

23-1 INTRODUCTION

This chapter addresses the requirements of Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966.¹ The Draft Section 4(f) Evaluation for the Tappan Zee Hudson River Crossing Project identified that the Replacement Bridge Alternative would use three Section 4(f) Properties—Tappan Zee Bridge, Elizabeth Place Park, and the South Nyack Historic District. Subsequent to publication of the Draft Section 4(f) Evaluation, the design of the Replacement Bridge Alternative was modified, and it was determined that the project would avoid use of Elizabeth Place Park and two properties in the South Nyack Historic District. Therefore, Section 4(f) does not apply to these resources. The Replacement Bridge Alternative would result in a Section 4(f) use of the Tappan Zee Bridge, which is eligible for listing on the National Registers of Historic Places, and therefore, Section 4(f) applies to the potential use of the Tappan Zee Bridge. Since the use of the Tappan Zee Bridge cannot be avoided, the Federal Highway Administration (FHWA) has identified measures to minimize harm to this property.

23-2 REGULATORY CONTEXT

Section 4(f) of the USDOT Act of 1966 (49 USC § 303; 23 CFR § 774) prohibits the Secretary of Transportation from approving any program or project that requires the “use” of (1) any publicly owned parkland, recreation area, or wildlife and waterfowl refuge of national, state, or local significance; or (2) any land from a historic site of national, state, or local significance (collectively, “Section 4(f) properties”), unless there is no feasible and prudent alternative to the use of such land and such program or project includes all possible planning to minimize harm to the park, recreation area, wildlife refuge, or historic site. A historic site is considered to be a property that is listed on, or eligible for listing on, the National Registers of Historic Places (“NR-listed” and “NR-eligible”).

A project uses a Section 4(f) property when:

- It permanently incorporates land from the property into a transportation facility;
- It temporarily but adversely occupies land that is part of the property; or
- It “constructively” uses the property, which occurs “when the transportation project does not incorporate land from a Section 4(f) property, but the proximity impacts are so severe that the protected activities, features, or attributes that qualify property for protection under Section 4(f) are substantially impaired.”

¹ In 1983, Section 4(f) of the USDOT Act was codified as 49 USC § 303(c), but this law is still commonly referred to as Section 4(f).

Tappan Zee Hudson River Crossing Project
Environmental Impact Statement

Whenever a Section 4(f) property would be used for a transportation project, documentation must be prepared to demonstrate that:

- No feasible and prudent alternative exists to the use of the 4(f) property; and
- The project includes all possible planning to minimize harm to the property.

As described in 23 CFR § 774.17, an alternative is not feasible if it cannot be built as a matter of sound engineering judgment. An alternative is not prudent if:

- It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;
- It results in unacceptable safety or operational problems;
- After reasonable mitigation, it still causes:
 - Severe social, economic, or environmental impacts;
 - Severe disruption to established communities;
 - Severe disproportionate impacts to minority or low income populations; or
 - Severe impacts to environmental resources protected under other Federal statutes;
- It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;
- It causes other unique problems or unusual factors; or
- It involves multiple factors of the above, that while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.

If there is no feasible and prudent avoidance alternative, FHWA may approve only the alternative that causes the least overall harm in light of Section 4(f)'s preservation purpose. As stated in 23 CFR § 774.3, the "least overall harm" is determined by balancing the following list of factors:

- The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property);
- The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
- The relative significance of each Section 4(f) property;
- The views of the official(s) with jurisdiction over each Section 4(f) property;
- The degree to which each alternative meets the purpose and need for the project;
- After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
- Substantial differences in costs among the alternatives.

23-2-1 PROGRAMMATIC SECTION 4(f) EVALUATION FOR HISTORIC BRIDGES

In July 1983, FHWA issued through the *Federal Register* a programmatic Section 4(f) approval for historic bridges that are part of the Federal Aid highway system or a state or local highway system. Programmatic Section 4(f) evaluations streamline the amount of documentation, approval, and interagency coordination that is required. If a project meets the criteria of the Programmatic Section 4(f) evaluation, it is deemed to meet the regulations of Section 4(f). For Programmatic Section 4(f) evaluations, interagency coordination is required with the official(s) with jurisdiction over the resource but not with the U.S. Department of Interior (DOI).

In its programmatic evaluation for historic bridges, FHWA states that:

Even though these structures are on or eligible for inclusion on the National Register of Historic Places, they must perform as an integral part of a modern transportation system. When they do not or cannot, they must be rehabilitated or replaced in order to assure public safety while maintaining system continuity and integrity.

FHWA can apply the programmatic Section 4(f) evaluation for historic bridges if a project that meet the following criteria:

- The bridge is to be replaced or rehabilitated with federal funds.
- The project will require the use of a historic bridge structure which is on or is eligible for listing on the National Register of Historic Places.
- The bridge is not a National Historic Landmark.
- The FHWA Division Administrator determines that the facts of the project match those set forth in the sections of the programmatic Section 4(f) evaluation.
- Agreement among the FHWA, the State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation (ACHP) has been reached through procedures pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The programmatic Section 4(f) evaluation and approval may be used only for projects where the FHWA Division Administrator, in accordance with the project's Section 4(f) evaluation, ensures that the project includes all possible planning to minimize harm. For bridges that are to be replaced, this is considered to occur when: 1) the existing bridge is made available for an alternative use, provided a responsible party agrees to maintain and preserve the bridge; and 2) agreement among the SHPO, ACHP, and FHWA is reached on measures to minimize harm through the Section 106 process of the NHPA, and such measures are incorporated into the project.

23-2-2 SECTION 4(f) REVIEW PROCESS

A Draft Section 4(f) Evaluation was published in tandem with the Draft Environmental Impact Statement (DEIS). This Final Section 4(f) Evaluation incorporates public comments on the Draft Section 4(f) Evaluation. This Final Section 4(f) evaluation contains the conclusions of the Draft Section 4(f) Evaluation, encompassing:

Tappan Zee Hudson River Crossing Project Environmental Impact Statement

- A description of the basis for concluding that there are no prudent and feasible alternatives to the use of the Section 4(f) property, including a demonstration that there are unique problems or unusual factors involved in the use of alternatives that avoid these properties, or that the cost, social, economic, and environmental impacts or community disruption resulting from the alternatives reach extraordinary magnitudes;
- A description of the basis for concluding that the proposed action includes all possible planning to minimize harm; and
- A summary of appropriate formal coordination with the U.S. Department of the Interior (DOI).

FHWA, acting as the lead federal agency, is issuing this Final Section 4(f) finding when it issues the Final Environmental Impact Statement (FEIS) for the Tappan Zee Hudson River Crossing Project.

23-3 APPLICABILITY OF SECTION 4(f) TO THE PROJECT

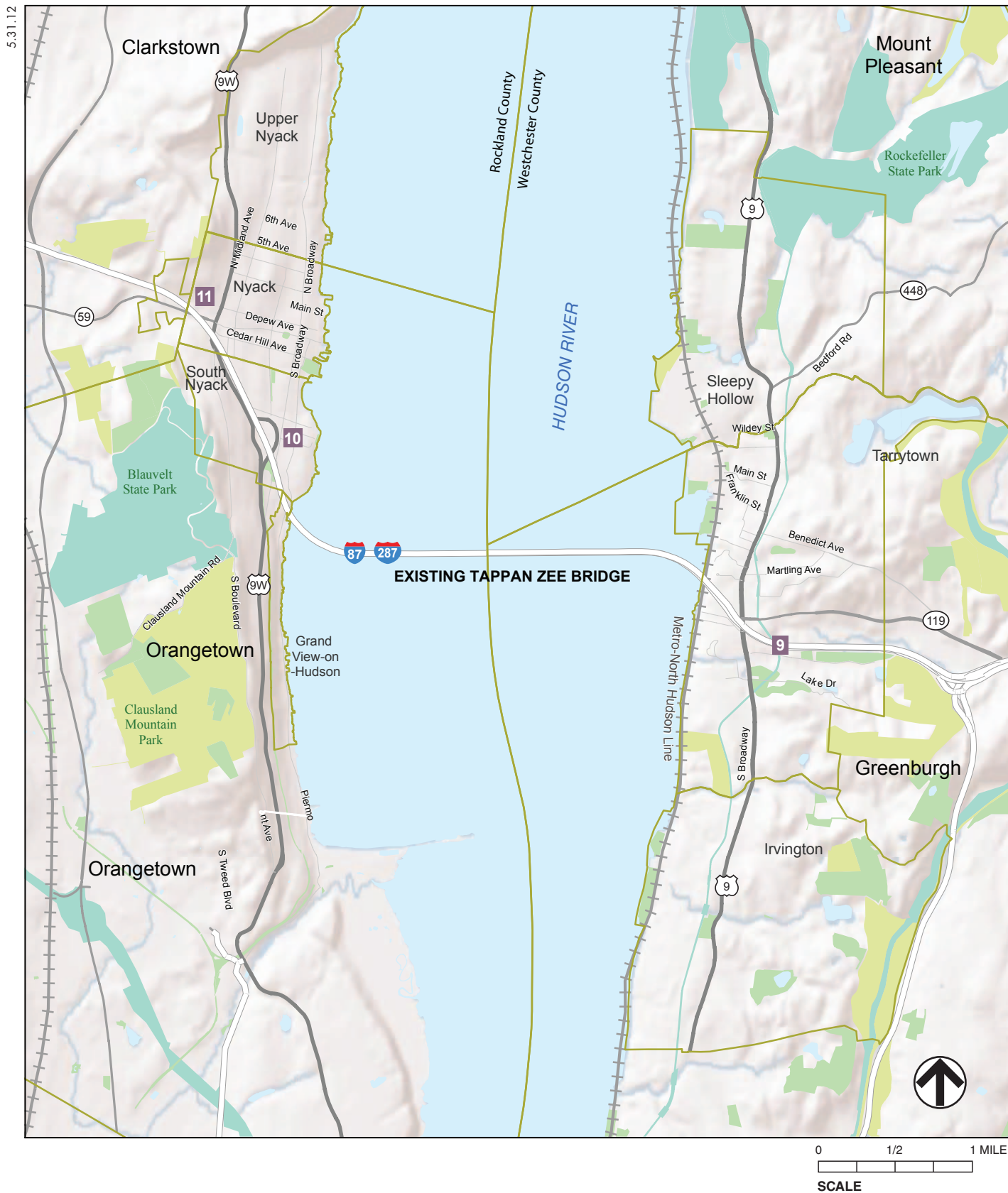
One Section 4(f) property—Tappan Zee Bridge—would be used by the Replacement Bridge Alternative. The effects of the Short Span and Long Span Options for the Replacement Bridge Alternative would be the same with respect to the Tappan Zee Bridge. This Section 4(f) property is shown in **Figure 23-1**.

It should be noted that the Draft Section 4(f) Evaluation identified use of two additional Section 4(f) properties—South Nyack Historic District and Elizabeth Place Park. Following publication of the Draft Section 4(f) Evaluation, the design of the Replacement Bridge Alternative was modified. Since the South Broadway Bridge over Interstate 87/287 would not be replaced under the refined design, the Replacement Bridge Alternative would avoid use of Elizabeth Place Park and the South Nyack Historic District, and accordingly, they are not identified in this Final Section 4(f) Evaluation.

As stated in 23 CFR § 77.11 and 23 CFR § 77.13, Section 4(f) applies to all archeological sites on or eligible for inclusion on the National Register, including those discovered during construction, except when:

- The Administration concludes that the archeological resource is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place. This exception applies both to situations where data recovery is undertaken and where the Administration decides, with agreement of the official(s) with jurisdiction, not to recover the resource; and
- The official(s) with jurisdiction over the Section 4(f) resource have been consulted and have not objected to the Administration finding.

No archaeological properties were identified within the land portion of the Area of Potential Effect (APE). Field investigations and analysis to complete the identification and evaluation of underwater archaeological sites are currently underway, in consultation with the SHPO. Based on studies completed to date, potentially eligible sites appear to have minimal value for preservation in place. If further study, in consultation with the SHPO, identifies National Register eligible sites that warrant preservation in place, this Section 4(f) evaluation would be supplement to address these properties.



As described above, a “constructive” use occurs “when the transportation project does not incorporate land from a Section 4(f) property, but the proximity impacts are so severe that the protected activities, features, or attributes that qualify a property for protection under Section 4(f) are substantially impaired.” The Replacement Bridge Alternative would construct a new bridge north of the existing location of the Tappan Zee Bridge with realignment and regrading of Interstate 87/287 in Rockland and Westchester Counties to meet the new bridge abutments. The realignment of the highway would result in its closer proximity to Section 4(f) properties on the north side of the existing right-of-way, and the higher elevation of the highway would be more visible from Section 4(f) properties on the south side of the right-of-way. Through the Section 106 Process, it has been determined that these historic properties are not adversely affected by the Replacement Bridge Alternative. The viewshed is not a characteristic that qualifies these properties for the National Register for protection under Section 4(f). Therefore, a constructive use does not apply.

23-4 SECTION 4(f) EVALUATION

23-4-1 TAPPAN ZEE BRIDGE

Section 6007 of SAFETEA-LU exempts the Interstate Highway System from being considered as a Section 4(f) property. This exemption applies to the entire Interstate System, except for specific facilities designated by FHWA as having national and/or exceptional significance. Although it is part of the Interstate Highway System, the requirements of Section 4(f) apply to the Tappan Zee Bridge as it is designated as having exceptional significance in engineering history for its use of prefabricated buoyant caissons supports.

The Tappan Zee Bridge was constructed between 1952 and 1955. Captain Emil H. Praeger, U.S. Navy Retired (1882–1973), served as chief engineer for Madigan-Hyland, the designers of the bridge. The bridge is 3.1-mile-long structure supported by a substructure consisting of abutments and 198 piers. It is the longest bridge in the state and one of the longest in the country. It also has the world's ninth longest cantilever span, at 1,212 feet. It has been determined eligible for National Register listing for its significance in the areas of transportation and engineering. The Tappan Zee Bridge is not designated as a National Historic Landmark.

23-4-1-1 DESCRIPTION OF THE USE OF THE SECTION 4(f) PROPERTY

The Replacement Bridge Alternative would incorporate portions of the existing Rockland and Westchester Counties' landings of the Tappan Zee Bridge into the new structure and would demolish the existing bridge, causeway, and approach spans.

23-4-1-2 ALTERNATIVES TO AVOID THE USE OF THE SECTION 4(f) PROPERTY

FHWA's programmatic Section 4(f) Evaluation identifies three alternatives to the use of a historic bridge: 1) Implement the No Build Alternative (“Do Nothing Alternative”); 2) Build a new structure at a different location without affecting the historic integrity of the old bridge, as determined by procedures implementing the NHPA; and 3) Rehabilitate the historic bridge without affecting the historic integrity of the structure, as determined by procedures implementing the NHPA.

Tappan Zee Hudson River Crossing Project Environmental Impact Statement

No Build Alternative

The No Build Alternative (“Do Nothing” Alternative”) would not result in the demolition of the Tappan Zee Bridge. Ongoing maintenance and capital projects would ensure that the Tappan Zee Bridge would remain safe to the traveling public, but these projects would not correct the structural, operational, safety, or mobility needs of the bridge. The New York State Thruway Authority (NYSTA) estimates that it would spend \$1.3 billion to maintain and repair the bridge over the next decade. Major work activities will include seismic upgrades to portions of the bridge, navigational safety improvements, steel and concrete repairs, and other miscellaneous improvements to continue to keep the bridge safe for traveling public. Despite this considerable expenditure, the structural, operational, safety, and mobility needs of the Tappan Zee Hudson River crossing would not be fully corrected.

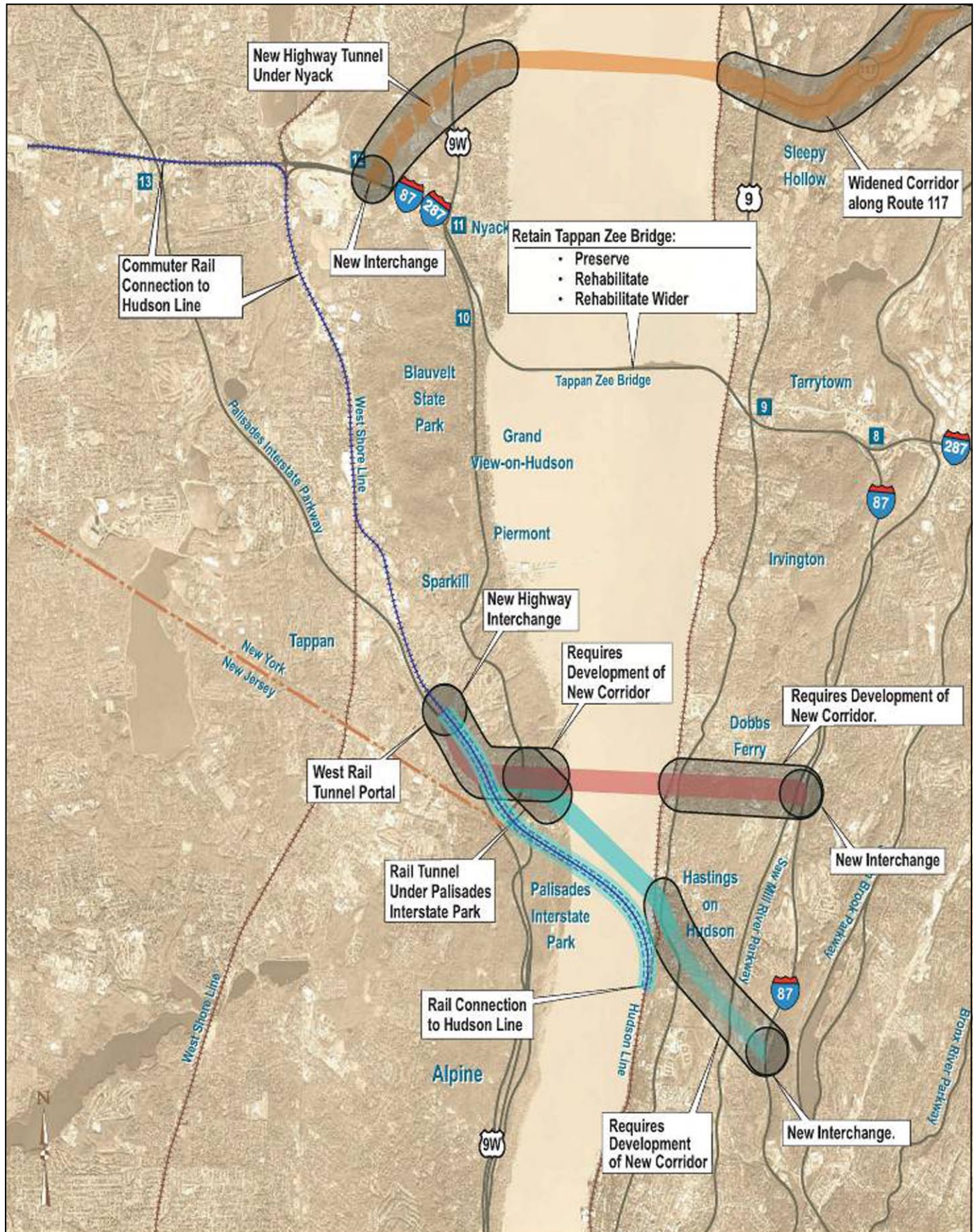
Given the age of the bridge and the vulnerabilities in extreme events, it is possible that the crossing could be closed altogether at some point in the future. If the bridge were closed, the vital link between the population and employment centers of Rockland and Westchester Counties would be removed, causing a break in the regional and national transportation network.

While the No Build Alternative would be feasible, it is not prudent, as it would not meet the project's purpose and need and could result in severe social, economic, and environmental impacts.

Build at a New Location Alternative

Construction of a new bridge on another alignment and retention of the existing bridge in a manner that would preserve its historic integrity would avoid a use of the Tappan Zee Bridge. Two potential alignments for a new bridge were evaluated—Remote Northern Route and Remote Southern Route (see **Figure 23-2**).

- **Remote Northern Route.** A Remote Northern Route was identified 3 miles north of the existing bridge that would generally avoid terrain obstacles. This route would require a new, 2-mile corridor in Rockland County, diverging from Interstate 87/287 near Interchange 12 (Palisades Interstate Parkway). In Westchester County, the alignment would require a new ½-mile long roadway from the Hudson River to Route 117 at its interchange with Route 9. At this point, the Remote Northern Route would rejoin the existing Interstate 87/287 right-of-way.
- **Remote Southern Route.** A Remote Southern Route was identified in the vicinity of Snedens Landing in Rockland County and Dobbs Ferry or Hastings on Hudson in Westchester County, approximately 4 miles south of the existing bridge. This route would diverge from the existing right-of-way at the Palisades Interstate Parkway (Interchange 13) in Rockland County and would rejoin Interstate 87 at south of Interchange 7 (Interstate 287) in Westchester County. It would require acquisition of about two miles of new right-of-way in Rockland County and about two to three miles of new right-of-way in Westchester County. The Remote Southern Route would also require extensive modifications to the Palisades Interstate Parkway to meet design requirements for interstate highways.



Avoidance Alternatives: Build at a New Location Alternative

The Remote Northern and Remote Southern Routes would require acquisition of more than 40 acres of property in a heavily populated area, resulting in a substantial number of residential and commercial relocations. Furthermore, the Remote Northern and Southern Routes would require reconstruction of portions of the Palisades Interstate Parkway to provide new interchanges and allow for truck access. The construction and reconstruction of the highway would impact a number of built and natural features in both Rockland and Westchester Counties. Thus, the Remote Northern and Remote Southern Routes are not considered prudent.

Rehabilitation Alternative

The Alternatives Analysis for Rehabilitation and Replacement of the Tappan Zee Bridge Report (March 2009) identified four rehabilitation options to enhance the structural integrity and operation of the existing Tappan Zee Bridge. Four rehabilitation options were considered:

- 1) Replacement Causeway and Rehabilitated Main Span;
- 2) Replacement Causeway and Widened Main Span;
- 3) Replacement Causeway, Rehabilitated Main Span, and Single Level Supplemental Bridge; and
- 4) Replacement Causeway, Rehabilitated Main Span, and Dual Level Supplemental Bridge.

The findings of this report were reviewed in the context of the purpose and need for the current project (see Chapter 1, "Purpose and Need"). This review concluded that the Rehabilitation Alternative is not considered prudent for the reasons described below.

The Rehabilitation Alternative would fail to meet the project goal of "ensuring the long-term vitality of this Hudson River crossing" for the following reasons:

- The Rehabilitation Alternative would be designed to comply with seismic criteria, which are based on strength. However, the Rehabilitation Alternative would lack ductility, which allows bridge members to endure changes in shape without breaking. Therefore, the Rehabilitation Alternative would be vulnerable during an extremely long or intensive earthquake.
- The Replacement Bridge Alternative would consist of two structures to provide for service redundancy in the event that one structure is closed for damage, maintenance, and/or repair. The Rehabilitation Alternative options that have a single structure would lack this service redundancy. If the bridge were heavily damaged by a natural or man-made event, it would be closed for repairs. If the bridge were closed, there would be no alternative routing for traffic at this location along the Hudson River.

The Rehabilitation Alternative would fail to meet the project goal of "improving transportation operations and safety on the crossing" for the following reasons:

- The Rehabilitation Alternative would lack alternative load path redundancy (i.e., the ability of bridge members to be supported by multiple means such as a deck supported both by a deck truss and by a bridge cable). As such, the Rehabilitation Alternative would not adequately address security or operational concerns. Its closure would severely affect traffic operations, freight movement, and economic conditions across the region.

Tappan Zee Hudson River Crossing Project Environmental Impact Statement

The Rehabilitation Alternative would fail to meet the project goal of “maximizing the public investment in a new Hudson River crossing” for the following reasons:

- The life span of bridge components retained in the Rehabilitation Alternative would be shorter than those of a new bridge. To maximize the public investment in a new Tappan Zee Hudson River crossing, the desired life span of the new structure is at least 100 years before major maintenance or rehabilitation is needed. However, components of the Rehabilitation Alternative would need major maintenance or replacement in as few as 50 years.
- The construction duration for the Rehabilitation Alternative would be one year longer than for a replacement bridge.
- There is much uncertainty associated with rehabilitation projects in that the extent of damage to certain bridge components may not be fully known until they are actually replaced. This uncertainty would have the potential to substantially increase the construction cost and duration of the Rehabilitation Alternative.
- The Rehabilitation Alternative would involve both upland and in-water construction activities and would be expected to result in many of the same environmental impacts of a replacement bridge.
- The Rehabilitation Alternative with two bridges would cost about \$2.5 to \$2.7 billion more than the Replacement Bridge Alternative. It would also result in more in-water work and would have the same deficiencies described above in terms of life cycle and vulnerabilities.

In addition, the Rehabilitation Alternative would remove historic features of the Tappan Zee Bridge and many other impacts of its construction and operation would be materially the same or potential worse than the Replacement Bridge Alternative. Given these considerations, the Rehabilitation Alternative would not meet the project’s purpose and need. While feasible, the Rehabilitation Alternative is not prudent. Rehabilitation without adversely affecting the historic integrity of the Tappan Zee Bridge is also not feasible.

Reuse Alternative

The reuse of the existing Tappan Zee Bridge in tandem with the Replacement Bridge Alternative would not avoid a use of this Section 4(f) property. Under the Reuse Alternative, FHWA, New York State Department of Transportation (NYSDOT), and NYSTA would seek a new owner for the existing Tappan Zee Bridge once the Replacement Bridge Alternative is operational. The new owner would be responsible for the future use of the bridge in accordance with federal, state, and local laws, permits, and approvals and would be responsible for the maintenance of the structure.

The Reuse Alternative is not prudent for the following reasons:

- Consistent with the project’s objectives to “minimize effects on existing highways” and “maximize the use of existing right-of-way,” the Replacement Bridge Alternative would incorporate as much of the existing bridge landings as possible into the new structures. In Rockland County, the landings would shift slightly north; however, in Westchester County, the new landings would fully incorporate right-of-way for the existing landings. Therefore, under the Reuse Alternative, access to the existing

Tappan Zee Bridge would be precluded without an alternative upland right-of-way. Upland right-of-way would be needed for pathways to get onto the bridge and possibly for parking or uses related to the bridge's conversion to public space.

- The reuse of the existing bridge in combination with the Replacement Bridge Alternative would result in three structures over a 500-foot corridor of the navigable channel. Based on consultation with the U.S. Coast Guard, retention of the existing bridge would be considered an obstruction to navigation.
- The cost to rehabilitate the existing structure for alternative use and to maintain its ongoing structural integrity would be very high. The estimated cost for full rehabilitation of the existing bridge is \$3.5 billion, including replacement of the causeway and seismic upgrades. The costs to maintain the bridge would be about \$50 million per year.
- The reuse of the existing structure would require demolition, alteration, or removal of bridge features. These efforts would adversely affect the historic integrity of the Tappan Zee Bridge.

23-4-1-3 MEASURES TO MINIMIZE HARM

As described above, the reuse of the existing Tappan Zee Bridge in place is not considered prudent or feasible. The Tappan Zee Bridge is more than 3.1 miles long with 198 piers, and the removal and relocation of the bridge in tact would be infeasible. Disassembly and reassembly of the structure would also be extremely difficult given the location, length, and age of the Tappan Zee Bridge. Furthermore, the removal of the bridge would likely alter or demolish its causeway foundations, buoyant foundations, and cofferdams, which are contributing elements to the historic integrity of the bridge.

Since preservation in place or relocation is not a viable option, FHWA, NYSDOT, and NYSTA, in consultation with SHPO, have explored measures to mitigate the adverse effect on the Tappan Zee Bridge. These measures, which are identified in the executed Section 106 Memorandum of Agreement (see **Appendix C**), are as follows:

- Historic American Engineering Record (HAER) documentation of the Tappan Zee Bridge would include at a minimum large-format black-and-white archival photographs, measured drawings, and a historic report meeting the current HAER guidelines established by the Heritage Documentation Program of the National Park Service. Copies of the HAER Report would be distributed to the Library of Congress and other appropriate repositories identified in consultation with SHPO.
- Educational materials documenting the history and construction of the bridge, which would be made publicly available.

23-5 COORDINATION

In accordance with the Safe, Accountable, Flexible, Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU), FHWA is identified as the lead federal agency for the federal environmental review process, and NYSDOT and NYSTA are identified as the joint lead agencies. Review of the Draft Section 4(f) Evaluation included FHWA, NYSDOT, NYSTA, DOI, ACHP and SHPO. As described in Chapter 3, "Process, Agency Coordination, and Public Participation," FHWA, NYSDOT, and NYSTA have

Tappan Zee Hudson River Crossing Project Environmental Impact Statement

initiated an extensive public outreach program. As part of these efforts, a formal consultation process under Section 106 of the NHPA was initiated. FHWA contacted Native American tribes and groups who may attach religious and cultural interest in sites within the Tappan Zee Hudson River crossing's area of potential effect. NYSDOT and NYSTA have contacted municipalities, preservation groups, and individuals with an interest in the project and the Section 106 process as well as property owners of historic sites within the area of potential effect. Through consultation with these groups, FHWA, NYSDOT, and NYSTA have developed mitigation measures for the use of the Tappan Zee Bridge. These measures are described above and are identified in the project's executed Section 106 Memorandum of Agreement (see **Appendix C**).

DOI reviewed the project's Draft Section 4(f) Evaluation. In a letter dated March 9, 2012 (see **Volume III**), DOI concurred that there is no prudent and feasible alternative to the proposed use of the Tappan Zee Bridge. DOI stated that continued consultation with SHPO throughout the project is necessary, and that measures to minimize harm and mitigate potential impacts should be executed in a MOA among FHWA, ACHP, NYSTA, NYSDOT, and SHPO.

23-6 CONCLUSION

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Tappan Zee Bridge, and the proposed action includes all possible planning to minimize harm to the (Section 4(f) property) resulting from such use.