Almonaster Avenue
Rolling Lift Bascule Bridge

Preliminary Analysis and Verification of Report
90% Draft Submittal

PREPARED FOR:
Louisiana Department of Transportation and Development
1201 Capitol Access Road
Baton Rouge LA, 70804

PREPARED:
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Introduction

The existing Almonaster Avenue bridge is a Strauss Heel-Trunnion Bascule built in 1920 (structure number U3630003900161). This bridge is owned, operated, and maintained by the Port of New Orleans and carries two mainline CSX tracks and two lanes (one East and one West) of vehicular traffic along Almonaster Avenue over the IHNC. The two vehicular traffic lanes have been closed to traffic due to damage from Hurricane Katrina. The sufficiency rating (SR) of the existing bascule has been below 50 for the past twenty years resulting in the need for its replacement.

Several Feasibility Studies have been conducted over the past two decades two of which identified a vertical lift bridge as the most preferred alternate based on the needs established at the time. The 1997 Study utilized a vertical lift bridge to accommodate 200 feet of horizontal clearance, two heavy rails, one light rail, two lanes of vehicular traffic in each direction, and a combined bicycle path/pedestrian walkway. In 2003 a more refined feasibility study was conducted which also gave prudence to utilizing the vertical lift alternate but without the light rail and without the bicycle path (only a pedestrian walkway). In July 2010 an Optimization Study was conducted where the main objective was to determine the optimum balance among horizontal clearance for maritime traffic, affordability, cost, safety, and other relevant issues. This Optimization Study resulted in two alternatives. Alternative 1 was a new vertical lift bridge having 200 feet of horizontal clearance. Alternative 2 was a new rolling lift bascule bridge having two heavy rail lines and two cantilevered roadways each containing one traffic lane and one full size shoulder. In an effort to reduce construction costs this bascule alternative allows only 150 feet of horizontal clearance.

Several rolling lift bascule scenarios were evaluated as it relates to span length, new pier placement, the reuse of existing bridge elements, and the removal of the existing bridge. The resulting solution was to replace the existing bridge with a new rolling lift bascule as outlined in the 2010 Optimization Study.

Scope

This document is intended to summarize our preliminary analysis and to verify the design and construction concepts which are presented in the 2010 Optimization Study for the rolling lift bascule bridge alternate. Additionally, we present improvements, changes, and recommendations to further reduce the total construction cost and minimize the impact to the operations of the Railroad and the IHNC during construction.

The 2010 Optimization Study proposed to raise the top of rail elevation across the bridge to elevation 9.0. The current design concept is to maintain the top of rail elevation as close to the existing elevation as possible without lowering the proposed bridge girder elevation below the current low steel elevation in an effort to improve constructability. Additionally the 2010 Optimization Study proposed to shift the north railroad track alignment to provide a 15 foot center to center railroad track spacing across the bridge. The current design concept is to provide a bridge width that can accommodate a 14 foot center to center railroad track spacing across the bridge, in compliance with minimum AREMA requirements, by widening the bridge symmetrically about the existing bridge centerline to allow for the reuse of the existing counterweight trunnion pier as the proposed rest pier. The current center to center railroad track spacing of 13’ 3 1/2” will be maintained across the proposed bridge and can be adjusted by the railroad at the same time that they adjust the approach rails in the future.

Design Criteria

The design features and geometric standards shall conform to the requirements of the *AASHTO LRFD Movable Highway Bridge Design Specifications*, 2nd Edition, dated 2007, published by the *American Association of State Highway and Transportation Officials* (*AASHTO*), the (*AASHTO*) *LRFD Bridge Design Manual*, 5th Edition, dated 2010 published by the *American Association of State Highway and Transportation Officials*, the *LADOT LRFD Bridge Design Manual*, 1st Edition, dated 2006, published by the *LADOT Bridge Design Section*, the *Manual for Railway Engineering*, dated 2011, published by the *American Railway Engineering and Maintenance-of-Way Association (AREMA), A Policy on Geometric Design of Highways and Streets*, dated 2011, published by *AASHTO*, and the *Department of Streets General Guide for Design Survey and Preparation of Plans and Specifications*, dated July 1988, including all revisions, published by the *City of New Orleans Department of Public Works*, and the following supplementary criteria:

Classification:	Urban Minor Arterial (LADOTD UA-1)
Design Speed:	Eastbound 40 MPH Westbound 30 MPH[1]
Minimum Radius: With 2.5% Superelevation:	 550 Feet
Vertical Alignment:	Maximum Grade: ±7.0%
Vertical Clearance: Bridge Vertical Clearance: Roadway Vertical Clearance:	 126 Ft. in Open-to-Navigation Position 16 Feet Minimum
Horizontal Clearance Navigation:	150 Ft. Face-to-Face of Fenders
Clear Zone: From Edge of Through Travel Lane: Outside From Back of Curb: Number Of Lanes:	 18 Feet Minimum[2] 6 Feet Minimum 2 (1 Lane in Each Direction)
Number Of Railway Tracks:	2
Lane Width:	11 Feet Minimum

[1] Design Exception: 40 MPH required by UA-1

Shoulder Width:

Roadway:	Outside: 8 Feet
	Inside: 2 Feet
Bridge:	Outside: 8 Feet
	Inside: 2 Feet

(NOTE: Outside Shoulder on Bridge shall be a partially-filled Grid Deck or a close mesh grating which will be able to safely accommodate bicycle traffic.)

Bridge Width: Traveled way plus 10 Feet

Provisions for Passing Stalled Vehicle (Traffic Condition C):

Radius 250 Feet:	Pavement width 23 Feet
Radius 550 Feet:	Pavement width 22 Feet
Radius 600 Feet:	Pavement width 21 Feet
Radius 800 Feet:	Pavement width 21 Feet
Tangent::	Pavement width 21 Feet

Vertical Curves:

For Crest Curves:	Exhibit 3-76 (AASHTO Policy)*
For Sag Curves:	Exhibit 3-79 (AASHTO Policy)*
*--Subject to Minimum Length (in Feet)	= 3 x Design Speed (in MPH)

Superelevation: AASHTO Method 2
Exhibit 3-40 (AASHTO Policy) @ 0.025 Ft./Ft. Max.

Fore Slope / Back Slope: 1:3 Minimum
1:4 Desired Fore Slope

Cross Slopes:

Portland Cement Concrete Pavement (Road)	2.5%
Asphaltic Concrete Pavement (Road)	2.5%
Bridge	2.5%

Stopping Sight Distance: 305 Feet Minimum

Design Truck (for determination of turning radii, etc.):
AASHTO WB-65 or WB-67 Truck (See attached Exhibit 2-16 from AASHTO, A Policy on Geometric Design of Highways and Streets).

Drainage:
FHWA Hydraulic Circulars, FHPM 6-7-3-2 and FEMA Flood Insurance Program

City Street & Frontage Roads 10 year event

Railroad Loading: Cooper E80 with Alternate Live Load

Roadway Loading: HL93

See Appendix II for LA DOTD - DESIGN EXCEPTION/DESIGN WAIVER FORM.
See Appendix III for Disposition of 30% Review Comments.

Construction Sequence and Construction Erection

The new rolling lift bascule span which will replace the existing Strauss Heel-Trunnion bascule and will be constructed on the existing alignment while maintaining both rail and marine traffic. The new span's overhead counterweight will be constructed on the east side of the IHNC (opposite the existing bridge). This new span will utilize the existing span's counterweight pier as its rest pier. The rolling lift spans configuration will allow the construction of the new counterweight pier and ultimately the entire new movable bridge while minimizing the railroad and marine traffic closures. The following sequence outlines the bascule span installation only; all other construction for this project is not covered in this report.

The construction sequencing is split into 17 stages and is presented in the 90% preliminary plan submittal (see ***Appendix I***). This sequence is recommended, but the contractor may choose to submit an alternate sequence for approval. Any work that does not disrupt rail or marine traffic may be completed in earlier stages than shown in the plans. The portion of the main span to be floated in shall be constructed off-site at any time prior to stage 14. The new operator's house shall be constructed any time prior to stage 15. The following is a summary of each stage and how the sequence differs from the 2010 optimization study:

Stage 1 (*Appendix I, sheet 1 of 15*):

The beginning of stage 1 involves work that can be completed without disrupting rail traffic. During work windows, the contractor will drive sheet piles between the tracks for future excavation. These sheets will be cut off below the top of the rail. The contactor shall also remove the existing roadway structure excluding the bascule span.

The first rail closure will occur on the south track for temporary jump span installation at the future main pier location. The jump span layout is our first major deviation from the 2010 Optimization study and is outlined in Stages 2 thru 7 below (see "*Investigate Temporary Jump Spans at the East End*" below**)**.

The first step of the jump span construction will be to remove the existing south-east railroad approach span.

Stage 2 (*Appendix I, sheet 2 of 15*):

Contractor shall drive six (6)-48" diameter steel pipe piles for the combined wall system and for the temporary support at the middle of the pier. Part of the cofferdam will also be

installed at this point. The layout of the piles and sheets can be seen in the stage 2 plan view of the construction sequence drawings (***Appendix I***).

Stage 3 (*Appendix I, sheet 3 of 15*):

The goal of stage 3 is to prepare the area for the jump span installation. The contractor will have to excavate to place the steel caps on the 48" diameter piles. Part of the existing east abutment will also have to be removed to avoid conflicts with the jump span girders.

Stage 4 (*Appendix I, sheet 4 of 15*):

The jump span installation will take place during this stage. First, the steel caps will be placed on the 48" diameter steel pipe piles. Then, the jump span girders shall be installed. Finally, track work shall be completed in order for the bridge to be reopened to rail traffic. ***(Appendix I)***

Stage 5 (*Appendix I, sheet 5 of 15*):

Once the jump spans for the south track over the future main pier are complete, stages 1 thru 4 shall be repeated for the north track.

In order to prepare for the main pier construction the remainder of the existing abutment shall also be removed, including its piles, then the remainder of the cofferdam shall be completed.

Stage 6 (*Appendix I, sheet 6 of 15*):

The main pier shall be constructed in stage 6. See "*Investigate the Bascule Pier Construction for the New Rolling Lift Bridge"* below for further discussions on this portion of the project.

Stage 7 (*Appendix I, sheet 7 of 15*):

The goal of stage 7 is to finalize the work on the westbound track. The westbound track will be closed to rail traffic during this stage. The track girder on the north side will be installed at this time. The westbound temporary jump spans over the main pier shall be removed. These

spans shall then be converted to permanent spans at the main pier. The north rack frame will be installed. During this stage, modifications to the north side of the existing counterweight trunnion pier will also be made in order to use this pier as the future rest pier. Before finalizing track work, the east side of the main pier will be backfilled. Track work can then be completed, and the bridge can be reopened to rail traffic. The contractor should also start building the new bascule span on the barge if he has not already done so.

Stage 8 (*Appendix I, sheet 8 of 15*):

Now that the majority of work on the westbound rail at the main pier and rest pier has been completed, the contractor will complete work on the eastbound rail. The items from stage 7 shall be completed on the on the south side of the main pier and rest pier. Once these items are completed the bridge can be reopened to rail traffic.

Stage 9 (*Appendix I, sheet 9 of 15*):

Stage 9 involves work that will not disrupt rail traffic. The contractor shall begin installing the counterweight removal false work (Driving 30” diameter and 24” diameter steel pipe piles).

Stage 10 (*Appendix I, sheet 10 of 15*):

The contractor shall install the new counterweight frame (the concrete will be poured at a later stage), new machinery, and new machinery house. Then the machinery shall be operated and the control system shall be adjusted (spin test). The contractor will then install cross-beams on both sides of the counterweight removal system.

Stage 11 (*Appendix I, sheet 11 of 15*):

The channel shall be closed to navigation at this time. The contractor shall complete the installation of the counterweight support system by installing the main beam system on the south side of the counterweight system and preparing to move the main beam under the counterweight. The contractor shall also remove the operator and machinery houses at this time.

Stage 12 (*Appendix I, sheet 12 of 15*):

Both tracks shall be closed to rail traffic. The contractor shall move the main beam system under the counterweight and finalize the remainder of the counterweight removal setup. The load of the counterweight will be transferred from the counterweight truss to the false work towers. The counterweight truss will then be disconnected from the bascule span.

Stage 13 (*Appendix I, sheet 13 of 15*):

The counterweight can now be moved to the south side of the bridge using Hillman 300-XOT rollers (or approved equal). The north side of the main counterweight removal support beam shall then be removed at the splice location. Once the counterweight truss is moved to the side, the contractor can remove the bascule span. The contractor shall then remove the temporary jump spans, existing piers (as necessary), and west fenders to facilitate the bascule span installation.

Stage 14 (*Appendix I, sheet 14 of 15*):

The bascule span will be floated in and installed in stage 14. The counterweight concrete will then be placed. Once track work is completed, the bridge can be reopened to rail traffic.

Stage 15 (*Appendix I, sheet 15 of 15*):

With channel traffic still closed, the contractor shall complete the removal of the existing piers and fenders as necessary. Also, in between train movements, necessary adjustments to the machinery and control system shall be made. The installation of the new fender system will then be completed. The channel will be ready to be reopened to navigation traffic once the fender system is installed. The demolition of the existing counterweight should take place at this time.

Stage 16 (*Appendix I, sheet 15 of 15*):

The contractor shall remove the counterweight support system.

Stage 17 (*Appendix I, sheet 15 of 15*):

The contractor shall construct the roadway approach spans at this time.

Modifications to the Existing Counterweight Trunnion Pier to Become the New Rest Pier

The 2010 Optimization Study proposed the following two methods of adapting the existing counterweight trunnion pier to function as the rest pier for the new rolling lift span:

1. Install two new bents with caps having 6'-0" diameter drilled shafts spaced 78' apart to support the new roadway width.

2. Modify the existing pier by adding a cap beam with post tensioning to support the new bascule span.

After investigating the above proposed methods we found them to be feasible, however, we feel that another alternative may be more cost effective. This alternate method shown in the sequence of construction drawings at Stage No. 8 (See ***Appendix I***) modifies the existing counterweight pier by removing a portion of the cap beam and then widening the column and beam to accommodate the new roadway width.

Because the existing counterweight trunnion pier has been designed to support the existing Straus Heal-Trunnion Bascule counterweight dead load as well as the railroad live loads it has sufficient capacity to now be used as a rest pier (it will only see the imbalance reaction from the new bascule and a portion of the dead load from the east span). Additionally, the modified pier will accommodate the required E80 railroad loads and the AASHTO LRFD HL93 truck loads.

Design and Construction of the Main Counterweight Pier

The new counterweight pier located on the east side of the IHNC has also been further optimized to reduce cost and minimize the complexity of the jump span sequence as shown on stages 1 thru 6 of the sequence of construction. (See ***Appendix I***). The current configuration significantly reduced the overall counterweight pier foundation width through the use of cantilevers to support the roadway spans instead of placing them directly on the proposed counterweight pier foundation.

Channel Dredging Analysis

To be completed by the 100 % preliminary plan submittal.

Investigate Temporary Structures

In order to minimize railroad closure time, the existing counterweight shall be moved off to the south side of the bridge using a system of beams and rollers. Support towers shall be installed on the north and south side of the existing counterweight. The system of beams that will be used to move the counterweight shall be set up on the south support tower prior to the railroad closure. The main beams shall be rolled into place under the counterweight as soon as rail traffic is stopped to facilitate the removal of the existing bridge. Once the counterweight is disconnected and secured on the beam system, it will be rolled off to the support system on the south side of the bridge using a system of jacks and Hillman rollers. This will allow the counterweight to be demolished at a later stage once rail traffic has been reopened. Stages 9-13 of the sequence of construction drawings (Appendix I, sheets 9-13) further depict this process.

Investigate Temporary Jump Spans at the East Approach

The 2010 Optimization Study called for temporary piers to be built in front of and behind the future main pier foundation. This would require a jump span length of over 80 feet. The girder depth for this system would force caps to be underwater. In order to limit the jump span girder depth, we utilized a combined wall system for the cofferdam to also act as supports for the jump span girders at the front and back of the seal. We also incorporated a temporary support at the center of the main pier. The piles at this support will later be filled with concrete and become a portion of the center wall of the pier. This allowed the jump span length to be almost half of that proposed in the 2010 Optimization Study and also keeps the caps above water.

See stages 1 thru 8 of the sequence of construction above.

Study the Material to be Used in the New Counterweight

For preliminary design of the counterweight, we are using a mixture of steel plates and heavy concrete (about 220 pcf) in compliance with AASHTO, AREMA, LDOTD and past projects. AASHTO and LADOTD allows heavy concrete to 325 pcf for counterweights.

Investigate New Roadway Beam Spans on the West Approach

New roadway beam spans will be required on the west approach as a result of the new roadway wider lanes and geometric layout. All roadway approaches will be new.

ALMONASTER BASCULE BRIDGE 42 MONTH PROJECT CONTRACT SCHEDULE

SIX MONTHS ASSEMBLY & MOBILIZATION + 33 MONTHS TO SWAPOUT + 9 MONTHS TO COMPLETION

2 DAYS MARINE CLOSURE followed by 4 DAYS RAIL & MARINE CLOSURE followed by 2 DAYS MARINE CLOSURE

PREPARED: 15-Nov-13

		PROJECT TIME - MONTHS																					
MAJOR PROJECT ACTIVITY	AWARD	1-3	4-6	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	26-27	28-30	31-33	34-36	37-39	40-42	43-45					
CONTRACT AWARD	3 Months																						
NOTICE TO PROCEED																							
ASSEMBLY PERIOD		6 Months Assembly																					
MOBILIZATION																							
STAGE 1 - ES-SE																							
STAGE 2 - ES-SE																							
STAGE 3 - ES-SE																							
STAGE 4 - ES-SE																							
STAGE 5 - ES-NE																							
STAGE 6 - ES-PIER																							
STAGE 7 - ESEWS-NORTH																							
STAGE 8 - ESEWS-SOUTH																							
STAGE 9 - ESEWS																							
STAGE 10 - ESEWS																							
STAGE 11 - REMOVE EXISTING BRIDGE																							
STAGE 12 - INSTALL NEW BRIDGE																							
STAGE 13 - DEMO/REMOVE EXISTING CW																							
STAGE 14 - INSTALL NEW BASCULE SPAN																							
STAGE 15 - REMOVE EXISTING RESIDUALS																							
STAGE 16 - BUILD ROADWAY BRIDGE																							
STAGE 17 - COMPLETE BRIDGE																							
STEEL SUBMITTAL & FABRICATION		SHOP DRAWINGS				FABRICATION & DELIVERY							BUILD ON WATER										
MECHANICAL SUBMITTALS & ASSEMBLY		SHOP DRAWINGS					FABRICATION & DELIVERY						BUILD ON SITE										
ELECTRICAL SUBMITTAL & ASSEMBLY		SUBMITTALS						ASSEMBLY						INSTALL									

ALMONASTER BASCULE BRIDGE OUTAGE TIME-LINE

2 DAYS MARINE CLOSURE followed by 4 DAYS RAIL & MARINE CLOSURE followed by 2 DAYS MARINE CLOSURE

				RAIL ROAD & MARINE CLOSURE DAYS																PREPARED:		15-Nov-13	
STAGE AND/OR MAJOR ACTIVITY	DAY 3	DAY 2	DAY 1	1				2				3				4				DAY 1	DAY 2	DAY 4	DAY 5
RESTRICTED MARINE OPENINGS																							
MARINE CHANNEL CLOSED																							
CLOSED TO RAILROAD TRAFFIC																							
MOVE RINGER BARGE INTO CHANNEL/POSITION																							
REMOVE EXISTING OPERATOR/MACHINERY HOUSE																							
PRESET EXTRACTION BARGE																							
MOVE IN/JACK/SUPPORT/SLIDE CW SOUTH																							
SEVER/REMOVE CW TRUSS & RACK																							
UNBALLAST EXTRACTION BARGE & LIFT SPAN																							
FLOAT EXISTING SPAN NORTH																							
REMOVE RR JUMP SPANS ON EAST BANK																							
REMOVE N & S CW STRUCTURES TO BARGE																							
FLOAT-IN & POSITION NEW BASCULE ON PIERS																							
INSTALL/SET/ALIGN RAIL MITERS & LOCKS																							
INTERCONNECT/BOLT-UP SPAN & CW TRUSS																							
PUMP CW CONCRETE/REMOVE TEMP SUPPORT																							
COMMISSION MECHANICAL/OPEN BASCULE																							

Construction Cost Estimate

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST	CLASSIFICATION
201-01	Clearing & Grubbing	1	LS	$4,000.00	$4,000.00	Road
202-01	Removal of Existing Flood Wall & Gates	1	LS	$35,000.00	$35,000.00	Flood Wall
202-01	Removal of Existing Bascule Bridge	1	LS	$547,200.00	$547,200.00	Bridge Removal
202-01	Removal of Existing Counterweight	1	LS	$1,058,400.00	$1,058,400.00	Bridge Removal
202-01	Removal of Existing Fender System	1	LS	$525,000.00	$525,000.00	Fender System
202-01	Removal of Existing Bridge Structures and Foundations	1	LS	$441,000.00	$441,000.00	Bridge Removal
202-02	Removal and Disposal of Concrete Pavement	5684	SY	$18.00	$102,312.00	Road
202-02	Removal of Catch Basin	7	Each	$500.00	$3,500.00	Road
202-02	Removal of Pipe (Storm Drain)	233	LF	$20.00	$4,660.00	Road
202-02	Removal of End Treatment	3	Each	$250.00	$750.00	Road
202-02	Removal of Railroad Crossing	8	Each	$1,000.00	$8,000.00	Road
203-01	General Excavation	5154	CY	$17.00	$87,618.00	Road
203-01	General Excavation (Fixed Bridge)	248	CY	$14.00	$3,472.00	Fixed Bridge
203-01	General Excavation (Main Pier)	15900	CY	$16.00	$254,400.00	Main Pier
203-02	Drainage Excavation (Dredging)	20000	CY	$13.50	$270,000.00	Bascule Bridge
203-03	Embankment	4306	CY	$38.00	$163,628.00	Road
203-08	Geotextile Fabric	8533	SY	$2.00	$17,066.00	Road
204-02	Temporary Hay or Straw Bales	72	Each	$20.00	$1,440.00	Road
204-06	Temporary Silt Fence	7500	LF	$5.00	$37,500.00	Road
204-07	Temporary Construction Entrance	2	Each	$2,000.00	$4,000.00	Road
302-02	Class II Base Course (8" Thick)	8533	SY	$28.00	$238,924.00	Road
601-02	Portland Concrete Pavement 10" Thick)	3326	SY	$90.00	$299,340.00	Road
601-02	Portland Concrete Pavement 12" Thick)	5207	SY	$95.00	$494,665.00	Road
701-01	Cross Drain Pipe (24" RCP)	154	LF	$100.00	$15,400.00	Road
701-03	Storm Drain Pipe (15" RCP)	282	LF	$90.00	$25,380.00	Road
701-05	Storm Drain Pipe (12" RCP)	85	LF	$80.00	$6,800.00	Road
701-14	Clean Existing Pipes	211	LF	$15.00	$3,165.00	Road
702-03	Catch Basins (CB-01)	5	Each	$2,600.00	$13,000.00	Road
702-05	Cross Drain End Treatment (2 Barrel, 24" RCP)	2	Each	$3,000.00	$6,000.00	Road
702-05	Cross Drain End Treatment (1 Barrel, 24" RCP)	2	Each	$3,500.00	$7,000.00	Road
702-06	Side Drain End Treatment (1 Barrel,15" RCP)	2	Each	$2,500.00	$5,000.00	Road
703-01	Shoulder Underdrains	2582	LF	$12.00	$30,984.00	Road
703-02	Shoulder Outlet Underdrains	9	Each	$325.00	$2,925.00	Road
703-03	Perforated Pipe Underdrains (6")	288	LF	$12.00	$3,456.00	Fixed Bridge
703-03	Perforated Pipe Underdrains (6")	144	LF	$12.00	$1,728.00	Main Pier
704-01	Guard Rail (Single Thrie Beam) (3'-1 1/2" post spacing)	607	LF	$50.00	$30,350.00	Road
704-06	Guard Rail Anchor Sections (Trailing End) (Single Thrie Beam)	120	LF	$80.00	$9,600.00	Road
704-08	Guard Rail Transitions (Single Thrie Beam)	250	LF	$70.00	$17,500.00	Road
704-11	Guard Rail End Treatment (Flared)	10	Each	$2,250.00	$22,500.00	Road
711-01	Riprap (55LB, 18" Thick)	1400	SY	$65.00	$91,000.00	Fixed Bridge
711-04	Geotextile Fabric (Riprap)	1400	SY	$4.00	$5,600.00	Fixed Bridge
716-01	Mulch	5.6	Ton	$600.00	$3,330.00	Road
717-01	Seeding	148	LB	$15.00	$2,220.00	Road
718-01	Fertilizer	2775	LB	$1.00	$2,775.00	Road
726-01	Bedding Material	120	CY	$103.00	$12,360.00	Fixed Bridge
727-01	Mobilization	1	LS	$4,682,165.00	$4,682,165.00	
729-01	Signs (Type A)	273	SF	$35.00	$9,555.00	Road
729-16	Object Marker Assembly (Type 3)	2	Each	$165.00	$330.00	Fixed Bridge
729-21	U-Channel Post	39	Each	$90.00	$3,510.00	Road
730-09	Electrical System (Bascule Bridge)	1	LS	$2,250,000.00	$2,250,000.00	Bascule Bridge
732-01	Plastic Pavement Striping (Solid Line) (24" Width) Thermoplastic 90	44	LF	$8.00	$352.00	Road
732-01	Plastic Pavement Striping (Solid Line) (4" Width) Thermoplastic 90 m	6700	LF	$0.60	$4,020.00	Road
732-04	Plastic Pavement Legends and Symbols (RR Crossing)	6	Each	$700.00	$4,200.00	Road
733-01	Concrete Roadway Barrier (Single Faced)	345	LF	$250.00	$86,250.00	Road
802-01	Structural Excavation (Flood Walls)	783	CY	$85.00	$66,555.00	Flood Wall
803-03	Steel Sheet Pile Wall (PZ-27)	15000	SF	$30.00	$450,000.00	Fixed Bridge
803-03	Steel Sheet Pile Wall (PZ-40)	28560	SF	$55.00	$1,570,800.00	Main Pier
804-01	Precast Concrete Piles (30")	1280	LF	$120.00	$153,600.00	Fixed Bridge
804-03	Steel Piles (H14Px73)	3600	LF	$55.00	$198,000.00	Fixed Bridge
804-03	Steel Piles (HP14x73)	18260	LF	$80.00	$1,460,800.00	Main Pier
804-05	Precast Concrete Test Piles	2	Each	$55.00	$110.00	Fixed Bridge
804-07	Steel Test Piles HP 14x73	2	Each	$11,000.00	$22,000.00	Main Pier
804-09	Loading Test Piles	2	Each	$30,000.00	$60,000.00	Fixed Bridge
804-09	Loading Test Piles	2	Each	$30,000.00	$60,000.00	Main Pier
804-10	Reloading Test Piles	2	Each	$12,000.00	$24,000.00	Fixed Bridge
804-10	Reloading Test Piles	2	Each	$12,000.00	$24,000.00	Main Pier
804-11	Redriving Test Piles	2	Each	$2,250.00	$4,500.00	Fixed Bridge
804-11	Redriving Test Piles	4	Each	$2,250.00	$9,000.00	Main Pier
804-17	Dynamic Monitoring	2	Each	$874.00	$1,748.00	Fixed Bridge
804-17	Dynamic Monitoring	4	Each	$874.00	$3,496.00	Main Pier
805-01	Class A Concrete (Counterweight & Balance Blocks)	1100	CY	$720.00	$792,000.00	Bascule Bridge
805-01	Class A Concrete (Flood Walls)	148	CY	$1,000.00	$148,000.00	Flood Wall
805-01	Class A Concrete (Footings)	10	CY	$500.00	$5,000.00	Fixed Bridge
805-01	Class A Concrete (Bents)	190	CY	$800.00	$152,000.00	Fixed Bridge
805-03	Class AA Concrete	249	CY	$700.00	$174,300.00	Fixed Bridge

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST	CLASSIFICATION
805-08	Precast-Prestressed Concrete Girders (Type II)	1200	LF	$105.00	$126,000.00	Fixed Bridge
805-08	Precast-Prestressed Concrete Girders (Type III) (EB	300	LF	$140.00	$42,000.00	Fixed Bridge
805-11	Strip Seal Joints	200	LF	$185.00	$37,000.00	Fixed Bridge
805-14	Class A Mass Concrete (Footing)	2237	CY	$600.00	$1,342,200.00	Main Pier
805-14	Class A Mass Concrete (Pier)	600	CY	$800.00	$480,000.00	Main Pier
806-01	Deformed Reinforcing Steel (Fixed Bridge)	135000	LB	$1.30	$175,500.00	Fixed Bridge
806-01	Deformed Reinforcing Steel (Flood Walls)	3164	LB	$1.00	$3,164.00	Flood Wall
806-01	Deformed Reinforcing Steel (Main Pier)	900000	LB	$1.00	$900,000.00	Main Pier
807-03	Steel (AASHTO M 270, Grade 50W)	160000	LB	$5.00	$800,000.00	Fixed Bridge
807-08	Structural Metalwork (Flood Gate)	26487	LB	$3.00	$79,461.00	Flood Wall
807-08	Structural Metalwork (Bascule & Track Girder Spans)	3940000	LB	$2.70	$10,638,000.00	Bascule Bridge
807-08	Structural Metalwork (Rack Frame)	200000	LB	$18.00	$3,600,000.00	Bascule Bridge
807-08	Structural Metalwork (Fixed Bridge)	2	LS	$5,000.00	$10,000.00	Fixed Bridge
808-01	Steel Grid Flooring (2 Floors x 181' x 21')	7602	SF	$81.00	$615,762.00	Bascule Bridge
809-01	Movable Bridge Machinery	1	LS	$4,950,000.00	$4,950,000.00	Bascule Bridge
809-02	Traffic Barriers	4	Each	$125,000.00	$500,000.00	Road
809-03	Operating House	1	LS	$720,000.00	$720,000.00	Bascule Bridge
809-04	Machinery Houses	1	LS	$450,000.00	$450,000.00	Bascule Bridge
810-01	Concrete Railing Barrier	864	LF	$65.00	$56,160.00	Fixed Bridge
810-02	Steel Railing (4 Rails x 181')	724	LF	$135.00	$97,740.00	Bascule Bridge
812-01	Treated Timber (Coastal Treatment) (Railroad)	44	MFBM	$7,200.00	$316,800.00	Bascule Bridge
813-01	Concrete Approach Slabs	440	SY	$212.00	$93,280.00	Fixed Bridge
NS-300	Geo Grid	8533	SY	$2.00	$17,066.00	Road
NS-702	Clean Catch Basin	6	Each	$100.00	$600.00	Road
NS-ITS	Electrical Service Connection	1	LS	$45,000.00	$45,000.00	Bascule Bridge
S-101	Dynamic Analysis	2	Each	$500.00	$1,000.00	Fixed Bridge
S-101	Dynamic Analysis	4	Each	$500.00	$2,000.00	Main Pier
S-107	Sheet Pile Whalers	1312	LF	$280.00	$367,360.00	Main Pier
S-108	Sheet Pile Anchors	20	Each	$19,000.00	$380,000.00	Main Pier
S-	Generator Platform	1	LS	$270,000.00	$270,000.00	Bascule Bridge
S-	Railroad Crossing Precast Panels	243	LF	$500.00	$121,500.00	Road
S-	Railroad Crossing Signal	5	Each	$250,000.00	$1,250,000.00	Road
S-	Sheet Pile Dolphins	1	LS	$1,650,000.00	$1,650,000.00	Fender System
S-	Fender System	1	LS	$1,200,000.00	$1,200,000.00	Fender System
S-	Sewer Service Connection	1	LS	$90,000.00	$90,000.00	Bascule Bridge
S-	Gas Service Connection	1	LS	$4,500.00	$4,500.00	Bascule Bridge
S-	Tremie Concrete	3136	CY	$330.00	$1,034,880.00	Main Pier
S-	Temporary Jump Spans and Bents	1	LS	$1,000,000.00	$1,000,000.00	Main Pier
S-	Modify Existing Piers	1	LS	$696,600.00	$696,600.00	Bascule Bridge
	Contingency (15%)				$7,725,570.00	
	Total Cost				$59,229,382.00	

Major Project Activity	Total
Roadway	$3,668,385.00
Floodwall	$332,180.00
Fixed Bridge	$2,680,416.00
Bascule Bridge	$25,806,402.00
Main Pier	$8,912,664.00
Fender System	$3,375,000.00
Demolition	$2,046,600.00
Mobilization	$4,682,165.00
Contingency	$7,725,570.00
Total Cost	**$59,229,382.00**

Proposed Railroad Signalization

The proposed railroad signalization plan remains the same as within the previous study. The CSX railroad signal will be changed from a bridge operated system to a railroad dispatched controlled system. The railroad dispatcher will communicate necessary information for bridge span movements to the bridge operator and control system. The cost or details associated with the railroad signalization changes will not be included within this project and are to be provided by CSX prior to the proposed bridge reconstruction project.

Proposed Sequence of Operation

The movable bridge control system outlined in the 2010 Optimization Study utilized PLC- based logic for accelerating, decelerating, and creep speed. After meeting with LADOTD Bridge Design and Port of New Orleans officials it was determined that no PLC logic would be used for the movable bridge primary control system and that the control system shall be based on only relay logic. There shall be two (2) 150 hp, wound rotor electric motors with stepped resistance attached to the input shafts of the primary reducer. The movable bridge machinery requires only one (1) 150 hp motor to operate the bridge and the control system shall alternate the use of each motor for every opening and closing sequence. The control system shall also prevent the use of both motors simultaneously. In the event of a motor failure, the bridge operator can select the functioning motor to operate the span and the motor alternating feature will be bypassed. The following sequence of operation represents how the bridge will operate utilizing relay logic and wound rotor motors with stepped resistance:

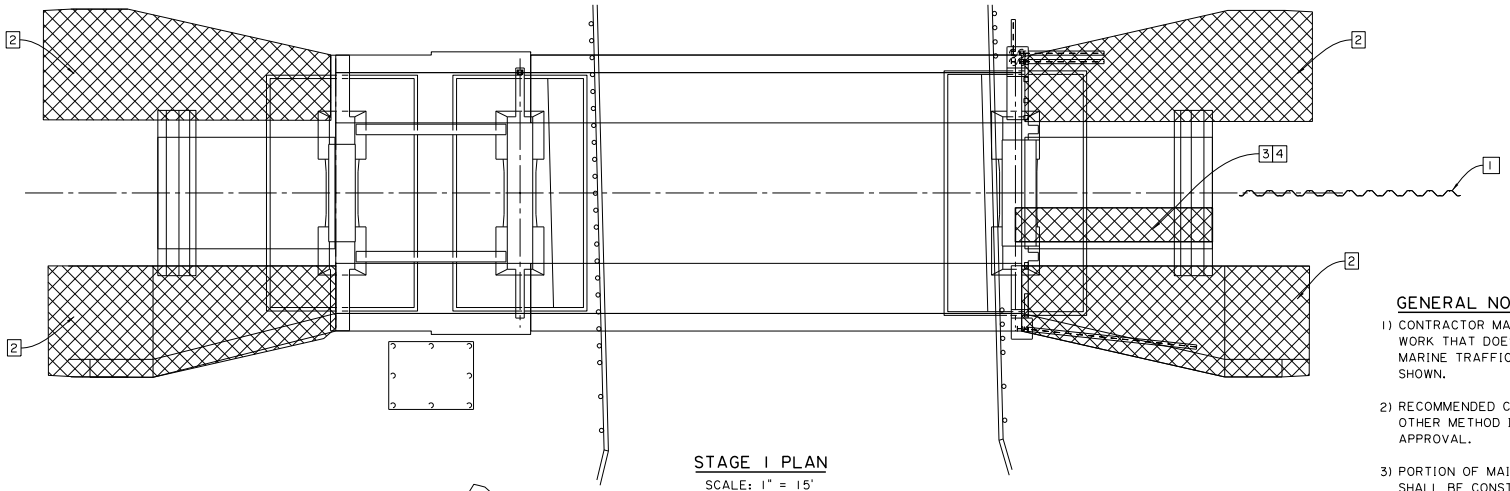
Open Bridge

1. Withdraw the span locks.
2. Motors energize and brakes open simultaneously.
3. The movable span accelerates to full speed utilizing stepped rotor resistance.
4. If after some time, bridge is not to speed or has not cleared the almost down state, then stop and alarm. (bridge is not moving correctly)
5. If the span is stopped at any point in its opening then restarted, it will automatically go through the stepped resistors for accelerating via timers.
6. When the span reaches the fully open set point, a rotary cam limit switch directly attached to the output shaft de-energizes the motors and brakes.
7. The brakes set according to the time delay settings on each brake. (Minimum time delay is 1 sec)
8. The span comes to a stop. It should be noted here that the rotary cam limit switch set point will take into account the angular rotation during braking/plugging.
9. There will be a back up snap action limit switch for the past open condition that will stop the span if the rotary cam fails, however, under normal operation the span will come to a stop before the past open limit switch is thrown. If the span trips the past open limit switch the motor and all brakes de-energize simultaneously and an alarm is generated.
10. Marine traffic passes.

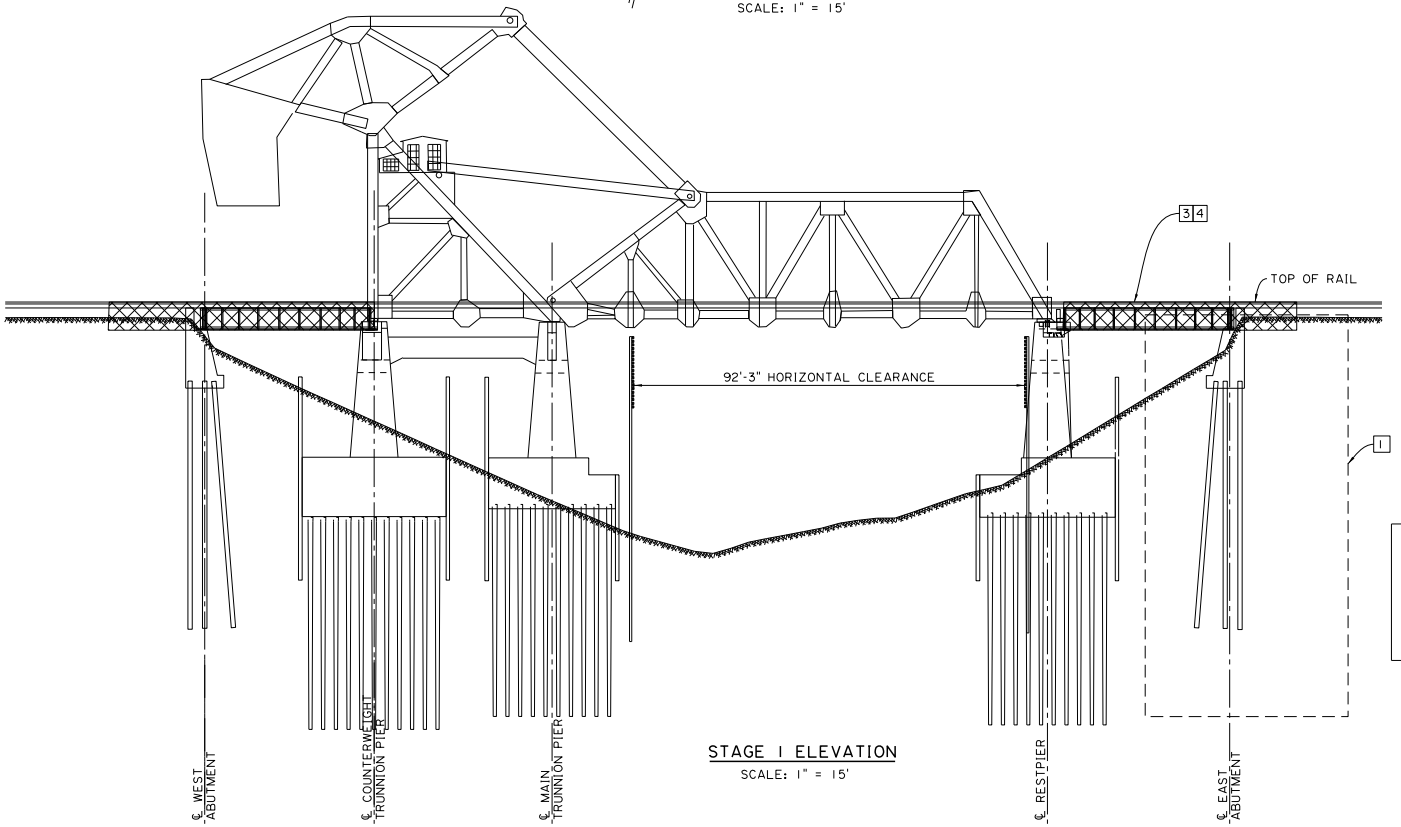
Close Bridge

11. The motors energize and the brakes release at the same time.
12. The movable span accelerates to full speed utilizing stepped rotor resistance.
13. When the span reaches the nearly seated position (about 5-8 feet from fully seated) the rotary cam limit switch activates the stopping sequence. (de-energizes the motors and brakes)
14. The brakes set according to the time delay settings on each brake. (Minimum time delay is 1 sec)
15. The span comes to a stop approximately 2 to 4 feet from fully seated.
16. The span is held in this position for about a second then the brakes release and the span begins to float down under its imbalance.
17. Air buffers engage on the rest pier and control the seating.
18. If the rotary cam limit switch fails for nearly seated then a back up snap action limit switch will activate the stopping sequence. Under normal operating conditions the span shall have come to a stop at nearly seated and the back up nearly seated limit switch should be thrown. Should any backup limit switch fail, the motor and all brakes should de-energize immediately and an alarm is generated.
19. When the span has seated 2 snap action limit switches will have been thrown to indicate that the span is seated on the control desk and give permission for the span locks to be driven.
20. If the span gets “hung up” and does not fully seat then the operator can use the push button to bump the bridge down.
21. At any time during operation of the span the operator can hit the emergency stop button and power will be terminated and the bridge will come to a stop according the brake delay settings.

APPENDIX I



STAGE I PLAN
SCALE: 1" = 15'



STAGE I ELEVATION
SCALE: 1" = 15'

GENERAL NOTES:

1) CONTRACTOR MAY OPT TO COMPLETE ANY WORK THAT DOES NOT DISRUPT RAIL OR MARINE TRAFFIC IN EARLIER STAGES THAN SHOWN.

2) RECOMMENDED CONSTRUCTION SEQUENCING, IF OTHER METHOD IS CHOSEN, MUST SUBMIT FOR APPROVAL.

3) PORTION OF MAIN SPAN TO BE FLOATED IN SHALL BE CONSTRUCTED OFF-SITE ANY TIME PRIOR TO STAGE 14.

4) NEW OPERTOR'S HOUSE SHALL BE CONSTRUCTED ANY TIME PRIOR TO STAGE 15.

STAGE I NOTES:

1 DURING WORK WINDOWS, DRIVE SHEET PILES BETWEEN TRACKS. CUT OFF BELOW TOP OF RAIL.

2 REMOVE EXISTING ROADWAY STRUCTURE EXCLUDING THE BASCULE SPAN.

3 SHUT DOWN SOUTHEAST TRACK TO RAIL SERVICE.

4 REMOVE EXISTING RAILROAD SPAN.

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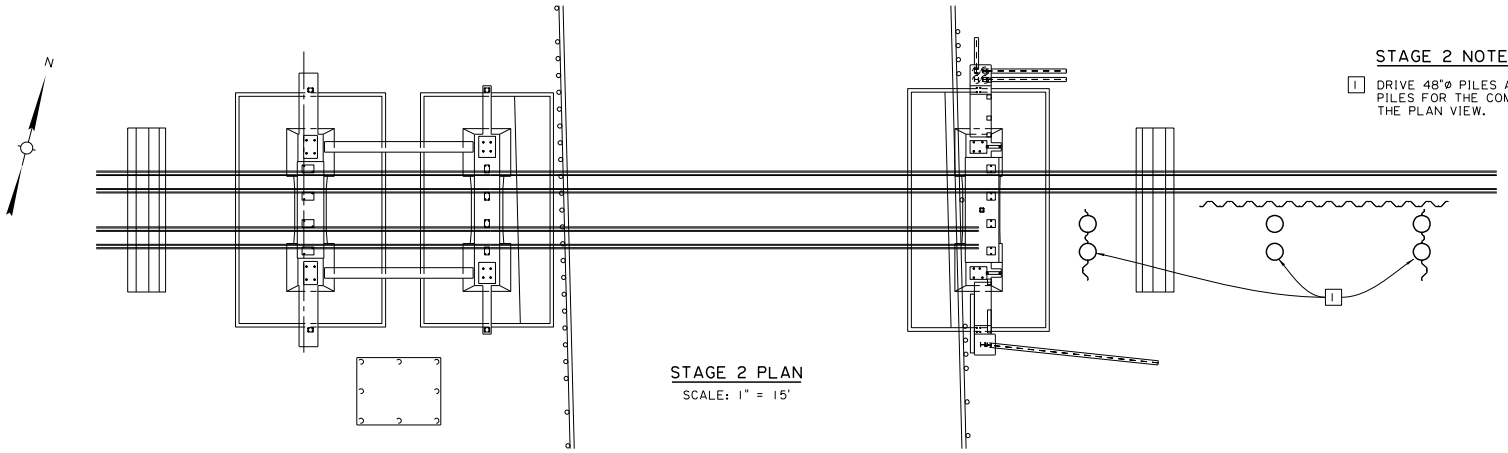
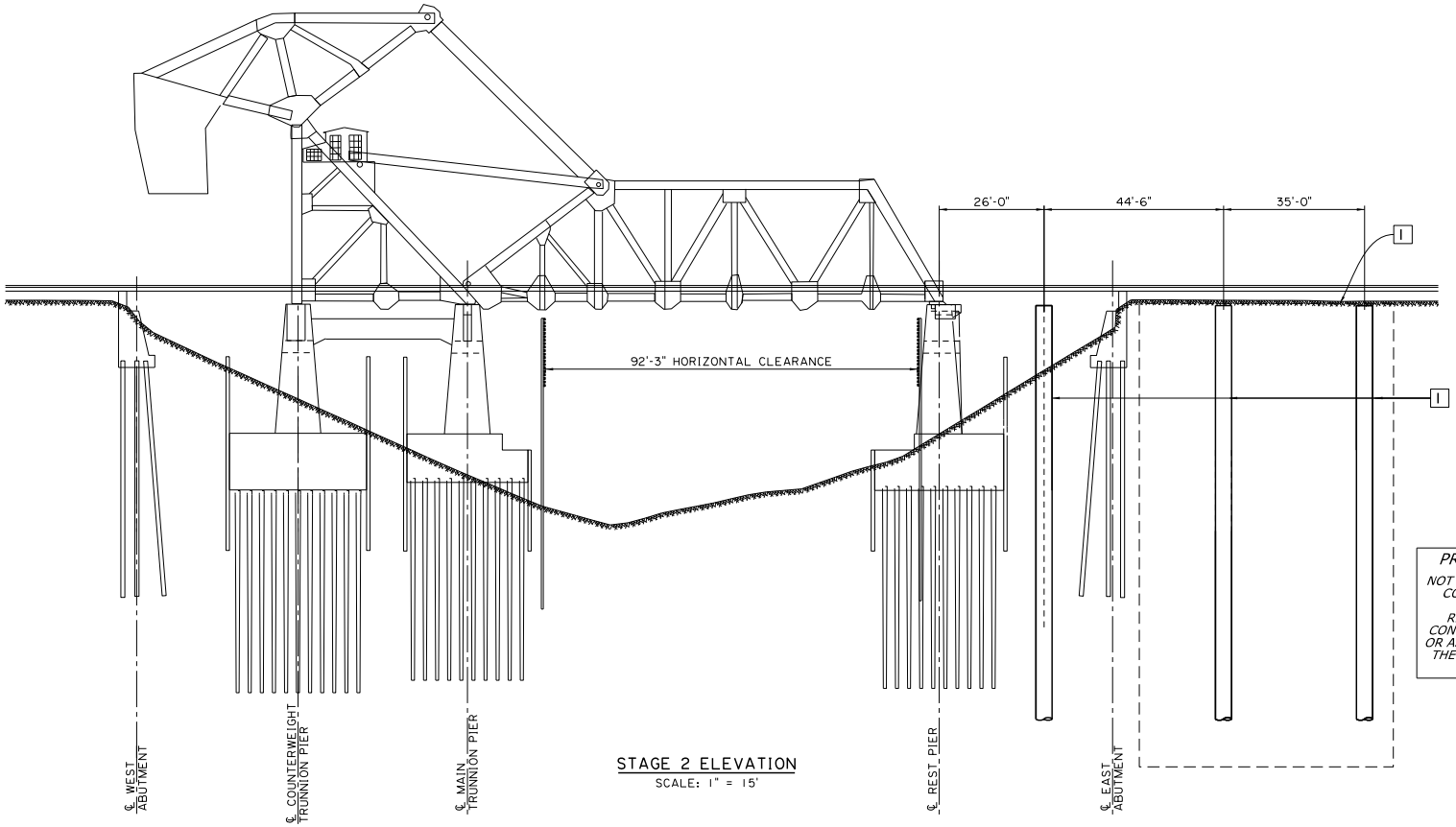


STAGE 2 PLAN
SCALE: 1" = 15'

STAGE 2 NOTES:

1. DRIVE 48"ø PILES AND PARTIAL SECTIONS OF SHEET PILES FOR THE COMBINED WALL SYSTEM AS SHOWN IN THE PLAN VIEW.



STAGE 2 ELEVATION
SCALE: 1" = 15'

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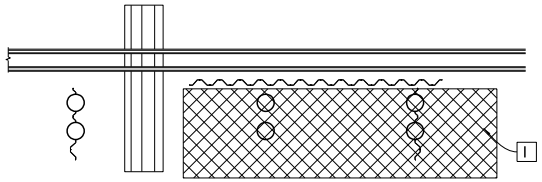
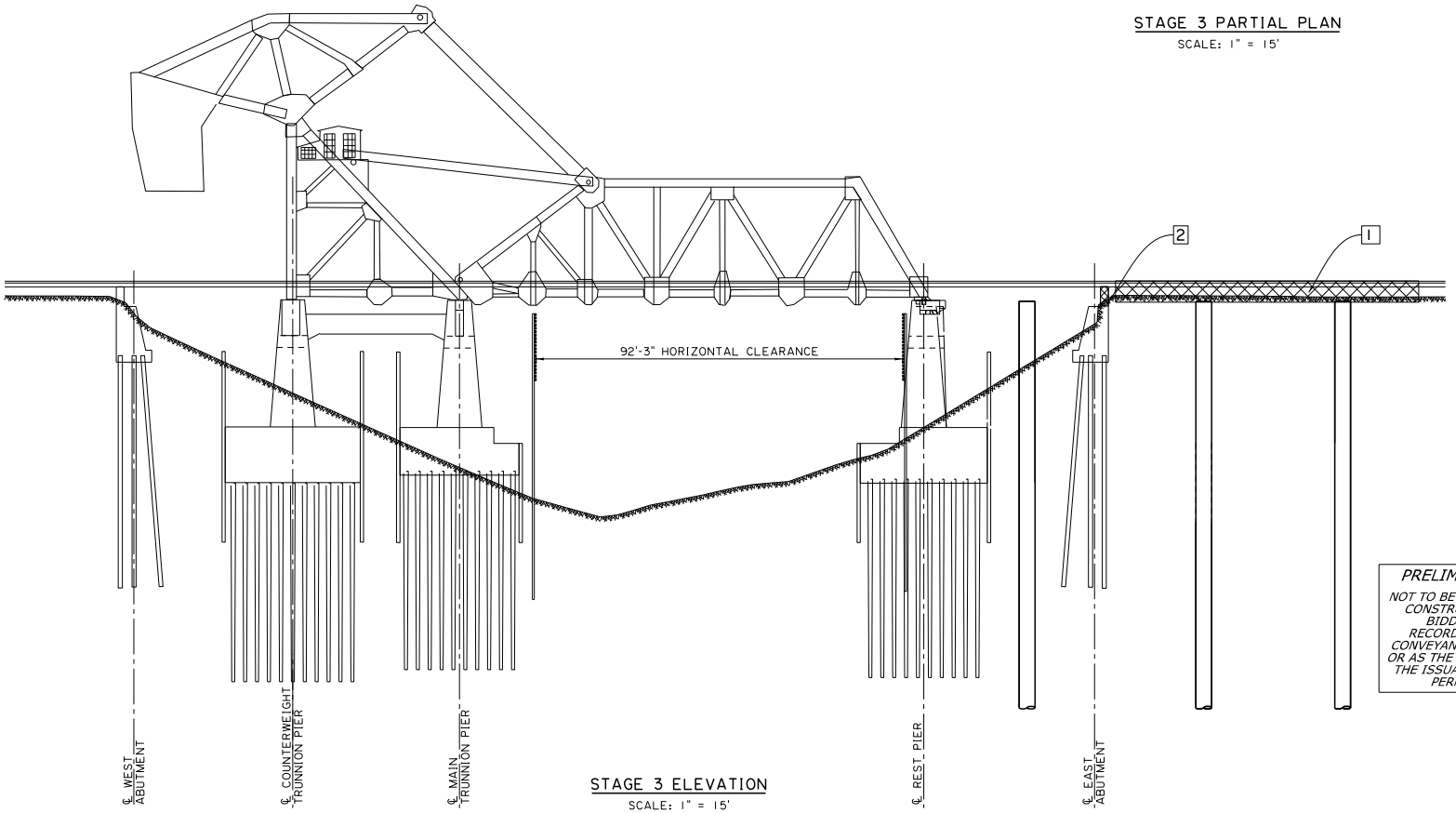
STAGE 3 NOTES:

1. EXCAVATE AS NEEDED TO PLACE STEEL CAPS ON COMBINED WALL SYSTEM.
2. REMOVE EXISTING ABUTMENT AS REQUIRED TO PLACE TEMPORARY JUMP SPAN.



STAGE 3 PARTIAL PLAN

SCALE: 1" = 15'



STAGE 3 ELEVATION

SCALE: 1" = 15'

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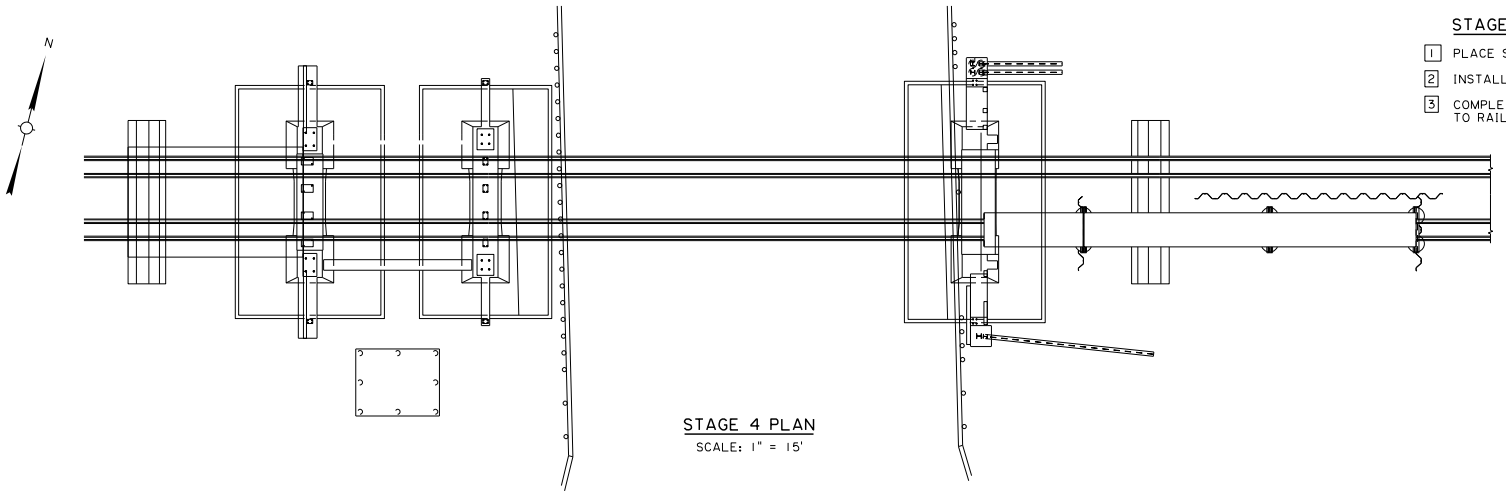
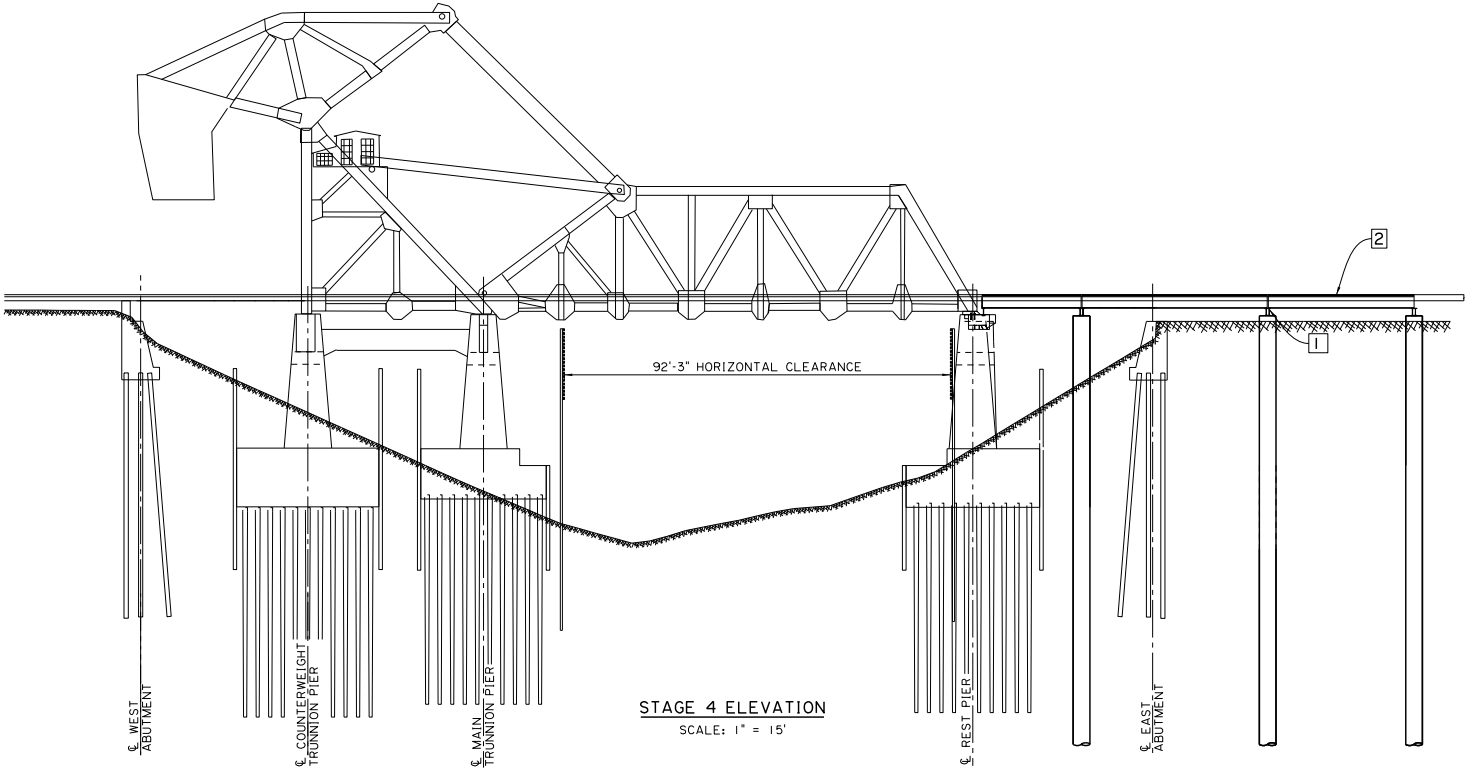


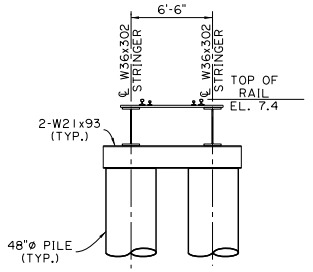
STAGE 4 PLAN
SCALE: 1" = 15'

STAGE 4 NOTES:

1. PLACE STEEL CAPS ON 48"ø PILES.
2. INSTALL TEMPORARY JUMP SPANS.
3. COMPLETE TRACK WORK AND OPEN BRIDGE TO RAIL TRAFFIC.



STAGE 4 ELEVATION
SCALE: 1" = 15'



STAGE 4 SECTION
SCALE: 1" = 5'

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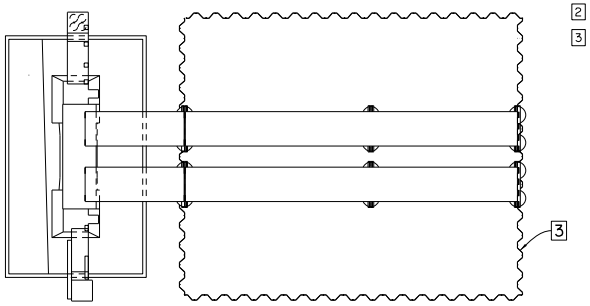
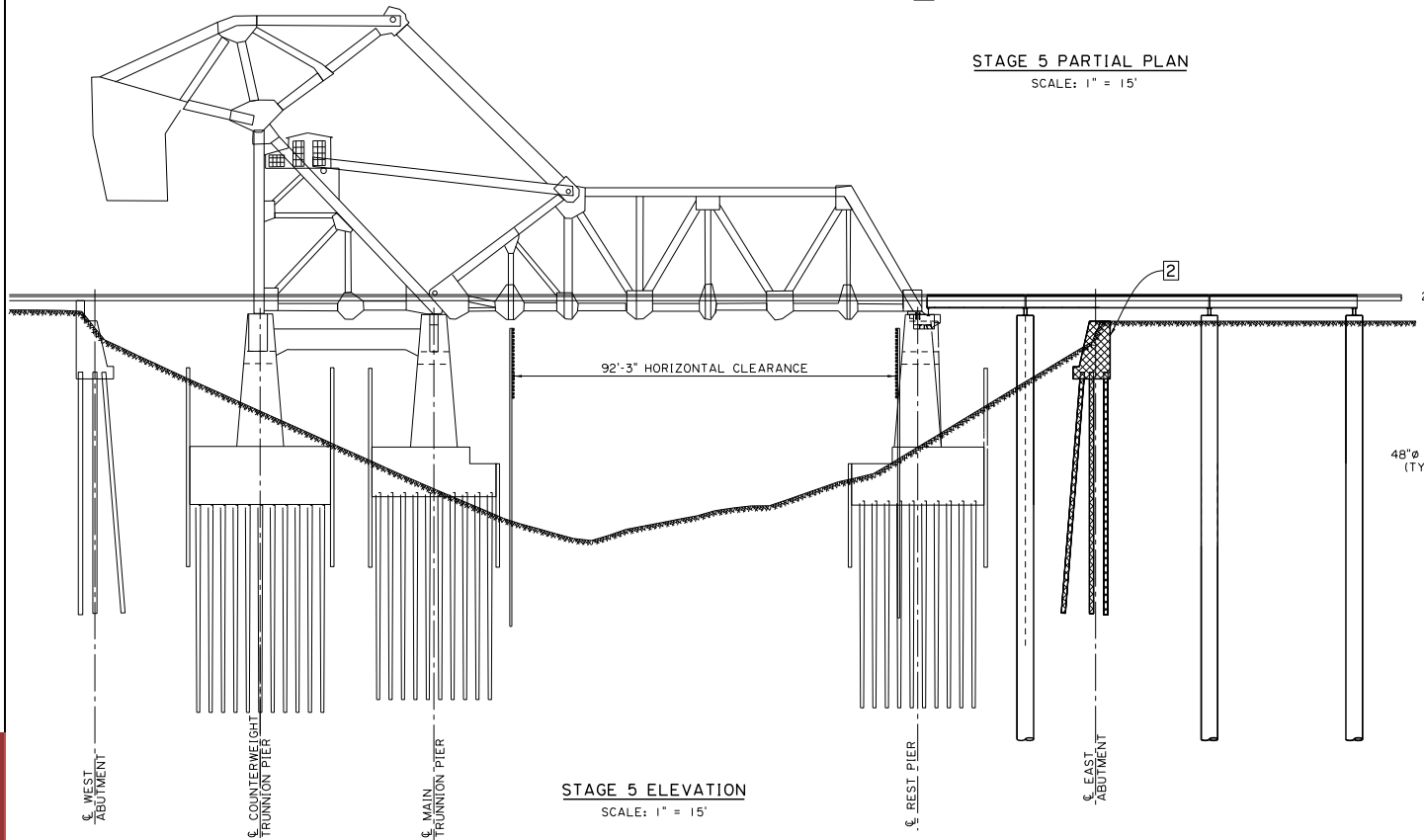
STAGE 5 NOTES:

1. REPEAT STAGES 1-4 FOR THE SECOND TRACK. REMOVE SHEET PILING BETWEEN TRACKS AFTER BOTH JUMP SPANS ARE IN PLACE.
2. REMOVE REMAINDER OF EXISTING ABUTMENT.
3. COMPLETE REMAINDER OF COFFERDAM.



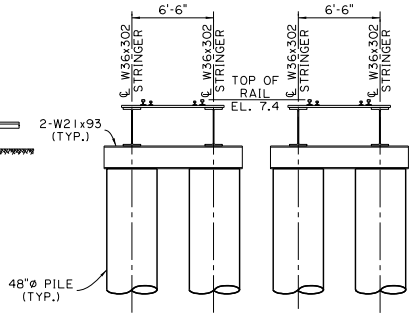
STAGE 5 PARTIAL PLAN

SCALE: 1" = 15'



STAGE 5 ELEVATION

SCALE: 1" = 15'



STAGE 5 SECTION

SCALE: 1" = 5'

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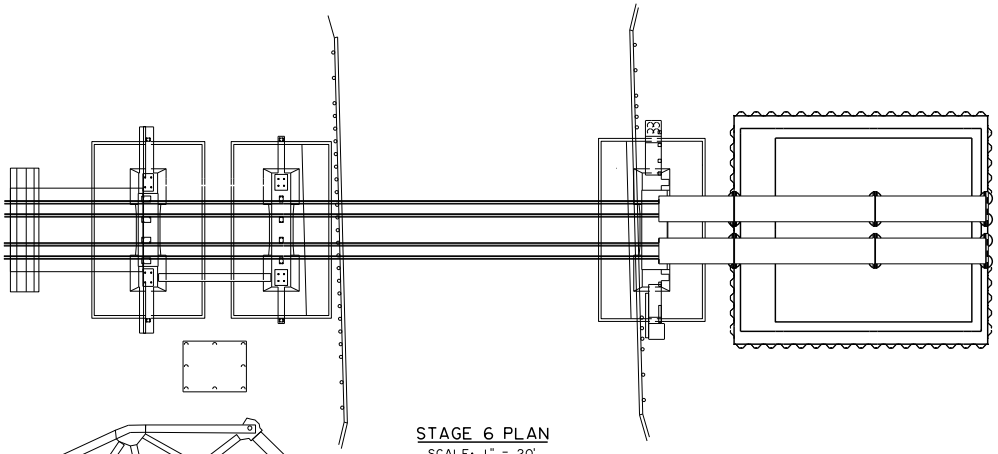
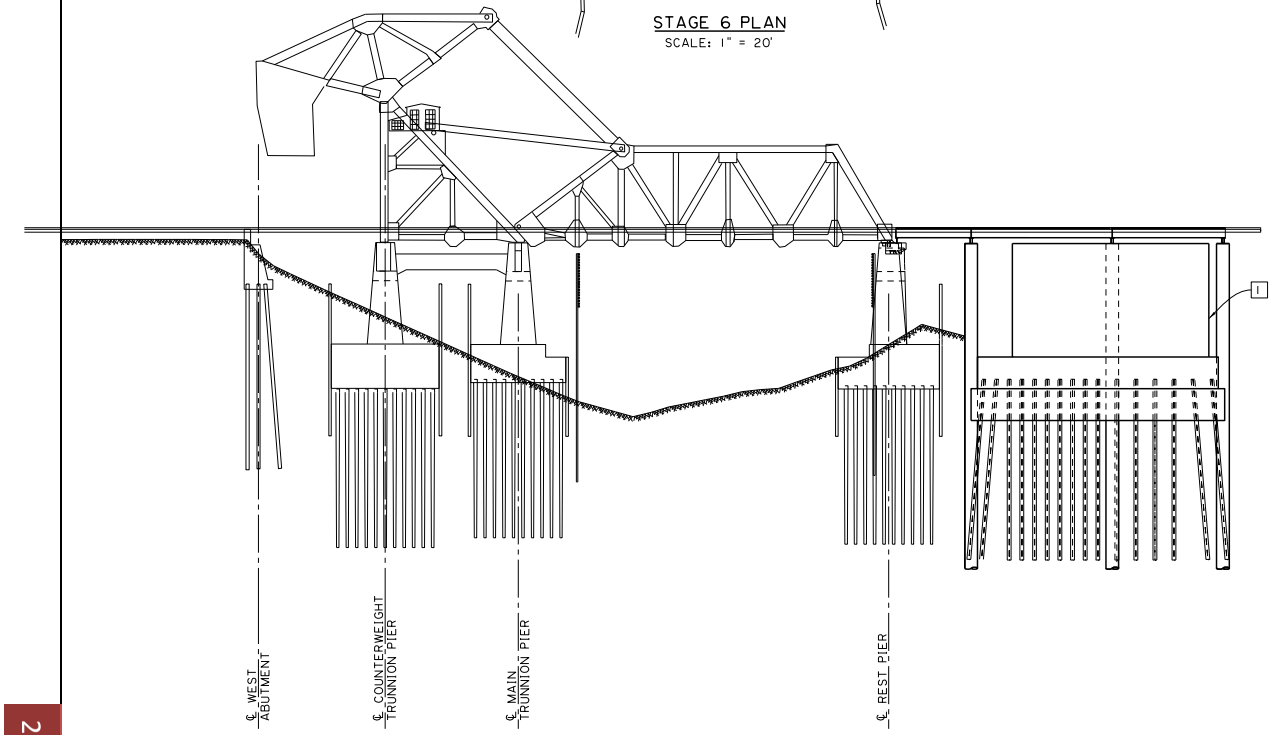


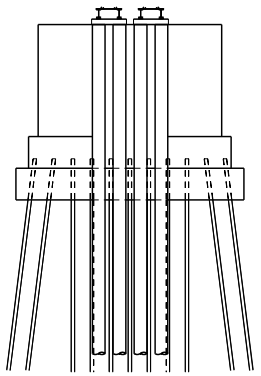
STAGE 6 PLAN
SCALE: 1" = 20'

STAGE 6 NOTES:

1 BUILD BASCULE MAIN PIER.



STAGE 6 ELEVATION
SCALE: 1" = 20'



STAGE 6 CROSS SECTION
SCALE: 1" = 20'

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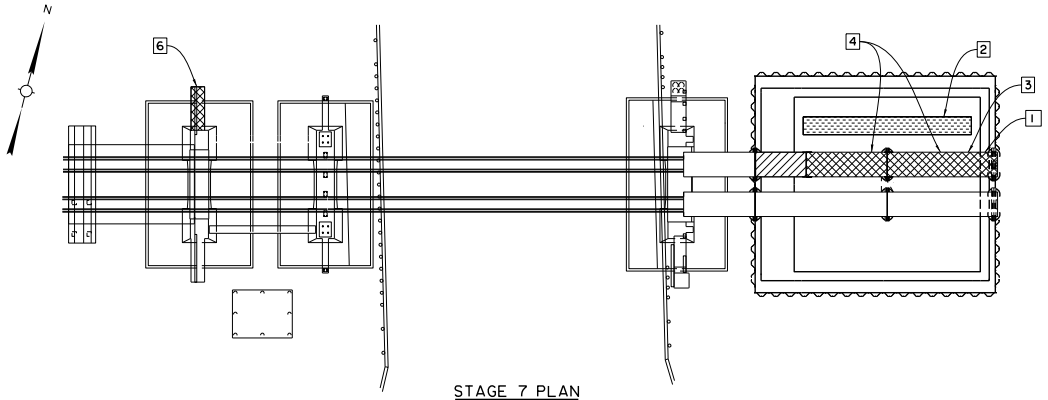
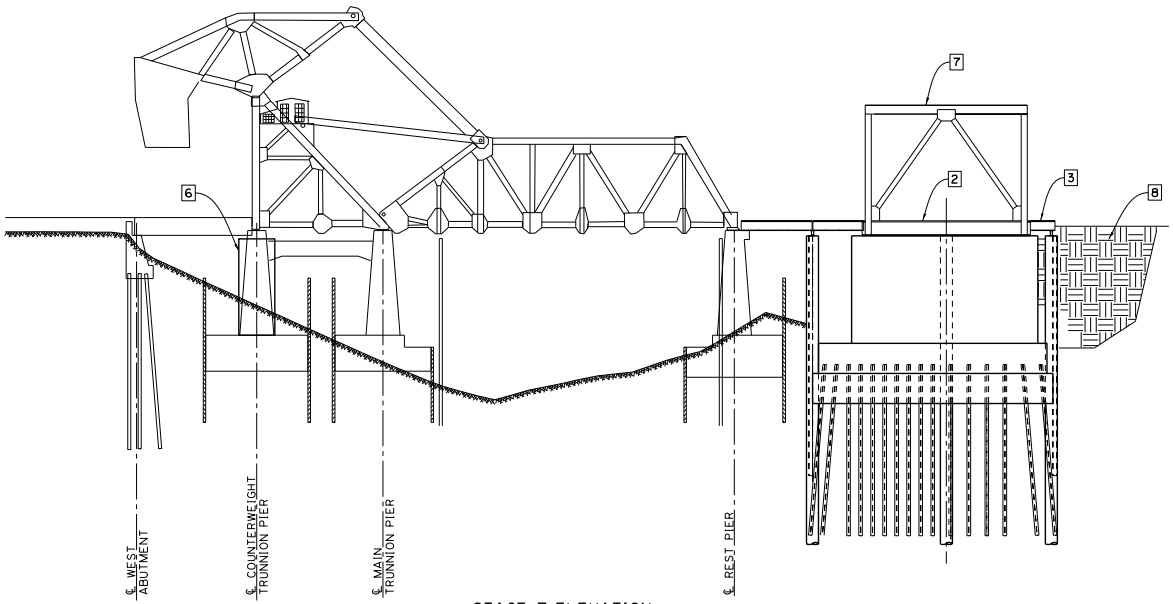


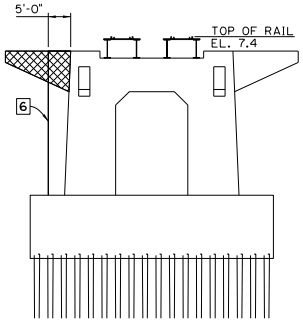
STAGE 7 PLAN
SCALE: 1" = 20'

STAGE 7 NOTES:

1. CLOSE WB RAIL TRAFFIC.
2. INSTALL TRACK GIRDER (WB SIDE).
3. REMOVE JUMP SPANS (WB).
4. CONVERT WB JUMP SPANS TO PERMANENT SPANS.
5. COMPLETE TRACK WORK ON NORTHEAST SPAN.
6. WIDEN AND REWORK NORTH SIDE OF REST PIER AS SHOWN IN SECTION.
7. INSTALL NORTH RACK FRAME.
8. BACKFILL NORTHEAST SIDE OF MAIN PIER.
9. COMPLETE TRACK WORK.
10. OPEN WB TRACK.
11. START BUILDING BASCULE SPAN ON BARGE.



STAGE 7 ELEVATION
SCALE: 1" = 20'



STAGE 8 PIER SECTION
SCALE: 1" = 15'

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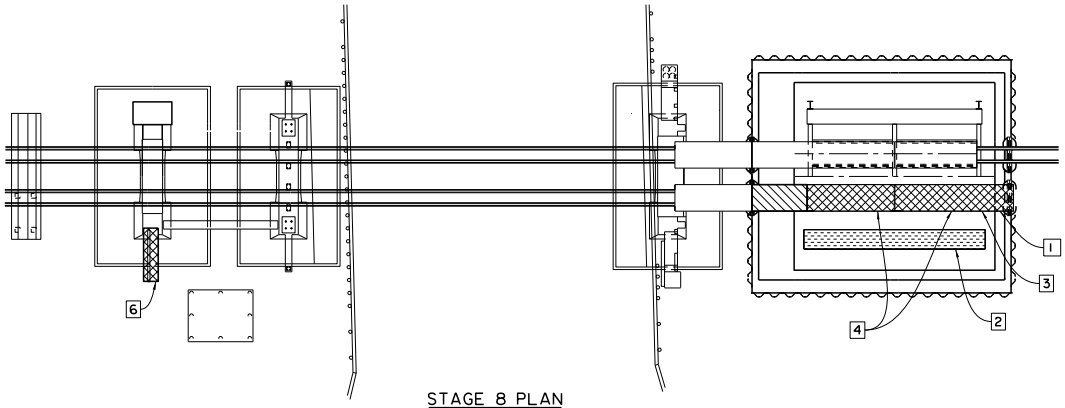
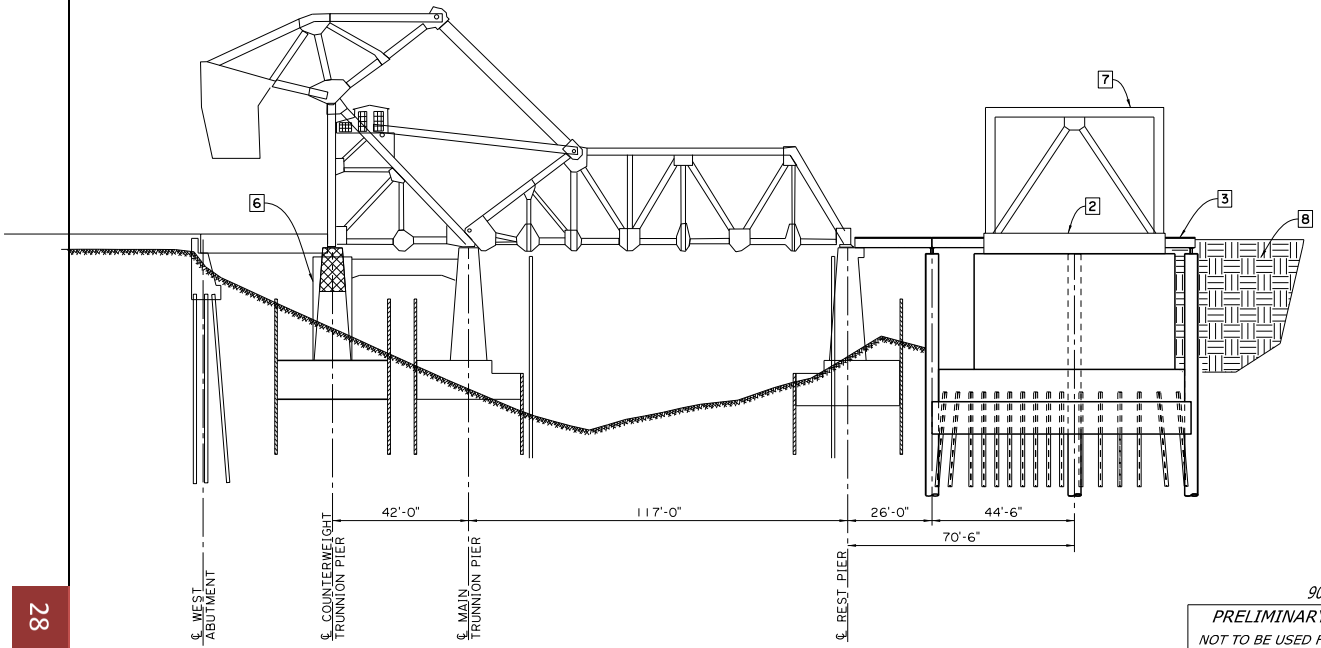
STAGE 8 NOTES:

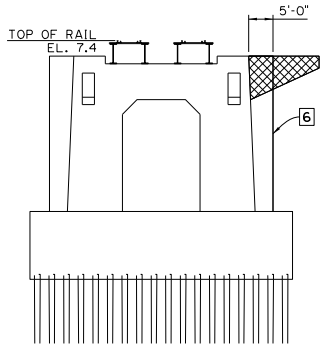
1. CLOSE EB RAIL TRAFFIC.
2. INSTALL TRACK GIRDER (EB SIDE).
3. REMOVE JUMP SPANS (EB).
4. CONVERT EB JUMP SPANS TO PERMANENT SPANS.
5. COMPLETE TRACK WORK ON SOUTHEAST SPAN.
6. WIDEN / REWORK EXISTING SOUTH SIDE OF REST PIER AS SHOWN IN SECTION.
7. INSTALL SOUTH RACK FRAME.
8. BACKFILL SOUTHEAST SIDE OF MAIN PIER.
9. COMPLETE TRACK WORK.
10. OPEN EB TRACK.



STAGE 8 PLAN
SCALE: 1" = 20'



STAGE 8 ELEVATION
SCALE: 1" = 20'



STAGE 8 PIER SECTION
SCALE: 1" = 15'

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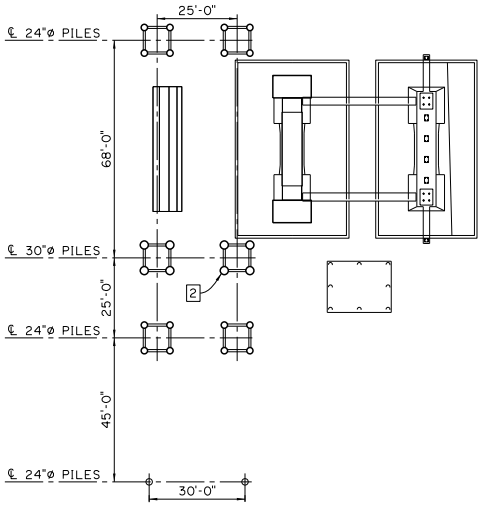
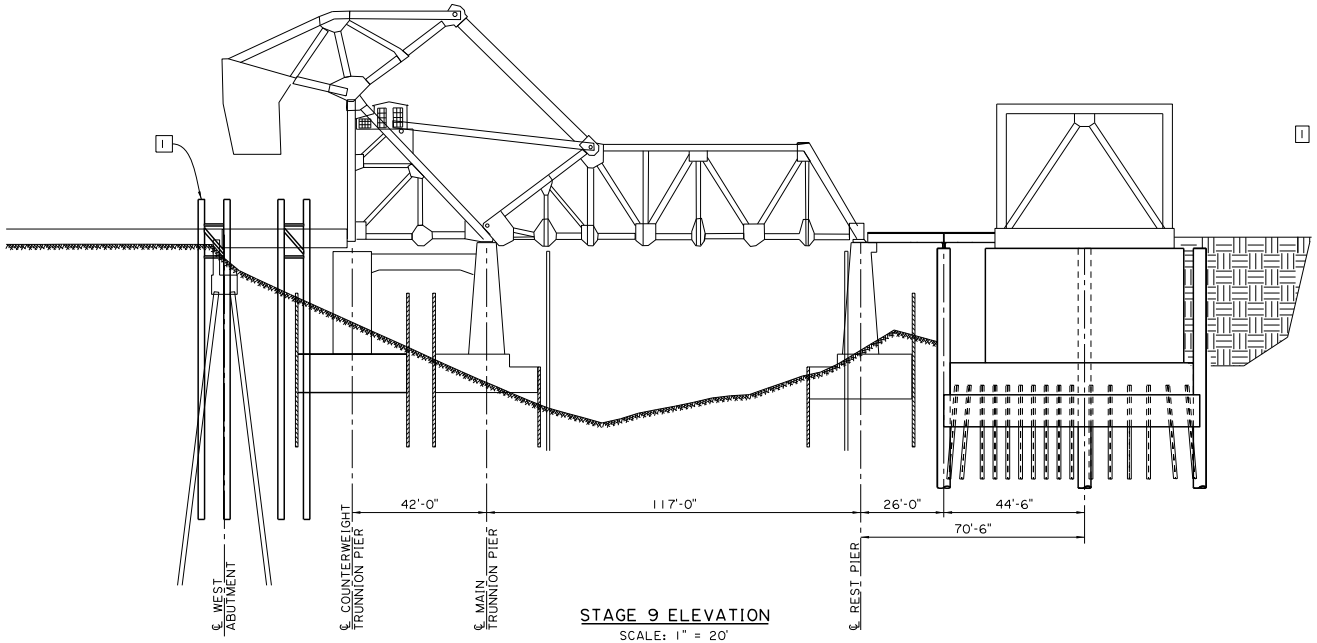


STAGE 9 PARTIAL PLAN
SCALE: 1" = 20'



STAGE 9 ELEVATION
SCALE: 1" = 20'

STAGE 9 NOTES:

1. BEGIN TO INSTALL COUNTERWEIGHT REMOVAL FALSE WORK.

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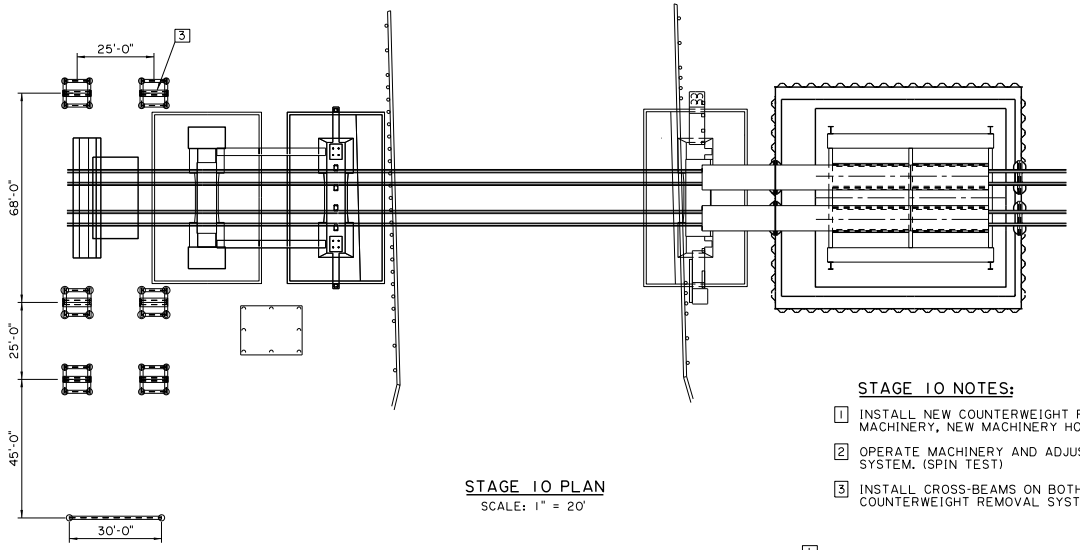
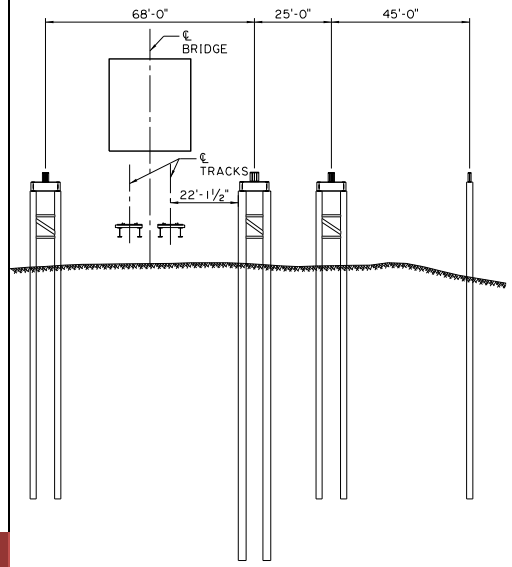


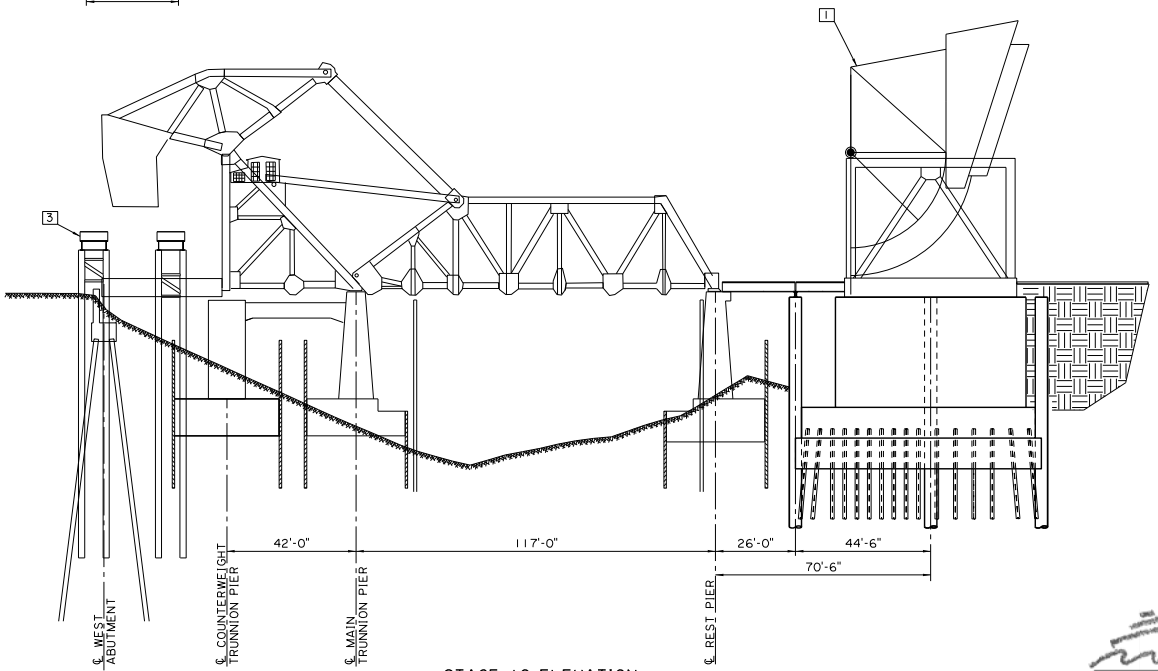
STAGE 10 PLAN
SCALE: 1" = 20'

STAGE 10 NOTES:

1. INSTALL NEW COUNTERWEIGHT FRAME, NEW MACHINERY, NEW MACHINERY HOUSE.
2. OPERATE MACHINERY AND ADJUST CONTROL SYSTEM. (SPIN TEST)
3. INSTALL CROSS-BEAMS ON BOTH SIDES OF COUNTERWEIGHT REMOVAL SYSTEM.



STAGE 10 SECTION
SCALE: 1" = 20'



STAGE 10 ELEVATION
SCALE: 1" = 20'

PORT OF NEW ORLEANS

BOARD OF COMMISSIONERS
PORT OF NEW ORLEANS

90% PRELIMINARY

PRELIMINARY	Louisiana Department of Transportation and Development
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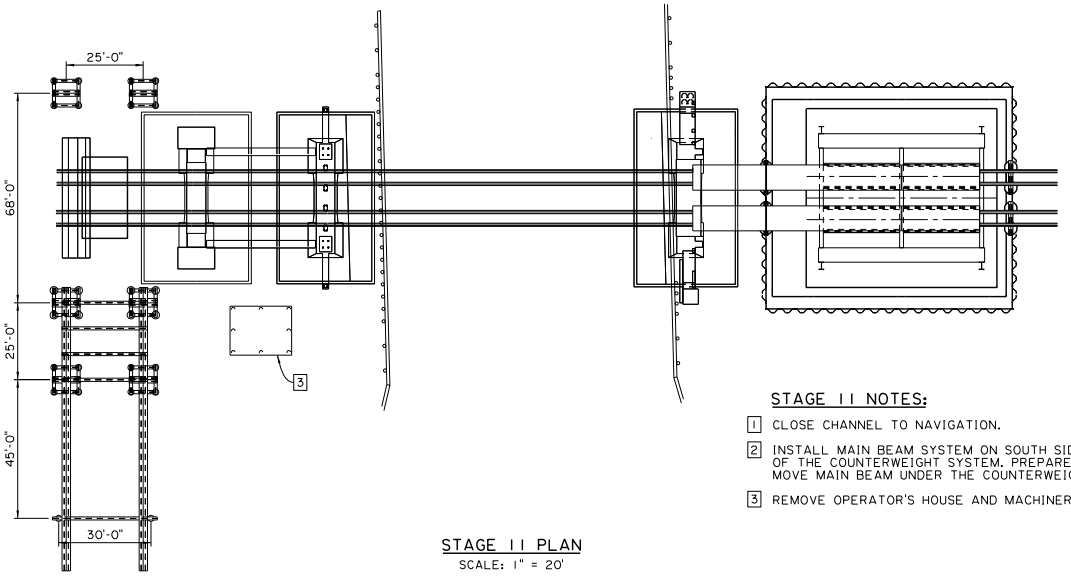
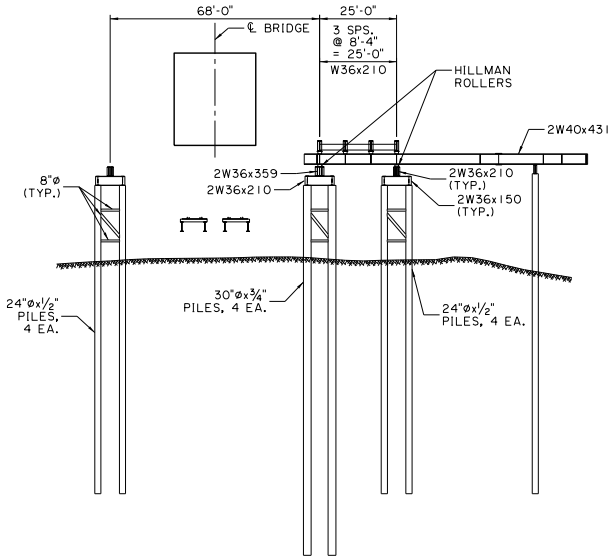


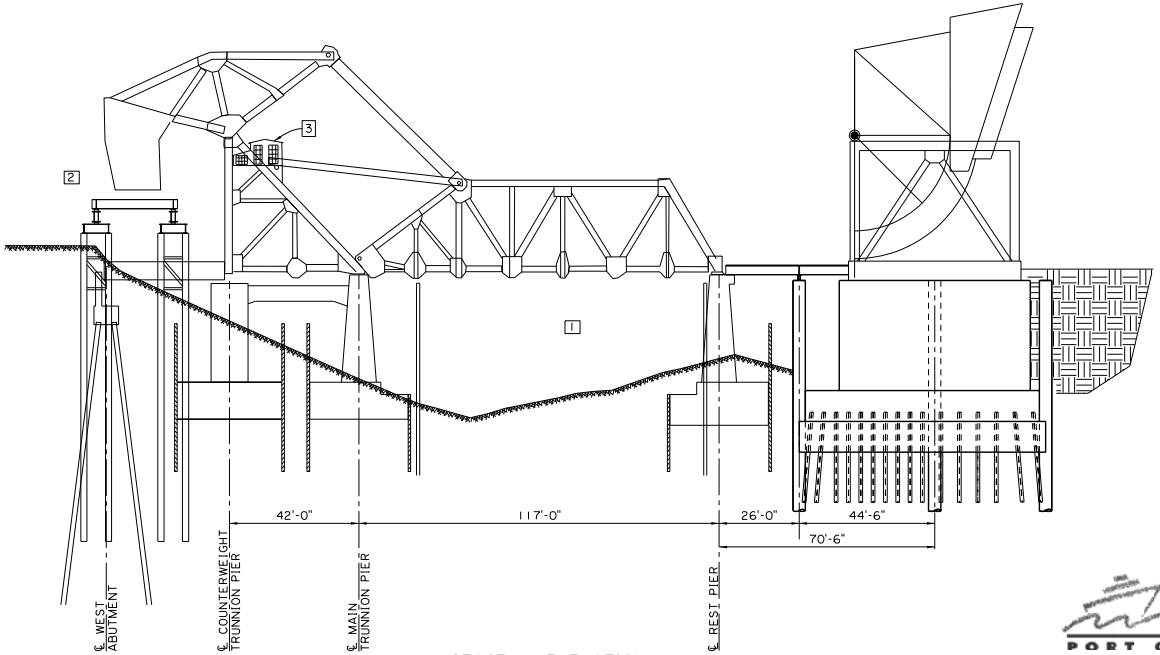
STAGE II PLAN
SCALE: 1" = 20'

STAGE II NOTES:

1. CLOSE CHANNEL TO NAVIGATION.
2. INSTALL MAIN BEAM SYSTEM ON SOUTH SIDE OF THE COUNTERWEIGHT SYSTEM. PREPARE TO MOVE MAIN BEAM UNDER THE COUNTERWEIGHT.
3. REMOVE OPERATOR'S HOUSE AND MACHINERY HOUSE.



STAGE II SECTION
SCALE: 1" = 20'



STAGE II ELEVATION
SCALE: 1" = 20'

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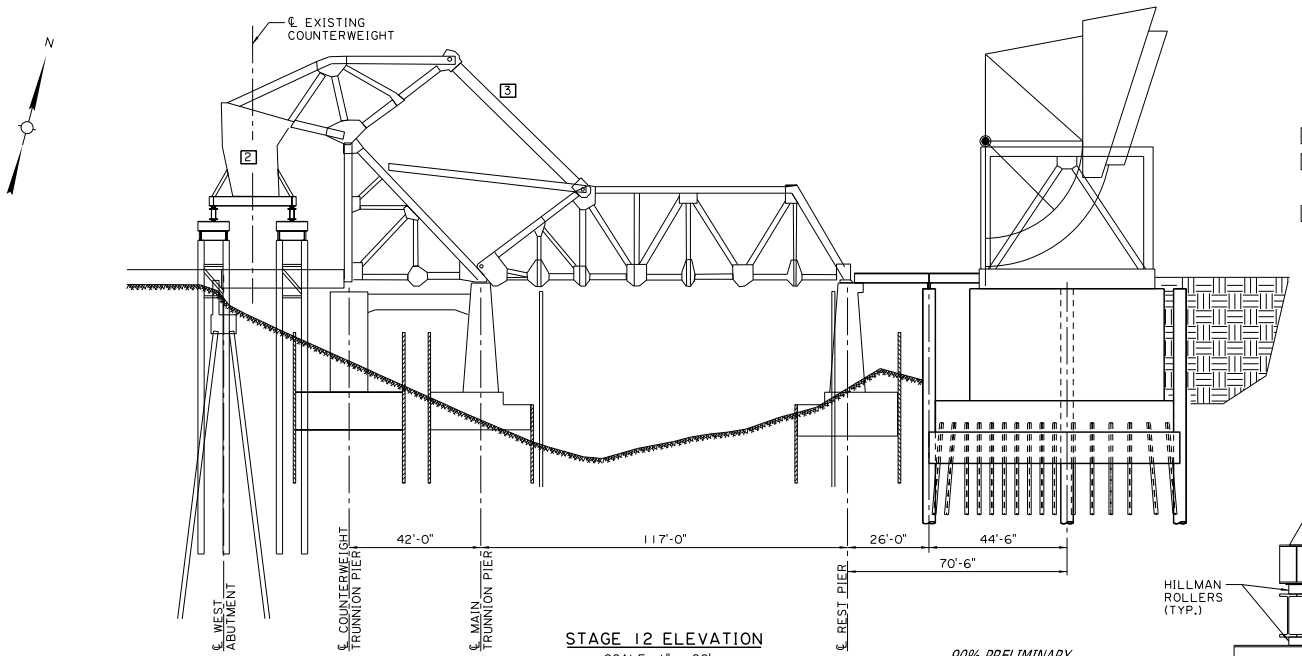
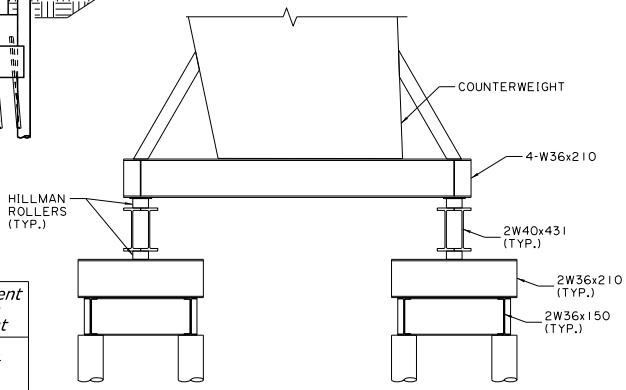


STAGE 12 ELEVATION
SCALE: 1" = 20'

STAGE 12 NOTES:

1. CLOSE SPAN TO RAIL TRAFFIC.
2. MOVE MAIN BEAM SYSTEM UNDER COUNTERWEIGHT AND FINALIZE REMAINDER OF COUNTERWEIGHT REMOVAL SETUP.
3. DISCONNECT THE COUNTERWEIGHT TRUSS FROM THE BASCULE SPAN.



FALSEWORK DETAIL
SCALE: 1" = 5'

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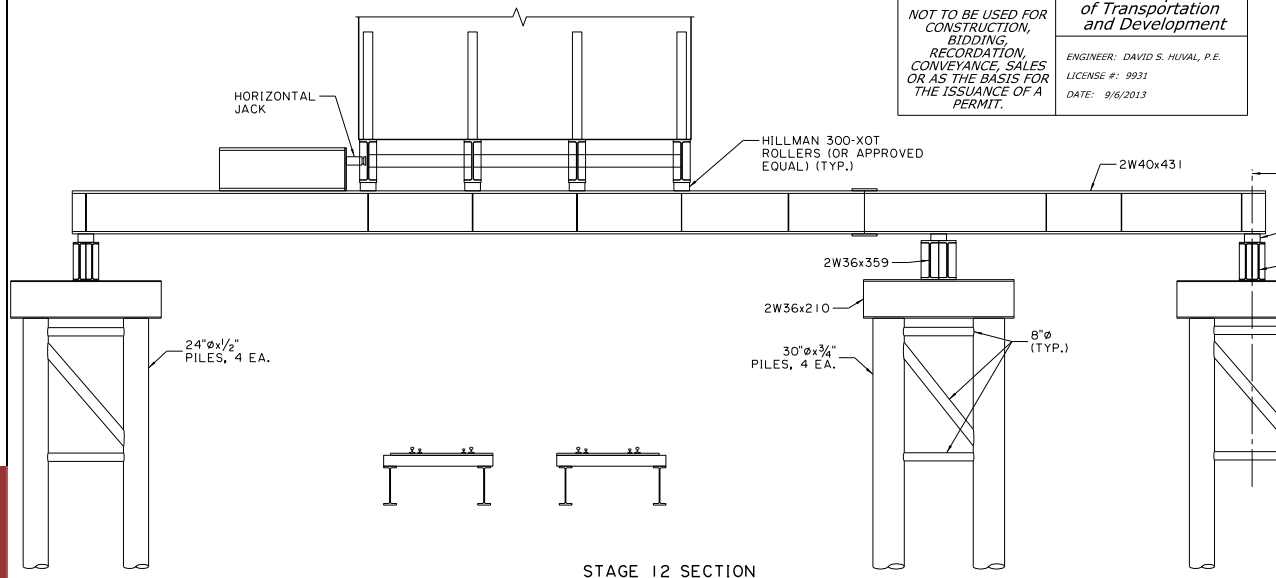

STAGE 12 SECTION
SCALE: 1" = 5'

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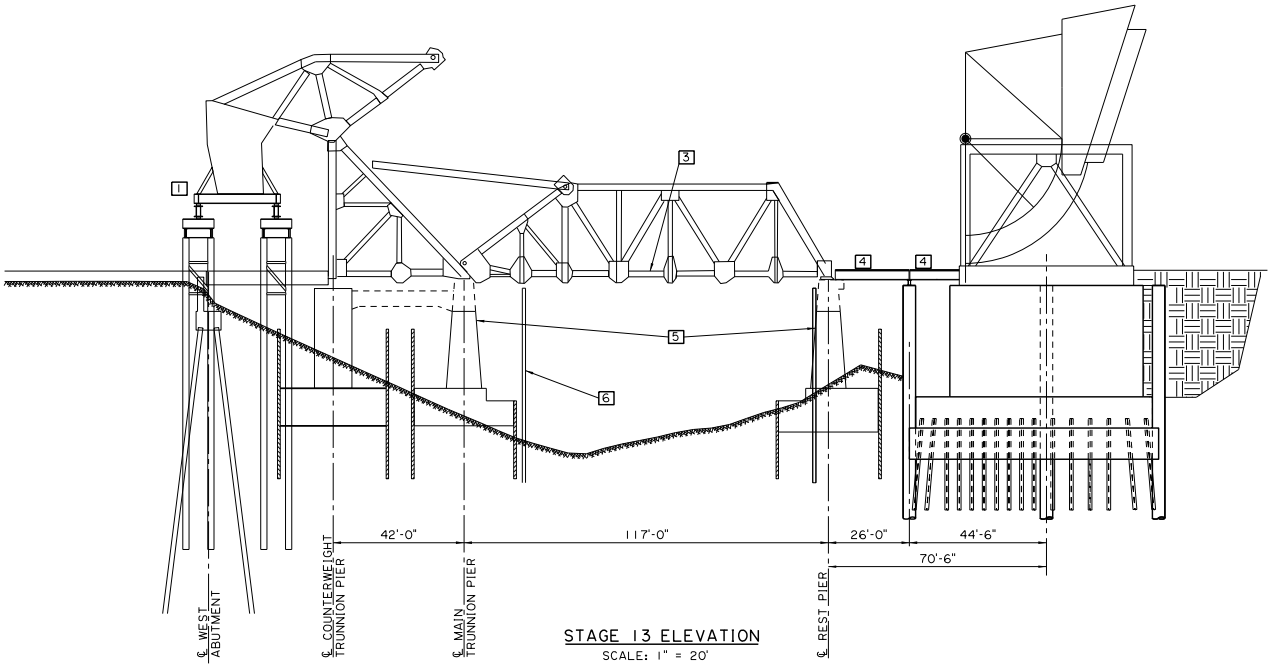

STAGE 13 ELEVATION
SCALE: 1" = 20'

STAGE 13 NOTES:

1. USE HILLMAN 300-XOT ROLLERS (OR APPROVED EQUAL) TO MOVE COUNTERWEIGHT TO THE SOUTH SIDE OF THE BRIDGE.
2. REMOVE NORTH SIDE OF MAIN BEAM AT SPLICE.
3. REMOVE BASCULE SPAN.
4. REMOVE TEMPORARY JUMP SPANS.
5. REMOVE EXISTING PIERS AS NECESSARY TO FACILITATE BASCULE INSTALLATION.
6. REMOVE EXISTING WEST FENDER TO FACILITATE BASCULE INSTALLATION.

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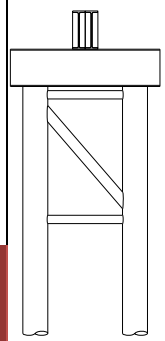
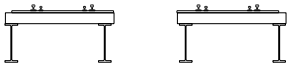
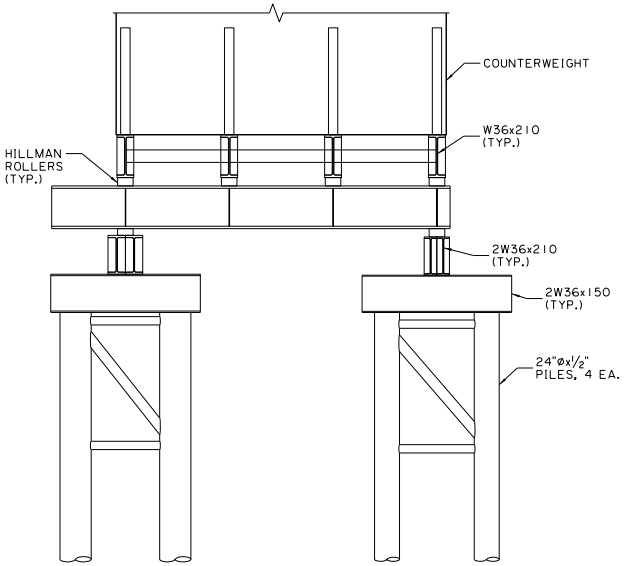
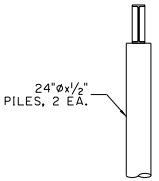




STAGE 13 SECTION
(AT EXISTING COUNTERWEIGHT)
SCALE: 1" = 20'





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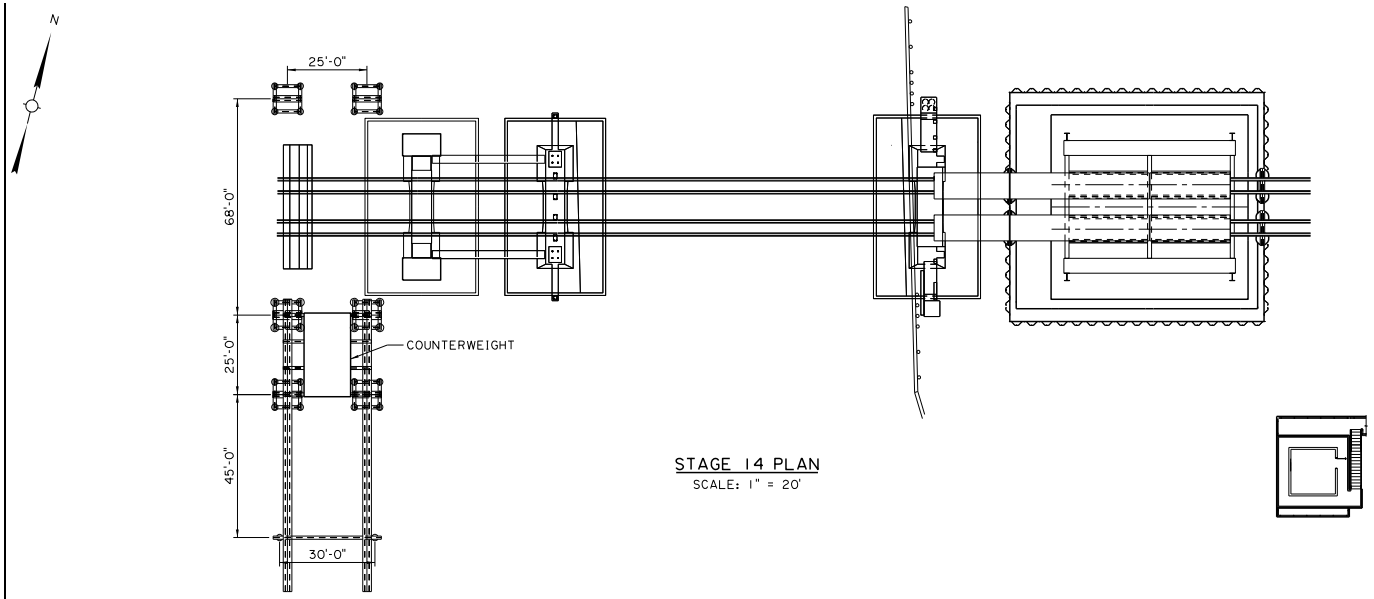
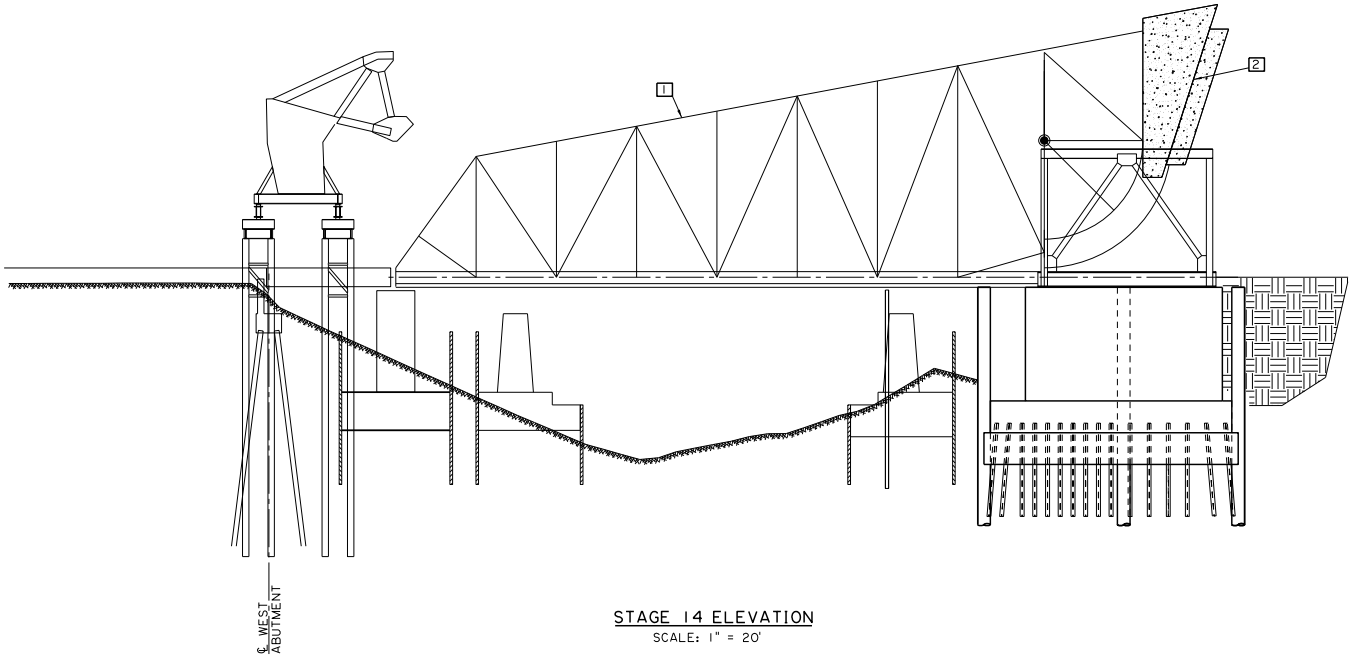


STAGE 14 PLAN
SCALE: 1" = 20'



STAGE 14 ELEVATION
SCALE: 1" = 20'

STAGE 14 NOTES:

1. INSTALL BASCULE SPAN.
2. PLACE COUNTERWEIGHT CONCRETE.
3. COMPLETE TRACK WORK AND OPEN BRIDGE TO RAIL TRAFFIC.

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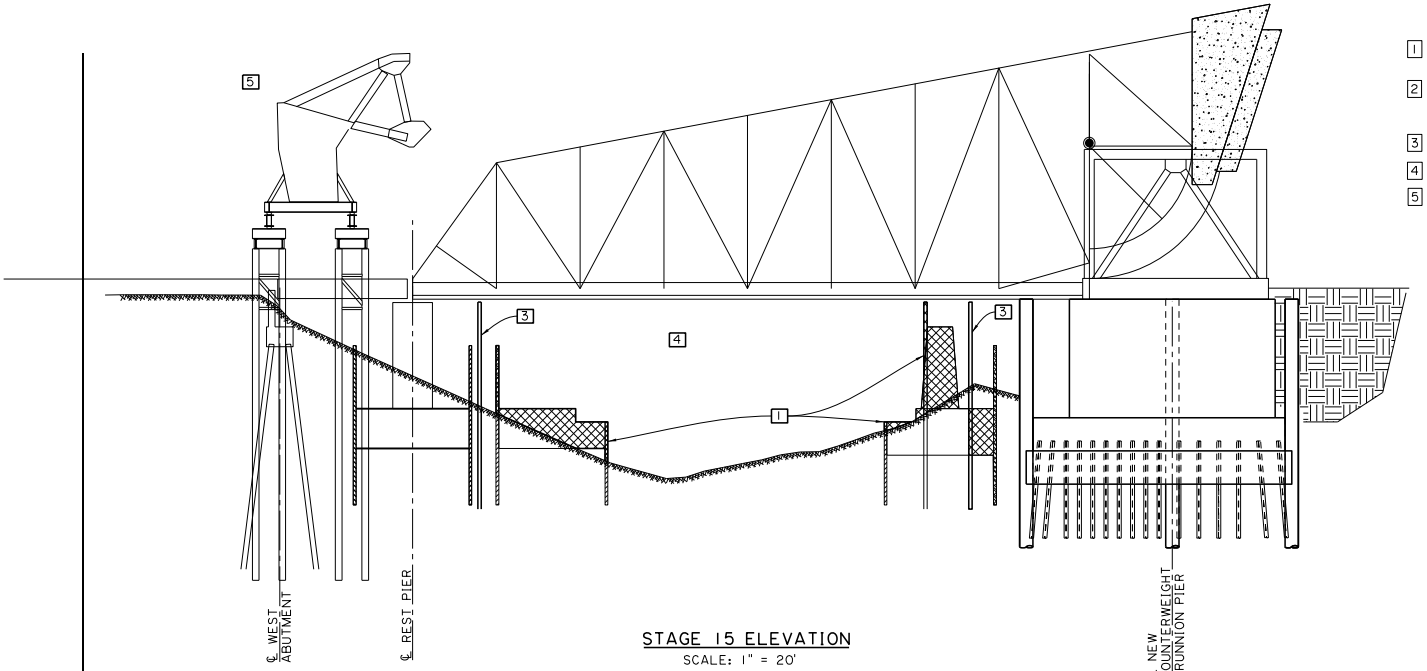
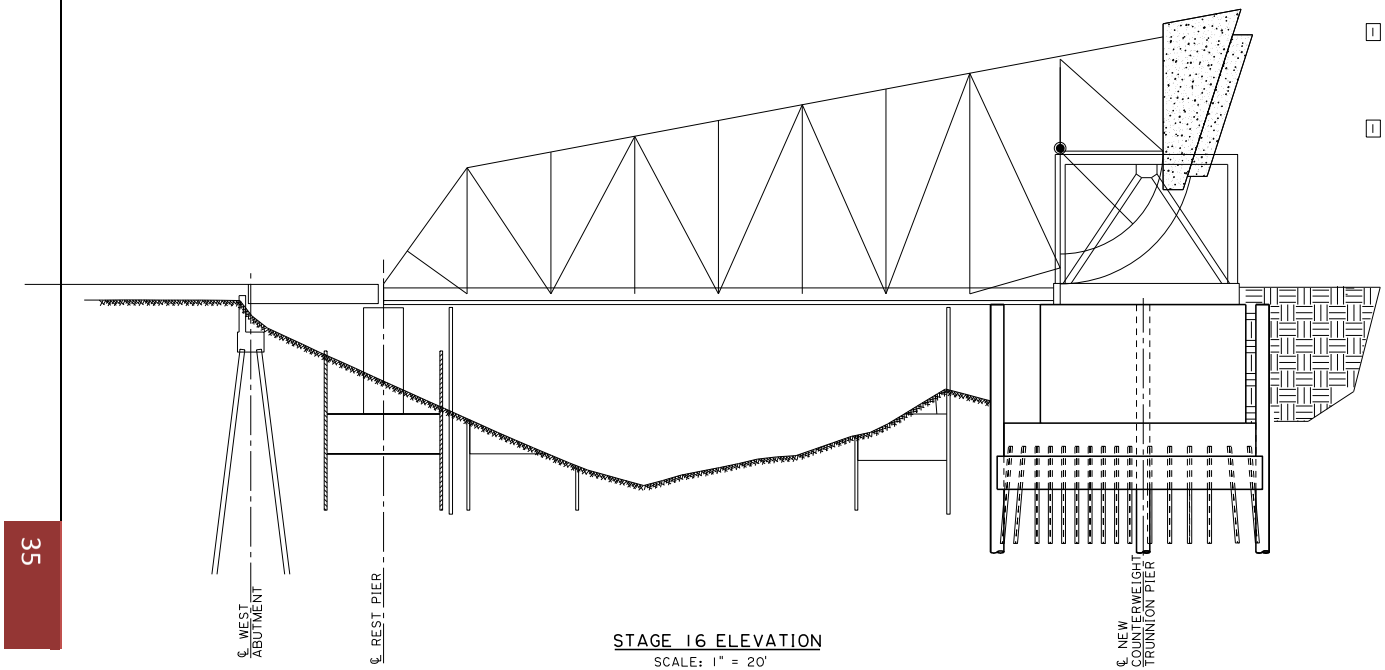


STAGE 15 ELEVATION
SCALE: 1" = 20'

STAGE 15 NOTES:

1. REMOVE EXISTING EAST FENDER AND REMAINDER OF PIERS AS NECESSARY.
2. IN BETWEEN TRAIN MOVEMENTS MAKE NECESSARY ADJUSTMENTS TO MACHINERY AND CONTROL SYSTEM.
3. COMPLETE INSTALLATION OF FENDER SYSTEM.
4. OPEN CHANNEL TO NAVIGATION TRAFFIC.
5. BEGIN DEMOLITION OF EXISTING COUNTERWEIGHT.



STAGE 16 ELEVATION
SCALE: 1" = 20'

STAGE 16 NOTES:

1. REMOVE COUNTERWEIGHT SUPPORT SYSTEM.

STAGE 17 NOTES:

1. CONSTRUCT ROADWAY APPROACH SPANS.

90% PRELIMINARY

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APPENDIX II

LA DOTD - DESIGN EXCEPTION/DESIGN WAIVER FORM

Date: **June 13, 2013**

State Project No.: **700-36-0142**
Federal Aid No.: **BR-8584(004)**
Name: **Almonaster Avenue Bridge**
Parish: **Orleans**
Route:

Prepared by: Anthony S. Evett, P.E.
Title: Project Manager

Recommended for approval by:
Title:

GENERAL INFORMATION

Type of Request:

X	Design Exception	
	Design Waiver	

Route and Design Classification:

Rural		Local		1	X
Suburban		Collector		2	
Urban	X	Arterial	X	3	
		Freeway		4	
				5	

Work Classification:

Speed:

	Posted:	30	mph
	Design:	40	mph (UA-1 required)
		30	mph (proposed)

Traffic Volumes:

Current ADT:	14,900
Design ADT:	19,500
D:	77 %
K:	13 %
T:	54 %

DESCRIPTIONS

It is required that a copy of the location map, as a minimum, be provided with your package. **It is highly recommended that other exhibits be provided to support your request.** These exhibits may include typical sections, geometric details, correspondence from other sections, agencies, etc.

1. ***Design Exception/Design Waiver for the following element(s) of work. Mark the element(s) to be discussed:***

Design Speed *	X	Clear Zone
Lane Width *		Cross Slope *
Superelevation *		Guardrail
Shoulder Width *		Vertical Clearance *
Vertical Alignment *		Bridge Width *
Horizontal Alignment *		Structural Capacity *
Stopping Sight Distance *		Horizontal Clearance
Grade *		Hydraulic Design Storm

Median Width Lateral Offset to Obstruction * (FHWA criteria only)

Other

Explain:

* FHWA Controlling Design Criteria. An exception from FHWA is required. Note that FHWA only requires that the minimum values cited in the *Green Book* are met.

2. ***Provide a synopsis of the scope of the project, the situation you are encountering and the problem you are attempting to mitigate:***

This project will include the preliminary design of a permanent rolling lift bascule bridge and approaches over the Inner Harbor Navigational Canal at Almonaster Avenue. This new bridge is to be constructed on the existing alignment while maintaining both rail and marine traffic. Unlike the existing span, the new span's overhead counterweight shall be on the east end of the span. The bascule span shall consist of a single truss supporting two railroad tracks, with the eastbound and westbound lanes of vehicular traffic being supported on the outside of the truss.

The eastbound approach roadway shall be reconstructed from France Toad to Jordon Road (approximately 2070 ft. with three railroad track crossings). The westbound approach roadway shall be reconstructed from approximately midway between France Road and the bridge to midway between Jordon Road and the bridge (approximately 1050 ft) with spot replacements at four areas of railroad track crossings. This project will also include floodwall and levee relocations, drainage improvements and utility adjustments.

The roadway is functionally classified as a UA-1, Urban Arterial. The one-lane Westbound roadway consists of a set of reverse curves approaching the Almonaster bridge in order to move the roadway out from beneath I-10, and another set of reverse curves exiting the Almonaster bridge to move the roadway back under I-10.

The Westbound roadway is geometrically constrained by two existing flood gates, three at grade railroad track crossings as well as the existing I-10 bridge piers. These geometric constraints inhibit design for 40 mph as required by UA-1 criteria. An existing 70' radius horizontal curve which is to remain, as well as other obstructions and stop conditions justify the use of the proposed 30 mph design speed.

3. ***Provide a concise written description of the proposed design exception/waiver. It is required to be specific in stating which design standard(s) is being requested to be excepted or waived. State the proposed and standard values of the design exception/waiver element, citing DOTD, AASHTO, or other criteria. This statement shall include the date of the design standards used for the design of the project. <u>Reference AASHTO guidelines to support your design decisions whenever possible.</u>***

   The standards referred to here are AASHTO's *A Policy on Geometric Design of Highways and Streets, 6th edition* of 2011, and LADOTD's *Roadway Design Procedures and Details* of 2009.

   Due to site constraints the reverse curves approaching the bridge on the Westbound alignment can be designed to a maximum design speed of 35 mph. The proposed design consists of two 550-ft radius reverse curves at 2.5% superelevation except where 0% superelevation is required through the flood gate (station 11+13.71). This station is necessarily located in a curve; extension of the tangent through the flood gate would require unacceptable shortening of reverse curve radii in order to fit the roadway through the I-10 bridge piers. According to AASHTO standards, the minimum radii for low-speed urban streets for 2.5% superelevation at 40 mph and 35 mph are 577 ft and 398 ft, respectively. The minimum radii for low-speed urban streets for 0% superelevation at 40 mph and 35 mph are 667 ft and 454 ft, respectively. The proposed design meets these 35-mph radius requirements with the 550 foot radii, but 40-mph design speed radii cannot be attained with the I-10 bridge pier constraints.

   Due to site constraints the reverse curves exiting the bridge on the Westbound alignment can be designed to a maximum design speed of 30 mph. The proposed design consists of two 270 ft radius reverse curves separated by a 26.7 foot tangent with a 2.5% normal crown cross slope rate (meeting the UA-1 minimum 2.5% superelevation rate). This proposed configuration provides a 100 foot cross slope transition which is centered between the two curves. The configuration provides 36.7 feet of transition within each of the two curves and 26.7 feet out of the curves.

   Due to multiple at grade railroad track crossings combined with the existing I-10 Bridge piers locations and right of way constraints it is not possible to reconfigure the existing 70' radius horizontal curve which will remain within the Westbound Roadway project limits. This curve currently provides a 15 design speed.

4. ***Discuss the terrain in the area of the project and the proposed design exception/waiver.***

   The terrain in the area of the project is flat. The roadway crosses the IHNC over the Almonaster Avenue bridge. While the Eastbound lane goes over earthen levees on either side of the bridge, the Westbound lane in consideration for this design exception goes through flood gates on either side of the bridge. There are multiple railway crossings, stop controlled intersections and obstructions both inside the project limits and immediately outside of the project limits.

5. ***Discuss the traffic in the area of the project and the proposed design exception/waiver.***

   While the roadway has been closed to traffic since Katrina, a pre-Katrina traffic study indicated that there were approximately 7000 vehicles per day, but the Westbound roadway contributed only 23% of the total traffic over the Almonaster Avenue bridge. There are more train crossings across the Westbound roadway that increase the probability of delay and reduce traffic. The traffic is expected to be mostly industrial users, with pre-Katrina counts indicating 54% small and large trucks.

6. ***Discuss the safety history of the project and the proposed design exception/waiver. It is required to determine and state if an abnormal accident site or area is within the project limits.***

   No abnormal accident site or area exists within the project limits.

7. ***Discuss the cost of the project and the proposed design exception/waiver. You will need to provide information that reflects the cost with and without the design exception/design waiver.***

   Several different roadway and bridge alternatives and their associated costs have been considered within earlier Almonaster Bridge Replacement optimization studies and narrowed down to the currently proposed configuration as the most economical and favorable design alternative. Due to the numerous physical constraints present within the Westbound roadway alignment the proposed 30 mph design speed is the most economical and practical solution. The above mentioned design exceptions will allow the roadway to fit within the constraints of the existing site conditions in a manner that is safe and consistent with surrounding urban development practices.

APPROVED: _____ DATE: _____
Chief Engineer

APPENDIX III

Disposition of LADOTD 30% Review Comments

1. The H.xxx number for the construction project is H.007250. This should be shown on the plans instead of H.004698 which is the engineering number. The FAP number for the construction project is BR-8584(003), and should also replace the FAP number currently shown in the plans.
   Corrected

2. The legacy project number doesn't need to be included on the plans (or if it is shown, the construction project number is 742-36-0104).
   Corrected

3. The roadway typical sections should begin on Sheet 2. Sheet 3 is reserved for the summary tables.
   Corrected

4. Bridge plans should start on Sheet 101, not Sheet 100.
   Corrected

5. The two general notes sheets (2a and 2b) are bridge related and should be located with the bridge plans.
   Corrected

6. The functional class shown on the title sheet should include the "UA-1" reference.
   Corrected – Changed "Urban Arterial" to "UA-1."

7. Sheet 3 – Use of the barrier curb shown on the westbound roadway will require approval from the Chief Engineer.
   The barrier curb has been removed from the proposed typical section.

8. Notes on Sheets 4 & 7 reference work required on at-grade railroad crossings. Is this work to be part of this project or will the work be done by others?
   This work will be included within this contract. However, the actual work may be done by railroad contractors along with other required railroad work.

9. Sheet 5 – The two 270' radius curves on the westbound roadway are only good for a speed of 30 mph. A design exception for the use of these curves is required.
   See attached Design Exception Documentation and comments below for additional details.

10. Sheet 5 – A minimum of 100' of tangent is required between reverse curves in urban areas. The tangent between the two curves on the westbound roadway needs to be lengthened to meet this minimum. If necessary, the radii of these curves can be reduced to 250' and still be good for a speed of 30 mph with a cross-slope of 2.5% in the direction of the curve.
    The current tangent length is 26.7 feet. The requested change in radius results in an increased tangent length of approximately 10 feet, which is still significantly less than the above stated minimum requirement of 100 feet. Based on the low speed urban superelevation data presented in the 2011 AASHTO Policy on geometric design of highways and streets, at a 30 mph design speed the 270' radius requires a superelevation rate of 2.2% whereas the 250' radius requires 4.0%.

Due to site constraints a horizontal alignment that is capable of providing enough room for a 4% superelevaion transition is not possible. In addition the site conditions do not allow us to lengthen the tangent to meet the above required 100 foot minimum.

The 270' radius configuration with a 2.5% Normal Crown cross slope in combination with the short tangent provides a superelevation transition with 36.7 feet of transition within each of the two curves and 26.7 feet out of the curves.

Due to site constraints it is our recommendation to maintain the current configuration and apply for design exceptions as required, See attached Design Exception Documentation.

11. Some of the superelevation transitions are not properly located. The transitions should be positioned so that a minimum of 50% of the required superelevation is provided at the PC or PT of the horizontal curves. Full superelevation should not be carried beyond the PC or PT of curves (for example, the first curve on the eastbound roadway ends at Sta. 3+54.04, but the superelevation transition doesn't begin until Sta. 4+50.00; this transition should begin prior to the end of the curve).
One of the main objective of this design was to develop a horizontal alignment which only required the use of a 2.5% Normal Crown Cross Slope within each of the proposed curves without the use of superelevation.

There are locations along each of the East and West bound roadways that require 0% cross slope to deal with site conditions, for instance on the Eastbound Roadway at station 5+06 and 13+93 the roadway crosses over the top of concrete levee structures which require a 0% cross slope. This is the reason that the cross slope transition was located as described above.

Due to the fact that we are only transitioning from normal crown 2.5 % left to right and the curves do not required additional superelevation rates above normal crown the locations of the currently proposed transitions should be acceptable.

The only transitions requiring a design exception is the transition located at on the westbound roadway at station 11+13.71. At this location a 0% roadway cross slope is required in order to provide a seal for the proposed flood gate which slides across the roadway and the railroad tracks. See attached Design Exception Documentation.

Disposition of Port of New Orleans 30% Review Comments

General:

1) The estimated duration of the roadway closure should also be provided in the 90% preliminary plan submittal.
Concur – Will be provided in 90% submittal.

2) When the existing Bridge Operator's House is removed in Stage 9 of the Construction Sequence, will temporary accommodations be made to operate the existing bridge and railroad switches?
No. Due to the concurrent removal of the bridge counterweight, the bridge will no longer be operable. Accommodation will be provided to operate required railroad switches.

3) A list of spare parts should be developed and the contractor should be required to provide the spare parts.
Concur – Will be provided in Final Design phase.

4) A closed circuit television system should be installed with a monitor for bridge operators and cameras positioned to assist them in viewing all traffic, the movable bridge span, and any "blind spots". The system should also be equipped with a digital video recorder that is transferrable to DVD and USB.
Concur – The closed circuit television system monitoring location is shown in Operator's House Second Floor Plan (sheet 303). Camara locations and direction of view will be provided within Final Design Phase.

5) A public address system should be provided to allow bridge operators to communicate with pedestrians at both sides of the Inner Harbor -Navigation Canal (IH-NC).
Concur – Will be provided in Final Design phase.

6) Where will the dredged material be disposed of? This could be an environmental concern.
Dredge quantities and disposal location not yet determined.

7) The Machinery House should be designed and equipped to allow for future replacement of motors and operating machinery. Installation of an overhead hoist should be considered.
Concur – See note sheet 305. Details will be provided in final plans.

8) To assist with future maintenance, the various types of lubricants needed to maintain bridge machinery should be kept to a minimum, if possible.
Concur

9) If practical, an automatic lubrication system should be considered for bridge machinery.
Concur – Will be provided in later submittal.

10) If it could affect the design of the bridge control system and/or the equipment specified and installed, it should be noted on the plans and/or in the project specifications that the bridge sometimes opens 20 times per day for marine traffic.
Noted

11) There should be a drawing(s) that shows property lines, right-of-ways, and the center-line and stationing of the IH-NC.
Provided

12) Temporary benchmarks and baselines should be identified and located on the drawings.
Baselines have been identified. TBMs will be provided within final plans phase.

13) A bridge clearance diagram and a diagram that shows the new bridge superimposed over the existing bridge should be included in the drawings.
Provided

14) The drawings should include a plan view showing the limits of dredging.
Concur – Will be provided in 90% submittal

15) Permanent traffic control plans will be needed and should include the area where Almonaster Avenue and Jourdan Road meet.
Concur – Will be provided in 90% submittal

16) The drawings should show details for paved railroad crossings.
Concur – Will be provided in 90% submittal

17) Permanent navigation lighting for the bridge and fender system should be shown on the drawings.
Concur – Will be provided in 90% submittal

18) We will ask the Port's Real Estate Department to designate a site along the IH-NC that will be suitable and available for the contractor's use as a staging area during construction, and we will forward the information for Volkert to include in the plans and specifications.
Noted – Preliminary detail to be provided in 90% submittal.

Proposed Railroad Signalization:

19) The proposed change of the railroad signal system from a "bridge operated system" to a "railroad dispatched controlled system" needs to be clarified and agreed to by the Port and CSXT. Currently the railroad dispatcher requests permission for a train to cross the bridge and the Bridge Operator operates switches on the railroad panel inside the Bridge Operator's House. The railroad signal system also monitors the rail joints and the span locks on the bascule span to ensure the bridge is fully seated and locked, and when a train is inside the "block" the bridge control system is disabled by the railroad signal system.
Noted – Details to be provided in 90% submittal.

20) Whether the new railroad signal system is installed by CSX personnel, the bridge replacement contractor or another contractor, it will have to be integrated with the bridge control system and should be operational when the new bridge becomes operational. CSX may also have union agreements regarding installation of the new signal system.
Noted – Details to be provided in 90% submittal.

21) Has CSX agreed to pay the cost of the new railroad signal system and provide the details as stated in the report?
Not to our knowledge.

Sheet No.1

22) If the LADOTD is agreeable, the existing layout map should be replaced with the attached proposed layout map, and the Port will provide an electronic copy to Volkert.
Layout Map has been changed to the map provided by the Port of New Orleans.

23) The Port's Work Order Number and Requisition Number should be added to the title sheet by inserting the following line under the F.A.P. Number:
"PORT OF NEW ORLEANS WORK ORDER NO. 1-801, REQ. NO. ######" (The requisition number is a six digit number that will be determined at a later date.) Corrected

24) A signature line should be added for the "Board of Commissioners Port of New Orleans"
Corrected

25) The State Project and F.A.P. numbers shown on the Layout Map appear to be incorrect.
Corrected

26) Is it correct to have three bridge sites shown on the Layout Map?
The three bridges referred to are the eastbound roadway bridge, the westbound roadway bridge, and the track bridge. Notes have been clarified.

27) "Navigation Canal" is misspelled in the title, and it is usually written:
"Inner Harbor -Navigation Canal" Corrected

28) Should the third line of the project title be "Plans of Proposed Bridge Replacement" instead of "Plans of Proposed State Highway"?
Corrected

29) The LADOTD should be consulted in regard to the title of the project. The Port's preference is "Almonaster Avenue Bridge Replacement".
The Port's preferred title has been provided on the title sheet. The LADOTD's preferred title, "ALMONASTER BRIDGE AND APPR." has been provided on each title block.

Sheet No. 2a (Now sheet 101)

30) Shouldn't the design specifications include AREMA?
yes (Note modified)

31) What is the purpose of designing the bridge for a future wearing surface?
This is provided as required per LADOTD Bridge Design Manual page 5(57).

32) What is the design speed for rail traffic?
Not applicable. The traffic is in a tangent within the limits of this project and no rail modifications are proposed.

33) STRUCTURAL METALWORK: Coordinate type/grade of steel with Sheet No. 105.
Note removed

34) STRUCTURAL METALWORK: Clarify grammar of notes and verify payment by "Lump Sum" with LADOTD.
Note removed

35) WELDING: " ...AWS D1.5-95 Bridge Welding Code of the Louisiana Standard Specifications ...?"
Note removed

36) ANCHOR BOLTS: Verify grade of steel and clarify the term "steel spans" (steel girder spans?). Should "structural metalwork" be deleted from the note?
Note removed

37) BOLTED CONNECTIONS: Verify that specified bolts are compatible with the type of steel. Are we trying to state that direct tension indicator (DTI) washers "shall be" used ..., and are we trying to differentiate between "high strength" connections and other connections?
Note removed

38) ERECTION: Specify whether the drawings must be submitted to the engineer for "review" or for "review and approval" (eliminate the term "and/or").
Corrected – “review and/or approval” changed to “review and approval.”

39) PORT OF GBR RAILROAD AND UPRR: CSX Transportation, Inc. owns the railroad tracks on the existing bridge and the New Orleans Public Belt Railroad owns tracks near France Road and Jourdan Road. The contract must be required to comply with the requirements of CSXT and NOPBRR when working within their right-of-ways, on their property, or near their tracks, and the contractor should be required to pay for any railroad flagman services required by the railroads. We will also have to determine whether the bridge contractor will perform the necessary track work, or if CXST has requirements regarding this work such as union agreements.
Concur

Sheet No. 2b (Now sheet 102)

40) PAINTED STEEL: At this time it is not clear as to what areas of steel require painting (10 feet from expansion joints?)
All exposed steel will be painted. (Note modified)

41) UNPAINTED STEEL: Is Volkert recommending the use of unpainted weathering steel? If so, it should be confirmed that the environment is suitable (brackish/saltwater), and it should not be used for handrails or in areas where the general public and/or bridge maintenance personnel will contact the steel due to stains on hands and clothing.
All exposed steel will be painted. (Note removed)

42) PDA MONITORING: The frequency of monitoring must be specified and it should be clear as to who will select the testing company, select the test piles, and pay for the testing (this may be covered by the LADOTD's Standard Specifications).
Concur – Will be provided in Final Design phase.

43) COFFERDAMS: Should the cofferdam design be submitted to the Engineer for review? It would probably be a good idea, but the contractor should remain responsible for the design.
Yes (Note modified).

44) JETTING: Due to poor soil conditions along the IH-NC, the Port generally does not allow jetting for installation of piles.
Concur (Note modified)

45) EXISTING SITE SURVEY AND VIBRATION MONITORING: Should the title of this note be changed to "VIBRATION MONITORING"? What are the acceptable vibration limits?
Corrected – Vibration criteria to be provided in Final Design phase.

46) COAST GUARD PERMITS OR MAJOR WATERWAY CROSSINGS: All requests for waterway closures associated with Port bridge projects usually go to the Bridge Administration Branch, Eighth Coast Guard District in New Orleans (not to Baton Rouge), and they usually require at least 30 days advance notice. This should be verified with the Bridge Administration Branch, Eighth Coast Guard District in New Orleans 504-671-2128.
Information has been verified (Note modified)

47) TEMPORARY NAVIGATIONAL LIGHTING: Temporary lighting plans should be submitted to the USCG in advance for approval.
Concur (Note modified)

Sheet No.3 (Now sheet 002)

48) Are these typical sections of the existing roadways or the required roadways?
Corrected – "Typical Section" changed to "Typical Finished Section"

Sheet Nos. 4 -7

49) Match lines should be shown.
Provided

50) The railroad tracks and their owners should be identified.
Corrected

51) The "Railroad Track" symbol shown in the legend is not used on the drawing.
Corrected

Sheet Nos. 4 & 5

52) The stationing along the center-line of the mainline track jumps from 8+00 to 9+00.
Corrected – Adjusted limits of sheet 4

Sheet No.6

53) Can the Bridge Operator's House be moved closer to the IH-NC to provide a better view of marine traffic?
Operator's house has been moved closer to IH-NC – also see sheet 301

54) A parking area near the Operator's House and an access road will be needed for bridge operators and maintenance personnel.
To be provided within 90% Plan Submittal

Sheet No. 100 (Now sheet 103)

55) Indicate direction of main pier views.
Provided

56) Check scale of views and show center-lines where applicable.
Corrected

Sheet Nos. 101, 102 & 103 (Now sheets 104, 105 & 106)

57) Add north arrow to plan view.
Corrected

58) Add titles to elevation views (perhaps the "Mainline" drawing should be first).
Corrected

Sheet No. 104 (Now sheet 107)

59) Correct grammar in note: "ALL FOUNDATIONS ...", or delete note.
Corrected

Sheet No. 105 (Now sheet 108)

60) STRUCTURAL STEEL: Weathering or painted?
By GEC -- Note added regarding coatings.

61) Elevation to be determined?
By GEC -- TBD Elevation note deleted.

Sheet No. 106 (Now sheet 109)

62) Elevation to be determined?
By GEC – TBD Elevation note deleted.

63) Where is Sheet No. S-l as mentioned in the note at bottom of drawing?
By GEC – S-1 reference changed to title-of-sheet reference.

Sheet No. 108 (Now sheet 110)

64) Where is Sheet No. S-l as mentioned in the note at bottom of drawing?
By GEC – S-1 reference changed to title-of-sheet reference.

Sheet No. 201

65) If possible, the air buffers and span locks should be elevated to prevent water intrusion during high water events.
By Huval – Concur – Span lock tail lock and air buffers have been raised to elev. 4.4. above the high water mark.

66) It may be a good idea to have two back-up limit switches for the "past open" and "nearly seated" positions.
By Huval – Having a second back-up limit switch is not what is done on movable bridges. If the back-up limit switch fails then the operator shall press the "emergency stop" button on the control desk.

67) Will the Bridge Operator be required to engage a foot pedal or some other type of safety switch during bridge operations? The Florida Avenue Bridge has a foot pedal.
Operations may be designed with a foot pedal if it is the preference of the Port.

Sheet No. 202

68) It would be preferable to have two 150 HP motors that could be used alternately.
By Huval – Concur – We will provide two 150 HP motors which will be alternately used. If a motor fails the other will be considered the "backup". 75 HP backup motor has been replaced with 150 HP motor.

69) Is it necessary (or advantageous) to have a primary reducer and a secondary reducer instead of a single reducer?
By Huval – A primary and secondary reducer is required due to the AASHTO and AREMA requirement for High Speed "Stopping Brakes" and Low Speed "Holding Brakes."

70) Will the brakes be operated electrically or by compressed air? (electric is preferred)
By Huval – The brakes will be operated electrically.

71) The primary and secondary reducers are both shown to have an input of 870.
By Huval – Corrected – Secondary reducer input changed to 174.

72) Should the output of the secondary reducer be 2.175?
By Huval – The primary reducer has an input of 870 rpm with a reduction of 5:1 providing an output of 174 rpm. The secondary reducer has an input of 174 rpm with an 80:1 reduction providing an output rpm of 2.175.

Sheet No. 301 (Now sheet 302)

73) Add a north arrow for direction.
By Huval – Corrected

74) If the navigation horn were electric, would this eliminate the need for an air compressor?
By Huval – The navigation horn will be electric and the air compressor has been eliminated; however, we will also consult LADOTD Bridge Design Electrical to determine if this will be acceptable to them.

75) If possible, the sewer should be connected to the City's sewer system to eliminate the need for a treatment tank.
By Huval – Concur – Sewage treatment plant eliminated in plans. If a sewer line is in the vicinity of the Operator's House then we will tie into the sewer line and eliminate the STP.

76) Can the generator be fueled by natural gas?

By Huval – Yes the generator can be fueled by natural gas. We will incorporate a natural gas generator into the plans. This will require removing the generator from the operator's house completely and placing it on a pile supported slab (2' above the levee) located 20'-30' east of the house. This generator will be outfitted with an enclosure for weather protection and will have enough clearance around it to accommodate NEC clear work space.

Sheet No. 302 (Now sheet 303)

77) Add a north arrow for direction.
By Huval – Corrected

78) The control desk should face the canal.
By Huval – We believe that the control desk should face the roadway/rails. This makes it easier for the operator to clearly view oncoming and off-going traffic while lowering gates and barriers.

79) The water fountain should be replaced with a reverse osmosis water treatment dispenser.
By Huval – Concur – Water fountain replaced with reverse osmosis water treatment dispenser.

80) Should there be an emergency exit for the Operator's Room?
By Huval – We have never designed for an emergency exit on a movable bridge operator's house. The structure is not considered a public building.

81) The compact refrigerator should be replaced with a full-size refrigerator.
By Huval – Concur – Compact refrigerator replaced with 10 cu.ft. top-freezer refrigerator

82) A kitchen sink and two-burner electric cook top should be added.
By Huval – Concur – sink and cook top added to kitchen area.

83) If practical, the HVAC closet should be relocated to allow more interior space.
By Huval – Concur – Size of HVAC closet decreased and HVAC closet door relocated to bathroom to allow more interior space in operator's room.

Sheet No. 303 (Now sheet 304)

84) The direction of the elevation view should be indicated.
By Huval – Concur – sheet 301 added to indicate orientation of operator's house and generator slab.

85) The navigation horn should be placed on the side of the building that faces the canal.
By Huval – Concur – navigation horn placement is towards the canal.

86) The floor of the lower level should be at least 2 feet higher than the top of the nearby floodwall.
By Huval – Concur. Floor of lower level moved to elev. 18.0.

Sheet No. 501

87) Fix numbering of the General Notes.
By Huval -- Corrected

APPENDIX IV

Disposition of LADOTD 60% Review Comments

LADOTD Geometrics Comments

1) There does not seem to be a clear zone shown on the Typical Section Sheet. (Volkert Response) A note has been added to the Typical Section Sheet which provides the required clear zone distance in the 90% Preliminary Plans.
2) The 270' radius on the Westbound side cannot meet the 40mph design speed shown on the title sheet. This radius at the 2.5% cross slope would yield about a 30mph design. (Volkert Response) See design exception documentation attached.
3) Stopping Sight Distance in the 270' Radius of the westbound roadway may be adversely effected by the bridge structure. The shoulder provided seems to provide about 200' of unimpeded sight line which meets a 30mph design. (Volkert Response) See design exception documentation attached.
4) Drainage structure number 40 is adjacent to the proposed shoulder. This implies a ditch or low spot at the in the clear zone area. This is probably not desirable. (Volkert Response) A proposed shallow swale ditch has been provided along the right side of the Eastbound Roadway from Station 2+00.00 to Station 4+50.00. This shallow swale ditch consists of a 4:1 foreslope and the backslope consists of an existing levee face at 3:1. The swale ditch is required to collect a small amount of runoff which flows off of the levee face. The proposed swale ditch is less than 1 foot deep and can be rounded to provide a safely traversable cross section. The proposed CB-1 Drop inlet will be flush with the proposed swale ditch grade and traversable.
5) The eastbound vertical alignment on sheet 10 has several 3-4% breaks in grade shown. This is not in keeping with AASHTO guidance such as shown on the 2011 page 9-185. It may be helpful to show an inset of this area and attempt to provide an improved crossing at this location with the use of short vertical curves instead of hard breaks. (Volkert Response) The grades presented within the profile represent the existing crossing configuration. The proposed grades will be adjusted to conform to the above referenced criteria during the final design phase following the selection of the appropriate Grade Crossing Warning Device to be used.
6) A joint detail may be needed especially with when Portland cement pavement is used on the bridge approaches. (Volkert Response) This design element will be provided within final design.
7) The cross sections seem to show the road almost flush with the existing ground in places, will adequate drainage be provided at these locations. (Volkert Response) Due to existing site constraints such as at grade railroad crossings and required intersection ties these situations could not be avoided. Positive roadway surface drainage as well as sub-grade drainage will be provided within the final design phase where possible.
8) The cross sections show v-bottom ditches in places. DOTD prefers ditches with a 4' minimum ditch bottom. (Volkert Response) V-bottom ditches have been provided in areas with constraints that prohibit the use of wider flat bottom ditches. All proposed v-bottom ditches will be reevaluated during the final design phase and flat bottom ditches rounding or appropriate protection will be provided within the final design phase.
9) It may be helpful to show limits of Clearing and Grubbing on the Typical Sections sheet. Sections of the westbound roadway under the high-rise bridge may need clearing as well. (Volkert Response) A detail illustrating the limits of clearing and grubbing will be provided within the final design phase.

10) The WB station 18+12 70' radius curve shown to remain may benefit from widening from about 20' to 27' as recommended by AASHTO 2011 page 3-103. (Volkert Response) Modifications to this curve are currently outside the scope of this project. There are additional substandard curves and intersection radius returns in the immediate area outside the project limits which will remain. The recommended widening can be provided to the inside of the curve within minimal expense within the final design phase if agreed to by all involved parties.

LADOTD Hydraulics Design Unit Comments

1) While the drainage work is not a major part of the project, in general the drainage is not clear. (Volkert Response) An attempt has been made to clarify the drainage plans within the 90% Preliminary Plan Submittal.
2) The drainage area divisions are not clear. (Volkert Response) An attempt has been made to clarify the drainage plans within the 90% Preliminary Plan Submittal.
3) The existing drainage sheets say the retention ponds have "no outfall" overflow has to go somewhere, by structure, over the road, etc. (Volkert Response) The Inner Harbor Navigational Canal (IHNC) Levee structure that is present on both the east and west sides of the IHNC currently blocks flow from making its way to the Canal. The existing drainage patterns behind the levee consist of several drainage basins that flow to existing retention ponds which have no outfall structures. The ponds collect water which then either evaporates or infiltrates into the ground over time. The proposed drainage configuration also uses these retention ponds. The proposed roadway improvements do not increase the runoff volumes within project limits. The existing pond performance has been analyzed and where deficiencies were identified their storage volumes were expanded to accommodate a 50 year design storm event. Above the 50 year design storm the water will pond outside the banks of the retention ponds and possibly impact surrounding transportation facilities. Under these conditions it is anticipated that the Flood gates will be closed which will prevent the use of these transportation facilities.
4) Existing drainage structures that are not removed are part of the proposed drainage plan. (Volkert Response) This has been corrected within the 90% Preliminary Plan Submittal.
5) Profiles of the proposed subsurface drainage pipes and catch basins are shown as cross drains, normally the full pipe length with catch basins are shown with slope direction of flow inverts, pipe type, etc. (Volkert Response) This has been corrected within the 90% Preliminary Plan Submittal.
6) Drainage outflows are not shown. (Volkert Response) This has been corrected within the 90% Preliminary Plan Submittal.
7) Direction of flow through the structures should be shown. (Volkert Response) This has been corrected within the 90% Preliminary Plan Submittal.
8) Structure numbers do not apply to open ends of pipe, this should be given with the pipe number, type and other information. (Volkert Response) This has been corrected within the 90% Preliminary Plan Submittal.

LADOTD Mechanical Comments

Sheet 202 (M2.1)

1. Why is the shaft so much larger than the output shaft of the gear box? (Huval Response) The shaft diameters have been revised to better reflect the intent of the machinery design.
2. Pinion shaft rotates about 5.25 revolutions relative to the gear box. I think "G" needs to be 6:1 reduction. (Huval Response) The gear box "G" has been changed to 6:1 reduction.

Sheet 203 (M2.2)

1. What is holding this plate on? (Huval Response) The plate is held in place by cap screws. This has been incorporated into the 90% Preliminary Plans.
2. Part No. 5 should be Class G material? (Huval Response) Yes. This has been incorporated into the 90% Preliminary Plans.
3. Is the bearing manufactured, or are you going to design it and have it fabricated? (Huval Response) The bearing assembly will be custom designed. The manufacturer is LUBRON and the Part No. is 320SLSPB464. This is the bearing used on the MDOT bridge "Fort Street (M85) over the Rouge River". Additional notes have been incorporated on this sheet to better reflect the intent of the machinery design.

Sheet 204 (M3.1)

1. Max A325 Bolt blank is 1 ½". The turned bolt will need to be slightly smaller. (Huval Response) The bolt diameter has been changed on the 90% Preliminary Plan Submittal.

Sheet 301 (A1.1)

1. Why isn't the generator in the machinery room of the operator's house? (Huval Response) Because the generator will be natural gas it would require explosion proof electrical components if it were to go into the machinery room. Additionally, the operator's house may need to be made significantly larger to allow for this natural gas generator to be inside the machinery room.
2. Is the elevation above the height of the levee? (Huval Response) Yes.

Sheet 304 (A1.4)

1. This house is an old design. The current house is much better. We will get you the current design. (Huval Response) That will be great. We will incorporate the current operator house design into the final plans for the bridge.

Sheet 514

1. What is the density of the counterweight concrete? After "Louisa" Malcolm Huval recommended not more than 180 lbs/cu.ft. (Huval Response) Currently, GEC is proposing 220 lbs/cu.ft.; however, Malcolm is working with GEC to get the density down.