

JOINT PUBLIC NOTICE

December 22, 2014

United States Army
Corps of Engineers
New Orleans District
Regulatory Branch
Post Office Box 60267
New Orleans, Louisiana 70160-0267

State of Louisiana
Department of Environmental Quality
Water Quality Certification Section
Post Office Box 4313
Baton Rouge, Louisiana 70821-4313

(504) 862-2675
Project Manager
Jamie Crowe
Jamie.M.Crowe@usace.army.mil
Permit Application Number
MVN 2008-3157 CO

(225) 219-3225
Project Manager
Elizabeth Johnson

WQC Application Number
WQC 141217-01

Interested parties are hereby notified that a permit application has been received by the New Orleans District of the U.S. Army Corps of Engineers pursuant to:
[X] Section 10 of the Rivers and Harbors Act of March 3, 1899 (30 Stat. 1151; 33 USC 403); and/or [X] Section 404 of the Clean Water Act (86 Stat. 816; 33 USC 1344).

Application has also been made to the Louisiana Department of Environmental Quality, Office of Environmental Services, for a Water Quality Certification (WQC) in accordance with statutory authority contained in LRS30:2047 A(3), and provisions of Section 401 of the Clean Water Act (P.L.95-17).

12-INCH BRINE PIPELINE BENEATH AND ACROSS THE MISSISSIPPI RIVER IN IBERVILLE PARISH

NAME OF APPLICANT: Boardwalk Louisiana Midstream, LLC, 4470 Bluebonnet Boulevard, Suite C, Baton Rouge, Louisiana 70810.

LOCATION OF WORK: Within the Mississippi River Basin, in the Lower Mississippi River – Baton Rouge hydrologic unit (HUC 08070100), in the Mississippi River, approximately 198 miles above the Head of Passes, in Iberville Parish, as shown on the enclosed drawings.

CHARACTER OF WORK: The applicant proposes to install an additional 12-inch pipeline crossing the Mississippi River adjacent to and north of an existing pipeline crossing. The proposed pipe will be installed via horizontal directional drill (HDD) to replace an existing, corroding brine pipeline, which will be abandoned in place after construction of the new pipeline. Excavation of 10' x10' bore pits will take place in the batture at the drill entry and exit points. Temporary spoil will be stored next to the pits

and used as backfill after the pipeline is installed. Board mats will be placed on the Mississippi River levee to allow equipment access to the batture. Approximately 1.4 acres of maintained herbaceous wetlands will be temporarily impacted by the proposed activity. After construction is complete, the all pre-project contours will be restored and the site will re-vegetate naturally. As compensation for unavoidable wetland impacts the applicant proposes to purchase wetland credits from a Corps approved mitigation bank located in the watershed.

The comment period for the Department of the Army Permit and the Louisiana Department of Environmental Quality WQC will close **30 days** from the date of this joint public notice. Written comments, including suggestions for modifications or objections to the proposed work, stating reasons thereof, are being solicited from anyone having interest in this permit and/or this WQC request and must be mailed so as to be received before or by the last day of the comment period. Letters concerning the Corps of Engineers permit application must reference the applicant's name and the Permit Application Number, and be mailed to the Corps of Engineers at the address above, **ATTENTION: REGULATORY BRANCH** Letters concerning the Water Quality Certification must reference the applicant's name and the WQC Application number and be mailed to the Louisiana Department of Environmental Quality at the address above. The application for this proposed project is on file with the Louisiana Department of Environmental Quality and may be examined weekdays between 8:00 a.m. and 4:30 p.m. Copies may be obtained upon payment of costs of reproduction.

Corps of Engineers Permit Criteria

The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people.

The U.S. Army Corps of Engineers is soliciting comments from the public, federal, state, and local agencies and officials, Indian Tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the U.S. Army Corps of Engineers to determine whether to make, modify, condition, or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties,

water quality, general environmental effects, and other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

The New Orleans District is unaware of properties listed on the National Register of Historic Places near the proposed work. The possibility exists that the proposed work may damage or destroy presently unknown archeological, scientific, prehistorical, historical sites, or data. Issuance of this public notice solicits input from the State Archeologist and State Historic Preservation Officer regarding potential impacts to cultural resources.

The proposed activity is located in areas known to be utilized by the pallid sturgeon (*Scaphirhynchus albus*) and the Louisiana black bear (*Ursus americanus luteolus*). Utilizing Standard Local Operating Procedure for Endangered Species in Louisiana (SLOPES), dated October 22, 2014, between the U.S. Army Corps of Engineers, New Orleans and U.S. Fish and Wildlife Service, Ecological Services Office, the Corps has determined that the proposed activity is not likely to adversely affect either species.

This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. The applicant's proposal would result in the destruction or alteration of **N/A acres** of EFH utilized by various life stages of red drum and penaeid shrimp. Our initial determination is that the proposed action would not have a substantial adverse impact on EFH or federally managed fisheries in the Gulf of Mexico. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

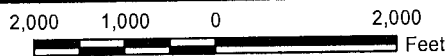
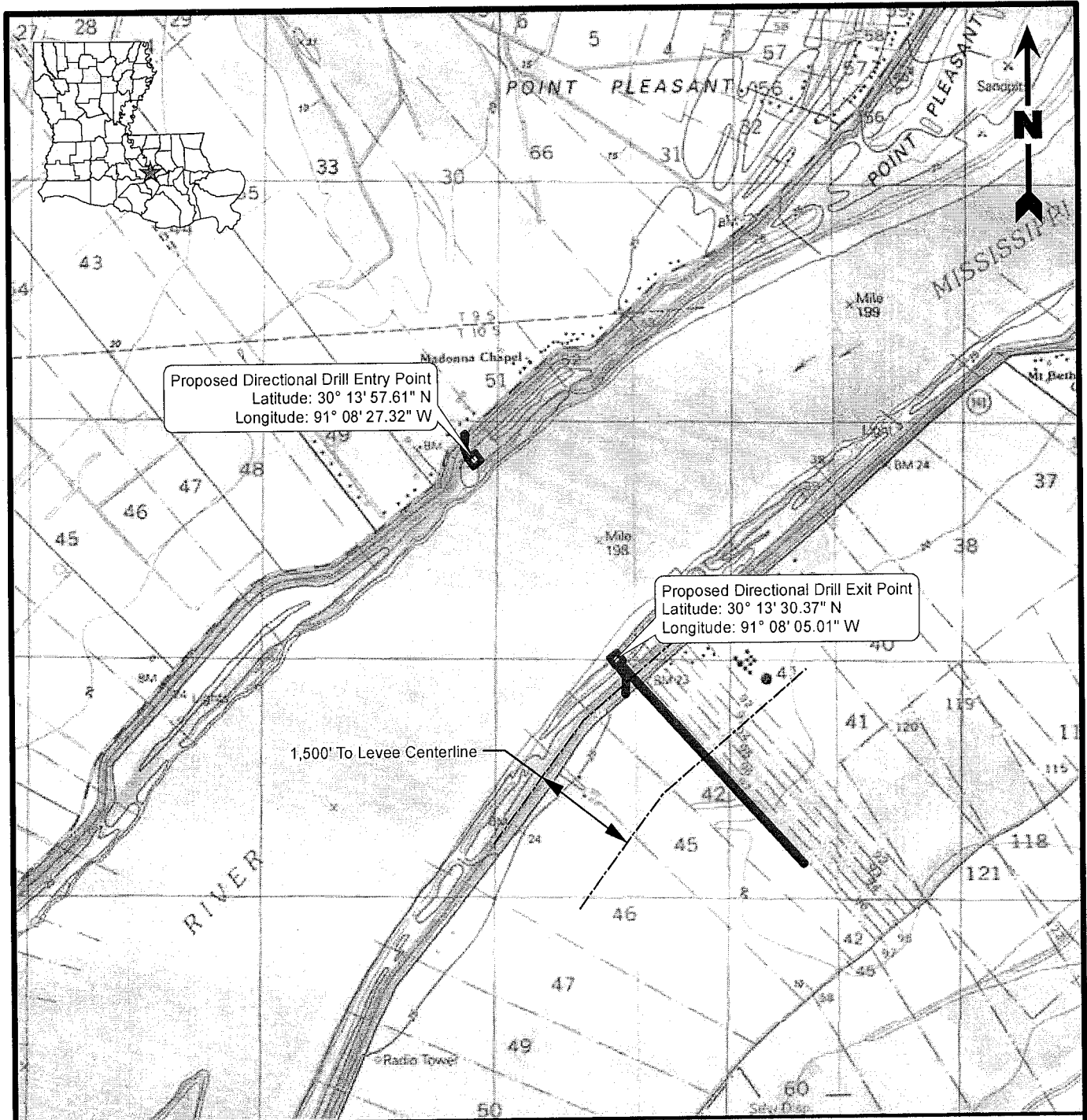
If the proposed work involves deposits of dredged or fill material into navigable waters, the evaluation of the probable impacts will include the application of guidelines established by the Administrator of the Environmental Protection Agency. Also, a certification that the proposed activity will not violate applicable water quality standards will be required from the Department of Environmental Quality, Office of Environmental Services, before a permit is issued.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing. You are requested to communicate the information contained in this notice to any other parties whom you deem likely to have interest in the matter.

You are requested to communicate the information contained in this notice to any other parties whom you deem likely to have interest in the matter.

John M. Herman
Chief, Central Evaluation Section
Regulatory Branch

Enclosure



Legend

Project Area

Reference

Base map comprised of U.S.G.S. 7.5 minute topographic maps, "White Castle, LA" and "Carville, LA".

Site Location Map

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC
Mississippi River Crossing



PROVIDENCE

Drawn By	LMM	10/29/14
Checked By	LMH	10/29/14
Approved By	JTG	10/29/14

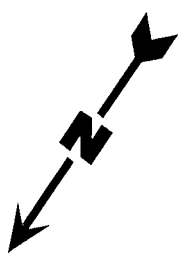
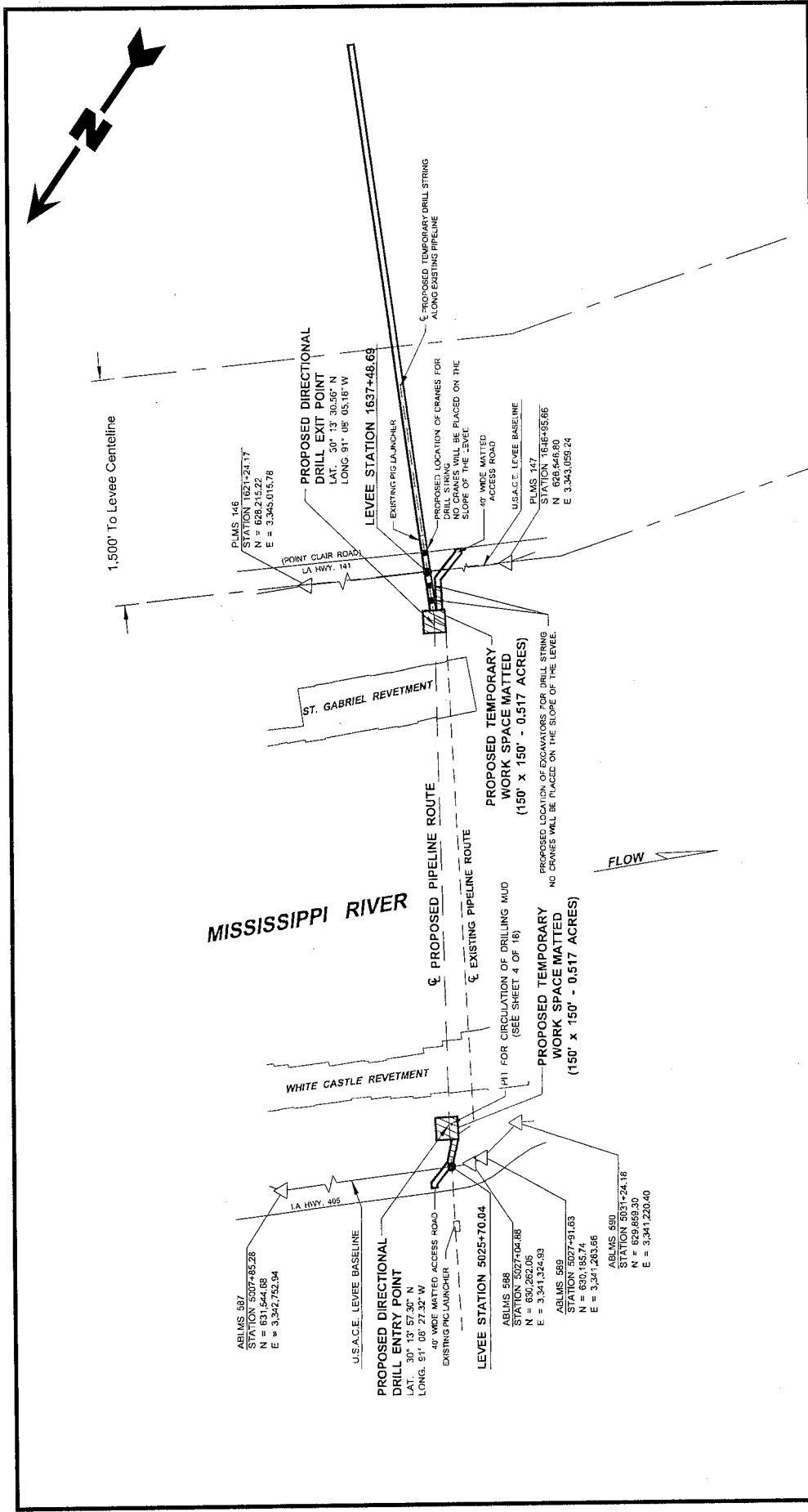
Project Number
708-014

Drawing Number
708-014-A004

1
Figure

Providence Engineering and Environmental Group LLC

OCT 30 2014



Site Plan

Section 10/404 Permit Application
 Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC
 Mississippi River Crossing

Drawn By	LMM	10/21/14
Checked By	LMH	10/21/14
Approved By	RPC	10/21/14
Project Number	708-014	
Drawing Number	708-014-A005	
Figure	2	



Legend

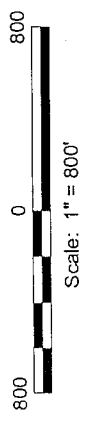
- Project Area
- Jurisdictional Wetlands

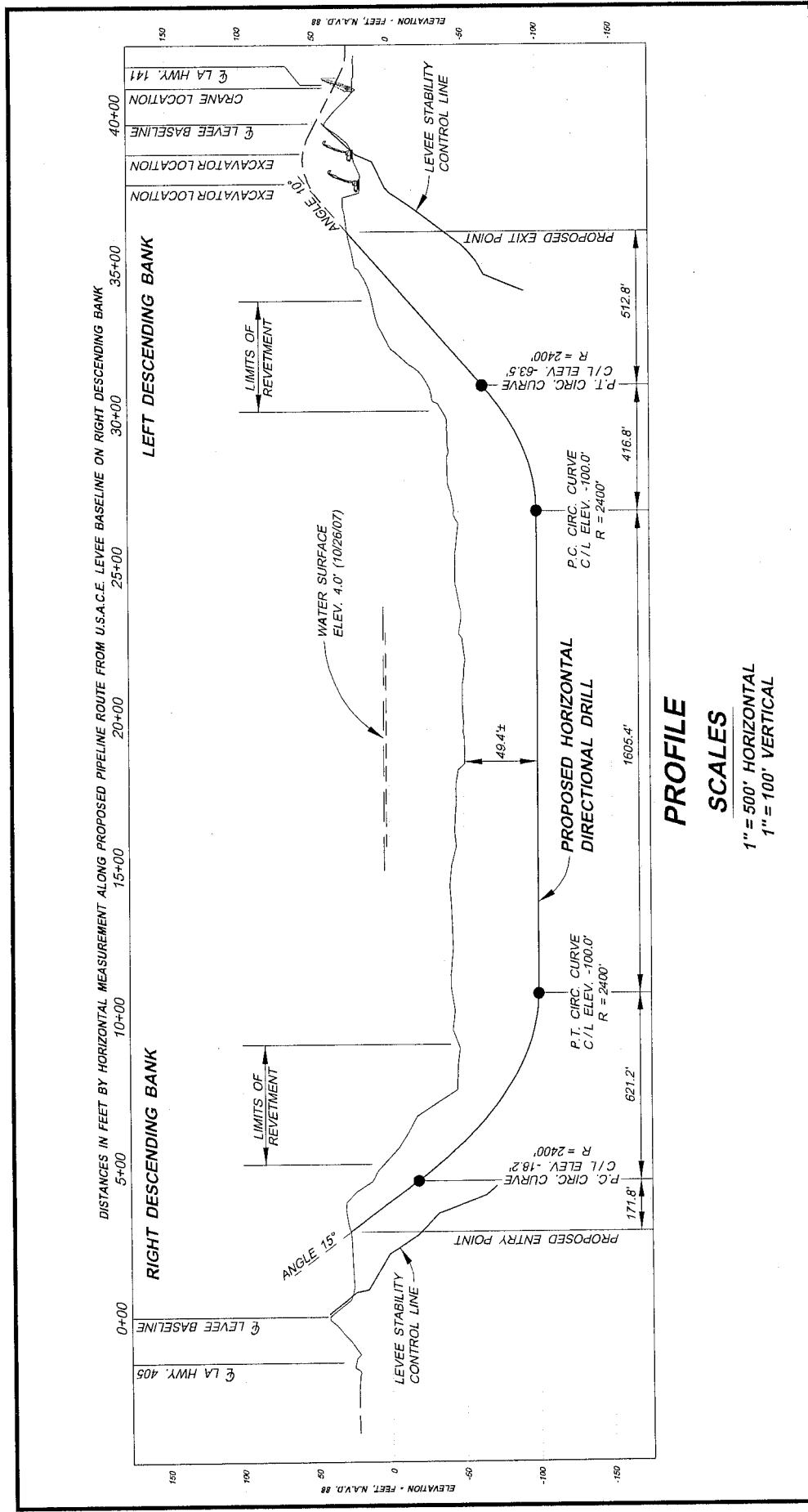
Note

See figure 9 for general notes and references.

Reference

Base map comprised of client provided figure titled: Plan, dwg no: A08-161-01, Sheet 2 of 9, dated: 07/22/14.





PROFILE
SCALES
 1" = 500' HORIZONTAL
 1" = 100' VERTICAL

Profile

Section 10/404 Permit Application
 Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC
 Mississippi River Crossing

Drawn By	LMH	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14
Project Number	708-014	
Drawing Number	708-014-A006	
Figure	3	

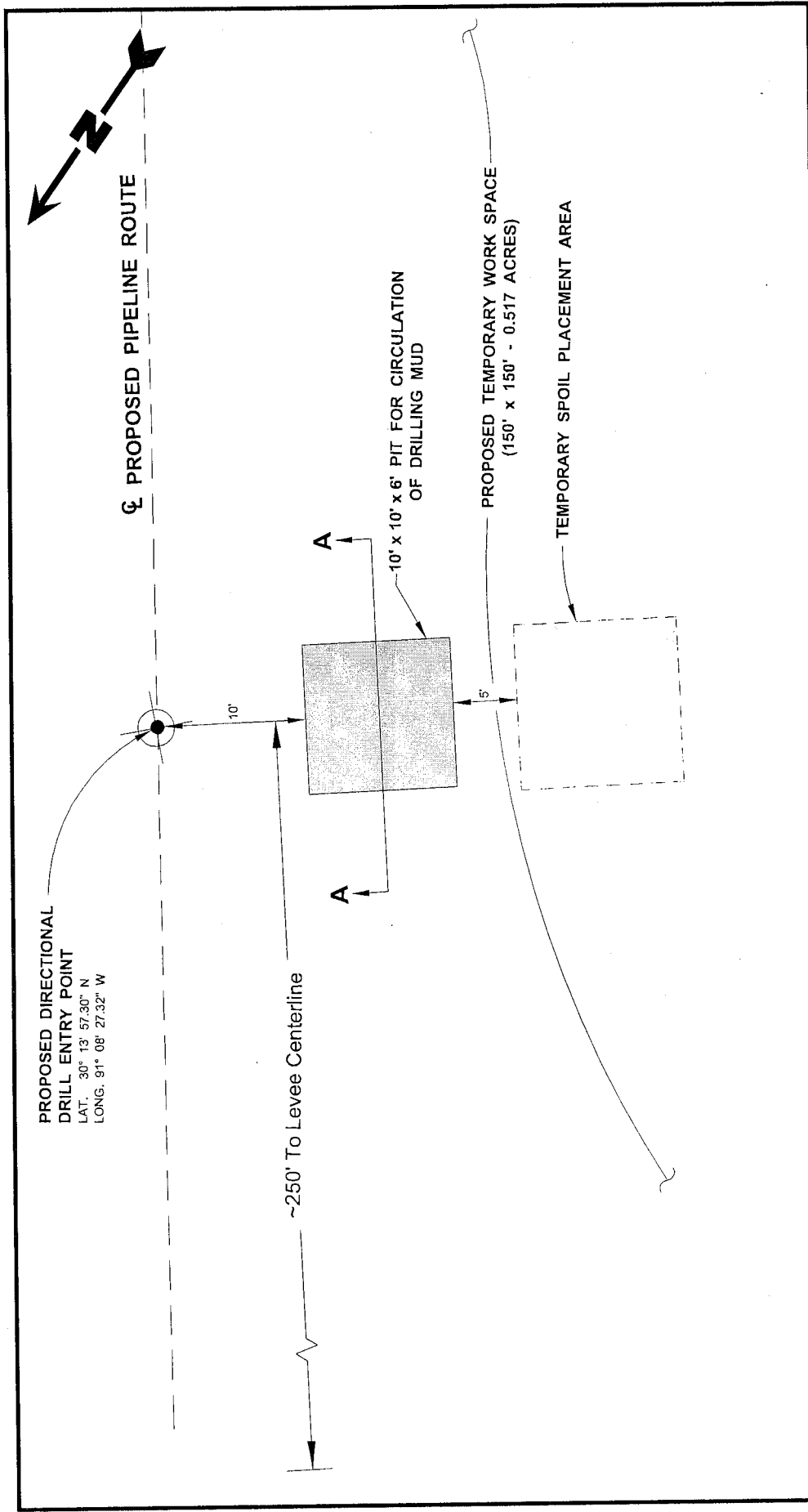


Note

See figure 9 for general notes and references.

Reference

Base map comprised of client provided figure titled: Profile, dwg no: A08-161-01, Sheet 3 of 9, dated: 07/22/14.

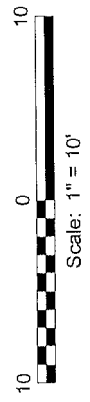


Mud Pit Detail (West Side)

Section 10/404 Permit Application
 Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC
 Mississippi River Crossing

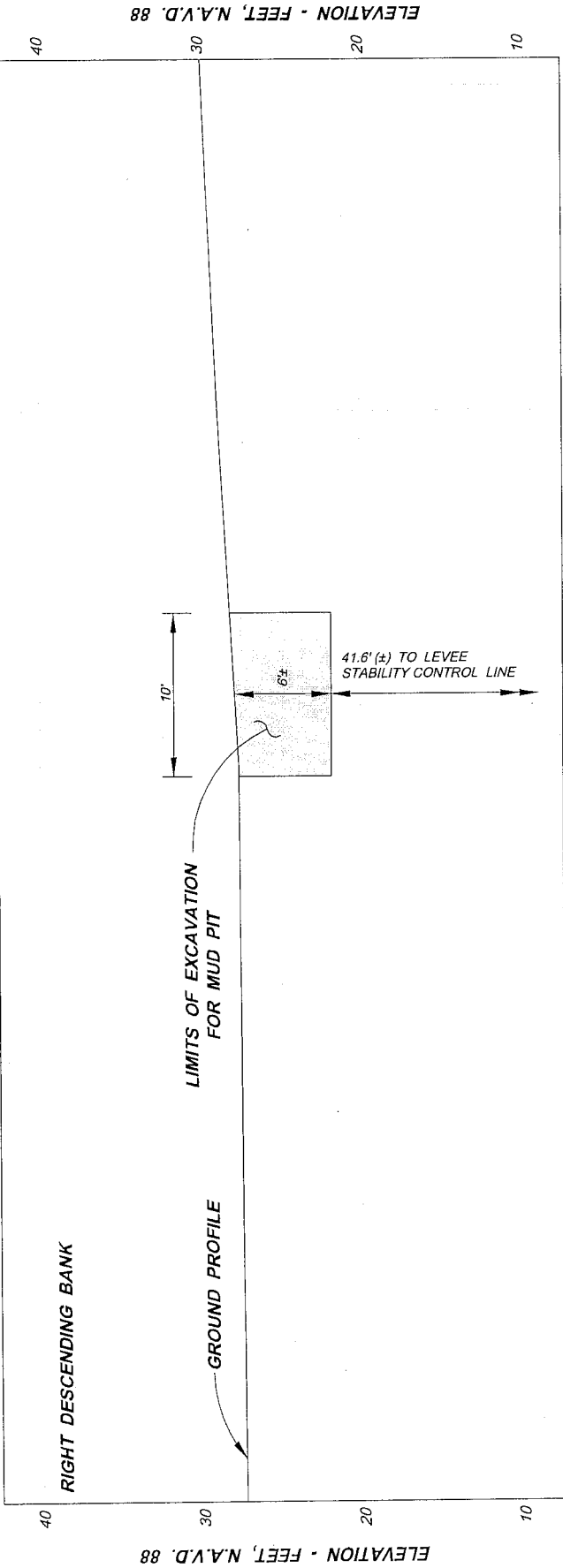
Drawn By	LMM	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14
Project Number	708-014	
Drawing Number	708-014-A007	
Figure	4	



Note
 See figure 9 for general notes and references.

Reference
 Base map comprised of client provided figure titled: Mud Pit Detail, dwg no: A08-161-01, Sheet 4 of 9, dated: 07/22/14.

DISTANCES IN FEET BY HORIZONTAL MEASUREMENT ALONG PROPOSED PIPELINE ROUTE FROM U.S.A.C.E. LEVEE BASELINE ON RIGHT DESCENDING BANK



SECTION A - A
SCALES
 1" = 10' HORIZONTAL
 1" = 10' VERTICAL

Note

See figure 9 for general notes and references.

Reference

Base map comprised of client provided figure titled: Section A-A', dwg no: A08-161-01, Sheet 5 of 9, dated: 07/22/14.

Section A-A'

Section 10/404 Permit Application
 Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC
 Mississippi River Crossing

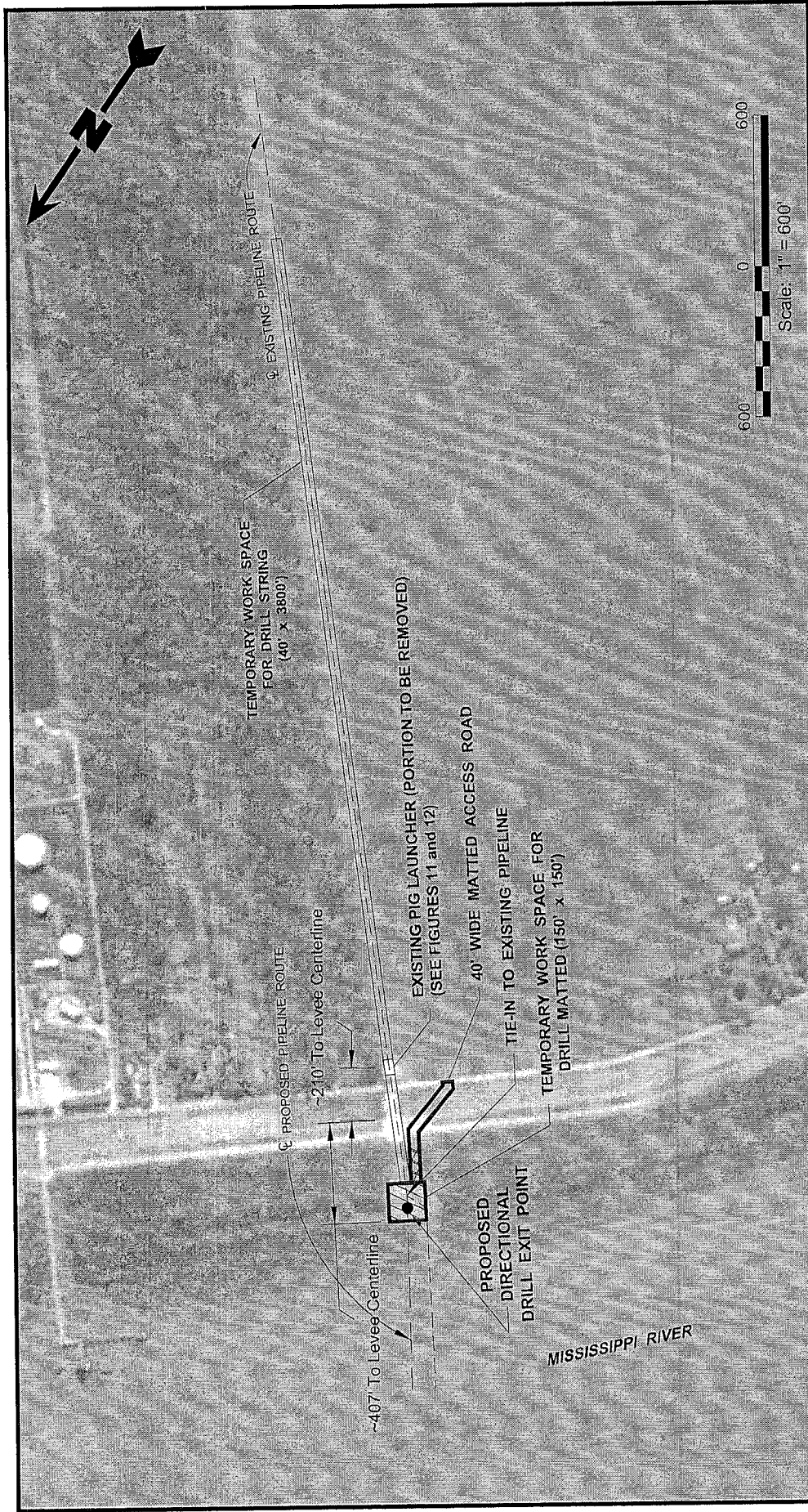
Drawn By	LMM	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14
Project Number 708-014		
Drawing Number 708-014-A008		



PROVIDENCE

5
 Figure

OCT 30 2014



Legend

- Project Area
- Jurisdictional Wetlands (0.66 Acre)
- Temporary Fill (0.14 Acre)

Notes

1. See figure 9 for general notes and references.
2. Will utilize historical workspace (MVN-2008-3157-CO). No clearing will be required.
3. Excavator and crawler tractor will be walked over the levee along the proposed matted access road and will remain within the 150' x 150' matted workspace shown on the plans.
4. Excavator specs: Ground Pressure - 4.8 psi; 33 kPa, Operational Weight: 28,170 lb.
5. Crawler Tractor Specs: Ground Pressure - 5.6 psi; 38.9 kPa, Operational Weight: 27,800 lb.
6. Crane Specs: Ground Pressure - 8 psi; 0.56 Kg/cm², Operational Weight: 62,820 lb.
7. No permanent fill be deposited in wetlands.
8. Temporary Fill = 336.06 yd³

Reference

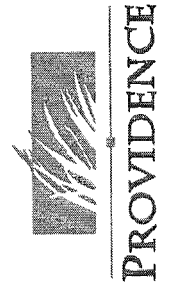
Base map comprised of client provided figure titled: Plan For Drill String, dwg no: A08-161-01, Sheet 6 of 9, dated: 07/22/14.

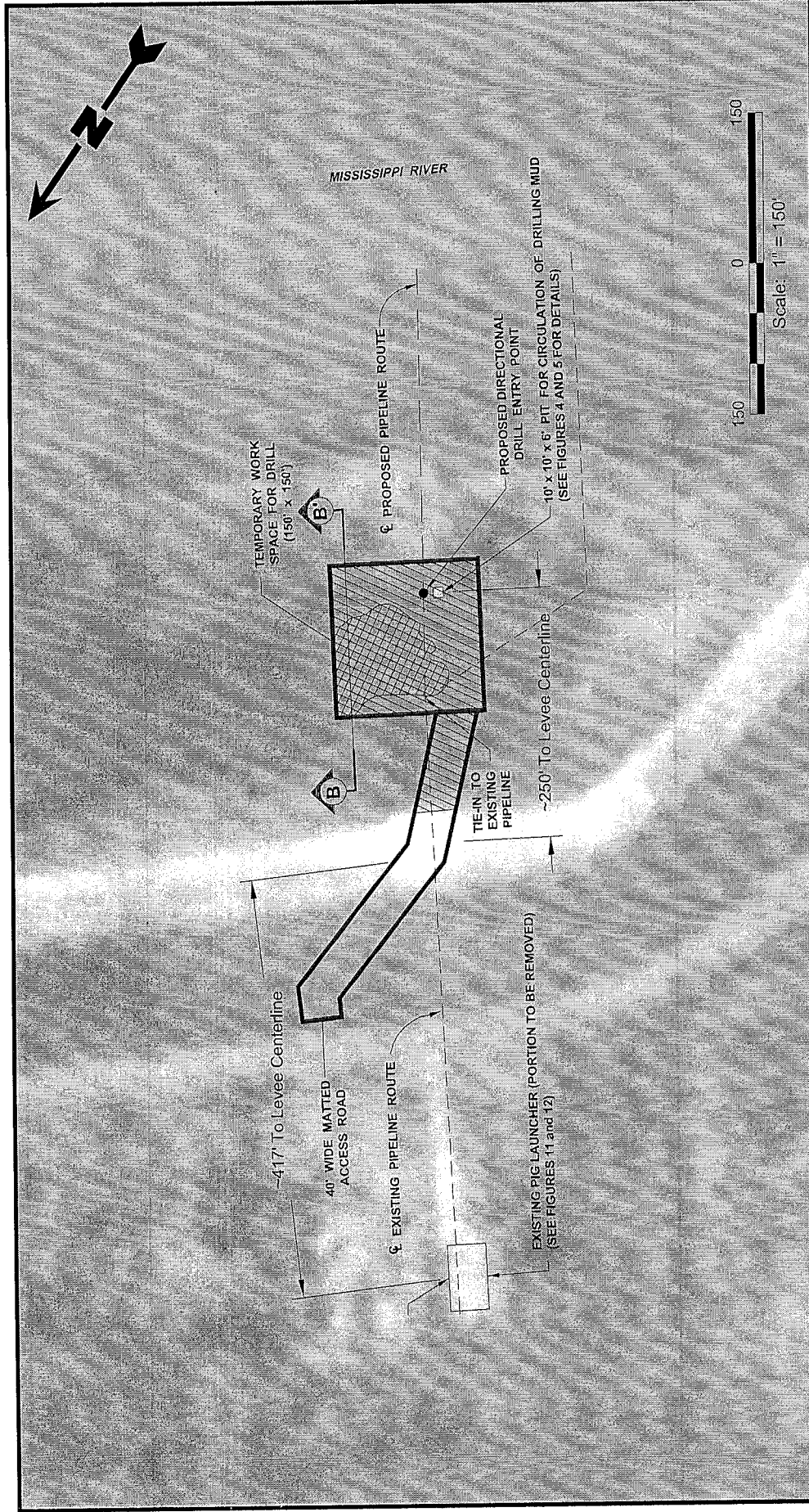
Plan For Drill String (East Side)

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC
Mississippi River Crossing

Drawn By	LMM	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14
Project Number	708-014	
Drawing Number	708-014-A009	
Figure	6	





Legend

- Project Area
- Jurisdictional Wetlands (0.61 Acre)
- Temporary Fill (0.20 Acre)

Notes

- See figure 9 for general notes and references.
- Will utilize historical workspace (MVN-2008-3157-CO). No clearing will be required.
- Excavator and crawler tractor will be walked over the levee along the proposed matted access road and will remain within the 150' x 150' matted workspace shown on the plans.
- Excavator specs: Ground Pressure - 4.8 psi; 33 kPa, Operational Weight: 28,170 lb.
- Crawler Tractor Specs: Ground Pressure - 5.6 psi; 38.9 kPa, Operational Weight: 27,800 lb.
- Crane Specs: Ground Pressure - 8 psi; 0.56 Kg/cm², Operational Weight: 62,820 lb.
- No permanent fill be deposited in wetlands.
- Temporary Fill (560 yd³) will be placed in water area only.

Reference

Base map comprised of client provided figure titled: Access Road, dwg no: A08-161-01, Sheet 7 of 9, dated: 07/22/14.

Access Road

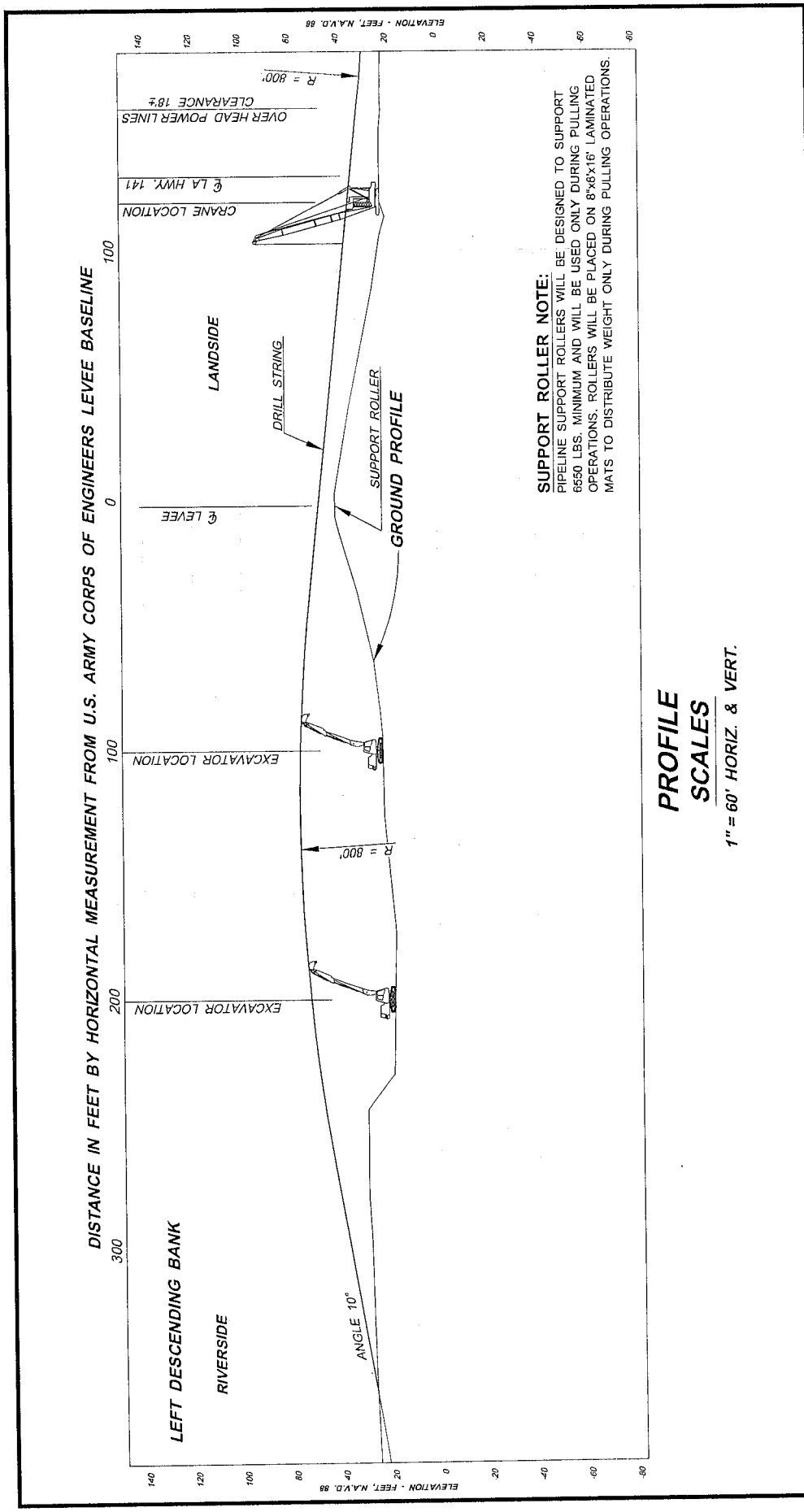
Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC

Mississippi River Crossing

Drawn By	LMM	10/21/14
Checked By	LMH	10/21/14
Approved By	RPC	10/21/14
Project Number	708-014	
Drawing Number	708-014-A010	
Figure	7	





Notes

1. See sheet 9 for general notes and references.
2. Excavator specs: Ground Pressure - 4.8 psi; 33 kPa, Operational Weight: 28,170 lb.
3. Crawler Tractor Specs: Ground Pressure - 5.6 psi; 38.9 kPa, Operational Weight: 27,800 lb.
4. Crane Specs: Ground Pressure - 8 psi; 0.56 Kg/cm², Operational Weight: 62,820 lb.

Reference

Base map comprised of client provided figure titled: Drill String Profile, dwg no: A08-161-01, Sheet 8 of 9, dated: 07/22/14.

Drill String Profile

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC
Mississippi River Crossing

Drawn By	LMM	10/21/14
Checked By	LMH	10/21/14
Approved By	RPC	10/21/14
Project Number 708-014		
Drawing Number 708-014-A011		
8		
Figure		



PROVIDENCE

PIPE SPECIFICATIONS

Contents to be handled	Brine
Number of lines	1
Pipe Material	Steel
Specification & Grade of Pipe	API 5L-X52
Outside Diameter (in.)	12.750"
Wall Thickness (in.)	0.250
Yield Strength (PSI)	52,000
Maximum allowable operating pressure (PSIG)	1440
Type of Joint (welded, mechanical joint, etc.)	Welded (ERW)
Coating Material	Fusion Bond Epoxy
Cathodic Protection	Impressed Current

** PIPE SPECIFICATION DATA PROVIDED BY
BOARDWALK LOUISIANA MIDSTREAM, LLC.

Notes

1. NORTH ARROW AND COORDINATES BASED ON THE LOUISIANA STATE PLANE COORDINATE SYSTEM SOUTH ZONE (NAD 83), BASED ON GLOBAL POSITIONING SYSTEM (GPS) TIES.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM (NAVD 88) BASED ON GLOBAL POSITIONING SYSTEM (GPS) TIES, SET T.B.M. - 1/2" IRON PIPE ON TOP OF LEVEE ON RIGHT BANK OF THE MISSISSIPPI RIVER (T.B.M. ELEVATION 42.20 FT.).
3. THE PROPOSED PIPELINE LOCATION AND DIMENSIONS SHOWN ARE APPROXIMATE, BASED ON DATA PROVIDED BY BOARDWALK LOUISIANA MIDSTREAM, LLC.
4. DISTANCES ARE IN FEET BY HORIZONTAL MEASUREMENT.
5. SECTION, TOWNSHIP AND RANGE INFORMATION TAKEN FROM REFERENCED UNITED STATES GEOLOGICAL SURVEY (U.S.G.S.) QUADRANGLE MAP.
6. THESE PLANS WERE PREPARED SOLELY FOR ACQUISITION OF REGULATORY PERMITS AND DO NOT REPRESENT ENGINEERING OR CONSTRUCTION DRAWINGS.

Reference

HYDRO FIELD BOOK NOS. 1324 & 1306.

HYDRO SOUNDING CHARTS DATED OCTOBER 25, 2007.

U.S.G.S. QUADRANGLE "WHITE CASTLE, LA" (REVISED 1992) SCALE: 1:24,000.

PETROLOGISTICS DRAWINGS ENTITLED, "PROPOSED 2-12" PIPELINES PERMIT APPLICATION, MISSISSIPPI RIVER CROSSING - 197.9 A.H.P. HYDRO DRAWING NO. A08-160-46, SHEETS 1-6 OF 6, REVISED MARCH 18, 2009.

PETROLOGISTICS DRAWING ENTITLED, "PROPOSED 2-12" PIPELINES PERMIT APPLICATION, LEFT DESCENDING BANK - 197.9 A.H.P., MISSISSIPPI RIVER LEVEE CROSSING, PLAN FOR DRILL STRING" HYDRO DRAWING NO. A08-160-107 SHEET 4 OF 8, DATED JULY 16, 2008.

PETROLOGISTICS DRAWING ENTITLED, "PROPOSED 2-12" PIPELINES PERMIT APPLICATION, RIGHT DESCENDING BANK - 197.9 A.H.P., MISSISSIPPI RIVER LEVEE CROSSING, ACCESS ROAD" HYDRO DRAWING NO. A08-160-106, SHEET 6 OF 7, DATED JULY 16, 2009.

PETROLOGISTICS DRAWING ENTITLED, "PROPOSED 2-12" PIPELINES PERMIT APPLICATION, LEFT DESCENDING BANK - 197.9 A.H.P., MISSISSIPPI RIVER LEVEE CROSSING, DRILL STRING PROFILE" HYDRO DRAWING NO. A08-160-107 SHEET 5 OF 8, DATED JULY 16, 2009.

Reference

Base map comprised of client provided figure titled: Pipe Specification, dwg no: A08-161-01, Sheet 9 of 9, dated: 07/22/14.

Pipe Specification

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC
Mississippi River Crossing



PROVIDENCE

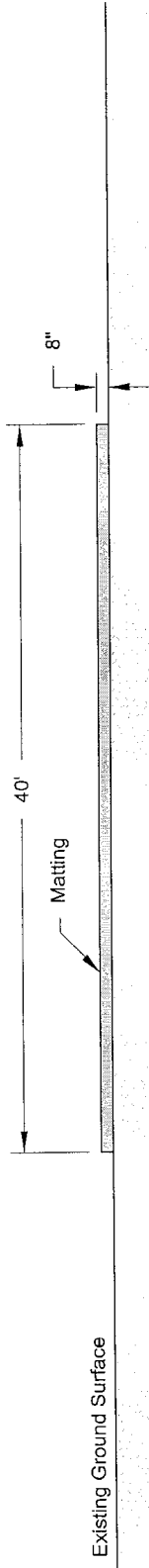
Drawn By	LMM	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14

Project Number
708-014

Drawing Number
708-014-A012

9

Figure

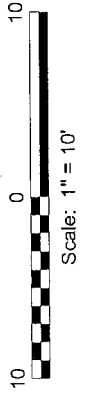


Typical Access Road Matting Cross-Section

Scale: 1" = 10'

Note

See figures 6 and 7 for location of matting.



Typical Access Road Matting Cross-Section

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC

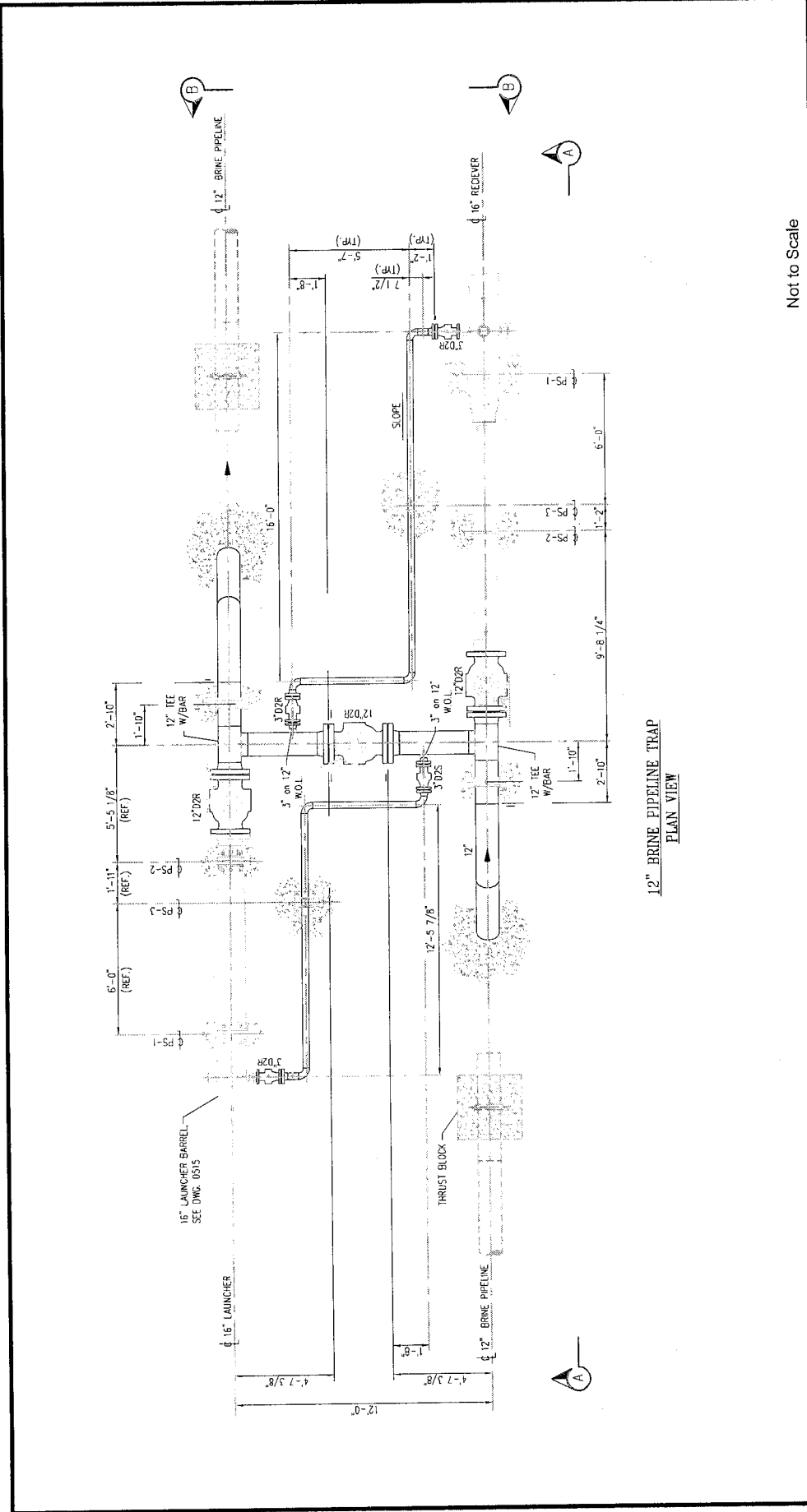
Mississippi River Crossing

Drawn By	LMM	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14
Project Number	708-014	
Drawing Number	708-014-A013	



PROVIDENCE

10
Figure



Not to Scale

12" BRINE PIPELINE TRAP
PLAN VIEW

Site Plan (Receiver/Launcher)

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC

Mississippi River Crossing

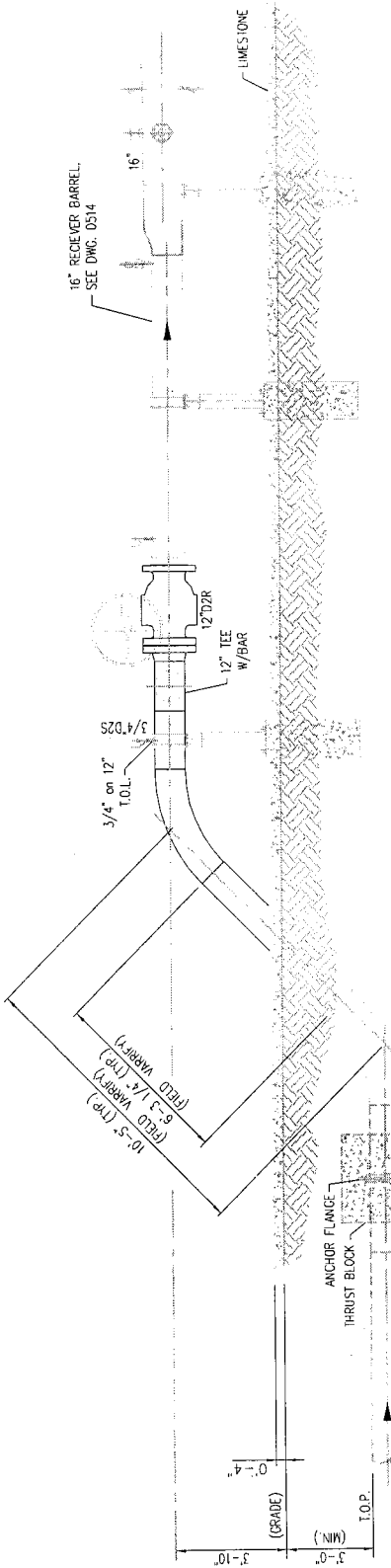
Drawn By	LMH	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14
Project Number	708-014	
Drawing Number	708-014-A014	
Figure	11	



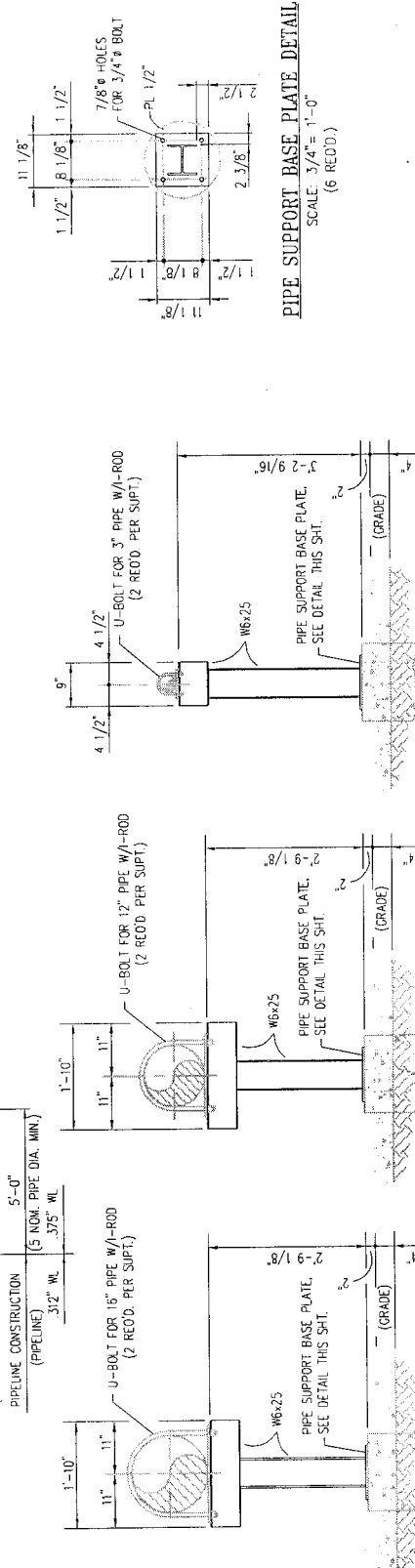
PROVIDENCE

Reference

Base map comprised of client provided figure titled: Olin Brine Project 12" Brine Pipeline Receiver/Launcher Piping Details, dwg no: C07042-P-0512, dated: 03/12/08.



ELEVATION "A"
SCALE: 3/8" = 1'-0"



PIPE SUPPORT BASE PLATE DETAIL
SCALE: 3/4" = 1'-0"
(6 RECD.)

Elevation and Details (Receiver/Launcher)

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC

Mississippi River Crossing

Drawn By	LMM	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14
Project Number	708-014	
Drawing Number	708-014-A015	

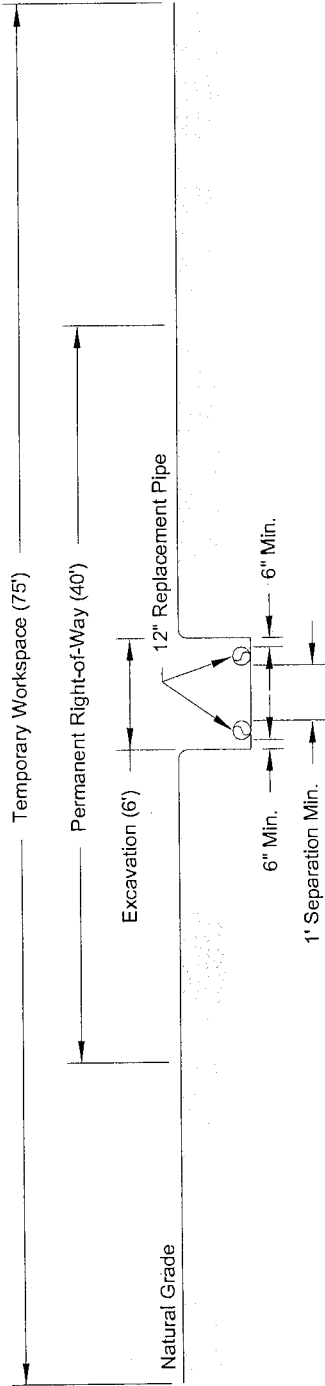


PROVIDENCE

12
Figure

Reference

Base map comprised of client provided figure titled:
Olin Brine Project 12" Brine Pipeline
Receiver/Launcher Piping Details, dwg no:
C07042-P-0512, dated: 03/12/08.

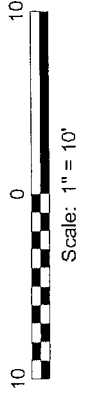


Typical Ditch Cross Section

Scale: 1" = 10'

Reference

Base map comprised of client provided figure titled: Typical Ditch Specifications Mult-Pipe, Sheet 1 of 1.



Typical Ditch Cross Section

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC

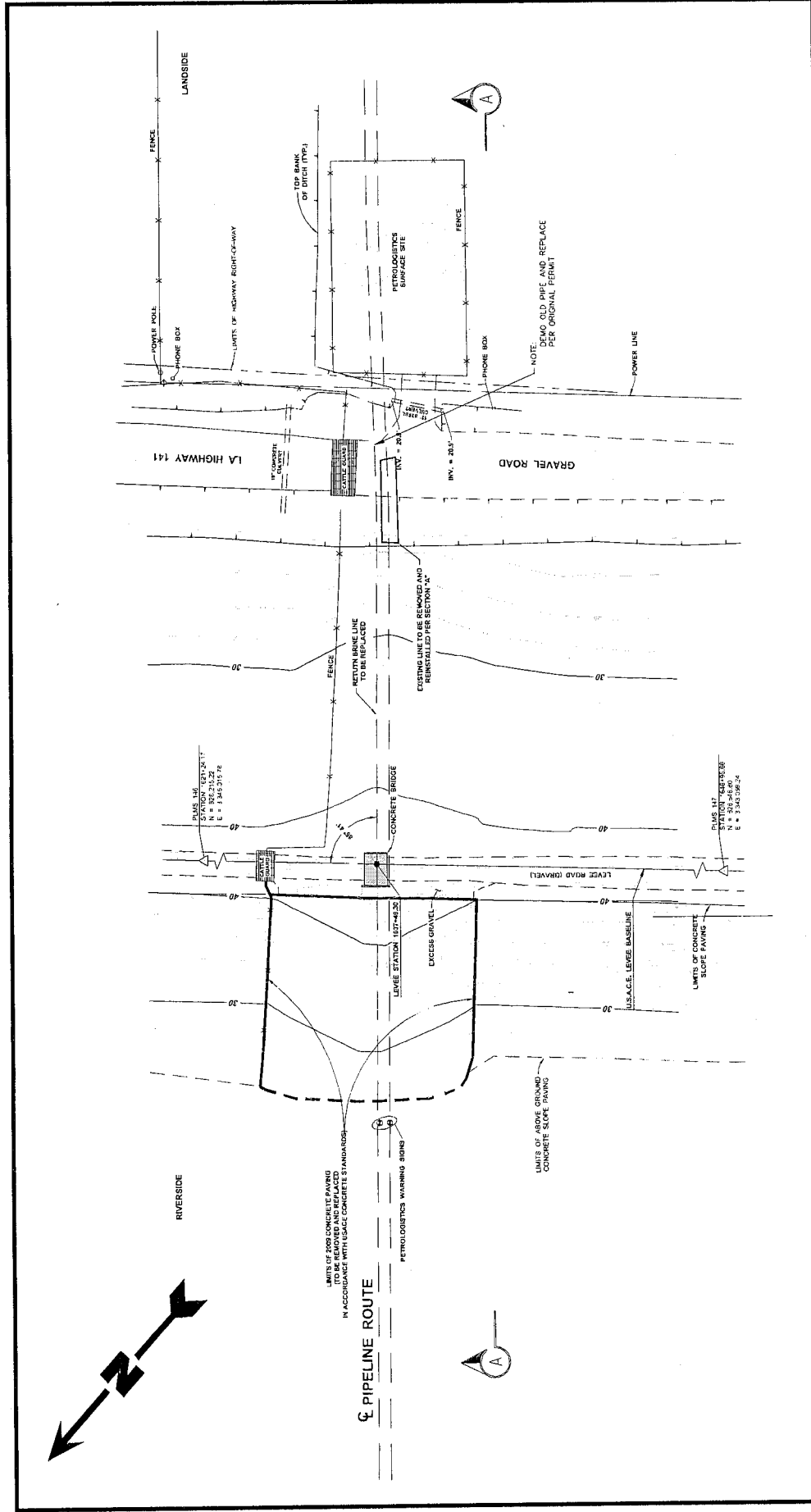
Mississippi River Crossing

Drawn By	LMM	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14
Project Number	708-014	
Drawing Number	708-014-A016	



PROVIDENCE

13
Figure




Site Plan (East Side)

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC
Mississippi River Crossing


Drawn By	LMM	10/27/14
Checked By	LMH	10/27/14
Approved By	RPC	10/27/14
Project Number	708-014	
Drawing Number	708-014-A017	



PROVIDENCE

14

Figure



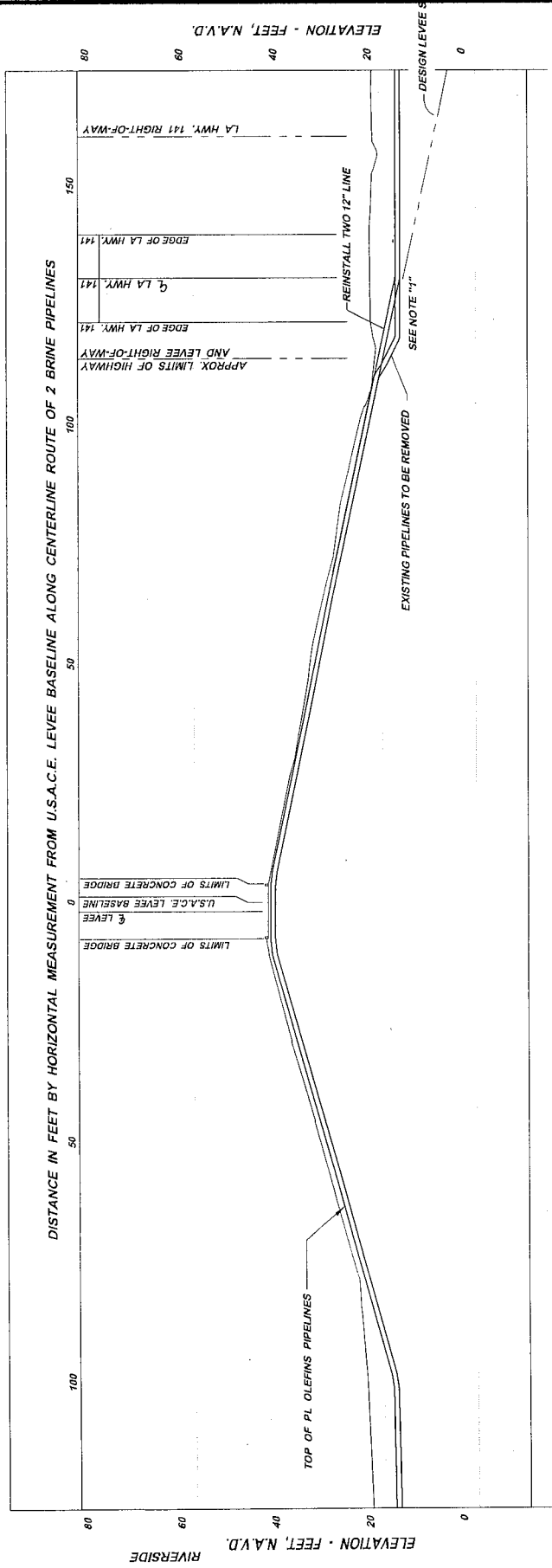
Scale: 1" = 50'

Reference

Base map provided by Boardwalk Louisiana Midstream, LLC,
 Titled: Return Brine Line Repair, Mississippi River Crossing
 Plan, Drawing No: SK-1002, Dated: 09/25/14.

OCT 30 2014

OCT 30 2014



PROFILE
SCALES
 1" = 20' HORIZ. & VERT.

Note

EXISTING FILL TO BE REMOVED AND REPLACED W/ COHESIVE MATERIAL PER USACE STANDARDS FOR LEVEE EMBANKMENT. COHESIVE FILL TO BE PLACED & COMPACTED PER USACE LEVEE SPECIFICATIONS.

Reference

Base map provided by Boardwalk Louisiana Midstream, LLC, Titled: Return Brine Line Repair, Mississippi River Crossing Section "A", Drawing No: SK-1001, Dated: 09/25/14.

Profile
(East Side)

Section 10/404 Permit Application
 Iberville Parish, Louisiana

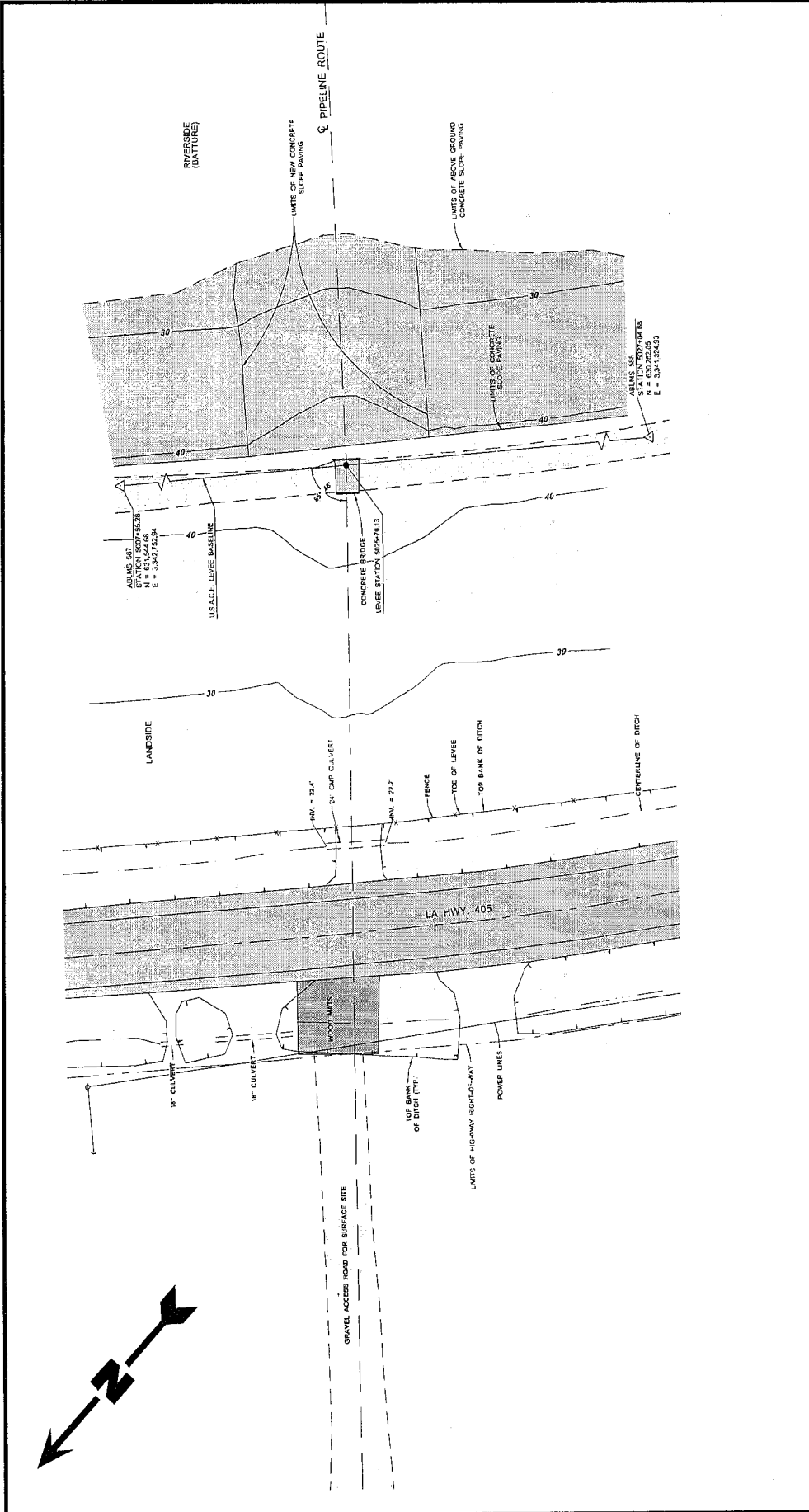
Boardwalk Louisiana Midstream, LLC

Mississippi River Crossing

Drawn By	LMM	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14
Project Number		
708-014		
Drawing Number		
708-014-A018		
15		
Figure		



PROVIDENCE



Site Plan (West Side)

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC

Mississippi River Crossing

Drawn By	LMM	10/29/14	
Checked By	LMH	10/29/14	
Approved By	RPC	10/29/14	
Project Number		708-014	
Drawing Number		708-014-A019	

16

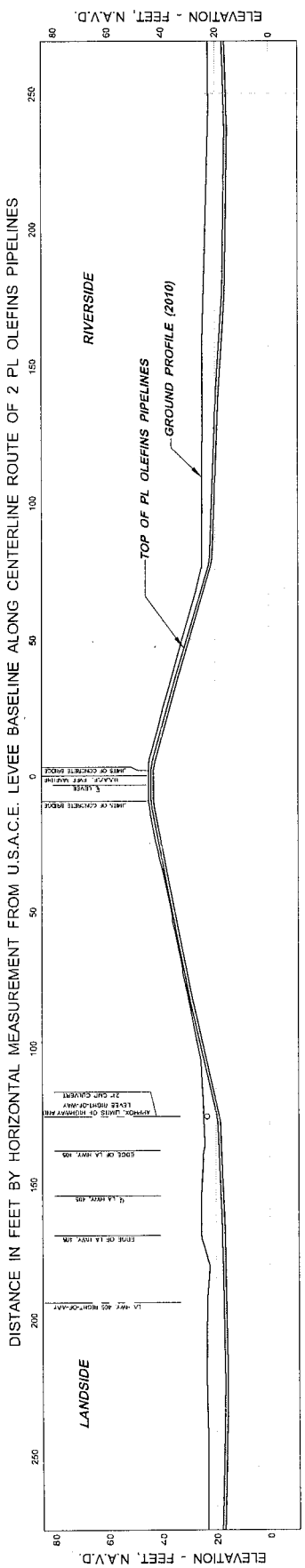
Figure

PROVIDENCE

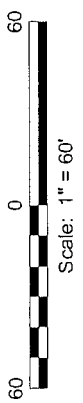
Scale: 1" = 50'

Reference

Base map provided by Boardwalk Louisiana Midstream, LLC,
Titled: Plan and Profile of Mississippi River Levee Crossing
Right Descending Bank - 197.9 A.H.P., Drawing No:
C08-160-110, Dated: April 6, 2010.



PROFILE SCALES
1" = 20' HORIZ. & VERT.



Reference
Base map provided by Boardwalk Louisiana Midstream, LLC.
Titled: Plan and Profile of Mississippi River Levee Crossing
Right Descending Bank - 197.9 A.H.P., Drawing No:
C08-160-110, Dated: April 6, 2010.

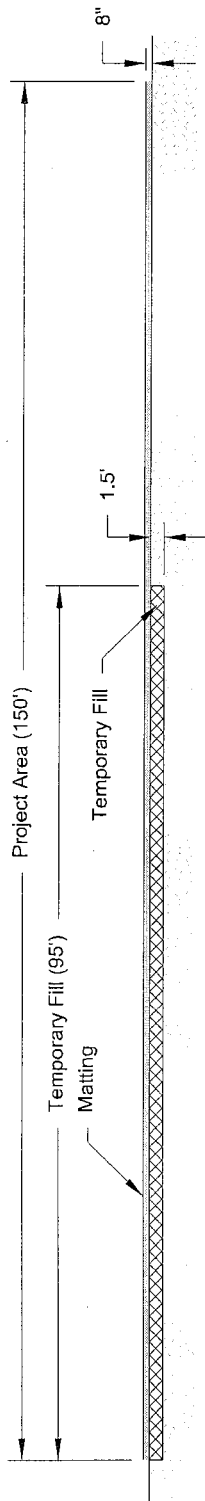
Profile (West Side)

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC
Mississippi River Crossing

Drawn By	LMM	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14
Project Number 708-014		
Drawing Number 708-014-A020		
17 Figure		





Section B-B'
Scale: 1" = 20'

Note

See figures 6 and 7 for location of matting.

Section B-B'

Section 10/404 Permit Application
Iberville Parish, Louisiana

Boardwalk Louisiana Midstream, LLC
Mississippi River Crossing

Drawn By	LMM	10/29/14
Checked By	LMH	10/29/14
Approved By	RPC	10/29/14

Project Number	708-014
Drawing Number	708-014-A021



PROVIDENCE

18

Figure