

Decatur Bridge Location and Environmental Study - Feasibility Report

Decatur Bridge
Burt County, Nebraska
Monona County, Iowa
Project No.: STP-51-7(109)
Control No.: 32395

January 2025

NEBRASKA

Good Life. Great Journey.

DEPARTMENT OF TRANSPORTATION

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Acronyms and Terms

Acronym or Term	Definition
ACS	American Community Survey (U.S. Census Bureau)
ADT	average daily traffic
BGEPA	Bald and Golden Eagle Protection Act
BDM	Bridge Design Manual
BMcD	Burns & McDonnell Engineering Company, Inc.
BOPP	Nebraska Department of Transportation Bridge Office Policies and Procedures
CAG	Community Advisory Group
CWA	Clean Water Act
DOT	Department of Transportation
EA	Environmental Assessment. An EA is a concise public document that provides sufficient evidence and analysis to determine whether to prepare an EIS or FONSI.
ESA	Endangered Species Act
FHU	Felsburg, Holt & Ullevig
ft/s	feet per second
FY	fiscal year
HMR	Hazardous Materials Report
HOV	high-occupancy vehicle
IA	Iowa abbreviation
ICAT	Iowa Crash Analysis Tool
IDNR	Iowa Department of Natural Resources
Iowa DOT	Iowa Department of Transportation
ICAT	Iowa Crash Analysis Tool
IMS	Interactive Mapping Service
IPaC	Information for Planning and Consultation
ESA	Endangered Species Act
FHWA	Federal Highway Administration

Acronym or Term	Definition
MAP-21	Moving Ahead for Progress in the 21st Century Act
MBTA	Migratory Bird Treaty Act
MRFFS	Missouri River Flow Frequency Study
MPO	Metropolitan Planning Organization
NBI	National Bridge Inventory
NDOT	Nebraska Department of Transportation
NDEE	Nebraska Department of Environment and Energy
NE	Nebraska abbreviation
NEPA	National Environmental Policy Act
NeSCAP	Nebraska Stream Condition Assessment Procedure
NGPC	Nebraska Game and Parks Commission
NHPA	National Historic Preservation Act
NLEB	Northern long-eared bat
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PEMA	Palustrine emergent temporarily flooded wetland
PEMC	Palustrine emergent seasonally flooded wetland
PEMF	Palustrine emergent semi-permanently flooded wetland
PFOA	Palustrine forested temporarily flooded wetland
PIP	Public Involvement Plan
PQS	Professionally Qualified Staff. NDOT environmental staff specializing in certain resources (e.g., historic, biological, civil rights).
PS&E	Plans, Specifications, and Estimates
PSSA	Palustrine scrub-shrub temporarily flooded wetland
PUB	Palustrine unconsolidated bottom open water
Q100	100-year flood event
Q500	500-year flood event
SHPO	State Historic Preservation Officer

Acronym or Term	Definition
SRTS	Siouxland Regional Transit System
TDM	Transportation Demand Management
TSM	Transportation Systems Management
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service
VMT	vehicle miles traveled
vpd	vehicles per day
WOUS	Waters of the United States

STUDY AREA DEFINITIONS	
Initial Survey Area	An Initial Survey Area was defined along the existing alignment of N-51 and IA-175 over the Missouri River (see Figure 5-1). Initial desktop data collection and field surveys were conducted within this Initial Survey Area.
Study Area	Generally encompassing Burt County, Nebraska and Monona County, Iowa which is the immediate area highly dependent upon the existing Decatur Bridge crossing of the Missouri River. The Study Area was used to collect demographic, traffic, land use, and other related inventories of existing conditions to support the development and screening of the study alignments. This Study Area may be carried forward or modified for use during the NEPA process. Additional resource-specific “study areas” may be referenced, particularly those used to collect archeological or historic resource information in order to define the context of the resources, or in the discussion of larger systems such as watersheds that do not follow political boundaries.

Chapter 1

Background and Purpose of the Location and Environmental Study

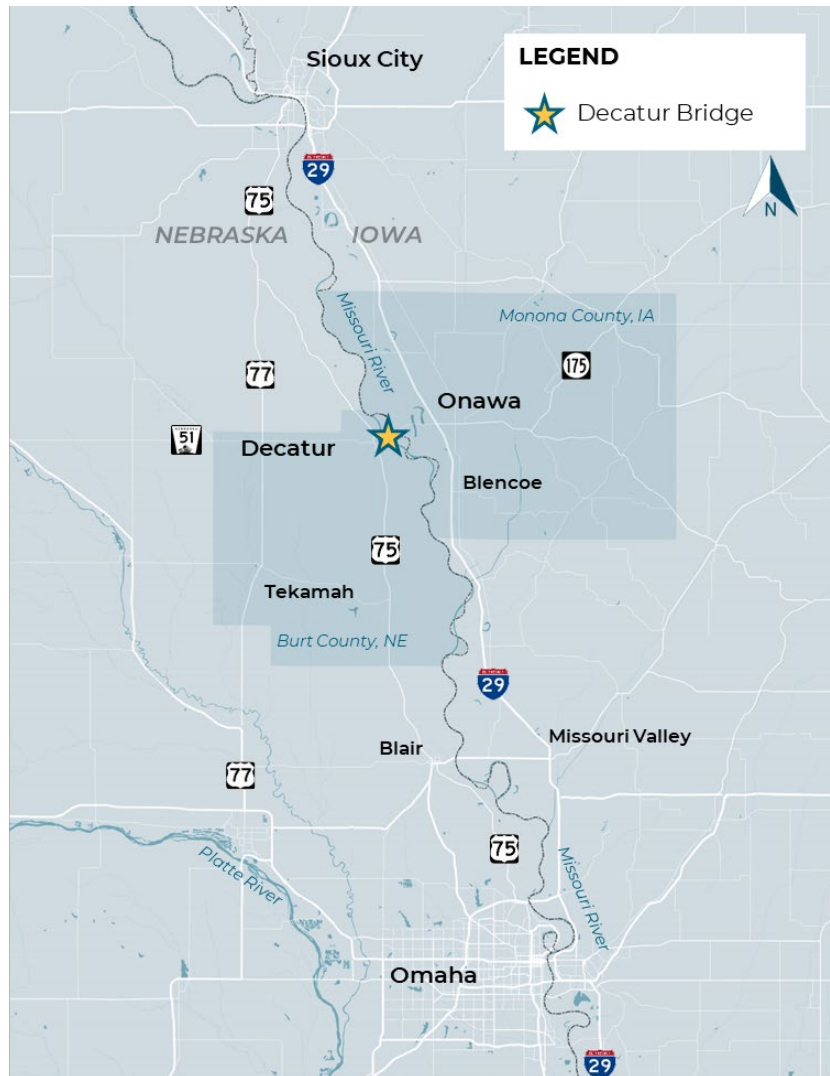
1.1 Project Description

The Nebraska Department of Transportation (NDOT) in partnership with the Iowa Department of Transportation (Iowa DOT), and the Federal Highway Administration (FHWA) initiated the Decatur Bridge Project (Control No. 32395) – a location and environmental study to assess the feasibility of improving the existing crossing of Nebraska Highway 51 (N-51)/Iowa Highway 175 (IA-175) over the Missouri River connecting Burt County Nebraska, and Monona County, Iowa.

The Decatur Bridge (S051 03644), whose construction started in 1951 and opened to traffic in 1956, has been previously determined eligible for listing in the National Register of Historic Places (NRHP). Alternatives studied include removing and replacing the existing crossing and rehabilitating the existing bridge. This project is being prepared as a Federal-aid eligible project.

This Location and Environmental Study serves as the background needed to initiate preliminary design and the environmental decision-making process required under the National Environmental Policy Act (NEPA). The NEPA process which determines if the project will have any significant impacts on the human and natural environment is required to (1) obtain approval of the recommended proposed action by the FHWA, (2) allow the use of federal funds for the project, and (3) support permitting and other approvals required under applicable special purpose laws and regulations (e.g., Clean Water Act [CWA], Endangered Species Act [ESA], National Historic Preservation Act [NHPA], Rivers and Harbors Act, Section 4(f) of the DOT Act, Executive Order

Figure 1-1: Project Location



12898 - Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, etc.)

1.2 Purpose of the Location and Environmental Study

The Decatur Bridge Location and Environmental Study was intended to:

- Identify the proposed action by assessing the issues associated with the existing crossing of N-51 and IA-175 via the Decatur Bridge over the Missouri River that may require repair, rehabilitation, or replacement.
- Identify the purpose and needs to be addressed by the proposed action.
- Identify feasible alignments for an improved river crossing and the universe of alternatives to be given initial consideration.
- Conduct desktop analyses and early field surveys to identify environmental features and constraints to be considered.
- Screen the universe of alternatives to determine which should be carried forward for detailed study to inform the NEPA decision.
- Conduct early coordination with regulatory and reviewing agencies and federally recognized Tribes.
- Conduct early outreach with the public, interested parties, and elected officials.
- Determine the appropriate NEPA Class of Action for the proposed project.

The following chapters capture the components of the Location and Environmental Study:

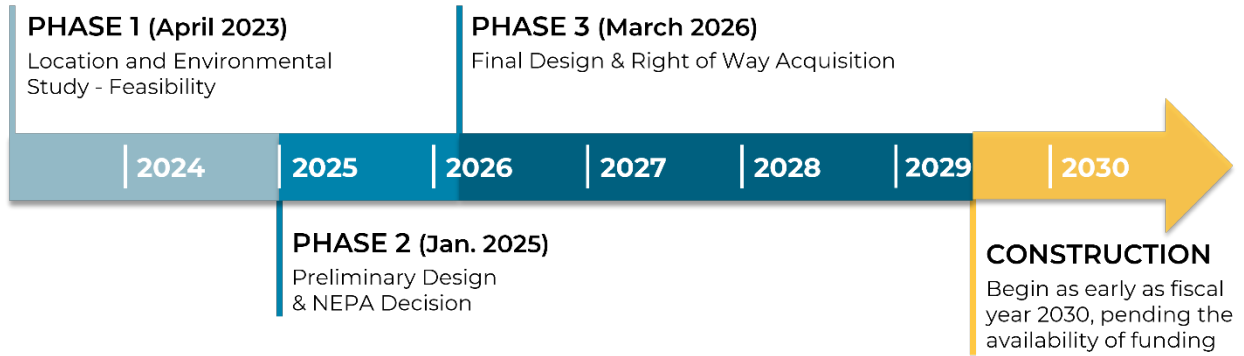
- Chapter 2 – Existing River Crossing Conditions
- Chapter 3 - Purpose and Need
- Chapter 4 - Alternatives Development and Screening
- Chapter 5 - Environmental Overview
- Chapter 6 - Public and Agency Outreach
- Chapter 7 - Location and Environmental Study Recommendations

1.3 Project Phases and Timeframes

The Decatur Bridge Project is comprised of three phases as illustrated in Figure 1-2. *Phase 1 – Location and Environmental Study* is the focus of this report. Phase 1 was initiated in April 2023 and completed in January 2025. *Phase 2 – Preliminary Design and NEPA Decision* is anticipated to start in January 2025 with formal agency and public scoping to initiate the NEPA process.¹ Phase 2 is anticipated to take 12 months from scoping through the issuance of an environmental decision by FHWA. Phase 3 – Final Design and Right-of-Way Acquisition may begin once Phase 2 is complete to allow the use of federal money to purchase the right-of-way (ROW) needed for the project. As indicated in Figure 1-2, construction of the project may begin as early as fiscal year (FY) 2030 based on when funding will be obligated by each DOT.

¹ To formally start the NEPA process, FHWA signs a NEPA Start Request Letter.

Figure 1-2: Project Phases and Timeframes



Chapter 2

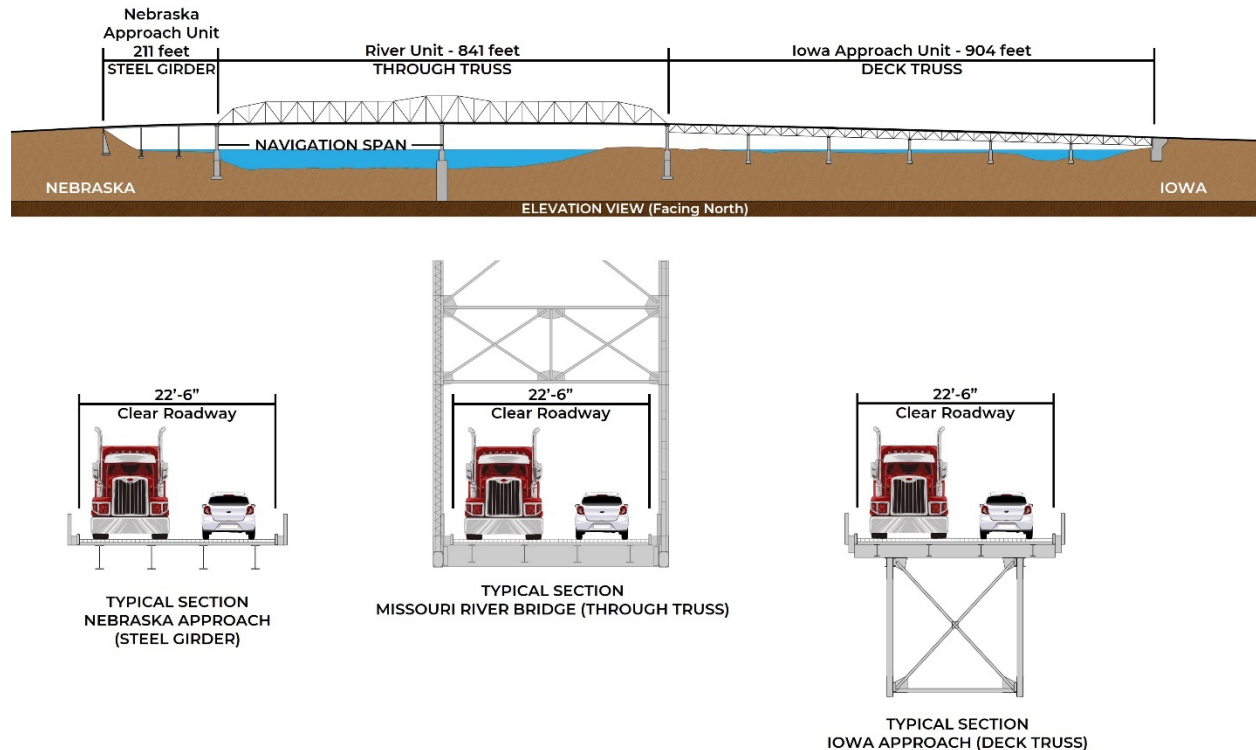
Existing River Crossing Conditions

During the Location and Environmental Study, the study team collected and analyzed information on the age, physical condition, and structural components of the Decatur Bridge; the approach roadways (N-51 and IA-175); the Missouri River including channel morphology, hydraulics, and adjacent land uses; and existing and forecasted traffic volumes and crash data. Detailed study reports and memoranda are in the project file and as sources listed in Chapter 9 – References.

2.1 Bridge Condition

The Decatur Bridge is 1,956 feet long and carries N-51/IA-175 over the Missouri River. As illustrated in Figure 2-1, the structure consists of a three-span Nebraska Approach Unit, a two-span River Unit, and two Iowa Approach Units each comprised of three spans. The Nebraska Approach Unit is a rolled steel girder structure, the River Unit is a continuous thru-truss with Warren-type panels, and the Iowa Approach Unit is comprised of continuous deck trusses. The deck is comprised of open steel grates providing a clear roadway width of 22'-6", consisting of two 11'-3" lanes and no shoulders. The Decatur Bridge is nearing the end of its service life because of several structural and functional deficiencies.

Figure 2-1: Existing Bridge Components



The Decatur Bridge receives a combined National Bridge Inventory (NBI), Fracture Critical (Nonredundant Steel Tension Member, or NSTM), and Element Inspection on a 2-year cycle. The most recent inspections for which reports are available were performed in September 2022 and September 2024. In the 2024 inspection, the deck was rated as “5 – Fair”, the superstructure was rated as “4 – Poor”, and the substructure was rated as “7 – Good”. Bridge condition ratings are used to describe the existing, in-place bridge as compared to the record drawing bridge condition.

2.1.1 Repair History

The Decatur Bridge has undergone nine structural repair projects over its service life including two major structural repairs. Seven of these repair projects have occurred within the last 36 years (roughly half of the structure’s life) for an average repair frequency of one project every five years. The structure has undergone two major structural repair projects.

- In 2000, the original concrete deck was replaced with an open steel grate deck. The deck replacement was required because of the age and deterioration of the concrete. Installing open steel grate decking helped maintain the functional load rating of the bridge, as the weight of the steel decking is approximately 20 percent of the original concrete deck weight.
- In 2017, NDOT performed a major repair project with the goal of extending the useful life and maintaining a functional load rating. Structural steel repairs were performed on the River Unit and Iowa Approach Unit trusses. The floor beams of the River Unit were post-tensioned to increase their capacity. Concrete repair and strengthening were performed on several substructure units. Street and navigation lighting were overhauled, and the approaches and railing were updated. The entire superstructure and steel portions of the substructure were blasted and repainted.

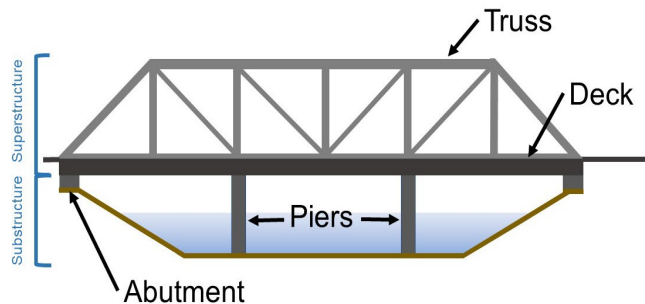
The 2017 major repair project improved the superstructure and substructure ratings by one point each, and the superstructure rating improved from Fair condition to Satisfactory condition.

In addition to structural repair projects, structural maintenance of the Decatur Bridge is performed by NDOT maintenance crews on a regular basis. Deterioration of the open steel grate deck panels was noted as early as 2010, after only 10 years of being in service. NDOT initiated a program to replace the loose deck panels in 2021 and has replaced approximately 20 panels out of 256 total.

What are bridge ratings?

Bridge ratings describe the physical condition of the Deck, Superstructure, and Substructure, as assigned by qualified bridge inspectors. Ratings range in number from 9 (excellent condition) to 0 (failed condition).

The **Deck** is the bridge component directly supporting wheel loads. The **Superstructure** includes the structural parts of the bridge that provide horizontal span (e.g., arch, truss, girders, etc.). The **Substructure** includes structural parts of the bridge that support the horizontal span (e.g., piers, bents, abutments, etc.).



What is bridge condition?

Bridge condition is determined by the lowest of the ratings for Deck, Superstructure, and Substructure. If the lowest rating is greater than or equal to 7, the bridge is classified as Good; if it is less than or equal to 4, the classification is Poor. Bridges rated 5 or 6 are classified as Fair.

2.1.2 Structural Deficiencies

The 2024 Inspection Report² identified several hundred deficiencies, of which the vast majority are structural. Twelve of the structural deficiencies were identified as having either “high” or “medium” urgency, and consisted of cracks in floorbeams, cracks in connection angles, section loss with holes and cracking in truss main tension members, fractured bolts and rivets, and barrier damage. Nine of these deficiencies are in primary load-carrying members or connections. The 2024 Inspection Report recommended repair of all twelve of the “high” and “medium” urgency structural deficiencies, and repair of an additional thirteen locations and instances of “low” urgency structural deficiencies. The number and severity of the structural deficiencies in the superstructure is the reason for the superstructure condition rating of “4 – Poor.”

2.1.3 Non-Structural Deficiencies

The 2024 Inspection Report identified approximately 15 non-structural deficiencies. Seven of those non-structural deficiencies were identified as having either “high” or “medium” urgency, and generally consisted of faulty lights, damaged approach rails, approach paving deterioration, and cracks in the deck panel to stringer welds. All seven deficiencies were recommended for repair. The extensive cracking in the deck panel welds is an ongoing issue and is the primary reason for the deck condition rating of “5 – Fair.”

2.1.4 Functional Deficiencies

The Decatur Bridge has several functional deficiencies. A functional deficiency is a condition that does not meet current design criteria.

The Decatur Bridge, depicted in Figure 2-1, has a clear bridge width of 22'-6", consisting of two 11'-3" lanes and no shoulders, narrower than the current design criteria. The current design criteria, depicted in Table 7-1, would require a clear bridge width of 40 feet, consisting of two 12-foot-wide lanes and 8-foot-wide shoulders. The narrow width limits the size of vehicles and agricultural equipment that can cross the bridge. Agricultural equipment can take up both lanes, which when in use limits the bridge to a single lane of traffic. This location is an important crossing for local farmers, as the detour to the nearest alternate river crossing is approximately 80 miles (round trip).

Additionally, approximately 20 of the structural deficiencies identified in the 2024 Inspection Report appear to be the result of vehicle impact with the River Unit truss superstructure. The narrow width and lack of shoulders increase the likelihood of these impacts. The Decatur Bridge meets current criteria for vertical clearance, but the overhead members still present a barrier to some large equipment and show evidence of past vehicle impacts

The current NDOT Bridge Design Manual (NDOT BDM)³ specifies concrete rails or concrete barriers along the outside edge of the bridge deck. For state highway bridges, the NDOT BDM minimum requirement is a 3'-3" tall concrete rail which has been crash tested at Testing Level 4 (TL-4) per the AASHTO Manual for Assessing Safety Hardware (MASH). These concrete sections provide a higher level of crash safety than the existing built-up steel bridge rail, which has a height of approximately 2'-11" above the top of deck and has not been MASH tested. The taller rail height also reduces the risk of large vehicles rolling over the barrier on impact.

² Fracture Critical and Routine Inspections Report for S051 03644. October 21, 2024.

³ NDOT Bridge Design Manual; 2024. Accessed at:
https://dot.nebraska.gov/media/4dapkdwu/24-11-12_ndot-bdm-ch-1-5-7-9-13.pdf

2.1.5 Service Life

The Decatur Bridge has reached the end of its service life. The average frequency of structural repairs has increased over the lifespan of the bridge, currently averaging once every five years. The bridge has already undergone two major repairs to improve the load rating and extend the service life (2000 and 2017). If a replacement alternative was selected and the Project was to begin construction in the Fall of 2029, the Decatur Bridge would need to remain in service until at least 2032. By 2032, the most recent major repair completed in 2017 would have extended the bridge's service life by 15 years.

The major repairs made in 2017 temporarily stabilized the deterioration of the superstructure and substructure and strengthened some of the weaker structural elements. However, by 2024, the superstructure condition dropped to a rating of "4 – Poor" and the deck condition dropped to a rating of "5 – Fair". The River Unit and Iowa Approach Unit have several "high" and "medium" urgency structural deficiencies occurring in primary load-carrying members and connections that need to be addressed. In addition, numerous locations have section loss, cracking, and pack rust. Deterioration of this type will continue as repainted areas break down over time. The open steel grate deck requires frequent re-welding and panel replacement. It also allows water to drain directly onto the members below, further accelerating deterioration. Because of the weight, replacing the steel deck with a concrete deck would further reduce the load rating of the bridge.

The inventory rating of the Decatur Bridge is less than half of that of a modern bridge design. Rehabilitation may maintain the current load rating but cannot improve it. The narrow deck width and load posting restrict the size and weight of vehicles that can legally use the bridge. The deck width is limited by the opening in the River Unit thru-truss and cannot be widened. Additional width could only be provided by constructing a new structure parallel to the existing bridge. The existing rails do not meet current design criteria.

2.2 Approach Roadways

In addition to the structure, the existing crossing includes an approach roadway embankment across the 100-year floodplain on both sides of the river. The Nebraska Approach Embankment is approximately 800 feet long from the western limits of the 100-year floodplain boundary to the West Abutment, with a maximum height of approximately 47 feet above the adjacent floodplain. The Iowa Approach Embankment is approximately 2,470 feet long from the East Abutment to the eastern limits of the 100-year floodplain, with a maximum height of approximately 50 feet above the adjacent floodplain.

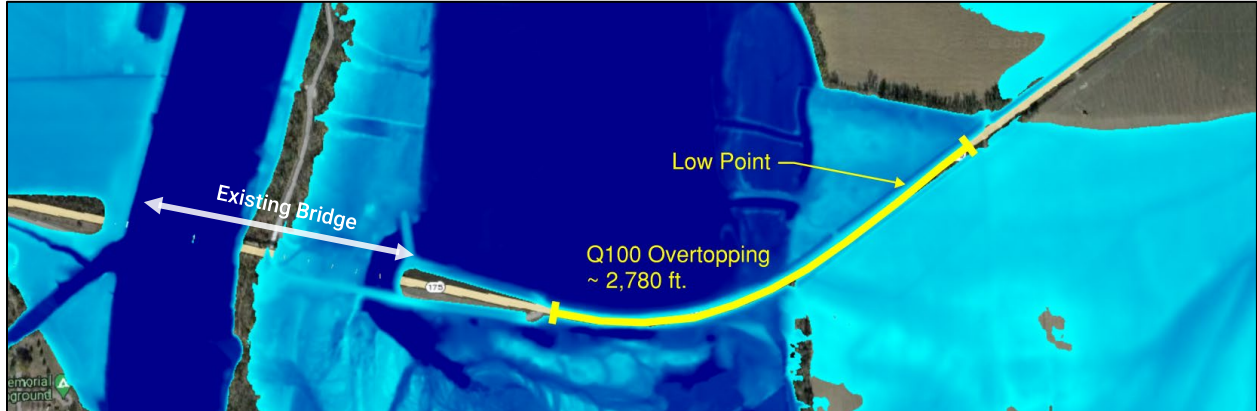
2.2.1 Resiliency Issues

In 2023, the U.S. Army Corps of Engineers (USACE) published the Missouri River Flow Frequency Study⁴ (2023 MRFFS), which includes new estimated flood flows along the Missouri River. The 2023 MRFFS is an update to a prior 2003 study and includes an additional 20 years of gage and precipitation data. The 2023 MRFFS predicts that the anticipated 100-year flood (Q100) and 500-year flood (Q500) events at Decatur are approximately 50 percent larger than the previous estimates from the 2003 study. The frequency of recent flood events indicates the new estimates for the Q100 and Q500 flows are reasonable. In the last 14 years alone, the Decatur Bridge site has experienced an approximate 75-year flood event (Q75) in 2011, an approximate 40-year flood event (Q40) in 2019, and a second approximate Q40 in 2024.

⁴ USACE 2023. *Missouri River Flow Frequency Study – Yankton, South Dakota to Hermann, Missouri*. US ACE Northwest Division, Omaha District, Kansas City District, and Missouri River Basin Water Management. June 2023

The Iowa DOT roadway freeboard requirement for state highways requires the Q100 to be below the edge of shoulder.⁵ The existing elevation of the Iowa approach roadway, IA-175, is susceptible to overtopping and closure during the Q100, which would force an approximate 80-mile round-trip detour. Figure 2-2 shows the approximate length of overtopped roadway at the Q100 event.

Figure 2-2: Roadway Overtopping at Q100



The Decatur Bridge east abutment also remains at risk of deep scour from large flood events. The 2011 Flood, roughly a Q75 according to the 2023 MRFFS, resulted in deep scour (up to 50 feet) at the east abutment and pier 8 (Iowa side of the crossing). The scour was driven by the geometry of the secondary channel in the east overbank where it meets the Decatur Bridge. All flow in the east overbank was constricted through a narrow, C-shaped channel in front of the east abutment. The water did not overtop IA-175, which did not relieve flooding north of the roadway resulting in high flow velocities below the abutment. The flow hit the existing pier and abutment at a high angle of attack. Figure 2-3 shows flow vectors and a heat map of velocities from a hydraulic model of the 2011 flood event. The peak velocity in the dark red areas is approximately 15 feet per second (ft/s). Table 2.1 shows typical velocity ranges based on past project experience for bridges over small and medium size rivers in the Midwest.

⁵ Iowa DOT Office of Bridges and Structures LRF Bridge Design Manual; July 2024. Accessed at: <https://iowadot.gov/bridge/policy/LRFDBridgeDesignManual.pdf>

Figure 2-3: 2011 Flood, Peak Velocities and Flow Vectors

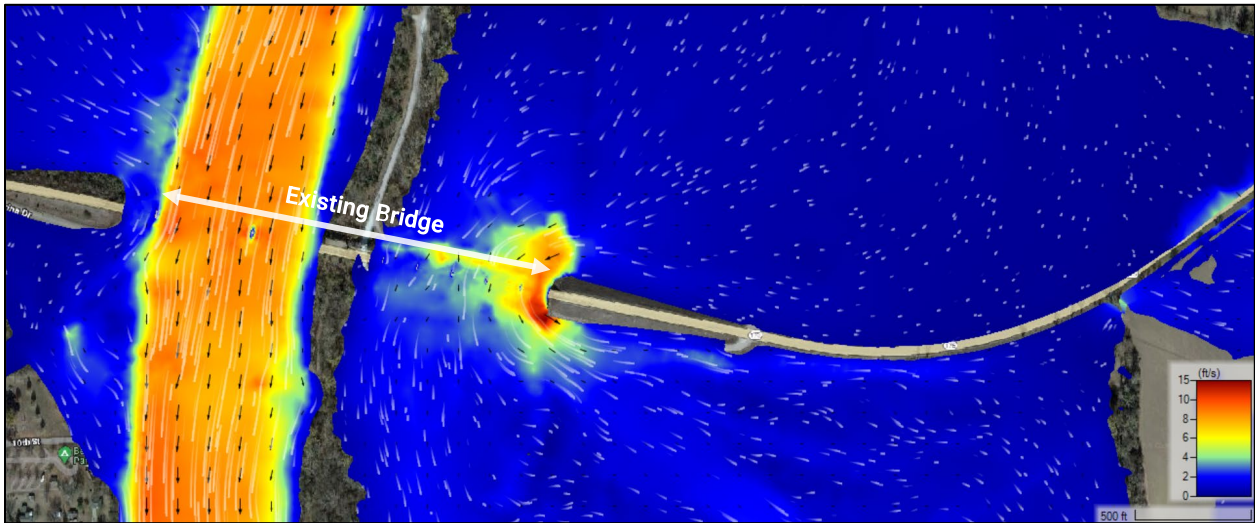

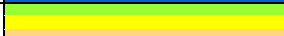





Table 2-1: Typical River Velocities

	Velocity (ft/s)	
Low	0 to 4	
Moderate	5 to 8	
High	9 to 12	
Very High	13 to 16	
Extremely High	17+	

After the 2011 flood event, the Iowa DOT filled in the scoured area and built two protective dikes which have slowed down the flow in front of the east abutment. The dikes and the area around them are armored with riprap to reduce scour potential. However, the overall geometry of the overbank and secondary channel remains unchanged. Overtopping of the roadway would provide some flood relief; however, predicted peak velocities around the south and north dikes are approximately 19 ft/s and 11 ft/s, respectively. Peak velocities where the roadway is overtopped are approximately 10 ft/s. If a Q100 or larger event were to occur under existing conditions, the scour risk below the abutment remains, even with the protection provided by the dikes and riprap.

2.3 Missouri River

Before the 1940s, a flood event caused the main channel of the Missouri River to shift east of its present location to the area near the Iowa Approach Unit, which is currently established as wetlands. The Decatur Bridge was built “in the dry” with the construction of the river spans completed in 1951. In 1955, using a system of dikes and dredging, the USACE re-aligned the river channel back to its present location to flow under the newly completed bridge.

The Missouri River Navigational Channel is a 300-foot-wide, 9-foot-deep channel maintained by the USACE for commercial navigation. The Navigation Channel is through the west span of the River Unit. The east span of the River Unit is not maintained for commercial traffic.

Flows on the Missouri River at Decatur are regulated by the Missouri River Mainstem Dam System, a system of six dams operated by the USACE for flood control and navigation. The Gavins Point Dam,

built in 1955 and approximately 120 river miles upstream of Decatur, is the lowest dam in the Missouri River system. Flows regulated by the Missouri River dam system significantly change downstream flow volumes.

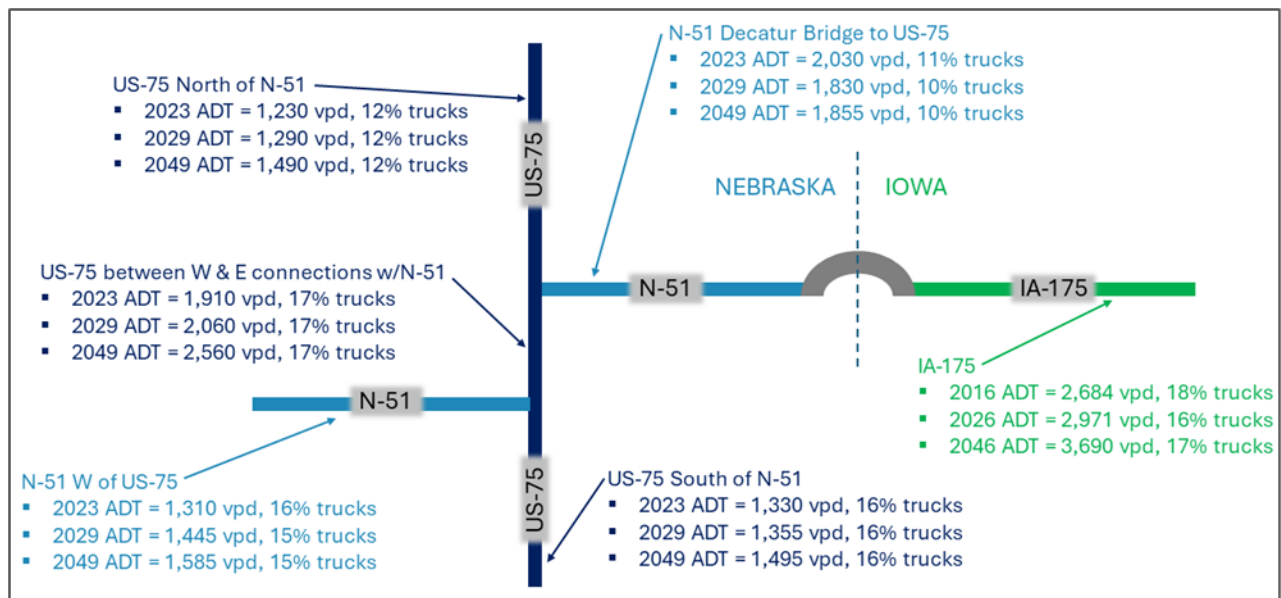
2.4 Traffic Volumes and Crash Data

2.4.1 Traffic Volumes

Figure 2-4 shows the existing and forecasted daily traffic volumes and truck percentages in the Study Area. Existing average daily traffic volumes (ADT) and truck percentages along N-51 and US-75 were gathered from local count stations in the Study Area and provided by NDOT. NDOT developed and provided forecasted traffic volumes and truck percentages for 2029 and 2049. Forecasted traffic volumes were developed based on historical traffic volumes and future growth anticipated along these corridors.

The existing ADTs and truck percentages along IA-175 were provided by Iowa DOT. The existing traffic volumes along IA-175 were based on traffic count data gathered at the IA-175/I-29 Interchange. The interchange is approximately six miles east of the Decatur Bridge, but the data provides a conservative estimate of traffic volumes along IA-175 between the Decatur Bridge and the Iowa State Line. Iowa DOT Systems Planning developed and provided forecasted daily traffic volumes and truck percentages on IA-175 for 2026 and 2046. Forecasted traffic volumes were developed based on historical traffic volumes and future growth anticipated along the IA-175 corridor.

Figure 2-4: Existing and Forecasted Average Daily Traffic Volumes Through the Study Area



Because of the differences in the original data sources and forecasting methodologies used by each DOT, the existing and forecasted traffic volumes on N-51 and IA-175 across the bridge are not consistent. Future coordination will occur in subsequent project phases to align the traffic data.

2.4.2 Crash Data

Table 2-1 summarizes the crash data within the Study Area. NDOT provided five-year crash data from 2019-2023. Crash data along IA-175 was obtained through the Iowa Crash Analysis Tool (ICAT), an online database maintained by the Iowa DOT that houses crash data for the entire state. Five-year crash data from 2019-2023 was gathered and reviewed along IA-175.

Table 2-2: Crash Data Within the Study Area

Crash Parameter	N-51 (US-75 to State Line) 2019-2023	IA-175 (State Line to Cherry Avenue) 2019-2023
Total crashes	6 (3 at/on bridge)	9 (2 at/on bridge)
Fatal crashes	0	0
Suspected Serious Injury	0	0
Suspected Minor Injury	1 injury (at/on bridge)	1
Possible Injury	3 injuries (all at/on bridge)	0
Property damage-only crashes	3	8
<p>Note: Crash data from both states do not overlap. NDOT values on N-51 extend from US-75 east to the state line (center of the bridge). Iowa DOT values on IA-175 extend from the state line east to Cherry Avenue.</p> <p>Confidential Information: Federal Law, 23, U.S.C. §407, prohibits the production of this document or its contents in discovery or its use in evidence in a State or Federal Court. The State of Nebraska has not waived any privilege it may assert as provided by that law through the dissemination of this document and has not authorized further distribution of this document or its contents to anyone other than the original recipient.</p>		

A segment crash analysis was completed through Decatur, starting at the N-51/US-75 intersection and ending at the Iowa State Line. From 2019 through 2023, a total of five crashes were recorded in this segment. Three crashes resulted in one suspected minor injury and three possible injuries; two crashes resulted in property damage only. This segment experienced a crash rate of 2.812 crashes per 100 million vehicle miles traveled (VMT) compared to the statewide average crash rate of 1.725 crashes per 100 million VMT for a 2-lane urban highway section.

An intersection crash analysis was completed at the N-51/US-75 intersection. One crash was recorded at the intersection from 2019-2023, which resulted in property damage only. No crash rate was calculated.

On IA-175, a total of nine crashes from 2019-2023 were recorded between the Nebraska State Line and Cherry Avenue. One crash resulted in a suspected minor injury and eight crashes resulted in property damage only. One crash struck the bridge overhead structure and one crash struck the bridge/bridge rail parapet.

Chapter 3

Purpose and Need

A well-defined purpose and need statement establishes the transportation problem(s) or need(s) to be addressed and the basic goals (purpose) to be achieved. The purpose and need statement drives the development and screening of the reasonable alternatives to be considered during the NEPA process and will play a key role in related analyses required for this project under Section 106 of the NHPA, Section 4(f) of the U.S. DOT Act, and Section 404 of the CWA.

NDOT, in partnership with Iowa DOT, obtained input on the identified needs from the Community Advisory Group (CAG) assembled for the project in January and April 2024, from the public in August 2024 (see Chapter 6 – Public and Agency Outreach), and from regulatory/reviewing agencies throughout the Location and Environmental Study.

The purpose and needs identified for the proposed action are summarized below. The Initial Purpose and Need Memorandum,⁶ with supporting data developed in June 2024, is in the project file and listed in Chapter 9 – References. The purpose and needs were shared with the public and agencies to obtain input during the public meetings held in August 2024.

3.1 Needs

3.1.1 Maintain Connectivity

- The existing crossing connects Decatur and Onawa area residents with services (employment, education, health care, emergency, recreation) on both sides of the river.
- Past long-term crossing closures negatively affected jobs and the regional economy.

3.1.2 Improve Infrastructure Condition

- Existing bridge condition - the state of the bridge in terms of structural deterioration, need for frequent and costly repairs, and issues that affect the remaining useful life of the structure.
- Existing bridge deficiencies - the design of the bridge in comparison to current standards.

3.1.3 Improve Resiliency Against Flooding

- Forecasted flood frequency and intensity – Recent trends on the lower Missouri River show an increase in the frequency and magnitude of major flood events at the project location. A 2023 USACE study predicts 50-year, 100-year, and 500-year floods to be 30 percent to 60 percent larger than previous estimates made in 2003, due to changing conditions within the upper Missouri River basin.
- Infrastructure stability – The crossing was closed for five months in 2011 due to foundation scour caused by the major flood event. The crossing remains susceptible to scour issues from future flood events of similar or greater magnitude.
- System reliability – The approach roadway (Iowa side) is susceptible to overtopping by updated 100-year and 500-year flood volumes.

⁶ Burns & McDonnell, 2024. *Initial Purpose and Need Memorandum for the Decatur Bridge Project*; STP-51-7(109), CN 32395, Burt County, Nebraska and Monona County, Iowa. June 4, 2024.

3.2 Purpose

The purpose of the proposed action is to provide a resilient river crossing connecting Decatur, Nebraska/N-51 and Onawa, Iowa/IA-175 that maintains access to regional commerce, employment, education, health care, and recreation facilities; maintains accessibility to and by emergency services; and provides infrastructure to support current and future travel demand.

Chapter 4

Alternatives Development and Screening

The identification and consideration of alternatives is an essential part of the overall decision-making process. Using engineering judgment and in consideration of input received from the CAG, agencies, and the public, the study team developed and screened an initial universe of alternatives including bridge repair and rehabilitation options, use of other existing Missouri River crossings; transportation systems and transportation demand management strategies, use of transit and other transportation modes, and construction of a new bridge along the existing and new location alignments to improve the river crossing.

4.1 Alternatives Considered

4.1.1 No Build Alternative

The No-Build Alternative was defined as follows and will be carried forward into the NEPA process to serve as a baseline for comparison with reasonable alternatives.

The No-Build Alternative would leave the existing Decatur Bridge crossing in place with regular and scheduled maintenance occurring until a point when repairs and maintenance cannot sustain the continued use of the crossing, and the crossing would be closed to traffic. Interim closures of the crossing would still occur to conduct scheduled maintenance and repairs when needed. The eventual closure of the crossing to vehicular use and the continued deterioration of the bridge may necessitate its removal in the future to support safe river navigation and to eliminate a safety hazard for area residents.

4.1.2 Bridge Repair or Rehabilitation

The repair or rehabilitation of bridge components that would extend the useful life of the crossing could include minor to major repairs and/or replacement of components such as the deck, stringers, beams, truss components, foundations, etc. Rehabilitation may be considered at multiple levels with "major" rehabilitation potentially altering or removing some of the defining features that make the bridge NRHP-eligible.

Existing structural deficiencies would be repaired, as well as new deficiencies that may be identified during inspections conducted prior to construction. A summary of existing deficiencies from the 2024 Inspection Report is in the project file and listed in Chapter 9 – References. Typical structural deficiency categories and potential repairs are summarized in Table 4-1.

Table 4-1: Typical Structural Deficiencies and Potential Repairs

Structural Deficiency	Potential Repair
Steel	
Section loss and holes	Splice plates or member replacement
Cracks, including in gusset plates and floor beams	Splice plates, arrest holes, or member replacement
Pack rust	Blasting and zone painting
Bent, impacted, or turn members	Splice plates or member replacement
Cracked stringer coping and clip angles	Arrest holes or clip angle replacement
Cracks extending beyond arrest holes	Splice plates or member replacement
Missing or sheared bolts and rivets	Bolt replacement
Localized paint peeling & rust bleeding	Blasting and zone painting
Concrete	
Abutment backwall cracking	Concrete patching or backwall replacement
Delamination and spalling at piers	Concrete patching
Cracks with exposed reinforcement at piers	Concrete patching w/ reinforcing replacement
Pier nose angle delamination	Nose angle replacement

The bridge has already undergone two major repair projects to extend its life in 2000 and 2017. Rehabilitation would extend the useful life of the existing bridge by no more than 20 years before further rehabilitation or replacement would be needed. Structural deterioration tends to accelerate with age (e.g., corrosion, section loss, fatigue effects like cracking), and the bridge has reached the end of its service life (79 years in 2029). Existing structural deficiencies may be addressed through rehabilitation, but further deficiencies will continue to develop.

The existing steel grate deck would not be replaced with a concrete deck, as the heavier concrete would significantly reduce the bridge load rating and posting. Structural repairs would not improve the load rating or posting; the weight of vehicles that can legally use the crossing would continue to be restricted. Because a concrete railing requires a concrete deck, the existing steel railing would not be upgraded to a concrete railing. Existing non-structural deficiencies would be repaired, including issues with deck panel welds, lighting, guardrail, approach railing, debris, vegetation, etc.

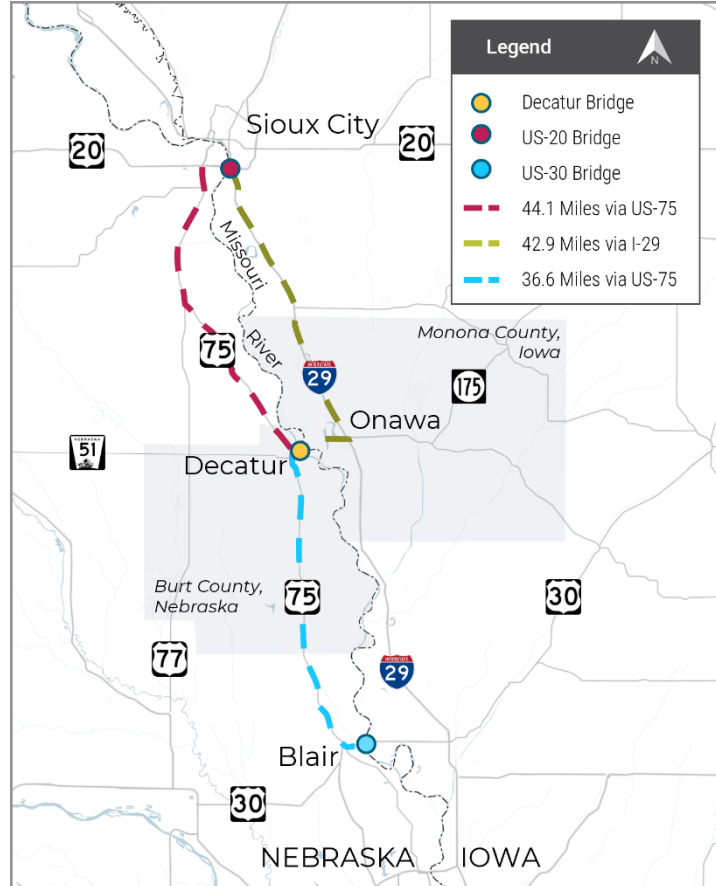
Widening the travel lanes and shoulders is not feasible, as the deck width is constrained by the width of the truss; therefore, the narrow roadway would continue to restrict the width of vehicles that can use the crossing. With rehabilitation, no improvements would be made to the scour risk at the existing bridge abutments.

4.1.3 Use of Other Existing Missouri River Crossings

The closest existing Missouri River crossings (bridge to bridge) to Decatur are at Blair, Nebraska (approximately 36.6 miles south via US-75 and US-30) and Sioux City, Iowa (approximately 44.1 miles north via US-75 and US-30) and Sioux City, Iowa (approximately 44.1 miles north via US-75 and US-20 Business through Nebraska or 42.9 miles via IA-175, I-29, and US-20 Business through Iowa) (see Figure 4-1). Like the No-Build Alternative defined above, the Decatur Bridge crossing would not be improved under this alternative. Only scheduled maintenance and repairs would continue to be conducted until a point in the future when repairs and maintenance can no longer sustain the continued use of the Decatur Bridge crossing and the crossing would be closed to traffic.

At that time, traffic would be rerouted along existing roadways to cross the Missouri River either at Blair or Sioux City. The existing approach roadways – N-51 and IA-175 - would be maintained to provide access to both sides of the river, but at a point in the future, the Decatur Bridge would be removed to avoid creating a hazard to river navigation and public safety. At that time, sections of N-51 and IA-175 could be removed from each state’s highway system with maintenance becoming the responsibility of each county or the Village of Decatur.

Figure 4-1: Nearest Existing Missouri River Crossings to Decatur



4.1.4 Transportation Systems Management / Transportation Demand Management

Transportation system management (TSM) is a set of low-cost (non-capital-intensive) strategies to enhance safety, reduce congestion, and improve traffic flow. Specific strategies include traffic signal synchronization, freeway operational improvements (e.g., changeable message signs, ramp metering), and incident management (e.g., clearing accidents and breakdowns quickly to allow traffic to move more smoothly). Other methods can include providing bus pullouts to remove stopped buses from the traffic stream, intersection improvements that provide signal priority for transit vehicles, and queue-jumper lanes to get transit vehicles to the front of the line at intersections.

Transportation demand management (TDM) includes managing or decreasing the demand for auto-related travel to increase the operating efficiency of transportation facilities. Managing or decreasing the demand for auto-related travel can be accomplished by providing mobility alternatives to using single-occupant vehicles (e.g., transit, carpool, vanpool, bicycle), incentives/disincentives to using single-occupant vehicles (e.g., congestion pricing, high-occupancy vehicle (HOV) lanes, travel time advantages for HOVs), alternative work environments (e.g., telecommuting and flex time), and parking management.

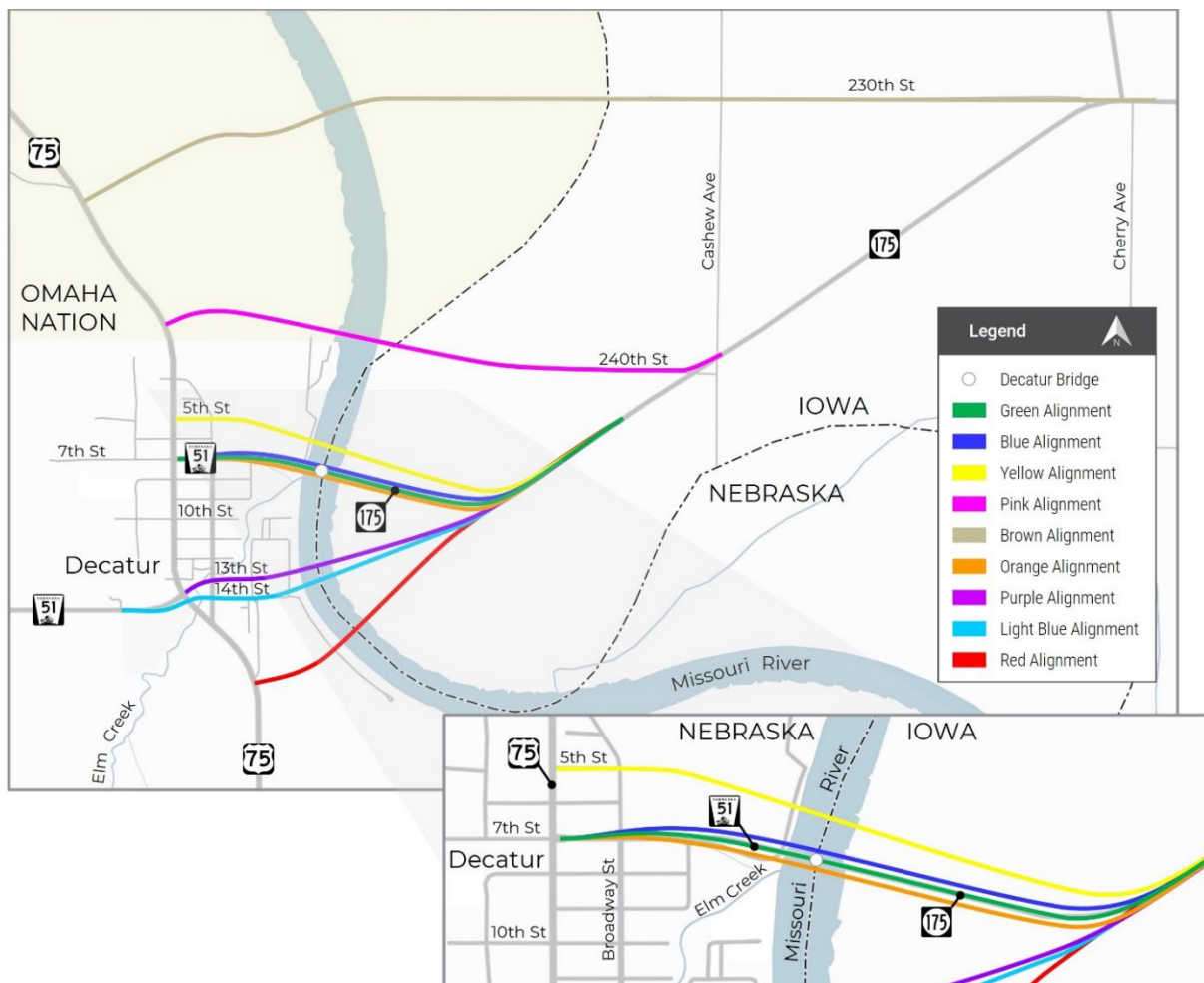
4.1.5 Alternate Transportation Modes

Alternate modes could include dedicated bus or rail transit; a ferry system in lieu of a bridge crossing; or other alternative modes of transportation that could provide access, support continued mobility, and maintain connectivity across the river at or near the location of the existing Decatur Bridge crossing. The Siouxland Regional Transit System (SRTS) is a public service dedicated to providing cost-effective, reliable public transportation across five counties in Iowa including Monona County and in Dakota County, Nebraska. Joyride Public Transit, operated out of Oakland, Nebraska, provides on-demand public transit service for nine communities across Burt and Cuming Counties including Decatur. Service is limited to Monday through Friday between the hours of 7 AM and 6 PM. The fare schedule is based on the trip distance, with trips up to 100 miles one-way from the point of origin included. Reservations must be made at least two days in advance of the desired travel day. No other existing or planned transit service serves the Decatur community.

4.1.6 Alignments to Provide an Improved River Crossing

To improve the river crossing, on-existing and new location alignments both north and south of the existing Decatur Bridge crossing were developed. Input received from the CAG in January and April 2024, and from the public in August 2024, was considered in developing and refining the alignments. Figure 4-2 illustrates the initial alignments considered to build a new river crossing.

Figure 4-2: Alignments to Provide an Improved River Crossing



The following table describes the alignments developed to provide an improved river crossing:

Table 4-2: Build Alignments

General Location:	Build Alignment:	Description:
EXISTING	GREEN Replace in like/kind on existing alignment	Remove the existing Decatur Bridge and construct a replacement crossing "in-like-and-kind" on the alignment of the existing river crossing.
NORTH OF THE EXISTING CROSSING	BLUE New crossing north of but near the existing alignment	Construct a new bridge and connecting roadways to provide a new river crossing adjacent to but approximately 80 feet north of the existing crossing. The existing Decatur Bridge would be removed once the new crossing is open to traffic.
	YELLOW New crossing north of the existing alignment	Construct a new bridge and connecting roadways to provide a new river crossing approximately 500 feet north of the existing crossing near 5 th Street. The existing Decatur Bridge would be removed once the new crossing is open to traffic.
	PINK New crossing far north of the existing alignment	Construct a new bridge and connecting roadways to provide a new river crossing approximately 0.5 miles north of the existing crossing. The existing Decatur Bridge would be removed once the new crossing is open to traffic.
	BROWN New crossing farthest north of the existing alignment	Construct a new bridge and connecting roadways to provide a new river crossing approximately 1.35 miles north of the existing crossing. The existing Decatur Bridge would be removed once the new crossing is open to traffic.
SOUTH OF THE EXISTING CROSSING	ORANGE New crossing south of but near the existing alignment	Construct a new bridge and connecting roadways to provide a new river crossing adjacent to but approximately 80 feet south of the existing crossing. The existing Decatur Bridge would be removed once the new crossing is open to traffic.
	PURPLE New crossing south of the existing alignment	Construct a new bridge and connecting roadways to provide a new river crossing approximately 0.36 miles south of the existing crossing. The existing Decatur Bridge would be removed once the new crossing is open to traffic.
	LIGHT BLUE New crossing far south of the existing alignment	Construct a new bridge and connecting roadways to provide a new river crossing approximately 0.4 miles south of the existing crossing near 13 th Street. The existing Decatur Bridge would be removed once the new crossing is open to traffic.
	RED New crossing farthest south of the existing alignment	Construct a new bridge and connecting roadways to provide a new river crossing approximately 0.64 miles south of the existing crossing near 14 th Street. The existing Decatur Bridge would be removed once the new crossing is open to traffic.

When an alignment(s) is selected for detailed study as a build alternative in the NEPA process, its horizontal and vertical alignment may be modified to reflect the further definition of design criteria, regulatory agency comments (e.g., from the U.S. Coast Guard [USCG] and USACE regarding bridge clearances and construction methods), and to minimize impacts to sensitive environmental features.

4.2 Alternatives Development and Screening Process

As Figure 4-3 illustrates, development and screening of alternatives involves multiple steps starting with establishing the purpose and need with agency and public input, screening the alternatives against the purpose and need, and then screening them against performance areas and determining high-level potential impacts to determine which alternatives should move forward for further detailed study to inform the NEPA decision.

Figure 4-3: Alternatives Screening Process

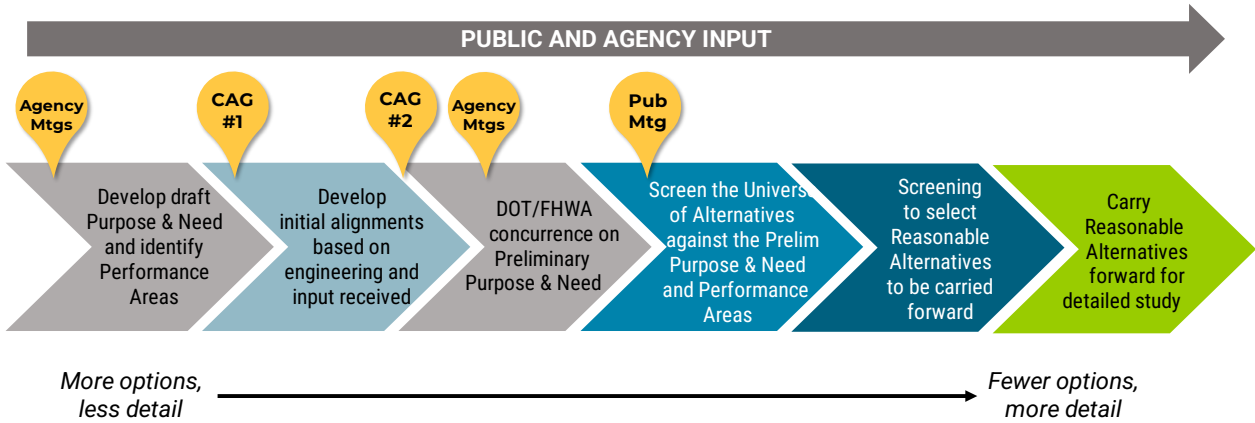


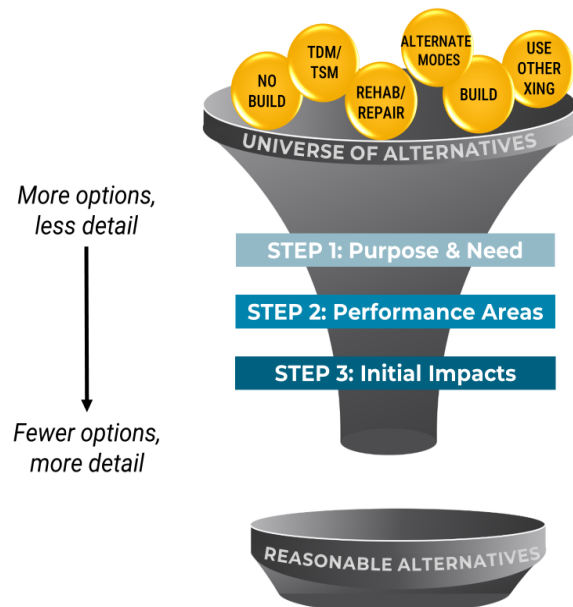
Figure 4-4 illustrates the 3-step process for screening the universe of alternatives. The following subsections describe each screening step. Copies of the matrices used in the 3-step screening process are included in Appendix A.

4.2.1 Step 1—Screening Against the Purpose and Need

Each alternative was compared to the identified needs to determine how well they would satisfy each need from “fully satisfies the need” to “does not satisfy the need” (see Appendix A - STEP-1 Screening the Universe of Alternatives Against the Purpose and Need). The alternatives were compared to the following needs and supporting criteria:

- **Need to Maintain Connectivity**
 - Connect residents with critical services
 - Accommodate local and regional travel demand (person vehicles, large trucks, agricultural traffic)
 - Minimize travel times for all users (route length and connectivity)
 - Support local and regional economies (existing and future, access and connectivity)

Figure 4-4: 3-Step Universe of Alternatives Screening Process



- **Need to Improve Infrastructure Condition**
 - Repair structural deterioration
 - Correct width and load posting deficiencies
 - Minimize long-term maintenance costs
- **Improve Resiliency Against Flooding**
 - Provide greater infrastructure stability and system reliability than the existing crossing
 - Provide a resilient crossing in the face of changing conditions within the watershed

The No-Build, Rehabilitation/Repair, TSM/TDM, Alternate Modes, and Use Another Crossing alternatives did not satisfy most of the needs because they would not provide a river crossing that meets current design criteria (e.g., wider travel lanes, shoulders, and address load restrictions). The No-Build, Rehabilitation/Repair, and Use of Another Crossing alternatives would require the existing river crossing to be closed to vehicular use at some time in the future. These alternatives would also result in long closures of the existing river crossing to facilitate repairs and/or replacement of bridge structural components requiring adverse, out-of-direction travel of more than 80 miles round trip.

For the alignments developed to provide an improved crossing or “Build” alternatives, the Replace in Like-and-Kind on the Existing Alignment (GREEN) would require a lengthy closure of the existing river crossing resulting in adverse out-of-direction travel of more than 80 miles round trip during the duration of construction. The GREEN could severely affect access to existing businesses in Decatur and access by emergency responders from Onawa during the closure timeframe potentially resulting in irreversible negative effects on residents and the local economy. The CAG did not support the GREEN alignment.

The longest “Build” alignments (BROWN and RED) would also result in adverse, out-of-direction travel and would bypass the community of Decatur. The CAG did not support either of these alignments.

Table 4-2 summarizes how the “Build” alignments fared in screening against the purpose and needs. A green checkmark indicates the alignment “fully satisfies the need”, a yellow dash indicates the alignment “partially satisfies the need”, and a red x indicates the alignment “does not satisfy the need”. The complete matrix is provided in Appendix A.

Table 4-2: Summary of Step 1 – Screening the Universe of Alternatives Against Purpose and Need

Needs	On Existing Alignment			Alignments North of Existing				Alignments South of Existing				Other Alternatives		
	NO-BUILD	REHAB/REPAIR	GREEN	BLUE	YELLOW	PINK	BROWN	ORANGE	PURPLE	LIGHT BLUE	RED	TSM/TMD	OTHER MODES	USE ANOTHER CROSSING
Need to Maintain Connectivity														
Connect residents with critical services	✗	—	—	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Accommodate local and regional travel demand (personal vehicles, large trucks, agricultural traffic)	✗	✗	✓	✓	✓	—	—	✓	—	—	—	✗	✗	✗
Minimize travel times for all users (route length and connectivity)	✗	—	—	✓	—	—	✗	✓	—	—	✗	✗	✗	✗
Support local and regional economies (existing and future, access and connectivity)	✗	—	✗	✓	✓	—	—	✓	—	—	—	✗	✗	✗
Need to Improve Infrastructure Condition														
Repair structural deterioration	✗	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Correct width and load posting deficiencies	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Minimize long-term maintenance costs	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Need to Improve Resiliency Against Flooding														
Provide greater infrastructure stability and system reliability than the existing crossing	✗	—	—	—	—	—	—	—	—	—	—	✗	✗	✗
Provide a resilient crossing in the face of changing conditions within the watershed	✗	—	—	—	—	—	—	—	—	—	—	✗	✗	✗
Does the alternative meet the purpose and need?	NO	NO	NO	YES	YES	YES	NO	YES	YES	YES	NO	NO	NO	NO

4.2.2 Step 2 - Screening Against Performance Areas

The second step in the alternative screening process involved evaluating alternatives against applicable performance areas defined by Federal and state guidance. The Moving Ahead for Progress in the 21st Century Act (MAP-21) established performance-based decision-making as an approach for highway investment, where states and metropolitan planning organizations (MPO) shall work to measure, manage, and improve upon the conditions and performance of transportation assets. Performance areas and more specific performance measures can be established during early project planning and carried through the various stages of project development, design, and construction to support and track project goals, promote planning and implementation consistency, and support the continued avoidance or minimization of impacts.

FHWAs *Performance-Based Planning and Programming Guidebook*⁷ and NDOT’s *2040 Statewide Transportation Plan*⁸ were reviewed to guide the selection of performance areas applicable to the Decatur Bridge project.

Table 4-3 compares the applicable performance areas selected from the referenced FHWA and NDOT documents.

Table 4-3: FHWA and NDOT Performance Areas Applicable to the Project

FHWA Performance Areas ¹	NDOT Performance Areas ²
Safety - Reduce fatalities and injuries on all public roads	Safety - provide a transportation system in Nebraska that is safe for all users
Infrastructure Condition - Maintain assets to a state of good repair	Asset Preservation - keep Nebraska’s multimodal transportation assets in a state of good repair
System Reliability - Improve efficiency of surface transportation system	Secure and Resilient Transportation - manage the risk and magnitude of disruptions to Nebraska’s transportation system
Environmental Sustainability - Enhance performance while protecting and enhancing the natural environment	Support for Economic and Community Vitality - Choose investments in Nebraska’s transportation system that best support the vitality of Nebraska’s economy and all of its communities

¹ – FHWA Performance-Based Planning and Programming Guide; September 2013

² - Nebraska Statewide Transportation Plan 2040; Performance Measures Memo, March 5, 2021

Through comparison of the above performance areas, the following performance areas were identified for this project and used in the screening of the universe of alternatives:

- **Infrastructure** - Provide a desired bridge lifespan of 75 years or greater and a typical section to support current and future travel demand and minimize long-term maintenance costs.
- **Accessibility** – Maintain or improve local and regional connectivity (connects directly to downtown Decatur/N-51, minimizing adverse, out-of-direction travel), maintain or minimize an

⁷ FHWA Performance-Based Planning and Programming Guide; September 2013. Accessed at: https://www.transit.dot.gov/sites/fta.dot.gov/files/Performance_Based_Planning_and_Programming_Guidebook.pdf

⁸ Nebraska Statewide Transportation Plan 2040; Performance Measures Memo, March 5, 2021. Accessed at: <https://dot.nebraska.gov/2040-ndot/>

increase in route length and travel times, and facilitate both commercial and recreational river navigation.

- **Safety** - Provide travel-lane widths and shoulders to support a variety of vehicle types and to minimize conflicts with disabled vehicles, support maintenance and emergency vehicle accessibility under traffic, and minimize travel distance for emergency response vehicles.
- **Resiliency** - Implement scour risk-reduction measures along the Missouri River channel and increase the approach roadway elevation to reduce the risk of overtopping.
- **Environment** - Minimize new right-of-way impacts on adjacent properties, public lands (including conservation and management areas), historical/cultural resources, wetlands and wooded habitats, and minimize the volume of fill material placed within the floodplain and regulatory floodway.
- **Constructability** – Minimize impacts to or relocation of major utilities and the temporary closure of N-51 and IA-175 during construction.

Table 4-4 summarizes the screening of the universe of alternatives against the selected performance areas. A green checkmark indicates the alternative “fully satisfies the performance area”, a yellow dash indicates the alternative “partially satisfies the performance area”, and a red x indicates the alternative “does not satisfy the performance area”. The TSM/TDM, Alternate Modes, and Use of Another Crossing alternatives were not assessed against the selected performance areas because they did not satisfy the needs in Step 1 of the screening process. The No-Build Alternative will be carried forward as a baseline for comparison with the other alternatives. Rehabilitation/Repair Alternatives are carried forward to support Section 106 and Section 4(f) reviews. A detailed version of this matrix with additional descriptions is included in Appendix A.

Except for the BLUE and YELLOW build alignments, all other build alignments had a least one category where the alignment would not satisfy the performance area. In comparison to the BLUE alignment, the ORANGE alignment would also minimize adverse, out-of-direction travel but would displace the parking area on the north side of the pedestrian bridge within the Beck Memorial Park and Campground the IDNR access road into the wildlife management area on the Iowa side of the river. The ORANGE alignment may also require land from the Beck Memorial Park and Campground. The alignments farther north or south of the existing river crossing would result in adverse, out-of-direction travel, require more additional ROW to build connecting roadways than the alignments closer to the existing crossing, would not connect into N-51 within downtown Decatur, and could require major utility/pipeline relocations. The PINK and BROWN alignments would require ROW from the Omaha Reservation.

Table 4-4: Summary of Step 2 – Screening the Universe of Alternatives Against Performance Areas Summary

Performance Areas	On Existing Alignment			Alignments North of Existing				Alignments South of Existing				
	NO-BUILD	REHAB/ REPAIR	GREEN	BLUE	YELLOW	PINK	BROWN	ORANGE	PURPLE	LIGHT BLUE	RED	
Infrastructure												
Provides desired bridge lifespan (>75 years)	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Provides typical section necessary to support current and future travel demand	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Minimizes long-term maintenance costs	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Accessibility												
Maintains or improves local and regional connectivity	✗	✗	✓	✓	—	✗	✗	—	✗	✗	✗	
Maintains or minimizes increases in route length and travel time	✗	✗	✓	✓	—	✗	✗	✓	✗	✗	✗	
Facilitates river navigation (commercial and recreational)	✗	✗	✓	✓	—	—	✓	✓	✓	✓	✓	
Safety												
Provides travel lane and shoulder widths to support a variety of vehicle types, minimize conflicts with disabled vehicles, supports maintenance and emergency vehicle accessibility under traffic (most cases)	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Minimize travel distance for emergency response vehicles	✗	✗	✓	✓	—	✗	✗	✓	✗	✗	✗	
Resiliency												
Provides opportunity to implement scour risk reduction measures in design (longer bridge, relief structure)	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Allows for an increase in approach roadway elevation to reduce overtopping risk	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Performance Areas	On Existing Alignment			Alignments North of Existing				Alignments South of Existing			
	NO-BUILD	REHAB/ REPAIR	GREEN	BLUE	YELLOW	PINK	BROWN	ORANGE	PURPLE	LIGHT BLUE	RED
Environment											
Minimizes new ROW impacts	✓	✓	✓	✓	—	✗	✗	✓	—	✗	✗
Minimizes impacts to adjacent property owners and number of potential displacements	✓	✓	✓	✓	—	—	✓	—	—	—	—
Minimizes impacts to public lands, conservation/management areas	✓	✓	✓	✓	—	✗	✗	✗	—	—	—
Minimizes impacts to wetland areas	✓	✓	✓	✓	—	✗	✗	✓	—	—	—
Minimizes impacts to wooded habitats	✓	✓	✓	✓	—	✗	✗	✓	—	—	—
Minimizes the volume of fill materials placed in the floodplain/floodway	✓	✓	✓	✓	—	✗	✗	✓	—	—	—
Constructability											
Minimizes major utility or infrastructure conflicts and potential relocations	✓	✓	✓	✓	✓	—	—	—	✓	—	—
Minimizes closure of N-51/IA-175 during construction	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓

4.2.3 Step 3 – High-level Impact Comparison

The third step in screening was to determine high-level potential impacts for the build alignments. The Replace in Like-and-Kind on the Existing Alignment (GREEN) and the longest “Build” alignments (BROWN and RED) were not included in the high-level impact comparison because they did not satisfy the needs in Step 1 of the screening process. Potential impacts were determined based on a typical 150-foot-wide corridor centered along each alignment for bridge and roadway sections that would be built on an earthen embankment and a typical 80-foot-wide corridor centered along each alignment where the roadway would be built at about or near the existing ground elevation. Additional resource information was mapped based on ArcGIS sources for those alignments outside of the Initial Survey Area. Table 4-5 summarizes the impact comparison. The more detailed impact comparison matrix is included in Appendix A - STEP-3 Screening the Universe of Alternatives - Impacts.

Table 4-5: High-Level Impacts of the Build Alignments

Impact Categories	Build Alignments Remaining After Step 1 and 2 Screening					
	BLUE	YELLOW	PINK	ORANGE	PURPLE	LIGHT BLUE
Total Corridor Length¹	1.6 miles	1.6 miles	2.1 miles	1.6 miles	1.6 miles	1.7 miles
Acres of New ROW²	23.8 acres	25.1 acres	31.3 acres	23.5 acres	24.3 acres	25.8 acres
Total Wetland Impacts³	6.1 acres	9.3 acres	9.9 acres	5.1 acres	8.3 acres	7.6 acres
Total Floodplain Impacts⁴	12.3 acres	15.3 acres	12.4 acres	12.2 acres	17.4 acres	17.1 acres
Impacts to USACE-owned Lands	0 acres	0 acres	0.9 acres	0 acres	0 acres	0 acres
Impacts to IDNR-owned lands	13.2 acres	13.0 acres	12.6 acres	13.5 acres	14.5 acres	14.5 acres
ROW Needed from Omaha Reservation⁵	0 acres	0 acres	12 acres	0 acres	0 acres	0 acres
Section 4(f) Resources Affected	Remove Decatur Bridge	Remove Decatur Bridge, IDNR boat ramp and parking area	Remove Decatur Bridge	Remove Decatur Bridge, encroach into and affect access to Beck Memorial Park & Campground	Remove Decatur Bridge	Remove Decatur Bridge
Major Utility Conflicts	None	None	Pipelines	South Dike, stormwater outfall, drainage ditch	Pipelines	Pipelines

1 – Based on length from US-75 to IA-175.

2 – Acreage estimate based on 150-foot-wide corridor for embankment sections and 80-foot-wide-corridor for at-grade sections with common endpoints at US-75 and IA-175.

3 – Total acreage from the combination of delineated wetlands within the Initial Survey Area (BLUE and ORANGE) and NWI-mapped wetlands for the remaining alignments. Includes riverine, palustrine, and lacustrine wetland types.

4 – 100-yr floodplain only mapped to state line/center of channel so quantity only accounts for areas in Iowa

5 – boundary from data obtained from the Bureau of Indian Affairs

Chapter 5

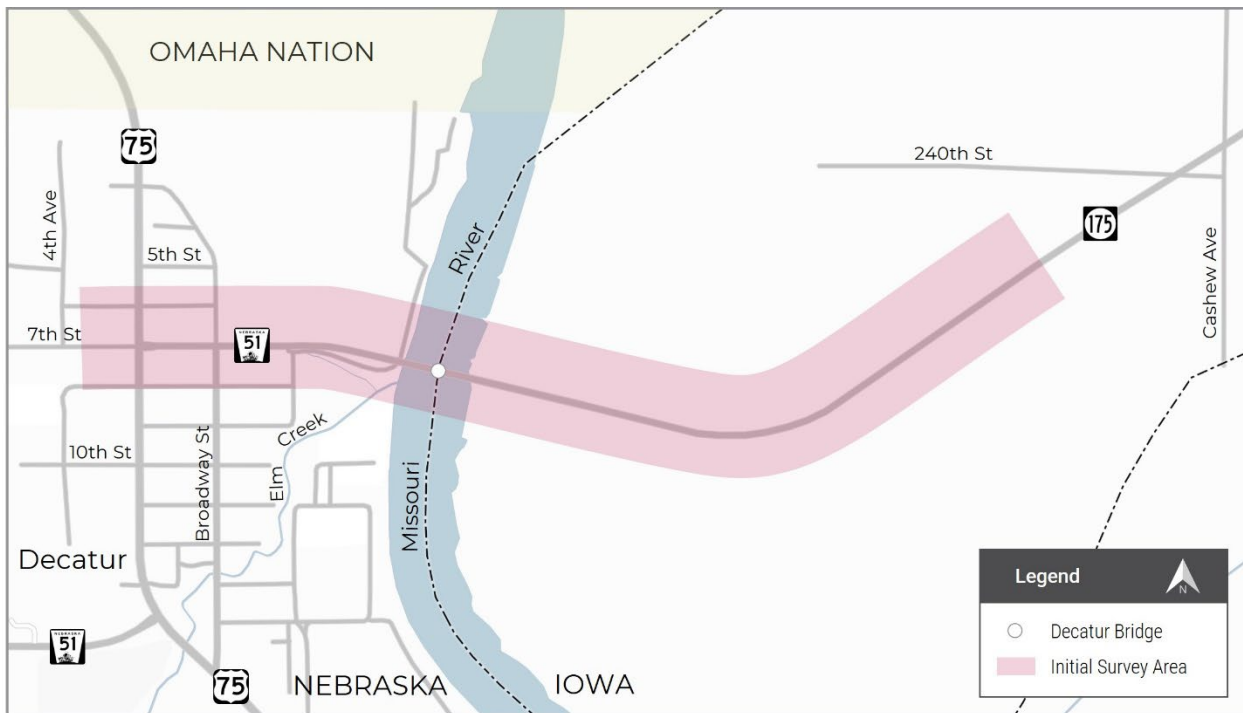
Environmental Overview

Desktop data collection, field surveys, and coordination with agencies occurred during the Location and Environmental Study to inform the development of the purpose and need and possible build alignments. The data collected will be used in developing the environmental document for the proposed action. Constraints mapping developed for the Initial Survey Area is included in Appendix B – Environmental Overview.

5.1 Initial Survey Area

An Initial Survey Area was defined along the existing alignment of N-51 and IA-175 over the Missouri River (see Figure 5-1). Initial desktop data collection and field surveys were conducted within this Initial Survey Area.

Figure 5-1: Initial Survey Area



5.2 Desktop Analyses and Field Surveys

5.2.1 Desktop Analyses

ArcGIS data from several sources were obtained and mapped within the Initial Survey Area and within the wider preliminary Study Area associated with the new location alignments. Additional data was provided by agencies including the USACE and the Iowa Department of Natural Resources (IDNR) regarding owned and managed lands, easements, and mitigation areas that were also mapped along with other agency datasets and published plans including:

- USACE Missouri River Recovery Program, Upper Decatur Bend

- U.S. Census 2018-2022 American Community Survey (ACS) 5-Year Estimates
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Mapping
- U.S. Geological Survey (USGS) topographic maps
- Nebraska Department of Environmental Quality (NDEE) Interactive Mapping System (IMS)
- Nebraska Game and Parks Commission (NGPC) Natural Heritage Program range maps
- Burt County (NE) Comprehensive Plan
- IDNR Contaminated Site Facilities
- IDNR Natural Areas Inventory
- IDNR Tieville-Blackbird-Upper Decatur Bend Area Management Plan
- Iowa DOT Monona County Highway and Transportation Map
- Monona County (IA) Future Land Use Plan

Appendix B – Environmental Overview includes the environmental overview map and constraints mapping developed. Additional data sources are included in the completed technical resource reports.

5.22 Field Surveys

The following provides a summary of the field survey conducted within the Initial Survey Area between October 2023 and July 2024. Technical reports developed under each resource category were reviewed by either NDOT or Iowa DOT and included in the project file. The technical reports provide the background data collected, field survey methodologies, and the results of the surveys including recommendations for follow-on work. The findings of these reports will be used to inform additional data collection or survey efforts, agency coordination/consultation, and the assessment of impacts of the alternatives carried forward for further detailed evaluation. Property right-of-entry requests (IA) and notifications (NE) were submitted to landowners prior to conducting field surveys.

5.2.2.1 Wetlands/Waters of the U.S. (WOUS)

A Wetland Delineation Report⁹ and a Nebraska Stream Condition Assessment Procedure (NeSCAP) Report¹⁰ were completed in November 2023. Field surveys were conducted in September and October 2023, following the protocols outlined in the 1987 USACE Wetland Delineation Manual, the 2010 Regional Supplement to the USACE Wetland Delineation Manual, and the 2020 NDOT Wetland and Water Resource Procedure Document.

Based on the field delineation, wetland and stream features were identified within the Initial Survey Area consisting of palustrine emergent temporarily and seasonally flooded (PEMA/PEMC), palustrine scrub-shrub temporarily flooded (PSSA), palustrine forested temporarily flooded (PFOA), and palustrine emergent semi-permanently flooded (PEMF) wetlands; and the Missouri River (perennial), unnamed tributaries (ephemeral), and palustrine unconsolidated bottom (PUB) open waters (e.g., ponds). The impacts on the delineated water features will be determined and coordination with the USACE will continue to determine which features are jurisdictional under Section 404 of the CWA and the appropriate level of permitting and mitigation required for unavoidable impacts to WOUS.

⁹ Felsburg, Holt & Ullevig, 2023. *Wetland Delineation Report, Decatur Bridge, Project No. STP-51-7(109): Control Number. 32395; Burt County, Nebraska and Monona County, Iowa. November 2023.*

¹⁰ Felsburg, Holt & Ullevig, 2023. *NeSCAP Stream Assessment, Decatur Bridge, Project No. STP-51-7(109): Control Number. 32395; Burt County, Nebraska and Monona County, Iowa. November 2023.*

The NeSCAP Report provided a summary of existing (baseline) conditions for three stream reaches within the Initial Survey Area (not including the Missouri River) following the 2016 USACE NeSCAP Manual. The NeSCAP calculation of stream condition index and score for each stream reach are included in the report. National Wetland Inventory (NWI) mapping was relied upon to screen alignment outside of the Initial Survey Area. During the NEPA study phase, the impacts and future stream conditions resulting from implementation of the reasonable alternatives will be determined.

5.2.2.2 Protected Species and Habitats

An Initial Habitat Assessment¹¹ was completed in October 2023 within the Initial Survey Area. The focus of the assessment was to identify the presence of habitats that may support species protected under the ESA, the Bald and Golden Eagle Protection Act (BGEPA), the Migratory Bird Treaty Act (MBTA), and species protected at the state level in Nebraska and Iowa. Using the USFWS Information for Planning and Consultation (IPaC) tool, 5 federally protected species and 13 additional state-protected species are known or likely to occur within the general project area. Based on desktop analysis and a field survey conducted in October 2023, potential habitat for the following protected species is present within the Initial Survey Area:

- Lake sturgeon (*Acipenser fulvescens*) state threatened (NE), pallid sturgeon (*Scaphirhynchus albus*) federally endangered and state endangered (NE and IA), and sturgeon chub (*Macrhybopsis gelida*) state threatened (NE) – all are known to inhabit large river systems within the Missouri and Mississippi River basins.
- Piping plover (*Charadrius melodus*) federally and state (NE) threatened – occur in areas of shallow open water, on mudflats, sandbars, and lake shores; shallow impoundments within IDNR and USACE-managed mitigation areas may provide suitable habitat.
- Northern long-eared bat (NLEB) (*Myotis septentrionalis*) federally endangered and state threatened (NE) and tricolored bat (*Perimyotis subflavus*) proposed federally endangered – during the summer, both species forage in forested areas and roost in trees that have sloughing bark, cracks, crevices, or hollows. Both species may use bridges or other structures as roost sites.
- Monarch butterfly (*Danaus plexippus*) federal candidate species – requires milkweed to complete its lifecycle, which occurs along roadsides and fence rows.

The results of the Initial Habitat Assessment and any follow-on field surveys will be used to assess potential project impacts and support consultation or conference under the ESA with the USFWS and appropriate state agencies, as warranted.

An Acoustic Bat Survey¹² was conducted in July 2024 to assess the potential seasonal presence of NLEB and tricolored bat within the Initial Survey Area. Although several bat species were determined to potentially be present based on the data obtained, the NLEB and tricolored bat were determined to be likely absent from the project area. If alignments/alternatives are selected for further study that extend outside of the Initial Survey Area, additional habitat surveys may be required.

¹¹ Burns & McDonnell, 2023. *Habitat Assessment Report for the Decatur Bridge Project; STP-51-7(109)*, CN 32395, Burt County, Nebraska and Monona County, Iowa. October 25, 2023.

¹² Burns & McDonnell, 2024. *Bat Acoustic Survey Report for the Decatur Bridge Project in Monona County, Iowa and Burt County, Nebraska*. November 26, 2024.

5.2.2.3 Archeological Resources

An archeological desktop review and background study¹³ were conducted for the Nebraska portion of the Initial Survey Area in September 2023 to identify previously recorded historic and pre-historic resources and identify areas of high potential for buried cultural resources. No potential shipwreck sites were identified along the Missouri River as the location of the channel and surrounding landforms have changed over time. Several archeological surveys have been conducted within and across the Initial Survey Area for other transportation and utility projects. Archeological field surveys (shovel tests, hand auguring, and/or deep testing as warranted) would be conducted along the build alignments carried forward for further study.

On behalf of the Iowa DOT Bear Creek Archeology completed a Phase 1A archeological and geomorphological review¹⁴ and a Phase I archeological survey¹⁵ of 487.4 acres including the Initial Survey Area. The geomorphological survey found landforms to consist of relatively young alluvial sediments that date from the modern area in the western portion of the survey area to possibly as early as the Late-Precontact/protohistoric period in the eastern portion of the survey area. The results of the pedestrian survey and subsurface testing identified three archeological sites (13MN, 97, 13MN98, and 13MN99). All three sites were identified as late nineteenth to twentieth-century Euro-American farmsteads/residences. As all three sites were significantly disturbed, none were recommended NRHP-eligible.

If alignments/alternatives are selected for further study that extend outside of the Initial Survey Area, additional background study and field investigations may be warranted.

5.2.2.4 Historic Resources

Decatur Bridge was determined NRHP eligible by the Nebraska State Historic Preservation Officer (SHPO) in 2013 and by the Iowa SHPO in 2011 under Criterion A: History-Transportation, as a large highway bridge that established the first highway crossing of a major waterway and a major state bridge-building initiative; and under Criterion C: Engineering, as a steel continuous through-truss bridge with an exceptional span length.

A historic resources desktop review and background study¹⁶ were conducted for the Nebraska portion of the Initial Survey Area in September 2023 to identify previously recorded historic resources in addition to the NRHP-eligible Decatur Bridge and the NRHP-listed A.B. Fuller House/Decatur Museum (the museum was destroyed by fire in Spring 2024). Previous historic resources surveys conducted within and beyond the Initial Survey Area recorded 38 above-ground resources (e.g., homes, barns, commercial buildings, cemeteries, etc.) of which 33 have not been evaluated for NRHP eligibility. One resource (Resource 39/BT03-007, Bungalow House) was recommended as NRHP-eligible.

A Phase 1A historical background and architectural review¹⁷ was conducted within the Iowa portion of the Initial Survey Area. The Iowa SHPO concurred that none of the resources evaluated were NRHP-eligible.

¹³ Burns & McDonnell, 2023. *Cultural Resources Desktop Review, Decatur Bridge Location and Environmental Study; STP-51-7(109), CN 32395, Burt County, Nebraska*. September 26, 2023.

¹⁴ Bear Creek Archeology, Inc, 2024. *Phase IA Archeological and Geomorphological Review for Proposed Improvement of the IA 175 Bridge over the Missouri River, Franklin Township, Monona County, Iowa*. January 2024.

¹⁵ Bear Creek Archeology, Inc. *Phase I Archeological Survey for Proposed Improvements to the Iowa 175 Bridge Spanning the Missouri River, Franklin Township, Monona County, Iowa*. August 2024.¹⁵

¹⁶ Burns & McDonnell, 2023. *Historic Resources Survey Report, Decatur Bridge Location and Environmental Study; STP-51-7(109), CN 32395, Burt County, Nebraska*. December 7, 2023.

¹⁷ Bear Creek Archeology, Inc, 2024. *Phase IA Historical Background and Architectural Review for Proposed Improvement of the IA 175 Bridge over the Missouri River, Franklin Township, Monona County, Iowa*. January 2024.

If alignments/alternatives are selected for further study that extend outside of the Initial Survey Area, additional background study and field investigations may be warranted.

5.2.2.5 Hazardous Materials

A Hazardous Materials Review (HMR)¹⁸ including a visual reconnaissance of the project area was conducted on September 29, 2023. The review included data from both Nebraska and Iowa contaminated sites databases to categorize identified sites as:

- Low Potential – investigation determines it is unlikely that contamination would be encountered during construction.
- Medium Potential – the potential for contamination is unknown and subsurface investigation or further coordination with regulatory agencies would be required to make a formal determination.
- High Potential – file review or subsurface investigation determines it is likely that contamination would be encountered during construction.

Based on the findings of the HMR, the project area would have a low potential to encounter soil or groundwater contamination during construction within the Initial Survey Area. If alignments/alternatives are selected for further study that extend outside of the Initial Survey Area, additional investigation may be required.

5.3 Early Agency Coordination

Early outreach to regulatory and reviewing agencies was initiated during the Location and Environmental Study to inform them of the potential project and obtain information from these agencies with regards to their jurisdiction by law, properties they may own or manage, and design or operational criteria applicable to the design and construction of the project.

Table 5-1 summarizes early agency coordination efforts. Coordination with most of these agencies will continue throughout the duration of the project. Meeting notes and presentations are included in the project file.

¹⁸ Felsburg, Holt & Ullevig, 2023. *Hazardous Materials Review Report, Decatur Bridge, Project No. STP-51-7(109): Control Number. 32395; Burt County, Nebraska and Monona County, Iowa.* November 28, 2023

Table 5-1: Early Agency Coordination

DATE	AGENCY ATTENDEES	DISCUSSION TOPICS
October 19, 2023	USCG, NDOT, Iowa DOT	Project Kick-Off and description, project timeline, coordination permission, bridge rehabilitation, bridge horizontal clearance (existing and new location alignments), bridge vertical clearance (key elevations), river navigation (collision history, typical barge traffic, vessel collision), removal depth for existing piers, navigation lighting and clearance gage requirements, construction requirements, USCG industry meeting.
November 3, 2023	USACE, IDNR, NDOT, Iowa DOT	Project Kick-Off and description, project timeline, concept study being conducted pre-NEPA, review of meeting with USCG on 10/19/2024, review of Missouri River navigation season, existing river structures, upcoming levee repairs, Section 408 triggers, hydrology and hydraulics study including scour and bathymetric survey, wetlands and agency management under the Missouri River Recovery Project (MRRP), and USACE real estate process.
November 17, 2023	USFWS, NGPC, NDOT, Iowa DOT	Project Kick-Off and description, project timeline and scope, Initial Survey Area, public lands, protected species, and wetland delineation/mitigation.
January 4, 2024	USACE, NDOT	Hydraulics – interpolation of flow data, stage-flow relationships at Decatur, 2% flow line, pier removal elevations
February 9, 2024	IDNR, NDOT, NDNR	Floodplain Permitting - Project Kick-Off and description, project timeline, data collected to date (floodplain, property boundaries), USACE Missouri River Flow Frequency Study (2023), USACE HEC-RAS model, bridge history/scour issues, flood map updates, permits by state, potential CLOMR.
May 9, 2024	USCG, FHWA, NDOT, Iowa DOT	Project schedule including NEPA and permits, upcoming meeting with USACE (5/17/2024), water surface elevations, existing bridge clearances, new vertical clearance, horizontal clearance, pier placement, conceptual alignments, vessel traffic, construction considerations, USCG industry meeting in 2025.
May 17, 2024	USACE, FHWA, NDOT, Iowa DOT	Project update – purpose and need, alignment/alternative screening process, impacts that could trigger reviews under Section 404 and 408 and by the USACE Real Estate Division, reviewed USACE real estate process (acquisition/easements), anticipated NEPA schedule and permits.
September 25, 2024	USACE, USCG, IDNR, FHWA, NDOT, Iowa DOT	Project update – reviewed anticipated NEPA schedule and unified timeline for USCG, USACE and IDNR permits/approvals after NEPA.

Chapter 6

Public and Agency Outreach

Public outreach and engagement were key aspects of the Location and Environmental Study. Input from the CAG, general public, and resource and regulatory agencies was important in establishing the purpose and need and developing and screening the universe of alternatives.

The following high-level summary describes the communications and outreach activities performed during the Location and Environmental Study from September 2023 through September 2024. More detailed summaries of each CAG and public meeting are in the project files and as sources listed in Chapter 9 – References.

6.1 Public Involvement Plan

A Public Involvement Plan (PIP) was established that outlined a process to inform and engage the public and interested parties in meaningful ways throughout the development of the Decatur Bridge Location and Environmental Study.

Based on an evaluation of the project scope, the project team employed a variety of communication and engagement tools for internal and external outreach. The tools are listed below:

Communication tools and strategies:

- Project website updated four times throughout the Location and Environmental Study
- Emails to CAG members and the more than 200 email sign-ups received through the project website
- Community survey promotional fliers distributed at locations on both sides of the river
- News releases to promote the community survey were distributed by NDOT and Iowa DOT
- Targeted postcard mailings to promote the two public meetings; NDOT and Iowa DOT compiled names and mailing addresses for local officials, as well as contiguous property and business owners located within the vicinity of the project.
- Temporary highway signs promoting the two public meetings
- Two legal notices to promote the two public meetings (Iowa and Nebraska newspapers)
- News releases to promote the two public meetings were distributed by NDOT and Iowa DOT
- Fact sheet handout provided at the public meeting promoting the opportunity for online comments for two weeks following the meeting
- Elected officials' notification provided by the agencies
- Social media posts to promote the community survey were provided to CAG members to share with their networks; 58 percent of survey respondents indicated they learned about the survey through social media
- Grassroots promotion/word of mouth; 20 percent of survey respondents indicated they learned about the survey by word of mouth

Engagement activities and strategies:

- Community survey – A survey was created in collaboration with the CAG members to gather widespread feedback from the region
- CAG workshops – Two workshop-style meetings were hosted (one in Iowa, and one in Nebraska) with community representatives.
- 30-day comment period – was extended to more than 60 days due to public meeting postponement as a result of area flooding.
- Public Information meetings – Two meetings were held: one in Nebraska and one in Iowa.

The public involvement team, together with NDOT and Iowa DOT, monitored engagement activities throughout the project development process to make sure participation was representative of the Study Area community. While the community survey was hosted online to streamline the feedback and reporting process, hard-copy formats were also made available at multiple community locations that were both accessible and convenient on both sides of the river.

The PIP will be updated and implemented throughout the remainder of the project.

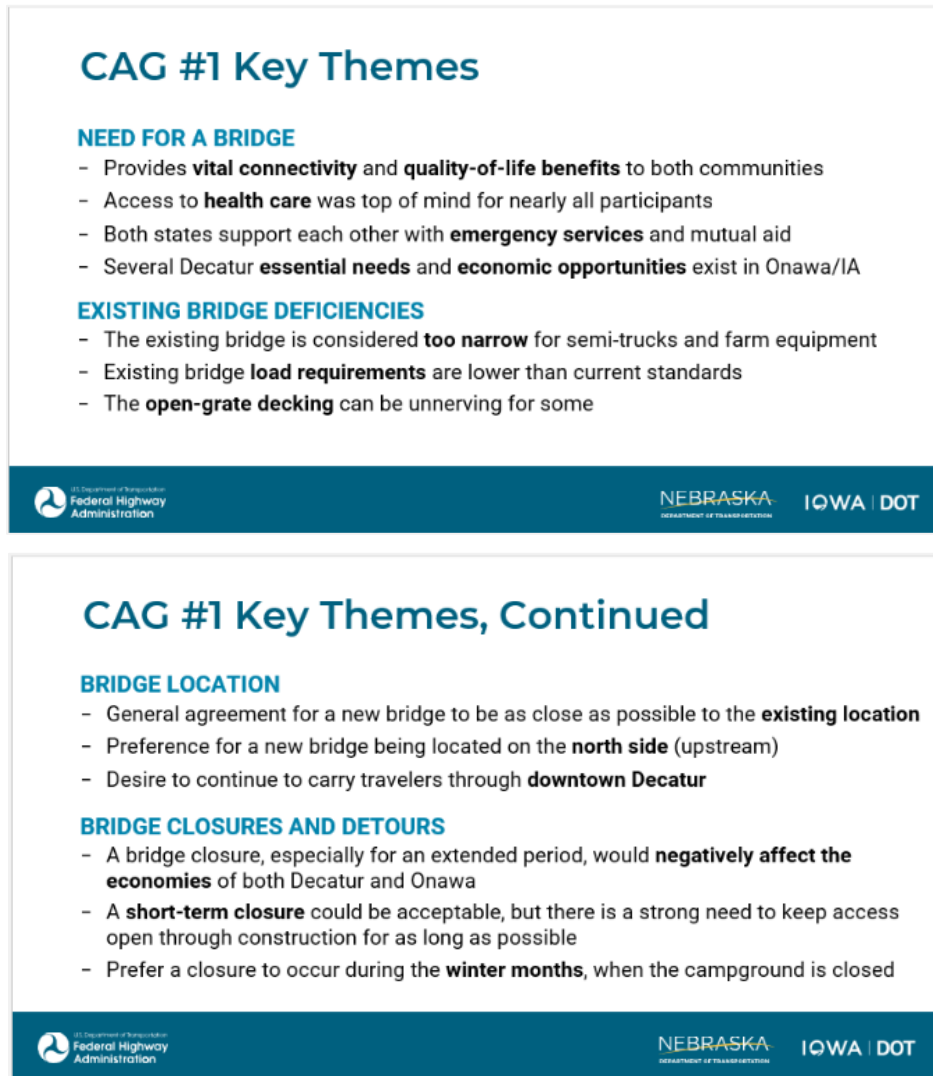
6.2 Community Advisory Group

The study team, together with the NDOT and Iowa DOT identified representatives from Study Area communities on both sides of the river to participate in a CAG. CAG members reflected a cross-section of the Decatur and Onawa communities including city and county officials – including sheriff, fire and EMS, healthcare providers, economic development and business owners, education institutions – including the Nebraska Indian Community College, the Omaha Nation, state agencies, and other interested parties. A total of 37 people were invited to participate in the CAG. Two CAG meetings were held – the first on January 18, 2024, in Onawa and the second on April 25, 2024, in Decatur. The CAG grew over time as representatives learned of the CAG meetings informally, and they were invited to join. More detailed summaries of each CAG meeting, including displays and presentations, are in the project file and as sources listed in Chapter 9 – References.

6.2.1 January 2024 CAG Meeting

The initial CAG meeting introduced the proposed project and solicited feedback on why an improved river crossing is needed and the purpose of the proposed action. CAG members provided input on key issues and needs to be addressed during the study along with indicating initial preferences for new river crossing locations (see Figure 6-1). The upcoming community survey was provided for feedback. CAG members made recommendations that were integrated into the final survey.

Figure 6-1: Key Themes from CAG Meeting #1



6.2.2 February 2024 Community Survey

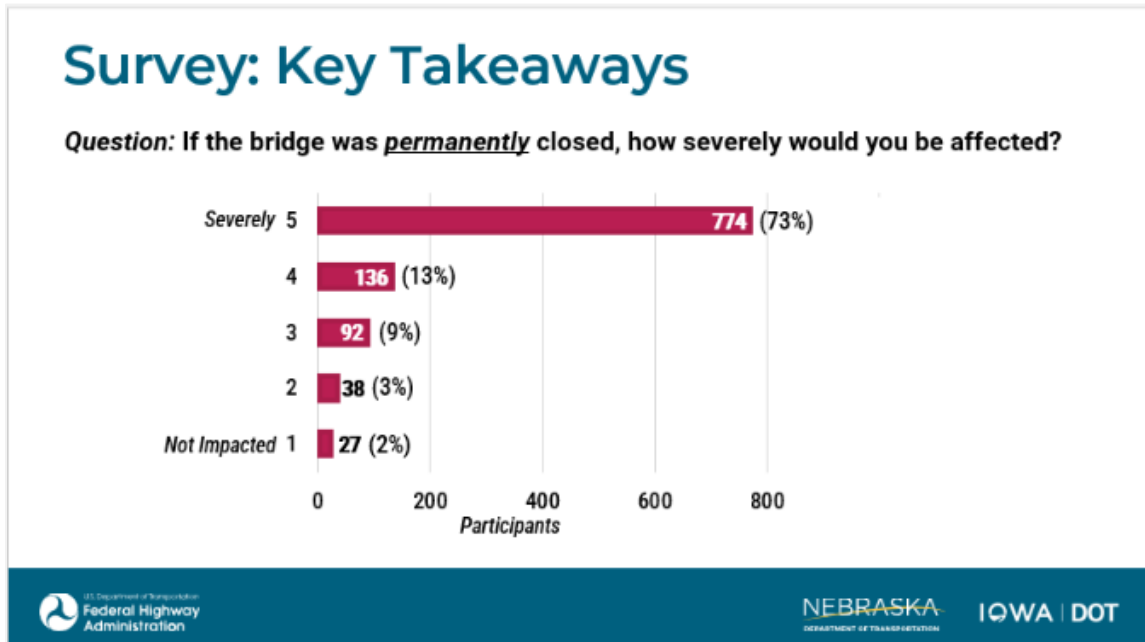
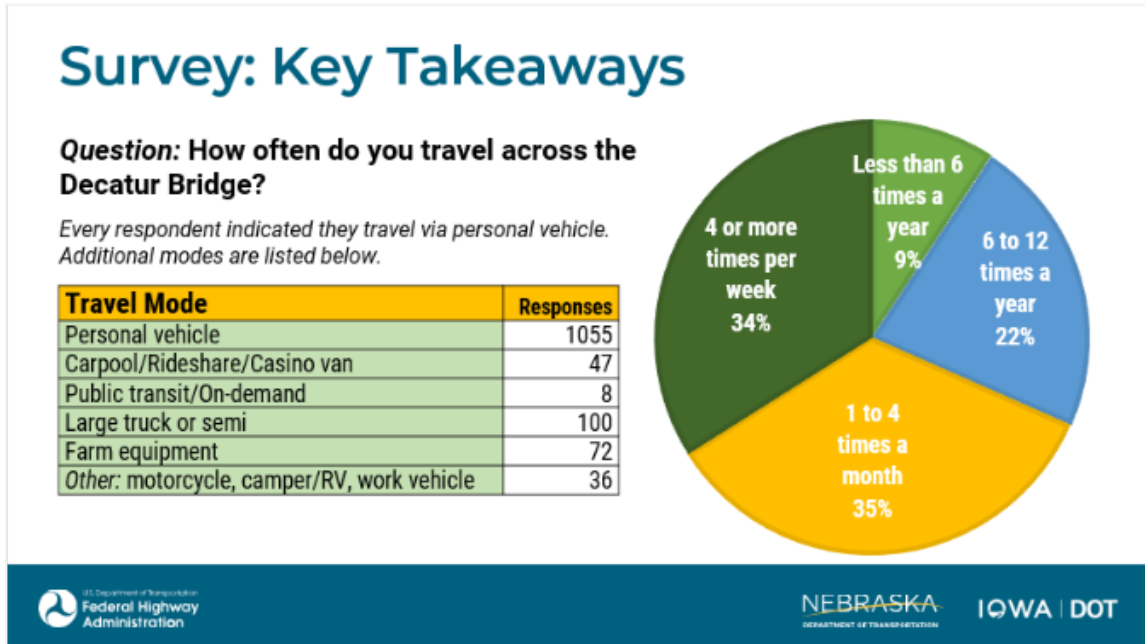
A community survey was open between February 1 and March 15, 2024. The survey was hosted online through the project website with hardcopy surveys available for pickup and drop-off at five community locations in Decatur and Onawa. The survey was promoted by social media and word of mouth, news releases were distributed by both DOTs, promotional flyers were made available at public facilities, and CAG members were encouraged to share a survey email with friends and family members.

A total of 1,092 surveys were submitted. The majority of survey respondents (58 percent) indicated they heard about the survey through social media; 20 percent by word of mouth.

In addition to a standard form survey format, online participants were asked to provide location-specific comments by dropping pins onto a virtual map – 87 map comments were received.

By the end of March 2024, more than 3,500 people visited the Decatur Bridge project website, and 164 people signed up for email updates.

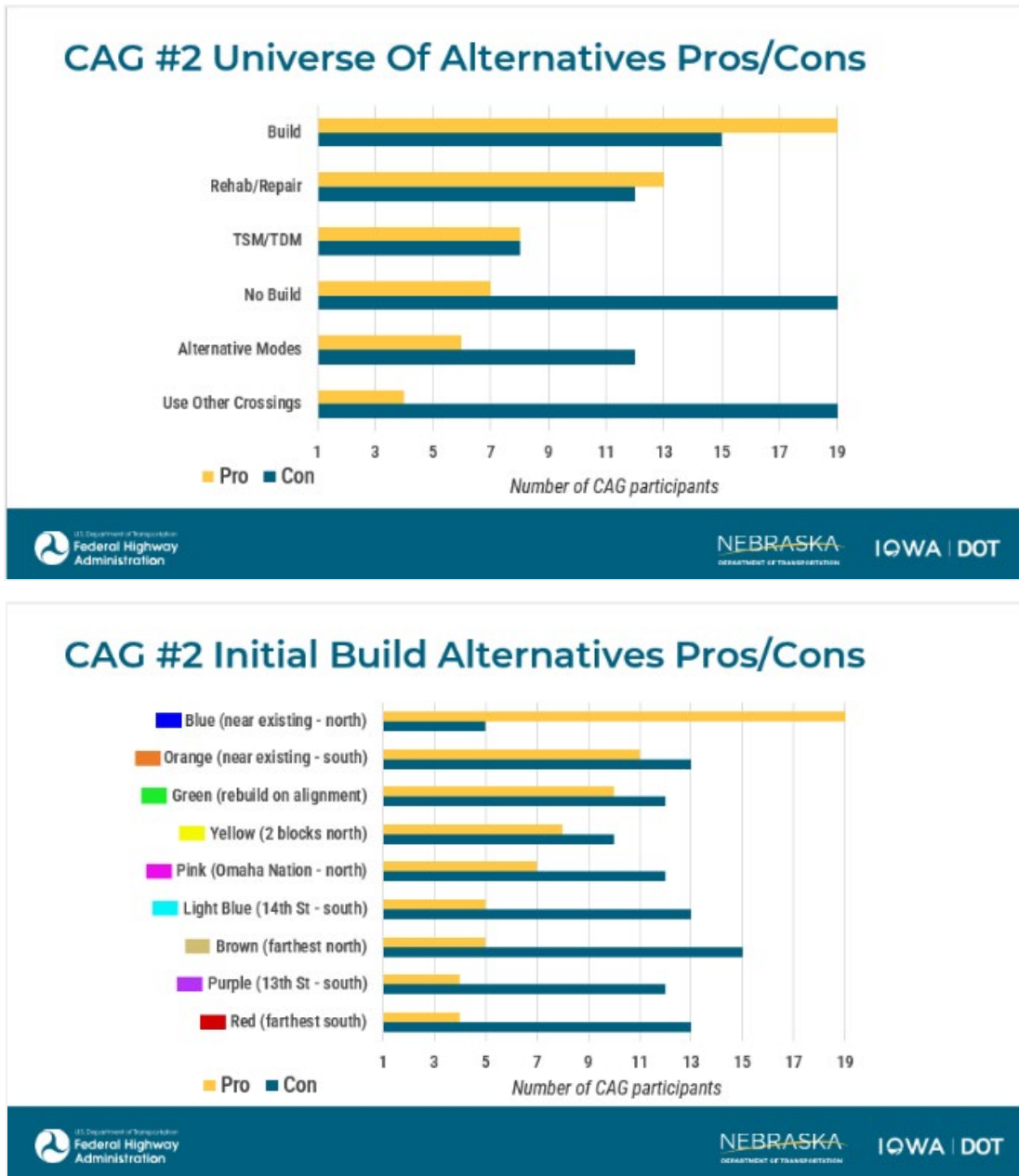
Figure 6-2: Key Takeaways from the Community Survey



6.2.3 April 2024 CAG Meeting

The second CAG meeting focused on the needs to be addressed by the crossing alignments developed by the study team and participants provided input on the preliminary purpose and need statements. CAG members shared their preferences for which alternatives should be studied further including transit, other modes, and using other existing river crossings in addition to new crossing alignments both north and south of the existing river crossing. In general, the CAG indicated a preference for building a new river crossing north of and adjacent to the existing crossing.

Figure 6-3: Input During CAG Meeting #2 on the Universe of Alternatives



6.3 Public, Interested Parties, and Elected Officials

An interested parties contact list was established at the onset of the Location and Environmental Study and was maintained throughout. The list included local officials from both Nebraska and Iowa, resource and regulatory agencies, and CAG members. In addition, an email sign-up form was available on the project website. More than 200 email contacts have been obtained as of September 2024. The contact list was used to keep those with interest in the project informed and engaged throughout the Location and Environmental Study by providing them with periodic updates and sending invitations for small group discussions and reminders regarding the community survey and the public meetings. It will also be used to advance communications and outreach for the remainder of the project.

Both NDOT and Iowa DOT coordinated with the federally recognized tribes with potential interests in the Study Area through early coordination under Section 106 of the NHPA. In addition, outreach was also conducted to the Omaha Tribe of Nebraska and the Nebraska Indian Community College in Macy, NE (north of Decatur) to participate in the CAG. Blackbird Bend Casino and WinnaVegas Casino, both in Monona County, Iowa were also contacted to participate in the CAG.

6.3.1 August 2024 Public Meetings

Two public information open house meetings were held, one in Nebraska and one in Iowa. Because of flooding in the Study Area in June 2024 when the meetings were initially scheduled, they were postponed until August 2024. The first meeting was held at the Onawa Community and Recreation Center, 320 10th Street, in Onawa, Iowa on Wednesday, August 28, 2024, from 11:30 AM – 1:30 PM, with approximately 57 attendees. The second public information open house meeting was held at the Decatur City Hall, 913 S Broadway Street, in Decatur, Nebraska on Thursday, August 29, 2024, from 5:00 – 7:00 PM, with approximately 81 attendees.

Almost 750 residents and business owners in the vicinity of the Decatur Bridge were notified by postcard (via the mail) of the meetings, both initially in May-June 2024 and prior to the rescheduled August meetings. Additionally, 325 public and private agencies with potential interest in the project, including the Nebraska Trucking Association, were notified of the public meetings. CAG members were also invited and encouraged to share information about the meeting with friends, family members, and the community in general.

Legal notices were placed prior to both meeting dates. For the rescheduled August public meetings, a legal notice was published in the *Onawa Democrat* on Wednesday, August 14, 2024; and in the Nebraska Press Association (NPA) recognized newspaper, the *Lyons-Mirror Sun*, on Thursday, August 8, 2024. Project information was placed on the NDOT website and the Decatur Bridge project website.

The initial comment period started on June 5, 2024, and was extended through September 16, 2024, with the postponement of the public meetings. Four comments were received during the initial comment period and an additional 45 comments were received during the remainder of the comment period. Four additional comments were submitted after the comment period had concluded.

Comments generally favored building a new bridge, with commenters preferring alignments that would maintain connectivity between Decatur and Onawa, minimize disruption to existing N-51 and IA-175 during construction (especially through Decatur), and remain as close to the existing bridge as possible. In general, the sentiment of the formal public comments submitted reflected the feedback communicated with the project team during the meetings and as previously shared by the CAG. More than half, 53 percent, of the comments received mentioned the BLUE alignment as a preferred location and 32 percent of the comments received mentioned the ORANGE alignment as a preferred location.

A more detailed summary of the public meeting, including the displays and the narrated presentation, are in the project files and as sources listed in Chapter 9 – References.

6.4 Agency Outreach

In addition to reaching out to the public, the study team conducted several meetings with resource and regulatory agencies as summarized in Table 5-1. The agencies provided data from previous and ongoing studies and input on design parameters such as bridge span length, vertical clearance between the water surface and the bottom of the bridge, and information on existing mitigation areas and public access facilities within the Initial Survey Area. The information provided by the agencies has informed the development of early alignments and will be used to assess impacts, determine mitigation needs, and inform the permits needed to construct the Preferred Alternative.

Chapter 7

Location and Environmental Study

Recommendations

The following sections summarize the recommendations of the Location and Environmental Study.

7.1 Design Criteria

7.1.1 Bridge Design Criteria

A New Bridge would be designed in accordance with the AASHTO LRFD Bridge Design Specifications, 10th Edition. The anticipated release date for the 10th Edition is in late 2024.

A Transition Point would be established at the east end of the East Paving Section of the New Bridge. Project elements west of the Transition Point, including the New Bridge, will be designed and constructed in accordance with NDOT standards, including the BOPP and NDOT BDM including current revisions. Project elements east of the Transition Point, including a possible Relief Bridge, will be designed and constructed in accordance with Iowa DOT standards, including the current online version of the Iowa DOT Bridge Design Manual (Iowa DOT BDM).

A New Bridge should implement methodologies from the AASHTO Guide Specification for Service Life Design of Highway Bridges, 1st Edition.¹⁹ Where there are conflicts between the AASHTO Service Life Guide and the respective state specifications, the respective DOT shall be consulted.

7.1.2 Road Design Criteria

Because project improvements would be constructed in both Nebraska and Iowa, design criteria except for that of a new bridge, as identified in Section 7.1.1 of this report, would be controlled by the state in which the improvement would be physically located. Improvements within the state of Nebraska would be designed in accordance with the NDOT Roadway Design Manual, May 2022²⁰. Improvements within the state of Iowa would be designed in accordance with the Iowa DOT Design Bureau Design Manual, Revised 2019²¹.

¹⁹ AASHTO 2020. *Guide Specification for Service Life Design of Highway Bridges, 1st Edition*.

²⁰ NDOT *Roadway Design Manual*; May 2022. Accessed at: <https://dot.nebraska.gov/media/by4be54v/rdm.pdf>

²¹ Iowa DOT *Design Manual*; June 25, 2019. Accessed at: <https://iowadot.gov/design/design-manual>

Table 7-1: Design Criteria

		Roadway N-51 (MUNICIPAL)	Roadway N-51 (RURAL)	Roadway IA-175 (RURAL)
National Functional Classification		Minor Arterial	Minor Arterial	Minor Arterial
*ADT (Current/Design Year) (VPD)		2030 (2023)/1855 (2049)	2030 (2023)/1855 (2049)	2971 (2026)/3690 (2046)
Number of Lanes		2	2	2
Project Type		New & Reconstructed	New & Reconstructed	New & Reconstructed
CRITERIA		PREFERRED DESIGN VALUE	PREFERRED DESIGN VALUE	PREFERRED DESIGN VALUE
Design Speed (mph)		35	65	65
Lane Width (ft)		12	12	12
Shoulder Width (ft)		8 paved (curbed)	10 total / 8 paved	10 total / 8 paved
Maximum Superelevation Rate		4%	6%	6%
Pavement Cross Slope		2%	2%	2%
Shoulder Cross Slope		2%	4%	4%
Horizontal Clear Zone (ft)		Curbed: 2' from back of curb	30	32
Foreslope		6:1 to clear zone	6:1 to clear zone	6:1 to clear zone
Backslope		3:1	3:1	3:1
Ditch Width (ft)		10	10	10
Design Storm (max. water surface elev.)		50 year (bottom of subgrade)	50 year (bottom of subgrade)	100 year (edge of shoulder)
Design Storm Storm Sewer		10 year	N/A	N/A
Clear Bridge Width (ft)		40	40	40
Vertical clearance	Navigation Span (USCG)	Minimum Navigation Low Beam - Elev. 1096.10 (NAVD 88)		
	Approach Unit Freeboard	3' above 50 yr, 1' above 100 yr and >0' above 500 yr		
	Roadway (ft)	16	16	16.5
	Sign Truss (ft)	17	17	17.5
Structural Capacity		LRFD		
* Because of the differences in the original data sources and forecasting methodologies used by each DOT, the existing and forecasted traffic volumes on N-51 and IA-175 across the bridge are not consistent. Future coordination will occur in subsequent project phases to align the traffic data.				

7.2 Bridge type

Anticipated structure type information in this section is concept-level only. Preliminary design and span layouts will be developed for the alternatives carried forward for detailed study.

A New Bridge would have at minimum a River Unit that spans the main channel, a Nebraska Approach Unit, and an Iowa Approach Unit. To meet the USCG horizontal clearance requirement, the navigation span of the River Unit would be approximately 420 to 460 feet long. For this span range, a welded steel plate girder bridge would be the most practical and economical structure type, as compared with a truss, tied arch, or cable-stayed bridge for the following reasons:

- A plate girder bridge is faster and less costly to construct.

- Steel bridges composed of multiple plate girders are more redundant than tied arch or truss bridges. Steel plate girder structural systems typically do not contain nonredundant steel tension members.
- More contractors and fabricators in the area have the capability of constructing a plate girder bridge.
- Over the lifespan of the structure, a plate girder bridge is easier to inspect than other types, and it may require less specialized equipment and training.
- Maintenance on a plate girder bridge is typically less costly. The deck generally protects the primary steel members from direct exposure to rain, snow, and deicing salts. There are also fewer elements that would require the services of specialty contractors for maintenance.

Two-span and three-span arrangements for the River Unit will be evaluated.

7.3 Typical Sections – Roadway and Bridge

NDOT and Iowa DOT selected 8-foot-wide paved shoulders to provide additional space to accommodate disabled vehicles. The wider shoulder would also provide more space for use by maintenance and emergency vehicles, to store plowed snow, and for drainage ponding. This width is consistent with other Missouri River crossings in both states.

An alternate typical section with a 10-foot-wide shared-use path was also considered. As of the date of this Report, the Location and Environmental Study has not identified the need to make specific accommodations for bicycle or pedestrian access across the bridge. This question may be further evaluated in subsequent project phases.

As shown in Figure 7-2, the proposed typical section for a new bridge would include two 12-foot-wide travel lanes with 8-foot-wide shoulders for a clear roadway width of 40 feet. Figure 7-3 depicts a proposed typical urban roadway section similar to the existing roadway within the Village of Decatur. The urban section would be a curbed section comprised of two 12-foot-wide travel lanes and 8-foot-wide shoulders and could include 5-foot-wide sidewalks on either or both sides of the roadway to match existing pedestrian facilities within the Village of Decatur. Figure 7-4 depicts a proposed rural roadway section comprised of two 12-foot-wide travel lanes and 8-foot-wide paved shoulders.

Figure 7-1: Concept Bridge Section

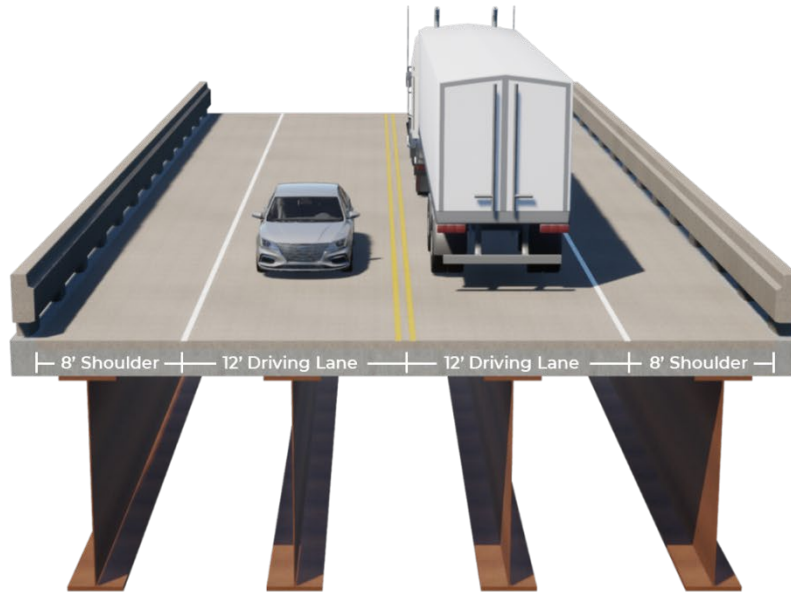


Figure 7-2: Concept Roadway Section – Urban

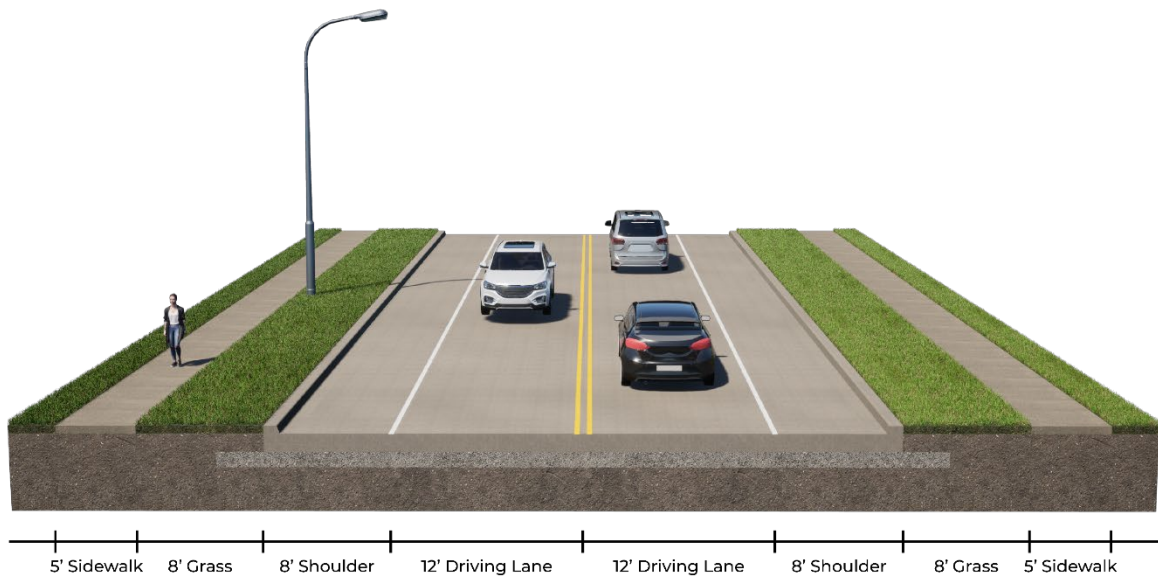
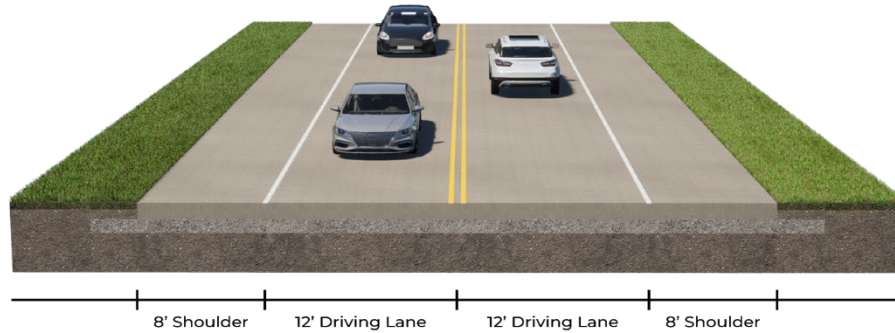


Figure 7-3: Concept Roadway Section – Rural

















7.4 Alternatives Recommended for Further Study During the NEPA Decision-Making Process

In consideration of the analyses completed and input received from regulatory agencies, CAG members, and the general public, the study team makes the following recommendations on the alternatives to be carried forward for detailed study to inform the NEPA decision.

Table 7-2 summarizes the recommendations resulting from the multi-level screening process.

Table 7-2: Multi-Level Screening Summary

Universe of Alternatives	ALTERNATIVE SCREENING STEPS			
	STEP 1 Meet Purpose and Need	STEP-2 Support Performance Areas	STEP 3 High-level Impact Comparison	Alternative to be Carried Forward into NEPA?
NO-BUILD	NO	NO	NOT ASSESSED	 YES as a baseline for comparison to the build alternatives
REHAB/REPAIR	NO	NO		 YES to satisfy Section 106 of the NHPA and Section 4(f) of the DOT Act
GREEN	NO	NO	NOT ASSESSED	 NO
BLUE	YES	YES	Avoids/minimizes impacts better than the other new location alignments	 YES The BLUE build alternative was the most preferred by CAG members and the public.
YELLOW	YES	Fully or partially satisfies all performance areas	Minimizes many impacts but requires more new roadway to be built, may affect an IDNR boat ramp and parking area.	 NO Although it minimizes impacts, because the alignment would bypass downtown Decatur, a major issue of the CAG and the public, the YELLOW build alternative is not recommended for detailed study during the NEPA process.
PINK	YES	NO	Several impacts	 NO
BROWN	NO	NO	NOT ASSESSED	 NO
ORANGE	YES	Fully satisfies most performance areas. Does not satisfy one performance area	Avoids/minimizes many impacts but may encroach into and affect access to Beck Memorial Park & Campground	 YES The ORANGE build alternative was the second most preferred alignment by the public. The amount of existing ROW available south of the bridge may allow the alignment to have less of an impact on the adjacent park and campground.
PURPLE	YES	NO	Several impacts	 NO
LIGHT BLUE	YES	NO	Several impacts	 NO
RED	NO	NO	NOT ASSESSED	 NO
TSM/TDM	NO	NOT ASSESSED	NOT ASSESSED	 NO
ALTERNATE MODES	NO			 NO
USE ANOTHER CROSSING	NO			 NO

Chapter 8 Preparers

Name	Project Role	Years of Experience	Education
Burns & McDonnell Engineering Company, Inc.			
Michelle Winkelmann, PE	Project Manager	28	BS Civil Engineering
Andrew Ferdon, PE	Bridge Design Lead	11	MS and BS Civil/Structural Engineering
Julie Sarson, PE	Bridge Design	30	MS Civil/Structural Engineering BS Architectural Engineering
Brandon Schmit, PE	Roadway Design Lead	8	BS Civil Engineering
Jaclyn Willis, EIT, MBA	Roadway Design	4	MBA BS Civil Engineering
Jessica Cross, EIT	Roadway Design	2	BS Civil Engineering
Seth Hensarling, EIT	Bridge Design	2	MS and BS Civil/Structural Engineering
Jon Kuchem, PE	Bridge Hydraulics	5	MS and BS Civil/Structural Engineering
Shari Cannon-Mackey, CEP, ENV SP	Environmental and NEPA Lead	34	MLA Landscape Architecture BLA Landscape Architecture BS Fisheries & Wildlife Biology
Brandy Harris	Historic Resources Lead (NE)	20	MA Public History BA History
Andrew Gottsfield, PhD, RPA	Archeology Lead (NE)	26	PhD Anthropology MA Anthropology BA Anthropology
Josiah Maine	Bat Biologist	13	MS Zoology BS Fisheries, Wildlife, and Conservation Biology
Lisa Kay Hummell	Public Involvement Lead	12	BS Mass Communications / Natural Resources and Environmental Science
Felsburg, Holt & Ullevig			
Allison Sambol	Environmental Studies	19	MA and BA Geography – Environmental Emphasis
Kody Unstad	Environmental Studies	10	MS Natural Resources – Wildlife Ecology BS Environmental Studies – Life Sciences

Chapter 9

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Appendix A: Alternatives Development and Screening

A.1 STEP 1 - SCREENING THE UNIVERSE OF ALTERNATIVES AGAINST THE PURPOSE AND NEED

Decatur round trip through Sioux City = 83.1 miles
Decatur round trip through Mo Valley IA and Blair NE = 88.4 miles

KEY: **FULLY SATISFIES NEED** **PARTIALLY SATISFIES NEED** **DOES NOT SATISFY NEED**

NEEDS	ON EXISTING ALIGNMENT			ALIGNMENTS TO THE NORTH OF EXISTING CROSSING				ALIGNMENTS TO THE SOUTH OF EXISTING CROSSING				OTHER ALTERNATIVES		
	NO BUILD	REHABILITATION / REPAIR	REPLACE LIKE/KIND ON EXISTING ALIGNMENT	NEW CROSSING NORTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING NORTH OF EXISTING ALIGNMENT	NEW CROSSING FAR NORTH	NEW CROSSING FARTHEST NORTH	NEW CROSSING SOUTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING SOUTH	NEW CROSSING SOUTH	NEW CROSSING FARTHEST SOUTH	TSM/TDM	ALTERNATE MODES	USE ANOTHER CROSSING
Maintain Connectivity														
Connect residents w/critical services	Only for the period of time the crossing can remain open to traffic.	Rehab/repair would close the crossing for limited timeframes, requiring residents to use detours of more than 80 miles (round trip).	A new crossing on the existing alignment would connect residents w/critical services on both sides of the river, but would require the crossing to be closed for 2-3 years while construction is completed. Residents would have to use other river crossings requiring a long detour (>80 miles).	New crossing would maintain access to critical services on both sides of the river.	New crossing would maintain access to critical services on both sides of the river.	New crossing would maintain access to critical services on both sides of the river but with longer adverse out-of-direction travel and longer travel times. Emergency responders would incur increased travel times.	New crossing would maintain access to critical services on both sides of the river but with longer adverse out-of-direction travel and longer travel times. Emergency responders would incur increased travel times.	New crossing would maintain access to critical services on both sides of the river.	New crossing would maintain access to critical services on both sides of the river.	New crossing would maintain access to critical services on both sides of the river.	New crossing would maintain access to critical services on both sides of the river but with longer adverse out-of-direction travel and longer travel times. Emergency responders would incur increased travel times.	These alternatives would not maintain the river crossing, instead they would rely on other corridors or modes to move people and goods to and from Decatur.		
Accommodate local and regional travel demand (personal vehicles, large trucks, agricultural traffic)	Narrow travel lanes, lack of shoulders, and weight limits would not be improved.	Narrow travel lanes, lack of shoulders, and weight limits would not be improved.	New crossing would be built to current design standards and would support the transport of permitted loads.	New crossing would be built to current design standards and would support the transport of permitted loads.	New crossing would be built to current design standards and would support the transport of permitted loads.	New crossing would be built to current design standards and would support the transport of permitted loads. Travelers w/destinations in Decatur or Onawa would have farther to travel.	New crossing would be built to current design standards and would support the transport of permitted loads. Travelers w/destinations in Decatur or Onawa would have farther to travel.	New crossing would be built to current design standards and would support the transport of permitted loads.	New crossing would be built to current design standards and would support the transport of permitted loads. Travelers w/destinations in Decatur or Onawa would have farther to travel.	New crossing would be built to current design standards and would support the transport of permitted loads. Travelers w/destinations in Decatur or Onawa would have farther to travel.	New crossing would be built to current design standards and would support the transport of permitted loads. Travelers w/destinations in Decatur or Onawa would have farther to travel.	None of these alternatives would support the needs as a stand-alone alternative and due to the rural location, relatively small traffic volumes (existing and future), relatively small population to be served, and lack of supporting infrastructure, none of them would add a transportation benefit for the cost in addition to a build alternative.		
Minimize travel times for all users (route length and connectivity)	Only for the period of time the crossing can remain open to traffic.	Rehab/repair would close the crossing for limited timeframes, requiring residents to use detours of more than 80 miles (round trip).	A new crossing on the existing alignment would connect residents w/critical services on both sides of the river, but would require the crossing to be closed for 2-3 years while construction is completed. Residents would have to use other river crossings requiring a long detour (>80 miles).	The new crossing would not add discernable distance or travel time.	The route traveled would be 4000 feet longer than the existing route, adding approx. 2 minutes in travel time because the alignment is farther north and would require travel down N-75 to get back to N-51 and the center of Decatur.	The route traveled would be 1.2 miles longer than the existing route, adding approx. 2 minutes in travel time because the alignment is farther north and would require travel down N-75 to get back to N-51 and the center of Decatur.	The route traveled would be 2.0 miles longer than the existing route, adding approx. 4 minutes in travel time because the alignment is farther north and would require travel down N-75 to get back to N-51 and the center of Decatur.	The new crossing would not add discernable distance or travel time.	The route traveled would be 1 mile longer than the existing route, adding approx. 2 minutes in travel time because the alignment is farther south and would require travel down N-75 to get back to N-51 and the center of Decatur.	The route traveled would be 1.1 mile longer than the existing route, adding approx. 2 minutes in travel time because the alignment is farther south and would require travel down N-75 to get back to N-51 and the center of Decatur.	The route traveled would be 1.4 miles longer than the existing route, adding approx. 3 minutes in travel time because the alignment is farther south and would require travel down N-75 to get back to N-51 and the center of Decatur.	TSM - the existing transportation system and traffic volumes do not warrant intersection/interchange/ramp improvements, signal optimization, or the introduction of new infrastructure to ease congestion and improve system capacity or function because such problems do not exist. Alternate Modes - Alternate modes such as bur or rail transit, ride-share, or ferry are not present or planned within the Study Area due to the rural location and limited population to be served Use of Another Crossing - the analysis indicates the adverse, out-of-distance travel to the nearest river crossings both north and south of Decatur would be prohibitive to travel , would add excessive travel times for emergency responders, therefore negatively affecting the local and regional economies and residents' the quality of life		
Support local and regional economies (existing and future, access and connectivity)	Only for the period of time the crossing can remain open to traffic.	Rehab/repair would only extend the crossing's useful life for 10-15 years, then the crossing would have to be closed, repaired again, or replaced. Rehab/repair would not improve the narrow travel lanes, lack of shoulders, or weight limits, which limit use of the bridge by agricultural equipment and large loads.	A new crossing could continue to provide access and support the regional economy in the future, but the 2-3 year closure of the crossing during construction may have negative and irreversible effects on the local economy.	A new crossing would provide continued access to the center of Decatur and support current and future economic growth in the region. The existing crossing would be closed for a short period of time to connect the new bridge to the existing roadway system before the existing bridge is removed.	A new crossing would provide continued access to the center of Decatur (with some additional travel distance/time) and support current and future economic growth in the region. Once the new crossing is open to traffic, the existing crossing would be closed and the bridge removed.	A new crossing would provide continued access to Decatur but would require greater travel time. Without connecting directly to Decatur, the alignment could negatively affect current and future economic growth in the region. Once the new crossing is open to traffic, the existing crossing would be closed and the bridge removed.	A new crossing would provide continued access to Decatur but would require greater travel time. Without connecting directly to Decatur, the alignment could negatively affect current and future economic growth in the region. Once the new crossing is open to traffic, the existing crossing would be closed and the bridge removed.	A new crossing would provide continued access to Decatur but would require greater travel time. Without connecting directly to Decatur, the alignment could negatively affect current and future economic growth in the region. Once the new crossing is open to traffic, the existing crossing would be closed and the bridge removed.	A new crossing would provide continued access to Decatur but would require greater travel time. Without connecting directly to Decatur, the alignment could negatively affect current and future economic growth in the region. Once the new crossing is open to traffic, the existing crossing would be closed and the bridge removed.	A new crossing would provide continued access to Decatur but would require greater travel time. Without connecting directly to Decatur, the alignment could negatively affect current and future economic growth in the region. Once the new crossing is open to traffic, the existing crossing would be closed and the bridge removed.	A new crossing would provide continued access to Decatur but would require greater travel time. Without connecting directly to Decatur, the alignment could negatively affect current and future economic growth in the region. Once the new crossing is open to traffic, the existing crossing would be closed and the bridge removed.	Use of Another Crossing - the analysis indicates the adverse, out-of-distance travel to the nearest river crossings both north and south of Decatur would be prohibitive to travel , would add excessive travel times for emergency responders, therefore negatively affecting the local and regional economies and residents' the quality of life		

A.1 STEP 1 - SCREENING THE UNIVERSE OF ALTERNATIVES AGAINST THE PURPOSE AND NEED

Decatur round trip through Sioux City = 83.1 miles
Decatur round trip through Mo Valley IA and Blair NE = 88.4 miles

KEY: **FULLY SATISFIES NEED** **PARTIALLY SATISFIES NEED** **DOES NOT SATISFY NEED**

NEEDS	ON EXISTING ALIGNMENT			ALIGNMENTS TO THE NORTH OF EXISTING CROSSING				ALIGNMENTS TO THE SOUTH OF EXISTING CROSSING				OTHER ALTERNATIVES			
	NO BUILD	REHABILITATION / REPAIR	REPLACE LIKE/KIND ON EXISTING ALIGNMENT	NEW CROSSING NORTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING NORTH OF EXISTING ALIGNMENT	NEW CROSSING FAR NORTH	NEW CROSSING FARTHEST NORTH	NEW CROSSING SOUTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING SOUTH	NEW CROSSING SOUTH	NEW CROSSING FARTHEST SOUTH	TSM/TDM	ALTERNATE MODES	USE ANOTHER CROSSING	
Improve Infrastructure Condition															
Repair structural deterioration	Crossing would be subject to closure when deterioration makes the structure unsafe for traffic.	Would extend the useful life of the crossing for approx. 10-15 years before closure, further repair, or replacement would need to occur.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	None of these alternatives would address the condition of the existing transportation infrastructure, correct the load restrictions on the bridge, nor minimize long-term maintenance costs. The existing crossing would most likely undergo regular, scheduled maintenance until a point in the near future when it would be closed to traffic. Under "Use Another Crossing" both NDOT and Iowa DOT would likely remove the sections of N-51 and IA-175 from the state system once the crossing is closed, placing the road maintenance burden on each respective county.			
Correct width and load posting deficiencies	Narrow travel lanes, lack of shoulders, and weight limits would not be improved.	Narrow travel lanes, lack of shoulders, and weight limits would not be improved.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.	New crossing would be built to current design standards.				
Minimize long-term maintenance costs	Maintenance costs would continue to increase even over the limited remaining lifespan of the bridge.	Maintenance costs would continue to increase even if rehabilitation occurs.	A new crossing would require less frequent maintenance than the existing crossing until later in the life of the new bridge.	A new crossing would require less frequent maintenance than the existing crossing until later in the life of the new bridge.	A new crossing would require less frequent maintenance than the existing crossing until later in the life of the new bridge.	A new crossing would require less frequent maintenance than the existing crossing until later in the life of the new bridge.	A new crossing would require less frequent maintenance than the existing crossing until later in the life of the new bridge.	A new crossing would require less frequent maintenance than the existing crossing until later in the life of the new bridge.	A new crossing would require less frequent maintenance than the existing crossing until later in the life of the new bridge.	A new crossing would require less frequent maintenance than the existing crossing until later in the life of the new bridge.	A new crossing would require less frequent maintenance than the existing crossing until later in the life of the new bridge.				
Improve Resiliency Against Flooding															
Provide greater infrastructure stability & system reliability than the existing crossing	No improvements would be made to address potential overtopping and scour damage caused by future flood events.	Rehabilitation could address future scour, overtopping would have to be addressed by changes to the approach roadways.	A new structure could address future scour, overtopping would have to be addressed by changes to the approach roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	None of these alternatives would address the resiliency of the crossing as no improvements would be made along this corridor.		
Provide a resilient crossing in the face of changing conditions within the watershed.	No improvements would be made to address scour and other hazards from future, more severe flood events due in part to climate change.	Rehabilitation could address future scour, overtopping would have to be addressed by changes to the approach roadways.	A new structure could address future scour, overtopping would have to be addressed by changes to the approach roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.	Dependent upon new bridge design, crossing location, and changes to the connecting roadways.				
DOES ALIGNMENT MEET PURPOSE & NEED?	NO	NO	NO	YES	YES	YES	NO	YES	YES	YES	NO	NO	NO	NO	
ALIGNMENT TO BE CARRIED FORWARD FOR FURTHER SCREENING?	These 2 alternatives will be carried forward under NEPA to serve as a baseline for comparison of build alternatives and to support review under Section 106/Section 4(f).		NO	YES	YES	YES	NO	YES	YES	YES	NO	NO	NO	NO	

A.2 STEP 2 - SCREENING THE UNIVERSE OF ALTERNATIVES AGAINST PERFORMANCE AREAS

KEY: FULLY SATISFIES PARTIALLY SATISFIES DOES NOT SATISFY

PERFORMANCE AREAS/ SCREENING CRITERIA	MEASURE	NORTH				SOUTH			
		NEW CROSSING NORTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING NORTH OF EXISTING ALIGNMENT	NEW CROSSING FAR NORTH	NEW CROSSING FARTHEST NORTH	NEW CROSSING SOUTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING SOUTH	NEW CROSSING SOUTH	NEW CROSSING FARTHEST SOUTH
INFRASTRUCTURE									
Provides desired bridge lifespan (>75 yrs)	qualitative	YES	YES	YES	YES	YES	YES	YES	YES
Provides typical-section necessary to support current and future travel demand	qualitative	YES	YES	YES	YES	YES	YES	YES	YES
Minimizes long-term maintenance costs	qualitative	YES	YES	YES	YES	YES	YES	YES	YES
ACCESSIBILITY									
Maintains or improves local and regional connectivity	Connects directly to downtown Decatur/N-51, minimizing adverse, out-of-direction travel	YES	does not connect directly to downtown Decatur, but does connect directly to N-51, 2 blocks north of downtown Decatur	NO	NO	requires relocation of Marina Drive; requires relocation of IDNR access entrance on road into WMA	NO	NO	NO
Maintains or minimizes increases in route length and travel time	qualitative	no adverse, out-of-direction travel	less than 1 mile of adverse, out-of-direction travel (4,000 FEET); minor increase in travel time	more than 1 mile of adverse, out-of-direction travel (6,300 FEET); minor increase in travel time	more than 2 miles of adverse, out-of-direction travel; substantial increase in travel time	no adverse, out-of-direction travel	more than 1 mile of adverse, out-of-direction travel (5,300 FEET); minor increase in travel time	more than 1 mile of adverse, out-of-direction travel (5,800 FEET); minor increase in travel time	more than 1 mile of adverse, out-of-direction travel (7,300 FEET); substantial increase in travel time
Facilitates river navigation - commercial and recreational	qualitative	no disruption of commercial or recreational boat navigation	no disruption of commercial or recreational navigation on Missouri River; may interfere with recreational boat access in east overbank	pier on east bank of Missouri River may impact site lines to Decatur Daybeacon (used for commercial navigation)	no disruption of commercial or recreational boat navigation	no disruption of commercial or recreational boat navigation	no disruption of commercial or recreational boat navigation	no disruption of commercial or recreational boat navigation	no disruption of commercial or recreational boat navigation
SAFETY									
Provides travel lane and shoulder widths to support a variety of vehicle types and minimize conflicts w/disabled vehicles; supports maintenance and emergency vehicle accessibility under traffic (most cases).	qualitative	YES	YES	YES	YES	YES	YES	YES	YES
Minimizes travel distance for emergency response vehicles.	quantitative	no adverse, out-of-direction travel	less than 1 mile of adverse, out-of-direction travel	more than 1 mile of adverse, out-of-direction travel	more than 2 miles of adverse, out-of-direction travel	no adverse, out-of-direction travel	more than 1 mile of adverse, out-of-direction travel	more than 1 mile of adverse, out-of-direction travel	more than 1 mile of adverse, out-of-direction travel

A.2 STEP 2 - SCREENING THE UNIVERSE OF ALTERNATIVES AGAINST PERFORMANCE AREAS

KEY: FULLY SATISFIES PARTIALLY SATISFIES DOES NOT SATISFY

PERFORMANCE AREAS/ SCREENING CRITERIA	MEASURE	NORTH				SOUTH			
		NEW CROSSING NORTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING NORTH OF EXISTING ALIGNMENT	NEW CROSSING FAR NORTH	NEW CROSSING FARTHEST NORTH	NEW CROSSING SOUTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING SOUTH	NEW CROSSING SOUTH	NEW CROSSING FARTHEST SOUTH
RESILIENCY									
Provides opportunity to implement scour risk reduction measures in design (e.g. longer bridge, relief structure, etc.)	qualitative	YES	YES	YES	YES	YES	YES	YES	YES
Allows for increase in approach roadway elevation to reduce overtopping risk.	qualitative	YES	YES	YES	YES	YES	YES	YES	YES
ENVIRONMENT									
Minimizes new ROW impacts	qualitative	alignment hugs existing crossing minimizing the length of new connecting roadway to be constructed	alignment would require additional ROW on new location from IA-175, across the river, and to connect with 5th Street in Decatur	alignment would require additional ROW on new location from IA-175, across the river, and to connect with N-75 approx 0.50 miles north of Decatur. Could require ROW within Omaha Nation Reservation	alignment would require ROW on new location through Monona County and from USACE-owned lands; could require ROW within Omaha Nation Reservation	alignment hugs existing crossing minimizing the length of new connecting roadway to be constructed	alignment would require additional ROW on new location after leaving IA-175, across the river, and to connect with N-75 approx 0.35 miles south of Decatur	alignment would require additional ROW on new location after leaving IA-175, across the river, and to connect with N-75 approx 0.40 miles south of Decatur	alignment would require additional ROW on new location after leaving IA-175, across the river, and to connect with N-75 approx 0.60 miles south of Decatur
Minimizes impacts to adjacent property owners and number of potential displacements	qualitative	appears to avoid displacements	may require displacements along 5th Street, avoids Pop-N-Docs. May require displacements in Decatur Lakes Neighborhood.	may require displacement of pipeline station at IA-175 connection on east end	appears to avoid displacements	may require displacements along NE-51 as it ties back into the existing highway	may require displacements south of downtown Decatur	may require displacements south of downtown Decatur, may interfere w/underground utilities	may thread the needle between homes, but would affect an irrigation pivot; may interfere with underground utilities
Minimizes impacts to public lands, conservation/management areas, etc.	qualitative	minimizes new ROW (adjacent to existing) from adjacent IDNR-owned lands with USACE mitigation easements	minimizes new ROW (adjacent to existing) from adjacent IDNR-owned lands with USACE mitigation easements	requires new ROW from adjacent USACE & IDNR owned lands; may encroach into Omaha Nation Reservation	requires new ROW from USACE-owned lands; may encroach into Omaha Nation Reservation	requires elimination or relocation of parking area on north side of pedestrian bridge; requires relocation of IDNR access entrance and road into WMA; may require land from Beck Memorial Park and Campground	requires new ROW from adjacent IDNR-owned lands with USACE mitigation easements	requires new ROW from adjacent IDNR-owned lands with USACE mitigation easements	requires new ROW from adjacent IDNR-owned lands with USACE mitigation easements
Minimizes impacts to wetland areas	qualitative	minimizes new ROW needed from within USACE/IDNR wetland mitigation areas	requires new ROW from within USACE/IDNR-wetland mitigation areas; affects area access, parking, boat ramp	requires new ROW from USACE/IDNR wetland mitigation areas; would require a pier where Wood Creek (NE) empties into the Missouri River	requires new ROW through wide expanse of floodplain wetlands owned by USACE	minimizes new ROW needed from within USACE/IDNR wetland mitigation areas; would require a pier near where Elm Creek (NE) empties into the Missouri River	requires new ROW from within USACE/IDNR-wetland mitigation areas	requires new ROW from within USACE/IDNR-wetland mitigation areas	requires new ROW from within USACE/IDNR-wetland mitigation areas
Minimizes impacts to wooded habitats (upland and bottomland forests)	qualitative	minimizes impacts to extent practicable being adjacent to existing hwy ROW	impacts to mitigation wetlands and forest habitats on new location	new location ROW causes impacts to undisturbed habitats	new location ROW causes impacts to undisturbed habitats	minimizes impacts to extent practicable being adjacent to existing hwy ROW	impacts to mitigation wetlands and forest habitats on new location	impacts to mitigation wetlands and forest habitats on new location	impacts to mitigation wetlands and forest habitats on new location
Minimizes the volume of fill materials placed in the floodplain/floodway	qualitative	minimizes if approx. existing bridge length is maintained	may require a longer bridge or more fill placed for approach roadways	may require a longer bridge or more fill placed for approach roadways	may require a longer bridge or more fill placed for approach roadways; fill would be placed within USACE-owned lands	minimizes if approx. existing bridge length is maintained	may require a longer bridge or more fill placed for approach roadways	may require a longer bridge or more fill placed for approach roadways	may require a longer bridge or more fill placed for approach roadways

A.2 STEP 2 - SCREENING THE UNIVERSE OF ALTERNATIVES AGAINST PERFORMANCE AREAS

KEY: FULLY SATISFIES PARTIALLY SATISFIES DOES NOT SATISFY

PERFORMANCE AREAS/ SCREENING CRITERIA	MEASURE	NORTH				SOUTH			
		NEW CROSSING NORTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING NORTH OF EXISTING ALIGNMENT	NEW CROSSING FAR NORTH	NEW CROSSING FARTHEST NORTH	NEW CROSSING SOUTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING SOUTH	NEW CROSSING SOUTH	NEW CROSSING FARTHEST SOUTH
CONSTRUCTABILITY									
Minimizes major utility or infrastructure impacts and potential relocations	qualitative	YES	YES	may require displacement of pipeline station at IA-175 connection on east end	undetermined	requires partial removal or relocation of South Dike near east abutment; requires relocation of stormwater outfall and drainage ditch south of Marina Drive	YES	may interfere with pipelines crossing the river	may interfere with pipelines crossing the river
Minimizes closure of N-51/IA-175 during construction	qualitative	YES	YES	YES	YES	YES	YES	YES	YES
PUBLIC INPUT									
Is initial alignment supported by the CAG?	YES OR NO	YES	YES	NO	NO	NO	NO	NO	NO
Is the initial alignment supported by the public? (pub mtgs 8/28 & 8/29)	YES OR NO	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
ALIGNMENT TO BE CARRIED FORWARD INTO NEPA?	YES OR NO	YES		NO	NO		NO	NO	NO

A.3 STEP 3 - SCREENING THE UNIVERSE OF ALTERNATIVES - HIGH LEVEL IMPACTS

KEY: SMALLEST IMPACT/MINIMIZES GREATEST IMPACT

PERFORMANCE AREAS/ SCREENING CRITERIA	MEASURE	NORTH			SOUTH		
		NEW CROSSING NORTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING NORTH OF EXISTING ALIGNMENT	NEW CROSSING FAR NORTH	NEW CROSSING SOUTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING SOUTH	NEW CROSSING SOUTH
INFRASTRUCTURE							
Provides desired bridge lifespan (>75 yrs)	qualitative (yes/no)	Yes	Yes	Yes	Yes	Yes	Yes
Provides typical-section necessary to support current and future travel demand	qualitative (yes/no)	Yes	Yes	Yes	Yes	Yes	Yes
Minimizes long-term maintenance costs	qualitative (yes/no)	Yes	Yes	Yes	Yes	Yes	Yes
ACCESSIBILITY							
Maintains or improves local and regional connectivity	Connects directly to downtown Decatur/N-51, minimizing out-of-distance travel	Yes	No	No	Yes	No	No
Maintains or minimizes increases in route length and travel time	feet/miles of out-of-distance travel (roundtrip to/from Decatur)	no change in out-of-distance travel	0.30 mile (roundtrip) of out-of-distance travel	0.75 mile (roundtrip) of out-of-distance travel	no change in out-of-distance travel	1.0 mile (roundtrip) of out-of-distance travel	1.1 miles (roundtrip) of out-of-distance travel
Facilitates river navigation - commercial and recreational	qualitative (yes/no)	Yes	Yes	Yes	Yes	Yes	Yes
SAFETY							
Provides travel lane widths and shoulders to support a variety of vehicle types and minimize conflicts w/disabled vehicles; supports maintenance and emergency vehicle accessibility under traffic (most cases).	qualitative (yes/no)	Yes	Yes	Yes	Yes	Yes	Yes
Minimizes travel distance for emergency response vehicles.	miles of adverse, out-of-direction travel (Decatur to/from Onawa)	no change in out-of-direction travel	0.15	0.66	no change in out-of-direction travel	0.36	0.38
RESILIENCY							
Provides opportunity to implement scour risk reduction measures in design (e.g. longer bridge, relief structure, etc.)	NA	NA	NA	NA	NA	NA	NA
Allows for increase in approach roadway elevation to reduce risk of overtopping.	NA	NA	NA	NA	NA	NA	NA
ENVIRONMENT							
Minimizes corridor length	Mile	1.55	1.56	2.13	1.56	1.57	1.73
Minimizes new ROW impacts	Acres	23.75	25.09	31.34	23.50	24.28	25.82
Minimizes potential right-of-way impacts	Number of Properties Impacted	4	10	6	3	16	21
	Properties Impacted (NE) - not including Federal/City Land	4	9	2	3	16	21
	Properties Impacted (IA) - not including Federal/City Land	-	1	4	-	-	-
Minimizes impacts to NWI Wetland Areas	Acres	within Surveyed Boundary (outside of Survey)					
Total Wetland Impacts	Acres	6.08	9.26	9.89	5.12	8.28	7.63
Minimizes impacts within 100-yr Floodplain (outside of surveyed boundary)	Acres	12.28	15.30	12.35	12.22	17.41	17.07
Minimizes Impacts to USACE-owned lands (outside of surveyed boundary)	Acres	-	-	0.88	-	-	-
USACE Owned Lands (NE)	Acres	-	-	0.88	-	-	-
USACE Owned Lands (IA)	Acres	-	-	-	-	-	-
Minimizes impacts to IDNR-owned lands (outside of Surveyed Boundary)	Acres	13.24	12.96	12.57	13.48	14.50	14.51
outside of USACE Easement	Acres	0.00	0.00	4.64	0.00	0.00	0.00
within USACE Easement	Acres	13.24	12.96	7.93	13.48	14.50	14.51
Avoids impacts to Omaha Reservation (outside of Surveyed Boundary)	Acres	NONE	NONE	11.88	NONE	NONE	NONE
Section 4(f) park/public recreation impacts	description	NONE	IDNR boat ramp and parking area	NONE	potential encroachment into Beck Memorial Park and Campground, affects access	NONE	NONE

A.3 STEP 3 - SCREENING THE UNIVERSE OF ALTERNATIVES - HIGH LEVEL IMPACTS

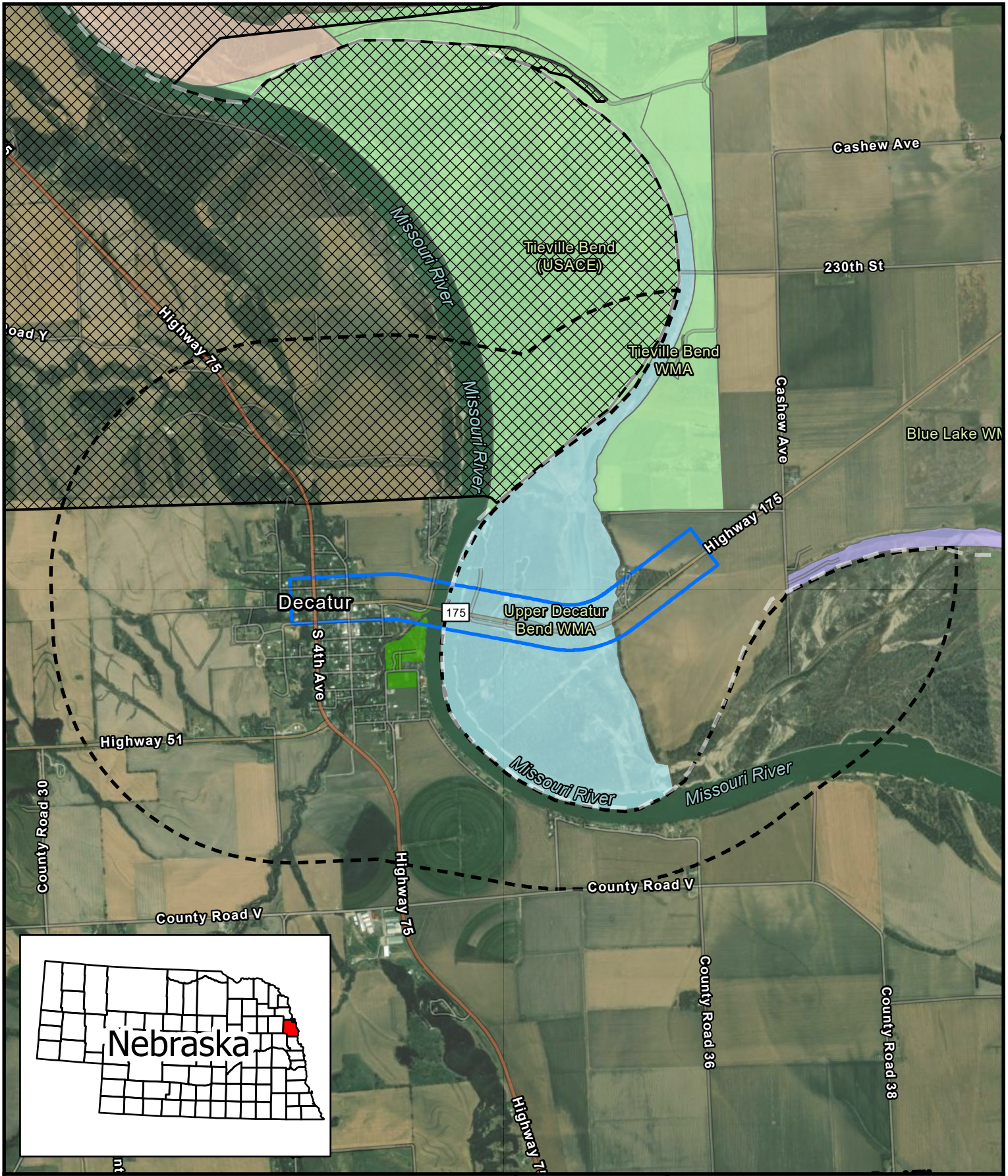
KEY: SMALLEST IMPACT/MINIMIZES GREATEST IMPACT

PERFORMANCE AREAS/ SCREENING CRITERIA	MEASURE	NORTH			SOUTH		
		NEW CROSSING NORTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING NORTH OF EXISTING ALIGNMENT	NEW CROSSING FAR NORTH	NEW CROSSING SOUTH OF, CLOSE TO EXISTING ALIGNMENT	NEW CROSSING SOUTH	NEW CROSSING SOUTH
CONSTRUCTABILITY							
Minimizes impacts to/relocation of major utilities or infrastructure	# of major utility crossings	0	0	Pipeline	Stormwater outfall & drainage ditch	Pipeline	Pipeline
Minimizes closure of N-51/IA-175 during construction	qualitative	YES	YES	YES	YES	YES	YES
PUBLIC INPUT							
Is initial alignment supported by the CAG?	YES OR NO	YES	YES	NO	NO	NO	NO
Is the initial alignment supported by the public?	YES OR NO	YES	NO	NO	YES	NO	NO
ALTERNATIVE TO BE CARRIED FORWARD IN NEPA?	YES OR NO	YES	NO	NO	YES	NO	NO

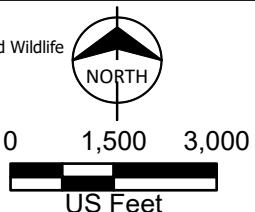
Note: all areas outside of the surveyed boundary shall be considered approximate values.

Appendix B: Environmental Overview

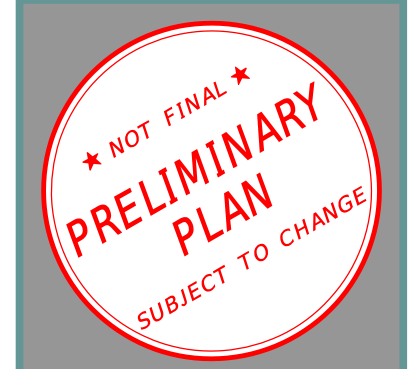
Path: C:\Users\sspurgeon\OneDrive - Burns & McDonnell\Desktop\Projects\Decatur Bridge NE (A)\DataFiles\Databases\157887_Decatur_Bridge.aprx sspurgeon 10/7/2024
Service Layer Credits: Hybrid Reference Layer: Iowa DNR, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/INASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS
World Imagery: Maxar



- Initial Survey Area
- 1-Mile CR-NE Study Area
- Omaha Nation Reservation
- Beck Memorial Park/Campground
- Upper Decatur Bend WMA
- Ivy Island WMA
- Middle Decatur Bend Wildlife Area WMA
- Tieville Bend WMA



Initial Survey Area and Study Area Features
Decatur Bridge Location/ Environmental Study
 Burt County, NE
 Monona County IA



SITE MAP
Scale 1" = 720'-0"

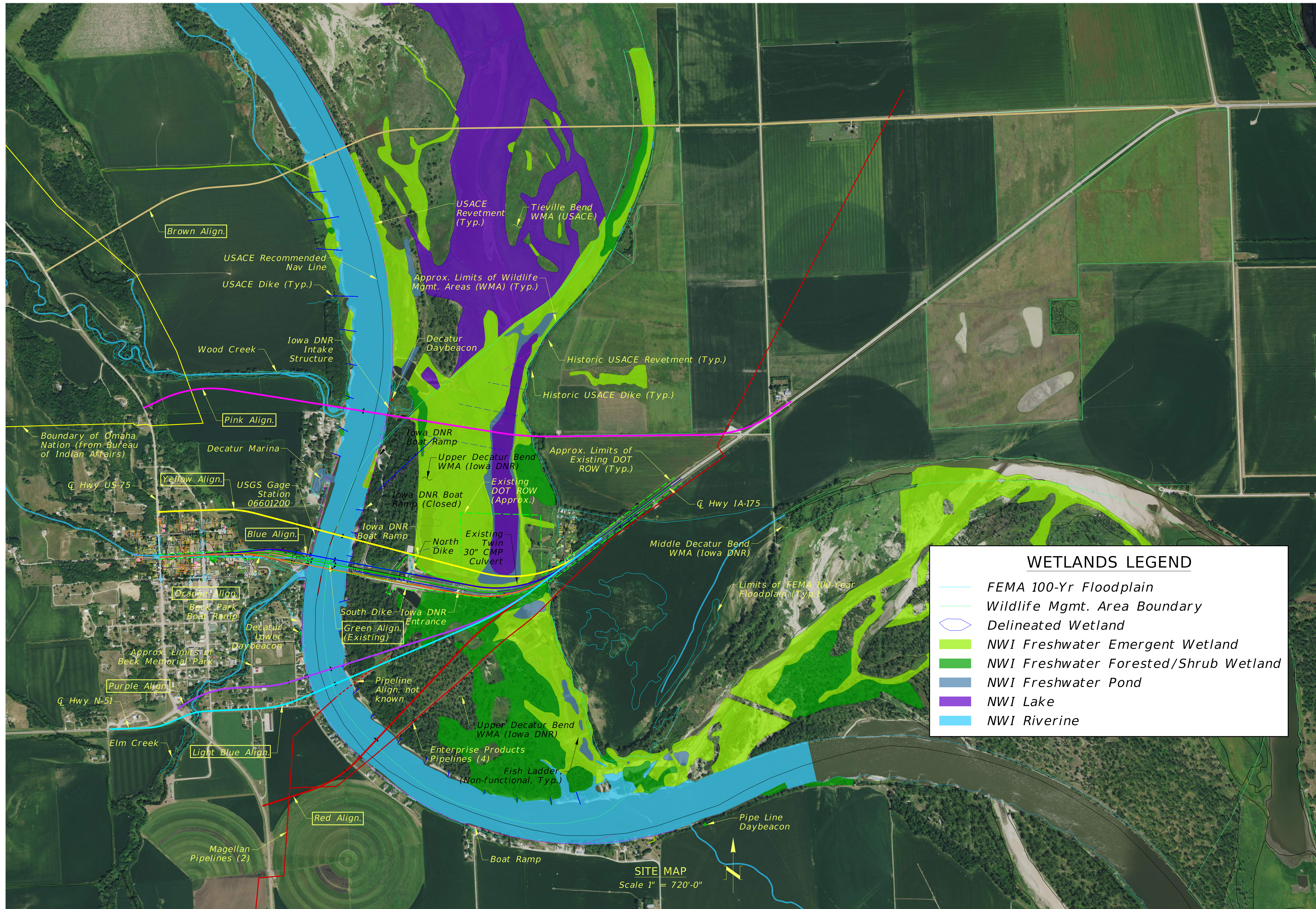
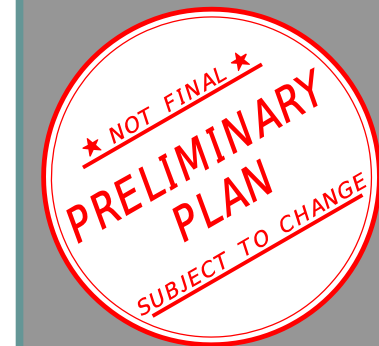
Decatur Bridge Location and Environmental Study Feasibility Report

Initial Constraints Map

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WETLANDS LEGEND

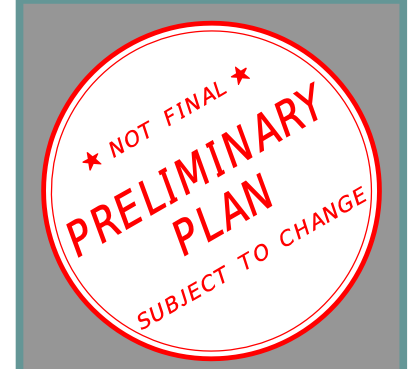
- FEMA 100-Yr Floodplain
- Wildlife Mgmt. Area Boundary
- Delineated Wetland
- NWI Freshwater Emergent Wetland
- NWI Freshwater Forested/Shrub Wetland
- NWI Freshwater Pond
- NWI Lake
- NWI Riverine

SITE MAP
Scale 1" = 720'-0"

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BRIDGE AND ROADWAY LEGEND

- River Unit
- Approach Unit or Relief Structure
- Roadway on Embankment
- Roadway At-Grade or Reconstruction

SITE MAP
Scale 1" = 720'-0"

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