

1 INTRODUCTION

This Final Environmental Impact Statement (FEIS) was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA; 40 CFR §§ 1500-1508 and 23 CFR § 771) and the New York State Environmental Quality Review Act (SEQRA; 6 NYCRR Part 617 and 17 NYCRR Part 15) for the Tappan Zee Hudson River Crossing Project. This FEIS incorporates analysis and conclusions presented in the Draft EIS (DEIS) for the project, public comments and responses on the DEIS, design refinements proposed subsequent to publication of the DEIS, and new information that became available after public release of the DEIS.

The Federal Highway Administration (FHWA), acting as federal lead agency, and the New York State Department of Transportation (NYSDOT) and New York State Thruway Authority (NYSTA), acting as joint lead agencies signed the cover sheet of the DEIS on January 18, 2012, and the document was made publicly available. A notice of its availability was published in the Federal Register on January 27, 2012, which established the public comment period on the document.

The public comment period was initially scheduled to conclude on March 15, 2012, but in response to public comments, FHWA, NYSDOT, and NYSTA extended the public comment period to March 30, 2012. Two public hearings were held during the public comment period. The first was on February 28, 2012 at the Palisades Mall in West Nyack, New York, and the second was on March 1, 2012 at the Westchester Marriott in Tarrytown, New York. A court reporter was on hand to accept oral comments on the DEIS at the hearings. Written comments (email and letters) were accepted throughout the public comment period. Written comments received after March 30, 2012 were also accepted. All substantive comments on the DEIS have been responded to in this FEIS.

In addition to public comments and responses, this FEIS incorporates design refinements and new information made available subsequent to publication of the DEIS. In accordance with 23 CFR 771.130 as well as 6 NYCRR Part 617 and 17 NYCRR Part 15, a re-evaluation statement was prepared. Because the design refinements and new information considered in the re-evaluation would not significantly impact the environment in a way not previously considered in the DEIS, it is not necessary to prepare a Supplemental DEIS, and FHWA concluded that the environmental review of the project should proceed with an FEIS. Specifically, the re-evaluation documented the potential effects of the following:

- Design refinements to the Replacement Bridge Alternative;
- Toll revenue bonds to finance the project;

Tappan Zee Hudson River Crossing Project Environmental Impact Statement

- Revised Biological Assessment (BA) and Essential Fish Habitat (EFH) Assessment and the issuance of a Biological Opinion (BO) and EFH conservation recommendations from the National Marine Fisheries Service (NMFS);
- The results of a draft analysis to be used by the U.S. Coast Guard (USCG) for its General Conformity Determination under the Clean Air Act in support of the project's General Bridge Permit application;
- The outcome of consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act;
- Results of sediment sampling and subsequent determinations by the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (USEPA) with respect to the transport of dredged materials to the Historic Area Remediation Site (HARS); and
- Refined analysis of hydroacoustic effects and ambient noise based on the results of the project's Pile Installation and Demonstration Program (PIDP).

The re-evaluation statement was accepted by FHWA, and as such, the design refinements and new information have been incorporated into this FEIS.

2 SUMMARY OF DESIGN REFINEMENTS AND NEW INFORMATION

2-1 DESIGN REFINEMENTS

Based on comments received on the DEIS regarding the impacts of the Replacement Bridge Alternative on parklands, historic resources, and the South Broadway Bridge in South Nyack, NYSDOT and NYSTA explored design modifications to lower the profile of Interstate 87/287 in Rockland County. **Table 1** presents the modifications to the Replacement Bridge Alternative. As a result of these modifications, the Replacement Bridge Alternative no longer requires replacement of the South Broadway Bridge, the displacement of residents, or temporary easements and acquisition of parklands.

2-2 TOLL REVENUE BONDS

Subsequent to publication of the DEIS, toll revenue bonds have been identified to finance the Replacement Bridge Alternative. The New York Metropolitan Transportation Council (NYMTC) Best Practices Model (BPM) was run for the 2017 analysis year to determine the potential diversions that may result from potential toll adjustments. The model assessed the potential traffic diversions to other Hudson River crossings as a result of the potential toll adjustments at the Tappan Zee Bridge. The analysis assumed a worst-case scenario under which the new car and truck tolls at the Tappan Zee Bridge would be equal to the Port Authority of New York and New Jersey (PANYNJ) tolls for 2017 at its Hudson River crossings. The analysis examined potential diversions to the following Hudson River Crossings: George Washington Bridge, the Lincoln and Holland Tunnels, the Bear Mountain Bridge, and the Newburgh-Beacon Bridge.

Table 1
Design Refinements

Replacement Bridge Alternative (DEIS)	Replacement Bridge Alternative with Refinements
Western limit of construction on Interstate 87/287 ends approximately 150 feet west of South Broadway Bridge	Western limit of construction on Interstate 87/287 ends approximately 300 feet east of the South Broadway Bridge
Reconfiguration of the Rockland landing would require reconstruction of the South Broadway Bridge	Revisions to the vertical alignment of the Rockland landing eliminate the need to replace the South Broadway Bridge
12 parcels were identified for full or partial acquisition or temporary easements along the right-of-way in Rockland County. One small permanent easement would be required in Westchester County. The property acquisitions would result in the relocation of nine households	The project would result in a small partial acquisition and permanent easement on two multi-family residential properties; one in the Village of South Nyack and one in the Village of Tarrytown. No property owners or residents would be displaced.
Increase in elevation of the approach roadway in proximity to 3 River Road / Bight Lane -approximately 4-7 feet under the Short Span Option, compared to the existing approach, and up to 30 feet under the Long Span Option	Increase in elevation of the approach roadway in proximity to 3 River Road / Bight Lane - approximately 5 feet over existing elevation for both the Short and Long Span Options with addition of a potential noise barrier
Superstructure depth as it crosses River Road – approximately 15 feet under the Short Span Option and 40 feet under the Long Span Option	Superstructure depth as it crosses River Road - approximately 6-8 feet under the Short and Long Span Options. Superstructure depth under the Short Span Option – 10 feet. Superstructure depth under the Long Span Option – 10-40 feet between Rockland landing and Pier 5, and 40 feet for remainder of superstructure.
The shared-use path would terminate on the north side of Interstate 87/287 at South Broadway in South Nyack	The shared-use path would terminate at Smith Avenue just west of the Bradford Mews Apartments in South Nyack

2-3 BIOLOGICAL ASSESSMENT, ESSENTIAL FISH HABITAT (EFH) ASSESSMENT, AND BIOLOGICAL OPINION

In support of the project's consultation with the National Marine Fisheries (NMFS) pursuant to Section 7 of the Endangered Species Act (ESA), the DEIS included a draft Biological Assessment to determine the potential impacts of the Replacement Bridge Alternative on threatened and endangered fish species. In response to comments received from NMFS and the New York State Department of Environmental Conservation (NYSDEC) on the DEIS and the draft Biological Assessment (BA), additional analyses were performed to estimate the effects of project activities on shortnose and Atlantic sturgeon. The additional analyses were presented in a revised BA, which was submitted to NMFS in April 2012. That assessment used benchmarks to establish potential effects to sturgeon that were based on West Coast interim criteria for onset of physiological effects on fish. The analyses relied on a conservative cumulative sound exposure level (SEL_{cum}) of 187 dB re 1 $\mu Pa^2 \cdot s$ for onset of physiological effects and considered higher levels of cumulative noise for onset of injury and mortality.

In its Biological Opinion (BO), NMFS provided an analysis of effects on shortnose and Atlantic sturgeon that relied on the Peak Sound Pressure Level (SPL) (of a single strike) criterion to assess the potential number of sturgeon affected by pile driving activities. Based on this analysis NMFS concluded that the number of sturgeon that may experience physiological impacts would be limited to 70 or fewer shortnose sturgeon and 70 or fewer Atlantic sturgeon for the Short Span Option, and 43 or fewer shortnose and 43 or fewer Atlantic sturgeon for the Long Span Option. These estimates are lower than those predicted in the DEIS and draft BA. NMFS further anticipates serious injury or mortality of no more than one shortnose sturgeon and no more than one Atlantic sturgeon for either bridge option for pile driving activities. NMFS based its estimates for

Tappan Zee Hudson River Crossing Project Environmental Impact Statement

Atlantic sturgeon effects on estimates derived for shortnose sturgeon and the fact that Atlantic sturgeon is less abundant than shortnose sturgeon in the Hudson River.

In its BO, NMFS indicated that the proposed dredging activities at the site may result in three or fewer shortnose sturgeon and three or fewer Atlantic sturgeon captured over the three year dredging period. NMFS also indicated that they expected no more than one of the three shortnose and one of the three Atlantic sturgeon captured to be injured or killed during dredging operations.

An Essential Fish Habitat (EFH) Assessment was published with the DEIS in January 2012. Subsequent to publication of the DEIS, NMFS issued comments on the EFH. The EFH was updated in response to NMFS comments and was provided to NMFS in April and is included in the FEIS. NMFS conservation recommendations, which were issued in June 2012, are in part based on the April 2012 EFH.

2-4 CONFORMITY WITH STATE AIR QUALITY IMPLEMENTATION PLANS

The DEIS included a detailed analysis of the potential air quality impacts associated with construction and operation of the Replacement Bridge Alternative. During the long-term operation of the project no exceedance of the National Ambient Air Quality Standards (NAAQS) were predicted. To reduce pollutant emissions during construction a number of Environmental Performance Commitments (EPCs) were proposed which would substantially reduce emissions from diesel engines. With these EPCs, the DEIS concluded that construction activities would not result in any exceedances of the NAAQS. There has been no change with respect to these conclusions.

The DEIS included a description of the emissions associated with dredging operations which the USEPA requested in support of a General Conformity Determination (GCD) that they believed would be necessary for the issuance of a permit from the U.S. Army Corp of Engineers (USACE). Subsequent to publication of the DEIS, the USCG also requested a similar accounting of emissions, but for the entire multi-year bridge construction process in support of the project's permit application under the General Bridge Act of 1946. Therefore, the project sponsors have prepared an analysis, which concludes that the project activities subject to the USCG Bridge Permit would conform to the State Implementation Plan (SIP).

2-5 ENDANGERED SPECIES CONSULTATION

The DEIS analyzed potential effects to three species that are listed on the USFWS database as occurring within Rockland and/or Westchester Counties, including the bog turtle (*Clemmys muhlenbergii*), the New England cottontail (*Sylvilagus transitionalis*), and the Indiana bat (*Myotis sodalis*). The analysis presented in the DEIS concluded that there would be no effect on the bog turtle or New England cottontail based on lack of appropriate habitat for these species within the study area. Regarding the Indiana bat, the DEIS stated that the study area is within sufficient proximity to a known bat hibernaculum in Ulster County for individuals associated with this hibernaculum to possibly migrate to, and establish a breeding site within, the study area.

The DEIS further indicated that additional coordination with USFWS would occur prior to the publication of the FEIS. Since publication of the DEIS, FHWA has initiated an informal consultation under Section 7 of the Endangered Species Act for these three species. The conclusions of the additional consultation remain the same as those

discussed in the DEIS, including a "no effect" determination for the bog turtle and New England cottontail and a "may affect, but not adversely affect" determination for the Indiana bat. As part of its consultation with USFWS, FHWA has committed to restrict the project's removal of four-inch diameter trees so that these trees are only removed during the Indiana bat's winter hibernation season (October 1 through March 31).

2-6 HISTORIC AREA REMEDIATION SITE

The DEIS analyzed the transport and disposal of dredged material to the Historic Area Remediation Site (HARS). Since publication of the DEIS, the required sediment sampling and analysis in support of the permit application to the USACE for the transport and placement of that material at HARS were undertaken. Based on that sampling, USEPA and USACE determined that the sediment resulting from Stages 1 and 2 of the dredging program would be suitable for placement at the HARS.

2-7 PILE INSTALLATION AND DEMONSTRATION PROGRAM

The DEIS included an extensive analysis based on modeling of the hydroacoustic effects of pile driving on the aquatic resources of the Hudson River particularly as it relates to the endangered shortnose and Atlantic Sturgeon as well as the species protected under the Essential Fish Habitat. The DEIS also described EPCs to minimize adverse effects on these resources. Many of these measures focused on minimizing the in-water noise associated with the driving of large diameter steel pipe piles that would be necessary to construct the project's foundations in the soft river sediments. The results of the analysis were reflected in the DEIS and draft BA.

A Pile Installation and Demonstration Program (PIDP) was conducted in the spring of 2012. The PIDP provided detailed data on the short- and long-range transmission of noise from pile driving within the Hudson River as well as information related to the efficacy of various EPCs identified in the DEIS. A total of seven test piles, at four sites, ranging in size from 4 to 10-feet in diameter were installed between April 28 to May 18, 2012. Hydroacoustic monitoring was performed at one short-range and 11 long-range sites during the program. Noise data was collected during both vibratory and impact hammering. The measurements indicated that the modeled impacts in the DEIS of pile driving were conservative with respect to sound levels expected during the actual construction. The DEIS modeling did not account for the presence of barges. As confirmed by the PIDP, barges tend to substantially reduce the transmission of noise outside the area of the barge. In addition, the testing of the various noise attenuation systems demonstrated that they all exceeded attenuation of 10 dB assumed in the DEIS analysis. Peak SPL noise levels were reduced up to 17 dB while rms SPL values were reduced by up to 16 dB.

Ambient noise monitoring was also undertaken during the PIDP, and the measured results were used to calibrate and validate construction noise modeling efforts from the DEIS.

3 SUMMARY OF THE CHANGES IN THIS FEIS

This FEIS includes a new chapter, Chapter 24, "Public and Agency Comments on the DEIS and Responses." In addition to responding to public comments on the DEIS, the chapters of this FEIS have also been updated or modified to reflect the design

Tappan Zee Hudson River Crossing Project Environmental Impact Statement

refinements and new information described above. The following is a summary of the changes reflected in this FEIS.

- **Chapter 1, Purpose and Need:** There have been no substantive changes in this chapter since publication of the DEIS.
- **Chapter 2, Project Alternatives:** The chapter incorporates the design refinements into the description of the Replacement Bridge Alternative, provides a discussion of the plan to finance the Replacement Bridge Alternative, and includes additional details on the elimination of the Rehabilitation, Tunnel, and Single Structure Alternatives. This chapter also describes the Replacement Bridge Alternative's ability to support express bus services to use the extra width on the bridge during peak hours, which would have to be appropriately assessed and considered before being implemented.
- **Chapter 3, Process, Agency Coordination, and Public Participation:** The chapter incorporates new information regarding the conformity requirements for the project as well as coordination activities undertaken since publication of the DEIS.
- **Chapter 4, Transportation:** The chapter incorporates a diversion analysis that was prepared to identify the potential effects of the potential toll adjustments, which would be used to finance the project. The chapter also incorporates the Replacement Bridge Alternative's ability to support express bus services to use the extra width on the bridge during peak hours, which would have to be appropriately assessed and considered before being implemented.
- **Chapter 5, Community Character:** This chapter incorporates revisions to the property acquisition and noise analyses to reflect the design refinements as well as identifies public policy initiative and plans that were undertaken following publication of the DEIS.
- **Chapter 6, Land Acquisition, Displacement, and Relocation:** The chapter is updated to reflect the refined land acquisition requirements for the Replacement Bridge Alternative.
- **Chapter 7, Parklands and Recreational Resources:** The chapter is modified to reflect that the project would no longer require temporary easements, temporary acquisition, or permanent acquisition of parkland or green space.
- **Chapter 8, Socioeconomic Conditions:** This chapter was updated to reflect changes in property acquisition requirements for the design refinements as well as potential socioeconomic effects of the potential toll adjustments.
- **Chapter 9: Visual and Aesthetic Resources:** The chapter is updated to reflect analysis of the design refinements, which result in a lower profile in Rockland County, as well as the effects of noise walls that were recommended in the DEIS to abate the adverse noise impacts associated with the Replacement Bridge Alternative.
- **Chapter 10, Historic and Cultural Resources:** As noted above, the design refinements in Rockland County would avoid the permanent acquisition and demolition of two properties within the South Nyack Historic District, and therefore,

the Replacement Bridge Alternative would no longer have an adverse effect on the South Nyack District. Furthermore, since publication of the DEIS, NYSDOT and NYSTA have undertaken additional archaeological documentation, and FHWA, the Advisory Council on Historic Preservation, the New York State Historic Preservation Officer, NYSDOT, and NYSTA have executed a Section 106 Memorandum of Agreement to identify measures to avoid, minimize, or mitigate adverse impact on historic and archaeological resources. All of this information is reflected in this chapter.

- **Chapter 11, Air Quality:** This chapter reflects analysis of the potential regional (mesoscale) and local (microscale) air quality effects of the potential toll increases at the Tappan Zee Bridge. The chapter also incorporates conformity determinations for the project. (Note that the detailed general conformity analysis is presented in Chapter 18, “Construction Impacts.”)
- **Chapter 12, Noise and Vibration:** Analysis was revised to incorporate the design refinements, resulting in the recommendation of an extended noise barrier along the north side of the Interstate 87/287 right-of-way eastward of the Bradford Mews Apartments. The chapter also reflects public outreach regarding recommended noise barriers that occurred subsequent to publication of the DEIS.
- **Chapter 13, Energy and Climate Change:** This chapter reflects more detailed information regarding sea level rise in response to public comments on the DEIS.
- **Chapter 14, Topography, Geology, and Soils:** The chapter reflects modified cut and fill calculations based on the design refinements.
- **Chapter 15, Water Quality:** The chapter reflects refined analysis of river sediments as well as revised calculations for stormwater resulting from the design refinements.
- **Chapter 16, Ecology:** This chapter reflects the revised BA, BO and EFH analyses as well as the mitigation recommendations from NMFS and NYSDEC. The chapter also includes the results of the informal consultation with USFWS regarding potential effects on the bog turtle (*Clemmys muhlenbergii*), New England cottontail (*Sylvilagus transitionalis*), and Indiana bat (*Myotis sodalis*), and it describes pertinent results of the PIDP.
- **Chapter 17, Hazardous Waste and Contaminated Materials:** The chapter includes results from a Phase 2 Environmental Site Investigation, which was undertaken subsequent to publication of the DEIS.
- **Chapter 18, Construction Impacts:** The chapter includes results of hydroacoustic and ambient noise monitoring from the PIDP, sedimentary data results from HARS sampling, more detailed information regarding dredging and demolition activities in response to public comments on the DEIS, and more specific information regarding certain environmental performance commitments and other mitigation measures based on the PIDP results, agency coordination, and public comments on the DEIS.
- **Chapter 19, Environmental Justice:** The chapter includes analysis of the potential effects of the potential toll adjustments on minority and low-income residents within the Tappan Zee Bridge commuter shed.

**Tappan Zee Hudson River Crossing Project
Environmental Impact Statement**

- **Chapter 20, Coastal Area Management:** The chapter includes the analysis and mitigation refinements described in the other chapters of this DEIS.
- **Chapter 21, Indirect and Cumulative Effects:** The chapter includes analysis of the potential indirect and cumulative effects of the potential toll adjustments.
- **Chapter 22, Other NEPA/SEQRA Considerations:** The chapter is updated to reflect edits to other relevant chapters of this FEIS.
- **Chapter 23, Final Section 4(f) Evaluation:** The chapter is updated to reflect coordination regarding the Draft Section 4(f) Evaluation. Furthermore, as the Replacement Bridge Alternative would avoid a use of Elizabeth Place Park and the South Nyack Historic District, these Section 4(f) resources are removed from the Final Section 4(f) Evaluation.

Changes since publication of the DEIS are denoted in double-underlined text¹.

¹ Note that this Foreword and Chapter 24, "Public and Agency Comments and Responses" do not include double-underlined text as they are entirely new to this FEIS.