

APPENDIX A

IMPLEMENTATION PLAN FOR SABINE UNIT 1999 RESTORATION PROJECT

1.0 INTRODUCTION

This document specifies the requirements applicable to the construction of the Sabine Unit 1999 Restoration Project (the "Restoration Project") by Settling Defendants under the Consent Decree settlement of natural resource damage claims in United States of America and the State of Louisiana v. ConocoPhillips Company, et al. This document is incorporated by reference therein and is an attachment to that Decree.

2.0 PROJECT OBJECTIVES & CONSTRUCTION REQUIREMENTS

2.1 Project Site - The Restoration Project will be implemented in the mid-Calcasieu Estuary watershed, within the Sabine National Wildlife Refuge ("Sabine NWR"), at the Unit 1999 Site ("Project Site"). The Sabine NWR is publicly owned and managed by the USFWS. The general location of the Project Site is depicted in Figure 1-1, attached hereto.

2.2 Project Goals - The goals of the Restoration Project are to:

- a. Extend the longevity and enhance the ecological services of the 247 acres of existing marsh at the Site through increased tidal exchange that will (i) increase the rate of accretion, (ii) decrease the rate of elevation change across the Site, and (iii) improve the functional quality of the habitat; and
- b. Create an additional 14.7 acres of sustainable, functionally equivalent brackish marsh.

2.3 Construction Requirements - The Restoration Project will include Levee Degradation, Levee Gapping, and Marsh Creation (generally depicted in Figure 1-2, attached hereto). The Levee Degradation and Levee Gapping activities are designed to increase tidal exchange, allow for increased deposition of mineral sediments onto the marsh surface, and enhance tidal flushing of the marsh. The Marsh Creation activities are designed to create additional substrate for the natural recruitment and re-colonization of native, desirable marsh vegetation. These actions will be performed in accordance with the following requirements and specifications:

2.3.1 Levee Degradation – At least 2,500 feet of the nearly 10,000 feet of the levees (i.e., those constructed in 1999 to contain a created marsh platform) will be degraded to achieve elevations similar to the interior marsh. Levee elevations (El.) greater than 1.75 feet NAVD (ft NAVD) will be reduced to between El. 0.85 ft. NAVD and El. 1.75 ft. NAVD. Material will be excavated from the levees using a marsh buggy or similar track-propelled machinery. Material excavated from the levees will be deposited in adjacent floatation channels (i.e. those located

between the excavated levee area and the marsh) in order to increase the elevation in the channels to between El. 0.85 ft. NAVD and El. 1.75 ft. NAVD for the purpose of creating new wetlands. The volume of material excavated for Levee Degradation and for Levee Gapping, in combination, will be sufficient to meet Marsh Creation requirements¹. Levee Degradation will otherwise be constructed in accordance with the plan and specifications for this action presented in the attached Drawings for Marsh Restoration Project, May 2008 (Attachment A).

2.3.2 Levee Gapping - Five gaps ("cuts") will be created in the remaining levees - one each in the west, north, and east levees; and two in the south levee. These gaps will be constructed at the locations and to the lines and grades depicted in Attachment A and each will be constructed near where a channel previously existed, to the extent practical. The dimensions of the gaps, as designed, will produce an average velocity through each of less than 5 centimeters/second, as identified in Tables 2-1 and 2-2². The volume of material excavated for Levee Degradation and for Levee Gapping, in combination, must be sufficient to meet Marsh Creation requirements. Levee Gapping will otherwise occur in accordance with the plan and specifications for this action presented in Attachment A.

2.3.3 Marsh Creation - Material from the Levee Degradation and the Levee Gapping will be deposited in adjacent flotation channels (i.e. those located between the excavated levee area and the existing marsh platform)². The deposition of this material will increase the elevation in the channels to between El. 0.85 ft. NAVD and El. 1.75 ft. NAVD to provide at least 14.7 acres (5.95 hectares) of additional substrate or platform suitable for the natural recruitment and recolonization of native, desirable marsh vegetation. Estimated excavation and fill calculations performed to identify the approximate expected area of new wetlands is provided in Table 2-2.

The surface of all excavated and fill areas will be graded to a constant elevation (to the extent practicable) such that it will not retain a depth of ponded water on the graded surface in excess of 0.5 feet. Surfaces between excavated and filled areas will be graded to drain at a reasonably constant slope between the limits of the constant elevation surfaces at slopes not exceeding 10H:1V. Excavation and fill surfaces will be graded to allow for substantially unobstructed water to flow into and out of the entire Project Site through each of the existing and new levee gaps. The surface of all excavated and fill areas will be compacted to the extent practical to minimize soft or unstable material while remaining suitable for native marsh vegetative recruitment across new marsh surface areas. The surface of all excavated and filled areas will also be lightly roughened after compaction and grading to facilitate volunteer seeding and establishment of native marsh vegetation. The surface grading and compaction work will be

¹ Site surfaces to be excavated and filled and associated excavation and fill volumes have been determined via a digital terrain model (DTM), using Autodesk AutoCAD Land Development software and levee topographic cross section data from a 2005 survey. With this information, the total linear levee footage to be degraded to create surface grades suitable for Marsh Creation in the adjacent channels is estimated at approximately 3500 ft (significantly larger than the required 2500 linear feet minimum).

² Except where fill is required to meet proposed grades for marsh creation, the fill will be placed in the existing canal between the gap and the existing marsh on either side of the gaps. The existing levees will be cut to form the gaps and, to the extent practicable, the existing levee material, the relatively short ends of the channel fill, and the existing marsh interior will be the only material exposed at the gap.

staged to limit vehicular and pedestrian traffic in these areas after completing the work to prevent displacement, erosion or further compaction of the soil. Marsh Creation will otherwise be constructed in accordance with the plan and specifications for this action presented in the attached "Drawings for Marsh Restoration Project, May 2008".

3.0 TRENASSES

Following completion of the Levee Degradation, Levee Gapping and fill work for Marsh Creation, a series of continuous trenasses (i.e., ditches) may be constructed to further improve hydrologic flow and connectivity within the marsh. The trenasse work is not a Construction Requirement, but the Settling Defendants have agreed to perform this additional work as requested by the Sabine NWR Managers.

To the extent practical, the trenasses will be designed to mimic natural channels and will be constructed in the area of old tidal channels. They will be created by compression and/or displacement of the surface (by a load imposed by a flotation crawler or tractor) to create one or more continuous channels, with the channel bottoms approximately 1.0 foot lower than adjacent marsh elevations. Fill material displaced by construction of the trenasses will be spread, if needed, to make piles with side slopes no steeper than 3H:1V and in a manner that allows substantially unobstructed water flow through the trenasses. The locations and configurations of the trenasses will be identified during the construction phase through consensus with the Sabine NWR Managers.

4.0 PROJECT IMPLEMENTATION

4.1 Project Construction - Settling Defendants shall construct the Restoration Project, in accordance with the Project Requirements and Construction Schedule specified herein, and all applicable laws and Project permits.

4.2 Schedule for Implementation

ACTION	SCHEDULE
Restoration Project Construction Activities	Completed within 180 days of Effective Date of Consent Decree
Construction Report to Trustee Council	Within 45 days of Completion of All Construction Activities

The above Schedule for Implementation may be adjusted by agreement of the Trustee Council and the Settling Defendants, as needed for Project implementation to occur consistent with applicable permits. In the absence of any such agreement, and provided the Settling Defendants are otherwise in compliance with the Restoration Implementation Plan, the period for Restoration Project Construction time period will be tolled for the period of any moratorium on

work imposed by applicable permits.

4.3 Notice of Construction Start Date - The Settling Defendants shall provide written notice to the Trustee Council, through the Lead Administrative Trustee, of the specific date construction will begin at least twenty-one (21) days prior to that date.

4.4 Interim Construction Reports - Following the start of construction activities at the Project Site, reports documenting the progress of all construction work will be prepared and sent to the Trustee Council monthly. These reports will include the locations of any construction work then on-going, the restoration work completed, the restoration work scheduled for the upcoming month and other information relevant to demonstrating full progress toward construction completion.

4.5 Notice of Construction End Date - The Settling Defendants shall provide written notice to the Trustee Council, through the Lead Administrative Trustee, at least fifteen (15) days in advance of the expected date for completion of all construction activities at the Project Site.

4.6 Field Modifications - In the course of performing any work or activity involved in implementing the Restoration Project, minor modifications to the Restoration Project may be required to address or adapt to field conditions or circumstances, or may otherwise be desirable to achieve, enhance or expedite the successful completion of the Restoration Project. Such field changes are permissible provided such changes do not materially alter, and are not otherwise inconsistent with the requirements set forth in the Consent Decree or the construction requirements identified in this Restoration Implementation Plan. Settling Defendants shall obtain the concurrence of the Sabine NWR Managers prior to implementing such changes and shall promptly notify the Lead Administrative Trustee of all such changes, including the reasons for same, when they occur.

4.7 Preliminary Inspection - Within ten (10) days of receipt of the Notice of Construction End Date, at least one representative of the Trustee Council will visit and visually inspect the Project Site. Such representative(s) will identify and verbally communicate to the Settling Defendants' Restoration Project Manager, or his/her designated on-site representative(s), any deficiencies, defects in or concerns pertaining to the construction work that are obvious from visual inspection only.

4.8 Construction Report - No later than forty five (45) days after completing all Restoration Project construction activities, Settling Defendants shall provide the Trustee Council with written notice and a report documenting the completion of all Restoration Project construction activities. Such report will be signed the Settling Defendants' Restoration Project Manager and include information sufficient to document that all activities necessary for construction of the Restoration Project have been completed in accordance with this Implementation Plan. The Construction Report will include, at a minimum:

- a. "Record" drawings of the degraded levees, the levee gaps, and the created

- marsh stamped by a registered professional engineer;
- b. "Record" topographic and bathymetric surveys, including all topographic and bathymetric data (in .xls format);
- c. Calculations of the actual sizes of the levee degradation, levee gaps and created marsh size, average elevations, and other information necessary to evaluate or determine whether the Restoration Project as constructed is in accordance with all Construction Requirements.
- d. Descriptions and photographs of all survey benchmark(s) used with geographic coordinates of their location and datum.
- e. Certification by a registered professional engineer that the Restoration Project was constructed in accordance with the materials and specifications presented in this Implementation Plan, including Tables 2-1 and 2-2 and the "Drawings for Marsh Restoration Project, May 2008" attached hereto.
- f. Description of all non-material changes or differences in design, methods, specifications or other Restoration Project details, and the reasons for same, from those found in this Implementation Plan.

The Construction Report shall be accompanied by the following statement, signed by a responsible corporate official of each Settling Defendant:

To the best of my/our knowledge, after thorough investigation, I/we certify that the information contained in or accompanying this submission is true, accurate and complete. I am/we are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

4.9 Certification of Construction Completion - Within thirty (30) working days of receipt of the Settling Defendants' Construction Report, the Trustee Council will review the Construction Report and conduct an inspection of the Restoration Project for the purpose of verifying that construction of the Restoration Project is in accordance with the requirements of this Implementation Plan ("Verifying Inspection"). The Trustees will coordinate the inspection of the Restoration Project with the Defendants' Restoration Project Manager so that he/she may attend the inspection with the Trustees' representatives.

If the Trustee Council determines that construction of the Restoration Project is in accordance with this Implementation Plan, the Trustee Council will provide written notice to the Settling Defendants' Restoration Project Manager certifying that construction of the Restoration Project is complete ("Certificate of Construction Completion"). Such Certificate will be issued by the Trustee Council within thirty (30) days of the date of the Verifying Inspection or, if the Trustee Council submits written comments on the Construction Report that Settling Defendants' must address before that report can be accepted as complete by the Trustee Council, within twenty (20) days of the Trustee Council's receipt of the revised Construction Report, whichever is later.

If the Trustee Council determines that the Restoration Project has not been constructed in accordance with this Implementation Plan, the Trustee Council will provide written notice to Settling Defendants' Restoration Project Manager identifying any Restoration Project deficiencies and the additional activities or actions that must be undertaken by the Settling Defendants for construction to conform to the requirements of this Implementation Plan, with a schedule for completion. This notice will be provided within thirty (30) days of the date of the Verifying Inspection. The Trustee Council and the Settling Defendants will also schedule a meeting to discuss the Restoration Project deficiencies. Settling Defendants shall perform all activities described in the Trustee Council's notice, in accordance with the identified schedule, subject only to the dispute resolution procedures set forth in Section X of the Consent Decree.

List of Attachments:

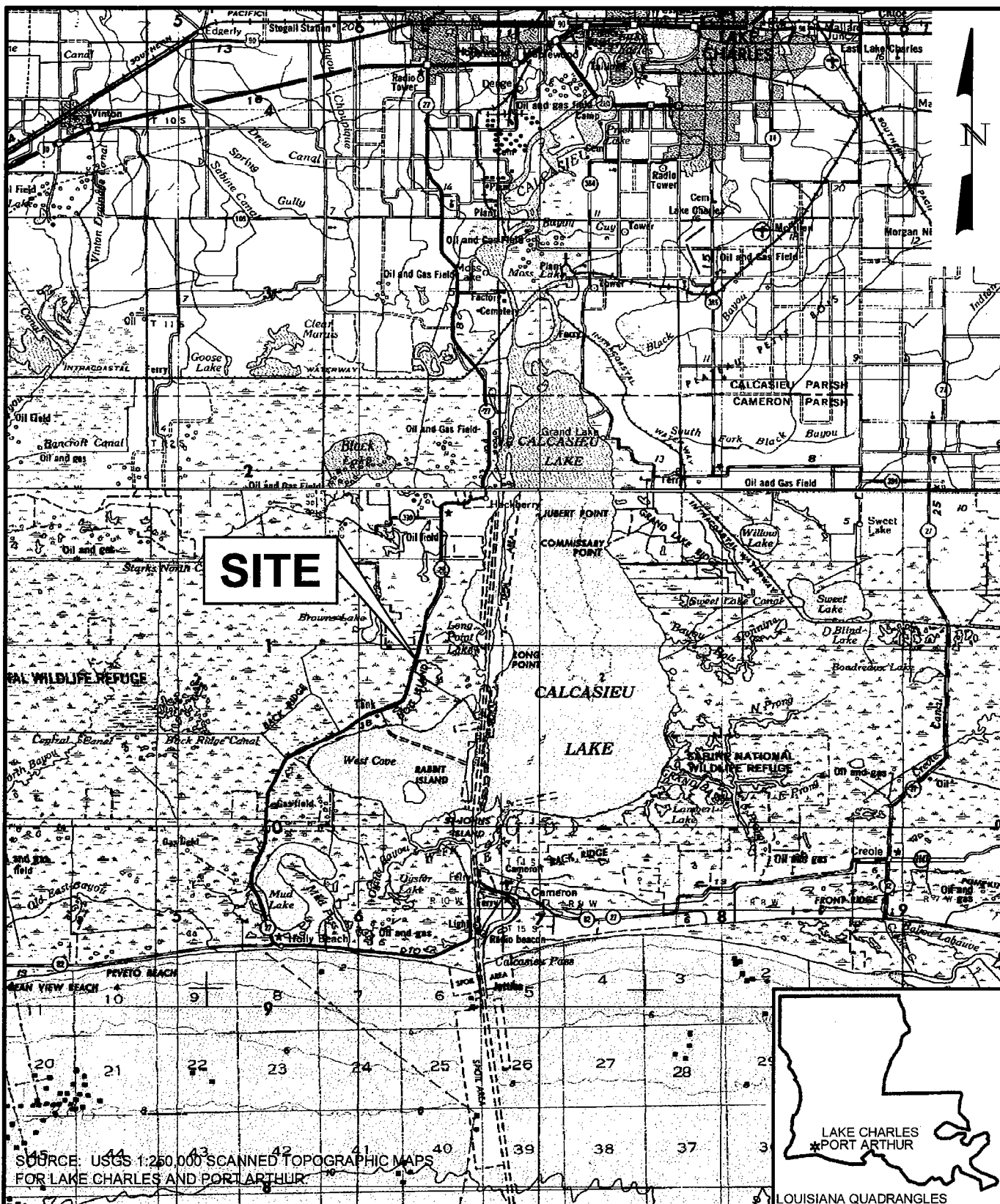
Figure 1-1

Figure 1-2

Drawings for Marsh Restoration Project, May 2008 (Attachment A)

Table 2-1

Table 2-2



RCM ERM Remediation & Construction Management

DESIGN: CRH/PSS DRAWN: MHB CHKD: MEH/JMB

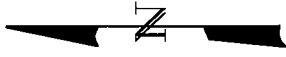
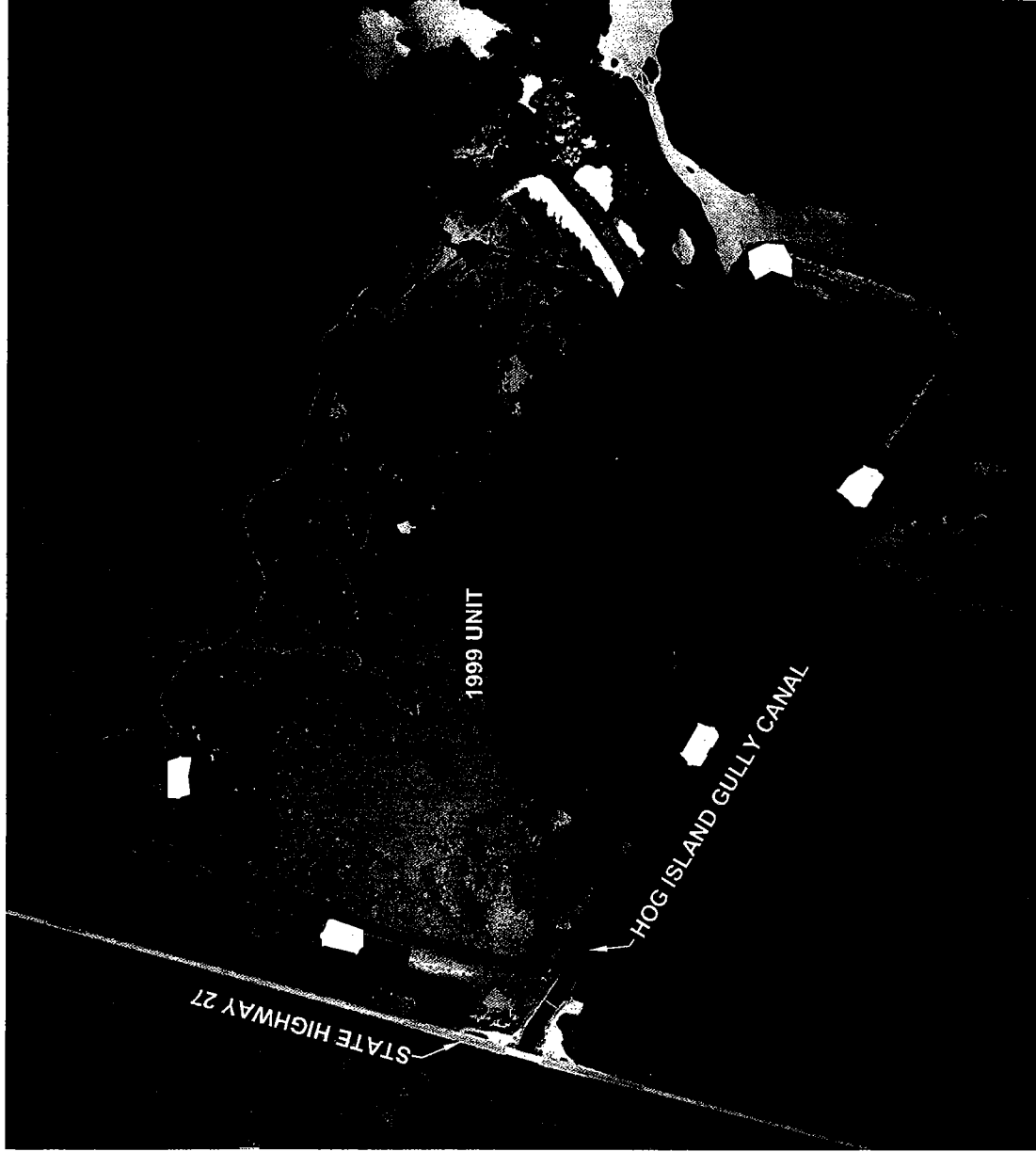
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FIGURE 1-1
SITE VICINITY MAP

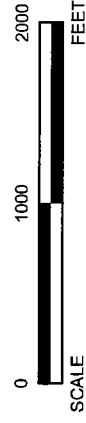
Sabine National Wildlife Refuge
Cameron Parish, Louisiana





LEGEND

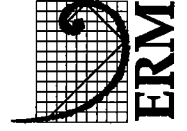
- OPEN WATER CHANNEL FILLED TO MARSH LEVEL
- SPOIL BANK EXCAVATED TO MARSH LEVEL
- SPOIL BANK REGRADED TO OPEN WATER IN CUT



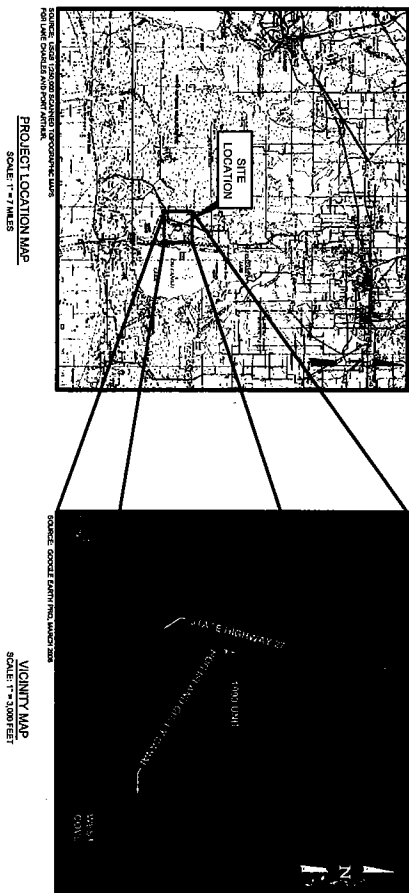
RCM ERM Remediation & Construction Management

DESIGN: EDM/PS	DRAWN: CAK/MHB	CHKD: MEH/JMB
DATE: 2/6/2009	SCALE: AS SHOWN	REV:
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**FIGURE 1-2
SITE LAYOUT**
1999 Unit Marsh Restoration Project
Sabine National Wildlife Refuge
Cameron Parish, Louisiana

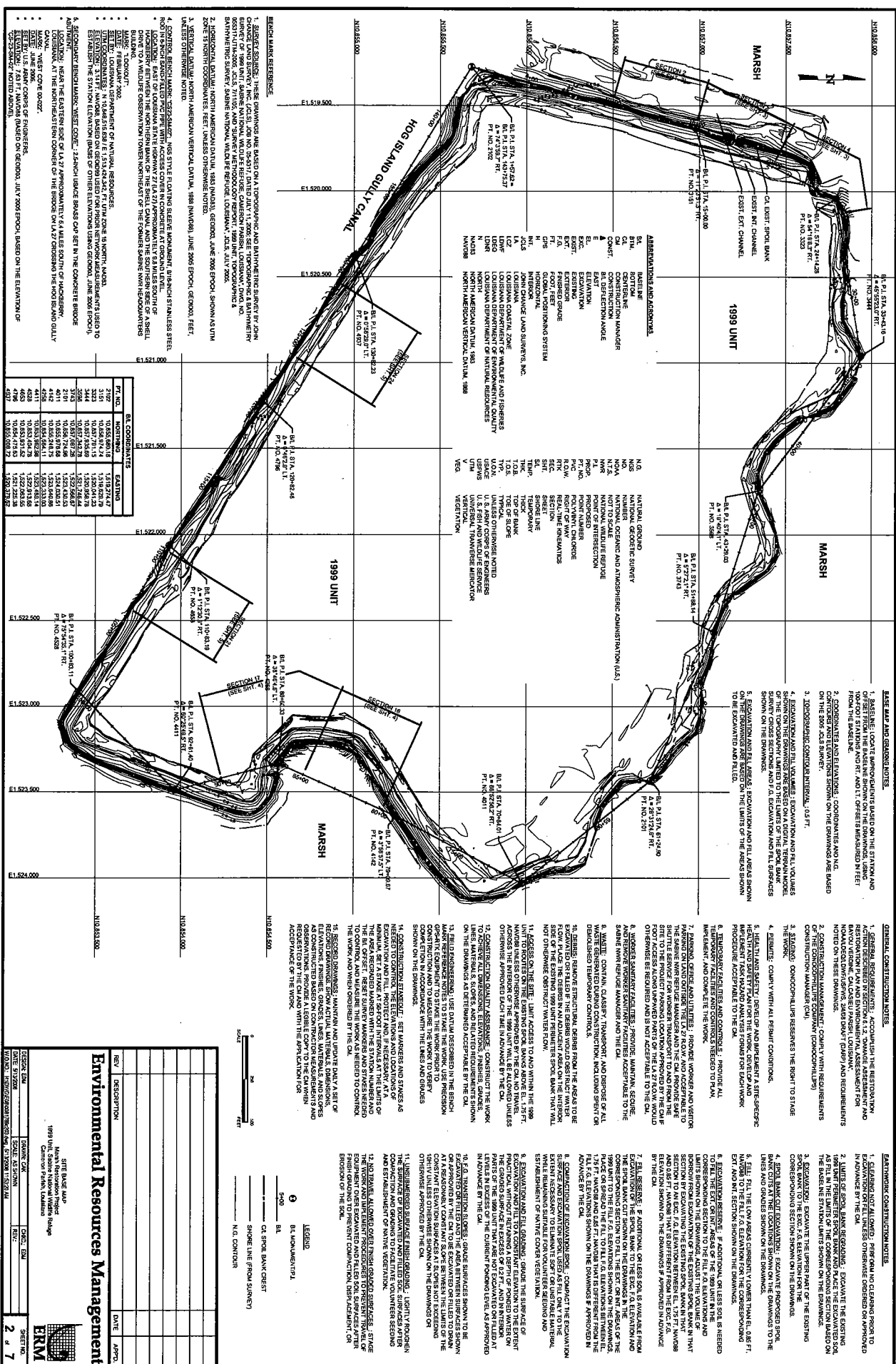


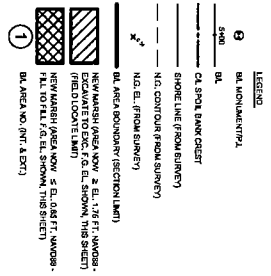
ConocoPhillips
Drawings For
MARSH RESTORATION PROJECT
1999 Unit
Sabine National Wildlife Refuge
Cameron Parish, Louisiana



INDEX OF DRAWINGS	
SHEET NO.	TITLE
1	COVER SHEET
2	BASE MAP
3	SPOIL BANK GRADING PLAN - SHEET 1 OF 3
4	SPOIL BANK GRADING PLAN - SHEET 2 OF 3
5	SPOIL BANK GRADING PLAN - SHEET 3 OF 3
6	SPOIL BANK PROFILE
7	SPOIL BANK GRADING SECTIONS AND DETAILS

Environmental Resources Management
ERM
Project No. 0081769
May 2008



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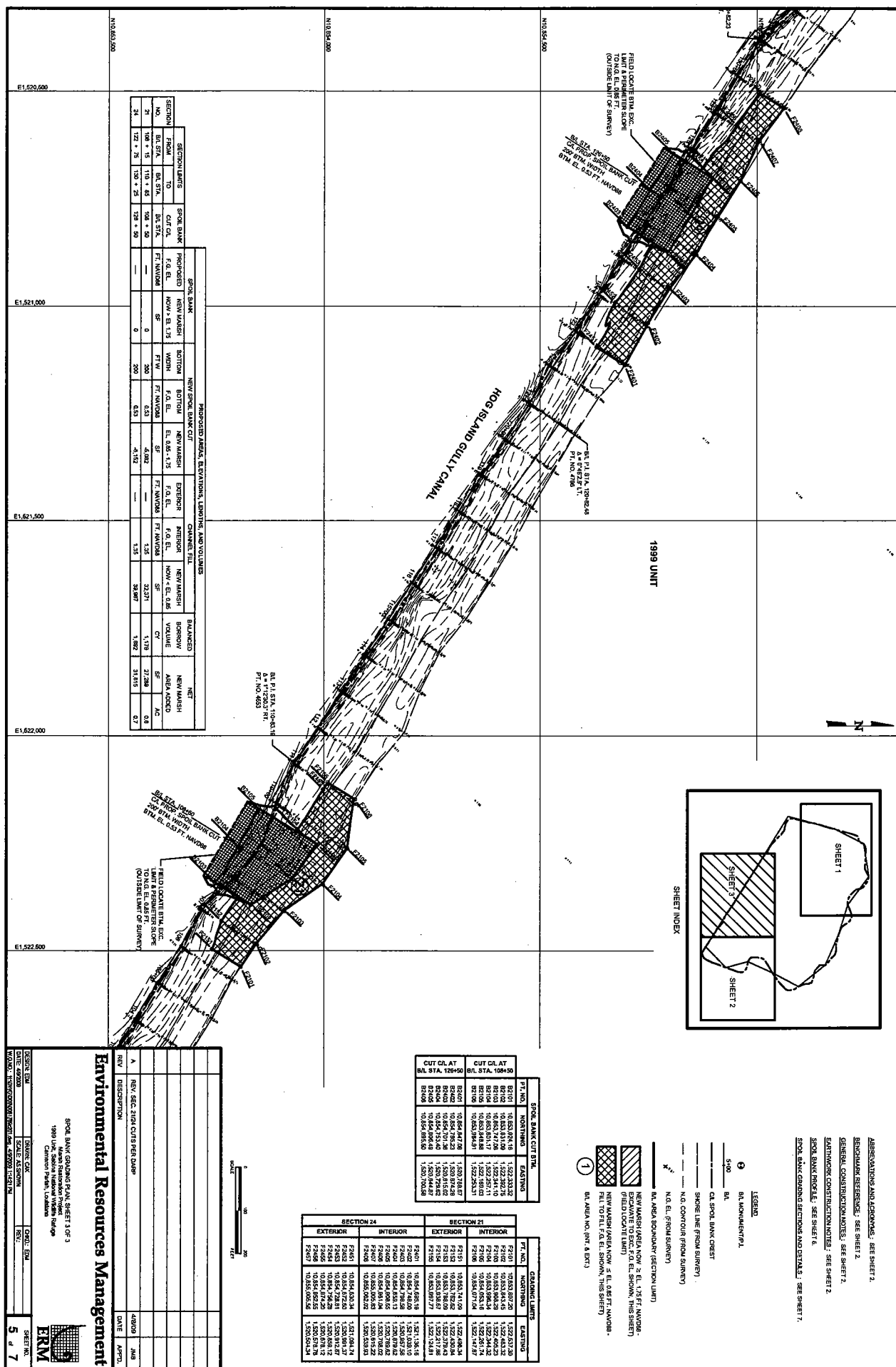


TABLE 2-1
WETLANDS RESTORATION TIDAL FLOW AND SPOIL BANK CUT CALCULATIONS [1]

1999 Unit Marsh Restoration Project
Sabine National Wildlife Refuge
Cameron Parish, Louisiana

Spoil Bank Cut No.	B/L Sta. of Cut C/L	Interior Wetlands		Avg. Tide Flux [10]	Spoil Bank Cut Design Values Used						
		Tidal Flow Subarea [5]			Btm. El. [14]	Cut Depth [15]	Cut Width [16]	Avg. Flow Depth [17]	Avg. Flow Area [18]	Avg. Velocity [19]	
—	100-ft. Sta.	SF	m ²	m ³ /s	ft. NAVD88	m	m	FT W	m	m/s	
Cut 1	14 + 00	1,983,000	184,000	1.02	0.53	0.25	61	200	0.31	19	0.05
Cut 2	29 + 30	1,983,000	184,000	1.02	0.53	0.25	61	200	0.31	19	0.05
Cut 3 [2]	34 + 20	2,873,000	267,000	0.33	0.9	0.14	30	100	0.20	6	0.05
	38 + 20			0.13	0.9	0.14	12	40	0.20	2	0.05
Cut 4 [3]	45 + 50			0.03	0.9	0.14	3	10	0.20	1	0.05
	49 + 50			0.03	0.9	0.14	3	10	0.20	1	0.05
	52 + 70			0.03	0.9	0.14	3	10	0.20	1	0.05
	55 + 20			0.03	0.9	0.14	3	10	0.20	1	0.05
	61 + 40			0.18	0.9	0.14	17	55	0.20	3	0.05
Cut 5 [4]	66 + 50			0.63	0.9	0.14	59	195	0.20	12	0.05
	85 + 90			0.08	1.0	0.11	9	30	0.17	2	0.05
Cut 6	88 + 50	1,983,000	184,000	1.02	0.53	0.25	61	200	0.31	19	0.05
Cut 7	108 + 50	1,983,000	184,000	1.02	0.53	0.25	61	200	0.31	19	0.05
Cut 8	126 + 50	1,983,000	184,000	1.02	0.53	0.25	61	200	0.31	19	0.05
Totals		12,788,000	1,187,000	6.6						122	0.05

ABBREVIATIONS AND ACRONYMS

Avg. average
Btm. bottom
El. Elevation
FT W feet wide
HR hours
Int interior
m meters
m/s meters per second
m² square meters
m³/s cubic meters per second
NAVD88 North American Vertical Datum, 1988
SF square feet
V velocity
VF vertical feet
WS water surface

Avg. Interior Wetlands Surface Elevation [6]	Max. Water Depth Over Int. Wetlands [7]	Avg. Int. W.S. [8]	Tidal Cycle [9]
m NAVD88	ft. NAVD88	ft. NAVD88	HR
0.41	1.35	1.55	6.3

Spoil Bank Cut Target Design Values			
Depth Over Wetlands [11]	Velocity [12]	Depth [13]	
Min., cm	Max., cm	m/s	m
10	20	0.05	0.25

TABLE 2-1
WETLANDS RESTORATION TIDAL FLOW AND SPOIL BANK CUT CALCULATIONS [1]

1999 Unit Marsh Restoration Project
Sabine National Wildlife Refuge
Cameron Parish, Louisiana

NOTES

- [1] Source: "A Rationale for Coastal Wetland Restoration through Spoil Bank Management in Louisiana, USA," Turner, R., Swenson, E., and Lee, J., *Env. Mgt.*, v. 18, no. 2 (Turner et al. 1994).
- [2] Existing spoil bank cut group (two cuts as shown). The tide flow subarea and flow rate was assumed to be based on a total flow through the cut group, with the flow distributed between the cuts in proportion to the average flow cross section area in that cuts to the total average cross section area in the group.
- [3] Existing spoil bank cut group (five cuts as shown). The tide flow subarea and flow rate was assumed to be based on a total flow through the cut group, with the flow distributed between the cuts in proportion to the average flow cross section area in that cuts to the total average cross section area in the group.
- [4] Existing spoil bank cut group (two cuts as shown). The tide flow subarea and flow rate was assumed to be based on a total flow through the cut group, with the flow distributed between the cuts in proportion to the average flow cross section area in that cuts to the total average cross section area in the group.
- [5] The subarea contributing to the tidal flux through each cut was assumed to be an equal part of the total area inside the spoil bank as the average cut open area is to the total cut open area.
- [6] The Marsh surface elevation was assumed to be the average of the range described in the DARP, i.e. the average of EL 0.30 m and 0.53 m.
- [7] The water depth over the marsh was assumed to be the average of the range reported observed in Turner et al. 1994.
- [8] The average water surface EL was calculated as the sum of the average marsh surface elevation plus half of the water depth over the marsh.
- [9] The tidal cycle length is half of the value reported in Turner et al. 1994, equal to the value between high tide and low tide (outflow) or between low tide and high tide (inflow).
- [10] The average tide flux was calculated as the product of the marsh subarea and the water depth over the marsh divided by the semi-diurnal tide cycle length (i.e. high tide to low tide or from low tide to high tide).
- [11] Observed range of water depth over wetlands cited in Turner et al. 1994, p. 273.
- [12] The target average tidal flux velocity recommended in Turner et al. 1994, p. 273.
- [13] The target depth of spoil bank cut recommended in Turner et al. 1994, p. 273.
- [14] The cut bottom EL was entered as a design value to be confirmed by comparison of the resulting calculation of the average tidal flux velocity to the target velocity.
- [15] The cut depth was calculated as the difference between the average Interior Wetlands Surface EL and the Bm. EL.
- [16] The cut width was entered as a design value to be confirmed by comparison of the resulting calculation of the average tidal flux velocity to the target velocity.
- [17] The average flow depth was calculated as the difference between the Avg. Int. Wetlands W.S. EL and the design cut Bm. EL.
- [18] The average flow cross section area was calculated as the product of the Avg. Int. Wetlands W.S. EL and the cut width.
- [19] The average velocity was calculated by dividing the average tide flux by the product of the cut width and the flow depth.

TABLE 2-2
SPOIL BANK AND SPOIL BANK CUT EXCAVATION AND FILL CALCULATIONS

1999 Unit Marsh Restoration Project
Sabine National Wildlife Refuge
Cameron Parish, Louisiana

Section No.	Section B/L Sta.		Length Filled	Spoil Bank		New Spoil Bank Cut				Channel Fill			Balanced		Net	
	From	To		Cut C/L B/L Sta.	Proposed F.G. El.	New Wetlands Now > El. 1.75	Bottom Width	Bottom F.G. El.	New Wetlands Now < El. 0.85	Exterior F.G. El.	Interior F.G. El.	New Wetlands Now < El. 0.85	Borrow Volume	CY	SF	AC
2	5 + 00	10 + 00	100-Ft. Sta.	9 + 00	ft. NAVD	SF	200	0.53	-29,568	0.85	0.85	121,504	4,041	136,295	3.1	
3	10 + 00	15 + 00		No New Cut	1.35	47,056	---	---	0	0.85	0.85	125,924	3,581	172,980	4.0	
4	15 + 00	20 + 00		No New Cut	1.50	37,179	---	---	0	0.85	0.85	92,472	2,041	129,651	3.0	
5	20 + 00	25 + 00		24 + 30	1.75	18,954	200	0.53	-23,723	0.85	0.85	22,561	1,193	17,792	0.0	
16	75 + 00	80 + 00		No New Cut	1.75	56,047	---	---	0	0.85	0.85	44,957	3,350	101,004	2.3	
17	80 + 00	85 + 00		84 + 00	1.75	73,770	200	0.53	-32,570	0.85	0.85	69,046	4,146	110,246	2.5	
21	106 + 15	110 + 85	470	108 + 50	---	0	200	0.53	-5,082	---	1.35	32,371	1,179	27,289	0.6	
24	122 + 75	130 + 25	750	126 + 50	---	0	200	0.55	-8,152	---	1.35	39,967	1,692	31,815	0.7	
Total:													28,287			16.3

ABBREVIATIONS AND ACRONYMS

AC acres
B/L baseline
Btm. bottom
CY cubic yards
El. elevation
F.G. finished grade
Ft. feet
Ft W feet width
ft. NAVD feet, North American Vertical Datum, 1988 (based on local Control Monument)
No. number
SF square feet
Sta. station
W width