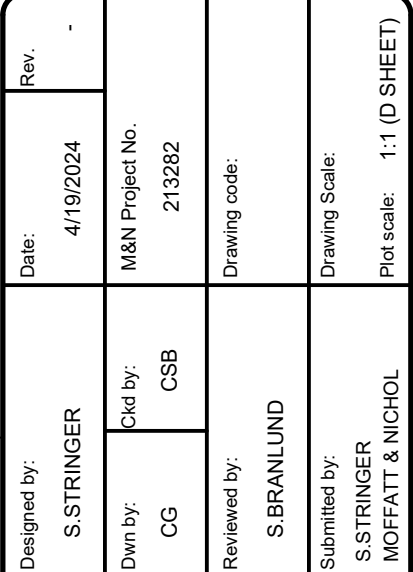


GEOTECHNICAL ENGINEER
GEOENGINEERS
1101 SOUTH FAWCETT AVE
SUITE 200
TACOMA, WA 98402
(206) 383-4940



SHEET INDEX		
INDEX NO.	SHEET REF. NO.	SHEET TITLE
1	G-001	COVER SHEET, VICINITY & LOCATION MAPS AND SHEET INDEX
2	G-002	GENERAL NOTES
3	G-003	STRUCTURAL NOTES & DESIGN CRITERIA (1 OF 2)
4	G-004	STRUCTURAL NOTES & DESIGN CRITERIA (2 OF 2)
5	G-005	STRUCTURAL SPECIAL INSPECTION REQUIREMENTS & DETAILS
6	G-006	ABBREVIATIONS & LEGEND
7	G-100	CONTRACTOR SITE ACCESS & LAYDOWN AREAS
8	V-100	EXISTING SITE PLAN
9	CD-100	DEMOLITION SITE PLAN (1OF 2)
10	CD-101	DEMOLITION SITE PLAN (2 OF 2)
11	CD-901	DEMOLITION PHOTOS (1 OF 2)
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13	C-100	OVERALL SITE PLAN
14	C-110	GRADING SITE PLAN
15	C-120	GRADING & PAVING DETAILS
16	S-100	BULKHEAD LAYOUT
17	S-201	BULKHEAD PLAN & ELEVATION (1 OF 2)
18	S-202	BULKHEAD PLAN & ELEVATION (2 OF 2)
19	S-301	BULKHEAD TYPICAL SECTIONS
20	S-501	BULKHEAD DETAILS (1 OF 2)
21	S-502	BULKHEAD DETAILS (2 OF 2)
22	S-511	MISCELLANEOUS DETAILS
23	S-512	HOIST DETAILS



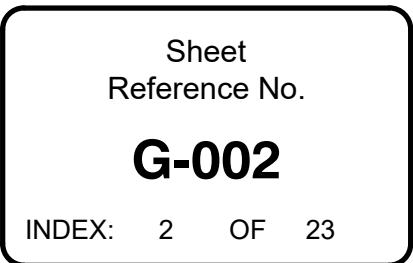
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FINAL DESIGN SUBMITTAL
ISSUED: JULY 5, 2024

Sheet
Reference No.
G-001

INDEX: 1 OF 23



CODES AND STANDARDS

ALL DESIGN AND CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF THE FOLLOWING CODES AND STANDARDS.

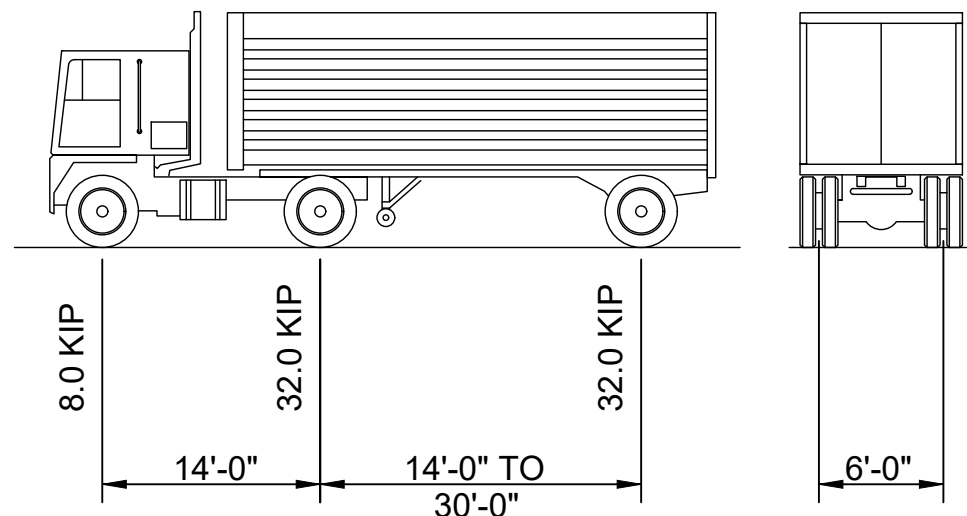
1. AMERICAN CONCRETE INSTITUTE (ACI) 318-14, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE & COMMENTARY.
2. ACI 301-20, SPECIFICATIONS FOR CONCRETE CONSTRUCTION.
3. ACI DETAILING MANUAL MNL(66)-20.
4. AISC 360-16, SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS.
5. AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) STANDARD 7-16, MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES.
6. AMERICAN WELDING SOCIETY (AWS), AWS D1.1-2020, STRUCTURAL WELDING CODE - STEEL.
7. AWS D1.4-2018, STRUCTURAL WELDING CODE - REINFORCING STEEL.
8. AWS D1.6-2017, STRUCTURAL WELDING CODE - STAINLESS STEEL.
9. INTERNATIONAL CODE COUNCIL (ICC), INTERNATIONAL BUILDING CODE (IBC), 2018.
10. US ARMY CORPS OF ENGINEERS - DESIGN OF SHEET PILE WALLS, EM 1110-2-2504
11. UFC 4-152-07, DESIGN SMALL CRAFT BERTHING FACILITIES, 1 SEPTEMBER 2012.
12. UFC 4-159-03, DESIGN: MOORINGS, 12 MARCH 2020.
13. WASHINGTON DEPARTMENT OF TRANSPORTATION (WSDOT), STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, 2021.
14. CRSI- MANUAL OF STANDARD PRACTICE 29TH EDITION, 2018

BULKHEAD DESIGN CRITERIA

1. THE BULKHEAD IS DESIGNED FOR STATIC, SEISMIC, AND LIQUEFACTION LATERAL LOADING CONDITIONS AS SPECIFIED IN THE GEOTECHNICAL ENGINEERING REPORT BY GEOENGINEERS INC, AUGUST 2022
2. BULKHEAD DESIGN IS IN ACCORDANCE WITH US ARMY CORPS OF ENGINEERS -DESIGN OF SHEET PILE WALLS (EM 1110-2-2504).
3. SUBMIT GROUTED TIE-BACK ANCHOR DESIGN CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF WASHINGTON TO THE PORT FOR REVIEW PRIOR TO THE START OF CONSTRUCTION. AT A MINIMUM PROVIDE: MATERIALS, DESIGN, STRESSING, LOAD TESTING, AND ACCEPTANCE CRITERIA IN ACCORDANCE WITH PTI RECOMMENDATIONS.
4. TIE-BACK ANCHOR ULTIMATE BOND STRENGTH INTO INTACT SILTSTONE OF 50PSI FOR MINIMUM 6 INCH DIAMETER ANCHOR.

ASD DESIGN: FACTOR OF SAFETY FOR BOND STRENGTH = 2.0 FOR STATIC CONDITIONS, 1.5 FOR SEISMIC CONDITIONS.
5. BULKHEAD SURCHARGE LIVE LOADING:

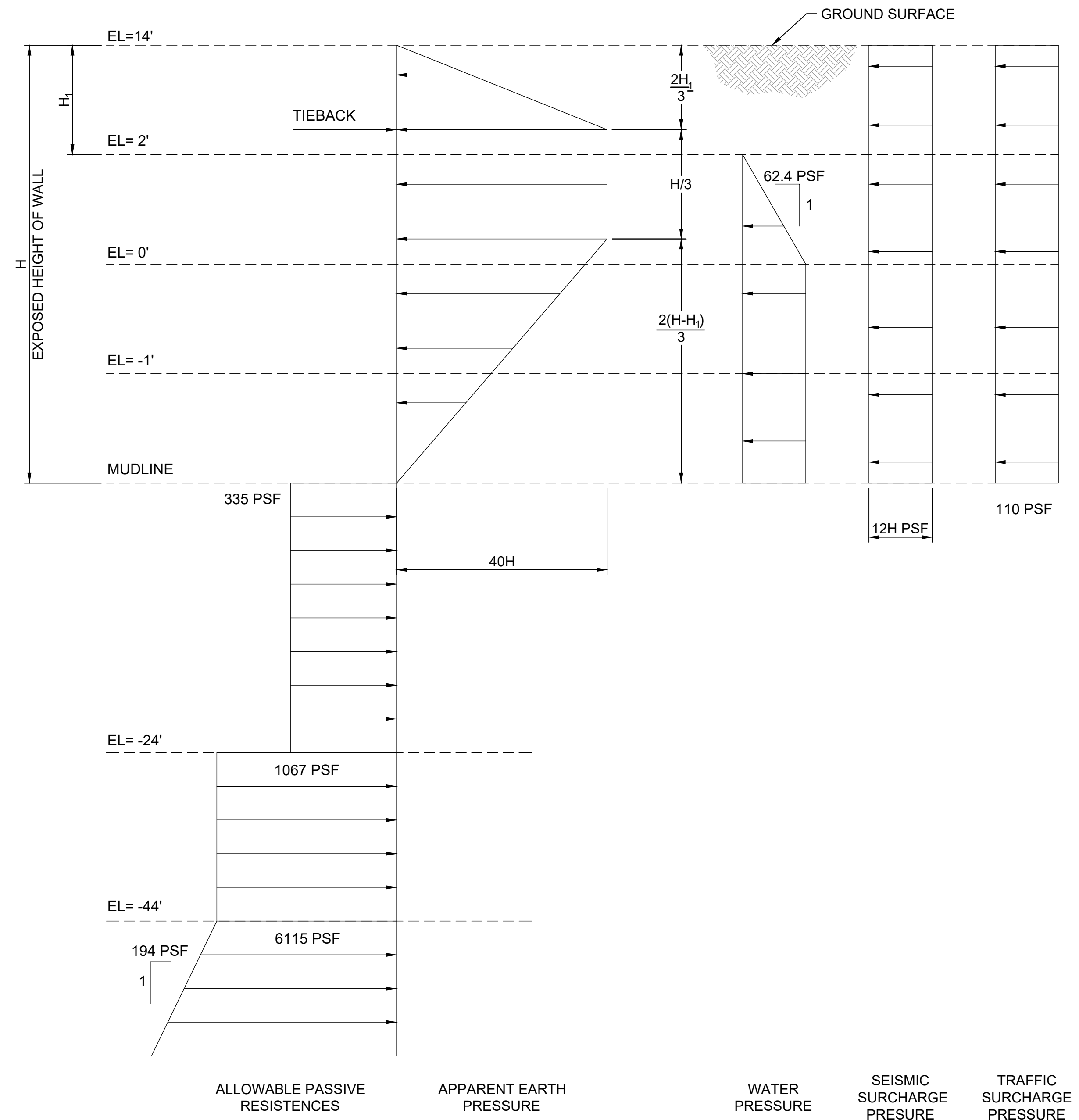
CONSTRUCTION LOAD CASE = 80 PSF
STATIC LOAD CASE = 300 PSF
SEISMIC LOAD CASE = 100 PSF
POST SEISMIC LOAD CASE = 100 PSF
6. VEHICLE LIVE LOADS, SEE DIAGRAMS BELOW.

HS20 DESIGN TRUCK (AASHTO)

BULKHEAD DESIGN CRITERIA (CONTINUED)



- | | | |
|----|---|---|
| 7. | WIND (ASCE 7-16)
BASIC WIND ON STRUCTURE
EXPOSURE | 95 MPH (3-SECOND GUST)
D |
| 8. | MOORING
TYPE I MILD WEATHER (UFC 4-159-03)
WIND VELOCITY
CURRENT VELOCITY
WAVES | 35 KNOTS
1.0 KNOTS
N/A FOR TYPE I MOORING |
| | DESIGN VESSEL (FISHING VESSEL)
DISPLACEMENT
LENGTH OVER ALL (LOA)
BEAM
DRAFT | 40 LONG TON
60 FEET
22 FEET
12 FEET |
| 9. | SEISMIC (ASCE 7-16)
RISK CATEGORY = II
SHORT PERIOD SPECTRAL RESPONSE, $S_s = 1.427g$
ONE-SECOND PERIOD SPECTRAL RESPONSE, $S_1 = 0.738g$
SITE CLASS = F
SPECTRAL RESPONSE COEFFICIENTS
SHORT PERIOD, $SDS = 1.142g$
ONE-SECOND PERIOD, $SD1 = 1.255g$ | |
| | MODIFIED PEAK GROUND ACCELERATION, $PGA_m = 0.798g$
SEISMIC DESIGN CATEGORY = D | |

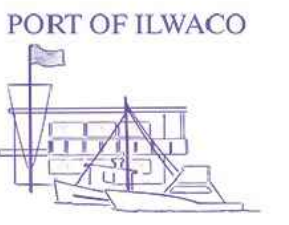


NOTES:

1. THE APPARENT EARTH PRESSURE DIAGRAMS ARE APPROPRIATE FOR A SINGLE ROW OF TIEBACKS AND INCLUDE ALL APPLICABLE SAFETY FACTORS.
2. ALL PRESSURES ARE IN PSF UNITS, ALL DIMENSIONS IN FOOT UNITS.

LATERAL EARTH PRESSURES FOR ANCHORED WALL

FINAL DESIGN SUBMITTAL
ISSUED: JULY 5, 2024

[illegible]

PORT OF ILWACO

MARINA STRUCTURES

REPLACEMENT

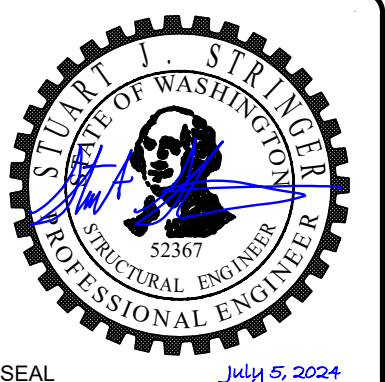
STRUCTURAL NOTES &

DESIGN CRITERIA (1 OF

2)

Designed by: S. STRINGER	Dwn by: CG	Ckd by: CSB	Date: 4/19/2024	Rev. *
			M&N Project No. 213282	
Reviewed by: S. BRANLUND			Drawing code:	
Submitted by: S. STRINGER MOFFATT & NICHOL			Drawing Scale: Plot scale: 1" = 1' (D SHEET)	

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Sheet
Reference No.
G-003
INDEX: 3 OF 23

STEEL PILING

1. MATERIAL: SHEET PILES ASTM A572, GRADE 60, FY=60KSI. SEE SPECIFICATION 31 62 00 DRIVEN PILES.
2. DRIVE ALL PILES TO THE REQUIRED TIP ELEVATIONS AS INDICATED.
3. ULTIMATE STEEL PILE CAPACITY IS SPECIFIED BY GEOENGINEERS,INC GEOTECHNICAL ENGINEERING REPORT.
4. COATING DAMAGED DURING HANDLING, DRIVING, OR DUE TO FIELD WELDING MUST BE RESTORED AS REQUIRED BY THE SPECIFICATIONS AND AS DIRECTED BY THE PORT. SEE SPECIFICATION 09 96 00 HIGH PERFORMANCE COATINGS.

STRUCTURAL STEEL AND MISCELLANEOUS METAL

1. CONFORM TO THE FOLLOWING, UON.

SHAPE	STANDARD	GRADE
PLATES	ASTM A572	GR 50
CHANNELS	ASTM A572	GR 50
W SECTIONS	ASTM A992	GR 50
ANGLES	ASTM A572	GR50
PIPE	ASTM A53	GR C
HSS RECTANGULAR	ASTM A500	GR C, FY=50 KSI
HSS ROUND	ASTM A500	GR C, FY=46 KSI

2. MACHINE BOLTS MUST CONFORM TO ASTM A307 GRADE A WITH COMPATIBLE ASTM A563 GRADE A NUTS AND ASTM F844 WASHERS.
3. HIGH STRENGTH BOLTS MUST CONFORM TO ASTM F3125, GRADE A325 WITH COMPATIBLE ASTM A563 NUTS AND ASTM F436 WASHERS.
4. ANCHOR BOLTS MUST CONFORM TO ASTM F 1554, GRADE 55, UON
5. WELDING MUST CONFORM TO AWS D1.1
6. WHERE INDICATED, EXPOSED STRUCTURAL STEEL MUST BE HOT-DIP GALVANIZED CONFORMING TO ASTM A123/A123M GRADE 100 FOR SHAPES, PLATES, AND FABRICATIONS, ASTM A153/153M CLASS C FOR HARDWARE, AND ASTM F2329.
7. SET ALL EMBEDDED ANCHOR BOLTS AND ANCHOR RODS USING TEMPLATES THAT ARE VERIFIED WITH CERTIFIED DRAWINGS OF THE EQUIPMENT, FRAMING, OR MOORING HARDWARE PRIOR TO THE CONCRETE POUR. NOTIFY THE PORT OF ANY CHANGES TO ANCHOR BOLT SIZES, SPACING, OR QUANTITIES FROM WHAT IS SHOWN ON THE DRAWINGS. TEMPLATES MUST BE ADEQUATE TO HOLD THE BOLTS ACCURATELY IN PLACE AND IN ALIGNMENT DURING THE CONCRETE POUR.
8. PROVIDE BLEED HOLES IN EMBEDDED PLATES AND SHAPES AT 2'-0" ON CENTER MAXIMUM.
9. STAINLESS STEEL MUST BE OF TYPE 316L, BARS AND SHAPES, BOLTS, NUTS, AND WASHERS MUST CONFORM TO ASTM A276/A276M, F593, F594, AND F844, RESPECTIVELY.

STRUCTURAL CONCRETE REINFORCEMENT

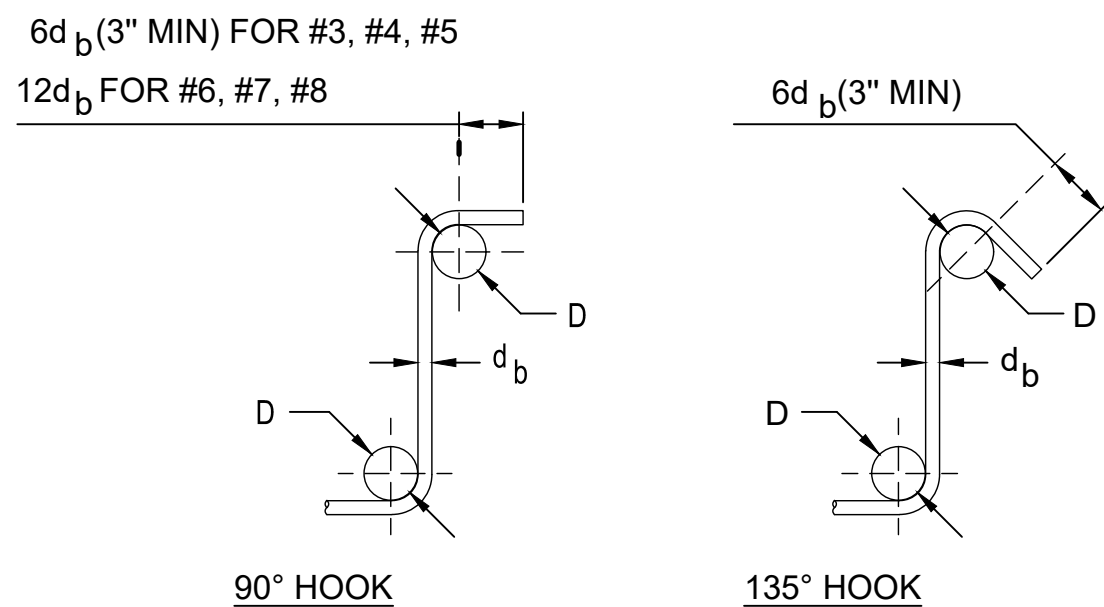
1. MATERIALS:

REINFORCEMENT	STANDARD	GRADE	NOTES
REINFORCING STEEL	ASTM A615	60	DEFORMED, UON
PREINFORCING STEEL TO BE WELDED	ASTM A706	60	DEFORMED
HEADED REINFORCEMENT (T-HEADS)	ASTM A970		CLASS HAS ROUND HEADS ONLY

2. PROVIDE MECHANICAL REINFORCING STEEL CONNECTORS (COUPLERS) THAT DEVELOP A MINIMUM OF 1.25 TIMES THE YIELD STRENGTH OF REINFORCING BARS.
3. PLACEMENT:
 - A LAP SPlice REINFORCING STEEL MARKED CONT (CONTINUOUS) WITH A MINIMUM LAP SPlice ACCORDING TO SHEET G-005 UON.
 - B CONFORM TO ACI 301, ACI MNL(66)-20, AND ACI 318 FOR CONCRETE DETAILS. DO NOT SPlice ANY REINFORCEMENT LESS THAN 40 FEET IN LENGTH UON.
 - C STAGGER SPlices OF ADJACENT BARS SO NO MORE THAN 50% OF THE BARS ARE SPliced AT ANY ONE LOCATION. PROVIDE A MINIMUM STAGGER BETWEEN LAP SPlices OF 180 BAR DIAMETERS UON.
 - E PROVIDE CORNER BARS AT ALL WALL, CURB, AND CURB WALL CORNERS MATCH THE QUANTITY, SPACING, AND DIAMETER OF ALL HORIZONTAL REINFORCEMENT AT THE CORNER. EXTEND TERMINATED STRAIGHT BARS THE FULL AVAILABLE LENGTH INTO ADJOINING MEMBERS. SPlice EACH CORNER BAR TO A TERMINATED STRAIGHT BAR WITH A MINIMUM SPlice LENGTH OF 60 BAR DIAMETERS. IF SPlice LENGTH IS NOT AVAILABLE, USE MECHANICAL REINFORCING BAR CONNECTORS.
 - F DO NOT WELD REINFORCING STEEL EXCEPT WHERE INDICATED OR BY APPROVAL OF THE PORT IN WRITING PRIOR TO CONSTRUCTION. IF AN ARC IS CREATED BETWEEN REINFORCING STEEL AND A WELDING ELECTRODE, REPLACE THE REINFORCING STEEL.

CAST-IN-PLACE CONCRETE

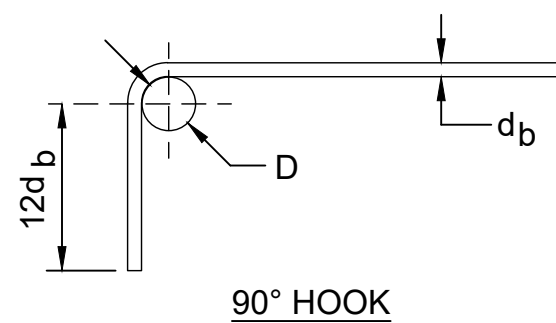
1. CAST-IN-PLACE CONCRETE MINIMUM 28 DAY COMPRESSIVE STRENGTH: 5000 PSI
REFER TO SPECIFICATION 03 30 00 CAST-IN-PLACE CONCRETE.
2. COVER FOR REINFORCING STEEL: 3 INCH, UON.
3. CHAMFER ALL EXPOSED CORNERS 3/4 INCH, UON.
4. PROVIDE CONSTRUCTION JOINTS ONLY AS NOTED ON THE DRAWINGS OR AS SPECIFICALLY PERMITTED BY THE PORT.
5. ROUGHEN CONSTRUCTION JOINTS TO 1/4 IN AMPLITUDE, UON. CLEAN AND REMOVE LAITANCE, THEN CONTINUOUSLY SOAK WITH WATER FOR 12 HOURS PRIOR TO POUR, UON. REMOVE STANDING WATER JUST PRIOR TO PLACING NEW CONCRETE.



BAR SIZE	#3	#4	#5	#6	#7	#8
D	1 1/2"	2"	2 1/2"	4 1/2"	5 1/4"	6"

TYPICAL STIRRUP & TIE HOOKS

SCALE: NTS

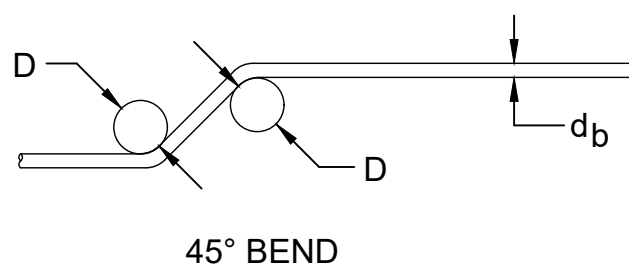
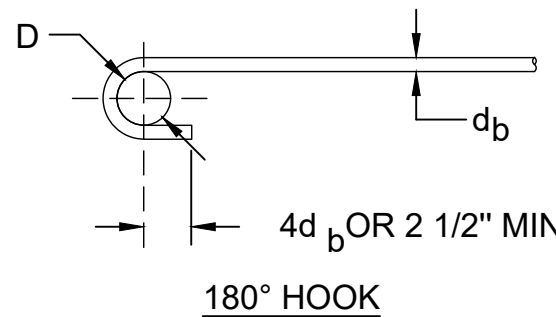


NOTES:

D=6d_b FOR #3 THRU #8

D=8d_b FOR #9 THRU #11

D=10d_b FOR #14 AND #18



TYPICAL REINFORCING HOOKS

SCALE: NTS

TIE BACK ANCHORS

1. TIE BACK ANCHORS INCLUDING STRAND, SHEATHING, AND ASSOCIATED HARDWARE MUST BE DYWIDAG MULTISTRAND, DOUBLE CORROSION PROTECTED OR APPROVED EQUAL MEETING ASTM A416.
2. GROUTED STRAND ANCHORS MUST CONFORM TO ASTM A416, GRADE 270, WITH COMPATIBLE HARDWARE AND ANCHORS. SYSTEM AS DESIGN IS PER DYWIDAG-SYSTEMS INTERNATIONAL. SUBMIT ALTERNATE SYSTEMS FOR APPROVAL PRIOR TO CONSTRUCTION.
3. TIE BACK ANCHOR SYSTEM AS SHOWN ON THE DRAWINGS IS FOR BID PURPOSES ONLY, FINAL DESIGN AND METHOD OF INSTALLTION IS TO BE DESIGNED BY THE CONTRACTOR. SEE G-004 FOR MINIMUM SPECIAL INSPECTION REQUIREMENTS.

BAR SIZE	LAP SPLICE LENGTH IN INCHES	
	OTHER BARS	TOP BARS
#3	19	24
#4	25	32
#5	31	40
#6	37	48
#7	54	70
#8	62	80
#9	70	91
#10	79	102
#11	87	113

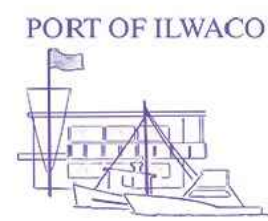
NOTES:

1. THE ABOVE SPLICE LENGTHS APPLY TO BARS WITH A MINIMUM SPACING OF 3db INCHES ON CENTER.

db = BAR NOMINAL DIAMETER
2. DEVELOPMENT LENGTH OF BARS SHALL EQUAL A MINIMUM OF 77% OF LAP SPLICE LENGTH.
3. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 INCHES OF CONCRETE CAST BELOW THE BARS.
4. VALUES ARE BASED ON CLASS "B" SPLICES (MAX 50% OF BARS SPLICED AT ONE LOCATION).

TYPICAL REINFORCING BAR LAP SPLICE LENGTH

SCALE: NTS

[illegible]

PORT OF ILWACO MARINA STRUCTURES REPLACEMENT

**STRUCTURAL NOTES &
DESIGN CRITERIA (2 OF
2)**

Designed by: S. STRINGER	Dwn by: CG	Cld by: CSB	Date: 4/19/2024	Rev. *
			M&N Project No. 213282	
Reviewed by: S. BRANLUND			Drawing code:	
Submitted by: S. STRINGER MOFFATT & NICHOL			Drawing Scale: Plot scale: 11 (D SHEET)	

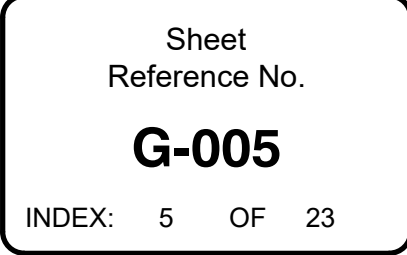
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Sheet
Reference No.

G-004

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[illegible]



PLAN - CONTRACTOR SITE ACCESS & LAYDOWN AREAS
SCALE: NTS

LAYDOWN AREA KEY NOTES

THE FOLLOWING AREAS WILL BE AVAILABLE
FOR CONTRACTOR LAYDOWN & STAGING.

- 1 UNFENCED GRAVEL LOT,
APPROXIMATELY 72'x100'
- 2 UNFENCED PAVED PARKING
APPROXIMATELY 116'x109'
- 3 FENCED GRAVEL LOT,
APPROXIMATELY 154'x64'

LEGEND

 CONTRACTOR LAYDOWN AREA CONSTRUCTION ACCESS ROUTE

FINAL DESIGN SUBMITTAL
ISSUED: JULY 5, 2024

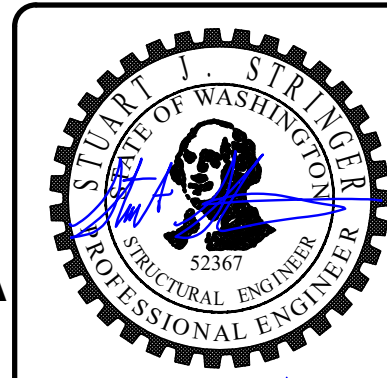
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PORT OF ILWACO MARINA STRUCTURES REPLACEMENT

**CONTRACTOR SITE
ACCESS & LAYDOWN
AREAS**

Designed by:	S STRINGER	Date:	4/19/2024	Rev.	-
Drawn by:	CG	Chk by:	CSB	M&M Project No.	213282
Reviewed by:	S BRANLUND	Drawing code:			
Submitted by:	S STRINGER	Drawing Scale:			

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Reference No.

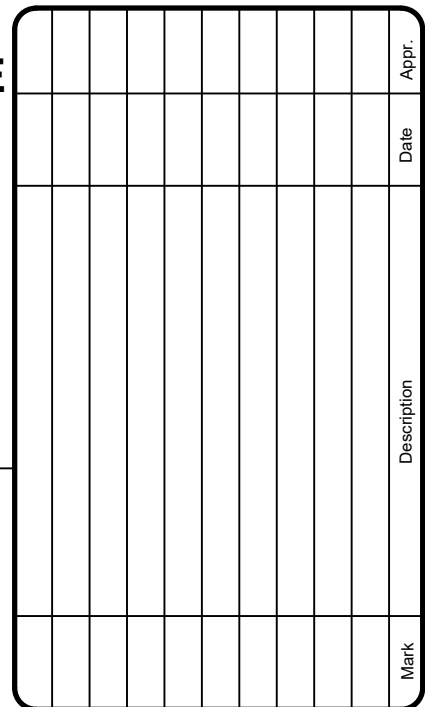
G-100

FINAL DESIGN SUBMITTAL
ISSUED: JULY 5, 2024

DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING

⊗	STEEL PILE
●	PILE
○	SUBMERGED PILE
⌚	UTILITY POLE
⛶	HYDRANT
⛶	WATER VALVE
○	PATH LIGHT
— MHHW —	MEAN HIGHER HIGH WATER (MHHW) (ELEV= +8.07' MLLW)

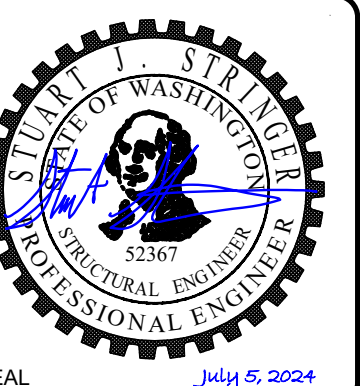
1. BATHYMETRY AND TOPOGRAPHY BASED ON A SURVEY PERFORMED BY SOLMAR HYDRO ON APRIL 13, 2022.
2. CONTOURS SHOWN ARE IN FEET RELATIVE TO MLLW.



EXISTING SITE PLAN

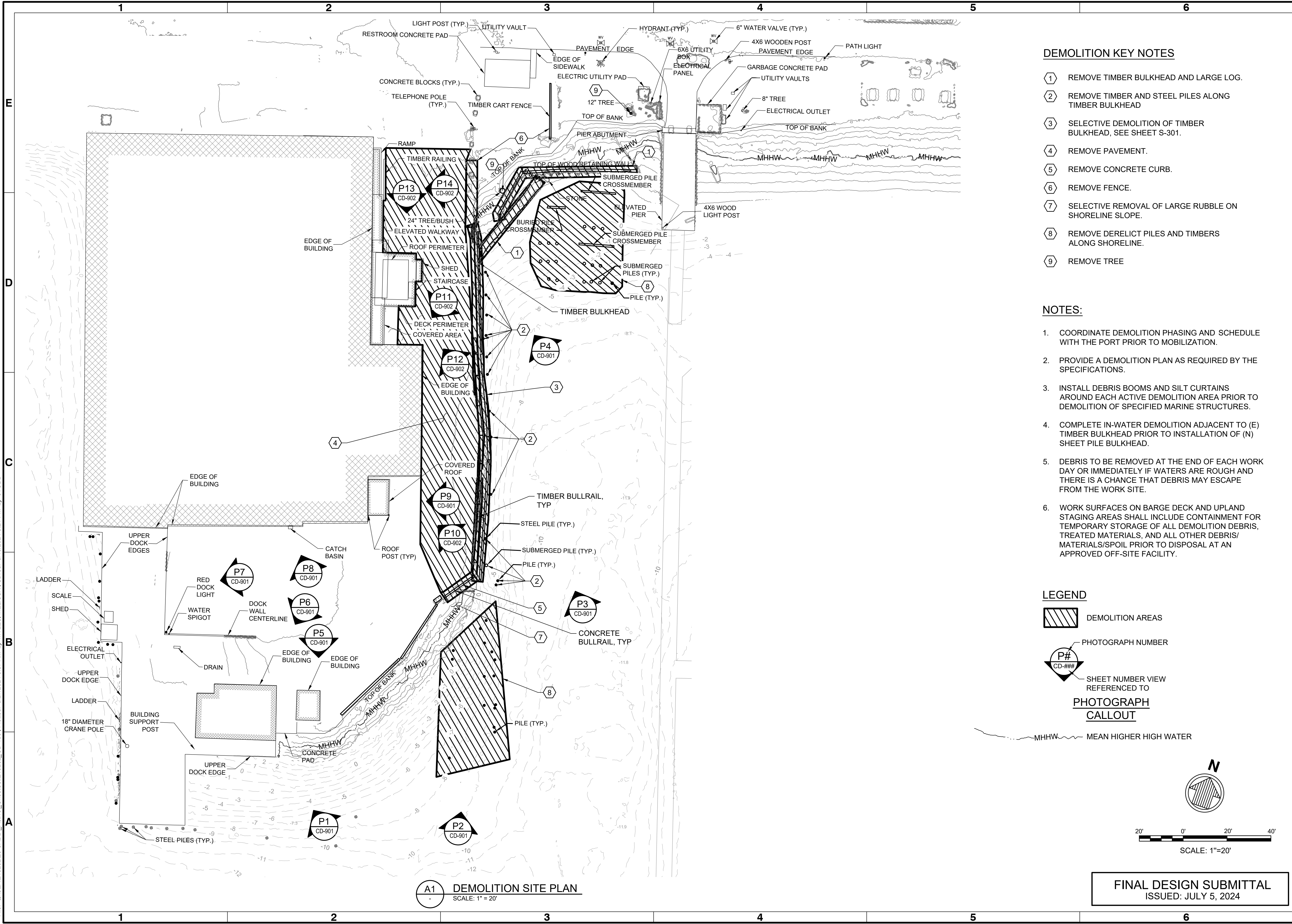
Designed by: S. STRINGER	Date: 4/19/2024	Rev. -
Drawn by: CG	Field by: CSB	M&N Project No. 213282
Reviewed by: S. BRANLUND		
Submitted by: S. STRINGER MOFFATT & NICHOL		
Drawing Scale: Drawing Scale:		Plot scale: 1"=1' (D SHEET)

moffatt & nichol



INDEX: 8 OF 23

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DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING

FINAL DESIGN SUBMITTAL
ISSUED: JULY 5, 2024

DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING

9 REMOVE DERELICT TIMBER FLOATS & OTHER DERELICT MATERIAL ALONG SHORELINE. APPROX 30'x100' PLAN AREA. APPROXIMATELY HALF OF TIMBER IS CREOSOTE TREATED. TIMBER PILES TO REMAIN.

NOTE:

1. SEE NOTES ON CD-100

LEGEND



DEMOLITION AREAS

-7.7

BATHYMETRY POINTS

PHOTOGRAPH NUMBER

SHEET NUMBER VIEW
REFERENCED TO

PHOTOGRAPH
CALLOUT

[illegible]

PORT OF ILWACO MARINA STRUCTURES REPLACEMENT

DEMOLITION SITE PLAN
(2 OF 2)

Designed by: S. STRINGER	Date:	4/19/2024	Rev.
	Dwn by: CG	Ckd by: CSB	
Reviewed by: S. BRANLUND		Drawing code:	
Submitted by: S. STRINGER MOFFATT & NICHOL		Drawing Scale: Plot scale: 1" = 11' (D SHEET 1)	

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Sheet
Reference No.

CD-101

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WORKPOINT TABLE		
WORKPOINT	NORTHING	EASTING
1	374293.75	745889.35
2	374301.30	745912.08
3	374383.34	745884.80
4	374476.95	745845.02

LEGEND



WORKPOINT, SEE TABLE ABOVE

— MHHW — EXISTING MEAN HIGHER HIGH
WATER (MHHW) (ELEV= +8.07' MLLW)

— MHHW — PROPOSED MEAN HIGHER HIGH
WATER (MHHW) (ELEV= +8.07' MLLW)

PAVING AREA LIMITS

BERM CONSTRUCTION

ROCK SLOPE PROTECTION

SUGGESTED CONSTRUCTION SEQUENCE:

1. PRIOR TO ANY GROUND DISTURBING ACTIVITIES, INSTALL TEMPORARY EROSION CONTROL MEASURES PER WSDOT TEMPORARY EROSION AND SEDIMENT CONTROL MANUAL, MAY 2019. SEE SPECIFICATION 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.
2. COORDINATE ACCESS AND CONSTRUCTION PHASING WITH TENANT OPERATIONS. INTERRUPTIONS SHALL BE MINIMIZED TO THE EXTENT POSSIBLE.
3. SAWCUT AND REMOVE PAVEMENT WITHIN LIMITS SHOWN. PROTECT ALL SURFACE FEATURES TO REMAIN.
4. REMOVE EXISTING TIMBER AND STEEL PILES WATERSIDE OF THE EXISTING TIMBER BULKHEAD.
5. PERFORM SELECTIVE DEMOLITION OF EXISTING TIMBER BULKHEAD, LARGE RUBBLE ON SHORELINE SLOPE, AND OTHER ITEMS AS NOTED ON THE DRAWINGS.
6. PROVIDE TEMPORARY SHORING AS NECESSARY.
7. DRIVE NEW SHEET PILES IN FRONT (WATERSIDE) OF THE EXISTING BULKHEAD.
8. PLACE BACKFILL BEHIND THE NEW BULKHEAD.
9. INSTALL BUT DO NOT TEST OR TENSION THE ANCHORS.
10. INSTALL PARTIAL CONCRETE CAP.
11. PRELOAD AND TEST THE ANCHORS AS DESCRIBED IN SPECIFICATION 31 51 13 SOIL ANCHORS. COMPLETE THE PILE CAP.
12. IN CONJUNCTION WITH THE MARINE STRUCTURAL CONSTRUCTION, PLACE BACKFILL AND CONSTRUCT PAVEMENT.
13. CLEAR AND GRUB EXISTING GROUND WITHIN FOOTPRINT OF PROPOSED BERM.
14. INSTALL SLOPE PROTECTION.
15. CONSTRUCT BERM AND SEED ALL DISTURBED SURFACES.

NOTE: DREDGING OF THE MARINA (NIC) ADJACENT TO THE BULKHEAD MUST NOT OCCUR UNTIL AFTER COMPLETION OF THE BULKHEAD INSTALLATION.

NOTE:

1. THE CONTRACTOR MAY PROPOSE ALTERNATIVE CONSTRUCTION SEQUENCE, THE CRITERIA FOR ACCEPTANCE MUST INCLUDE:

MAXIMUM ALLOWABLE SHEET PILE WALL STRESS, $F_a=25\text{ksi}$. SEE SPECIFICATION
31 62 00 DRIVEN PILES.

THE CONTRACTOR MUST SUBMIT CALCULATIONS, STAMPED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF WASHINGTON DEMONSTRATING COMPLIANCE WITH THE ABOVE CRITERIA FOR ENGINEERS APPROVAL.



20' 0' 20' 40'

SCALE: 1"=20'

FINAL DESIGN SUBMITTAL
ISSUED: JULY 5, 2024

[illegible]

PORT OF ILWACO MARINA STRUCTURES REPLACEMENT

OVERALL SITE PLAN

Designed by: S. STRINGER	Date: 4/19/2024		Rev. -
	Dwn by: CG	Cld by: CSB M&N Project No. 213282	
Reviewed by: S. BRANLUND			Drawing code:
Submitted by: S. STRINGER MOFFATT & NICHOL			Drawing Scale: Plot scale: 1" = 11' (D SHEET)

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STREET SUITE 610
SEATTLE, WA 98101
(206) 622-0222

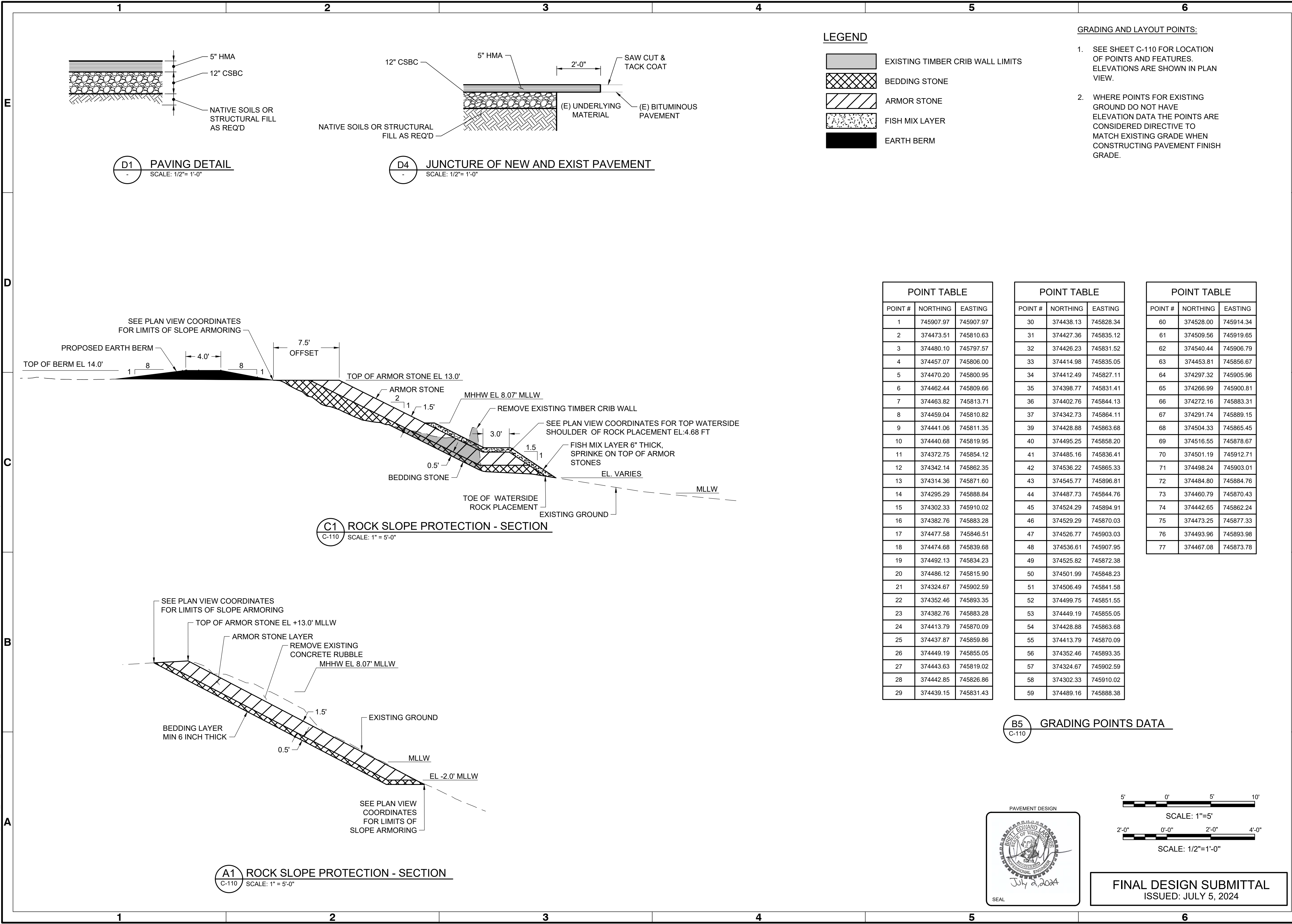


Sheet
Reference No.

C-100

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PORT OF ILWACO

PORT OF ILWACO MARINA STRUCTURES REPLACEMENT

GRADING & PAVING DETAILS

600 UNIVERSITY STREET SUITE 610 SEATTLE, WA 98101 (206) 622-0222

moffatt & nichol

JAMES A. MOFFATT, P.E.
REGISTERED PROFESSIONAL ENGINEER
JULY 5, 2024

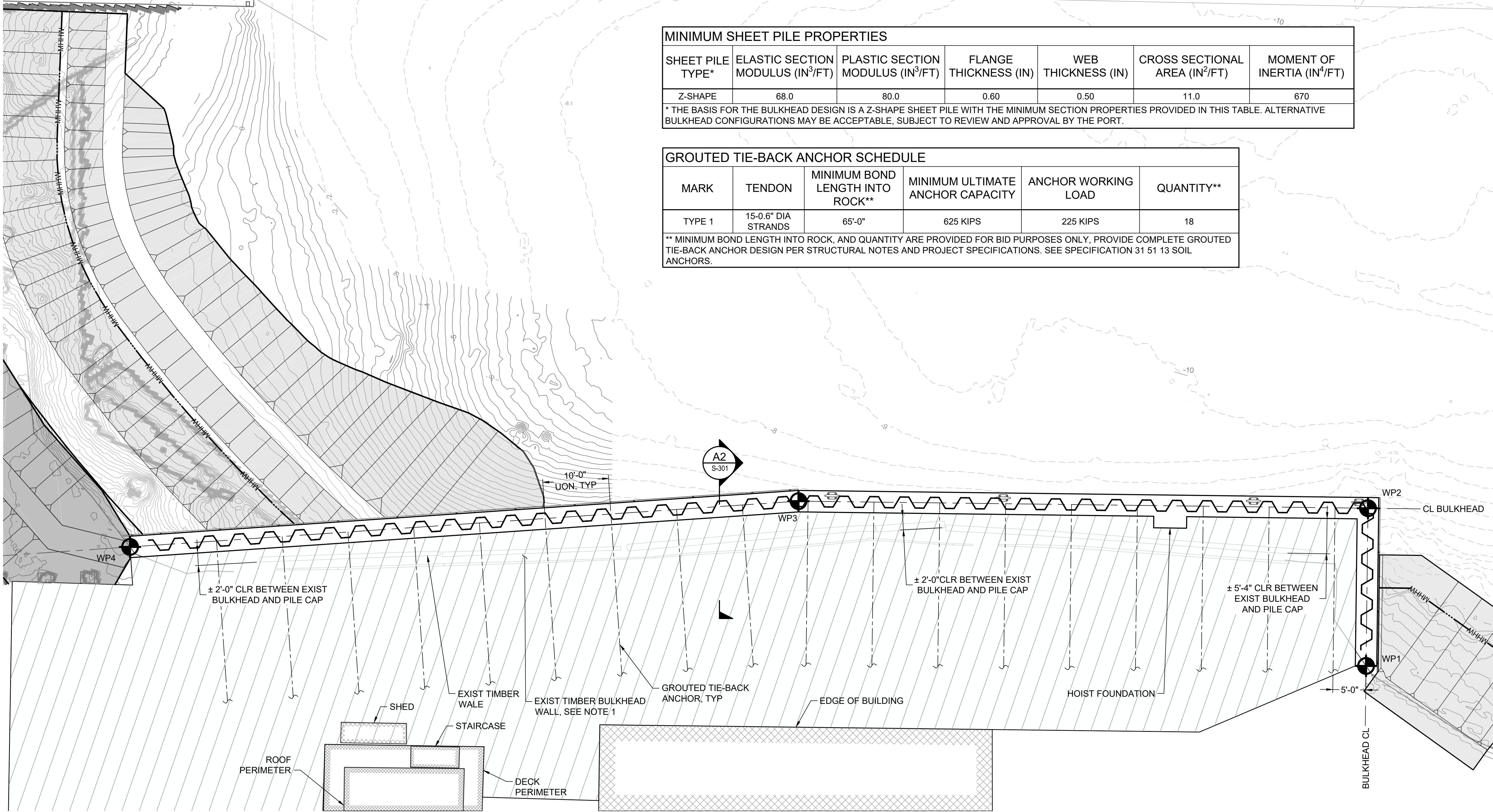
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



MINIMUM SHEET PILE PROPERTIES						
SHEET PILE TYPE*	ELASTIC SECTION MODULUS (IN ³ /FT)	PLASTIC SECTION MODULUS (IN ³ /FT)	FLANGE THICKNESS (IN)	WEB THICKNESS (IN)	CROSS SECTIONAL AREA (IN ² /FT)	MOMENT OF INERTIA (IN ⁴ /FT)
Z-SHAPE	68.0	80.0	0.60	0.50	11.0	670

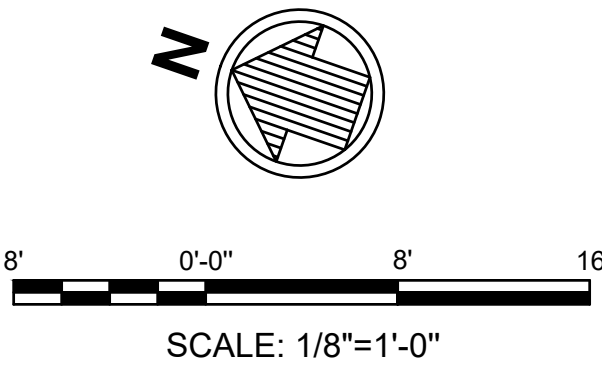
* THE BASIS FOR THE BULKHEAD DESIGN IS A Z-SHAPE SHEET PILE WITH THE MINIMUM SECTION PROPERTIES PROVIDED IN THIS TABLE. ALTERNATIVE BULKHEAD CONFIGURATIONS MAY BE ACCEPTABLE, SUBJECT TO REVIEW AND APPROVAL BY THE PORT.

GROUTED TIE-BACK ANCHOR SCHEDULE					
MARK	TENDON	MINIMUM BOND LENGTH INTO ROCK**	MINIMUM ULTIMATE ANCHOR CAPACITY	ANCHOR WORKING LOAD	QUANTITY**
TYPE 1	15-0.6" DIA STRANDS	65'-0"	625 KIPS	225 KIPS	18
** MINIMUM BOND LENGTH INTO ROCK, AND QUANTITY ARE PROVIDED FOR BID PURPOSES ONLY, PROVIDE COMPLETE GROUTED TIE-BACK ANCHOR DESIGN PER STRUCTURAL NOTES AND PROJECT SPECIFICATIONS. SEE SPECIFICATION 31 51 13 SOIL ANCHORS.					



- | NOTES: | |
|--------|--|
| 1. | EXISTING TIMBER BULKHEAD WALL LOCATION IS APPROXIMATE. THE EXISTING STEEL CABLE TIE-BACK LOCATIONS VARY. THE EXISTING BULKHEAD ANCHOR SYSTEM IS UNKNOWN. PRIOR TO START OF CONSTRUCTION ACTIVITIES, LOCATIONS/ELEVATIONS OF EXISTING BULKHEAD COMPONENTS MUST BE FIELD VERIFIED. |
| 2. | BUILDING FOUNDATIONS ARE UNKNOWN, CONTRACTOR TO FIELD VERIFY. |
| 3. | PROVIDE FINAL GROUTED TIE-BACK ANCHOR AS-BUILT LOCATIONS, LENGTHS, AND GROUT VOLUMES TO THE PORT AND INDICATE ON THE RECORD DRAWINGS. |
| 4. | PROVIDE TIE-BACK INSTALLATION PROCEDURES TO THE PORT FOR APPROVAL PRIOR TO INSTALLATION. |
| 5. | COAT BOTH SIDES OF ALL SHEET PILE ELEMENTS PER THE SPECIFICATIONS. EXTEND THE COATING TO A FINAL ELEVATION OF EL -20' MLLW OR DEEPER. SEE SPECIFICATION 09 96 00 HIGH PERFORMANCE COATINGS. |
| 6. | THE SHEET PILE SECTION, INTERLOCKS, AND SHEET LAYOUT SHOWN IN THESE DRAWINGS IS SCHEMATIC. CONTRACTOR TO SUBMIT FINAL SHEET LAYOUT WITH THE FURNISHED SHEET SECTION AND INTERLOCKS FOR REVIEW AND APPROVAL BY THE PORT. |

LEGEND	
	WORKPOINT, SEE SHEET C-100
	PAVING AREA LIMITS
	BERM CONSTRUCTION
	ROCK SLOPE PROTECTION



FINAL DESIGN SUBMITTAL
ISSUED: JULY 5, 2024

[illegible]

PORT OF ILWACO MARINA STRUCTURES REPLACEMENT	BULKHEAD LAYOUT
--	-----------------

Submitted by: S. STRINGER MOFFATT & NICHOL	Drawing Scale: Plot scale: 1" = 11' (D SHEET)
Drawing code: S. BRANLUND	
Reviewed by: CG	Dwn by: CG
Desiged by: S. STRINGER	Ckd by: CSB M&N Project No. 213282
Date: 4/19/2024	Rev.



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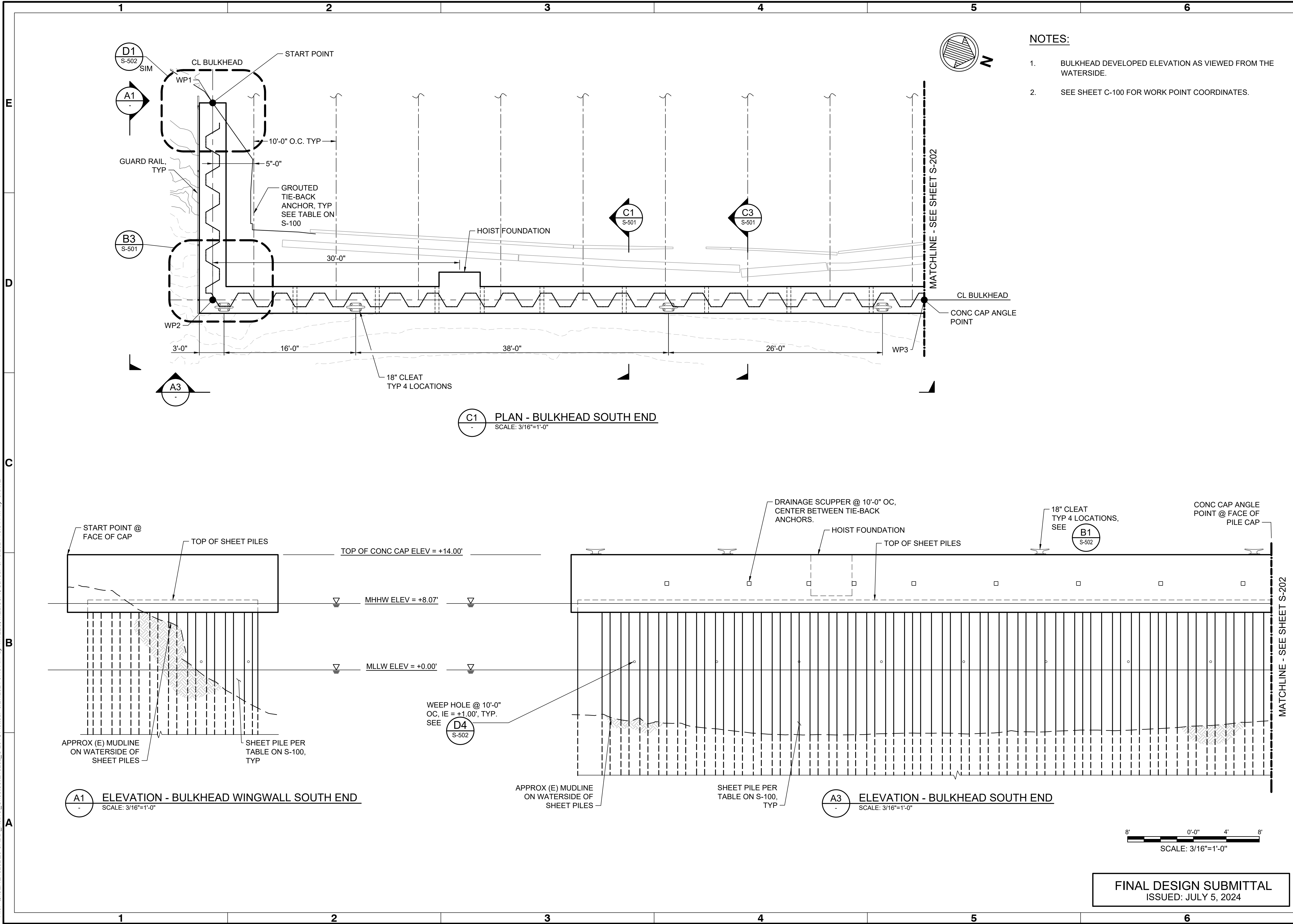
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STREET, SUITE 610
SEATTLE, WA 98101
(206) 622-0222

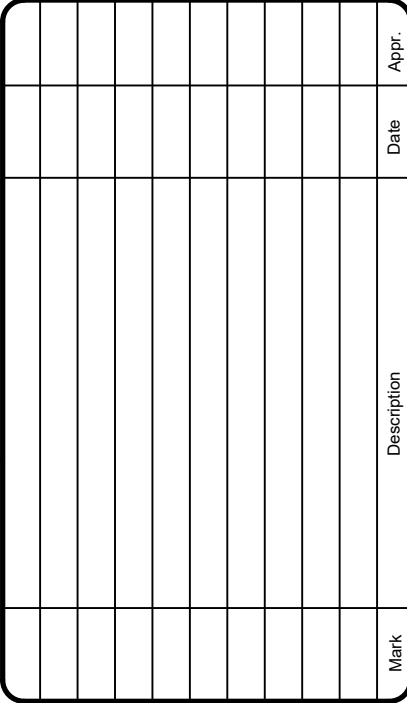
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July 5, 2024

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<p>PORT OF ILWACO MARINA STRUCTURES REPLACEMENT</p>	<p>BULKHEAD PLAN & ELEVATION (2 OF 2)</p>
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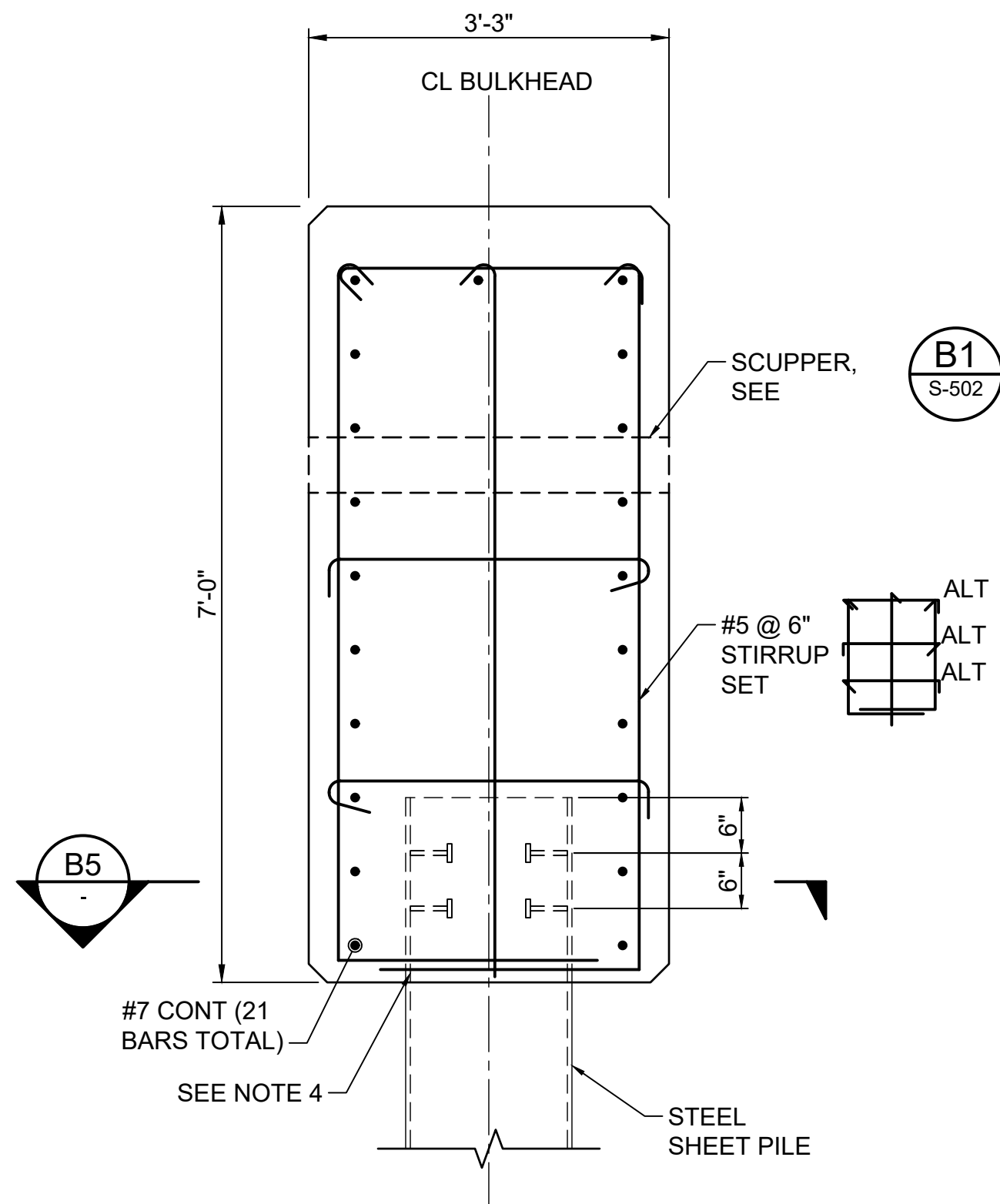
Submitted by: S. STRINGER MOFFATT & NICHOL	Drawing Scale: Plot scale: 1" = 11' (D SHEET)
Submitted by: S. BRANLUND	Drawing code:
Reviewed by: CG	Dwn by: CG
Designed by: S. STRINGER	Ckd by: CSB M&N Project No. 213282
Date: 4/19/2024	Rev.



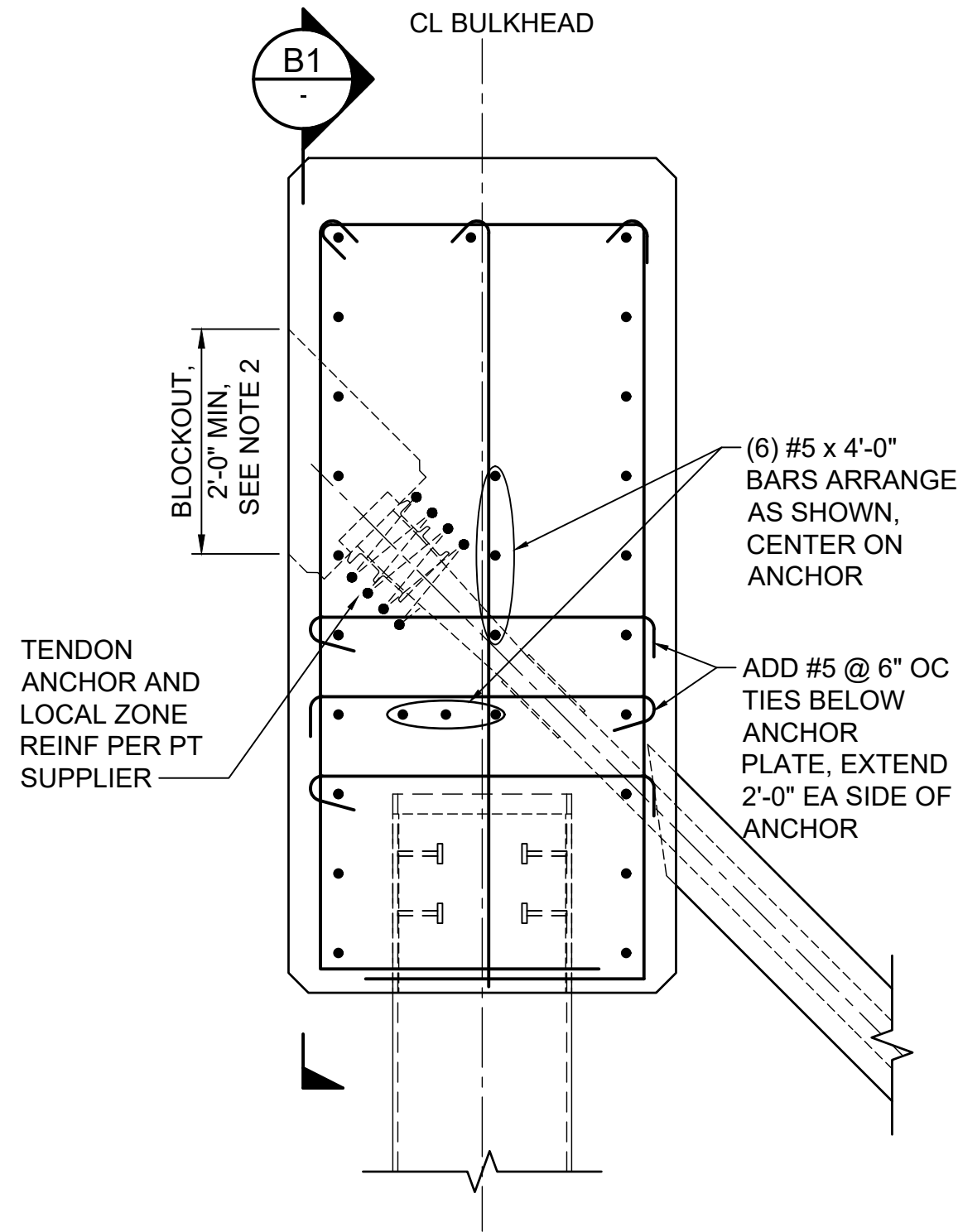
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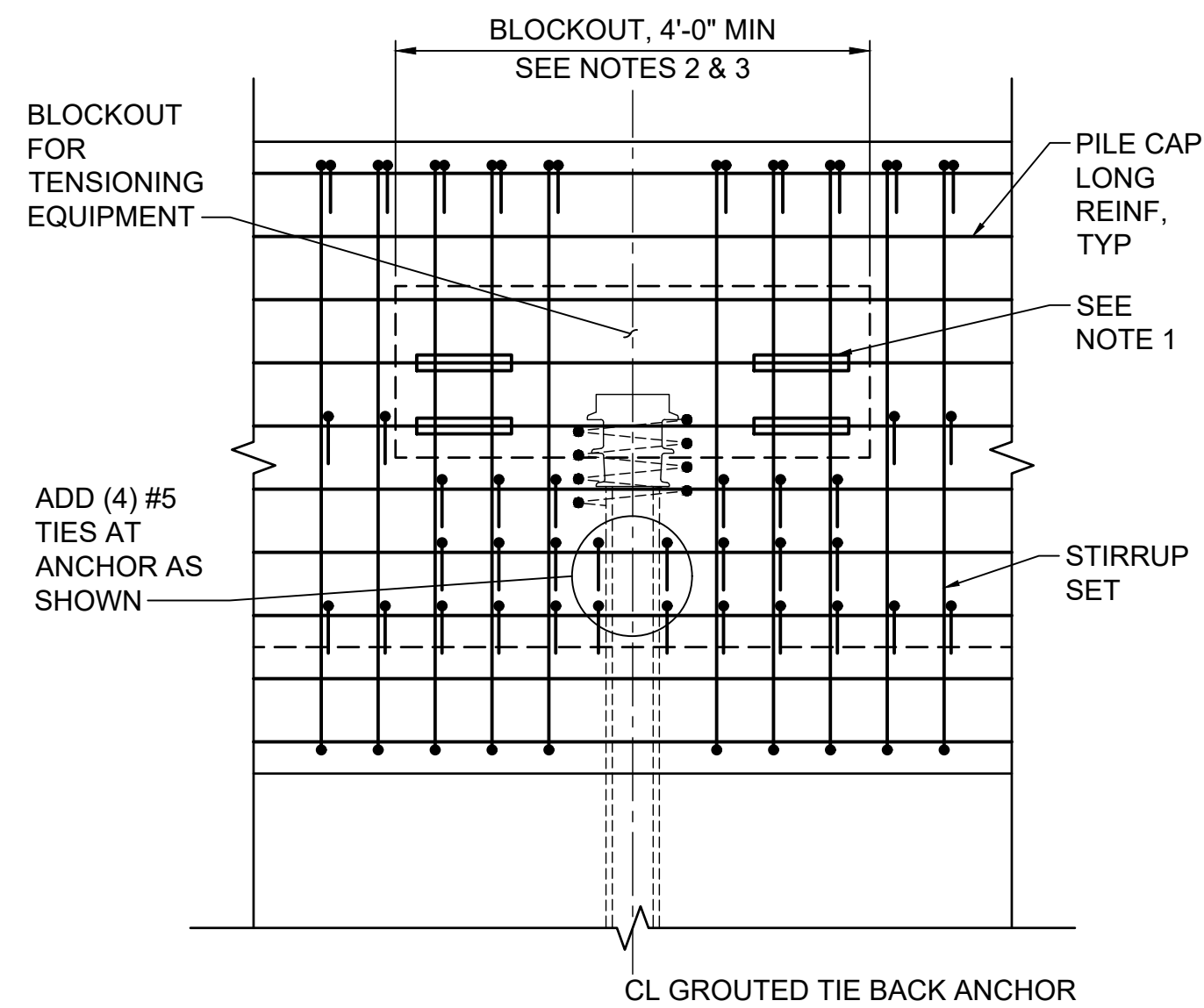
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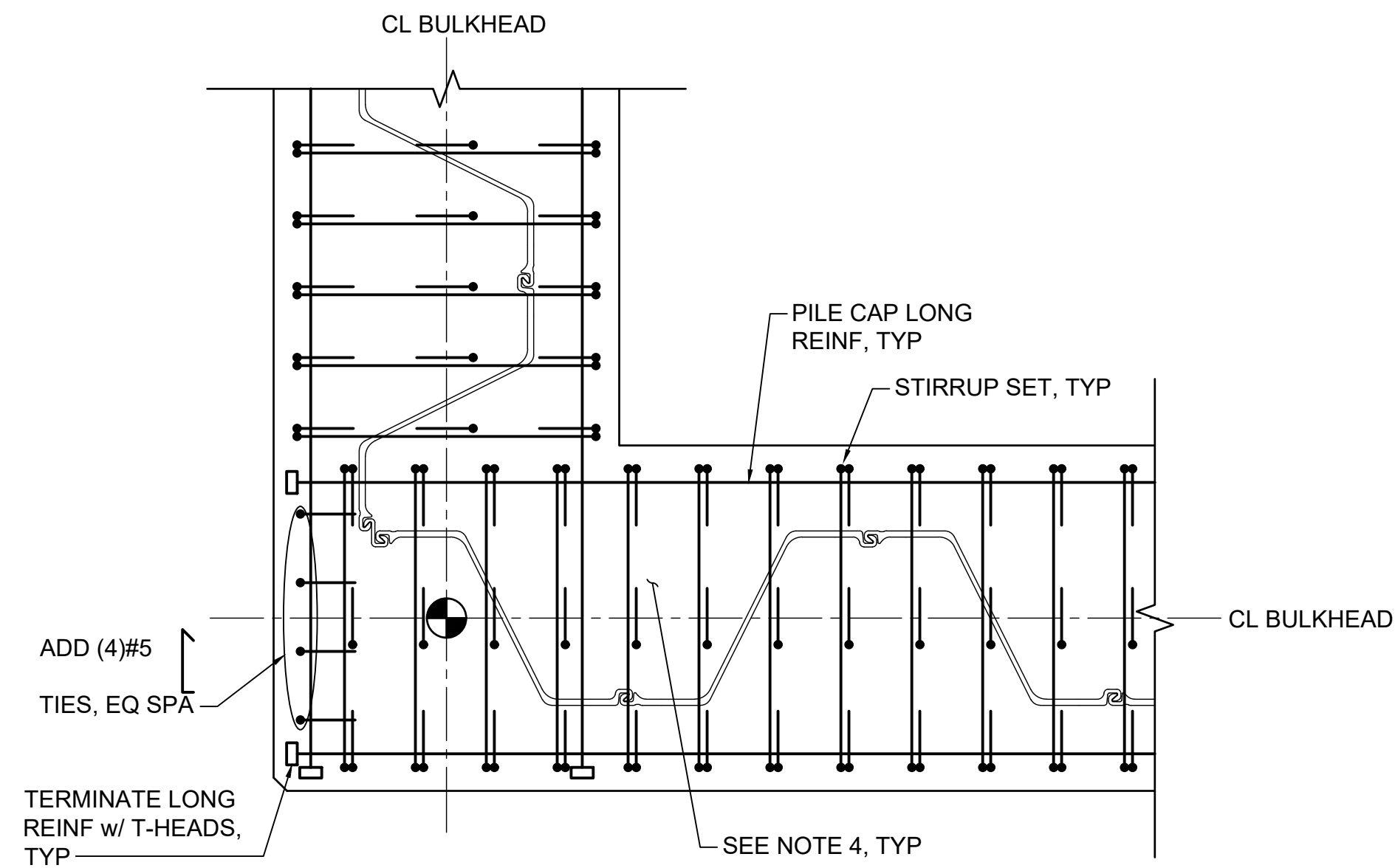
C1 SECTION - TYPICAL PILE CAP
S-201 SCALE: 3/4" = 1'-0"
S-202



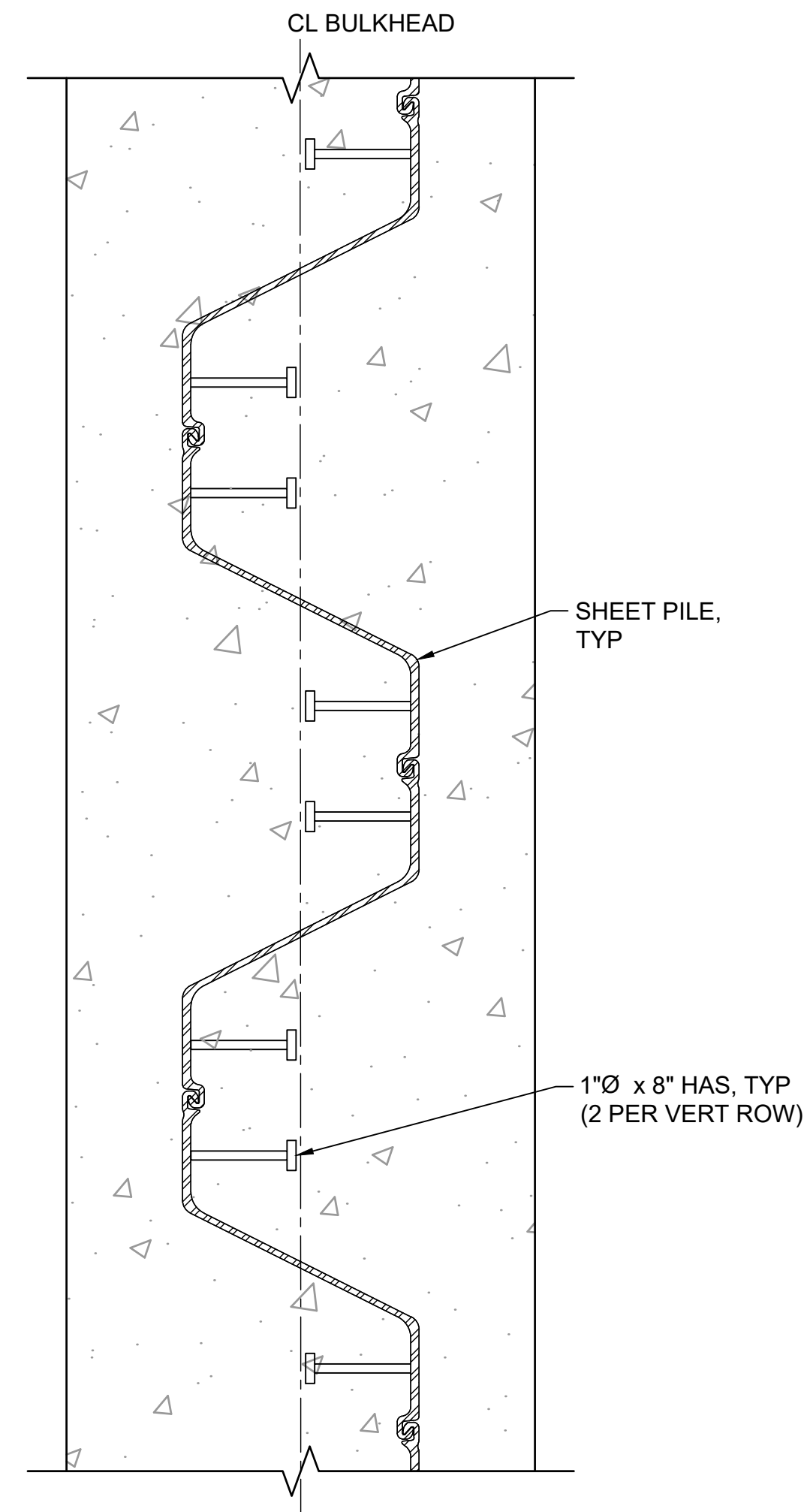
C3 SECTION - PILE CAP AT ANCHOR
S-201 SCALE: 3/4" = 1'-0"
S-202



B1 SECTION - ANCHOR BLOCKOUT
SCALE: 3/4" = 1'-0"

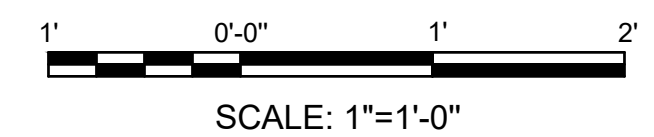
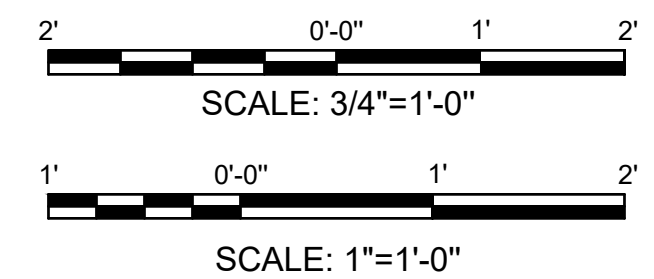


B3 DETAIL - BULKHEAD CAP CORNER
S-201 SCALE: 3/4" = 1'-0"

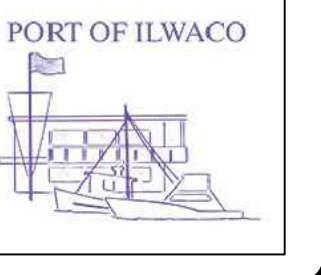


B5 DETAIL - HAS AT SHEET PILE
- SCALE: 1" = 1'-0"

- ## NOTES:
1. USE MECHANICAL COUPLERS TO CONNECT MATCHING REINFORCING BARS.
 2. SELECT BLOCKOUT SIZE TO ACCOMMODATE TENSIONING EQUIPMENT, BLOCKOUT MINIMUM DIMENSIONS SHOWN.
 3. STIRRUP SPACING MAY BE ADJUSTED AT ANCHOR LOCATIONS TO ALLOW FOR TENSIONING EQUIPMENT.
 4. DRILL HOLES IN SHEET PILE FOR PLACEMENT OF BULKHEAD CONCRETE CAP STIRRUPS AND LONG REINF.



FINAL DESIGN SUBMITTAL
ISSUED: JULY 5, 2024

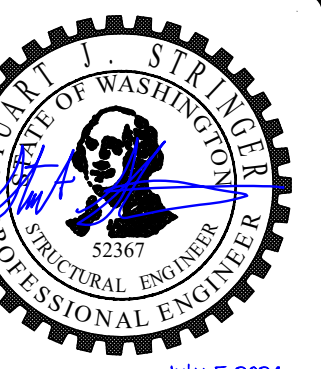
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**MARINA STRUCTURES
REPLACEMENT**

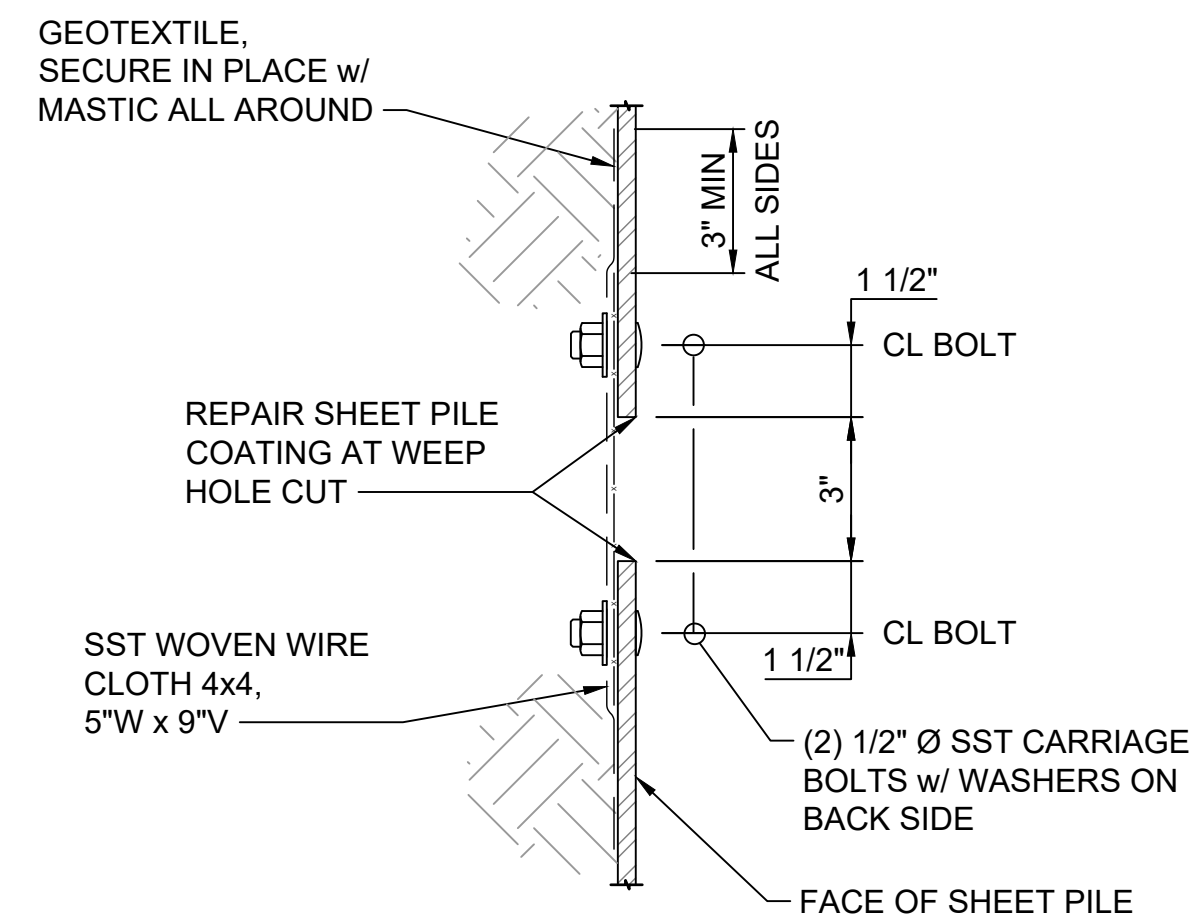
**BULKHEAD DETAIL
(1 OF 2)**

Designed by: S. STRINGER	Date: 4/19/2024		M&N Project No: 213282	Rev. -
	Drawn by: CG	Ckd by: CSB		
Reviewed by: S. BRANLUND			Drawing code:	
Submitted by: S. STRINGER MOFFATT & NICHOL			Drawing Scale:	Plot scale: 1:1 (D SHEET)

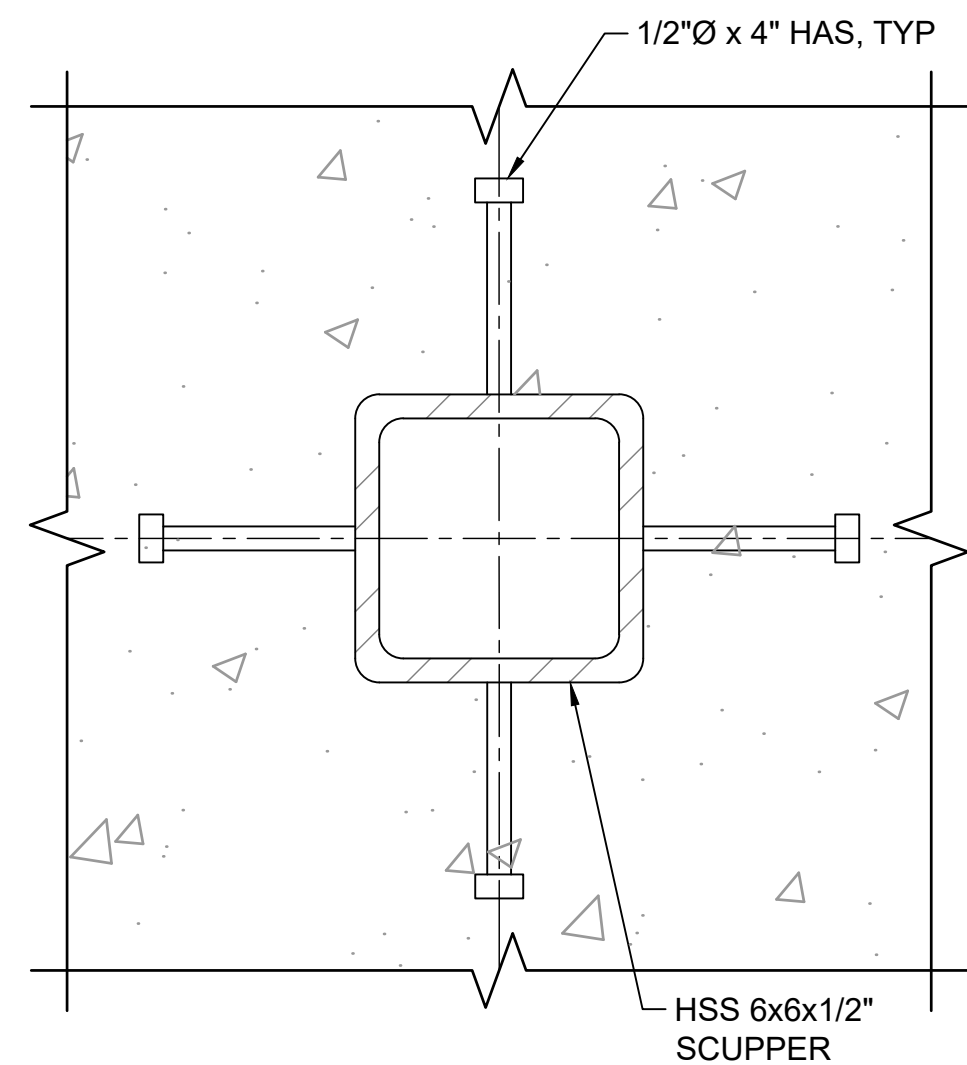
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Sheet
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S-501

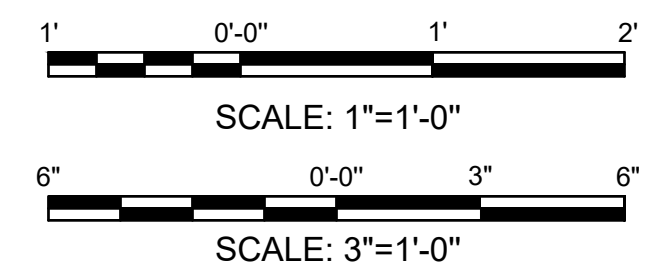


D4 DETAIL - WEEP HOLE
S-201 SCALE: 1" = 1'-0"

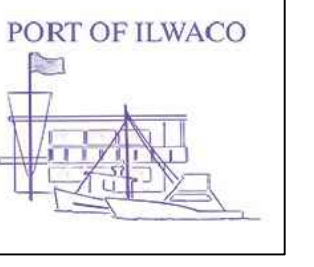


B4 SECTION - SCUPPER
- SCALE: 3" = 1'-0"

1. PREFABRICATED WEEP HOLE FILTERS MAY BE SUBSTITUTED FOR THE WEEP HOLE DETAIL SHOWN SUBJECT TO REVIEW AND APPROVAL BY THE PORT.



FINAL DESIGN SUBMITTAL
ISSUED: JULY 5, 2024

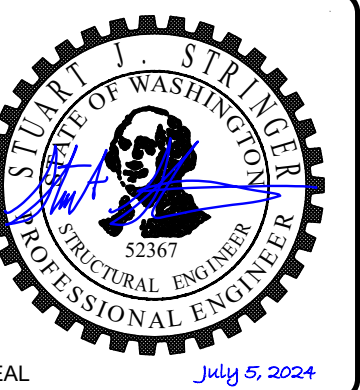
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MARINA STRUCTURES
REPLACEMENT

BULKHEAD DETAILS
(2 OF 2)

Designed by: S. STRINGER	Date: 4/19/2024	Rev. -
Drawn by: CG	Check by: CSB	M&N Project No. 213282
Reviewed by: S. BRANLUND		Drawing code:
Submitted by: S. STRINGER		Drawing Scale:
MOFFATT & NICHOL		Plot scale: 1" = 1' (D SHEET)

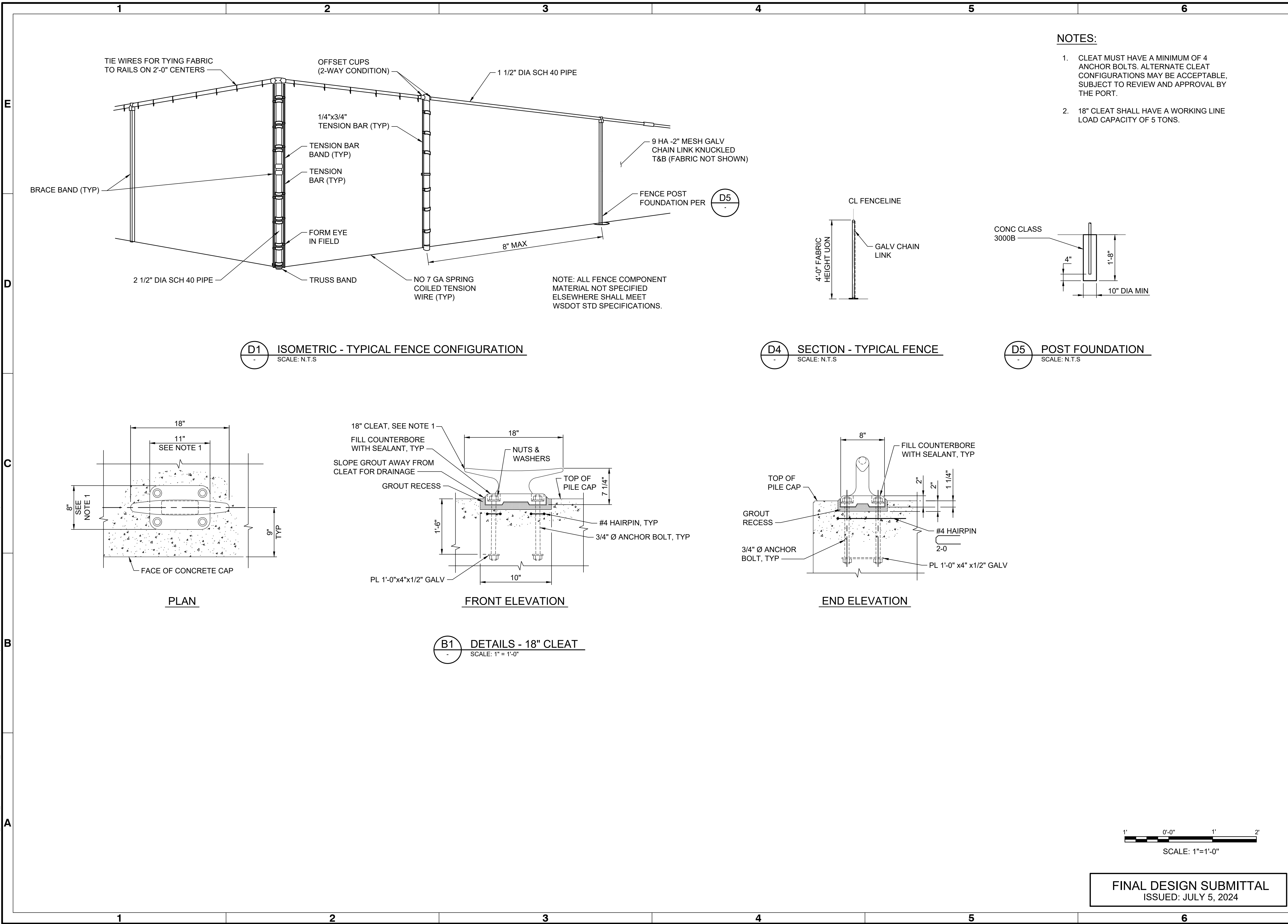
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Reference No.
S-502

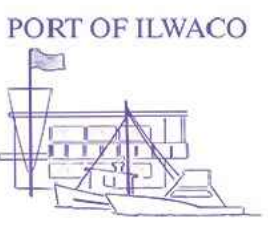
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NOTES:

- CLEAT MUST HAVE A MINIMUM OF 4 ANCHOR BOLTS. ALTERNATE CLEAT CONFIGURATIONS MAY BE ACCEPTABLE, SUBJECT TO REVIEW AND APPROVAL BY THE PORT.
- 18" CLEAT SHALL HAVE A WORKING LINE LOAD CAPACITY OF 5 TONS.



Age
Date
Description
Mark

PORT OF ILWACO
MARINA STRUCTURES
REPLACEMENT

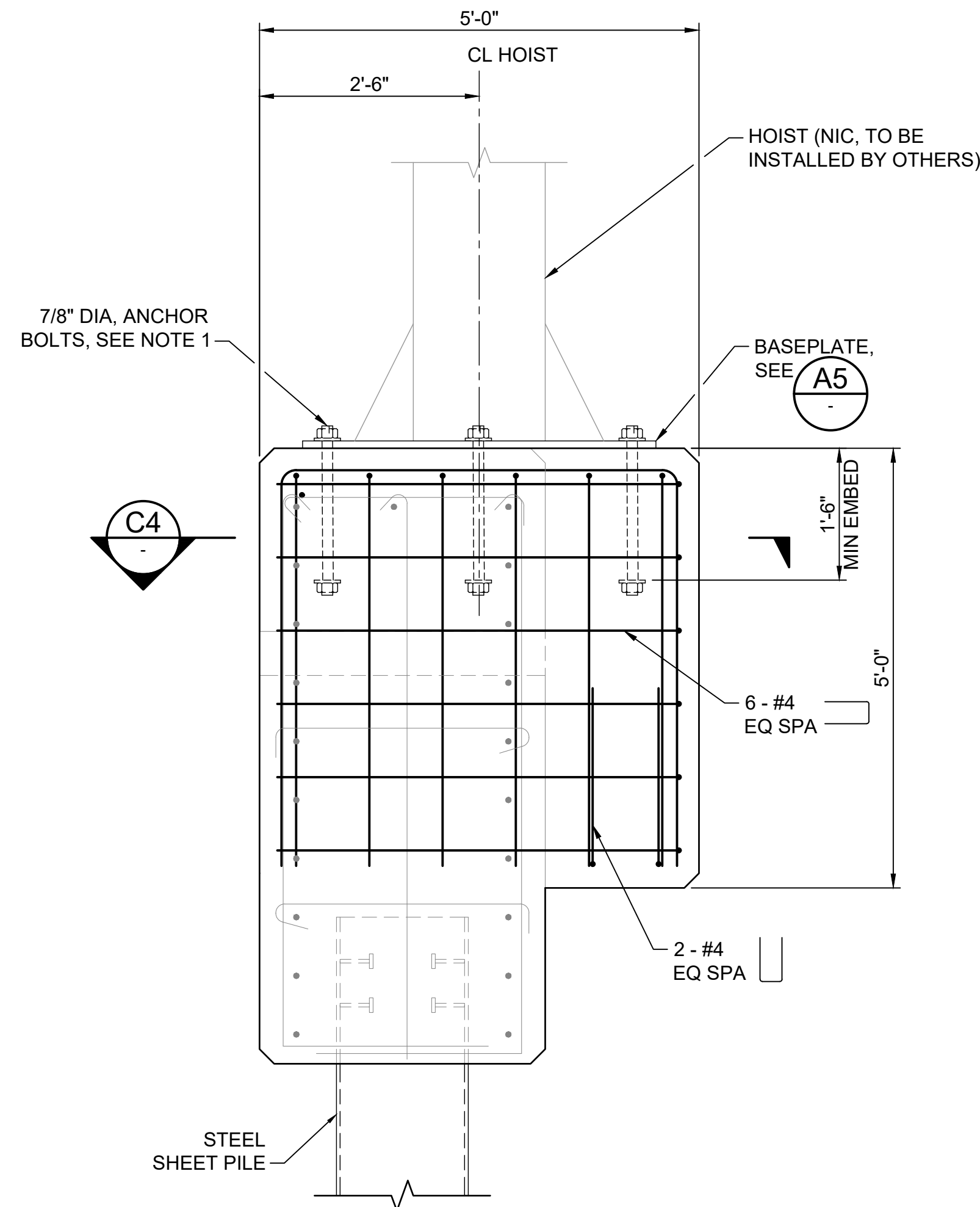
MISCELLANEOUS
DETAILS

Rev.	Date	By	Check	Drawn	Scale
1	4/19/2024	S. STRINGER	CG	S. BRANLUND	1" = 1'-0" (D SHEET)
Date:		MAN Project No.:		Drawing code:	
4/19/2024		213282		CSB	
Designed by:		Drawn by:		Reviewed by:	
S. STRINGER		CG		S. BRANLUND	
Submitted by:		Submitted by:		Submitted by:	
MOFFATT & NICHOL		MOFFATT & NICHOL		MOFFATT & NICHOL	

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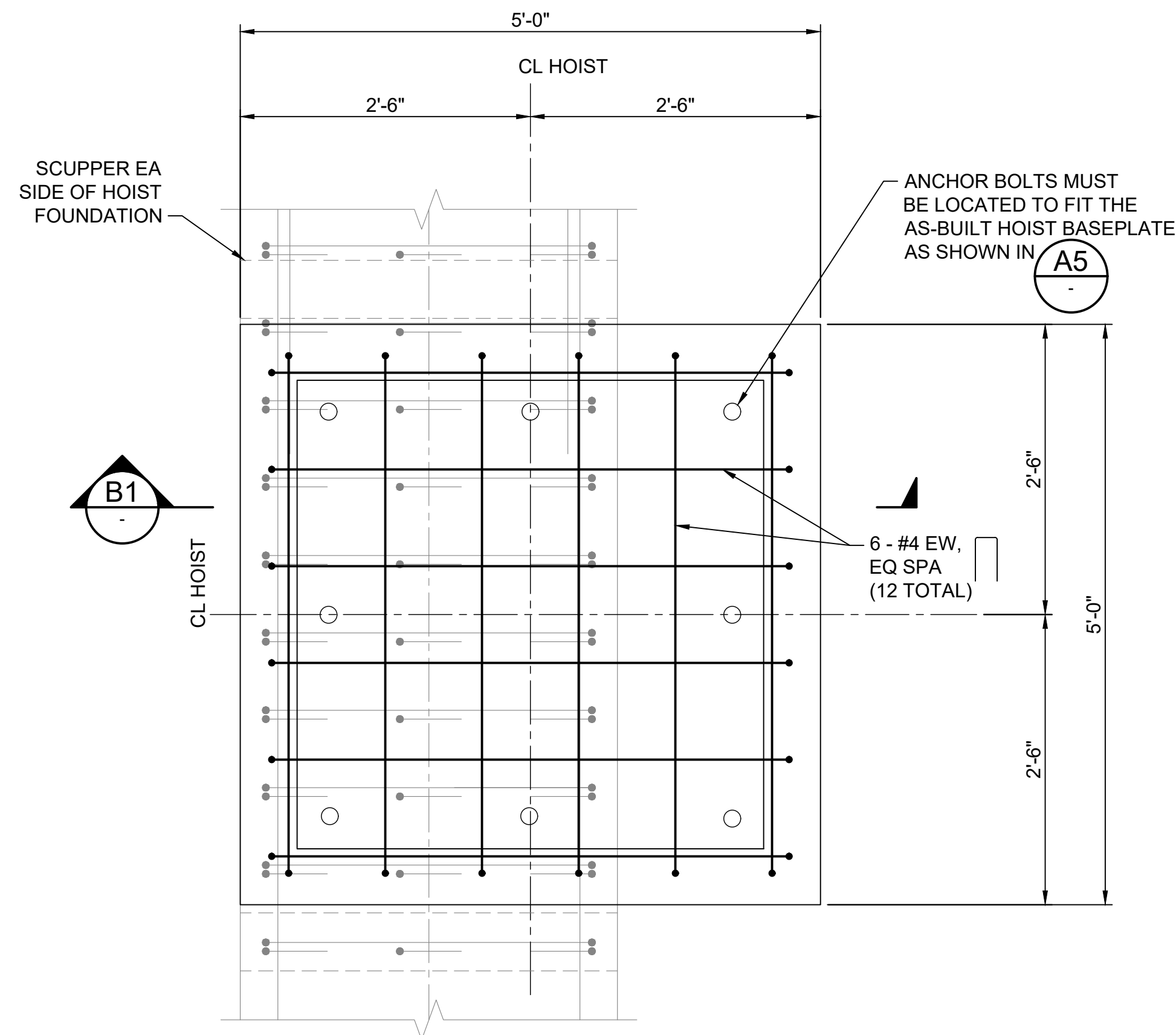


B1 HOIST ANCHORAGE - SECTION
S-512 SCALE: 3/4" = 1'-0"

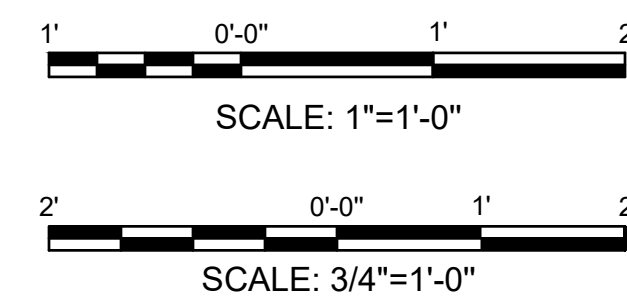
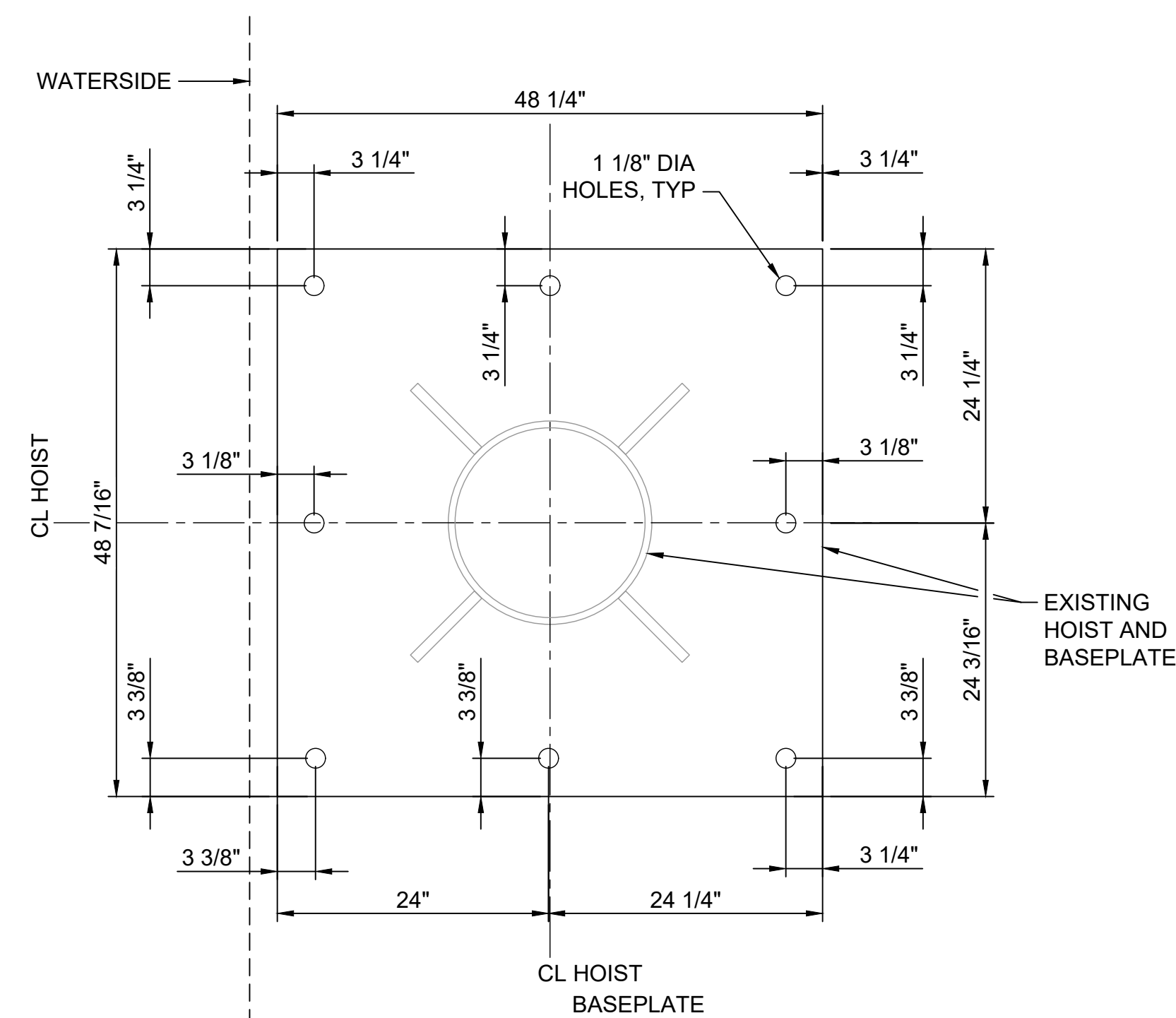
NOTES

1. REINFORCEMENT SHOWN ON  AND  IS IN ADDITION TO TYPICAL BULKHEAD CAP REINFORCEMENT SHOWN ON S-501.
2. HOIST PROVIDED BY SAFE COAST SEAFOODS, TO BE INSTALLED BY OTHERS (NIC). THE HOIST ANCHORS AND LOADING BASED ON INFORMATION PROVIDED BY SAFE COAST SEAFOODS.

HOIST CAPACITY = 5000 lbs
OVERTURNING MOMENT = 93 kip-ft
3. HOIST BASE PLATE HOLE SPACING SHOWN PROVIDED BY SAFE COAST SEAFOODS. COORDINATE WITH PORT AND SAFE COAST SEAFOODS FOR VERIFICATION OF HOIST ANCHOR BOLT LOCATIONS.

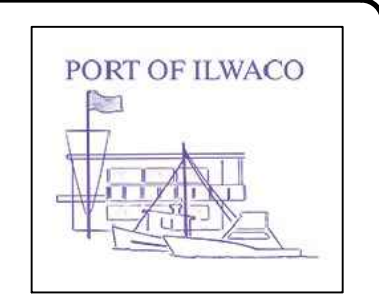


C4 SECTION
S-512 SCALE: 1" = 1'-0"



A5 BASEPLATE - DETAIL
S-512 SCALE: 1" = 1'-0"

FINAL DESIGN SUBMITTAL
ISSUED: JULY 5, 2024

[illegible]

PORT OF ILWACO MARINA STRUCTURES REPLACEMENT

HOIST DETAILS

C	Designed by:		Date:		Rev.
	S. STRINGER		4/19/2024		
	Dwn by:	Old by:	M&N Project No.		
	CG	CSB	213282		
	Reviewed by:		Drawing code:		
	S BRANLUND				
	Submitted by:		Drawing Scale:		
	S. STRINGER		Plot scale: 1" = 10' (SHEET)		
	MOFFATT & NICHOL				

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Reference No.

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