



ALTERNATIVES DEVELOPMENT AND ANALYSIS TECHNICAL MEMORANDUM

Planning and Environment Linkages (PEL) Study

I-80 over Mississippi River

Rock Island County, IL and Scott County, IA

IDOT District 2

July 2022

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1 Introduction

1.1 Project Location/Description

This Alternatives Development and Analysis Technical Memorandum is part of the I-80 over the Mississippi River Planning and Environment Linkages (PEL) study being conducted by the Illinois Department of Transportation (IDOT) in coordination with the Iowa Department of Transportation (Iowa DOT). The project study area shown in **Figure 1** is located within Rock Island County, Illinois and Scott County, Iowa. Beginning in Illinois, the project study area encompasses the entire I-88/I-80 system interchange in all directions (i.e., eastern logical terminus): west along IL 5/IL 92 to Denhardt Road/193rd Street N, south along I-80 approximately 3,200 feet, and east along I-88 (Ronald Reagan Memorial Highway) to Old IL 2 (38th Avenue). Continuing north along I-80, the project study area includes eastbound and westbound Weigh Stations, a Rest Area (Frontage Road) for eastbound traffic, and a full interchange access to IL 84 (2nd Avenue). Along IL 84 (2nd Avenue), it extends west to 180th Street N and east to 19th Street. Continuing across the Mississippi River into Iowa, the project study area includes a full interchange access to US 67 (S Cody Road). Along US 67 (S Cody Road), it extends west to Sycamore Drive/Canal Shore Drive SW and east to Eagle Ridge Road. The project study area continues north and west along I-80 where it ends at the SW 35th Street bridge (i.e., western logical terminus). The total length of the project study area is approximately 5.8 miles. The I-80 over the Mississippi River Phase I (preliminary engineering and environmental clearance) is currently listed in the Bi-State Regional Commission 2022-2025 Transportation Improvement Program (TIP). The IDOT Fiscal Year 2022-2027 Proposed Highway Improvement Program includes funding for the I-80 over Mississippi River project through construction.

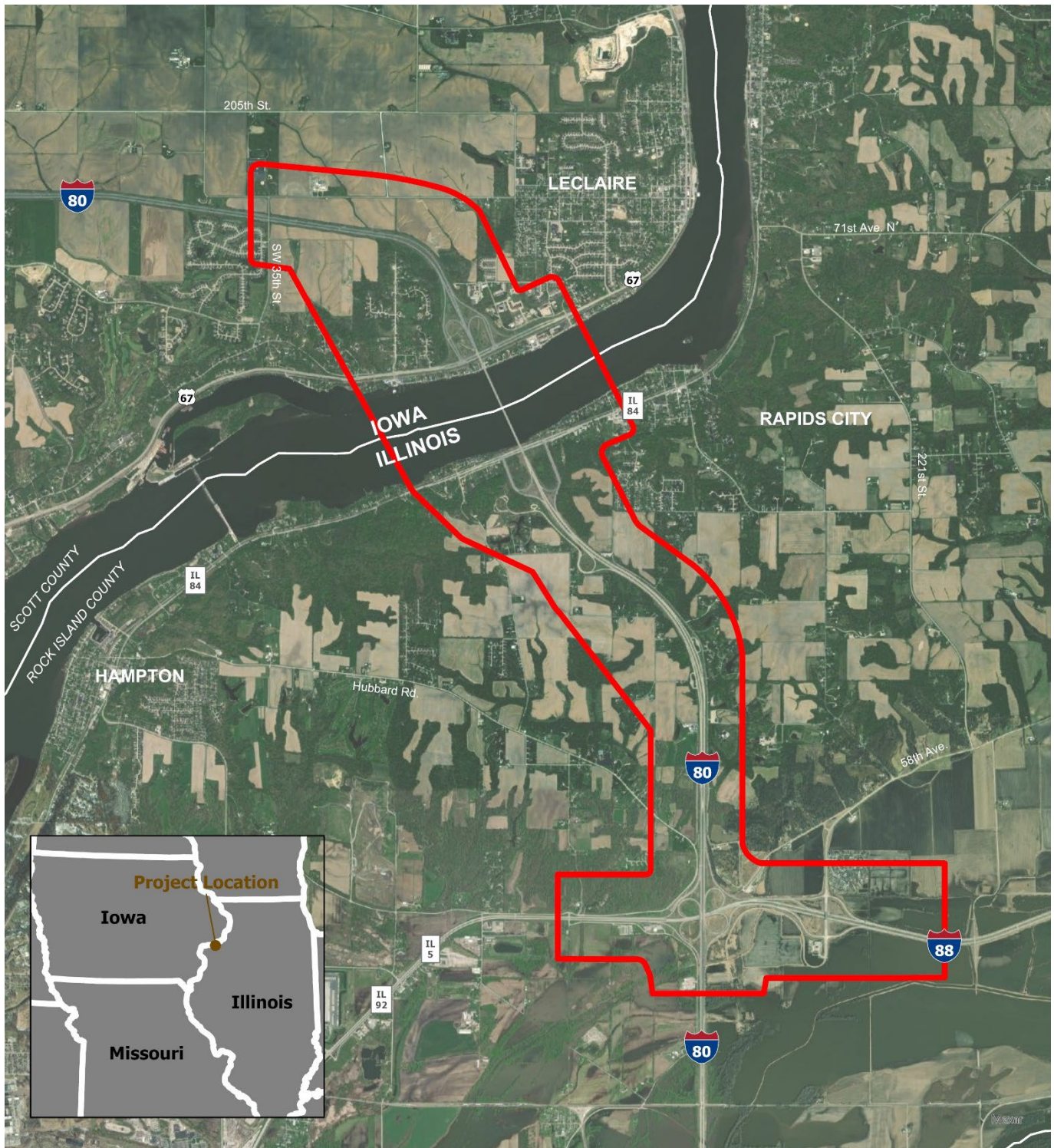
The I-80/I-88 interchange represents the project's eastern logical terminus as it is the first interchange east of the I-80 bridge over the Mississippi River and the I-80/IL 84 interchange, a point of change in traffic patterns and volumes, and a concern for design deficiencies. The SW 35th Street bridge is the project's western logical terminus because it represents the estimated limit of improvements associated with the I-80/US 67 interchange and I-80 bridge over the Mississippi River. The SW 35th Street bridge also represents the eastern logical terminus for another Iowa DOT project in Scott County called the I-80 Corridor Study. As previously mentioned, the length of the project study area between these logical termini is 5.8 miles. The development of this project does not depend on the development of any other projects; therefore, it has independent utility.

Sections 1.3 discusses the existing conditions of I-80 and its associated bridges and interchanges, existing and future traffic conditions, and existing environmental conditions within the project study area. Section 1.4 discusses the project's purpose and need.

1.2 Feasibility Review Summary

In March 2017, IDOT District 2 completed the *Feasibility Review, I-80 over the Mississippi River* that considered additional lanes across the Mississippi River on I-80. The Feasibility Review was based on the assumptions that the existing bridge would be partially or completely reconstructed and widened to three lanes for traffic in one direction and a new three-lane companion bridge would be constructed adjacent to the existing bridge for traffic in the opposite direction. The purpose was to assist IDOT and Iowa DOT in arriving at a consensus on several key project planning elements as well as provide direction for potential future studies. The primary focus was to determine whether the existing substructure (i.e., piers) should be completely removed or whether it should be reintegrated (i.e., re-used) into new construction. Based on a comparison of lifecycle costs and advantages and disadvantages, the Feasibility Review recommended that removal of the existing substructure be pursued under further study and considered the preferred course of action over the re-use of the existing substructure.

FIGURE 1 – PROJECT STUDY AREA



1.3 Existing Conditions Technical Report Summary

As part of the I-80 over the Mississippi River PEL study, IDOT completed an *Existing Conditions Technical Report* (ECTR) in July 2020. (Note: For the ECTR, the western end of the project study area was located just east of the Middle Road interchange. However, since the report, the western end of the project study area was moved approximately 3 miles to the east and now ends at the SW 35th Street bridge. The following summary of the ECTR presents the information associated with the revised project study area.) The purpose of this report was to identify existing roadway, bridge, traffic (existing and future), safety (i.e., crashes), and environmental conditions within the project study area. The report identified three deficient curves on the I-80 mainline and 13 deficient curves associated with the US 67, IL 84, and I-88 interchanges. There are also two deficient curves associated with the I-88/Old IL 2 interchange. In addition, the ramp terminals associated with the entrance loop ramps at the IL 84 and US 67 interchanges do not meet current design standards. Bridge deficiencies were also identified on the I-80 bridge over the Mississippi River, the I-80 bridges over I-88, one local road bridge over I-80, and one I-88 culvert. The traffic analysis determined that all of the highway sections and ramps operate at level of service (LOS) A or B under existing conditions (i.e., year 2017), except for the eastbound exit ramp for the I-80/IL 84 interchange, which operates at LOS C. Levels of service range from A to F, with LOS A representing free-flowing traffic (i.e., no congestion) while LOS F represents heavy traffic congestion. By the year 2045, most of the sections will continue to operate at LOS A or B, with eight sections operating at LOS C. Both IDOT and Iowa DOT list LOS C as the design standard for urban interstates. Because I-80 and I-88 are designated as urban interstates within the project study area, all of the sections currently operate and are projected to operate at an acceptable LOS. (Note: The traffic analysis was subsequently updated for the 2050 design year to be consistent with the Bi-State Regional Plan Commission Long Range Transportation Plan. Similar to the 2045 analysis, all sections in the project area are projected to operate at LOS C or better in 2050.) The information from the ECTR was then used in the development of the project's purpose and need, which is summarized in the following Section 1.4.

The ECTR also identified existing environmental conditions within the project study area using secondary source data. The following is a summary of the environmental conditions that were identified in the ECTR. In addition to the Mississippi River, the project study area crosses six streams. The Mississippi River and one unnamed stream have designated 100-year floodplains and floodways and another unnamed stream has a designated 100-year floodplain. There is one public park, one forest preserve/refuge (i.e., natural area), and the Great River Trail within the project study area. Forested habitat is located within the project study area that could represent potential habitat for the federally endangered Indiana bat and the federally threatened northern long-eared bat. In addition, there are three federally endangered mussel species and one Illinois-threatened mussel species located in the Mississippi River downstream of the project study area. The bald eagle inhabits the project study area in the Illiniwek Forest Preserve and the Elton E. Fawks Bald Eagle Refuge and the peregrine falcon has been known to nest on the I-80 bridge over the Mississippi River. Wetlands from the National Wetland Inventory (NWI) maps are located along the Mississippi River west of I-80 and south of the I-80/I-88 interchange. Five archaeological sites are located in Illinois. These sites are not listed on the National Register of Historic Places (NRHP) but warrant further investigation if they would be impacted. A portion of the Lock and Dam No. 14 Historic District, which is listed on the (NRHP), is located in the project study area in Iowa. There are also community facilities, regulated substances, and wells in the project study area. Most of the surrounding land use consists of agriculture. All the secondary source data that was collected for the ECTR was used in the development and analysis of impacts for the alternatives that were evaluated in Section 4.

1.4 Project Purpose and Need Statement

Using the information collected for the ECTR, an analysis of the project's purpose and need was performed. A *Purpose and Need Statement* was prepared in July 2020 and presented at the September 2020 NEPA/404 Merger Meeting for informational purposes. At that meeting, the agencies had no comments on the project's purpose and need. Afterwards, the purpose and need was updated in July 2021 and presented at the NEPA/404 Merger Meeting held on September 2021 for Consistency Determination. At that meeting, the agencies had no comments and agreed with the project's purpose and need. The following are the results from the *Purpose and Need Statement*.

1.4.1 PROJECT NEED

Based on the analysis of bridge conditions, existing roadway geometric deficiencies, existing and future traffic conditions, and safety, the following represents the project need.

- The I-80 Mississippi River Bridge, built in 1967, is a non-redundant, two-girder system design. Based on historical experience with this structure, this bridge is susceptible to cracking. The structural cracks can quickly propagate to the point of local bridge component failure. This could, in turn, trigger immediate load restrictions and possible long-term bridge closure. Emergency lane closures due to cracking have occurred multiple times in the past.
- Costly bridge inspections are necessary to assure the integrity of the bridge. A typical biennial inspection of a redundant steel framing system looks for steel section loss due to corrosion. Obvious cracks in steel members are also noted, but inspection detail to discover small fatigue cracks is not necessarily performed since the failure of a redundant member does not cause the structure to collapse. For the I-80 Mississippi River Bridge, inspection of fracture critical members needs to be much more meticulous since member failure could lead to structure collapse. Sudden member loss due to fracture typically initiates at the tip of small fatigue cracks, thus it is important for the inspector to be satisfied these small cracks are not present. At critical locations the inspector needs to clean rusted steel to bare metal and perform dye penetrant or magnetic particle tests. Some steel members such as pins will be ultrasonic inspected. The inspection of a fracture critical structure is more labor intensive and requires staff with special skills.
- There are bridge deficiencies on the I-80 bridge over the Mississippi River, the I-80 bridges over I-88, one local road bridge over I-80, and one I-88 culvert within the project study area.
- There are three deficient curves on the I-80 mainline and 13 deficient curves associated with the US 67, IL 84, and I-88 interchanges. There are also two deficient curves associated with the I-88/Old IL 2 interchange. In addition, the ramp terminals associated with the entrance loop ramps at the IL 84 and US 67 interchanges do not meet current design standards.
- Crash trends (i.e., higher concentrations of crash numbers and/or crash types) occur at the following locations:
 - I-80/US 67 Eastbound Ramp Intersection
 - I-80 Bridge Over the Mississippi River
 - I-80/IL 84 Westbound Ramp Intersection
 - I-80 Mainline between the IL 84 Interchange and the Mississippi Rapids Rest Area Exit Ramp
 - I-80 Eastbound Exit Ramp to I-88 Eastbound

1.4.2 PROJECT PURPOSE

Based on the project's need, the following represents the project purpose.

- Provide a structurally sound bridge over the Mississippi River.
- Improve deficient conditions on existing bridges and culvert.
- Improve roadway geometrics where they are clearly a contributing cause to safety issues.
- Improve safety on I-80 mainline and interchanges.

1.4.3 PERFORMANCE MEASURES FOR SATISFYING THE PROJECT'S PURPOSE AND NEED

Based on the project purpose, the following performance measures will be used in evaluating whether project alternatives meet the project's purpose and need.

- A structurally sound bridge over the Mississippi River.
- Reduce the existing bridge/culvert deficiencies within the project study area.
- Eliminate or reduce roadway geometric deficiencies where they are a contributing cause to safety issues.
- Reduced crash rates and trends on the I-80 mainline and interchanges.

2 Range of Reasonable Alternatives

2.1 No-Build Alternative

As part of the No-Build Alternative, no improvements would be made to I-80 through the study area, the existing I-80 Mississippi River bridge, and the US 67, IL 84, and I-88 interchanges other than those associated with routine and emergency repairs and maintenance.

2.2 Transportation System Management Alternative

The Transportation System Management (TSM) Alternative would include better management and operation of existing transportation facilities to improve traffic flow and enhance system accessibility and safety. Elements of a TSM Alternative would include intersection improvements such as traffic signal timing, adding/extending turning lanes and minor geometric improvements such as extending acceleration/deceleration lanes,

2.3 Mass Transit Alternative

There is no existing mass transit service currently provided in the study area. MetroLINK operates bus services in the Quad Cities area in Illinois. In Iowa, bus service is provided by Citibus for Davenport and Bettendorf Transit. This alternative would include expanding bus service from any of these transit agencies to and along I-80 within the project area.

2.4 Build Alternatives

The proposed build alternatives discussed in the following sections are divided into two areas:

1. Mississippi River Bridge Alternatives, includes improvements along I-80 between the western project limits in Iowa and the Mississippi Rapids Rest Area ramps south of the IL 84 interchange in Illinois. This also includes improvements to the US 67 and IL 84 interchanges.
2. I-88 Interchange Alternatives, includes improvements at the I-80/I-88 interchange and the I-88/Old IL 2 interchange.

All build alternatives include maintaining two through lanes in each direction along I-80 through the study area.

2.4.1 MISSISSIPPI RIVER BRIDGE ALTERNATIVES

As described in the following sections, for some of the following Mississippi River bridge alternatives (i.e., Alternatives 2, 3, 6, and 7), a new replacement bridge would be constructed off alignment from the existing bridge. As a result, these alternatives may not require that the existing bridge be demolished. The decision to either demolish the existing bridge or keep it for repurposing will be evaluated during the NEPA phase. All the other bridge replacement alternatives (i.e., Alternatives 1, 4, and 5) would require the demolition of the existing bridge. Additionally, the Bridge Reconstruction Alternative would not allow for repurposing of the bridge.

For this PEL Study, the need for pedestrian and bicycle accommodations was not assessed since bicycles and pedestrians are prohibited on interstate highways. If warranted, this issue can be revisited during the NEPA phase.

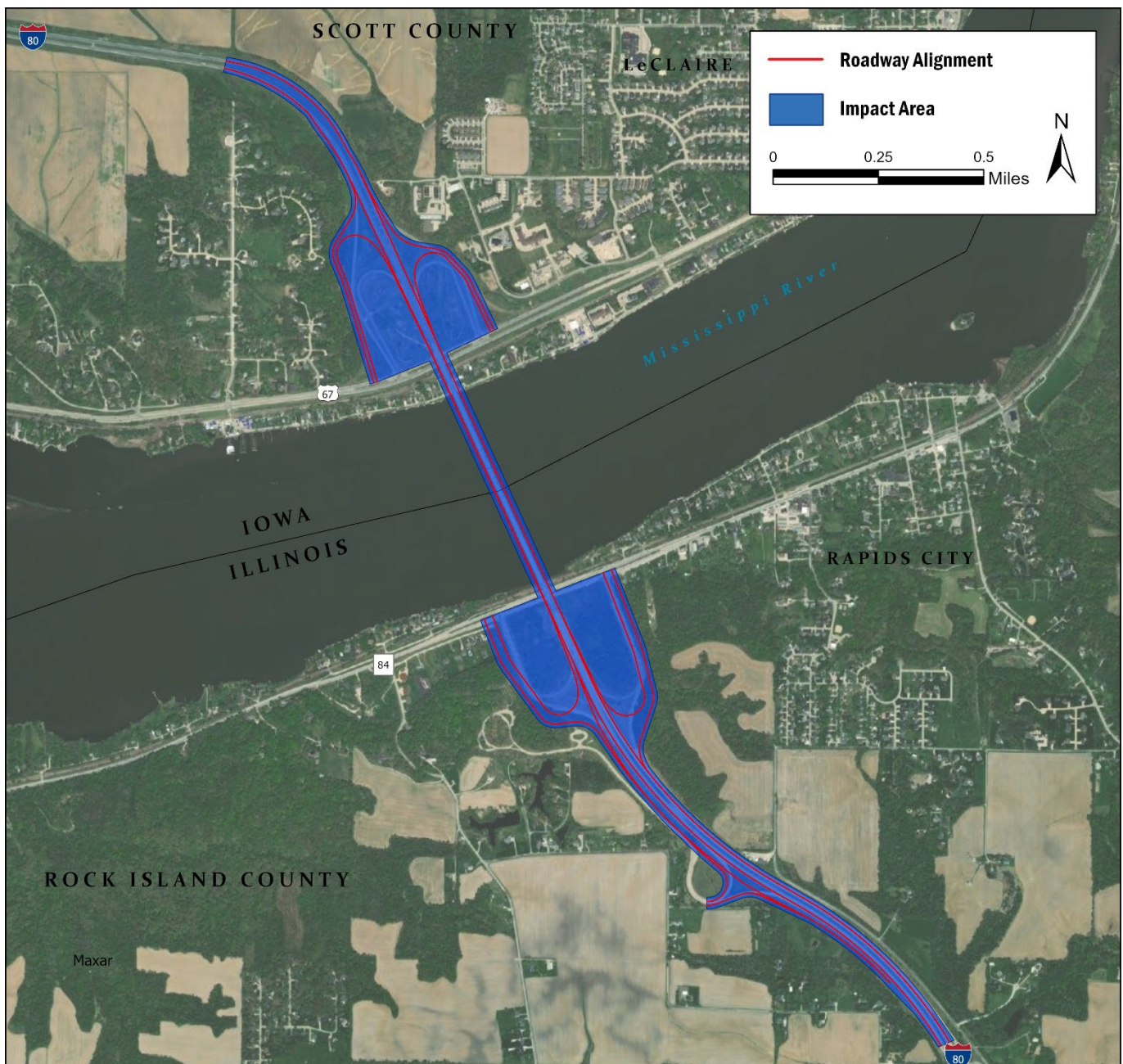
2.4.1.1 Bridge Reconstruction Alternative

This alternative would involve the replacement of the existing bridge deck and steel girders (i.e., superstructure) and re-using the existing piers (i.e., substructure) (**Figure 2**). The bridge deck would be widened to accommodate four 12-foot through lanes, two 12-foot auxiliary lanes, and 12-foot outside and 6-foot inside shoulders. The existing non-redundant girder system would be replaced with a redundant girder system. To accommodate the wider deck, the existing bridge piers would also be widened and strengthened. As part of this alternative, both the US 67 and IL 84 interchanges would

also be reconstructed to meet current Iowa DOT and IDOT design standards. Both interchanges would be reconstructed as partial cloverleafs, which is the same type of interchange as the existing interchanges. In addition, a collector-distributor (C-D) road would be provided for eastbound traffic between the IL 84 interchange and the Mississippi Rapids Rest Area. This alternative would require the complete closure of the bridge and a detour during construction.

As previously discussed in Section 1.2, IDOT's 2017 Feasibility Review evaluated another I-80 bridge reconstruction option. This proposed option involved the reconstruction of the existing bridge to accommodate three lanes of one-way traffic and the construction of a new companion bridge that would accommodate three lanes of one-way traffic for the other direction. The trade-off of reusing the existing substructure (i.e., piers) versus complete removal and replacement of them was also evaluated. Based on a comparison of lifecycle costs and advantages and disadvantages, the Feasibility Review recommended that removal of the existing substructure be pursued under further study and considered the preferred course of action over the re-use of the existing substructure.

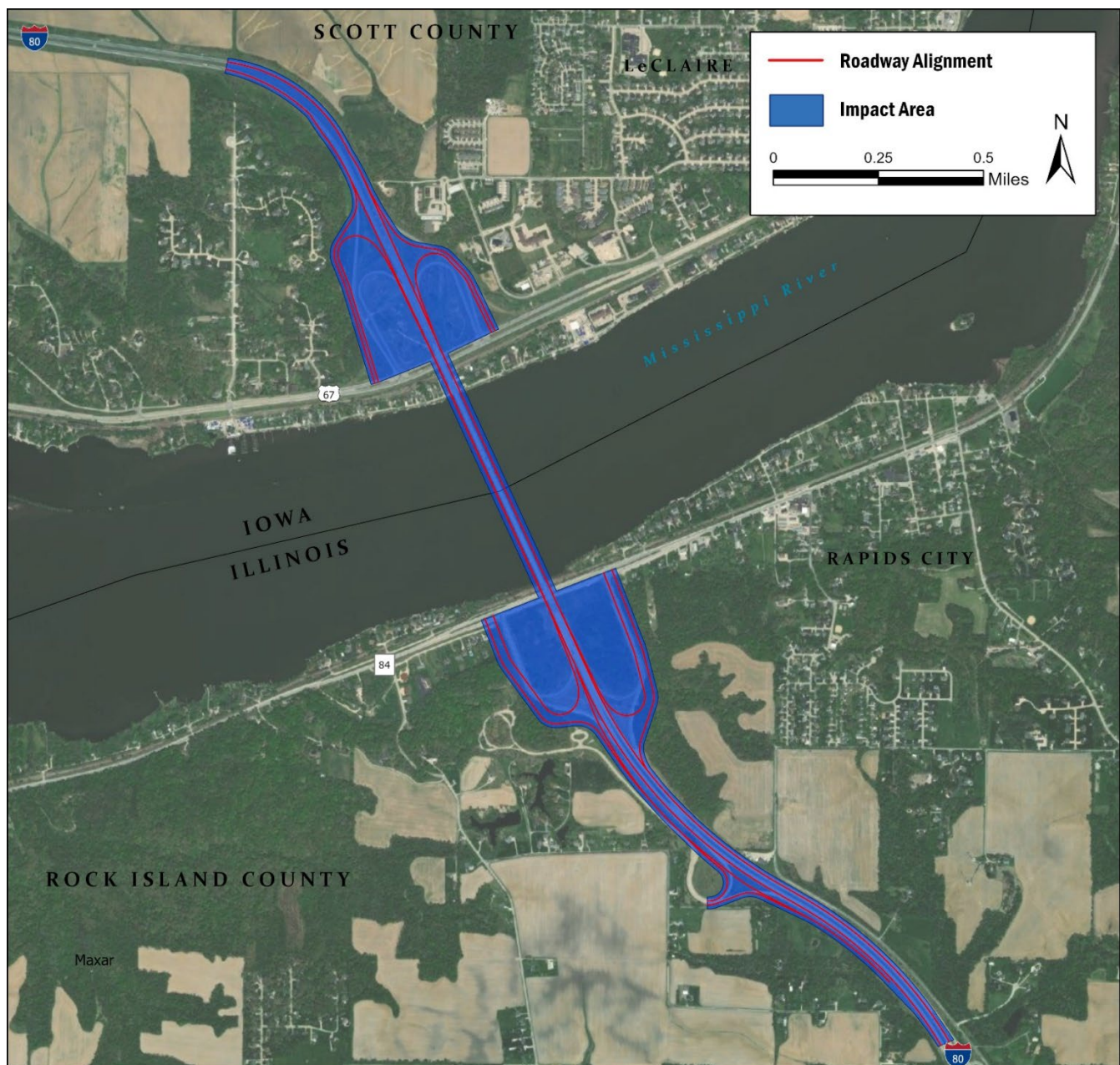
FIGURE 2 – BRIDGE RECONSTRUCTION ALTERNATIVE



2.4.1.2 Alternative 1 – Bridge Replacement on Existing Alignment

Alternative 1 would involve the complete replacement of the existing I-80 bridge on the existing alignment (**Figure 3**). The proposed bridge would most likely be a multi-girder, steel bridge that would accommodate four 12-foot through lanes, two 12-foot auxiliary lanes, and 12-foot outside and 6-foot inside shoulders. It could be constructed as a single deck, or two independent decks with either back-to-back parapets at the centerline, or a median gap along the centerline. The existing bridge would first need to be demolished before the new bridge could be constructed on the existing alignment. A detour would be required during the demolition of the existing bridge and the construction of the new bridge. Both the US 67 and IL 84 interchanges would be reconstructed to meet current Iowa DOT and IDOT design standards. Both interchanges would be reconstructed as partial cloverleaves, which is the same type of interchange as the existing interchanges. In Iowa, the construction limits of the US 67 interchange along I-80 would end just west of the first curve. In Illinois, a collector-distributor (C-D) road would be provided for eastbound traffic between the IL 84 interchange and the Mississippi Rapids Rest Area.

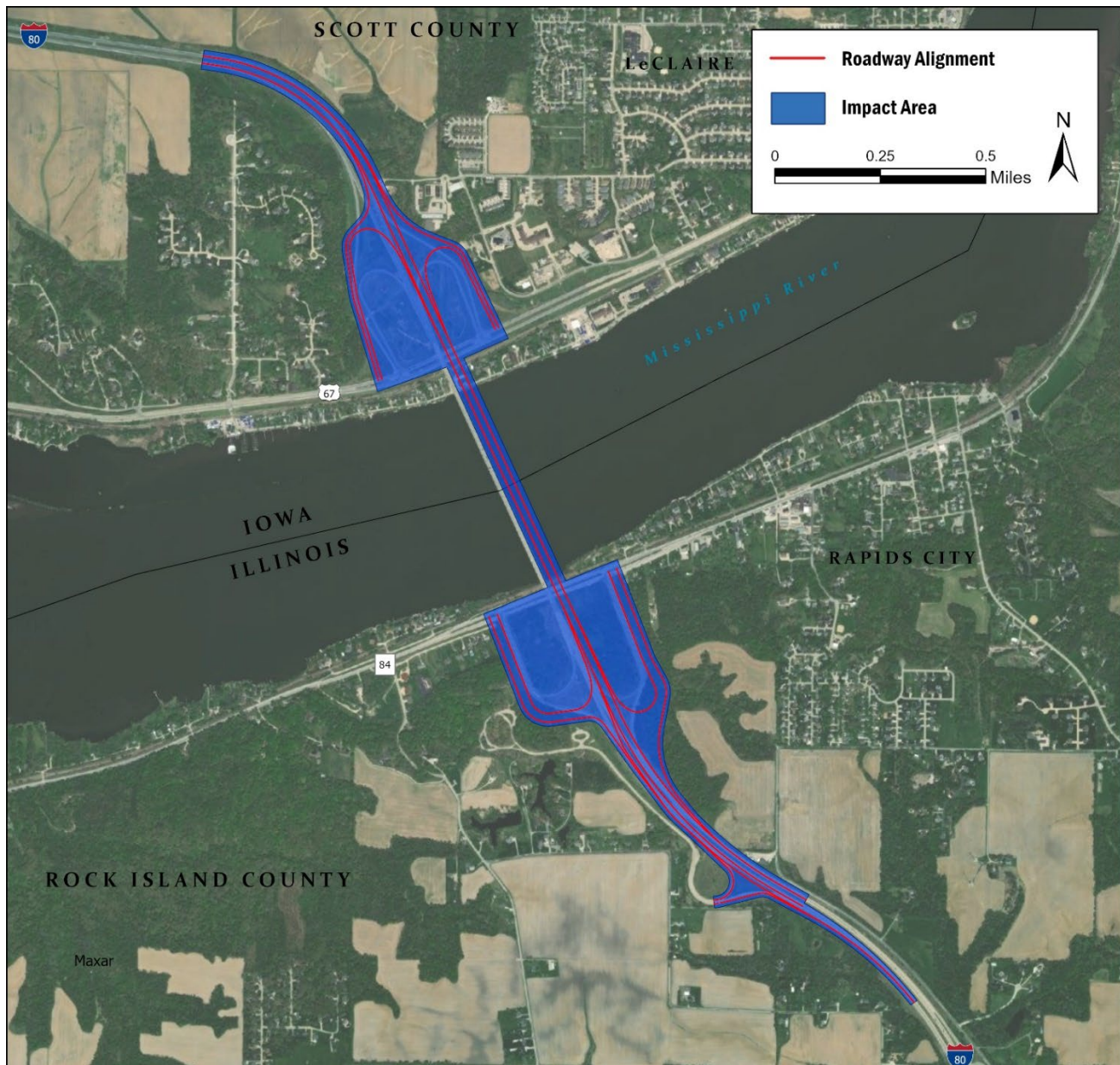
FIGURE 3 – ALTERNATIVE 1 – BRIDGE REPLACEMENT ON EXISTING ALIGNMENT



2.4.1.3 Alternative 2 – Bridge Replacement East

Alternative 2 would involve the complete replacement of the existing I-80 bridge with a new bridge east of the existing bridge (**Figure 4**). The proposed bridge would most likely be a multi-girder, steel bridge that would accommodate four 12-foot through lanes, two 12-foot auxiliary lanes, and 12-foot outside and 6-foot inside shoulders. It could be constructed as a single deck, or two independent decks with either back-to-back parapets at the centerline, or a median gap along the centerline. The new bridge would be constructed approximately 50 feet away from the existing bridge. Both the US 67 and IL 84 interchanges would be reconstructed to accommodate the shift in the bridge location to the east and to meet current Iowa DOT and IDOT design standards. Both interchanges would be reconstructed as partial cloverleaves, which is the same type of interchange as the existing interchanges. In Iowa, west of the US 67 interchange, the relocated I-80 mainline would transition back to the existing mainline just west of the first curve. In Illinois, south of the IL 84 interchange, the relocated I-80 mainline would transition back to the existing mainline just south of the first curve. In addition, a collector-distributor (C-D) road would be provided for eastbound traffic between the IL 84 interchange and the Mississippi Rapids Rest Area.

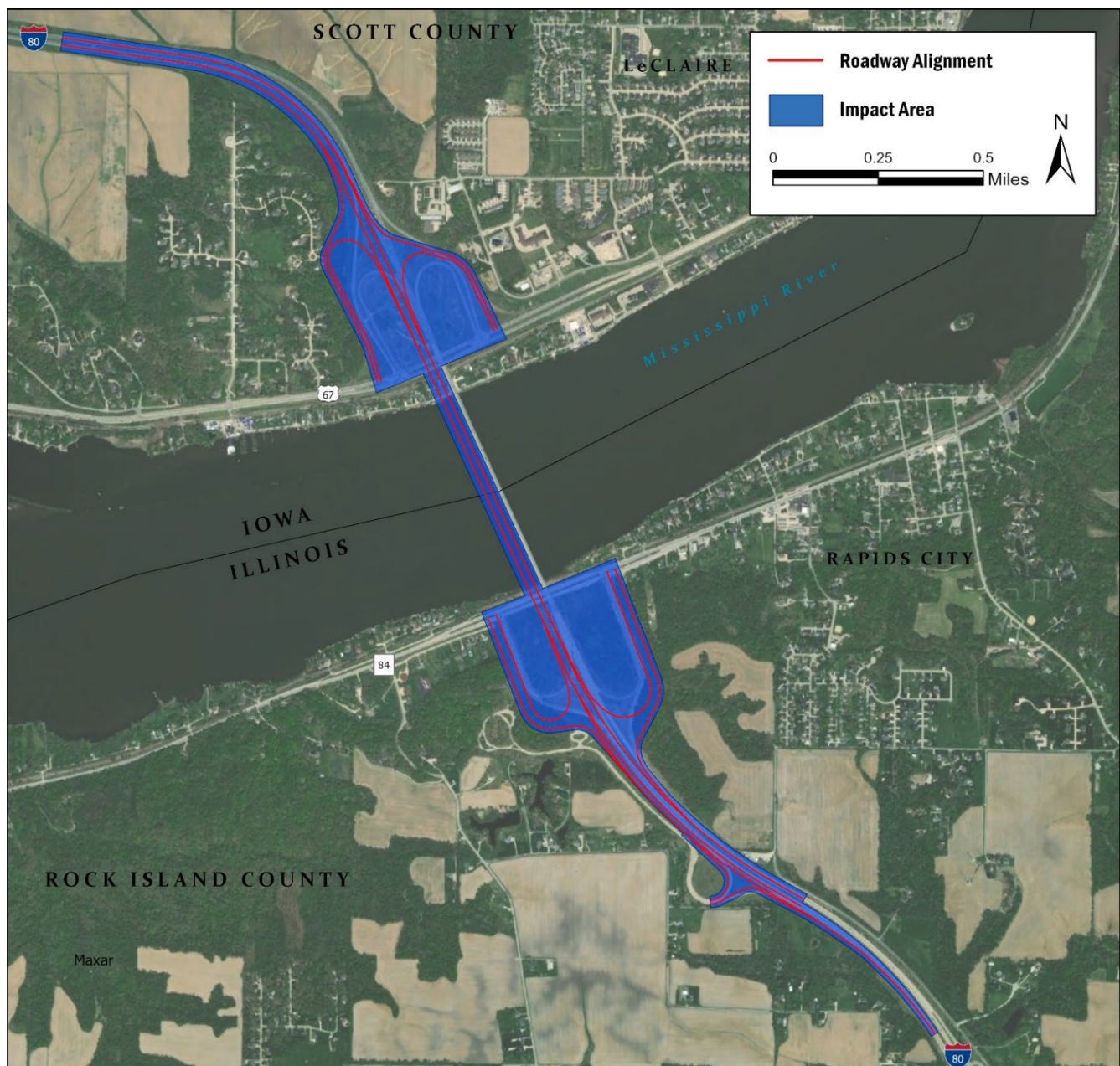
FIGURE 4 – ALTERNATIVE 2 – BRIDGE REPLACEMENT EAST



2.4.1.4 Alternative 3 – Bridge Replacement West

Alternative 3 would involve the complete replacement of the existing I-80 bridge with a new bridge west of the existing bridge (Figure 5). The proposed bridge would most likely be a multi-girder, steel bridge that would accommodate four 12-foot through lanes, two 12-foot auxiliary lanes, and 12-foot outside and 6-foot inside shoulders. It could be constructed as a single deck, or two independent decks with either back-to-back parapets at the centerline, or a median gap along the centerline. The new bridge would be constructed approximately 50 feet away from the existing bridge. Both the US 67 and IL 84 interchanges would be reconstructed to accommodate the shift in the bridge location to the west and to meet current Iowa DOT and IDOT design standards. Both interchanges would be reconstructed as partial cloverleafs, which is the same type of interchange as the existing interchanges. In Iowa, west of the US 67 interchange, the relocated I-80 mainline would transition back to the existing mainline just west of the first curve. In Illinois, south of the IL 84 interchange, the relocated I-80 mainline would transition back to the existing mainline just south of the first curve. In addition, a collector-distributor (C-D) road would be provided for eastbound traffic between the IL 84 interchange and the Mississippi Rapids Rest Area.

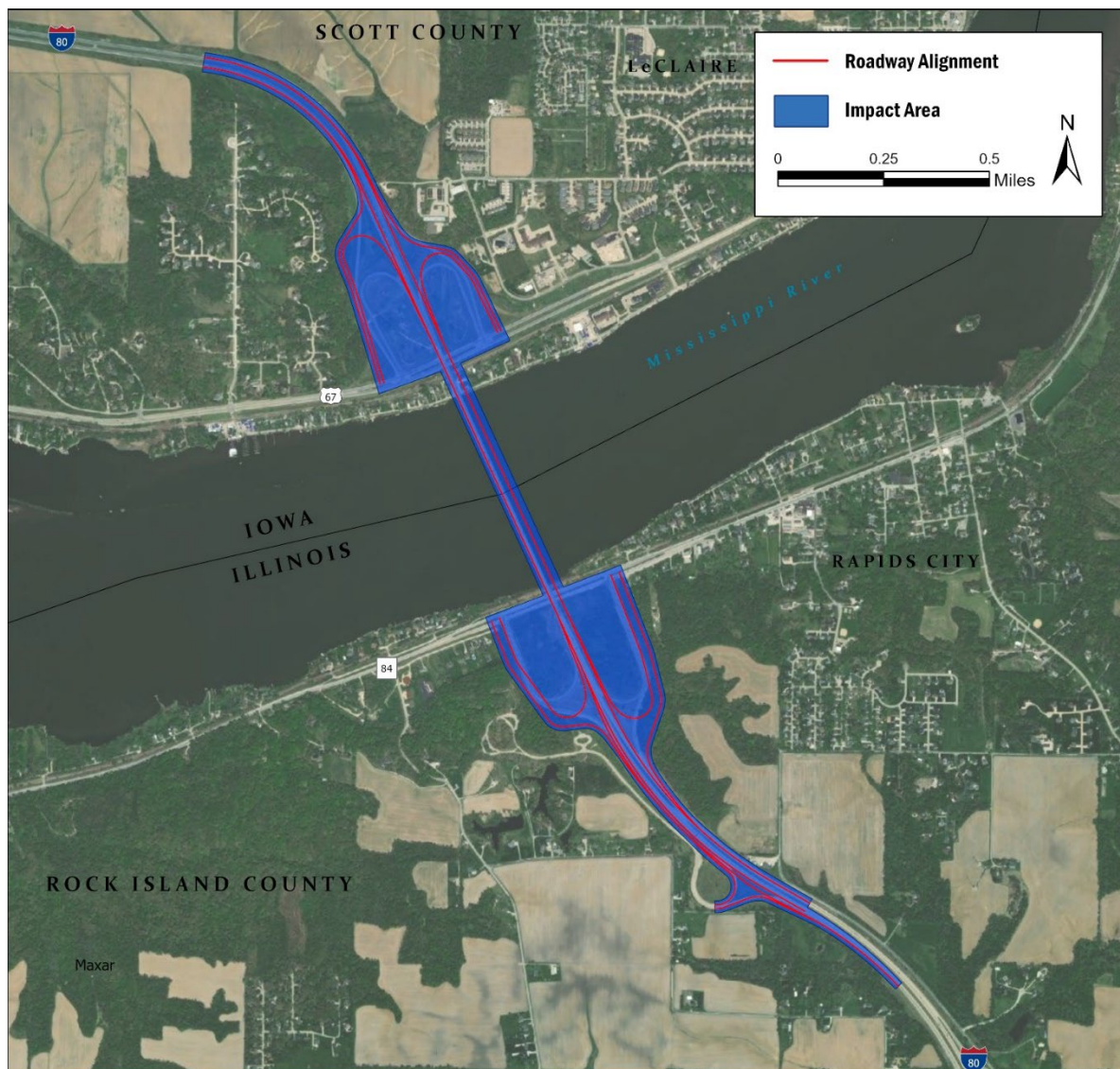
FIGURE 5 – ALTERNATIVE 3 – BRIDGE REPLACEMENT WEST



2.4.1.5 Alternative 4 – New Companion Bridge East and Replacement of Existing Bridge

Alternative 4 would involve the construction of a new two-lane bridge east of the existing bridge that would carry westbound traffic (**Figure 6**). It would also include the replacement of the existing I-80 bridge on the existing alignment with another new two-lane bridge that would carry eastbound traffic. Both bridges would most likely be multi-girder, steel bridges with two 12-foot through lanes, one 12-foot auxiliary lane, and 12-foot outside and 6-foot inside shoulders. The new bridge for westbound traffic would be constructed approximately 20 feet east of the existing bridge, which would be demolished following the completion of the new bridge. All traffic would be shifted to the new eastern bridge during the demolition of the existing bridge and the construction of the new bridge on the existing alignment. Once the new bridge on the existing alignment is completed, eastbound traffic would then be shifted to that bridge and westbound traffic would remain on the new eastern bridge. Both the US 67 and IL 84 interchanges would be reconstructed to accommodate the shift associated with the new eastern bridge and to meet current Iowa DOT and IDOT design standards. Both interchanges would be reconstructed as partial cloverleaves, which is the same type of interchange as the existing interchanges. In Iowa, west of the US 67 interchange, the relocated I-80 mainline would transition back to the existing mainline just west of the first curve. In Illinois, south of the IL 84 interchange, the relocated I-80 mainline would transition back to the existing mainline just south of the first curve. In addition, a collector-distributor (C-D) road would be provided for eastbound traffic between the IL 84 interchange and the Mississippi Rapids Rest Area.

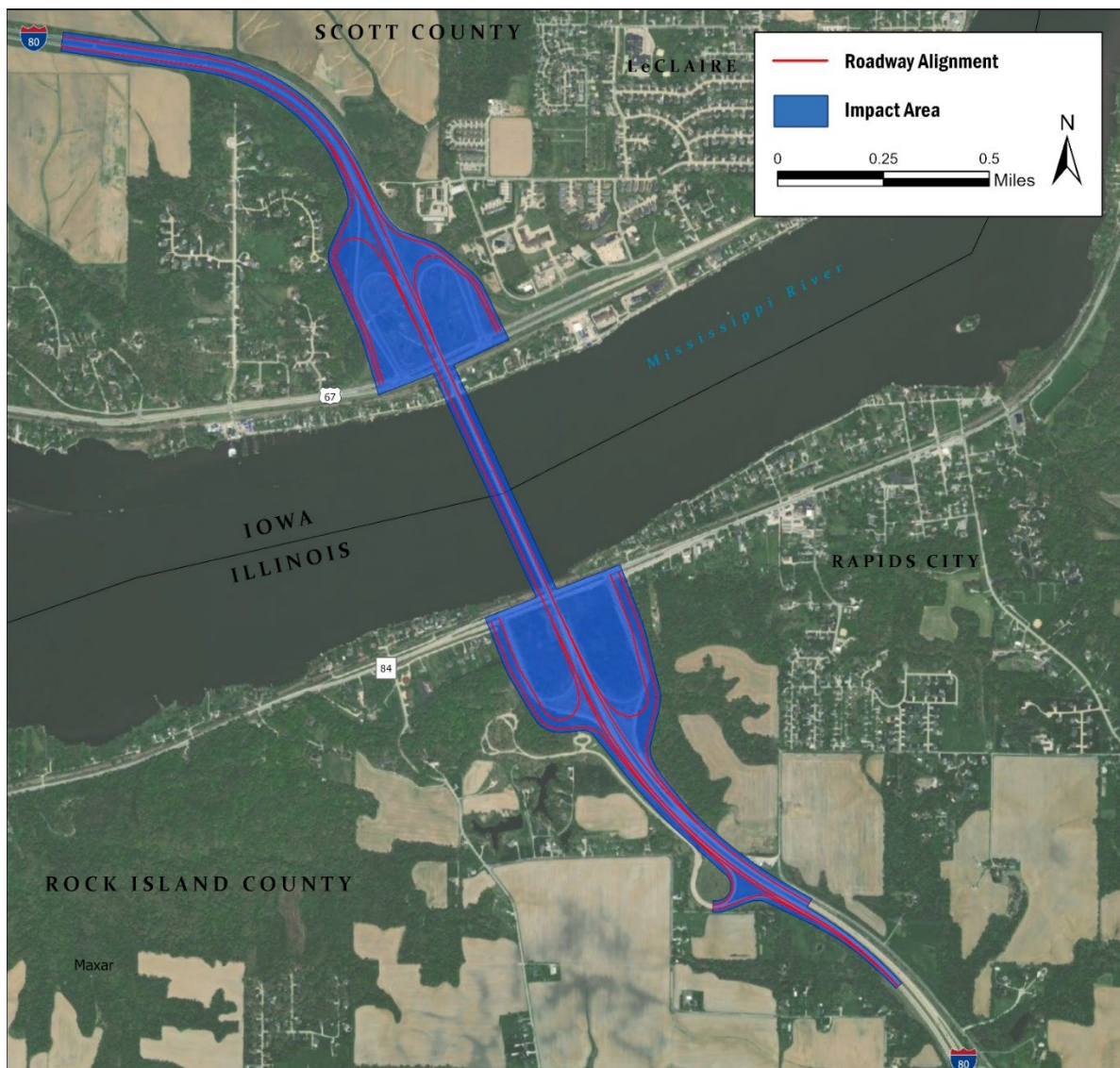
FIGURE 6 – ALTERNATIVE 4 – NEW COMPANION BRIDGE EAST AND REPLACEMENT OF EXISTING BRIDGE



2.4.1.6 Alternative 5 – New Companion Bridge West and Replacement of Existing Bridge

Alternative 5 would involve the construction of a new two-lane bridge west of the existing bridge that would carry eastbound traffic (**Figure 7**). It would also include the replacement of the existing I-80 bridge on the existing alignment with another new two-lane bridge that would carry westbound traffic. Both bridges would most likely be multi-girder, steel bridges with two, 12-foot through lanes, one 12-foot auxiliary lane, and 12-foot outside and 6-foot inside shoulders. The new bridge for the eastbound traffic would be constructed approximately 20 feet west of the existing bridge, which would be demolished following the completion of the new bridge. All traffic would be shifted to the new western bridge during the demolition of the existing bridge and the construction of the new bridge on the existing alignment. Once the new bridge on the existing alignment is completed, westbound traffic would then be shifted to that bridge and eastbound traffic would remain on the new western bridge. Both the US 67 and IL 84 interchanges would be reconstructed to accommodate the shift associated with the new western bridge and to meet current Iowa DOT and IDOT design standards. Both interchanges would be reconstructed as partial cloverleaves, which is the same type of interchange as the existing interchanges. In Iowa, west of the US 67 interchange, the relocated I-80 mainline would transition back to the existing mainline just west of the first curve. In Illinois, south of the IL 84 interchange, the relocated I-80 mainline would transition back to the existing mainline just south of the first curve. In addition, a collector-distributor (C-D) road would be provided for eastbound traffic between the IL 84 interchange and the Mississippi Rapids Rest Area.

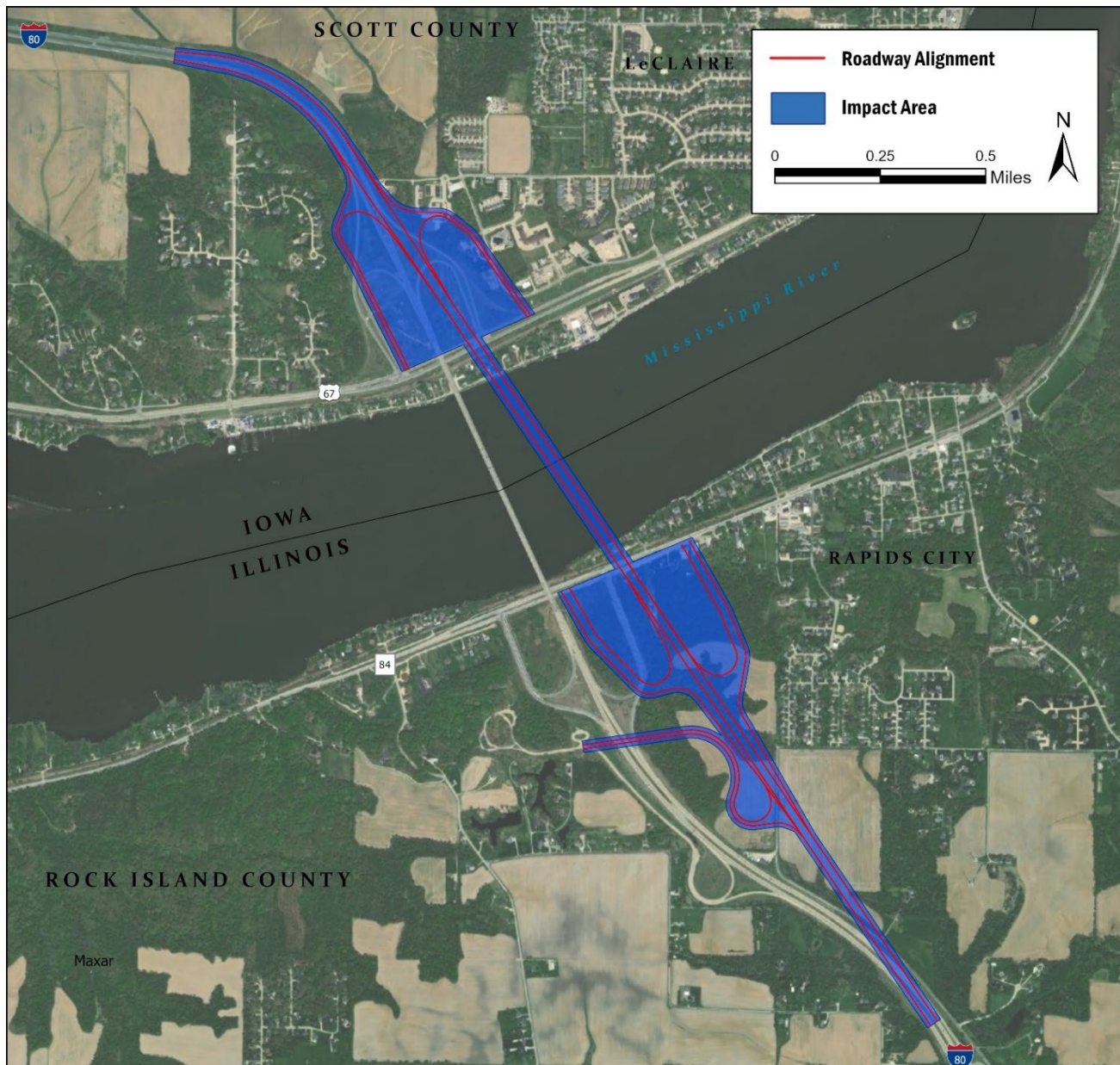
FIGURE 7 – ALTERNATIVE 5 – NEW COMPANION BRIDGE WEST AND REPLACEMENT OF EXISTING BRIDGE



2.4.1.7 Alternative 6 - Bridge Replacement on New Alignment East

Alternative 6 would involve the complete replacement of the existing I-80 bridge with a new bridge approximately 600 feet east of the existing bridge (**Figure 8**). The proposed bridge would most likely be a multi-girder, steel bridge that would accommodate four 12-foot through lanes, two 12-foot auxiliary lanes, and 12-foot outside and 6-foot inside shoulders. It could be constructed as a single deck, or two independent decks with either back-to-back parapets at the centerline, or a median gap along the centerline. The US 67 interchange would be reconstructed mostly within the existing interchange area to accommodate the new alignment of the bridge and to meet current Iowa DOT design standards. The IL 84 interchange would be reconstructed mostly outside of the existing interchange area to accommodate the new alignment of the bridge and to meet current IDOT design standards. Both interchanges would be reconstructed as partial cloverleafs, which is the same type of interchange as the existing interchanges. In Iowa, west of the US 67 interchange, the relocated I-80 mainline would transition back to the existing mainline just west of the first curve. In Illinois, south of the IL 84 interchange, the relocated I-80 mainline would transition back to the existing mainline at the curve south of the Mississippi Rapids Rest Area ramps. Access to the Mississippi Rest Area for eastbound traffic would be maintained via new ramps.

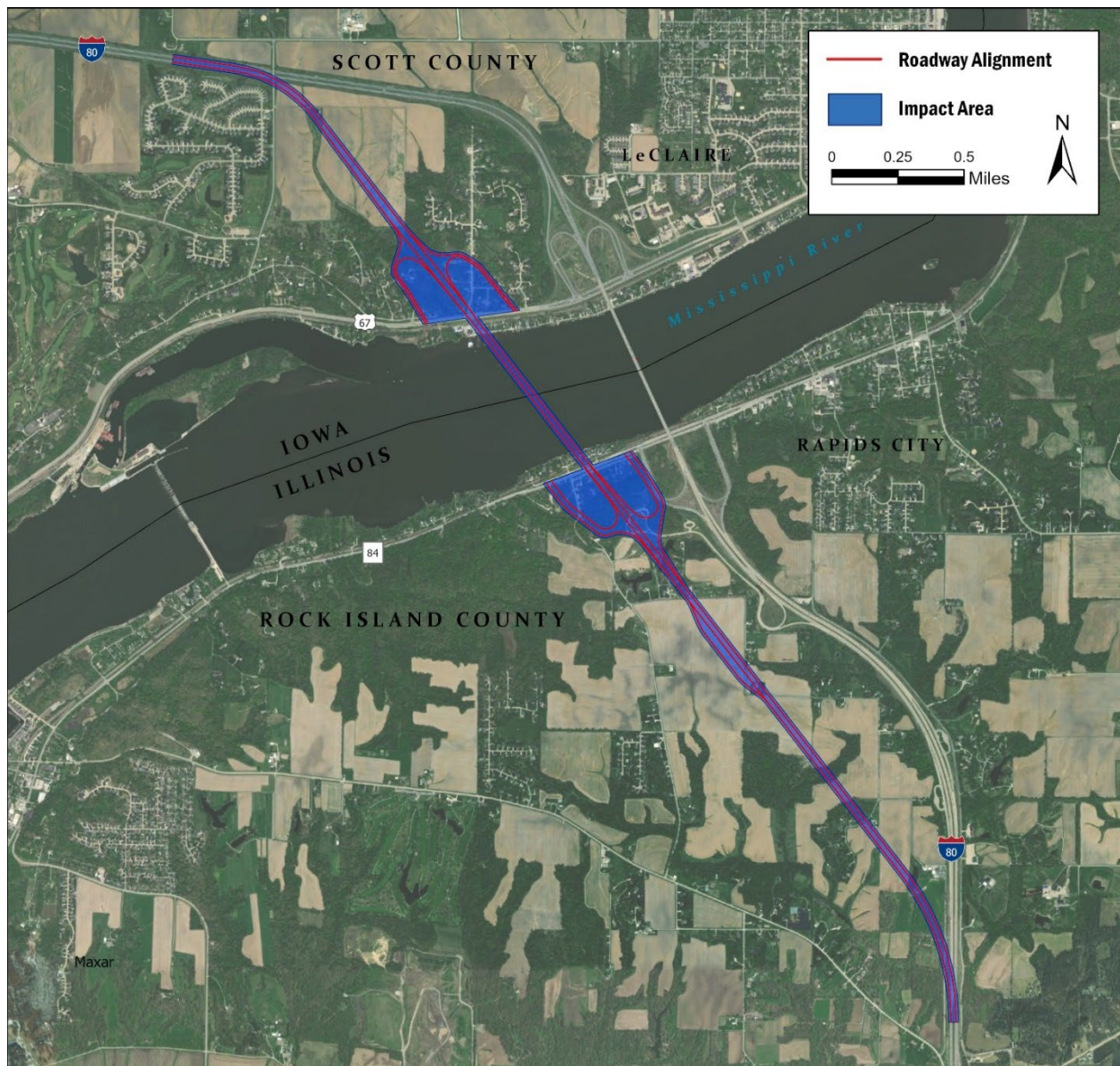
FIGURE 8 – ALTERNATIVE 6 – BRIDGE REPLACEMENT ON NEW ALIGNMENT EAST



2.4.1.8 Alternative 7 - Bridge Replacement on New Alignment West

Alternative 7 would involve the complete replacement of the existing I-80 bridge with a new bridge approximately 2,100 feet west of the existing bridge (**Figure 9**). The proposed bridge would most likely be a multi-girder, steel bridge that would accommodate four 12-foot through lanes, two 12-foot auxiliary lanes, and 12-foot outside and 6-foot inside shoulders. It could be constructed as a single deck, or two independent decks with either back-to-back parapets at the centerline, or a median gap along the centerline. A new US 67 interchange would be constructed completely outside of the existing interchange area to accommodate the new alignment of the bridge and to meet current Iowa DOT design standards. A new IL 84 interchange would be constructed almost entirely outside of the existing interchange area to accommodate the new alignment of the bridge and to meet current IDOT design standards. Both interchanges would be constructed as partial cloverleafs, which is the same type of interchange as the existing interchanges. In Iowa, west of the US 67 interchange, the relocated I-80 mainline would transition back to the existing mainline and end approximately 2,000 feet west of SW 35th Street. In Illinois, south of the IL 84 interchange, the relocated I-80 mainline would transition back to the existing mainline just north of the I-88 interchange. This alternative would displace of the Mississippi Rest Area so a new rest area would be provided for eastbound traffic just south of the IL 84 interchange.

FIGURE 9 – ALTERNATIVE 7 – BRIDGE REPLACEMENT ON NEW ALIGNMENT WEST

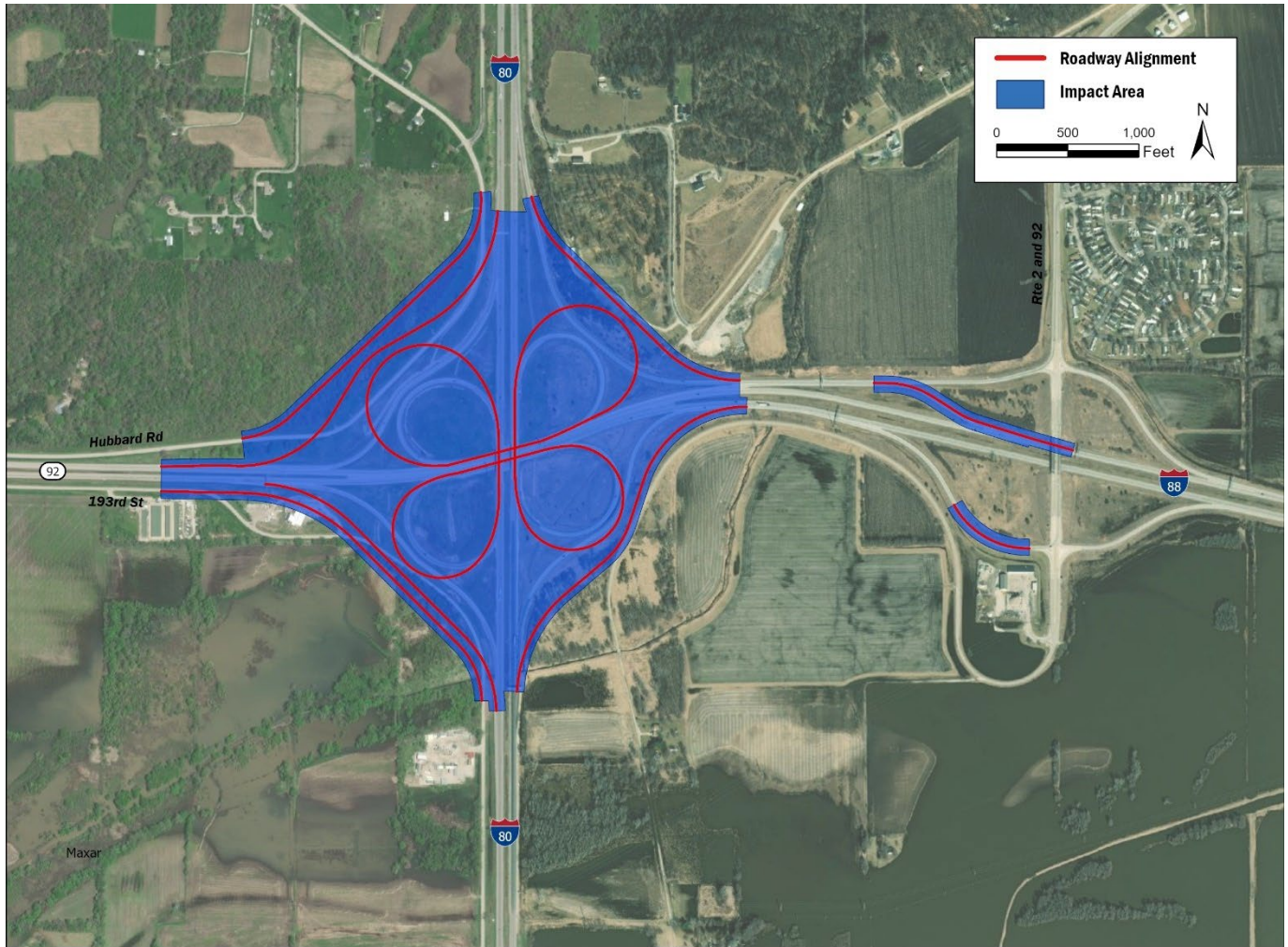


2.4.2 I-88 INTERCHANGE ALTERNATIVES

2.4.2.1 Alternative A - Expanded Cloverleaf

This alternative includes maintaining the existing interchange type (i.e., cloverleaf) while expanding the loop ramps to correct the identified geometric deficiencies (**Figure 10**). This alternative includes expanding all four loop ramps and modifying the outer directional ramps and frontage roads to accommodate the expanded loop ramps. Minor ramp modifications at the Old IL 2 interchange are also included in this alternative to correct geometric deficiencies identified in the study area.

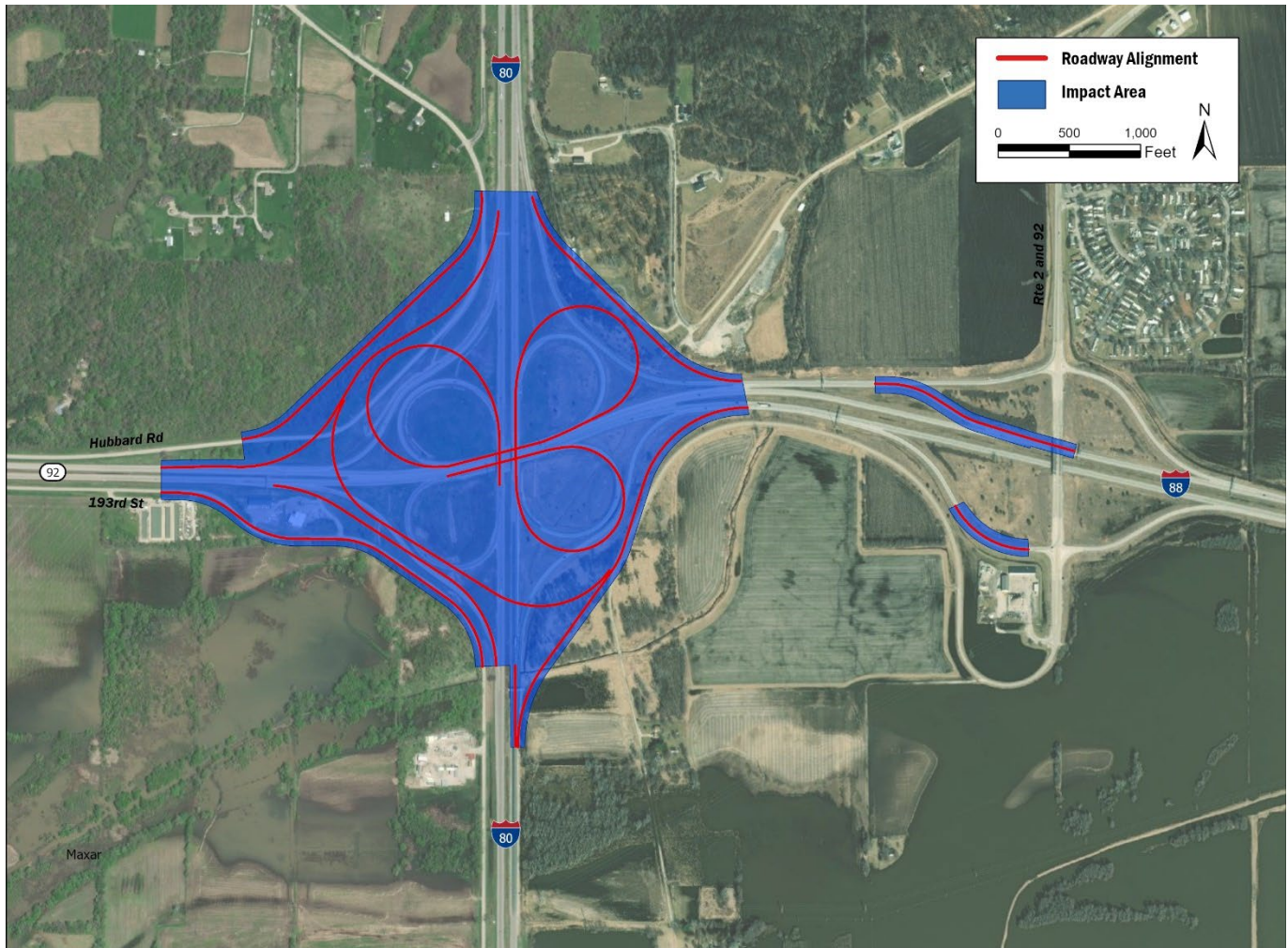
FIGURE 10 – ALTERNATIVE A – EXPANDED CLOVERLEAF



2.4.2.2 Alternative B - Expanded Cloverleaf with Outer Direct Ramp

This alternative includes maintaining and expanding the loop ramps in the northwest, northeast, and southeast quadrants of the interchange and modifying the outer directional ramps and frontage roads to accommodate the expanded loop ramps (**Figure 11**). Additionally, a southbound to eastbound directional ramp is also included as this is a predominant movement at this interchange. This directional ramp would replace the existing loop ramp in the southwest quadrant where a substantial amount of crashes were identified as part of the purpose and need. Similar to Alternative A, minor ramp modifications at the Old IL 2 interchange are also included in this alternative to correct geometric deficiencies identified in the study area.

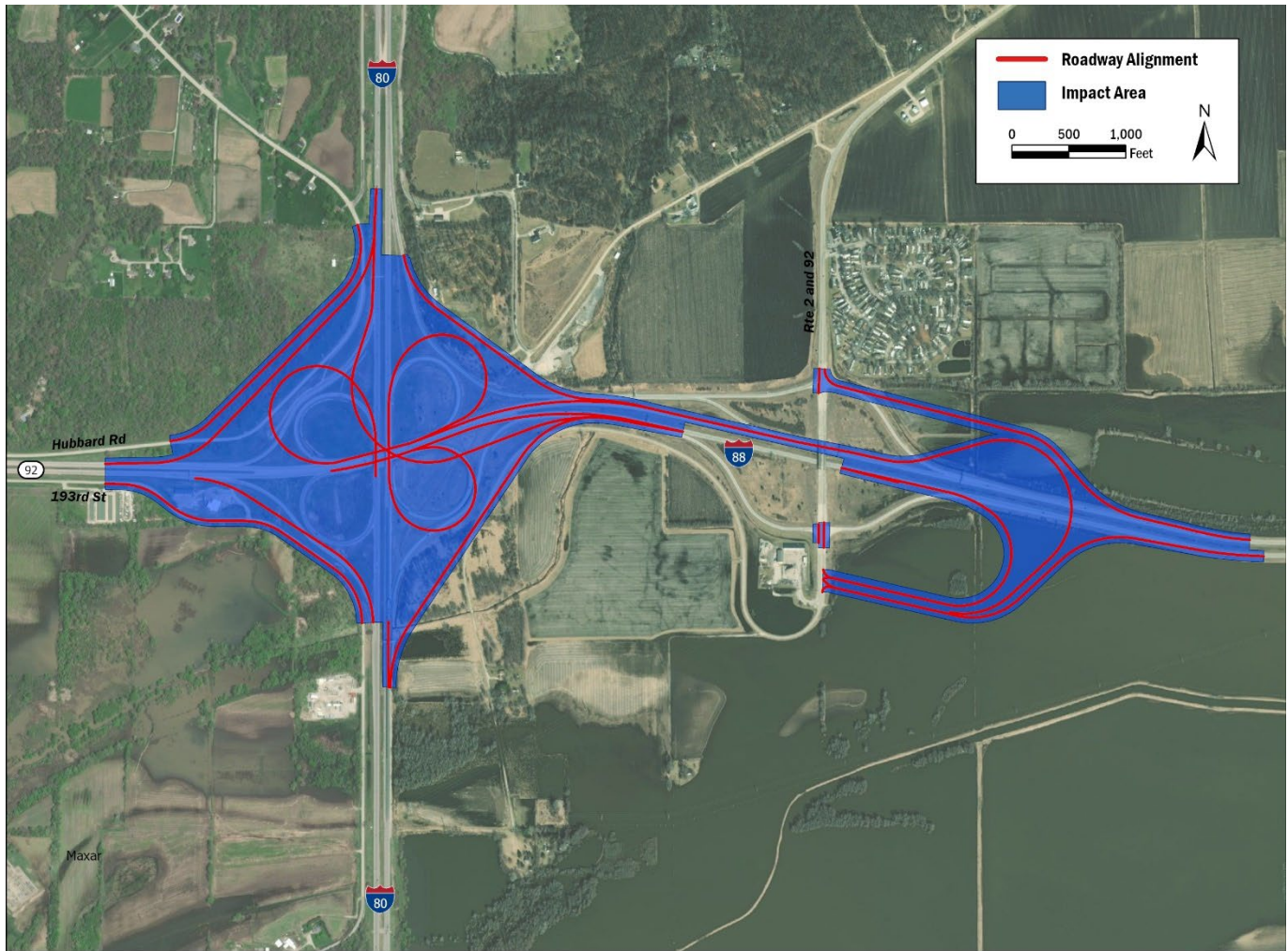
FIGURE 11 – ALTERNATIVE B – EXPANDED CLOVERLEAF WITH OUTER DIRECT RAMP



2.4.2.3 Alternative C – Expanded Cloverleaf with Direct Ramp and Old IL 2 Interchange

This alternative includes maintaining and expanding the loop ramps in the northwest, northeast, and southeast quadrants of the interchange and modifying the outer directional ramps and frontage roads to accommodate the expanded loop ramps. Additionally, a southbound to eastbound directional ramp is also included as this is a predominant movement at this interchange. This directional ramp would replace the existing loop ramp in the southwest quadrant where a substantial amount of crashes were identified as part of the purpose and need. With Alternative C, the directional ramp is located so that it could be retained if the interchange was later modified to a four-level interchange as is discussed with Alternative D below. This alternative also includes complete modification of the Old IL 2 interchange (Figure 12).

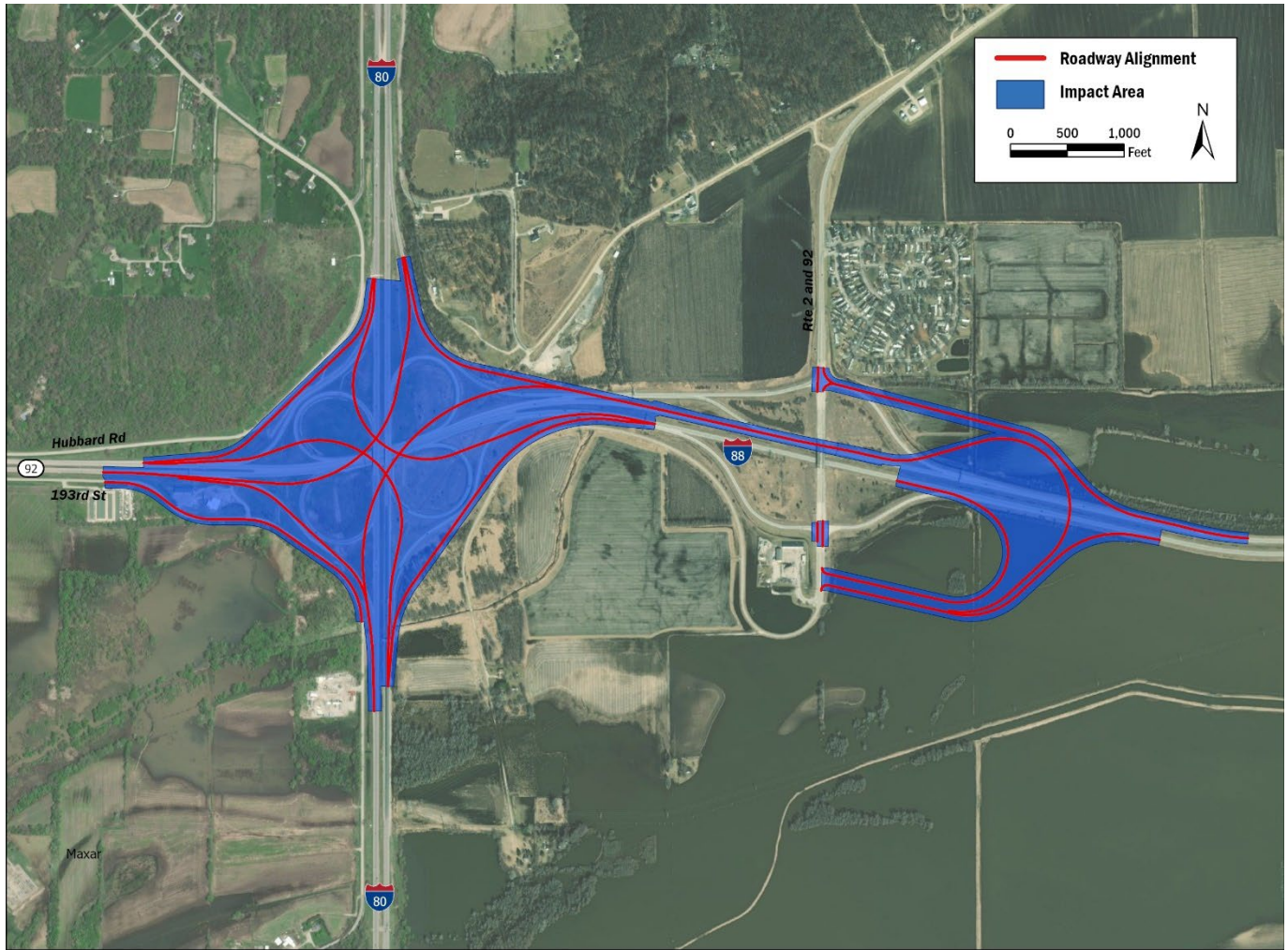
FIGURE 12 – ALTERNATIVE C – EXPANDED CLOVERLEAF WITH DIRECT RAMP AND OLD IL 2 INTERCHANGE



2.4.2.4 Alternative D – Four-Level Interchange and Old IL 2 Interchange

This alternative includes removing all loop ramps and providing a fully directional, four-level interchange. With the four-level interchange, the ramps on the west side of the Old IL 2 interchange would have to be relocated. Therefore, this alternative also includes a completely modified I-88 interchange at Old IL 2. (Figure 13).

FIGURE 13 – ALTERNATIVE D – FOUR LEVEL INTERCHANGE AND OLD IL 2 INTERCHANGE



3 Alternatives Evaluation and Screening

3.1 Level 1 Evaluation Criteria –Purpose and Need/Fatal Flaw

The first level of screening is based on whether the alternative has a fatal flaw regarding design and feasibility, and whether the alternative meets the project's purpose and need using the following performance measures.

- A structurally sound bridge over the Mississippi River.
- Reduce the existing bridge/culvert deficiencies within the project study area.
- Eliminate or reduce roadway geometric deficiencies where they are a contributing cause to safety issues.
- Reduce crash rates and trends on the I-80 mainline and interchanges.

If the alternative does not meet the project's purpose and need, it is dismissed from further evaluation.

3.2 Level 1 Evaluation and Screening – Purpose and Need/Fatal Flaw

The following alternatives either had a fatal flaw or would not meet the performance measures for satisfying the project's purpose and need as outlined in Section 1.4.3.

3.2.1 NO-BUILD ALTERNATIVE

The No-Build Alternative would not address any of the elements of the project's purpose and need since no improvements would be made in the project area to I-80, the US 67, IL 84, or I-88 interchanges, or to the bridge over the Mississippi River. Although the No-Build Alternative would not meet the project's purpose and need, it will be carried forward into the NEPA phase as a baseline comparison for the build alternatives in accordance with NEPA.

3.2.2 TRANSPORTATION SYSTEM MANAGEMENT ALTERNATIVE

While the Transportation System Management Alternative may address some elements of the project's purpose and need, it would not address one of the primary purposes of the project which is to provide a structurally sound bridge over the Mississippi River. Therefore, this alternative was dismissed from further consideration.

3.2.3 MASS TRANSIT ALTERNATIVE

The Mass Transit Alternative would not address any of the elements of the project's purpose and need. Therefore, this alternative was dismissed from further consideration.

3.2.4 BRIDGE RECONSTRUCTION ALTERNATIVE

With regard to the replacement of the superstructure (i.e., deck and girders), it would not be feasible to address the roadway geometry aspects of the purpose and need (i.e., substandard shoulders) by a superstructure replacement without also doing major work on the existing substructures (i.e., piers). The current superstructure supporting two lanes and substandard shoulders each way is about 62 feet wide. For the bridge to meet current design standards for two lanes and full shoulders each way, it would need to be at least 95 feet wide. It would not be feasible to support this increased width on the existing piers which were developed for a 62-foot, 2-girder structure. Major structural widening of the existing piers and foundations to accommodate a widened multi-girder superstructure would not be cost effective, given concerns noted with the existing substructures in the Feasibility Review (age, scour concerns at the foundation, seismic performance concerns, and rebar detailing concerns with the original construction). Furthermore, because of the available width of existing deck and type of construction of the existing superstructure (2-girder with floor beams), a staged reconstruction would not be possible. As a result, the I-80 bridge would need to be closed during construction and traffic would need to be detoured.

Reconstruction (re-use of the existing substructures) was also considered in the 2017 Feasibility Review as a scenario in which the existing piers are used to support a new one-way bridge, with a new companion one-way bridge built alongside. As part of the identification of potential alternatives for the I-80 over the Mississippi River PEL Study, this potential re-use

of existing substructures was re-evaluated. The Feasibility Review did not recommend the re-use of the existing substructures due to the associated disadvantages and that there was a small difference in the life-cycle cost between the replacement and re-use of the substructures. This was due in large part to the amount of work that would be required to widen and strengthen the substructures to accommodate the new multi-girder superstructure. In addition to work required to accommodate the geometry, additional substructure work was anticipated to upgrade the piers for seismic performance criteria sought by the Iowa DOT, and cofferdam work was anticipated to address emerging scour issues with the spread footing foundations (3 locations). To undertake that work for substructures which were already 51 years old and would need to last for 135 years to realize the design life of a replaced superstructure was not considered advisable. The re-consideration of the Feasibility Study confirmed its recommendation that the replacement of the substructures is the preferred course of action over re-use of the existing substructures. It was determined that the aforementioned information represents a fatal flaw in the Bridge Reconstruction Alternative; therefore, it was dismissed from further consideration.

3.2.5 ALTERNATIVES 1 THROUGH 7 AND ALTERNATIVES A THROUGH D

Alternatives 1 through 7 and Alternatives A through D would meet the performance measures for satisfying the project's purpose and need as outlined in Section 1.4.3 and shown in **Tables 1 and 2**. As a result, these alternatives were carried forward for Level 2 Evaluation and Screening with regard to engineering and environmental impacts.

3.3 Level 2 Evaluation Criteria – Engineering/Environmental Impacts

The following criteria were used to perform a comparative evaluation of the alternatives. Secondary source data used in the evaluation of alternative impacts was obtained as part of the ECTR.

- Relocations (number)
- Right-of-way (acres)
- NWI Wetlands (acres)
- Streams (number/linear feet)
- Floodplains/floodways
- Potential Indiana bat and Northern Long-Eared Bat (NLEB) Forested Habitat (acres)
- Public Parks and Recreation Areas/Section 4(f) Resources (number)
- Historic and Archaeological Resources/Section 106 Resources (number)
- Special Waste Sites (number)
- Prime Farmland Soils (acres)
- Environmental Justice Populations (number of EJ census block groups traversed by the alternative)
- Community Facilities and Services (number and emergency response times)
- Constructability and Maintenance of Traffic during Construction
- Public and Agency Input

3.4 Level 2 Evaluation and Screening – Engineering/Environmental Impacts

3.4.1 MISSISSIPPI RIVER BRIDGE ALTERNATIVES

3.4.1.1 Environmental Impacts

As shown in **Table 1**, all of the alternatives retained for Level 2 screening would result in no impacts to NWI wetlands and one impact to a public park and recreation/Section 4 (f) resource. As a result, these resources do not represent a differentiator in the evaluation and screening of the alternatives. The one Section 4(f) resource that would be impacted by all of the alternatives would be the Great River Trail located along the Illinois side of the river between the BNSF railroad and IL 84. For historic and archaeological resources/Section 106 resources, all of the alternatives would impact one archaeological site except for Alternative 7, which would have no impacts. The one archaeological site, which is not

TABLE 1 – ALTERNATIVES EVALUATION AND SCREENING SUMMARY – MISSISSIPPI RIVER BRIDGE ALTERNATIVES

Evaluation Criteria	1	2	3	4	5	6	7
Purpose and Need							
A structurally sound bridge over the Mississippi River.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reduce the existing bridge/culvert deficiencies within the project study area.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Eliminate or reduce roadway geometric deficiencies where they are a contributing cause to safety issues.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reduced crash rates on I-80 mainline and interchanges.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Environmental Impacts							
Relocations (number)	1	3	5	1	1	15	53
Right-of-way (acres)	3	6	8	1	4	95	157
NWI Wetlands (acres)	0	0	0	0	0	0	0
Streams (number/linear feet)	4/3,965	4/3,800	5/4,756	4/3,920	5/4,575	3/2,084	9/4,208
Floodplains/Floodways (acres)	15/2	15/2	17/3	17/2	18/3	15/3	15/2
Potential Indiana Bat and NLEB Forested Habitat (acres)	31	38	40	31	32	66	70
Public Parks/Recreation Areas/Section 4(f) Resources (number)	1	1	1	1	1	1	1
Historic and Archaeological Resources/Section 106 Resources (number)	1	1	1	1	1	1	0
Special Waste Sites (number)	0	0	0	0	0	0	2
Prime Farmland Soils (acres)	3	4	11	2	4	91	128
Community Facilities and Services (number)	0	0	0	0	0	0	2
Environmental Justice Populations (number of EJ census block groups)	1	1	1	1	1	0	1
Engineering							
Constructability	Less Favorable	More Favorable	More Favorable	Less Favorable	Less Favorable	More Favorable	More Favorable
Maintenance of Traffic during Construction	Greatest Impacts	Least Impacts	Least Impacts	Moderate Impacts	Moderate Impacts	Least Impacts	Least Impacts

	Most Environmental Impacts
	Least Environmental Impacts

listed on the NRHP, has been identified as an unknown prehistoric site that is located within the infield of the I-80 eastbound exit ramp for IL 84. Except for Alternative 6, which would have no impacts to environmental justice populations, all of the alternatives would impact one environmental justice population census block group that is located along IL 84 west of the I-80 bridge over the Mississippi River. The only relocation within the environmental justice population census block group would occur with Alternative 7. For special waste sites and community facilities and services, none of the alternatives would impact these resources except for Alternative 7, which would impact two sites of each resource. Note that only existing and available data such as National Wetland Inventory (NWI) maps from the ECTR were used to identify potential wetlands and historic and archaeological resources within the study area so it is possible that more of these resources and impacts may be identified during the detailed field surveys that will be conducted during the NEPA phase.

Relocations range from one (Alternatives 1, 4, and 5) to 53 (Alternative 7). All of the relocations are residential except for Alternative 2, which has one business relocation, and Alternatives 6 and 7, which have four business relocations. Right-of-way impacts range from 1 (Alternative 4) to 157 acres (Alternative 7). The number of streams impacted ranges from 3 (Alternative 6) to 9 (Alternative 7) while the linear feet of streams impacted ranges from 2,084 (Alternative 6) to 4,756 (Alternative 3). In general, the alternatives with the new bridge located east of the existing bridge (i.e., Alternatives 2, 4, and 6) result in less stream impacts than the alternatives with the new bridge located west of the existing bridge (i.e., Alternatives 3, 5, and 7). Impacts to floodplains range from 15 (Alternatives 1, 2, 6, and 7) to 18 acres (Alternative 5). Impacts to floodways between the alternatives only differ by 1 acre with Alternatives 1, 2, 4, and 7 impacting 2 acres and Alternatives 3, 5, and 6 impacting 3 acres. Impacts to potential Indiana bat and NLEB forested habitat range from 31 (i.e., Alternatives 1 and 4) to 70 acres (i.e., Alternative 7). Impacts to prime farmland range from 2 (Alternative 4) to 128 acres (Alternative 7).

3.4.1.2 Constructability and Maintenance of Traffic During Construction

3.4.1.2.1 Constructability

With regard to constructability, Alternatives 2, 3, 6, and 7 (i.e., the alternatives with one new bridge off of the existing alignment) are considered more favorable than Alternatives 1 (i.e., Bridge Replacement on Existing Alignment Alternative), 4, and 5, (i.e., the alternatives with a new companion bridge and a new bridge on the existing alignment) primarily because they would not use the existing bridge alignment, and therefore, they would not require construction staging or the need for a detour.

For Alternative 1, the existing bridge would be completely closed and a detour provided during the demolition of the existing bridge and the construction of a new bridge on the existing alignment.

For Alternatives 2, 3, 6, and 7, the entire bridge would be constructed at once with no or little interference to the existing bridge and traffic. Once the bridge is built, all the traffic would be moved to the new bridge. For Alternatives 4 and 5, construction would occur in two stages. First, a new bridge would be constructed parallel to the existing bridge. Once construction is complete, traffic would be shifted to the new bridge and the existing bridge would then be demolished. The new bridge, which is designed for one-way traffic, would need to be temporally modified to accommodate two-way traffic during construction, which would include a temporary concrete barrier in the median and narrower shoulders. Following the demolition of the existing bridge, a second new bridge would then be constructed on the existing alignment. Once the second bridge is complete, traffic would be shifted so that there is one-way traffic on each bridge, which would require removing the temporary two-way traffic modifications to the first new bridge so that it can accommodate one-way traffic.

For Alternatives 2, 3, 6, and 7, by building the new bridge completely off of the existing alignment, the construction schedule could be cut in half compared to building two bridges at different times with one of them being built on the existing alignment (i.e., Alternatives 4 and 5).

An additional constructability advantage with constructing fully off alignment is the removal of any possible interference with existing foundations. Alternatives 4 and 5 may be able to avoid such interference by design, but Alternatives, 2, 3, 6, and 7 would provide greater freedom for optimal pier placement without the constructability challenge of existing foundation removal.

With regard to any other constructability issues, there are no differentiating factors between the alternatives at this level of development.

3.4.1.2.2 Maintenance of Traffic During Construction

Assumptions:

- Except for Alternative 1, which requires the complete closure of the bridge and a detour, during construction, a minimum of two lanes of traffic in each direction must always be maintained on the river crossing due to the high volume of truck traffic. This would ensure that the desired level of service is maintained throughout construction. Some localized lane closures would be allowable during off-peak hours to facilitate cross-over construction and pavement tie-ins as needed.
- Construction of the mainline bridge would impact IL-84 and US 67 traffic equally, and none of the alternatives would be superior to the others based upon crossroad impacts.
- As much as possible, the reuse of the I-80 mainline roadway alignment would be maximized in order to reduce cost.
- Between similar alternatives (i.e., Alternatives 2 and 3 and Alternative 4 and 5), the maintenance of traffic benefits or differences of either east side or west side construction is not discernable at this level of development.
- Maintenance of ramp traffic during construction would require detailed maintenance of traffic plans and any discussion of the differences between alternatives is difficult to identify under the current level of development.

Rating of Traffic Impacts:

Regarding the evaluation of the alternatives relative to maintenance of traffic, some notable differences are identified between the alternatives. For the purposes of this discussion, the traffic impacts will fall into three categories from least to greatest traffic impact. The categories are as follows:

- **Least Impact to Traffic** - Alternatives that include the largest offset from the existing roadway and river crossing generally provide the best options for maintaining traffic since existing I-80 traffic remains largely unaffected by the construction activities that occur at a substantial distance from the existing edge of pavement and bridge. The majority of the improvements will be completed prior to connecting the existing pavement to the new pavement and bridge crossing.
- **Moderate Impact to Traffic** – Alternatives that create a moderate impact to traffic generally reuse the existing alignment to a point where some traffic impacts would result. These impacts may include reconstructing existing pavement under traffic requiring the use of crossovers or localized detours and lane closures. The existing river crossing alignment may also factor into the staging of the proposed improvements.
- **Greatest Impact to Traffic** – Alternatives that reuse the existing alignment and bridge crossing location are the most impactful to existing traffic since they require new construction/reconstruction to occur on the existing facility including construction of the new bridge. Existing traffic would undergo substantial alterations to travel patterns including long-term closures and extensive detour routes.

Comparison of Alternatives:

Alternatives 2 and 3 are similar in the potential impacts to existing traffic during construction. Both alternatives would offset proposed improvements at an appropriate distance from the existing roadway and bridge. Therefore, construction activities would not disrupt traffic throughout much of the construction. The proposed river bridge, the most extensive construction activity, would be offset from the existing bridge and could be constructed without interrupting travel on the existing bridge. Therefore, the major construction activity would not be the source of traffic impact. Traffic tie-in points to the I-80 mainline would interrupt existing traffic but the impact would be minimal since paving would be less time consuming and disruptions could be minimized using temporary pavement. As a result, Alternatives 2 and 3 would have the least impact to traffic during construction.

Because Alternatives 6 and 7 would be constructed on a new alignment, they would also have the least impacts to traffic during construction. For both alternatives, the proposed new bridge could be constructed without interrupting traffic on the existing bridge. For Alternative 7, the new US 67 and IL 84 interchanges could also be constructed without interrupting traffic on the existing interchanges. For Alternative 6, there would be some interruption of traffic during the construction of the US 67 interchange but minimal interruption of traffic during the construction of the IL 84 interchange.

Alternatives 4, and 5 would have similar impacts to traffic during construction. Both Alternatives 4 and 5 would involve the construction of two bridges: one parallel to the existing alignment and one on existing alignment. Each bridge would carry one-way of traffic in the ultimate configuration but would be constructed with width sufficient to carry two lanes in each direction in a temporary configuration. One new bridge would be constructed first, while traffic is maintained on the existing bridge. During the second stage of construction, traffic would be shifted to the new bridge with two lanes of travel maintained in each direction. Shoulders would be substandard in the interim. No detours would be required under these alternatives. Due to the additional traffic stage (construction duration), substandard shoulders on the bridge in the interim configuration, and additional crossovers required for traffic shifts, these alternatives would have a moderate impact to traffic.

Alternative 1 would have the greatest impacts to traffic during construction because it would require the complete closure of the existing bridge during the demolition of the bridge and the subsequent construction of a new bridge on the existing alignment, which would require a maximum 38-mile detour. The detour would use only interstates and follow I-80 east from the IL 84 interchange to I-280 west. It would then follow I-74 north to I-80 east where it would end at the US 67 interchange. This same detour would be taken in reverse if the traveler is starting from the US 67 interchange.

3.4.2 I-88 INTERCHANGE ALTERNATIVES

3.4.2.1 Environmental Impacts

As shown in **Table 2**, all of the I-88 interchange alternatives would result in no impacts to historic and archaeological resources/Section 106 resources, community facilities and services, and EJ populations while resulting in the same impacts to special waste sites (i.e., two sites). As a result, none of these impacts represent a differentiator in the evaluation and screening of the alternatives. Note that only existing and available data such as the NWI maps from the ECTR were used to identify potential wetlands and historic and archaeological resources within the study area so it is possible that more of these resources and impacts may be identified during the detailed field surveys that will be conducted during the NEPA phase.

Relocations range from two (Alternative D) to three (Alternatives A, B, and C). All of the relocations are businesses. Right-of-way impacts range from 21 (Alternative A) to 55 acres (Alternative C). NWI wetland impacts range from 1 (Alternative D) to 4 acres (Alternative A). The number of streams impacted ranges from 1 (Alternatives A and B) to 3 (Alternatives C and D) while the linear feet of streams impacted ranges from 298 (Alternative B) to 2,016 (Alternative D). The impacts to floodplains range from 7 (Alternative A) to 32 acres (Alternative C) while none of the alternatives would impact floodways. Impacts to potential Indiana bat and NLEB forested habitat range from 6 (Alternative D) to 15 acres (Alternative C). Alternatives A, B, and C would impact one Section 4(f) resource, which is a Forest Preserve located in the northwest quadrant of the I-88 interchange. Alternative D would have no impacts to Section 4(f) resources. Impacts to prime farmland range from 21 (Alternative A) to 55 acres (Alternative C). In general, the alternatives that include major modifications to the Old IL 2 interchange (i.e., Alternatives C and D) result in greater impacts to right-of-way, streams, floodplains, and prime farmland.

3.4.2.2 Constructability and Maintenance of Traffic During Construction

Constructability and maintenance of traffic during construction are considered similar with Alternatives A, B, and C as they all involve rebuilding the loop ramps in a similar fashion. Alternative D is considered less favorable in terms of constructability and maintenance of traffic during construction due to the vertical changes in profile.

TABLE 2 – ALTERNATIVES EVALUATION AND SCREENING SUMMARY – I-88 INTERCHANGE ALTERNATIVES

Evaluation Criteria	A	B	C	D
Purpose and Need				
A structurally sound bridge over the Mississippi River.	N/A	N/A	N/A	N/A
Reduce the existing bridge/culvert deficiencies within the project study area.	Yes	Yes	Yes	Yes
Eliminate or reduce roadway geometric deficiencies where they are a contributing cause to safety issues.	Yes	Yes	Yes	Yes
Reduced crash rates on I-80 mainline and interchanges.	Yes	Yes	Yes	Yes
Environmental Impacts				
Relocations (number)	3	3	3	2
Right-of-way (acres)	21	23	55	36
NWI Wetlands (acres)	4	3	3	1
Streams (number/linear feet)	1/391	1/298	3/1,591	3/2,016
Floodplains/Floodways (acres)	7/0	11/0	32/0	30/0
Potential Indiana Bat and NLEB Forested Habitat (acres)	14	13	15	6
Public Parks/Recreation Areas/Section 4(f) Resources (number)	1	1	1	0
Historic and Archaeological Resources/Section 106 Resources (number)	0	0	0	0
Special Waste Sites (number)	2	2	2	2
Prime Farmland Soils (acres)	21	23	55	36
Community Facilities and Services (number)	0	0	0	0
Environmental Justice Populations (number of EJ census block groups)	0	0	0	0
Engineering				
Constructability	More Favorable	More Favorable	More Favorable	Less Favorable
Maintenance of Traffic during Construction	Least Impacts	Least Impacts	Least Impacts	Moderate Impacts



Most Environmental Impacts

Least Environmental Impacts

3.5 Public and Agency Input

On February 14, 2019, IDOT presented the I-80 over the Mississippi River PEL Study project introduction/overview at the NEPA/Section 404 merger meeting for information purposes.

On April 6, 2020, 481 project kick-off letters were distributed to stakeholders representing local, state, and federal agencies, public officials, and private organizations introducing them to the PEL study and inviting them to the virtual public meeting.

On April 22, 2020, IDOT conducted a virtual public meeting for the project to provide a project introduction, identify the preliminary project purpose and need, and to obtain input from the public. The meeting included an introduction, a project video, a presentation of exhibit boards, and a question and answer session. There were 621 people that attended the public meeting, and 125 comments/questions were submitted during the meeting.

Notable comments and questions received during the public meeting focused on the following:

- Substandard shoulders
- Bridge too narrow
- Not enough space to get around accidents
- Low sides of bridge are a problem
- Lack of height of bridge makes it scary
- Ramps too short, difficult to merge
- Too much truck traffic
- Expand to three lanes each way
- More lanes
- Safety of vehicles and structure
- Pedestrian accommodations needed (multiple)
- No funds for pedestrian accommodations/car only bridge (multiple)
- Safety for property owners during construction
- Impact of construction on business/economy
- Access to LeClaire/Rapids City during construction
- Ease of access a problem
- Need well-lit exits/entrances with clear signage
- Consider tolling

Questions asked during the public meeting were answered by the project team. Approximately 20 comments were received after the meeting which generally touched upon the same topics listed above. Each of these comments were responded to individually.

On September 10, 2020, IDOT presented the project purpose and need at the NEPA/Section 404 merger meeting for information purposes. No comments were provided by the resource agencies at this meeting. It was concluded that IDOT would submit the purpose and need to FHWA after this meeting for an off-cycle review. FHWA will circulate the document to the resource agencies with a 30-day comment period.

On September 9, 2021, IDOT presented the purpose and need to the NEPA/Section 404 merger meeting for consistency determination. The agencies in attendance agreed that the purpose and need contains the appropriate documentation and analysis, on par with a NEPA-level analysis, such that the information could be incorporated into a NEPA document at a later date, with no revisions, or minimal revisions due to changed conditions in the project area, or revised laws.

IDOT established a website for the project (<https://www.i80mississippibridge.com/>). The project contains project information and documents. Comments can be submitted through the project website. Following the public meeting comment period, one additional comment was received at the project website regarding the construction procurement method.

On May 11, 2022, IDOT conducted a second virtual public meeting for the project to present the range of reasonable alternatives that were developed and evaluated based on their ability to meet the project's purpose and need, environmental impacts, and engineering issues such as constructability and maintenance of traffic during construction. The purpose of this meeting was to present the results of this evaluation, obtain input from the public, and answer any questions. The meeting included an introduction, a project video, a presentation of exhibit boards, and a question and answer session. There were 408 people that attended the public meeting, and 111 comments/questions were submitted during the meeting.

Notable comments and questions submitted during the public meeting focused on the following: (Note: For the more common comments and comments that indicated support or opposition to an alternative or option, the number of comments submitted is provided in parentheses.)

- Support the Bison Bridge* (22 comments)
- Oppose the Bison Bridge (2 comments)
- Oppose Alternative 1 (4 comments)
- Support Alternatives 2 and 3 (1 comment)
- Oppose Alternative 6 (1 comment)
- Pedestrian and bicycle accommodations (6 comments)
- Noise impacts (5 comments)
- Options to retain and reuse the existing bridge
- Traffic impacts and cost of detours
- Government agency coordination
- Impacts of alternatives
- Timing of construction
- Wider bridge center span for river traffic
- Canal Shore Drive impacts during construction
- Alternative evaluation criteria
- Cost of alternatives
- Location of new bridge
- Changes in study area
- Compensation and disruptions for property owners
- Interchange at SW 35th Street
- Consideration of economic development
- Influence of Corps of Engineers

*The Bison Bridge is a concept that is being proposed by the Bison Bridge Foundation that would involve repurposing the existing I-80 bridge over the Mississippi River using private funding to create a national park for bison. It would also provide pedestrian and bicycle access across the river. In April 2022, the Illinois House of Representatives passed a resolution (HR 0699) urging "the Governor and the Secretary of the Department of Transportation to develop plans for the new I-80 bridge structure that includes the incorporation of the Bison Bridge structure." It is important to note that the project's purpose and need and range of the reasonable alternatives does not include the development of a Bison Bridge nor would it be needed to mitigate any anticipated impacts associated with the project; therefore, it was not included in this Alternatives Development and Analysis Technical Memorandum and is not considered a project alternative.

In addition to the 111 comments submitted during the public meeting, 266 comments were submitted from May 11 to May 25. **Table 3** presents the number of comments that supported or opposed an alternative.

TABLE 3 – NUMBER OF COMMENTS THAT SUPPORT OR OPPOSE AN ALTERNATIVE

Alternative	Support	Oppose
Alternative 1	0	10
Alternative 2	3	0
Alternative 3	3	1
Alternative 4	10	0
Alternative 5	7	0
Alternative 6	1	5
Alternative 7	0	16

Other notable comments included the following:

- Support the Bison Bridge (124 comments)
- Oppose the Bison Bridge (32 comments)
- Support pedestrian and bicycle accommodations (24 comments)
- Noise impacts (5 comments)

Responses will be provided for each comment and question.

3.6 Summary of Alternatives Evaluation

3.6.1 MISSISSIPPI RIVER BRIDGE ALTERNATIVES

3.6.1.1 Alternative 1 – Bridge Replacement on Existing Alignment

Along with Alternatives 4 and 5, Alternative 1 would have the fewest number of relocations (1). Note: The number in parentheses following the reference to a resource represents the impacts to that resource from **Table 1**. Along with Alternative 4, it would result in the fewest impacts to Indiana bat and NLEB forested habitat (31 acres). It would also result in the fewest impacts to floodplains/floodways (15 acres/2 acres), along with Alternatives 2 and 7. It would result in the second fewest impacts to prime farmland (3 acres) and right-of-way (3 acres). The alternative's impacts to streams falls within the middle ranking of impacts for all the alternatives. For the other environmental resources, the impacts, or lack of impacts, are the same as or similar to all the alternatives.

Along with Alternatives 4 and 5, Alternative 1 would be less favorable with regard to constructability. In addition, Alternative 1 would have the greatest impacts to traffic during construction because the bridge would need to be completely closed for approximately four years during construction, resulting in a maximum 38-mile detour.

Although Alternative 1 would generally have lower or similar impacts compared to the other alternatives, it is not recommended as an Alternative to be Carried Forward for further evaluation in the NEPA phase due to the impacts to travelers that would be associated with the 38-mile detour during the four-year closure of the bridge during construction.

3.6.1.2 Alternative 2 – Bridge Replacement East

Along with Alternatives 1 and 7, Alternative 2 would have the fewest impacts to floodplains/floodways (15 acres/2 acres). It would result in the second fewest number of relocations (3). The 38 acres of impacts to potential Indiana bat and NLEB forested habitat and the 6 acres of right-of-way impacts fall in the middle ranking of impacts for all the alternatives. It would have the second lowest impacts to streams (3,800 linear feet). Along with Alternative 5, it would have the third lowest impacts to prime farmland (4 acres). For the other environmental resources, the impacts, or lack of impacts, are the same as or similar to all the other alternatives.

Along with Alternatives 3, 6, and 7, Alternative 2 would be more favorable with regard to constructability and would have the least impacts to traffic during construction.

In general, because Alternative 2 would result in lower or similar impacts compared to the other alternatives, be more favorable with regard to constructability, and have the least impacts to traffic during construction, it is recommended as an Alternative to be Carried Forward for further evaluation in the NEPA phase.

3.6.1.3 Alternative 3 – Bridge Replacement West

Alternative 3 would have the most impacts to streams (5 streams and 4,756 linear feet) and the second highest impacts to floodplains/floodways (17 acres/3 acres). It would have the third highest impacts with regard to relocations (5), prime farmland (11 acres), potential Indiana bat and NLEB forested habitat (40 acres), and right-of-way (8 acres). For the other environmental resources, the impacts, or lack of impacts, are the same as or similar to all the other alternatives.

Along with Alternatives 2, 6, and 7, Alternative 3 would be more favorable with regard to constructability and would have the least impacts to traffic during construction.

In general, because Alternative 3 would result in relatively similar impacts to Alternatives 1, 2, 4, and 5 and substantially less impacts to several resources compared to Alternatives 6 and 7, be more favorable with regard to constructability, and have the least impacts to traffic during construction, it is recommended as an Alternative to be Carried Forward for further evaluation in the NEPA phase.

3.6.1.4 Alternative 4 – New Companion Bridge East and Replacement of Existing Bridge

Along with Alternatives 1 and 5, Alternative 4 would result in the lowest number of relocations (1). It would also have the lowest impacts to right-of-way (1 acre), potential Indiana bat and NLEB forested habitat (31 acres) (along with Alternative 1), and prime farmland (2 acres). In addition, it would result in the third lowest impacts to streams (3,920 linear feet) and the third highest impacts to floodplains/floodways (17 acres/2 acres). For the other environmental resources, the impacts, or lack of impacts, are the same as or similar to all the other alternatives.

Along with Alternatives 1 and 5, Alternative 4 would be less favorable with regard to constructability and would have moderate impacts to traffic during construction, along with Alternative 5.

In general, because Alternative 4 would result in the lowest impacts or similar impacts compared to the other alternatives, it is recommended as an Alternative to be Carried Forward for further evaluation in the NEPA document. Although Alternative 4 would be less favorable with regard to constructability and have moderate impacts to traffic during construction, it would not be to the level that would warrant its dismissal from further evaluation in the NEPA phase.

3.6.1.5 Alternative 5 – New Companion Bridge West and Replacement of Existing Bridge

Along with Alternatives 1, and 4, Alternative 5 would result in the lowest number of relocations (1). It would also result in the third lowest impacts to right-of-way (4 acres), potential Indiana bat and NLEB forested habitat (32 acres), and prime farmland (4 acres) (along with Alternative 2). However, it would result in the highest impacts to floodplains/floodways (18 acres/3 acres) and the second highest impacts to streams (4,575 linear feet). For the other environmental resources, the impacts, or lack of impacts, are the same as or similar to all the other alternatives.

Along with Alternatives 1 and 4, Alternative 5 would be less favorable with regard to constructability and would have moderate impacts to traffic during construction, along with Alternative 4.

In general, because Alternative 5 would result in lower or similar impacts, except for streams, compared to the other alternatives, it is recommended as an Alternative to be Carried Forward for further evaluation in the NEPA phase. Although Alternative 5 would be less favorable with regard to constructability and have moderate impacts to traffic during construction, it would not be to the level that would warrant its dismissal from further evaluation in the NEPA phase.

3.6.1.6 Alternative 6 – Bridge Replacement of New Alignment East

Alternative 6 would have the second highest impacts with regard to relocations (15), right-of-way (95 acres), potential Indiana bat and NLEB forested habitat (66 acres), and prime farmland (91 acres). However, it would result in the second lowest impacts to floodplains/floodways (15 acres/3 acres) and the lowest impacts to streams (3 streams and 2,084 linear feet). In addition, Alternative 6 is the only alternative that would not impact an environmental justice population. For the other environmental resources, the impacts, or lack of impacts, are the same as or similar to all the other alternatives.

Along with Alternatives 2, 3, and 7, Alternative 6 would be more favorable with regard to constructability and have the least impacts to traffic during construction.

In general, because Alternative 6 would result in the second highest impacts to several resources and that these impacts would be considerably higher than all the alternatives except Alternative 7, it is not recommended as an Alternative to be Carried Forward for further evaluation in the NEPA phase.

3.6.1.7 Alternative 7 – Bridge Replacement on New Alignment West

Alternative 7 would result in the highest impacts with regard to relocations (53), right-of-way (157 acres), potential Indiana bat and NLEB forest habitat (70 acres), prime farmland (128 acres), special waste sites (2), community facilities and services (2), and number of streams (9). It would have the third highest impacts to linear feet of the streams (4,208). However, Alternative 7 is the only Alternative that would not impact an archaeological site while all the other alternatives would impact only one site. For the other environmental resources, the impacts, or lack of impacts, are the same as or similar to all the other alternatives.

Along with Alternatives 2, 3, and 6, Alternative 7 would be more favorable with regard to constructability and have the least impacts to traffic during construction.

In general, because Alternative 7 would result in the highest impacts to several resources and that these impacts would be considerably higher than all the alternatives, it is not recommended as an Alternative to be Carried Forward for further evaluation in the NEPA phase.

3.6.2 I-88 INTERCHANGE ALTERNATIVES

3.6.2.1 Alternative A – Expanded Cloverleaf

Along with Alternatives B and C, Alternative A would result in three relocations, which is only one more than Alternative D, and impact one Section 4(f) resource, which is a Forest Preserve located in the northwest quadrant of the I-88 interchange. Note: More detailed design measures will be evaluated in the NEPA phase to avoid or minimize impacts to the Forest Preserve. It would result in the lowest impacts to right-of-way (21 acres), prime farmland (21 acres), and floodplains (7 acres). It would result in the second lowest impacts to streams (1 stream and 391 linear feet). However, it would result in the highest impacts to NWI wetlands (4 acres) and the second highest impacts to potential Indiana bat and NLEB forested habitat (14 acres). As with all the alternatives, Alternative A would have the same impacts to special waste sites (2) and no impacts to historic and archaeological resources/Section 106 resources, community facilities and services, environmental justice populations, and floodways.

Along with Alternatives B and C, Alternative A would be more favorable with regard to constructability and result in the least impacts to traffic during construction.

In general, because Alternative A would result in lower or similar impacts to the other alternatives, be more favorable with regard to constructability, and have the least impacts to traffic during construction, it is recommended as an Alternative to be Carried Forward for further evaluation in the NEPA phase.

3.6.2.2 Alternative B – Expanded Cloverleaf with Outer Direct Ramp

Along with Alternatives A and C, Alternative B would result in three relocations, which is only one more than Alternative D, and impact one Section 4(f) resource, which is a Forest Preserve located in the northwest quadrant of the I-88

interchange. Note: More detailed design measures will be evaluated in the NEPA phase to avoid or minimize impacts to the Forest Preserve. It would have the lowest impacts to streams (1 stream and 298 linear feet) and the second lowest impacts to right-of-way (23 acres), prime farmland (23 acres), floodplains (11 acres), potential Indiana bat and NLEB forested habitat (13 acres). As with all the alternatives, Alternative B would have the same impacts to special waste sites (2) and no impacts to historic and archaeological resources/Section 106 resources, community facilities and services, environmental just populations, and floodways.

Along with Alternatives A and C, Alternative B would be more favorable with regard to constructability and result in the least impacts to traffic during construction.

In general, because Alternative B would result in lower or similar impacts to the other alternatives, be more favorable with regard to constructability, and have the least impacts to traffic during construction, it is recommended as an Alternative to be Carried Forward for further evaluation in the NEPA phase.

3.6.2.3 Alternative C - Expanded Cloverleaf with Direct Ramp and Old IL 2 Interchange

Alternative C would result in the most impacts with regard to relocations (3) (along with Alternatives A and B), right-of-way (55 acres), potential Indiana bat and NLEB forested habitat 15 acres), floodplains (32 acres), and prime farmland (55 acres). The NWI wetland impacts for Alternative C (3 acres) is the same as Alternative B, which is less than Alternative A (4 acres) and more than Alternative D (1 acre), it would have the second highest impacts to streams (3 streams and 1,591 linear feet). Along with Alternatives A and B, Alternative C would impact one Section 4(f) resource, which is a Forest Preserve located in the northwest quadrant of the I-88 interchange. Note: More detailed design measures will be evaluated in the NEPA phase to avoid or minimize impacts to the Forest Preserve. As with all the alternatives, Alternative C would have the same impacts to special waste sites (2) and no impacts to historic and archaeological resources/Section 106 resources, community facilities and services, environmental just populations, and floodways.

Along with Alternatives A and B, Alternative C would be more favorable with regard to constructability and result in the least impacts to traffic during construction.

In general, because Alternative C would result in the highest or second highest impacts to several resources, it is not recommended as an Alternative to be Carried Forward for further evaluation in the NEPA phase.

3.6.2.4 Alternative D – Four-Level Interchange and Old IL 2 Interchange

Alternative D would result in the least impacts regarding relocations (2), NWI wetlands (1 acre), and potential Indiana bat and NLEB forested habitat (6 acres). It would have the highest impacts to streams (3 streams and 2,016 linear feet) and the second highest impacts to right-of-way (36 acres), floodplains (30 acres), and prime farmland (36 acres). Alternative D is the only alternative that would not impact a Section 4(f) resource. As with all the alternatives, Alternative D would have the same impacts to special waste sites (2) and no impacts to historic and archaeological resources/Section 106 resources, community facilities and services, environmental just populations, and floodways.

Alternative B would be less favorable with regard to constructability and result moderate impacts to traffic during construction.

Although Alternative D would result the highest or second highest impacts to a few resources, it would also result in the lowest impacts to a few resources. It is also the only alternative that would not impact a Section 4(f) resource. Although Alternative D would be less favorable with regard to constructability and have moderate impacts to traffic during construction, it would not be to the level that would warrant its dismissal from further evaluation in the NEPA phase. As a result, it is recommended as an Alternative to be Carried Forward for further evaluation in the NEPA document.

4 Recommended Alternatives to be Carried Forward for Further Evaluation in the NEPA Phase

Table 4 summarizes the alternatives analysis described in this document and identifies the recommended Alternatives to be Carried Forward for further evaluation in the NEPA phase.

TABLE 4 – RECOMMENDED ALTERNATIVES TO BE CARRIED FORWARD

Alternative	Level 1 Screening	Level 2 Screening			Alternatives to Be Carried Forward
	Meets Purpose and Need/Fatal Flaw	Environmental Impacts	Constructability	MOT	
No-Build Alternative	No	Retained as baseline alternative throughout NEPA.			Yes
Transportation System Management Alternative	No				No
Mass Transit Alternative	No				No
Build Alternatives					
Mississippi Bridge Alternatives					
Bridge Reconstruction Alternative	Fatal Flaw				No
Alternative 1 - Bridge Replacement on Existing Alignment	Yes	Lower/Similar Impacts	Less Favorable	Greatest Impacts	No
Alternative 2 - Bridge Replacement East	Yes	Lower/Similar Impacts	More Favorable	Least Impacts	Yes
Alternative 3 - Bridge Replacement West	Yes	Lower/Similar Impacts	More Favorable	Least Impacts	Yes
Alternative 4 - New Companion Bridge East and Replacement of Existing Bridge	Yes	Lowest/Similar Impacts	Less Favorable	Moderate Impacts	Yes
Alternative 5 - New Companion Bridge West and Replacement of Existing Bridge	Yes	Lower/Similar Impacts	Less Favorable	Moderate Impacts	Yes
Alternative 6 - Bridge Replacement on New Alignment East	Yes	Higher Impacts	More Favorable	Least Impacts	No
Alternative 7 - Bridge Replacement on New Alignment West	Yes	Highest Impacts	More Favorable	Least Impacts	No
I-88 Interchange Alternatives					
Alternative A - Expanded Cloverleaf	Yes	Lower/Similar Impacts	More Favorable	Least Impacts	Yes
Alternative B - Expanded Cloverleaf with Outer Direct Ramp	Yes	Lower/Similar Impacts	More Favorable	Least Impacts	Yes
Alternative C - Expanded Cloverleaf with Direct Ramp and Old IL 2 Interchange	Yes	Highest Impacts	More Favorable	Least Impacts	No
Alternative D - Four-Level Interchange and Old IL 2 Interchange	Yes	Lowest/Higher Impacts	Less Favorable	Moderate Impacts	Yes