

BICYCLE AND PEDESTRIAN ACCESS STUDY

ROOSEVELT BOULEVARD BRIDGE OVER CROOK HORN CREEK

City of Ocean City and Upper Township
Cape May County
New Jersey



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Submitted to:
**County of Cape May
Cape May Court House, New Jersey**

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Executive Summary

As part of the scope of services for design of bridge deck rehabilitation for the Roosevelt Boulevard Bridge over Crook Horn Creek, the feasibility of providing pedestrian and/or bicycle access across the bridge has been investigated with the assumption that the work will be performed in conjunction with the deck rehabilitation program. Therefore, where appropriate, the costs associated with each alternate listed below were added to the estimated deck rehabilitation construction costs to obtain a reasonable comparison of construction cost. The four alternates noted below were evaluated based on the following criteria: ability to achieve pedestrian/bicycle access; construction cost; and impacts on right-of-way, utilities and environmental permitting.

Alternates:

- 1) Modify existing safetywalk and barrier parapets to provide a bicycle compatible lane in each direction. Pedestrian safetywalks are eliminated in order to minimize widening and impacts.
- 2A) Widen the existing structure along the south fascia and provide a bicycle compatible eastbound lane and 6-foot pedestrian sidewalk.
- 2B) Widen the existing structure along the south fascia and provide a separate 10 foot wide shared use pathway (south side of bridge only) for bicyclists and pedestrians to travel in both directions.
- 3) Construct a separate 10 foot wide shared use structure along the south fascia for bicyclists and pedestrians to travel in both directions.

Alternate 2B has been determined to be the preliminary preferred alternate. Alternate 2B achieves the goal of providing a shared use path to allow both pedestrian and bicycle access across the structure and has less impacts to ROW, utilities and environmental permitting when compared to Alternate 3. Alternate 2B reconstructs the entire bridge deck which increases the initial construction cost as compared to Alternates 1 and 2A which provide only deck rehabilitation on 18 of the 31 spans. Although Alternate 1 is the least expensive, it does not permit pedestrian access and Alternate 1 is more expensive than Alternate 2B when life cycle costs (maintenance and replacement of deck in future years) are included.

Alternate 2B will affect the scope of work under the Deck Rehabilitation Program as currently proposed. In order to incorporate the modifications associated with Alternate 2B, the project advertisement would be postponed until late 2016 with construction starting in Spring 2017 and completion in May 2018.

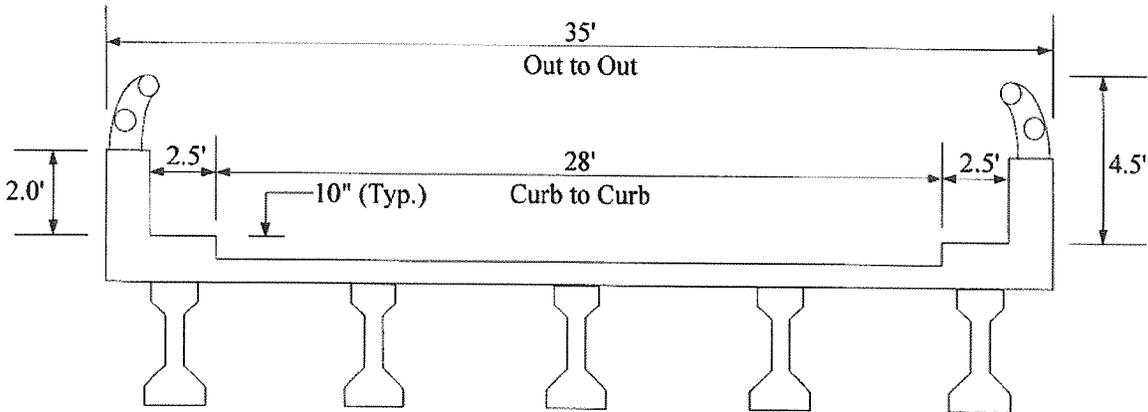
The construction costs noted herein are in 2016 dollars and do not include costs associated with construction inspection and contract administration.

I. Introduction

As part of the Roosevelt Boulevard Bridge Deck Rehabilitation project, GPI evaluated the feasibility of providing pedestrian and/or bicycle access along the south side of the bridge from the West Service (access) Road on the Upper Township side to the East Service (access) Road on the Ocean City side of the bridge. Access alternates conform to the Federal and State Americans with Disability Act (ADA) including applicable amendments. Alternates were evaluated based on ability to achieve pedestrian and bicycle access; construction cost; and impacts on right-of-way, utilities and environmental permitting.

II. Existing Conditions Summary

The Roosevelt Boulevard Bridge was constructed in 1964 and has remained basically unchanged since it was opened to traffic. The bridge is approximately 1,628 feet long and is comprised of 31 spans. The bridge consists of a single 93 feet long steel through-girder main span and 30 prestressed concrete girder spans of various lengths. The typical approach span cross-section (shown below) is symmetrical and consists of a 14 feet wide lane with a 2.5 feet wide safetywalk and concrete parapet with steel railing in each direction. The substructures consist of stub abutments, multi-column piers, wall piers and pier pile bents. All substructures are founded on deep foundations consisting of either cast-in-place concrete piles or timber piles. Photos of the existing structure are included in Appendix 1.



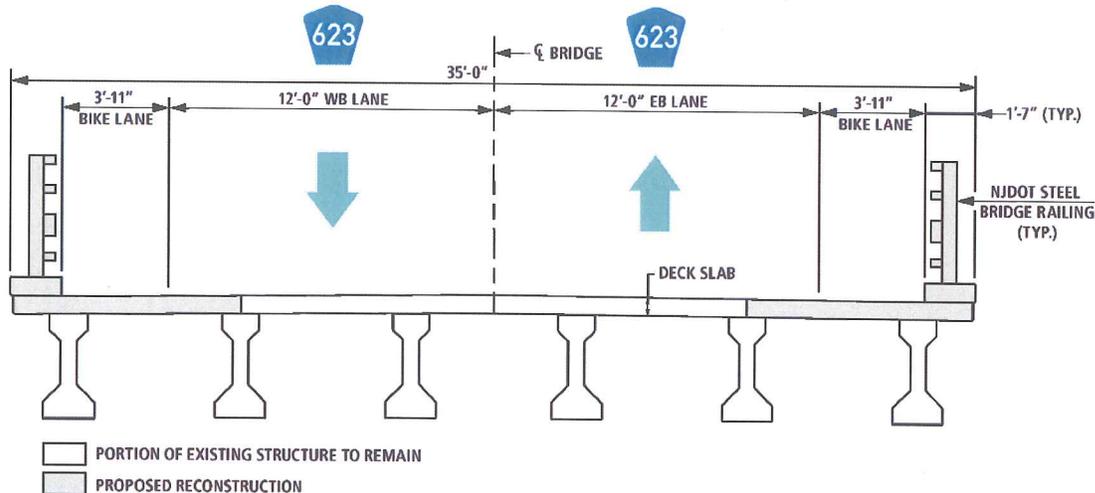
III. Alternates

Four alternates were identified to meet the goal of providing a pedestrian and/or bicyclist pathway across the Roosevelt Boulevard Bridge:

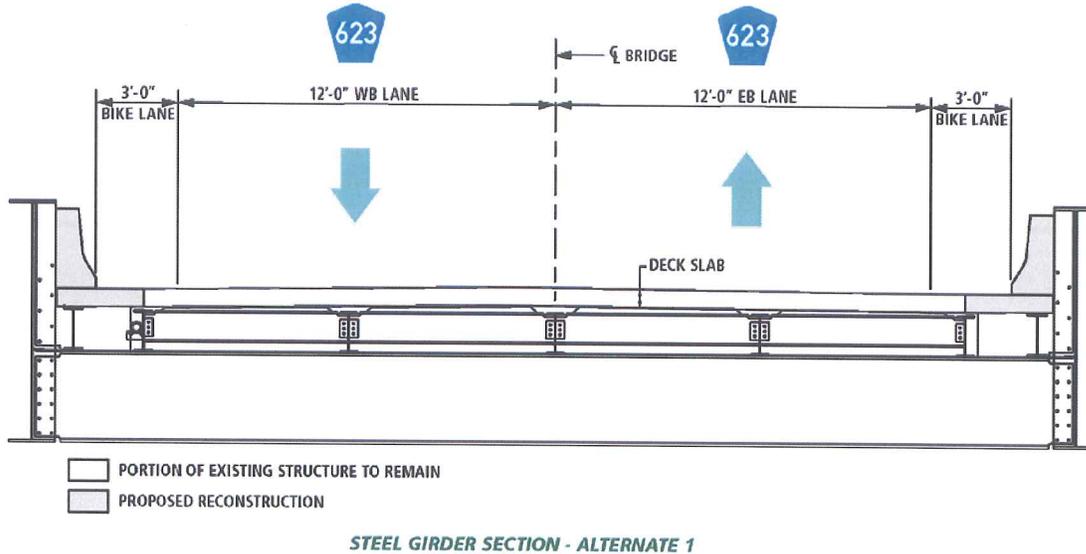
- 1) Modify existing safetywalk and barrier parapets to provide a bicycle compatible lane in each direction. Safetywalks are eliminated in order to minimize widening and impacts.
- 2A) Widen the existing structure along the south fascia and provide a bicycle compatible eastbound lane and 6-foot pedestrian sidewalk.
- 2B) Widen the existing structure along the south fascia and provide a separate 10 foot wide shared use pathway (south side of bridge only) for bicyclists and pedestrians to travel in both directions.
- 3) Construct a separate 10 foot wide shared use structure along the south fascia for bicyclists and pedestrians to travel in both directions.

A. Alternate 1

Alternate 1 involves removal of the existing safetywalk and replacement of the barrier parapets with standard NJDOT bike compatible steel bridge railings. The concrete deck spanning both fascia bays will also need to be completely reconstructed to accommodate the new railing system vehicular crash level requirements. The single steel through girder main span will require more expensive removal and reconstruction to accommodate the bike lane, and the existing steel safetywalk and parapet will be replaced with a standard half shape barrier curb cast against the steel through girder. The additional roadway width gained from these modifications satisfies NJDOT minimum requirements (15 feet) for bicycle compatible lanes. A new bridge lighting system will be required due to the reconstruction of both fascias. Safetywalks are eliminated.



TYPICAL SECTION - ALTERNATE 1

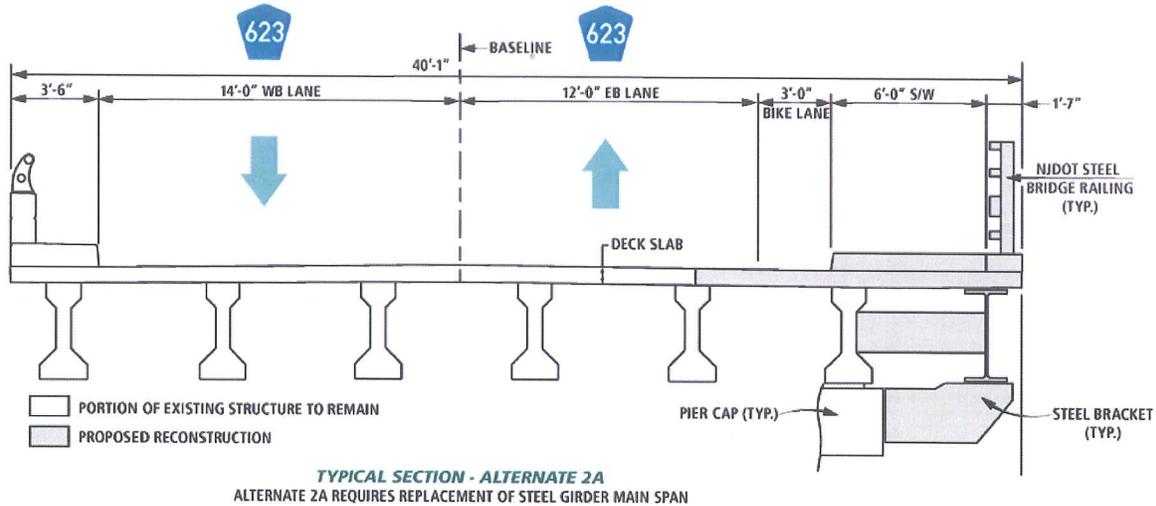


As a result of maintaining the out-to-out width of the bridge with no new substructure elements, this alternate results in the least overall impacts and lowest construction costs. No utility impacts are anticipated and minimal permitting is required. Alternate 1 has the least initial construction cost at a value of \$10M.

B. Alternate 2A

Alternate 2A involves the widening of the existing structure along the south fascia through addition of a new fascia girder line supported by cantilevered brackets extending from the existing pier caps. The additional structure width will accommodate a 6-foot pedestrian sidewalk and bridge railing along the south fascia and an eastbound bicycle lane. The widening will be ADA compliant as the vertical grade of the existing structure is less than the maximum permitted (5%). To accommodate these modifications, the concrete deck along the south fascia bay would be completely reconstructed and new bridge lighting required along the south fascia.

This alternate provides access for bicyclists and pedestrians traveling eastbound across the bridge. The main steel through girder span will require complete replacement as this structure type cannot be modified to incorporate the changes to the cross section that are associated with this alternate. Replacement of this span can be performed under a complete closure of the bridge for a limited duration of approximately 1 week using Accelerated Bridge Construction (ABC) techniques involving prefabricated beams and deck elements. If ABC techniques are not used, the approximate duration to replace this span is 3 months utilizing both one lane closures (maintaining one lane of alternating direction traffic) combined with a limited number and duration (less than 24 hours) of full bridge closures for construction access. Grading at the approaches will be required to accommodate the wider section, which would likely result in the need to construct a retaining wall along the east approach.

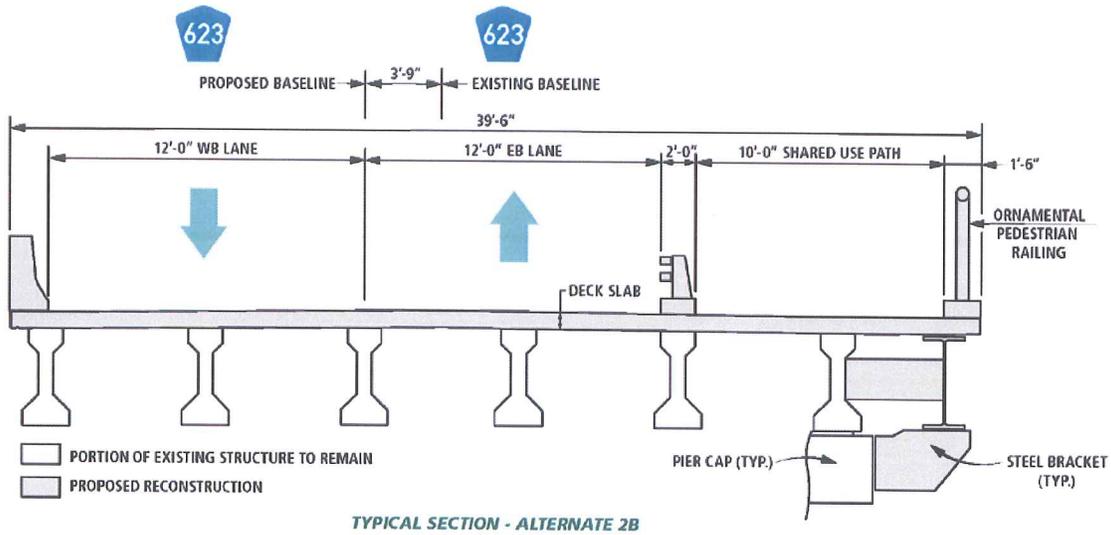


Alternate 2A will have increased impacts compared to Alternate 1. Utility impacts are likely due to the close proximity of the high voltage lines to the south fascia; crane placement and boom clearances associated with erection of the new fascia girders will potentially violate the minimum clearances required for high voltage lines thereby necessitating utility coordination for temporary shutdowns. Environmental permitting and approval from several agencies would be required due to the increased footprint of the bridge and construction access from within the waterway. Alternate 2A has an estimated construction cost of \$12M.

C. Alternate 2B

Alternate 2B is similar to Alternate 2A in that it also requires a widening along the south fascia; however, the required widening is slightly less. This widening, coupled with a replacement of the entire bridge deck, northern barrier parapet, and shift in the roadway baseline, would facilitate the installation of a separate 10 foot wide shared use path that will allow both bicyclists and pedestrians to travel across the bridge in either direction. This path would be separated from vehicular traffic by a two-foot wide barrier.

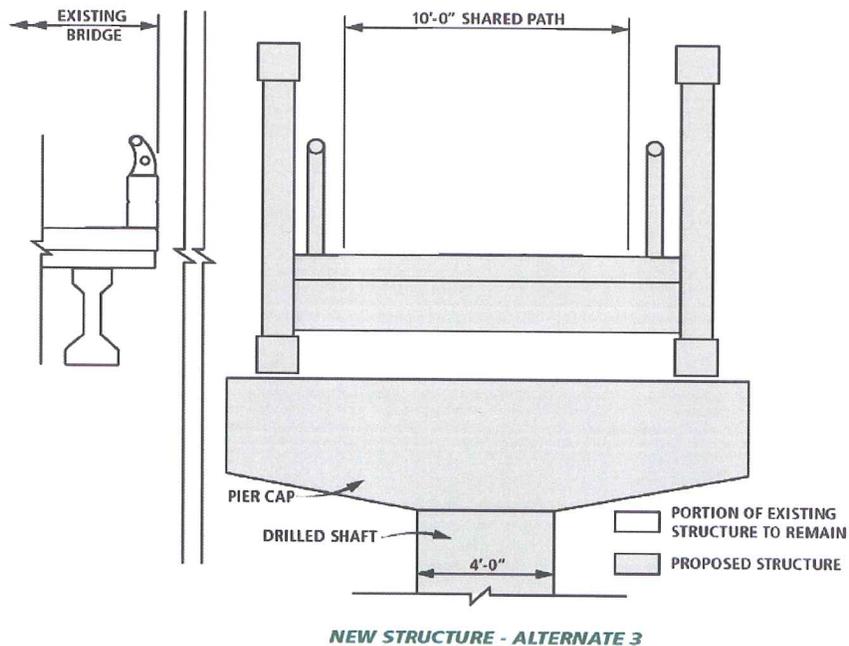
Similar to Alternate 2A, the widening requires a fascia beam supported by brackets attached to each pier cap, as well as complete replacement of the main steel through girder span using ABC methods. The shift in the horizontal alignment to the north is required to limit the amount of widening to the south. Otherwise it is not feasible to incorporate the 10'-0" wide shared path into the existing structure because of the increased load that the cantilever brackets would have to support and transfer to the existing pier caps.



Impacts from this alternate are similar to Alternate 2A with the exception that the deck is completely replaced. Alternate 2B has an estimated construction cost of \$13M. This alternate provides a deck that has a design service life of approximately 50 years.

D. Alternate 3

Alternate 3 provides a 10 foot wide shared use path via a separate structure constructed to the south of the existing bridge. The new structure would be founded on independent drilled shafts extending to prefabricated concrete pier caps and a prefabricated steel superstructure.



Building a new separate structure will result in the greatest impacts. A significant number of environmental permits would be required and the high voltage overhead electric wires would need to be relocated. Retaining walls along each approach to the structure will be required to limit impacts to ROW, adjacent roadways and environmental permitting. The structure would be designed to meet the ADA requirements. The estimated construction cost for Alternate 3 is \$10M which does not consider the costs associated with the deck replacement program since this is an isolated structure that does not require any modifications to the existing bridge. When the estimated deck replacement program costs are included, the combined cost is approximately \$18M. This alternate does not include the cost associated with the electrical facility relocation.

E. Summary Matrix

A summary of the various impacts and parameters that were considered during the evaluation of each Alternate is presented in the matrix below:

ALTERNATE	ROW IMPACTS	IMPT REQUIRED ON BRIDGE	ADA COMPLIANT	UTILITY IMPACTS	PERMIT IMPACTS										CONSTRUCTION DURATION	CONSTRUCTION COST		
					WETLANDS MITIGATION	COASTAL WETLANDS	WETLANDS (GP-10)	TIDELANDS	ARMY CORPS	CAFRA	COAST GUARD	WATER QUALITY CERTIFICATION	WATER FRONT DEVELOPMENT	STORMWATER			FLOOD HAZARD	
1		✓						✓								✓	1 year	\$10M
2A		✓	✓	✓				✓	✓	✓		✓	✓	✓		✓	1.5 years	\$12M
2B		✓	✓	✓				✓	✓	✓		✓	✓	✓		✓	1.5 years	\$13M
3	✓		✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	2 years	\$18M

Appendix 1 – Existing Bridge Photos

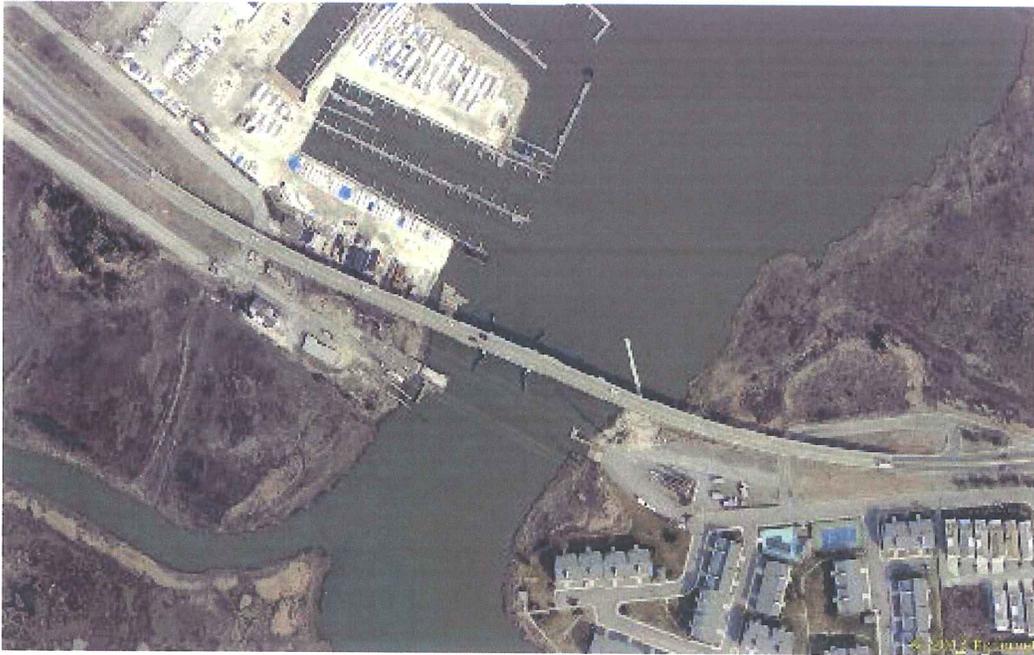


Photo 1 – Aerial View of Roosevelt Boulevard Bridge



Photo 2 – View on Bridge Deck Looking West



Photo 5 – Main Steel Span



Photo 6 – East Approach