



Historic Bridge Management Plan for the Gulf Outlet Canal Bridge

Recall Number: 001630

Structure Number: 02361480201061

Parish: Orleans

Route: LA 47

**Crossing Description: Gulf Intracoastal Waterway
(Gulf Outlet)**



Prepared for

**Louisiana Department of
Transportation and
Development**

Prepared by

**Mead
& Hunt**

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August 2016

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Executive Summary

The Gulf Outlet Canal Bridge (Recall No. 001630) is located in Orleans Parish, Louisiana, and is owned by the State of Louisiana. Construction of the bridge began in June 1964 and was completed in July 1967. The bridge was determined eligible for the National Register of Historic Places (National Register) in 2013. It is significant as an important example of a distinctive type of truss bridge that includes a complex engineering solution; specifically, it features a cantilever Warren through truss with a tied-arch suspended span.

The bridge carries four lanes of Louisiana Highway (LA) 47 across the Mississippi River Gulf Outlet (Gulf Intracoastal Waterway) between St. Bernard Parish and New Orleans, Louisiana. The bridge's main spans are a three-span steel cantilever truss unit, with two 351-foot-long Warren deck trusses as the anchor/cantilever spans and a 546-foot-long tied-arch truss as the suspended span. The bridge has 22 welded steel plate girder major approach spans, 20 prestressed concrete girder intermediate approach spans, and 24 reinforced concrete slab minor approach spans, all supported on concrete column pier bents. Pin-hinged joints are located at the connection between the main cantilever truss spans and the suspended span, and pin-and-hanger assemblies are also present on the major approach spans to separate steel girders and form expansion joints on the major approach spans. The total length of the bridge is 6,642 feet.

The bridge is in satisfactory condition overall and appears to adequately serve its purpose of carrying vehicular traffic. The major deficiency is that the paint system on the bridge (steel truss spans and steel plate girder spans) has completely failed, and areas of exposed metal have moderate surface corrosion throughout the steel spans. With proper maintenance and rehabilitation, the Gulf Outlet Canal Bridge can continue to serve in its present capacity for 20 years or longer.

Any work on the bridge should proceed according to recommendations in this Historic Bridge Management Plan (Plan), which adhere to the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (Secretary's Standards), the *Management Plan for Historic Bridges Statewide* (Statewide Historic Bridge Plan), and the *Programmatic Agreement among the Federal Highway Administration, the Louisiana Department of Transportation And Development, the Advisory Council on Historic Preservation, and the Louisiana State Historic Preservation Officer Regarding Management of Historic Bridges in Louisiana* (PA).

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1. Introduction

This Plan, used in conjunction with the Statewide Historic Bridge Plan, provides guidance on the approach to preservation activities for the Gulf Outlet Canal Bridge (Recall No. 001630), identified as a Preservation Priority Bridge. Completion of individual management plans for Preservation Priority Bridges and the Statewide Historic Bridge Plan fulfills terms of the PA, which was executed on September 21, 2015.

The PA provides the basis and procedures for the management of historic bridges in Louisiana and outlines the procedures for the treatment of historic bridges, including Preservation Priority Bridges. In accordance with the PA, an owner seeking state or federal funding for Preservation Priority Bridges will be required by the Louisiana Department of Transportation and Development (LADOTD), in cooperation with the Louisiana State Historic Preservation Office (LASHPO) and the Federal Highway Administration (FHWA), to follow the procedures outlined in this Plan and the Statewide Historic Bridge Plan.

The Statewide Historic Bridge Plan outlines the overall approach to bridge preservation through a discussion of the collaboration of the historian and engineer, guidance on assessing preservation needs, and resources and technical guidance on maintenance and rehabilitation activities that are broadly applicable to historic bridges. A glossary of common engineering and historical terms is included in the Statewide Historic Bridge Plan.

This Plan for the Gulf Outlet Canal Bridge compiles and summarizes the specific historic and engineering information for this Preservation Priority Bridge. It documents the existing use and condition of the bridge, along with assessments of the preservation needs, including cost estimates. Preservation can be accomplished in two manners: preventative maintenance and rehabilitation. Maintenance includes cyclical or condition-based activities that, along with regular structural inspections, are directed toward continued structure serviceability. Rehabilitation activities are near- or long-term steps that need to be taken to preserve and in some cases restore a bridge's structural condition and serviceability. In assessing preservation activities for each Preservation Priority Bridge, a design life of 20 years was considered, which is consistent with the duration of the PA. This Plan provides the bridge owner, and other interested parties, with detailed information related to the historic nature of the bridge and the necessary background to make an informed planning decision. Recommendations within this Plan should be reviewed in 10 years following completion of the Plan to identify any needed updates or revisions.

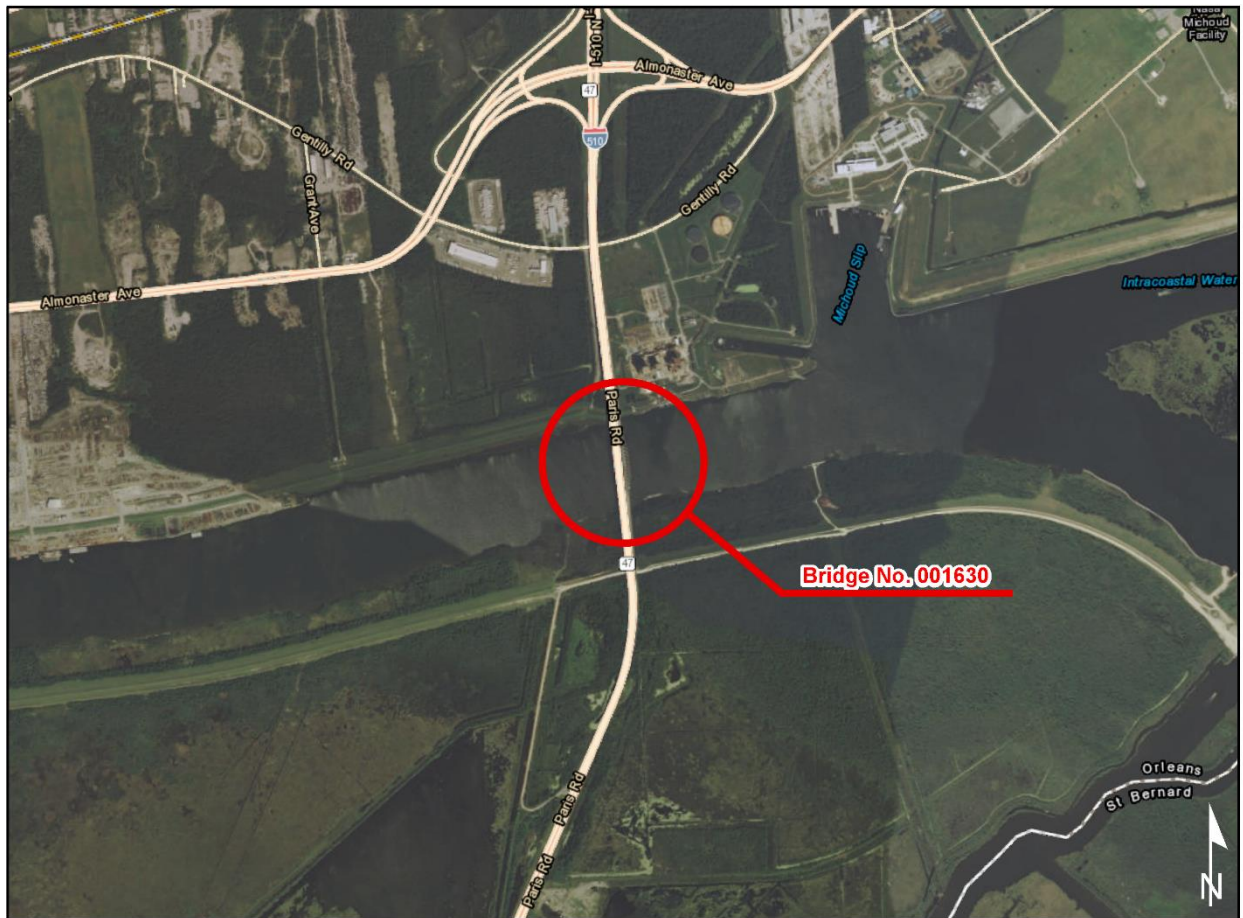
Existing bridge data sources typically available for Louisiana bridges were gathered for this Plan, and field investigation confirmed the general structural condition and character-defining features of the subject bridge. These sources include:

- The current LADOTD Bridge Inspection Report, and any other similar inspection reports
- Original bridge construction plans, any rehabilitation plans, and record as-built plans, as available
- Existing historical and documentary material related to the historic bridges

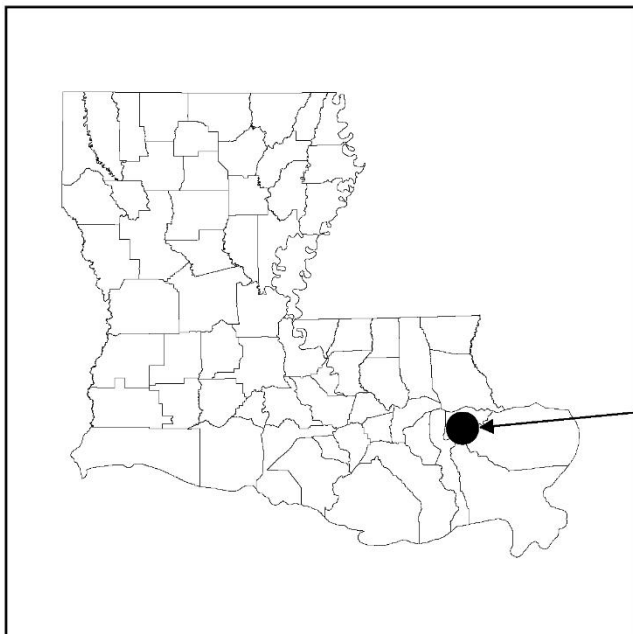
Recommendations within this Plan are consistent with the Secretary's Standards. The Secretary's Standards are basic principles created to help preserve the distinct character of a historic property and its site, while allowing for reasonable change to meet new engineering standards and codes. The Secretary's Standards recommend repairing, rather than replacing, deteriorated features whenever possible. A version of the Secretary's Standards that is specific to historic bridges is included in the Statewide Historic Bridge Plan. Following these standards is a requirement of the PA.

A bridge historian and bridge engineer from Mead & Hunt, Inc. (Mead & Hunt) jointly prepared this Plan under contract to the LADOTD. The LADOTD, FHWA, and LASHPO reviewed and provided input into the final Plan.

2. Location Map



0 1,250 2,500 5,000 Feet



PROJECT LOCATION
Bridge Number: 001630
Structure Number: 02361480201061
Orleans Parish
Route: LA 47
Crossing Description: Gulf Intercoastal Waterway

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3. Historic Data

A. Identifying information

Structure Number: 02361480201061

Recall Number: 001630

LASHPO Number: 36-01804

Bridge Name: Gulf Outlet Canal Bridge, also known as Gulf Intracoastal Waterway Bridge and Green Bridge

Date of Construction: 1964-1967

Main Span Type: Steel High Truss (Cantilevered Tied Arch Through Truss)

Contractor: Foster and Creighton Co., Nashville, Tenn.

Designer/Engineer: Barnard & Burk of Baton Rouge, Louisiana, and Hardesty & Hanover of New York. Steel was fabricated by the American Bridge Division of United States Steel Corp., Pittsburgh.

B. Description of bridge

This bridge carries four lanes of LA 47 across the Mississippi River Gulf Outlet (Gulf Intracoastal Waterway) between St. Bernard Parish and New Orleans, Louisiana. The bridge is located entirely in Orleans Parish. Interstate Highway (I-) 510 ends just to the north of the bridge. It is known locally as the Green Bridge or the Paris Road Bridge.

The main span of the bridge is a 1,248-foot-long steel cantilever truss with a tied-arch suspended span. Truss members are in the Warren configuration, which features diagonal members to withstand both tensile and compressive forces. Added vertical members provide bracing. The total length of the bridge is 6,642 feet. Beginning at the south end of the bridge, the bridge consists of twelve 20-foot-long concrete slab spans; ten 80-foot-long prestressed concrete girder spans; one 132-foot-long welded steel plate girder span; nine 154-foot-long welded steel plate girder spans; one 132-foot-long welded steel plate girder span; one 1,248-foot-long tied-arch cantilever steel truss span; one 132-foot-long welded steel plate girder span; nine 154-foot-long welded steel plate girder spans; one 132-foot-long welded steel plate girder span; two 80-foot-long prestressed concrete girder spans; one 70-foot-long prestressed concrete girder span; seven 80-foot-long prestressed concrete girder spans; and twelve 20-foot-long concrete slab spans. This bridge is classified as a fracture-critical structure.

The width of the four-lane roadway is 58 feet, 1 inch between curbs, with a cast-in-place concrete deck width of 66 feet, 4 inches edge to edge. The minimum vertical clearance from the top of the deck to the underside of the steel end portal frame of the truss span is 17 feet, 1 inch. The vertical clearance from low steel on the bottom of the bridge truss span to the water level is approximately 135 feet.

The bridge's concrete slab spans each consist of two side-by-side slabs, with each slab handling one direction of LA 47 traffic. Each span is 20 feet long, with a slab thickness of 1 foot, 1-7/8 inch. Each slab span is 32 feet, 11 inches wide, with a 29-foot curb-to-curb roadway width, a 1-foot inside median curb railing, and a 2-foot-11-inch outside curb, sidewalk, and railing. The concrete slab spans are supported on three-column concrete pier bents with concrete bent caps and cast-in-place concrete footings on piles. Concrete curtain walls, 8 inches in width, extend from the outside edges of each slab down to ground level, limiting access to the underside of the slab spans.

The bridge's concrete girder spans were originally constructed with 12 lines of precast prestressed concrete girders, six in each direction of traffic. In 1989 three additional prestressed girders were added to the west side of spans 48 through 57 on the bridge's north approach to accommodate a two-lane entrance ramp connecting Almonaster Boulevard with southbound LA 47. The concrete girder spans are supported on paired two-column concrete pier bents with concrete bent caps and concrete footings on piles.

The bridge's steel girder major approach spans were each constructed with eight lines of continuous welded steel girders. The girder lines are connected by transverse steel angles aligned diagonally and horizontally to form cross-frame bracing. Pin-and-hanger assemblies are used to separate the girders and form expansion joints. The 1989 widening resulted in the addition of two steel girders on the west side of spans 38 through 47, on the bridge's north approach. The steel girder spans are supported on two-column concrete box column piers with concrete footings on piles.

The bridge's main spans are a three-span, steel, cantilever truss unit with two 351-foot-long Warren deck trusses as the anchor/cantilever spans and a 546-foot-long tied-arch truss as the suspended span. The truss chords, verticals, and bottom ties are box-shaped members, made up of four plates welded to form a box with interior diaphragms as stiffeners. For various truss members, plates are perforated with oval holes, which reduce the weight of the structure. These openings also provide access for inspections of the bridge. These primary members connect at gusset plates, with rivets and high-strength bolts.

The bridge's paint system has failed, with widespread surface corrosion.

The bridge's north portal bracing over the southbound traffic lanes has minor impact damage but no other collision damage is evident on the truss span.

The main span floor system is composed of eight lines of steel I-beam stringers with transverse steel plate girder floor beams and transverse steel channel diaphragms between stringers. The floor system supports a concrete deck.

The bridge's outside railing, as originally constructed, is a 3-foot-high, single-beam, concrete rail with concrete posts and curb. The railing is offset to the outboard side to provide a 1-foot-6-inch-wide sidewalk as part of the curb. The original outside railing has been replaced with a closed concrete parapet barrier on the west side of the bridge's north approach, where the 1989 ramp widening took place. The bridge's inside railing is a closed concrete curb and median barrier, rising 2 feet, 8 inches above the deck surface.

The most notable alteration is the ramp addition on the west side of the bridge's north approach spans, constructed in 1989 to connect the Old Gentilly Road interchange with southbound LA 47. This ramp consists of the same structural configuration as the original design, with welded steel plate girder spans, prestressed concrete girder spans, and concrete slab spans. The steel girder spans taper in toward the original steel plate girder spans just north of the steel truss span. This 1989 widening did not result in any alteration to the steel truss main spans, the bridge's primary character-defining feature. The addition affected a relatively small portion of the overall bridge and resulted in minimal change to the bridge's historic materials.

The bridge carries an average daily traffic (ADT) of approximately 27,000 vehicles. The posted speed limit on the bridge is 55 miles per hour.

C. History and significance

The Gulf Outlet Canal Bridge spans the Gulf Intracoastal Waterway (GIWW), which is located along the Gulf Coast of the United States and runs for approximately 1,050 miles from Carrabelle, Florida, to Brownsville, Texas. A 5.5-mile-long section of the GIWW in the bridge's vicinity also serves as the channel for a portion of the Mississippi River – Gulf Outlet Canal (abbreviated as MRGO). The GIWW provides boats and barges with a navigable channel protected from wave action. The idea of a continuous inland waterway along the Gulf Coast had been discussed since at least the 1870s. Civic leaders from the Louisiana and Texas coasts formed the Interstate Inland Waterway League in 1905, with the ambitious goal of creating a connected system of canals and waterways across the central and eastern United States, including the Gulf Coast. The organization later evolved into today's Gulf Intracoastal Canal Association. In 1925 Congress authorized a continuous protected waterway between New Orleans and Galveston. By 1942 a series of legislative actions authorized the extension of the waterway to its current limits.¹

MRGO is a 76-mile channel constructed by the United States Army Corps of Engineers (USACE) to provide a shorter deep-draft route between the Gulf of Mexico and New Orleans's inner harbor Industrial Canal via the GIWW. Construction of the MRGO began in 1958 following authorization from Congress in 1956. The MRGO was designed to accommodate a 36-foot-deep, 500-foot-wide channel. An interim

¹ Lynn Alperin, *History of the Gulf Intracoastal Waterway*, Navigation History NWS-83-9 (Fort Belvoir, Va.: National Waterways Study, U.S. Army Corps of Engineers Institute for Water Resources, March 1983), 21-28.

channel was opened for maritime traffic in mid-1963 and the MRGO was fully operational by 1968.² Disastrous flooding from Hurricane Katrina's storm surge in August 2005 caused shoaling in the MRGO channel, reducing its effective depth to only 22 feet. As a result, the USACE de-authorized the MRGO in 2008 and a permanent storm surge barrier was constructed in the canal in 2009.³

Initial MRGO plans called for construction of a four-lane vertical lift bridge with 400-foot horizontal clearance to carry LA 47 over the canal. In 1960 the State of Louisiana requested a change in design to a high-level fixed bridge with 500-foot horizontal clearance. State agencies argued that the movable bridge would limit commercial development of the Port of New Orleans and would be inadequate to handle projected highway traffic volumes on LA 47. The USACE agreed and the bridge was designed as a fixed high-level structure. Construction of the Gulf Outlet Canal Bridge began in June 1964, and it was opened to traffic in July 1967.

In 1989 the Old Gentilly Road interchange was constructed north of the bridge. As a result of this interchange, a new roadway ramp to southbound LA 47 was constructed on the west side of the north approach spans to the main truss span. As noted above, the ramp construction included widening of the bridge's north concrete slab, prestressed concrete girder, and steel plate girder spans. While the Gulf Outlet Canal Bridge itself is located in Orleans Parish, LA 47 provides an important road link for St. Bernard Parish. It serves as one of only three roadway connections to the parish and is the only north-south roadway that crosses the MRGO.

The bridge was originally painted in a distinctive green color, leading to its unofficial local name as the Green Bridge. While a specific paint color is not listed in the bridge construction plans, it was likely Foliage Green Bridge Paint, noted as a color in the Louisiana Department of Highways July 1955 paint specifications manual. The American Association of Highway and Transportation Officials (AASHTO) materials standards guide also references Foliage Green as a valid paint standard in use between 1938 and 1940 and again between 1950 and 1992. Per information from the LADOTD, the bridge was painted grey in 1983 but locals continue to refer to it as "The Green Bridge."

The bridge is eligible for listing in the National Register under *Criterion C: Design/Engineering*. The Gulf Outlet Canal Bridge is significant as an important example of a distinctive type of truss bridge. Significance is demonstrated through an innovative or complex technological solution related to site conditions, consisting of the use of a cantilever truss with a tied-arch suspended span to meet the challenges of crossing the Gulf Outlet Canal. Significance is also demonstrated by the presence of distinctive features of the Warren through truss, which is characterized by diagonal members to withstand both tensile and compressive forces. This example has added verticals for bracing. This bridge exhibits a replacement railing on the north approach spans that results in a minor loss of integrity. However, the bridge's significant features are not affected by this alteration.

² Alperin, 34-35.

³ U.S. Army Corps of Engineers, "History of MRGO," www.mvn.usace.army.mil/Missions/Environmental/MRGOEcosystemRestoration/HistoryofMRGO.aspx.

D. Character-defining features

Character-defining features are prominent or distinctive aspects, qualities, or characteristics of a historic property that contribute significantly to its physical character. Features may include materials, engineering design, and structural and decorative details. Elements of the bridge that are not identified as character-defining features may be historic fabric. Historic fabric is material in a bridge that was part of original construction. It is important to consider both character-defining features and the bridge's historic fabric when planning any work.

The Gulf Outlet Canal Bridge has one character-defining feature: its cantilever steel Warren truss with tied-arch suspended span (described below). Other elements that represent historic fabric but are not considered to be character-defining include the approach spans, bridge railing (with the exception of the 1989 railing alteration on the bridge's north approach), substructure elements, deck, and floor system. The concrete deck is original, except for the concrete deck that was added as part of the 1989 construction for adding the roadway ramp from the Old Gentilly Road interchange.

The following item is the character-defining feature of this bridge:

Feature 1: Design and construction of a cantilever steel Warren truss with tied-arch suspended span

This feature includes the entire main span, comprised of a three-span, steel, cantilever truss unit, with two 351-foot-long Warren deck trusses as the anchor/cantilever spans and a 546-foot-long tied-arch truss as the suspended span. The Warren truss features diagonal members to withstand both tensile and compressive forces, and added verticals for bracing.



Character-defining Feature Photo 1: Design and construction of a cantilever steel Warren truss with tied-arch suspended span. The Warren truss features diagonal members to withstand both tensile and compressive forces, and added verticals for bracing.



Character-defining Feature Photo 2: Design and construction of a cantilever steel Warren truss with tied-arch suspended span. The Warren truss features diagonal members to withstand both tensile and compressive forces, and added verticals for bracing.

The following images illustrate other bridge features that are of historic fabric, meaning they are part of original construction but are not considered to be character-defining features:



Historic Fabric Photo 1: Concrete deck and original concrete railings.



Historic Fabric Photo 2: Typical steel girder approach span.



Historic Fabric Photo 3: Typical prestressed concrete girder approach span.



Historic Fabric Photo 4: Portion of suspended truss span, showing floor system components.

4. Engineering Data

A. Existing conditions

(1) Structural observations

The overall condition of this bridge is satisfactory. The major deficiency is that the paint system on the bridge (steel truss spans and steel plate girder spans) has failed, and areas of exposed metal have moderate surface corrosion throughout the steel truss span and girder spans.

The bridge is classified as fracture critical. The bridge contains the following fracture critical members:

- Pins and hangers on the welded steel plate girder spans.
- All floor beams and ancillary gusset and connection plates on the truss span.
- Tie downs on piers 1 and 4 (truss panel points L0 and L32).
- Pin connections in truss span at panel points U8, U9, L9, M10, M11, M12, L16, M21, M22, U23, L23, and U24 (see diagram in Appendix D).
- All tension members in the truss span.

The bridge inspection report for inspection performed on October 22, 2014, noted that fracture critical members were visually inspected, and no cracks or defects were found, other than surface corrosion, minor pack rust, and minor pitting in some of the secondary steel members (bracing and gusset connection plates). This bridge has an inspection frequency of 24 months.

The bridge has a scour code of 5 (Scour Stable) for the bridge foundations. An underwater inspection in November 2012 observed that overall the submerged components of the bridge substructure units were in satisfactory condition.

The concrete deck condition is good. The deck drains are generally in good condition and are functioning without debris accumulation. The finger-type expansion joints in the concrete deck above panel points L9 and L23 are in good condition but are wide open, allowing for heavy debris accumulation on the lower lateral bracing below the joints. The joint seals in the southerly concrete slab spans are deteriorated and filled with debris, and are in poor condition. The joint seals in the northerly concrete slab spans are in satisfactory condition.

The superstructure condition is satisfactory, except for failure of the paint system as noted above.

The substructure condition is satisfactory. There are minor cracks and minor spalls on a few concrete piers.

The deck geometry appraisal is good.

The under clearance appraisal is good (approximately 135 feet vertical clearance).

Vertical clearance from the top of the roadway to the lowest steel member is 17.1 feet.

(2) Non-structural observations

The roadway alignment appraisal is good.

The waterway adequacy appraisal is good. No pier protection is in place or required, nor are waterway control devices such as spur dikes or embankment protection. Waterway banks are in stable condition. Both sides of the waterway are protected with earthen levees that appear to be in good condition. Signage for the waterway, attached to the piers, is adequate, but could use re-painting for easier reading.

There are channel marking signs on each of the main truss span piers.

(3) Serviceability observations

The bridge railings are concrete post and rail type that do not meet current design criteria for height and impact loading, except the newer parapets on the west side of the newer northerly approach spans from the 1989 widening are the standard Jersey-type concrete parapets which meet current design criteria.

The bridge carries an ADT of approximately 27,000 vehicles. The posted speed limit on the bridge is 55 miles per hour. The clear roadway width for northbound and southbound traffic is 28 feet, 6 inches, measured from face of parapet to edge of sidewalk, with the roadways separated by a median barrier. The roadway is striped for two lanes of traffic without shoulders. There is a 1-foot-6-inch-wide sidewalk on each exterior side of the roadway. Current LADOTD minimum design guidelines state that the minimum width of bridges (measured gutter line to gutter line) should be equal to the approach roadway width. For this highway, the guidelines call for an inside shoulder width of 6 feet and an outside shoulder width of 10 feet, with two 12-foot-wide lanes, for a total clear width of 40 feet, 0 inches. The clear roadway width does not meet current minimum design standards, but these standards are modified for long bridges such as this bridge, where it is impractical to provide shoulders on each side of the roadway. Any preservation work for this bridge would be done under American Association of State Highway and Transportation Officials (AASHTO) Resurfacing, Restoration, or Rehabilitation (3R) criteria, which focus primarily on the preservation and extension of the service life of existing facilities and on safety enhancements. Under the classification of 3R projects, the type of projects include bridge repairs, but would not require the bridge to be widened. With two lanes of traffic in each direction,

and based on the current ADT, the bridge has sufficient capacity to safely handle the traffic. Also, there is minimal crash history for collisions between vehicles or for crashing into the barrier railing. Thus, the functionality of this bridge is acceptable without modification to its width or railings.

At the north end of the bridge, the approach roadway includes the on-ramp from the Old Gentilly Road interchange. The vertical profile and horizontal alignment meet standard design criteria. Adequate steel plate beam guard railing is located along the edge of the on-ramp and is attached to the concrete parapet at the abutment. This railing is in good condition. There is no railing on the roadway exiting from the bridge. Although there is no evidence of crashes at this location of the bridge, consideration should be given to installing such railing to enhance safety of the facility.

At the south end of the bridge, the vertical profile and horizontal alignment for the approach roadway meet design criteria. Adequate steel plate beam guard railing is located along the edge of the on-ramp and is attached to the concrete parapet at the abutment. There is no railing on the roadway exiting from the bridge. Although there is no evidence of crashes at this location of the bridge, consideration should be given to installing such railing to enhance safety of the facility.

Pavement markings (striped edge lines and lane lines) are moderately faded but still functional.

B. Sources of information

Plans available:	Yes, available at the LADOTD Bridge Section office
Inspection report date:	October 22, 2014
Fracture critical report date:	(included as part of routine inspection report)
Underwater inspection report:	May 2013
Date of site visit:	December 15-17, 2015



Condition Photo 1: Truss span paint failure.



Condition Photo 2: Truss span paint failure.



Condition Photo 3: Substandard concrete post and beam bridge railing, typical on entire bridge except at north end, west side, and where newer ramp was added with concrete Jersey-type parapet.



Condition Photo 4: Steel plate girders paint failure.



Condition Photo 5: Condition of hinged pin joint at truss span panel point L9; joint apparently frozen in full contraction position.



Condition Photo 6: Condition of hinged pin joint at truss span panel point L16.



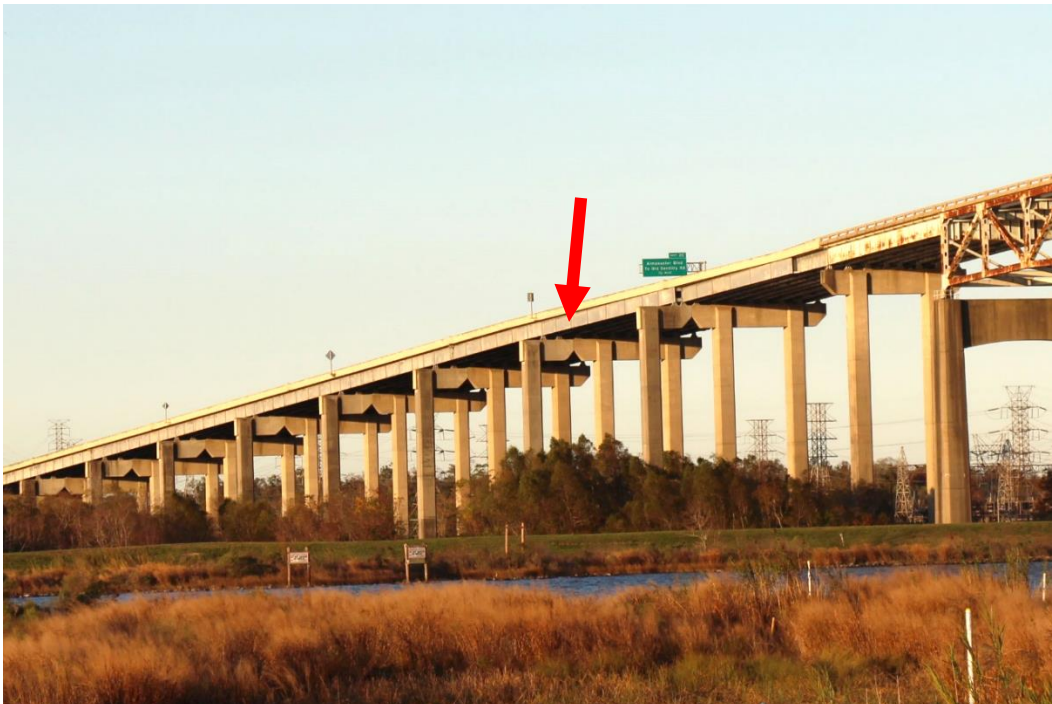
Condition Photo 7: Condition of hinged hangers of plate girders at connection to truss span, with deck expansion joint above the hinge.



Condition Photo 8: Condition of steel plate girders hinged expansion joints, and condition of cross frames under the deck joints. Cross frames connection plates (hard to see in photo) also have paint failure, corrosion, and minor section loss, typical at cross frames under expansion joints.



Condition Photo 9: Minor impact damage to end of portal member on the north end of bridge, over outside southbound traffic lane (horizontal member in foreground with dark rust and paint failure).



Condition Photo 10: North approach spans steel plate girders, west side of bridge, showing newer exterior girders and newer parapet from addition of on-ramp from Old Gentilly Road interchange north of the bridge.



Condition Photo 11: North approach roadway to the bridge, facing southbound direction. Note the on-ramp from Old Gentilly Road Interchange. Note Jersey-style concrete parapet on right side of road.



Condition Photo 12: Condition of waterway marking signs on pier in waterway, typical for two piers. Signs could be re-painted for easier reading.



Condition Photo 13: Condition of waterway banks, each side of waterway; both sides of the waterway are protected with levees.

5. Recommendations

This Preservation Priority Bridge should remain in use and can meet current and projected transportation needs for the next 20 years or more. Maintenance and rehabilitation activities should be completed in a manner consistent with the long-term preservation of this historic bridge. The Statewide Historic Bridge Plan provides additional guidance and approaches to completing maintenance and rehabilitation activities that adhere to the Secretary's Standards. Work should be conducted under the supervision of a qualified professional historian, as defined in the PA. The bridge engineer, or the bridge engineer's supervising engineer, should have demonstrated expertise in historic bridge projects and must have completed the LADOTD's historic bridge training. When developing plans and specifications for a project, the bridge engineer should follow the recommendations below.

Under the terms agreed upon in the PA, the bridge owner may undertake certain activities that are considered to be best practices without additional consultation or public notification. These activities are documented in Attachment 5 of the PA and are limited to the activities specifically noted. All recommended preventative maintenance and rehabilitation activities for this bridge are included in Attachment 5 and are not expected to alter character-defining features or historic fabric of the bridge. Some cyclical or condition-based maintenance items are noted below under Rehabilitation because they are expected to be completed as part of an overall rehabilitation project for this bridge. These activities may need to be completed as conditions dictate to promote long-term preservation of this historic bridge. Recommendations within this Plan should be reviewed in 10 years following completion of the Plan to identify any needed updates or revisions.

The opinions of probable costs provided below are in 2016 dollars. The costs were developed without benefit of preliminary rehabilitation plans and are based on the above identified tasks using engineering judgment and/or gross estimates of quantities and historic unit prices and are intended to provide a programming level of estimated costs. Refinement of the probable costs is recommended once preliminary plans have been developed. The estimated preservation costs include a 10 percent contingency and 7 percent mobilization allowance of the preservation activities, excluding soft costs. Actual costs may vary significantly from those opinions of cost provided herein. Engineering design, historical consultation, and construction administration costs are not included as these may be provided by the owner or consultants.

A. Preventative maintenance

The following are recommendations for cyclical maintenance. There are no condition-based maintenance recommendations at this time, based on the bridge condition as observed during the site visit and as documented in available information.

1. Clean bridge deck and flush drains regularly to maintain good condition. This cyclical maintenance cost is not included in the cost.

B. Rehabilitation

The following are recommendations for rehabilitation. It is noted that the LADOTD has a rehabilitation project tentatively scheduled for letting in December 2017, with rehabilitation work to be done in 2018.

1. Clean and paint all welded steel plate girder spans and the tied arch cantilever steel truss span, including all bearings, in accordance with Specification Section 811 – Painting and Protective Coatings. Such painting should be done per LADOTD standard practice (estimated at 20-year intervals) or as conditions warrant for the life of the painting system.
2. Repair deteriorated secondary structural steel members on the truss span, to match historic appearance, as may be determined during the cleaning and painting operations noted in Item 1 above. These secondary members consist of deteriorated lateral bracing connection gusset plates under expansion joints, and other secondary members.
3. Clean and reseal the expansion joints in the concrete deck for the southerly concrete slab spans.
4. Repair spalled concrete on substructure units in a manner that the concrete used for the repair matches the color, texture and consistency of the adjacent existing concrete.
5. Mill and overlay asphalt roadway approaches at each end of the bridge.

Bridge Recall No. 001630		Date: 5/24/2016 (updated)		
Gulf Outlet Canal Bridge				
Opinion of Probable Costs				
Rehabilitation				
Item	Quantity	Unit	Unit Cost	Total
Clean and paint steel girder spans and truss span per Specification Section 811 – Painting and Protective Coatings (includes containment)	1	LS	\$21,000,000	\$21,000,000
Repair deteriorated structural steel members	10,000	LB	\$10	\$100,000
Reseal deck expansion joints on south concrete slabs	660	LF	\$20	\$13,200
Repair spalled concrete on substructure units	2,000	SF	\$25	\$50,000
Mill and overlay asphalt roadway approaches at each end of bridge	2,200	SY	\$40	\$88,000
Item Subtotal				\$21,251,200
Contingency			10.00%	\$2,125,120
Mobilization			7.00%	\$1,636,342
TOTAL				\$25,012,662
			Round to:	\$25,013,000

C. Identification of any anticipated design exceptions

No design exceptions were noted, nor are any design exceptions recommended. The concrete post and beam bridge railings do not meet current design standards but met design standards at the time of original construction. These bridge railings are not recommended to be updated as part of the proposed rehabilitation activities.

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Appendix A. Historic Inventory Form

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Louisiana Historic Bridge Inventory

Recall Number: 001630

Structure Number: 02361480201061

SHPO Number: 36-01804

Bridge Name: GULF OUTLET CANAL BRIDGE

Location Data:

District: 02

Parish: Orleans

Feature Crossed: INTRACOASTAL WATERWAY(GULF OUTLET)

Facility Carried: LA0047

Location: 2.0 MI SOUTH OF I-10

City, Village or Town (if applicable): New Orleans

Status: Open

Bridge Owner: State of Louisiana

Latitude: 29.995861

Longitude: -89.939972

Structural Data:

Bridge Type: Steel High Truss (Cantilevered Through Truss)

Year Built: 1967

Main Span Configuration (if applicable): Warren through truss

Maximum Span Length (feet): 702

Number of Spans: 3

Overall Structure Length (feet): 6622

Approach Span Type (if applicable): Concrete - mixed design

Posted Load:

Current ADT: 028500

Design and Construction Data:

Engineer or Builder:

Unknown

Bridge Plaque:

None

National Register of Historic Places Evaluation:

This through truss bridge has significance as an important example of a distinctive type of truss bridge. Significance is demonstrated through an innovative or complex technological solution related to site conditions, consisting of the use of a cantilever truss with a tied-arch suspended span to meet the challenges of crossing the Gulf Outlet Canal. Significance is also demonstrated by the presence of distinctive features of the Warren through truss, which is characterized by diagonal members to withstand both tensile and compressive forces. This example has added verticals for bracing. This bridge exhibits a replacement parapet on one approach span that results in a minor loss of integrity, but is able to convey its significant design features. This bridge is eligible for listing in the National Register under Criterion C: Design/Engineering: Design/Engineering.

No evidence was found during research or data collection activities to indicate that this bridge possesses a direct and important association with historical events or trends. This bridge does not possess significance under Criterion A

Within/Adjacent to Known Historic District: N/A

National Register Historic District Name: N/A

National Register Determination: Eligible

National Register Determination Date: 2013

Surveyor: Mead & Hunt, Inc.

Date Surveyed: 2013



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Recall Number: 001630

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Bridge Name: GULF OUTLET CANAL BRIDGE

Parish: Orleans

Bridge Owner: State of Louisiana

Feature Crossed: INTRACOASTAL WATERWAY(GULF OUTL

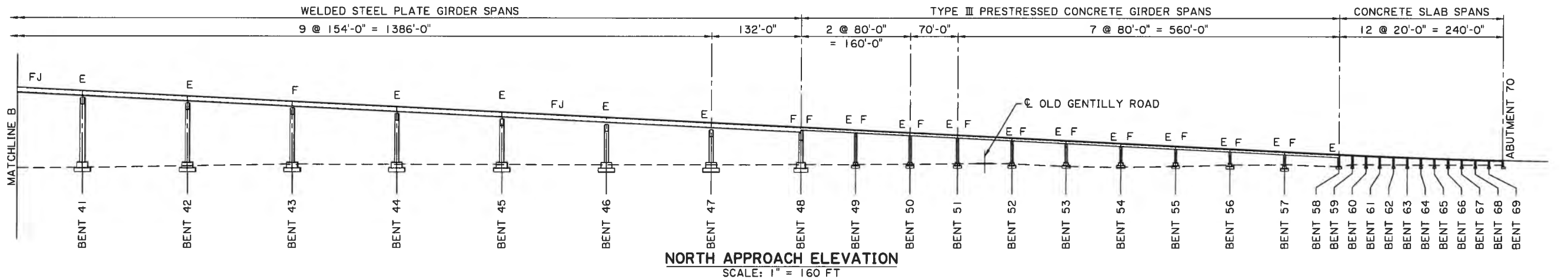
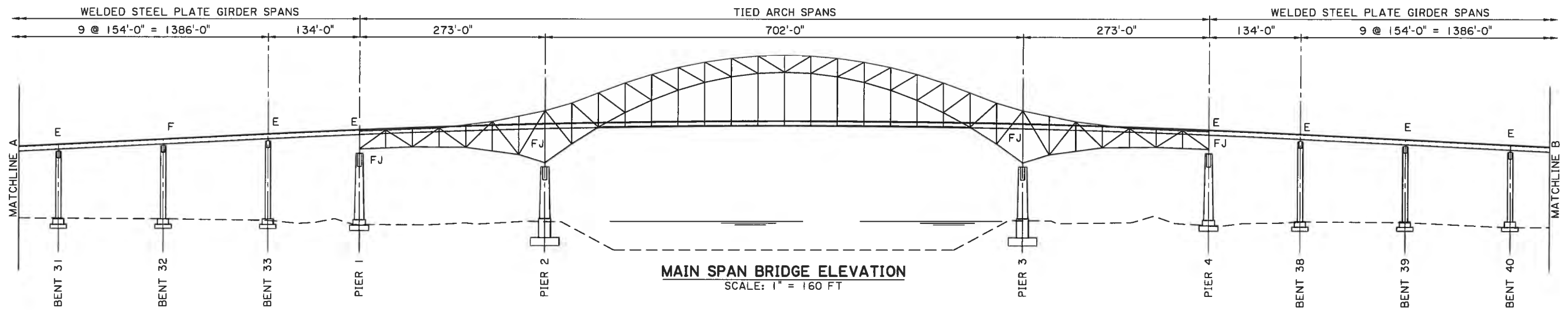
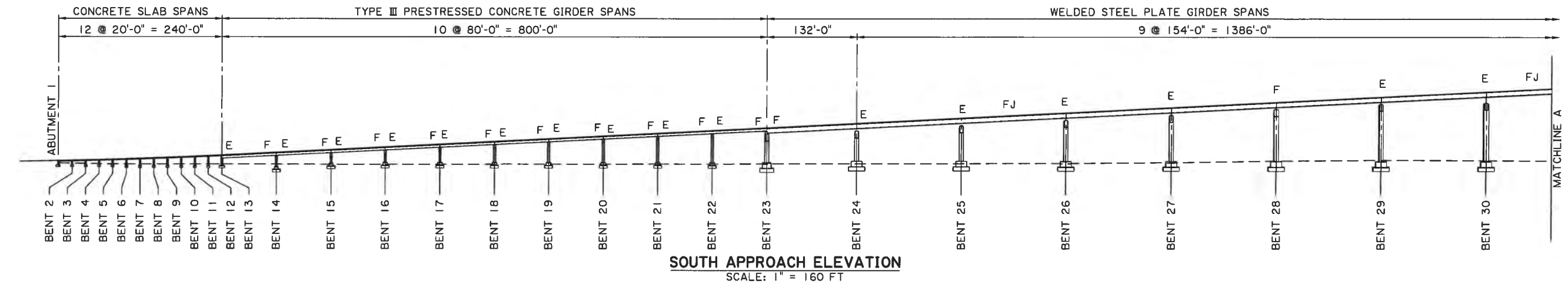
Facility Carried: LA0047

Photographs:



Appendix B. Select Plan Sheets

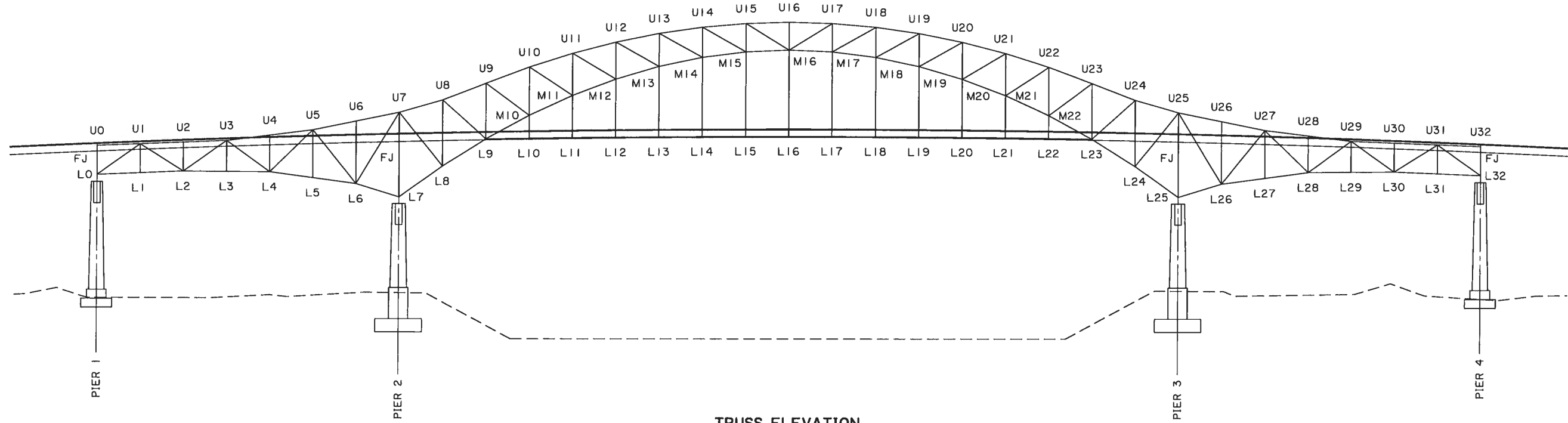
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NOTES:

1. BENT NUMBERING SYSTEM PER DISTRICT 02, LA DOTD.
2. F = FIXED BEARING LOCATION; E = EXPANSION BEARING LOCATION ; FJ = FINGER JOINT LOCATION.

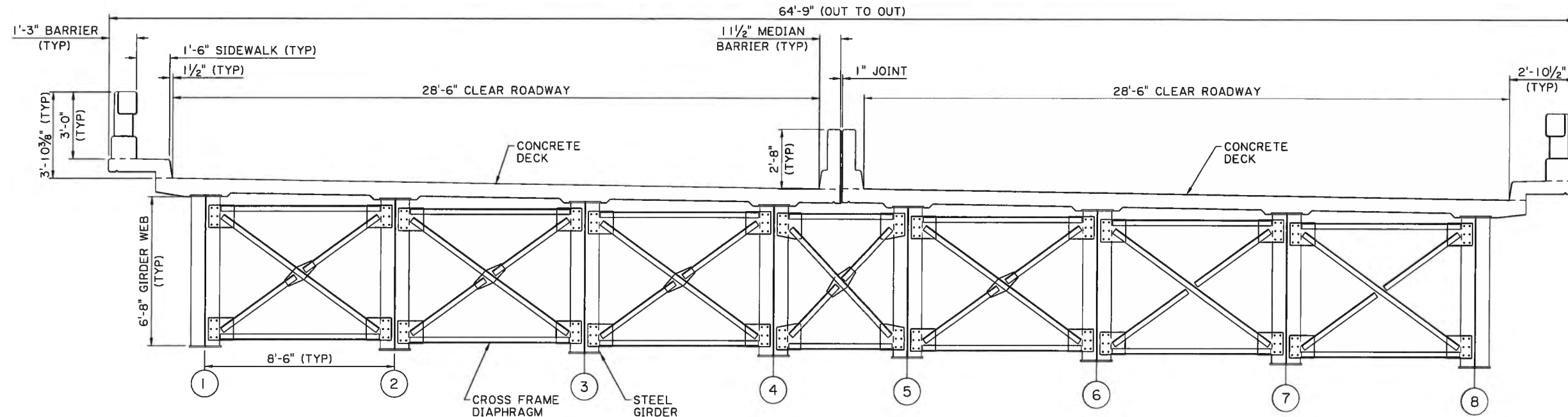
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PARISH	ORLEANS
FEDERAL PROJECT	BR3606(500)
STATE PROJECT	700-36-01B5
DESIGNED	
CHECKED	
DATE	OCT. 2006
SHEET	FIG. 1 OF 3
BY	
NO.	
DATE	
REVISION DESCRIPTION	
INSPECTION REPORT	
LA 47 OVER MISSISSIPPI RIVER GULF OUTLET	
FIGURE 1 - ELEVATION	



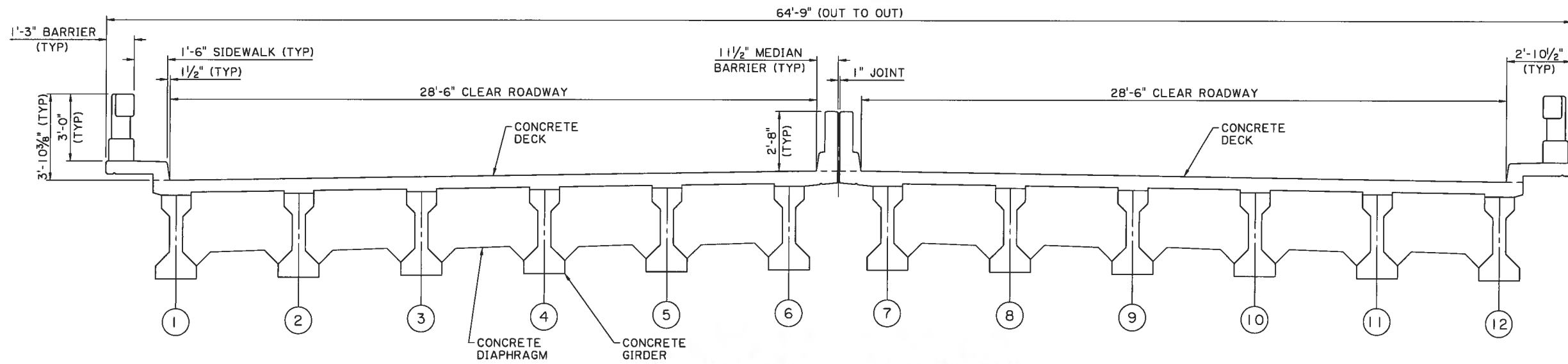
**TRUSS ELEVATION
PANEL POINT LOCATIONS**
SCALE: 1" = 100 FT

- NOTES:
1. E = EXPANSION JOINT
 2. FJ = FINGER JOINT

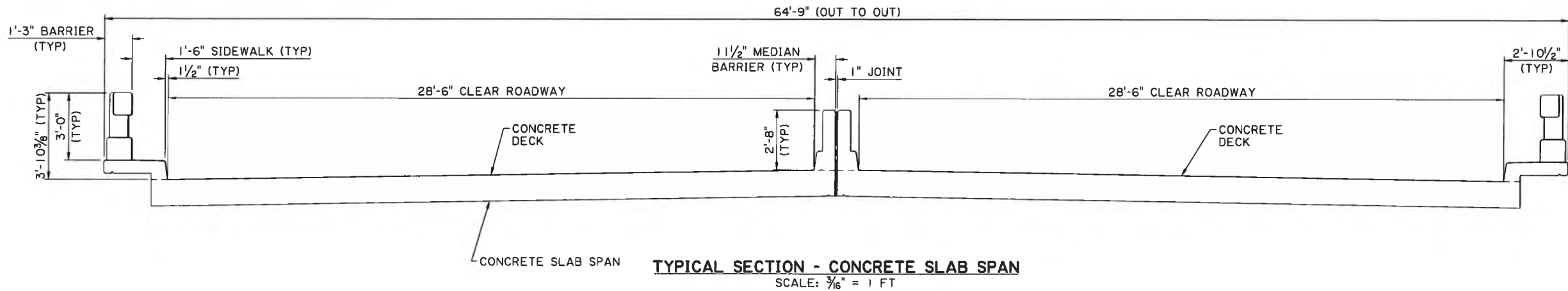
SHEET NUMBER	F-2				
DESIGNED	CHECKED	DATE	SHEET	BY	REVISION DESCRIPTION
L.A.D.	M.S.	OCT. 2006	FIG. 2 OF 3		
PARISH	FEDERAL PROJECT	STATE PROJECT	DATE	SHEET	BY
ORLEANS	BR3606(500)	700-36-0185			
<p>INSPECTION REPORT</p>					
<p>LA 47 OVER MISSISSIPPI RIVER GULF OUTLET</p>					
<p>FIGURE 2 - PANEL POINT LOCATIONS</p>					



TYPICAL SECTION - STEEL GIRDER SPAN
SCALE: 3/16" = 1 FT



TYPICAL SECTION - CONCRETE GIRDER SPAN
SCALE: 3/16" = 1 FT



TYPICAL SECTION - CONCRETE SLAB SPAN
SCALE: 3/16" = 1 FT

SHEET NUMBER	F-3
PARISH	ORLEANS
FEDERAL PROJECT	BR3606(500)
STATE PROJECT	700-36-0185
DESIGNED	
CHECKED	
DATE	OCT. 2006
REVISION DESCRIPTION	FIG. 3 OF 3
BY	
INSPECTION REPORT	
LA 47 OVER MISSISSIPPI RIVER GULF OUTLET	
FIGURE 3 - TYPICAL SECTIONS	

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