Hwy 243 Osceola Bridge Project

Draft Alternatives Evaluation Criteria Report

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DEPARTMENT OF TRANSPORTATION

WISCONSIN DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation
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Introduction

The purpose of this report is to describe the alternatives evaluation process and alternatives evaluation criteria for the Trunk Highway (Hwy) 243 Osceola Bridge Project. This report will be distributed to Cooperating and Participating Agencies and the public for review and comment with the draft purpose and need statement and logical termini report for the Hwy 243 Osceola Bridge Project.

The Minnesota Department of Transportation (MnDOT) and Wisconsin Department of Transportation (WisDOT) recognize that information collected and analyzed as part of developing the purpose and need statement will influence the evaluation criteria. Comments from Cooperating and Participating Agencies and the public involved in reviewing the draft purpose and need statement may also result in changes to the evaluation criteria as project development progresses. Should that happen, an updated alternatives evaluation criteria report will be provided.

Project Location

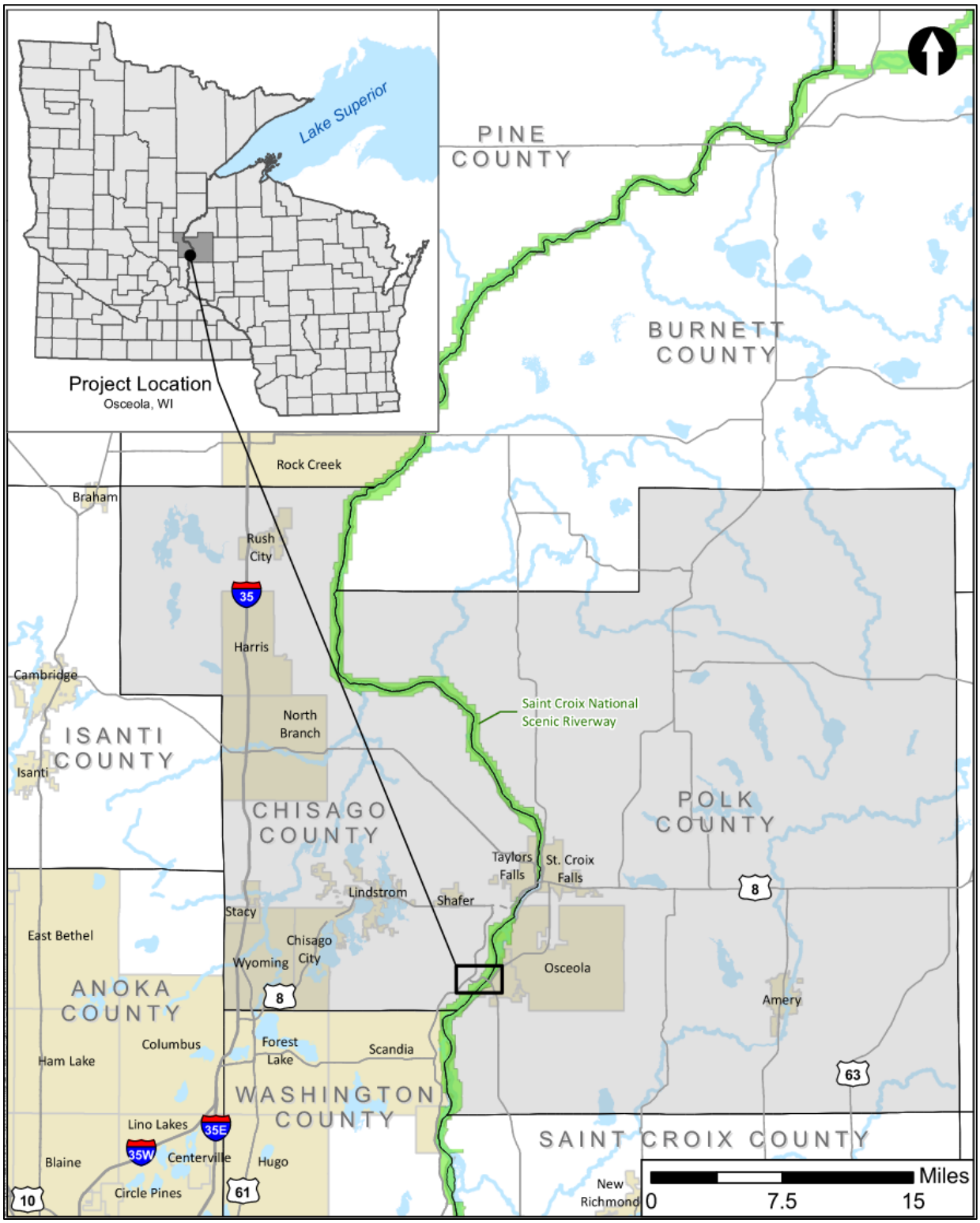
The Hwy 243 Osceola Bridge Project is in Franconia Township in Chisago County, Minnesota and the Village of Osceola in Polk County, Wisconsin and includes the Hwy 243 Bridge over the St. Croix River (MnDOT Bridge No. 6347 and WisDOT Bridge No. B-48-224). The Hwy 243 Bridge is approximately seven river miles downstream of the US Highway (US Hwy) 8 crossing between Taylors Falls, Minnesota and St. Croix Falls, Wisconsin, and approximately 23 river miles upstream of the MN Hwy 36/WI Hwy 64 crossing between Oak Park Heights, Minnesota and Town of St. Joseph, Wisconsin. The Hwy 243 Osceola Bridge is one of seven highway crossings of the St. Croix River along the Minnesota/Wisconsin state line.

Figure 1 on the following page illustrates the project location and the St. Croix National Scenic Riverway (see also "Project Setting" section below).

Project Setting

The Hwy 243 Osceola Bridge and approach roadways are in the St. Croix National Scenic Riverway (referred to as "Riverway" throughout this document). The St. Croix National Scenic Riverway is a unit of the national park system administered by the National Park Service (NPS). The Riverway was established by the United States Congress in 1968 and is one of the original eight rivers protected under the National Wild and Scenic Rivers Act (WSRA). The Riverway includes the St. Croix River, Namekagon River, and adjacent lands, and forms a 230-mile long park that extends from northwest Wisconsin to the confluence with the Mississippi River at Prescott, Wisconsin.

Figure 1. Hwy 243 Osceola Bridge Project, Project Location Map



The Riverway is unique for its free-flowing character, water quality, and outstandingly remarkable values (ORV), including aquatic, cultural, recreational, riparian, scenic-aesthetic, and geologic values. These characteristics and values comprise the foundation for which the Riverway was designated as a national wild and scenic river. Each of the six ORV categories listed above are present in the St. Croix River segment from St. Croix Falls, Wisconsin to the Osceola Landing, including the Hwy 243 crossing.

The immediate setting adjacent to the Hwy 243 corridor and Hwy 243 Bridge includes the Village of Osceola on the Wisconsin side of the Riverway and largely undeveloped lands on the Minnesota side of the Riverway. The Osceola Landing is on the Minnesota side of the Riverway, south of Hwy 243. The Osceola Landing is one of more than 60 landings providing public access to the Riverway, and is busiest landing operated by the NPS on the Riverway. Side-channels and backwaters to the St. Croix River are present on both sides of Hwy 243 on the Minnesota side of the Riverway. The bluff on the Wisconsin side overlooks the Riverway and includes local parks and trails adjacent to the Hwy 243 corridor.

Figure 2 illustrates the view from the Wisconsin bluff to the northwest overlooking the Riverway and Hwy 243 Osceola Bridge.

Figure 2. St. Croix National Scenic Riverway and Hwy 243 Bridge

Brief Summary of Purpose and Need

The Hwy 243 Osceola Bridge Project is in the process of developing the draft purpose and need statement for the project. The purpose and need for the Hwy 243 Osceola Bridge Project will be documented in a separate report from this evaluation criteria report. The draft purpose and need statement will be distributed to Cooperating and Participating Agencies and the public for review. The purpose and need statement will be finalized following this agency and public comment period. The draft purpose and need for the Hwy 243 Osceola Bridge Project is summarized below.

Draft Purpose and Need

Project Need

MnDOT, in cooperation with WisDOT, has identified several factors justifying the need for the Hwy 243 Osceola Bridge Project. The needs have been categorized as primary or secondary as defined below.

Primary needs include the primary transportation problems that led to the initiation of the project. One primary need has been identified: bridge condition.

Secondary needs are other transportation problems that may be able to be addressed at the same time as primary needs. One secondary need has been identified: walkability/bikeability.

Additional Considerations

Additional considerations are elements that are not central to the purpose and need of the project but are important criteria for evaluating build alternatives. The additional considerations identified for this project include:

- Maintenance of traffic during construction
- Osceola Landing
- Stormwater management
- Regulatory requirements

Purpose Statement

The purpose of this project is to maintain a highway connection over the St. Croix River in the Hwy 243 corridor between Washington/Chisago counties in Minnesota and the Village of Osceola in Wisconsin and address pedestrian and bicycle comfort and mobility while minimizing impacts to the area's sensitive resources.

Alternatives Evaluation Process and Criteria

Evaluation Process Overview

The alternatives evaluation for the Hwy 243 Osceola Bridge Project will use a three-step process. The process begins with identifying a reasonable range of alternatives, including a no build alternative. Each step includes a progressively greater level of build alternative design detail and quantitative and qualitative analysis. The outcome of the third step is the identification of a preferred alternative for the Hwy 243 Osceola Bridge Project. The alternatives evaluation process for the Hwy 243 Osceola Bridge Project is summarized below.

1. Step 1: Do the alternatives address the primary need for the Hwy 243 Osceola Bridge Project (i.e., the problems that led to the initiation of the project)? "Fatal flaw" assessment of alternatives. Fatal flaws include costs or impacts that prohibit an alternative from being built.

2. Step 2: Do the alternatives address the secondary needs for the Hwy 243 Osceola Bridge Project? Qualitative and quantitative assessment other considerations and initial assessment of social, economic, and environmental (SEE) impacts.

3. Step 3: Detailed quantitative and qualitative assessment of SEE impacts.

Figure 3 on the following page illustrates the steps in the Hwy 243 Osceola Bridge Project alternatives evaluation process. These three steps and associated evaluation criteria are described in the following sections.

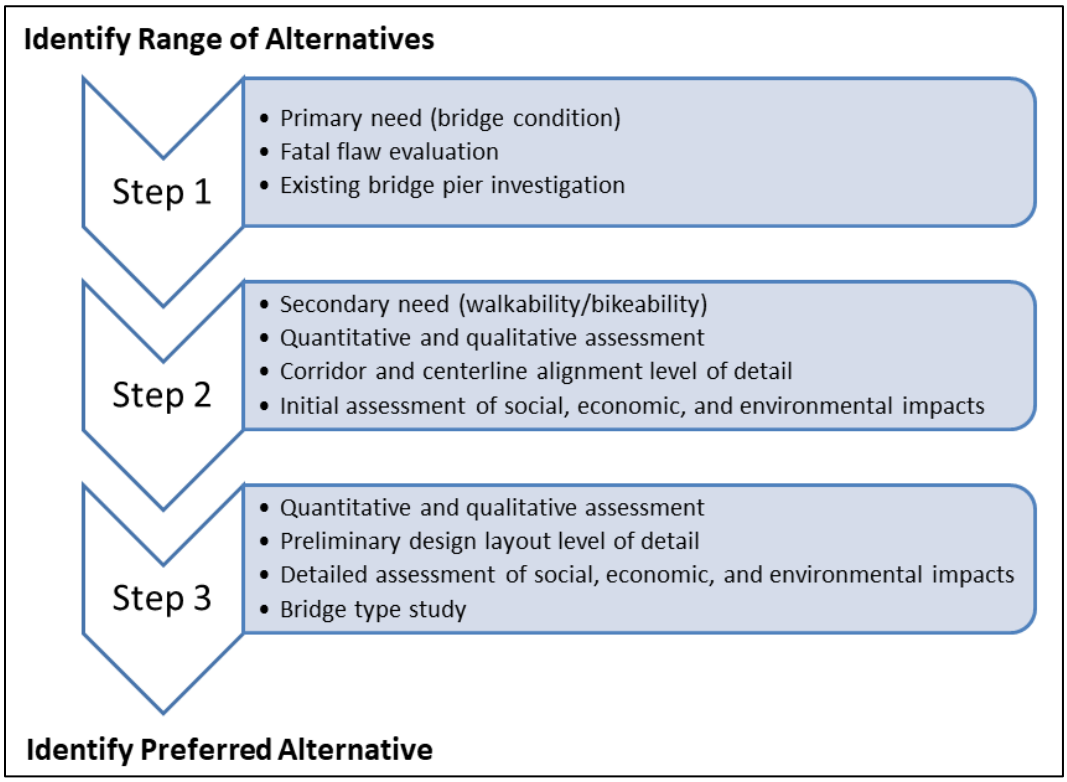
Alternatives Evaluation Criteria

Step 1, Primary Need

A reasonable range of alternatives will be identified at the start of Step 1. Build Alternatives are not limited to, but may include a bridge rehabilitation alternative, a deck replacement using existing bridge piers alternative, and bridge replacement alternatives (on the existing bridge alignment and new alignments). The No Build Alternative will be defined and will be used as the basis for comparison in Step 1 (as well as subsequent steps of the alternatives evaluation process).

Step 1 includes an engineering analysis of the existing Hwy 243 Bridge piers. The purpose of this investigation is to determine the feasibility of the existing bridge piers to carry the loading of a new bridge deck and superstructure. The findings of the existing bridge pier analysis will be documented in a technical memorandum.

Figure 3. Hwy 243 Osceola Bridge Project Alternatives Evaluation Process



The alternatives will be evaluated against the primary need for the project in Step 1. Alternatives that do not address the primary bridge condition need for the project will be dismissed from further consideration. Step 1 will also include a qualitative evaluation of alternatives to identify potential "fatal flaws". An alternative is considered fatally flawed if it would include costs or impacts that prohibit an alternative from being built (e.g., not permittable or results in un-mitigable impacts). An alternative that is not constructable would also be considered fatally flawed. For example, if the investigation of the existing bridge piers determines that the existing piers cannot accommodate any additional loading, then any alternative that results in additional loads on the existing bridge piers would be considered not constructable and dismissed from further consideration in Step 1. It is anticipated that alternatives will be reviewed with NPS in Step 1 to obtain their perspective regarding un-mitigatable impacts (e.g., likely negative Section 7(a) determination).

Table 1 on the following page lists the Step 1 evaluation criteria, measurement (qualitative or quantitative), and tools used for each evaluation criteria.

Table 1. Step 1 Evaluation Criteria

Category	Evaluation Criteria	Measurement	Methodology/Tool
Primary Need	Bridge Condition	Does or does not improve bridge condition (deck, superstructure, substructure) Does or does not extend service life of the structure	National Bridge Inventory (NBI) Condition Ratings (1) MnDOT Transportation Asset Management Plan (TAMP) (2)
	Structure Robustness	Does or does not improve structural robustness	Qualitative assessment (structural capacity, structural redundancy)
Other Consideration	Fatal Flaw Evaluation	Assessment of potential costs or impacts that prohibit an alternative from being built	Qualitative assessment

(1) National Bridge Inventory (NBI) ratings are numerical ratings ranging from 9 (Excellent) to 0 (Failed Condition: Bridge is closed).

(2) MnDOT Transportation Asset Management Plan (TAMP) Technical Guide, July 2014, will be used to estimate remaining service life of the existing Hwy 243 Bridge based on NBI condition ratings.

Step 2, Secondary Need and Qualitative Assessment

Build Alternatives in Step 2 will be developed based on a bridge typical section, centerline alignment, and a corridor footprint. The evaluation criteria in Step 2 include the secondary needs for the project and social, economic, and environmental (SEE) performance measures. The No Build Alternative and Build Alternatives will be compared based on their ability to address the secondary needs and a qualitative and quantitative assessment of anticipated SEE impacts. Alternatives that would result in greater environmental impacts may be rejected in Step 2 if there are other alternatives with reasonable performance that result in impacts of a lesser degree. Remaining alternatives will be advanced to Step 3 for further consideration.

Step 2 evaluation criteria have been categorized into Poor/Fair/Good ratings. Thresholds for differentiating between the Poor/Fair/Good ratings will be identified based on analysis results for Build Alternatives compared to the No Build Alternative. In general, secondary need evaluation criteria will be graded based on whether the corridor alternative improves the condition (Good rating), moderately improves the condition (Fair rating), or results in minimal to no improvement (Poor rating) in the condition compared to the No Build Alternative. For SEE impact-related evaluation criteria, the categories include whether a corridor alternative does not impact/avoids a resource (Good rating), results in a moderate impact to a resource (Fair rating), or results in a high impact to a resource (Poor rating).

Table 2 lists the Step 2 evaluation criteria, measurement (qualitative or quantitative), and tools used for each evaluation criteria. Table 2 also lists the Poor/Fair/Good ratings and their general definitions for Step 2 evaluation criteria.

Table 2. Step 2 Evaluation Criteria and Performance Categories

Category	Evaluation Criteria	Performance Measure	Methodology/Tool	Poor Performance	Fair Performance	Good Performance
Secondary Need	Walkability/ Bikeability	Multi-modal level of service (MMLOS) (segment-based analysis)	Oregon DOT MMLOS methodology	LOS E/F	LOS C/D	LOS A/B
		Pedestrian and bicycle level of traffic stress (LTS) (segment-based analysis)	Oregon DOT pedestrian and bicycle LTS methodology	Pedestrian LTS 4 Bicycle LTS 4	Pedestrian LTS 2 or LTS 3 Bicycle LTS 2 or LST 3	Pedestrian LTS 1 Bicycle LTS 1
Other Considerations	Constructability	Assessment of construction costs, opportunities for construction access	Qualitative assessment	Requires special bridge assembly and approach roadway construction techniques	Limited need for special bridge assembly or approach roadway construction	Opportunity to use standard construction techniques
	Maintenance of Traffic during Construction, Vehicles	Opportunity to maintain existing Hwy 243 Bridge during construction	Qualitative assessment	Two or more years of bridge closure and detour during construction	One-year bridge closure and detour during construction	Less than one-year bridge closure and detour during construction
	Osceola Landing	Osceola Landing access at Hwy 243	Qualitative assessment	No opportunity to improve Hwy 243 at Osceola Landing (turn lanes)	May provide opportunity to improve Hwy 243 at Osceola Landing (turn lanes)	Opportunity to improve Hwy 243 at Osceola Landing (turn lanes)
		Consistency with planned improvements	Qualitative assessment	Not consistent with planned improvements at Osceola Landing	May be consistent with planned improvements at Osceola Landing	Consistent with planned improvements at Osceola Landing

Category	Evaluation Criteria	Performance Measure	Methodology/Tool	Poor Performance	Fair Performance	Good Performance
Other Considerations	Hwy 243 Wayside Rest Area	Opportunity to maintain function of Hwy 243 Wayside Rest Area	Qualitative assessment	No opportunity to maintain wayside rest area function	May provide opportunity to maintain wayside rest area function	Opportunity to maintain wayside rest area function
	Hwy 243 Emergency Pull-Off (Wisconsin)	Opportunity to maintain function of pull-off for emergency vehicles	Qualitative assessment	No opportunity to maintain pull-off function	May provide opportunity to maintain pull-off function	Opportunity to maintain pull-off function
Social, Economic, and Environmental (SEE) Considerations	Aquatic Resource Impacts	Opportunity to avoid or minimize wetland impacts	Quantitative assessment, number and acres of wetlands impacted Level 1 wetland delineation	No opportunity to avoid wetland impacts Anticipated impacts ≥ 1 acre	Anticipated wetland impacts < 1 acres	Opportunity to avoid wetland impacts
	Bluff Impacts	Opportunity to avoid or minimize impacts to Wisconsin bluff	Quantitative and qualitative assessment, amount of bluff disturbance (acres)	No opportunity to avoid Wisconsin bluff Anticipated bluff disturbance ≥ 1 acre	May impact Wisconsin bluff Anticipated bluff disturbance < 1 acre	Provides opportunity to avoid Wisconsin bluff impacts
	Cultural Resources	Opportunity to avoid or minimize impacts to Osceola Commercial Historic District and other identified resources	Qualitative assessment	Anticipated adverse effect determination	Anticipated no adverse effect determination	Anticipated no historic properties effected determination

Category	Evaluation Criteria	Performance Measure	Methodology/Tool	Poor Performance	Fair Performance	Good Performance
Social, Economic, and Environmental (SEE) Considerations	Floodplain Impacts	Opportunity to avoid or minimize floodplain encroachment	Quantitative assessment, encroachment FEMA floodplain mapping	Anticipated floodplain encroachment ≥ 100 feet	Anticipated floodplain encroachment < 100 feet	Opportunity to avoid floodplain encroachment
	Protected Species	Opportunity to avoid or minimize impacts to protected species	Qualitative assessment	Anticipated may affect, likely to adversely affect determination	Anticipated may affect, not likely to adversely affect determination	Anticipated no affect determination
	Property Impacts	Assessment of right of way needs and potential residential and commercial relocations	Quantitative assessment, total number of parcels impacted (strip taking and/or total taking/relocation)	Anticipated right of way impacts include strip takings and total parcel takes Includes potential relocations	Anticipated right of way impacts include strip takings and total parcel takes No relocations	Anticipated right of way impacts include strip taking only and no total takes No relocations
	Section 4(f) Properties	Opportunity to avoid/minimize impacts or enhance Section 4(f) properties	Quantitative assessment, number and acres of Section 4(f) properties impacted	Section 4(f) use is likely Number of acres and activities, features, and attributes affected anticipated beyond de minimis	Section 4(f) use is likely Number of acres and activities, features, and attributes affected anticipated to be de minimis	Avoids Section 4(f) properties Not likely to affect activities, features, or attributes, qualifying the property for Section 4(f) protection

Step 3, Social, Economic, and Environmental Impacts

Build Alternatives will be developed to preliminary design layout level of detail in Step 3. The evaluation criteria in Step 3 include social, economic, and environmental performance measures. The alternatives will be compared based on a quantitative and qualitative assessment of impacts. The outcome of Step 3 is the identification of a preferred alternative for the Hwy 243 Osceola Bridge Project.

Step 3 includes a bridge type study for remaining Build Alternatives. The outcome of the bridge type study is the identification of a recommended bridge type for the Hwy 243 Osceola Bridge Project. A separate evaluation matrix will be developed for the bridge type study. Anticipated evaluation criteria include constructability; number of piers and pier location; impacts to river hydraulics; riverway navigation conflicts; construction cost; and visual impacts.

There are several Section 4(f) properties in the study area, including the St. Croix National Wild and Scenic Riverway, the Osceola Commercial Historic District, Cascade Falls and Wilkie Glen Conservancy/Open Space, Gristmill Park, Millpond Park, and Osceola Picnic Bluff. Section 4(f) use will be an important consideration in the alternatives evaluation under Step 3. The likely path for Section 4(f) (e.g., de minimis, programmatic, individual) will be identified in consultation with the Federal Highway Administration (FHWA) in Step 3.

Table 3 lists the Step 3 evaluation criteria, measurement (qualitative or quantitative), and methodology/tools used with each evaluation criteria.

Table 3. Step 3 Evaluation Criteria

Category	Evaluation Criteria	Measurement	Methodology/Tool
Social, Economic, and Environmental (SEE) Considerations	Aquatic Resource Impacts	Acres of wetland impacts Description of quality of impacted wetlands	Level 1 wetland delineation Qualitative assessment
	Bluff Impacts	Acres of bluff disturbance (amount of cut/fill along Wisconsin bluff)	Preliminary layout Qualitative assessment
	Cultural Resources	Impacts to Osceola Commercial Historic District and other identified resources	Quantitative assessment (number eligible and NRHP listed properties affected) Qualitative assessment (assessment for likely adverse effects) Cultural resource investigations
	Economic Impacts	Impacts to businesses due to bridge closures during construction	Qualitative assessment

Category	Evaluation Criteria	Measurement	Methodology/Tool
Social, Economic, and Environmental (SEE) Considerations	Environmental Justice	Identify minority and low-income populations Assessment of disproportionately high and adverse effects (if any populations present)	Qualitative assessment US Census data supplemented with input from local units of government
	Floodplain Impacts	Linear feet of floodplain encroachment (longitudinal and transverse)	FEMA floodplain mapping
	Property Impacts	Acres of new right of way Number of parcels impacted (strip takings and/or full takings) Number of relocations (commercial and residential)	Preliminary layout
	Protected Species	Impacts to protected species (assessment for likely adverse affect determination)	Qualitative assessment Bat survey Mussel survey Bridge type study
	Recreation	Temporary impacts to river users due to bridge construction	Qualitative assessment Bridge type study
	River Hydraulics (Free-Flowing Condition)	Impacts to river hydraulics, number and location of piers in St. Croix River	Qualitative assessment Bridge type study
	River Navigation	Does or does not meet Coast Guard requirements for horizontal and vertical clearances	Qualitative assessment Bridge type study
	Section 4(f) Properties	Acres of permanent use of Section 4(f) properties Description of temporary occupancies during construction Opportunities to enhance Section 4(f) properties	Location and size of use Qualitative assessment (extent of activities, features, and attributes, affected) Bridge type study

Category	Evaluation Criteria	Measurement	Methodology/Tool
Social, Economic, and Environmental (SEE) Considerations	Vegetation and Terrestrial Habitat	Acres of tree removal Impacts to natural plant communities/areas of environmental sensitivity	Minnesota Biological Survey (native plant communities
	Visual Impacts	Visual impacts to user groups	Qualitative assessment Visual impact assessment (VIA) Bridge type study
	Water Quality	Acres of new impervious surface Opportunity to treat runoff from bridge surface prior to discharge	Preliminary layout Qualitative assessment