APPENDIX A

CWPPRA PPL 23 PROJECT FACT SHEET AND PROJECT MAP

Louisiana Coastal Wetlands Conservation and Restoration Task Force

February 2014 Cost figures as of: November 2015



Island Road Marsh Creation & Nourishment (TE-117)

Project Status

Approved Date:2014Project Area:383 acresApproved Funds:\$3.72 MTotal Est. Cost:\$39.1 MNet Benefit After 20 Years:312 acresStatus:Engineering and DesignProject Type:Marsh CreationPPL #:23

Location

Region 3, Terrebonne Basin, Terrebonne Parish.

Problems

The Terrebonne Basin is an abandoned delta complex, characterized by a thick section of unconsolidated sediments that are undergoing dewatering and compaction, contributing to high subsidence, and a network of old distributary ridges extending southward from Houma. Historically, subsidence and numerous oil and gas canals and pipelines in the area have contributed significantly to wetland losses. Since 1932, the Terrebonne Basin has lost approximately 20% of its wetlands. One-third of the Terrebonne Basin's remaining wetlands are estimated to be lost to open water by the year 2040. There has been a significant reduction in the marsh platform in the vicinity of Island Road (1.60%/year based on USGS data from 1984 to 2011) that has provided some historical wave energy protection. Island Road is the only land access to the Isle of Jean Charles located west of Pointe Aux Chenes which serves unique Native American and minority communities that historically relied on fishing for their livelihood

Restoration Strategy

The restoration concept provides for the creation and/or nourishment of approximately 383 acres of emergent saline marsh that will form a land bridge along portions of the perimeter of Cutoff Canal, Twin Pipelines Canals, and Island Road.

The proposed project's primary feature is to create 364 acres and nourish 19 acres of saline marsh. Sediment will be hydraulically pumped from a borrow source near Lake Felicity. Containment dikes will be constructed around the marsh creation area to retain sediment during pumping and will be degraded and/or gapped no later than three years post construction. Half of the newly constructed marsh (182 acres) will be planted following construction to stabilize the platform and reduce time for full vegetation.



The general project area viewed from Pointe aux Chene marina to Isle de Jean Charles.

Progress to Date

This project is on Priority Project List 23.

For more project information, please contact:



Federal Sponsor: National Marine Fisheries Service Baton Rouge, LA (225) 389-0508

Local Sponsor: Coastal Protection and Restoration Authority Baton Rouge, LA (225) 342-4736



APPENDIX B

ELECTRONIC INFRASTRUCTURE INVENTORY

ELECTRONIC FILES AVAILABLE AT:

<u><ftp://ftp.coastal.la.gov/TE-</u>
<u>117/Preliminary_Design_Report/2_Appendices/Appendix_B/ELECTRONIC_INFRASTRUCTU</u>
<u>RE_INVENTORY.ZIP></u>

APPENDIX C

ALTERNATIVES ANALYSIS DOCUMENTATION

ELECTRONIC FILES AVAILABLE AT:

<ftp://ftp.coastal.la.gov/TE-117/Preliminary_Design_Report/2_Appendices/Appendix_C/ALT_ANALYSIS_FILES.ZIP>

APPENDIX D

CALCULATIONS PACKET

TE-0117 ISLAND ROAD MARSH CREATION AND NOURISHMENT

30% DESIGN CALCULATIONS PACKET

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LIST OF ABBREVIATIONS, VARIABLES, UNITS, AND OTHER TERMS

LIST OF ABBREVIA	ATIONS, VARIABLES, UNITS, AND OTHER TERMS [C]
Δ	Area (i.e., as in spatial area or cross-sectional area)
AECDM	Cross-Sectional Area of ECD Under ML Conditions
AECD SI	Cross-Sectional Area of ECD Under SL Conditions
A ECD, SL	Cross-Sectional Area of Borrow Pit/Channel (or Borrow Area) of ECDs
AC	
RA	Borrow Area
	Continued (i.e., as in "[Continued] from the previous page")
[0] C	Cohesion (i.e., cohesive strength or cohesive shear strength of cohesive soils)
C _C	Coefficient of Compression (as determined empirically from geotechnical laboratory tests)
C _v	Coefficient of Consolidation (as determined empirically from geotechnical laboratory tests)
C·F	Cut-to-fill Ratio
CAD	Computer-Aided Drafting
CC	Conveyance Corridor
CF	Cubic Foot
CHF	C. H. Fenstermaker & Associates, LLC
CL	Centerline
CMF	Constructed Marsh Fill
CMFE	Constructed Marsh Fill Elevation
CO-OPS	Center for Operational Oceanographic Products and Services (of NOAA)
CPRA	Coastal Protection and Restoration Authority of Louisiana
CPT	Cone Penetrometer Test
CRMS	Coastwide Reference Monitoring System
CWPPRA	Coastal Wetlands Planning, Protection, and Restoration Act
CY	Cubic Yard
DP	Design Profile (i.e., governing geotechnical soil conditions, as in "design profile 1")
e	Void Ratio
e ₀	Void Ratio (or Initial Void Ratio of soils)
e _{0,BA}	Initial Void Ratio of Borrow Area Soils
e _{0,MCNA,TY0}	Initial Void Ratio of Marsh Creation and Nourishment Area Soils for TY0 Conditions
e _{0,MCNA,TY20}	Initial Void Ratio of Rest. Area Soils for TY20 Conditions
E&D	Engineering and Design
ECD(s)	Earthen Containment Dike(s)
EL	Elevation
EL _{PI=20%,TY(-4)}	Elevation Corresponding to 20 th Percentile of Percent Inundation for TY(-4) Conditions
EL _{PI=20%,TY0}	Elevation Corresponding to 20 th Percentile of Percent Inundation for TY0 Conditions
EL _{PI=20%,TY20}	Elevation Corresponding to 20th Percentile of Percent Inundation for TY20 Conditions
EL _{PI=80%,TY(-4)}	Elevation Corresponding to 80 th Percentile of Percent Inundation for TY(-4) Conditions
EL _{PI=20%,TY0}	Elevation Corresponding to 80 th Percentile of Percent Inundation for TY0 Conditions
EL _{PI=20%,TY20}	Elevation Corresponding to 80 th Percentile of Percent Inundation for TY20 Conditions

LIST OF ABBREVIA	ATIONS, VARIABLES, UNITS, AND OTHER TERMS [C]
EL _{RM@50%}	Elevation of 50 th Percentile of Reference Marsh Surveys
EL _{RM@80%}	Elevation of 80 th Percentile of Reference Marsh Surveys
ESLR	Eustatic Sea Level Rise
EQ	Equation (as defined in theoretical portions of calculations packet)
F _S	Factor of Safety
FT (or ft)	Foot
GEO	GeoEngineers, Inc.
GPS	Geographic Positioning System
Н	Height
$H_{ECD,ML}$	Height of ECD for ML Construction Conditions
H _{ECD,SL}	Height of ECD for SL Construction Conditions
H _{ECDBA}	Height of Borrow Pit/Channel (or Borrow Area) of ECDs
H _{dr}	Drainage Height (of soil layer undergoing compression/consolidation)
L	Length
L _{ECD,ML}	Longitudinal Length of ECD for ML Construction Conditions
L _{ECD,SL}	Longitudinal Length of ECD for SL Construction Conditions
L _{ECDBA}	Longitudinal Length of Borrow Pit/Channel (or Borrow Area) of ECDs
L _{CORR.MECH-D.CC}	Length, Mechanical Dredging Required (i.e., CC lengh needing access dredging)
L _{CORR,TOTAL,CC}	Length (i.e., total length of CC needed for complete navigable marine access)
L _{CORR.MECH-D.NAC}	Length, Mechanical Dredging Required (i.e., NAC lengh needing access dredging)
L _{CORR.TOTAL.NAC}	Length (i.e., total length of NAC needed for complete navigable marine access)
L _{CORR MECH-D SAC}	Length, Mechanical Dredging Required (i.e., SAC lengh needing access dredging)
L _{CORR TOTAL SAC}	Length (i.e., total length of SAC needed for complete navigable marine access)
LCZ	Louisiana Coastal Zone
LF	Linear Foot
LLC	Limited Liability Company
MCNA	Marsh Creation and Nourishment Area
MCDG	Marsh Creation Design Guidelines
MHW	Mean High Water
MHW _{BA}	Mean High Water (as calculated for the TE-0117 Borrow Area)
MHW _{CRMS0341}	Mean High Water (as determined by CRMS0341 data during observation period)
MHW _{CRMS3296}	Mean High Water (as determined by CRMS3296 data during observation period)
MHW _{MCNA}	Mean High Water (as calculated for the TE-0017 Marsh Creation and Nourishment Area)
MHW _{MCNA,TY(-4)}	Mean High Water at MCNA for TY(-4) Conditions
MHW _{MCNA TY0}	Mean High Water at MCNA for TY0 Conditions
MHW _{MCNA TY20}	Mean High Water at MCNA for TY20 Conditions
MHW _{TBS TE-0117}	Mean High Water Calculated by TBS (as applicable to MCNA)
MI	Mile
ML	Multiple Lift (i.e., as in multiple lift construction for ECDs)

LIST OF ABBREVIA	ATIONS, VARIABLES, UNITS, AND OTHER TERMS [C]
MIG	Meen Low Gulf
MLW	Mean High Water
MLWDA	Mean Low Water (as calculated for the TE-0117 Borrow Area)
MI Work contra	Mean Low Water (as determined by CRMS0341 data during observation period)
MI W cr w cr w so s	Mean Low Water (as determined by CRMS0544 data during observation period)
MI W. CRMS3296	Mean Low Water (as calculated for the TE-0017 Marsh Creation and Nourishment Area)
ML W MCNA	Mean Low Water at MCNA for $TV(A)$ Conditions
ML W MCNA,TY(-4)	Mean Low Water at MCNA for TV0 Conditions
ML W MCNA,TY0	Mean Low Water at MCNA for TV20 Conditions
ML W _{MCNA,TY20}	Mean Low Water Coloulated by TDS (as applicable to MCNA)
IVIL W TBS,TE-0117	Millimeter
IIIII MSI	Minimeter Mean Sea Level
MTI	Mean Tide Level
MTL	Mean Tide Level (as calculated for the TE-0117 Borrow Area)
MTL on voor u	Mean Tide Level (as determined by CRMS0341 data during observation period)
MTL CRMS0341	Mean Tide Level (as determined by CRMS3296 data during observation period)
MTL	Mean Tide Level (as calculated for the TE-0117 Marsh Creation and Nourishment Area)
MTI MTI	Mean Tide Level (as calculated by TRS (as applicable to MCNA)
MTP	Mean Tide Range
MTR_	Mean Tide Range (as calculated for the TE-0117 Borrow Area)
MTR _{BA}	Mean Tide Range (as determined by CRMS0341 data during observation period)
MTR MTR	Mean Tide Range (as determined by CRMS30941 data during observation period)
MTD	Mean Tide Range Calculated by TRS (as applicable to MCNA)
MTD	Mean Tide Range (as calculated for the TE 0117 Merch Creation and Neurishment Area)
NAC	Northern Access Corridor
NAU NAVD88	North American Vertical Datum of 1988
NMFS	National Marine Fisheries Service (of NOA A)
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service (of NOAA)
NTBMS	National Tidal Benchmark System
NTDE	National Tidal Datum Epoch
O&G	Oil & Gas
OM&M	Operations, Monitoring, & Maintenance
φ	Angle of Interal Friction (i.e., phi angle of granular soils)
PI	Percent Inundation
PInt	Point of Intersection
PL	Pipeline
POB	Point of Beginning
POE	Point of Ending

PSDDF	Primary Consolidation, Secondary Compression, and Desiccation of Dredge Fill (software
R _{ESLR}	Rate of ESLR (as applied to PI calculations and CMFE determination)
RM	Reference Marsh (i.e., as in reference or "healthy" marsh elevation surveys)
RSLR	Relative Sea Level Rise
RTK	Real Time Kinematic (i.e., surveying)
S	Settlement
σ	Normal Stress (i.e., normal stress applied to soils)
σ'	Effective Stress (i.e., effective stress applied to soils)
σ'_{f}	Effective Stress (following compression/consolidation laboratory analysis)
σ' _p	Effective Stress (preceding compression/consolidation laboratory analysis)
SAC	Southern Access Corridor
SETANL	Settlement Analysis (software)
SF	Square Foot
SL	Multiple Lift (i.e., as in single lift construction for ECDs)
SS	Sideslopes
SS _{ECD}	Sideslopes (of ECD design)
SS _{ECDBA}	Sideslopes (of Borrow Pit/Channel for ECD design)
t	time
τ	Shear Stress (i.e., shear stress applied to soils)
T_{V}	Terzaghi Time Factor (as applied to consolidation laboratory analysis)
TBS	T. Baker Smith, LLC
TPCG	Terrebonne Parish Consolidated Government
TY	Target Year (i.e., design life, as in "target year 20")
USACE	United States Army Corps of Engineers
V	Volume
V _{CORR,MECH-D,CC}	Volume, Mechanical Dredging Req. (i.e., volume of access dredging required in CC)
V _{CORR,MECH-D,NAC}	Volume, Mechanical Dredging Req. (i.e., volume of access dredging required in NAC)
V _{CORR.MECH-D.SAC}	Volume, Mechanical Dredging Req. (i.e., volume of access dredging required in SAC)
V _{ECD ML}	In-Place Volume of ECD Under ML Conditions
V _{ECD.SL}	In-Place Volume of ECD Under SL Conditions
V _{ECDBA}	Volume Required in Borrow Pit/Channel for ECD Construction
W	Width
W _{CR}	Crown Width (i.e., as in crown width of spoil/embankment/dike)
W _{CR,ECD}	Crown Width of ECD
W _{CR ECDBA}	Crown Width of Borrow Pit/Channel for ECD
WVA	Wetland Value Assessment
VR (or vr)	Vear

TIDAL DATUM DETERMINATION

TIDAL DATUM DETERMINATION

Identification of Engineering Problem

The purpose of this exercise is to compute statistical tidal variables (i.e., MHW/MLW, etc.) that are used in further E&D of CPRA coastal restoration projects.

Breakdown of Governing Assumptions and Calculation Methodology

- As stated by NOAA <http://www.tidesandcurrents.noaa.gov/>, tidal datum determinations are performed utilizing datasets that span timescales of 19 years. NOAA refers to a timescale of said duration as the Nationa Tidal Datum Epoch (NTDE). Utilization of NTDE datasets in tidal variable calculations allow the following to be achieved for the determination of site-specific tidal datum determinations:
 - i) include all significant tidal periods typically observed cyclically throughout the period of regression of lunar nodes (equal to 18.6 years);
 - ii) account for local meteorological effects on sea level; and
 - iii) establish a uniform approach that is applied to tidal datum calculations for all NOAA stations.
- 2) Also acknowledged by NOAA is the significance of the effect of RSLR, as it pertains to the determination of accurate statistical tidal variables. In certain locales, in order to offset some of the inaccuracies introduced by the older portions of NTDE datasets, NOAA advocates for the use of datasets with reduced timescales to reduce inaccuracies brought on by high rates of RLSR. For CWPPRA coastal restoration projects, datasets For CWPPRA coastal restoration projects, datasets with timescales spanning as little as 5 years have previously been utilized and deemed to be acceptable for use in performing tidal datum determinations. Based on all of this, the TE-0117 design team has opted to perform a tidal datum determination utilizing modified NTDE datasets of 5 years.
- 3) Existent within the relative vicinity of TE-0117 project features of interest are the following CRMS stations:
 - CRMS3296 (N 29° 23' 02.508", W 90° 28' 44.507") near marsh creation and nourishment area
 - CRMS0341 (N 29° 18' 33.725", W 90° 30' 45.789") near borrow area at southern access corridor approach
- 4) As defined by NOAA and other CPRA project literature, the following statistical tidal variables are continuously determined and published for public use by the NOAA gage station at Grand Isle, LA and were determined on each of the CRMS datasets obtained for this project.
 - MHW, or mean high water, is defined as the arithmetic mean of all of the high water elevations observed over the NTDE (or modified dataset).
 - MLW, or mean low water, is defined as the arithmetic mean of all of the low water elevations observed over the NTDE (or modified dataset).
 - MTL, or mean tide level, is defined as a tidal datum equivalent to the average of MHW and MLW observed over the NTDE (or modified dataset).

TIDAL DATUM DETERMINATION [C]

Breakdown of Governing Assumptions and Calculation Methodology [Continued]

4) [Continued]

- MHW, or mean high water, is defined as the arithmetic mean of all of the high water elevations observed over the NTDE (or modified dataset).
- MLW, or mean low water, is defined as the arithmetic mean of all of the low water elevations observed over the NTDE (or modified dataset).
- MTL, or mean tide level, is defined as a tidal datum equivalent to the average of MHW and MLW observed over the NTDE (or modified dataset).
- **MTR** is defined as the mean tidal range and is equivalent to the difference between MHW and MLW observed over the NTDE (or modified dataset).
- 5) While past CPRA convention has utilized the range-ratio method, the execution of statistical tidal variable calculations using CRMS water level datasets for design have been utilized for recent CPRA in-house design CWPPRA projects.
- 6) The following tidal variables were determined/calculated using water level data obtained from the CRMS stations referenced in item 4).
 - MHW_{CRMS3296} is defined as the MHW during the declared observation period near the marsh creation and nourishment area, as indicated from water level data obtained from CRMS3296.
 - MLW_{CMRS3296} is defined as the MLW during the declared observation period near the marsh creation and nourishment area, as indicated from water level data obtained from CRMS3296.
 - MTL_{CRMS3296} is defined as the MTL during the delcared observation period near the marsh creation and nourishment area, as indicated from water level data obtained from CRMS3296.
 - MTR_{CRMS3296} is defined as the MTR during the declared observation period near the marsh creation and nourishment area, as indicated from water level data obtained from CRMS3296.
 - MHW_{CRMS0341} is defined as the MHW during the declared observation period near the borrow area, as indicated from water level data obtained from CRMS0341.
 - MLW_{CRMS0341} is defined as the MLW during the declared observation period near the borrow area, as indicated from water level data obtained from CRMS0341.
 - MTL_{CRMS0341} is defined as the MTL during the declared observation period near the borrow area, as indicated from water level data obtained from CRMS0341.
 - MTR_{CRMS0341} is defined as the MTR during the declared observation period near the borrow area, as indicated from water level data obtained from CRMS0341.
- 7) With the above-stated statistical tidal variables calculated for each CRMS station, the statistical tidal variables calculated by TBS in support of the TE-0117 project were compared against both tidal variable distributions generated for the BA and MCNA project features. Note that the water surface elevations were obtained in areas near the restoration area features, which were in closer proximity to CRMS3296.

TIDAL DATUM DETERMINATION [C]

Breakdown of Governing Assumptions and Calculation Methodology [Continued]

8) Based on the results of the comparison, the following tidal variables were identified for project design.

- MHW_{MCNA} is defined as the MHW calculated at the marsh creation and nourishment area.
- MLW_{MCNA} is defined as the MLW calculated at the marsh creation and nourishment area.
- MTL_{MCNA} is defined as the MTL calculated at the marsh creation and nourishment area.
- MTR_{MCNA} is defined as the MTR calculated at the marsh creation and nourishment area.
- MHW_{BA} is defined as the MHW calculated at the borrow area.
- MLW_{BA} is defined as the MLW calculated at the borrow area.
- MTL_{BA} is defined as the MTL calculated at the borrow area.
- MTR_{BA} is defined as the MTR calculated at the borrow area.

Solution

See the following page(s) for applicable calculations and the statement of final solution(s).



-	
CALCULATED VALUES	
1) No calculations of note.	
2) No calculations of note.	
3) The following tables contain the	e CRMS data statistical tidal
variable calculations.	
TABLE R-1: CRMS32	296 CALCULATIONS
VARIABLE	VALUE [FT NAVD88]
MHW _{CRMS3296}	+0.8037
MLW _{CRMS3296}	-0.3586
MTL _{CRMS3296}	+0.2226
MTR _{CRMS3296}	1.1623*
*Denotes value in absolute FT not	relative to elevation datum
TABLE R-2: CRMS03	41 CALCULATIONS
VARIABLE	VALUE [FT NAVD88]
MHW _{CRMS0341}	+0.9048
MLW _{CRMS0341}	-0.449
MTL _{CRMS0341}	+0.2279
MTR _{CRMS0341}	1.3538*
*Denotes value in absolute FT not	relative to elevation datum
4) The following table contains the 3 .	e TBS calculations.
TABLE R-3: TBS	CALCULATIONS
VARIABLE	VALUE [FT NAVD88]
MHW _{TBS,TE-0117}	+1.09
MLW _{TBS,TE-0117}	-0.02
MTL _{TBS,TE-01117}	+0.55
MTR _{TBS,TE-0117}	1.11*
*Denotes value in absolute FT not	relative to elevation datum

FIGURES AND GRAPHICS	THEORY, EQUATIONS, AND METHODS
	5) The following variables were selected for use in design.
	• MHW _{MCNA} • MHW _{BA}
	• MLW _{MCNA} • MLW _{BA}
	Where:
	$\mathbf{MHW}_{\mathbf{MCNA}} = \mathbf{MHW}_{\mathbf{CRMS3296}}$
	$MLW_{MCNA} = MLW_{CRMS3296}$
	$\mathbf{MHW}_{\mathbf{BA}} = \mathbf{MHW}_{\mathbf{CRMS0341}}$
	$\mathbf{MLW}_{\mathbf{BA}} = \mathbf{MLW}_{\mathbf{CRMS0341}}$
	See Table R-4 for these values.

CALCULATED VALUES		
 The following table contains the final values for tidal variables that were selected for design. 		
TABLE R-4: TE-0117 TIDAL CALCULATIONS		
<u>VARIABLE</u>	VALUE [FT NAVD88]	
MHW _{MCNA}	+0.80	
MLW _{MCNA}	-0.36	
$\mathrm{MHW}_{\mathrm{BA}}$	0.90	
MLW _{BA}	-0.45	

PERCENT INUNDATION SELECTION AND REFERENCE MARSH ELEVATION COMPARISON

PERCENT INUNDATION SELECTION AND REFERENCE MARSH ELEVATION COMPARISON

Identification of Engineering Problem

The purpose of this exercise is to prescribe an appropriate selection of percent inundation, as compared to reference marsh elevation surveys and desired marsh restoration type, for marsh creation project design.

Breakdown of Governing Assumptions and Calculation Methodology

- 1) With the knowledge of rising sea levels and projected increases in RSLR becoming evermore critical in marsh creation project design, CPRA has developed guidance literature for the use of the percent inundation method for estimating a marsh creation project's constructed marsh fill elevation (CMFE), so as to meet project goals while maximing ecological benefits throughout the project design life (see CPRA MCDG, Appendix D).
- 2) As identified by Appendix D of the CPRA MCDG, the following items were determined for utilization in the percent inundation method.
 - i) analysis of local water level data and site-specific tidal datum determination;
 - ii) selection of optimal percent inundation, as determined by desired marsh restoration type;
 - iii) calculation of elevation contours corresponding to upper and lower bounds of optimal water level range of selected percent inundation;
 - iv) selection of appropriate RSLR rates, on a site-/basin-specific basis;
 - v) projection of design water level elevations (i.e., MHW, MLW, upper/lower bounds of percent inundation, etc.) from present-day conditions throughout design life; and
 - vi) generation of percent inundation plot, to be used in further E&D.
- 3) As reported in the TE-0117 T. Baker Smith, LLC survey report and survey drawings, reference (existing) marsh elevation surveys were performed, under the direction of CPRA field personnel, to ascertain elevation data in marsh micro-environments that were considered to be representative of suitable TY20 project conditions. This survey data was used in formulating a comparison between the projected upper/lower bounds of percent inundation range and the projected TY20 reference marsh elevations to assist in further E&D and the evaluation of success criteria.

Solution

See the following page(s) for applicable calculations and the statement of final solution(s).

FIGURES AND GRAPHICS





THEORY, EQUATIONS, AND METHODS

)	CPRA	MCDG,	Appendix	D was	consulted.
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- 2) Per MCDG, Appendix D, the first step in using Percent Inundation methods is to perform a local water level data analysis. The earlier portion of this packet titled "TITLE DATUM DETERMINATION" contains such an analysis.
-) The Percent Inundation method then states to identify the optimal inundation zone according to marsh type within the LCZ. As such, the following was selected as the optimal inundation range values for TE-0117 project design.
- Marsh Type Saline • Optimal (Preferred) In. Range 20% - 80%
-) Utilizing the local water level analysis mentioned in item 2), the Percent Inundation method then requires a check that five (5) years or more of hydrologi data has been collected and referenced to Geoid 12A. Following this check, the water surface elevation dataset is to be ranked to identify the 20th and 80th percentiles of water levels. Note that the identification/calculation of 20th and 80th percent inundation water surface elevations represent the design-level (TY0 or earlier) water surface elevations, which are projected to undergo increases in elevation value due to eustatic sea level rise (ESLR) throughout the design life of TE-0117. The following variables were calculated for designlevel percent inundation water surface elevation values.
- EL_{PI=20%,TY(-4)} • EL_{PI=80%,TY(-4)} • EL_{PI=20%,TY0}

 - EL_{PI=80%,TY0}
-) The next step in the Percent Inundation method entails the calculation of projected water surface elevations through the design life of a marsh creation project. The following variables were calculated to determine the final projected percent inundation elevation values. See Table R-5.
- EL_{PI=20%,TY20} • EL_{PI=80%,TY20}

Note that the selected rate of ESLR used in this calculation is shown below.

Where:

R_{ESLR}

= annual rate of sea level rise due to eustacy [ft/yr]

Note that a rate of RSLR was previously conveyed to GEO that was informed by 2012 Master Plan guidance literature. The regoinal subsidence map shown in Figure R-3 together with Master Plan literature were both used to provide a a range of values for GEO to develop a selection of appropriate sea level rise rate to use in generation of settlement curves. Moving forward, CPRA explored the updated 2017 Master Plan guidance literature for sea level rise and selected upper the "1.0-m by 2100" scenario. An annual rate approximation of this scenario is shown in Table R-5 in addition to other calculations. Figure R-4 and Figure R-5 show graphical representations of design-level percent inundation water surface elevation values and water surface elevation projections throughout the TE-011 design life, respectively.

	CALCULATED VALU	ES	
	1) No calculations of no	ote.	
	2) No calculations of no	ote.	
	3) No calculations of no	ote.	
ic	 The following tables elevation calculations 	contain the design-lev s.	vel Percent Inundation
	TABLE R-5: PERC	ENT INUNDATION	CALCULATIONS
	<u>VARIABLE</u>	VALUE	<u>UNIT</u>
	R _{ESLR}	0.023204167	ft/yr
	EL _{PI=20%,TY(-4)}	+0.80	FT NAVD88
	EL _{PI=80%,TY(-4)}	-0.20	FT NAVD88
	MHW _{MCNA,TY(-4)}	+0.80	FT NAVD88
ed	MLW _{MCNA,TY(-4)}	-0.36	FT NAVD88
	EL _{PI=20%,TY0}	+0.89	FT NAVD88
	EL _{PI=80%,TY0}	-0.11	FT NAVD88
	MHW _{MCNA,TY0}	+0.90	FT NAVD88
	MLW _{MCNA,TY0}	-0.27	FT NAVD88
	EL _{PI=20%,TY20}	+1.36	FT NAVD88
	EL _{PI=80%,TY20}	+0.36	FT NAVD88
	MHW _{MCNA,TY20}	+1.36	FT NAVD88
es	MLW _{MCNA,TY20}	+0.20	FT NAVD88
er	5) Calculations discusse	ed in this item are sho	wn in Table R-5.
5			
7			



	CALCULATED VALUES
1	

SETTLEMENT AND TARGET PUMP ELEVATION DETERMINATION

SETTLEMENT AND TARGET PUMP ELEVATION DETERMINATION

Identification of Engineering Problem

The purpose of this exercise is to determine the required target pump elevation for marsh creation design and construction via the generation of geotechnical settlement curves.

Breakdown of Governing Assumptions and Calculation Methodology

- 1) A critical component of successful marsh creation project designs is the generation of geotechnical settlement curves. CWPPRA project teams rely heavily on the information presented in settlement curves in order to perform a variety of functions, including but not limited to the following:
 - i) calculating necessary marsh creation project design variables, as in the context of cross-sectional design dimensions and required volumetric pay quantities;
 - ii) developing construction drawings and contract specifications, as in the context of prescribing necessary CMFE, overbuild tolerances, minimum durations of time between construction lifts and/or the acceptance pay surveys, ECD elevations, ECD sideslopes, ECD slope stability analyses and determinations of factors of safety against governing failure conditions, ECD borrow pit design dimensions, borrow area plan and profile designs, expectations on dewatering and dike gapping and degradation following construction, and other topics.
 - iii) assisting in the development of long-term OM&M plans;
 - iv) assessing post-construction restoration quality, as in the context of the performance of WVA and other restoration crediting; and
 - v) informing future vegetative planting scenarios.
- 2) Key information that was utilized in the generation of settlement curves for the TE-0117 project include:
 - i) in situ soil mechanics properties obtained from laboratory testing performed on geotechnical borings and CPTs sampled at the TE-0117 restoration area and proposed ECD alignments;
 - ii) analytical data generated from soil samples extracted at the TE-0117 borrow area--both in situ and in the form of reconstitued composite samples of multiple in situ soil speciemens following homogenization;
 - iii) pilot scale settling column test data generated from TE-0117 borrow area composite samples;
 - iv) assumptions made for shrinkage and desiccation processes, as informed by TE-0117 borrow area analytical findings;
 - v) computationally simulated dredge slurry settlement output data produced by geotechnical engineering software (i.e., PSDDF, SETANL) using TE-0117 analytical findings; and
 - vi) regional subsidence rates across coastal Louisiana.
 - vii) other project information, as in the context of geotechnical reporting issued for previous CPRA projects.
- 3) The below-listed variables were critical in calculating settlement.
 - Coefficient of compression, C_C, of governing situ foundation soil section(s)
 - Coefficient of consolidation, C_V, of governing in situ foundation soil section(s)

SETTLEMENT AND TARGET PUMP ELEVATION DETERMINATION [C]

Breakdown of Governing Assumptions and Calculation Methodology [Continued]

4) GeoEngineers, Inc., with select information provided by CPRA (discussed in the "PERCENT INUNDATION SELECTION..." portion of this packet), produced geotechnical settlement curves for an array of five (5) different target pump elevations across several strategically selected locations throughout the TE-0117 restoration area, all of which indicative of varying in situ soil conditions and existing mudline elevations. The above-listed information in item 2) was utilized in the generation of settlement curves by first analytically determining consolidation characteristics of in situ foundation soils, which were derived empirically from consolidation geotechnical laboratory test procedures. Following the borrow area geotechnical investigation, GeoEngineers, Inc. was able to develop hydraulic dredge slurry settling properties from the settling column test and low stress consolidation test procedures conducted on borrow area homogenized soils. With the analytical findings established, computer software simulations were conducted, which were able to predict long-term settlement and time-rate settlement values for governing soil conditions across the site.

Solution

See the following page(s) for applicable calculations and the statement of final solution(s).



	CALCULATED VALUES
IC.	1) No calculations of note.
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4,	
es	2) No calculations of note.
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om	



3) No calculations of note.			
	3) No calculations of note.		



EARTHEN CONTAINMENT DIKE AND ALTERNATE CLOSURE SYSTEM DESIGN CALCULATIONS

EARTHEN CONTAINMENT DIKE AND ALTERNATE CLOSURE SYSTEM DESIGN CALCULATIONS

Identification of Engineering Problem-Global Layout

The purpose of this exercise is to execute computations to support the earthen containment dike (ECD) and alternate sheetpile-sand berm gap closure designs that will assist in further E&D progress of numerous other marsh creation area project feature design decisions.

Note: This portion of the TE-0117 calculations packet has been subdivided into multiple sections. These sections are listed below and are sequentially encountered throughout the documentation of the calculation procedure outlined in the pages that follow.

Organization of ECD and Alternate Closure System Design Calculations

- Sub-Element 1 of 3 ECD Design, Governing Design Scenarios, Single Lift
- Sub-Element 2 of 3 ECD Design, Governing Design Scenarios, Multiple Lift
- Sub-Element 3 of 3 Alternate Gap Closure System Design

Statement of Global Assumptions and Documentation of Calculation Processes

- All of the following statements of problem identifications, declarations of assumptions, discussions of calculation methodologies, and presentations of calculated values/results attempt to follow the same format. In some instances, deviation from the general format is observed and is done so having been informed by the use of best engineering judgment.
- 2) As stated in several sections throughout the main text portion of the TE-0117 design report, the comprehensiv geotechnical design concept is (and has been throughout the progression of TE-0117 Phase I) that fill site geometry is (and will likely continue to be) governed by the geotechnical conditions of both the in situ soil strata of the marsh creation and nourishment area feature, as well as by the soil mechanics and particulate settling properties of analytical findings generated from soil samples obtained at the borrow area feature. Thus, the TE-0117 design team opted for a stepwise approach to the progression of TE-0117 project feature design, where the ECD and alternate gap closure system features would serve the roles of entailing the most critical design activities needed for completion of E&D, requiring the most rigorous amounts of design attention, having the longest duration of engineering time required for E&D completion, and likely result in being the most influential design component for the entirety of the TE-0117 project.
- 3) The following sections entail the case-specific identifications of engineering problem, breakdowns of governing assumptions and calculation methodologies, and solutions pertaining to each of the following three sub-elements of this section of the calculations packet.

EARTHEN CONTAINMENT DIKE AND ALTERNATE CLOSURE SYSTEM DESIGN CALCULATIONS [C]

SUB-ELEMENT 1 OF 3 - ECD DESIGN, GOVERNING DESIGN SCENARIOS, SINGLE LIFT

Identification of Engineering Problem

The purpose of this exercise is to determine the governing design dimensions needed to provide adequate factors of safety for single lift ECD construction and postconstruction conditions.

Breakdown of Governing Assumptions and Calculation Methodology

- 1) Although the TE-0117 project requires much E&D development at the current time, it is understood that a substantial constituent of the total linear footage of fill site containment will utilize single lift ECD, if not the majority.
- 2) GeoEngineers developed two governing design profiles for use across the marsh creation and nourishment areas of the TE-0117 site. Below is a summary of each design profile and their design applications.

Design Profile	Limitations	Key Parameters	
	• High in situ moisture content	 30' min. stability berm Dike group EL 4'* 	
DP 1	• C/P line shows low τ for dike cnstr.	 Dike crown width 5' Dike how maintain 182 211 	
	• No c	 Dike borrow sidesi. 1V:2H Dike constr. sidesi. 1V:4H Dil da da	
	• High in situ moisture content	 Dike b. ch. min. EL -10'* 25' min. stability berm Dike group EL 4'* 	
DP 2	 C/P more favorable τ for dike cnstr. Cohesive ovrbrdn., φ = 30° for d. cnstr. 	 Dike crown width 5' Dike how maintain 182 211 	
		 Dike borrow sidesi. 17.244 Dike constr. sidesi. 1V:444 Dike b. ch. min. EL -10'* 	

*Values referenced to NAVD88

 ECD construction is expected to be achievable in one construction lift for areas that contain desirable preconstruction mudline elevations (EL. ≥ +2.0' NAVD88) and in situ soil conditions (DP 1 mostly).

Solution

See the following page(s) for applicable calculations and the statement of final solution(s).



	CALCULATED VALU	CALCULATED VALUES					
	1) No calculations of note.						
	 The following table contains the values calculated for design dimensions and design quantities for single lift ECD construction. 						
	TABLE R-6: SI	TABLE R-6: SINGLE LIFT ECD CALCULATIONS					
(3)	VARIABLE	VALUE	<u>UNIT</u>				
	$\mathrm{H}_{\mathrm{ECD},\mathrm{SL}}$	6	FT				
1	W _{CR,ECD}	5	FT				
	SS _{ECD}	SS _{ECD} 1V:4H FT/FT					
	A _{ECD,SL}	174	SF				
(4)	$V_{ECD,SL}*$	174	CF				
	$V_{ECD,SL}*$	6.44	СҮ				
	H_{ECDBA}	8	FT				
	W _{CR,ECDBA} **	40	FT				
	SS_{ECDBA}	1V:2H	FT/FT				
	A_{ECDBA}	448	SF				
	$V_{ECDBA}*$	448	CF				
	V _{ECDBA} *	16.59	СҮ				
(5)	*Values represented as per LF of ECD/borrow channel reach **Borrow pit width based on worst case ECD construction						
(6)							
	3) No calculations of note.						
	1						

EARTHEN CONTAINMENT DIKE AND ALTERNATE CLOSURE SYSTEM DESIGN CALCULATIONS [C]

SUB-ELEMENT 2 OF 3 - ECD DESIGN, GOVERNING DESIGN SCENARIOS, MULTIPLE LIFT

Identification of Engineering Problem

The purpose of this exercise is to determine the governing design dimensions needed to provide adequate factors of safety for multiple lift ECD construction and postconstruction conditions.

Breakdown of Governing Assumptions and Calculation Methodology

- 1) As stated in item 1) beneath the previous section, while single lift ECD designs are proposed for a a substantial constituent of the total linear footage of fill site containment, a critical design component of TE-0117 is the multiple lift ECD proposed design.
- 2) The same design profiles developed in item 2) beneath the previous section apply.
- 3) ECD construction is expected to be achievable in two construction lifts for areas that contain preconstruction mudline elevations that are not desirable for one lift ECD construction.
- 4) In areas that require multiple lift construction, future E&D progress should consider the following prior to the final design milestone.
 - The necessity to specify a predetermined wait period following completion of the first lift and commencing the second lift is critical when developing construction bidding documetns and contract specifications.
 - The declaration of a predetermined ECD construction sequence would ideally begin in an area of the projec site such that lift one of the ECD exhibiting the most challenging in situ soil conditions has the first opportunity to undergo strength gains.
 - The creation of construction budgets, schedules, and construction specifications should consider changing field conditions as a result of dike performance of multiple lift ECD construction introducing complications

Solution

See the following page(s) for applicable calculations and the statement of final solution(s).


	CALCULATED VALU	<u>ES</u>						
)	1) No calculations of note.							
	 The following tables contain the values calculated for the design quantities for multiple lift ECD construction. 							
	TABLE R-7: F	TIRST LIFT ECD CAL	CULATIONS					
	VARIABLE	VALUE	<u>UNIT</u>					
	$H_{ECD,SL}$	7	FT					
	W _{CR,ECD}	5	FT					
CD	SS_{ECD}	FT/FT						
	$A_{ECD,SL}$	231	SF					
7)	CF							
8) V _{ECD,SL} * 8.56 CY								
	TABLE R-8: SE	COND LIFT ECD CA	LCULATIONS					
	VARIABLE	VALUE	<u>UNIT</u>					
	$\mathrm{H}_{\mathrm{ECD,ML}}$	1.5	FT					
l	W _{CR,ECD}	5	FT					
	SS_{ECD}	1V:4H	FT/FT					
	$A_{\text{ECD,ML}}$	16.5	SF					
	$V_{ECD,ML}$ *	16.5	CF					
	V _{ECD,ML} *	0.61	СҮ					
	TABLE R-9	: ECD BORROW QU	ANTITIES					
	<u>VARIABLE</u>	VALUE	<u>UNIT</u>					
	H_{ECDBA}	7	FT					
	W _{CR,ECDBA}	40	FT					
	SS _{ECDBA}	1V:2H	FT/FT					
	A_{ECDBA}	378	SF					
	$V_{ECDBA}*$	378	CF					
	$V_{ECDBA}*$	14.00	СҮ					

EARTHEN CONTAINMENT DIKE AND ALTERNATE CLOSURE SYSTEM DESIGN CALCULATIONS [C]

SUB-ELEMENT 3 OF 3 - ALTERNATE GAP CLOSURE SYSTEM DESIGN

Identification of Engineering Problem

The purpose of this exercise is to determine the governing design dimensions needed to provide adequate factors of safety for the alternate gap closure system design.

Breakdown of Governing Assumptions and Calculation Methodology

- In the southernmost portion of FILL SITE C, a deep bathymetric channel pit-like feature exists. In this area, the bathymetric relief deepens from approximately -3 FT NAVD88 to approximately -11 FT NAVD88.
 In order to maximize benefit acreage, the TE-0117 project team, alongside GeoEngineers, Inc., has explored the use of a sand berm-sheetpile closure complex for a proposed containment design at this location.
- 2) In situ soil characteristics at this portion of the marsh creation area are similar to select other locations with the exception of cohesive and peat overburden being nonexistent and a silty sand and sand layer understood to be exposed at the waterbottom surface.
- 3) The alternate gap closure system construction, operation, and long-term performance is expected to be acheivable as designed based on safety factors for what are believed to be the governing failure conditions based on what is known at the current time. If decided to move forward with the alternate gap closure system design, future E&D progress should consider incorporating a more significant, detailed design effort to explore other potential sources of failure and even consider increasing factors of safety used for design by GeoEngineers, Inc.
- 4) The acquiring of additional knowledge and review of past CPRA project literature in which sand bermsheetpile closure systems have been designed, constructed, and successfully operated during and post construction is recommended prior to the final design milestone.
- 5) Contrary to ECD construction at the TE-0117 project site, construction loads are not analyzed as governing conditions, so much as oveturning moments and shear forces are believed to be drivers of design dimensions

Solution

See the following page(s) for applicable calculations and the statement of final solution(s).



CALCULATED VALUES

- 1) No calculations of note.
- 2) No calculations of note.

MARSH CREATION AND NOURISHMENT AREA DESIGN CALCULATIONS

MARSH CREATION AND NOURISHMENT AREA DESIGN CALCULATIONS

Identification of Engineering Problem

The purpose of this exercise is to compute: (1) the total proposed benefit acreage; and (2) the total required in-place fill volume corresponding to the marsh creation and nourishment area design shown in the 30% design drawing package.

Breakdown of Governing Assumptions and Calculation Methodology

- 1) In order to produce the above-mentioned calculations, the following information was reviewed:
 - i) TE-0117 restoration area and vicinity survey data, survey report, and accompanying survey drawings submitted by T. Baker Smith, LLC.
 - ii) TE-0117 supplementary marsh creation area geotechnical engineering report and accompanying geotechnical investigation data reports submitted by GeoEngineers, Inc.
 - iii) TE-0117 30% design drawings (applicable restoration area plan and profile sheets).
- 2) The calculation procedure utilized entailed the following methodologies.
 - The proposed marsh creation and nourishment area restoration cell boundaries were overlaid onto the design level survey data collected by T. Baker Smith, LLC. Following this step, design template transects at finished CMFE were drawn corresponding to the survey transects taken as part of the design level survey package.
 - The use of CAD computational methods were used to create volumetric estimates by first generating a three-dimensional surface contour of the existing conditions at the restoration area, as indicated by design-level survey data. A second three-dimensional surface contour was created of the finished marsh creation and nourishment area surface corresponding to the finished CMFE. The inscribed volume was then calculated.
- 3) Note that certain portions within this calculations packet call for future recommendations to implement design changes that could alter the currently propsed marsh creation and nourishment area benefit acreage, and therefore the currently estimated total required in-place fill volume.

Solution

See the following page(s) for applicable calculations and the statement of final solution(s).



THEORY, EQUATIONS, AND METHODS

-) The TE-0117 30% design CAD package was used to obtain planview layout drawings of the marsh creation and nourishment area. See Figure R-17.
- 2) CAD was used to accurately measure total proposed benefit acres and to execute volumetric calculation methods to compute in-place fill volumes. Table R-10 contains applicable benefit acreage values for proposed design; Table R-11 contains in-place volumetric calculations.

-,							
 The following tables contain calculated values for proposed benefit acreages and in-place volumetric quantities. 							
TABLE R-1	0: TE-0117 PROPOSE	D BENEFITS					
POLYGON	AREA [SF]	AREA [AC]					
MCA1 1,711,647 39.3							
MCA2	6,780,236	155.7					
MCA3	1,898,582	43.6					
MCA4	2,298,264	52.8					
TOTAL	12,688,729	291.3					
TABLE R-11: T	E-0117 VOLUMETRIC	CALCULATIONS					
POLYGON	<u>VOLUMETRIC</u> <u>FEATURE</u>	TOTAL VOLUME [CY]					
MCA1	FILL VOLUME DIKE B. FILL TOTAL	156,257 84,272 240,529					
MCA2	FILL VOLUME DIKE B. FILL TOTAL	592,774 189,676 782,450					
MCA3	FILL VOLUME DIKE B. FILL TOTAL	211,882 85,775 297,657					
MCA4	FILL VOLUME DIKE B. FILL TOTAL	103,929 114,203 218,132					
TOTAL 1,538,767							
		<u> </u>					

ACCESS AND CONVEYANCE CORRIDOR DESIGN CALCULATIONS

NORTHERN ACCESS/CONVEYANCE/SOUTHERN ACCESS CORRIDOR DESIGN CALCULATIONS

Identification of Engineering Problem

The purpose of this exercise is to compute the total estimated maximum access dredging quantity (on the bases of total volumetric quantity and total LF quantity) corresponding to the corridor design shown in the 30% design drawing package.

Breakdown of Governing Assumptions and Calculation Methodology

- 1) In order to compute the estimated access dredging quantity required for the TE-0117 project, the following actions were carried out.
 - Information was gathered on draft depths, marine navigation, and overall equipment performance for a hypothetical hydraulic dredge and construction euqipment fleet needed in order to execute all construction operations needed for a project of similar scale and scope as TE-0117.
 - The total maximum LF of required navigable conveyance corridor was calculated, based on project layout dimensions and a review of applicable sections of the TE-0117 surveying deliverables submitted by CHF.
- 2) Along with the tidal datum determination presented in this calculations packet, a minimum mulline elevation corresponding to the requirement for access dredging was selected. This mulline elevation was selected based on information collected on draft depths and TE-0117 survey data that established a controlling water depth needed for vessel draft requirements envisioned for the TE-0117 project.
- 3) An operating width was selected, based on knowledge of dredge and equipment logistics and the contents of applicable information gathered on marine navigation and overall equipment performance.
- 4) Based on all of the above information, the following variables were calculated:
 - i) L_{CORR.TOTAL} is defined as the total length of navigable marine corridor needed for the TE-0117 project.
 - ii) L_{CORR,MECH-D} is defined as the total length of marine corridor requiring mechanical access dredging in order to establish complete navigable marine access.
 - iii) V_{CORR,MECH-D} is defined as the total volume of mechanical access dredging required in order to establish complete navigable marine access.

Solution

See the following page(s) for applicable calculations and the statement of final solution(s).



CALCULATED VALU	CALCULATED VALUES							
1) No calculations of n	1) No calculations of note.							
 The following table contains the values corrspondencing to lengths of navigable access corridor required for TE-0117. 								
TABLE R-12: TE	TABLE R-12: TE-0117 ACCESS CORRIDOR LENGTHS							
CORRIDOR	LENGTH [LF]	LENGTH [MI]						
NAC	15,545	2.94						
CC	CC 21,286 4.03							
SAC	79,110	14.98						
SAC SPUR	16,508	3.13						
TOTAL	132,449	25.09						
3) The following table TABLE	contains the NAC calc	ulations. ATIONS						
VARIABLE	VARIABLE VALUE UNIT							
L _{CORR,TOTAL,NAC} 15,545 LF								
L _{corr,mech-d,nac}	6,900	LF						
H _{ECDBA}	7	FT						
W _{CR,ECDBA}	80	FT						
SS _{ECDBA}	SS _{ECDBA} 1V:2H FT/FT							
A _{ECDBA}	A _{ECDBA} 658 SF							
V _{ECDBA} * 658 CF								
$V_{ECDBA}*$	V _{ECDBA} * 24.37 CY							
V _{CORR,MECH-D,NAC}	V _{CORR,MECH-D,NAC} 4,540,200 CF							
V _{CORR,MECH-D,NAC}	168,156	СҮ						
*Values represented as	per LF of ECD/borrow	channel reach						



CALCULATED VALUES									
4) The following table	4) The following table contains the CC calculations.								
<u>VARIABLE</u>	<u>VALUE</u>	<u>UNIT</u>							
L _{CORR,TOTAL,CC}	21,286	LF							
L _{CORR,MECH-D,CC}	7,901	LF							
H _{ECDBA}	1	FT							
W _{CR,ECDBA}	80	FT							
SS_{ECDBA}	1V:2H	FT/FT							
A_{ECDBA}	82	SF							
d V _{ECDBA} *	82	CF							
$V_{ECDBA}*$	3.04	СҮ							
V _{CORR,MECH-D,NAC}	647,882	CF							
V _{CORR,MECH-D,NAC}	23,996	СҮ							
*Values represented as per LF of ECD/borrow channel reach									
TABLE R-15: CC CALCULATIONS (@ -8' CUT)									
VADIADIE	VALUE.	INUT							
VARIABLE	VALUE	UNIT							
VARIABLE L _{CORR,TOTAL,CC}	<u>VALUE</u> 21,286	<u>UNIT</u> LF							
VARIABLE L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC}	<u>VALUE</u> 21,286 18,000	UNIT LF LF							
VARIABLE L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC} H _{ECDBA}	<u>VALUE</u> 21,286 18,000 4	UNIT LF LF FT							
VARIABLE L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC} H _{ECDBA} W _{CR,ECDBA}	<u>VALUE</u> 21,286 18,000 4 80	UNIT LF LF FT FT							
VARIABLE L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC} H _{ECDBA} W _{CR,ECDBA} SS _{ECDBA}	VALUE 21,286 18,000 4 80 1V:2H	UNIT LF LF FT FT FT/FT							
VARIABLE L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC} H _{ECDBA} W _{CR,ECDBA} SS _{ECDBA} A _{ECDBA}	VALUE 21,286 18,000 4 80 1V:2H 352	UNIT LF LF FT FT FT/FT SF							
VARIABLE L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC} H _{ECDBA} W _{CR,ECDBA} SS _{ECDBA} A _{ECDBA}	VALUE 21,286 18,000 4 80 1V:2H 352 352	UNIT LF LF FT FT FT/FT SF CF							
VARIABLE L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC} H _{ECDBA} W _{CR,ECDBA} SS _{ECDBA} A _{ECDBA} V _{ECDBA} *	VALUE 21,286 18,000 4 80 1V:2H 352 352 13.04	UNIT LF LF FT FT FT/FT SF CF CY							
VARIABLE L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC} H _{ECDBA} W _{CR,ECDBA} SS _{ECDBA} A _{ECDBA} V _{ECDBA} * V _{ECDBA} * V _{CORR,MECH-D,NAC}	VALUE 21,286 18,000 4 80 1V:2H 352 352 13.04 6,336,000	UNIT LF LF FT FT FT/FT SF CF CY CY							
VARIABLE L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC} H _{ECDBA} W _{CR,ECDBA} SS _{ECDBA} A _{ECDBA} V _{ECDBA} * V _{ECDBA} * V _{CORR,MECH-D,NAC} V _{CORR,MECH-D,NAC}	VALUE 21,286 18,000 4 80 1V:2H 352 352 13.04 6,336,000 234,667	UNIT LF LF FT FT FT FT/FT SF CF CY CF CF							



	5) The following table contains the CC calculations.							
TABLE R	-16: SAC CALCULA	TIONS						
VARIABLE	VALUE	UNIT						
L _{CORR,TOTAL,CC}	79,110	LF						
L _{CORR,MECH-D,CC}	18,900	LF						
H_{ECDBA}	2	FT						
W _{CR,ECDBA}	80	FT						
SS_{ECDBA}	1V:2H	FT/FT						
A_{ECDBA}	168	SF						
$V_{ECDBA}*$	168	CF						
V _{ECDBA} * 6.22 CY								
V _{CORR,MECH-D,NAC}	3,175,200	CF						
V _{CORR,MECH-D,NAC}	117,600	СҮ						
Values represented as p	er LF of ECD/borrow	channel reach						
TABLE R-17	: SAC SPUR CALCU	LATIONS						
VARIABLE	VALUE	UNIT						
L _{CORR,TOTAL,CC}	16,508	LF						
L _{corr,total,cc} L _{corr,mech-d,cc}	16,508 16,500	LF						
L _{corr,total,cc} L _{corr,mech-d,cc} H _{ecdba}	16,508 16,500 2	LF LF FT						
L _{corr,total,cc} L _{corr,mech-d,cc} H _{ecdba} W _{cr,ecdba}	16,508 16,500 2 80	LF LF FT FT						
L _{corr,total,cc} L _{corr,mech-d,cc} H _{ecdba} W _{cr,ecdba} SS _{ecdba}	16,508 16,500 2 80 1V:2H	LF LF FT FT FT/FT						
L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC} H _{ECDBA} W _{CR,ECDBA} SS _{ECDBA} A _{ECDBA}	16,508 16,500 2 80 1V:2H 168	LF LF FT FT FT/FT SF						
L _{corr,total,cc} L _{corr,mech-d,cc} H _{ecdba} W _{cr,ecdba} SS _{ecdba} A _{ecdba} V _{ecdba} *	16,508 16,500 2 80 1V:2H 168 168	LF LF FT FT FT/FT SF CF						
L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC} H _{ECDBA} W _{CR,ECDBA} SS _{ECDBA} A _{ECDBA} * V _{ECDBA} *	16,508 16,500 2 80 1V:2H 168 168 6.22	LF LF FT FT FT/FT SF CF CY						
L _{CORR,TOTAL,CC} L _{CORR,MECH-D,CC} H _{ECDBA} W _{CR,ECDBA} SS _{ECDBA} A _{ECDBA} V _{ECDBA} * V _{ECDBA} * V _{CORR,MECH-D,NAC}	16,508 16,500 2 80 1V:2H 168 168 6.22 2,772,000	LF LF FT FT FT/FT SF CF CY CF						

BORROW AREA DESIGN CALCULATIONS

BORROW AREA DESIGN CALCULATIONS

Identification of Engineering Problem

The purpose of this exercise is to compute the total available borrow volume quantity corresponding to the borrow area design shown in the 30% design drawing package.

Breakdown of Governing Assumptions and Calculation Methodology

- 1) In order to perform the borrow area boundary layout and then compute the total borrow volume availability, the following information was reviewed:
 - i) TE-0117 Borrow Area Development Services Deliverable Package submitted by C. H. Fenstermaker & Associates, LLC;
 - ii) Volumetric quantity estimates produced for the TE-0117 30% design package.
- Dissolved oxygen (DO) impacts due to borrow area excavation operations were voiced by NMFS as a
 potential concern. During TE-0117 design, it was decided to restrict hydraulic dredging to bottom elevations
 no deeper than than -12 FT NAVD88.
- 3) A cut-to-fill ratio for hydraulic dredging of 1.2:1 was utilized, as recommended by GeoEngineers, Inc.
- 4) Based on the above-stated review of project information and the DO constraint, the borrow area layout was selected as shown in TE-0117 design documents, and a maximum excavation elevation contour was selected as shown. The volume was calculated with the CAD surface compulation methodology as stated in item 2) of the "MARSH CREATION AND..." section of this calculations packet.

Solution

See the following page(s) for applicable calculations and the statement of final solution(s).



CALCULATED VALUES	
1) No calculations of note.	
2) No calculations of note.	
 The following table contains volu borrow area sizing. 	umetric quantities used in
TABLE R-18: BORROW A	AREA CALCULATIONS
VOLUMETRIC FEATURE	VOLUME [CY]
Total Volume Demand (C:F = 1.2:1)	1,846,521
-10' NAVD88 Total Borrow Availability -12' NAVD88	3,307,155
Total Borrow Availability	4,561,581
-15' NAVD88 Total Borrow Availability	6,911,180

APPENDIX E

TE-0117 MARSH CREATION AREA TOPOGRAPHIC, BATHYMETRIC, AND MAGNETOMETER SURVEYING DATA COLLECTION INFORMATION (Deliverables submitted April 2016 by T. Baker Smith, LLC)

<ftp://ftp.coastal.la.gov/TE117/Preliminary_Design_Report/2_Appendices/Appendix_E/Final.ZIP>

APPENDIX F

TE-0117 BORROW AREA AND ACCESS CORRIDOR TOPOGRAPHIC, BATHYMETRIC, MAGNETOMETER, AND GEOPHYSICAL DATA COLLECTION INFORMATION (Deliverables submitted September 2018 by C. H. Fenstermaker & Associates, LLC)

APPENDIX G

TE-0117 GEOTECHNICAL INVESTIGATION DATA REPORT, EXPLORATORY MARSH CREATION AREA GEOTECHNICAL INVESTIGATION (Deliverables submitted July 2015 by GeoEngineers, Inc.)

APPENDIX H

TE-0117 GEOTECHNICAL INVESTIGATION DATA REPORT, SUPPLEMENTARY MARSH CREATION AREA GEOTECHNICAL INVESTIGATION (Deliverables submitted February 2017 by GeoEngineers, Inc.)

<ftp://ftp.coastal.la.gov/TE-117/Preliminary_Design_Report/2_Appendices/Appendix_H/_FINAL_Data_Report.ZIP>

APPENDIX I

TE-0117 GEOTECHNICAL INVESTIGATION DATA REPORT, BORROW AREA GEOPHYSICAL DATA REPORT ADDENDUM (Deliverables submitted April 2018 by GeoEngineers, Inc.)

<ftp://ftp.coastal.la.gov/TE117/Preliminary_Design_Report/2_Appendices/Appendix_I/_FINAL.ZIP>

APPENDIX J

TE-0117 GEOTECHNICAL ENGINEERING REPORT, EXPLORATORY MARSH CREATION AREA GEOTECHNICAL INVESTIGATION (Deliverables submitted July 2015 by GeoEngineers, Inc.)

<ftp://ftp.coastal.la.gov/TE-117/Preliminary_Design_Report/2_Appendices/Appendix_J/_FINAL.ZIP>

APPENDIX K

TE-0117 GEOTECHNICAL ENGINEERING REPORT, SUPPLEMENTARY MARSH CREATION AREA GEOTECHNICAL INVESTIGATION (Deliverables submitted August 2018 by GeoEngineers, Inc.)

<ftp://ftp.coastal.la.gov/TE-</pre>

117/Preliminary_Design_Report/2_Appendices/Appendix_K/_FINAL_Engineering_Report.ZIP

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APPENDIX L

TE-0117 BORROW REGION WAVE AND VELOCITY IMPACT ANALYSIS MODELING REPORT

(Deliverables submitted August 2018 by University of Louisiana at Lafayette)

<u><ftp://ftp.coastal.la.gov/TE-</u>
<u>117/Preliminary_Design_Report/2_Appendices/Appendix_L/_FINAL.ZIP></u>

APPENDIX M

30% DESIGN DRAWINGS

INDEX TO SHEETS

SHEET NO. DESCRIPTION

- 1 TITLE SHEET
- 2 GENERAL NOTES
- 3 PROJECT LAYOUT
- 4 NORTHERN ACCESS CORRIDOR PLAN VIEW
- 5 MARSH CREATION AREA AND CONVEYANCE CORRIDOR PLAN VIEW
- 6 BORROW AREA AND SOUTHERN ACCESS CORRIDOR PLAN VIEW
- 7 SOUTHERN ACCESS CORRIDOR AND SOUTHERN ACCESS CORRIDOR SPUR PLAN VIEW
- 8 SOUTHERN ACCESS CORRIDOR PLAN VIEW
- 9-16 TYPICAL SECTIONS
- 17 SETTLEMENT PLATE DETAILS
- 18 TEMPORARY WARNING SIGN DETAIL
- 19 GRADE STAKE DETAIL

STATE OF LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY

ISLAND ROAD MARSH CREATION AND NOURISHMENT PROJECT TE-0117 TERREBONNE PARISH



20,000' 10,000' 0' 20,000' 40,000'

LICENSURE CLASSIFICATION REQUIREMENTS MAJOR CLASSIFICATION: HEAVY CONSTRUCTION AND/OR DREDGING



PRELIMINARY

DOCUMENTS ARE NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

		BY						
		DESCRIPTION						
		DATE						
		REV.						
COASTAL PROTECTION RESTORATION AUTHO	OASTAL PROTECTION / RESTORATION AUTHOR 150 TERRACE AVENUE BATON ROUGE, LOUISIANA 70802							
TITLE SHEET	DESIGNED BY: JACQUES BOUDREAUX, P.E.	APPROVED BY: DAIN GILLEN, P.E.						
ISLAND ROAD MARSH CREATION AND NOURISHMENT PROJECT	STATE PROJECT NUMBER: TE-0117	DRAWN BY: SHANE FAUST						
DATE: OCTO	BER 2	019						
SHEET 1 OF 19								

GENERAL NOTES:

- 1. EQUIPMENT ACCESS TO THE PROJECT SITE SHALL BE THROUGH NAVIGABLE WATERWAYS AND SHALL NOT IMPACT EXISTING WATER BOTTOMS OR WETLANDS UNLESS OTHERWISE NOTED.
- 2. PLANS AND SPECIFICATIONS ARE COMPLEMENTARY; WHAT IS REQUIRED BY ONE IS BINDING AS IF REQUIRED BY ALL. CLARIFICATIONS AND INTERPRETATIONS OF, OR NOTIFICATIONS OF MINOR VARIATIONS AND DEVIATIONS IN THE CONTRACT DOCUMENTS, WILL BE ISSUED BY THE ENGINEER.
- THE CONTRACTOR SHALL MAINTAIN AIDS TO NAVIGATION DURING CONSTRUCTION AND HAVE ADEQUATE NAVIGATIONAL EQUIPMENT ON THE DREDGE 3. TO AVOID DREDGING IN RESTRICTED AREAS. ANY DAMAGE TO EXISTING AIDS TO NAVIGATION SHALL BE REPAIRED BY THE CONTRACTOR TO U.S. COAST GUARD STANDARDS AT THE EXPENSE OF THE CONTRACTOR.
- 4. PROJECT FEATURES MAY BE REVISED BY THE ENGINEER THROUGHOUT THE WORK TO REFLECT CHANGES IN FIELD CONDITIONS.
- 5. A MAGNETOMETER SURVEY SHALL BE PERFORMED IN ANY AREAS POTENTIALLY REQUIRING EARTHWORK OR PROPOSING WATER BOTTOM DISTURBANCE PRIOR TO EXCAVATION OR DREDGING, DRAWINGS SHOWING THE TRACK LINES, COORDINATES, AMPLITUDE, SIGNATURE TYPE, AND DURATION OF ALL ANOMALIES SHALL BE SUBMITTED TO THE ENGINEER IN THE PRECONSTRUCTION SURVEY. THE DRAWINGS SHALL BE ACCOMPANIED BY A WRITTEN REPORT DISCUSSING THE INTERPRETATION OF MAGNETOMETER RESULTS AND THE IDENTIFICATION OF INFRASTRUCTURE.
- THE CONTRACTOR IS RESPONSIBLE FOR CONTAINING THE HYDRAULICALLY DREDGED MATERIAL WITHIN THE BOUNDARIES OF THE MARSH CREATION 6. AREAS.
- BACKGROUND IMAGERY WAS TAKEN IN 2016. 7.
- PIPELINE AND UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL LOCATE AND MARK ALL PIPELINES AND 8. UTILITIES LOCATED WITHIN 250 FT. OF THE WORK PRIOR TO BEGINNING CONSTRUCTION. THE CONTRACTOR SHALL MAINTAIN THESE MARKERS DURING CONSTRUCTION. VERIFIED PIPELINES REFERENCE THE PIPELINE LOCATION (X, Y, Z) DETERMINED FROM THE DESIGN SURVEY(S).

NOTIFICATIONS:

- 1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE FOLLOWING PIPELINE AND UTILITY OPERATORS AT LEAST FIVE (5) WORKING DAYS IN ADVANCE OF THE WORK. CALL LOUISIANA ONE CALL AT 1-800-272-3020 5 DAYS PRIOR TO ANY EXCAVATION AND/OR DREDGING TO LOCATE ALL PIPELINES OR UTILITIES.
- 2. THE CONTRACTOR SHALL NOTIFY THE LANDOWNERS LISTED BELOW AT LEAST FIVE (5) WORKING DAYS PRIOR TO PERFORMING THE WORK.

APACHE LOUISINA MINERALS, INC. CONTACT: TIMOTHY J. ALLEN PHONE: (985) 876-5267

CONOCOPHILLIPS CONTACT: ORDIS J. SMITH PHONE: (985) 853-3018

TERREBONNE PARISH CONSOLIDATED GOVERNMENT CONTACT: MART BLACK PHONE: (985) 873-6889

3. MODIFICATIONS TO THE DREDGE PIPELINE CORRIDOR AND EQUIPMENT ACCESS CORRIDOR SHALL REQUIRE APPROVAL BY THE ENGINEER.

DESIGN NOTES:

1. ALL ELEVATIONS ARE GIVEN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) U.S. SURVEY FEET, GEOID 12A. ALL HORIZONTAL COORDINATES ARE GIVEN IN THE NORTH AMERICAN DATUM OF 1983 (NAD 83, LOUISIANA STATE PLANE SOUTH ZONE U.S. FEET). ALL ELEVATIONS ARE BASED ON THE FOLLOWING:

SECONDARY SURVEY MONUMENT	ELEVATION	NORTHING	EASTING
TE10-SM-08	1.09'	334,370.51	3,562,994.43
CRMSTE-SM-19	0.86'	303,440.69	3,533,118.70

- 3 DATA FROM STATIONS CRMS3296 AND CRMS0341 WERE USED TO CALCULATE THE MHW AND MLW. ELEVATIONS ARE REFERENCED TO NAVD 88, US FEET, GEOID 12A. MHW = +0.80' AND MLW = -0.35' WITHIN PROJECT AREA.
- THE EXISTING ELEVATIONS SHOWN ON THE PLANS ARE BASED ON THE DESIGN SURVEYS PERFORMED IN 2016 BY T.BAKER SMITH, LLC. (TBS) AND 2017 4. BY C.H. FENDSTERMAKER & ASSOCIATES, LLC (CHF). SURVEY INFORMATION HAS BEEN INCLUDED IN APPENDIX E AND APPENDIX F TO THE DESIGN REPORT.
- GEOTECHNICAL INVESTIGATION WERE PERFORMED BY GEOENGINEERS INC. IN 2015 AND 2018. GEOTECHNICAL INFORMATION HAS BEEN INCLUDED IN 5. APPENDICES G THROUGH K TO THE DESIGN REPORT.

LEGEND - SECTION VIEWS

BORROW AREA

CONSTRUCTED MARSH FILL EARTHEN CONTAINMENT DIKE ---- EXISTING WATER BOTTOM REHANDLING AREA TEMPORARY SPOIL

SUMMARY OF ESTIMATED QUANTITIES								
ITEM No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY ¹					
1	MOBILIZATION / DEMOBILIZATION	LS	1					
2	ACCESS DREDGING WITH SIGNAGE	LS	1					
3	MARSH FILL (INCLUDING DIKE BACKFILL)	CY	1,846,521					
4	EARTHEN CONTAINMENT DIKES	LF	27,350					
5	ALTERNATE SHEETPILE CLOSURE SYSTEM	LS	1					
6	GRADESTAKES	LS	1					
7	INSTRUMENTED SETTLEMENT PLATES	EA	6					
8	VEGETATIVE PLANTINGS	PLANTS	170,625					
9	CONSTRUCTION SURVEYS	LS	1					

THE QUANTITIES SHOWN WERE CALCULATED FROM THE DESIGN SURVEY. THE OWNER 1. RESERVES THE RIGHT TO ADJUST QUANTITIES 25% HIGHER OR LOWER WITHOUT ADJUSTMENT OF THE UNIT PRICE.

2. QUANTITY IS BASED ON THE BORROW AREA CUT VOLUMES. PAYMENT QUANTITY WILL BE BASED ON PROCESS SURVEYS OF THE MARSH CREATION BORROW AREA.

LEGEND - PLAN VIEWS

- ---- ACCESS CORRIDOR CL
- ----- ACCESS CORRIDOR LIMITS (BOC)
- ------ DREDGE PIPELINE CORRIDOR
- EARTHEN CONTAINMENT DIKE
- **EARTHEN CONTAINMENT DIKE** BORROW AREA
- FEDERAL NAVIGATIONAL CHANNEL
- ٠ GRADE STAKE
- PL-1⊗ KNOWN PIPELINE CROSSING
- MAGNETOMETER ANOMALY
- MARSH CREATION AREA
- MARSH CREATION BORROW AREA
- SP-1 X SETTLEMENT PLATE
- B-1 🔂 SOIL BORING
- Α SURVEY MONUMENT
- ---- SURVEY TRANSECT
- TEMPORARY SPOIL
- R VERIFIED PIPELINE
- UNVERIFIED PIPELINE

ABBREVIATIONS:

POC		
CHE	C H FENSTERMAKER & ASSOCIATES	
CI	CENTERLINE	
CMF	CONSTRUCTED MARSH FILL	
CPT	CONE PENETRATION TEST	
CY	CUBIC YARD	
DPC	DREDGE PIPE CORRIDOR	
EAC	EQUIPMENT ACCESS CORRIDOR	
EB	EXISTING WATER BOTTOM	
ECD	EARTHEN CONTAINMENT DIKE	
ECDBA	EARTHEN CONTAINMENT DIKE	
	BORROW AREA	
EL	ELEVATION	
FT	FOOT	
HNC	HOUMA NAVIGATION CHANNEL	
MCA		1 a
MCBA	MARSH CREATION BORROW AREA	Ē
NAC	NORTHERN ACCESS CORRIDOR	1
NTS	NOT TO SCALE	Ę
PI	POINT OF INTERSECTION	Ē
PL	PIPELINE	
SAC	SOUTHERN ACCESS CORRIDOR	× .
SB	SOIL BORING	
SF	SQUARE FOOT	
SM	SURVEY MONUMENT	È
SP	SETTLEMENT PLATE	E
ST		2
SY		101
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11 317,129.72 3,552,853.27 12 316,531.37 3,553,102.31 13 316,009.77 3,552,705.93 14 315,009.88 3,553,018.23 15 314,118.17 3,552,820.67 17 310,097.94 3,552,915.718 18 310,074.69 3,552,912.63 20 308,390.99 3,552,912.63 21 307,790.68 3,552,621.11 22 302,024.81 3,552,012.037 23 298,637.72 3,552,012.037 24 298,637.72 3,552,070.03 CONT HERN ACCESS CHANNEL CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,358.42 27 295,362.65 3,546,358.42 27 295,382.44 3,546,007.13 30 292,921.55 3,546,308.42 27 295,382.44 3,546,007.13 30 292,921.55 3,546,3701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36	317, 129, 72 3,552,853,27 316, 531, 37 3,553, 102,31 315, 009, 88 3,553, 102,32 314, 118, 17 3,552, 2705, 53 313, 007, 94 3,552, 280, 67 310, 074, 69 3,552, 280, 67 310, 074, 69 3,552, 281, 108 306, 789, 47 3,552, 281, 108 307, 790, 68 3,552, 212, 037 298, 637, 72 3,552, 210, 37 298, 637, 72 3,552, 210, 37 298, 637, 72 3,552, 210, 37 298, 637, 72 3,552, 010, 33 298, 693, 15 3,546, 480, 33 298, 693, 15 3,546, 480, 33 298, 099, 15 3,546, 480, 33 298, 099, 15 3,546, 430, 33 298, 099, 15 3,546, 430, 33 298, 099, 15 3,546, 430, 33 298, 099, 15 3,546, 430, 33 298, 099, 15 3,546, 430, 33 298, 099, 15 3,546, 430, 33 298, 099, 15 3,546, 430, 33 298, 099, 15 3,546, 430, 33 298, 093, 16 3,546, 430, 33 298, 093, 10, 3,535, 549, 92 3,537, 549, 93 <	10	320,965.71	3,5	53,036.13
12 316,531.37 3,553,102.31 13 316,009.77 3,552,705.93 14 315,009.88 3,553,018.23 15 314,118.17 3,552,767.95 16 313,097.94 3,552,820.67 17 310,912.93 3,552,981.08 20 308,390.99 3,552,981.08 20 308,390.99 3,552,120.37 23 298,637.72 3,552,120.37 24 298,637.72 3,552,070.03 CRMERN ACCESS CHANNEL CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,386.42 27 295,362.65 3,546,358.42 28 294,417.29 3,546,208.79 29 293,894.48 3,546,071.13 30 292,921.55 3,546,092.41 31 289,810.64 3,543,701.02 34 269,786.73 3,546,874.84 33 277,731.08 3,539,157.49.53 36 263,365.00 3,539,597.84 37 262,135.40 3,539,597.84 <td>316.531.37 3.553.102.31 316.009.77 3.552.705.93 313.007.988 3.552.820.67 313.007.94 3.552.820.67 310.0724 3.552.820.67 310.0724 3.552.912.83 300.789.47 3.552.912.63 307.790.68 3.552.912.63 307.790.68 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.070.03 UTHERN ACCESS CHANNEL ENTERLINE COORDINATES Intern Access Corridor Spurg (sac Spurg) 293.804.48 3.546.007.13 298.089.15 3.546.358.42 299.106.4 3.546.708.241 289.801.64 3.546.708.241 289.810.64 3.543.754.23 286.308.20 3.533.575.49.23 286.308.20 3.533.575.24.92 208.165.06 3.522.053.48 VELNER NAVIGATION CANAL (HNC) 288.346.47 3.539.976.84</td> <td>11</td> <td>317,129.72</td> <td>3,5</td> <td>52,853.27</td>	316.531.37 3.553.102.31 316.009.77 3.552.705.93 313.007.988 3.552.820.67 313.007.94 3.552.820.67 310.0724 3.552.820.67 310.0724 3.552.912.83 300.789.47 3.552.912.63 307.790.68 3.552.912.63 307.790.68 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.070.03 UTHERN ACCESS CHANNEL ENTERLINE COORDINATES Intern Access Corridor Spurg (sac Spurg) 293.804.48 3.546.007.13 298.089.15 3.546.358.42 299.106.4 3.546.708.241 289.801.64 3.546.708.241 289.810.64 3.543.754.23 286.308.20 3.533.575.49.23 286.308.20 3.533.575.24.92 208.165.06 3.522.053.48 VELNER NAVIGATION CANAL (HNC) 288.346.47 3.539.976.84	11	317,129.72	3,5	52,853.27
13 316,009.77 3,552,705.93 14 315,009.88 3,553,018.23 15 314,118.17 3,552,767.95 16 313,097.94 3,552,820.67 17 310,912.93 3,553,157.18 18 310,074.69 3,552,981.08 20 308,390.99 3,552,021.03 21 307,790.68 3,552,021.037 23 298,637.72 3,552,120.37 24 298,637.72 3,552,070.03 CARKE BARREL CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,480.33 26 298,089.15 3,546,480.33 26 298,089.15 3,546,007.13 30 292,921.55 3,546,007.13 30 292,921.55 3,546,007.13 30 292,921.55 3,546,007.13 31 277,731.08 3,533,143.48 35 266,308.20 3,533,547,549.53 36 263,786.50 3,539,156.24 37 262,135.40 3,539,156.24 <	316.009.77 3.552,707.95 313.007.94 3.552,707.95 313.007.94 3.552,800.67 310.012.93 3.552,800.67 300.774.69 3.552,900.15 308,789.47 3.552,910.83 307,790.68 3.552,201.72 302,024.81 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,100.33 UTHERN ACCESS CHANNEL ENTERLINE COORDINATES I NORTHING EASTING 298,089.15 3.546,358.42 298,089.15 3.546,358.42 294,417.29 3.546,208.79 293,894.48 3.546,007.13 2929.2921.55 3.546,398.42 294,417.29 3.546,208.79 293,894.48 3.546,007.13 2929.921.55 3.53,546,922 293,894.48 3.533,595.84 286,308.20 3.537,549.62 286,306.21 3.539,597.84 286,306.22 3.537,527.62 239,063.90 3.535,524.92 208,165.06 3.522,053.48 UMUMA NAVIG	12	316,531.37	3,5	53,102.31
14 315,009.88 3,553,018.23 CRMSTE- 15 314,118.17 3,552,767.95 16 313,097.94 3,552,820.67 17 310,074.69 3,552,981.08 20 308,789.47 3,552,912.63 21 307,790.68 3,552,120.37 23 298,637.72 3,552,120.37 23 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,070.03 EASTING 25 298,089.15 3,546,480.33 26 298,089.15 3,546,480.33 26 298,089.15 3,546,480.33 20 20,354,6358.42 28 294,417.29 3,546,607.13 30 292,921.55 3,546,007.13 30 292,921.55 3,546,007.13 30 292,921.55 3,546,007.13 30 292,921.55 3,546,007.13 33 277,731.08 3,533,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,1597.84 37	315.009.88 3.553.018.23 314.118.17 3.552.767.95 313.097.94 3.552.820.67 310.0104.69 3.552.981.06 308.789.47 3.552.981.08 308.789.47 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.460.03 309.735.552.418 SOUTHERN ACCESS 298.09.15 3.546.358.42 298.09.15 3.546.071.13 298.2921.55 3.546.974.84 277.713.08 3.543.701.02 298.786.47 3.539.917.01 258.346.47 3.539.917.	13	316,009.77	3,5	52,705.93
15 314,118.17 3,552,767.95 16 313,097.94 3,552,820.67 17 310,912.93 3,553,157.18 18 310,074.69 3,552,981.08 20 308,789.47 3,552,981.08 20 308,390.99 3,552,921.63 21 307,790.68 3,552,120.37 23 298,637.72 3,552,120.37 24 298,637.72 3,552,070.03 CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,358.42 27 295,362.65 3,546,358.42 27 295,362.65 3,546,087.99 29 293,894.48 3,546,007.13 30 292,921.55 3,546,208.79 29 293,894.48 3,546,007.13 30 292,921.55 3,546,208.79 29 293,894.48 3,546,007.13 30 292,921.55 3,546,208.79 29 293,894.40 3,539,156.24 36 263,736.50 3,539,156.24 38 258,346.47	314,118,17 3,552,20.67 313,097,94 3,552,20.67 310,074,69 3,552,20.67 300,789,47 3,552,910.65 308,789,47 3,552,92.91.08 306,789,47 3,552,291.03 307,790,68 3,552,210.37 298,637,72 3,552,120.37 298,637,72 3,552,070.03 UTHERN ACCESS CHANNEL ENTERLINE COORDINATES NORTHING EASTING 298,089,15 3,546,208.79 298,089,15 3,546,208.79 298,089,15 3,546,208.79 298,991,15 3,546,208.79 298,991,15 3,546,208.79 298,991,15 3,546,208.79 298,991,16 3,546,208.79 298,991,16 3,546,208.79 298,981,064 3,546,701.80 286,786,73 3,546,874.84 277,71,710.06 3,537,549.53 286,308,20 3,537,549.53 283,736,50 3,539,957.84 286,309,00 3,535,524.92 208,165.06 3,522,053.48 VICARISTION CANAL (HNC) A144,00 CANAL	14	315,009.88	3,5	53,018.23
16 313,097.94 3,552,820.67 17 310,912.93 3,552,981.08 18 310,074.69 3,552,981.08 20 308,789.47 3,552,981.08 20 308,789.47 3,552,981.08 20 308,789.47 3,552,912.63 21 307,790.68 3,552,621.11 22 302,024.81 3,552,120.37 23 298,637.72 3,552,070.03 CenterLine coordinates DINT NORTHING EASTING 25 298,089.15 3,546,480.33 26 298,089.15 3,546,358.42 27 295,362.65 3,546,007.13 30 292,921.55 3,546,077.13 30 292,921.55 3,546,707.13 30 292,921.55 3,546,71.80 32 266,786.73 3,546,874.84 33 277,731.08 3,539,156.24 38 268,306.0 3,539,597.84 37 262,135.40 3,539,917.01 39 254,371.16 3,537,527.62 40 239,063.90 3,535,524.92 <td>313.097.94 3.552,820.67 310.972.93 3.552,981.08 300,390.99 3.552,981.08 308,390.99 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,089.15 3.546,400.33 299,099.15 3.546,358.42 299,155 3.546,358.42 299,155 3.546,358.42 299,810.64 3.546,741.80 280,786.73 3.546,741.80 286,786.73 3.546,741.80 286,786.73 3.546,741.80 286,786.73 3.539,197.84 286,308.20 3.537,549.52 286,308.20 3.533,143.48 266,308.20 3.533,143.48 266,308.20 3.535,524.92 239,063.30 3.535,524.92 238,063.90 3.535,524.92 238,063.90 3.535,524.92 <!--</td--><td>15</td><td>314,118.17</td><td>3,5</td><td>52,767.95</td></td>	313.097.94 3.552,820.67 310.972.93 3.552,981.08 300,390.99 3.552,981.08 308,390.99 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,637.72 3.552,120.37 298,089.15 3.546,400.33 299,099.15 3.546,358.42 299,155 3.546,358.42 299,155 3.546,358.42 299,810.64 3.546,741.80 280,786.73 3.546,741.80 286,786.73 3.546,741.80 286,786.73 3.546,741.80 286,786.73 3.539,197.84 286,308.20 3.537,549.52 286,308.20 3.533,143.48 266,308.20 3.533,143.48 266,308.20 3.535,524.92 239,063.30 3.535,524.92 238,063.90 3.535,524.92 238,063.90 3.535,524.92 </td <td>15</td> <td>314,118.17</td> <td>3,5</td> <td>52,767.95</td>	15	314,118.17	3,5	52,767.95
17 310,912.93 3,553,157.18 18 310,074.69 3,552,960.15 19 308,390.99 3,552,981.08 20 308,390.99 3,552,912.63 21 307,790.68 3,552,621.11 22 302,024.81 3,552,120.37 23 298,637.72 3,552,120.37 24 298,637.72 3,552,070.03 CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,480.33 26 298,089.15 3,546,358.42 27 295,362.65 3,546,358.42 28 294,417.29 3,546,007.13 30 292,921.55 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 266,308.20 3,537,549.53 36 263,736.50 3,539,156.24 38 258,346.47 3,539,156.24 38 258,346.47 3,539,156.24 38 258,346.47 3,539,156.24 38 258,346.47	310.912.93 3.563.157.18 310.074.69 3.552.960.15 308,789.47 3.552.912.63 307,790.68 3.552.912.63 307,790.68 3.552.120.37 298,637.72 3.552.120.37 298,637.72 3.552.070.03 UTHERN ACCESS CHANNEL ENTERLINE COORDINATES I NORTHING EASTING 298,089.15 3.546.386.42 298,089.15 3.546.358.42 293,894.48 3.546,071.13 292,921.55 3.546.358.42 296,785.73 3.546,374.84 277,77,731.08 3.543,701.02 296,785.38 3.5339,195.24 296,785.38 3.5339,197.01 286,373.65.0 3.539,197.84 293,083.90 3.535,524.92 293,083.90 3.535,524.92 293,083.90 3.535,524.92 293,083.90 3.535,524.92 293,083.90 3.535,524.92 293,083.90 3.535,524.92 293,083.90 3.535,524.92 293,083.90 3.535,524.92 293,083.90 3.535,524.92 293,085.06	16	313,097.94	3.5	52,820.67
11 11<	310,074.69 3,552,960.15 308,789.47 3,552,961.06 308,390.99 3,552,961.06 302,024.81 3,552,021.11 302,024.81 3,552,120.37 298,637.72 3,552,120.37 298,637.72 3,552,070.03 UTHERN ACCESS CHANNEL ENTERLINE COORDINATES Inorthing I NORTHING EASTING 298,089.15 3,546,388.42 298,089.15 3,546,358.42 299,089.15 3,546,358.42 299,089.15 3,546,308.42 299,810.64 3,546,308.42 299,810.64 3,546,741.80 286,786.73 3,546,307.13 299,810.64 3,543,701.02 269,765.38 3,538,143.48 266,308.20 3,537,524.92 228,371.16 3,537,827.62 238,043.90 3,535,524.92 208,165.06 3,522,053.48 208,165.06 3,522,053.48 TERREBONNE BAY	17	310.912.93	3.5	53,157.18
19 308,789.47 3,552,981.08 20 308,390.99 3,552,912.63 21 307,790.68 3,552,120.37 23 298,637.72 3,552,120.37 24 298,637.72 3,552,070.03 SOUTHERN ACCESS CHANNEL CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,358.42 27 295,362.65 3,546,358.42 28 294,417.29 3,546,358.42 27 295,362.65 3,546,358.42 28 294,417.29 3,546,007.13 30 292,921.55 3,546,0741.80 32 286,786.73 3,546,741.80 32 286,308.20 3,533,156.24 33 277,731.08 3,533,143.48 35 266,308.20 3,539,156.24 38 268,346.47 3,539,156.24 38 258,346.47 3,539,156.24 39 254,371.16 3,537,549.23 39 254,371.16 3,532,053.48	2002.189.47 3.552.981.08 308.789.47 3.552.981.08 307.790.68 3.552.981.08 307.790.68 3.552.120.37 298.637.72 3.552.120.37 298.637.72 3.552.070.03 UTHERN ACCESS CHANNEL ENTERLINE COORDINATES Inorthing 1 NORTHING EASTING 298.089.15 3.546.480.33 298.089.15 3.546.368.42 295.362.65 3.546.007.13 292.921.55 3.546.007.13 292.921.55 3.545.092.41 289.810.64 3.546.741.80 286.786.73 3.546.741.80 286.786.73 3.545.917.01 286.786.73 3.537.549.53 286.786.47 3.539.917.01 286.378.60 3.537.827.62 233.063.90 3.535.524.92 208.165.06 3.522.053.48	18	310 074 69	3,5	52 960 15
10 10<	ODD, 100, 101 ODD, 100, 100 300, 300, 99 3, 552, 912, 63 307, 790, 68 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 637, 72 3, 552, 170, 03 UTHERN ACCESS CHANNEL LAKE BARRE ENTERLINE COORDINATES SOUTHERN ACCESS 1 NORTHING EASTING 298, 089, 15 3, 546, 083, 42 295, 362, 65 3, 546, 087, 42 293, 294, 48 3, 546, 087, 44 293, 294, 48 3, 546, 741, 80 286, 786, 73 3, 546, 744, 84 266, 308, 20 3, 539, 597, 84 286, 306, 300 3, 539, 597, 84 286, 306, 300 3, 532, 053, 48 208, 165, 06 3, 522, 053, 48 VERTION CANAL (HNC)	10	308 780 17	3,5	52 981 08
21 307,790.68 3,552,621.11 22 302,024.81 3,552,120.37 23 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,070.03 SOUTHERN ACCESS CHANNEL CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,480.33 26 299,089.15 3,546,358.42 27 295,362.65 3,546,007.13 30 292,921.55 3,546,007.13 30 292,921.55 3,546,007.13 30 292,921.55 3,546,007.13 31 286,786.73 3,546,874.84 33 277,731.08 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,917.01 39 254,371.16 3,537,827.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	OCULUSING OCULUSING POB ACCESS I 307,790.68 3,552,621.11 Image: Constraint of the second sec	20	308 300 00	3,0 2,5	52,001.00
21 307,790.00 3,302,021.11 22 302,024.81 3,552,120.37 23 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,070.03 SOUTHERN ACCESS CHANNEL CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,384.42 26 298,089.15 3,546,384.22 27 295,362.65 3,546,374.84 30 292,921.55 3,545,092.41 31 289,786.73 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,785.38 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16	З02, 024, 81 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 637, 72 3, 552, 120, 37 298, 089, 15 3, 546, 480, 33 298, 089, 15 3, 546, 358, 42 298, 089, 15 3, 546, 208, 79 293, 362, 65 3, 546, 208, 79 293, 894, 48 3, 546, 007, 13 292, 921, 55 3, 545, 092, 41 298, 106, 44 3, 546, 741, 80 286, 786, 73 3, 546, 741, 80 286, 786, 73 3, 543, 701, 02 286, 786, 73 3, 543, 701, 02 286, 786, 73 3, 543, 701, 02 283, 346, 47 3, 539, 156, 24 283, 346, 47 3, 539, 156, 24 239, 063, 300 3, 532, 524, 92 208, 165, 06 3, 522, 053, 48 TERREBONNE BAY	20	207 700 00	3,5	52 624 44
22 302,024.81 3,552,120.37 23 298,637.72 3,552,120.37 24 298,637.72 3,552,120.37 24 298,637.72 3,552,070.03 SOUTHERN ACCESS CHANNEL CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,480.33 26 298,089.15 3,546,358.42 27 295,362.65 3,546,087.99 29 293,894.48 3,546,007.13 30 292,921.55 3,545,092.41 31 289,810.64 3,546,781.84 33 277,731.08 3,546,707.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,156.24 38 258,346.47 3,539,156.24 39 254,371.16 3,537,524.92 41 208,165.06 3,522,053.48	302,024.81 298,637.72 3,552,070.03 UTHERN ACCESS CHANNEL ENTERLINE COORDINATES I NORTHING EASTING 298,089.15 3,546,480.33 298,089.15 3,546,358.42 295,362.65 3,546,0358.42 299,089.15 3,546,007.13 293,894.48 3,546,007.13 293,894.48 3,546,007.13 292,921.55 3,545,092.41 289,810.64 3,546,741.80 286,786.73 3,546,874.84 266,308.20 3,533,1549.53 263,736.50 3,539,197.01 254,371.16 3,537,549.53 208,165.06 3,522,053.48 POE ACCESS DREDGING HOUMA NAVIGATION CANAL (HNC) TERREBONNE BAY	21	307,790.68	3,5	52,621.11
23 298,637.72 3,552,120.37 24 298,637.72 3,552,070.03 SOUTHERN ACCESS CHANNEL CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,480.33 26 298,089.15 3,546,358.42 27 295,362.65 3,546,358.42 28 294,417.29 3,546,208.79 29 293,894.48 3,546,007.13 30 292,921.55 3,545,092.41 31 289,810.64 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,917.01 39 254,371.16 3,537,527.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	299,0537.72 3,552,070.03 UTHERN ACCESS CHANNEL ENTERLINE COORDINATES 1 NORTHING EASTING 298,089.15 3,546,480.33 299,099.15 3,546,087.99 293,894.48 3,546,007.13 292,921.55 3,545,092.41 298,786.73 3,546,607.13 292,921.55 3,545,092.41 280,786.73 3,546,647.41.80 286,786.73 3,546,647.484 266,308.20 3,537,549.53 263,736.50 3,539,97.84 265,376.50 3,539,97.84 265,376.50 3,539,917.01 254,371.16 3,537,627.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48 TERREBONNE BAY	22	302,024.81	3,5	52,120.37
24 298,637.72 3,552,070.03 SOUTHERN ACCESS CHANNEL CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,480.33 26 298,089.15 3,546,358.42 27 295,362.65 3,546,208.79 29 293,894.48 3,546,007.13 30 292,921.55 3,546,007.13 30 292,921.55 3,546,741.80 32 286,786.73 3,546,741.80 32 286,786.73 3,546,741.80 32 286,786.73 3,546,924.1 31 289,810.64 3,543,701.02 34 269,765.38 3,539,150.24 35 266,308.20 3,537,549.53 36 263,736.50 3,539,150.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,549.23 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	299,637.72 3,552,070.03 UTHERN ACCESS CHANNEL ENTERLINE COORDINATES 1 NORTHING EASTING 299,089.15 3,546,480.33 SOUTHERN ACCESS 299,089.15 3,546,358.42 SOUTHERN ACCESS 299,089.15 3,546,0358.42 SOUTHERN ACCESS 299,292.155 3,546,071.13 SOUTHERN ACCESS 299,292.155 3,546,071.13 SOUTHERN ACCESS 280,766.73 3,546,071.102 Southern Access 260,765.38 3,533,1549.53 POE ACCESS DREDGING 262,735.40 3,539,156.24 Southern Access 239,063.90 3,533,5524.92 Doe Access DREDGING 208,165.06 3,522,053.48 HOUMA NAVIGATION CANAL (HNC) TERREBONNE BAY	23	298,637.72	3,5	52,120.37
SOUTHERN ACCESS CHANNEL CENTERLINE COORDINATES LAKE BARRE DINT NORTHING EASTING 25 298,089.15 3,546,480.33 26 298,089.15 3,546,358.42 27 295,362.65 3,546,0358.42 28 294,417.29 3,546,007.13 30 292,921.55 3,546,0741.80 31 289,080.64 3,546,0741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,527.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	UTHERN ACCESS CHANNEL ENTERLINE COORDINATES T NORTHING EASTING 298,089.15 3,546,358.42 298,089.15 3,546,358.42 299,281.55 3,546,007.13 292,921.55 3,546,007.13 292,921.55 3,545,092.41 289,780.64 3,546,714.80 286,786.73 3,546,874.84 277,731.08 3,543,701.02 269,765.38 3,538,143.48 266,308.20 3,537,549.53 266,308.20 3,552,953.48 HOUMA NAVIGATION CANAL (HNC)	24	298,637.72	3,5	52,070.03
SOUTHERN ACCESS CHANNEL LAKE BARRE CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,480.33 SOUTHERN ACCESS 26 298,089.15 3,546,358.42 SOUTHERN ACCESS 27 295,362.65 3,546,358.42 SOUTHERN ACCESS 28 294,417.29 3,546,007.13 SOUTHERN ACCESS 30 292,921.55 3,546,007.13 SOUTHERN ACCESS 31 289,810.64 3,546,741.80 SOUTHERN ACCESS 32 286,786.73 3,546,874.84 Souther Access	UTHERN ACCESS CHANNEL LAKE BARRE ENTERLINE COORDINATES Image: Coordinates Southern Access 1 NORTHING EASTING Southern Access 298,089.15 3,546,358.42 Southern Access 294,0417.29 3,546,0358.42 Southern Access 299,921.55 3,546,007.13 Southern Access 299,921.55 3,546,007.13 Southern Access 280,786.73 3,546,0741.80 Southern Access Dreadend 280,786.73 3,546,071.02 Southern Access Dreadend 266,308.20 3,537,549.53 POE Access Dreadend 266,308.20 3,539,156.24 Boe Access Dreadend 258,346.47 3,539,156.24 Boe Access Dreadend 208,165.06 3,522,053.48 HOUMA NAVIGATION CANAL (HNC) Brended Hinch	1000			
CENTERLINE COORDINATES DINT NORTHING EASTING 25 298,089.15 3,546,480.33 26 298,089.15 3,546,358.42 27 295,362.65 3,546,358.42 28 294,417.29 3,546,007.13 30 292,921.55 3,545,092.41 31 289,810.64 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,9597.84 37 262,135.40 3,539,917.01 39 254,371.16 3,537,549.53 36 263,736.50 3,539,917.01 39 254,371.16 3,537,524.92 41 208,165.06 3,522,053.48	ENTERLINE COORDINATES T NORTHING EASTING 298,089.15 3,546,480.33 298,089.15 3,546,358.42 295,362.65 3,546,358.42 294,417.29 3,546,007.13 292,921.55 3,545,092.41 289,810.64 3,546,774.80 280,786.73 3,546,874.84 277,731.08 3,543,701.02 269,765.38 3,538,143.48 266,308.20 3,537,549.53 263,736.50 3,539,150.24 258,346.47 3,539,917.01 258,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48 TERREBONNE BAY	SOUT	THERN ACC	ESS C	HANNEL
DINT NORTHING EASTING 25 298,089.15 3,546,480.33 26 298,089.15 3,546,358.42 27 295,362.65 3,546,358.42 28 294,417.29 3,546,208.79 29 293,894.48 3,546,007.13 30 292,921.55 3,545,092.41 31 289,810.64 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,9597.84 37 262,135.40 3,539,917.01 39 254,371.16 3,537,549.23 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	NORTHING EASTING 298.089.15 3.546.480.33 299.089.15 3.546.358.42 294.417.29 3.546.208.79 293.894.48 3.546.007.13 299.292.155 3.546.741.80 286.786.73 3.546.874.84 277.731.08 3.543.701.02 266.308.20 3.537.549.53 266.308.20 3.537.549.53 266.308.20 3.537.549.53 266.308.20 3.537.549.53 266.308.20 3.537.549.53 266.308.20 3.537.549.53 266.308.20 3.537.549.53 266.308.20 3.537.549.23 239.063.90 3.535.524.92 208.165.06 3.522.053.48	CEN			NATES
JIN I NOR I HING EAS I ING 25 298,089.15 3,546,480.33 SOUTHERN ACCESS CORRIDOR SPUR (SAC SPUR) 27 295,362.65 3,546,358.42 CORRIDOR SPUR (SAC SPUR) 28 294,417.29 3,546,007.13 GAC SPUR) 30 292,921.55 3,545,092.41 GAC SPUR) 31 289,810.64 3,546,741.80 GAC SPUR) 32 286,786.73 3,546,874.84 GAC SPUR) 33 277,731.08 3,543,701.02 GAC SPUR) 34 269,765.38 3,538,143.48 GAC SPUR) 35 266,308.20 3,537,549.53 GAC SPUR) 36 263,736.50 3,539,156.24 GACCESS DREDGING 37 262,135.40 3,539,156.24 GAN AL (HNC) 39 254,371.16 3,537,549.25 HOUMA 40 239,063.90 3,535,524.92 HOUMA 41 208,165.06 3,522,053.48 GANAL (HNC)	NUK I HING EASTING 298,089.15 3,546,480.33 298,089.15 3,546,358.42 295,362.65 3,546,258.42 295,382.65 3,546,208.79 293,894.48 3,546,007.13 292,921.55 3,546,374.84 286,786.73 3,546,874.84 277,731.08 3,543,701.02 266,765.38 3,538,143.48 266,308.20 3,537,549.53 263,736.50 3,539,197.84 262,135.40 3,539,197.01 258,346.47 3,539,170.10 254,371.16 3,537,524.92 208,165.06 3,522,053.48 HOUMA NAVIGATION 208,165.06 3,522,053.48				
25 298,089.15 3,546,480.33 26 298,089.15 3,546,358.42 27 295,362.65 3,546,358.42 28 294,417.29 3,546,208.79 29 293,894.48 3,546,007.13 30 292,921.55 3,545,092.41 31 289,810.64 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,534,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,527.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	298,089.15 3,546,480.33 298,089.15 3,546,358.42 295,362.65 3,546,208.79 294,417.29 3,546,007.13 292,921.55 3,546,007.13 292,921.55 3,546,007.13 292,921.55 3,546,007.13 292,921.55 3,546,007.13 292,921.55 3,546,007.13 292,921.55 3,546,007.13 292,921.55 3,546,007.102 269,765.38 3,538,143.48 266,736.50 3,539,150.24 266,736.50 3,539,157.84 262,135.40 3,539,156.24 258,346.47 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48		NURTHING	EA	ASTING
26 298,089.15 3,546,358.42 27 295,362.65 3,546,358.42 28 294,417.29 3,546,208.79 29 293,894.48 3,546,007.13 30 292,921.55 3,545,092.41 31 289,810.64 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,827.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	298,089.15 3,546,358.42 295,362.65 3,540,358.42 294,417.29 3,546,208.79 293,894.48 3,546,007.13 299,21.55 3,545,092.41 289,810.64 3,546,741.80 286,786.73 3,546,874.84 277,731.08 3,543,701.02 269,765.38 3,539,157.549.53 266,308.20 3,539,156.24 258,346.47 3,539,917.01 258,346.47 3,539,917.01 258,346.47 3,539,917.01 258,346.47 3,539,917.01 258,346.47 3,539,917.01 258,346.47 3,539,917.01 258,346.47 3,539,917.01 208,165.06 3,522,053.48 Does access DREDGING AVIGATION CANAL (HNC) 208,165.06 3,522,053.48 TERREBONNE BAY	25	298,089.15	3,5	46,480.33
27 295,362.65 3,546,358.42 28 294,417.29 3,546,208.79 29 293,894.48 3,546,007.13 30 292,921.55 3,545,092.41 31 289,810.64 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,827.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	295,362.65 3,546,358.42 294,417.29 3,546,208.79 293,894.48 3,546,007.13 292,921.55 3,545,092.41 289,810.64 3,546,741.80 286,786.73 3,546,874.84 277,731.08 3,543,701.02 269,765.38 3,538,143.48 266,308.20 3,537,549.53 263,736.50 3,539,195.24 258,346.47 3,539,917.01 258,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48	26	298,089.15	3,5	46,358.42
28 294,417.29 3,546,208.79 29 293,894.48 3,546,007.13 30 292,921.55 3,545,092.41 31 289,810.64 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,827.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	294,417.29 3,546,208.79 293,894.48 3,546,007.13 292,921.55 3,545,092.41 289,810.64 3,546,874.84 277,731.08 3,543,701.02 269,765.38 3,539,150.24 266,308.20 3,537,549.53 263,736.50 3,539,997.84 262,135.40 3,539,156.24 258,346.47 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48 TERREBONNE BAY	27	295,362.65	3,5	46,358.42
29 293,894.48 3,546,007.13 30 292,921.55 3,545,092.41 31 289,810.64 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,957.84 37 262,135.40 3,539,9156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,827.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	293,894.48 3,546,007.13 292,921.55 3,545,092.41 289,810.64 3,546,741.80 286,786.73 3,546,874.84 277,731.08 3,543,701.02 269,765.38 3,538,143.48 266,308.20 3,537,549.53 263,736.50 3,539,957.84 262,135.40 3,539,917.01 258,346.47 3,539,917.01 258,346.47 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48 TERREBONNE BAY	28	294,417.29	3,5	46,208.79
30 292,921.55 3,545,092.41 31 289,810.64 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,527.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	292,921.55 3,545,092.41 289,810.64 3,546,7741.80 286,786.73 3,546,874.84 277,731.08 3,543,701.02 269,765.38 3,538,143.48 266,308.20 3,537,549.53 263,736.50 3,539,597.84 262,135.40 3,539,156.24 258,346.47 3,539,156.24 258,346.47 3,539,7827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48 TERREBONNE BAY	29	293,894,48	3.5	46,007.13
31 289,810.64 3,546,741.80 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,527.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	289,810.64 3,546,741.80 286,786.73 3,546,874.84 277,731.08 3,543,701.02 269,765.38 3,539,143.48 266,308.20 3,537,549.53 263,736.50 3,539,597.84 262,135.40 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48	30	292,921,55	3.5	45.092 41
01 200,010.04 0,040,141.00 32 286,786.73 3,546,874.84 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,527.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	226,761.77 3,546,874.84 277,731.08 3,538,143.48 2269,765.38 3,538,143.48 2263,736.50 3,539,597.84 2262,135.40 3,539,156.24 258,346.47 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48	31	289 810 64	3,5	46 741 80
32 200,100.13 3,340,014.04 33 277,731.08 3,543,701.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,527.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	200,100.13 0,040,074.04 277,731.08 3,543,701.02 269,765.38 3,538,143.48 266,308.20 3,537,549.53 263,736.50 3,539,597.84 262,135.40 3,539,917.01 258,346.47 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48	32	203,010.04	3,5	<u>10,141.00</u> 16 874 94
33 211,131.00 3,543,101.02 34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,827.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	211,131.00 3,343,101.02 269,765.38 3,538,143.48 266,308.20 3,537,549.53 263,736.50 3,539,597.84 262,135.40 3,539,156.24 258,346.47 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48 TERREBONNE BAY	32	200,100.13	3,5	+0,0/4.04
34 269,765.38 3,538,143.48 35 266,308.20 3,537,549.53 36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,527.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	269,765.38 3,538,143.48 266,308.20 3,537,549.53 263,736.50 3,539,597.84 262,135.40 3,539,156.24 258,346.47 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48	33	211,131.08	3,5	+3,701.02
35 266,308.20 3,537,549.53 36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,827.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	266,308.20 3,537,549.53 263,736.50 3,539,597.84 262,135.40 3,539,156.24 258,346.47 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48 TERREBONNE BAY	34	269,765.38	3,5	38,143.48
36 263,736.50 3,539,597.84 37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,827.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	263,736.50 3,539,597.84 262,135.40 3,539,156.24 258,346.47 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48 TERREBONNE BAY	35	266,308.20	3,5	37,549.53
37 262,135.40 3,539,156.24 38 258,346.47 3,539,917.01 39 254,371.16 3,537,827.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	262,135.40 3,539,156.24 258,346.47 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48 TERREBONNE BAY	36	263,736.50	3,5	39,597.84
38 258,346.47 3,539,917.01 39 254,371.16 3,537,827.62 40 239,063.90 3,535,524.92 41 208,165.06 3,522,053.48	258,346.47 3,539,917.01 254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48 TERREBONNE BAY	37	262,135.40	3.5	39,156.24
39 254,371.16 3,537,827.62 HOUMA 40 239,063.90 3,535,524.92 NAVIGATION 41 208,165.06 3,522,053.48 CANAL (HNC)	254,371.16 3,537,827.62 239,063.90 3,535,524.92 208,165.06 3,522,053.48 TERREBONNE BAY	38	258,346 47	3.5	39.917.01
40 239,063.90 3,535,524.92 NAVIGATION 41 208,165.06 3,522,053.48 CANAL (HNC)	239,063.90 3,535,524.92 NAVIGATION CANAL (HNC) 208,165.06 3,522,053.48 NAVIGATION	39	254 371 16	3.5	37 827 62
40 239,000.00 3,353,324.52 41 208,165.06 3,522,053.48	200,000.50 0,024.52 208,165.06 3,522,053.48 CANAL (HNC) TERREBONNE BAY	40	230 062 00	3,3 2 F	35 521 02
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그는 물질에 다 가격 방법하는 거야? 것이 많이 다 가지 않는 것이 않는 것이 않는 것이 많은 것이 다 가지 않는 것이 같아요. ^^^^ 같이 나는 것이 같아요. ^^^ ?^^ ?^^ ?^^ ?^^ ?^^ ?^^ ?^^ ?^^ ?^	TERREBONNE BAY		al al and		
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SEE SHEET 8

12,00 NOTE 1. \$ 2. H H 3. N 4. 0 4. 0 1. 5. T	12,000 0 12,000 24,000 NOTES: 1. SEE SHEET 5 FOR MARSH CREATION AREA PERIMETER COORDINATES. SEE SHEET 7 FOR BORROW AREA PERIMETER COORDINATES. TIMBALIER ISLAND LEGEND 2. HNC BOUNDARY OBTAINED FROM USACE NEW ORLEANS DISTRICT HYDROGRAPHIC SURVEY DATABASE. NOTE THAT FEDERAL NAVIGATION CHANNEL SURVEYS OCCUR PERIODICALLY AND MAY RENDER CURRENT DEPICTION OBSOLETE IN THE FUTURE. Imbalier Island ACCESS CORRIDOR CL • ACCESS CORRIDOR PI DREDGE PIPELINE CORSIDOR HE BORROW AREA. PIPELINE CROSSINGS ARE PROPOSED IN THE NAC, CC, AND SAC. SEE INSETS FOR MORE DETAILED INFORMATION ON PIPELINES. GULF OF MEXICO DREDGE PIPELINE CORRIDOR FEDERAL NAVIGATIONAL CHANNEL PI-1@ KNOWN PIPELINE CORSING ESTABLISHED. SEE DESIGN REPORT SECTION 5.0 FOR MORE INFORMATION. PROPOSED BORROW 3. THE BACKGROUND IMAGE WAS TAKEN IN 2016. FOR MARE ALS IN 2016. PROPOSED MARSH CREATION AND NOURISHMENT										
	COASTAL PROTECTION AND RESTORATION AUTHORITY ISLAND ROAD MARSH CREATION AND NOURISHMENT PROJECT PROJECT LAYOUT										
				DRAWN BY: SHANE FAUST	DUGE, LOUISIANA 70802	STATE PROJECT NUMBER: TE-0117 APPROVED BY: DAIN GILLEN. P.E.		DATE: OCTOBER 2019 SHEET 3 OF 19			





-	53 54	326,546.65	3,554,640.5	2 8	UPL		¹⁰		un.		LEGEND	
	55	327,052.29	3,555,025.2	8		e Bill	H UPI	~ CC2	17	ACCES	S CORRIDOR CL	
	56	327,382.76	3,555,130.8	9		IN	S S	14	UPL			
	57	327,625.78	3,555,173.7	5	- 14 S - 1		<u>j</u>			ACCES	S CORRIDOR LINITS (BOC)	
	58	327,749.91	3,555,159.5	5			3AY	UN		ACCES	S CORRIDOR PI (SEE SHEET 3	
	59	327,847.81	3,555,133.7	0		UPI D				FURCE	JORDINATES)	
100	60	328,621.26	3,554,927.3	3	1000	5		IT UP.	(00)	$-\cdots$ – DREDG	E PIPELINE CORRIDOR CL	
	61	328,574.63	3,554,739.3	2	1,000' 50	0' 0'	1,000'	2,000		26 MARSH	CREATION AREA BOUNDARY	
	62	328,422.41	3,554,459.1	3					"PL	PI		
NO	OTES:											
1	SEE SHEET 3 FOR ACCESS CORRIDOR PI'S AND OTHER INFORMATION.											
2	PIPFI	IPELINE INFORMATION ON THE PLANS IS APPROXIMATE. UNVERIFIED PIPELINE LOCATIONS ARE BASED ON LDNR SONRIS										
<u> </u>	DATA	DATABASE AND IS NOT GUARANTEED TO BE ACCURATE.										
3.	SEE S	SEE SECTION 5.0 OF THE DESIGN REPORT FOR PIPELINE INFORMATION AS IDENTIFIED BY TBS AND CHF.										
4.	LINE	NE INDICATED WITH UNVERIFIED PIPELINE LINETYPE IN THIS LOCATION WAS NOT IDENTIFIED DURING DATA COLLECTION AND IS										
	NOT E	NOT BELIEVED TO EXIST.										
5.	MULTIPLE LIFT CONSTRUCTION IS ANTICIPATED FOR BOTH MARSH FILL AND CONTAINMENT DIKES. HOWEVER, SOME SECTIONS ARE											
	UNDE											
	DEPICTED IN DESIGN DRAWINGS, WHILE COSTS WERE ESTIMATED ASSUMING ALL MULTIPLE LIFT CONSTRUCTION.											
6. THE BACKGROUND IMAGE WAS TAKEN IN 2016.												
										_		
				+	COASTAL PROTECTION AND RESTORATION AUTHORITY				ISLAND ROA	D	MARSH CREATION AREA	
									MARSH CREATION AND		AND CONVEYANCE	
						150	TERRACE AVELINUE		NOURISHMENT PROJECT		CORRIDOR PLAN VIEW	
						BATON I	ROUGE, LOUISIANA 70802					
					STATE PROJECT NUMBER					117	DATE: OCTOBER 2019	
REV.	DATE	DESCF	RIPTION	BY	DRAWN BY: SHANE FAUST DESIGNED BY: JACQUES BOUDREAUX, P.E.			APPROVED BY: DAIN GILLEN, P.E.		SHEET 5 OF 19		


						WY THE		LEGEND			
	1,000'	500' 0'	1,000'	2,000'		4.2	ACCES	S CORRIDOR CL S CORRIDOR LIMITS (BOC) S CORRIDOR PI (SEE SHEET 3			
<u>NO</u> 1. 2. 3.	NOTES: 1. SEE SHEET 3 FOR ACCESS CORRIDOR PI'S AND OTHER INFORMATION. 2. PIPELINE INFORMATION ON THE PLANS IS APPROXIMATE. UNVERIFIED PIPELINE LOCATIONS ARE BASED ON LDNR SONRIS DATABASE AND IS NOT GUARANTEED TO BE ACCURATE. 3. THE BACKGROUND IMAGE WAS TAKEN IN 2016. CORRIDOR CL										
				COASTAL I RESTORAT	PROTECTION AND TION AUTHORITY ERRACE AVEUNUE	ISLAND ROA MARSH CREATIOI NOURISHMENT PR	D N AND OJECT	BORROW AREA AND SOUTHERN ACCESS CORRIDOR PLAN VIEW			
				BATON RO	DUGE, LOUISIANA 70802	STATE PROJECT NUMBER: TE-0	117	DATE: OCTOBER 2019			
REV.	DATE	DESCRIPTION	BY	DRAWN BY: SHANE FAUST	DESIGNED BY: JACQUES BOUDREAUX, P.E.	APPROVED BY: DAIN GILLEN, P.E.		SHEET 6 OF 19			



2.000	' 1.000' 0'	2.00	0'	SAC 4.000'	38						
			Uvita		/			LEGEND			
NOTES: 1. SEI 2. PIP DA 3. SEI DA 4. TH	NOTES: 1. SEE SHEET 3 FOR ACCESS CORRIDOR PI'S AND OTHER INFORMATION. 2. PIPELINE INFORMATION ON THE PLANS IS APPROXIMATE. UNVERIFIED PIPELINE LOCATIONS ARE BASED ON LDNR SONRIS DATABASE AND IS NOT GUARANTEED TO BE ACCURATE. 3. SEE SECTION 5.0 OF THE DESIGN REPORT FOR MORE IN-DEPTH PIPELINE INFORMATION AS IDENTIFIED DURING TE-0117 PROJECT DATA COLLECTION BY TBS AND CHF. 4. THE RACK CROLIND IMAGE WAS TAKEN IN 2016										
				COASTAL F RESTORAT	PROTECTION AND ION AUTHORITY ERRACE AVEUNUE DUGE, LOUISIANA 70802	ISLAND ROA MARSH CREATIO NOURISHMENT PF	D N AND ROJECT	SOUTHERN ACCESS CORRIDOR AND SOUTHERN ACCESS CORRIDOR SPUR PLAN VIEW			
REV. DAT	E DESCRIPTION		BY	DRAWN BY: SHANE FAUST	DESIGNED BY: JACQUES BOUDREAUX, P.E.	STATE PROJECT NUMBER: TE-0 APPROVED BY: DAIN GILLEN, P.E		DATE: OCTOBER 2019 SHEET 7 OF 19			

	PIPELINE/FLOWLINE INFORMATION										
(ACCESS DREDGING DENOTED IN BOLD)											
ID	EXCAV?	TOP ¹ EL	BOC ² EL								
PL-14	N	-10 FT NAVD88	-8 FT NAVD88								
1. Top of pipe 2. Bottom of	1. Top of pipe. 2. Bottom of cut.										

PL CROSSING NO. 14 HARVEST PIPELINE / HILLCORP PIPELINE

SAC

2,000'	1,000' 0'	2,00	C + TOHMC	4,000'				
NOTES:								LEGEND
1. SEE 2. PIPI DAT 3. SEE DAT 4. THE	SHEET 3 FOR ACCESS ELINE INFORMATION ON ABASE AND IS NOT GUA SECTION 5.0 OF THE D A COLLECTION BY TBS	I THE PLAN ARANTEED ESIGN REP AND CHF. WAS TAKEN	s is a to be ort i	AND OTHER INFORMATION IPPROXIMATE. UNVERIFIE E ACCURATE. FOR MORE IN-DEPTH PIPE D16.	I. D PIPELINE LOCATIONS ARE BASED LINE INFORMATION AS IDENTIFIED D	ON LDNR SONRIS DURING TE-0117 PROJECT		S CORRIDOR CL S CORRIDOR PI (SEE SHEET 3 ORDINATES) D PIPELINE
				COASTAL F RESTORAT	PROTECTION AND TION AUTHORITY BRRACE AVEUNUE	ISLAND ROA MARSH CREATIO NOURISHMENT PF	D N AND ROJECT	SOUTHERN ACCESS CORRIDOR PLAN VIEW
				BATON RC	JUGE, LUUISIANA /0802	STATE PROJECT NUMBER: TE-0	117	DATE: OCTOBER 2019
REV. DATE	DESCRIPTION		BY	DRAWN BY: SHANE FAUST	DESIGNED BY: JACQUES BOUDREAUX, P.E.	APPROVED BY: DAIN GILLEN, P.E.		SHEET 8 OF 19



NOTES:

- 1. MAXIMUM WIDTH OF FLOTATION CHANNEL TO BE 80' AT BOTTOM ELEVATION CONTOUR. A MAXIMUM REQUIRED TEMPORARY SPOIL TEMPLATE HAS BEEN DETERMINED AND WILL BE SHOWN IN CONSTRUCTION PERMIT DRAWINGS. FOLLOWING CONSTRUCTION, PRE-PROJECT CONDITIONS WILL BE RESTORED.
- 2. A MINIMUM OFFSET OF 30' WILL BE MAINTAINED BETWEEN TOP OF CUT IN FLOTATION CHANNEL AND TOE OF FILL OF TEMPORARY SPOIL PLACEMENT, WHICH IS CONSISTENT WITH WORST CASE SOIL CONDITIONS ANALYZED FOR EARTHEN CONTAINMENT DIKE DESIGN IN MARSH CREATION AREA.
- 3. TEMPORARY WARNING SIGNS WILL BE PLACED TO WARN BOATERS OF POTENTIAL HAZARDS AND TO DELINEATE TOTAL RIGHT-OF-WAY OF WORK AREA.
- 4. CHF PERFORMED A TOPOGRAPHIC SURVEY IN THE VICINITY AND DETERMINED THE ELEVATION OF THE LOW SAG OF THE SHOWN OVERHEAD POWERLINE TO BE +37 FT. NAVD88. BASED ON HISTORICAL WATER LEVEL ANALYSIS AND TIDE DATUM CALCULATIONS, VESSELS HAVING A TOTAL VERTICAL CLEARANCE OF OVER 30' WILL NOT BE ABLE TO ACCESS THE LOCATION.

NORTH			B
O			
			RIPTION
DVERHEAD POWERLINE			DESCF
.OW SAG EL. = +37 FT. NAVD88			
			DATE
		+	REV.
= <u>-0.35'</u>	COASTAL PROTECTION AND BESTORATION ALTHORITY	BATON ROUGE, LOUISIANA 7002	
	TYPICAL SECTIONS	DESIGNED BY: JACQUES BOUDREAUX, P.E.	APPROVED BY: DAIN GILLEN, P.E.
HORIZONTAL GRAPHIC SCALE	ISLAND ROAD MARSH CREATION AND NOURISHMENT PROJECT	STATE PROJECT NUMBER: TE-0117	DRAWN BY: SHANE FAUST
VERTICAL GRAPHIC SCALE	DATE: OCT	OBER :	2019
	SHEET 9	OF 19	



ORDER TO DETERMINE CHANGES IN TOPOGRAPHICAL/BATHYMETRIC CONSDITIONS.

NOTES:

						BY
						DESCRIPTION
						DATE
						REV.
	COASTAL PROTECTIC	DESTODATION ALTH	ITTON NOTIONATION	150 TERRACE AVENUE	BATON ROUGE, LOUISIANA 708(
	I YPICAL SECTIONS				DESIGNED BY: JACQUES BOUDREAUX, P.E.	APPROVED BY: DAIN GILLEN, P.E.
	ISLAND KUAD MARSH CREATION AND	NOURISHMENT PROJECT			STATE PROJECT NUMBER: TE-0117	DRAWN BY: SHANE FAUST
DA	TE:	OC.	го	BI	ER 2	2019
SH	EET	10	OF	1	9	



NORTHWEST



1. THE CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO PERFORM A PRE-CONSTRUCTION SURVEY IN ORDER TO LOCATE ANY AND ALL PIPELINE INFRASTRUCTURE AND POTENTIAL HAZARDS AND IN ORDER TO DETERMINE CHANGES IN TOPOGRAPHIC/BATHYMETRIC CONDITIONS.

2. MULTIPLE LIFT CONSTRUCTION IS ANTICIPATED FOR BOTH MARSH FILL AND CONTAINMENT DIKES. HOWEVER, SOME SECTIONS ARE UNDERSTOOD TO ACHIEVE ADEQUATE FACTORS OF SAFETY WITH SINGLE LIFT. FOR 30% DESIGN, SINGLE LIFT CONSTRUCTION IS DEPICTED IN DESIGN DRAWINGS, WHILE COSTS WERE ESTIMATED ASSUMING ALL MULTIPLE LIFT CONSTRUCTION.



10'

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					DESCRIPTION
					DATE
			+	+	RV.
		COASTAL PROTECTION AN	L RESTURATION AUTHORIT	150 TERRACE AVENUE BATON ROUGE, LOUISIANA 70802	
ST <u>12.0'</u>	TVPICAL SECTIONS			DESIGNED BY: JACQUES BOUDREAUX, P.E.	APPROVED BY: DAIN GILLEN, P.E.
AL GRAPHIC SCALE 200' 400'	U A OA G A VI A	MARSH CREATION AND NOURISHMENT PROJECT		STATE PROJECT NUMBER: TE-0117	DRAWN BY: SHANE FAUST
20' 40' GRAPHIC SCALE	DAT	TE: OC	сто	BER 2	.019
	SHE	ET 15	OF	19	



				-	
NORTHWEST					Å
ANNEL					DESCRIPTION
					DATE
					REV.
NORTHWEST		CUASTAL FRUIECTION AND Restoration althority	150 TERRACE AVENIE	BATON ROUGE, LOUISIANA 70802	
	TYPICAL SECTIONS			DESIGNED BY: JACQUES BOUDREAUX, P.E.	APPROVED BY: DAIN GILLEN, P.E.
NTOUR. A MAXIMUM REQUIRED TEMPORARY SPOIL RMIT DRAWINGS. FOLLOWING CONSTRUCTION, TION CHANNEL AND TOE OF FILL OF TEMPORARY S ANALYZED FOR EARTHEN CONTAINMENT DIKE AL HAZARDS AND TO DELINEATE TOTAL ID DETERMINED THE TOP PIPE ELEVATION OF THE	ISLAND ROAD	MAKSH CKEATION AND NOURISHMENT PROJECT		STATE PROJECT NUMBER: TE-0117	DRAWN BY: SHANE FAUST
AVD88. THE CONSTRUCTION CONTRACTOR WILL TE ANY AND ALL PIPELINE INFRASTRUCTURE AND	DATE	: OCT	OB	ER 2	019
BATHYMETRIC CONDITIONS.	SHEE	Г 16 (DF 1	9	





TEMPORARY WARNING SIGN DETAIL

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NOTES:

- 1. TEMPORARY WARNING SIGNS, INCLUDING TIMBER PILES, SHALL BE INSTALLED AT LOCATIONS SHOWN ON THE PLANS. THE 2" BORDER ON THE WARNING SIGN WILL BE REFLECTIVE MATERIAL OF ORANGE COLOR. THE LETTERING FIELD WE BE A REFLECTIVE MATERIAL OF WHITE COLOR. THE LETTERING FOR THE WARNING SIGNS WILL BE BLACK. ALL SIGNS MUST MEET U.S. COAST GUARD STANDARDS; IN ACCORDANCE WITH 33 CFR 330.4 (a)(1) WHICH CAN BE DOWNLOADED AT http://www.access.gpo.gov/nara/cfr/waisidx_0233cfr330_02.html
- 1. NEOPRENE WASHERS SHALL BE PLACED BETWEEN THE SIGN AND THE PILING AT ALL POINTS OF CONTACT.
- 2. 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.
- 3. TIMBER PILES SHALL CONFORM TO SECTIONS 804 AND 1014 OF THE LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES, AS PUBLISHED BY THE LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT, LATEST EDITION. PILES SHALL BE TREATED WITH A CREOSOTE SOLUTION CONFORMING TO AWPA P2 TO A MINIMUM RETENTION OF 20 PCF AND CAPPED ACCORDING TO LA DOTD SPECIFICATION 812.06.
- 4. TIMBER PILINGS SHALL BE 40' IN LENGTH WITH A NOMINAL 12" DIAMETER BUTT AND 7" MINIMUM DIAMETER AT THE TIP.
- 5. THE TOP OF THE PILES SHALL BE COATED WITH COAL TAR EPOXY PAINT PRIOR TO PLACING CAP. THE PILE CAP SHALL BE ATTACHED USING ALUMINUM OR STAINLESS STEEL NAILS.

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3						DESCRIPTION	
						DATE	
						REV.	
		COASTAL PROTECTION AND	RESTORATION AUTHORITY	150 TERRACE AVENIE	BATON ROUGE, LOUISIANA 70802		
		I EMPORARI WARNING SIGN DETAIL			DESIGNED BY: J. BOUDREAUX, P.E.	APPROVED BY: D. GILLEN, P.E.	
	NOT A DAY DAY DELL'UNIT	AND NOURISHMENT PROJECT			STATE PROJECT NUMBER: TE-0117	DRAWN BY: S. FAUST	
	DA	TE:	OCT	OB	ER 2	019	
	SHI	EET	18 0	OF 1	19		



MARSH CREATION AREAS 1, 2, & 3 NTS

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							DESCRIPTION	
							DATE	
							REV.	
	COASTAL PROTECTION	DESTODATION ALTUOD	UCITION NOTION AUTION	150 TERRACE AVENUE	BATON ROUGE, LOUISIANA 70802			
	GRADE STAKE DETAILS				DESIGNED BY: J. BOUDREAUX, P.E.		APPROVED BY: D. GILLEN, P.E.	
SLAND ROAD MARSH CREATION AND NOURISHMENT PROJECT TATE PROJECT NUMBER: TE-0117 DESIC RAWN BY: S. FAUST APPRO								
DA	TE:	OC	го	BI	ER 2	20	19	
SH	SHEET 19 OF 19							

NTS