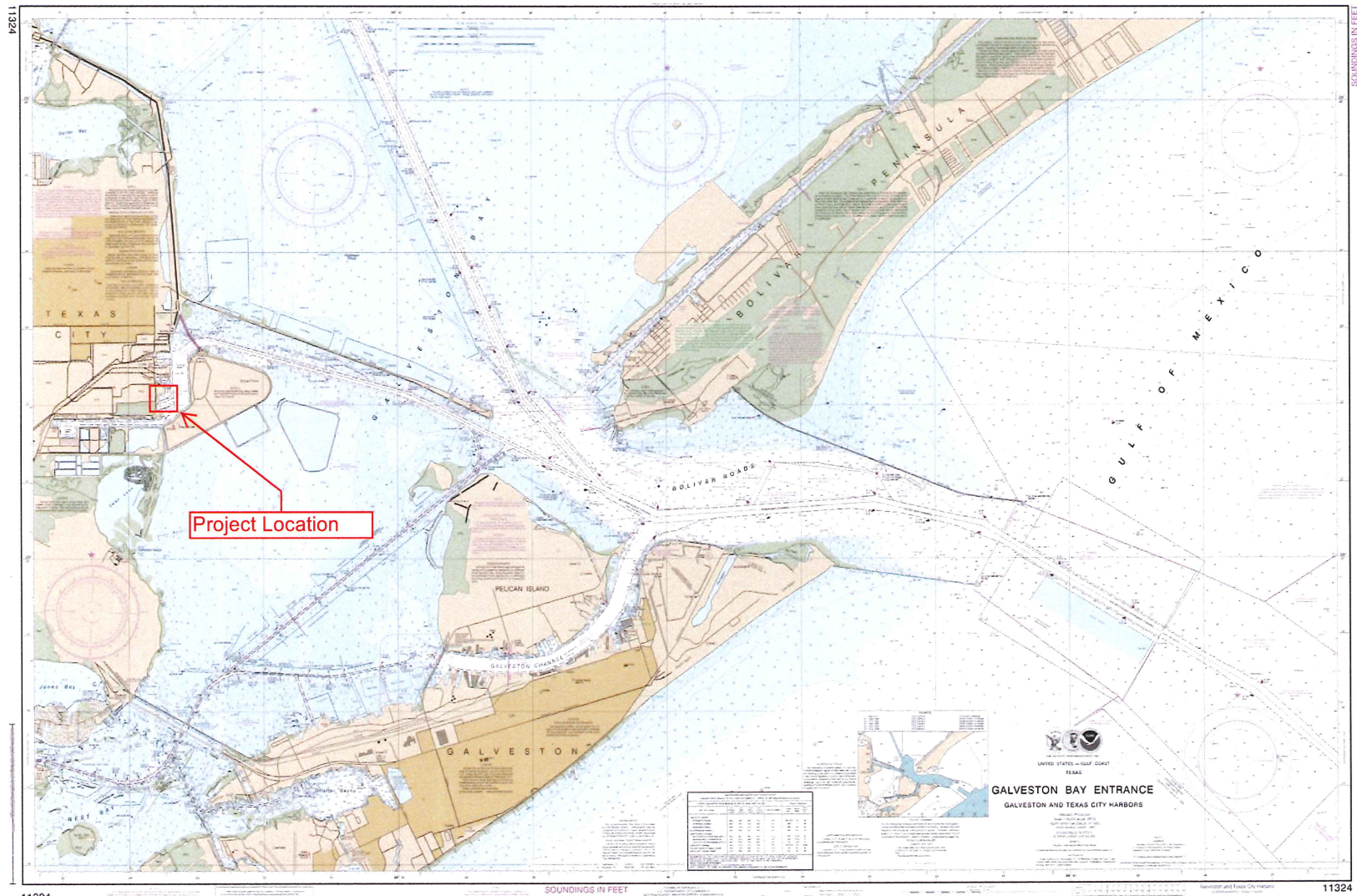


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LAW OFFICES OF JAMES M. HARRIS, P.C. 011-1001318

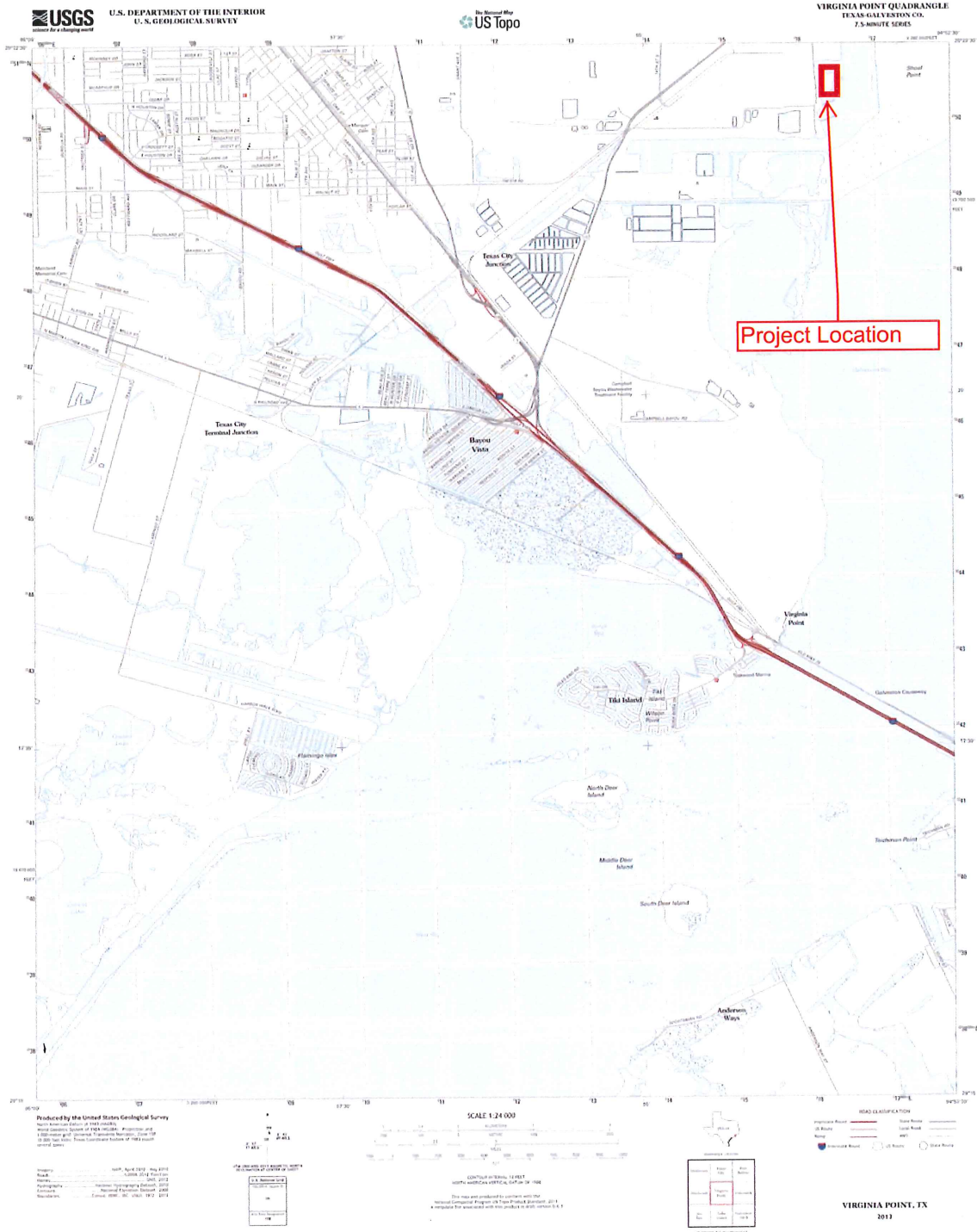
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SOUNDINGS IN FEET

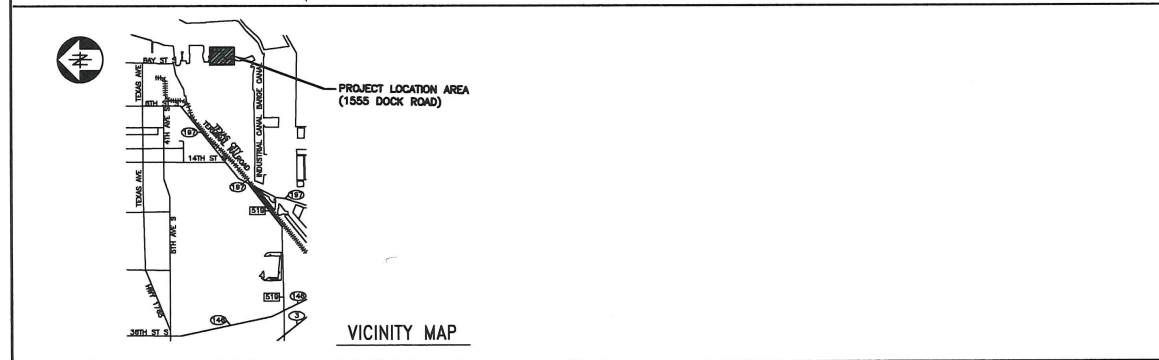
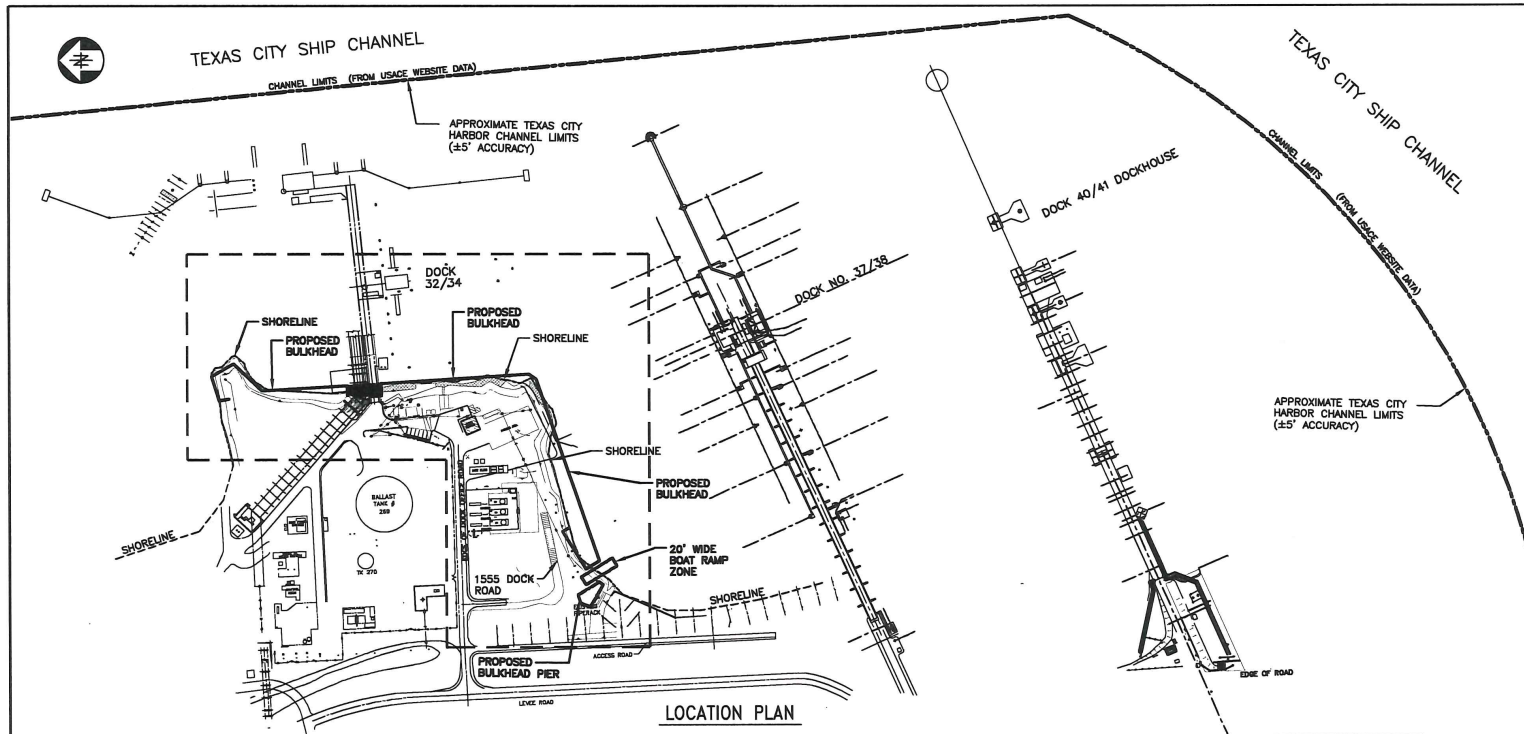
UNITED STATES - GULF COAST  
TEXAS  
**GALVESTON BAY ENTRANCE**  
GALVESTON AND TEXAS CITY HARBORS


11324

APR 22 2019

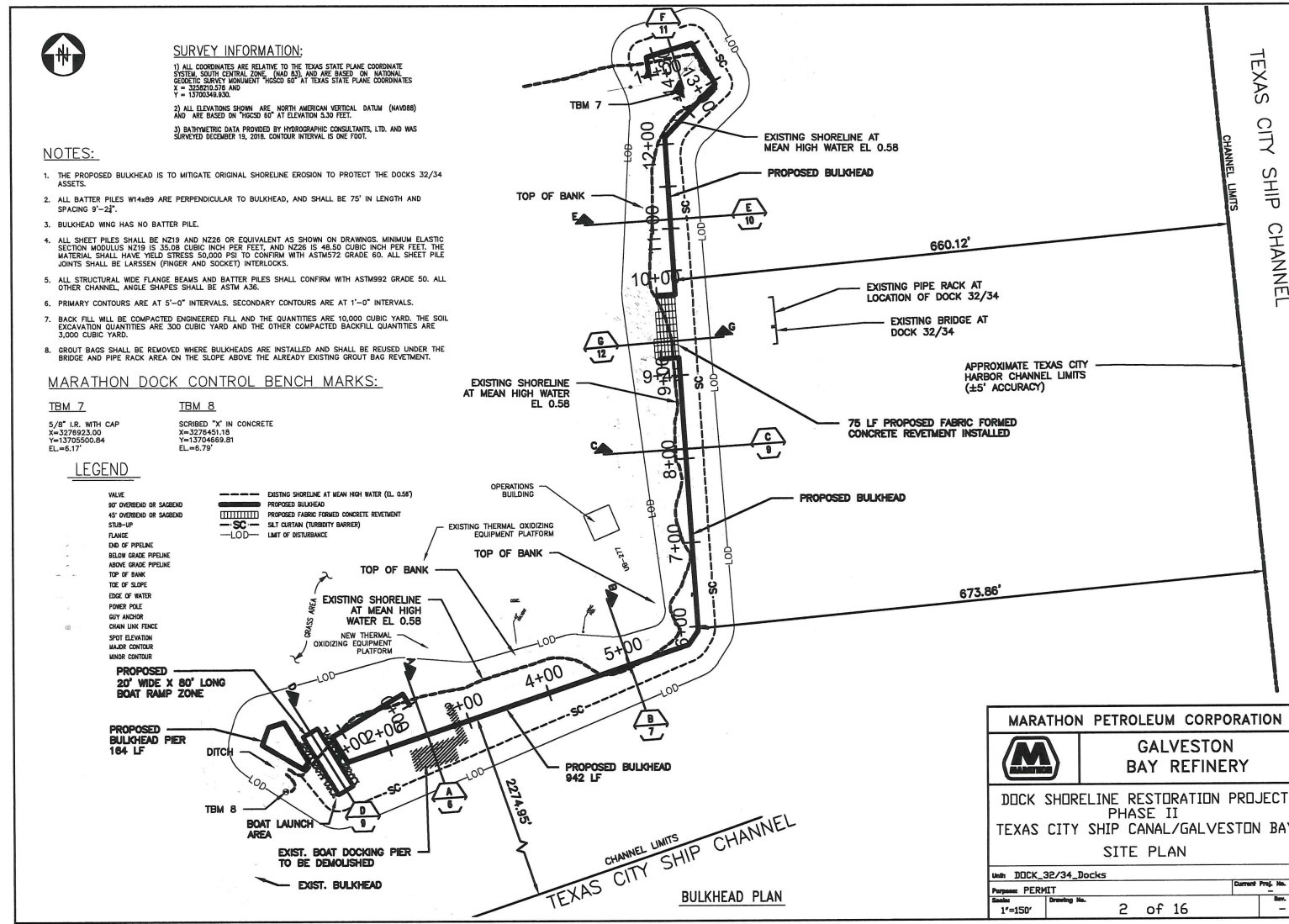


APR 22 2019



MARATHON PETROLEUM CORPORATION	
	
GALVESTON BAY REFINERY	
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY LOCATION PLAN AND VICINITY MAP	
Unit: DDCK_32/34_Docks	
Purpose: PERMIT	Current Proj. No.
Scale: NTS	Drawing No. 1 of 16
Rev.:	-

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**SURVEY INFORMATION:**

- 1) ALL COORDINATES ARE RELATIVE TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE, TMD 831, AND ARE BASED ON NATIONAL GEODETIC SURVEY MONUMENT 745000 60' AT TEXAS STATE PLANE COORDINATES X = 1330210.576 AND Y = 1370244.820.
- 2) ALL ELEVATIONS SHOWN ARE NORTH AMERICAN VERTICAL DATUM (NAVD88) AND ARE BASED ON "HIGCSO 60" AT ELEVATION 5.30 FEET.
- 3) BATHYMETRIC DATA PROVIDED BY HYDROGRAPHIC CONSULTANTS, LTD. AND WAS SOUNDED DECEMBER 16, 2018. CONTOUR INTERVAL IS ONE FOOT.

**NOTES:**

1. THE PROPOSED BULKHEAD IS TO MITIGATE ORIGINAL SHORELINE EROSION TO PROTECT THE DOCKS 32/34 ASSETS.
2. ALL BATTER PILES W14x89 ARE PERPENDICULAR TO BULKHEAD, AND SHALL BE 75' IN LENGTH AND SPACING 9'-24".
3. BULKHEAD WING HAS NO BATTER PILE.
4. ALL SHEET PILES SHALL BE NZ19 AND NZ26 OR EQUIVALENT AS SHOWN ON DRAWINGS. MINIMUM ELASTIC SECTION MODULUS NZ19 IS 35.08 CUBIC INCH PER FOOT, AND NZ26 IS 48.50 CUBIC INCH PER FOOT. THE MATERIAL SHALL HAVE YIELD STRESS 50,000 PSI TO CONFIRM WITH ASTM572 GRADE 60. ALL SHEET PILE JOINTS SHALL BE LARSEN (FINGER AND SOCKET) INTERLOCKS.
5. ALL STRUCTURAL WIDE FLANGE BEAMS AND BATTER PILES SHALL CONFIRM WITH ASTM992 GRADE 50. ALL OTHER CHANNEL, ANGLE SHAPES SHALL BE ASTM A36.
6. PRIMARY CONTOURS ARE AT 5'-0" INTERVALS. SECONDARY CONTOURS ARE AT 1'-0" INTERVALS.
7. BACK FILL WILL BE COMPACTED ENGINEERED FILL, AND THE QUANTITIES ARE 10,000 CUBIC YARD. THE SOIL EXCAVATION QUANTITIES ARE 300 CUBIC YARD AND THE OTHER COMPACTED BACKFILL QUANTITIES ARE 3,000 CUBIC YARD.
8. GROUT BAGS SHALL BE REMOVED WHERE BULKHEADS ARE INSTALLED AND SHALL BE REUSED UNDER THE BRIDGE AND PIPE RACK AREA ON THE SLOPE ABOVE THE ALREADY EXISTING GROUT BAG RETEVMENT.

**MARATHON DOCK CONTROL BENCH MARKS:**

TBM 7	TBM 8
5/8" I.R. WITH CAP	SCRIBED "X" IN CONCRETE
X=3278923.00	X=3276451.18
Y=13705500.84	Y=13704669.81
EL.=6.17'	EL.=6.79'

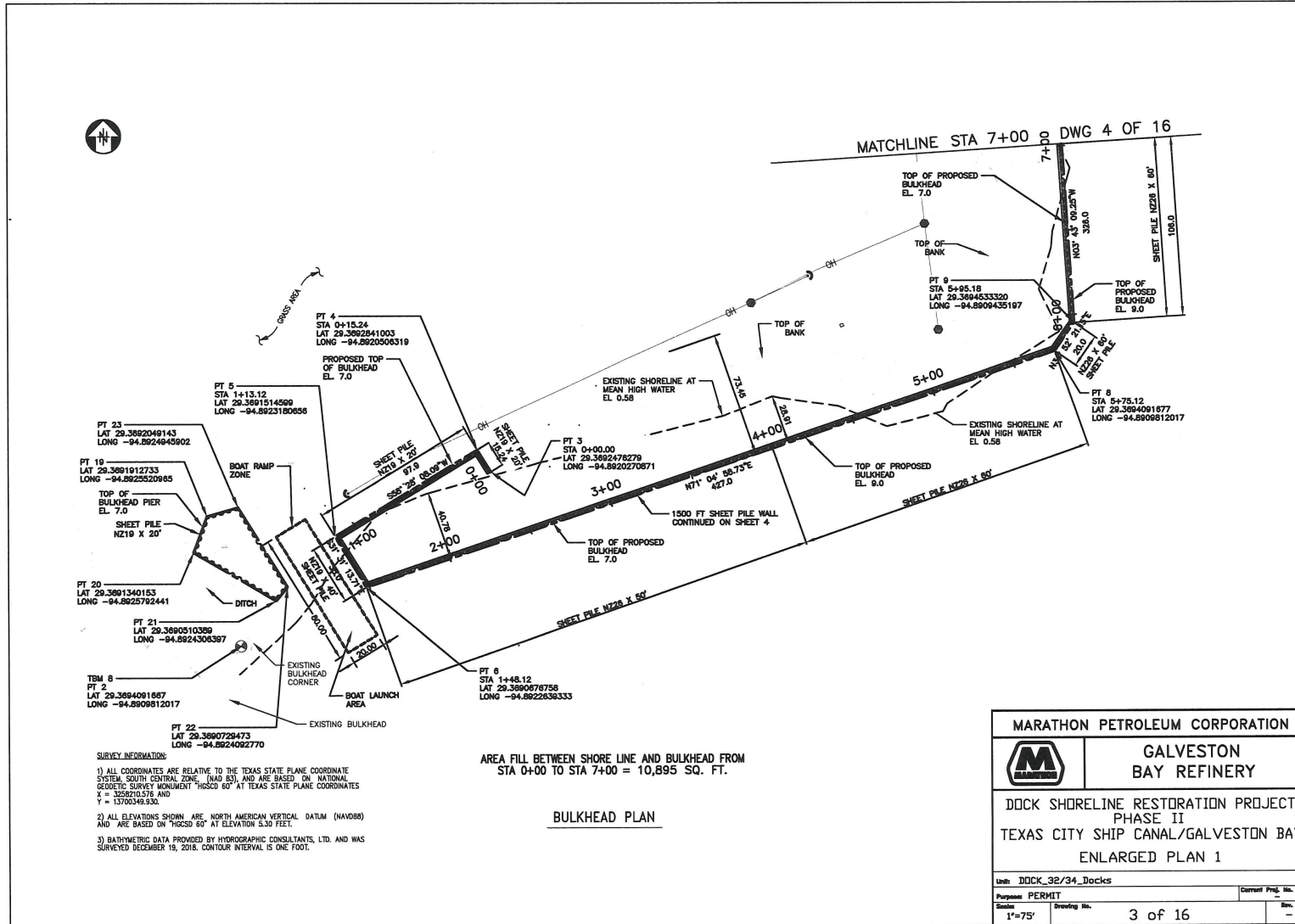
**LEGEND**

— — — — —	EXISTING SHORELINE AT MEAN HIGH WATER (EL. 0.58')
▬▬▬▬▬▬▬	PROPOSED BULKHEAD
▨▨▨▨▨▨▨	PROPOSED FABRIC FORMED CONCRETE RETEVMENT
— SC —	SILT CURTAIN (TURBIDITY BARRIER)
— LOD —	LIMIT OF DISTURBANCE
— — — — —	EXISTING SHORELINE AT MEAN HIGH WATER (EL. 0.58')
▬▬▬▬▬▬▬	PROPOSED BULKHEAD
▨▨▨▨▨▨▨	PROPOSED FABRIC FORMED CONCRETE RETEVMENT
— SC —	SILT CURTAIN (TURBIDITY BARRIER)
— LOD —	LIMIT OF DISTURBANCE

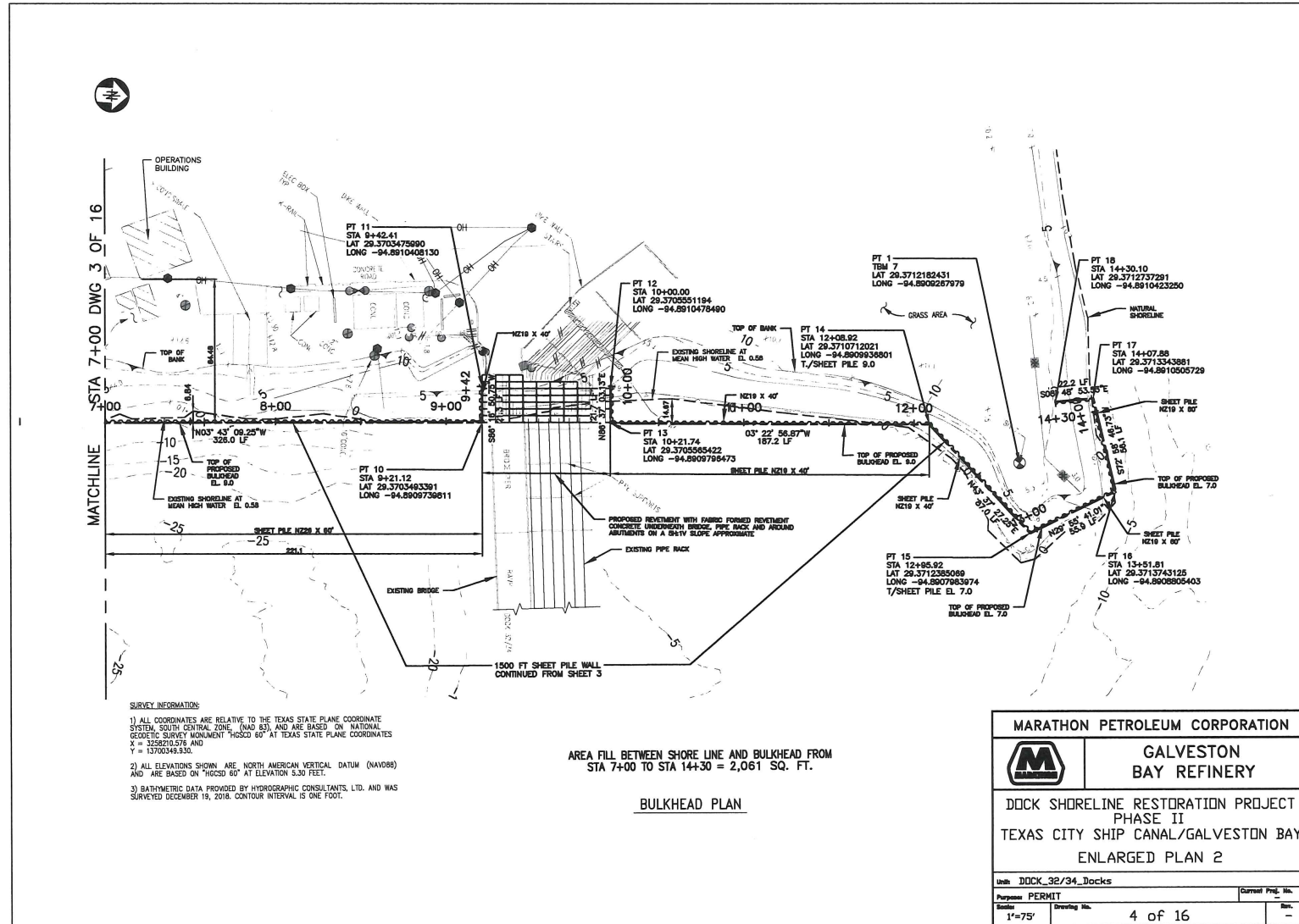
MARATHON PETROLEUM CORPORATION	
<b>GALVESTON BAY REFINERY</b>	
<b>DOCK SHORELINE RESTORATION PROJECT</b> <b>PHASE II</b> <b>TEXAS CITY SHIP CANAL/GALVESTON BAY</b> <b>SITE PLAN</b>	
Unit: DOCK_32/34_Docks	
Purpose: PERMIT	Current Proj. No.
Scale: 1"=150'	Drawing No. 2 of 16
Date:	Rev:

**BULKHEAD PLAN**

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APR 2 2 2019



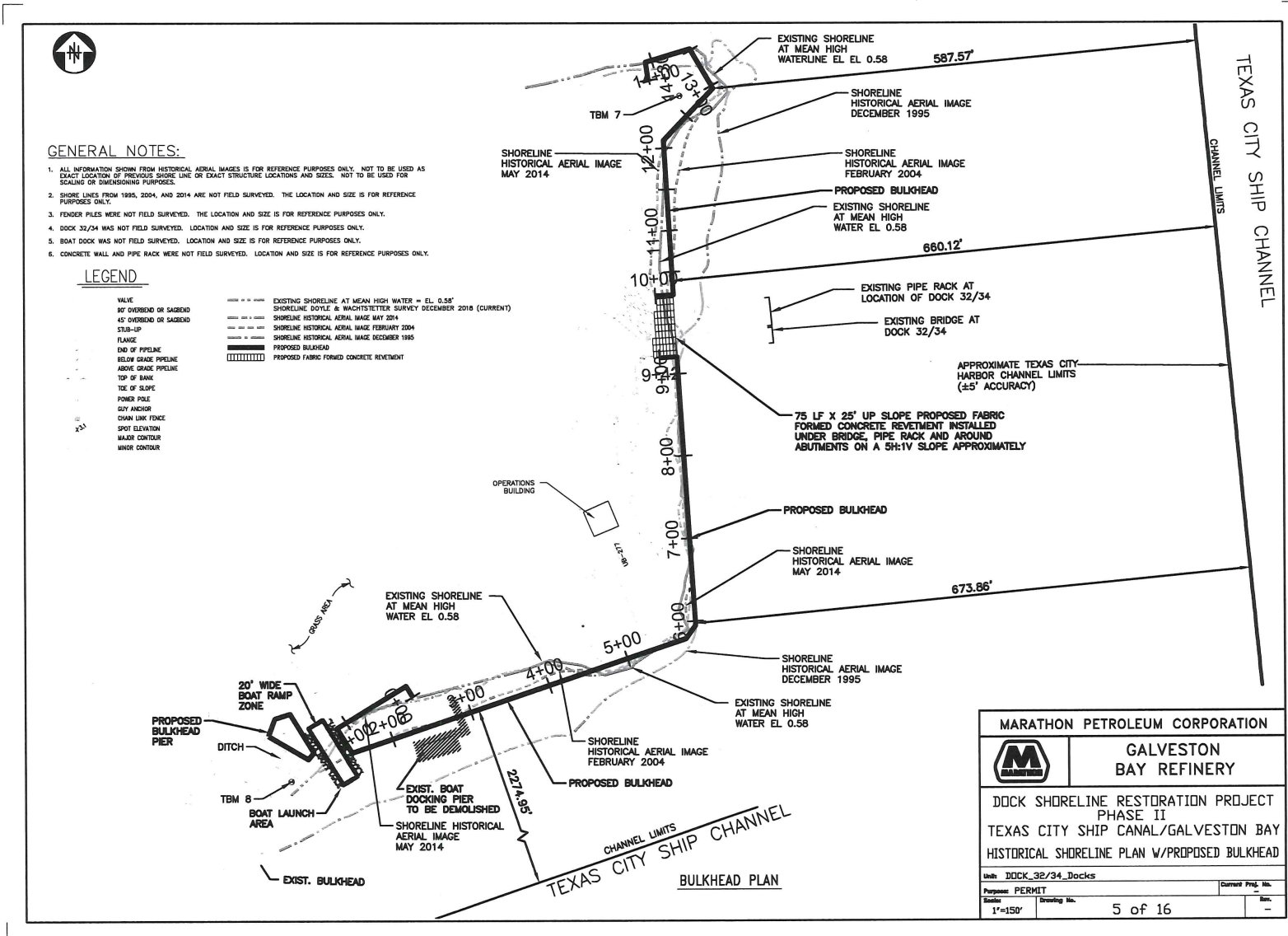
**SURVEY INFORMATION:**  
 1) ALL COORDINATES ARE RELATIVE TO THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (NAD 83), AND ARE BASED ON NATIONAL GEODETIC SURVEY MONUMENT "HICSD 60" AT TEXAS STATE PLANE COORDINATES X = 3258210.576 AND Y = 13700449.530.  
 2) ALL ELEVATIONS SHOWN ARE NORTH AMERICAN VERTICAL DATUM (NAVD83) AND ARE BASED ON "HICSD 60" AT ELEVATION 5.30 FEET.  
 3) BATHYMETRIC DATA PROVIDED BY HYDROGRAPHIC CONSULTANTS, LTD. AND WAS SURVEYED DECEMBER 19, 2018. CONTOUR INTERVAL IS ONE FOOT.

AREA FILL BETWEEN SHORE LINE AND BULKHEAD FROM STA 7+00 TO STA 14+30 = 2,061 SQ. FT.

BULKHEAD PLAN

<b>MARATHON PETROLEUM CORPORATION</b>	
	<b>GALVESTON BAY REFINERY</b>
<b>DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY ENLARGED PLAN 2</b>	
Unit: <b>DOCK_32/34_Docks</b>	Current Proj. No.:
Purpose: <b>PERMIT</b>	Sheet No.:
Scale: <b>1"=75'</b>	Drawing No. <b>4 of 16</b>
	Rev. <b>-</b>

APR 22 2019



**GENERAL NOTES:**

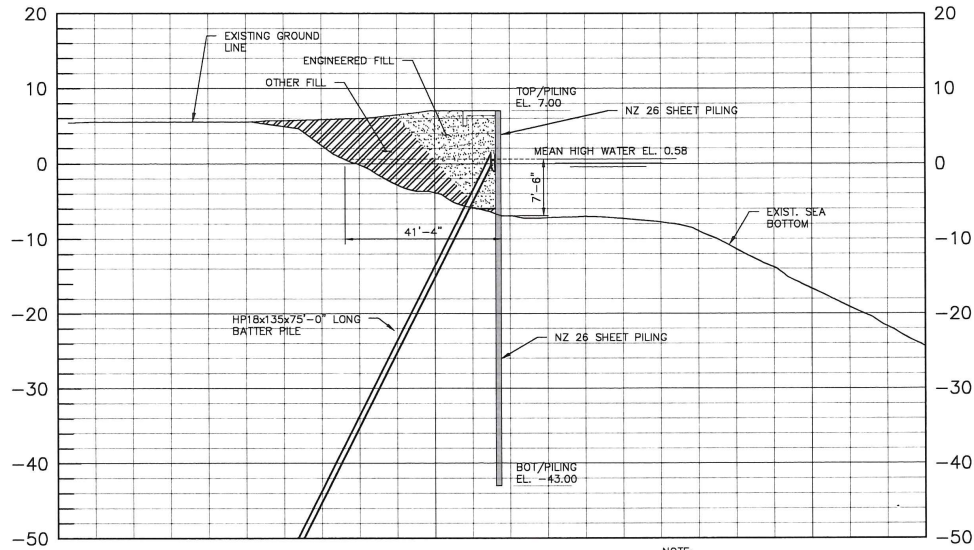
1. ALL INFORMATION SHOWN FROM HISTORICAL AERIAL IMAGES IS FOR REFERENCE PURPOSES ONLY. NOT TO BE USED AS EXACT LOCATION OF PREVIOUS SHORE LINE OR EXACT STRUCTURE LOCATIONS AND SIZES. NOT TO BE USED FOR SCALING OR DIMENSIONING PURPOSES.
2. SHORE LINES FROM 1995, 2004, AND 2014 ARE NOT FIELD SURVEYED. THE LOCATION AND SIZE IS FOR REFERENCE PURPOSES ONLY.
3. FENDER PILES WERE NOT FIELD SURVEYED. THE LOCATION AND SIZE IS FOR REFERENCE PURPOSES ONLY.
4. DOCK 32/34 WAS NOT FIELD SURVEYED. LOCATION AND SIZE IS FOR REFERENCE PURPOSES ONLY.
5. BOAT DOCK WAS NOT FIELD SURVEYED. LOCATION AND SIZE IS FOR REFERENCE PURPOSES ONLY.
6. CONCRETE WALL AND PIPE RACK WERE NOT FIELD SURVEYED. LOCATION AND SIZE IS FOR REFERENCE PURPOSES ONLY.

**LEGEND**

- |       |   |
|-------|---|
| —     | EXISTING SHORELINE AT MEAN HIGH WATER = EL. 0.58'           |
| ---   | SHORELINE DODD & WACHSTETTER SURVEY DECEMBER 1918 (CURRENT) |
| ----  | SHORELINE HISTORICAL AERIAL IMAGE MAY 2014                  |
| ----- | SHORELINE HISTORICAL AERIAL IMAGE FEBRUARY 2004             |
| ----- | SHORELINE HISTORICAL AERIAL IMAGE DECEMBER 1995             |
| ===== | PROPOSED BULKHEAD   |
|       | PROPOSED FABRIC FORMED CONCRETE REVETMENT                   |
| ----  | VALVE   |
| ----  | 90° OVERHEAD OR SAGBEND                                     |
| ----  | 45° OVERHEAD OR SAGBEND                                     |
| ----  | STUB-UP   |
| ----  | FLANGE  |
| ----  | END OF PIPELINE   |
| ----  | BELOW GRADE PIPELINE  |
| ----  | ABOVE GRADE PIPELINE  |
| ----  | TOP OF BANK   |
| ----  | TIDE OF SLOPE   |
| ----  | POWER POLE  |
| ----  | BUY ANCHOR  |
| ----  | CHAIN LINK FENCE  |
| ----  | SPOT ELEVATION  |
| ----  | MAJOR CONTOUR   |
| ----  | MINOR CONTOUR   |


MARATHON PETROLEUM CORPORATION	
GALVESTON BAY REFINERY	
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY HISTORICAL SHORELINE PLAN W/PROPOSED BULKHEAD	
Units: DOCK_32/34_Docks	Current Proj. No.
Purpose: PERMIT	Rev.
Scale: 1"=150'	Drawing No. 5 of 16

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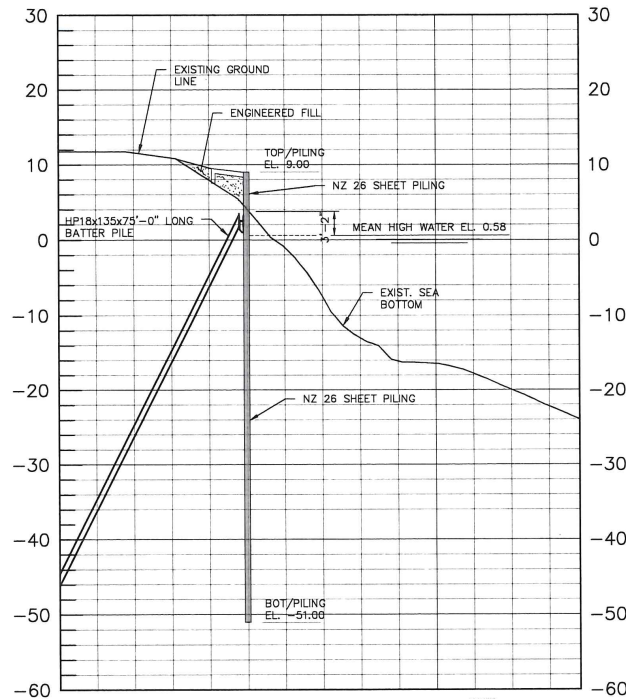
NOTE:  
2,440 CUBIC YARDS FILL MATERIAL PLACED  
BELOW MEAN HIGH WATER EL. 0.58 FROM  
STA 1+48 THRU 9+21 AND STA 10+21 THRU 14+08

**SECTION A**  
(DWG 2 OF 16)  
SCALE: VERT: 1" = 20'-0"  
HORIZ: 1" = 40'-0"

MARATHON PETROLEUM CORPORATION		
		
GALVESTON BAY REFINERY		
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY SECTION A		
Unit: DOCK_32/34_Docks		
Purpose: PERMIT	Current Proj. No.	
Scale: AS NOTED	Drawing No. 6 of 16	Rev. -




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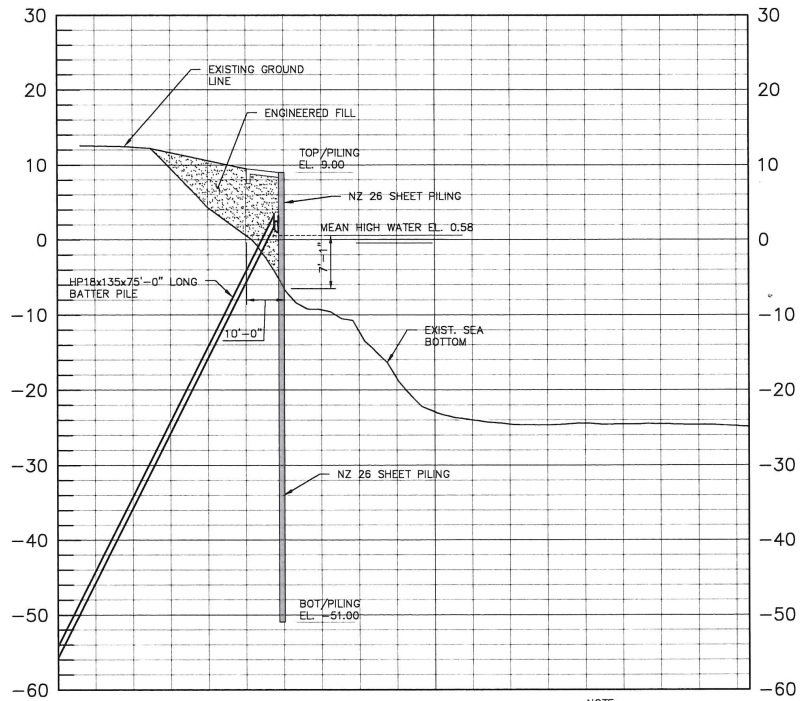


NOTE:  
2,440 CUBIC YARDS FILL MATERIAL PLACED  
BELOW MEAN HIGH WATER EL. 0.58 FROM  
STA 1+48 THRU 9+21 AND STA 10+21 THRU 14+08

**SECTION B**  
(DWG 2 OF 16)  
SCALE: VERT: 1" = 20'-0"  
HORIZ: 1" = 40'-0"


MARATHON PETROLEUM CORPORATION	
	GALVESTON BAY REFINERY
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY SECTION B	
Unit: DOCK_32/34_Docks	
Purpose: PERMIT	Current Proj. No.
Scale: AS NOTED	Drawing No. 7 of 16
	Rev. -

APR 22 2019

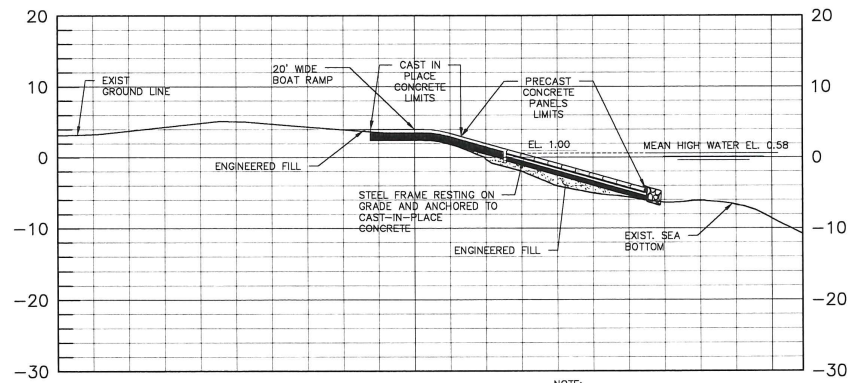


NOTE:  
2,440 CUBIC YARDS FILL MATERIAL PLACED  
BELOW MEAN HIGH WATER EL 0.58 FROM  
STA 1+48 THRU 9+21 AND STA 10+21 THRU 14+08

**SECTION C**  
(DWG 2 OF 16)  
SCALE: VERT: 1" = 20'-0"  
HORIZ: 1" = 40'-0"


MARATHON PETROLEUM CORPORATION	
	GALVESTON BAY REFINERY
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY SECTION C	
Unit: DOCK_32/34_Docks	
Purpose: PERMIT	Current Proj. No.
Scale: AS NOTED	Drawing No. 8 of 16
	Rev. -

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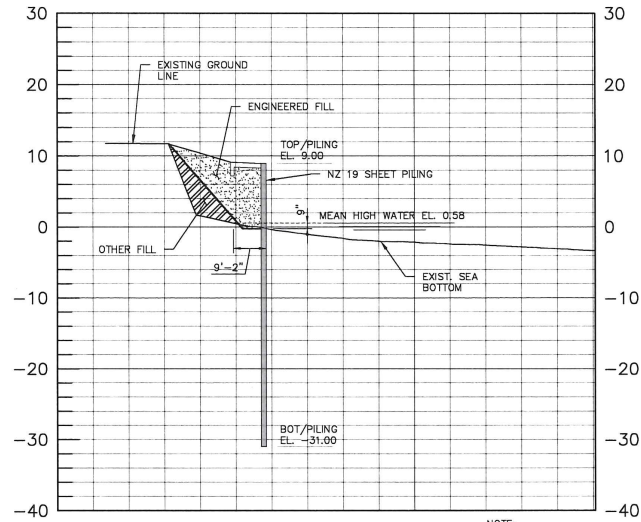


NOTE:  
2,440 CUBIC YARDS FILL MATERIAL PLACED  
BELOW MEAN HIGH WATER EL. 0.58 FROM  
STA 1+48 THRU 9+21 AND STA 10+21 THRU 14+08

**SECTION D**  
(DWG 2 OF 16)  
SCALE: VERT: 1" = 20'-0"  
HORIZ: 1" = 40'-0"


MARATHON PETROLEUM CORPORATION	
	GALVESTON BAY REFINERY
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY SECTION D	
Unit: DOCK_32/34_Docks	Current Proj. No.
Purpose: PERMIT	
Scale: AS NOTED	Drawing No. 9 of 16
	Rev. -

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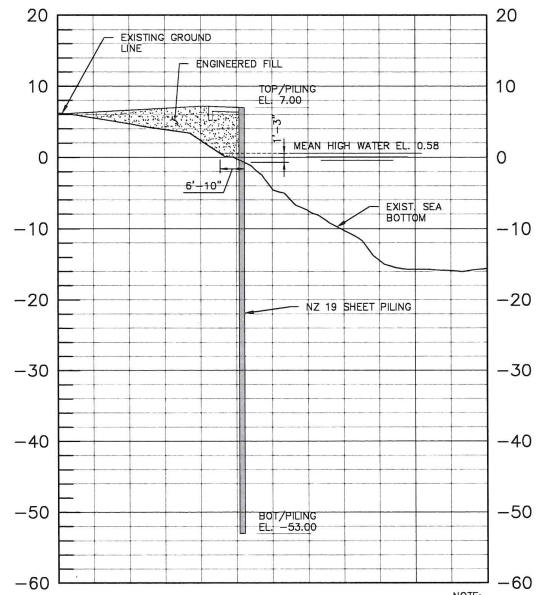


NOTE:  
2,440 CUBIC YARDS FILL MATERIAL PLACED  
BELOW MEAN HIGH WATER EL. 0.58 FROM  
STA 1+48 THRU 9+21 AND STA 10+21 THRU 14+08

**SECTION E**  
(DWG 2 OF 16)  
SCALE: VERT: 1" = 20'-0"  
HORIZ: 1" = 40'-0"


MARATHON PETROLEUM CORPORATION	
	GALVESTON BAY REFINERY
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY SECTION E	
Unit: DOCK_3E/34_Decks	Current Proj. No.
Purpose: PERMIT	
Scale: AS NOTED	Drawing No. 10 of 16
	Rev. -

APR 22 2019

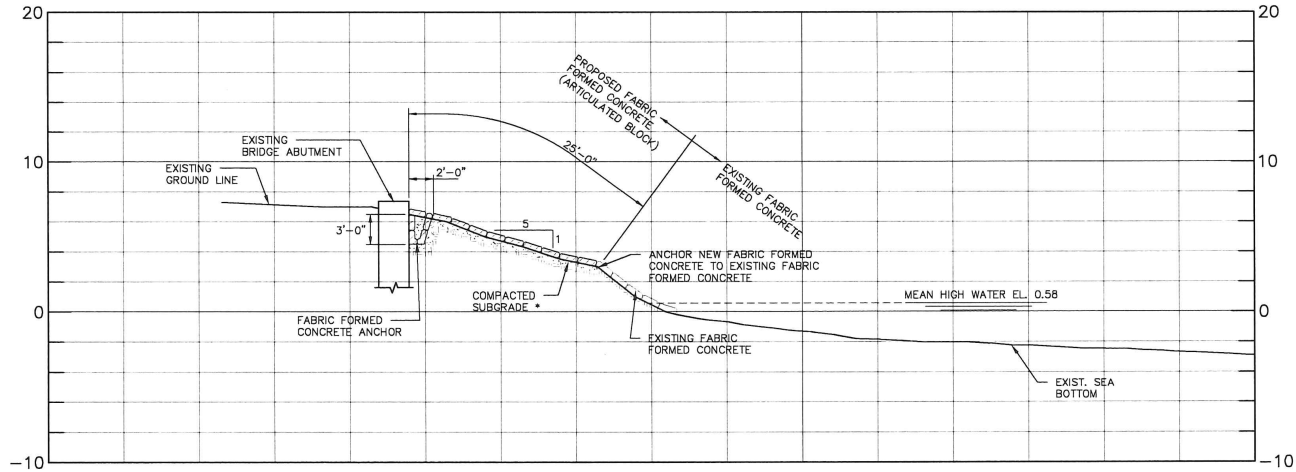


NOTE:  
2,440 CUBIC YARDS FILL MATERIAL PLACED  
BELOW MEAN HIGH WATER EL 0.58 FROM  
STA 1+48 THRU 9+21 AND STA 10+21 THRU 14+08

**SECTION F**  
(DWG 2 OF 16)  
SCALE: VERT: 1" = 20'-0"  
HORIZ: 1" = 40'-0"

MARATHON PETROLEUM CORPORATION	
	GALVESTON BAY REFINERY
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY SECTION F	
Unit: DOCK_32/34_Docks	Current Proj. No. -
Purpose: PERMIT	Rev: -
Scale: AS NOTED	Drawing No. 11 of 16

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\* REMOVE TOP 6" OF THE EXISTING SOIL LAYER, REMOVE ANY ORGANICS AND OBSTRUCTION, PROVIDE 6" LAYER OF CRUSHED STONE (#67) AND COMPACT TO PREPARE A NEAT LINE

NOTE:  
2,440 CUBIC YARDS FILL MATERIAL PLACED BELOW MEAN HIGH WATER EL. 0.58 FROM STA 1+48 THRU 9+21 AND STA 10+21 THRU 14+08

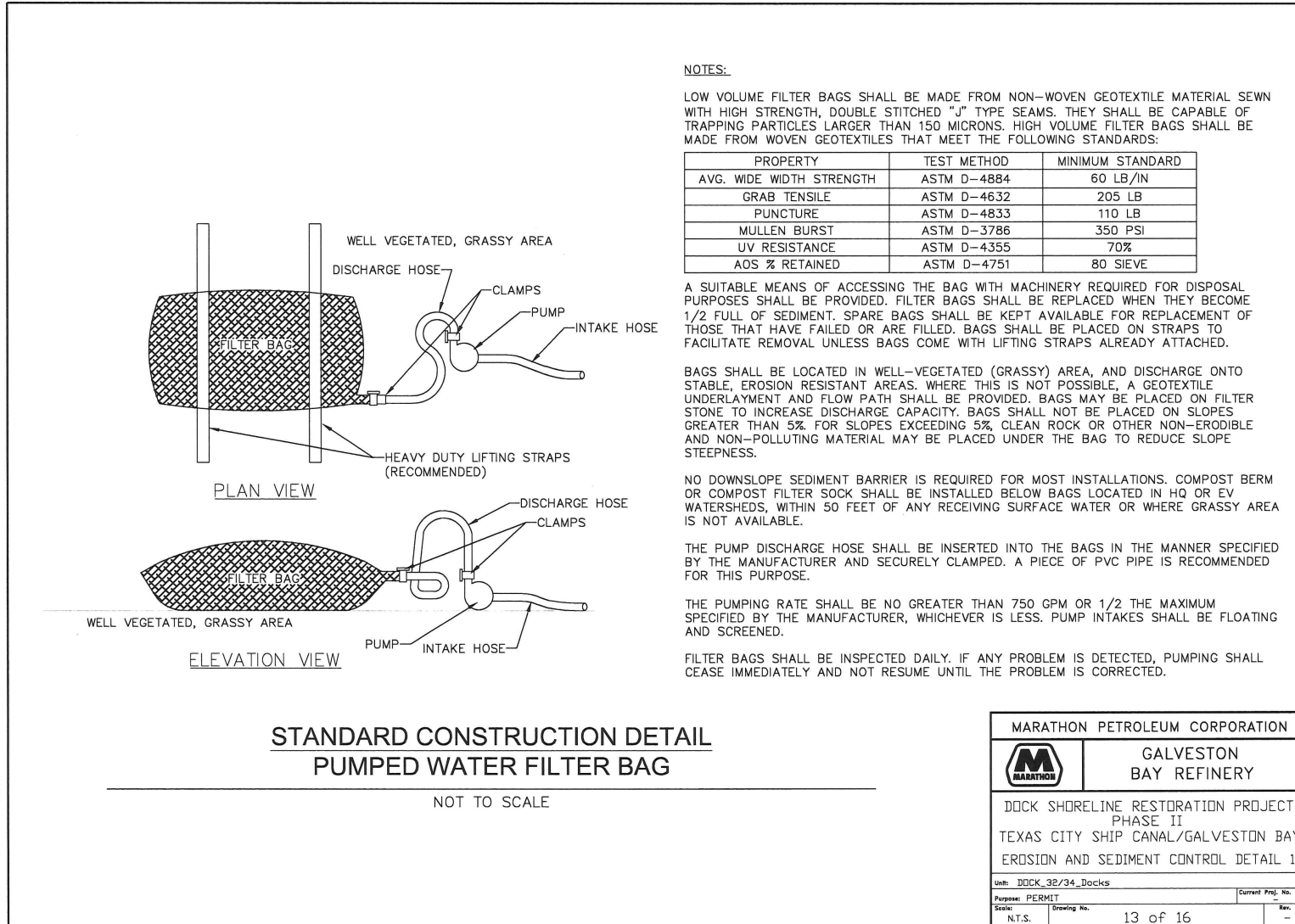
FABRIC FORMED CONCRETE REVETMENT AT  
BRIDGE ABUTMENT/PIPE RACK SUPPORTS

SECTION G

(DWG 12 OF 16)  
SCALE: VERT: 1" = 10'-0"  
HORIZ: 1" = 20'-0"

MARATHON PETROLEUM CORPORATION	
	GALVESTON BAY REFINERY
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY SECTION G	
Unit: DDCK_32/34_Docks	
Purpose: PERMIT	Current Proj. No.
Scale: AS NOTED	Drawing No. 12 of 16
	Rev. -

APR 22 2019



**NOTES:**

LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.

BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5% CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.

NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.


THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.

THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.

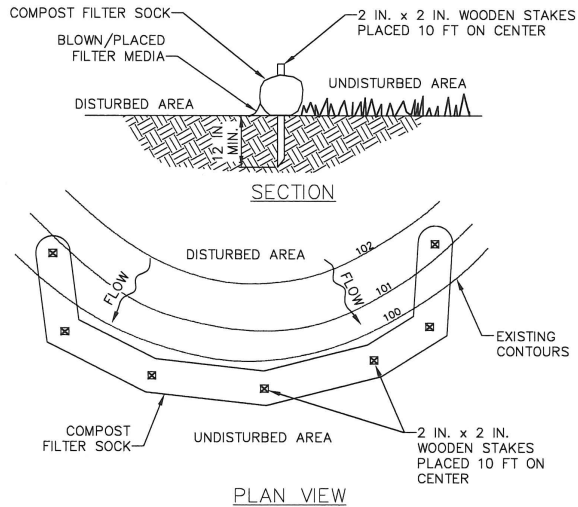
FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

**STANDARD CONSTRUCTION DETAIL  
PUMPED WATER FILTER BAG**

NOT TO SCALE

MARATHON PETROLEUM CORPORATION	
	
GALVESTON BAY REFINERY	
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY EROSION AND SEDIMENT CONTROL DETAIL 1	
Unit: DDCR_32/34_Docks	
Purpose: PERMIT	Current Proj. No.
Scale: N.T.S.	Drawing No. 13 of 16
	Rev. -

APR 22 2019



**STANDARD CONSTRUCTION DETAIL  
COMPOST FILTER SOCK**

NOT TO SCALE

**NOTES:**

SOCK FABRIC SHALL MEET THE STANDARDS FOR THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND ALL LOCAL JURISDICTIONS. THE COMPOST FILTER SOCK WILL SHALL BE INSTALLED FOLLOWING THE LATEST BMP'S METHODS.

COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.


TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.

ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.

COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

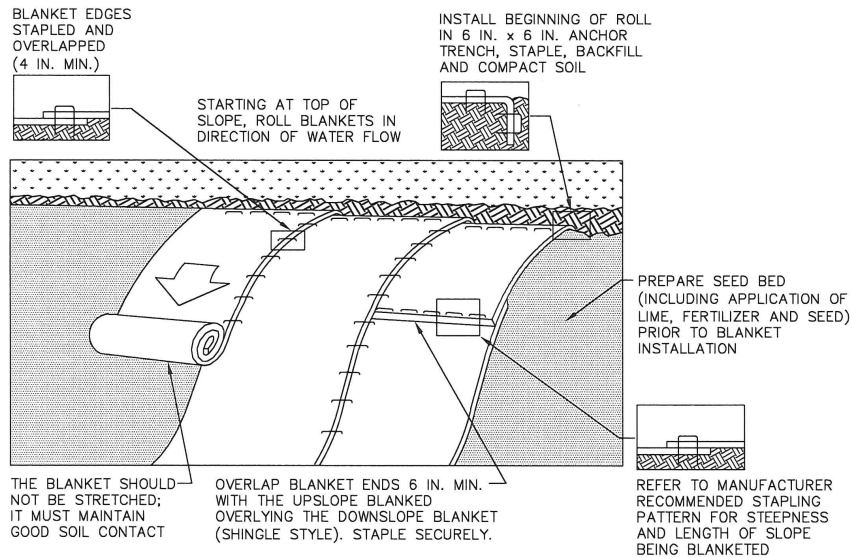
BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

MARATHON PETROLEUM CORPORATION	
	GALVESTON BAY REFINERY
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY EROSION AND SEDIMENT CONTROL DETAIL 2	
Units: DOCK_32/34_Docks	Current Proj. No.
Purpose: PERMIT	Rev.
Scale: N.T.S.	Drawing No. 14 of 16



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**NOTES:**

SEED AND SOIL AMENDMENTS SHALL BE APPLIED ACCORDING TO THE RATES IN THE PLAN DRAWINGS PRIOR TO INSTALLING THE BLANKET.

PROVIDE ANCHOR TRENCH AT TOE OF SLOPE IN SIMILAR FASHION AS AT TOP OF SLOPE.

SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS.


BLANKET SHALL HAVE GOOD CONTINUOUS CONTACT WITH UNDERLYING SOIL THROUGHOUT ENTIRE LENGTH. LAY BLANKET LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH SOIL. DO NOT STRETCH BLANKET.

THE BLANKET SHALL BE STAPLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

BLANKETED AREAS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70% COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS SHALL BE RESTORED OR REPLACED WITHIN 4 CALENDAR DAYS.

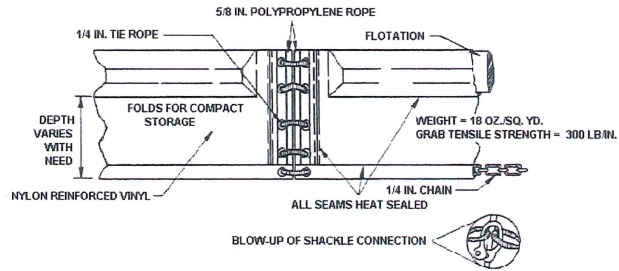
**STANDARD CONSTRUCTION DETAIL  
EROSION CONTROL BLANKET INSTALLATION**

NOT TO SCALE

MARATHON PETROLEUM CORPORATION		
		GALVESTON BAY REFINERY
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY EROSION AND SEDIMENT CONTROL DETAIL 3		
Unit: DOCK_32/34_Docks		
Purpose: PERMIT		Current Proj. No.
Scale: N.T.S.	Drawing No. 15 of 16	Rev. -

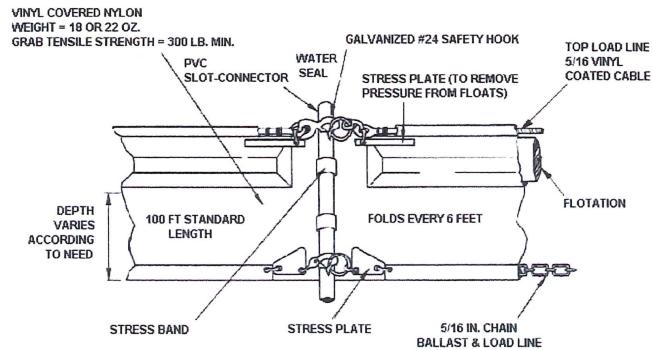
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**FIGURE 3.14**  
Turbidity Barrier Installation  
No Current and Sheltered from Wind and Waves



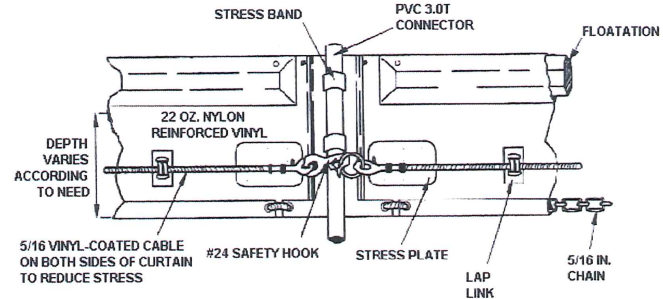
Adapted from VA DSWC

**FIGURE 3.15**  
Turbidity Barrier Installation  
Small to Moderate Current ( $\leq 3.5$  FPS) and Some Wind and Wave Action




Adapted from VA DSWC

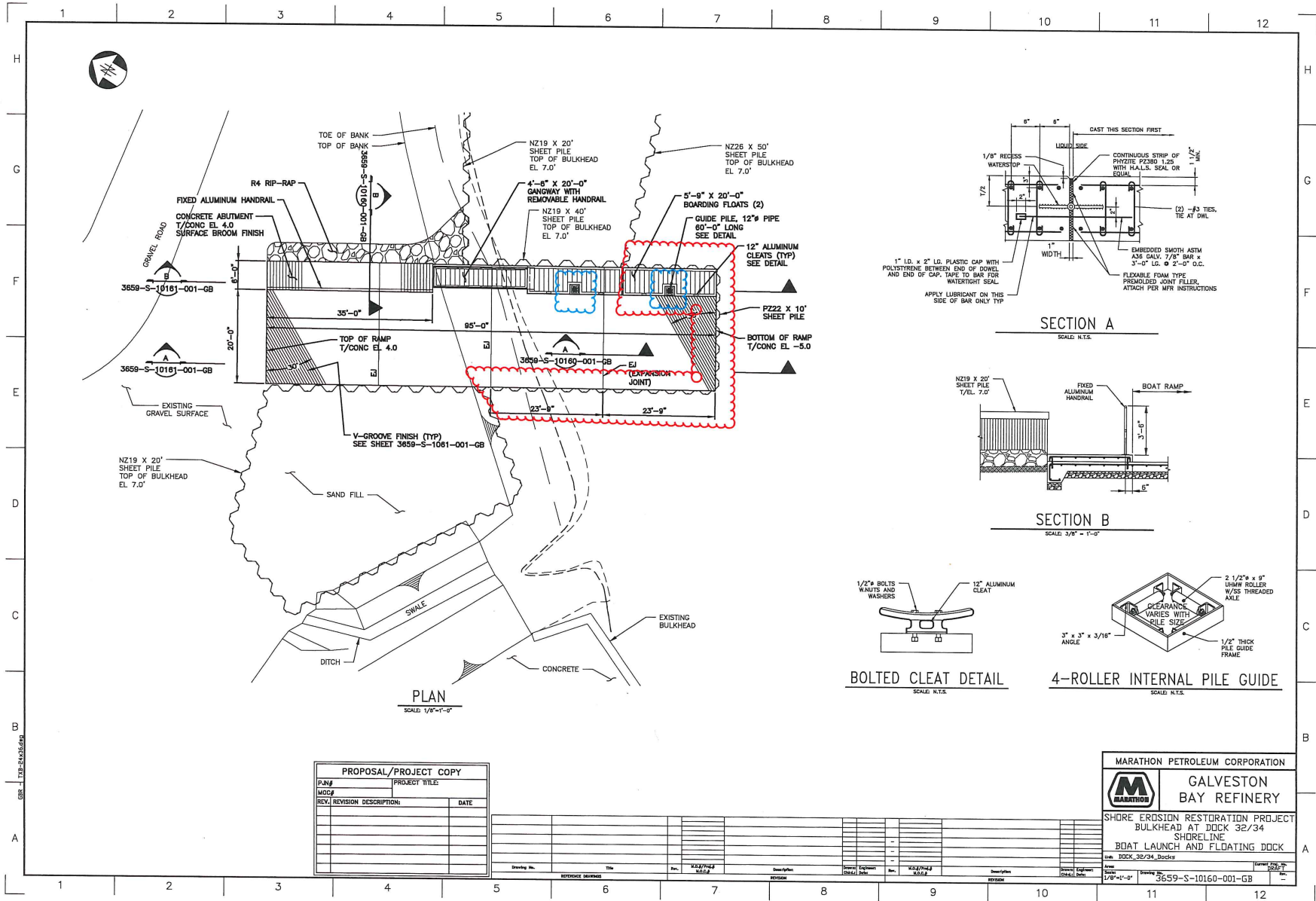
**FIGURE 3.16**  
Turbidity Barrier Installation  
Considerable Current (3.5 - 5 FPS) and Potential Tidal, Wind, and Wave Action

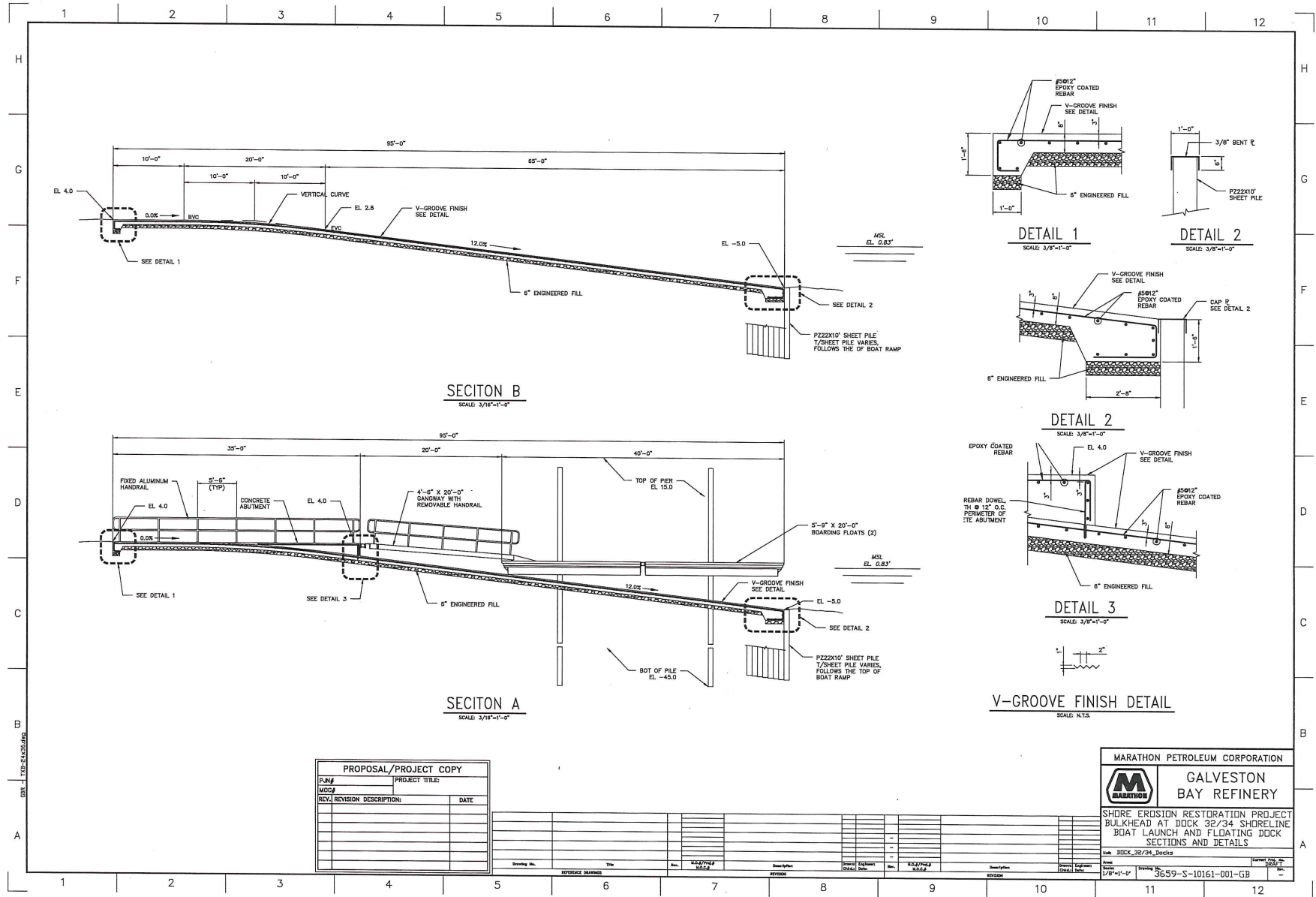


Adapted from VA DSWC

**Installation** - Follow the manufacturer's guidelines for proper installation. Make sure all obstacles, impediments, and potentially damaging objects have been removed from the installation area prior to beginning the installation. Figures 3.14 through 3.17 illustrate typical installations. However, manufacturer's details should be used for actual installation.

MARATHON PETROLEUM CORPORATION	
	GALVESTON BAY REFINERY
DOCK SHORELINE RESTORATION PROJECT PHASE II TEXAS CITY SHIP CANAL/GALVESTON BAY EROSION AND SEDIMENT CONTROL DETAIL 4	
Unit: DOCK_32/34_Docks	Current Proj. No. -
Purpose: PERMIT	Rev. -
Scale: N.T.S.	Drawing No. 16 of 16





PROPOSAL/PROJECT COPY	
P-134#	PROJECT TITLE:
MCC#	
REV.	REVISION DESCRIPTION
	DATE

Revising No.	Title	Date	Checked By	Checked Date	Checked	Checked Date	Checked	Checked Date

MARATHON PETROLEUM CORPORATION	
GALVESTON BAY REFINERY	
SHORE EROSION RESTORATION PROJECT	
BULKHEAD AT DOCK 32/34 SHORELINE	
BOAT LAUNCH AND FLOATING DOCK	
SECTIONS AND DETAILS	
Sheet: BULKHEAD_32/34_Details	
Scale: 3/16"=1'-0"	Drawing No.: 3659-S-10161-001-GB

APR 22 2019



Environmental Services, Inc.

21 August 2015

Richard B. Ewer, P.E.  
Structural Senior Project Manager  
Shellmark Engineering, L.L.C.  
921 FM 517 E  
Dickinson, TX 77539

**RE: SAV and Oyster Survey at Marathon Bay Refineries, Texas City**

Dear Richard:

Pursuant to your recent request, Horizon Environmental Services, Inc. (Horizon) has completed a submerged aquatic vegetation (SAV) and oyster survey for the above-referenced project.

The survey was conducted by boat on August 12, 2015 using visual inspection and a PVC pole or Eckman Dredge to probe the bottom for live oyster concentrations and SAV roots or above-ground vegetative matter. Figure 1 indicates the survey area. In general, the existing shoreline in the survey area was composed of fill material, rock or concrete riprap, or concrete revet blocks for stabilization (see photos 1-4 attached). The bottom below water level was generally steeply descending from the shore and was typically covered with riprap to depths of 6+ feet, but several areas of gravelly clay sediment were observed. Water depths generally increased rapidly from the shoreline reaching 6 to 15 feet deep a few feet from shore, but a few more gradually descending areas were noted. The zone of potential occurrence for oyster concentrations and/or SAVs was narrow (usually less than 10 feet from the shoreline). Visibility of the bottom was generally limited to about 2 feet due to water clarity. Below that depth and up to 5 feet deep, probes of the bottom were made at frequent intervals with the PVC pole and an Eckman Dredge.

The survey resulted in finding no live oyster accumulations or SAV. Scattered dead oyster shell were noted on the riprap and other hard structures in the water (see Photo 5). It is our opinion that the shoreline that was assessed does not provide suitable habitat characteristics for SAV and is not likely to support significant live oyster concentrations due to excessive water depths and likely periodic water quality issues in this industrial area.

**CORPORATE HEADQUARTERS**

1507 South IH 35 ★ Austin, Texas 78741 ★ 512.328.2430 ★ Fax 512.328.1804 ★ www.horizon-esi.com  
Certified WBE/DBE/HUB/SBE

APR 22 2019

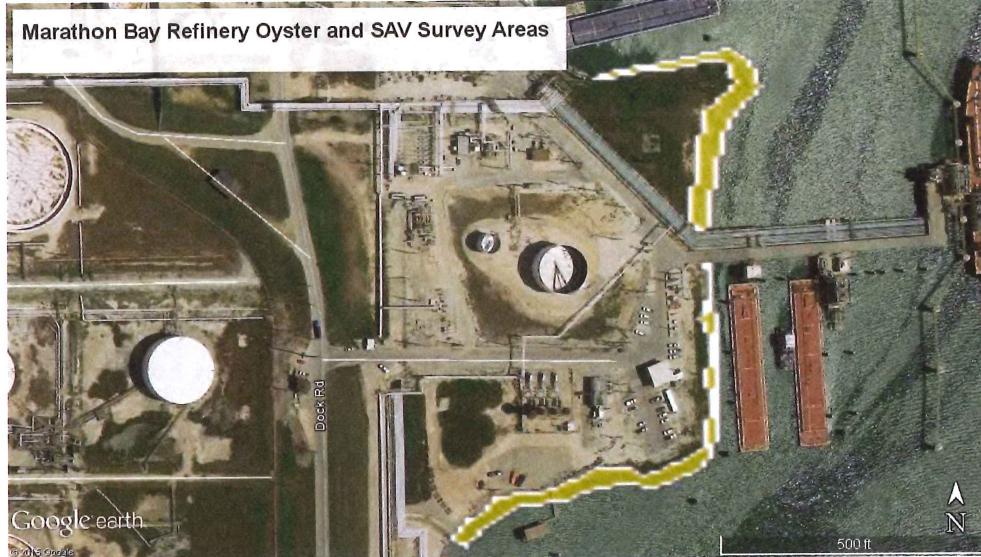


FIGURE 1: SURVEY AREAS

Please call if you have questions.

Sincerely,  
For Horizon Environmental Services, Inc.

A handwritten signature in black ink, appearing to read "C. Lee Sherrod".

C. Lee Sherrod  
Vice President