CONSTRUCTION DRAWINGS FOR

OIL DOCK 5 BULKHEAD REPAIRS

PORT OF BROWNSVILLE

JULY 2019

BROWNSVILLE, TEXAS

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VICINITY MAP

LOCATION MAP

BOARD OF COMMISSIONERS

JOHN REED ..... CHAIRMAN
SERGIO TITO LÒPEZ ..... VICE CHAIRMAN
RALPH COWEN ..... SECRETARY
JOHN WOOD ..... COMMISSIONER
ESTEBAN GUERRA ..... COMMISSIONER

ADMINISTRATION

EDUARDO A. CAMPIRANO..... PORT DIRECTOR & C.E.O.
DONNA EYMARD ..... DEPUTY PORT DIRECTOR
ARIEL CHÁVEZ II, PE/RPLS ..... DIRECTOR OF ENGINEERING

ISSUED FOR BID

STATE OF TEXAS
JUAN D. GARCIA
86492
LICENSED
PROFESSIONAL ENGINEER

NO.	DATE	REVISION	BY	APVD
A	06/13/19	ISSUED FOR REVIEW	JDG	SAF
B	07/03/19	ISSUED FOR REVIEW	JDG	SAF
0	07/19/19	ISSUED FOR BID	JDG	SAF

DSGN DR CHK APVD

CH2M HILL ENGINEERS, INC
TBPE FIRM NO. F-3699
555 N. CARANCAHUA, SUITE 320
CORPUS CHRISTI, TEXAS 78401
TEL: 1.361.888.8100
FAX: 1.361.888.8600

PORT OF BROWNSVILLE
the port that works

PORT OF BROWNSVILLE
OIL DOCK 5 BULKHEAD REPAIRS
TITLE SHEET

SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

SHT NO 1 OF 11
PROJ
DWG
RD CODE

SCOPE OF WORK:

1. GENERALLY THE WORK CONSISTS OF REPAIRS TO AN EXISTING CANTILEVERED BULKHEAD WHICH HAS DEFLECTED TOWARDS THE SHIP CHANNEL DUE TO SCOUR IN FRONT OF THE BULKHEAD. SCOPE INCLUDES PROVIDING AN ANCHOR SYSTEM FOR THE BULKHEAD AND PROVIDING BACKFILL MATERIAL BEHIND THE BULKHEAD. ALSO INCLUDED IS PROVIDING RIPRAP OR A PRECAST CONCRETE REVETMENT SYSTEM IN FRONT OF THE WALL.

2. THE BASE BID INCLUDES PROVIDING ANCHOR RODS THAT WILL ATTACH TO THE EXISTING CANTILEVER BULKHEAD AND A CAST IN PLACE CONCRETE ANCHOR WALL. AN ALTERNATE BID INCLUDES PROVIDING HELICAL SOIL ANCHORS THAT WILL ATTACH TO THE EXISTING CANTILEVER BULKHEAD. CONTRACTOR SHALL PROVIDE THE HELICAL SOIL ANCHOR DESIGN PER HELICAL ANCHOR SPECIFICATION. CONTRACTOR SHALL PROVIDE HELICAL ANCHOR DESIGN AND TESTING METHODS SIGNED BY A TEXAS LICENSED PROFESSIONAL ENGINEER AND SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

3. BASE BID AND ALTERNATE BID ALSO INCLUDES PROVIDING A TYPE R STONE RIPRAP IN FRONT OF THE WALL TO EL -5 FT MLT AND SLOPING TOWARDS THE CHANNEL AT 2H : 1V UNTIL IT INTERSECTS EXISTING SLOPE. FILTER FABRIC REQUIRED PER SPECIFICATION.

4. AN ADDITIVE BID INCLUDES INSTALLING A RUBBLE MOUND CONSISTING OF A WELL-GRADED COARSE-GRAINED MATERIAL IN FRONT OF THE WALL TO EL -5.5 FT MLT AND SLOPING TOWARDS THE CHANNEL AT 2H : 1V UNTIL IT INTERSECTS EXISTING SLOPE. THEN INSTALLING AN ARTICULATED CONCRETE BLOCK MATS OVER THE RUBBLE MOUND. A GEOTEXTILE FILTER FABRIC SHOULD BE PLACED BENEATH THE MATS BEFORE PLACEMENT ON THE RUBBLE MOUND PER SPECIFICATION.

RECOMMENDED CONSTRUCTION SEQUENCE:

1. PLACE STONE RIPRAP OR RUBBLE MOUND IN FRONT OF WALL TO RE-ESTABLISH PASSIVE RESISTANCE.

2. INSTALL TIE RODS TO MAIN WALL AND ANCHOR WALL PER DETAILS FOR BASE BID OR INSTALL HELICAL ANCHORS PER ALTERNATE BID.

3. PLACE BACKFILL PER EARTHWORK SPECIFICATION.

GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND QUANTITIES BEFORE PROCEEDING WITH THE WORK. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

2. ALL WORK SHALL CONFORM TO THE FOLLOWING STANDARDS AND SPECIFICATIONS:

   A. TECHNICAL SPECIFICATIONS.

   B. AMERICAN INSTITUTE OF STEEL CONSTRUCTION ALLOWABLE STRESS DESIGN (9th EDITION).

   C. AMERICAN CONCRETE INSTITUTE ACI 318-14.

3. ALL CONSTRUCTION LAYOUTS AND SURVEYS SHALL BE PERFORMED BY THE CONTRACTOR.

4. THE DRAWINGS SHOW AS MUCH INFORMATION AS CAN BE REASONABLY OBTAINED BY SURVEYS AND FROM UTILITY RECORDS REGARDING THE LOCATION AND NATURE OF ABOVE GRADE AND BELOW GRADE PIPELINES, HOWEVER, THE ACCURACY OR COMPLETENESS OF SUCH INFORMATION IS NOT GUARANTEED. THE CONTRACTOR SHALL CONDUCT HIS OWN INVESTIGATION AND SHALL EXERCISE CAUTION.

5. THE CONTRACTOR SHALL VISIT THE SITE OF THE WORK AND EXAMINE LOCAL CONDITIONS TO BE ENCOUNTERED AND IMPROVEMENTS TO BE PROTECTED, AND SHALL CONDUCT OTHER RESEARCH NECESSARY TO ASSURE THAT THEY UNDERSTAND THE PROJECT THOROUGHLY AND ARE FULLY AWARE OF ALL CONDITIONS AND CONSTRAINTS WHICH MAY BE ENCOUNTERED DURING THE COURSE OF CONSTRUCTION.

6. EXISTING UNDERGROUND FIBER OPTIC LINE EXISTS ALONG THE LAND SIDE OF BULKHEAD ALONG THE CURB AND EXISTING ROADWAY. THIS FIBER OPTIC LINE SHALL REMAIN IN SERVICE DURING CONSTRUCTION. CONTRACTOR SHALL PREVENT DAMAGE TO THIS LINE.

7. CONTRACTOR SHALL PROVIDE ALL MATERIALS, EQUIPMENT AND LABOR FOR BASE BID OR ALTERNATE BID AND ADDITIVE BID IF SELECTED. INSTALLATION WILL BE SUBSIDIARY TO THE BID ITEMS AND WILL NOT BE PAID FOR SEPARATELY.

CONCRETE:

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF THE SCHEDULE LISTED BELOW.

	MIN COMPRESSIVE STRENGTH (PSI)	CEMENT TYPE	MAX AGGREGATE SIZE (IN)
CAST-IN-PLACE CONCRETE	4000 @ 28 DAYS	II	1 1/2"

2. USE HYDRAULIC CEMENT CONCRETE, CLASS H (HPC) SULFATE RESISTANCE WITH A MAXIMUM W/C RATIO OF 0.40.

3. HORIZONTAL AND VERTICAL CONSTRUCTION JOINTS SHALL BE PERMITTED ONLY WHERE INDICATED ON THE DRAWINGS. ALTERNATIVE LOCATIONS OF JOINTS PROPOSED BY THE CONTRACTOR SHALL BE SUBMITTED AND APPROVED BY THE ENGINEER. ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED, BRUSHED AND DAMPED PRIOR TO PLACING NEW CONCRETE.

4. ALL EXPOSED SURFACES OF CONCRETE SHALL RECEIVE A NON-SLIP BROOM FINISH.

5. ALL FORMED SURFACES SHALL HAVE A SMOOTH FORM FINISH.

6. REINFORCING STEEL SHALL BE ASTM 615, GRADE 60.

STEEL:

A. ROLLED SHAPES SHALL BE ASTM A992 (Fy = 50.0 ksi)

B. PLATES, ANGLES AND CHANNEL MEMEBER SHALL BE ASTM A572, GARDE 50 (Fy = 50 ksi)

C. ANCHOR ROD SHALL BE DYWIDAG THREADBARS GRADE 75, OR APPROVED EQUAL.

D. WALER BOLTS SHALL BE ASTM A325, TYPE I HEAVY HEX STEEL STRUCTURAL BOLTS.

E. THE CENTRAL SHAFTS OF THE HELICAL ANCHORS SHALL CONFORM TO ASTM A513 AND SHALL CONSIST OF HIGH STRENGTH STRUCTURAL STEEL TUBE.

ACCESS TO THE SITE:

1. ACCESS TO THE SITE IS LIMITED. ACCESS TO THE SITE SHALL BE COORDINATED WITH THE PORT ENGINEER.

DESIGN CRITERIA:

1. DESIGN MUDLINE DEPTH -5' MLT TOP OF RIPRAP OR REVETMENT.

HOT DIP GALVANIZING:

1. THE DYWIDAG TIE RODS, NUTS, BOLTS, WASHER AND HELICAL ANCHORS, AS APPLICABLE, SHALL BE HOT DIP GALVANIZED (HDG) PER ASTM A123 OR A153.

COAL TAR EPOXY COATING:

1. ALL STRUCTURAL STEEL INCLUDING WALERS AND PLATES SHALL BE COAL TAR EPOXY COATED.

RIP RAP (BASE BID):

1. PROVIDE TYPE R STONE RIP RAP CONFORMING TO TXDOT SPECIFICATION ITEM 432. USE DURABLE NATURAL STONE WITH A MINIMUM BULK SPECIFIC GRAVITY OF 2.4 AS DETERMINED BY TEX-403-A. USE STONES BETWEEN 50 AND 250 LBS WITH A MINIMUM OF 50% OF STONES HEAVIER THAN 100 LBS.

FILTER FABRIC (BASE BID AND ADDITIVE BID:

1. PROVIDE TYPE 2 FILTER FABRIC IN ACCORDANCE WITH TXDOT DMS-6200 (DEPARTMENTAL MATERIAL SPECIFICATION) "FILTER FABRIC". PLACE FILTER FABRIC PRIOR TO PLACEMENT OF STONE RIPRAP.

2. REFER TO TXDOT, MATERIAL PRODUCER LIST, ENTITLED "SILT FENCE, FILTER FABRIC, AND FABRIC UNDERSEAL" FOR A LIST OF APPROVED MANUFACTURERS.

3. REFER TO SCOUR PROTECTION SPECIFICATION FOR GEOTEXTILE FILTER FABRIC TO USE BELOW CONCRETE REVETMENT.

EARTHWORK:

A. FILL MATERIAL SHALL BE PLACED IN 8 INCH MAXIMUM LIFTS AND COMPACTED TO 98% STANDARD PROCTOR DENSITY ASTM D698 IN FRONT OF AND DIRECTLY BEHIND CONCRETE ANCHOR WALL AND TO 95% STANDARD PROCTOR EVERYWHERE ELSE AND SHALL HAVE A P.I. BETWEEN 7% AND 17%. EXCAVATED MATERIAL MAY BE REUSED IF THE P.I. IS WITHIN THESE LIMITS.

OWNER SUPPLIED MATERIAL:

NONE

MONUMENT AND CONTROL:

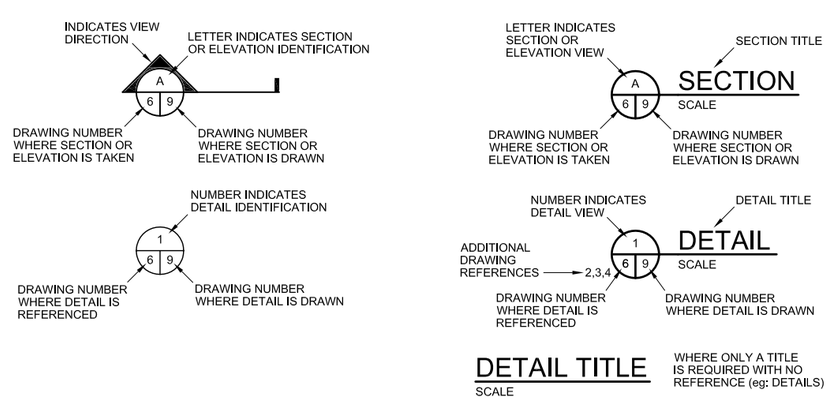
1. SURVEY PERFORMED BY VASQUEZ SURVEY, INC., DATED MARCH 19, 2019. (956) 541-9826

2. VERTICAL DATUM: NAVD 88

3. REFERENCE MONUMENT T.B.M. LOCATED ON NW CORNER OF MOORING STRUCTURE WEST OF BULKHEAD.

   ELEV: +8.22' NAVD 88 (+9.62' MLT)

SECTION / DETAIL DESIGNATIONS:



ABBREVIATIONS:

ACI	AMERICAN CONCRETE INSTITUTE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWS	AMERICAN WELDING SOCIETY
BOT	BOTTOM
CL	CENTERLINE
CLR	CLEAR, CLEARANCE
COE	CORPS OF ENGINEERS
CONC	CONCRETE
CONT	CONTINUOUS
DFT	DRY FILM THICKNESS
DIA	DIAMETER
DIM	DIMENSION
DWG	DRAWINGS
E	EAST
EA	EACH
EJ	EXPANSION JOINT
EL	ELEVATION
EXIST	EXISTING
EXP	EXPANSION
FT	FOOT, FEET
FC	COMPRESSIVE STRENGTH AT 28 DAYS
FY	YIELD STRENGTH
GR	GRADE
HDG	HOT DIP GALVANIZED
HORZ	HORIZONTAL
IN	INCH
IR	IRON ROD
KIP	THOUSAND POUNDS
KSI	KIPS PER SQUARE INCH
LB	POUNDS
LF	LINEAR FEET
MAX	MAXIMUM
MIN	MINIMUM
MLLW	MEAN LOWER LOW WATER
MLT	MEAN LOW TIDE
MSL	MEAN SEA LEVEL
N	NORTH
NAD 83	NORTH AMERICAN DATUM OF 1983
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
NGVD 29	NATIONAL GEODETIC VERTICAL DATUM OF 1929
NO	NUMBER
NOAA	NATIONAL OCEANIC ATMOSPHERIC ADMINISTRATION
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OPPOSITE HAND
PC	POINT OF CURVATURE
PCF	POUNDS PER CUBIC FOOT
PI	POINT OF INTERSECTION
PLCS	PLACES
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
REQ'D	REQUIRED
R	RADIUS
S	SOUTH, SEWER
SECT	SECTION
SF	SQUARE FOOT
SHT	SHEET
SIM	SIMILAR
SPECS	SPECIFICATIONS
SS	STAINLESS STEEL, STORM SEWER
SSP	STEEL SHEET PILE
STA	STATION
STD	STANDARD
TBM	TEMPORARY BENCH MARK
THK	THICK, THICKNESS
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TYP	TYPICAL
VERT	VERTICAL
W	WEST
W/	WITH
&	AND
@	AT
℄	CENTER LINE
Ø	DIAMETER
#	NUMBER
%	PERCENT

STATE OF TEXAS
JUAN D. GARCIA
86492
LICENSED
PROFESSIONAL ENGINEER
06/21/19

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DSGN BY APVD

CH2M HILL ENGINEERS, INC
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555 N. CARANCAHUA, SUITE 320
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PORT OF BROWNSVILLE
the port that works

PORT OF BROWNSVILLE
OIL DOCK 5 BULKHEAD REPAIRS
GENERAL NOTES

SCALE
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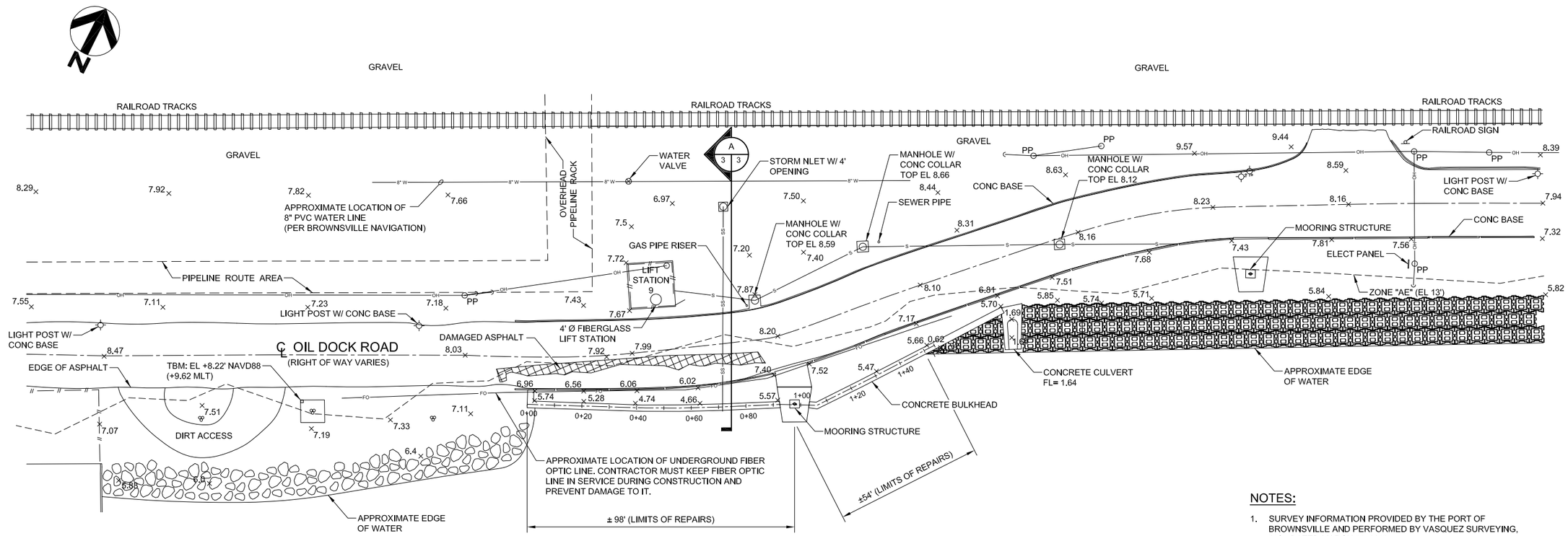
0 1"

SHT NO 2 OF 11
PROJ
DWG
RD CODE



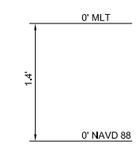
EXISTING SITE PLAN

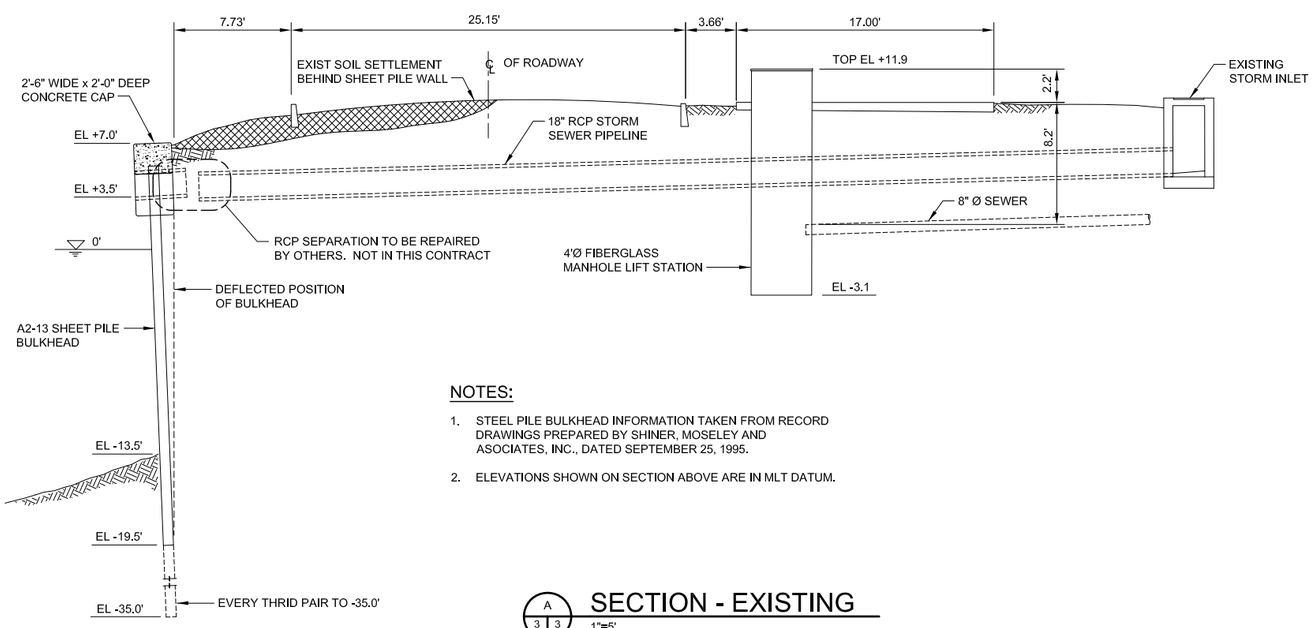
1"=20'

NOTES:

1. SURVEY INFORMATION PROVIDED BY THE PORT OF BROWNSVILLE AND PERFORMED BY VASQUEZ SURVEYING, INC., DATED MARCH 19, 2019.
2. ELEVATIONS SHOWN ON SURVEY DRAWING ABOVE ARE IN NAVD88 DATUM.

TIDE DATUM CHART:





NOTES:

1. STEEL PILE BULKHEAD INFORMATION TAKEN FROM RECORD DRAWINGS PREPARED BY SHINER, MOSELEY AND ASOCIATES, INC., DATED SEPTEMBER 25, 1995.
2. ELEVATIONS SHOWN ON SECTION ABOVE ARE IN MLT DATUM.

SECTION - EXISTING

1"=5'

THIS INFORMATION WAS PROVIDED BY THE PORT OF BROWNSVILLE AND PERFORMED BY NAISMITH MARINE, DATED MAY 15, 2019.

ELEVATION AND DEFLECTION FROM PLUMB ALONG BULKHEAD

STATION	AT TOP OF WALL	AT 10' BELOW TOP OF WALL
0+10	0.34'	-0.06'
0+20	0.68'	0.23'
0+30	1.03'	0.32'
0+40	1.38'	0.16'
0+50	1.32'	0.46'
0+60	1.15'	0.19'
0+70	0.87'	0.21'
0+80	0.43'	0.01'
0+90	0.0'	0.18'
1+05	0.0'	-0.03'
1+10	0.09'	0.04'
1+20	0.23'	0.00'
1+30	0.28'	-0.04'
1+40	0.28'	0.29'

GRAPHIC SCALE(S):
1"=20' 0 20' 40' 60'

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DSGN SAF

STATE OF TEXAS JUAN D. GARCIA 88492 LICENSED PROFESSIONAL ENGINEER 7/19/2019

555 N. CARANCAHUA, SUITE 320
CORPUS CHRISTI, TEXAS 78401
TEL: 1.361.888.8100
FAX: 1.361.888.8600
CH2M HILL ENGINEERS, INC
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PORT OF BROWNSVILLE the port that works

PORT OF BROWNSVILLE
OIL DOCK 5 BULKHEAD REPAIRS
EXISTING SITE PLAN

SCALE
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0 1"

SHT NO 3 OF 11
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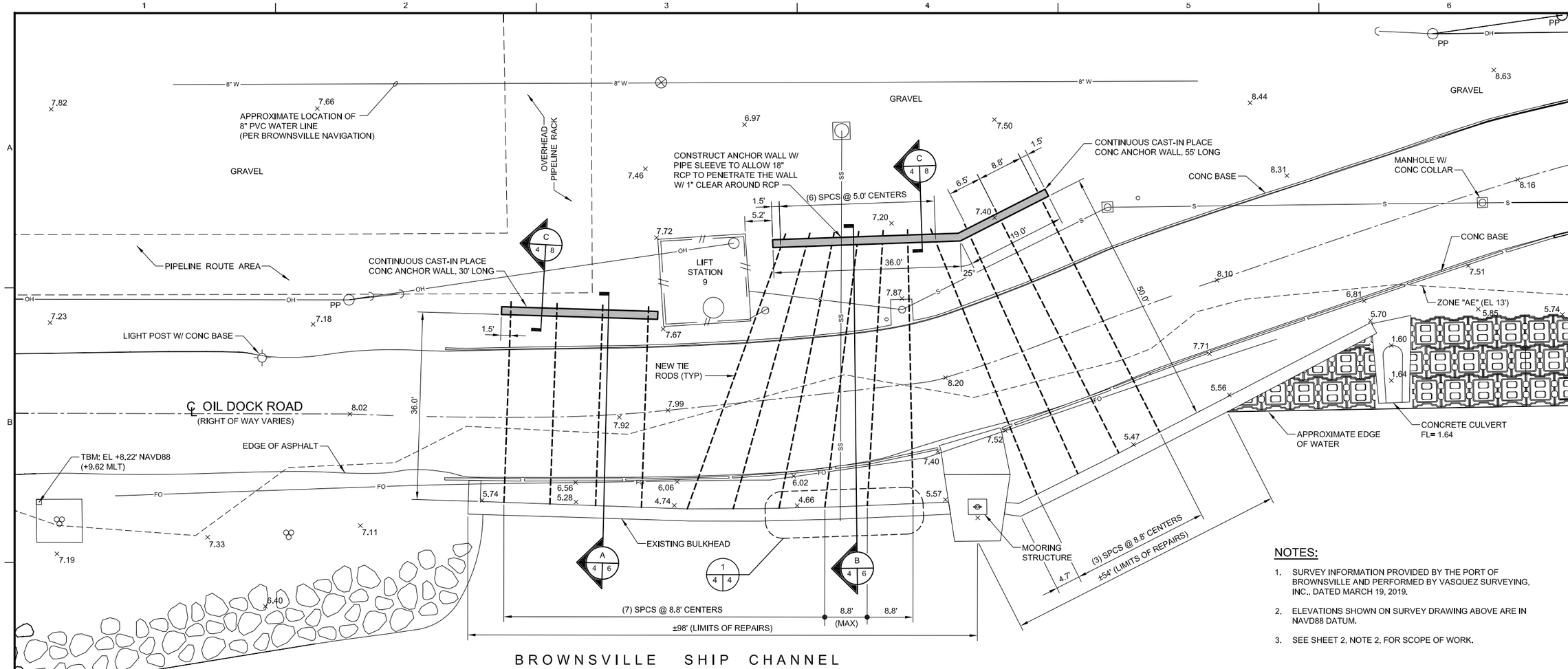
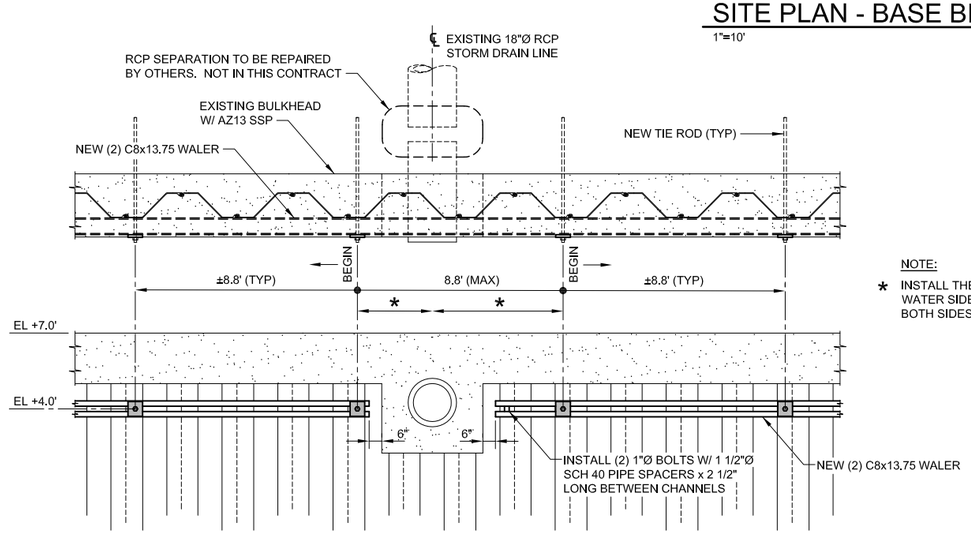


SITE PLAN - BASE BID

1"=10'



NOTE:

* INSTALL THE FIRST TIE ROD AT THE FIRST WATER SIDE SSP FLANGE, AS SHOWN, AT BOTH SIDES OF THE OUTFALL.

DETAIL - BULKHEAD

NTS

NOTES:

1. SURVEY INFORMATION PROVIDED BY THE PORT OF BROWNSVILLE AND PERFORMED BY VASQUEZ SURVEYING, INC., DATED MARCH 19, 2019.
2. ELEVATIONS SHOWN ON SURVEY DRAWING ABOVE ARE IN NAVD88 DATUM.
3. SEE SHEET 2, NOTE 2, FOR SCOPE OF WORK.

GRAPHIC SCALE(S): 1"=10' 0 10' 20' 30'

STATE OF TEXAS JUAN D. GARCIA 88492 LICENSED PROFESSIONAL ENGINEER

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SITE PLAN - BASE BID

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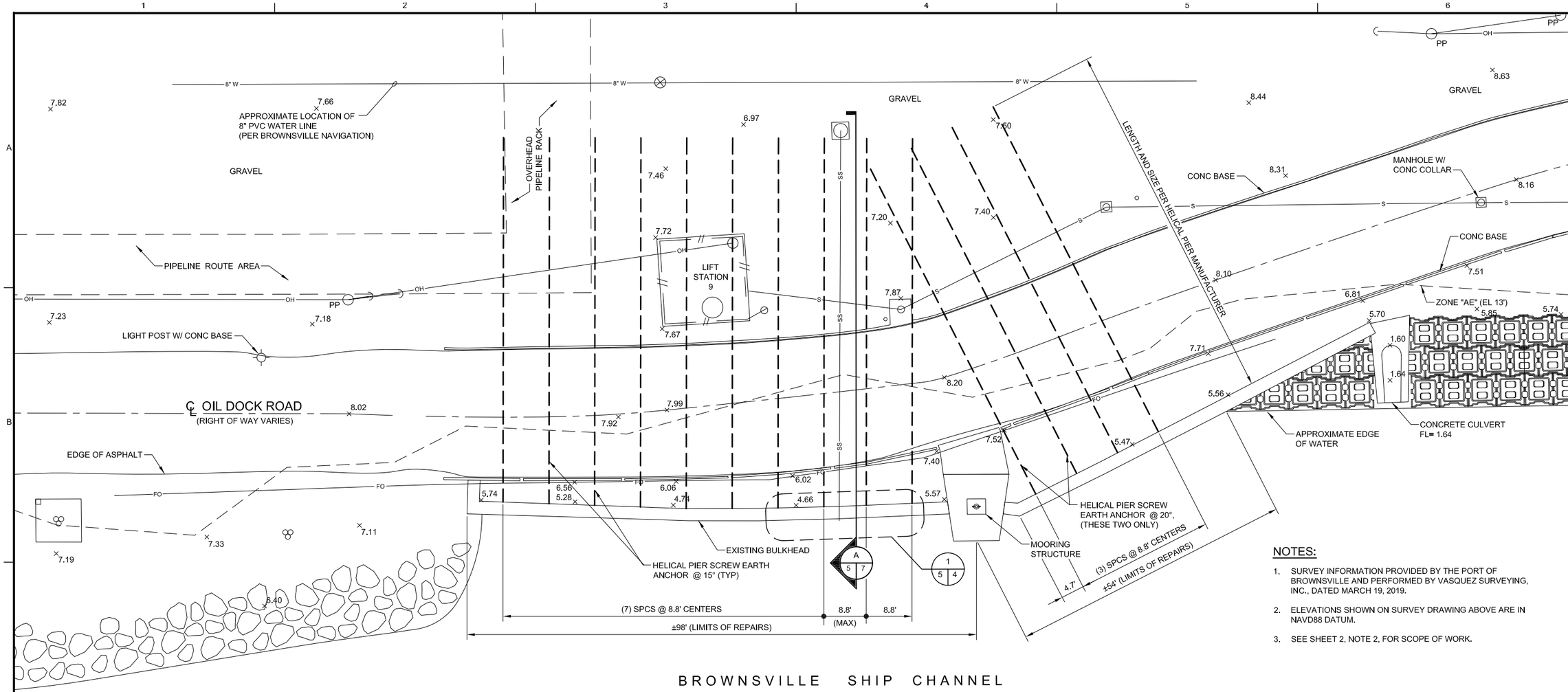

SITE PLAN - ALTERNATE BID

1"=10'

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GRAPHIC SCALE(S):
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STATE OF TEXAS JUAN D. GARCIA 88492 LICENSED PROFESSIONAL ENGINEER

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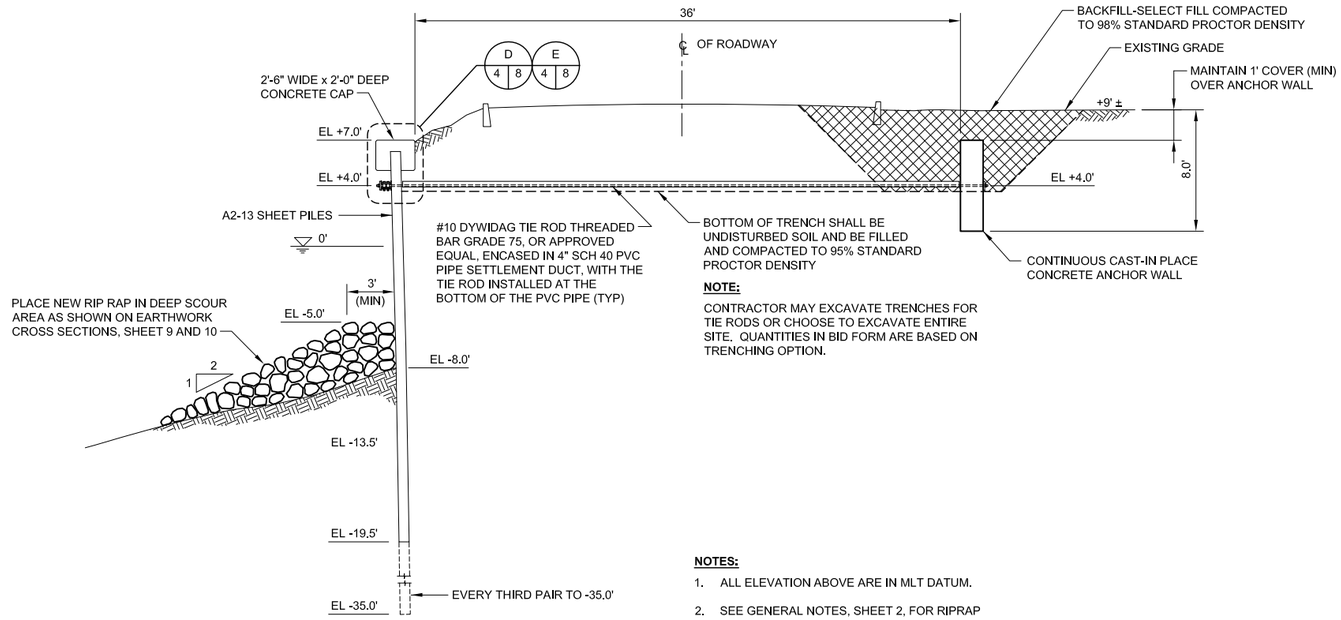
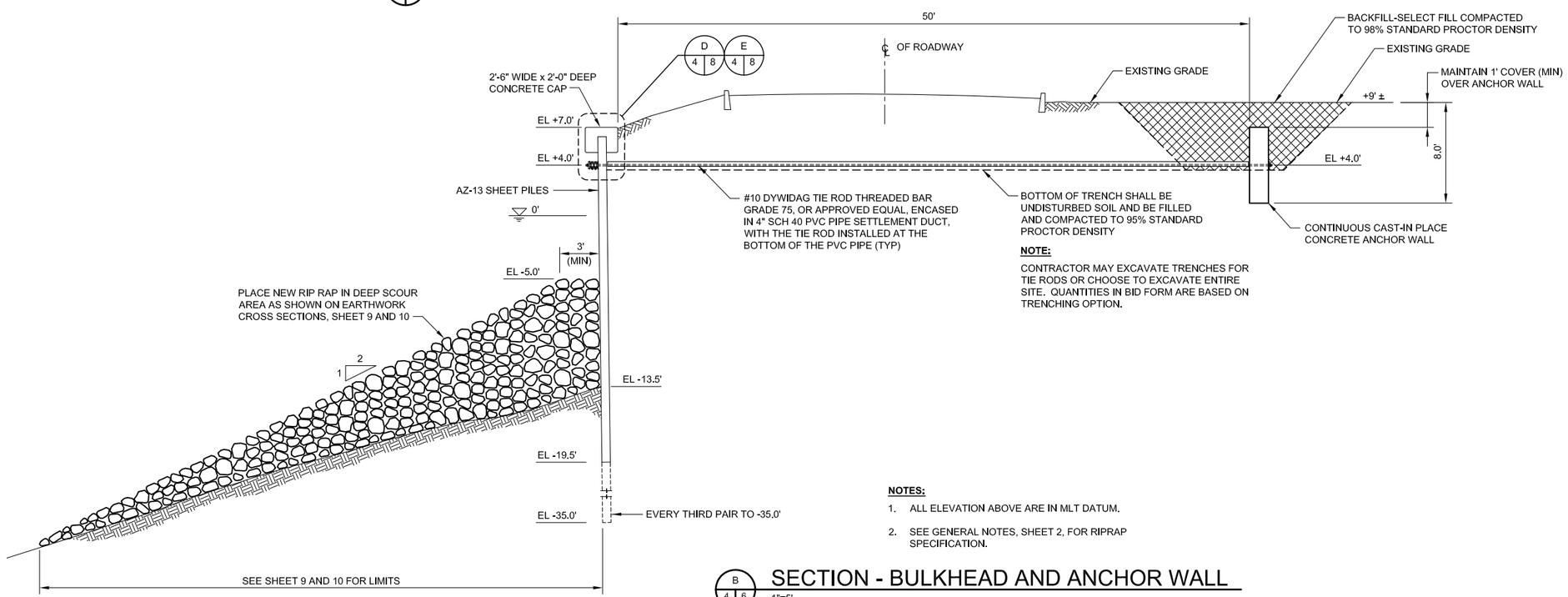


NOTES:

1. ALL ELEVATION ABOVE ARE IN MLT DATUM.
2. SEE GENERAL NOTES, SHEET 2, FOR RIPRAP SPECIFICATION.

SECTION - BULKHEAD AND ANCHOR WALL

A 4 6 — 1"=5'



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2. SEE GENERAL NOTES, SHEET 2, FOR RIPRAP SPECIFICATION.

SECTION - BULKHEAD AND ANCHOR WALL

B 4 6 — 1"=5'

GRAPHIC SCALE(S):
1"=5' 0 5' 10' 15'

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DSGN DR CHK APVD

STATE OF TEXAS JUAN D. GARCIA 86492 LICENSED PROFESSIONAL ENGINEER 7/19/2019

555 N. CARANCAHUA, SUITE 320
CORPUS CHRISTI, TEXAS 78401
TEL: 1.361.888.8100
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BASE BID

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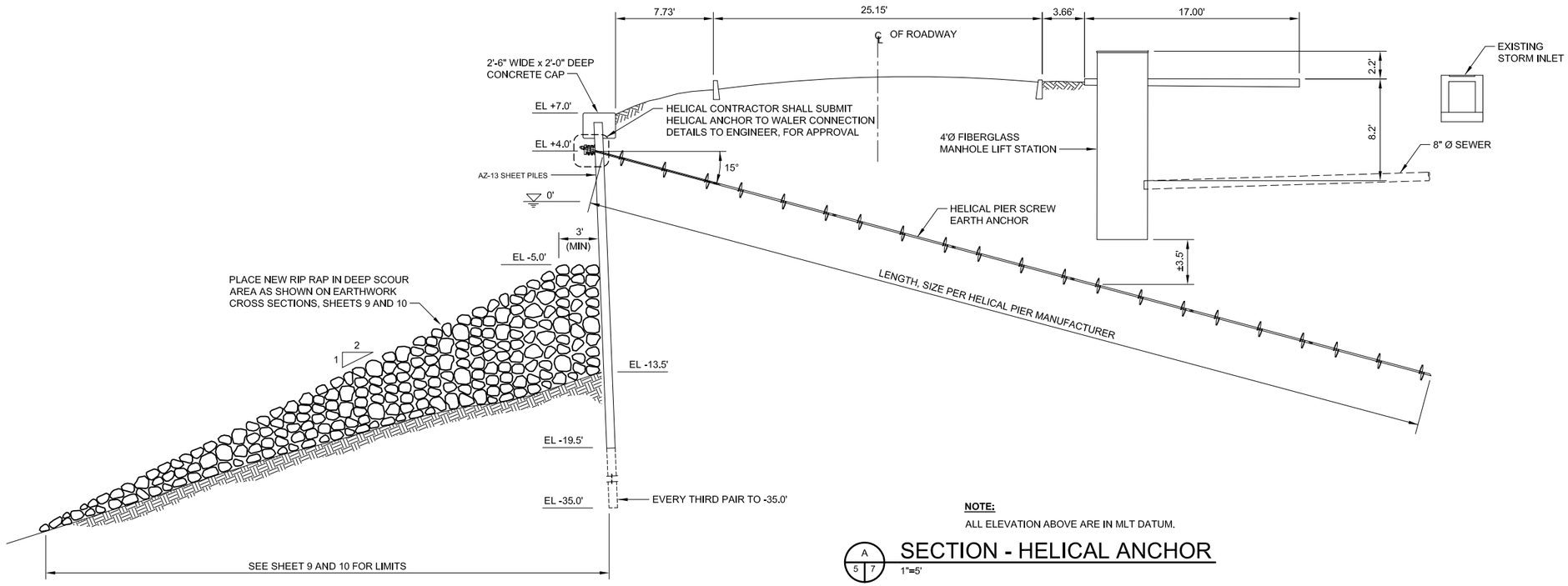


NOTE:

ALL ELEVATION ABOVE ARE IN MLT DATUM.

A 5 7 SECTION - HELICAL ANCHOR

1"=5'

NOTE:

1. HELICAL ANCHORS SHALL BE DESIGNED FOR A HORIZONTAL SERVICE LOAD OF 26.4 KIPS EACH BASED ON THE ANCHORS BEING SPACED A MAXIMUM OF 8.8' OC ALONG WALL. A SAFETY FACTOR OF 2.0 IS RECOMMENDED FOR ANCHORAGE.
2. HELICAL ANCHORS SHALL BE PLACED AT A DOWNWARD ANGLE OF 15° FROM HORIZONTAL IN ORDER TO AVOID UTILITIES.
3. HELICAL ANCHOR MANUFACTURER SHALL PROVIDE SHOP DRAWINGS WHICH SHOW CONNECTION TO OUTSIDE FACE OF SHEET PILE WALL.
4. LOAD TRANSFER TO OUTSIDE WALL SHALL BE BY MEANS OF WALER SYSTEM DESIGNED BY HELICAL MANUFACTURER.
5. SEE NOTE 2 ON SHEET 2 FOR SCOPE OF WORK.
6. SEE GENERAL NOTES, SHEET 2 FOR RIPRAP SPECIFICATION.

GRAPHIC SCALE(S):

1"=5' 0 5' 10' 15'

STATE OF TEXAS JUAN D. GARCIA 88492 LICENSED PROFESSIONAL ENGINEER

NO.	DATE	REVISION	BY	APVD
A	06/13/19	ISSUED FOR REVIEW	JDG	SAF
B	07/03/19	ISSUED FOR REVIEW	JDG	SAF
0	07/19/19	ISSUED FOR BID	JDG	SAF

DSGN DR CHK APVD

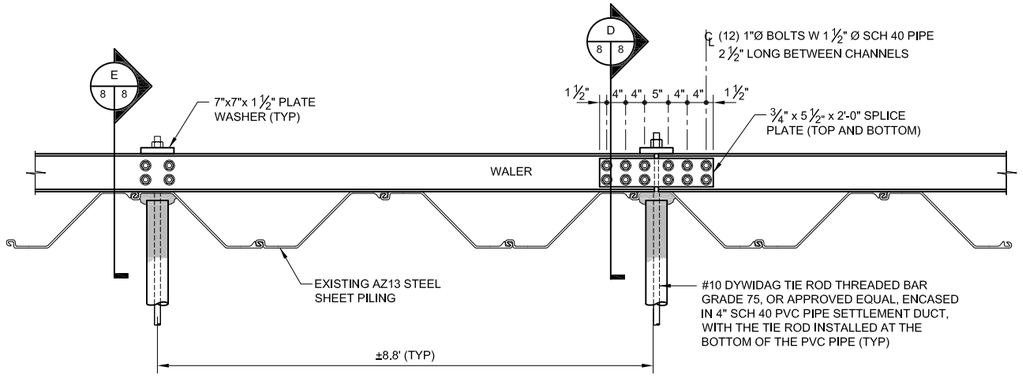
CH2M HILL ENGINEERS, INC
TBPE FIRM NO. F-3699
555 N. CARANCAHUA, SUITE 320
CORPUS CHRISTI, TEXAS 78401
TEL: 1.361.888.8100
FAX: 1.361.888.8600

PORT OF BROWNSVILLE the port that works

PORT OF BROWNSVILLE
OIL DOCK 5 BULKHEAD REPAIRS
BULKHEAD SECTION
ALTERNATE BID

SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

SHT NO 7 OF 11
PROJ
DWG
RD CODE



PLAN

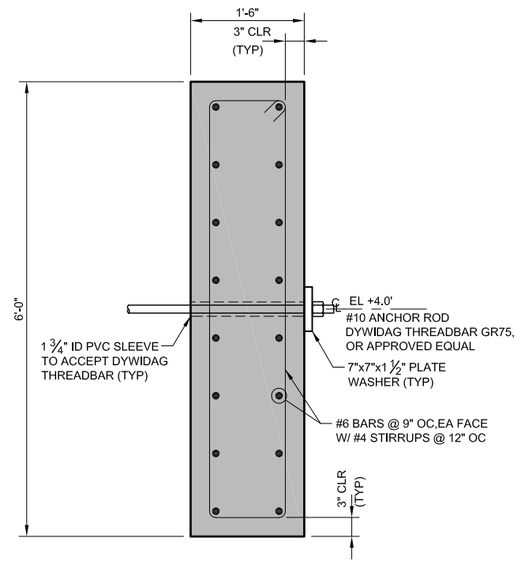
DETAIL - BULKHEAD

1 / 8 8 — 3/4"=1'-0"

NOTES:

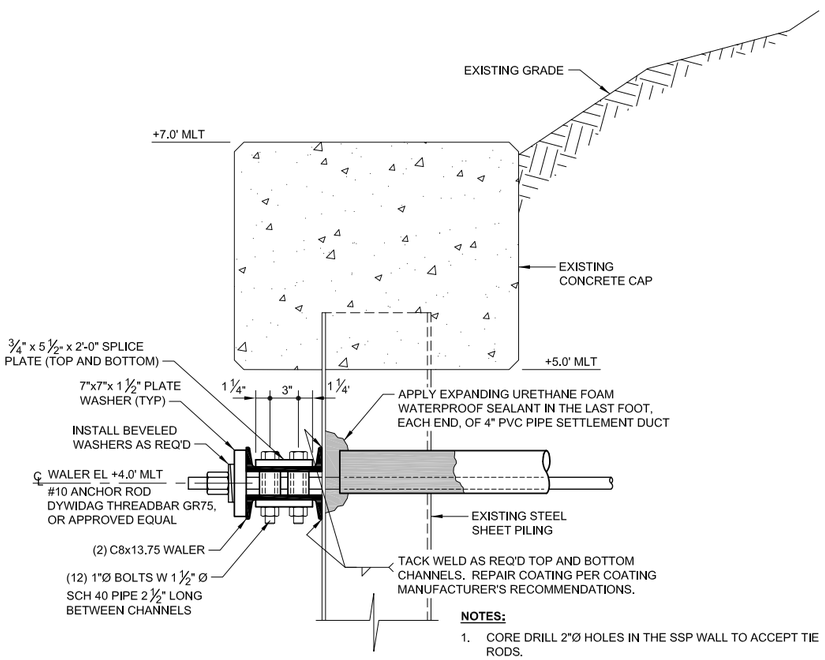
OPTION 1: WALER BEAMS SHALL BE FABRICATED WITH CURVATURE TO CONFORM TO DEFLECTED WALL. SEE ESTIMATED WALL DEFLECTIONS ON SHEET 3.

OPTION 2: WALER BEAMS SHALL BE SPLICED AT EACH TIE ROD LOCATION TO ACHIEVE THE EXISTING WALL CURVATURE.



SECTION - ANCHOR WALL

C / 4 8 — 1/2"=1'-0"

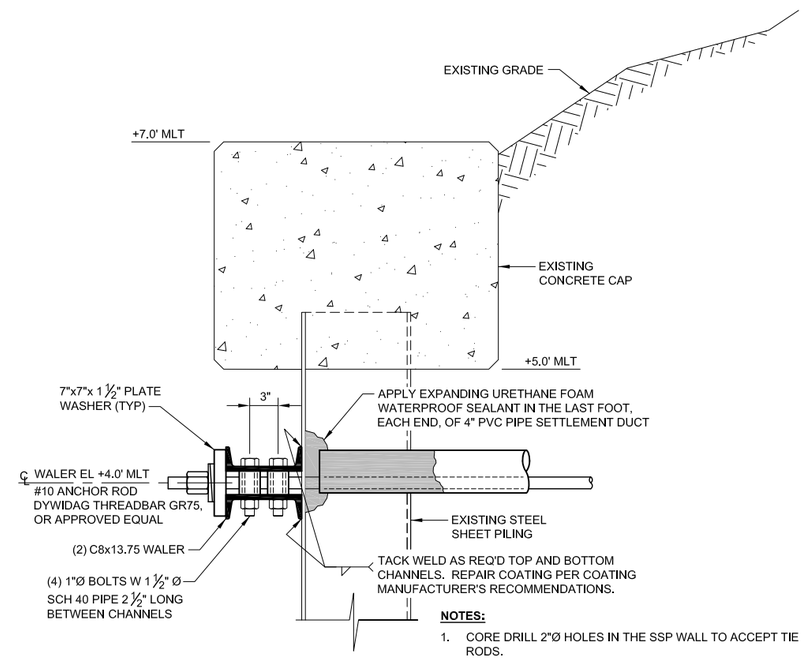


NOTES:

1. CORE DRILL 2"Ø HOLES IN THE SSP WALL TO ACCEPT TIE RODS.
2. EXISTING EXTERIOR SURFACE OF STEEL SHEET PILE WALL HAS EXTENSIVE MARINE GROWTH THAT MUST BE REMOVED PRIOR TO PLACEMENT OF THE WALER.

SECTION - WALER SPLICE PLATE

D / 4 6 — 1 1/2"=1'-0"



NOTES:

1. CORE DRILL 2"Ø HOLES IN THE SSP WALL TO ACCEPT TIE RODS.
2. EXISTING EXTERIOR SURFACE OF STEEL SHEET PILE WALL HAS EXTENSIVE MARINE GROWTH THAT MUST BE REMOVED PRIOR TO PLACEMENT OF THE WALER.

SECTION - BULKHEAD

E / 4 6 — 1 1/2"=1'-0"

GRAPHIC SCALE(S):

1/2"=1'-0": 0, 2', 4', 6'

3/4"=1'-0": 0, 1', 2', 3', 4'

1 1/2"=1'-0": 0, 6", 12", 18", 24"

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0	07/19/19	ISSUED FOR BID	JDG	SAF

DSGN DR CHK APVD

STATE OF TEXAS — JUAN D. GARCIA — 88492 — LICENSED — PROFESSIONAL ENGINEER — 07/19/19

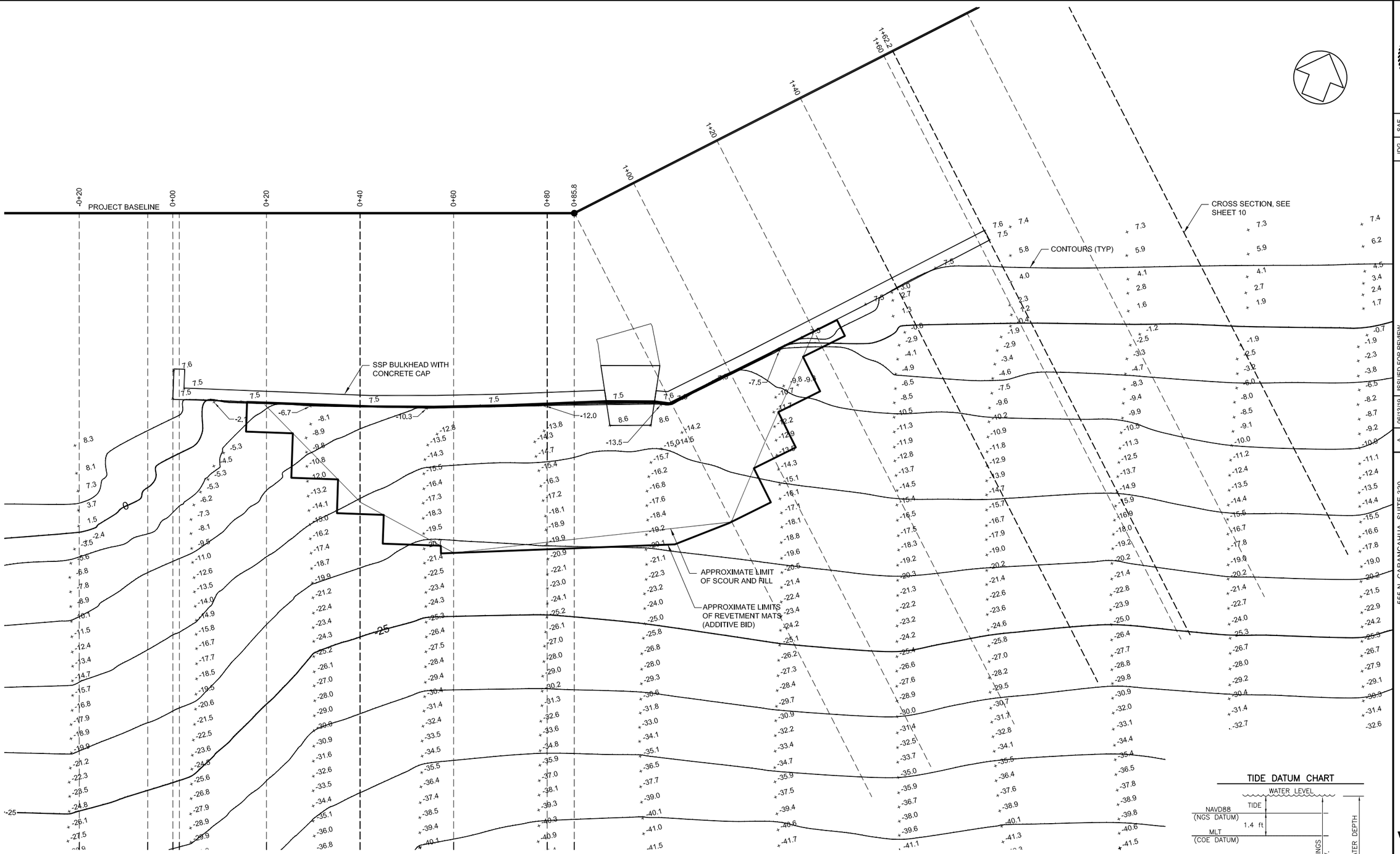
CH2M HILL ENGINEERS, INC
TBPE FIRM NO. F-3699
555 N. CARANCAHUA, SUITE 320
CORPUS CHRISTI, TEXAS 78401
TEL: 1.361.888.8100
FAX: 1.361.888.8600

PORT OF BROWNSVILLE — the port that works

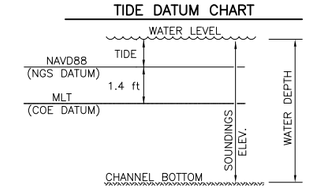
PORT OF BROWNSVILLE
OIL DOCK 5 BULKHEAD REPAIRS
SECTIONS AND DETAILS

SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

SHT NO 8 OF 11
PROJ
DWG
RD CODE



TIDE DATUM CHART



APPROXIMATE AREA OF REVETMENT MATS = 3,490 SF

NOTE:

1. VERTICAL DATUM REFERENCED TO USACE MLT.
2. EXISTING SURVEY PROVIDED BY PORT OF BROWNSVILLE AND PERFORMED BY NAISMITH MARINES SERVICES 3-2019

GRAPHIC SCALE 0 5' 10' 20'

STATE OF TEXAS JUAN D. GARCIA 88492 LICENSED PROFESSIONAL ENGINEER

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0	07/19/19	ISSUED FOR BID	JDG	SAF

DSGN | DR | CHK | APVD

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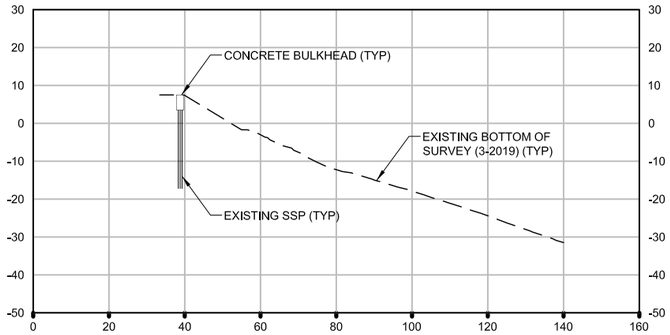
PORT OF BROWNSVILLE the port that works

PORT OF BROWNSVILLE
OIL DOCK 5 BULKHEAD REPAIRS
SITE PLAN
SOUNDINGS

SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

SHT NO 9 OF 11
PROJ
DWG
RD CODE

0+00



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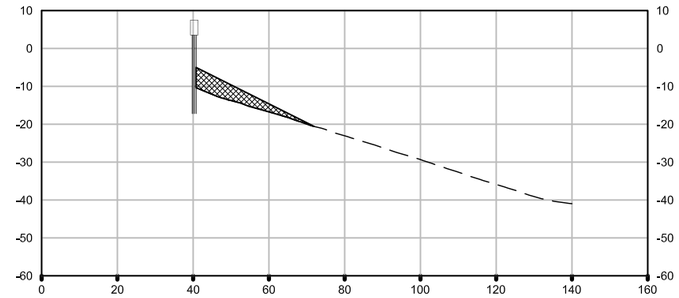

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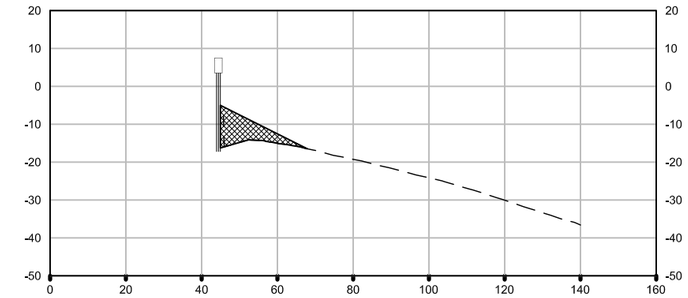

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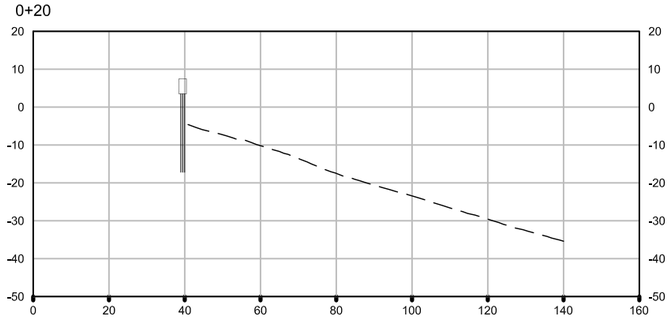

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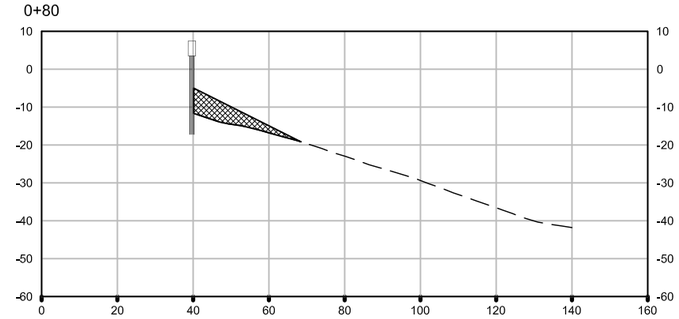
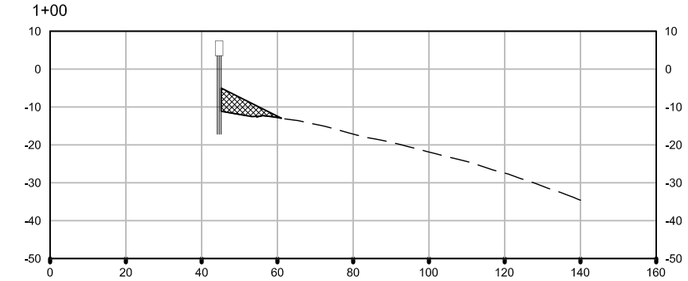
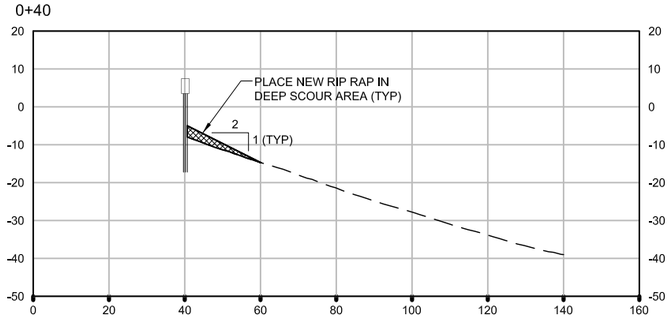


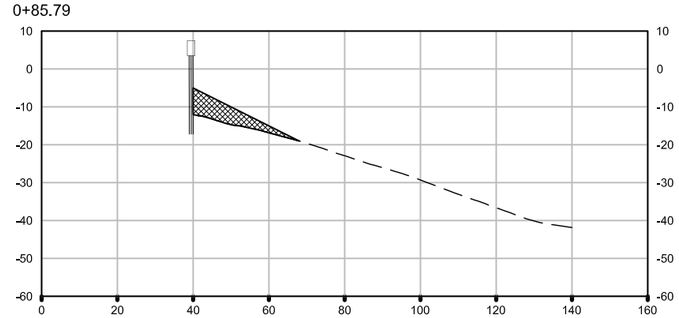
1+00



0+40



0+85.79



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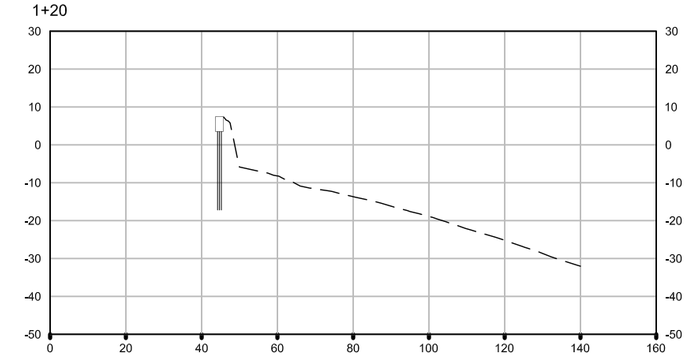
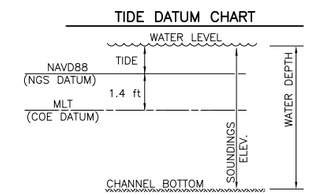


NOTE:

1. VERTICAL DATUM REFERENCED TO USACE MLT

Station	(Sq. Ft.) End Area	(Sq. Ft.) End Area Average	Vertical Scale Factor	Factored End Area Average	(Ft.) Distance	(Cu. Ft.) Volume	(Cu. Yds.) Volume
40	30.00						
		59.50	1	59.50	20	1190.00	44.07
60	89.00						
		92.50	1	92.50	20	1850.00	68.52
80	96.00						
		96.50	1	96.50	5.79	558.74	20.69
85.79	97.00						
		99.00	1	99.00	0.05	4.95	0.18
85.84	101.00						
		80.50	1	80.50	14.16	1139.88	42.22
100	60.00						
					Total Cubic Yards:		176
						+10%	194

TIDE DATUM CHART



HOR GRAPHIC SCALE 0 10' 20' 40'

VER GRAPHIC SCALE 0 10' 20' 40'

STATE OF TEXAS JUAN D. GARCIA 88492 LICENSED PROFESSIONAL ENGINEER

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0	07/19/19	ISSUED FOR BID	JDG	SAF

DSGN DR CHK APVD

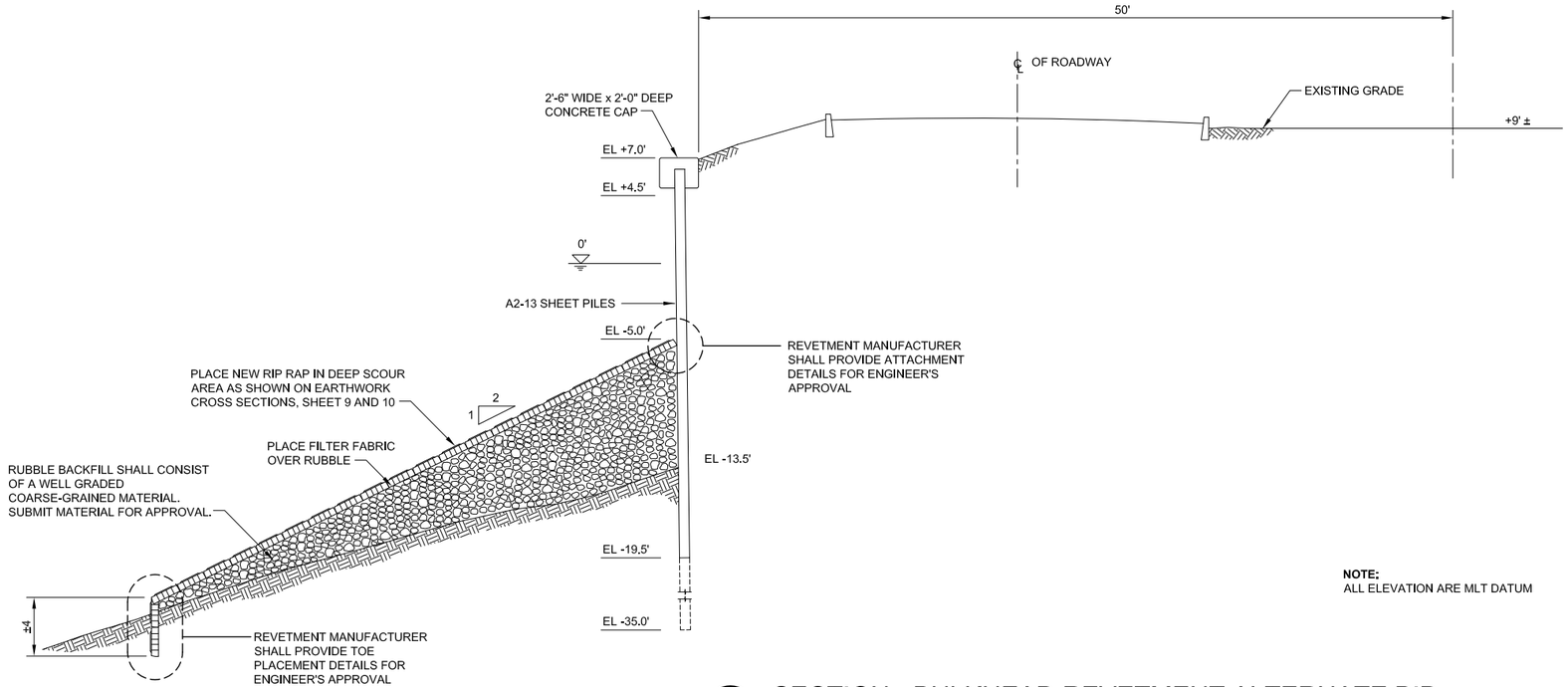
CH2M HILL ENGINEERS, INC
TBPE FIRM NO. F-3699
556 N. CARANCAHUA, SUITE 320
CORPUS CHRISTI, TEXAS 78401
TEL: 1.361.888.8100
FAX: 1.361.888.8600

PORT OF BROWNSVILLE
the port that works

PORT OF BROWNSVILLE
OIL DOCK 5 BULKHEAD REPAIRS
EARTHWORK
CROSS SECTIONS

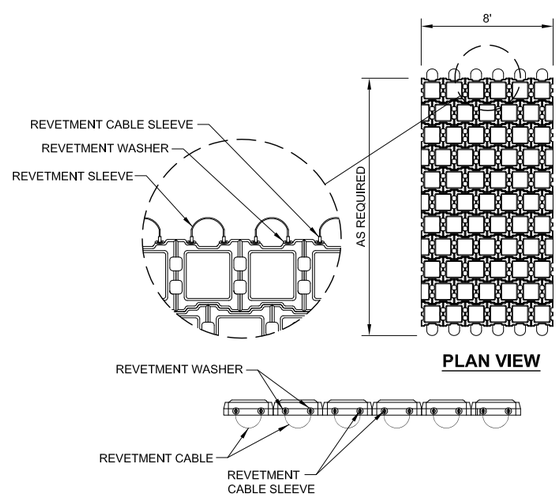
SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

SHT NO 10 OF 11
PROJ
DWG
RD CODE

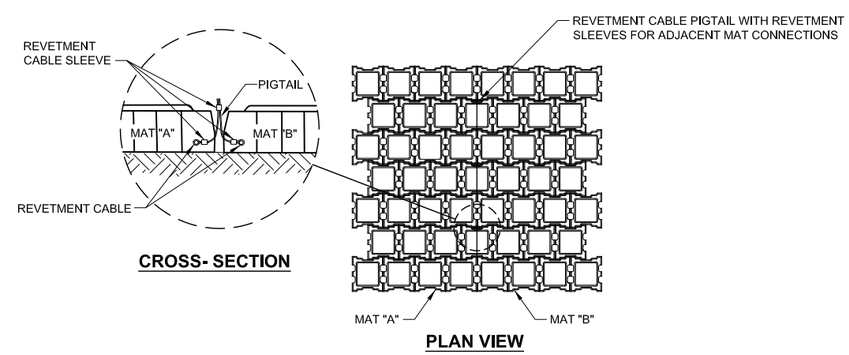


NOTE:
ALL ELEVATION ARE MLT DATUM

B 4 11 SECTION - BULKHEAD REVETMENT ALTERNATE BID
1"=5'



1 11 11 TYPICAL ARMORFLEX MAT
NTS



2 11 11 CONNECTION BETWEEN TWO ADJACENT MATS USING PIGTAILS
NTS

NOTES

1. CONCRETE REVETMENT SYSTEM SHALL BE SHOREBLOCK SD SERIES OR APPROVED EQUAL, AVAILABLE FROM PREMIER CONCRETE PRODUCTS, INC. PHONE 713-641-9797.
2. MATS SHALL BE CLOSED CELL AND BE 6" MIN THICKNESS.
3. APPROXIMATE SQUARE FOOTAGE OF REVETMENT IS 3,490 SF. QUANTITY SHALL BE VERIFIED BY BIDDERS.
4. APPROXIMATE VOLUME OF RUBBLE FILL IS 194 CY.

GRAPHIC SCALE(S):
1"=5' 0 5' 10' 15'

STATE OF TEXAS JUAN D. GARCIA 88492 LICENSED PROFESSIONAL ENGINEER
7/19/2019

NO.	DATE	REVISION	BY	APVD
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DSGN DR CHK APVD

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CORPUS CHRISTI, TEXAS 78401
TEL: 1.361.888.8100
FAX: 1.361.888.8600

PORT OF BROWNSVILLE the port that works

CH2M HILL ENGINEERS, INC
TBPE FIRM NO. F-3699

PORT OF BROWNSVILLE
OIL DOCK 5 BULKHEAD REPAIRS
BULKHEAD REVETMENT
ADDITIVE BID

SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

SHT NO 11 OF 11
PROJ
DWG
RD CODE