

Appendix C. Cost Estimates

West Pearl River

**West Pearl River
Computations Matrix
January 24, 2017**

Alternative R-1 Rehabilitation	Location	Offset	Required ROW (acres)	ROW Cost	Cost					Potential Wetlands Acreage Affected
					Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost	
Rehabilitation	Existing			\$ -	14,359,375	\$ 75,000	\$ 1,600,000	\$ 16,034,375		
Permanent fixed, new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Temporary, fixed new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Permanent movable, new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Temporary, movable new construction	Downstream	52.5	0	\$ -	\$ 11,200,000	\$ 400,000	\$ 800,000	\$ 12,400,000	\$ 69,920	3.9
Demo Existing Bridge			0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Total			0	\$ -				\$ 28,434,375	\$ 69,920	3.9
Road W 650	Bridge 540	Road E 650	Permanent Temporary (ft.)						\$ 28,504,295	

Alternative R-2 Rehabilitation for Use in One-Way Pair (Add New Parallel Couplet)	Location	Offset	Required ROW (acres)	ROW Cost	Cost					Potential Wetlands Acreage Affected
					Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost	
Rehabilitation				\$ -	\$ 14,359,375	\$ 75,000	\$ 1,600,000	\$ 16,034,375	\$ -	
Permanent fixed, new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Temporary, fixed new construction			0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Permanent movable, new construction	Downstream	52.5'	0	\$ -	\$ 23,000,000	\$ 1,400,000	\$ 800,000	\$ 25,200,000	\$ 193,420	10.9
Temporary, movable new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Demo Existing Bridge			0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Total			0	\$ -				\$ 41,234,375	\$ 193,420	10.9
Road W 2750	Bridge 1340	Road E 1000	Permanent (ft.) Temporary						\$ 41,427,795	

**West Pearl River
Computations Matrix
January 24, 2017**

Alternative R-3				Required ROW (acres)	ROW Cost	Cost					Potential Wetlands		
Bypass and Adaptive Reuse for Non-Vehicular Use on site and New Bridge						Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost	Acreage Affected		
Rehabilitation				Existing		\$ -	6,000,000	\$ 50,000	\$ 605,000	\$ 6,655,000	\$ -		
Permanent fixed, new construction				Downstream	52.5	0	\$ -	\$ 18,960,000	\$ 1,780,000	\$ 2,074,000	\$ 22,814,000	\$ 216,600	11.0
Temporary, fixed new construction							\$ -	\$ -	\$ -	\$ -	\$ -		
Permanent movable, new construction													
Temporary, movable new construction							\$ -	\$ -	\$ -	\$ -	\$ -		
Demo Existing Bridge						0	\$ -	\$ -	\$ -	\$ -	\$ -		
Total						0	\$ -				\$ 29,469,000	\$ 216,600	11.0
Road W 1400	Bridge 3700	Road E 600	Permanent (ft.) Temporary	\$ 29,685,600									

Alternative F-1 New Fixed Span Structure at 50' Vertical Clearance above MHW (1.35) on Offset Alignment				Location	Offset	Required ROW (acres)	ROW Cost	Cost					Potential Wetlands Acreage Affected	
								Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost		
Rehabilitation							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Permanent fixed, new construction				Downstream	52.5'	0	\$ -	\$ 18,960,000	\$ 1,780,000	\$ 2,074,000	\$ 22,814,000	\$ 216,600	11.0	
Temporary, fixed new construction							\$ -	\$ -	\$ 450,000	\$ -	\$ 450,000	\$ -		
Permanent movable, new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Temporary, movable new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Demo Existing Bridge						0	\$ -	\$ 850,000	\$ 450,000	\$ -	\$ 1,300,000	\$ -		
Total						0	\$ -				\$ 24,564,000	\$ 216,600	11.0	
Road W 1400 500	Bridge 3700	Road E 600 700	Permanent (ft.) Temporary	note: Cost includes frontage road connection Requires low profile diversion during construction										\$ 24,780,600

**West Pearl River
Computations Matrix
January 24, 2017**

Alternative M-1				Location	Offset	Required ROW (acres)	ROW Cost	Cost					Potential Wetlands Acreage Affected
New Movable Lift Span Structure at 50' (open) Vertical Clearance on Offset Alignment Low Chord above 100-Year Flood EL Plus 1'								Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost	
Rehabilitation							\$ -	\$ -	\$ -	\$ -	\$ -		
Permanent fixed, new construction							\$ -	\$ -	\$ -	\$ -	\$ -		
Temporary, fixed new construction							\$ -	\$ -	\$ -	\$ -	\$ -		
Permanent movable, new construction				Downstream	52.5'	0	\$ -	\$ 27,054,181	\$ 2,000,000	\$ 2,000,000	\$ 31,054,181	\$ 195,130	10.9
Temporary, movable new construction							\$ -	\$ -	\$ -	\$ -	\$ -		
Demo Existing Bridge						0	\$ -	\$ 850,000	\$ 400,000	\$ -	\$ 1,250,000	\$ -	
Total						0	\$ -				\$ 32,304,181	\$ 195,130	10.9
Road W 2500	Bridge 1535	Road E 1100	Permanent (ft.) Temporary	note: Cost includes frontage road connection					\$ 32,499,311				

Alternative M-3				Required ROW (acres)	ROW Cost	Cost					Potential Wetlands Acreage Affected		
New Movable Bascule Span Structure at 50' (open) Vertical Clearance On Offset Alignment Low Chord above 100-Year Flood EL Plus 1'						Location	Offset	Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost	
Rehabilitation							\$ -	\$ -	\$ -	0	\$ -	\$ -	
Permanent fixed, new construction							\$ -	\$ -	\$ -	0	\$ -	\$ -	
Temporary, fixed new construction							\$ -	\$ -	\$ 230,000	\$ -	\$ 230,000	\$ -	
Permanent movable, new construction				Downstream	52.5'	0	\$ -	\$ 36,283,434	\$ 1,650,000	\$ 1,800,000	\$ 39,733,434	\$ -	10.6
Temporary, movable new construction							\$ -				\$ -	\$ 196,080	
Demo Existing Bridge						0	\$ -	\$ 850,000	\$ 400,000	\$ -	\$ 1,250,000	\$ -	
Total						0	\$ -				\$ 41,213,434	\$ 196,080	10.6
Road W 2150	Bridge 2210	Road E 800 650	Permanent (ft.) Temporary	note: Cost includes frontage road connection Requires low profile diversion during construction									\$ 41,409,514

WEST PEARL RIVER – REHABILITATION ANALYSIS
PREPARED BY HUVAL AND ASSOVCiates
MOVABLE SPAN ENGINEER FOR US 90 BRIDGES TEAM

Current Bridge Status	
Deficiency	Comments
Load posted 20T-35T	Structurally Deficient for current design and state legal loads
Vertical clearance (roadway): 14'-7"	16.5' required clearance
Shoulder width: 2'	8' required shoulder width
Existing Low Chord Elevation: 12.20 NAVD88	Required Flood Elevation: 19.13 NAVD 88

Guidelines followed for rehabilitation can be found in *LADOTD Bridge Design and Evaluation Manual – Chapter 6: Design Policy for Bridge Rehabilitation/Repair Projects* as well as *AASHTO Manual for Bridge Evaluation 2nd Edition*.

The following items are addressed in our assessment for cost of rehabilitation

- Replace all counterweight ropes and drum operating ropes
- Replace existing machinery
 - Replace trunnion bearings
 - Replace sheaves
- Replace electrical system
- Install traffic barriers
- Paint all steel members (approx. 40,000 sq. ft.)
- Replace the operator's house
- Remove load posting
- Replace inspection platform, handrail, and ladder
- Repair deteriorated gusset plates and chords (as referenced in inspection report dated 4/21/2014)
- Scour mitigation

In order to determine if it was possible to remove the load posting, the members which control the load posting must be identified. Live Load Rating Reports* provided by LADOTD were utilized. Members which have an HL-93 Inventory Rating less than 0.9 are considered structurally deficient and must be replaced or rehabilitated. For truss members, replacement is more prudent rather than rehabilitation as the truss members present on this structure are not standard members which are still in use. Improving their structural capacity without replacement would be difficult and would result in a change to the "look" of the existing historical truss.

*Live Load Rating Report provided is dated August, 2015. The analysis was performed using the HS20-44 truck. Current DOTD load rating policy would require computations to be performed in LRFD, using HL-93. Additionally, only the controlling members were listed in the report. This means that additional members could require load posting beyond what is listed. Conclusions were drawn from this Live Load Rating Report which indicate MINIMUM repairs required to remove the load posting. It would need to be confirmed that no other members in the structure required load posting.

In order to remove the load posting the following rehabilitation must be done:

- Replacement of all (14) approach spans
 - These spans are reinforced concrete deck girder spans. There is no simple/cost effective way to strengthen this type of span/member so replacement is recommended.
- Replacement of two (2) truss members on the vertical lift span – (See attachment B for member locations)
 - A. 2 diagonal truss members (2-L3x2½x5/16; each side)
- Replacement of floor beams and stringers for the vertical lift span.

A rehabilitated structure, though it would no longer be load posted, will remain functionally and geometrically deficient.

WEST PEARL RIVER BRIDGE REHABILITATION COST

WEST PEARL	
Rehabilitation Alternative	
Items	Cost
Wire Rope	\$ 1,200,000.00
Machinery	\$ 2,500,000.00
Electrical	\$ 800,000.00
Traffic Barriers	\$ 500,000.00
Painting	\$ 2,000,000.00
Operators House	\$ 500,000.00
Approach Span Removal and Replacement	\$ 1,200,000.00
Concrete Deck and Steel Stringer Removal and Replacement	\$ 1,900,000.00
Load Posted Steel Truss Member Replacement	\$ 200,000.00
Inspection Platform, Handrail, & Ladder	\$ 150,000.00
Deteriorated Gusset & Chord Repair	\$ 500,000.00
Scour Mitigation	\$ 37,500.00
Sub Total	\$ 11,487,500.00
Contingency (25%)	\$ 2,871,875.00
Design	\$ 1,600,000.00
Roadway	\$ 75,000.00
Total	\$ 16,030,000.00
Temporary Detour Structure (Vertical Lift Span)	\$ 11,200,000.00
Design	\$ 800,000.00
Roadway	\$ 400,000.00
GRAND TOTAL	\$ 28,430,000.00

West Middle and Middle Middle Pearl Rivers

West Middle and Middle Middle Pearl Rivers

Computations Matrix

August 29, 2016

Alternative F-1 (Both Structures)										
New Fixed Span Structures On 52.5' Upstream Offset Alignment Using Storm Surge Plus Wave Plus 1-foot as the Low Chord Bridge Clearance				Required ROW (acres)	ROW Cost	Cost				Wetlands Acreage Affected
Location	Offset					Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost
Rehabilitation					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Permanent fixed, new construction	North	52.5'	0	\$ -	\$ -	\$ 8,534,000	\$ 2,014,000	\$ 1,054,800	\$ 11,602,800	\$ 223,060
Temporary, fixed new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Permanent movable, new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Temporary, movable new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Demo Existing Bridge			0	\$ -	\$ -	\$ 1,000,000	\$ 580,000	\$ -	\$ 1,580,000	\$ -
Single Structure, both x 2 Total				0	\$ -				\$ 13,182,800	\$ 223,060
Road W	vg. Bridge Leng	Road E							\$ 13,405,860	12.2
1200	1085	650	Permanent (ft)	\$ 4,024,000	WMP Bridge Cost	\$ 1,007,000	Road Cost Per Site	Note: Wetlands acreage considers two bridges with connecting offset roadway.		
			Temporary (ft)	\$ 4,510,000	MMP Bridge Cost					

Alternative F-2 (Both Structures)										
New Fixed Span Structures on Existing Alignment Using Storm Surge Plus Wave Plus 1-foot as the Low Chord Bridge Clearance				Required ROW (acres)	ROW Cost	Cost				Potential Wetlands Acreage Affected
Location	Offset					Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost
Rehabilitation					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Permanent fixed, new construction	Existing			\$ -	\$ -	\$ 8,534,000	\$ 965,000	\$ 949,900	\$ 10,448,900	\$ -
Temporary, fixed new construction	North	52.5'		\$ -	\$ -	\$ 1,756,000	\$ 950,000	\$ 54,120	\$ 2,760,120	\$ 155,230
Permanent movable, new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Temporary, movable new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Demo Existing Bridge				\$ -	\$ -	\$ 1,000,000	\$ 175,000	\$ -	\$ 1,175,000	\$ -
Single Structure, both x 2 Total				0	\$ -				\$ 14,384,020	\$ 155,230
Road W	vg. Bridge Leng	Road E		\$ 4,024,000	WMP Bridge Cost				\$ 14,539,250	6.6
500	1085	500	Permanent (ft)	\$ 4,510,000	MMP Bridge Cost	\$ 482,500	Road Cost Per Site			
700	600	700	Temporary (ft)	\$ 878,000	Temporary Bridge Cost Per Site	\$ 475,000	Temporary Road Cost Per Site			

East Middle Pearl River

**East Middle Pearl River
Computations Matrix
December 1, 2017**

Alternative R-1 Rehabilitation	Location	Offset	Required ROW (acres)	ROW Cost	Cost					Potential Wetlands Acreage Affected
					Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost	
Rehabilitation	Existing	0	0	\$ -	2,200,000	\$ 75,000	\$ 227,500	\$ 2,502,500	\$ -	
Permanent fixed, new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Temporary, fixed new construction	South	48.5'	0	\$ -	\$ 878,000	\$ 410,000	\$ 25,760	\$ 1,313,760	\$ 68,400	3.8
Permanent movable, new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Temporary, movable new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Demo Existing Bridge				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Total			0	\$ -				\$ 3,816,260	\$ 68,400	3.8
Road W Bridge Road E 600 600 600 Permanent Temporary (ft)										

The rehab costs above reflect a rehab providing a 20-year life as required in the PA. The proposed repairs do not upgrade the bridge loading. Repairs to the bridge that would bring the bridge into structural compliance would so degrade the historic contributing elements that the bridge may no longer be considered historic. Costs for this type of upgrade are not presented. Upgrading the bridge structure would also require repairs to the bridge foundation not accounted for in the costs.

**East Middle Pearl River
Computations Matrix
December 1, 2017**

Alternative R-2				Required ROW (acres)	ROW Cost	Cost					Potential Wetlands Acreage Affected		
Rehabilitation for use in One-Way Pair (Add New Parallel Couplet at MHW)						Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost			
Location													
Rehabilitation				Existing			\$ -	\$ 2,200,000	\$ 75,000	\$ 227,500	\$ 2,502,500	\$ -	
Permanent fixed, new construction				South	52.5'		\$ -	\$ 3,350,000	\$ 467,000	\$ 381,700	\$ 4,198,700	\$ 96,330	5.1
Temporary, fixed new construction						0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Permanent movable, new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Temporary, movable new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Demo Existing Bridge						0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Total						0	\$ -				\$ 6,701,200	\$ 96,330	5.1
Road W 900	Bridge 1185	Road E 450	Permanent (ft) Temporary										

The rehab costs above reflect a rehab providing a 20-year life as required in the PA. The proposed repairs do not upgrade the bridge loading. Repairs to the bridge that would bring the bridge into structural compliance would so degrade the historic contributing elements that the bridge may no longer be considered historic. Costs for this type of upgrade are not presented. Upgrading the bridge structure would also require repairs to the bridge foundation not accounted for in the costs.

**East Middle Pearl River
Computations Matrix
December 1, 2017**

Alternative R-3				Location	Offset	Required ROW (acres)	ROW Cost	Cost					Potential Wetlands Acreage Affected
Bypass and Adaptive Reuse for Non-Vehicular Use on site and New Bridge								Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost	
Rehabilitation						0	\$ -	2,200,000	\$ 50,000	\$ 225,000	\$ 2,475,000	\$ -	
Permanent fixed, new construction				South	52.5	0	\$ -	\$ 4,670,000	\$ 700,000	\$ 537,000	\$ 5,907,000	\$ 96,330	5.1
Temporary, fixed new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Permanent movable, new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Temporary, movable new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Demo Existing Bridge						0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.0
Total						0	\$ -				\$ 8,382,000	\$ 96,330	5.1
Road W 900	Bridge 1185	Road E 450	Permanent (ft)										

Alternative F-3				Required ROW (acres)	ROW Cost	Cost					Potential Wetlands Acreage Affected		
New Fixed Span Structure On Offset Alignment Using Surge plus wave plus 1' Clearance						Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost			
Location				Offset									
Rehabilitation						\$ -	\$ -	\$ -	\$ -	\$ -			
Permanent fixed, new construction				North	52.5'	0	\$ -	\$ 4,670,000	\$ 700,000	\$ 537,000	\$ 5,907,000	\$ 96,330	5.1
Temporary, fixed new construction							\$ -			\$ -	\$ -	\$ -	
Permanent movable, new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Temporary, movable new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Demo Existing Bridge						0	\$ -	\$ 500,000	\$ 245,000	\$ -	\$ 745,000	\$ -	
Total						0	\$ -				\$ 6,652,000	\$ 96,330	5.1
Road W 900	Bridge 1185	Road E 450	Permanent (ft) Temporary (ft)										

**East Middle Pearl River
Computations Matrix
December 1, 2017**

Alternative F-4 New Fixed Span Structure On Existing Alignment Using Surge plus wave plus 1' Clearance				Location	Offset	Required ROW (acres)	ROW Cost	Cost					Potential Wetlands Acreage Affected
								Bridge Cost	Roadway Cost	Design Cost	D&C Cost	Utility Cost	
Rehabilitation							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Permanent fixed, new construction				Existing		0	\$ -	\$ 4,670,000	\$ 420,000	\$ 509,000	\$ 5,599,000	\$ -	3.6
Temporary, fixed new construction				North	52.5'		\$ -	\$ 878,000	\$ 475,000	\$ 27,060	\$ 1,380,060	\$ 70,490	2.5
Permanent movable, new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Temporary, movable new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Demo Existing Bridge						0	\$ -	\$ 500,000	\$ 168,000	\$ -	\$ 668,000	\$ -	
Total						0	\$ -				\$ 7,647,060	\$ 70,490	6.1
Road W	Bridge	Road E											
320	1185	350	Permanent (ft)										
700	600	700	Temporary (ft)										

EAST MIDDLE PEARL RIVER – REHABILITATION ANALYSIS
PREPARED BY NEEL-SCHAFER INC.
FIXED SPAN ENGINEER FOR US 90 BRIDGES TEAM

Current Bridge Status	
Deficiency	Comments
Load posted 15T-25T	Structurally Deficient for current design and state legal loads
Shoulder width: 2'	8' required shoulder width
Existing Low Chord Elevation: 11.37 NAVD88	Required Flood Elevation: 13.31 NAVD88

Guidelines followed for rehabilitation can be found in *LADOTD Bridge Design and Evaluation Manual – Chapter 6: Design Policy for Bridge Rehabilitation/Repair Projects* as well as *AASHTO Manual for Bridge Evaluation 2nd Edition*.

The US90 Bridge over East Middle Pearl River is classified as a Preservation Candidate in the Programmatic Agreement regarding management of historic bridges in Louisiana. The structure is 582 feet long and consists of 12 reinforced concrete deck girder approach spans and 3 steel pony truss spans across the river. As such, a determination of the feasibility to rehabilitate this structure is to be made during the environmental process. Information available to use as a basis for this determination is limited to the most recent load rating and inspection reports. Among the many findings in these documents, the pony truss spans control the load rating of the overall bridge and the inspection report indicates that there is moderate to major pack rust at all lower chord gusset plate connections with 20% to 30% section loss in the gusset plates, 15% to 20% section loss in the chord members and 15% to 30% section loss in the floor beams. All these tension members are considered to be fracture critical components. It is also noted that the upper chord has pack rust with 15% section loss at all panel point locations.

Based on the inspection report, in order for the service life of the East Middle Pearl River Bridge to be extended another 20 years as stated in the Programmatic agreement, rehabilitation to address panel point pack rust and member section loss would most likely require partial truss disassembly and at a minimum, member replacement of the lower chords, gussets, floor beams and stringers. These operations are extensive and costly and will require the bridge to be closed during rehabilitation. In order to replace these members, the existing concrete deck will have to be removed and a temporary piling support system installed to support the partially disassembled truss while the members are being replaced. It is estimated that the lower chords, gussets, floor beams and stringers constitute at least 50% of the overall truss.

A determination of the load rating capacity of the final rehabilitated structure would require an in-depth field inspection and subsequent load rating analysis study. Replacement of the chords, gussets, floor beams and stringers with section properties similar to the original members will produce a bridge rating

approximately equal to the original rating when the bridge was constructed in 1933. Thus, even the rehabilitated bridge will still have to be posted for a reduced capacity compared to current standard highway loading and also, the horizontal bridge width (24 feet) would not meet the minimum requirements for a Rural Arterial (RA-2) roadway classification established for this study. In order for the bridge to be rehabilitated to support current standard highway loading, all truss members will most likely have to be replaced with similar but with either heavier or stronger section properties than the original members.

EAST MIDDLE PEARL RIVER BRIDGE RENOVATION COST

Work Item	Bridge Length	Bridge Width	Additional Width	Unit Cost	Cost
Temp. Pile Support, Replace Bottom Chords & Verticals on Trusses, Floorbeams & Stringers	246	N.A.	N.A.	\$4,500.00	\$1,107,000.00
Existing Deck Demo	246	24	N.A.	\$25.00	\$147,600.00
Remove Existing Stringers & Floorbeams	246	24	N.A.	\$45.00	\$265,680.00
Riprap Channel (5 feet thick, 2 tons per CY)	246	24	40	\$50.00	\$145,777.78
Contingency Factor					1.3
Total Bridge Rehab. Cost = \$2,165,875					
Includes Installation of Temp. Support Structure On Piling To Support Existing Truss In Order To Replace Bottom Chords, Verticals, Floorbeams, Stringers & Deck: Also Includes Riprap Bank To Bank For Scour					

East Pearl River

East Pearl River
Alternatives Computations Matrix
December 2019

Attachment 3

Alternative R-1 Rehabilitation				Location	Offset	Required ROW (acres)	ROW Cost	Cost						Potential Wetlands Acreage Affected
								Bridge Cost	Roadway Cost	Construction Cost	Design Cost	D&C Cost	Utility Cost	
Rehabilitation				Existing			\$ -	28,250,000	\$ 75,000	\$ 28,325,000	\$ 1,000,000	\$ 29,325,000	\$ -	
Permanent fixed, new construction							\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	
Temporary, fixed new construction							\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	
Permanent movable, new construction							\$ -						\$ -	
Temporary, movable new construction				north	48.5		\$ -	\$ 13,700,000	\$ 532,000	\$ 14,232,000	\$ 800,000	\$ 15,032,000	\$ 85,120	4.1
Demo Existing Bridge							\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	
Total						0	0	\$ 42,557,000		\$ 1,800,000	\$ 44,357,000	\$ 85,120	4.1	
Road W	Bridge	Road E	Total											
650	940	650	Permanent (ft) Temporary (ft)											

**East Pearl River
Alternatives Computations Matrix
December 2019**

Attachment 3

Alternative R-3 Bypass and Adaptive Reuse for Non-Vehicular Use on site and New Bridge	Location	Offset	Required ROW (acres)	ROW Cost	Cost						Potential Wetlands Acreage Affected
					Bridge Cost	Roadway Cost		Design Cost	D&C Cost	Utility Cost	
Rehabilitation	Existing			\$ -	\$ 13,000,000	\$ 50,000	\$ 13,050,000	\$ 800,000	\$ 13,850,000	\$ -	
Permanent fixed, new construction				\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	
Temporary, fixed new construction				\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	
Permanent movable, new construction	north	52.5	1.25	\$ 973,718	\$ 33,700,000	\$ 1,540,000	\$ 35,240,000	\$ 2,800,000	\$ 38,040,000	\$ 167,390	5.2
Temporary, movable new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Demo Existing Bridge			0	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	
Total			1.25	\$ 973,718	\$ 48,290,000		\$ 3,600,000	\$ 51,890,000		\$ 167,390	5.2
Road W 1100	Bridge 2205	Road E 1100	Permanent (ft) Temporary (ft)	\$ 52,057,390							

Alternative F-4 (Loop) New Fixed Span Steel Structure at 73' Vertical Clearance Above MHW (1.35) On a 52.5' Offset Alignment Downstream				Location	Offset	Required ROW (acres)	ROW Cost	Cost					Potential Wetlands Acreage Affected	
								Bridge Cost	Roadway Cost	Construction Cost	Design Cost	D&C Cost		Utility Cost
Rehabilitation							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Permanent fixed, new construction				South	52.5'	2.99	\$ 1,701,160	\$ 44,800,000	\$ 3,000,000	\$ 47,800,000	\$ 4,780,000	\$ 52,580,000	\$ 257,260	5.2
Temporary, fixed new construction							\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	
Permanent movable, new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Temporary, movable new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Demo Existing Bridge							\$ -	\$ 1,250,000	\$ 702,000	\$ 1,952,000	\$ -	\$ 1,952,000	\$ -	
Total						2.99	\$ 1,701,160	\$ 49,752,000		\$ 4,780,000	\$ 54,532,000	\$ 257,260	5.2	
Road W 475 -	Bridge 5660 -	Road E 635 -	Permanent (ft) Temporary (ft)	Roadway cost includes all tie-in connections										\$ 54,789,260

**East Pearl River
Alternatives Computations Matrix
December 2019**

Attachment 3

Alternative F-4 (Gooseneck) New Fixed Span Steel Structure at 73' Vertical Clearance Above MHW (1.35) On a 52.5' Offset Alignment Downstream	Location	Offset	Required ROW (acres)	ROW Cost	Cost						Potential Wetlands Acreage Affected	
					Bridge Cost	Roadway Cost	Construction Cost	Design Cost	D&C Cost	Utility Cost		
Rehabilitation				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Permanent fixed, new construction	South	52.5'	3.81	\$ 2,341,422	\$ 44,800,000	\$ 3,300,000	\$ 48,100,000	\$ 4,810,000	\$ 52,910,000	\$ 257,260	5.8	
Temporary, fixed new construction				\$ -	\$ -	\$ -		\$ -	\$ -	\$ -		
Permanent movable, new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Temporary, movable new construction				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Demo Existing Bridge				\$ -	\$ 1,250,000	\$ 702,000	\$ 1,952,000	\$ -	\$ 1,952,000	\$ -		
Total			3.81	\$ 2,341,422			\$ 50,052,000	\$ 4,810,000	\$ 54,862,000	\$ 257,260	5.8	
Road W 475 -	Bridge 5660 -	Road E 635 -	Permanent (ft) Temporary (ft)	Roadway cost includes all tie-in connections							\$ 55,119,260	

Alternative M-4B New Movable Lift Span Structure with 73' (open) Vertical Clearance On a 52.5' Offset Alignment (Downstream) Low Chord 25' above MHW (Mid-Level)	Location	Offset	Required ROW (acres)	ROW Cost	Cost						Potential Wetlands Acreage Affected	
					Bridge Cost	Roadway Cost	Construction Cost	Design Cost	D&C Cost	Utility Cost		
Rehabilitation				\$ -	\$ -	\$ -		\$ -	\$ -	\$ -		
Permanent fixed, new construction				\$ -	\$ -	\$ -		\$ -	\$ -	\$ -		
Temporary, fixed new construction				\$ -	\$ -	\$ -		\$ -	\$ -	\$ -		
Permanent movable, new construction	South	52.5'	0.812	\$ 973,718	\$ 42,800,000 \$150,000	\$ 1,770,000	\$ 44,570,000 150,000	\$ 2,800,000	\$ 47,370,000	\$ 168,910	5.2	
Modification to existing swing span								\$ 25,000	\$ 175,000			
Temporary, movable new construction				\$ -	\$ -	\$ -		\$ -	\$ -	\$ -		
Demo Existing Bridge				\$ -	\$ 1,250,000	\$ 400,000	\$ 1,650,000	\$ -	\$ 1,650,000	\$ -		
Total			0.812	\$ 973,718			\$ 46,370,000	\$ 2,825,000	\$ 49,195,000	\$ 168,910	5.2	
Road W 1150	Bridge 2195	Road E 1100	Permanent (ft) Temporary (ft)									\$ 49,363,910

East Pearl River
Alternatives Computations Matrix
December 2019

Attachment 3

Alternative M-4D				Required ROW (acres)	ROW Cost	Cost						Potential Wetlands Acreage Affected		
New Movable Bascule Span Structure with 73' (open) Vertical Clearance On a 52.5' Offset Alignment (Downstream) Low Chord 25' above MHW (Mid-Level)						Bridge Cost	Roadway Cost	Construction Cost	Design Cost	D&C Cost	Utility Cost			
Rehabilitation							\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	
Permanent fixed, new construction							\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	
Temporary, fixed new construction							\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	
Permanent movable, new construction				South	52.5'	0.812	\$ 973,718	\$ 65,000,000	\$ 1,540,000	\$ 66,540,000	\$ 2,800,000	\$ 69,340,000	\$ 168,720	5.2
Modification to existing swing span							\$150,000		\$ 150,000	\$ 25,000	\$ 175,000			
Temporary, movable new construction							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Demo Existing Bridge							\$ -	\$ 1,250,000	\$ 400,000	\$ 1,650,000	\$ -	\$ 1,650,000	\$ -	
Total						0.812	\$ 973,718			\$ 68,340,000	\$ 2,825,000	\$ 71,165,000	\$ 168,720	5.2
Road W 950	Bridge 2590	Road E 900	Permanent (ft) Temporary (ft)	Roadway cost includes all tie-in connections										\$ 72,307,438

EAST PEARL RIVER – REHABILITATION ANALYSIS
PREPARED BY HUVAL AND ASSOVCiates
MOVABLE SPAN ENGINEER FOR US 90 BRIDGES TEAM

Current Bridge Status	
Deficiency	Comments
Load posted 15T-25T	Structurally Deficient for current design and state legal loads
Vertical clearance (roadway): 15'	16.5' required clearance
Shoulder width: 2'	8' required shoulder width
Horizontal navigational clearance (river): 90'	USCG requests 115' horizontal navigational clearance to match upstream I-10 horizontal clearance
Existing Low Chord Elevation: 12.22 NAVD88	Required Flood Elevation: 18.14 NAVD 88

Guidelines followed for rehabilitation can be found in *LADOTD Bridge Design and Evaluation Manual – Chapter 6: Design Policy for Bridge Rehabilitation/Repair Projects* as well as *AASHTO Manual for Bridge Evaluation 2nd Edition*.

The following items are addressed in our assessment for cost of rehabilitation

- Repair existing machinery
 - o Gears and bushings are excessively worn
 - o Main gear rack needs to be replaced
 - o Refurbish end wedge system
- Replace electrical system
- Replace traffic gates
- Paint all steel members (approx. 45,000 sq. ft.)
- Replace the operator's house
- Remove load posting
- Repair deteriorated gusset plates (as referenced in inspection report dated 4/28/2015)
- Repair bent box girder

In order to determine if it was possible to remove the load posting, the members which control the load posting must be identified. Live Load Rating Reports* provided by LADOTD were utilized. Members which have an HL-93 Inventory Rating less than 0.9 are considered structurally deficient and must be replaced or rehabilitated. For truss members, replacement is more prudent rather than rehabilitation as the truss members present on this structure are not standard members which are still in use. Improving their structural capacity without replacement would be difficult and would result in a change to the "look" of the existing historical truss.

*Live Load Rating Report provided is dated November, 1984. The analysis was performed in ASD using the HS20-44 truck. Current DOTD load rating policy would require computations to be performed in LRFD, using HL-93. Conclusions were drawn from this Live Load Rating Report which indicate MINIMUM repairs required to remove the load posting. A new live load rating report would need to be performed using current design standards to confirm that there are no additional members which require repair in order to remove the load posting.

In order to remove the load posting the following rehabilitation must be done:

- Replacement of all (14) approach spans
 - These spans are reinforced concrete deck girder spans. There is no simple/cost effective way to strengthen this type of span/member so replacement is recommended.
- Replacement of various truss members on the two stationary truss spans – these members represent approximately 30% of truss members on the stationary trusses (See attachment C for member locations)
 - A. 2 lower truss members (2-C10x20s; each side)
 - B. 3 upper truss members (2-C12c25; PL16x3/8; each side)
 - C. 2 diagonal truss members (2-L7x4x3/8; each side)
- Replacement of floor beams and stringers for both stationary truss span and the swing truss span

A rehabilitated structure, though it would no longer be load posted, will remain functionally and geometrically deficient.

EAST PEARL RIVER BRIDGE REHABILITATION COST

EAST PEARL	
Rehabilitation Alternative	
Items	Cost
Machinery	\$ 2,500,000.00
Electrical	\$ 1,250,000.00
Traffic Gates	\$ 500,000.00
Painting	\$ 5,000,000.00
Operators House	\$ 300,000.00
Approach Span Removal and Replacement	\$ 1,200,000.00
Concrete Deck and Steel Stringer Removal and Replacement	\$ 9,600,000.00
Load Posted Steel Truss Member Replacement	\$ 1,500,000.00
Deteriorated Gusset & Chord Repair	\$ 500,000.00
Bent Box Girder Repair	\$ 250,000.00
Sub Total	\$ 22,600,000.00
Contingency (25%)	\$ 5,650,000.00
Design	\$ 1,000,000.00
Roadway	\$ 75,000.00
Total	\$ 29,325,000.00
Temporary Detour Structure (Vertical Lift Span)	\$ 13,700,000.00
Design	\$ 800,000.00
Roadway	\$ 460,000.00
GRAND TOTAL	\$ 44,285,000.00

Life Cycle Cost

East Pearl River Movable Span Alternatives

INPUT VALUES IN BLUE

Construction Cost (linked from Sheet2)						
Span Length	No. Spans	Total Length	Bridge Width	Beam Type	Unit Cost	0 Cost
40.00	8	320.00	42.50	18" Quad	\$95.00	\$1,292,000
120.00	19	2280.00	42.50	BT-72	\$170.00	\$16,473,000
980.00	1	980.00	42.50	Steel	\$310.00	\$12,911,500
120.00	15	1800.00	42.50	BT-72	\$170.00	\$13,005,000
40.00	7	280.00	42.50	18" Quad	\$95.00	\$1,130,500
0.00	0			0.00	\$0.00	
Total Bridge Cost =					\$44,812,000	

Design Life (years): 50

Recurring Cost (Constant Dollars)		
	Cost	Frequency (years)
Routine Bridge Inspection	\$ 40,000	2
Underwater Bridge Inspection	\$ 30,000	5
Additional For In-Depth Bridge Inspection	\$ 25,000	10
Cleaning/Painting Steel Span		
Area per girder (sqft/ft):	36.66674	
No. girders:	4	
Length (ft):	980.00	
LADOTD Cost/sqft:	\$ 11.00	\$ 1,581,070 15
Replace Finger Joint Trough		
No. Joints:	2	
Length of 1 joint(ft):	42.50	
LADOTD Cost/ft:	\$ 800.00	\$ 68,000 15
General Bridge Maintenance (patching, clearing drains & joints)	\$ 20,000	5

Real Discount Rates	
Time (years)	Real Discount Rate
0	0.3%
3	0.3%
5	0.6%
7	0.8%
10	1.0%
20	1.2%
30	1.5%
100	1.5%

From OMB Circular No. A-94

Constant Dollars									Discount Rate	Present Value
Year	Construction Cost	Routine Bridge Inspection	Underwater Bridge Inspection	In-Depth Bridge Inspection	Cleaning & Painting Steel Span	Replace Finger Joint Trough	General Bridge Maintenance	Total		
0	\$ 44,812,000							\$ 44,812,000		\$ 44,812,000
1		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.30%	\$ -
2		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	0.30%	\$ 39,761
3		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.30%	\$ -
4		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	0.45%	\$ 39,288
5		\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ 20,000	\$ 50,000	0.60%	\$ 48,527
6		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	0.70%	\$ 38,360
7		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.80%	\$ -
8		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	0.87%	\$ 37,332
9		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.93%	\$ -
10		\$ 40,000	\$ 30,000	\$ 25,000	\$ -	\$ -	\$ 20,000	\$ 115,000	1.00%	\$ 104,108
11		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.02%	\$ -
12		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.04%	\$ 35,330
13		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.06%	\$ -
14		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.08%	\$ 34,415
15		\$ -	\$ 30,000	\$ -	\$ 1,581,070	\$ 68,000	\$ 20,000	\$ 1,699,070	1.10%	\$ 1,441,929
16		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.12%	\$ 33,471
17		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.14%	\$ -
18		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.16%	\$ 32,501
19		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.18%	\$ -
20		\$ 40,000	\$ 30,000	\$ 25,000	\$ -	\$ -	\$ 20,000	\$ 115,000	1.20%	\$ 90,592
21		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.23%	\$ -
22		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.26%	\$ 30,369
23		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.29%	\$ -
24		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.32%	\$ 29,200
25		\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ 20,000	\$ 50,000	1.35%	\$ 35,758
26		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.38%	\$ 28,009
27		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.41%	\$ -
28		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.44%	\$ 26,804
29		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.47%	\$ -
30		\$ 40,000	\$ 30,000	\$ 25,000	\$ 1,581,070	\$ 68,000	\$ 20,000	\$ 1,764,070	1.50%	\$ 1,128,586
31		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.50%	\$ -
32		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.50%	\$ 24,840
33		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.50%	\$ -
34		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.50%	\$ 24,111
35		\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ 20,000	\$ 50,000	1.50%	\$ 29,693
36		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.50%	\$ 23,404
37		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.50%	\$ -
38		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.50%	\$ 22,717
39		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.50%	\$ -
40		\$ 40,000	\$ 30,000	\$ 25,000	\$ -	\$ -	\$ 20,000	\$ 115,000	1.50%	\$ 63,395
41		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.50%	\$ -
42		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.50%	\$ 21,404
43		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.50%	\$ -
44		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.50%	\$ 20,776
45		\$ -	\$ 30,000	\$ -	\$ 1,581,070	\$ 68,000	\$ 20,000	\$ 1,699,070	1.50%	\$ 869,439
46		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.50%	\$ 20,166
47		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.50%	\$ -
48		\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,000	1.50%	\$ 19,574
49		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	1.50%	\$ -
50		\$ 40,000	\$ 30,000	\$ 25,000	\$ -	\$ -	\$ 20,000	\$ 115,000	1.50%	\$ 54,626
Total:										\$ 49,260,483

Bridge LCCA For Alternative Comparision \$ 49,300,000

Rounded to nearest \$100k

US 90 @ Pearl River Cost Analysis				
Bascule Span Bridge				
Repair/ Replacement Item	Time Until Repair Requ	Number of Repairs per Life of Bridge	Cost of Repair/Replace	Total Cost of Repair/Replacement
Main Span Deck (open grid)	30 years	1	\$800,000.00	\$800,000.00
Machinery				
Trunnion Bearing (Rehabilitation)	45 years	1	\$400,000.00	\$400,000.00
Span Locks (Repairs)	22.5 years	2	\$200,000.00	\$400,000.00
Air Buffers (Rehabilitation)	30 years	1	\$200,000.00	\$200,000.00
Span Drive Machinery (Rehabilitation)	30 years	1	\$700,000.00	\$700,000.00
Electrical System (Replacement)	30 years	1	\$1,000,000.00	\$1,000,000.00
Emergency Generator (Replacement)	22.5 years	2	\$350,000.00	\$700,000.00
Operator's House (Rehabilitation)	45 years	1	\$250,000.00	\$250,000.00
Painting	30 years	1	\$600,000.00	\$600,000.00
Maintenance Item	Frequency /year	Number of Years	Cost/Visit	Total Cost/ Life
General Maintenance and Lubrication	3	50	\$ 5,000.00	\$ 750,000.00
Inspection	0.5	50	\$45,000.00	\$ 1,125,000.00

Real Discount Rates	
Time (years)	Real Discount Rate
0	0.3%
3	0.3%
5	0.6%
7	0.8%
10	1.0%
20	1.2%
30	1.5%
100	1.5%

Constant Dollars															
Year	Construction Cost	General Maintenance and Lubrication	Underwater Bridge Inspection	In-Depth Bridge Inspection	Cleaning & Painting Steel Span	Operator's House Rehabilitation	Emergency Generator Replacement	Electrical System Replacement	Machinery Rehabilitation	Main Span Deck Rehabilitation	Operator's Salary	Total	Discount Rate	Present Value	
0	\$ 62,400,000											\$ 62,400,000		\$ 62,400,000	
1	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,200	\$ 17,200	0.30%	\$ 17,149	
2	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,288	\$ 62,288	0.30%	\$ 61,916	
3	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,380	\$ 17,380	0.30%	\$ 17,224	
4	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,475	\$ 62,475	0.45%	\$ 61,363	
5	\$ -	\$ 15,000	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,574	\$ 47,574	0.60%	\$ 46,172	
6	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,677	\$ 62,677	0.70%	\$ 60,108	
7	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,784	\$ 17,784	0.80%	\$ 16,819	
8	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,895	\$ 62,895	0.87%	\$ 58,700	
9	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,011	\$ 18,011	0.93%	\$ 16,566	
10	\$ -	\$ 15,000	\$ 30,000	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,131	\$ 93,131	1.00%	\$ 84,311	
11	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,257	\$ 18,257	1.02%	\$ 16,328	
12	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,387	\$ 63,387	1.04%	\$ 55,986	
13	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,522	\$ 18,522	1.06%	\$ 16,150	
14	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,663	\$ 63,663	1.08%	\$ 54,774	
15	\$ -	\$ 15,000	\$ 30,000	\$ -	\$ 1,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,810	\$ 1,048,810	1.10%	\$ 890,081	
16	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,962	\$ 63,962	1.12%	\$ 53,522	
17	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,121	\$ 19,121	1.14%	\$ 15,769	
18	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,285	\$ 64,285	1.16%	\$ 52,234	
19	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.18%	\$ 15,569	
20	\$ -	\$ 15,000	\$ 30,000	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 94,457	1.20%	\$ 74,409	
21	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.23%	\$ 15,052	
22	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ 350,000	\$ -	\$ 200,000	\$ -	\$ 4,457	\$ 614,457	1.26%	\$ 466,506	
23	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.29%	\$ 14,489	
24	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.32%	\$ 47,053	
25	\$ -	\$ 15,000	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 49,457	1.35%	\$ 35,370	
26	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.38%	\$ 45,135	
27	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.41%	\$ 13,332	
28	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.44%	\$ 43,193	
29	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.47%	\$ 12,743	
30	\$ -	\$ 15,000	\$ 30,000	\$ 45,000	\$ 1,000,000	\$ -	\$ -	\$ 1,000,000	\$ 900,000	\$ 800,000	\$ 4,457	\$ 3,794,457	1.50%	\$ 2,427,551	
31	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.50%	\$ 12,264	
32	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.50%	\$ 40,027	
33	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.50%	\$ 11,904	
34	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.50%	\$ 38,853	
35	\$ -	\$ 15,000	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 49,457	1.50%	\$ 29,371	
36	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.50%	\$ 37,713	
37	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.50%	\$ 11,216	
38	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.50%	\$ 36,607	
39	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.50%	\$ 10,887	
40	\$ -	\$ 15,000	\$ 30,000	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 94,457	1.50%	\$ 52,071	
41	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.50%	\$ 10,567	
42	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.50%	\$ 34,490	
43	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.50%	\$ 10,257	
44	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.50%	\$ 33,478	
45	\$ -	\$ 15,000	\$ 30,000	\$ -	\$ 1,000,000	\$ 250,000	\$ -	\$ -	\$ 400,000	\$ -	\$ 4,457	\$ 1,699,457	1.50%	\$ 869,638	
46	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.50%	\$ 32,496	
47	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.50%	\$ 9,664	
48	\$ -	\$ 15,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.50%	\$ 31,543	
49	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 19,457	1.50%	\$ 9,381	
50	\$ -	\$ 15,000	\$ 30,000	\$ 45,000	\$ -	\$ -	\$ 350,000	\$ -	\$ 200,000	\$ -	\$ 4,457	\$ 644,457	1.50%	\$ 306,120	
														Total:	\$ 68,834,118

Construction Cost + Operation and Maintenance for 50 years	\$ 68,800,000
Operation and Maintenance for 50 years	\$ 6,400,000

US 90 @ Pearl River Cost Analysis				
Vertical Lift Bridge				
Repair/ Replacement Item	Time Until Repair Required	Number of Repairs per Life of Bridge	Cost of Repair/Replacement	Total Cost of Repair/Replacement
Main Span Deck (Concrete)	45 years	1	\$2,000,000.00	\$2,000,000.00
Machinery				
Counterweight Ropes (Replacement)	30 years	1	\$500,000.00	\$500,000.00
Sheave & Trunnion Bearing (Rehabilitation)	45 years	1	\$1,000,000.00	\$1,000,000.00
Span Locks (Repairs)	22.5 years	2	\$200,000.00	\$400,000.00
Air Buffers (Rehabilitation)	30 years	1	\$200,000.00	\$200,000.00
Span Guides and Rollers (Replacement)	45 years	1	\$150,000.00	\$150,000.00
Tower Drive Machinery (Rehabilitation)	30 years	1	\$700,000.00	\$700,000.00
Electrical System (Replacement)	30 years	1	\$1,000,000.00	\$1,000,000.00
Emergency Generator (Replacement)	22.5 years	2	\$350,000.00	\$700,000.00
Operator's House (Rehabilitation)	45 years	1	\$250,000.00	\$250,000.00
Painting	30 years	1	\$600,000.00	\$600,000.00
Maintenance Item	Frequency /year	Number of Years	Cost/Visit	Total Cost/ Life
General Maintenance and Lubrication	3	50	\$ 10,000.00	\$ 1,500,000.00
Inspection	0.5	50	\$45,000.00	\$ 1,125,000.00

Real Discount Rates		
Time (years)	Real Discount Rate	
0		0.3%
3		0.3%
5		0.6%
7		0.8%
10		1.0%
20		1.2%
30		1.5%
100		1.5%

Constant Dollars															
Year	Construction Cost	General Maintenance and Lubrication	Underwater Bridge Inspection	In-Depth Bridge Inspection	Cleaning & Painting Steel Span	Operator's House Rehabilitation	Emergency Generator Replacement	Electrical System Replacement	Machinery Rehabilitation	Main Span Deck Rehabilitation	Operator's Salary	Total	Discount Rate	Present Value	
0	\$ 43,300,000											\$ 43,300,000		\$ 43,300,000	
1	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,200	\$ 32,200	0.30%	\$ 32,104	
2	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,288	\$ 77,288	0.30%	\$ 76,826	
3	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,380	\$ 32,380	0.30%	\$ 32,090	
4	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,475	\$ 77,475	0.45%	\$ 76,096	
5	\$ -	\$ 30,000	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,574	\$ 62,574	0.60%	\$ 60,730	
6	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,677	\$ 77,677	0.70%	\$ 74,493	
7	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,784	\$ 32,784	0.80%	\$ 31,005	
8	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,895	\$ 77,895	0.87%	\$ 72,699	
9	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,011	\$ 33,011	0.93%	\$ 30,363	
10	\$ -	\$ 30,000	\$ 30,000	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,131	\$ 108,131	1.00%	\$ 97,890	
11	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,257	\$ 33,257	1.02%	\$ 29,744	
12	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,387	\$ 78,387	1.04%	\$ 69,235	
13	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,522	\$ 33,522	1.06%	\$ 29,228	
14	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,663	\$ 78,663	1.08%	\$ 67,680	
15	\$ -	\$ 30,000	\$ 30,000	\$ -	\$ 1,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,810	\$ 1,063,810	1.10%	\$ 902,811	
16	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,962	\$ 78,962	1.12%	\$ 66,073	
17	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,121	\$ 34,121	1.14%	\$ 28,140	
18	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,285	\$ 79,285	1.16%	\$ 64,422	
19	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.18%	\$ 27,572	
20	\$ -	\$ 30,000	\$ 30,000	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 109,457	1.20%	\$ 86,225	
21	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.23%	\$ 26,655	
22	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ 350,000	\$ -	\$ 200,000	\$ -	\$ 4,457	\$ 629,457	1.26%	\$ 477,894	
23	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.29%	\$ 25,659	
24	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 79,457	1.32%	\$ 58,003	
25	\$ -	\$ 30,000	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.35%	\$ 46,097	
26	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 79,457	1.38%	\$ 55,638	
27	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.41%	\$ 23,610	
28	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 79,457	1.44%	\$ 53,244	
29	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.47%	\$ 22,568	
30	\$ -	\$ 30,000	\$ 30,000	\$ 45,000	\$ 1,000,000	\$ -	\$ -	\$ 1,000,000	\$ 1,700,000	\$ -	\$ 4,457	\$ 3,809,457	1.50%	\$ 2,437,147	
31	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.50%	\$ 21,719	
32	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 79,457	1.50%	\$ 49,342	
33	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.50%	\$ 21,081	
34	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 79,457	1.50%	\$ 47,895	
35	\$ -	\$ 30,000	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 64,457	1.50%	\$ 38,279	
36	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 79,457	1.50%	\$ 46,489	
37	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.50%	\$ 19,862	
38	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 79,457	1.50%	\$ 45,126	
39	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.50%	\$ 19,280	
40	\$ -	\$ 30,000	\$ 30,000	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 109,457	1.50%	\$ 60,340	
41	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.50%	\$ 18,714	
42	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 79,457	1.50%	\$ 42,517	
43	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.50%	\$ 18,165	
44	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 79,457	1.50%	\$ 41,269	
45	\$ -	\$ 30,000	\$ 30,000	\$ -	\$ 1,000,000	\$ 250,000	\$ -	\$ -	\$ 1,150,000	\$ 2,000,000	\$ 4,457	\$ 4,464,457	1.50%	\$ 2,284,529	
46	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 79,457	1.50%	\$ 40,058	
47	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.50%	\$ 17,115	
48	\$ -	\$ 30,000	\$ -	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 79,457	1.50%	\$ 38,883	
49	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,457	\$ 34,457	1.50%	\$ 16,613	
50	\$ -	\$ 30,000	\$ 30,000	\$ 45,000	\$ -	\$ -	\$ 350,000	\$ -	\$ 200,000	\$ -	\$ 4,457	\$ 659,457	1.50%	\$ 313,245	
Total:														\$ 51,682,462	

Construction Cost + Operation and Maintenance for 50 years	\$ 51,700,000
Operation and Maintenance for 50 years	\$ 8,400,000