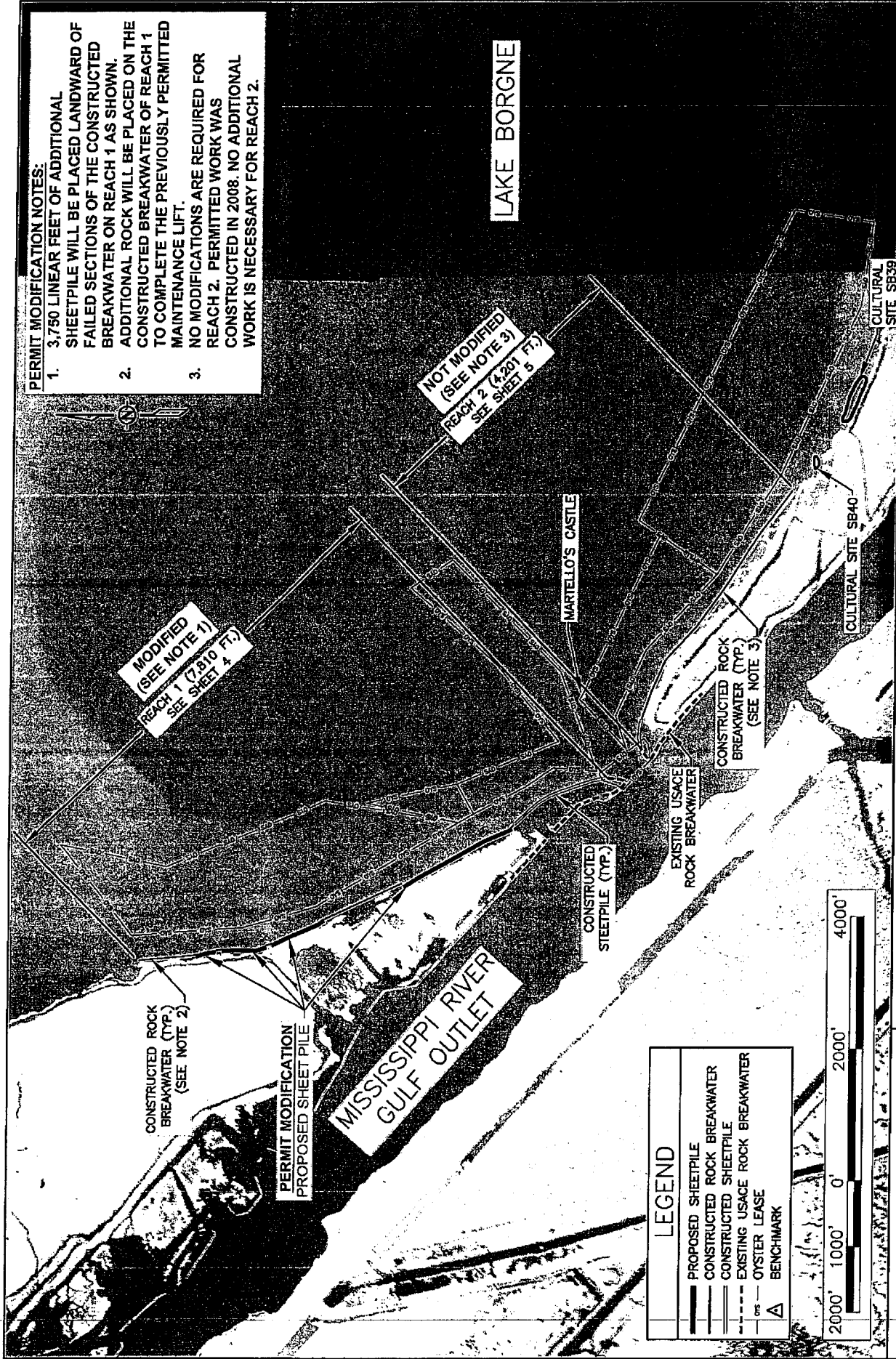


APPLICATION BY: U.S. ENVIRONMENTAL PROTECTION AGENCY 1445 ROSS AVE. DALLAS, TX 75202-2733	OFFICE OF COASTAL PROTECTION & RESTORATION RESTORATION ENGINEERING DIVISION 450 LAUREL STREET BATON ROUGE, LOUISIANA 70801	LAKE BORGNE SHORELINE PROTECTION	VICINITY MAP
DRAWN BY: KRISTI CANTU	DESIGNED BY: A. GONZALES-ROOLES	STATE PROJECT NUMBER: PO-30 FEDERAL PROJECT NUMBER: PO-30	DATE: NOVEMBER 2005 (REV. 11/2011) SHEET 1 OF 35



- PERMIT MODIFICATION NOTES:**
1. 3,750 LINEAR FEET OF ADDITIONAL SHEETPILE WILL BE PLACED LANDWARD OF FAILED SECTIONS OF THE CONSTRUCTED BREAKWATER ON REACH 1 AS SHOWN.
  2. ADDITIONAL ROCK WILL BE PLACED ON THE CONSTRUCTED BREAKWATER OF REACH 1 TO COMPLETE THE PREVIOUSLY PERMITTED MAINTENANCE LIFT.
  3. NO MODIFICATIONS ARE REQUIRED FOR REACH 2. PERMITTED WORK WAS CONSTRUCTED IN 2008. NO ADDITIONAL WORK IS NECESSARY FOR REACH 2.

LAKE BORGNE

APPLICATION BY: U.S. ENVIRONMENTAL PROTECTION AGENCY 1445 ROSS AVE DALLAS, TX 75202-2733	OFFICE OF COASTAL PROTECTION & RESTORATION RESTORATION ENGINEERING DIVISION 460 LAUREL STREET BATON ROUGE, LOUISIANA 70801	LAKE BORGNE SHORELINE PROTECTION  STATE PROJECT NUMBER: PO-30 FEDERAL PROJECT NUMBER: PO-30	PROJECT LAYOUT BAYOU DUPRE  DATE: NOVEMBER 2005 (REV. 11/2011) SHEET 2 OF 35
DRAWN BY: KRISTI CANU	DESIGNED BY: A. GONZALES-RODILES		
	APPROVED BY: SHANNON HAYNES, P.E.		

**PERMIT MODIFICATION NOTES:**

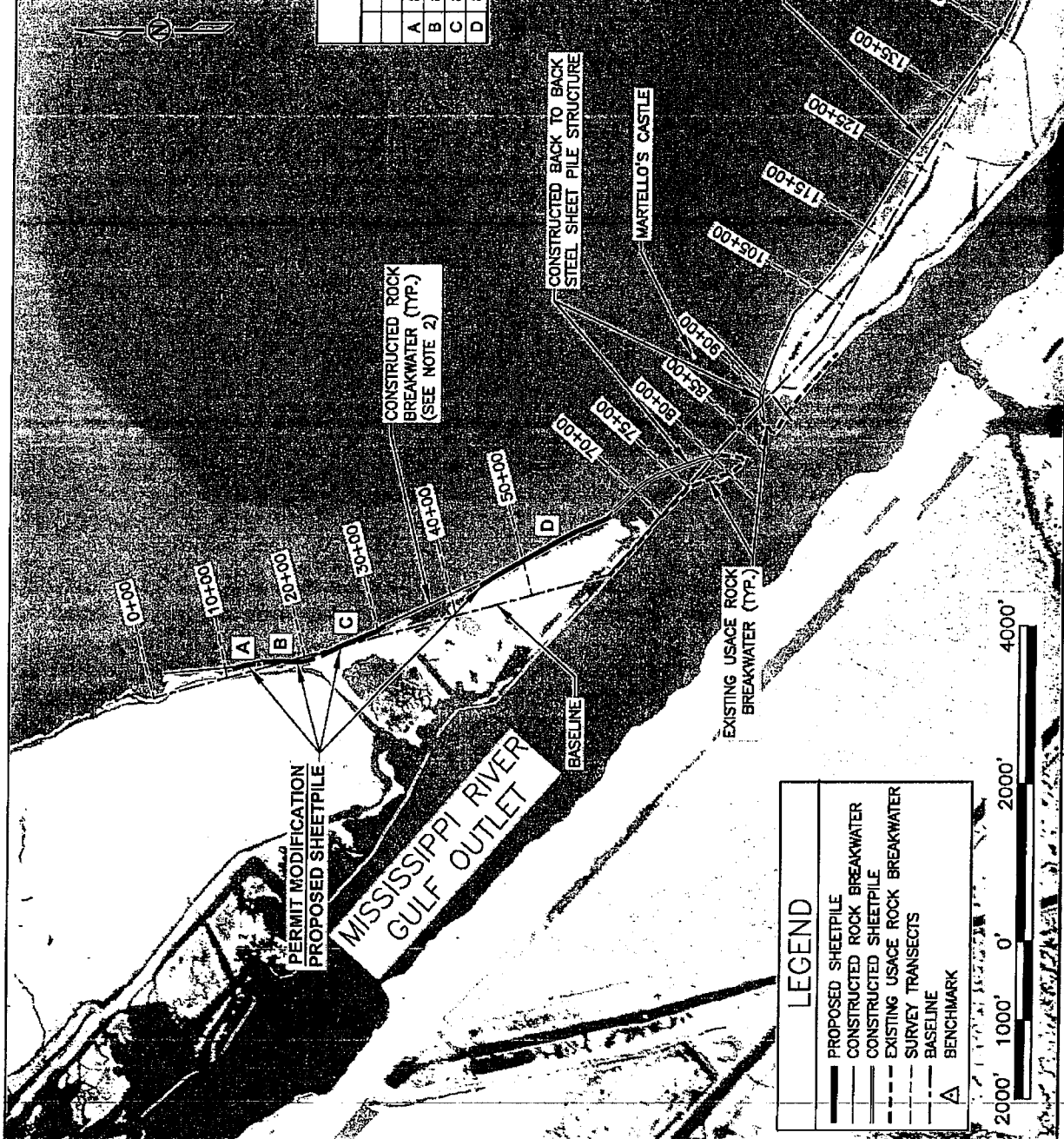
- 3,750 LINEAR FEET OF ADDITIONAL SHEETPILE WILL BE PLACED LANDWARD OF FAILED SECTIONS OF THE CONSTRUCTED BREAKWATER ON REACH 1 AS SHOWN.
- ADDITIONAL ROCK WILL BE PLACED ON THE CONSTRUCTED BREAKWATER OF REACH 1 TO COMPLETE THE PREVIOUSLY PERMITTED MAINTENANCE LIFT.
- NO MODIFICATIONS ARE REQUIRED FOR REACH 2. PERMITTED WORK WAS CONSTRUCTED IN 2008. NO ADDITIONAL WORK IS NECESSARY FOR REACH 2.

**PERMIT MODIFICATION**

**SHEETPILE REACH COORDINATES**

	NORTHWEST		SOUTHEAST	
	LONGITUDE	LATITUDE	LONGITUDE	LATITUDE
A	89° 50' 51.38"	29° 57' 40.80"	89° 50' 50.74"	29° 57' 37.89"
B	89° 50' 50.55"	29° 57' 36.93"	89° 50' 50.02"	29° 57' 30.32"
C	89° 50' 49.71"	29° 57' 29.56"	89° 50' 45.59"	29° 57' 21.31"
D	89° 50' 39.95"	29° 57' 9.34"	89° 50' 30.17"	29° 56' 53.00"

LAKE BORGNE



LEGEND	
	PROPOSED SHEETPILE
	CONSTRUCTED ROCK BREAKWATER
	CONSTRUCTED SHEETPILE
	EXISTING USAGE ROCK BREAKWATER
	SURVEY TRANSECTS
	BASELINE
	BENCHMARK

APPLICATION BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY  
1443 ROSS AVE.  
DALLAS, TX 75202-2733

OFFICE OF COASTAL PROTECTION & RESTORATION  
RESTORATION ENGINEERING DIVISION  
460 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

LAKE BORGNE SHORELINE PROTECTION

SURVEY LAYOUT  
BAYOU DUPRE

DRAWN BY: KRISTI CANTU

DESIGNED BY: A. GONZALES-RODILES

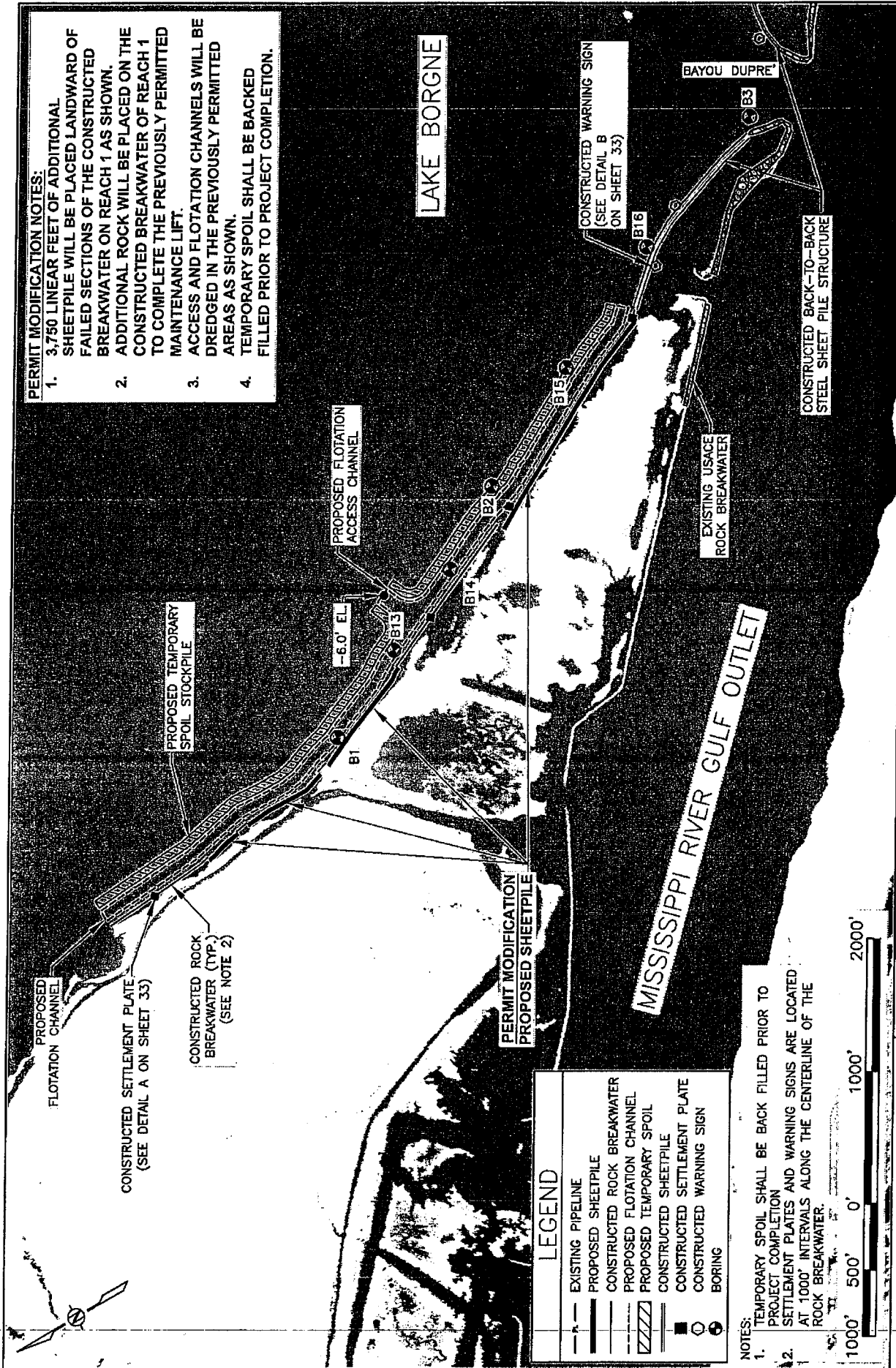
APPROVED BY: SHANNON HAYNES, P.E.

STATE PROJECT NUMBER: PO-30

FEDERAL PROJECT NUMBER: PO-30

DATE: NOVEMBER 2005 (REV. 4/2011)

SHEET 3 OF 35



APPLICATION BY: U.S. ENVIRONMENTAL PROTECTION AGENCY 1445 ROSS AVE. DALLAS, TX 75202-2733	OFFICE OF COASTAL PROTECTION & RESTORATION RESTORATION ENGINEERING DIVISION 450 LAUREL STREET BATON ROUGE, LOUISIANA 70801	LAKE BORGNE SHORELINE PROTECTION	BREAKWATER ALIGNMENT BAYOU DUPRE' - REACH 1
DRAWN BY: KRISTI CANTU	DESIGNED BY: A. GONZALES-RODILES	APPROVED BY: SHANNON HAYNES, P.E.	DATE: NOVEMBER 2005 (REV. 11/2011)
STATE PROJECT NUMBER: PO-30	FEDERAL PROJECT NUMBER: PO-30	SHEET 4 OF 35	

NO PERMIT MODIFICATIONS REQUIRED FOR REACH 2  
 PERMITTED WORK COMPLETED IN 2008.  
 NO ADDITIONAL WORK TO BE DONE.

LAKE BORGNE

EXISTING WARNING SIGN  
 (SEE DETAIL B ON SHEET 33)

MARTELLO'S CASTLE

TEMPORARY  
 SPOIL STOCKPILE

FLOTATION  
 ACCESS CHANNEL

FLOTATION CHANNEL

BAYOU DUPRE

EXISTING USACE  
 ROCK BREAKWATER

CONSTRUCTED  
 SETTLEMENT PLATE  
 (SEE DETAIL A ON  
 SHEET 33)

CONSTRUCTED BACK-TO-BACK  
 STEEL SHEET PILE STRUCTURE

CONSTRUCTED ROCK  
 BREAKWATER (TYP.)

CULTURAL  
 SITE SB40

CULTURAL  
 SITE SB39

MISSISSIPPI RIVER GULF OUTLET

LEGEND

- EXISTING PIPELINE
- BORING
- CONSTRUCTED ROCK BREAKWATER
- - - PROPOSED FLOTATION CHANNEL
- //// PROPOSED TEMPORARY SPOIL
- CONSTRUCTED SHEETPILE
- CONSTRUCTED SETTLEMENT PLATE
- CONSTRUCTED WARNING SIGN

- NOTES:
1. TEMPORARY SPOIL SHALL BE BACK FILLED PRIOR TO PROJECT COMPLETION
  2. SETTLEMENT PLATES AND WARNING SIGNS ARE LOCATED AT 1000' INTERVALS ALONG THE CENTERLINE OF THE ROCK BREAKWATER.

1000' 500' 0' 1000' 2000'

APPLICATION BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY  
 1445 P.O. BOX 217  
 DALLAS, TX 75202-2173

OFFICE OF COASTAL PROTECTION & RESTORATION  
 RESTORATION ENGINEERING DIVISION  
 450 LAUREL STREET  
 BATON ROUGE, LOUISIANA 70801

LAKE BORGNE SHORELINE PROTECTION

BREAKWATER ALIGNMENT  
 BAYOU DUPRE - REACH 2

DRAWN BY: KRISTI CANTU

DESIGNED BY: A. GONZALES-RODILES

APPROVED BY: SHANNON HAYNES, P.E.

STATE PROJECT NUMBER: PO-30

FEDERAL PROJECT NUMBER: PO-30

DATE: NOVEMBER 2005 (REV. 11/2011)

SHEET 5 OF 35





**PERMIT MODIFICATION NOTES:**

1. 760 LINEAR FEET OF ADDITIONAL SHEETPILE WILL BE PLACED LANDWARD OF FAILED SECTIONS OF THE CONSTRUCTED BREAKWATER ON REACH 3 AS SHOWN.
2. ADDITIONAL ROCK WILL BE PLACED ON THE CONSTRUCTED BREAKWATER OF THE EASTERN PORTION OF REACH 3 TO COMPLETE THE PREVIOUSLY PERMITTED MAINTENANCE LIFT.
3. NO MODIFICATIONS ARE REQUIRED FOR REACH 4. PERMITTED WORK WAS CONSTRUCTED IN 2005. NO ADDITIONAL WORK IS NECESSARY FOR REACH 4.

NOT MODIFIED  
REACH 4 (8,330 FT.)  
SEE SHEET 16

OYSTER LEASE  
CONSTRUCTED ROCK BREAKWATER  
(SEE NOTE 3)

PERMIT MODIFICATION  
PROPOSED SHEETPILE  
CONSTRUCTED ROCK BREAKWATER  
(SEE NOTE 2)

LEGEND	
—	PROPOSED SHEETPILE
—	CONSTRUCTED ROCK BREAKWATER
—	EXISTING USACE ROCK BREAKWATER
—	OYSTER LEASE
△	BENCHMARK



APPLICATION BY: U.S. ENVIRONMENTAL PROTECTION AGENCY 1445 ROSS AVE. DALLAS, TX 75202-2733	OFFICE OF COASTAL PROTECTION & RESTORATION RESTORATION ENGINEERING DIVISION 450 LAUREL STREET BATON ROUGE, LOUISIANA 70801		LAKE BORGNE SHORELINE PROTECTION		PROJECT LAYOUT SHELL BEACH	
	DESIGNED BY: A. GONZALES-RODILES APPROVED BY: SHANNON HAYNES, P.E.	STATE PROJECT NUMBER: PO-30 FEDERAL PROJECT NUMBER: PO-30	DATE: NOVEMBER 2005 (REV. 11/2011) SHEET 13 OF 35			

DRAWN BY: KRISTI CANTU



<p>APPLICATION BY: U.S. ENVIRONMENTAL PROTECTION AGENCY 1445 ROSS AVE. DALLAS, TX 75202-2733</p>	<p>OFFICE OF COASTAL PROTECTION &amp; RESTORATION RESTORATION ENGINEERING DIVISION 450 LAUREL STREET BATON ROUGE, LOUISIANA 70801</p>	<p>LAKE BORGNE SHORELINE PROTECTION</p>	<p>SURVEY LAYOUT SHELL BEACH</p>
<p>DRAWN BY: KRISTI CANTU</p>	<p>DESIGNED BY: A. GONZALES-ROULES</p>	<p>APPROVED BY: SHANNON HAYNES, P.E.</p>	<p>DATE: NOVEMBER 2005 (REV. 11/2011) SHEET 14 OF 35</p>

PERMIT MODIFICATION NOTES:

1. 760 LINEAR FEET OF ADDITIONAL SHEETPILE WILL BE PLACED LANDWARD OF FAILED SECTIONS OF THE CONSTRUCTED BREAKWATER ON REACH 3 AS SHOWN.
2. ADDITIONAL ROCK WILL BE PLACED ON THE CONSTRUCTED BREAKWATER OF THE EASTERN PORTION OF REACH 3 TO COMPLETE THE PREVIOUSLY PERMITTED MAINTENANCE LIFT. NO MODIFICATIONS ARE REQUIRED FOR REACH 4.
3. NO MODIFICATIONS ARE REQUIRED FOR REACH 4. ADDITIONAL WORK IS NECESSARY FOR REACH 4.

CONSTRUCTED ROCK BREAKWATER (TYP.)  
(SEE NOTE 2)

CONSTRUCTED ROCK BREAKWATER (TYP.)  
(SEE NOTE 3)

**PERMIT MODIFICATION NOTES:**

1. 760 LINEAR FEET OF ADDITIONAL SHEETPILE WILL BE PLACED LANDWARD OF FAILED SECTIONS OF THE CONSTRUCTED BREAKWATER ON REACH 3 AS SHOWN.
2. ADDITIONAL ROCK WILL BE PLACED ON THE CONSTRUCTED BREAKWATER OF THE EASTERN PORTION OF REACH 3 TO COMPLETE THE PREVIOUSLY PERMITTED MAINTENANCE LIFT.
3. NO MODIFICATIONS ARE REQUIRED FOR REACH 4.
4. PERMITTED WORK WAS CONSTRUCTED IN 2005. NO ADDITIONAL WORK IS NECESSARY FOR REACH 4.

LAKE BORGNE

FLOTATION ACCESS CHANNEL

TEMPORARY SPOIL

CONSTRUCTED ROCK BREAKWATER

SEE DETAIL A (SHEET 33)

PROPOSED FLOTATION ACCESS CHANNEL

PROPOSED FLOTATION ACCESS CHANNEL

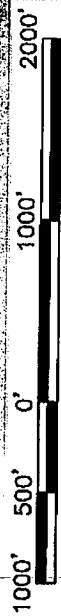
CONSTRUCTED ROCK BREAKWATER (SEE NOTE 2)

PERMIT MODIFICATION PROPOSED SHEETPILE

**LEGEND**

- PROPOSED SHEETPILE
- CONSTRUCTED ROCK BREAKWATER
- PROPOSED FLOTATION CHANNEL
- EXISTING PIPELINE
- PROPOSED TEMPORARY SPOIL
- EXISTING BORING
- CONSTRUCTED SETTLEMENT PLATE
- CONSTRUCTED WARNING SIGN

- NOTES:**
1. TEMPORARY SPOIL SHALL BE BACK FILLED PRIOR TO PROJECT COMPLETION
  2. SETTLEMENT PLATES AND WARNING SIGNS ARE LOCATED AT 1000' INTERVALS ALONG THE CENTERLINE OF THE ROCK BREAKWATER.



APPLICATION BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY  
1400 P.O. BOX 450  
DALLAS, TX 75202-2733

OFFICE OF COASTAL PROTECTION & RESTORATION  
RESTORATION ENGINEERING DIVISION  
450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

LAKE BORGNE SHORELINE PROTECTION

BREAKWATER ALIGNMENT  
SHELL BEACH - REACH 3

DRAWN BY: KRISTI CANTU

DESIGNED BY: A. GONZALES-ROULES APPROVED BY: SHANNON HAYNES, P.E.

STATE PROJECT NUMBER: PO-30

FEDERAL PROJECT NUMBER: PO-30

DATE: NOVEMBER 2005 (REV. 11/2011)

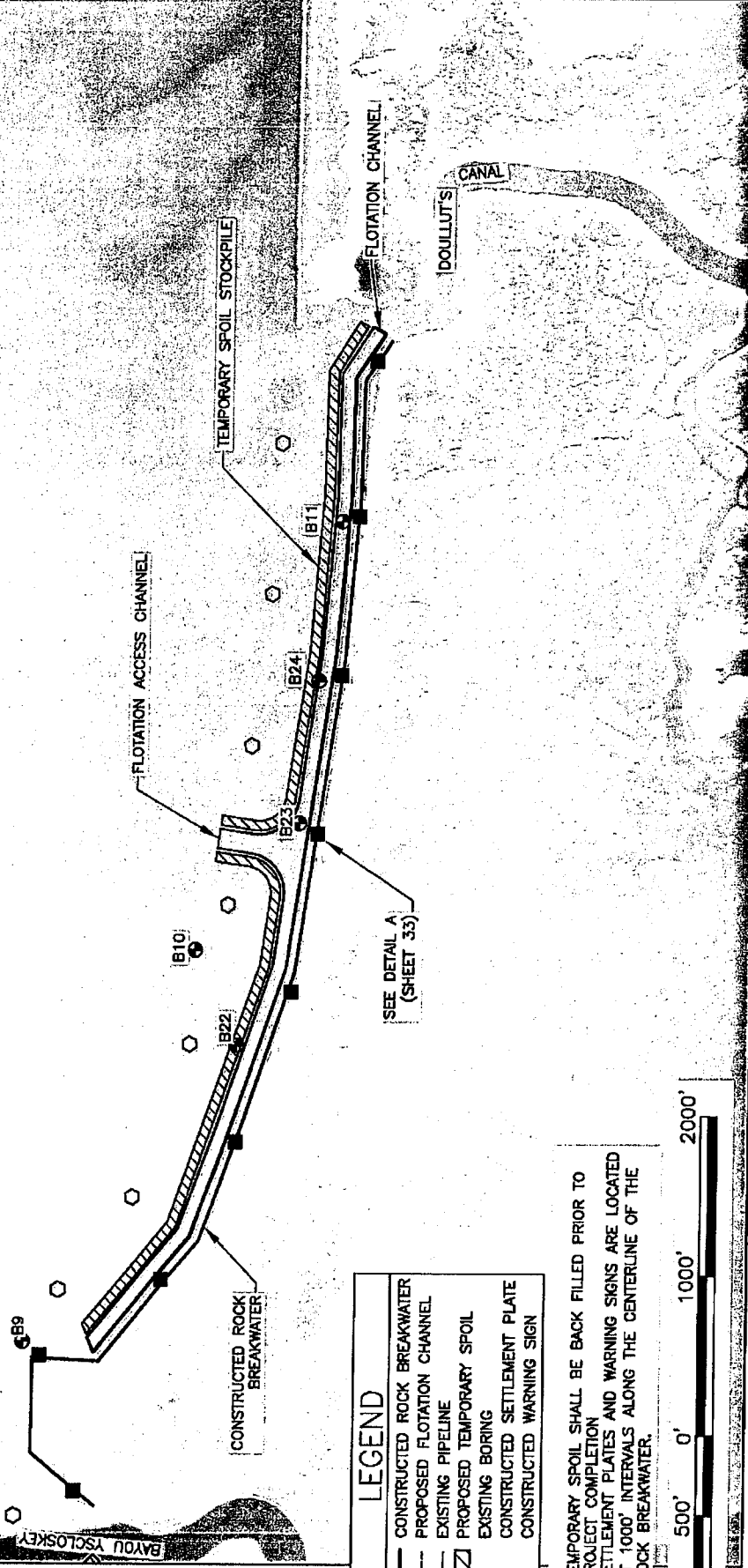
SHEET 15 OF 35



NO PERMIT MODIFICATIONS REQUIRED FOR REACH4  
 PERMITTED WORK COMPLETED IN 2005.  
 NO ADDITIONAL WORK TO BE DONE.

CONSTRUCTED WARNING SIGN  
 SEE DETAIL B  
 (SHEET 33)

LAKE BORGNE



### LEGEND

- CONSTRUCTED ROCK BREAKWATER
- PROPOSED FLOTATION CHANNEL
- PL — EXISTING PIPELINE
- ▨ PROPOSED TEMPORARY SPOIL
- EXISTING BORING
- CONSTRUCTED SETTLEMENT PLATE
- CONSTRUCTED WARNING SIGN

- NOTES:
- TEMPORARY SPOIL SHALL BE BACK FILLED PRIOR TO PROJECT COMPLETION
  - SETTLEMENT PLATES AND WARNING SIGNS ARE LOCATED AT 1000' INTERVALS ALONG THE CENTERLINE OF THE ROCK BREAKWATER.

1000' 500' 0' 1000' 2000'

APPLICATION BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY  
 1445 ROSS AVE.  
 DALLAS, TX 75202-2733

OFFICE OF COASTAL PROTECTION & RESTORATION  
 RESTORATION ENGINEERING DIVISION  
 450 LAUREL STREET  
 BATON ROUGE, LOUISIANA 70801

LAKE BORGNE SHORELINE PROTECTION

BREAKWATER ALIGNMENT  
 SHELL BEACH - REACH 3

DRAWN BY: KRISTI CANTU

DESIGNED BY: SHANNON HAYNES, P.E.

APPROVED BY: LUKE LEBAS, P.E.

STATE PROJECT NUMBER: PO-30

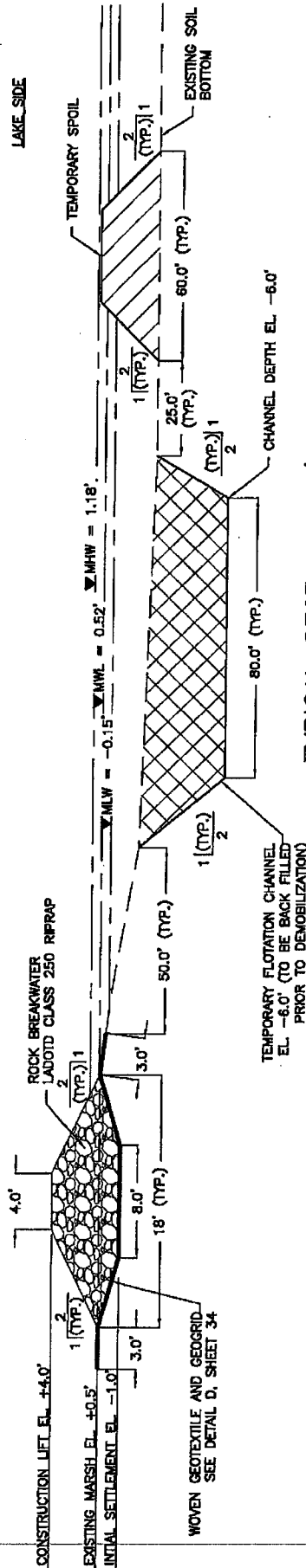
FEDERAL PROJECT NUMBER: PO-30

DATE: NOVEMBER 2005 (REV. 11/2011)

SHEET 16 OF 35

NO MODIFICATIONS

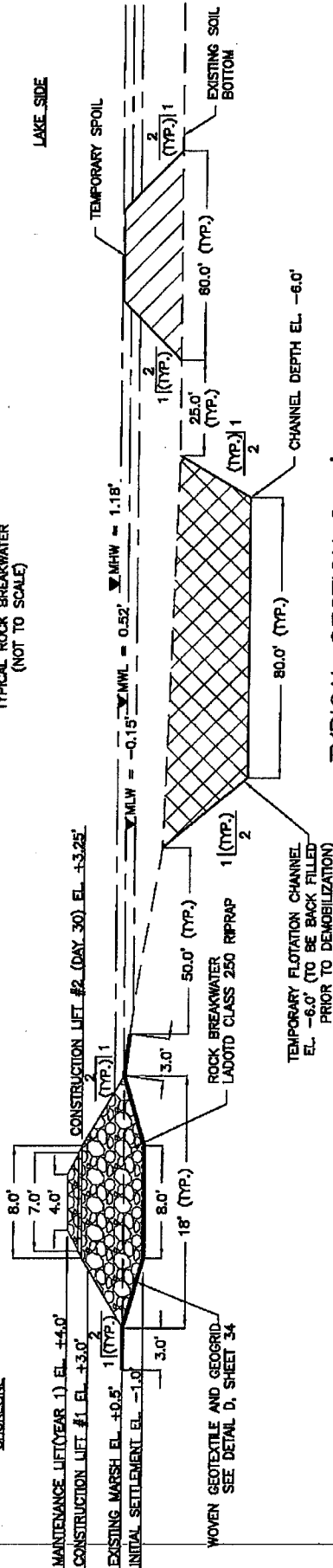
SHORELINE



TYPICAL SECTION A-A'

TYPICAL ROCK BREAKWATER  
(NOT TO SCALE)

SHORELINE



TYPICAL SECTION B-B'

TYPICAL ROCK BREAKWATER  
(NOT TO SCALE)

NOTES:

1. ARMOR STONE RIPRAP SHALL MEET LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT CLASS 250 POUND STONE, OR OWNER APPROVED EQUIVALENT. GRADATION TESTS OF REPRESENTATIVE STONE (15 TON MIN. SAMPLE SIZE) SHALL BE MADE AT THE QUARRY. CERTIFIED TEST RESULTS MUST BE SUBMITTED AND APPROVED PRIOR TO PLACEMENT ON THE PROJECT. THE STONE PLACEMENT METHOD SHALL PRODUCE A REASONABLY WELL GRADED ROCK MASS WITH Voids MINIMIZED AND A VERTICAL TOLERANCE OF 6 INCHES ABOVE FINAL GRADE. STONE SHALL BE PLACED TO FULL THICKNESS IN ONE LIFT WITH A MAXIMUM DROP OF 1 FOOT TO AVOID DAMAGING THE GEOTEXTILE FABRIC. FOLLOWING A PERIOD OF SETTLEMENT, A SECOND OPERATION SHALL BE MADE TO RESTORE THE ROCK DIKE TO THE REQUIRED SHAPE AND GRADE AS DIRECTED BY ENGINEER.
2. THE BREAKWATER SHALL BE CONSTRUCTED WITH THE CENTERLINE PLACED AT THE LOCATIONS SHOWN ON THE PLAN AND PROFILE SHEETS. ACTUAL ALIGNMENT MAY BE ADJUSTED BY PROJECT ENGINEER PRIOR TO CONSTRUCTION IN ORDER TO MEET CHANGING FIELD CONDITIONS. IF ADDITIONAL QUANTITIES FOR ARMOR STONE AND WOVEN GEOTEXTILE FABRIC ARE NECESSARY, THEY WILL BE PAID FOR AT THE UNIT PRICE BID FOR THE ITEM.

APPLICATION BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY  
1445 ROSS AVE.  
DALLAS, TX 75202-2733

OFFICE OF COASTAL PROTECTION & RESTORATION  
RESTORATION ENGINEERING DIVISION  
450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

LAKE BORGNE SHORELINE PROTECTION

TYPICAL SECTIONS  
A-A' AND B-B'

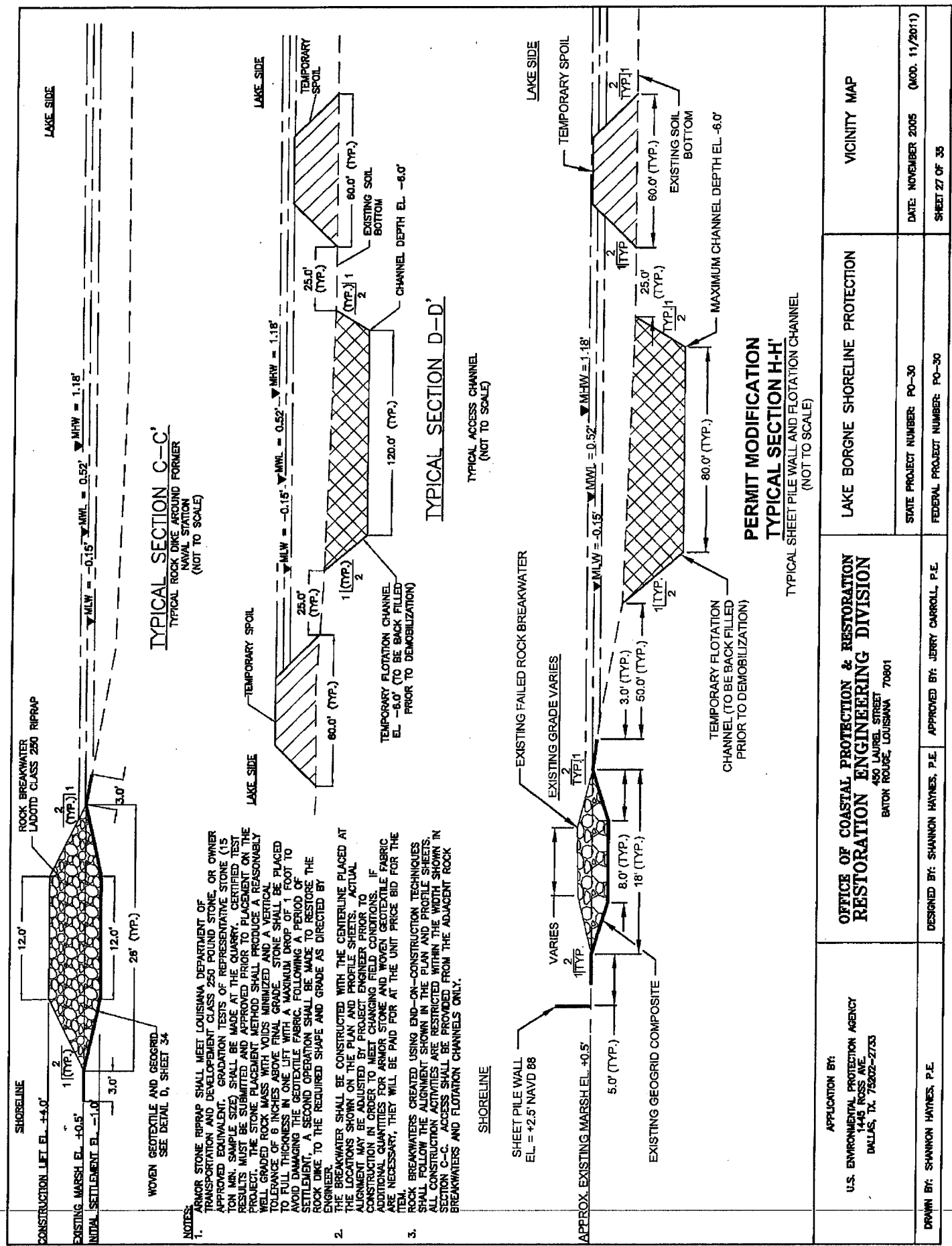
DRAWN BY: SHANNON HAYNES, P.E.

DESIGNED BY: SHANNON HAYNES, P.E.

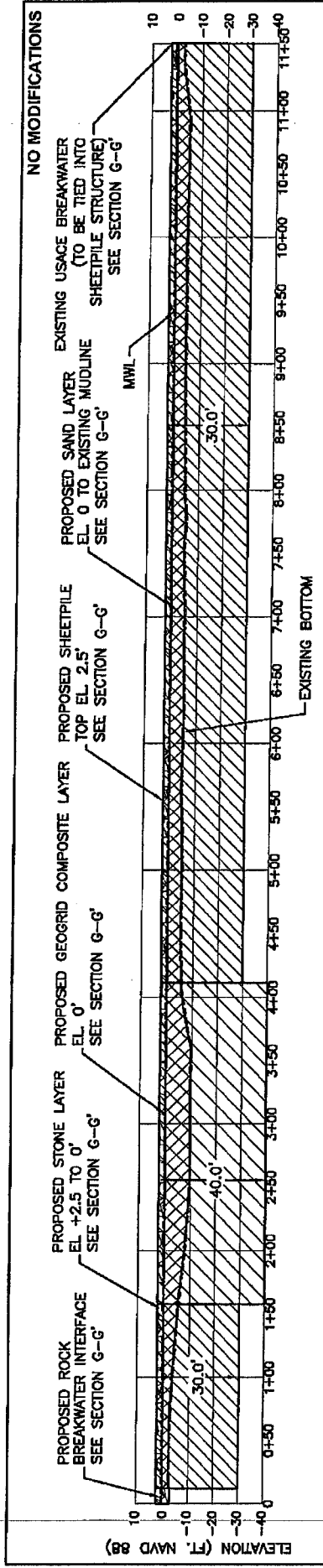
STATE PROJECT NUMBER: PO-30  
FEDERAL PROJECT NUMBER: PO-30

DATE: NOVEMBER 2005 (MOD. 11.2011)

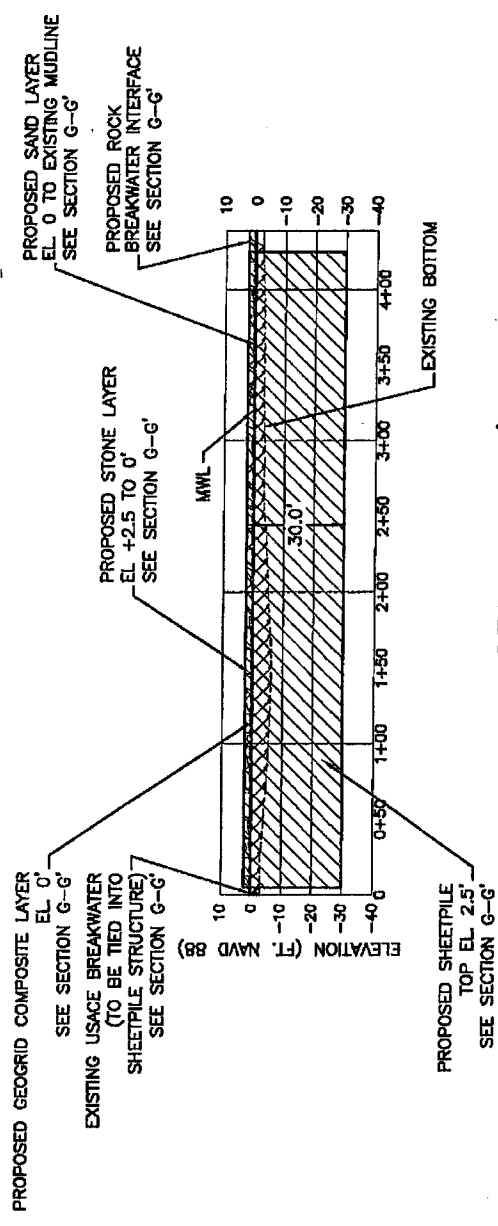
SHEET 28 OF 35



APPLICATION BY:  U.S. ENVIRONMENTAL PROTECTION AGENCY 1445 ROSS AVE. DALLAS, TX. 75202-2733	OFFICE OF COASTAL PROTECTION & RESTORATION RESTORATION ENGINEERING DIVISION 450 LAUREL STREET BATON ROUGE, LOUISIANA 70801	LAKE BORGNE SHORELINE PROTECTION	VICINITY MAP
DRAWN BY: SHANNON HAYNES, P.E.	DESIGNED BY: SHANNON HAYNES, P.E.	STATE PROJECT NUMBER: PO-30	DATE: NOVEMBER 2005 (MOD. 11/2011)  SHEET 27 OF 35



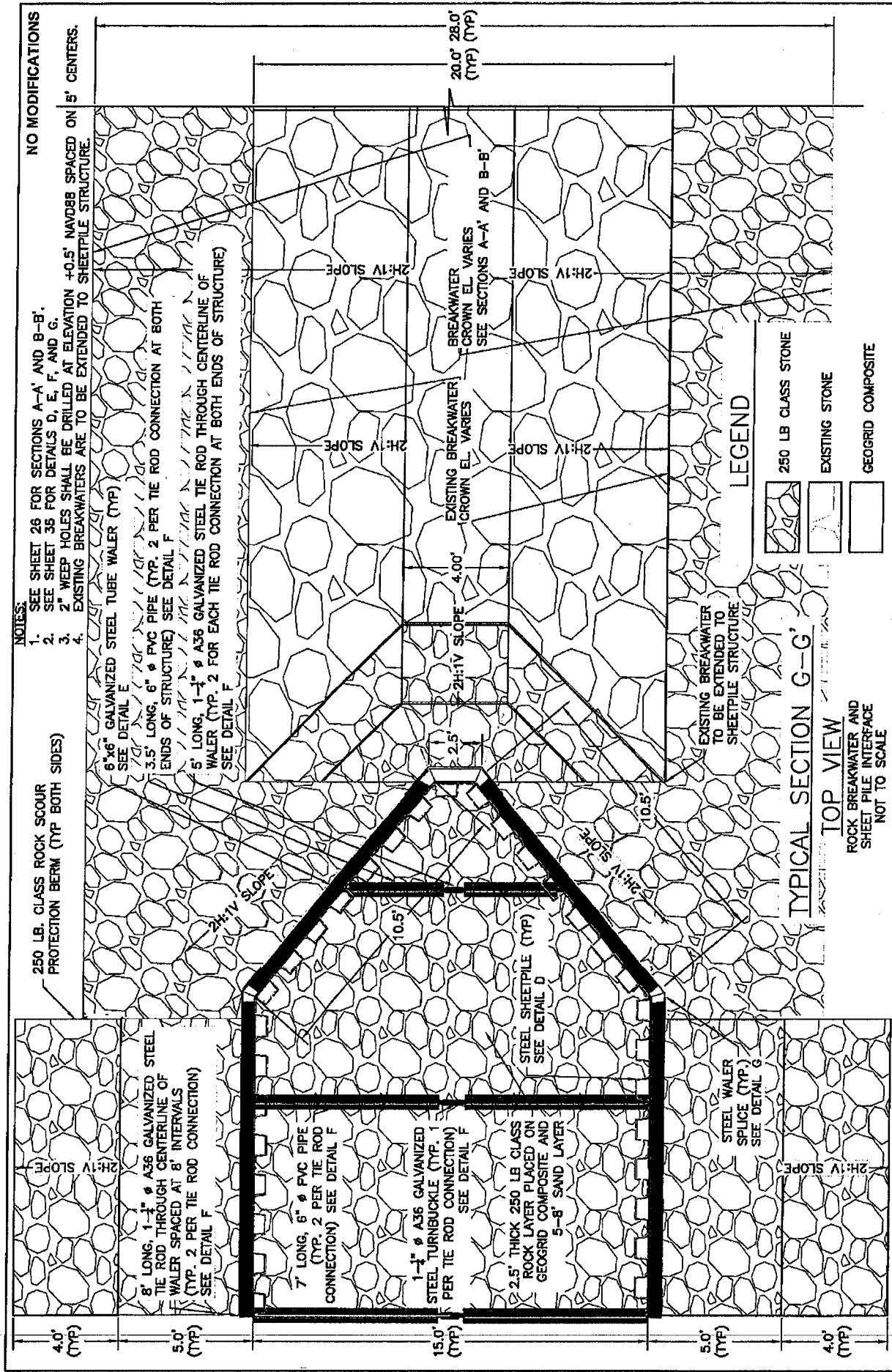
**SECTION E-E'**  
 PROPOSED BACK-TO-BACK STEEL SHEET PILE  
 STRUCTURE FOR REACH 1  
 (NOT TO SCALE)



**SECTION F-F'**  
 PROPOSED BACK-TO-BACK STEEL SHEET PILE  
 STRUCTURE FOR REACH 2  
 (NOT TO SCALE)

NOTE:  
 SEE SHEETS 29-32 FOR TYPICAL SECTION G-G'.

APPLICATION BY:  U.S. ENVIRONMENTAL PROTECTION AGENCY 1445 ROSS AVE. DALLAS, TX 75202-2733	OFFICE OF COASTAL PROTECTION & RESTORATION RESTORATION ENGINEERING DIVISION 450 LAUREL STREET BATON ROUGE, LOUISIANA 70801	LAKE BORGNE SHORELINE PROTECTION	SECTIONS E-E' AND F-F' BAYOU DUPRE, REACH 1 & 2
DRAWN BY: KRISTI CANTU	DESIGNED BY: SHANNON HAYNES, P.E.	STATE PROJECT NUMBER: PO-30 FEDERAL PROJECT NUMBER: PO-30	DATE: NOVEMBER 2005 SHEET 28 OF 35



APPLICATION BY: U.S. ENVIRONMENTAL PROTECTION AGENCY 1446 ROSS AVE. DALLAS, TX 75202-2733	OFFICE OF COASTAL PROTECTION & RESTORATION <b>RESTORATION ENGINEERING DIVISION</b> 450 LAUREL STREET BATON ROUGE, LOUISIANA 70801	LAKE BORGNE SHORELINE PROTECTION	ROCK BREAKWATER SHEETPILE INTERFACE DETAIL
DRAWN BY: SHANNON HAYNES, P.E.	DESIGNED BY: SHANNON HAYNES, P.E.	APPROVED BY: LUKE LEWIS, P.E.	DATE: NOVEMBER 2005 SHEET 29 OF 35
STATE PROJECT NUMBER: PO-30	FEDERAL PROJECT NUMBER: PO-30		



LEGEND	
	250 LB CLASS STONE
	EXISTING SOIL
	SAND

NO MODIFICATIONS

GEOGRID COMPOSITE BETWEEN  
ROCK AND SAND LAYERS  
SEE DETAIL C

STEEL SHEET PILE (TYP.)  
SEE DETAIL D

6"x6"x1/2" A500 GALVANIZED  
STEEL TUBE WALER (TYP.)  
SEE DETAIL E

GALVANIZED STEEL WALER SPLICE  
AT ALL WALER CONNECTIONS AND  
BENDS IN THE ALIGNMENT (TYP.)  
SEE DETAIL G

STEEL SHEETPILE  
TOP EL. +2.5'

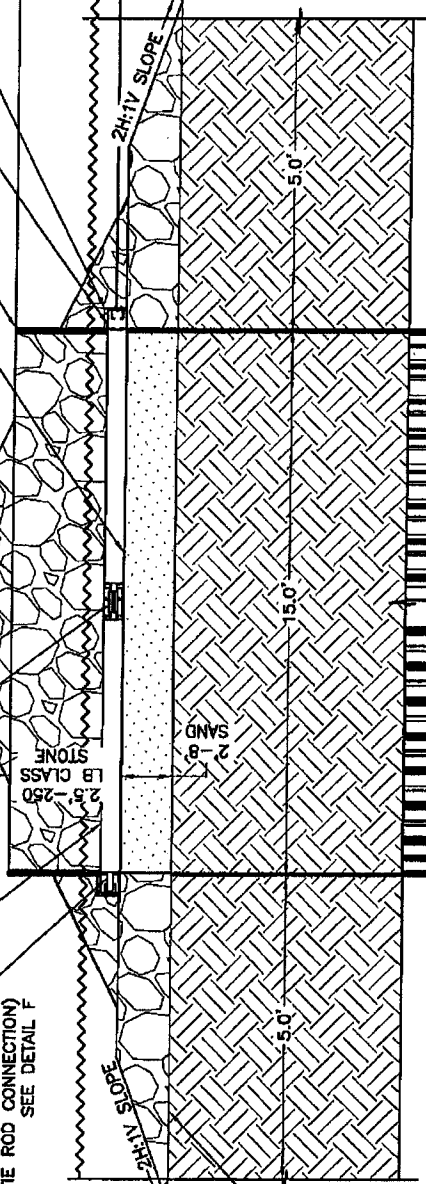
MEAN WATER EL. +0.5'  
WALER CENTERLINE &  
GEOGRID COMPOSITE  
EL. 0', SEE DETAIL C  
EXISTING MUD LINE  
EL. VARIES

1-1/2" Ø A36 GALVANIZED STEEL  
TURNBUCKLE (TYP. 1 PER  
TIE ROD CONNECTION)  
SEE DETAIL F

7' LONG, 6" Ø PVC PIPE  
(TYP. 2 PER TIE ROD CONNECTION)  
SEE DETAIL F

8' LONG, 1-1/2" Ø A36 GALVANIZED STEEL TIE ROD  
SPACED AT 8' INTERVALS THROUGH CENTERLINE  
OF WALER (TYP. 2 PER TIE ROD CONNECTION)  
SEE DETAIL F

2' HIGH, 250 LB CLASS ROCK  
SCOUR PROTECTION BERM (TYP.)  
BASE EL. = MUDLINE  
CROWN EL. = MUDLINE +2.0'



# TYPICAL SECTION G-G'

FRONT VIEW  
ROCK BREAKWATER AND  
SHEET PILE INTERFACE  
NOT TO SCALE

- NOTES:
- SEE SHEET 26 FOR SECTIONS A-A' AND B-B'.
  - SEE SHEET 34 FOR DETAIL C.
  - SEE SHEET 35 FOR DETAILS D, E, F, AND G.
  - 2" DEEP HOLES SHALL BE DRILLED AT ELEVATION +0.5' NAVD88 SPACED ON 5' CENTERS. GEOGRID COMPOSITE LAYER SHALL OVERLAP EACH HOLE.
  - SEE TECHNICAL SPECIFICATIONS FOR SAND. SAND LAYER SHALL BE MONITORED FOR SETTLEMENT AND BACKFILLED TO MAINTAIN ELEVATION 0' FOR A MINIMUM OF 30 DAYS PRIOR TO PLACEMENT OF GEOGRID COMPOSITE AND STONE LAYER.
  - EXISTING BREAKWATERS ARE TO BE EXTENDED TO SHEETPILE STRUCTURE USING ADDITIONAL ROCK.

APPLICATION BY:  
U.S. ENVIRONMENTAL PROTECTION AGENCY  
1445 ROSS AVE.  
DALLAS, TX 75202-2733

OFFICE OF COASTAL PROTECTION & RESTORATION  
RESTORATION ENGINEERING DIVISION  
450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

LAKE BORGNE SHORELINE PROTECTION

ROCK BREAKWATER  
SHEETPILE INTERFACE DETAIL

DRAWN BY: SHANNON HAYNES, P.E.

DESIGNED BY: SHANNON HAYNES, P.E.

APPROVED BY: LUKE LEBAS, P.E.

STATE PROJECT NUMBER: PO-30

FEDERAL PROJECT NUMBER: PO-30

DATE: NOVEMBER 2005

SHEET 30 OF 35

NO MODIFICATIONS

CROWN EL VARIES  
SEE SECTIONS  
A-A' AND B-B'

6"x8"x1" A500 GALVANIZED  
STEEL TUBE WALER (TYP.)  
SEE DETAIL E

GALVANIZED STEEL  
WALER SPLICE AT ALL WALER  
CONNECTION AND BEND IN  
THE ALIGNMENT (TYP.)  
SEE DETAIL G

STEEL SHEETPILE TOP EL. +2.5'

2.5'-250 LB  
CLASS STONE

MEAN WATER EL. +0.5'

WATER CENTERLINE & GEOGRID COMPOSITE EL. 0'

2:1 SLOPE  
SAND  
2' TO 8'

EXISTING BREAKWATER  
(TO BE EXTENDED TO  
SHEETPILE STRUCTURE)

2' HIGH, 250 LB CLASS ROCK  
SCOUR PROTECTION BERM (TYP.)  
BASE EL. = MUDLINE  
CROWN EL. = MUDLINE +2.0'

STEEL SHEETPILE (TYP.)  
SEE DETAIL D

EXISTING SOIL

# LEGEND

250 LB CLASS STONE

EXISTING STONE

EXISTING SOIL

## NOTES:

1. SEE SHEET 26 FOR SECTIONS A-A' AND B-B'.
2. SEE SHEET 34 FOR DETAILS C, D, E, F, AND G.
3. SEE SHEET 35 FOR DETAILS D, E, F, AND G.
4. 2" DEEP HOLES SHALL BE DRILLED AT ELEVATION +0.5' NAVD88 SPACED ON 5' CENTERS. GEOGRID COMPOSITE LAYER SHALL OVERLAP EACH HOLE.
5. SEE TECHNICAL SPECIFICATIONS FOR SAND. BACKFILL TO MAINTAIN ELEVATION 0' FOR A MINIMUM OF 30 DAYS PRIOR TO PLACEMENT OF GEOGRID COMPOSITE AND STONE LAYER.
6. EXISTING BREAKWATERS ARE TO BE EXTENDED TO SHEETPILE STRUCTURE USING ADDITIONAL ROCK.

## TYPICAL SECTION G-G'

SIDE VIEW  
ROCK BREAKWATER AND  
SHEET PILE INTERFACE  
NOT TO SCALE

APPROVED BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY  
1445 ROSS AVE.  
DALLAS, TX 75202-2733

OFFICE OF COASTAL PROTECTION & RESTORATION  
ENGINEERING DIVISION  
450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

DRAWN BY: SHANNON HAYNES, P.E.

DESIGNED BY: SHANNON HAYNES, P.E.

STATE PROJECT NUMBER: PO-30

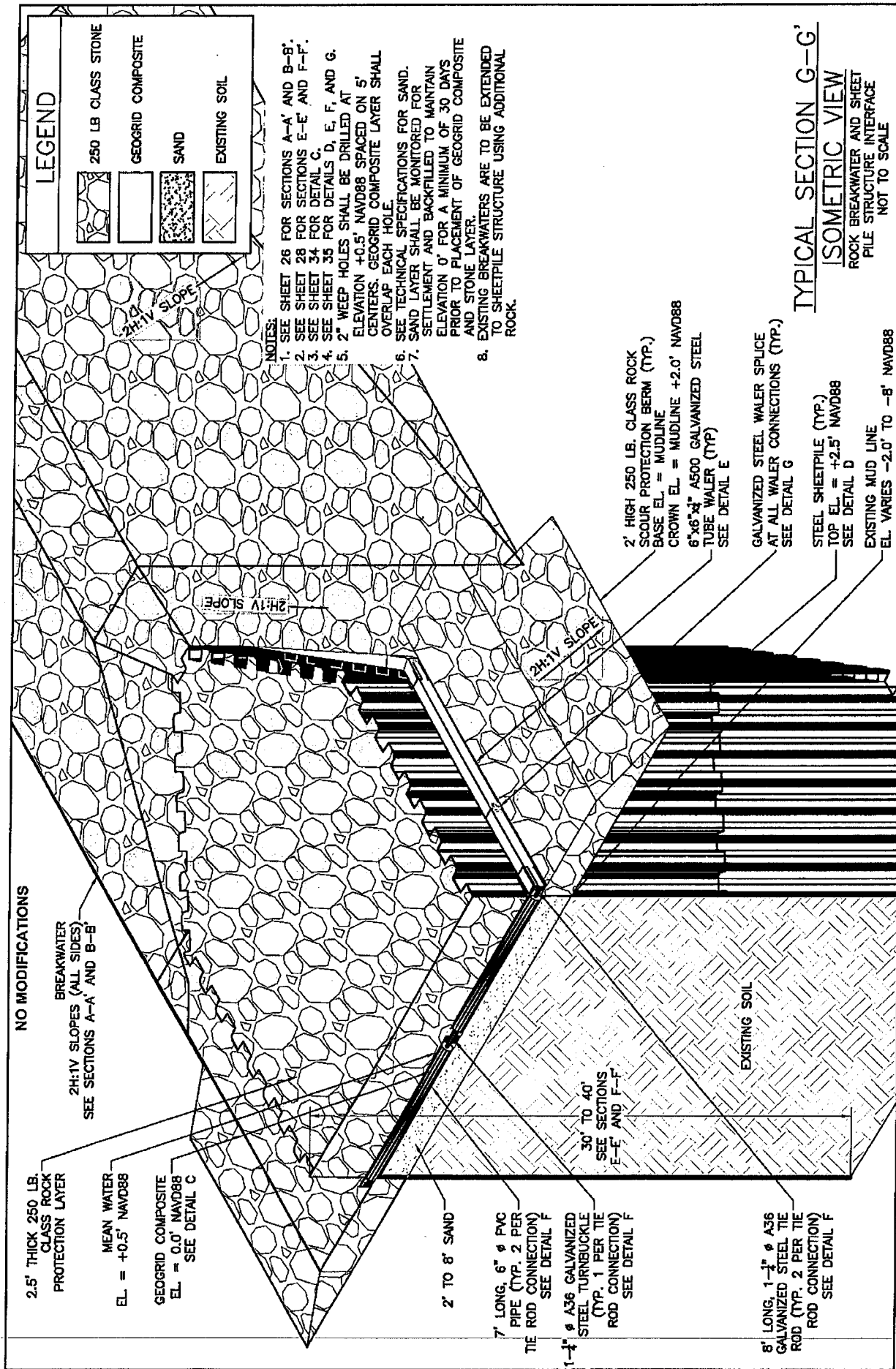
FEDERAL PROJECT NUMBER: PO-30

LAKE BORGNE SHORELINE PROTECTION

ROCK BREAKWATER  
SHEETPILE INTERFACE DETAIL

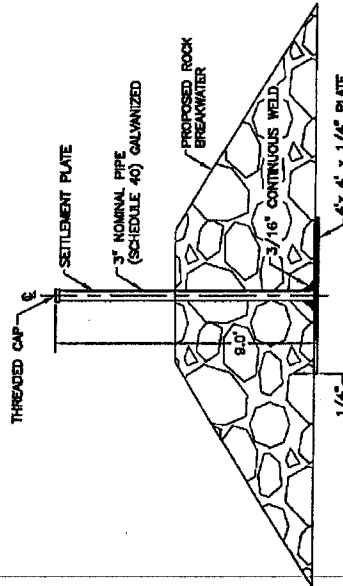
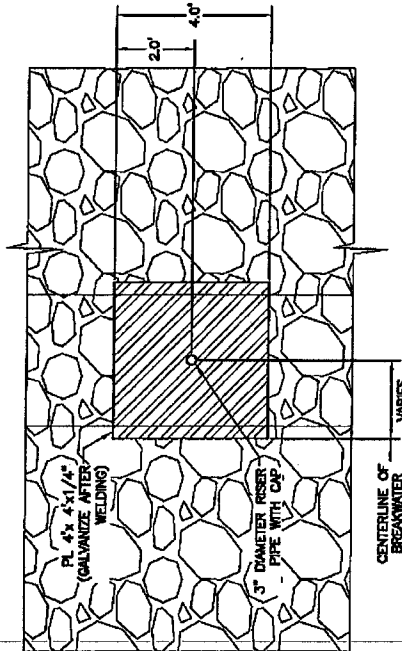
DATE: NOVEMBER 2005

SHEET 31 OF 35

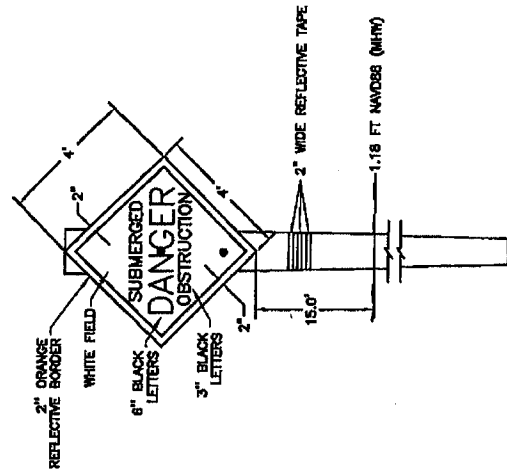


APPLICATION BY: U.S. ENVIRONMENTAL PROTECTION AGENCY 1445 ROSS AVE. DALLAS, TX 75202-2733	OFFICE OF COASTAL PROTECTION & RESTORATION RESTORATION ENGINEERING DIVISION 450 LAUREL STREET BATON ROUGE, LOUISIANA 70801	LAKE BORGNE SHORELINE PROTECTION	ROCK BREAKWATER SHEETPILE INTERFACE DETAIL
DRAWN BY: SHANNON HAYNES, P.E.	DESIGNED BY: SHANNON HAYNES, P.E.	STATE PROJECT NUMBER: PO-30	DATE: NOVEMBER 2005
	APPROVED BY: LUKE LEBAS, P.E.	FEDERAL PROJECT NUMBER: PO-30	SHEET 32 OF 35

NO MODIFICATIONS



DETAIL A  
ROCK DIKE SETTLEMENT PLATE  
NOT TO SCALE



DETAIL B  
WARNING SIGN SIDE DETAIL  
NOT TO SCALE

- GENERAL NOTES:
1. ALL SIGNS SHALL BE INSTALLED AT 1000 FT. INTERVALS, 500 FT. OFFSHORE FROM THE CENTERLINE OF THE ROCK BREAKWATERS.
  2. THE 2" BORDER ON THE SIGN SHALL BE A REFLECTIVE ORANGE MATERIAL. THE LETTERING FIELD SHALL BE A REFLECTIVE WHITE MATERIAL. THE LETTERING FOR THE WARNING SIGNS SHALL BE IN BLACK. ALL SIGNS MUST MEET U.S. COAST GUARD STANDARDS IN ACCORDANCE WITH COMNAVANT INSTRUCTION N14500.25A, DATED 11/7/03, AND COMMANDANT NOTICE 10500, DATED 2/11/06.
  3. NEOPRENE WASHERS SHALL BE PLACED BETWEEN THE SIGN AND THE PILING AT ALL POINTS OF CONTACT.
  4. HARDWARE FOR TIMBER CONNECTIONS SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH SECTION 811.5 OF THE LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES AS PUBLISHED BY THE LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT, LATEST EDITION.
  5. TIMBER PILES SHALL CONFORM TO THE SPECIFICATIONS FOR ROADS AND BRIDGES AS PUBLISHED BY THE LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (LAOTD), LATEST EDITION. PILES SHALL BE TREATED WITH A CREOSOTE SOLUTION CONFORMING TO ANPPA P2 TO A MINIMUM RETENTION OF 16 PCF AND CAPPED ACCORDING TO LAOTD SPECIFICATION 812.08.
  6. SETTLEMENT PLATES SHALL BE INSTALLED ALONG THE CENTERLINE OF THE BREAKWATER AT 1000' INTERVALS.
  7. THE ROCK DIKE SETTLEMENT PLATES SHALL BE SURVEYED DAILY BY THE CONTRACTOR AFTER INSTALLATION. ALL INITIAL WORK IS COMPLETED.
  8. SETTLEMENT PLATES SHALL BE FABRICATED USING ASTM A36 STEEL AND HOT-DIPPED GALVANIZED.

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OFFICE OF COASTAL PROTECTION & RESTORATION  
RESTORATION ENGINEERING DIVISION  
450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

LAKE BORGNE SHORELINE PROTECTION

TYPICAL DETAILS

DRAWN BY: SHANNON HAYNES, P.E.

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