

REFERENCE DOCUMENT 5

Hyundai Merchant Marine Terminal

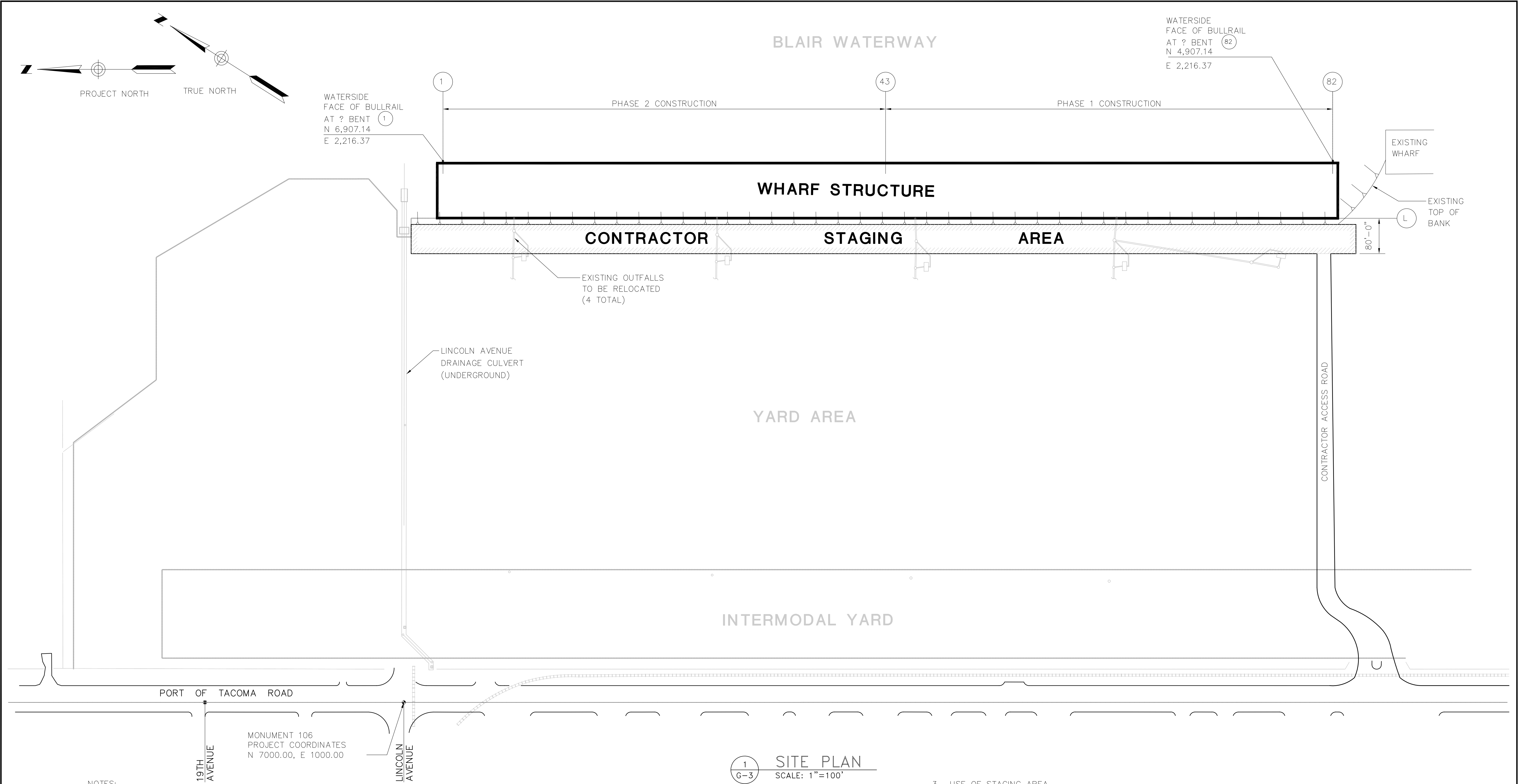
(Contract No. 978038,
Record Drawings

Dated January 4, 1999, 58 Sheets)



HYUNDAI MERCHANT MARINE TERMINAL

CONTRACT NO. 978038



NOTES:

1. PROJECT DATUM

- A. PROJECT BASELINE (NORTH-SOUTH LINE) ESTABLISHED AS BETWEEN MONUMENTS 106 & 109 ON PORT OF TACOMA ROAD.
- B. MONUMENT 109 PROJECT COORDINATES:
N 3696.82, E 1000.00 (NOT SHOWN)
- C. VERTICAL DATUM: MONUMENT 106 EL. +17.16

2. REQUIRED SEQUENCE OF CONSTRUCTION

- A. PHASE 1 CONSTRUCTION WILL START AT THE SOUTH END (BENT 82) AND PROCEED TO THE NORTH. PILE DRIVING FOR PHASE 1 CONSTRUCTION TO BE COMPLETE BY 15 MARCH 1998 AND ALL PHASE 1 CONSTRUCTION, INCLUDING PAVING AND UTILITIES, TO BE COMPLETED FOR PORT'S OCCUPANCY BY 15 OCTOBER 1998.
- B. PHASE 2 CONSTRUCTION, AT CONTRACTOR'S OPTION, MAY START AT ANY TIME SUBJECT TO AVAILABILITY OF PORT FURNISHED 24" CONCRETE PILES. SEE SPECIFICATIONS FOR PILE DELIVERY SCHEDULE. PHASE 2 CONSTRUCTION AND THE ENTIRE PROJECT TO BE COMPLETED BY 30 NOVEMBER 1998.

3. USE OF STAGING AREA

- A. STAGING AREA AS SHOWN SHALL BE PROGRESSIVELY VACATED FROM SOUTH TO NORTH FOLLOWING COMPLETION OF WHARF CONSTRUCTION.
- B. THERE WILL BE ONGOING WORK BY OTHERS IN THE YARD AREA, INCLUDING THE DESIGNATED STAGING AREA FOR THIS CONTRACTOR. PORT WILL COORDINATE THE ALLOCATION/VACATION OF WORK AREAS FOR THE VARIOUS CONTRACTORS WORKING ON THE SITE & MAY REQUIRE THIS CONTRACTOR TO TEMPORARILY VACATE PORTIONS OF THE STAGING AREA TO ALLOW WORK BY OTHERS IN SUCH AREAS. CONTRACTOR SHALL BE AWARE OF SUCH WORK BY OTHERS AND FULLY COOPERATE WITH THE PORT TO FACILITATE WORK BY OTHERS.

AS-BUILT

AUTOCAD FILE NO.
5012G3

G-3

DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 3 OF 58



PORT OF TACOMA
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APPROVED

DATE
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CHIEF ENGINEER

MMD
DRAWN BY DATE
DESIGNED BY DATE

BCM
CHECKED BY DATE
JAS
PROJ ENGR DATE

AS-BUILT	RDD	JAS	1/4/93
REVISION	BY	APP.	DATE

HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
SITE PLAN

STRUCTURAL NOTES

CODES AND STANDARDS

1. STRUCTURAL

- A.

ALL METHODS AND MATERIALS SHALL CONFORM TO THE UNIFORM BUILDING CODE, 1994 EDITION, AS AMENDED AND ADOPTED BY THE CITY OF TACOMA.
- B.

SEISMIC DESIGN OF THE WHARF STRUCTURE SHALL CONFORM TO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" AS ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, INC. (AASHTO), 16TH EDITION, 1996.
- C.

REINFORCED CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" (ACI 301) AND "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318), LATEST EDITIONS.
- D.

STRUCTURAL AND MISCELLANEOUS STEEL FABRICATION AND ERECTION THEREOF SHALL CONFORM TO THE "AISC MANUAL OF STEEL CONSTRUCTION," LATEST EDITION.
- E.

WELDING OF STRUCTURAL AND MISCELLANEOUS STEEL SHALL CONFORM TO THE LATEST EDITION OF "STRUCTURAL WELDING CODE – STEEL" (AWS D1.1).

2. CIVIL

- A.

ALL METHODS AND MATERIALS SHALL CONFORM TO THE WASHINGTON STATE 1996 STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION AS PREPARED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) AND THE AMERICAN PUBLIC WORKS ASSOCIATION (APWA) WASHINGTON STATE CHAPTER.
- B.

ALL PIPING ETC. SHALL CONFORM TO AMERICAN WATER WORKS ASSOCIATION (AWWA) GUIDELINES.
- C.

ALL TRACKWORK SHALL CONFORM TO THE AMERICAN RAILROAD ENGINEERING ASSOCIATION (AREA), MANUAL FOR RAILWAY ENGINEERING, 1996 EDITION.

GENERAL

1.

THESE NOTES CONTAIN GENERAL INFORMATION AND ARE NOT COMPLETE FOR CONSTRUCTION PURPOSES. CONTRACTOR SHALL VERIFY INFORMATION GIVEN HERE WITH SPECIFICATIONS AND OTHER DOCUMENTS AND BRING ANY CONFLICTS TO THE ATTENTION OF THE PORT BEFORE BEGINNING AFFECTED WORK. THE PORT'S ENGINEER WILL RESOLVE ANY SUCH CONFLICT.
2.

ALL DIMENSIONS AND DETAILS WILL BE VERIFIED BY THE CONTRACTOR PRIOR TO FABRICATION AND CONSTRUCTION.
3.

ALL SHOP DRAWINGS FOR PRECAST CONCRETE ELEMENTS, REINFORCING STEEL, MISCELLANEOUS STEEL, AND FENDER SYSTEM SHALL BE SUBMITTED TO AND REVIEWED BY THE PORT PRIOR TO FABRICATION.
4.

ALL ELEVATIONS REFER TO MEAN LOWER LOW WATER (MLLW) EL 0.00 FT AS DEFINED BY THE U.S. ARMY CORPS OF ENGINEERS.
5.

BUILDING CLASSIFICATION: 1FR

PILING

1.

PILES SHALL BE DRIVEN TO THE MINIMUM TIP ELEVATIONS INDICATED.
2.

STEEL PILING SHALL CONFORM TO ASTM A 252, GRADE 3.

REINFORCED CONCRETE

1.

REINFORCING STEEL

A.

PRESTRESSING STEEL SHALL BE UNCOATED LOW–RELAXATION SEVEN–WIRE STRAND CONFORMING TO ASTM A 416, GRADE 270.

B.

ALL REINFORCING STEEL SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615, GRADE 60.

C.

ALL REINFORCING STEEL OVER NO. 6 IN SIZE IN PRECAST CONCRETE DECK PANELS SHALL BE OF WELDABLE QUALITY AND SHALL CONFORM TO ASTM A 615, OR A 706 GRADE 60. ADDITIONALLY, THE CARBON EQUIVALENT SHALL NOT EXCEED 0.55%.

D.

WIRE FOR SPIRAL REINFORCEMENT SHALL CONFORM TO ASTM A 82.

- E.

SPLICING OF LONGITUDINAL REINFORCEMENT OVER 40 FT IN LENGTH, EXCEPT AS SPECIFICALLY NOTED ON THE DRAWINGS, SHALL BE PERMITTED. SPLICES SHALL BE CLASS "B" (ACI 318) STAGGERED WITH NO MORE THAN 50% OF THE BARS BEING SPLICED AT ANY ONE LOCATION. SPLICE LENGTH SHALL BE INCREASED FOR TOP BAR CONDITIONS AS PER ACI 318. MINIMUM LENGTH OF LAP SPLICE SHALL BE 50 TIMES THE BAR DIAMETER.
- F.

PROVIDE CORNER BARS AT ALL CORNERS. CORNER BARS SHALL MATCH THE NUMBER/SPACING AND DIAMETER OF ALL HORIZONTAL REINFORCEMENT AT THE CORNER. TERMINATED STRAIGHT BARS SHALL EXTEND FULL AVAILABLE LENGTH INTO ADJOINING MEMBERS. SPLICE LENGTH SHALL BE INCREASED FOR TOP BAR CONDITIONS AS PER ACI 318. SPLICE CORNER BAR TO TERMINATED STRAIGHT BAR WITH A MINIMUM SPLICE LENGTH OF 50 BAR DIAMETERS.

2.

PRECAST CONCRETE

MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS

- A.

PRECAST PRESTRESSED CONCRETE PILES

8000 PSI
- B.

PRECAST CONCRETE PANELS

6000 PSI

3.

CAST–IN–PLACE CONCRETE

MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS

- A.

CAST–IN–PLACE CONCRETE PILE CAPS

4000 PSI
- B.

BULLRAILS

4000 PSI
- C.

DECK PANEL SHEAR KEY CONCRETE

4000 PSI
- D.

CAST–IN–PLACE CONCRETE IN PILE BUILDUP

6000 PSI

4.

ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4 IN.

5.

CONSTRUCTION JOINTS SHALL BE PROVIDED ONLY AS NOTED ON THE DRAWINGS AND AS SPECIFICALLY PERMITTED BY THE PORT ENGINEER.

STRUCTURAL TIMBER

1.

ALL TIMBER SHALL BE PACIFIC COAST DOUGLAS FIR, GRADE NO. 1, AND SHALL CONFORM TO THE LATEST SPECIFICATIONS OF THE WEST COAST LUMBER INSPECTION BUREAU (WCLIB).
2.

ALL TIMBER SHALL BE SURFACED FOUR SIDES (S4S) UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWINGS.
3.

ALL TIMBER SHALL BE PRESSURE TREATED IN ACCORDANCE WITH AMERICAN WOOD PRESERVER ASSOCIATION (AWPA) STANDARDS. REMOVABLE TIMBER BULLRAIL SHALL BE TREATED IN ACCORDANCE WITH AWPA C2–82 AND P5–81, ACA OR CCA, WITH A MINIMUM RETENTION OF 0.4 LB WATERBORNE PRESERVATIVE PER CUBIC FOOT. STORAGE, HANDLING, CARE, AND FIELD TREATMENT OF TREATED TIMBER SHALL BE IN ACCORDANCE WITH AWPA STANDARD M4–80.
4.

FABRICATION: ALL TREATED TIMBER SHALL BE CUT TO LENGTH AND BORED BEFORE TREATMENT. HOLES FOR BOLTS SHALL BE 1/16 INCH LARGER THAN THE BOLT. LEAD HOLES FOR DOWELS AND LAG BOLTS SHALL BE PREBORED TO 65 PERCENT OF SHANK DIAMETER.
5.

HARDWARE: BOLTS AND MISCELLANEOUS HARDWARE NECESSARY FOR THE COMPLETE INSTALLATION SHALL BE HOT–DIP GALVANIZED. BOLTS SHALL BE TIGHTENED WHEN INSTALLED AND RETIGHTENED BEFORE FINAL ACCEPTANCE OF THE CONTRACT. ALL NAILS AND SPIKES SHALL BE HOT–DIP GALVANIZED.

GROUT

1.

ALL GROUT, EXCEPT AS NOTED IN THE SPECIFICATIONS, SHALL BE NON–SHRINK "MASTER FLOW 928" OR APPROVED EQUAL.

MISCELLANEOUS STEEL

1.

ALL MISCELLANEOUS STEEL SHAPES AND PLATES, EXCEPT AS NOTED BELOW, SHALL CONFORM TO ASTM A 36.
2.

ALL BOLTS AND NUTS SHALL CONFORM TO ASTM A 307, UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWINGS.
3.

ALL MISCELLANEOUS STEEL, INCLUDING ALL FASTENERS, SHALL BE HOT–DIP GALVANIZED. GALVANIZE ITEMS AFTER FABRICATION AS FAR AS PRACTICABLE. GALVANIZING DAMAGED ACCIDENTALLY OR DUE TO FIELD WELDING SHALL BE RESTORED WITH FIELD–APPLIED GALVANIZING COMPOUND.

4.

PROVIDE BLEED HOLES IN EMBEDDED PLATES AND SHAPES AT 24–IN. ON CENTER MAXIMUM.
5.

ALL MISCELLANEOUS PIPE, INCLUDING BOLLARDS, SHALL CONFORM TO ASTM A 53, GRADE B.

DESIGN CONCEPT

1.

VERTICAL LOADS
LOADS ARE DISTRIBUTED THROUGH ASPHALT/CONCRETE PAVING TO DECK PANELS, DECK PANELS TO PILE CAPS, PILE CAPS TO PILES, PILES TO SOIL IN FRICTION AND END BEARING.
2.

HORIZONTAL LOADS
HORIZONTAL LOADS, INCLUDING SEISMIC FORCES, SOIL PRESSURE, SHIP IMPACT, AND MOORING FORCES ARE TRANSMITTED THROUGH THE DECK ACTING AS A DIAPHRAGM TO THE BATTER PILES. HORIZONTAL LOADS PARALLEL TO THE WHARF ARE RESISTED BY SOIL FRICTION AGAINST BULKHEAD AND SHEET PILES.

SEISMIC DESIGN

THE SEISMIC DESIGN IS IN BASIC ACCORDANCE WITH THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES (1996 EDITION), DIVISION I–A, SEISMIC DESIGN.

THE SEISMIC LOADING HAS BEEN EXTENDED BEYOND THAT OUTLINED IN THE AASHTO SPECIFICATION TO INCLUDE AN OPERATING LEVEL GROUND MOTION UNDER WHICH THE WHARF IS INTENDED TO REMAIN EFFECTIVELY OPERATIONAL. THE DESIGN APPROACH IS THEREFORE MULTI–LEVEL AS OUTLINED IN SEISMIC GUIDELINES FOR PORTS, DRAFT MONOGRAPH 1997, ASCE.

THE SEISMIC LOADING IS REPRESENTED BY TWO RESPONSE SPECTRA.

1.

THE DESIGN EARTHQUAKE SPECTRUM REPRESENTS GROUND MOTIONS WITH A 10 PERCENT CHANCE OF EXCEEDENCE IN 50 YEARS. THIS LOADING IS IN DIRECT ACCORDANCE WITH AASHTO. (PER FIGURE 6, GEO ENGINEERS REPORT ADDENDUM, DATED 9/10/97, FILE NO. 0454–042–03)
2.

THE OPERATING LEVEL EARTHQUAKE SPECTRUM, REPRESENTS GROUND MOTIONS WITH A 50 PERCENT CHANCE OF EXCEEDENCE IN 50 YEARS. (PER FIGURE 5, GEO ENGINEERS REPORT ADDENDUM, DATED 9/10/97, FILE NO. 0454–042–03)

AASHTO SEISMIC PARAMETERS

IMPORTANCE CLASSIFICATION	II
ACCELERATION COEFFICIENT	0.33 – DESIGN LEVEL LOADING 0.15 – OPERATING LEVEL LOADING
SEISMIC PERFORMANCE CATEGORY	C – FOR BOTH LOADINGS
SOIL PROFILE TYPE	III
RESPONSE MODIFICATION FACTORS	R = 1 – FOR BOTH LOADINGS

DESIGN CRITERIA

DESIGN LOADS

1.

UNIFORM LIVE LOAD ON PIER:
750 PSF ON ALL/ANY COMBINATION OF SPANS, EXCEPT 2000 PSF IN THE HEAVY LOAD AREA.
2.

CONCENTRATED LIVE LOAD (WHEELS, OUTRIGGERS, ETC.):

P = 100 KIPS, INCLUDING IMPACT
WHEEL/OUTRIGGER TRANSVERSE SPACING > 8 FEET
WHEEL/OUTRIGGER LONGITUDINAL SPACING > 18 FEET
CONTACT PRESSURE: 100 PSI +/-

3.

BERTHING:

A. VESSELS

1.

SHIP
LENGTH OVERALL (LOA): 902 FEET
BEAM: 131 FEET
DRAFT: 40 FEET
DISPLACEMENT: 89,340 LT
2.

BARGE
LENGTH OVERALL (LOA): 400 FEET
BEAM: 100 FEET
DRAFT: 14 FEET
DISPLACEMENT: 18,105 LT

B. BERTHING LOADS

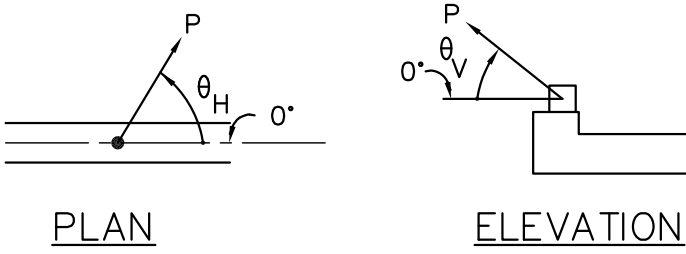
1.

SHIP
APPROACH VELOCITY: 1 KNOT
APPROACH ANGLE: 10 DEGREES
2.

BARGE
APPROACH VELOCITY: 1 KNOT
APPROACH ANGLE: 10 DEGREES

4.

LINE PULL ON BOLLARDS AND CLEATS:



LOCATION	LINE PULL P	RANGE OF HORIZONTAL ANGLE Hθ	RANGE OF VERTICAL ANGLE Vθ
TYPICAL BOLLARD	125 KIPS	0° TO 180°	0° TO 30°

5. CONTAINER CRANE LOADS

- A.

OPERATING WHEEL LOADS: EQUIVALENT UNIFORM LINE LOAD = 40 KIPS PER LINEAR FOOT OF RAIL, INCLUDING IMPACT
- B.

LONGITUDINAL LOADS AT PIN SOCKETS: P = 150 KIPS, PER SOCKET.
- C.

CRANE STOPS: P = 200 KIPS ACTING HORIZONTALLY 4'–6" ABOVE TOP OF RAIL, PER STOP.

U1 = 1.4D + 1.7L
U2 = 1.3D + 1.7L + 1.3E
U3 = 1.3D + 0.17L + 1.7B + 1.3E
U4 = 1.3D + 1.3E + 1.3EQ (SEISMIC LEVEL I)
U5 = 1.0D + 1.0E + 1.0EQ (SEISMIC LEVEL 2)

D – DEAD LOAD
L – LIVE LOAD (UNIFORM AND/OR GANTRY CRANE)
B – BERTHING LOAD
E – EARTH PRESSURE LOAD
EQ – EARTHQUAKE LOAD

7. SPECIAL INSPECTION:

THE CRITICAL ELEMENTS REQUIRING SPECIAL INSPECTION PER UBC CHAPTER 17 ARE AS FOLLOWS:

- A. CONCRETE
- B. BOLTS INSTALLED IN CONCRETE
- C. REINFORCING STEEL
- D. STRUCTURAL WELDING
- E. PILING

AS-BUILT

AUTOCAD FILE NO. 5012G4	G-4
DRAWING NO.	EP-5012-26
CONTRACT NO.	978038
SHEET NO.	4 OF 58



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DATE
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CHIEF ENGINEER

MM 9/91
DRAWN BY DATE

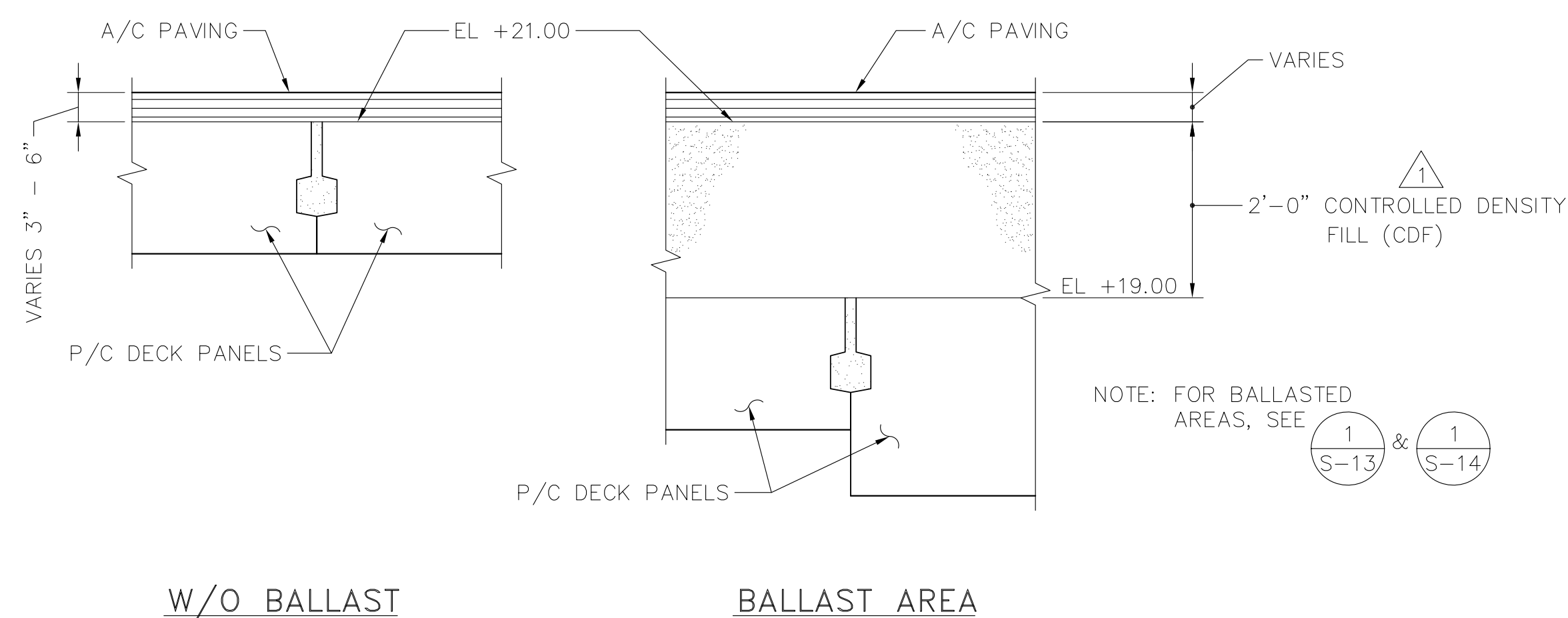
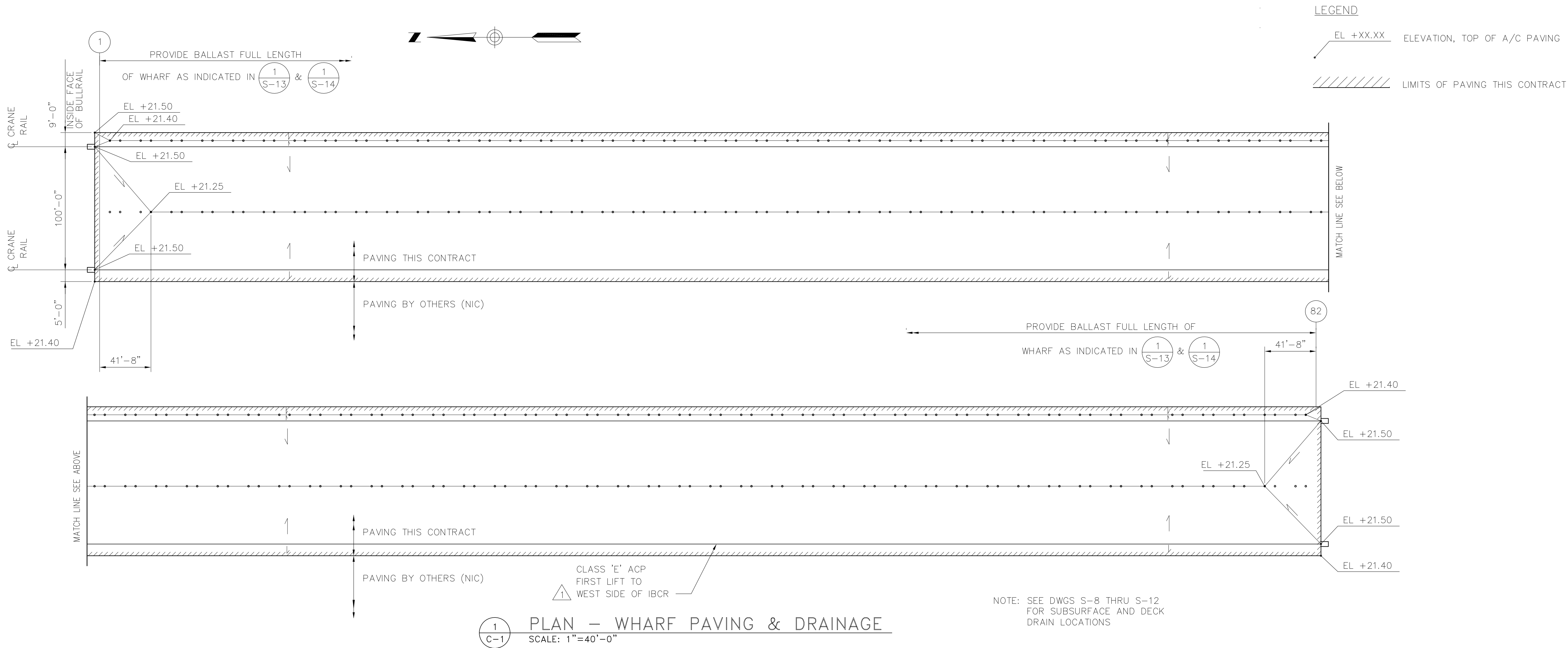
JAS 9/91
DESIGNED BY DATE

BCM 9/91
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JAS 9/91
PROJ ENGR DATE

AS-BUILT	RDD	JAS	1/4/99
MARK	REVISION	BY	APP. DATE

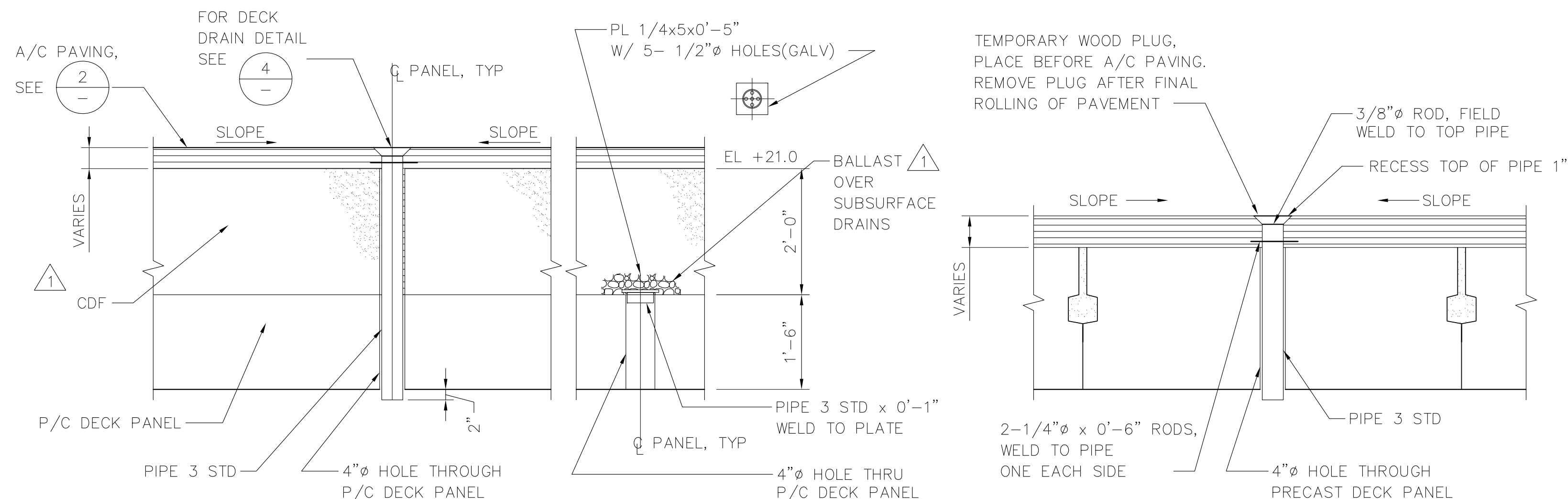
**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
GENERAL NOTES**



2 C-1

DETAIL - PAVING & BALLAST

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



3 C-1

DECK DRAIN & SUBSURFACE DRAIN @ BALLASTED AREA

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

4 C-1

DETAIL DECK DRAIN AS-BUILT

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



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HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
WHARF PAVING AND DRAINAGE PLAN

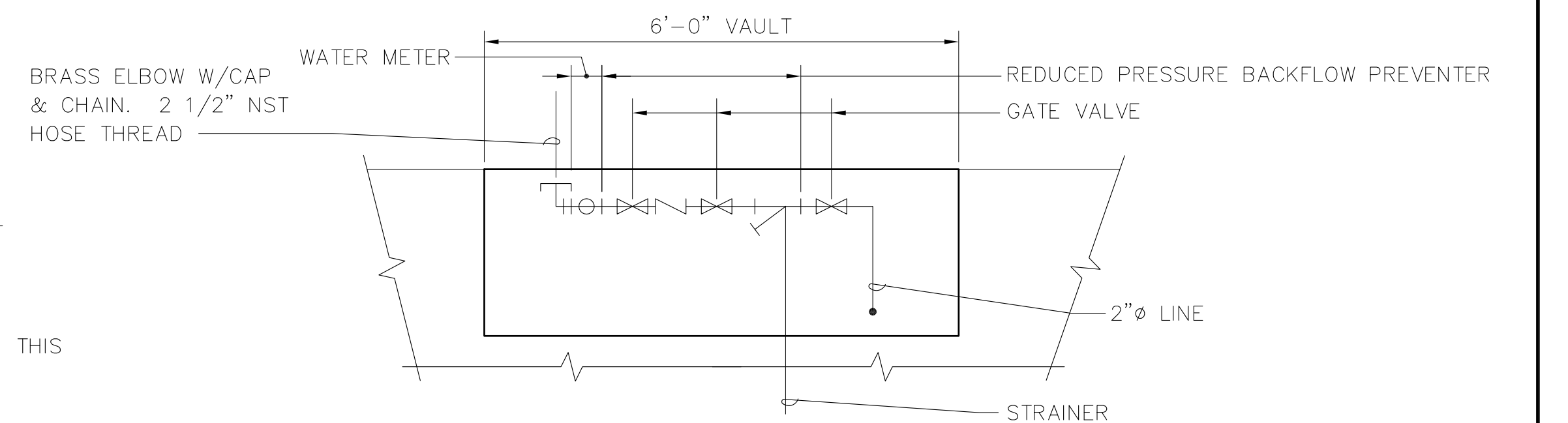
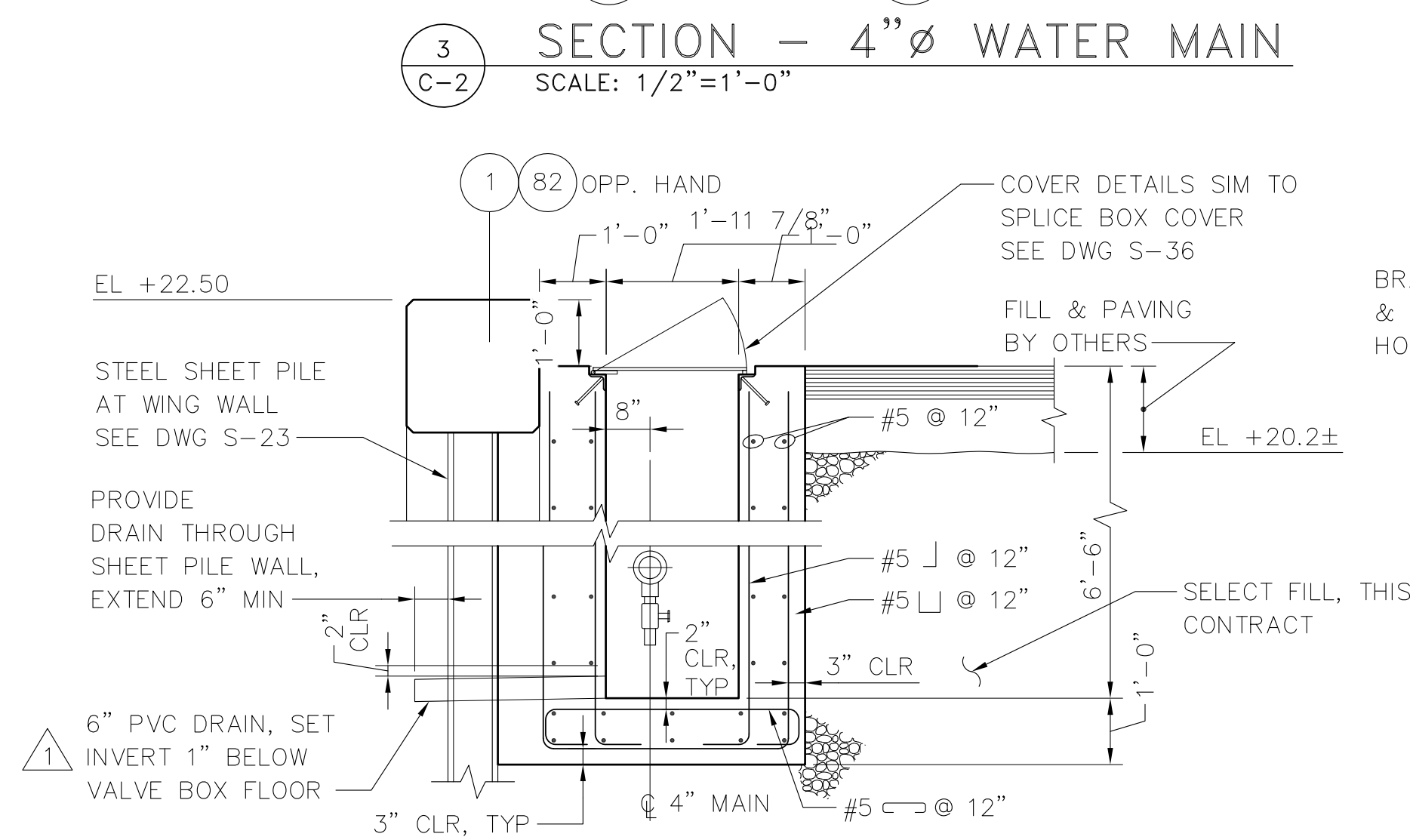
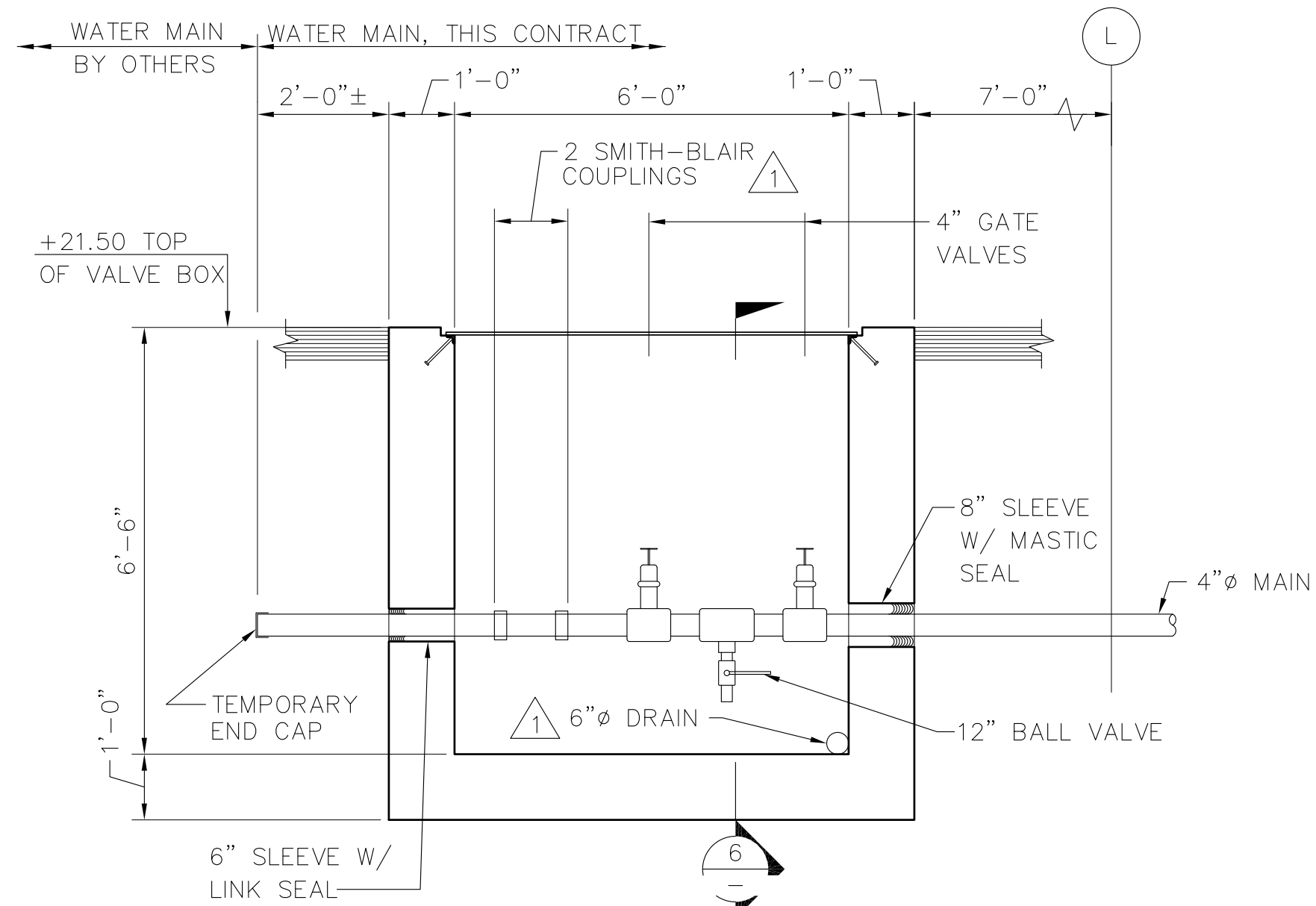
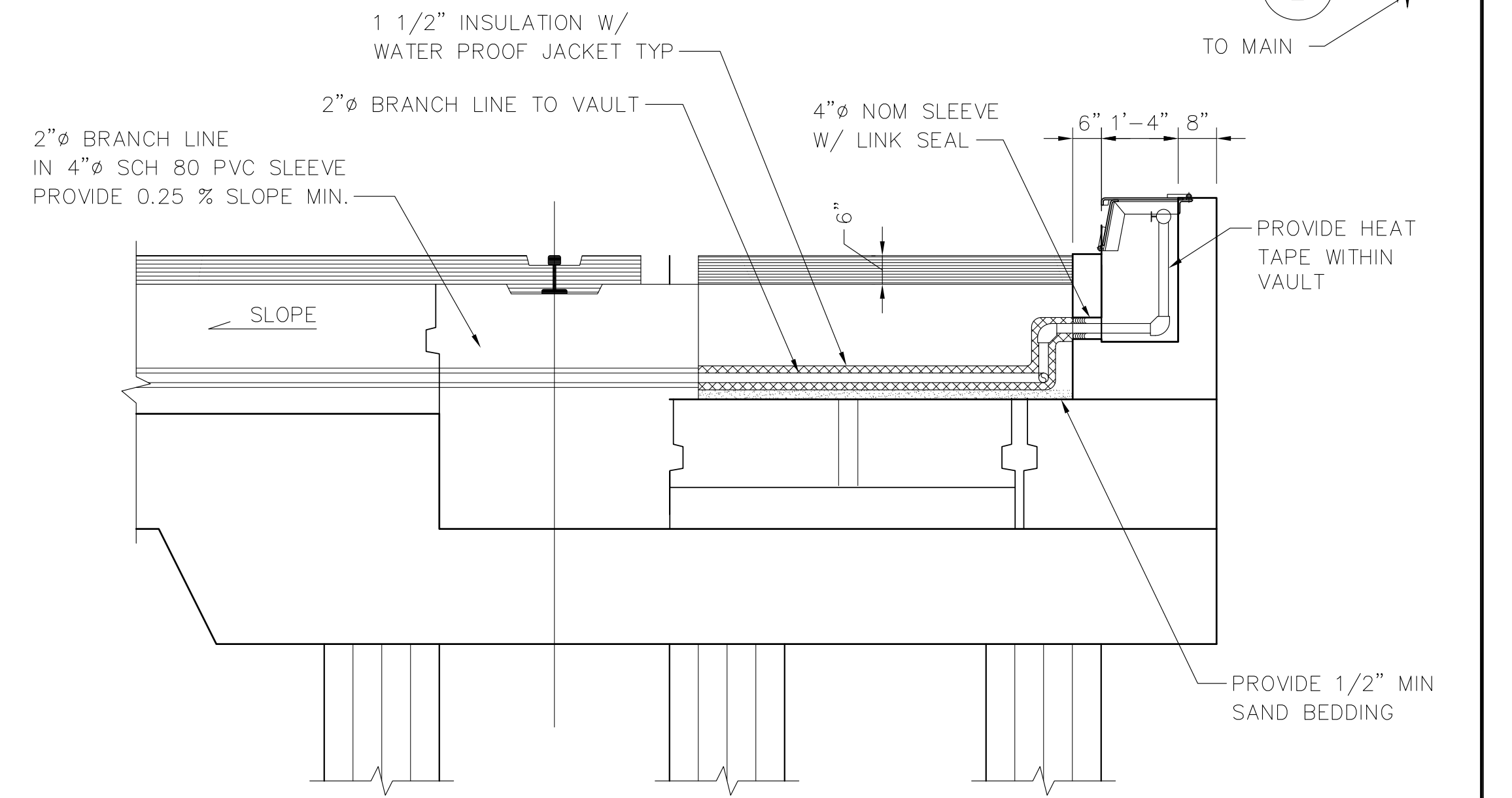
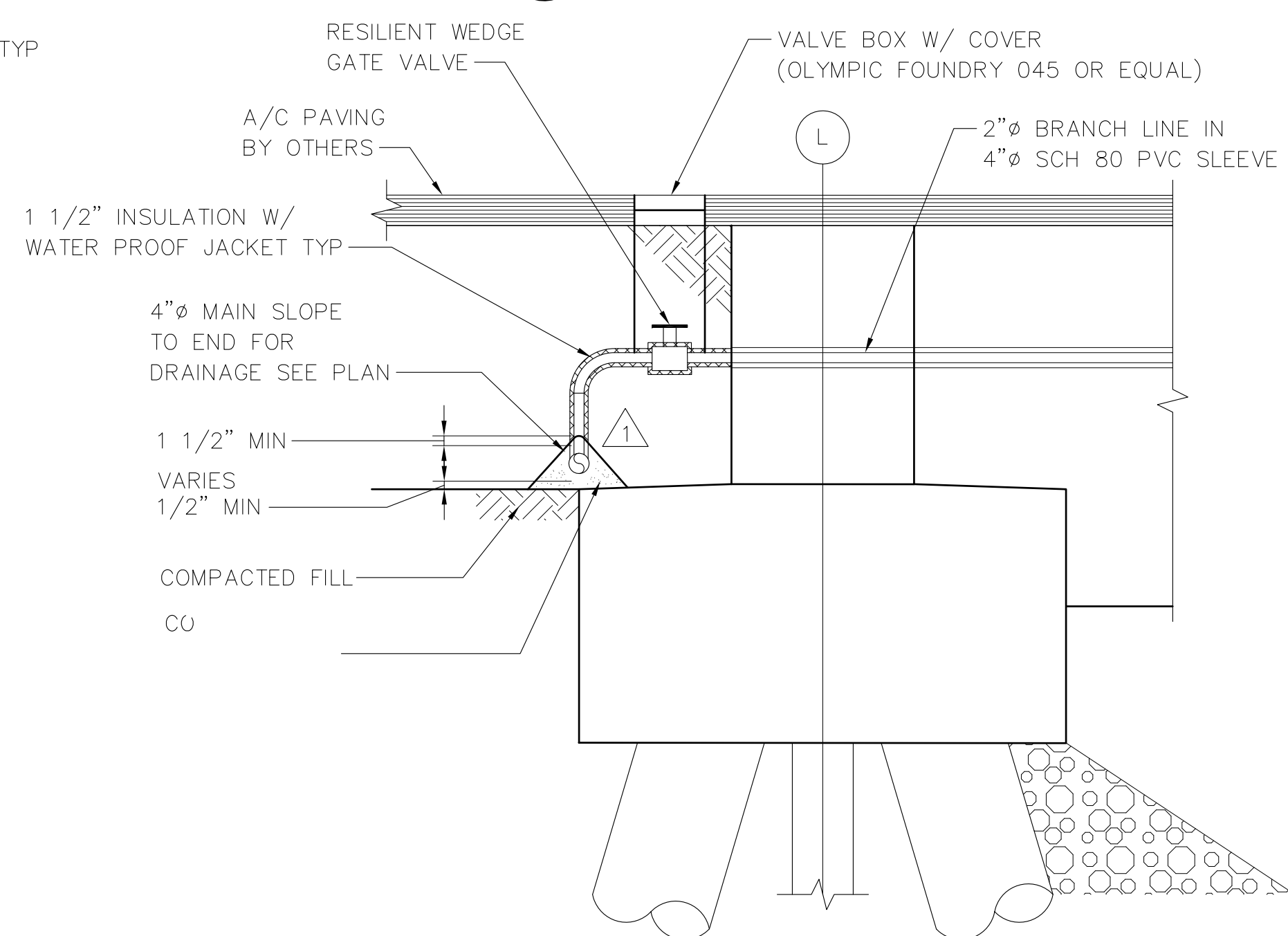
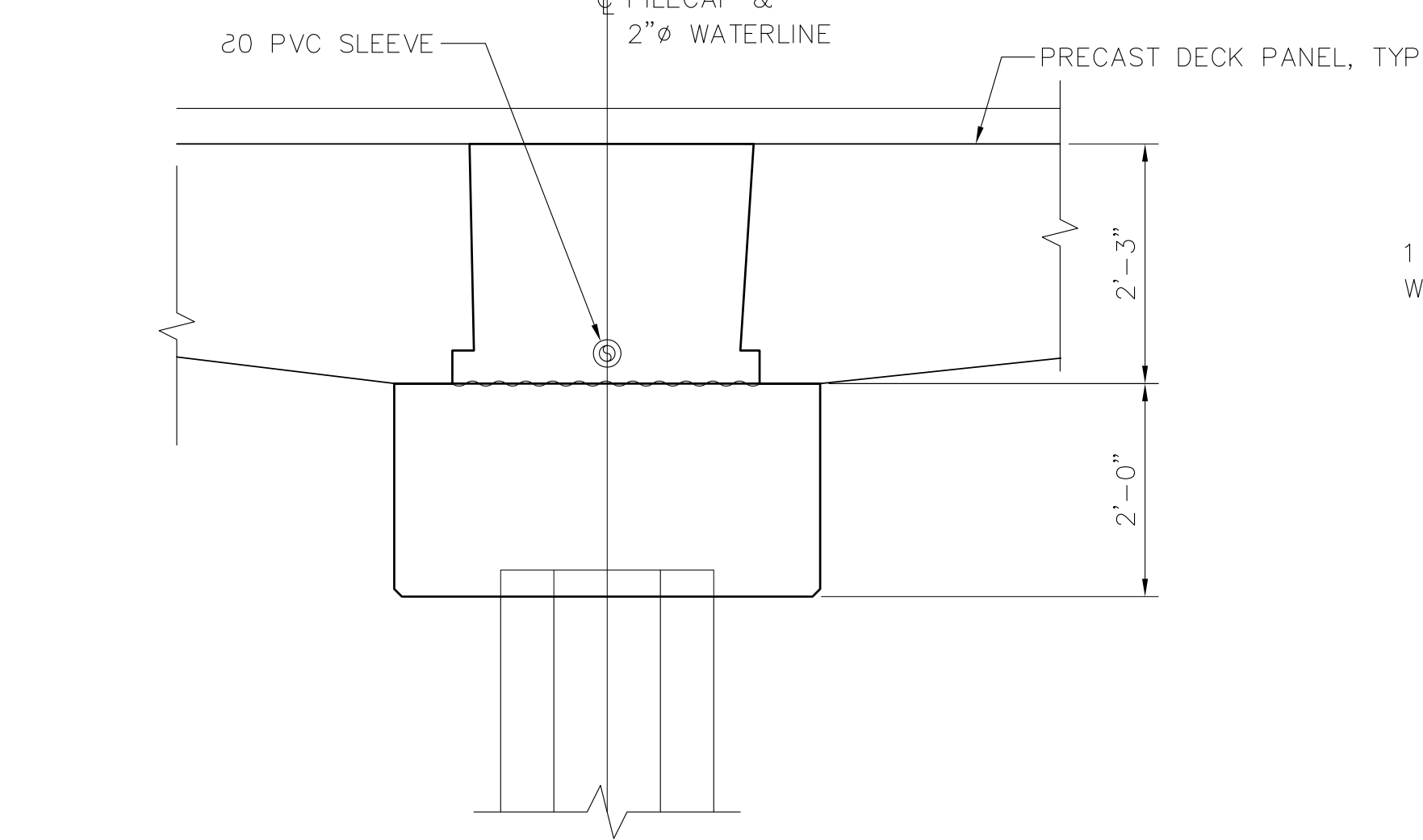
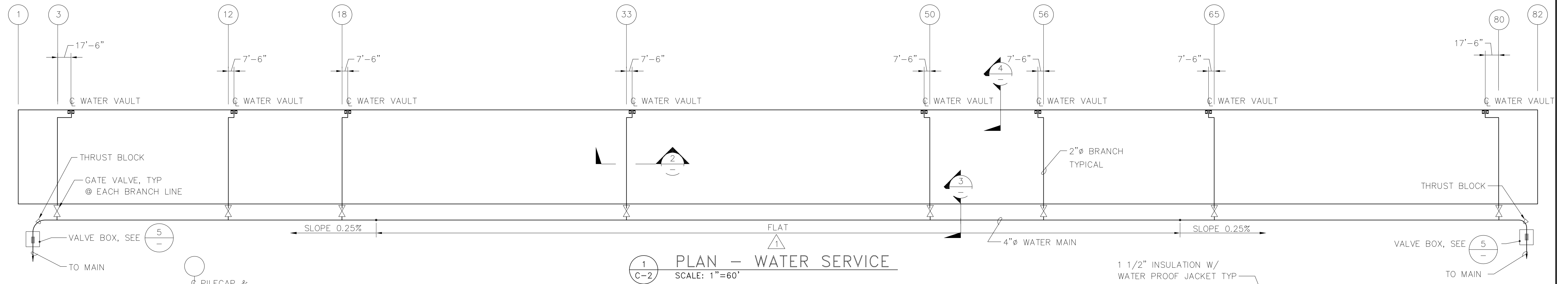
AUTOCAD FILE NO.
5012C1

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DRAWING NO. EP-5012-26

CONTRACT NO. 978038

SHEET NO. 5 OF 58



AS-BUILT

AUTOCAD FILE NO.
5012C2

C-2



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DATE
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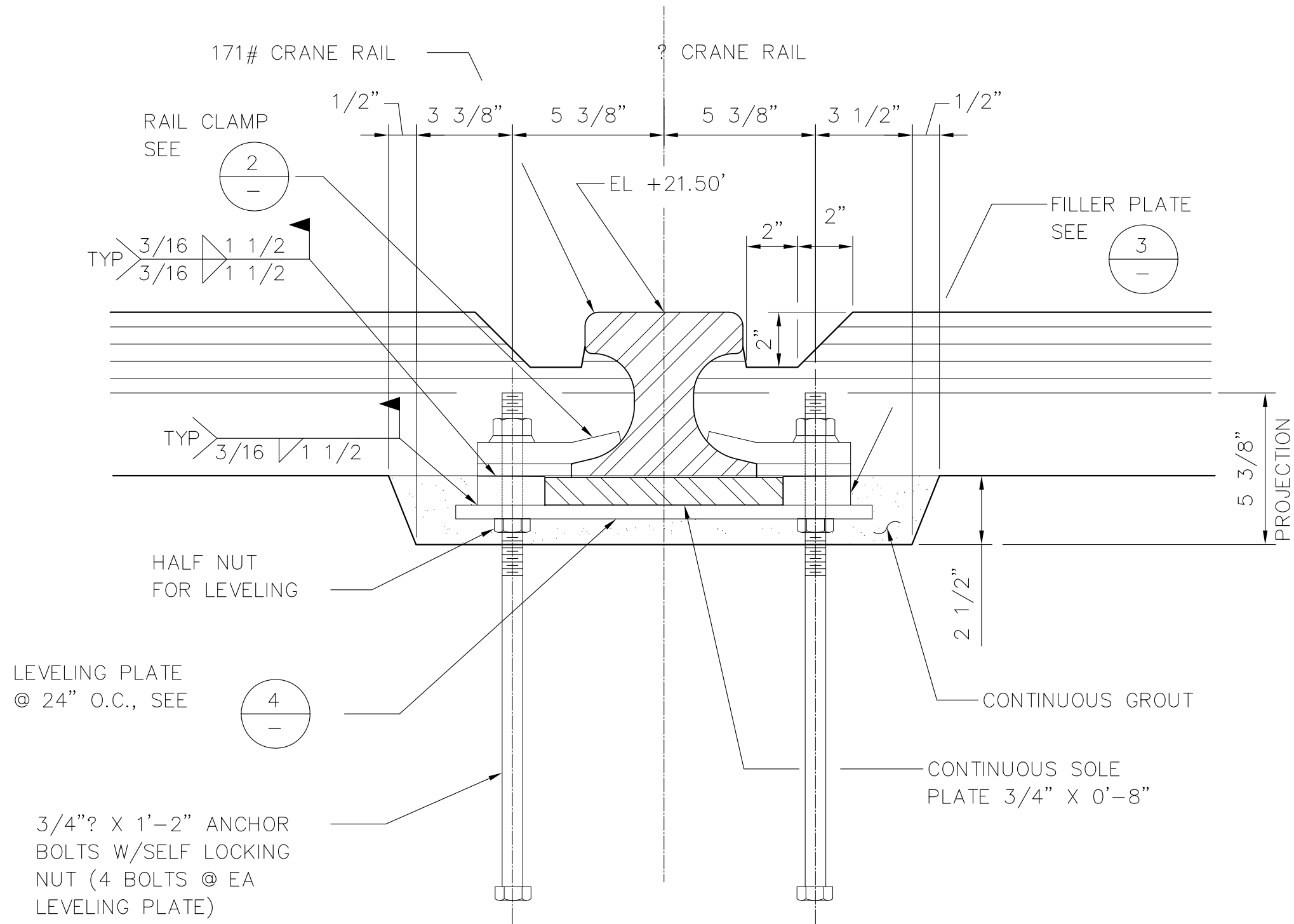
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**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
WHARF WATER SERVICE PLAN & DETAILS**

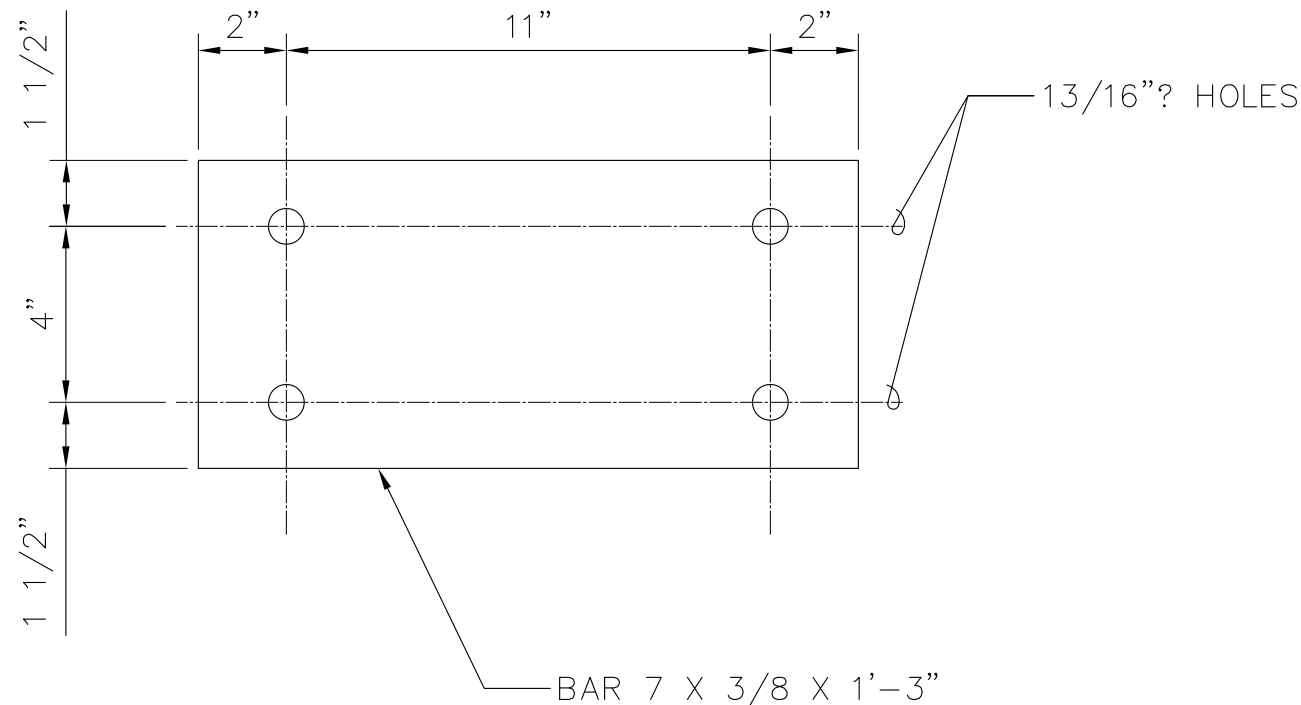
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CONTRACT NO. **978038**
SHEET NO. **6** OF **58**



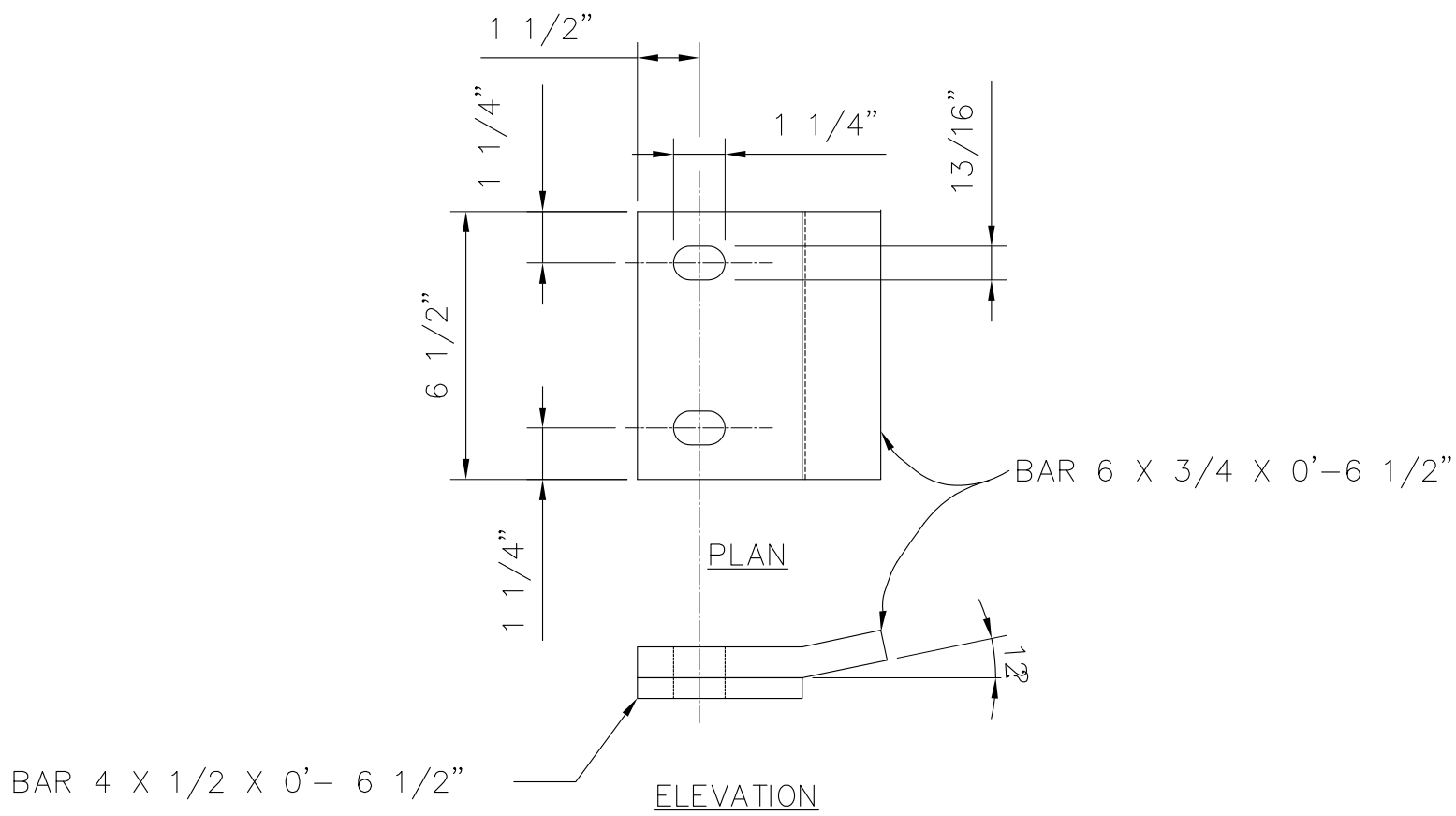
NOTES:

1. LOCATE SOLE PLATE JOINTS OVER LEVELING PLATE. PROVIDE 1/4" GAP BETWEEN PLATES AT JOINT.
2. STAGGER RAIL AND SOLE PLATE JOINTS.
3. SOLE PLATE EDGES UNDER RAIL, AT JOINT LINE, TO BE GROUND SMOOTH.

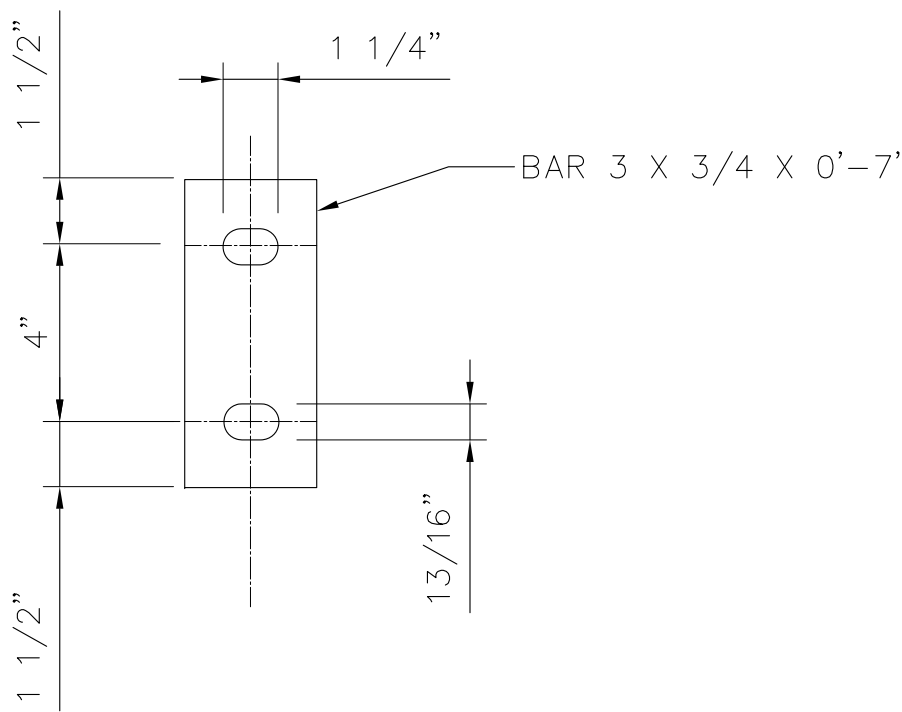
1
C-3
DETAIL — TYPICAL CRANE RAIL
SCALE: 3"=1'-0"



4
C-3
LEVELING PLATE
SCALE: 3"=1'-0"



2
C-3
CLAMP PLATE
SCALE: 3"=1'-0"



3
C-3
FILLER PLATE
SCALE: 3"=1'-0"



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PROJ ENGR DATE



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RDD

JAS

1/4/99

MARK

REVISION

BY

APP.

DATE

**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
WHARF TRACKWORK DETAILS**

AS-BUILT

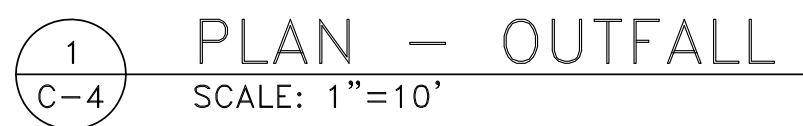
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5012C3

C-3

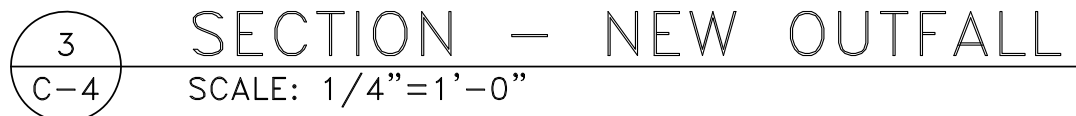
DRAWING NO. **EP-5012-26**

CONTRACT NO. **978038**

SHEET NO. **7** OF **58**



CONDITION AT OUTFALL BETWEEN BENTS (7) & (8); (43) & (44); (62) & (63)
IS SIMILAR, AND REQUIRES RELOCATION
AS SHOWN HERE



C-4

SHEET NO. 8 OF 58

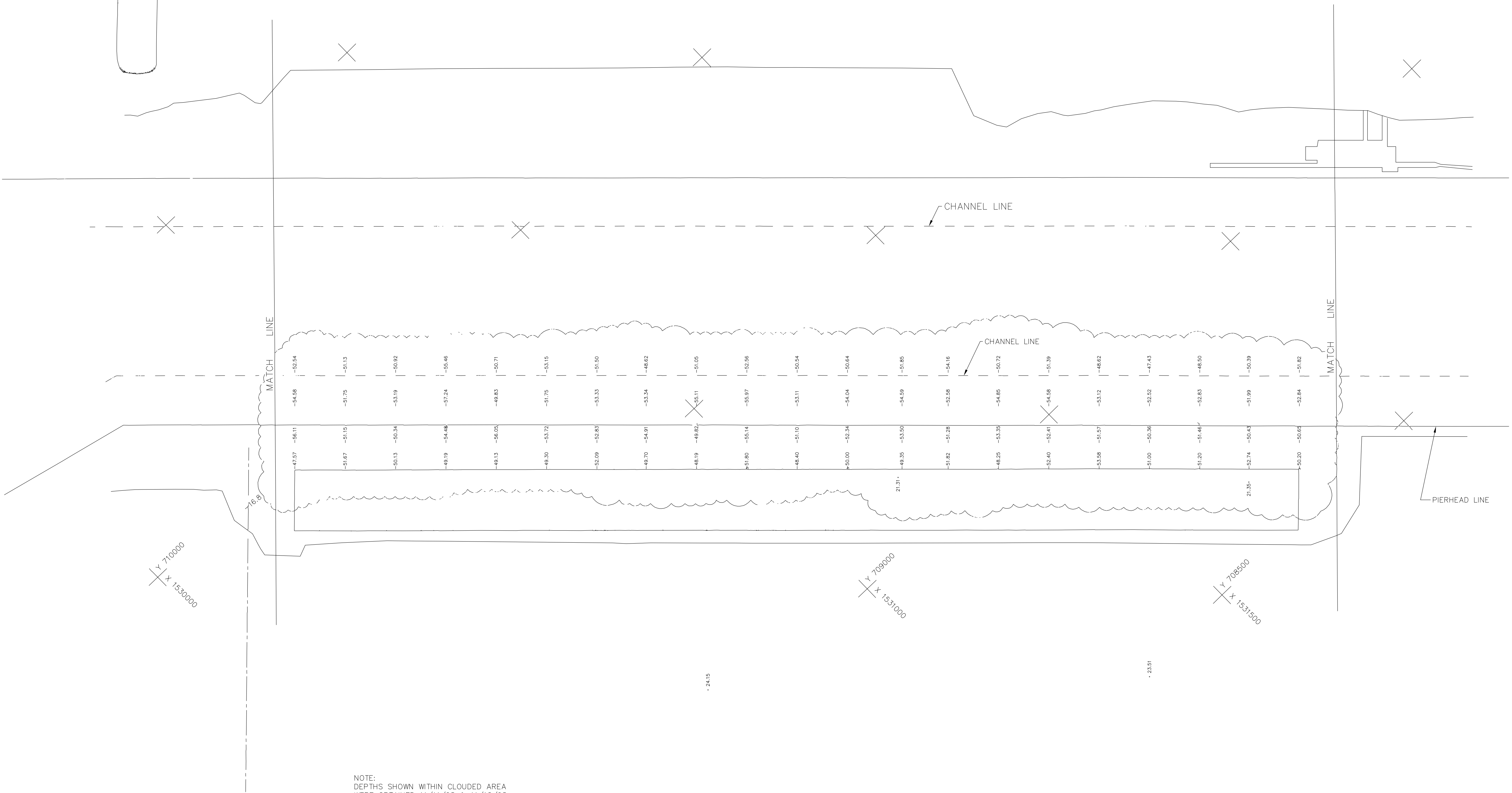


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HYUNDAI DREDGE TOPOG

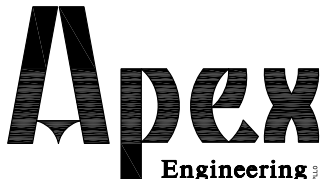


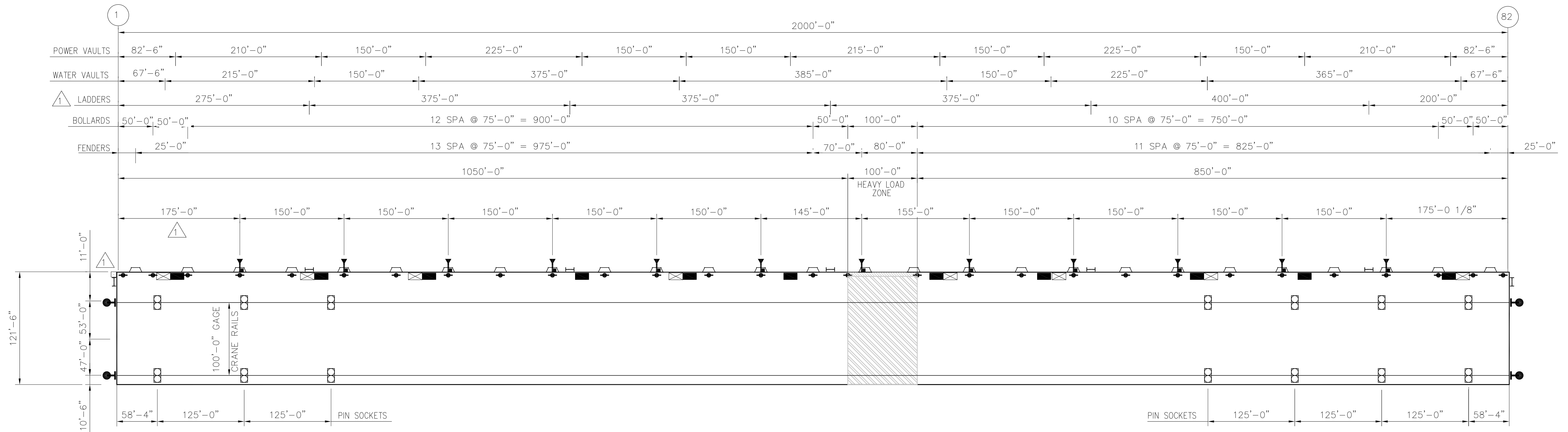
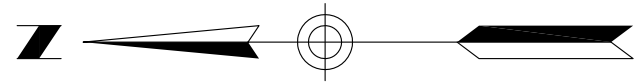
NOTE:
DEPTHS SHOWN WITHIN CLOUDED AREA
WERE OBTAINED 11/11/98 & 11/12/98
BY APEX ENGINEERING

THIS IS A SCANNED DRAWING
BERGER/ABAM ENGINEERS, INC.
APEX FILE NO. 25163-780

SCALE 1" = 100'-0"

AS-BUILT	
AUTOCAD FILE NO. 5012C5	C-5

 PORT OF TACOMA P.O. BOX 1837 TACOMA, WASHINGTON 98401 (206) 383-5841	 Apex Engineering 2601 South 25th, Suite 200 Tacoma, Washington 98409-7479 (253) 473-4434 FAX: (253) 473-0599	APPROVED _____ DATE CURTIS L. RATCLIFFE P.E. CHIEF ENGINEER	GWW 11/3/98 DRAWN BY DATE MG 11/3/98 DESIGNED BY DATE	CHECKED BY DATE PROJ ENGR DATE	MARK	AS-BUILT	RDD	JAS	1/4/99	HYUNDAI MERCHANT MARINE TERMINAL WHARF PORT OF TACOMA DREDGE TOPOG	DRAWING NO. EP-5012-26 CONTRACT NO. 978038 SHEET NO. 9 OF 57



1 WHARF SURFACE FEATURES PLAN
S-1 SCALE: NONE

- LEGEND
- POWER VAULTS
 - WATER VAULTS
 - BOLLARDS
 - FENDER UNITS
 - LADDER
 - LIFE RINGS
 - CRANE STOPS
 - NAVIGATION LIGHT
 - CRANE PIN SOCKETS
 - REMOVABLE BULLRAIL SECTIONS
 - HEAVY LOAD ZONE

AS-BUILT

AUTOCAD FILE NO.
5012S1

S-1



PORT OF TACOMA
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(206) 431-2300 FAX: (206) 431-2250

APPROVED

CURTIS L. RATCLIFFE P.E.
CHIEF ENGINEER

MMD 9/91
DRAWN BY DATE

DESIGNED BY DATE

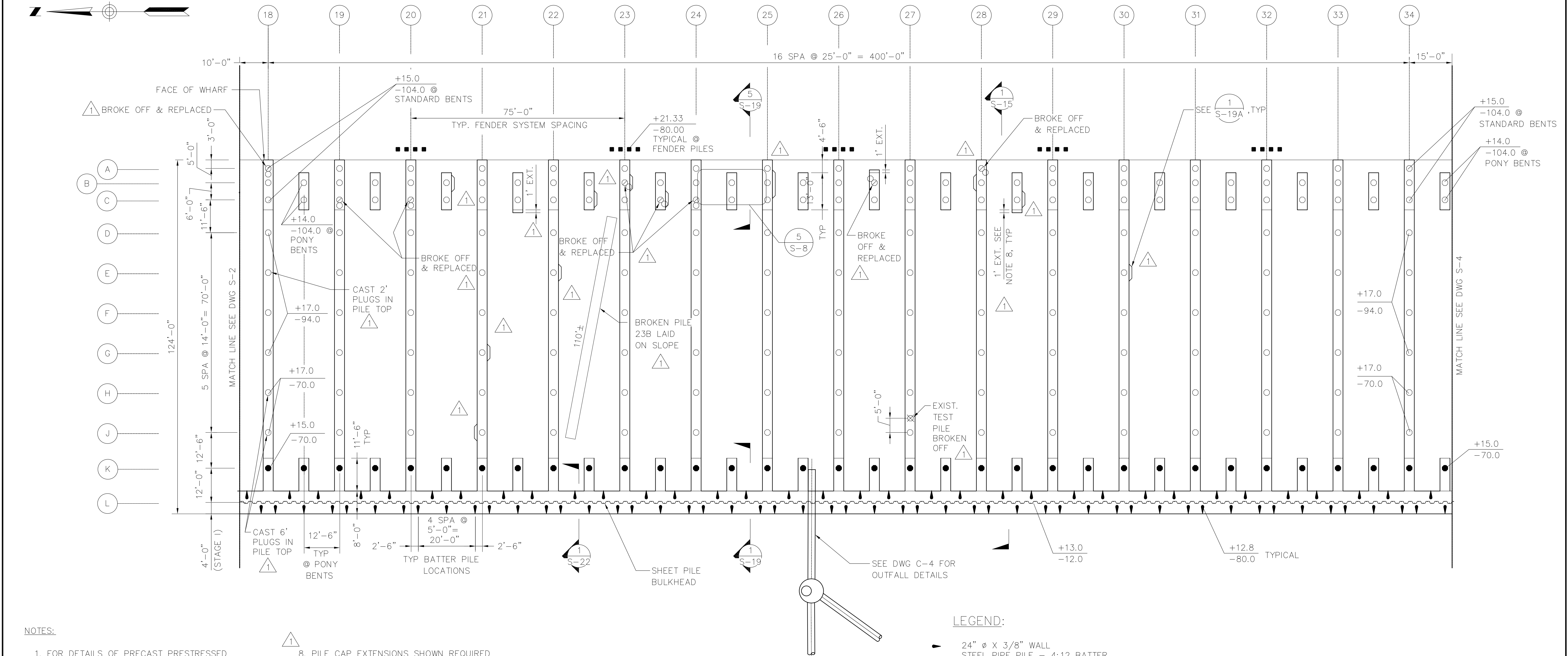
BCM 9/91
CHECKED BY DATE

JAS 9/91
PROJ ENGR DATE

MARK	REVISION	BY	APP.	DATE
AS-BUILT		RDD	JAS	1/4/99

**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
SURFACE FEATURES PLAN**

DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **10** OF **58**



NOTES:

- FOR DETAILS OF PRECAST PRESTRESSED CONCRETE PILES, SEE DWGS S-31 & S-32.
 - FOR CONCRETE PILE CUT-OFF DETAILS SEE DWG S-7. PILES SHALL NOT BE DRIVEN BELOW THE DESIGN TIP ELEVATION UNLESS OTHERWISE DIRECTED BY THE PORT.
 - FOR BULKHEAD STEEL PIPE PILE AND SHEET PILE CUT-OFF DETAILS, SEE DWGS S-22 & S-23.
 - FOR FENDER SYSTEM DETAILS, SEE DWGS S-33 & S-34.
 - BULKHEAD AND PILE CAPS STAGE 1, SHALL BE PLACED MONOLITHIC WITHOUT ANY CONSTRUCTION JOINTS.
 - CONSTRUCTION JOINTS IN BULKHEAD SHALL BE PERMITTED BETWEEN PILE CAPS AND AWAY FROM PILE LOCATIONS.
 - CUTOFF AND INCORPORATE TEST PILE INTO PILE CAP. (PILES BROKEN OFF @ M)
1. BROKE OFF & REPLACED
2. BROKE OFF & REPLACED
3. BROKE OFF & REPLACED
4. BROKE OFF & REPLACED
5. BROKE OFF & REPLACED
6. BROKE OFF & REPLACED
7. BROKE OFF & REPLACED
8. BROKE OFF & REPLACED
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10. BROKE OFF & REPLACED
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12. BROKE OFF & REPLACED
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23. BROKE OFF & REPLACED
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29. BROKE OFF & REPLACED
30. BROKE OFF & REPLACED
31. BROKE OFF & REPLACED
32. BROKE OFF & REPLACED
33. BROKE OFF & REPLACED
34. BROKE OFF & REPLACED

1
S-3

PILE AND PILE CAP PLAN

SCALE: 1/16"=1'-0"

LEGEND:

- 24" ϕ X 3/8" WALL
STEEL PIPE PILE - 4:12 BATTER
- 24" HOLLOW OCTAGONAL PRECAST
CONCRETE PILE - PLUMB
- 24" SOLID OCTAGONAL PRECAST
CONCRETE PILE - PLUMB
- SHEET PILE BULKHEAD
- 16" SQUARE PRESTRESSED
CONCRETE FENDER PILE
- PILE CUT-OFF ELEVATION
PILE TIP ELEVATION
- SHEET PILE CUT-OFF ELEVATION
SHEET PILE TIP ELEVATION
- TEST PILE - 24" ϕ HOLLOW
OCTAGONAL PLUMB CONCRETE;
INCORPORATE INTO PILE CAP
- PILE CAP TAB-OUT



KEY PLAN

AS-BUILT

AUTOCAD FILE NO.
5012S3

S-3



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FEDERAL WAY, WASHINGTON 98003-6395
(206) 431-2300 FAX: (206) 431-2250

APPROVED

DATE
CURTIS L. RATCLIFFE P.E.
CHIEF ENGINEER

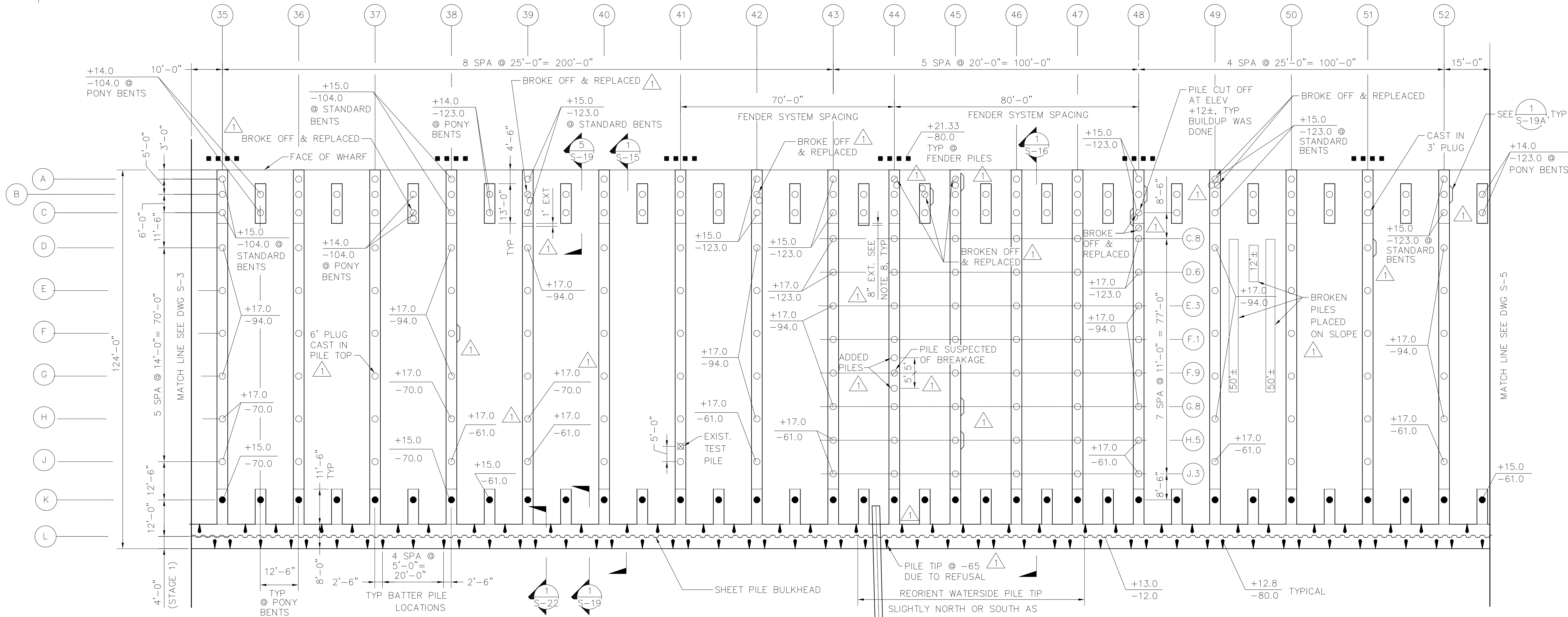
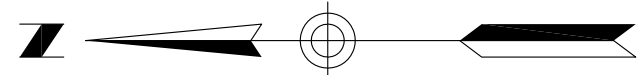
MMO 9/91
DRAWN BY DATE
DESIGNED BY DATE

BCM 9/91
CHECKED BY DATE
JAS 9/91
PROJ ENGR DATE

MARK	REVISION	BY	APP.	DATE
1	AS-BUILT	RDD	JAS	1/4/93

**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
PILE & PILE CAP PLAN - SHEET 2**

DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **12** OF **58**



NOTES:

- FOR DETAILS OF PRECAST PRESTRESSED CONCRETE PILES, SEE DWGS S-31 & S-32.
- FOR CONCRETE PILE CUT-OFF DETAILS SEE DWG S-7. PILES SHALL NOT BE DRIVEN BELOW THE DESIGN TIP ELEVATION UNLESS OTHERWISE DIRECTED BY THE PORT.
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- CONSTRUCTION JOINTS IN BULKHEAD SHALL BE PERMITTED BETWEEN PILE CAPS AND AWAY FROM PILE LOCATIONS.
- CUTOFF AND INCORPORATE TEST PILE INTO PILE CAP. (PILE BROKEN OFF @ M)



8. PILE CAP EXTENSIONS SHOWN REQUIRED DUE TO MISALIGNED PILE. REINFORCING AS SHOWN DWG'S S-15 THROUGH S-19 TO BE EXTENDED TO ACCOMMODATE EXTENSIONS SHOWN.

LEGEND:

- 24" ϕ X 3/8" WALL STEEL PIPE PILE - 4:12 BATTER
- 24" HOLLOW OCTAGONAL PRECAST CONCRETE PILE - PLUMB
- 24" SOLID OCTAGONAL PRECAST CONCRETE PILE - PLUMB

SHEET PILE BULKHEAD

- 16" SQUARE PRESTRESSED CONCRETE FENDER PILE

+XX.XX
-XX.XX

PILE CUT-OFF ELEVATION
PILE TIP ELEVATION

+XX.XX
-XX.XX

SHEET PILE CUT-OFF ELEVATION
SHEET PILE TIP ELEVATION

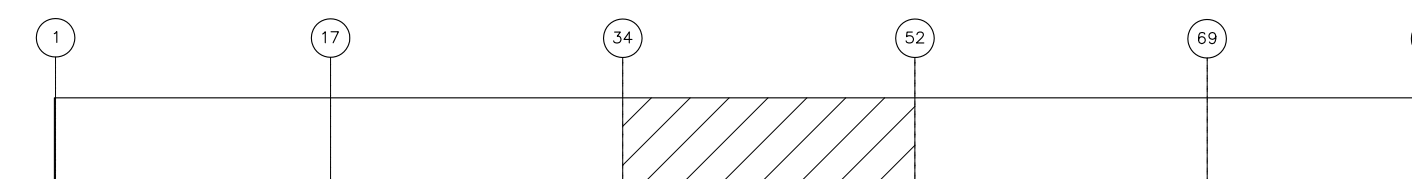
- TEST PILE - 24" ϕ HOLLOW OCTAGONAL PLUMB CONCRETE; INCORPORATE INTO PILE CAP

PILE CAP TAB-OUT

1
S-4

PILE AND PILE CAP PLAN

SCALE: 1/16"=1'-0"



KEY PLAN

AS-BUILT

AUTOCAD FILE NO.
5012S4

S-4



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(206) 431-2300 FAX: (206) 431-2250

APPROVED

CURTIS L. RATCLIFFE P.E.
CHIEF ENGINEER

DATE

MMDD
DRAWN BY DATE

DESIGNED BY DATE

BCM
CHECKED BY DATE

JAS
PROJ ENGR DATE

AS-BUILT

MARK

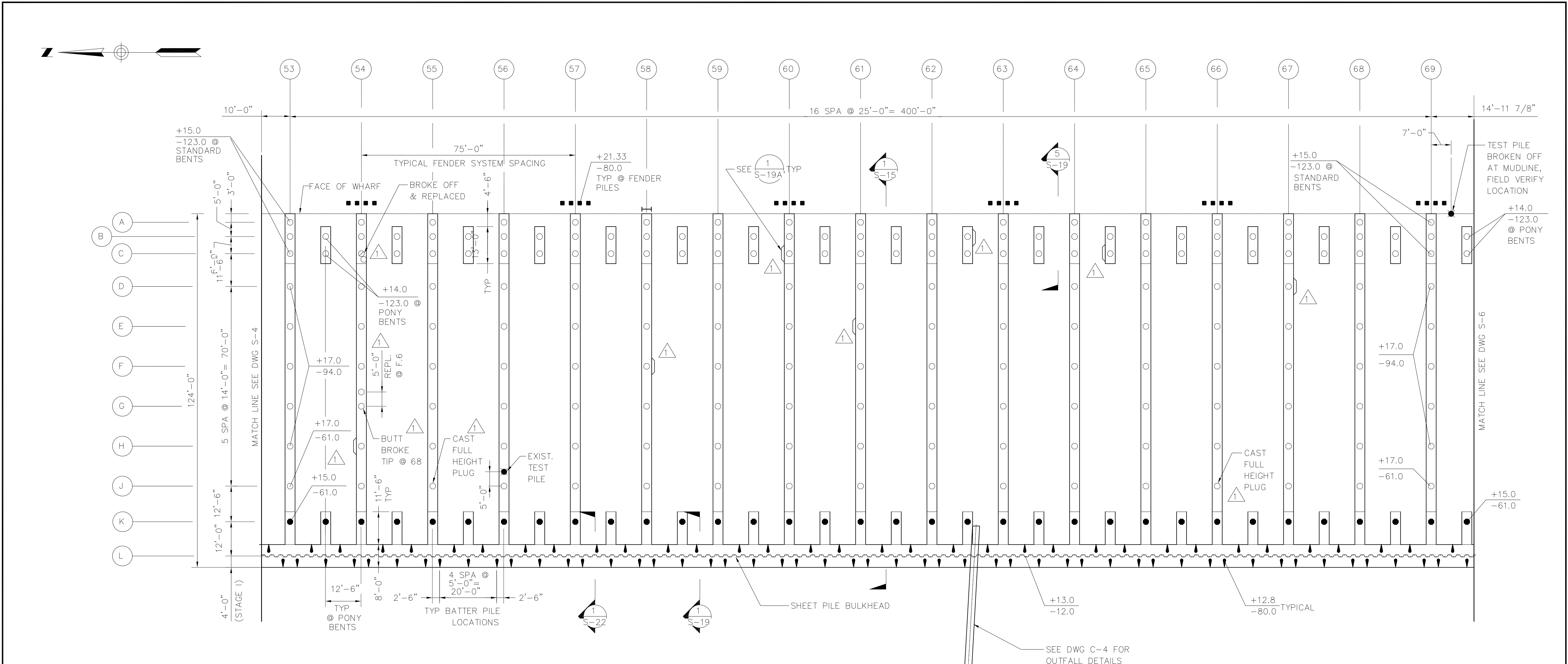
REVISION

BY APP. DATE

RDD JAS 1/4/99

**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
PILE & PILE CAP PLAN - SHEET 3**

DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **13** OF **58**



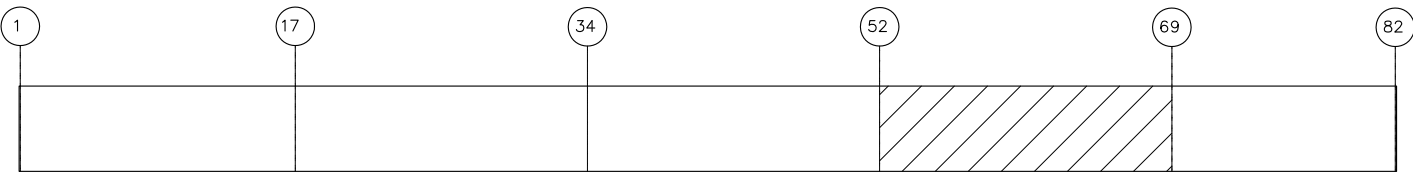
NOTES:

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- CONSTRUCTION JOINTS IN BULKHEAD SHALL BE PERMITTED BETWEEN PILE CAPS AND AWAY FROM PILE LOCATIONS.
- CUTOFF AND INCORPORATE TEST PILE INTO PILE CAP.

LEGEND:

- 24" ϕ X 3/8" WALL STEEL PIPE PILE - 4:12 BATTER
- 24" HOLLOW OCTAGONAL PRECAST CONCRETE PILE - PLUMB
- 24" SOLID OCTAGONAL PRECAST CONCRETE PILE - PLUMB
- SHEET PILE BULKHEAD
- 16" SQUARE PRESTRESSED CONCRETE FENDER PILE
- PILE CUT-OFF ELEVATION
PILE TIP ELEVATION
- SHEET PILE CUT-OFF ELEVATION
SHEET PILE TIP ELEVATION
- EXISTING TEST PILE - BROKEN OFF AT MUDLINE
- TEST PILE - 24" ϕ HOLLOW OCTAGONAL PLUMB CONCRETE; INCORPORATE INTO PILE CAP
- PILE CAP TAB-OUT

PILE AND PILE CAP PLAN
SCALE: 1/16"=1'-0"

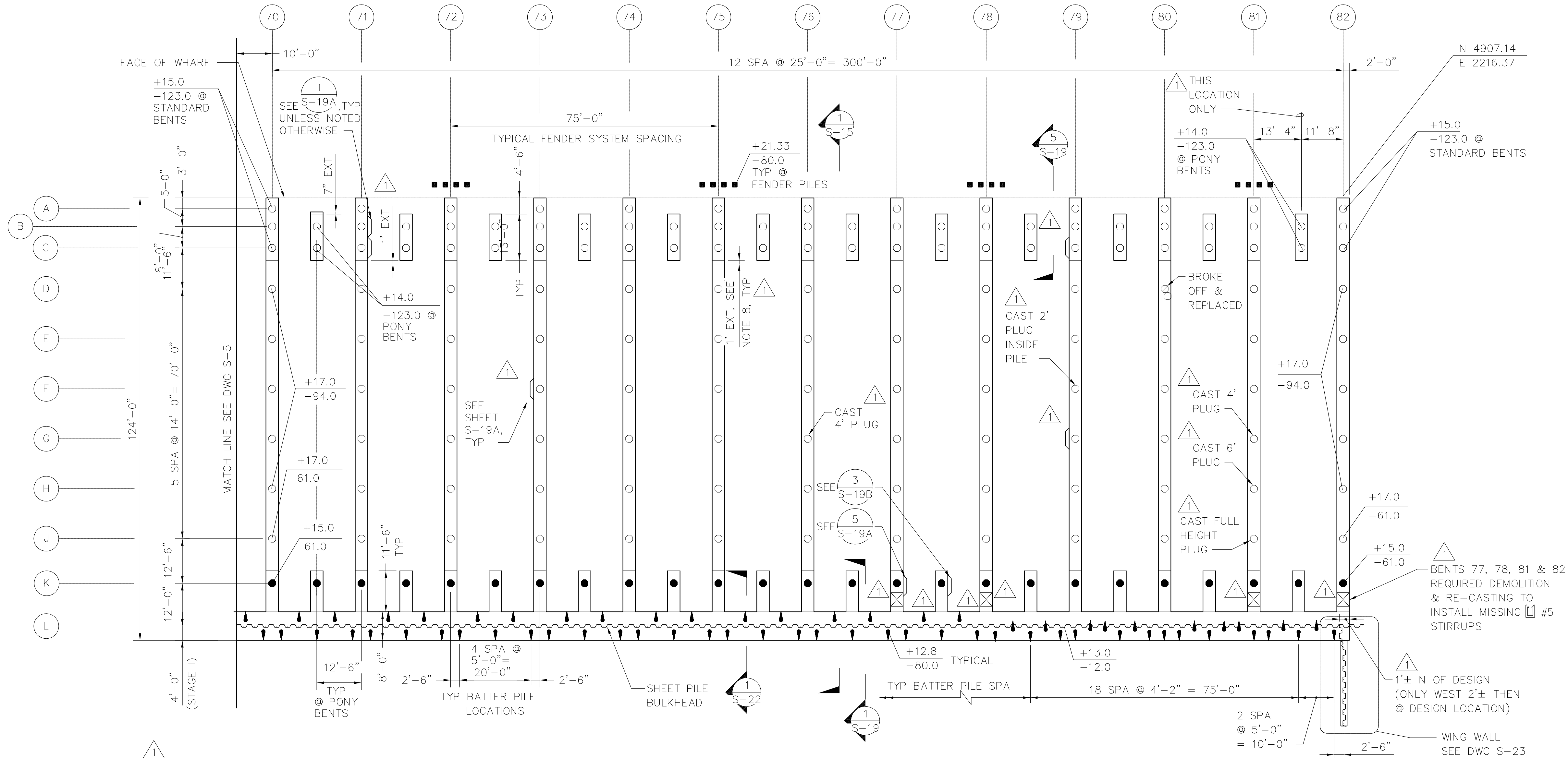
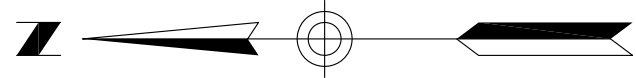


KEY PLAN

AS-BUILT

AUTOCAD FILE NO. 5012S5
S-5

	PORT OF TACOMA P.O. BOX 1837 TACOMA, WASHINGTON 98401 (206) 383-5841		BERGER/ABAM ENGINEERS INC. 33301 9TH AVENUE SOUTH FEDERAL WAY, WASHINGTON 98003-6395 (206) 431-2300 FAX: (206) 431-2250		APPROVED _____ DATE CURTIS L. RATCLIFFE P.E. CHIEF ENGINEER	MMD DRAWN BY DATE FLY/FDP DESIGNED BY DATE	9/31 DATE 9/31 DATE	BCM CHECKED BY DATE JAS PROJ ENGR DATE	9/31 DATE 9/31 DATE	AS-BUILT RDD JAS 1/4/99	BY APP. DATE	HYUNDAI MERCHANT MARINE TERMINAL WHARF PORT OF TACOMA PILE & PILE CAP PLAN - SHEET 4	DRAWING NO. EP-5012-26 CONTRACT NO. 978038 SHEET NO. 14 OF 57



NOTES:

- FOR DETAILS OF PRECAST PRESTRESSED CONCRETE PILES, SEE DWGS S-31 & S-32.
- FOR CONCRETE PILE CUT-OFF DETAILS SEE DWG S-7. PILES SHALL NOT BE DRIVEN BELOW THE DESIGN TIP ELEVATION UNLESS OTHERWISE DIRECTED BY THE PORT.
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- CONSTRUCTION JOINTS IN BULKHEAD SHALL BE PERMITTED BETWEEN PILE CAPS AND AWAY FROM PILE LOCATIONS.
- PILE CAP EXTENSIONS SHOWN REQUIRED DUE TO MISALIGNED PILE. REINFORCING AS SHOWN DWG'S S-15 THROUGH S-19 TO BE EXTENDED TO ACCOMMODATE EXTENSIONS SHOWN.

PILE AND PILE CAP PLAN
SCALE: 1/16"=1'-0"

LEGEND:

- 24" ϕ X 3/8" WALL
STEEL PIPE PILE - 4:12 BATTER
- 24" HOLLOW OCTAGONAL PRECAST
CONCRETE PILE - PLUMB
- 24" SOLID OCTAGONAL PRECAST
CONCRETE PILE - PLUMB
- SHEET PILE BULKHEAD
- 16" SQUARE PRESTRESSED
CONCRETE FENDER PILE
- +XX.XX
-XX.XX
PILE CUT-OFF ELEVATION
PILE TIP ELEVATION
- +XX.XX
-XX.XX
SHEET PILE CUT-OFF ELEVATION
SHEET PILE TIP ELEVATION
- PILE CAP TAB-OUT



KEY PLAN

AS-BUILT

AUTOCAD FILE NO.
5012S6

S-6



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(206) 431-2300 FAX: (206) 431-2250

APPROVED

CURTIS L. RATCLIFFE P.E.
CHIEF ENGINEER

DATE

DESIGNED BY DATE

DATE

DATE

DATE

DATE

DATE

DATE

DATE

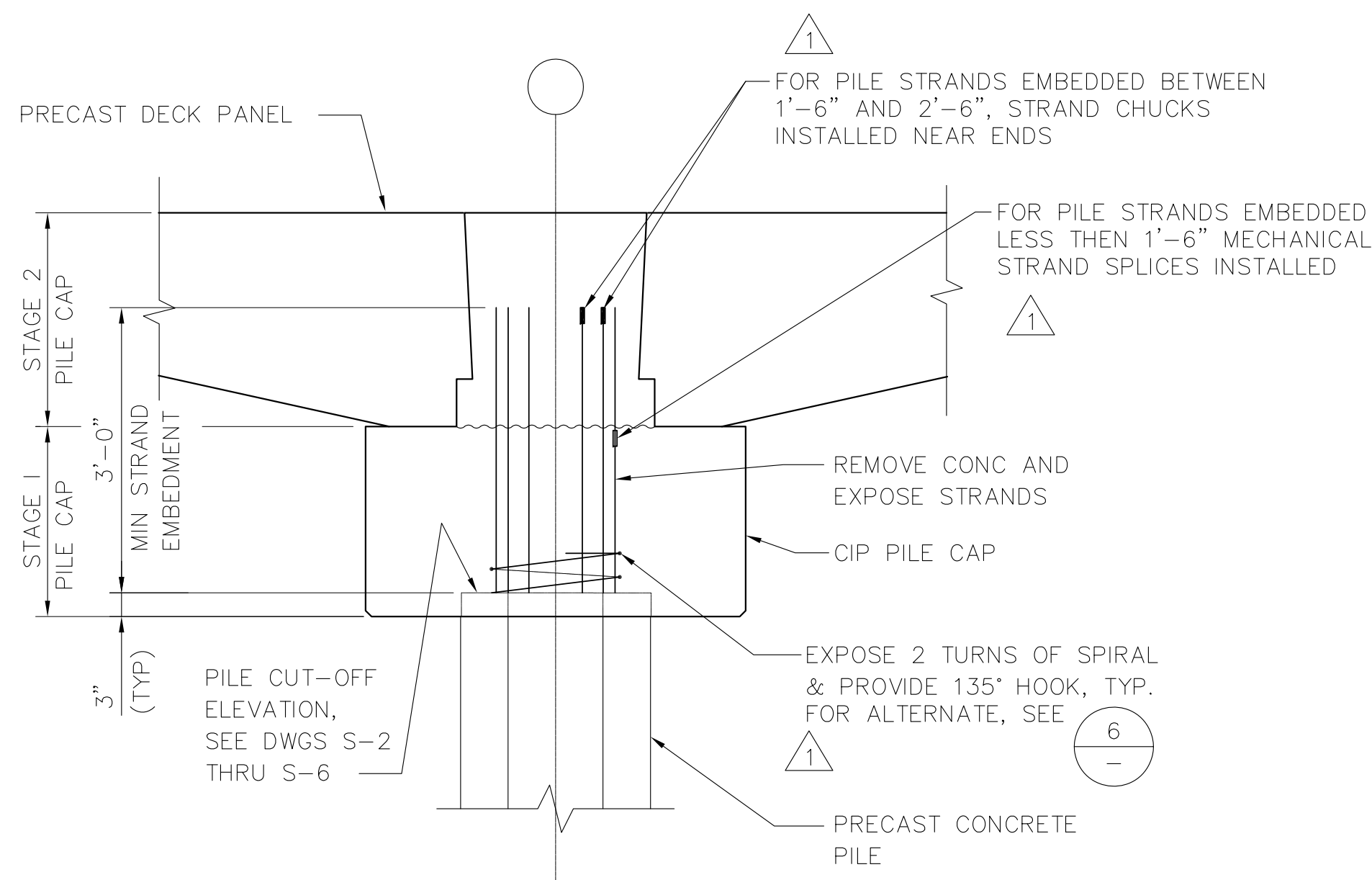
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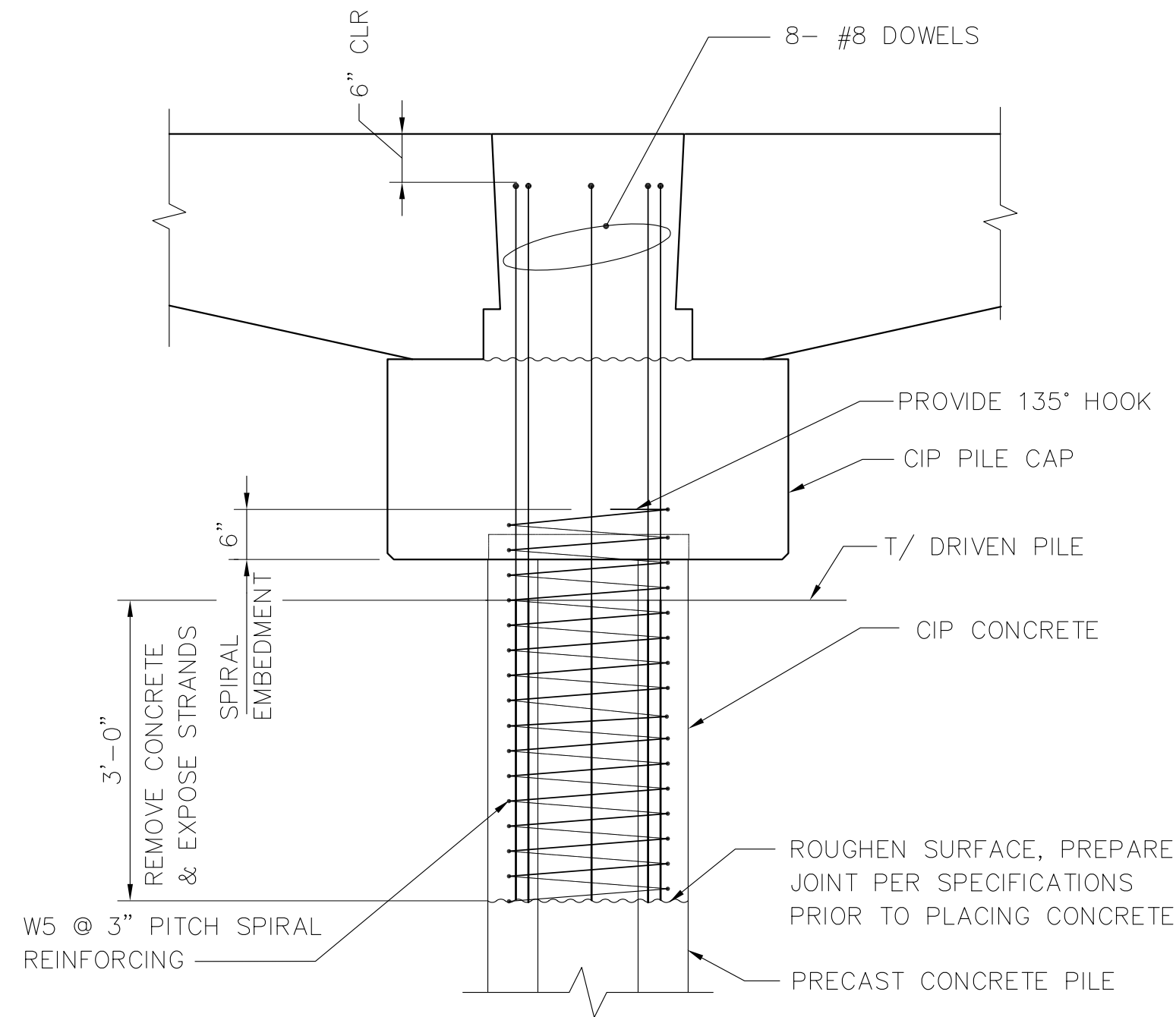
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HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
PILE & PILE CAP PLAN - SHEET 5

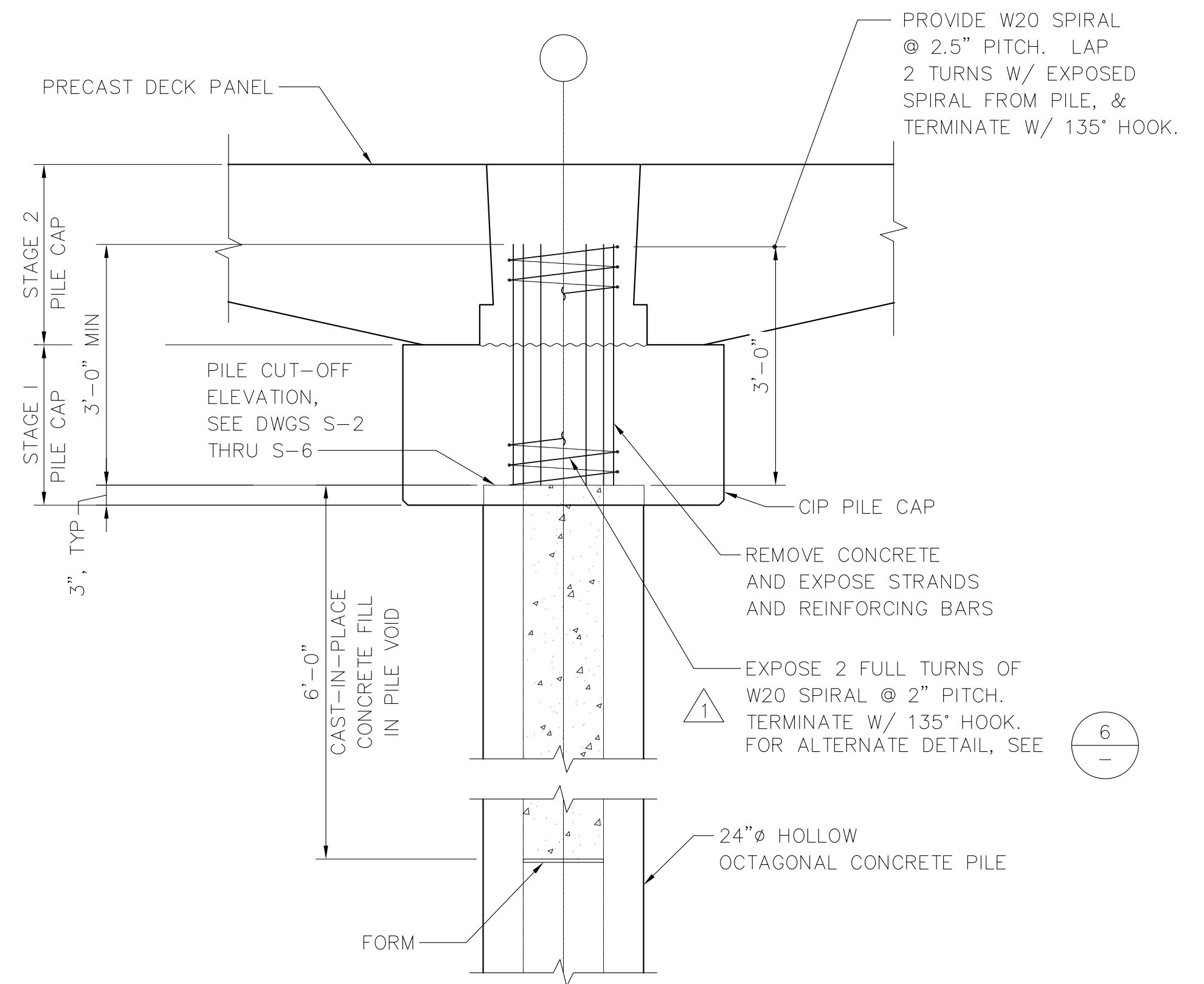
DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **15** OF **58**



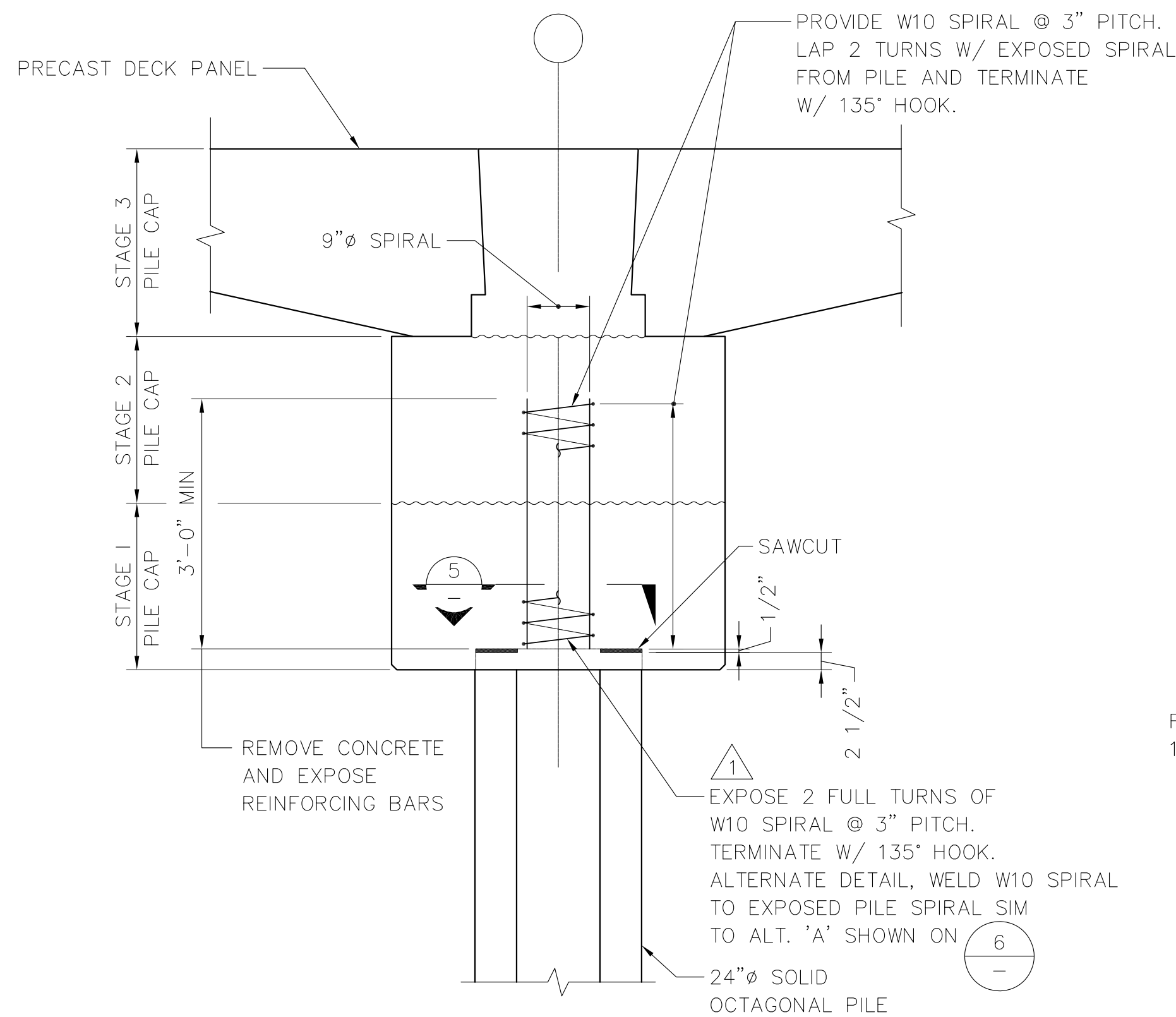
1
S-7
DETAIL - PILE CUT-OFF
SCALE: 3/4"=1'-0"



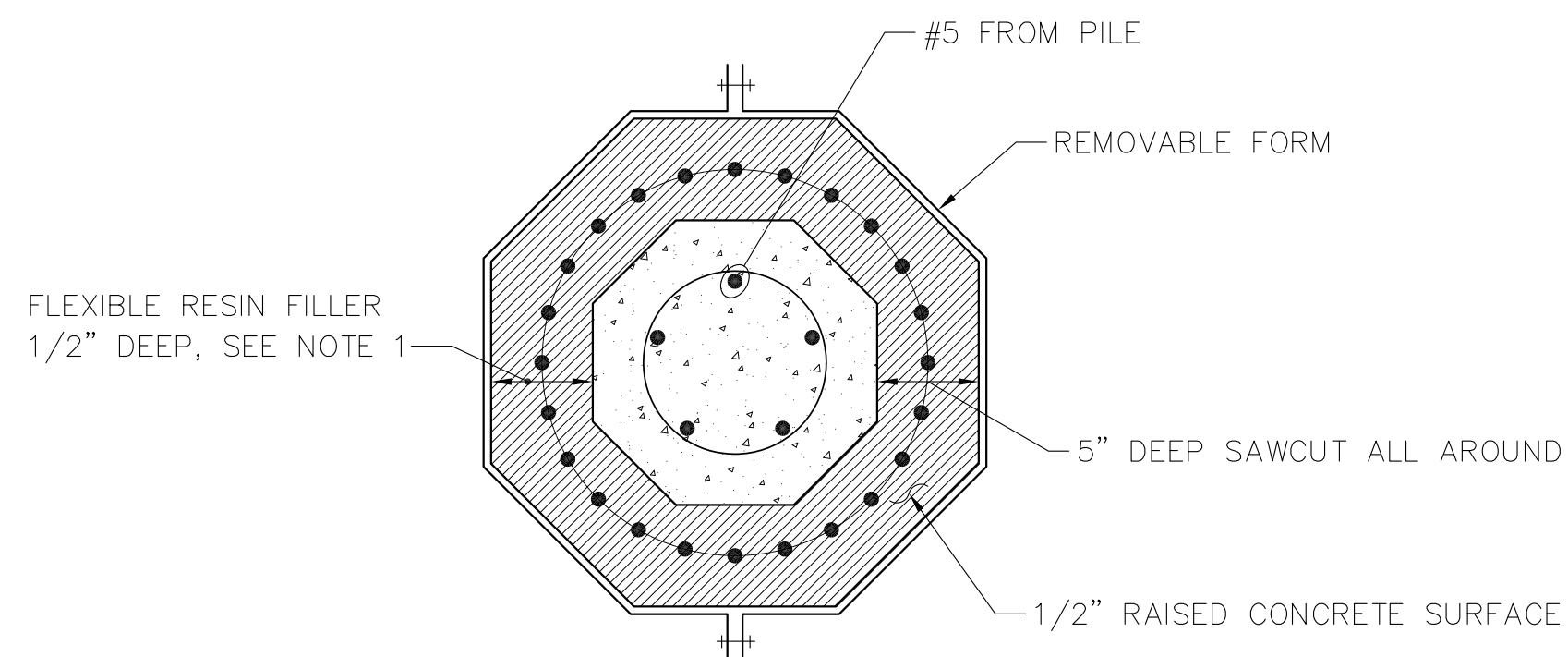
2
S-7
DETAIL - PILE BUILD-UP
SCALE: 3/4"=1'-0"
(PILE TOP BELOW CUTOFF)



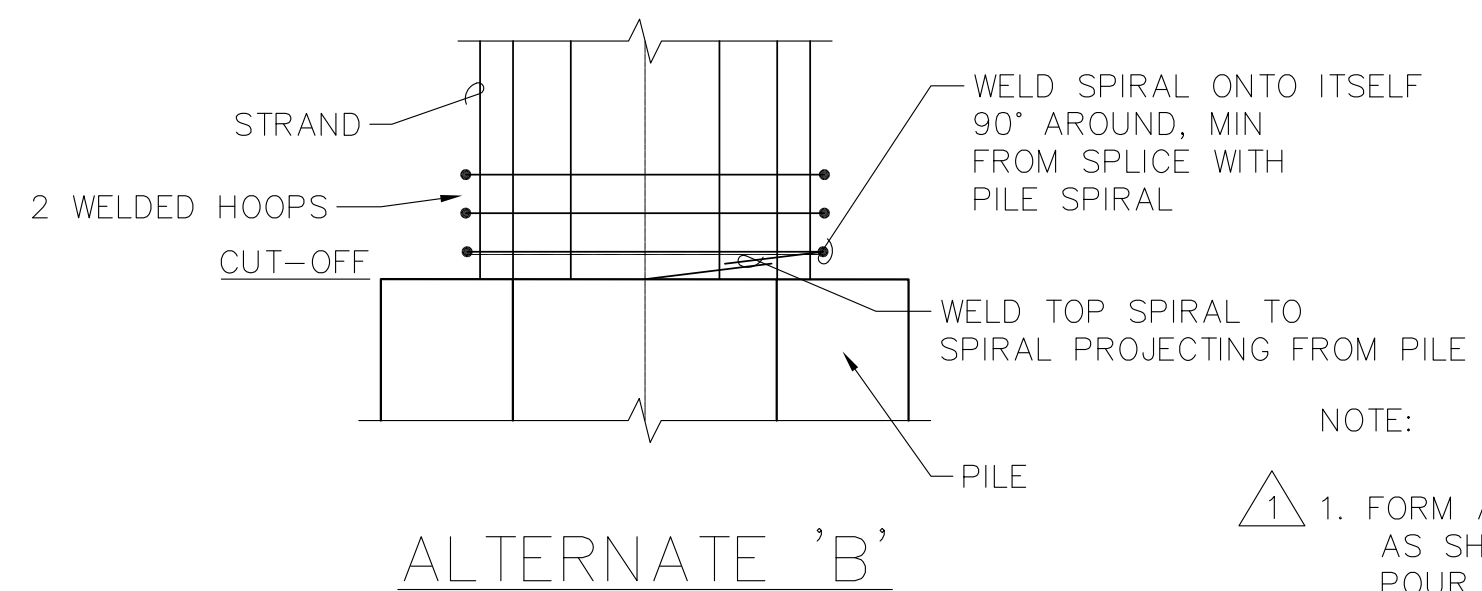
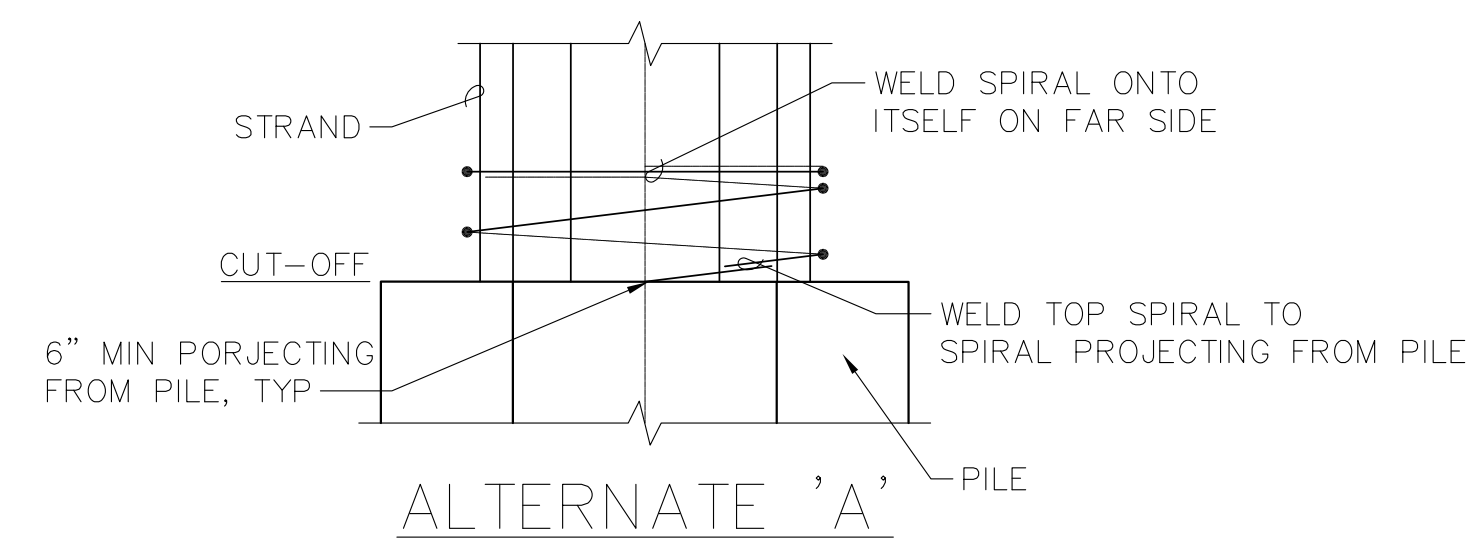
3
S-7
DETAIL - PILE CUT-OFF @ ROWS
SCALE: 3/4"=1'-0"
(H, J, G.8, H.5 & J.3)



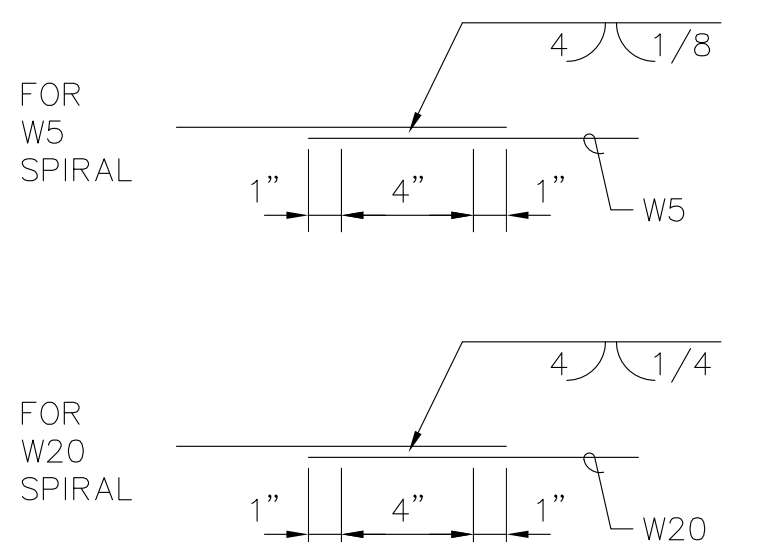
4
S-7
DETAIL - PILE CUT-OFF @ ROW
SCALE: 3/4"=1'-0"



5
S-7
SECTION
SCALE: 1 1/2"=1'-0"



6
S-7
ALTERNATE SPIRAL DETAILS
SCALE: 1 1/2" = 1'-0"



- NOTE:
1. FORM AND POUR SIKADUR 22 LOW MOD EPOXY RESIN AS SHOWN, AROUND FULL PERIMETER OF PILE. POUR AND CURE PER MANUFACTURERS SPECIFICATIONS FOR A TACK FREE SURFACE.
 2. FOR STEEL PIPE PILES & SHEET PILE CUT-OFF DETAILS, SEE DWG S-22.

AS-BUILT

AUTOCAD FILE NO. **5012S7**

S-7

DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **16** OF **58**



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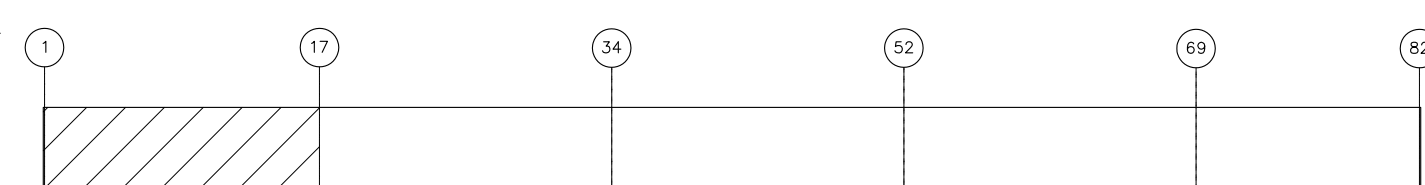
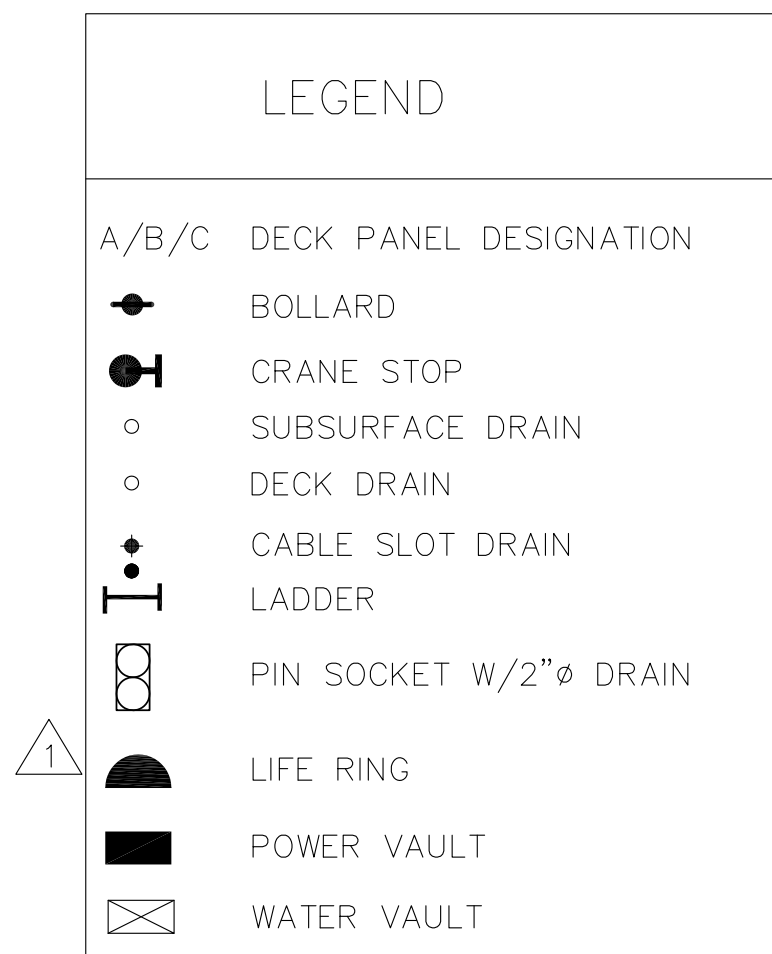
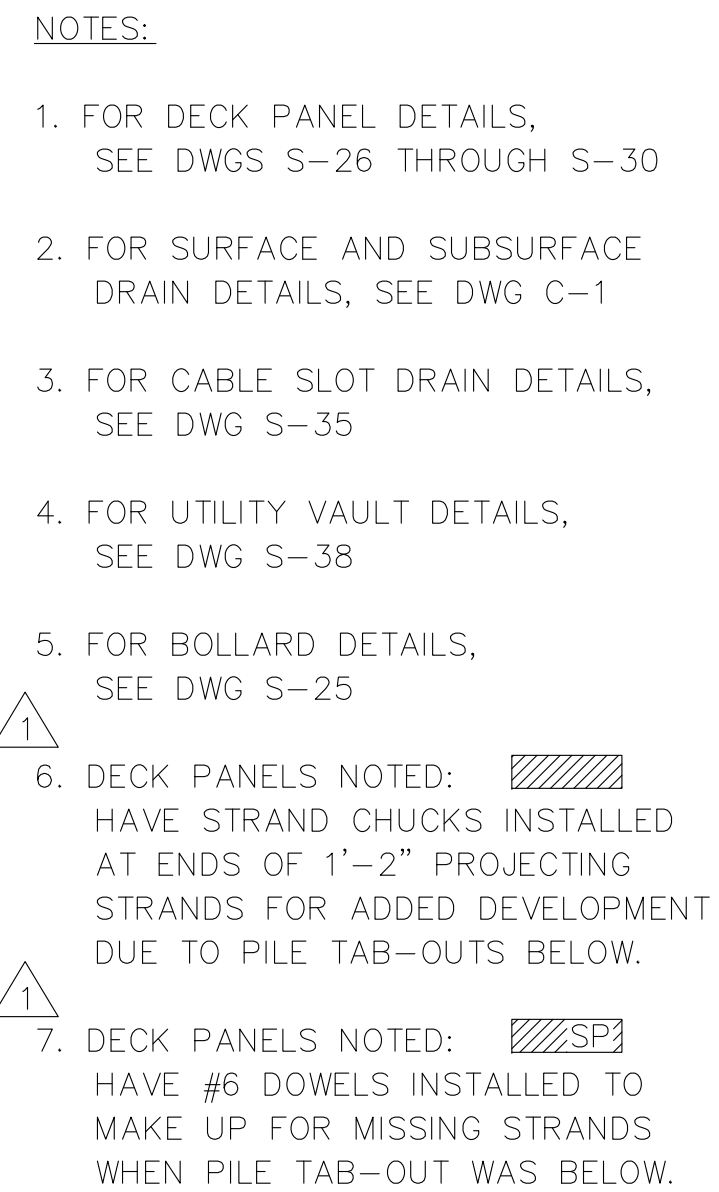
DATE
CURTIS L. RATCLIFFE P.E.
CHIEF ENGINEER

MMMD
DRAWN BY
DATE
9/91
DESIGNED BY
DATE
9/91

BCM
CHECKED BY
DATE
9/91
PROJ ENGR
DATE
9/91

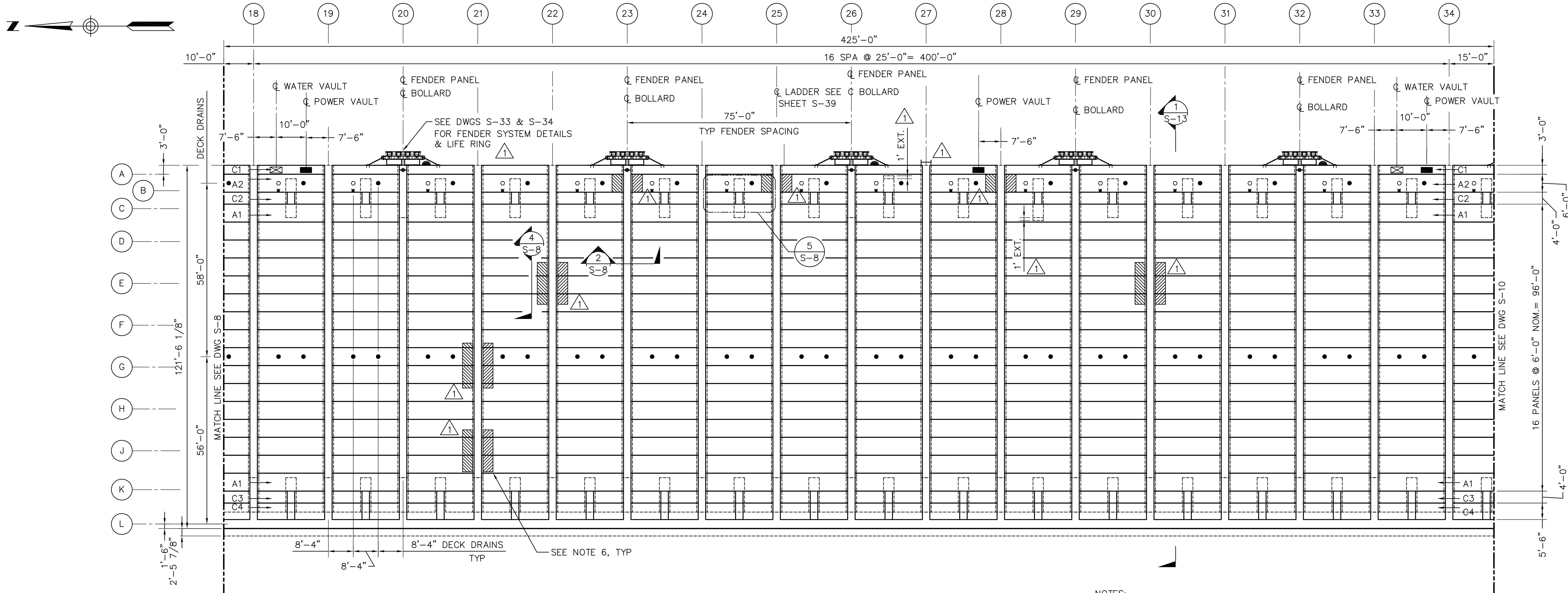
AS-BUILT	RDD	JAS	1/4/99
MARK	REVISION	BY	APP. DATE

HYUNDAI MERCHANT MARINE TERMINAL WHARF
PORT OF TACOMA
PILE TO PILE CAP CONNECTION DETAILS



S-8

DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **17** OF **58**



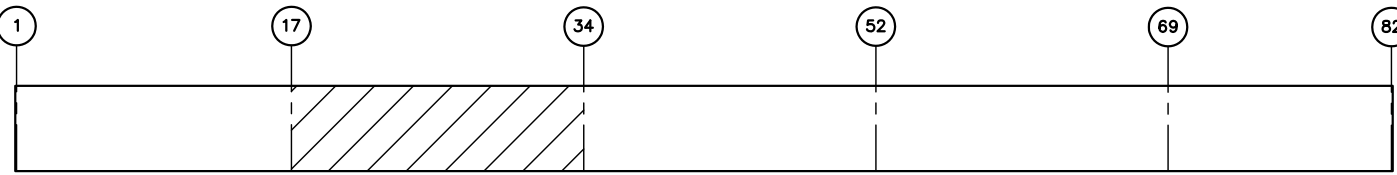
1 DECK PLAN
S-9 SCALE: 1/16"=1'-0"

NOTES:

- FOR DECK PANEL DETAILS, SEE DWGS S-26 THROUGH S-30
- FOR SURFACE AND SUBSURFACE DRAIN DETAILS, SEE DWG C-1
- FOR CABLE SLOT DRAIN DETAILS, SEE DWG S-35
- FOR UTILITY VAULT DETAILS, SEE DWG S-38
- FOR BOLLARD DETAILS, SEE DWG S-25

1 6. DECK PANELS NOTED: HAVE STRAND CHUCKS INSTALLED AT ENDS OF 1'-2" PROJECTING STRANDS FOR ADDED DEVELOPMENT DUE TO PILE TAB-OUTS BELOW.

LEGEND	
A/B/C	DECK PANEL DESIGNATION
●	BOLLARD
●	CRANE STOP
○	SUBSURFACE DRAIN
○	DECK DRAIN
+	CABLE SLOT DRAIN
I	LADDER
⊠	PIN SOCKET W/2"Ø DRAIN
△	LIFE RING
■	POWER VAULT
⊠	WATER VAULT



KEY PLAN

AS-BUILT

AUTOCAD FILE NO.
5012S9

S-9

DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 18 OF 58



PORT OF TACOMA
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APPROVED

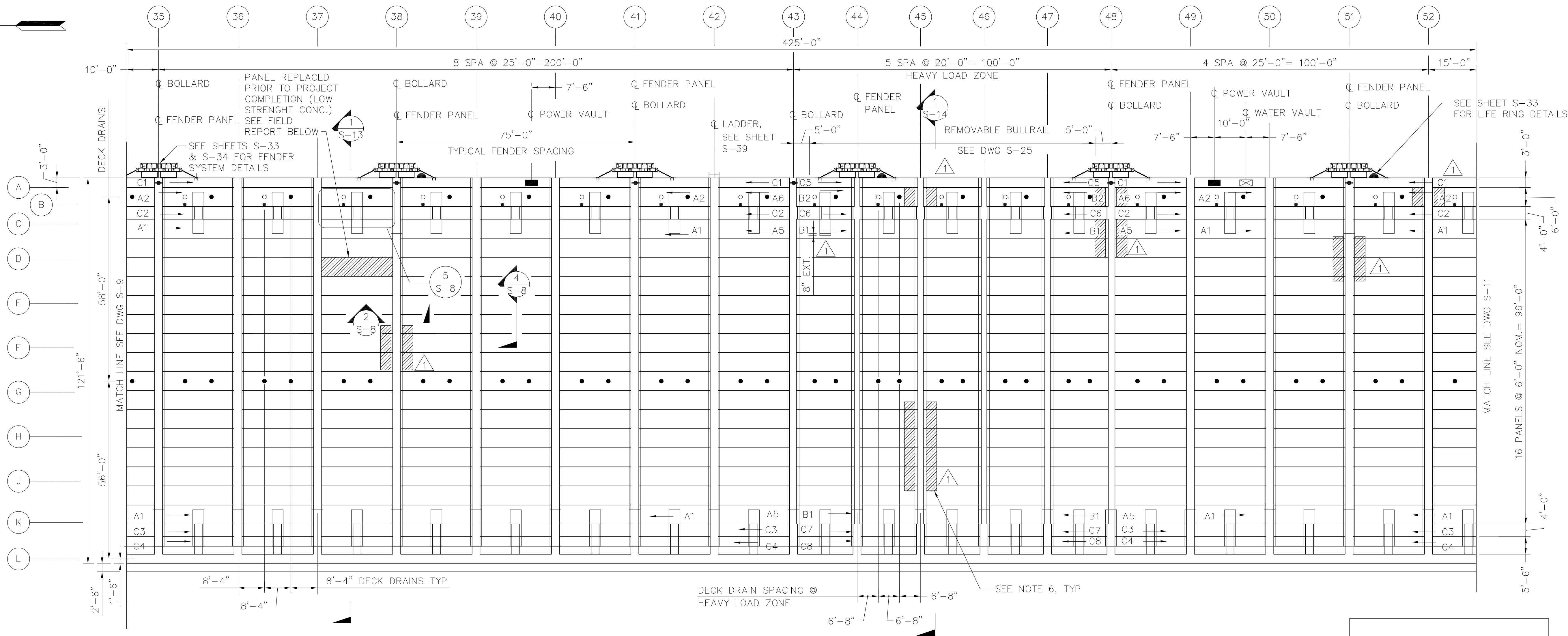
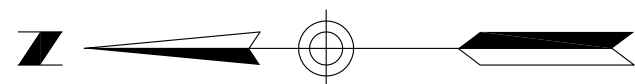
DATE
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**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
DECK PLAN - SHEET 2**



1
S-10 DECK PLAN
SCALE: 1/16"=1'-0"



CONCRETE TECHNOLOGY CORPORATION
FIELD REPORT

DATE: OCTOBER 12, 1998
TO: AMERICAN CONSTRUCTION
FROM: LIZ JOHNSON, PROJECT MANAGER
SUBJECT: HYUNDAI MARINE TERMINAL

CTC JOB NO. 97153

CTC PERFORMED SCHMIDT-HAMMER TESTING ON THE TOP SURFACE OF THE DECK PANELS BETWEEN BENTS 36 AND 39. THE TROWELED SURFACE PRODUCES A WIDER RANGE OF RESULTS THAN HAMMER READINGS ON A FORMED SURFACE. TYPICAL READINGS WERE FROM 34 TO 49 WITH MOST READINGS BETWEEN 36-42.

THE DECK THAT WAS REMOVED (BETWEEN BENTS 37 & 38, AT D2) HAD HAMMER READINGS THAT VARIED FROM 17 TO 44. THE END AT BENT 37 WAS HARDEST, WITH HAMMER READINGS THAT WERE COMPARABLE TO SURROUNDING PANELS. THE OTHER END WAS SOFTER, WITH READINGS IN THE 22-30 RANGE. THE MIDDLE SECTION OF THIS PANEL HAD THE SOFTEST HAMMER READINGS RANGING FROM 17-24. THERE WAS CLEARLY A DIFFERENCE IN THE HAMMER READINGS ON THIS DECK PANEL.

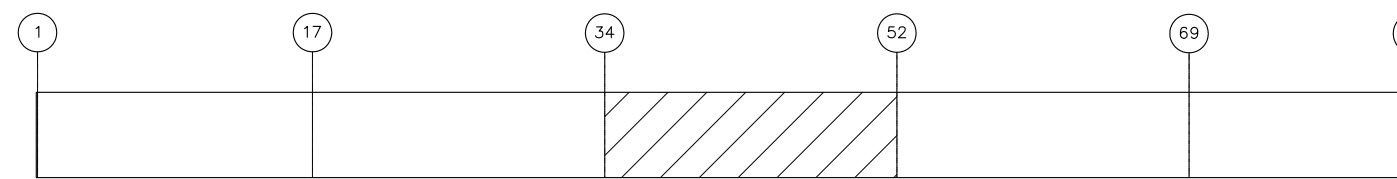
BASED ON THESE RESULT, WE ARE CONFIDENT THAT THE DEFECTIVE BATCH OF CONCRETE WAS PLACED ENTIRELY IN THE DECK PANEL THAT WE REMOVED.

NOTES:

- FOR DECK PANEL DETAILS, SEE DWGS S-26 THROUGH S-30
- FOR SURFACE AND SUBSURFACE DRAIN DETAILS, SEE DWG C-1
- FOR CABLE SLOT DRAIN DETAILS, SEE DWG S-35
- FOR UTILITY VAULT DETAILS, SEE DWG S-38
- FOR BOLLARD DETAILS, SEE DWG S-25
- DECK PANELS NOTED: HAVE STRAND CHUCKS INSTALLED AT ENDS OF 1'-2" PROJECTING STRANDS FOR ADDED DEVELOPMENT DUE TO PILE TAB-OUTS BELOW.

LEGEND

- A/B/C DECK PANEL DESIGNATION
- BOLLARD
- CRANE STOP
- SUBSURFACE DRAIN
- DECK DRAIN
- CABLE SLOT DRAIN
- LADDER
- PIN SOCKET W/2"Ø DRAIN
- LIFE RING
- POWER VAULT
- WATER VAULT



KEY PLAN

AS-BUILT

AUTOCAD FILE NO. 5012S10 S-10

DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 19 OF 58



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APPROVED

DATE
CURTIS L. RATCLIFFE P.E.
CHIEF ENGINEER

MMMD

9/91
DRAWN BY DATE
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BCM

9/91
CHECKED BY DATE
JAS 9/91
PROJ ENGR DATE



AS-BUILT

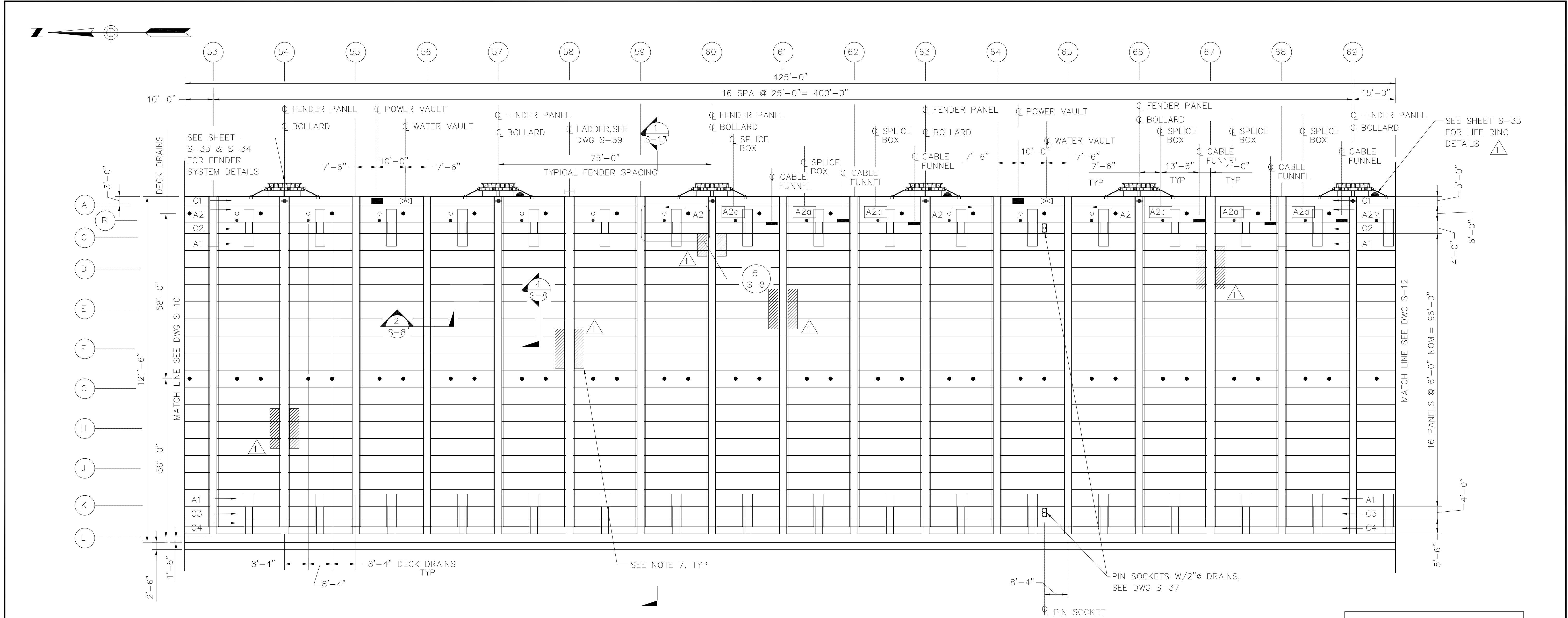
RDD JAS 1/4/93

MARK

REVISION

BY APP. DATE

HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
DECK PLAN - SHEET 3



1 DECK PLAN
SCALE: 1/16"=1'-0"

NOTES:

- FOR DECK PANEL DETAILS, SEE DWGS S-26 THROUGH S-30
- FOR SURFACE AND SUBSURFACE DRAIN DETAILS, SEE DWG C-1
- FOR CABLE SLOT DRAIN DETAILS, SEE DWG S-35
- FOR UTILITY VAULT DETAILS, SEE DWG S-38
- FOR BOLLARD DETAILS, SEE DWG S-2
- FOR CRANE POWER SPlice BOX AND CABLE FUNNEL DETAILS, SEE DWG S-36. FOR PANELS TYPE 2a DETAILS, SEE DWG S-30
- DECK PANELS NOTED: HAVE STRAND CHUCKS INSTALLED AT ENDS OF 1'-2" PROJECTING STRANDS FOR ADDED DEVELOPMENT DUE TO PILE TAB-OUTS BELOW.

LEGEND	
A/B/C	DECK PANEL DESIGNATION
	BOLLARD
	CRANE STOP
	SUBSURFACE DRAIN
	DECK DRAIN
	CABLE SLOT DRAIN
	LADDER
	PIN SOCKET W/2"Ø DRAIN
	LIFE RING
	POWER VAULT
	WATER VAULT



KEY PLAN

AS-BUILT

AUTOCAD FILE NO. 5012S11 S-11



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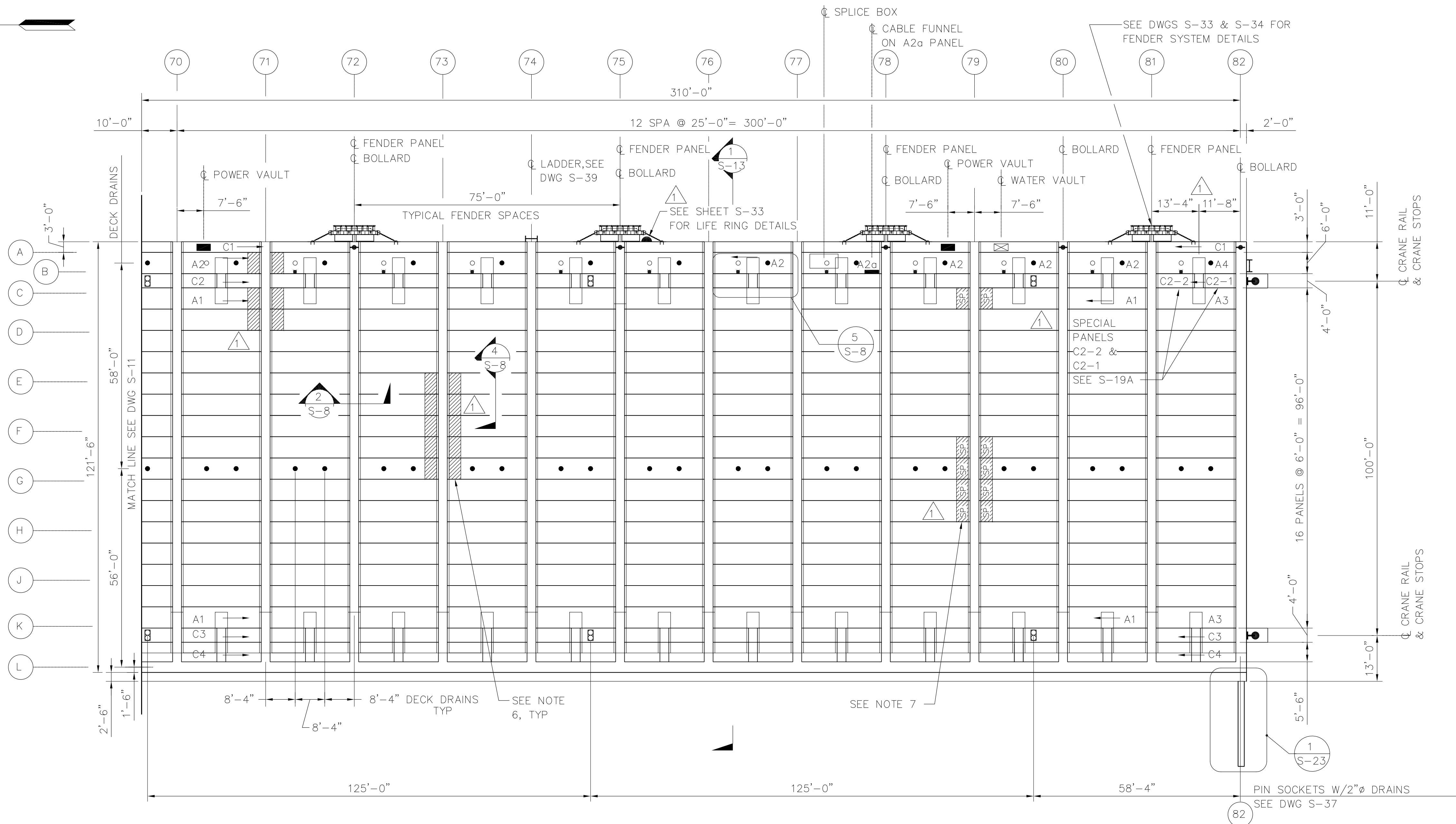
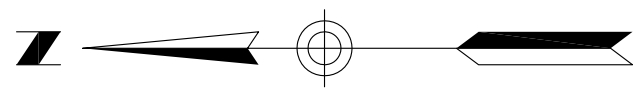
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1	AS-BUILT	RDD	JAS	1/4/93
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HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
DECK PLAN - SHEET 4

DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 20 OF 58



NOTES:

1. FOR DECK PANEL DETAILS, SEE DWGS S- 26 THROUGH S-30.
2. FOR SURFACE AND SUBSURFACE DRAIN DETAILS, SEE DWG C-1.
3. FOR CABLE SLOT DRAIN DETAILS, SEE DWG S-35.
4. FOR UTILITY VAULT DETAILS, SEE DWG S-38.
5. FOR BOLLARD DETAILS, SEE DWG S-25

1 6. DECK PANELS NOTED: HAVE STRAND CHUCKS INSTALLED AT ENDS OF 1'-2" PROJECTING STRANDS FOR ADDED DEVELOPMENT DUE TO PILE TAB-OUTS BELOW.

1 7. DECK PANELS NOTED: HAVE #6 DOWELS INSTALLED TO MAKE UP FOR MISSING STRANDS WHEN PILE TAB-OUT WAS BELOW.

1 DECK PLAN
S-12 SCALE: 1/16"=1'-0"

LEGEND

- A/B/C DECK PANEL DESIGNATION
- BOLLARD
 - CRANE STOP
 - SUBSURFACE DRAIN
 - DECK DRAIN
 - CABLE SLOT DRAIN
 - LADDER
 - PIN SOCKET W/2" DRAIN
 - LIFE RING
 - POWER VAULT
 - WATER VAULT



KEY PLAN

AS-BUILT

AUTOCAD FILE NO.
5012S12

S-12

DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **21** OF **58**



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DATE

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DATE

DATE

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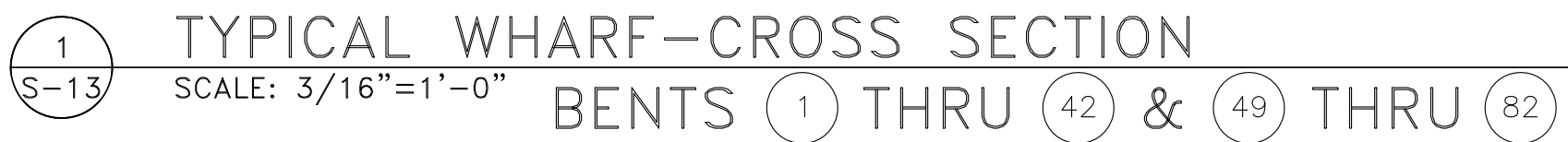
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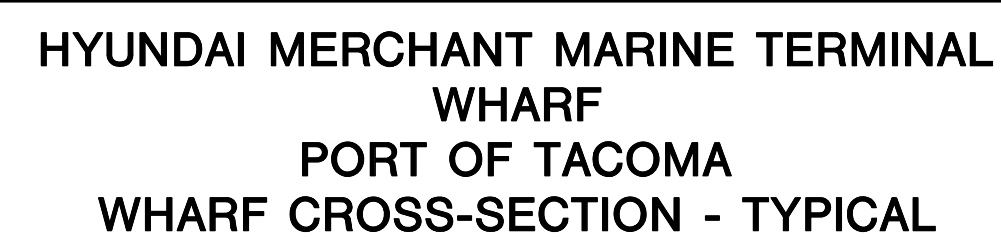
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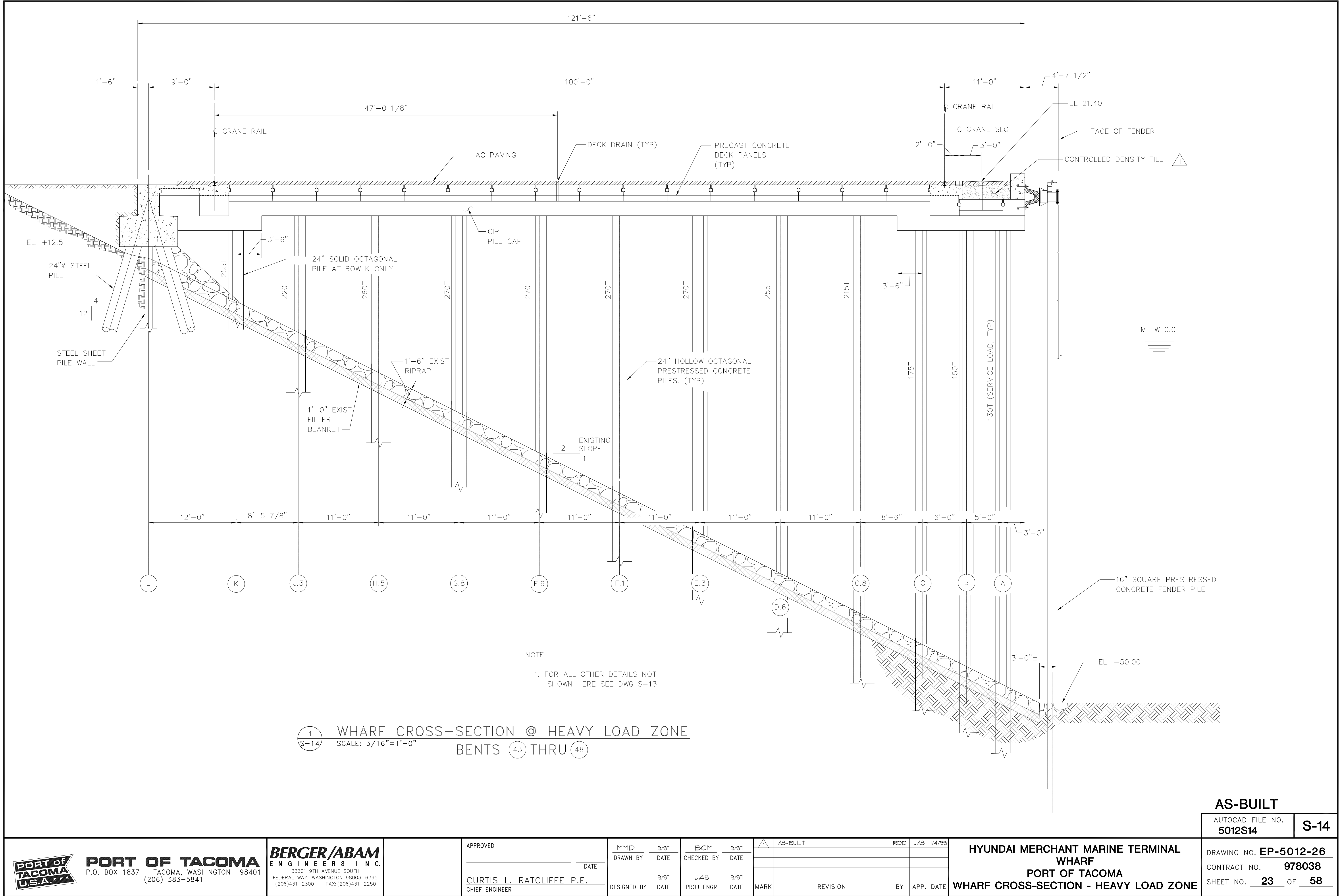
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**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
DECK PLAN - SHEET 5**



DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **22** OF **58**





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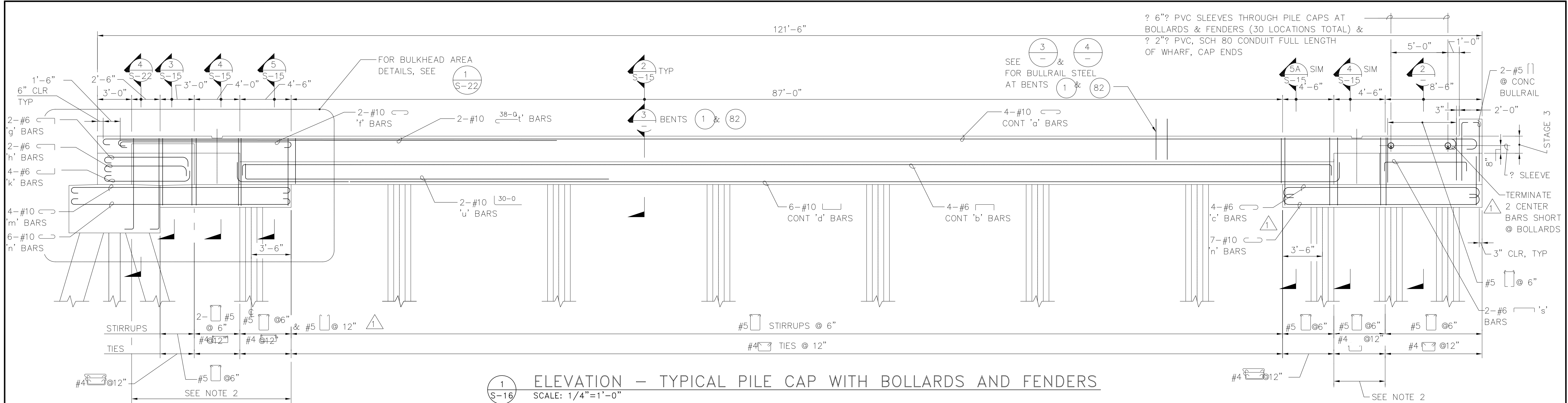
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CHIEF ENGINEER

DESIGNED BY MMD **DATE** 9/91
DRAWN BY BCM **DATE** 9/91
CHECKED BY JAS **DATE** 9/91
PROJ ENGR JAS **DATE** 9/91

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RDD JAS 1/4/93

HYUNDAI MERCHANT MARINE TERMINAL WHARF
PORT OF TACOMA
WHARF CROSS-SECTION - HEAVY LOAD ZONE

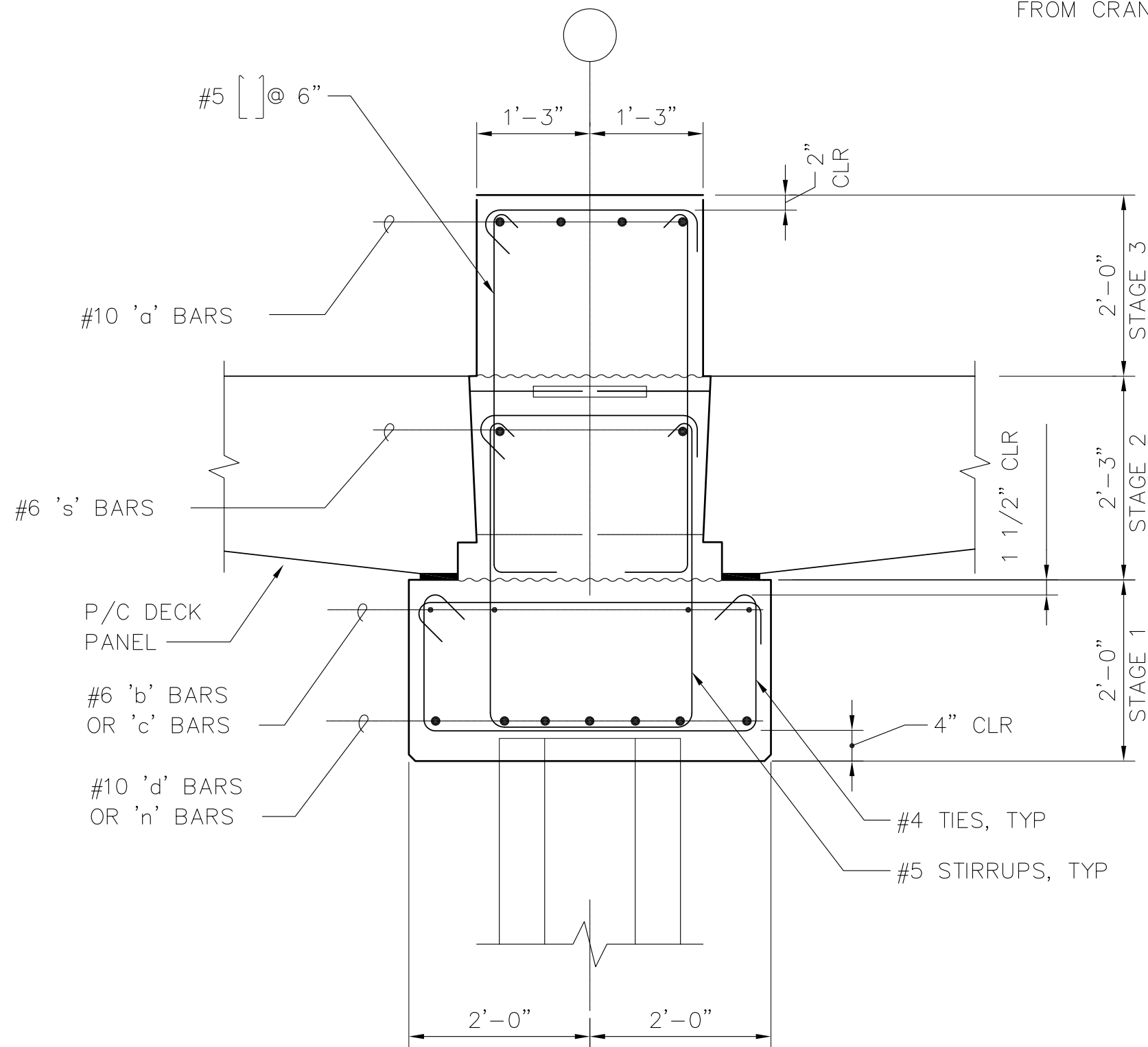
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AUTOCAD FILE NO. 5012S14
DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 23 OF 58



1 ELEVATION – TYPICAL PILE CAP WITH BOLLARDS AND FENDERS
SCALE: 1/4"=1'-0"

NOTES:

- SEE DWGS S-8 THRU S-12 FOR LOCATIONS OF TYPICAL CAPS WITH BOLLARDS OR FENDERS AT THE BULLRAIL
- COORDINATE STIRRUP PLACEMENT IN PILE CAP TO MISS BARS PROJECTING FROM CRANE BEAM PANELS AND PANELS ADJACENT TO BULKHEAD.
- CONSECUTIVE STIRRUP CAP BARS SHALL HAVE THEIR 90° HOOKS ON OPPOSITE SIDES.
- FOR SLEEVES AT WATER LINES, SEE DWG C-2, FOR SLEEVES AT POWER AND GROUND WIRE LOCATIONS, SEE ELECTRICAL DRAWINGS.

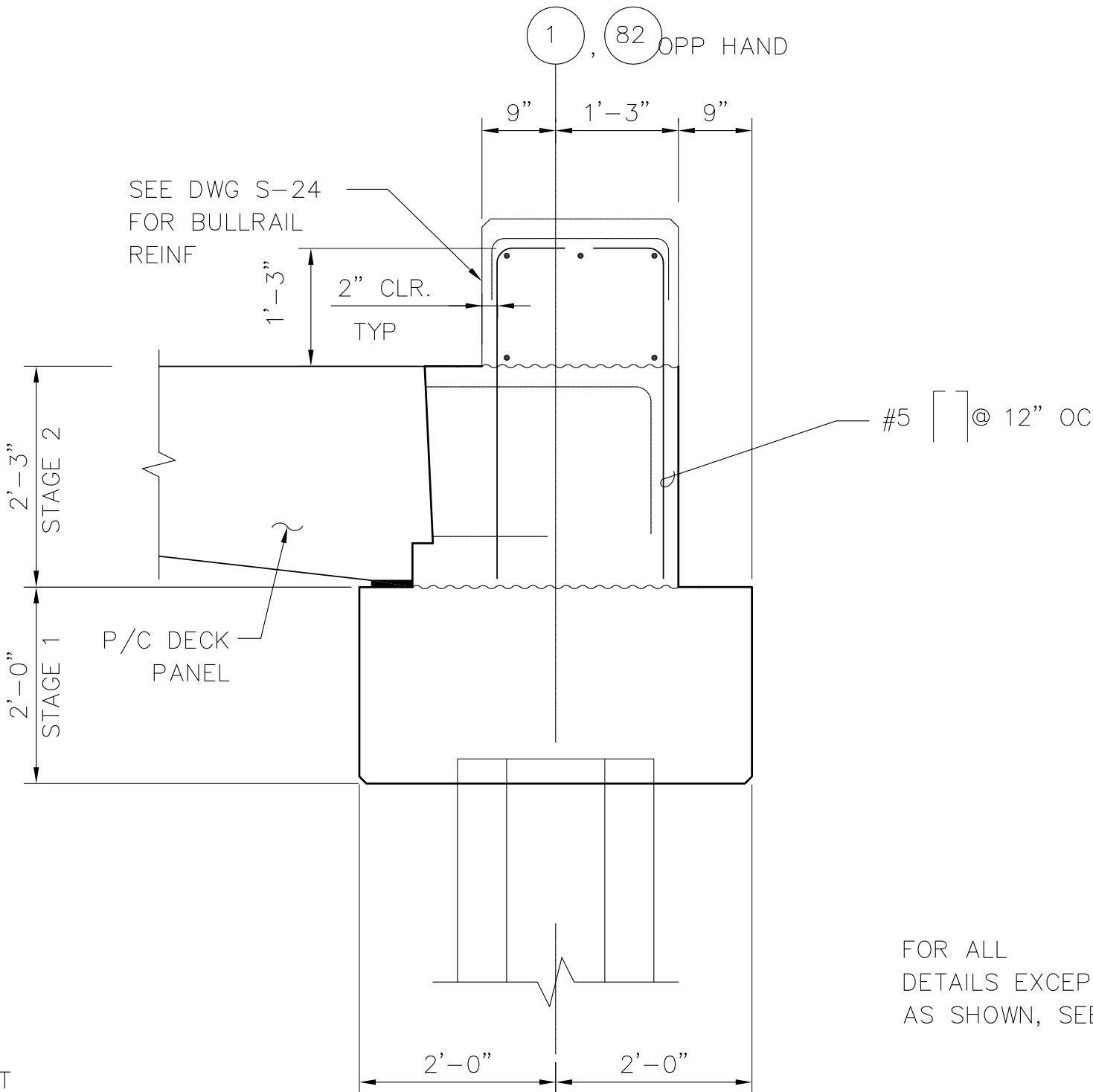


2 SECTION – TYPICAL PILE CAPS @ BOLLARDS & FENDERS, BALLAST AREA
SCALE: 3/4"=1'-0"

NOTES:

- FOR BOLLARD REINF SEE DWG S-25
- FOR ALL DETAILS EXCEPT AS SHOWN, SEE

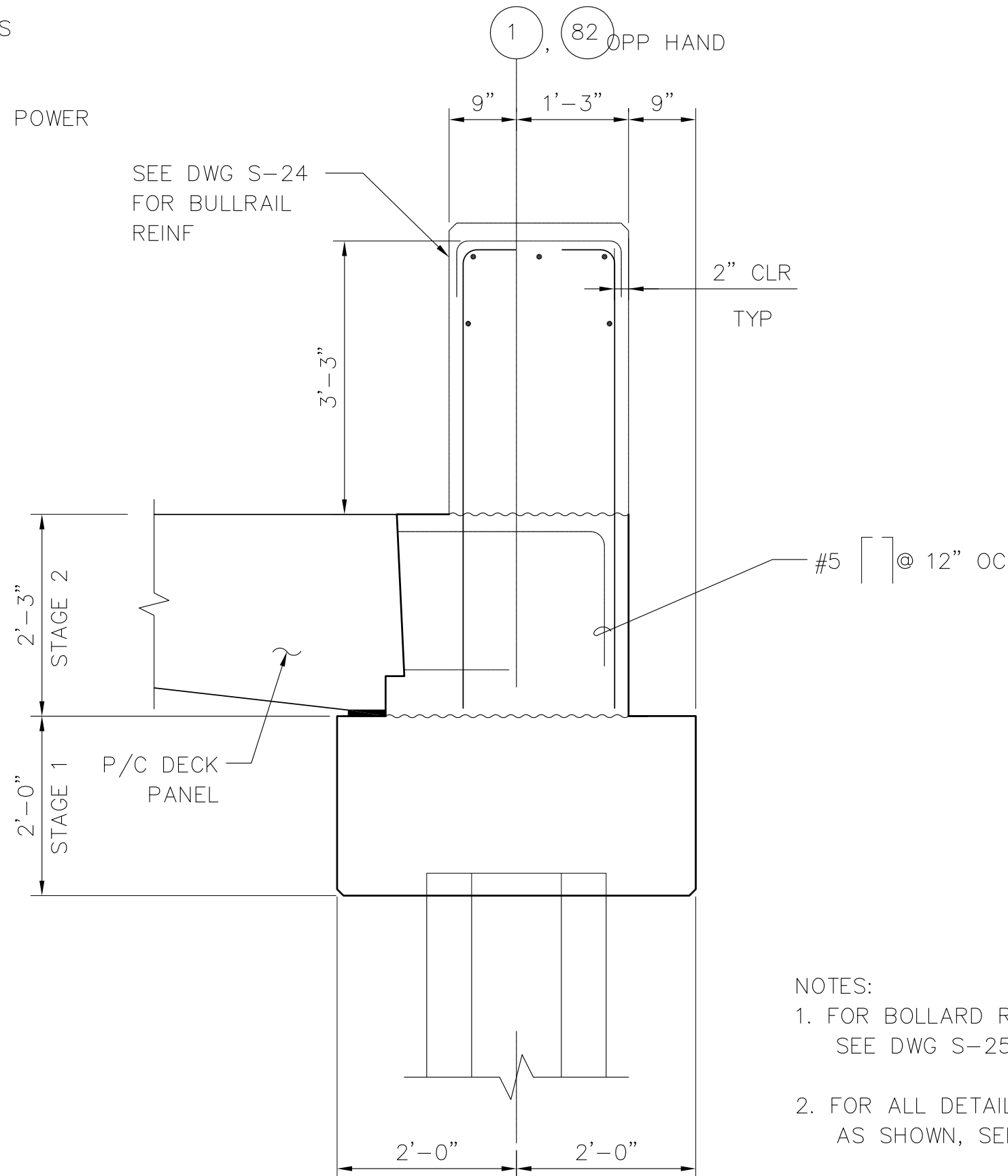
2 S-15



3 SECTION – PILE CAP @ BENT 1 (BENT 82 OPP HAND)
SCALE: 3/4"=1'-0"

FOR ALL DETAILS EXCEPT AS SHOWN, SEE

2 S-15



4 SECTION – PILE CAP @ BENT 1 BALLAST AREA (BENT 82 OPP HAND)
SCALE: 3/4"=1'-0"

NOTES:

- FOR BOLLARD REINF SEE DWG S-25
- FOR ALL DETAILS EXCEPT AS SHOWN, SEE

2 S-15

AS-BUILT

AUTOCAD FILE NO. 5012S16

S-16



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CURTIS L. RATCLIFFE P.E.
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MMMD

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PROJ ENGR DATE

AS-BUILT

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MARK

RDD

JAS

BY

1/4/99

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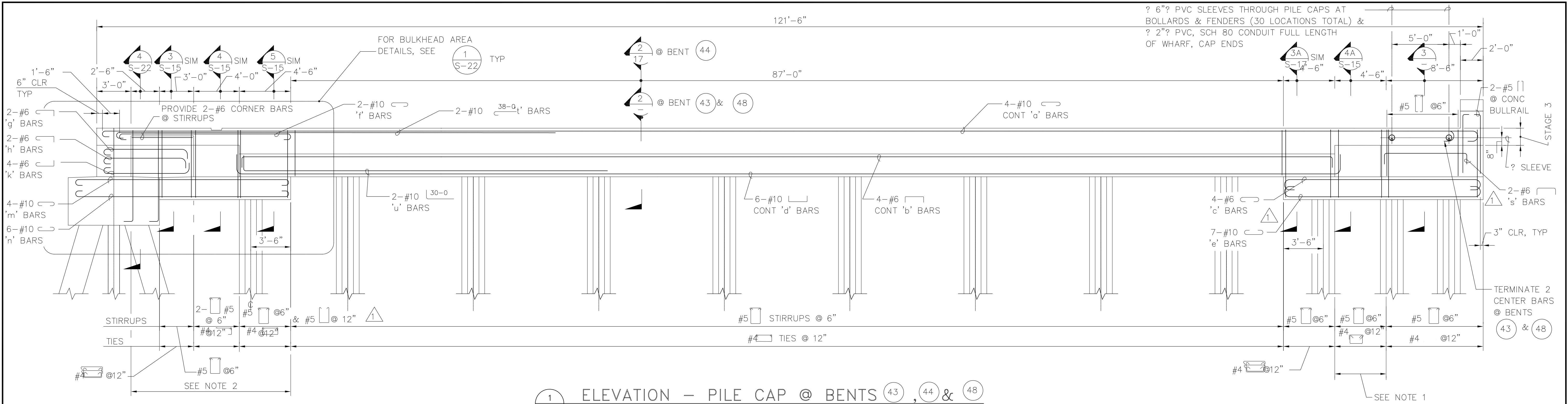
DATE

HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
PILE CAP DETAILS - SHEET 2

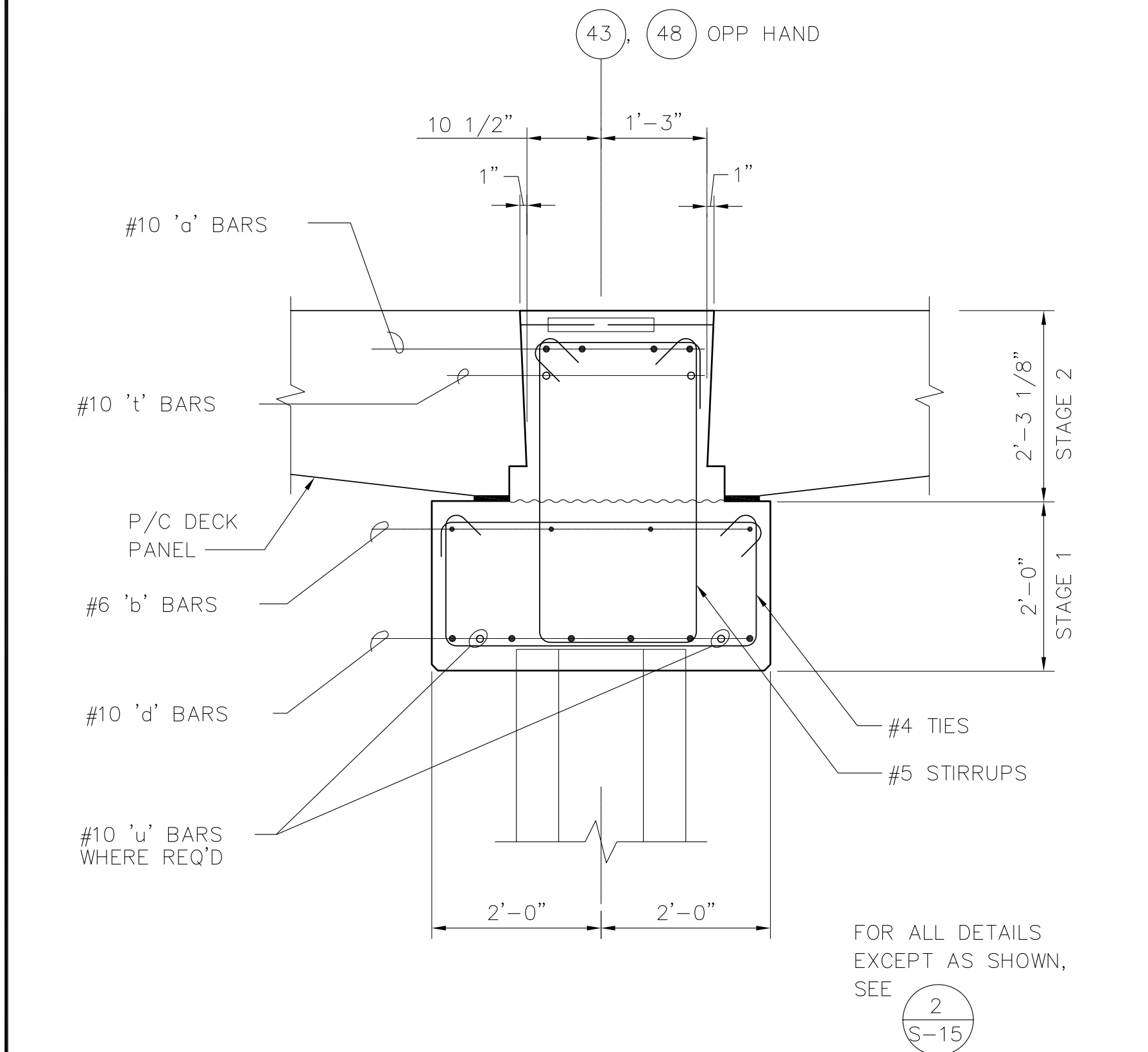
DRAWING NO. EP-5012-26

CONTRACT NO. 978038

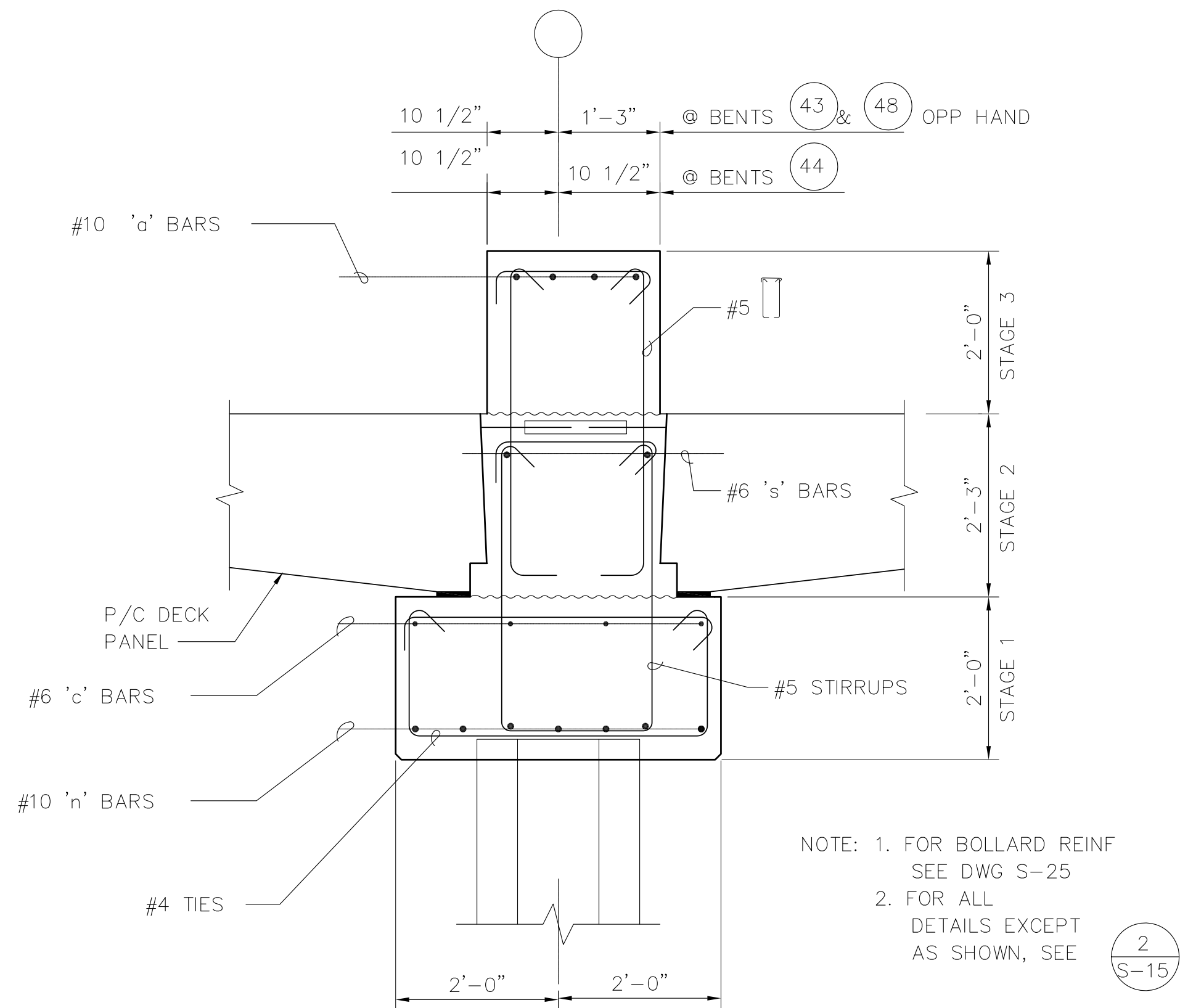
SHEET NO. 25 OF 58



1
S-18 ELEVATION - PILE CAP @ BENTS 43, 44 & 48
SCALE: 1/4"=1'-0"



2
S-18 SECTION - PILE CAP @ BENTS 43 & 48
SCALE: 3/4"=1'-0"



3
S-18 SECTION - PILE CAP @ BENTS 43, 44 & 48
SCALE: 3/4"=1'-0"

BALLAST AREA

NOTES:

- COORDINATE STIRRUP PLACEMENT IN PILE CAP TO MISS BARS PROJECTING FROM CRANE BEAM PANELS AND PANELS ADJACENT TO BULKHEAD.
- CONSECUTIVE STIRRUP CAP BARS SHALL HAVE THEIR 90° HOOKS ON OPPOSITE SIDES.
- FOR SLEEVES AT WATER LINES, SEE DWG C-2, FOR SLEEVES AT POWER AND GROUND WIRE LOCATIONS, SEE ELECTRICAL DRAWINGS.

AS-BUILT

AUTOCAD FILE NO. 5012S18 S-18



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HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
PILE CAP DETAILS - SHEET 4

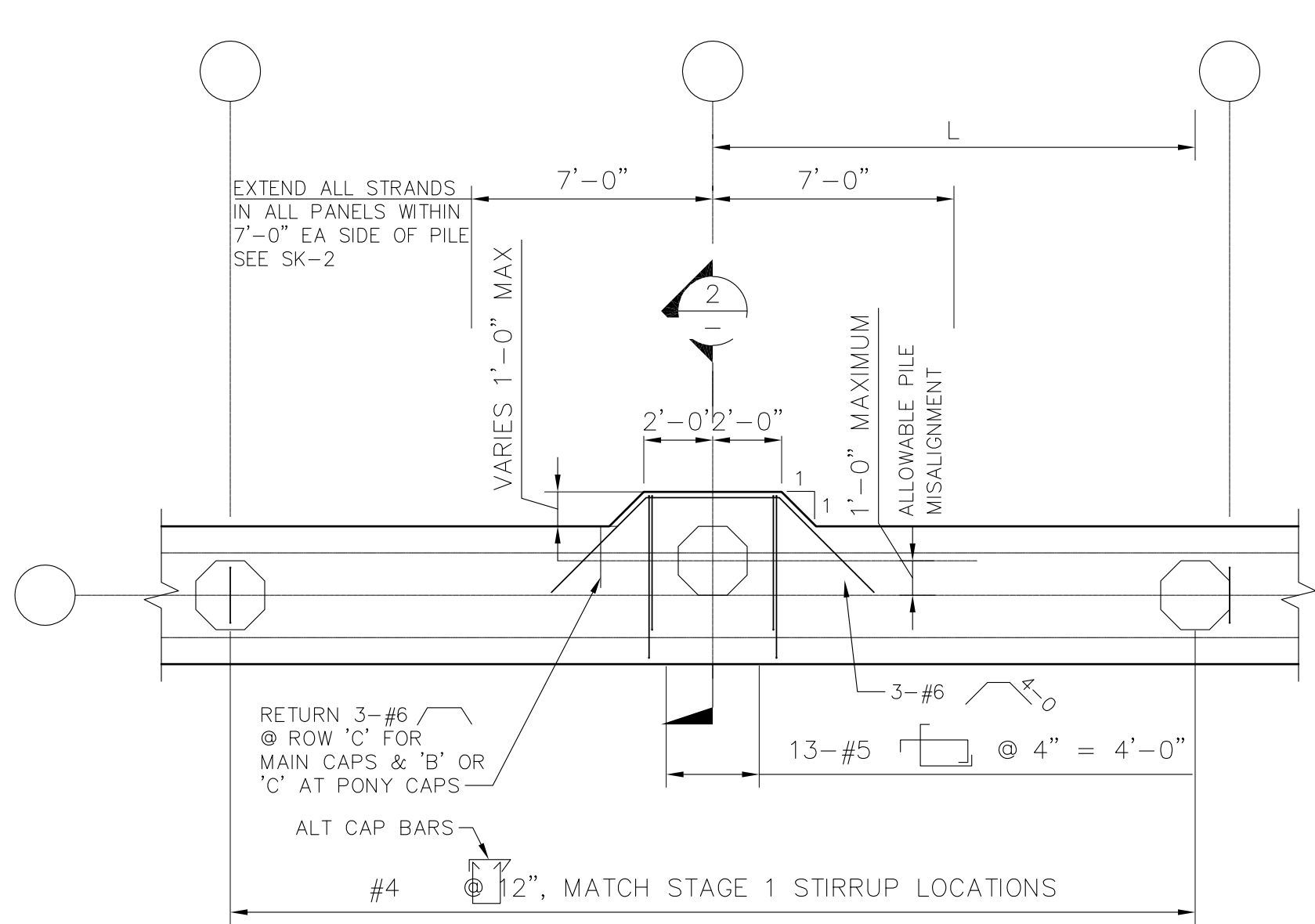
DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 27 OF 58



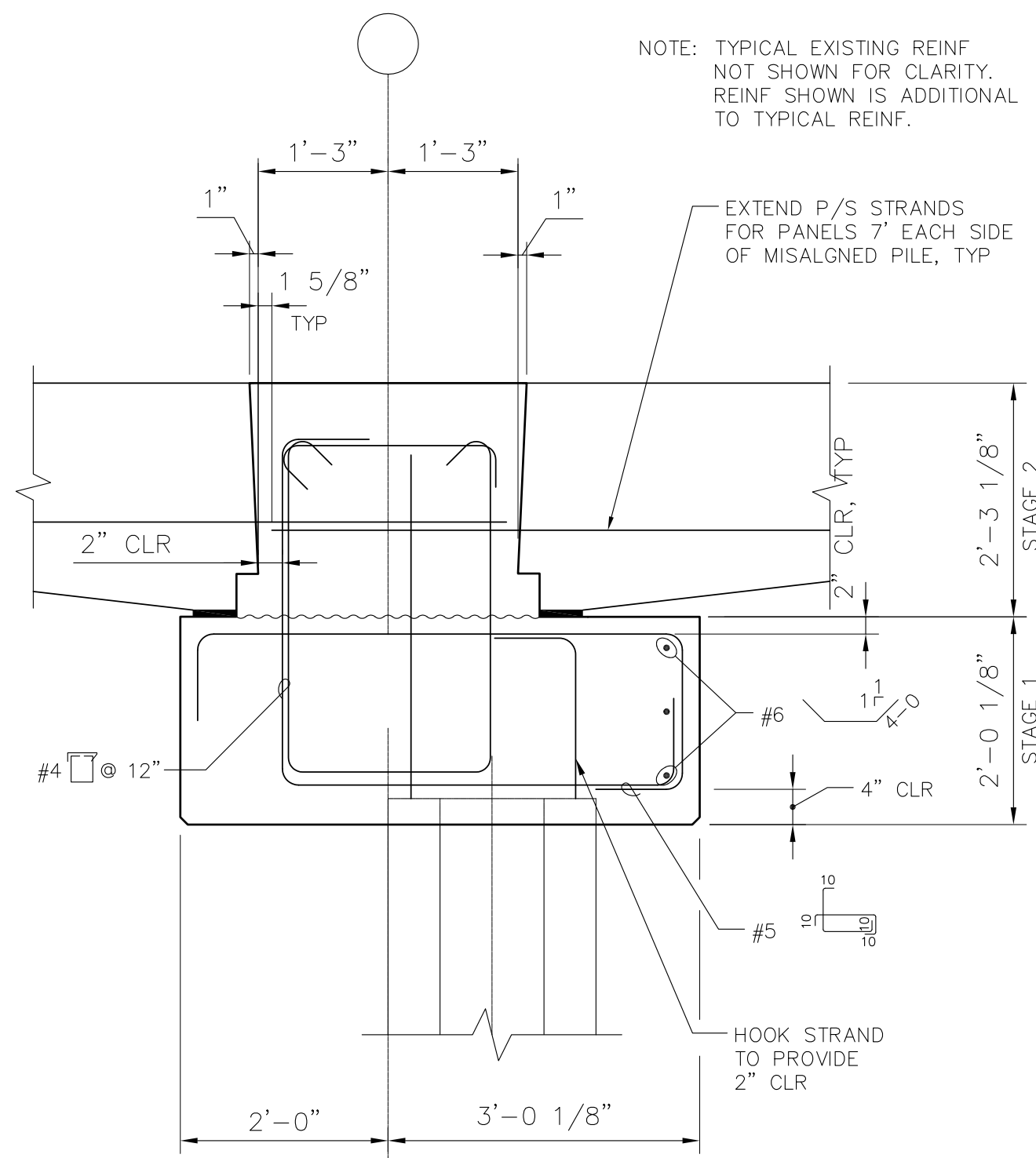
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SHEET NO. **28** OF **58**

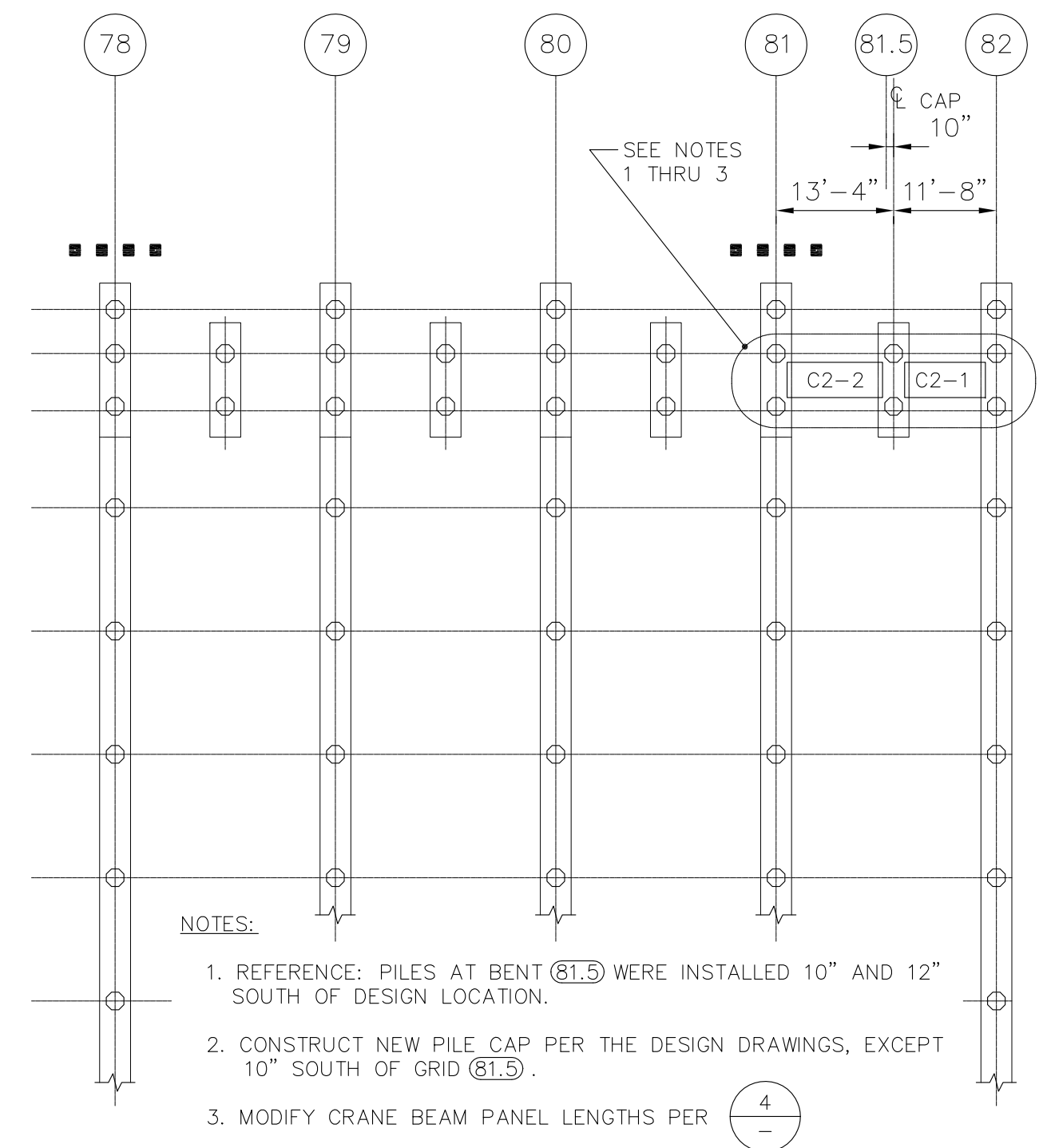
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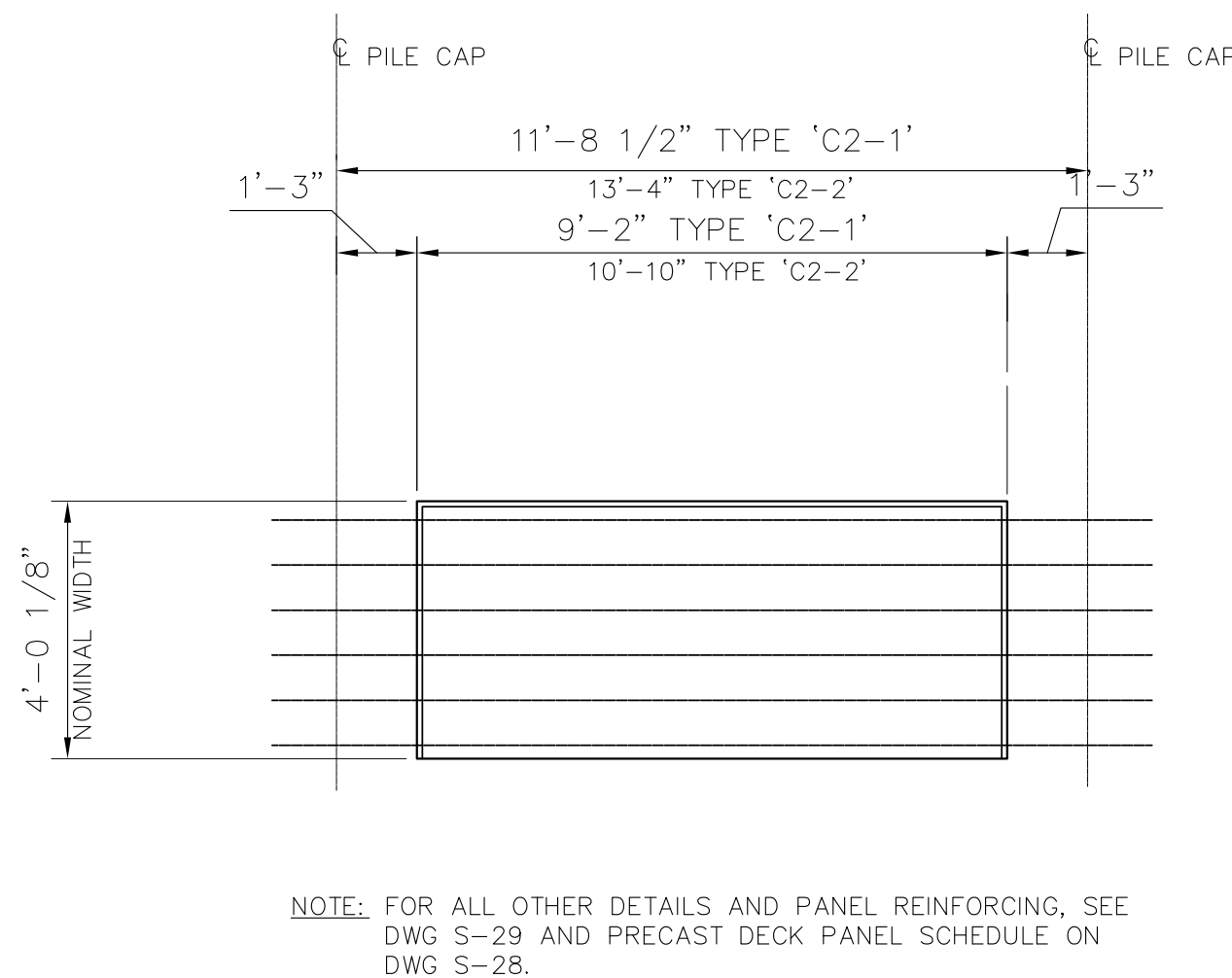
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- PLAN — TAB-OUT FOR MISALIGNED PILE
SCALE: 1/4"=1'-0"



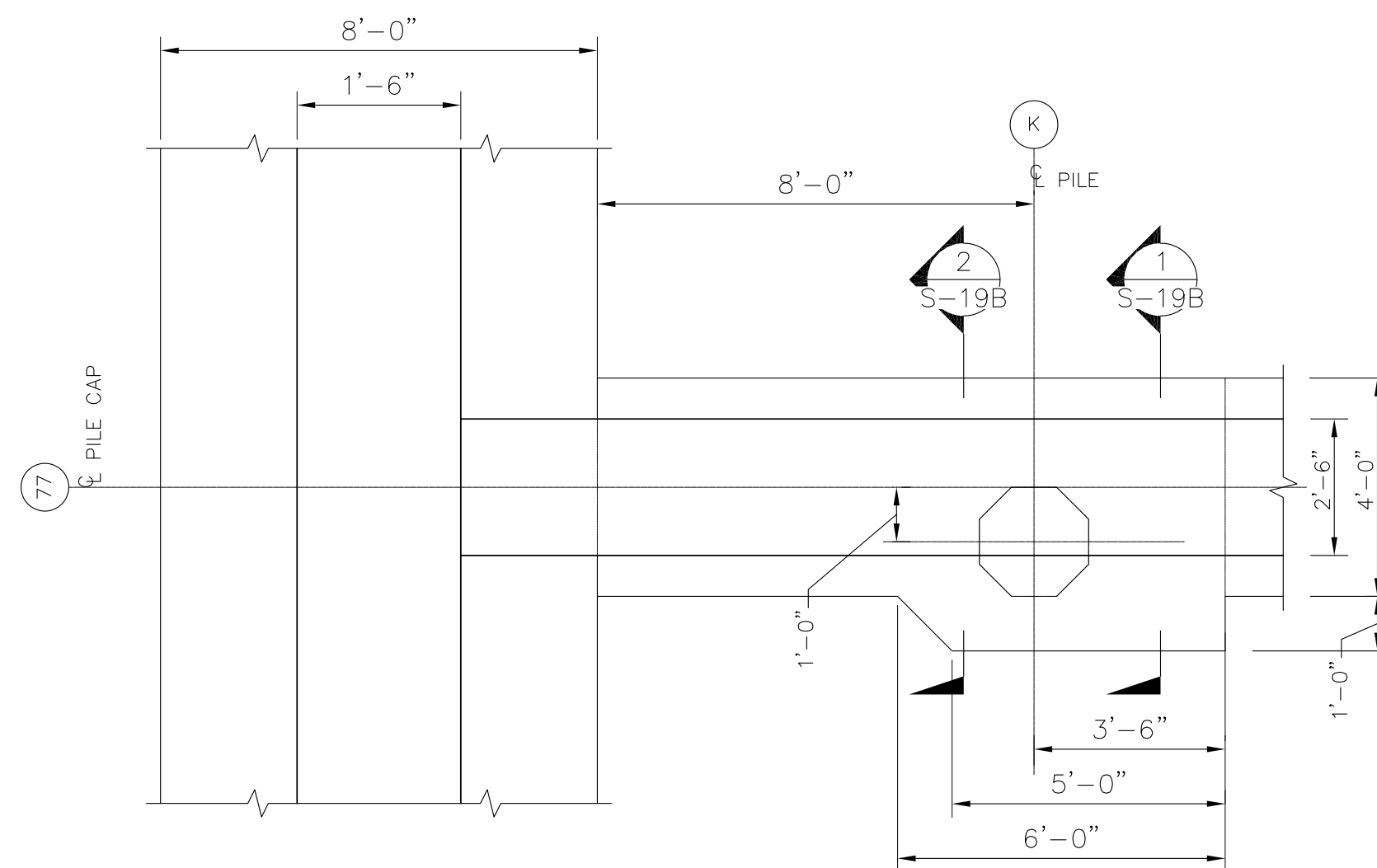
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- DETAIL — ADDITIONAL REINFORCING FOR MISALIGNED PILE
SCALE: 3/4"=1'-0"



3
- PLAN — PILE & PILE CAP
SCALE: 1/16"=1'-0"



4
- PLAN — TYPE 'C2' PANELS SIMILAR
SCALE: 3/4"=1'-0"



5
- PLAN — PILE CAP TABOUT AT 77
SCALE: 3/8"=1'-0"

AS-BUILT

AUTOCAD FILE NO. 5012S19A S-19A



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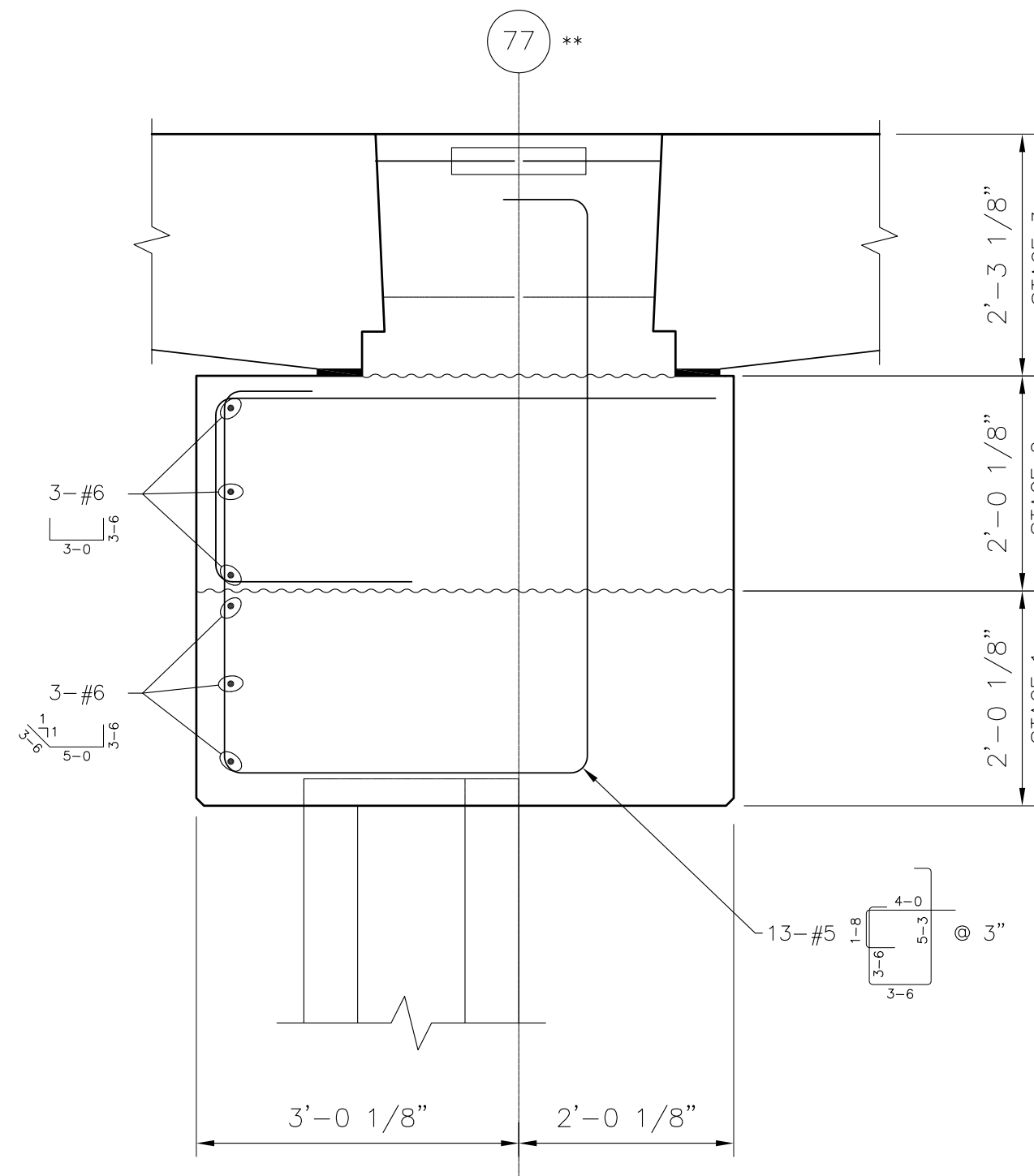
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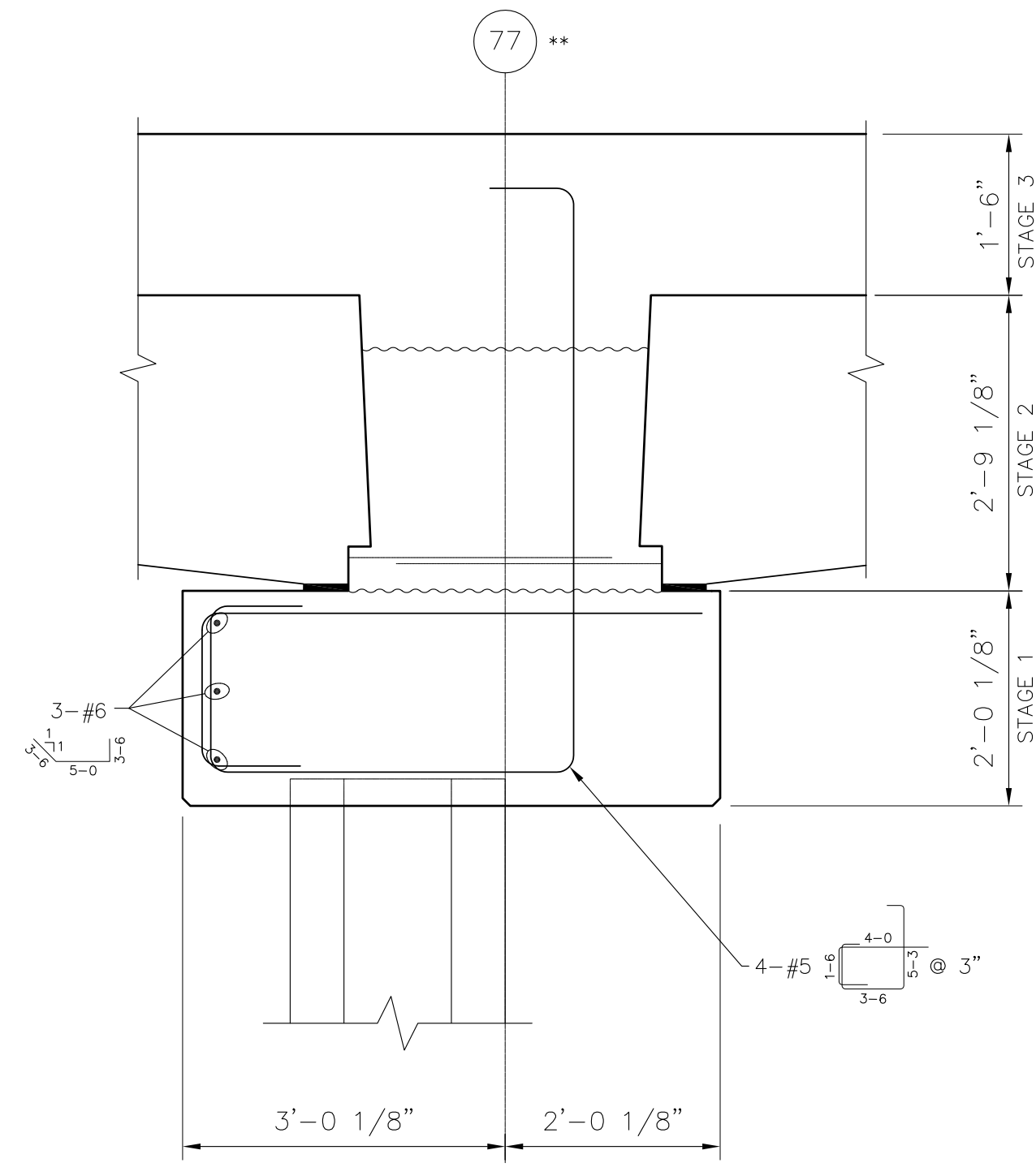
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**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
PILE CAP DETAILS - SHEET 6**

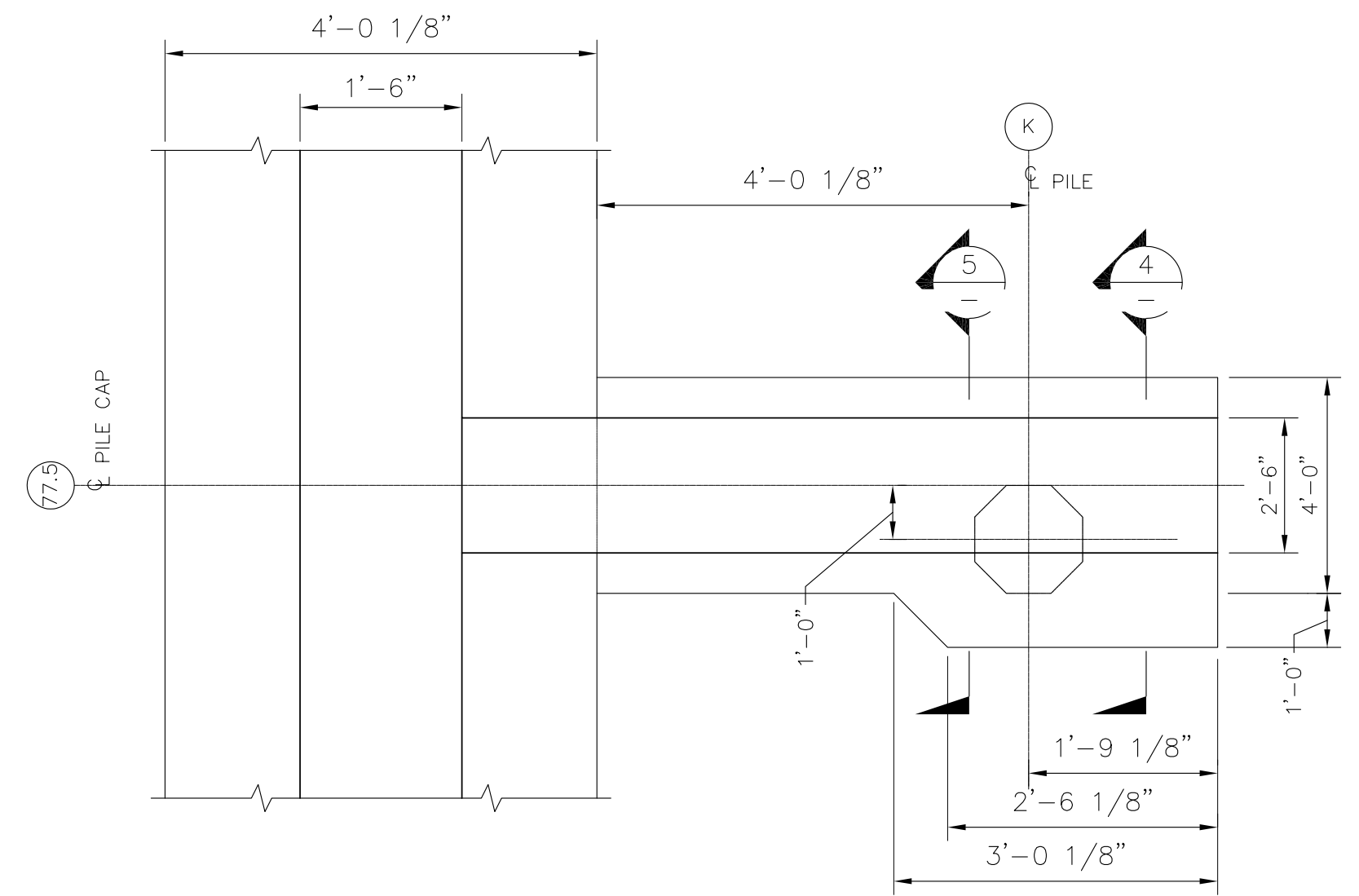
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CONTRACT NO. 978038
SHEET NO. 29 OF 58



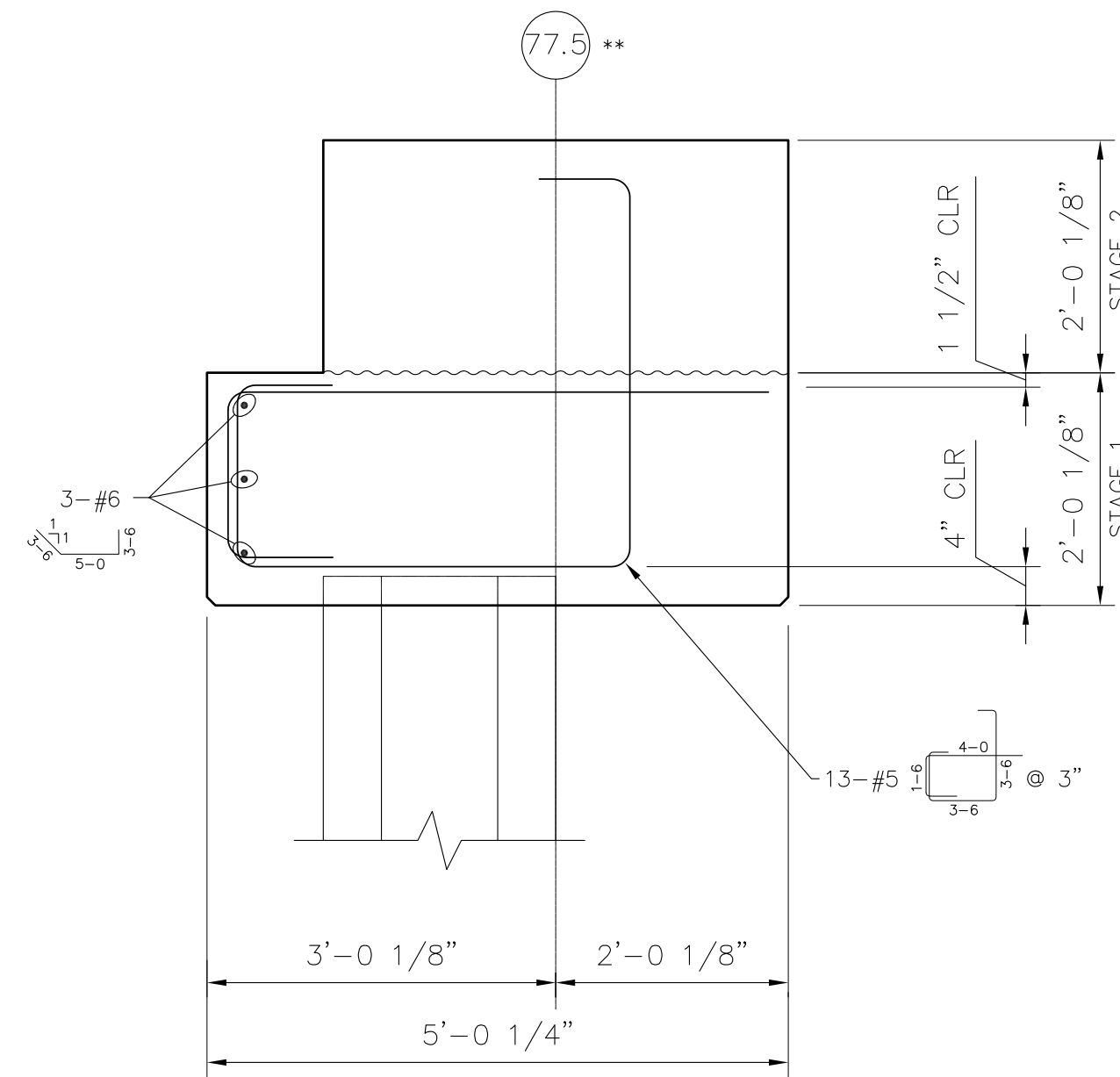
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-
SECTION
SCALE: 3/4"=1'-0"



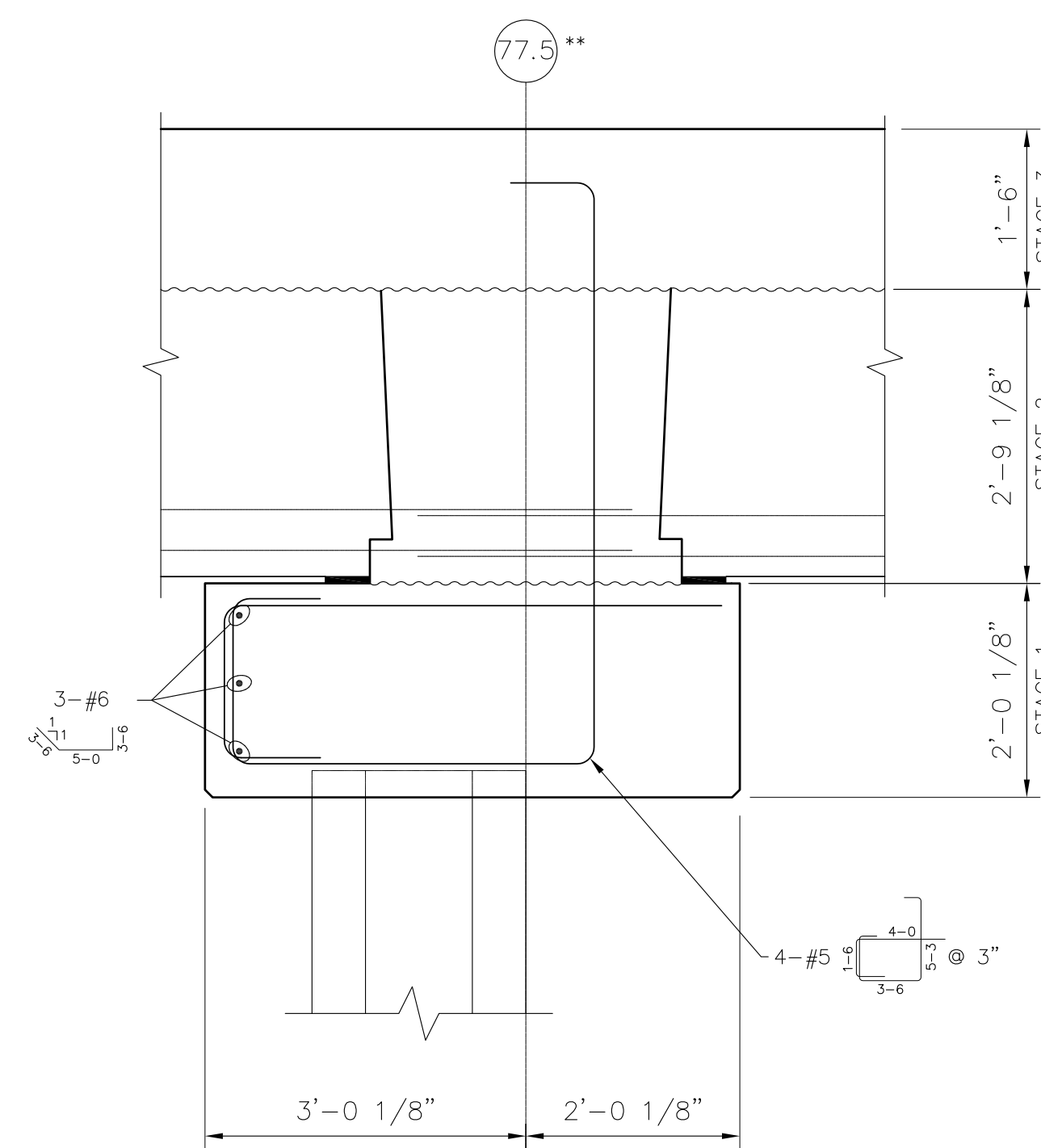
2
-
SECTION
SCALE: 3/4"=1'-0"



3
-
PLAN — PILE CAP TABOUT AT (77.5)
SCALE: 3/4"=1'-0"



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



5
-
SECTION
SCALE: 3/4"=1'-0"

**NOTE: ALL REINFORCING SHOWN
IS IN ADDITION TO
TYPICAL REINFORCEMENT
IN PILE CAPS.

AS-BUILT

AUTOCAD FILE NO.
5012S19B

S-19B



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**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
PILE CAP DETAILS - SHEET 7**

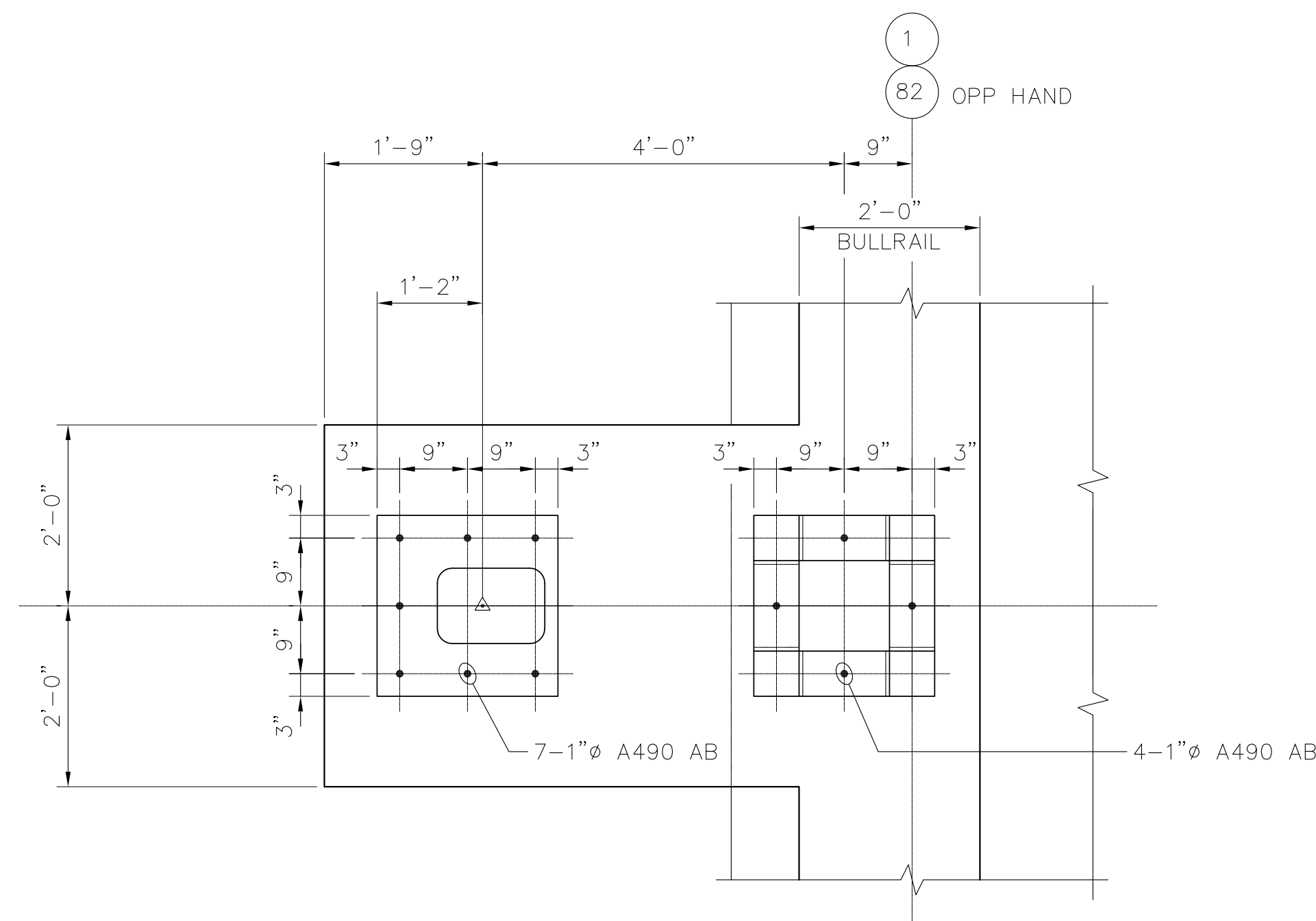
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CONTRACT NO. **978038**
SHEET NO. **30** OF **58**



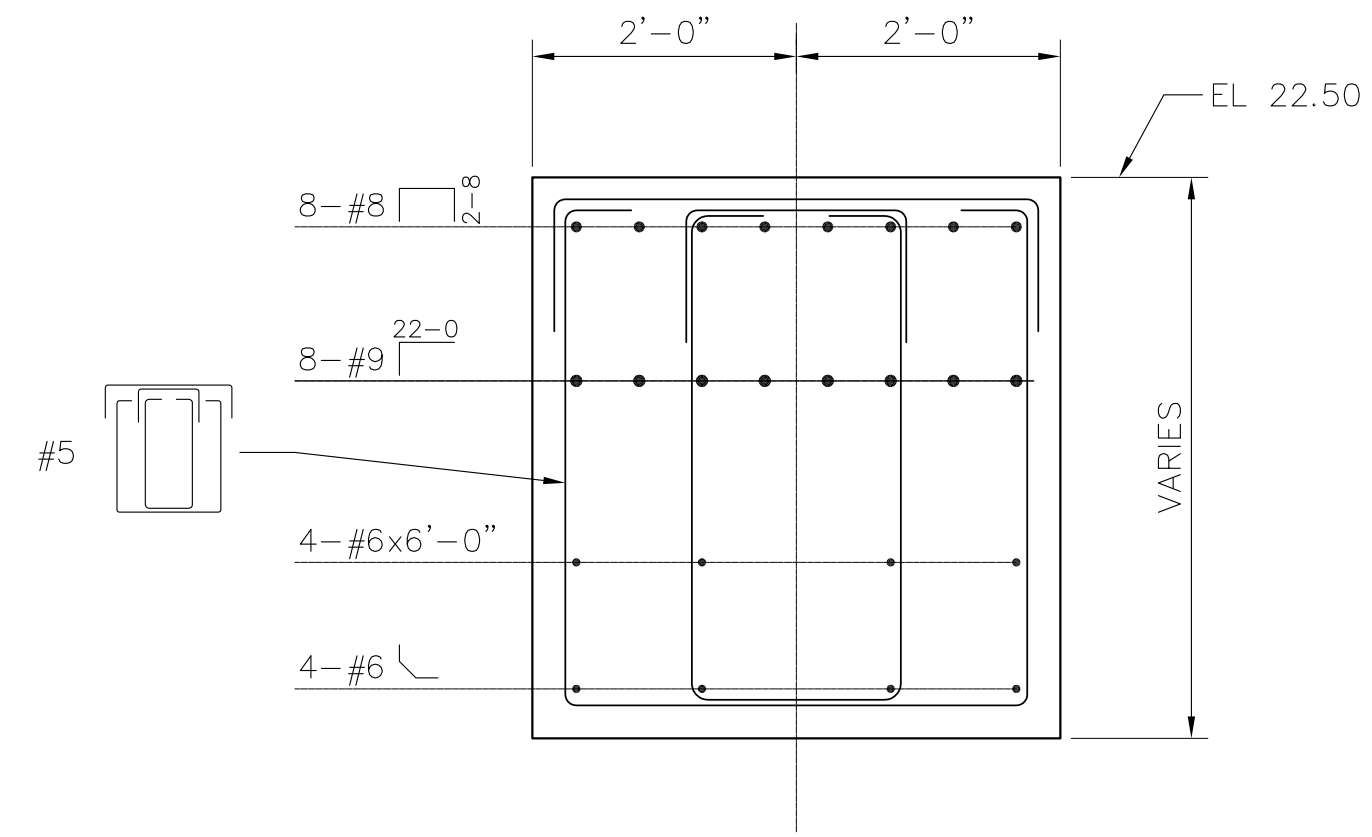
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SHEET NO. **31** OF **58**

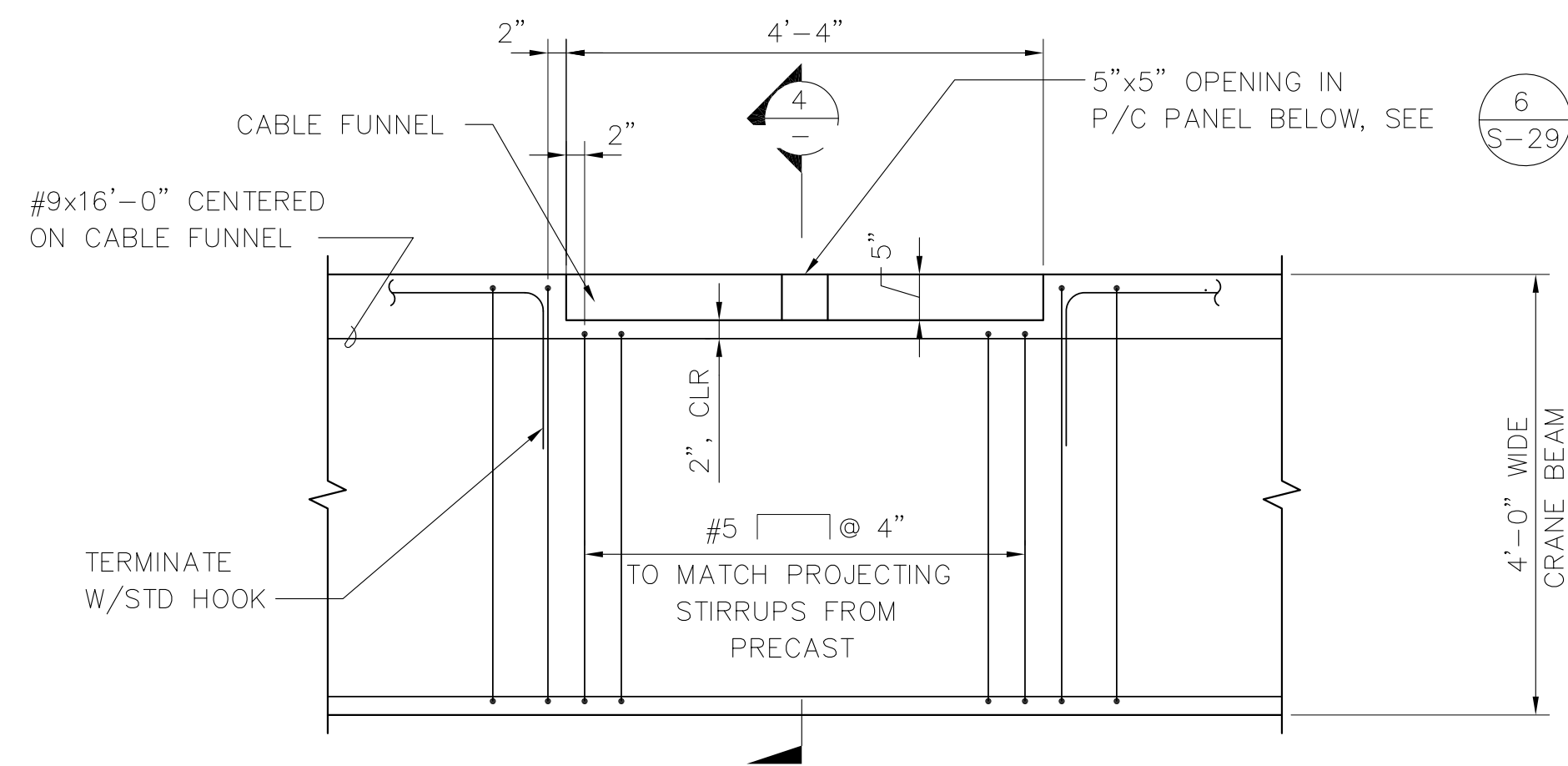




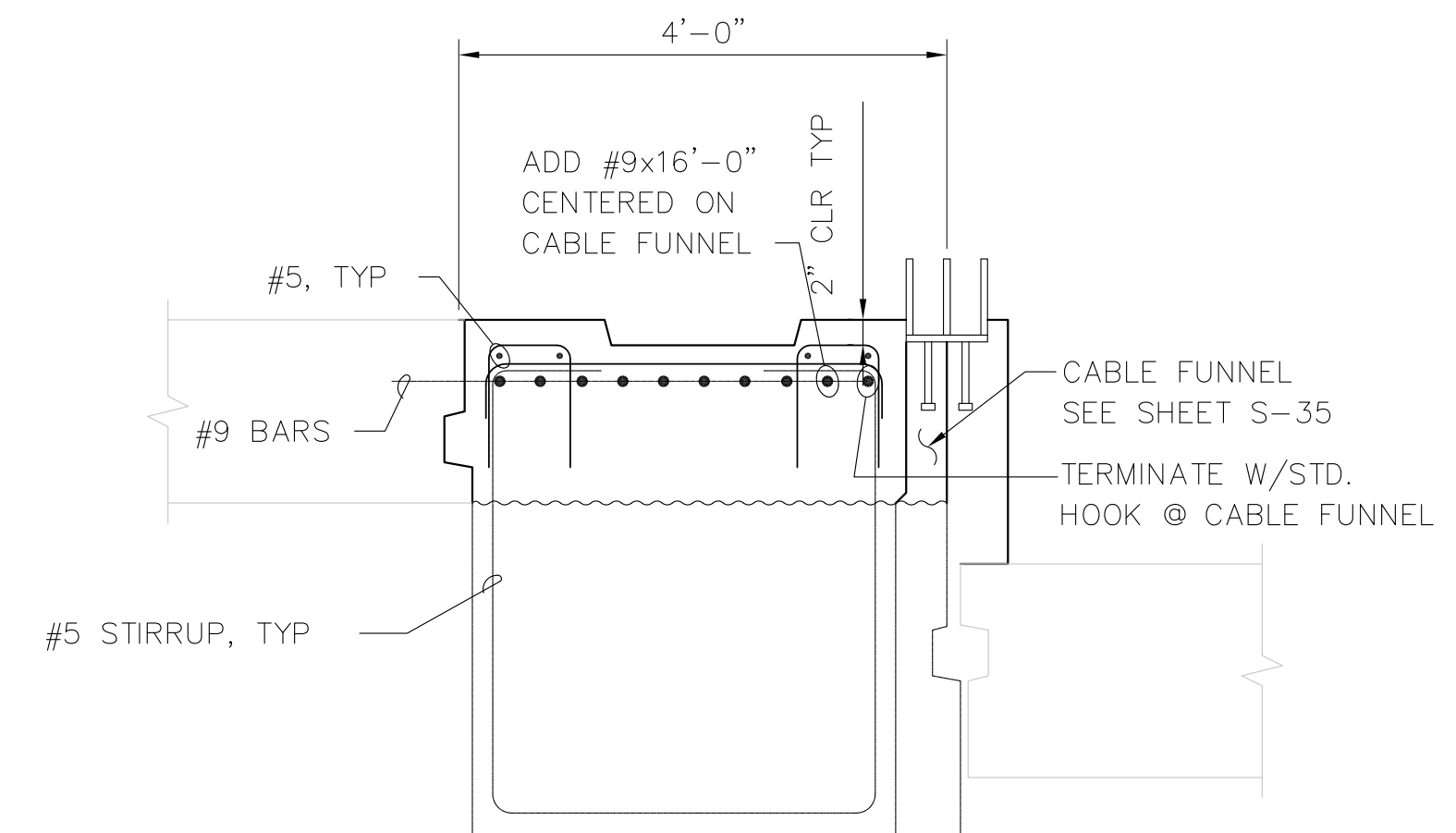
(1)
S-21 SECTION - CRANE STOP
SCALE: 3/4"=1'-0"



(2)
S-21 SECTION - CRANE STOP
SCALE: 3/4"=1'-0"



(3)
S-21 PLAN - WATERSIDE CRANE BEAM @ CABLE FUNNEL
SCALE: 3/4"=1'-0"



FOR ALL DETAILS
EXCEPT AS NOTED, SEE
(3)
S-20

(4)
S-21 SECTION - CRANE BEAM @ CABLE FUNNEL
SCALE: 3/4"=1'-0"

AS-BUILT

AUTOCAD FILE NO.
5012S21

S-21



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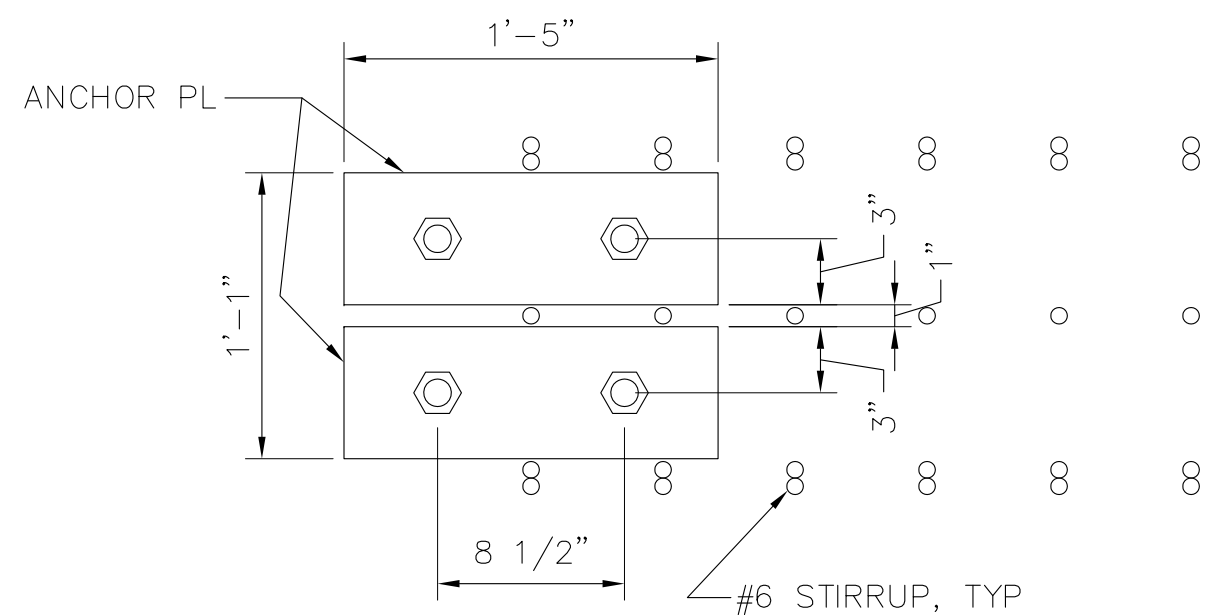
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**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
CRANE BEAM DETAILS - SHEET 2**

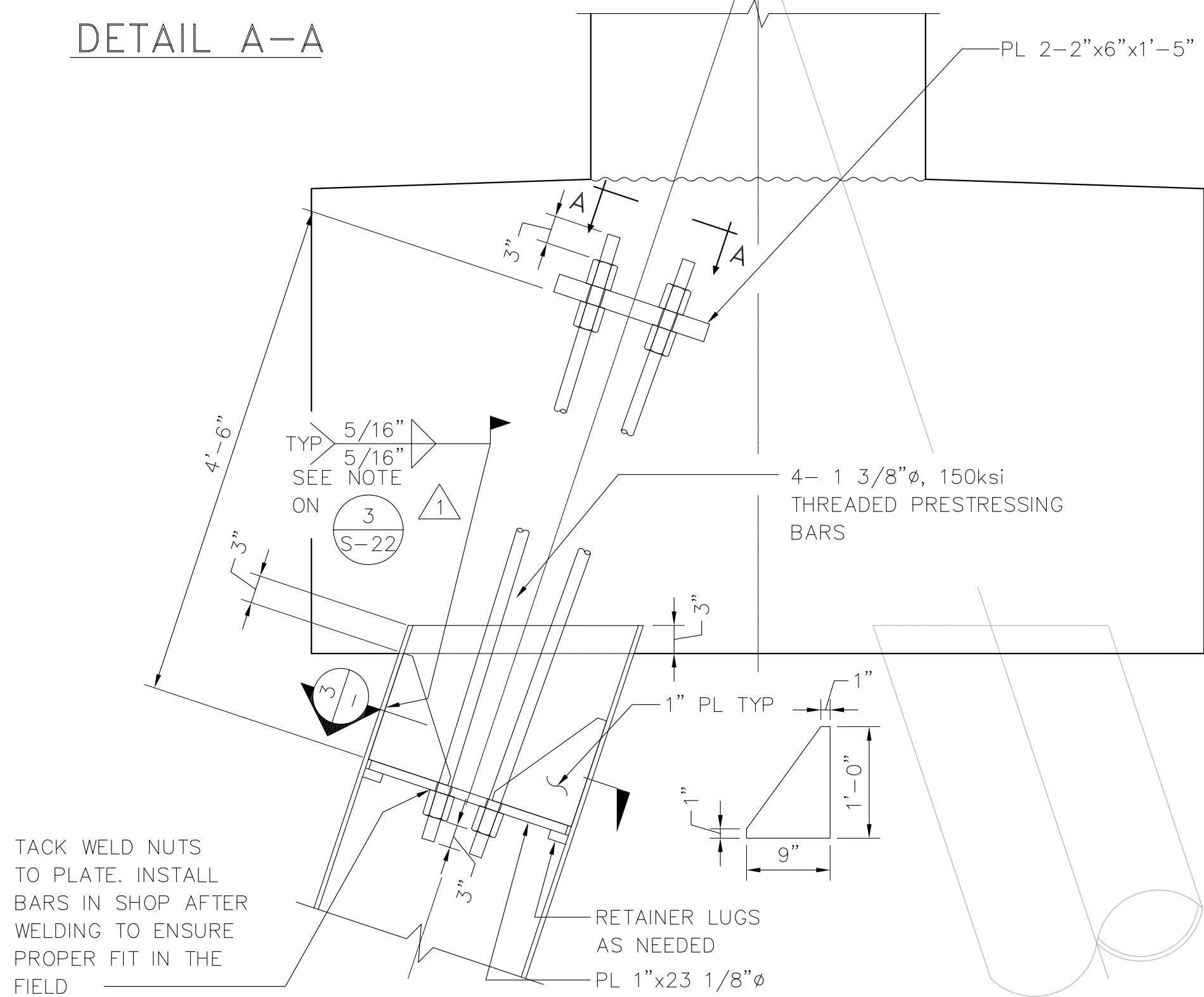
DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **32** OF **58**

NOTES:

1. WATERSIDE STEEL PIPE PILES & WATERSIDE FACE OF SHEET PILES TO BE PAINTED, SEE SPECIFICATIONS.
2. SHEET PILE DESIGNATION IS SHOWN FOR INDICATION OF SIZE AND SECTION PROPERTIES. PRODUCT OF OTHER MANUFACTURERS MEETING THE SPECIFICATION, SIZE AND SECTION PROPERTY REQUIREMENTS WILL BE ACCEPTABLE.
3. CAP SOFFIT OUTBOARD OF SHEET MAY BE FORMED OR POURED ON TEMPORARY BERM AT CONTRACTOR'S OPTION. FORMS, IF USED, MUST BE REMOVED.
4. BACKFILL NORTH OF BENT (22.5) WAS DONE WITH SITE EXCAVATED CONTAMINATED MATERIAL. FROM BENT (22.5) TO BENT (49) SITE EXCAVATED MATERIAL WAS PLACED ONLY ABOVE ELECTRICAL DUCT BANK ELEVATION. YARD PAVING SECTION FROM BENT (14) TO BENT (22.5) HAS GRAVEL BASE CUT BACK TO AN 8" DEPTH. FROM BENT (14) TO BENT (1) THE YARD PAVING SECTION HAD THE GRAVEL BASE CUT BACK TO A 6" DEPTH.

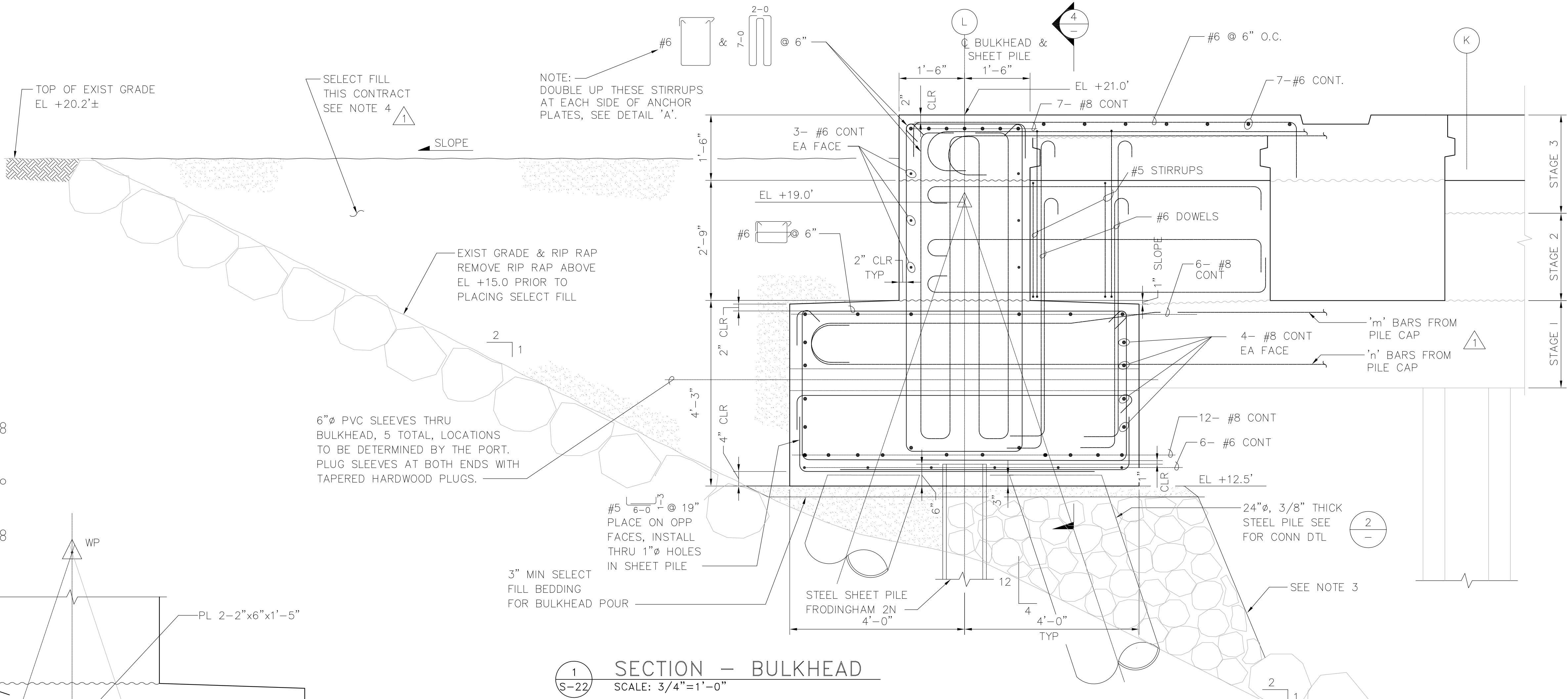


DETAIL A-A

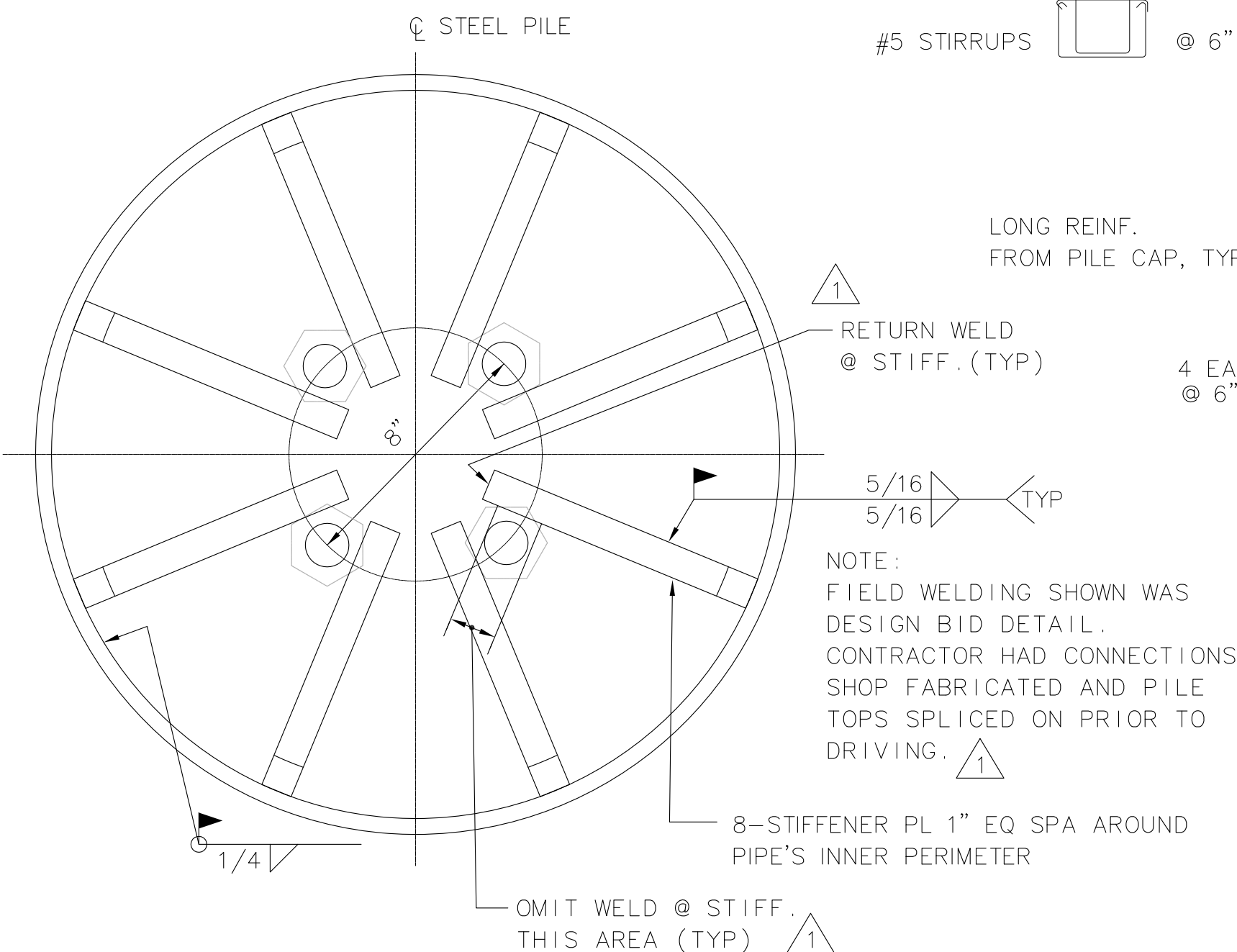


2
S-22
DETAIL - STEEL PIPE CONNECTION
SCALE: 1"=1'-0"

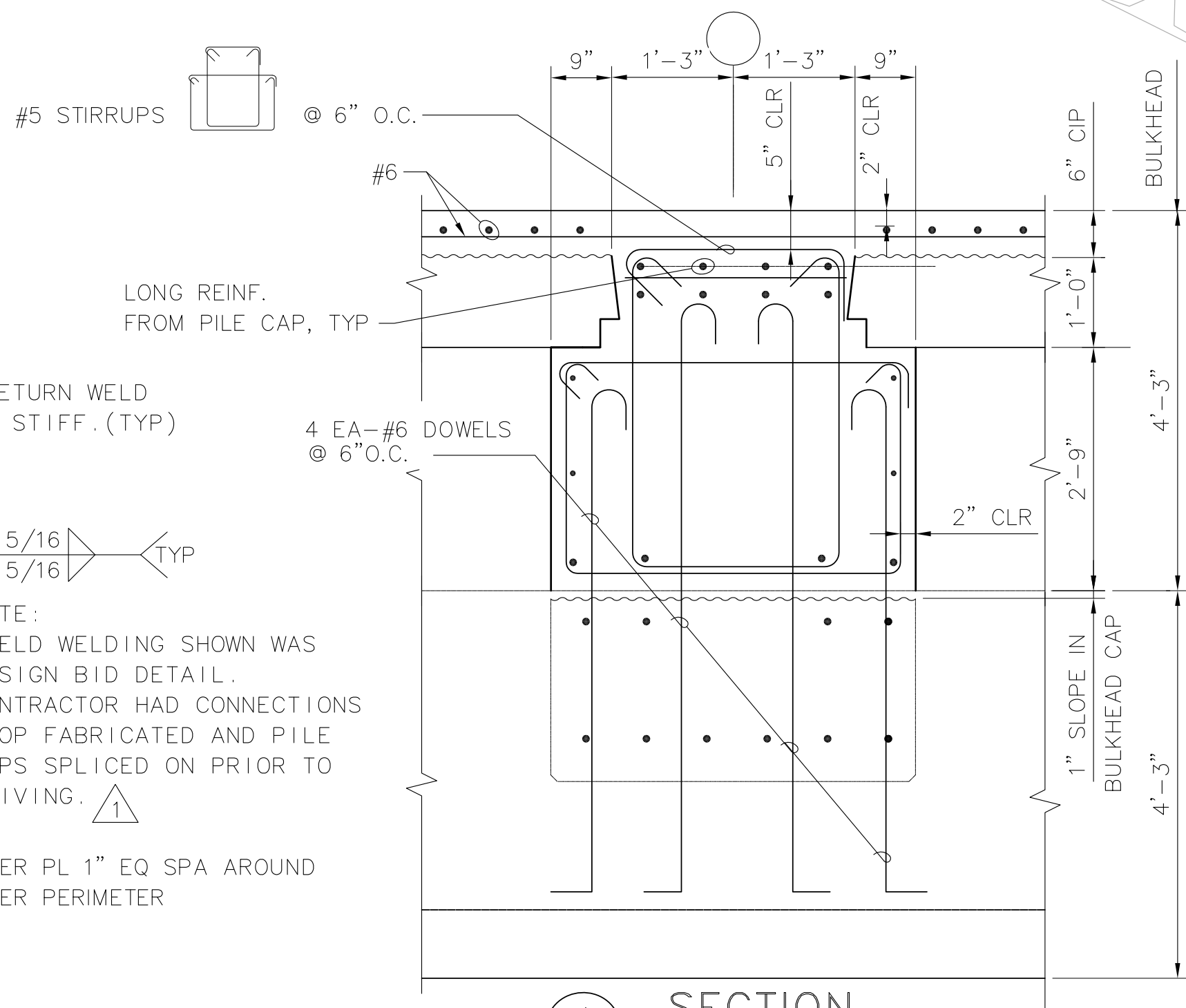
NOTE: MISCELLANEOUS STEEL FABRICATIONS SHOWN ON THIS DETAIL NEED NOT BE GALVANIZED



1
S-22
SECTION - BULKHEAD
SCALE: 3/4"=1'-0"



3
S-22
SECTION - STEEL PILE CONNECTION
SCALE: 3"=1'-0"



4
S-22
SECTION
SCALE: 3/4"=1'-0"

NOTE: BULKHEAD REINF. & PILING NOT SHOWN FOR CLARITY

AS-BUILT

AUTOCAD FILE NO.
5015S22

S-22



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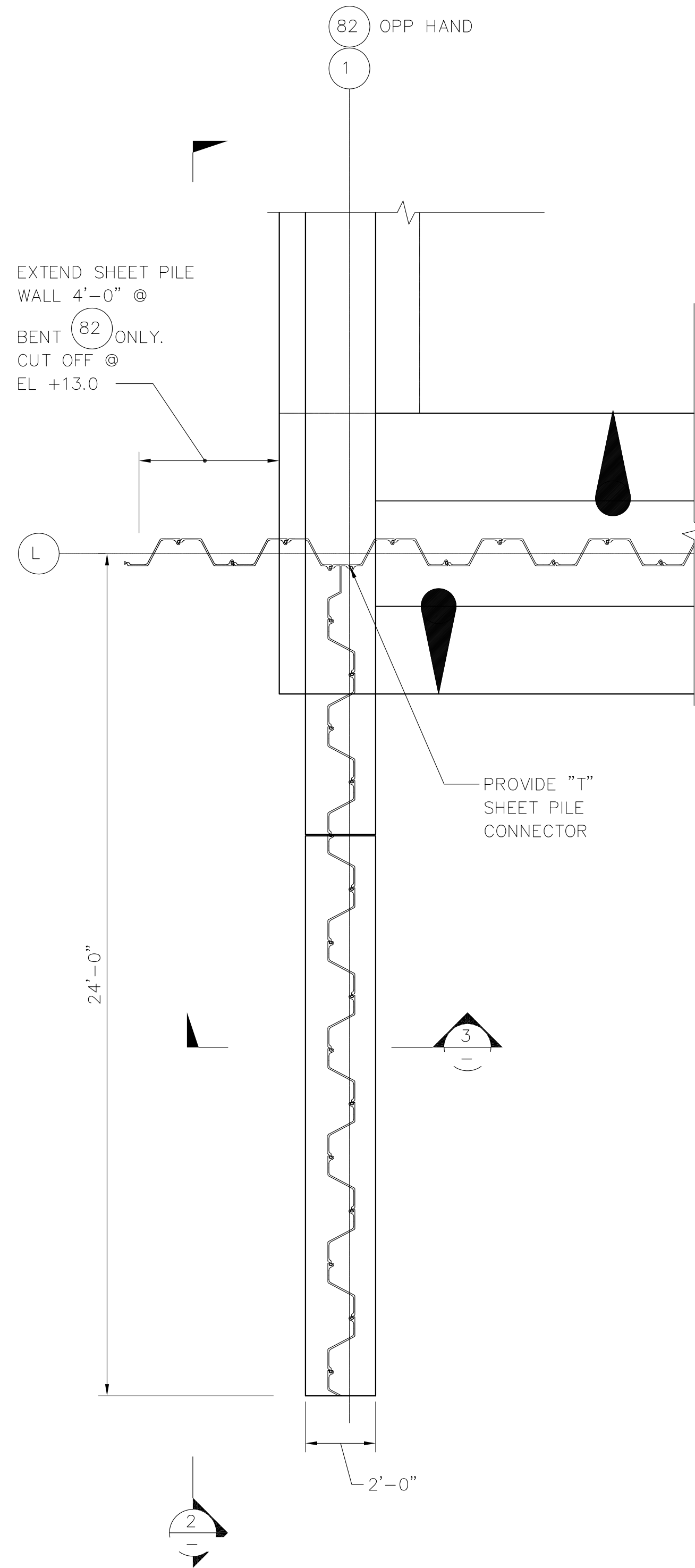
MARK REVISION

RDD JAS 1/4/99

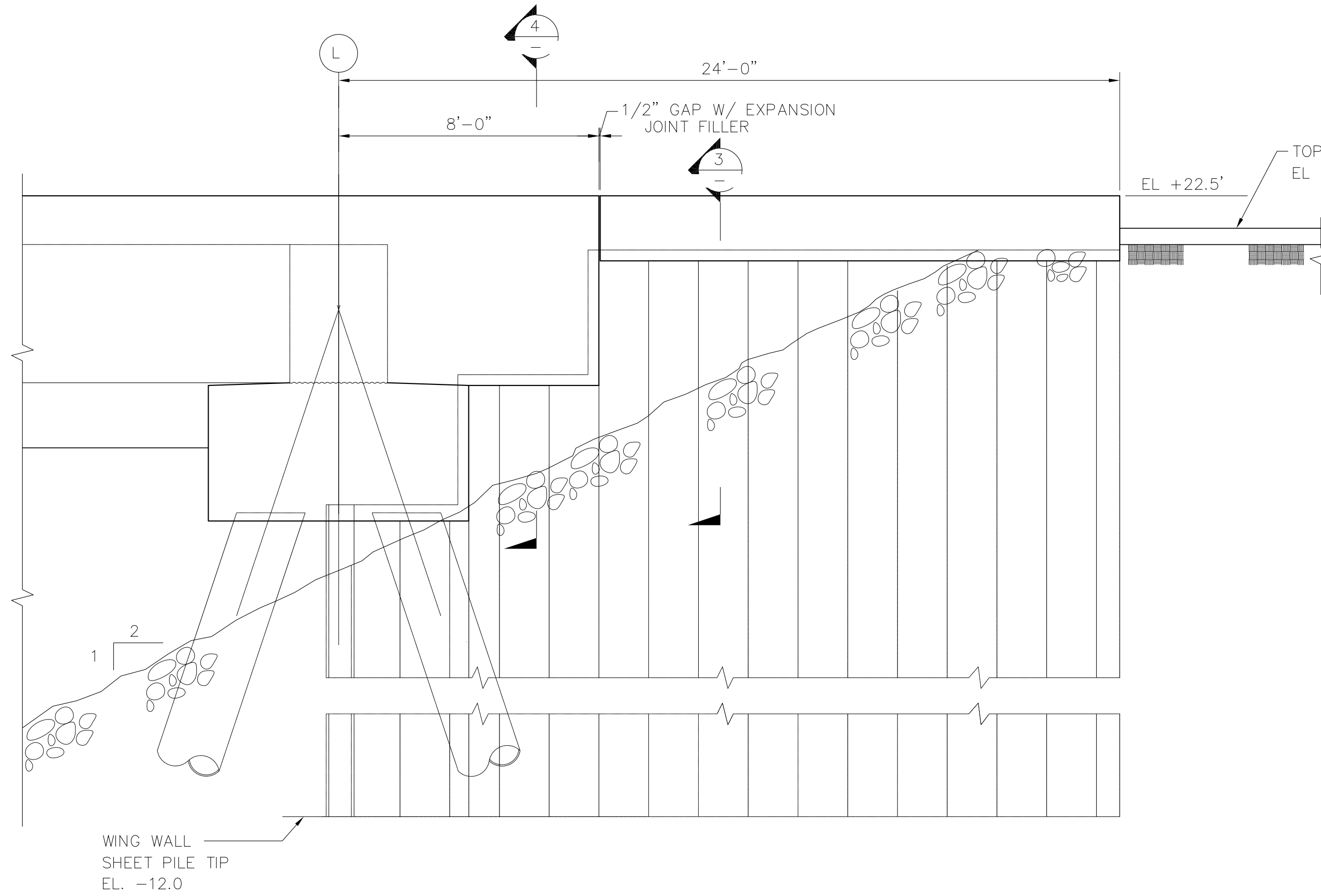
BY APP. DATE

HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
BULKHEAD DETAILS - SHEET 1

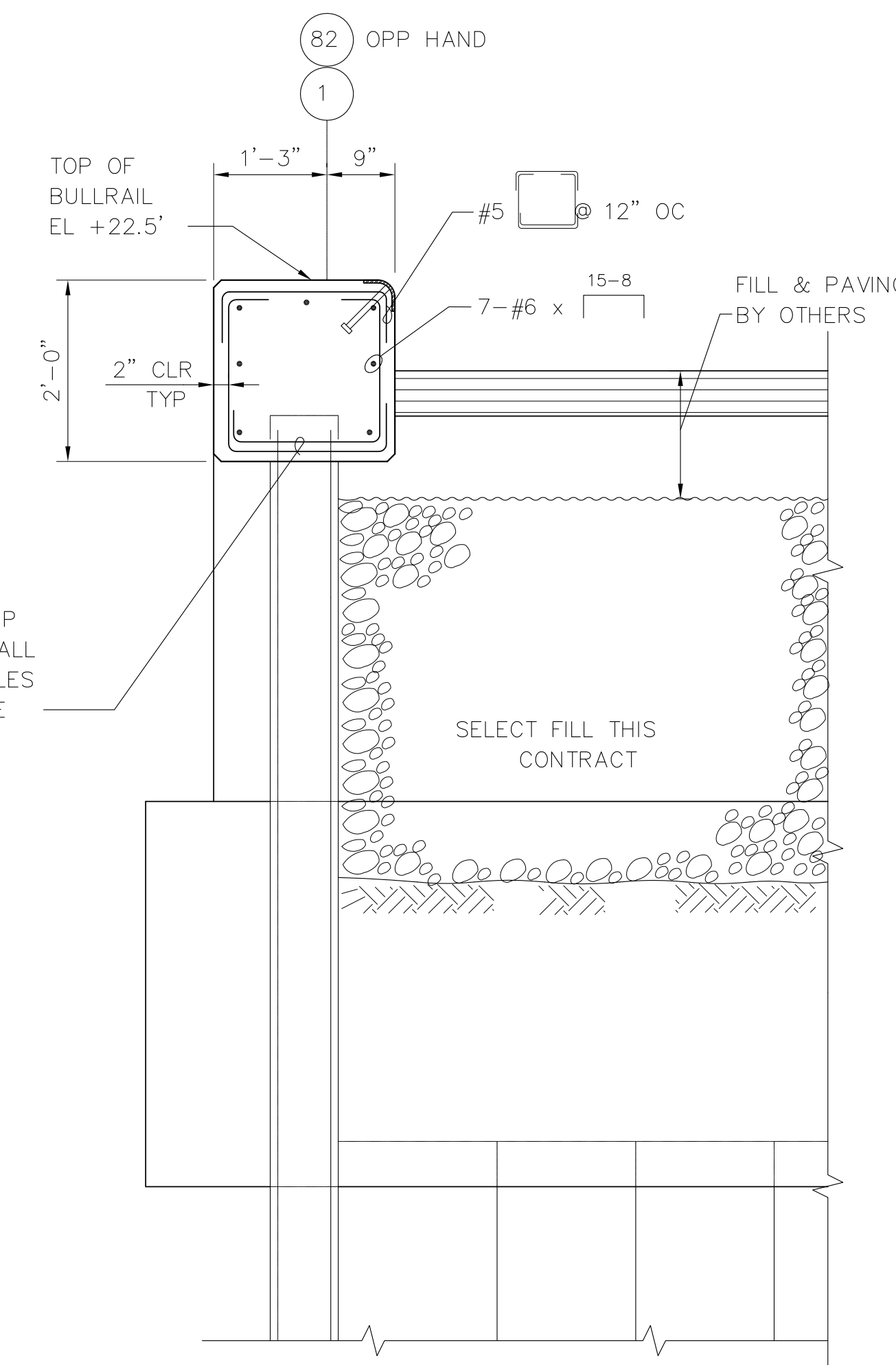
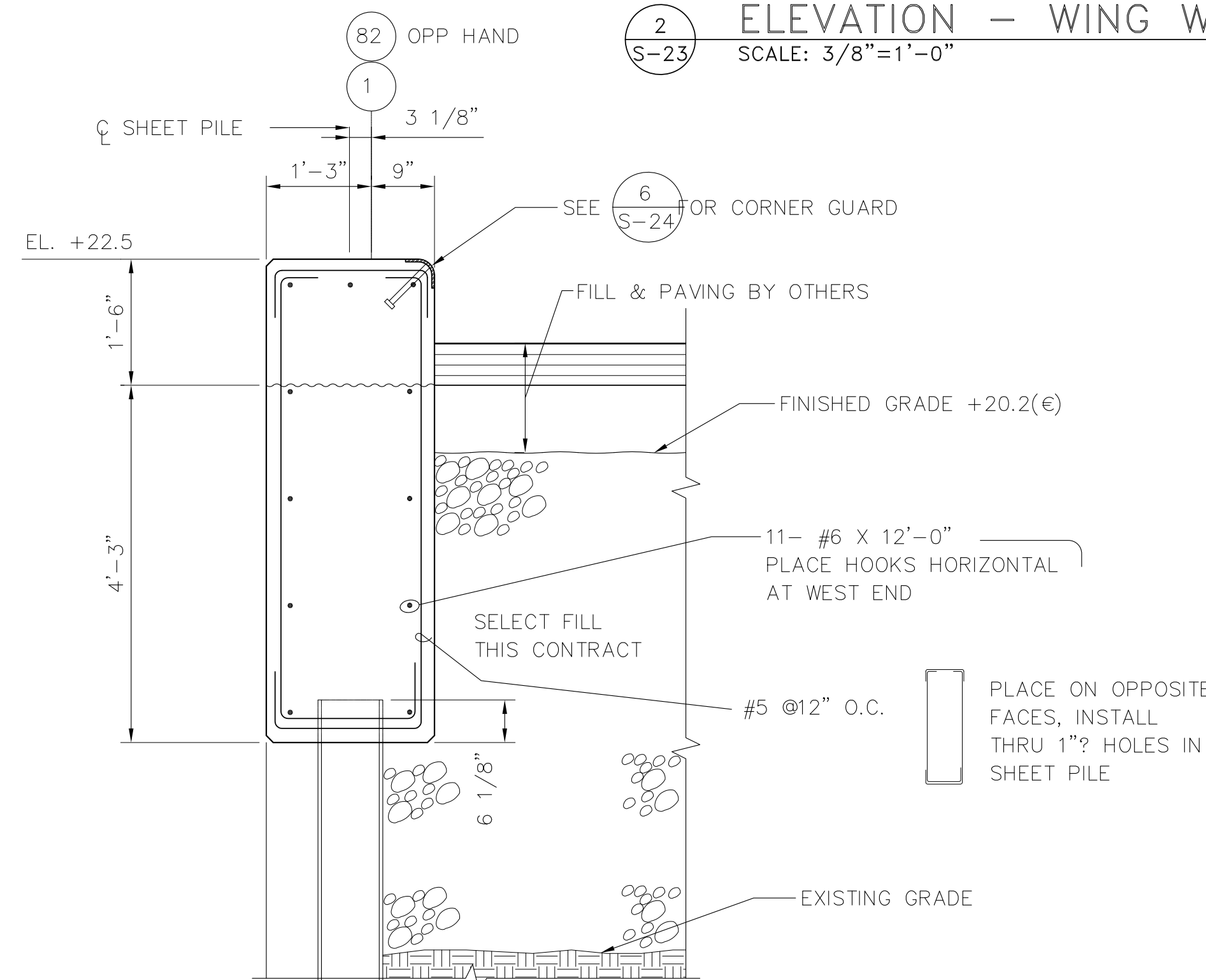
DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **33** OF **58**



1 PLAN - WING WALL AT
S-23 SCALE: 3/8"=1'-0" BENT 1 & 82



2 ELEVATION - WING WALL
S-23 SCALE: 3/8"=1'-0"



3 SECTION - WING WALL
S-23 SCALE: 3/4"=1'-0"



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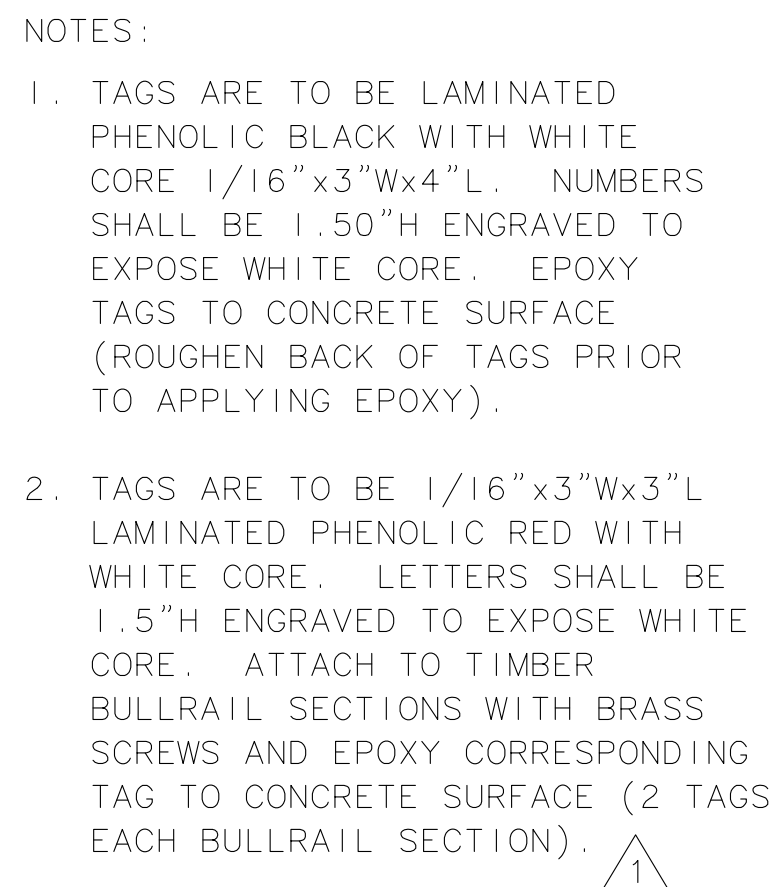
**HYUNDAI MERCHANT MARINE TERMINAL
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PORT OF TACOMA
BULKHEAD DETAILS - SHEET 2**

AS-BUILT

AUTOCAD FILE NO.
5012S23

S-23

DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **34** OF **58**



AT DROPPED PILECAP

AT CRANE BEAM AREA

5'-9"

3'-9"

2'-0"

1'-3"

9"

PROJECTING DOWELS FROM PILE CAP

PILECAP REINF

NOTE: FOR ALL DETAILS EXCEPT AS NOTED SEE

1

82

82

1

1'-3"

9"

3'-6"

2'-3"

2'-0"

DOWELS FROM PILE CAP

PILECAP REINF

NOTE: FOR ALL DETAILS EXCEPT AS NOTED SEE

1

2'-0"

BULLRAIL LETTER TAG
SEE NOTE 2

BENT # TAG
SEE NOTE 1

REMOVABLE BULLRAIL
SEE DWG S-25

4-#8 CONT
EXTEND THESE BARS 4'-0"
INTO BULLRAIL AT BENT

4-#6 CONT
FROM TYP BULLRAIL

STIRRUPS FROM
PC DECK PANEL

2'-6"

2'-3"

43

48

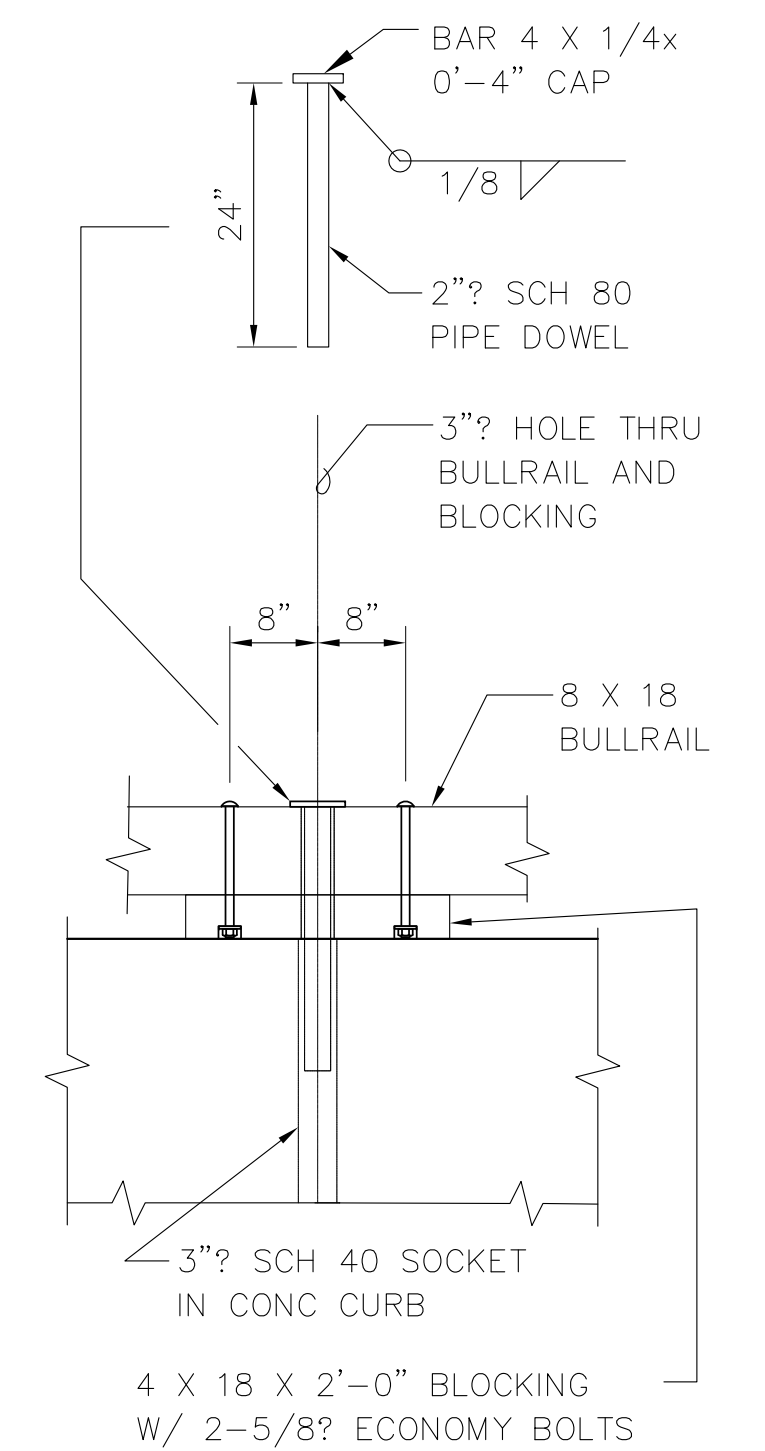
[illegible]

BENT PL 1/4"
2 1/2" EA LEG
W 1/2"x6" STUDS
@ 18" OC

NOTES:

1. CONTINUOUS BULLRAIL REINFORCEMENT INTERRUPTED AT VAULTS SHALL BE TERMINATED WITH STANDARD HOOKS.
2. FOR ADDITIONAL REINFORCING AT BOLLARDS, SEE DRAWING S-25.
3. SEE ELECTRICAL AND WATER SYSTEM DRAWINGS FOR UTILITY PENETRATIONS.

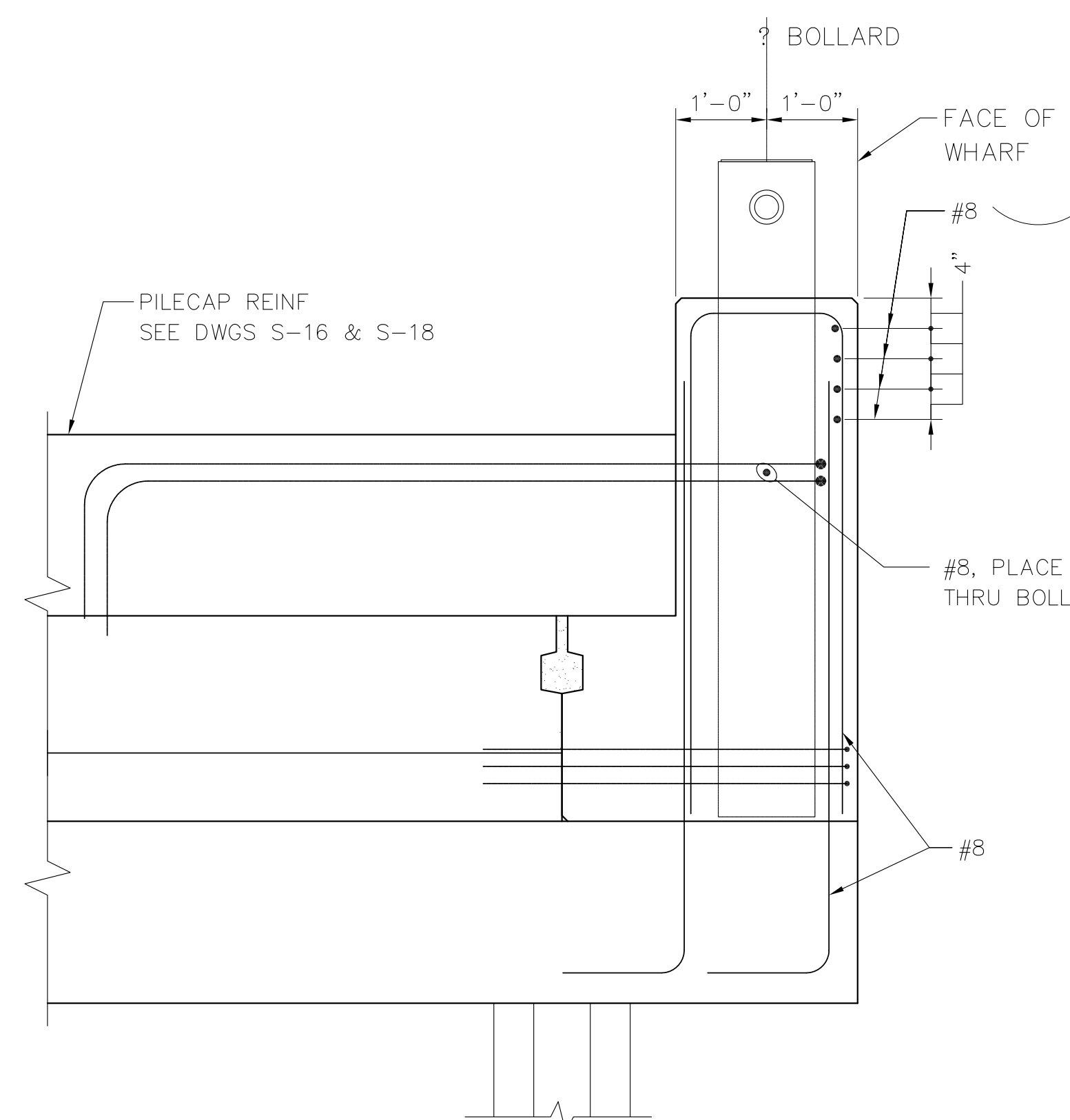
DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **35** OF **58**



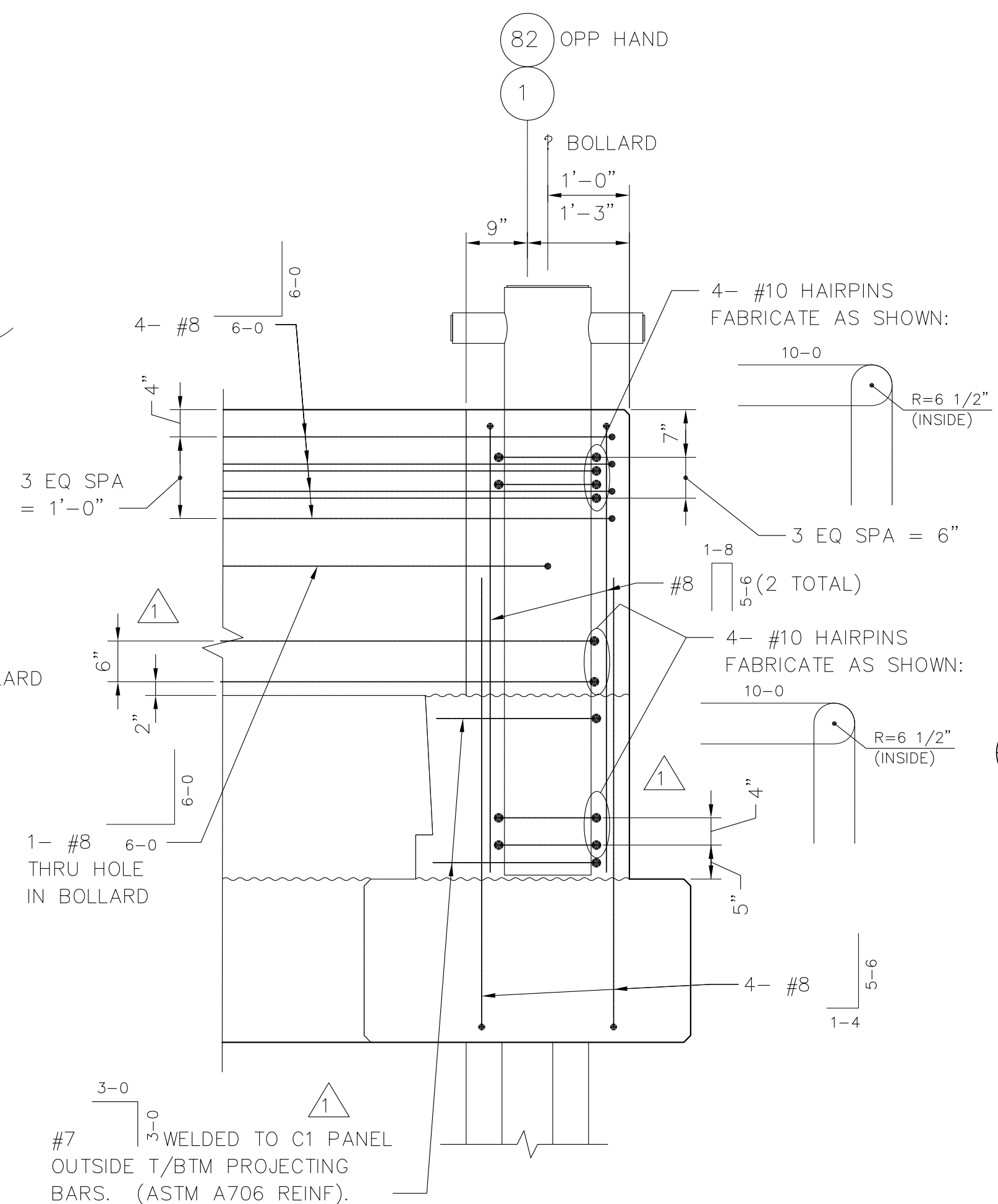
2
S-25

DETAIL

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



5 SECTION @ TYPICAL
S-25 SCALE: 3/4"=1'-0" BOLLARDS



3 SECTION - TIMBER
S-25 SCALE: 3/4"=1'-0"

NOTES:

1. REINF SHOWN ON THIS SHEET IS TYP @ BOLLARDS AND IS ADDITIONAL TO THE BULLRAIL, PILE CAP & P/C PANEL REINF SHOWN ELSEWHERE.
2. FOR BOLLARD DETAILS, SEE DWG S-39.

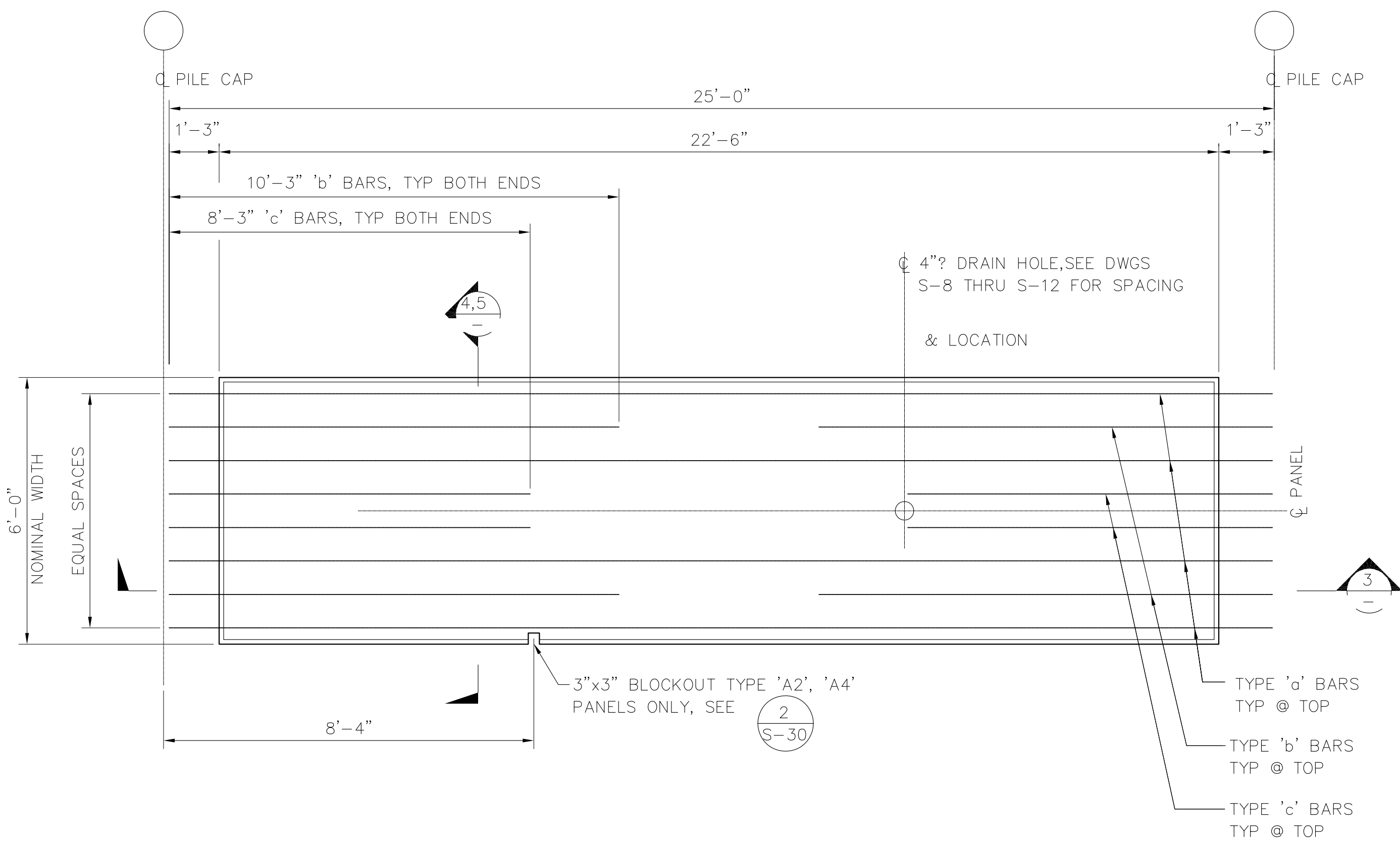
6
S-25

ELEV - CORNER BOLLARD @ 1 & 82
SCALE: 3/4"=1'-0"
(LOOKING WEST)

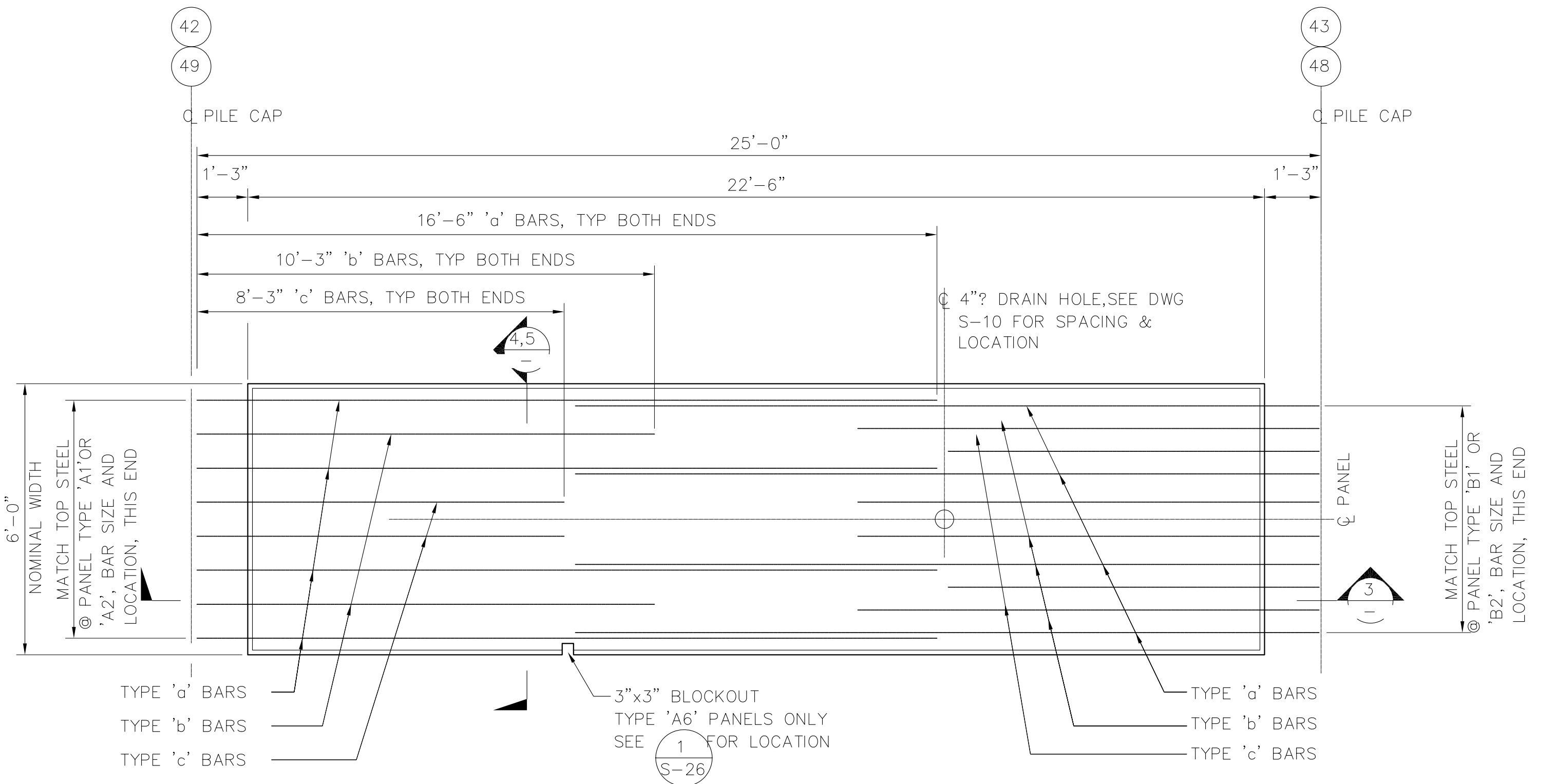
AUTOCAD FILE NO.
5012S25

SHEET NO. **36** OF **58**

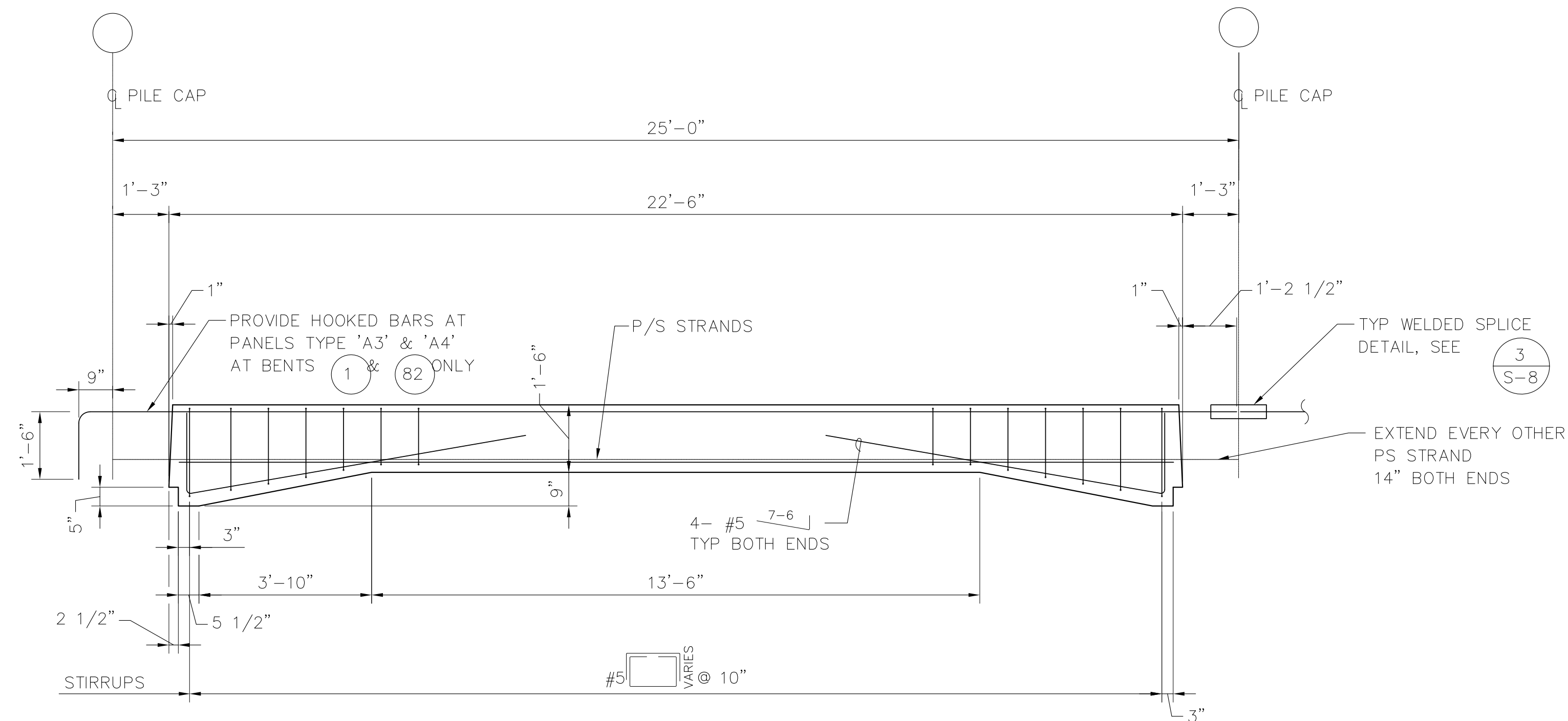
HYUNDAI MERCHNT MARINE TER MINAL
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BULLRAIL DETAILS - SHEET 2



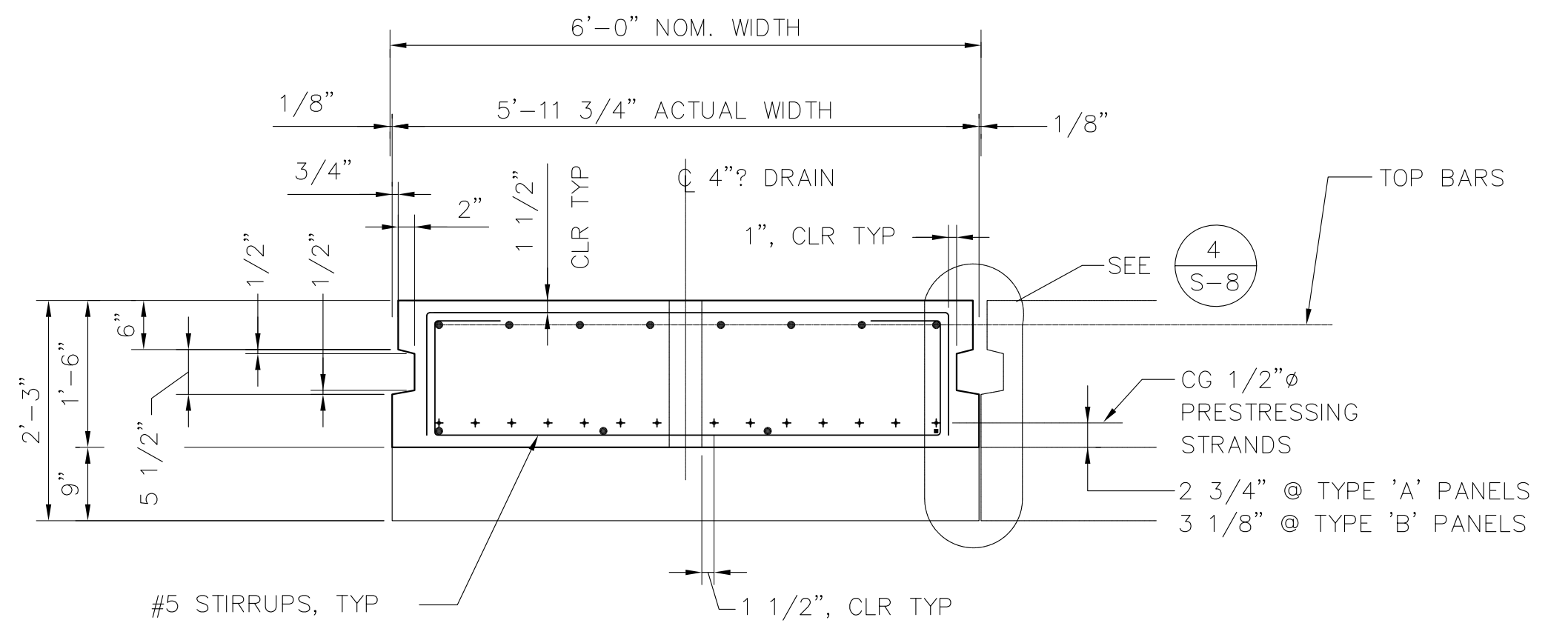
1 PLAN — TYPE 'A1' THRU 'A4' PANELS (SEE SCHEDULE S-26)
SCALE: 1/2"=1'-0" DWG S-27)



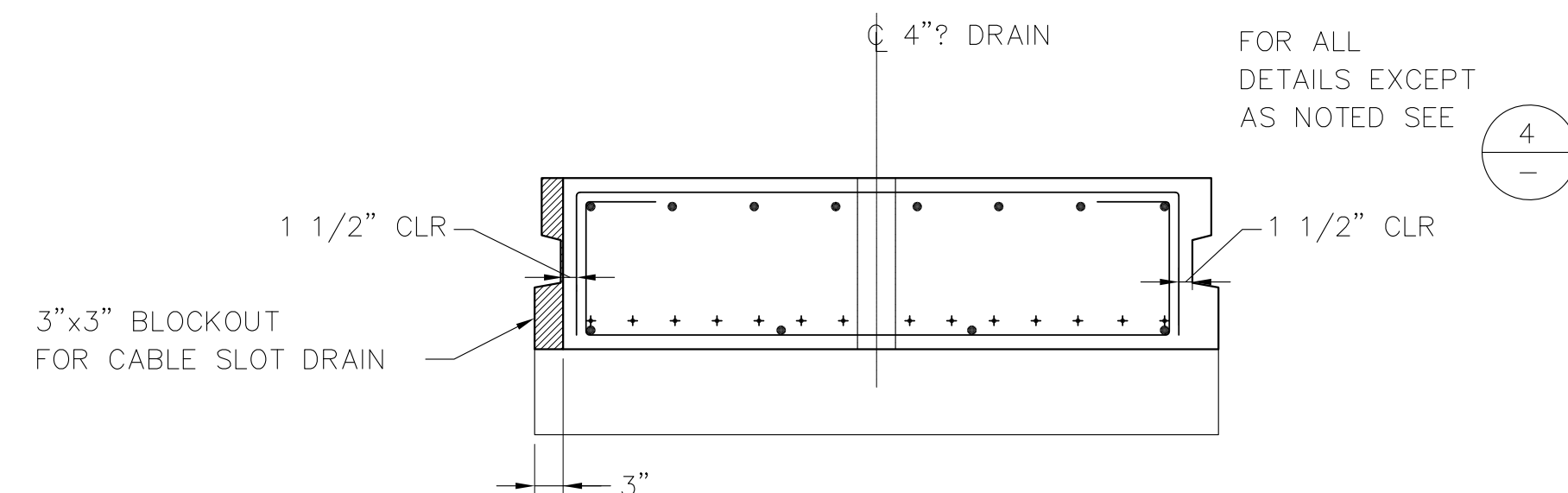
2 PLAN — TYPE 'A5' & 'A6' PANELS (SEE SCHEDULE S-26)
SCALE: 1/2"=1'-0" DWG S-27)



3 ELEVATION — TYPE 'A' PANELS (S-26)
SCALE: 1/2"=1'-0"



4 SECTION — TYPE 'A1', 'A3', 'A5', & 'B1' PANELS (S-26)
SCALE: 3/4"=1'-0"



5 SECTION — TYPES 'A2', 'A4', 'A6' & 'B2' PANELS (S-26)
SCALE: 3/4"=1'-0"

AS-BUILT

AUTOCAD FILE NO. 5012S26 S-26



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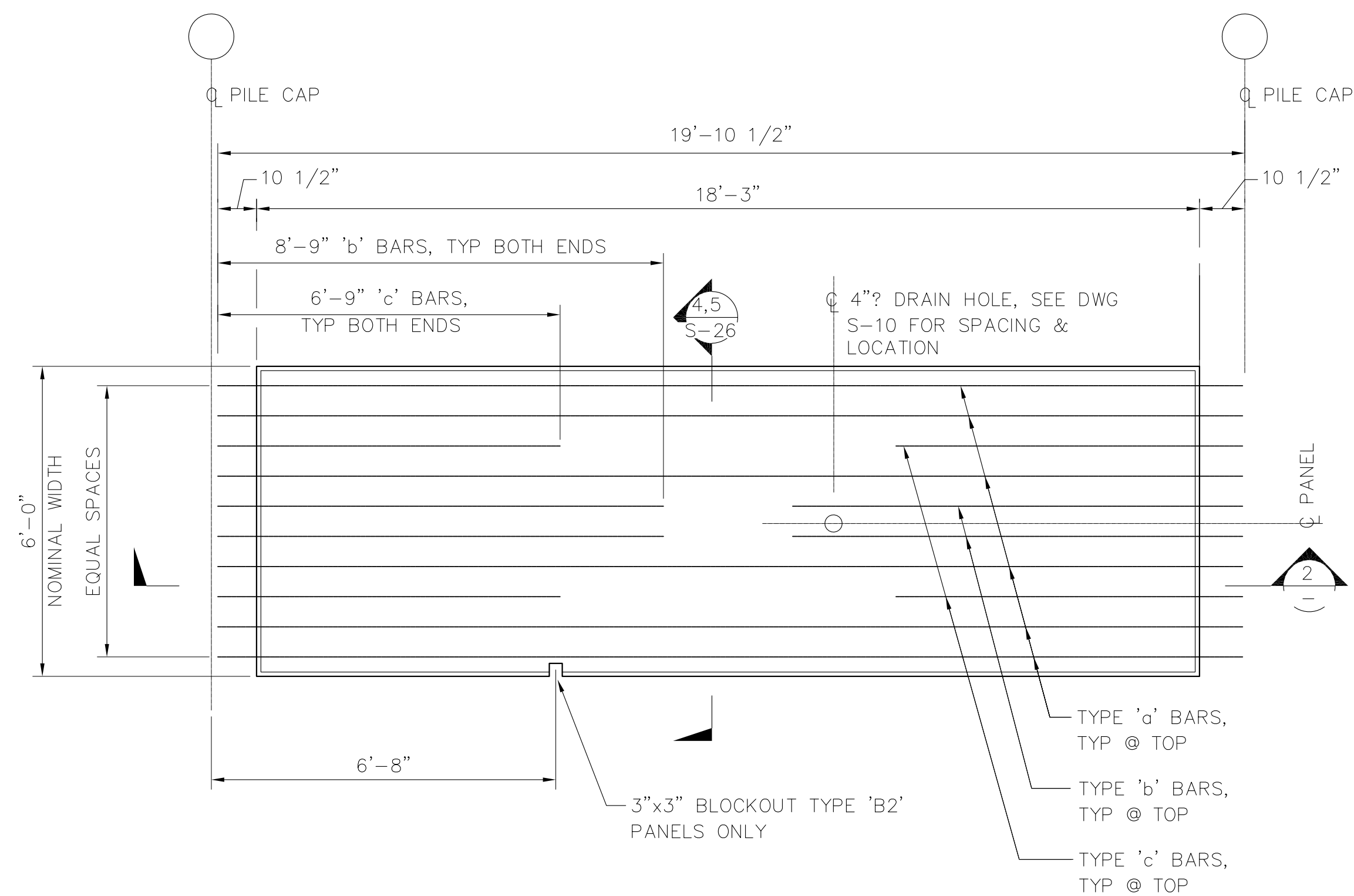
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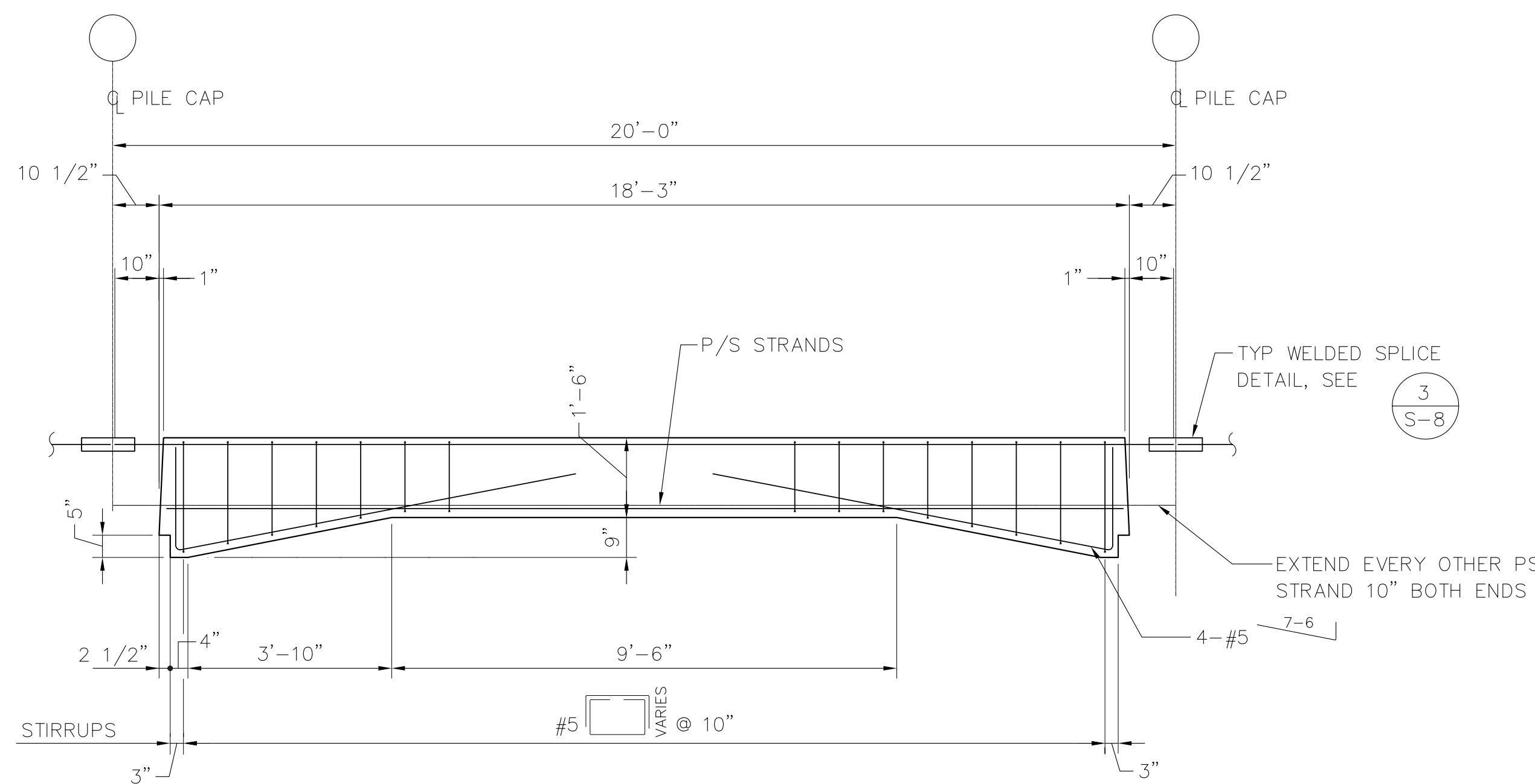
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HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
DECK PANEL DETAILS - SHEET 1

DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 37 OF 58



1 PLAN — TYPE 'B' PANELS (SEE SCHEDULE)
SCALE: 1/2"=1'-0"



2 ELEVATION — TYPE 'B' PANELS
SCALE: 1/2"=1'-0"

PRECAST DECK PANEL SCHEDULE PANELS 'A1' THRU 'A6', 'B1' & 'B2'

PANEL TYPE	PANEL WIDTH (NOM.)	REF. PLAN	ELEV.	TRANSV. SECTION	CONC STRENGTH	FINAL PRESTRESS (KIPS)	BOTTOM BARS (GR 60)	TOP BARS		
								BARS 'a'	BARS 'b' EA END	BARS 'c' EA END
PRESTRESSED CONCRETE PANELS	A1	6'-0"	1 S-26	3 S-26	4 S-26	f'c RELEASE = 4000 PSI MIN f'c @ 28 DAYS = 6000 PSI MIN f'c @ ERECTION = 6000 PSI MIN	294	4- #4	4- #8	2- #8
	A2	6'-0"	1 S-26	3 S-26	5 S-26		343	4- #4	4- #9	2- #9
	A2a	6'-0"	1 S-30	3 S-26	2 S-30		343	4- #4	4- #9	2- #9
	A3	6'-0"	1 S-26	3 S-26	4 S-26		343	4- #4	4- #8	2- #8
	A4	6'-0"	1 S-26	3 S-26	5 S-26		490	4- #4	4- #9	2- #9
	A5	6'-0"	2 S-26	3 S-26	4 S-26		294	4- #4	MATCH REINF. FOR PANELS 'A1' & 'B1'	
	A6	6'-0"	2 S-26	3 S-26	5 S-26		343	4- #4	MATCH REINF. FOR PANELS 'A2' & 'B2'	
	B1	6'-0"	1 S-27	2 S-27	4 S-26		436	4- #4	6- #10	2- #10
	B2	6'-0"	1 S-27	2 S-27	5 S-26		490	4- #4	6- #10	2- #10

AS-BUILT

AUTOCAD FILE NO.
5012S27

S-27



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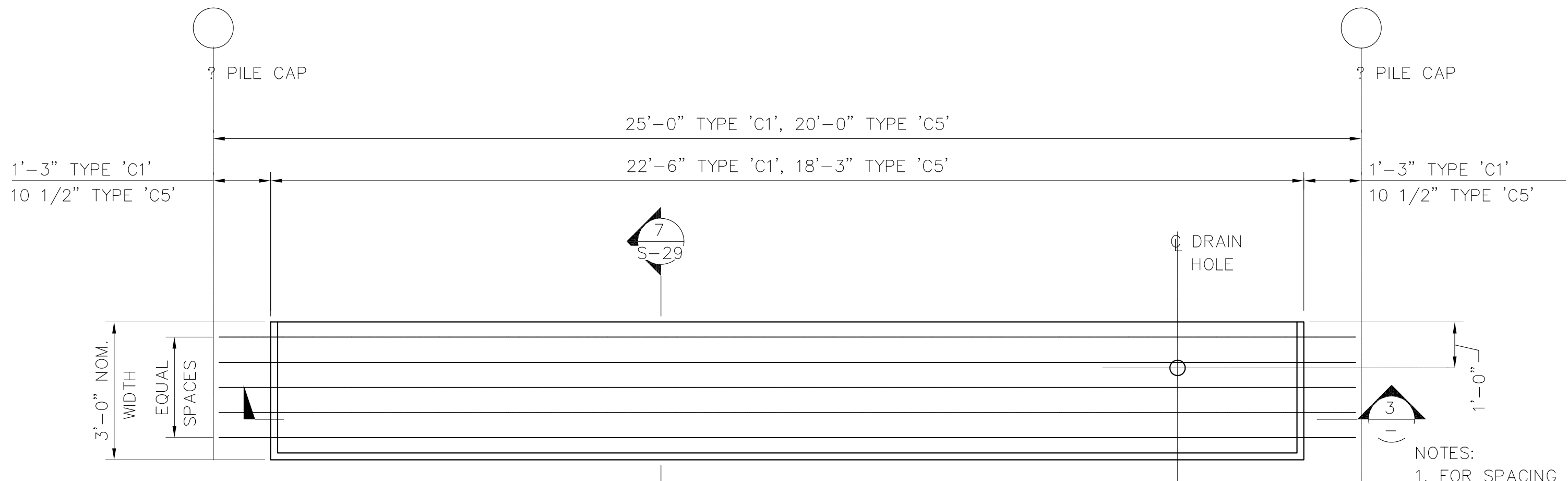
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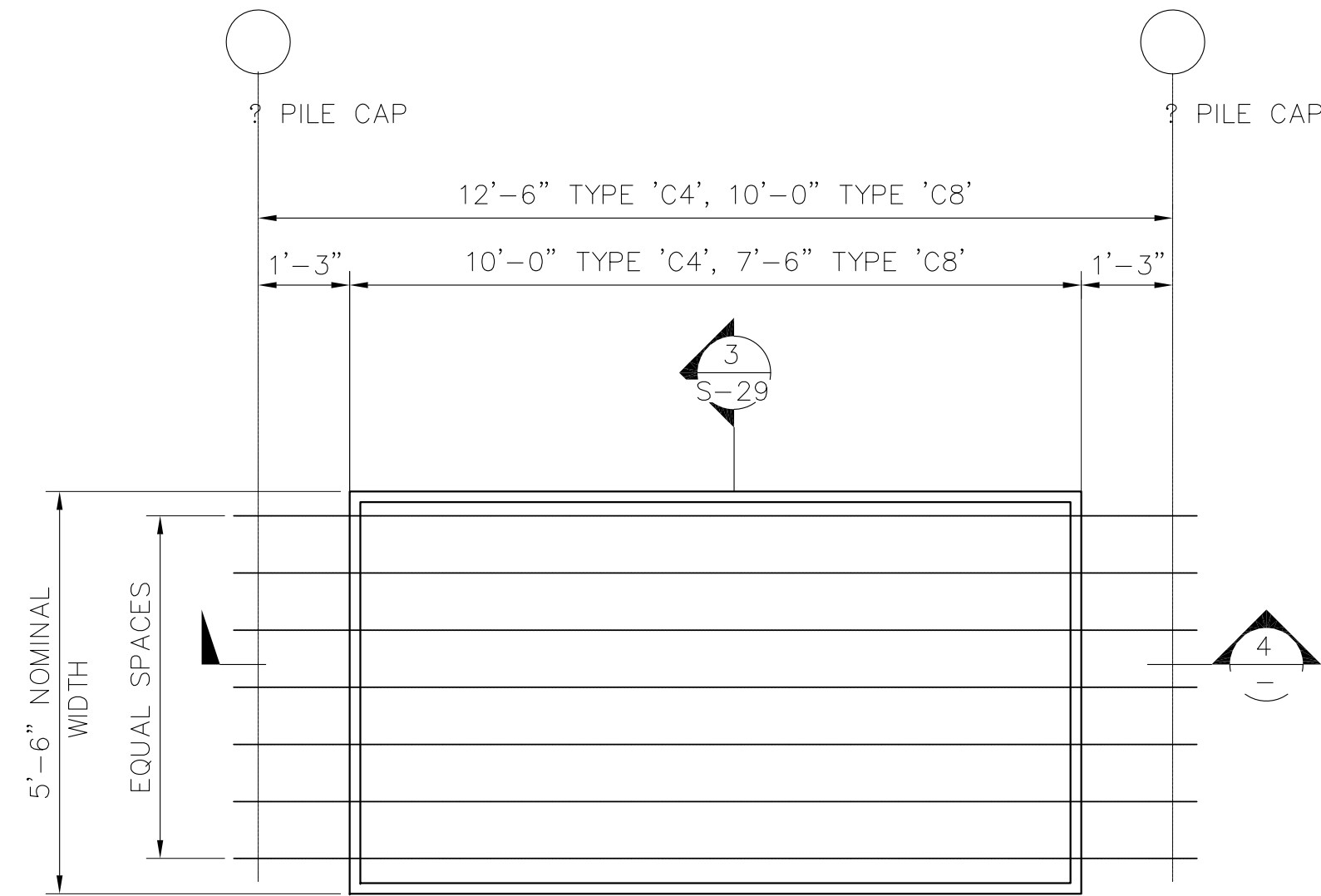
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HYUNDAI MERCHANT MARINE TERMINAL
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DECK PANEL DETAILS - SHEET 2

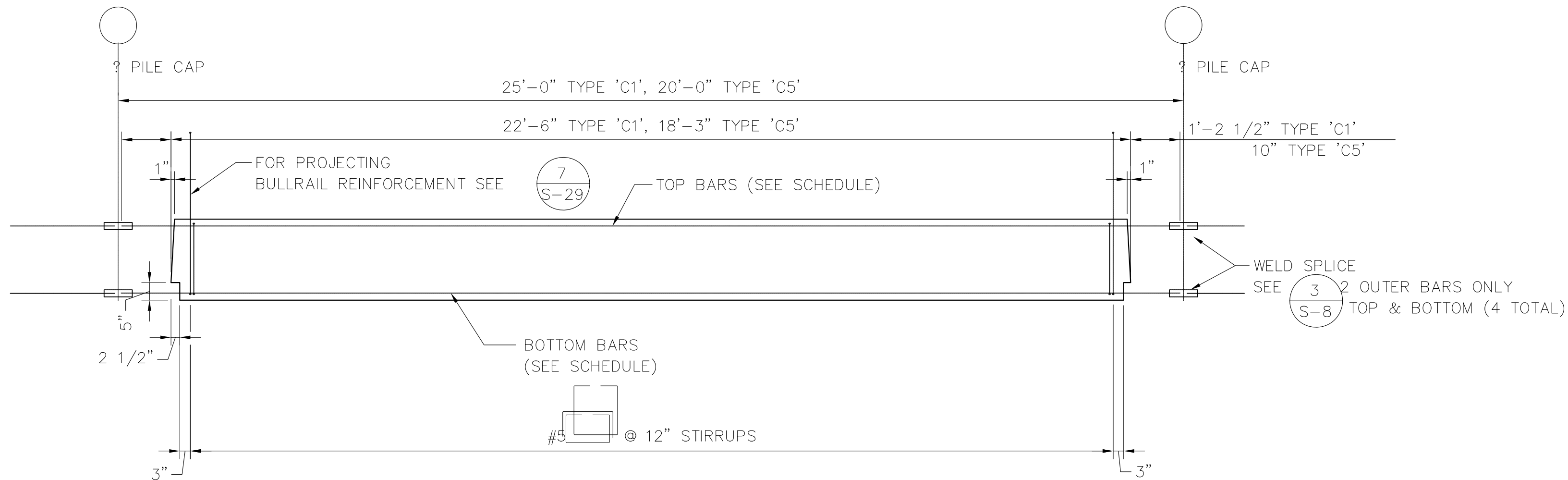
DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 38 OF 58



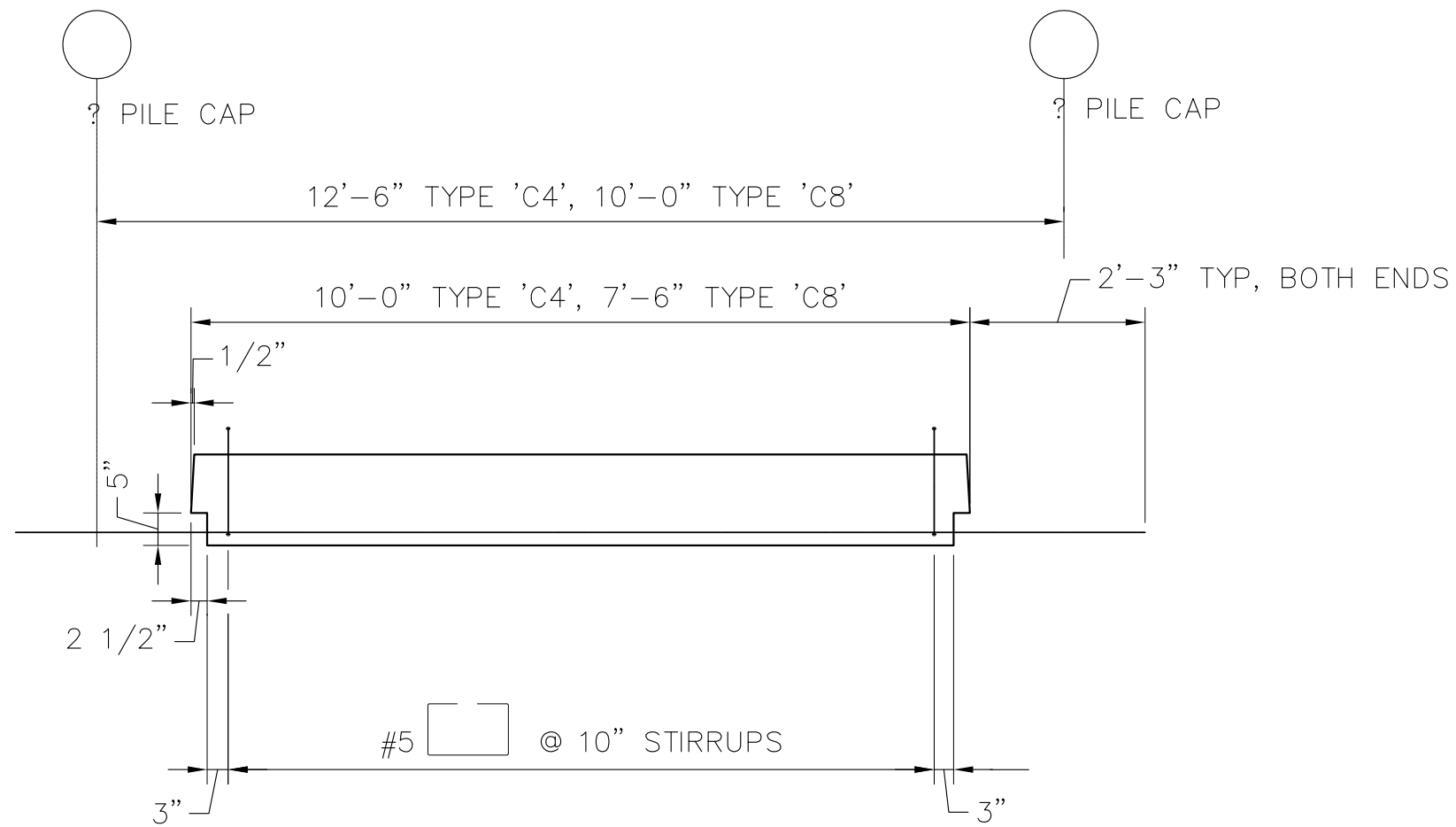
1 PLAN — TYPE 'C1' & 'C5' PANELS (SEE SCHEDULE)
SCALE: 1/2"=1'-0"



2 PLAN — TYPE 'C4' & 'C8' PANELS (SEE SCHEDULE)
SCALE: 1/2"=1'-0"



3 ELEVATION — TYPE 'C1' & 'C5' PANELS (SEE SCHEDULE)
SCALE: 1/2"=1'-0"



4 ELEVATION — TYPE 'C4' & 'C8' PANELS (SEE SCHEDULE)
SCALE: 1/2"=1'-0"

PRECAST DECK PANEL SCHEDULE TYPE 'C' PANELS							
PANEL TYPE	PANEL WIDTH (NOM.)	PLAN REF.	ELEV	TRANSV. SECTION	CONC STRENGTH	BOTTOM BARS (GR 60)	TOP BARS (GR 60)
C1	3'-0"	1 S-28	3 S-28	7 S-29	f' _c @ 28 DAYS = 6000 PSI MIN f' _c @ ERECTION = 6000 PSI MIN	4- #9	5- #9
C2	4'-0"	1 S-29	4 S-29	2,6 S-29		12- #6	N/A
C3	4'-0"	1 S-29	4 S-29	5 S-29		12- #6	N/A
C4	5'-6"	2 S-28	4 S-28	3 S-29		10- #6	N/A
C5	3'-0"	1 S-28	3 S-28	7 S-29		5- #9	5- #9
C6	4'-0"	1 S-29	4 S-29	2 S-29		12- #6	N/A
C7	4'-0"	1 S-29	4 S-29	5 S-29		12- #6	N/A
C8	5'-6"	2 S-28	4 S-28	3 S-29		10- #6	N/A



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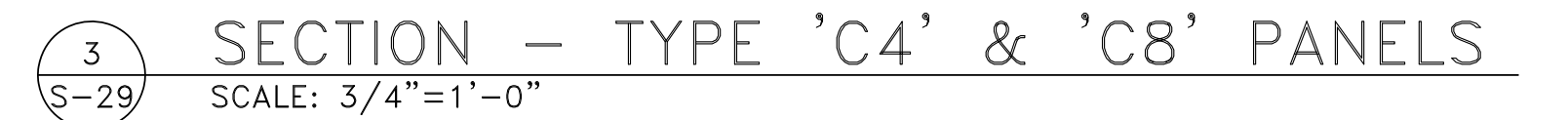
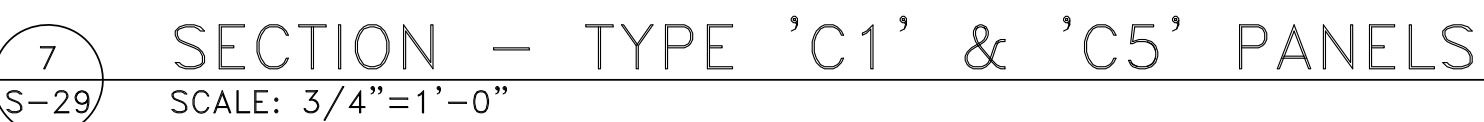
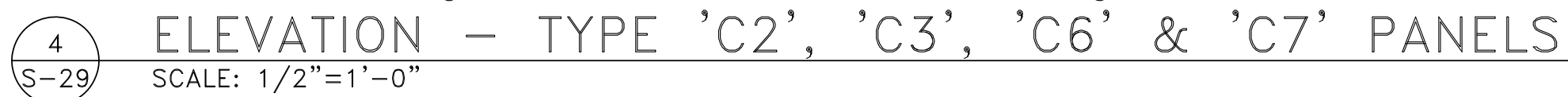
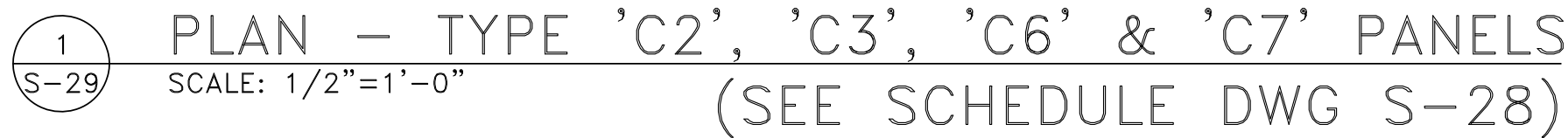
**HYUNDAI MERCHANT MARINE TERMINAL
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DECK PANEL DETAILS - SHEET 3**

AS-BUILT

AUTOCAD FILE NO.
5012S28

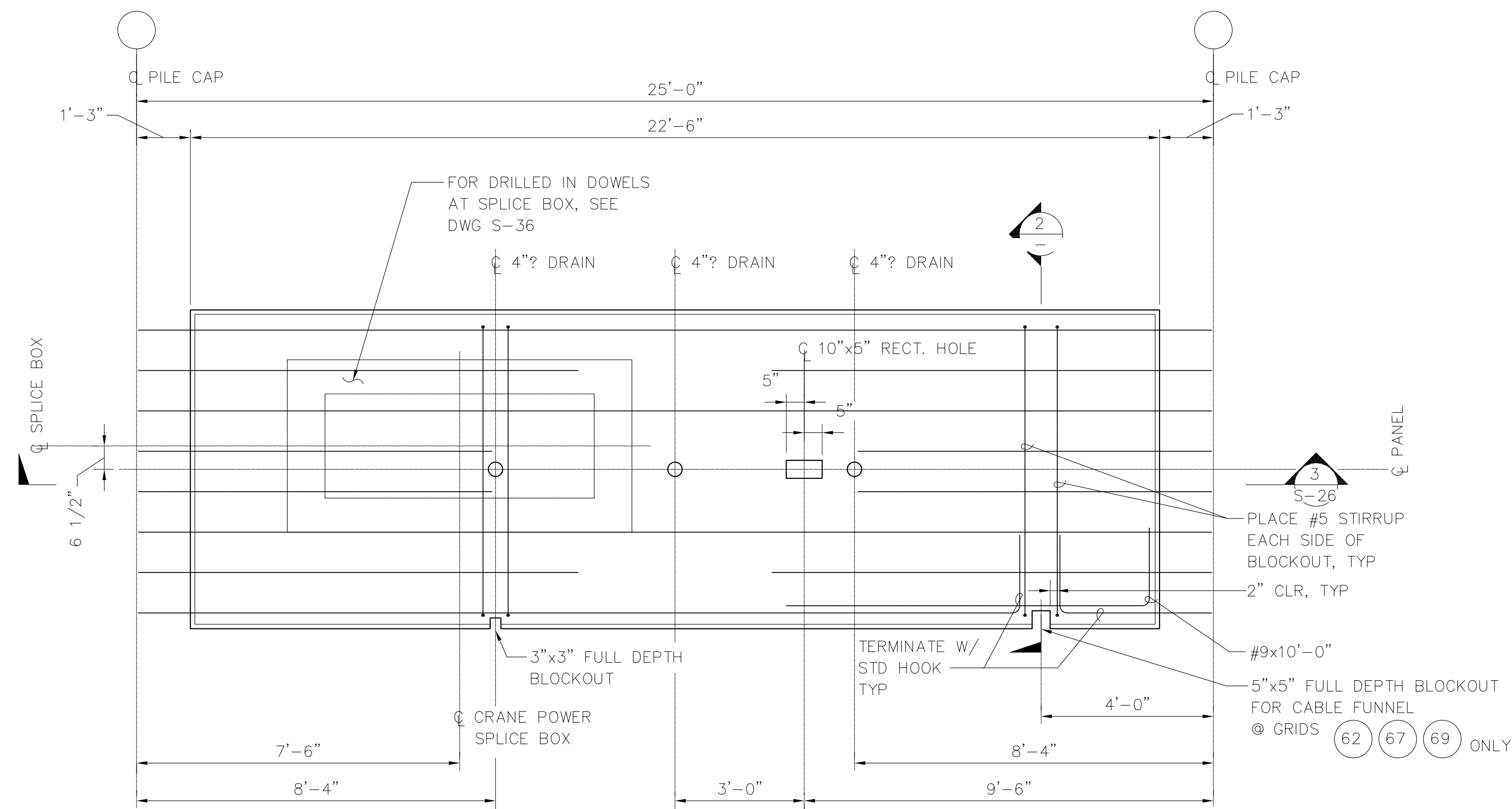
S-28

DRAWING NO. **EP-5012-26**
CONTRACT NO. **978038**
SHEET NO. **39** OF **58**



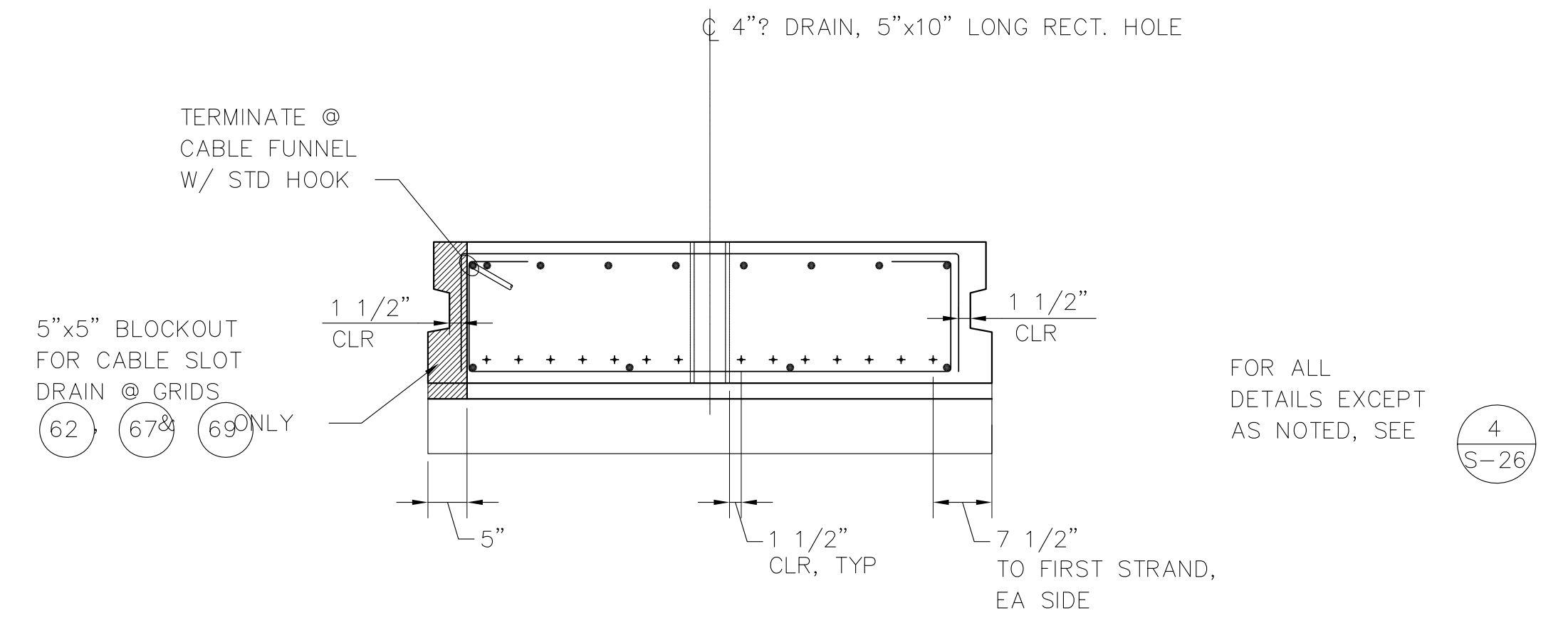
NOTES:

1. FOR FENDER SYSTEM ANCHOR
INSERT DETAILS, SEE
DWG S-33.
2. COORDINATE WITH BOLLARD
PLACEMENT, SEE DWG S-25.



1 PLAN — TYPE 'A2a' PANELS
SCALE: 1/2"=1'-0"

FOR ALL DETAILS EXCEPT AS NOTED, SEE 1 S-26



2 SECTION — TYPE 'A2a' PANELS
SCALE: 3/4"=1'-0"



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CHIEF ENGINEER

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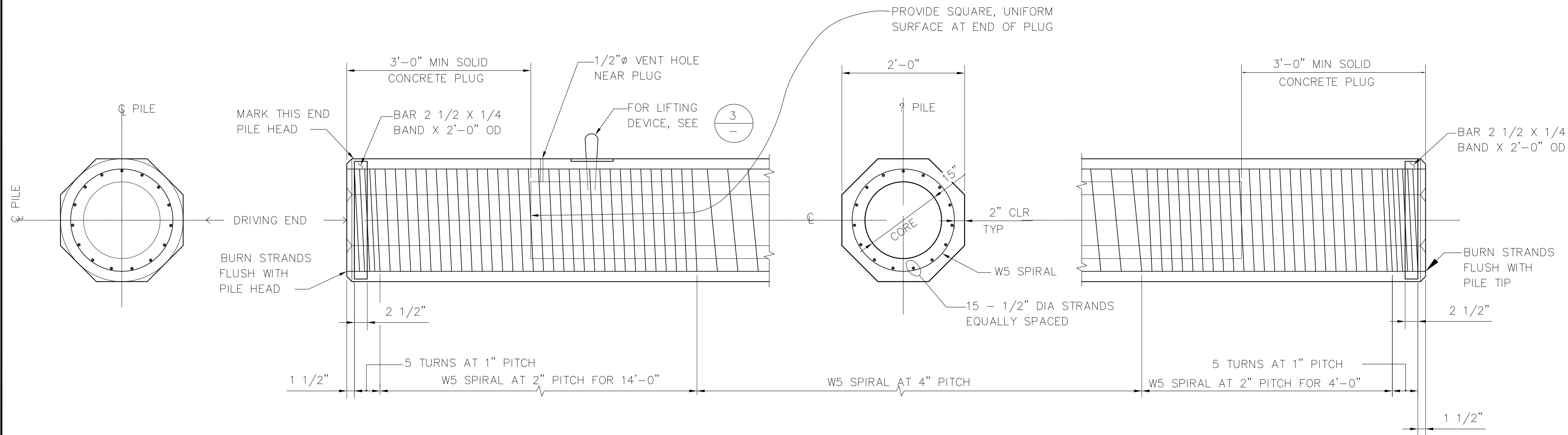
HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
DECK PANEL DETAILS - SHEET 5

AS-BUILT

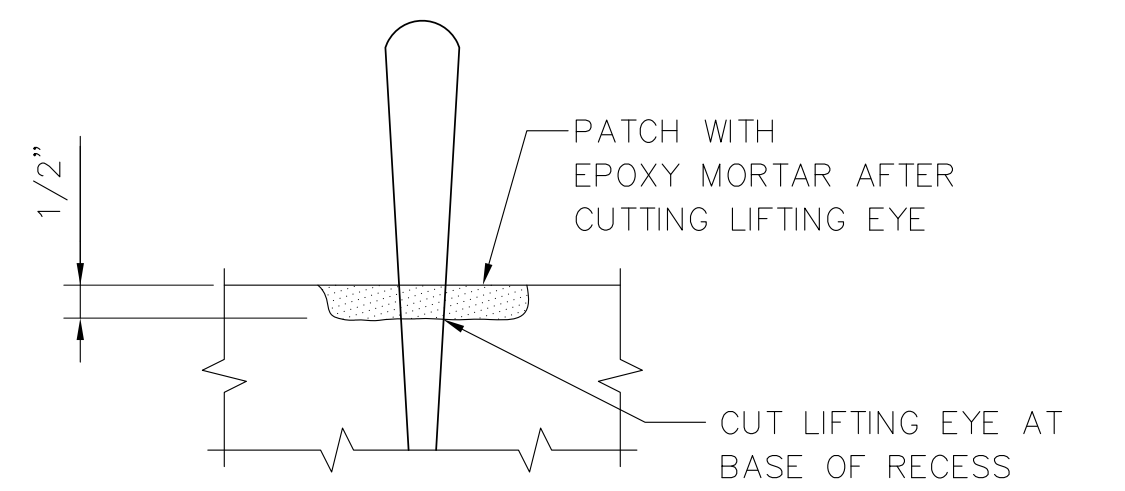
AUTOCAD FILE NO.
5012S30

S-30

DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 41 OF 58



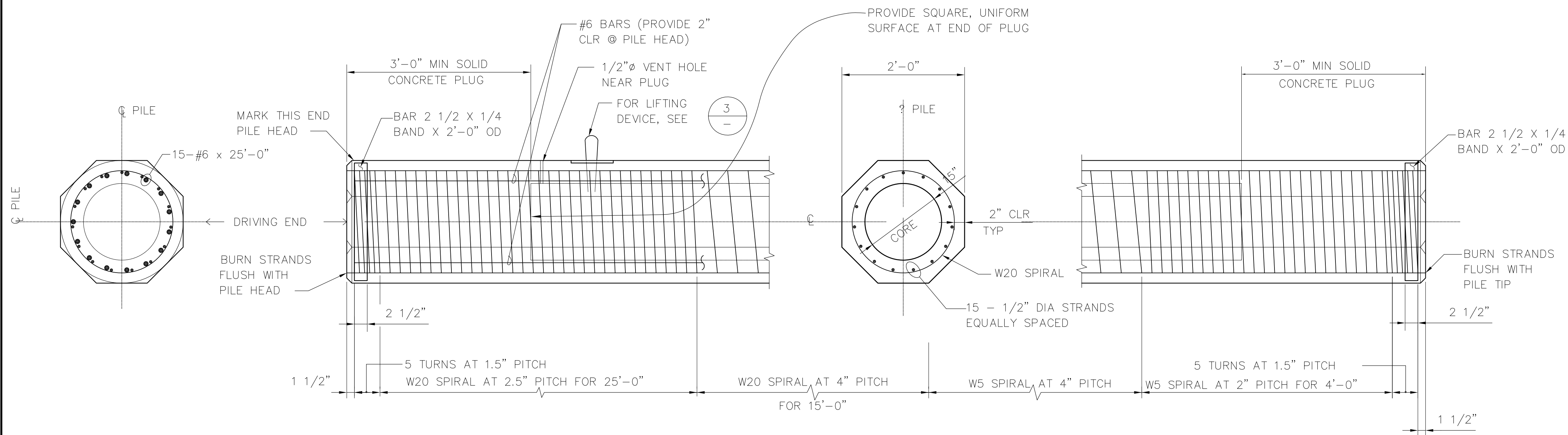
1 24" HOLLOW OCTAGONAL PRECAST PRESTRESSED CONCRETE PILE
SCALE: 1"=1'-0"
(ALL PILES EXCEPT ROWS H, J, K, L, G.8, H.5, J.3)



NOTE:
LIFTING DEVICE LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR CONSIDERING ALL LOADS IMPARTED TO THE PILE (NORMAL AND PARALLEL TO THE LONGITUDINAL AXIS) BY THE RIGGING BEING USED. ALL MODES OF LIFTING (FABRICATION AND FIELD) SHALL BE CONSIDERED.

3 DETAIL - LIFTING EYE
SCALE: NONE

NOTE: THESE PILES WILL BE FURNISHED BY THE PORT, SEE SPECIFICATIONS



2 24" HOLLOW OCTAGONAL PRECAST PRESTRESSED CONCRETE PILE
SCALE: 1"=1'-0"
(ROWS H, J, G.8, H.5, J.3)

NOTE: THESE PILES WILL BE FURNISHED BY THE PORT, SEE SPECIFICATIONS

PRECAST PRESTRESSED PILE DATA (OCTAGONAL CONCRETE PILES)		
SIZE	24" HOLLOW	24" SOLID
SECTION AREA	300 SQ IN	477 SQ IN
WEIGHT	330 LBS/FT	525 LBS/FT
SECTION MODULUS	1308 CUBIC IN	1515 CUBIC IN
PRETENSION:	24" HOLLOW	24" SOLID
NUMBER OF STRANDS	15	22
DESIGN FORCE	378 KIPS	555 KIPS
PRESTRESS IN CONCRETE	1260 PSI	1160 PSI
MIN CONCRETE COMPRESSIVE STRENGTH:		
AT RELEASE	4800 PSI	
AT DRIVING	8000 PSI	
AT 28 DAYS	8000 PSI	
PRESTRESSING STEEL	1/2" DIA 7-WIRE LOW RELAXATION STRAND	
SPIRAL	ASTM A82 SPACING/DRAWING	

NOTES:

- MARK DRIVING END OF ALL PILES CLEARLY IN PRECAST PLANT.
- PILES IN ROWS H, J, K, G.8, H.5, & J.3 SHALL HAVE MARKS DESIGNATING THE RESPECTIVE ROW LOCATION PAINTED CLEARLY ON THE PILE.

AS-BUILT

AUTOCAD FILE NO. 5012S31 S-31



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DATE
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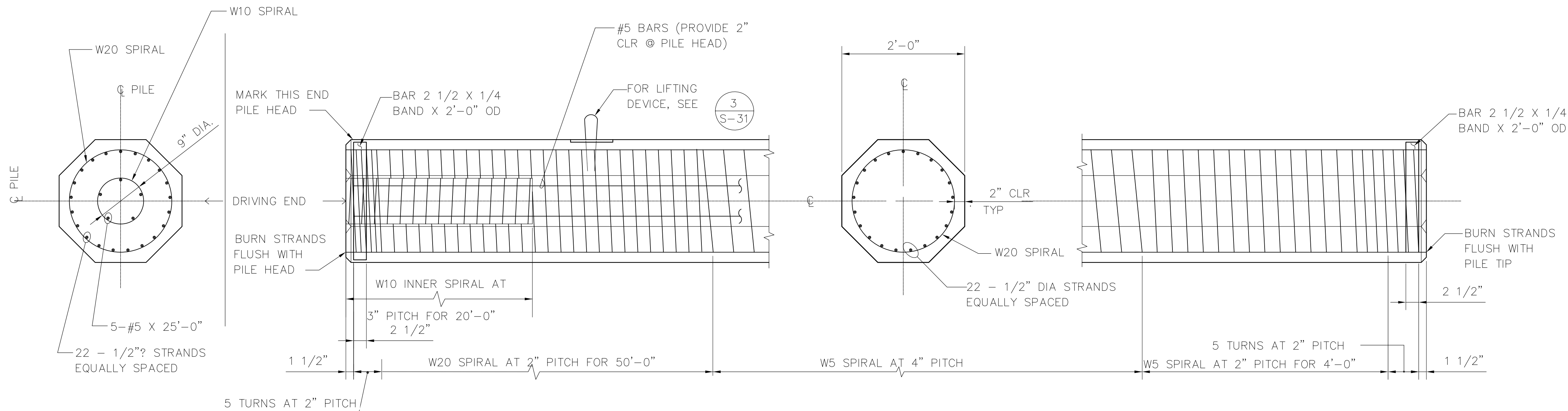
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**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
PRECAST PILE DETAILS - SHEET 1**

DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 42 OF 58



1
S-32 24" SOLID OCTAGONAL PRECAST PRESTRESSED CONCRETE PILE-ROW K
SCALE: 1"=1'-0"

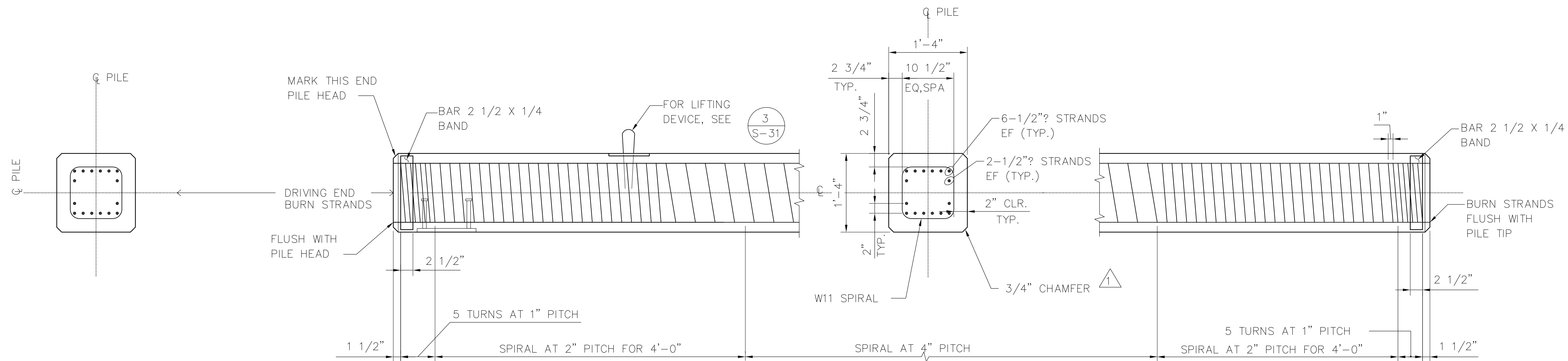
NOTE: SEE DWG S-31 FOR SOLID PILE DATA.

NOTE: THESE PILES WILL BE FURNISHED BY THE PORT, SEE SPECIFICATIONS.

PRECAST PRESTRESSED PILE DATA (SQUARE CONCRETE PILES)	
SIZE	16" SOLID
SECTION AREA	256 SQ IN
WEIGHT	276 LBS/FT
SECTION MODULUS	683 CUBIC IN
PRETENSION: NUMBER OF STRANDS	16
DESIGN FORCE	154 KIPS
PRESTRESS IN CONCRETE	600 PSI
MIN CONCRETE COMPRESSIVE STRENGTH: AT RELEASE	4800 PSI
AT DRIVING	8000 PSI
AT 28 DAYS	8000 PSI
PRESTRESSING STEEL	1/2" DIA 7-WIRE LOW RELAXATION STRAND
SPIRAL	ASTM A82 SPACING/DRAWING

NOTES:

1. MARK DRIVING END OF ALL PILES CLEARLY IN PRECAST PLANT.
2. PILES IN ROWS H, J, K, G.8, H.5, & J.3 SHALL HAVE MARKS DESIGNATING THE RESPECTIVE ROW LOCATION PAINTED CLEARLY ON THE PILE.



2
S-32 16" SOLID SQUARE PRECAST PRESTRESSED CONCRETE FENDER PILE
SCALE: 1"=1'-0"

NOTE: SEE 5 S-33 4 S-34 FOR FENDER ATTACHMENT DETAILS

AS-BUILT

AUTOCAD FILE NO.
5012S32

S-32



PORT OF TACOMA
P.O. BOX 1837 TACOMA, WASHINGTON 98401
(206) 383-5841

BERGER/ABAM
ENGINEERS INC.
33301 9TH AVENUE SOUTH
FEDERAL WAY, WASHINGTON 98003-6395
(206) 431-2300 FAX: (206) 431-2250

APPROVED

DATE
CURTIS L. RATCLIFFE P.E.
CHIEF ENGINEER

MMD 9/91
DRAWN BY DATE
JAS 9/91
DESIGNED BY DATE

BCM 9/91
CHECKED BY DATE
JAS 9/91
PROJ ENGR DATE

AS-BUILT
RDD JAS 1/4/99
MARK REVISION BY APP. DATE

**HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
PRECAST PILE DETAILS - SHEET 2**

DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 43 OF 58