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Secretary

February 3, 2016

MEMORANDUM TO: Mr. Hugh Overholt, Member, Board of Transportation
Mr. Ferrell Blount, At-Large Member, Board of Transportation
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Mr. Jeff Cabaniss, P.E., Division Planner, Division 2
Mr. Mike Holder, P.E., Chief Engineer
Mr. Tom Childrey, Manager, Right of Way
Mr. Doug Lane, Contract Standards and Development
Mr. Patrick Flanagan, Down East RPO
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Mr. Jim Speer, P.E., Roadway Design
Mr. Patrick Norman, P.E., Transportation Planning
Mr. Lee Cowhig, EI, Transportation Planning
Mr. James Dunlop, P.E., Congestion Management
Mr. Richard Hancock, P.E. PDEA
Mr. Charles Cox, P.E., PDEA
Mr. David Wasserman, P.E., Prioritization Office

FROM: Mr. Derrick W. Lewis, P.E.
Feasibility Studies Unit
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SUBJECT: Feasibility Study FS-1002A / U-5740; US 70 Causeway Improvements from 4th Street in Morehead City to the proposed US 70 Bypass (R-3307) in Beaufort, Carteret County, Division 2.

Our staff has completed a feasibility study for the proposed project referenced above. A copy of our report is attached for your information.

Feasibility Studies are also available online located at:
<https://connect.ncdot.gov/projects/planning/Pages/FeasibilityStudyDocuments.aspx>

DWL/sdy

Attachment



FEASIBILITY STUDY

US 70 Causeway Improvements
From 4th Street in Morehead City to the Proposed
US 70 Bypass (R-3307) in Beaufort

Carteret County
Division 2
FS-1002A / U-5740

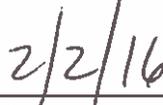


Feasibility Studies Unit
Division of Planning and Programming
North Carolina Department of Transportation

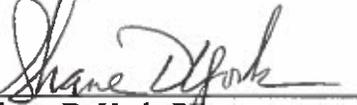
February 2, 2016



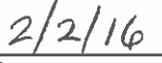
Derrick W. Lewis, PE
Feasibility Studies Unit Head
Feasibility Studies Unit, NCDOT



Date



Shane D. York, PE
Feasibility Studies Engineer
Feasibility Studies Unit, NCDOT



Date

US-70 Causeway Improvements from 4th Street in Morehead City to the Proposed US 70 Bypass (R-3307) in Beaufort; Carteret County

I. INTRODUCTION

This project proposes to widen the US 70 Causeway to 2 travel lanes in each direction from 4th Street in Morehead City to the Proposed US 70 Bypass (R-3307) in Beaufort, Carteret County, with a total distance of approximately 1.6 miles. US 70 is a two to four-lane principal arterial and has posted speed limit of 35 to 45 mph within the project limits. The surrounding land uses are a mix of residential, industrial/commercial, marina/marina services, and recreational uses in the immediate vicinity of the project site.

It should be noted that a Feasibility Study is a preliminary document that is the initial step in the planning and design process for a candidate project and not the product of exhaustive environmental or design investigations. The purpose of the study is to describe the proposed project including cost, and identify potential problems that may require consideration in the planning and design phases.

Once a candidate project is identified for funding in the TIP, the Feasibility Study is followed by a rigorous planning and design process that meets the requirements of the National Environmental Policy Act (NEPA), where either an Environmental Impact Statement (EIS) or an Environmental Assessment (EA) is done.

Figure 1 shows the general project location and feasibility study area.

II. PURPOSE AND NEED

The primary need of the proposed project includes the following:

- The bridge needs to be replaced. Bridge # 150013 was built in 1964 and listed as structurally deficient. It has two travel lanes and carries 2-way traffic over Newport River. The main structure is a steel continuous stringer multibeam with a maximum span of 141 ft. and a navigation vertical clearance of 65 feet, while the approach structure consists of prestressed concrete girders. The total structure length is 3248 ft (approx. 0.62 mile).
- Traffic congestion between Morehead City and the Town of Beaufort. As you travel east from Morehead City towards the bridge the road drops from four lanes down to two lanes. East of the bridge it widens back to a 4 lane divided section. The two-lane section creates a bottleneck.
- The predicted LOS as a two lane bridge in the design year is F.

The primary purposes of the proposed project includes the following:

- Replace an aging bridge that is structurally deficient.
- Eliminate the two-lane bottleneck and provide a continuous four lane facility.
- Improve the Level of Service (LOS) for vehicles traveling on US 70. By widening the bridge to four lanes the LOS will improve from F in the AM and PM peak hours to C in the AM and B in the PM peak hours.

III. EXISTING CONDITIONS

US 70 within the feasibility study area is a four lane divided facility in Morehead City with a posted speed limit of 35 mph. It is functionally classified as an Other Principal Arterial. There is a railroad track in the median of the road. East of 4th street the road transitions to a two-lane facility along the frontage of the Port Terminal. The Causeway Bridge carries traffic over the Newport River. East of the bridge US 70 transitions into a four-lane divided facility with a raised concrete median. Just east of the intersection with SR 1175 (Radio Island Road) the speed limit increases to 45 mph. US 70 connects Morehead City to the Town of Beaufort. US 70 is classified as Statewide in the NC Multimodal Investment Network (NCMIN). US 70 is also classified as a Strategic Transportation Corridor from Wake County to Carteret County.

Railroad tracks parallel US 70 within the feasibility study area. There is a draw bridge for the railroad on the Newport River (Bridge No. 150110). The owner of the railroad is the North Carolina State Ports Authority, and the operator is Carolina Coastal Railway.

US 70 has curb and gutter and sidewalks on both sides in Morehead City and a grassy shoulder surrounding the railroad track in the median. US 70 along the frontage of the Port Terminal has 2 ft paved shoulders and a raised concrete median. US 70 on Radio Island has grassy shoulders and a raised concrete median. The intersection of US 70 and Radio Island Road also provides access to the public boat ramp on the north side of Radio Island. Large electrical power lines run parallel to US 70 just south of the Causeway Bridge.

IV. OTHER PLANNED TRANSPORTATION PROJECTS

There are two other projects in the Adopted 2016-2025 State Transportation Improvement Program (STIP) near the study area. These include:

- R-3307 Construct new bridge over Gallant's Channel. Four lanes from Radio Island to US 70 north of Beaufort near SR 1429 (Olga Road). This project is currently in construction. Multi-lanes, part on new location.
- AV-5746 Construct full parallel taxiway at Michael J. Smith Field in the Town of Beaufort.

V. DESCRIPTION OF ALTERNATIVES

For evaluation purposes, the project was divided into segments. Segment 1 starts at 4th Street in Morehead City and stops at the western limit of the bridge. Segment 2 is the bridge. Segment 3 starts at the eastern limit of the bridge and stops at the proposed tie in to R-3307 on the east side of Radio Island.

Segment 1

Design concept A proposes a four-lane divided section with 12 ft lanes and a 20 foot raised concrete median. It has a 5 ft sidewalk and curb and gutter on the north side and a 4 ft paved shoulder on the south side. The existing traffic signal at US 70 and Port Terminal Road would be relocated approximately 200 ft east. Due to the presence of the railroad on the south side, all the widening occurs on the north side.

Design concept B proposes a four-lane divided section with 11 ft lanes and a 4 – 20 ft variable raised concrete median. The 11 ft lanes transition to 12 ft lanes just east of the northern entrance to the Port Terminal. US 70 has a 5 ft sidewalk and curb and gutter on the north side and a 4 ft paved shoulder on the south side. The existing traffic signal at US 70 and Port Terminal Road would be relocated approximately 300 ft east and would align with the proposed Bridges Street Extension. Bridges Street Extension is a 2 lane facility with 12 ft lanes on new location that connects US 70 to the intersection of 4th Street to Bridges Street. The existing intersection of 4th Street and US 70 would be converted from full access to right-in, right-out access from the side street. The existing traffic signal at US 70 and 4th Street would be removed.

Segment 2

There were two design concepts for Segment 2, widen to the north side and widen to the south side of the existing bridge. In both cases the proposed bridges would be one-way pairs with two 12 ft lanes with a 10 ft paved shoulder on the outside and a four ft paved shoulder on the inside. The northern side of the north bridge would have a 5 ft sidewalk.

The north widening would impact the ROW for Phosphate Plant. The existing chute that transfers material from the plant to the port terminal would remain in place. The road underneath the bridge that access the plant would remain in place. Widening to the south would require the relocation of the large power lines to a location south of the railroad tracks. The Port Authority requested that during construction for this bridge the width of the channel that allows ships to travel under the bridge be widened. This would also widen the draw bridge that serves the railroad.

Segment 3

There were 5 alternates for Segment 3. Four of them are grade separated, and the fifth alternate is at-grade.

Alternate A

Alternate A proposes to grade separate US 70 over SR 1175 (Radio Island Road) at the existing location of US 70 and Radio Island Road / and the public boat ramp access road.

The typical section for the US 70 bridge is a four-lane divided section with a 10 ft median and 10 ft paved shoulders on both sides. The median has a concrete barrier in the middle.

The typical section for US 70 at grade is a four-lane divided facility with a variable 10 - 20 ft raised grassy median and 4 ft paved shoulders on the outside. The north side of the road has curb and gutter and a 5 ft sidewalk.

The railroad crossing of Morgan Road has been realigned to cross at a location southwest of existing, creating a new intersection with Radio Island Road. SR 1205 (Old Causeway Road) has been relocated to intersect with Morgan Road and Radio Island Road. The proposed typical for Morgan Road and Radio Island Road is two 12 ft lanes.

The northern portion of Morgan Road would be removed. The portion of Old Causeway Road just west of Radio Island Road would be removed. These changes will eliminate the existing 5-leg intersection and convert it to a 3-leg intersection.

Alternate B

Alternate B proposes to grade separate US 70 over SR 1175 (Radio Island Road) and move the rail crossing approximately 400 ft east of the existing location, which would be removed. A new location road to access the public boat ramp would be constructed on the north side.

The typical section for the US 70 bridge is a four-lane divided section with a 10 ft median and 10 ft paved shoulders on both sides. The median has a concrete barrier in the middle.

The typical section for US 70 at grade is a four-lane divided facility with a variable 10 - 20 ft raised grassy median and 4 ft paved shoulders on the outside. The north side of the road has curb and gutter and a 5 ft sidewalk.

The boat ramp access road (-Y1-) is a 2 lane facility with 12 ft lanes on new location that connects US 70 to the boat ramp. Due to the proximity to the water, a retaining wall will be required on the north side.

Alternate C

Alternate C proposes to grade separate a new location road -Y1- over US 70. The existing intersection of Radio Island Road (SR 1175) and the public boat ramp access road will be removed. Old Causeway Road -Y2- (SR 1205) and Radio Island Road -Y3- (SR 1175) and Morgan Road will be

realigned to create a new intersection approximately 200 ft south of the existing intersection. This will eliminate the five leg intersection and create a four-leg intersection.

The typical section for US 70 at-grade is a four-lane divided facility with a 20 ft raised grassy median and 4 ft paved shoulders on the outside. The north side of the road has curb and gutter and a 5 ft sidewalk.

The typical section for –Y1- Bridge over US 70 is five 12 ft lanes with 10 ft paved shoulders The typical section for the portion of –Y1- on the approach and departure of the bridge is two 12 ft lanes with 10 ft paved shoulders on both sides.

The typical section for –Y1- at-grade, –Y2-, -Y3-, -Y4-, and –Y5- is two 12 ft lanes.

Alternate D

Alternate D proposes to grade separate a new location road –Y1- over US 70 approximately 600 feet east of the existing location, which will be removed. This will put the bridge supports in the water on both sides of Radio Island.

The typical section for US 70 at-grade is a four-lane divided facility with a 20 ft raised grassy median and 4 ft paved shoulders on the outside. The north side of the road has curb and gutter and a 5 ft sidewalk. Due to the proximity to the water, a retaining wall will be required on the north side.

The typical section for –Y1- Bridge over US 70 is five 12 ft lanes with 10 ft paved shoulders The typical section for the portion of –Y1- on the approach and departure of the bridge is two 12 ft lanes with 10 ft paved shoulders on both sides.

The typical section for –Y1- at-grade, –Y2-, -Y3-, and -Y4- is two 12 ft lanes.

Alternate E

Alternate E is the at-grade alternate. It proposes to eliminate the five-leg intersection by moving approximately 400 ft east of the existing intersection, which will be closed. A new location road –Y- will be constructed on the north side of US 70 to access the public boat ramp.

The typical section for US 70 at-grade is a four-lane divided facility with a 20 ft raised grassy median and 4 ft paved shoulders on the outside.

The typical section for –Y1- is two 12 ft lanes. Due to the proximity to the water, a retaining wall will be required on the north side.

VI. TRAFFIC AND SAFETY

Traffic Analysis

Level of service (LOS) is the standard measure of effectiveness used to determine the quality of service provided by transportation facilities and is represented by a letter designation of A to F. LOS A represents the best operating conditions and LOS F represents a breakdown in traffic flow. Synchro 9 was used for all intersection analyses and Highway Capacity Software (HCS 2010) was used to perform freeway and multilane highway analyses.

Table 1 - Level of Service Classifications and Conditions

Level of Service (LOS)	Traffic Flow Conditions
A	Free flow operations. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The general level of physical and psychological comfort provided to the driver is still high.
B	Reasonably free flow operations. The ability to maneuver within the traffic stream is only slightly restricted and the general level of physical and psychological comfort provided to the driver is still high.
C	Flow with speeds at or near free flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted and lane changes require more vigilance on the part of the driver. The driver notices an increase in tension because of the additional vigilance required for safe operation.
D	Speeds decline with increasing traffic. Freedom to maneuver within the traffic stream is more noticeably limited. The driver experiences reduced physical and psychological comfort levels.
E	At lower boundary, the facility is at capacity. Operations are volatile because there are virtually no gaps in the traffic stream. There is little room to maneuver. The driver experiences poor levels of physical and psychological comfort.
F	Breakdowns in traffic flow. The number of vehicles entering the highway section exceeds the capacity or ability of the highway to accommodate that number of vehicles. There is little or no room to maneuver. The driver experiences poor levels of physical and psychological comfort.

Source: Transportation Research Board, 2010

The 2012 No-Build Annual Average Daily Traffic (AADT) along US 70 ranges from approximately 18,400 vehicles per day west of 4th Street in Morehead City to 21,000 vehicles per day west of Radio Island Road. The 2012 traffic volumes within the feasibility study area are listed in Table 2.

Table 2 - 2012 No-Build Annual Average Daily Traffic Volumes

Route	Location	No-Build
US 70	West of 4 th Street	18,400
	East of 4 th Street	21,700
	East of Port Terminal Road	21,000
	East of Radio Island Road	20,900
4th Street	North of US 70	3,700
	South of US 70	600
Port Terminal Rd	South of US 70	1,500
Boat Ramp Access	North of US 70	200
Radio Island Rd	South of US 70	900

The 2035 Build Annual Average Daily Traffic (AADT) along US 70 ranges from approximately 29,200 vehicles per day west of 4th Street in Morehead City to 32,800 vehicles per day west of Radio Island Road. The 2035 traffic volumes within the feasibility study area are listed in Table 3.

Table 3 - 2035 Build Annual Average Daily Traffic Volumes

Route	Location	2035 Build
US 70	West of 4 th Street	26,200
	East of 4 th Street	34,000
	East of Port Terminal Road	32,800
	East of Radio Island Road	32,700
4th Street	North of US 70	5,500
	South of US 70	900
Port Terminal Rd	South of US 70	2,400
Boat Ramp Access	North of US 70	200
Radio Island Rd	South of US 70	1,300

Table 4 represents the analysis results for the segments along the corridor as a four-lane divided facility, US 70 is anticipated to operate at LOS C or above in the year 2035.

Table 4 - Multilane Segment Analysis

Segment	Year	AM	PM
		LOS / pc/mi/ln	LOS / pc/mi/ln
US 70 west of 4 th Street	2012	A 9.8	B 11.3
	2035	B 15.5	B 17.9
US 70 from 4 th Street to Port Terminal Road	2012	A 10.9	B 14.1
	2035	B 17.3	C 22.1
US 70 from Port Terminal Road to Radio Island Road SR 1175	2012	A 10.8	B 13.1
	2035	B 16.9	C 20.4
US 70 east of Radio Island Road SR 1175	2012	A 10.7	B 13.1
	2035	B 16.7	C 20.6

Table 5 - Two Lane Analysis

Segment	Year	LOS / vol/cap
US 70 from Port Terminal Road to Radio Island Road SR 1175	2012	E 0.68
	2035 No Build	F 1.06

If the two-lane bridge is not widened it will have a LOS of F in the design year.

Table 6 represents the analysis results for the signalized intersections along US 70. It is anticipated they will all operate at LOS D or better in the year 2035.

Table 6 - Signalized Intersection Analysis

Intersection	Year	AM	PM
		LOS / Delay (sec)	LOS / Delay (sec)
US 70 at 4 th Street	2012	B 14.2	C 28.1
	2035	C 26.3	D 41.7
US 70 at Port Terminal Road	2012	B 14.9	B 13.0
	2035	B 16.5	B 14.6
US 70 at Radio Island Road SR 1175	2012	C 20.9	C 21.2
	2035	C 26.3	C 21.0

Safety

Crash data was obtained from the NCDOT for portions of US 70 within the feasibility study area for the years 2012 – 2015. Table 6 summarizes High Level Crashes and Table 7 summarizes the Accident Types. The most common type of crash in the project area is Rear End. In the last 3 years there were 14 crashes at 4th Street and US 70, 1 at Port Terminal at US 70, and 10 crashes at Radio Island Road at US 70.

Table 6 - High Level Crash Summary

Crash Type	Number of Crashes	Percent of Total
Total Crashes	101	100
Fatal Crashes	0	0
Non-Fatal Injury Crashes	31	30.69
Total Injury Crashes	31	30.69
Property Damage Only Crashes	70	69.31
Night Crashes	5	4.95
Alcohol / Drugs Involvement Crashes	4	3.96

The crash rate for this facility was 171.93 crashes per 100 million vehicle miles. This is less than the statewide average crash rate of 210.37 for US routes in urban areas.

The severity index for this facility was 3.27. This is less than the statewide average of 3.99 for US routes in urban areas.

Table 7 - Accident Type Summary

Accident Type	Number of Crashes	Percent of Total
Angle	13	12.87
Animal	1	0.99
Fixed Object	1	0.99
Left Turn, Different Roadways	1	0.99
Left Turn, Same Roadway	3	2.97
Other Collision with Vehicle	3	2.97
Other Non-Collision	1	0.99
Pedalcyclist	1	0.99
Pedestrian	1	0.99
Ran Off Road – Right	5	4.95
Rear End, Slow or Stop	61	60.40
Right Turn, Same Roadway	1	0.99
Sideswipe, Opposite Direction	2	1.98
Sideswipe, Same Direction	7	6.93

VII. ENVIRONMENTAL SCREENING

The following is a preliminary review of environmental constraints that may have a potential effect on the project. The information obtained for the environmental screening is from readily available GIS sources. No survey work other than a field inspection was performed for this study. The environmental screening is not a substitute for the project planning / environmental documentation process. The purpose of environmental screening is to identify potential environmental constraints early in the process. For the purpose of this study, potential environmental constraints were identified within the feasibility study area.

Wetlands and Floodplains

The project area is surrounded by wetlands, specifically Estuarine and Marine Deepwater (the Newport River), and Estuarine and Marine Wetlands (the low elevation portions of Radio Island.) The project area is within the 100 year floodplain and the 500 year floodplain. Bogue Sound is just south of the project area.

Endangered Species

There is only one endangered species near the project. The Colonial Waterbird, (Gull-Tern-Skimmer Colony) is located on the north side of Radio Island. The last observation was made in 1977. A field visit will be needed to determine if the Waterbirds are still there during the NEPA process.

Historic Properties and Archaeology

As part of the environmental screening process, existing GIS and the NC State Historic Preservation Office webpage were reviewed for the presence of any known historic properties within the project area. There were none. Note that there are several in the Town of Beaufort, but they will not be impacted by this project.

There are no archaeological sites in or near the project area.

Hazardous Materials

There is one site that stores hazardous waste in the project area, and that is the NC State Port Authority on US 70.

VIII. EVALUATION OF ALTERNATIVES

Estimated costs associated with ROW impacts are shown in Tables 8A, 8B, and 8C. Estimated total costs associated with the design alternatives are summarized in Table 9. Note that ROW values in Table 9 have been rounded to the nearest multiple of \$100,000.

Table 8A - Summary of ROW Impacts

	Segment 1-A	Segment 1-B	Segment 2 North Widening
Type of Access	Partial C/A	Partial C/A	Full C/A
Estimated No. of Parcels	84	3	1
Residential Relocations	0	0	0
Business Relocations	2 / \$50,000	1 / \$25,000	0
Graves	0	0	0
Church / Non-Profit	0	0	0
Misc. Individual Boat Slips	80 / \$600,000	0	0
Land and Damage	\$15,125,000	\$2,500,000	\$22,300,000
Acquisition	\$775,000	\$225,000	\$200,000
Total Estimated R/W Cost:	\$16,550,000	\$2,750,000	\$22,500,000

Table 8B - Summary of ROW Impacts

	Segment 2 South Widening	Segment 3-A	Segment 3-B
Type of Access	Full C/A	Full C/A	Full C/A
Estimated No. of Parcels	1	4	5
Residential Relocations	0	0	0
Business Relocations	0	1 / \$25,000	0
Graves	0	0	0
Church / Non-Profit	0	0	0
Misc.	0	0	0
Land and Damage	\$1,125,000	\$3,300,000	\$3,125,000
Acquisition	\$50,000	\$175,000	\$150,000
Total Estimated R/W Cost:	\$1,175,000	\$3,500,000	\$3,275,000

Table 8C - Summary of ROW Impacts

	Segment 3-C	Segment 3-D	Segment 3-E
Type of Access	Full C/A	Full C/A	Full C/A
Estimated No. of Parcels	8	11	2
Residential Relocations	2 / \$40,000	5 / \$100,000	0
Business Relocations	1 / \$25,000	0	0
Graves	0	0	0
Church / Non-Profit	0	0	0
Misc.	0	0	0
Land and Damage	\$8,500,000	\$7,775,000	\$875,000
Acquisition	\$185,000	\$250,000	\$75,000
Total Estimated R/W Cost:	\$8,750,000	\$8,125,000	\$950,000

Table 9 - Summary of Cost Estimates

Segment – Alternate	Length (Mile)	Construction	Utility Relocation	ROW	Total
S1 - A	0.52	\$3,200,000	\$3,000,000	\$16,600,000	\$22,800,000
S1 - B	0.56	\$3,000,000	\$2,800,000	\$2,800,000	\$8,600,000
S2 - N	0.63	\$62,400,000	\$3,100,000	\$22,500,000	\$88,000,000
S2 – S	0.63	\$63,100,000	\$3,700,000	\$1,200,000	\$68,000,000
S3 – A	0.48	\$11,000,000	\$3,500,000	\$3,500,000	\$18,000,000
S3 – B	0.53	\$11,600,000	\$2,100,000	\$3,300,000	\$17,000,000
S3 – C	0.52	\$26,000,000	\$3,600,000	\$8,800,000	\$38,400,000
S3 – D	0.57	\$33,600,000	\$4,800,000	\$8,200,000	\$46,600,000
S3 – E	0.48	\$4,100,000	\$3,400,000	\$1,000,000	\$8,500,000

S1A – Segment 1 Design Concept A, 12 ft lanes with 20 ft median

S1B – Segment 1 Design Concept B, 11 ft lanes with 4 ft median

S2N – Bridge Widening to the North

S2S – Bridge Widening to the South

S3A – US 70 elevated west

S3B – US 70 elevated east

S3C – Y1 elevated west

S3D – Y1 elevated east

S3E – at grade

IX. CONCLUSIONS

All of the design concepts studied will provide adequate capacity for the projected traffic in the design year. The preferred combination of segments is Segment 1-B, Segment 2-South, and Segment 3-B.

In Segment 1, Design Concept B is preferred over A because the smaller ROW footprint preserves the commercial properties on the north side of US 70, which includes the Yacht Club.

In Segment 2, widening to the south is preferred over the north due to impacts to PCS Phosphate. The NC Port Authority and PCS Phosphate believe that widening to the north will disrupt current operations of PCS Phosphate and could result in making it a business relocate with damages of 30 to 40 million dollars. The design assumes PCS Phosphate will continue using the conveyor belt and the road underneath the bridge. PCS Phosphate currently leases all the Port Authority land on the north side of US 70 providing 50 to 60% of the Port Authorities annual revenue.

Note that widening to the south has impacts also. Major electrical high voltage transmission lines connecting Morehead City to Beaufort will be substantially impacted. The design recommends moving them south of the Railroad tracks, though the placement of them may impact the turning basin for ships. Existing submarine telephone, water and sewer lines will create problems for any new pilings. The Southern widening assumes PCS Phosphate will continue using the conveyor belt and the road underneath the bridge.

Both North and South alternates recommend widening the channel beneath the bridge. This will require the replacement of the Railroad drawbridge. Note that the design labels the new width of the channel as 100 ft, though the actual width will be determined by the bridge design in the future. 100 ft was used to generate a cost estimate.

In Segment 3, Alternate B (elevated US 70 to the east) is preferred because it had the least impacts and was the least expensive of the grade-separated options.

The combined cost of these options:

Alternate	Construction	Utility Relocation	ROW	Total
S1-B	\$3,000,000	\$2,800,000	\$2,800,000	\$8,600,000
S2-South	\$63,100,000	\$3,700,000	\$1,200,000	\$68,000,000
S3-B	\$11,600,000	\$2,100,000	\$3,300,000	\$17,000,000
Totals	\$77,700,000	\$8,600,000	\$7,300,000	\$93,600,000

If an interim solution is desired for Segment 3, Alternate E provides a four-lane divided at-grade option.