

3 TZB Rehabilitation Options

3.1 Introduction

This chapter describes possible options that rehabilitate and enhance the existing TZB. Four Rehabilitation Options have been developed:

- **Rehabilitation Option 1** - Provides a replacement Causeway and rehabilitated Main Spans
- **Rehabilitation Option 2** - Provides a replacement Causeway and widened Main Spans
- **Rehabilitation Option 3** - Provides a replacement Causeway, rehabilitated Main Spans and a single level Supplemental Bridge
- **Rehabilitation Option 4** - Provides a replacement Causeway, rehabilitated Main Spans and a dual level Supplemental Bridge

All the Rehabilitation Options include the entire replacement of the existing Causeway due to the extent of work required to bring it to an acceptable condition and satisfy structural performance requirements. Full justification of this is provided in Chapter 2.5.

See Appendix C for detailed drawings of the four Rehabilitation Options.

3.2 Rehabilitation Option 1

This chapter outlines the details of Rehabilitation Option 1 for the TZB. The purpose of this option is to provide a minimum build scenario that rehabilitates the strength and condition of the TZB to required levels.

Specific components include:

- **Causeway** - Existing Causeway replaced by two parallel structures, each carrying four general purpose traffic lanes with full size shoulders
- **West Deck Trusses** - Existing structure widened to temporarily carry traffic during connection with replaced Causeway. Existing traffic arrangement maintained in the final configuration
- **Existing Main Spans** - Existing span rehabilitated and the existing traffic arrangement maintained (seven lanes with movable barrier and no shoulders)
- **East Deck Trusses** - Existing structure rehabilitated and the existing traffic arrangement maintained
- **Pedestrian and Bicycle Path** - One path to be provided on the north or south side of the TZB

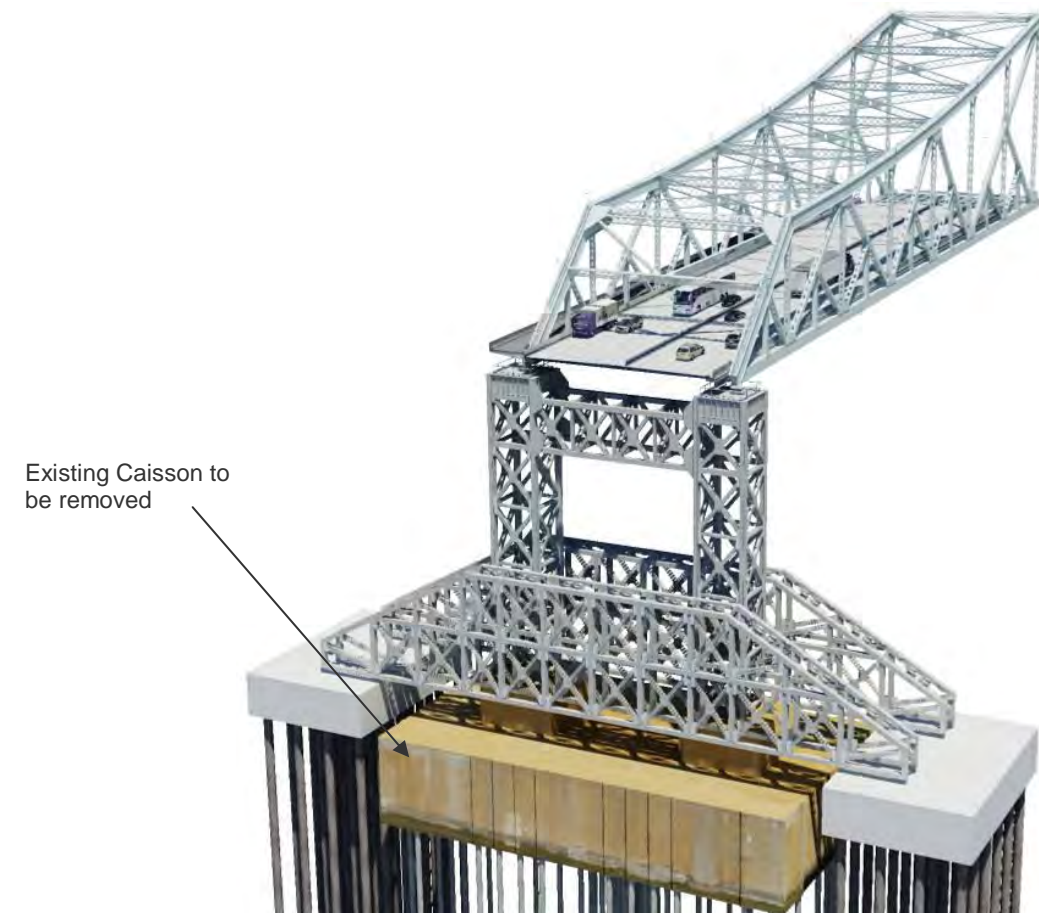
No specific provision for transit is included in Rehabilitation Option 1, although bus services could continue to use the general traffic lanes as they currently do. Figures 3-1 and 3-2 (page 14) demonstrate the layout of Rehabilitation Option 1.

3.2.1 Rockland Landing

The replacement Causeway (170 feet wide) would be significantly wider than the existing Causeway (91 feet wide). This extra width would require existing maintenance access ramps, retaining walls, noise walls, etc. to be relocated to provide space for the new highway. This work can be accommodated within the existing 250-foot wide right-of-way (ROW).

Interchange 10 and South Broadway Bridge are not affected by the work associated with Rehabilitation Option 1.

A combined Pedestrian and Bicycle Path is included on the north side of the rehabilitated TZB with an access ramp to River Road at a location chosen to avoid direct impacts on properties.



Rehabilitation Option 1

Same as existing TZB but with a new Causeway

7 General purpose lanes
One reversible lane as existing
1 Pedestrian and Bicycle path

Figure 3-1

Rehabilitation Option 1

NYSTA Maintenance Facility

The NYSTA requires that the current direct access between its Dockside Maintenance Facility on River Road and the TZB be maintained in all options for the rehabilitation or replacement of the TZB.

In Rehabilitation Option 1, two ramps are provided. One ramp would be an eastbound exit ramp from the eastbound travel way to River Road. The second ramp would be a westbound access ramp from River Road to the westbound travel way. Unfortunately, it is not possible to maintain facilities for westbound NYSTA maintenance vehicles to exit, and eastbound vehicles to enter the Thruway at the Rockland landing of the crossing without significant property acquisitions. As a result, these ingress and egress needs could only be satisfied by using Interchange 10.

The widened Thruway would require the existing Rockland garage for the movable barrier machine to be removed and a new storage location provided on the modified TZB Causeway.

Noise Walls

Currently, noise walls are located adjacent to the westbound Thruway lanes extending from the TZB to Interchange 11. As part of the construction associated with the possible rehabilitated TZB, a portion of these noise walls would be relocated between Interchange 10 and the abutment at River Road.

Although noise walls are not currently present adjacent to the eastbound Thruway lanes near the TZB landing, further assessment of the future traffic and associated noise levels to be reported in the DEIS will more accurately address whether noise walls will be required.

3.2.2 Existing TZB Rehabilitation

Causeway

The existing Causeway would be replaced by a new Causeway consisting of two parallel structures:

- A 76-foot wide eastbound Causeway containing four 12-foot wide highway lanes and two 12-foot wide shoulders.
- A 93-foot wide westbound Causeway containing four 12-foot wide highway lanes, two 12-foot wide shoulders and a 15-foot wide Pedestrian and Bicycle Path on the north side.

Both Causeways would be constructed approximately 70 feet north of the existing Causeway, which would be demolished following completion of the replacement Causeways.

The replacement Causeways would be generally constructed 30 feet apart, except at the Rockland Landing and where the Causeway connects to the existing West Deck Truss where they would necessarily come together.

The replacement Causeways would follow a similar vertical profile to the existing Causeway and retain the same ascending grade of 3% as the existing TZB. The replacement Causeway would tie into the existing West Deck Truss.

The vertical clearance from the underside of the replacement Causeway structure to mean sea level would be 30 feet. This is an increase over the approximate 20 feet existing to provide for greater access under the TZB for sailing vessels.

At the point of connection between the replacement Causeway and the West Deck Truss (see Figure 3-3, page 15), there are complex geometric, connection and staging requirements including:

- Tying the horizontal curvature and super-elevation of the replacement Causeway and the existing structure together, as they are offset from each other, using an alignment with a design speed of 70 mph
- Modifying the existing structure to support the highway as it transitions between it and the replacement Causeway
- Transitioning between eight highway lanes (four each way) on the replacement Causeway to seven lanes (three each way with a reversible center lane) on the existing structure
- Providing space for the continued use and storage of the movable barrier machine on the retained sections of the existing structure
- Transitioning between 12-foot lane widths on the replacement Causeway to lane widths varying from 11’-5” to 11’-11” on the existing structure
- Transitioning between four 12-foot shoulders on the replacement Causeway to no shoulders on the existing structure
- Construction in close proximity to the existing Causeway
- Construction staging to maintain a minimum of seven highway lanes across the bridge during peak hours at all times during construction

Existing West Deck Truss Spans

The structure and foundations of the West Deck Trusses would need to be strengthened and upgraded to withstand seismic loadings. The details of this work are described in Chapter 5.3.5 of this report. In addition to these efforts, the West Deck Trusses would need to be altered to attach to the replaced Causeway.

The replaced Causeways would connect to the westernmost existing Deck Truss. Approximately 1,250 feet of existing bridge deck would need to be removed and reconstructed to accommodate the super-elevation of the reverse curve connecting the replaced Causeways to the existing TZB alignment. The existing West Deck Trusses would need to be widened for a distance of 1,500 feet, so that seven lanes of traffic may be maintained on the bridge, while this deck replacement is carried out.

A 15-foot wide Pedestrian and Bicycle Path would make final use of this widening. This path would be cantilevered off the north side of the remaining Deck Trusses and continue the path from the replacement Causeway.

The West Deck Trusses would retain the reversible center lane of the current configuration with three dedicated highway lanes in each direction.

To maintain the movable barrier in the AM position (four eastbound lanes and three westbound lanes) at all times, except during the evening peak, as is current practice, the Movable Barrier Machine would need to stand on the bridge deck overnight. Sufficient space is available for the creation of a parking area and garage for the movable barrier machine on the bridge deck.

Existing Main Spans

In order to bring the Main Spans into compliance with current structural requirements, the structure of the Main Spans would need to be strengthened and upgraded and the foundations replaced to withstand seismic and wind loading. The details of this work are described in Chapters 5.1 and 5.3 of this report. In addition to these efforts, the Main Spans would need to be altered to support a Pedestrian and Bicycle Path, which would be cantilevered off its northern side.

The Main Spans would retain the reversible center lane of the current configuration with three dedicated highway lanes in each direction.

Existing Deck Trusses East of the Main Spans

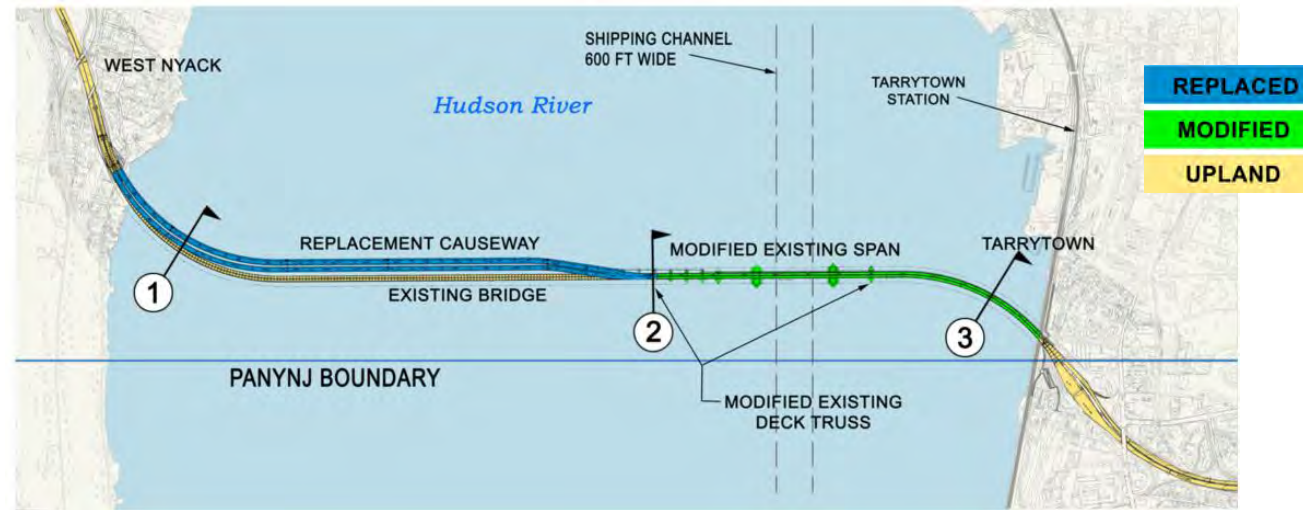
In order to bring the East Deck Truss sections into compliance with current structural requirements, the structure and foundations of the East Deck Trusses would need to be strengthened and be upgraded to withstand seismic loading. The details of this work are described in Chapter 5.3.5 of this report. In addition to these efforts, the trusses would need to be altered to support the Pedestrian and Bicycle Path, which would be cantilevered off their northern side.

The East Deck Truss sections would retain the reversible center lane of the current configuration with three dedicated highway lanes in each direction.

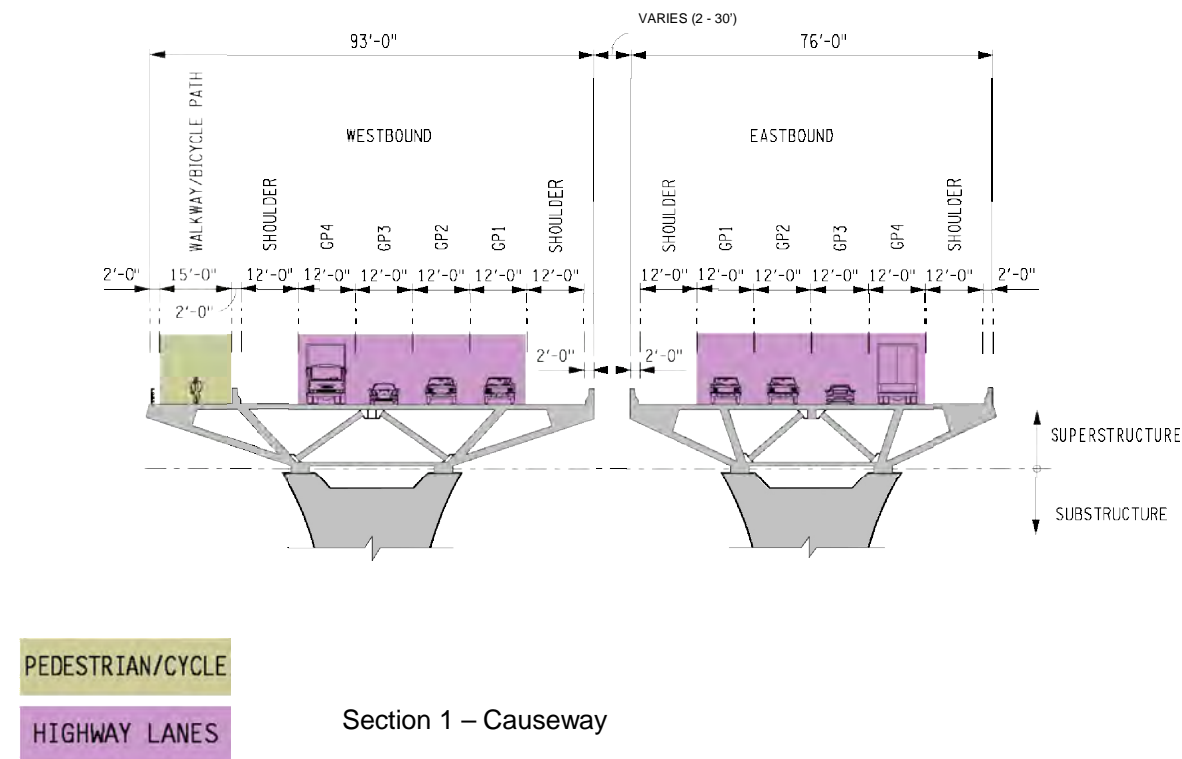
3.2.3 Westchester Landing

The configuration of the Westchester Landing would remain essentially unchanged from its current configuration. The only change would be the addition of the combined Pedestrian and Bicycle Path on the northern side of the existing crossing.

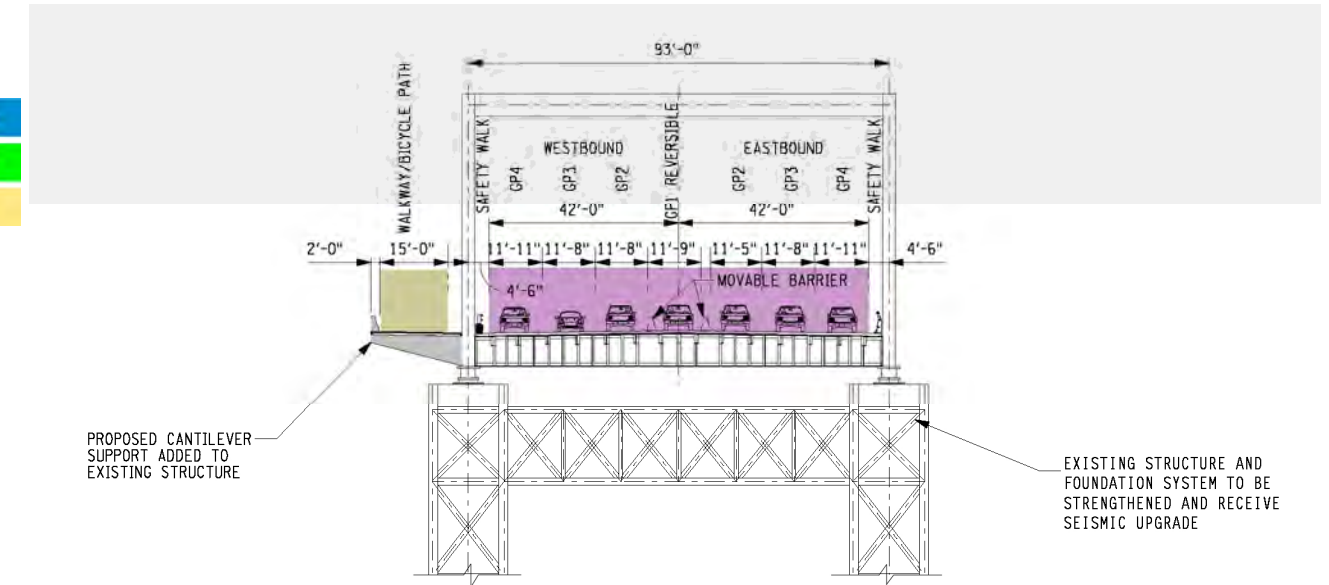
The addition of the Pedestrian and Bicycle Path would increase the overall width of the bridge at the Westchester Landing by 19 feet from 91 feet to 110 feet. This would fit within the existing ROW.



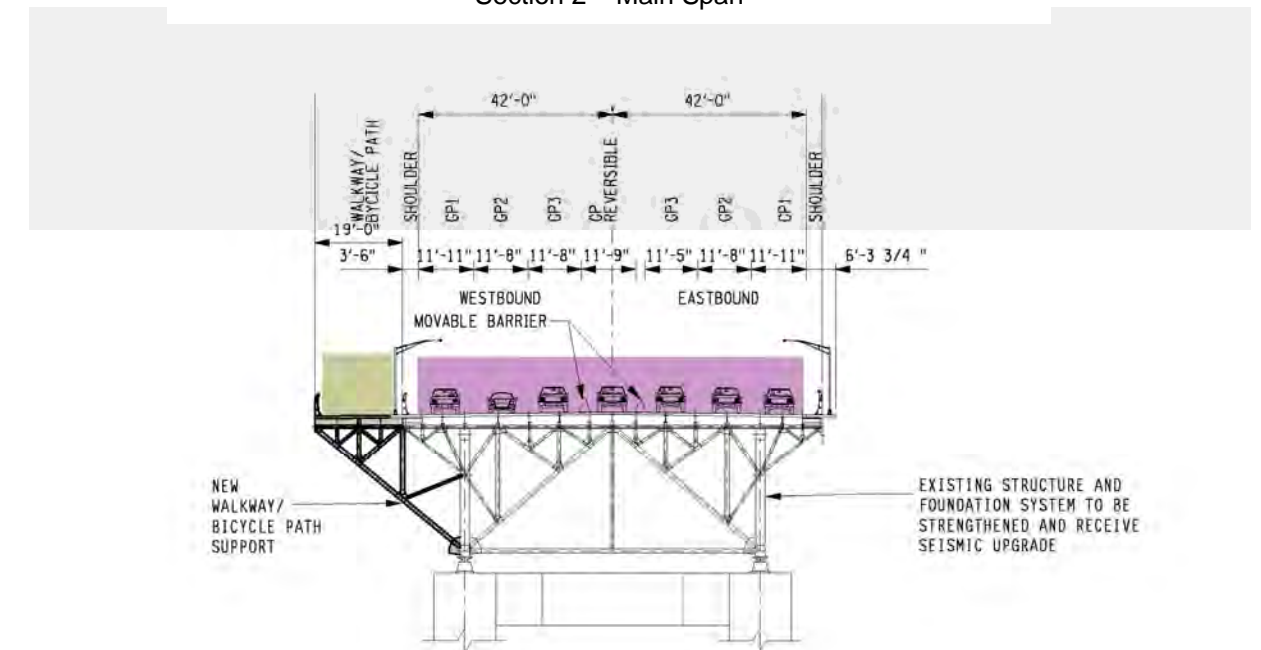
General Arrangement



Section 1 - Causeway

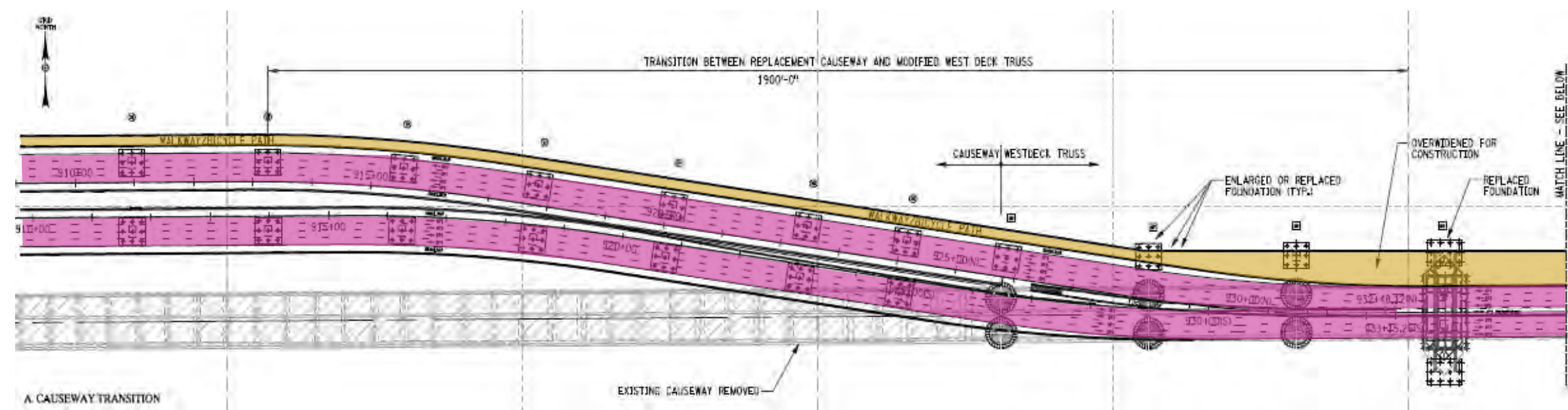


Section 2 - Main Span

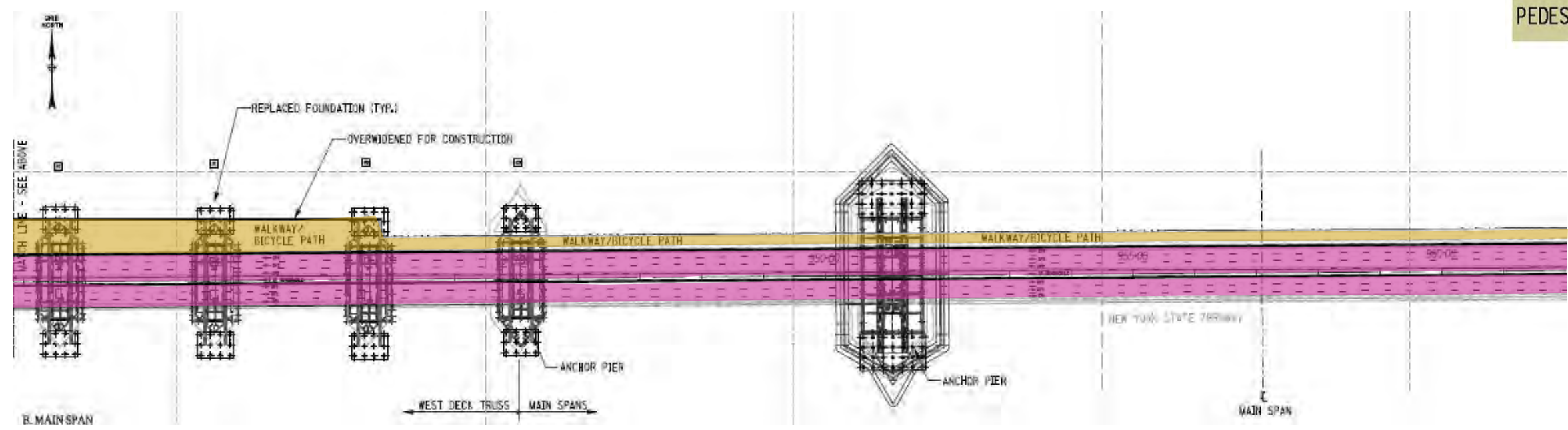


Section 3 - Deck Truss

Figure 3-2
Rehabilitation Option 1: Typical Cross Sections



A. Causeway Transition



B. Main Span

HIGHWAY LANES

PEDESTRIAN/CYCLE

Figure 3-3
Rehabilitation Option 1: Causeway Transition Connections

3.3 Rehabilitation Option 2

This chapter outlines the details of Rehabilitation Option 2 for the TZB. This option represents the minimum build scenario that accommodates the highway and transit components of Alternative 3 and its sub-options. Specific components include:

- **Causeway** - Existing Causeway replaced by two parallel structures, each with four general purpose lanes, one Bus Rapid Transit /High Occupancy Toll (BRT/HOT) lane and full sized shoulders
- **West Deck Trusses** - Ten lanes, one BRT/HOT, four general purpose lanes and full sized shoulders in each direction, on a single deck supported by a widened under-truss on additional outrigger piers
- **Modified Existing Main Spans** - Ten highway lanes on a single structure, with one BRT/HOT lane, one general purpose lane and shoulders in each direction occupying the existing bridge truss and three general purpose lanes and shoulders in each direction carried in two outrigger widening sections
- **East Deck Trusses** - Ten lanes, one BRT/HOT, four general purpose lanes and full sized shoulders in each direction, on a single deck supported by a widened under-truss on additional outrigger piers
- **Pedestrian and Bicycle Paths** - A path would be provided on each side of the TZB

The proposed layout of Rehabilitation Option 2 is shown in Figures 3-4 and 3-5 (page 19).

3.3.1 Rockland Landing

Due to the inclusion of the BRT/HOT lanes and Pedestrian and Bicycle Paths on both sides of the TZB, Rehabilitation Option 2 is wider than Rehabilitation Option 1 at the Rockland shore. This additional width means that slivers of ROW are required.

The increase in width of the Thruway, due to the inclusion of BRT/HOT lanes, would require the reconstruction of South Broadway Bridge (with associated work to its approaches).

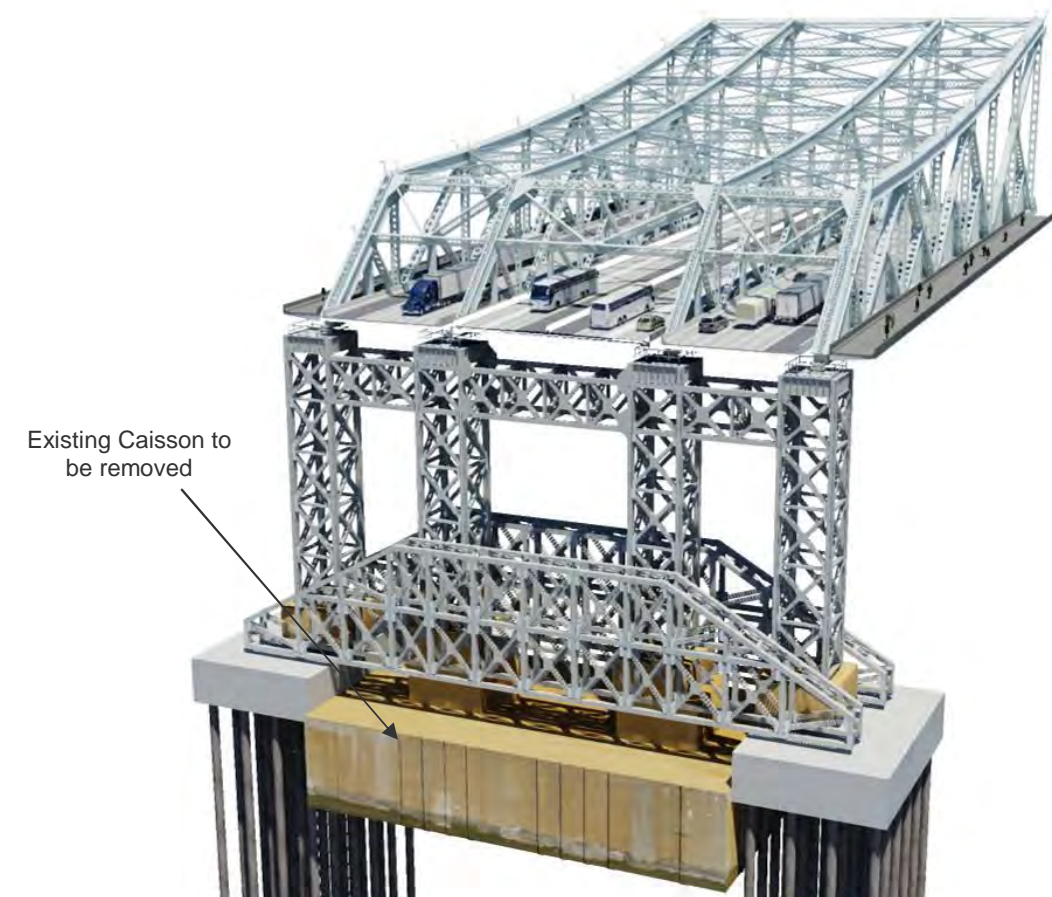
The Pedestrian and Bicycle Paths are shown with access ramps to River Road, with the ramps located to avoid direct impacts to properties. Access is also included that allows pedestrians and cyclists to connect to River Road and to South Broadway. This connection links to the former Erie Railroad line, which has been converted to a trail.

NYSTA Maintenance Facility

Rehabilitation Option 2 would have similar impacts to Rehabilitation Option 1 on access between the Thruway and existing NYSTA maintenance facilities located at the Rockland end of the TZB. Maintenance access would be provided by an exit ramp from the eastbound travel way and River Road and an access ramp between River Road and the westbound travel way. All other maintenance access would be via Interchange 10.

Noise Walls

Rehabilitation Option 2 would have similar impacts to Rehabilitation Option 1 regarding existing or supplemental noise walls, except that they would need to be relocated closer to the edge of the ROW given the greater width of the Thruway in this option.



Rehabilitation Option 2

Widened Structure to Provide Alternative 3 Components

8 General purpose lanes
2 BRT/HOT lanes
2 Pedestrian and Bicycle Paths

Figure 3-4

Rehabilitation Option 2

3.3.2 Existing TZB Rehabilitation

Replacement Causeway

The replacement eastbound and westbound Causeways would be constructed on two different alignments. The westbound Causeway would be constructed first and would be located approximately 50 feet north of the existing Causeway.

Following completion of the westbound replacement Causeway, the existing Causeway would be demolished and the eastbound replacement Causeway constructed in its place. Its alignment would place its northern edge approximately 40 feet south of the existing Causeway’s northern edge to enable it to match up with the widened Main Spans and Deck Truss Spans.

The replacement Causeways would follow the same vertical profile as the existing Causeway and maintain the same ascending grade of 3% as the existing TZB. The replacement Causeway would tie into the widened existing West Deck Truss.

At the point of connection between the replacement Causeway and the Deck Truss of the existing bridge (Figure 3-6, page 20), there are complex geometric, connection and staging requirements including:

- Tying the horizontal curvature and super-elevation of the replacement Causeway and the widened existing structure together
- Modifying the existing structure to support the highway at the transition with the replacement Causeway
- Construction staging to maintain a minimum of seven highway lanes (requiring relocation of the moveable barrier system) across the bridge during peak hours at all times during construction

Existing West Deck Truss Spans

The replacement Causeways would connect to the existing West Deck Trusses. To accommodate the eight highway lanes, two BRT/HOT lanes, four shoulders and two Pedestrian and Bicycle Paths of the replacement Causeways, the existing West Deck Trusses would be widened from 91 feet to 216 feet.

Additional Deck Truss sections, towers and foundations would be constructed on each side of the existing Deck Truss to carry the additional traffic lanes and Pedestrian and Bicycle Paths.

Approximately 1000 feet of the existing TZB deck would need to be removed and reconstructed to accommodate the super-elevation of the reverse curve returning the offset alignment of the replacement westbound Causeway to the alignment of the widened TZB westbound lanes.

In order to bring the existing West Deck Truss sections into compliance with current structural requirements, the structure and foundations of the existing West Deck Trusses would need to be strengthened and upgraded to withstand seismic loading. The details of this work are described in Chapter 5.3.5 of this report.

Existing Main Spans

The existing Main Spans would be widened by 157 feet from 93 feet to 248 feet to accommodate eight highway lanes, two BRT/HOT lanes, four shoulders and two Pedestrian and Bicycle Paths.

Additional truss sections, towers and foundations would be constructed on each side of the existing Main Spans to carry traffic lanes. The Pedestrian and Bicycle Paths would be cantilevered off each side of the widened Main Spans.

In order to bring the existing Main Spans into compliance with current structural requirements, the structure of the existing Main Spans would need to be strengthened and modified and the foundations replaced to withstand seismic and wind loading. The details of this work are described in Chapter 5.3.5 of this report.

The existing portion of the Main Spans would carry two BRT/HOT lanes, two general purpose lanes and two shoulders. The northern portion of the new structure would carry three westbound general purpose lanes, a shoulder and a Pedestrian and Bicycle Path, while the southern portion of the new structure would carry three eastbound general purpose lanes, a shoulder and a Pedestrian and Bicycle Path.

Existing Deck Trusses East of the Main Spans

The existing Deck Trusses east of the Main Spans would be widened from 91 feet to 216 feet to accommodate 8 general purpose lanes, 2 BRT/HOT lanes, 4 shoulders and 2 Pedestrian and Bicycle Paths. As illustrated in Figure 3.5 (page 19), additional Deck Truss sections, towers and foundations would be constructed on each side of the existing Deck Truss to carry the traffic lanes and Pedestrian and Bicycle Paths.

In order to bring the existing Deck Truss sections into compliance with current structural requirements, the structure and foundations of the existing Deck Trusses would need to be strengthened and modified to withstand seismic loading. The details of this work are described in Chapter 5.3.5 of this report.

3.3.3 Westchester Landing

General

Approaching the Westchester shore, the general purpose highway lanes converge to eliminate the lane division necessary to accommodate the Main Spans. In each direction, the four general purpose lanes are contiguous and are separated from the BRT/HOT lane by a 4-foot painted buffer, as provided elsewhere in the corridor.

The ROW at the Westchester Landing is approximately 260 feet wide at its narrowest point. Approximately 90 feet of the available space is on the north side and 80 feet is on the south side of the existing crossing. East of the immediate landing, the space available for the widening of the highway is reduced because of the Toll Plaza and the on-ramp from Route 9 (Broadway).

The widening of the Thruway at the Westchester Landing is unequal due to the eastbound Toll Plaza and the off and on-ramps to Route 9. As a result, the southern boundary of the widened TZB will fall outside of its southern ROW boundary over the Metro North ROW by approximately 60 feet. Other than this infringement, there are no other permanent property impacts associated with Rehabilitation Option 2.

Highway and BRT/HOT Lanes

The westbound general purpose and BRT/HOT lanes are uninterrupted between the Westchester Broadway overbridge (Route 9) and the widened TZB. Near the abutment of the widened TZB, an on-ramp from southbound Route 9 merges into the highway lanes. Additional widening of the TZB would be required in this area to provide a safe merging distance for traffic from the on-ramp.

In the eastbound direction, the BRT/HOT lanes would be continuous and uninterrupted through the landing area, while the four general purpose highway lanes would split as they approach the landing. Three of the four general purpose lanes would connect directly with a highway speed E-ZPass toll facility while the fourth general purpose lane would widen to provide access to a conventional Toll Plaza with toll booths.

Toll Booths

There is only sufficient space for seven toll booths within the boundaries of the existing NYSTA ROW at the Westchester Landing. The provision of additional toll booths would require a widening of the roadway to the east of the toll booths to allow for merging traffic, with impacts to Van Wart Avenue and adjacent properties.

Pedestrian and Bicycle Path

The combined Pedestrian and Bicycle Paths would connect to Route 9, Van Wart Avenue and to the proposed River Walk, which would be built by others.

Of these three connecting points, the infrastructure to connect to the River Walk is the more substantial because of the approximate 100-foot difference in elevation. In accordance with the American with Disabilities Act (ADA), ramps totaling approximately 2000 feet are required to accomplish this change in elevation.

BRT Access to Tarrytown Station

In addition to the two BRT/HOT lanes on the Thruway, the widened TZB may also need to allow sufficient space for an optional BRT connection from Route 119 to Tarrytown Station via the Metro-North Hudson Line. The designs presented in this report show this link, as it is a potential element of the BRT modalalternatives. The accommodation of this link is independent of the TZB options.

NYSTA and NYSP Facilities and Access

The space available at the Westchester Landing for the NYSTA and New York State Police (NYSP) facilities would be reduced and the existing operations would be partially relocated and reconfigured. The primary connections provided include:

- Access for maintenance vehicles to the TZB from the NYSTA facility on the north side of the Toll Plaza
- Access for maintenance vehicles from the TZB to the NYSTA facility on the south side of the Toll Plaza
- Connection between the NYSTA facilities on the north and south side of the Toll Plaza via an underpass under the TZB and use of the BRT connection to Tarrytown

Landing Structure

Between the Hudson Line and the widened bridge abutment there are complex geometric, connection and staging requirements including:

- widening in the approach to the Toll Plaza
- provision of a BRT highway connection to Tarrytown
- provision of a maintenance vehicle underpass
- staging requirements during the transition from existing to replacement TZB

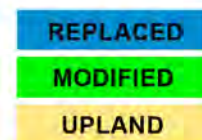
To accommodate these complexities, a special structure that differs in form from the remainder of the rehabilitated crossing may be warranted. This special structure would be of simpler construction compared to the remaining spans of the rehabilitated TZB and might be similar to the East Trestle Spans of the existing TZB.

Construction

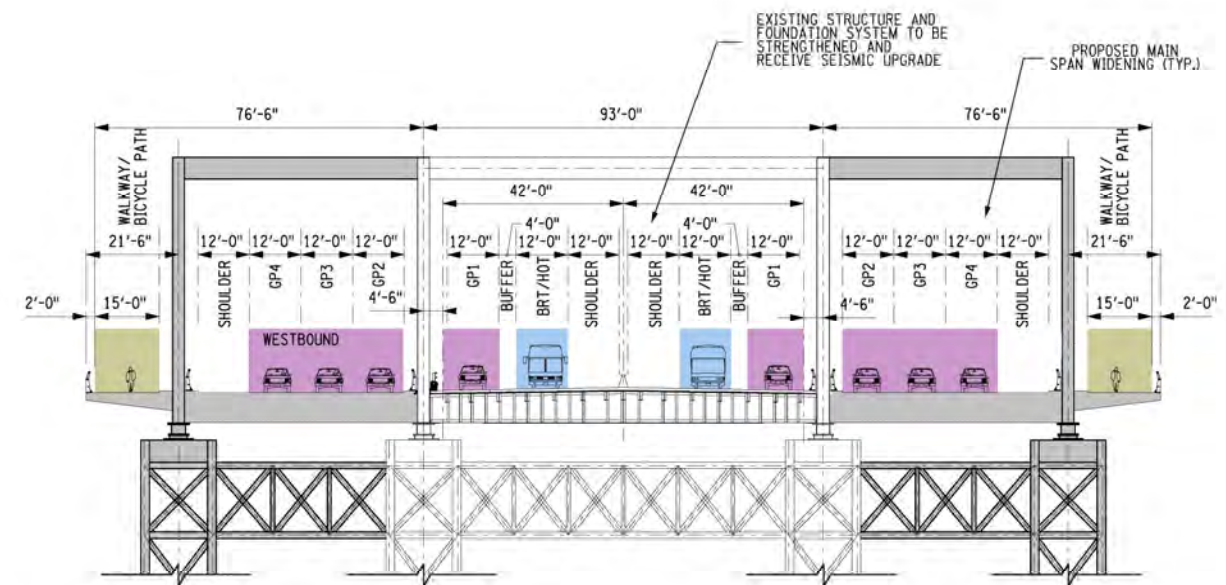
There is substantial overlap between the existing and proposed lane arrangements in the landing area. A simple transition of traffic between the existing and widened Thruway would not be possible. Instead traffic lanes would need to be temporarily shifted to remove traffic from the area of overlap and allow construction of the widened bridge in the landing area. Any shift of traffic would need to maintain access for eastbound traffic to the Toll Plaza.

Noise Walls

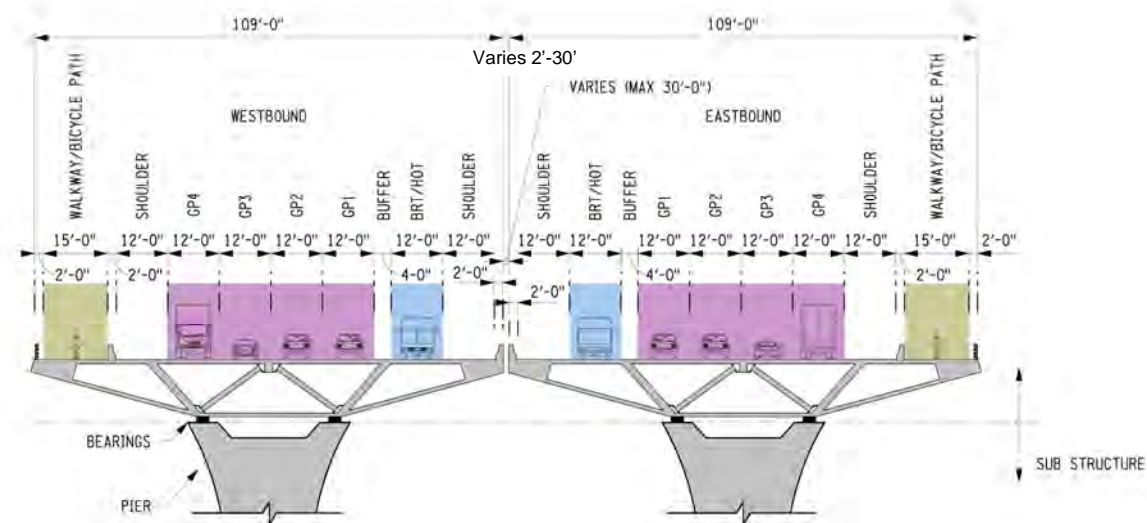
Noise walls are present along the south edge of the Thruway from the toll booths to the Broadway Bridge overpass. It is expected that any modifications to the Toll Plaza would retain the existing noise walls. Further assessment of the future traffic and associated noise levels will be reported in the DEIS and will more accurately address noise walls in this area.



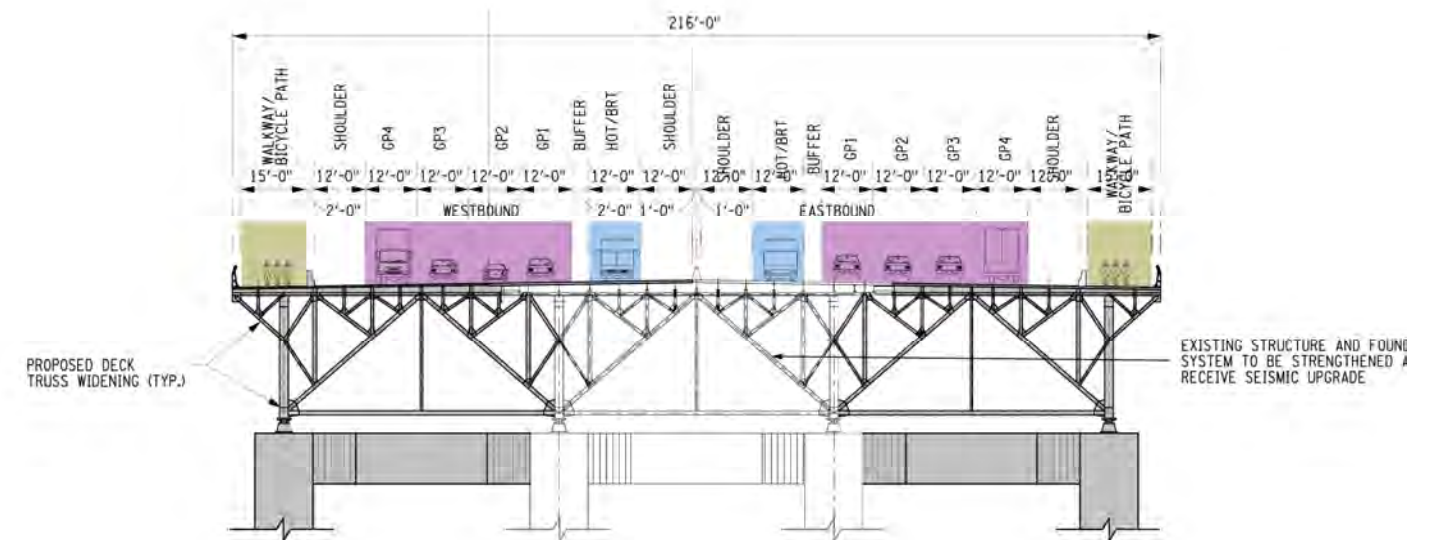
General Arrangement



Section 2 – Main Span



Section 1 - Causeway



Section 3 – East Deck Truss

Figure 3-5
Rehabilitation Option 2: Typical Cross Sections

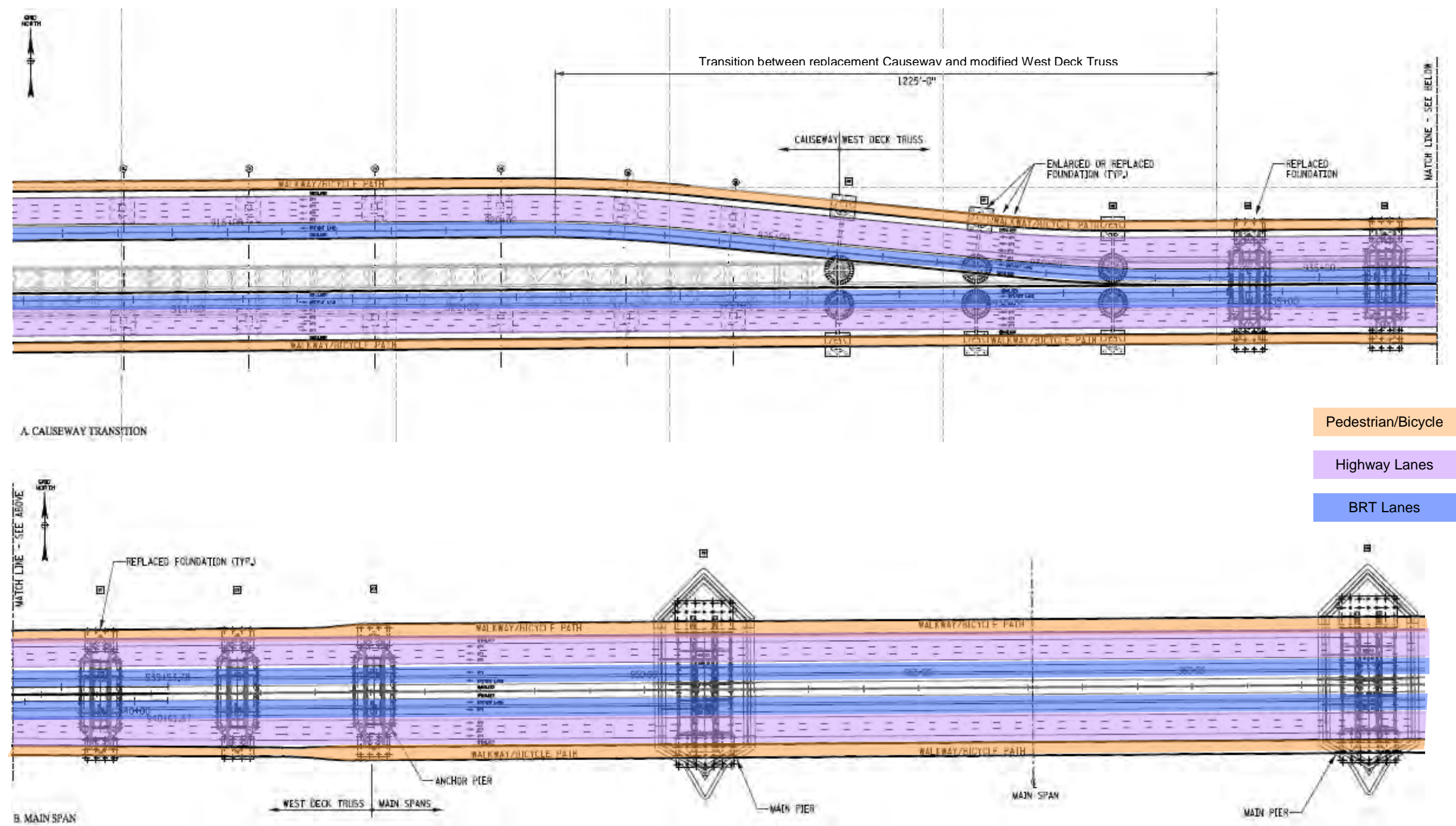


Figure 3-6
Rehabilitation Option 2: Causeway Transition Connections

3.4 Rehabilitation Option 3

This chapter outlines the details of Rehabilitation Option 3 for the TZB. Similar to Rehabilitation Option 2, this option is also configured to accommodate the highway and transit modes of Alternative 3. In this option, a new supplemental structure is introduced to provide the additional required roadway to avoid widening the existing structure. Specific components include:

- **Causeway** - Existing Causeway replaced by two parallel structures, each with four general purpose lanes one Bus Rapid Transit /High Occupancy Toll (BRT/HOT) lane and full sized shoulders
- **Existing Main Spans and East and West Deck Trusses** - Eastbound traffic lanes (four general purpose lanes, one BRT/HOT lane and full sized shoulders) carried on existing, rehabilitated structure
- **Supplemental Bridge** - Westbound traffic lanes (four general purpose lanes one BRT/HOT lane and full sized shoulders) carried on new structure
- **Pedestrian and Bicycle Paths** - A path would be provided on each side of the TZB

The proposed layout of Rehabilitation Option 3 is shown in Figures 3-7 and 3-8 (page 23).

3.4.1 Rockland Landing

The components in this area are very similar to Rehabilitation Option 2 as described in Chapter 3.3.1 of this Report.

3.4.2 Replacement Causeway

The replacement Causeway would be constructed in phases. First, the westbound Causeway would be constructed which would connect to the Supplemental Bridge constructed at the same time. All traffic would temporarily shift to this new structure. Then the existing Causeway would be demolished, with the eastbound Causeway constructed on its alignment.

The replacement Causeways would follow a similar vertical profile to the existing Causeway and maintain the same ascending grade of 3% as the existing TZB.

As the replacement eastbound Causeway would generally follow the alignment of the existing TZB Causeway, no reverse curve would be required where the Causeway ties into the existing Deck Truss, unlike Rehabilitation Options 1 and 2.

3.4.3 Existing TZB Rehabilitation

Existing West Deck Truss Spans

As indicated previously, the replacement eastbound Causeway would connect to the westernmost existing Deck Truss. Sufficient width is available on the existing Deck Truss roadway to accommodate the 4 highway lanes, one BRT/HOT lane and 2 shoulders of the replacement Causeway. However, insufficient width is available on the existing structure to accommodate the 15-foot wide Pedestrian and Bicycle Path.

Additional bridge deck width for the Pedestrian and Bicycle Path would be created by cantilevering the pathway off the south side of the Deck Truss as shown on Figure 3.8 (page 23).

In order to bring the existing West Deck Truss sections into compliance with current structural requirements, the structure and foundations of the existing West Deck Trusses would need to be strengthened and modified to withstand seismic loading. The four buoyant foundations would have to be removed and replaced with a new foundation. The details of this work are described in Chapter 5.3.5 of this report.

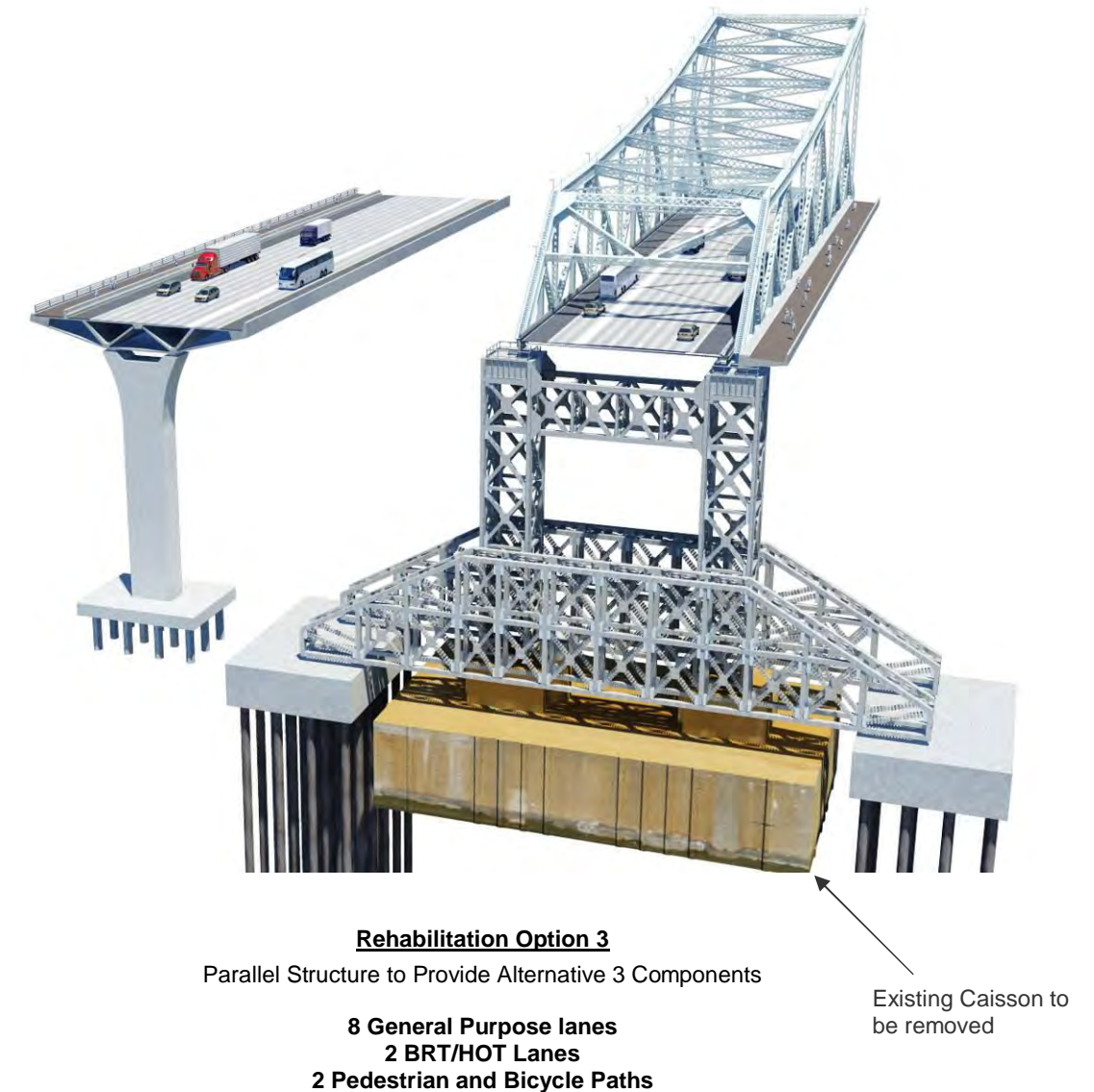


Figure 3-7
Rehabilitation Option 3

Existing Main Spans

The existing Main Spans deck would carry four highway lanes, one BRT/HOT lane and full sized shoulders.

A 15-foot wide Pedestrian and Bicycle Path would be cantilevered off the south side of the Main Spans to continue the path from the Rockland Landing to the Westchester Landing.

In order to bring the Main Spans into compliance with current structural requirements, the structure of the Main Spans would need to be strengthened and modified and the foundations replaced to withstand seismic and wind loading. The details of this work are described in Chapter 5.3.5 of this report.

Existing East Deck Truss Spans

A 15-foot wide Pedestrian and Bicycle Path would be cantilevered off the south side of the Deck Trusses to continue the path from the Rockland Landing to the Westchester Landing.

In order to bring the Deck Truss sections into compliance with current structural requirements, the structure and foundation of the Deck Trusses would need to be strengthened and modified to withstand seismic loading. The details of this work are described in Chapter 5.3.5 of this report.

3.4.4 Supplemental Bridge

A new bridge to supplement the capacity of the existing TZB would be constructed to the north of the existing TZB to carry only westbound traffic. The Supplemental Bridge would provide four highway lanes, one BRT/HOT lane and full sized shoulders. The Supplemental Bridge would also provide a Pedestrian and Bicycle Path along its north side.

To avoid impacting the foundations of the existing TZB, the Supplemental Bridge would be constructed at an offset of approximately 300 feet to the north of the existing bridge.

The Supplemental Bridge would provide a deck width of 109 feet with spans of 230 feet except at the Main Spans. The Main Spans of the Supplemental Bridge would likely be 2,600 feet in length.

3.4.5 Westchester Landing

The ROW at the Westchester Landing is approximately 260 feet wide at its narrowest point. Approximately 90 feet of the available space is on the north side and 80 feet is on the south side of the existing crossing. East of the immediate landing the space available for the widening of the highway is reduced because of the Toll Plaza and the on-ramp from Route 9 (Broadway).

The southern edge of the Supplemental Bridge would be placed adjacent to the northern edge of the easternmost Deck Truss of existing TZB. As a result, the northern edge of the Supplemental Bridge would be located approximately 30 feet north of the intersection of the NYSTA and Metro-North ROW boundaries. This would require the acquisition of additional ROW from both Metro-North and adjacent properties on the north side of the Thruway.

While the eastbound roadway will be slightly widened in its approach to the reconstructed Toll Plaza, this widening is anticipated to remain within the NYSTA ROW.

The provisions for highway and BRT/HOT Lanes, Toll Plaza, Pedestrian and Bicycle Path, BRT access to Tarrytown Station, NYSTA Maintenance Facility, and access and special landing structure are the same as Rehabilitation Option 2.

Construction

The impacts in this area are similar to Rehabilitation Option 2. There is substantial overlap between the existing and proposed lane arrangements in the landing area. A simple transition of traffic between the existing and widened Thruway would not be possible. Instead traffic lanes would need to be temporarily shifted to remove traffic from the area of overlap and allow construction of the widened bridge in the landing area. Any shift of traffic would need to maintain access for east bound traffic to the Toll Plaza.

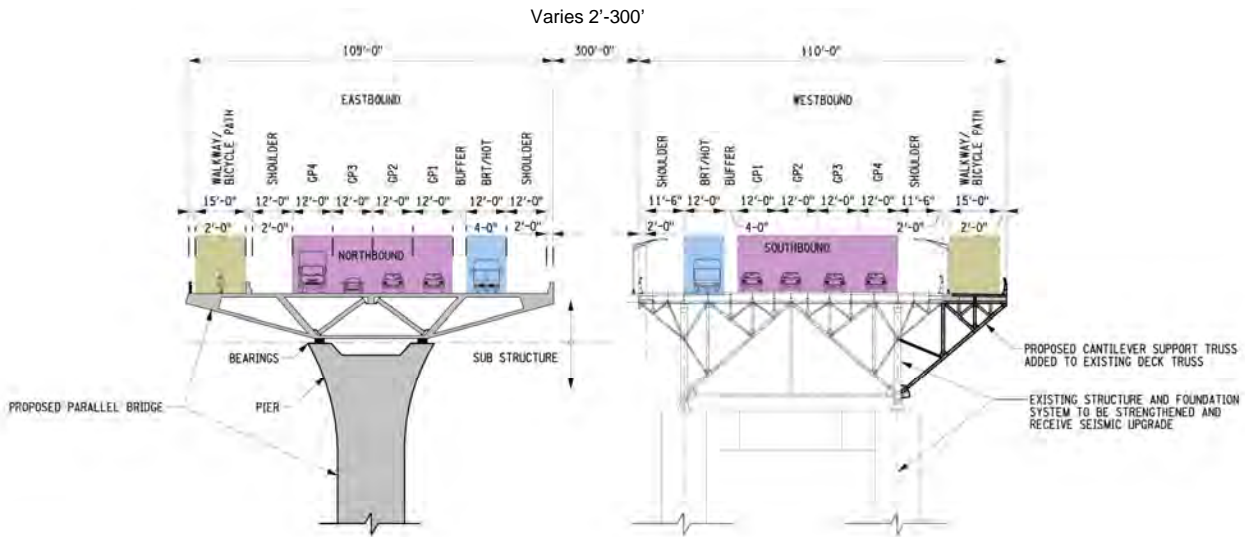
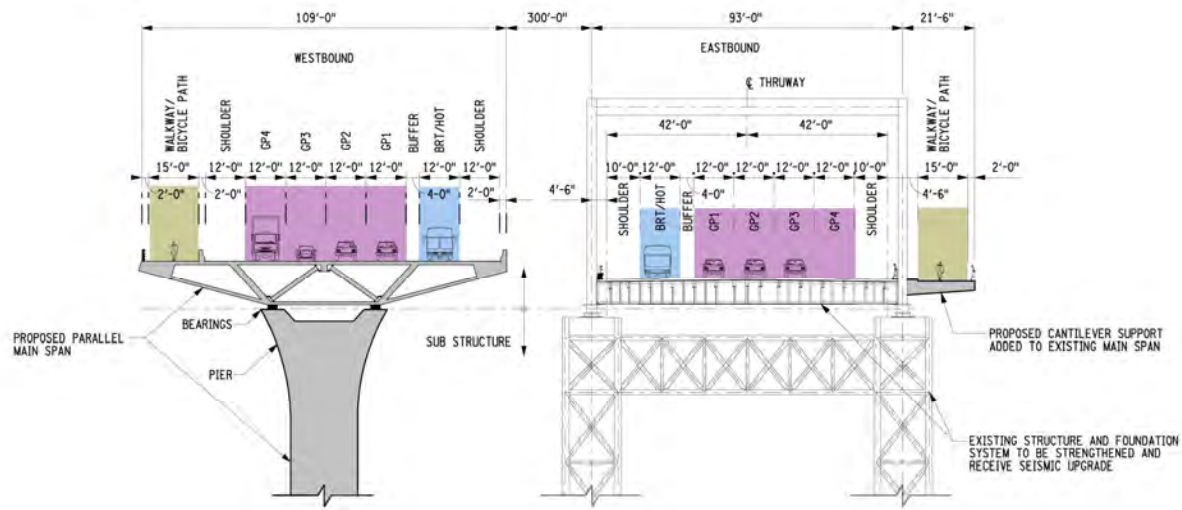
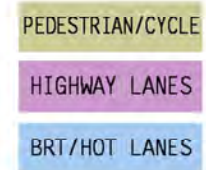
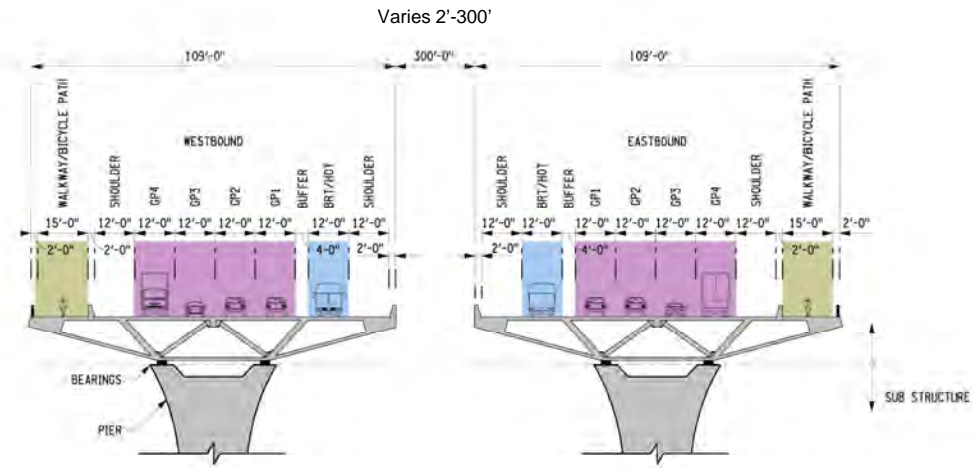
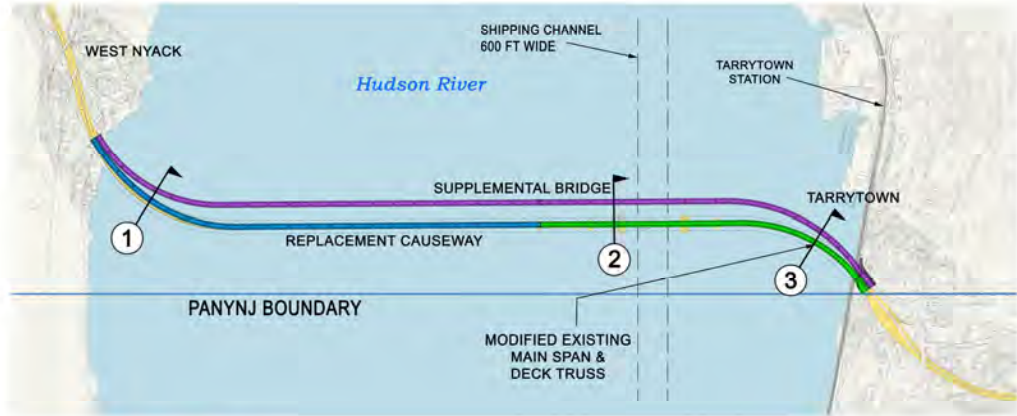


Figure 3-8
Rehabilitation Option 3: Typical Cross Section

3.5 Rehabilitation Option 4

This chapter outlines the details of Rehabilitation Option 4 for the TZB. Similar to Rehabilitation Option 3, this option includes a supplemental structure parallel to the existing TZB but is configured to accommodate the highway and transit modes of Alternative 4 (A, B, C or D). This requires the addition of two CRT tracks, which are located on the lower level of the supplemental structure. Specific components include:

- **Causeway** - Existing Causeway replaced by two parallel structures, each with four general purpose lanes, a BRT/HOT lane and full sized shoulders. The westbound structure would also carry two CRT tracks beneath the roadway
- **Existing Main Spans and East and West Deck Trusses** - Eastbound traffic lanes (four general purpose lanes, one BRT/HOT lane and full sized shoulders) carried on the existing, rehabilitated structure
- **Supplemental Bridge** - Westbound traffic lanes (four general purpose lanes, a BRT/HOT lane and full sized shoulders) carried on the top deck of a new structure with two CRT tracks beneath the roadway
- **Pedestrian and Bicycle Paths** - A path would be provided on each side of the crossing

The proposed layout of Rehabilitation Option 4 is shown in Figures 3-9 and 3-10 (page 26).

3.5.1 Rockland Landing

Rehabilitation Option 4 has a similar footprint in the Rockland landing to Rehabilitation Options 2 and 3. The difference is that the westbound Causeway is a deeper structure to accommodate CRT on the lower level and consequently the highway lanes are at a higher elevation in the landing area. The difference in elevation is approximately 25 feet compared to the Rehabilitation Option 2 and up to 40 feet higher than the existing Thruway. Consequently, compared to Rehabilitation Option 2, retaining walls are higher and maintenance access ramps are longer.

3.5.2 Replacement Causeway

The eastbound replacement Causeway would be similar to its counterpart in Rehabilitation Option 3.

The westbound Causeway would have two decks, with the upper deck carrying the highway and the lower deck carrying the CRT tracks. To carry the CRT on its lower level, the depth of the westbound Causeway would be substantially greater than the eastbound Causeway (36 feet vs. 15 feet). This would result in the westbound Causeway having a higher vehicular deck elevation. Additionally, due to the grade limitation of the CRT tracks, the ascending and descending grades of the westbound Causeway would be limited to a maximum of 2% as compared to the 3% of the eastbound Causeway.

The replacement Causeway would be constructed in phases. First, the westbound Causeway would be constructed which would connect to the supplemental bridge constructed at the same time. All traffic would temporarily shift to this new structure. Then the existing Causeway would be demolished, with the eastbound Causeway constructed on its alignment.

As the replacement eastbound Causeway would generally follow the alignment of the existing TZB Causeway, no reverse curve would be required where the Causeway ties into the existing Deck Truss, unlike Rehabilitation Options 1 and 2.

3.5.3 Existing TZB Rehabilitation

The existing West Deck Truss, Main Spans and East Deck Truss would be rehabilitated and modified in an identical manner as Rehabilitation Option 3.

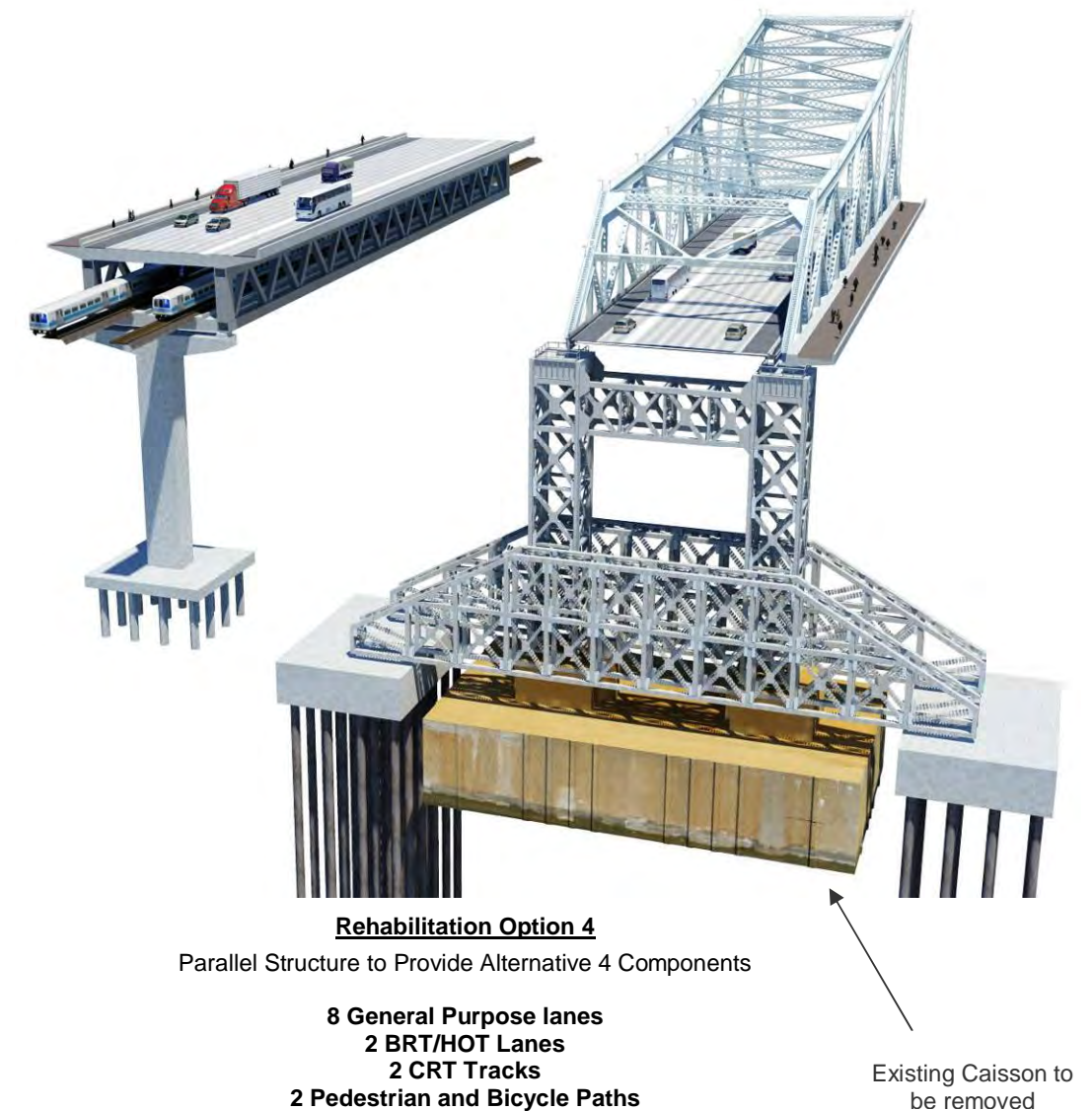


Figure 3-9
Rehabilitation Option 4

3.5.4 Supplemental Bridge

The new bridge to supplement the capacity of the existing TZB, under this option, would be constructed to the north of the existing TZB. It would carry westbound vehicular traffic and the CRT tracks. The Supplemental Bridge would be a two-level bridge with:

- Four general purpose lanes, one BRT/HOT lane and full sized shoulders on the upper level
- Two CRT tracks separated by a 10-foot wide maintenance way on the lower level
- A Pedestrian and Bicycle Path along its northern side on the upper level

As with the westbound Causeway, the depth of the supplemental bridge would be substantially greater than the existing TZB. This would result in the Supplemental Bridge having a higher vehicular deck elevation than that of the rehabilitated Main Spans due to the need to maintain required navigational clearance over the shipping channel.

To avoid impacting the foundations of the existing TZB, the Supplemental Bridge would be constructed approximately 300 feet north of the existing TZB. The Supplemental Bridge would provide a deck width of 109 feet with spans up to 400 feet in length except at the Main Spans. The central channel crossing span of the Supplemental Bridge Main Spans would be 2,600 feet in length.

3.5.5 Westchester Landing

The ROW at the Westchester Landing is approximately 260 feet wide at its narrowest point. Approximately 90 feet of the available space is on the north side and 80 feet is on the south side of the existing crossing. East of this constriction, the space available for the widening of the highway is reduced because of the Toll Plaza and the on-ramp from Route 9 (Broadway).

The southern edge of the supplemental bridge would be placed adjacent to the northern edge of the easternmost Deck Truss of the existing bridge. As a result, the northern edge of the Supplemental Bridge would be located approximately 30 feet north of the intersection of the NYSTA and Metro-North ROW boundaries, requiring the acquisition of additional ROW for the construction of the Supplemental Bridge. The acquisition width increases to almost 50 feet with the inclusion of a pedestrian ramp from the Pedestrian and Bicycle Path to the proposed River Walk.

While the eastbound roadway will be slightly widened in its approach to the reconstructed Toll Plaza, this widening is anticipated to remain within the NYSTA ROW.

The provisions for highway and BRT/HOT Lanes, Toll Plaza, Pedestrian and Bicycle Path and special landing structure are similar to Rehabilitation Option 2.

Given the positioning and orientation of the Supplemental Bridge, the challenge at the Westchester Landing will be to accommodate all the facilities required within the space available. Meanwhile, traffic operations must be maintained during the construction of the Supplemental Bridge, the subsequent construction of the replacement Causeway (which would require the existing TZB to be closed to traffic) and the reconfiguration of the Toll Plaza.

CRT Alignment

Fundamental to the CRT alignment, in the Westchester Landing area, is the requirement to connect to the Hudson Line via a proposed tunnel passing under the area currently occupied by the NYSTA Maintenance Facility.

To connect to the tunnel, the tracks from the supplemental bridge would enter the ground immediately at the Westchester Landing and swing in a counterclockwise direction to align towards the NYSTA Maintenance Facility. This would create a section of tangent track of sufficient length to allow the construction of the Tappan Zee station, should this be required.

All of these factors result in a substantial reduction in the space available for the NYSTA Thruway Maintenance Facility and Troop T Headquarters.

NYSTA Maintenance Facility and Access

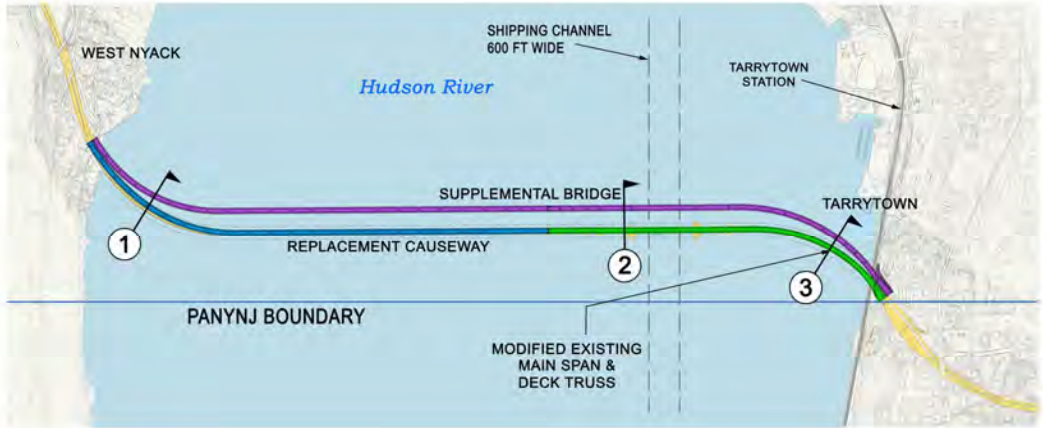
The NYSTA maintenance facilities at the Westchester Landing are comprised of two areas, one on either side of the Toll Plaza. The facilities on the south side of the plaza, which support the operations of the Toll Plaza, would remain largely unchanged though provisions for pedestrian and bicycle access would reduce the storage area available.

The facilities on the north side of the Toll Plaza would be substantially reduced in size to make room for a possible Tappan Zee CRT Station. Most of the facilities would be displaced and would need to be relocated elsewhere in close proximity to the TZB.

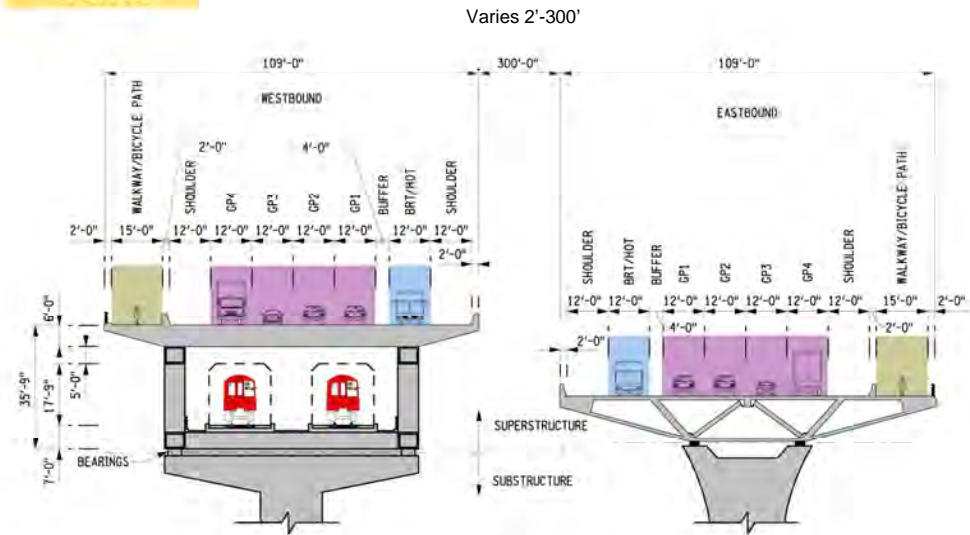
A restricted access roadway, under the existing TZB, presently connects the NYSTA facilities on the north and south sides of the Toll Plaza. The present roadway is adjacent to the bridge abutment of the Supplemental Bridge and would need to be relocated to re-establish the connection between the north and south sides of the Toll Plaza.

Construction

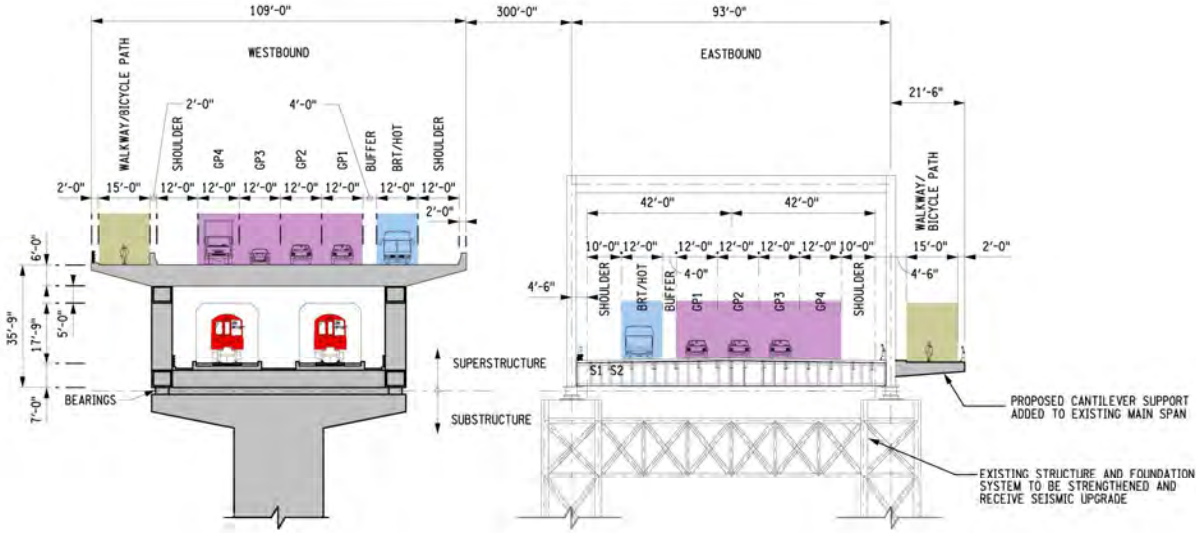
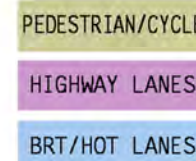
The impacts in this area are similar to Rehabilitation Option 2. There is substantial overlap between the existing and proposed lane arrangements in the landing area. A simple transition of traffic between the existing and widened Thruway would not be possible. Instead traffic lanes would need to be temporarily shifted to remove traffic from the area of overlap and allow construction of the widened bridge in the landing area. Any shift of traffic would need to maintain access for east bound traffic to the Toll Plaza.



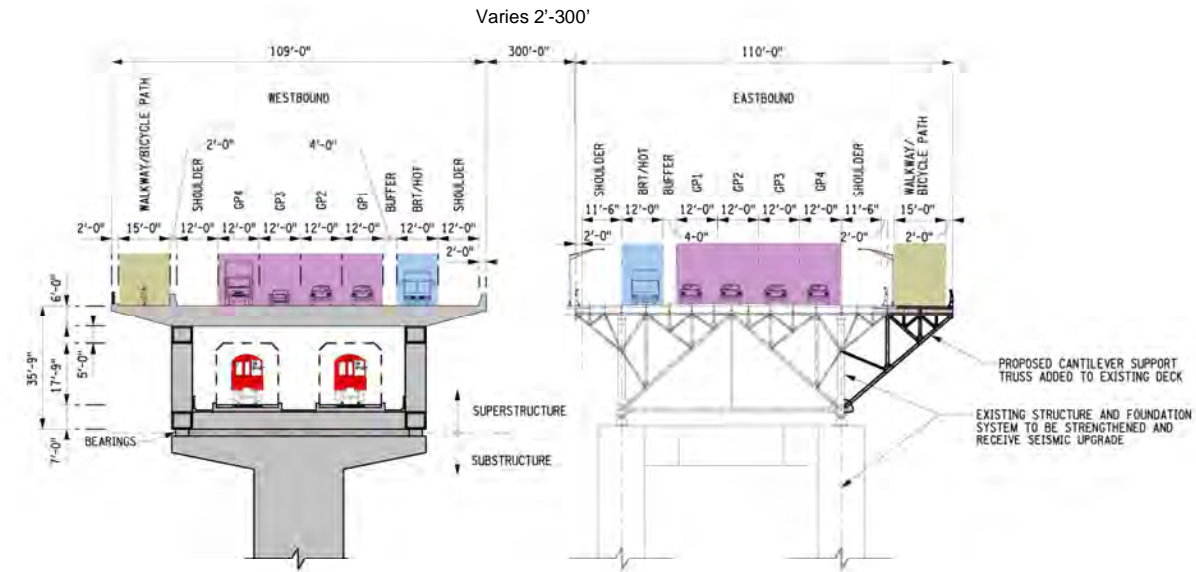
General Arrangement



Section 1 - Causeway



Section 2 – Main Span



Section 3 – East Deck Truss

Figure 3-10
Rehabilitation Option 4: Typical Cross Sections