



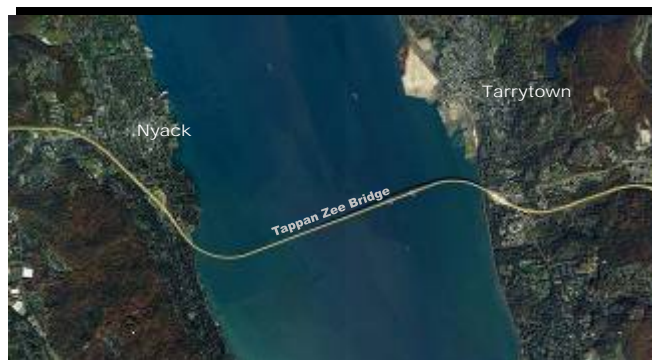
TAPPAN ZEE BRIDGE/I-287
ENVIRONMENTAL REVIEW

**New York State Department of Transportation
Metropolitan Transportation Authority Metro-North Railroad
New York State Thruway Authority**

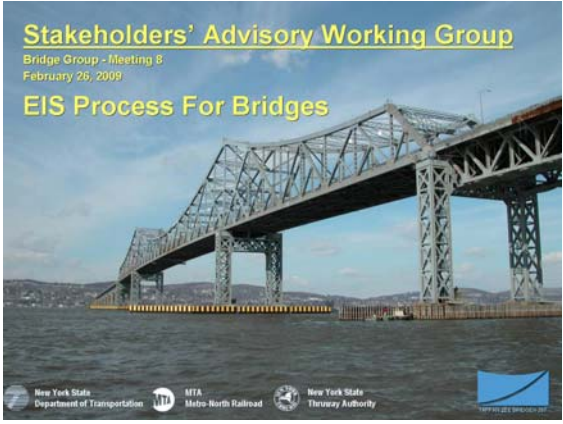
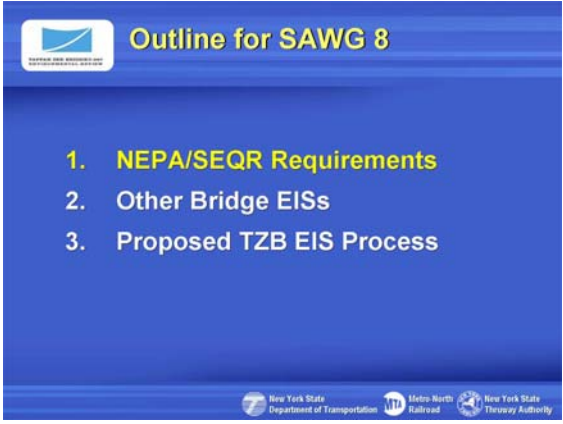
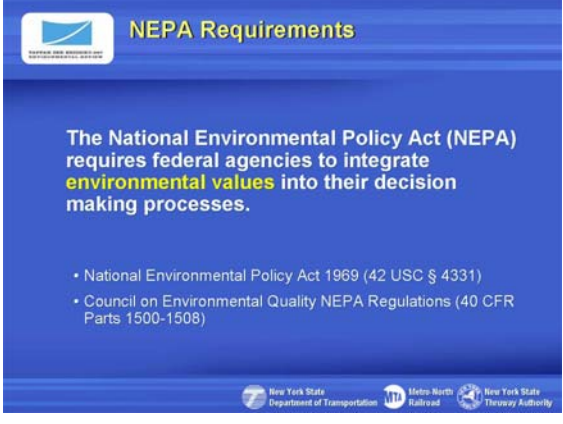
Presentation

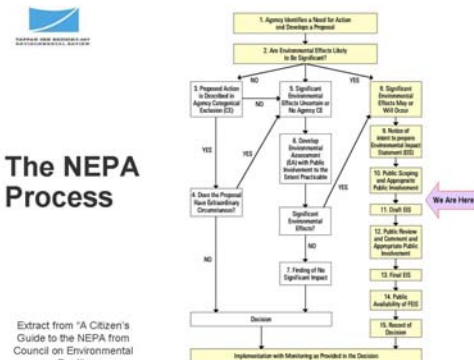


***Stakeholders' Advisory Working Group
Bridge Meeting 8***

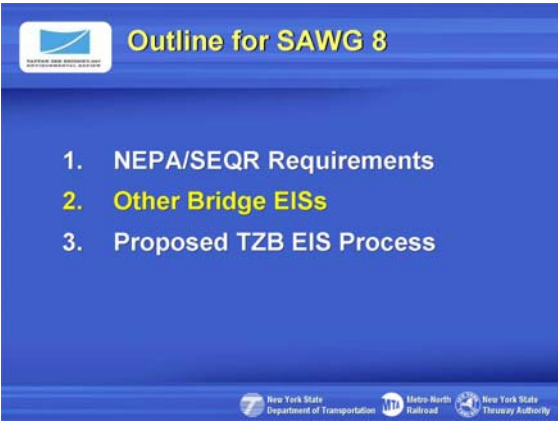
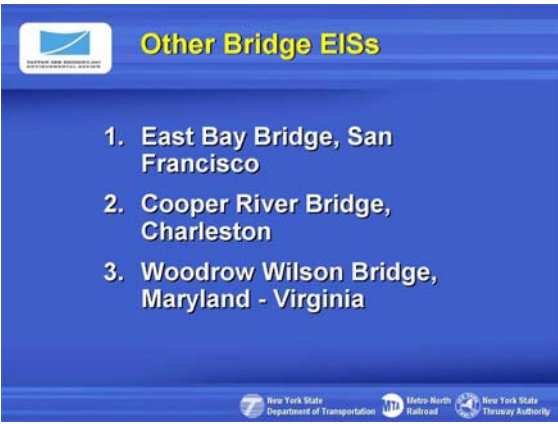

***Tappan Zee Bridge/I-287 Corridor
Environmental Review***



February 26, 2008

	<p>Slide 1</p> <p>Title slide.</p>
	<p>Slide 2</p> <p>Title slide for Part 1 of the presentation outlining NEPA/SEQR requirements.</p>
	<p>Slide 3</p> <p>Congress enacted NEPA in 1969. NEPA established national environmental policy.</p> <p>To implement these policies, NEPA requires agencies to undertake an assessment of the environmental effects of their proposed actions prior to making any decisions.</p>

 <p>The NEPA Process</p> <p>Extract from "A Citizen's Guide to the NEPA from Council on Environmental Quality"</p>	<p>Slide 4</p> <p>This slide shows the NEPA process and is an extract from the NEPA document <i>The Citizens Guide to the NEPA</i> which is available on the web.</p> <p>The TZB/I-287 Environmental Review follows the process highlighted by the yellow boxes on the slide. Currently, we are completing Scoping and commencing the DEIS.</p>
 <p>NEPA Requirements Federal Highway Administration regulations</p> <p>"...Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, State, and local environmental protection goals"</p> <p>22 CFR, Highway Chapter 1, Federal Highway Administration, Department of Transportation, Subchapter H, Right of way and environment, Part 771 - Environmental Impact and Related Procedures</p> <ul style="list-style-type: none"> NEPA document will also meet SEQR requirements <p>New York State Department of Transportation Metro-North Railroad New York State Thruway Authority</p>	<p>Slide 5</p> <p>NEPA requires federal agencies to develop their own regulations and also stipulates that agencies, such as FHWA and FTA, look at various alternative courses of action in a project.</p> <p>If a project satisfies NEPA requirements, it meets the state's SEQR requirements too.</p> <p>Of note in the FHWA NEPA requirements, shown on this slide, the objective is a <i>balanced</i> consideration of efficient and safe transportation and environmental impacts.</p>
 <p>Consideration of Permitting Requirements</p> <p>Federal</p> <ul style="list-style-type: none"> United States Army Corps of Engineers (USACE) Section 404 Clean Water Act Individual Permit USACE Section 10 Rivers and Harbors Act Permit United States Coast Guard (USCG) Section 9 Rivers and Harbors Act - Bridge Permit <p>State</p> <ul style="list-style-type: none"> New York State Department of Environmental Conservation (NYSDEC) ECL Article 25 Tidal Wetlands Permit NYSDEC ECL Article 24 Freshwater Wetlands Permit NYSDEC ECL Article 34 Coastal Erosion Control Permit NYSDEC Section 401, Water Quality Certification NYSDEC SPDES Point Source State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (GP-05-001) NYSDEC Dredging/Disposal Air Quality Permits and Air Quality Conformity New York State Department of State (NYSDOS) Federal Coastal Zone Management 	<p>Slide 6</p> <p>Beyond the requirements of NEPA, there are additional regulatory and permitting requirements. This slide shows many of the different agencies that are involved.</p> <p>The number of agencies and their requirements are extensive and providing sufficient information to these agencies is a major activity during the EIS. The TZB/I-287 Environmental Review has begun to engage these agencies at a preliminary level.</p> <p>The documentation prepared for the EIS also serves to provide the necessary information to these agencies.</p>

 <p>Outline for SAWG 8</p> <ol style="list-style-type: none"> 1. NEPA/SEQR Requirements 2. Other Bridge EISs 3. Proposed TZB EIS Process 	<p>Slide 7</p> <p>Title slide for Part 2 of the presentation.</p> <p>Part 2 looks at the process and environmental considerations of other recently constructed bridges.</p>
 <p>Other Bridge EISs</p> <ol style="list-style-type: none"> 1. East Bay Bridge, San Francisco 2. Cooper River Bridge, Charleston 3. Woodrow Wilson Bridge, Maryland - Virginia 	<p>Slide 8</p> <p>This slide lists the three bridges to be discussed.</p> <p>In each of these three bridge projects, the Alternatives in the DEIS were not associated with bridge type or form but instead the Alternatives with focused on the bridge alignment. Effectively, the EIS considered how the bridge fit into the overall environment.</p> <p>Notably, the final bridge type and form was not determined during the EIS for each of these three bridges but was identified as part of a type selection process, or design competition, after the EIS was completed.</p> <p>Overall, these projects follow the general process outlined in the first Bridge SAWG meeting of May 31, 2007 "<i>Form follows Fit follows Function</i>".</p> <div data-bbox="846 1367 1349 1461">  <pre> graph LR Function([Function]) --> Fit([Fit]) Fit --> Form([Form]) </pre> </div> <p>For the TZB/I287 Environmental Review the first part of this process is complete as the overall functional requirements of the recommended Replacement Bridge were established in the <i>Transit Mode Selection Report</i> which is available on the project website. As recommended in this report the Replacement Bridge will support 8 general purpose lanes, 2 lanes for BRT, 2 CRT tracks and a shared use path for pedestrians and cycles.</p>

<div data-bbox="261 243 337 289" data-label="Image"> </div> <div data-bbox="427 237 711 294" data-label="Section-Header"> <h3>San Francisco – Oakland Bay Bridge</h3> </div> <div data-bbox="274 323 738 445" data-label="Image"> </div> <div data-bbox="274 455 738 590" data-label="Image"> </div> <div data-bbox="341 590 659 606" data-label="Caption"> <p>10 lanes + pedestrian/bicycle path (approx 210 feet total width)</p> </div>	<div data-bbox="820 203 914 233" data-label="Section-Header"> <h4>Slide 9</h4> </div> <div data-bbox="820 249 1385 432" data-label="Text"> <p>This slide shows the Main Spans of the existing and Replacement Bridge for the east spans of the San Francisco Oakland Bay Bridge (SFOBB). The Main Spans are currently under construction and due to be completed in 2013.</p> </div> <div data-bbox="820 449 1370 663" data-label="Text"> <p>Project is similar to TZB in that there are soft soils in the project area and it is not entirely founded on rock. Other similarities include the number of lanes (a total of 10 lanes), the Main Span length, the long Approach Spans, the accommodation of transit and the pedestrian/cycleway.</p> </div> <div data-bbox="820 674 1385 741" data-label="Text"> <p>Overall the east spans of the SFOBB are about 80% of the overall length of the TZB.</p> </div>
<div data-bbox="261 795 337 842" data-label="Image"> </div> <div data-bbox="341 800 756 829" data-label="Section-Header"> <h3>San Francisco – Oakland East Spans</h3> </div> <div data-bbox="240 852 784 1079" data-label="Figure"> </div> <div data-bbox="240 1085 784 1180" data-label="Image"> </div>	<div data-bbox="820 760 930 789" data-label="Section-Header"> <h4>Slide 10</h4> </div> <div data-bbox="820 806 1385 991" data-label="Text"> <p>While the previous slide shows the main spans for the SFOBB it would be a mistake to consider only the Main Spans. The Main Spans only represent one sixth of the overall bridge length. For the TZB the Main Spans represent one eighth of the overall length of the bridge.</p> </div> <div data-bbox="820 1003 1385 1129" data-label="Text"> <p>It is the Approach Spans on each side of the Main Spans that are the bulk of the bridge and it is these spans that warrant close study in the EIS, particularly at the landings and in the river.</p> </div> <div data-bbox="820 1142 1365 1234" data-label="Text"> <p>In bridges with long Approach Spans it is necessary to focus on the Approach Spans to ensure an overall efficient structure.</p> </div> <div data-bbox="820 1249 1321 1314" data-label="Text"> <p>The slide also shows a visualization of the pedestrian/cycleway.</p> </div> <div data-bbox="820 1327 1347 1451" data-label="Text"> <p>The bridge was designed to accommodate commuter rail transit in the future with rail occupying one of the existing highway lanes and shoulder in each direction.</p> </div>

<div data-bbox="261 243 337 289" data-label="Image"> </div> <div data-bbox="342 243 704 275" data-label="Section-Header"> <h2>San Francisco – Oakland Bridge</h2> </div> <div data-bbox="261 315 771 606" data-label="Figure"> </div>	<div data-bbox="820 203 925 233" data-label="Section-Header"> <h3>Slide 11</h3> </div> <div data-bbox="820 249 1364 310" data-label="Text"> <p>This slide shows both a side view and a cross section of the east spans of the SFOBB.</p> </div> <div data-bbox="820 325 1385 541" data-label="Text"> <p>In the side view it is possible to see the profile of the bridge – the profile is the overall grade and elevation of the bridge. Because of the potential for future rail the overall grade on the bridge is shallow and the bridge has a constant grade from the Oakland landing to the Main Spans.</p> </div> <div data-bbox="820 556 1385 800" data-label="Text"> <p>A similar, smooth grade would be needed to accommodate CRT for the Replacement Bridge for the TZB/I287 Environmental Review. This overall profile would differ from that of the current TZB which has a long length that is flat near the Rockland Landing. A preferred overall profile of the Replacement Bridge will need to be established as part of the upcoming DEIS.</p> </div> <div data-bbox="820 814 1385 1058" data-label="Text"> <p>Similarly, it will be necessary to establish the general cross-section of the Replacement Bridge as part of the TZB/I287 Environmental Review. For the SFOBB the existing bridge has two levels with westbound traffic above eastbound traffic. However, the new bridge has only one single level with eastbound and west bound traffic side by side.</p> </div> <div data-bbox="820 1073 1372 1257" data-label="Text"> <p>The SFOBB, used long Approach Spans up to 550 feet between piers. These long spans reduced the number of piers in the water and concentrated the foundation construction requirements at only a few points to limit environmental impacts.</p> </div>
<div data-bbox="261 1329 337 1375" data-label="Image"> </div> <div data-bbox="428 1329 711 1381" data-label="Section-Header"> <h2>San Francisco – Oakland Bay Bridge</h2> </div> <div data-bbox="318 1402 498 1428" data-label="Section-Header"> <h3>EIS Bridge Process</h3> </div> <div data-bbox="318 1430 708 1629" data-label="List-Group"> <ul style="list-style-type: none"> • Scoping: Twelve alternatives, in addition to the No-Build Alternative, were considered during the scoping phase of this project. • Alternatives <ul style="list-style-type: none"> – No-Build Alternative – 1 Retrofit Alternative – 3 Replacement Alternatives </div> <div data-bbox="470 1694 786 1724" data-label="Page-Footer"> <p>New York State Department of Transportation Metro-North Railroad New York State Thruway Authority</p> </div>	<div data-bbox="820 1291 928 1320" data-label="Section-Header"> <h3>Slide 12</h3> </div> <div data-bbox="820 1337 1325 1398" data-label="Text"> <p>This slide provides a summary of the Alternatives from the SFOBB EIS process.</p> </div> <div data-bbox="820 1415 1385 1661" data-label="Text"> <p>The Alternatives for the SFOBB included a Rehabilitation Alternative in the EIS. A Rehabilitation Alternative is not included on the EIS for the TZB/I287 Environmental Review as this alternative was not found to be reasonable for the reasons outlined in the <i>Alternatives Analysis for Rehabilitation and Replacement of the Tappan Zee Bridge Report</i>.</p> </div>

<div data-bbox="237 222 789 638" data-label="Complex-Block">  <h3>San Francisco – Oakland Bay Bridge</h3> <p>EIS Details</p> <ul style="list-style-type: none"> • Each replacement alternative in the EIS differed only in alignment • Design variations were limited to the types of bridge that may be constructed over the navigational channel • Suspension bridge preferred <p><small>New York State Department of Transportation Metro-North Railroad New York State Thruway Authority</small></p> </div>	<p>Slide 13</p> <p>Each of the Replacement Bridge Alternatives differed only in their alignment. All the alternatives assumed the same bridge type(s) which were developed as part of an overall engineering report.</p> <p>Contemporary with the EIS, a Engineering and Design Advisory Panel was created to make recommendations on the technical requirements of the replacement bridge. One of the key recommendations was that two bridge types be progressed to a more detailed design stage to further evaluate technical options.</p> <p>After these studies a preference for a suspension bridge type was included in the FEIS.</p>
<div data-bbox="237 802 789 1218" data-label="Complex-Block">  <h3>San Francisco – Oakland Bay Bridge</h3>  <p><small>New York State Department of Transportation Metro-North Railroad New York State Thruway Authority</small></p> </div>	<p>Slide 14</p> <p>This slide was taken from the Oakland side of the bridge during construction. You can see the existing dual level bridge with the new bridge piers for the new bridge on the right.</p> <p>The area on bottom left was used as a construction staging area during construction. A similar construction staging area would be needed for a Replacement Bridge as part of the TZB/I287 Environmental Review. Because of the lack of space at the landings a temporary platform may be necessary in the river.</p>
<div data-bbox="237 1327 789 1743" data-label="Complex-Block">  <h3>San Francisco – Oakland Bay Bridge</h3>  </div>	<p>Slide 15</p> <p>This photo (right) shows a hammer used for driving foundation piles. The piles are large steel tubes with diameters up to 8-feet.</p> <p>The foundations for the SFOBB used large diameters in association with the long spans. To confirm pile capacities and to test noise levels a series of test piles were constructed in advance of the main construction. These tests confirmed the capacities of the piles and resulted in the introduction of special noise and vibration control measures.</p> <p>Pile capacity and construction noise are issues to be examined in the DEIS for the TZB/I287 Environmental Review.</p>



Slide 16

This image gives a good impression of the size of the foundation pile. The construction worker stands beside an 8-foot diameter section.

In the studies to date for the TZB/I287 Environmental Review a 4-foot diameter steel pile has been used. However, further engineering studies remain to be completed to determine if a larger pile size but reduced number of piles would be possible or advantageous.



Slide 17

This image shows the methodology used for the SFOBB to control noise and vibration during the installation of the pile foundations.

The method uses bubbles of air around the foundation components to reduce noise and vibration.


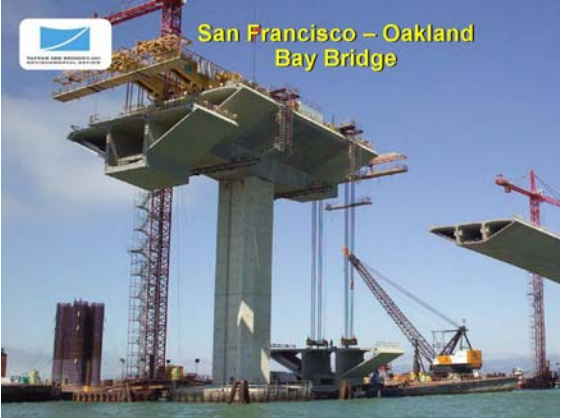

The image shows the actual rig used during construction.



Slide 18





This slide is one of four that shows how the construction of the bridge advanced. In this slide the piles have been installed and the pilecap that holds the piles together is under construction. Note the number of vessels in the river necessary to support construction.


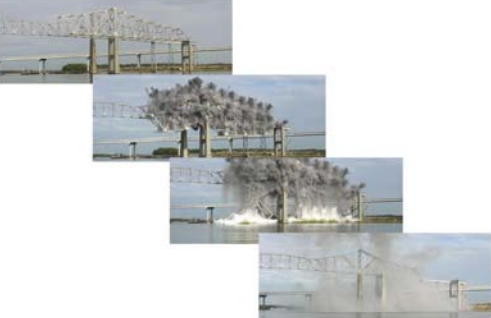




The impacts of these types of construction vessels to the river and aquatic life is to be considered in the TZB/I287 Environmental Review.

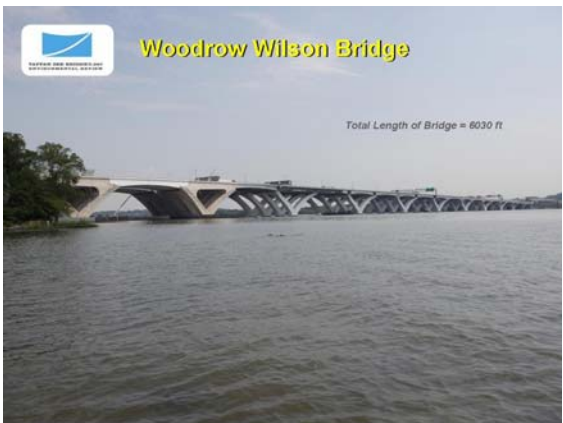
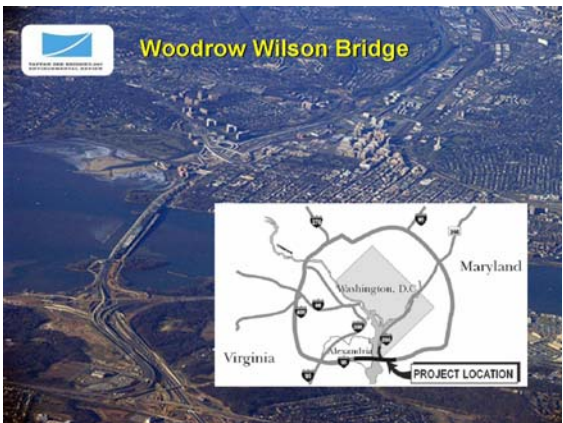

	<p>Slide 19</p> <p>This image, the second of four construction sequence images shows the construction of a pier above the pilecap. For the SFOBB the piers were concrete and were cast-in-place. In many other modern bridges pre-fabrication of the piers offsite is used to limit the period of construction on site and possible environmental impacts.</p>
	<p>Slide 20</p> <p>This image, the third of four, shows the construction of the superstructure above the piers. For the SFOBB, the superstructure was pre-fabricated offsite and brought in sections to the bridge by barge.</p> <p>Once at the site, each superstructure segment was lifted into position and tensioned against the previous segment. This process results in very quick construction of the bridge and reduces the overall construction duration.</p>
	<p>Slide 21</p> <p>This slide, the last in a series of four, shows an aerial view of the nearly constructed Approach Spans. As can be seen the new bridge is formed of two parallel structures which are wider than the existing bridge.</p> <p>The wider structure results in an increase in the shadow area and has implications for aquatic life. Studies assessing the implications to aquatic life will be part of the TZB/I287 Environmental Review.</p> <p>On the right, there is a rendering of the shared use path for cyclists and pedestrians, and of the construction staging area that is located miles away from the bridge construction.</p>





<div data-bbox="261 243 337 289" data-label="Image"> </div> <div data-bbox="347 247 716 279" data-label="Section-Header"> <h3>Cooper River Bridge, Charleston</h3> </div> <div data-bbox="235 333 792 558" data-label="Image"> </div> <div data-bbox="362 560 626 577" data-label="Text"> <p>8 lanes + pedestrian/bicycle path (145 ft total width)</p> </div>	<div data-bbox="818 203 930 233" data-label="Section-Header"> <h4>Slide 22</h4> </div> <div data-bbox="818 249 1380 373" data-label="Text"> <p>The next bridge to be looked at is the Cooper River Bridge in Charleston, South Carolina. Its EIS was published in 1992 and the FEIS in 1993. The bridge was opened in 2005.</p> </div> <div data-bbox="818 388 1380 510" data-label="Text"> <p>Similar to the SFOBB, the Cooper River Bridge had Main Spans and long Approach Spans. In the case of the Cooper River Bridge, a Cable-Stay type bridge is used for the Main Span.</p> </div> <div data-bbox="818 525 1331 617" data-label="Text"> <p>Distinct from the SFOBB which used long spans for the Approach Spans, the Cooper River Bridge used a series of short spans.</p> </div> <div data-bbox="818 632 1385 753" data-label="Text"> <p>For the Replacement Bridge Alternatives in the TZB/I287 Environmental Review, both long and short spans for the Approach Spans are to be considered.</p> </div>
<div data-bbox="261 846 337 892" data-label="Image"> </div> <div data-bbox="363 846 732 875" data-label="Section-Header"> <h3>Cooper River Bridge, Charleston</h3> </div> <div data-bbox="454 890 579 907" data-label="Text"> <p>Total Length 13200 feet</p> </div> <div data-bbox="235 915 792 1239" data-label="Image"> </div>	<div data-bbox="818 804 930 833" data-label="Section-Header"> <h4>Slide 23</h4> </div> <div data-bbox="818 865 1380 987" data-label="Text"> <p>The total project was 2.5 miles long. The project was more than just a new bridge; it also included major highway interchanges on both ends.</p> </div> <div data-bbox="818 1016 1380 1081" data-label="Text"> <p>For reference, the main span of the bridge was located immediately to the right of Drum Island.</p> </div>
<div data-bbox="261 1371 337 1417" data-label="Image"> </div> <div data-bbox="363 1371 732 1400" data-label="Section-Header"> <h3>Cooper River Bridge, Charleston</h3> </div> <div data-bbox="290 1444 487 1472" data-label="Section-Header"> <h4>EIS Documentation</h4> </div> <div data-bbox="290 1472 742 1543" data-label="List-Group"> <ul style="list-style-type: none"> • Technical report on bridge arrangement, rehabilitation, tunnel, bikeway and walkway, transit, bridge type </div> <div data-bbox="290 1560 454 1587" data-label="Section-Header"> <h4>EIS Alternatives</h4> </div> <div data-bbox="290 1587 685 1711" data-label="List-Group"> <ul style="list-style-type: none"> • No Build • Replacement bridge in existing Grace/Pearman Corridor • Replacement bridge in Newmarket Corridor </div> <div data-bbox="469 1732 792 1764" data-label="Page-Footer"> <p>New York State Department of Transportation Metro-North Railroad New York State Thruway Authority</p> </div>	<div data-bbox="818 1329 930 1358" data-label="Section-Header"> <h4>Slide 24</h4> </div> <div data-bbox="818 1390 1372 1482" data-label="Text"> <p>The EIS established basic requirements of the bridge and identified engineering needs and design criteria.</p> </div> <div data-bbox="818 1512 1330 1606" data-label="Text"> <p>Alternatives centered on what alignment to use, as that would be the driving force in identifying impacts.</p> </div> <div data-bbox="818 1633 1364 1726" data-label="Text"> <p>Similar to the SFOBB, a technical report was prepared to establish the primary engineering components of the bridge.</p> </div>

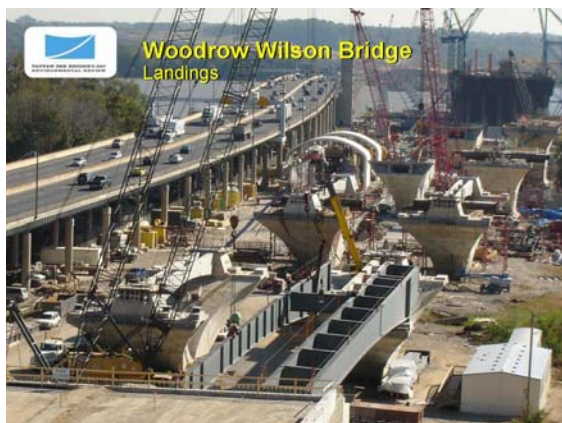
<div data-bbox="256 239 347 296" data-label="Image"> </div> <div data-bbox="363 243 732 275" data-label="Section-Header"> <h3>Cooper River Bridge, Charleston</h3> </div> <div data-bbox="292 319 347 344" data-label="Section-Header"> <h4>EIS :</h4> </div> <div data-bbox="292 346 686 428" data-label="List-Group"> <ul style="list-style-type: none"> • Cable stayed bridge type preferred • H tower preferred • Transit and Ped/Cycleway options </div> <div data-bbox="292 443 393 468" data-label="Section-Header"> <h4>After EIS:</h4> </div> <div data-bbox="292 470 693 546" data-label="List-Group"> <ul style="list-style-type: none"> • New outreach process resulted in a diamond tower • Parallel design/build procurement </div> <div data-bbox="470 606 786 636" data-label="Image"> </div>	<div data-bbox="820 203 928 231" data-label="Section-Header"> <h4>Slide 25</h4> </div> <div data-bbox="820 249 1369 371" data-label="Text"> <p>Initially, a cable stayed bridge using an H-type tower was preferred in the EIS because of the design's reputation as simple, cheap and modern.</p> </div> <div data-bbox="820 388 1377 510" data-label="Text"> <p>However, after the EIS, further development of the bridge type instigated by the local communities resulted in the adoption of a diamond shaped tower.</p> </div>
<div data-bbox="272 766 347 823" data-label="Image"> </div> <div data-bbox="352 762 721 810" data-label="Section-Header"> <h3>Cooper River Bridge, Charleston EIS Recommended Bridge</h3> </div> <div data-bbox="276 829 665 1121" data-label="Image"> </div> <div data-bbox="675 875 774 1058" data-label="Image"> </div> <div data-bbox="324 1125 634 1150" data-label="Caption"> <p>Photo 15 Aerial view of the project area depicting the replacement bridge prior to the demolition of the existing bridges. Mount Pleasant is in the foreground.</p> </div>	<div data-bbox="820 728 928 756" data-label="Section-Header"> <h4>Slide 26</h4> </div> <div data-bbox="820 774 1378 898" data-label="Text"> <p>This slide shows the new roadway structure as it parallels the old. In the larger image, extracted from the original EIS document, the H type tower is just visible.</p> </div> <div data-bbox="820 913 1372 974" data-label="Text"> <p>The diamond style tower, on the right, was the final tower type adopted.</p> </div>
<div data-bbox="256 1291 347 1348" data-label="Image"> </div> <div data-bbox="352 1297 714 1329" data-label="Section-Header"> <h3>Cooper River Bridge, Charleston</h3> </div> <div data-bbox="235 1270 792 1690" data-label="Image"> </div>	<div data-bbox="820 1253 928 1281" data-label="Section-Header"> <h4>Slide 27</h4> </div> <div data-bbox="820 1299 1380 1453" data-label="Text"> <p>Though the Main Spans of a new bridge are typically the subject of much attention, they are only a small part of the overall bridge. As shown in the two images here, the overall bridge is much more than the Main Spans.</p> </div> <div data-bbox="820 1467 1385 1560" data-label="Text"> <p>These views in particular highlight the extent of the bridge construction at the landings and how the bridge fits into the shore environment.</p> </div> <div data-bbox="820 1575 1378 1728" data-label="Text"> <p>One of the most important initial areas of study for the TZB/1287 Environmental Review is to examine how a replacement bridge fits into the existing highway right-of-way boundaries at both the Rockland and Westchester landings.</p> </div>

<p> Cooper River Bridge, Charleston Foundation Construction</p> 	<p>Slide 28</p> <p>These pictures show the bridge's foundation construction for the Cooper River Bridge. All the images show the construction of the foundations for the diamond towers.</p> <p>Surrounding the towers is an artificial island made up of fill material. This island was necessary to prevent errant ships from colliding with the piers. The need and implications for the island were a major area of study during the EIS and design process.</p> <p>For the Replacement Bridge in the TZB/I287 Environmental Review measures that provide protection against ship collision will also be necessary. While an artificial island is not likely for the TZB additional structures surrounding the piers are likely to deflect impacts. The environmental implications of these structures will be evaluated as part of the EIS.</p>
<p> Cooper River Bridge, Charleston Pier Protection and Temp Platforms</p> 	<p>Slide 29</p> <p>The photo on the left shows the completed artificial island for the Cooper River Bridge.</p> <p>This image also shows part of the existing bridge being demolished and debris falling into the river. This is an environmental impact and would not be allowed for the TZB.</p> <p>The second image shows the short Approach Spans for the Cooper River Bridge as well as a temporary platform that was built to access the piers for construction. It is likely that a temporary pier would also be required as part of the replacement for the TZB.</p>

<p> Cooper River Bridge, Charleston Removal of Existing Bridge</p> 	<p>Slide 30</p> <p>This slide shows the explosive demolition method used for removal of the Main Spans of the old Cooper River Bridge. This type of demolition is unlikely for the TZB because of the resulting impacts to the river and possible impacts to aquatic life.</p> <p>However, as part of the TZB/I287 Environmental Review, the method of demolition has to be studied.</p>
<p> Cooper River Bridge, Charleston Lighting</p> 	<p>Slide 31</p> <p>This slide shows the final and proposed lighting arrangement for the Main Spans of the Cooper River Bridge.</p> <p>As part of the development of the bridge details after the EIS, lighting was the subject of significant discussions in the outreach process.</p> <p>Though a final lighting design would not be available for a Replacement Bridge as part of the TAB/I287 Environmental Review, environmental impacts associated with lighting will be assessed as part of the EIS.</p>
<p> Cooper River Bridge, Charleston Driver Experience</p> 	<p>Slide 32</p> <p>This image shows the final Cooper River bridge from the view point of the driver while the inset image shows a detail of the pedestrian/cycleway around the pier.</p> <p>In the future stages of the development of a possible Replacement Bridge as part of the TZB/I287 Environmental Review, the views of all users from the bridge need to be considered, not just the views towards the bridge.</p>

	<p>Slide 33</p> <p>The Woodrow Wilson Bridge carries I-95/495 over the Potomac River in Washington, DC. The EIS was completed over a long period of time, from 1989 to 2000. The bridge opened in 2008.</p> <p>Unlike the previous two bridge examples, this bridge does not have a long Main Span with towers that reach above the deck. Instead the Woodrow Wilson Bridge has a bascule span that opens to allow ships to pass.</p>
	<p>Slide 34</p> <p>The full length of this project is 2 miles. In addition to the bridge, there are new interchange connections on both sides.</p>
	<p>Slide 35</p> <p>This is a plan view of the location of the bridge. The navigation channel is near the Alexandria, Virginia side of the bridge on the left. As can be seen the bridge is wider than that existing and there are impacts to properties at the landing.</p> <p>Unlike the TZB, the width between the highway right-of-way boundaries was insufficient for the width of the new bridge and some properties were displaced.</p>

 <h3>Woodrow Wilson Bridge</h3> <p><u>During EIS</u></p> <ul style="list-style-type: none"> • Alternatives <ul style="list-style-type: none"> – Low level bridge with bascule span – High level bridge – Tunnel • Major concern about bridge aesthetics <p><small>New York State Department of Transportation Metro-North Railroad New York State Thruway Authority</small></p>	<p>Slide 36</p> <p>Because of the close proximity of properties to the end of the bridge and also the close proximity of the shipping channel to one of the landings, the height of the bridge was a major concern. The higher the bridge the longer and larger the landing length required.</p> <p>As seen from the list of Alternatives the height of the bridge was the major differentiator between the Alternatives included in the EIS.</p> <p>The preferred Alternative resulting from the EIS was the low level bridge. This achieved a balance of shipping accommodation and function while not compromising community impact.</p>
 <h3>Woodrow Wilson Bridge</h3> <p><u>After EIS</u></p> <ul style="list-style-type: none"> • Bridge Design Competition was completed in November 1998 • Four firms submitted a total of seven concepts • A jury comprised of individuals from a variety of disciplines selected a winning concept <p><small>New York State Department of Transportation Metro-North Railroad New York State Thruway Authority</small></p>	<p>Slide 37</p> <p>It was not until after the EIS that the form of the bridge was determined. The process utilized a design competition and a continuing public outreach process to identify the final bridge form.</p>
 <h3>Woodrow Wilson Bridge Construction Sequence</h3> 	<p>Slide 38</p> <p>These images show the overall construction sequence for the Woodrow Wilson Bridge. The order of construction is piles, foundations, pilecaps, piers and then the deck.</p> <p>For the TZB/I287 Environmental Review the overall construction sequence and construction duration will be studied. In particular, the interaction of construction with aquatic life needs to be understood.</p>



Slide 39

This slide shows the construction of the Woodrow Wilson Bridge at one of the landings. The image shows the existing highway in operation and construction of the full width of the replacement bridge.

This differs from the likely construction sequence for the Replacement Bridge as part of the TZB/I287 Environmental Review, for which only one half of the new bridge would be constructed at the landings at any one time.



Slide 40

This image again shows the new Woodrow Wilson Bridge at one of the landings. The new bridge is at a higher elevation than that of the existing bridge.

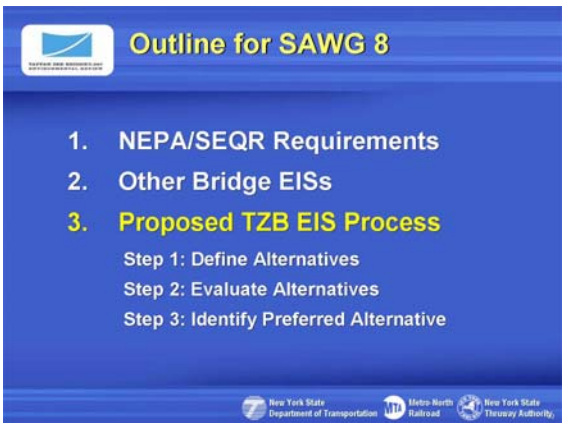
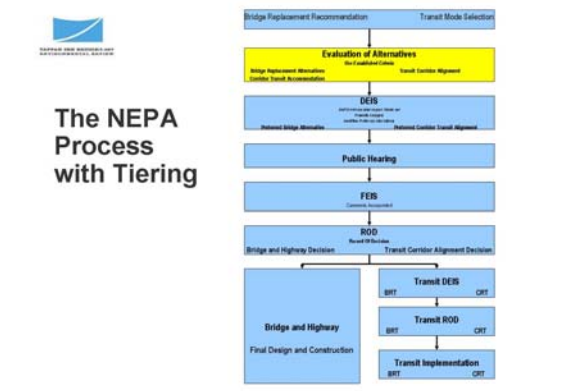
A similar condition may occur at the landings for the Replacement Bridge as part of the TZB/I287 Environmental Review depending on the depth of the deck structure, river clearances and the positioning of CRT on the bridge. As part of the initial studies in the EIS it is necessary to understand the possible range of bridge arrangements to fully quantify possible impacts.




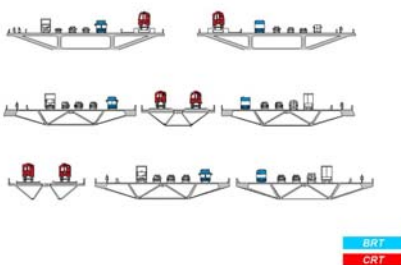

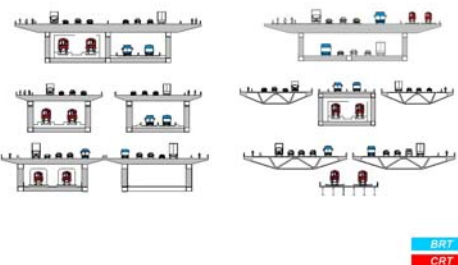
Slide 41



This slide shows the locations of the environmental mitigation measures undertaken as part of the Woodrow Wilson Bridge reconstruction.

The environmental measures are located at some distance from the site of the bridge construction and include the creation of new wetlands, a new bald eagle sanctuary and a new fish reef off of the Chesapeake Bay. Similar environmental mitigation measures may be necessary as part of the TZB/I287 Environmental Review.

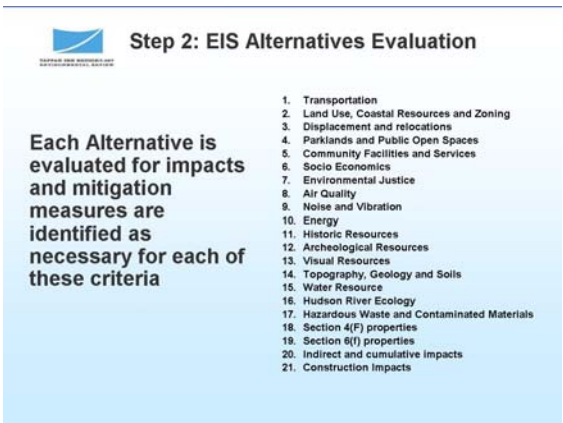


 <p>Outline for SAWG 8</p> <ol style="list-style-type: none"> 1. NEPA/SEQR Requirements 2. Other Bridge EISs 3. Proposed TZB EIS Process <ul style="list-style-type: none"> Step 1: Define Alternatives Step 2: Evaluate Alternatives Step 3: Identify Preferred Alternative <p>New York State Department of Transportation Metro-North Railroad New York State Thruway Authority</p>	<p>Slide 42</p> <p>Title slide for Part 3 of the presentation.</p> <p>Having considered in Part 2 how other large projects developed Part 3 looks at the proposed process for the Replacement Bridge in the TZB/I287 Environmental Review.</p> <p>Overall a three step process is planned.</p>
 <p>The NEPA Process with Tiering</p> <pre> graph TD A[Bridge Replacement Recommendation Transit Mode Selection] --> B[Evaluation of Alternatives BRT / Guided Busway Transit Corridor Alignment] B --> C[DEIS BRT / Guided Busway Transit Corridor Alignment] C --> D[Public Hearing] D --> E[FEIS Guided Busway] E --> F[ROD BRT / Guided Busway Transit Corridor Alignment] F --> G[BRT / Guided Busway Transit Corridor Alignment] F --> H[Transit DEIS BRT / Guided Busway Transit Corridor Alignment] H --> I[Transit ROD BRT / Guided Busway Transit Corridor Alignment] I --> J[Transit Implementation BRT / Guided Busway Transit Corridor Alignment] G --> K[Bridge and Highway Final Design and Construction] </pre>	<p>Slide 43</p> <p>Before outlining the three steps, this slide outlines the overall process for the Replacement Bridge within the overall tiered EIS.</p> <p>The study is currently completing Scoping and the yellow box entitled <i>Evaluation of Alternatives</i> indicates where we are in the overall process. We are commencing the DEIS which will be followed by a Public Hearing, FEIS and Record of Decision (ROD). After the ROD, final design and construction would commence for the Bridge and Highway work.</p> <p>Final design and construction of the Transit components across the corridor would commence only after a further Transit EIS and ROD.</p>


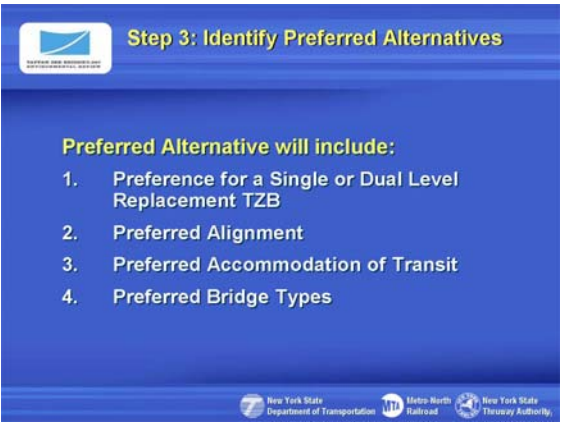
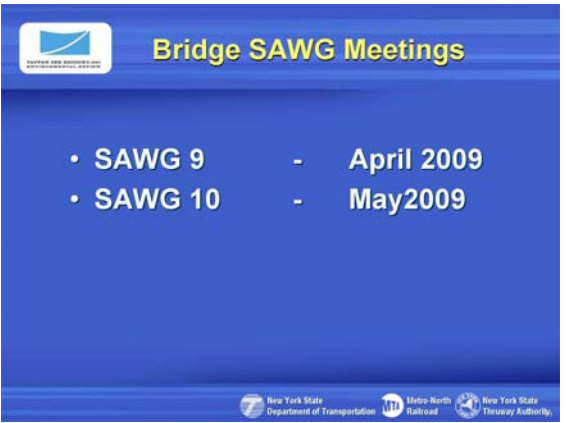
<div data-bbox="272 241 349 283"> </div> <div data-bbox="370 249 766 277" data-label="Section-Header"> <h3>DEIS Process for Replacement TZB</h3> </div> <div data-bbox="363 338 693 552"> <pre> graph TD S1[Step 1: Define Bridge Alternatives 1. Single Level Replacement 2. Dual Level Replacement] --> S2[Step 2: Evaluate Alternatives] S2 --> S3[Step 3: Identify Preferred Alternative] RA[Regulatory Agencies And Public Collaboration] --> S1 RA --> S2 RA --> S3 </pre> </div>	<div data-bbox="820 205 928 233" data-label="Section-Header"> <h4>Slide 44</h4> </div> <div data-bbox="820 252 1380 342" data-label="Text"> <p>This slide shows the three steps anticipated for the development of the Replacement Bridge Alternatives.</p> </div> <div data-bbox="820 359 1385 693" data-label="Text"> <p>Step 1 starts with defining the alternatives beyond the simple titles of Single Level or Dual Level that resulted from the <i>Alternatives Analysis of Rehabilitation and Replacement of the Tappan Zee Bridge Report</i>. In this step the possible alignments, profiles and cross-section of the bridge would be developed and typical foundations and bridge types would be identified. This step would conclude with the detailed description of the bridge alternatives in a technical report.</p> </div> <div data-bbox="820 707 1369 861" data-label="Text"> <p>In Step 2 the Bridge Alternatives would be evaluated to identify impacts and any mitigation that may be necessary. The details of this evaluation would form the heart of the EIS document for the Bridge.</p> </div> <div data-bbox="820 875 1373 936" data-label="Text"> <p>In Step 3 a preferred Alternative for the Bridge would be determined.</p> </div>
<div data-bbox="272 1081 349 1123"> </div> <div data-bbox="350 1081 693 1108" data-label="Section-Header"> <h3>Replacement TZB Alternatives</h3> </div> <div data-bbox="303 1159 735 1457"> </div>	<div data-bbox="820 1045 928 1073" data-label="Section-Header"> <h4>Slide 45</h4> </div> <div data-bbox="820 1075 1380 1287" data-label="Text"> <p>This slide shows the Bridge Alternatives resulting from the <i>Alternatives Analysis of Rehabilitation and Replacement of the Tappan Zee Bridge Report</i>. In this report two Alternatives were determined to be reasonable and recommended for inclusion in the EIS. These were:</p> </div> <div data-bbox="865 1287 1339 1350" data-label="List-Group"> <ol style="list-style-type: none"> 1. A Single Level Replacement bridge 2. A Dual Level Replacement bridge </div> <div data-bbox="820 1365 1385 1579" data-label="Text"> <p>The referenced report highlighted that the bridge arrangements (cross-section) developed for these Alternatives were representative and that further assessment of the possible bridge arrangements was warranted in the DEIS. This further assessment would be completed during Step 1.</p> </div>

<p> Possible Single Level Arrangements</p> 	<p>Slide 46</p> <p>This slide shows a range of possible of arrangements for the Replacement Bridge in the Single Level Alternative to be considered as part of Step 1.</p>
<p> Possible Dual Level Arrangements</p> 	<p>Slide 47</p> <p>This slide shows a range of possible of arrangements for the Replacement Bridge in the Dual Level Alternative to be considered as part of Step 1.</p>

 <p>Step 1: Define TZB Alternatives</p> <p>Alternatives Considerations</p> <ol style="list-style-type: none"> 1. Alignment issues 2. Accommodation of transit 3. Bridge type and form screening 4. Flexibility to allow construction and design innovation <p>New York State Department of Transportation, Metro-North Railroad, New York State Thruway Authority</p>	<p>Slide 48</p> <p>This slide lists the specific issues to be considered as part of the Step 1 technical report. This includes the following:</p> <ul style="list-style-type: none"> • Various alignments for the bridge will be considered • Where to position CRT and BRT within the bridge cross-section will be considered • Bridge types and forms that are not technically suitable will be identified • A range of practical foundation types, span lengths will be established <p>Notably, rather than identifying for example only one foundation type, the technical report will present a range of practical foundation types to be evaluated in the EIS. By keeping a range of foundation types, the designers and contactors that will be responsible for construction of the Replacement Bridge would have the greatest flexibility.</p>
 <p>Possible Alignment Issues</p> <ol style="list-style-type: none"> 1. Toll Plaza 2. Separation between existing and replacement structure 3. Landing ROW 4. Bike/pedestrian alignment/accommodation 	<p>Slide 49</p> <p>This slide lists some of the specific issues to be addressed to establish the overall alignment of the bridge to fully understand the potential impacts.</p> <p>Key in this list is the existing landing right-of-way as it is one of the goals and objectives of the TZB/I287 Environmental Review to eliminated and/or minimize impacts.</p>

<div data-bbox="272 241 349 283" data-label="Image"> </div> <h3 data-bbox="365 241 665 268">Accommodation of Transit</h3> <ol data-bbox="279 325 527 567" style="list-style-type: none"> 1. Arrangement of BRT and CRT on bridge 2. Transit alignment <ul style="list-style-type: none"> • Near station location • Hudson line connection • Future allowance for cross-corridor 3. Operational issues <ul style="list-style-type: none"> • Service road requirements • Freight accommodation <div data-bbox="527 346 755 556" data-label="Image"> </div>	<h3 data-bbox="824 205 928 233">Slide 50</h3> <p data-bbox="824 283 1385 373">This slide lists some of the specific issues to be addressed to optimize the accommodation of transit.</p> <p data-bbox="824 388 1385 541">In particular, the positioning of transit on a Replacement Bridge is greatly affected by any stations or other facilities at the landings, grade limitations and the need to connect CRT to the existing Hudson Line.</p> <p data-bbox="824 556 1385 619">All of these issues would be addressed during Step 1.</p>
<div data-bbox="272 766 349 808" data-label="Image"> </div> <h3 data-bbox="365 766 609 808">Bridge Type and Form</h3> <p data-bbox="381 808 673 829">(Beam, truss, arch, suspension, cable-stay)</p> <ol data-bbox="503 924 738 1050" style="list-style-type: none"> 1. Approach type 2. Main span type 3. Screening of types 4. Concrete or steel <div data-bbox="235 745 787 1165" data-label="Image"> </div>	<h3 data-bbox="824 730 928 758">Slide 51</h3> <p data-bbox="824 777 1385 867">As part of the DEIS process is intended that a final bridge type or form will be identified as impacts are common to many bridge types.</p> <p data-bbox="824 882 1385 1008">Instead, the DEIS documentation would identify those bridge types that are not practical and may warrant exclusion in subsequent design phases.</p> <p data-bbox="824 1022 1385 1085">Different bridge types would be considered for the Approach Spans and the Main Spans.</p>
<div data-bbox="272 1291 349 1333" data-label="Image"> </div> <h3 data-bbox="365 1291 609 1333">Bridge Type and Form</h3> <div data-bbox="251 1344 755 1627" data-label="Image"> </div>	<h3 data-bbox="824 1255 928 1283">Slide 52</h3> <p data-bbox="824 1312 1385 1438">This slide shows the five general types of bridges that will be considered. The five types are included in this meeting to ensure that we all have the same terminology.</p>

 <p>Step 2: EIS Alternatives Evaluation</p> <p>Each Alternative is evaluated for impacts and mitigation measures are identified as necessary for each of these criteria</p> <ol style="list-style-type: none"> 1. Transportation 2. Land Use, Coastal Resources and Zoning 3. Displacement and relocations 4. Parklands and Public Open Spaces 5. Community Facilities and Services 6. Socio Economics 7. Environmental Justice 8. Air Quality 9. Noise and Vibration 10. Energy 11. Historic Resources 12. Archeological Resources 13. Visual Resources 14. Topography, Geology and Soils 15. Water Resource 16. Hudson River Ecology 17. Hazardous Waste and Contaminated Materials 18. Section 4(F) properties 19. Section 6(f) properties 20. Indirect and cumulative impacts 21. Construction Impacts 	<p>Slide 53</p> <p>This slide lists the 21 technical subjects that form the basis of the evaluation of the Replacement Bridge Alternatives in Step 2. Each subject corresponds to a specific chapter in the EIS report.</p> <p>Each of the Replacement Bridge Alternatives will be evaluated for each of these criteria and the associated impacts and mitigation measures will be identified and will be outlined at future Bridge SAWG meetings.</p>
 <p>Where are the Possible Impacts to the Hudson River</p>	<p>Slide 54</p> <p>This slide shows the overall Hudson River at the existing TZB. The slide is a reminder of what an asset the river is and how we must conduct our evaluations in sufficient detail to fully understand any impacts.</p> <p>To support the evaluations, many baseline studies of the river aquatic life have been prepared. This includes a fish survey as well as much sediment testing. The results from these and other baseline studies will inform the evaluation process.</p> <ul style="list-style-type: none"> •
 <p>Where are the Possible Impacts in Nyack</p> <p>View from South Broadway Bridge looking east</p>	<p>Slide 55</p> <p>This slide shows a view of the highway at the Nyack shore. This is an area to focus on in future meetings.</p>

 <p>Where are the Possible Impacts in Tarrytown</p> <p>View from Broadway Bridge looking west</p>	<p>Slide 56</p> <p>This slide shows an aerial view of the Tarrytown shore. This is an area to focus on in future meetings.</p>
 <p>Step 3: Identify Preferred Alternatives</p> <p>Preferred Alternative will include:</p> <ol style="list-style-type: none"> 1. Preference for a Single or Dual Level Replacement TZB 2. Preferred Alignment 3. Preferred Accommodation of Transit 4. Preferred Bridge Types 	<p>Slide 57</p> <p>This slide lists the anticipated recommendations from the EIS process for the Replacement Bridge in Step 3.</p> <p>Primarily it is anticipated that the process will result in a recommendation for a Single or a Dual Level Replacement Bridge. This would included a recommendation on a preferred alignment and on the accommodation of transit (where is it in the cross-section).</p> <p>A single preferred bridge type would not be identified but instead all bridge types that are practical would be listed.</p>
 <p>Bridge SAWG Meetings</p> <ul style="list-style-type: none"> • SAWG 9 - April 2009 • SAWG 10 - May 2009 	<p>Slide 58</p> <p>These are proposed dates for future bridge SAWG meetings.</p>