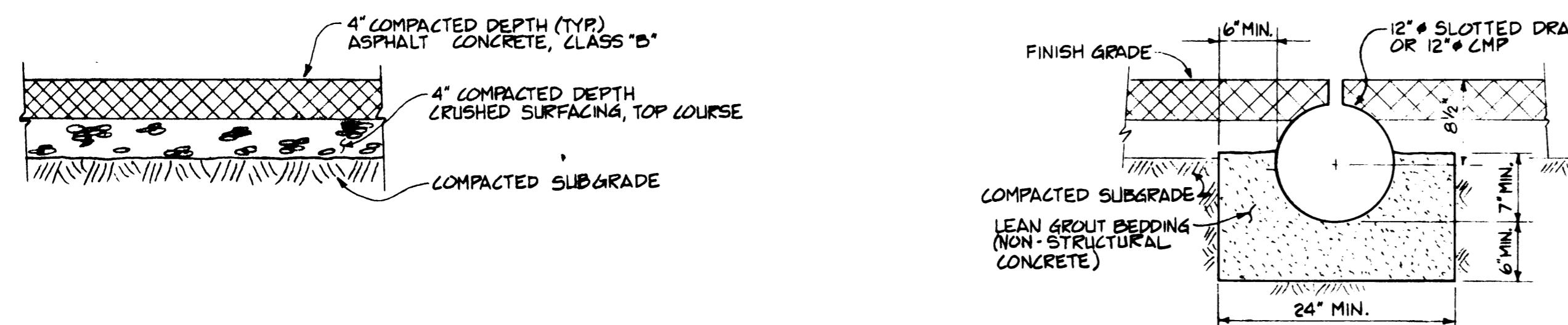


CROSS SECTION-TYPICAL THROUGHOUT

N.T.S. 1 (C1/C2)

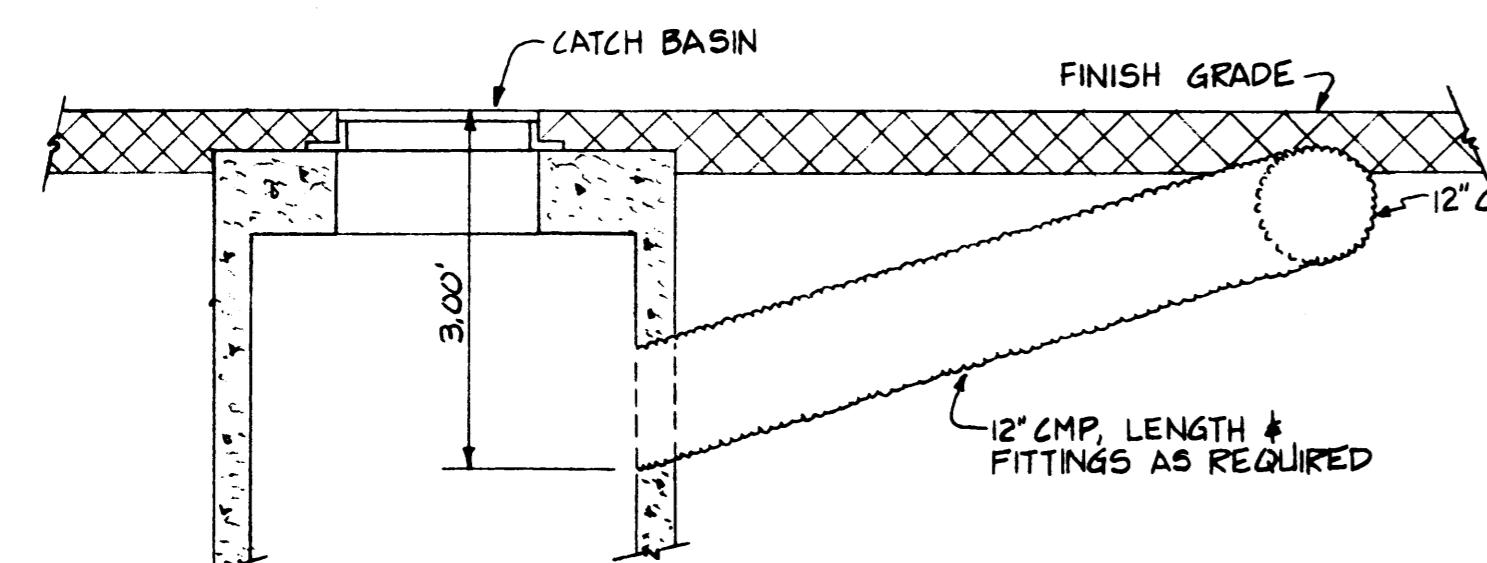


ASPHALT PAVEMENT SECTION

1" - 1' - 0" 2 (C2/C2)

SURFACE DRAIN DETAIL

1" - 1' - 0" 3 (C2/C2)



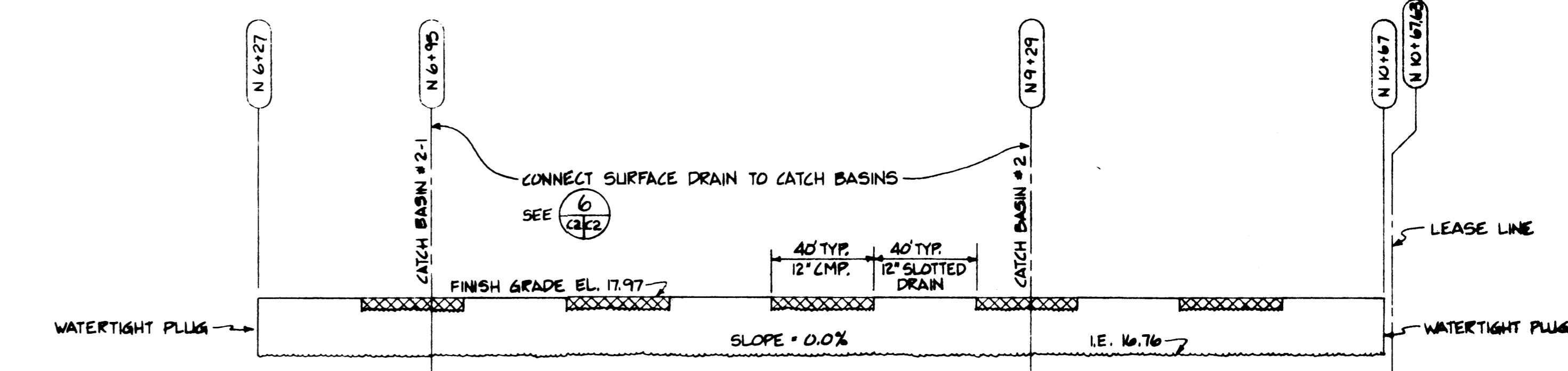
SURFACE DRAIN CONNECTION DETAIL

N.T.S. 6 (C2/C2)

SURFACE DRAIN DETAIL

N.T.S.

4 (C1/C2)



SURFACE DRAIN DETAIL

N.T.S.

5 (C1/C2)

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WRITTEN PERMISSION OF WHITACRE ENGINEERS, INC.

**SHIPYARD #3 EXTENSION (PHASE I)
PAVING & DRAINAGE DETAILS**

CLIENT: TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON 98421

Whitacre Engineers, Inc.

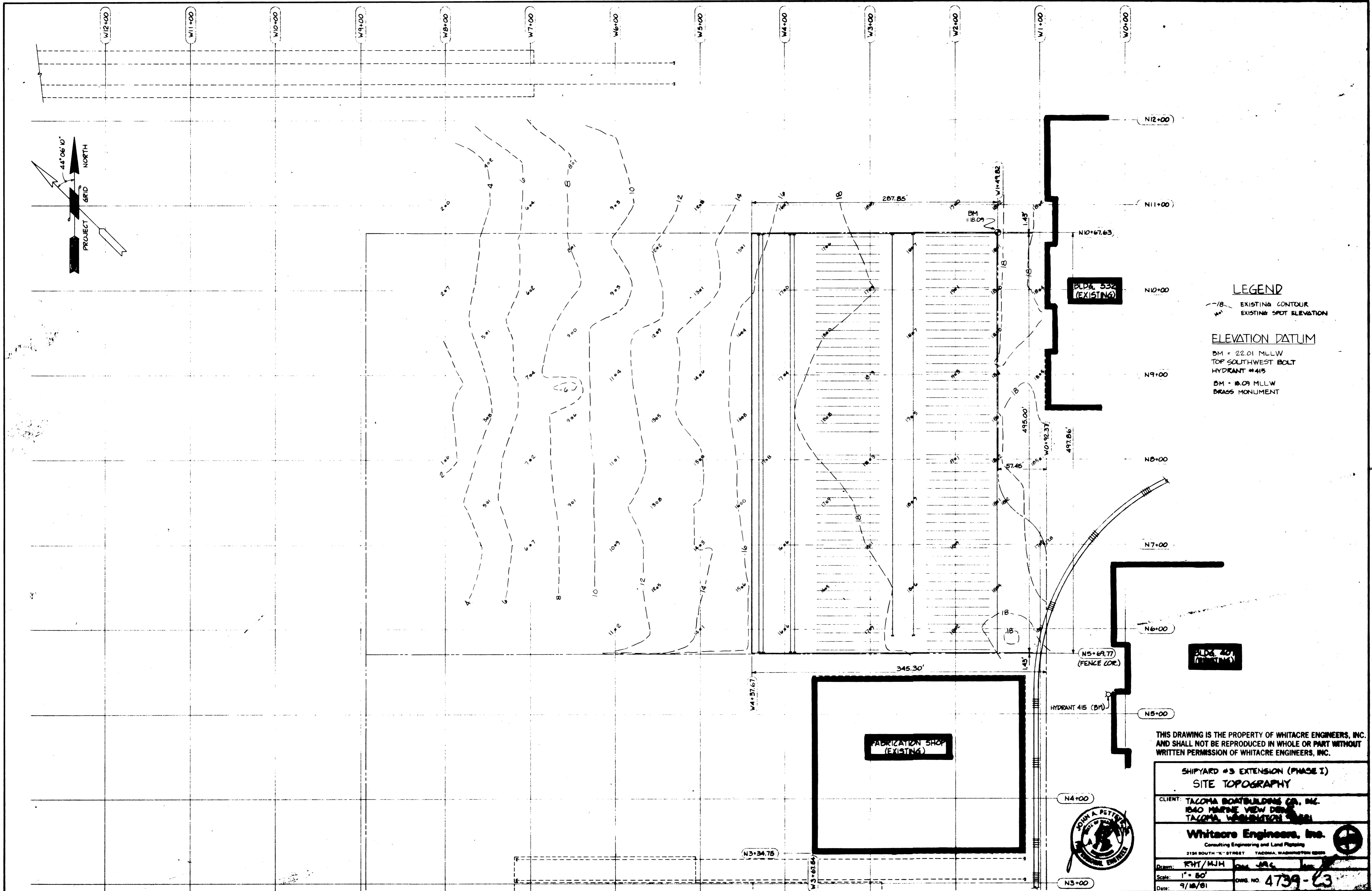
Consulting Engineering and Land Planning

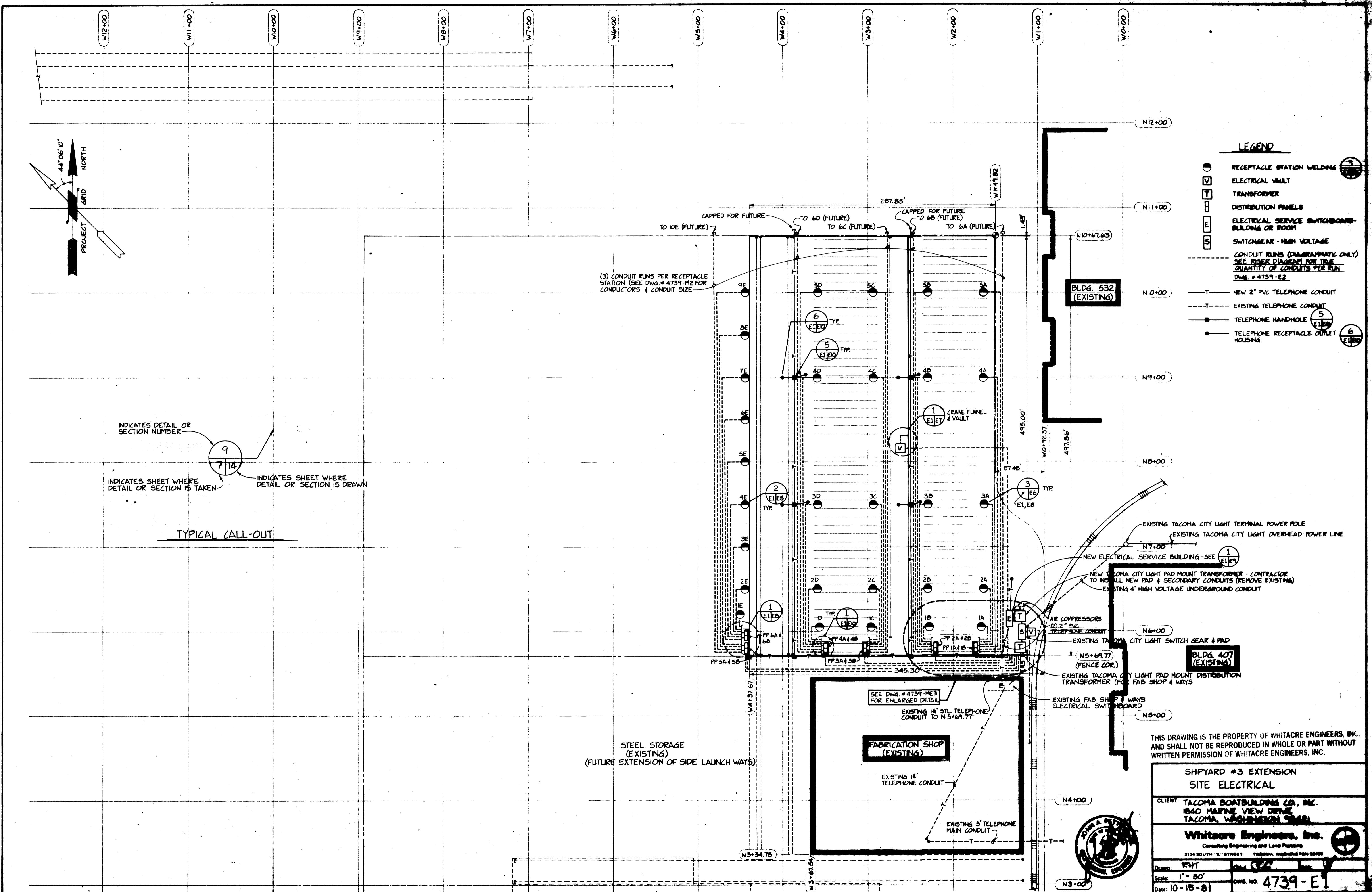
2124 SOUTH "K" STREET TACOMA, WASHINGTON 98406

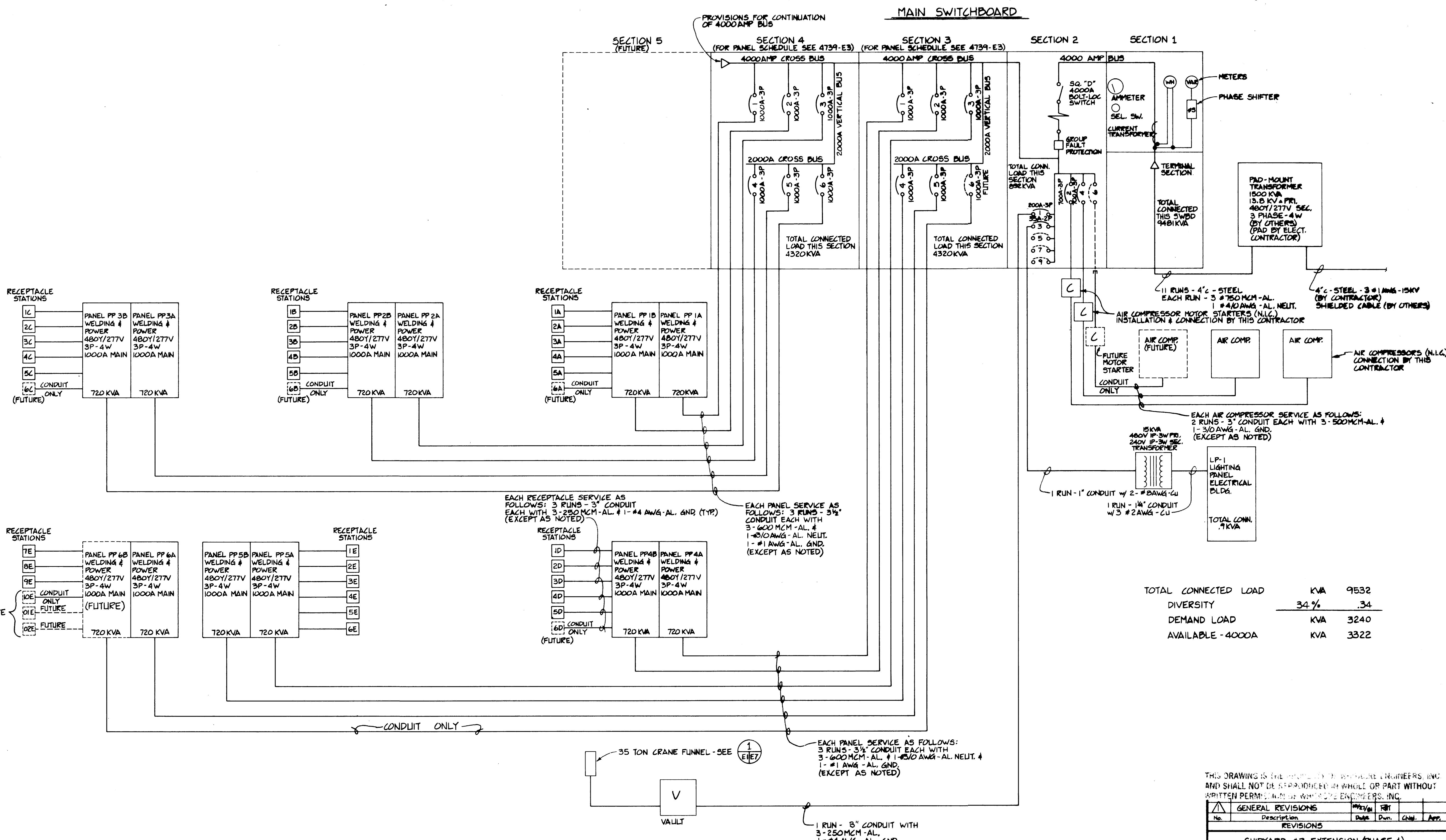


Drawn:	RHT	Checked:	JRC
Scale:	NOTED	Approved:	
Date:	9/18/01	W.D. No.:	4739-22

EP-4632-12







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WRITTEN PERMISSION OF WHITING ENGINEERS, INC.						
No.	GENERAL REVISIONS		Date	Draw.	Chkd.	App.
	Description	REVISIONS				

SHIPYARD #3 EXTENSION (PHASE 1)
ELECTRICAL RISER DIAGRAM
BASE BID

BASE BID
CLIENT: TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON 98421

Whitacre Engineers, Inc.

Consulting Engineering and Land Planning

2124 SOUTH "K" STREET		TACOMA, WASHINGTON 98405
Drawn:	RAT	Chkd.
Scale:	NONE	DWG. NO.
Date:	10-15-81	App.

EP-4532-12

PANEL: SWBD SECT. 2			SQ. "D" SWITCHBOARD SECTION 480Y/277V 3P-4W 60CY 2000AMP BUS - 5-400AMP, 3-1000AMP SPACES		
KVA	CIRCUIT DESIGNATION	BRKR.	BRKR.	CIRCUIT DESIGNATION	KVA
131	35 TON CRANE - FEEDER	200A-3P	1	700A-3P AIR COMPRESSOR - 400HP	38
.9	SERVICE BLDG. TRANSFORMER	35A-2P	3	700A-3P AIR COMPRESSOR - 400HP	38
—	SPACE (400AMP)	—	5	—	—
—	SPACE (400AMP)	—	7	—	—
—	SPACE (400AMP)	—	9	—	—
132	TOTAL KVA	892		TOTAL AMPS	1074

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SHIPYARD #3 EXTENSION (PHASE 1)
SWITCHBOARD & SERVICE BLDG.
PANEL SCHEDULES

CLIENT TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON 98421

Whitacre Engineers, Inc.

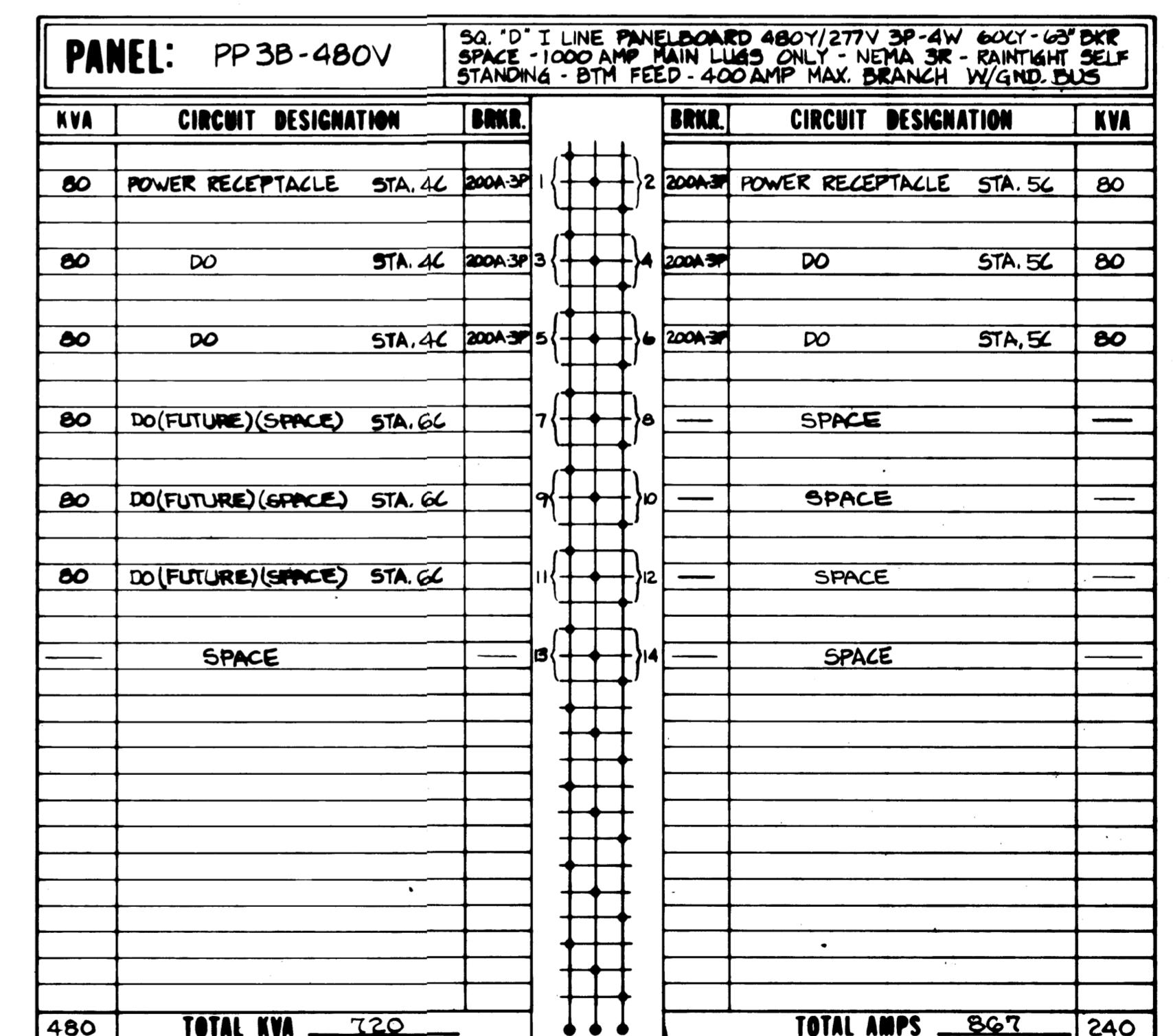
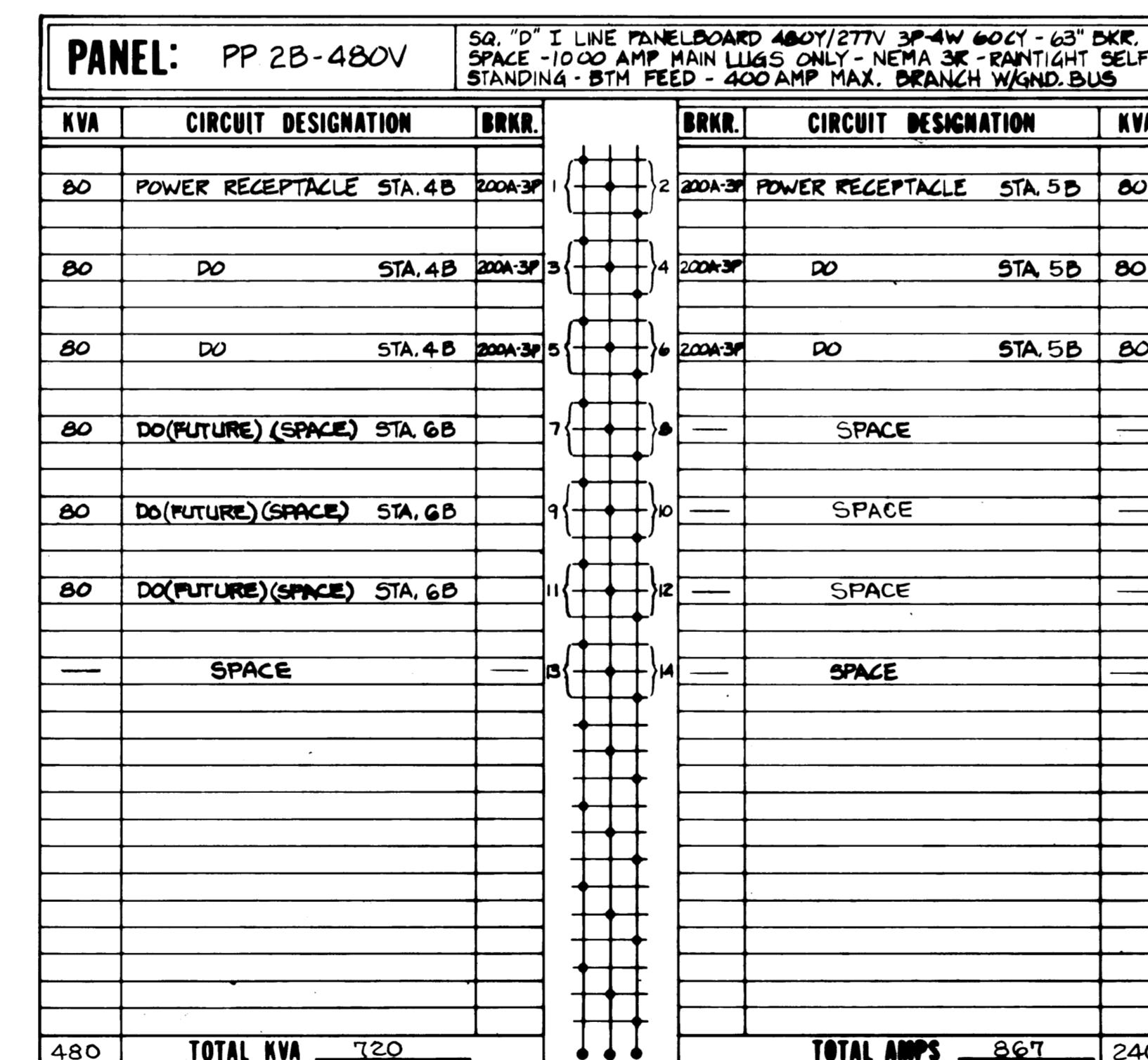
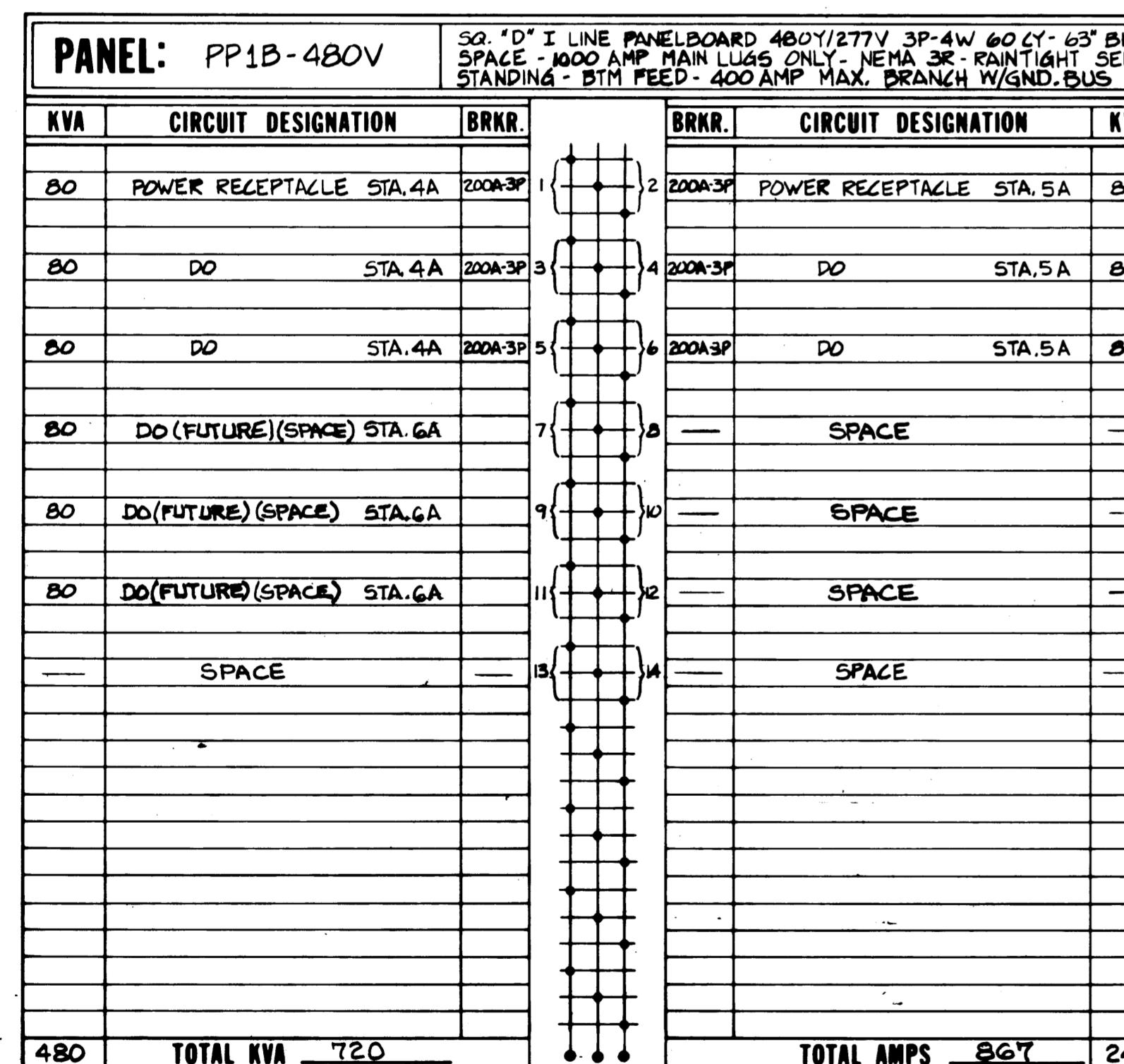
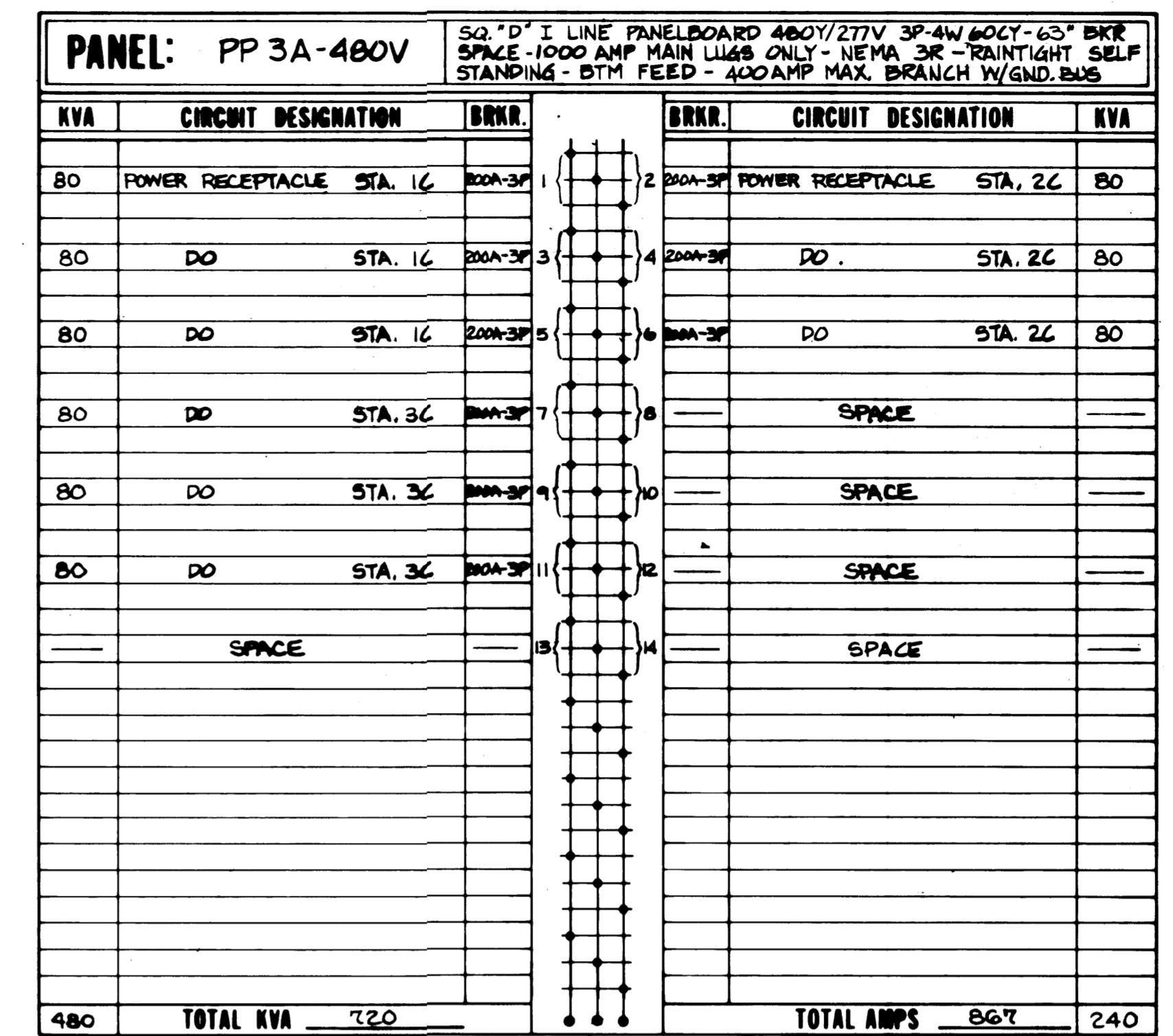
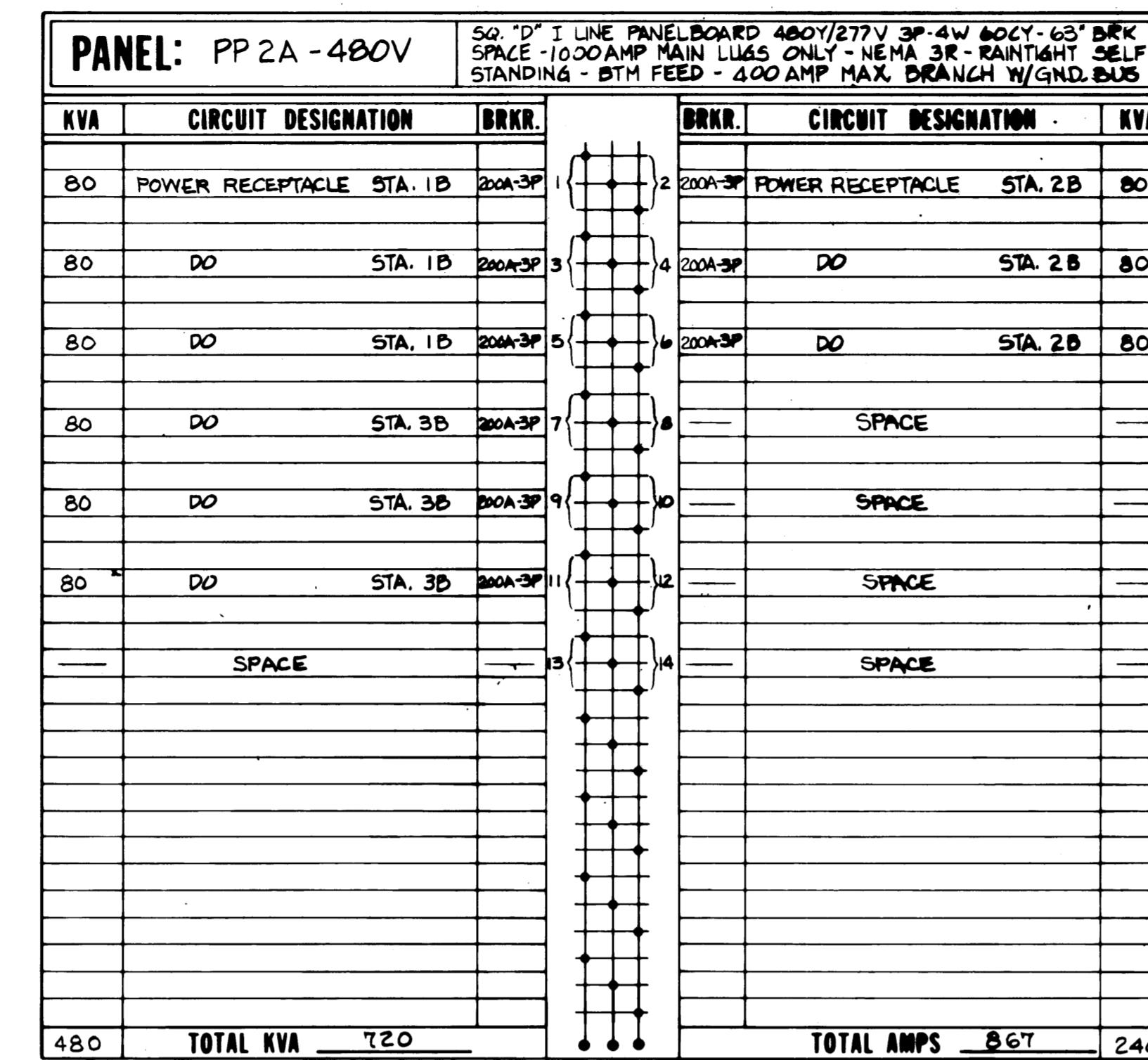
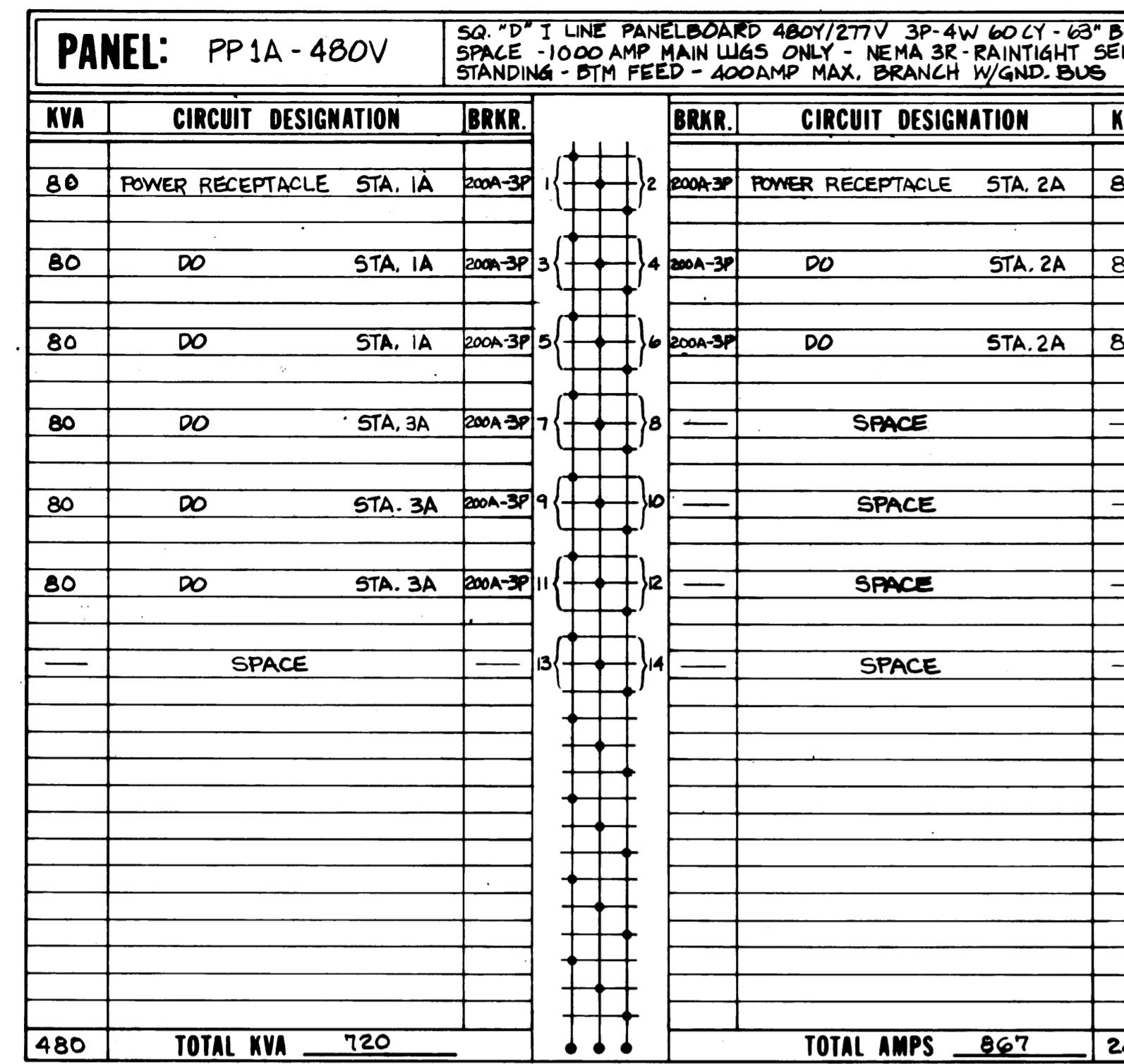
Consulting Engineering and Land Planning

Drawn:	RHT	Chkd.	GL.	App.
Scale:	NONE			
Date:	10-15-81			
		DWG. NO. 4739 - E3		

EP-4532-12

EP-4632-12





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REVISE MAX. BRANCH BKR.
No. Description Date Dom. Chkd. App.

REVISIONS

SHIPYARD #3 EXTENSION
480V PANEL SCHEDULES (1)

CLIENT TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON 98421

Whitacre Engineers, Inc.

Consulting Engineering and Land Planning

2124 SOUTH K STREET TACOMA WASHINGTON 98404

Drawn: RHT Chkd: BC App:
Scale: NONE DWG NO: 4739 - E4
Date: 10-15-81 DWG NO: 4739 - E4



EP-4832-12

PANEL: PP 4A-480V			SQ. "D" I LINE PANELBOARD 480Y/277V 3P-4W 60CY-63" BK SPACE - 1000 AMP MAIN LUGS ONLY - NEMA 3R - RAINTIGHT SEL STANDING - BTM FEED - 400 AMP MAX, BRANCH W/GND. BUS		
KVA	CIRCUIT DESIGNATION	BRKR.	BRKR.	CIRCUIT DESIGNATION	KVA
80	POWER RECEPTACLE STA. 1D	200A-3P	1	200A-3P POWER RECEPTACLE STA. 2D	80
80	DO STA. 1D	200A-3P	3	200A-3P DO STA. 2D	80
80	DO STA. 1D	200A-3P	5	200A-3P DO STA. 2D	80
80	DO STA. 3D	200A-3P	7	— SPACE	—
80	DO STA. 3D	200A-3P	9	— SPACE	—
80	DO STA. 3D	200A-3P	11	— SPACE	—
—	SPACE	—	13	— SPACE	—
480	TOTAL KVA	720			TOTAL AMPS 867

PANEL: PP 5A - 480V			5Q, "D" I LINE PANELBOARD 480Y/277V 3P-4W 60CY-63CY SPACE - 1000 AMP MAIN LUGS ONLY - NEMA 3R - RAINTIGHT STANDING - BTM FEED - 400 AMP MAX. BRANCH W/GND. BUS		
KVA	CIRCUIT DESIGNATION	BRKR.	BRKR.	CIRCUIT DESIGNATION	
80	POWER RECEPTACLE STA. 1E	200A-3P	1	200A-3P POWER RECEPTACLE STA. 2E	
80	DO STA. 1E	200A-3P	3	200A-3P DO STA. 2E	
80	DO STA. 1E	200A-3P	5	200A-3P DO STA. 2E	
80	DO STA. 3E	200A-3P	7	SPACE	
80	DO STA. 3E	200A-3P	9	SPACE	
80	DO STA. 3E	200A-3P	11	SPACE	
—	SPACE	—	13	SPACE	
480	TOTAL KVA	720		TOTAL AMPS	867

PANEL: PP 6A-480V			SQ. "D" 1 LINE PANELBOARD 480Y/277V 3P-4W 60CY-63" SPACE - 1000 AMP MAIN LUGS ONLY - NEMA 3R - RAILTIGHT STANDING - BTM FEED - 400AMP MAX. BRANCH W/GND.		
KVA	CIRCUIT DESIGNATION	BRKR.	BRKR.	CIRCUIT DESIGNATION	
80	POWER RECEPTACLE STA. 7E	200A-3P	1	200A-3P POWER RECEPTACLE STA. 8E	
80	DO	STA. 7E 200A-3P	3	200A-3P DO STA. 8E	
80	DO	STA. 7E 200A-3P	5	200A-3P DO STA. 8E	
80	DO	STA. 9E 200A-3P	7	— SPACE	
80	DO	STA. 9E 200A-3P	9	— SPACE	
80	DO	STA. 9E 200A-3P	11	— SPACE	
—	SPACE	—	13	— SPACE	
480	TOTAL KVA	720			TOTAL AMPS 867

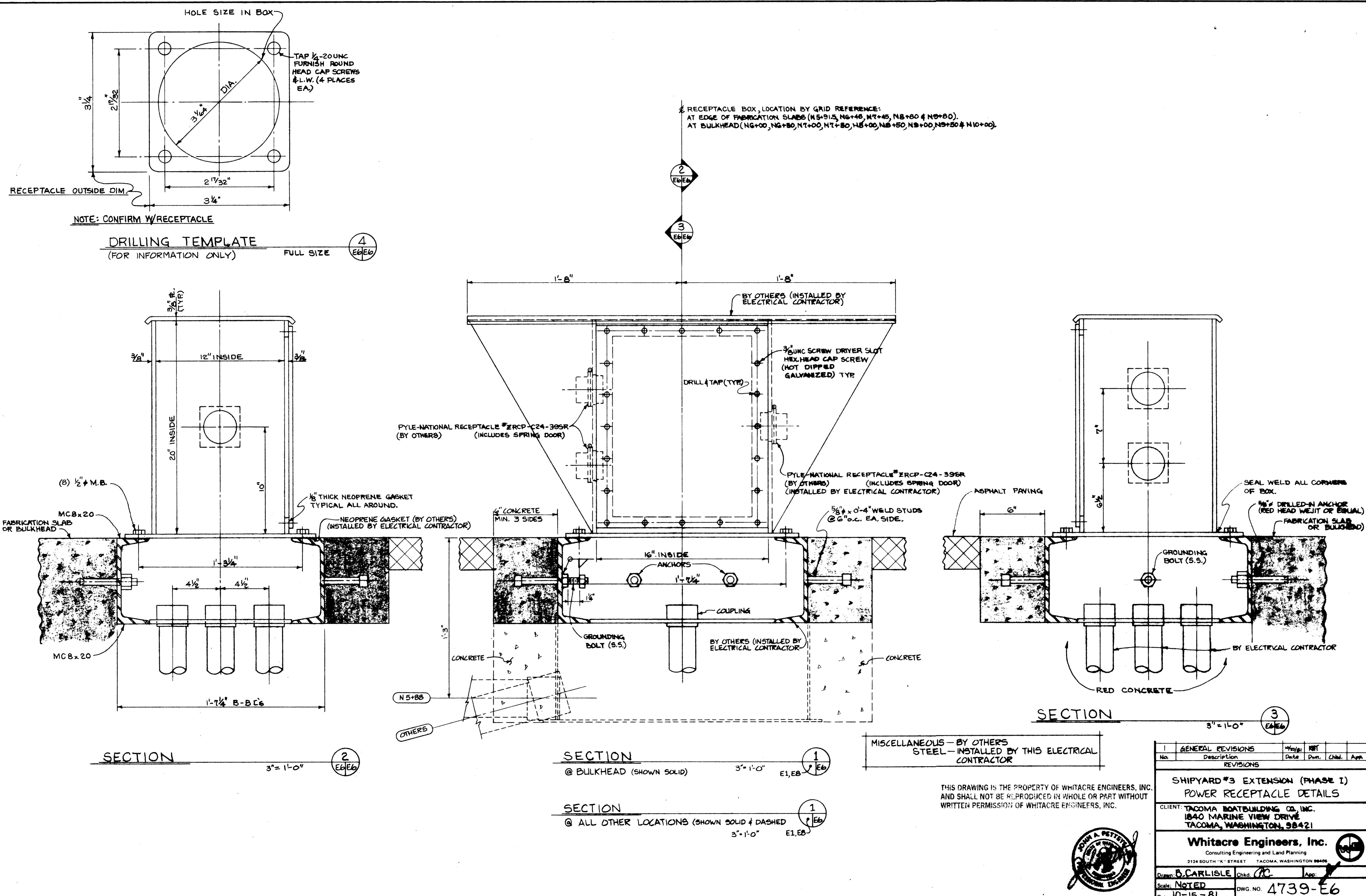
PANEL: PP 4B-480V			SQ. "D" I LINE PANELBOARD 480Y/277V 3P-4W 60CY - 63" BK SPACE - 1000 AMP MAIN LUGS ONLY - NEMA 3R - RAINTIGHT SEL STANDING - BTM FEED - 400 AMP MAX, BRANCH W/GND.BUS		
KVA	CIRCUIT DESIGNATION	BRKR.	BRKR.	CIRCUIT DESIGNATION	KVA
80	POWER RECEPTACLE STA. 4D	200A-3P	1	200A-3P POWER RECEPTACLE STA. 5D	80
80	DO STA. 4D	200A-3P	3	200A-3P DO STA. 5D	80
80	DO STA. 4D	200A-3P	5	200A-3P DO STA. 5D	80
80	DO(FUTURE)(SPACE) STA. 6D		7	SPACE	
80	DO(FUTURE)(SPACE) STA. 6D		9	SPACE	
80	DO(FUTURE)(SPACE) STA. 6D		11	SPACE	
—	SPACE	—	13	SPACE	—
480	TOTAL KVA	720			
				TOTAL AMPS	867

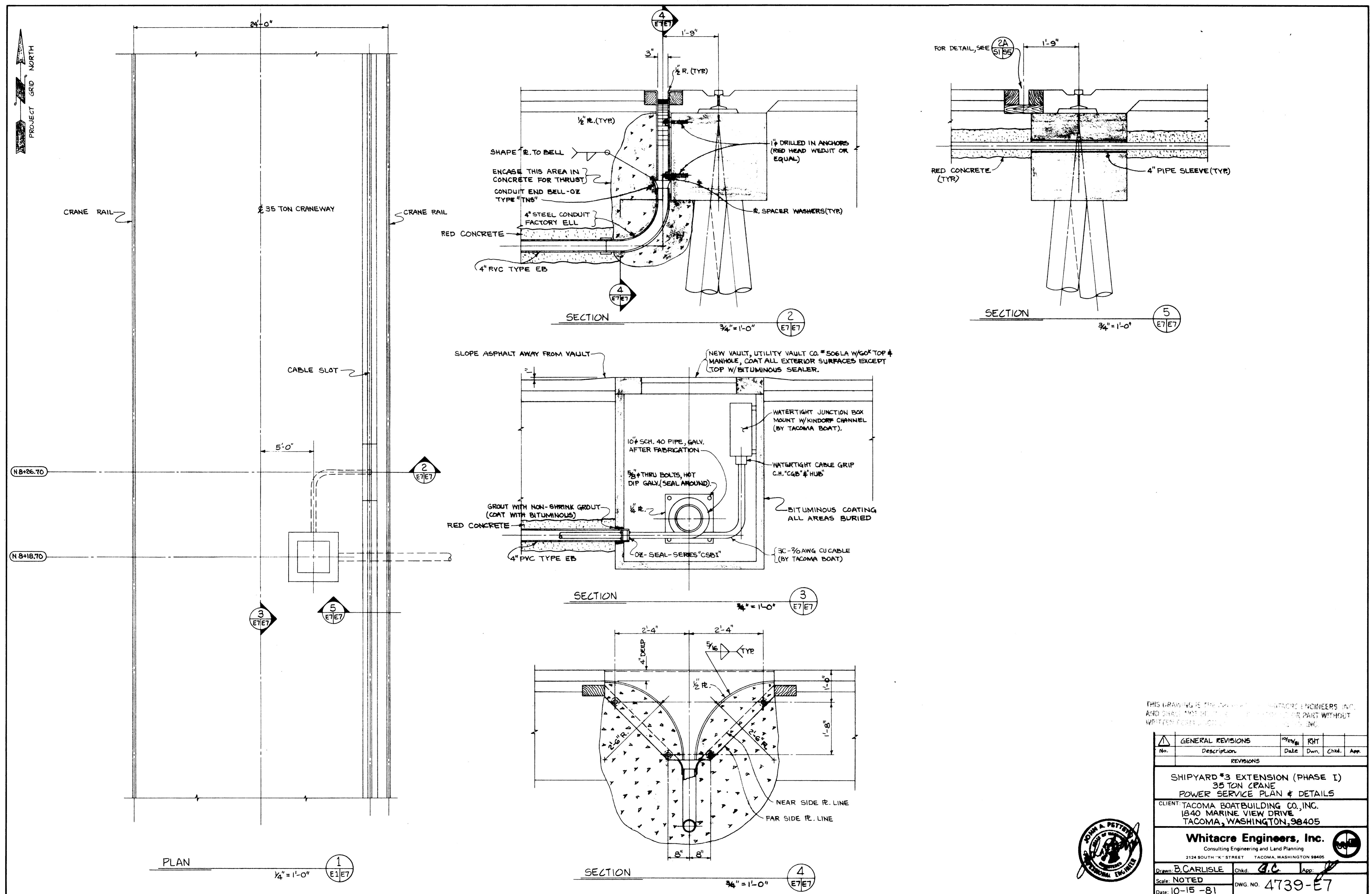
PANEL: PP 6B-480V (FUTURE)			SQ. "D" I LINE PANELBOARD 480Y/277V 3P-4W 60CY - 63" BK SPACE - 1000 AMP MAIN LUGS ONLY - NEMA 3R - RAINTIGHT SEL STANDING - BTM FEED - 400 AMP MAX, BRANCH W/GND, BL		
KVA	CIRCUIT DESIGNATION	BRKR.	BRKR.	CIRCUIT DESIGNATION	
80	POWER RECEPTACLE STA.10E	200A-3P	1	200A-3P	POWER RECEPTACLE STA.01E
80	DO(FUTURE)	STA.10E	200A-3P	3	200A-3P
80	DO(FUTURE)	STA.10E	200A-3P	4	DO(FUTURE) STA.01E
80	DO (FUTURE)	STA.02E	200A-3P	5	200A-3P
80	DO (FUTURE)	STA.02E	200A-3P	6	DO (FUTURE) STA.01E
80	DO (FUTURE)	STA.02E	200A-3P	7	—
80	DO (FUTURE)	STA.02E	200A-3P	8	SPACE
80	DO (FUTURE)	STA.02E	200A-3P	9	—
80	DO (FUTURE)	STA.02E	200A-3P	10	SPACE
—	SPACE	—	11	—	SPACE
—	SPACE	—	12	—	SPACE
—	SPACE	—	13	—	SPACE
—	SPACE	—	14	—	SPACE
480	TOTAL KVA	720			TOTAL AMPS 867

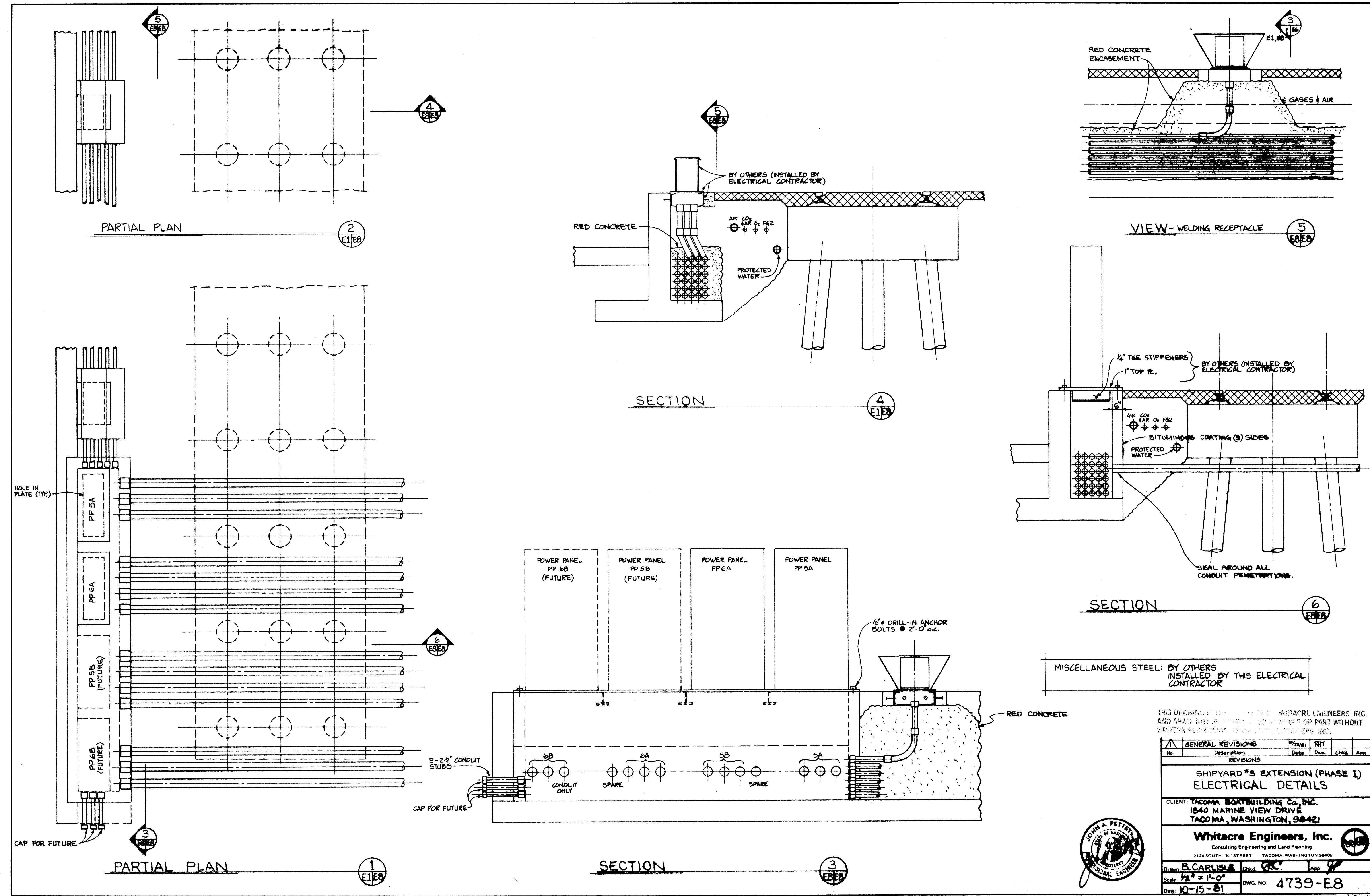
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⚠	REVISE MAX. BRANCH BKR.	1970/11	RHT		
No.	Description	Date	Drawn.	Chkd.	App.
REVISIONS					
SHIPYARD #3 EXTENSION					
480V PANEL SCHEDULES (2)					
CLIENT	TACOMA BOATBUILDING CO., INC. 1840 MARINE VIEW DRIVE TACOMA, WASHINGTON 98421				
Whitacre Engineers, Inc. Consulting Engineering and Land Planning 2124 SOUTH K STREET TACOMA WASHINGTON 98405					
Drawn:	RHT	Chkd.	GC	App.	<i>10/15/81</i>
Scale:	NONE		DWG. NO	4739 - E5	
Date:	10-15-81				









GENERAL REVISIONS		10/23/81	RHT		
Description		Date	Draw	Chkd.	App.
REVISIONS					

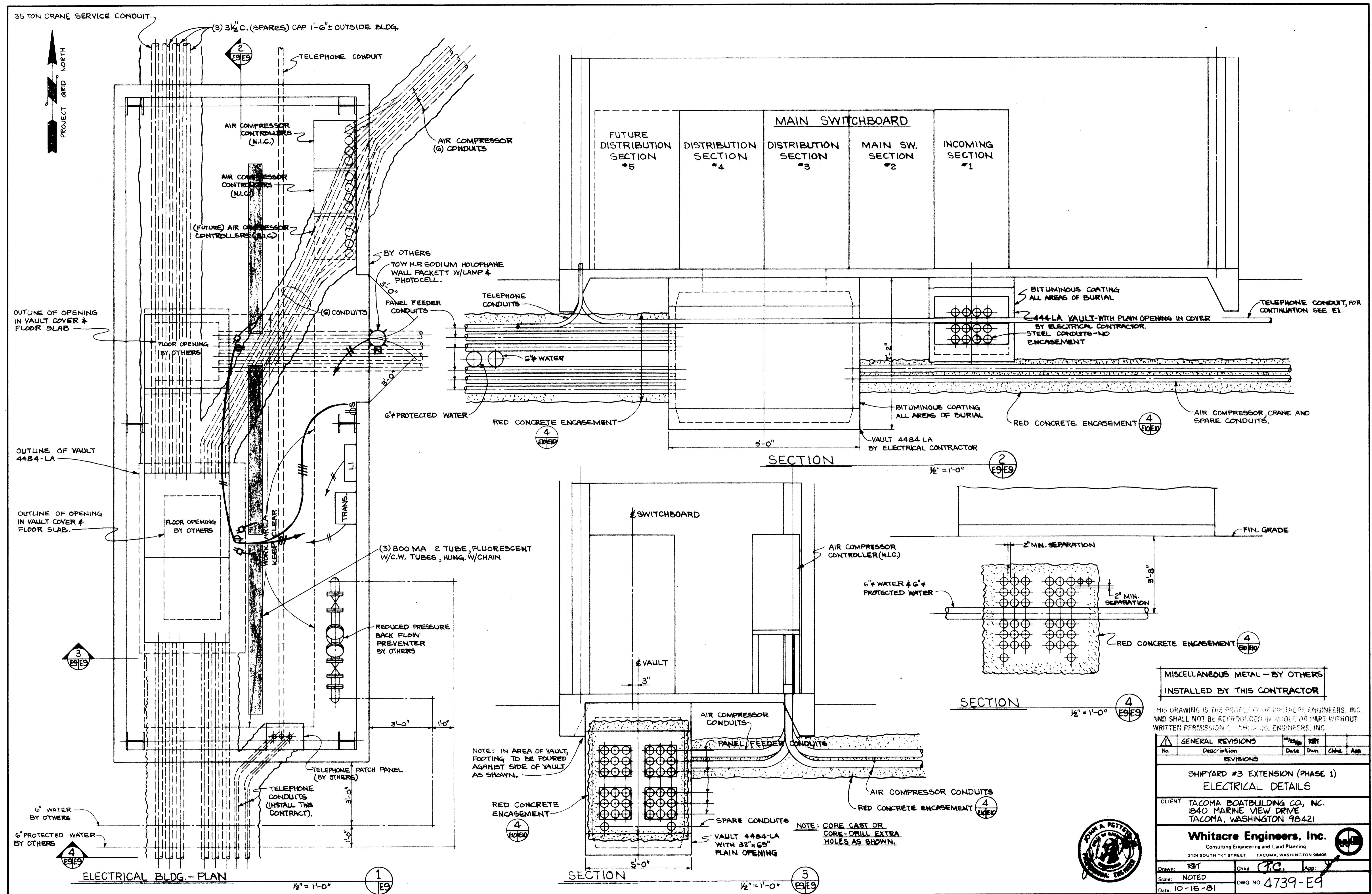
SHIPYARD #3 EXTENSION (PHASE I)
ELECTRICAL DETAILS

IENT: TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON, 98421

Whitacre Engineers, Inc.

Consulting Engineering and Land Planning		99
2124 SOUTH "K" STREET	TACOMA, WASHINGTON 98405	

EP-4532-12



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GENERAL REVISIONS		10/29/01	REV			
Description	Date	Draw.	Chkd.	App.		
REVISIONS						

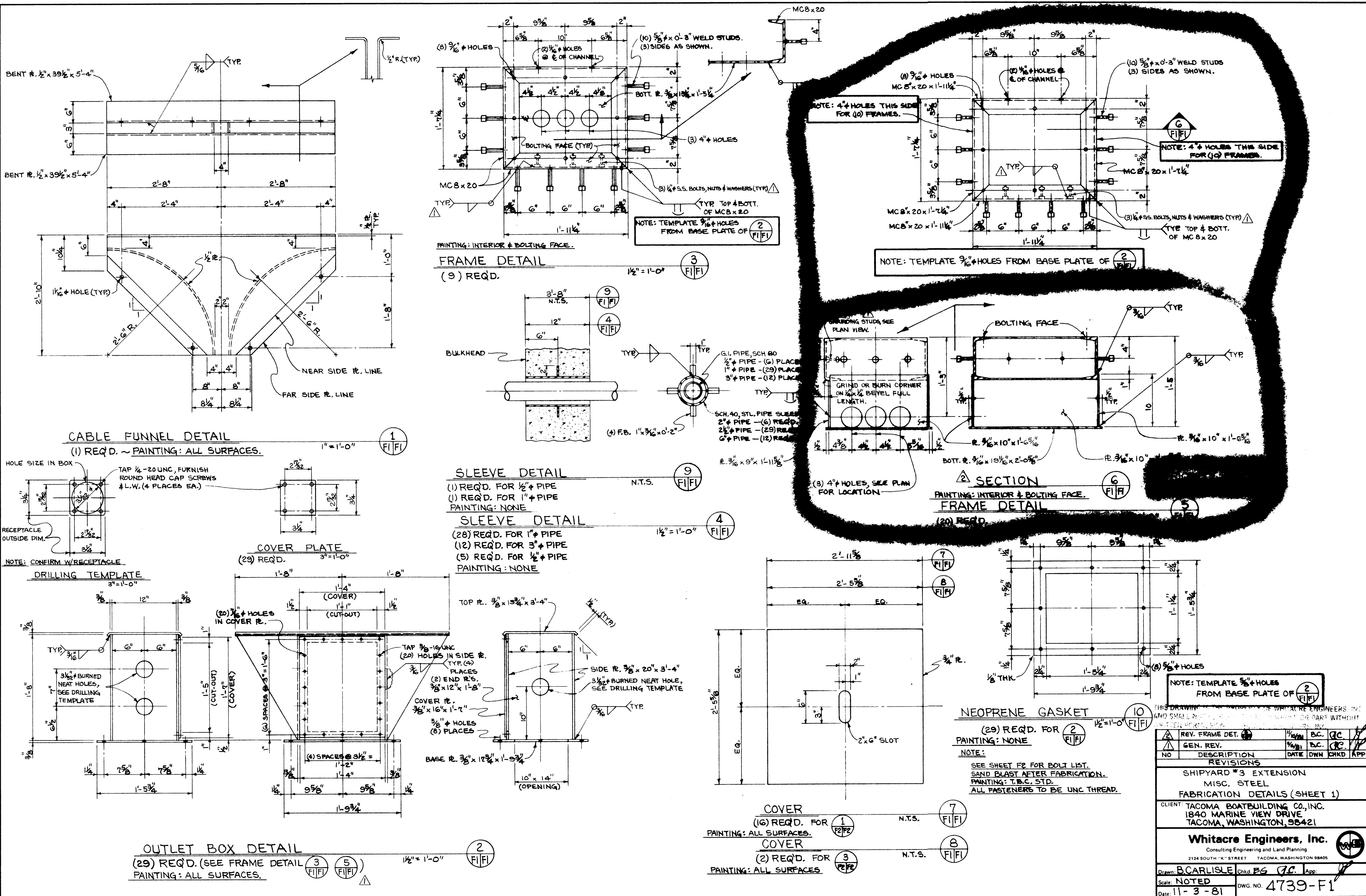
IPYARD #3 EXTENSION (PHASE 1) ELECTRICAL DETAILS

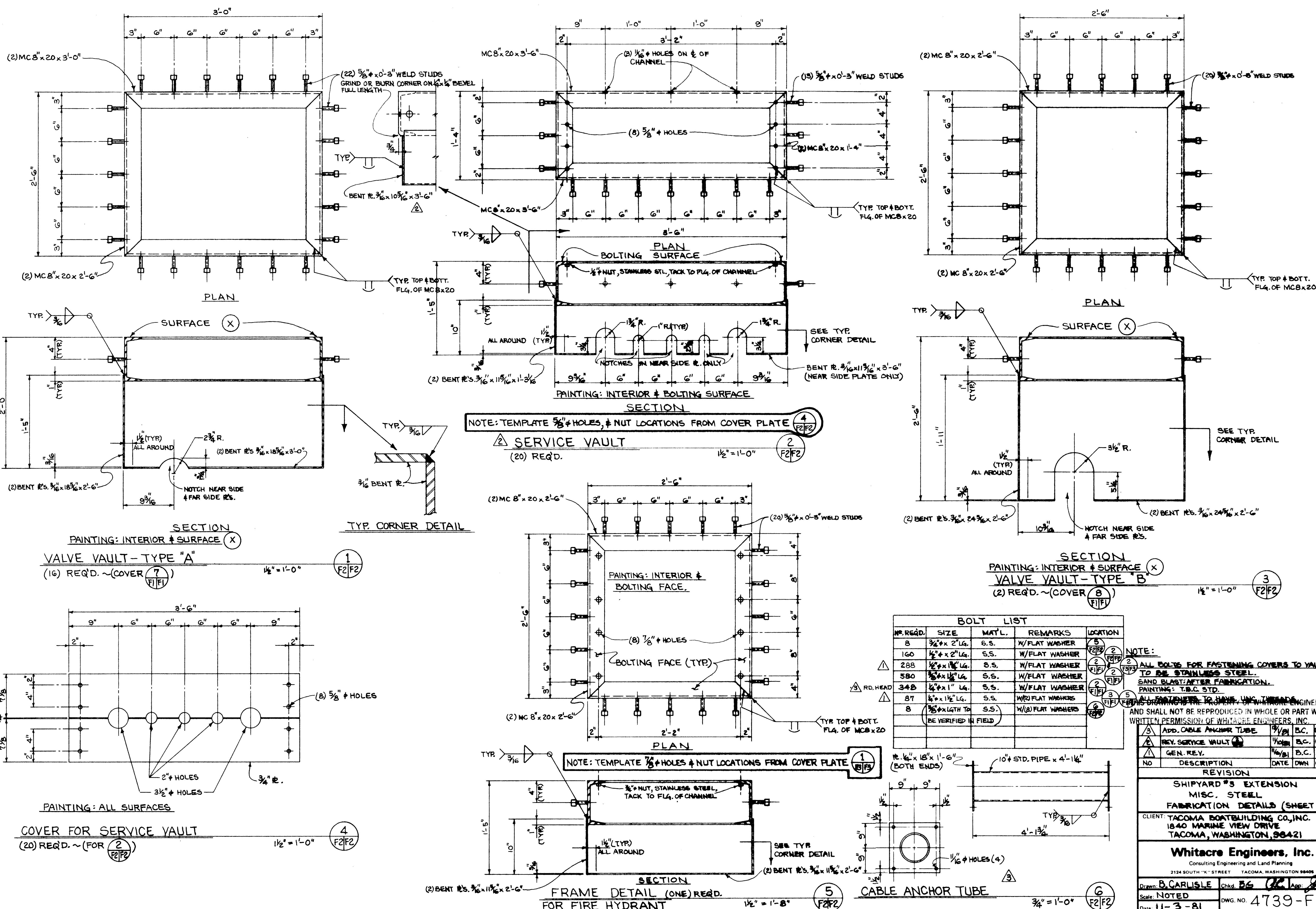
T: TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON 98421

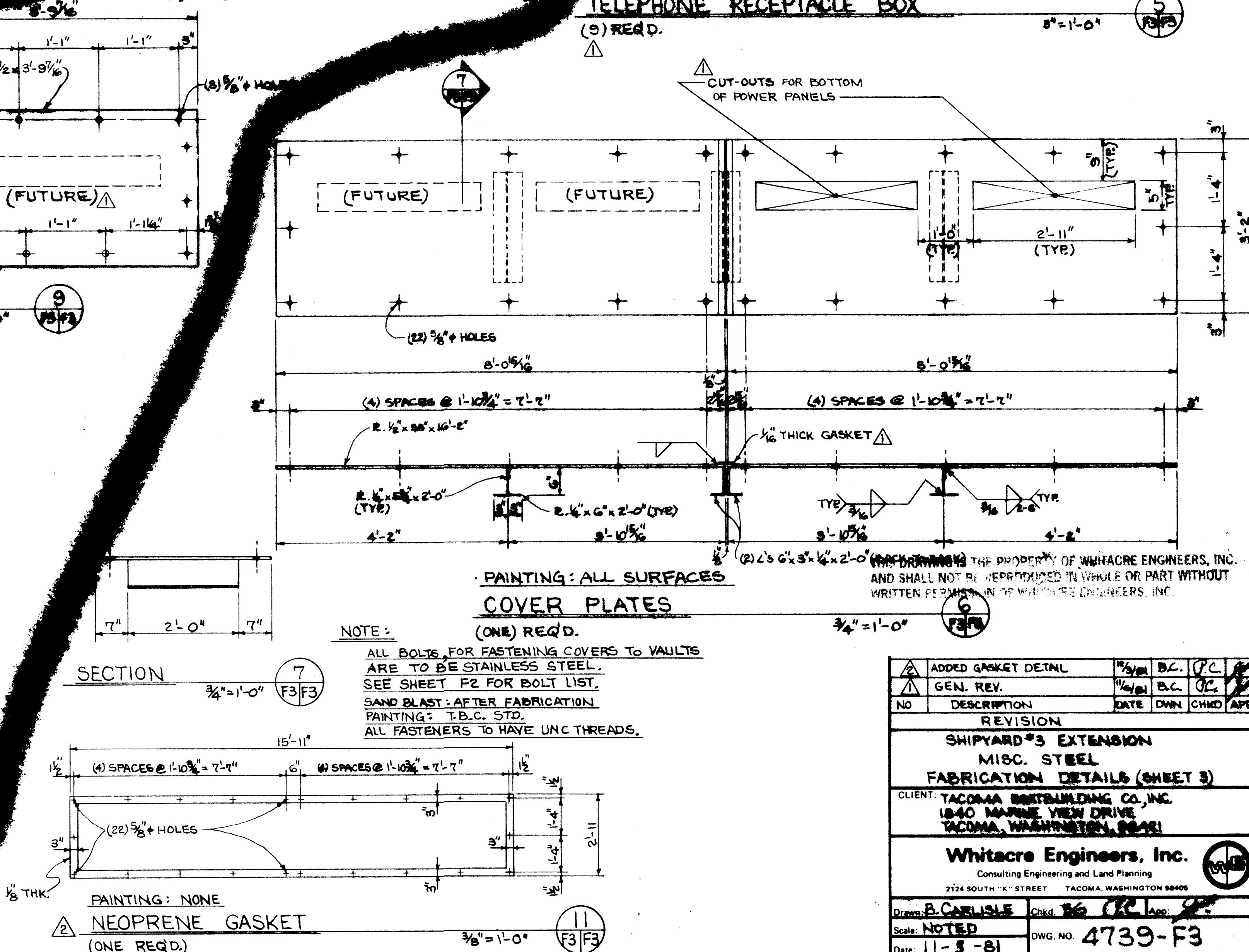
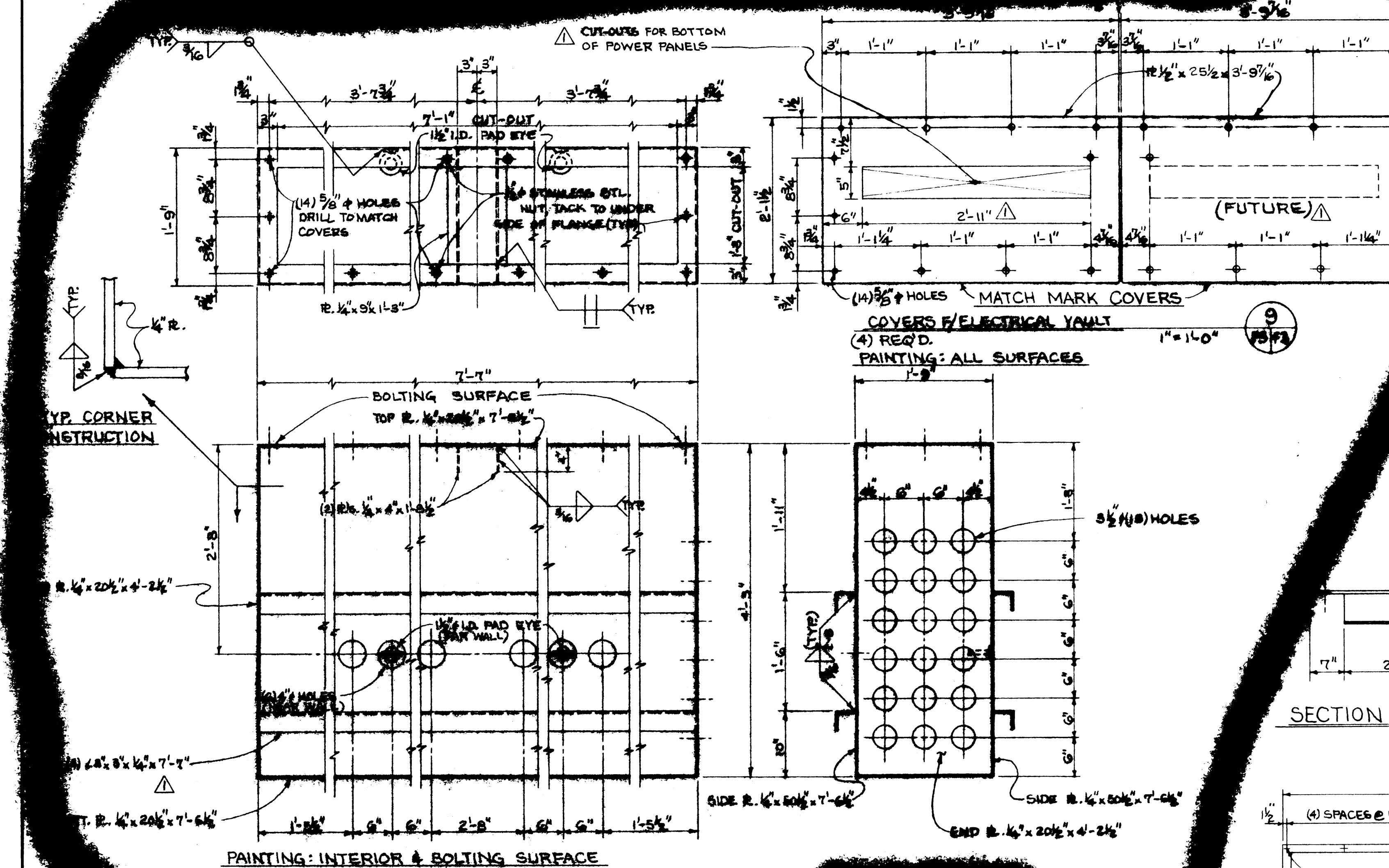
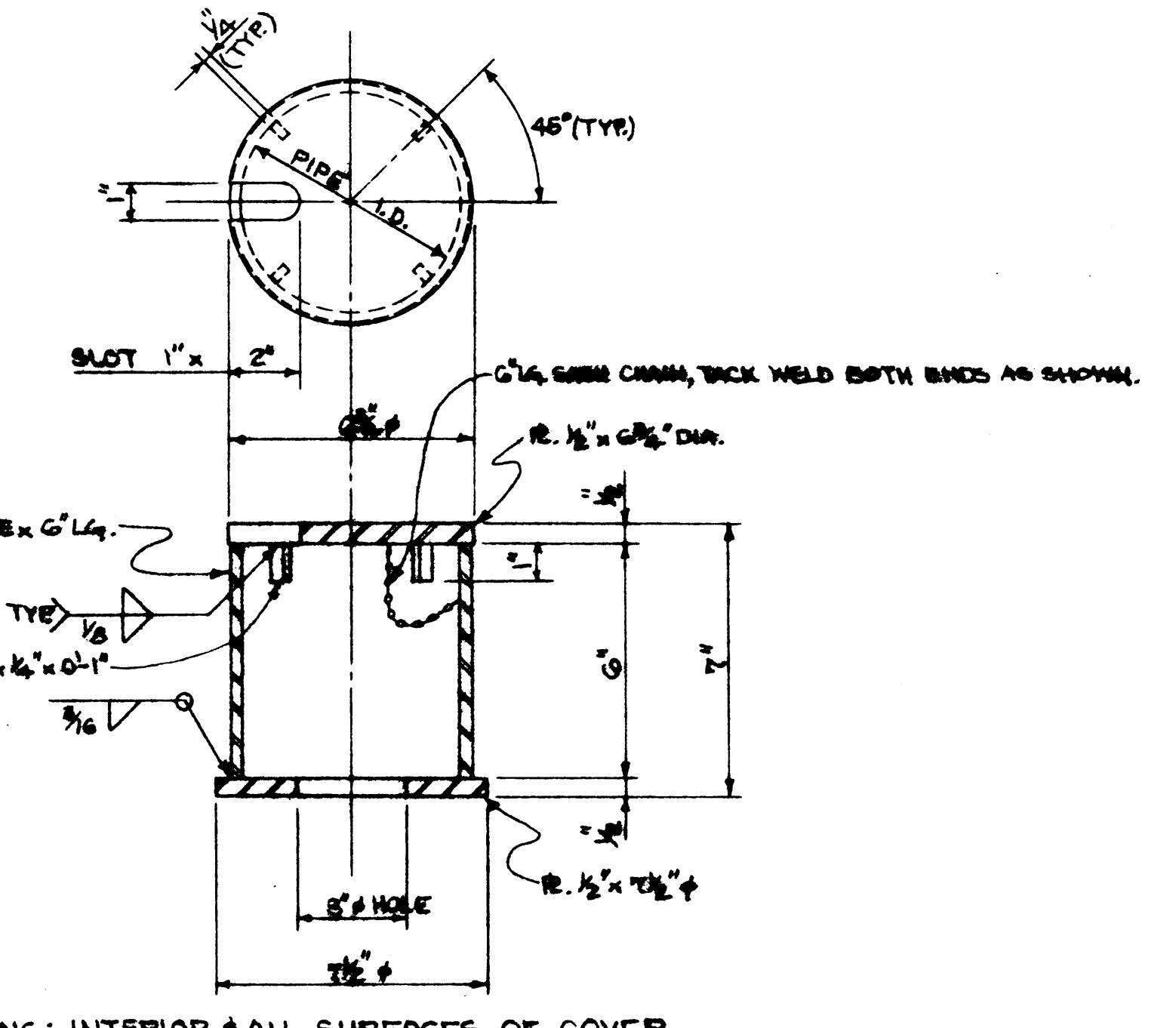
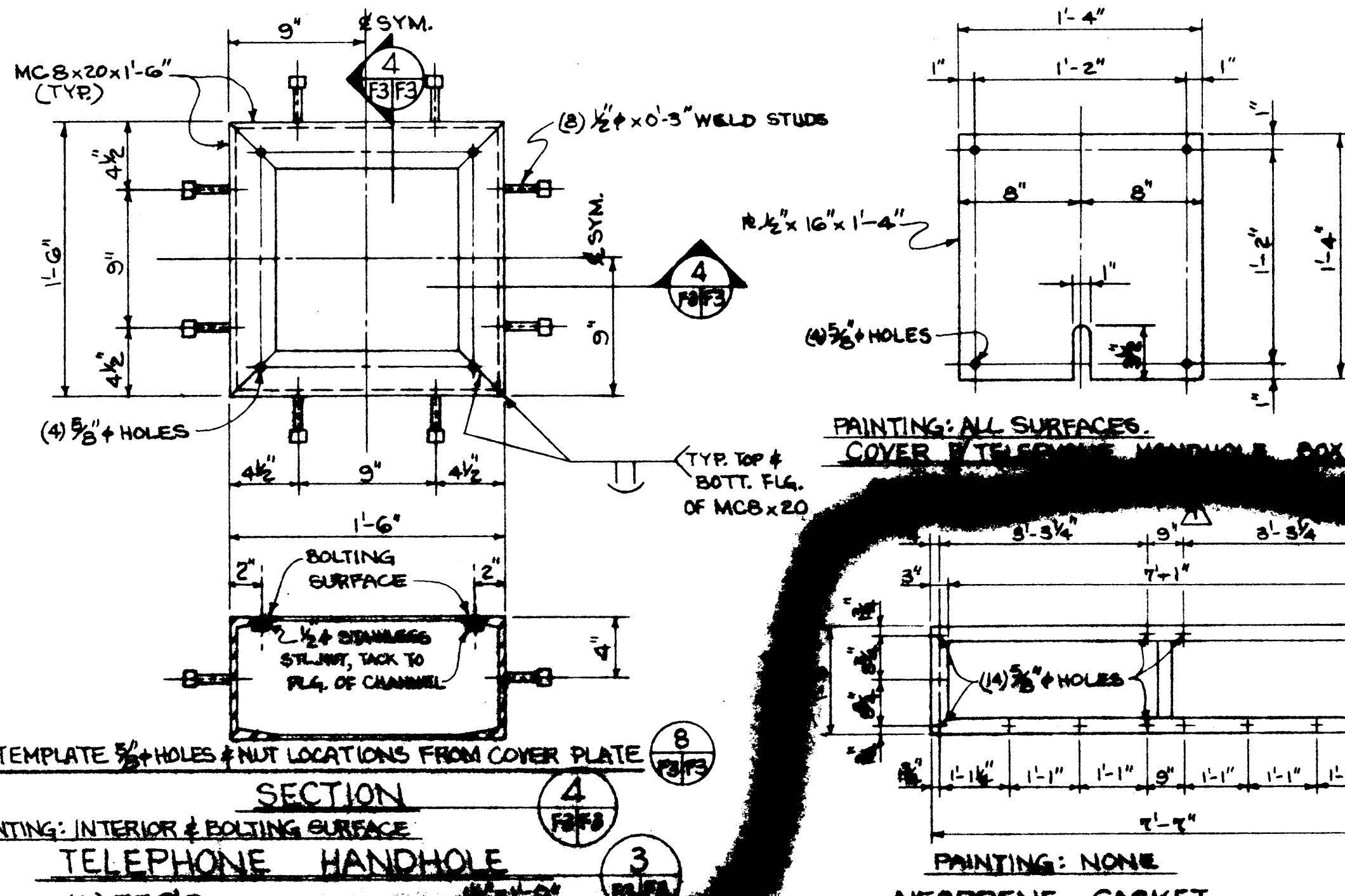
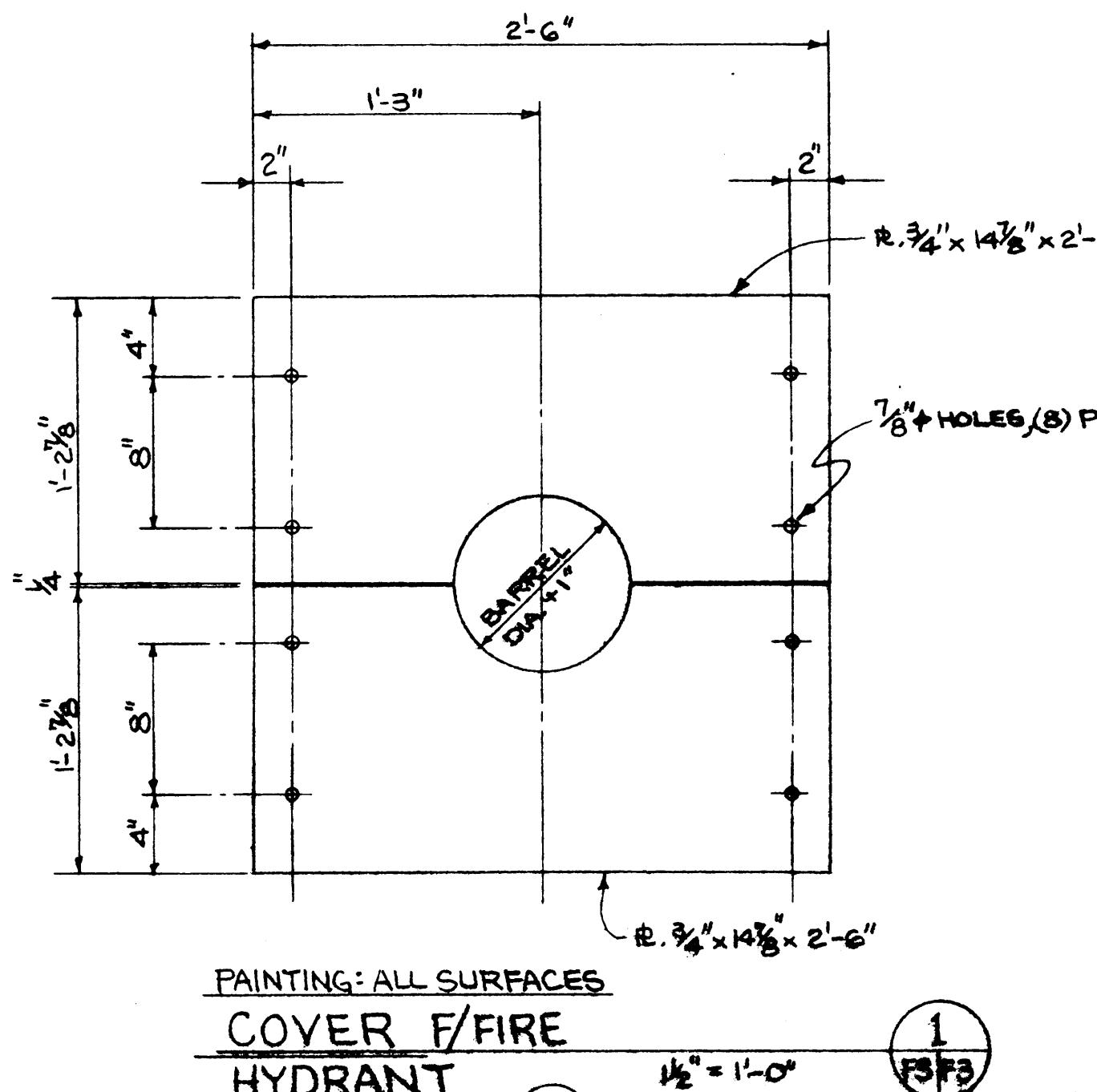
Whitacre Engineers, Inc.

Consulting Engineering and Land Planning

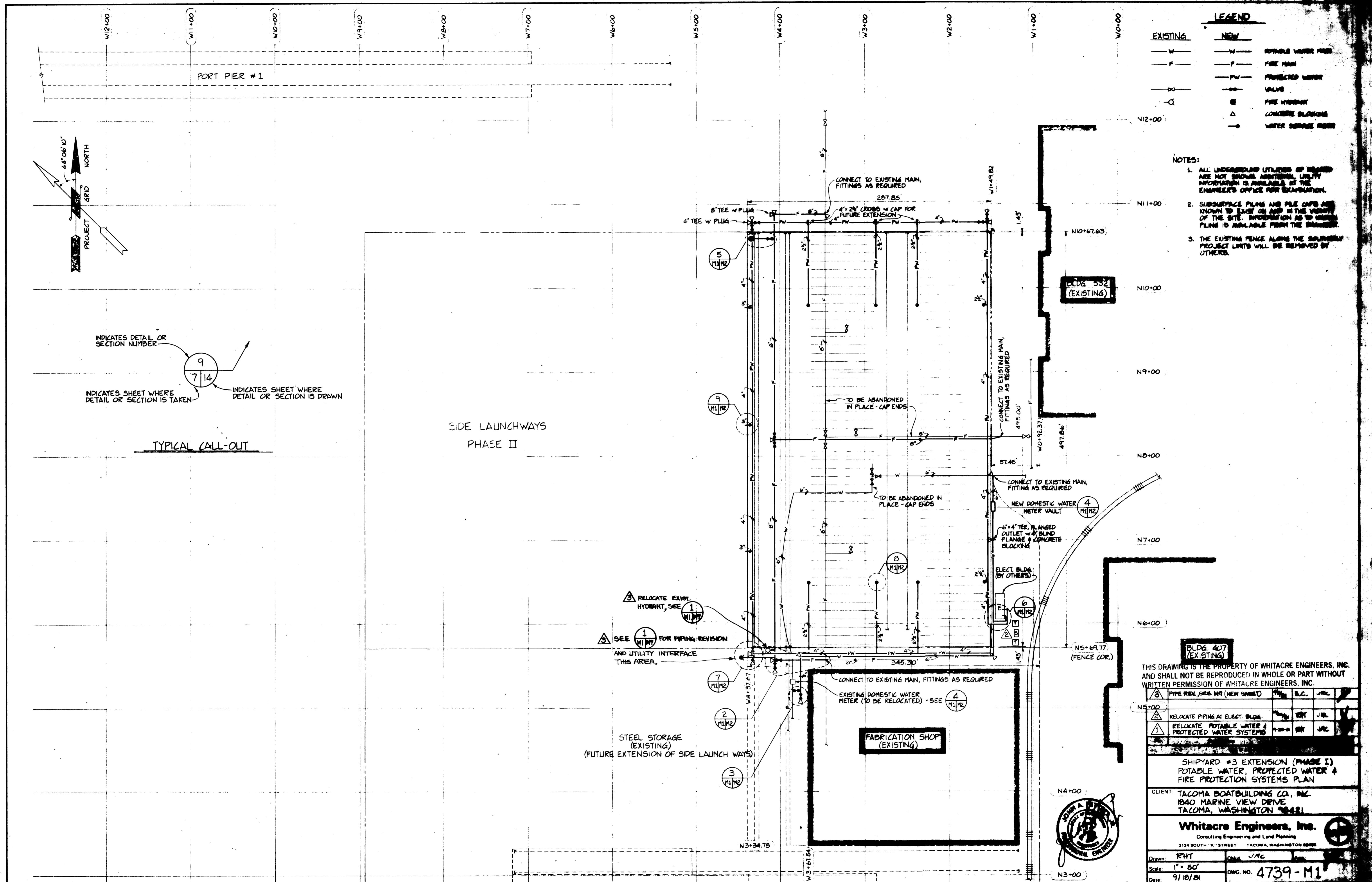
2124 SOUTH "K" STREET		TACOMA, WASHINGTON 98405
RAT	Chkd.	G.C.
NOTED	App:	
0-15-81	DWG. NO. 4739-E9	

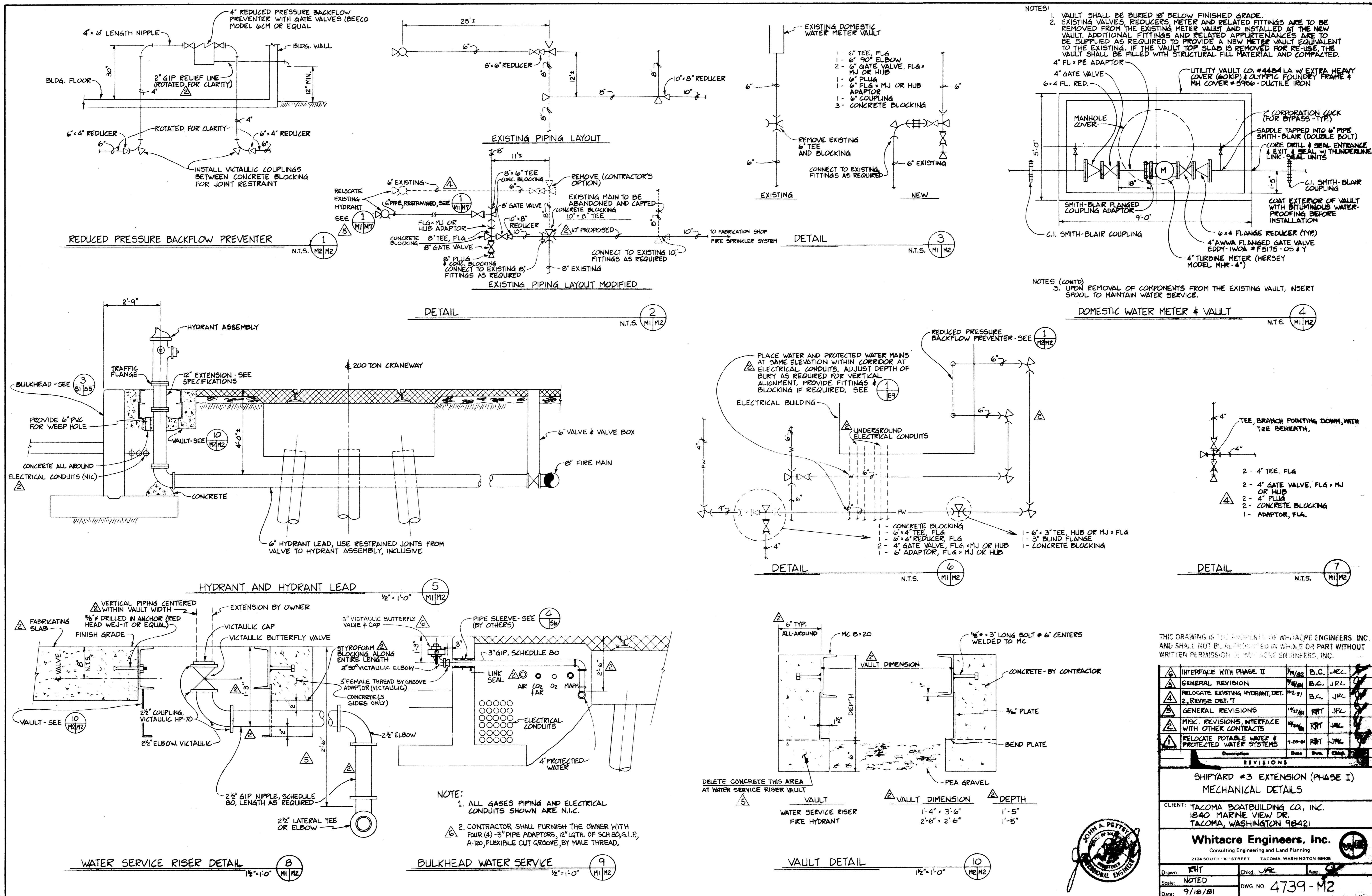


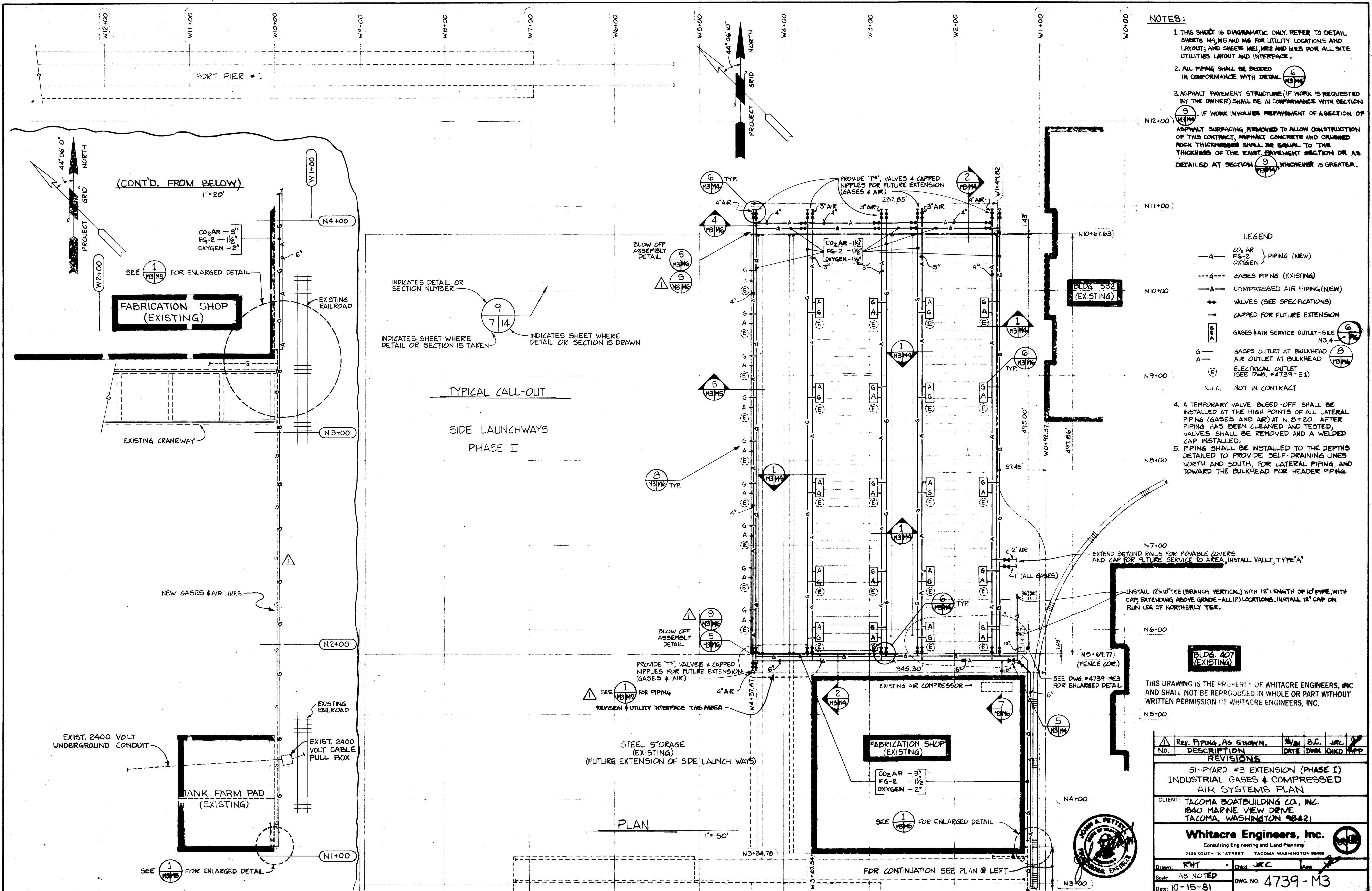


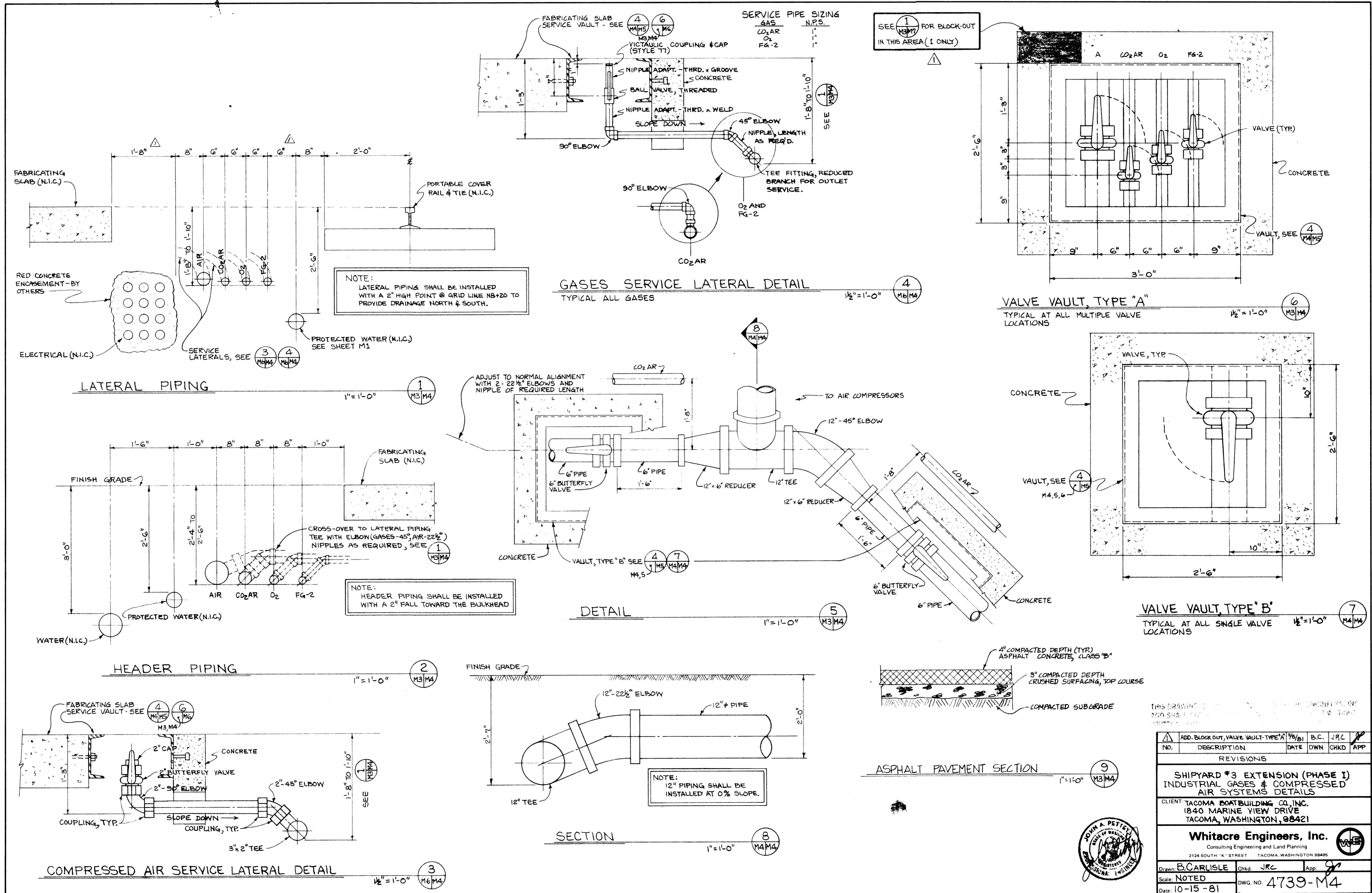


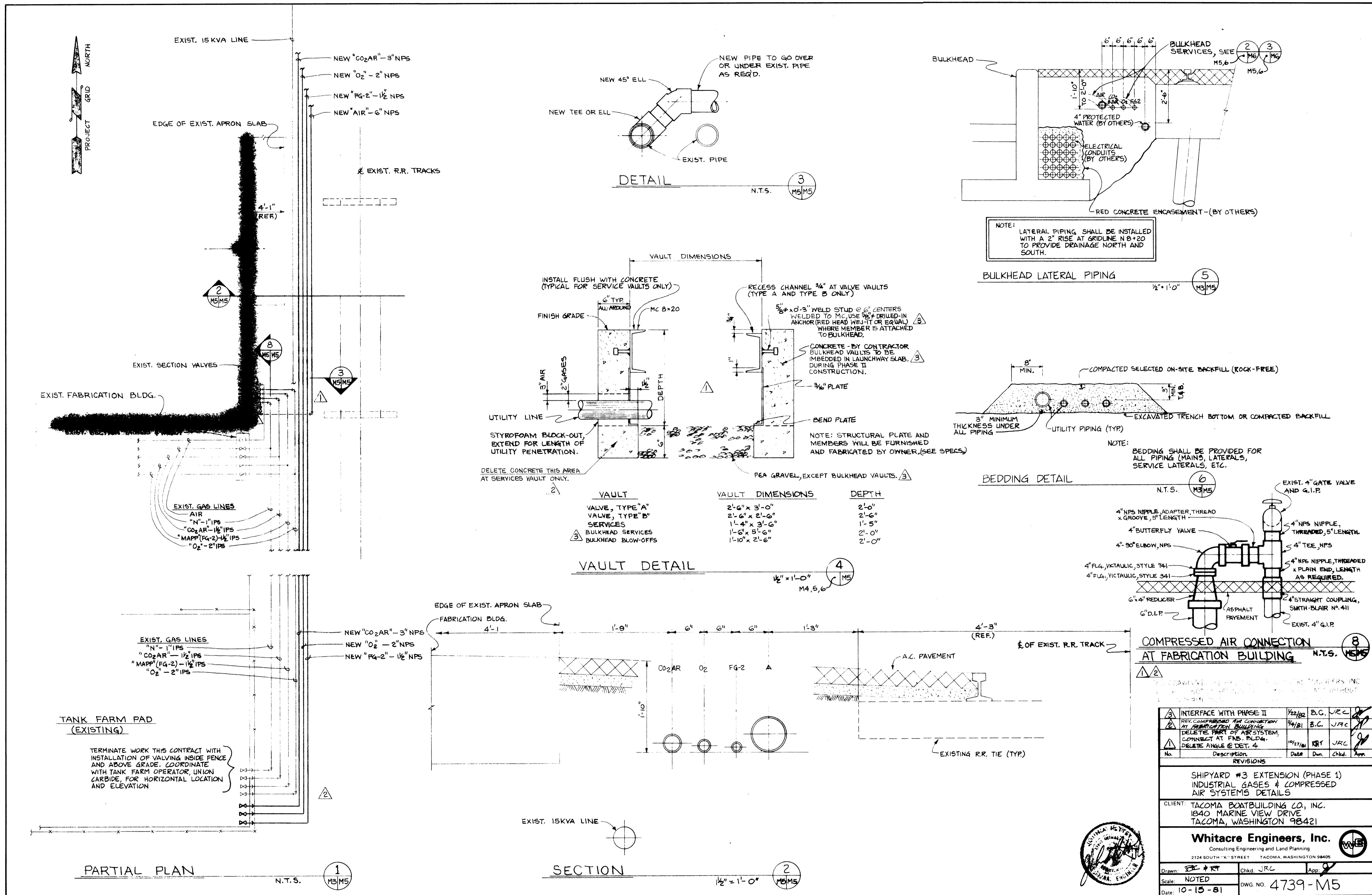
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	GEN. REV.	11/10/01	B.C.	P.C.	
NO	DESCRIPTION	DATE	DWNR	CHKD	APP
REVISION					
SHIPYARD #3 EXTENSION					
MISC. STEEL					
FABRICATION DETAILS (SHEET 3)					
CLIENT: TACOMA BOATBUILDING CO., INC. 1840 MARINE VIEW DRIVE TACOMA, WASHINGTON 98401					
<p>Whitacre Engineers, Inc. Consulting Engineering and Land Planning 2124 SOUTH "K" STREET TACOMA, WASHINGTON 98405</p>					
Drawn: <u>B. CARLISLE</u>		Chkd: <u>BS (KC)</u>	App: <u>✓</u>		
Scale: <u>NOTED</u>		DWG. NO. <u>4739-F3</u>			
Date: <u>11-3-01</u>					

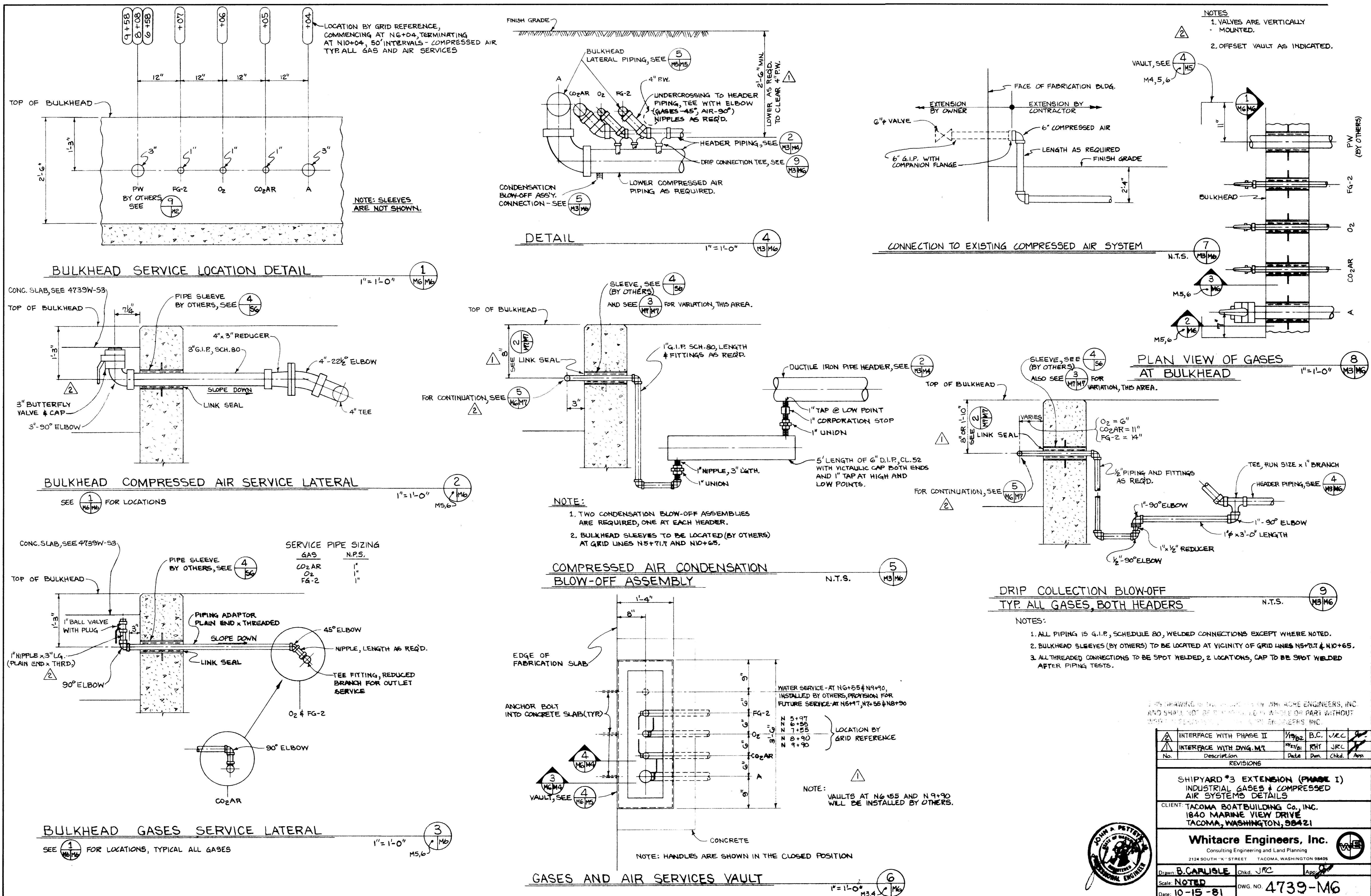


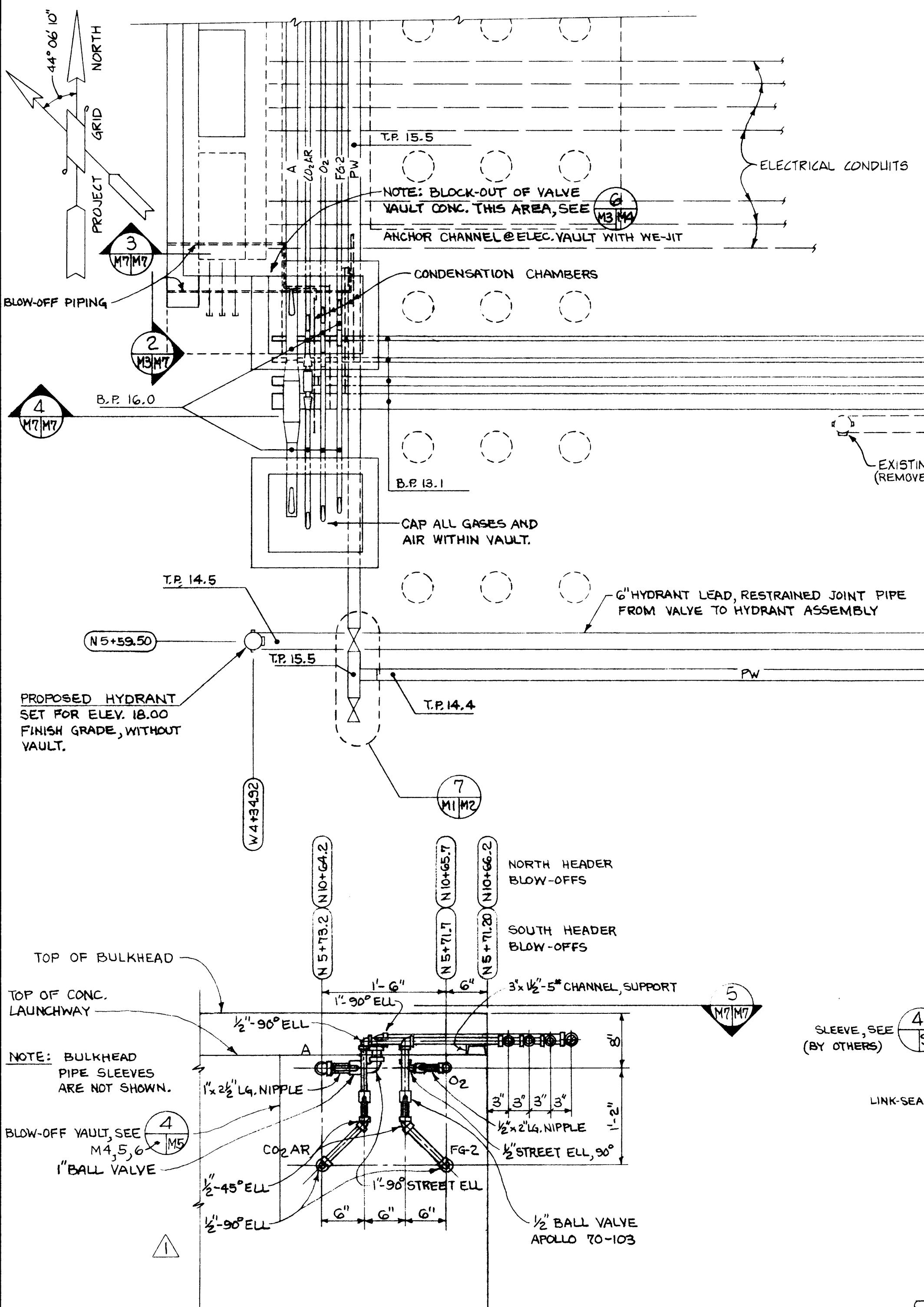












BLOW-OFF LOCATIONS

1" = 1" = 0" 2

SECTION

6" = 1'-0" 3

SECTION

1176

PARTIAL PLAN

TOP OF BULKHEAD

TOP OF CONC. LAUNCHWAY

NOTE: BULKHEAD PIPE SLEEVES ARE NOT SHOWN.

BLOW-OFF VAULT, SEE M4,5,6

1" BALL VALVE

4 M5

1/2" STREET ELL, 90°

1/2" LG. NIPPLE

CO₂ AR

FG-2

1/2" - 45° ELL

1/2" - 90° ELL

1" - 90° STREET ELL

1" - 90° ELL

1" - 90° ELL

1" - 6"

6"

3" x 1/2" - 5* CHANNEL SUPPORT

6"

6"

6"

30

2

1

1/2" BALL VALVE APOLLO 70-103

1

A

This technical drawing illustrates a concrete vault structure with the following components and details:

- LINK-SEAL**: A horizontal seal at the top of the structure.
- CO₂ AR**: A valve or fitting on the left side.
- ELECTRICAL CONDUITS (BY OTHERS)**: Wires running along the bottom of the structure.
- PROTECTED WATER**: A section of the vault containing water.
- CONCRETE VAULT, BY OTHERS**: The main structure.
- ELECTRICAL, SEE (BY OTHERS)**: A label pointing to the top right.
- BLOW-OFF PIPING, SEE (TYPICAL)**: Piping at the top and bottom of the structure.
- BLow-OFF PIPING, SEE (TYP.)**: A label pointing to the right.
- 4 SG**: A circular callout at the top left.
- 6 EB**: A circular callout at the top right.
- 5 M3 MG**: A circular callout on the right.
- 9 MG**: A circular callout at the bottom right.

1 M7

FINISH GRADE

2'-0"

4'-11"

BULKHEAD LATERAL PIPING, SEE 5 M5/M6

AIR CO₂ AR O₂ FG-2

GASES & AIR PIPING TEE,
SIZE SAME AS HEADER PIPING,
REDUCE PIPE SIZE AT BULKHEAD
LATERAL AS REQUIRED.

CAP

HEADER PIPING, SEE 2 M3/M4

DRIP CONNECTION TYP, ALL GASES, SEE 5 M3/M6

CONDENSATION BLOW-OFF
ASSEMBLY CONNECTION, SEE 5 M3/M6

EXTEND ALL GASES

HEADER PIPING CAP

1 M7

2 M3/M4

3 M4

4 M4

5 M5/M6

5 M3/M6

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⚠	INTERFACE WITH PHASE II	1/20/82	B.C.	VRCL	
NO.	DESCRIPTION	DATE	DWN.	CHKD.	APP.
REVISIONS					

SHIPYARD #3 EXTENSION (PHASE 1)
GASES, AIR & MECHANICAL DETAILS

CLIENT: TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE

1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON 98421

Whittaker Engineers, Inc.
Consulting Engineering and Land Planning
2124 SOUTH "K" STREET TACOMA, WASHINGTON 98405

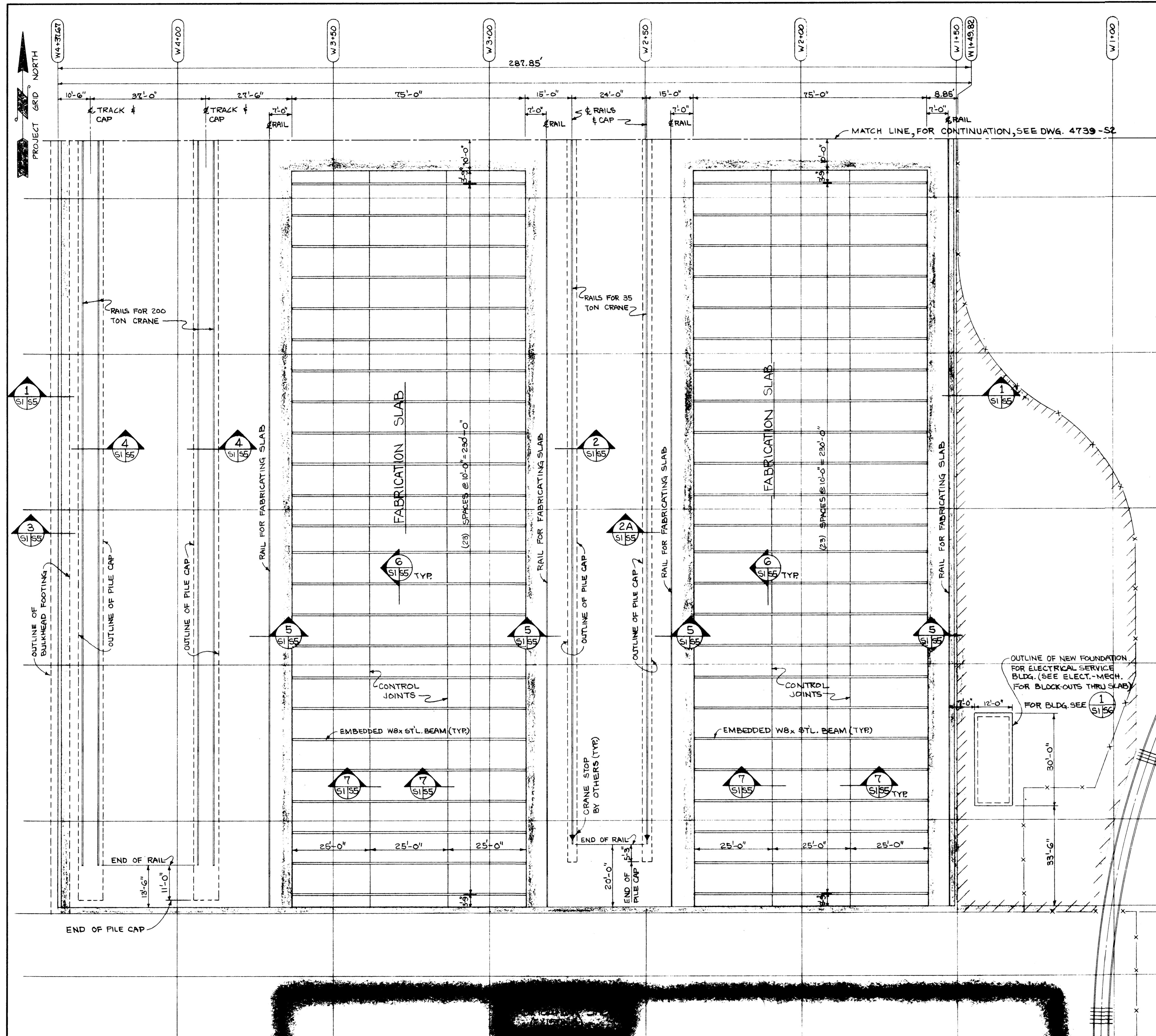
The logo for Whittaker Engineers, Inc. features a circular emblem with the letters "WE" in the center, surrounded by a stylized "W" and "E" design.

Drawn: <u>RHT</u>	Chkd. <u>JRC</u>	App: <u>J</u>
Scale: <u>NOTED</u>	DWG. NO. <u>1739 - M7</u>	

Scale: 1/4 INCHES = 1'-0" DWG. NO. 4139-M7
Date: 10-30-81

EP-4532 12

EP-4532-12



LEGEND

ASPHALT PAVING,
4" OVER 3" CRUSHED. **⚠**
(2) LIFTS OF 2"

ASPHALT PAVING,
3" OVER 2" CRUSHED.
(2) LIFTS OF 1 1/2"

INDICATES DETAIL OR
SECTION NUMBER

INDICATES SHEET WHERE
DETAIL (OR SECTION) IS TAKEN

INDICATES SHEET WHERE
DETAIL OR SECTION IS DRAWN

DESIGN CRITERIA

200 TON CRANE: 

35 TON CRANE: FOR 3 WHEELS 65^K @ 3'-9"

OR FOR 2 WHEELS 80^K @ 4'-8 1/2"

4'-8 1/2"

FIRS 800

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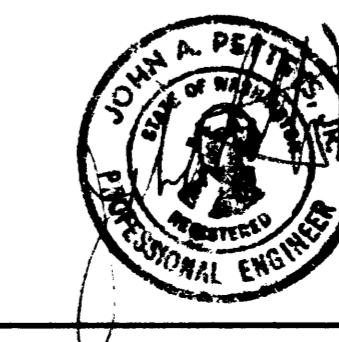
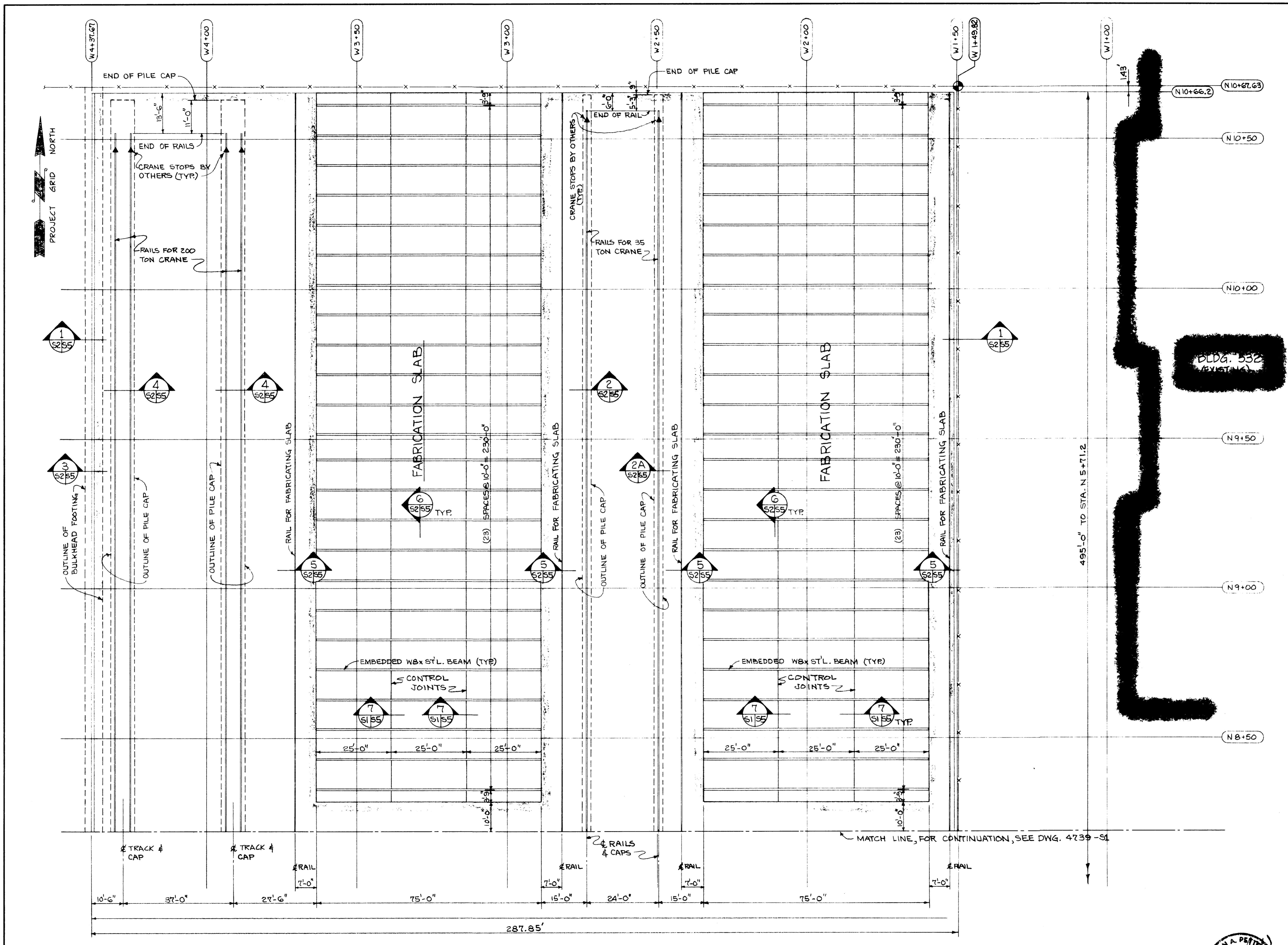
REVISED PER ADDENDUM		Date	DWN.	Chkd.	App.	
No.	Description	REVISIONS				

CLIENT: TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON 98421

Whitacre Engineers, Inc.

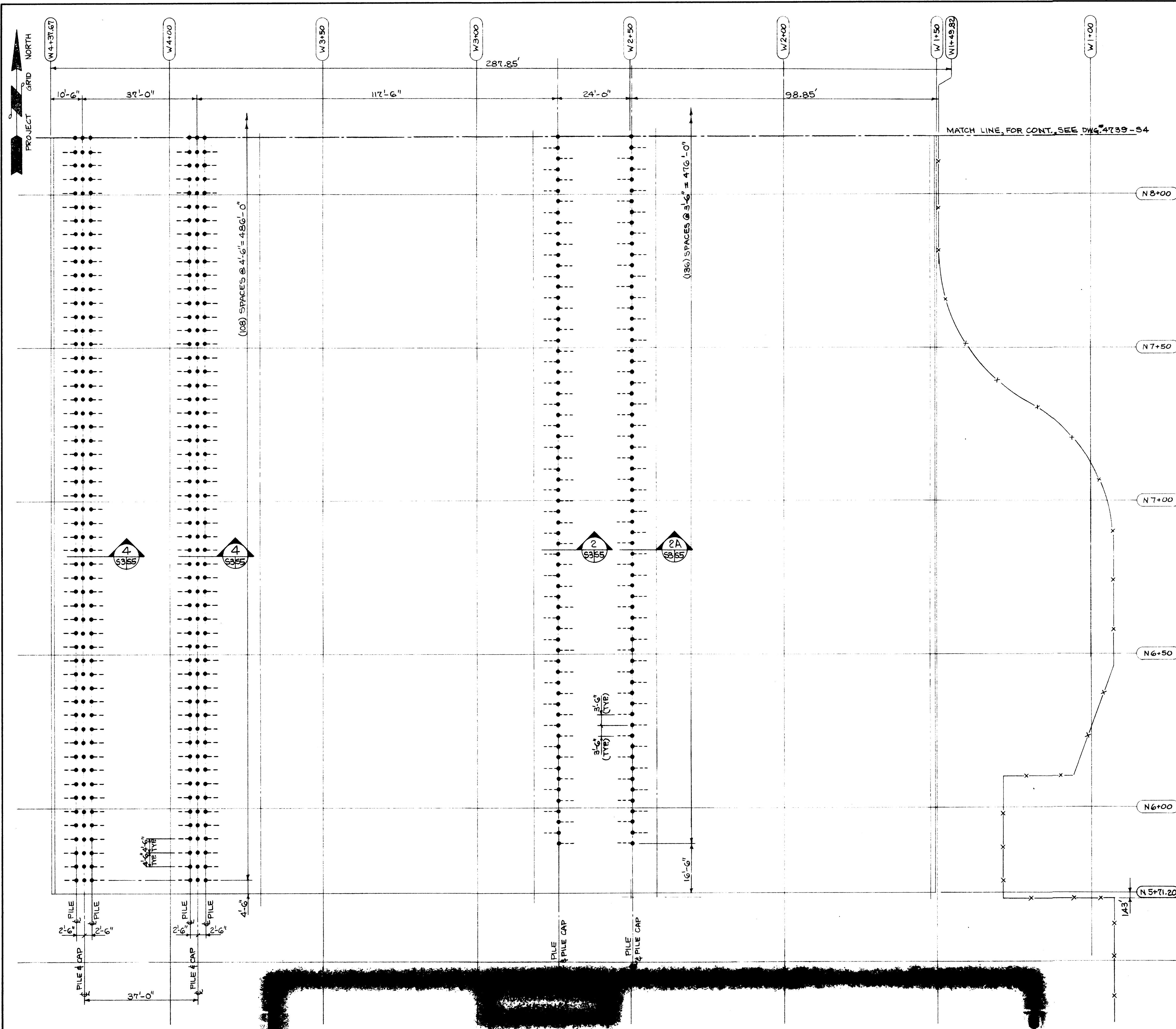
Consulting Engineering and Land Planning

T	Chkd. R J F	App: 8
- 1'-0"	DWG. NO. 4739-51	



LEGEND

REVISED PER ADDENDUM		10/16/81	RHT	JW	91
No.	Description	Date	DWN.	Chkd.	App.
REVISIONS					
SHIPYARD #3 EXTENSION (PHASE I)					
BACK-UP AREA "B"-PLAN					
CLIENT: TACOMA BOATBUILDING CO., INC. 1840 MARINE VIEW DRIVE TACOMA, WASHINGTON 98421					
Whitacre Engineers, Inc. Consulting Engineering and Land Planning 2124 SOUTH "K" STREET TACOMA, WASHINGTON 98405					
Drawn:	RHT	Chkd.	RJF	App:	JW
Scale:	1/16" • 1'-0"				
Date:	9-18-81		DWG. NO. 4739-52		



LEGEND

- TIMBER PILE (VERTICAL)
- TIMBER PILE (BATTER)
(\$ TAKEN @ CUT-OFF ELEV)

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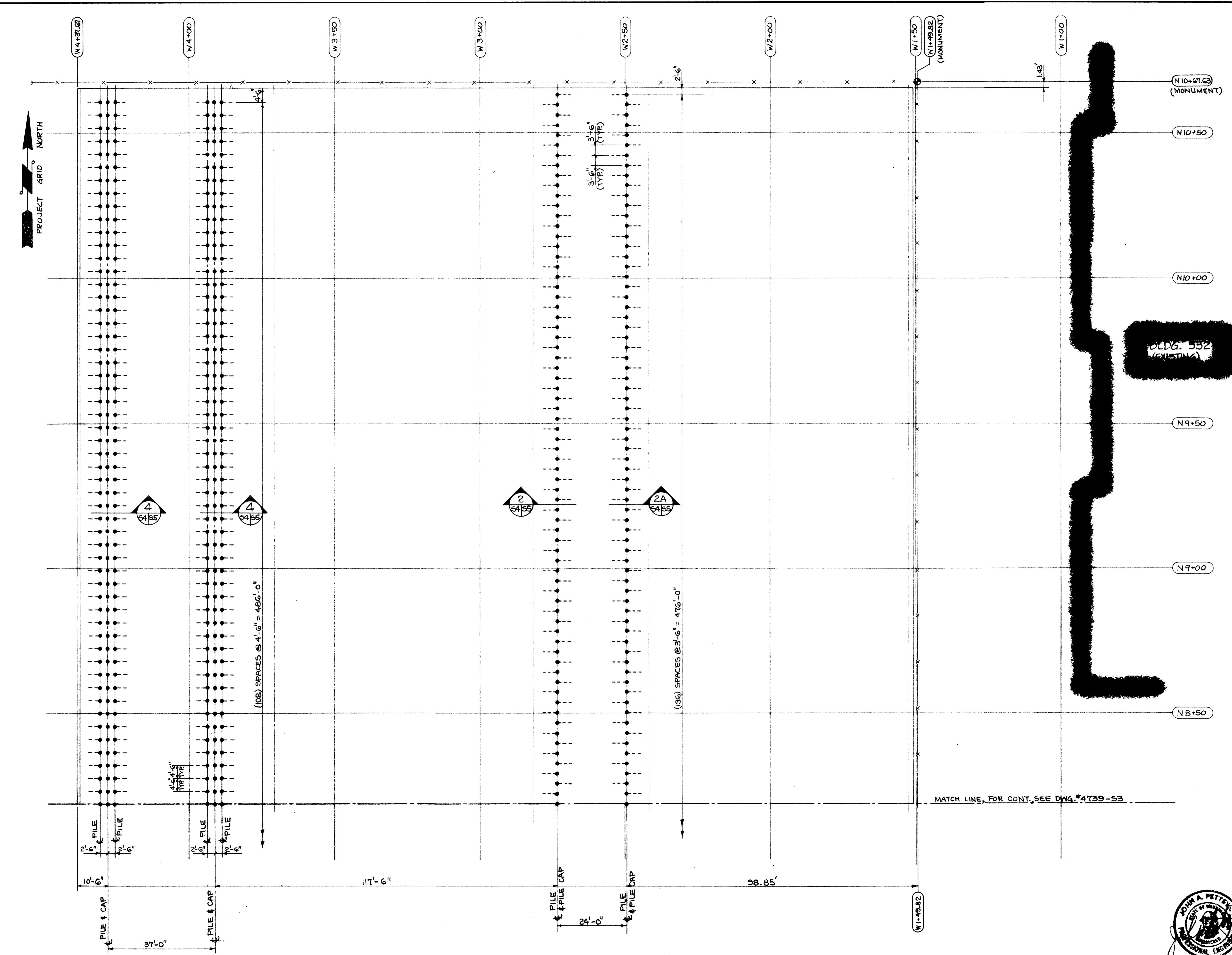
SHIPYARD #3 EXTENSION (PHASE I)
PILING PLAN - AREA "A"

CLIENT: TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON, 98421

Whitacre Engineers, Inc.

Consulting Engineering and Land Planning		
2124 SOUTH "K" STREET		TACOMA, WASHINGTON 98405
Drawn: <u>B. CARLISLE</u>	Chkd. <u>BJF</u>	App: <u>10</u>
Scale: <u>1/16" = 1'-0"</u>	DWG. NO. <u>4739-S3</u>	
Date: <u>9-18-81</u>		





LEGEND

- TIMBER PILE (VERTICAL)
- TIMBER PILE (BATTER)
(E TAKEN @ CUT-OFF ELEV.)

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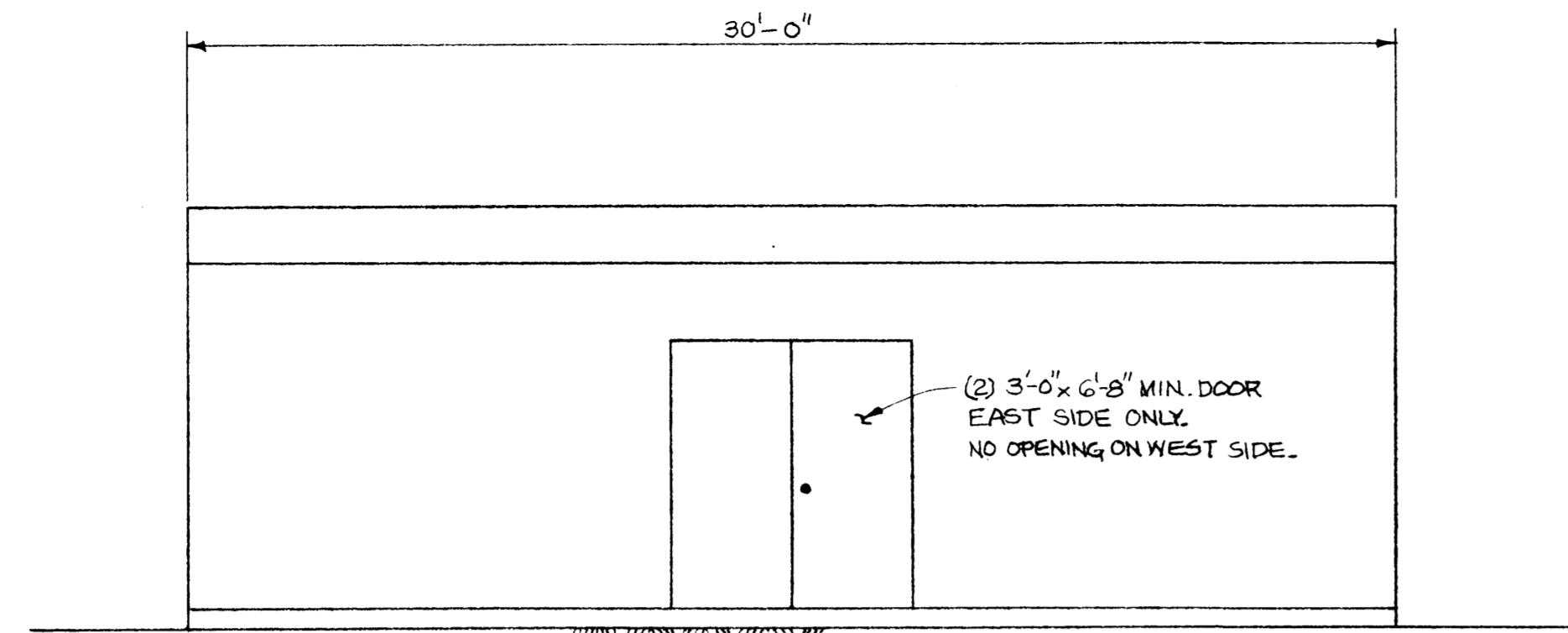
SHIPYARD #3 EXTENSION (PHASE I)
PILING PLAN - AREA "B"

CLIENT: TACOMA BOATBUILDING Co., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON, 98421

Whitacre Engineers, Inc.

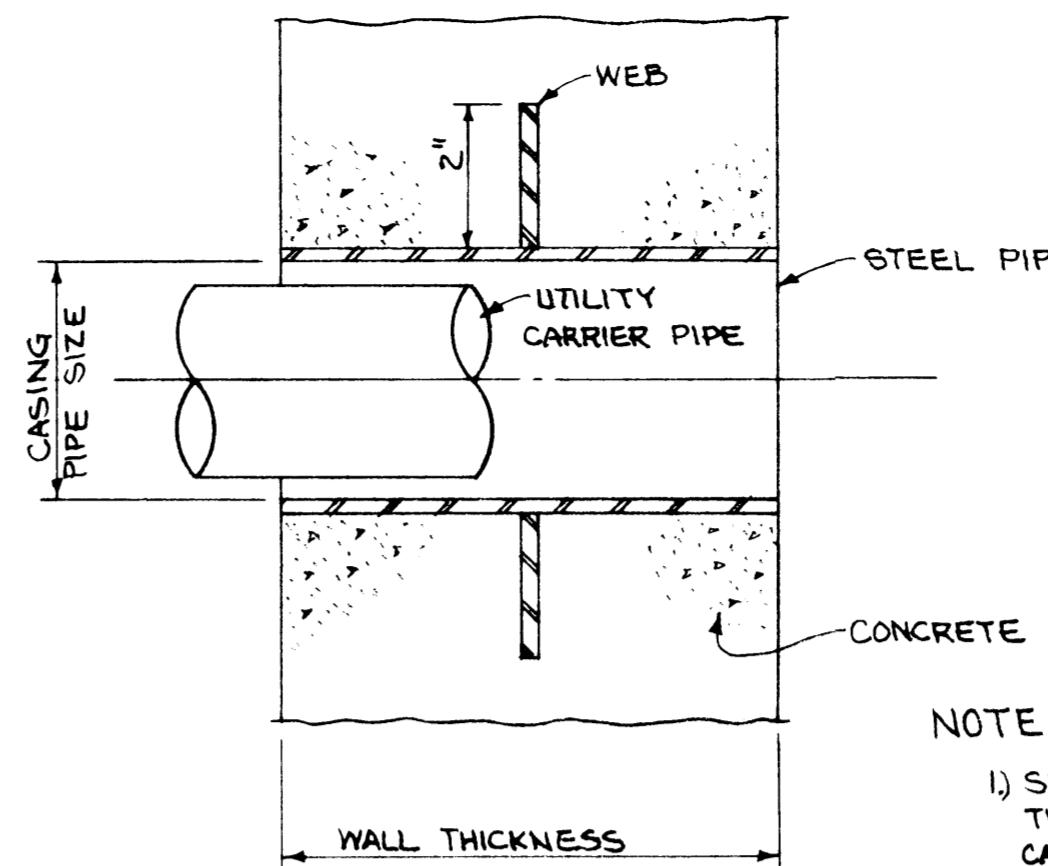
Consulting Engineering and Land Planning		
2124 SOUTH "K" STREET TACOMA, WASHINGTON 98405		
Drawn: B. CARLISLE	Chkd. BJF	App: /
Scale: 1/8" = 1'-0"	DWG. NO. 4739-S4	
Date: 9-18-81		





BLDG. NOTES:

- 1) DESIGN LOADS
ROOF LIVE LOAD: 25 PS.F.
WIND: 20 PS.F. (HORIZ.)
- 2) BLDG. SHALL BE "RANCHER" SERIES, BY SOULE OR APPROVED EQUAL, AND AS SHOWN.
- 3) PROVIDE BLDG. MANUFACTURERS STANDARD CEILING INSULATION.

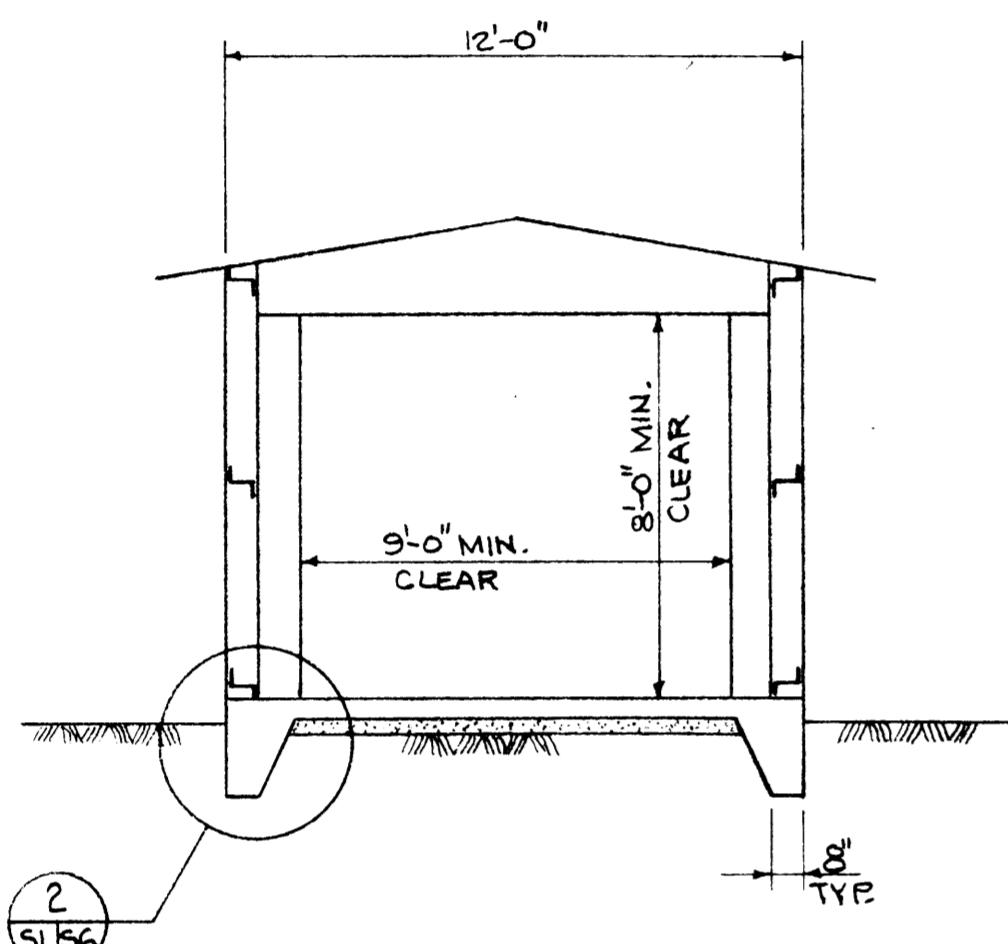


NOTE:

- 1) SLEEVES TO BE SCH. 40 STEEL PIPE, TWO PIPE SIZES LARGER THAN THE CARRIER PIPE.
- 2) WEB, $\frac{3}{16}$ " PLATE, IS TO BE NOTCHED FOR THE CASING PIPE OUTSIDE DIAMETER AND WELDED AT FOUR EQUALLY SPACED LOCATIONS.

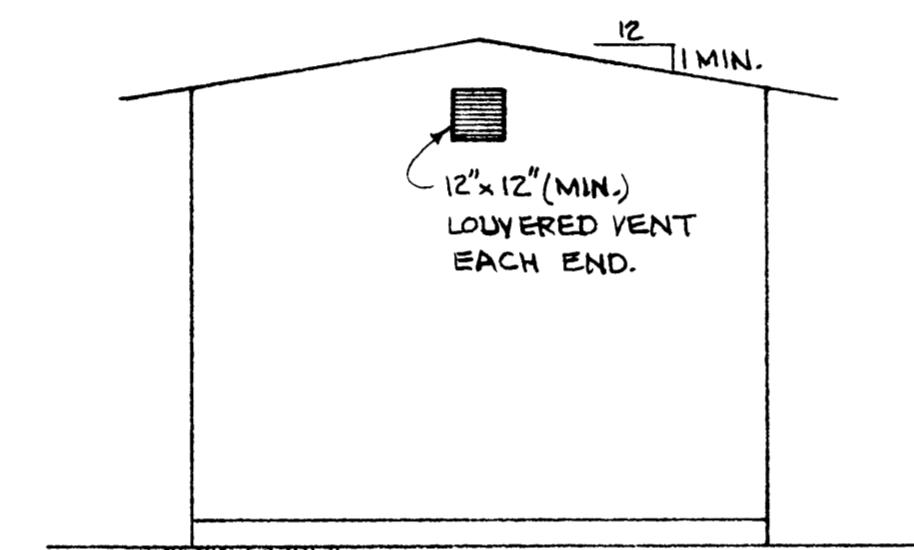
SLEEVES

4
S156
N.T.S.



TYP. CROSS SECTION

$\frac{1}{4}$ " = 1'-0"



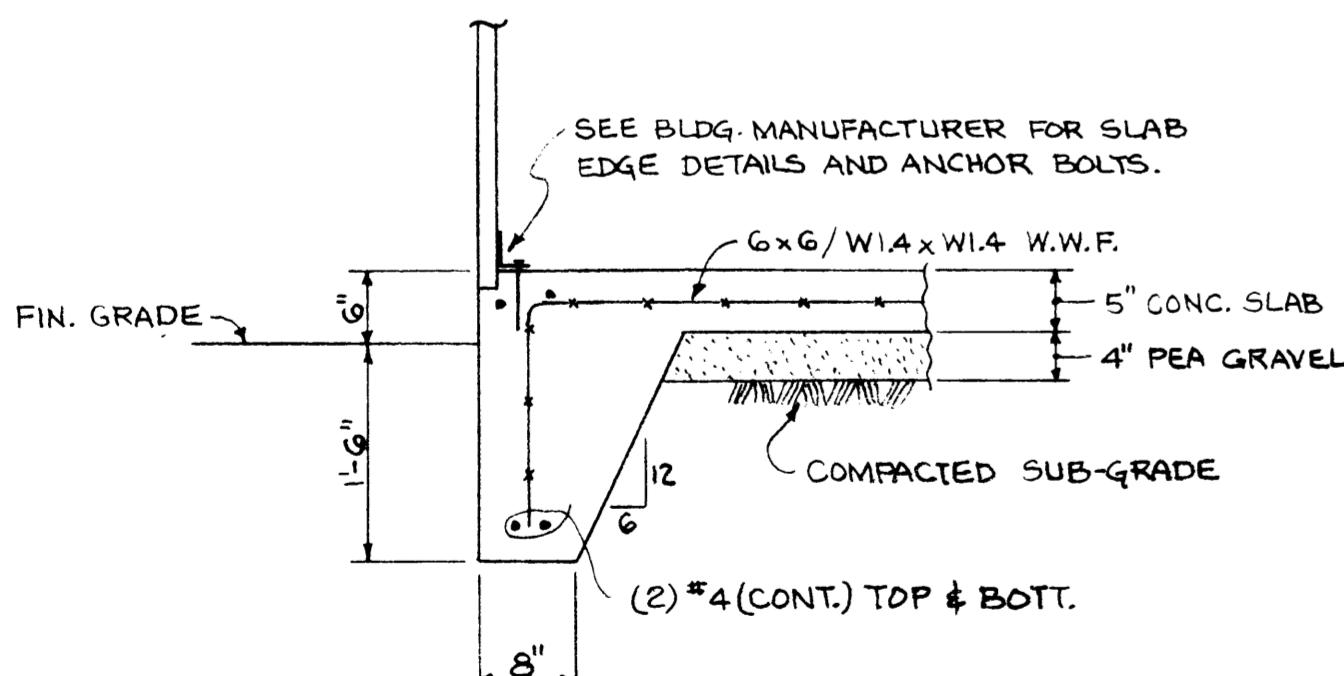
TYP. END ELEVATION

$\frac{1}{4}$ " = 1'-0"

ELECTRICAL SERVICE BLDG.

$\frac{1}{4}$ " = 1'-0"

1
S156



TYP. FOUNDATION - (ELECT. SERVICE BLDG.)

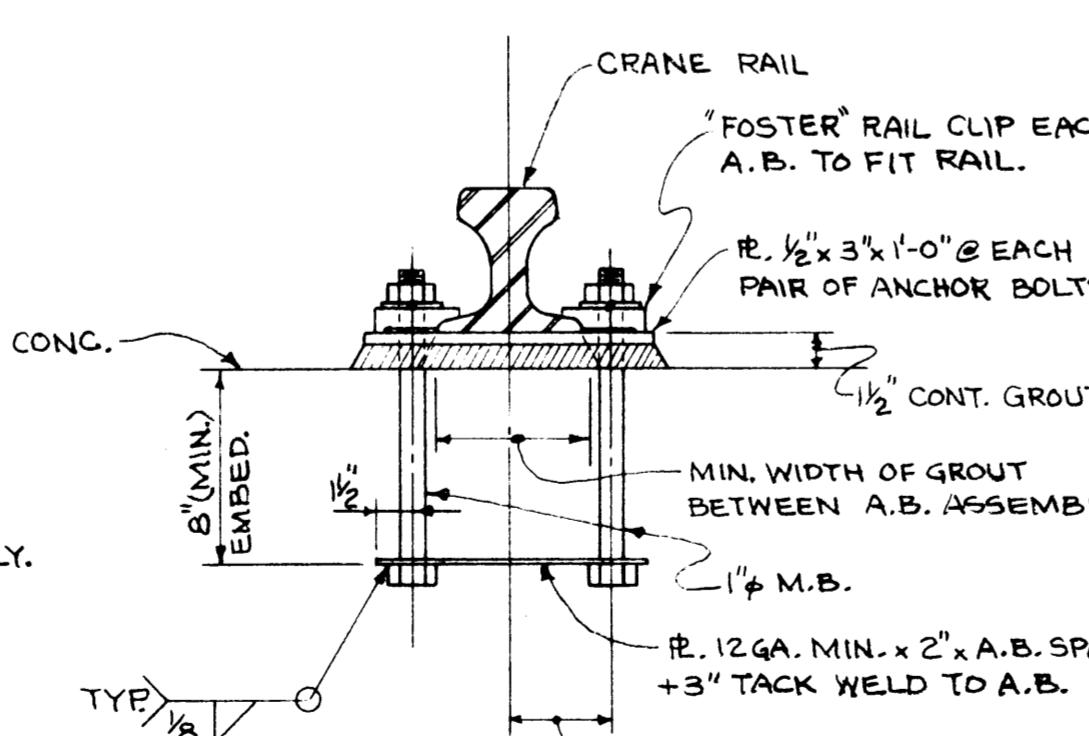
SECTION

$\frac{3}{4}$ " = 1'-0"

2
S156

NOTES:

- 1) PROVIDE CONT. GROUT BED UNDER RAIL AND ANCHOR BOLT ASSEMBLY.
- 2) SPACE ANCHOR BOLT ASSEMBLY \geq 24" O.C.
- 3) USE A-307 M.B. FOR ANCHOR BOLTS.



TYP. CRANE RAIL ANCHOR BOLT ASSEMBLY

SECTION

$\frac{1}{2}$ " = 1'-0"

3
S156

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SHIPYARD #3 EXTENSION (PHASE I)
DETAILS (SHEET #2)

CLIENT: TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON, 98421

Whitacre Engineers, Inc.

Consulting Engineering and Land Planning

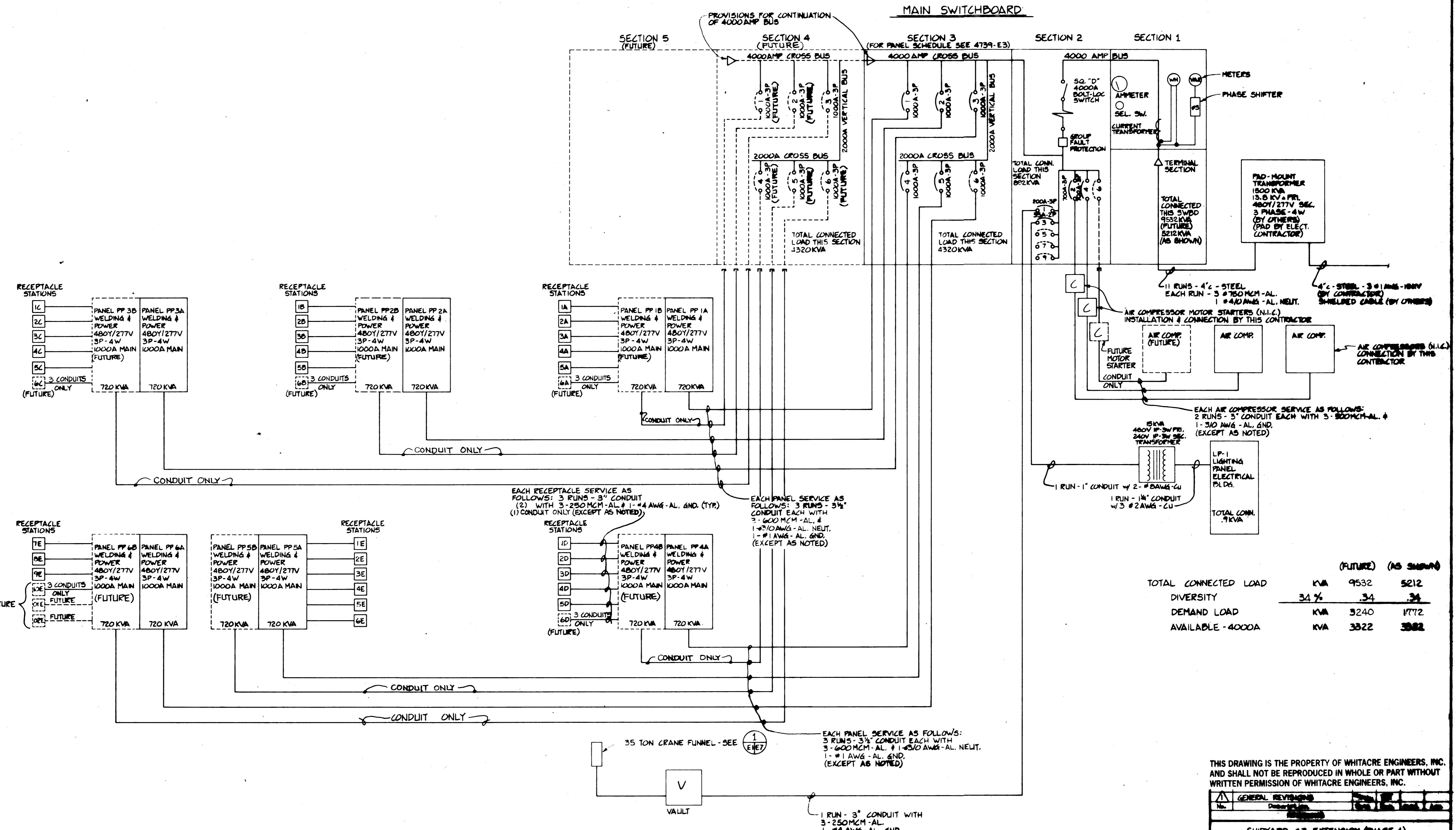
2124 SOUTH "K" STREET TACOMA, WASHINGTON 98405

Drawn: B. CARLISLE Chkd: R.J.F. App: J.P.

Scale: NOTED DWG. NO. 4739-S6

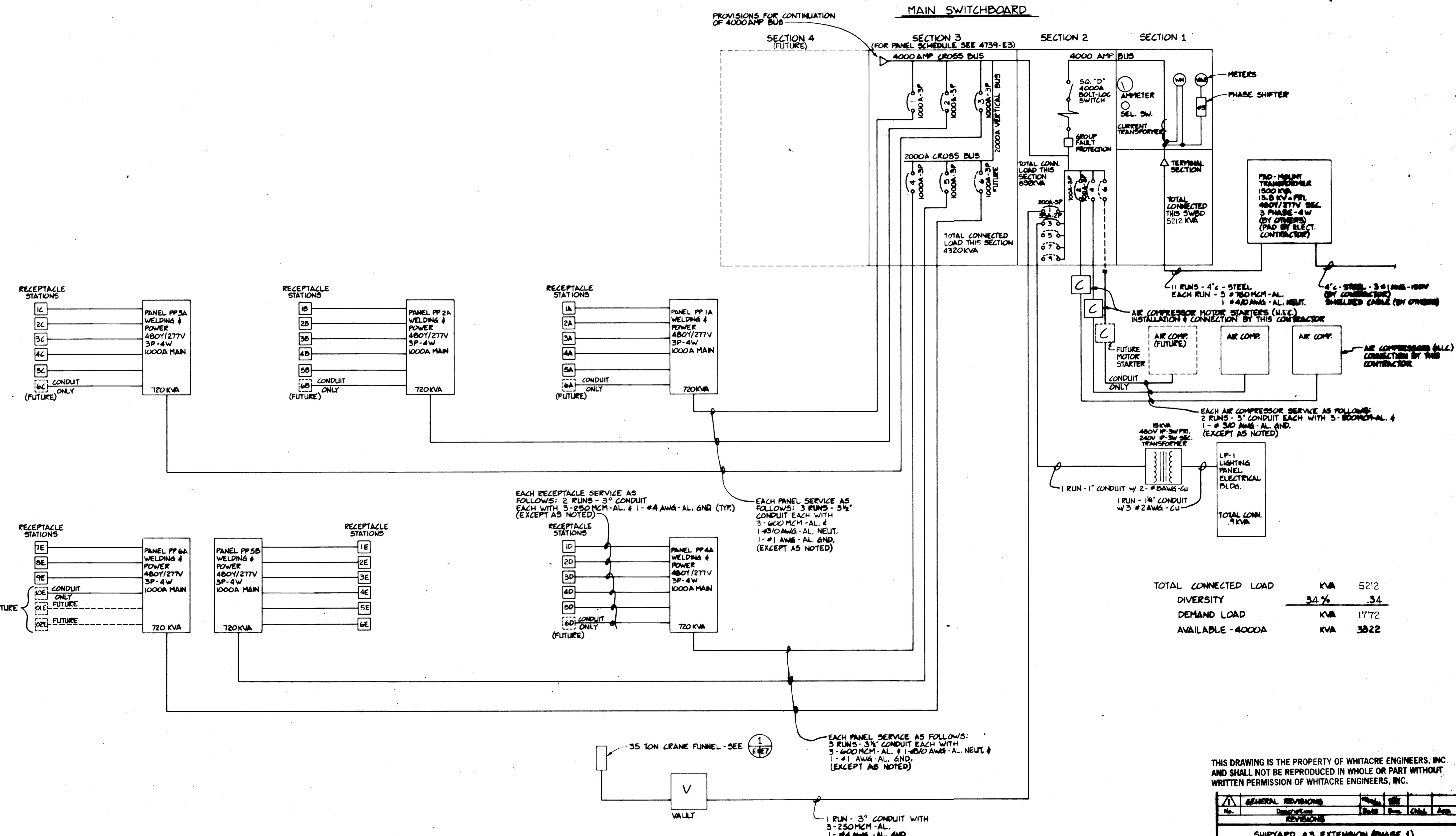
Date: 9-18-81





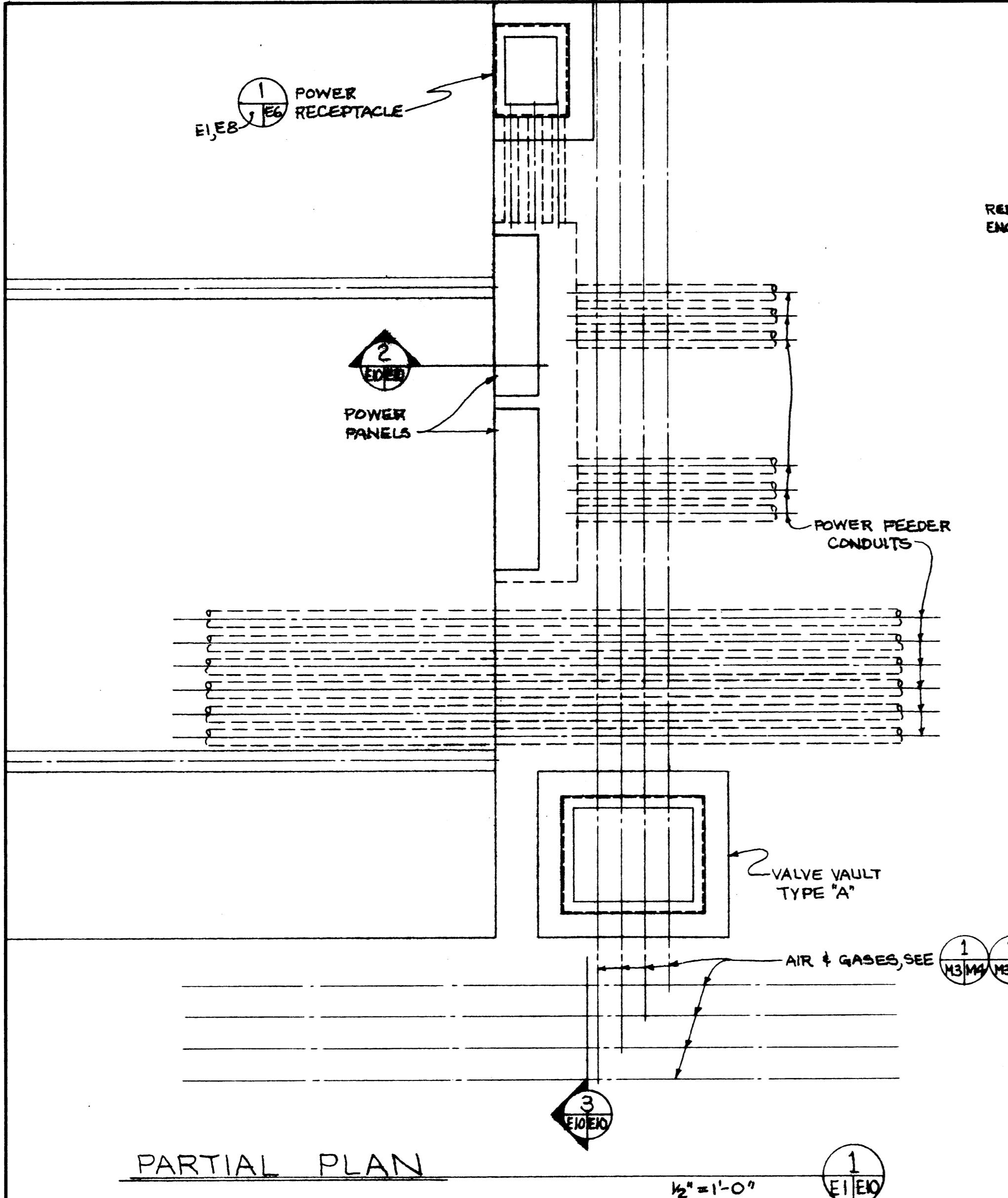
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GENERAL REVISIONS	
No.	Description
SHIPYARD #3 EXTENSION (PHASE 1) ELECTRICAL RISER DIAGRAM ALTERNATE P&D 1	
CLIENT: TACOMA BOATBUILDING CO., INC. 1840 MARINE VIEW DRIVE TACOMA, WASHINGTON 98431	
Whitacre Engineers, Inc. Consulting Engineering and Land Planning 2124 SOUTH "K" STREET TACOMA, WASHINGTON 98404	
Drawn:	RAT
Check:	None
Date:	10-15-81
Dwg. No.	4739 - E2A

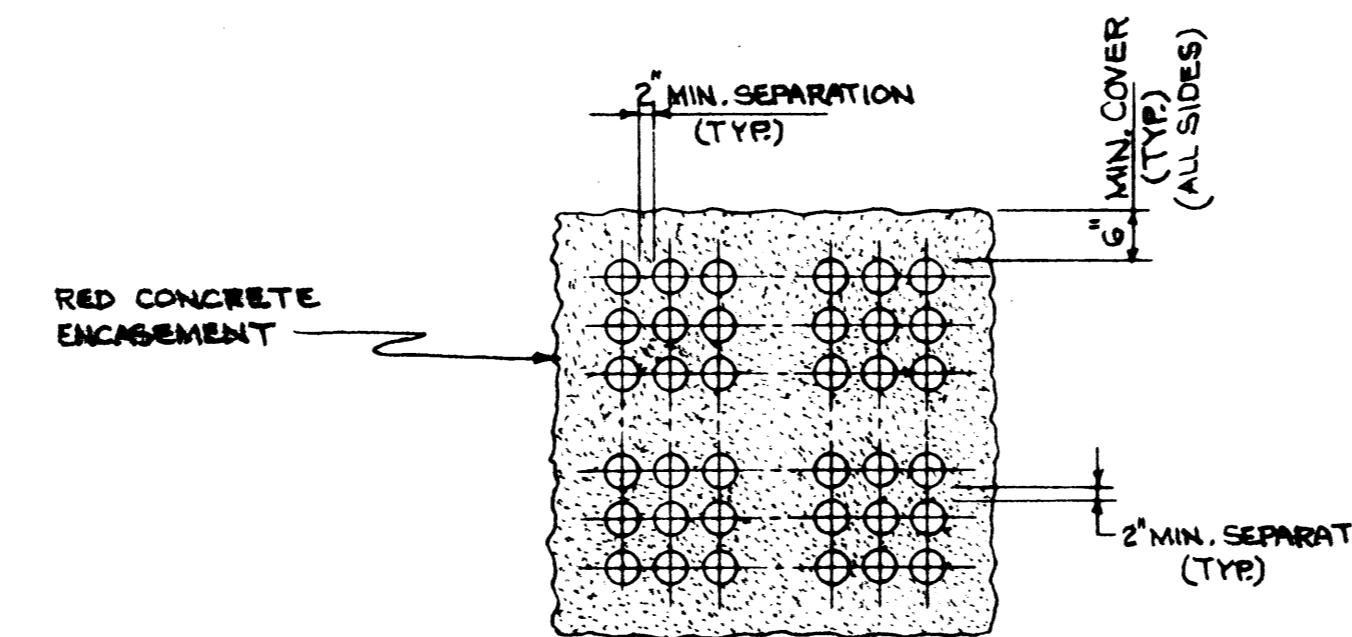


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GENERAL REVISIONS		Rev.	Rev.	Chgs.	Am.
Description		Date	Rev.	Chgs.	Am.
REVISIONS					
SHIPYARD #3 EXTENSION (PHASE 1) ELECTRICAL RISER DIAGRAM ALTERNATE BND 2					
CLIENT: TACOMA BOATBUILDING CO., INC. 1840 MARINE VIEW DRIVE TACOMA, WASHINGTON 98421					
Whitacre Engineers, Inc. Consulting Engineering and Land Planning 2124 SOUTH "K" STREET TACOMA, WASHINGTON 98404					
Rev:	REV	C.C.		P	
By:	NONE		DWG. NO.		4739 - E2B
On:	10-15-81				

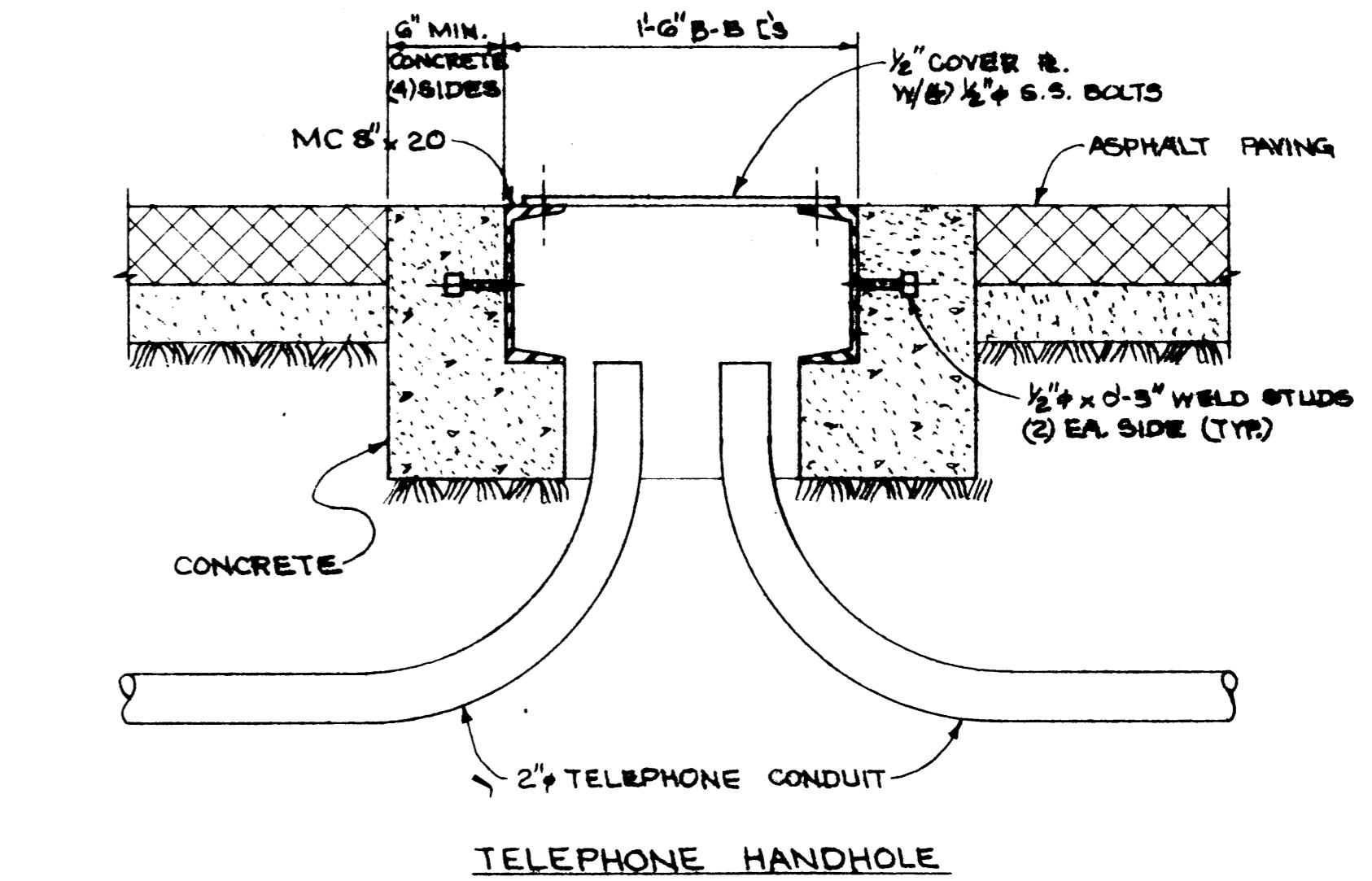


PARTIAL PLAN



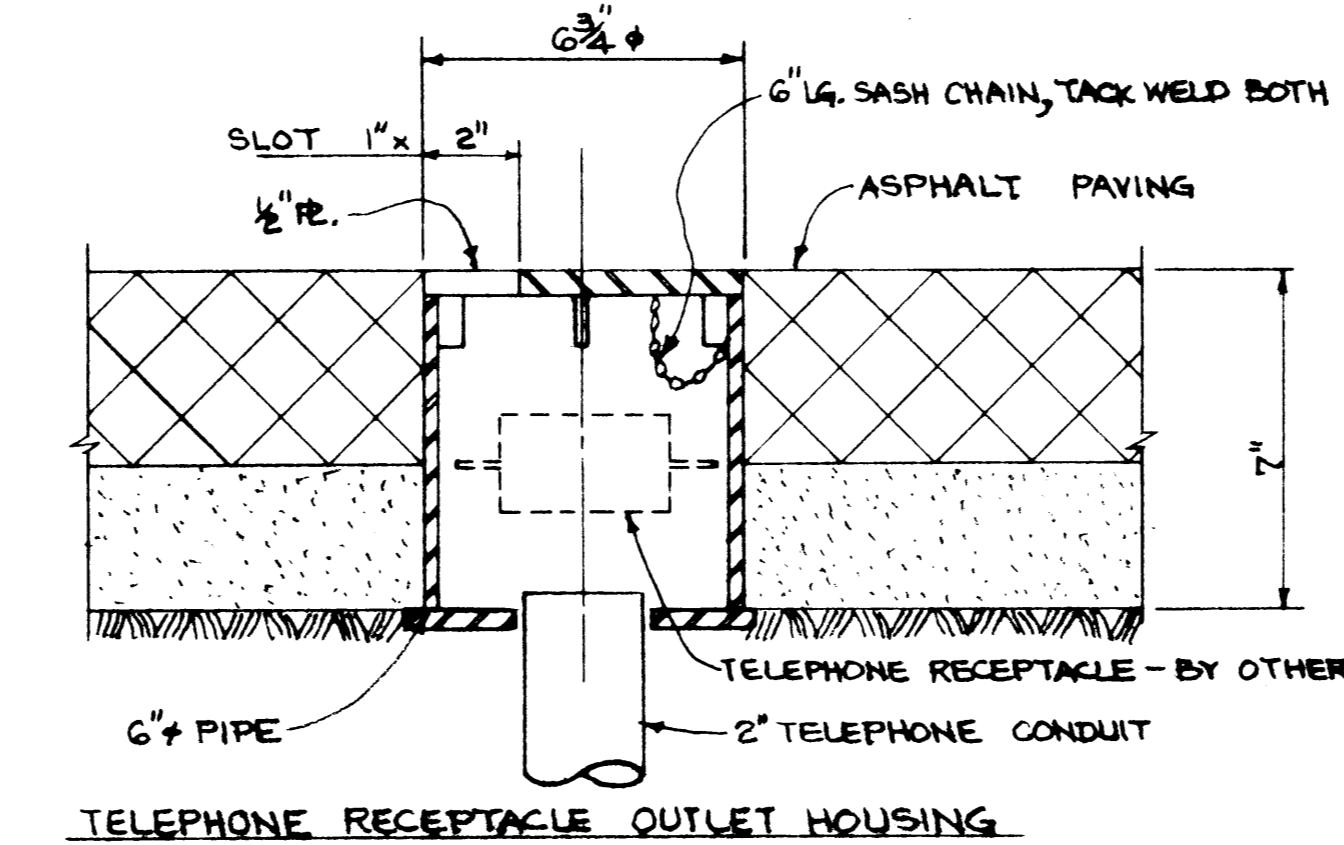
TYPICAL SECTION

1/2" = 1'-0" 4 E1 E10



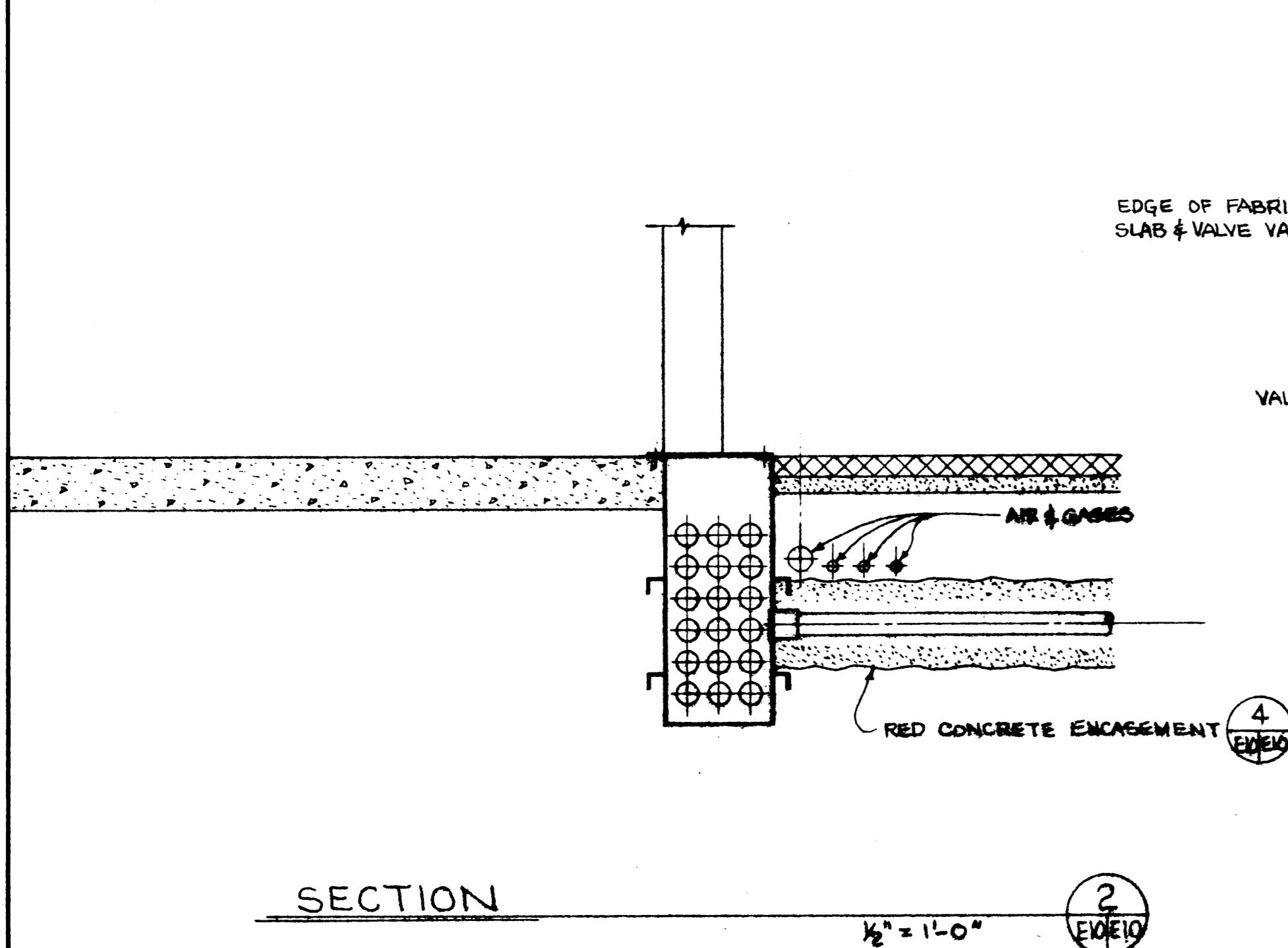
SECTION

1/2" = 1'-0" 5 E1 E10

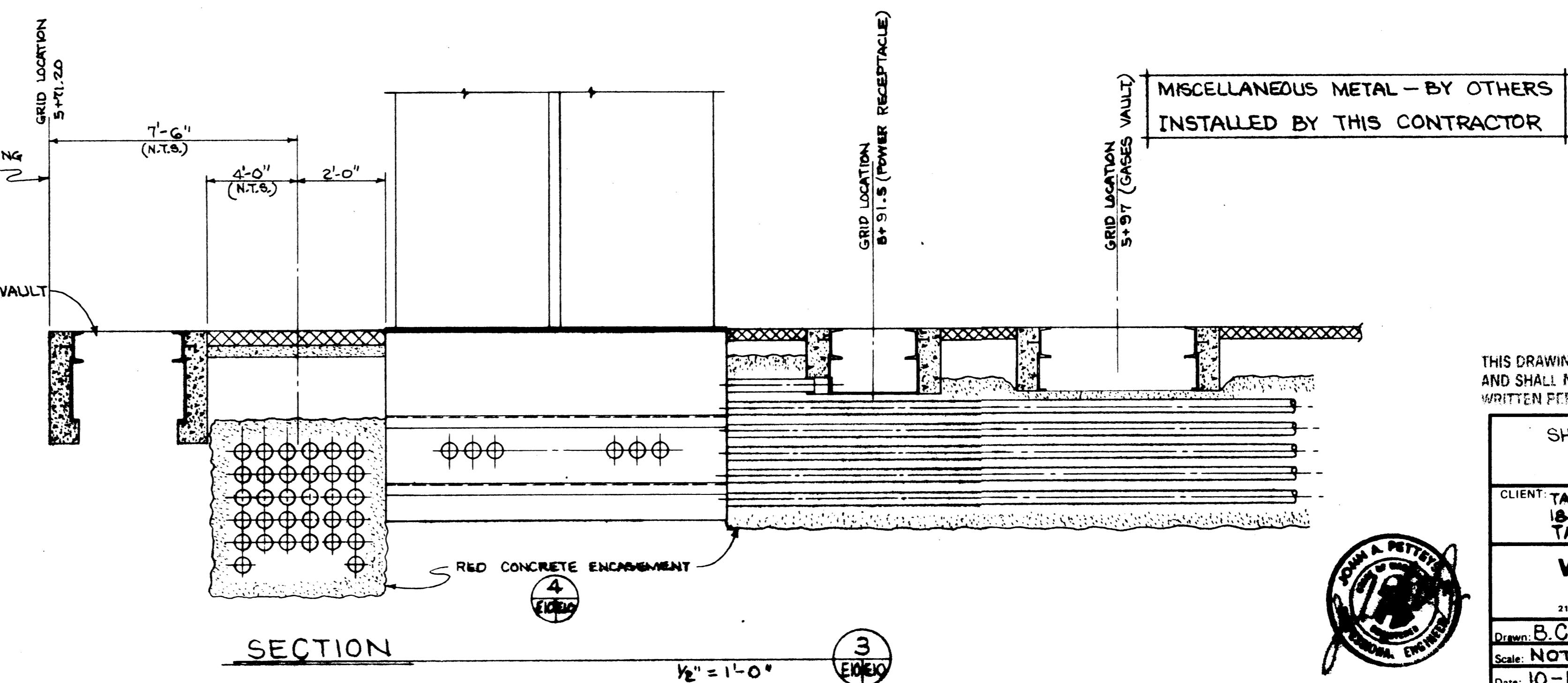


SECTION

3" = 1'-0" 6 E1 E10



SECTION



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SHIPYARD #3 EXTENSION (PHASE I)
ELECTRICAL DETAILS

CLIENT: TACOMA BOATBUILDING CO. INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON 98421

Whitacre Engineers, Inc.

Consulting Engineering and Land Planning

2124 SOUTH "K" STREET TACOMA, WASHINGTON 98405

Drawn: B. CARLISLE Chkd: *[Signature]* App: *[Signature]*

Scale: NOTED

Date: 10-15-81 DWG. NO. 4739-E10



GENERAL NOTES & SPECIFICATIONS

CIVIL / STRUCTURAL

General:

All methods and materials shall conform to the Uniform Building Code, 1979 Edition, as amended and adopted by Ordinance 22418 of City of Tacoma on May 26, 1981, and the 1977 edition of the Standard Specifications for Municipal Public Works Construction prepared by the Washington State Chapter American Public Works Association (APWA).

The APWA Standard Specifications, except as modified or superseded hereafter by these General Notes, shall govern all phases of work under this scope and they are by reference made an integral part of this project scope and General Notes as if herein fully set forth.

SCOPE OF WORK:

Contractor(s) shall provide all labor, materials, and incidental work for a complete Tacoma Boatbuilding Company, Inc. Yard No. 3 Extension. The project scope shall include, but not be limited to, the following contracts:

CONTRACT A (Civil and Structural)

1. Construct two (2) Fabricating Pavement Slabs.
2. Construct one (1) 200 Ton Craneway, complete with crane rail and timber piling.
3. Construct one (1) 35 Ton Craneway, complete with crane rail and timber piling.
4. Construct concrete bulkhead and miscellaneous structures.
5. Miscellaneous demolition, site preparation and excavation, asphaltic paving and all others.
6. Relocation and expansion existing storm drainage system.

CONTRACT B (Mechanical)

1. Relocation existing potable water and fire protection system.
2. Construct new protected water and potable water system.

CONTRACT C (Electrical)

1. Relocate and expand existing electrical systems.
2. Construct new electrical systems.

CONTRACT D (Industrial Gases)

1. Relocate and expand existing industrial gasses system.
2. Construct new industrial gasses system.

CONTRACT E (Fencing)

1. Construct complete chain link fencing system with gates and other openings as shown on the drawings.

Lines & Grades: Owner will provide, in the vicinity of the construction site, the following references at the start of construction:

- a. Control base line.
- b. Two (2) B.M. located for vertical control.

Owner shall provide, on a one-time basis only, the vertical and horizontal preliminary construction layout from the above furnished control points. Contractor shall provide, at his own expense, all additional construction vertical and horizontal layout.

Contractor shall protect the furnished control points and/or have them re-established at his own expense.

Verification of Site Conditions: All dimensions, details, and existing conditions shall be verified by the Contractor prior to fabrication or construction.

Shop Drawings: All shop drawings required for reinforcing and miscellaneous steel shall be submitted to and reviewed by the Engineer prior to fabrication.

Permits: The Owner and/or Owner's representative shall be responsible for all necessary permits and inspections as required for the various phases of work of the project, unless indicated otherwise in the General Notes and Specifications.

Notification: The Owner, City, and/or Port of Tacoma shall be notified by Contractor(s) 48 hours prior to starting of construction and 48 hours prior to all testing.

Owner Representative: To be provided at a later date.

City of Tacoma: Mr. Jack Fabry, Inspection Division, phone: 593-4283.

Port of Tacoma: Mr. Arnold Rollins, Inspection Division, phone: 383-5841 ext. 312.

Other Contractors or Other Work: It is anticipated that other work adjacent to or within the limits of this project may be performed by others during the life of this project.

Any portion of the work involving the facilities of other Contractors, public or private utilities, Port of Tacoma agencies, or City departments, will be performed by the respective agencies, utilities, or departments with their own forces or by other contractors under separate contracts.

The Contractor shall cooperate with the other contractor(s), utilities, agencies, and/or departments and so conduct his operations that the necessary removal or reconstruction of their facilities can be accomplished with a minimum interruption of service.

Whenever the Contractor finds it necessary to interfere with the facilities of any other contractor(s), private or public utility, or property of the Port of Tacoma or City departments, he shall notify the respective utility, agency, or department, 48 hours in advance of such interference or interruption of service.

The Contractor shall have no claim by reason of the operations of the other contractor(s) private or public utilities, Port of Tacoma agency, and/or City Departments in the removal, reconstruction, or construction of their facilities except that in the event the operations of the utilities, agency, and/or the departments result in a delay to the Contractor on this project, an extension of time will be granted equal to the time actually lost as a result of such delay.

Order of Work: The Contractor shall schedule and arrange his work to hold to a minimum the amount of interference to all property owners located along or in the vicinity of the project area. A reasonable access shall be maintained to all property owners at all times, except when the property owner has authorized, in writing, the closure of access for a specific period of time.

Mobilization: Contractor shall provide own site office, telephone, electrical, water, sanitary, and all other provisions. Space may be provided in the project area for site office only, all other staging, fabrication, storage, and other functions will originate at an offsite area. Contractor's work force will be required to park at offsite areas, there to be contractor bussed to and from work areas due to site congestion. Contractor shall be responsible to coordinate with Port of Tacoma, Mr. Bill Kittrell, phone 383-5841, to provide own offsite compound, parking, fencing, pad, access, security, and all other related items.

As-Built Drawings: Contractor(s) shall maintain a set of contract plans at the site on which the actual location of all civil, structural, and mechanical parts of the project shall be shown in a legible, neat, manner. These sets of plans shall show actual dimensions of the various items from established construction lines so they can readily be found after construction is completed. One complete set of drawings shall be presented to the Owner for review prior to final acceptance of the project.

Communications: The Owner appointed representative shall be the only authorized person to answer questions or interpret the drawings and specifications. All work executed by the Contractor(s) found to be in error or wrong location due to consultations with all others shall be repaired, altered, or replaced at Contractor's own expense.

Openings, Cutting, Patching, Blockouts: Space will be allowed in all construction for installation of openings, blockouts, cuttings, and others as required for a complete project. The Mechanical and Electrical contractors shall provide the Civil/Structural Contractor the necessary materials, locations, and dimensions for his work requirements. This notification shall be in ample time to avoid delays and unnecessary labor. All cutting in construction made necessary to admit work, repair defective material, defective workmanship, or by neglect of the contractor(s) to properly anticipate requirements, shall be done by the Contractor(s) at his, or their, own expense.

Maintenance of Traffic: The Contractor shall generally be responsible for all maintenance of traffic from the security control house on Alexander Avenue to and including the project site. Additional offsite responsibility shall be as directed by the Port or City of Tacoma. Sections 7-1.15 through 7-1.25 (APWA) shall be amended as required to delete "Owner provide and/or maintain" to "Contractor provide and/or maintain, as directed by the Owner".

Construction Limits: The approximate construction limits for this project are shown on the drawings. If a conflict arises over the project construction limit the Owner or Engineer shall determine the exact construction limits.

Disposal of Materials: All unsuitable and excess material shall become the property of the Contractor. The Contractor shall dispose of materials at an approved offsite disposal area.

Damage to Existing Improvement and Utilities: Refer to Section 5-1.10 of the Standard Specifications (APWA).

The second paragraph of Section 5-1.10 of the Standard Specifications (APWA) shall be deleted and the following inserted in lieu thereof:

Underground utilities of record, except services, are shown on the construction drawings insofar as is possible to do so. These are for the Contractor's convenience only and the Owner assumes no responsibility for their exact locations. If other utilities of record not shown on the drawings or utilities not of record are encountered during the course of construction, the Contractor shall not be responsible for damage to these utilities. The Contractor shall stop work immediately to minimize damage to the existing utility and notify the Owner or Engineer for further instructions. Generally, the Contractor shall be instructed to abandon the utility in place or repair the damaged utility. Payment for repair of the damaged utility shall be per APWA Section 9-1.03 Payment for Extra Work. The Owner or Engineer shall select the method of measurement and payment per individual item or incident.

Additionally, the Contractor shall exercise caution to avoid damage to all roads, both public and private. Any damage caused to any road or driveway shall be repaired by the Contractor, to the satisfaction of the Owner or Engineer, at the Contractor's own expense.

If the Contractor obtains materials from non-specified sources and the location of the sources necessitates haulage on other than public roads or highways, the Contractor shall, at his own expense, make all arrangements for use of the haulage routes.

Clearing and Grubbing: Clearing and grubbing, as required, on this project shall be performed in accordance with Section 2-01 of the Standard Specifications (APWA) within the project construction limits indicated on the drawings.

Excavation: Contractor shall excavate to depths and limits indicated on the drawings. Contractor shall refrain from over excavation or disturbing soil not required to be excavated. Subgrade in cut areas shall be compacted to a minimum 95% of the maximum dry density test as determined by ASTM D-1557.

Trenching and Backfill: All trenching for mechanical and electrical utilities shall be excavated to proper levels, widths and grades. Cribbing and dewatering will be provided where necessary. Encasement or bedding will be provided as shown on the drawings or per applicable APWA Standard Specifications. Backfill after installation and approved testing of utilities. Any trenching near or under footings or slabs shall be accomplished only after approval by the Owner or Engineer. All bedding, testing, and backfilling shall be in accordance with his directions. Generally, Contractor shall compact bedding and backfill in layers or lifts by means and methods as indicated in the APWA Standard Specifications to 95% of the maximum dry density test as determined by ASTM D-1557.

Fill material: If required, shall be selected on site material generated in excavation. If additional borrow or fill material is required it shall be Class "B" bankrun gravel conforming to APWA Standard Specifications, Section 26. All fill shall be placed in lifts not exceeding 8" (loose thickness) and shall be compacted to a minimum 95% of the maximum dry density test as determined by ASTM D-1557.

Preroll and Unsuitable Materials: Contractor shall preroll with loaded dump truck or similar equipment. If any soft areas of unsuitable material are encountered, these areas shall be backfilled with fill material indicated above. If the Contractor considers the excavation and backfill to be an extra he shall notify the Owner or Engineer and request the excavation be cross-sectioned for determination of the in-place additional volume. The Contractor shall include in his bid add or deduct unit price per cubic yard figures to be utilized where changes are requested by the Owner or Engineer or encountered by the Contractor. These unit price figures shall be complete cost for all labor, materials, and equipment for item in-place. No additional payment shall be allowed placing, spreading, compacting, or others.

Extra Demolition Encountered During Construction: In addition to underground utilities, of record and not of record, that may be encountered during construction, see above. The Contractor may encounter existing piling, ship or boat keels, ballast or other similar material, buried storage or underground fuel tanks and/or other buried debris.

If material of this nature is encountered during the pile driving or excavation phases of construction, the Contractor shall divert his forces to another work area or stop work immediately, if deemed necessary by the Contractor, to minimize damage to the encountered item or object or the area of work. The Contractor shall notify the Owner or Engineer for further instruction. Generally, the Contractor will be instructed to abandon the encountered items in place or remove portion of item to a depth of one (1) foot below bottom of trenches, subgrades, or other applicable datum. Payment for Extra Demolition Encountered During Construction shall be per APWA, Section 9-1.03 Payment for Extra Work. The Owner or Engineer shall select the method of measurement and payment per individual item or object encountered.

Timber Piling

General: Owner shall provide all timber piling. The piling shall be stockpiled and stored offsite at the supplier's facility and supplier trucked to the job site at rates or in quantities as directed by the Owner. Barging and off loading of material in the vicinity of the project area will not be allowed.

- a. All piles shall be peeled Pacific Coast Douglas Fir, 7" minimum tip diameter and 12" minimum diameter 3' free butt, conforming to ASTM D25-79.
- b. Piles shall be pressure treated to APWA Standards C1-80, C3-80, and P13-65 with a minimum retention of 17.0 lbs. of creosote per cubic foot (by assay).

Storage, handling, and care of treated piling shall be in accordance with APWA Standard M4-90.

Field treatment of piles for accidental damage to the skin and where field connections are required, shall be in accordance with APWA Standard M4-90.

- c. Piles shall be driven to or below minimum tip elevations noted on the drawings.

Assumed design capacity of piles is 35 Tons and this shall be verified in the field by using the following pile driving formula:

$$P = \frac{Q}{2}$$

$$Q = \frac{a E_r}{3 + 1/2 S_o}$$

$$S_o = \left[\frac{2 \cdot a \cdot E_r \cdot L}{A \cdot E} \right]^{1/2}$$

Where
 P = Design pile capacity, pounds
 Q = ultimate pile capacity, pounds
 E_r = rated hammer energy, foot-pounds
 a = hammer efficiency = $\frac{\text{Delivered energy}}{\text{rated energy}}$ = about 0.8
 A = cross sectional area of pile, inches²
 L = length of pile, feet
 E = modulus of elasticity of pile material, psi
 S_o = final set, penetration per blow, feet

Notify Engineer immediately if pile design capacity is not achieved in actual driving.

In the event design pile capacity is not achieved with the specific size and length of piles, the Engineer may decide to increase the length and/or size of piles, and/or introduce additional piles to cover the lower pile capacity. Such changes, if required by the Engineer, shall be treated as additional work and shall be paid for at contract unit prices.

- d. Piles shall be fresh cut on the butt end just before placing in the leads for driving. Head and tip of piles shall be "sniped" or chamfered to at least the depth of the sap to avoid splitting of the sap from the body of the piling during driving. Piles shall be driven with square ends. Pointing will not be permitted.

- e. Pile Driving: Fixed lead drivers shall be used in driving all piles. Use of hanging or swinging leads will not be allowed, unless they are so constructed that they can be held in a fixed position during driving. Leads shall be of sufficient length so that the use of a follower will not be necessary.

Adjustable leads shall be used in driving batter piles.

Use of spuds or chocks in the leads shall be kept to a minimum to avoid damaging the treated skin of piling.

Pile hammer shall be approved air, steam, or diesel powered, developing approximately 15,000 foot pound energy. Driving caps and cushions shall be used to protect the head of pile and provide uniform distribution of hammer energy to the pile head. Banding may be required by the Engineer to prevent damage during hard driving.

- f. Tolerances in Driving: Allowable tolerance in driving shall not be more than one-quarter inch per foot of pile length from the vertical for plumb piles or more than one-half inch per foot of pile length from the required angle for batter piles. Top of pile shall be within three inches of the location indicated. Manipulation of piles to force them into position will be permitted only with a device which has a capacity not to exceed five hundred pounds. Pile driver winch or hoist lines shall not be used to align piles. Any pile, the final position of which deviates more than the limits specified, may be rejected by the Engineer and not paid for, and if so ordered, shall be pulled and redriven, or cut off and a new pile driven, at the Contractor's expense.

- g. Jetting: Piles may be jetted only as specifically authorized in writing by the Engineer.

- h. Splices: Splicing of piles shall not be allowed.

- i. Delays: When driving is interrupted before final penetration is reached, record for bearing capacity shall not be taken until at least twelve inches of penetration or refusal has been obtained after driving has been resumed.

- j. Driving Record: The Owner's representative may keep a detailed record of all pile driving operations from the time the pile is picked up until it is completely driven. The Contractor shall, at all times, render such assistance as may be required by the Engineer in keeping records of all piles driven.

- k. Pile cut-off and treatment of head.

- (1) Piles shall be cut off perpendicular to the longitudinal pile axis, at elevations indicated on the drawings.

- (2) Treatment of pile heads to be embedded in concrete cap is not required.

Asphalt Concrete Pavement:

Asphalt concrete pavement shall be constructed in accordance with Section 34 of the Standard Specifications (APWA). Bid price shall be full compensation for furnishing all labor, equipment, material and supplies required to construct that class of pavement in place where shown on the plans or directed by the Owner. No additional compensation will be allowed for placing pavement in small areas requiring hand placement and compaction. The limits and thickness shall be as shown on the drawings.

Asphalt concrete shall be laid in separate courses, as shown on the typical section. Asphalt concrete shall be furnished and laid in accordance with Section 34 of the Standard Specifications (APWA); Class "B" asphalt concrete shall be as specified for use on this project. The grade of the paving asphalt will be AR-9000 penetration. As specified in the Standard Specifications, pavement sections without curb and gutter will require reference lines.

The asphalt concrete mixture shall have a temperature not less than 260°F when deposited on the roadway. Each truck load shall be covered with a suitable tarpaulin while in transit to prevent unnecessary heat loss.

Prior to the commencement of paving operations, the existing surface shall be prepared as specified in the Standard Specifications. An asphalt tack coat having a grade of CRS-1 shall be applied at the rate directed by the Owner or Engineer. An additional tack coat between courses may be required as directed by the Owner.

Crushed Surfacing: Crushed surfacing, top course shall be provided and constructed in accordance with Section 23 of the Standard Specifications (APWA). The limits and thickness shall be as indicated on the drawings.

Material meeting the requirements of this section shall be furnished from source(s) provided by the Contractor.

Tests for production control shall be performed by the Contractor. The Owner or Engineer, or City, will perform such tests as they deem necessary to approve material. Unless directed otherwise by the Owner or Engineer, all materials will be approved in stockpile prior to delivery to the project.

Pavement Transition Project Perimeter: Asphalt concrete pavement from the Yard No. 3 extension shall extend into the existing shipyard No. 3 and the roadway adjacent to Building No. 532 to meet the existing pavement. The Contractor shall remove or overlay the existing pavement to provide a uniform transition and positive drainage.

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SHIPYARD #3 EXTENSION (PHASE 1)
CIVIL/STRUCTURAL GENERAL NOTES
& SPECIFICATIONS (SHEET 1)

CIVIL / STRUCTURAL CONTINUED

Reinforced Concrete:

- a. All methods and materials shall conform to all requirements of ACI 361-72 (Revised 1973), Specifications for Structural Concrete for Buildings, except as modified hereafter.

b. Formwork: All forms and formwork shall conform to Chapter 4- Formwork:

- (1) Earth cuts as forms will not be permitted.
- (2) Shop drawings for formwork will not be required.
- (3) Tolerances for formed surfaces shall be per Table 4.3.1, except the final vertical elevations, stop the pile caps, and grade beams for the 200 Ton and 35 Ton craneways shall be $\pm 1/4"$ per 10 feet. Measured after removal of formwork.
- (4) Weight supporting formwork and shoring may be removed when the concrete has reached a compressive strength equal to seventy percent of specified design strength.
- (5) Reshoring will not be required.

c. Reinforcement: All reinforcement shall conform to Chapter 5 - Reinforcement.

- (1) Reinforcing steel shall be deformed new billet steel bars conforming to ASTM A615-74, Grade 60.
- (2) Welded wire fabric shall be plain wire conforming to ASTM A185-73, Grade 40.
- (3) Welding of reinforcement is not required.

(4) 3" minimum concrete cover around bars for concrete poured directly against ground and 1-1/2" minimum concrete cover around bars for concrete exposed to weather, unless noted otherwise on drawings.

- (5) All splices shall be staggered. Minimum splice - 30 bar diameters.

- (6) All corners shall be reinforced with corner bars of same size and spacing as main steel running to corner. Minimum length of each leg of corner bar shall be 48 bar diameters.

d. Joints and Embedded Items shall conform to Chapter 6 - Joints and Embedded Items.

- (1) Waterstops will not be required.
- (2) Generally joint filler shall be premolded type, location and thickness as shown on the drawings, unless directed otherwise by the Owner.
- (3) For construction joints not shown on the drawings, type and location per Chapter 6.

e. Concrete:

- (1) Placement of concrete under water should not be required.
- (2) Materials:

- (a) Cement shall conform to ASTM C-150, Type I or II.
- (b) Coarse and fine aggregate shall conform to ASTM C-33.
- (c) Air entraining admixtures shall conform to ASTM C-260.

- (d) Water reducing admixtures shall conform to ASTM C-494.

- (e) Slabs on grade, pile caps, grade beams, bulkhead and other miscellaneous reinforced concrete shall develop 3000 psi minimum strength in 28 days. W/C ratio shall not exceed 6.0 U.S. gallons of water per 94-lb. sack of cement. 4" to 5" slump. Maximum aggregate size 1-1/2" in pile caps, grade beams, slabs on grade and footings; 1" in others. Air entrainment 5% to 7% in elements exposed to weather.

- (f) Contractor shall submit complete details of the proposed concrete mix, including laboratory test certificate, for review by the Owner, prior to construction.

f. Concrete Finishes and Finishing Tolerances:

- (1) Top, horizontal surface pile caps and grade beams use floated finish, finish tolerance, Class B, $\pm 1/8"$ /10'.
- (2) Floor slabs, troweled finish, Class B finish tolerance.
- (3) Exposed concrete, smooth form finish, Class B finish tolerance.
- (4) Non-exposed concrete, rough form finish, Class C finish tolerance.

Cement Concrete Pavement:

- a. All methods and materials shall conform to Section 39 Standard Specifications (APWA) except as modified hereafter.

- b. Fabrication slabs shall develop 4000 psi minimum compressive strength in 28 days. Class 5.5(1), air entrainment 5% to 7%, 2" to 4" slump.

- c. Miscellaneous Non-Structural Concrete shall develop 2000 psi minimum strength in 28 days. W/C ratio shall not exceed 7.3 U.S. gallons of water per 94-lb. sack of cement. 5" to 6" slump. Maximum aggregate size 1-1/2". See applicable Section APWA as directed by Owner.

d. Concrete Finishes and Finishing Tolerances:

- (1) Fabrication slab; light broom finish, $\pm 1/8"$ per 10' and $\pm 1/10"$ finish tolerance.
- (2) Other concrete; finish and tolerance as directed by Owner.

e. Joints and Embedded Items:

- (1) Joints and embedded items shall be as shown on the drawings or as directed by the Owner.

Structural and Miscellaneous Steel:

- General: All Structural and Miscellaneous Steel shall be provided and fabricated by the Owner. Contractor shall transport, handle, assemble, place, erect and provide all other work as directed by the Owner. The Contractor shall provide the Owner with detailed schedule, complete with required dates, quantities, and shop drawings as required for a complete project.

- a. All structural steel shapes and plates shall conform to ASTM A36. Pipes shall conform to ASTM A501.

- b. All bolts and nuts shall conform to ASTM A307, unless specifically noted otherwise on the drawings.

- c. All structural steel and fabrication and erection thereof, shall conform to the latest specifications of the American Institute of Steel Construction (AISC).

- d. All welding shall conform to the latest specifications of the American Welding Society (AWS) Structural Welding Code. Welding electrodes shall be E70XX unless specifically noted otherwise.

Timber (Except Piling):

- a. All timber shall be Pacific Coast Douglas Fir, Grade No. 2 or better and shall conform to the latest specifications of the West Coast Lumber Inspection Bureau (WCLIB).
- b. All timber shall be surfaced four sides (S4S) unless specifically noted otherwise on the drawings.
- c. All timber shall be pressure treated in accordance with AWPA Standards C1-80, C2-80, and P1-78, with a retention of 10-lbs. of creosote per cubic foot, (by Assay). Storage, handling, care, and field treatment of treated timber shall be in accordance with AWPA Standard M4-80.
- d. Fabrication. All treated timber shall be, insofar as practicable, cut to length, bored and framed before treatment. Holes for bolts shall be 1/16" larger than the bolt. Lead holes for dowels and lag bolts shall be prepared to 65% of shank diameter. The Contractor shall prepare fabrication drawings of all pieces, which shall be submitted to the Engineer for review prior to proceeding with fabrication.
- e. Installation. All workmanship shall be in accordance with the best standard practices. Holes bored in field shall be filled with, or swabbed with a round brush with two coats of hot creosote oil, and field cuts painted with two coats of hot creosote oil. When bolt heads are countersunk, countersink shall be filled with acoite mastic. All handling of treated timber with pointed tools shall be confined to ends. Slings for handling timber shall be rope, not steel cable.

RAILWAY AND CRANEWAY TRACKAGE

General:

- a. All methods and materials shall conform to American Railway Engineering Assoc. Specifications and Recommended Practices, latest edition, and the special requirements of the Port of Tacoma for railway and craneway track work.
- b. Work in Other Sections: Crushed Surfacing top course and pavement.

Verification: All dimensions and details shall be verified by Contractor prior to fabrication and construction.

Lines and Grades: Owner will provide, in the vicinity of the construction site, the following references at the start of construction:

- a. Control base line.
- b. Two (2) B.M. located for vertical control.

Owner shall provide, on a one-time basis only, the vertical and horizontal preliminary construction layout from the above furnished control points. Contractor shall provide, at his own expense, all additional construction vertical and horizontal layout. Contractor shall protect the furnished control points and/or have them re-established at his own expense.

Material and Construction: The Contractor shall provide and install all of the materials and accessories required to provide the complete Craneway and Railway systems to the lines and grades shown on the drawings.

Track Ballast: Track ballast will not be required.

Rails: 200-Ton Craneway - #1 Relay, 1/8" tolerance horizontal and vertical, 132 A.R.E.A. 35-Ton Craneway - #1 Relay, 1/8" tolerance horizontal and vertical, 131 A.R.E.A. Fabrication Slab Railway - #1 Relay, 1/8" tolerance horizontal and vertical, 90 A.S.C.E., A.R.A.A. or A.R.A.B., same type rail throughout project limits.

Tie Plates: Tie plates shall be of the size, with dimensions and punchings to fit the rails used. Plates shall be double shoulder.

Tie Plugs: When required, shall fit holes from which spikes are drawn. Plugs shall conform to current AREA Specifications for tie plugs and shall be treated with a creosoted oil solution until an absorption of 10 pounds per cubic foot is obtained.

Track Bolts, Nuts and Spring Washers: Track bolts, 1-1/16" x 6" with nuts, conforming to current AREA Specifications for Heat Treated Carbon Steel Track Bolts and Low Carbon Steel Nuts, with wrench turn fit, shall be used. Spring washers shall conform to the current AREA Specifications for Spring Washers and shall be of the size to fit the bolt used. New track bolts, nuts, and spring washers shall be used throughout the project.

Track Spikes: Track spikes shall be 5/8" square reinforced throat design conforming to the current AREA Specifications for High-Carbon Steel Track Spikes, without copper, except length under head shall be increased to 6-1/8". New track spikes shall be used throughout the project.

Splice Bars: Each rail splice must be of the proper design and dimensions for the rail on which it is to be applied. Used bars in good condition may be used. Secure in place with full number of bolts, nuts, and nut locks. Stagger bolts with heads placed inside and outside alternately, draw tight before splicing or anchoring. Before adjacent pavement is constructed, check and tighten all bolts.

Rail Anchors: Rail anchors shall be of standard manufacture of size and length shown on the drawings.

Rail Clips: Rail clip shall be used where shown on the drawings. Clips shall be manufactured by "Foster" or equal. Catalog number or size as required to fit the various rails and plates used in the project.

Crane Stops: Will be furnished and installed by Owner.

Frogs, Switches and Crossings: No frogs, switches, crossings or related accessories will be required.

Track Laying (General): Lay rail with staggered joints, joints located as nearly as possible opposite the middle of other rail. Use temporary shims to secure spacing between ends of rail.

Construction Fabrication Slab Railways: Ties will be required for Fabrication Slab Railways (Only). Use new 6" x 8" or 7" x 9" x 4"-6", creosote treated to West Coast Standard, 8# - 50-50 creosote petroleum. Ties shall be spaced at 1'-8" o.c. throughout. Each tie shall have two (2) spikes. No tie plates will be used on Fabrication Slab Railway, spike rails directly to ties. Excavate and compact subgrade to lines and levels required to establish final elevations shown on the drawings. Lay ties directly on subgrade without ballast. Lay and spike track. Place and compact crushed surfacing material between and around ties and rail to lines and limits necessary for the final pavement material. Crane stops will be furnished/installed by Owner.

Construction 200 Ton and 35 Ton Craneways: Construct craneway to final lines and grades shown on the drawings.

Crane rails shall be laid on concrete grade beams. The Contractor shall place a continuous grout pad under the tie plates and rail to provide continuous bearing area under the entire system. The Contractor shall set rail anchors at dimensions and spacings shown on the drawings. The rail shall be laid and secured with rail anchors, bolts, nut locks and rail clips. Install splice bars and associated items. Place crushed surfacing material around rail to lines and limits necessary for the final pavement material. Provide crane stops at ends of all rails.

Continuous Grout: Contractor shall provide a continuous grout pad under tie plates and rail. Grout shall be damp pack, 4000 psi, sand, cement, and aggregate mix. Maximum aggregate shall be one half depth of grout pad. Contractor shall submit to the Owner the proposed grout mix and placement method for approval prior to construction.

STORM DRAIN SYSTEM

General: All methods and materials shall conform to Division III "Sanitary Sewer and Storm Drains" Standard Specification (APWA).

Catch Basins: Contractor will provide and install catch basins where shown on the drawings. The catch basins shall be manufactured by Towne Concrete, Inc., or equal. The size and type as indicated on the drawings.

Pipe: Contractor shall provide and install piping and related fittings as required for a complete project.

- a. Pipe, unless specified otherwise, shall be concrete, ASTM C-14, Class 3 complete with rubber gasket.

- b. Pipe, where specified shall be:

- (1) Slotted drain; 12" diameter, 2-1/2" grate height, 14 gauge, asphalt coated, bands without gasket, conforming to the applicable portions of AASHTO-M36, as manufactured by Armco, or equal.

- (2) Corrugated Pipe: 12" diameter and less, 18 gauge, asphalt coated, conforming to AASHTO-M36, bands with gasket when pipe is not set in grout.

Bedding:

- a. Concrete pipe: Class B as designated in Section 61-3.03C (APWA). Additional bedding may be required under the pipe, per Section 61-3.03A, to provide a stabilized foundation capable of supporting the pipe.

- b. Corrugated pipe and slotted drain:

- (1) Less than 1'-0" cover, lean grout as shown on the drawings.

- (2) 1'-0" or greater cover, per APWA criteria.

Note:

- 1. The Contractor shall prior to construction on the storm system, expose the existing storm sewer at the locations of proposed connection. The Engineer shall verify invert elevations and make grade adjustments as required.

- 2. The surface drain piping shall be installed in a trench excavated into compacted subgrade. Piping shall be leveled to grade and secured by the Contractor to prevent the pipe from floating during bedding placement. Grout mix shall be in contact with the undersides of the piping and the trench walls.

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SHIPYARD #3 EXTENSION (PHASE 1) CIVIL/STRUCTURAL GENERAL NOTES # SPECIFICATIONS (SHEET 2)	
CLIENT: TACOMA BOATBUILDING CO., INC. 1840 MARINE VIEW DRIVE TACOMA, WASHINGTON 98421	
Whitacre Engineers, Inc. Consulting Engineering and Land Planning	
Drawn: <i>RAT</i>	Chkd. <i>✓</i>
Scale: <i>NONE</i>	DWG. NO. <i>4739-GN2</i>
Date: <i>9/18/81</i>	App:



GENERAL NOTES & SPECIFICATIONS

MECHANICAL

UTILITIES - POTABLE WATER, PROTECTED WATER, AND FIRE PROTECTION SYSTEMS

General:

All methods and materials shall conform to the Uniform Building Code, 1979 Edition, as amended and adopted by Ordinance 22418 of City of Tacoma on May 26, 1981, and the 1977 edition of the Standard Specifications for Municipal Public Works Construction prepared by the Washington State Chapter American Public Works Association (APWA).

The APWA Standard Specifications, except as modified or superseded hereafter by these General Notes, shall govern all phases of work under this scope and they are by reference made an integral part of this project scope and General Notes as if herein fully set forth.

See other applicable "General Notes and Specifications" sections.

Utility Depth of Cover: The Contractor will provide the following minimum depth of cover over the respective piping systems:

- a. Potable Water System - 3'-0"
- b. Protected Water System - 2'-6"
- c. Fire Protection System - 4'-0"

Reaction Blocking: The Contractor will provide reaction blocking where indicated on the drawings and in accordance with APWA criteria. Reaction blocks for pipe and fittings shall be placed so as to secure bearing on undisturbed earth. The blocking and bracing size will be determined by the Contractor and will be of sufficient proportions and installed so as to withstand the required test pressure and operating conditions. Precast blocking will not be used. Blocking will be formed so that bolts, joints, gaskets, and flanges of adjacent joints are clear of the concrete and so that bolts and joints can be dismantled without removing the concrete, per APWA 74-2.14.

Excavation: The Contractor shall provide trench excavation and backfill for potable and protected water and fire protection system per Section 73 Standard Specifications (APWA).

Utility Bedding: The Contractor will bed utility piping in conformance with the applicable portions of APWA.

Disruption of Water Service: Water service (domestic and fire) is to be maintained at existing buildings during working hours. The Contractor will coordinate his activities with the affected water service users to assure his disruption of service will not interfere with working hours.

MATERIAL AND INSTALLATION:

Potable Water System:

Pipe: DIP Class 52, with cement lining
 Fittings: Ductile Iron or Cast Iron
 Type of Joint: Mechanical joint or push on, unless specified otherwise on the plans or required by the Specifications.
 Valve: "Gate" type, valve and valve box per APWA, opening counterclockwise. Where a valve is shown on the plans adjacent to a fitting, the valve will be flanged to the fitting.
 Misc. Notes: Piping to be disinfected, tested, and flushed in conformance with the General Specifications.

Protected Water System:

Pipe: DIP, Class 52, with cement lining
 3" and smaller - galvanized steel pipe-Schedule 40 or Schedule 80 where specified on the plans or required of the specifications, all with bituminous coating.

Fittings & Joints: 4" and larger piping - Ductile Iron or Cast Iron with mechanical or push on joints unless specified otherwise on the plans or required of the specifications. Gaskets shall conform to the Specifications.
 3" and smaller piping will be restrained joint and, unless specified otherwise, be one of the following:

- a. Screwed, with malleable iron fittings. Joints to be sealed with teflon tape or equal, to provide a watertight joint.
- b. Flexible cut groove, in conformance with AWWA C-606 with Style 77 or Style HP-70 coupling (unless specified otherwise), hot dip galvanized by the manufacturer, and appropriate gasket for intended service, as manufactured by Victaulic, or equal.

Valves: 4" and larger; "gate" type with valve box in conformance with the General Specifications, opening counterclockwise.
 "Victaulic Butterfly Valve" will be Series 700 standard model as manufactured by Victaulic, or equal.

Testing: Piping to be tested and flushed in conformance with APWA.
 Misc. Notes: 1. Water service riser vault, similar to that shown in the details, shall be furnished by the Owner. The Contractor will be responsible for installing the vault and placement of concrete as detailed.

2. The Contractor will furnish the Owner with 10 each 2 $\frac{1}{2}$ " GIP, Schedule 80, adaptors, flexible cut groove by male thread, 12" long.
3. Link Seal, manufactured by Thunderline Corporation, will be installed at the sleeve locations where the water main penetrates the bulkhead. The Contractor is to verify with Owner the size and type of sleeve.

Fire Protection System:

a. All methods and materials will conform to the following:
 (1) Uniform Building Code, 1979 edition.
 (2) APWA Standard Specifications, 1977 edition.
 (3) NFPA #24, Latest Edition, Outside Protection, and
 (4) All other applicable codes.

b. Pipe: DIP, Class 52, with cement lining.

Fittings: Ductile Iron or Cast Iron

Type of Joint: Mechanical joint or push on unless specified otherwise on the plans or required by the specifications.

Restrained joint, where specified, will be one of the following:

- (1) Pacific Water Works Holding Spool
- (2) Flexible cut groove in conformance with AWWA C-606 with appropriate fittings and gaskets for the type of pipe and intended service, as manufactured by Victaulic, or equal, couplings to be hot dip galvanized by the manufacturer.

Pipe wall thickness, when used in conjunction with restrained joints, will be as recommended by the joint manufacturer.

Valve: "Gate" type - gate valves and valve box to be in conformance with APWA, opening counterclockwise. Where a valve is shown on the plans adjacent to a fitting, the valve will be flanged to the fitting.

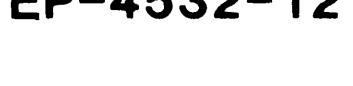
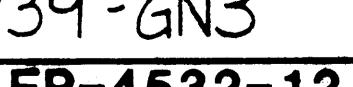
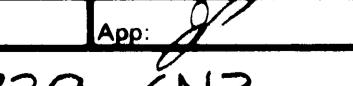
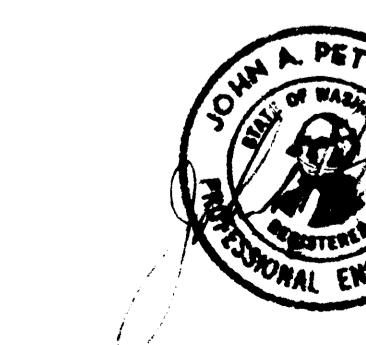
Fire Hydrant: Fire Hydrant shall be standard size conforming to the requirements of the City of Tacoma Utilities Department. Hydrant will include a traffic flange and will incorporate a 12" barrel extension, to permit hydrant removal at the bottom of the extension. Hydrant stem shall be coupled at the base of the barrel extension level to permit stem disassembly.

Testing: Piping to be tested and flushed in conformance with the General Specifications. Disinfection is not required.

Misc. Notes: Fire hydrant vault, similar to that shown in the details, shall be furnished by the Owner. The Contractor will be responsible for installing the vault and placement of concrete as detailed.

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SHIPYARD #3 EXTENSION (PHASE 1) MECHANICAL GENERAL NOTES & SPECIFICATIONS		
CLIENT: TACOMA BOATBUILDING CO., INC. 1840 MARINE VIEW DRIVE TACOMA, WASHINGTON 98421		
Whitacre Engineers, Inc. Consulting Engineering and Land Planning		
2124 SOUTH "K" STREET TACOMA, WASHINGTON 98405		
RHM	Chkd. JRC	App. J
Scale: NONE	DWG. NO. 4739-GN3	
Date: 9/18/81		



GENERAL NOTES & SPECIFICATIONS

ELECTRICAL

GENERAL:

All methods and materials shall conform to the following publications and standards listed below. These publications, except as modified or superceded hereafter by these General Notes, General Requirements, and Specifications, shall govern all work under this scope and they are, by reference, made an integral part of this project as if herein fully set forth.

1. Most recent rules and regulations of National Board of Fire Underwriters.
2. National Electric Contractors Association Standards of Installation, latest edition.
3. National Electric Code, 1981 Edition.
4. Uniform Fire Code, 1979 Edition.
5. All other applicable Local, State, and Federal rules and regulations.

The Washington State Chapter of American Public Works Association (APWA) Standard Specifications for Municipal Public Works Construction, 1977 Edition, "General Requirements and Covenants" Division One, except as modified or superceded hereafter by these General Notes and Specifications, shall govern all phases of work under this project.

If a conflict should arise between any of the standards or specifications listed herein, the Owner shall be notified in writing and written directions resolving the conflict will be returned to the Contractor.

SCOPE OF WORK:

The Contractor shall provide all labor, material, and incidental work for a complete electrical system as described hereafter and as shown on the applicable drawings:

1. Relocate and Expand Existing Electrical Systems.
2. Construct New Electrical Systems.

Definitions:

- A. The term "equal" as used herein, shall mean of equal or better qualification in the opinion of the Owner of a material or piece of equipment substituted for that which is shown on the drawings or called out in the specifications.
- B. The term "provide" as used herein, shall mean the furnishing and installing of the equipment including connections and appurtenances complete, ready for use.
- C. The term "mechanical equipment" as used herein shall mean the amenities furnished under the following systems:
 1. Welding Gasses
 2. Compressed Air
 3. Potable Water
 4. Protected Water
 5. Fire Protection
- D. The term "Owner" as used herein shall mean the Owner and/or his representative. The Owner-appointed representative shall be the only authorized person to answer questions or interpret the drawings and specifications. All work executed by the Contractor found to be in error or wrong location due to consultations with all others shall be repaired, altered, or replaced at Contractor's own expense.
- E. The term "Contractor" as used herein shall mean the Electrical Contractor and/or his sub-contractor for the type of work under this Section. Electrical Contractor shall be fully responsible for all the acts of his sub-contractors.

Intent of Drawings:

- A. Electrical Drawings do not attempt to show complete details of construction which affect electrical installations and show only approximate location of equipment and the general requirements as to size and location of conduit, etc. All measurements shall be taken at the project site and checked against the drawings of the bid set. Any conflict shall be reported to the Owner for adjustment before proceeding with the work. Failure to follow this instruction shall be considered sufficient cause for the Contractor to alter his work at his own expense, as directed by the Owner.
- B. To eliminate all possible errors and interferences, this Contractor shall thoroughly examine all of the bid set drawings. Before work is started in any portion of the project, this Contractor shall consult with each of the other Contractors for the work regarding locations and spaces required for their work and lay out this work to avoid interference therewith. Upon failure to so cooperate, this Contractor shall, at his own expense, move his work to provide the necessary space for the other Contractors.

As-Built Drawings: This Contractor shall maintain a set of contract plans at the site on which the actual location of conduits, equipment, main feeders, etc., as installed, shall be done in a legible, neat manner. This set of Plans shall show actual dimensions of underground conduit from construction lines so they can be readily found after covering. This set of Plans shall be presented to the Owner for review prior to final acceptance of project.

Coordination: To eliminate all possible errors and interferences, the Contractor shall thoroughly examine all drawings of the bid set. Before work is started in any portion of the project, Contractor shall consult with each of the other Contractors for work regarding locations, spaces required for their work and lay out this work to avoid interference therewith. Upon failure to so cooperate, this Contractor shall, at his own expense, move his work to provide necessary space for other Contractors.

Lines and Grades: Owner will provide, in the vicinity of the construction site, the following references at the start of construction:

1. Control base line
2. Two (2) B.M. located for vertical control.

Contractor shall provide, at his own expense, all construction vertical and horizontal layout. Contractor shall protect the furnished control points and/or have them re-established at his own expense.

Notification: The Owner, City, and/or Port of Tacoma shall be notified by Contractor 48 hours prior to start of construction and 48 hours prior to all testing.

Owner Representative: To be provided at a later date.

City of Tacoma: Mr. Roy Glass, Inspection Division, phone: 383-2741, ext. 438

Port of Tacoma: Mr. Arnold Rollins, Inspection Division, phone: 383-5841, ext. 312.

Other Contractors or Other Work: It is anticipated that other work adjacent to or within the limits of this project may be performed by others during the life of this project.

The project scope shall include, but not be limited to, the following contracts:

CONTRACT A (Civil and Structural)

1. Construct two (2) Fabricating Pavement Slabs.
2. Construct one (1) 200-Ton Craneway, complete with crane rail and timber piling.
3. Construct one (1) 35-Ton Craneway, complete with crane rail and timber piling.
4. Construct concrete bulkhead and miscellaneous structures.
5. Miscellaneous demolition, site preparation and excavation, asphaltic paving and all others.
6. Relocation and expansion existing storm drainage system.

CONTRACT B (Mechanical)

1. Relocation existing potable water and fire protection system.
2. Construct new protected water and potable water system.

CONTRACT C (Electrical)

1. Relocate and expand existing electrical systems.
2. Construct new electrical systems.

CONTRACT D (Industrial Gases)

1. Relocate and expand existing industrial gases system.
2. Relocate new industrial gases system.

CONTRACT E (Fencing)

1. Construct complete chain link fencing system with gates and other openings as shown on the drawings.

Any portion of the work involving the facilities of other contractors, public or private utilities, Port of Tacoma agencies, or City departments, will be performed by the respective agencies, utilities, or departments with their own forces or by other contractors under separate contracts.

The Contractor shall cooperate with the other contractors, utilities, agencies, and/or departments and so conduct his operations so that the necessary removal or reconstruction of their facilities can be accomplished with a minimum interruption of service.

Whenever the Contractor finds it necessary to interfere with the facilities of any other contractor, private or public utility, or property of the Port of Tacoma, or City departments, he shall notify the respective utility, agency, or department, 48 hours in advance of such interference or interruption of service.

The Contractor shall have no claim by reason of the operations of the other contractors, private or public utilities, Port of Tacoma agency, and/or City departments in the removal, reconstruction, or construction of their facilities except that in the event the operations of the utilities, agency, and/or departments result in a delay to the Contractor on this project, an extension of time will be granted equal to the time actually lost as a result of such delay.

Order of Work: The Contractor shall schedule and arrange his work to hold to a minimum the amount of interference to all property owners located along or in the vicinity of the project area. A reasonable access shall be maintained to all property owners at all times, except when the property owner has authorized, in writing, the closure of access for a specific period of time.

Laying Out Work: Electrical Contractor shall immediately upon entering project site for purpose of beginning work, locate all general reference points as established by the Owner and take such action as is necessary to prevent their destruction, lay out his work and be responsible for all lines, elevations, grading for utilities and other work executed by him under contract. He must exercise proper precaution to verify figures shown on Drawings before laying out work and will be held responsible for any error resulting from his failure to exercise such precaution. Coordination of utility installation with final site grading, elevations by other Contractors shall be the responsibility of this Contractor.

Electrical Work for Mechanical, Other Equipment: This Contractor shall check with, cooperate with other Contractors and shall provide all boxes, conduit, wire, appurtenances as required to make complete power connections to all mechanical pieces of equipment. If equipment furnished has current characteristics or size that differ from that shown on Drawings or specified, this Contractor shall not purchase or install breakers, switches, wire, conduit until required size of same has been fully determined by Owner. Changes shall be made to correspond to characteristics of equipment furnished.

Workmanship: The Contractor shall furnish and install all equipment included in contract, to provide a complete system with a neat, finished appearance. If, in judgment of Owner, any portion of work has not been installed in workmanlike manner, or left in rough, unfinished manner, this Contractor shall be required to remove equipment, reinstall same, patch, paint surrounding surfaces in manner satisfactory to Owner without any increased cost to the Owner.

Tests, Adjustments, Guarantee: All work under this contract shall be thoroughly, systematically tested, both during construction and after completion. Notify Owner two (2) working days in advance of all tests. Tests shall be maintained until approved. Notice to Owner shall be given two (2) working days in advance of covering of conduit, cable installations; two (2) working days in advance of covering, panelboards, installing covers on receptacles, and like finish work; and two (2) working days in advance of job completion. This Contractor shall test completed installation as in regular service. Any defects or imperfections that may show up are to be promptly corrected. Contractor shall guarantee entire system and all parts thereof for minimum period of one year from date of final acceptance and shall repair or replace any part which may show signs of failure in that time, if such failure, in opinion of Owner, is due to imperfections in materials or improper workmanship. Included in the above tests, is the test of the Ground Fault System in the Switchboard, in accordance with the National Electrical Code NFPA 70-1981, Section 230-95(c). Any expense incurred shall be included in Contractor's costs and included in his bid.

Mobilization: The Contractor shall provide own site office, telephone, electrical, water, sanitary, and all other provisions. Space may be provided in the project area for site office only. All other staging, fabrication, storage, and other functions will originate at an offsite area. The Contractor's work force will be required to park at offsite areas, there to be Contractor bussed to and from work areas due to site congestion. Contractor shall be responsible to coordinate with Port of Tacoma, Mr. Bill Kittrell, phone 383-5841, to provide own offsite compound, parking, fencing, pad, access, security, and all other related items.

Openings, Cutting, Patching, Sleeves, Blockouts, and Others: Space will be allowed in all construction for installation of openings, blockouts, cuttings, sleeves, and others as required for a complete project. The Electrical Contractor shall provide the Civil/Structural Contractor the necessary materials, locations and dimensions for his work requirements. This notification shall be in ample time to avoid delays and unnecessary labor. All cutting in construction made necessary to admit work, repair defective material, defective workmanship, or by neglect of the Contractor to properly anticipate requirements, shall be done by the Contractor at his, or their, own expense.

Maintenance of Traffic: The Civil/Structural Contractor shall generally be responsible for all maintenance of traffic from the security control house on Alexander Avenue to and including the project site. The Electrical Contractor shall be responsible for coordination of his Maintenance of Traffic requirements to the Owner's representative and Civil/Structural Contractor.

Construction Limits: The construction limits for this project are as necessary for the construction of the work covered by Contract "C". If a conflict arises over the project construction limit, the Owner will determine the exact construction limits.

Disposal of Materials: All unsuitable and excess excavated material shall become the property of the Contractor. The Contractor shall dispose of materials at an approved offsite disposal area.

Damage to Existing Improvement and Utilities: Refer to Section 5-1.10 of the Standard Specifications (APWA).

The second paragraph of Section 5-1.10 of the Standard Specifications (APWA) shall be deleted and the following inserted in lieu thereof:

Underground utilities of record, except services, are shown on the drawings insofar as is possible to do so. These are for the Contractor's convenience only and the Owner assumes no responsibility for their exact locations. If other utilities of record not shown on the drawings or utilities not of record are encountered during the course of construction, the Contractor shall not be responsible for damage to these utilities. The Contractor shall stop work immediately to minimize damage to the existing utility and notify the Owner for further instructions. Generally, the Contractor shall be instructed to abandon the utility in place or repair the damaged utility. Payment for repair of the damaged utility shall be per APWA Section 9-1.03 Payment for Extra Work. The Owner shall select the method of measurement and payment per individual item or incident.

Extra Demolition Encountered During Construction: In addition to underground utilities, of record and not of record, that may be encountered during construction (see above), the Contractor may encounter existing piling, ship or boat keels, ballast or other similar material, buried storage or underground fuel tanks and/or other buried debris.

If material of this nature is encountered during excavation phase of construction, the Contractor shall divert his forces to another work area or stop work immediately, if deemed necessary by the Contractor, to minimize damage to the encountered item or object or the area of work. The Contractor shall notify the Owner for further instructions. Generally, the Contractor will be instructed to abandon the encountered items in place or remove portion of item to a depth of one (1) foot below bottom of trenches, subgrades, or other applicable datum. Payment for Extra Demolition Encountered During Construction shall be per APWA Section 9-1.03 Payment for Extra Work. The Owner shall select the method of measurement and payment per individual item or object encountered.

Trenching, Bedding, Backfilling and Others: Shall be done by the Civil/Structural Contractor. The Electrical Contractor shall coordinate with the Civil/Structural Contractor and be responsible to provide all the necessary horizontal and vertical construction survey control for the electrical work.

The Electrical Contractor shall be responsible to assure the trenching, bedding, backfilling, and all others to the depths and limits indicated on the drawings or as required for the project scope. The Electrical Contractor shall be responsible to assure that over excavation or disturbing soil not required to be excavated is minimized. Subgrade in cut areas shall be compacted to a minimum 95% of the maximum dry density test procedure as determined by ASTM D-1557.

Cribbing and Dewatering: Shall be provided where necessary. Encasement or bedding will be provided as shown on the drawings or per applicable APWA Standard Specifications.

Backfilling will be permitted after installation and approved testing of utilities. Any trenching near or under footings or slabs shall be accomplished only after approval by the Owner. All bedding, testing, and backfilling shall be in accordance with his directions. Generally, the Contractor shall compact bedding and backfill in layers or lifts by means and methods as indicated in the APWA Standard Specifications to 95% of the maximum dry density test as determined by ASTM D-1557.

Backfill Material: Where required, backfill material shall be selected on site material generated in excavation. If additional borrow material is required it shall be Class "B" bankrun gravel conforming to APWA Standard Specifications, Section 26. All fill shall be placed in lifts not exceeding 6" (loose thickness) and shall be compacted to a minimum 95% of the maximum dry density test as determined by ASTM D-1557.

Bedding Materials: The bedding material shall be selected on-site material and shall be a clean sand-gravel mixture free from organic matter.

Pavement Removal and Replacement: Asphaltic or cement concrete pavement or sidewalk removal and replacement, if necessary, for installation of Electrical Work shall be done in accordance with Section 52 and other applicable sections of APWA. The Contractor shall execute the removal and replacement of neat, precise work lines both vertically and horizontally. See "Disposal of Materials" section. This work is to be provided by Civil/Structural Contractor. There is a Unit Price figure requested for incidental work under Contract "C", if required.

Asphalt Concrete Pavement: Asphalt concrete pavement shall be constructed in accordance with Section 34 of the Standard Specifications (APWA). Bid price shall be full compensation for furnishing all labor, equipment, material and supplies required to construct that class of pavement in place where shown on the plans or directed by the Owner. No additional compensation will be allowed for placing pavement in small areas requiring hand placement and compaction. The limits and thickness shall be as shown on the drawings or as directed by the Owner.

Asphalt concrete shall be laid in separate courses, as shown on the typical section. Asphalt concrete shall be furnished and laid in accordance with Section 34 of the Standard Specifications (APWA); Class "B" asphalt concrete shall be as specified for use on this project. The grade of the paving asphalt will be AR-4000 penetration. As specified in the Standard Specifications, pavement sections without curb and gutter will require reference lines.

The asphalt concrete mixture shall have a temperature not less than 260°F when deposited. Each truck load shall be covered with a suitable tarpaulin while in transit to prevent unnecessary heat loss.

Crushed Surfacing: Crushed surfacing, top course shall be provided and constructed in accordance with Section 23 of the Standard Specifications (APWA). The limits and thickness shall be as indicated on the drawings.

Material meeting the requirements of this section shall be furnished from source(s) provided by the Contractor.

Tests for production control shall be performed by the Contractor. The Owner or City will perform such tests as they deem necessary to approve material. Unless directed otherwise by the Owner, all materials will be approved in stockpile prior to delivery to the project.

Structural and Miscellaneous Steel:

General: All Structural and Miscellaneous Steel shall be provided and fabricated by the Owner at the site. Contractor shall handle, assemble, place, erect, and provide all other work as directed by the Owner. The Contractor shall provide the Owner with detailed schedule, complete with required dates, quantities, and shop drawings as required for a complete project.

- a. All structural steel shapes and plates shall conform to ASTM A36. Pipes shall conform to ASTM A501.

- b. All bolts and nuts shall conform to ASTM A307, unless specifically noted otherwise on the drawings.

- c. All structural steel and fabrication and erection thereof, shall conform to the latest specifications of the American Institute of Steel Construction (AISC).

- d. All welding shall conform to the latest specifications of the American Welding Society (AWS) Structural Welding Code.

Material and Material Submittals:

A. General: All materials used on the project shall be new domestic material of best quality, free from defects and approved by Underwriter's Laboratories. This Contractor shall submit catalog and engineering data on all equipment as specified. Material and equipment hereinafter specified is designated by various catalog (manufacturer's) numbers.

B. Submittal: Submittal shall be as follows: Before ordering or installing any of the materials, the Contractor shall submit to the Owner, for preliminary review, five (5) copies of complete information on the materials to be used on the project. Submittal shall include, but not be limited to, the following:

- Dry type transformer
- Switchgear
- Panelboards, including circuit breaker arrangement
- Distribution panelboards
- Wire and cable
- Wiring devices
- Other equipment as requested.

The Owner will return three (3) sets of this preliminary submittal to the Contractor showing any corrections, additions, or deletions.

C. Manual: Contractor shall resubmit to Owner a complete, corrected list of materials used on the project. This submittal shall be in form of a manual which shall include submittal data for equipment finally used on project and presented in three (3) copies in following manner:

- (1) Information contained in manuals shall include maintenance information, parts lists normally furnished by manufacturer with equipment, together with supplementary drawings where necessary to itemize servicing, maintenance points. Data in manuals shall be neat, clean copies. Drawings shall be accordaned folded. Index shall be provided with all contents listed in orderly presentation.
- (2) Binding: Each copy of instruction manual shall be bound as a single volume with hardboard cover. Front of volume shall be imprinted with name of project, Owner, year of completion and words "Electrical Equipment". Also imprinted with name of the Electrical Contractor.
- (3) Number of Copies: Three (3) copies of instruction manual shall be transmitted to Owner after approval.

Instructions to Owners: Owner or his appointed representative shall be given complete instructions in use and operation of electrical systems and components. This shall include tour of completed project site with Owner or his representative, if requested.

Codes and Permits:

A. General: All materials, workmanship shall be in accordance with most recent rules, regulations of National Board of Fire Underwriters, Local Ordinances, and in accordance with National Electrical Contractors Association

ELECTRICAL CONTINUED

Nameplates: Manufacturer's Standards.

Documents: Following documents must be presented to Owner prior to final acceptance of building:

- A. As-Built drawings
- B. Maintenance, Operating Instructions
- C. Guarantees (other than one year). Final payment of contract will be contingent upon receiving these documents and the final material submittal.

MATERIAL AND INSTALLATION

General:

A. Service & Systems, General: The Contractor shall furnish and install all necessary service, main panel outlet boxes, conduit, fittings, panelboards, receptacles, wires, and all other apparatus and accessories specified herein, indicated on the Drawings, or necessary for a complete electrical system.

B. Drawings shall be used to ascertain construction features prior to installation of outlets, receptacles, switches, light fixtures, and telephones, and all conflicts reported immediately to Engineer. Locations shall be modified as directed by Owner.

Branch Panels:

A. General: Shall be as called for on Drawings. Furnish all metal dead-front cabinets, equipped with locks all keyed alike. Provide typewritten index of circuits, under plastic, in holder on inside of panel doors. Each circuit listed in schedule by number, as applicable using final numbers as verified by Owner. Panels shall have nametags mounted inside enclosure, and not on either side of door, and shall be readily visible with door open.

B. Circuit breakers shall not have handle tie or bale construction for multi-pole breakers; multi-pole breakers shall be common trip type.

C. Circuit connections shall be as shown on Drawings unless otherwise approved.

D. Submittal data shall include panelboard circuit diagram and breaker type used.

Feeders and Mains: The riser diagram shows method of feeding and gives necessary data as to wire and conduit size.

Branch Circuits:

A. Wiring plans show principal features, details of circuit wiring for various branch circuits. Circuits shall be connected to breakers as shown according to number.

B. PLANS ARE DIAGRAMMATIC ONLY.

C. All branch circuits shall be minimum of No. 12 AWG gauge unless otherwise shown on Drawings.

D. Circuits larger than 20 amperes as indicated on Panel Schedule shall have wire and conduit according to ampere load, taking into account voltage drop and derating for number of conductors in raceway.

E. Unless otherwise shown, or specified, Contractor shall provide single conduit for each set of conductors for feeders, mains, branch circuits. For branch circuits containing more than three conductors, or conductors of larger size than #12 AWG gauge, Contractor shall use larger conduit as shown or required by Code.

Conduit:

A. Material:

- (1) Galvanized Steel-PVC Factory Coated for Service Conduits.
- (2) PVC-U.L. 651, Type EB Power Duct for concrete encasement in outdoor trenches only.
- (3) EMT, Indoor use only.

B. Installation:

- (1) Conduit terminations shall be as called out on drawings. Conduit run in earth shall be embedded in red concrete, except service conduits.
- (2) Indoor conduit shall be EMT anchored at least once per conduit section with cast or wrought hook cleats secured with screws.
- (3) Conduit shall be cut true to length and ends carefully reamed. Thoroughly dry, swab out as directed, required before pulling wire. Cap during construction. Flattened, damaged conduit shall not be used and will be replaced before wire is pulled.
- (4) Conduit routing shown on Drawings is DIAGRAMMATIC ONLY and shall be routed so as to clear structural members, equipment of other trades.
- (5) Elbows shall be factory manufactured in 1-1/4" and larger runs.
- (6) Plug each section of conduit at both ends as soon as installed to prevent its filling with concrete, dirt, etc. and to obviate moisture condensation therein.
- (7) Pull wires shall be installed in all conduits for future use and for telephone conduits installed under this contract.

Conductors:

A. Material:

- (1) Size #12 through #1 AWG - Copper. Size #1/0 AWG and larger - Aluminum.
- (2) Wire shall be minimum size No. 12 unless otherwise noted except signal, control circuits operating at 24 volts or less to ground may be No. 18 minimum. All wire shall be type THWN or XHHW.
- (3) Cable for use in connecting portable equipment or where noted shall be heavy duty rubber covered with integral ground conductor separate from all other conductors.

B. Installation:

- (1) Pulling: Use no mechanical means for No. 8 AWG conductors or smaller. Powdered soapstone or approved spray cream may be only lubricant used.
- (2) Connections shall be made with Ideal Wingnut or Minnesota Mining Scotchlok connectors of size recommended by manufacturer for conductors, #10 and #12. Compression for all larger sizes.

Grounding:

- A. All electrical work shall be grounded in accordance with latest requirements of applicable codes. Service entrance ground wire shall be run in conduit to water service location whether shown on Drawings or not.
- B. Convenience outlets shall have jumper wire firmly secured to convenience outlet grounding screw and secured to outlet box.
- C. Ground wires shall be sized, installed, and terminated in accordance with NFPA 70-Section 250, for all PVC conduit, except telephone.

Outlets:

A. General: Outlet locations shown on drawings shall be considered as approximate only.

B. Material and Installation:

- (1) Outlet boxes used for exposed work shall be cast or malleable iron, (Appleton, Crouse-Hinds, or approved equal) secured by a minimum of two (2) fasteners each. (Not held in place by conduit strap.)
- (2) Where required, each outlet shall be provided with suitable device plates to accommodate devices installed.

Receptacles:

Types:

- (1) Duplex receptacles shall be Specification Grade, side wired only (color by Owner), Leviton, Sierra, Bryant, Hubbel, General Electric, or equal.
- (2) 200 Ampere, Special Receptacles, shall be purchased by Owner. Contractor shall install as directed by the Owner.

Switches: Switches shall be Specification Grade, Quiet Type, side wired only (color by Owner), Leviton, Sierra, Bryant, Hubbel, General Electric, or equal.

Light Fixtures: Light fixtures shall be as called for on the drawings and supported by a secure means or as shown on the drawings.

Electrical Utility Vaults: Utility vaults shall be manufactured by Utility Vault Co.; Division of Concrete Conduit Company, Inc.; Auburn, Washington, or equal. The various components as: frames, covers, grates, extensions, risers, adaptors, and all other necessary accessories, shall be as shown on the drawings or as required for a complete project.

Telephone:

General: The Contractor shall furnish and install all necessary conduit, fittings, pull wire, and all other apparatus and accessories specified herein, indicated on the drawings, or necessary for a complete telephone system. The telephone hand holds and telephone receptacle outlet housing shall be provided by Owner and installed by the Contractor.

Drawings: The drawings give necessary data as conduit size, locations, etc. The plans and drawings are diagrammatic only.

Material:

- (1) Conduit & Fittings, PVC, UL 651, Type EB Communication Duct.
- (2) Telephone splicing handholds will be provided by the Owner, including the various components as: frames, covers, grates, extensions, risers, adaptors, etc. The Contractor shall provide all other necessary accessories required for a complete installation.
- (3) Telephone Receptacle Outlet Housings will be provided by the Owner. Contractor will provide all other necessary accessories required for a complete installation.

Installation:

- (1) Conduit and fittings, see "Electrical Section" B. Installation.
- (2) Pull wire shall be provided and installed in all conduit used for telephone service.
- (3) Telephone Receptacle Outlet and telephone hand holds will be provided by the Owner and installed by the Contractor.

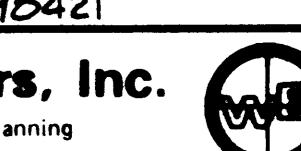
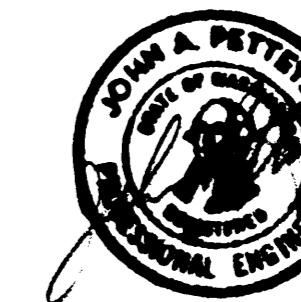
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WRITTEN PERMISSION OF WHITACRE ENGINEERS, INC.

SHIPYARD #3 EXTENSION (PHASE 1)
ELECTRICAL GENERAL NOTES
† SPECIFICATIONS (SHEET 2)

CLIENT: TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON 98401

Whitacre Engineers, Inc.
Consulting Engineering and Land Planning
2124 SOUTH "K" STREET TACOMA, WASHINGTON 98405

Drawn: RHT Chkd: AC App:
Scale: NONE DWG. NO. 4739-GN5
Date: 10-15-81



GENERAL NOTES & SPECIFICATIONS

GASES & AIR

GENERAL:

All methods and materials shall conform to the following publications and standards listed below. These publications, except as modified or superseded hereafter by these General Notes, General Requirements, and Specifications, shall govern all work under this scope and they are, by reference, made an integral part of this project scope. General Requirements, General Notes, and Specifications as if herein fully set forth.

ANSI B31, Code Case #75 "Piping for Gases, Including Air".

ANSI B16-3, "Malleable-Iron Screwed Fittings, 150-300 pound"

ANSI 13.1-75, "Scheme for the Identification of Piping Systems"

ANSI B2-1-68, "Pipe Threads"

NFPA 51-77a, "Oxygen Fuel Gas Systems for Welding and Cutting"

NFPA 51-1974 and ANSI Z-223.1-1974, National Fuel Gas Code, "Installation of gas piping and gas equipment on Industrial premises and certain other premises"

Compressed Gas Association, pamphlet G-4-4, "Industrial Practices for Gaseous Oxygen Transmission and Distribution Piping Systems"

Compressed Gas Association, pamphlet G-4-1, "Equipment Cleaned for Oxygen Service"

All other applicable Local, State, and Federal rules and regulations.

The Washington State Chapter of American Public Works Association (APWA) Standard Specifications for Municipal Public Works Construction, 1977 Edition, "General Requirements and Covenants" Division One, except as modified or superseded hereafter by these General Notes and Specifications, shall govern all phases of work under this project scope and the APWA General Requirements and Covenants are made, by reference, an integral part of this project scope as if herein fully set forth.

If a conflict should arise between any of the standards or specifications listed herein, the Owner shall be notified in writing and written directions resolving the conflict will be returned to the Contractor.

Definitions:

- A. The term "equal" as used herein, shall mean of equal or better qualification in the opinion of the Owner of a material or piece of equipment substituted for that which is shown on the drawings or called out in the specifications.
- B. The term "provide" as used herein, shall mean the furnishing and installing of the equipment including connections and appurtenances complete, ready for use.
- C. The term "Mechanical equipment" as used herein shall mean the amenities furnished under the following systems:
 - 1. Welding Gases
 - 2. Compressed Air
- D. The term "Owner" as used herein shall mean the Owner and/or his representative. The Owner-appointed representative shall be the only authorized person to answer questions or interpret the drawings and specifications. All work executed by the Contractor found to be in error or wrong location due to consultations with all others shall be repaired, altered, or replaced at Contractor's own expense.
- E. The term "Contractor" as used herein shall mean the Industrial Gases Contractor and/or his sub-contractor for the type of work under this Section. The Industrial Gases Contractor shall be fully responsible for all the acts of his sub-contractors.

SCOPE OF WORK

The Contractor shall provide all labor, material, and incidental work for complete systems as described below:

1. Construct complete compressed air piping distribution system.
2. Construct complete oxygen piping distribution system.
3. Construct complete Carbon Dioxide-Argon piping distribution system.
4. Construct complete FG-2 (Manufactured Gas) piping distribution system.

Laying Out Work: Contractor shall immediately upon entering project site for purpose of beginning work, locate all general reference points as established by the Owner and take such action as is necessary to prevent their destruction, lay out his work and be responsible for all lines, elevations, grading for gases and air piping and other work executed by him under this contract. He must exercise proper precaution to verify figures shown on Drawings before laying out work and will be held responsible for any error resulting from his failure to exercise such precaution. Coordination of gases and air piping installation with final site grading elevations by other Contractors shall be the responsibility of this Contractor.

Lines and Grades: Owner will provide, in the vicinity of the construction site, the following references at the start of construction:

1. Control base line
2. Two (2) B.M. located for vertical control.

Contractor shall provide, at his own expense, all construction vertical and horizontal layout. Contractor shall protect the furnished control points and/or have them re-established at his own expense.

Notification: The Owner, City, and/or Port of Tacoma shall be notified by Contractor 48 hours prior to start of construction and 48 hours prior to all testing.

Owner Representative: To be provided at a later date.

City of Tacoma: Mr. Ron Turner, Inspection Division, phone: 593-4281.

Port of Tacoma: Mr. Arnold Rollins, Inspection Division, phone: 383-5841 ext. 312.

Other Contractors or Other Work: It is anticipated that other work adjacent to or within the limits of this project may be performed by others during the life of this project.

The project scope shall include, but not be limited to, the following contracts:

CONTRACT A (Civil and Structural)

1. Construct two (2) Fabricating Pavement Slabs.
2. Construct one (1) 200-Ton Craneway, complete with crane rail and timber piling.
3. Construct one (1) 35-Ton Craneway, complete with crane rail and timber piling.
4. Construct concrete bulkhead and miscellaneous structures.
5. Miscellaneous demolition, site preparation and excavation, asphaltic paving and all others.
6. Relocation and expansion existing storm drainage system.

CONTRACT B (Mechanical)

1. Relocation existing potable water and fire protection system.
2. Construct new protected water and potable water system.

CONTRACT C (Electrical)

1. Relocate and expand existing electrical systems.
2. Construct new electrical systems.

CONTRACT D (Industrial Gases)

1. Relocate and expand existing industrial gases system.
2. Relocate new industrial gases system.

CONTRACT E (Fencing)

1. Construct complete chain link fencing system with gates and other openings as shown on the drawings.

Any portion of the work involving the facilities of other contractors, public or private utilities, Port of Tacoma agencies, or City departments, will be performed by the respective agencies, utilities, or departments with their own forces or by other contractors under separate contracts.

The Contractor shall cooperate with the other contractors, utilities, agencies, and/or departments and so conduct his operations so that the necessary removal or reconstruction of their facilities can be accomplished with a minimum interruption of service.

Whenever the Contractor finds it necessary to interfere with the facilities of any other contractor, private or public utility, or property of the Port of Tacoma, or City departments, he shall notify the respective utility, agency, or department, 48 hours in advance of such interference or interruption of service.

The Contractor shall have no claim by reason of the operations of the other contractors, private or public utilities, Port of Tacoma agency, and/or City departments in the removal, reconstruction, or construction of their facilities except that in the event the operations of the utilities, agency, and/or departments result in a delay to the Contractor on this project, an extension of time will be granted equal to the time actually lost as a result of such delay.

Order of Work: The Contractor shall schedule and arrange his work to hold to a minimum the amount of interference to all property owners located along or in the vicinity of the project area. A reasonable access shall be maintained to all property owners at all times, except when the property owner has authorized, in writing, the closure of access for a specific period of time.

Intent of Drawings:

A. Gases and Air Piping Drawings do not attempt to show complete details of construction which affect installations and show only approximate location of equipment and the general requirements as to size and location of piping, etc. All measurements shall be taken at the project site and checked against the drawings of the bid set. Any conflict shall be reported to the Owner for adjustment before proceeding with the work. Failure to follow this instruction shall be considered sufficient cause for the Contractor to alter his work at his own expense, as directed by the Owner.

B. To eliminate all possible errors and interferences, this Contractor shall thoroughly examine all of the bid set drawings. Before work is started in any portion of the project, this Contractor shall consult with each of the other Contractors for the work regarding locations and spaces required for their work and lay out this work to avoid interference therewith. Upon failure to so cooperate, this Contractor shall, at his own expense, move his work to provide the necessary space for the other Contractor(s).

Mobilization: The Contractor shall provide own site office, telephone, electrical, water, sanitary, and all other provisions. Space may be provided in the project area for site office only, all other staging, fabrication, storage, and other functions will originate at an offsite area. The Contractor's work force will be required to park at offsite areas, there to be contractor bussed to and from work areas due to site congestion. Contractor shall be responsible to coordinate with Port of Tacoma, Mr. Bill Kittrell, phone 383-5841, to provide own offsite compound, parking, fencing, pad, access, security, and all other related items.

As-Built Drawings: The Contractor shall maintain a set of contract plans at the site on which the actual location of all gases and air piping parts of the project shall be shown in a legible, neat manner. These sets of plans shall show actual dimensions of the various items from established construction lines so they can readily be found after construction is completed. One complete set of drawings shall be presented to the Owner for review prior to final acceptance of the project.

Communications: The Owner appointed representative shall be the only authorized person to answer questions or interpret the drawings and specifications. All work executed by the Contractor found to be in error or wrong location due to consultations with all others shall be repaired, altered, or replaced at Contractor's own expense.

Openings, Cutting, Patching, Sleeves, Blockouts, and Others: Space will be allowed in all construction for installation of openings, blockouts, cuttings, sleeves, and others as required for a complete project. The Contractor shall provide the Civil/Structural Contractor the necessary materials, locations and dimensions for his work requirements. This notification shall be in ample time to avoid delays and unnecessary labor. All cutting in construction made necessary to admit work, repair defective material, defective workmanship, or by neglect of the Contractor to properly anticipate requirements, shall be done by the Contractor at his, or their, own expense.

Maintenance of Traffic: The Civil/Structural Contractor shall generally be responsible for all maintenance of traffic from the security control house on Alexander Avenue to and including the project site. The Contractor shall be responsible for coordination of his Maintenance of Traffic requirements to the Owner's representative and Civil/Structural Contractor.

Backfill Material: Where required, backfill material shall be selected on site material generated in excavation. If additional borrow material is required it shall be Class "B" bankrun gravel conforming to APWA Standard Specifications, Section 26. All fill shall be placed in lifts not exceeding 8" (loose thickness) and shall be compacted to a minimum 95% of the maximum dry density test as determined by ASTM D-1557.

Material and Material Submittals:

A. General: All materials used on the project shall be new domestic material of best quality, free from defects.

B. Submittal: Pipes, valves, and fittings.

C. Manual: The Contractor shall submit to the Owner a complete, corrected list of materials to be used on project. This submittal shall be in form of a manual which shall include submittal data for equipment finally used on project and presented in three (3) copies in following manner:

(1) Information contained in manuals shall include maintenance information, parts lists normally furnished by manufacturer with equipment, together with supplementary drawings where necessary to itemize servicing, maintenance points. Data in manuals shall be neat, clean copies. Drawings shall be accordion folded. Index shall be provided with all contents listed in orderly presentation.

(2) Binding: Each copy of instruction manual shall be bound as a single volume with hardboard cover. Front of volume shall be imprinted with name of project, Owner, year of completion and words "Gases and Air Piping Systems". Also imprinted with name of the Contractor.

(3) Number of Copies: Three (3) copies of instruction manual shall be transmitted to Owner after approval.

Instructions to Owners: The Owner or his appointed representative shall be given complete instructions in use and operation of gases and air piping systems and components. This shall include tour of completed project site with Owner or his representative, if requested.

Codes and Permits:

A. General: All materials, workmanship shall be in accordance with most recent rules, regulations of National Board of Fire Underwriters and Local, State and Federal Ordinances and Regulations.

B. Inspection: During progress of the job, all work shall be subjected to inspection of Owner, National Board of Fire Underwriters, State and Local Inspectors, and their certificate shall be furnished by Contractor to Owner, stating that all insurance rules, regulations under which work was done have been complied with. This inspection is part of test and work will not be considered ready for acceptance until certificates have been delivered to Owner. Notify Owner in writing when same is delivered.

C. Permits: Contractor shall obtain all permits and pay any fees required by any governmental agency having jurisdiction over this work.

Construction Limits: The construction limits for this project are as necessary for the construction of the work covered by Contract "D". If a conflict arises over the project construction limit the Owner will determine the exact construction limits.

Disposal of Materials: All unsuitable and excess excavated material shall become the property of the Contractor. The Contractor shall dispose of materials at an approved offsite disposal area.

Damage to Existing Improvement and Utilities: Refer to Section 5-1.10 of the Standard Specifications (APWA).

The second paragraph of Section 5-1.10 of the Standard Specifications (APWA) shall be deleted and the following inserted in lieu thereof:

Underground utilities of record, except services, are shown in part on the drawings insofar as is possible to do so. These are for the Contractor's convenience only and the Owner assumes no responsibility for their exact locations. If other utilities of record not shown on the drawings or utilities not of record are encountered during the course of construction, the Contractor shall not be responsible for damage to these utilities. The Contractor shall stop work immediately to minimize damage to the existing utility and notify the Owner for further instructions. Generally, the Contractor shall be instructed to abandon the utility in place or repair the damaged utility. Payment for repair of the damaged utility shall be per APWA Section 9-1.03 Payment for Extra Work. The Owner will select the method of measurement and payment per individual item or incident.

Extra Demolition Encountered During Construction: In addition to underground utilities, of record and not of record, that may be encountered during construction (see above), the Contractor may encounter existing piling, ship or boat keels, ballast or other similar material, buried storage or underground fuel tanks and/or other buried debris.

If material of this nature is encountered during excavation phase of construction, the Contractor shall divert his forces to another work area or stop work immediately, if deemed necessary by the Contractor, to minimize damage to the encountered item or object or the area of work. The Contractor shall notify the Owner for further instructions. Generally, the Contractor will be instructed to abandon the encountered items in place or remove portion of item to a depth of one (1) foot below bottom of trenches, subgrades, or other applicable datum. Payment for Extra Demolition Encountered During Construction shall be per APWA Section 9-1.03 Payment for Extra Work. The Owner will select the method of measurement and payment per individual item or object encountered.

Trenching, Bedding, Backfilling, and Others: Shall be done by the Civil/Structural Contractor. The Contractor shall coordinate with the Civil/Structural Contractor and be responsible to provide all the necessary horizontal and vertical construction survey control for the gases and compressed air piping systems.

The Contractor shall be responsible to assure the trenching, bedding, backfilling, and others are to the depths and limits indicated on the drawings or as required for the project scope. Subgrade in cut areas shall be compacted to a minimum 95% of the maximum dry density test procedure as determined by ASTM D-1557.

Cribbing and dewatering shall be provided where necessary. Encasement or bedding shall be provided as shown on the drawings or per applicable APWA Standard Specifications. Backfilling shall be permitted after installation and approved testing of utilities. Any trenching near or under footings or slabs shall be accomplished only after approval by the Owner. All bedding, testing, and backfilling shall be in accordance with his directions. Generally, the Contractor shall compact bedding and backfill in layers or lifts by means and methods as indicated in the APWA Standard Specifications to 95% of the maximum dry density test as determined by ASTM D-1557.

Backfill Material: Where required, backfill material shall be selected on site material generated in excavation. If additional borrow material is required it shall be Class "B" bankrun gravel conforming to APWA Standard Specifications, Section 26. All fill shall be placed in lifts not exceeding 8" (loose thickness) and shall be compacted to a minimum 95% of the maximum dry density test as determined by ASTM D-1557.

Bedding Materials: The bedding material shall be selected on-site material and shall be a clean sand mixture free from organic matter. Bedding shall be accomplished by this Contractor.

Pavement Removal and Replacement: Asphaltic or cement concrete pavement or sidewalk removal and replacement. If necessary, for installation of gases and air piping systems shall be done in accordance with Section 52 and other applicable sections of APWA. The Contractor shall execute the removal and replacement of neat, precise work lines both vertically and horizontally. See "Disposal of Materials" section. This work is to be provided by Civil/Structural Contractor. There is a Unit Price figure requested for incidental work under Contract "D" if required.

Asphalt Concrete Pavement: Asphalt concrete pavement shall be constructed in accordance with Section 38 of the Standard Specifications (APWA). Unit price shall be full compensation for furnishing all labor, equipment, material and supplies required to construct that class of pavement in place where shown on the plans or directed by the Owner. No additional compensation will be allowed for placing pavement in small areas requiring hand placement and compaction. The limits and thickness shall be as shown on the drawings or as directed by the Owner.

Asphalt concrete shall be laid in separate courses, as shown on the typical section. Asphalt concrete shall be furnished and laid in accordance with Section 38 of the Standard Specifications (APWA); Class "B" asphalt concrete shall be as specified for use on this project. The grade of the paving asphalt shall be AR-4000 penetration. As specified in the Standard Specifications, pavement sections without curb and gutter shall require reference lines.

The asphalt concrete mixture shall have a temperature not less than 260°F when deposited. Each truck load shall be covered with a suitable tarpaulin while in transit to prevent unnecessary heat loss.

Crushed Surfacing: Crushed surfacing, top course shall be provided and constructed in accordance with Section 23 of the Standard Specifications (APWA). The limits and thickness shall be as indicated on the drawings.

Material meeting the requirements of this section shall be furnished from source(s) provided by the Contractor.

Tests for production control shall be performed by the Contractor. The Owner or City will perform such tests as they deem necessary to approve material. Unless directed otherwise by the Owner, all materials shall be approved in stockpile prior to delivery to the project.

Buried Utility Warning and Identification Tape: The Contractor shall provide and install a polyethylene plastic tape manufactured specifically for warning and identification of buried gases and compressed air utility lines. Tape shall be of the type provided in roll stock, 6 inches minimum width, color coded, with warning and identification imprinted in bold black letters continuously and repeatedly over entire tape length. Code and letter coloring shall be permanent, unaffected by moisture and other substances contained in trench backfill materials.

Material shall be provided for entire length of buried utility systems, install per manufacturer's recommendations.

Above Ground Utility Warning and Identification System: The Owner will provide and install all above ground utility warning and identification systems for the gases and compressed air utility systems. The system should be in accordance with ANSI Standard A13.1-1975, "Scheme for Identification of Piping Systems".

The Contractor shall provide a temporary identification system at each gases and compressed air pipe service outlet. The tags shall be a metal tab type, commercially manufactured piping identification label. Secure to each service outlet with "TY-wrap" plastic devices. Identify type of services, as: Compressed Air, Oxygen, FG-2 Manufactured Gas, and CO₂-AR. Contractor shall submit samples to Owner for approval before installation.

GASES & AIR CONTINUED

Structural and Miscellaneous Steel:

General: All Structural and Miscellaneous Steel will be provided and fabricated by the Owner on site. The Contractor shall handle, assemble, place, erect and provide all other work as directed by the Owner. The Contractor shall provide the Owner with detailed schedule, complete with required dates, quantities, and shop drawings as required for a complete project.

- a. All structural steel shapes and plates shall conform to ASTM A36. Pipes shall conform to ASTM A501.
- b. All bolts and nuts shall conform to ASTM A307, unless specifically noted otherwise on the drawings.
- c. All structural steel and fabrication and erection thereof, shall conform to the latest specifications of the American Institute of Steel Construction (AISC).
- d. All welding shall conform to the latest specifications of the American Welding Society (AWS) Structural Welding Code.

Modification of Existing Systems: The Contractor will not be required to modify the existing oxygen, FG-2, CO₂-AR or compressed air systems. The new portions of these systems will terminate inside the tank farm. The final connection to the existing header system within the tank farm area will be done by others. The Contractor shall make the new compressed air supply connection to an existing compressed air supply system at the outside edge of the existing Fabrication Building. See drawings for more detail.

Compressed Air System

Cleaning Method: All material, pipe, fittings, equipment, etc. shall be precleaned before start of construction.

Construction methods used, along with very close inspection surveillance, shall be planned to assure maintenance of this cleanliness. Minor loose particles such as soil, sand, weld spatter, etc. introduced during construction shall be blown out by high velocity air purge when construction and testing is completed.

Final cleaning shall include a flushing with a clean solvent as 1,1,1-Trichlorethane, with inline filter system. Dry system with dry oil-free nitrogen to remove liquid by entrainment. Leave residual nitrogen in lines, close all valves for temporary storage before system is placed in service.

Gases, FG-2 and CO₂-AR System

Cleaning Method: All material, pipe fittings, equipment, etc. shall have its interior thoroughly cleaned of all foreign material, rust, scale, and any other deposits before start of construction, using approved sand blasting or pickling procedure. The construction methods used, along with very close inspection surveillance, shall be planned to assure maintenance of this cleanliness. Minor loose particles such as soil, sand, weld spatter, etc. introduced during construction shall be blown out by high velocity air purge when construction and testing is completed. Final cleaning shall include a flushing with a clean solvent as 1,1,1-Trichlorethane, with inline filter system. Dry system with dry oil-free nitrogen to remove all liquid by entrainment. Leave residual nitrogen in lines, close all valves for temporary storage before system is placed in service.

Gases, Oxygen System

Cleaning Method: All material, pipe fittings, valves, equipment, etc. shall have its interior thoroughly cleaned of all foreign material, rust, scale, and any other deposit before start of construction, using approved sand blasting or pickling procedure. All components to be prepackaged in suitable sealed containers and clearly marked cleaned and packed for Oxygen service (see Packaging and Labeling). The construction methods used, along with very close inspection surveillance, shall be planned to assure maintenance of this cleanliness. Minor loose particles such as soil, sand, weld spatter, etc. introduced during construction shall be blown out by high velocity air purge when construction and testing is complete. Final cleaning shall include a flushing with a clean solvent as 1,1,1-Trichlorethane, with inline filter system. Dry system with dry oil-free nitrogen to remove all liquid by entrainment. Leave residual nitrogen in lines, close all valves for temporary storage before system is placed in service.

Refer to Compressed Gas Association, Inc., pamphlet G-4.1 - "Cleaning Equipment for Oxygen Service" for additional information.

Packaging and Labeling: Contractor shall follow applicable portions of Section 12, "Packaging and Labeling", Compressed Gas Association, Inc. Pamphlet G-4.1. for all gases and compressed air systems as directed by the Owner.

Personnel Safety: Contractor shall follow applicable portions of Section 13, "Personnel Safety", Compressed Gas Association, Inc., Pamphlet G-4.1. for all gases and compressed air piping systems as directed by the Owner.

Testing and Inspection

General: Testing of gases and compressed air systems shall be done prior to placing in service and connection to major equipment and to tank farm. The testing shall be made at the following pressures:

System Type	Working Pressure	Test Pressure
Oxygen	160 PSIG	320 PSIG
FG-2 (Union Carbide)	40 PSIG	180 PSIG
CO ₂ -AR (25% CO ₂ & 75% AR)	35 PSIG	180 PSIG
Compressed Air	120 PSIG	180 PSIG

Equipment and Apparatus: Required for performing inspections and test shall be provided by the Contractor. Leaks or defects, if found, shall be corrected and the affected section shall be cleaned and retested.

Test Gauges: Pressure test gauges shall be currently certified devices. The gauges shall be accurate to within 1.0 percent of the gauges full scale reading. Maximum gauge scale shall be between 1.5 to 2.0 times the test pressure. Copies of certificates shall be presented to Owner upon request.

Field Tests: The following field tests shall be conducted when applicable to piping installed on this contract. Make adjustments or replacements until deficiencies are corrected. Repeat tests until approved installation and testing is achieved.

Pressure Tests: Test pressures as specified above. Isolate piping system from all sources of air or gases during test period. Maintain test pressure at least 24 hours between first and last reading of pressure and temperature. Take first reading at least one hour after test pressure has been applied. Do not take test readings during rapid weather changes. There shall be no reduction in the applied test pressure other than that due to a change in ambient temperature. Allow for ambient temperature change in accordance with the relationship $PF + 14.7 = (P_1 + 14.7)(T_2 + 460) \text{ div. by } (T_1 + 460)$, where T and P represent Fahrenheit temperature and gauge pressure, respectively. Subscripts 1 and 2 denote initial and final readings, and PF is the final calculated pressure. If PF exceeds the measured final pressure, retest each section individually. Apply a soap solution to all joints of each section for which a reduction in pressure occurs after allowing for ambient temperature change. Repair leaking joints and repeat test until no reduction in pressure occurs. A test gauge calibrated in 1.0 PSI increments and readable to 0.5 PSI shall be used in performing this test.

Oxygen, FG-2 and CO₂-AR systems shall be tested by means of water pumped, oil-free nitrogen. Grade M or better nitrogen should be used.

Compressed air system shall be tested by means of water pumped clean dry air.

Visual Examination: Each section of piping and fittings shall be visually examined and measured where necessary, to determine shipping damage, thickness or coating, bond of coating to piping and other evidence of conformance or non-conformance to requirements of this specification. Any piping section or fittings which do not conform to these requirements or which shows shipping damage shall be rejected without further examination or testing.

After Backfill: All piping systems or sections of systems shall be proved tight after backfilling by the pressure tests previously specified except pressure shall be held for a minimum of 1 hour. If a drop in pressure occurs during the test, the leak shall be located and repaired and the installation involved shall be retested and proven tight.

Tests Oxygen System (Optional)

Owner may request the Contractor provide optional testing to oxygen system. A section test may be requested while work is in progress, for approximately every 500 feet of distribution piping. Before pressure is released all welded joints shall be hammered to loosen any remaining scale. Each joint shall be tested for leaks by means of "Snoop". Leaks found during testing shall be repaired and section retested.

"Snoop" is a leak detector. A product of Nuclear Products Co.; 5635 Sarnap Road; Cleveland, Ohio.

Safety Hazards: The Contractor is cautioned about the potentials of fire and asphyxiation hazards that may be present about the work site during modification to existing systems or testing.

All modification work to existing systems and testing should follow the safety precaution of checking the system, soil, and surrounding atmosphere for an oxygen enriched or deficient atmosphere.

Inspection: Contractor shall follow applicable portions of Section 11, "Inspection", Compressed Gas Association, Inc., Pamphlet G-4.1. for all gases and compressed air piping systems as directed by the Owner.

MATERIAL AND INSTALLATION

GAS PIPING SYSTEMS - O₂, FG2 and CO₂-ARGON

Pipe: All pipe shall be black steel with plain ends and shall meet all of the requirements of ASTM A120-80. Wall thickness class will vary as follows, where NPS stands for Nominal Pipe Size:

- A. 1" NPS and smaller shall be Schedule 80.
- B. 1½" NPS and larger shall be Schedule 40.
- C. All Oxygen Piping shall be Schedule 80.

Joints: All joints shall be made with socket welding fittings and/or couplings unless specifically noted otherwise. Butt welded joints, mitered joints, or bending of pipe shall not be permitted.

Fittings and Couplings: Forged steel socket welding type as manufactured by ITT Grinnell or approved equal conforming to ANSI B16.11.

Valves: Ball valves shall be used on all lines. Valves shall be of the same nominal size as the line on which they are installed and shall have full port openings unless noted otherwise.

A. Ball valves shall be Apollo Model manufactured by Consolidated Brass Company, as specified below. Seat, ball, stem, and seal materials shall be in conformance with the manufacturer's recommendation as being most compatible for the working pressure and material being transported.

1. 1" valve shall be bronze body, 600 PSI, WOG, cold, non-shock, threaded ends (70-100 Series). Port opening shall be no less than 7/8".
2. 1½" and larger valves shall be carbon steel body, 1000 PSI, 3 piece WOG, cold, non-shock, socket weld ends with full size port. (82-200 Series). Installation shall be in conformance with manufacturer's recommendation.

Corrosion Protection: All buried steel pipe and fittings shall be provided with an exterior protective coating system.

- A. 3M Company, Scotchwrap #50; 10 mil thickness.
- B. Permacel, #306, 10 mil thickness.

For straight runs of pipe, tape shall be 10 mil minimum in place thickness. For hand-wrapped items provide 20 mil minimum in place thickness. Minimum 2" wide tape, larger widths per pipe size. Contractor shall clean pipe system before application, apply, handle, store, etc. per manufacturer's recommendations and requirements.

Exterior protective coating system may be inspected by Owner's representative before trench backfill. Any defective work or damage due to handling or placing shall be corrected, before backfill, as directed by the Owner.

Miscellaneous Notes:

A. Link Seal, manufactured by Thunderline Corporation, will be installed at the sleeve locations where indicated on the drawings. The Contractor is to verify with Owner the size and type of sleeve.

B. Pipe Thread Tape or Sealant: Pipe thread tape or sealant shall be used on the male thread portion of all screw joints.

1. Pipe thread material - Permacel, #P-412, 3.5 mil, teflon, or equal.
2. Pipe thread sealant - Permacel, "Hi-D", 3 mil, teflon, or equal.

Application, percent overlap between layers, handling, storage, and all others shall be per manufacturer's recommendations. Contractor shall be responsible to assure if equal material is used on Oxygen piping system it must be compatible with the application.

C. Where specified on the drawings at the gases service lateral (see Detail 4, dwg. M4), grooved piping and Victaulic, or equal, couplings shall be installed. Grooving, materials, and related items shall be in conformance with applicable sections of the specifications at "Compressed Air Piping System". Gasket grade shall be in conformance with the manufacturer's recommendation as being most compatible for the working pressure and material being transported.

D. The Contractor shall furnish the Owner the following items:

- 1" NPS black steel pipe, Schedule 80, ASTM A120, 18" length, standard square cut groove (Victaulic) by plain end. 66 each

COMPRESSED AIR PIPING SYSTEM

Pipe: All pipe shall be galvanized steel pipe or ductile iron pipe as follows:

- 2" NPS shall be galvanized steel, Schedule 80.
- 3" NPS shall be galvanized steel, Schedule 40, Schedule 80 where specified.
- 4", 6", & 12" pipe shall be ductile iron pipe, Class 52.

A. Galvanized steel pipe shall meet all of the requirements of ASTM A120-80.

B. Ductile iron pipe shall have cement lining inside, 1 mil bituminous coating, and meet all of the requirements of ANSI 21.51-1976.

Joints: All joints shall be made with grooved end fittings and couplings and shall meet all of the requirements of AWWA C606-78.

A. Galvanized steel pipe shall have standard square cut groove ends.

B. Ductile iron pipe shall have flexible radius groove ends.

C. Jointing ductile iron pipe to steel pipe shall be performed by installing a Victaulic flange, Style 341 with a Victaulic flange, Style 741. To provide gasket seal, a hard, high temperature flange gasket shall be inserted between the flanges. Victaulic butterfly valves installed along ductile iron piping shall be installed in conformance with the above jointing method. Fitting bolts shall be oriented to facilitate future joint disassembly.

Fittings and Couplings: As manufactured by Victaulic, or approved equal.

A. 2" and 3" fittings shall be malleable iron, grooved and hot dip galvanized. Fittings shall conform to "Standard Pipe" outside diameters.

B. 4", 6", and 12" fittings shall be cast iron, grooved, with cement lining inside and 1 mil bituminous coating.

C. 2" couplings shall be Victaulic, Style HP-70, hot dip galvanized, with Grade "T" gaskets, except where Style HP-70 is specified.

D. 3" couplings shall be Victaulic, Style 77, hot dip galvanized, with Grade "T" gaskets.

E. 4", 6", & 12" couplings shall be Victaulic, Style 31, with bituminous coating and Grade "S" gaskets.

Valves: Valves shall be Victaulic, Series 700 Butterfly valve with manual handle, or equal.

Corrosion Protection:

A. All buried ductile iron pipe and fittings shall have factory applied bituminous coating, 1 mil minimum thickness.

B. All buried galvanized steel pipe and fittings shall be provided with an exterior protective coating system.

- 1. 3M Company, Scotchwrap #50; 10 mil thickness

- 2. Permacel, #306, 10 mil thickness.

For straight runs of pipe, tape shall be 10 mil minimum in place thickness. For hand-wrapped items provide 20 mil minimum in place thickness. Minimum 2" wide tape, larger widths per pipe size. Contractor shall clean pipe system before application, apply, handle, store, etc. per manufacturer's recommendations and requirements.

Exterior protective coating system may be inspected by Owner's representative before trench backfill. Any defective work or damage due to handling or placing shall be corrected, before backfill, as directed by the Owner.

Miscellaneous Notes:

A. Link Seal, manufactured by Thunderline Corporation, will be installed at the sleeve locations where indicated on the drawings. The Contractor is to verify with Owner the size and type of sleeve.

B. Pipe Thread Tape or Sealant: Pipe thread tape or sealant shall be used on the male thread portion of all screw joints.

1. Pipe thread material - Permacel, #P-412, 3.5 mil, teflon, or equal.

2. Pipe thread sealant - Permacel, "Hi-D", 3 mil, teflon, or equal.

Application, percent overlap between layers, handling, storage, and all others shall be per manufacturer's recommendations.

C. The Contractor shall furnish the Owner the following items:

- 1. 2" NPS galvanized steel pipe, Schedule 80, ASTM A120, 24" length, standard square cut groove (Victaulic) by threaded end. 22 each

- 2. 3" NPS galvanized steel pipe, Schedule 80, ASTM A120, 4" length, standard square cut groove (Victaulic) by threaded end. 10 each

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SHIPYARD #3 EXTENSION (PHASE 1) GASES & AIR GENERAL NOTES & SPECIFICATIONS (SHEET 2)

CLIENT: TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON 98421

Whitacre Engineers, Inc.
Consulting Engineering and Land Planning

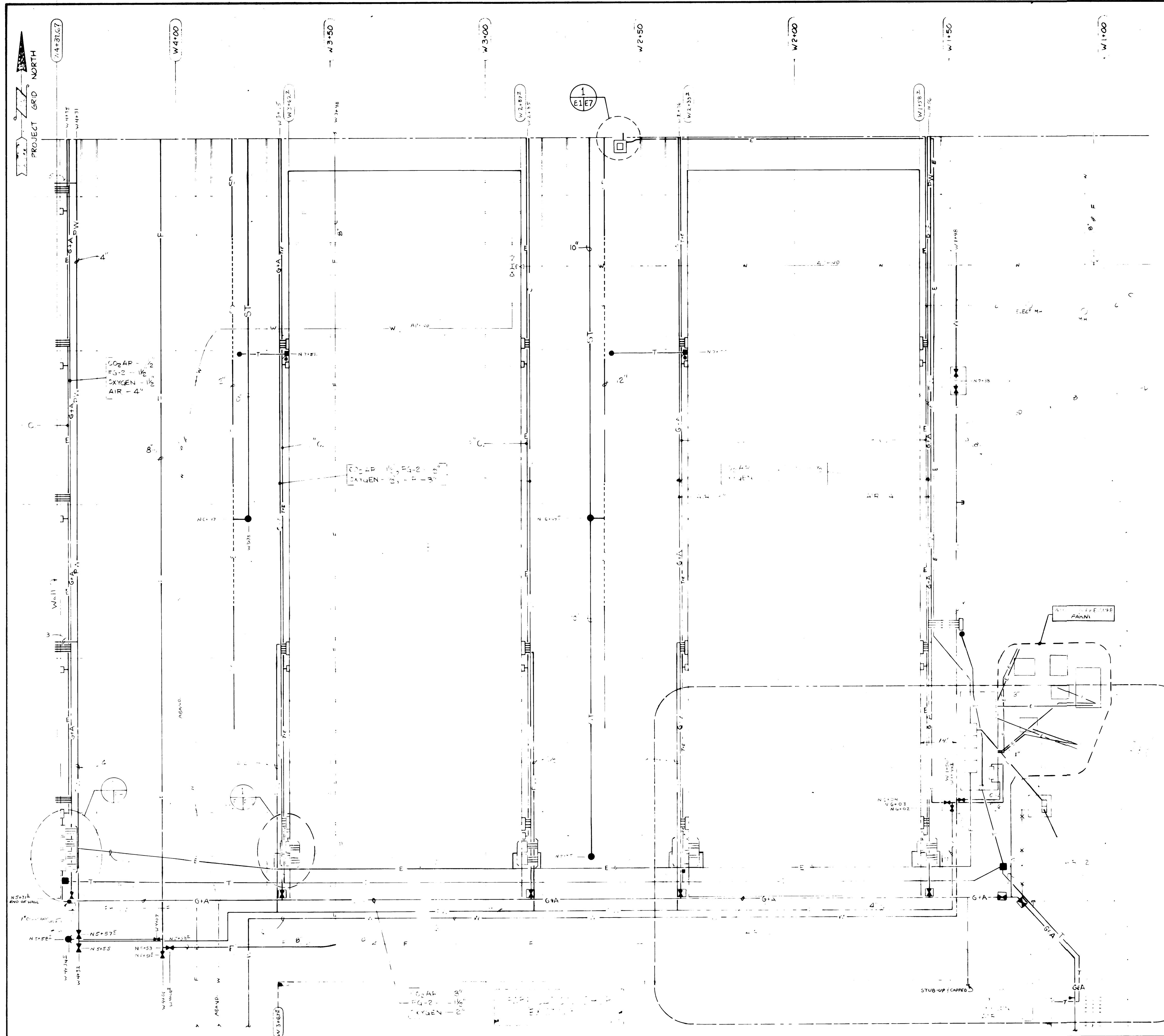
2124 SOUTH 'K' STREET TACOMA, WASHINGTON 98405

Drawn: RHT Chkd: JRC App:

Scale: NONE

Date: 10-15-01 DWG. NO. 4739-GN7

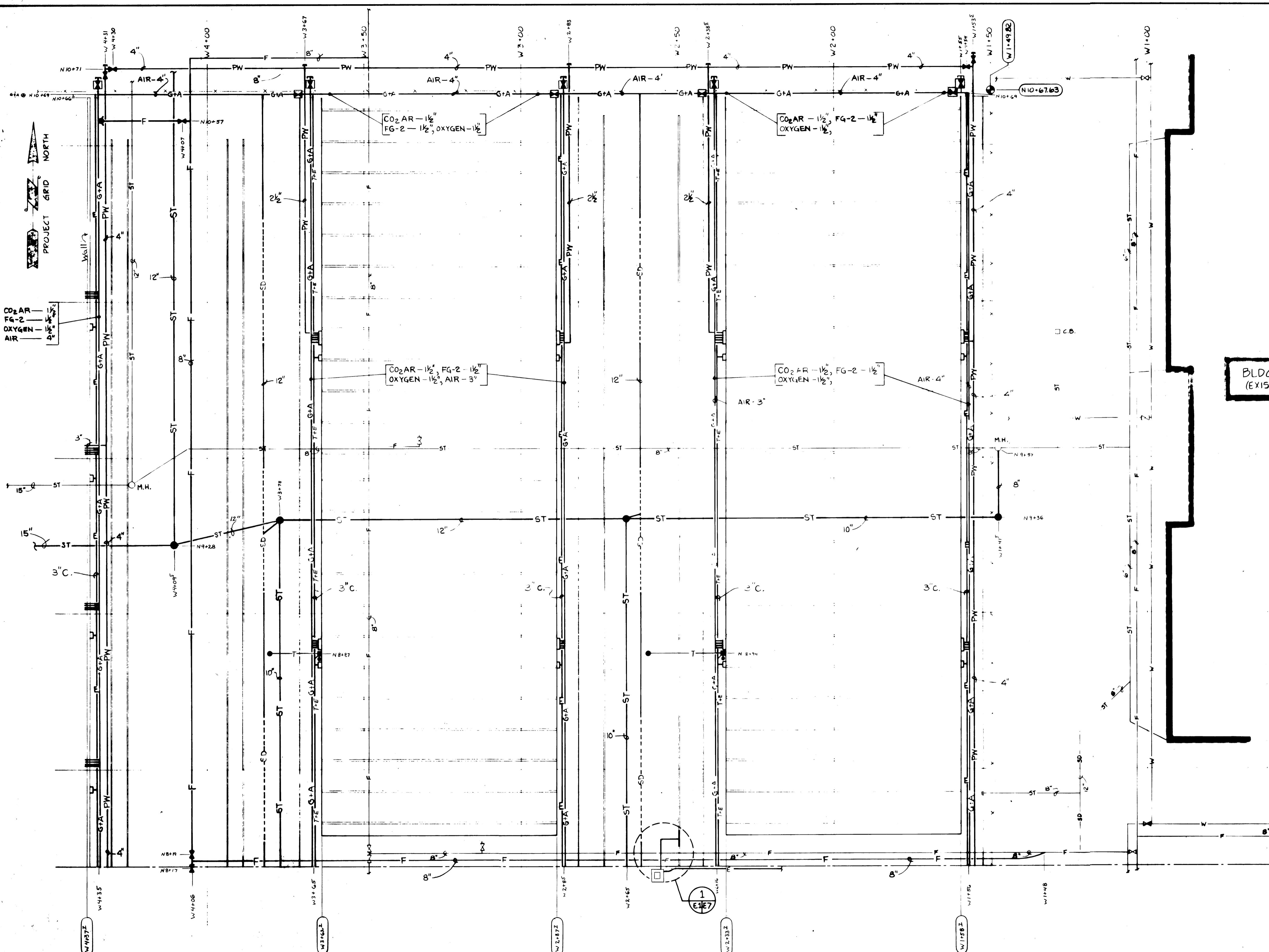
EP-4532-12



LEGEND

AS-BUILT

1. *What is the name of the author of the book?*



LEGEND

<u>EXISTING</u>	<u>NEW</u>	
— W —	— W —	POTABLE WATER MAIN
— F —	— F —	FIRE MAIN
— PW —	— PW —	PROTECTED WATER
— ∞ —	— \bullet —	VALVE
— Q —	— Q —	FIRE HYDRANT
— ST —	— ST —	VALVE + VAULT
— O —	— O —	STORM SEWER
— S —	— S —	MANHOLE OR CATCH BASIN
— SD —	— SD —	SUBSURFACE DRAIN
— E —	— E —	ELECTRICAL CONDUIT
— G+A —	— G+A —	GASES & AIR
— T —	— T —	2" PVC TELEPHONE CONDUIT
— PH —	— PH —	TELEPHONE HANDHOLE
— TR —	— TR —	TELEPHONE RECEPTACLE OUTLET HOUSING
— T+E —	— T+E —	TELEPHONE & ELECTRICAL CONDUIT

BLDG. 532
(EXISTING)

AS-BUILT

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WRITTEN PERMISSION OF WHITACRE ENGINEERS, INC.

SHIPYARD #3 EXTENSION (PHASE I)
YARD UTILITIES PLAN - AREA "B"

TACOMA BOATBUILDING CO., INC.
1840 MARINE VIEW DRIVE
TACOMA, WASHINGTON 98421

Whitacre Engineers, Inc.

Consulting Engineers and Land Surveyors

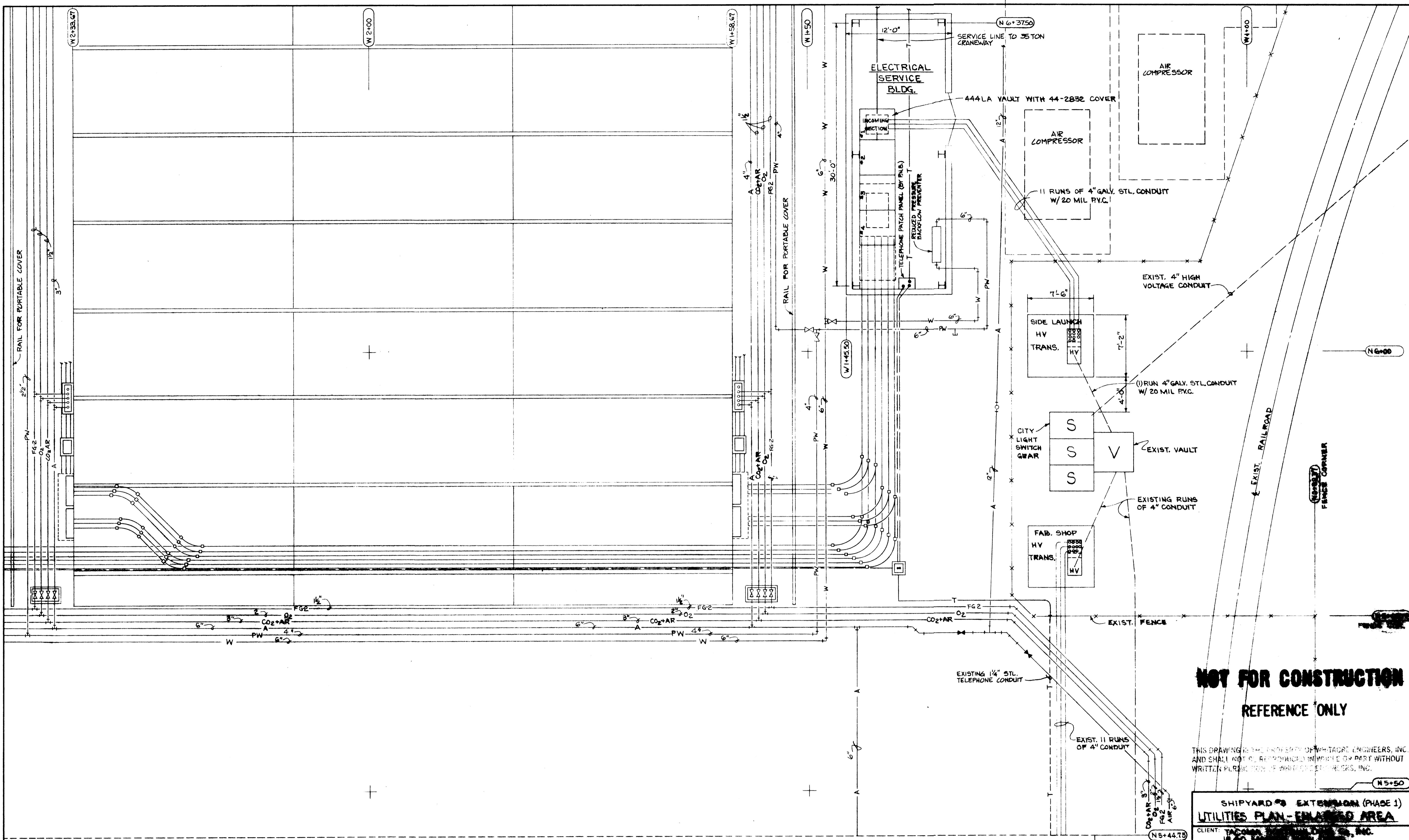
CONTINUING EDUCATION AND LEADERSHIP

EE 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 11000 12000 13000 14000 15000 16000 17000 18000 19000 20000 21000 22000 23000 24000 25000 26000 27000 28000 29000 30000 31000 32000 33000 34000 35000 36000 37000 38000 39000 40000 41000 42000 43000 44000 45000 46000 47000 48000 49000 50000 51000 52000 53000 54000 55000 56000 57000 58000 59000 60000 61000 62000 63000 64000 65000 66000 67000 68000 69000 70000 71000 72000 73000 74000 75000 76000 77000 78000 79000 80000 81000 82000 83000 84000 85000 86000 87000 88000 89000 90000 91000 92000 93000 94000 95000 96000 97000 98000 99000 100000 101000 102000 103000 104000 105000 106000 107000 108000 109000 110000 111000 112000 113000 114000 115000 116000 117000 118000 119000 120000 121000 122000 123000 124000 125000 126000 127000 128000 129000 130000 131000 132000 133000 134000 135000 136000 137000 138000 139000 140000 141000 142000 143000 144000 145000 146000 147000 148000 149000 150000 151000 152000 153000 154000 155000 156000 157000 158000 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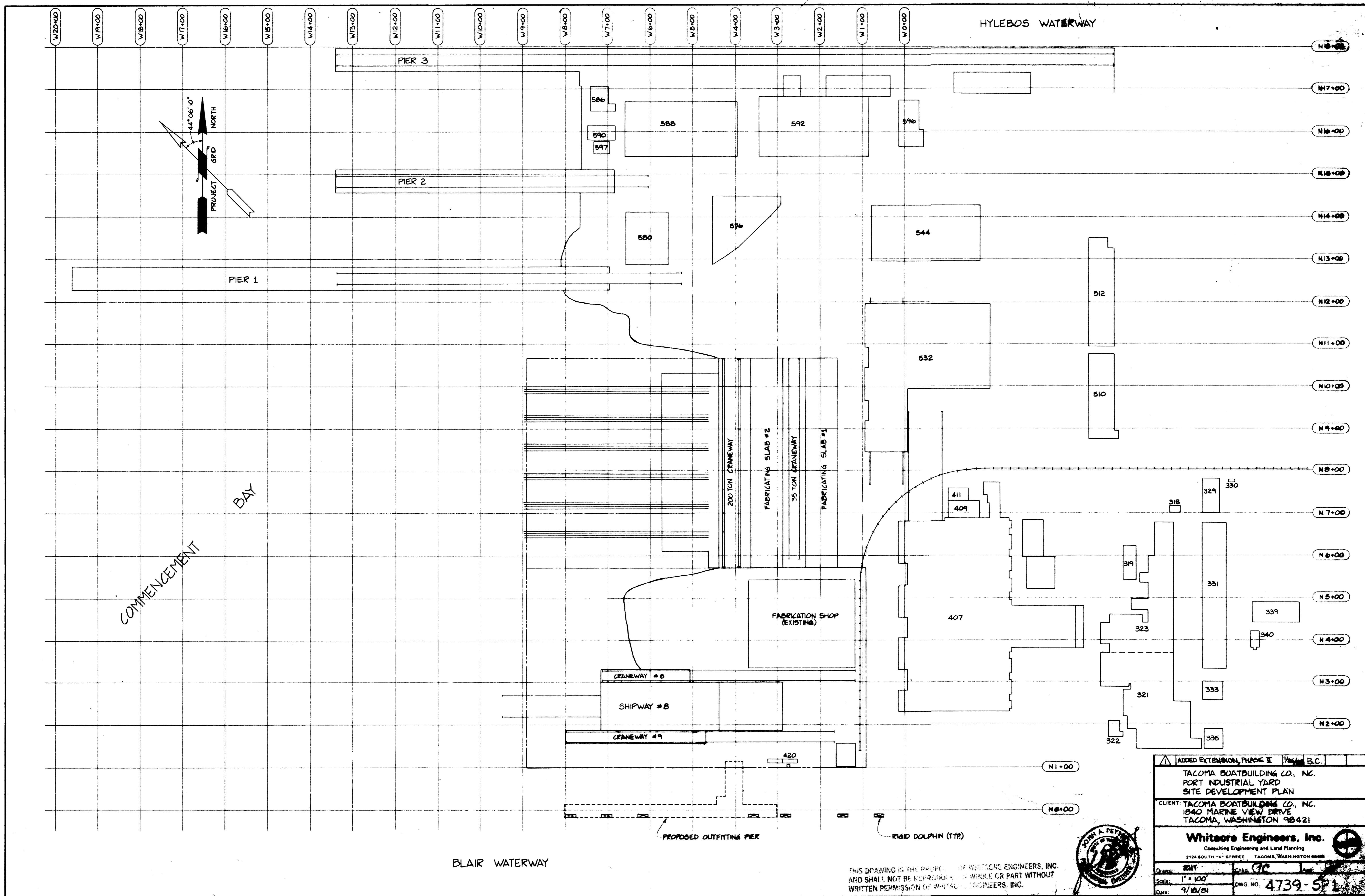
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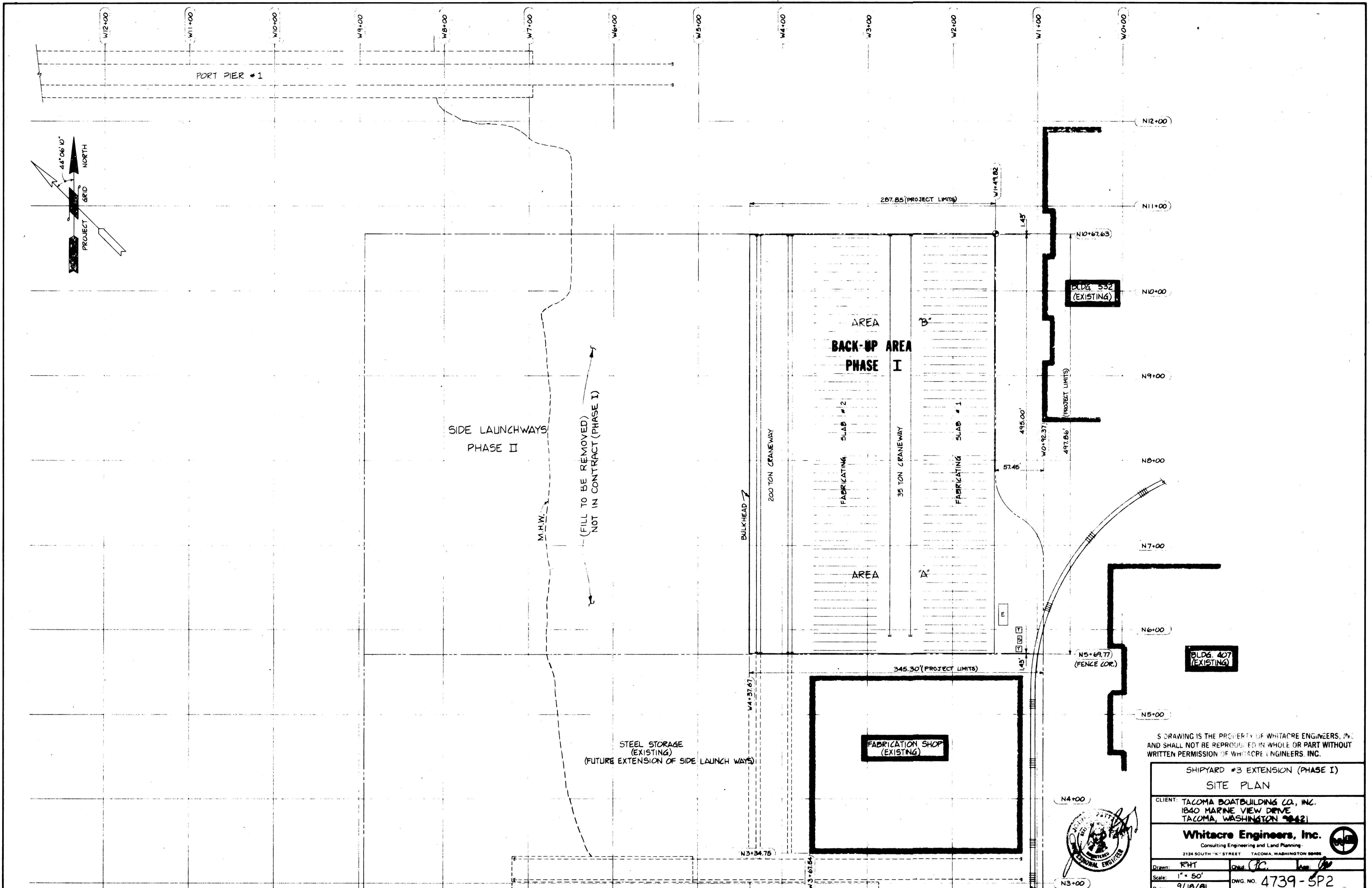
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10. *Leucosia* (Leucosia) *leucostoma* (Fabricius) (Fig. 10)



FABRICATION SHOP
(EXISTING)





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AND SHALL NOT BE REPRODUCED IN WHOLE OR PART WITHOUT
WRITTEN PERMISSION OF WHITACRE ENGINEERS, INC.

SHIPYARD #3 EXTENSION (PHASE I)

SITE PLAN

Whitacre Engineers, Inc.
Consulting Engineering and Land Planning.
124 SOUTH "K" STREET TACOMA, WASHINGTON 98403
C.R. 50' 18/81 DWG. NO. 4739-SP2