Existing Right of Way
Property Line
Wisconsin & Southern Railroad
Commercial Ave
Commercial Ave
Nakoosa Trl
30
30
51
US 51 Preferred Alternative
PROJECT ID 5410-08-01
WIS 30 TO I-39/90/94
(US 51 NORTH STUDY)
WISCONSIN DEPARTMENT OF TRANSPORTATION
DANE COUNTY, WISCONSIN
N
0
75
150
300
Feet
SHEET 1
51
NORTH STUDY


Preferred Alternative Legend
Proposed Geometry
Existing Bridge Structure
Proposed Bridge Structure
Retaining Wall
Shared Use Path
Existing Right of Way
Property Line
MacArthur Ave
N Stoughton Rd
51
Mayfair Park
Larson Ct
Noise Wall
N Stoughton Service Rd
Brigham Park
Lexington Ave
Wisconsin & Southern Railroad
Commercial Ave
Commercial Ave
US 51 Preferred Alternative
PROJECT ID 5410-08-01
WIS 30 TO I-39/90/94
(US 51 NORTH STUDY)
WISCONSIN DEPARTMENT
OF TRANSPORTATION
DANE COUNTY, WISCONSIN
N
75
150
300
Feet
SHEET 2
51
NORTH STUDY
Nakoosa Trl


Preferred Alternative Legend
Proposed Geometry
Existing Bridge Structure
Proposed Bridge Structure
Retaining Wall
Shared Use Path
Existing Right of Way
Property Line
Reindahl Park
Lien Rd
Anderson St
E Washington Ave
Mendota St
Hoover Dr
Rowland Ave
Schmedeman Ave
City of Madison RRFB
MacArthur Ave
N Stoughton Service Rd
N Stoughton Rd
Albert Ct
Prairie Ave
Concord Ave
Rosedale Ave
Larson Ct
51
151
US 51 Preferred Alternative
PROJECT ID 5410-08-01
WIS 30 TO I-39/90/94
(US 51 NORTH STUDY)
WISCONSIN DEPARTMENT OF TRANSPORTATION
DANE COUNTY, WISCONSIN
0 75 150 300 Feet
SHEET 3
NORTH STUDY


Preferred Alternative Legend
Proposed Geometry
Existing Bridge Structure
Proposed Bridge Structure
Retaining Wall
Shared Use Path
Existing Right of Way
Property Line
Pierstorff St
Kinsman Blvd
N Stoughton Rd
Bartillion Dr
Orin Rd
Reindahl Park
51
US 51 Preferred Alternative
PROJECT ID 5410-08-01
WIS 30 TO I-39/90/94
(US 51 NORTH STUDY)
WISCONSIN DEPARTMENT OF TRANSPORTATION
DANE COUNTY, WISCONSIN
N
0 75 150 300
Feet
SHEET 4
51
NORTH STUDY


Preferred Alternative Legend
Proposed Geometry
Existing Bridge Structure
Proposed Bridge Structure
Retaining Wall
Shared Use Path
Existing Right of Way
Property Line
Rieder Rd
Runway Protection Zone
51
US 51 Preferred Alternative
PROJECT ID 5410-08-01
WIS 30 TO I-39/90/94
(US 51 NORTH STUDY)
WISCONSIN DEPARTMENT OF TRANSPORTATION
DANE COUNTY, WISCONSIN
N
0
75
150
300
Feet
SHEET 5
51
NORTH STUDY

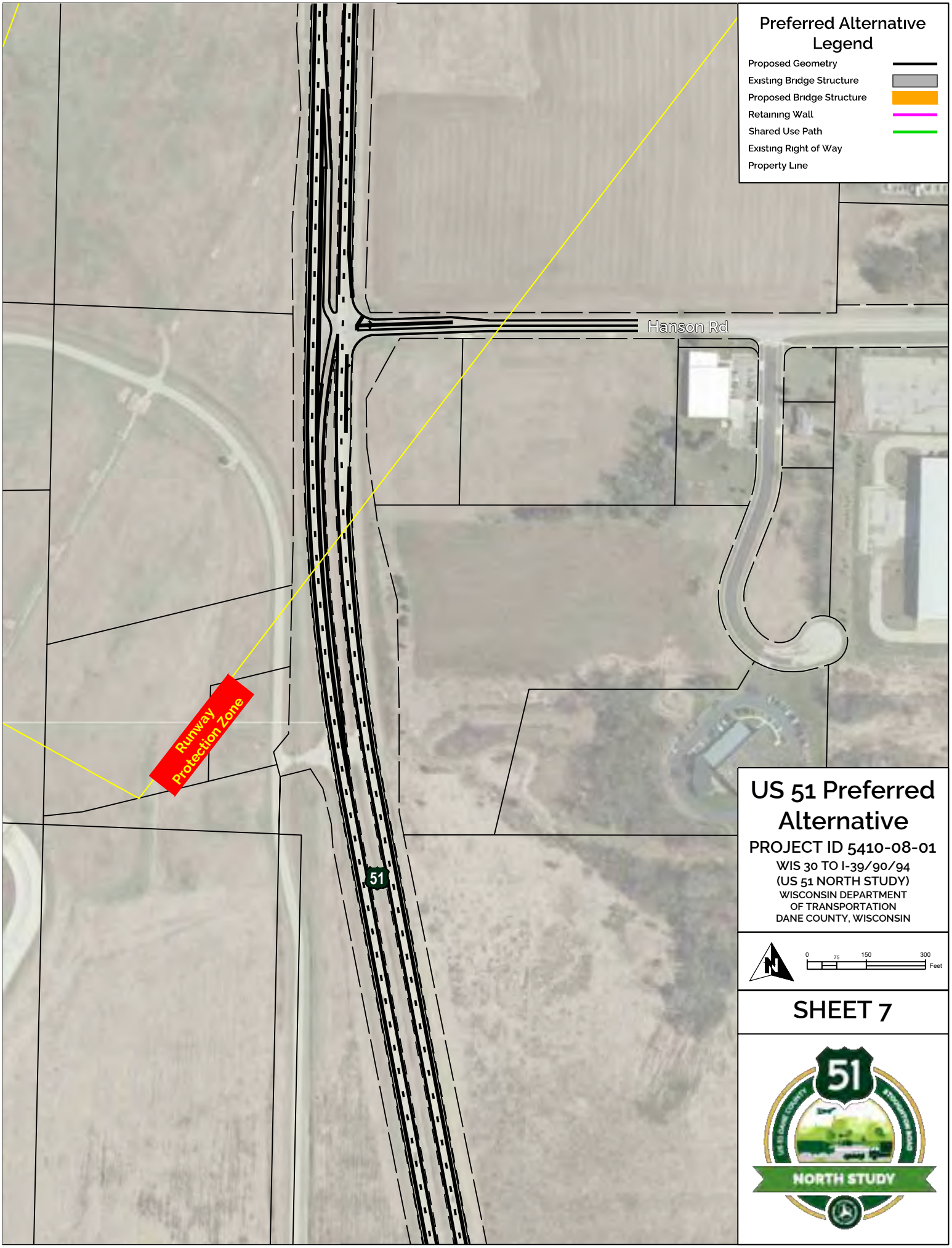


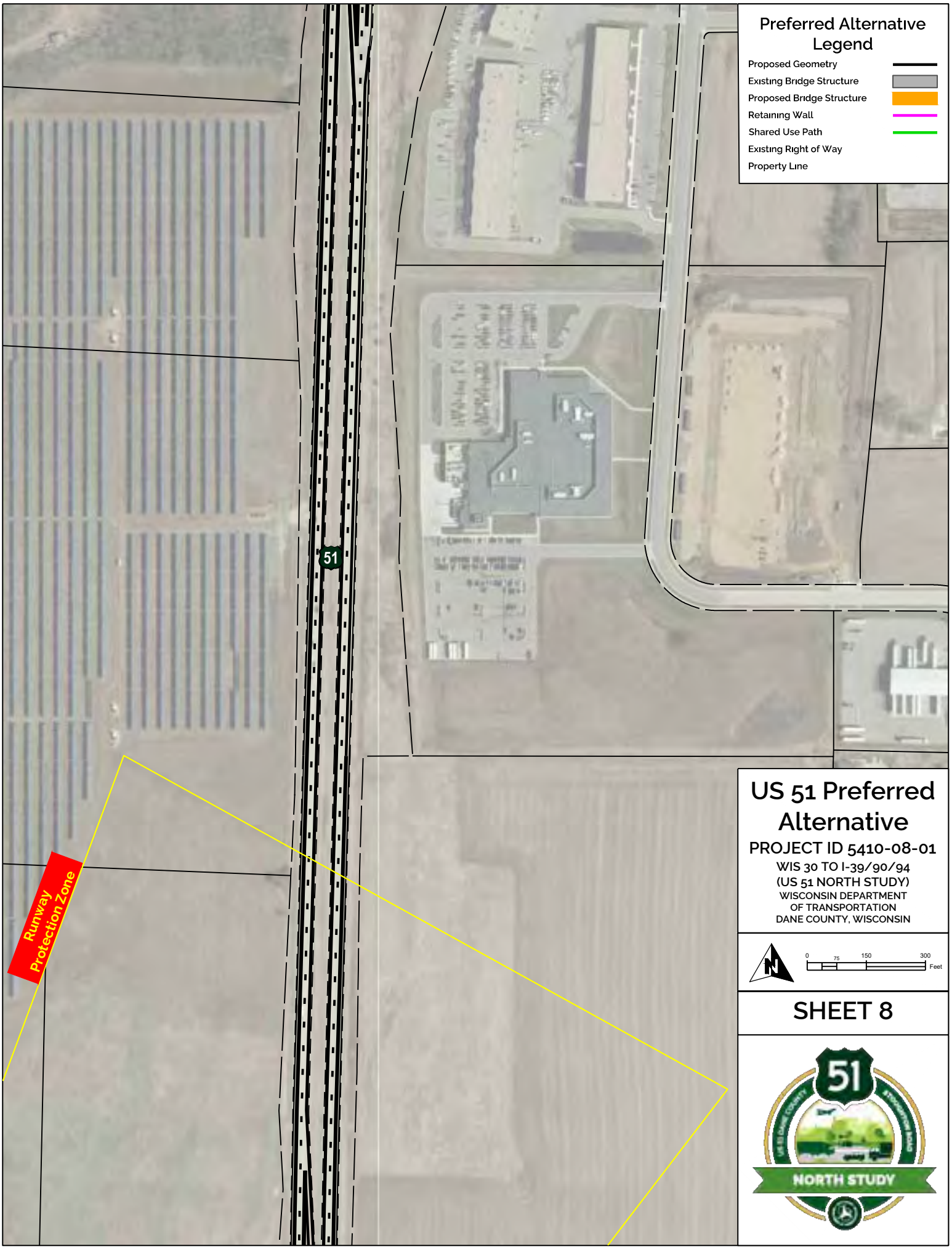
US 51 Preferred Alternative

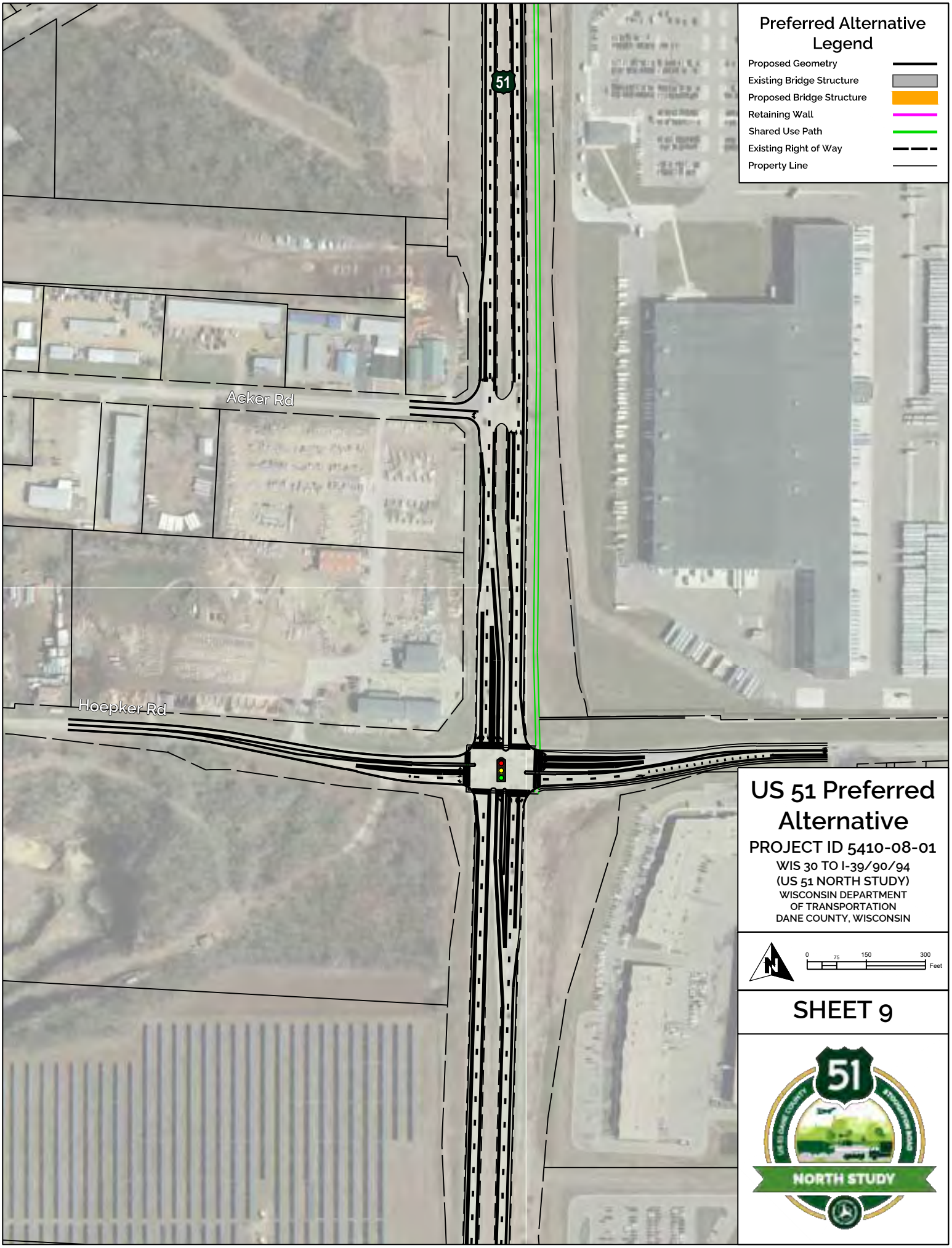
PROJECT ID 5410-08-01

WIS 30 TO I-39/90/94
(US 51 NORTH STUDY)
WISCONSIN DEPARTMENT
OF TRANSPORTATION
DANE COUNTY, WISCONSIN

SHEET 6


Preferred Alternative Legend
Proposed Geometry
Existing Bridge Structure
Proposed Bridge Structure
Retaining Wall
Shared Use Path
Existing Right of Way
Property Line
Hanson Rd
Runway Protection Zone
51
US 51 Preferred Alternative
PROJECT ID 5410-08-01
WIS 30 TO I-39/90/94
(US 51 NORTH STUDY)
WISCONSIN DEPARTMENT OF TRANSPORTATION
DANE COUNTY, WISCONSIN
N
0
75
150
300
Feet
SHEET 7
51
NORTH STUDY


Preferred Alternative Legend
Proposed Geometry
Existing Bridge Structure
Proposed Bridge Structure
Retaining Wall
Shared Use Path
Existing Right of Way
Property Line
51
Runway Protection Zone
US 51 Preferred Alternative
PROJECT ID 5410-08-01
WIS 30 TO I-39/90/94
(US 51 NORTH STUDY)
WISCONSIN DEPARTMENT OF TRANSPORTATION
DANE COUNTY, WISCONSIN
N
0
75
150
300
Feet
SHEET 8
51
NORTH STUDY


Preferred Alternative Legend
Proposed Geometry
Existing Bridge Structure
Proposed Bridge Structure
Retaining Wall
Shared Use Path
Existing Right of Way
Property Line
51
Acker Rd
Hoepker Rd
US 51 Preferred Alternative
PROJECT ID 5410-08-01
WIS 30 TO I-39/90/94
(US 51 NORTH STUDY)
WISCONSIN DEPARTMENT OF TRANSPORTATION
DANE COUNTY, WISCONSIN
N
0
75
150
300
Feet
SHEET 9
51
NORTH STUDY


Preferred Alternative Legend
Proposed Geometry
Existing Bridge Structure
Proposed Bridge Structure
Retaining Wall
Shared Use Path
Existing Right of Way
Property Line
Daentl Rd
US 51 project to tie into I-39/90/94 project.
Daentl Rd
Anderson Rd
CV
51
US 51 Preferred Alternative
PROJECT ID 5410-08-01
WIS 30 TO I-39/90/94
(US 51 NORTH STUDY)
WISCONSIN DEPARTMENT OF TRANSPORTATION
DANE COUNTY, WISCONSIN
N
0
75
150
300
Feet
SHEET 10
51
NORTH STUDY