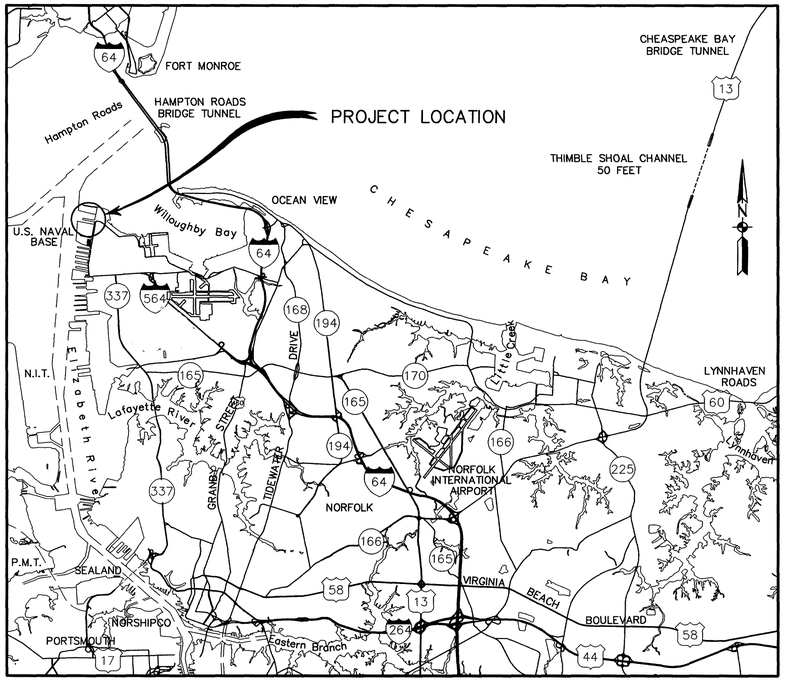
REVISE
FENDER SYSTEM
FOR PIER 12
NAVAL STATION NORFOLK VIRGINIA



VICINITY MAP

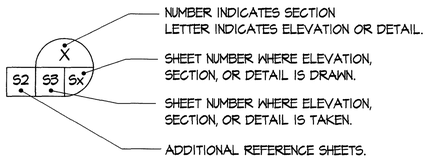
GRAPHIC SCALE

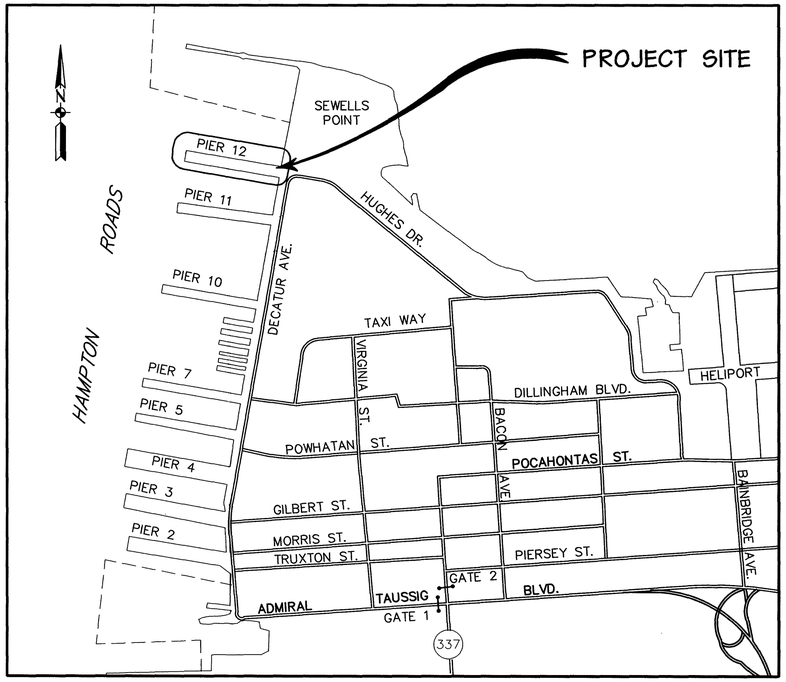
8000 0 8000 16000

1 IN. = 8000 FT.

SCALE IN FEET

DRAWING INDEX			
SHEET NO.	SHEET TITLE	PWC DRAWING NO.	NAVFAC NUMBER
T-1	TITLE SHEET	16128	4,405,297
D-1	LEGEND, NOTES, ABBREVIATIONS & DETAILS	16128A	4,405,298
D-2	DEMOLITION PLAN BENTS 1 THRU 37	16128B	4,405,299
D-3	DEMOLITION PLAN BENTS 38 THRU 78	16128C	4,405,300
D-4	DEMOLITION PLAN BENTS 79 THRU 90	16128D	4,405,301
D-5	DETAILS AND SECTIONS	16128E	4,405,302
S-1	CONSTRUCTION LAYOUT PLAN & NOTES	16128F	4,405,303
S-2	CONSTRUCTION PLAN BENTS 1 THRU 37	16128G	4,405,304
S-3	CONSTRUCTION PLAN BENTS 38 THRU 78	16128H	4,405,305
S-4	CONSTRUCTION PLAN BENTS 79 THRU 90	16128I	4,405,306
S-5	CORNER CLUSTER PLAN AND SECTIONS	16128J	4,405,307
S-6	BOLSTER W/ THRU BOLT PLAN AND SECTION	16128K	4,405,308
S-7	CORNER CLUSTER PLAN AND SECTIONS	16128L	4,405,309
S-8	FOAM FILLED FENDER MODULE	16128M	4,405,310
S-9	FOAM FILLED FENDER MODULE DETAILS	16128N	4,405,311
S-10	BUCKLING FENDER PILE MODULE	16128O	4,405,312
S-11	CONCRETE PILE SECTIONS AND DETAILS	16128P	4,405,313





LOCATION MAP

GRAPHIC SCALE

1000 0 1000 2000

1 IN. = 1000 FT.

SCALE IN FEET

MILLENNIUM ENGINEERS LLC

James R Gaulet 7/14/00
FIRM PRINCIPAL DATE

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGN:	DRAWN:	CHECKED:
DBC	TTA	JRC

EIC/AIC: E.L. THEISZ DATE:

DIVISION DIRECTOR: F.B. COLE, JR. P.E. DATE:

DEPARTMENT HEAD: R.H. IVES, JR. P.E.

FIRE PROTECTION: DATE:

ACTIVITY: A. Pts 7/25/00 DATE:

APPROVED: FOR C.O. COMMANDER, NAVFAC JBCole 8/10/00 DATE:

DRAWING SIZE: D SCALE: AS SHOWN

CM NUMBER

JOB ORDER NUMBER: ABBL4J

CONSTRUCTION CONTRACT NO: N62470-00-C-3360

SPECIFICATION NUMBER: 05-00-3360

PWC DRAWING NO:	NAVFAC DRAWING NO:
16128	4,405,297

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK VIRGINIA
NAVAL STATION NORFOLK
NAVY PUBLIC WORKS CENTER
NORFOLK VIRGINIA

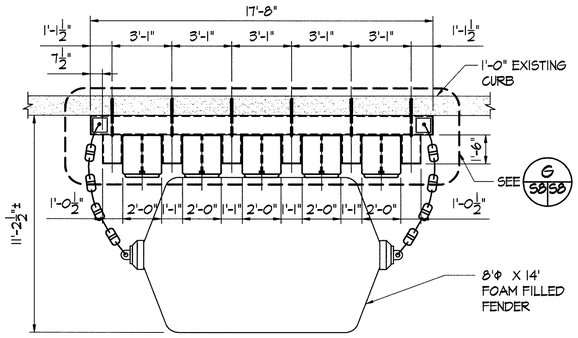
REVISE FENDER SYSTEM FOR PIER 12
NAVAL STATION NORFOLK VIRGINIA
COVER SHEET

Millennium ENGINEERS LLC

COMMONWEALTH OF VIRGINIA
DENNIS B. CLARK
No. 17509
PROFESSIONAL ENGINEER
7/14/00

SHEET NUMBER: T-1
SHEET 1 OF 17

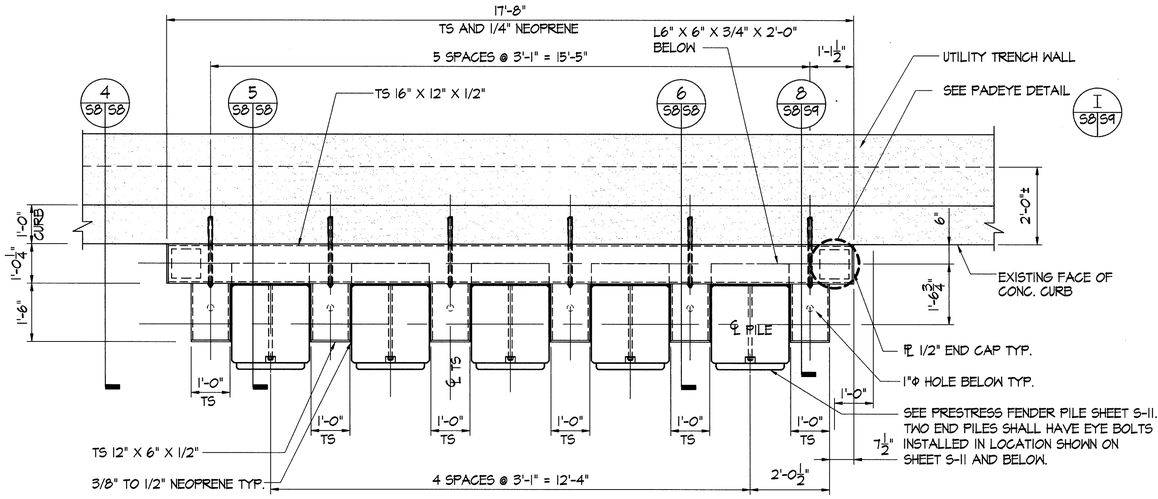
FILENAME: C:\PROJECT\9944\9944T1



PLAN - FOAM FILLED FENDER MODULE F

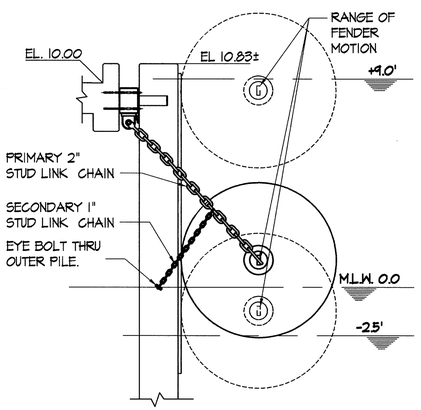
SCALE: 1/4" = 1'-0"

S4 | S3 | S2 | S8



PLAN - TS FRAME AND FENDERS PILES 6 S8|S8

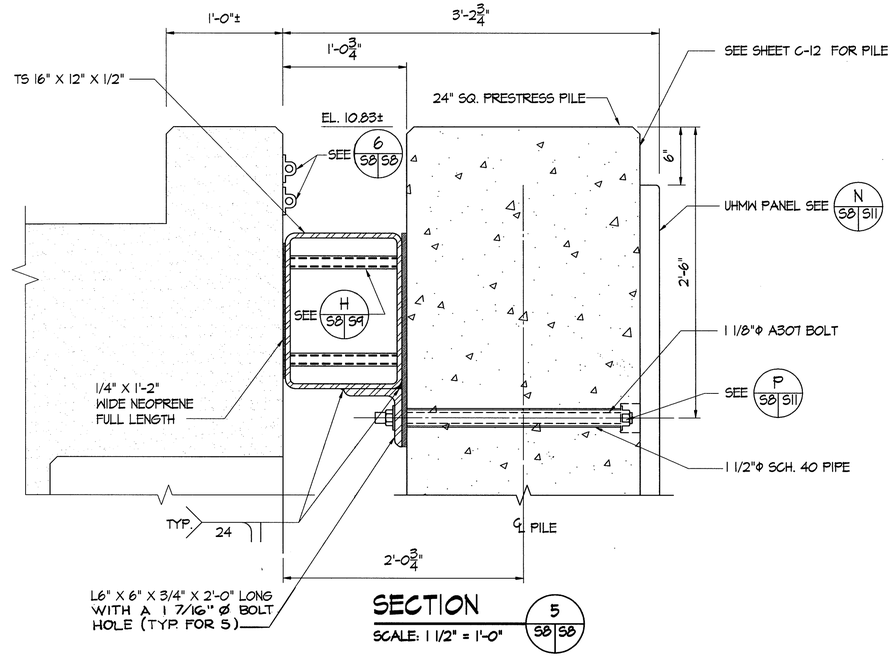
SCALE: 1/2" = 1'-0"



NOTE:
CONTRACTOR AND FENDER VENDOR SHALL CALCULATE THE LENGTH OF 2" PRIMARY STUD LINK CHAIN AND SECONDARY 1" STUD LINK CHAIN REQUIRED FOR THE RANGE OF FENDER MOTION SHOWN. THE CHAIN LENGTHS SHALL BE SUCH AS TO PREVENT THE FENDER FROM "ROLL OVER" ON THE PILE. LENGTHS AND CALCULATIONS SHALL BE SUBMITTED TO THE CONTRACTING OFFICER. CONTRACTOR SHALL BE PREPARED TO MODIFY THE CHAIN LENGTHS IN THE FIELD DURING INSTALLATION TO ENSURE FENDER OPERATES AS SHOWN.

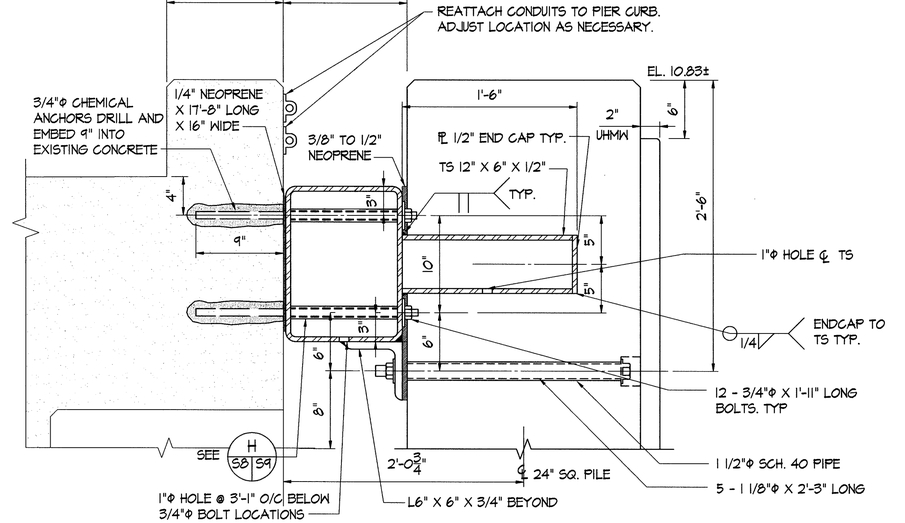
FENDER RANGE OF MOTION 4 S8|S8

NOT TO SCALE



SECTION 5 S8|S8

SCALE: 1 1/2" = 1'-0"



SECTION 6 S8|S8

SCALE: 1 1/2" = 1'-0"

GRAPHIC SCALE

1/4" = 1'-0" 4 0 2 4 8

1/2" = 1'-0" 2 1 0 1 2 4

1 1/2" = 1'-0" 1 0 1

SCALE IN FEET

Millennium ENGINEERS LLC

COMMONWEALTH OF VIRGINIA
DENNIS B. CLARK
No. 17509
PROFESSIONAL ENGINEER
7/14/00

UNITED STATES NAVY
NAVAL FACILITIES ENGINEERING COMMAND

MILLENNIUM ENGINEERS LLC
FIRM PRINCIPAL 7/14/00 DATE

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGN:	DRAWN:	CHECKED:
NEK	TTA	DBC

EIC/AIC: E.L. THEISZ — DATE:
DIVISION DIRECTOR: F.B. COLE, JR. P.E. — DATE:
DEPARTMENT HEAD: R.H. IVES, JR. P.E. — DATE:
FIRE PROTECTION: — DATE:
ACTIVITY: 7/25/00 — DATE:
APPROVED: FOR C.O. COMMANDER, NAVFAC 8/10/00 — DATE:

DRAWING SIZE:	SCALE:
D	AS SHOWN

CM NUMBER:
JOB ORDER NUMBER:
CONSTRUCTION CONTRACT NO: N62470-00-C-3360
SPECIFICATION NUMBER: 05-00-3360

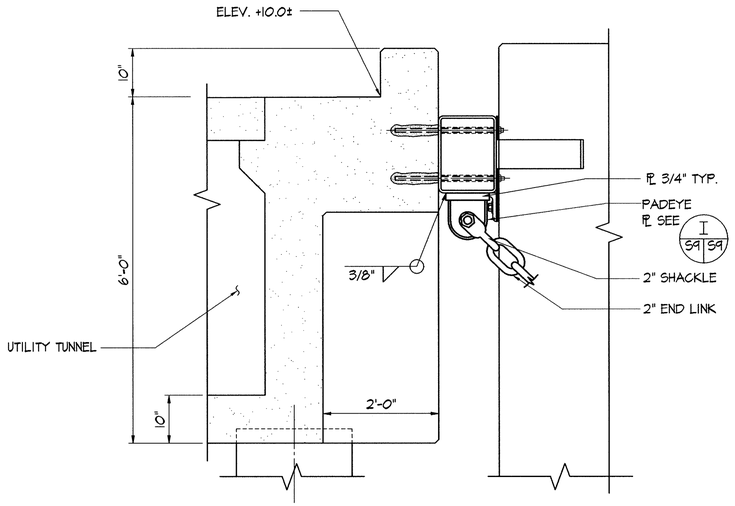
PWC DRAWING NO:	NAVFAC DRAWING NO:
16128M	4405310

DEPARTMENT OF THE NAVY
NAVAL STATION NORFOLK
NAVY PUBLIC WORKS CENTER
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK VIRGINIA
VIRGINIA

REVISE FENDER SYSTEM FOR PIER 12
NAVAL STATION NORFOLK VIRGINIA
FOAM FILLED FENDER MODULE

SHEET NUMBER: S-8
SHEET 14 OF 17

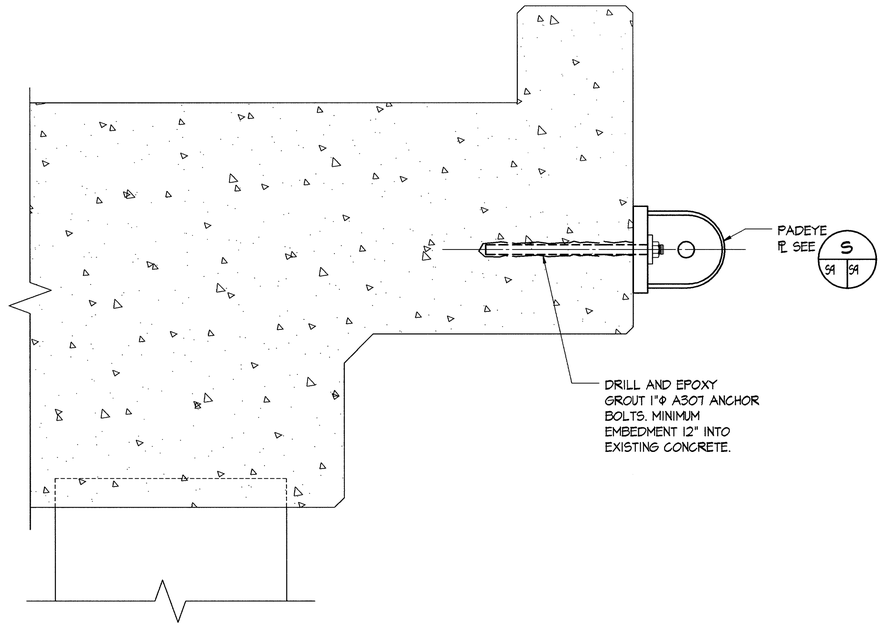
FILENAME: C:\PROJECT\9944\9944S8\9944S8



SECTION - PADEYE ATTACHMENT

8 | S8 | S9

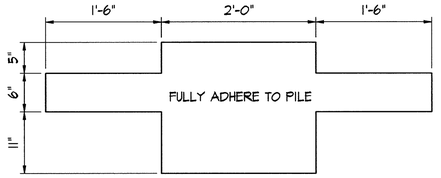
SCALE: 3/4" = 1'-0"



SECTION - PADEYE ATTACHMENT

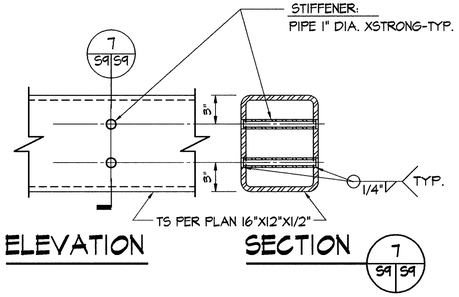
11 | S9 | S9

SCALE: 1 1/2" = 1'-0"



3/8" TO 1/2" NEOPRENE SHEET

NOT TO SCALE

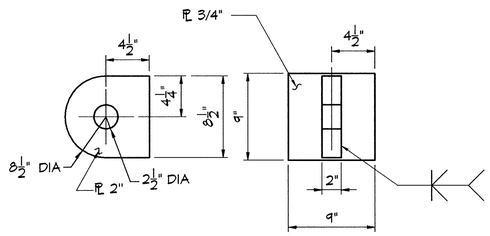


ELEVATION SECTION 7 | S9 | S9

DETAIL - TS FRAME STIFFENER

H | S10 | S9 | S9

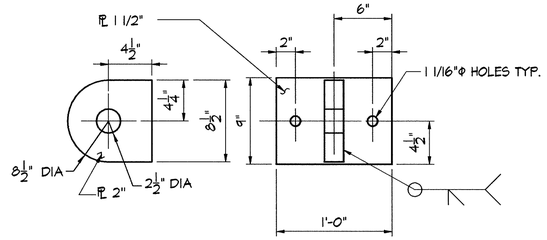
SCALE: 1 1/2" = 1'-0"



PADEYE PLATE DETAILS

I | S9 | S8 | S9

SCALE: 1 1/2" = 1'-0"

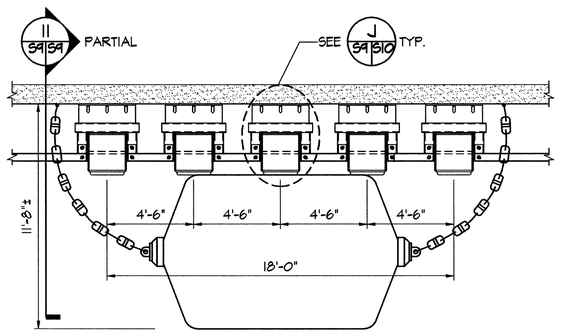


PADEYE PLATE DETAILS

S | S9 | S9

SCALE: 1 1/2" = 1'-0"

(PADEYE ASSEMBLY SHALL BE PROVIDED AND INSTALLED READY FOR FENDER ATTACHMENT)



PLAN - FOAM FILLED FENDER MODULE

R | S3 | S2 | S9

SCALE: 1/4" = 1'-0"

GRAPHIC SCALE

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

1 1/2" = 1'-0" 0

SCALE IN FEET

Millennium ENGINEERS LLC

COMMONWEALTH OF VIRGINIA DENNIS B. CLARK No. 17509 PROFESSIONAL ENGINEER 7/14/00

MILLENNIUM ENGINEERS LLC

FIRM PRINCIPAL 7/14/00 DATE

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVED
1	CHANGES DUE TO NEW CAMELS	6/19/01	DBC

DESIGN:	DRAWN:	CHECKED:
NEK	TTA	JRC

EIC/AIC: E.L. THEISZ DATE:

DIVISION DIRECTOR: F.B. COLE, JR. P.E. DATE:

DEPARTMENT HEAD: R.H. IVES, JR. P.E.

FIRE PROTECTION: DATE:

ACTIVITY: DATE:

APPROVED: FOR C.O. COMMANDER, NAVFAC 6/21/01 DATE:

DRAWING SIZE:	SCALE:
D	AS SHOWN

CM NUMBER:

JOB ORDER NUMBER:

CONSTRUCTION CONTRACT NO: N62470-00-C-3360

SPECIFICATION NUMBER: 05-00-3360

PWC DRAWING NO:	NAVFAC DRAWING NO:
161288	4,405,311

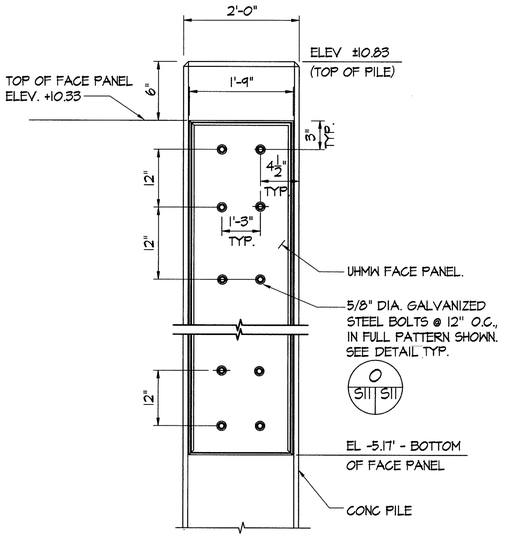
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND NAVY PUBLIC WORKS CENTER NORFOLK VIRGINIA NAVAL STATION NORFOLK VIRGINIA

REVISE FENDER SYSTEM FOR PIER 12 NAVAL STATION NORFOLK VIRGINIA

FOAM FILLED FENDER MODULE DETAILS

SHEET NUMBER: S-9 SHEET 15 OF 17

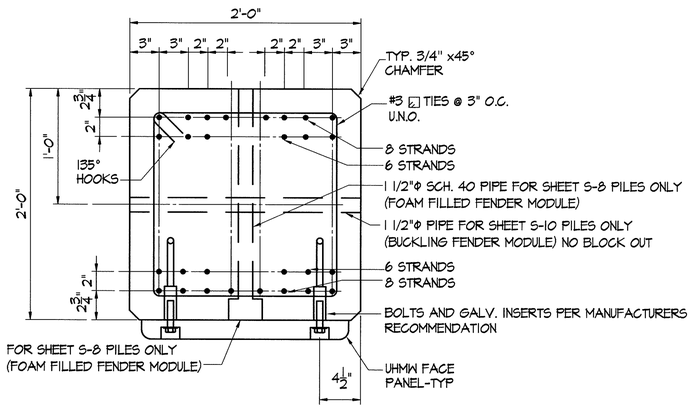
FILENAME: C:\PROJECT\9944\9944S9\9944S9



SECTION-UHMW FACE PANEL ELEVATION

N
S11 | S10 | S8 | S11

NOT TO SCALE

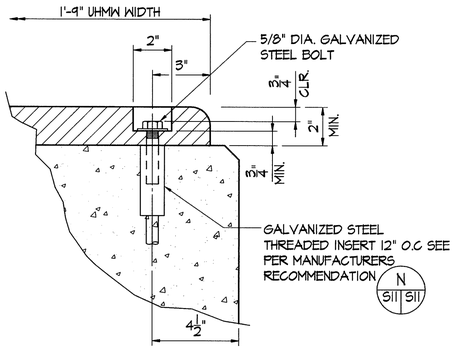


NOTE:
1. DIMENSIONS ARE SHOWN TO CENTERLINE OF STRAND, MAINTAIN 2" MIN. CONC. COVER OVER ALL REINFORCING.
2. THE 28 - 1/2"Φ STRANDS ARE SHOWN, CONTRACTOR MAY SUBSTITUTE 20 - 0.6"Φ STRANDS IN LIEU OF 1/2"Φ STRANDS.
3. STRAND DIMENSIONS MAY BE ADJUSTED TO ENSURE CLEARANCE OF UHMW INSERTS.

DETAIL - PRESTRESSED PILE

Q
S11 | S11

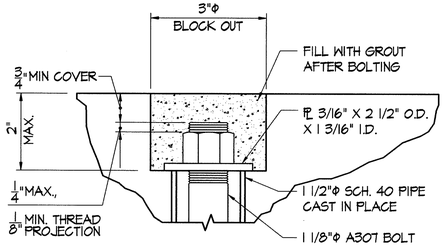
NOT TO SCALE



DETAIL - UHMW FACE PANEL

O
S11 | S11

SCALE: 3" = 1'-0"

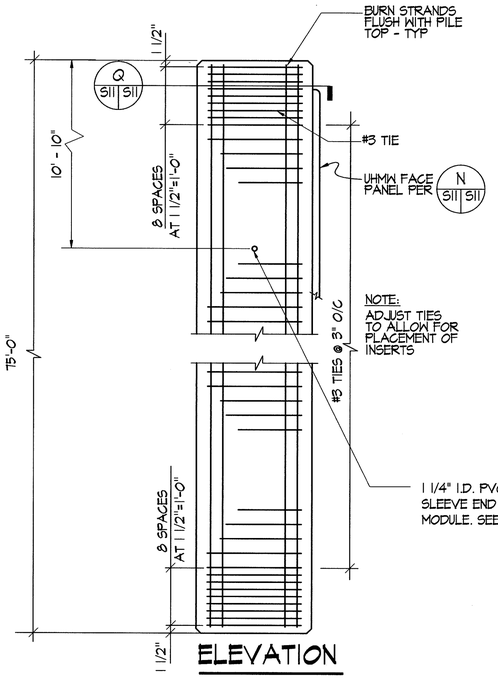


DETAIL FOR BLOCKOUT

P
S8 | S11

SCALE: 6" = 1'-0"

(SHEET S-8 PILES ONLY)

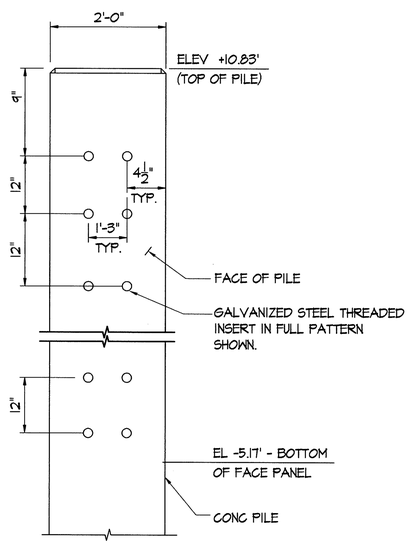


ELEVATION

PRESTRESSED FENDER PILE

PRESTRESSED PILE NOTES

1. MINIMUM CONCRETE STRENGTHS:
   28 DAYS ——— f'c=8000 PSI
   AT INITIAL PRESTRESSING ——— f'ci=5600 PSI
2. PRESTRESSING STEEL SHALL BE 28 -1/2" DIA, OR 20 - 0.6" DIA. 270 KSI SEVEN WIRE, UNCOATED, LOW RELAXATION STRANDS.
3. #3 ⊠ TIES SHALL CONFORM TO ASTM A615, GRADE 60.
4. RESIDUAL FINAL PRESTRESS AFTER LOSSES SHALL NOT BE LESS THAN 1145 PSI.
5. INSTALL PILES WITH INSERTS FACING AWAY FROM THE PIER.
6. AFTER COMPLETION OF THE PILE PLACEMENT AND ATTACHMENT, FORM AND PLACE EPOXY SEALER ON TOP OF THE PILE.
7. ALL PILES SHALL CONTAIN SILICA FUME AT 10% BY WEIGHT OF CEMENT.



PILE INSERT ELEVATION

NOT TO SCALE

GRAPHIC SCALE
3" = 1'-0" (1" 0 1)
6" = 1'-0" (0 1'-0")
SCALE IN FEET

Millennium ENGINEERS LLC

COMMONWEALTH OF VIRGINIA
DENNIS B. CLARK
No. 17509
PROFESSIONAL ENGINEER
7/14/00

UNITED STATES NAVY
NAVFAC
FACILITIES ENGINEERING COMMAND

MILLENNIUM ENGINEERS LLC
[signature] 7/14/00
PM PRINCIPAL DATE

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGN:	DRAWN:	CHECKED:
NEK	TTA	DBC

EIC/AIC: E.L. THEISZ — DATE:
DIVISION DIRECTOR: F.B. COLE, JR. P.E. — DATE:
DEPARTMENT HEAD: R.H. IVES, JR. P.E. — DATE:
FIRE PROTECTION: — DATE:
ACTIVITY: [signature] 7/25/00
APPROVED: FOR C.O. COMMANDER, NAVFAC 8/10/00
DRAWING SIZE: D — SCALE: AS SHOWN
CM NUMBER:
JOB ORDER NUMBER:
CONSTRUCTION CONTRACT NO: N62470- 00-C-3360
SPECIFICATION NUMBER: 05- 00-3360
PWC DRAWING NO: 161128P — NAVFAC DRAWING NO: 4,405,313

DEPARTMENT OF THE NAVY
NAVY PUBLIC WORKS CENTER
NAVAL STATION NORFOLK
NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VIRGINIA

REVISE FENDER SYSTEM FOR PIER 12
NAVAL STATION NORFOLK VIRGINIA

CONCRETE PILE SECTIONS AND DETAILS

SHEET NUMBER: S-11
SHEET 17 OF 17

FILENAME: C:\PROJECT\9944\9944S11\9944S11

TEST BORING - B3

MATERIAL	DEPTH IN FT BELOW M.L.W.	BLOWS/FT.	SAMPLE NO.
WATER			
LT. TAN CLAYEY SAND & SHELL FRAGMENTS		32	5
LGE. % OF GRAVEL PRESENT		37	6
CLAY DECREASING WITH DEPTH.		34	7
MATERIAL DKR. IN COLOR WITH DEPTH.		39	8
	58'-0	35	9
GREEN SILTY SAND & SHELL FRAGMENTS. SAND MEDIUM FINE GRAINED		83	10
		97	11
		83	12
SOME TRACE OF CLAY		136	13
		84	14
	90'-0	79	15

TEST BORING - B6

MATERIAL	DEPTH IN FT BELOW M.L.W.	BLOWS/FT	SAMPLE NO.
WATER			
TAN CLAYEY SAND & SHELL		19	5
TR. OF GRAVEL		31	6
		44	7
		39	8
	62'-0	42	9
BL. GREY SANDY CLAY, LGE. % SHELL, TRACE OF GRAVEL		36	10
	68'-0	57	11
BLUE GREY CLAYEY SAND & SHELL		61	12
	79'-0	37	13
BLUE GREY SANDY CLAY LGE. % OF SHELL		42	14
		49	15

TEST BORING - B5

MATERIAL	DEPTH IN FT BELOW M.L.W.	BLOWS/FT	SAMPLE NO.
WATER			
TAN CLAYEY SAND & SHELL TRACE OF FINE GRAVEL		37	5
		41	6
		57	7
	53'-0	62	8
BLUE GREY CLAYEY SAND & SHELL. TRACE OF GRAVEL		66	9
		71	10
		79	11
		77	12
		74	13
		61	14
		73	15

TEST BORING - B2

MATERIAL	DEPTH IN FEET BELOW M.L.W.	BLOWS/FT.	SAMPLE NO.
WATER			
		33	5
BROWN CLAYEY SAND, SHELLS, TRACE OF GRAVEL	39'-0	44	6
		36	7
		52	8
	52'-0	79	9
BLUE GREY SAND, SHELLS, TRACE OF CLAY		76	10
SAND INCREASING & BECOMING FINER GRAINED WITH DEPTH		149	11
		59	12
		79	13
		53	14
		29	15
	83'-0	33	16
		41	17

TEST BORING - 4

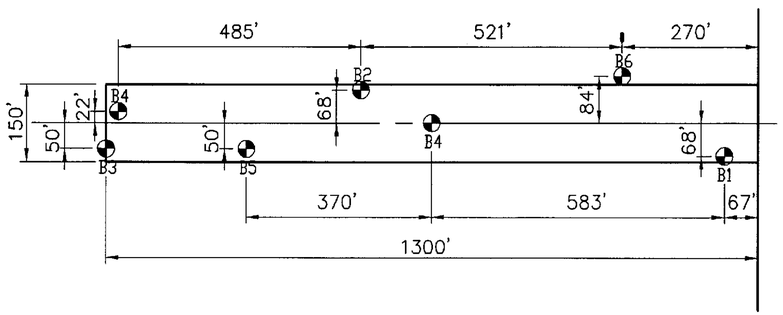
MATERIAL	DEPTH IN FEET BELOW M.L.W.	BLOWS/FT	SAMPLE NO.
WATER			
		20 -29	4
COARSE BROWN SAND. TRACE OF SILT & SHELLS			
		17 -23	5
	54'-0	75 -112	6
GREY MEDIUM TO COARSE SAND, SILT & SHELLS		21 -28	7
	75'-0	40 -52	8

TEST BORING - B6

MATERIAL	DEPTH IN FEET BELOW M.L.W.	BLOWS/FT	SAMPLE NO.
WATER			
TAN SILTY SAND SOME SHELL FRAGMENTS & GRAVEL.		47	5
		49	6
COARSE GRAV. SAND MED. FINE GRAINED		43	7
	53'-0	41	8
		48	9
		46	10
BLUEISH GREY CLAYEY SAND SHELL FRAG. TRACE OF SMALL GRAVEL		42	11
		40	12
		37	13
		39	14
		46	15
	87'-0	17	6
BLUE SILTY CLAY, TRACE OF SHELL FRAGMENTS &			

TEST BORING - B1

MATERIAL	DEPTH IN FEET BELOW M.L.W.	BLOWS/FT.	SAMPLE NO.
WATER			
	40'-0	40	6
		43	7
TAN CLAYEY SANDY SHELL FRAGMENTS		49	8
MIXED FINE GRAINED SAND		47	9
	58'-0	52	10
TAN CLAYEY SILTY SHELL FRAGMENTS TRACES OF VERY FINE GRAINED SAND		60	11
		45	12
		40	13
GREY SILTY CLAY SOME SAND SAND INCREASING WITH DEPTH.		50	14
		25	15
		22	16



BORING LOCATION PLAN

NO SCALE

BORING LOG INFORMATION OBTAINED FROM ORIGINAL DESIGN CONSTRUCTION DRAWING Y&D 700,593

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVED

EIC/AIC: E.L. THEISZ — DATE:

DRAWING SIZE: D — SCALE: AS SHOWN

CM NUMBER

JOB ORDER NUMBER: ABBL4J

CONSTRUCTION CONTRACT NO: N62470-00-C-3360

SPECIFICATION NUMBER: 05-00-3360

PWC DRAWING NO: — NAVFAC DRAWING NO:

DEPARTMENT OF THE NAVY
NAVAL STATION NORFOLK
NAVY PUBLIC WORKS CENTER
NAVAL FACILITIES ENGINEERING COMMAND NORFOLK VIRGINIA

BORING LOG DATA

PIER 12

SHEET NUMBER: R-1
SHEET 1 OF 1