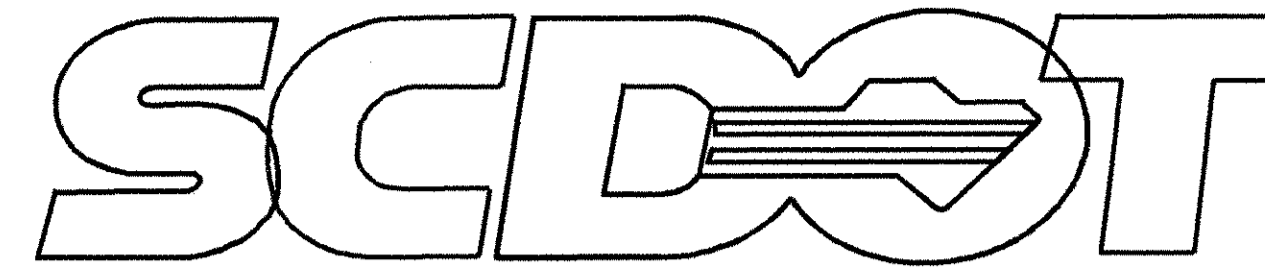
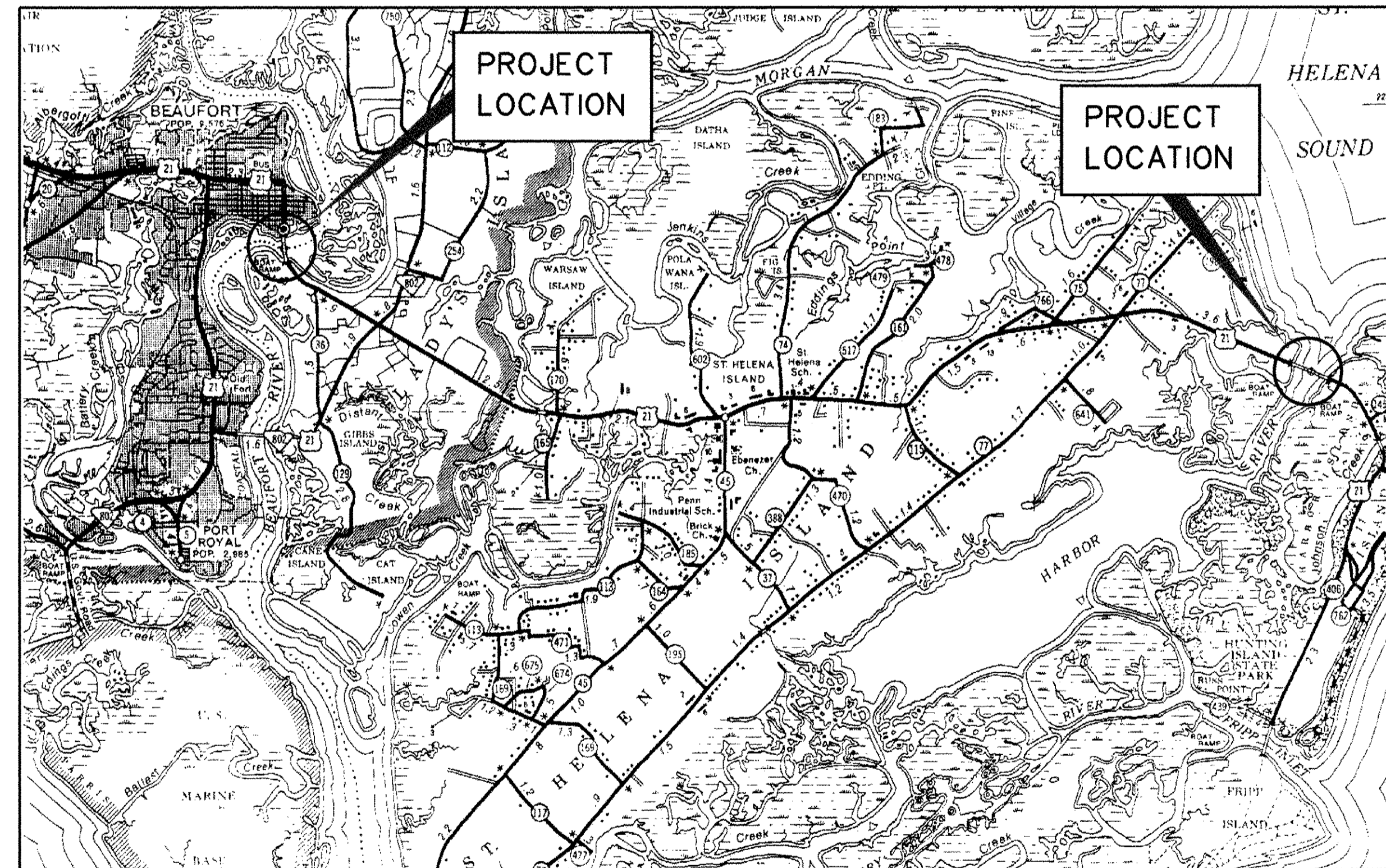


FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	1	115

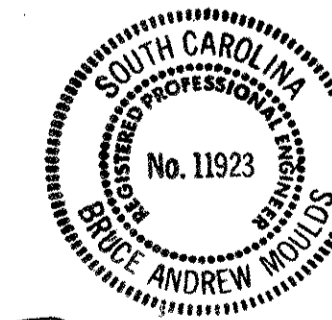
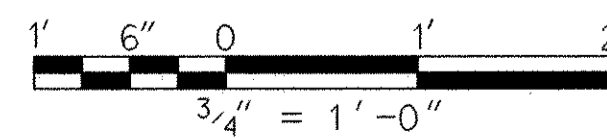


South Carolina Department of Transportation

STATE PROJECT NO. BRT-BBMF (010) LADY'S ISLAND
 BRT-BBMF (011) HARBOR RIVER
 FILE NO. 7.630 LADY'S ISLAND
 7.629 HARBOR RIVER
 MOVABLE BRIDGE REHABILITATION
 BEAUFORT COUNTY
 U.S. 21 OVER THE INTERCOASTAL WATERWAY (LADY'S ISLAND)
 AND U.S. 21 OVER HARBOR RIVER



LAYOUT



WATSON / TATE
 ARCHITECTS, INC.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

Bruce A. Mills 2-21-97

NOTE: ALL WORKMANSHIP AND MATERIAL ON THIS PROJECT TO CONFORM WITH SOUTH CAROLINA DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, EDITION OF 1986.

APPROVED FOR CONSTRUCTION	DATE
DIRECTOR OF PRE-CONSTRUCTION	DATE

3 DAYS BEFORE DIGGING IN
 SOUTH CAROLINA
 CALL 1-800-922-0983
 PALMETTO UTILITY PROTECTION SERVICE

REVIEWED:	DATE
ASSISTANT BRIDGE DESIGN ENGINEER	DATE
APPROVED:	DATE
BRIDGE DESIGN ENGINEER	DATE

INDEX OF SHEETS

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2	G-2	INDEX OF DRAWINGS / SUMMARY OF QUANTITIES	77	E-1	INDEX OF DRAWINGS
3	G-3	TRAFFIC CONTROL & STAGING PLAN	78	E-2	ONE-LINE DIAGRAM
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			80	E-4	ROADWAY LEVEL-PLAN VIEW - HARBOR RIVER
5	S-1	GENERAL PLAN & ELEVATION - LADY'S ISLAND	81	E-5	ROADWAY LEVEL-PLAN VIEW - LADY'S ISLAND
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8	S-4	REMOVAL OF EXISTING CONTROL HOUSE FRAMING - LADY'S ISLAND	84	E-8	CONTROL HOUSE-CABINET ELEVATIONS
9	S-5	CONTROL HOUSE FRAMING - LADY'S ISLAND	85	E-9	CONTROL CONSOLE LAYOUT
10	S-6	CONTROL HOUSE FRAMING TYPICAL DETAILS - LADY'S ISLAND	86	E-10	ANNUNCIATOR DETAILS
11	S-7	NEW SPAN DRIVE SUPPORTS - LADY'S ISLAND	87	E-11	CONTROL CONSOLE DEVICE LIST
12	S-8	NEW SPAN DRIVE SUPPORT DETAILS - LADY'S ISLAND	88	E-12	ELECTRICAL CABINET DETAILS
13	S-9	CONTROL HOUSE STAIRWAY - LADY'S ISLAND	89	E-13	LIGHTING AND INTERCOM SYSTEMS
14	S-10	PIVOT PIER STAIRWAY - LADY'S ISLAND	90	E-14	MISCELLANEOUS DETAILS I
15	S-11	REST PIER STAIRWAY - LADY'S ISLAND	91	E-15	MISCELLANEOUS DETAILS II
16	S-12	PIVOT PIER PLATFORM - LADY'S ISLAND	92	E-16	SYSTEM FLOW DIAGRAM
17	S-13	REST PIER PLATFORM - LADY'S ISLAND	93	E-17	SPEED/TIME CURVES
18	S-14	TRUSS NAVIGATIONAL BEACON ACCESS 1 - LADY'S ISLAND	94	E-18	MOTOR STARTER CIRCUITS
19	S-15	TRUSS NAVIGATIONAL BEACON ACCESS 2 - LADY'S ISLAND	95	E-19	SCHEMATIC LEGEND
20	S-16	FENDER PLAN & NOTES - LADY'S ISLAND	96	E-20	SCHEMATIC NO. 1
21	S-17	FENDER SECTION & DETAILS - LADY'S ISLAND	97	E-21	SCHEMATIC NO. 2
22	S-18	APPROACH RAILING - LADY'S ISLAND	98	E-22	SCHEMATIC NO. 3
23	S-19	HURRICANE TIEDOWN - LADY'S ISLAND	99	E-23	SCHEMATIC NO. 4
			100	E-24	SCHEMATIC NO. 5
24	A-1	FLOOR PLAN - LADY'S ISLAND	101	E-25	SCHEMATIC NO. 6
25	A-2	EXTERIOR ELEVATIONS - LADY'S ISLAND	102	E-26	SCHEMATIC NO. 7
26	A-3	BUILDING SECTION & DETAILS - LADY'S ISLAND	103	E-27	SCHEMATIC NO. 8
27	A-4	ROOF FRAMING PLAN & DETAILS - LADY'S ISLAND	104	E-28	SCHEMATIC NO. 9
28	A-5	CURTAINWALL, DOOR & WINDOW DETAILS - LADY'S ISLAND	105	E-29	SCHEMATIC NO. 10
29	A-6	INTERIOR ELEVATIONS, REFLECTED CEILING PLAN & CABINET DETAILS - LADY'S ISLAND	106	E-30	SCHEMATIC NO. 11
			107	E-31	SCHEMATIC NO. 12
			108	E-32	SCHEMATIC NO. 13
30	M-1	DEMOLITION OF EXISTING SPAN DRIVE - LADY'S ISLAND	109	E-33	BRIDGE EQUIPMENT DEVICE LIST
31	M-2	DEMOLITION OF EXISTING WEDGE DRIVE - LADY'S ISLAND	110	E-34	WIRING TABLE-I
32	M-3	NEW SPAN DRIVE-1 - LADY'S ISLAND	111	E-35	WIRING TABLE-II
33	M-4	NEW SPAN DRIVE-2 - LADY'S ISLAND	112	E-36	WIRING TABLE-III
34	M-5	MACHINERY DETAILS - LADY'S ISLAND	113	E-37	CIRCUIT SCHEDULE-I
35	M-6	SPAN CONTROL EQUIPMENT - LADY'S ISLAND	114	E-38	CIRCUIT SCHEDULE-II
36	M-7	WEDGE DRIVE REPAIRS - LADY'S ISLAND	115	E-39	RACEWAY SCHEDULE
37	M-8	WEDGE DRIVE REPAIR DETAILS - LADY'S ISLAND			
38	M-9	WATER & SEWER LINE DETAILS 1 - LADY'S ISLAND			
39	M-10	WATER & SEWER LINE DETAILS 2 - LADY'S ISLAND			
40	M-11	TRAFFIC CONTROL EQUIPMENT - LADY'S ISLAND			
41	M-12	BARRIER GATE REPAIRS - LADY'S ISLAND			
42	S-20	GENERAL PLAN & ELEVATION - HARBOR RIVER			
43	S-21	LOCATION OF WORK - HARBOR RIVER			
44	S-22	REMOVAL OF EXISTING CONTROL HOUSE - HARBOR RIVER			
45	S-23	CONTROL HOUSE FRAMING - HARBOR RIVER			
46	S-24	NEW SPAN DRIVE SUPPORTS - HARBOR RIVER			
47	S-25	NEW SPAN DRIVE SUPPORT DETAILS - HARBOR RIVER			
48	S-26	APPROACH WALKWAY - HARBOR RIVER			
49	S-27	SWING SPAN WALKWAY - HARBOR RIVER			
50	S-28	CONTROL HOUSE STAIRWAY - HARBOR RIVER			
51	S-29	PIVOT PIER STAIRWAY - HARBOR RIVER			
52	S-30	REST PIER STAIRWAY - HARBOR RIVER			
53	S-31	PIVOT PIER PLATFORM - HARBOR RIVER			
54	S-32	REST PIER PLATFORM - HARBOR RIVER			
55	S-33	TRUSS NAVIGATIONAL BEACON ACCESS			
56	S-34	RAILING MODIFICATIONS			
57	S-35	FENDER PLAN & NOTES - HARBOR RIVER			
58	S-36	FENDER SECTION & DETAILS - HARBOR RIVER			
59	S-37	HURRICANE TIEDOWN - HARBOR RIVER			
60	A-7	FLOOR PLAN - HARBOR RIVER			
61	A-8	EXTERIOR ELEVATIONS - HARBOR RIVER			
62	A-9	BUILDING SECTION & DETAILS - HARBOR RIVER			
63	A-10	ROOF FRAMING PLAN & DETAILS - HARBOR RIVER			
64	A-11	CURTAINWALL, DOOR & WINDOW DETAILS - HARBOR RIVER			
65	A-12	INTERIOR ELEVATIONS, REFLECTED CEILING PLAN & CABINET DETAILS - HARBOR RIVER			
66	M-13	DEMOLITION OF EXISTING SPAN DRIVE - HARBOR RIVER			
67	M-14	DEMOLITION OF EXISTING WEDGE DRIVE - HARBOR RIVER			
68	M-15	NEW SPAN DRIVE-1 - HARBOR RIVER			
69	M-16	NEW SPAN DRIVE-2 - HARBOR RIVER			
70	M-17	MACHINERY DETAILS - HARBOR RIVER			
71	M-18	SPAN CONTROL EQUIPMENT - HARBOR RIVER			
72	M-19	WEDGE DRIVE REPAIRS - HARBOR RIVER			
73	M-20	WEDGE DRIVE REPAIR DETAILS - HARBOR RIVER			
74	M-21	WATER & SEWER LINE DETAILS - HARBOR RIVER			
75	M-22	TRAFFIC CONTROL EQUIPMENT - HARBOR RIVER			
76	M-23	NEW BARRIER GATE			

SUMMARY OF ESTIMATED QUANTITIES

ITEM NO.	B I D I T E M	UNIT	QUANTITY	ITEM NO.	B I D I T E M	UNIT	QUANTITY
818.0101	Mobilization	Lump Sum	Lump Sum				
	LADY'S ISLAND				HARBOR RIVER		
107.0101	Traffic Control	Lump Sum	Lump Sum	107.0201	Traffic Control	Lump Sum	Lump Sum
610.0101	Electrical	Lump Sum	Lump Sum	610.0201	Electrical	Lump Sum	Lump Sum
610.0102	Temporary Electrical Work	Lump Sum	Lump Sum	610.0202	Temporary Electrical Work	Lump Sum	Lump Sum
610.0103	Lighting and Intercom System	Lump Sum	Lump Sum	610.0203	Lighting and Intercom System	Lump Sum	Lump Sum
610.0104	Bridge Electrical Service	Lump Sum	Lump Sum	610.0204	Bridge Electrical Service	Lump Sum	Lump Sum
610.0105	Emergency Generator	Lump Sum	Lump Sum	610.0205	Emergency Generator	Lump Sum	Lump Sum
610.0106	Emergency Generator	Lump Sum	Lump Sum	610.0206	Roadway Electrical Work	Lump Sum	Lump Sum
610.0107	Roadway Electrical Work	Lump Sum	Lump Sum	610.0207	Submarine Cable	Lump Sum	Lump Sum
610.0108	Submarine Cable	Lump Sum	Lump Sum	610.0208	Bridge Control System	Lump Sum	Lump Sum
610.0109	Bridge Control System	Lump Sum	Lump Sum	610.0209	Lightning Protection System	Lump Sum	Lump Sum
610.0110	Lightning Protection System	Lump Sum	Lump Sum	610.0210	Start Up Service	Lump Sum	Lump Sum
	Start Up Service	Lump Sum	Lump Sum		Training and Documentation	Lump Sum	Lump Sum
	Training and Documentation	Lump Sum	Lump Sum				
611.0101	Mechanical	Lump Sum	Lump Sum	611.0201	Mechanical	Lump Sum	Lump Sum
611.0102	New Span Drive	Lump Sum	Lump Sum	611.0202	New Span Drive	Lump Sum	Lump Sum
611.0103	Rehabilitation of Wedge Drive	Lump Sum	Lump Sum	611.0203	Rehabilitation of Wedge Drive	Lump Sum	Lump Sum
611.0104	Balance Wheel Repair	Lump Sum	Lump Sum	611.0204	Balance Wheel Repair	Lump Sum	Lump Sum
	New Centering Locks	Each	2		New Centering Locks	Each	2
612.0101	Traffic Control Equipment	Lump Sum	Lump Sum	612.0201	Traffic Control Equipment	Lump Sum	Lump Sum
612.0102	Warning Gates	Each	2	612.0202	Warning Gates	Each	2
612.0103	Rehabilitation to Existing Barrier Gates	Lump Sum	Lump Sum	612.0203	New Barrier Gates	Lump Sum	Lump Sum
613.0101	Underground Water Line	Linear Foot	62	613.0201	Control House Water and Sewer	Lump Sum	Lump Sum
613.0102	Control House Water and Sewer	Lump Sum	Lump Sum	613.0202	Water Line on Bridge	Linear Foot	45
613.0103	Water Line on Bridge	Linear Foot	856				
702.0101	Concrete	Cubic Feet	76.52	702.0201	Concrete	Cubic Feet	112.47
702.0102	Structural Concrete	Square Ft.	15	702.0202	Structural Concrete	Square Ft.	37.5
702.0103	Concrete Spall repair	Linear Feet	60	702.0203	Concrete Spall repair	Linear Feet	60
	Cold Applied Bridge Joint Sealants				Cold Applied Bridge Joint Sealants		
705.0101	Bridge Railing	Linear Feet	4,054	706.0201	Treated Timber	Board Ft.	3,500
706.0101	Treated Structural Timber	Board Ft.	4,300				
709.0101	Structural Steel	Lump Sum	Lump Sum	709.0201	Structural Steel	Lump Sum	Lump Sum
709.0102	Control House Support and Platform	Lump Sum	Lump Sum	709.0202	Control House Support and Platform	Lump Sum	Lump Sum
709.0103	Control House Stairway	Lump Sum	Lump Sum	709.0203	Control House Stairway	Lump Sum	Lump Sum
709.0104	Pivot Pier Stairway	Lump Sum	Lump Sum	709.0204	Approach Walkway	Lump Sum	Lump Sum
709.0105	Pivot Pier Platform	Lump Sum	Lump Sum	709.0205	Swing Span Walkway	Lump Sum	Lump Sum
709.0106	Rest Pier Stairway	Lump Sum	Lump Sum	709.0206	Pivot Pier Stairway	Lump Sum	Lump Sum
709.0107	Rest Pier Platform	Lump Sum	Lump Sum	709.0207	Pivot Pier Platform	Lump Sum	Lump Sum
709.0108	End Light Access	Lump Sum	Lump Sum	709.0208	Rest Pier Stairway	Lump Sum	Lump Sum
709.0109	Center Light Access	Lump Sum	Lump Sum	709.0209	Rest Pier Platform	Lump Sum	Lump Sum
709.0110	Barrier Gate Platform	Lump Sum	Lump Sum	709.0210	End Light Access	Lump Sum	Lump Sum
709.0111	Warning Gate Platform	Lump Sum	Lump Sum	709.0211	Center Light Access	Lump Sum	Lump Sum
709.0112	Rivet Replacement with High Strength Bolt	Each	200	709.0212	Barrier Gate Platform	Lump Sum	Lump Sum
709.0113	Truss Reinforcement	Lump Sum	Lump Sum	709.0213	Warning Gate Platform	Lump Sum	Lump Sum
709.0114	Bracing Reinforcement	Lump Sum	Lump Sum	709.0214	Rivet Replacement with High Strength Bolt	Each	1,050
709.0115	Sway Bracing Repair	Lump Sum	Lump Sum	709.0215	Bracing Reinforcement	Lump Sum	Lump Sum
709.0116	Span Drive Support	Lump Sum	Lump Sum	709.0216	Span Drive Support	Lump Sum	Lump Sum
709.0117	Railing on Swing Span	Pound	3,528	709.0217	Floor Beam Reinforcement	Lump Sum	Lump Sum
709.0118	Hurricane Tiedown	Lump Sum	Lump Sum		Hurricane Tiedown	Lump Sum	Lump Sum
710.0101	Painting	Lump Sum	Lump Sum	710.0201	Painting	Lump Sum	Lump Sum
	Cleaning And Painting				Cleaning And Painting		
819.0101	Miscellaneous Items	Lump Sum	Lump Sum	819.0201	Miscellaneous Items	Lump Sum	Lump Sum
820.0101	Control House Demolition	Lump Sum	Lump Sum	820.0201	Control House Demolition	Lump Sum	Lump Sum
821.0101	New Control House	Lump Sum	Lump Sum	821.0201	New Control House	Lump Sum	Lump Sum
822.0101	Asbestos Abatement	Lump Sum	Lump Sum	822.0201	Asbestos Abatement	Lump Sum	Lump Sum
823.0101	Bridge Operation	Month	9	823.0201	Epoxy Pressure Injection of Concrete Cracks	Linear Feet	300
					Cracks		
					Bridge Operation	Month	9

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

LADY'S ISLAND/HARBOR RIVER

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REV.			
REV.			
REVIEWED			
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DES.	LDP	BAM	2-97
BY	CHK	DATE	

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	U.S. 21	BEAUFORT	G-2

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610.0106	Submarine Cable	Lump Sum	Lump Sum
610.0107	Bridge Control System	Lump Sum	Lump Sum
610.0108	Lightning Protection System	Lump Sum	Lump Sum
610.0109	Start Up Service	Lump Sum	Lump Sum
610.0110	Training and Documentation	Lump Sum	Lump Sum
	Mechanical		
611.0101	New Span Drive	Lump Sum	Lump Sum
611.0102	Rehabilitation of Wedge Drive	Lump Sum	Lump Sum
611.0103	Balance Wheel Repair	Lump Sum	Lump Sum
611.0104	New Centering Locks	Each	4
612.0101	Traffic Control Equipment	Lump Sum	Lump Sum
612.0102	Warning Gates	Each	4
612.0103	Rehabilitation to Existing Barrier Gates	Lump Sum	Lump Sum
612.0104	New Barrier Gates	Lump Sum	Lump Sum
613.0101	Underground Water Line	Linear Foot	62
613.0102	Control House Water and Sewer	Lump Sum	Lump Sum
613.0103	Water Line on Bridge	Linear Foot	901
	Concrete		
702.0101	Structural Concrete	Cubic Feet	189
702.0102	Concrete Spall repair	Square Ft.	52.5
702.0103	Cold Applied Bridge Joint Sealants	Linear Feet	120
705.0101	Bridge Railing	Linear Feet	4,054
	Treated Timber		
706.0101	Treated Structural Timber	Board Ft.	7,800
	Structural Steel		
709.0101	Control House Support and Platform	Lump Sum	Lump Sum
709.0102	Control House Stairway	Lump Sum	Lump Sum
709.0103	Pivot Pier Stairway	Lump Sum	Lump Sum
709.0104	Pivot Pier Platform	Lump Sum	Lump Sum
709.0105	Rest Pier Stairway	Lump Sum	Lump Sum
709.0106	Rest Pier Platform	Lump Sum	Lump Sum
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709.0110	Warning Gate Platform	Lump Sum	Lump Sum
709.0111	Rivet Replacement with High Strength Bolt	Each	1,250
709.0112	Truss Reinforcement	Lump Sum	Lump Sum
709.0113	Bracing Reinforcement	Lump Sum	Lump Sum
709.0114	Sway Bracing Repair	Lump Sum	Lump Sum
709.0115	Span Drive Support	Lump Sum	Lump Sum
709.0116	Railing on Swing Span	Pound	3,528
709.0117	Hurricane Tiedown	Lump Sum	Lump Sum
709.0118	Floor Beam Reinforcement	Lump Sum	Lump Sum
709.0119	Approach Walkway	Lump Sum	Lump Sum
709.0120	Swing Span Walkway	Lump Sum	Lump Sum
	Painting		
710.0101	Cleaning And Painting	Lump Sum	Lump Sum
	Miscellaneous Items		
819.0101	Control House Demolition	Lump Sum	Lump Sum
820.0101	New Control House	Lump Sum	Lump Sum
821.0101	Asbestos Abatement	Lump Sum	Lump Sum
822.0101	Epoxy Pressure Injection of Concrete Cracks	Linear Feet	300
823.0101	Bridge Operation	Month	18

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10	S-6	CONTROL HOUSE FRAMING TYPICAL DETAILS - LADY'S ISLAND	86	E-10	ANNUNCIATOR DETAILS
11	S-7	NEW SPAN DRIVE SUPPORTS - LADY'S ISLAND	87	E-11	CONTROL CONSOLE DEVICE LIST
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13	S-9	CONTROL HOUSE STAIRWAY - LADY'S ISLAND	89	E-13	LIGHTING AND INTERCOM SYSTEMS
14	S-10	PIVOT PIER STAIRWAY - LADY'S ISLAND	90	E-14	MISCELLANEOUS DETAILS I
15	S-11	REST PIER STAIRWAY - LADY'S ISLAND	91	E-15	MISCELLANEOUS DETAILS II
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24	A-1	FLOOR PLAN - LADY'S ISLAND	102	E-26	SCHEMATIC NO. 7
25	A-2	EXTERIOR ELEVATIONS - LADY'S ISLAND	103	E-27	SCHEMATIC NO. 8
26	A-3	BUILDING SECTION & DETAILS - LADY'S ISLAND	104	E-28	SCHEMATIC NO. 9
27	A-4	ROOF FRAMING PLAN & DETAILS - LADY'S ISLAND	105	E-29	SCHEMATIC NO. 10
28	A-5	CURTAINWALL, DOOR & WINDOW DETAILS - LADY'S ISLAND	106	E-30	SCHEMATIC NO. 11
29	A-6	INTERIOR ELEVATIONS, REFLECTED CEILING PLAN & CABINET DETAILS - LADY'S ISLAND	107	E-31	SCHEMATIC NO. 12
			108	E-32	SCHEMATIC NO. 13
			109	E-33	BRIDGE EQUIPMENT DEVICE LIST
30	M-1	DEMOLITION OF EXISTING SPAN DRIVE - LADY'S ISLAND	110	E-34	WIRING TABLE-I
31	M-2	DEMOLITION OF EXISTING WEDGE DRIVE - LADY'S ISLAND	111	E-35	WIRING TABLE-II
32	M-3	NEW SPAN DRIVE-1 - LADY'S ISLAND	112	E-36	WIRING TABLE-III
33	M-4	NEW SPAN DRIVE-2 - LADY'S ISLAND	113	E-37	CIRCUIT SCHEDULE-I
34	M-5	MACHINERY DETAILS - LADY'S ISLAND	114	E-38	CIRCUIT SCHEDULE-II
35	M-6	SPAN CONTROL EQUIPMENT - LADY'S ISLAND	115	E-39	RACEWAY SCHEDULE
36	M-7	WEDGE DRIVE REPAIRS - LADY'S ISLAND			
37	M-8	WEDGE DRIVE REPAIR DETAILS - LADY'S ISLAND			
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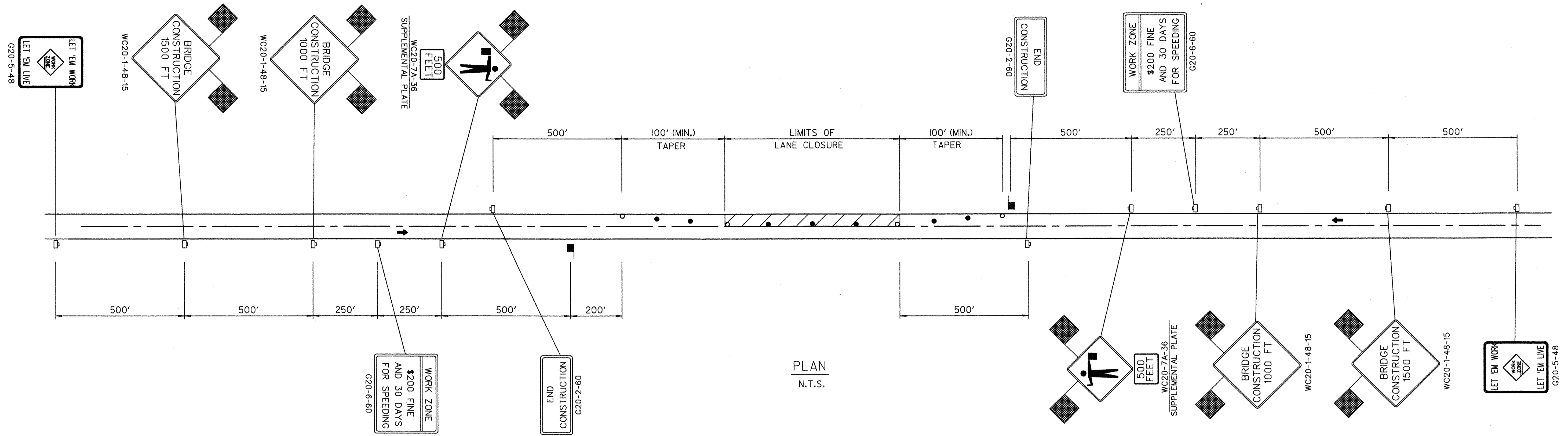
LADY'S ISLAND/HARBOR RIVER

INDEX OF DRAWINGS SUMMARY OF QUANTITIES

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PLAN
N.T.S.

ALL SIGN LOCATIONS ARE TO BE MEASURED FROM THE WORK AREA. WORK LIMITS FOR THE PROJECT WILL BE DETERMINED BY THE ENGINEER AND AS INDICATED IN THE CONTRACT.

ALL ADVANCE SIGNS ARE TO BE MOUNTED 2 FEET FROM THE EDGE OF A PAVED SHOULDER OR THE FACE OF A CURB OR 6-12 FEET FROM THE EDGE OF AN ADJACENT TRAVEL LANE WHERE NO PAVED SHOULDERS EXIST TO THE NEAREST EDGE OF THE SIGN. ALSO, THE ADVANCE SIGNS ARE TO BE MOUNTED 7 FEET FROM THE GROUND TO THE BOTTOM EDGE OF THE SIGN. HOWEVER, IF A SECONDARY SIGN IS MOUNTED BELOW THE SIGN, THE MAJOR SIGN SHALL BE 7 FEET AND THE SECONDARY SIGN SHALL BE NO LESS THAN 5 FEET FROM THE BOTTOM EDGE OF THE SIGN TO THE GROUND. SPECIAL SIGN MOUNTING ASSEMBLIES MAY BE NECESSARY IN AREAS OF DOUBLE FACED GUARDRAIL, CONCRETE MEDIAN BARRIER, AND/OR BRIDGE PARAPET WALLS AND SHALL BE PROVIDED BY THE CONTRACTOR.

FLAT SHEET SIGNS ARE TO BE MOUNTED SUCH THAT THEY ARE STRAIGHT AND LEVEL AND SUCH THAT THE FACE OF THE SIGNS ARE PERPENDICULAR TO THE SURFACE OF ROADWAY.

ALL SIGNS ARE TO BE REFLECTORIZED USING TYPE III SHEETING.

MAINTAIN AND REPLACE PAVEMENT MARKINGS AS REQUIRED BY THE ADDENDUM, THE SPECIAL PROVISIONS, THE SC MUTCD, AND THE PLANS.

RELOCATE AND MAINTAIN THE TRAFFIC CONTROL DEVICES AS ILLUSTRATED. UTILIZATION OF CONES AND/OR BARRICADES INSTEAD OF DRUMS AS DIRECTED BY THIS TYPICAL PLAN SHALL BE PROHIBITED. RELOCATION OF THE TRAFFIC CONTROL DEVICES SHALL BE CARRIED OUT IN AN EXPEDITIOUS MANNER WITH MINIMAL IMPACT UPON TRAFFIC.

ALL DISTANCE INTERVALS ARE RECOMMENDED, HOWEVER, ADJUSTMENTS MAY BE REQUIRED AS DIRECTED BY THE ENGINEER.

ALL BARRICADES AND DRUMS SHALL BE REFLECTORIZED WITH TYPE III SHEETING.

SPACING INDICATED ARE FOR NORMAL CONDITIONS. ADJUSTMENTS MAY BE REQUIRED BECAUSE OF HORIZONTAL AND/OR VERTICAL ALIGNMENT OR OTHER SIGHT DISTANCE RESTRICTIONS.

TWO ORANGE FLAGS (18 INCHES X 18 INCHES) SHALL BE MOUNTED ON EACH "WC20-..." SIGN AT ALL TIMES.

IF THE PERMANENT CONSTRUCTION SIGNS ARE NOT INSTALLED AND MAINTAINED ACCORDING TO THE SPECIAL PROVISIONS, THE SUPPLEMENTAL SPECIFICATIONS AND/OR THE PLANS, THE DEPARTMENT RESERVES THE RIGHT TO RESTRICT CONSTRUCTION OPERATIONS AND/OR WITHHOLD THE MONTHLY ESTIMATES.

DROP-OFFS GREATER THAN 2' ADJACENT TO A TRAVEL LANE OPEN TO TRAFFIC SHALL BE PROHIBITED.

DRUMS SHALL BE ERECTED NO CLOSER THAN 3' OR NO FURTHER THAN 6' FROM THE EXISTING TRAVELWAY EDGE.

REHABILITATION OF THE BRIDGE SHALL BE PERFORMED ONE SIDE AT A TIME IN CONJUNCTION WITH THE SINGLE LANE CLOSURE.

ANY COMPLETE CLOSURE OF THE BRIDGE DUE TO CONSTRUCTION OR REHABILITATION SHALL BE AS SHORT AS POSSIBLE IN DURATION.

MARINE TRAFFIC SHALL BE MAINTAINED THROUGHOUT THE REHABILITATION PERIOD.

LEGEND:

- FLAG MAN
- PORTABLE PLASTIC DRUMS
- PORTABLE PLASTIC DRUMS MOUNTED WITH 7" AMBER TYPE "A" LOW INTENSITY FLASHING WARNING LIGHTS
- ← DIRECTION OF FLOW

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DEPARTMENT OF TRANSPORTATION
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LADY'S ISLAND/HABOR RIVER

TRAFFIC CONTROL & STAGING PLAN

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SPECIFICATIONS

South Carolina Standard Specifications for Highway Construction, 1986 Edition
 AASHTO 1996 Standard Specifications for highway bridges
 with interim Specifications.
 ANSI/AASHTO AWS D1.5 Bridge Welding Code (latest edition)
 with additions and revisions as stated in the Special Provisions.
 ASHTO 1988 Standard Specifications for Movable Highway Bridges
 with Interim Specifications.
 1996 Title 29 Code of Federal Regulations, Part 1910 - Occupational
 Safety and Health Standards and applicable sections of Part 1926 -
 Safety and Health Regulations of Construction.
 All Design and Construction shall confirm to the Southern Standard
 Building Code.
 Building Code requirements for Reinforced Concrete
 (ACI 318).

SPECIAL NOTE

Generally, in the case of discrepancy, this standard sheet of
 notes shall govern over the specifications but the remainder
 of the plans shall govern over notes on this sheet and
 Special Provisions shall govern over all. See Standard
 Specifications Sec. 105.04.

MATERIAL AND WORKMANSHIP

Except as may otherwise be specified on the plans or in
 the Special Provisions. All material and workmanship shall
 be in accordance with the South Carolina Department of
 Highways and Public Transportation Standard Specifications
 for Highway Construction, 1986 Edition as amended by the
 Special Provisions.

ALTERNATES TO PLAN DETAILS

The details shown in these plans for the fabrication
 and construction of Architectural, Electrical, Mechanical,
 and structural elements shall be the sole basis for bids on this
 project. Upon award of contract, the Contractor may propose
 changes in details or design for the review and approval
 of the Engineer, any proposed change in design or by
 details affecting the design shall be prepared and sealed
 by a professional engineer registered in the State of South
 Carolina. When there is a potential for cost savings realized
 as a result of an approved change, it shall be shared equally by
 the Department and the Contractor. Any delays due to the
 submittal and review of proposed changes shall not be considered
 as a basis for extension of contract time unless specifically
 approved in writing by the Engineer. The Department reserves the
 right to reject any proposed change(s) at the Engineer's
 discretion.

CONCRETE

The class of concrete shall be Class "D" unless noted otherwise.

STEEL

Structural steel shall be as noted on the Structural
 sheets of these plans
 Reinforcing bar fabrication shall conform to the current
 C.R.S.I. Manual of Standard Practice except as noted.
 All bolts shall be ASTM A325 7/8" diameter, with 15/16"
 diameter holes, unless noted otherwise.
 All Anchor Bolts, washer and nuts, set in concrete shall be stainless steel,
 unless noted otherwise.
 Grating shall be galvanized welded steel grating Type W/B size 4 made
 with 1"x3/16" bearing bars at 1-3/16" centers and cross bars
 at 4" centers as manufactured by Borden Metal Products Co. or
 approved equal.
 Stair treads shall be galvanized welded steel treads with Algrip nosing made
 with 1"x3/16" bars as manufactured by Borden Metal Products Co., or equal.
 Stairs shall have 11" tread and 7" rise, unless otherwise noted.
 Clip side of tread as required to fit in channel.
 House Platform decking shall be 1/8" galvanized steel floor plates,
 48" width maximum.
 Stay in place forms shall not be used.
 Torch cutting shall not be allowed to remove rivets or cut bolt holes.

DIMENSIONS

The Contractor's attention is directed to the fact that due to the nature of
 rehabilitation projects, the exact extent of reconstruction work cannot always
 be accurately determined prior to the commencement of work. These contract
 documents have been prepared based on field inspection and other information
 available at the time. Dimensions on these plans have been taken from available
 original contract plans and shop drawings. These dimensions are not guaranteed
 to represent the present condition of the structure. The Contractor shall verify all
 necessary dimensions and elevations in the field prior to submittal of Shop Drawings
 and indicate on the Shop Drawings which dimensions differ. Cost of verification is
 included in the prices bid for the various items. Actual field conditions may require
 modifications to construction details and work quantities. The Contractor shall perform
 the work in accordance with field conditions and as directed by the Engineer.

GROUT MATERIAL

Chemically cured grout shown on the plans to set anchor bolts or
 reinforcing bars into existing concrete shall be Kelibond or Keligrout in
 System epoxy resin as manufactured by Kelkin-Gold, Inc. .

LADY'S ISLAND & HARBOR RIVER

SUGGESTED GENERAL CONSTRUCTION SEQUENCE

STAGE I:

- i) Remove existing span drive. Maintain span operation utilizing
 existing manual drive.
- ii) Install new span drive support structure, see Dwg. No. S-7 & S-24.
- iii) Install new span drive. See Dwg. No. M-3 & M-15 for Span Drive Construction
 Sequence.

STAGE II:

- i) Install temporary electrical controls on platform adjacent to truss
 at roadway level. See Dwg. No. S-9 & S-28 for location.
- ii) Operate swing span using new gearmotor and temporary electrical controls.

STAGE III:

- i) Remove existing control house and supports. Perform asbestos abatement.
- ii) Install new control house supports, floor, walls and roof with new electrical
 equipment in place. See Dwg. No. S-5 & S-23 for sequence of construction.

STAGE IV:

- i) Install conduits and field wiring for new electrical equipment.
- ii) Field test new electrical system. Operate swing span using new main drive.
- iii) Remove temporary electrical controls.

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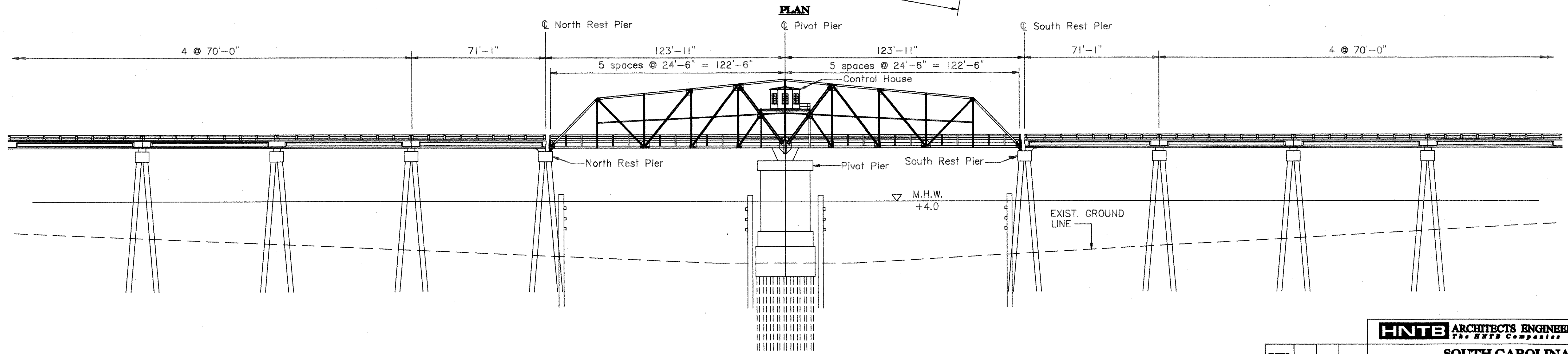
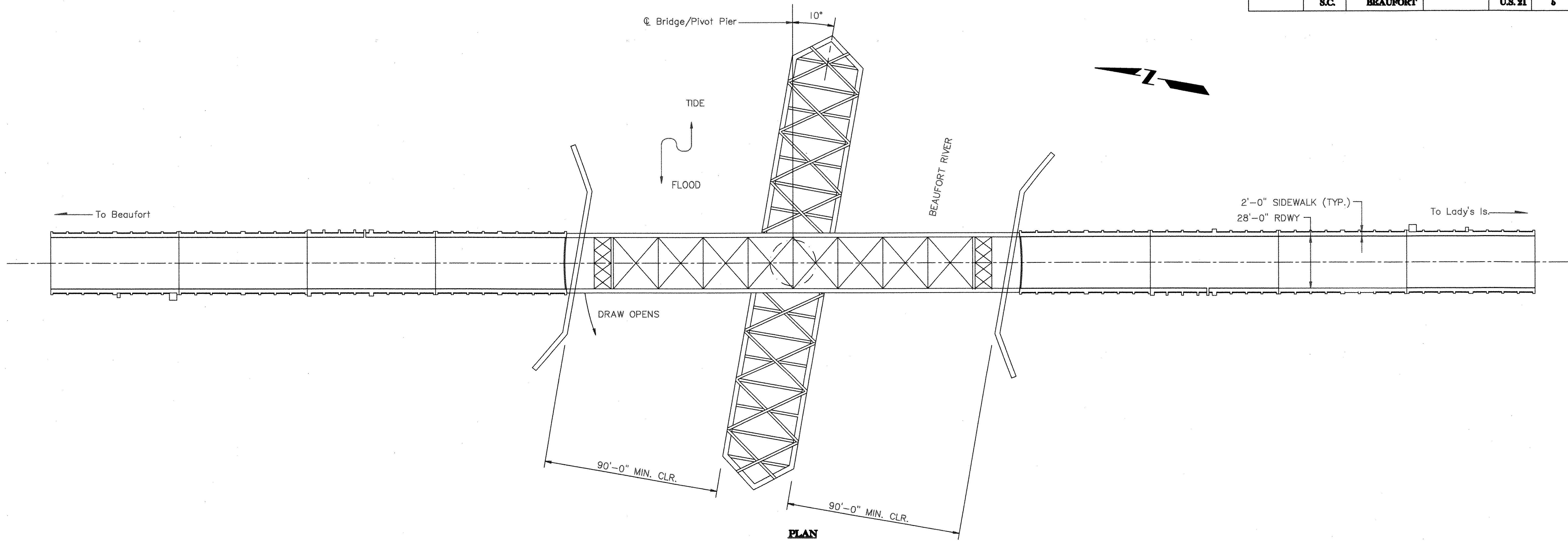
SOUTH CAROLINA
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 BRIDGE DESIGN COLUMBIA, S.C.

LADY'S ISLAND/HARBOR RIVER

GENERAL NOTES

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BY	CHK	DATE	FILE NO.	ROUTE	COUNTY	DRAWING NO.													
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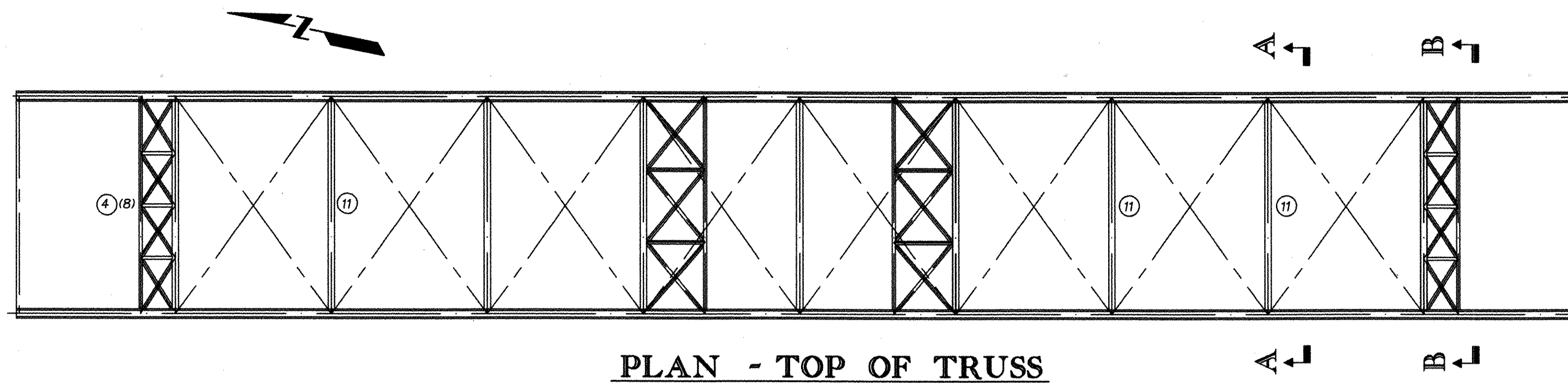
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BRIDGE DESIGN COLUMBIA, S.C.

LADY'S ISLAND

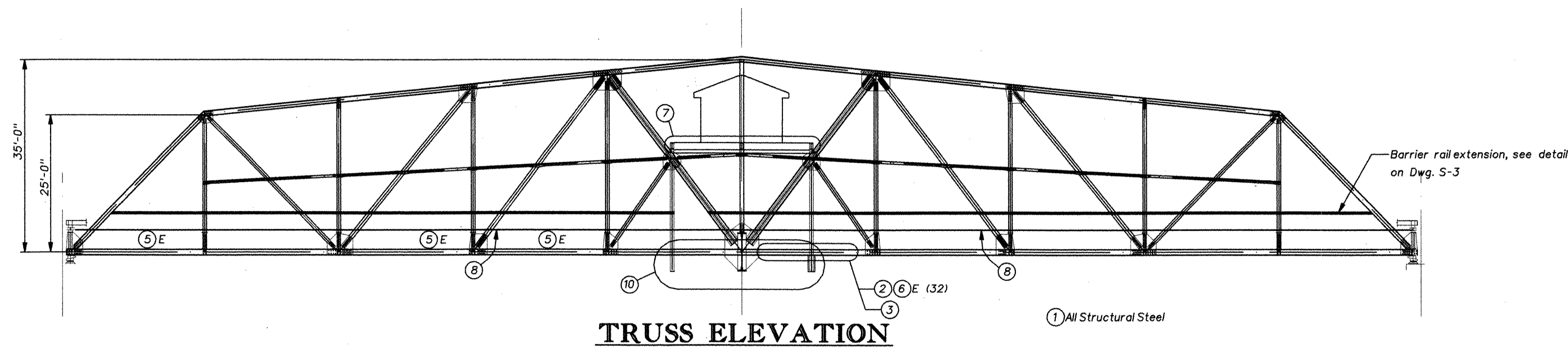
**GENERAL PLAN
& ELEVATION**

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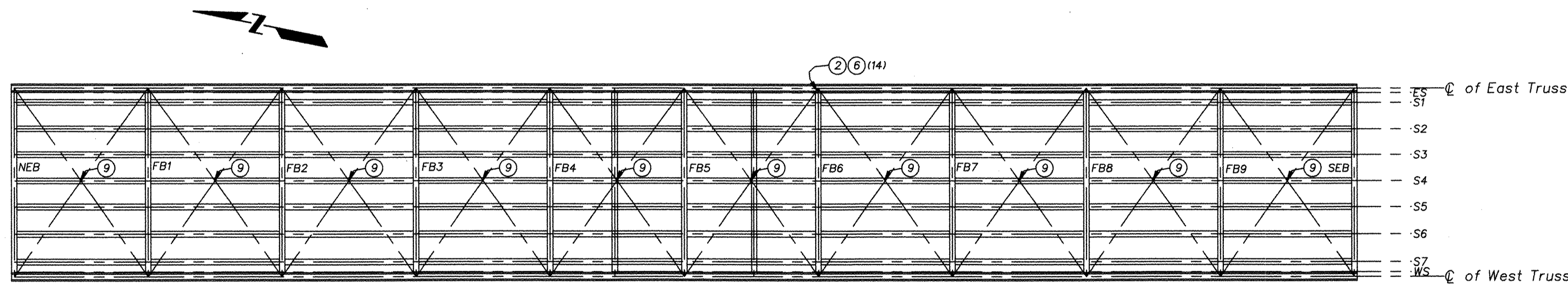
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PLAN - TOP OF TRUSS



TRUSS ELEVATION

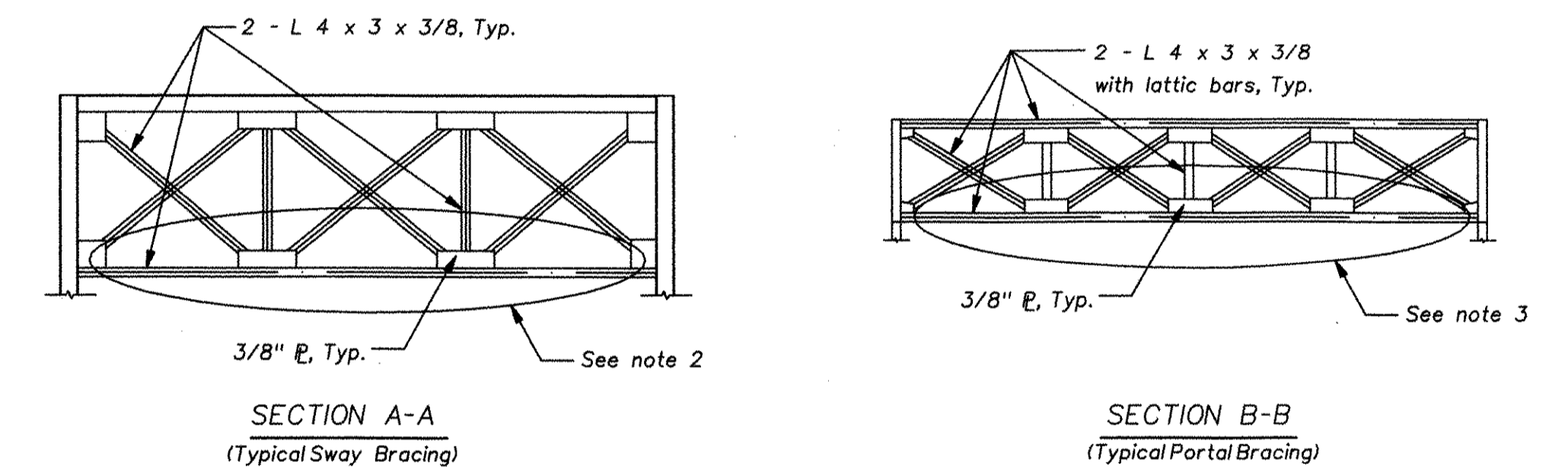


PLAN - BOTTOM OF TRUSS

GENERAL STRUCTURAL NOTES:

- Codes: (use latest edition)
 - Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings (AISC), unless otherwise shown or specified.
 - American Welding Society standards and specifications.
- Live Loads:

Wind	50psf
Floors	100psf
Stairs and Walkways	85psf
- Structural Steel:
 - Structural steel shall conform to ASTM A36.
 - All bolts shall be ASTM A325 3/8" diameter unless noted otherwise.
 - Rolled steel sections shall be assembled with mill camber up.
- Concrete:
 - All concrete shall have minimum compressive strength at 28 days of 4000psi.
 - The surface of all slabs shall receive a light broom finish.
- Reinforcing Steel:
 - All reinforcing steel to be ASTM A615, Grade 60.
 - Unless shown otherwise, the clear cover for reinforcing bars shall be:
 - Control house slab: 1 1/2".
 - All other slabs: 1 1/2".
- Contractor shall verify all dimensions before beginning work. Check Mechanical and Electrical drawings for conduit, pipe sleeves, etc. to be imbedded in concrete, as well as openings in structure for mechanical and electrical installations.
- Provide adequate shoring or bracing of existing structures and new structures during construction to resist all required forces such as dead loads, live loads, construction loads, wind and unbalanced loading. Provide temporary enclosures to protect the general public, the Engineer, Owner and the Contractors personnel from hazards during the construction work.
- All shop drawings shall be prepared under the direct supervision of a Professional Engineer registered in the state of South Carolina and all shop drawings submitted shall bear his seal.
- Rivet removal and replacement shall be done one at a time except for secondary gusset plate and lattice bar replacement. For details, see Typical Structural Details sheet.



NOTES:

- Diagonal support hangers shall be 1" dia. x 2'-0" threaded rods, with double nut connections to the stringers and diagonals, and shall be paid for under 'Bracing Reinforcement'.
- Portal and Sway bracing repair shall consist of replacing damaged lower horizontals, diagonals and connections, as well as jack-straightening, cleaning and painting the affected verticals and diagonals. This work shall be paid for under 'Bracing Reinforcement' and 'Sway Bracing Repair' respectively.
- Gusset E repair/replacement shall be paid for under "Bracing Reinforcement".

LEGEND

- Item of work
- (1) E (100) Number of bolts/rivets to be replaced (where applicable)
- East or West truss

ITEMS OF WORK

Work No.	Description (Quantities)	Pay Item No.
1	Clean (sandblast) and paint (36,000 SF)	710
2	Rivet/ bolt replacement (200)	709
3	Chord repair (x15 ft.)	709
4	Portal connection repair (x 4 SF)	709
5	Concrete spall repair (x 15 SF)	702
6	Gusset plate repair/ replacement (x 6 SF)	709
7	Control house support member removal	709
8	Joint cleaning and resealing (60 LF)	702
9	Reinstall Lower diagonal hangers (x10)	709
10	Machinery support replacement	709
11	Sway bracing repair (x 3)	709

Items of work locate the primary tasks for the Structural repairs only. For items of work details, see Typical Structural Details sheet.

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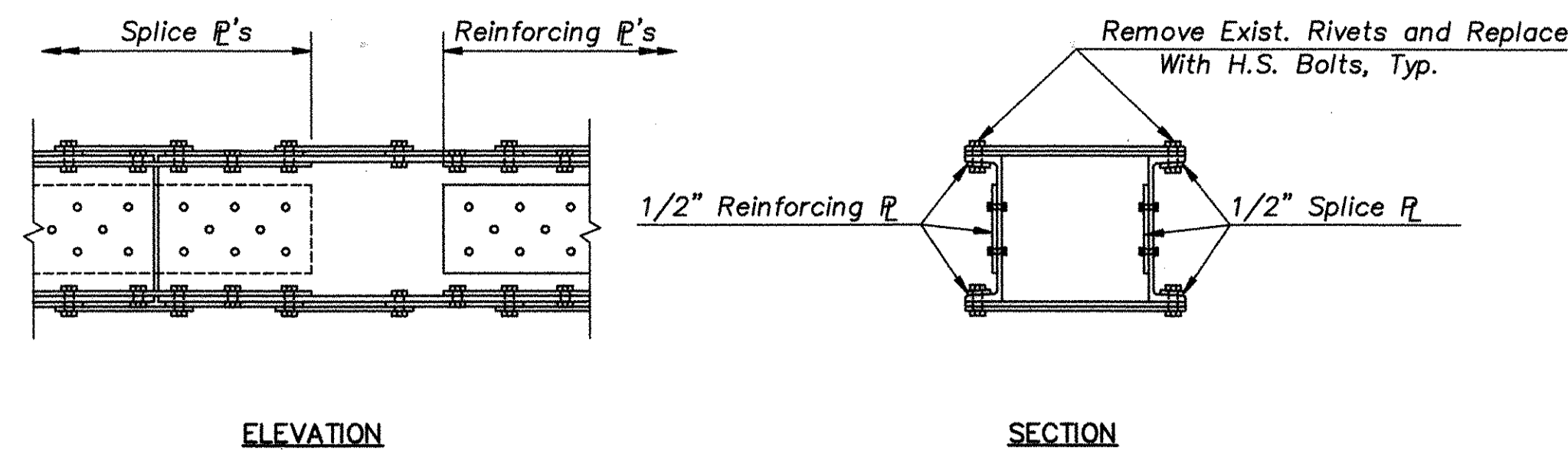
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LADY'S ISLAND

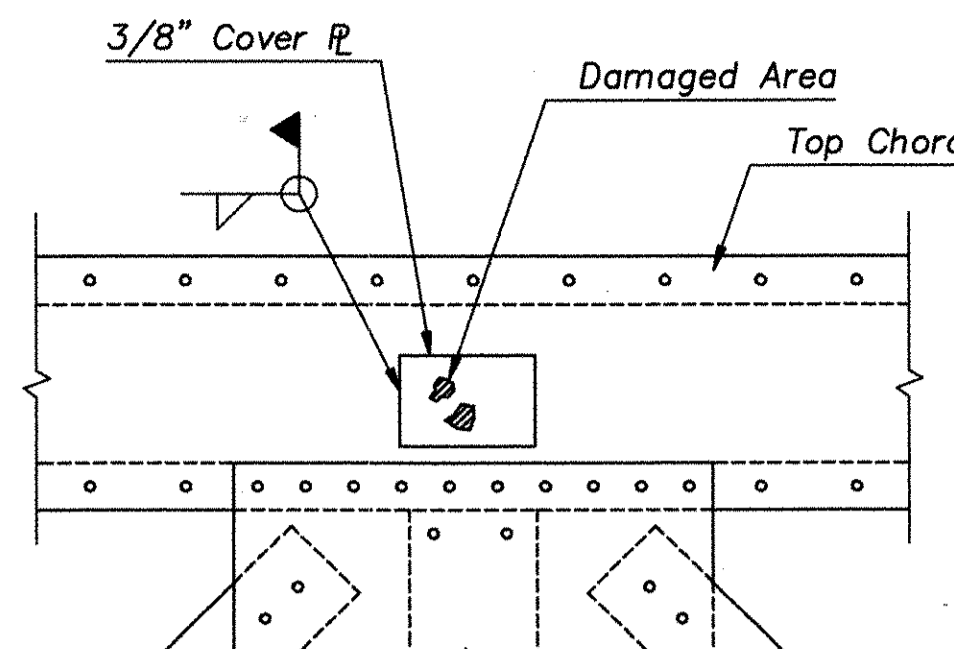
LOCATION OF STRUCTURAL WORK

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DR.	LDP	BAM	2-97
DES.	LDP	BAM	2-97
BY	CHK.	DATE	

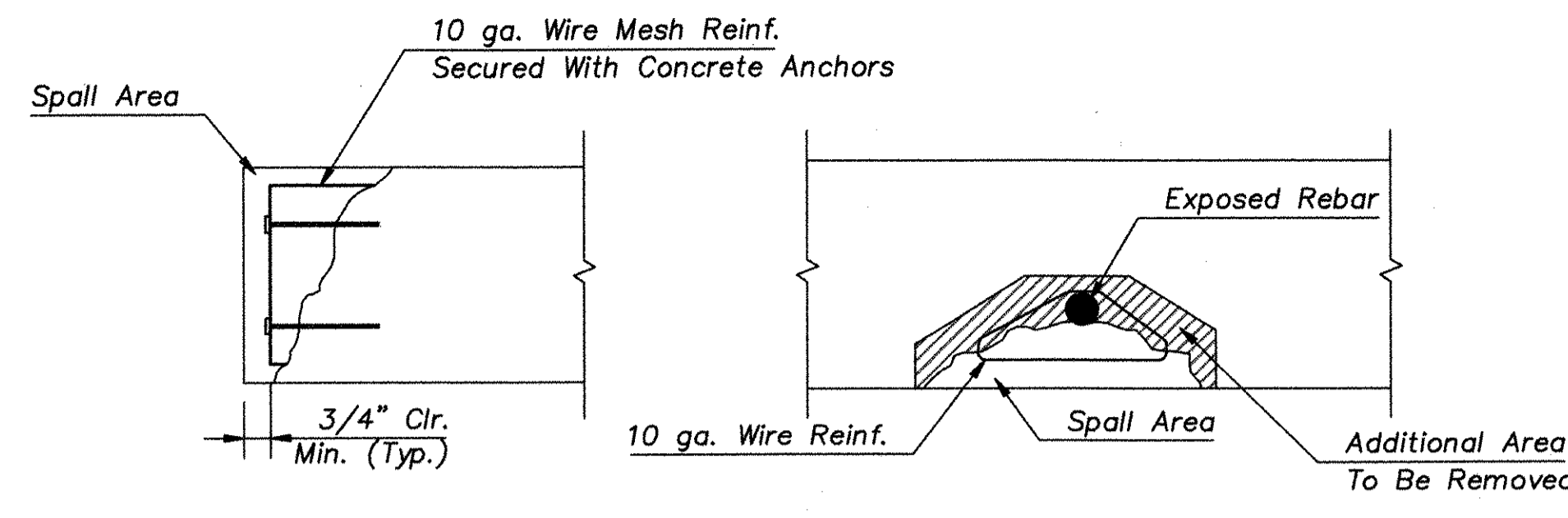
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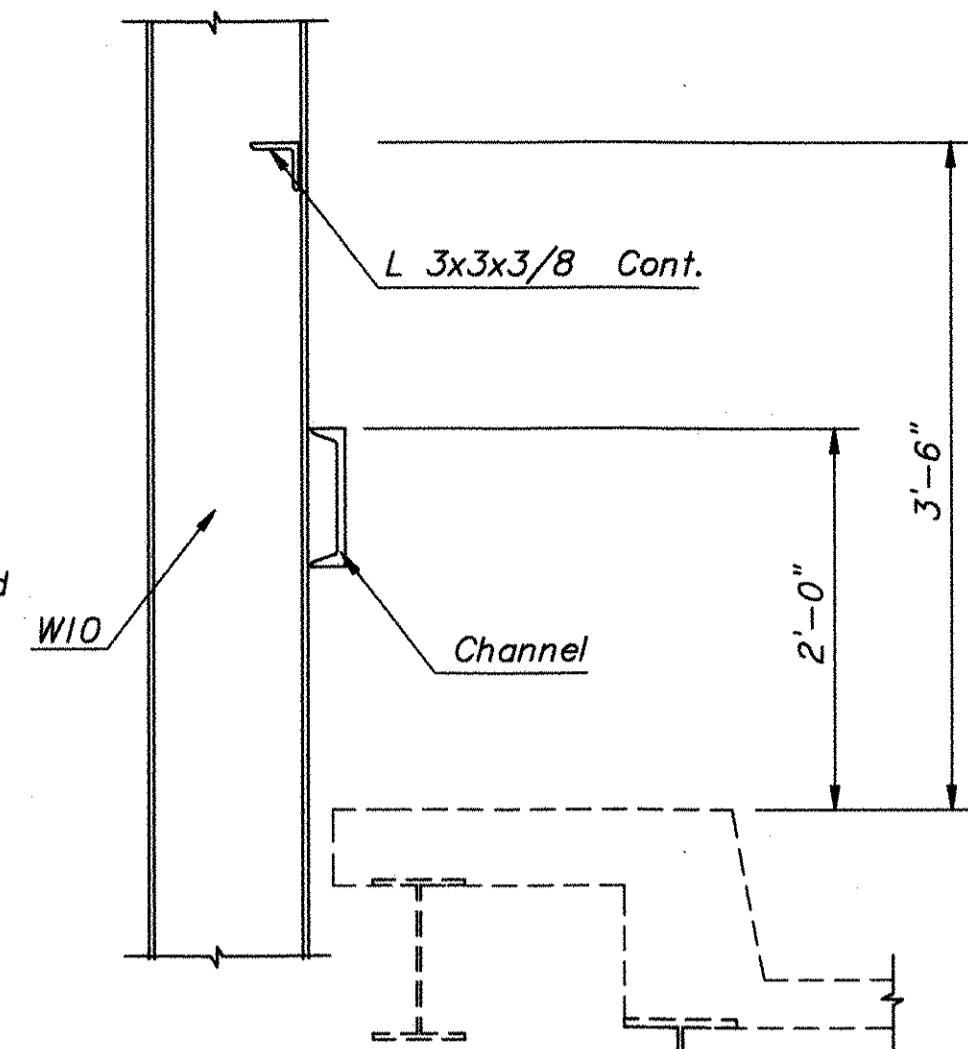
TYPICAL CHORD REPAIR DETAIL



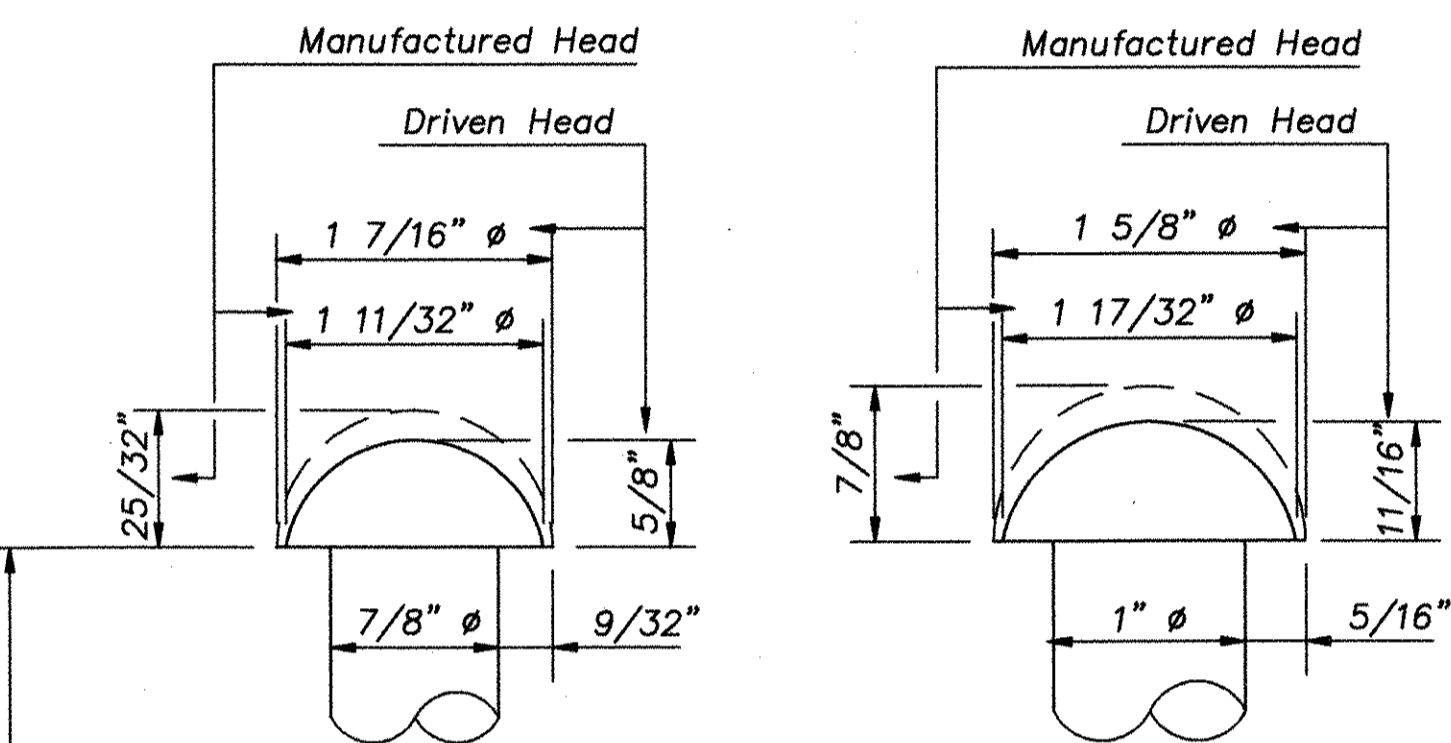
TYPICAL TRUSS GUSSET PLATE REPAIR DETAIL
(For repair areas less than 2 sq. ft.)



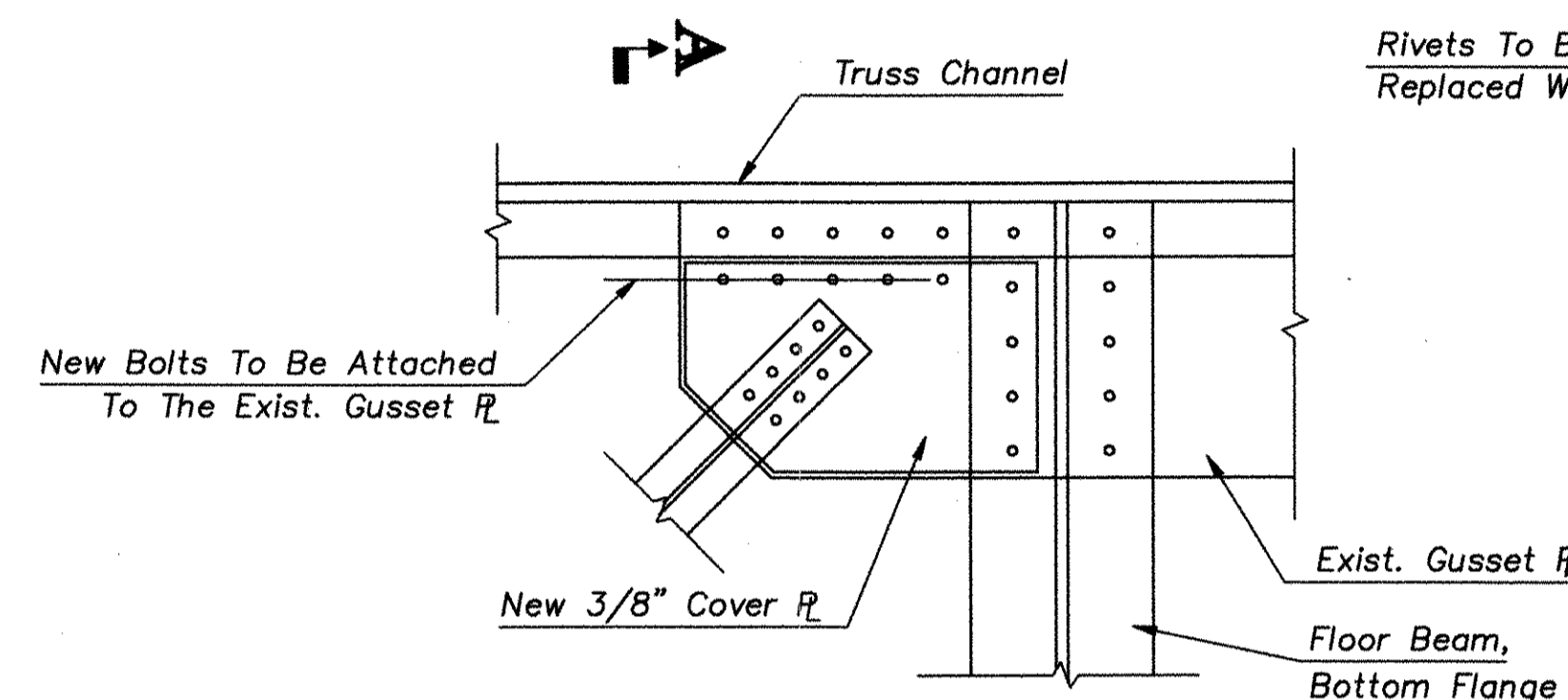
TYPICAL CONCRETE SPALL REPAIR DETAIL



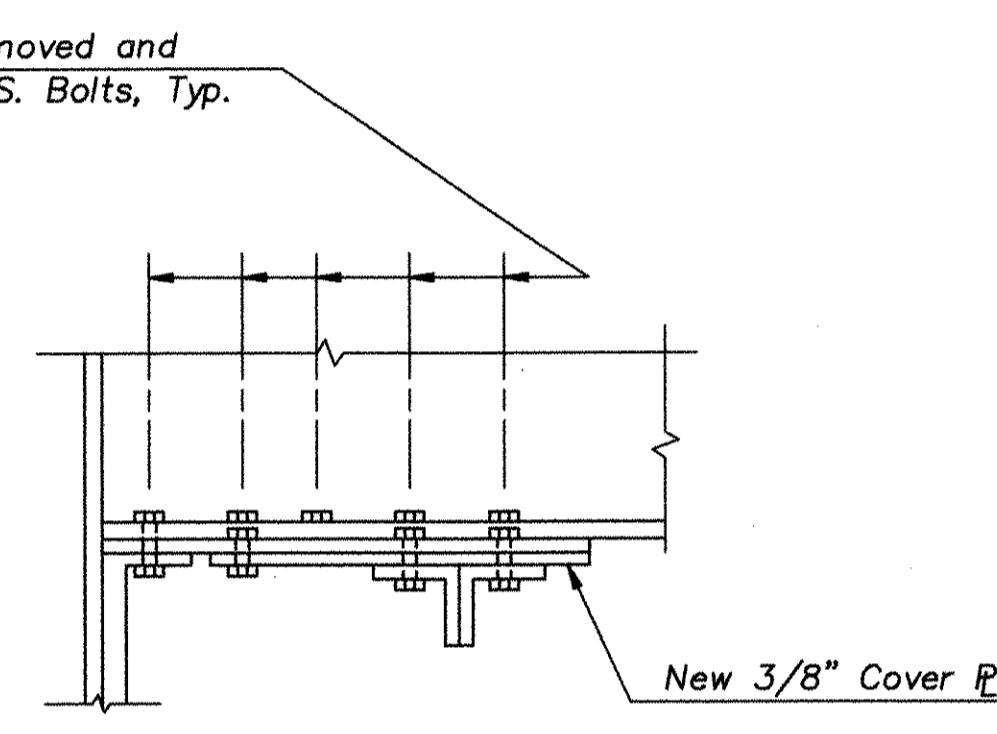
TYPICAL RAIL EXTENSION DETAIL
(Lady's Island Only)



CONDITION A - NEW RIVET

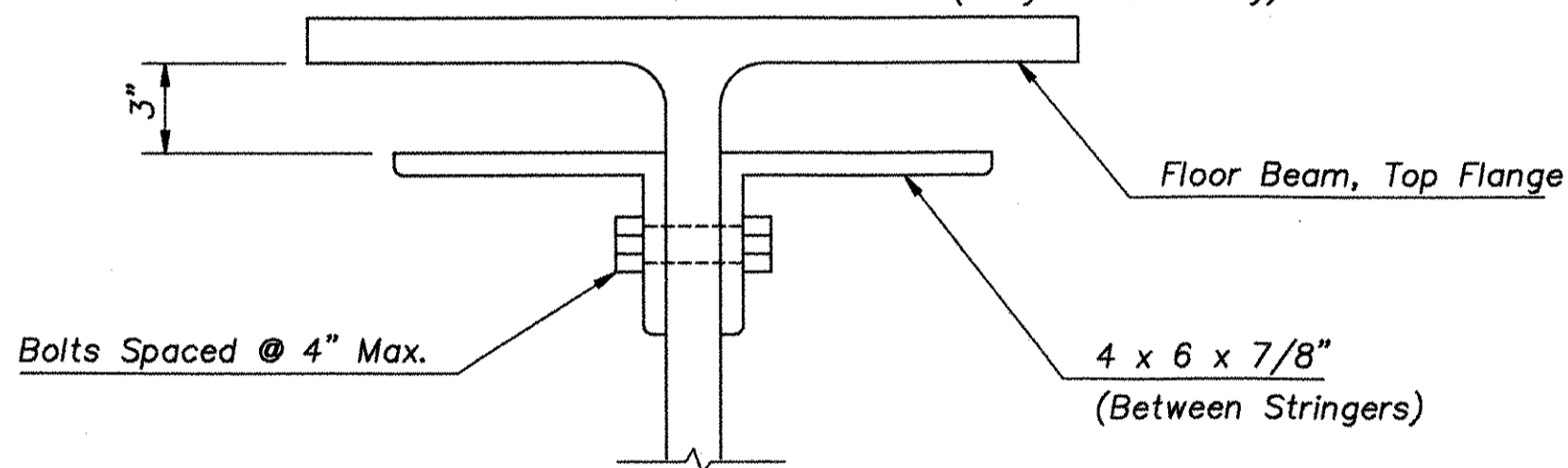


PLAN - BOTTOM VIEW



SECTION

TYPICAL BRACING GUSSET PLATE REPAIR DETAIL

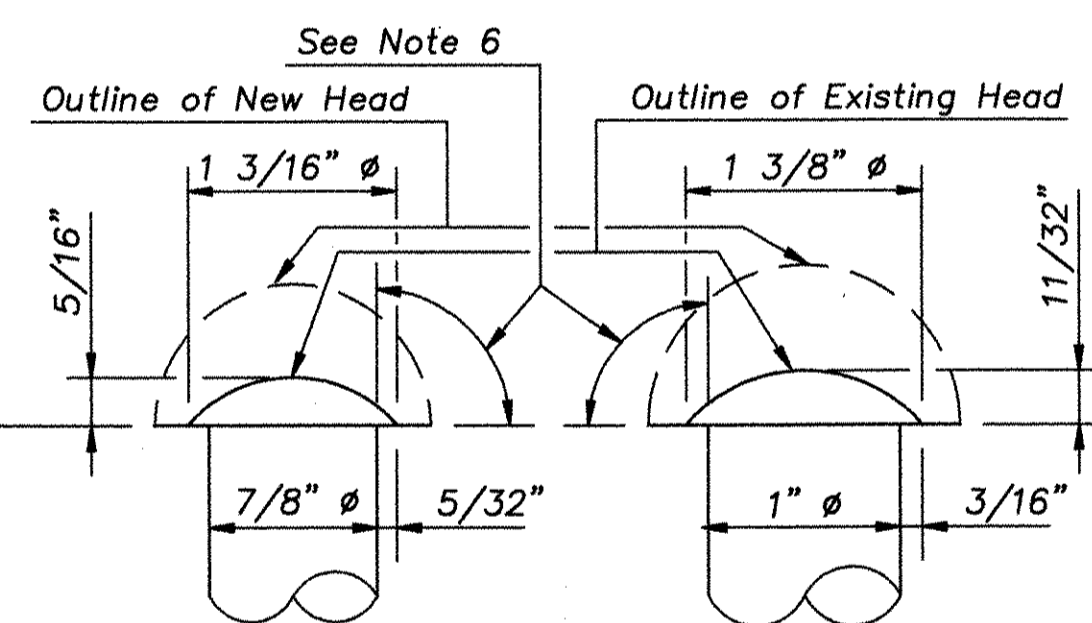


TYPICAL FLOOR BEAM REINFORCEMENT DETAIL
(Harbor River Only)

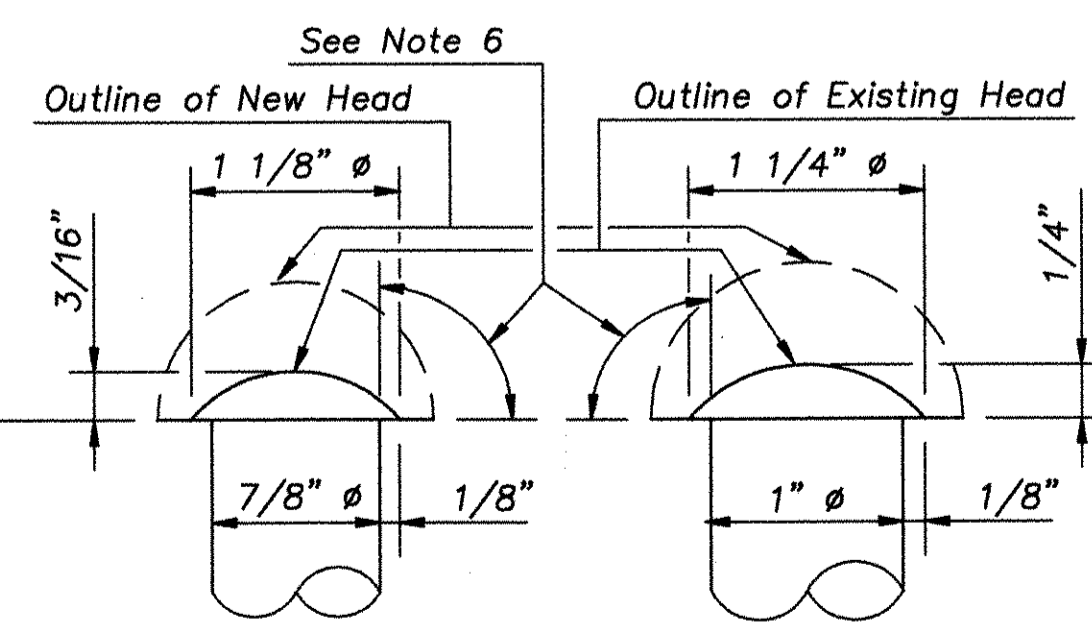
ACCEPTABLE CATEGORY B

CONDITIONALLY ACCEPTABLE CATEGORY C

UNACCEPTABLE CATEGORY D



CONDITION B - MINIMUM UNCONDITIONAL ACCEPTANCE



CONDITION C - MINIMUM CONDITIONALLY ACCEPTABLE

RIVET REPLACEMENT CRITERIA

RIVOT REPLACEMENT NOTES

- Rivets replaced to permit removal of any of the connected parts (whether called for on the plans or ordered by the engineer) and high strength bolts to replace same rivets shall be installed and paid for under "Rivet Replacement With High Strength Bolt".
- The number of replacement bolts tabulated on the drawings is based on a visual inspection, and is to serve only as a guide.
- The number of replacement bolts tabulated on the drawings shall be paid for under Item No. 709, "Rivet Replacement With High Strength Bolt".
- Rivets (Category B) with dimensions of both heads meeting or surpassing each of the minimum requirements shown for Condition B may be left in place subject to conditions described in Note 7.
- Rivets (Category C) not meeting the requirements of Condition B, but having dimensions which meet or surpass at both heads each of the minimum requirements shown for condition C may be left in place subject to the following conditions:
 - There is no prying action from applied stress which tends to separate the connected parts.
 - Rivet heads do not have additional losses described in Note 7.
 - Rivets may be left in place to the extent that their number does not exceed 20% of connection rivets in any one connection or 50% of stitch rivets in any one portion of a member.
 - Where the above percentages are exceeded, the number of rivets over the prescribed percentage shall be replaced with high-strength bolts.
- When selecting rivets for replacement to meet the above percentage requirements, the worst rivets in any group or connection shall be selected for replacement.
- Rivets (Category D) not meeting the requirements of Condition C at either head shall be replaced.
- Replacement will also be required for any rivet exhibiting additional loss in the form of pits or gouges of the edge of either head projecting beyond the shank where such loss reduced the section below the limits shown for Condition B.
- Dimensions shown on these sketches for Conditions B and C are minimum requirements for both driven and manufactured heads. The minimum height of head is measured to the center of the rivet. The minimum diameter applies to that direction in which it is the smallest.
- All high-strength bolt connections shall be assembled with a hardened washer under both the bolt head and nut. Where necessary, washers may be clipped on one side to a point not closer than 7/8 of the bolt diameter from the center of the washer.
- If reaming is required to dress up the rivet holes, the cost of this reaming shall be included in the price bid for the item under which the bolt is being replaced. If after reaming, the holes exceed the tolerances shown in the AISC Steel Manual, the contractor shall install the next larger sized bolt at no additional cost to the State.
- The above notes also apply to bolts with similar conditions.

REPAIR NOTES

- For additional details and procedures for cleaning, painting, materials, joint and crack repair, see specifications.
- Existing section properties shall be maintained where section loss requires reinforcement or replacement.
- All areas to be repaired shall be thoroughly cleaned before any connections are made.
- Cover plates shall extend a minimum of 3" beyond damaged areas.
- Contractor shall provide adequate temporary support of all members during repair as required.
- For Epoxy Pressure Injection of Concrete Cracks and Joint Repairs, see the Special Provisions of the Standard Specifications.

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LADY'S ISLAND/HARBOR RIVER

**TYPICAL STRUCTURAL
DETAILS**

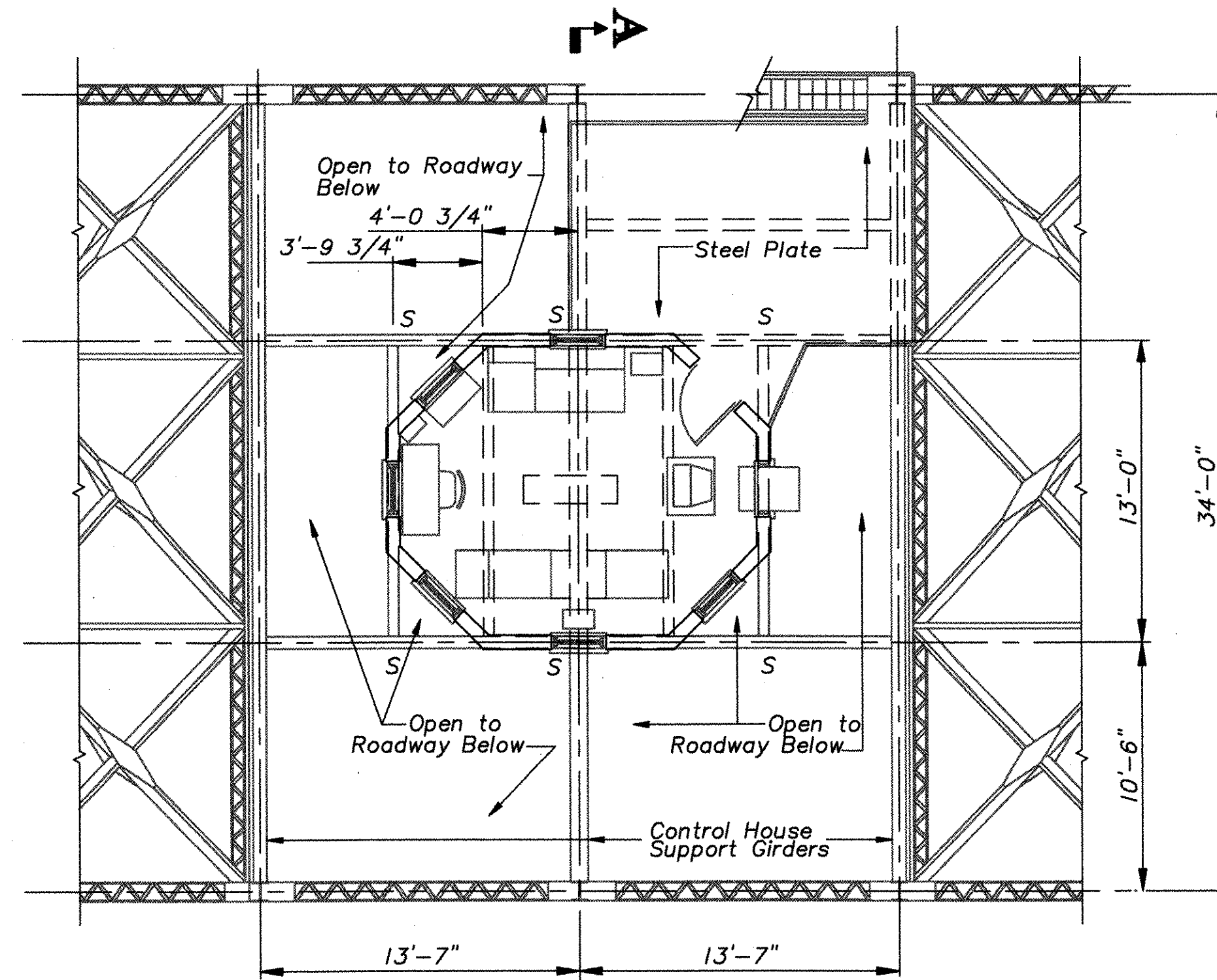
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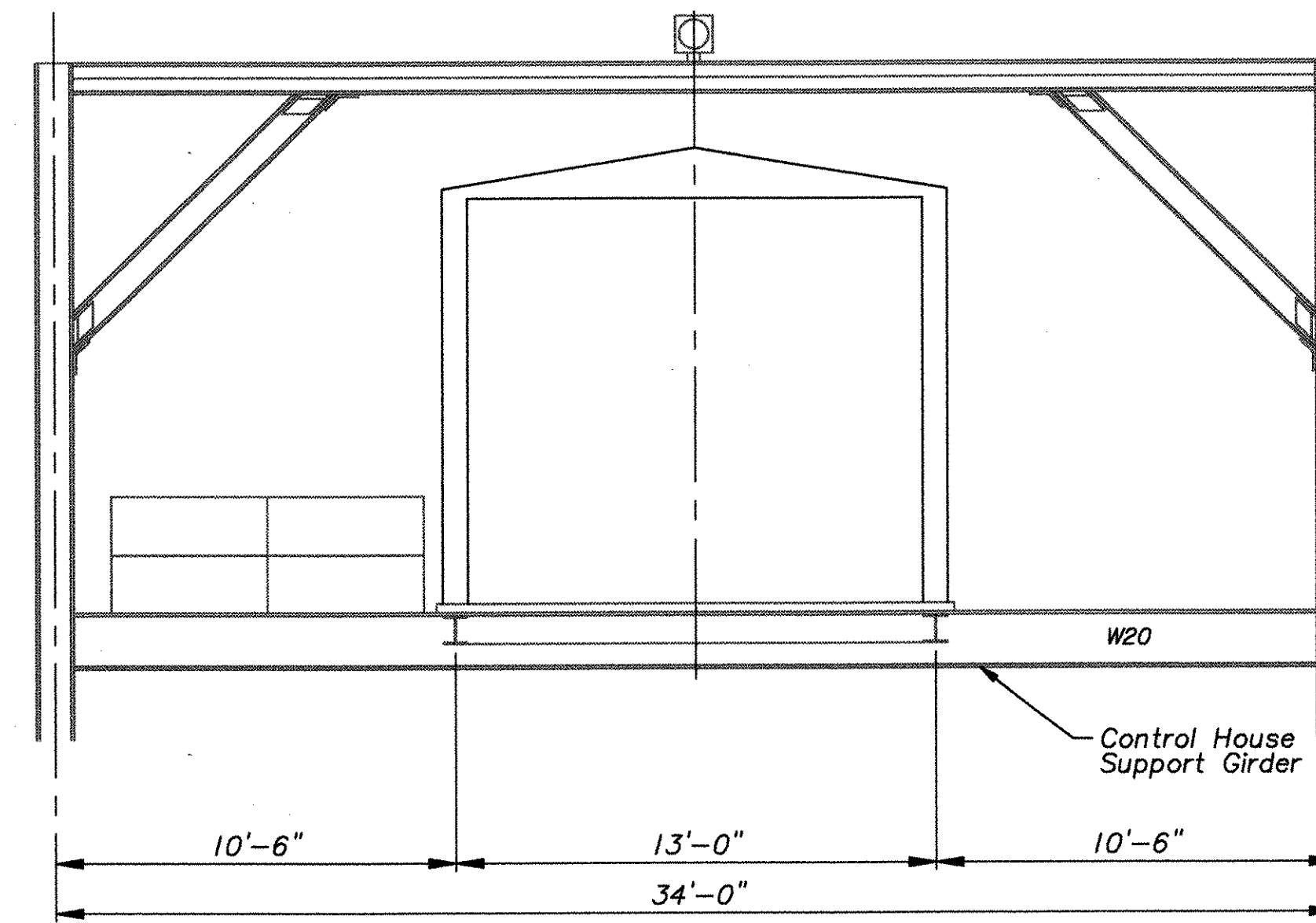
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	S.C.	BEAUFORT		U.S. 21	8	116

QUANTITIES

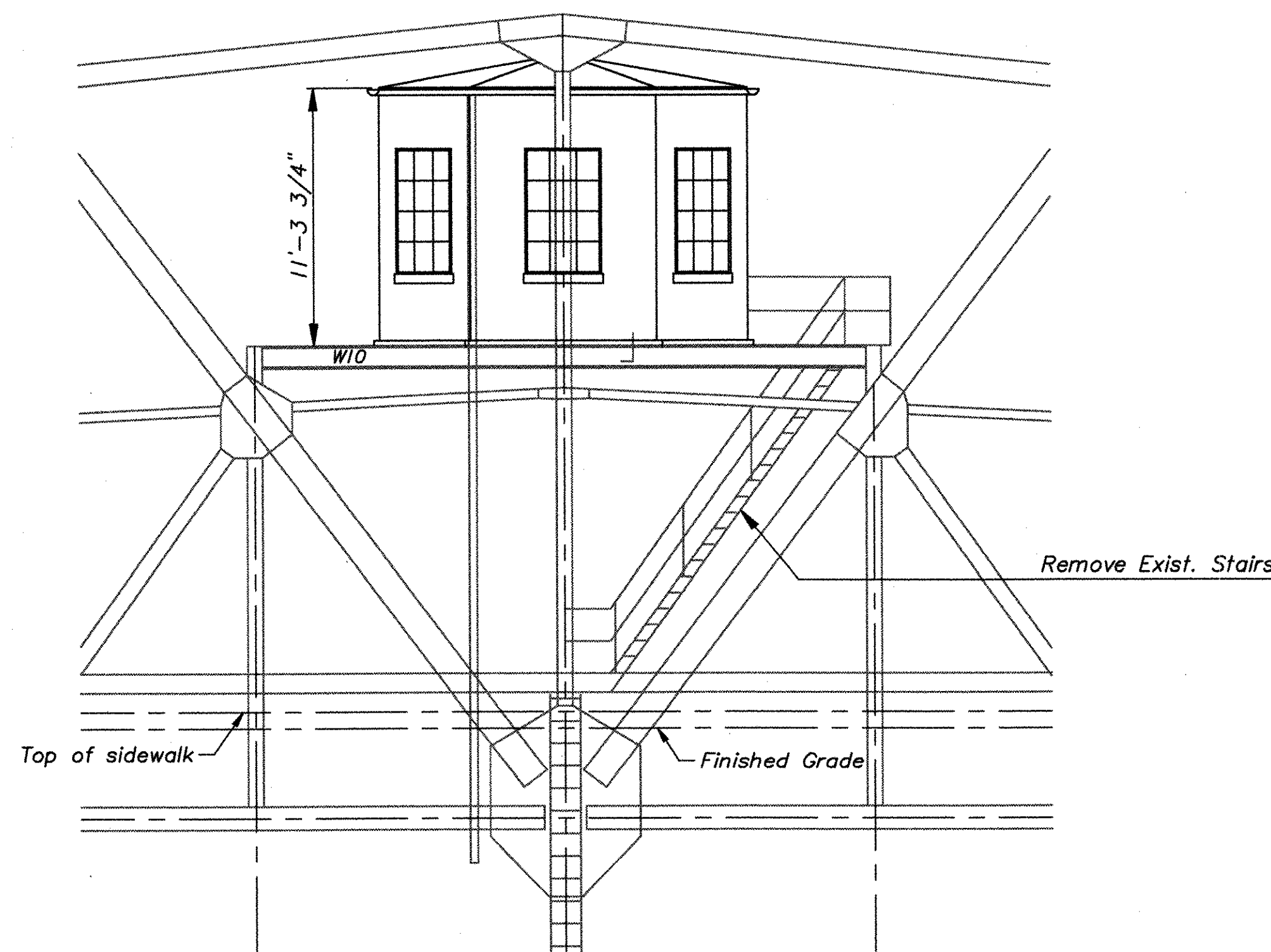
ITEM	UNIT	CONTRACT QUANTITY
Control House Demolition (6,900 Lbs.)	L.S.	L.S.



PLAN



SECTION A-A
(PARTIAL SECTION)



ELEVATION

SEQUENCE OF REMOVAL NOTES:

1. Coordinate the following sequencing with Mechanical and Electrical Notes:
 - a) Temporarily relocate electrical bridge system as needed, for location, See Dwg. No. S-9.
 - b) Detach all components of the control house from the main bridge members. Remove platform deck, rails and secondary deck supports. The control house at this point shall be supported by the control house girders only.
 - c) Close vehicular traffic from both directions.
 - d) Position low platform dolly under the existing control house.
 - e) A jacking system shall be installed to bear up against the bottom of the control house support girders. At a minimum there should be six contact areas supporting the three main control house support girders. (Each located with an S.)
 - f) Once the jacking system is in place, torch cut the ends of the control house support girders.
 - g) When the control house is completely detached from the bridge, lower the jacks slowly to bring down the control house (The Contractor shall verify that the control house resting on the top of the jacking system when it is completely lowered, is able to clear the 15'-0" minimum clearance of the bridge).
 - h) Remove the control house from bridge site.
 - i) Remove the remaining portions of the support girders, leaving the support columns intact.
2. The cost for the removal of the control house support framing is to be included with "New Control House Support and Platform".
- S Denotes Suggested location of temporary supports.

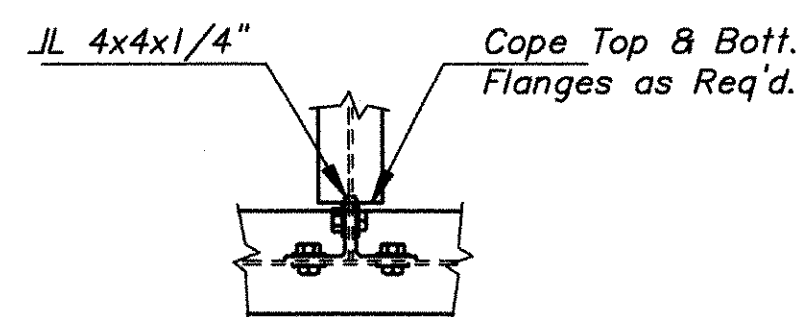
HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

LADY'S ISLAND
REMOVAL OF EXISTING CONTROL HOUSE FRAMING

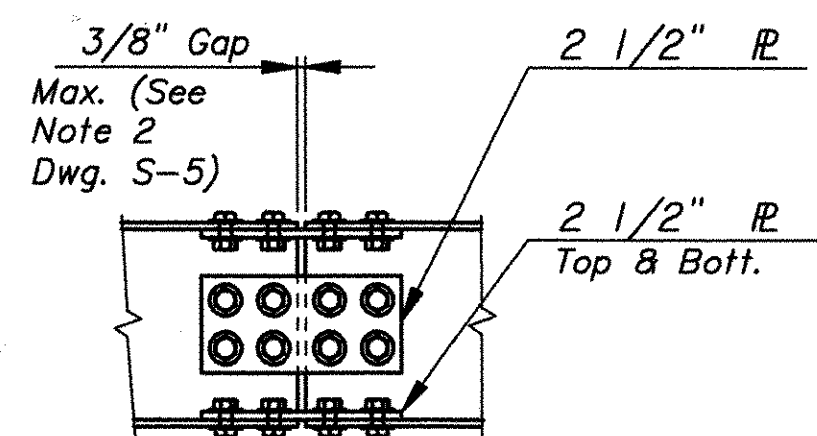
REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.	KMS	LDP	2-97
DES.			
BY	CHK	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	8-4



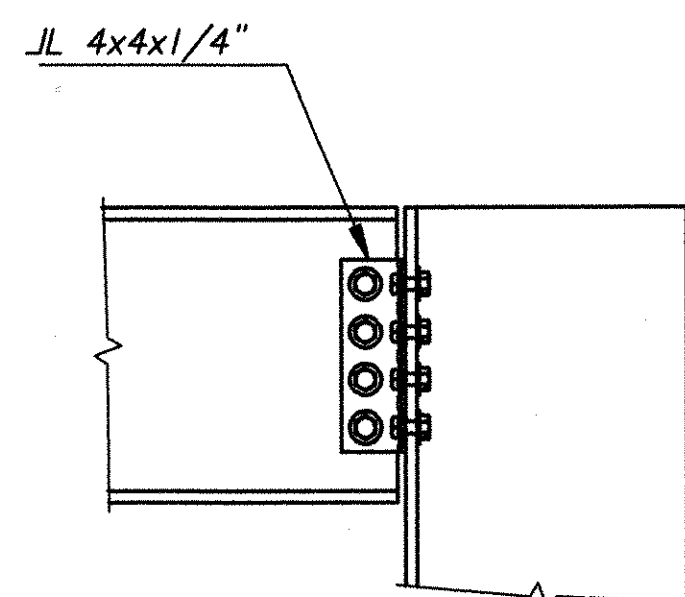
PLAN

DETAIL "A"



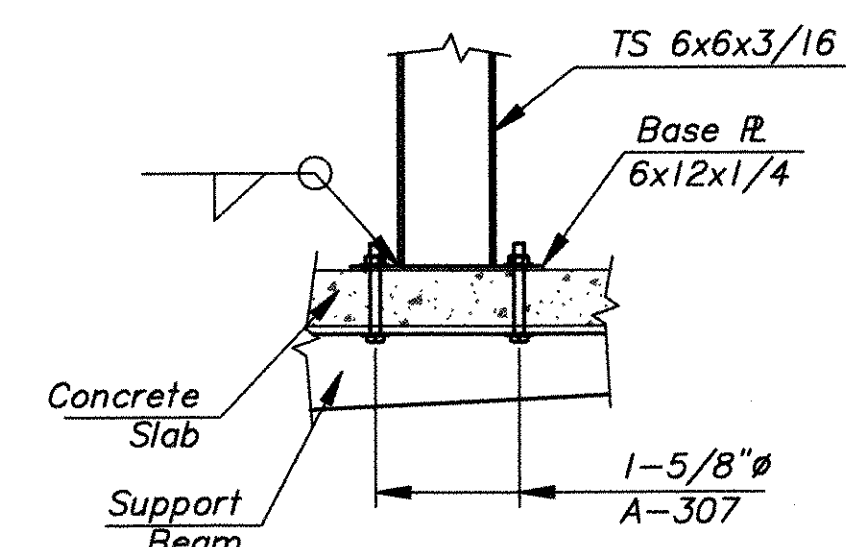
ELEVATION

DETAIL "B"



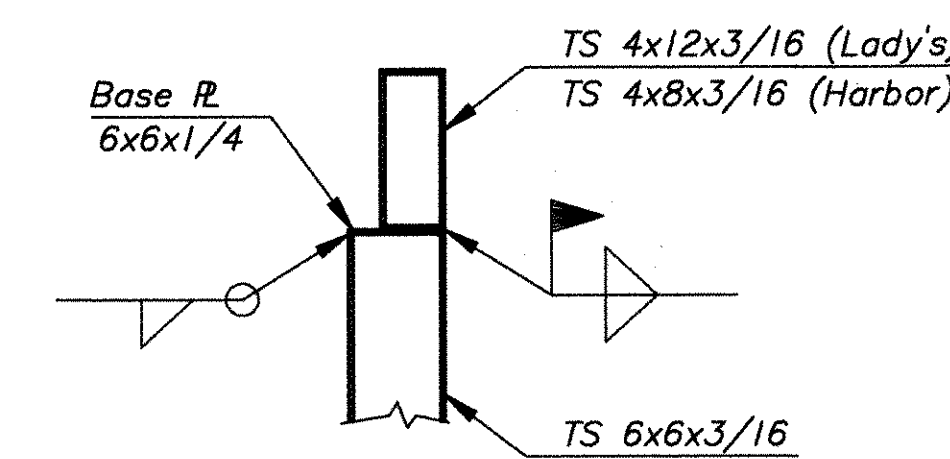
ELEVATION

DETAIL "C"

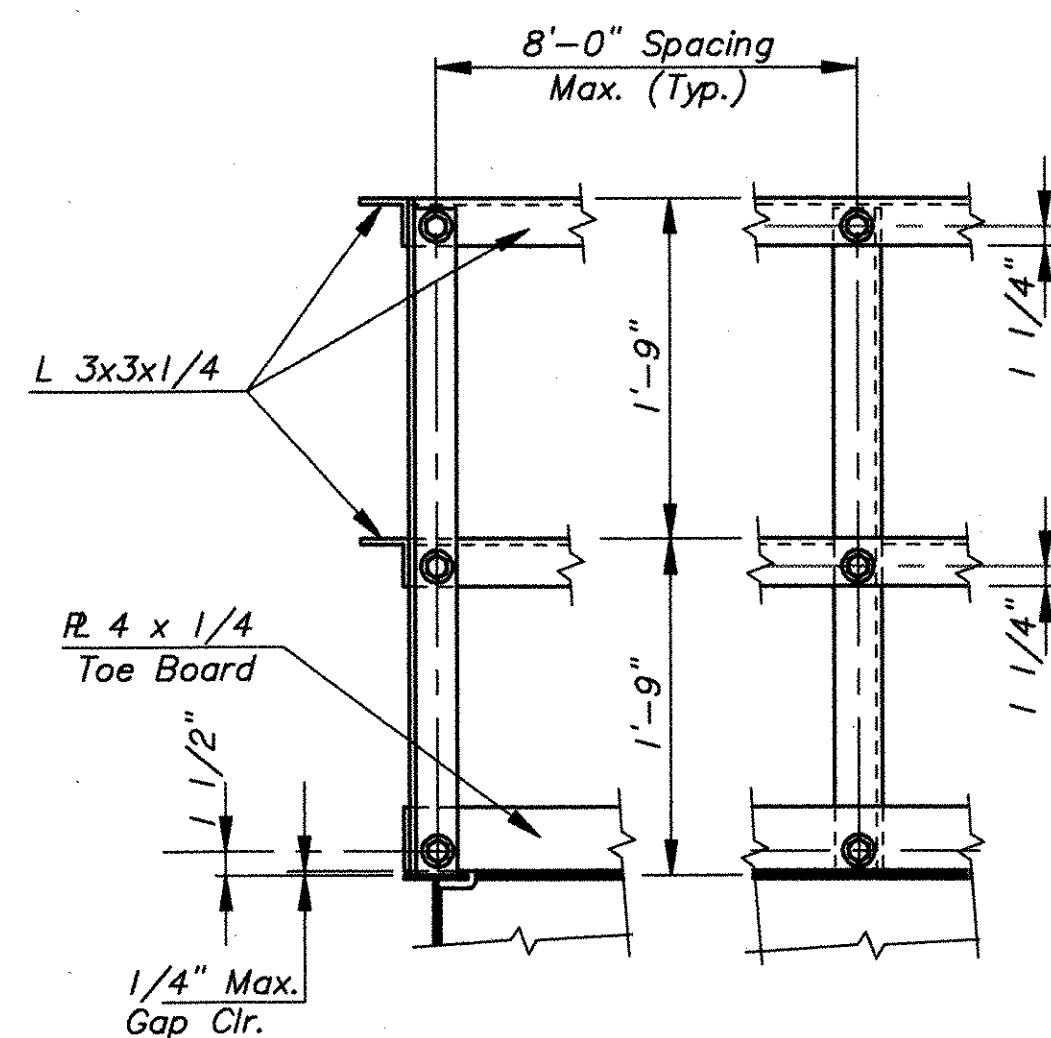


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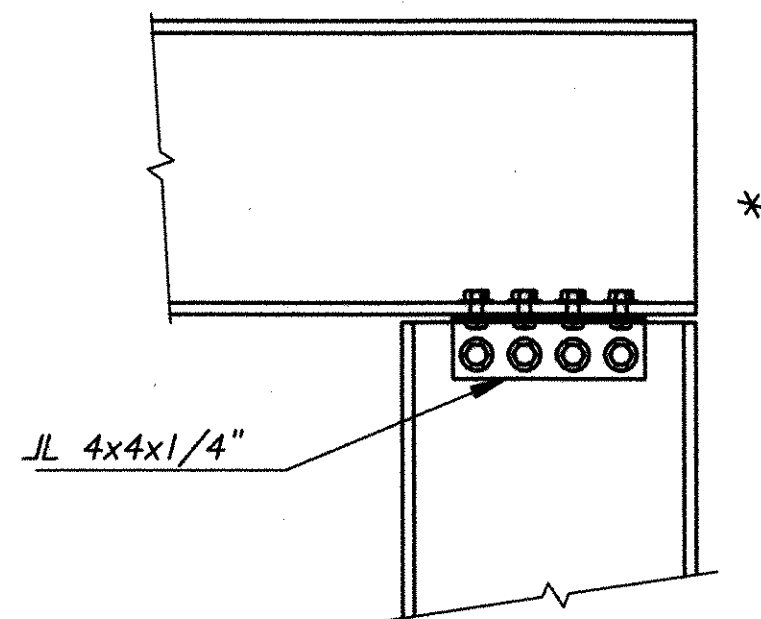
NOTE: Clip Base R and place bolts within enclosed wall area see Architectural drawings.



DETAIL "E"



DETAIL "F"

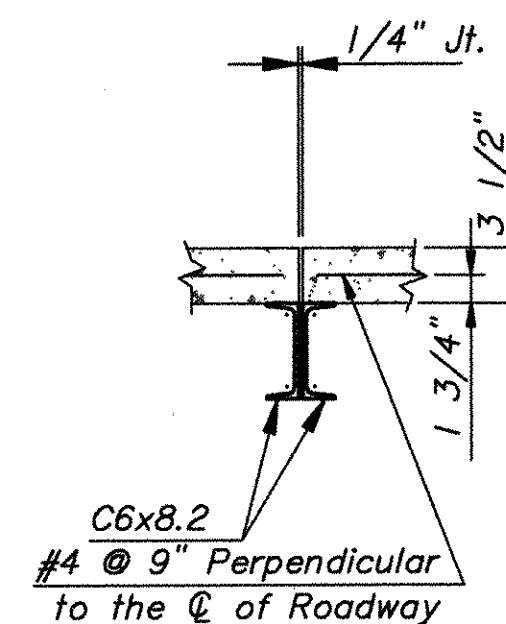


This detail only occurs at the stairs.

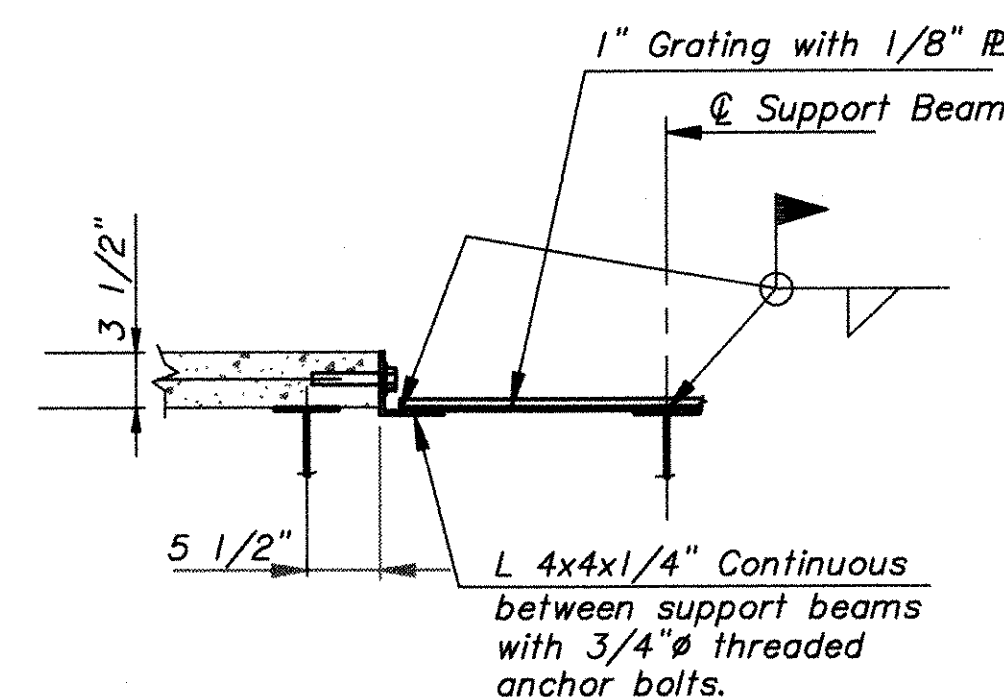
ELEVATION

DETAIL "G"

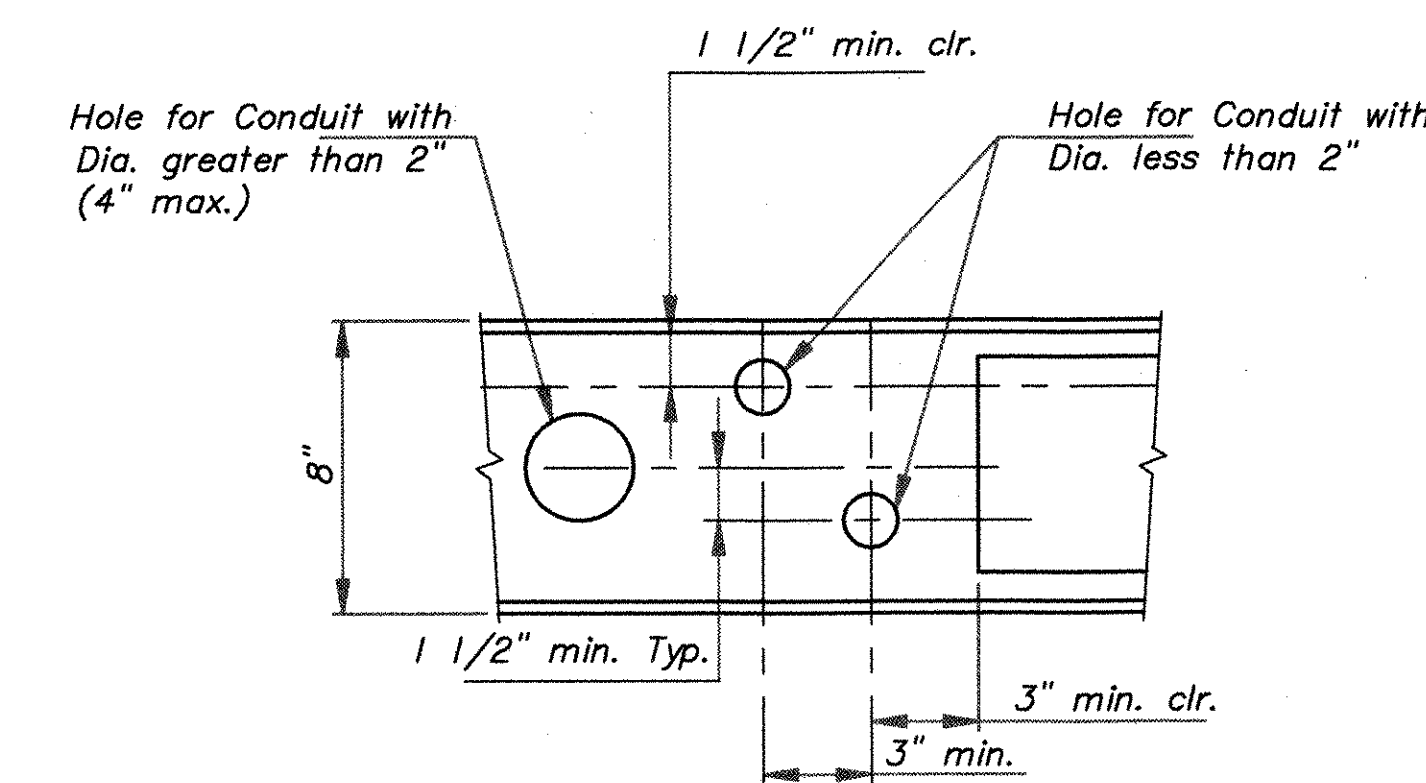
* For Stair Connection, see Dwg. No. S-9



SECTION B-B



SECTION C-C

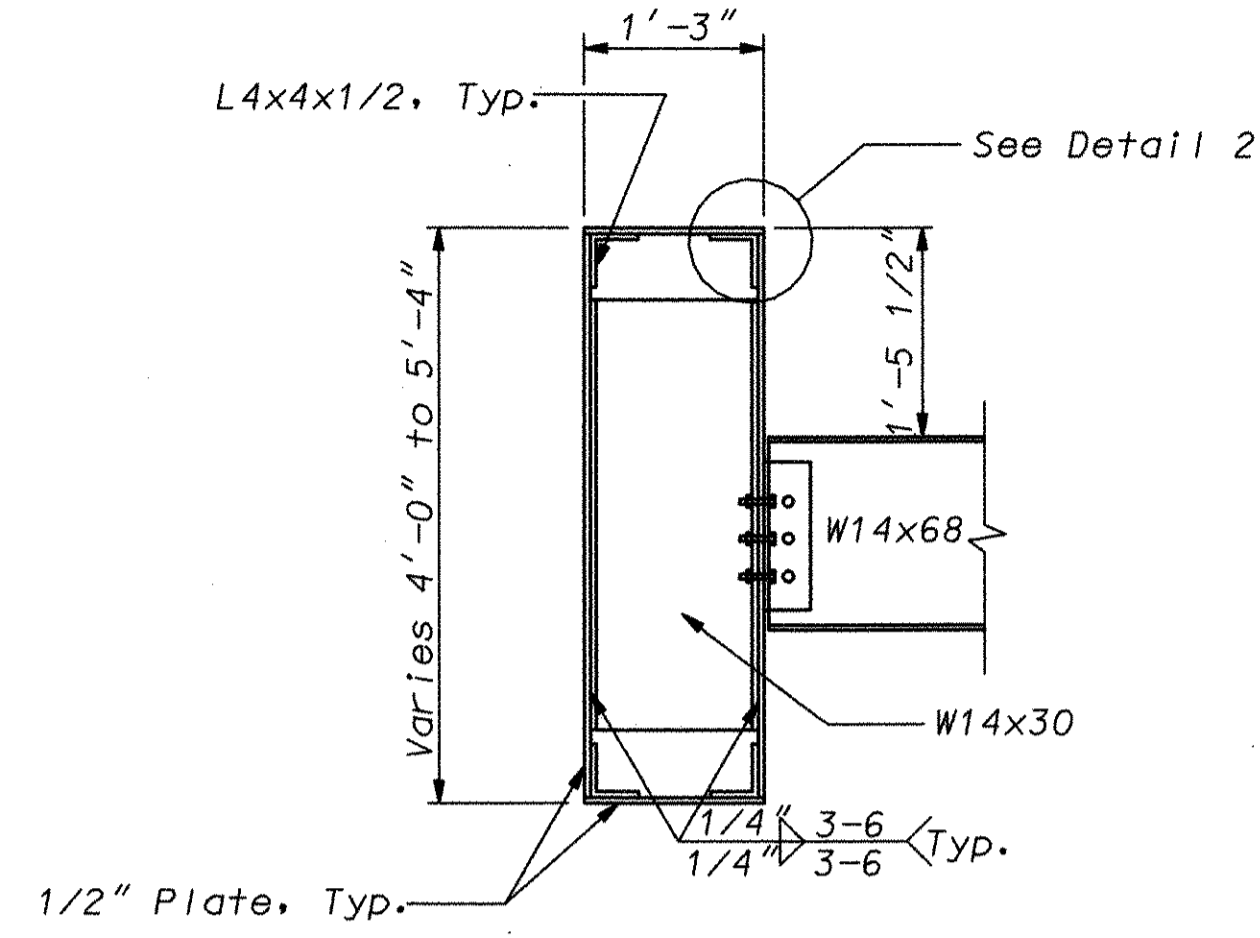


DETAIL "J"

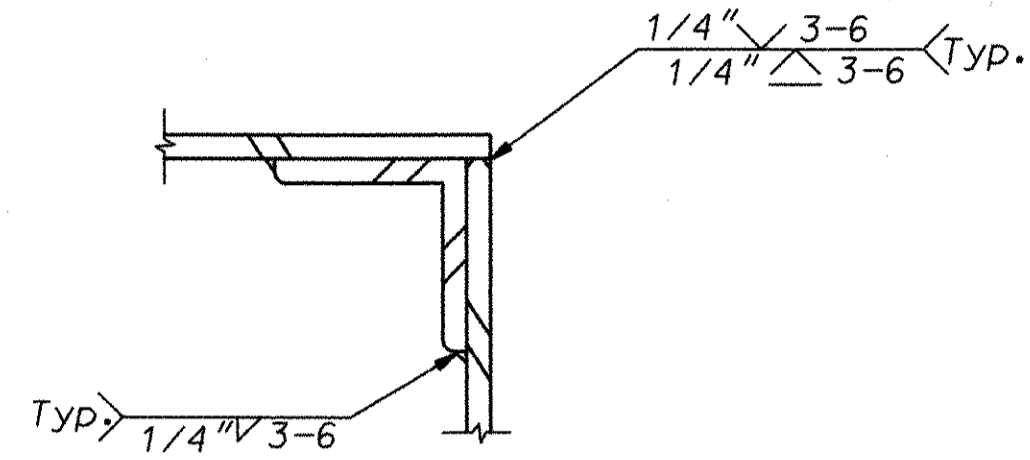
NOTE: Holes shall be drilled, not torch cut, 1/8" larger than conduit diameter. Coordinate hole locations with Electrical Drawings.

REV.			
REV.			
REV.			
REVIEWED			
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DR.	TQT	LDP	2-97
DES.	TQT	LDP	2-97
BY	CHK	DATE	

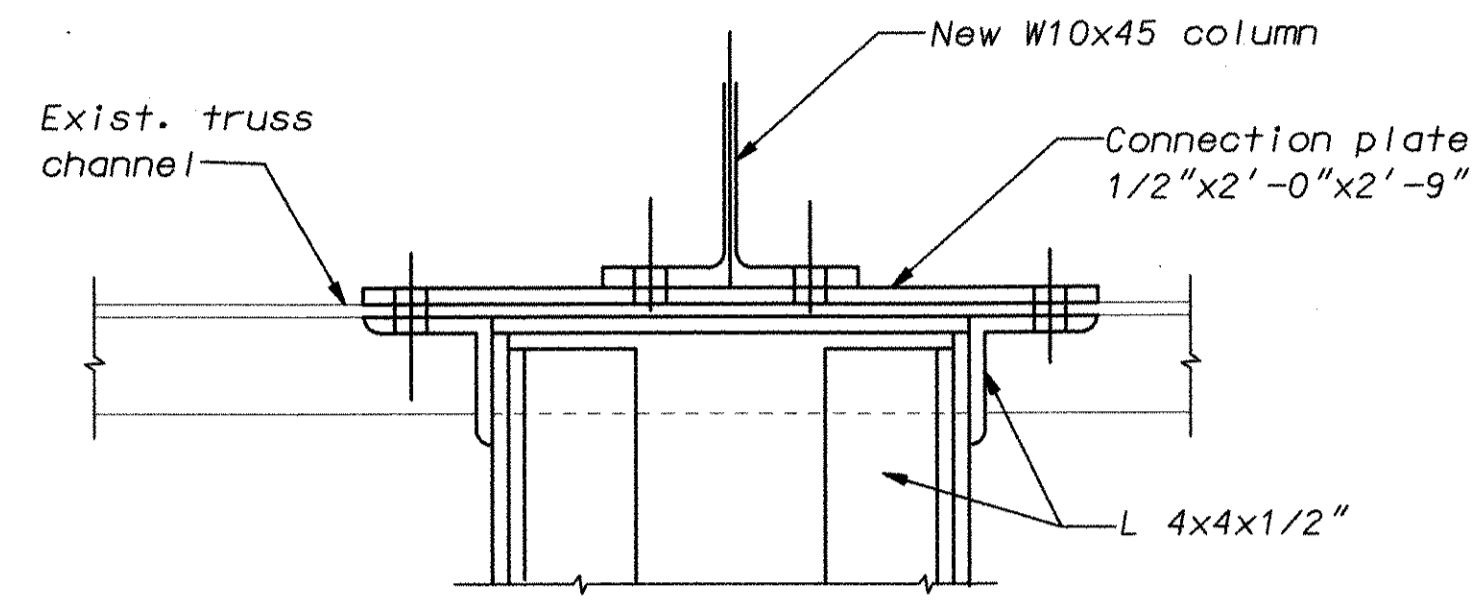
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	S.C.	BEAUFORT		US-21	12	115



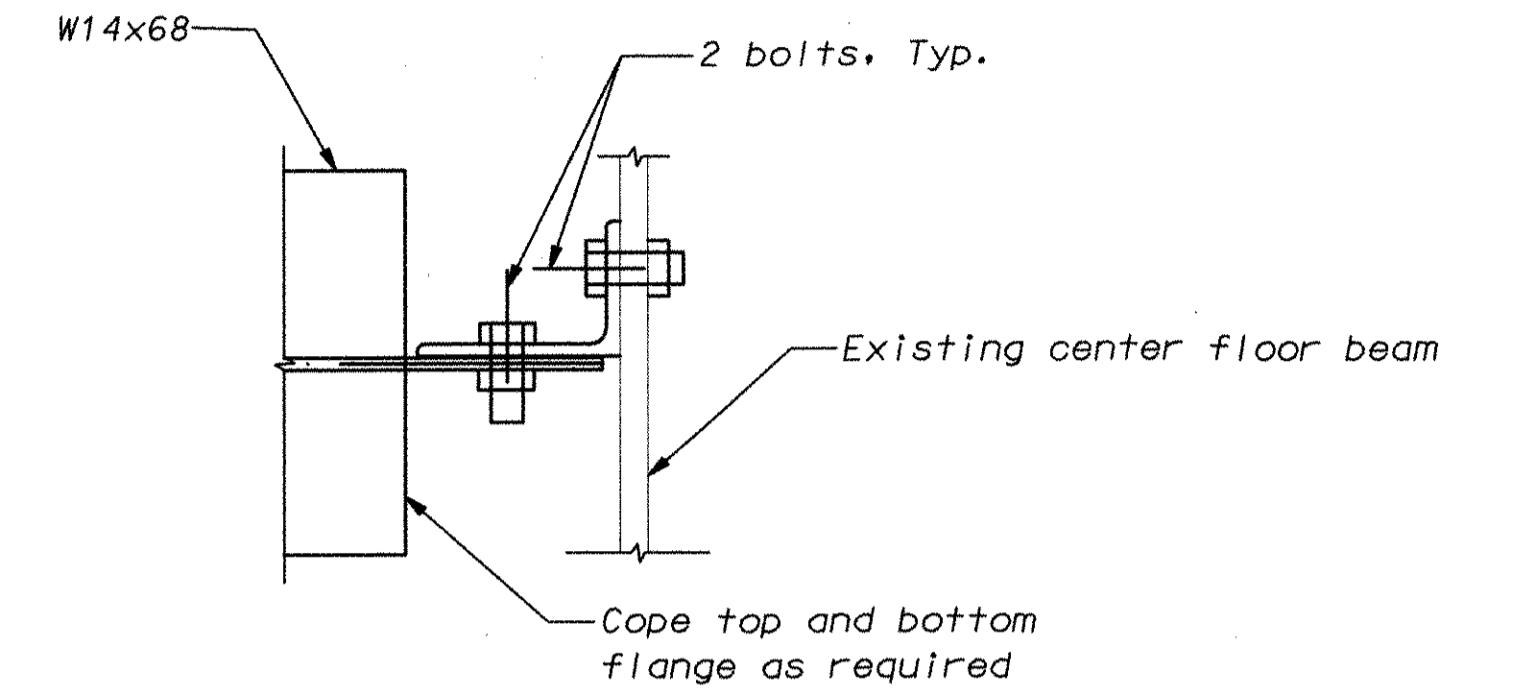
DETAIL 1



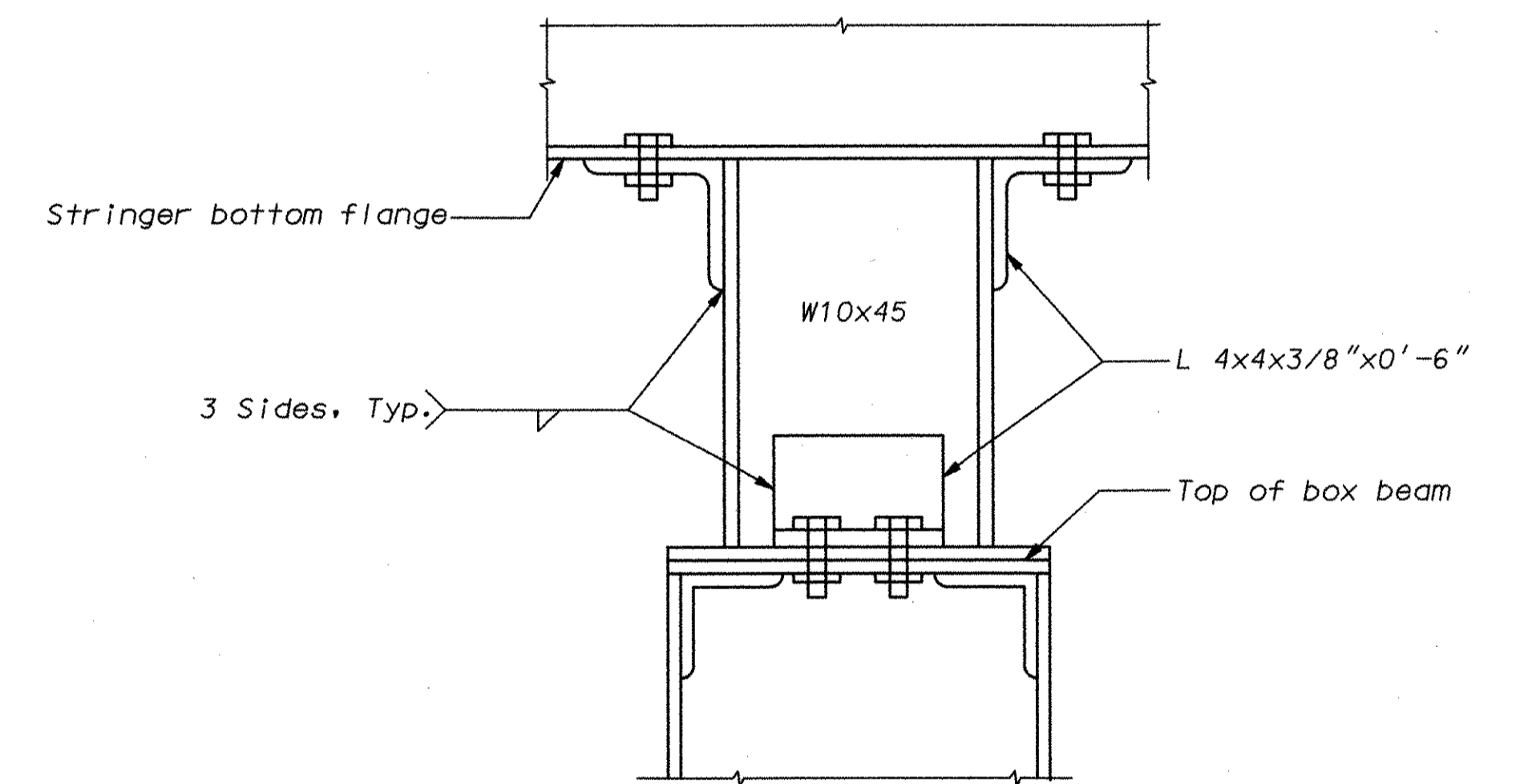
DETAIL 2



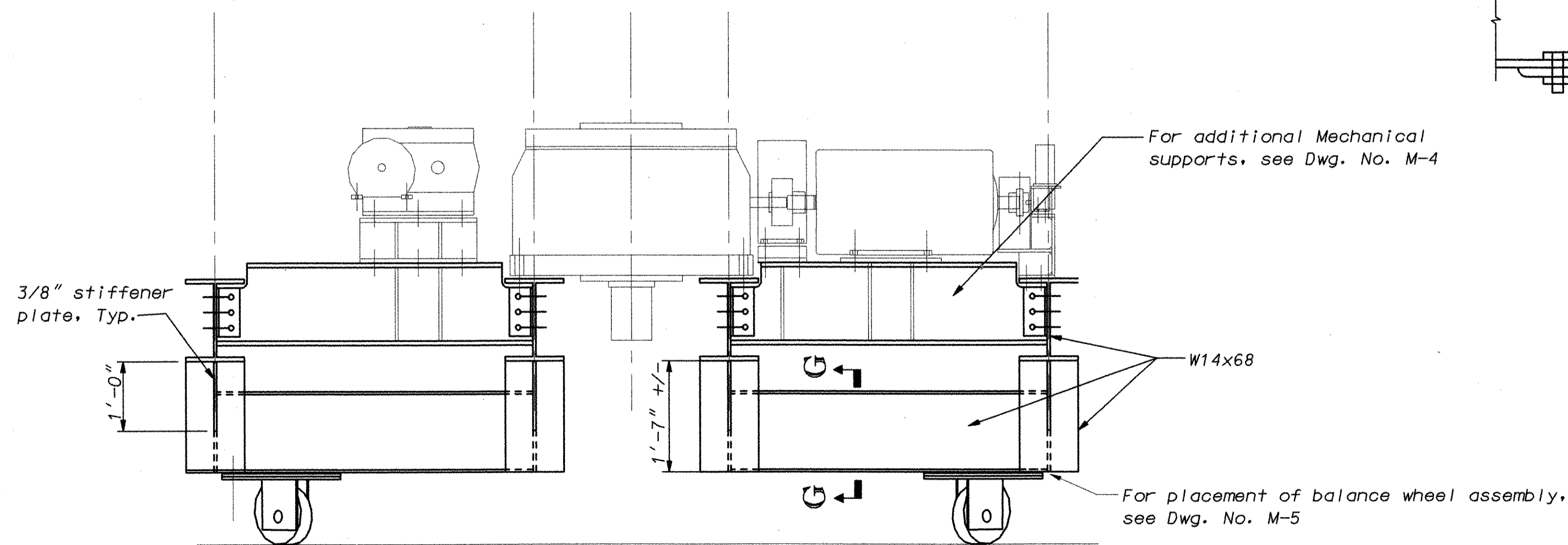
DETAIL 3



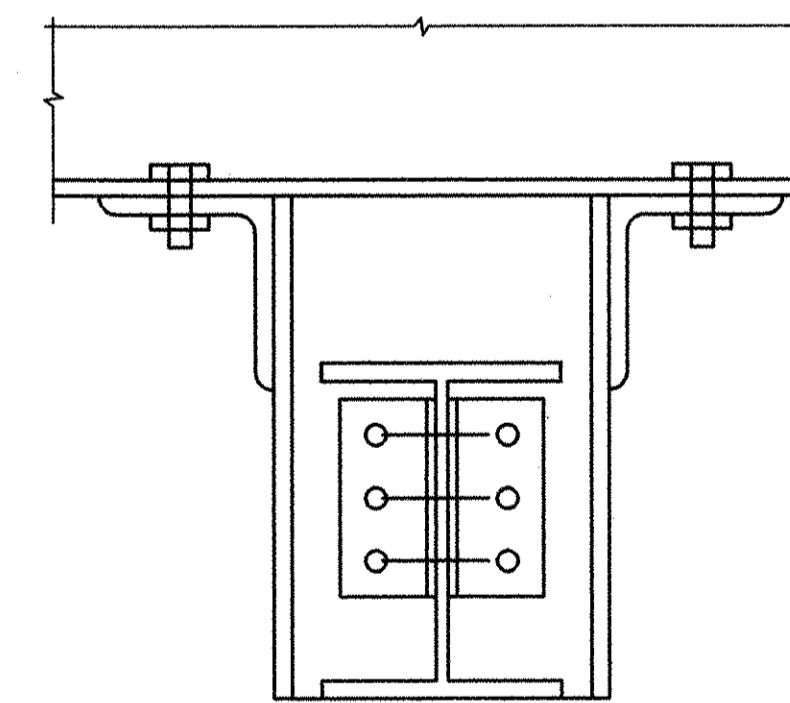
DETAIL 4



DETAIL 5



SECTION F-F

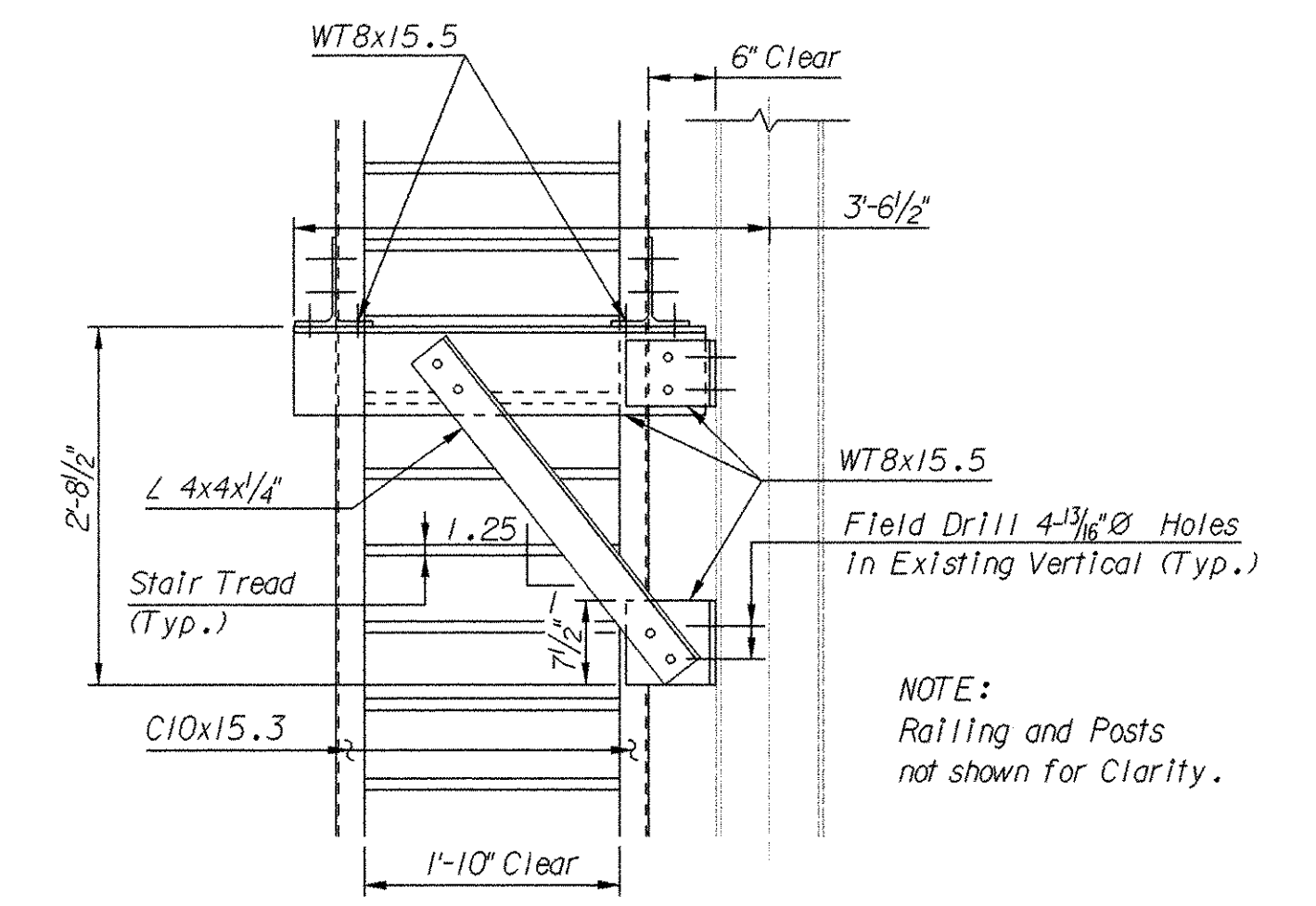
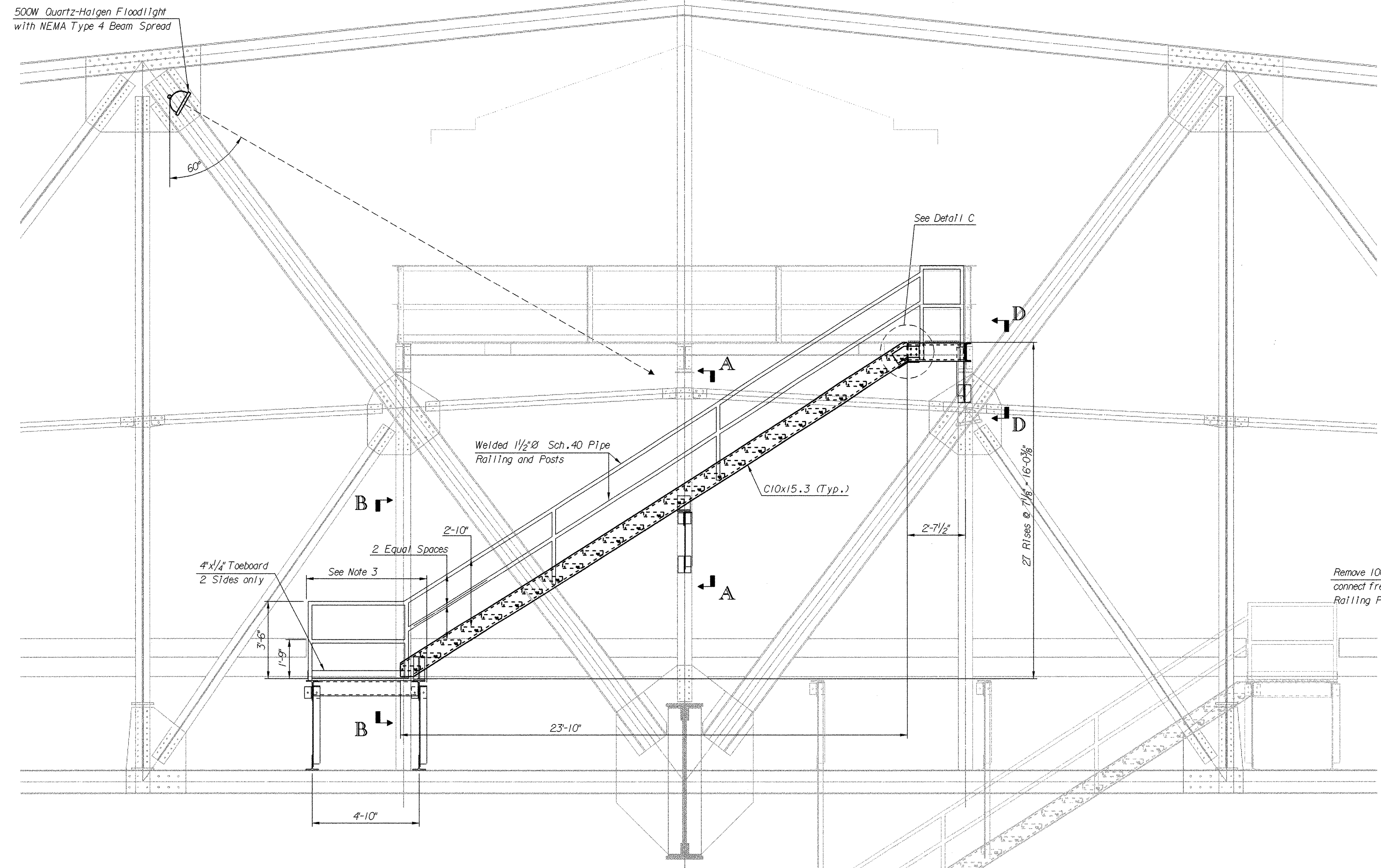


SECTION G-G

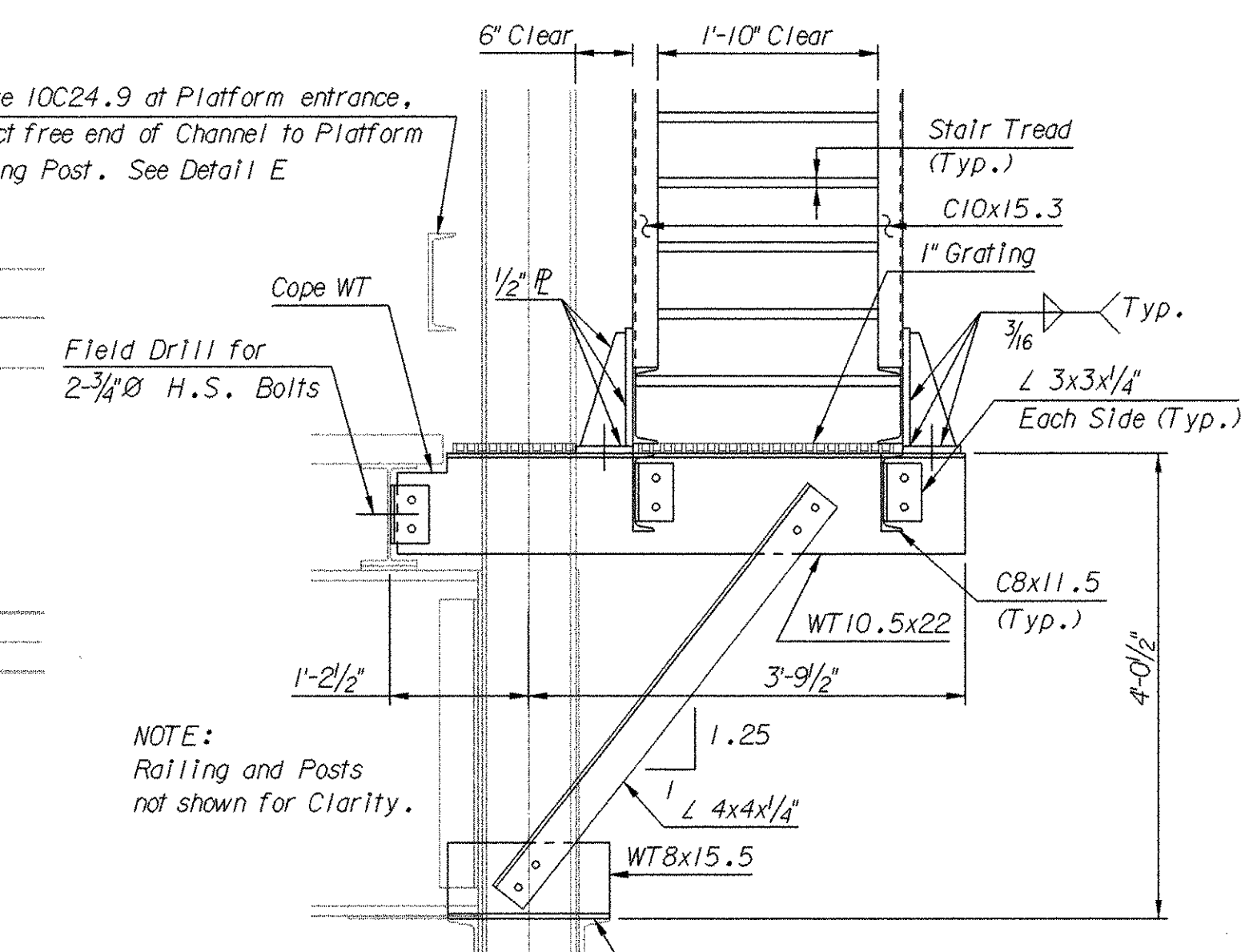
HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
LADY'S ISLAND			
NEW SPAN DRIVE SUPPORT DETAILS			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	LDP	BAM	2-97
DR.	LDP	BAM	2-97
DES.	LDP	BAM	2-97
BY	CHK.	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-8

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	13	115

QUANTITIES		
ITEM	UNIT	CONTRACT QUANTITY
Control House Stairway	LS.	Lump Sum



SECTION A-A
3/4" = 1'-0"

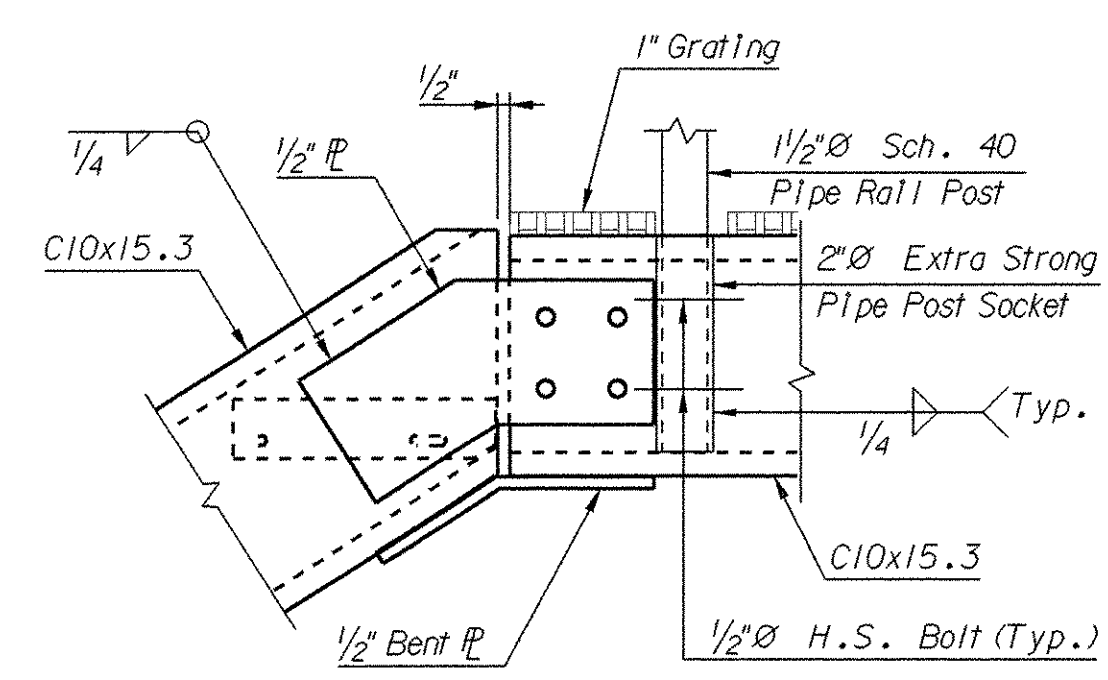


SECTION B-B
3/4" = 1'-0"

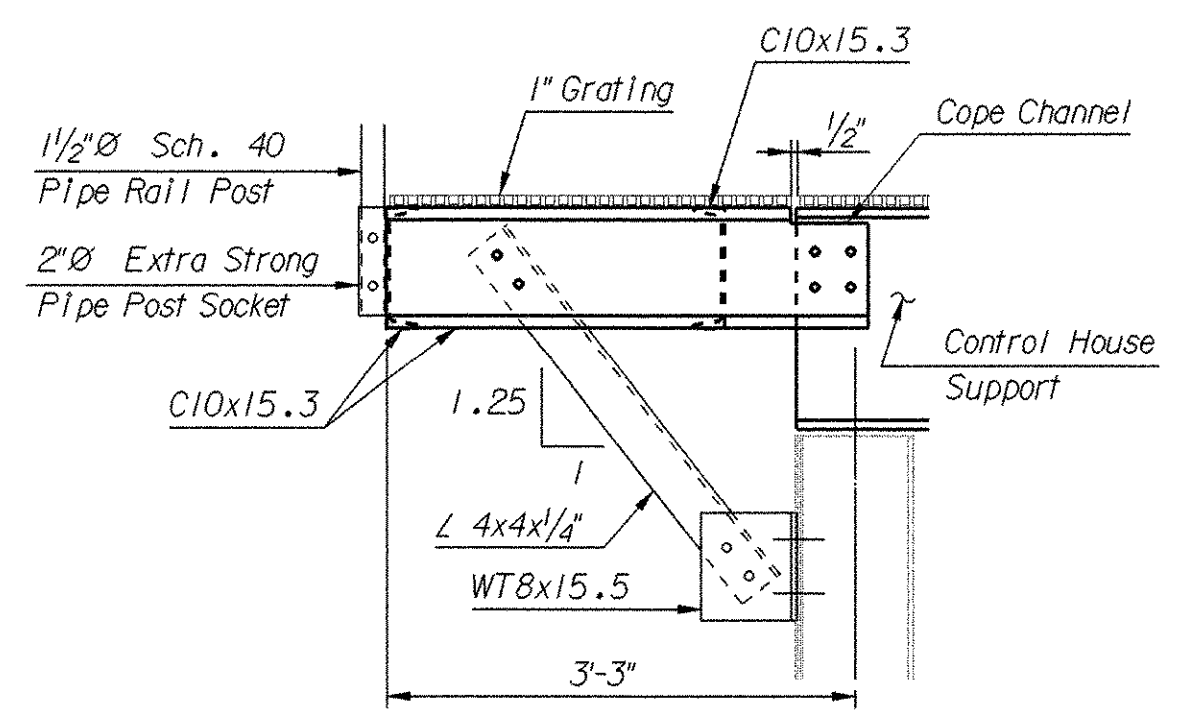
EAST ELEVATION
3/8" = 1'-0"

NOTES

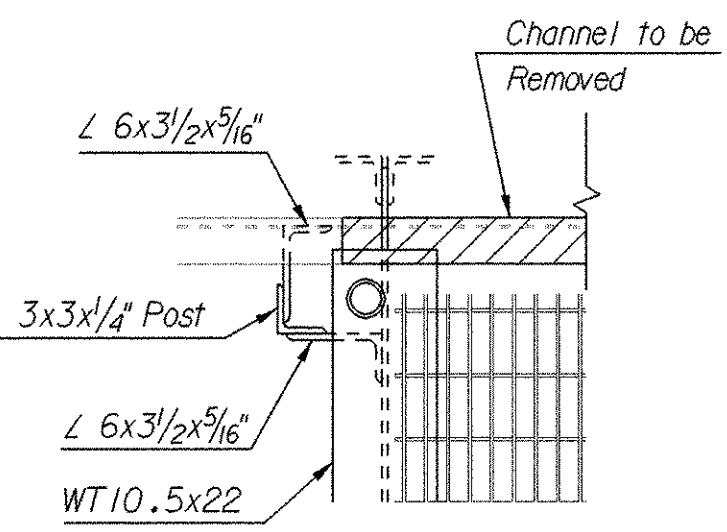
- All Bolts 3/4" High Strength Bolts.
- Existing Stairs not shown. Cost for removal of Existing Stairs to be included in Pay Item Control House Support and Platform.
- Contractor to install this portion of Stairs first for utilization of Temporary Electrical Work. Mount Electrical Cabinets to Existing Truss Members.
- Cost for installation of Floodlight and related electrical work shall be included in Section 610.
- Material for Control House Stairway shall include Stairs, Landings, Railing and Supporting Members.



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



SECTION D-D
3/4" = 1'-0"



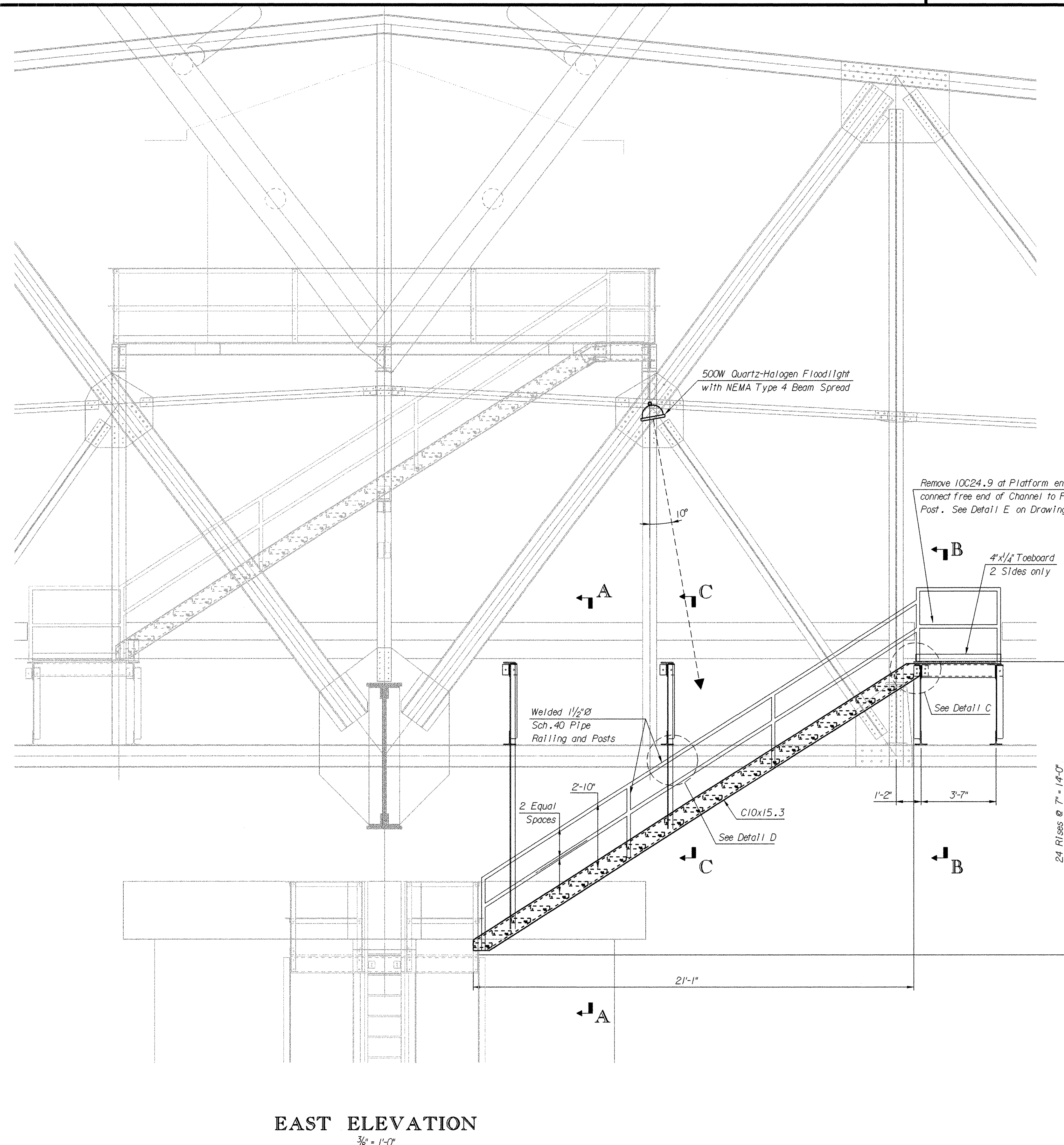
DETAIL E
1" = 1'-0"

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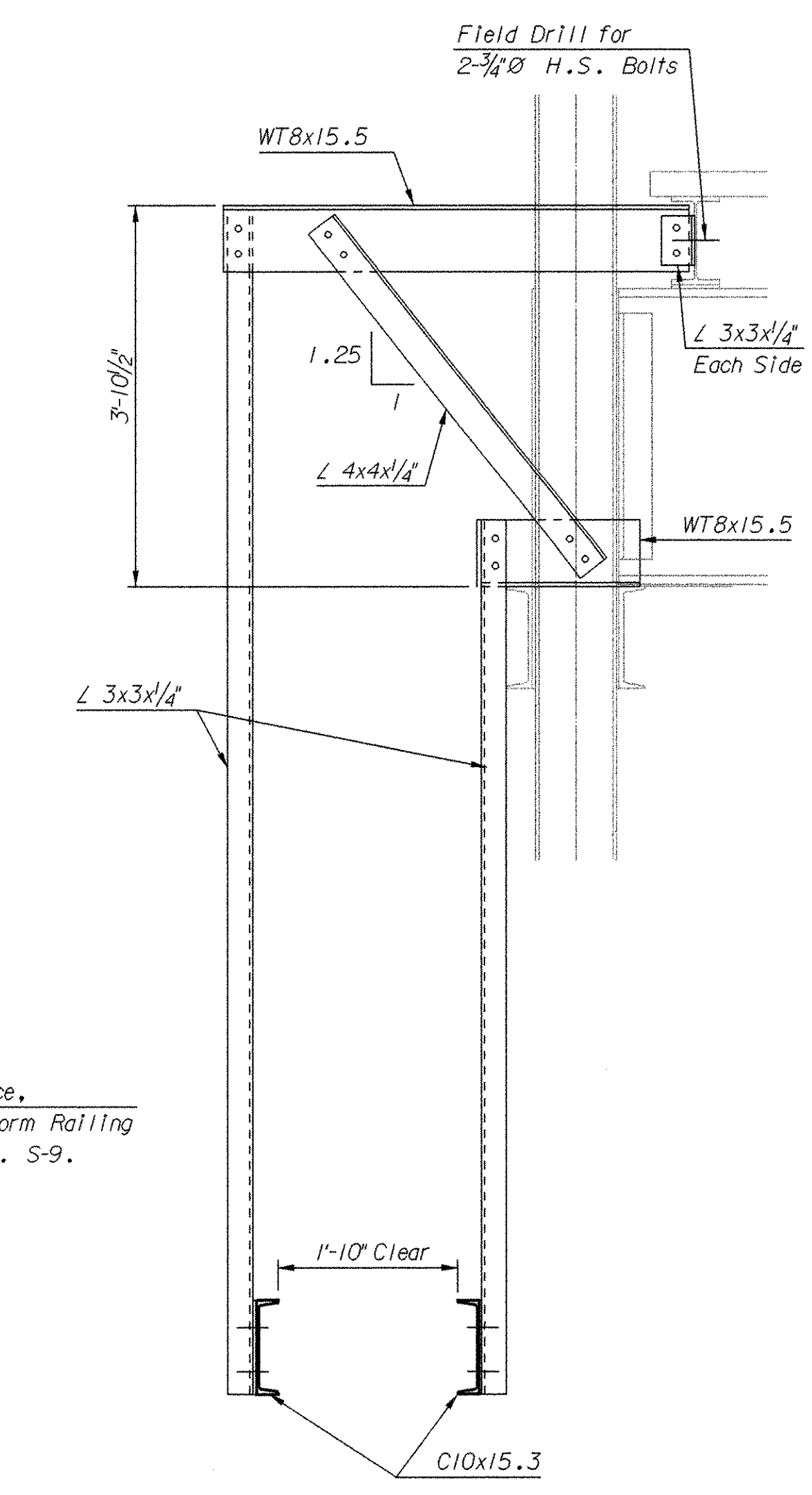
HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C. LADY'S ISLAND			
CONTROL HOUSE STAIRWAY			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	EK	SN	2-97
DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-9

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	14	116

QUANTITIES		
I T E M	UNIT	CONTRACT QUANTITY
Pivot Pier Stairway	L.S.	Lump Sum

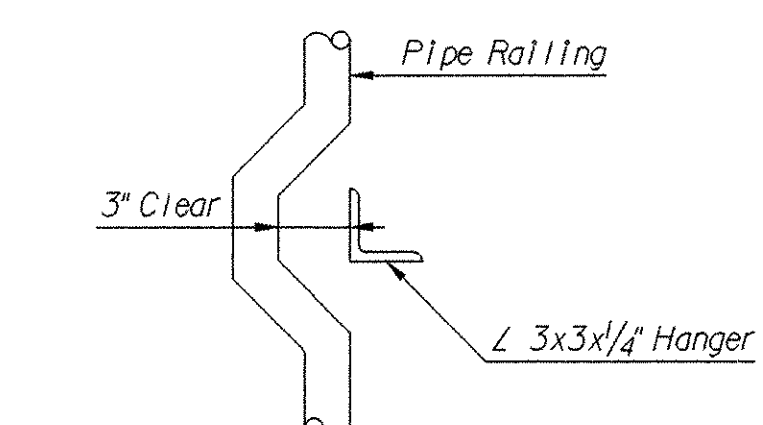


EAST ELEVATION
3/8" = 1'-0"

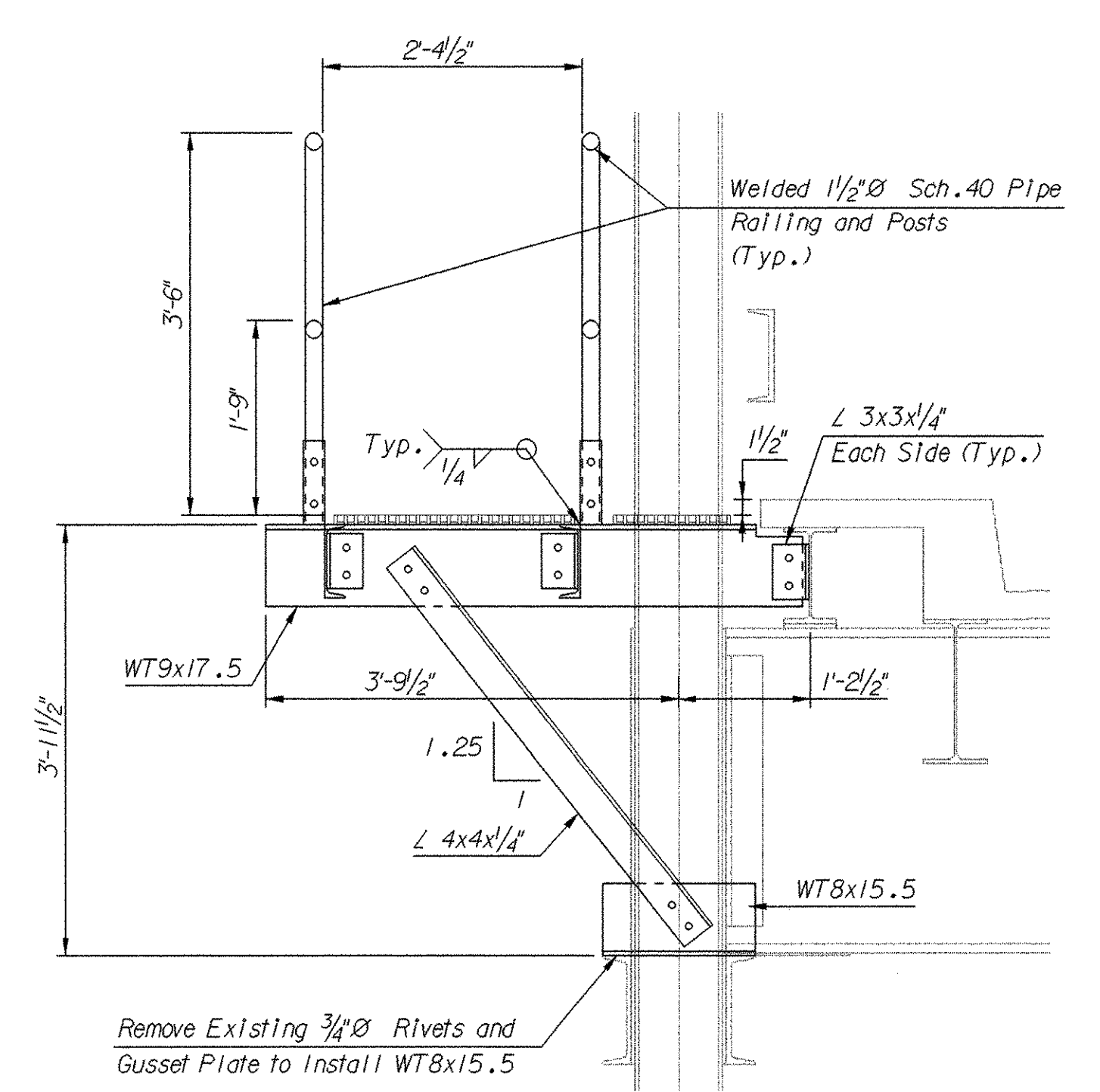


SECTION A-A
3/4" = 1'-0"

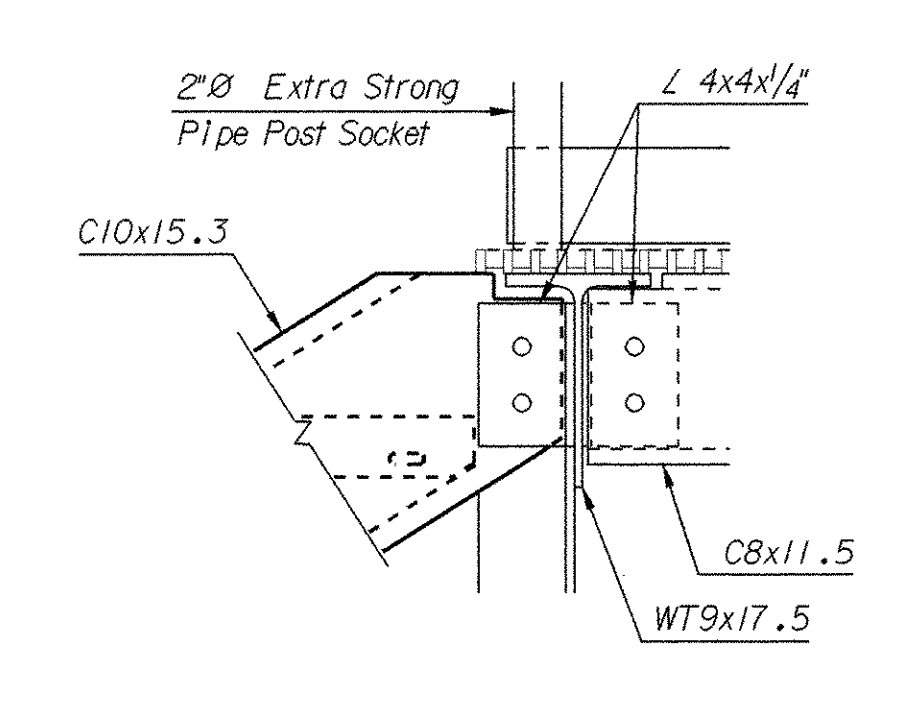
NOTE:
Section C-C Similar



DETAIL D
(Typical Railing at Hanger)
1/2" = 1'-0"



SECTION B-B
3/4" = 1'-0"



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

NOTES

- All Bolts 3/4" High Strength Bolts.
- Material for Pivot Pier Stairway shall include Stairs, Top Landing, Railing and Supporting Members which fasten Stairway to Swing Span and existing Structural Steel.
- Cost for Installation of Floodlight and related electrical work shall be included in Section 610.

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LADY'S ISLAND

PIVOT PIER STAIRWAY

REV.	BY	CHK.	DATE

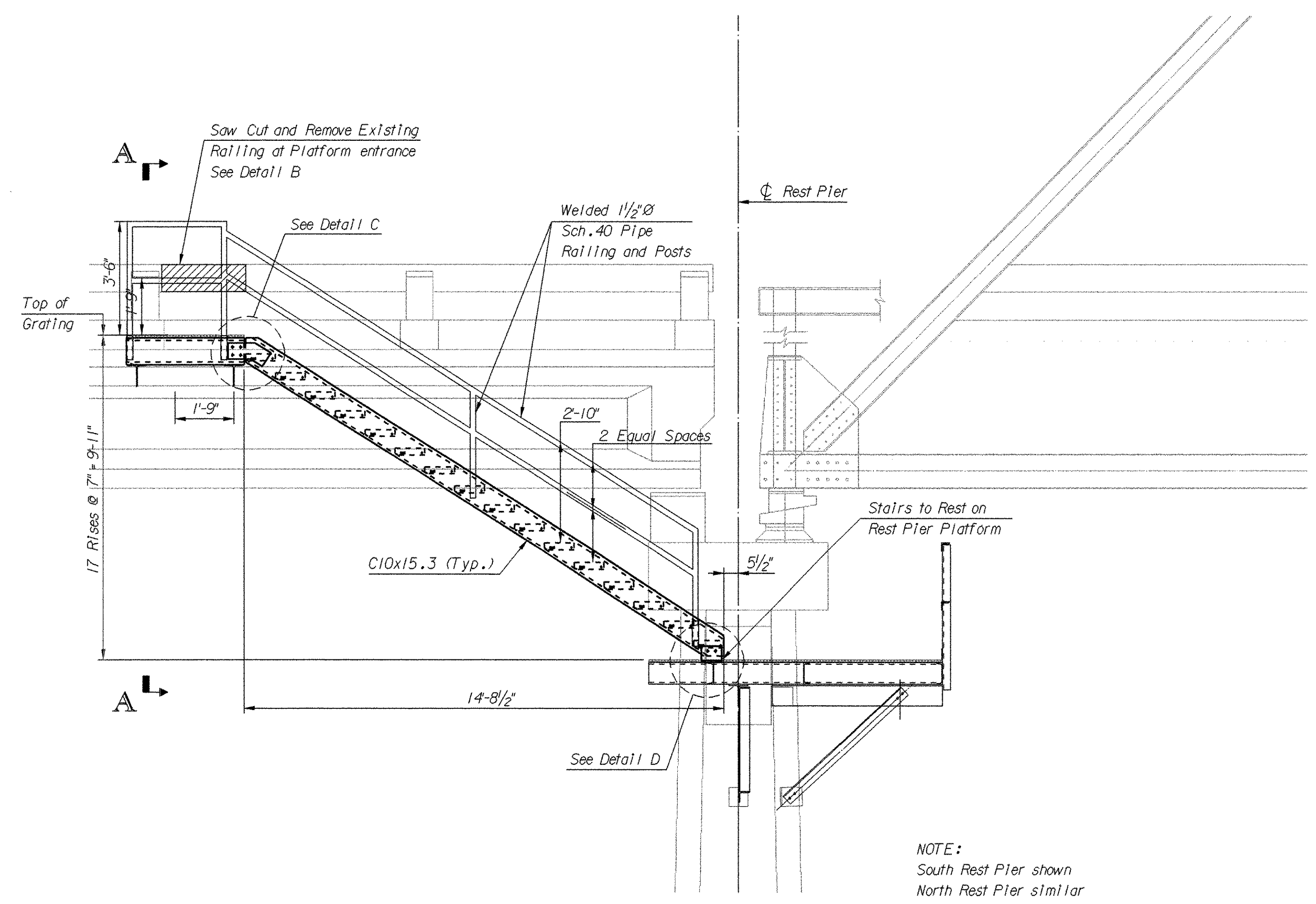
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DR.	RM	SN	2-97
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BY	CHK.	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-10

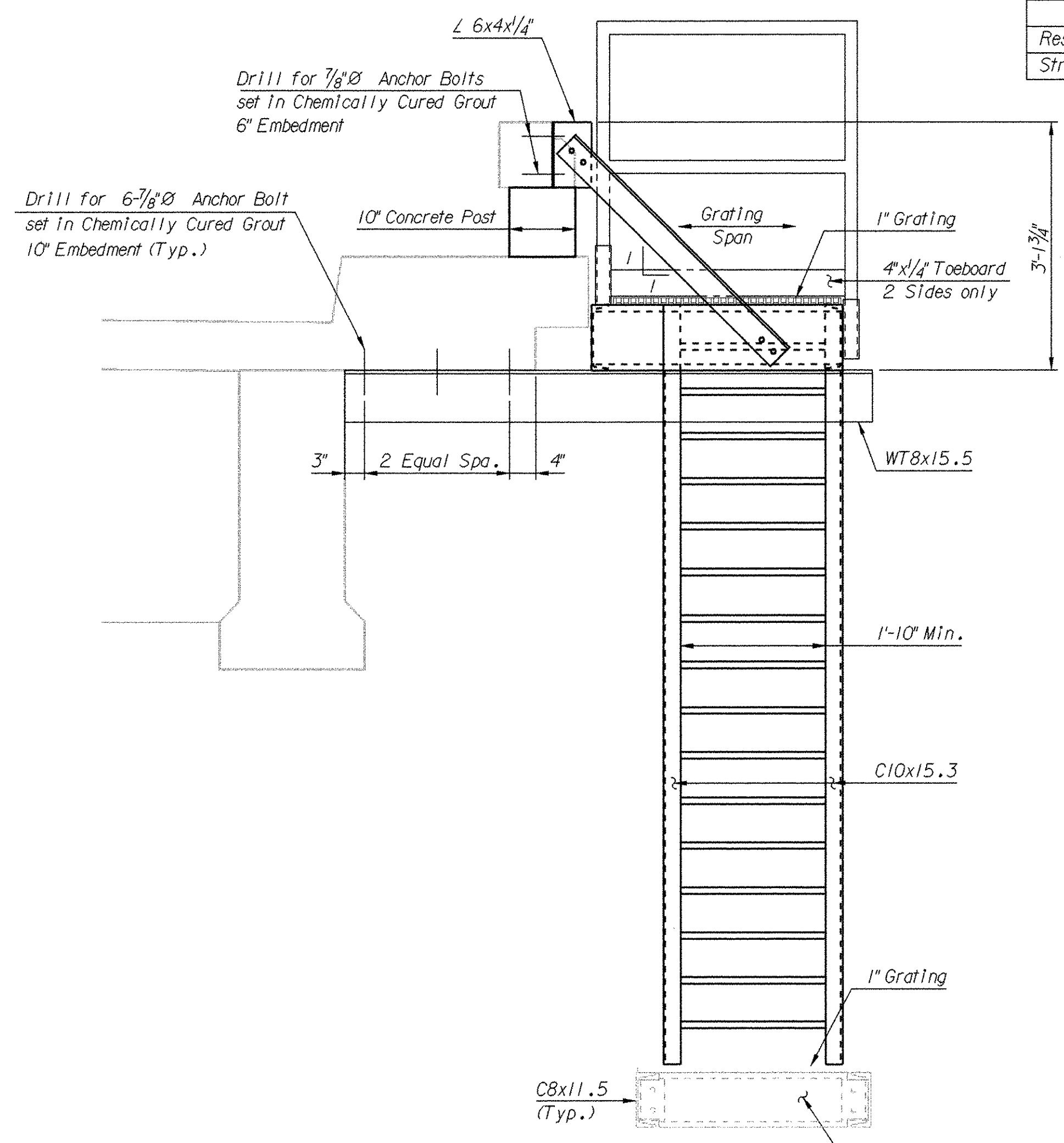
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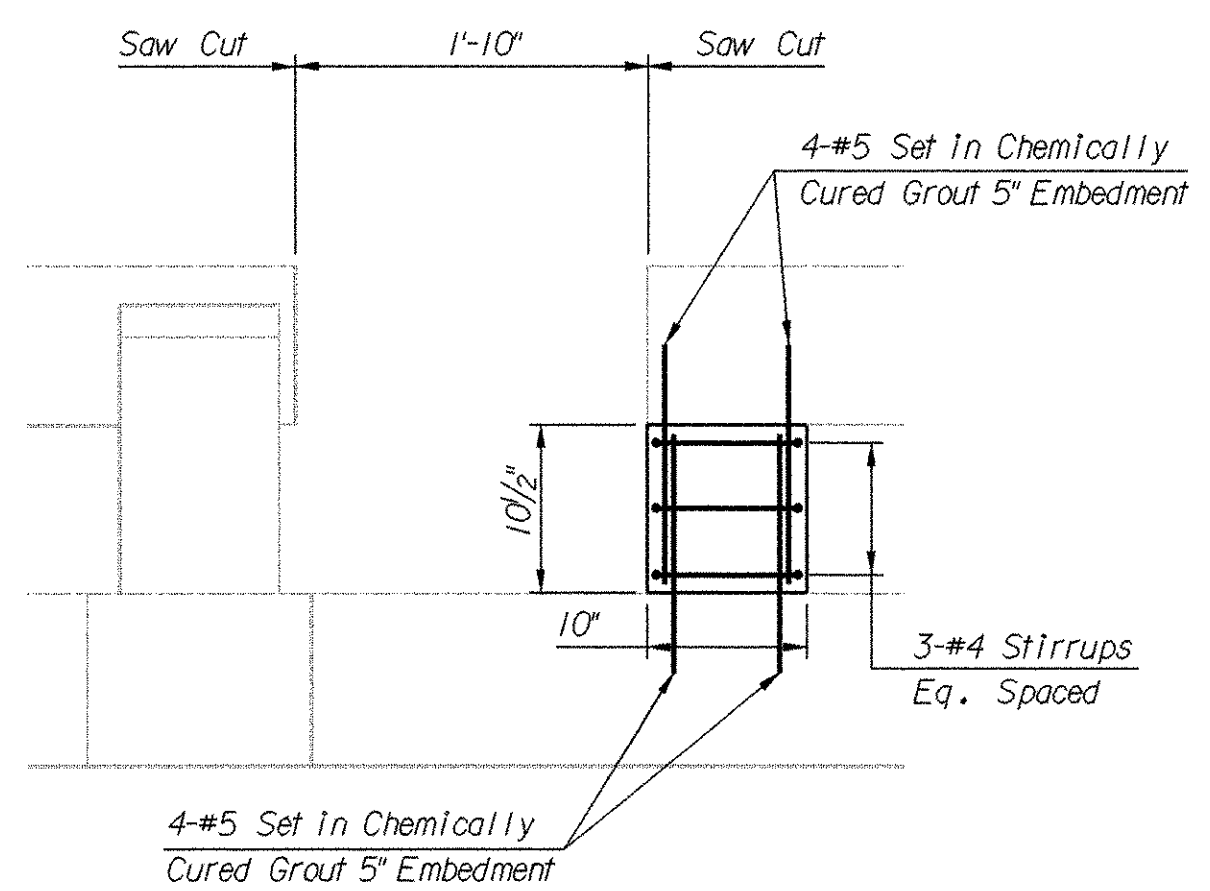
QUANTITIES		
I T E M	UNIT	CONTRACT QUANTITY
Rest Pier Platform	L.S.	Lump Sum
Structural Concrete	C.F.	1.0



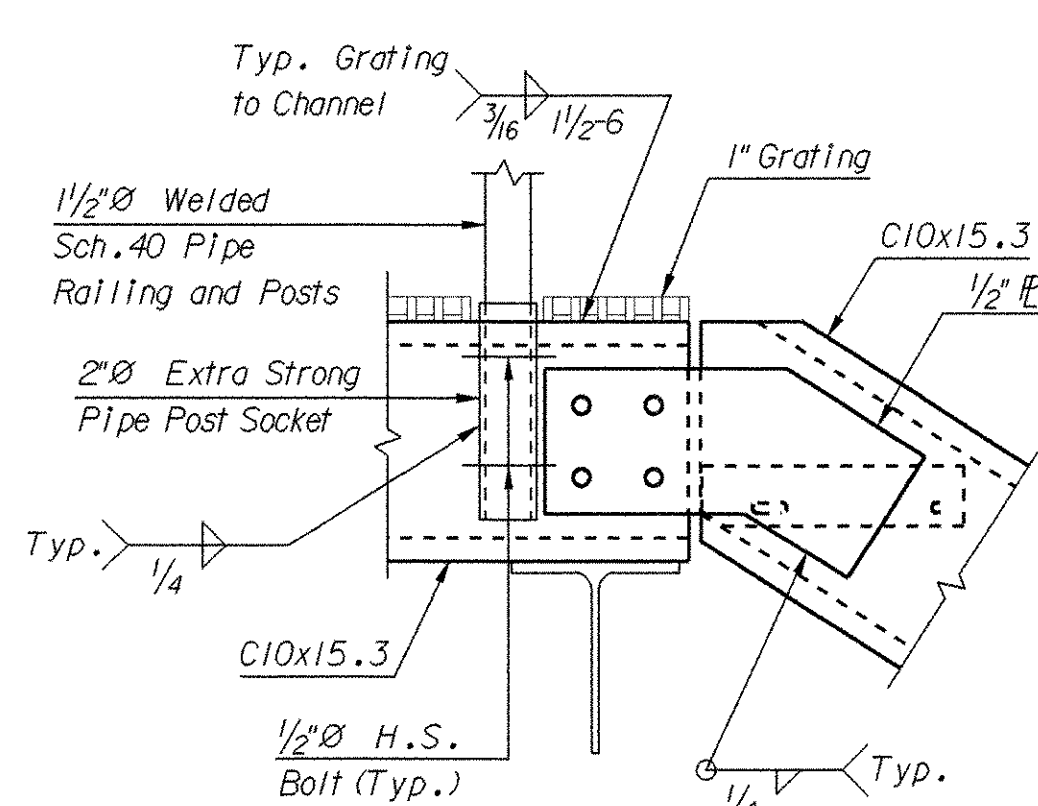
EAST ELEVATION
3/8" = 1'-0"



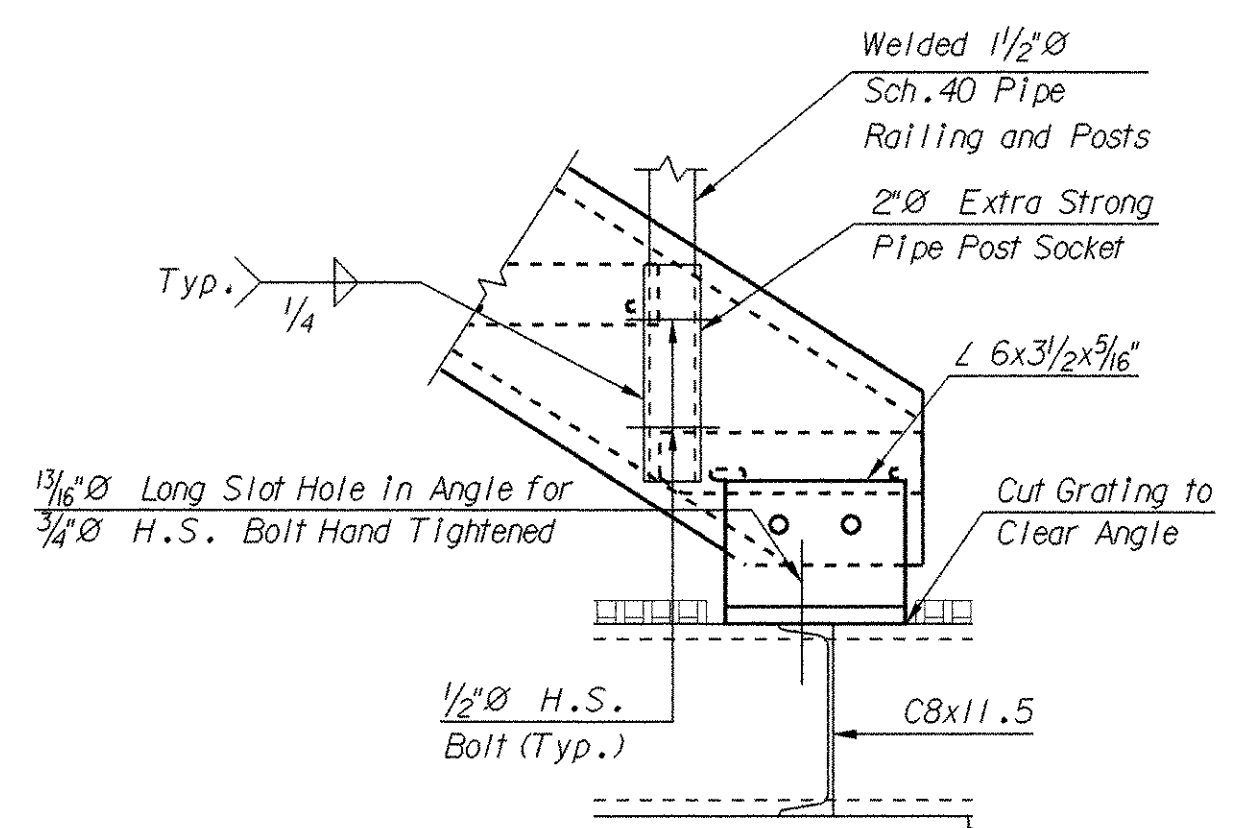
SECTION A-A
3/4" = 1'-0"



DETAIL B
3/4" = 1'-0"



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



DETAIL D
3/4" = 1'-0"

NOTES

- All Bolts 3/4" High Strength Bolts.
- See Electrical Drawing for Platform Lighting.
- For Details of Rest Pier Platform, see Drawing No. S-13.
- Cost for C8x11.5 under Stair shall be Included in Pay Item Rest Pier Platform.
- Material for Rest Pier Stairway shall include Stairs and Supporting members which fasten Stairway to Approach Walkway and Existing Structure.

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LADY'S ISLAND

REST PIER STAIRWAY

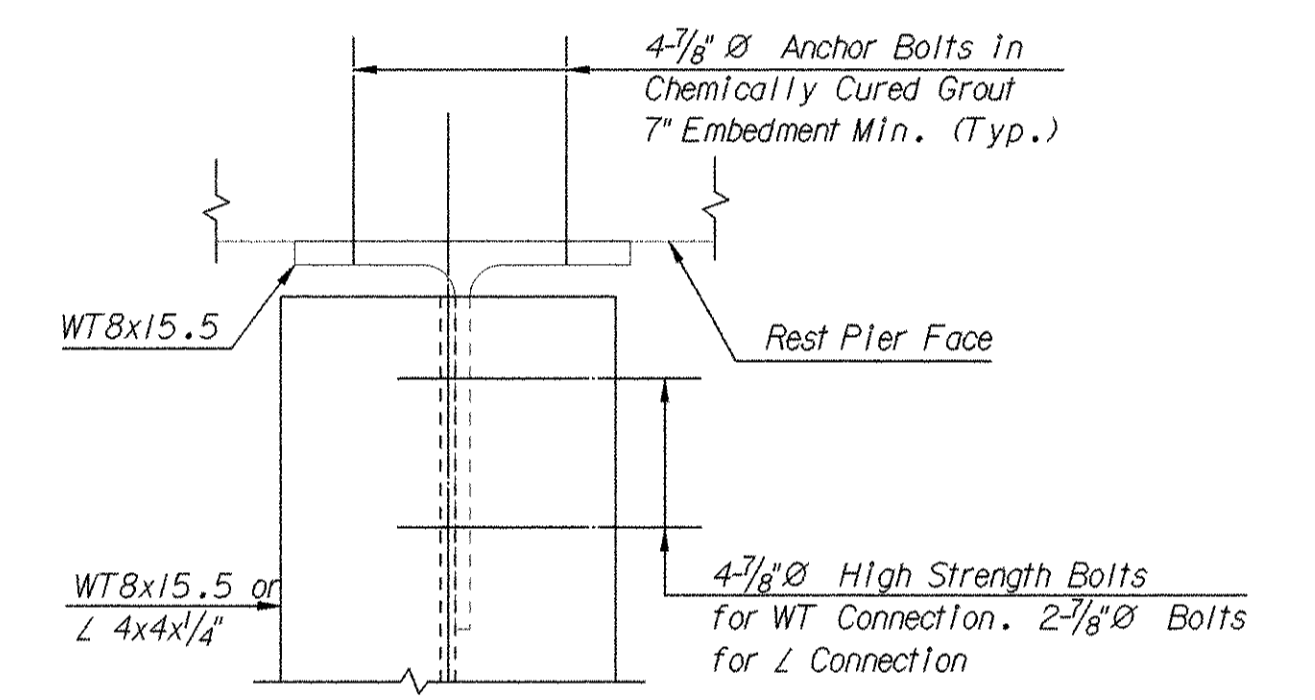
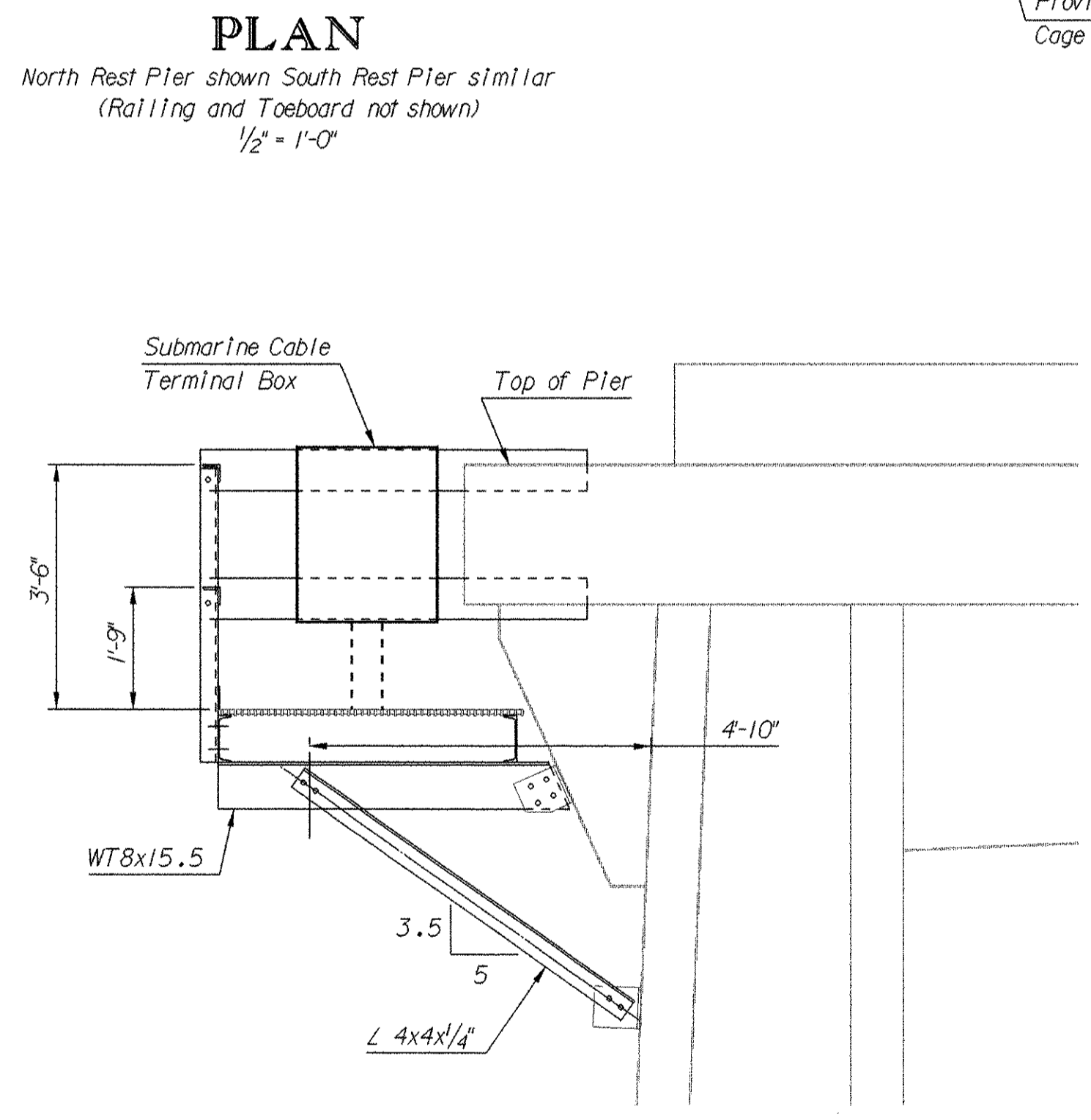
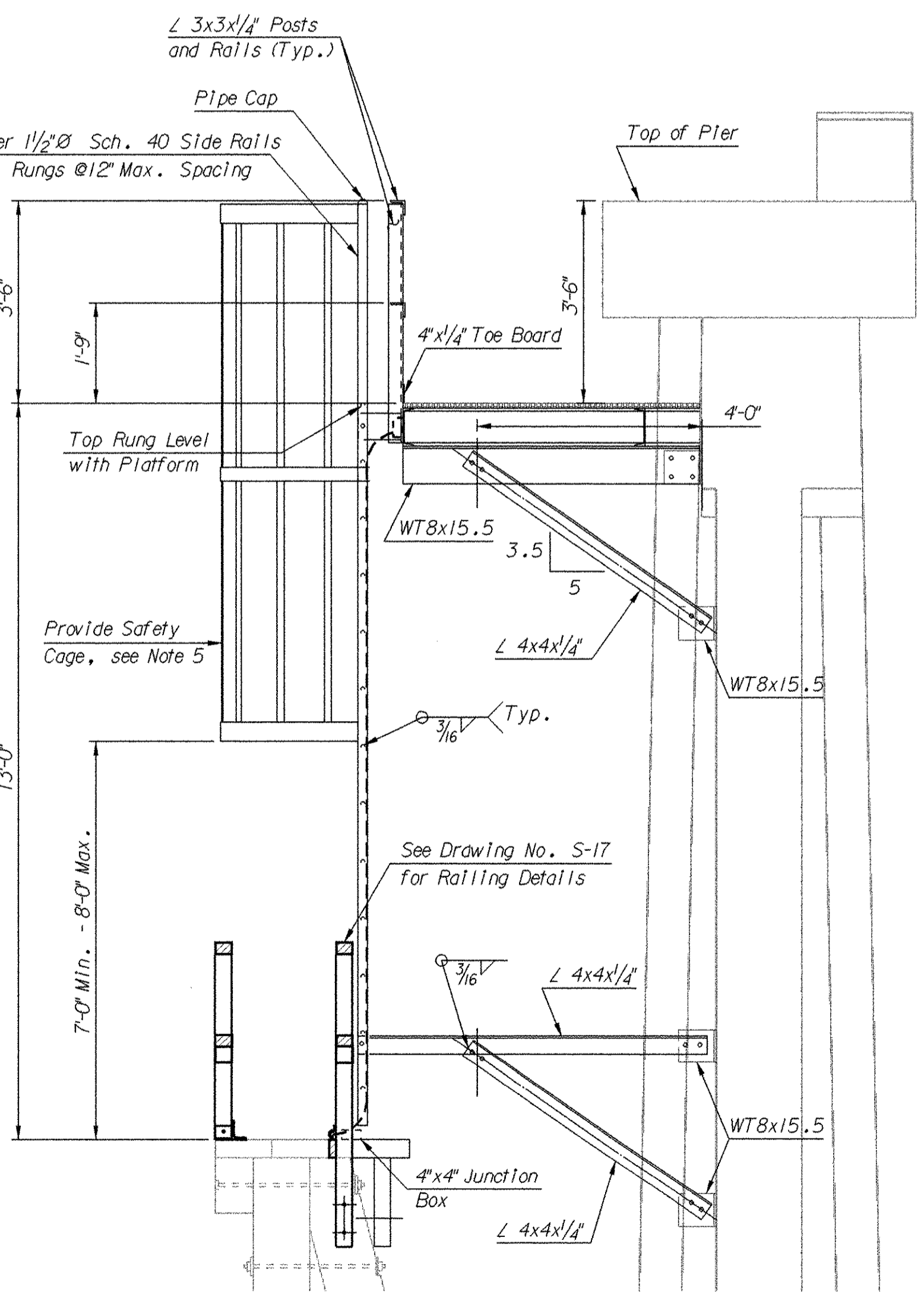
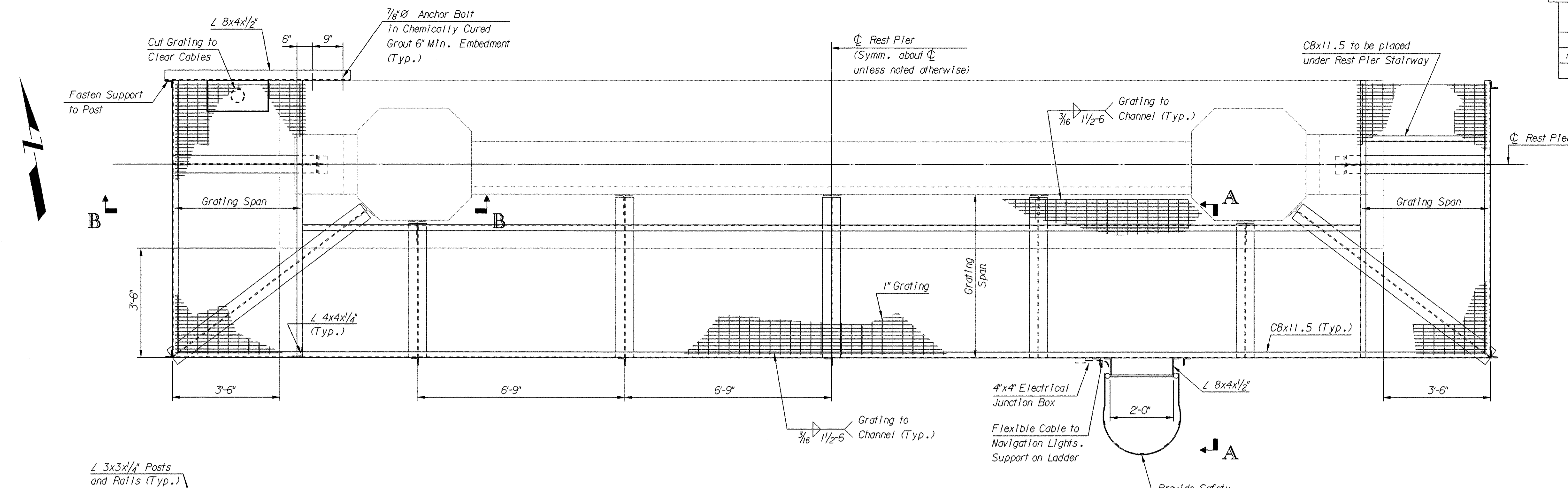
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BY	CHK.	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-11

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FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	17	115

QUANTITIES		
ITEM	UNIT	CONTRACT QUANTITY
Rest Pier Platform	L.S.	Lump Sum



TYPICAL PIER CONNECTION

NOTES

- All Bolts 3/4" High Strength Bolts unless noted otherwise.
- Cost to remove Existing Ladder and Install New Ladder to Fender to be included in Pay Item Rest Pier Platform.
- Cost for Junction Box and Flexible Cable to Navigation Lights to be included in Pay Item Bridge Control System.
- Cost for Submarine Cable Terminal Box Support to be included in Pay Item Rest Pier Platform. Terminal Box to be paid for under Pay Item Submarine Cable.
- Furnish and Install a Ladder Cage conforming to OSHA 1910.27 to be approved by the Engineer.

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LADY'S ISLAND

REST PIER
PLATFORM

REV.			
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REVIEWED			
QUAN.	EK	SN	2-97
DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

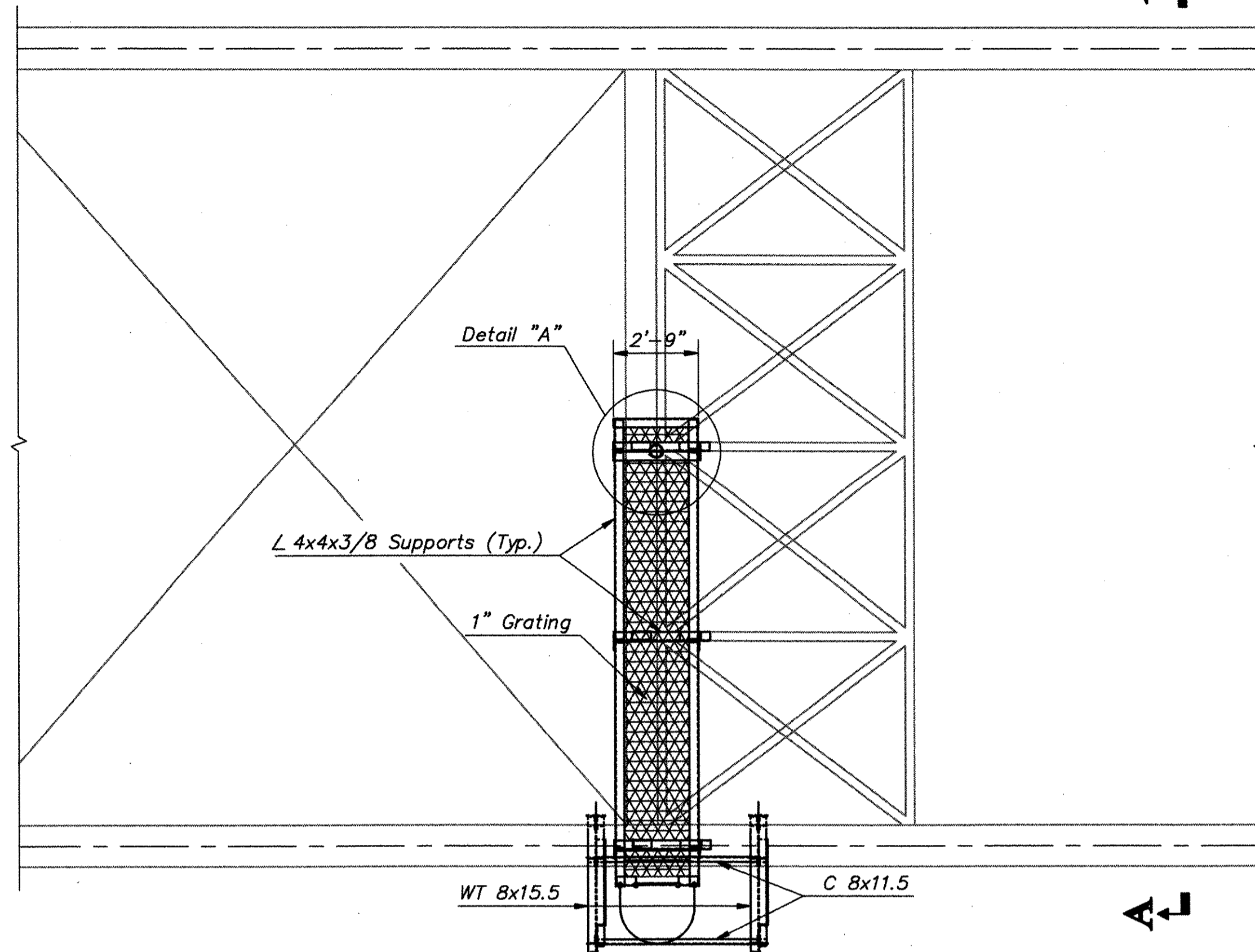
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	US-21	BEAUFORT	S-15

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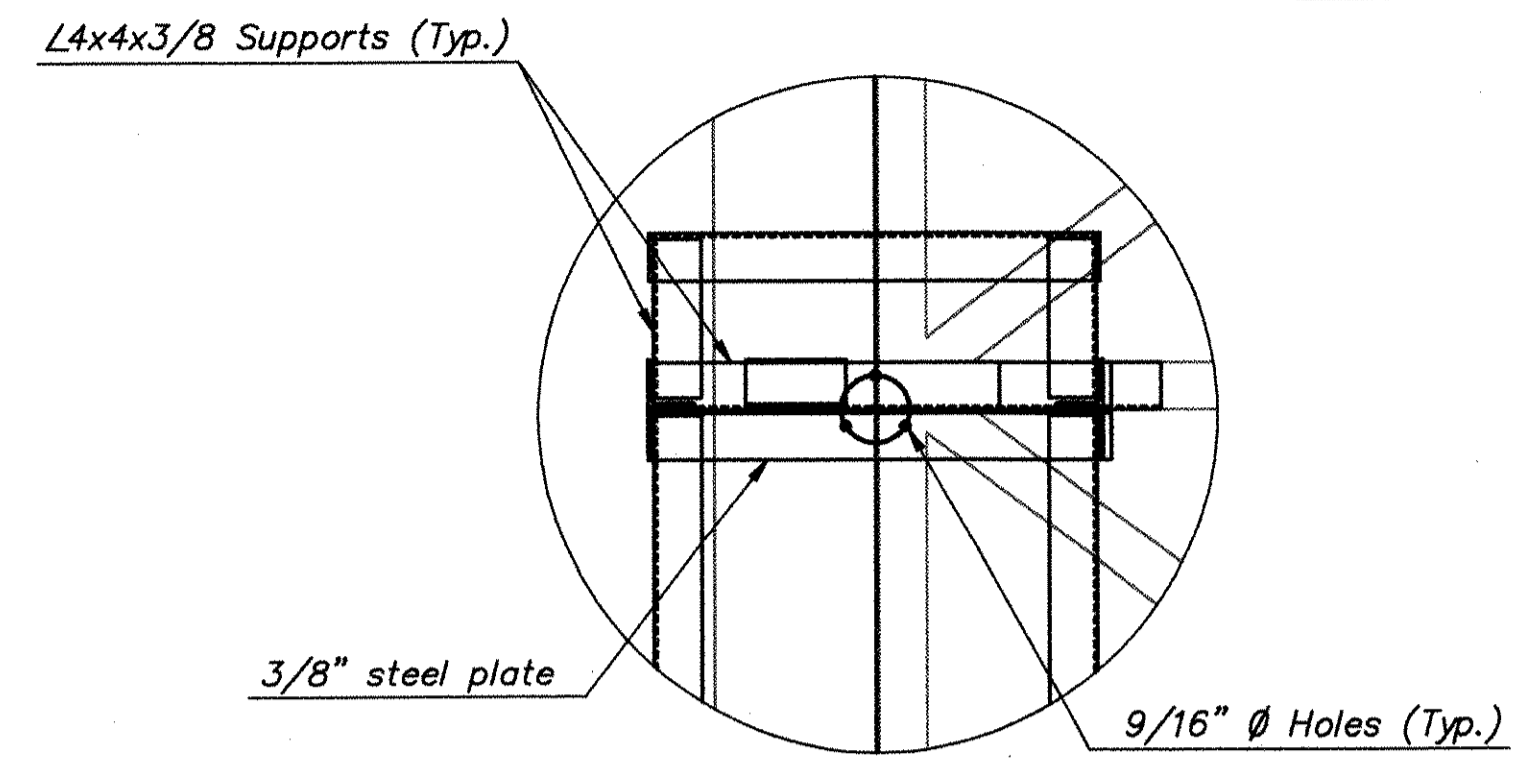
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	S.C.	BEAUFORT		U.S. 21	18	116

QUANTITIES

ITEM	UNIT	CONTRACT QUANTITY
End Light Access (1,857 Lbs.)	L.S.	L.S.

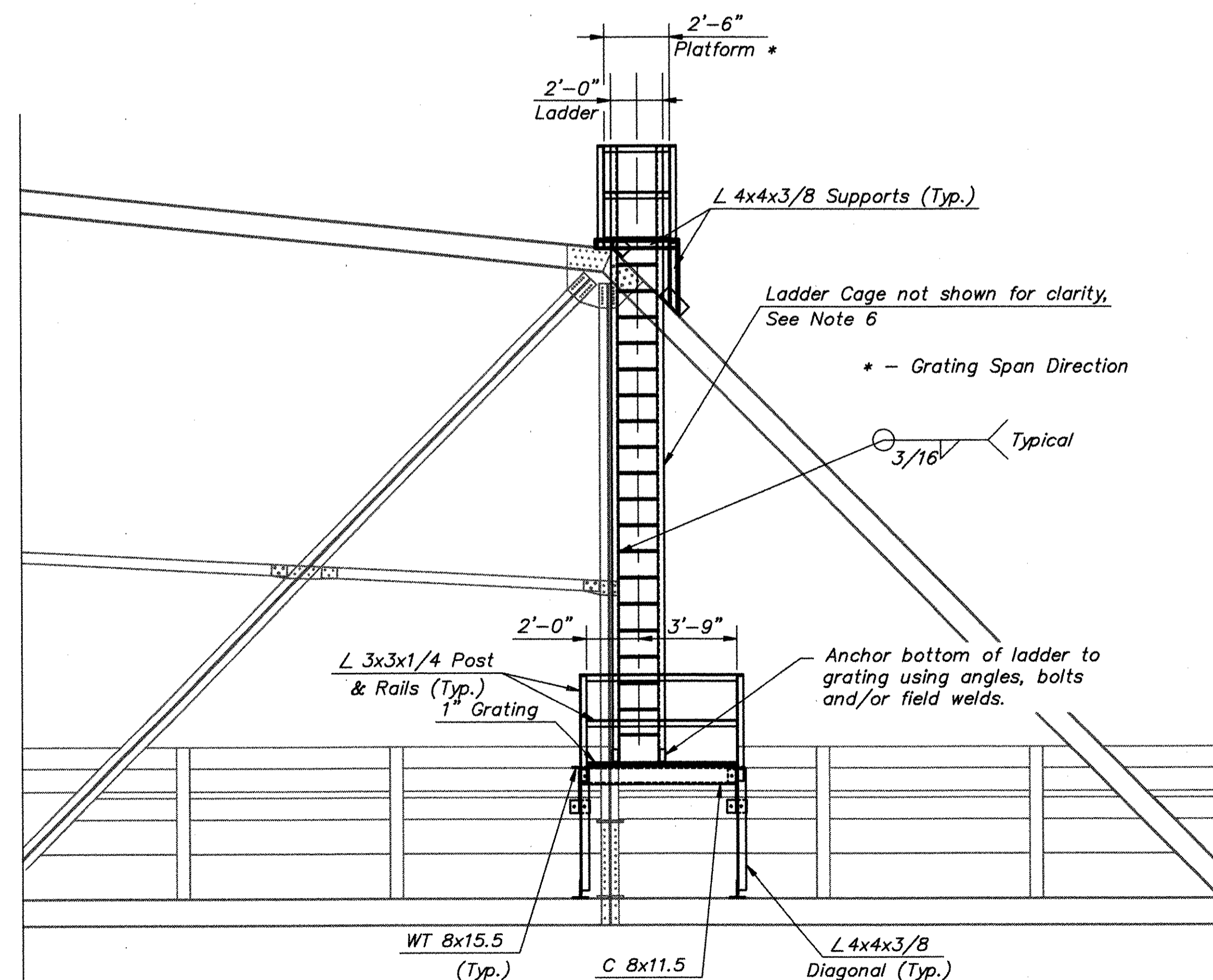


PLAN
(Horizontal Rails not shown)
(North end shown, South end similar, opposite hand)

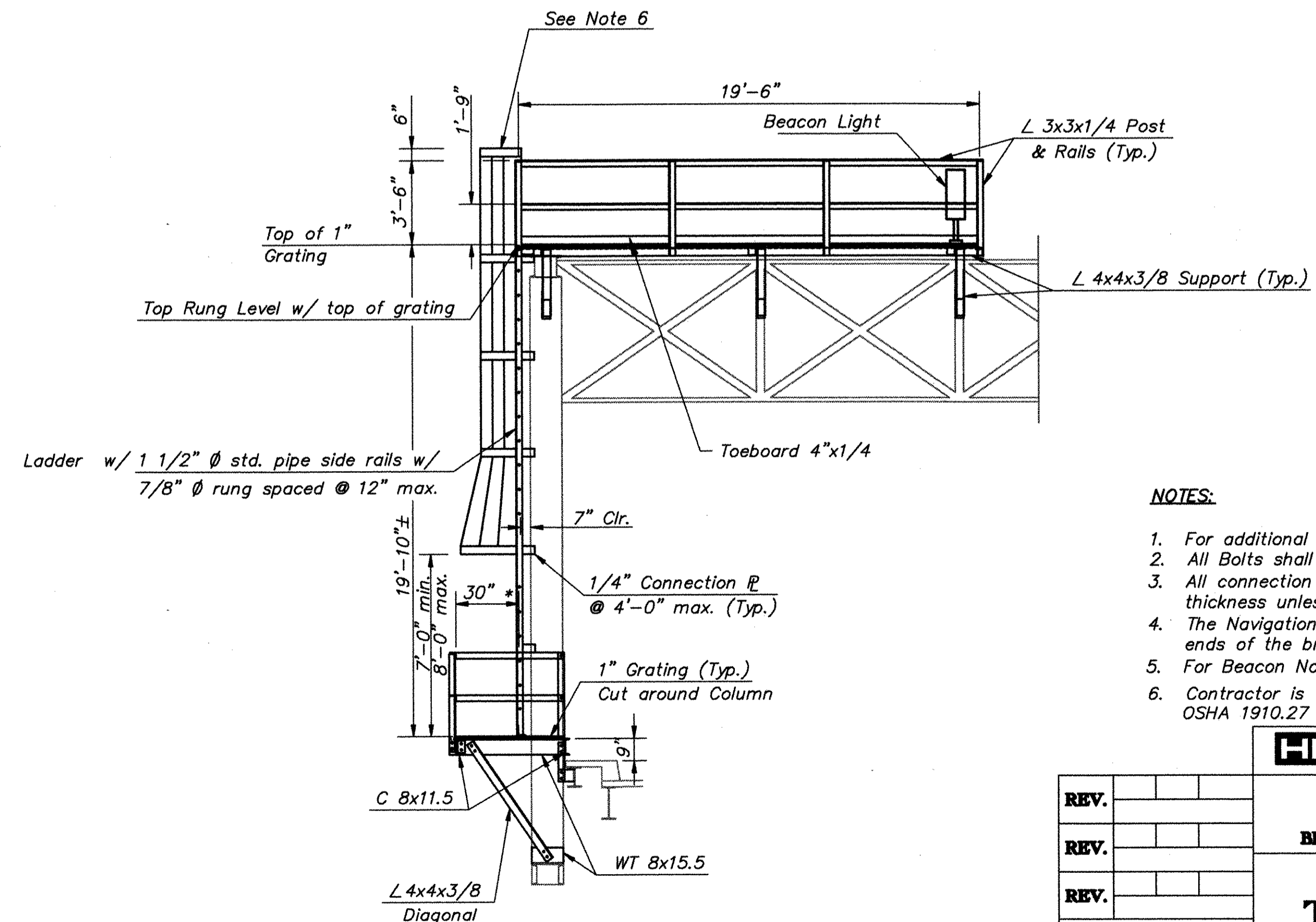


3/8" steel plate shall be securely connected to the 4x4x3/8 angle support frame. This will provide a level base for the connection of the end span light. Mounting of the end span light will require three 1/2" ϕ bolts spaced evenly about a 5.75" dia. circular pattern.

DETAIL "A"



ELEVATION



VIEW A-A

NOTES:

- For additional railing notes, see Dwg. No. G-5
- All Bolts shall be 3/4" Dia. bolts, unless otherwise noted.
- All connection angles and plates shall be a minimum of 3/8" thickness unless otherwise noted.
- The Navigational Beacon Access as shown shall be required at ends of the bridge.
- For Beacon Notes, see Dwg. No. S-16.
- Contractor is to furnish and install a ladder cage conforming to OSHA 1910.27 to be approved by the Engineer.

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LADY'S ISLAND

TRUSS NAVIGATIONAL BEACON ACCESS - 1

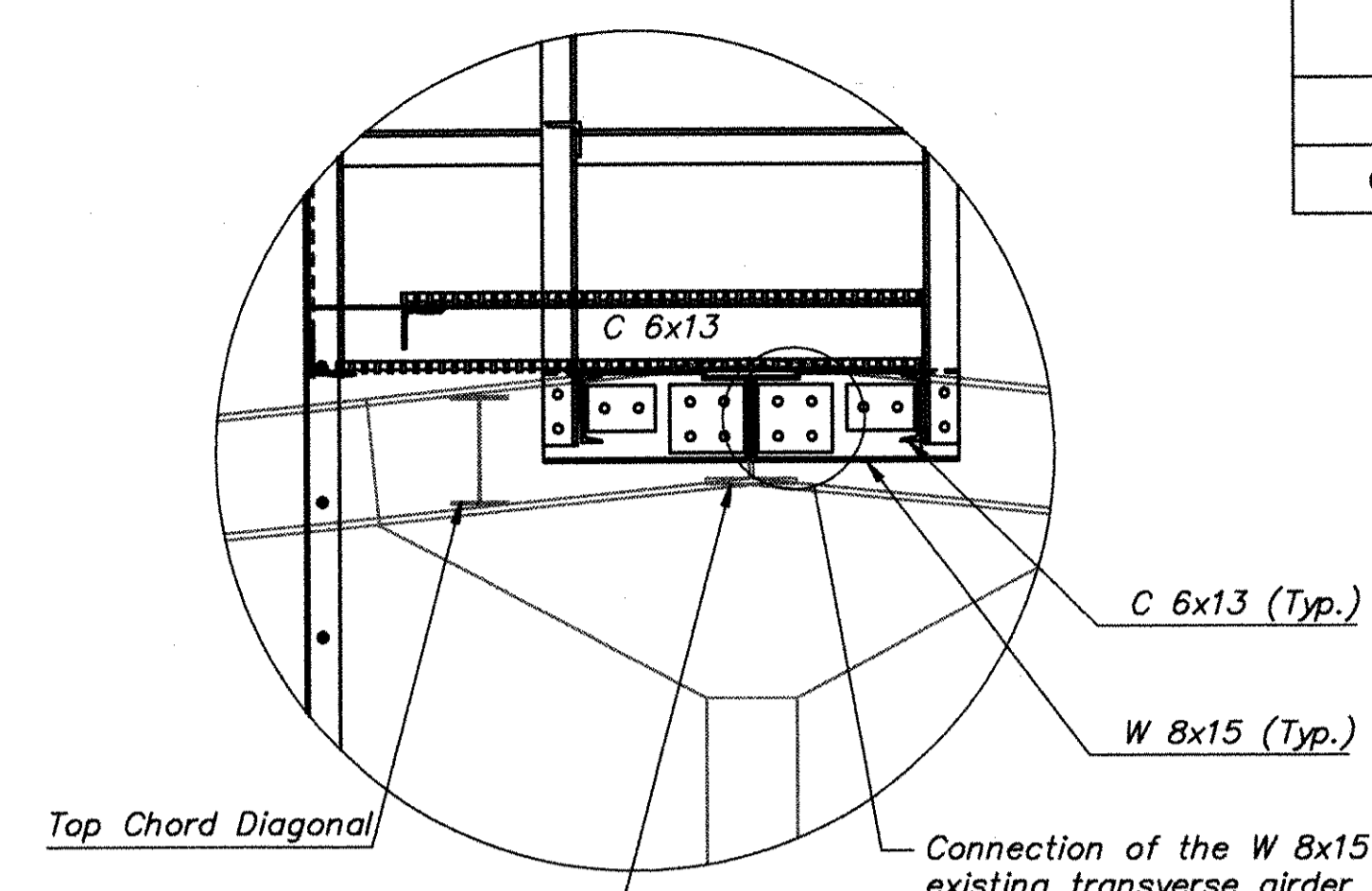
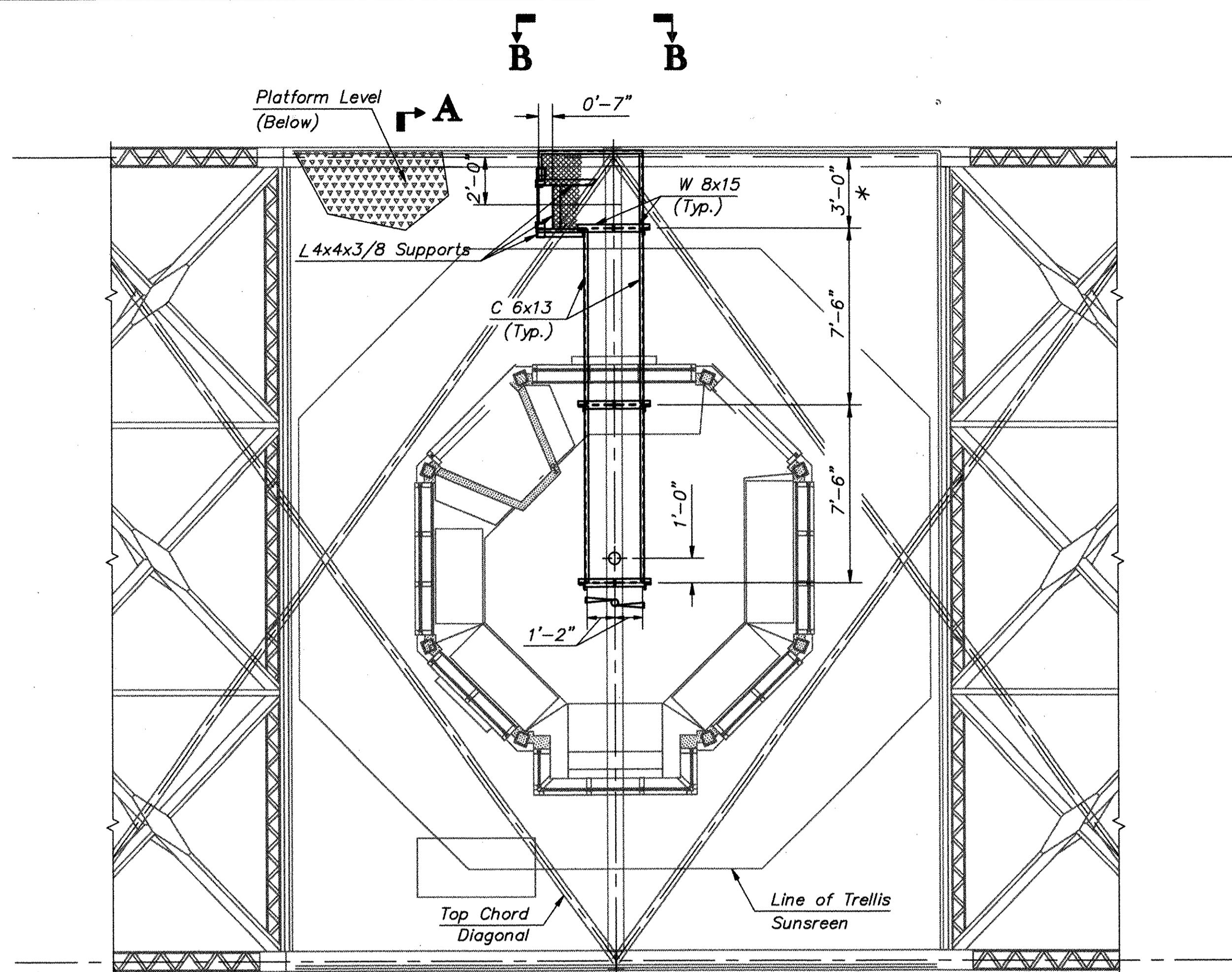
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DR.	TQT	LDP	2-97
DES.	TQT	LDP	2-97
BY	CHK	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	S-14

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	S.C.	BEAUFORT		U.S. 21	19	116

QUANTITIES

ITEM	UNIT	CONTRACT QUANTITY
Center Light Access (2,746 Lbs.)	L.S.	L.S.

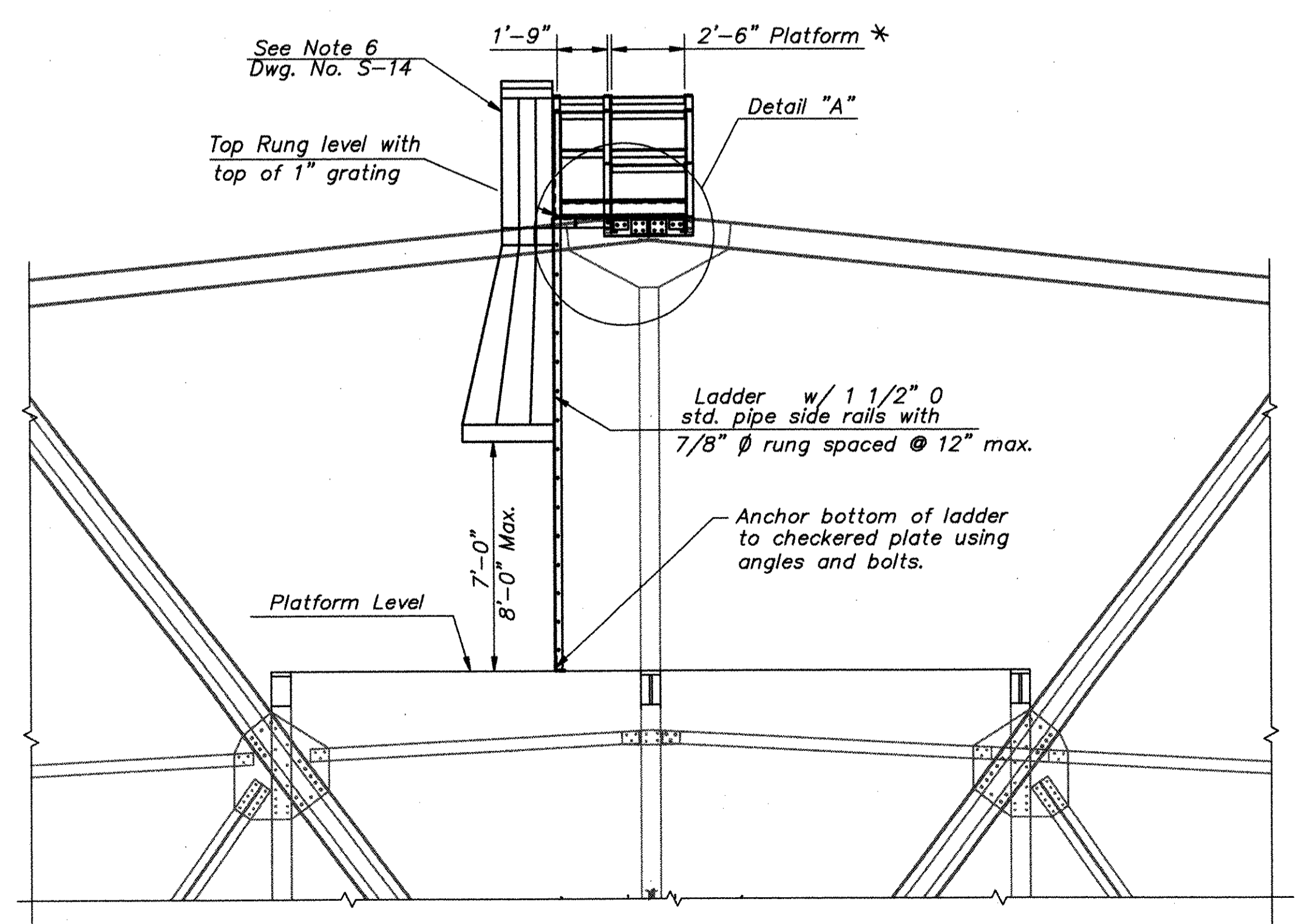


DETAIL "A"

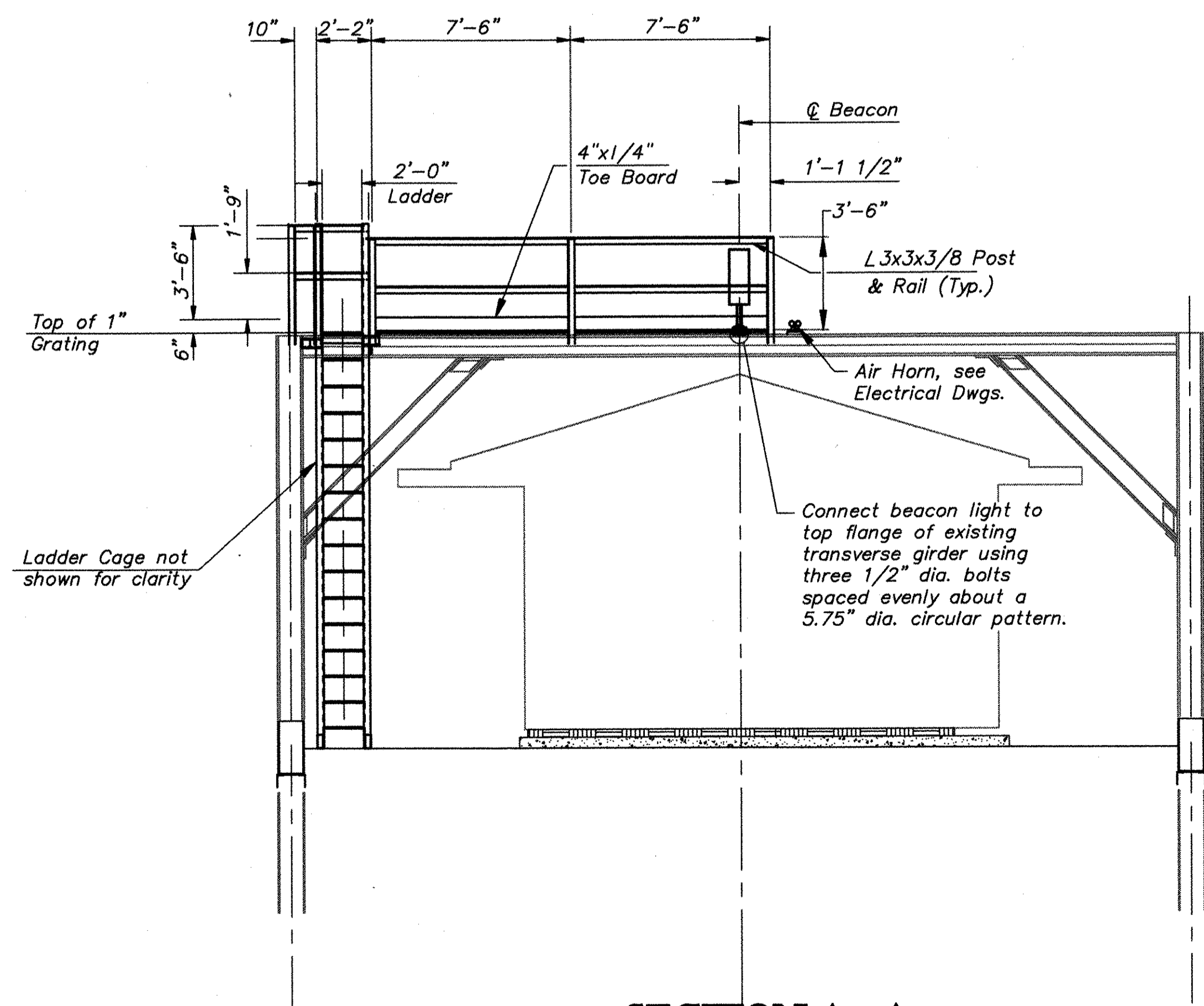
NOTES:

- For additional railing notes, see Dwg. No. G-5.
- All bolts shall be 3/4" dia. bolts unless otherwise noted.
- All connection angles and plates shall be a minimum of 3/8" thickness unless otherwise noted.

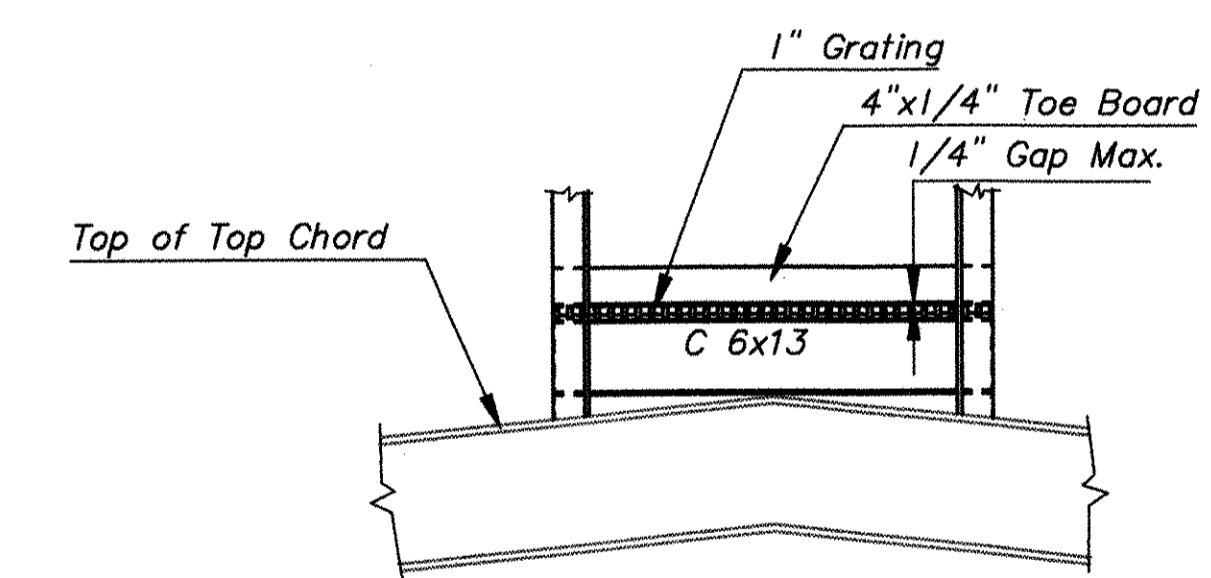
PLAN
(Horizontal Rails not shown)
* Grating Span Direction



ELEVATION
(Control House not shown)



SECTION A-A



SECTION B-B

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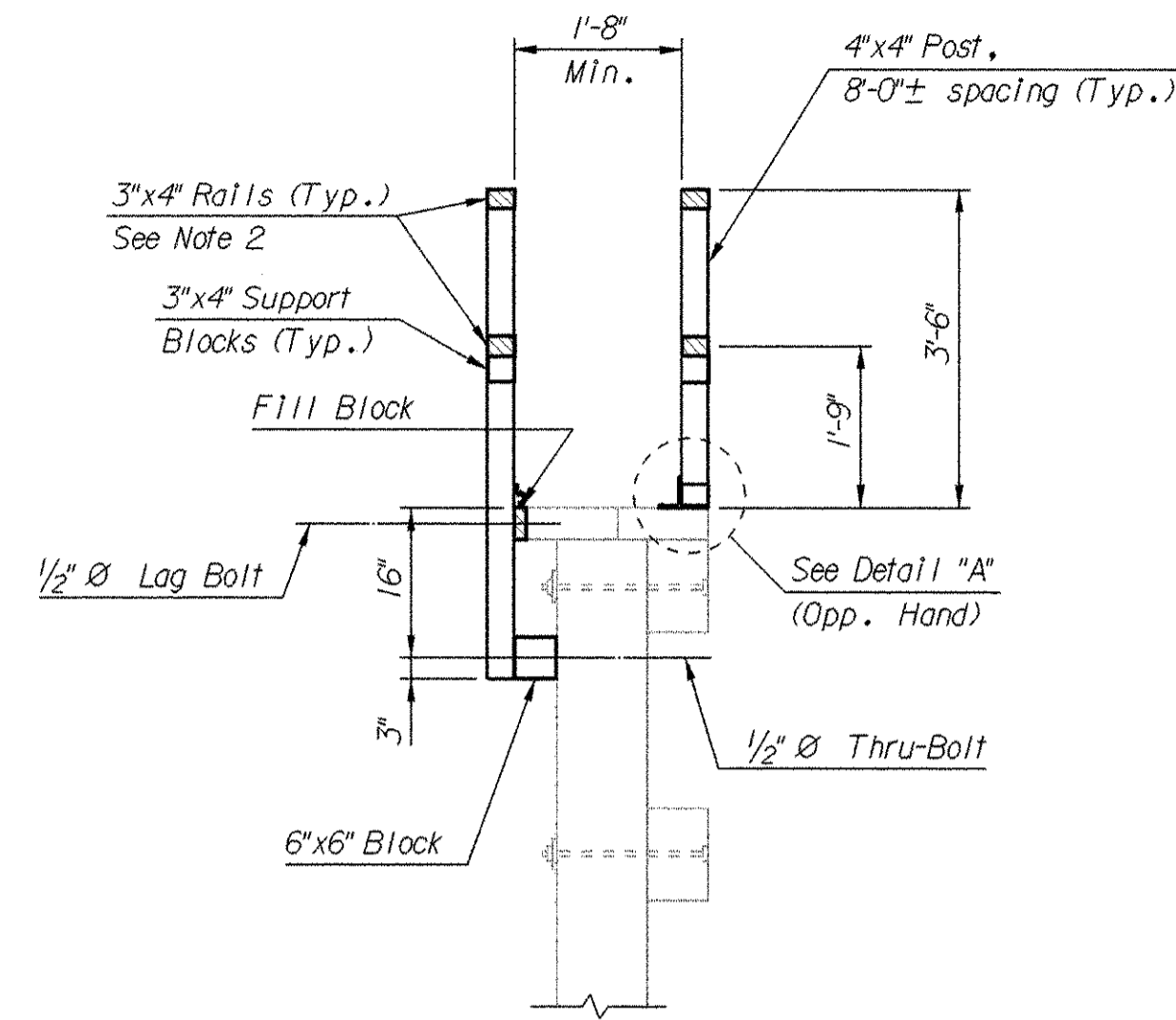
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
LADY ISLAND

TRUSS NAVIGATIONAL BEACON ACCESS - 2

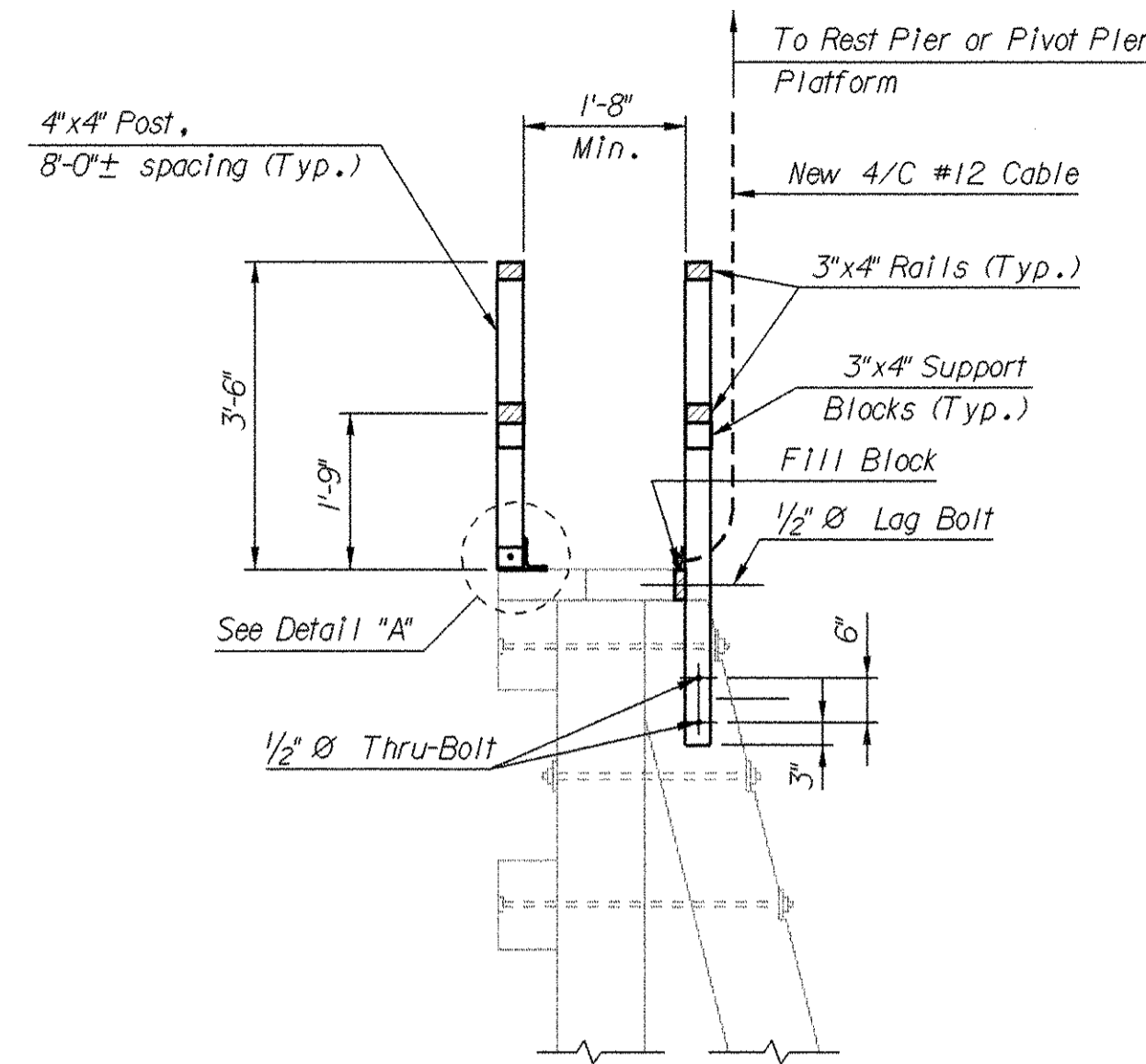
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DR.	TQT	LDP	2-97
DES.	TQT	LDP	2-97
BY	CHK	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	S-15

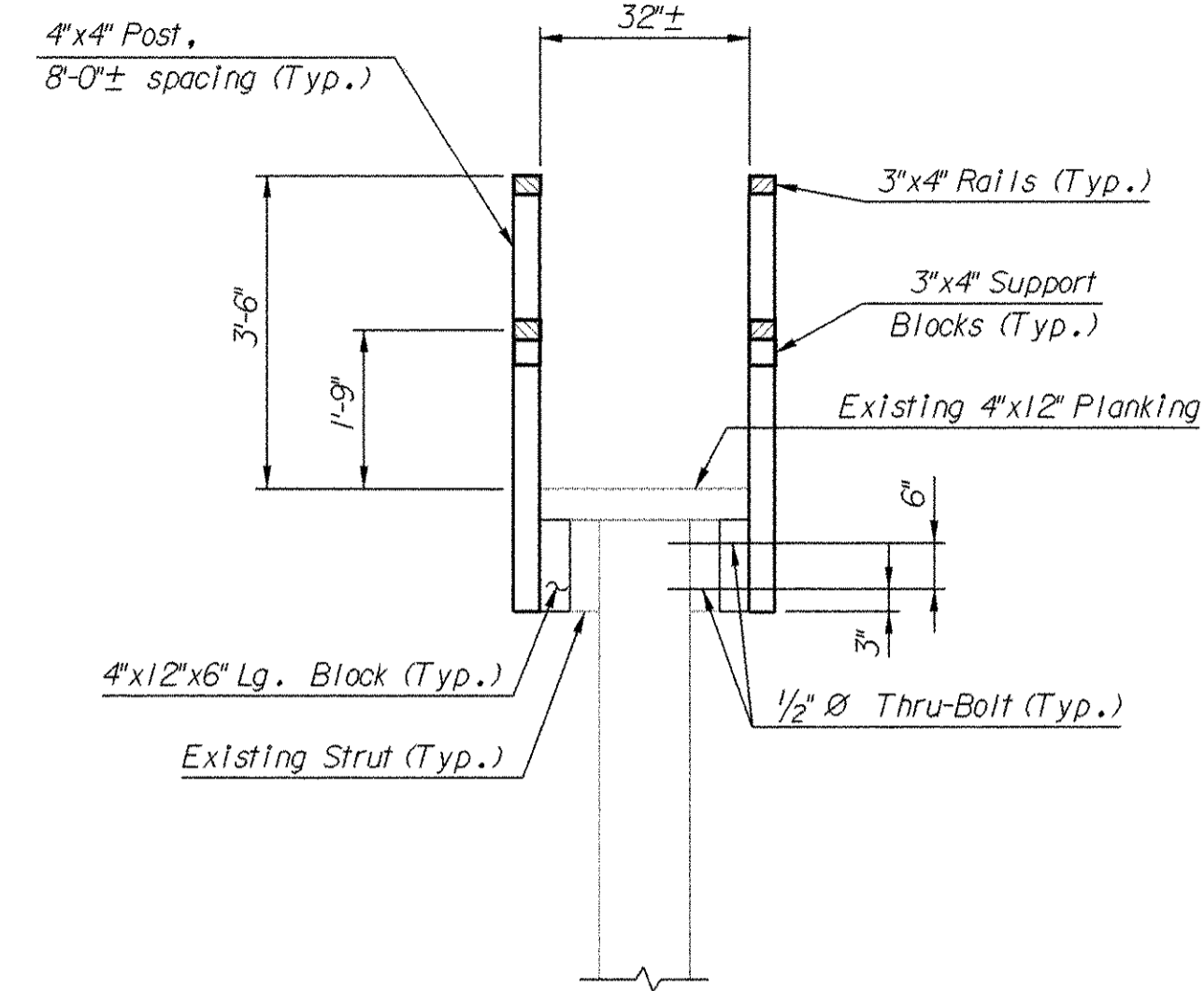
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	21	115



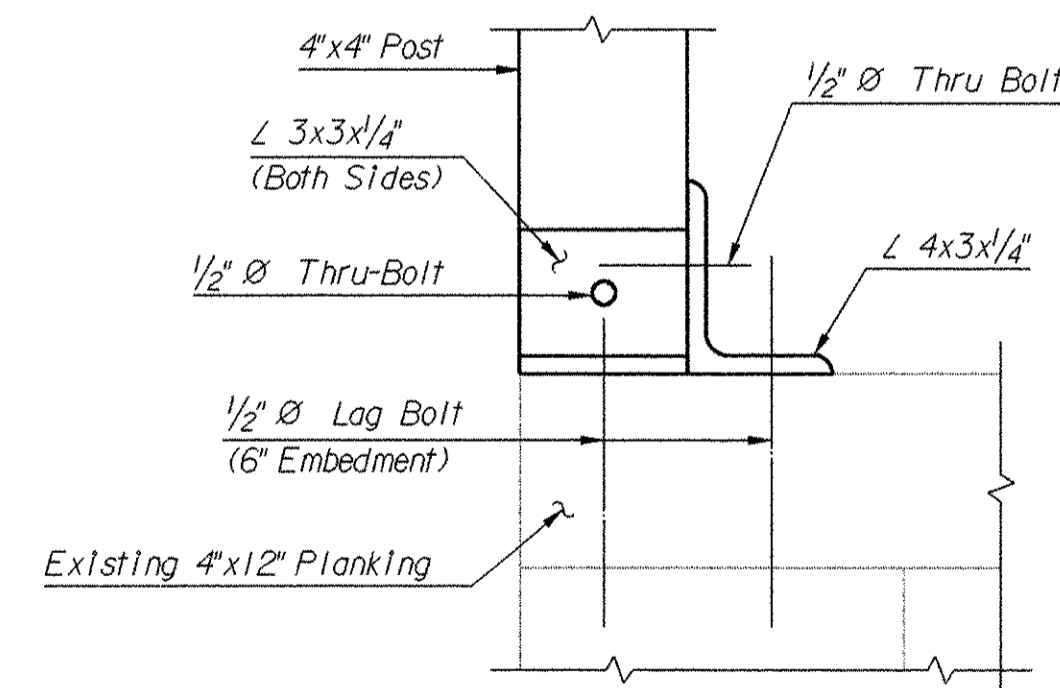
SECTION A-A
1/2" = 1'-0"



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



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



DETAIL A
3" = 1'-0"

NOTES

1. For Location of Sections A-A, B-B and C-C see Drawing No. S-16.
2. Rails to be fastened to posts using 2-40d Nails at each Location.
3. Navigation Light Cable to be secured to each post (8'-0"± max. spacing) using Cable Strap SECL-1U manufactured by Appleton Electric Company.

Design Filename: u:\112161\0603\020\uscdet01.dwg
 Plot Date: 19-FEB-1997
 Plot Time: 11:51 AM
 Plotter: PLOTTER\HPGL2E.PLOT

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
LADY'S ISLAND

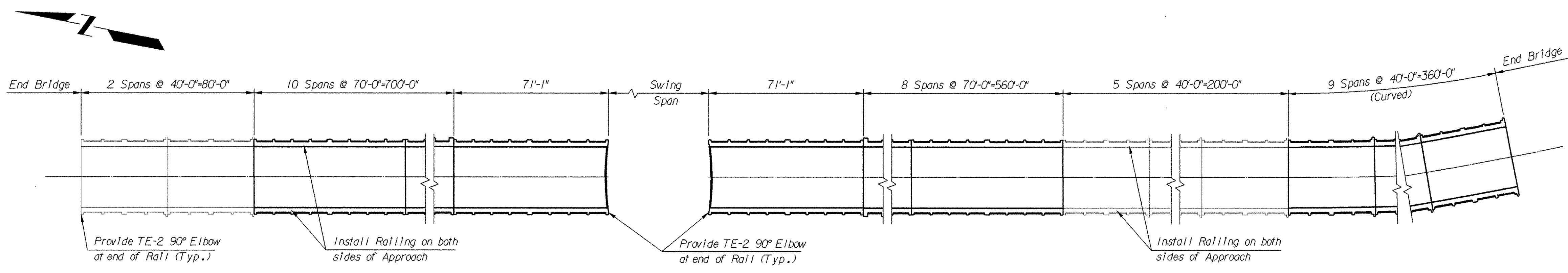
**FENDER SECTIONS
AND DETAILS**

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	EK	SN	2-97
DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

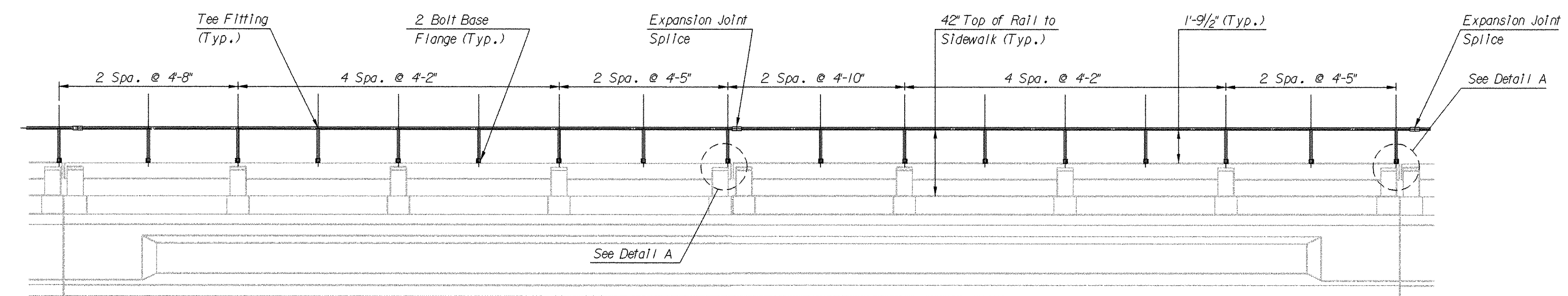
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-17

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
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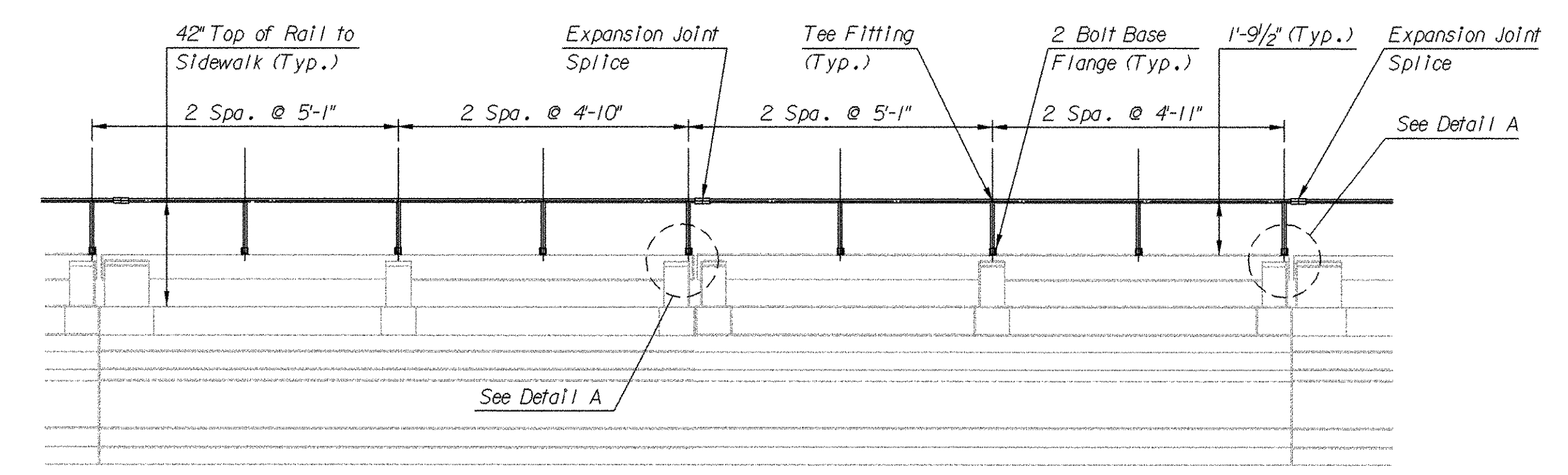
QUANTITIES		
I T E M	UNIT	CONTRACT QUANTITY
Bridge Railing	LF.	4054



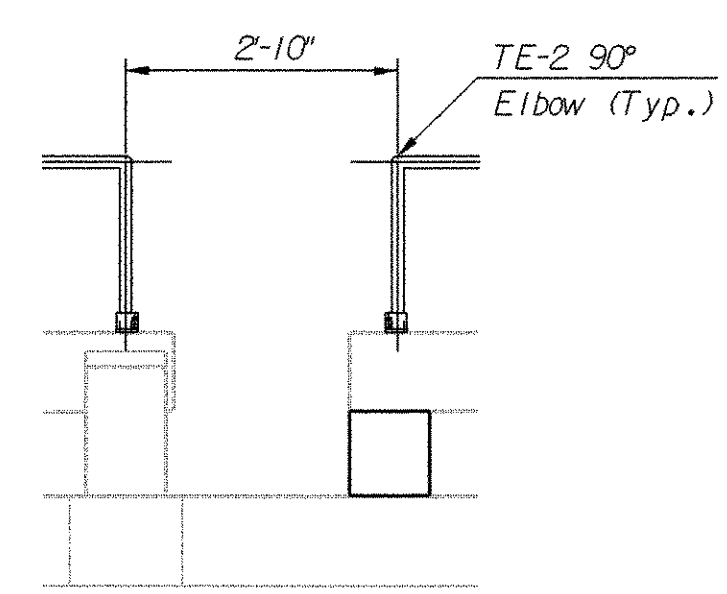
LOCATION OF WORK
1" = 30'-0"



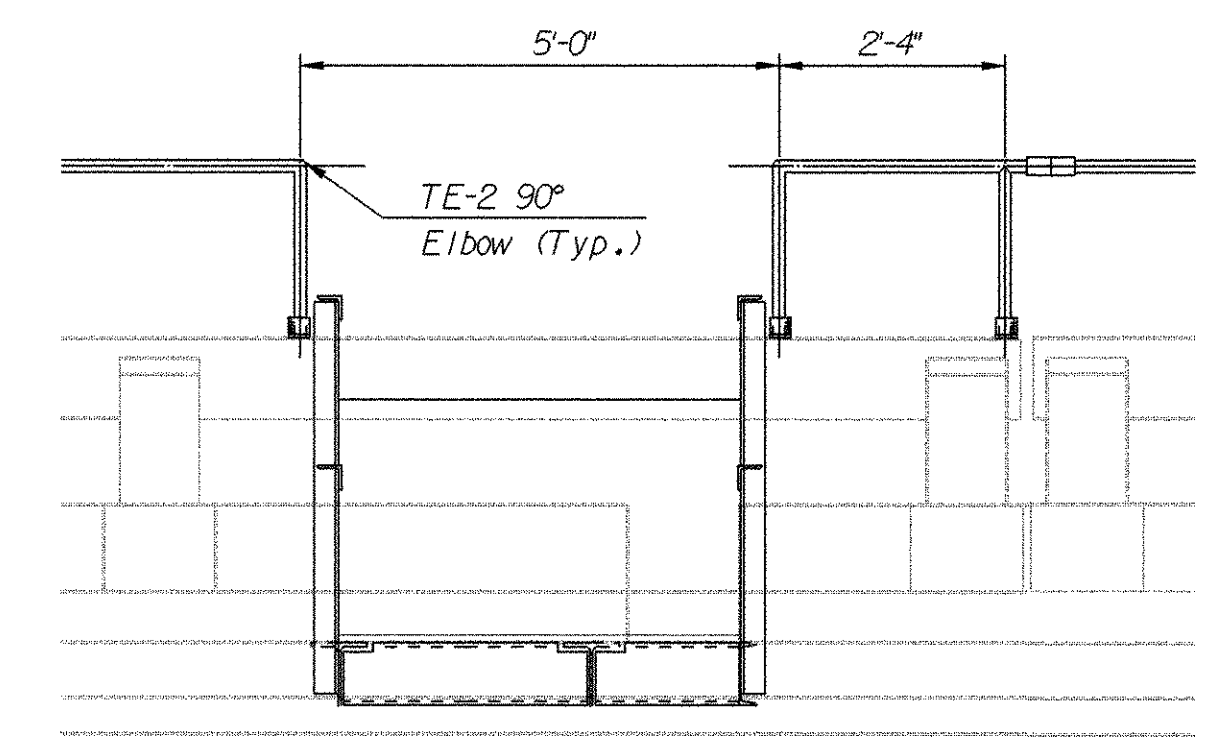
TYPICAL ELEVATION (70' SPAN)
1/4" = 1'-0"



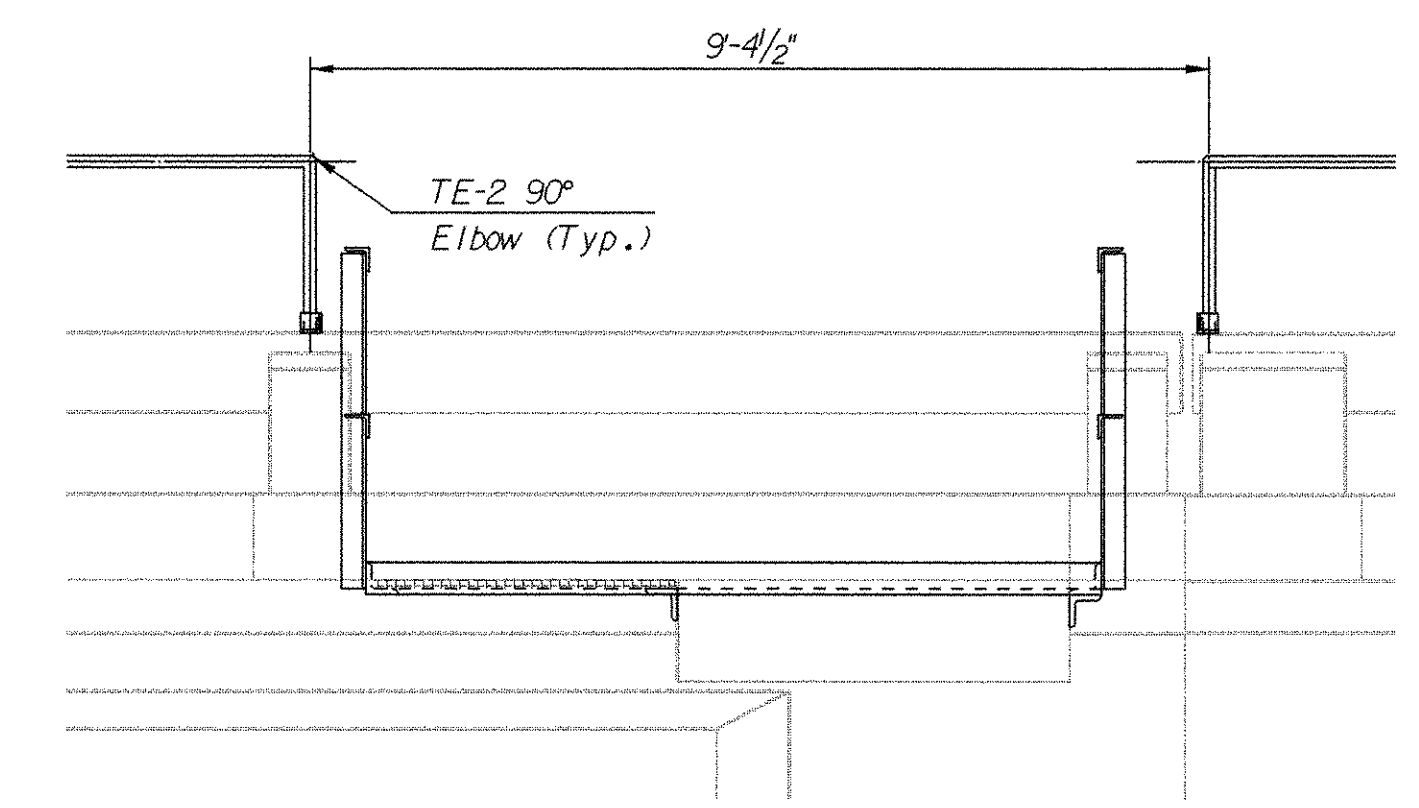
TYPICAL ELEVATION (40' SPAN)
1/4" = 1'-0"



ELEVATION AT REST PIER STAIRWAY
(2 Locations)
1/2" = 1'-0"



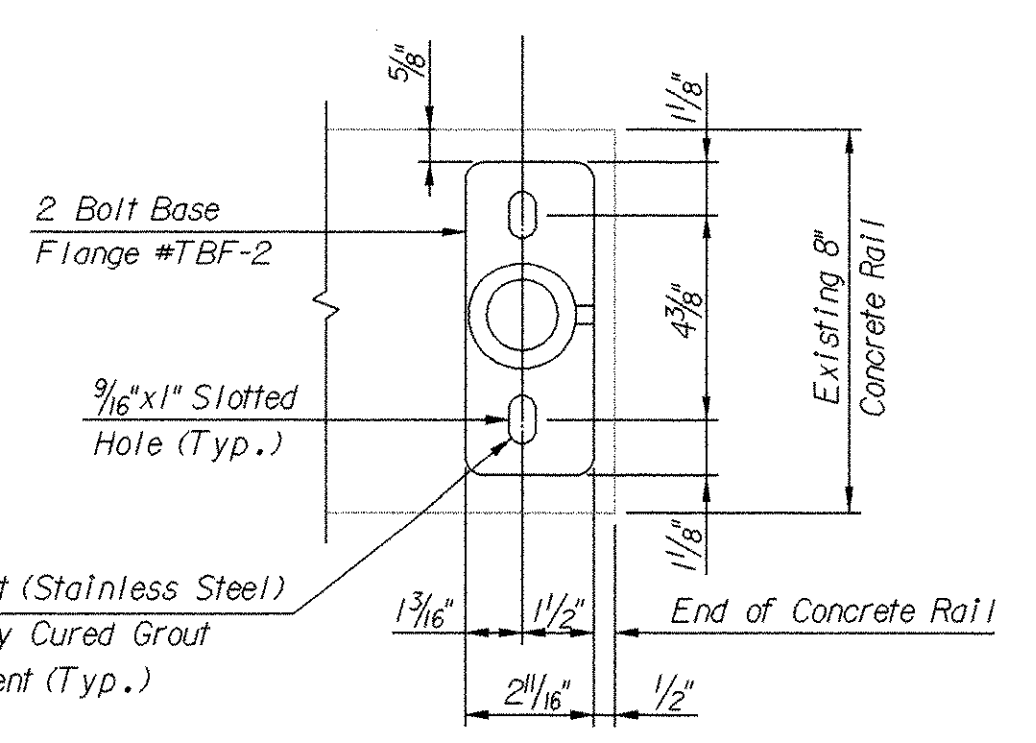
ELEVATION AT BARRIER GATE
(2 Locations)
1/2" = 1'-0"



ELEVATION AT WARNING GATE
(2 Locations)
1/2" = 1'-0"

NOTES

- Railing and Posts shall be 1 1/2"Ø Schedule 40 Pipe Railing conforming to ASTM B221 Alloy 6061-T6 or Alloy 6105-T5.
- Railing components shown are from Thomson Fabricating Company Birmingham, Al.
- Railing Splices not shown.
- For Locations of Warning and Barrier Gates see Drawing No. M-11.



DETAIL A
3" = 1'-0"

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BRIDGE DESIGN COLUMBIA, S.C.
LADY'S ISLAND

APPROACH RAILING

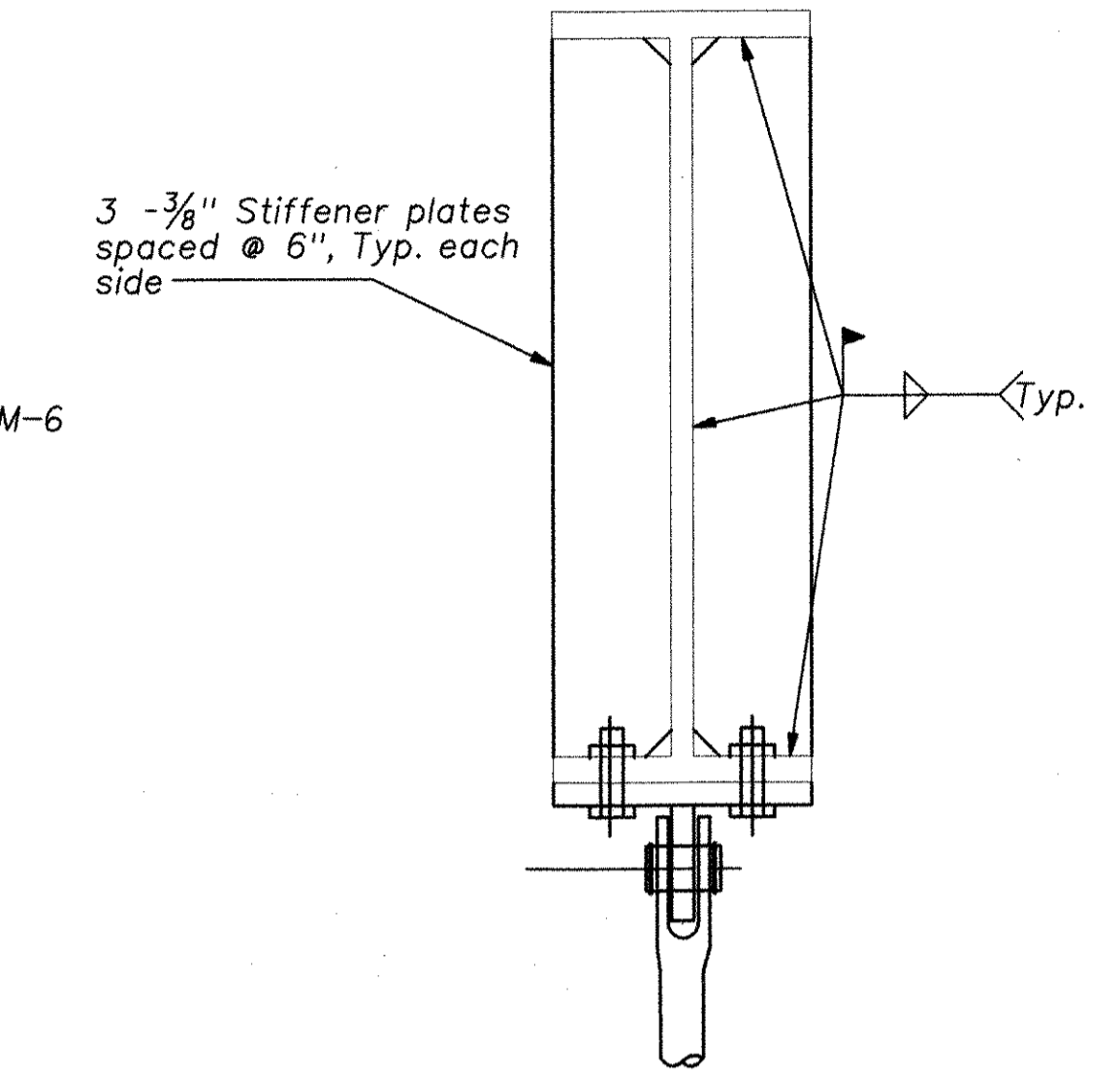
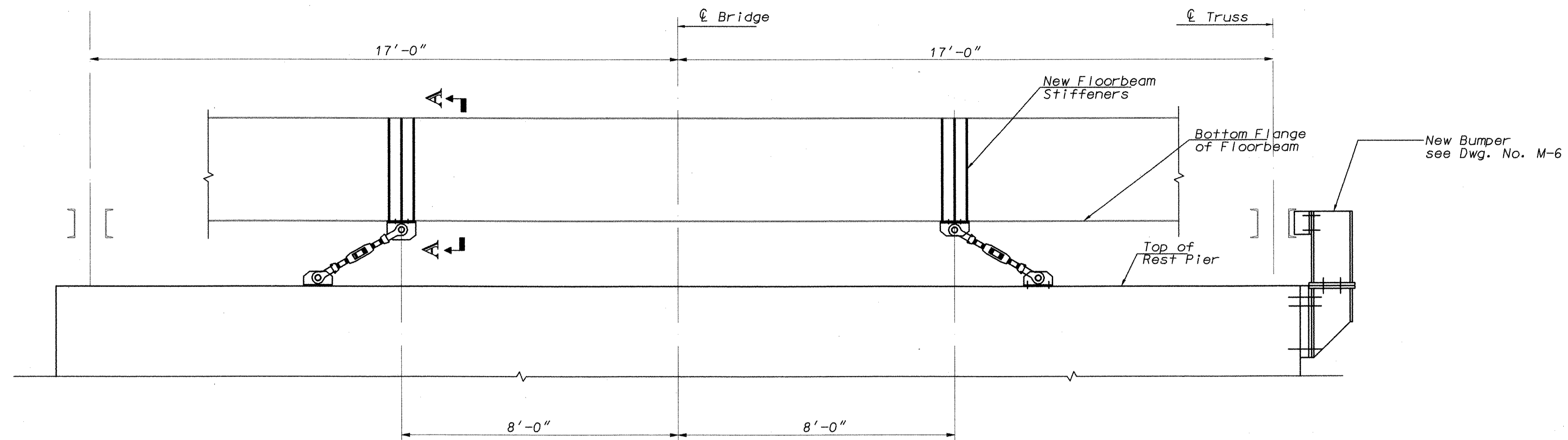
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	EK	SN	2-97
DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-18

Design Filename: \\N12181\p103\020\support\dr...
 Date: 19-FEB-1997 11:42:00 AM
 UNIT: INCHES/FEETABLE: 1/4"=1'-0"

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	S.C.	BEAUFORT		US-21	23	115

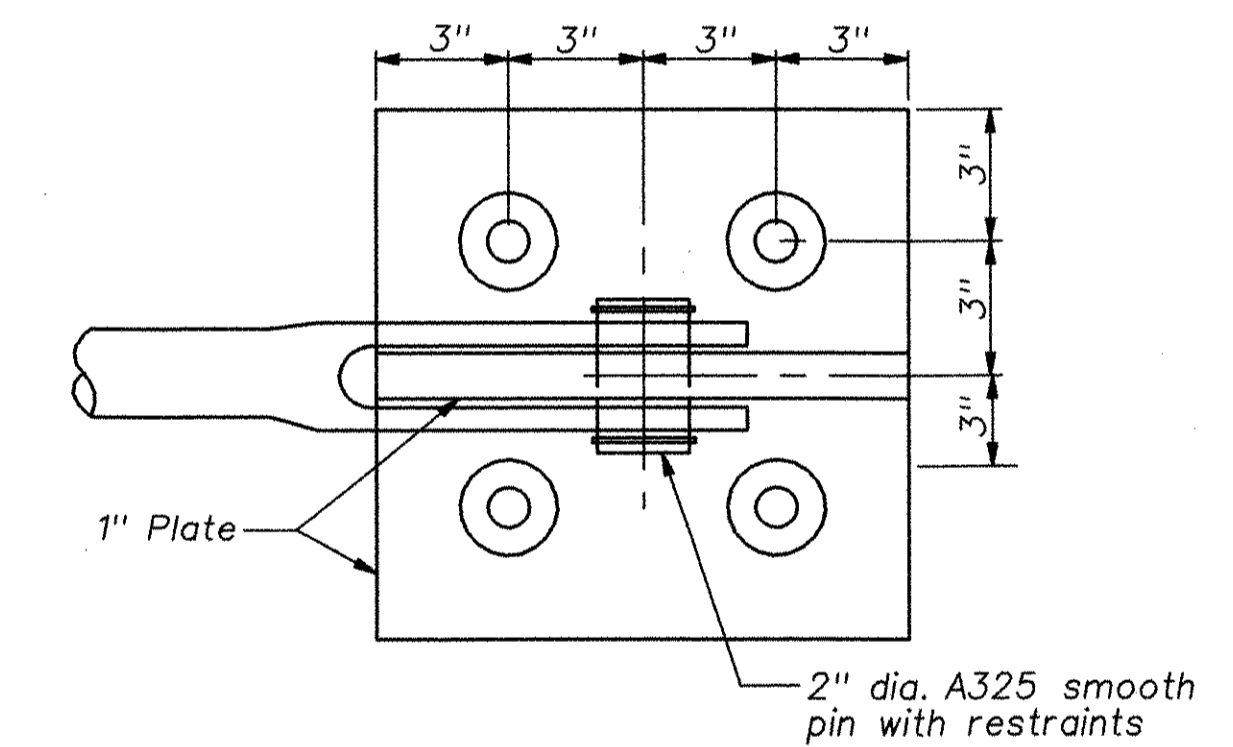
QUANTITIES		
ITEM	UNIT	QUANTITY
Hurricane Tie Down	Lump Sum	Lump Sum



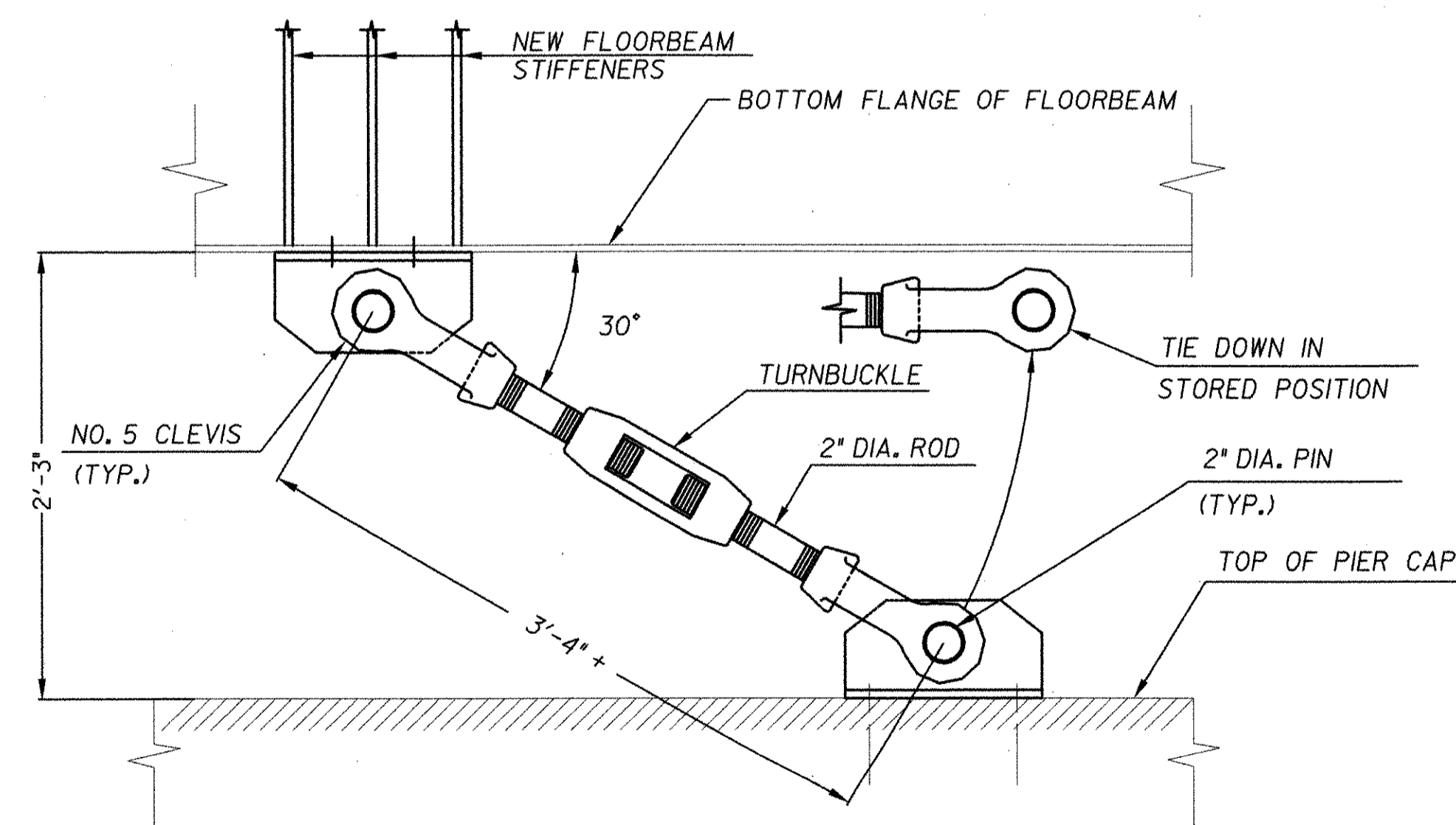
SECTION A-A

ELEVATION

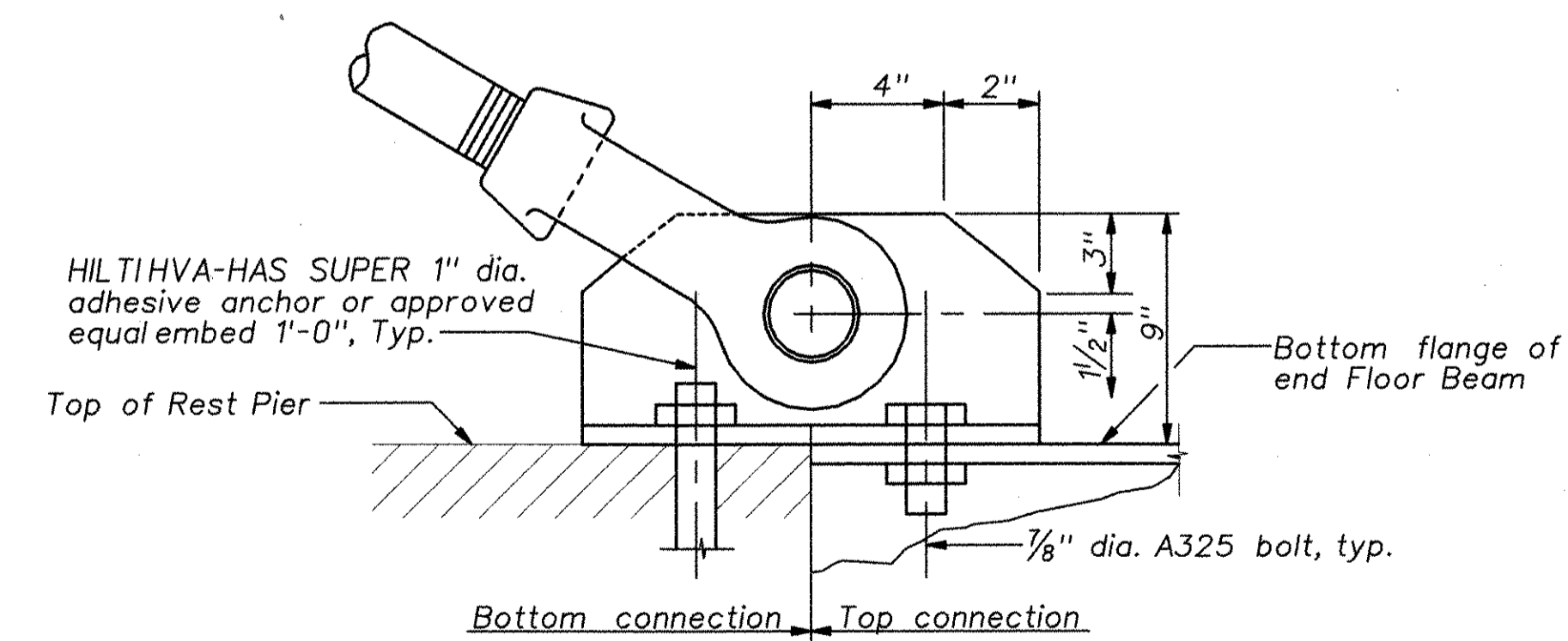
North Rest Pier Shown
South Rest Pier Similar
1/2" x 1'-0"



CONNECTION DETAIL-PLAN



TIE DOWN DETAIL



CONNECTION DETAIL-ELEVATION

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DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

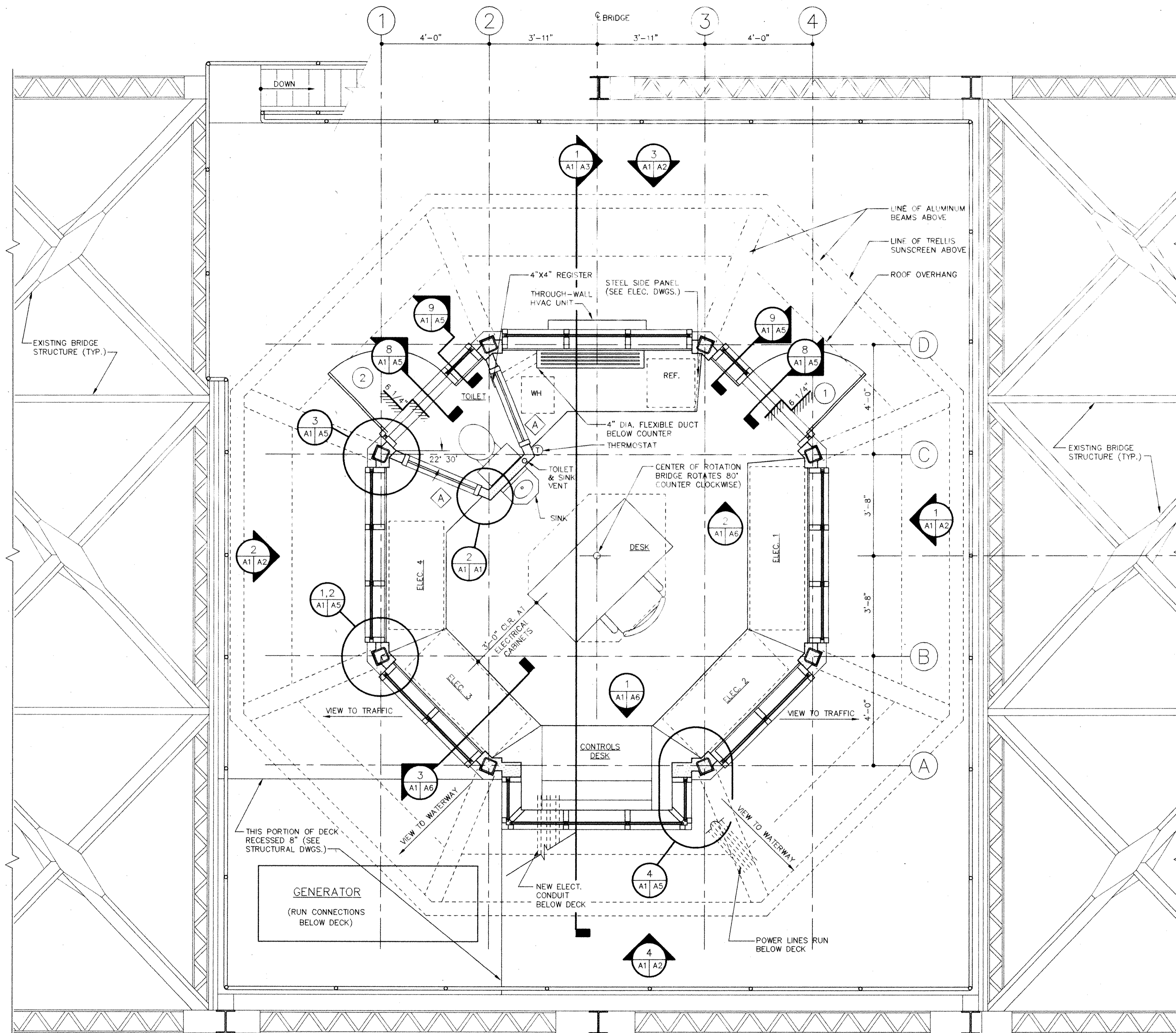
LADY'S ISLAND

**HURRICANE
TIE DOWN**

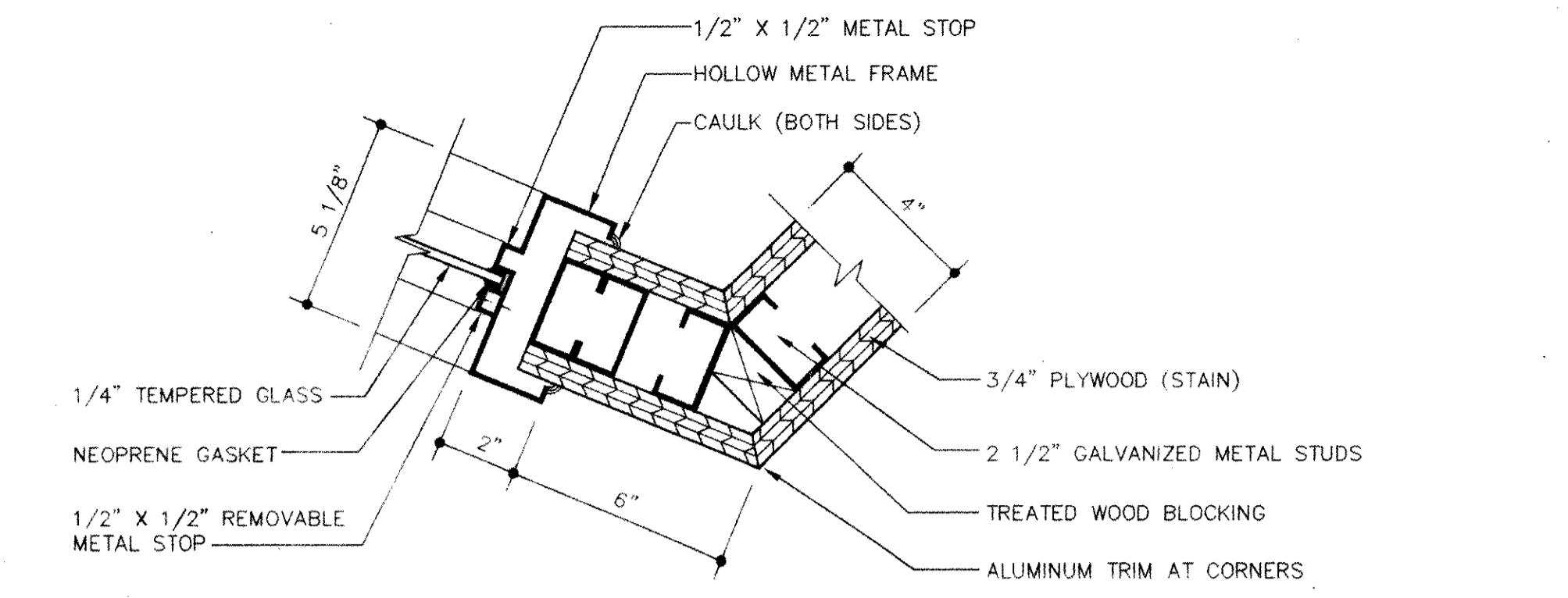
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	LDP/BAM	2-97	
DR.	LDP/BAM	2-97	
DES.	LDP/BAM	2-97	
BY	CHK.	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-19

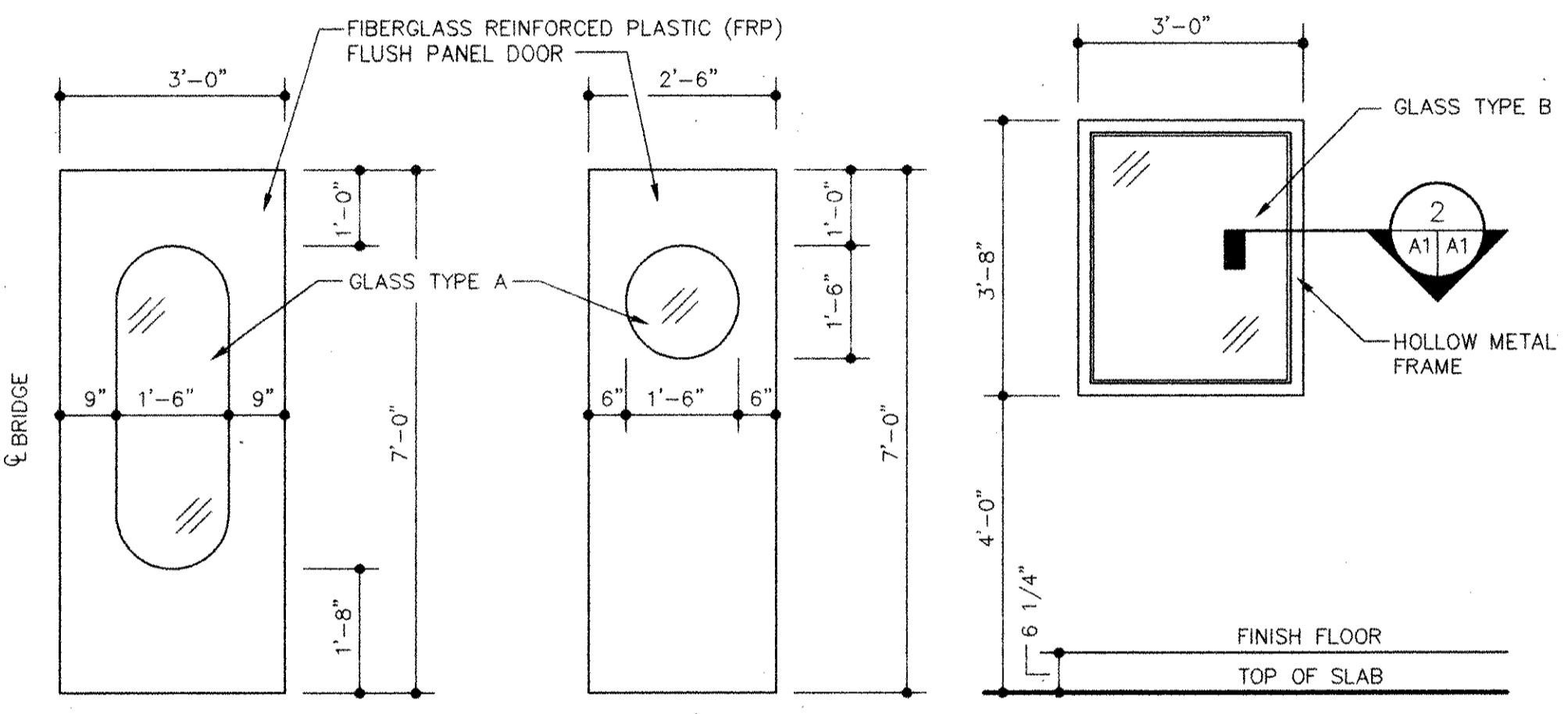
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	24	115



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

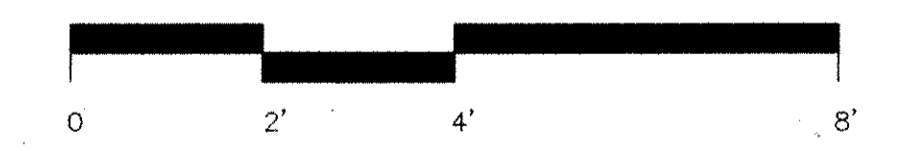
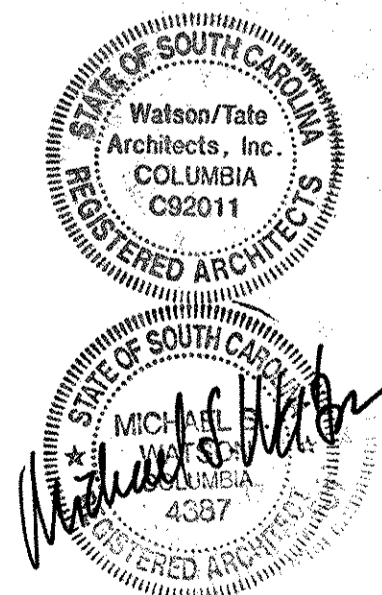


2 CORNER & JAMB DETAIL
SCALE: 3" = 1'-0"



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

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



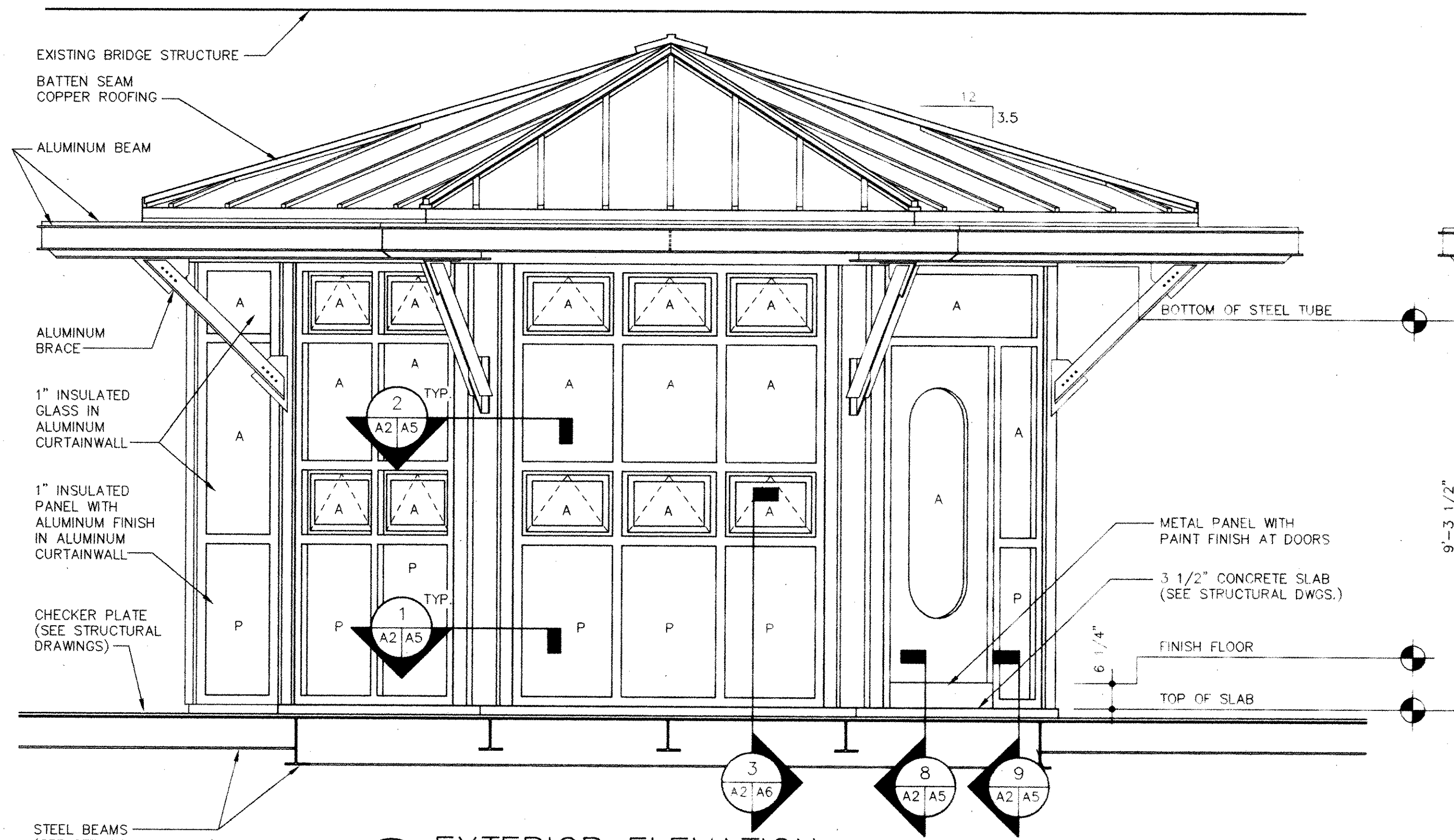
WATSON/TATE ARCHITECTS, INC.
HNTB ARCHITECTS ENGINEERS PLANNERS
 The HNTB Companies

REV.	QUAN.	DR.	DES.	BY	CHK.	DATE

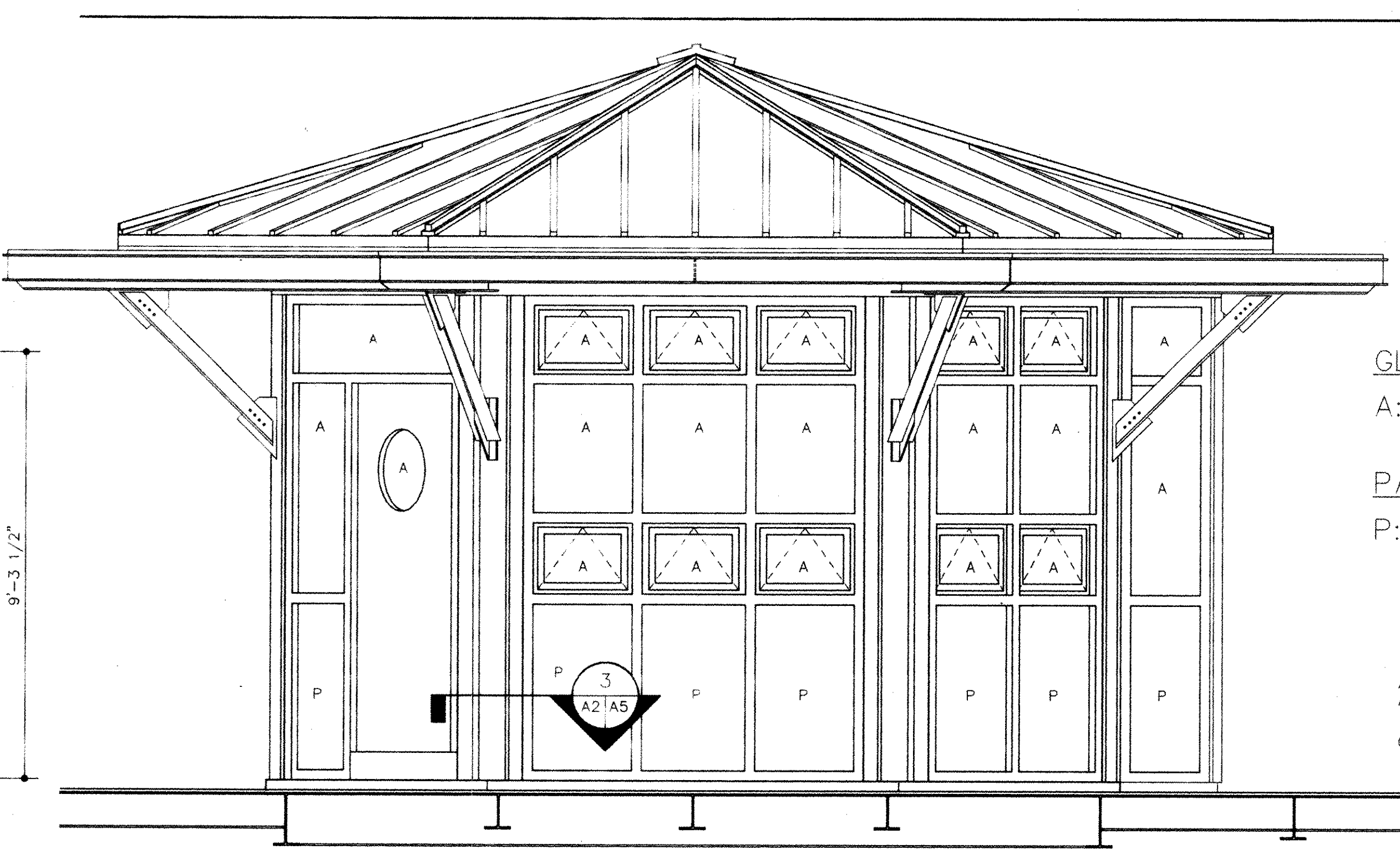
SOUTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 BRIDGE DESIGN COLUMBIA, S.C.

LADY'S ISLAND
 FLOOR PLAN

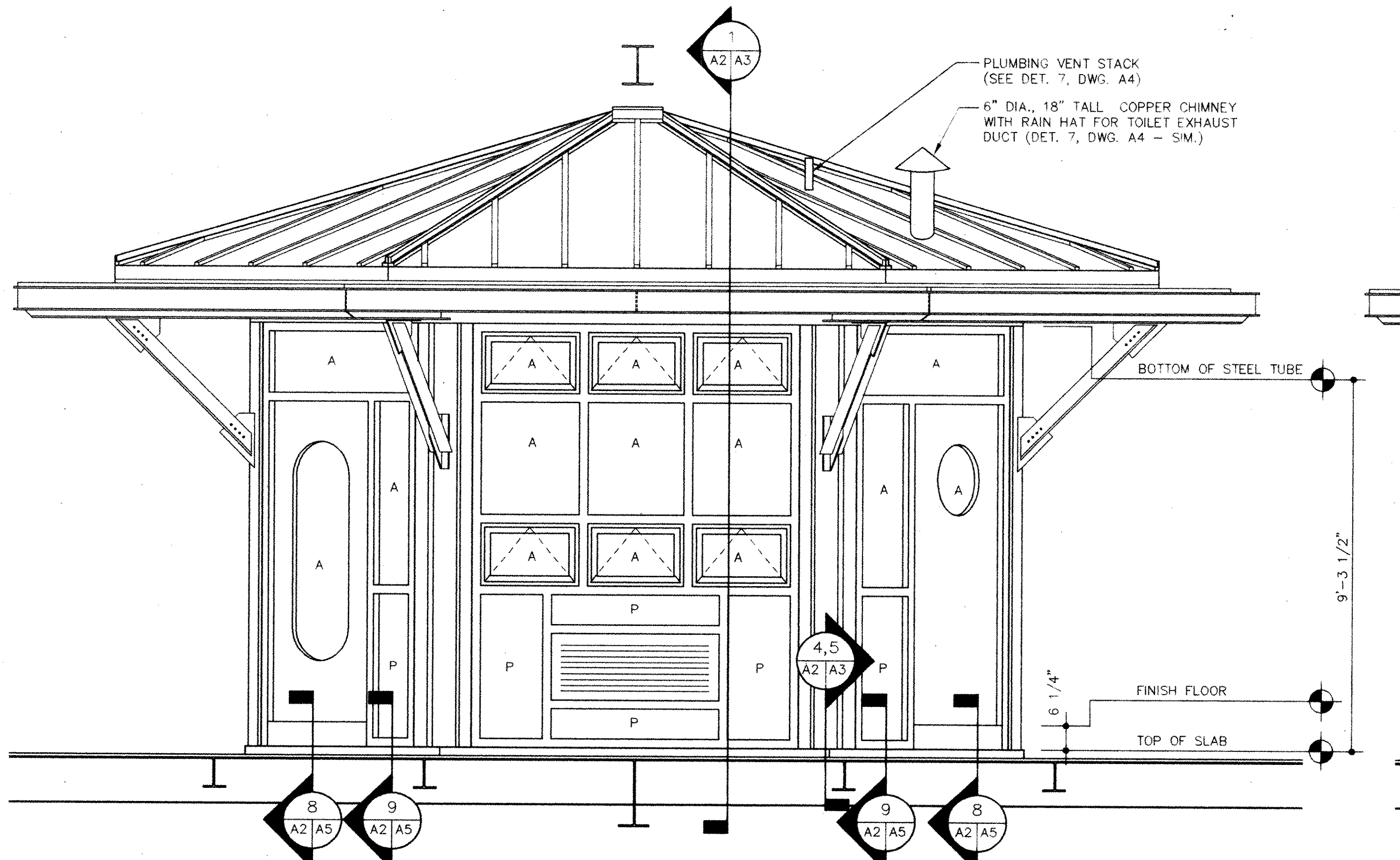
FILE NO. US-21 COUNTY BEAUFORT DRAWING NO. A-1



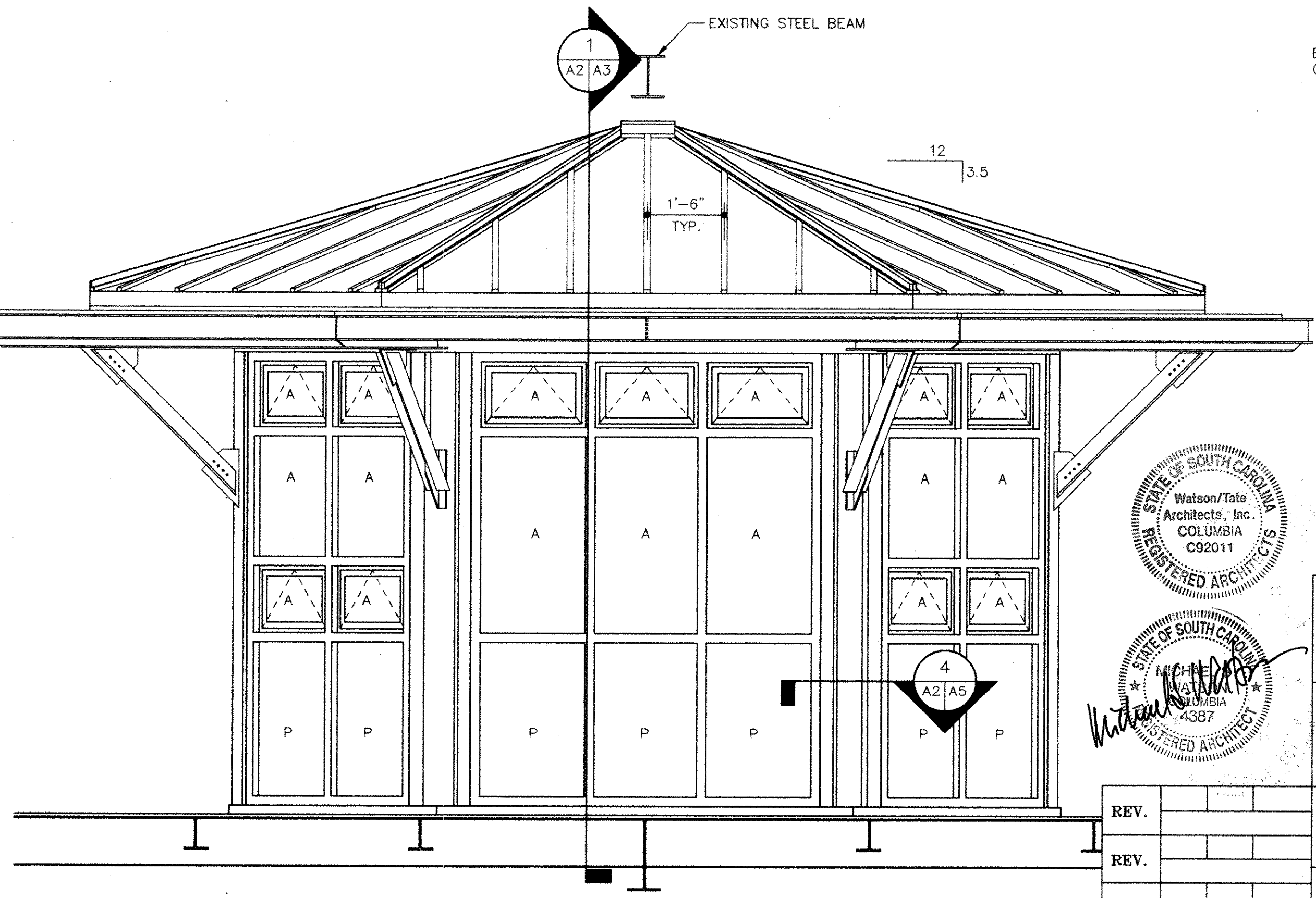
1 EXTERIOR ELEVATION
SCALE: 1/2" = 1'-0"



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



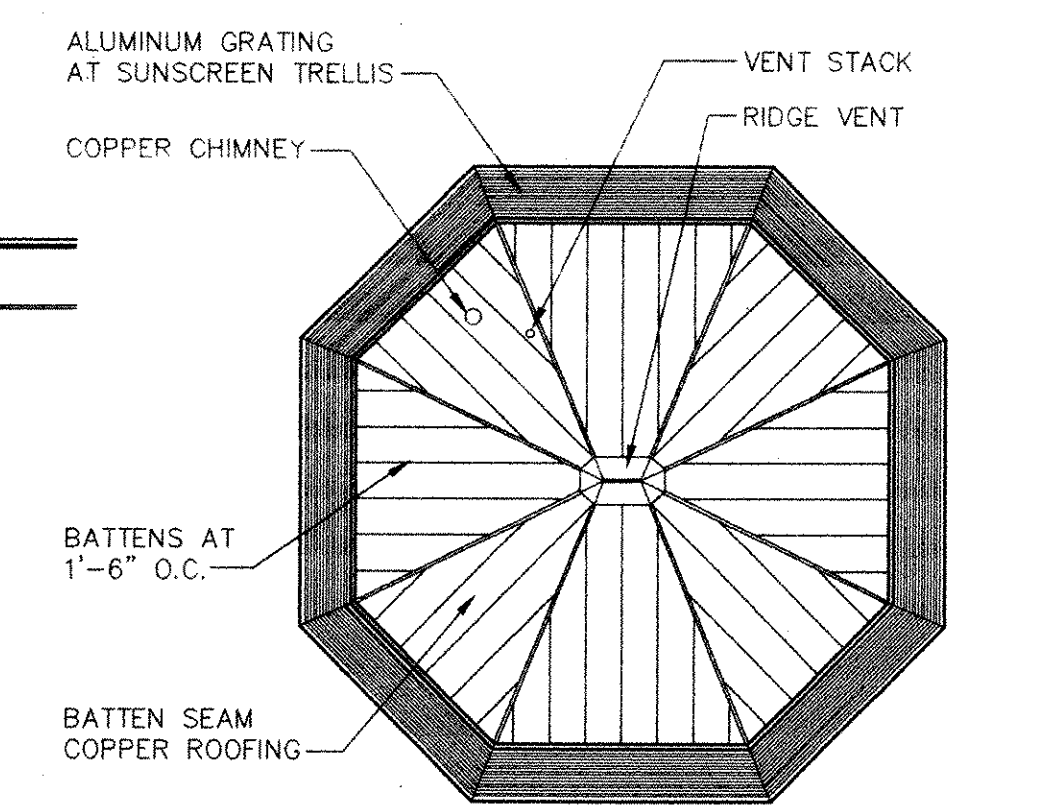
3 EXTERIOR ELEVATION
SCALE: 1/2" = 1'-0"



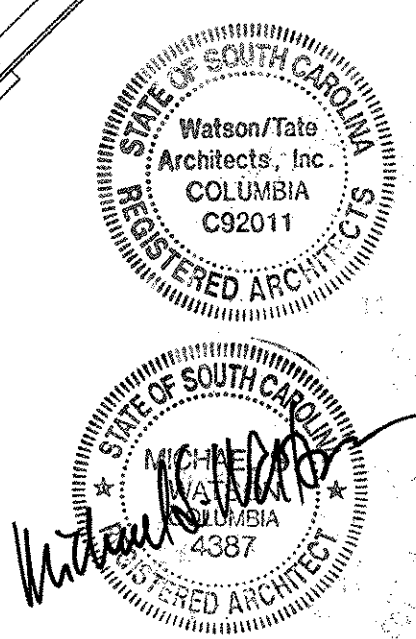
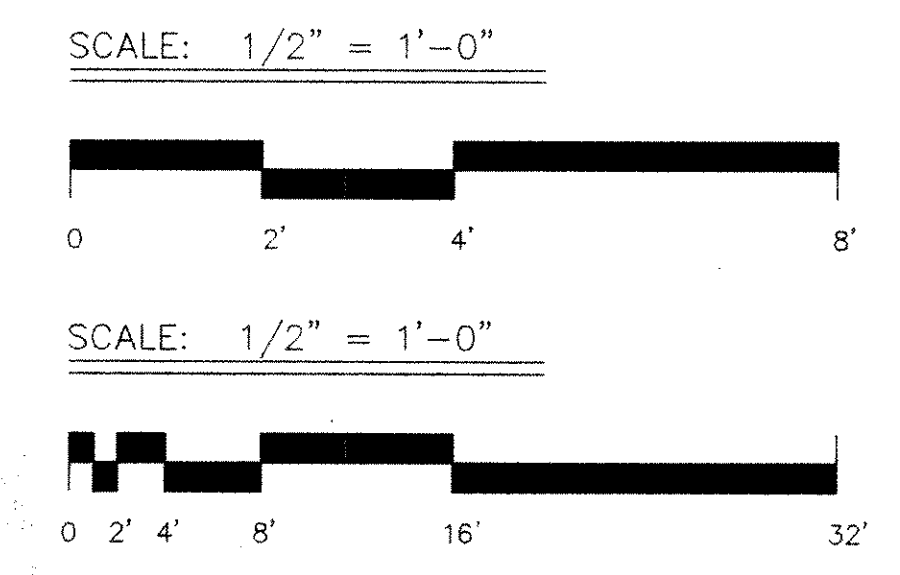
4 EXTERIOR ELEVATION
SCALE: 1/2" = 1'-0"

GLASS SCHEDULE:
A: CLEAR, BULLET RESISTANT VISION GLASS SYSTEM

PANEL SCHEDULE:
P: ALUMINUM FACED INSULATED PANEL WITH FLUOROPOLYMER FINISH



5 ROOF PLAN
SCALE: 1/8" = 1'-0"



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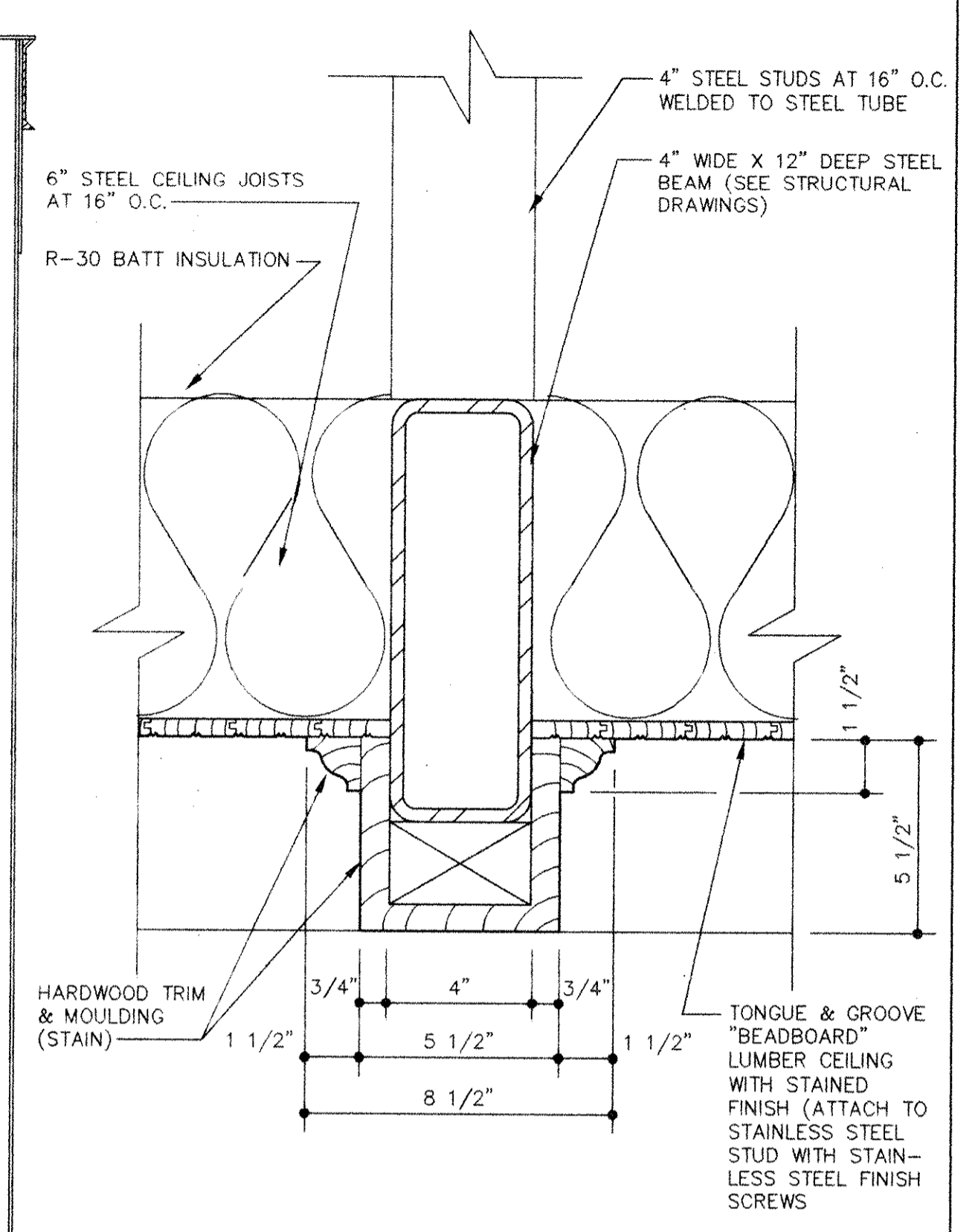
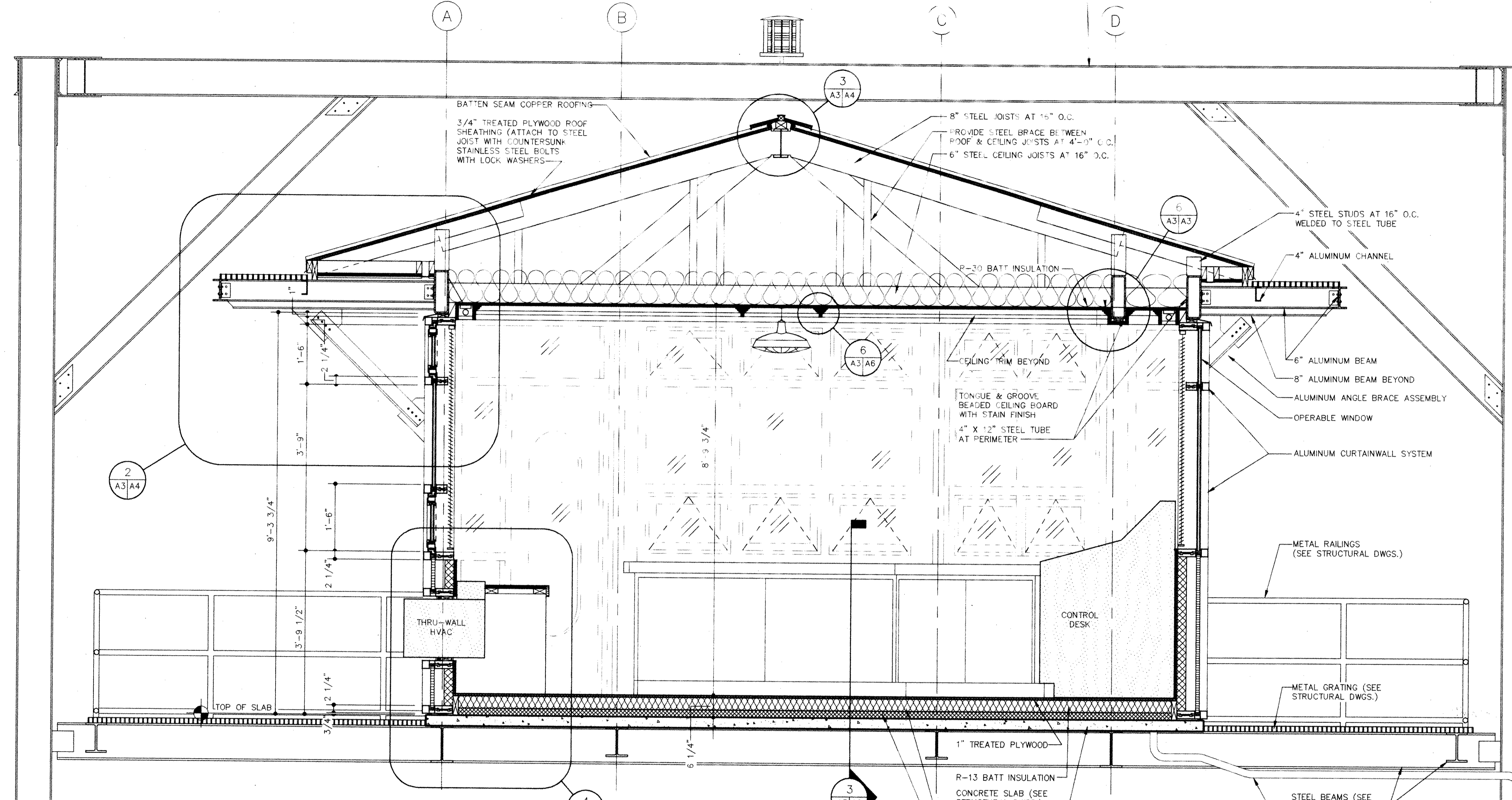
LADY'S ISLAND
EXTERIOR ELEVATIONS

REV.				
REV.				
REV.				
REVIEWED				
QUAN.				
DR.	RRF	MSW	02/97	
DES.	MSW	MSW	02/97	
BY	CHK.	DATE		

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	A-2

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	26	115

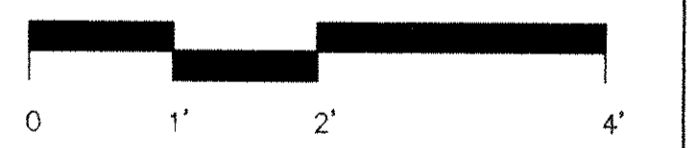
BRIDGE STRUCTURE (SEE STRUCTURAL DRAWING)



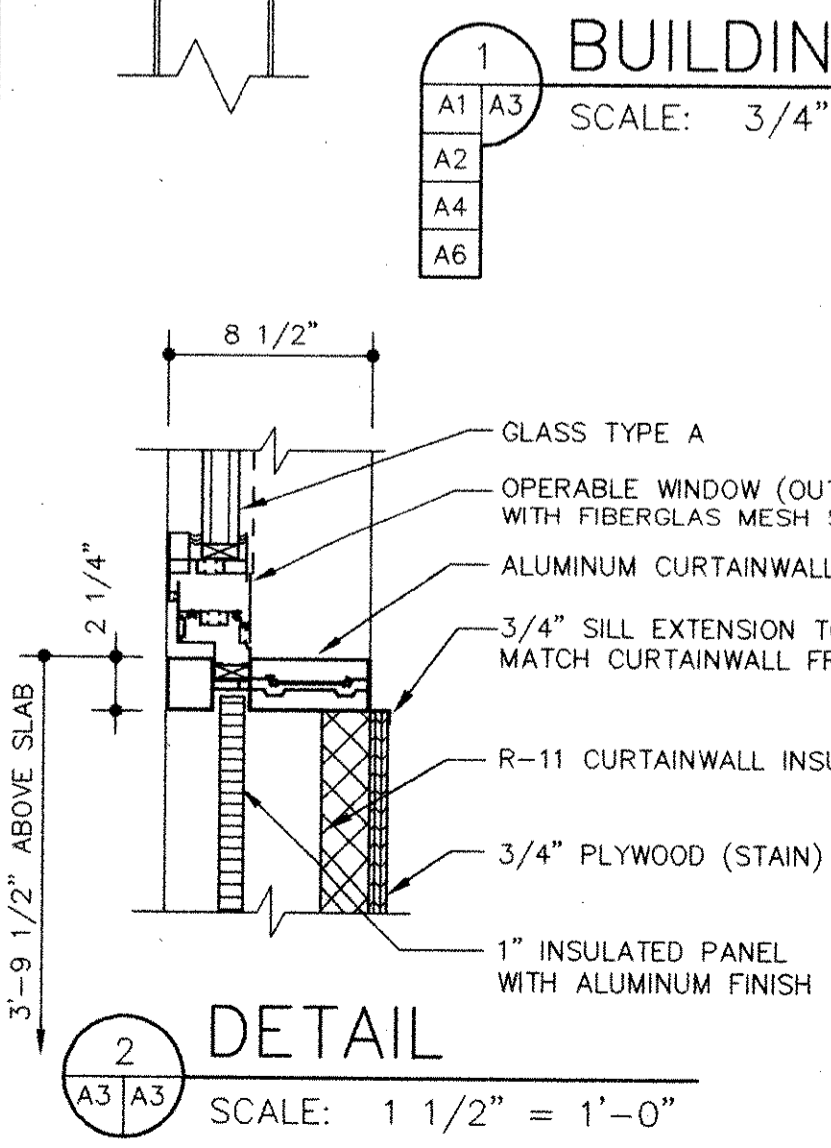
6 CEILING TRIM DETAIL
SCALE: 3" = 1'-0"

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

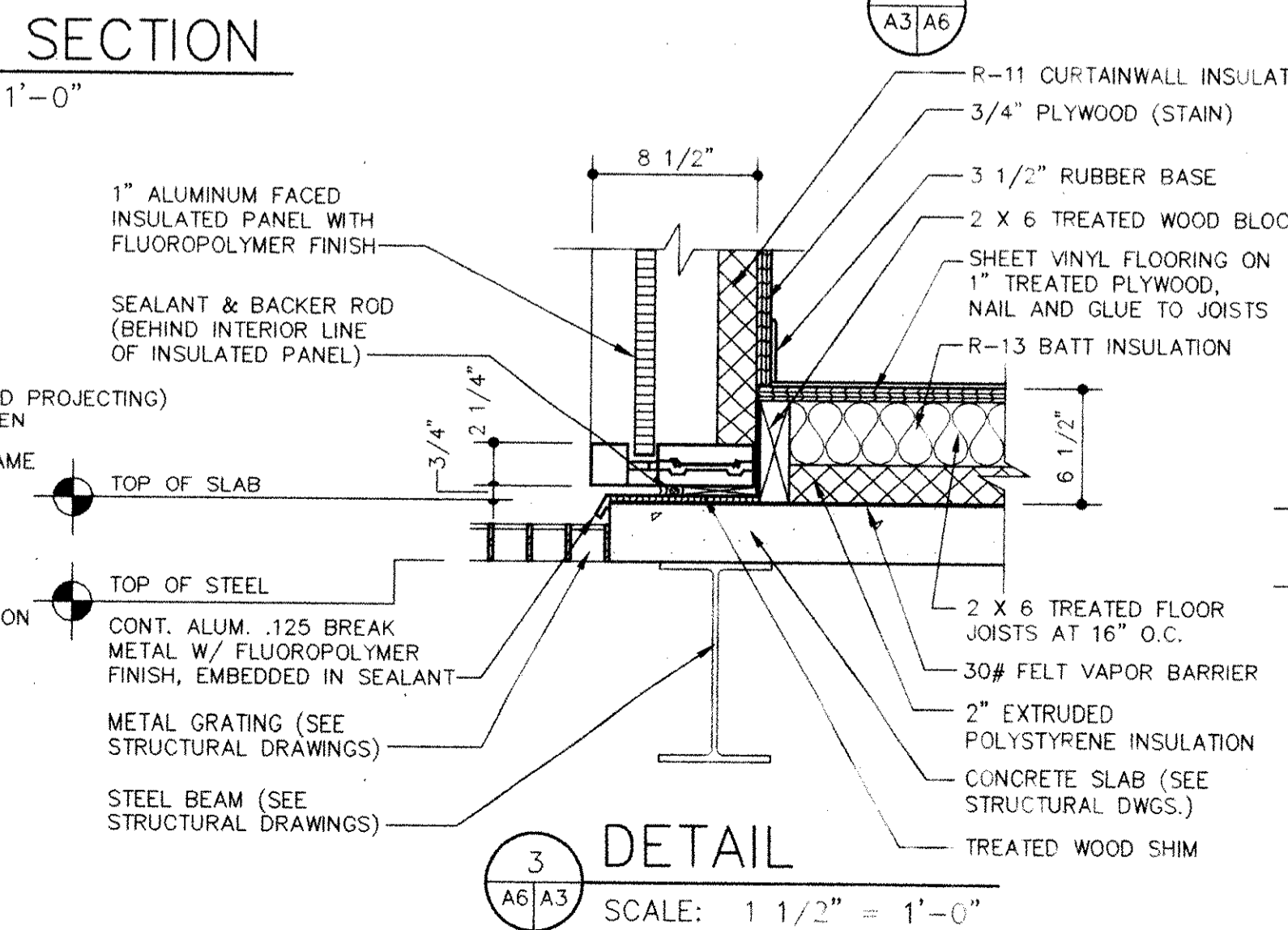
SCALE: 3/4" = 1'-0"



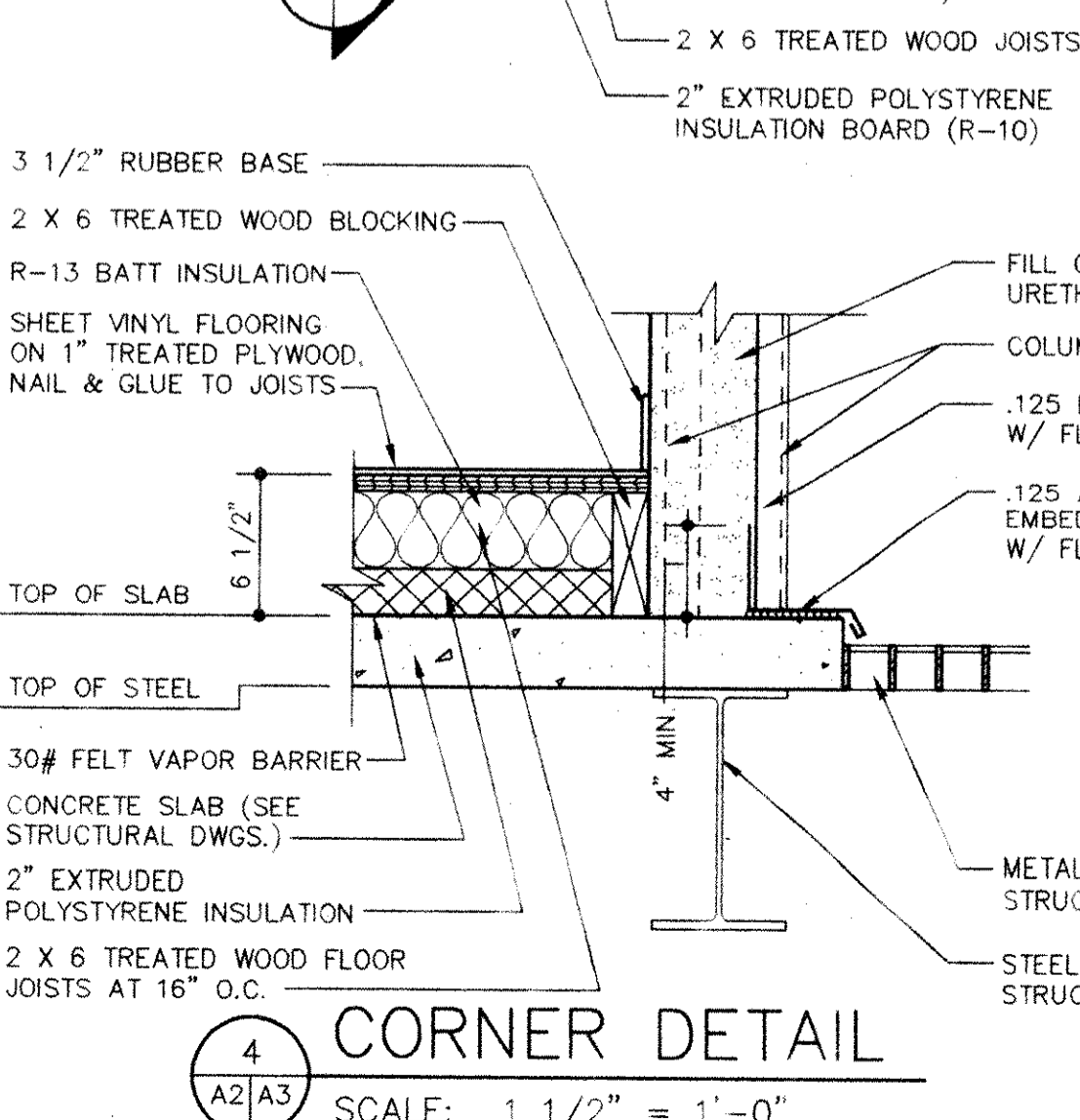
SCALE: 1 1/2" = 1'-0"



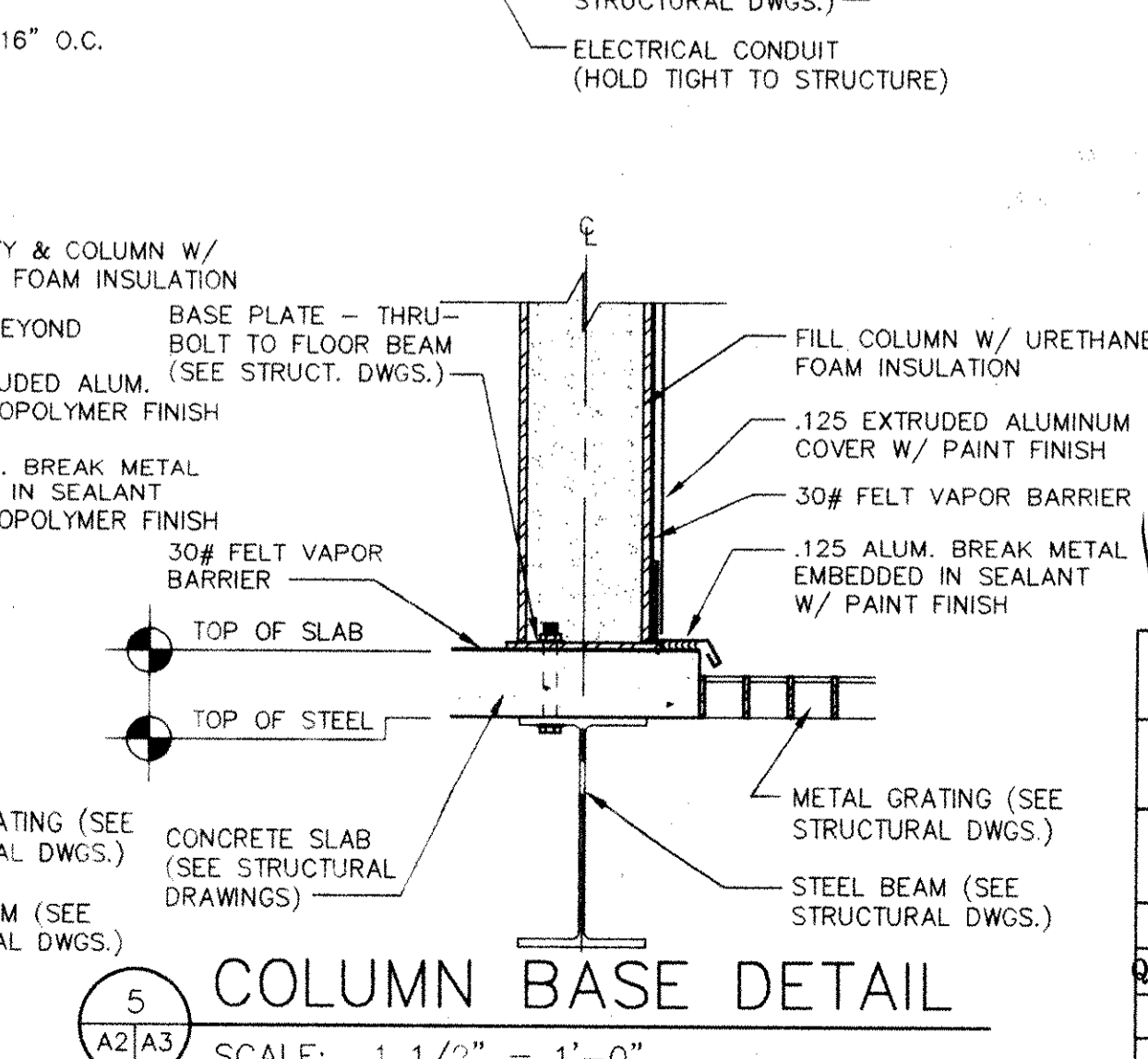
2 DETAIL
SCALE: 1 1/2" = 1'-0"



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



4 CORNER DETAIL
SCALE: 1 1/2" = 1'-0"



5 COLUMN BASE DETAIL
SCALE: 1 1/2" = 1'-0"



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HNTB ARCHITECTS ENGINEERS PLANNERS
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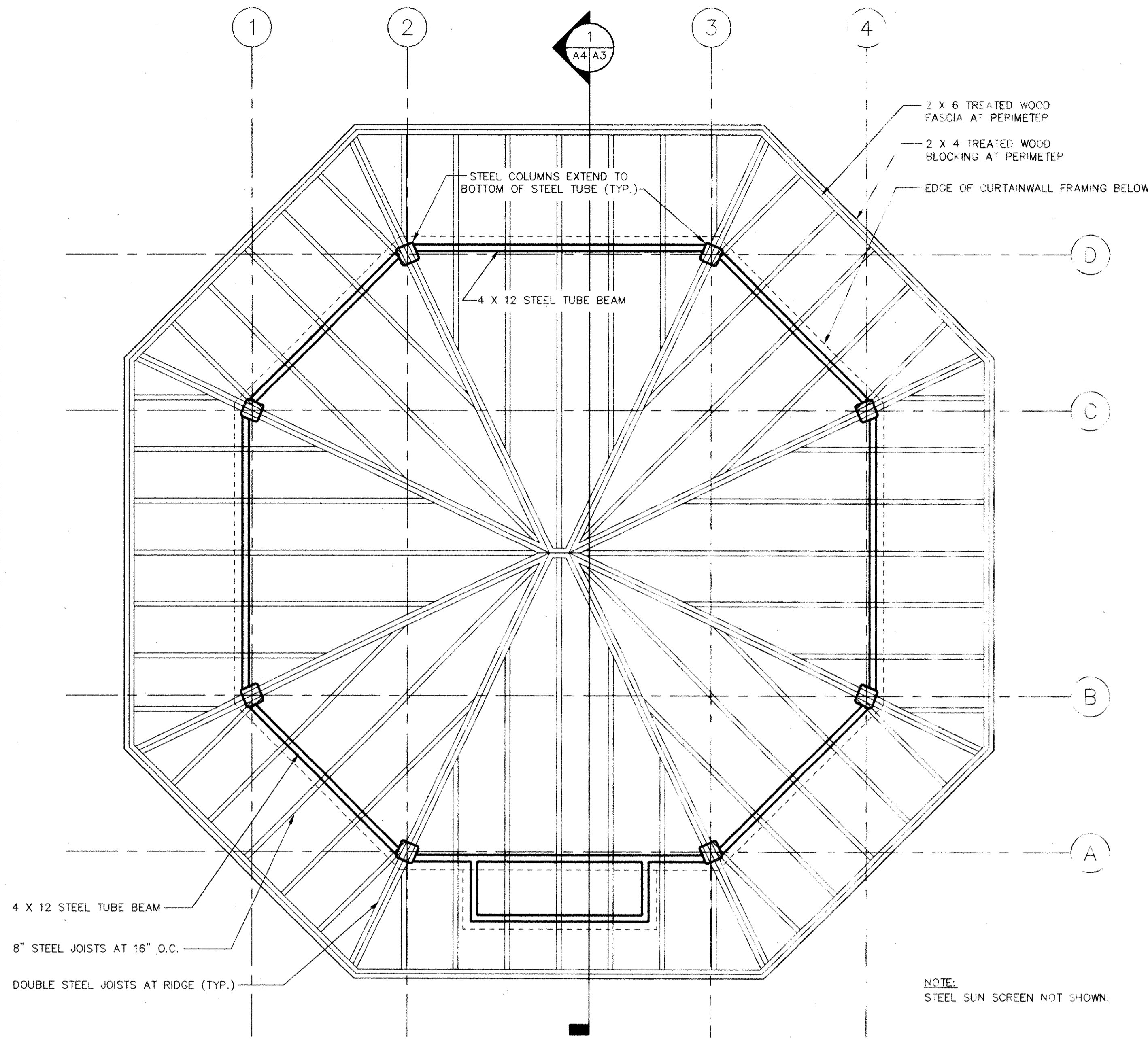
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

LADY'S ISLAND
BUILDING SECTION
& DETAILS

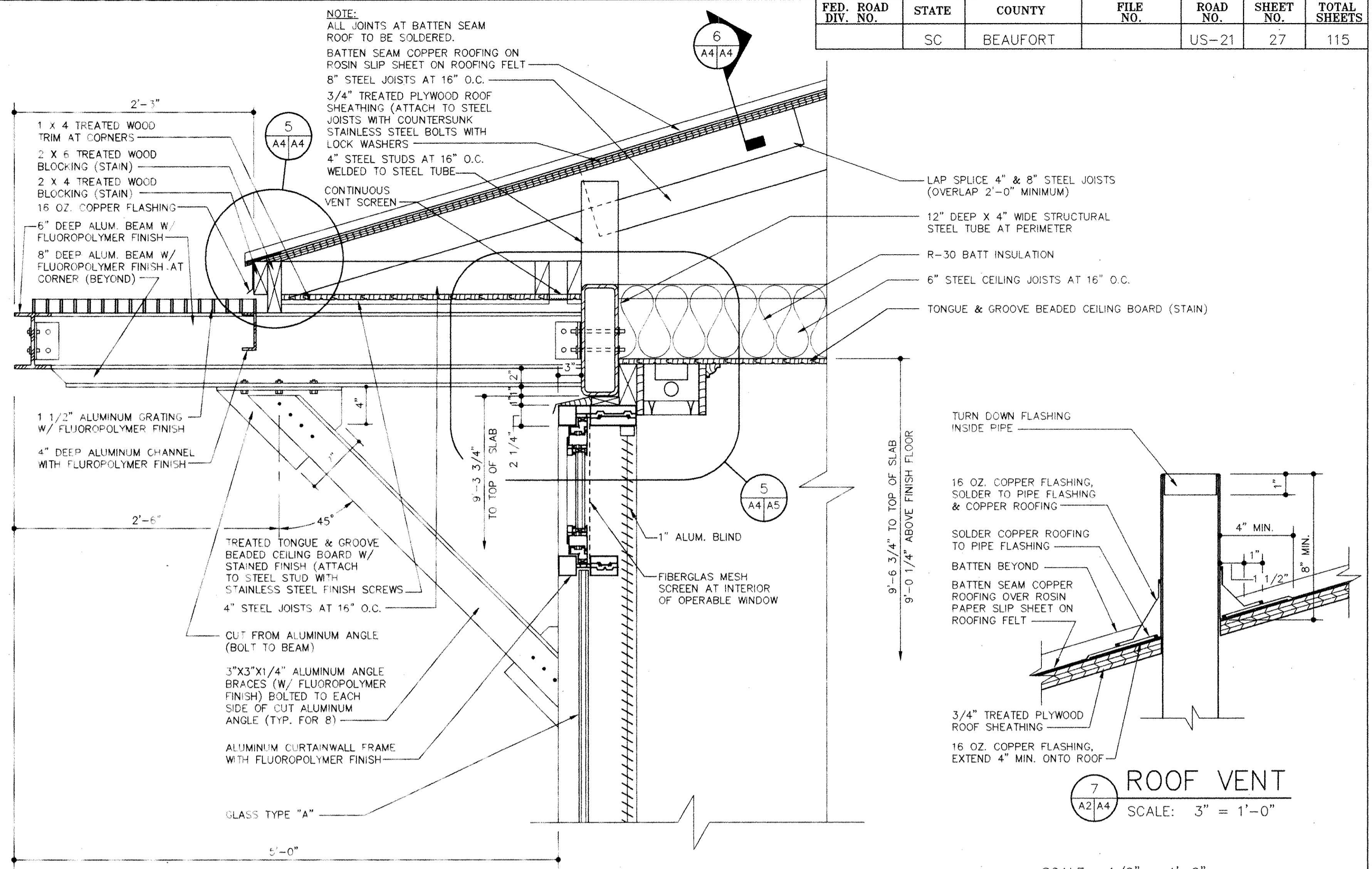
REV.			
REV.			
REV.			
QUAN.			
DR.	RRF	MSW	02/97
DES.	MSW	MSW	02/97
BY	CHK.	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	A-3

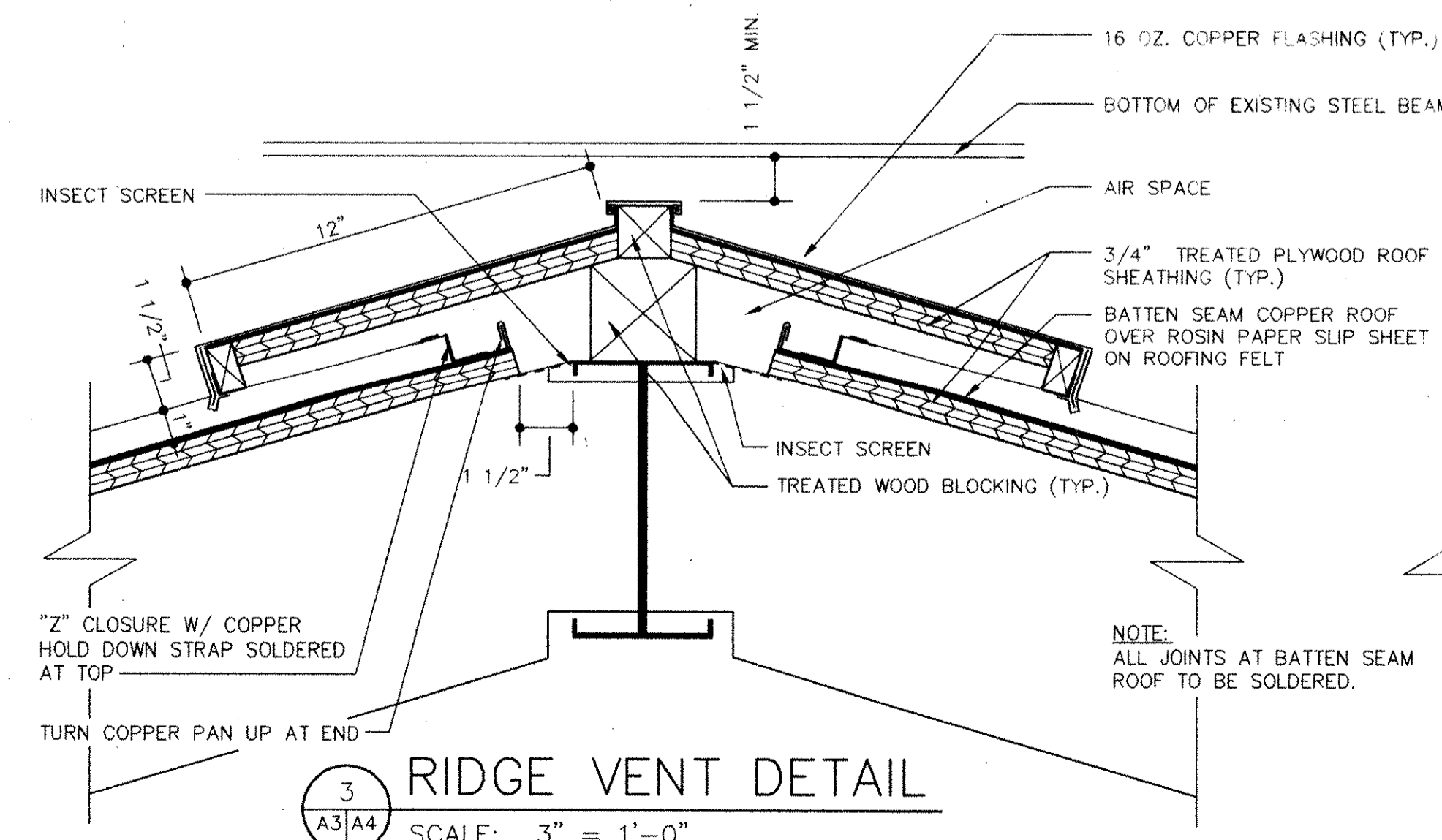
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	27	115



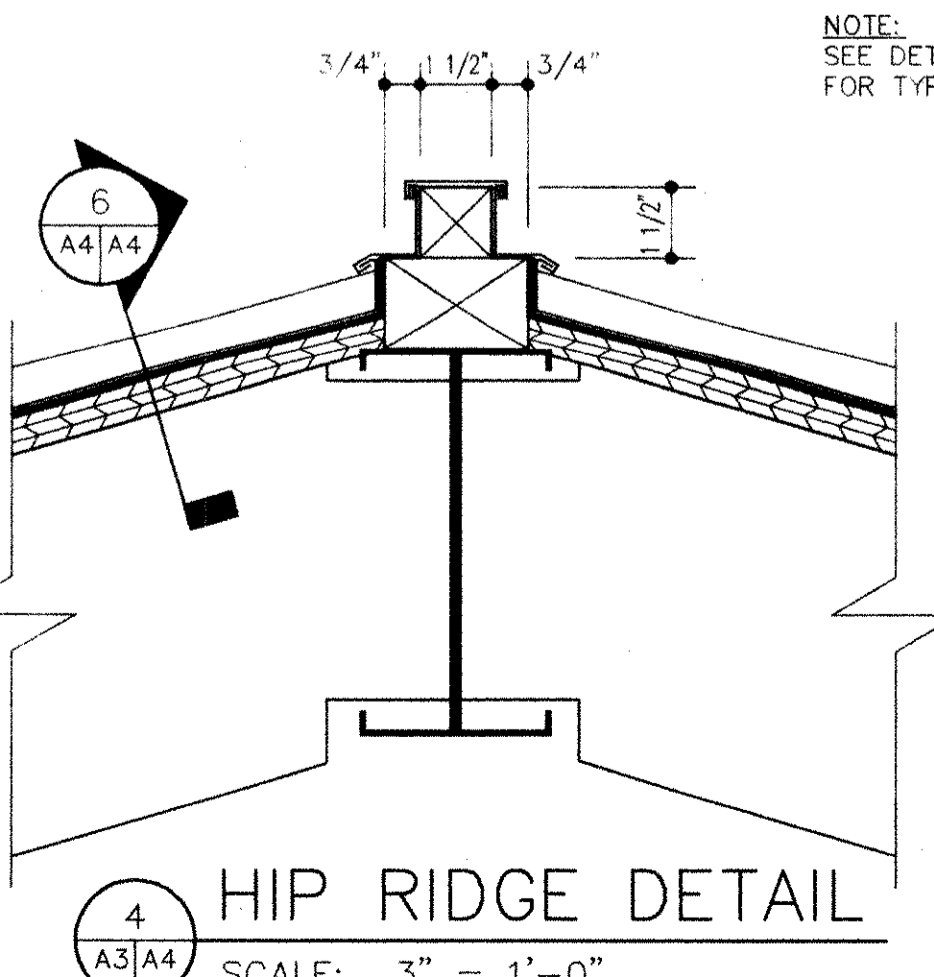
1 ROOF FRAMING PLAN
SCALE: 1/2" = 1'-0"



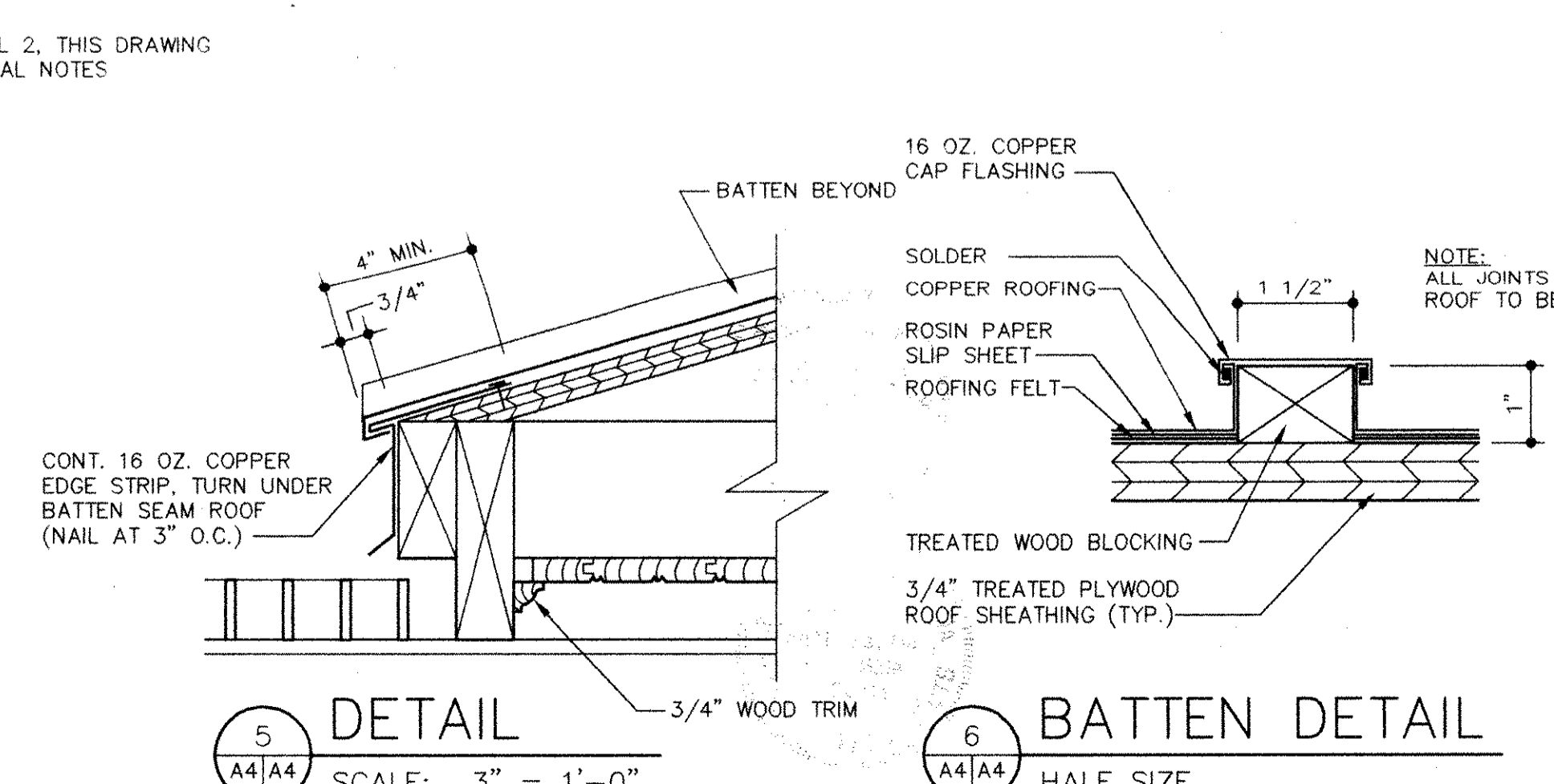
2 DETAIL
SCALE: 1 1/2" = 1'-0"



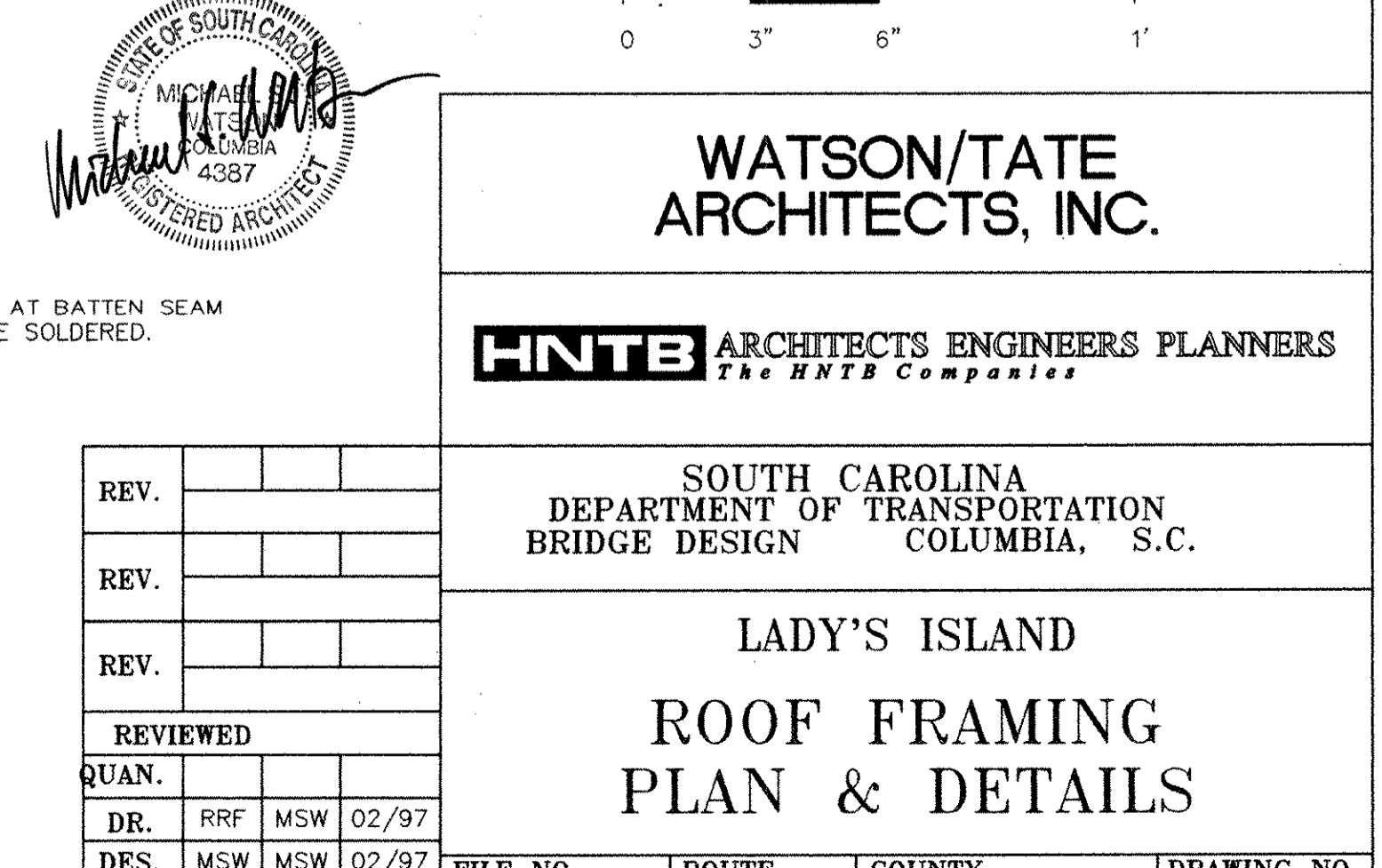
3 RIDGE VENT DETAIL
SCALE: 3" = 1'-0"



4 HIP RIDGE DETAIL
SCALE: 3" = 1'-0"

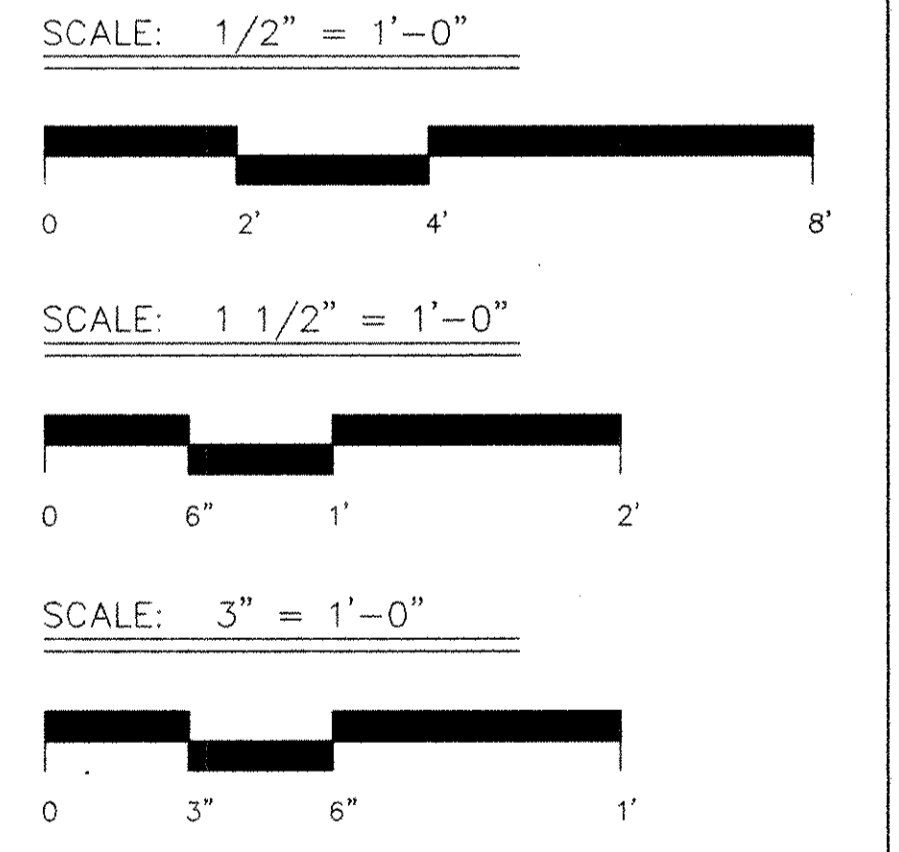


5 DETAIL
SCALE: 3" = 1'-0"



6 BATTEN DETAIL
SCALE: 3" = 1'-0"

7 ROOF VENT
SCALE: 3" = 1'-0"



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SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

LADY'S ISLAND
ROOF FRAMING PLAN & DETAILS

REV.				
REV.				
REV.				
REVIEWED				
QUAN.				
DR.	RRF	MSW	02/97	
DES.	MSW	MSW	02/97	
BY	CHK.	DATE		

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	A-4

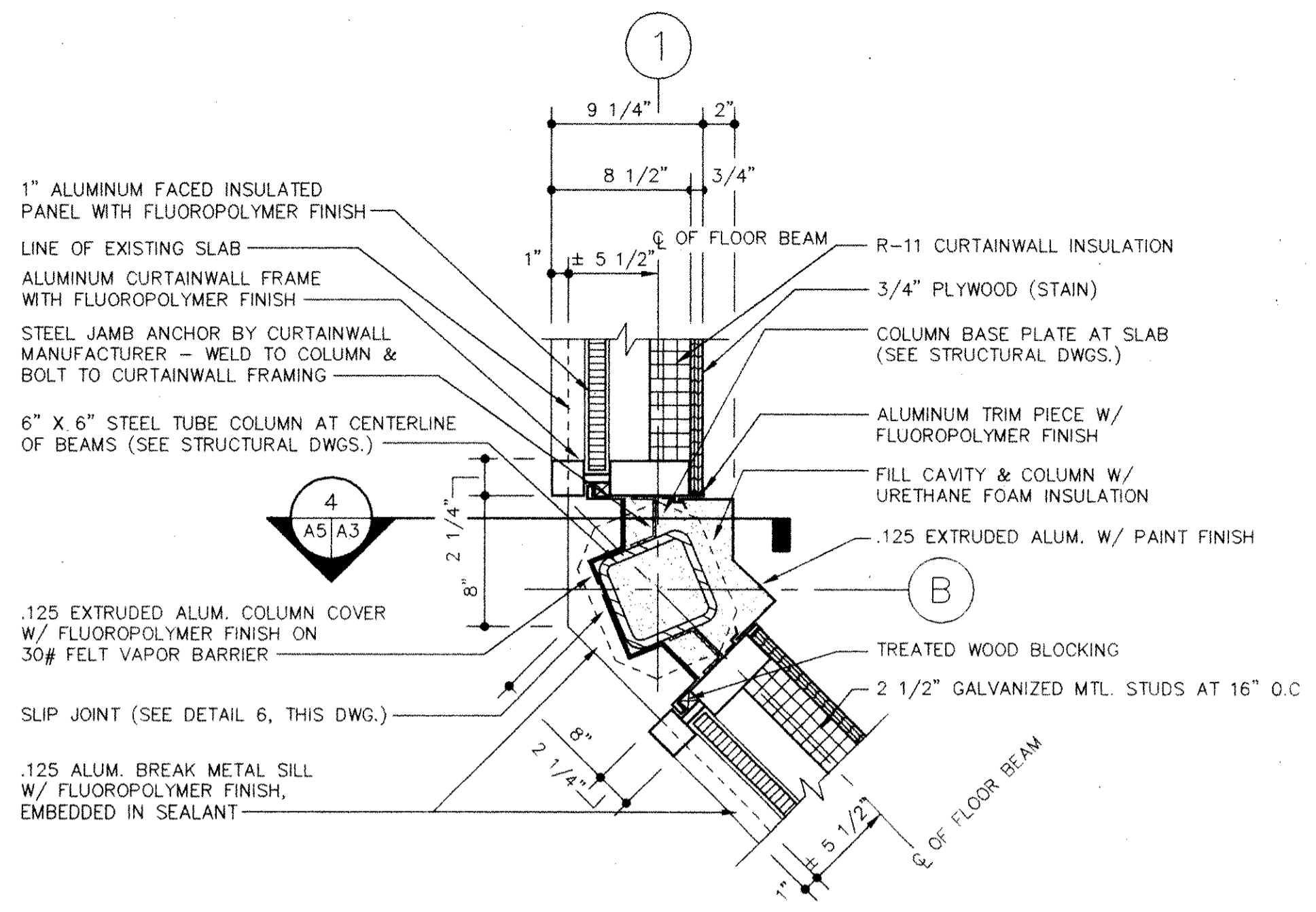
NOTE: STEEL SUN SCREEN NOT SHOWN.

NOTE: SEE DETAIL 2, THIS DRAWING FOR TYPICAL NOTES.

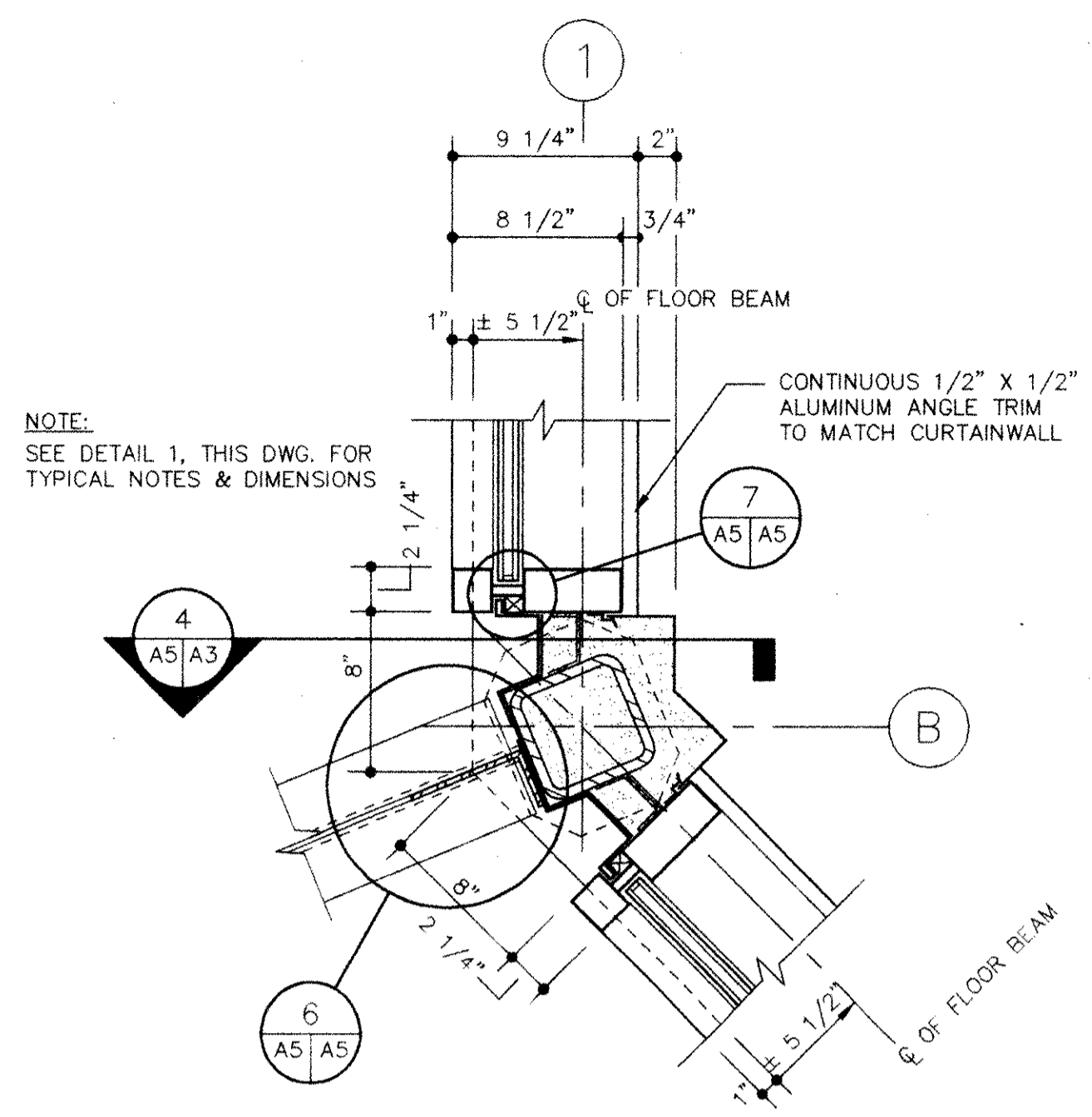
NOTE: ALL JOINTS AT BATTEN SEAM ROOF TO BE SOLDERED.

NOTE: ALL JOINTS AT BATTEN SEAM ROOF TO BE SOLDERED.

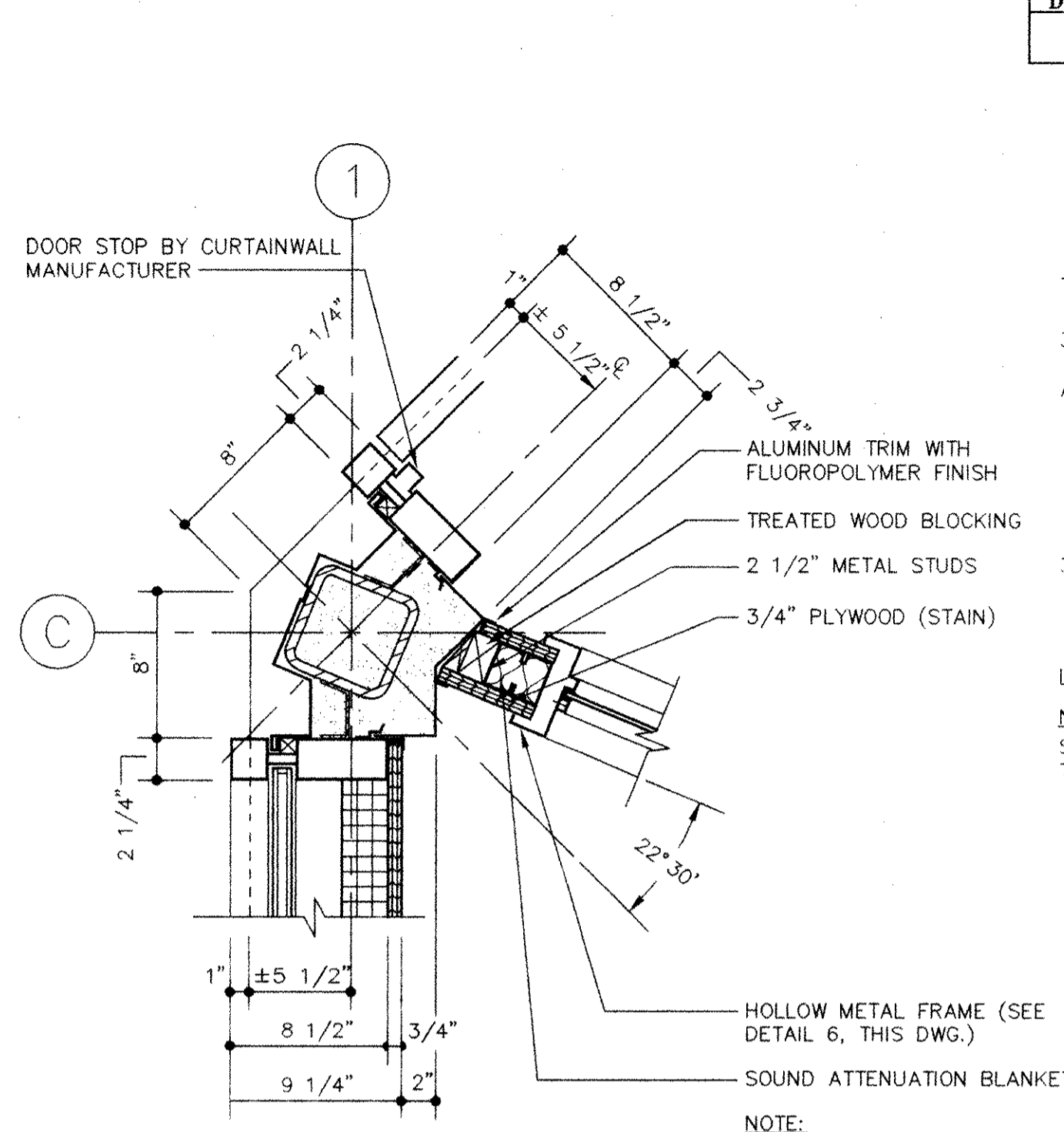
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	28	115



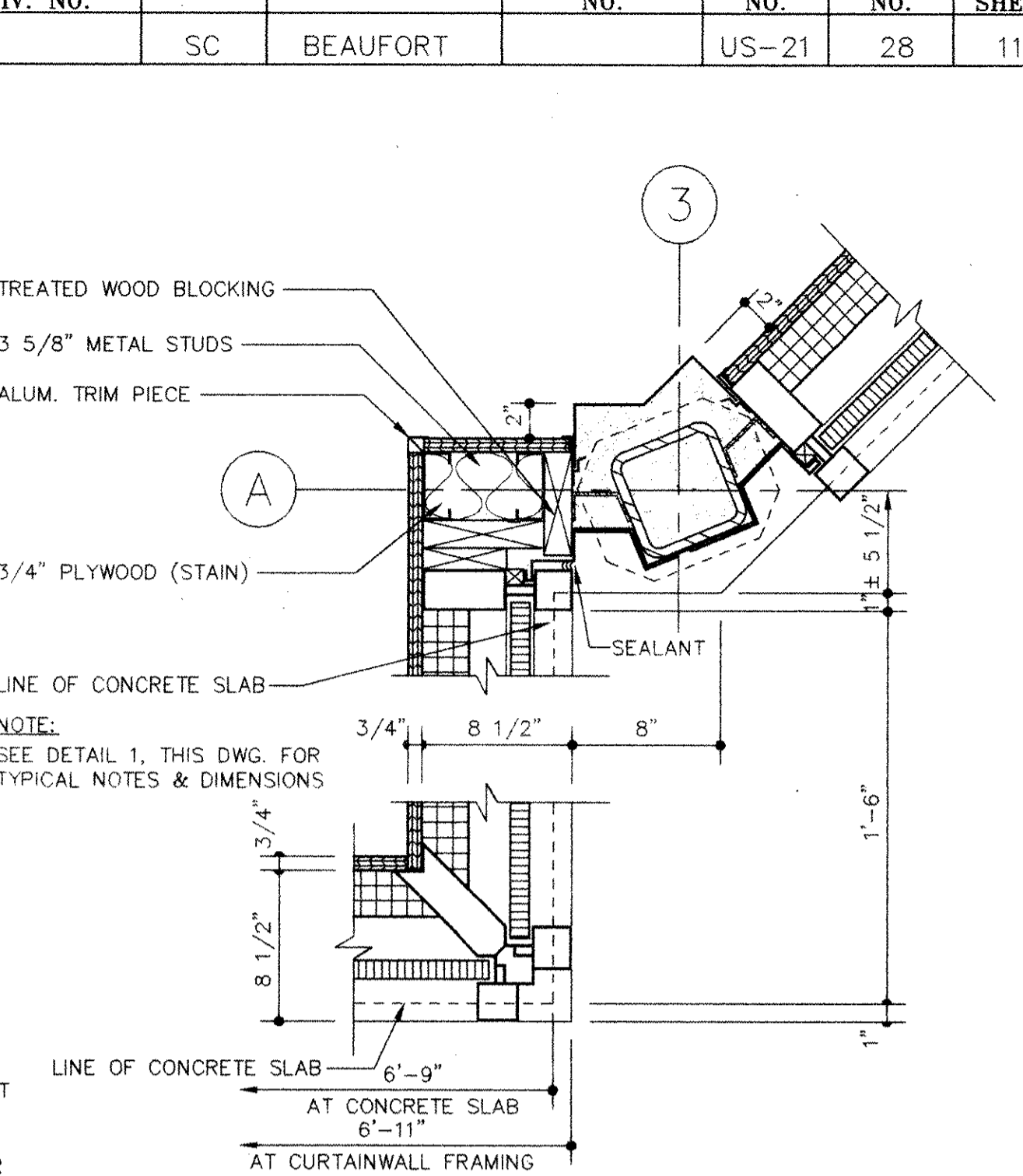
1 CORNER DET. AT ALUM. PANEL
 SCALE: 1 1/2" = 1'-0"



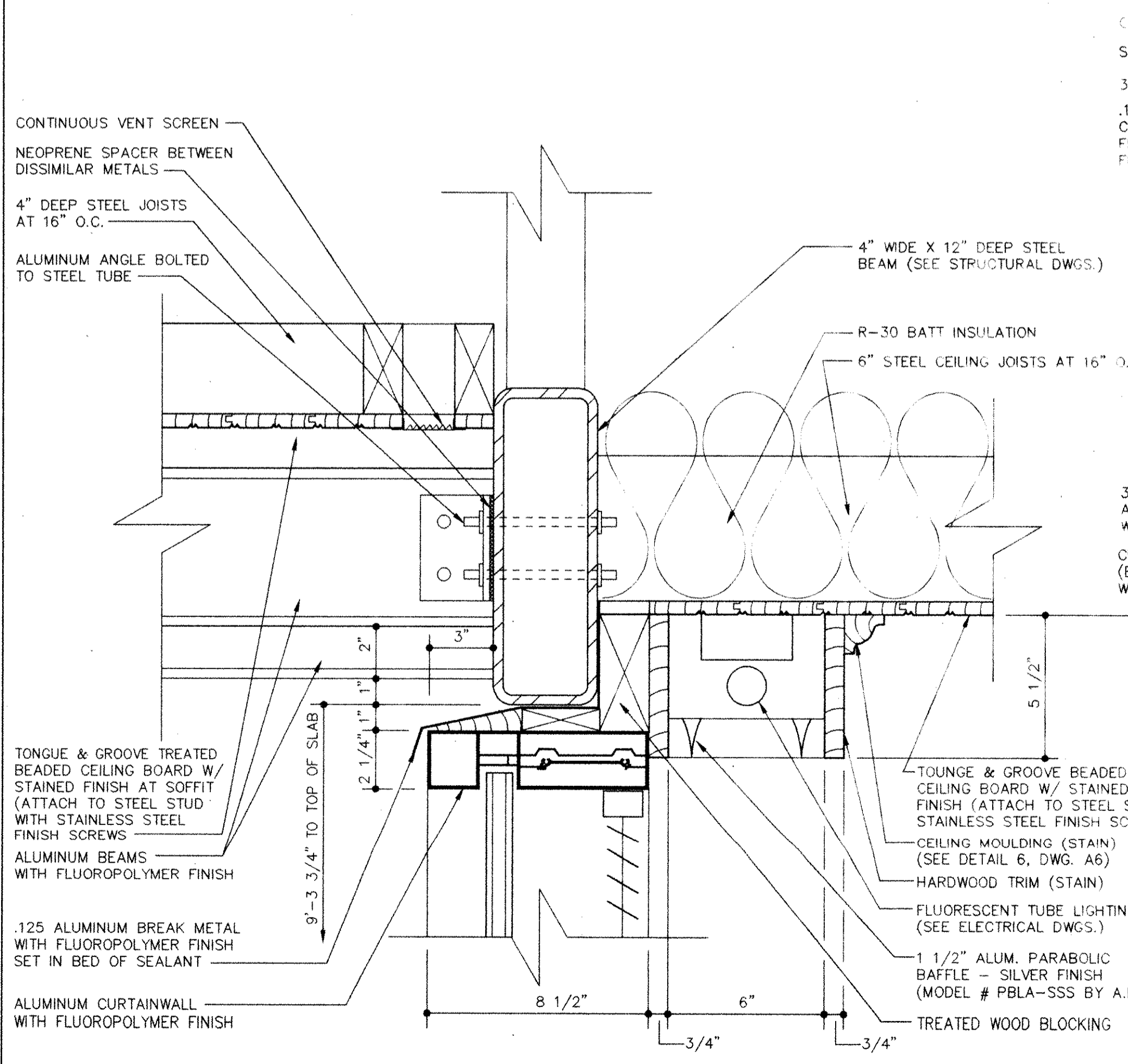
2 CORNER DET. AT VISION GLASS
 SCALE: 1 1/2" = 1'-0"



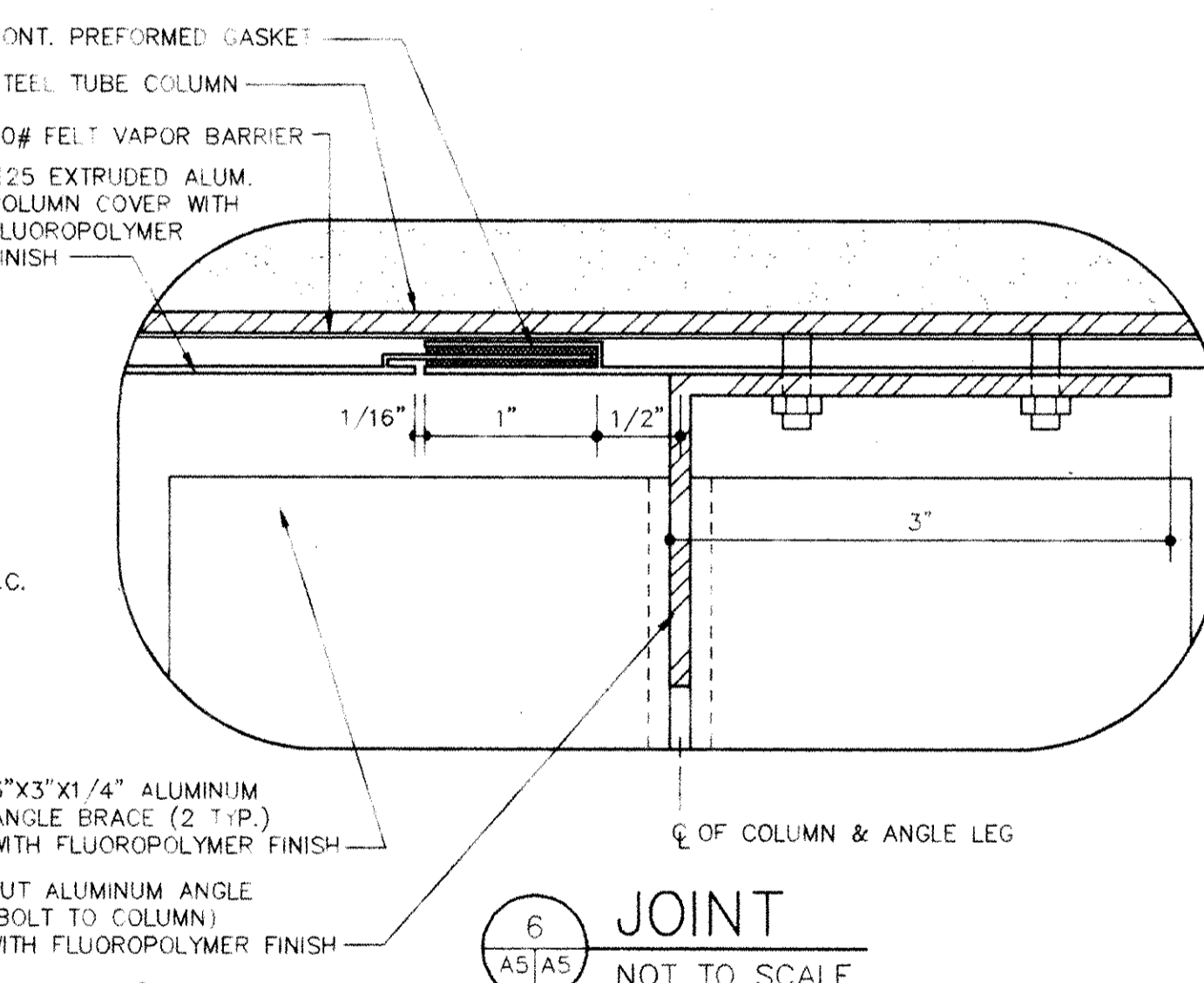
3 DETAIL
 SCALE: 1 1/2" = 1'-0"



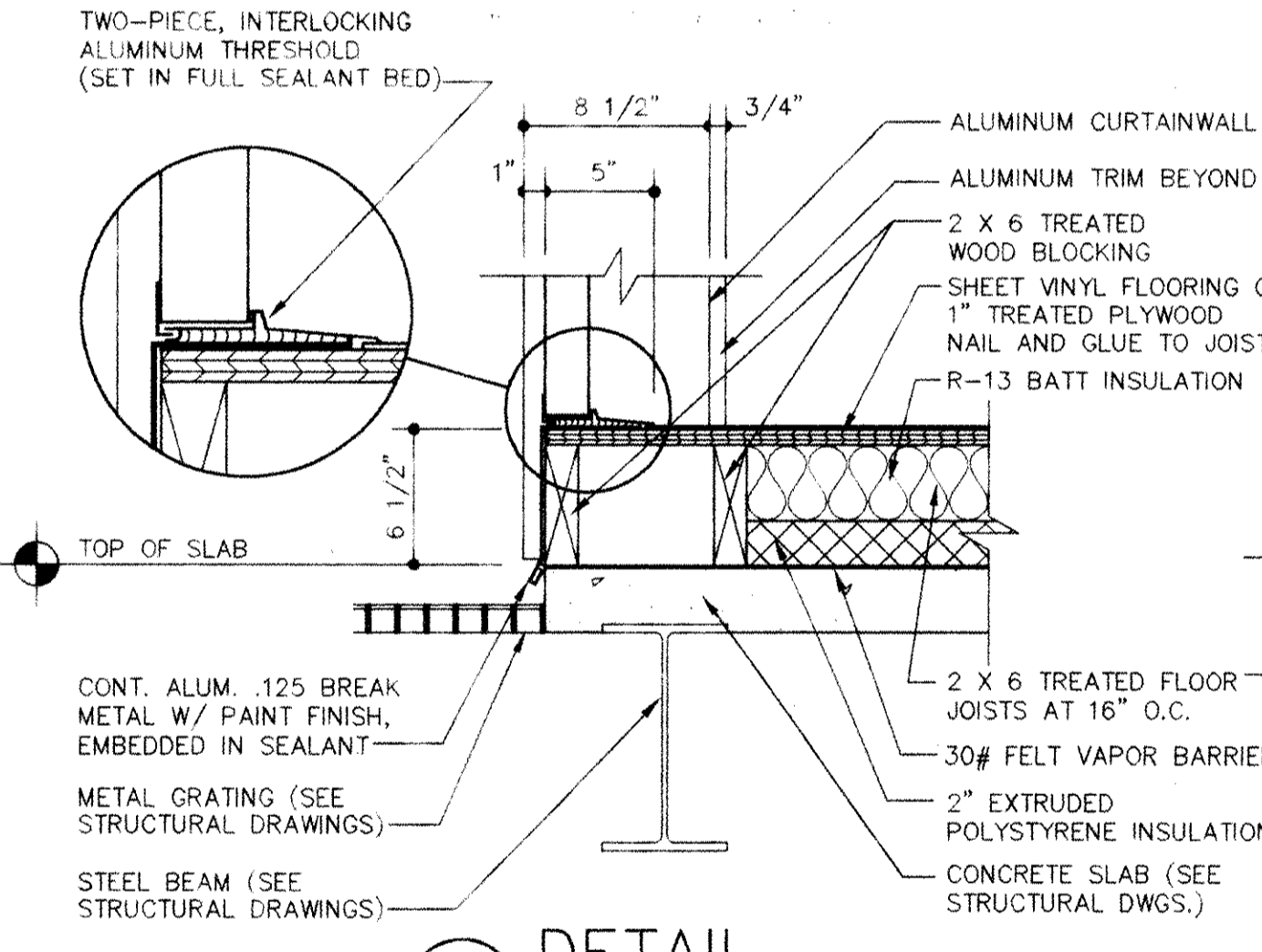
4 DETAIL (BELOW COUNTER)
 SCALE: 1 1/2" = 1'-0"



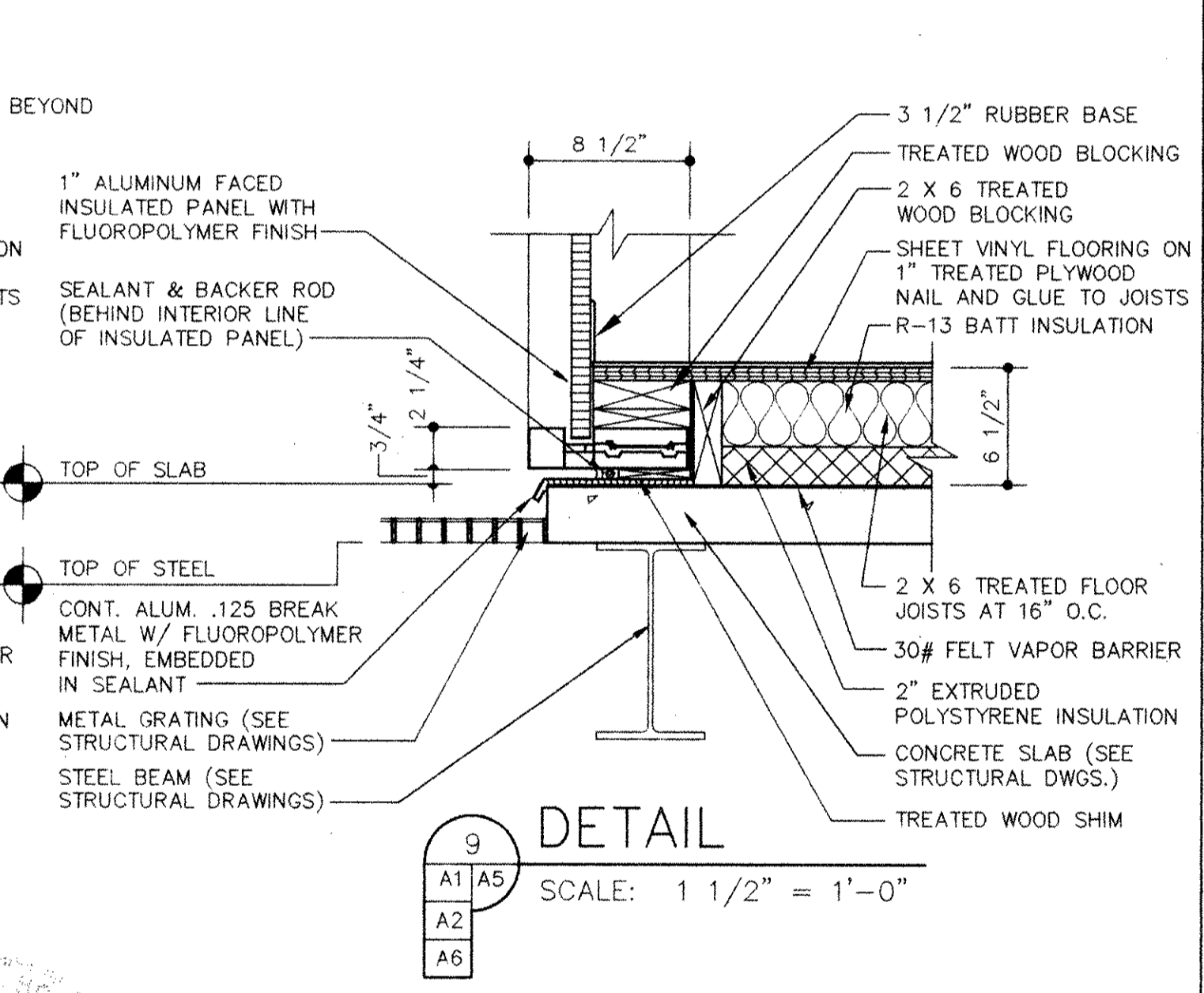
5 DETAIL
 SCALE: 3" = 1'-0"



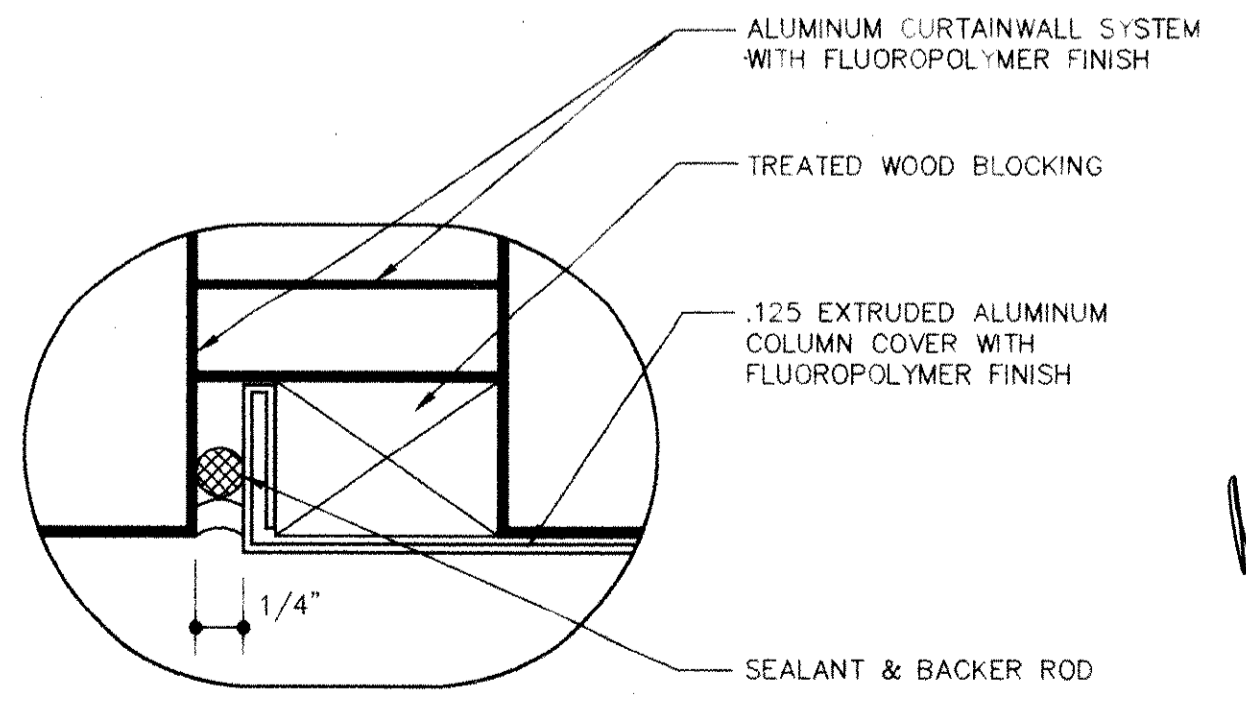
6 JOINT
 NOT TO SCALE



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

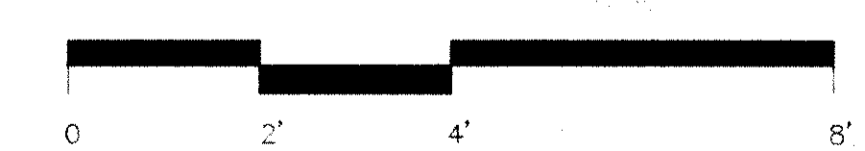


9 DETAIL
 SCALE: 1 1/2" = 1'-0"



7 JOINT
 NOT TO SCALE

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



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



SCALE: 3" = 1'-0"



REV.	BY	CHK.	DATE
QUAN.	DR.	MSW	DATE

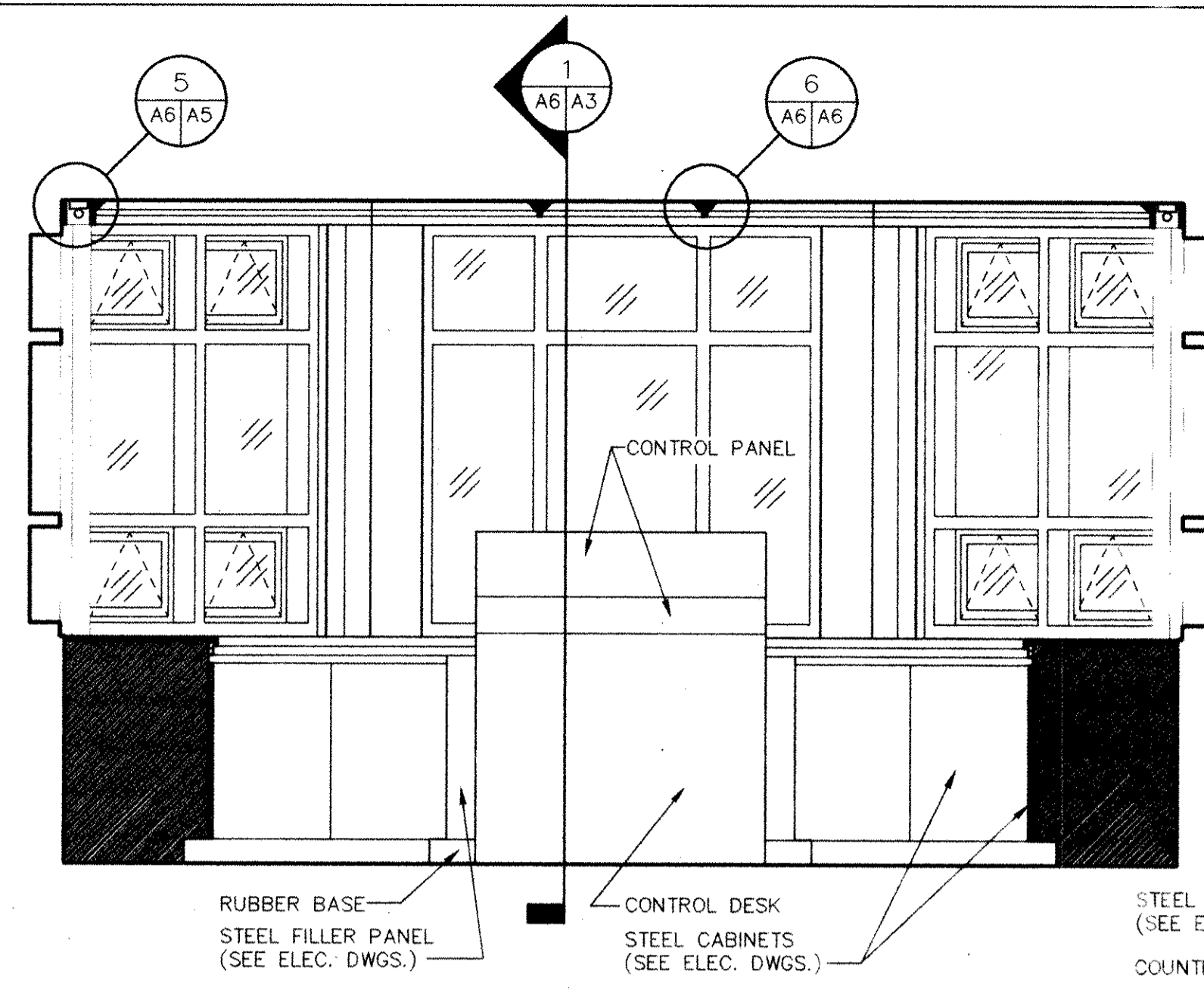
WATSON/TATE ARCHITECTS, INC.

HNTB ARCHITECTS ENGINEERS PLANNERS
 The HNTB Companies

SOUTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 BRIDGE DESIGN COLUMBIA, S.C.

LADY'S ISLAND
CURTAINWALL, DOOR & WINDOW DETAILS

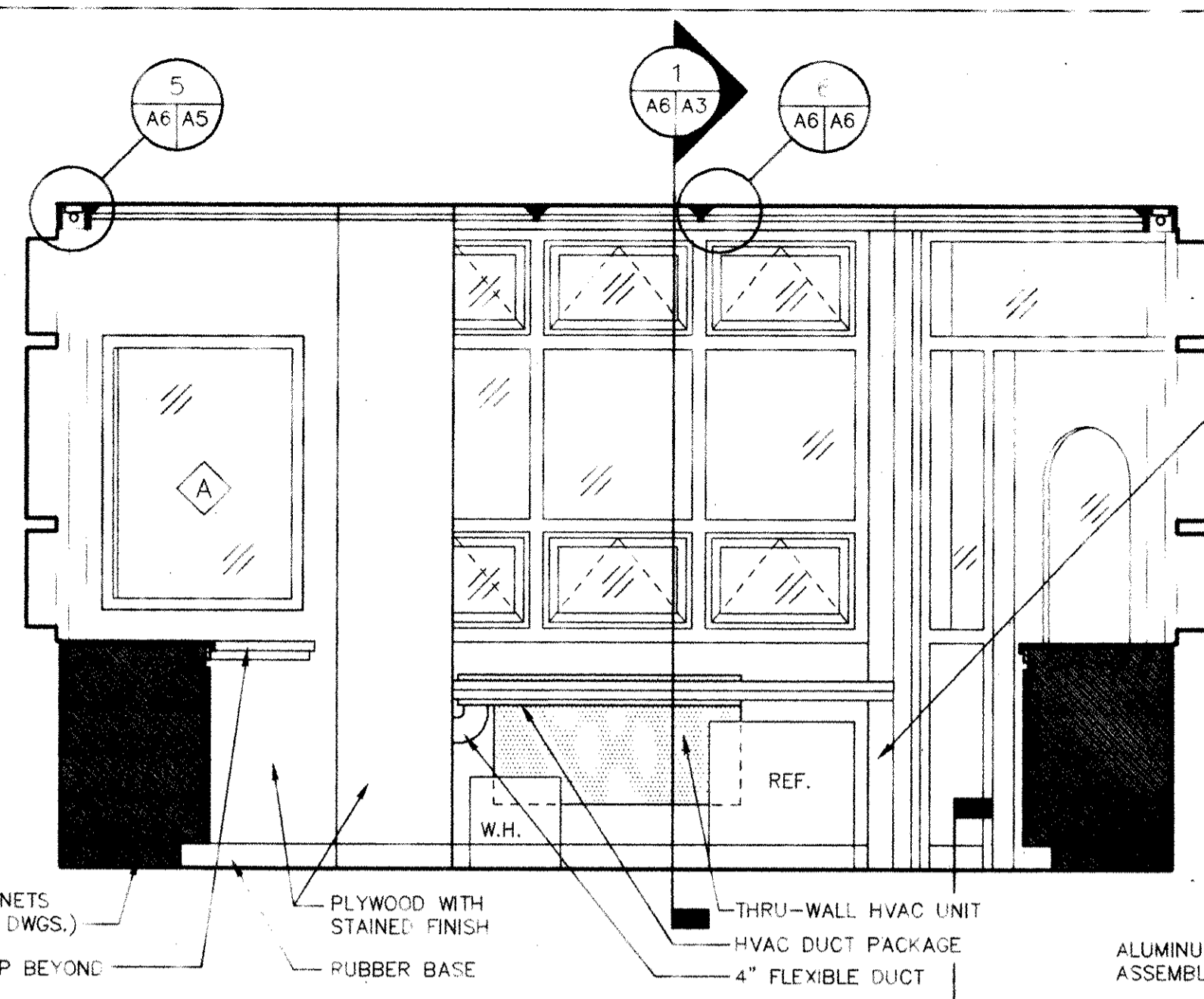
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	A-5



1
A1/A6

INTERIOR ELEVATION

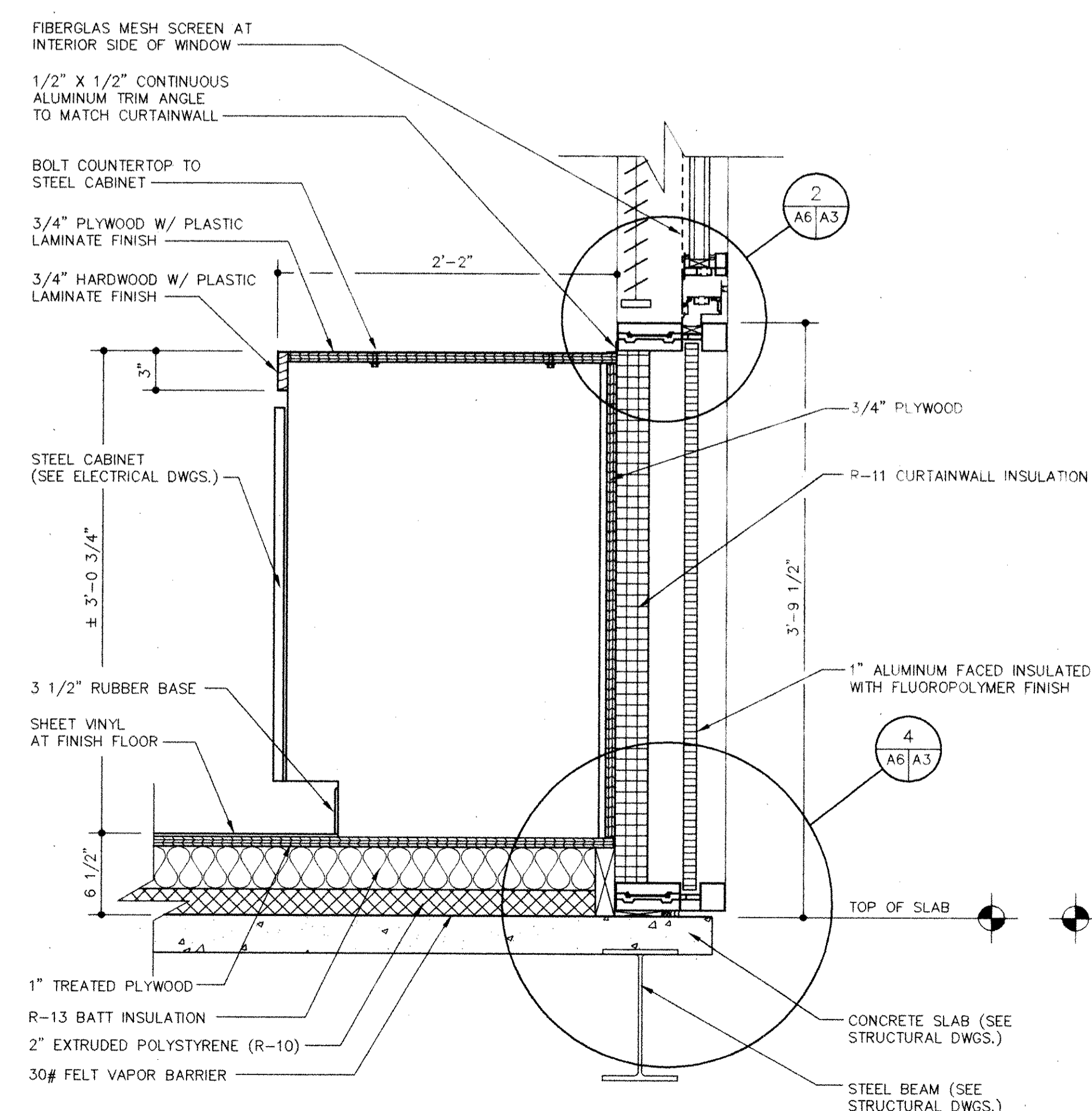
SCALE: 1/2" = 1'-0"



2
A1/A6

INTERIOR ELEVATION

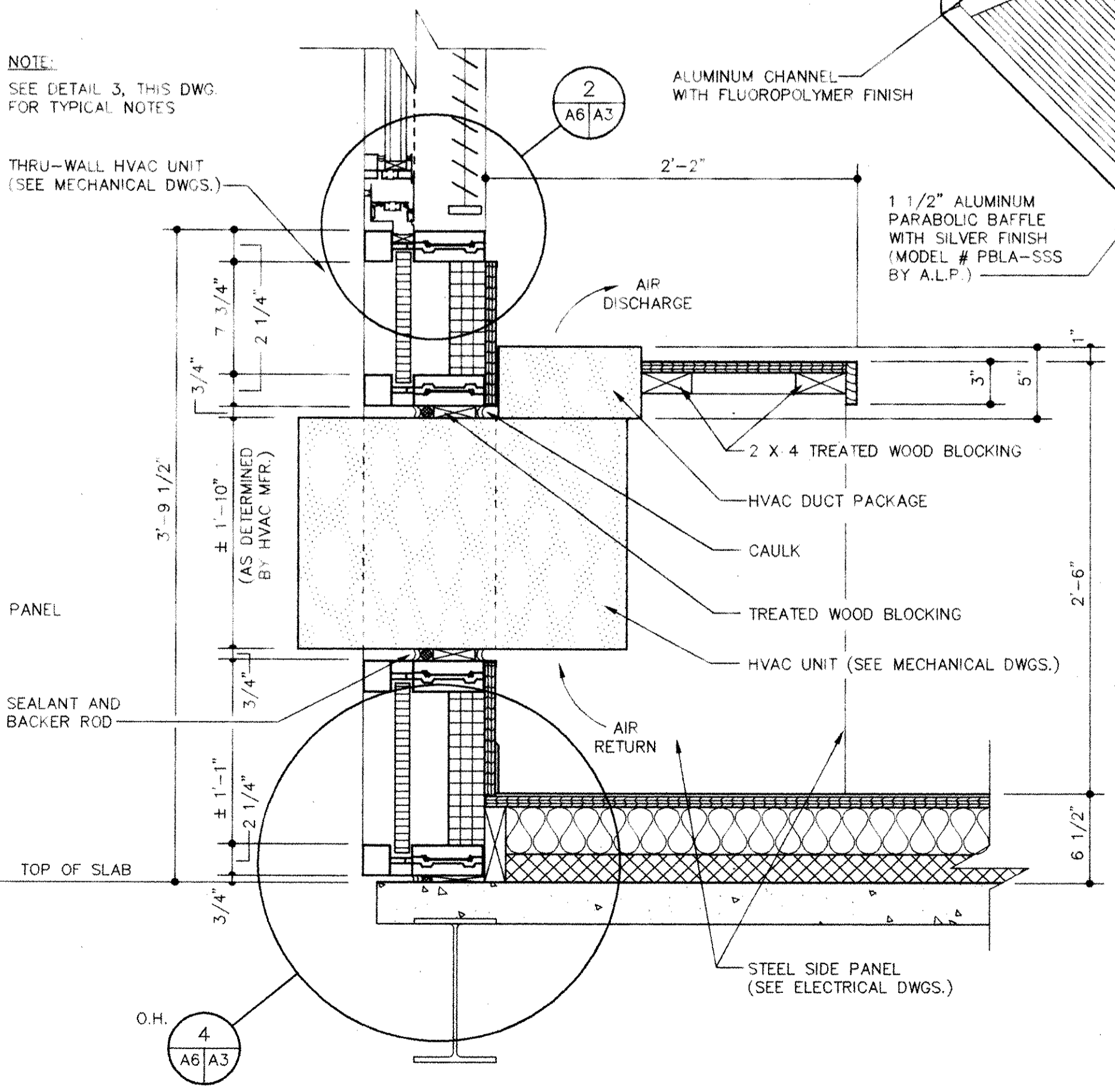
SCALE: 1/2" = 1'-0"



3
A1/A6

CABINET DETAIL

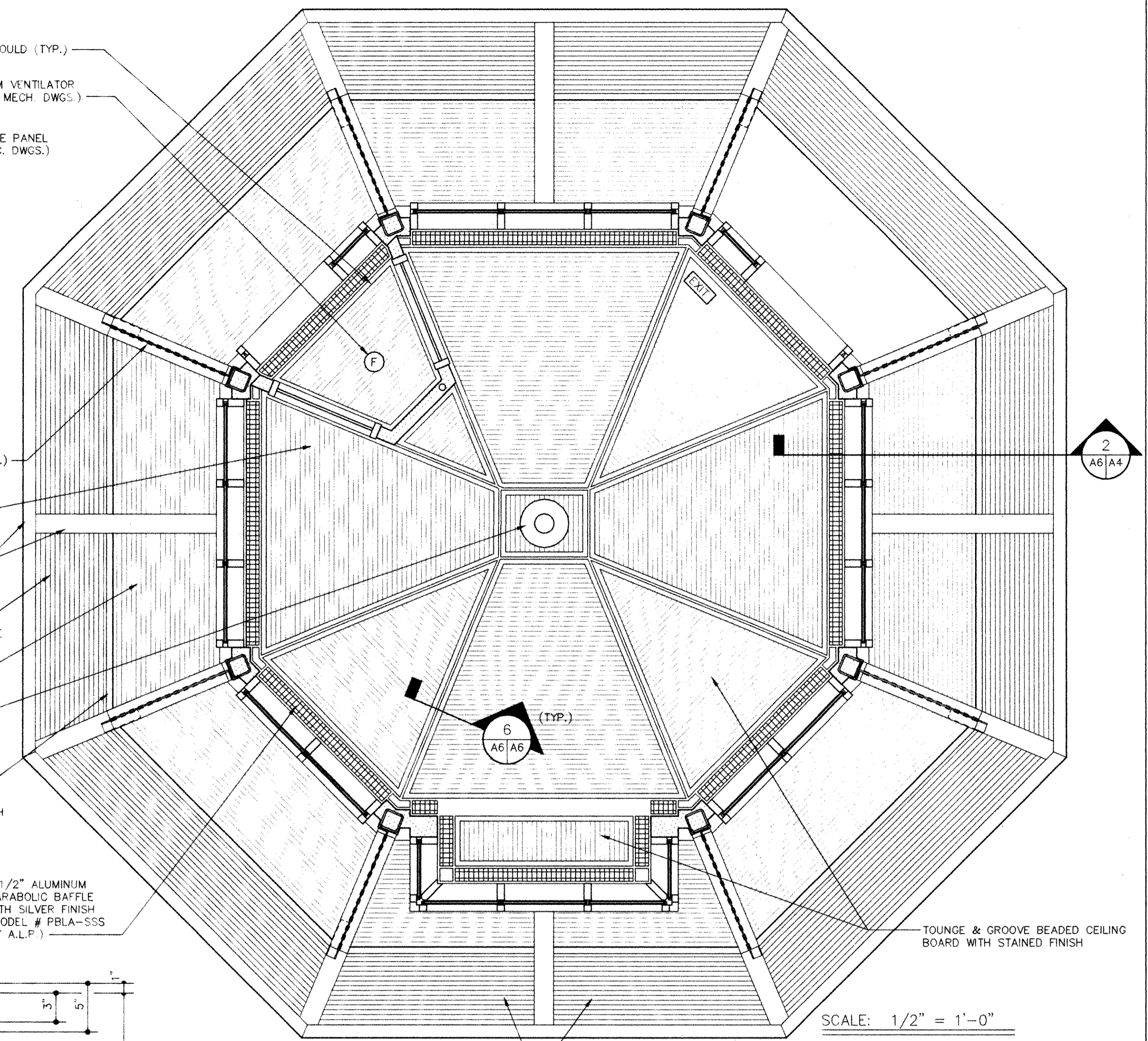
SCALE: 1 1/2" = 1'-0"



4
A3/A6

DESK DETAIL

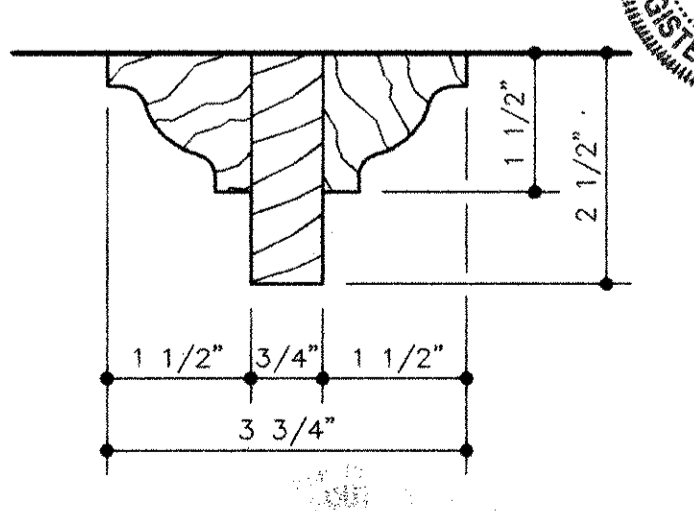
SCALE: 1 1/2" = 1'-0"



5
A6/A6

REFLECTED CEILING PLAN

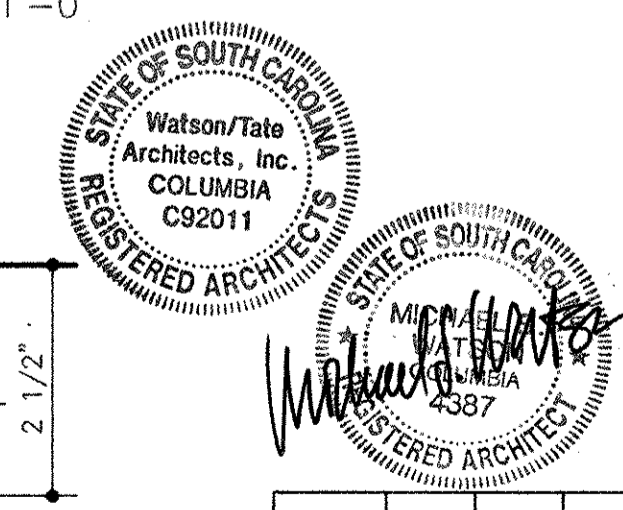
SCALE: 1/2" = 1'-0"



6
A3/A6

CEILING TRIM DETAIL

SCALE: HALF SIZE



WATSON/TATE ARCHITECTS, INC.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

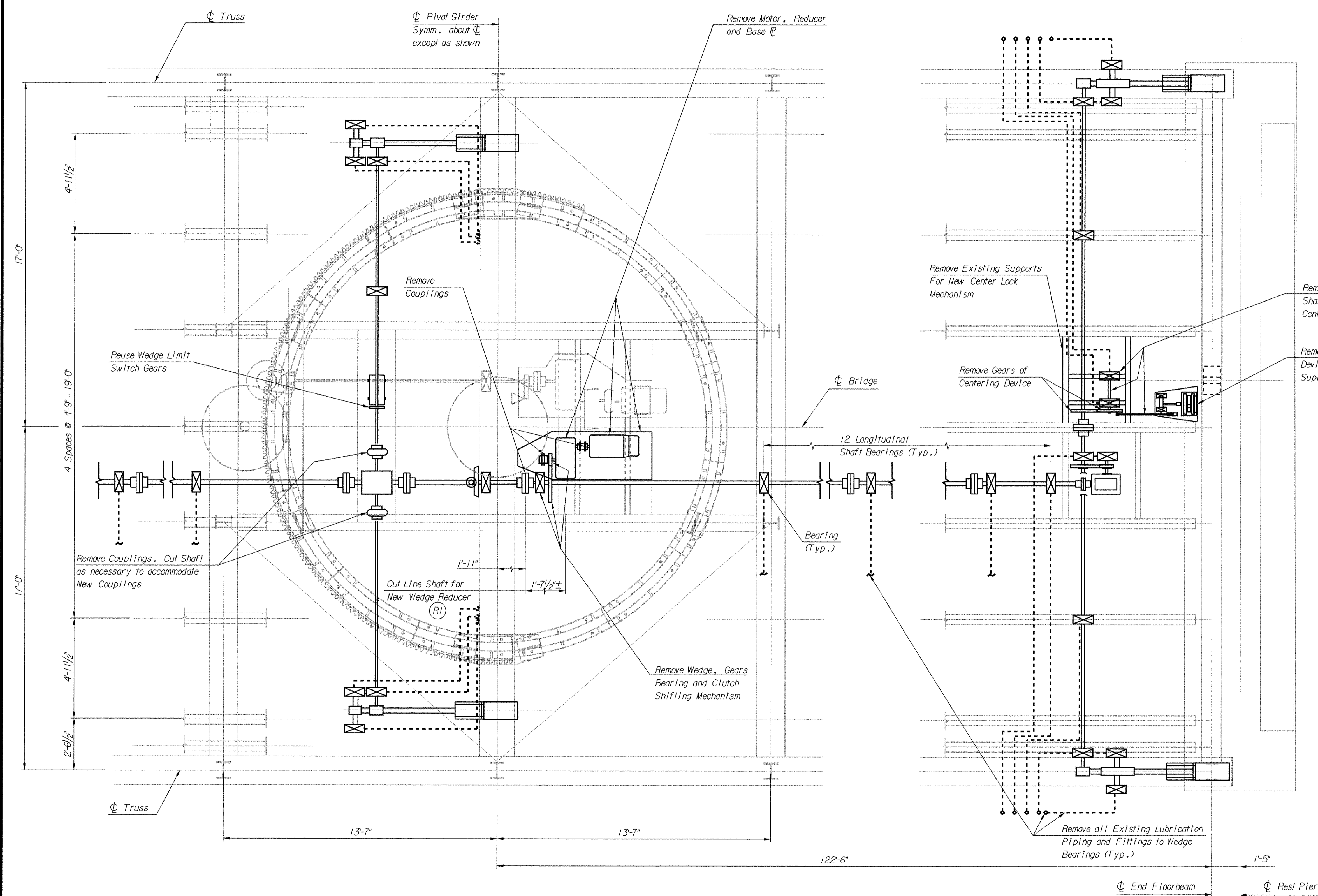
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

LADY'S ISLAND
**INTERIOR ELEVATIONS,
REFLECTED CEILING PLAN
& CABINET DETAILS**

REV.				
REV.				
REV.				
REVIEWED				
QUAN.				
DR.	RRF	MSW	02/97	
DES.	MSW	MSW	02/97	
BY	CHK.	DATE		

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	A-6

WEDGE DRIVE CONSTRUCTION SEQUENCE



1. Install new center lock receiving sockets on both north and south rest piers. Remove existing centering mechanism and supports. Install new north and south center lock drive and supports. For details see Drawing No. M-8.
2. Rehabilitate wedge manual drive for manual wedge operation.
3. Temporarily install two 50 ton, single-acting, hydraulic cylinders with locking nuts equipped with base and tilt saddle on the south rest pier. See Drawing No. M-7 for location. Place each cylinder adjacent to the end wedges. The cylinders will be operated by a single pump unit with control valves for synchronous lift of the span end.
4. Remove section of south line shaft for new box beam installation. Modify shaft to accommodate the new wedge drive, see Drawing No. M-7. Remove south end wedge mechanisms and bearing bushings to be rehabilitated. Replace south worm reducer oil and install oil gage. Maintain wedge operation by using the manual drive and hydraulic cylinders.

Typical Hydraulic Cylinder Operation:
 Confirm roadway/swing span joint alignment with wedges and center lock drive (closed). Extend the cylinder rods up to the bottom flange of the end floorbeam. Plates should be placed between the flange and rod for load distribution. Once the proper elevation is attained (joint is level) a locking nut shall be used to hold the position. Pull wedges and disassemble for repairs. For repair details, see Drawing No. M-8.

For bridge operation during construction, the cylinder rods must be retracted and cleared for a bridge opening. After the opening is completed and the swing span is centered, reinstall the cylinders to elevate and support the cantilevered end.

Note: Temporarily support shafts of unsupported lengths exceeding 11 and 16 feet for line and cross shafts respectively during bearing repairs and box beam replacement.

5. Reinstall line shaft through new box beam.
6. Install new wedge drive machinery including motor and reducer. Coupling halves on line shaft to be installed in the field. Coordinate wedge drive installation with span drive replacement and support installation.
7. Install rehabilitated south end wedge mechanisms and new bearing bushings.
8. Relocate hydraulic cylinders and pump unit from the south rest pier to the north rest pier.
9. Disable the north end wedges by removing the coupling spacer at the center worm reducer longitudinal output shaft. Remove the north end wedge mechanisms and bearing bushings to be rehabilitated. Replace north worm reducer oil and install oil gage. Maintain wedge operation by using the new wedge drive and hydraulic cylinders.
10. Install rehabilitated north end wedge mechanisms, new bearing bushings and reinstall coupling spacer.
11. Relocate hydraulic cylinders and pump unit from the north rest pier to the center pivot pier. Each cylinder shall be placed under the pivot beam adjacent to the center wedges.
12. Remove the center wedge mechanisms, bearing bushing to be rehabilitated and "Paraflex" couplings. Replace the center worm reducer oil and install oil gage. Maintain wedge operation by using the new wedge drive and hydraulic cylinders.
13. Install rehabilitated center wedge mechanisms, new bearing bushings and new couplings. Coupling halves on the worm gear reducer to be installed in the field.
14. Remove hydraulic cylinders and pump unit.
15. Operate new wedge drive to verify alignment and seating of wedges. Adjust wedges as necessary for proper seating and alignment.

Contractor has the option of submitting an alternate construction sequence to the Engineer for approval.

PLAN
3/8"=1'-0"

- NOTES:**
1. Cost for all work shown on this drawing to be included in Pay Item "Rehabilitation of Wedge Drive" unless otherwise noted.
 2. Cost for removal of existing centering device mechanism and supports to be included in Pay Item "New Centering Locks."

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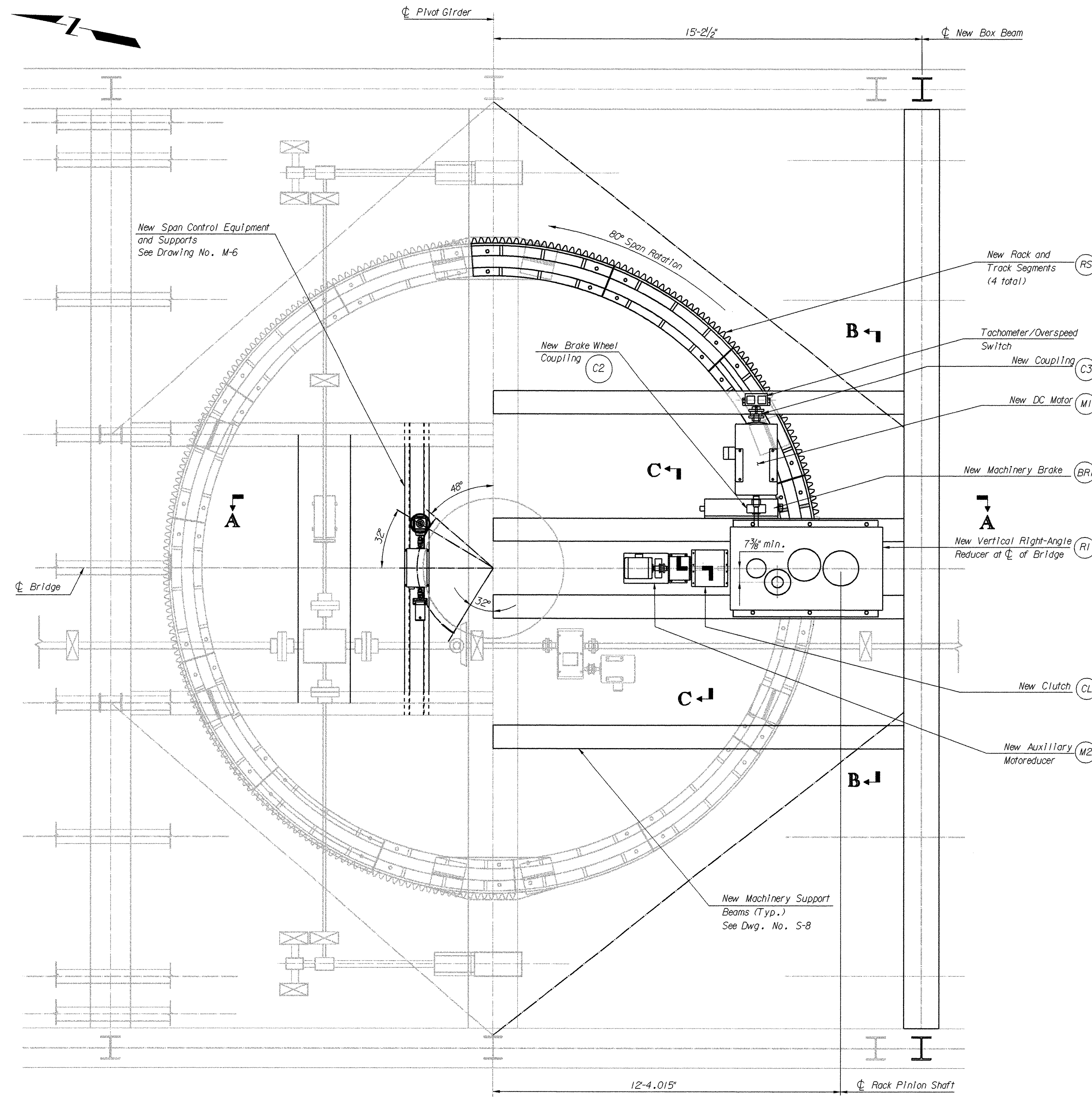
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

LADY'S ISLAND
**DEMOLITION OF
EXISTING
WEDGE DRIVE**

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY		CHK.	DATE

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-2

19-FEB-1997 10:12:16 AM C:\D20\Drawings\115\115-31.dwg
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 Plot Scale: 1/8"=1'-0"
 Plot Table:



PLAN
1/2"=1'-0"

NOTES:

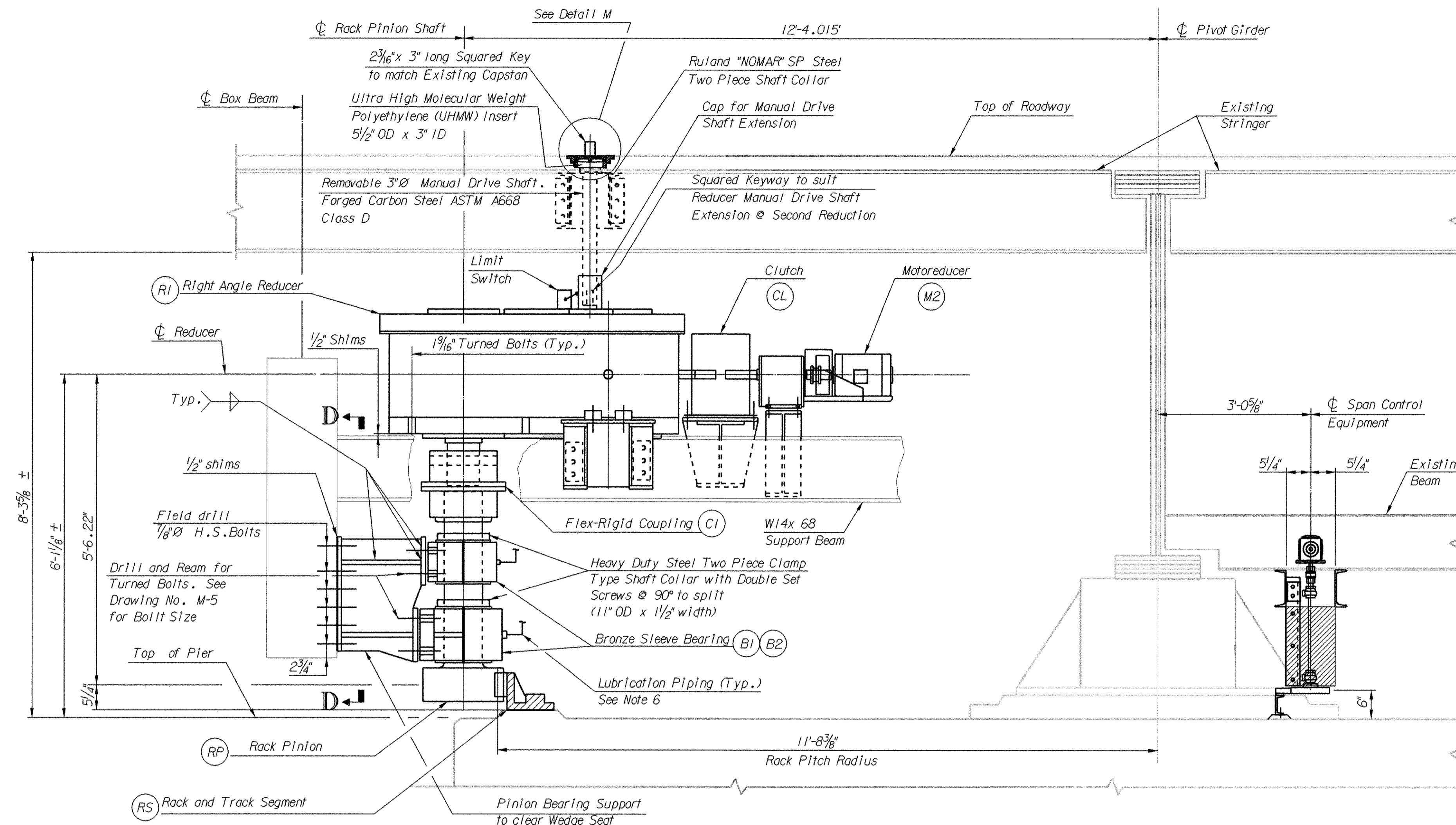
1. For Sections A-A, B-B and C-C, see Drawing No. M-4

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	32	115
SPAN MACHINERY SCHEDULE						
MK	QTY	DESCRIPTION	MANUFACTURER			
M1	1	Foot-mounted, DC motor, 500V totally enclosed non-ventilated, 20 HP, 1150 RPM base speed.	Series 9100, Frame 366AT as manufactured by Fincor			
M2	1	Concentric shaft motoreducer, dual speed, squirrel cage AC gearmotor, totally enclosed fan cooled, 7.5 HP synchronous speed 1800/450 RPM, 4.13:1 ratio. Provide Type T41, Size 1040 controlled torque-steel flex coupling and coupling guard. Slip torque set @ 405 lb-in. Extend drive shaft to suit clutch hub.	Type FZ2, Size 1030-Class 11 as manufactured by The Falk Corp.			
R1	1	Modified double input vertical right angle reducer, 350.87:1 ratio, rated for 588 in-kips at 3.28 RPM, service factor 1.0, Extend shaft at M1 input to 8 1/2" to suit brakewheel coupling and cover. Extend shaft at M2 input to suit clutch hub.	Quadruple reduction unit No. 14VB4 as manufactured by Philadelphia Gear Corp. See mechanical specifications for special design criteria			
BR1	1	Thrustor operated machinery brake, 8" diameter brake wheel with manual release, NEMA 3R enclosure. Brake setting 110 ft-lbs.	3 Phase AC Thrust Operated, Type 8" MBT/E-ED23/5 as manufactured by Mondel Engineering Limited.			
CL	1	Electrically engaged clutch with straight bores, DC operated with rectifier. Drive hub with 1 3/4" bore, 3/8" x 3/8" x 5 1/8" key to match M2 shaft. Driven hub with 1 3/4" bore, 7/8" x 7/8" x 2 3/4" key to match R1 shaft. Torque capacity @ 400 lbs-ft.	Style E, Class S, Size 1002, NEMA 3R enclosure manufactured by Rexnord Corporation Stearns Division.			
C1	1	Flex-rigid, vertical single engagement gear coupling. Rigid hub with 6 1/8" bore, 1 3/4" x 1 1/2" x 7 1/32" key to match R1 output, 2" diameter dowel thru hub. Flex hub with 8" bore, (2) 2" x 1 1/2" x 7 1/32" key to match rack pinion shaft.	Type GV52 exposed bolts, Size 1060GV as manufactured by The Falk Corp.			
C2	1	Brakewheel coupling, 8" diameter x 3 1/2" face. A hub with 1 3/4" bore, 3/8" x 3/8" x 3" key to match R1 input shaft at M1. B hub with 2 3/8" bore, 5/8" x 5/8" x 3" key min. or to suit M1 shaft keyway.	Type BW Steelflex, Size 8BW as manufactured by The Falk Corp.			
C3	1	Single engagement gear coupling. Drive hub with 2 1/8" bore, 1/2" x 1/2" x 3" key to match M1 shaft. Driven hub with 5/8" bore, 3/16" x 3/16" key to suit tachometer/overspeed switch shaft.	Type G51, size 1010G as manufactured by The Falk Corp.			
B1	1	Rack Pinion bearing. Double flanged, split-type bronze bushing (ASTM B22 Alloy 91100) with double spiral grease grooves.	B1 - Model No. SMCB-81 B2 - Model No. SMCB-64 as manufactured by Steward Machine Co. For details, see Drawing No. M-5			
B2	1					
RS	4	Rack Segment, 21 teeth, 280.750" pitch diameter, 3.00" circular pitch, 20° standard involute. Cast Steel, ASTM A148 Grade 80-50.	For details, see Drawing No. M-5			
RP	1	Rack Pinion, 16 teeth, 15.279" pitch diameter, 3.00" circular pitch, 20° standard involute. Forged Alloy Steel, ASTM A668 Class K	For details, see Drawing No. M-5			

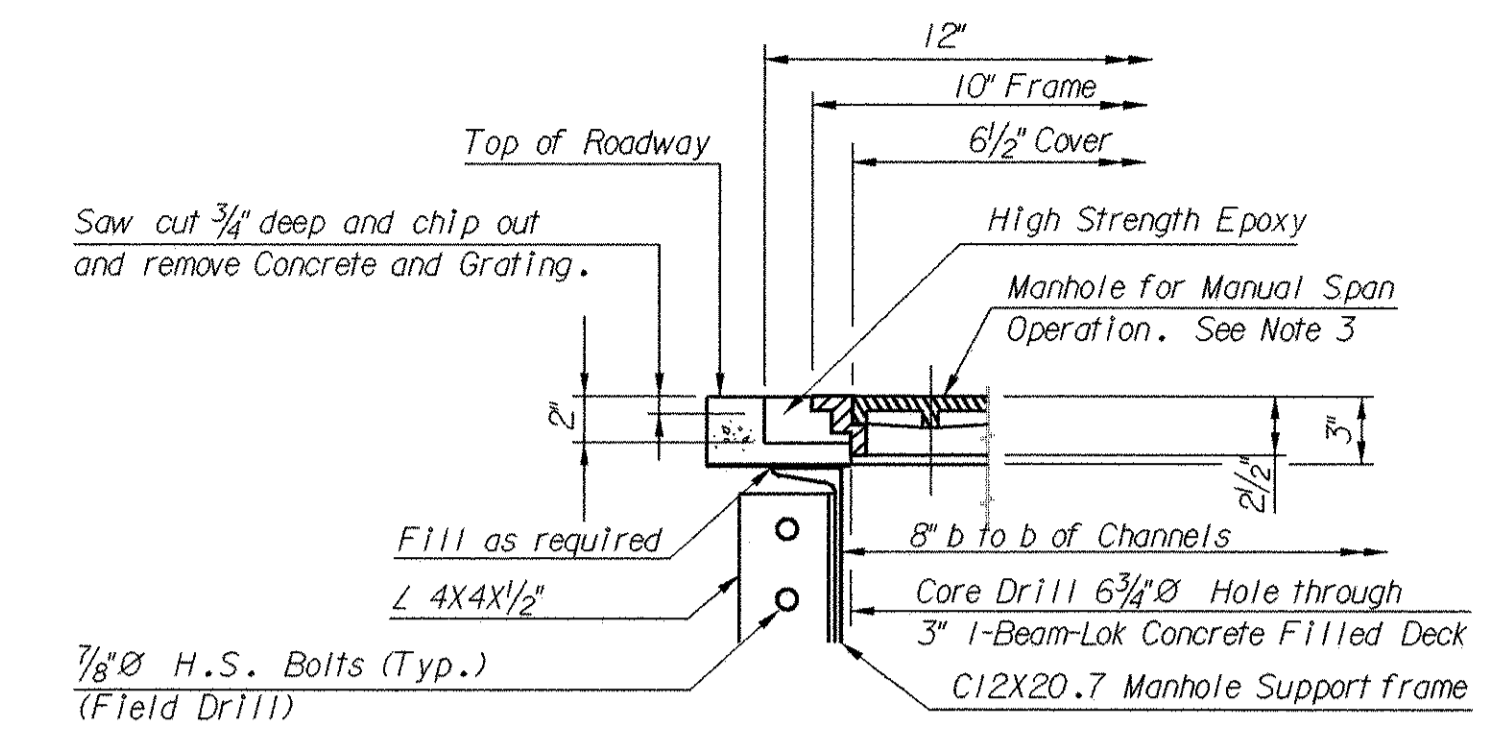
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REV.					
REV.					
REVIEWED				FILE NO.	
QUAN.	SN	EK	2-97	ROUTE	US-21
DR.	FG	SN	2-97	COUNTY	BEAUFORT
DES.	SN	EK	2-97	DRAWING NO.	M-3
BY		CHK. DATE			

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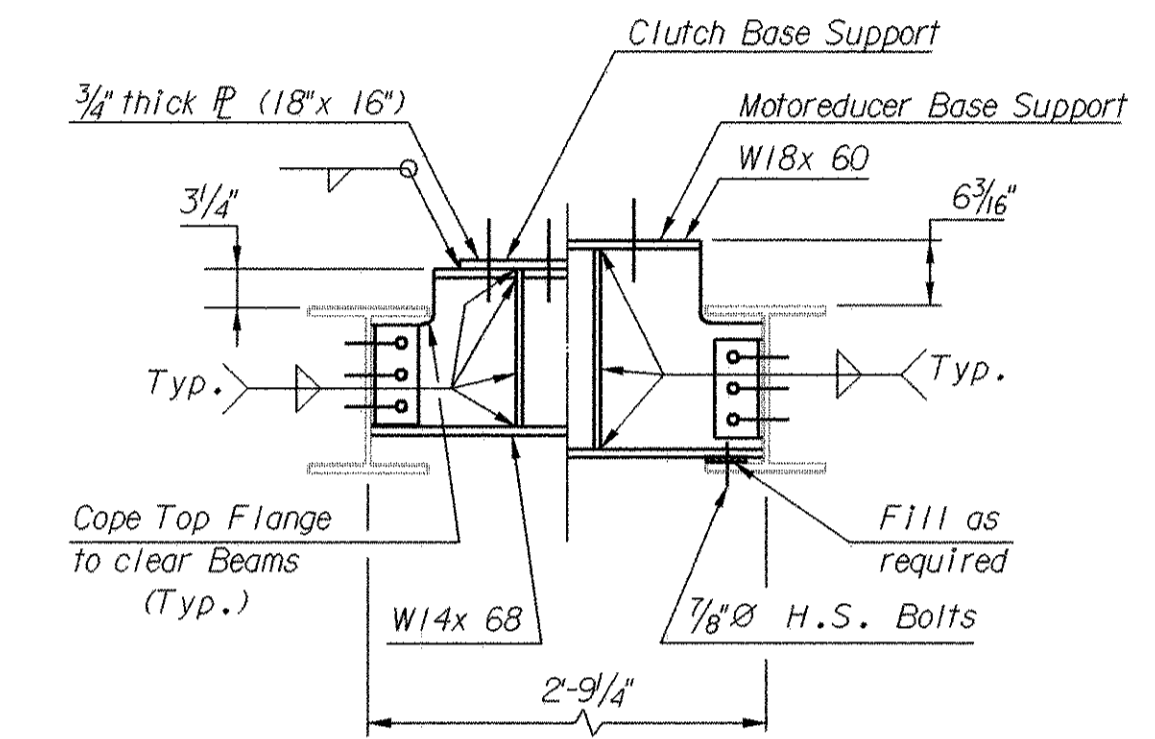
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	SC	BEAUFORT		US-21	33	115



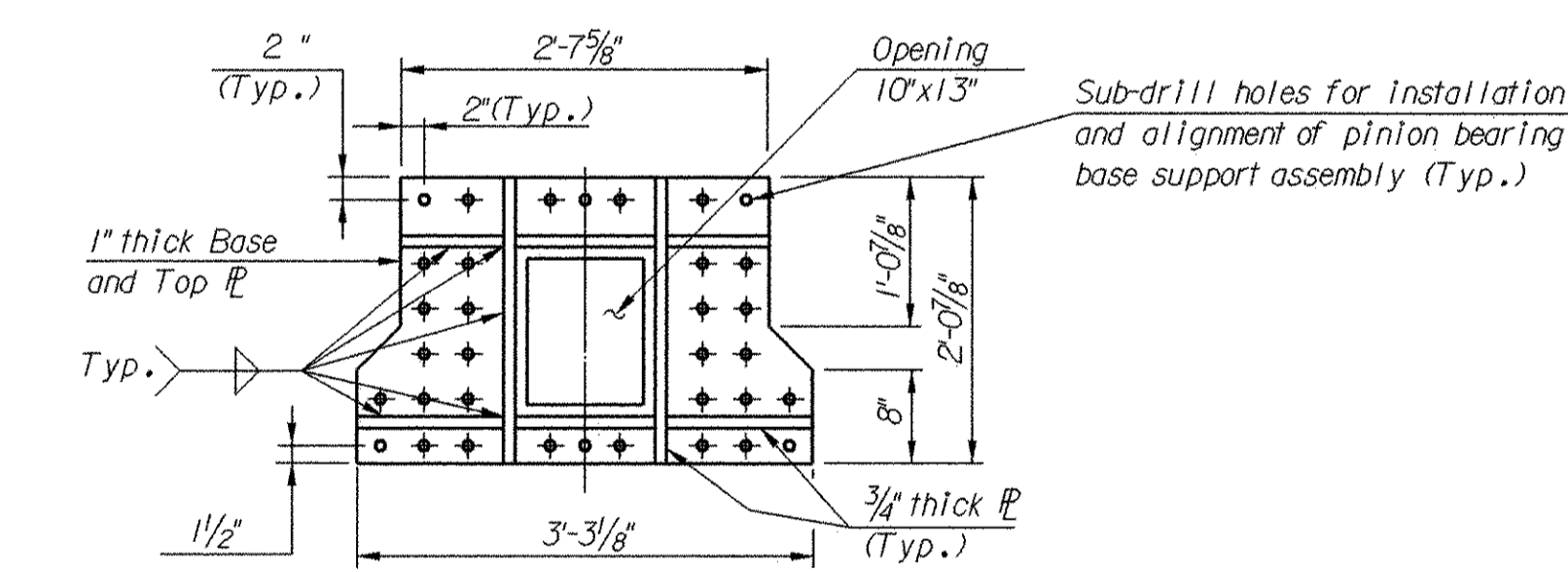
SECTION A-A
3/4"-1'-0"



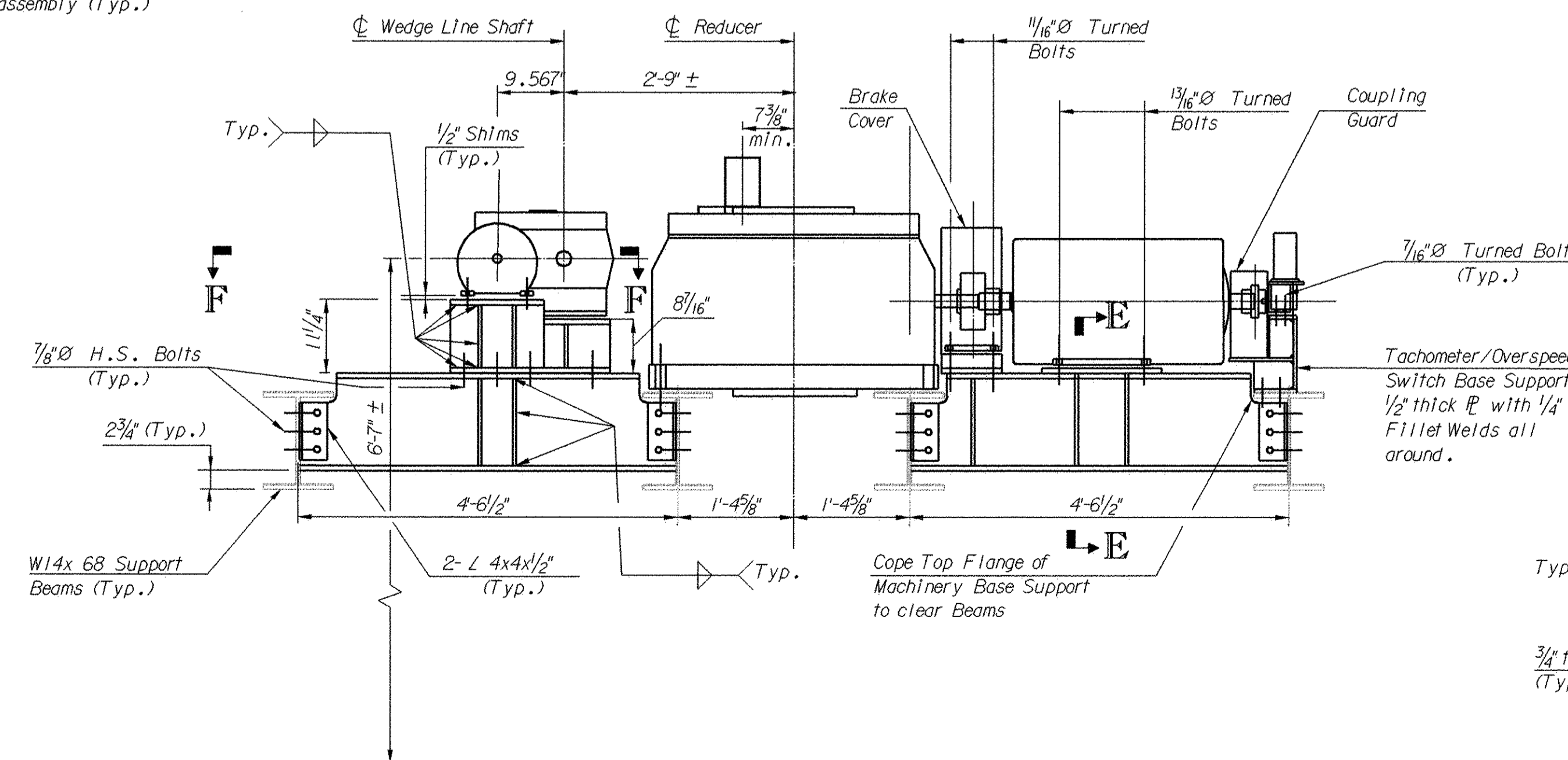
DETAIL M
1 1/2"-1'-0"



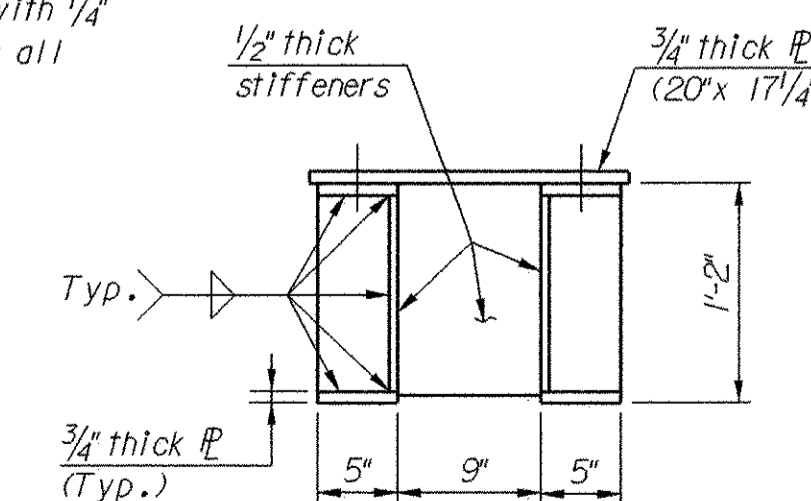
SECTION C-C
3/4"-1'-0"



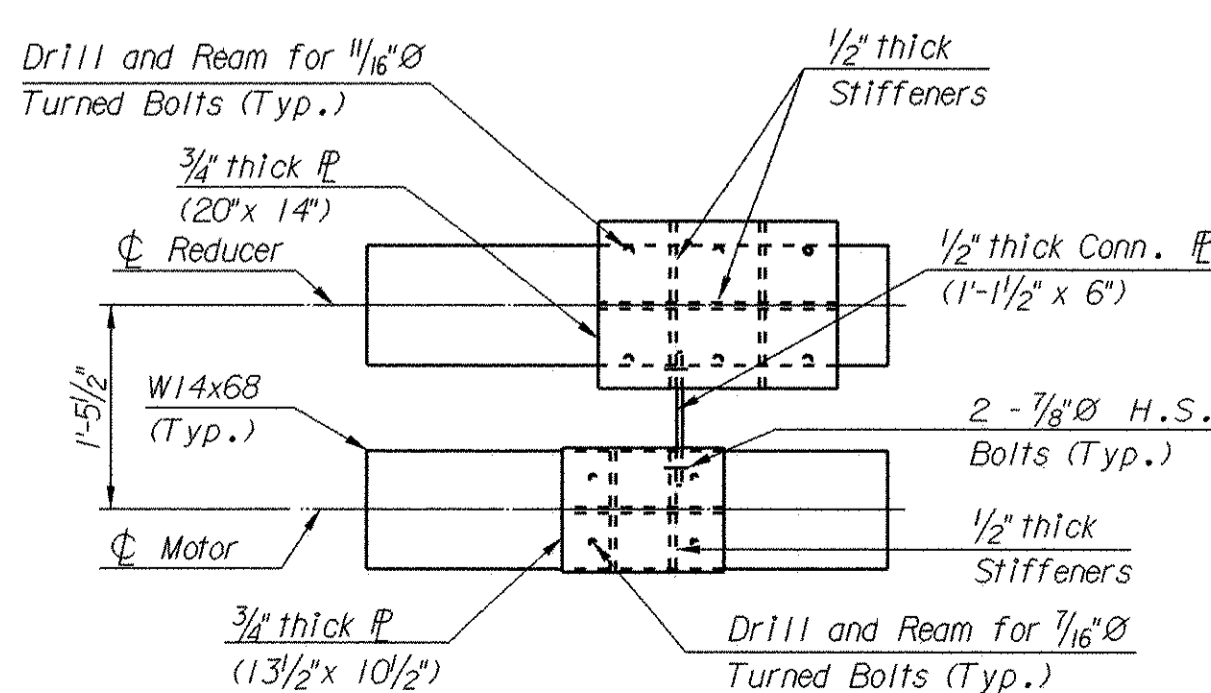
SECTION D-D
3/4"-1'-0"



SECTION B-B
3/4"-1'-0"



SECTION E-E
3/4"-1'-0"



VIEW F-F
3/4"-1'-0"

NOTES:

- For location of Sections A-A, B-B and C-C, see Drawing No. M-3.
- For Span Control Equipment, see Drawing No. M-6.
- Heavy duty manhole frame and solid lid with "self-sealing application" and type F concealed lift handles. R-6013 Series as manufactured by NEENAH Foundry Company. Drill and top underside lid for threaded stud and tightening nut to secure bar lock as recommended by the manufacturer. Manhole bar lock for manual span operation only. Cost to furnish and install manhole frame and manual drive shaft to be included in Pay Item "New Span Drive."
- All steel machinery supports shall be 3/4" thick base plates with 1/2" thick web and stiffeners unless otherwise noted. The steel shall be structural carbon steel conforming to the requirements of ASTM A36.
- All welds to be 1/4" continuous fillet welds unless otherwise noted.
- Cost to furnish and install box beam and W14x68 support beams to be included in Pay Item "Span Drive Support." Cost to furnish and install machinery base supports for span drive M1, M2, B1, CL and tachometer/overspeed to be included in Pay Item "New Span Drive." Cost to furnish and install machinery base supports for wedge drive M1 and R1 to be included in Pay Item "Rehabilitation of Wedge Drive." Cost to furnish and install bearing B1 and B2 lubrication piping and fittings to be included in Pay Item "New Span Drive."

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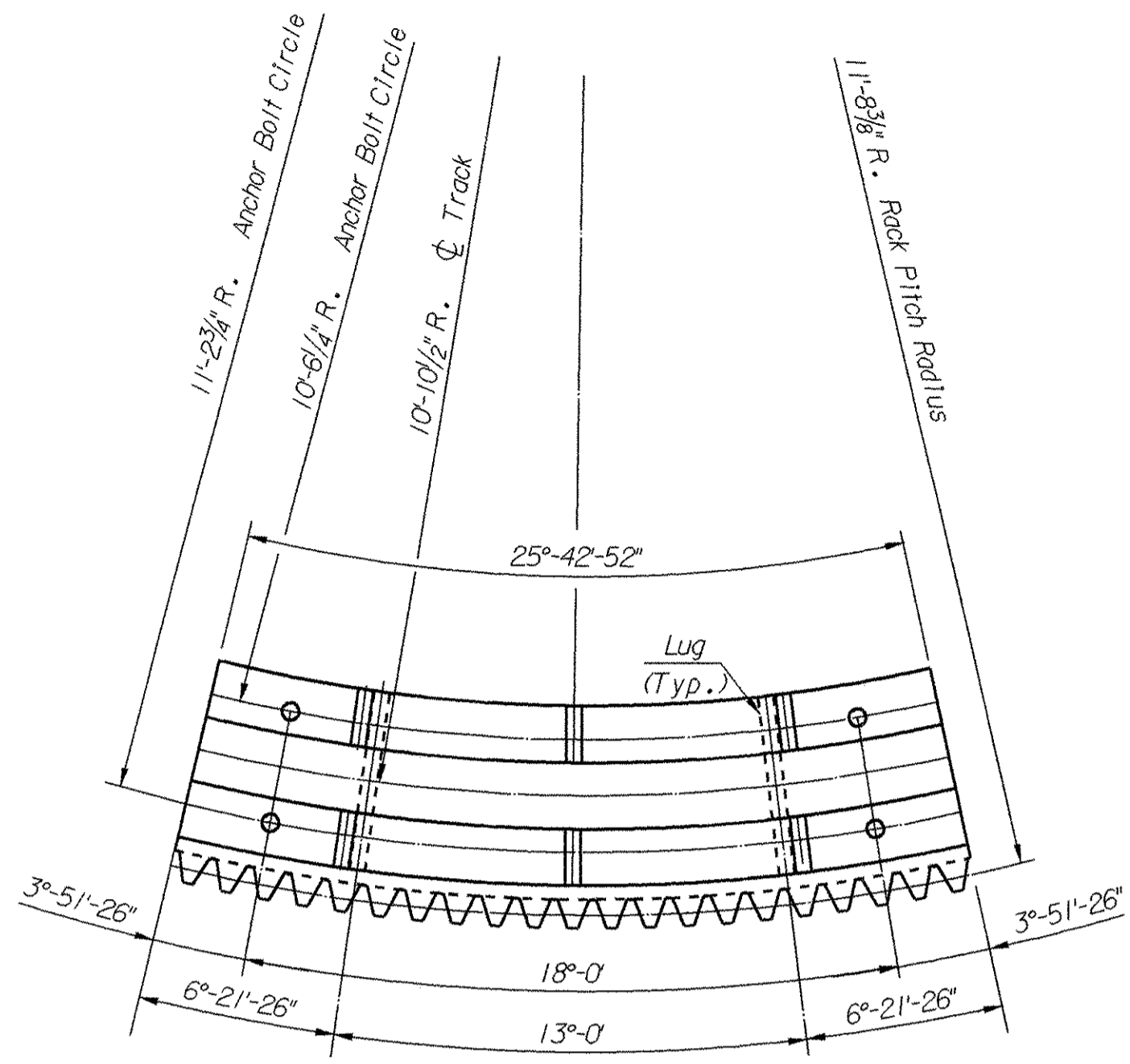
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

LADY'S ISLAND

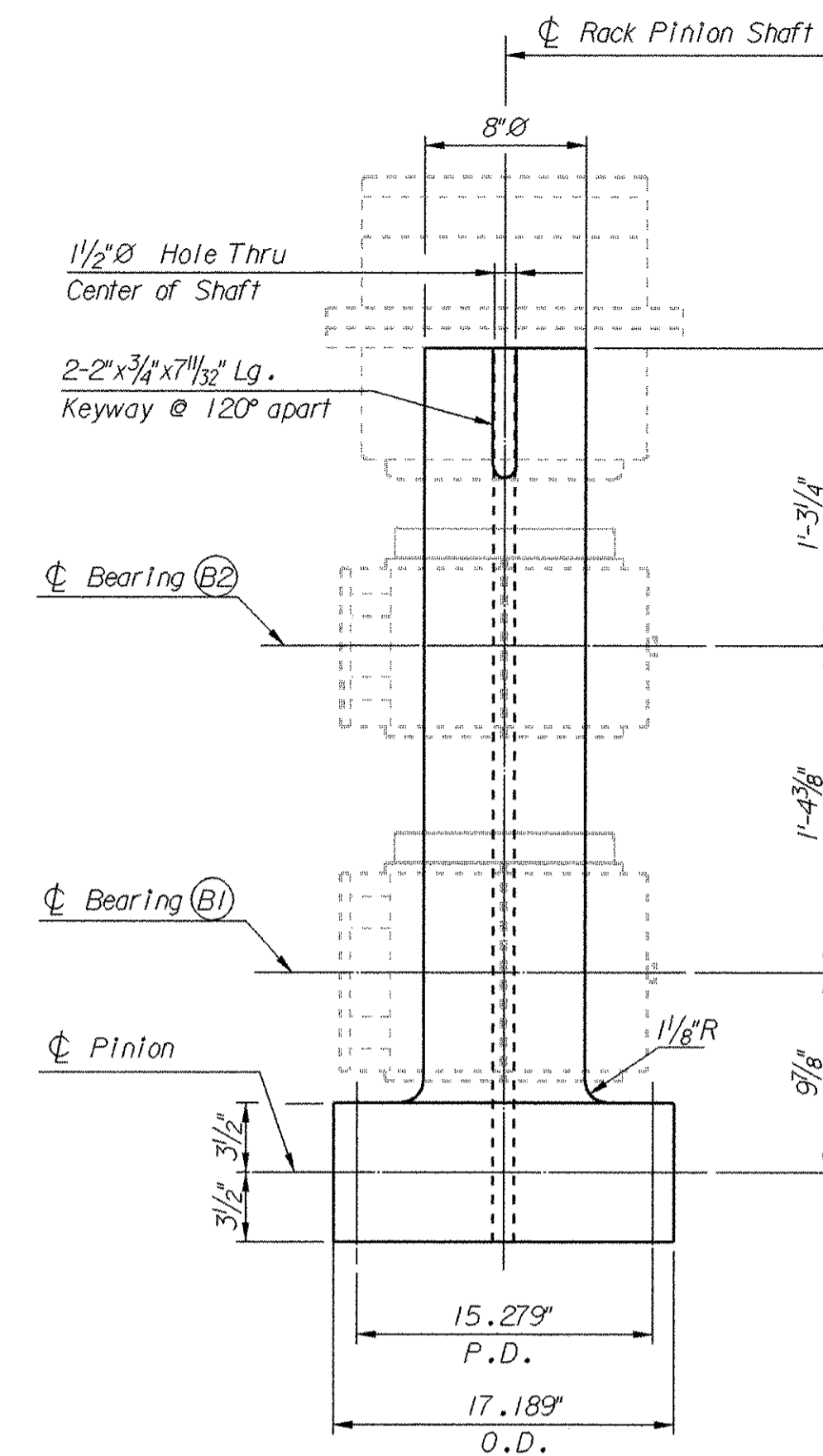
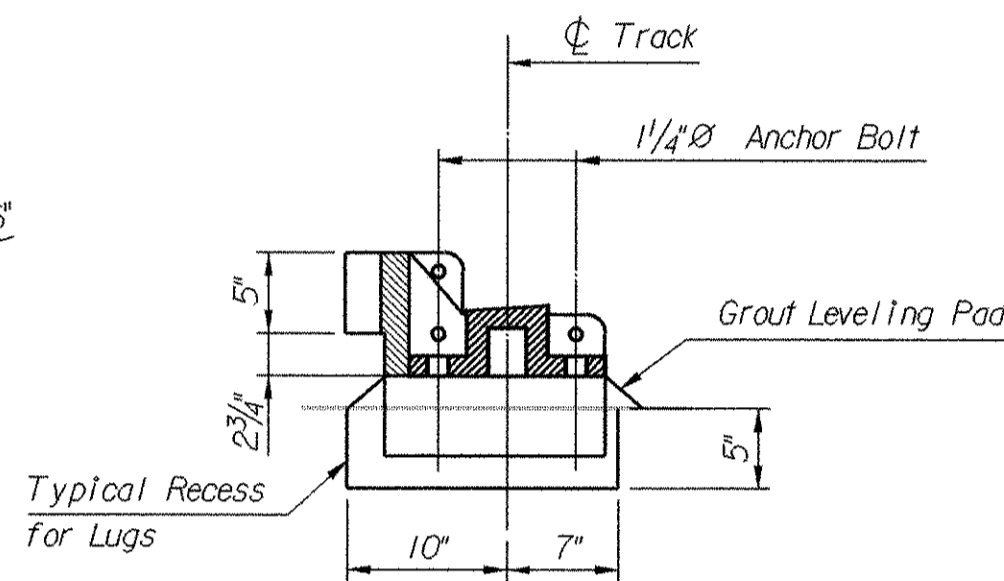
NEW SPAN DRIVE - 2

REV.	BY	CHK.	DATE
REVIEWED			
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DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

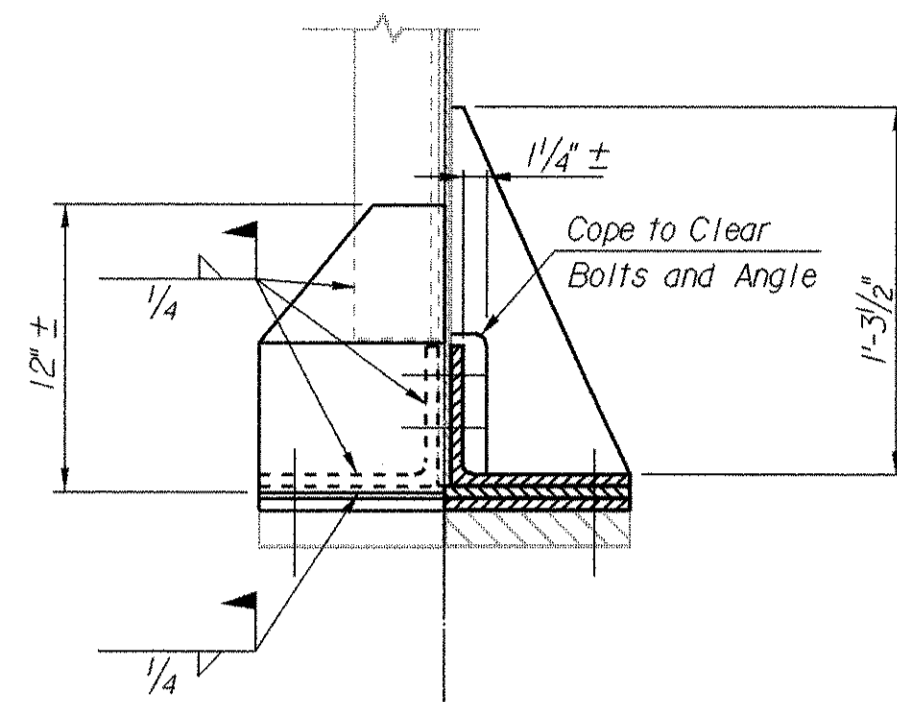
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-4



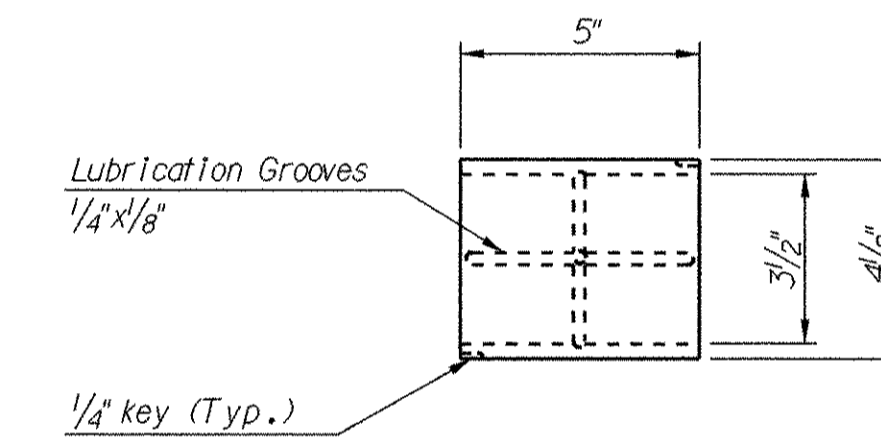
(RS) RACK SEGMENT
 (Contractor to Field Verify Dimensions)
 1'-1'-0"



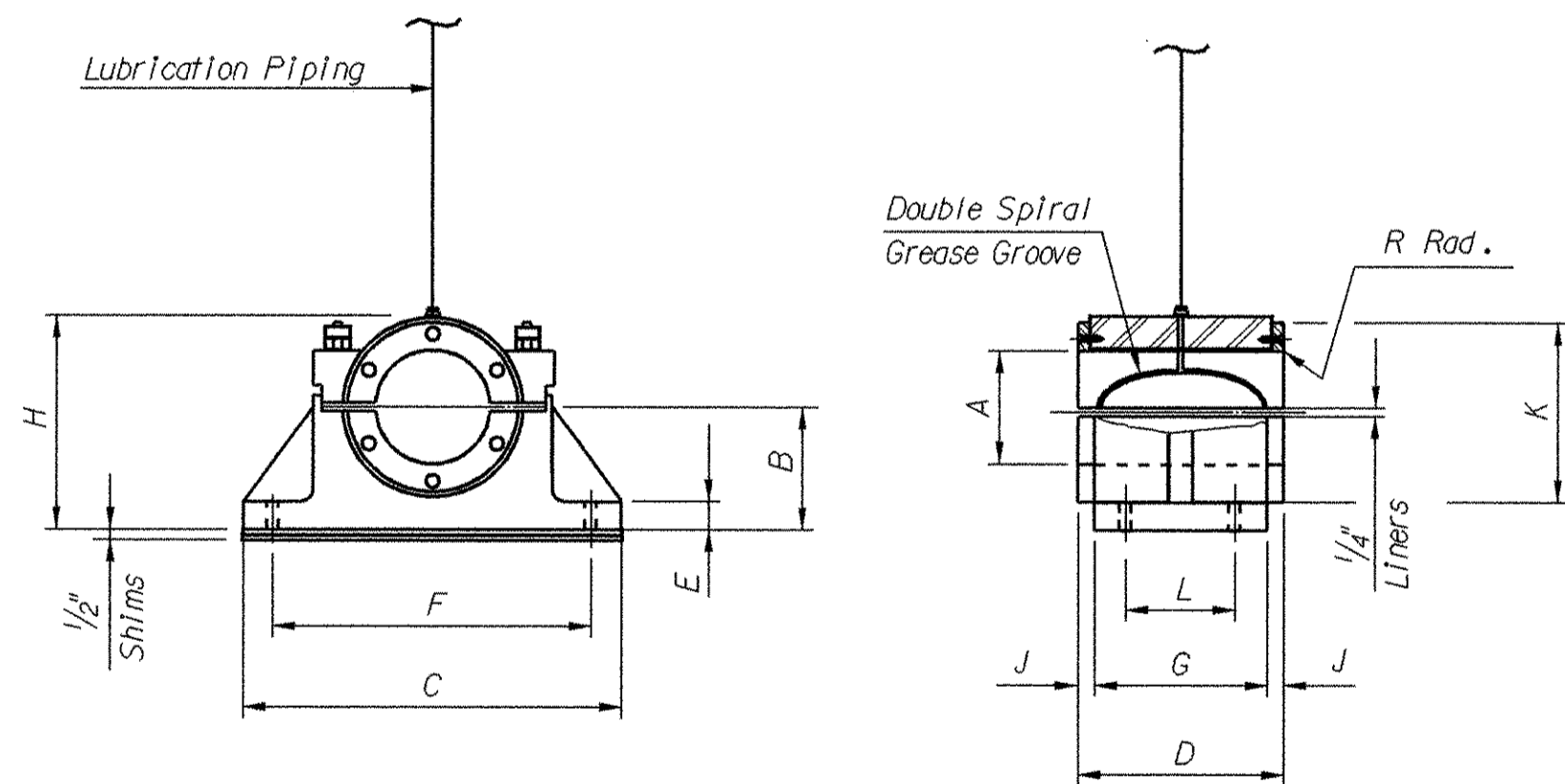
(RP) RACK PINION
 1/2'-1'-0"



SECTION A-A
 (At Bent Φ)

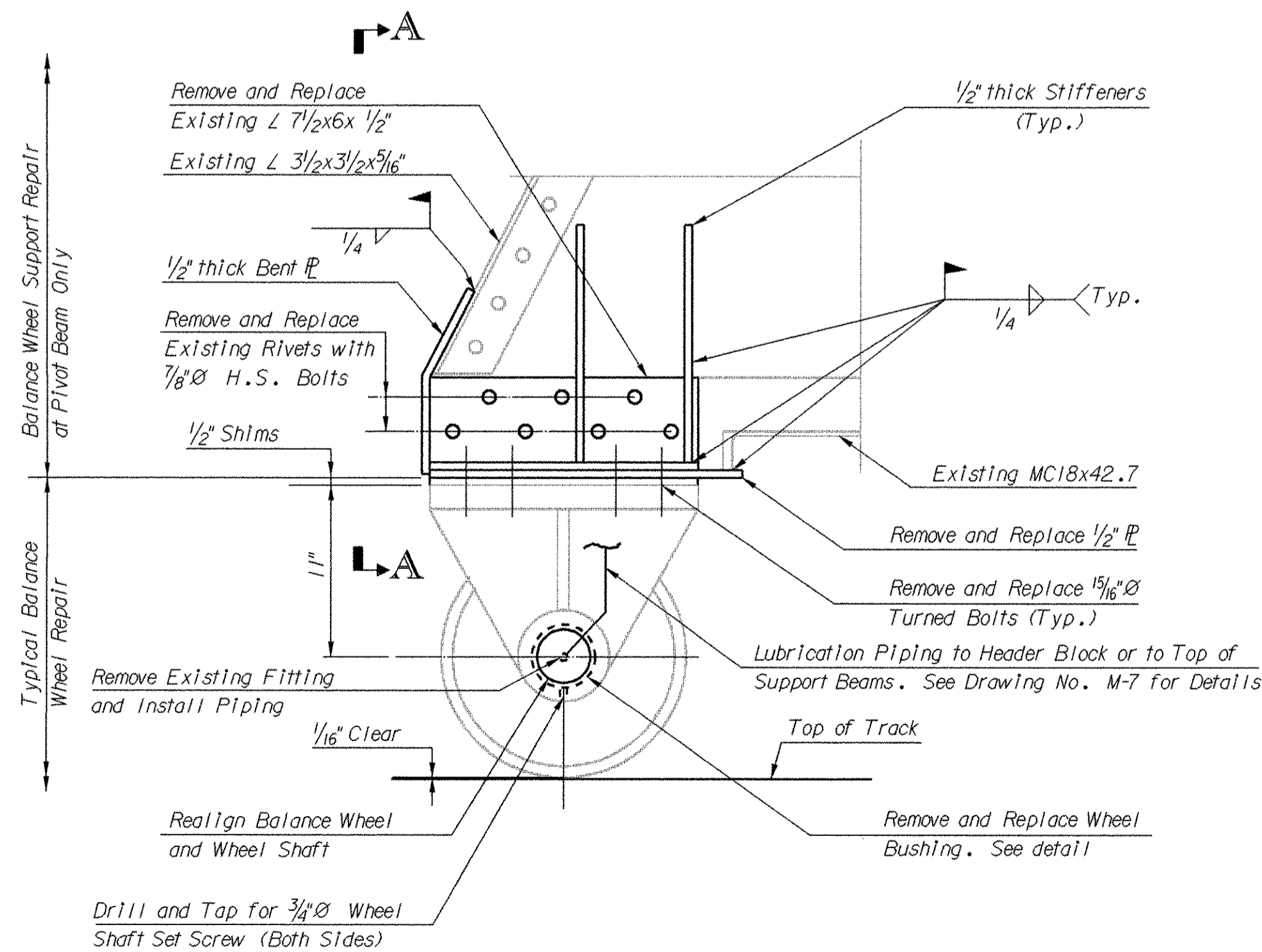


BALANCE WHEEL BUSHING
 (ASTM B22 Alloy C93700)
 (Contractor to Field Verify)
 3'-1'-0"



(B1) (B2) PINION BEARING
 NTS

MK	MODEL NUMBER	SHAFT DIA A	B	C	D	E	F	G	H	J	K	L	BASE NO.	BOLTS SIZE	RAD. R
B1	SMCB-81	8"	7 3/4"	25"	10 1/2"	2"	20"	9 1/2"	15"	1 1/2"	12"	5 3/4"	4	1 5/16"	3/8"
B2	SMCB-64	8"	7 1/4"	23"	9 1/2"	1 3/4"	18 1/2"	8 1/2"	13 3/8"	1 1/2"	11 1/4"	5"	4	1 5/16"	1/4"



BALANCE WHEEL REPAIR
 (Contractor to Field Verify Dimensions)
 1/2'-1'-0"

NOTES:

1. Scribe pitch lines on both sides of all gears.
2. Rack tooth dimensions and profile to match existing. Field verify all tooth dimensions for proper match.
3. Recess for lugs - Fill with non-shrink grout after setting rack sections.
4. Cast to furnish and install rack segments, rack pinion shaft and bearings B1 and B2 to be included in Pay Item "New Span Drive."
5. Cost to rehabilitate balance wheels and support to be included in Pay Item "Balance Wheel Repair."

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 BRIDGE DESIGN COLUMBIA, S.C.
 LADY'S ISLAND

MACHINERY DETAILS

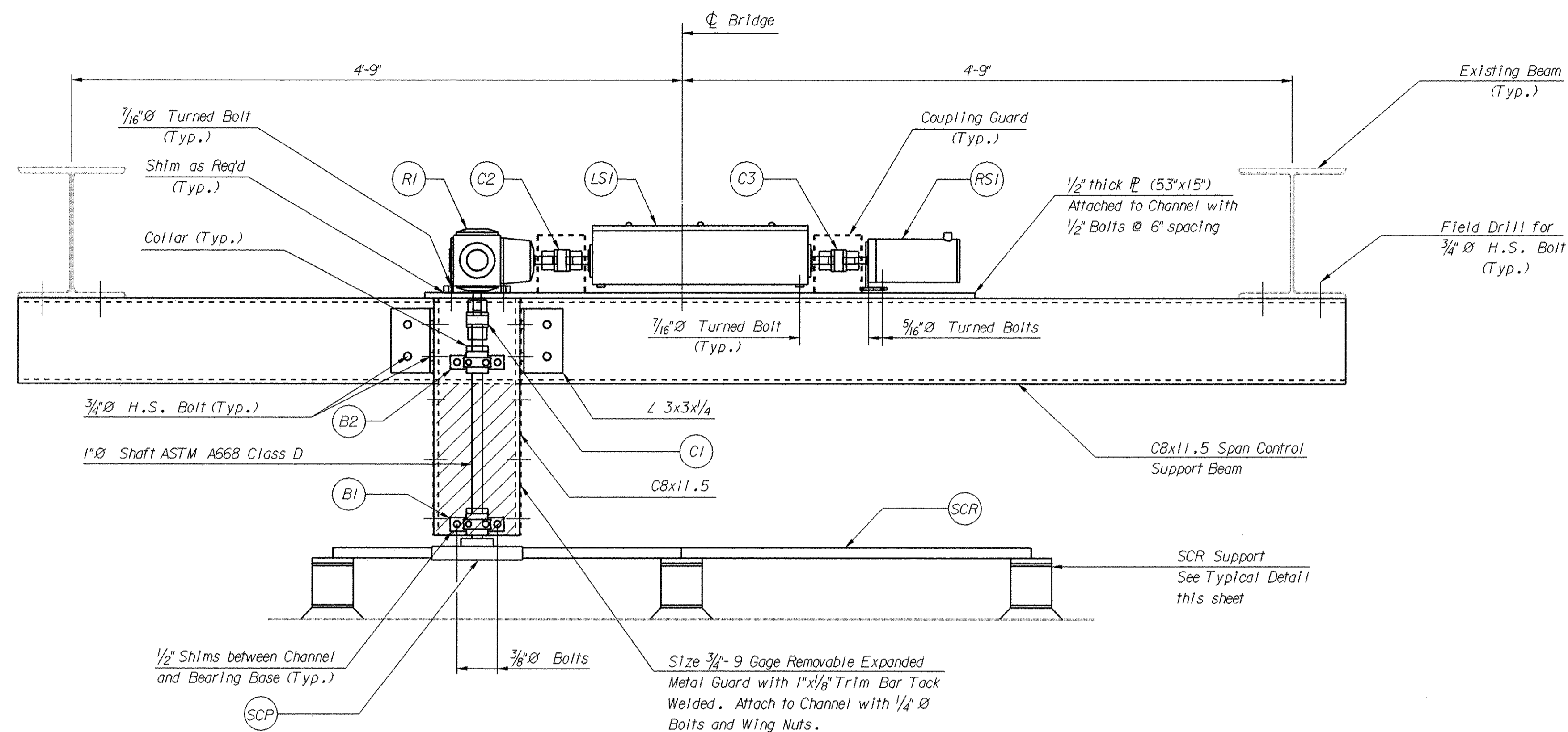
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QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

FILE NO.	ROUTE US-21	COUNTY BEAUFORT	DRAWING NO. M-5
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FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	35	115

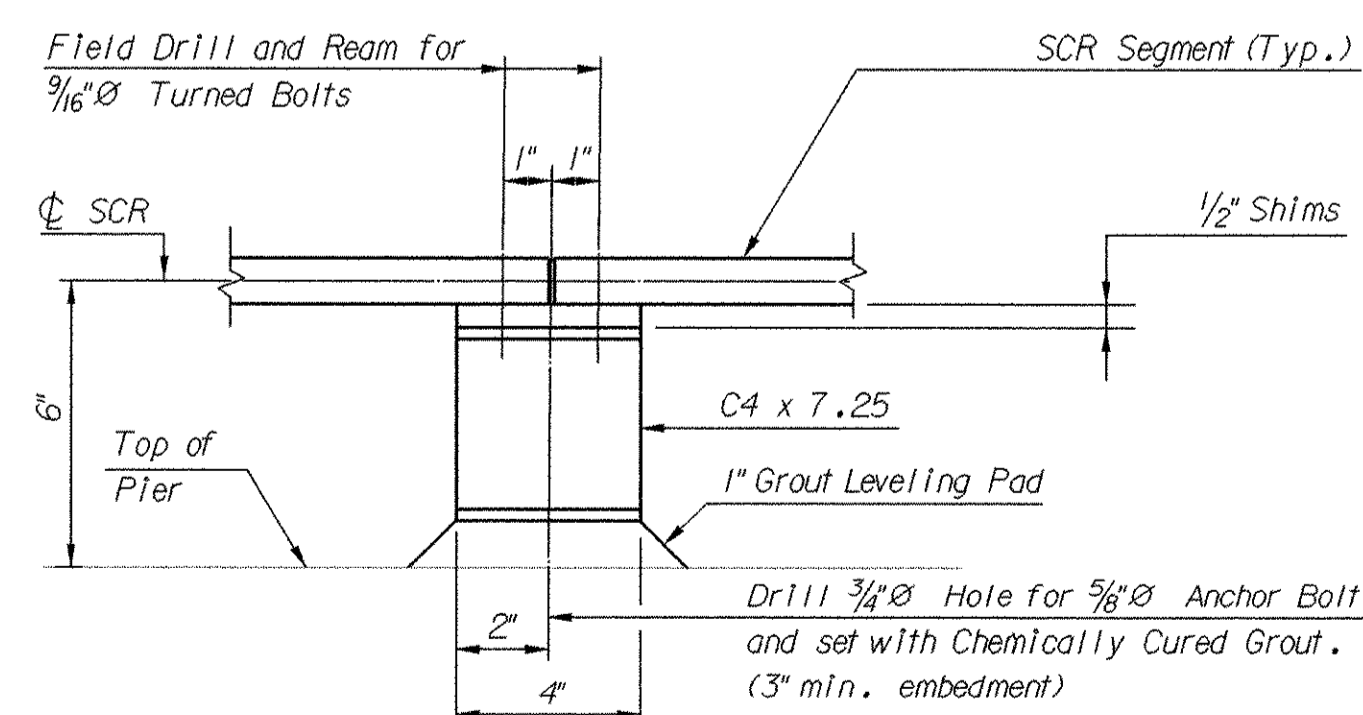
SPAN CONTROL SCHEDULE

MK	QTY	DESCRIPTION	MANUFACTURER
RSI	1	Absolute position brushless resolver, NEMA 4x enclosure.	See electrical specifications
LSI	1	Rotary span limit switch, NEMA 4x s.s. enclosure.	See electrical specifications
RI	1	Spiral bevel reducer, QM5 assembly, 2:1 ratio.	VR237 Series as manufactured by Boston Gear.
C1	1	Precision machined bored shaft coupling. Drive hub with 1" bore, 1 3/4" x 1 3/4" x 1 1/16" key to match shaft. Driven hub with 3/4" bore, 3/16" x 3/16" key to suit RI input shaft.	FC Series, XFCBB Best-Bronz Inserts (3 jaw) Type, Size FC20 as manufactured by Boston Gear.
C2	1	Precision machined bored shaft coupling. Drive hub with 3/4" bore, 3/16" x 3/16" x 1" key to suit RI output shaft. Driven hub with 3/4" bore, keyway to match LSI input shaft.	FC Series, XFCBB Best-Bronz Inserts (3 jaw) Type, Size FC20 as manufactured by Boston Gear.
C3	1	Precision machined bored shaft coupling. Drive hub with 3/4" bore, keyway to match LSI output shaft. Driven hub with 5/8" bore, 3/16" x 3/16" x 3/4" key min. or to suit RSI keyway.	FC Series, XFCBB Best-Bronz Inserts (3 jaw) Type, Size FC20 as manufactured by Boston Gear.
B1	1	Ball bearing pillow block-standard duty. Extended inner race	SL Series, Catalog No. SL-1, Item Code 64690 as manufactured by Boston Gear.
B2	1	Ball bearing pillow block-standard duty. Extended inner race	SL Series, Catalog No. SL-1, Item Code 64690 as manufactured by Boston Gear.
Collar	2	Steel clamping collar for 1" diameter shaft. 2SC Series.	Two Piece Type, as manufactured by Boston Gear.
SCR	1	100° Rack segment, 144 teeth, 65° pitch diameter, 8" diametral pitch, 20° standard involute, 1" face width, 2 equal 50° steel segments.	Option to fabricate rack as one segment
SCP	1	Rack pinion, 66 teeth, 8.25" pitch diameter, 8" diametral pitch, 20° standard involute, 1.25" face width, Steel.	



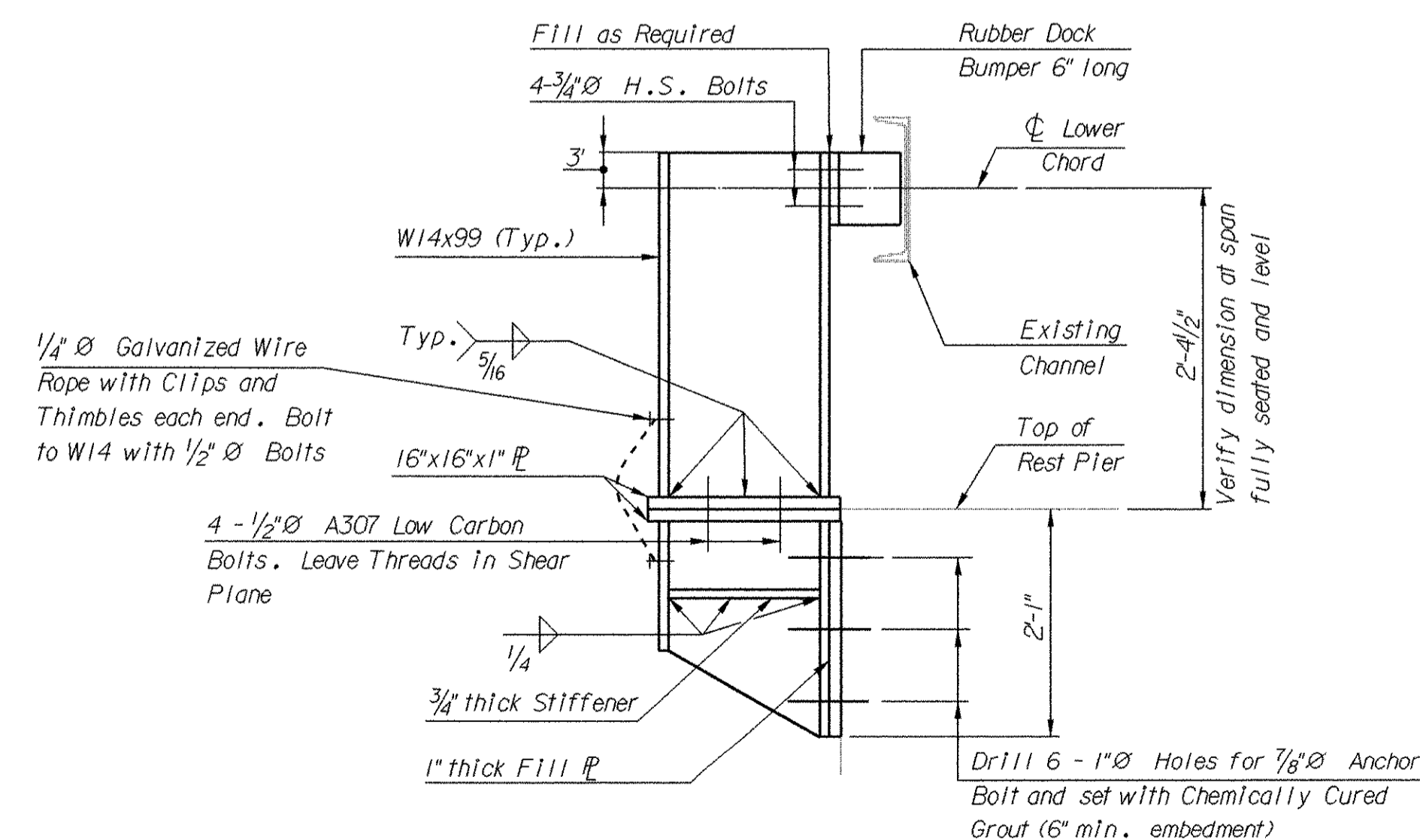
ELEVATION

1 1/2'-1'-0"



TYPICAL SCR SUPPORT DETAIL

3'-1'-0"



SPAN BUMPER

1'-1'-0"

NOTES:

- For location of Span Control Equipment, see Drawing No. M-3 and M-4.
- Cost to furnish and install Span Control Equipment and Supports to be included in Pay Item "New Span Drive" unless otherwise noted. Cost to furnish RSI and LSI to be included in Pay Item "Bridge Control System".
- For location of Span Bumper, see Drawing No. M-7. Cost to furnish and install Span Bumper to be included in Pay Item "New Centering Locks."
- Scribe pitch lines on both sides of SCR and SCP.

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DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
LADY'S ISLAND

SPAN CONTROL EQUIPMENT

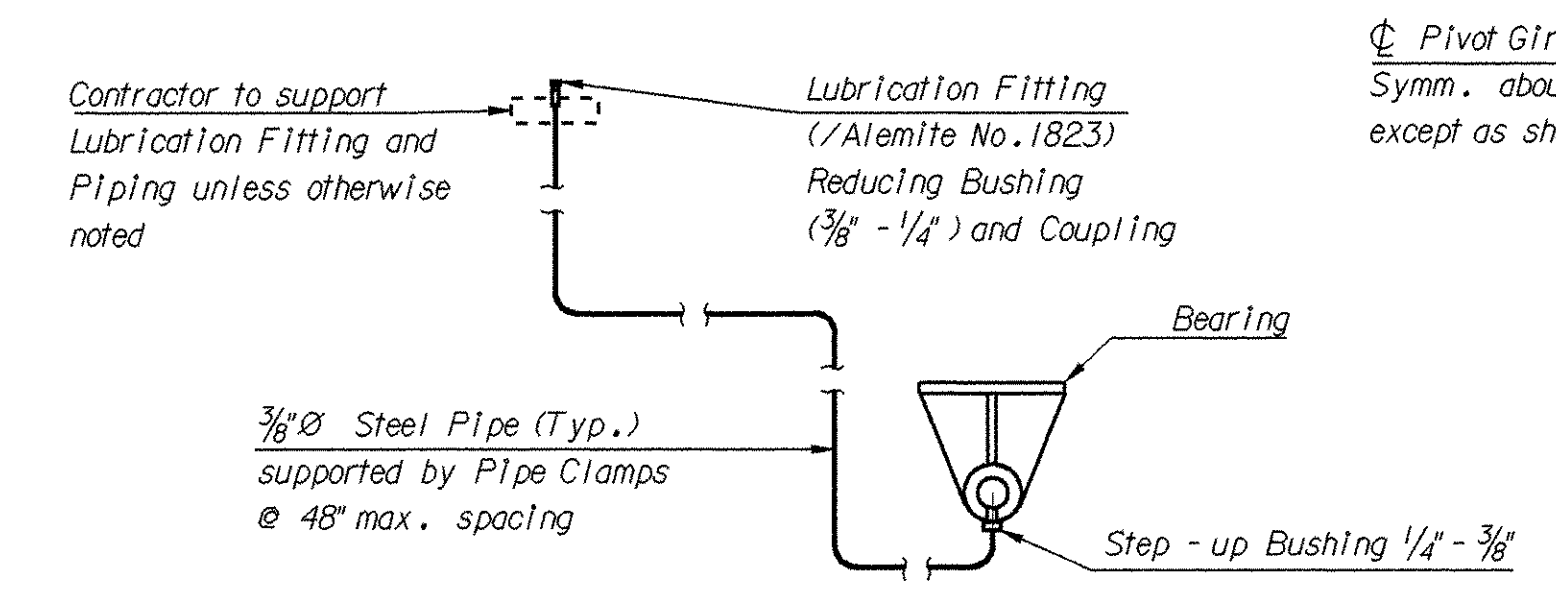
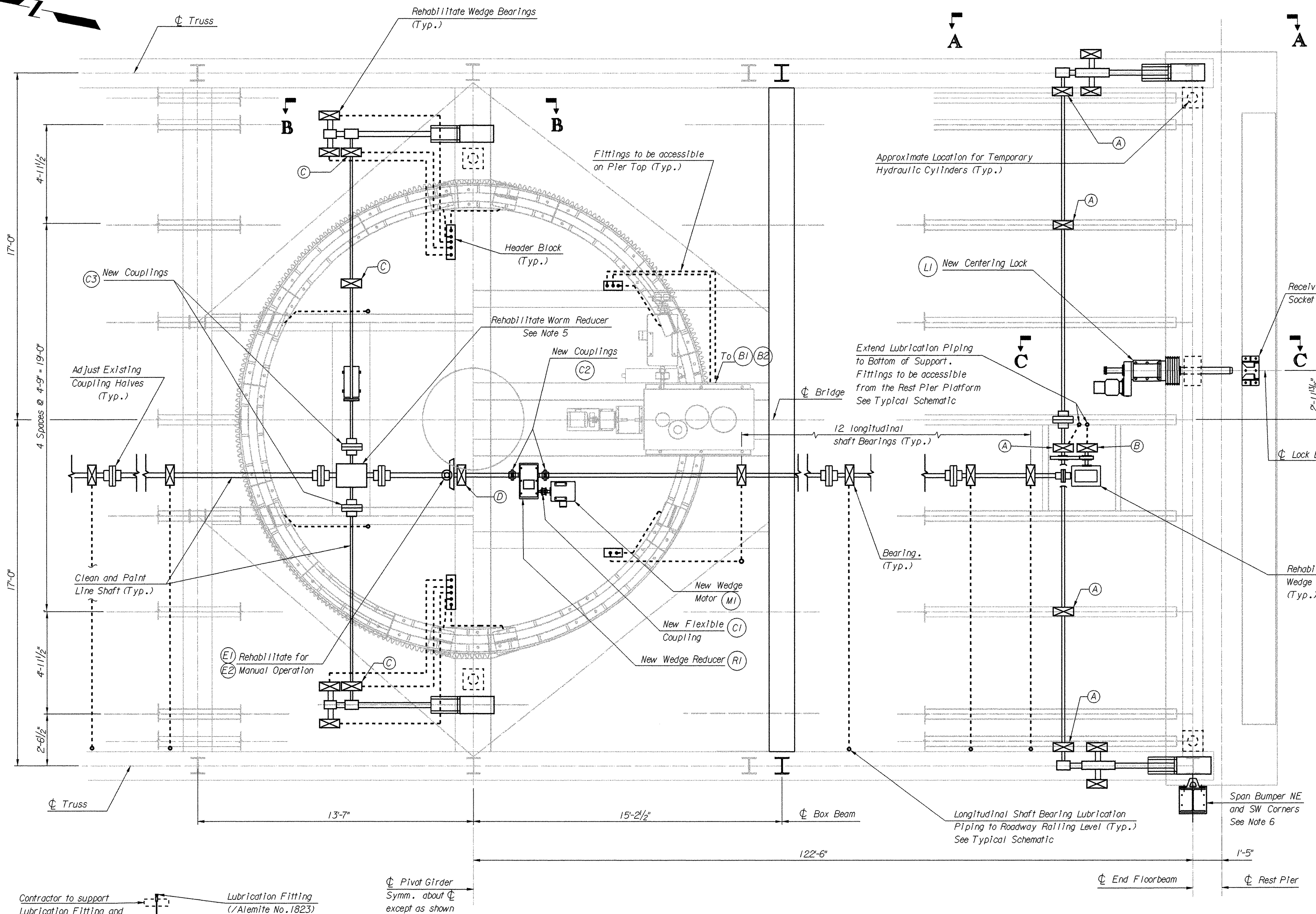
REV.			
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QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-6

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	36	115

WEDGE MACHINERY SCHEDULE

MK	QTY	DESCRIPTION	MANUFACTURER
MI	1	Foot-mounted, squirrel cage AC motor, totally enclosed non-ventilated, 7 1/2 HP, synchronous speed 900 RPM. Integral disc brake set for 45 ft-lbs.	Frame 2J3T, as manufactured by Allen-Bradley.
RI	1	Single input, double output parallel shaft reducer, 10.86:1 ratio, rated output of 8.56 in-kips at 80.57 RPM, Service Factor 1.0.	Double reduction unit No. 55HP2 as manufactured by Philadelphia Gear Corp.
CI	1	Flexible steelflex coupling, horizontal split cover. Drive hub with 1 3/8" bore, 5/16" x 5/16" x 1 7/8" key min. or to suit MI shaft keyway. Driven hub with 1 1/8" bore, 1/4" x 1/4" x 1 1/2" key to suit RI input shaft.	Type T10, Size 1030T as manufactured by The Falk Corp.
C2	2	Flex-rigid, single engagement gear coupling. Rigid hub with 2 3/8" bore, 1/2" x 1/2" x 1 3/16" key min. or to suit RI shaft keyway. Flex hub with 2 3/8" bore, 1/2" x 1/2" x 1 15/16" key to match exist. modified shaft.	Type G5I shrouded bolts, Size 1015G as manufactured by The Falk Corp.
C3	2	Flex-rigid, single engagement gear coupling. Rigid hub with 2 3/8" bore, 5/8" x 5/8" x 2 7/8" key to match worm gear reducer output shaft. Flex hub with 2 1/2" bore, 3/8" x 3/8" x 2 1/16" key to match exist. shaft.	Type G5I shrouded bolts, Size 1020G as manufactured by The Falk Corp.
LI	2	Modified center lock bar operator for upside-down mounting with gear housing rotated 90°, 4" x 4" bar, 12" stroke.	Model EG-2B as manufactured by Steward Machine Company.



PLAN
3/8" = 1'-0"

	BEARING	BUSHING	REPLACEMENT
Bearing A	3 3/8" ID	4 3/8" OD	5 1/2" Lg. Split Type
Bearing B	3" ID	3 3/8" OD	6" Lg. Split Type
Bearing C	2 1/2" ID	3 1/8" OD	3 3/8" Lg. Split Type
Bearing D	2 3/8" ID	3 3/8" OD	5 1/4" Lg. Split Type
Bearing E1	2 1/2" ID	3 3/8" OD	6" Lg. Split Type
Bearing E2	2 1/2" ID	3 3/8" OD	3" Lg. Sleeve Type

See Note 4
* Contractor to Field Verify

NOTES:

- Cost to furnish and install Wedge Drive Equipment and Supports to be included in Pay Item "Rehabilitation of Wedge Drive" unless otherwise noted. Cost to furnish wedge motor MI to be included in Pay Item "Bridge Control System."
- Cost to furnish and install Centering Lock, Sockets and Supports to be included in Pay Item "New Centering Locks."
- For wedge motor and reducer support details, see Drawing No. M-4.
- Replace bearing bushing and deteriorated cap bolts. Replace lubrication fitting with giant bottom head fitting, Alemite No. 1823 unless otherwise noted.
- Replace existing oil and drill and tap housing for 1/4" sight oil level indicator with drain cock, Figure 80, size No. 2 as manufactured by the Ernst Gage Co.
- For span bumper details, see Drawing No. M-6.
- For Sections A-A, B-B and C-C, see Drawing No. M-8.

HNTB ARCHITECTS ENGINEERS PLANNERS
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SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, SC.
LADY'S ISLAND

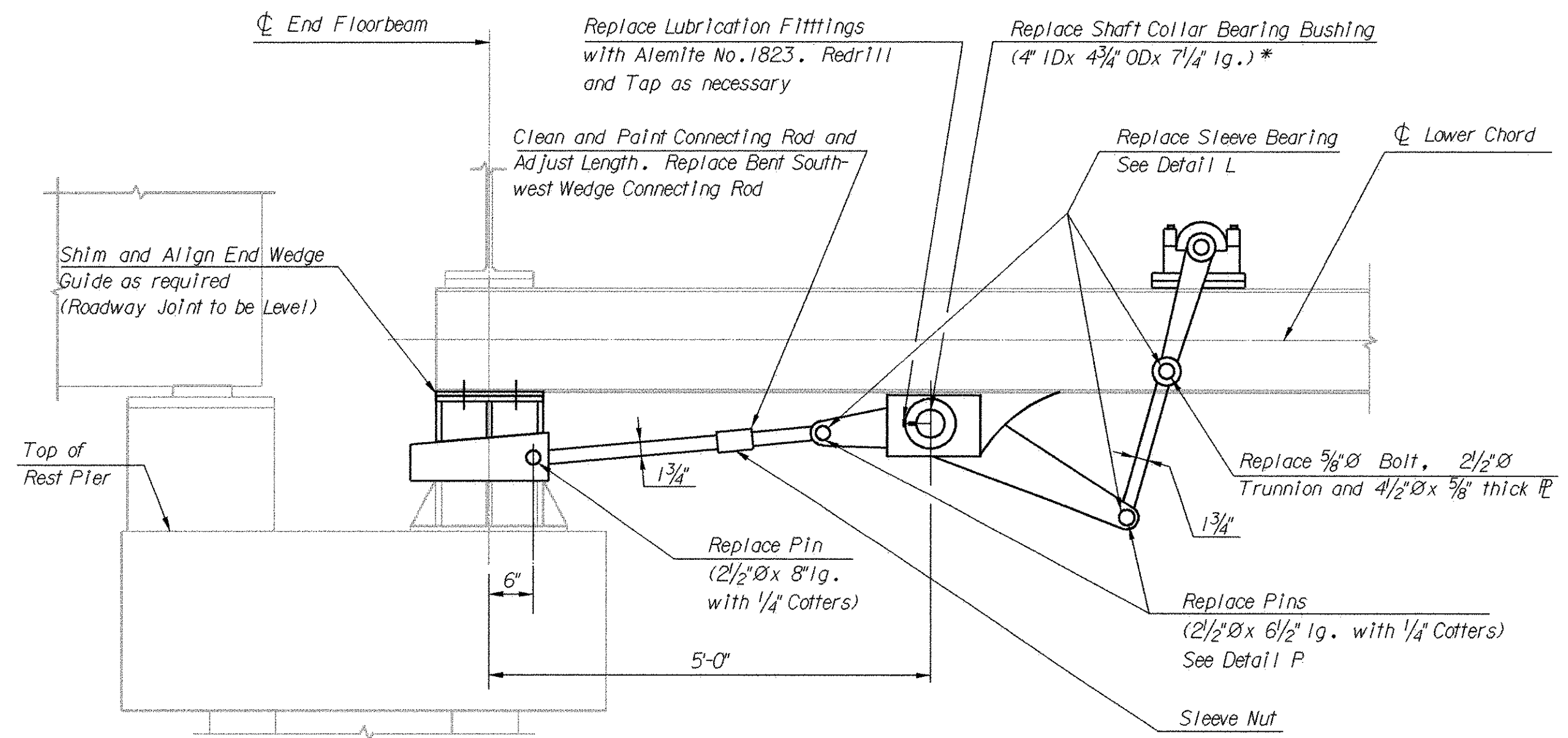
WEDGE DRIVE REPAIRS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

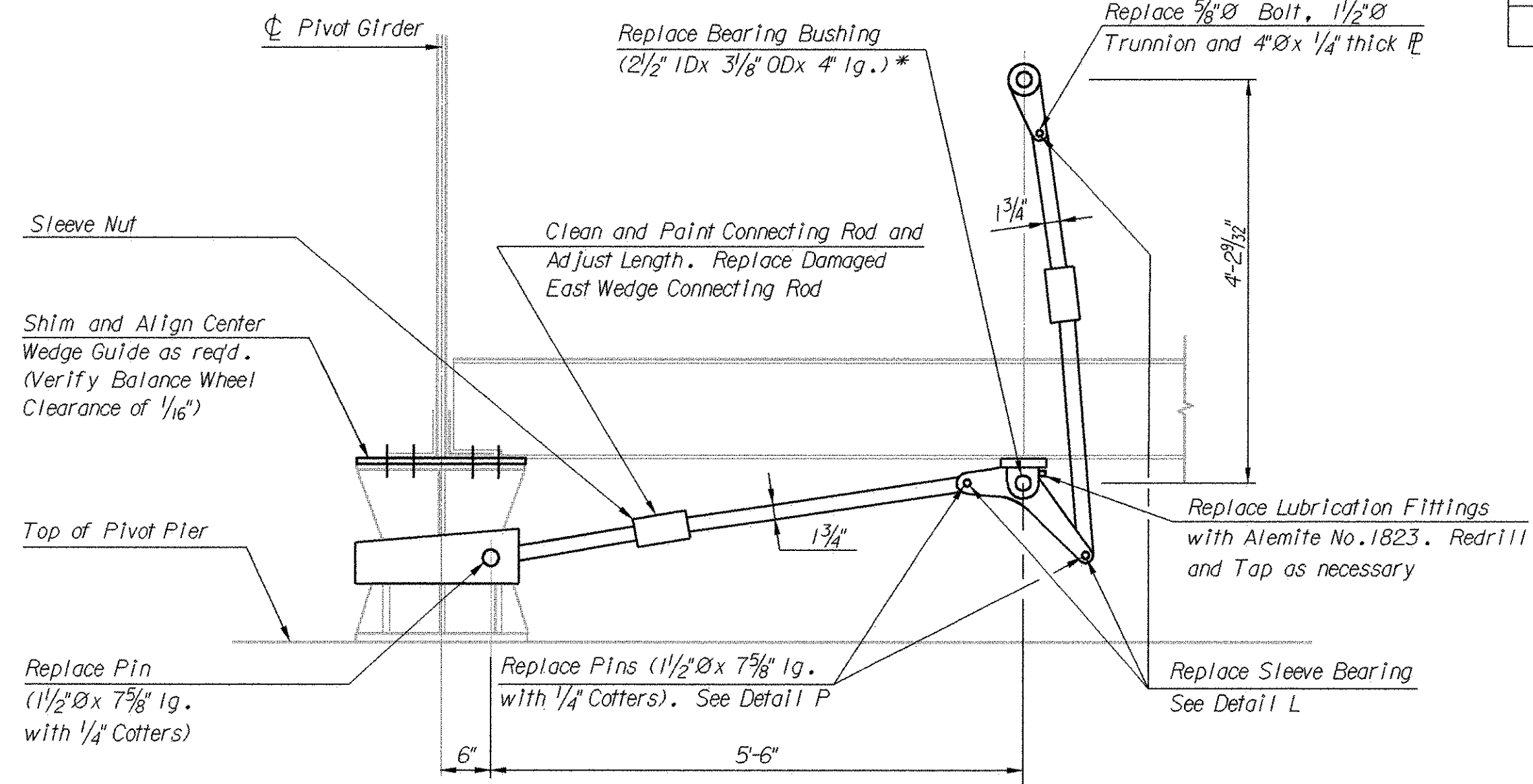
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-7

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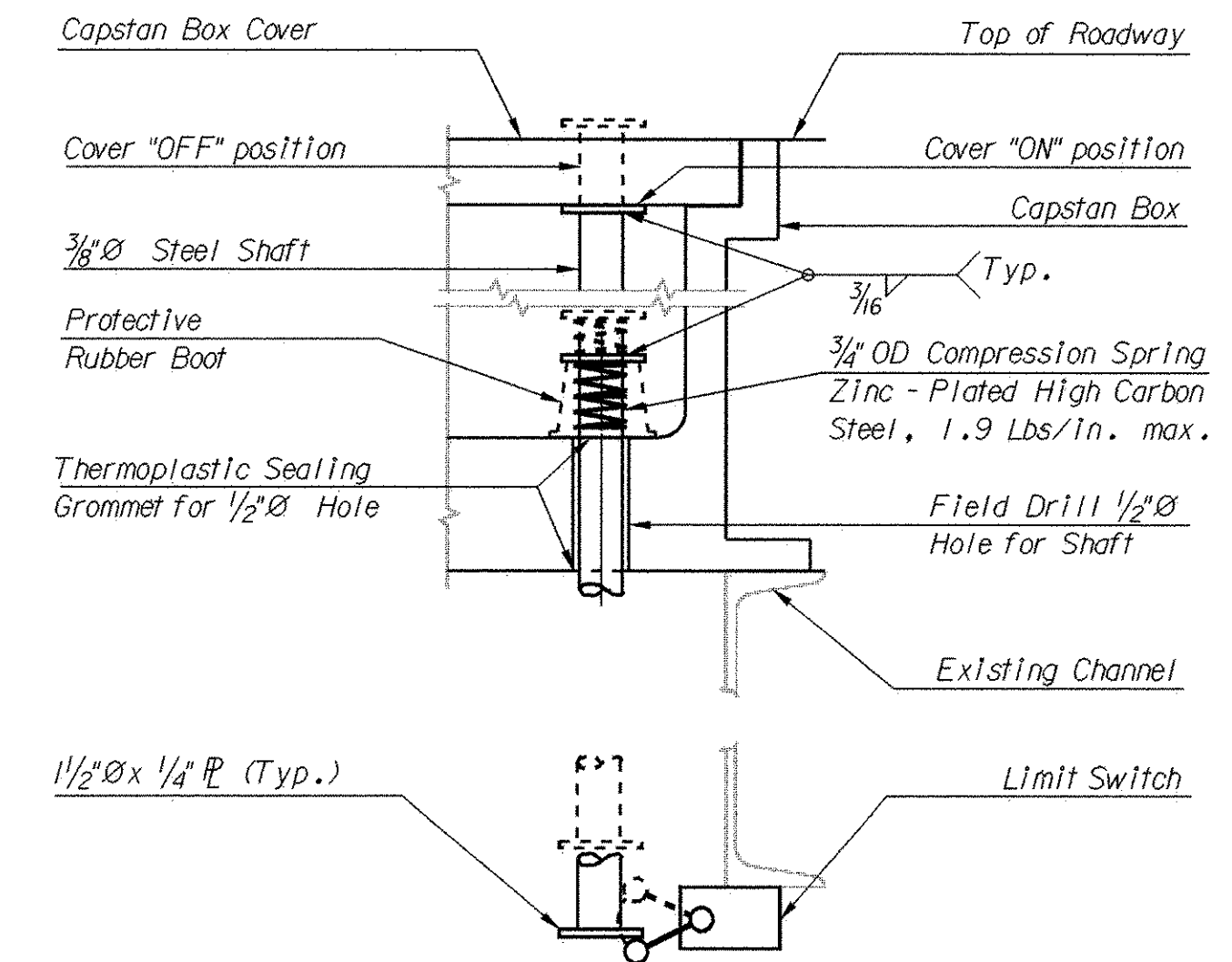
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	SC	BEAUFORT		US-21	37	115



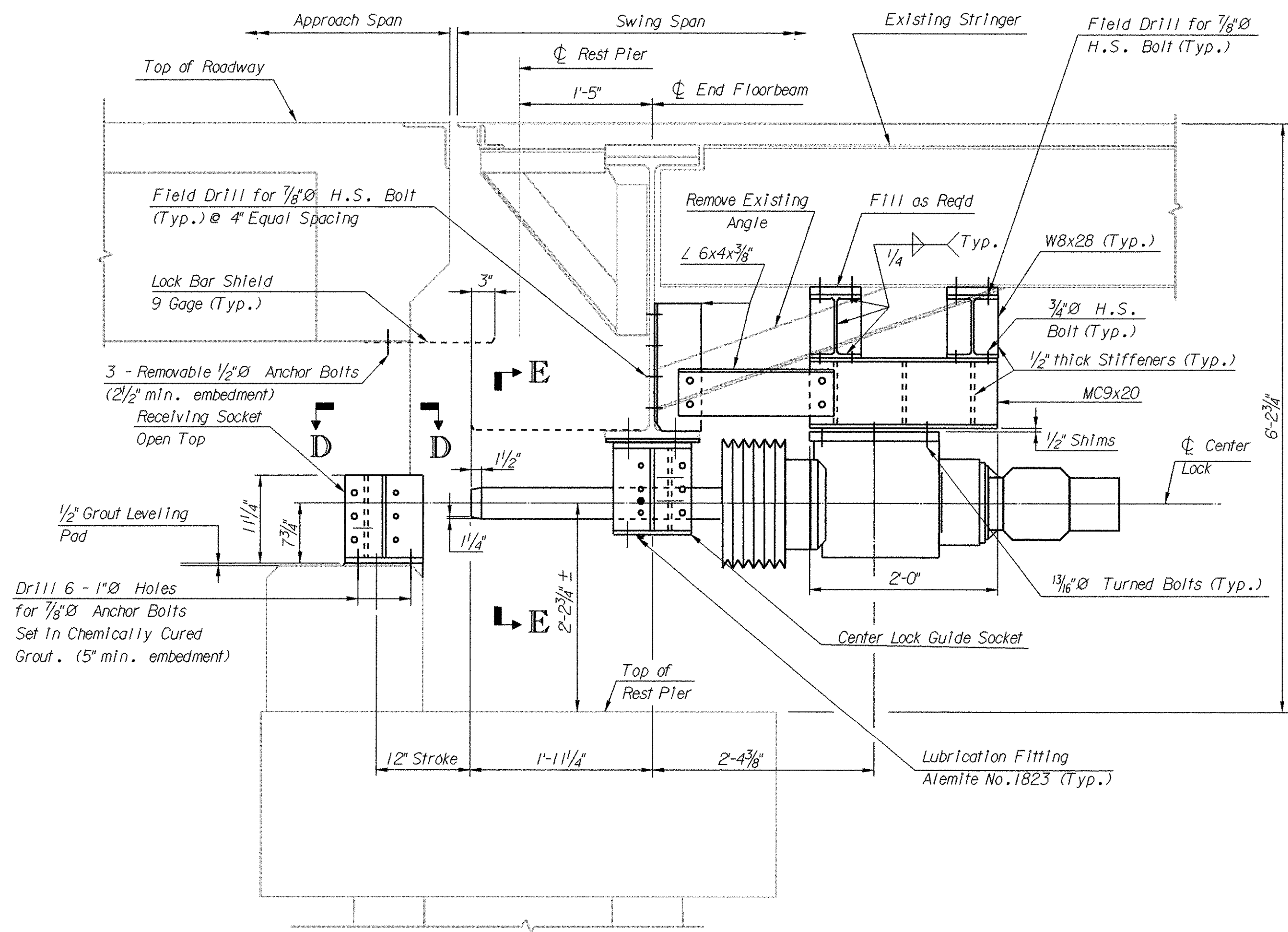
SECTION A-A
(Typical Repairs to End Wedges)
* (Contractor to Field Verify)
3/4"-1'-0"



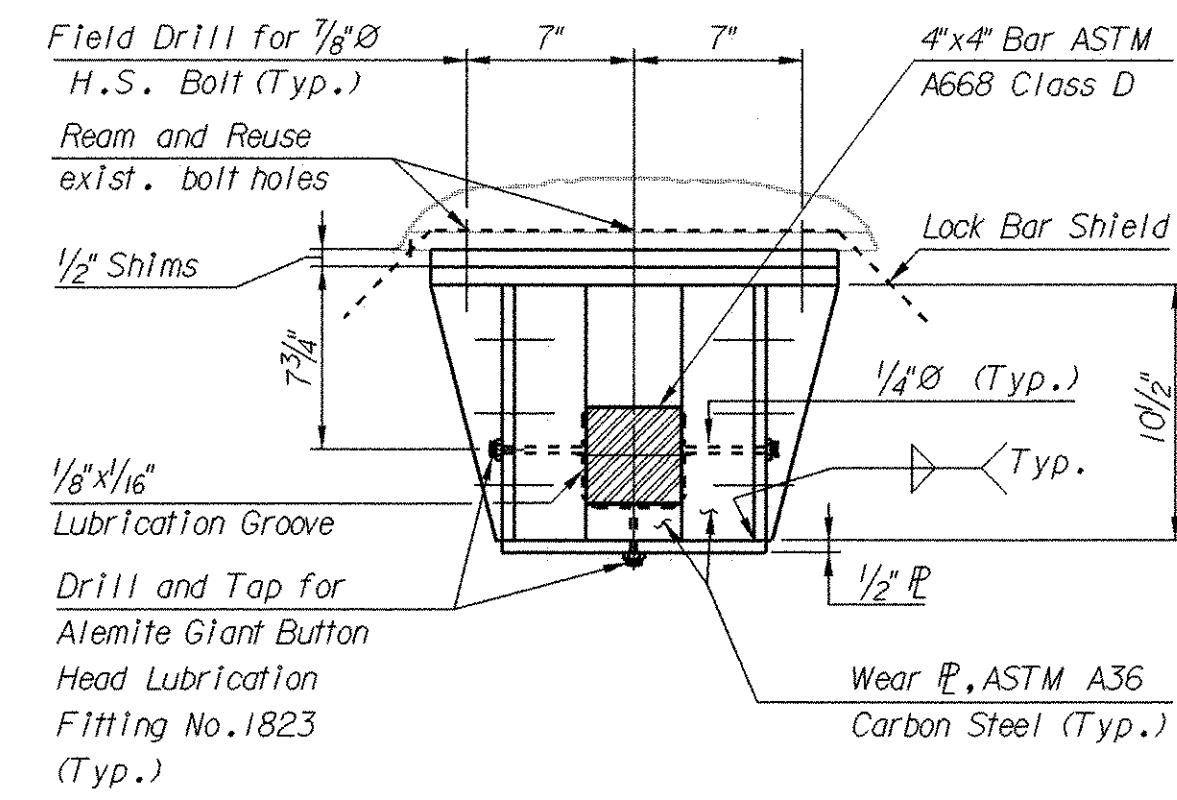
SECTION B-B
(Typical Repairs to Center Wedges)
* (Contractor to Field Verify)
3/4"-1'-0"



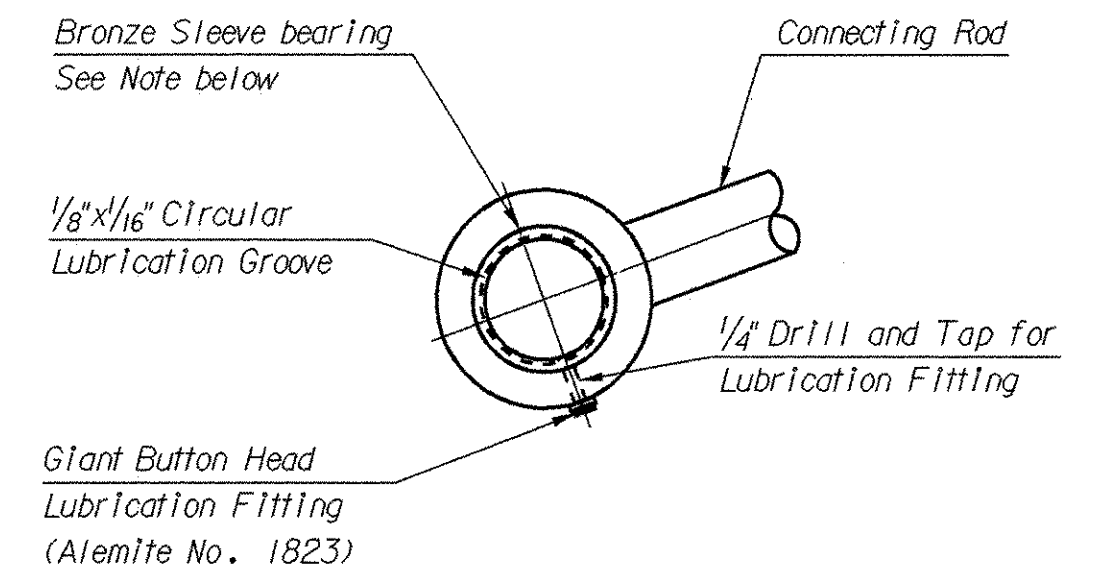
MANUAL WEDGE LIMIT SWITCH SCHEMATIC
NTS



SECTION C-C
(Typical New Center Lock at Rest Piers)
1"-1'-0"

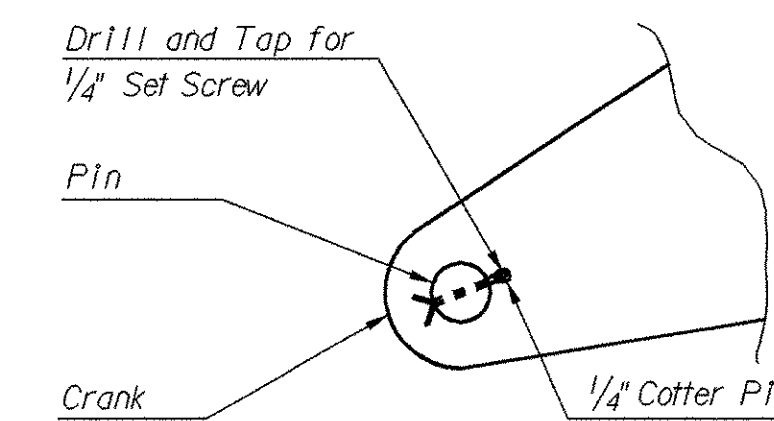


SECTION E-E
1 1/2"-1'-0"

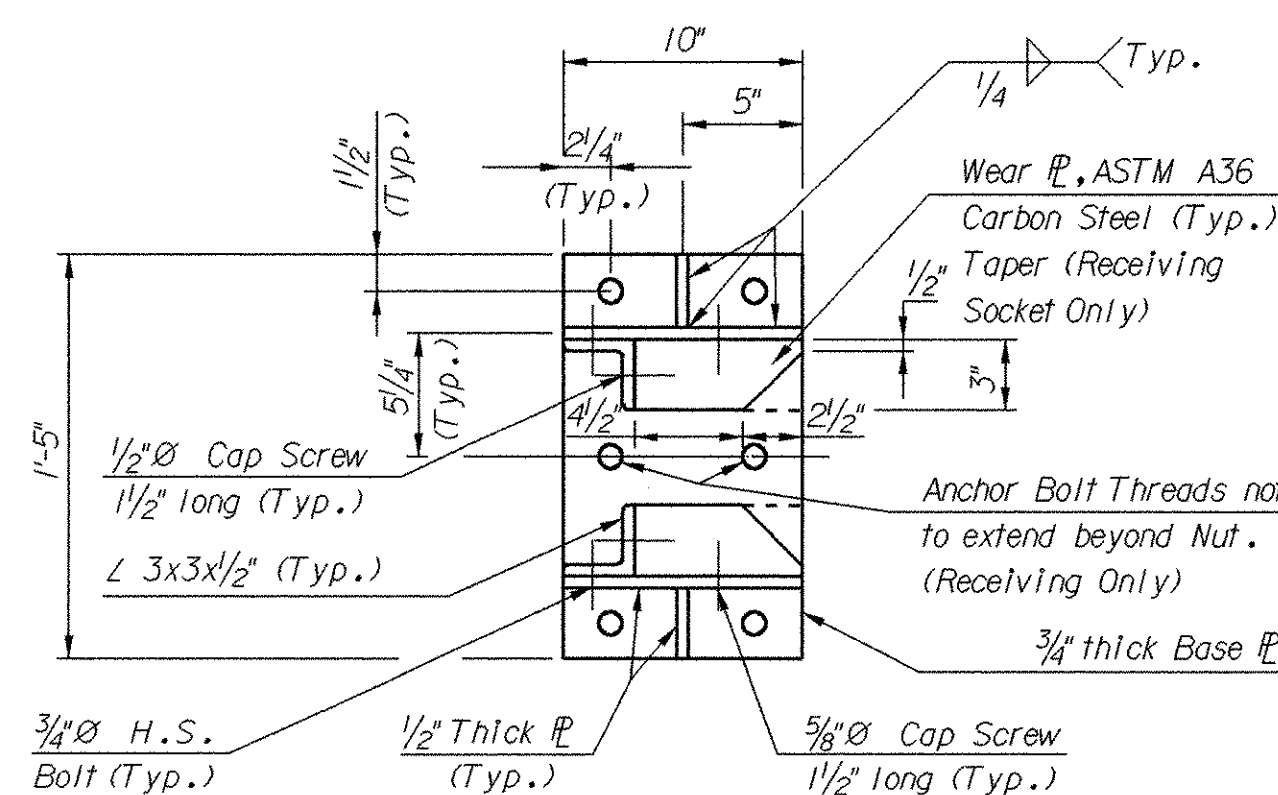


DETAIL L
NTS

Note: 1/2" ID x 2" OD x 2 1/2" lg. for End Wedges
2 1/2" ID x 2 7/8" OD x 2 1/2" lg. for Center Wedges



DETAIL P
(Typical for Both Sides)
Connecting Rod not Shown for clarity
NTS

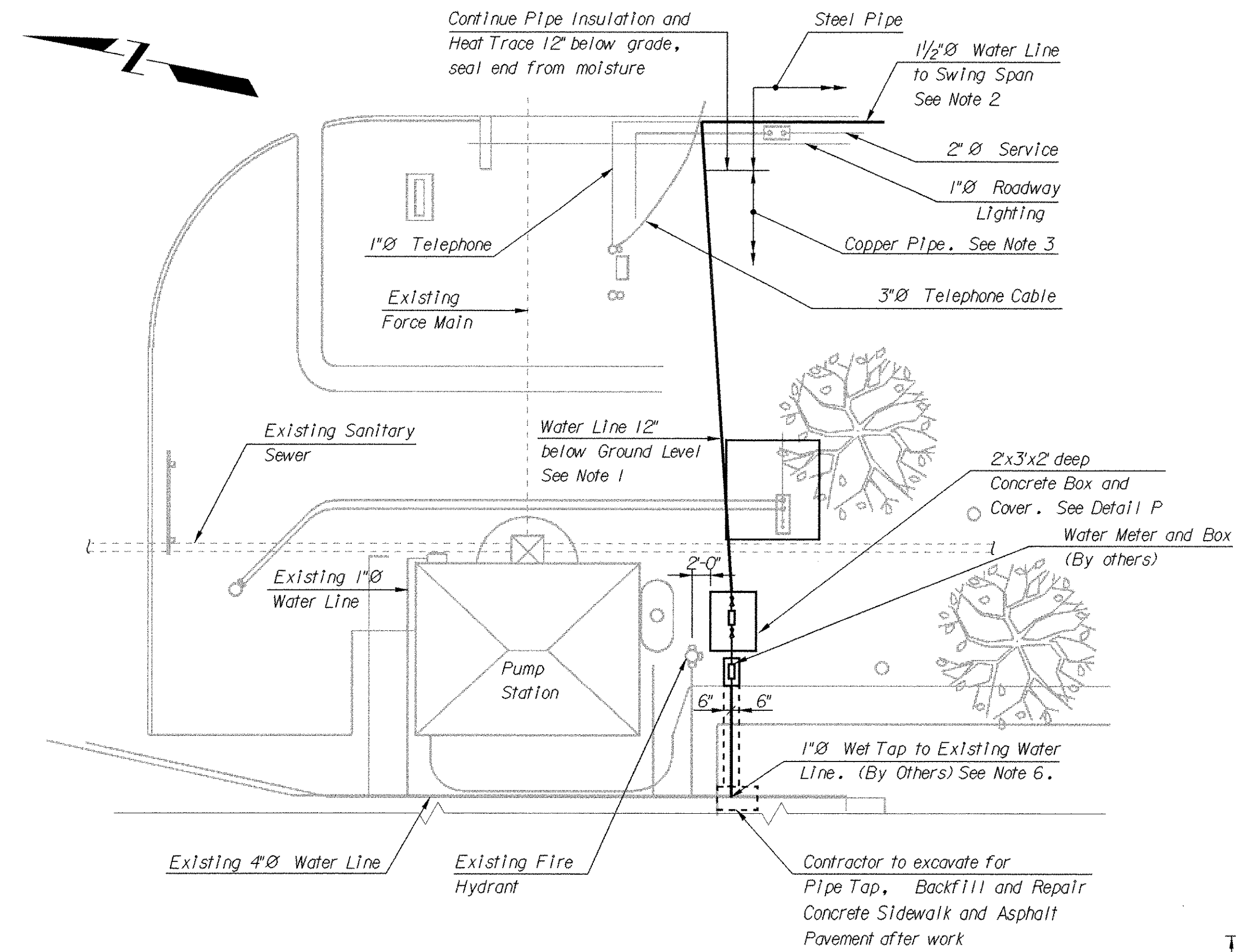


VIEW D-D
Guide Socket similar except as shown and noted
1 1/2"-1'-0"

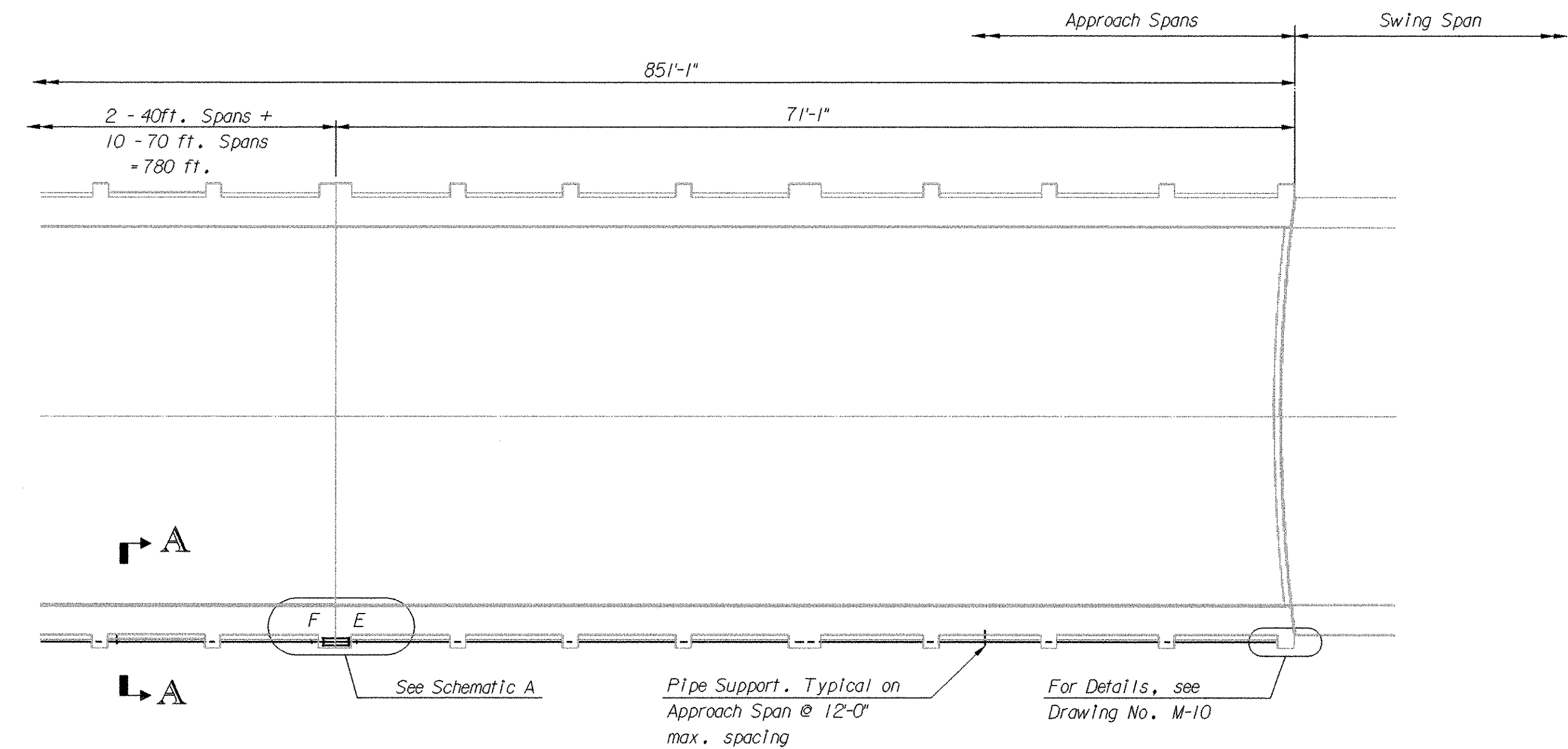
NOTES:

1. For location of Sections A-A, B-B and C-C, see Drawing No. M-7

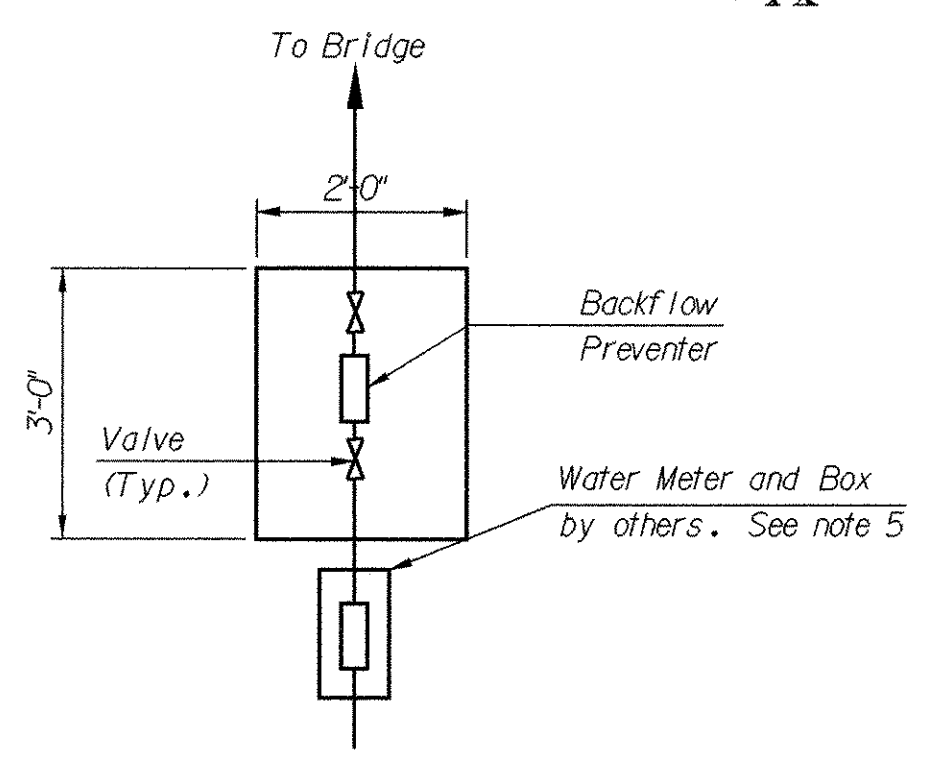
HNTB ARCHITECTS ENGINEERS PLANNERS The HNTB Companies			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C. LADY'S ISLAND			
WEDGE DRIVE REPAIR DETAILS			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-8



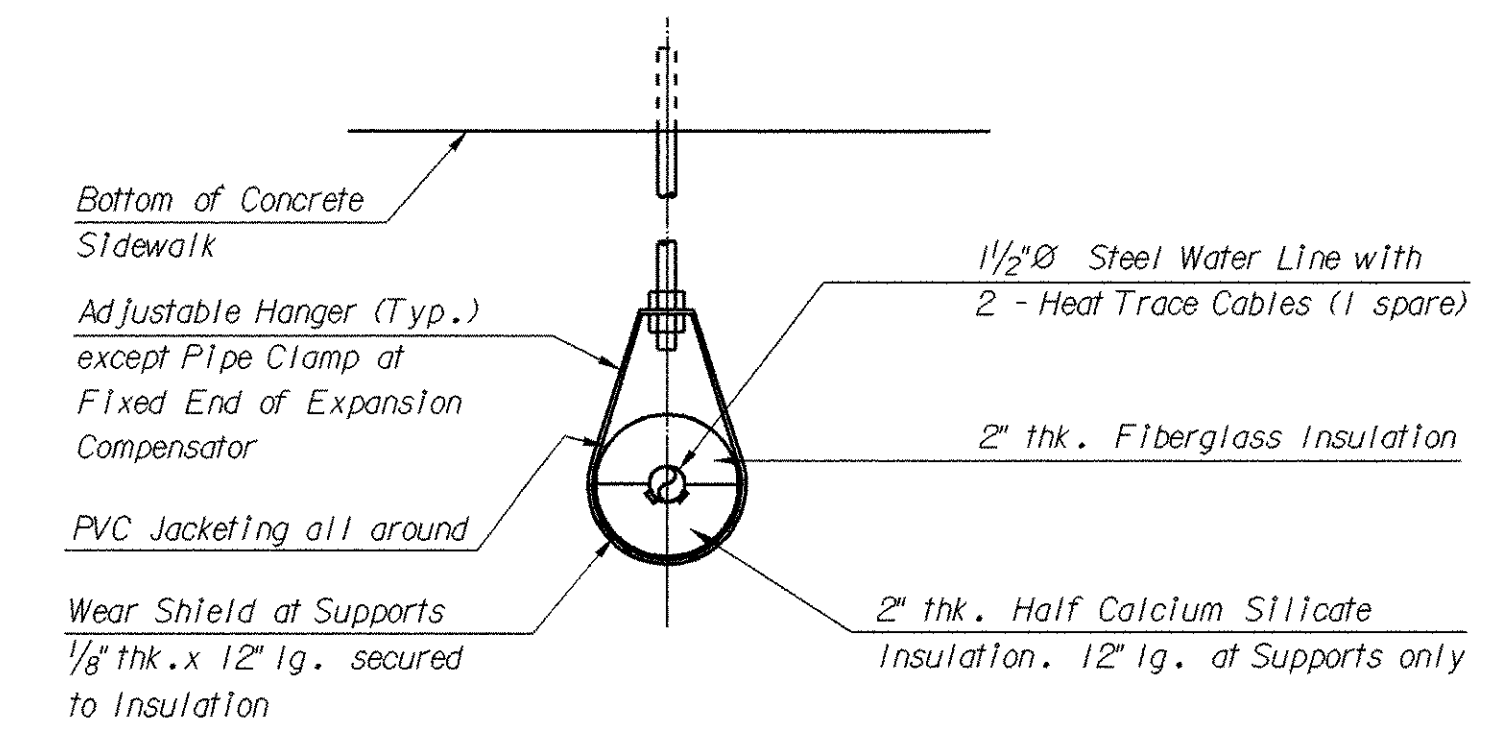
PLAN
1"-10'-0"



PLAN - APPROACH SPAN
1"-10'-0"

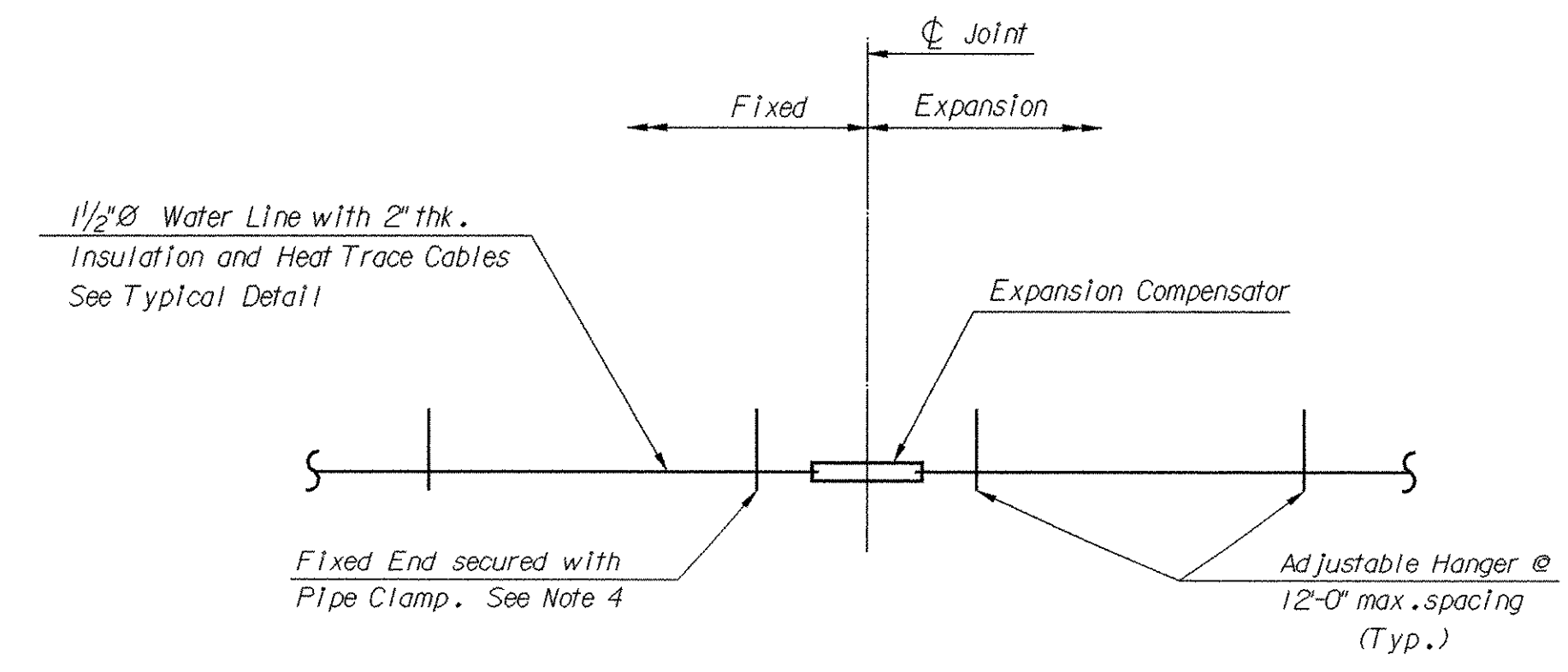


DETAIL P
Provide Pipe Saddle Supports for Piping Inside of Pit, one under each Valve (Typ.)
NTS

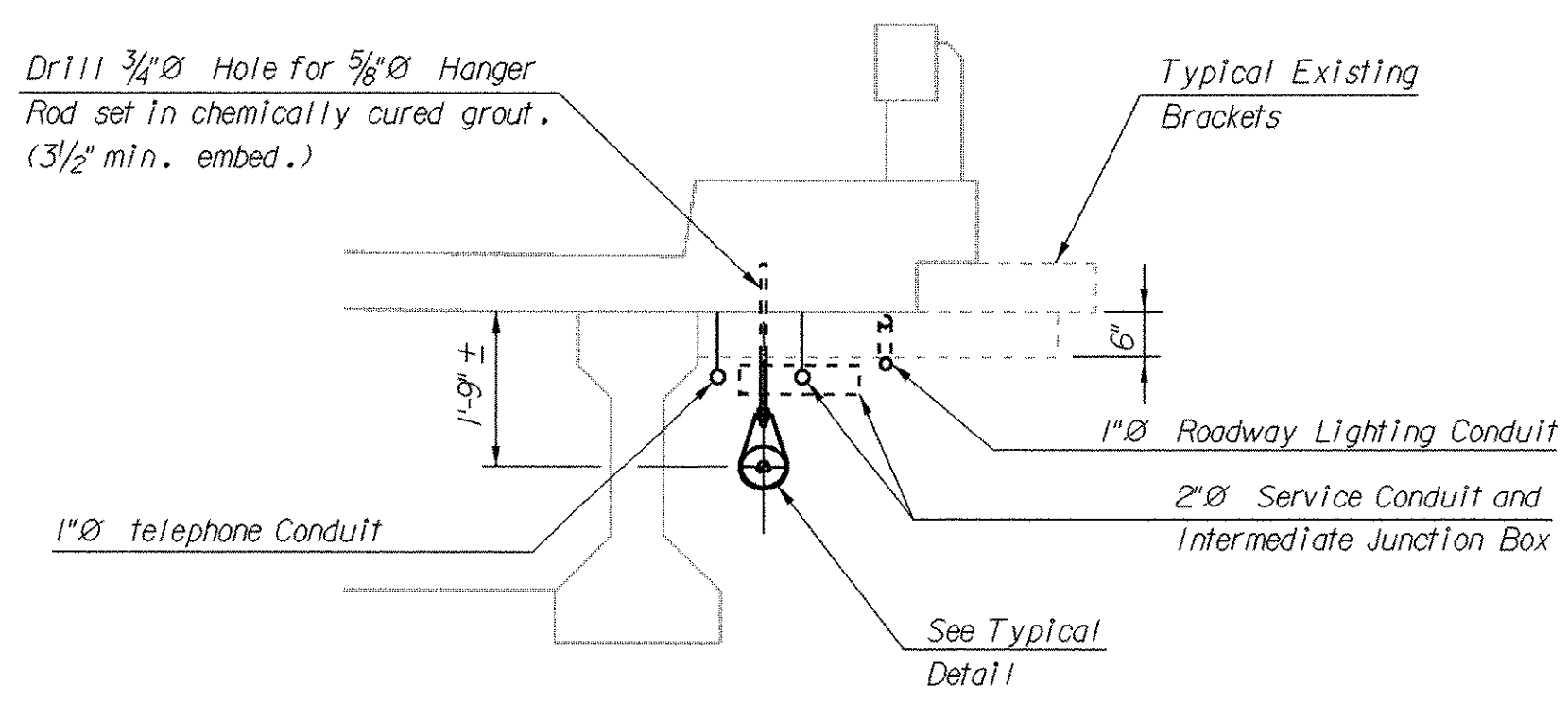


TYPICAL PIPE SUPPORT ON APPROACH SPAN
1/2"-1'-0"

- NOTES:**
1. All piping underground to be copper.
 2. Insulation on pipe not shown.
 3. Copper pipe shall terminate at start of insulation on steel pipe.
 4. Pipe clamp directly fastened to pipe through insulation.
 5. Contractor to coordinate location of backflow preventer with the City of Beaufort.
 6. Contractor to pay fee for Tap by others.



SCHEMATIC A
Typical Expansion Detail at Joints (Insulation not shown for clarity)
NTS



SECTION A-A
1/2"-1'-0"

QUANTITIES		
ITEM	UNIT	QUANTITY
Underground Water Line	L. F.	62
Water Line on Bridge	L. F.	856
Control House Water and Sewer	L. S.	Lump Sum

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

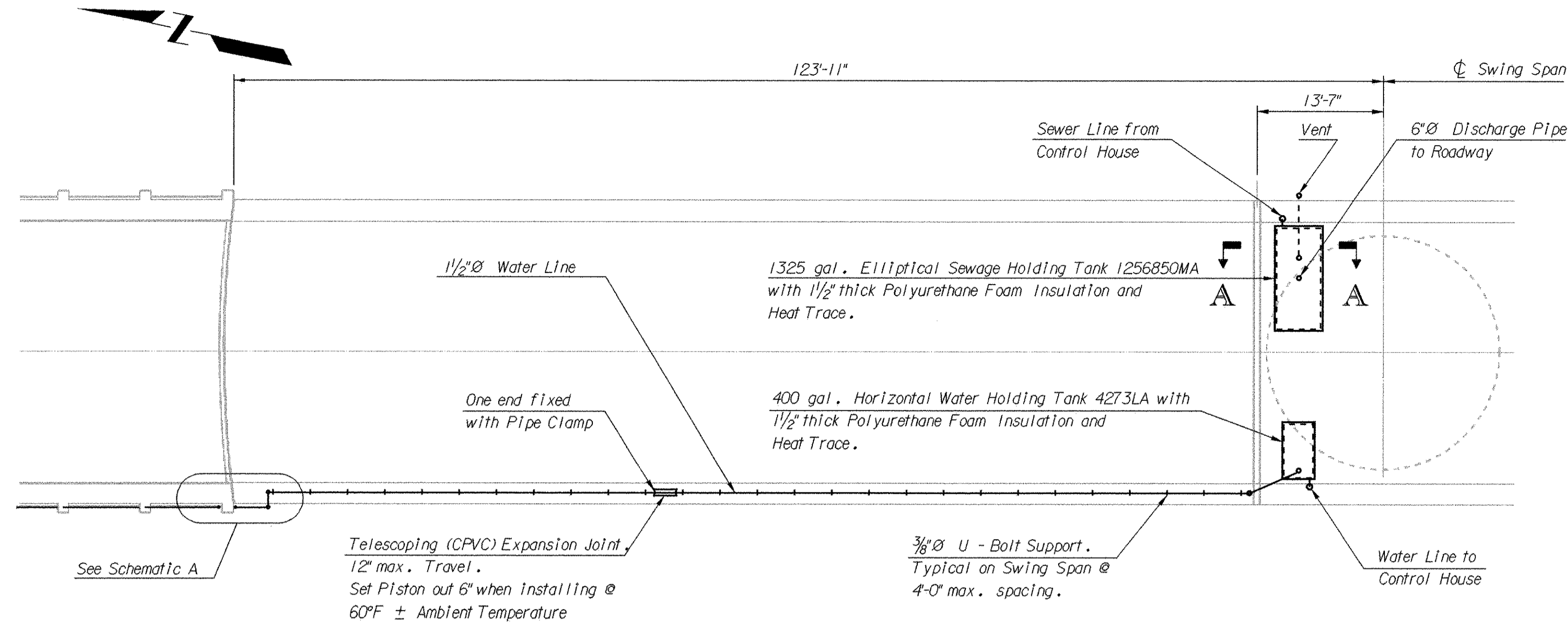
HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
LADY'S ISLAND

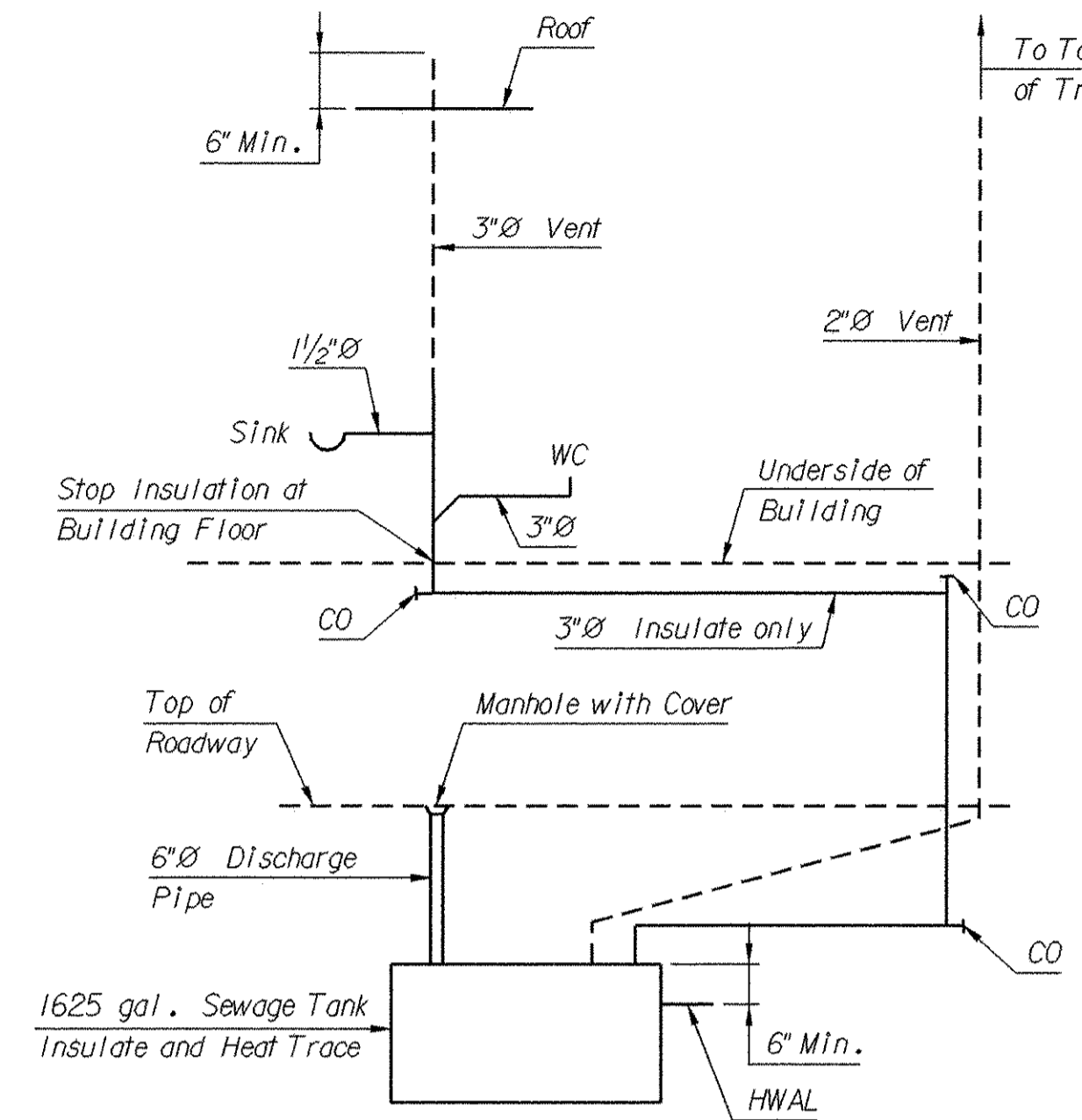
WATER AND SEWER LINE DETAILS - 1

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-9

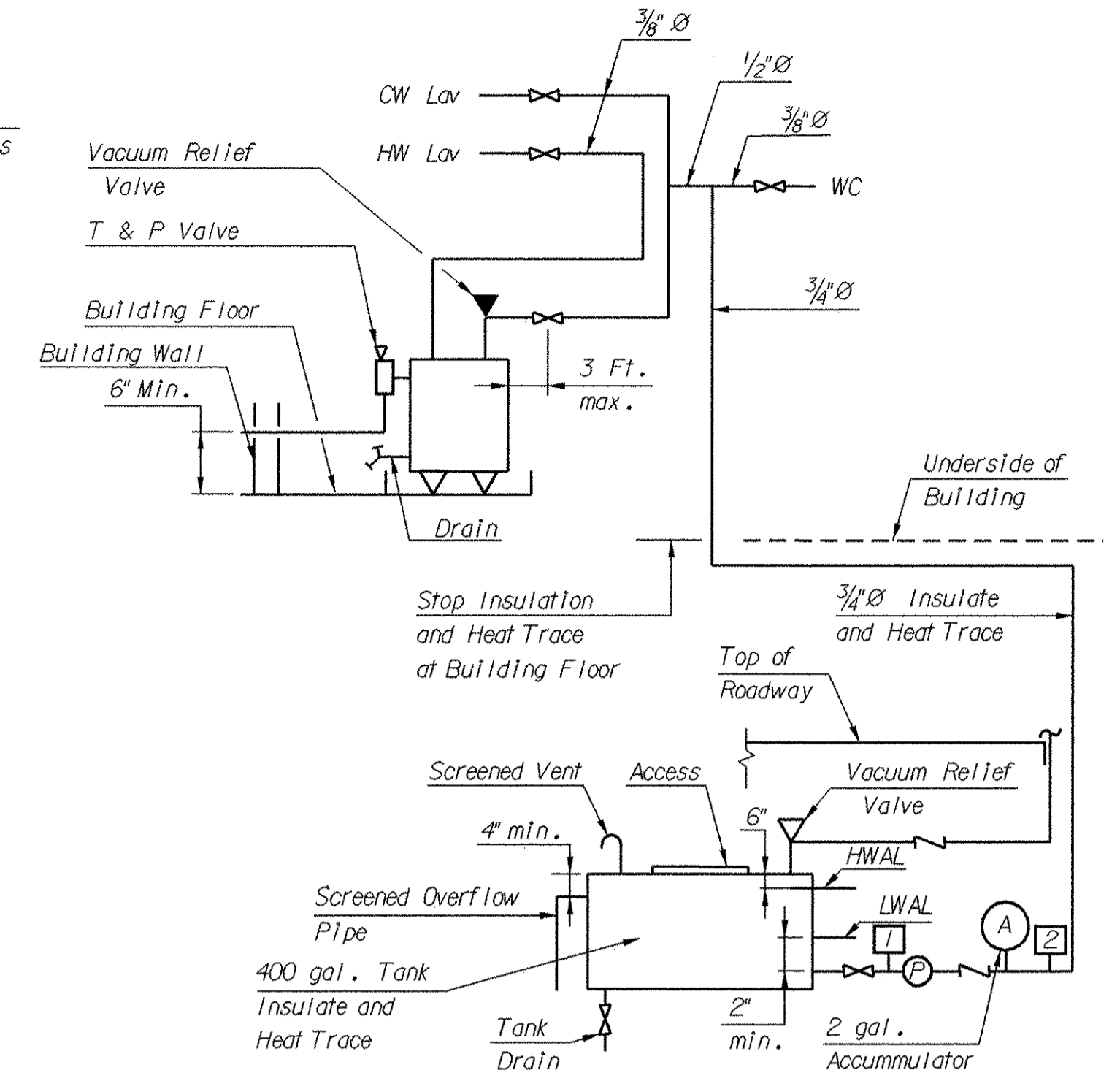
Design: [unreadable]
 18-FEB-1997
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 [unreadable]



PLAN
1" = 10'-0"



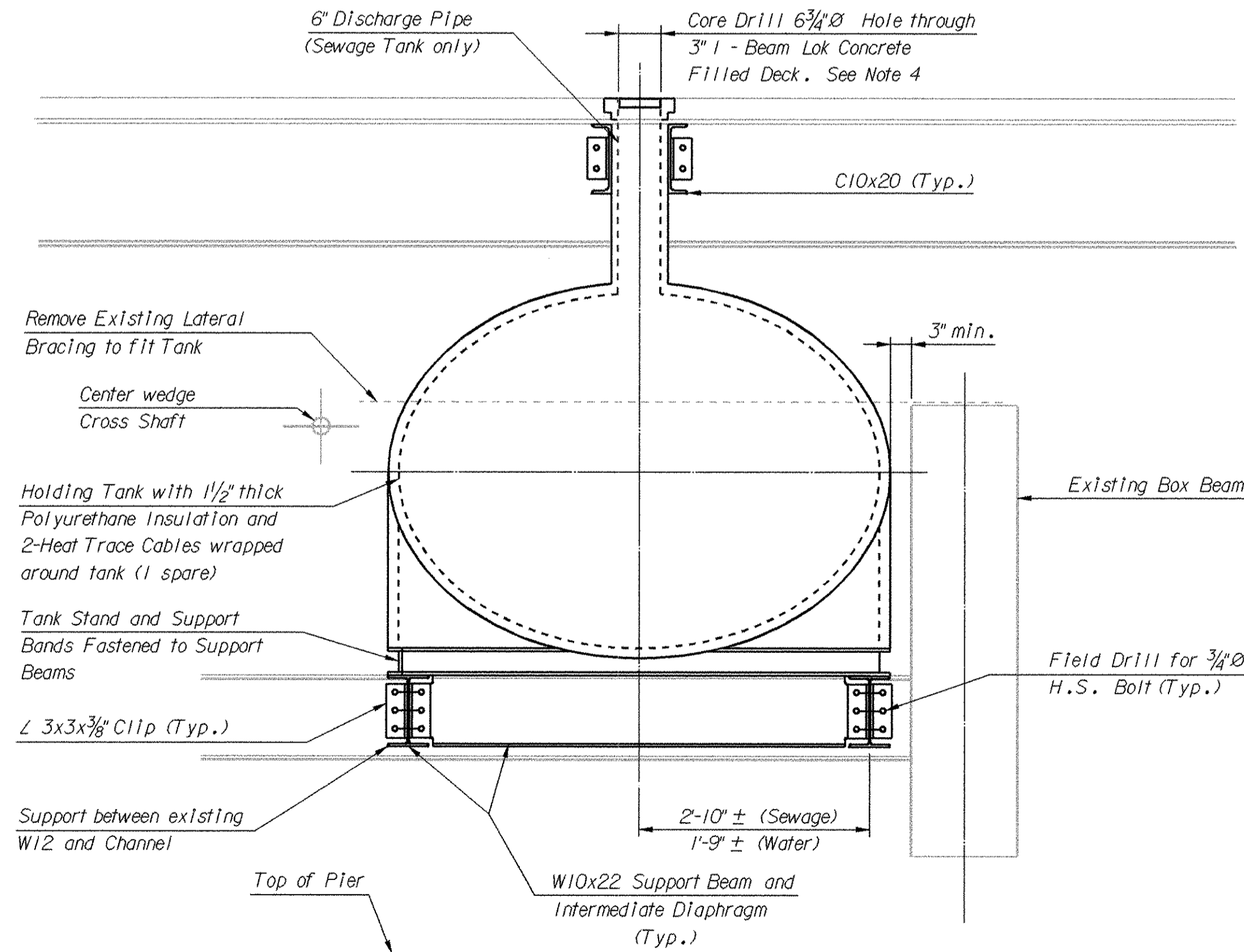
WASTE AND VENT DISTRIBUTION PIPING
NTS



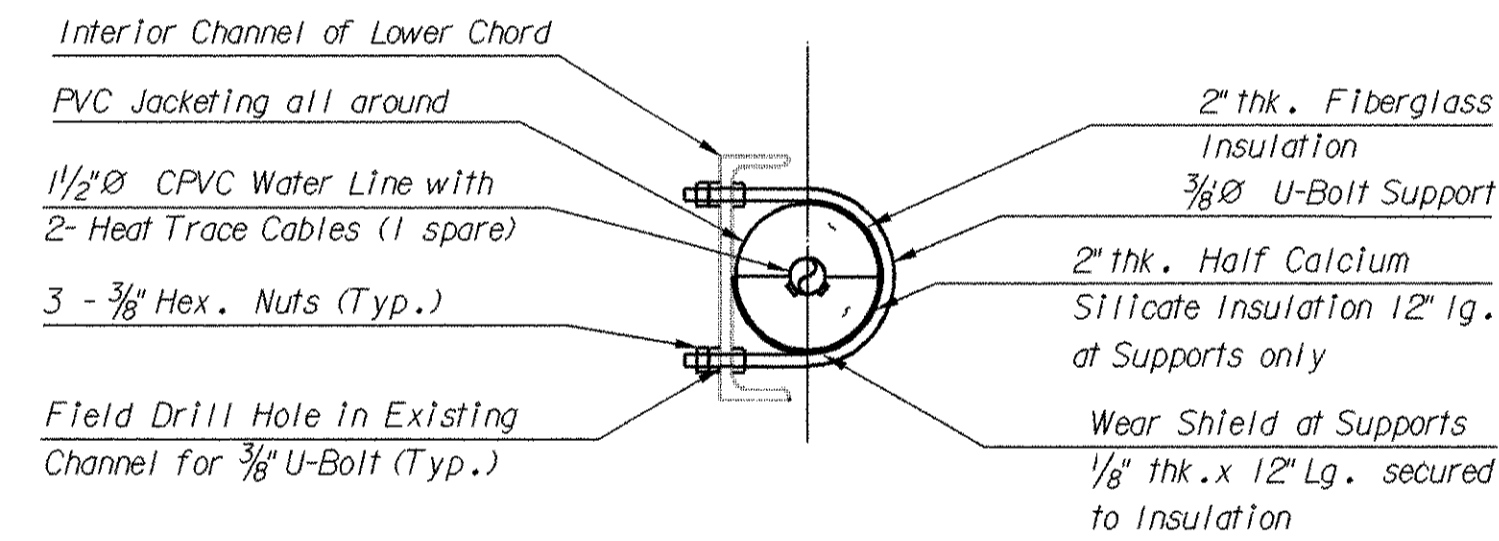
WATER DISTRIBUTION PIPING
NTS

LEGEND

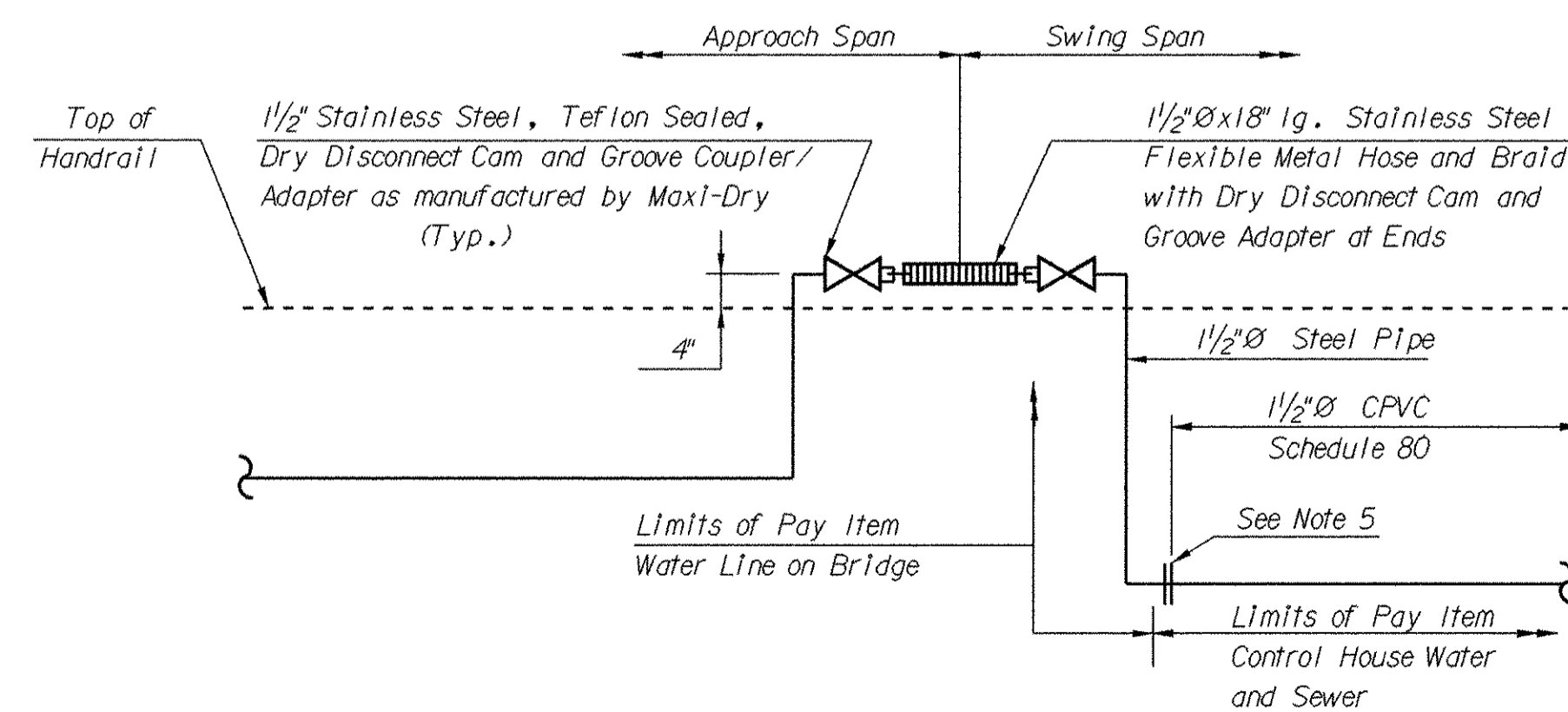
	Booster Pump		Ball Valve
	Cleanout		Check Valve
	Watercloset		Low Suction Cut-Off
	High Water Alarm Level		Pressure Switch for Pump Control
	Low Water Alarm Level		



SECTION A-A
Sewage Holding Tank Shown
Water Holding Tank Similar
See Note 3
3/4" = 1'-0"



TYPICAL PIPE SUPPORT ON SWING SPAN
1 1/2" = 1'-0"



SCHEMATIC A
(Insulation not shown for clarity)
NTS

NOTES:

- All vent piping to be CPVC Schedule 40. All other piping to be CPVC Schedule 80 unless otherwise noted.
- All work shown on this drawing to be included in Pay Item "Control House Water and Sewer" unless otherwise noted.
- Cost for structural steel supports to be included in Pay Item "Control House Water and Sewer."
Heat trace cables to be wrapped evenly across full length of tanks. A minimum of 13 wraps and 8 wraps for sewage and water holding tanks respectively.
- Heavy duty manhole frame and solid lid (with self-sealing application) R-6013 Series as manufactured by NEENAH Foundry Company. See Drawing No. M-4 for additional details. Lid will have the word "SEWER" lettered on top of lid.
- Steel and CPVC pipe shall have fixed flanges at ends for piping transition. Gasket shall be used between flanges for seal.
- Provide protector plugs and caps for dry disconnect cam and groove coupler and adapter to guard against damage and contaminants when disconnected.

REV.	QUAN.	SN	EK	2-97
	DR.	FG	SN	2-97
	DES.	SN	EK	2-97
	BY	CHK	DATE	

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

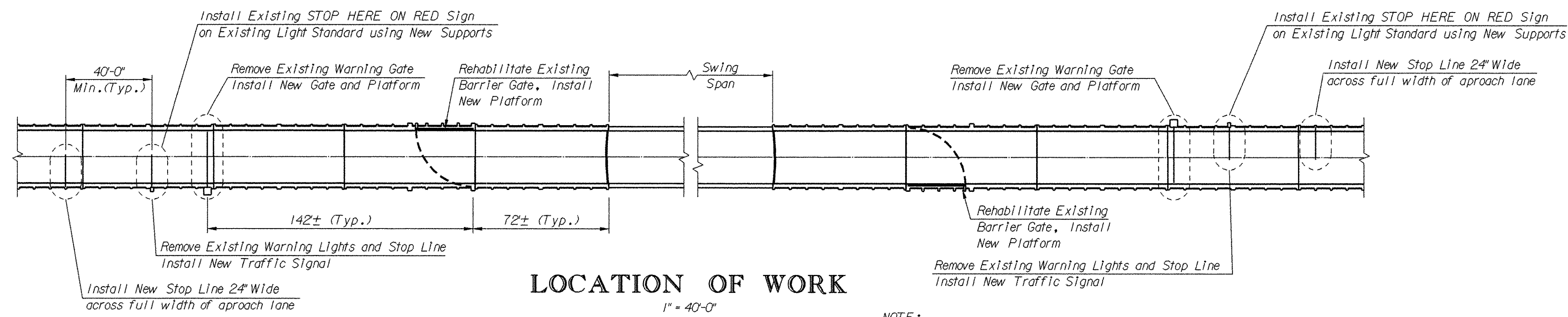
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
LADY'S ISLAND

WATER AND SEWER LINE DETAILS - 2

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-10

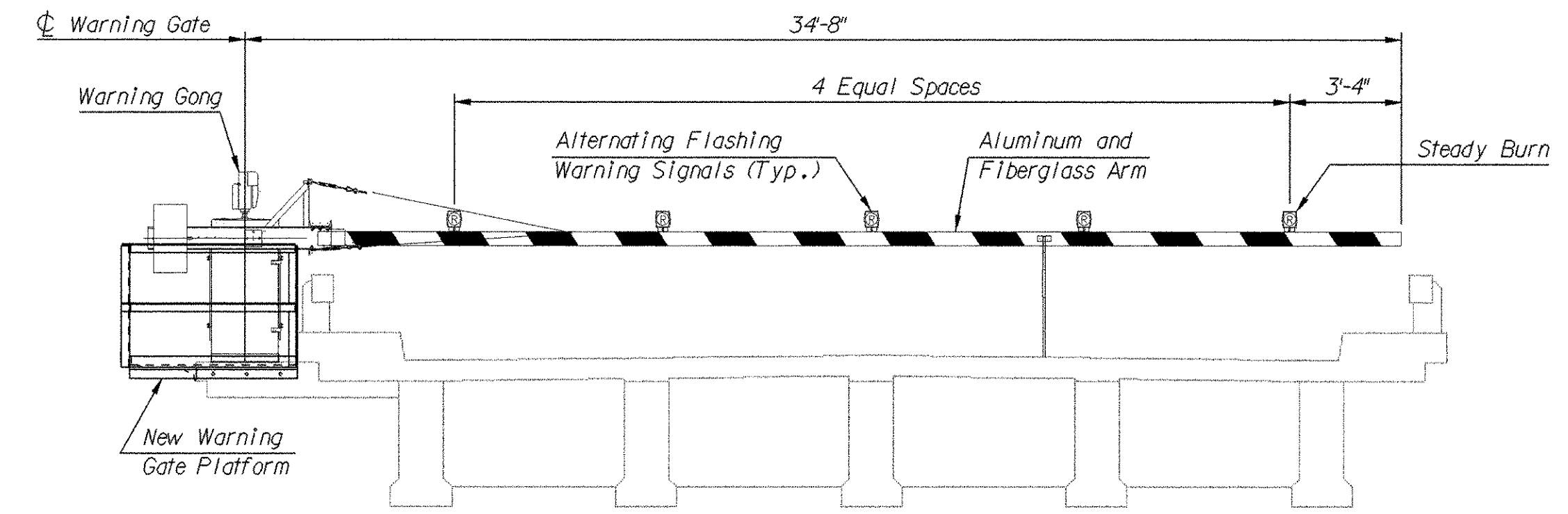
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	40	115

QUANTITIES		
ITEM	UNIT	CONTRACT QUANTITY
Traffic Control Equipment	LS.	Lump Sum
Warning Gates	Each	2
Warning Gate Platform	LS.	Lump Sum
Structural Concrete	C.F.	6.3

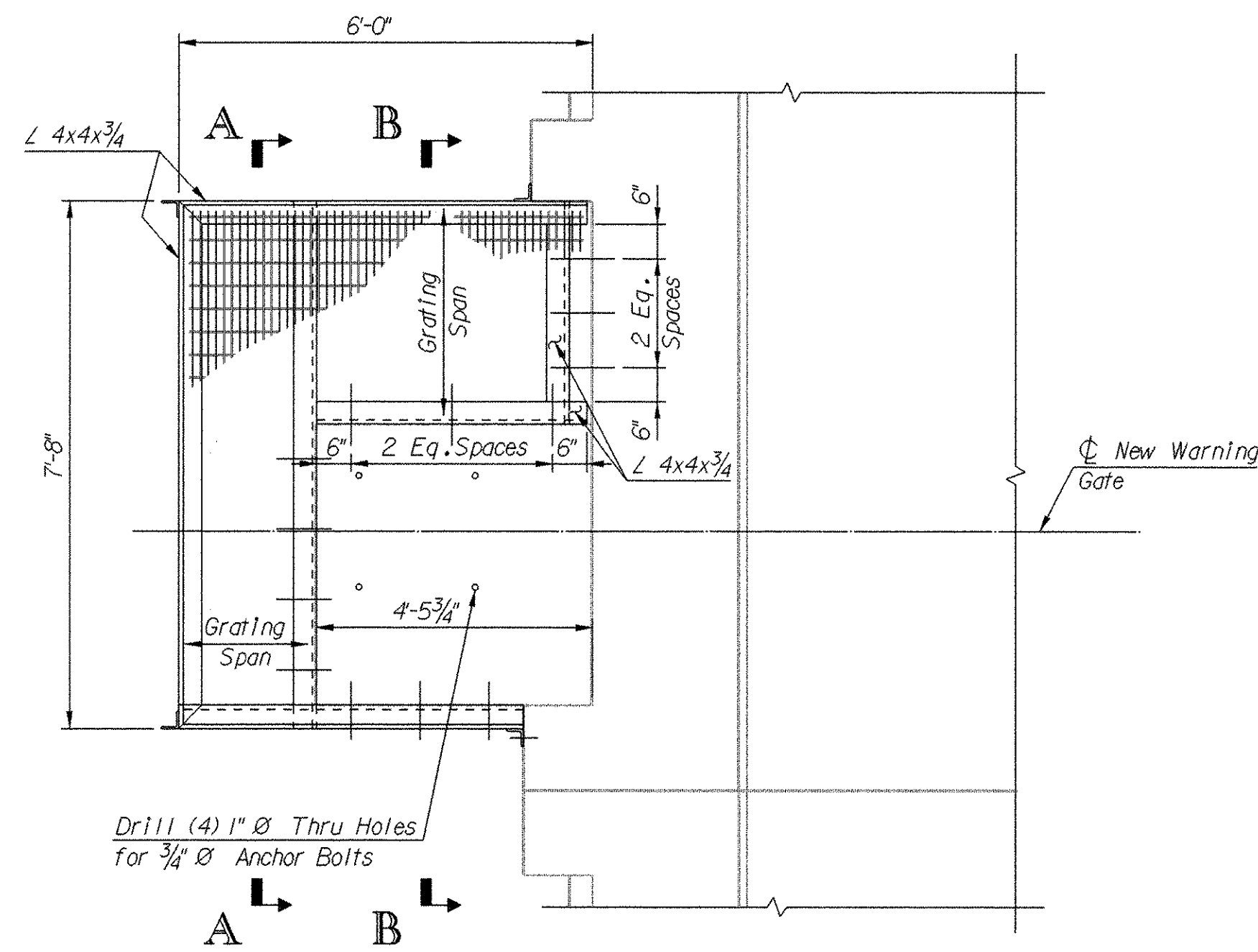


LOCATION OF WORK
1" = 40'-0"

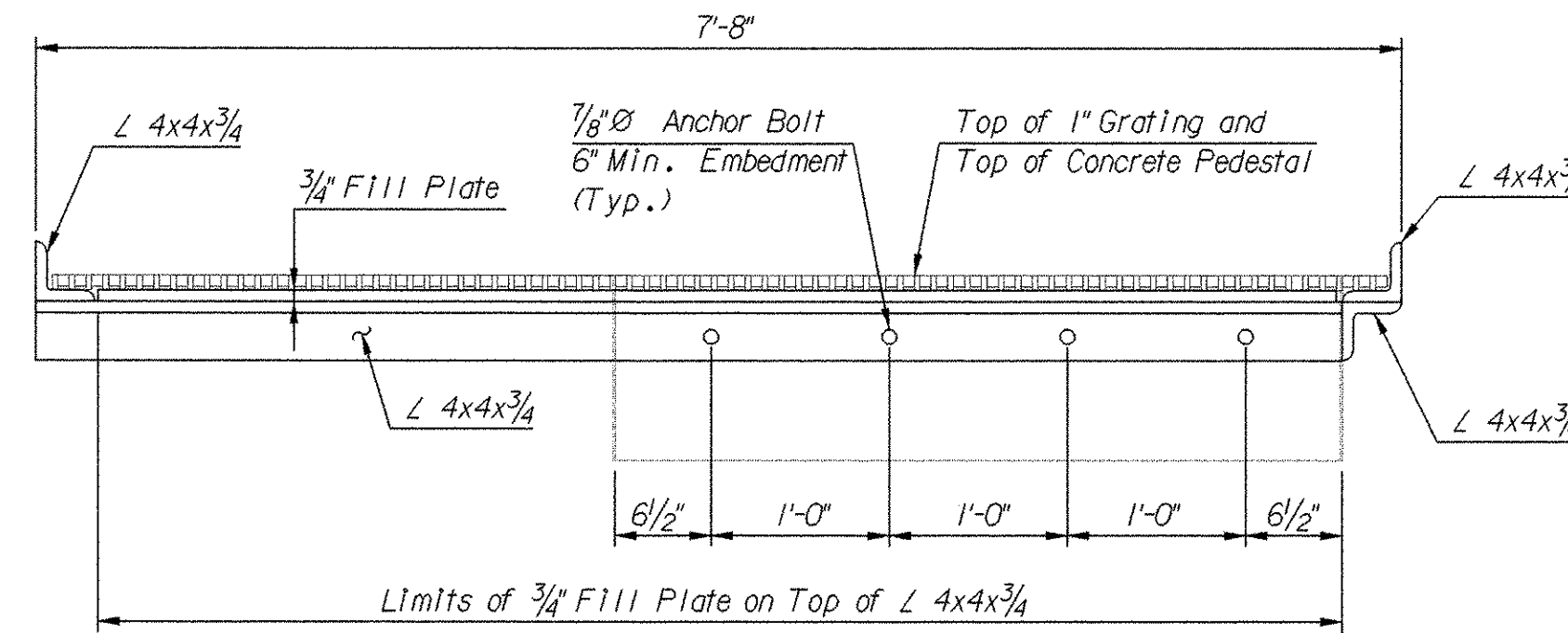
NOTE:
For Details of Barrier Gate Rehabilitation see Drawing No. M-12



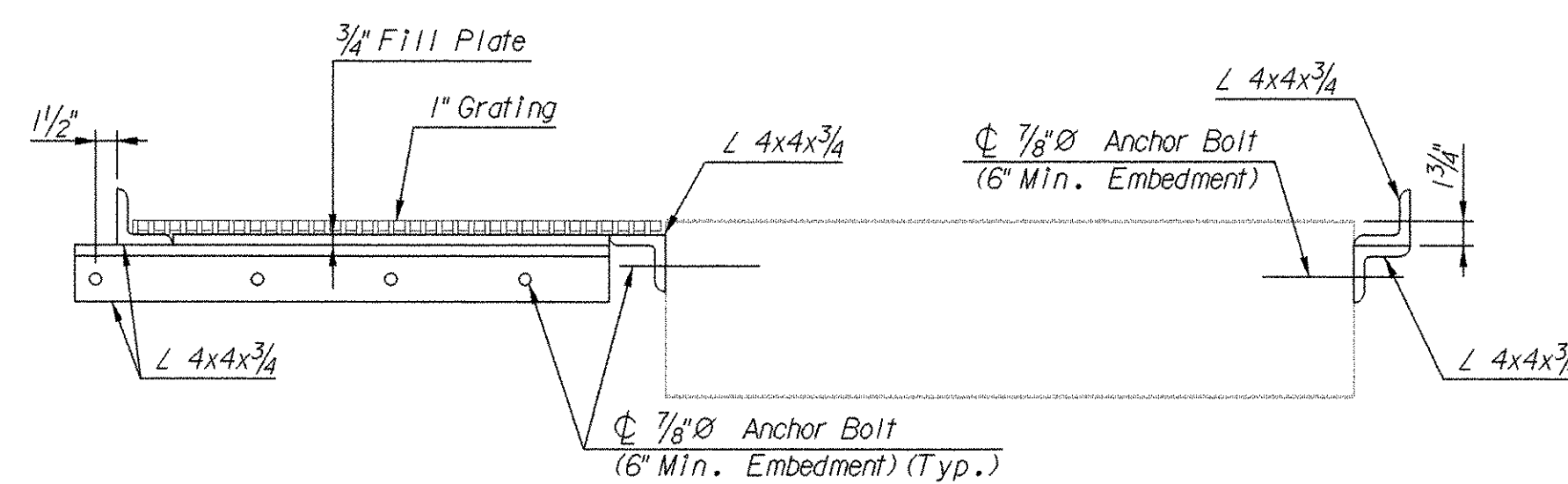
GATE ELEVATION
1/4" = 1'-0"



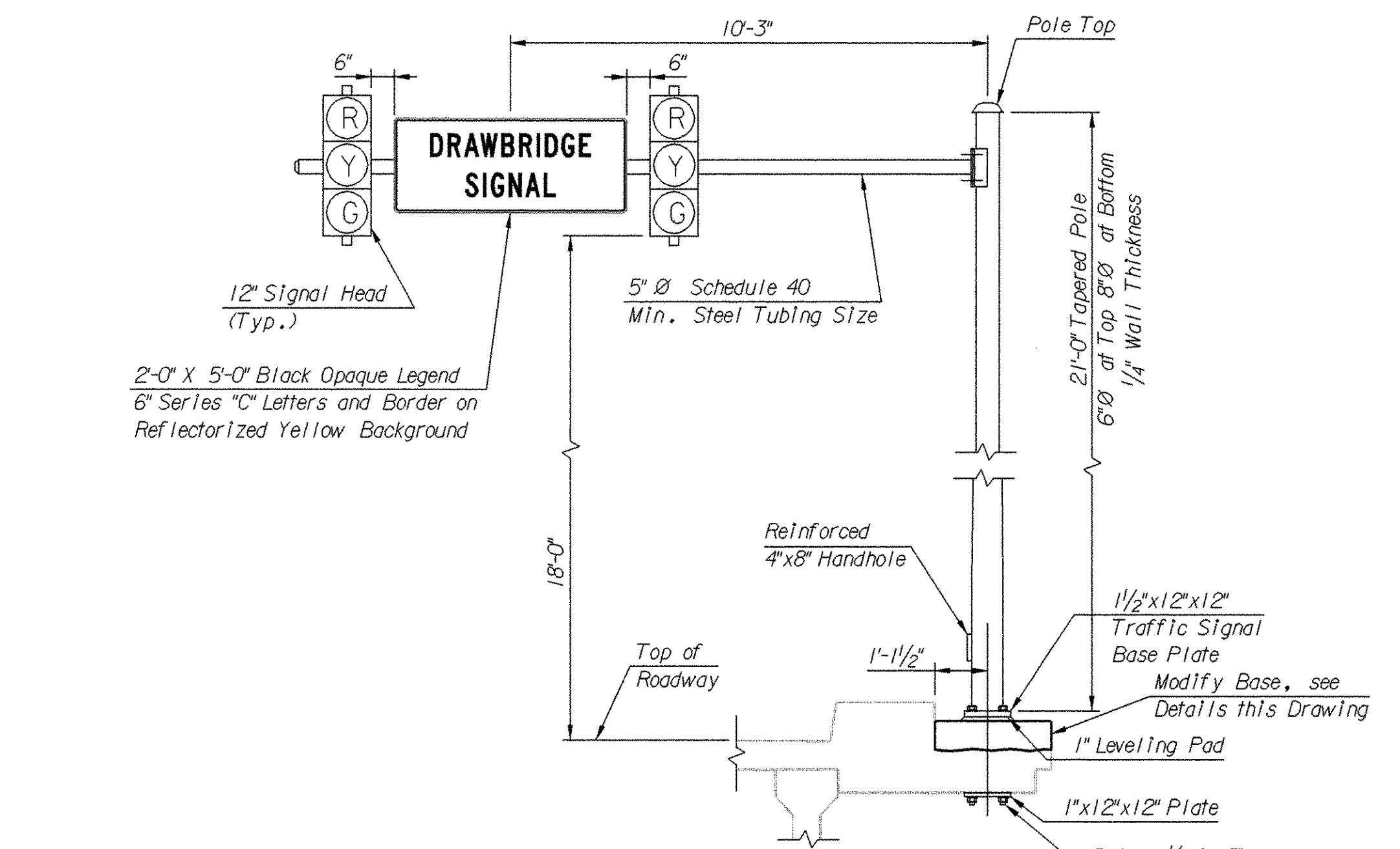
PLAN
1/2" = 1'-0"



SECTION A-A
1" = 1'-0"



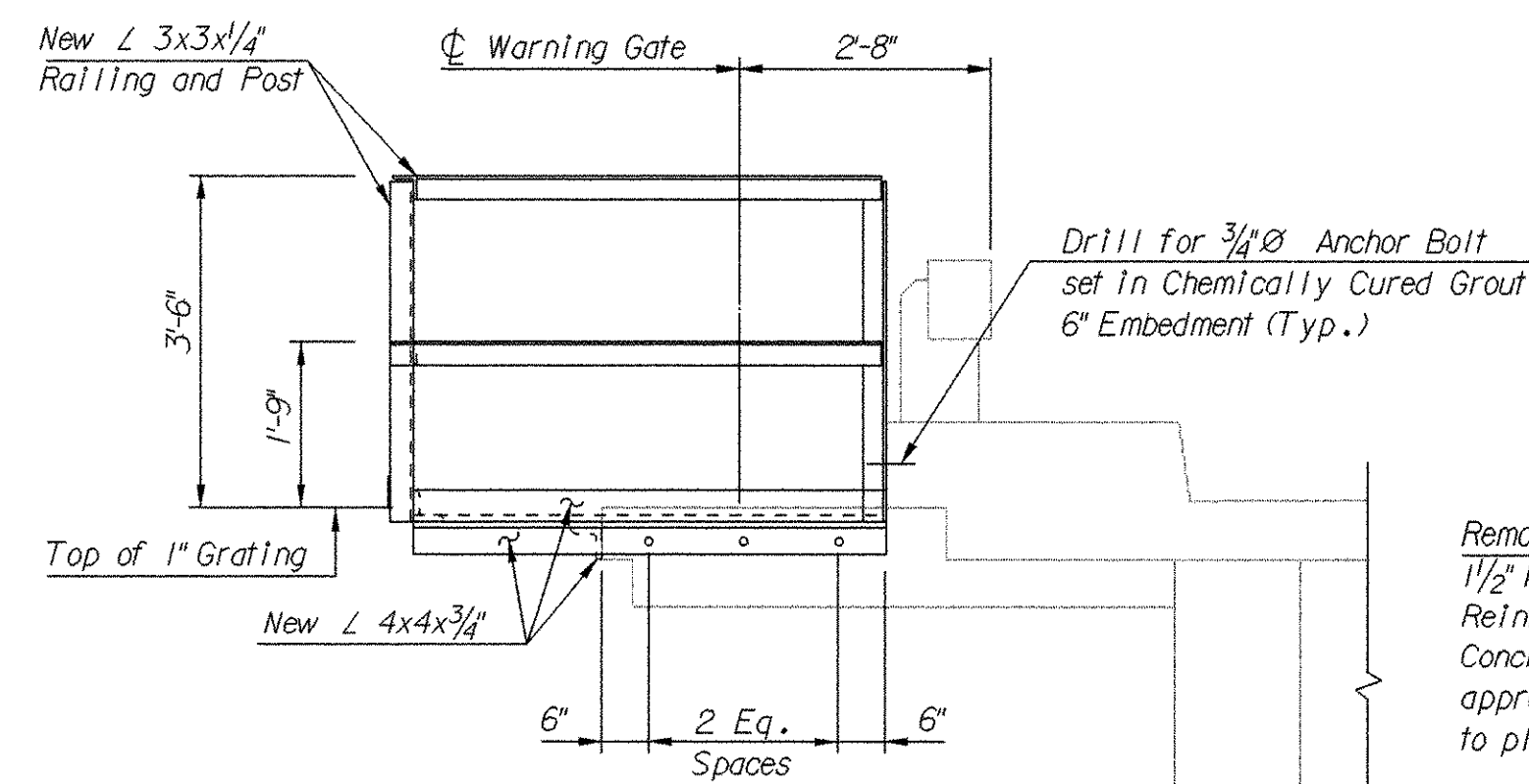
SECTION B-B
1" = 1'-0"



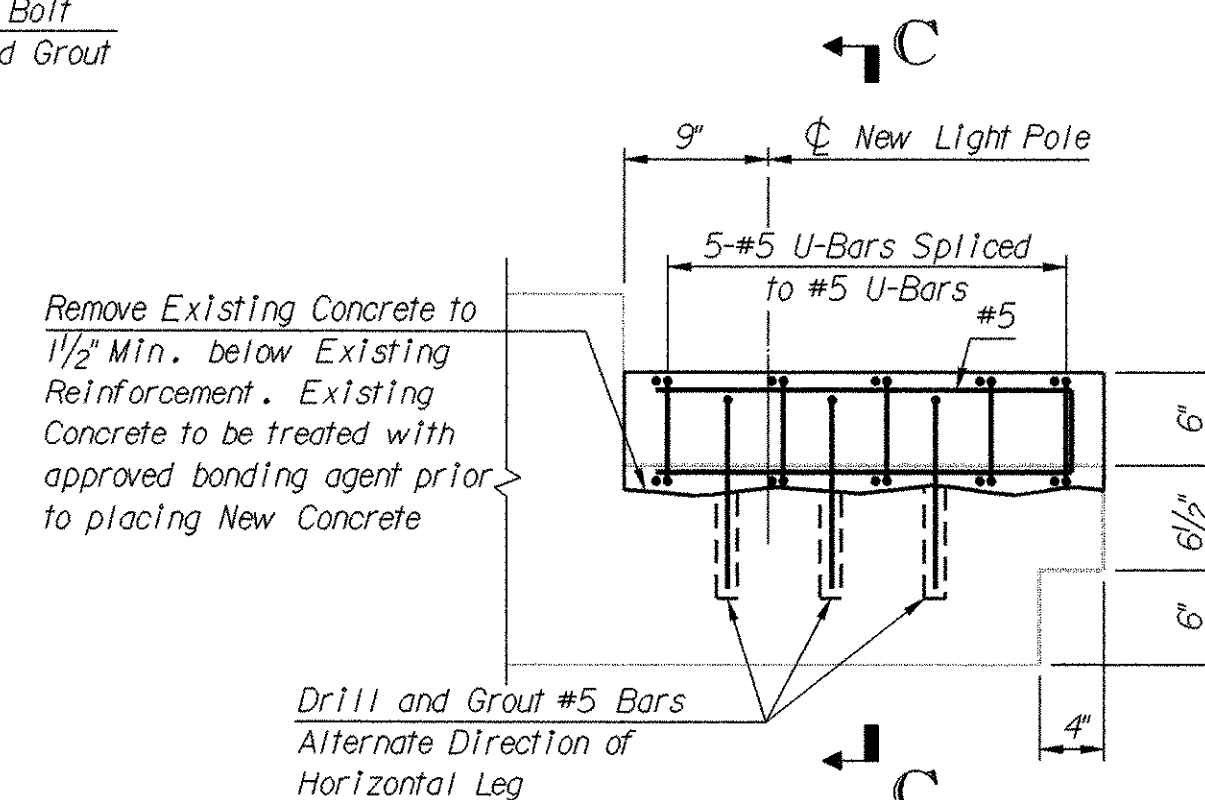
TRAFFIC SIGNAL POLE AND MAST ARM
3/8" = 1'-0"

NOTES

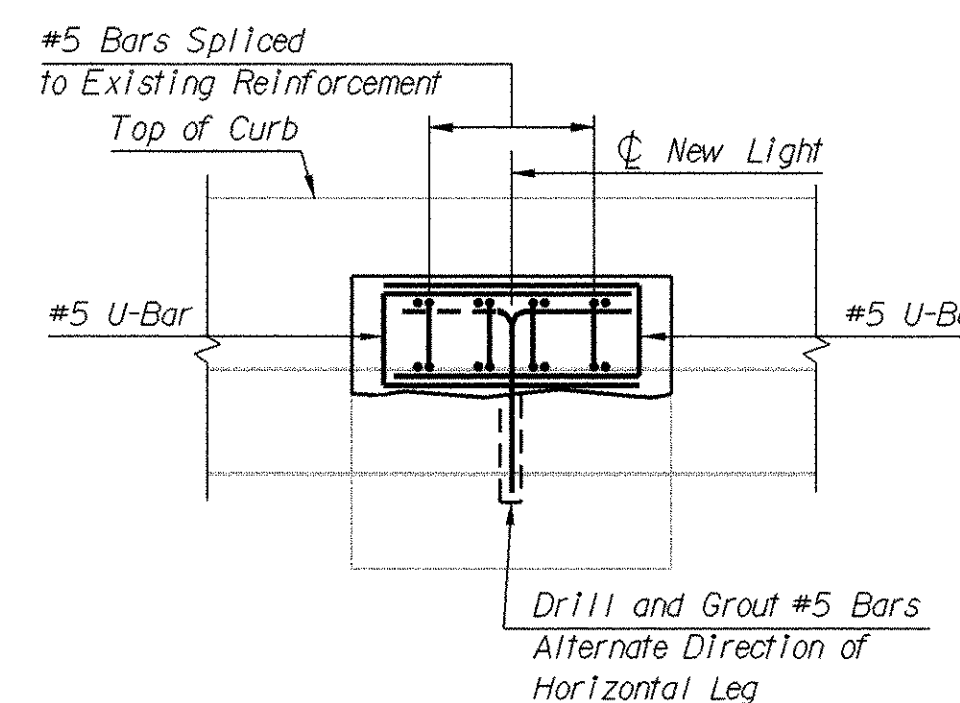
- Cost for removal of existing lights and stop lines and installation of new signal lights, poles and stop lines to be included in Pay Item "Traffic Control Equipment".
- Cost for modifications to signal pole base to be included in Pay Item "Structural Concrete".



ELEVATION
1/2" = 1'-0"



POLE BASE MODIFICATION
1" = 1'-0"

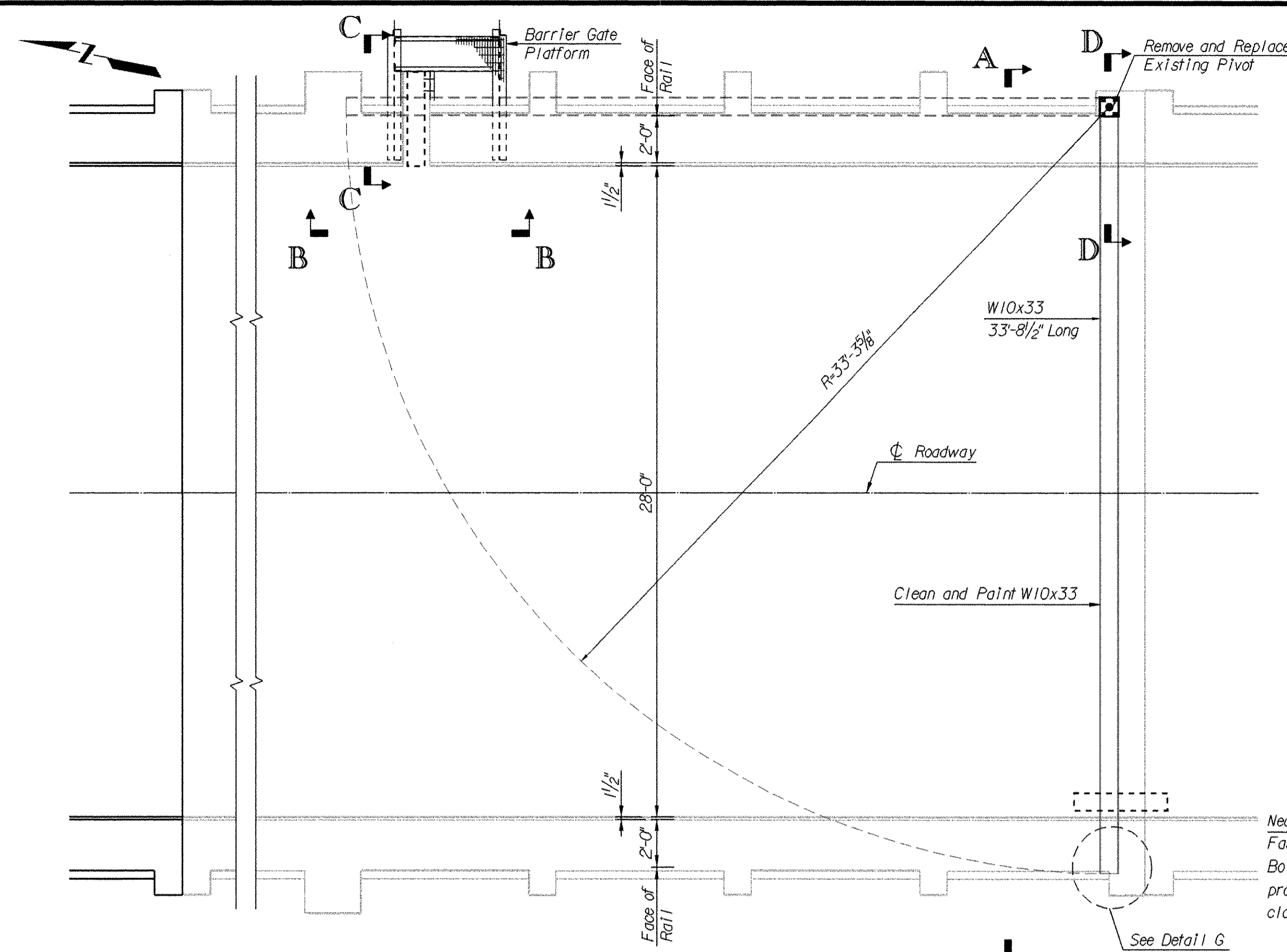


SECTION C-C
1" = 1'-0"

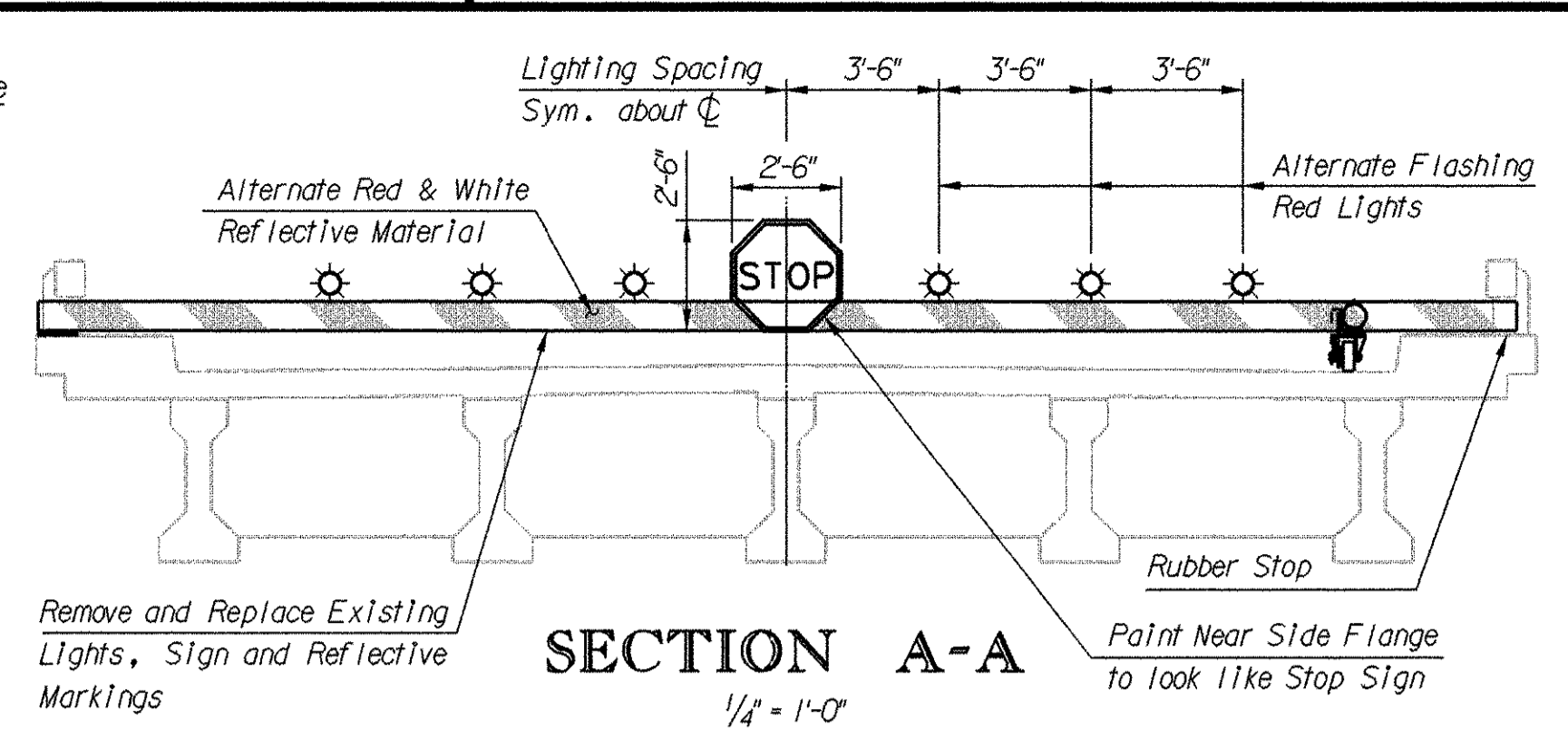
REV.						HNTB ARCHITECTS ENGINEERS PLANNERS The HNTB Companies SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C. LADY'S ISLAND TRAFFIC CONTROL EQUIPMENT
REV.						
REV.						
REVISED						
QUAN.	EK	SN	2-97			
DR.	RM	SN	2-97			
DES.	SN	EK	2-97			
BY	CHK.	DATE				
FILE NO.	ROUTE	COUNTY	DRAWING NO.			
	US-21	BEAUFORT	M-11			

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	41	115

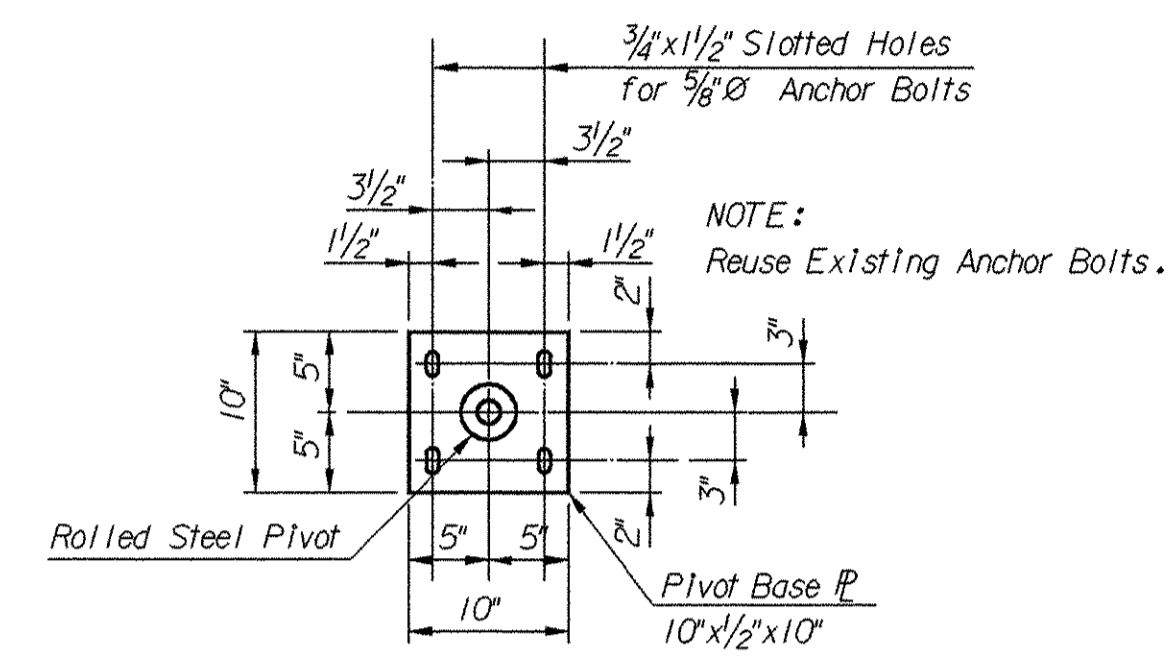
QUANTITIES		
I T E M	UNIT	CONTRACT QUANTITY
Rehabilitation to Existing Barrier Gates	L.S.	Lump Sum
Barrier Gate Platform	L.S.	Lump Sum



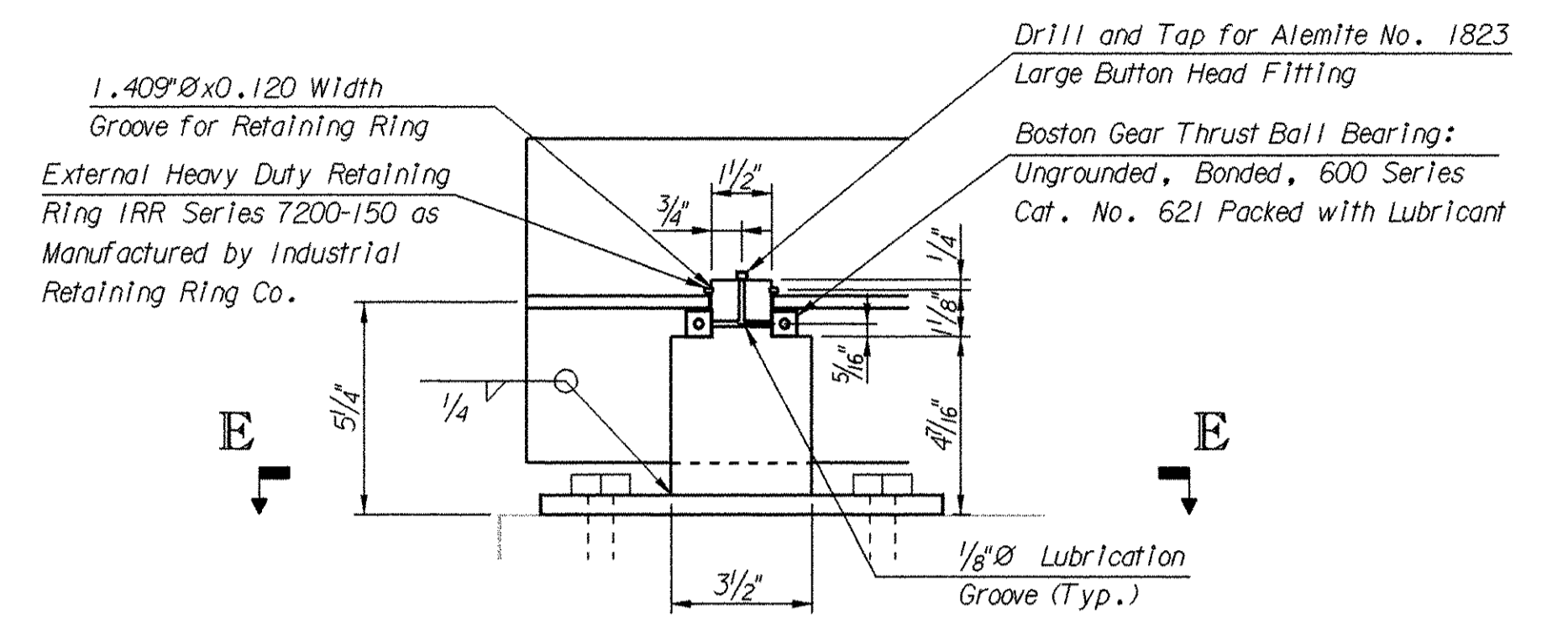
PLAN
North Barrier Gate Shown
South Barrier Gate Similar and Opposite
see Drawing No. M-11 for Location
3/8" = 1'-0"



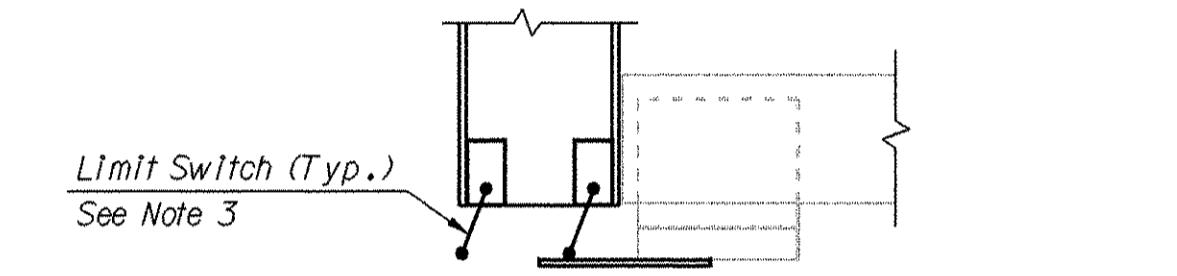
SECTION A-A
1/4" = 1'-0"



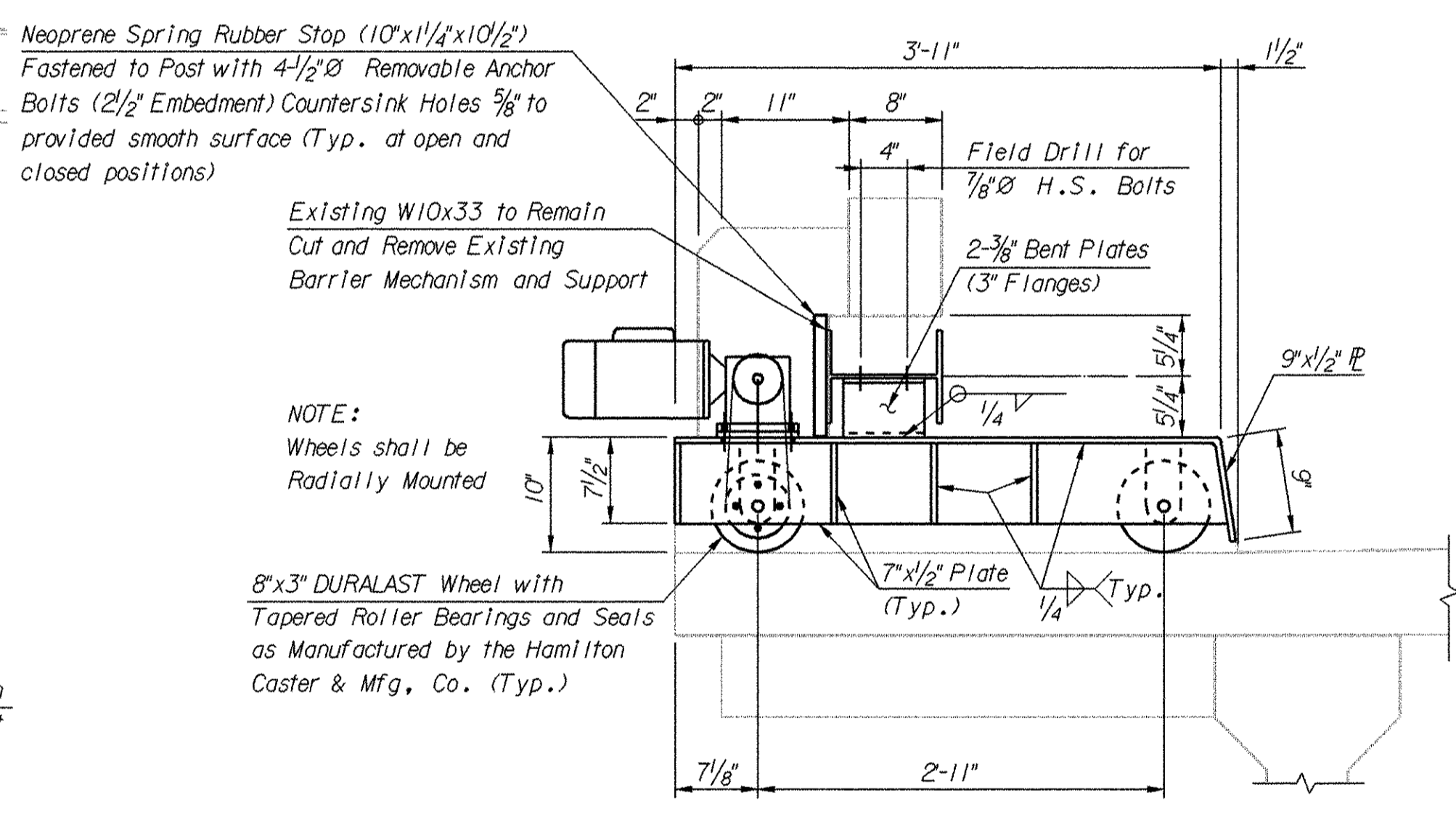
SECTION E-E
1" = 1'-0"



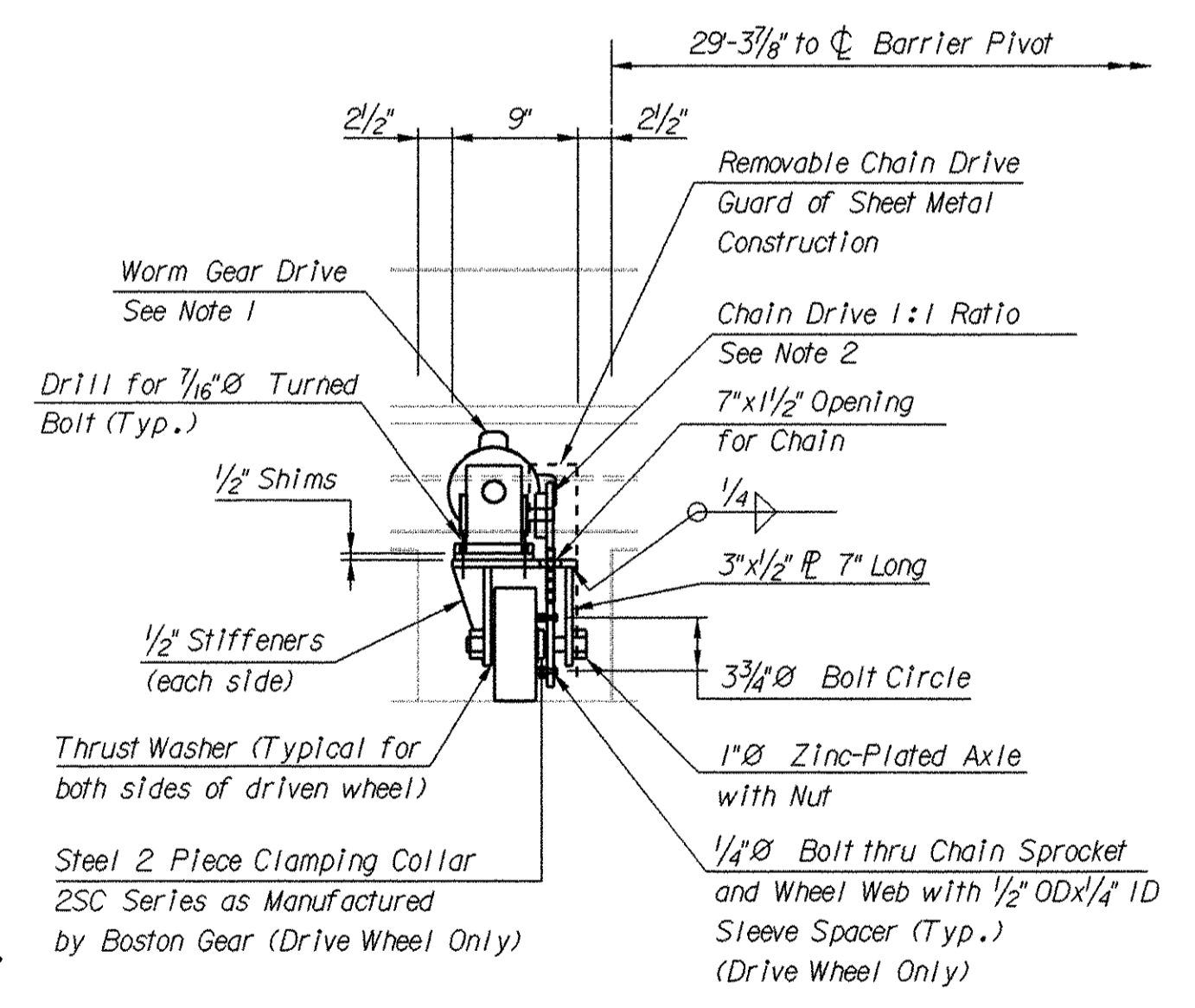
SECTION D-D
3" = 1'-0"



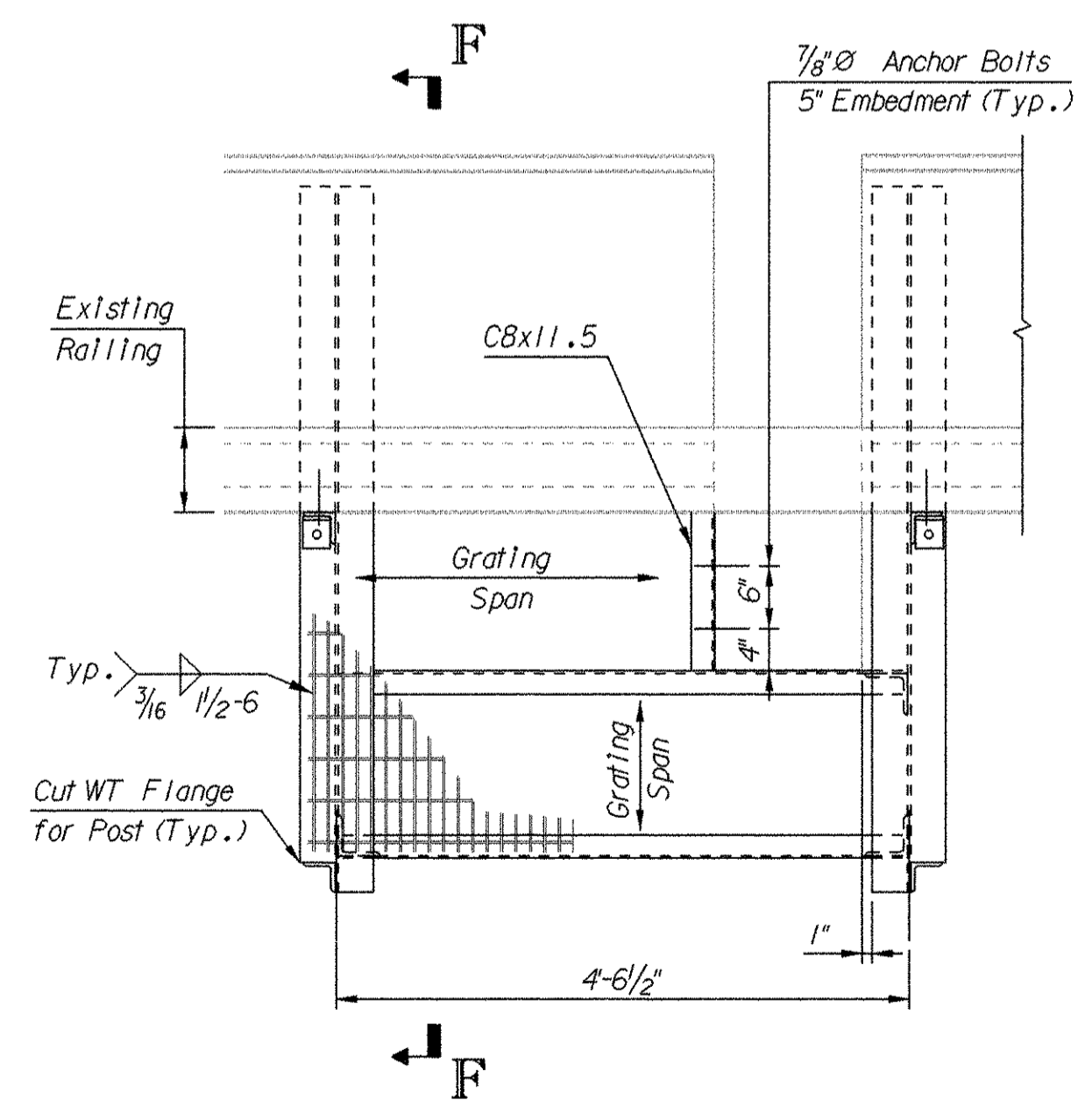
DETAIL G
1" = 1'-0"



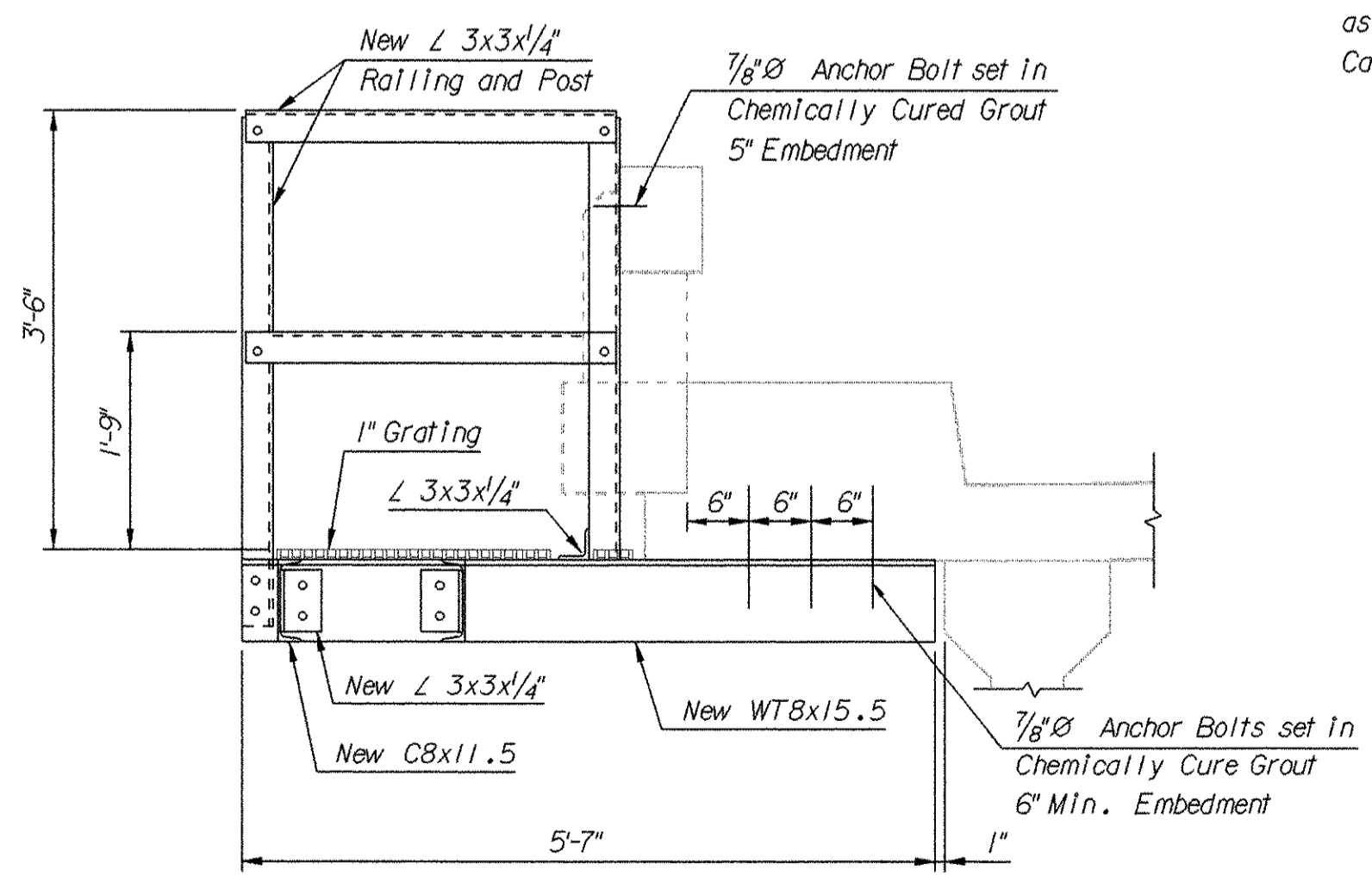
SECTION C-C
1" = 1'-0"



ELEVATION B-B
1" = 1'-0"



PARTIAL PLAN AT BARRIER BRACKET
(Railing not Shown for Clarity)
3/4" = 1'-0"



SECTION F-F
3/4" = 1'-0"

NOTES

- 1/2 HP A.C. Motor, totally enclosed non-ventilated 1750 rpm with integral disc brake. Brake set at 1.5 lbs.-ft. Baldor Motor FUTF-B (66223) 460V, 3-Phase, 60Hz as supplied by Boston Gear. Single Reduction Worm Gear Reducer F700 Series-Flanged Quill Type, Size 721, B position horizontal base, assembly type G, 30:1 ratio, rated output of 680 lbs.-in. at 58.3 output rpm as manufactured by Boston Gear.
- Barrier Chain Drive as manufactured by Boston Gear. Single width, Stainless Steel No. 60 Chain-3/4" Pitch (ANSI Standard).
No. 60-3/4" pitch Steel Drive Sprocket:
23 Teeth, 5.508 pitch diameter, Type B single hub, 1" bore with 1/4x1/4x1/4 key to suit worm gear drive output shaft.
No. 60-3/4" pitch Steel Driven Sprocket:
23 Teeth, 5.508 pitch diameter, Type A no hub, 1 1/4" bore.
- Contractor to provide all necessary Hardware and Strike Plates to shim and align Limit Switches for proper operation and stopping of Gate.
- All Work shown on this drawing to be included in Pay Item "Rehabilitation to Existing Barrier Gates" unless otherwise noted. Cost to furnish and install barrier gate platform to be included in Pay Item "Barrier Gate Platform". Cost to furnish and install gate limit switches, conduits and wiring to be included under Section 610 Bridge Electrical Work.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
LADY'S ISLAND
BARRIER GATE REPAIRS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	EK	SN	2-97
DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

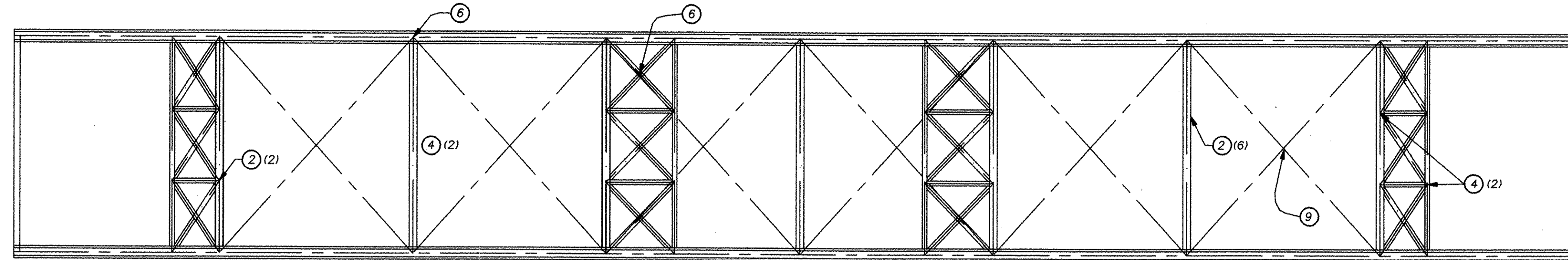
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-12

Design: E. Williams
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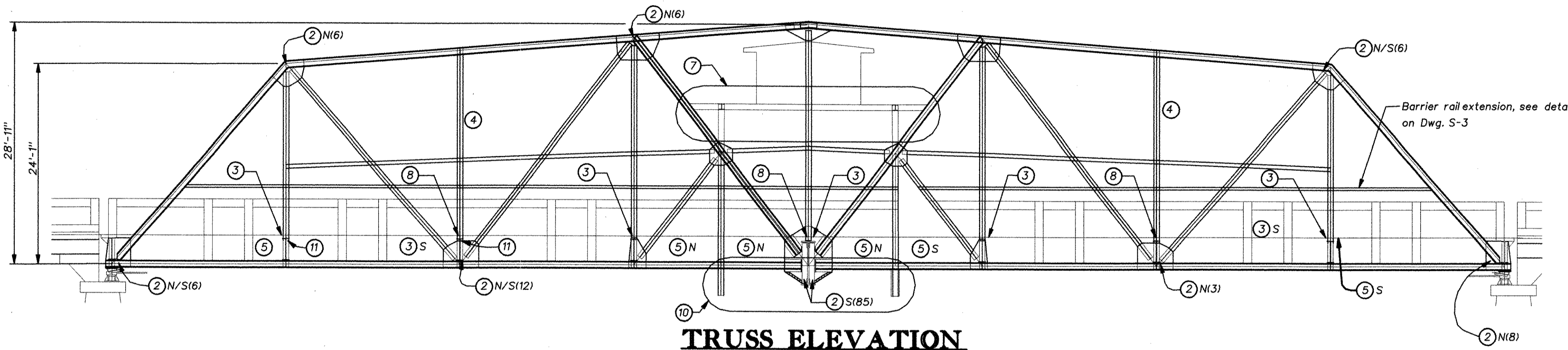
GENERAL STRUCTURAL NOTES:

- Codes: (use latest edition)
 - Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings (AISC), unless otherwise shown or specified.
 - American Welding Society standards and specifications.
- Live Loads:

Wind	50psf
Floors	100psf
Stairs and Walkways	85psf
- Structural Steel:
 - Structural steel shall conform to ASTM A36.
 - All bolts shall be ASTM A325 7/8" diameter unless noted otherwise.
 - Rolled steel sections shall be assembled with mill camber up.
- Concrete:
 - All concrete shall have minimum compressive strength at 28 days of 3000psi.
 - The surface of all slabs shall receive a light broom finish.
- Reinforcing Steel:
 - All reinforcing steel to be ASTM A615, Grade 60.
 - Unless shown otherwise, the clear cover for reinforcing bars shall be:
 - Control house slab: 1 1/2".
 - All other slabs: 1 1/2".
- Contractor shall verify all dimensions before beginning work. Check Mechanical and Electrical drawings for conduit, pipe sleeves, etc. to be imbedded in concrete, as well as openings in structure for mechanical and electrical installations.
- Provide adequate shoring or bracing of existing structures and new structures during construction to resist all required forces such as dead loads, live loads, construction loads, wind and unbalanced loading. Provide temporary enclosures to protect the general public, the Engineer, Owner and the Contractors personnel from hazards during the construction work.
- All shop drawings shall be prepared under the direct supervision of a Professional Engineer registered in the state of South Carolina and all shop drawings submitted shall bear his seal.
- Rivet removal and replacement shall be done one at a time except for secondary gusset plate and lattice bar replacement. For details, see Typical Structural Details sheet.

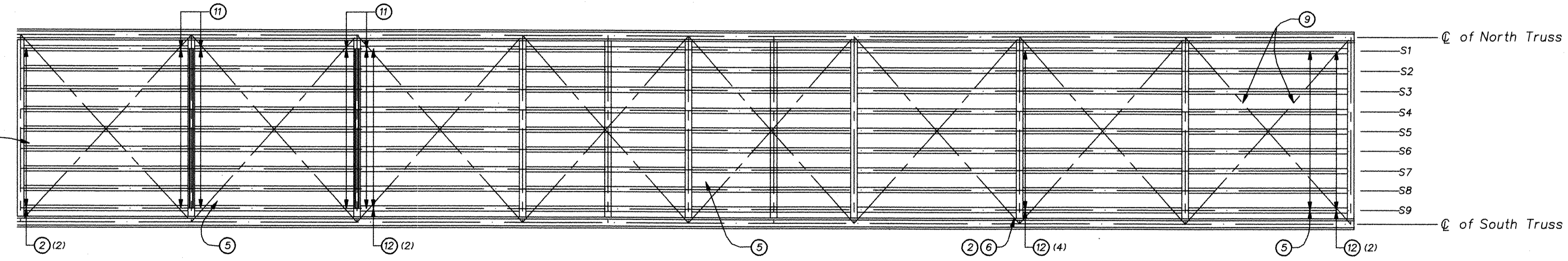


PLAN - TOP OF TRUSS



TRUSS ELEVATION

① All Structural Steel



PLAN - BOTTOM OF TRUSS

- NOTES:**
- Sway Bracing repair shall consist of cleaning, painting, reinforcing, and 'jack-straightening' damaged members.
 - Diagonal, Gusset plate and stringer repair shall consist of cleaning, painting and reinforcing damaged areas. These repairs are to be paid under 'Bracing Reinforcement'.

LEGEND

- Item of work
- ①N (100) ← Number of bolts/rivets to be replaced (where applicable)
- ← North or South truss

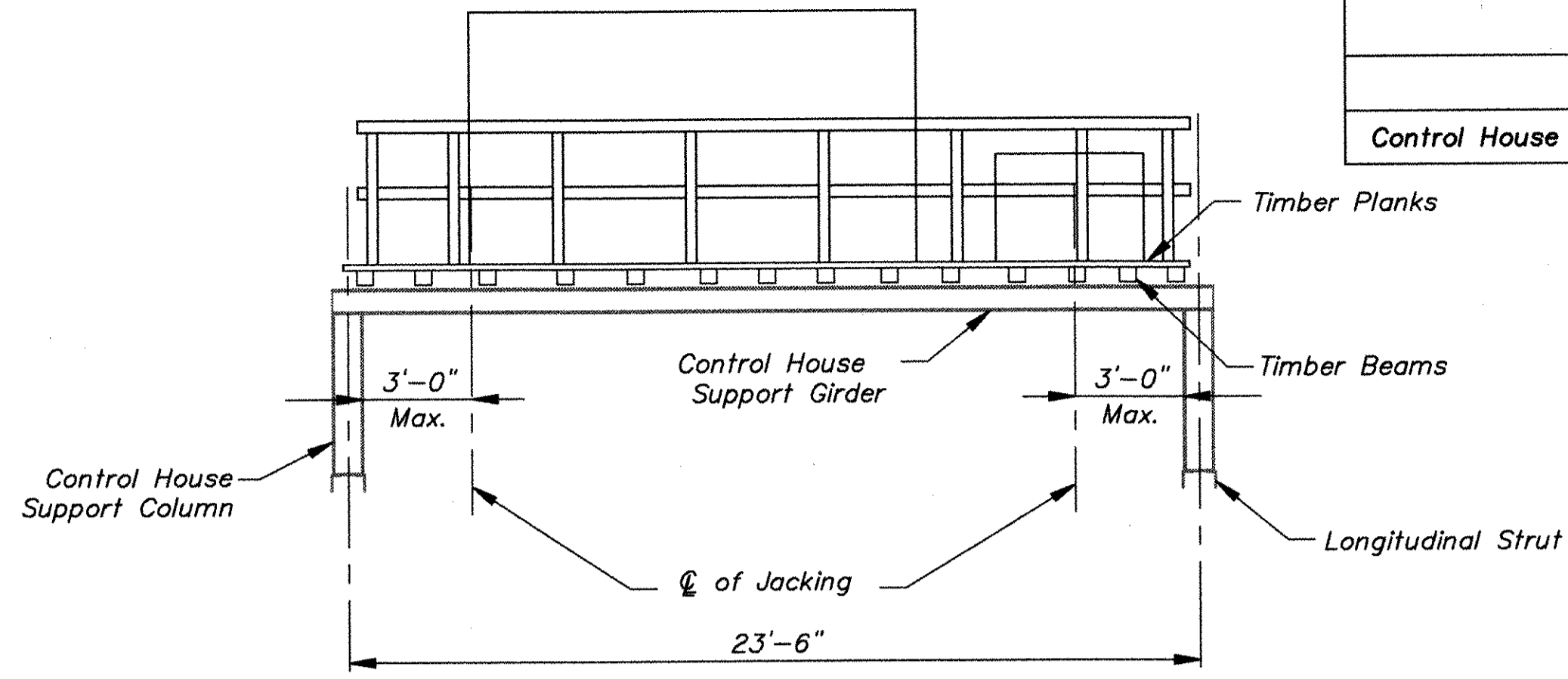
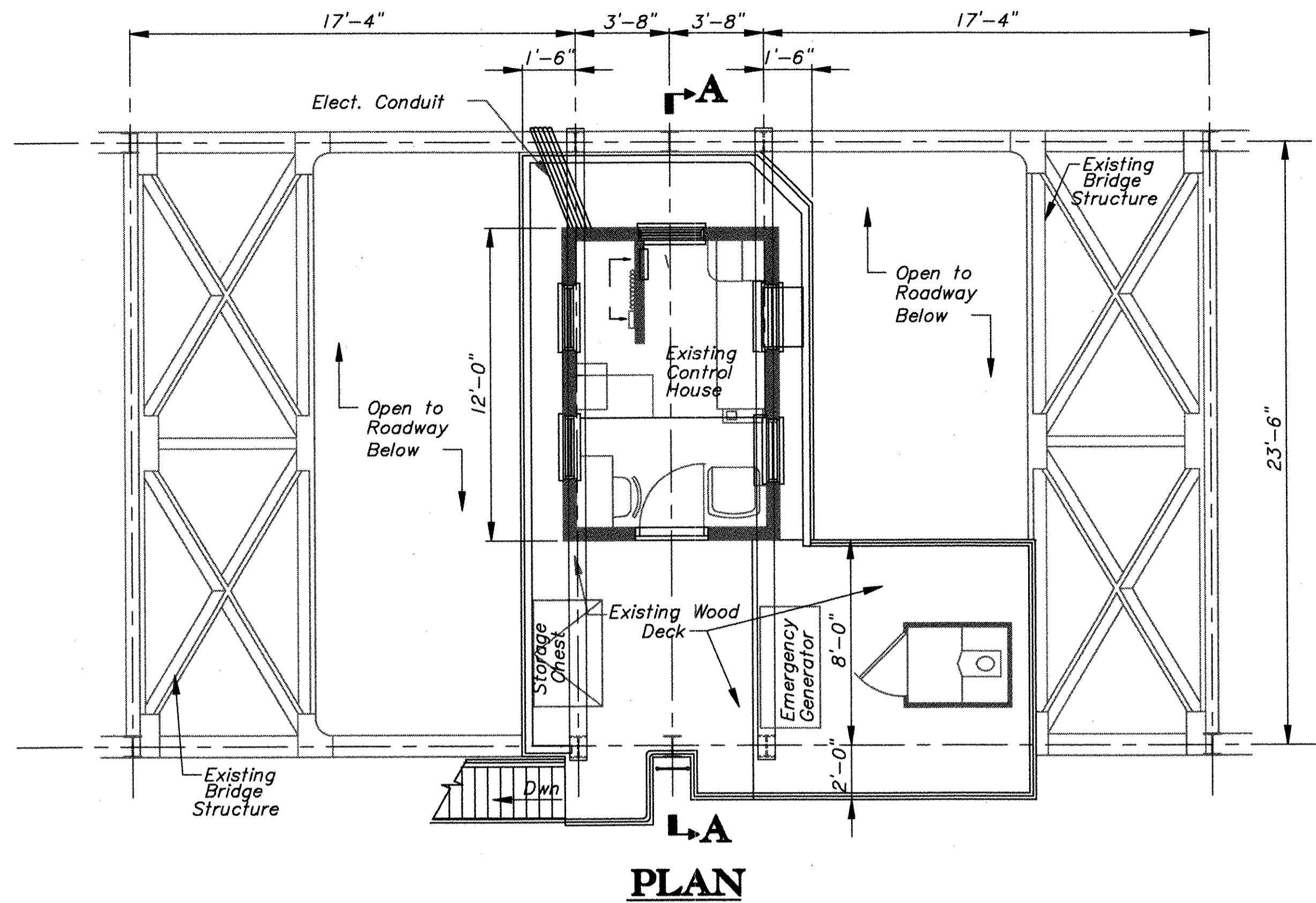
ITEMS OF WORK		
Work No.	Description (Quantities)	Pay Item No.
1	Clean (sandblast) and paint (27,000 SF)	710
2	Rivet/ bolt replacement (1,050)	709
3	Clean and seal deck cracks (300 LF)	822
4	Sway bracing repair (4 SF x4)	709
5	Concrete spall repair (30 SF)	702
6	Gusset plate repair/ replacement (x20 SF)	709
7	Control house support member removal	709
8	Joint cleaning and resealing (60 LF)	702
9	Diagonal repair/replacement (6 SF)	709
10	Machinery support replacement	709
11	Floor beam flange reinforcement (64 LF)	709
12	Stringer connection repair (36 SF)	709

Items of work locate the primary tasks for the Structural repairs only. For items of work details, see Typical Structural Details sheet.

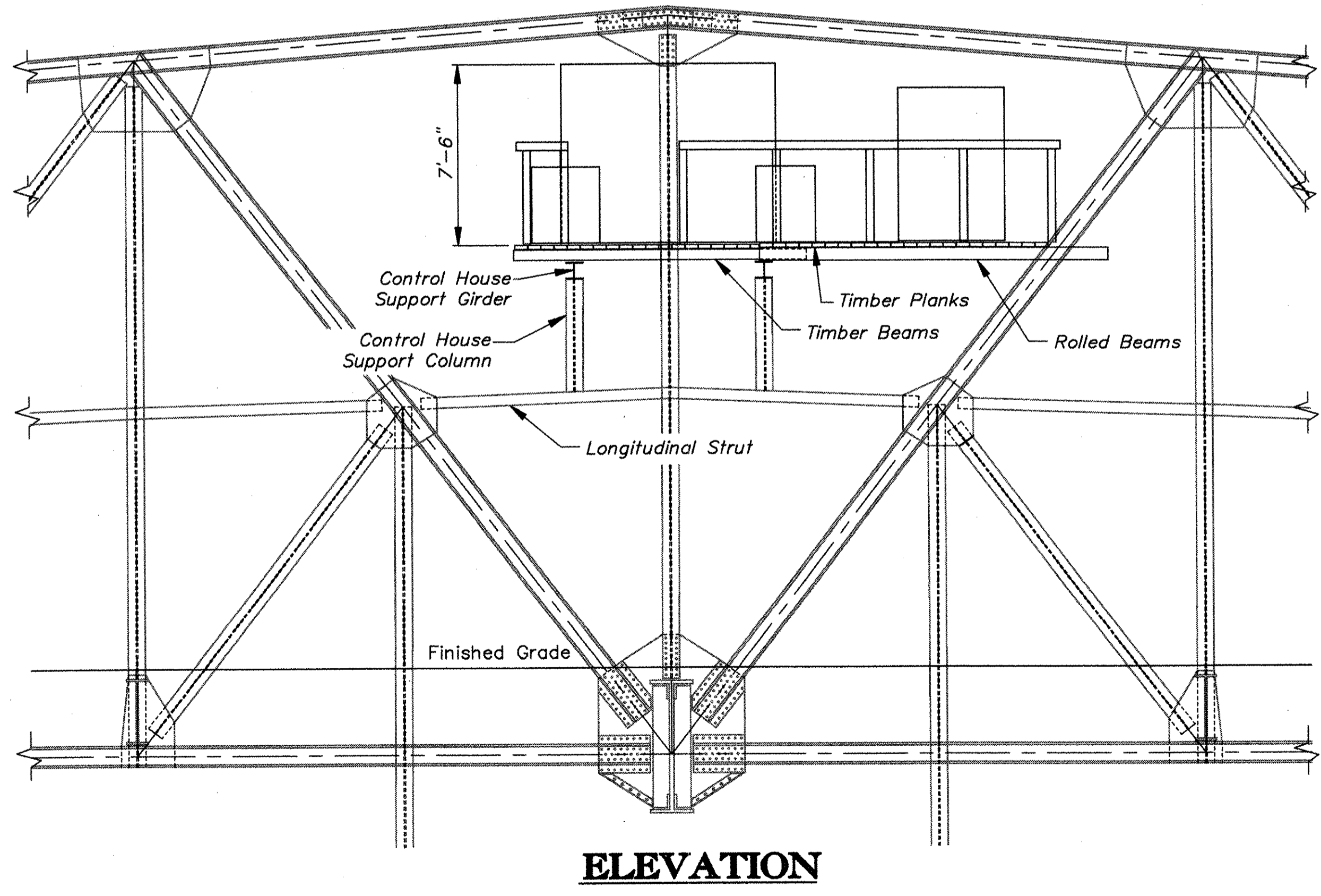
HNTB ARCHITECTS ENGINEERS PLANNERS <small>The HNTB Companies</small>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C. HARBOR RIVER			
LOCATION OF STRUCTURAL WORK			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	LDP	BAM	2-97
DR.	LDP	BAM	2-97
DES.	LDP	BAM	2-97
BY	CHK.	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-21

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	S.C.	BEAUFORT		U.S. 21	44	116

QUANTITIES		
ITEM	UNIT	CONTRACT QUANTITY
Control House Demolition (3,370 Lbs.)	L.S.	L.S.



SECTION A-A
(PARTIAL SECTION)



ELEVATION

SEQUENCE OF REMOVAL NOTES:

1. Coordinate this sequencing with Mechanical and Electrical Notes.
 - a) Close eastbound lane.
 - b) Remove existing electrical toilet and emergency generator or relocate them within the area supported by the control house support girders.
 - c) Remove existing rolled beams and timber planks supporting the previously relocated electrical toilet and emergency generator.
 - d) Temporary relocate electrical bridge system as needed.
 - e) Detach all components of the control house from the main bridge members. Remove platform deck, rails and secondary deck supports. The control house at this point shall be supported by the control house girders only.
 - f) Close vehicular traffic from both directions.
 - g) Position low platform dolly under the existing control house.
 - i) A jacking system shall be installed to bear up against the bottom of the control house support girders. At a minimum there should be four contact areas supporting the two main control house support girders, (One at each end of the two control house support girders.) The point of contact on the control house support girders shall be a maximum of 3' from the interior face of the control house support column (See Section A-A)
 - j) Once the jacking system is in place, torch cut the ends of the control house support girders.
 - k) When the control house is completely detached from the bridge, lower the jacks slowly to bring down the control house (The Contractor shall verify that the control house resting on the top of the jacking system when it is completely lowered, is able to clear the 15'-0" minimum clearance of the bridge).
 - l) Remove the control house from bridge site.
 - m) Remove the remainder of the control house support beams and the support columns.
2. The cost for the removal of the control house support framing is to be included with "New Control House Support and Platform".

For dimensions and demolition of existing control house, see Dwg. No. A-3.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

REMOVAL OF EXISTING CONTROL HOUSE FRAMING

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.	TQT	LDP	2-97
DES.			
BY	CHK	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	S-22

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	S.C.	BEAUFORT		U.S. 21	46	116

QUANTITIES

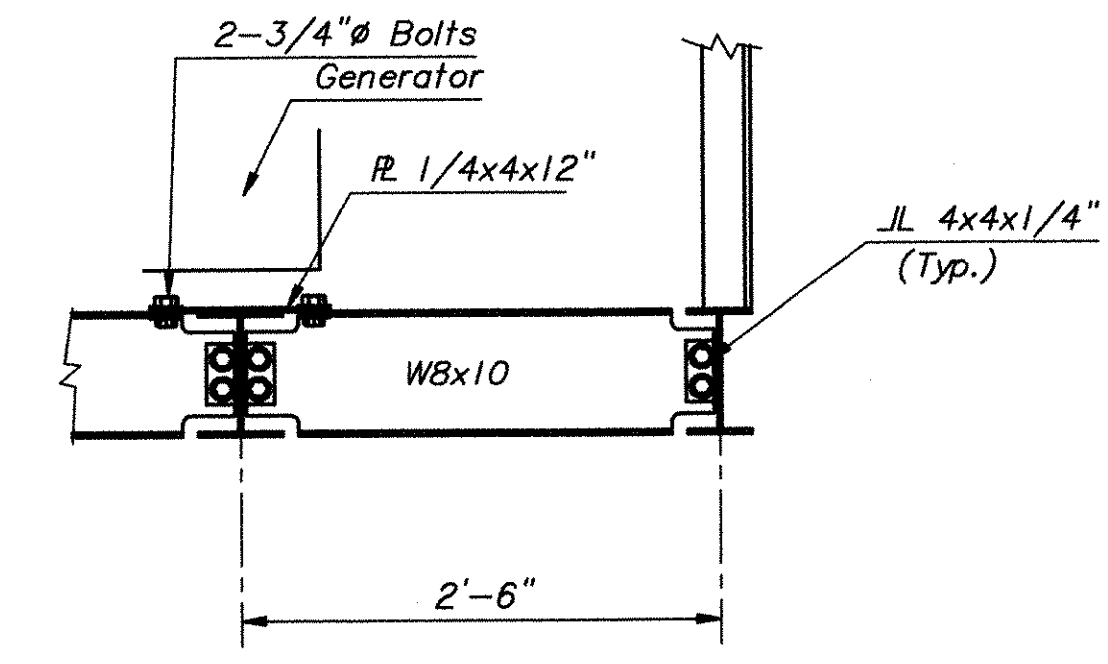
ITEM	UNIT	CONTRACT QUANTITY
Control House Framing (17,456 Lbs.)	L.S.	L.S.

The hatched portion of the proposed girder and the control house slab with its electrical equipments shall be fabricated offsite, transported to site and installed as two units.
1" Grating with 1/8" Plate, connect supports with counter sunk bolts, (Typ.)

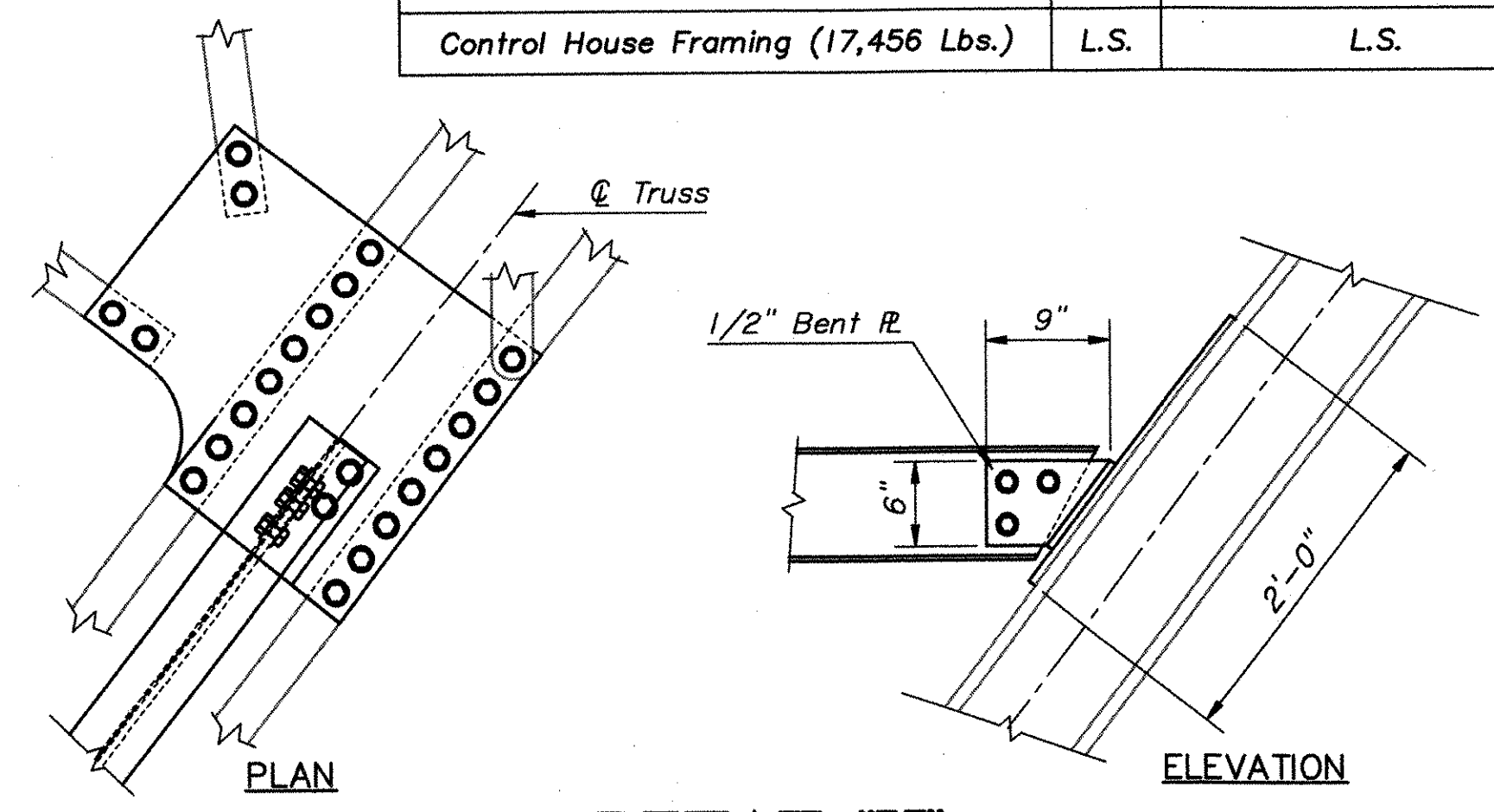
Emergency Generator, 2'-9" Wx8'-1 1/4" Lx 4'-0" H, location is critical DO NOT relocate without The Engineers approval. For details see Electrical Drawings.

LOCATION	LOAD (KIPS)
1	1.2
2	3.3
3	10.1
4	14.2
5	15.2
6	2.4
7	1.3
8	4.2
9	1.0
10	3.6
11	22.1
12	23.6
13	38.2
14	5.0
15	23.6
16	38.2
17	5.0

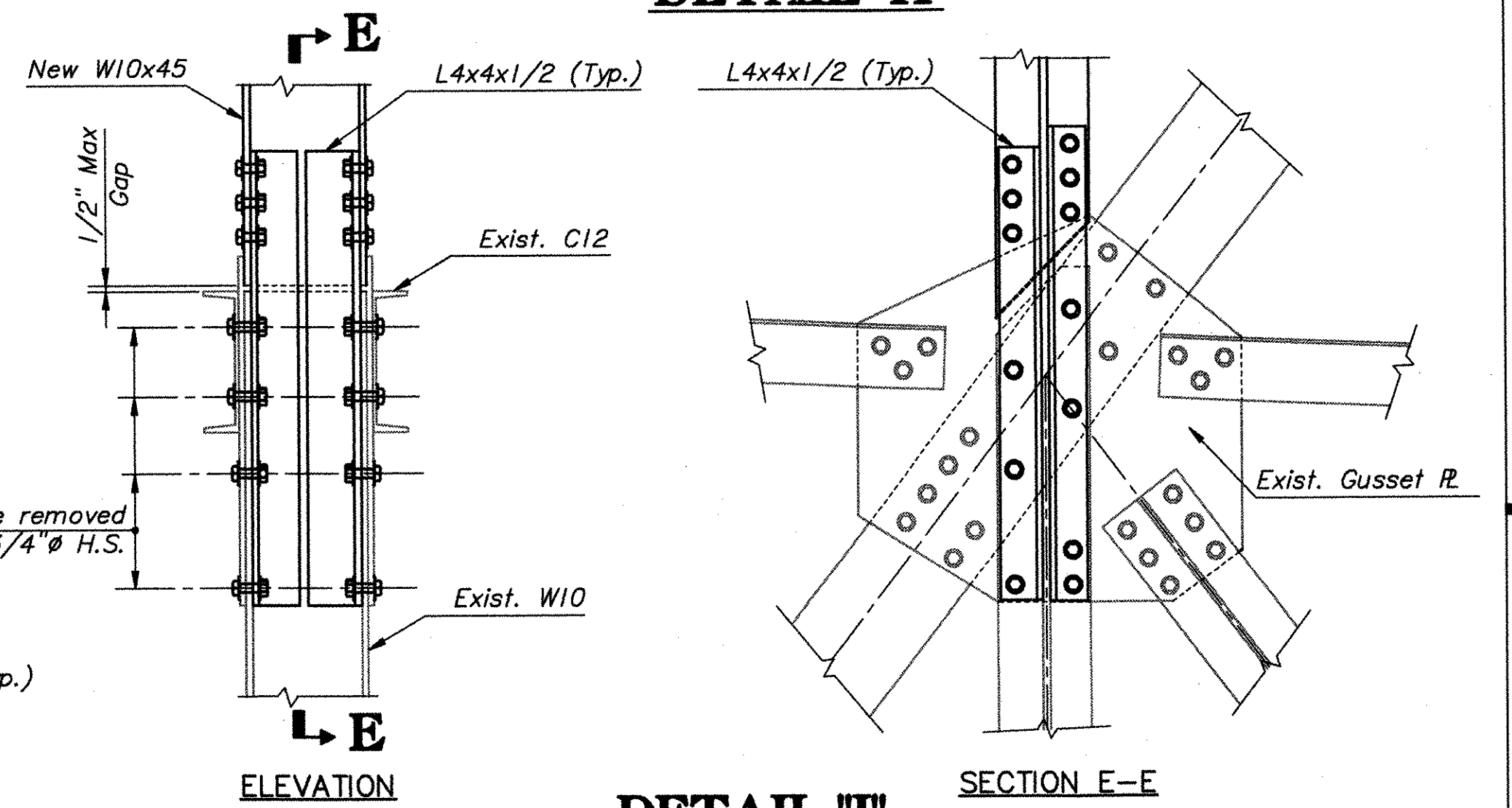
① - Beam Reaction Indicator



SECTION D-D



DETAIL "H"



NOTES:

- The following Construction sequence shall be coordinated with the Mechanical and Electrical Notes:
 - The control house framing shall be partially assembled off-site in two units.
 - The two pre-fabricated control house units shall be assembled, including the structural tube framing, and the complete Architectural shell, near the site on a low platform dolly.
 - Position low platform dolly under the new control house (The Contractor shall verify that the control house resting on top a jacking system when completely lowered is able to clear the 15'-0" minimum vertical clearance of the bridge).
 - The W10 splice beams and the W10 support beams shall be attached to the truss and temporarily supported.
 - Close vehicular traffic in both directions.
 - Transport the control house platform on to the bridge, then raise it and attach it to the splice plates.
 - Attach remaining secondary framing members, railing and decking.
- The field splice shall develop the full capacity of the section connected.
- On site assembly of the control house support shall be carefully planned to limit bridge closure time.
- For details of proposed control house, see Dwg. No. A-4.
- For additional railing notes, see Dwg. No. G-4.
- For Sections B-B, C-C & Details A thru G, see Dwg. No. S-6.
- For holes in steel sections, see Detail J, Dwg. No. S-6.

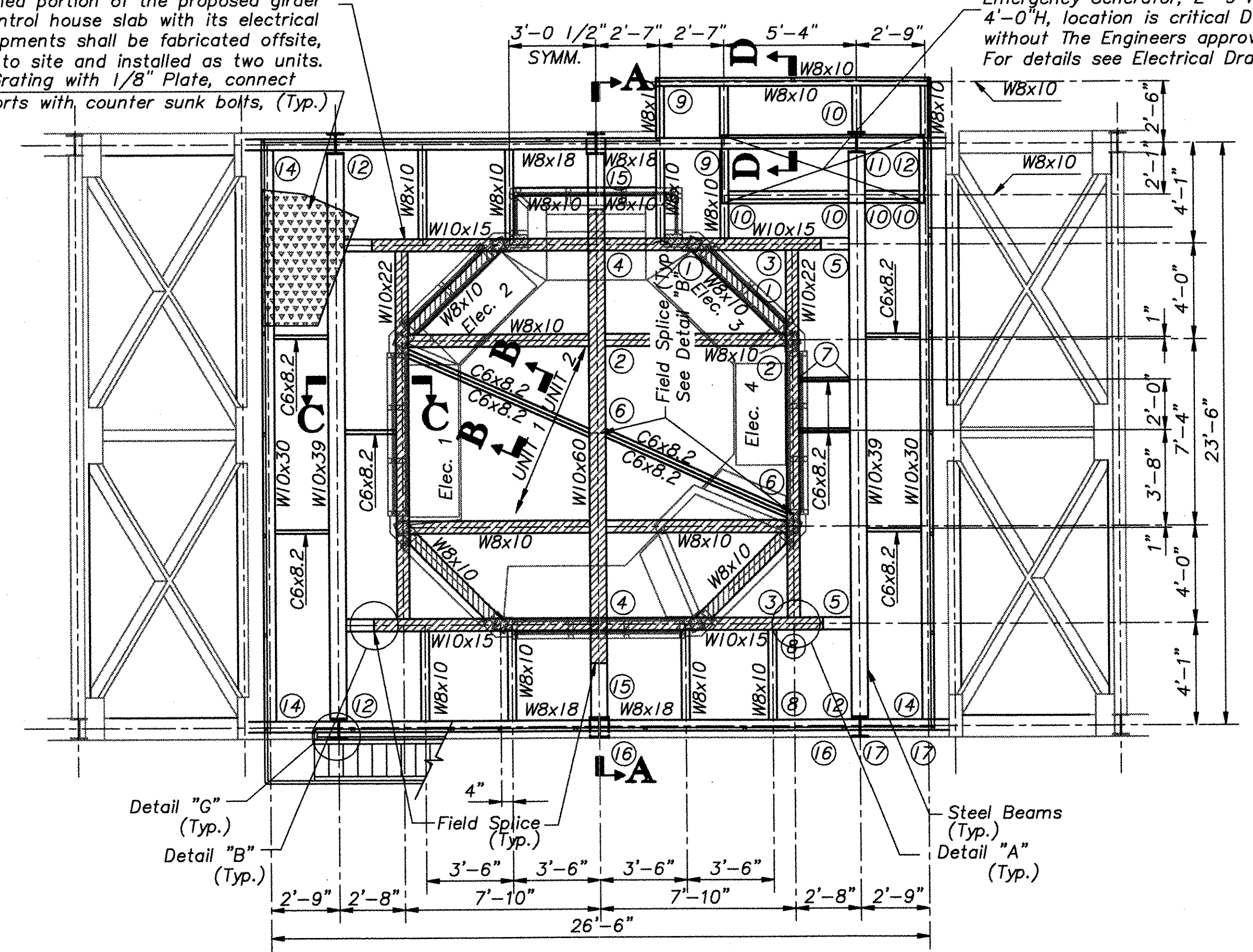
HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

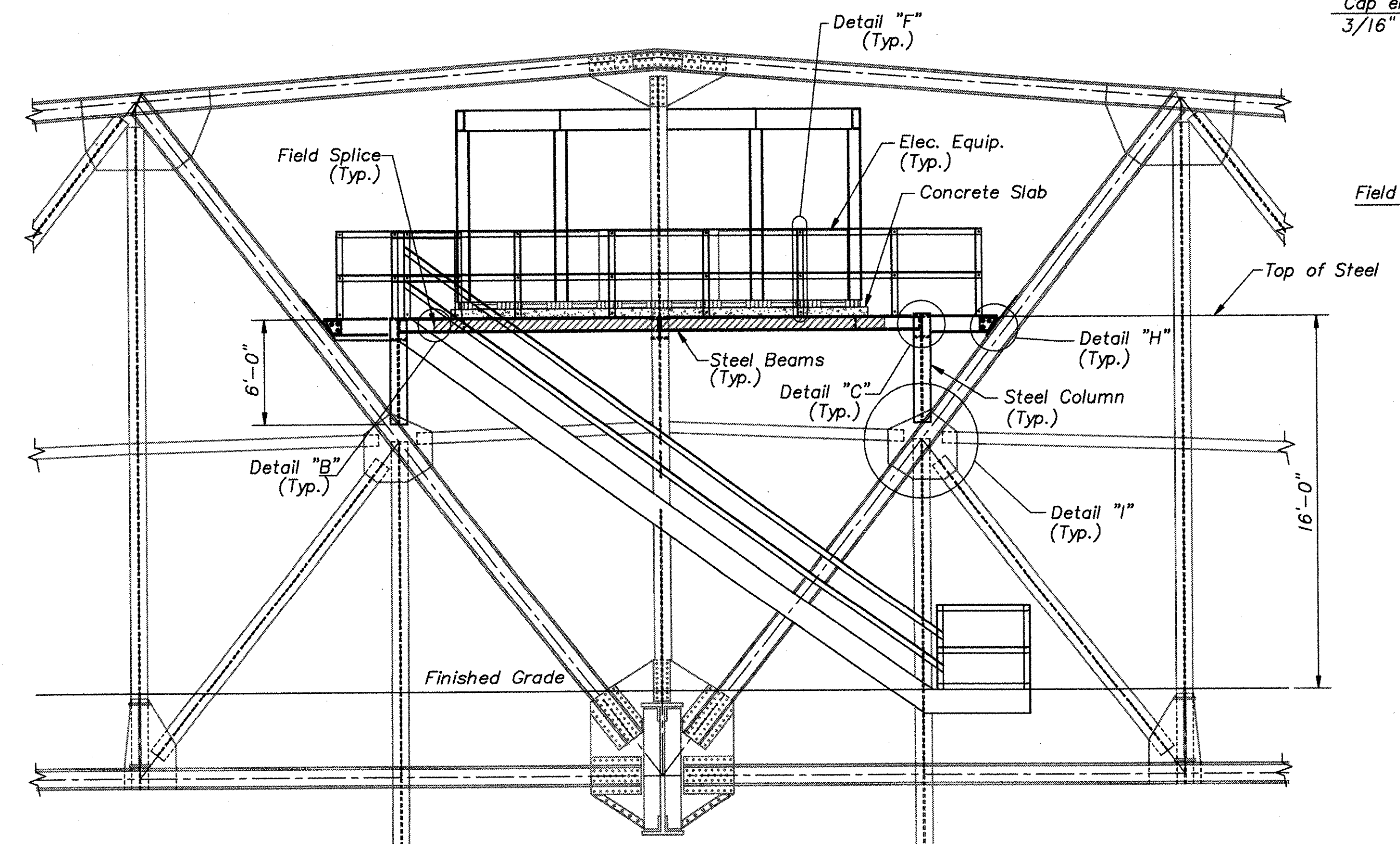
CONTROL HOUSE FRAMING

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	LDP	2-97	
DR.	TQT	LDP	2-97
DES.	TQT	LDP	2-97
BY	CHK.	DATE	

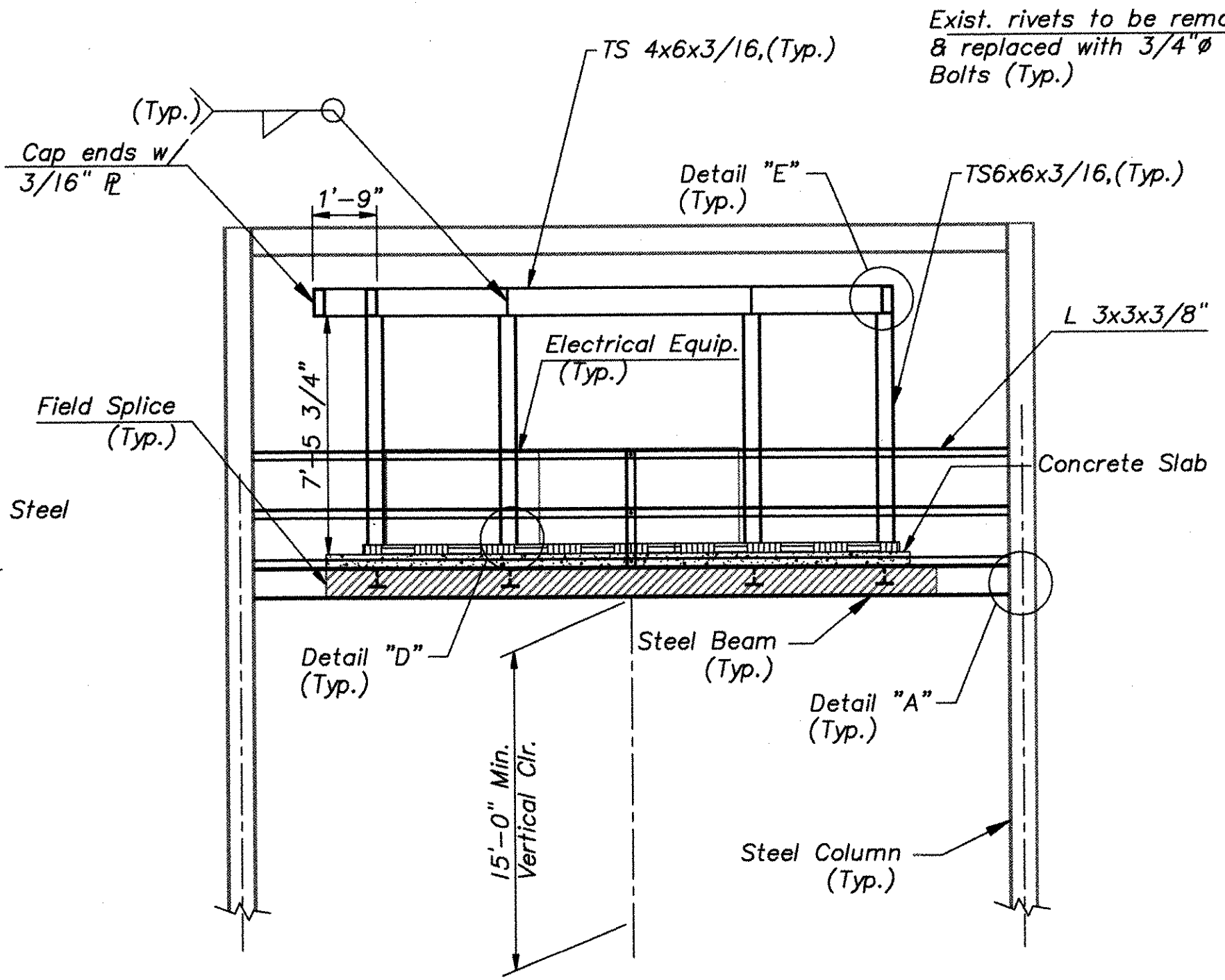
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	S-25



FRAMING PLAN



ELEVATION

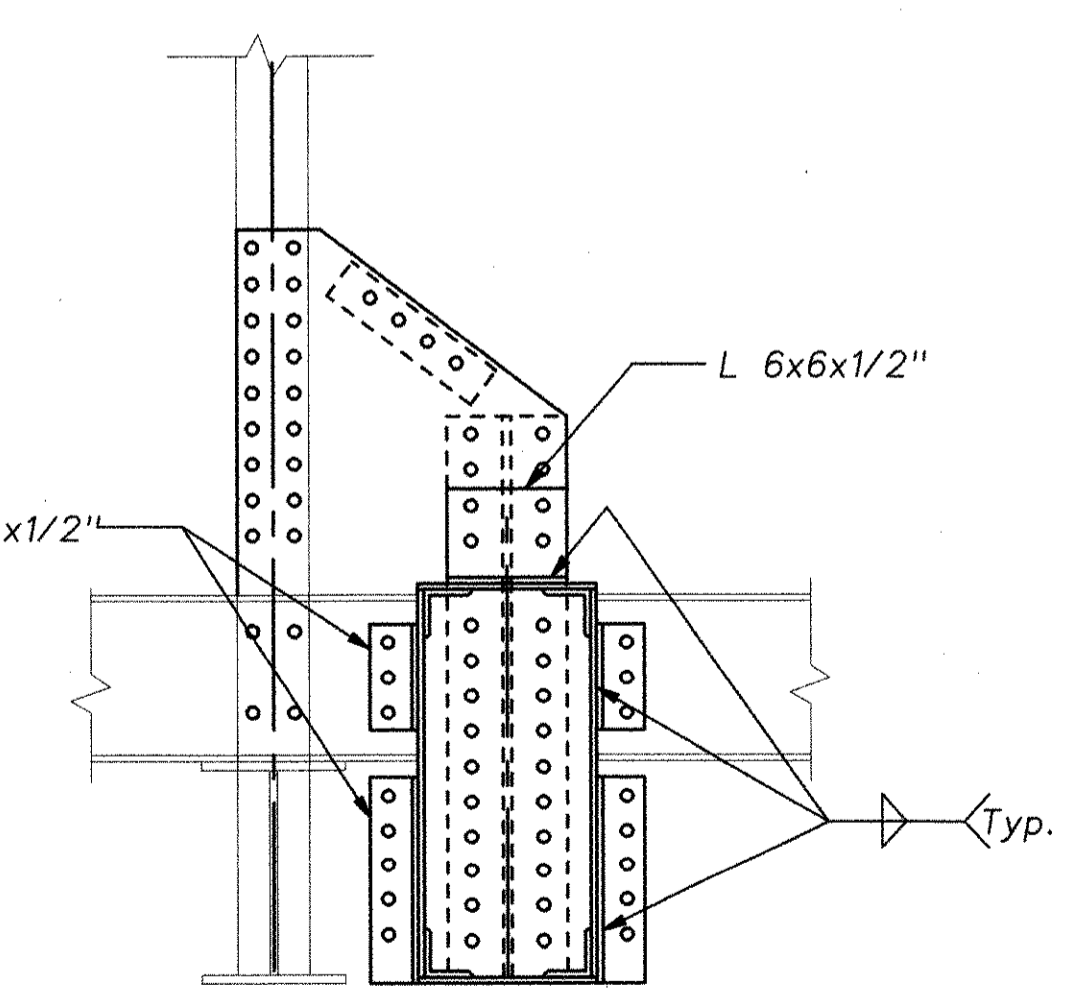
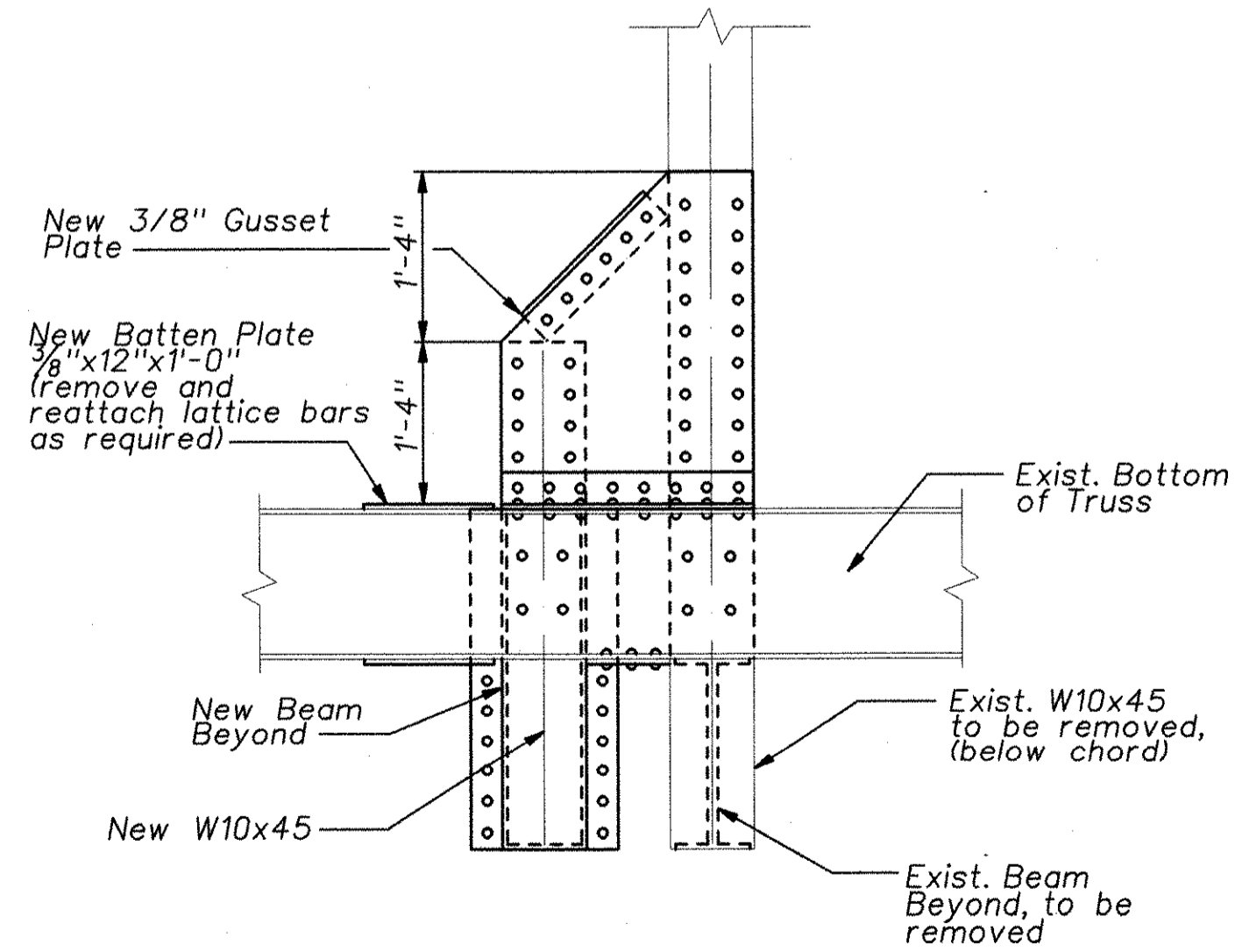
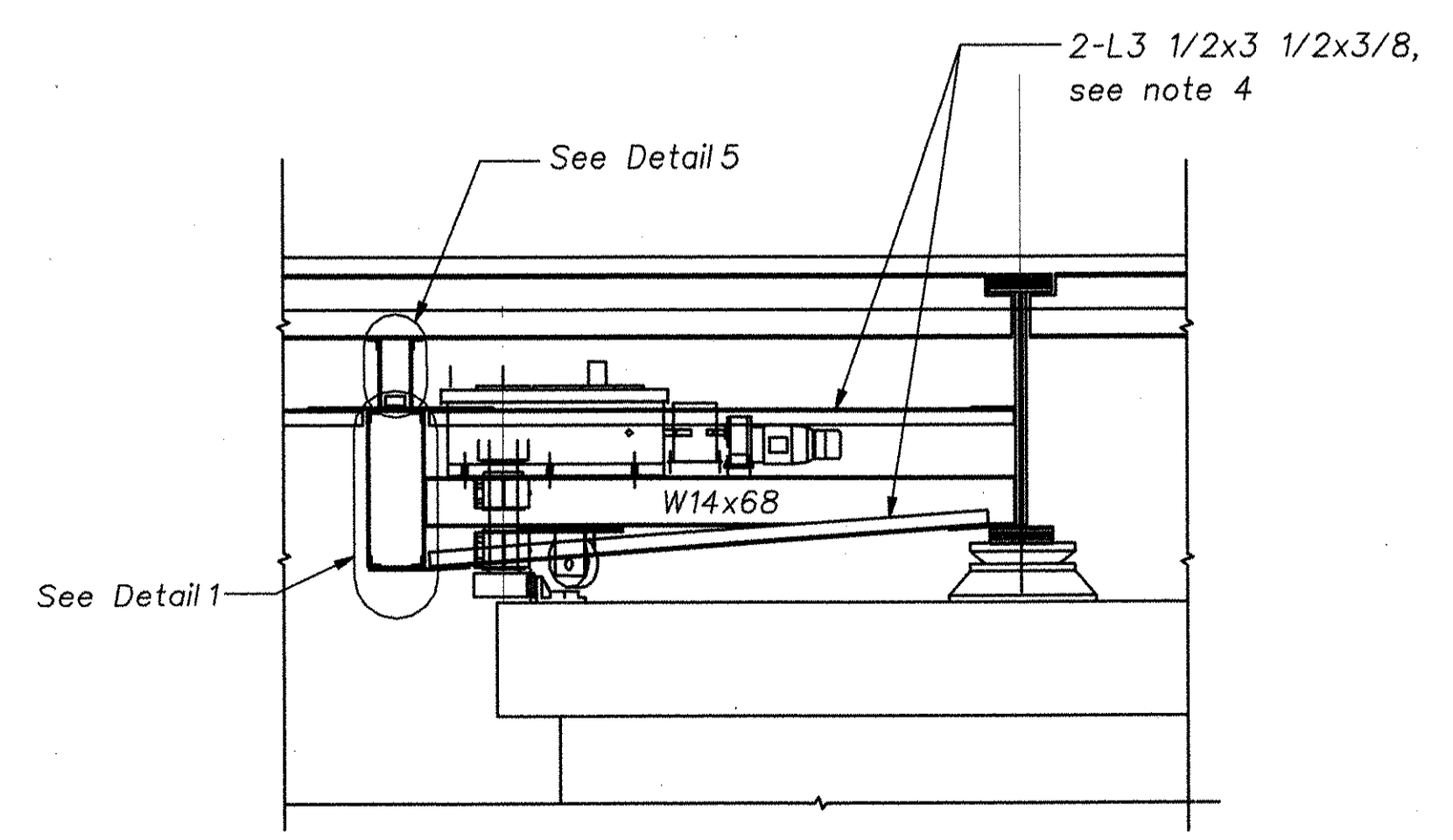
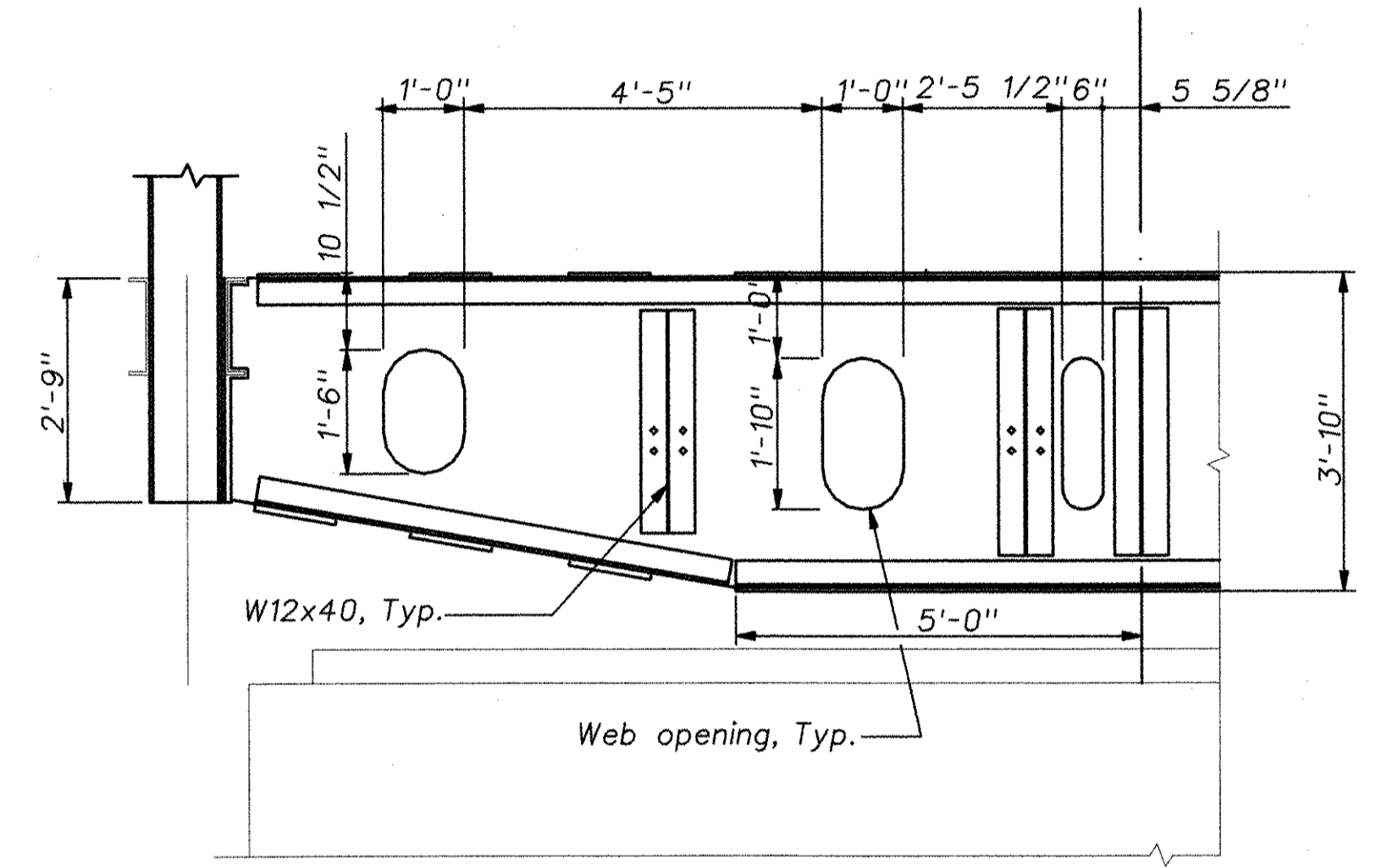
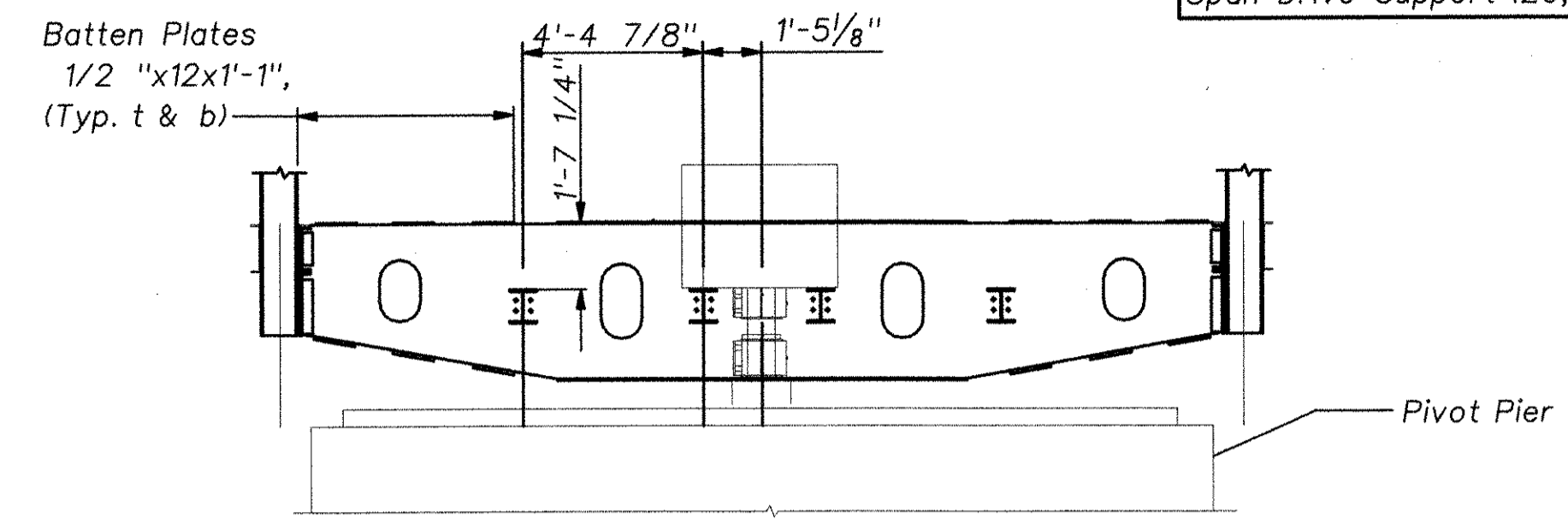
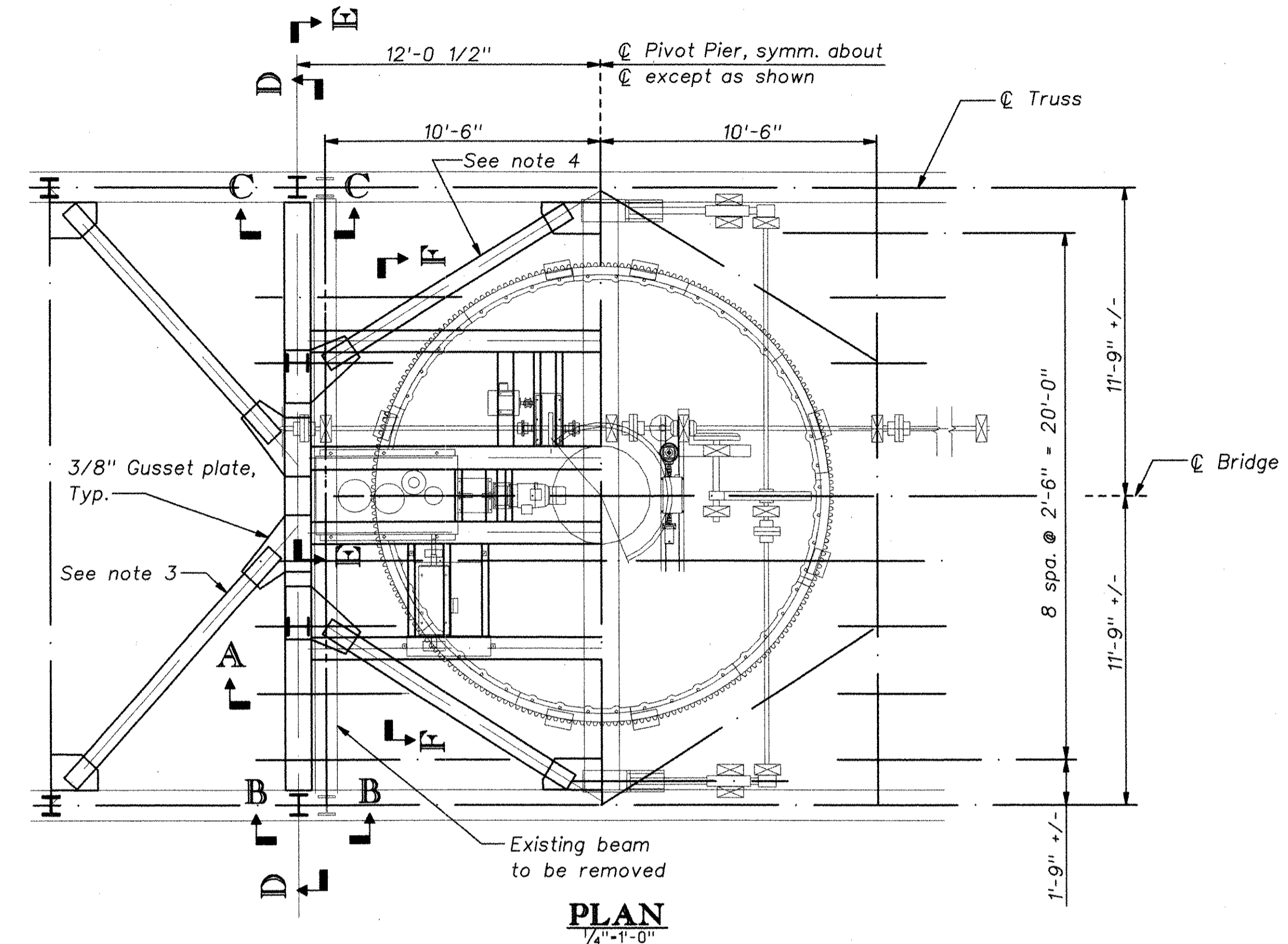


SECTION A-A
(Partial Section)

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	S.C.			US-21	46	115

QUANTITIES

ITEM	UNIT	QUANTITY
Span Drive Support (20,698 lbs.)	Lump Sum	Lump Sum



- Notes:
- The new rack pinion beam shall be placed prior to removal of the existing beam.
 - The contractor shall coordinate sequencing of structural, mechanical and electrical work to assure safe bridge operation during construction.
 - The existing exterior diagonal cross bracing shall be cut as required to be attached to the new rack pinion beam.
 - The interior leg of the diagonal cross bracing shall be removed and replaced as shown at the top and bottom of the box beam.
 - All areas where new members are connected to existing shall be cleaned and painted prior to connection.
 - Counter balance dead load shall be added to the swing span as necessary to assure safe bridge operation during construction.
 - For details 1 thru 5 and Section F-F, see Dwg. No. S-8.
 - For Mechanical details, see Dwg. No. M-15.
 - Only one balance wheel shall be removed at one time.

For additional notes, see Section B-B.

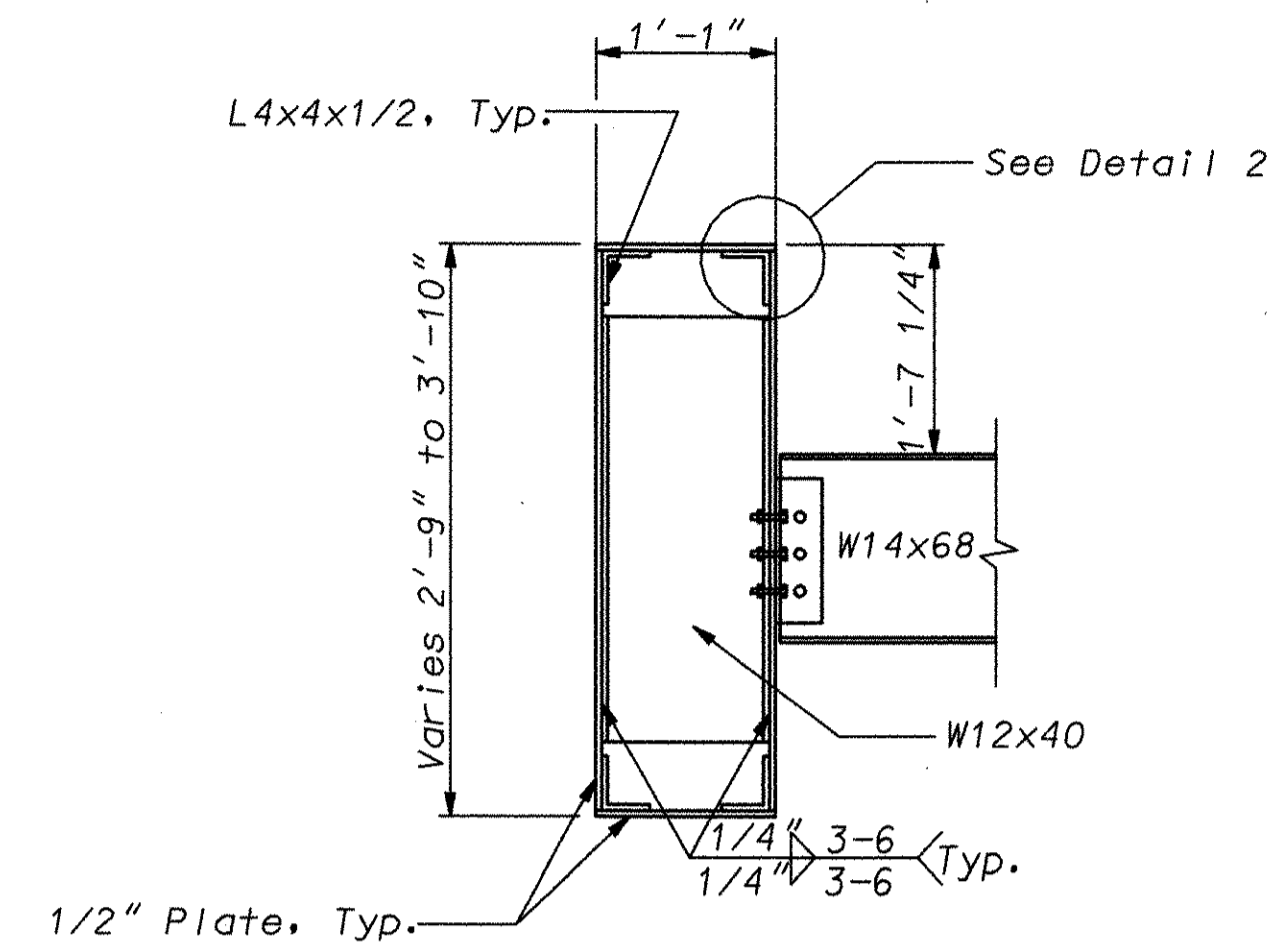
HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
HARBOR RIVER
NEW SPAN DRIVE SUPPORTS

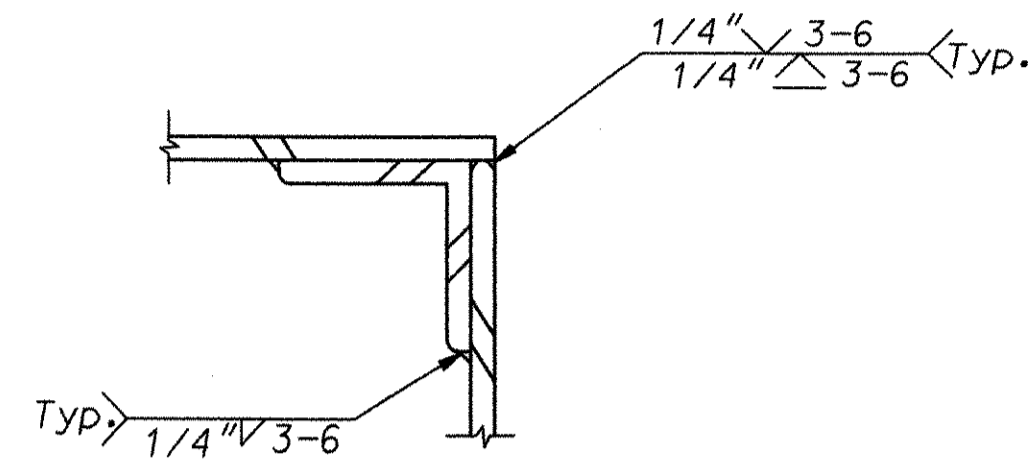
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REVIEWED			
QUAN.	LDP	BAM	2-97
DR.	LDP	BAM	2-97
DES.	LDP	BAM	2-97
BY	CHK	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-24

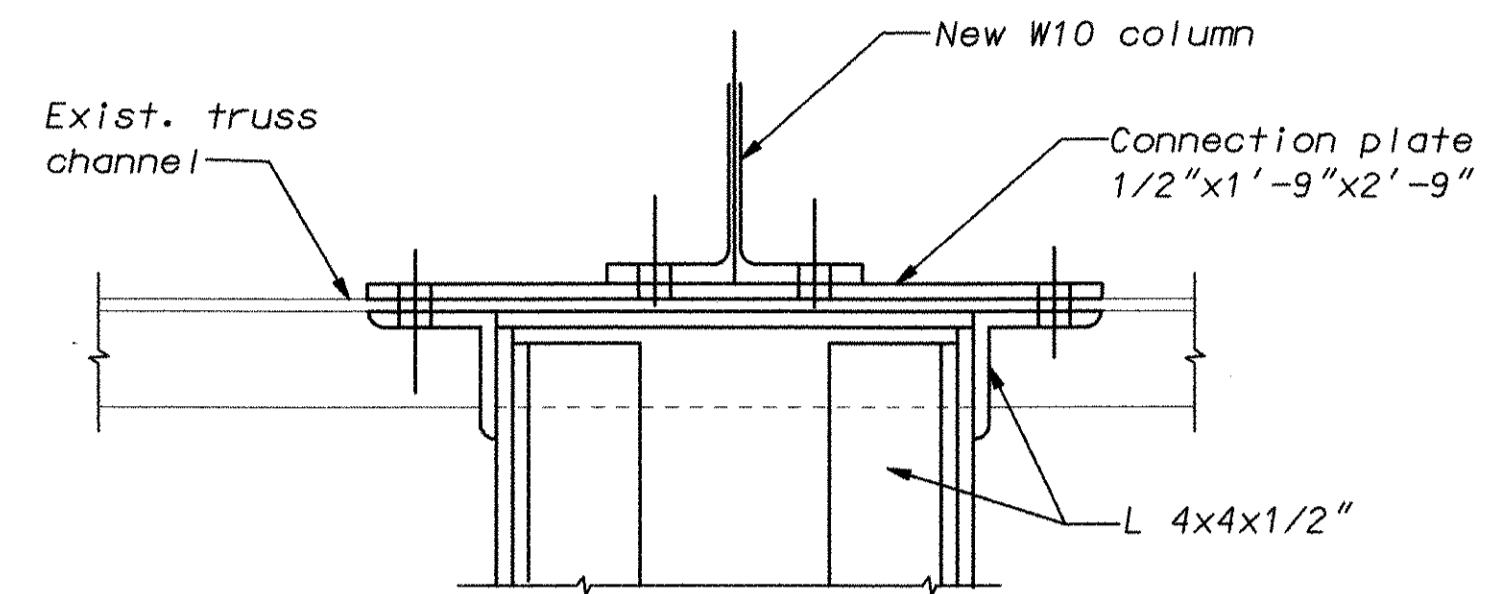
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	S.C.	BEAUFORT		US-21	47	115



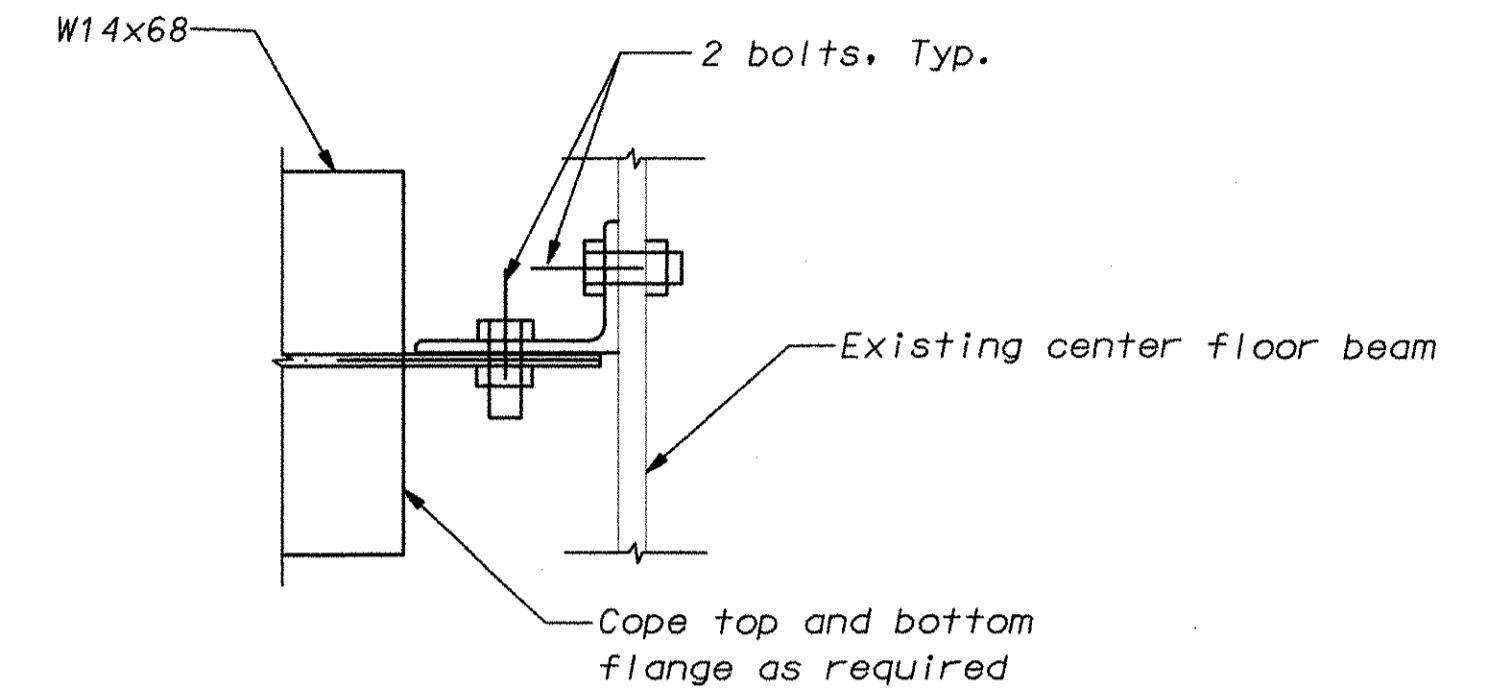
DETAIL 1



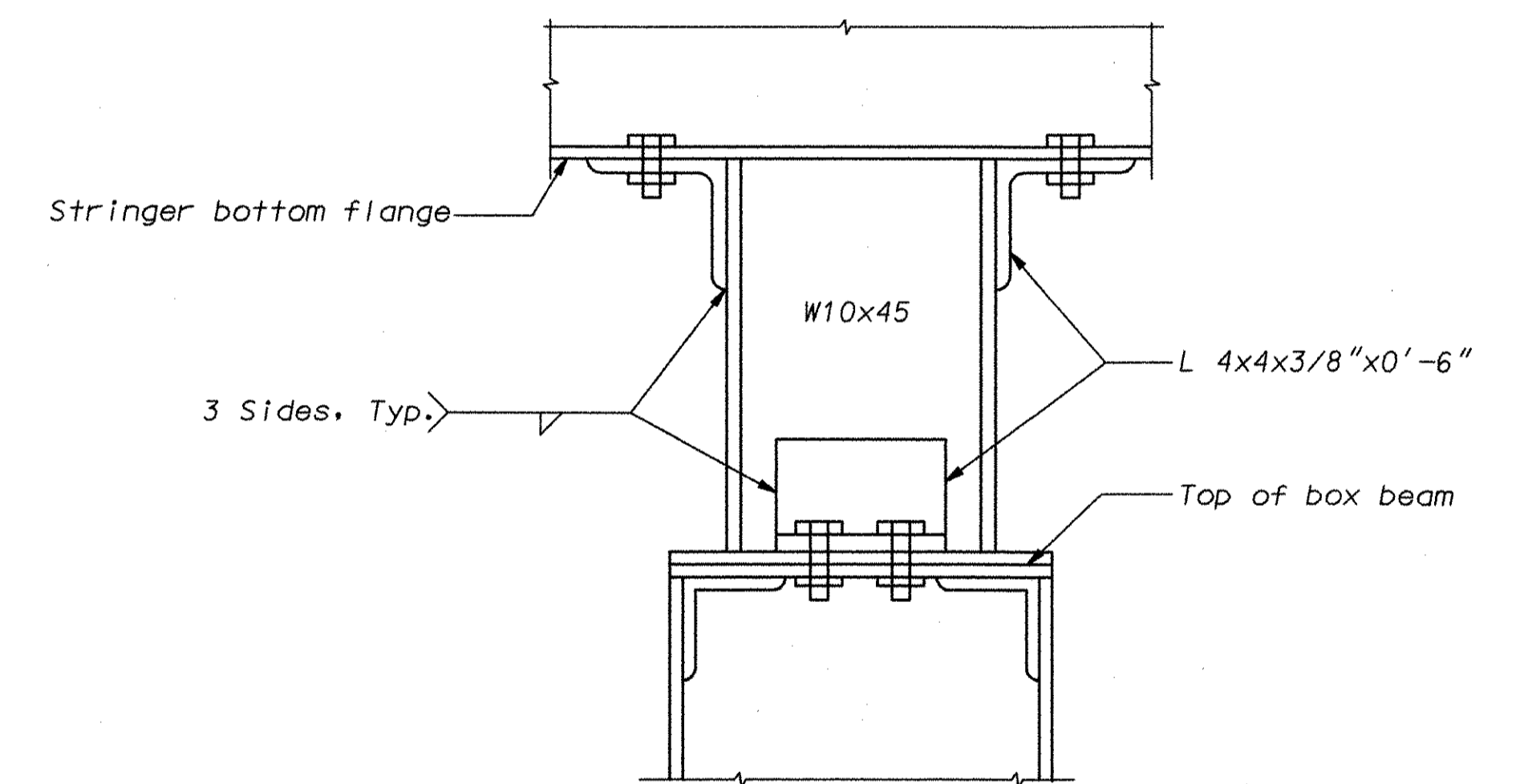
DETAIL 2



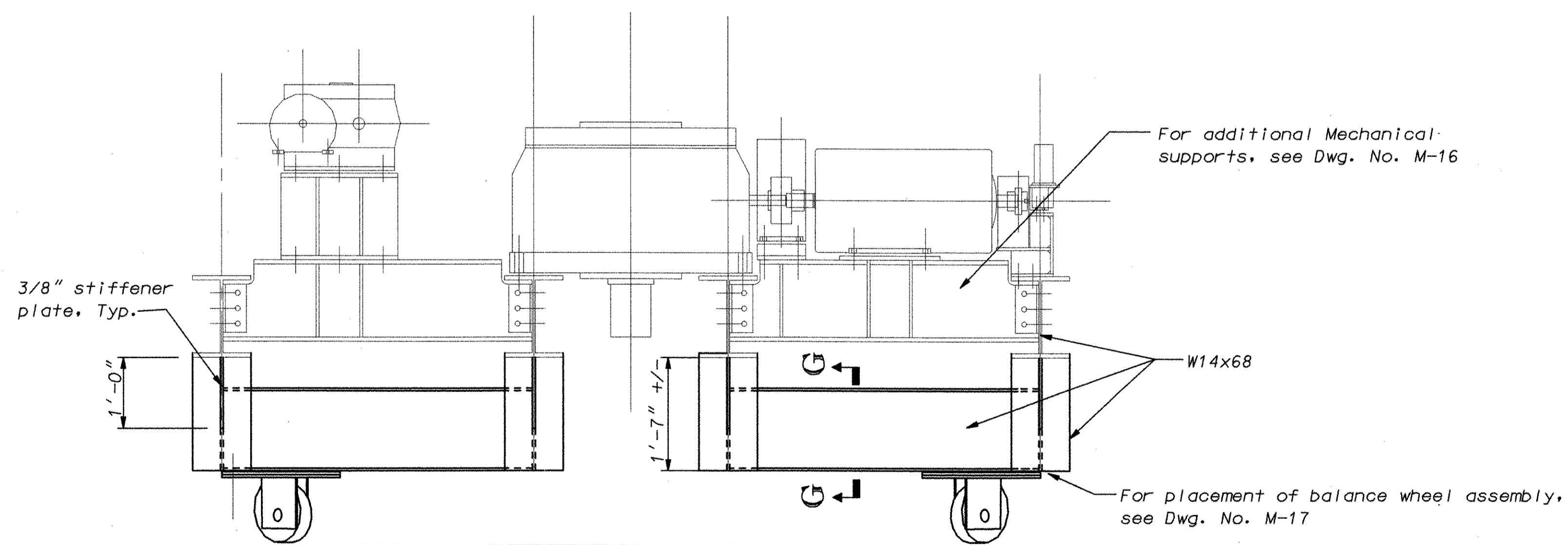
DETAIL 3



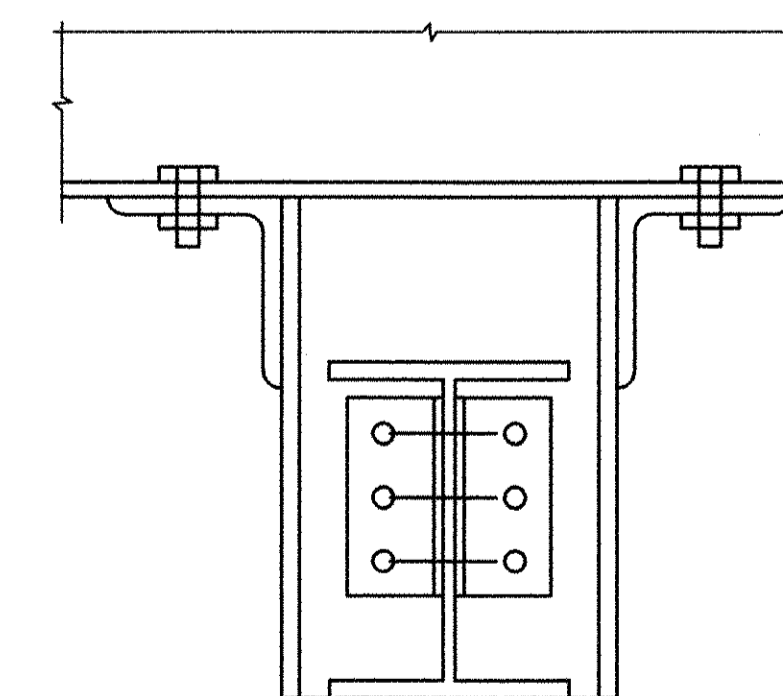
DETAIL 4



DETAIL 5



SECTION F-F



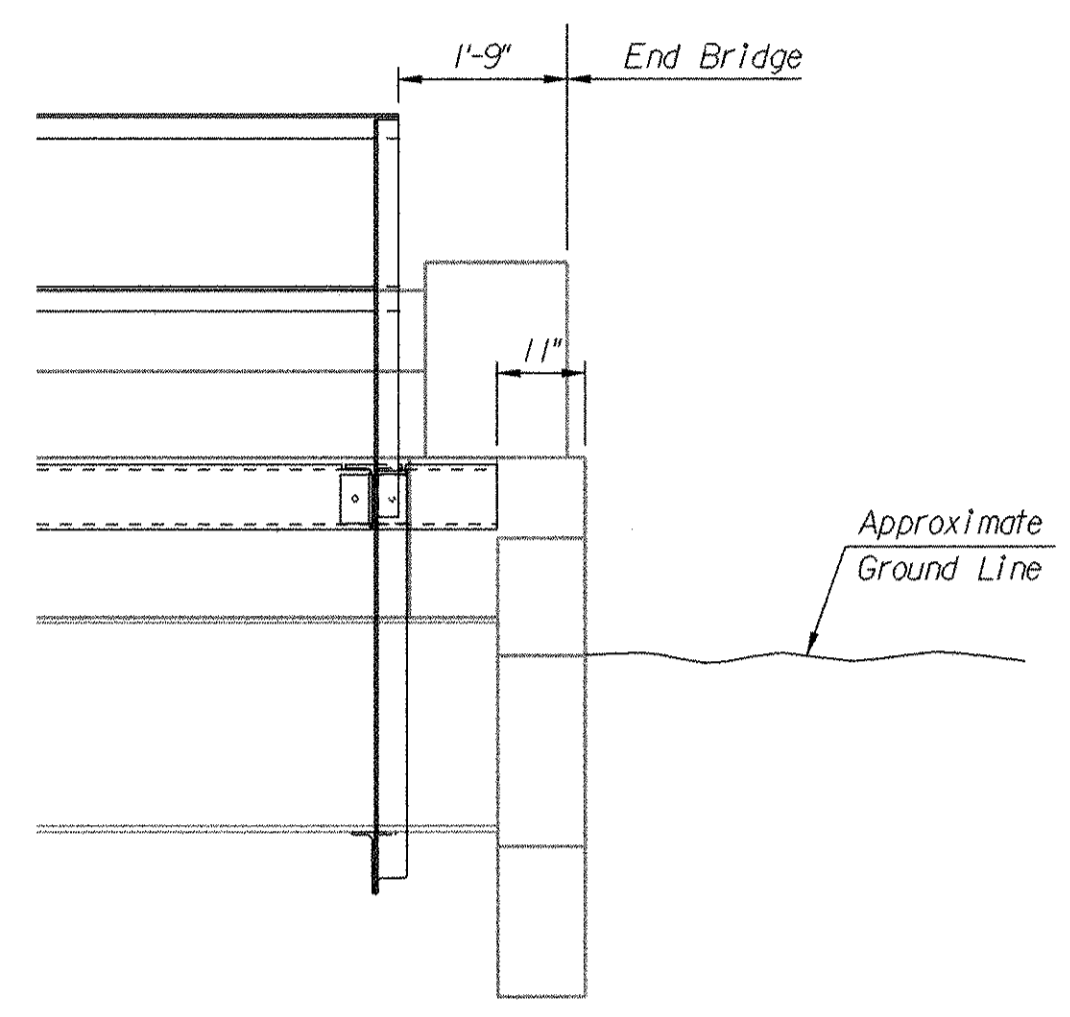
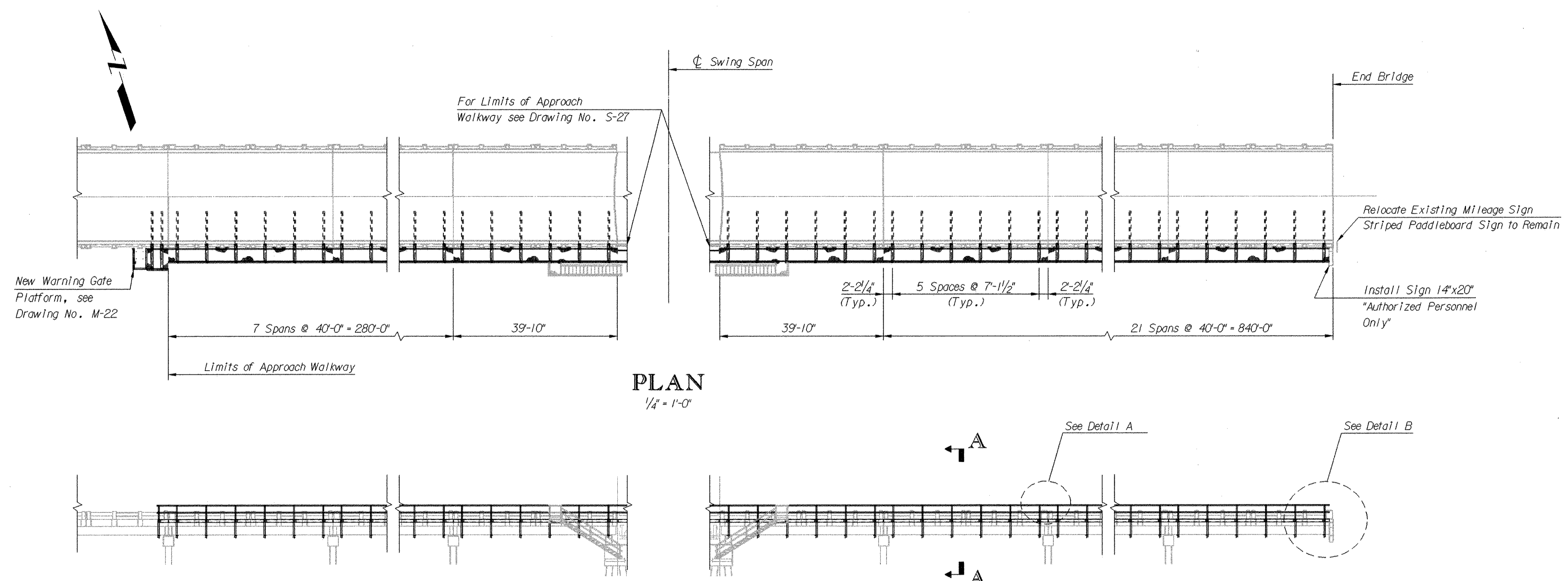
SECTION G-G

HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
HARBOR RIVER			
NEW SPAN DRIVE SUPPORT DETAILS			
REV.			
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REVIEWED			
QUAN.	LDP	BAM	2-97
DR.	LDP	BAM	2-97
DES.	LDP	BAM	2-97
BY	CHK	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-25

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	48	115

QUANTITIES

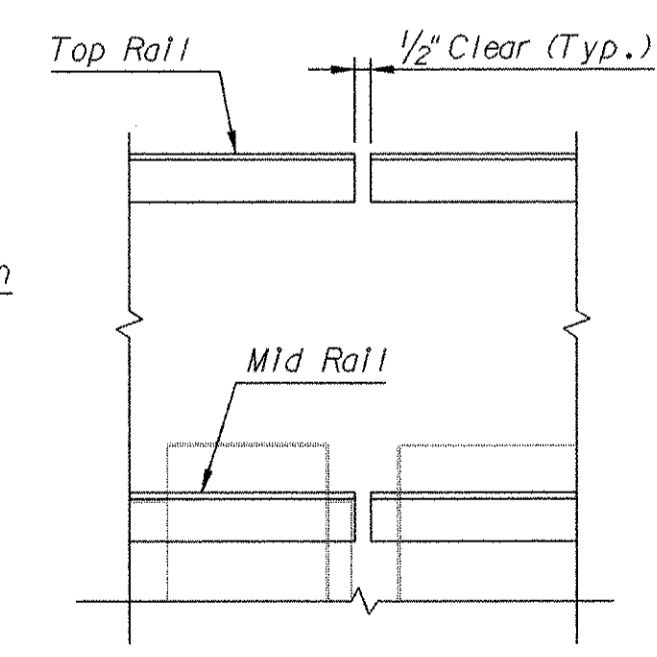
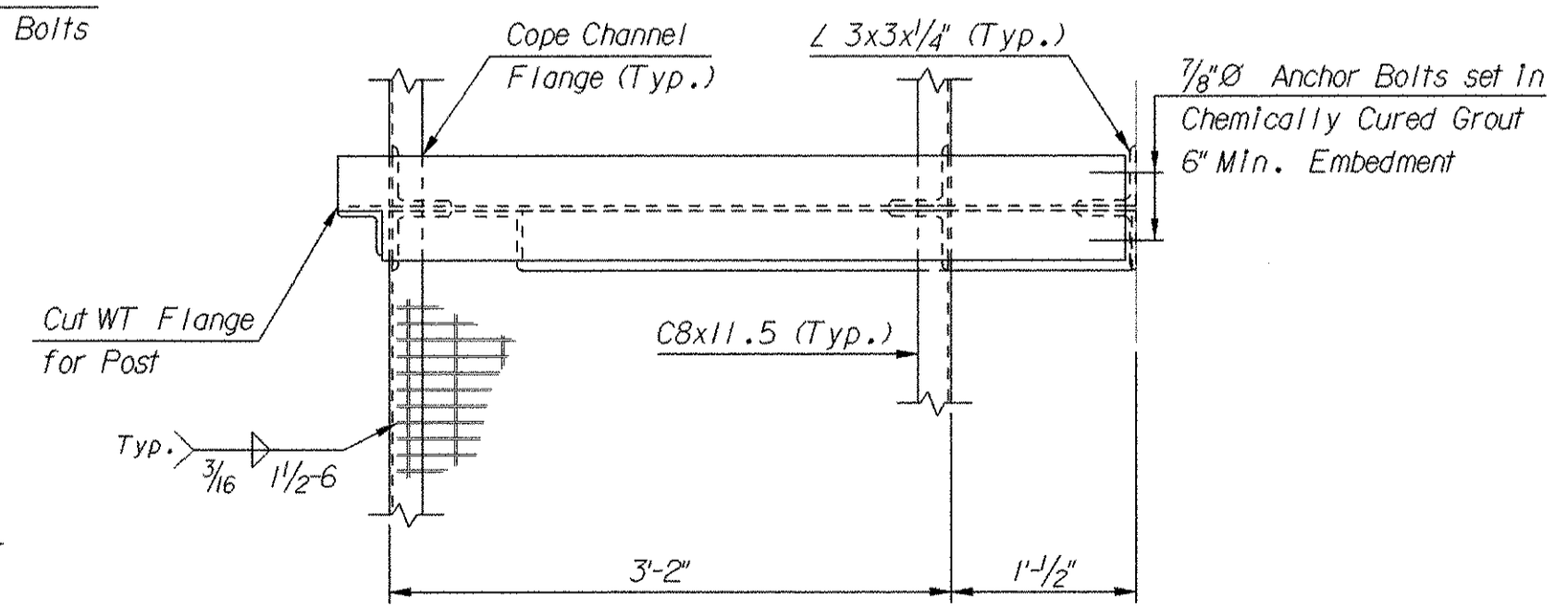
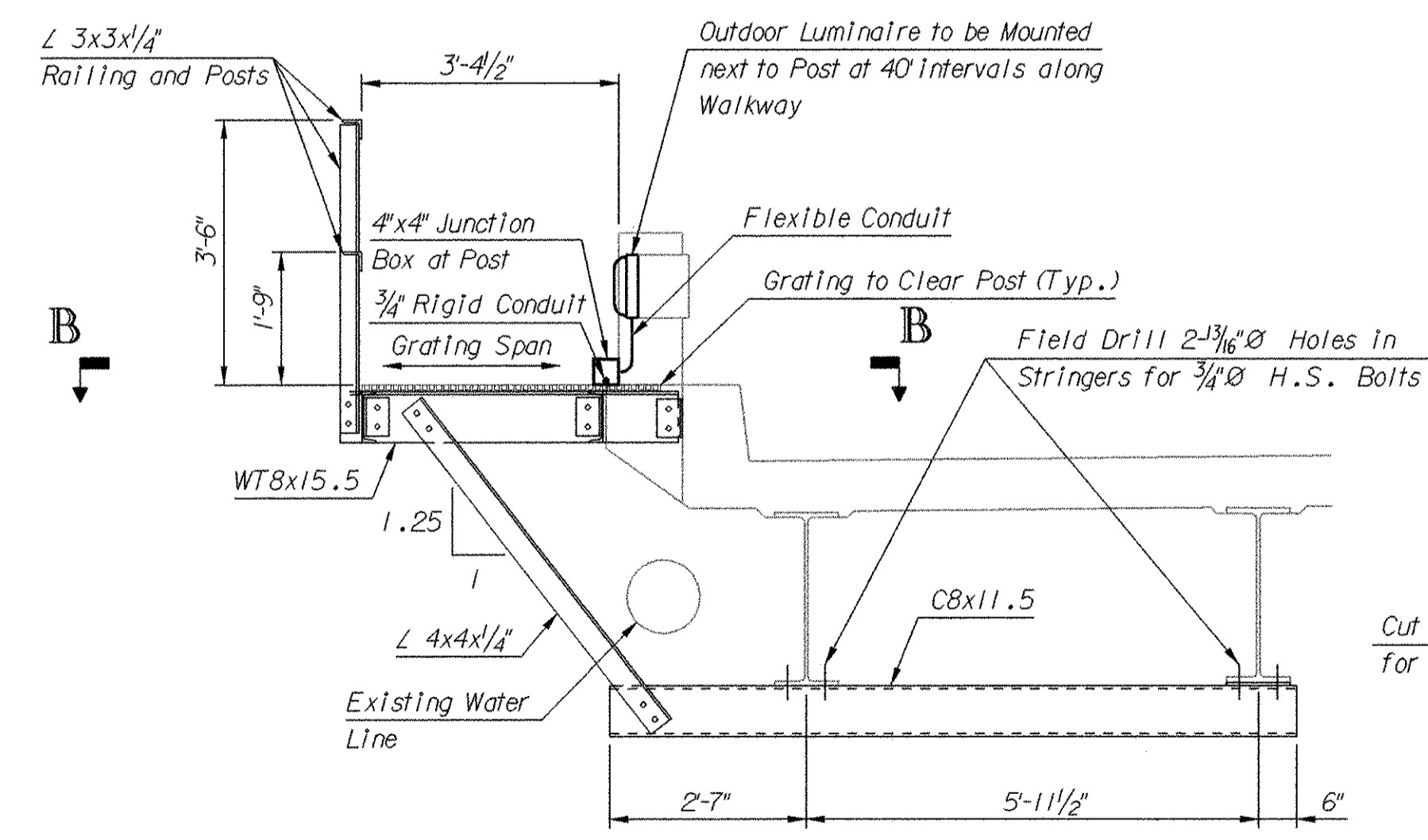
ITEM	UNIT	CONTRACT QUANTITY
Approach Walkway	L.S.	Lump Sum



PLAN
1/4" = 1'-0"

EAST ELEVATION
1/4" = 1'-0"

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



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

SECTION B-B
1" = 1'-0"

DETAIL A
1" = 1'-0"

NOTES

1. All Bolts 3/4" High Strength Bolts unless noted otherwise.
2. Cost to Install Authorized Personnel Only Sign and relocation of existing sign to be included in Pay Item Approach Walkway.
3. Cost for Lights and related Electrical Work to be included in Section 610 Electrical Work.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
HARBOR RIVER

APPROACH WALKWAY

REV.			
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QUAN.	EK	SN	2-97
DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

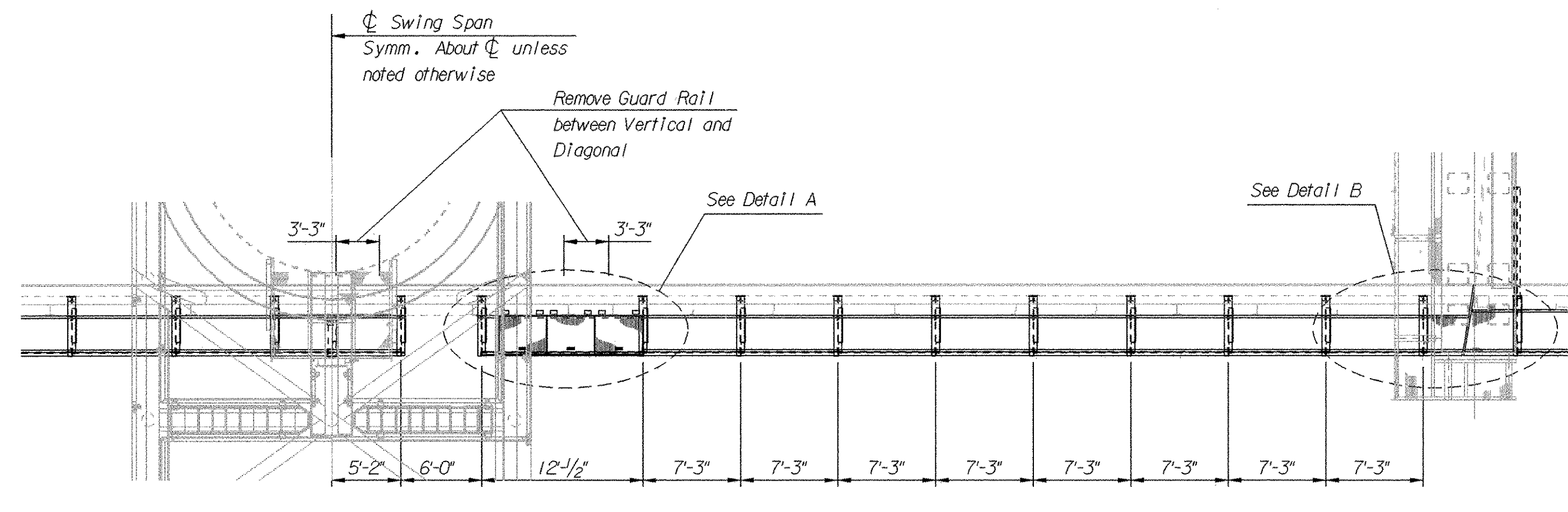
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	US-21	BEAUFORT	S-26

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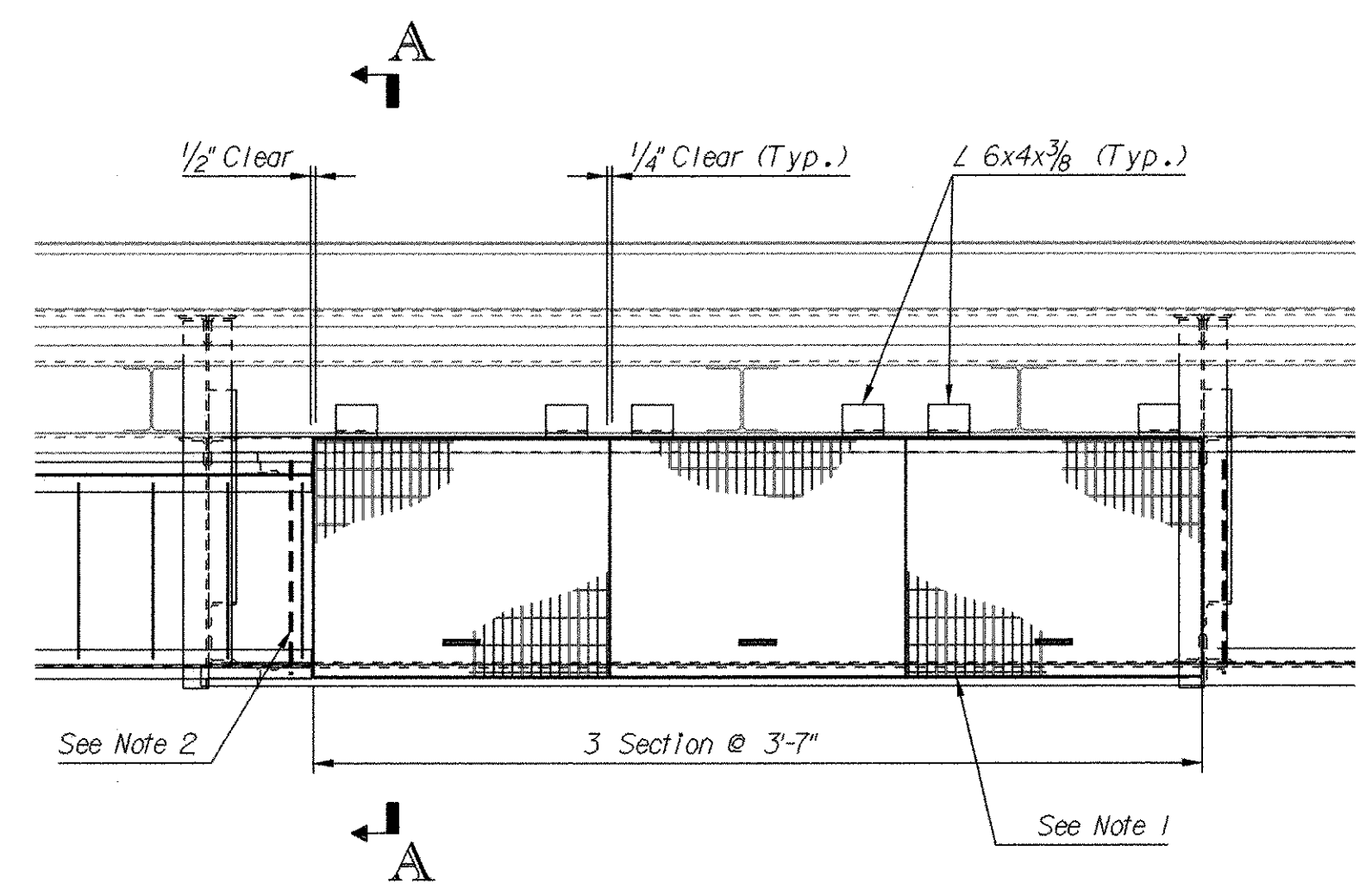
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	49	115

QUANTITIES

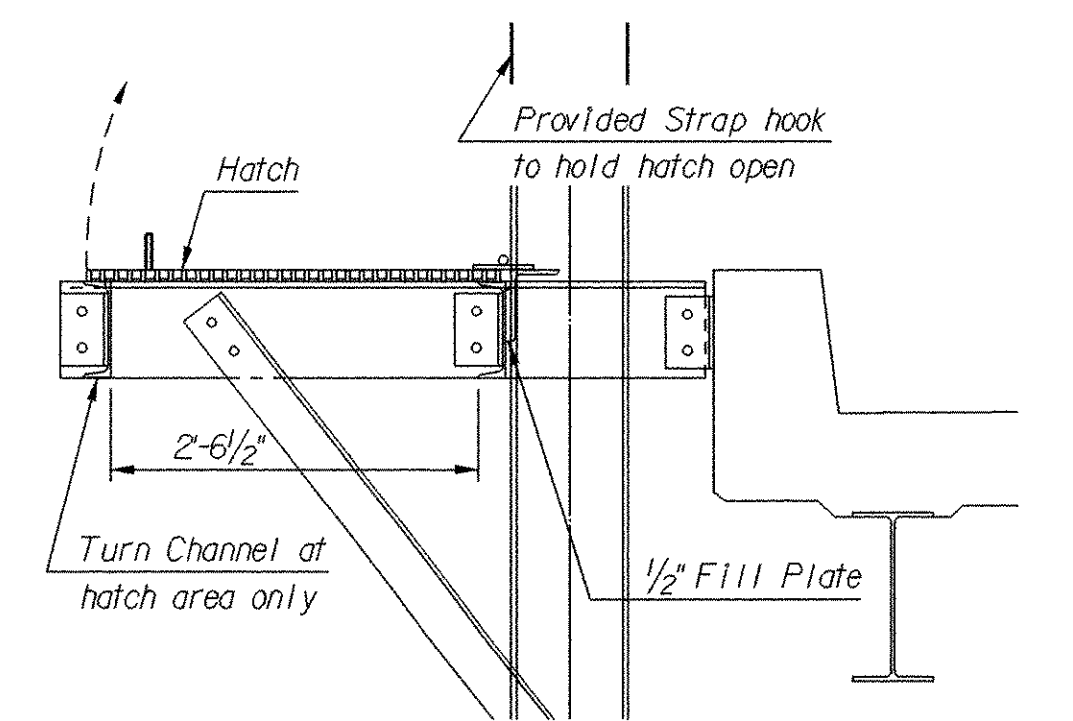
ITEM	UNIT	CONTRACT QUANTITY
Swing Span Walkway	L.S.	Lump Sum



PLAN
1/8" = 1'-0"

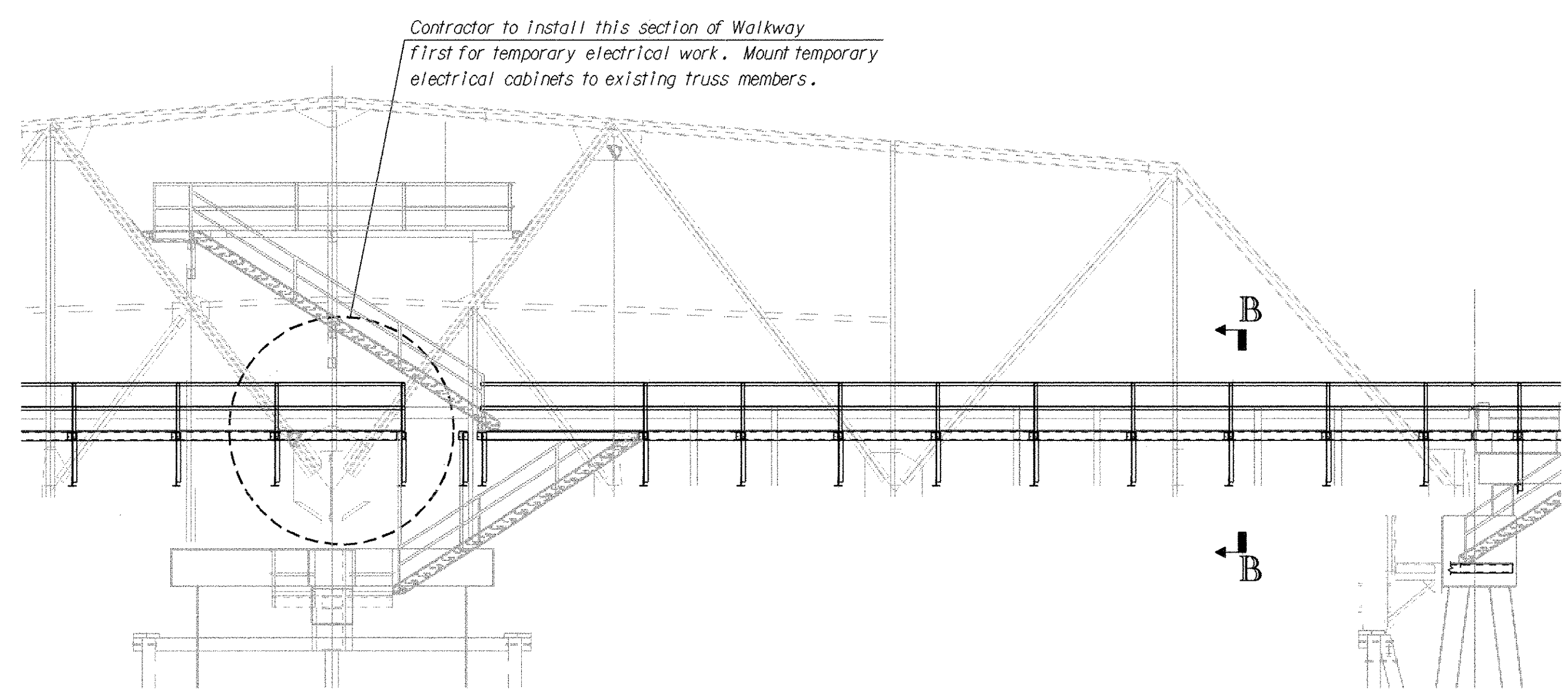


DETAIL A
1/2" = 1'-0"

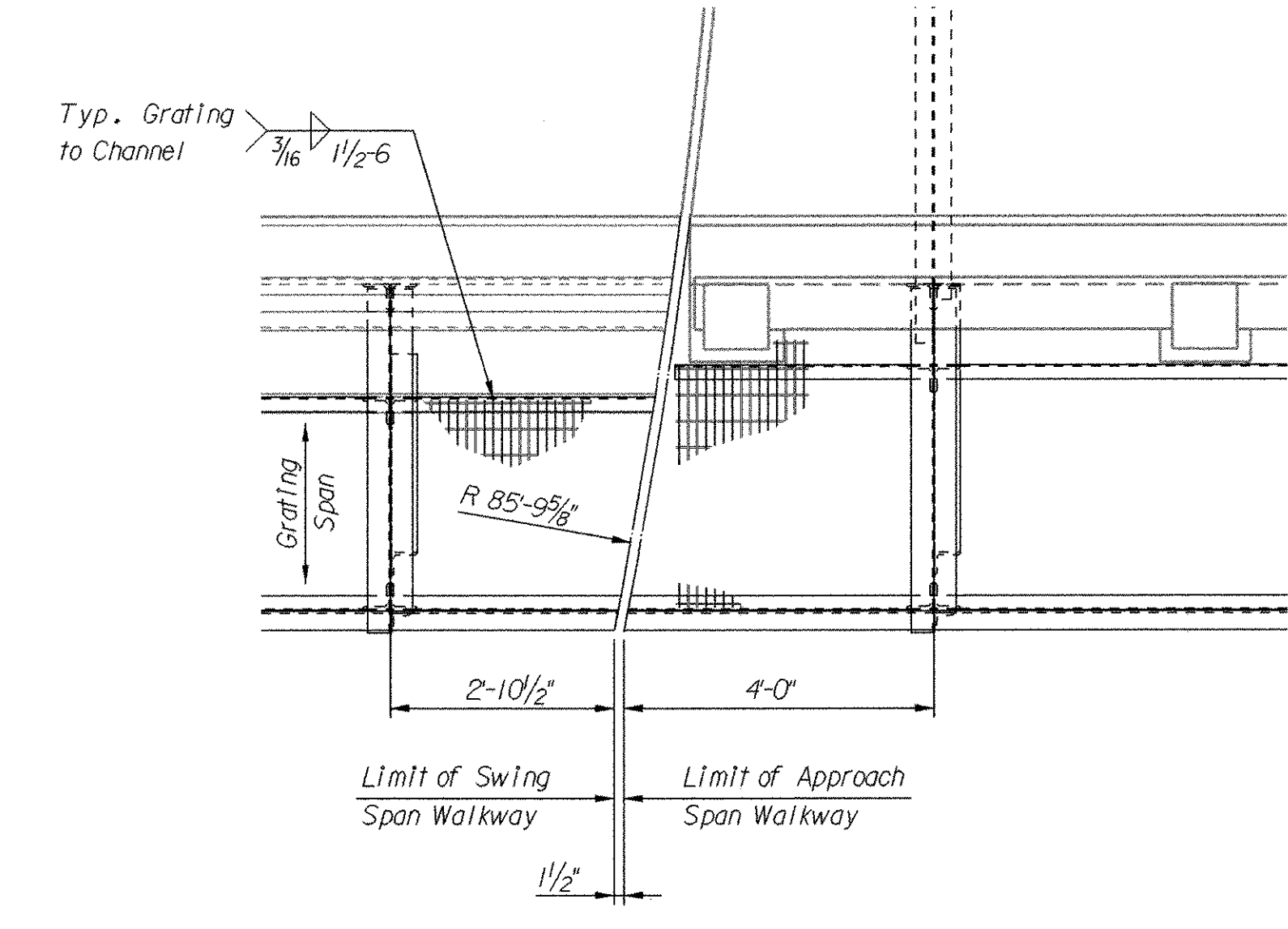


SECTION A-A
3/4" = 1'-0"

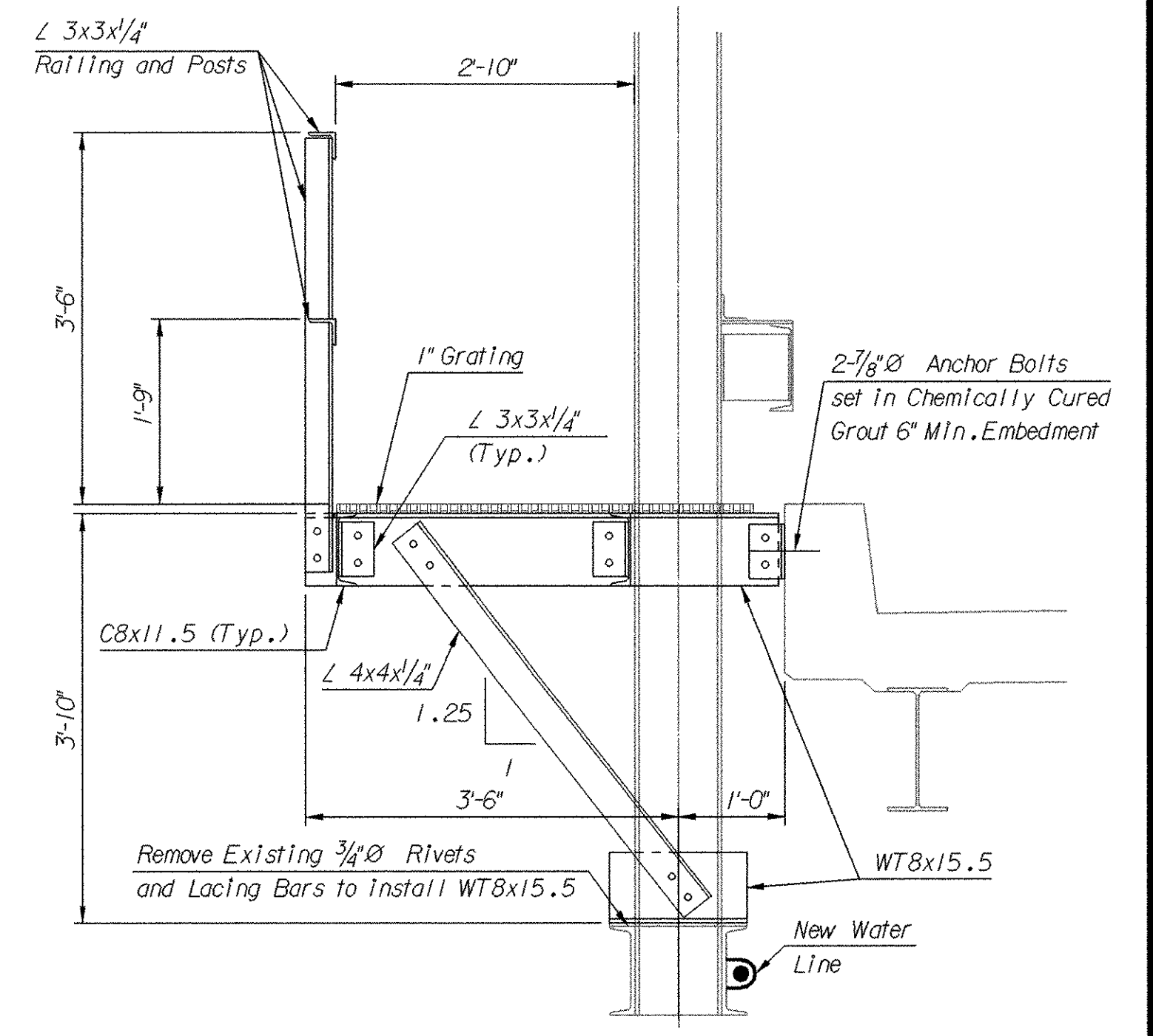
NOTE:
Details the same as Section B-B unless noted otherwise



EAST ELEVATION
1/8" = 1'-0"



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



SECTION B-B
3/4" = 1'-0"

NOTES

- Hatches to be fabricated for molded one piece fiberglass reinforced polyester grating 1"x4" standard as manufactured by Chemgrate. Each hatch to have 2'-5"x5' heavy duty 5 knuckle ball bearing hinges fastened to grating using stainless steel saddle clips and bolts. Provide lifting handle for each hatch. Hatches to be included in Pay Item Swing Span Walkway.
- Furnish and install steel self closing safety gate as manufactured by Fab En Co. Inc. Cost to be included in Pay Item Swing Span Walkway.
- All bolts 3/4" high strength bolts unless noted otherwise.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

SWING SPAN WALKWAY

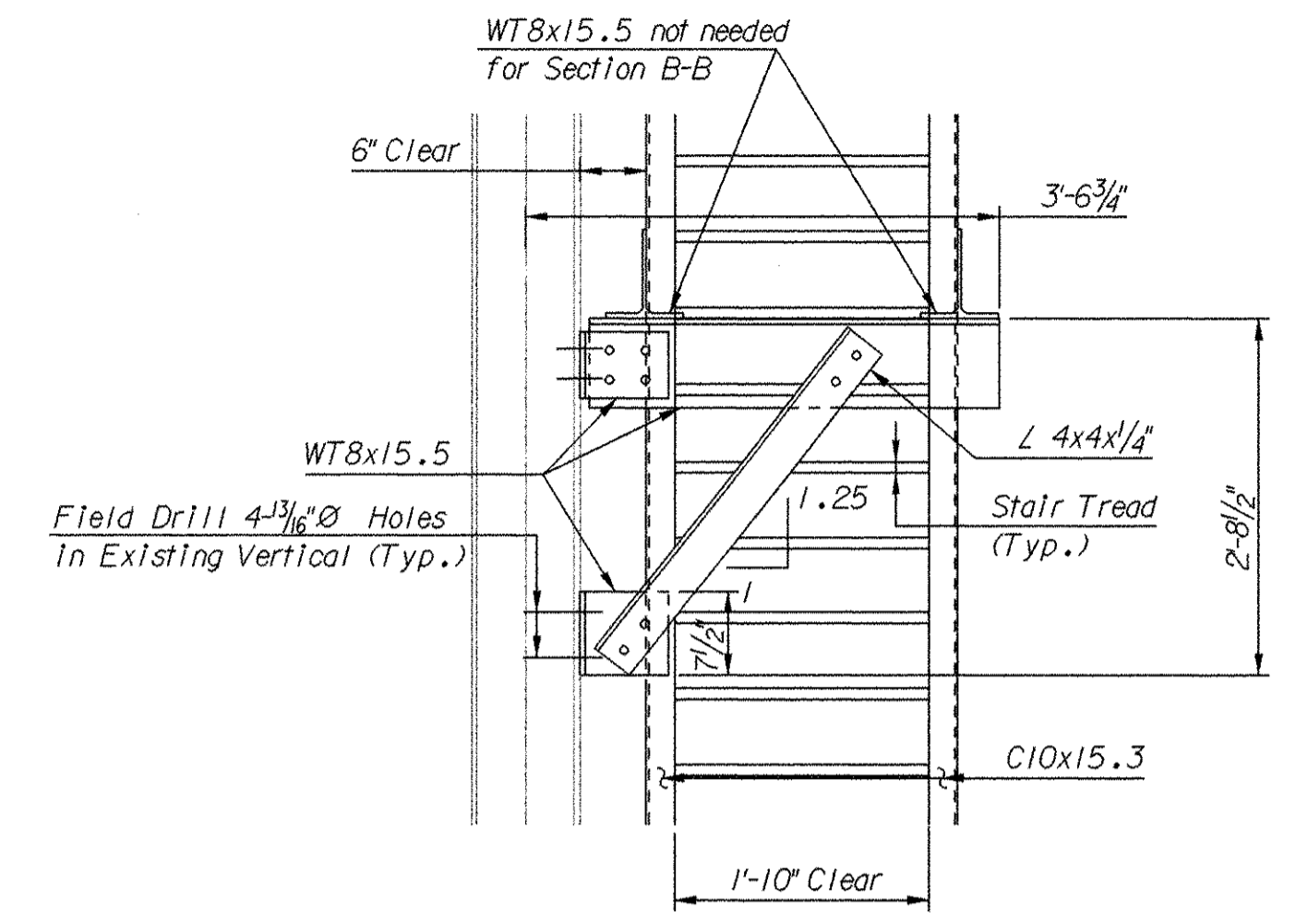
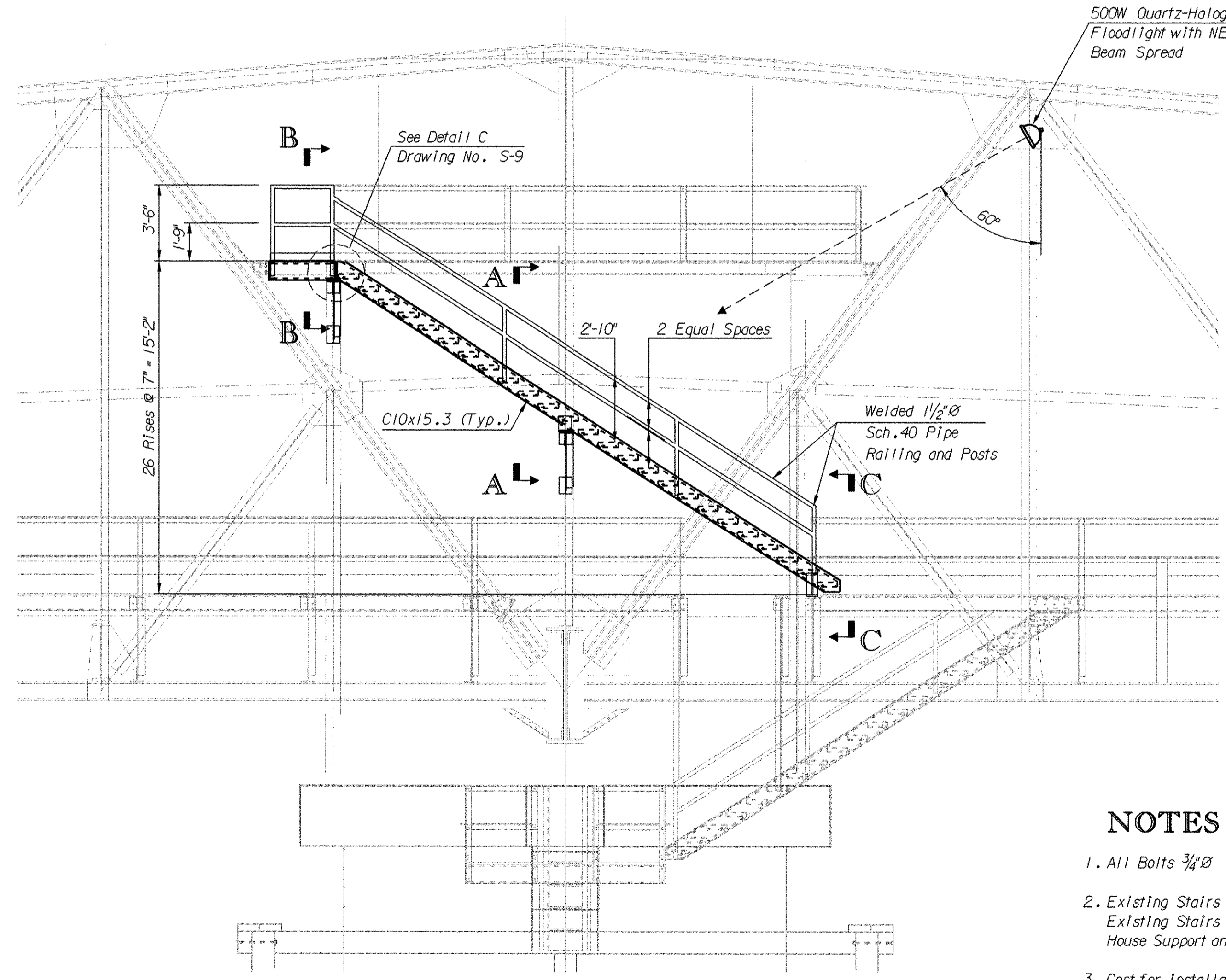
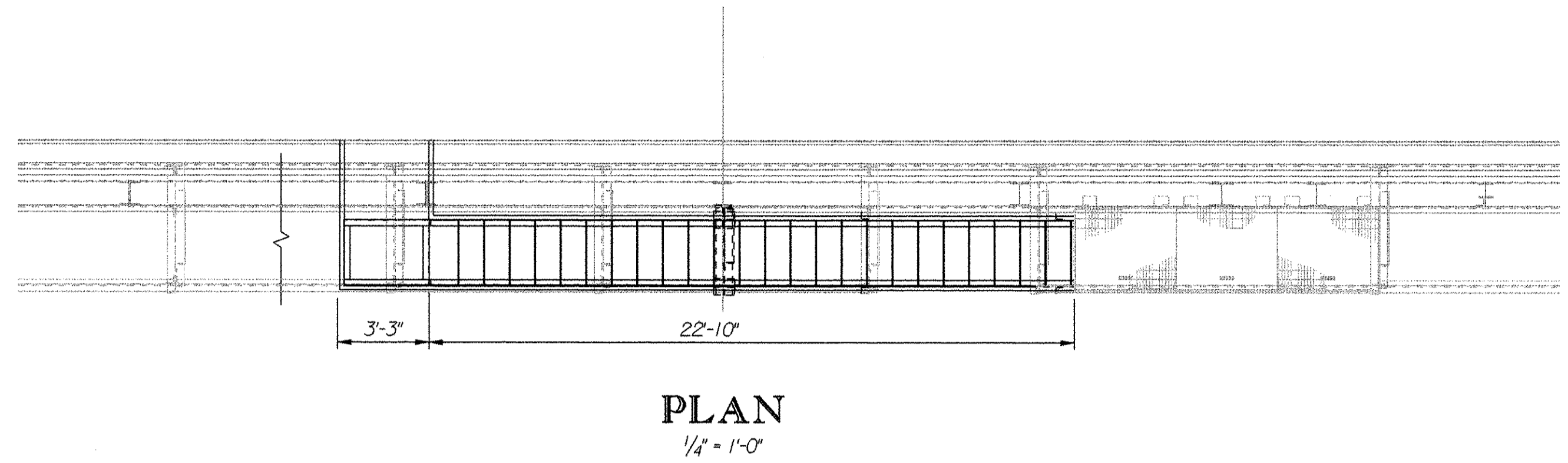
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DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-27

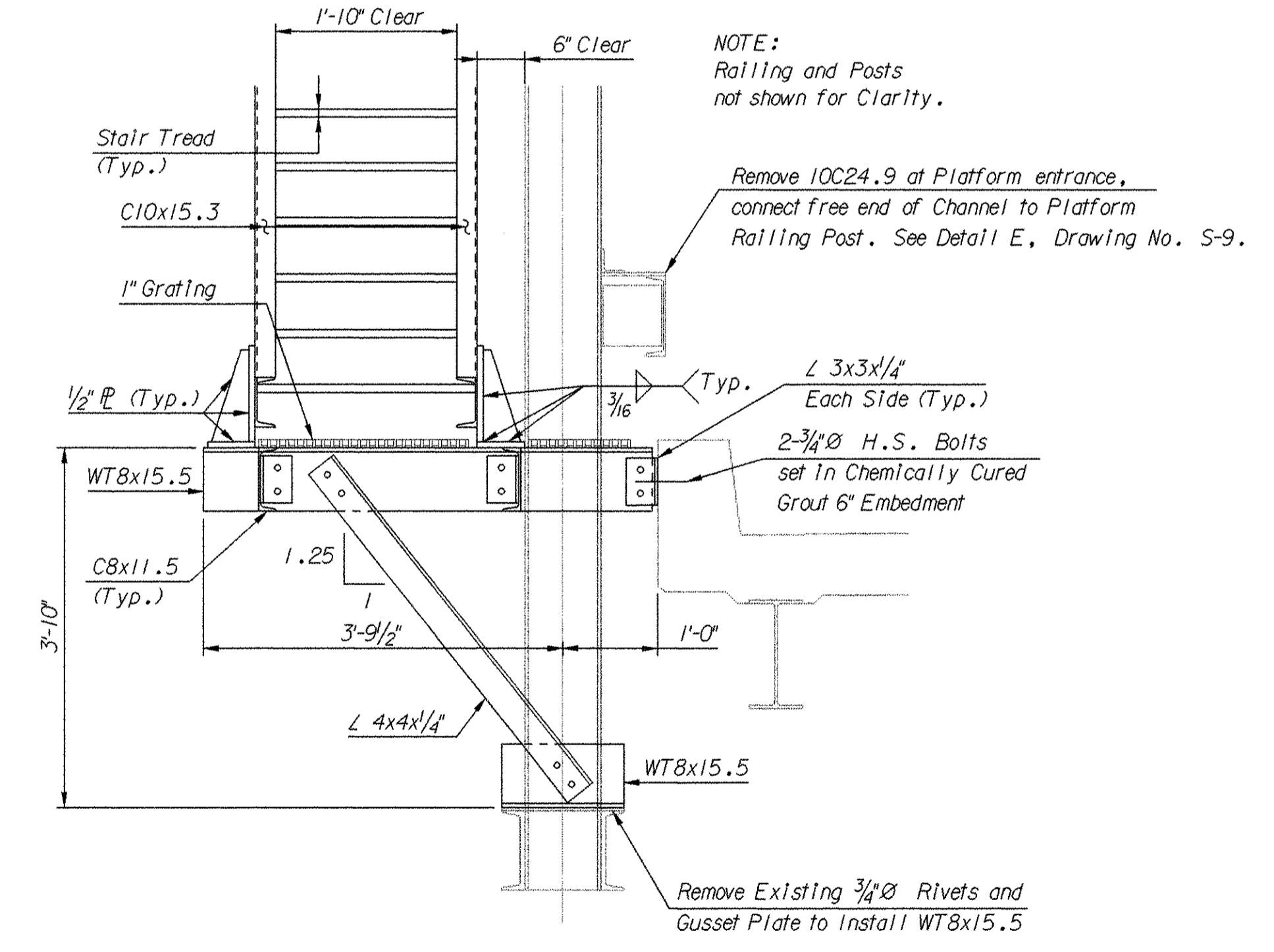
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FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	50	115

QUANTITIES		
I T E M	UNIT	CONTRACT QUANTITY
Control House Stairway	L.S.	Lump Sum



NOTE:
Section B-B similar but stair channels bolt directly to WT.
Railing and Posts not shown for Clarity.



NOTE:
Railing and Posts not shown for Clarity.

Remove 10C24.9 at Platform entrance, connect free end of Channel to Platform Railing Post. See Detail E, Drawing No. S-9.

Remove Existing 3/4" Rivets and Gusset Plate to Install WT8x15.5

NOTES

- All Bolts 3/4" High Strength Bolts.
- Existing Stairs not shown. Cost for removal of Existing Stairs to be Included in Pay Item Control House Support and Platform.
- Cost for installation of Floodlight and related electrical work shall be Included in Section 610.
- Material for Control House Stairway shall include Stairs, Landings, Railing and Supporting Members.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
HARBOR RIVER

CONTROL HOUSE STAIRWAY

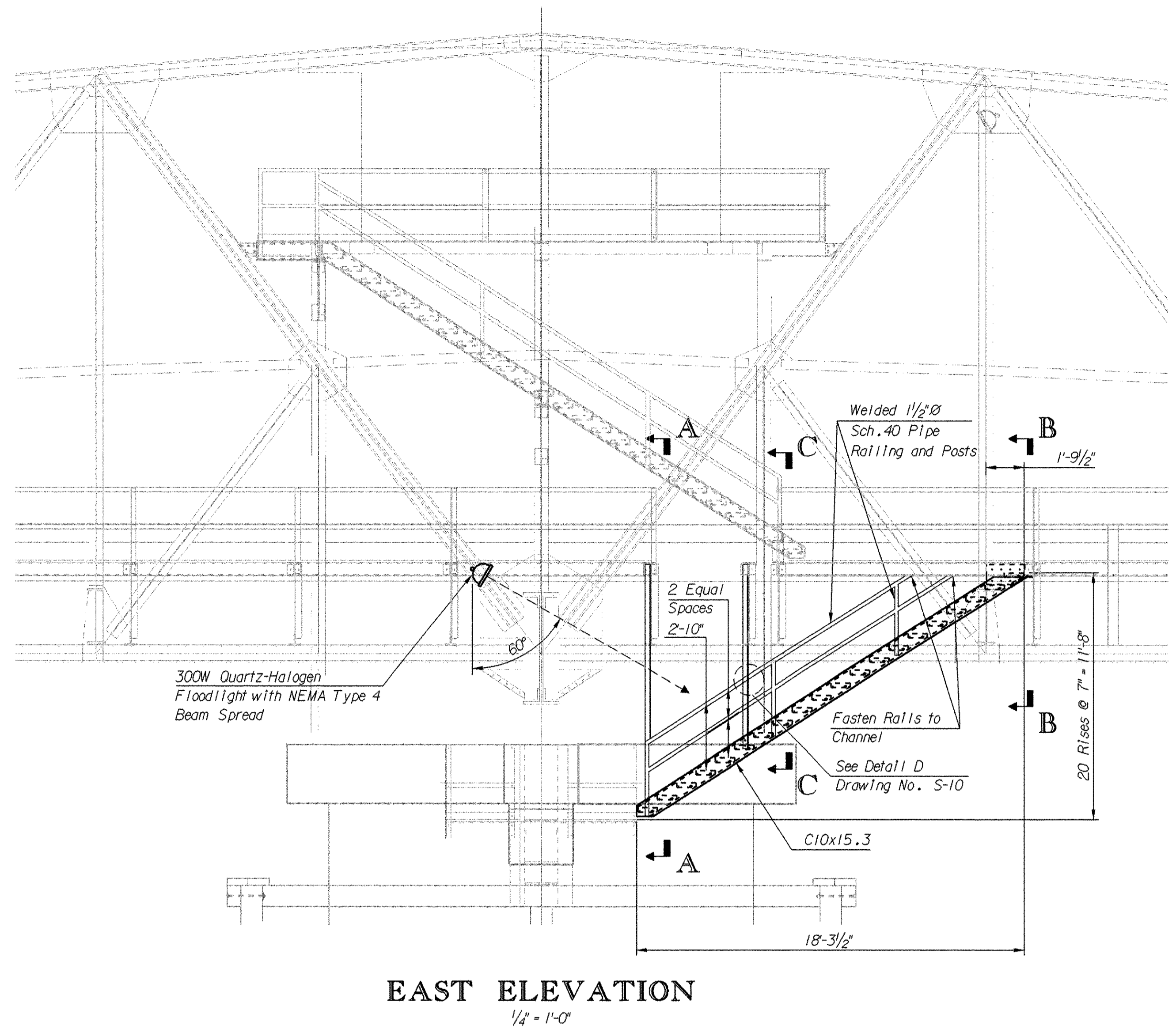
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DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-28

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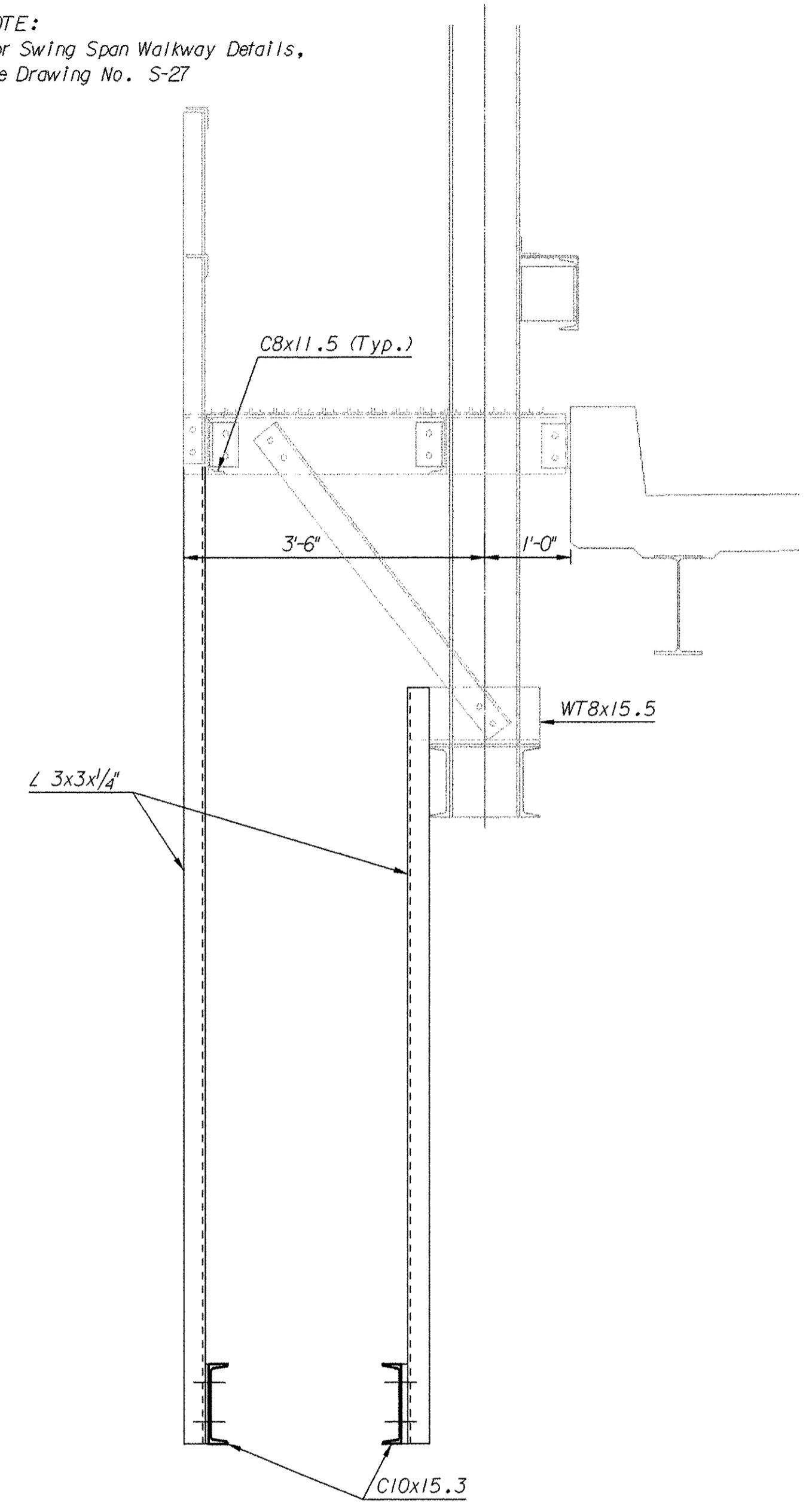
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	SC	BEAUFORT		US-21	51	115

QUANTITIES		
I T E M	UNIT	CONTRACT QUANTITY
Pivot Pier Stairway	L.S.	Lump Sum



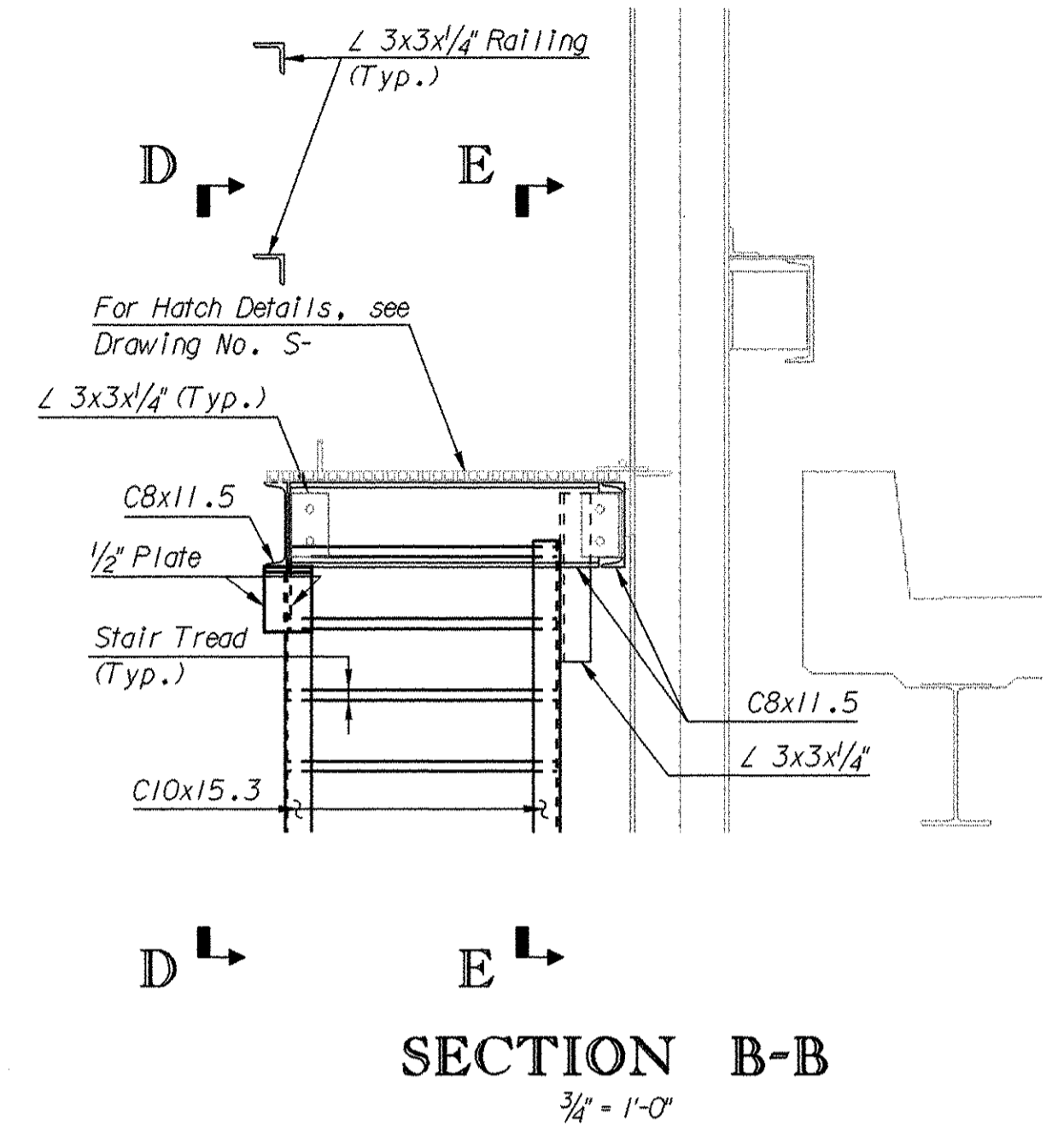
EAST ELEVATION
1/4" = 1'-0"

NOTE:
For Swing Span Walkway Details,
see Drawing No. S-27



SECTION A-A
3/4" = 1'-0"

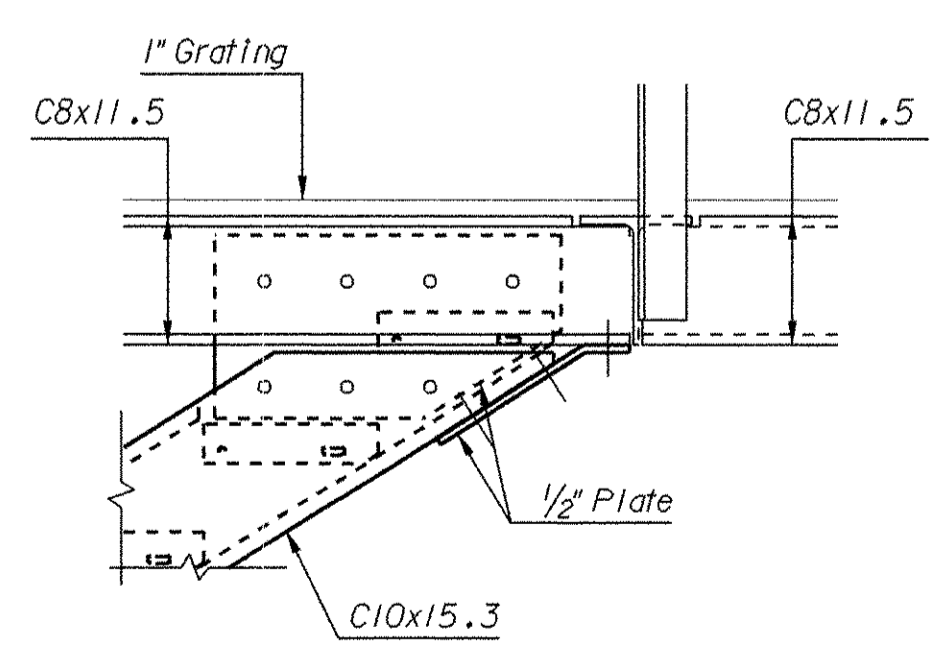
NOTE:
Section C-C Similar except
no Grating or Railing



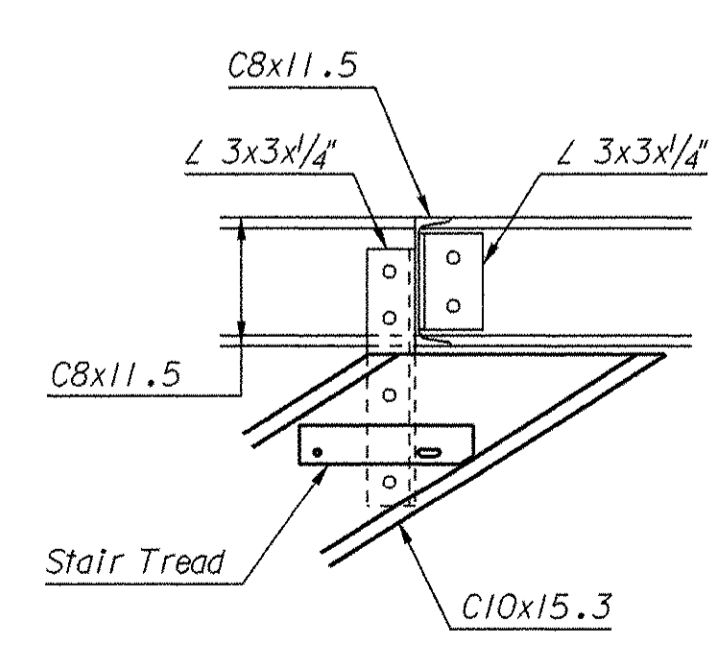
SECTION B-B
3/4" = 1'-0"

NOTES

- All Bolts 3/4" High Strength Bolts.
- Material for Pivot Pier Stairway shall include Stairs, Top Landing, Railing and Supporting Members which fasten Stairway to Swing Span and existing Structural Steel.
- Cost for installation of Floodlight and related electrical work shall be included in Section 610.



SECTION D-D
1" = 1'-0"



SECTION E-E
3/4" = 1'-0"

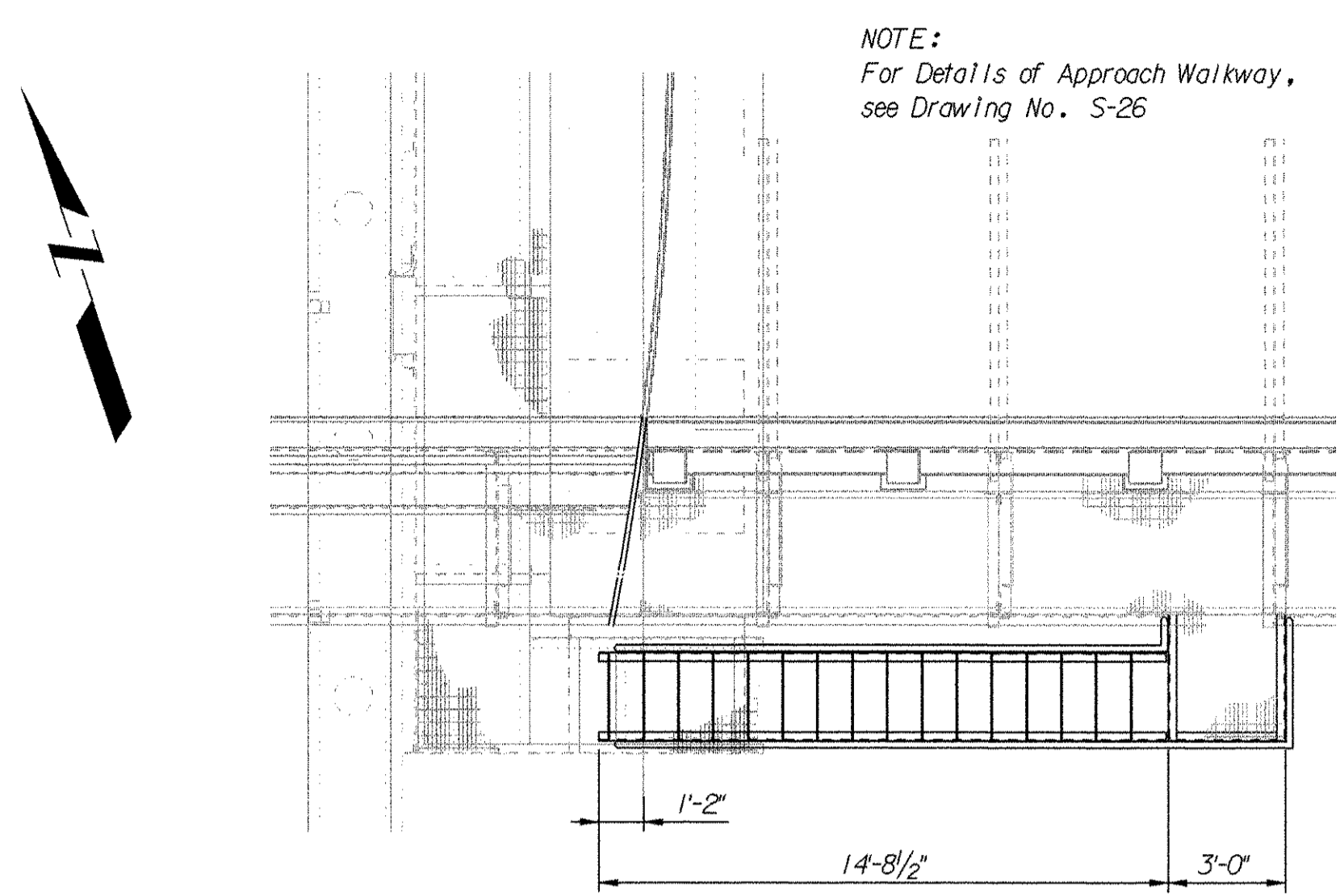
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REVIEWED				QUAN.	EK	SN	2-97
				DR.	RM	SN	2-97
				DES.	SN	EK	2-97
				BY	CHK.	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.				
US-21	US-21	BEAUFORT	S-29				

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	52	115

QUANTITIES

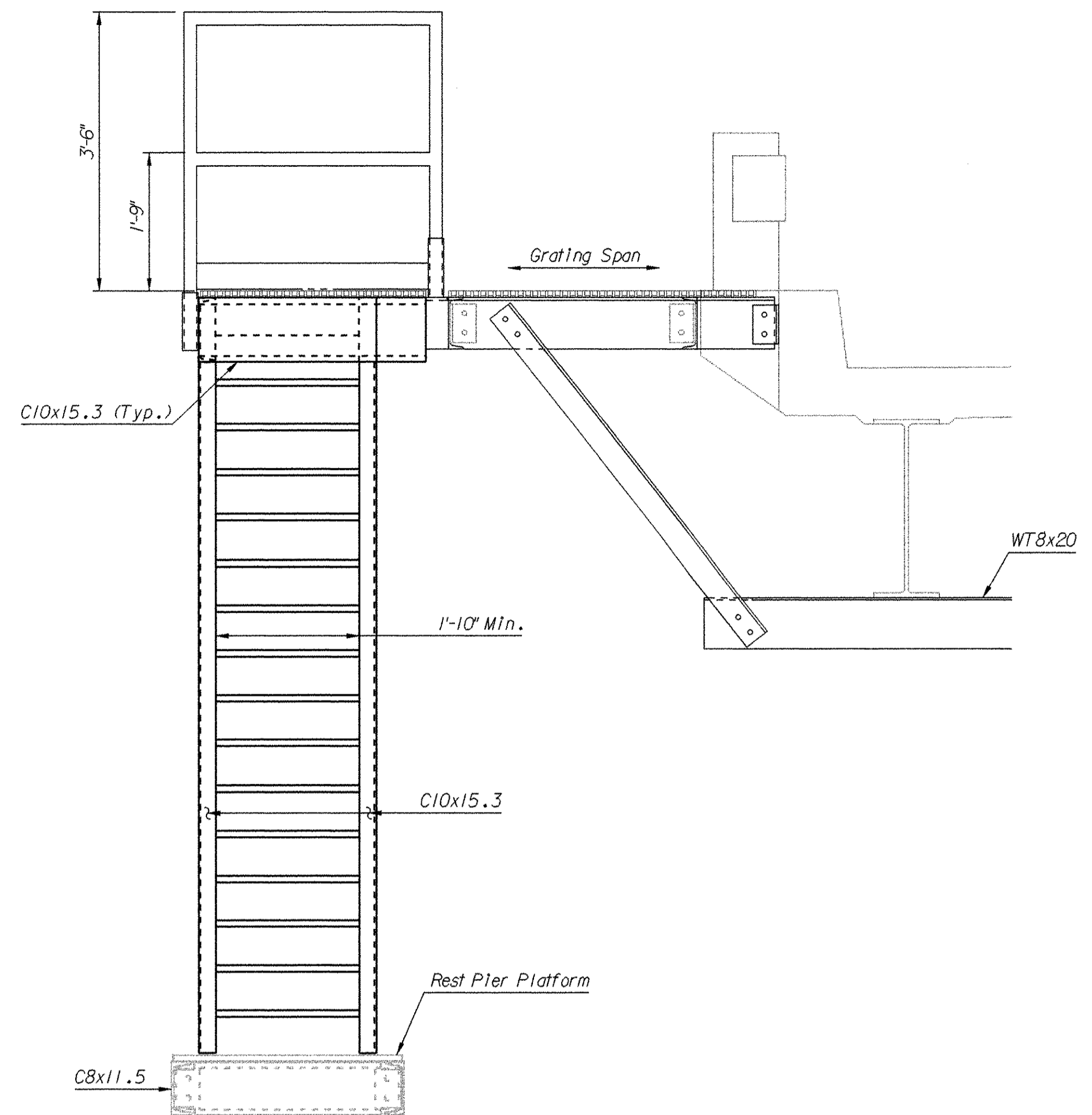
ITEM	UNIT	CONTRACT QUANTITY
Rest Pier Stairway	L.S.	Lump Sum



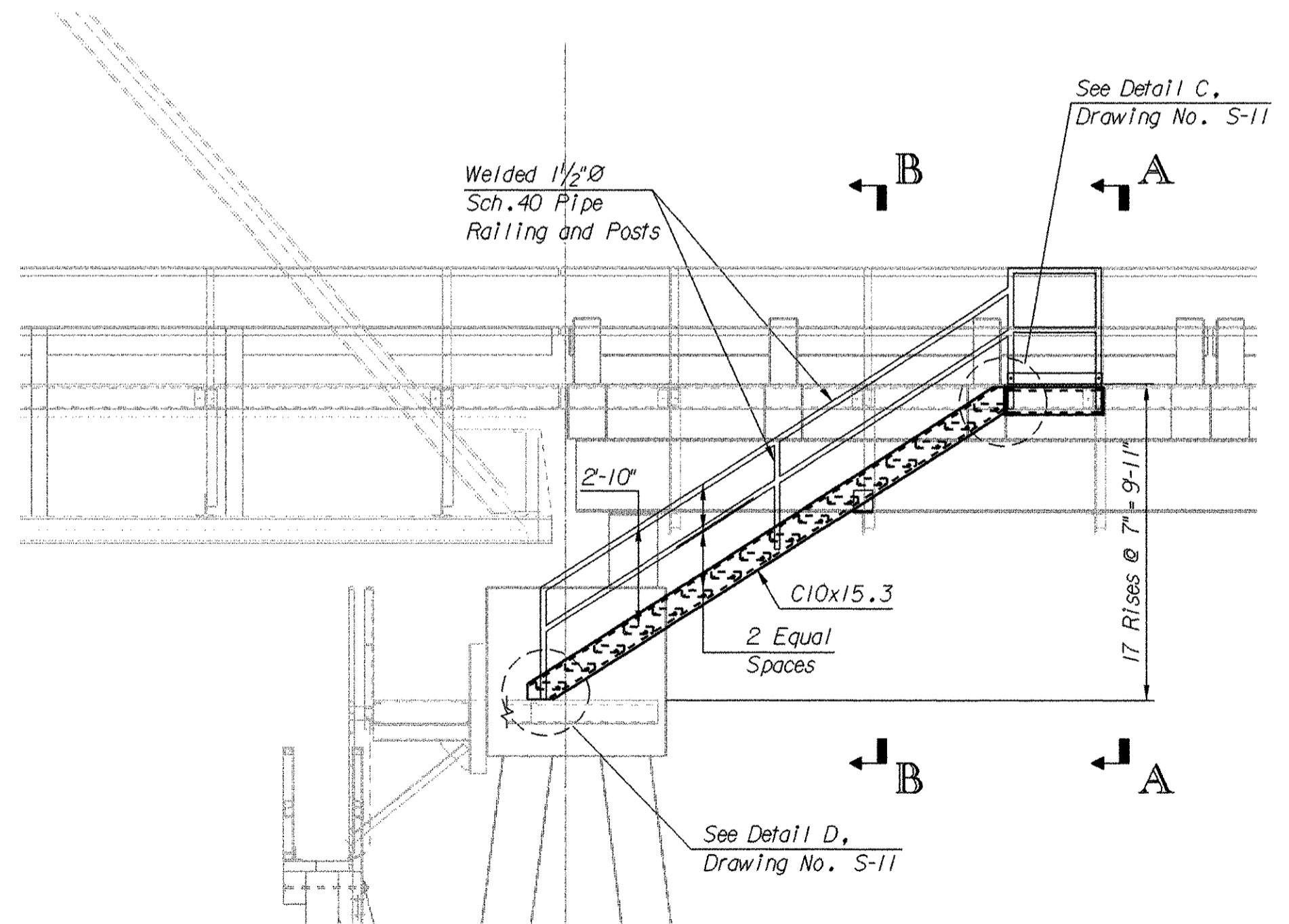
PLAN
1/4" = 1'-0"

NOTE:
For Details of Approach Walkway,
see Drawing No. S-26

NOTE:
East Rest Pier shown
West Rest Pier similar

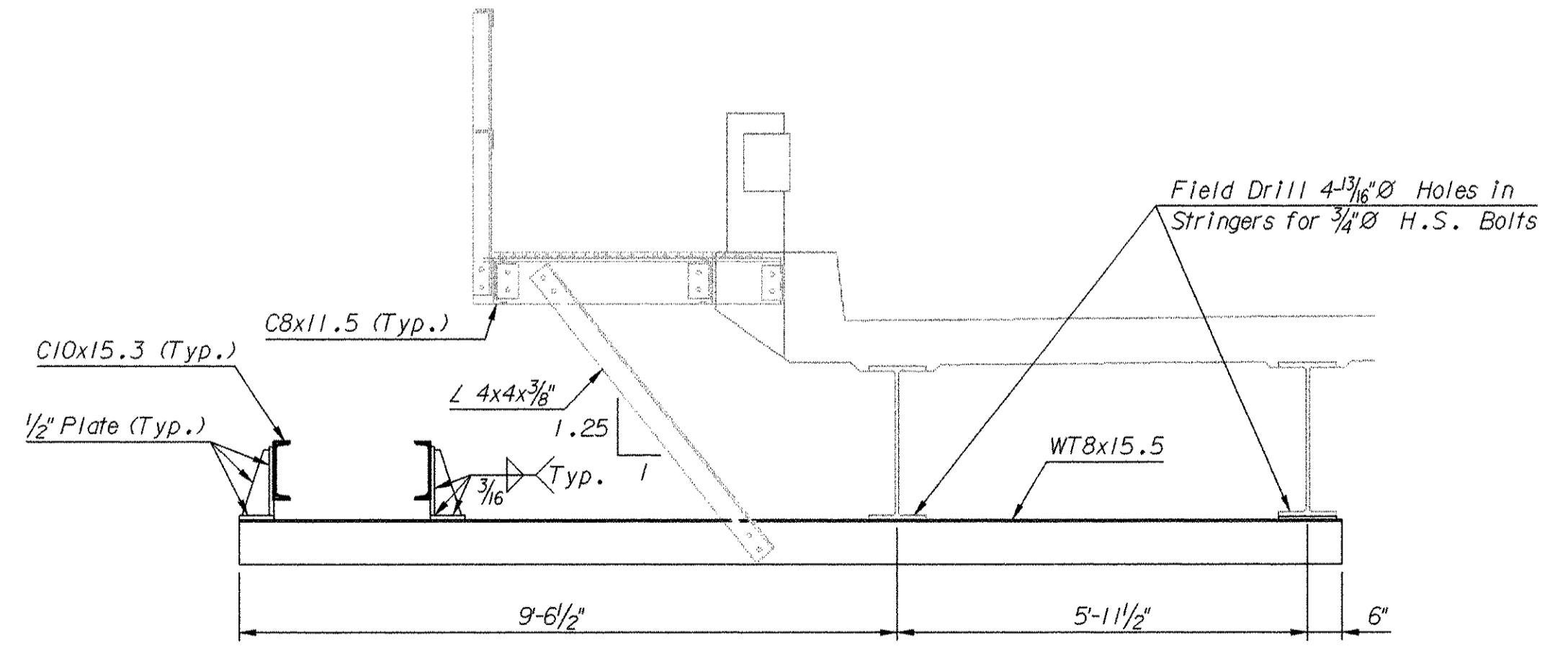


SECTION A-A
3/4" = 1'-0"



EAST ELEVATION
1/4" = 1'-0"

NOTE:
East Rest Pier shown
West Rest Pier similar



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

NOTES

1. All Bolts 3/4" High Strength Bolts.
2. See Electrical Drawing for Platform Lighting.
3. For Details of Rest Pier Platform, see Drawing No. S-13.
4. Cost for C8x11.5 under Stair shall be included in Pay Item Rest Pier Platform.
5. Material for Rest Pier Stairway shall include Stairs and Supporting members which fasten Stairway to Approach Walkway and Existing Structure.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
HARBOR RIVER

**REST PIER
STAIRWAY**

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	EK	SN	2-97
DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY		CHK. DATE	

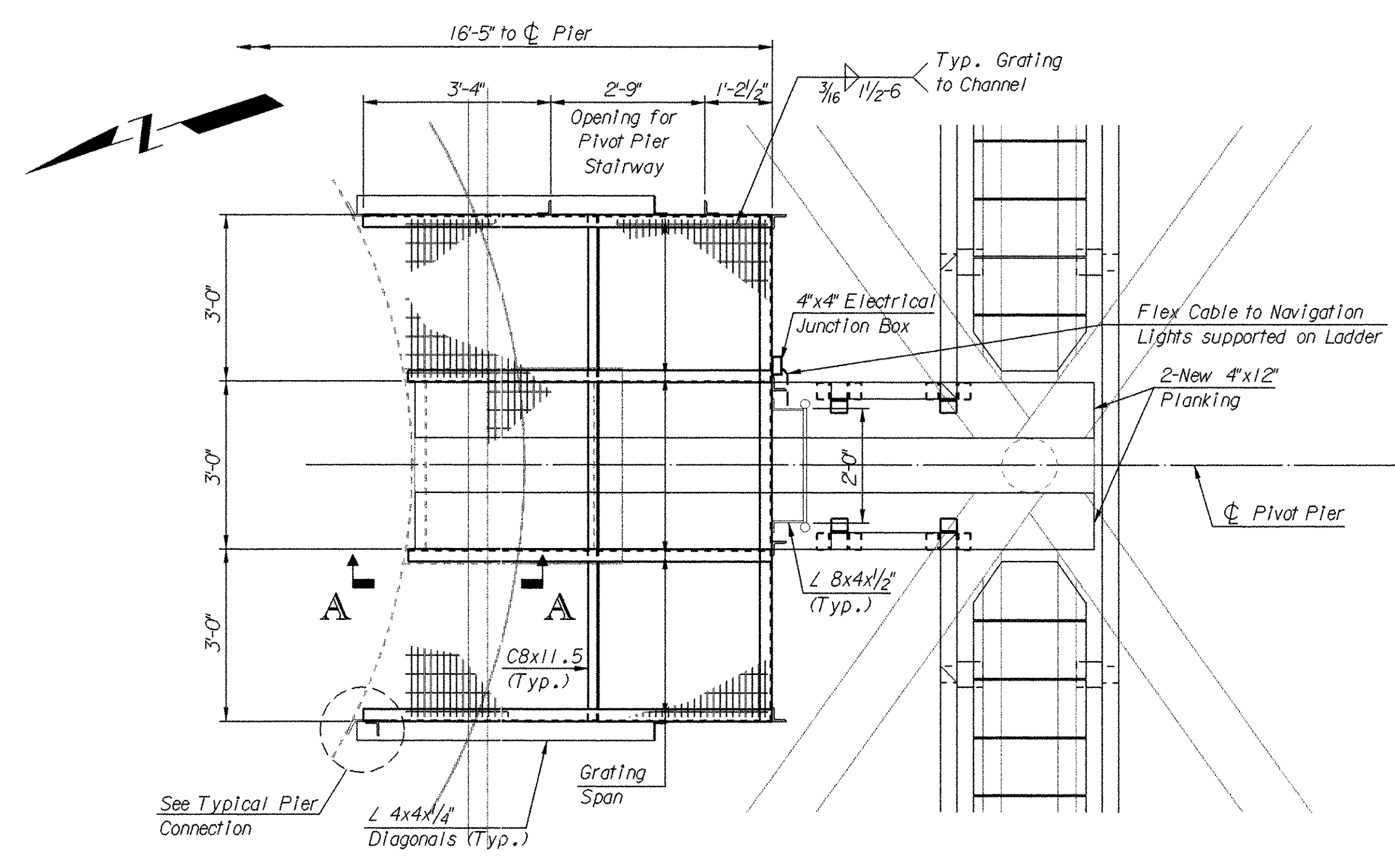
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-30

Design File name: c:\p1\1511\1511\1511\1511\1511\1511.dwg
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	SC	BEAUFORT		US-21	55	115

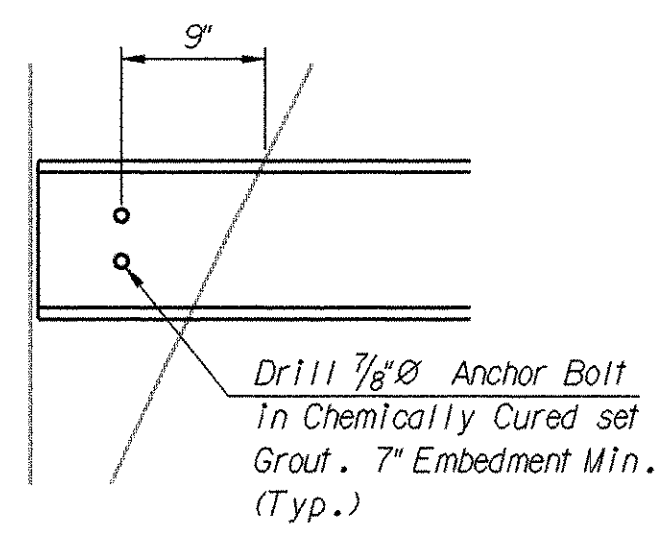
QUANTITIES

ITEM	UNIT	CONTRACT QUANTITY
Pivot Pier Platform	L.S.	Lump Sum

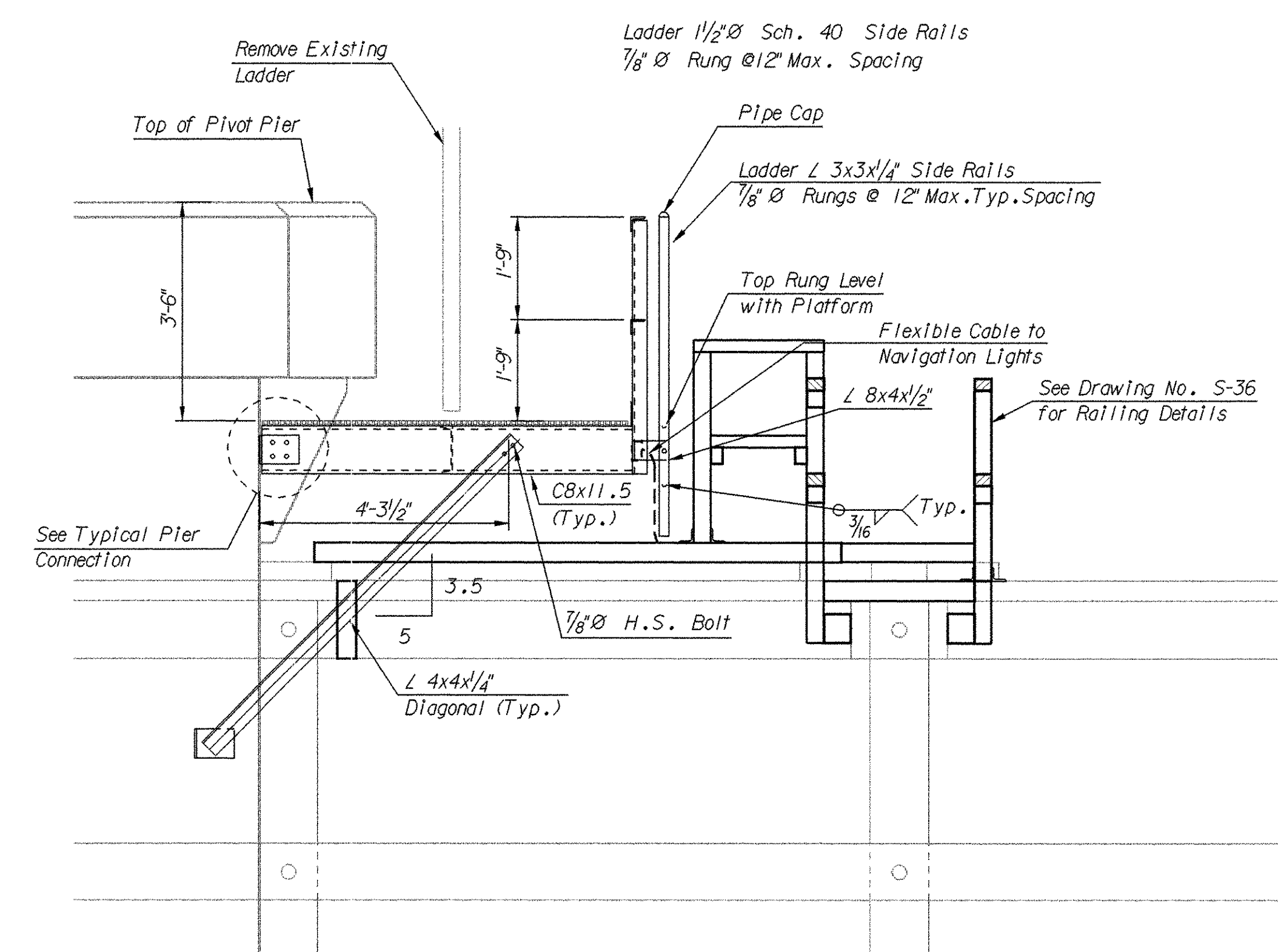


PLAN

(Existing Platform not shown)
(New Railing and Toeboard not shown)
1/2" = 1'-0"

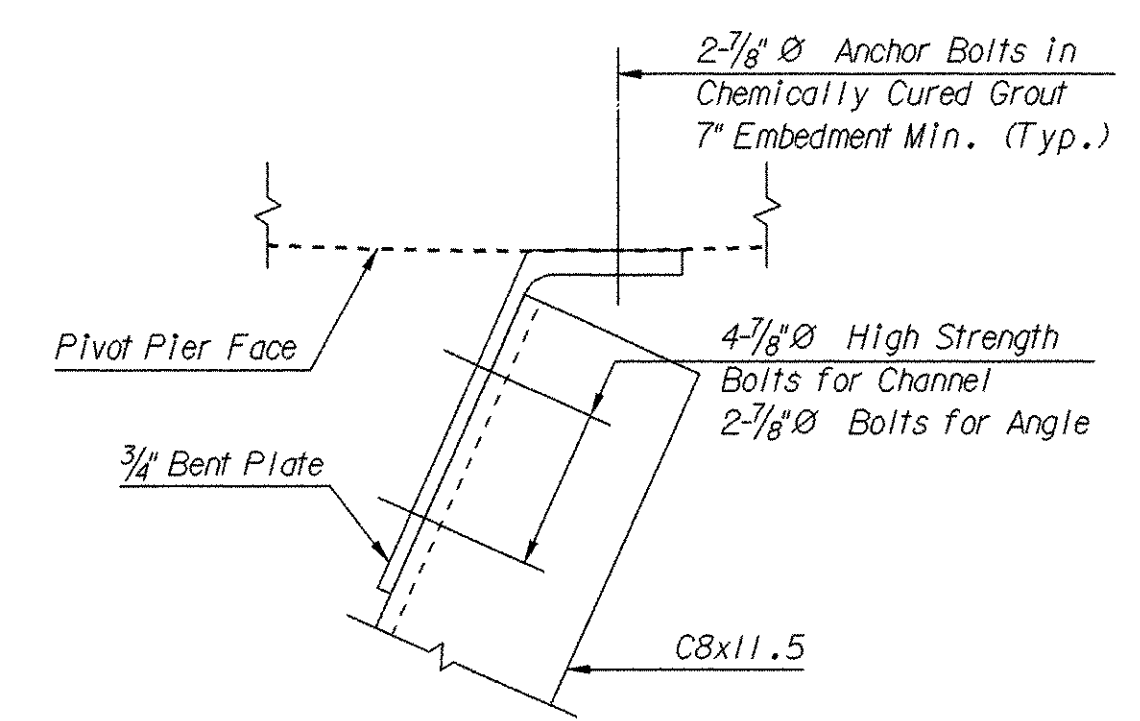


SECTION A-A
1" = 1'-0"



ELEVATION

1/2" = 1'-0"



TYPICAL PIER CONNECTION

1/2" = 1'-0"

NOTES

1. All Bolts 3/4" High Strength Bolts unless noted otherwise.
2. Cost to remove existing ladder to be included in Pay Item Pivot Pier Platform.
3. Cost to furnish and install new planking on fender to be included in Pay Item Treated Structural Timber.
4. Cost for Junction Box and Flexible Cable to Navigation Lights to be included in Pay Item Bridge Control System.

HNTB ARCHITECTS ENGINEERS PLANNERS
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SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

HARBOR RIVER

**PIVOT PIER
PLATFORM**

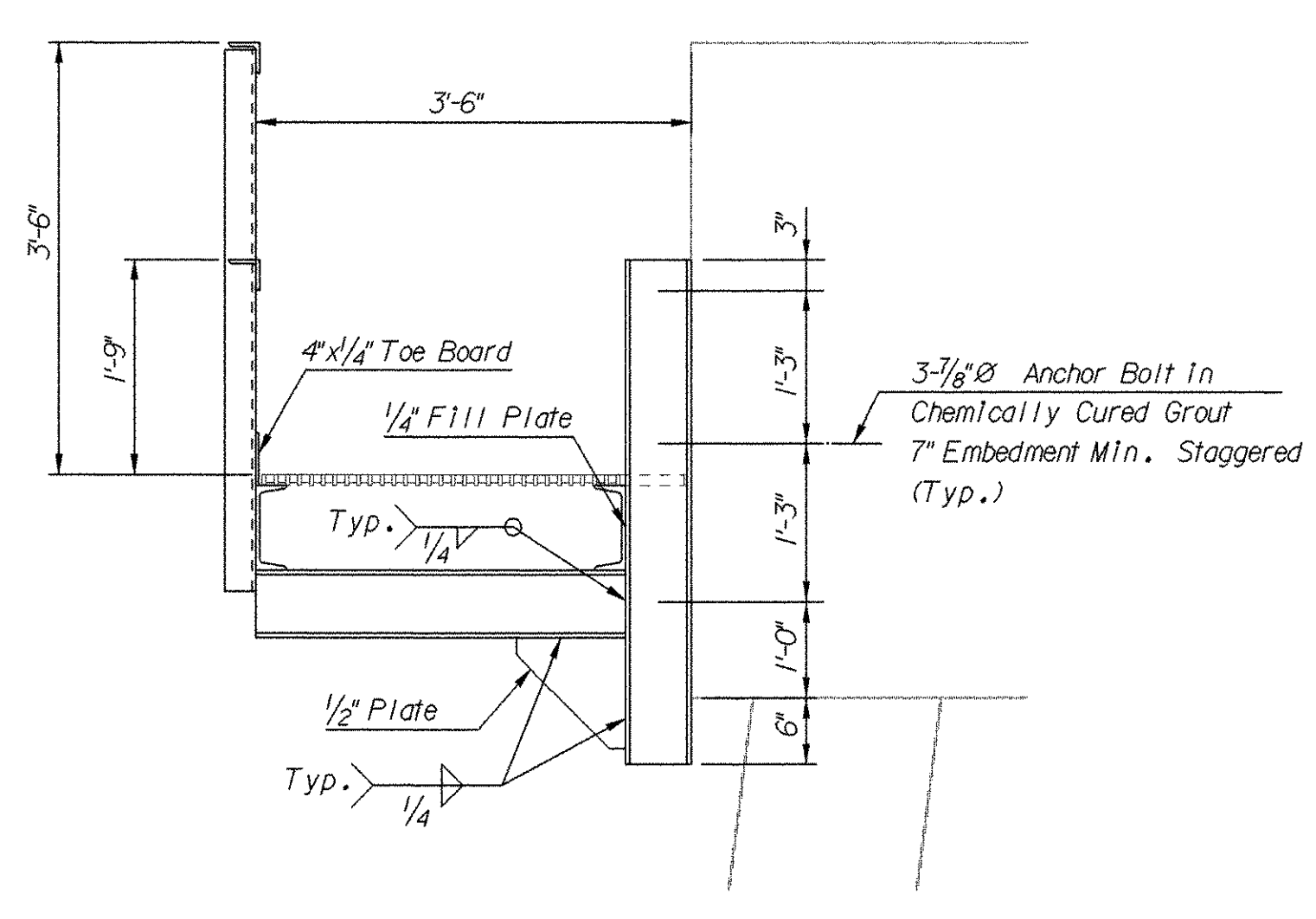
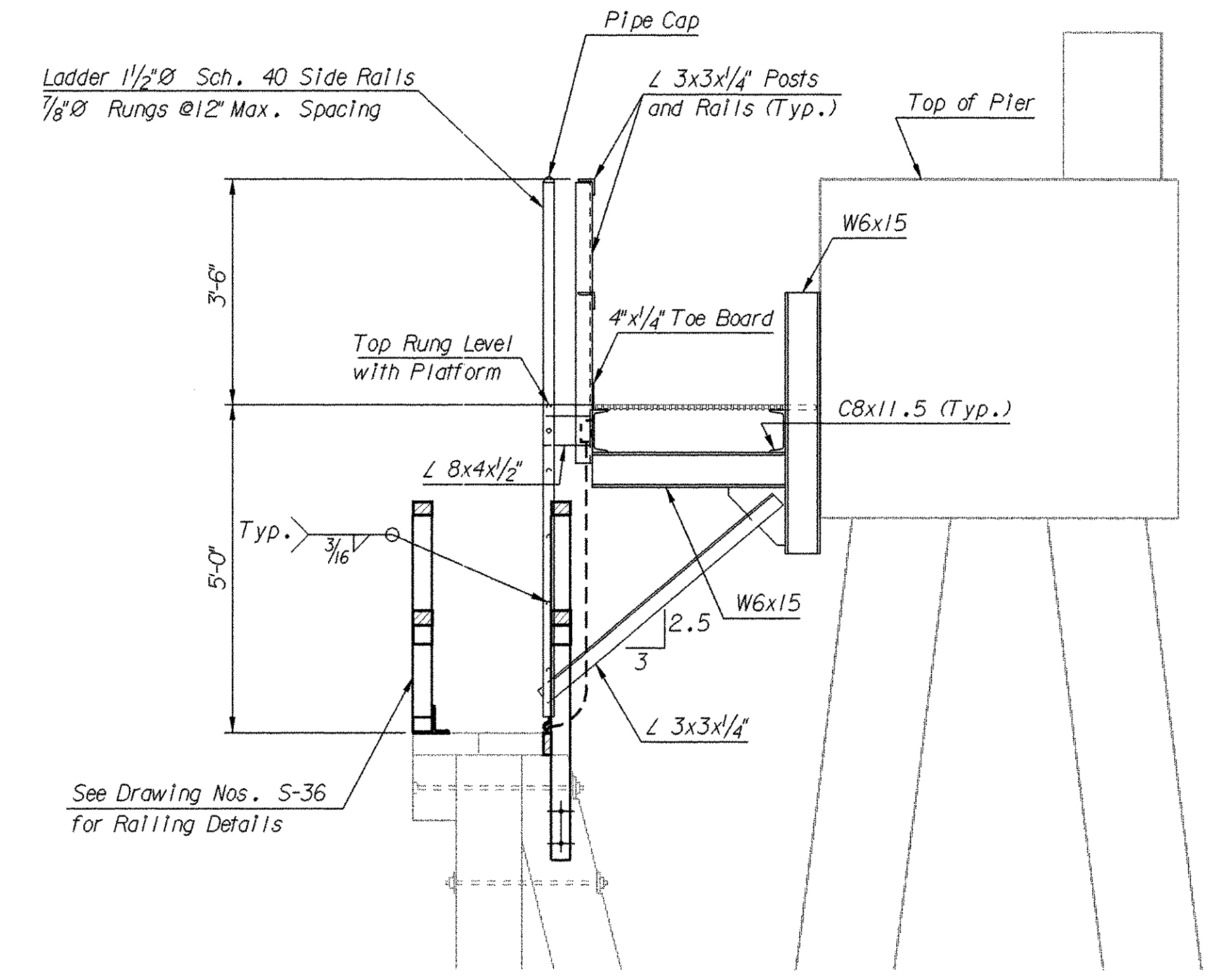
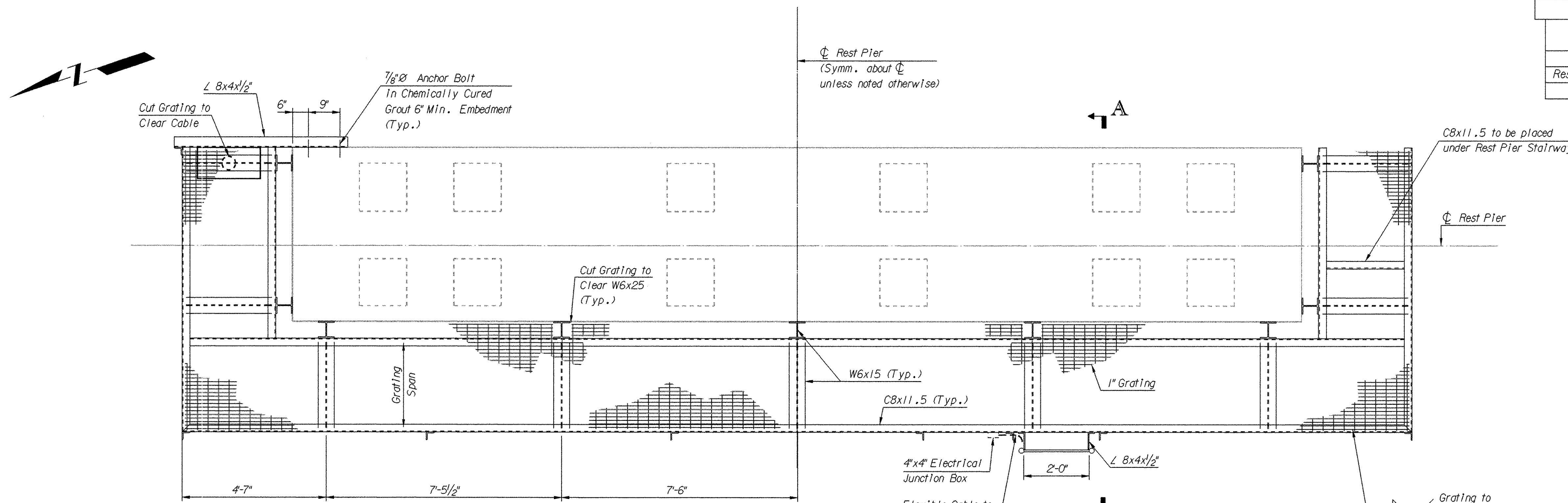
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REV.			
REV.			
REVIEWED			
QUAN.	EK	SN	2-97
DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-31

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	SC	BEAUFORT		US-21	54	115

QUANTITIES		
I T E M	UNIT	CONTRACT QUANTITY
Rest Pier Platform	L.S.	Lump Sum



- NOTES**
- All Bolts 3/4" High Strength Bolts unless noted otherwise.
 - Cost for Junction Box and Flexible Cable to Navigation Lights to be included in Pay Item Bridge Control System.
 - Cost for Submarine Cable Terminal Box Support to included in Pay Item Rest Pier Platform. Terminal Box to be paid for under Pay Item Submarine Cable.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
HARBOR RIVER

**REST PIER
PLATFORM**

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	EK	SN	2-97
DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

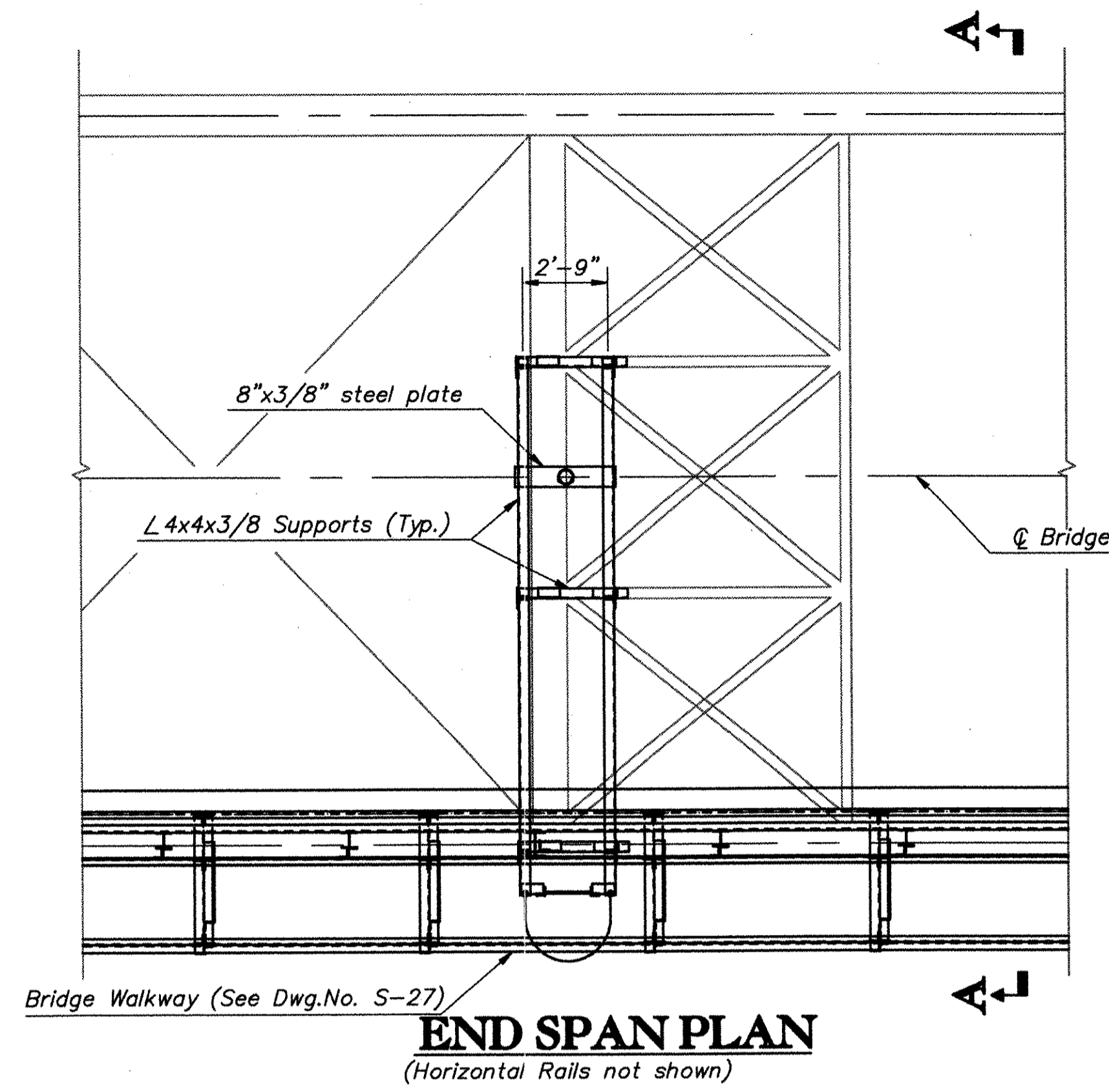
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	US-21	BEAUFORT	S-32

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	S.C.	BEAUFORT		U.S. 21	65	116

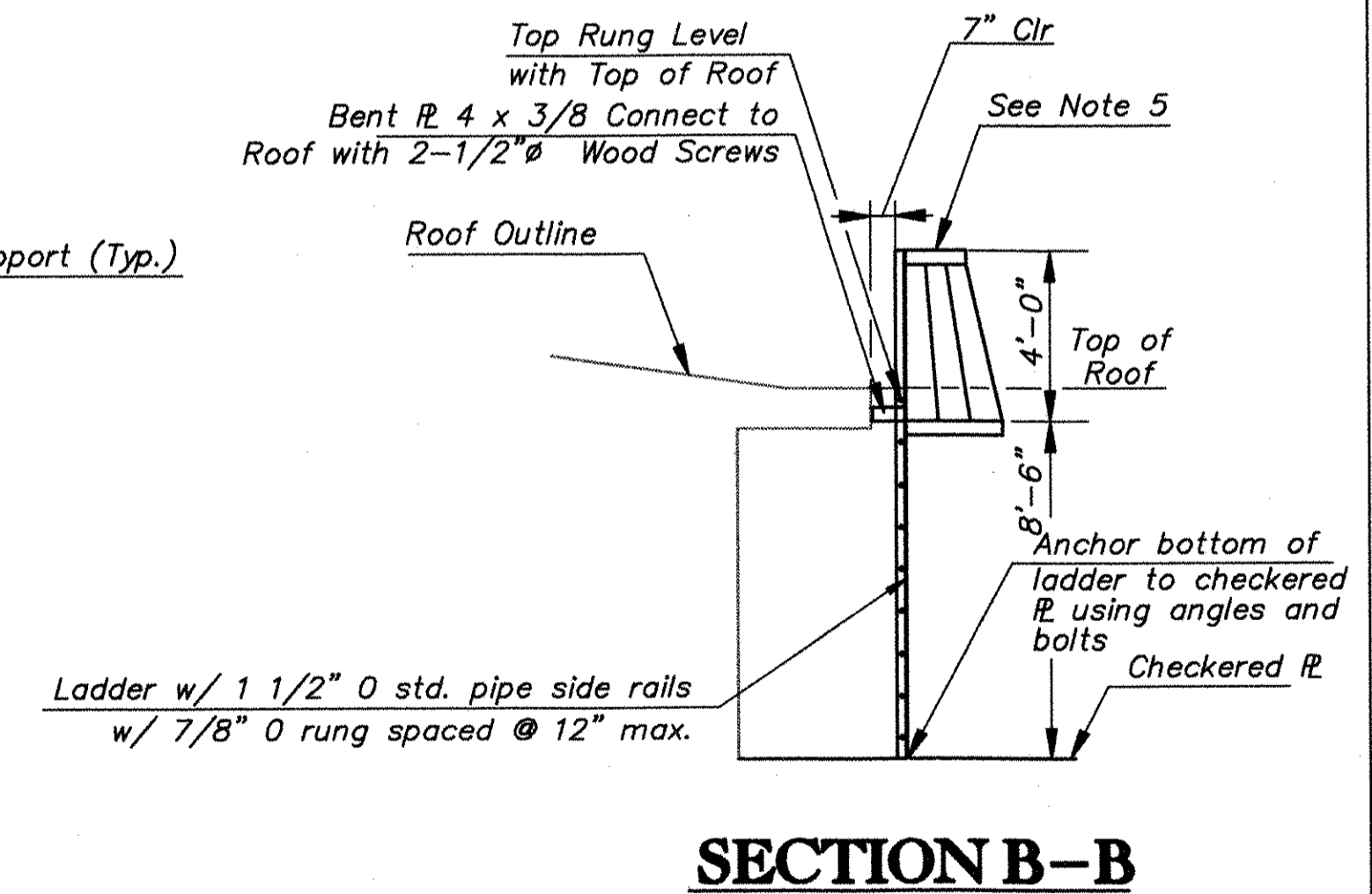
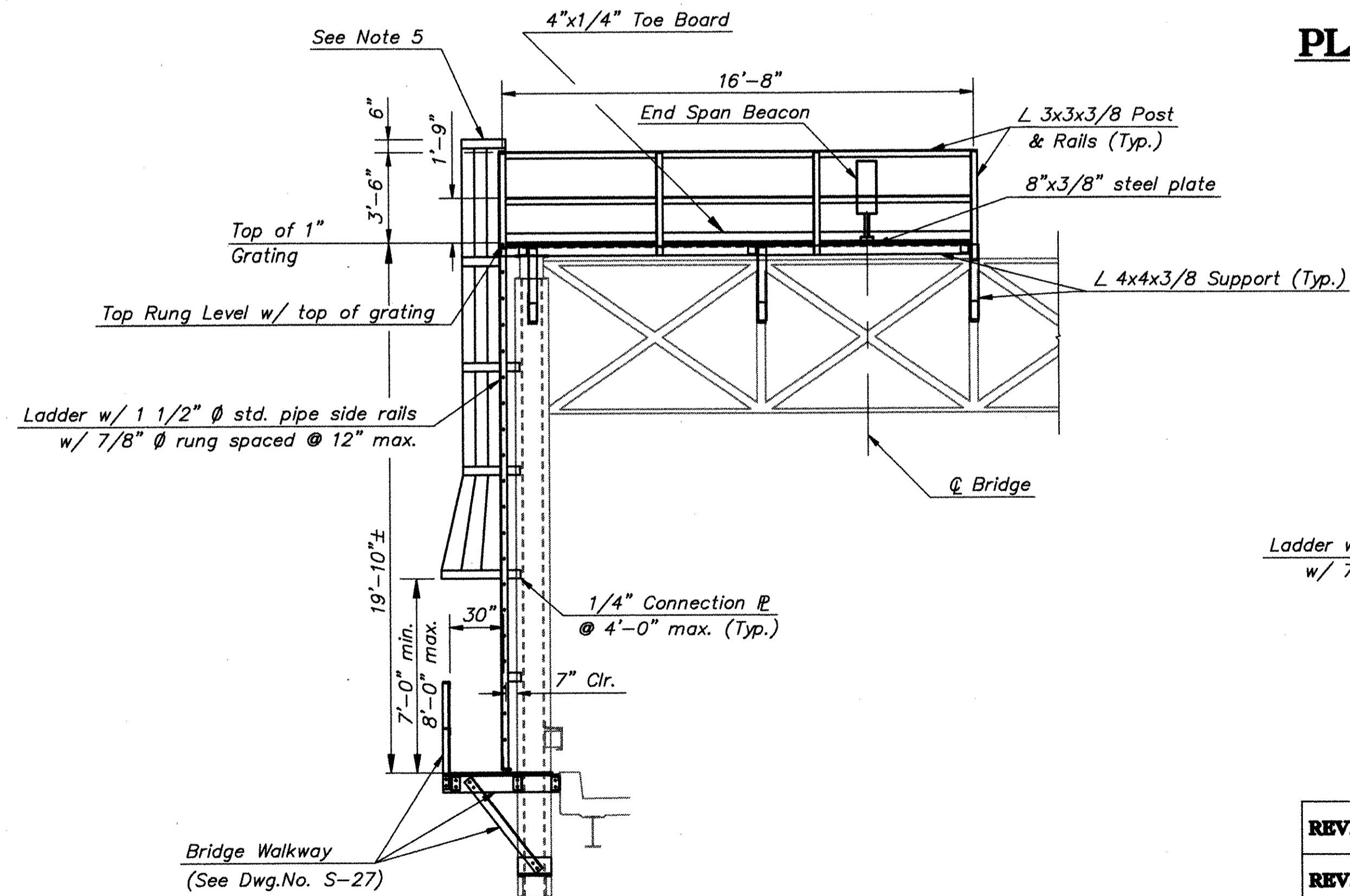
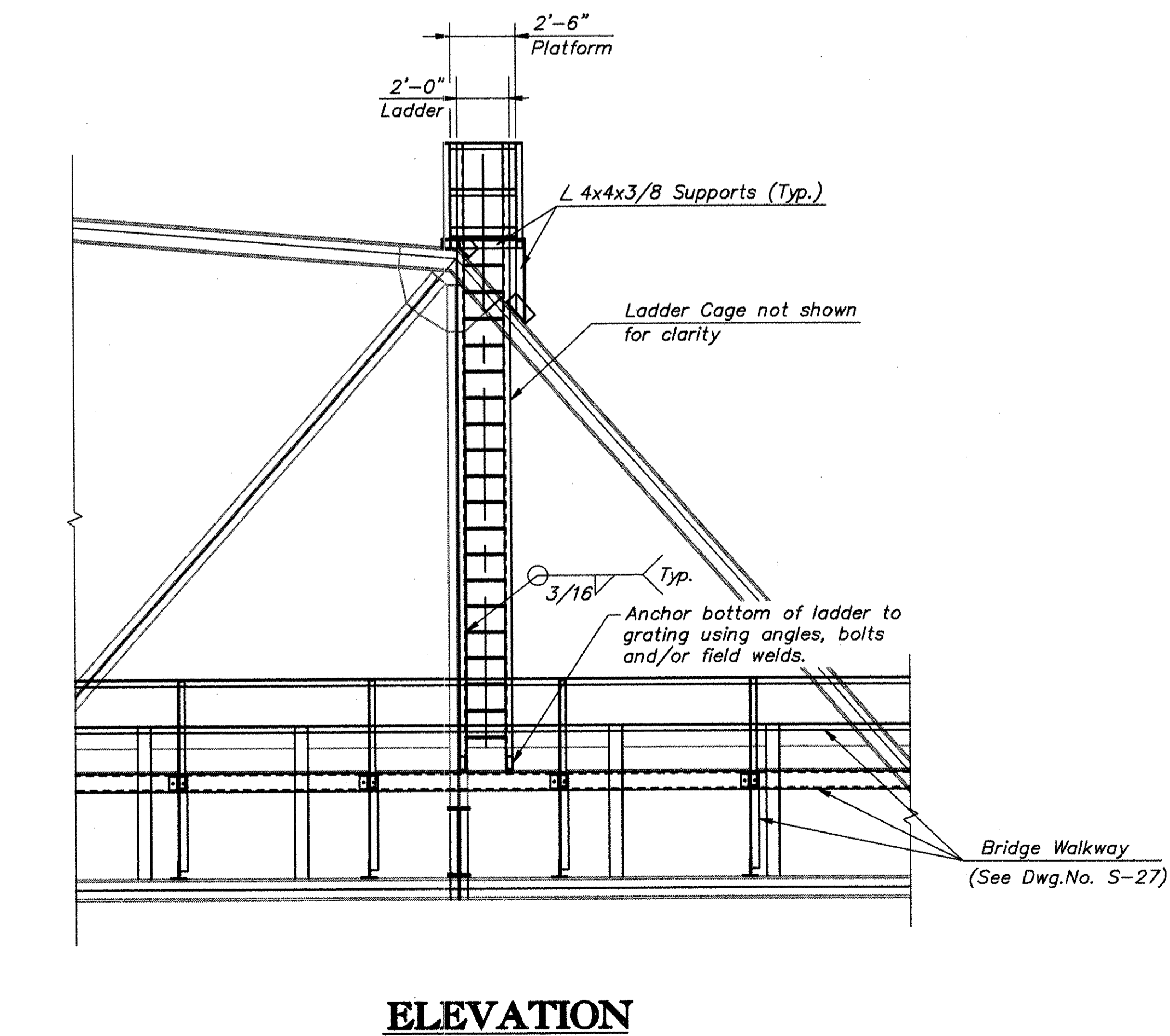
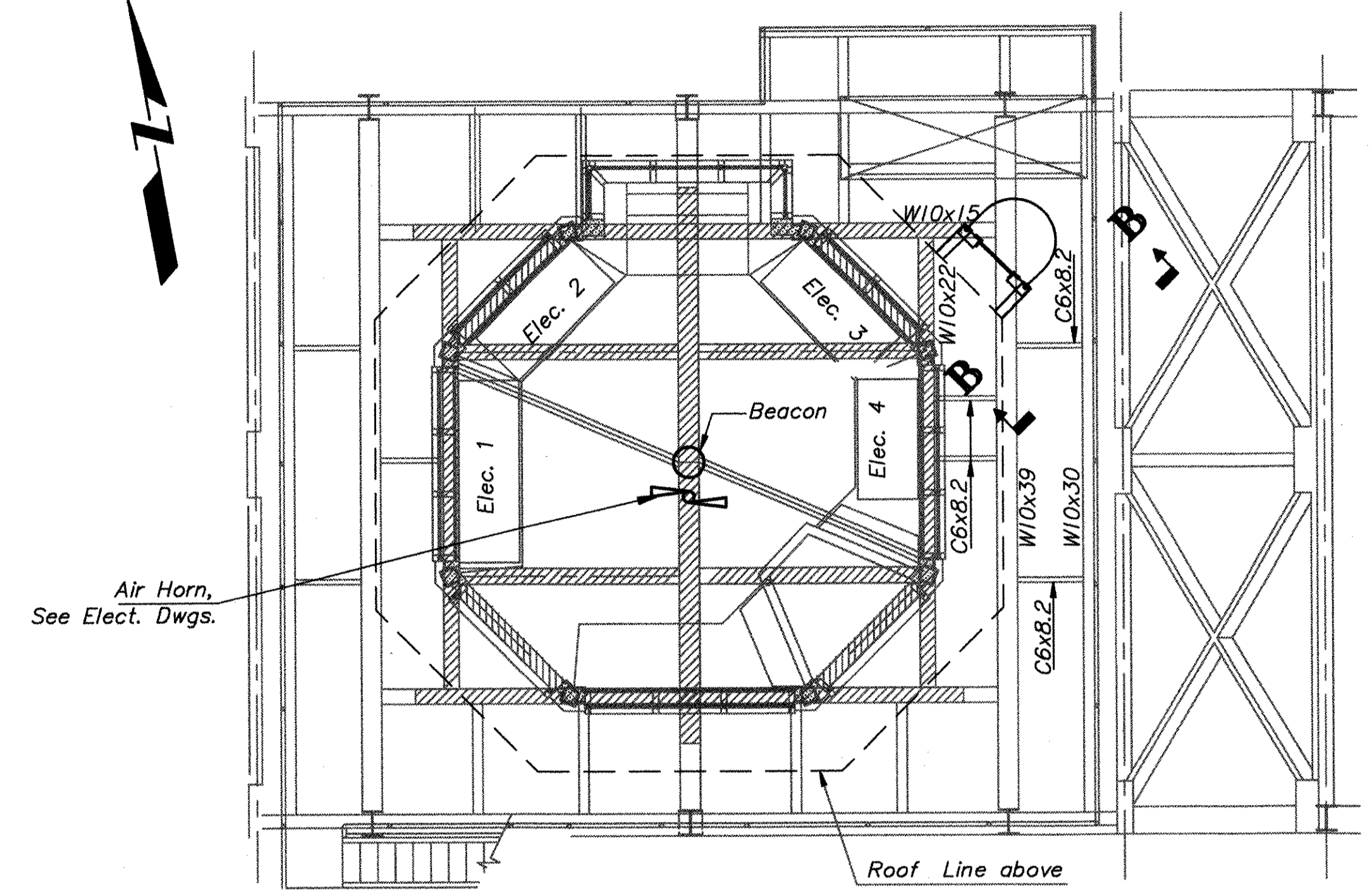
QUANTITIES

ITEM	UNIT	CONTRACT QUANTITY
End Light Access (1,690 Lbs.)	L.S.	L.S.
Center Light Access (196 Lbs.)	L.S.	L.S.



NOTES:

1. For additional railing notes, see Dwg. No. G-5
2. All Bolts shall be 3/4" Dia. bolts, unless otherwise noted.
3. All connection angles and plates shall be a minimum of 3/8" thickness unless otherwise noted.
4. The end span beacon platform shall be required at each end of bridge truss.
5. Contractor is to furnish and install a ladder cage conforming to OSHA 1910.27 to be approved by the Engineer.



HNTB ARCHITECTS ENGINEERS PLANNERS
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DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

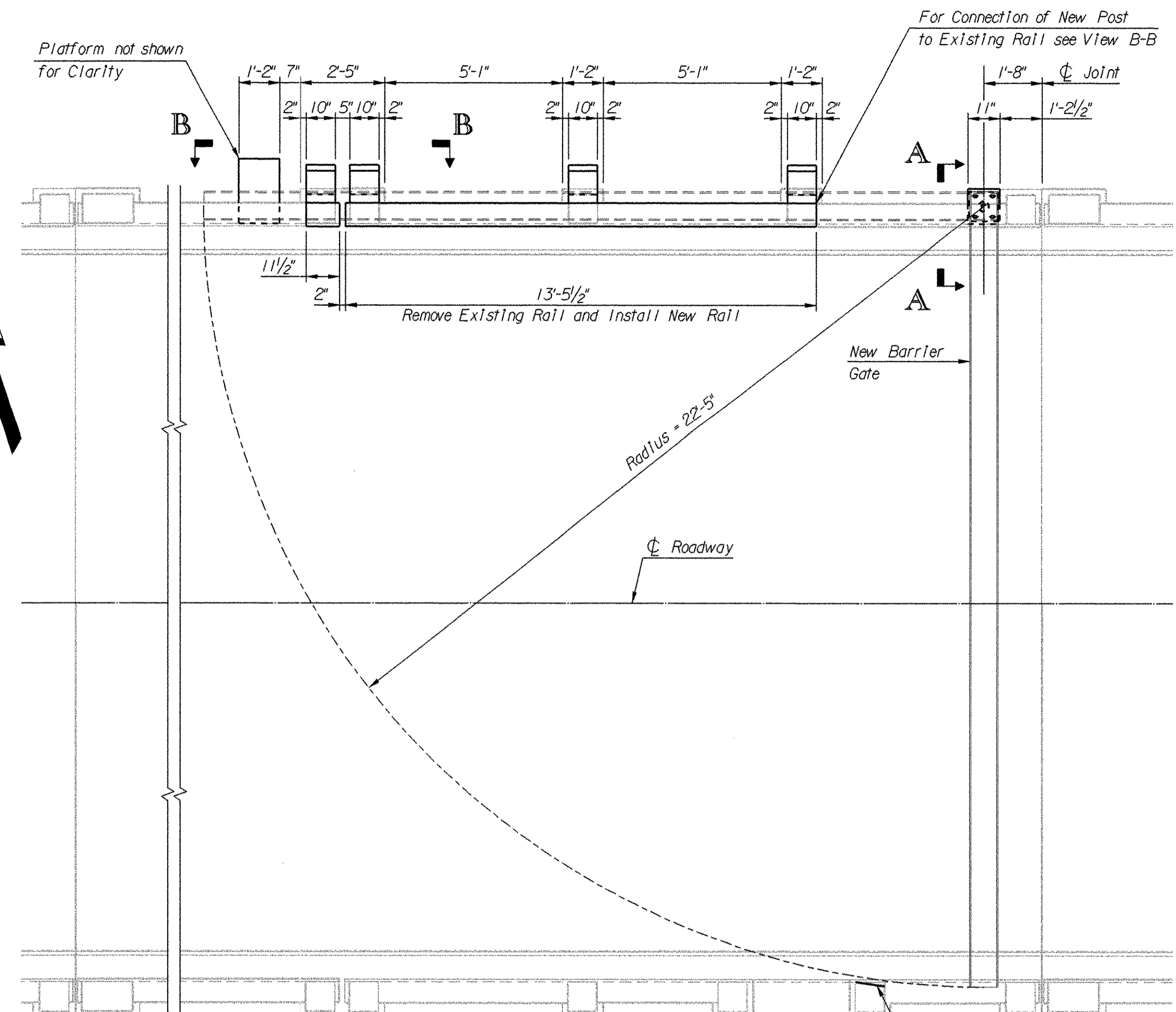
TRUSS NAVIGATIONAL BEACON ACCESS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	LDP	BAM	2-97
DR.	TQT	LDP	2-97
DES.	TQT	LDP	2-97
BY	CHK	DATE	

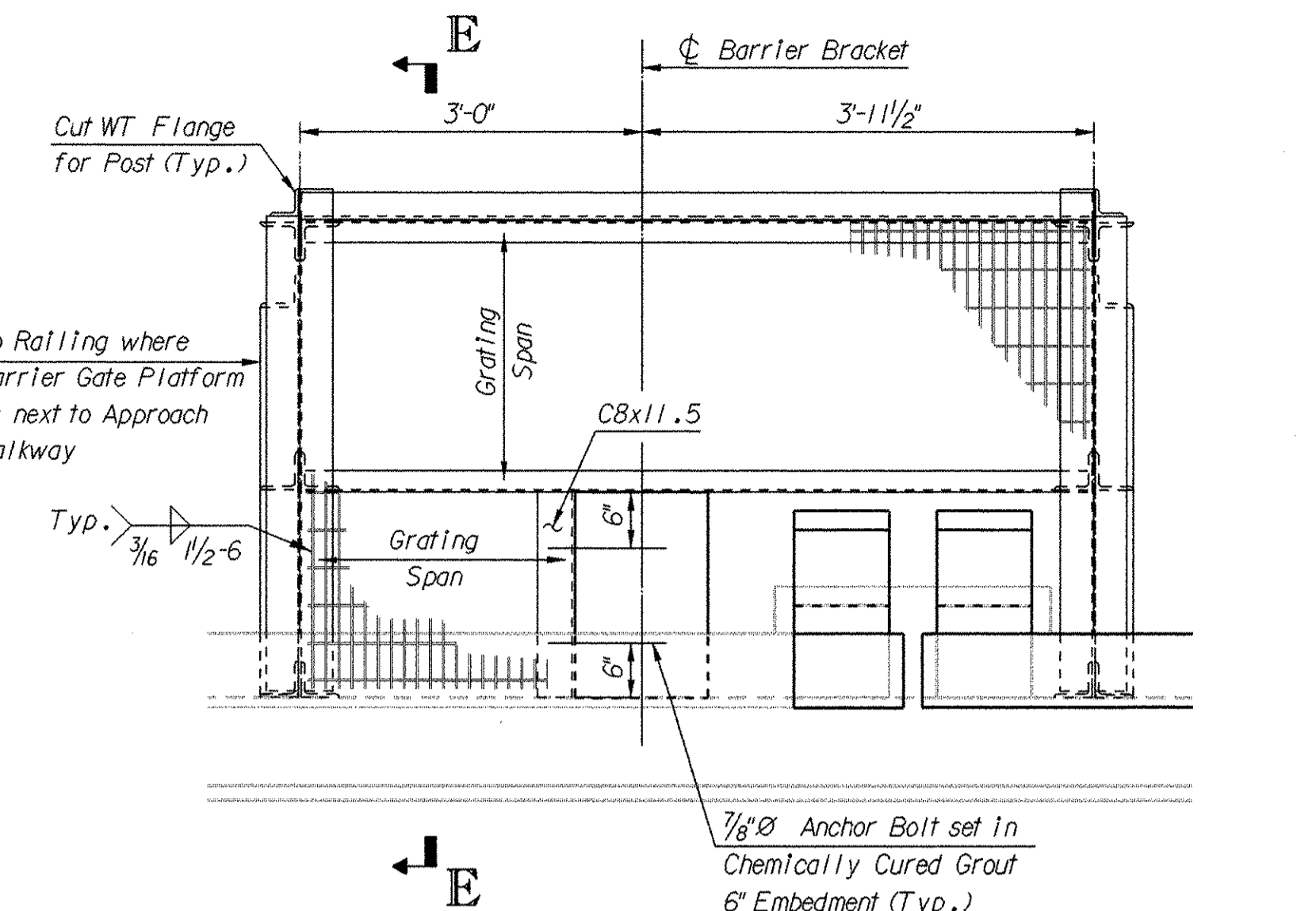
FILE NO.	ROUTE U.S. 21	COUNTY BEAUFORT	DRAWING NO. S-55
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	SC	BEAUFORT		US-21	56	115

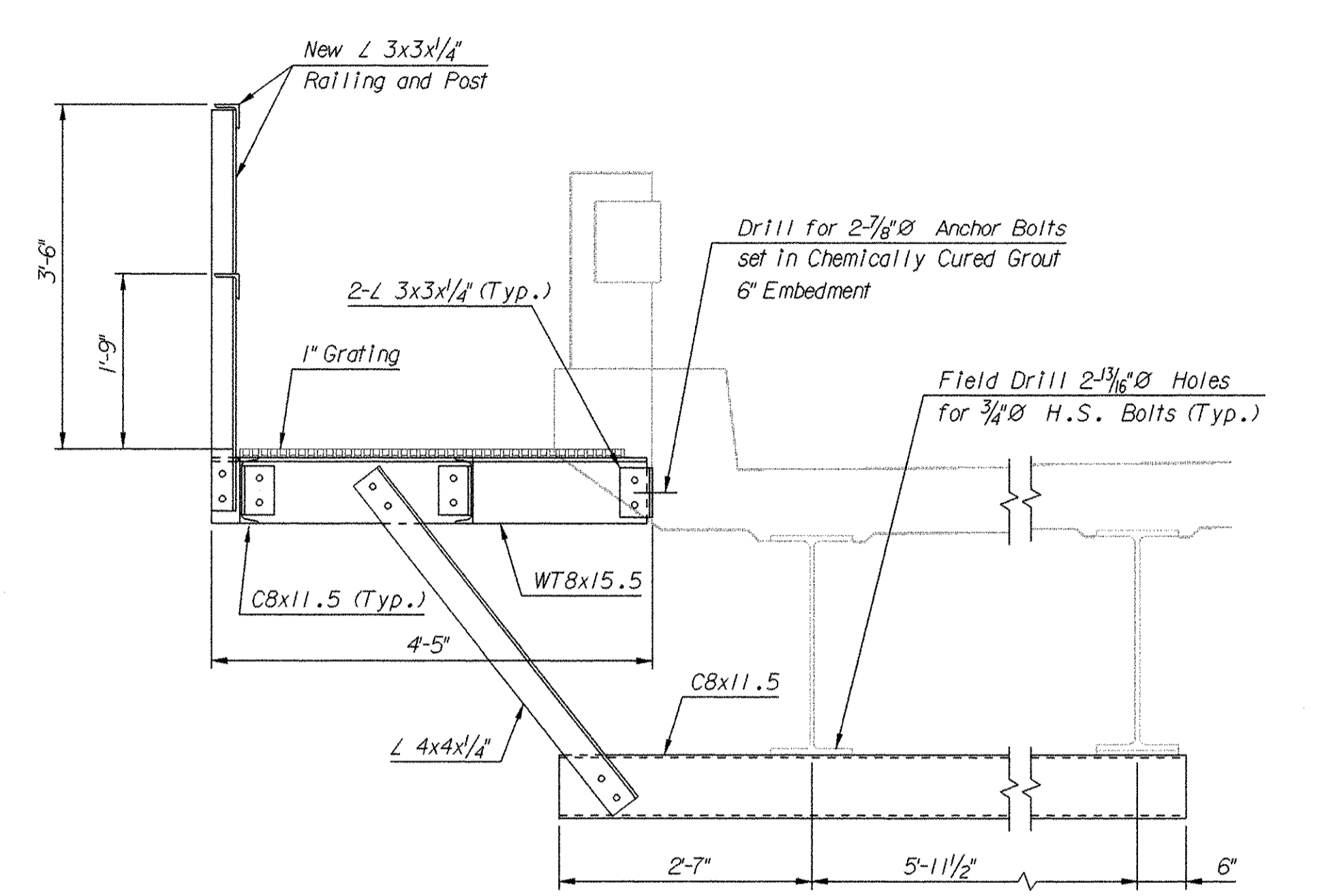
QUANTITIES		
ITEM	UNIT	CONTRACT QUANTITY
Structural Concrete	C.F.	33.2
Barrier Gate Platform	L.S.	Lump Sum



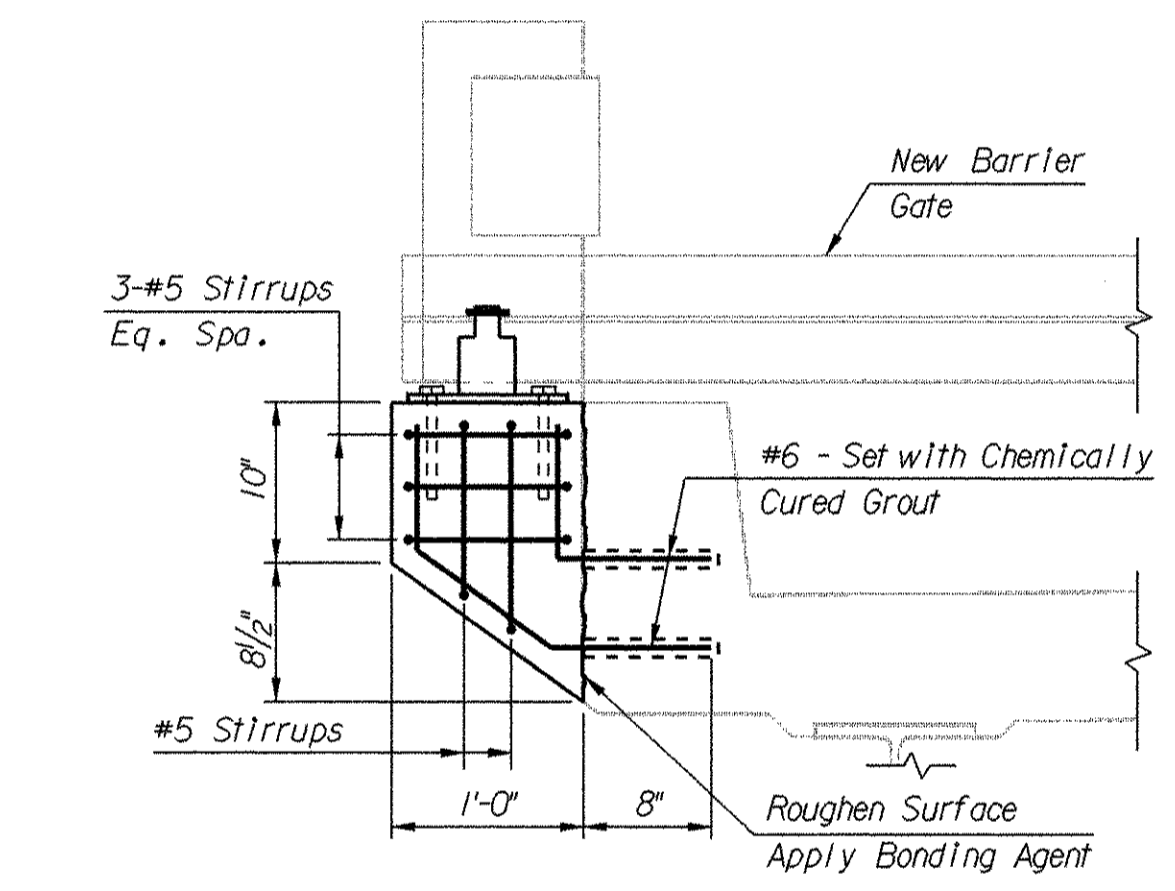
PLAN
East Barrier Gate Shown
West Similar
3/4" = 1'-0"



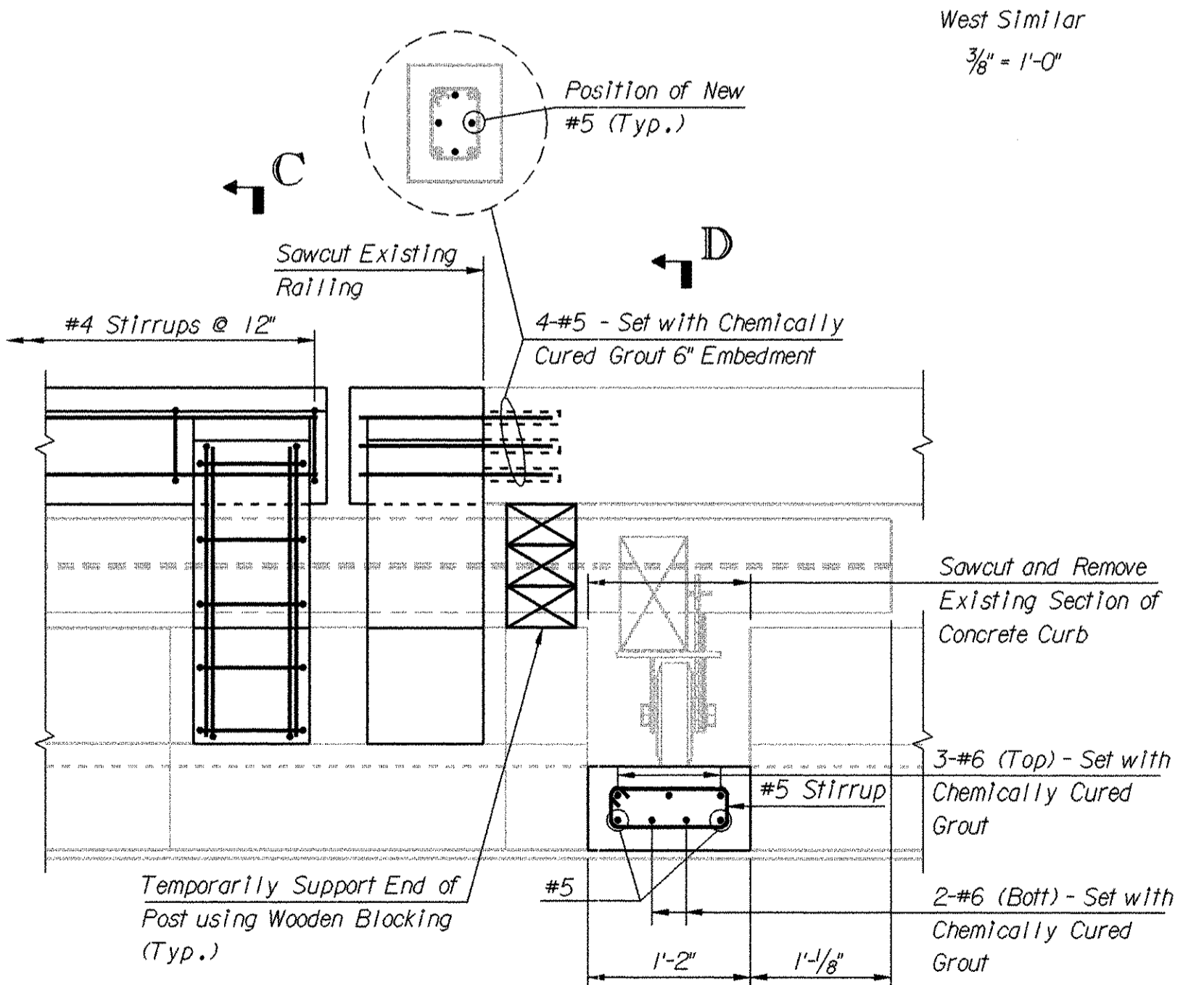
PARTIAL PLAN AT BARRIER BRACKET
(East Barrier Gate only)
3/4" = 1'-0"



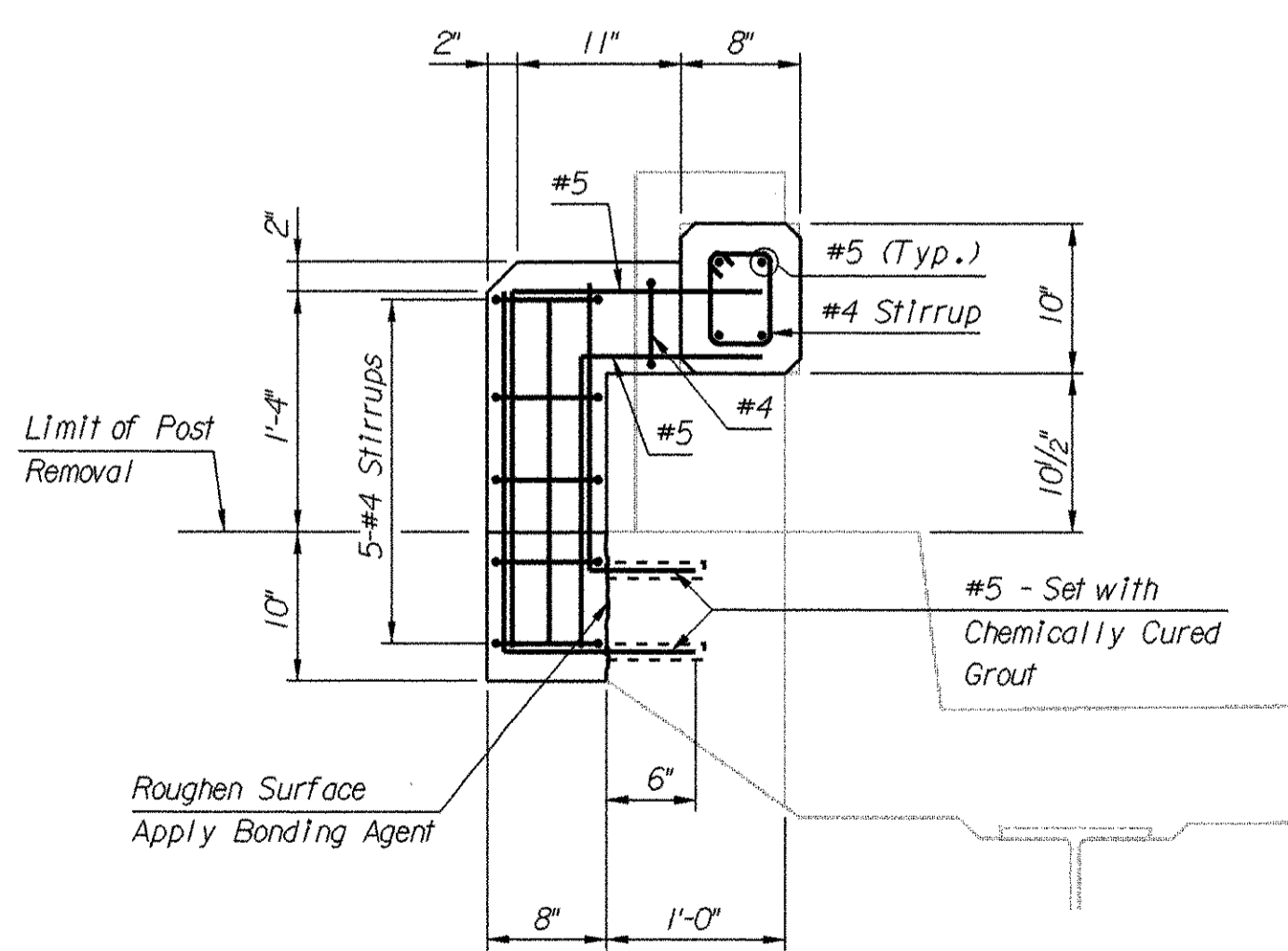
SECTION E-E
3/4" = 1'-0"



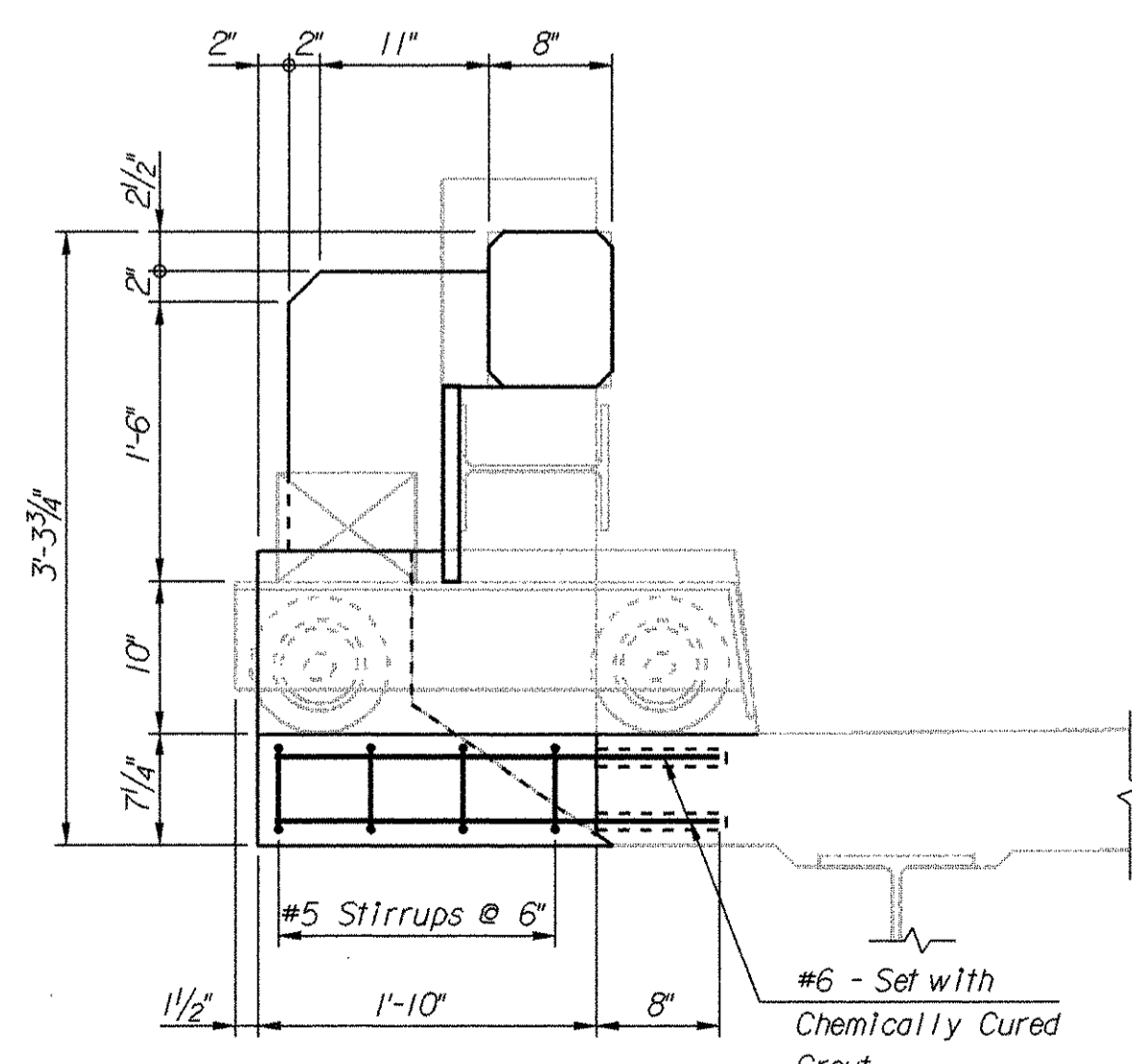
SECTION A-A
1" = 1'-0"



VIEW B-B
1" = 1'-0"



SECTION C-C
(Typical Post Reinforcing)
1" = 1'-0"



SECTION D-D
1" = 1'-0"

NOTES:

1. For Location of Modifications see Drawing No. M-22.
2. For New Barrier Gate Details see Drawing No. M-23.
3. Cost to remove Existing Concrete Railing and Posts to be Included in Pay Item "Structural Concrete".
4. All Bolts 3/4" High Strength Bolts.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

HARBOR RIVER
RAILING MODIFICATIONS

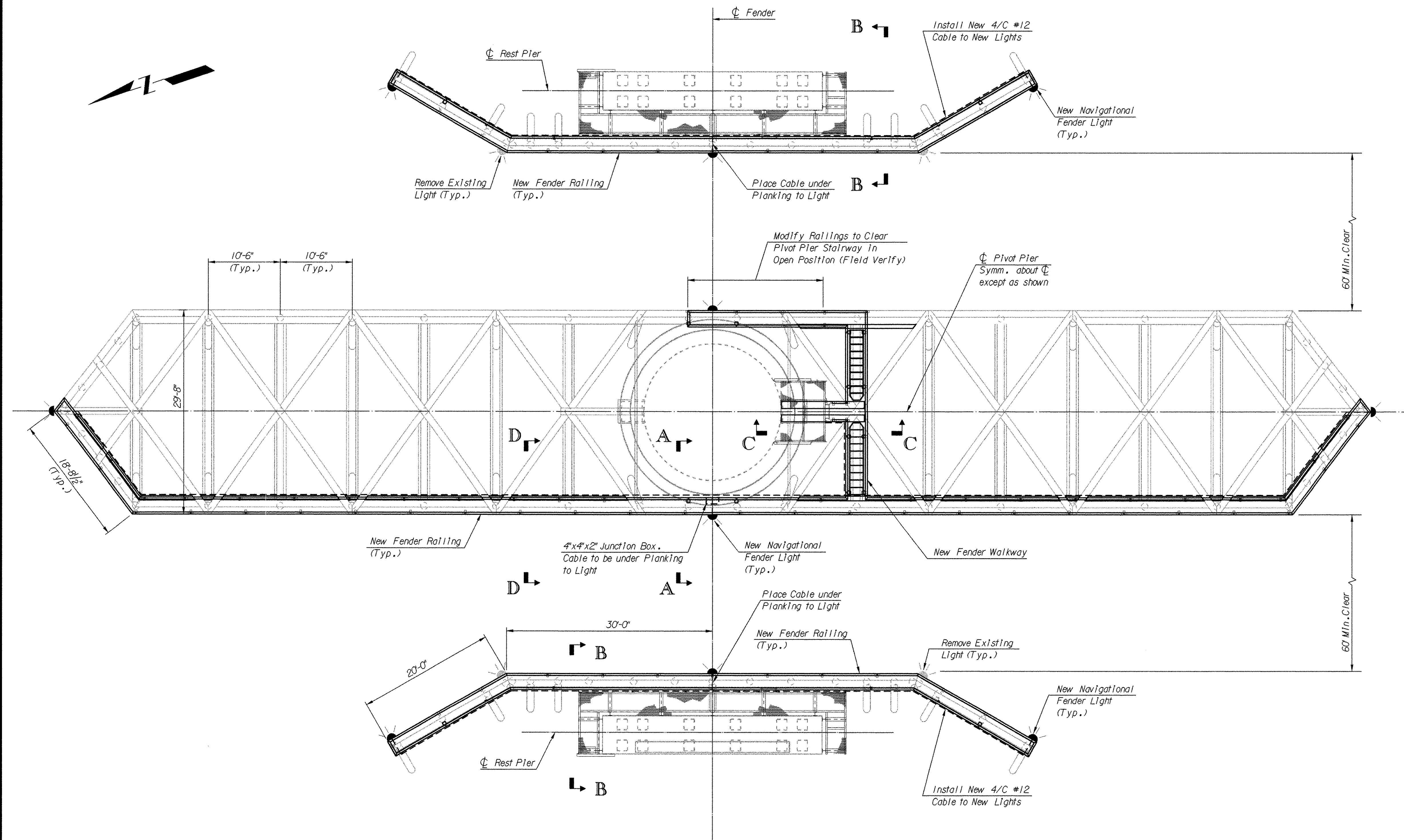
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REV.				
REV.				
REVIEWED				
QUAN.	EK	SN	2-97	
DR.	RM	SN	2-97	
DES.	SN	EK	2-97	
BY	CHK	DATE		

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	S-34

Design: E. Williams
 Plotted on: 10/1/97
 Plot Date: 10/1/97
 Plot Time: 10:10:00 AM
 Plot User: E. Williams
 Plot Device: HPGL/2

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	57	115

QUANTITIES		
I T E M	UNIT	CONTRACT QUANTITY
Treated Structural Timber	B.F.	3500



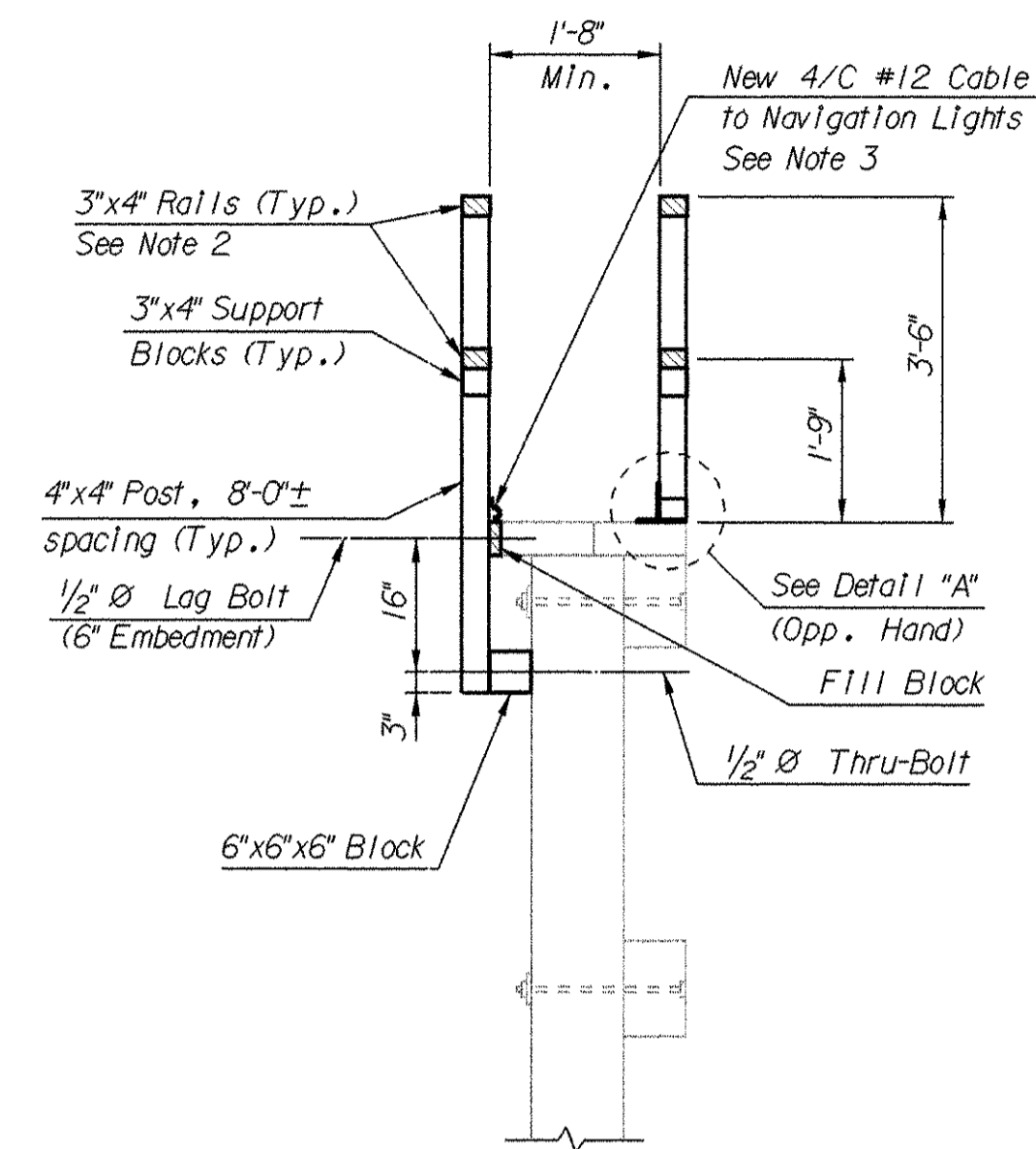
PLAN OF FENDER SYSTEM
1/8" = 1'-0"

- NOTES:**
- For Sections A-A, B-B and C-C see Drawing No. S-36.
 - Prior to installing new fender access, contractor shall examine condition of existing fender and notify the Engineer of any damage to fender which will affect the work.
 - Wood shall be pressure treated Southern Yellow Pine conforming to Section 706 of the Standard Specifications and shall be treated in accordance to Section 707 of the Standard Specifications.
 - Hardware used for the fender access shall be galvanized steel conforming to Section 708 of the Standard Specifications. Price for hardware shall not be paid as a separate item. Payment for furnishing and installing hardware shall be included in the unit price bid for Treated Structural Timber.
 - Cost for removal of existing and installation of new navigation lights, junction boxes, cable and hardware shall be included in Pay Item Bridge Control System.

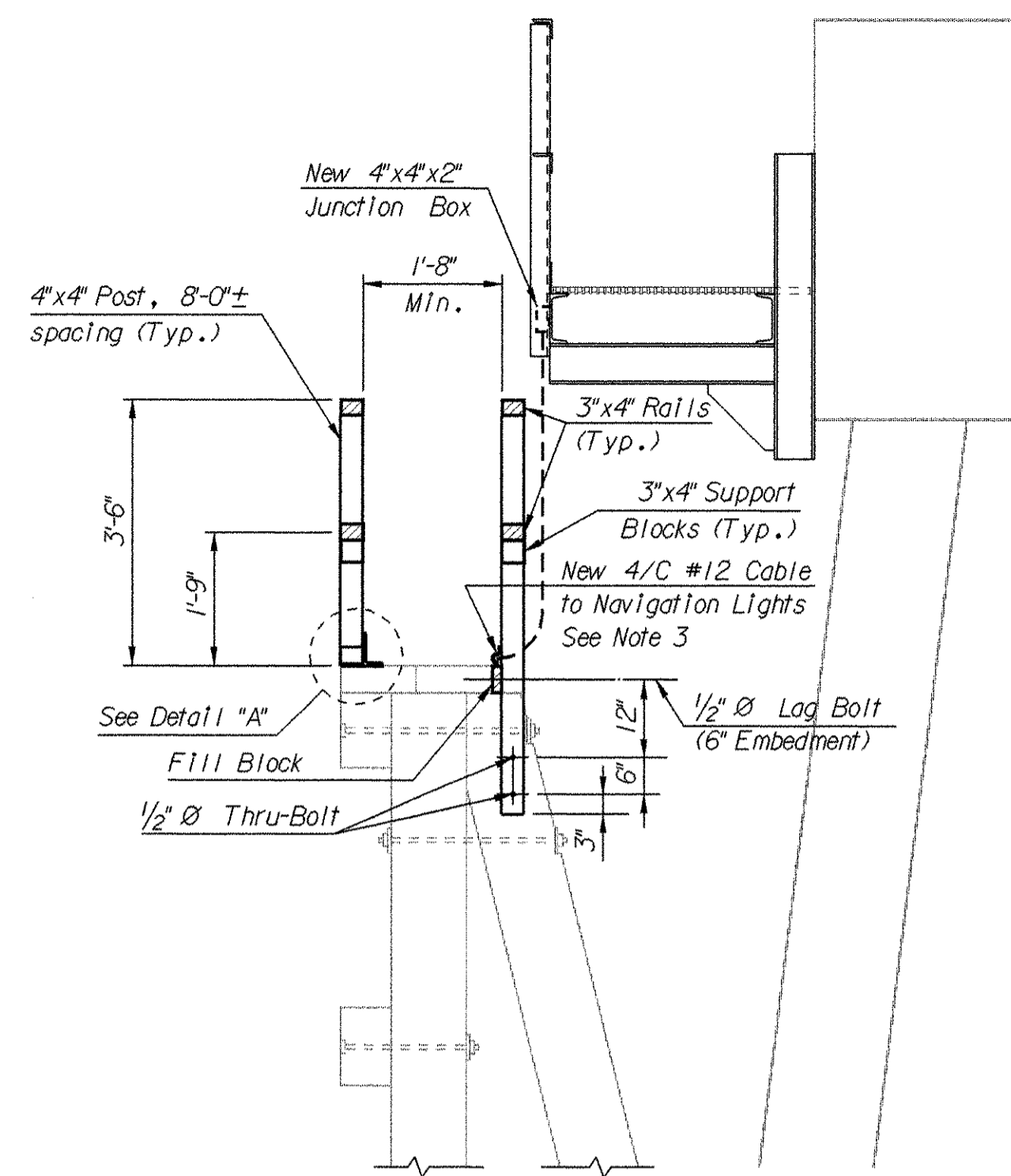
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REV.							
REV.							
REVIEWED				FILE NO.	ROUTE	COUNTY	DRAWING NO.
QUAN.	EK	SN	2-97	US-21	BEAUFORT	S-35	
DR.	RM	SN	2-97				
DES.	SN	EK	2-97				
BY CHK. DATE							

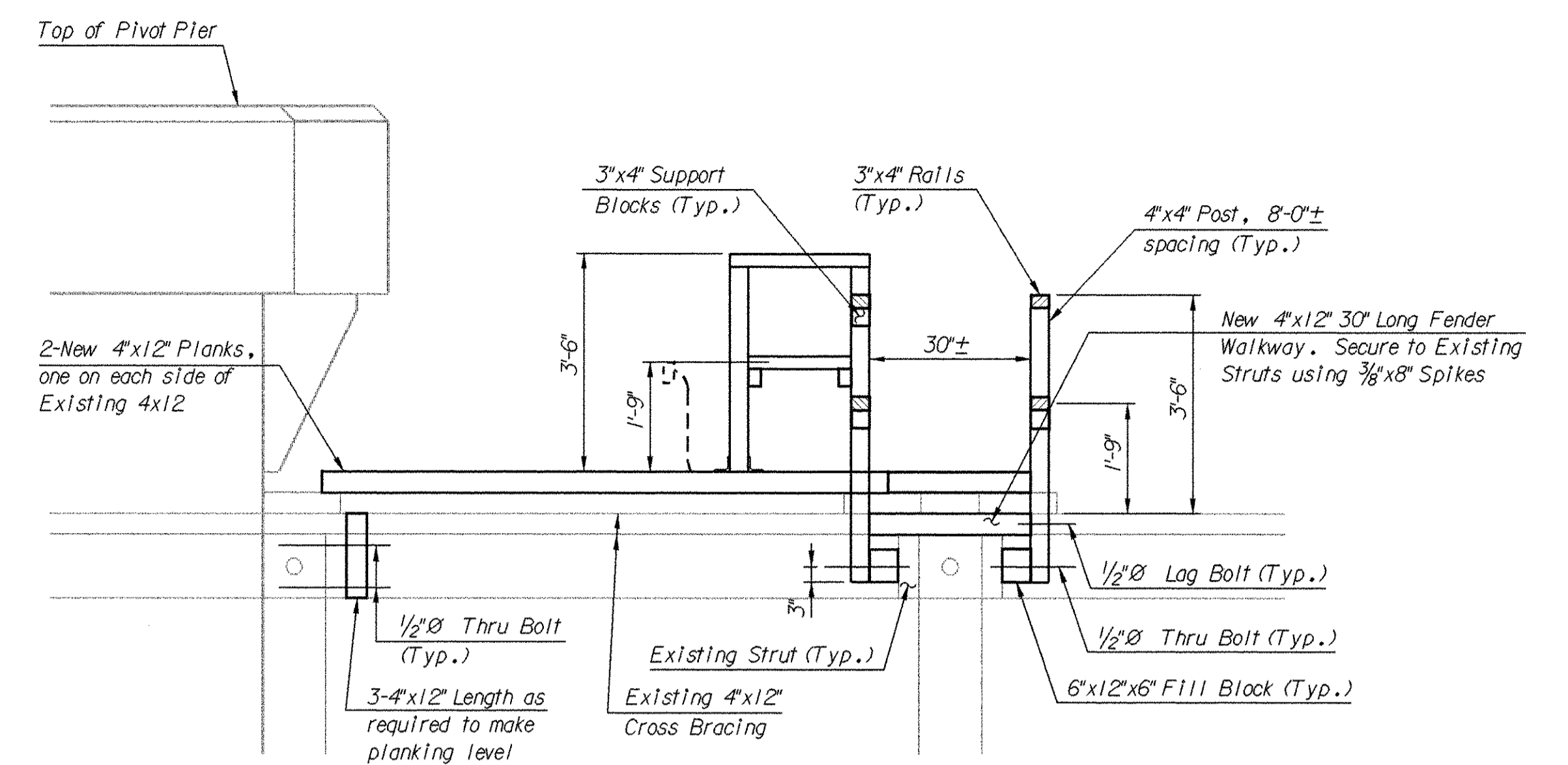
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	SC	BEAUFORT		US-21	58	115



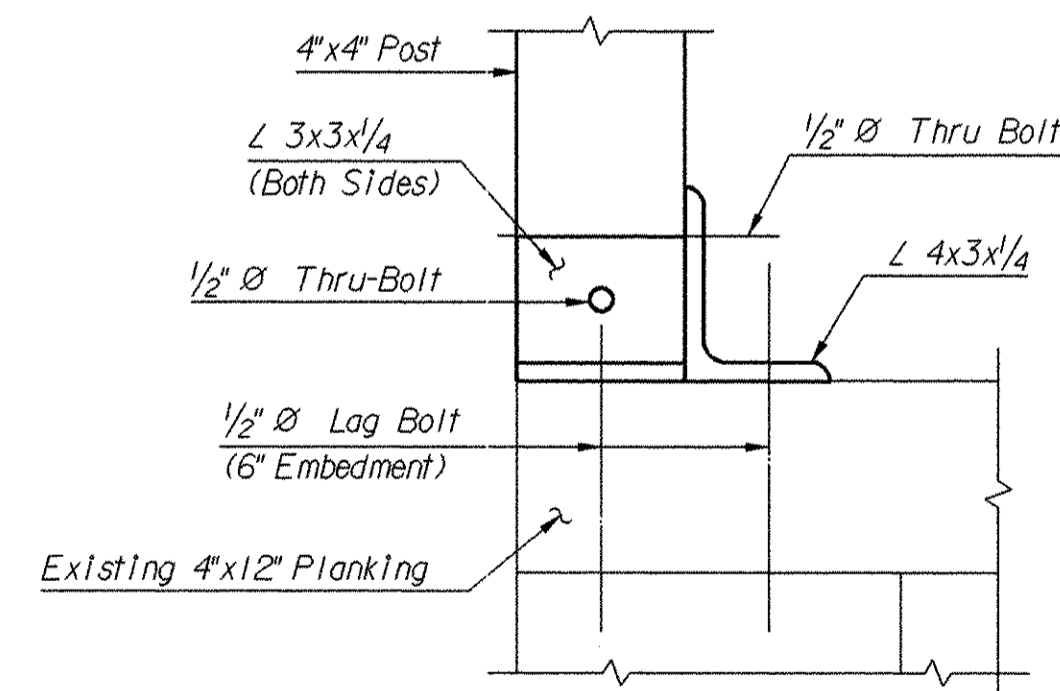
SECTION A-A
1/2" = 1'-0"



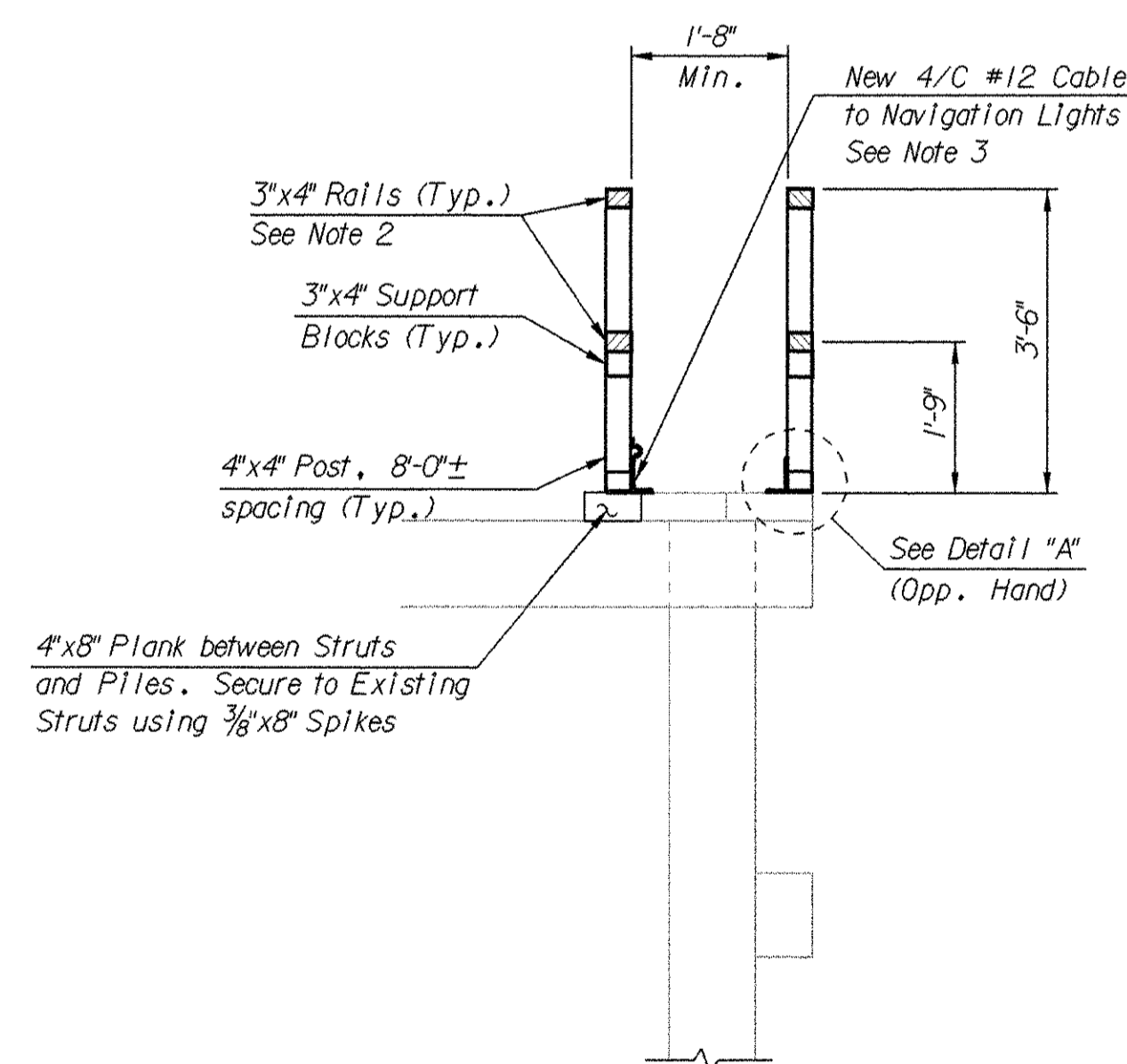
SECTION B-B
1/2" = 1'-0"



SECTION C-C
(New Pivot Pier Platform not shown)
1/2" = 1'-0"



DETAIL A
3" = 1'-0"



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

NOTES

1. For Location of Sections A-A, B-B and C-C see Drawing No. S-35.
2. Rails to be fastened to posts using 2-40d Nails at each location.
3. Navigation Light Cable to be secured to each post (8'-0"± max. spacing) using Cable Strap SECL-1U manufactured by Appleton Electric Company.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.
HARBOR RIVER

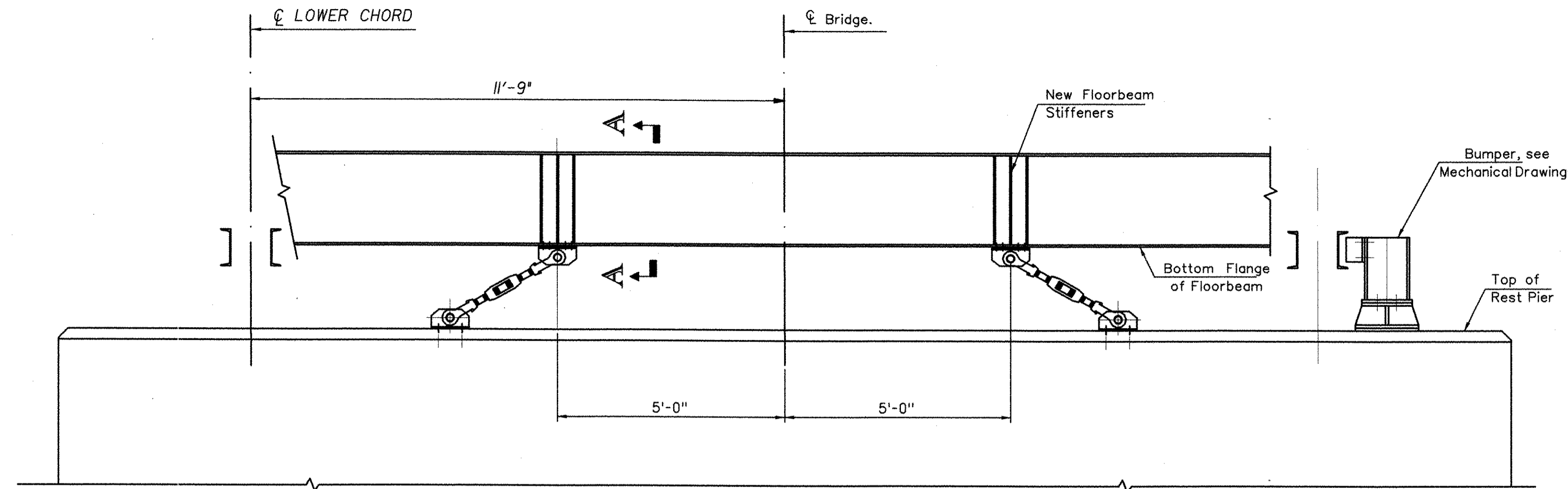
FENDER SECTIONS AND DETAILS

REV.									
REV.									
REV.									
REVIEWED									
QUAN.	EK	SN	2-97						
DR.	RM	SN	2-97						
DES.	SN	EK	2-97						
BY	CHK.	DATE							
FILE NO.	ROUTE	COUNTY	DRAWING NO.						
	US-21	BEAUFORT	S-36						

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	S.C.	Beaufort		US-21	59	115

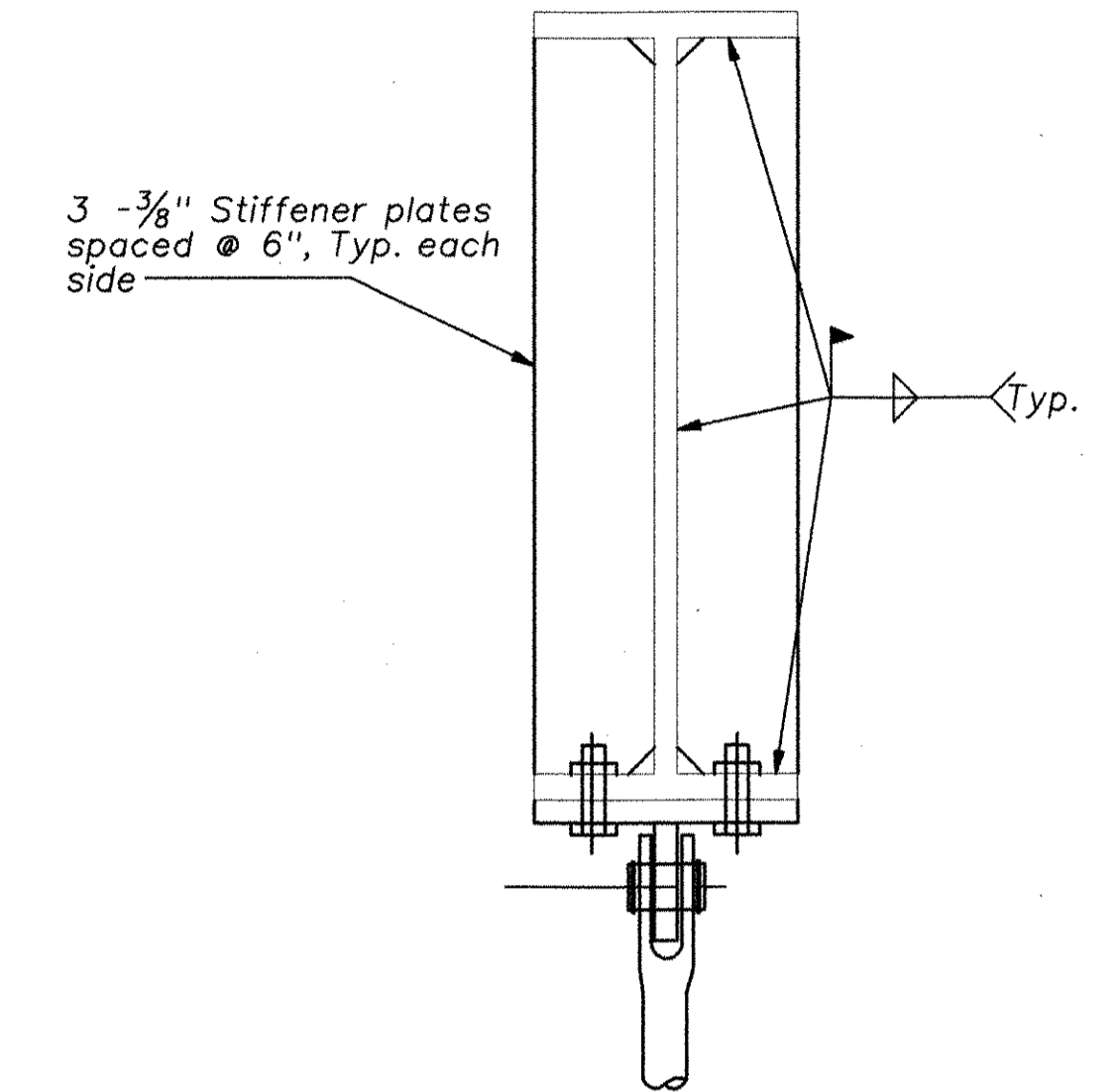
QUANTITIES

ITEM	UNIT	QUANTITY
Hurricane Tie Down	Lump Sum	Lump Sum

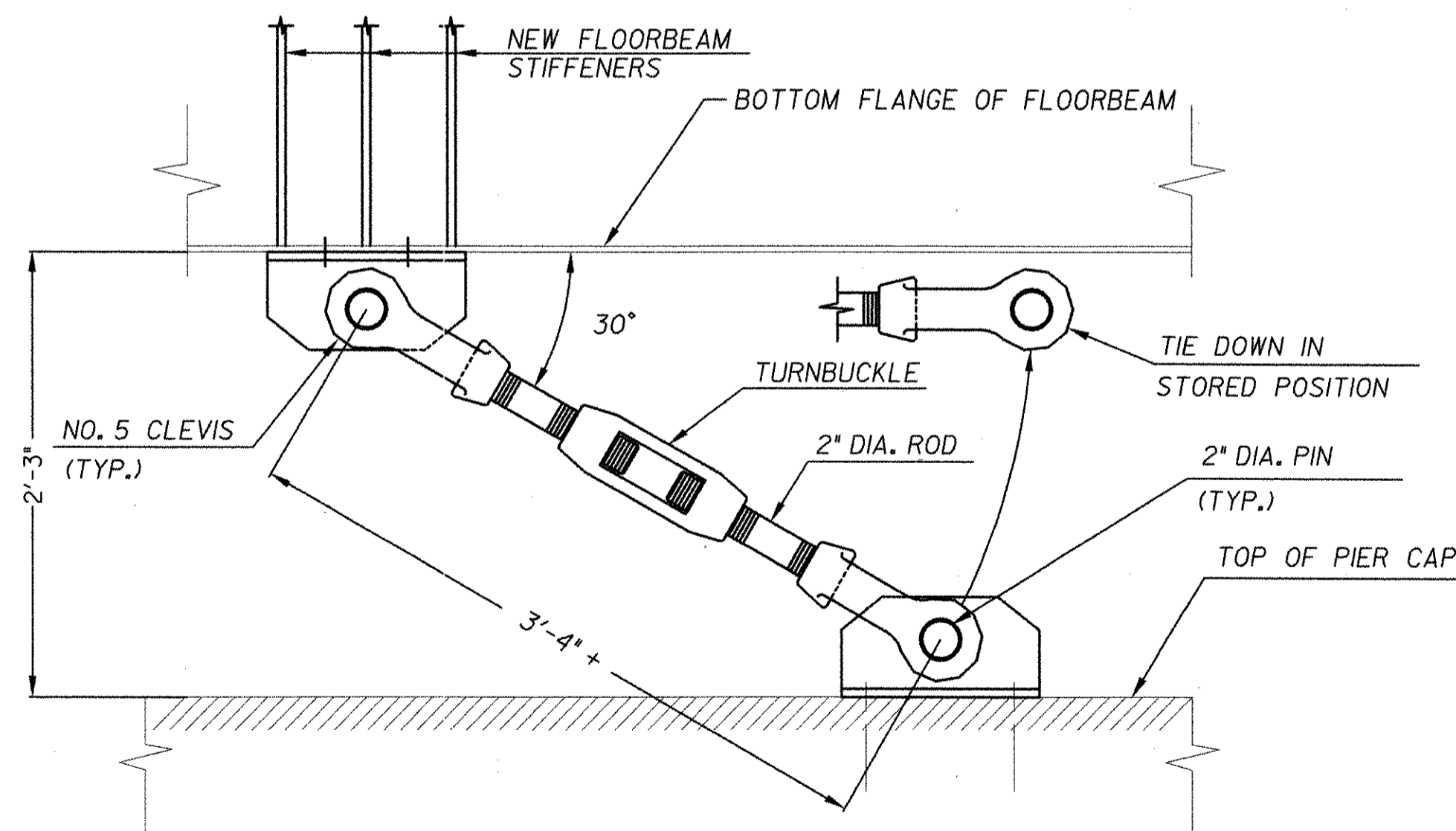


ELEVATION

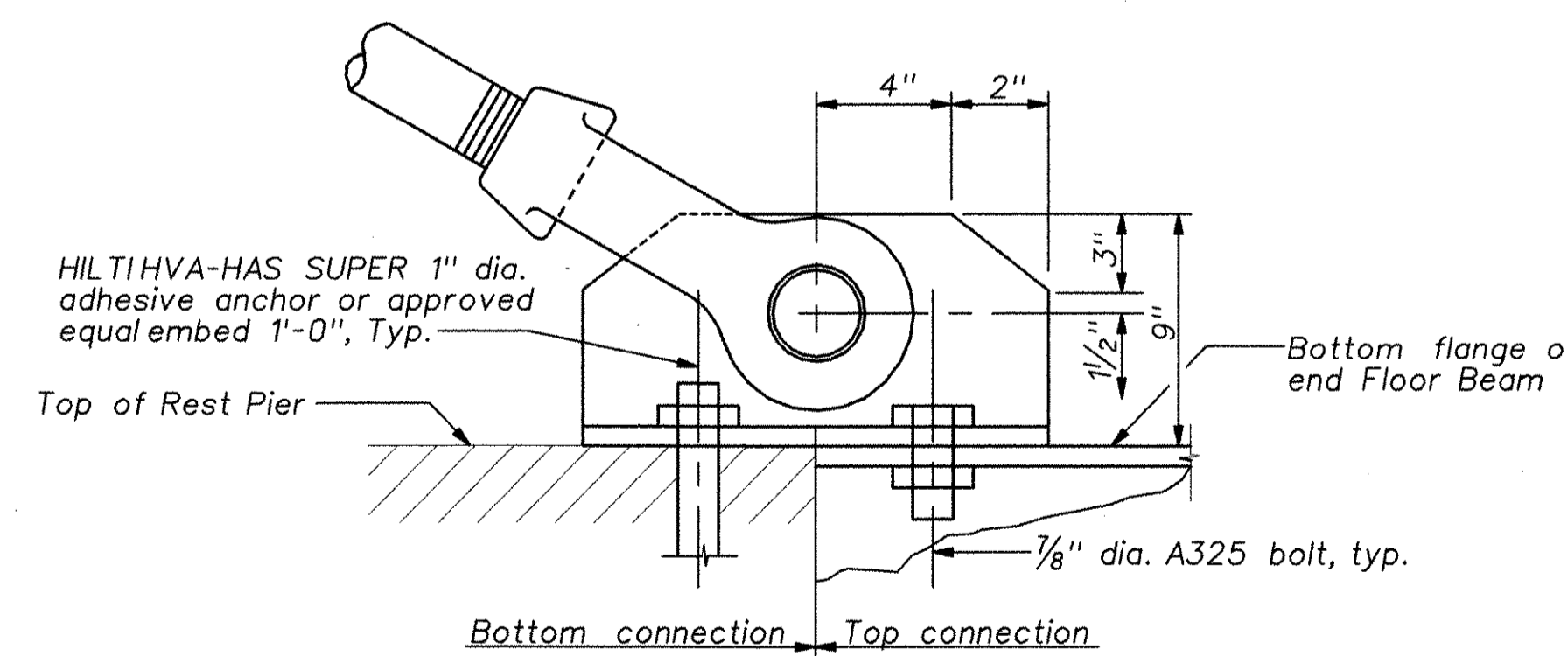
East Rest pier Shown
West rest Pier Similar
1/2"-1'-0"



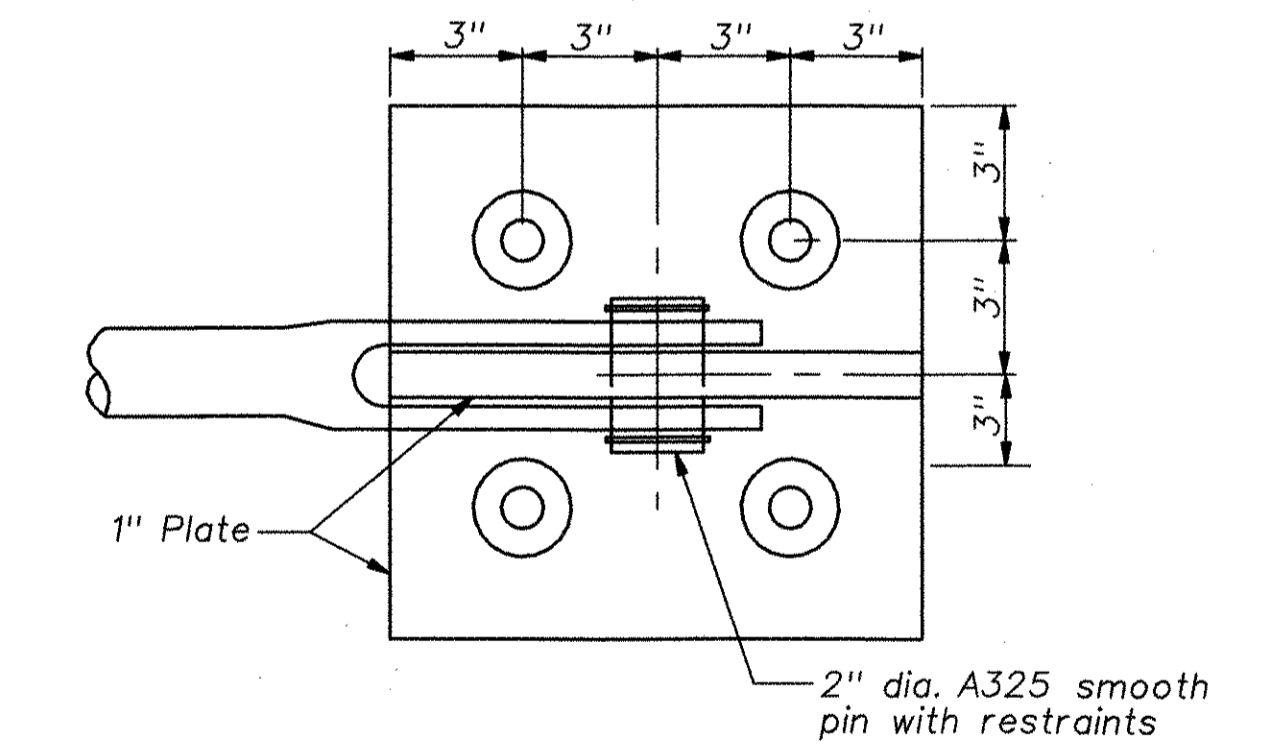
SECTION A-A



TIE DOWN DETAIL



CONNECTION DETAIL-ELEVATION



CONNECTION DETAIL-PLAN

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	LDP	BAM	2/97
DR.	LDP	BAM	2/97
DES.	LDP	BAM	2/97
BY	CHK	DATE	

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

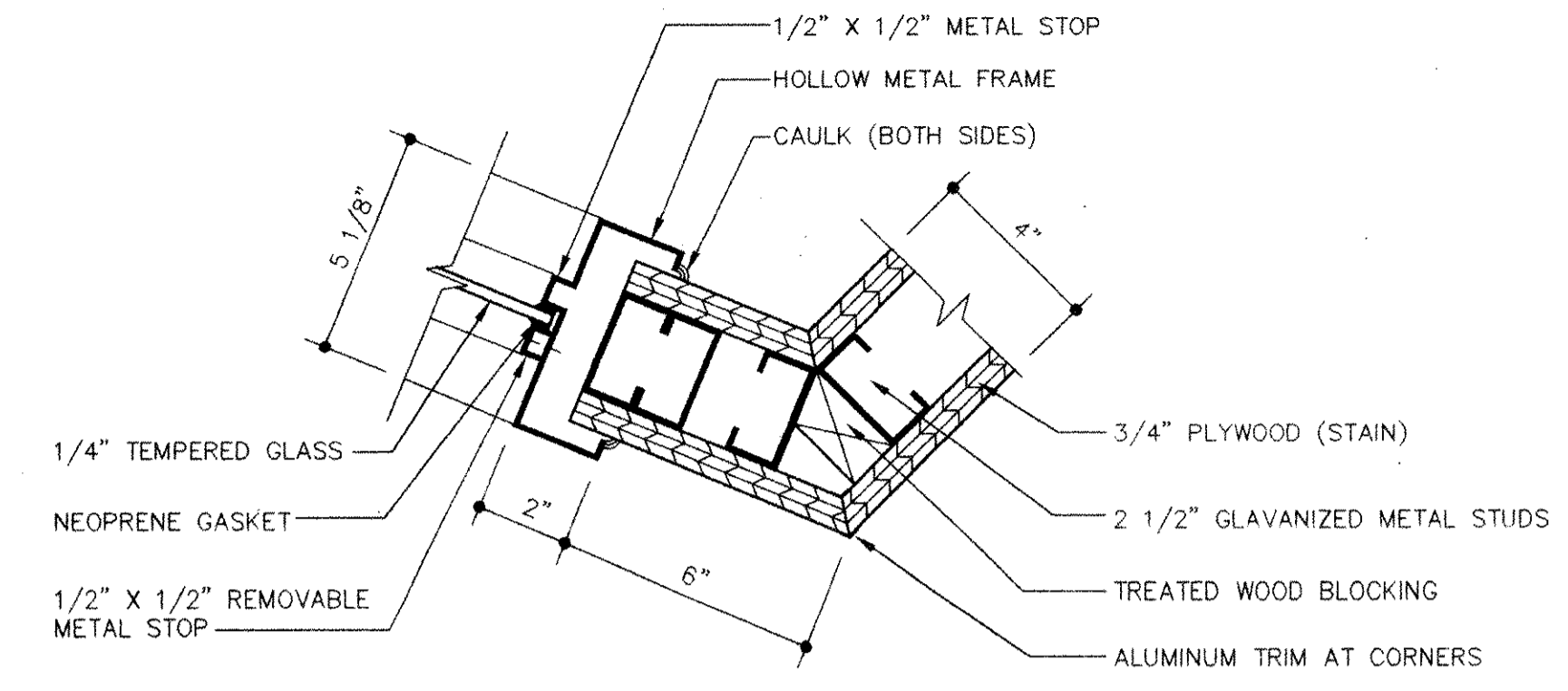
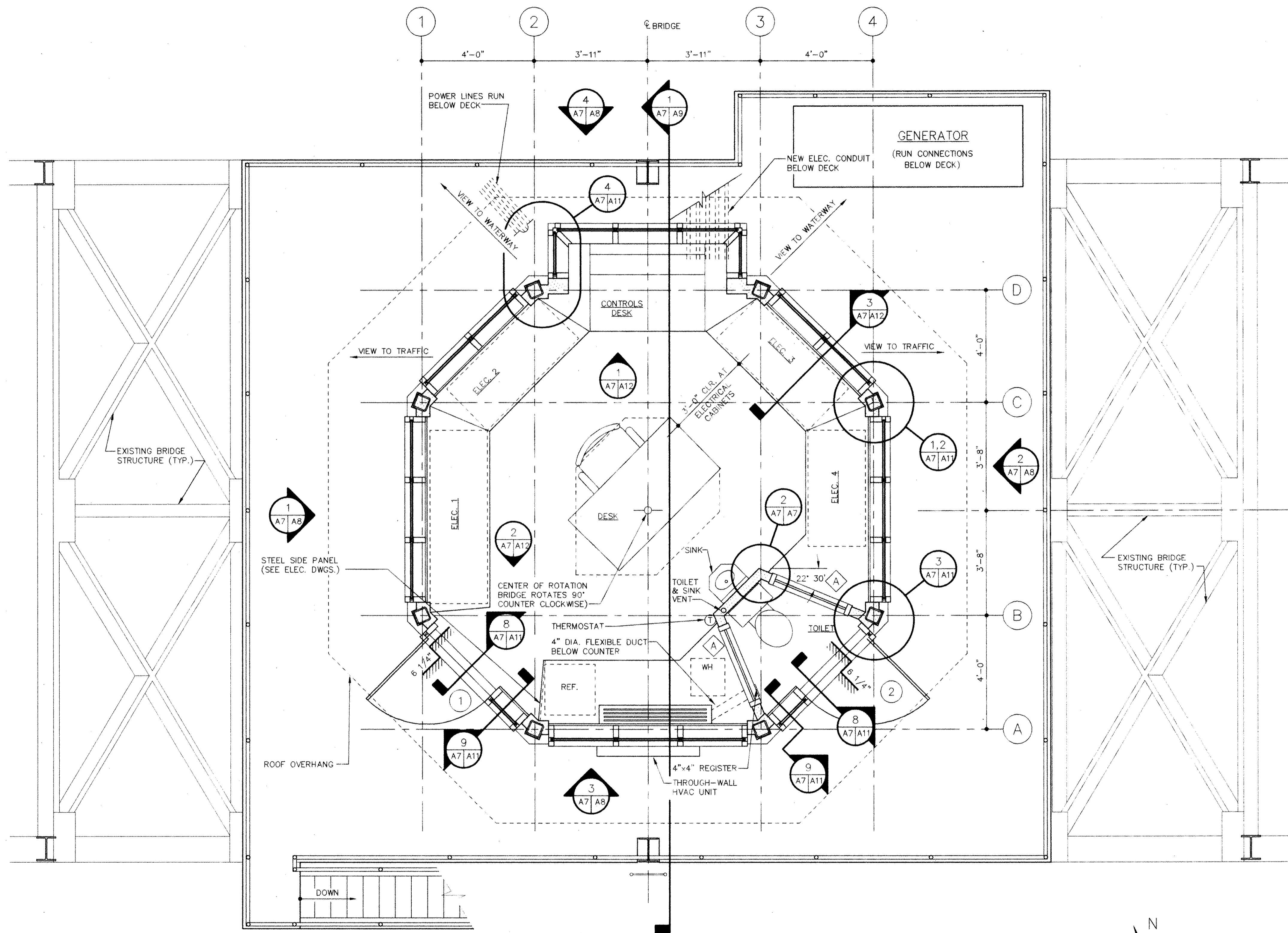
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

HARBOR RIVER

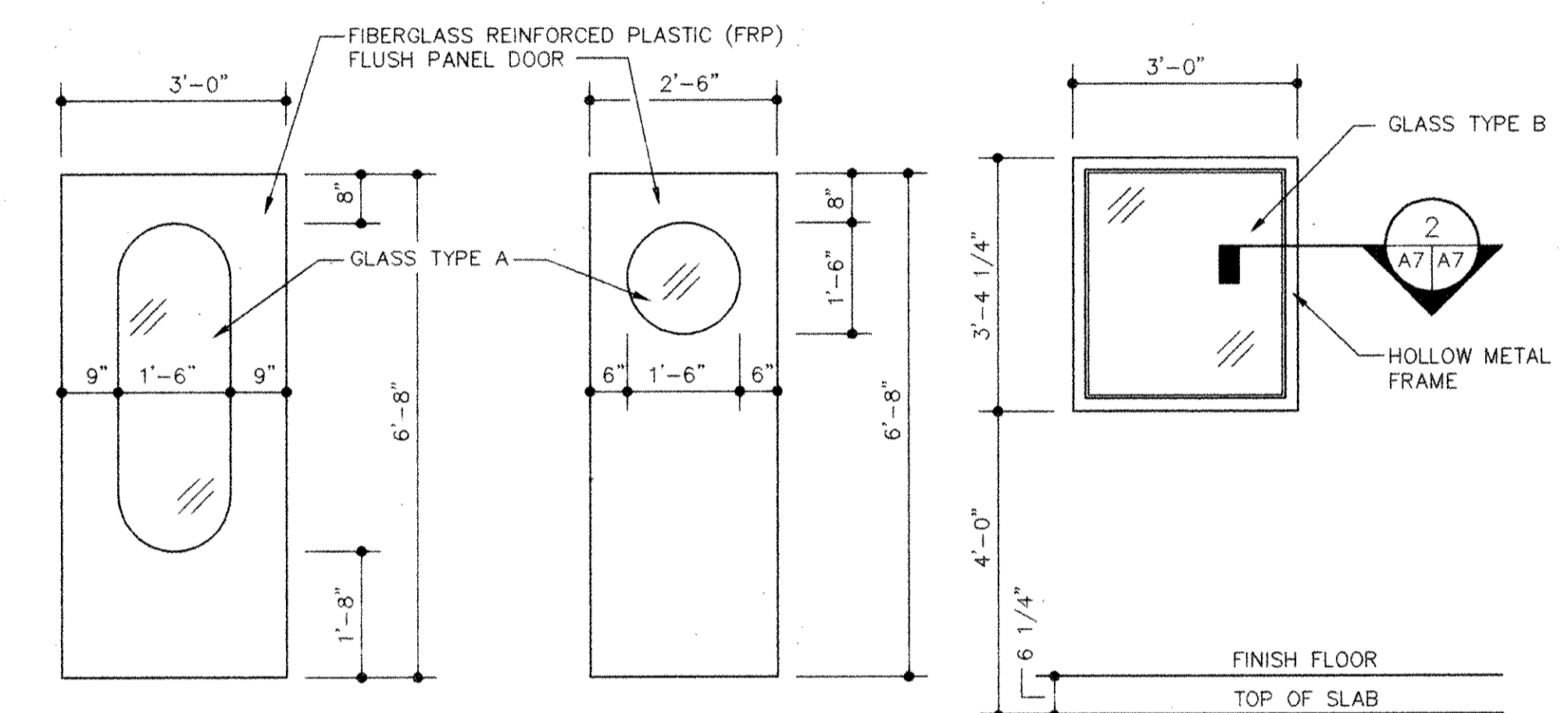
HURRICANE TIE DOWN

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S.-21	BEAUFORT	S-37

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	60	115

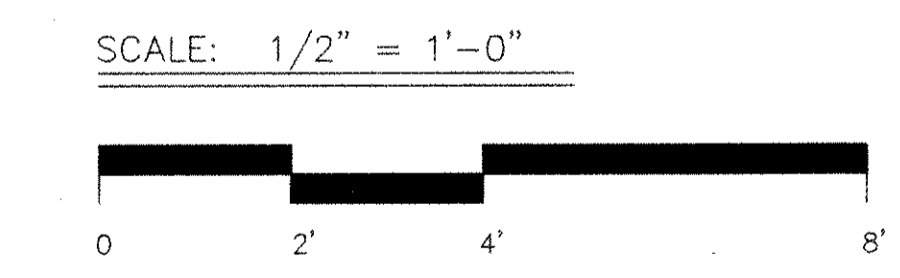


2 CORNER & JAMB DETAIL
SCALE: 3" = 1'-0"



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

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



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

WATSON/TATE ARCHITECTS, INC.
HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

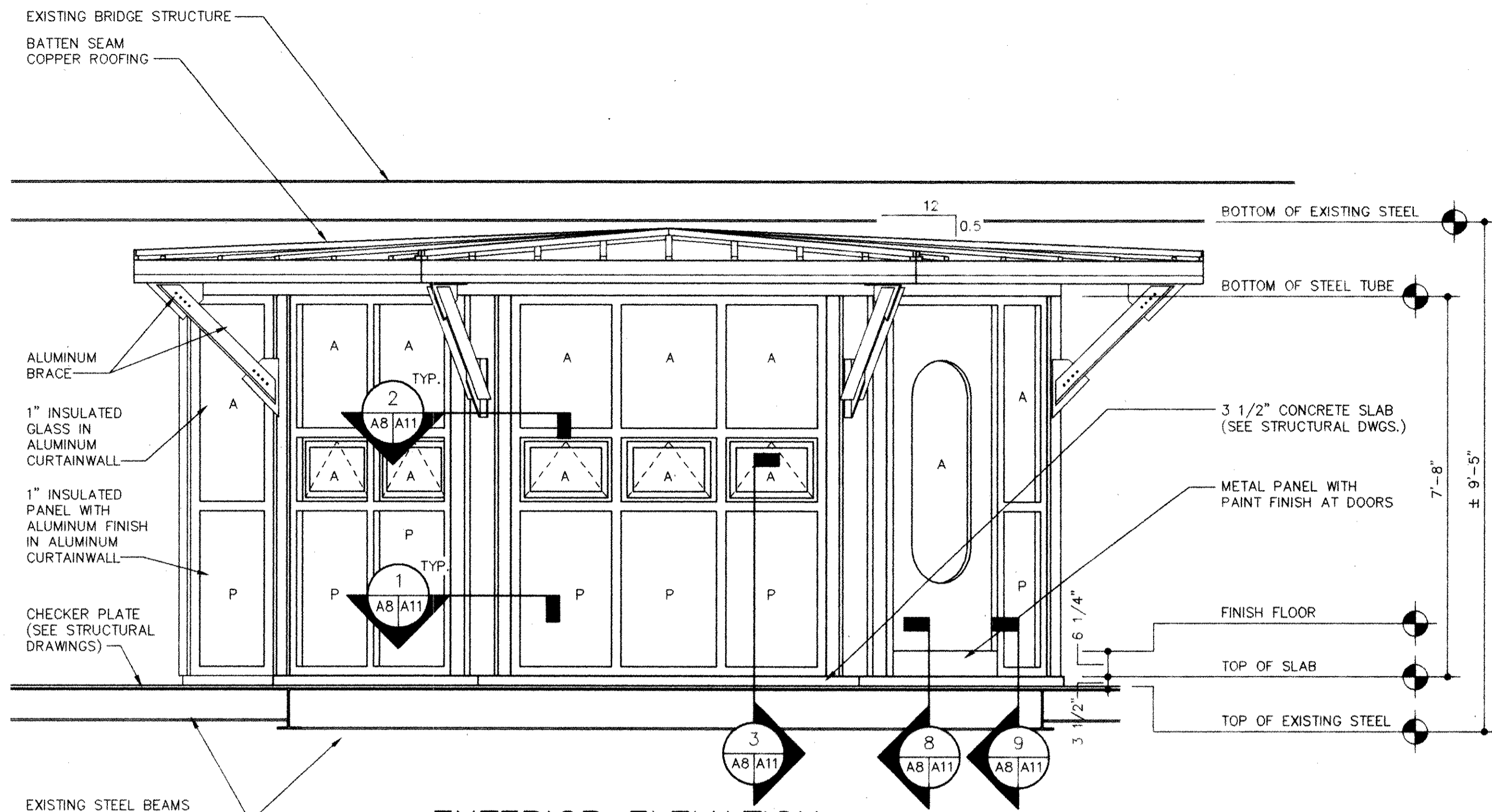
HARBOR RIVER
FLOOR PLAN

REV.			
REV.			
REV.			
QUAN.			
DR.	RRF	MSW	02/97
DES.	MSW	MSW	02/97
BY	CHK.	DATE	

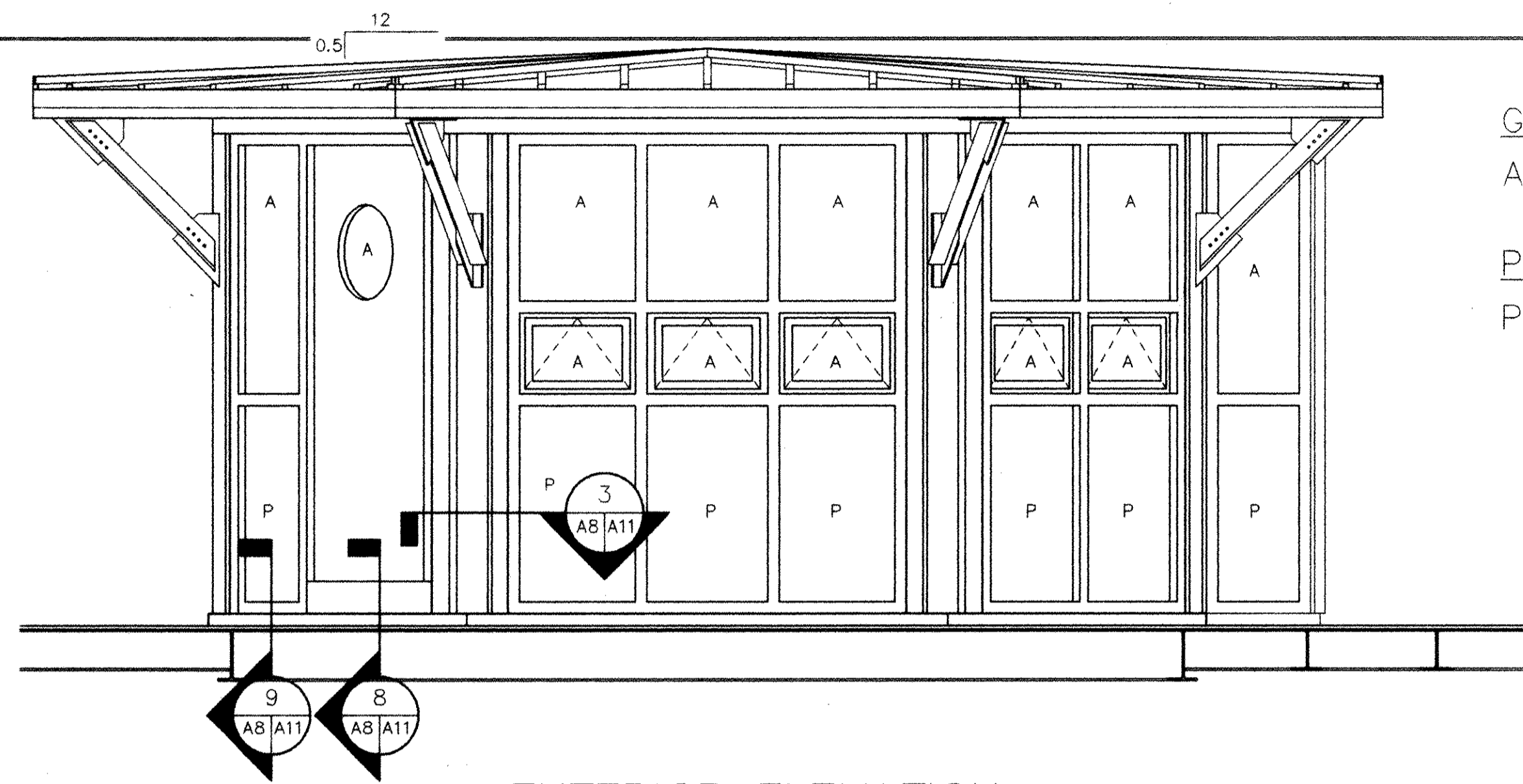
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	A-7



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	SC	BEAUFORT		US-21	61	115



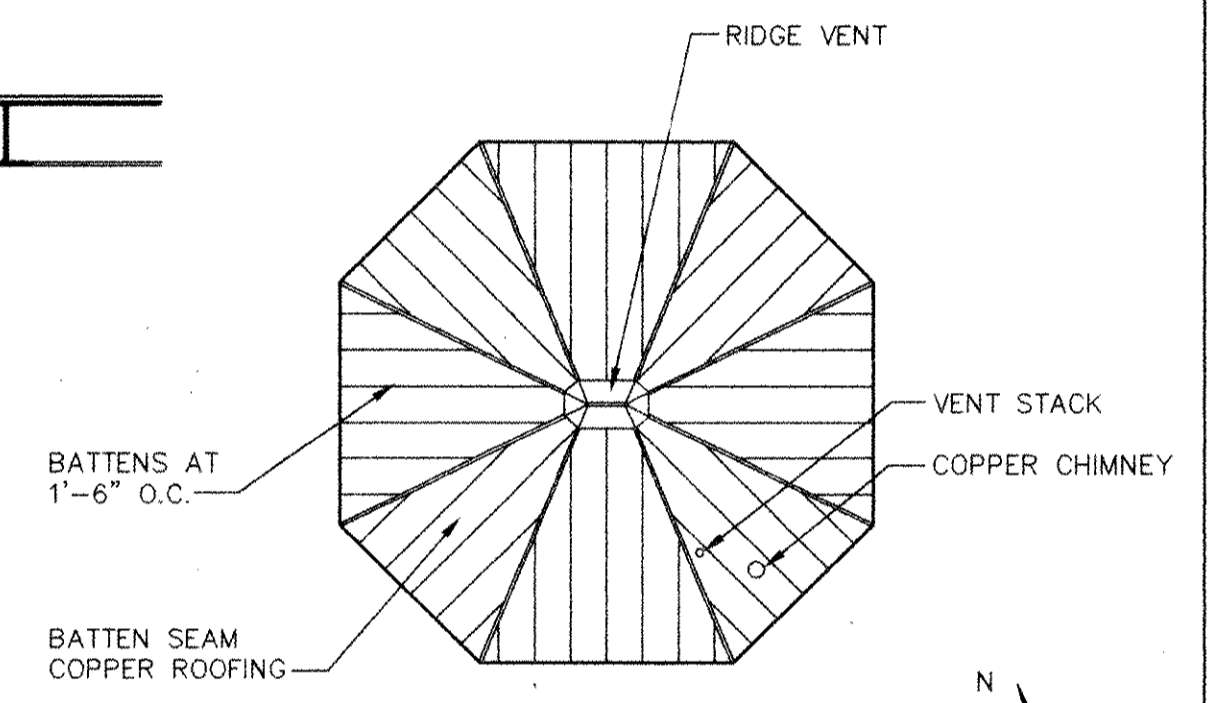
1 EXTERIOR ELEVATION
SCALE: 1/2" = 1'-0"



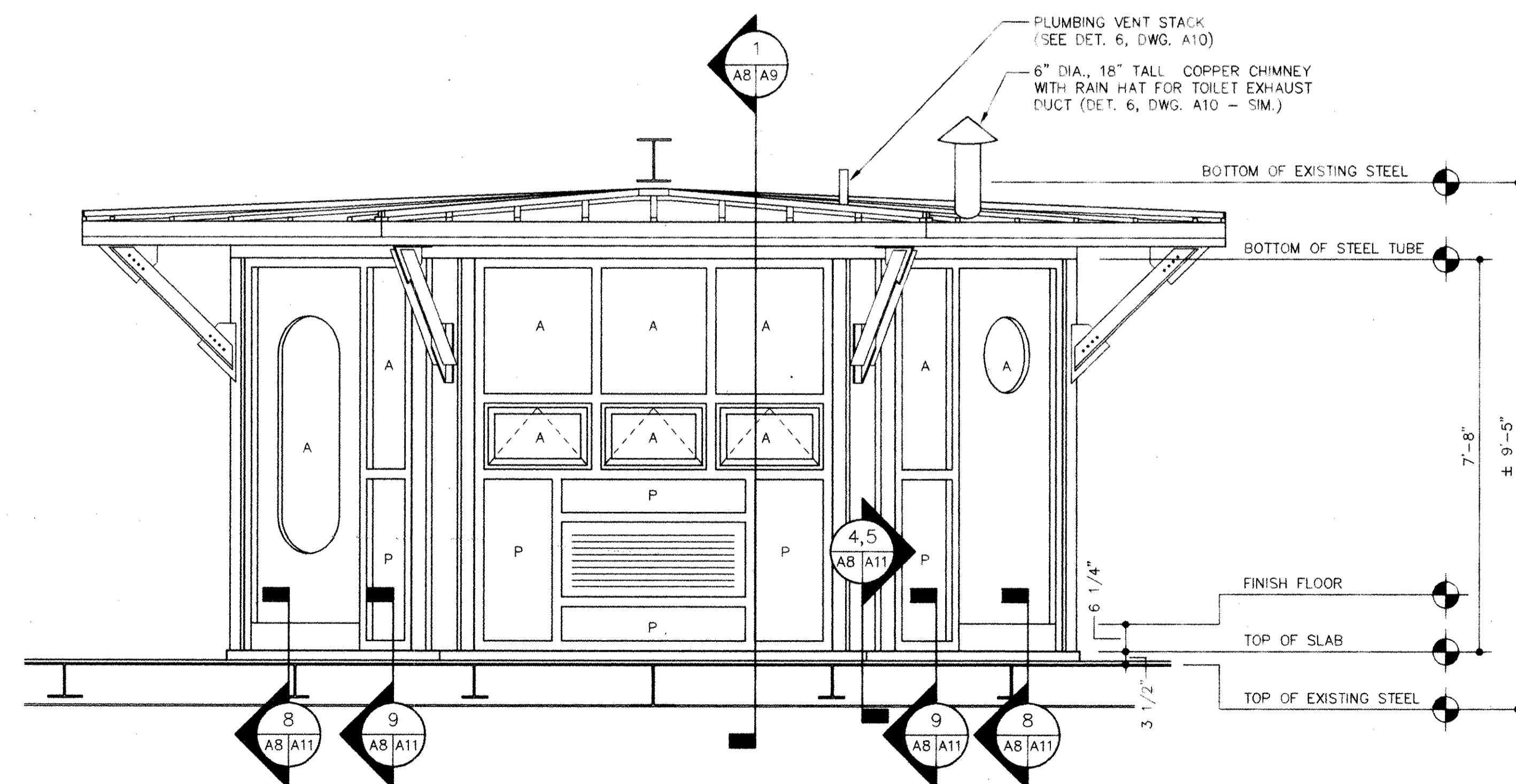
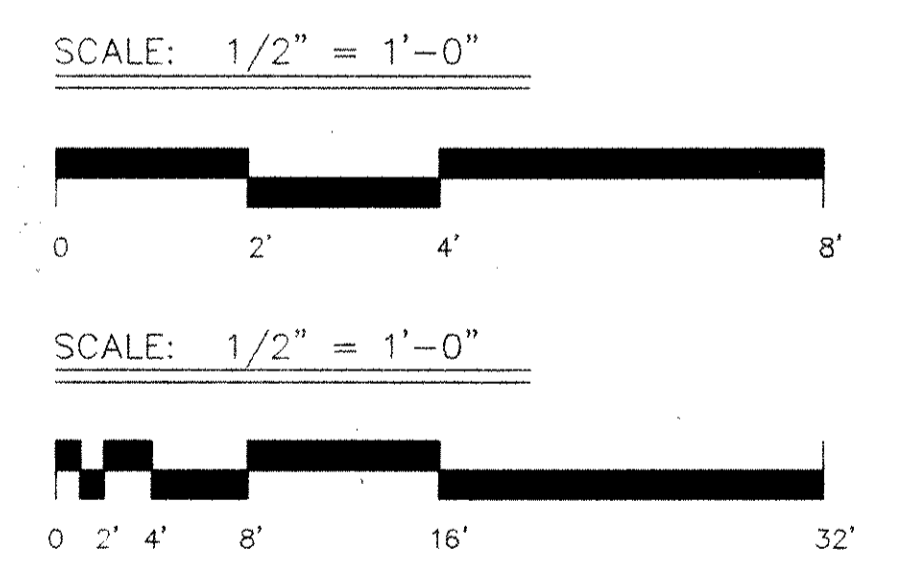
2 EXTERIOR ELEVATION
SCALE: 1/2" = 1'-0"

GLASS SCHEDULE:
A: CLEAR, BULLET RESISTANT VISION GLASS SYSTEM

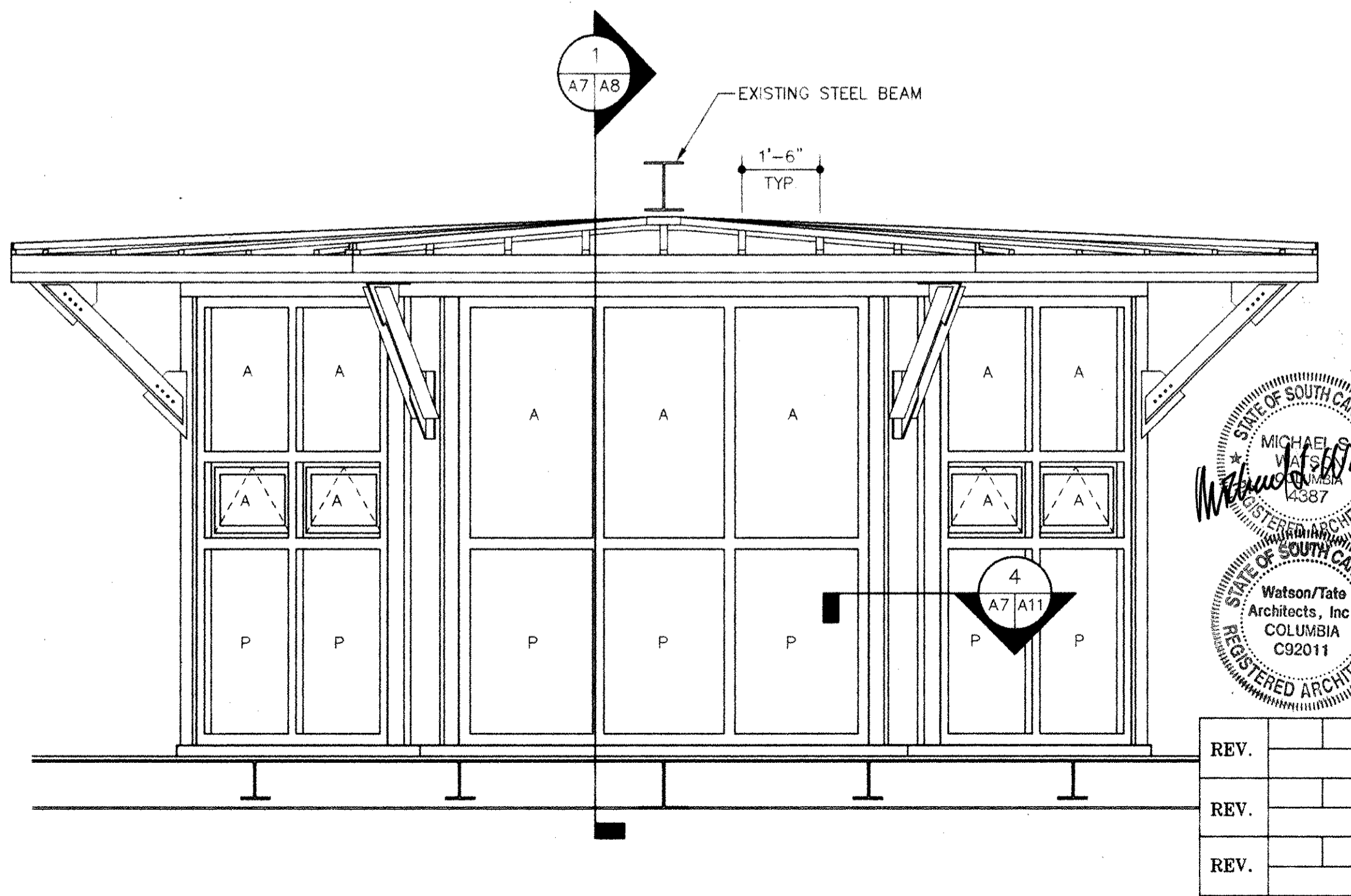
PANEL SCHEDULE:
P: ALUMINUM FACED INSULATED PANEL WITH FLUOROPOLYMER FINISH



5 ROOF PLAN
SCALE: 1/8" = 1'-0"



3 EXTERIOR ELEVATION
SCALE: 1/2" = 1'-0"



4 EXTERIOR ELEVATION
SCALE: 1/2" = 1'-0"



WATSON/TATE ARCHITECTS, INC.

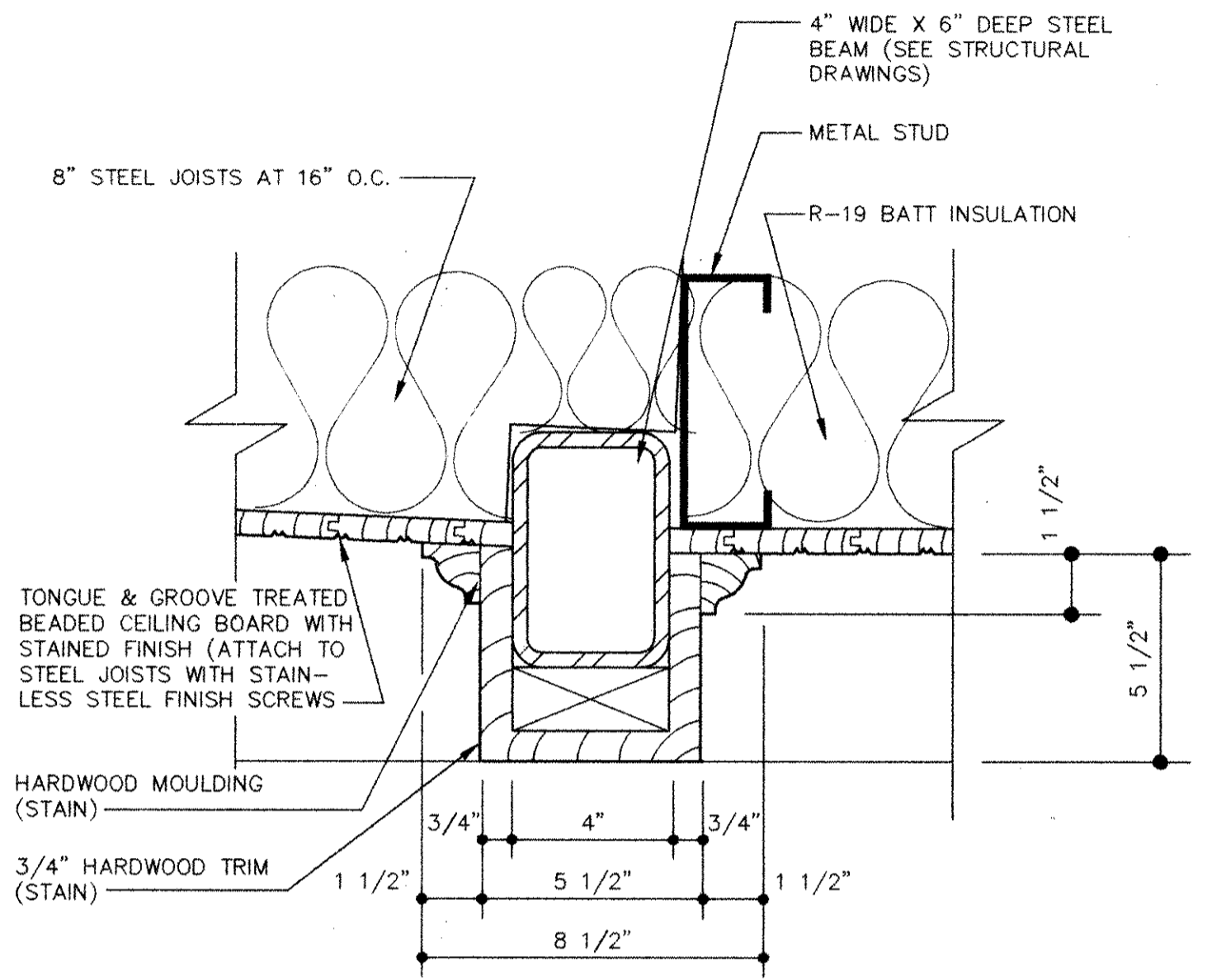
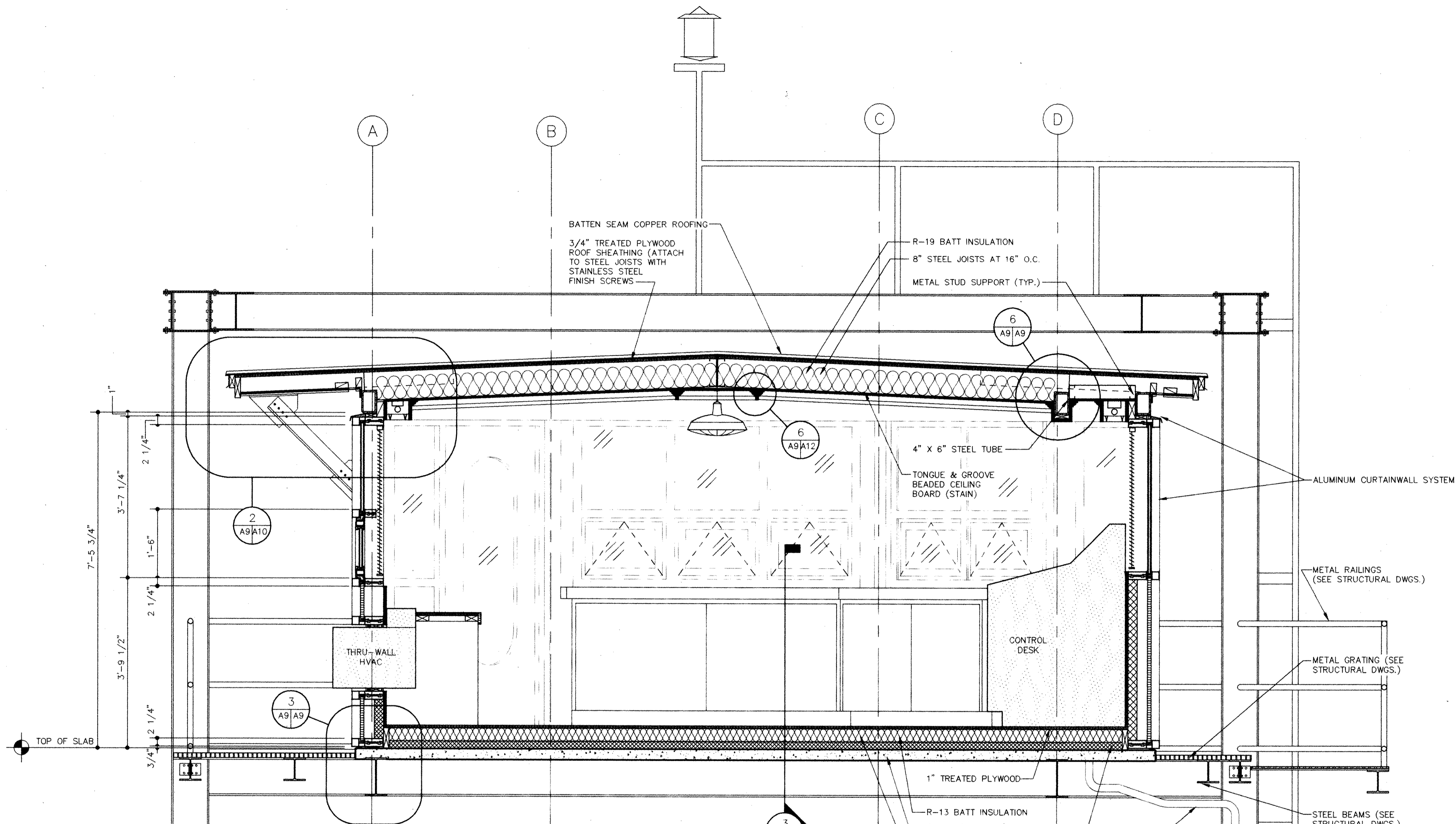
HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

REV.	QUAN.	DR.	DES.	BY	CHK.	DATE
		RRF	MSW			02/97
		MSW	MSW			02/97

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

**HARBOR RIVER
EXTERIOR
ELEVATIONS**

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	A-8



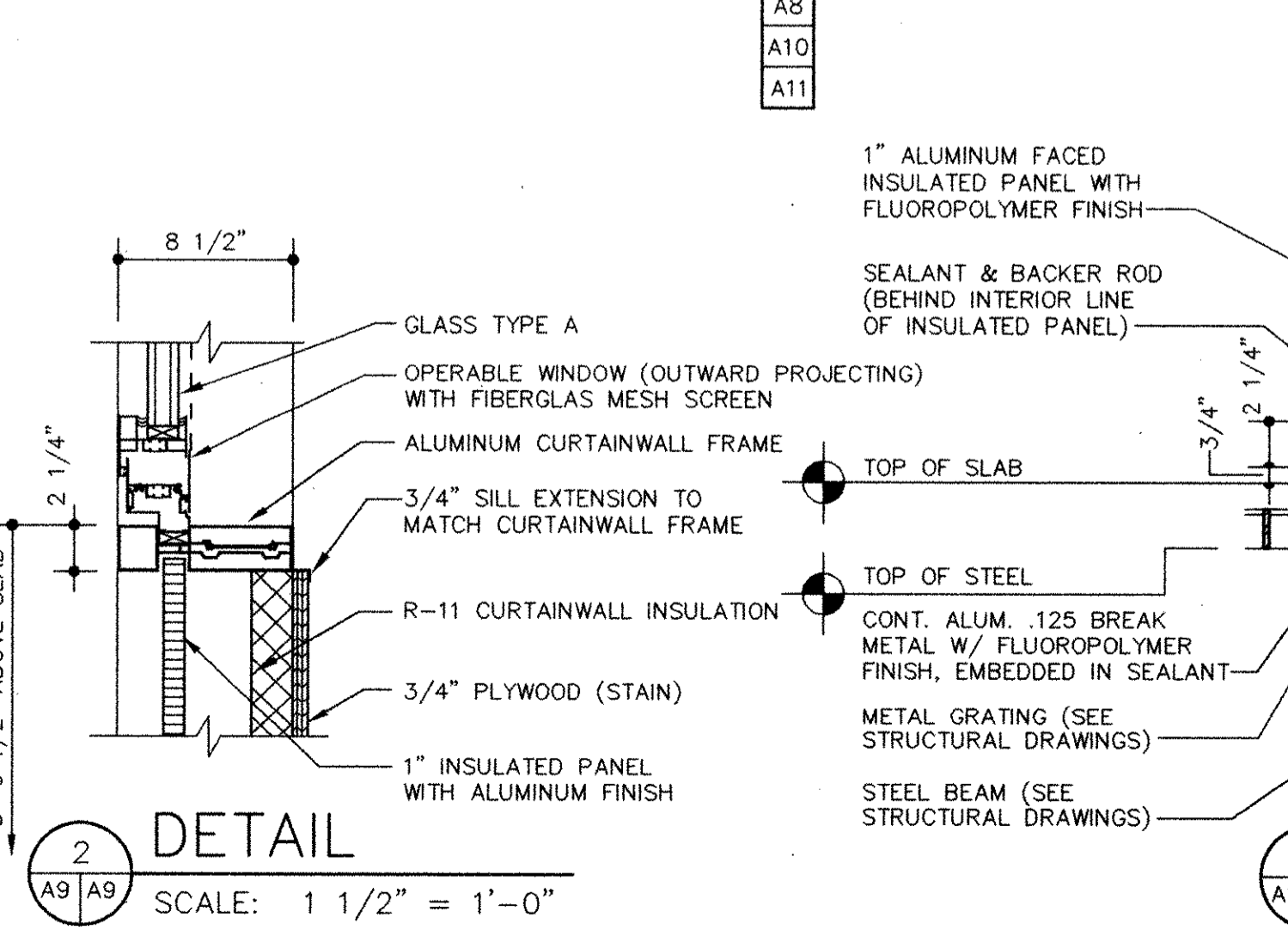
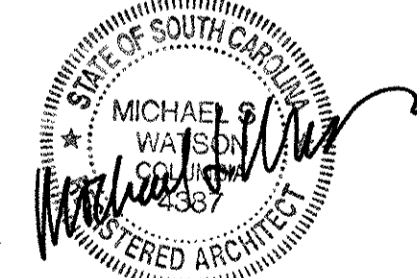
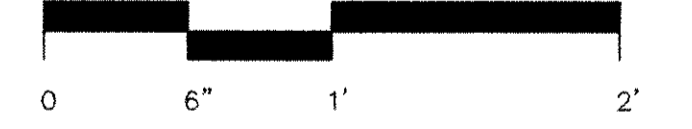
6
A9/A9
CEILING TRIM DETAIL
SCALE: 3" = 1'-0"

1
A7/A9
A8
A10
A11
BUILDING SECTION
SCALE: 3/4" = 1'-0"

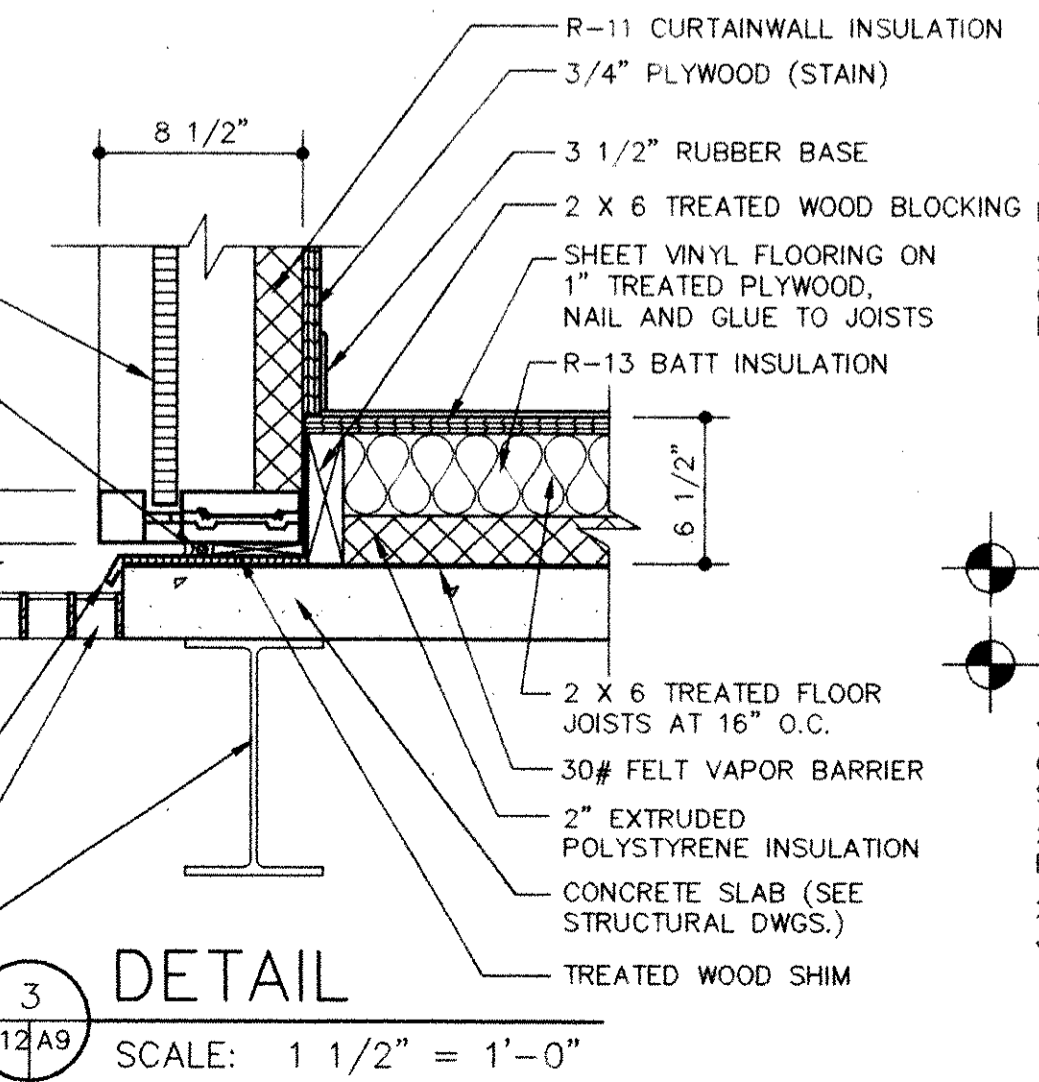
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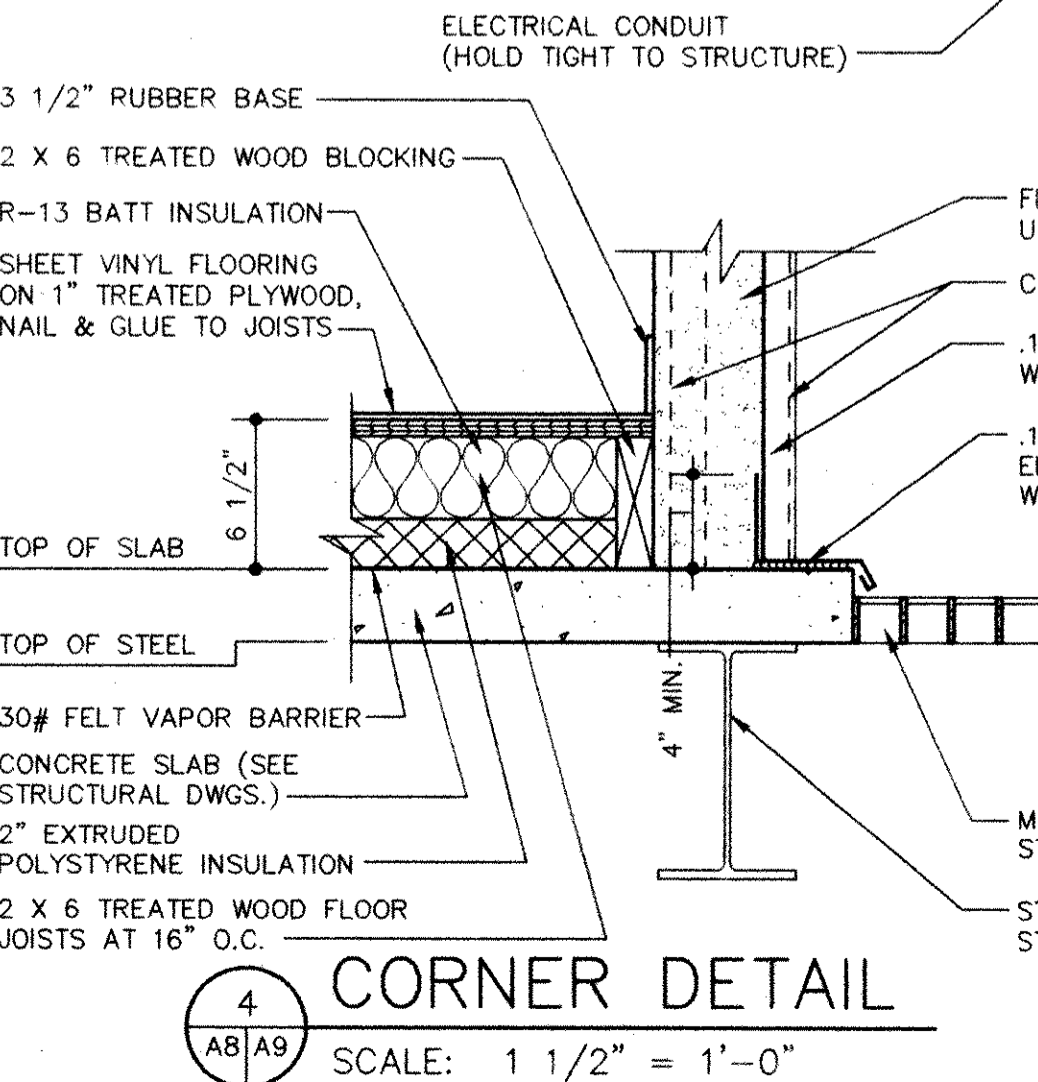
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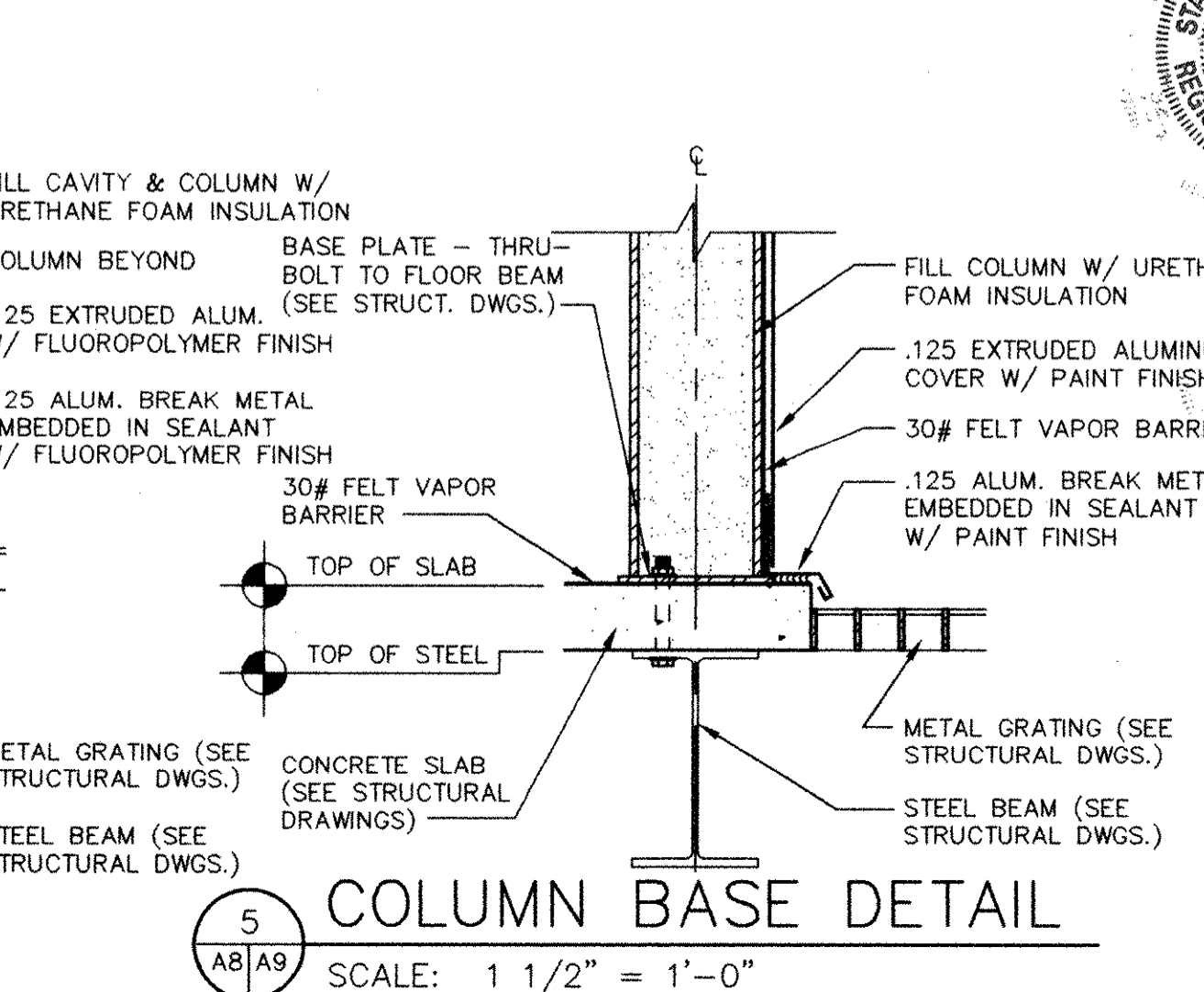
2
A9/A9
DETAIL
SCALE: 1 1/2" = 1'-0"



3
A12/A9
DETAIL
SCALE: 1 1/2" = 1'-0"



4
A8/A9
CORNER DETAIL
SCALE: 1 1/2" = 1'-0"



5
A8/A9
COLUMN BASE DETAIL
SCALE: 1 1/2" = 1'-0"

WATSON/TATE ARCHITECTS, INC.

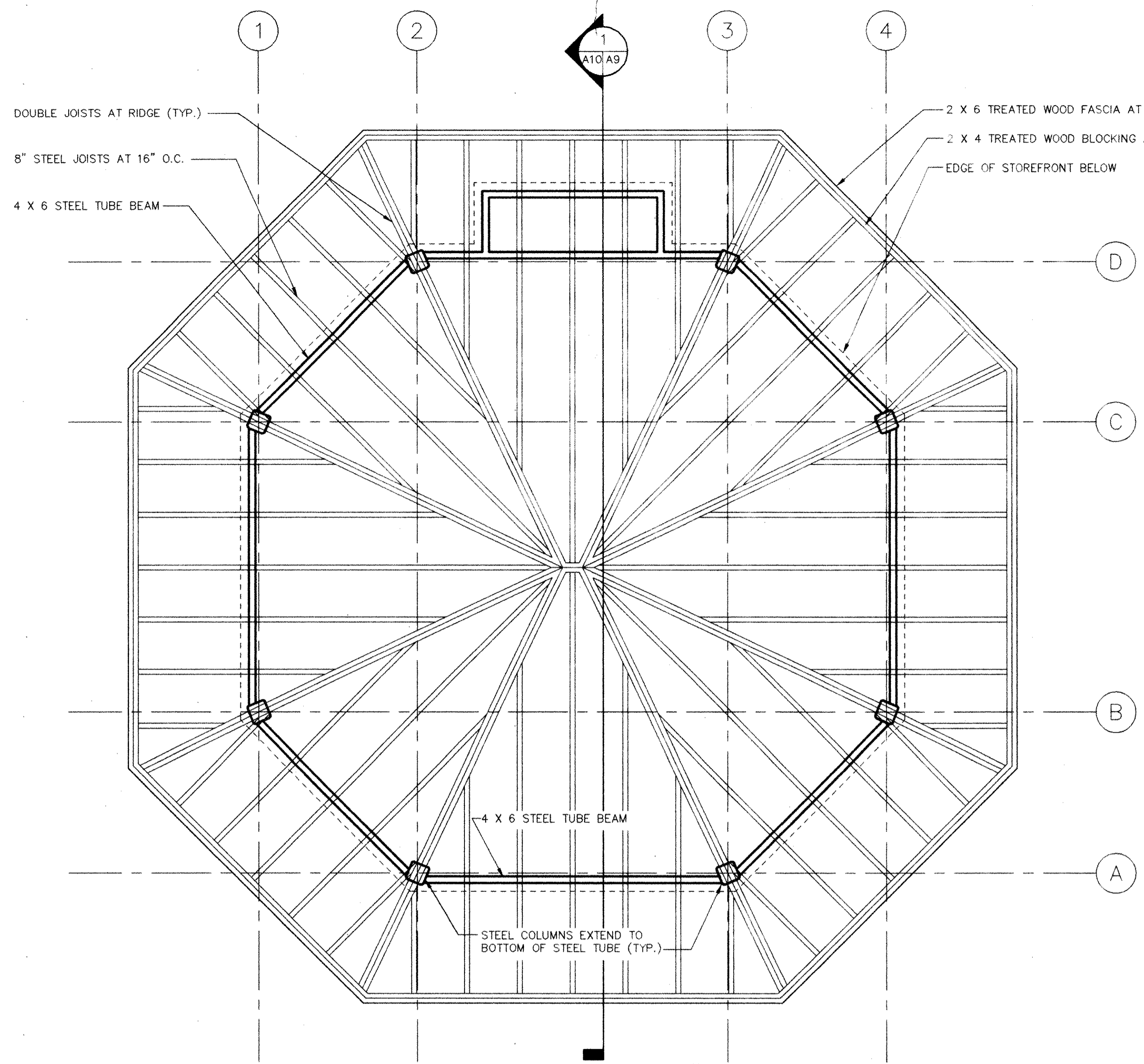
HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

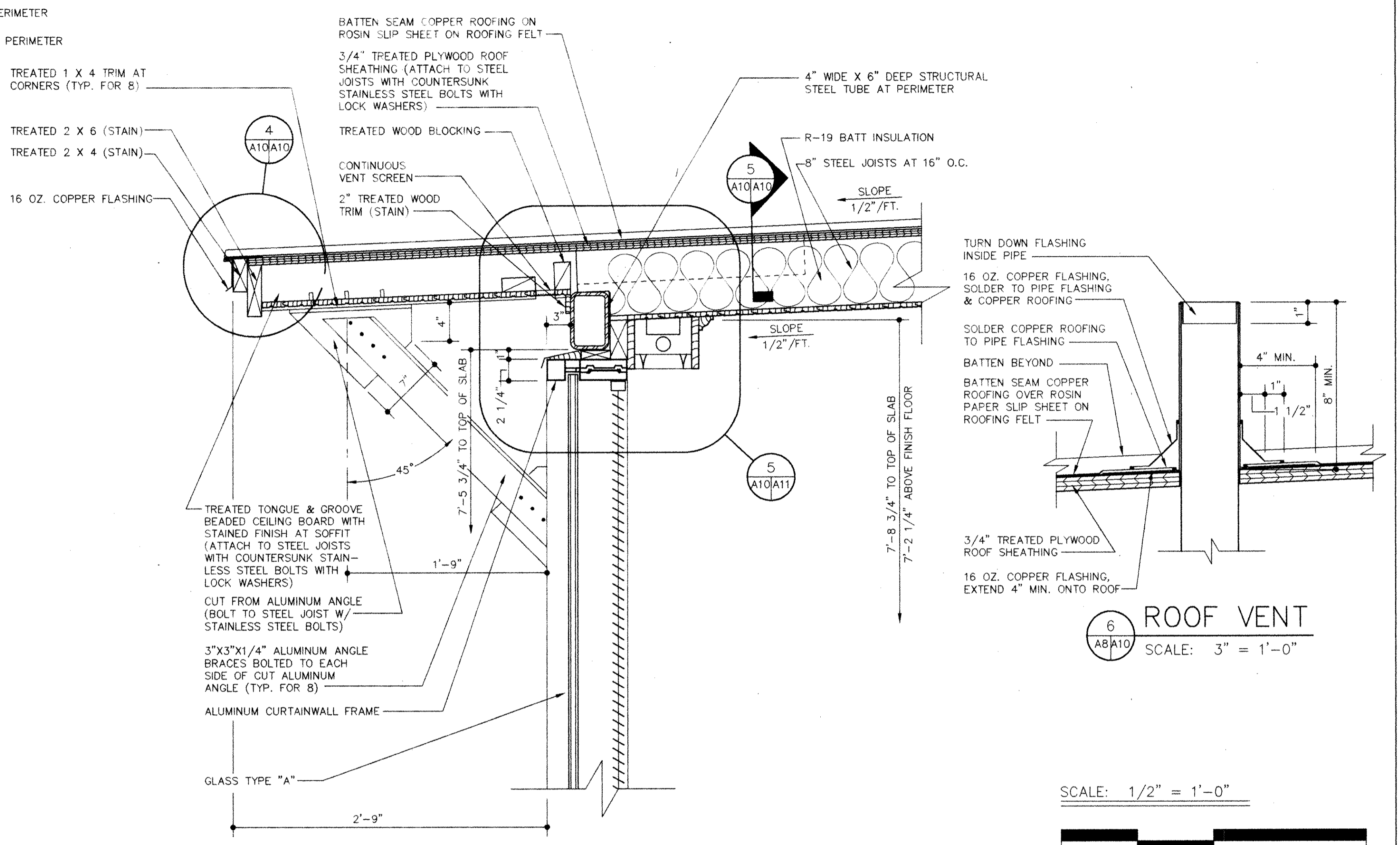
**HARBOR RIVER
BUILDING SECTION
& DETAILS**

REV.			
REV.			
REV.			
QUAN.			
DR.	RRF	MSW	02/97
DES.	MSW	MSW	02/97
BY	CHK.	DATE	

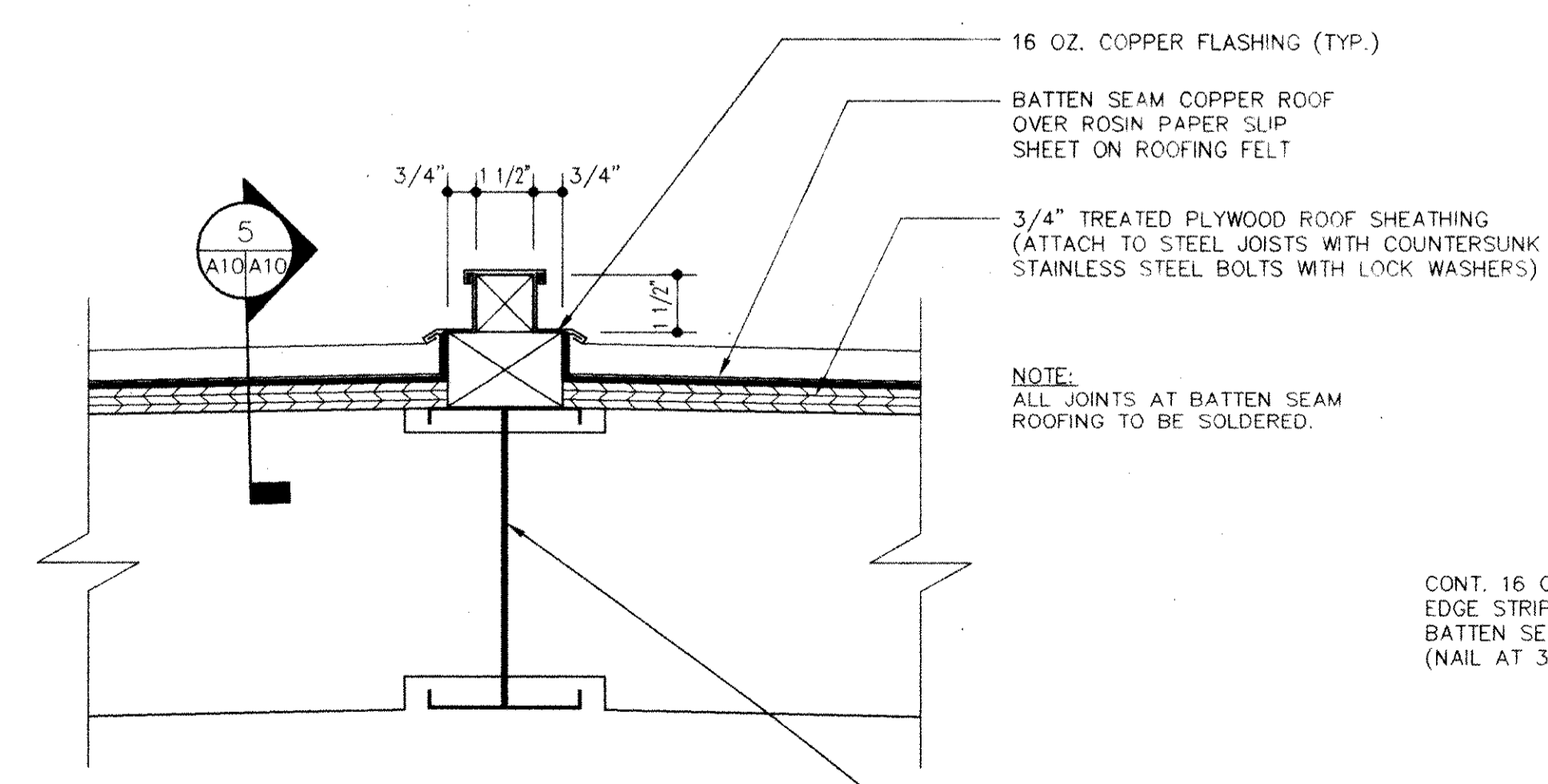
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	US-21	BEAUFORT	A-9



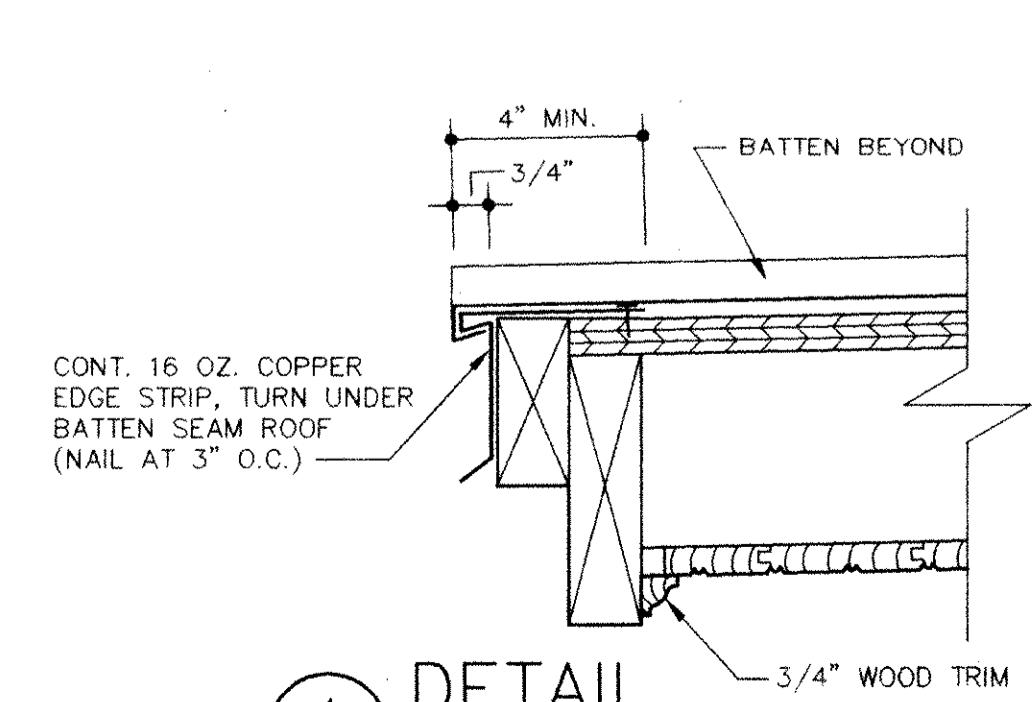
1 ROOF FRAMING PLAN
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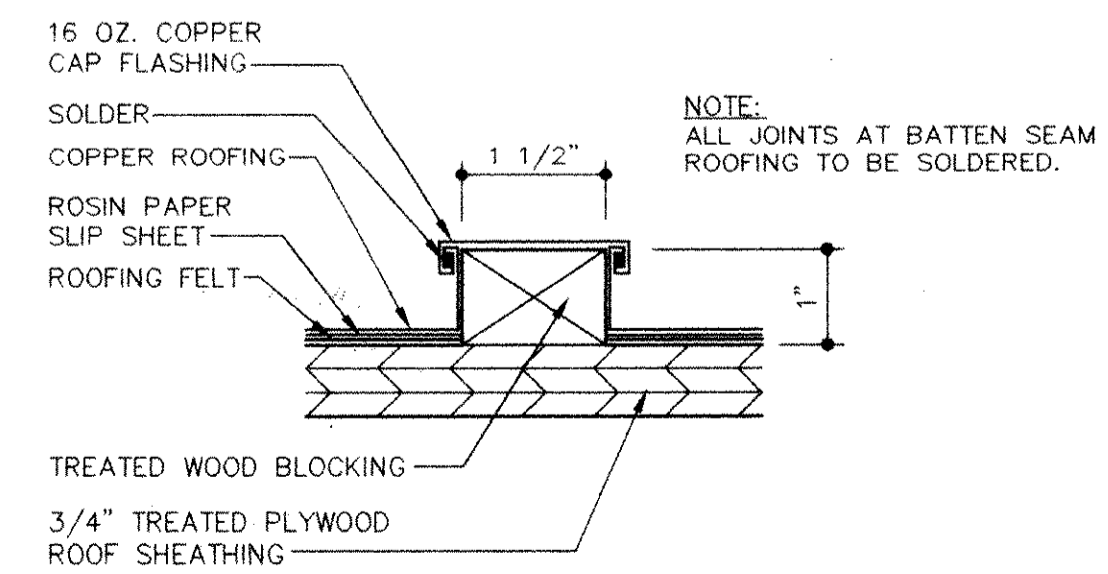
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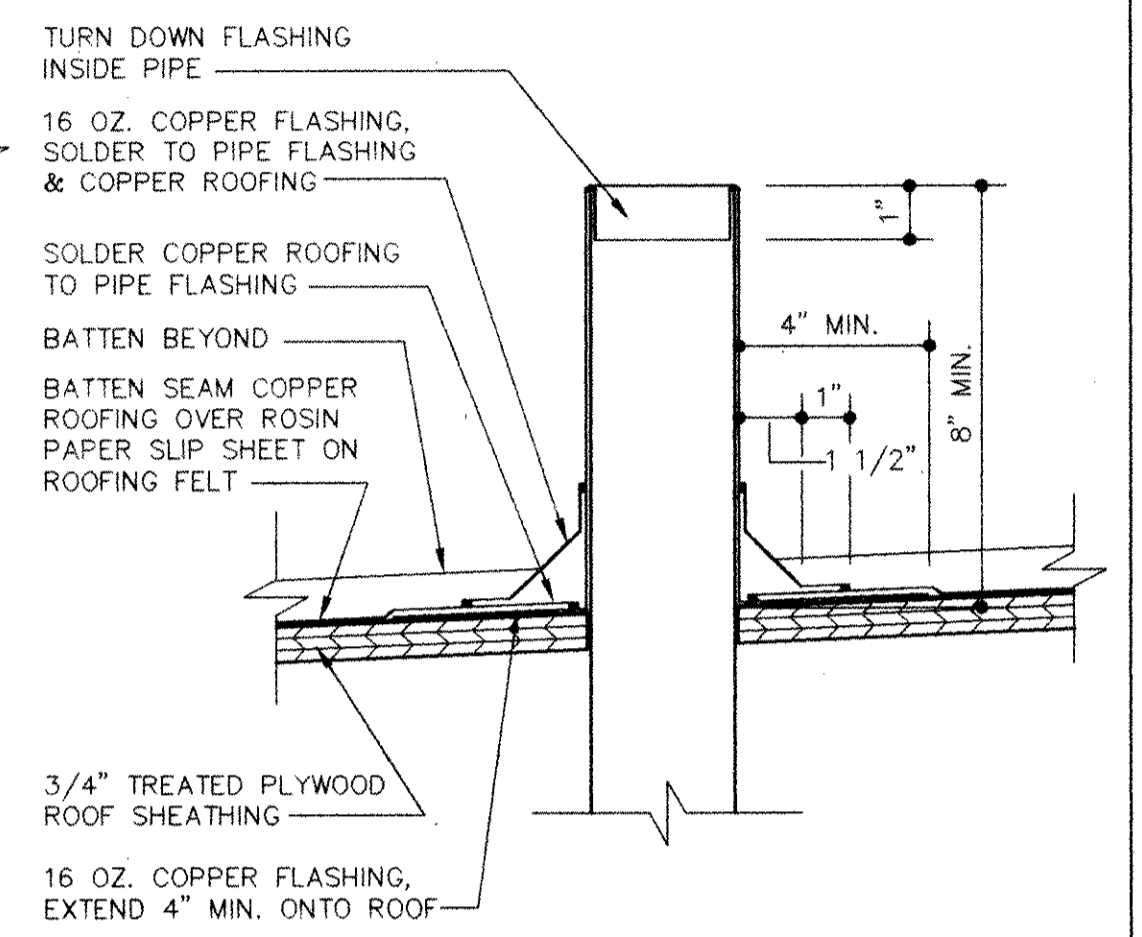
3 HIP RIDGE DETAIL
 SCALE: 3" = 1'-0"



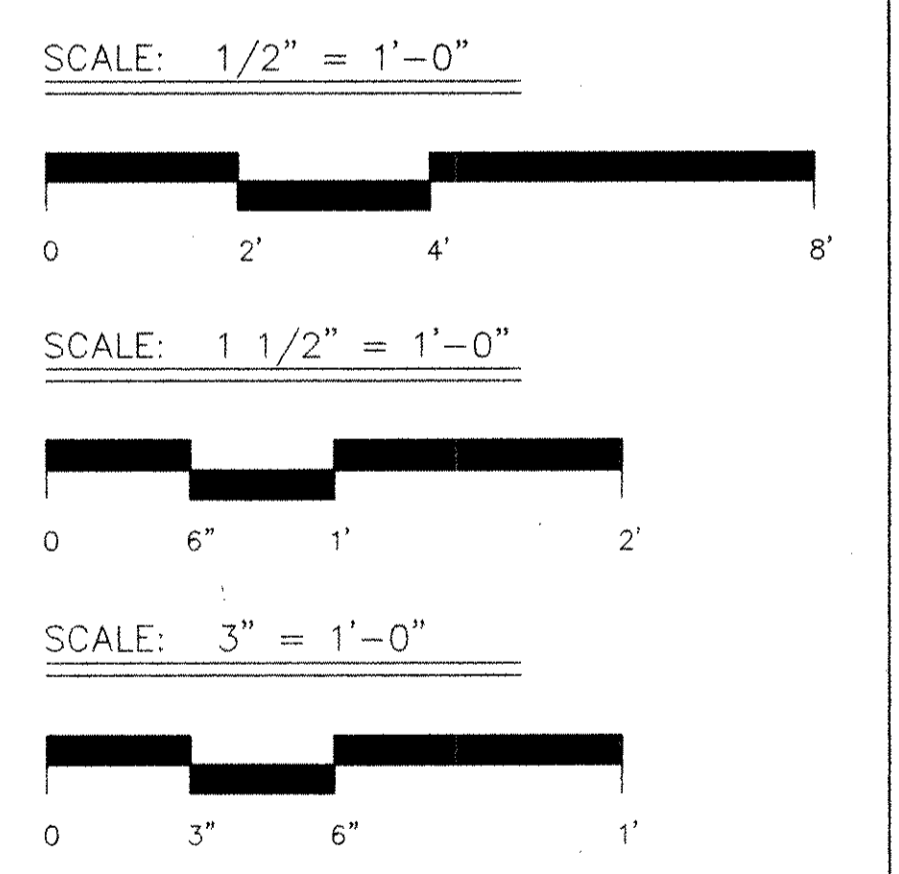
4 DETAIL
 SCALE: 3" = 1'-0"



5 BATTEN DETAIL
 SCALE: 3" = 1'-0"



6 ROOF VENT
 SCALE: 3" = 1'-0"



WATSON/TATE ARCHITECTS, INC.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

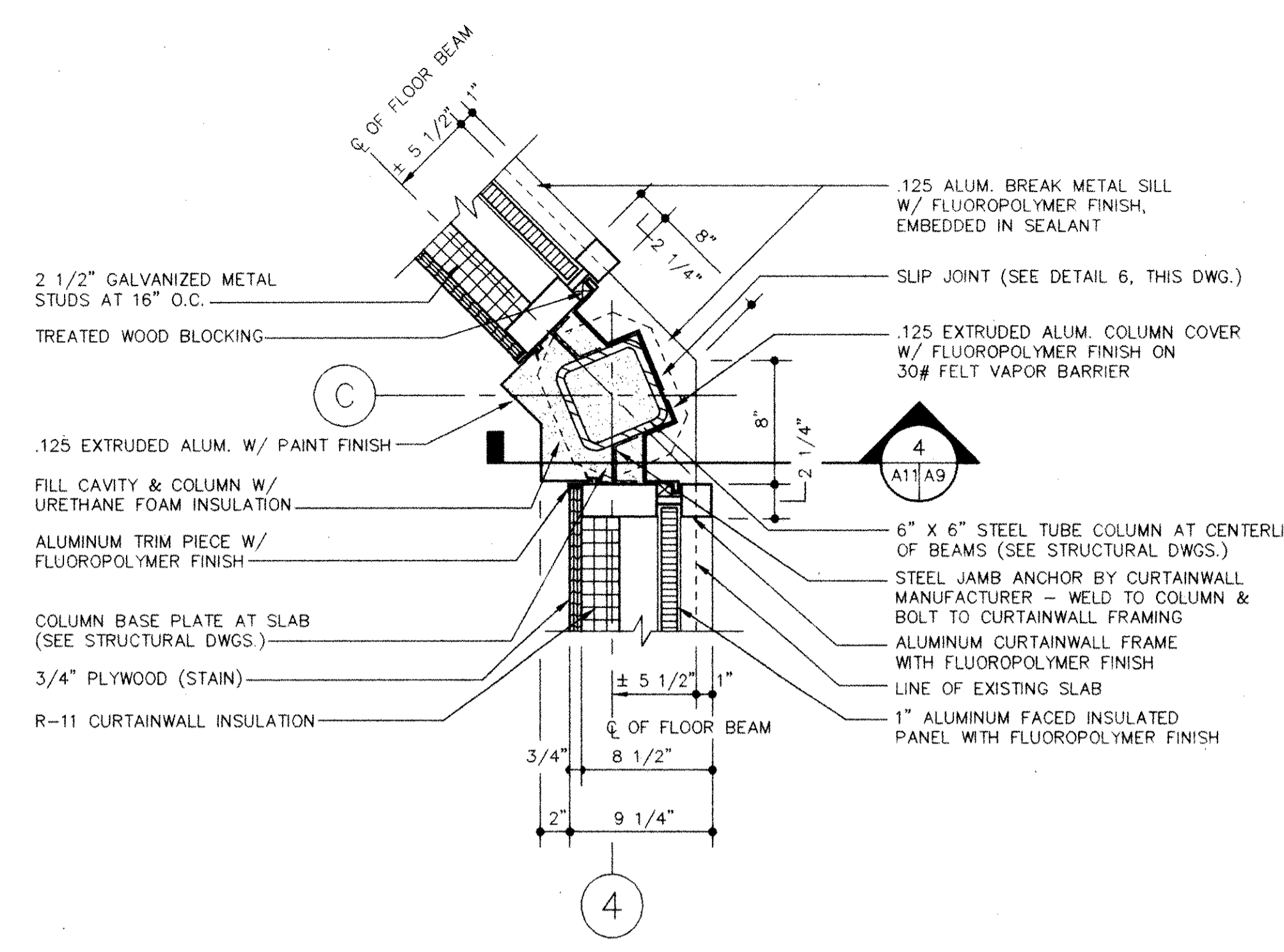
SOUTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 BRIDGE DESIGN COLUMBIA, S.C.

HARBOR RIVER
ROOF FRAMING PLAN & DETAILS

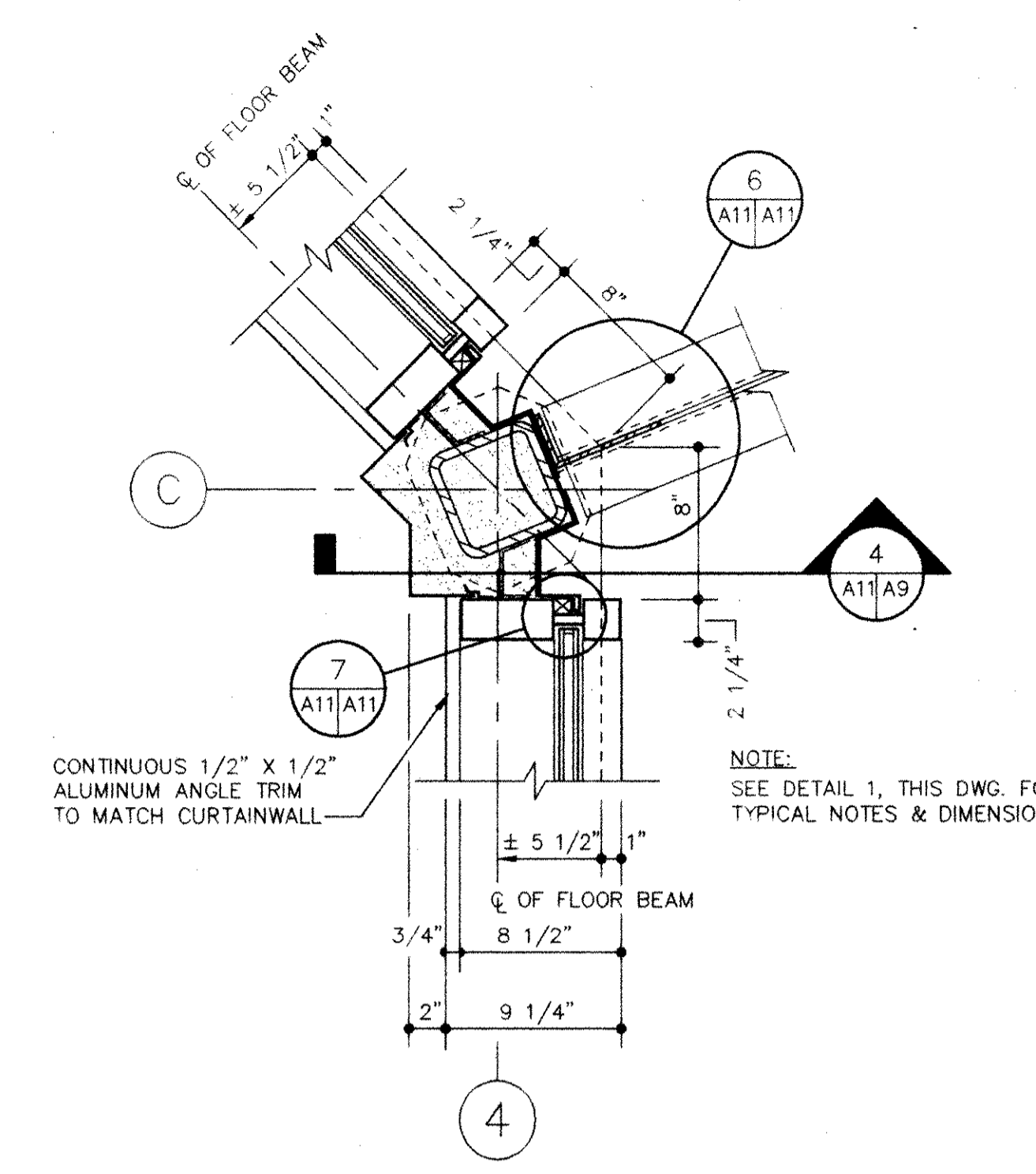
REV.					
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REVIEWED					
QUAN.					
DR.	RRF	MSW	02/97		
DES.	MSW	MSW	02/97		
BY	CHK.	DATE			

FILE NO.	DATE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	A-10

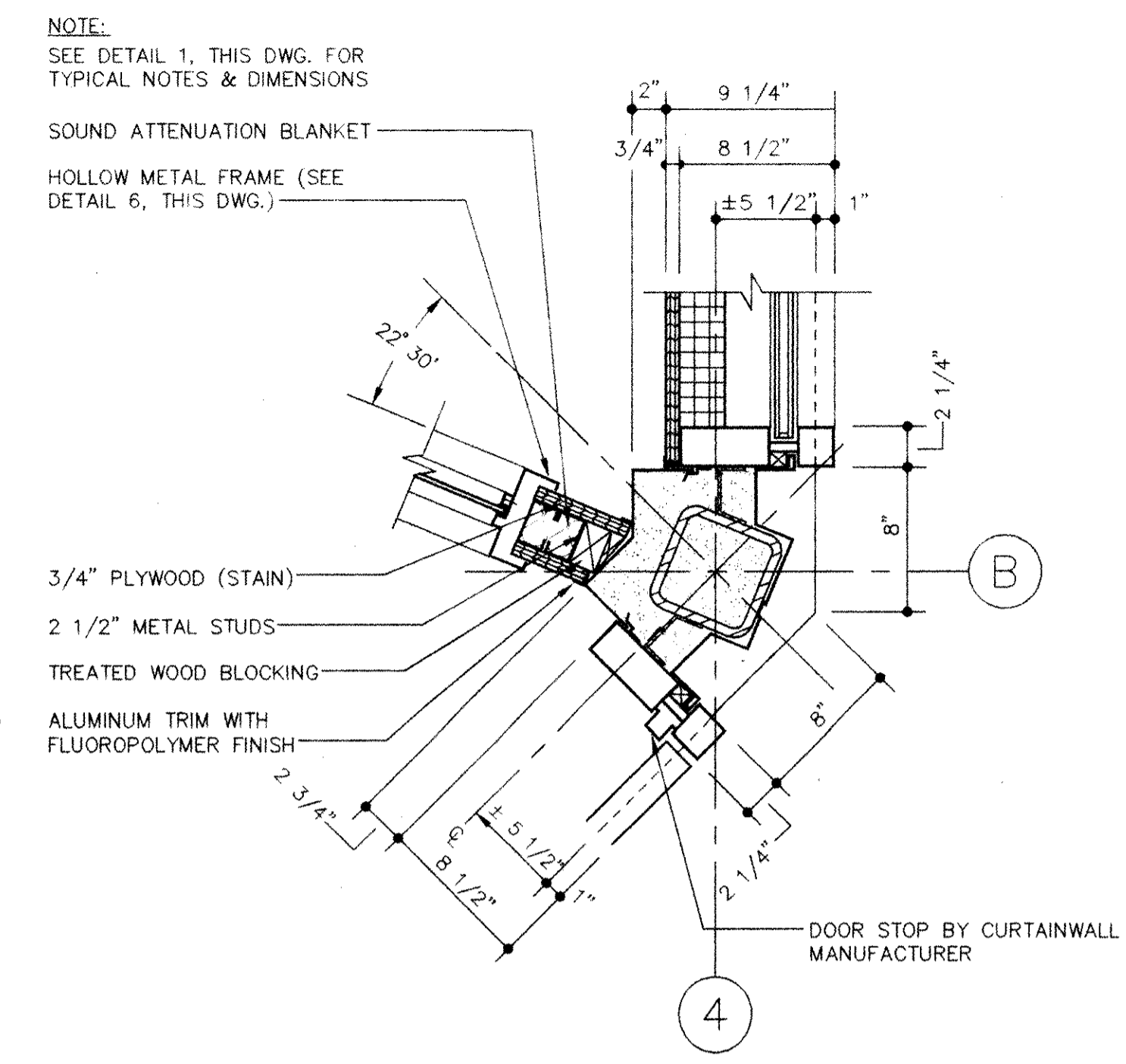
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	SC	BEAUFORT		US-21	64	115



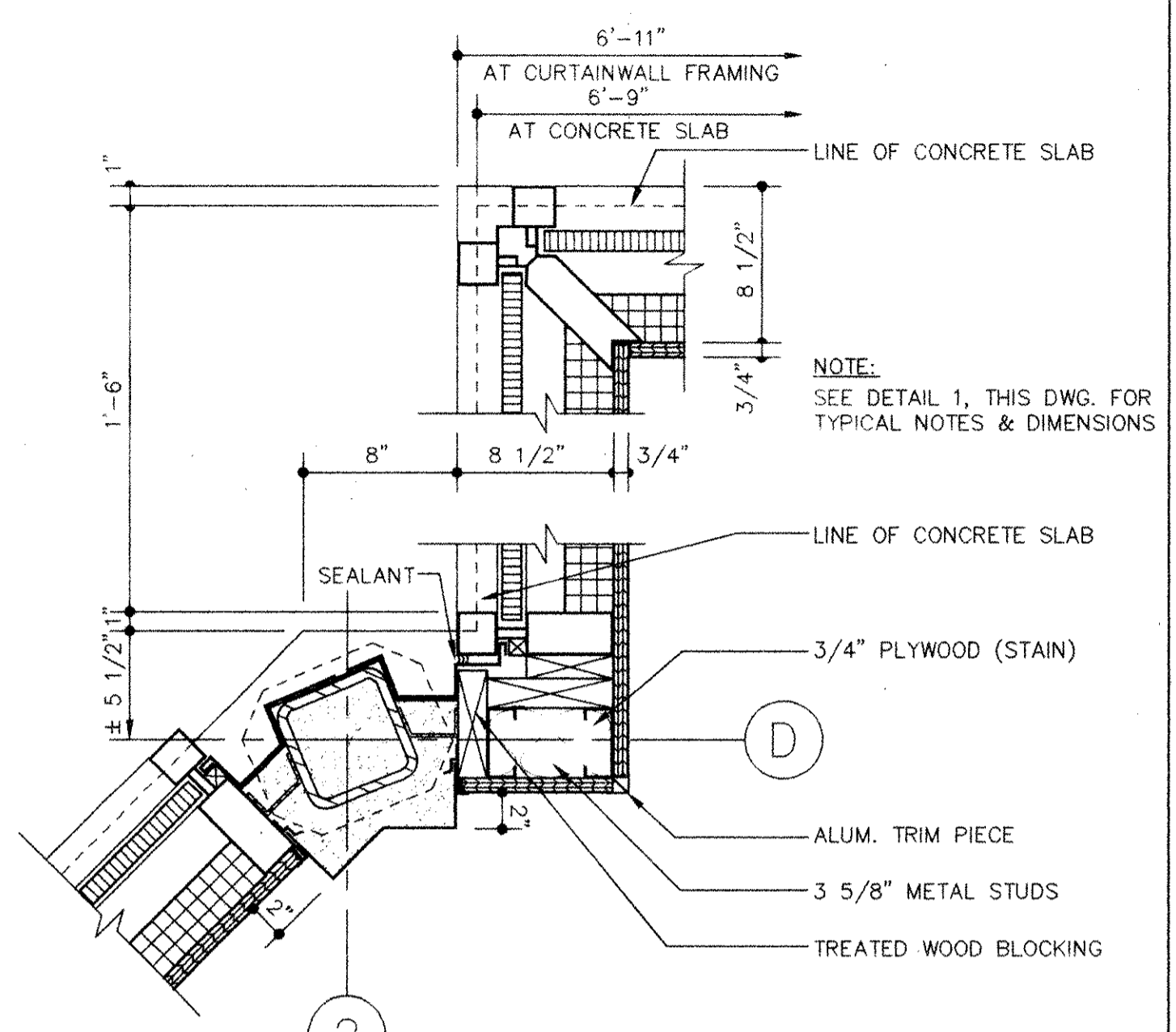
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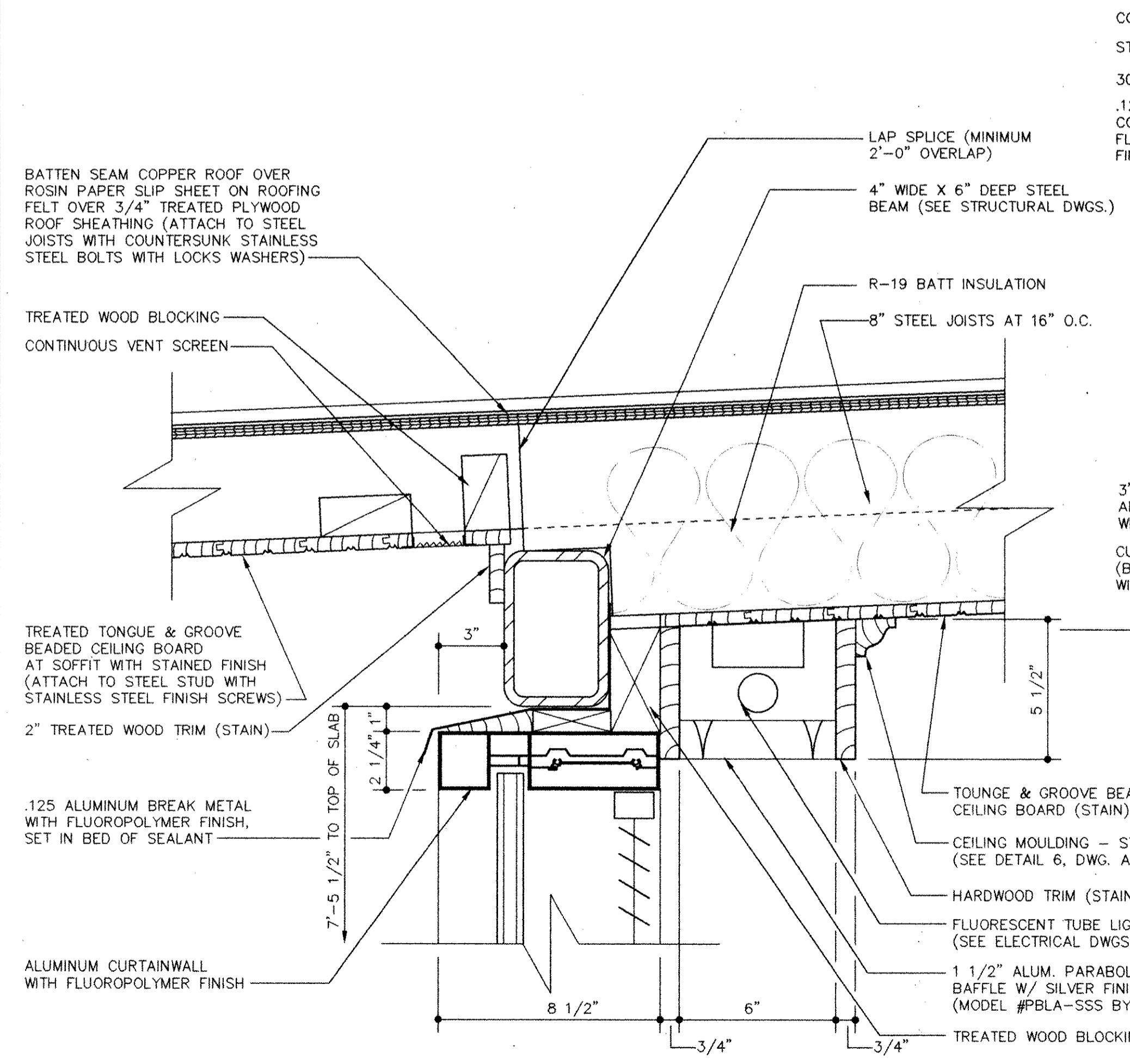
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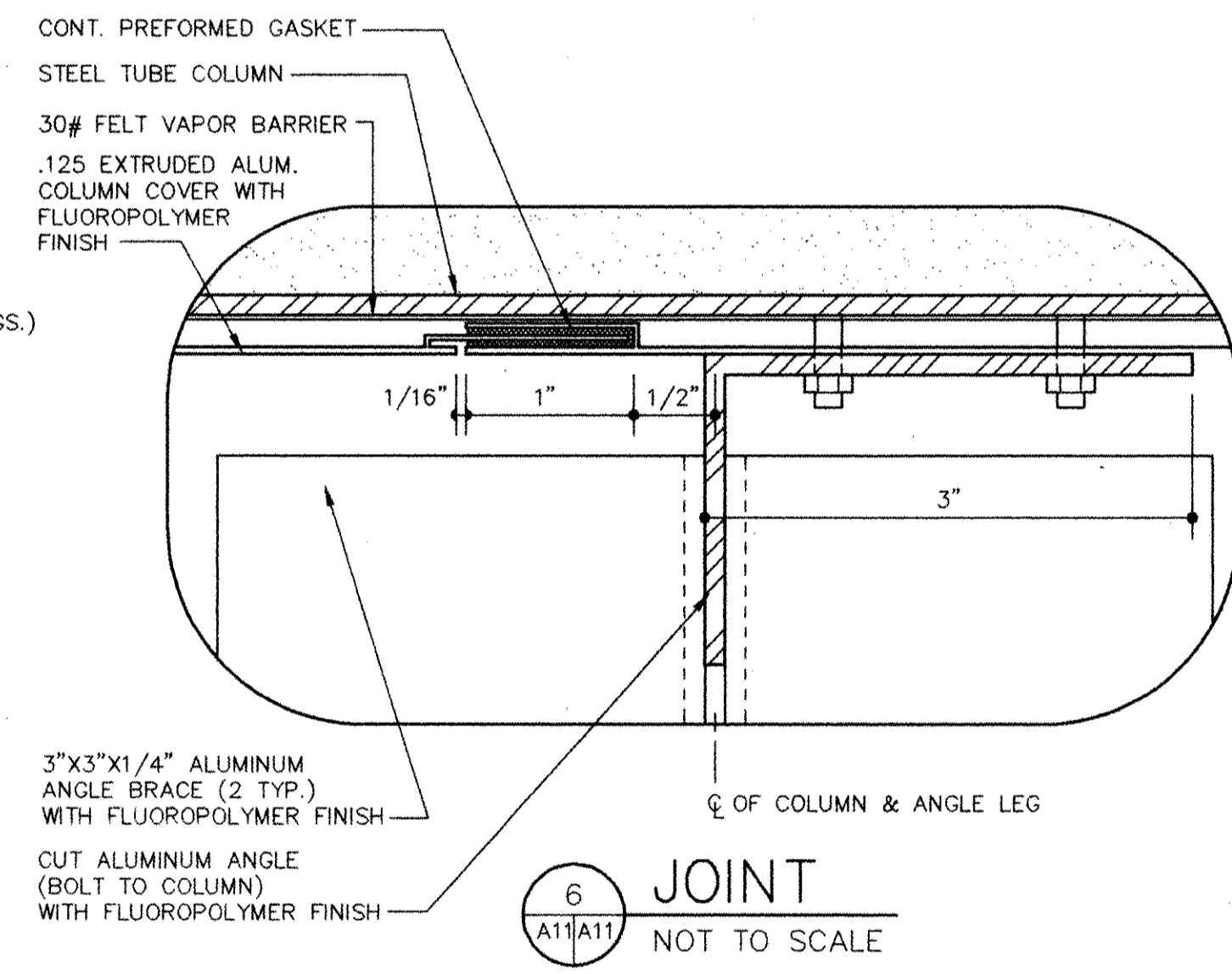
3 DETAIL
 SCALE: 1 1/2" = 1'-0"



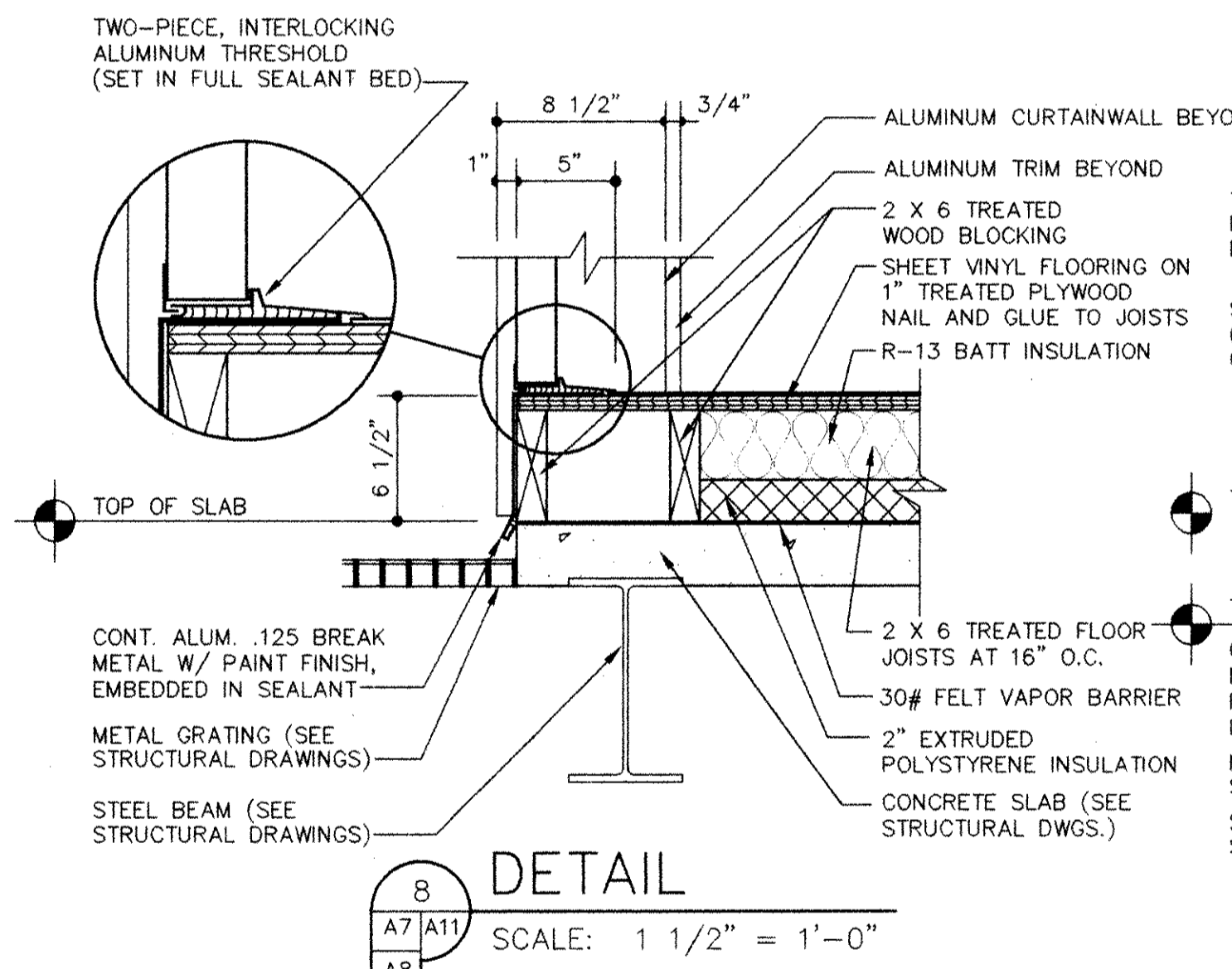
4 DETAIL (BELOW COUNTER)
 SCALE: 1 1/2" = 1'-0"



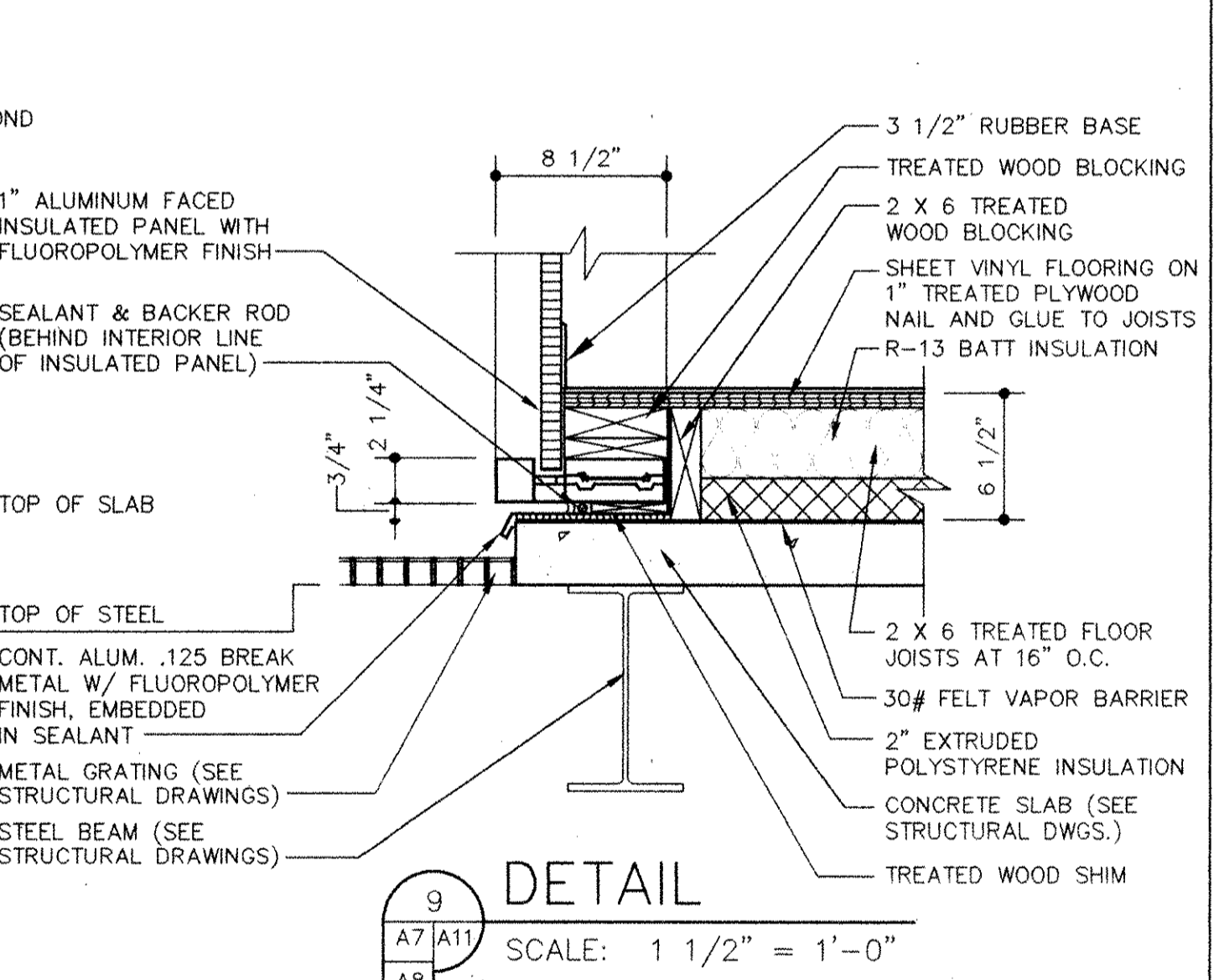
5 DETAIL
 SCALE: 3" = 1'-0"



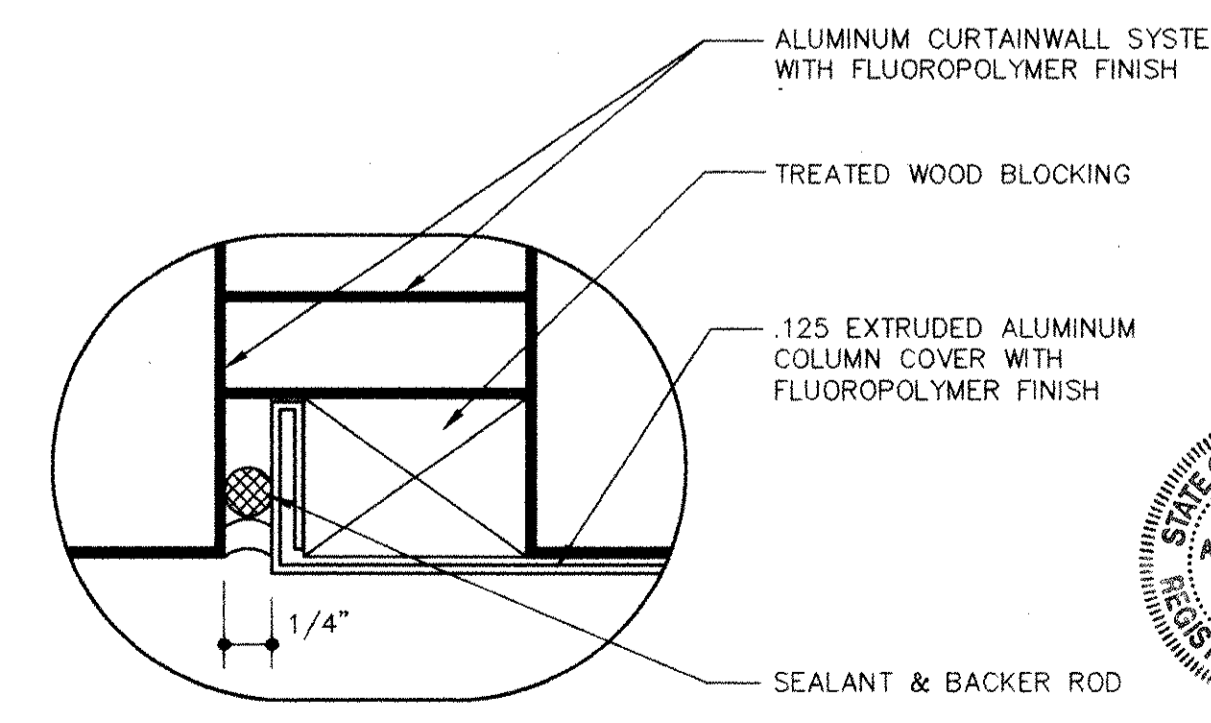
6 JOINT
 NOT TO SCALE



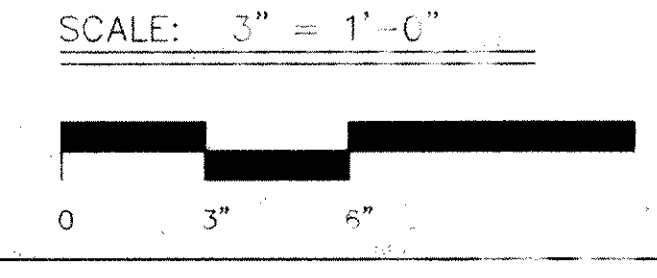
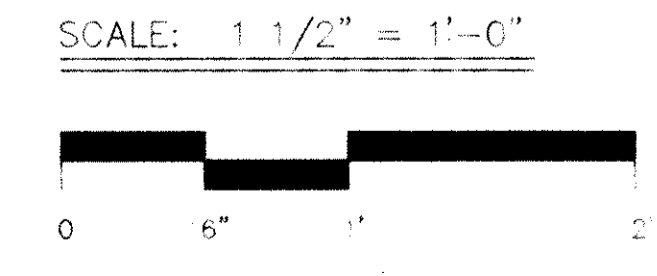
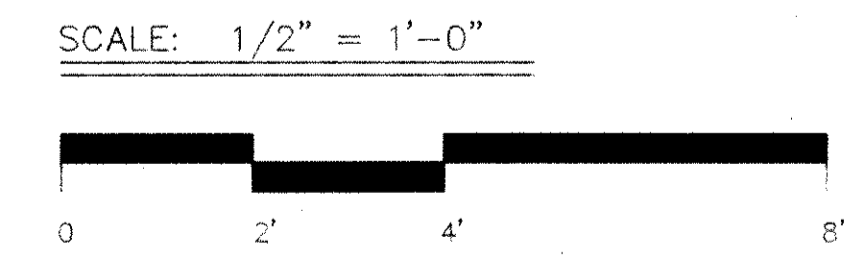
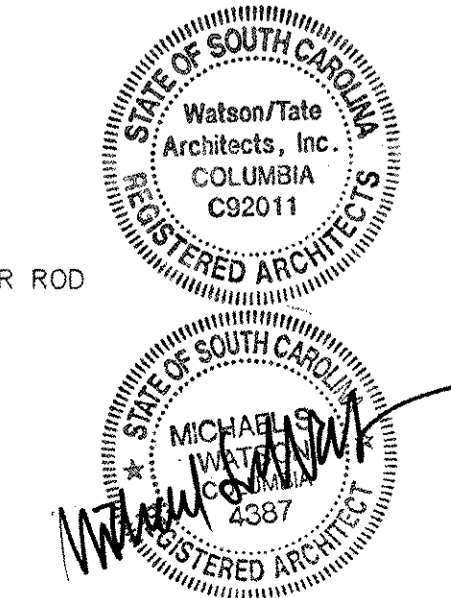
8 DETAIL
 SCALE: 1 1/2" = 1'-0"



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



7 JOINT
 NOT TO SCALE



REV.	QUAN.	DR.	DES.	BY	CHK.	DATE
		RRF	MSW			02/97
		MSW	MSW			02/97

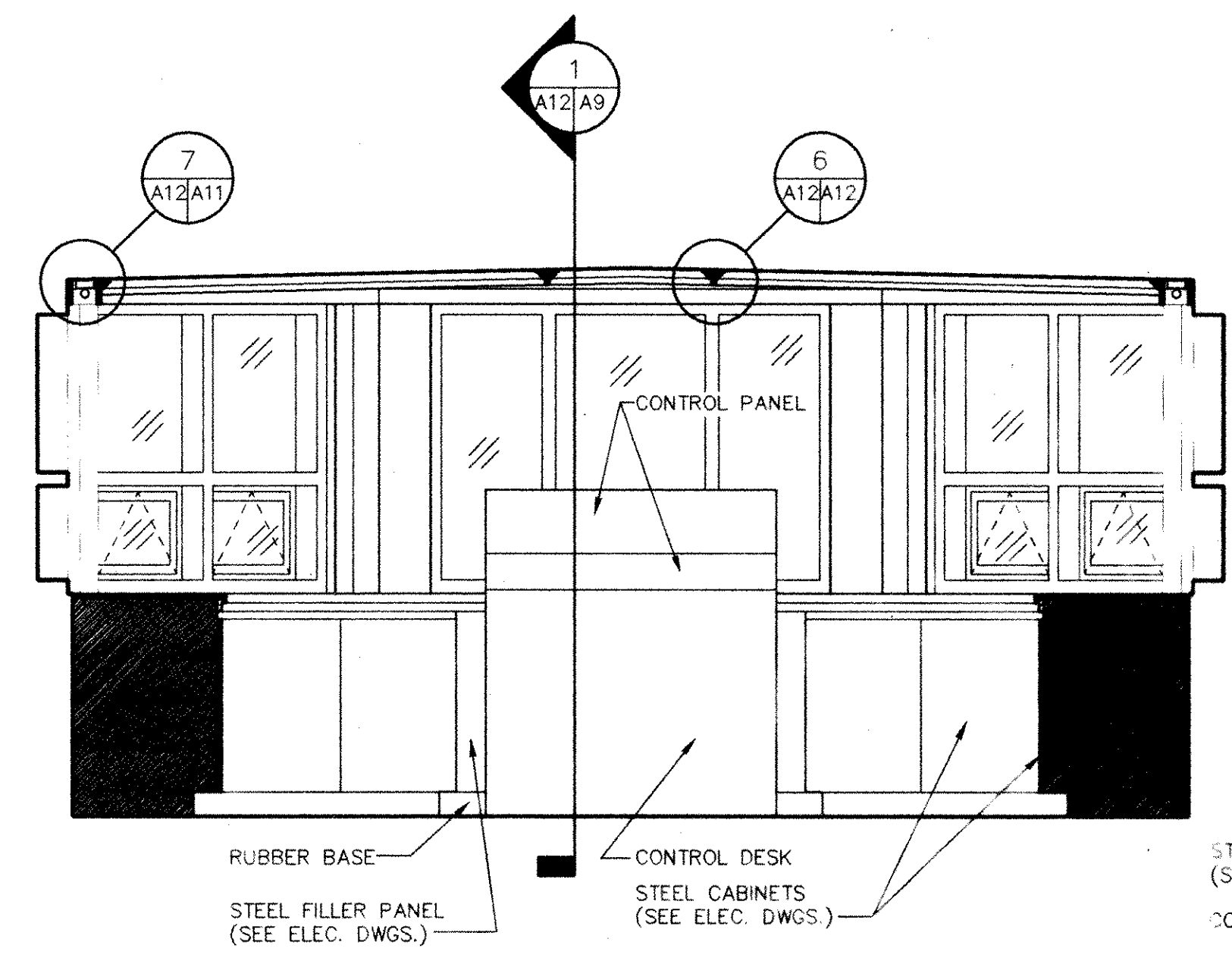
WATSON/TATE ARCHITECTS, INC.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

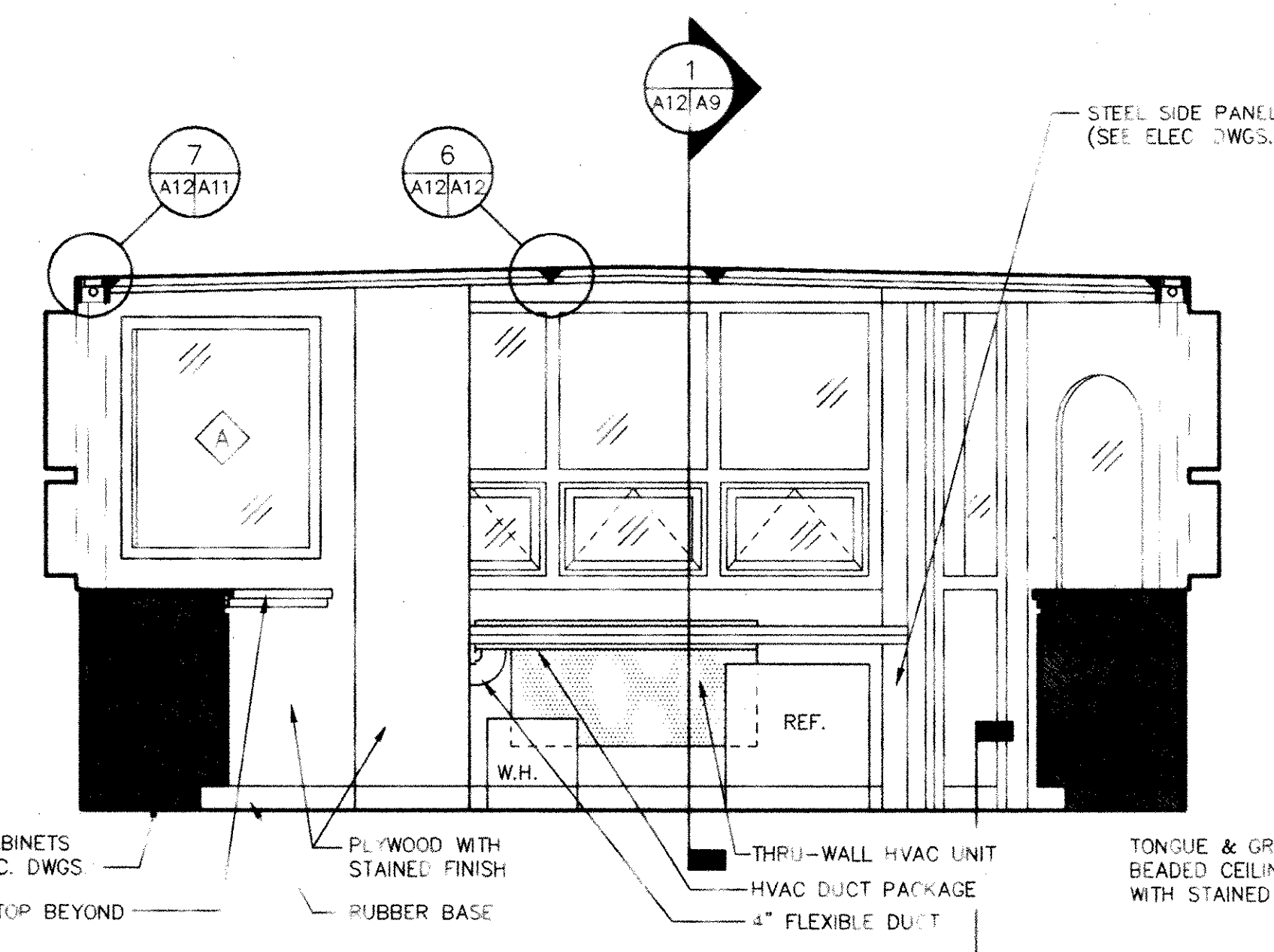
SOUTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 BRIDGE DESIGN COLUMBIA, S.C.

**HARBOR RIVER
 CURTAINWALL, DOOR
 & WINDOW DETAILS**

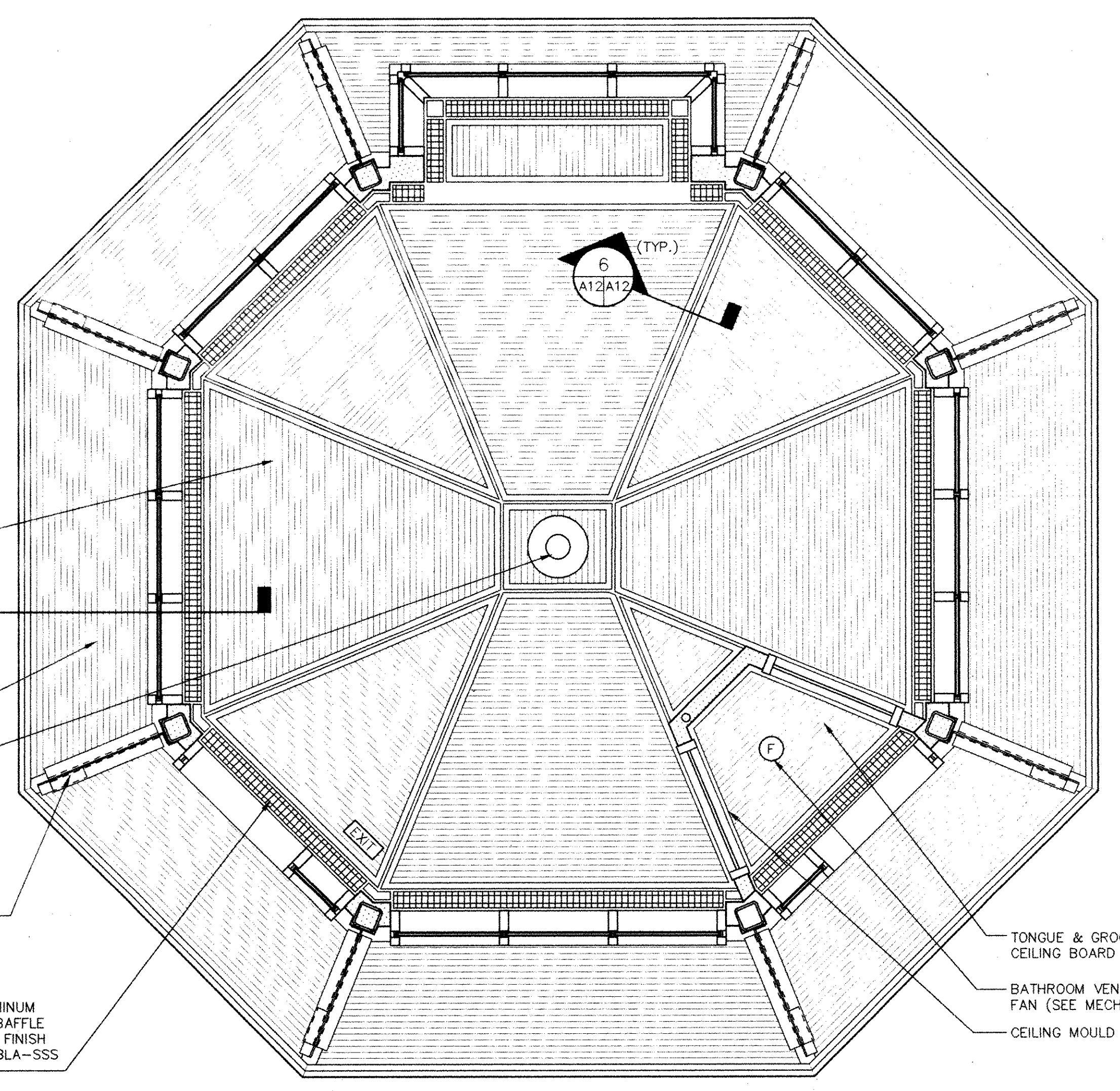
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	A-11



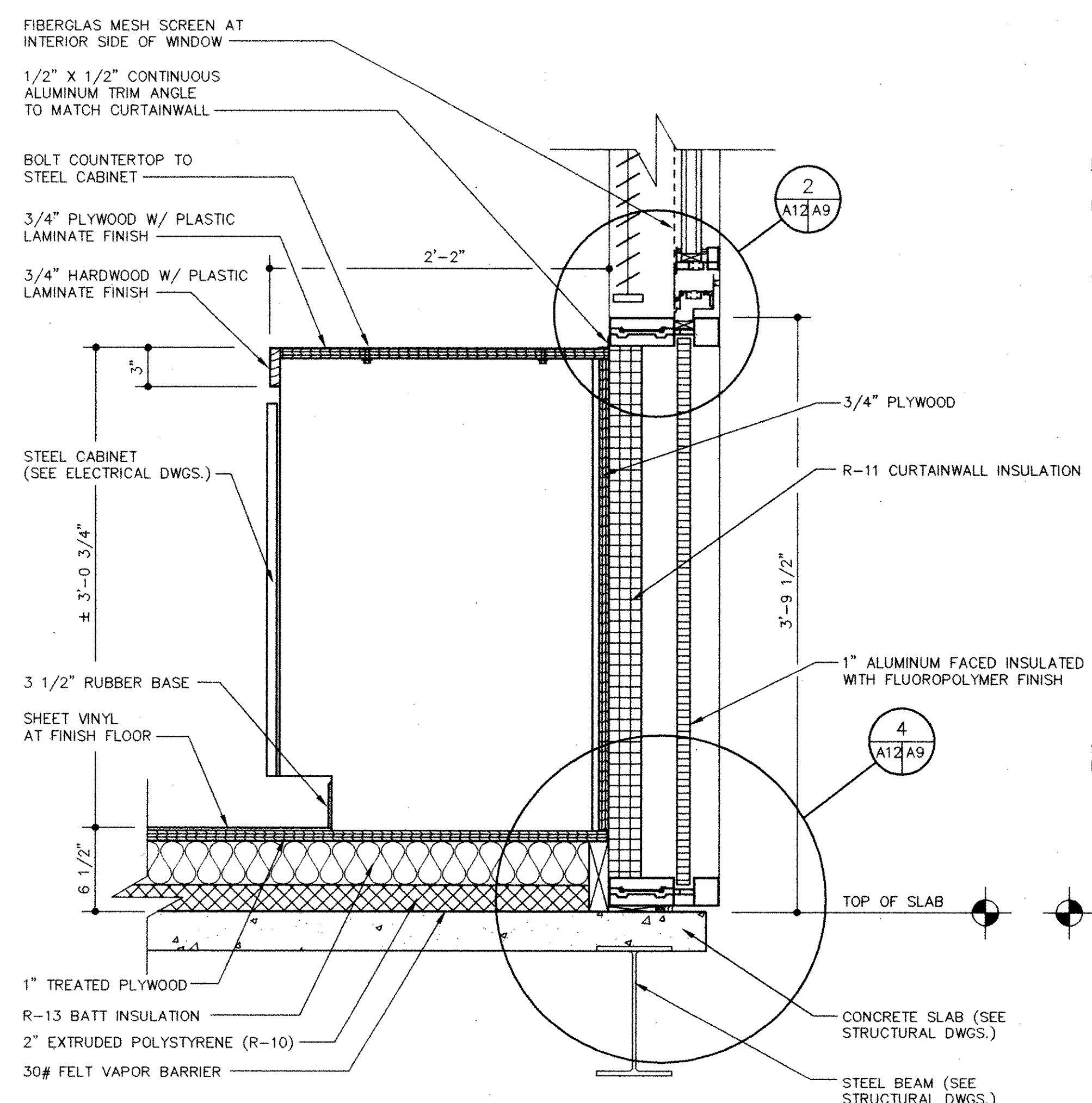
1 INTERIOR ELEVATION
SCALE: 1/2" = 1'-0"



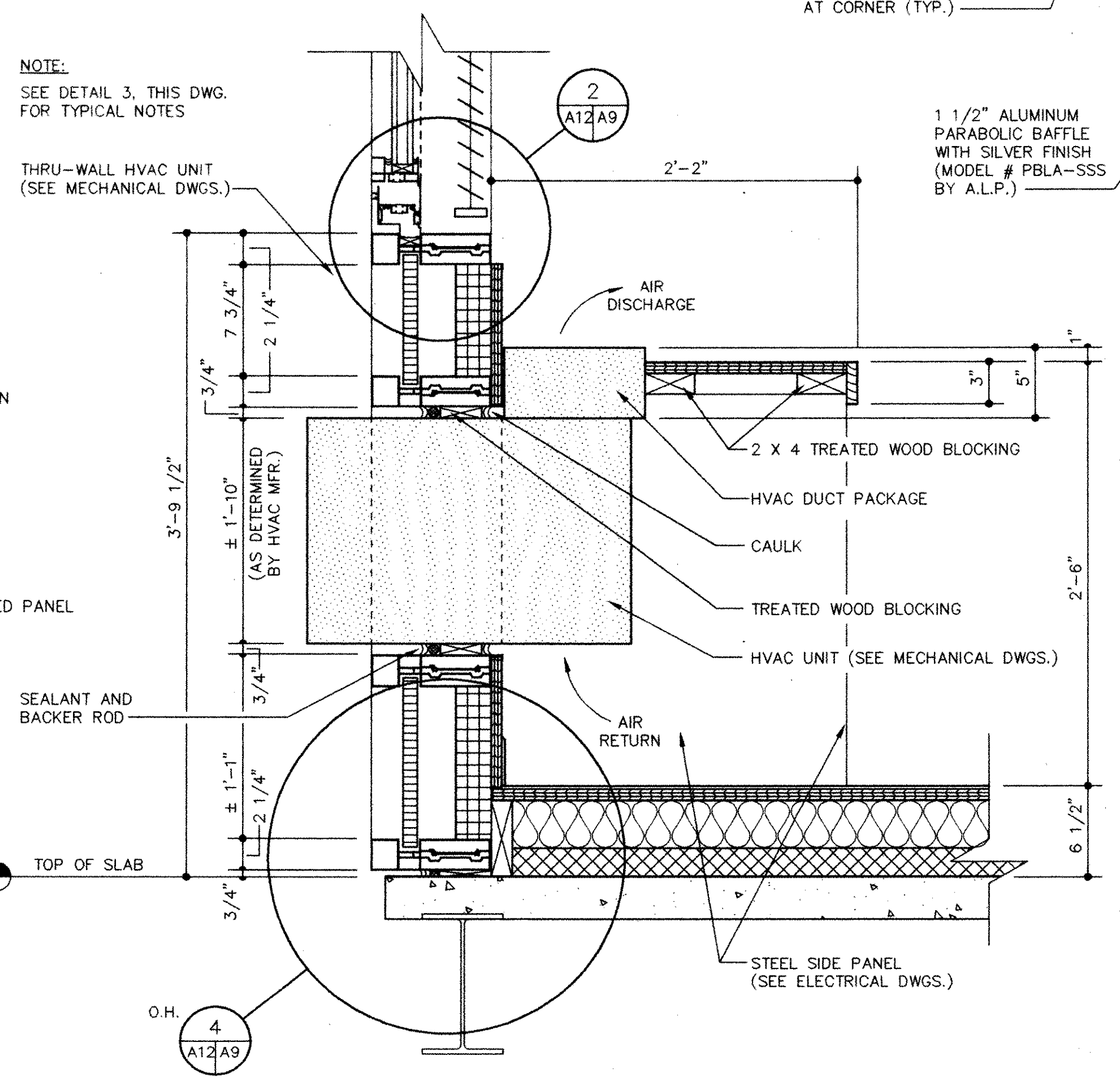
2 INTERIOR ELEVATION
SCALE: 1/2" = 1'-0"



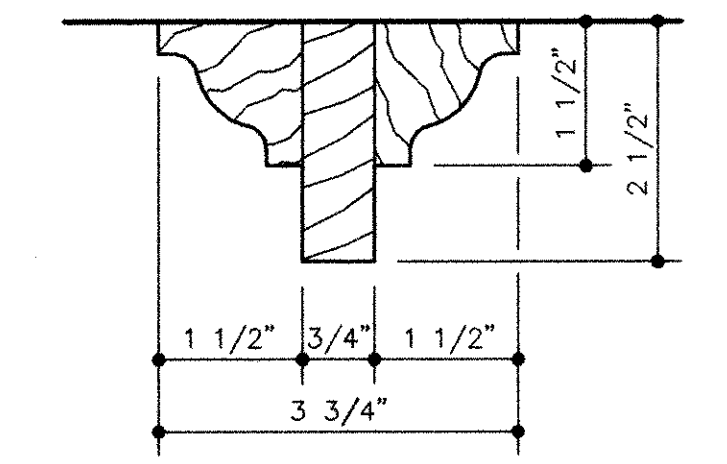
5 REFLECTED CEILING PLAN
SCALE: 1/2" = 1'-0"



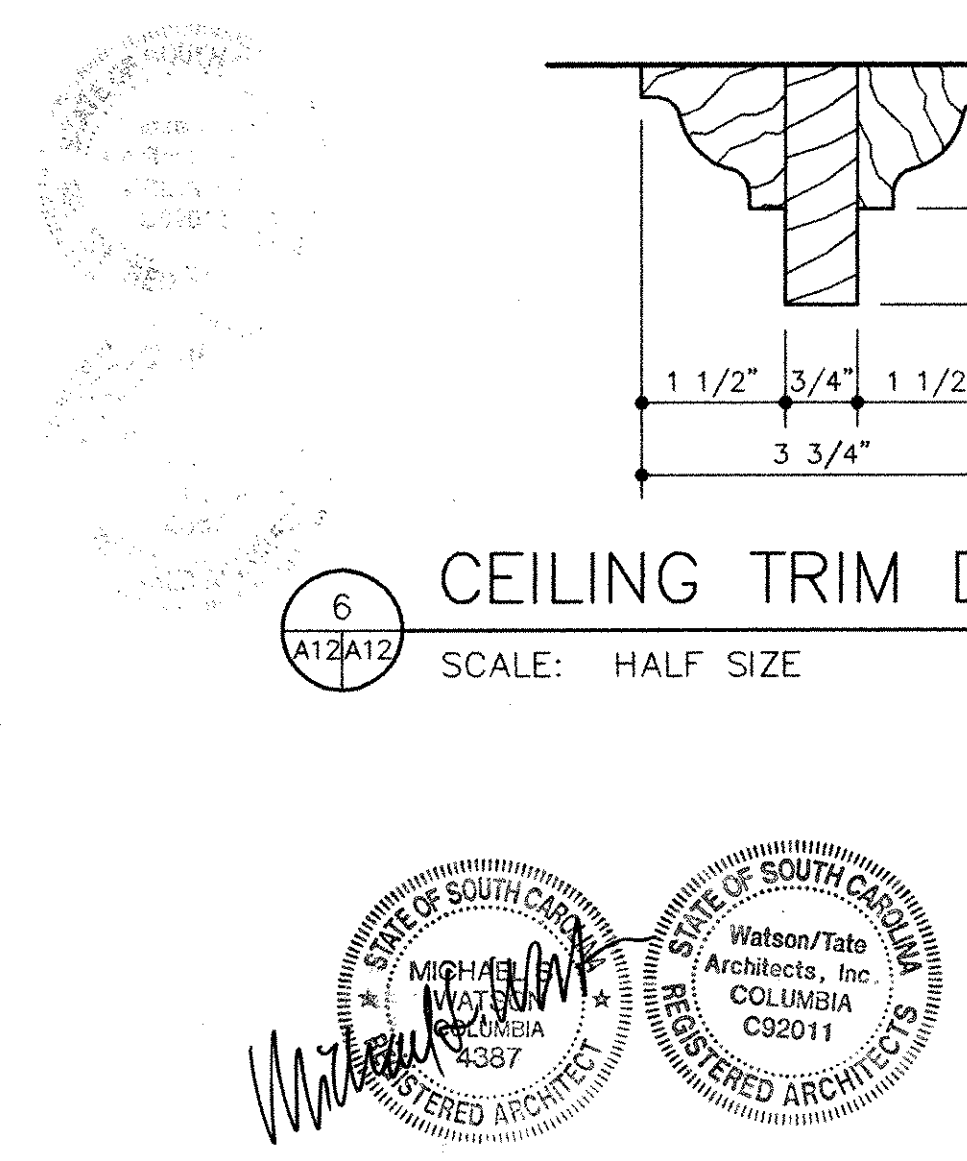
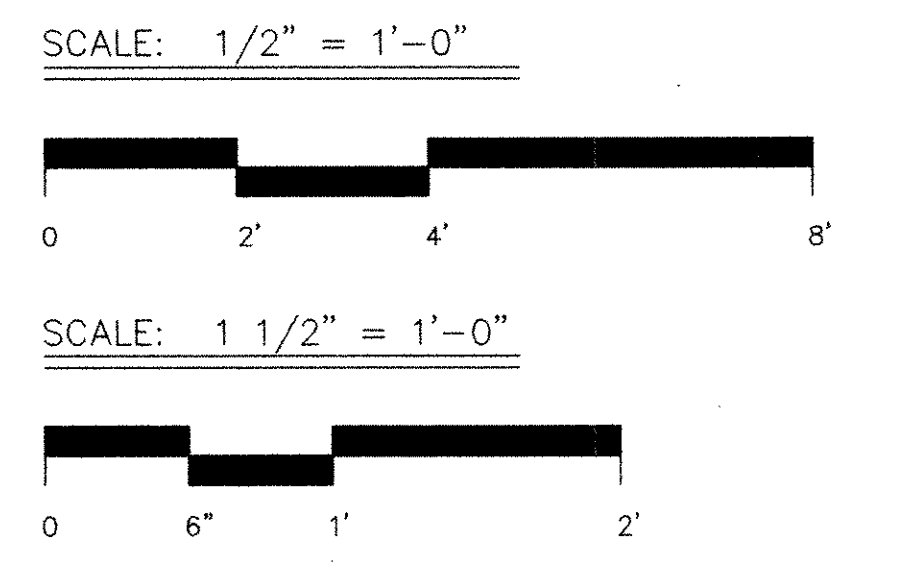
3 CABINET DETAIL
SCALE: 1 1/2" = 1'-0"



4 DESK DETAIL
SCALE: 1 1/2" = 1'-0"



6 CEILING TRIM DETAIL
SCALE: HALF SIZE



WATSON/TATE ARCHITECTS, INC.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

HARBOR RIVER
**INTERIOR ELEVATIONS,
REFLECTED CEILING PLAN
& CABINET DETAILS**

REV.				
REV.				
REV.				
QUAN.				
DR.	RRF	MSW	02/97	
DES.	MSW	MSW	02/97	
BY	CHK.	DATE		

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	A-12

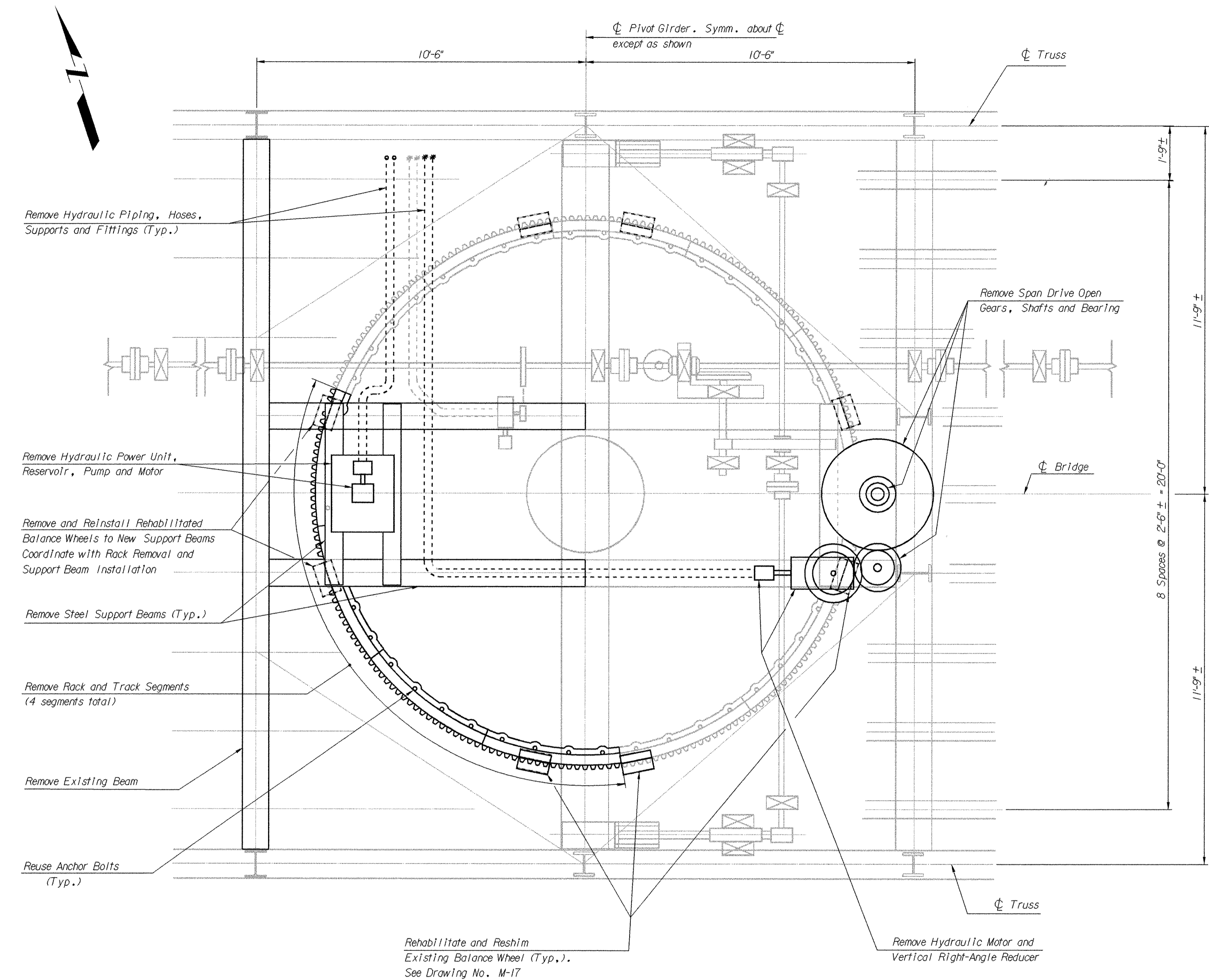
SPAN DRIVE CONSTRUCTION SEQUENCE

1. Remove one of four rack and track segment as shown for verification of dimensions and configuration. Temporarily install a steel plate as substitute for removed segment to maintain span operation.
2. Remove the remainder of existing rack and track segments as shown and replace with new rack and track segments (4 segments total). See Drawing No. M-17 for segment details. Reuse existing anchor bolts. Coordinate segment removal with rehabilitation of balance wheels. Segment removal and installation is to be performed one at a time to ensure continued operation of swing span.
3. Install new box beam outside of existing beam on west side of pivot pier. For details see Drawing No. S-24.
4. Remove span drive machinery on west side of pivot pier including hydraulic power unit (motor, manifold, coupling, pump and reservoir) and piping. Remove hydraulic motor, right angle reducer and pinion on east side of pivot pier. Maintain span operation by using manual drive.
5. Remove hydraulic motor, reducer, and chain sprocket of wedge drive on west side of pivot pier. Maintain operation using manual drive for wedges.
6. Remove existing beam and machinery supports on west side of pivot pier.
7. Temporarily place and support span drive reducer (R1) under west side of swing span at pivot pier.
8. Install new machinery supports on west side of pivot pier.
9. Install new rack pinion, bearing B1 and base support to new box beam. Shim and align base support using sub-drilled holes to new box beam for proper alignment of rack pinion to rack. Manually operate span to verify alignment. Field ream support bolt holes one at a time once alignment is correct.
10. Align reducer (R1) to new rack pinion shaft. Fasten reducer to new supports using turned bolts in reamed holes.
11. Install remainder of span drive machinery including motor, motoreducer, clutch and brake.
12. Remove remainder of existing span drive machinery on east side of pivot pier.

Contractor has the option of submitting an alternate construction sequence to The Engineer for approval.

NOTES:

1. Cost for existing span drive removal to be included in Pay Item "New Span Drive."
2. Cost for existing beam and support beam removal to be included in Pay Item "Span Drive Support."
3. Cost to remove and rehabilitate balance wheels to be included in Pay Item "Balance Wheel Repairs"



PLAN
1/2" = 1'-0"

QUANTITIES		
I T E M	UNIT	QUANTITY
New Span Drive	L. S.	Lump Sum
Rehabilitation of Wedge Drive	L. S.	Lump Sum
Balance Wheel Repair	L. S.	Lump Sum
New Centering Locks	Ea.	2

HNTB ARCHITECTS ENGINEERS PLANNERS <small>The HNTB Companies</small>	
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.	
HARBOR RIVER DEMOLITION OF EXISTING SPAN DRIVE	
REV.	
REV.	
REV.	
REVIEWED	
QUAN.	SN EK 2-97
DR.	FG SN 2-97
DES.	SN EK 2-97
BY	CHK. DATE
FILE NO.	ROUTE COUNTY DRAWING NO.
	US-21 BEAUFORT M-13

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Created by: JGCR/MLM/SSS/SSS/SSS/SSS
User: JGCR/MLM/SSS/SSS/SSS/SSS

WEDGE DRIVE CONSTRUCTION SEQUENCE

1. Modify east and west pier walls to accommodate new center lock receiving sockets. Remove existing centering mechanism and supports. Install new east and west center lock drive and supports. For details see Drawing No. M-20.
2. Temporarily install two 50 ton, single-acting, hydraulic cylinders with locking nuts equipped with base and tilt saddle on the west rest pier. See Drawing No. M-19 for location. Place each cylinder adjacent to the end wedges. The cylinders will be operated by a single pump unit with control valves for synchronous lift of the span end.
3. Cut section of west line shaft to accommodate the new wedge drive installation, see Drawing No. M-19. Remove west end wedge mechanisms and bearing bushings to be rehabilitated. Clean and realign west end open gears and couplings. Maintain wedge operation by using the manual drive and hydraulic cylinders.

Typical Hydraulic Cylinder Operation:

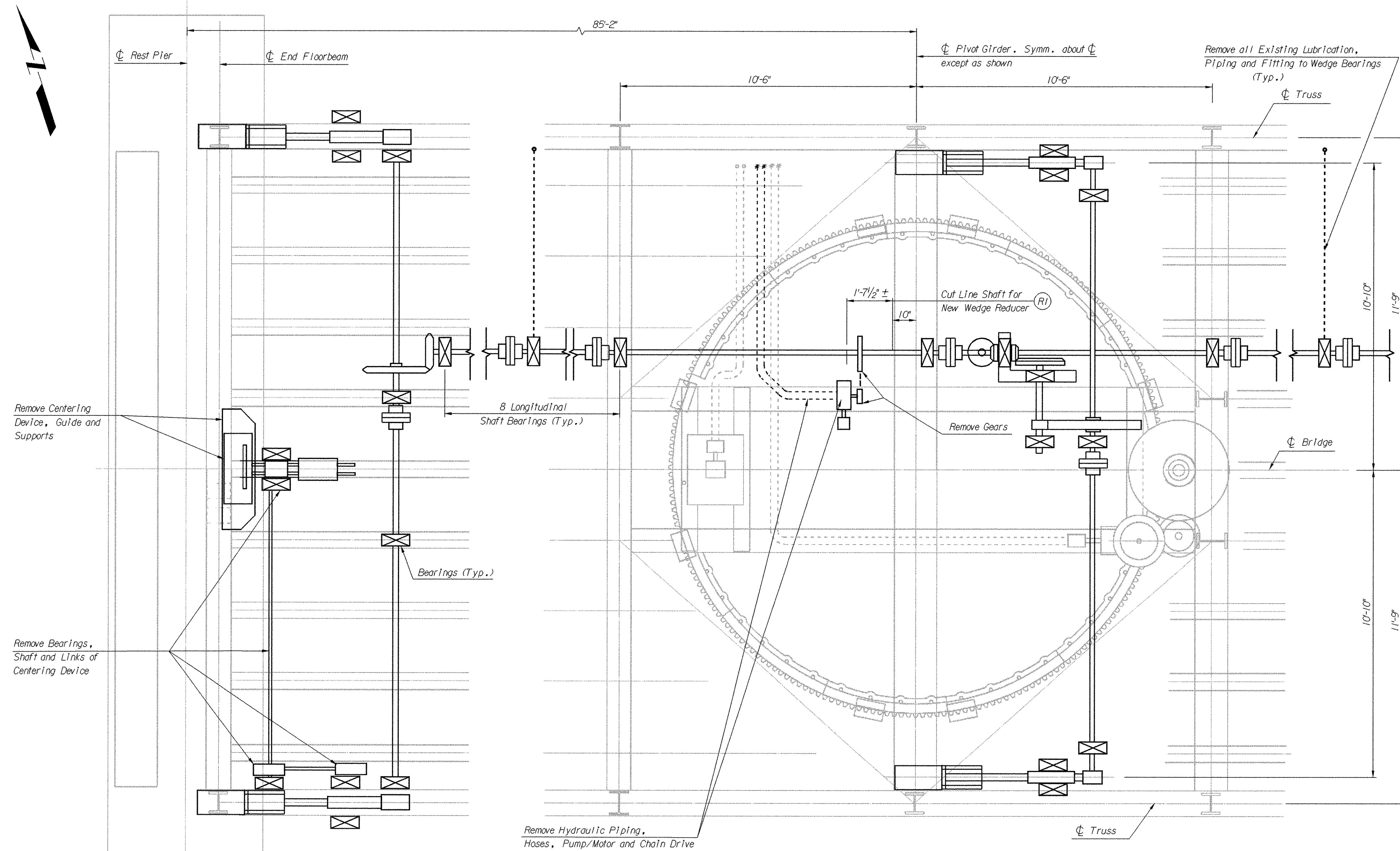
Confirm roadway/swing span joint alignment with wedges and center lock driven (closed). Extend the cylinder rods up to the bottom flange of the end floorbeam. Plates should be placed between the flange and rod for load distribution. Once the proper elevation is attained (joint is level) a locking nut shall be used to hold the position. Pull wedges and disassemble for repairs. For repair details, see Drawing No. M-20.

For bridge operation during construction, the cylinder rods must be retracted and cleared for a bridge opening. After the opening is completed and the swing span is centered, reinstall the cylinders to elevate and support the cantilevered end.

Note: Temporarily support shafts of unsupported lengths exceeding 10 and 12 feet for line and cross shafts respectively during bearing repairs.

4. Install new wedge drive machinery including motor and reducer. Coupling halves on line shaft to be installed in the field. Coordinate wedge drive installation with span drive replacement and support installation.
5. Install rehabilitated west end wedge mechanisms and new bearing bushings.
6. Relocate hydraulic cylinders and pump unit from the west rest pier to the east rest pier.
7. Remove east end wedge mechanisms and bearing bushings to be rehabilitated. Clean and realign east end open gears and couplings. Maintain wedge operation by using the new wedge drive and hydraulic cylinders.
8. Install rehabilitated east end wedge mechanisms and new bearing bushings.
9. Relocate hydraulic cylinders and pump unit from the east rest pier to the center pivot pier. Each cylinder shall be placed under the pivot beam adjacent to the center wedges.
10. Remove the center wedge mechanisms and bearing bushings to be rehabilitated. Clean and realign wedge gearing. Maintain wedge operation by using the new wedge drive and hydraulic cylinders.
11. Install rehabilitated center wedge mechanisms and new bearing bushings.
12. Remove hydraulic cylinders and pump unit.
13. Operate new wedge drive to verify alignment of open gears and seating of wedges. Adjust wedges as necessary for proper alignment and seating.

Contractor has the option of submitting an alternate construction sequence to the Engineer for approval.



PLAN
1/2"=1'-0"

NOTES:

1. Cost of all work shown on this drawing to be included in Pay Item "Rehabilitation of Wedge Drive" unless otherwise noted.
2. Cost for removal of existing centering device mechanism and supports to be included in Pay Item "New Centering Locks."

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

DEMOLITION OF EXISTING WEDGE DRIVE

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

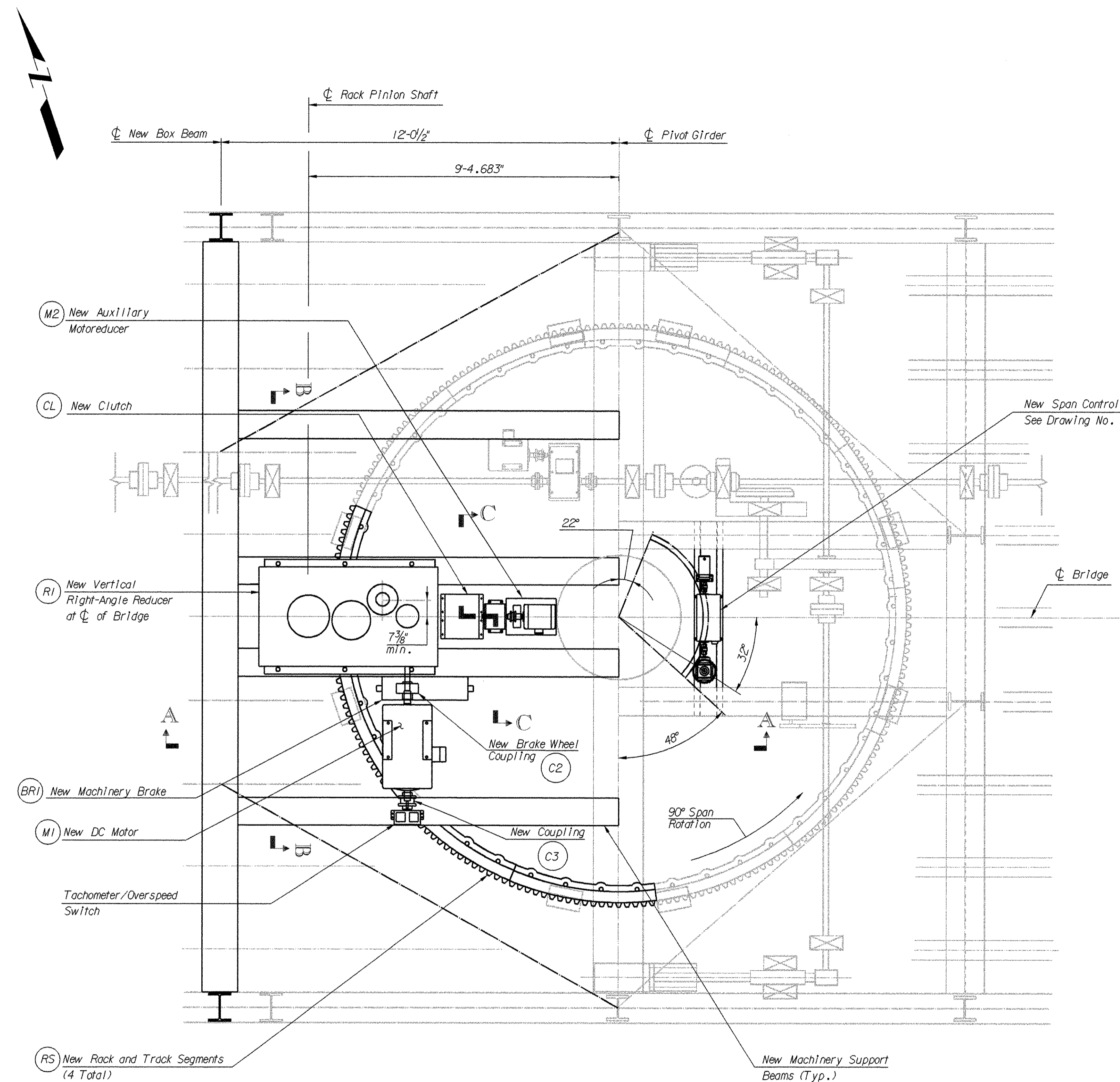
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-14

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	68	115

SPAN MACHINERY SCHEDULE

MK	QTY	DESCRIPTION	MANUFACTURER
M1	1	Foot-mounted, DC motor, 500V totally enclosed non-ventilated, 20 HP, 1150 RPM base speed, 1060 RPM set speed	Series 9100, Frame 366AT as manufactured by Fincor
M2	1	Concentric shaft motoreducer, dual speed, squirrel cage AC gearmotor, totally enclosed fan cooled, 5 HP, synchronous speed 1800/450 RPM. 5.06:1 ratio, with Type T41, Size 1030 controlled torque-steel flex coupling and coupling guard. Slip torque set @ 270 lb-in. Extend drive shaft to suit clutch hub.	Type FZ2, Size 1020-Class 11 as manufactured by The Falk Corp.
R1	1	Modified double input vertical right angle reducer, 350.87:1 ratio, rated for 588 in-kips at 3.28 RPM, service factor 1.0, Extend shaft at M1 input to 8 1/2" to suit brakewheel coupling and cover. Extend shaft at M2 input to suit clutch hub.	Quadruple reduction unit No. 14VB4 as manufactured by Philadelphia Gear Corp. See mechanical specifications for special design criteria
BR1	1	Thruster operated machinery brake, 8" diameter brake wheel with manual release, NEMA 3R enclosure. Brake setting 65 ft-lbs.	3 Phase AC Hy-Thrust Operated, Type 8" MBT/E-ED23/5 as manufactured by Mondel Engineering Limited.
CL	1	Electrically engaged clutch with straight bores, DC operated with rectifier. Drive hub with 1 1/2" bore, 3/8"x3/8"x5/8" key to match M2 shaft. Driven hub with 1 3/4" bore 3/8"x3/8"x2 3/4" key to match R1 shaft. Torque capacity @ 400 lbs-ft.	Style E, Class S, Size 1002 NEMA 3R enclosure as manufactured by Rexnord Corporation Stearns Division
C1	1	Rigid thrust coupling, upper hub with 6 1/8" bore, 1 3/4"x1 1/2"x7 1/8" key to match R1 output, Lower hub with 8" bore, 2"x1 1/2" x7 1/8" key. 2" diameter dowel thru hubs.	Type GV82 exposed bolts, Size 1060GV as manufactured by The Falk Corp.
C2	1	Brakewheel coupling, 8" diameter x 3 1/2" face. A hub with 1 3/4" bore, 3/8"x3/8"x3" key to match R1 input shaft at M1. B hub with 2 3/8" bore, 5/8"x5/8"x3" key min or to suit M1 shaft keyway.	Type BW Steelflex, Size 8BW as manufactured by The Falk Corp.
C3	1	Single engagement gear coupling. Drive hub with 2 1/8" bore, 1/2"x1/2"x3" key to match M1 shaft. Driven hub with 5/8" bore, 3/16"x3/16" key to suit tachometer/overspeed switch shaft.	Type G51, size 1010G as manufactured by The Falk Corp.
B1	1	Rack pinion bearing. Double flanged, split-type bronze bushing (ASTM B22 Alloy 91100) with double spiral grease grooves.	Model No. SMCB-64 as manufactured by Steward Machine Co. For details, see Drawing No. M-17
RS	4	Rack Segment, 18 teeth, 210.744" pitch diameter, 3.0625" circular pitch, 20° special involute. Cast Steel, ASTM A148 grade 80-50.	For details, see Drawing No. M-17
RP	1	Rack Pinion, 15 teeth, 14.622" pitch diameter, 3.0625" circular pitch, 20° special involute. Forged Alloy Steel, ASTM A668 Class K.	For details, see Drawing No. M-17

HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
HARBOR RIVER			
NEW SPAN DRIVE - 1			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-15

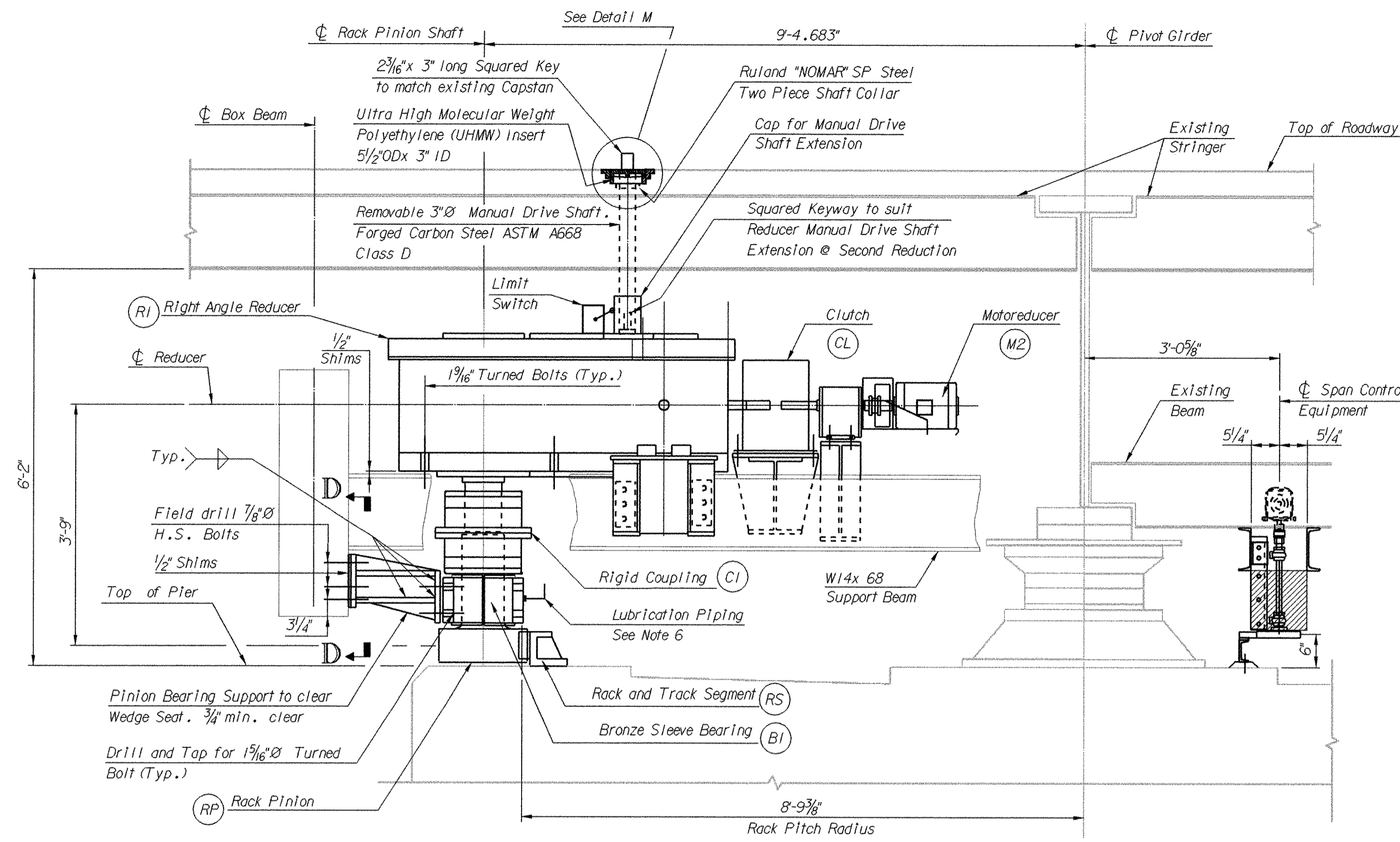


PLAN
1/2"=1'-0"

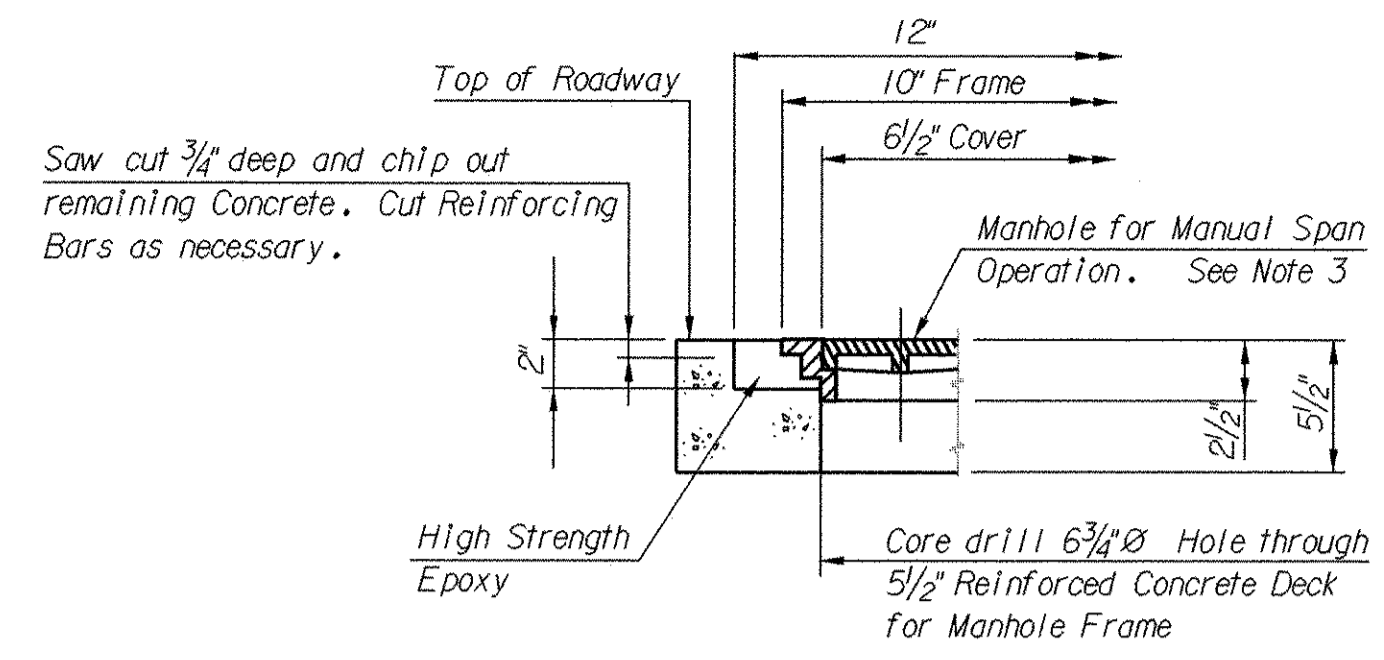
NOTES:
1. For Sections A-A, B-B and C-C, see Drawing No. M-16

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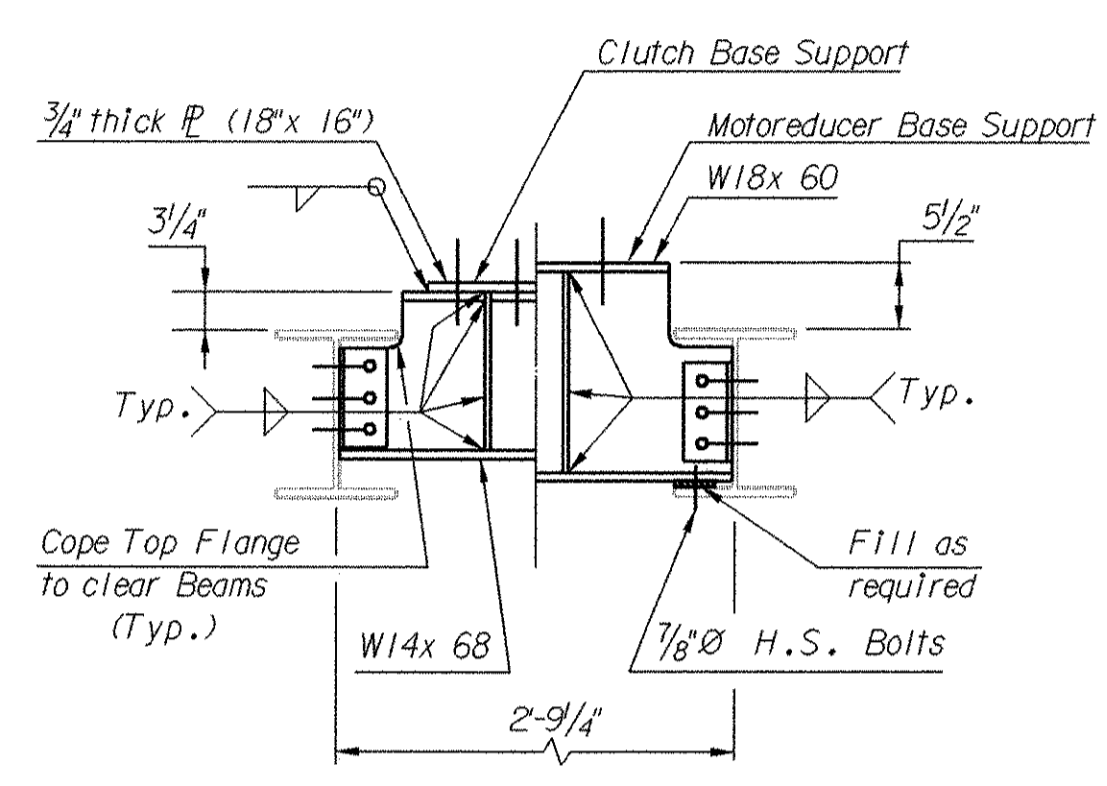
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	SC	BEAUFORT		US-21	69	115



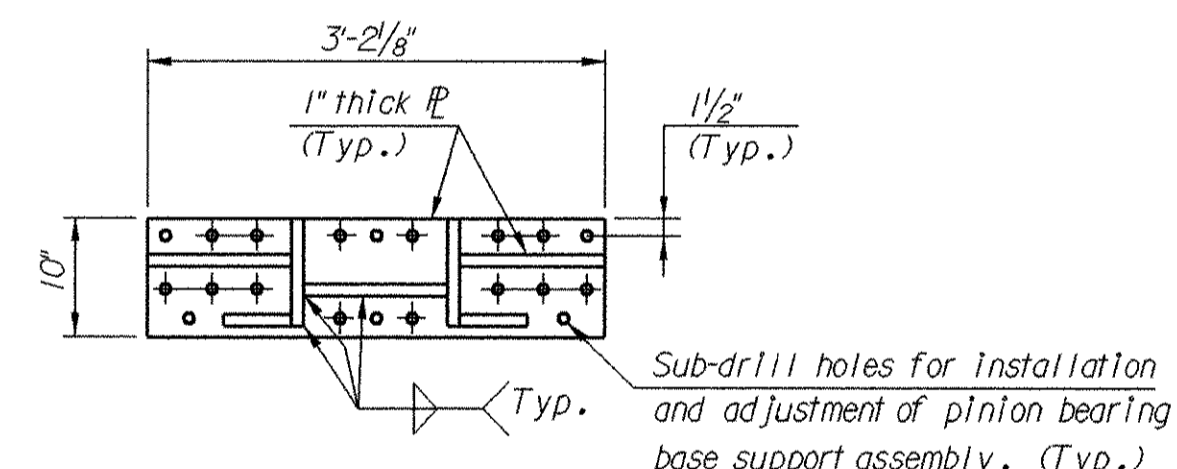
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3/4"-1'-0"



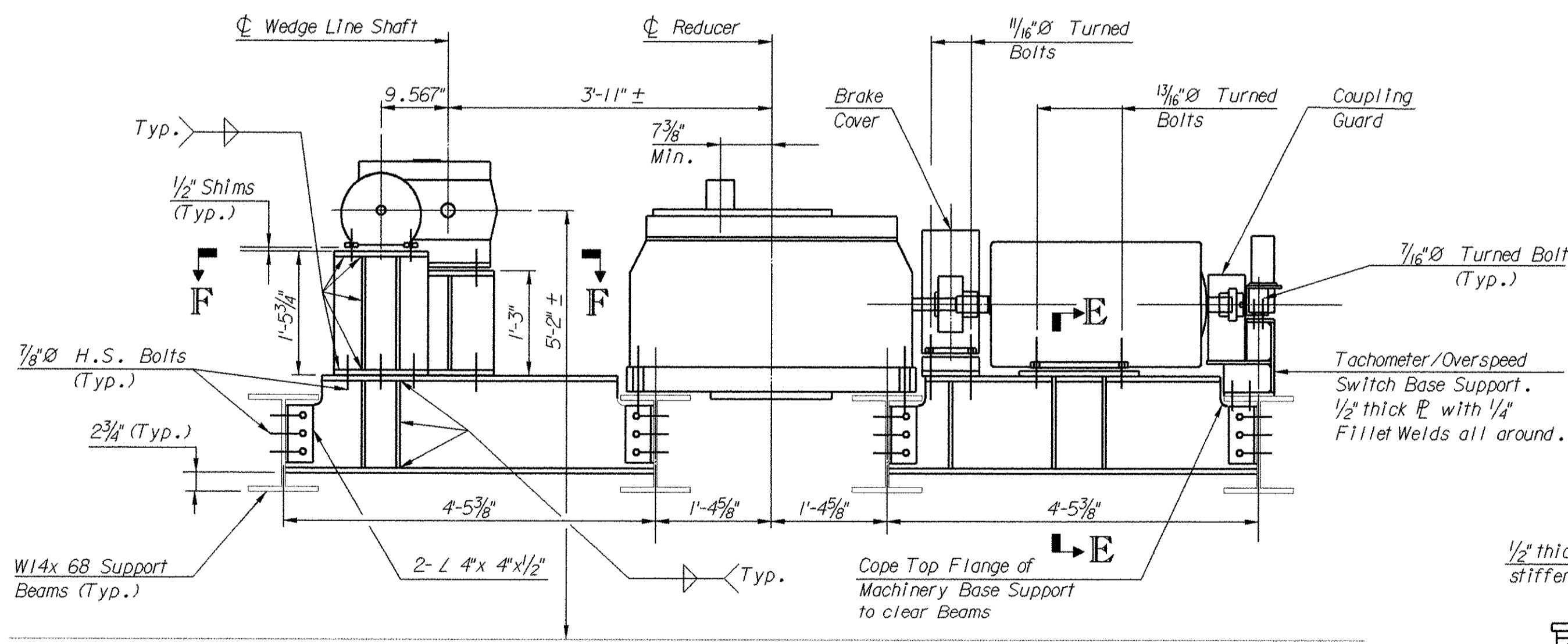
DETAIL M
1 1/2"-1'-0"



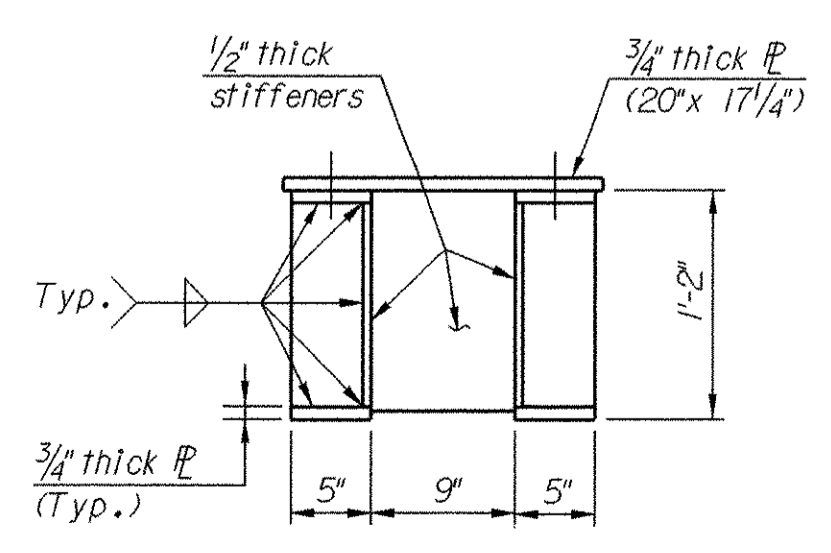
SECTION C-C
3/4"-1'-0"



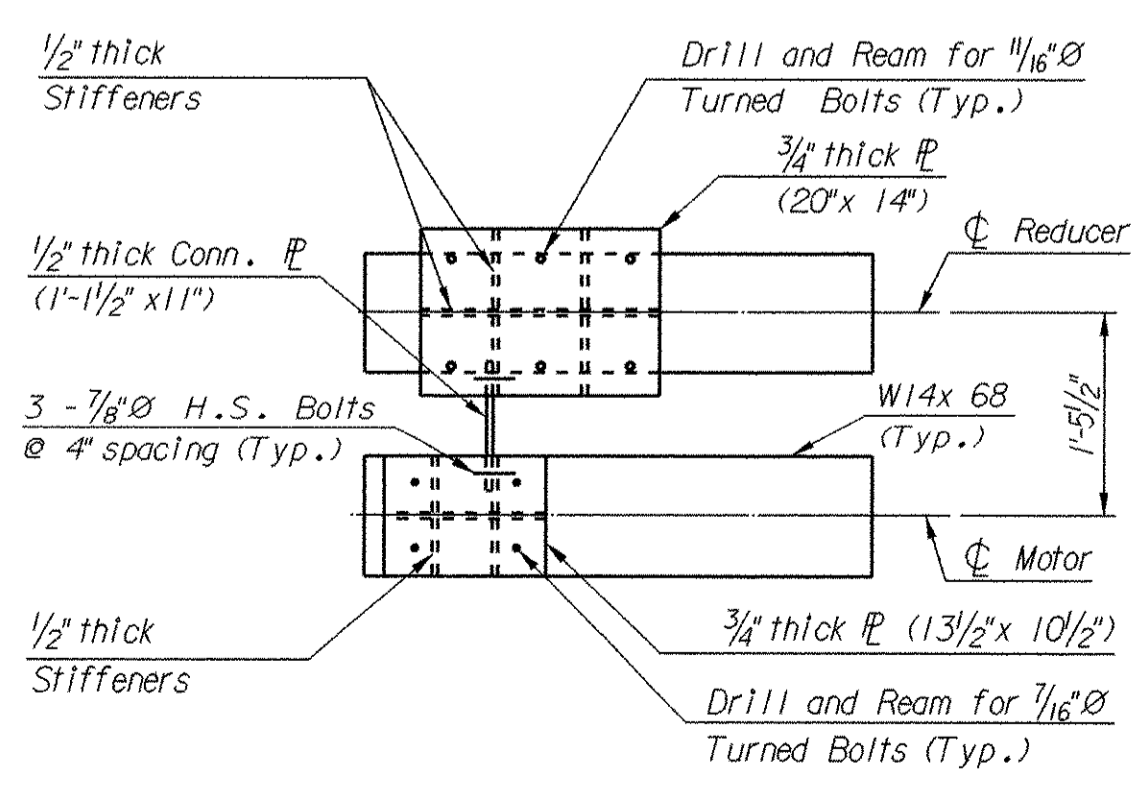
SECTION D-D
3/4"-1'-0"



SECTION B-B
3/4"-1'-0"



SECTION E-E
3/4"-1'-0"



VIEW F-F
3/4"-1'-0"

NOTES:

- For location of Sections A-A, B-B and C-C, see Drawing No. M-15.
- For Span Control Equipment, see Drawing No. M-18.
- Heavy duty manhole frame and solid lid (with "self-sealing application" type F concealed lift handles, R-6013 Series as manufactured by NEENAH Foundry Company. Drill and tap underside of lid for threaded stud and tightening nut to secure bar lock as recommended by the manufacturer. Manhole bar lock for manual span operation only. Cost to furnish and install manhole frame and manual drive shaft to be included in Pay Item "New Span Drive."
- All steel machinery supports shall be 3/4" thick base plates with 1/2" thick web and stiffeners unless otherwise noted.
- All welds to be 1/4" continuous fillets welds unless otherwise noted.
- Cost to furnish and install box beam and W14x68 support beams to be included in Pay Item "Span Drive Support." Cost to furnish and install machinery base supports for span drive M1, M2, BR1, CL and tachometer/overspeed to be included in Pay Item "New Span Drive." Cost to furnish and install machinery base supports for wedge drive M1 and RI to be included in Pay Item "Rehabilitation of Wedge Drive." Cost to furnish and install bearing BI lubrication piping and fittings to be included in Pay Item "New Span Drive."

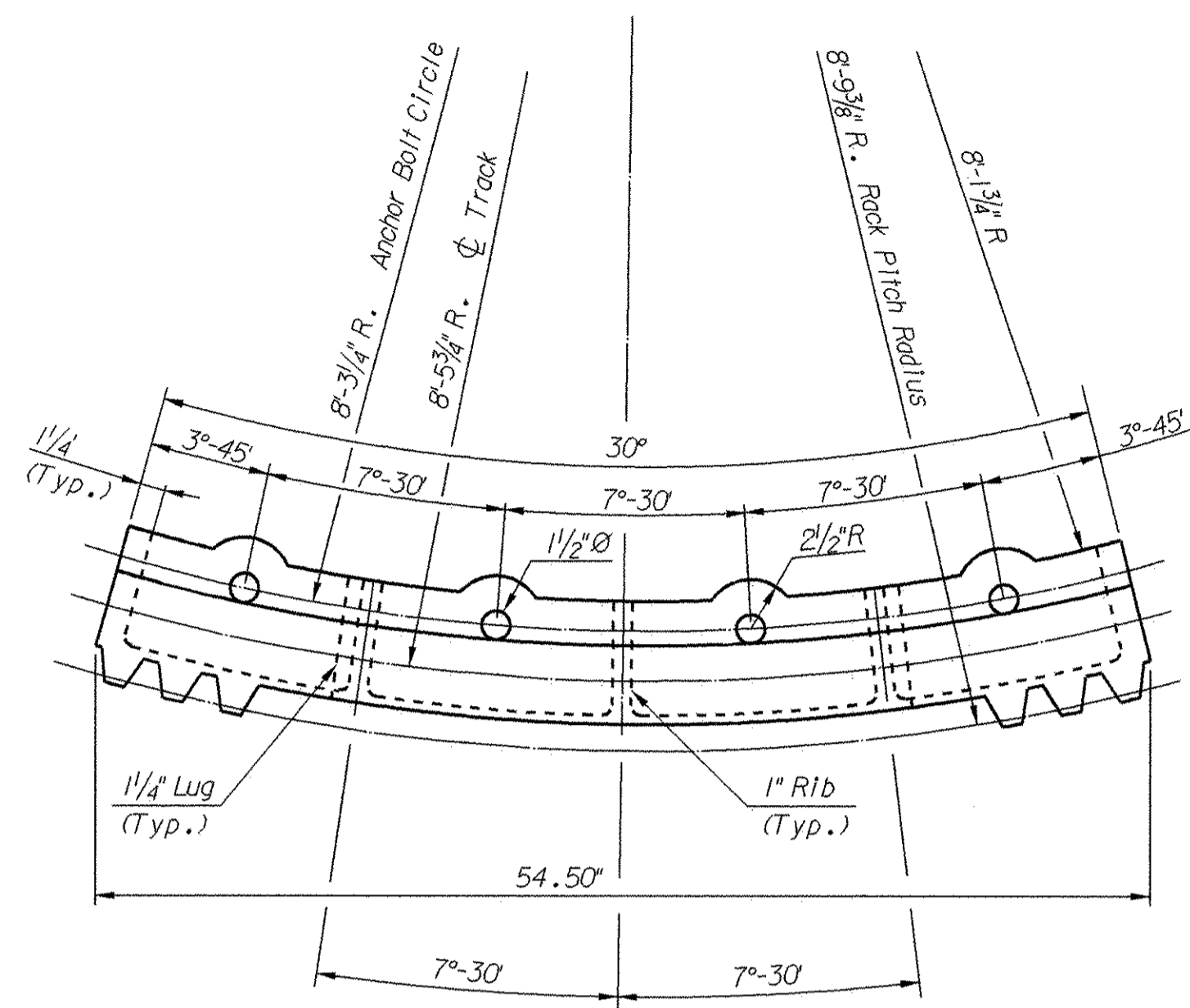
HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, SC.
HARBOR RIVER

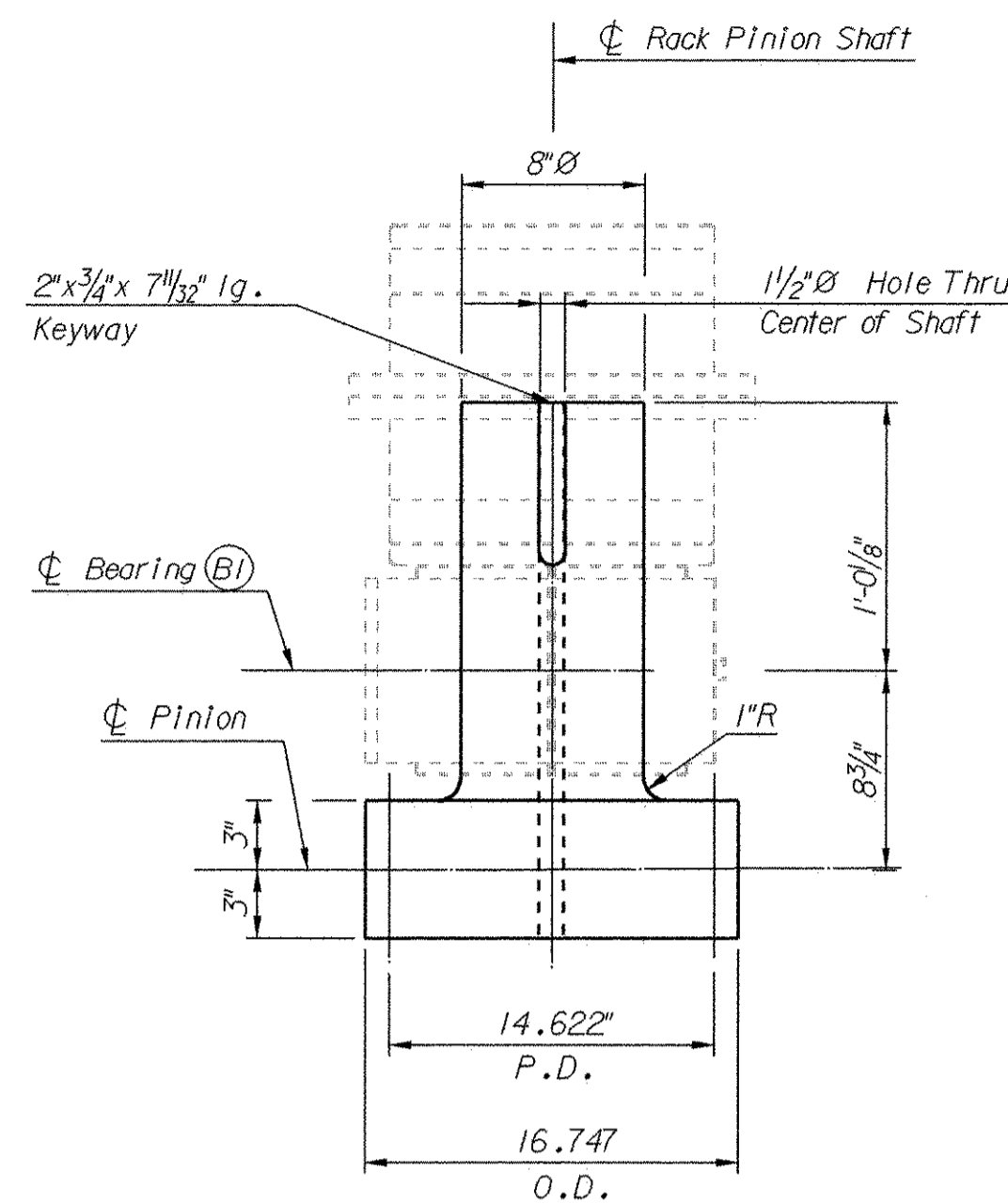
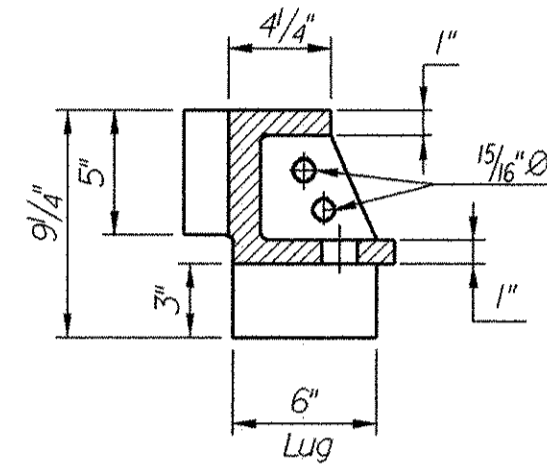
NEW SPAN DRIVE - 2

REV.					
REV.					
REV.					
REVIEWED					
QUAN.	SN	EK	2-97		
DR.	FG	SN	2-97		
DES.	SN	EK	2-97		
BY	CHK.	DATE		FILE NO.	ROUTE
				US-21	COUNTY
				BEAUFORT	DRAWING NO.
					M-16

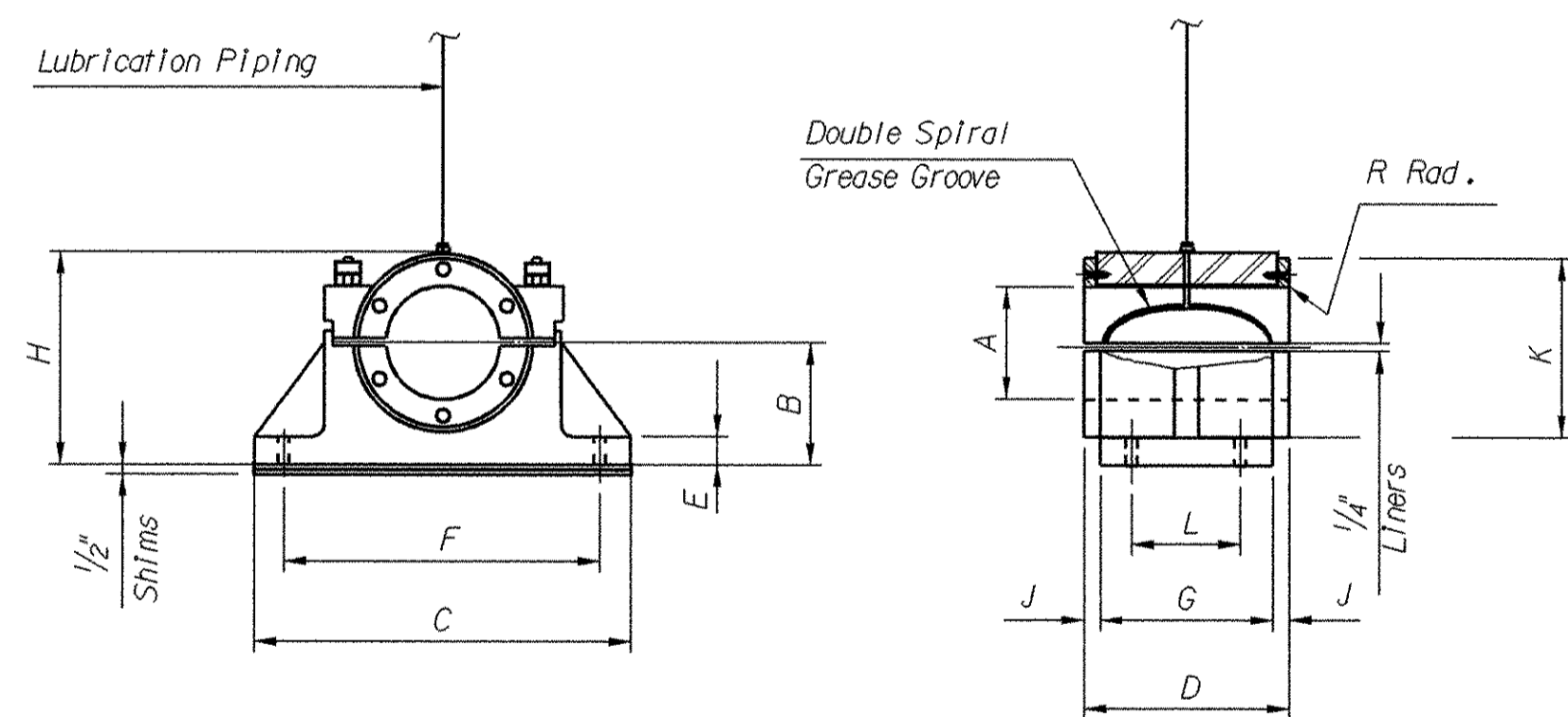
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 User: HNTB\HNTB\KULLEN
 Pen Table:



(RS) RACK SEGMENT
1 1/2" - 1'-0"

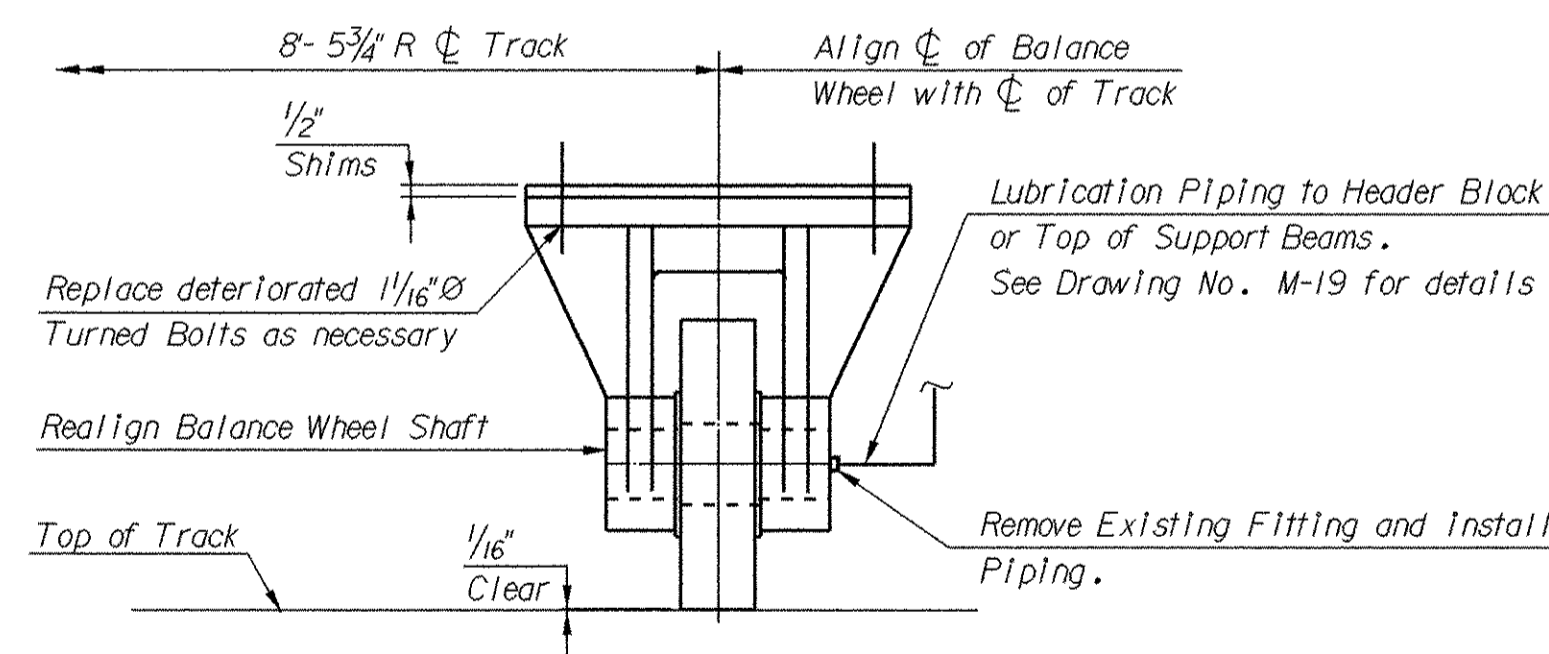


(RP) RACK PINION
1 1/2" - 1'-0"



MK	MODEL NUMBER	SHAFT DIA	A	B	C	D	E	F	G	H	J	K	L	BASE NO.	BOLTS SIZE	RAD. R
B1	SMCB-64	8"	7 1/4"	23"	9 1/2"	1 3/4"	18 1/2"	8 1/2"	13 3/8"	1/2"	11 1/4"	5"	4	15/16"	1/4"	

(B1) PINION BEARING
NTS



TYPICAL BALANCE WHEEL REHABILITATION
NTS

NOTES:

1. Scribe pitch lines on both sides of all gears.
2. Rack tooth dimensions and profile to match existing. Field verify.
3. Rack pinion to mate to existing rack configuration. Field verify all tooth dimensions for proper mating.
4. Recess for lugs - Fill with non-shrink grout after setting rack sections.
5. Cost to furnish and install rack segments, rack pinion shaft and bearing B1 to be included in Pay Item "New Span Drive."
6. Cost to rehabilitate balance wheels to be included in Pay Item "Balance Wheel Repair."

Design: Filmonas
 Date: 09-FEB-1997
 File: C:\Users\N151\Documents\1515555555.dgn
 Plot: 10/24/97

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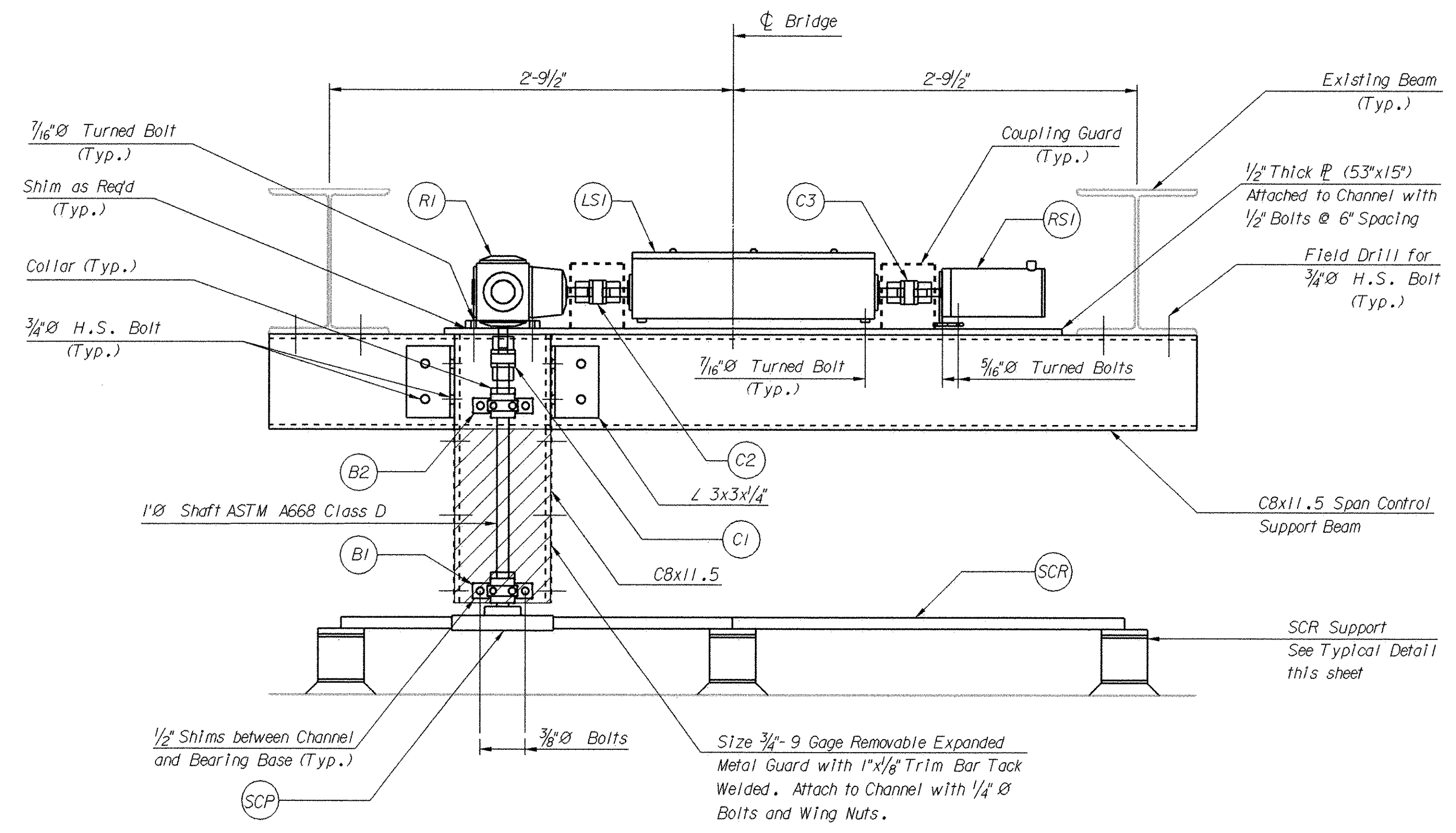
MACHINERY DETAILS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

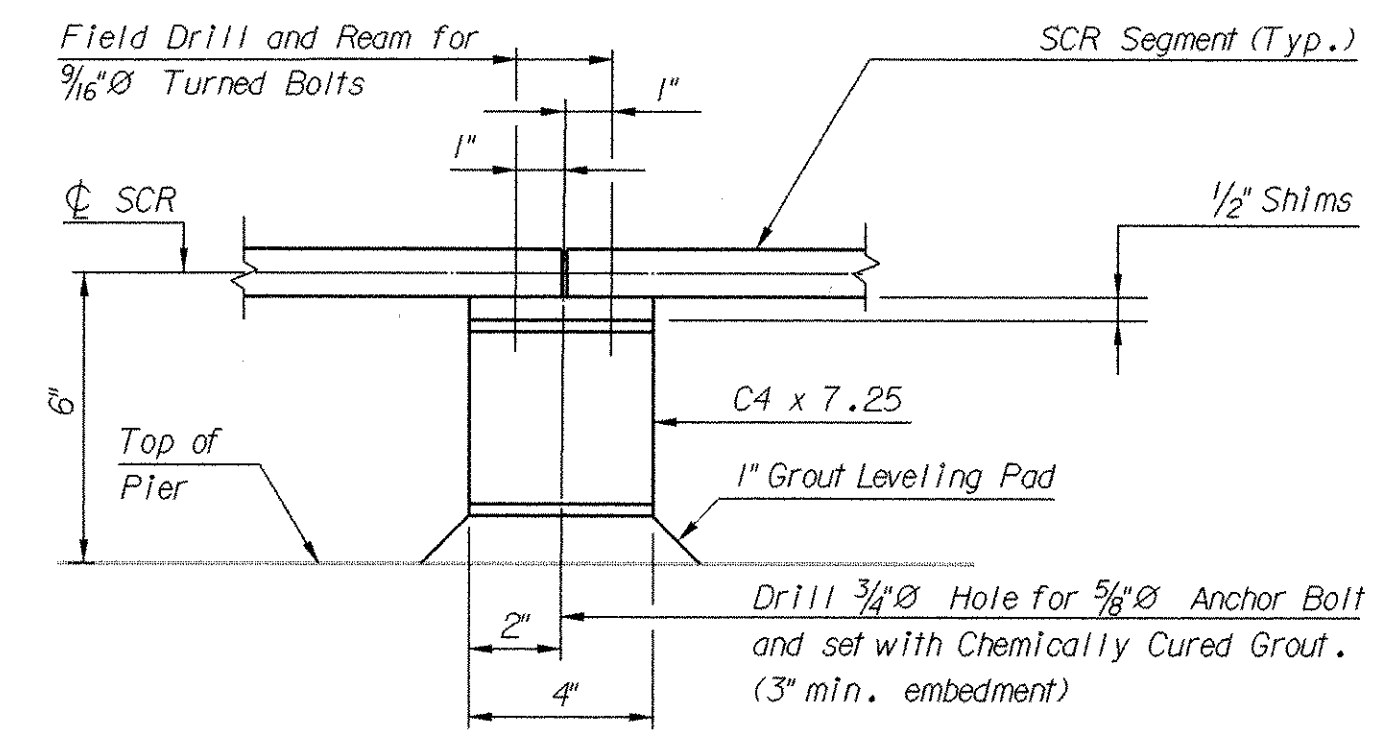
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-17

SPAN CONTROL SCHEDULE

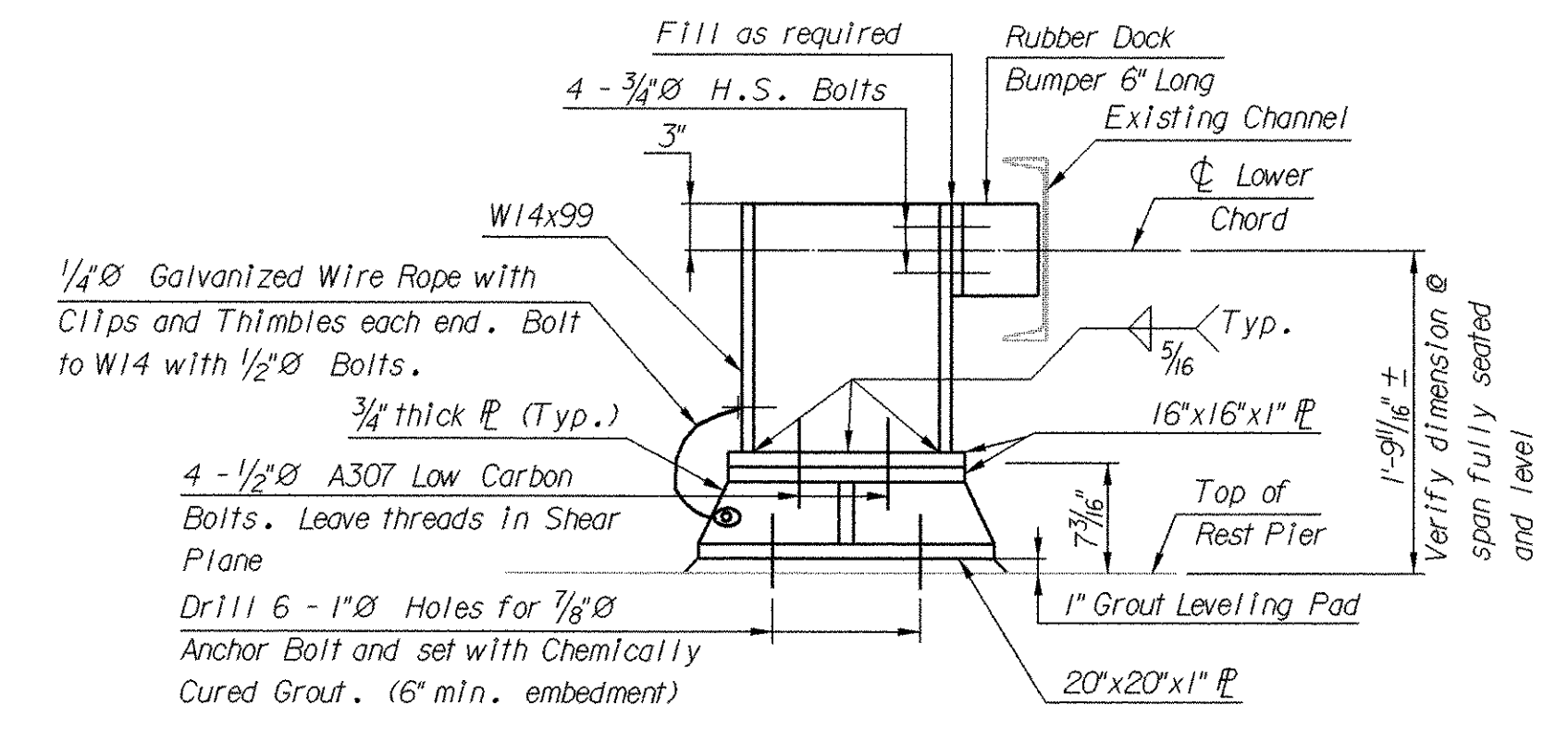
MK	QTY	DESCRIPTION	MANUFACTURER
RSI	1	Absolute position brushless resolver, NEMA 4x enclosure.	See electrical specifications
LSI	1	Rotary span limit switch, NEMA 4x s.s. enclosure.	See electrical specifications
RI	1	Spiral bevel reducer, OM5 assembly, 2:1 ratio.	VR237 Series as manufactured by Boston Gear.
C1	1	Precision machined bored shaft coupling. Drive hub with 1" bore, 1 3/4" x 1 3/4" x 1 7/16" key to match shaft. Driven hub with 3/4" bore, 3/16" x 3/16" x 1" key to suit RI input shaft.	FC Series, XFCBB Best-Bronz Inserts (3 Jaw) Type, Size FC20 as manufactured by Boston Gear.
C2	1	Precision machined bored shaft coupling. Drive hub with 3/4" bore, 3/16" x 3/16" x 1" key to suit RI output shaft. Driven hub with 3/4" bore, keyway to match LSI input shaft.	FC Series, XFCBB Best-Bronz Inserts (3 Jaw) Type, Size FC20 as manufactured by Boston Gear.
C3	1	Precision machined bored shaft coupling. Drive hub with 3/4" bore, keyway to match LSI output shaft. Driven hub with 5/8" bore, 3/16" x 3/16" x 3/4" key min. or to suit RSI keyway.	FC Series, XFCBB Best-Bronz Inserts (3 Jaw) Type, Size FC20 as manufactured by Boston Gear.
B1	1	Ball bearing pillow block-standard duty. Extended inner race	SL Series, Catalog No. SL-1, Item Code 64690 as manufactured by Boston Gear.
B2	1	Ball bearing pillow block-standard duty. Extended inner race	SL Series, Catalog No. SL-1, Item Code 64690 as manufactured by Boston Gear.
Collar	2	Steel clamping collar for 1" diameter shaft. 2SC Series.	Two Piece Type, as manufactured by Boston Gear.
SCR	1	110° Rack segment, 159 teeth, 65" pitch diameter, 8" diametral pitch, 20° standard involute, 1" face width, 2 equal 55° steel segments.	Option to fabricate rack as one segment
SCP	1	Rack pinion, 66 teeth, 8.25" Pitch diameter, 8" diametral pitch, 20° standard involute, 1.25" face width, Steel.	



ELEVATION
1/2"-1'-0"



TYPICAL SCR SUPPORT DETAIL
3"-1'-0"



SPAN BUMPER
1"-1'-0"

NOTES:

- For location of Span Control Equipment, see Drawings No. M-15 and M-16.
- Cost to furnish and install Span Control Equipment and Supports to be included in Pay Item "New Span Drive" unless otherwise noted. Cost to furnish RSI and LSI to be included in Pay Item "Bridge Control System."
- For location of Span Bumper, see Drawing No. M-19. Cost to furnish and install Span Bumper to be included in Pay Item "New Centering Locks."
- Scribe pitch lines on both sides of SCR and SCP.

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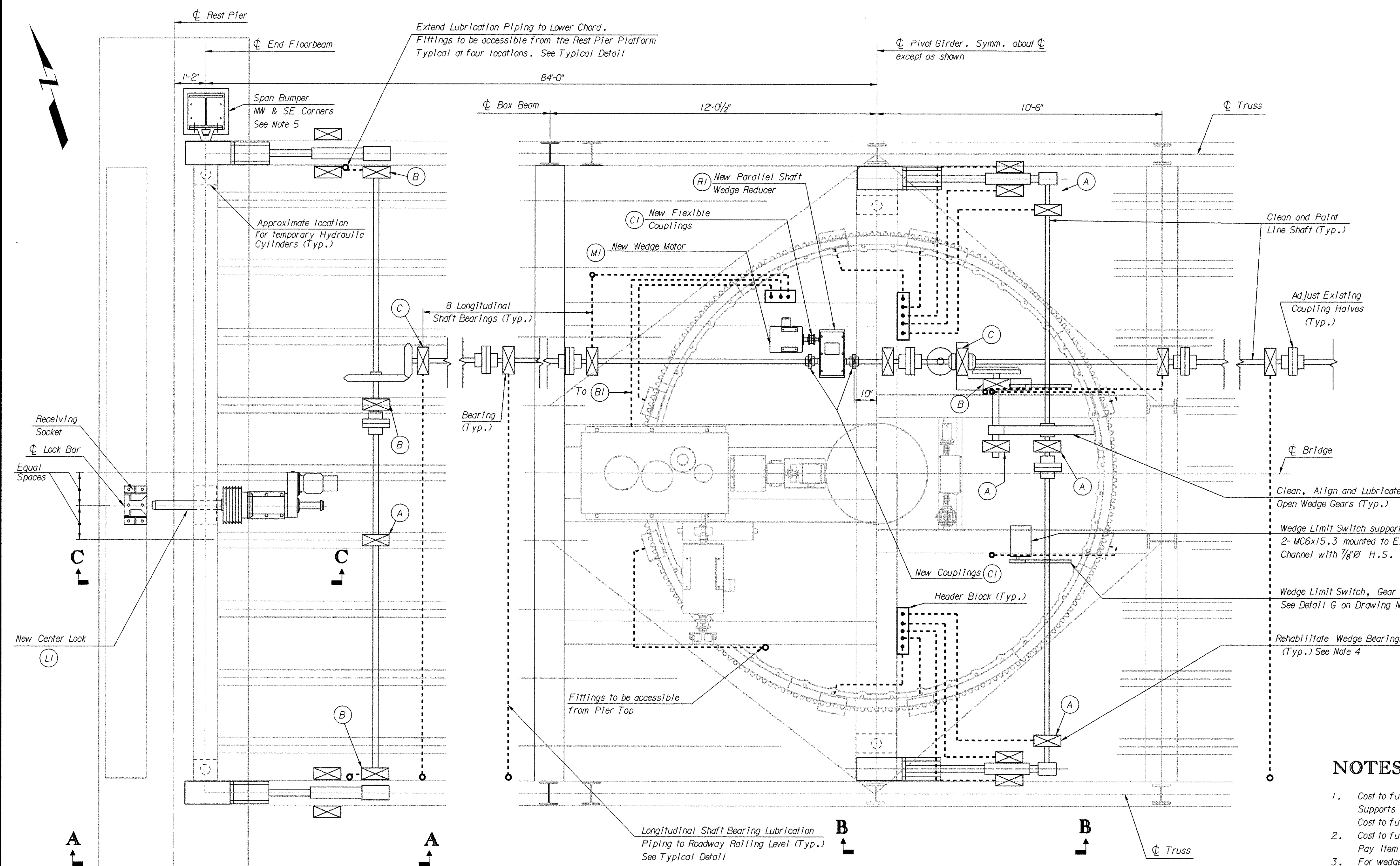
SPAN CONTROL EQUIPMENT

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-18

WEDGE MACHINERY SCHEDULE

MK	QTY	DESCRIPTION	MANUFACTURER
M1	1	Foot-mounted, squirrel cage AC motor, totally enclosed non-ventilated, 7 1/2 HP, synchronous speed 900 RPM. Integral disc brake set for 45 ft-lbs.	Frame 213T, as manufactured by Allen-Bradley.
R1	1	Single input, double output parallel shaft reducer, 200:1 ratio, rated output of 15.76 in-kips at 43.75 RPM, Service Factor 1.0.	Double reduction unit No. 55HP2 as manufactured by Philadelphia Gear Corp.
C1	1	Flexible steelflex coupling, horizontal split cover. Drive hub with 1 3/8" bore, 5/16" x 5/16" x 1 1/8" min. or to suit M1 shaft keyway. Driven hub with 1/8" bore, 1/4" x 1/4" x 1 1/2" to suit R1 input shaft.	Type T10, Size 1030T as manufactured by The Falk Corp.
C2	2	Flex-rigid, single engagement gear coupling. Rigid hub with 2 3/16" bore, 1/2" x 1/2" x 1 3/16" min. or to suit R1 shaft keyway. Flex hub with 2" bore, 1/2" x 1/2" x 1 3/16" key.	Type 651 shrouded bolts, Size 1015G as manufactured by The Falk Corp.
L1	2	Modified center lock bar operator for upside down mounting with gear housing rotated 90°, 4" x 4" bar, 12" stroke.	Model EG-2B as manufactured by Steward Machine Company.



NOTES:

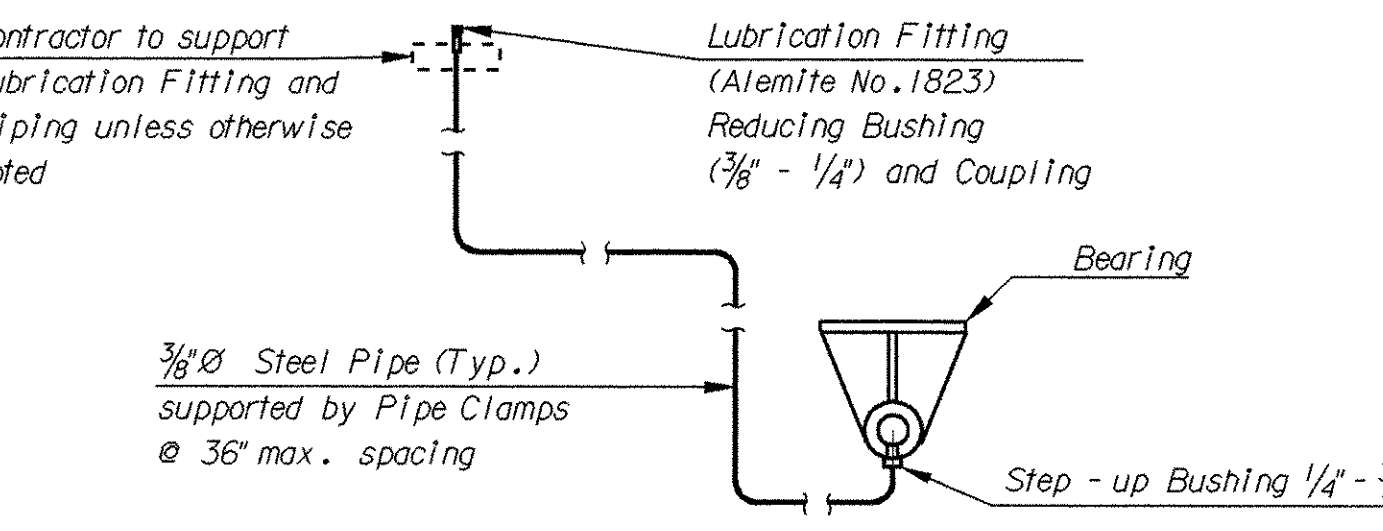
- Cost to furnish and install Wedge Drive Equipment, Limit Switch Equipment and Supports to be included in Pay Item "Rehabilitation of Wedge Drive" unless otherwise noted. Cost to furnish wedge cam limit switch to be included in Pay Item "Bridge Control System."
- Cost to furnish and install Centering Locks, Sockets and Supports to be included in Pay Item "New Centering Locks."
- For wedge motor and reducer support details, see Drawing No. M-16.
- Replace bearing bushing and deteriorated cap bolts. Replace lubrication fitting with giant button head fitting, Alomite No. 1823 unless otherwise noted.
- For span bumper details, see Drawing No. M-18
- For Sections A-A, B-B and C-C, see Drawing No. M-20.

PLAN 1/2"=1'-0"

BABBIT BUSHING REPLACEMENT			
BEARING A	2 1/2" ID	3 3/8" OD	5" Lg.
BEARING B	2 1/2" ID	3 3/8" OD	6" Lg.
BEARING C	2" ID	2 3/8" OD	5 1/4" Lg.

See Note 4
* Contractor to Field Verify

LUBRICATION PIPING SCHEMATIC NTS



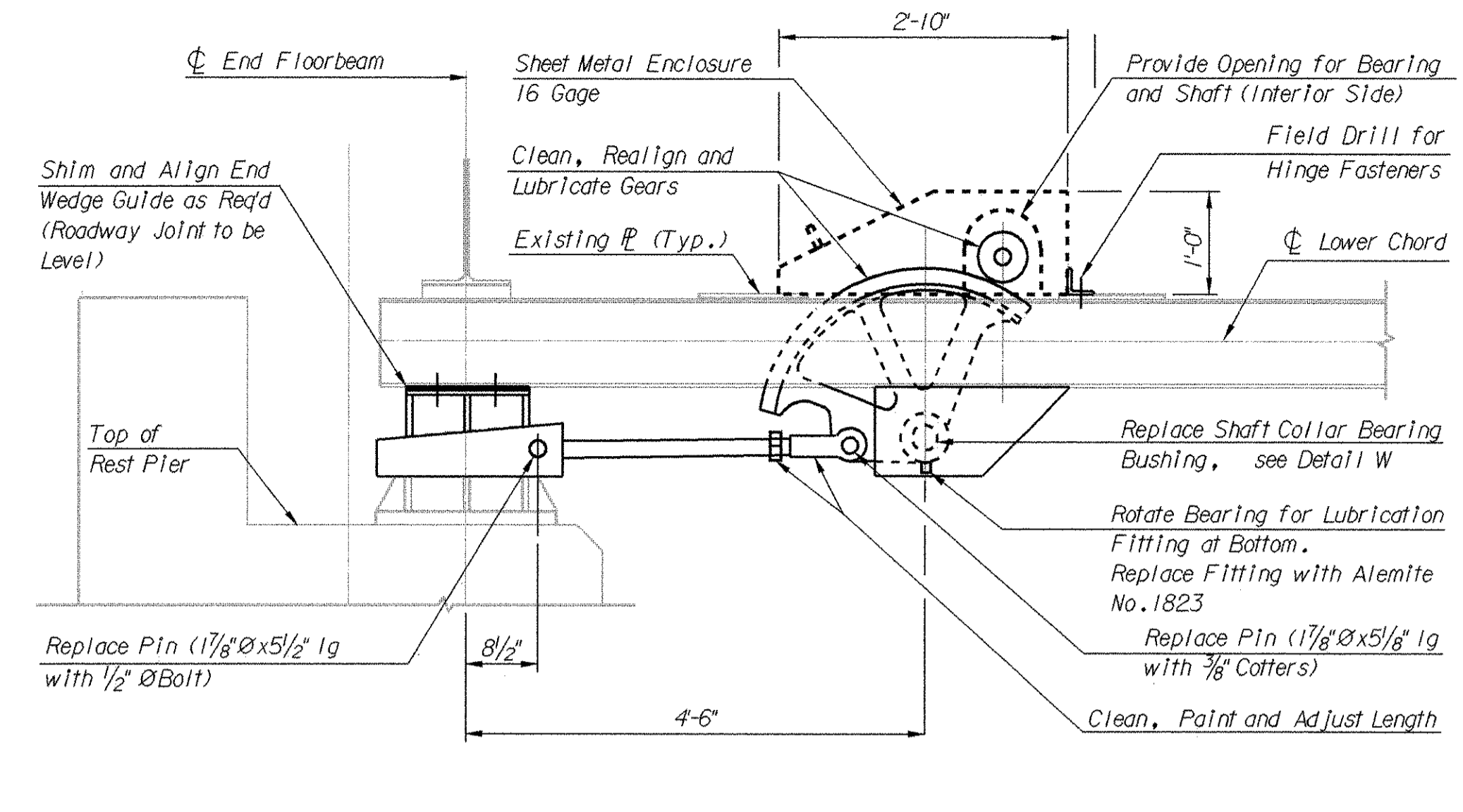
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HARBOR RIVER

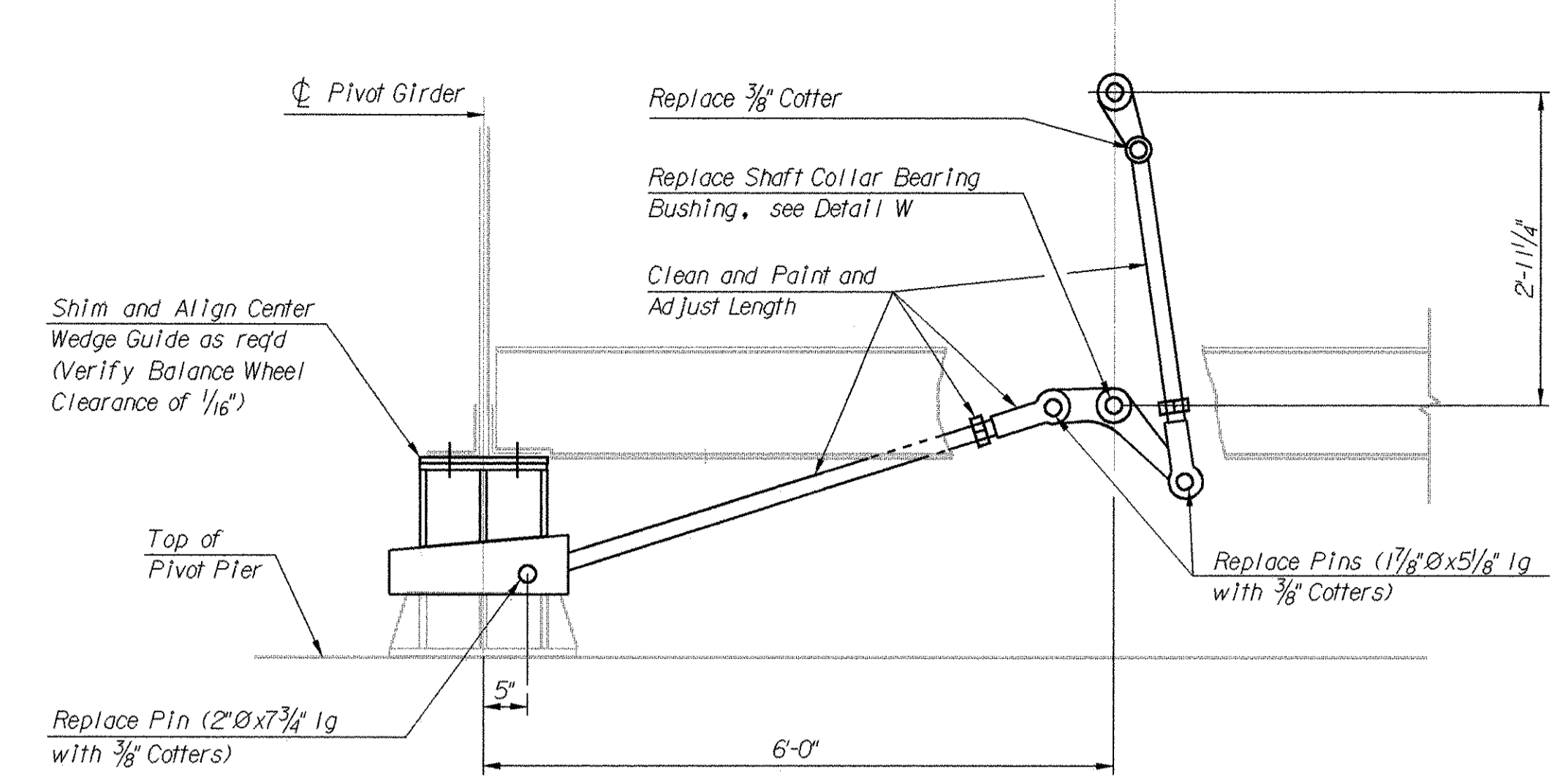
WEDGE DRIVE REPAIRS

REV.	BY	CHK.	DATE
REVIEWED			
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DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

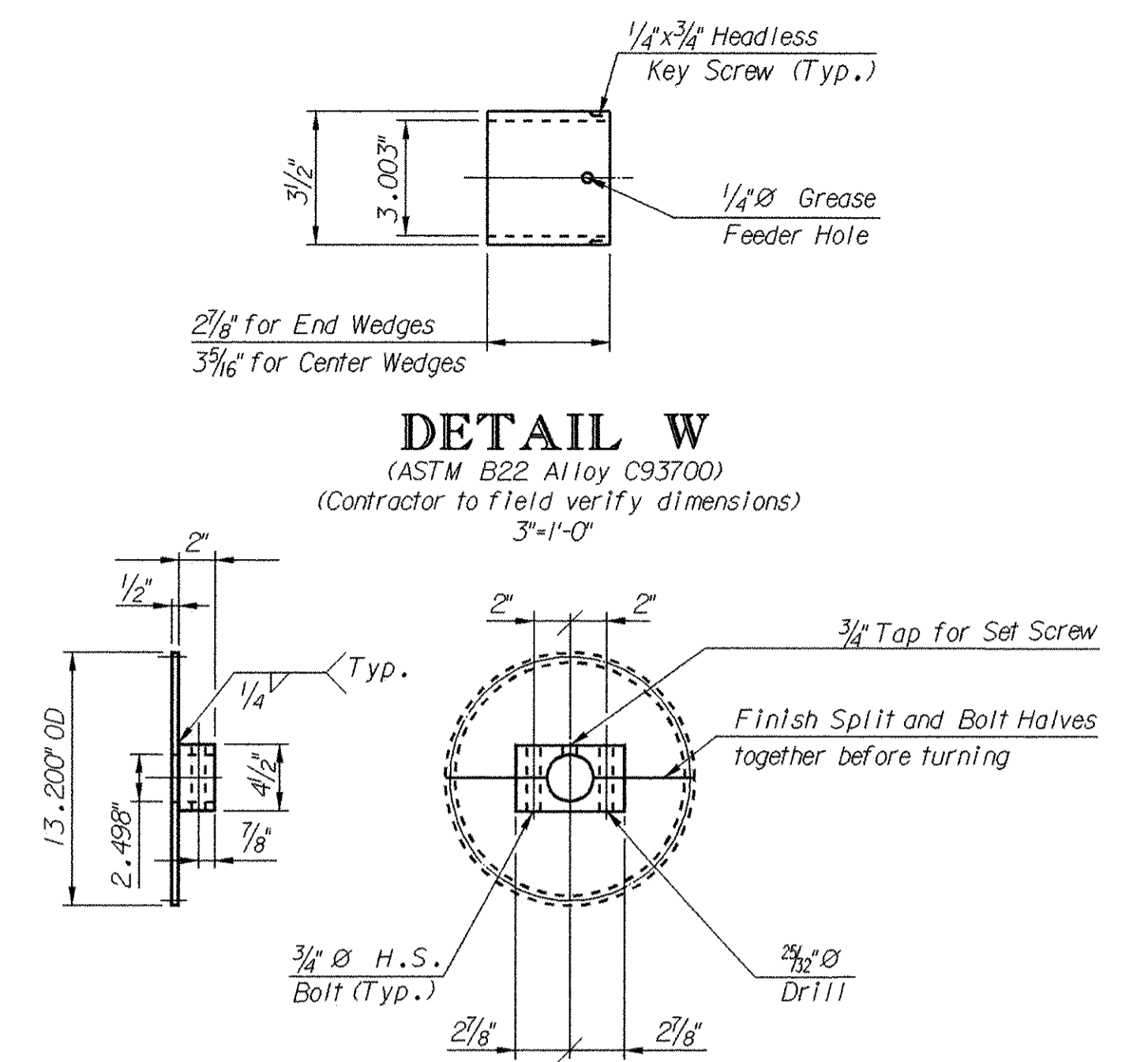
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-19



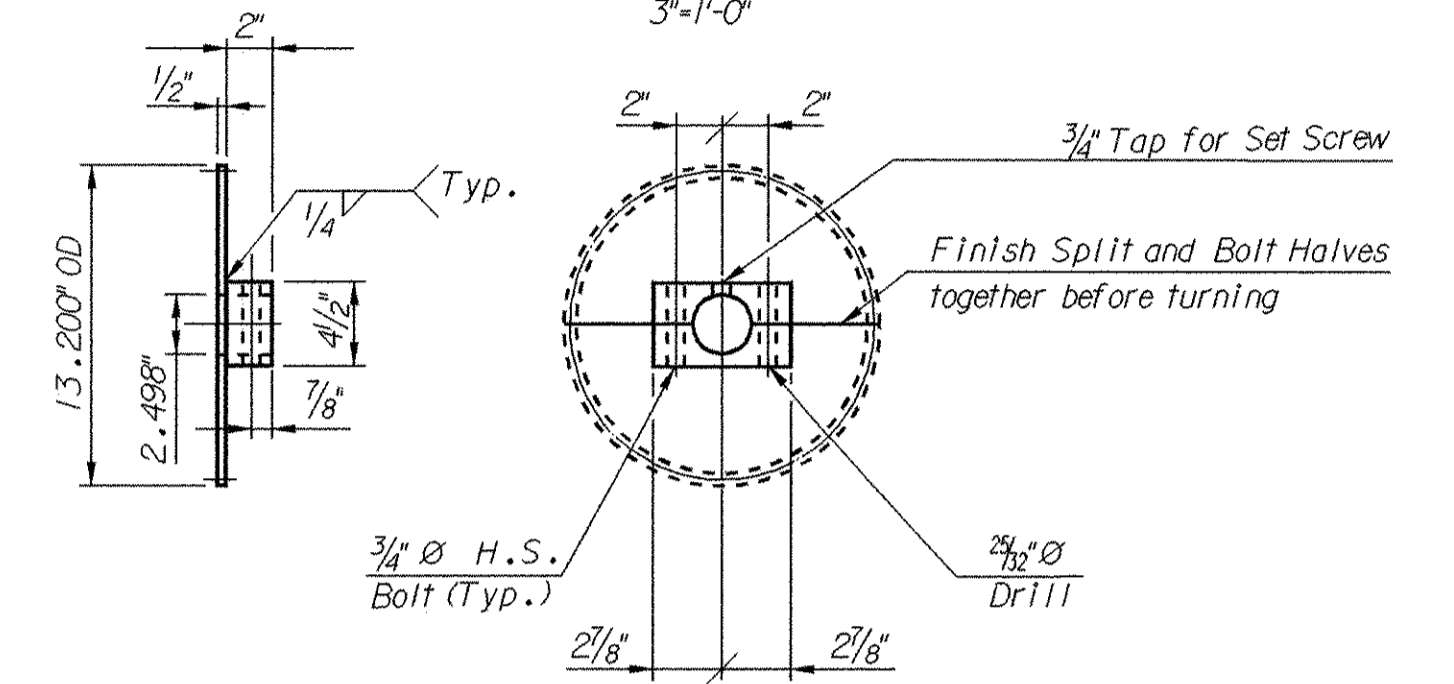
SECTION A-A
(Typical Repairs to End Wedges)
3/4"-1'-0"



SECTION B-B
(Typical Repairs to Center Wedges)
3/4"-1'-0"

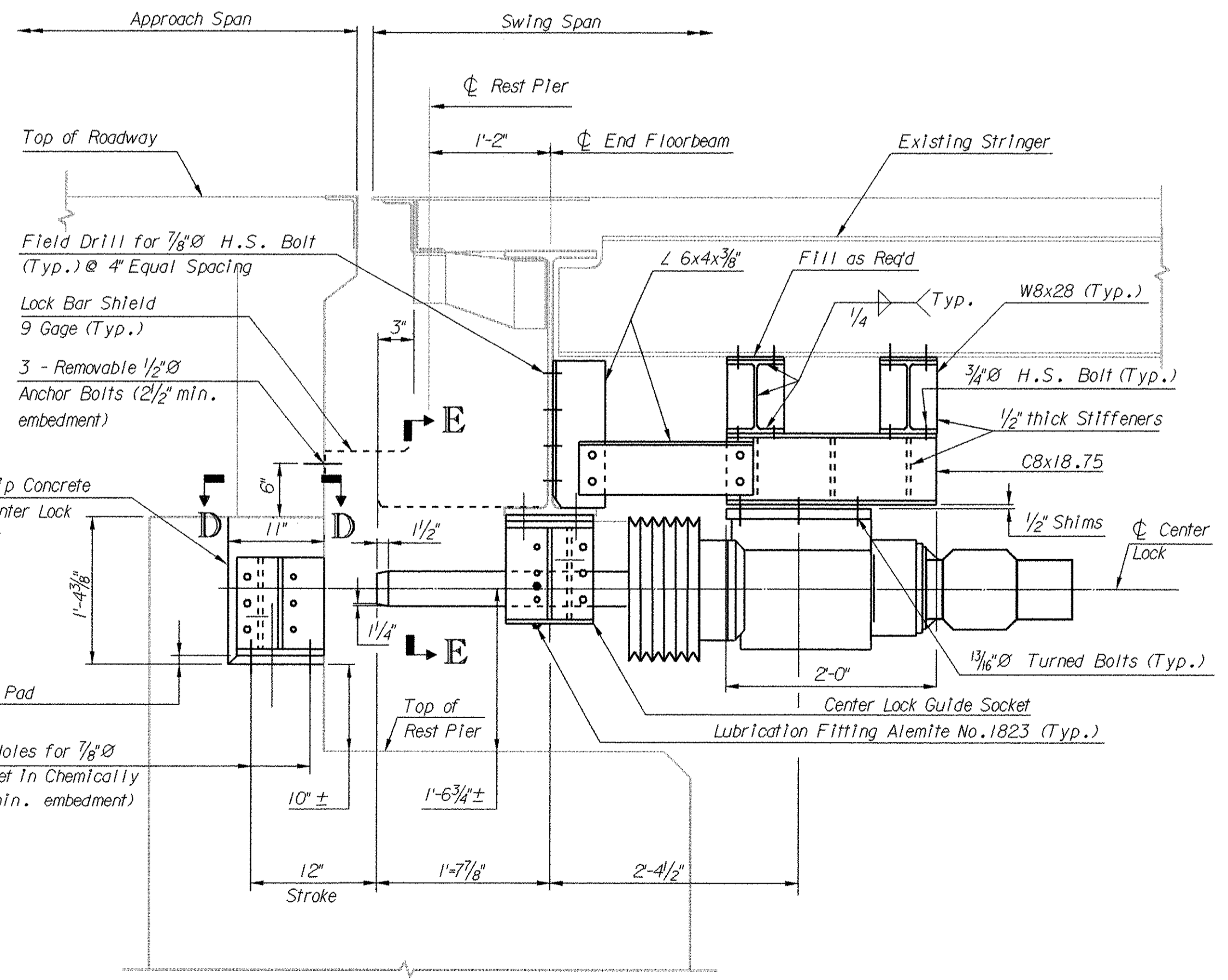


DETAIL W
(ASTM B22 Alloy C93700)
(Contractor to field verify dimensions)
3"-1'-0"

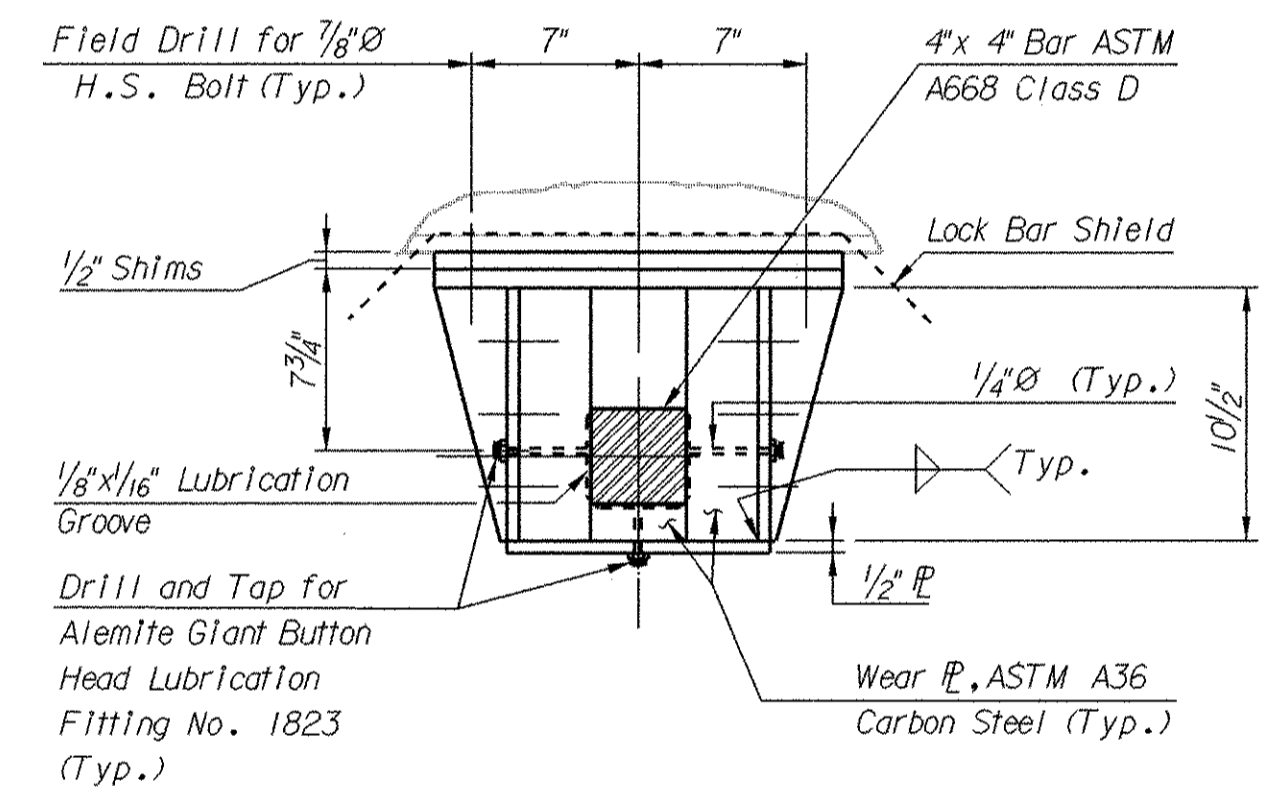


DETAIL G

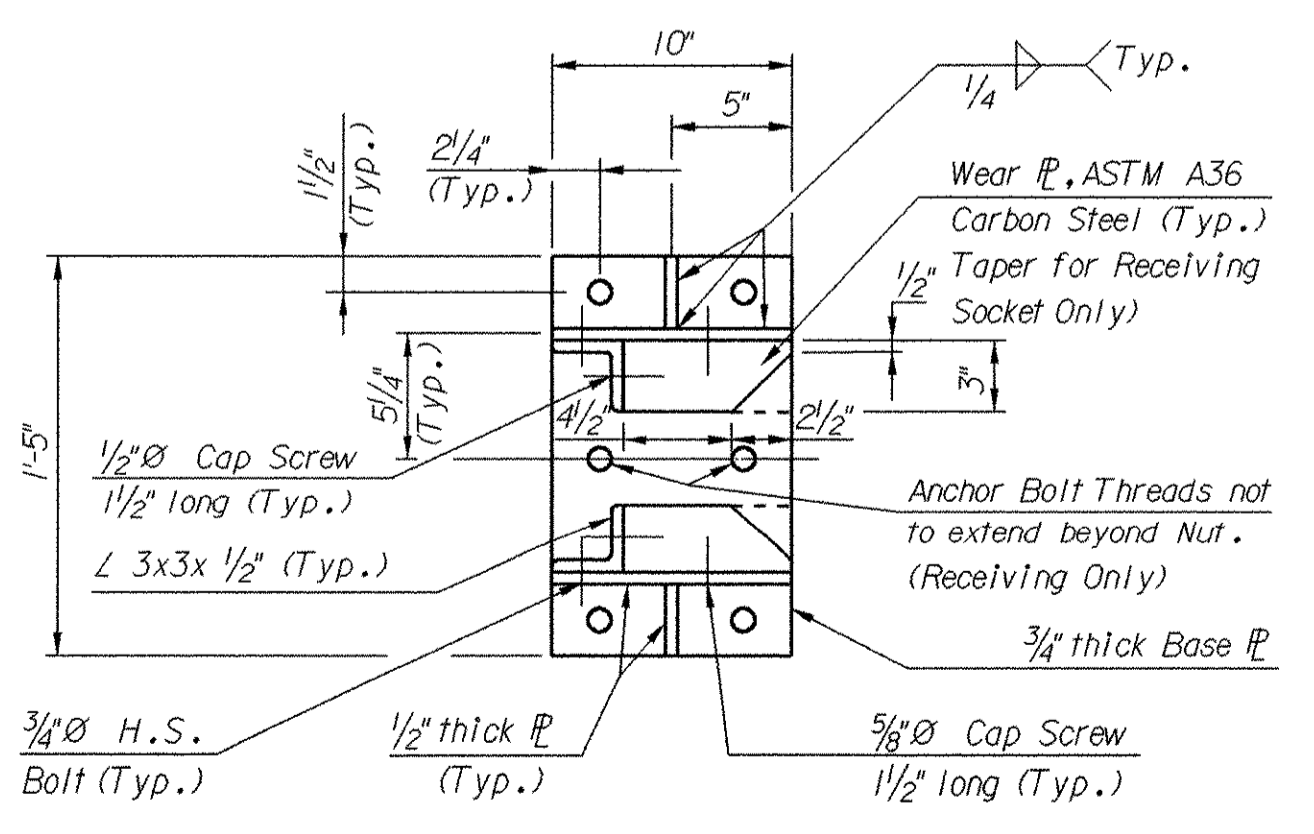
Steel L.S. Gear: 64 teeth, 12.80" Pitch Diameter
5 Diametral Pitch, 20° Standard Involute
Steel L.S. Pinion: 36 teeth, 7.20" Pitch Diameter,
5 Diametral Pitch, 20° Standard Involute
Bore of pinion to match L.S. Shaft
(Scribe Pitch Line on Both Sides of Gear and Pinion)
(Split on Gear Only)
1 1/2"-1'-0"



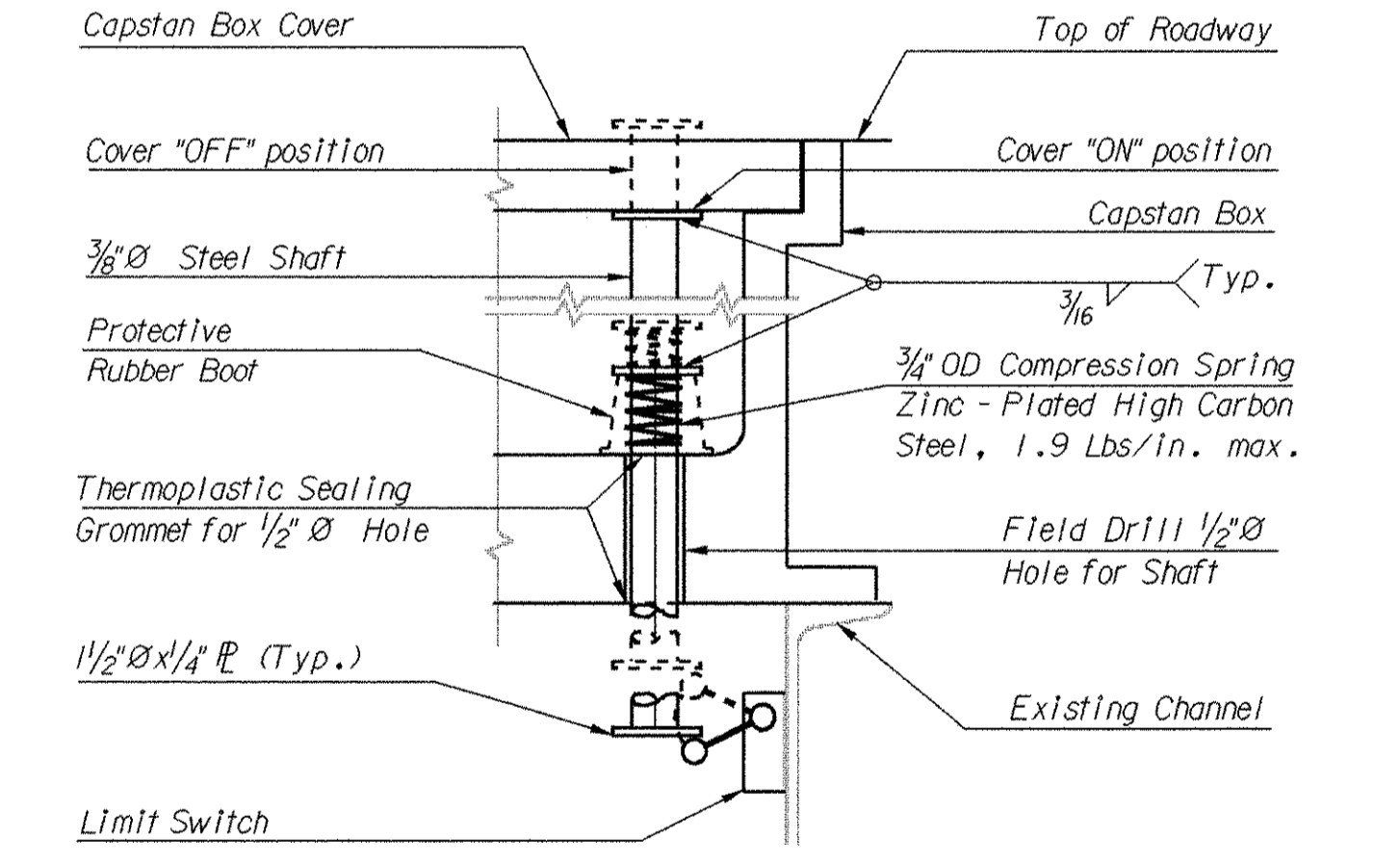
SECTION C-C
(Typical New center Lock at rest Piers)
1"-1'-0"



SECTION E-E
1 1/2"-1'-0"



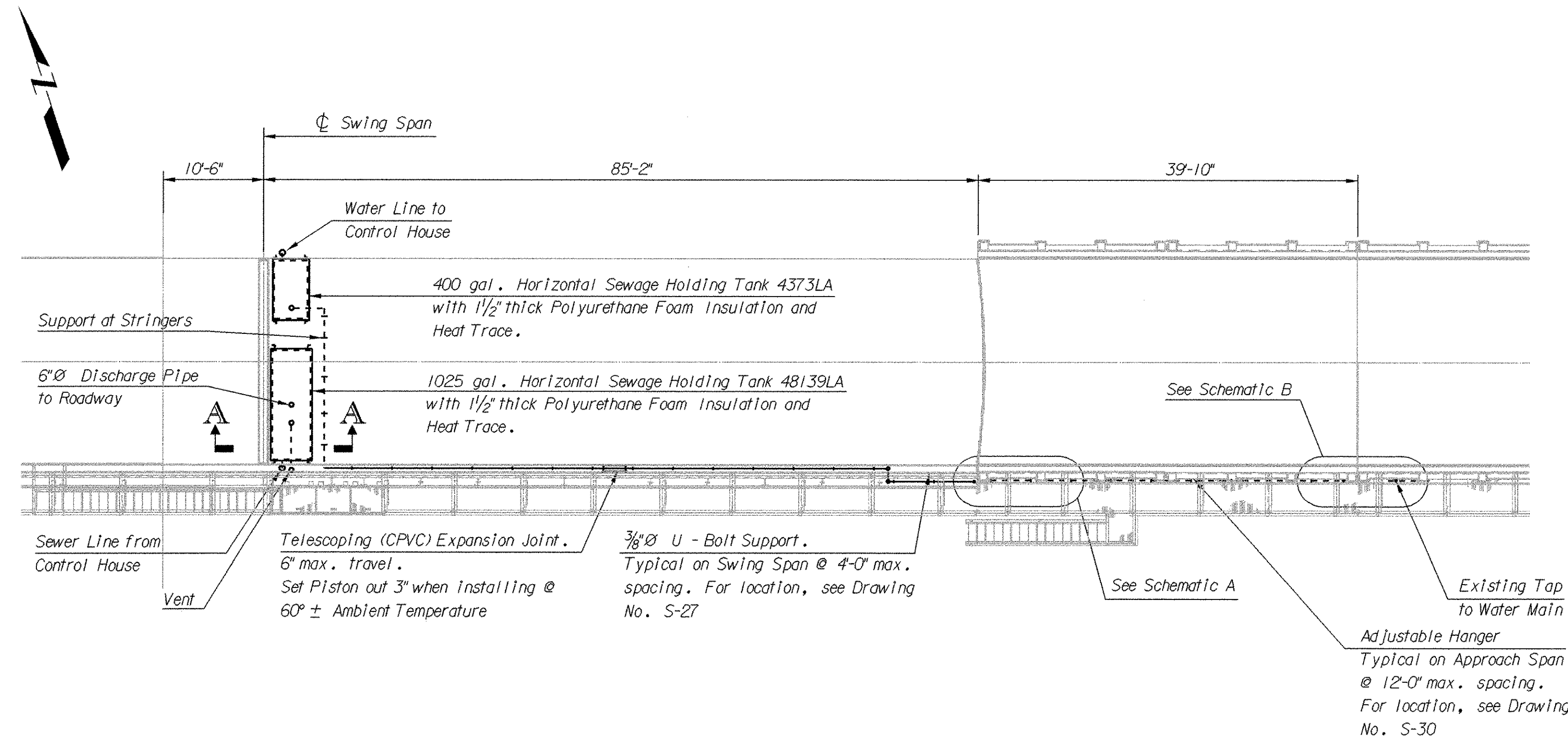
VIEW D-D
Guide Socket Similar Except as Shown and Noted
1 1/2"-1'-0"



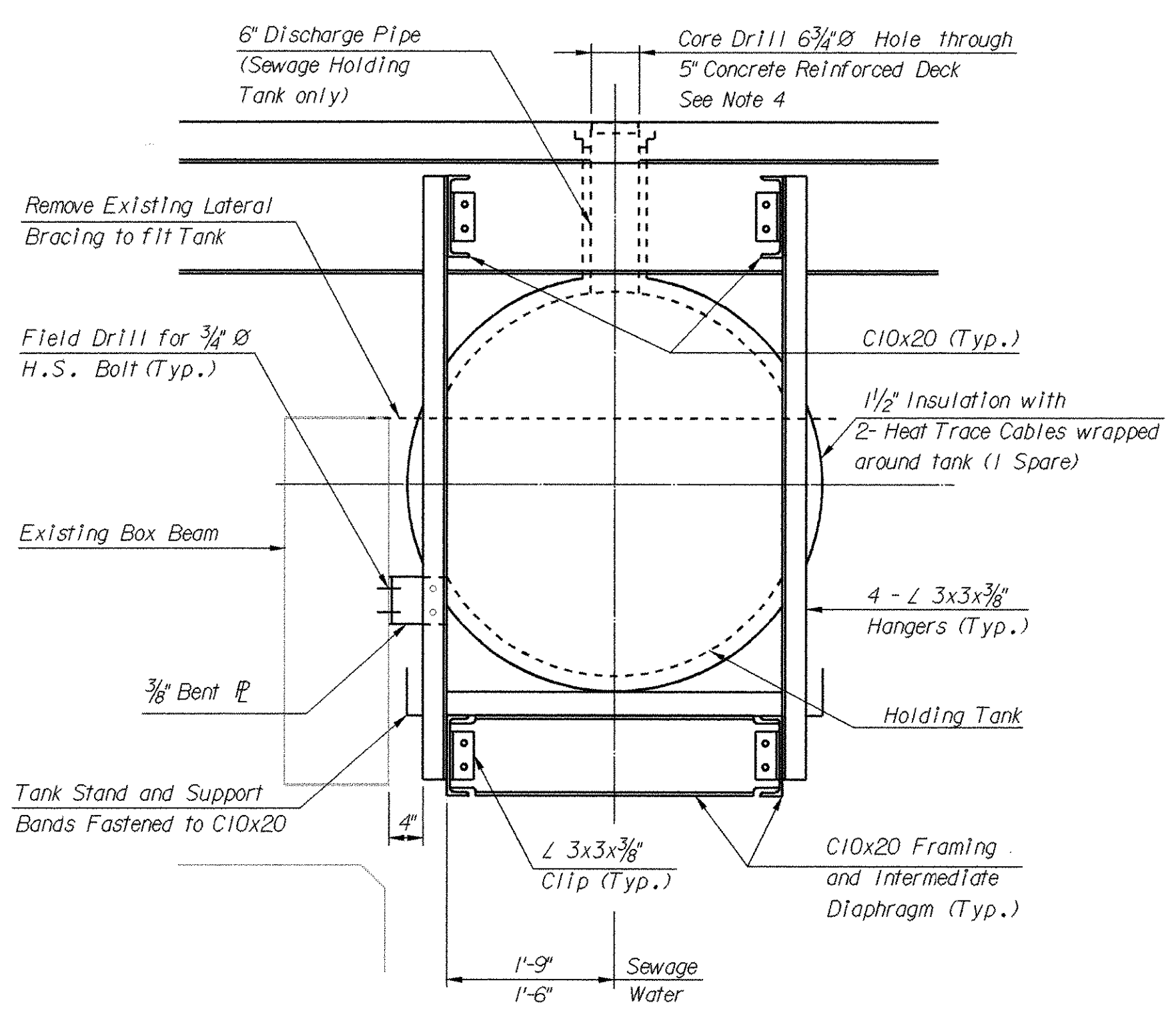
MANUAL WEDGE LIMIT SWITCH SCHEMATIC
NTS

NOTES:
1. For location of Sections A-A, B-B and C-C, see Drawing No. M-19.
2. For location of Detail G, see Drawing No. M-19.

HNTB ARCHITECTS ENGINEERS PLANNERS The HNTB Companies			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION			
BRIDGE DESIGN		COLUMBIA, S.C.	
HARBOR RIVER			
WEDGE DRIVE REPAIR DETAILS			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-20

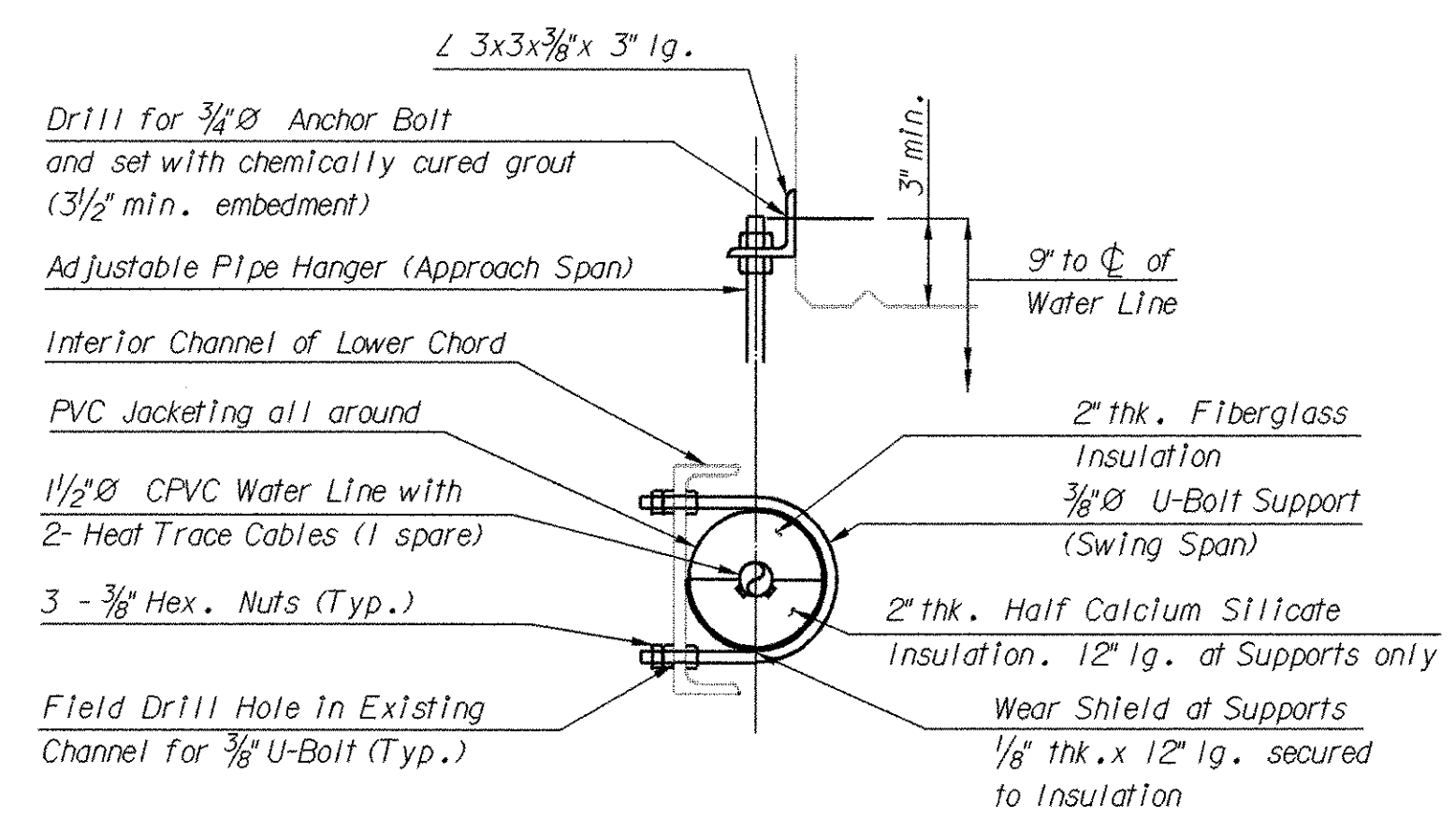


PLAN
1" = 10'-0"

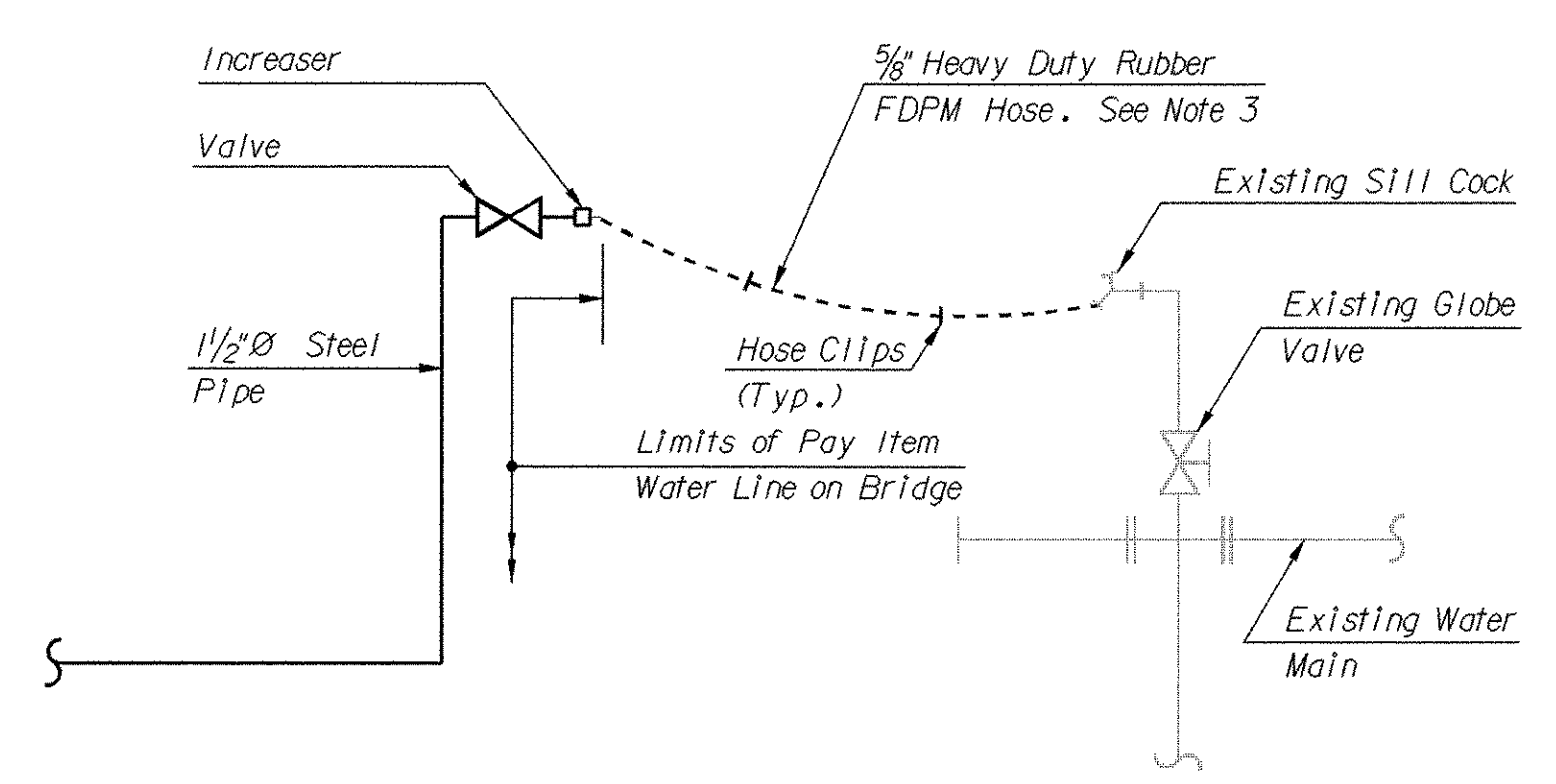


SECTION A-A
Sewage Holding Tank Shown
Water Holding Tank Similar
See Note 2
3/4" = 1'-0"

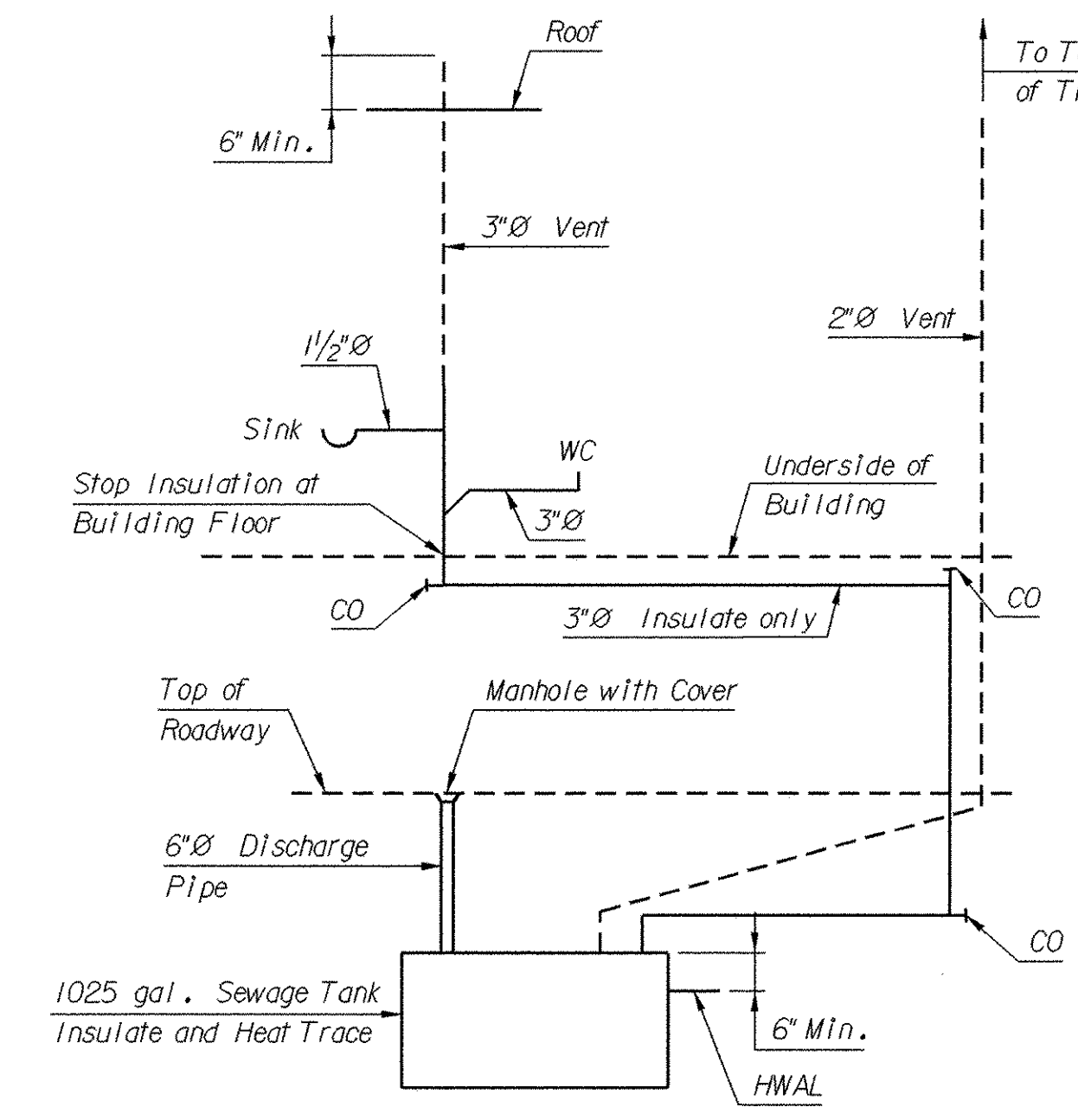
NOTE: Tanks and Supports not to extend beyond face of fender system.



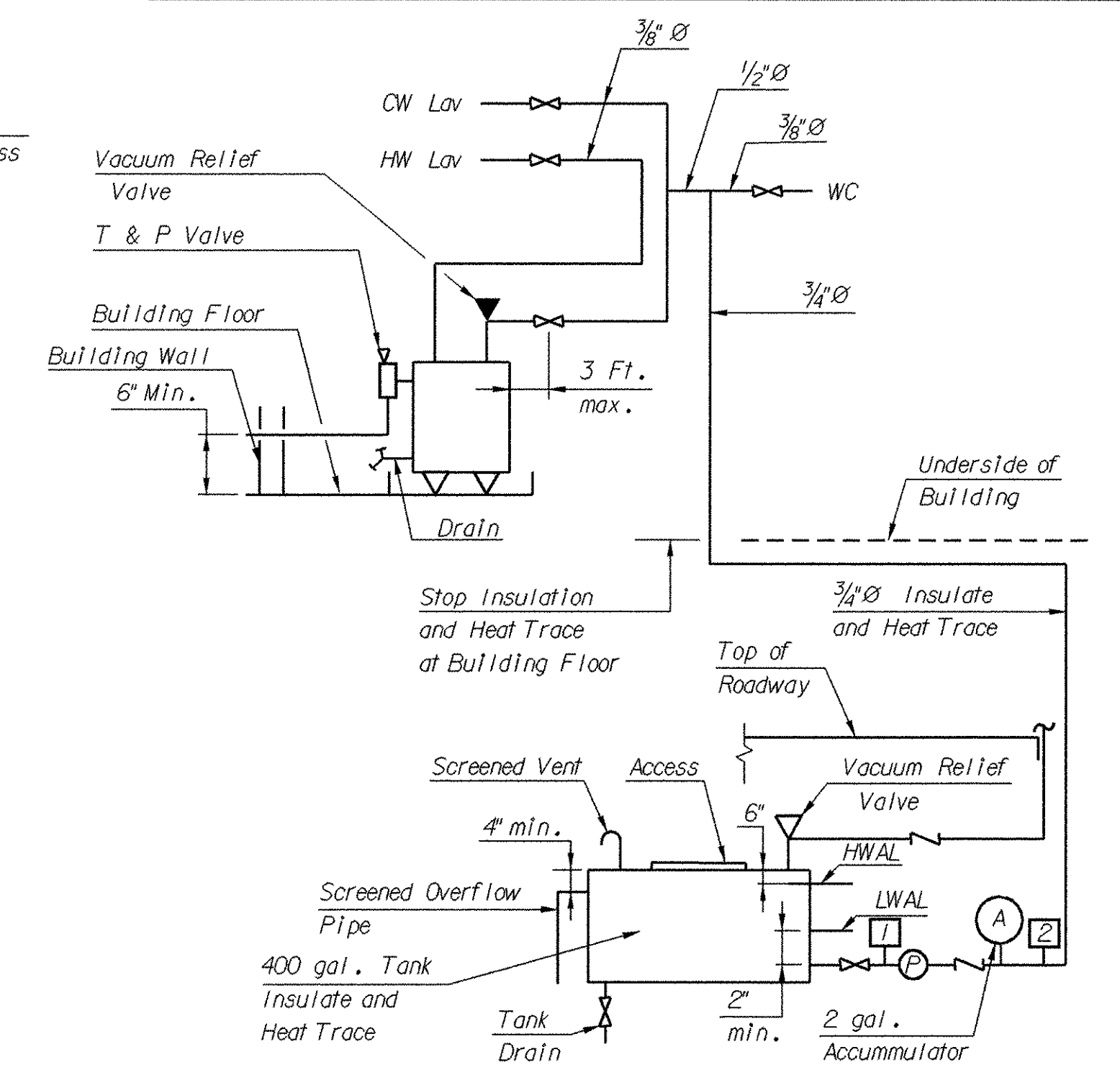
TYPICAL PIPE SUPPORT
Support on Swing span shown,
Approach Span similar except as noted.
1/2" = 1'-0"



SCHEMATIC B
(Insulation not shown for clarity)
NTS

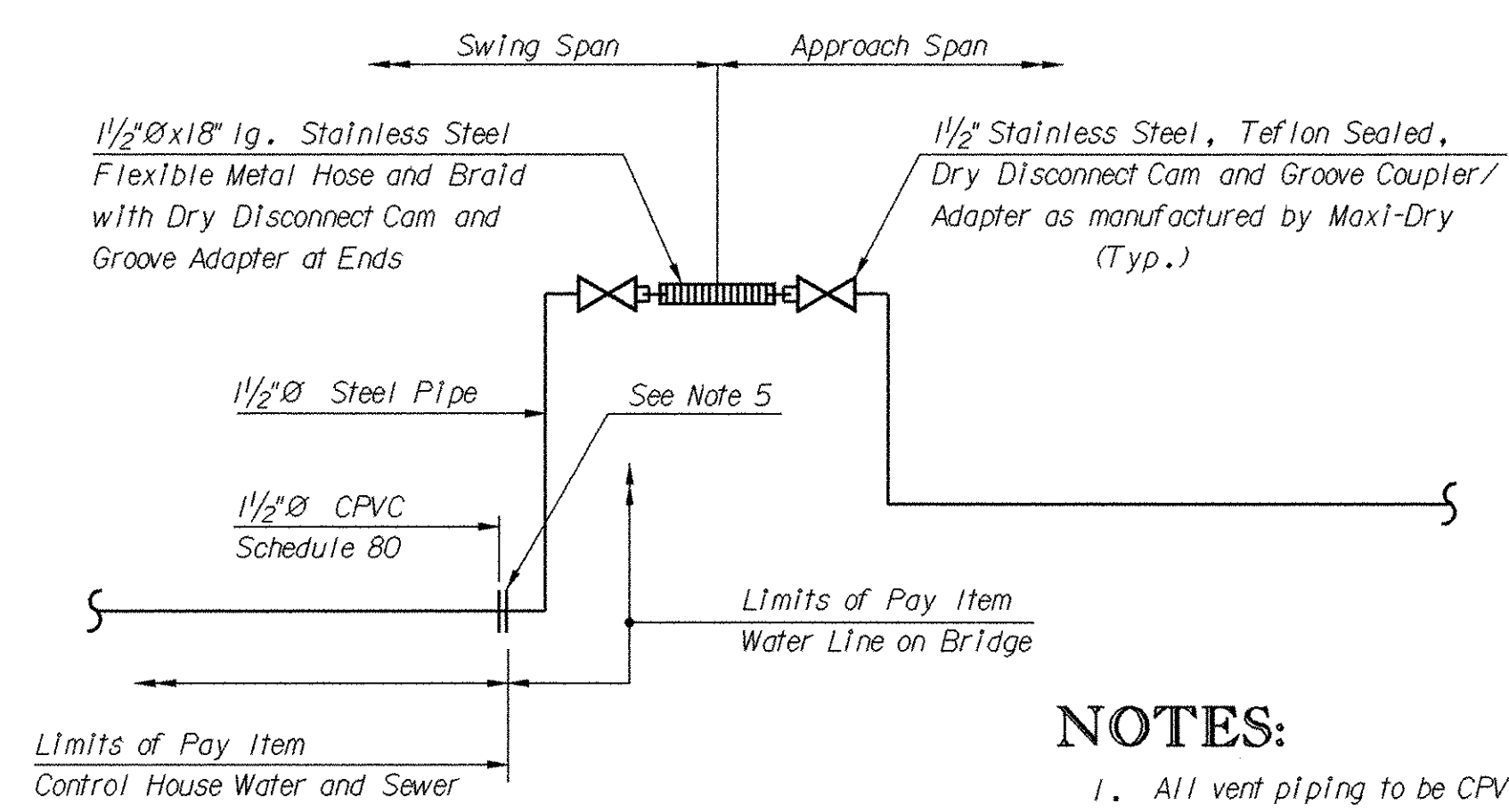


WASTE AND VENT DISTRIBUTION PIPING
NTS



WATER DISTRIBUTION PIPING
NTS

- LEGEND**
- ⊕ Booster Pump
 - CO Cleanout
 - WC Watercloset
 - HWAL High Water Alarm Level
 - LWAL Low Water Alarm Level
 - ⊘ Ball Valve
 - ∇ Check Valve
 - ⌈ Low Suction Cut-Off
 - ⊠ Pressure Switch for Pump Control



SCHEMATIC A
(Insulation not shown for clarity)
NTS

QUANTITIES		
ITEM	UNIT	QUANTITY
Water Line on Bridge	L. F.	45
Control House Water and Sewer	L. S.	Lump Sum

NOTES:

- All vent piping to be CPVC Schedule 40. All others piping to be CPVC Schedule 80 unless otherwise noted.
- Cost for structural steel supports to be included in Pay Item "Control House Water and Sewer" unless otherwise noted.
- Cost for rubber hose to be included in Pay Item "Water Line on Bridge." Heat trace cables to be wrapped evenly across full length of tanks. A minimum of 13 wraps and 8 wraps for sewage and water holding tanks respectively.
- Heavy duty manhole frame and solid lid (with self-sealing application) R-6013 Series as manufactured by NEENAH Foundry Company. See Drawing M-16 for additional details. Lid will have the word "SEWER" lettered on top of lid.
- Steel and CPVC pipe shall have fixed flanges at ends for piping transition. Gasket shall be used between flanges for seal.
- Provide protector plugs and caps for dry disconnect cam and groove coupler and adapter to guard against damage and contaminants when disconnected.

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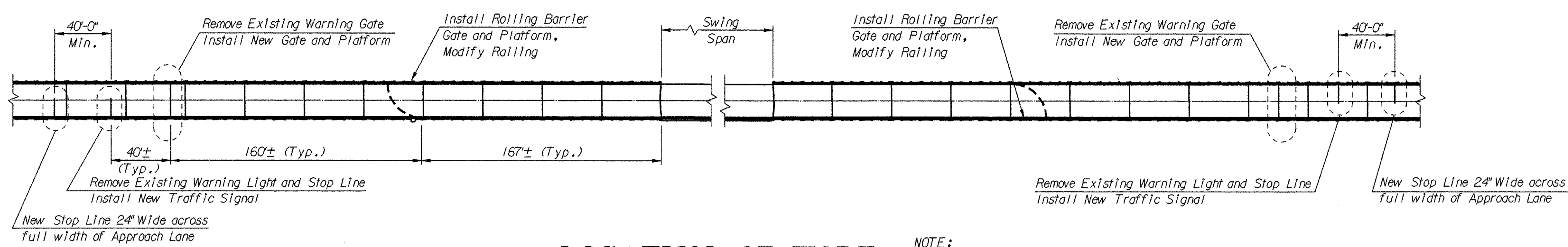
WATER AND SEWER LINE DETAILS

REV.	BY	CHK.	DATE
REVIEWED			
QUAN.	SN	EK	2-97
DR.	FG	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-21

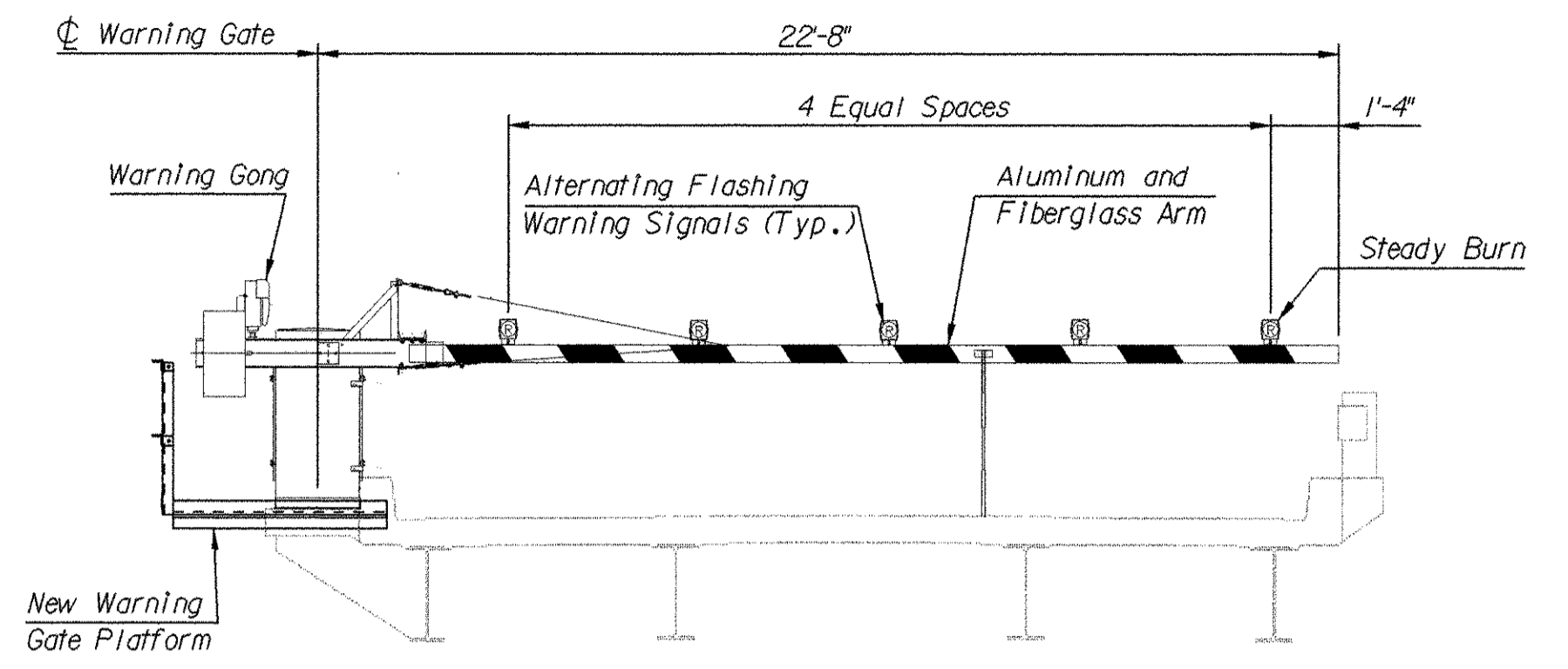
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	75	115

QUANTITIES		
ITEM	UNIT	CONTRACT QUANTITY
Traffic Control Equipment	L.S.	Lump Sum
Warning Gates	Each	2
Warning Gate Platform	L.S.	Lump Sum
Structural Concrete	C.F.	10

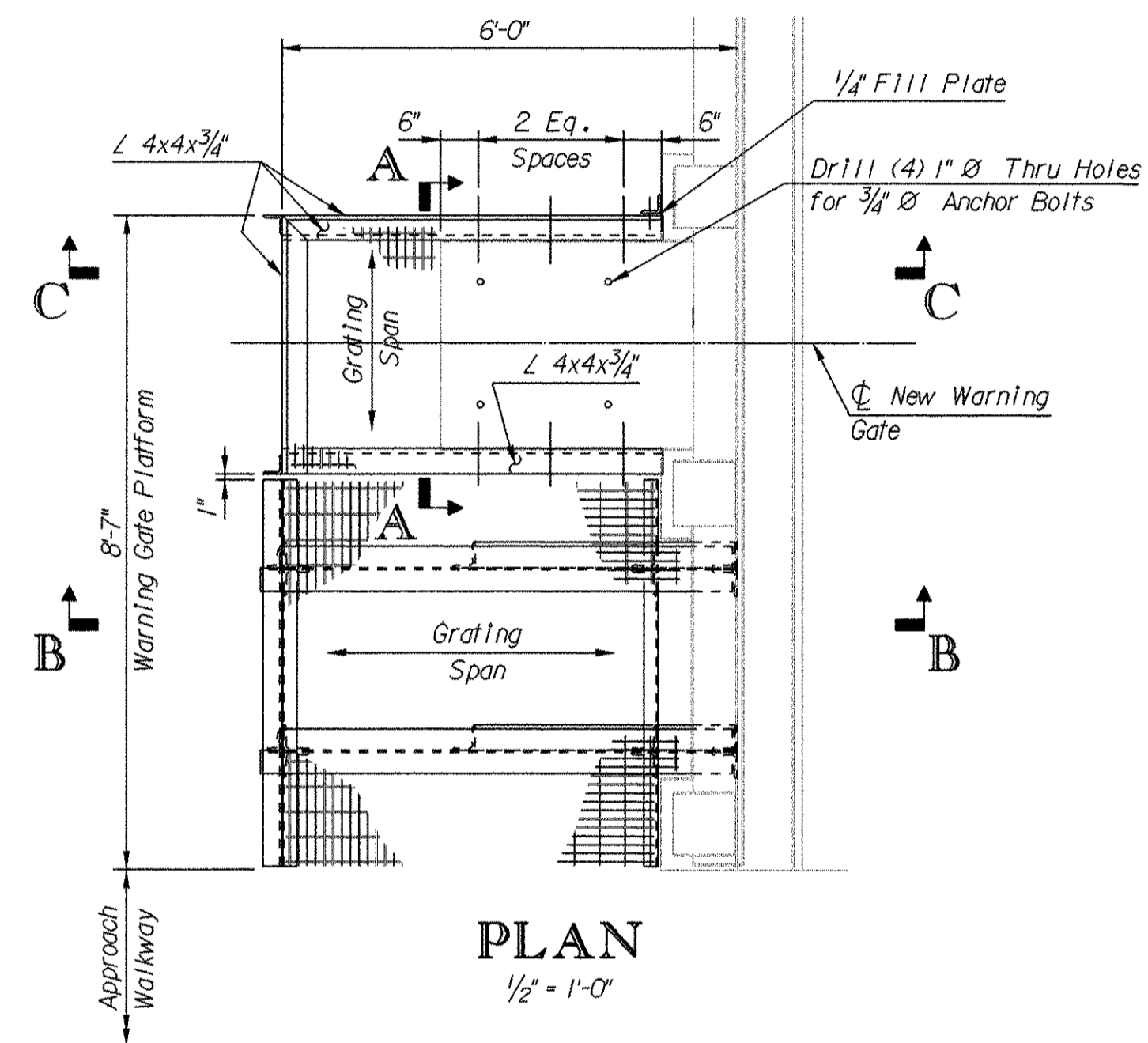


LOCATION OF WORK
1" = 40'-0"

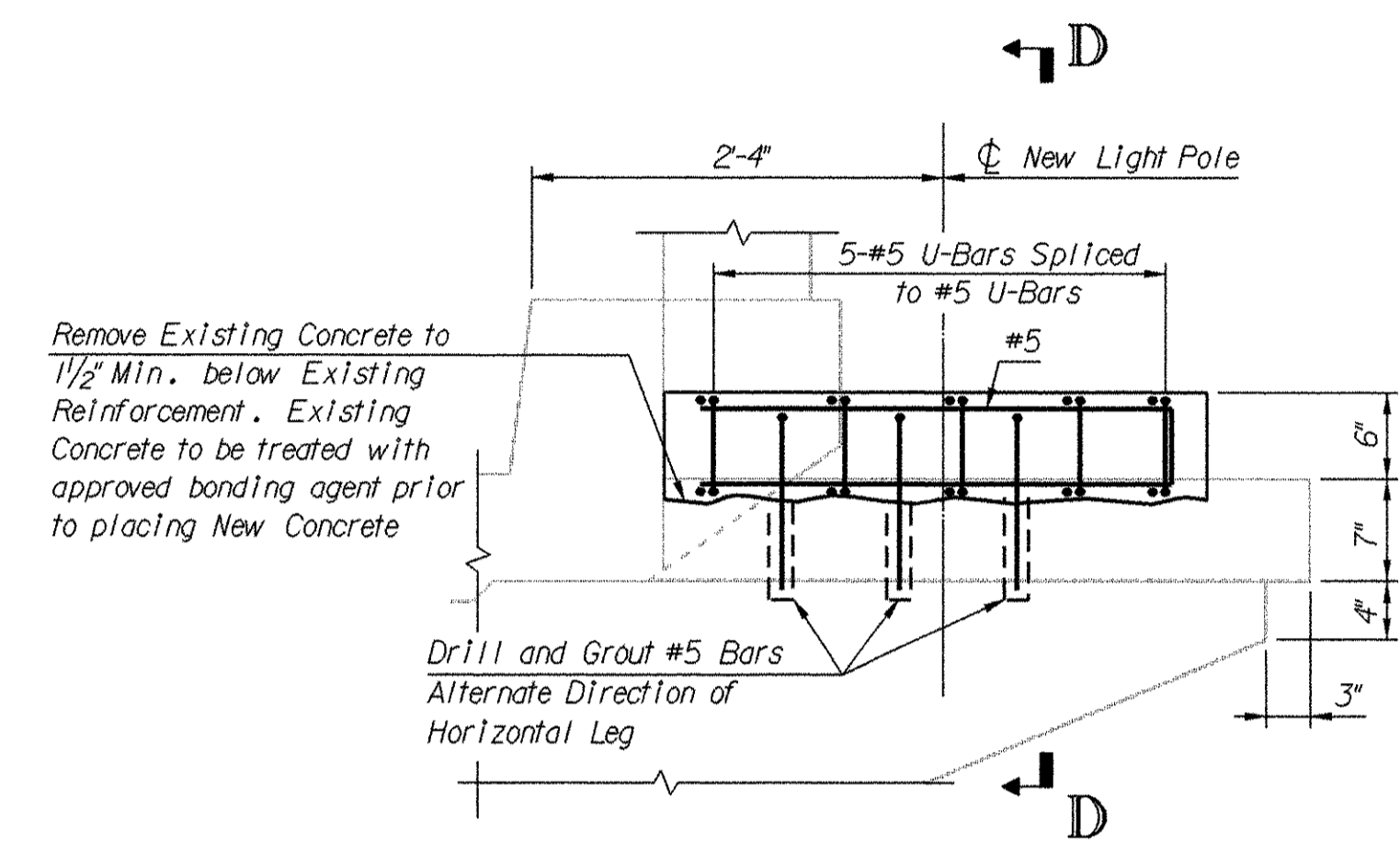
NOTE:
For Details of New Platform and Railing Modification, see Drawing No. S-34
For Details of New Barrier Gate, see Drawing No. M-23



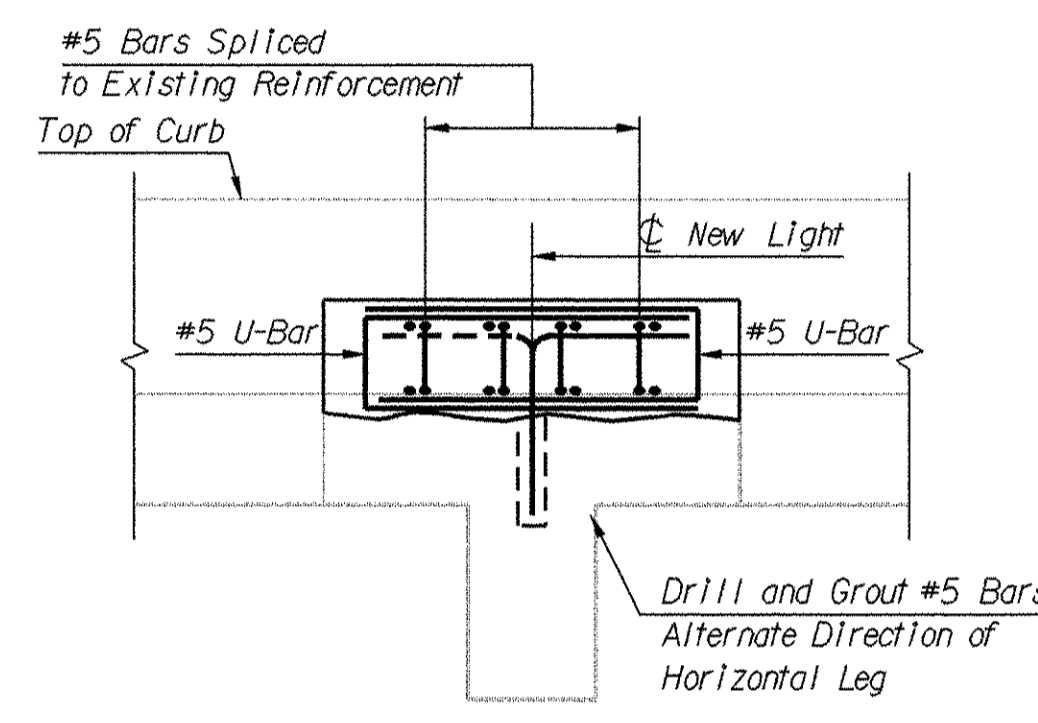
GATE ELEVATION
1/4" = 1'-0"



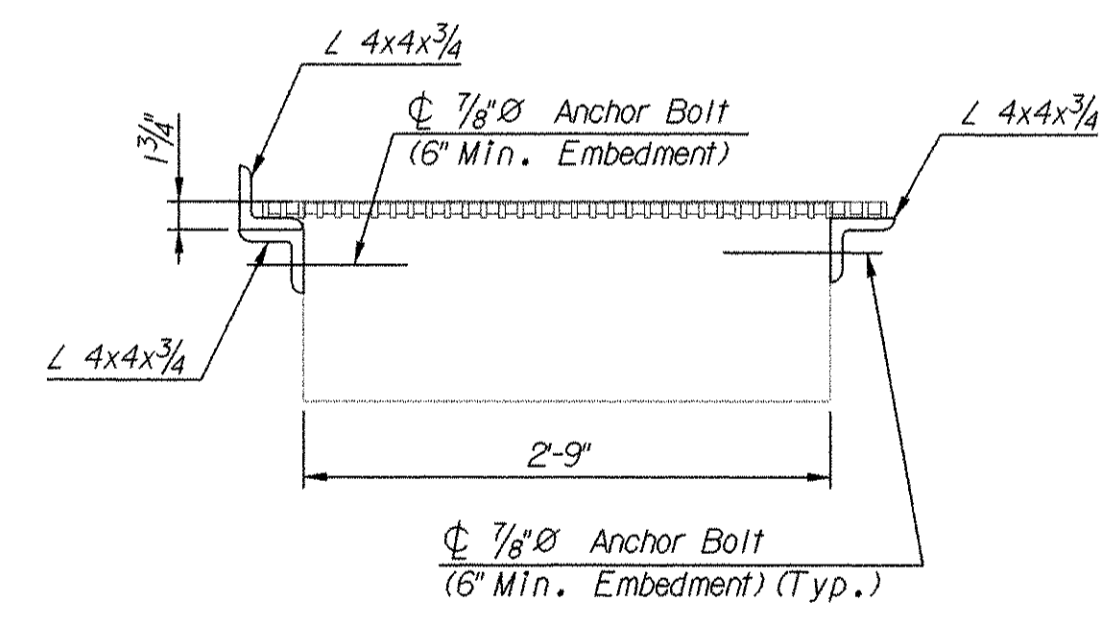
PLAN
1/2" = 1'-0"



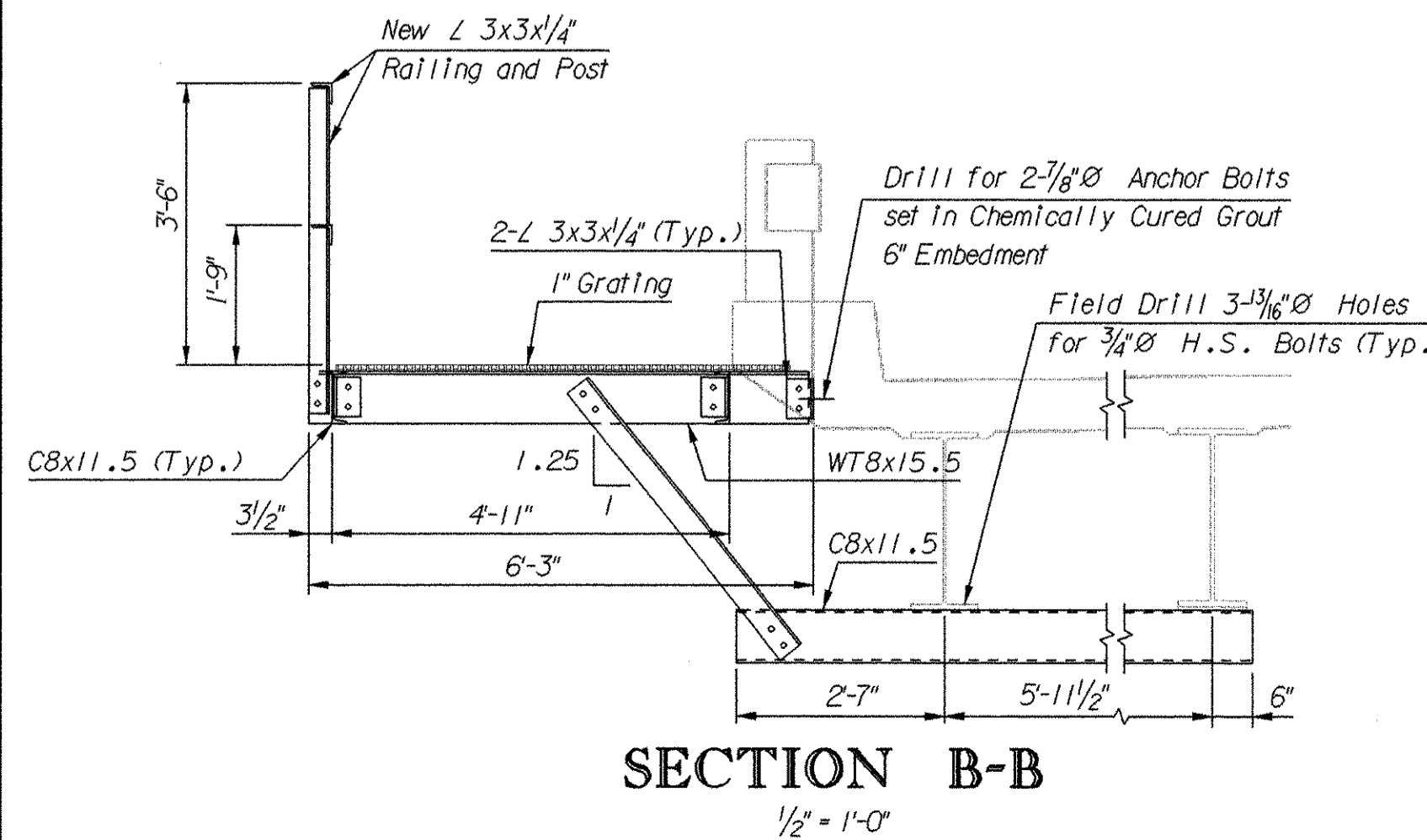
POLE BASE MODIFICATION
1" = 1'-0"



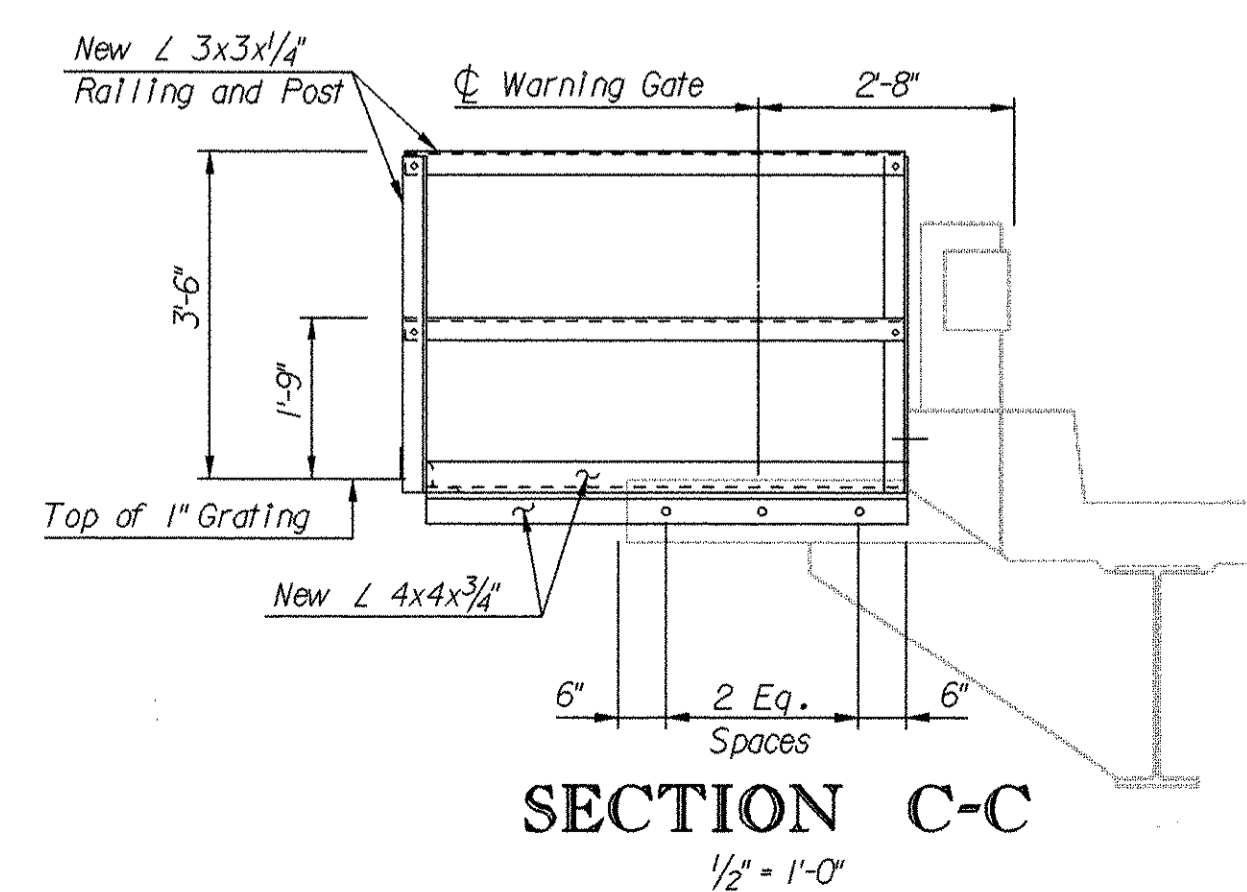
SECTION D-D
1" = 1'-0"



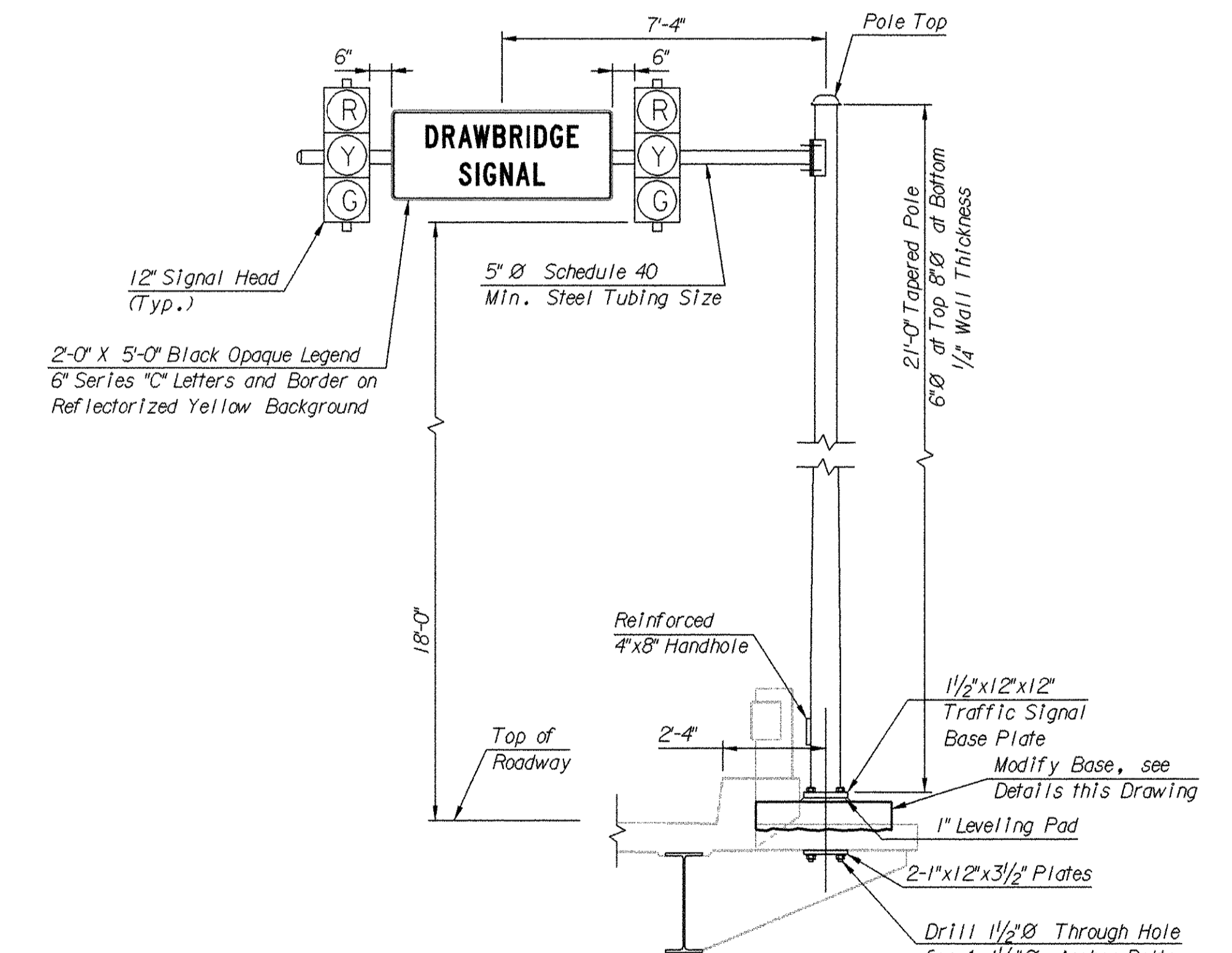
SECTION A-A
1" = 1'-0"



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



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



TRAFFIC SIGNAL POLE AND MAST ARM
3/8" = 1'-0"

- NOTES**
1. Cost for removal of existing lights and stop lines and installation of new signal lights, poles and stop lines to be included in Pay Item "Traffic Control Equipment".
 2. Cost for modifications to signal pole base to be included in Pay Item "Structural Concrete".

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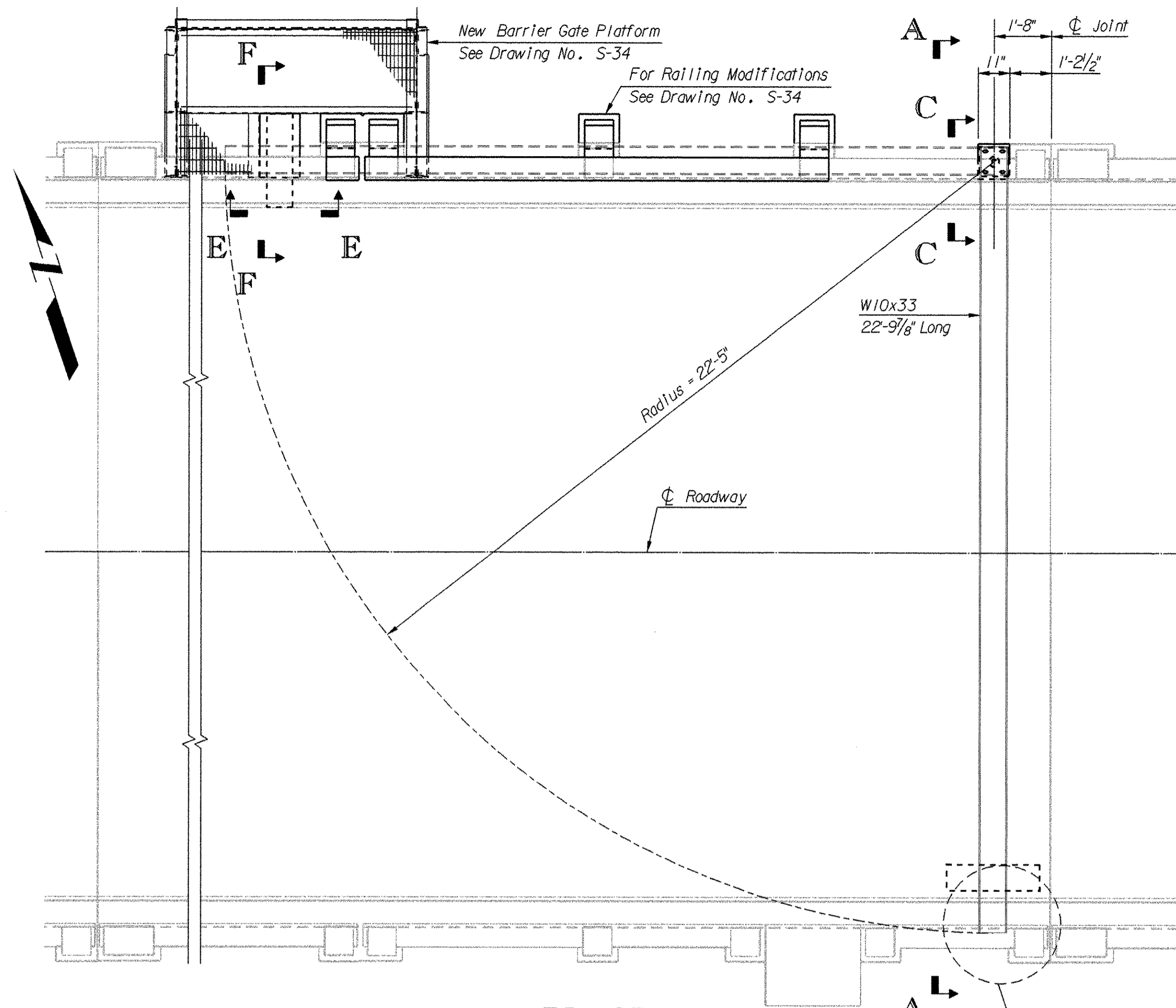
TRAFFIC CONTROL EQUIPMENT

REV.			
REV.			
REV.			
REVIEWED			
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DR.	RM	SN	2-97
DES.	SN	EK	2-97
BY	CHK.	DATE	

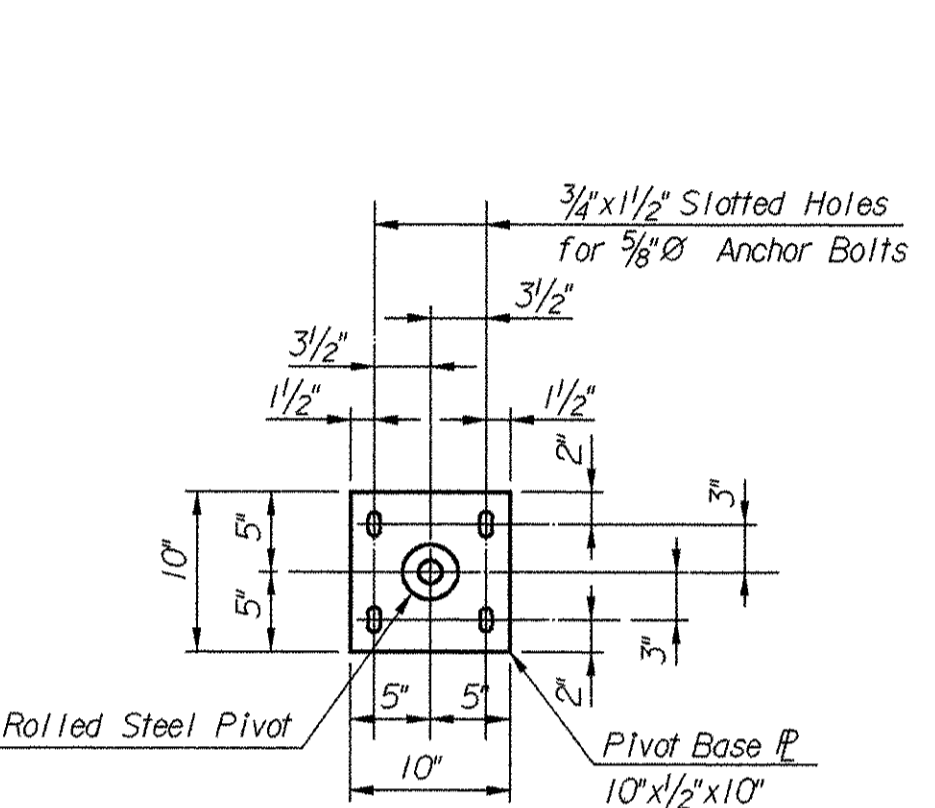
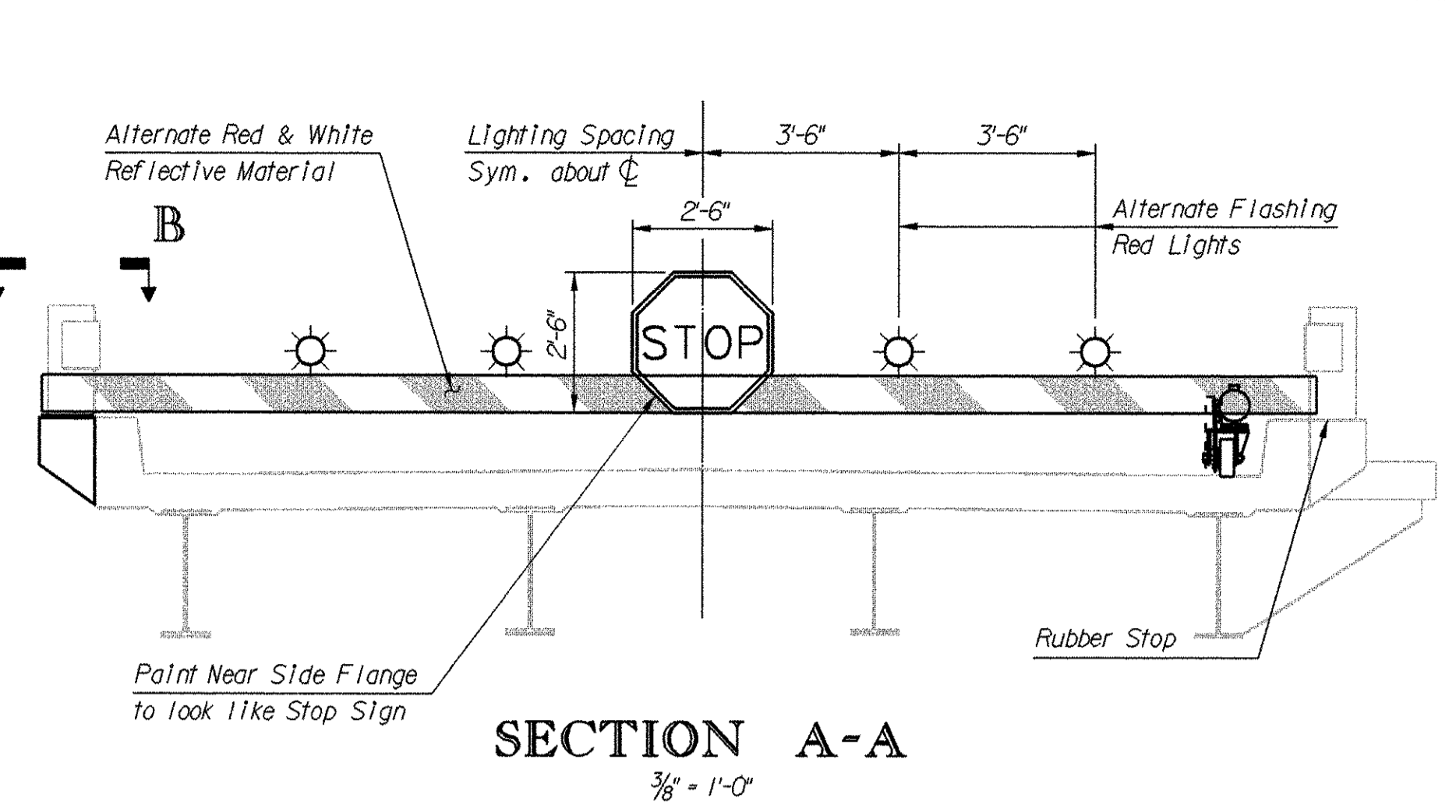
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	US-21	BEAUFORT	M-22

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		US-21	76	115

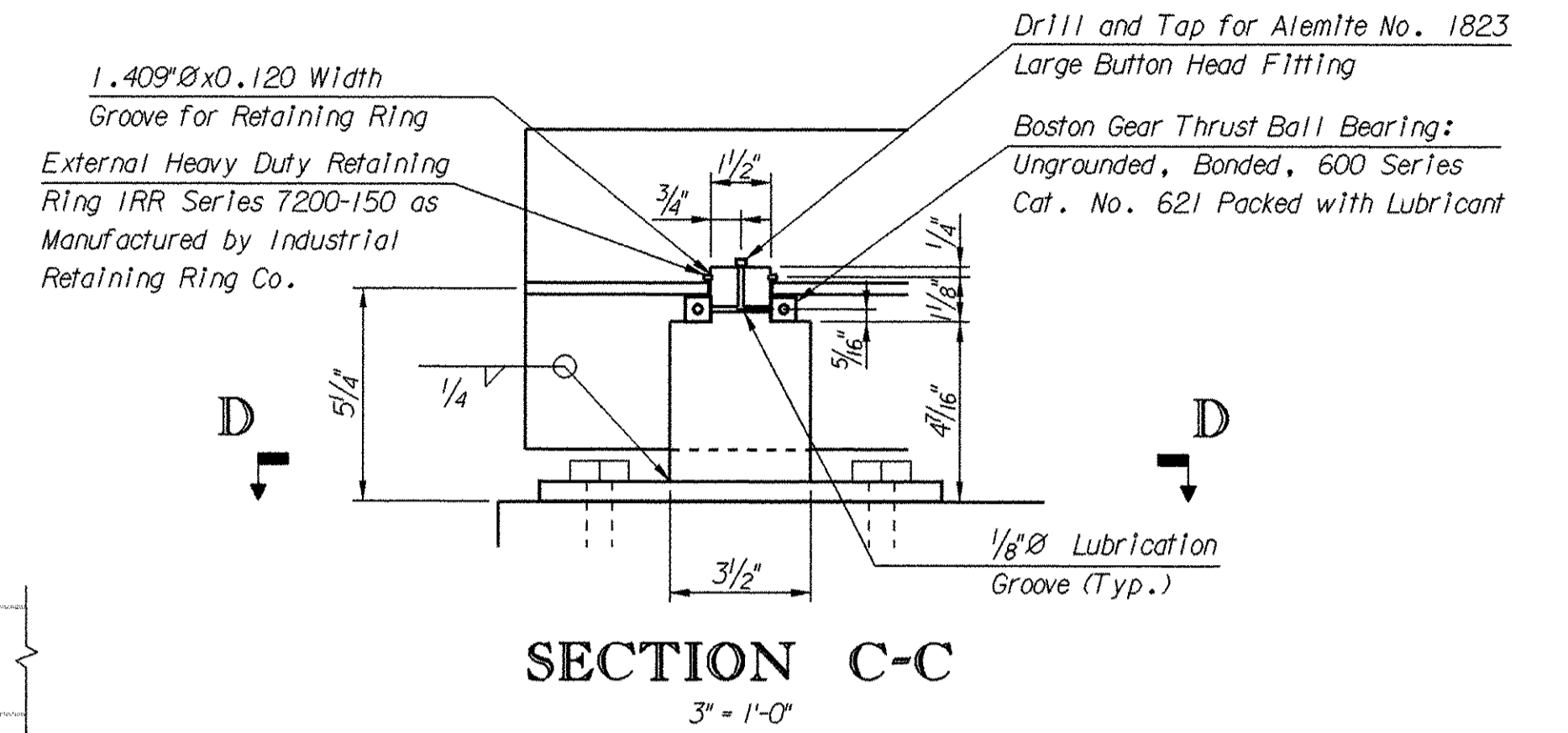
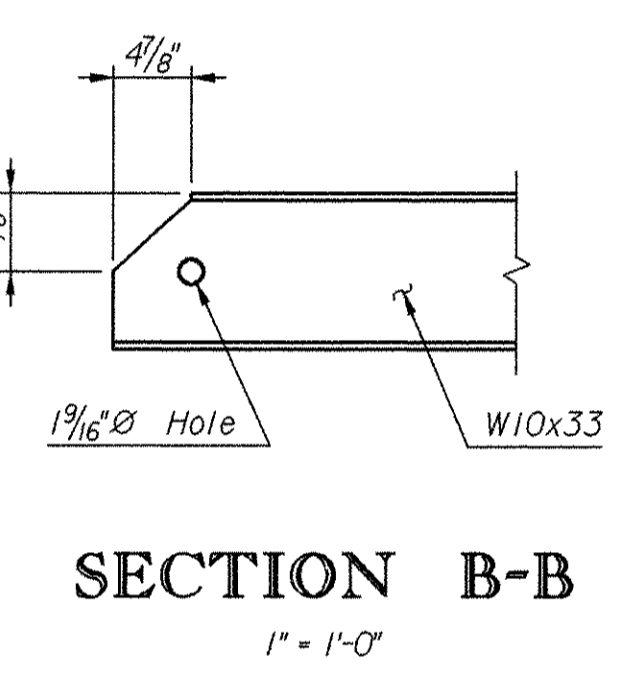
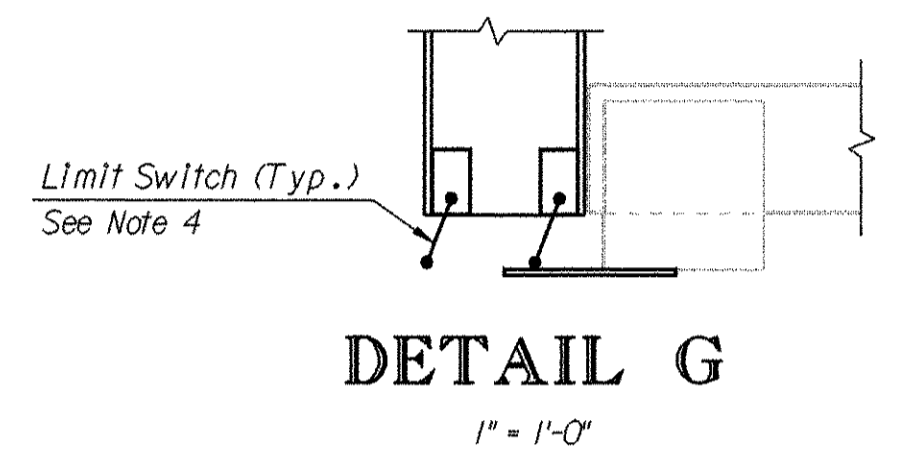
QUANTITIES		
I T E M	UNIT	CONTRACT QUANTITY
New Barrier Gates	L.S.	Lump Sum



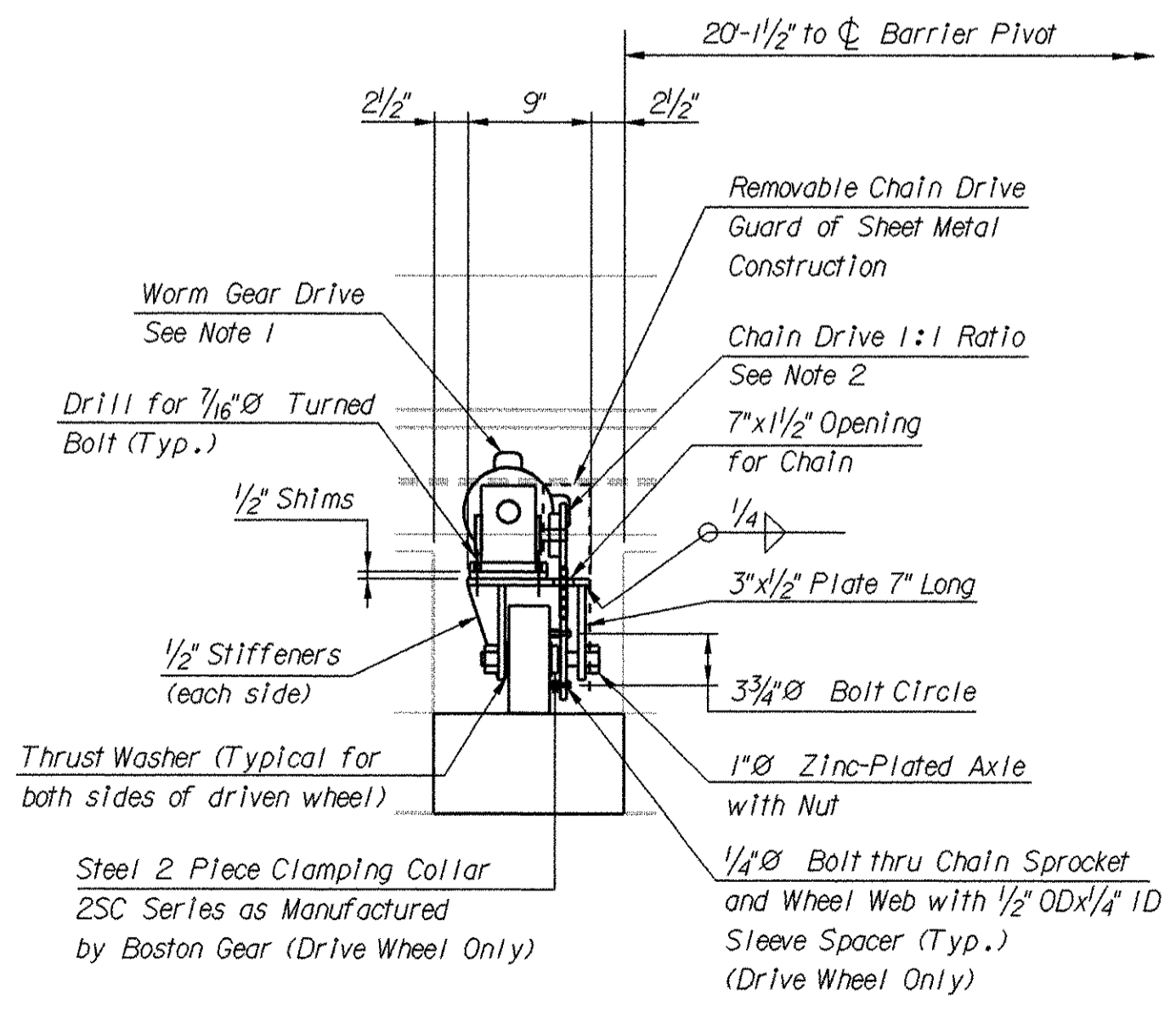
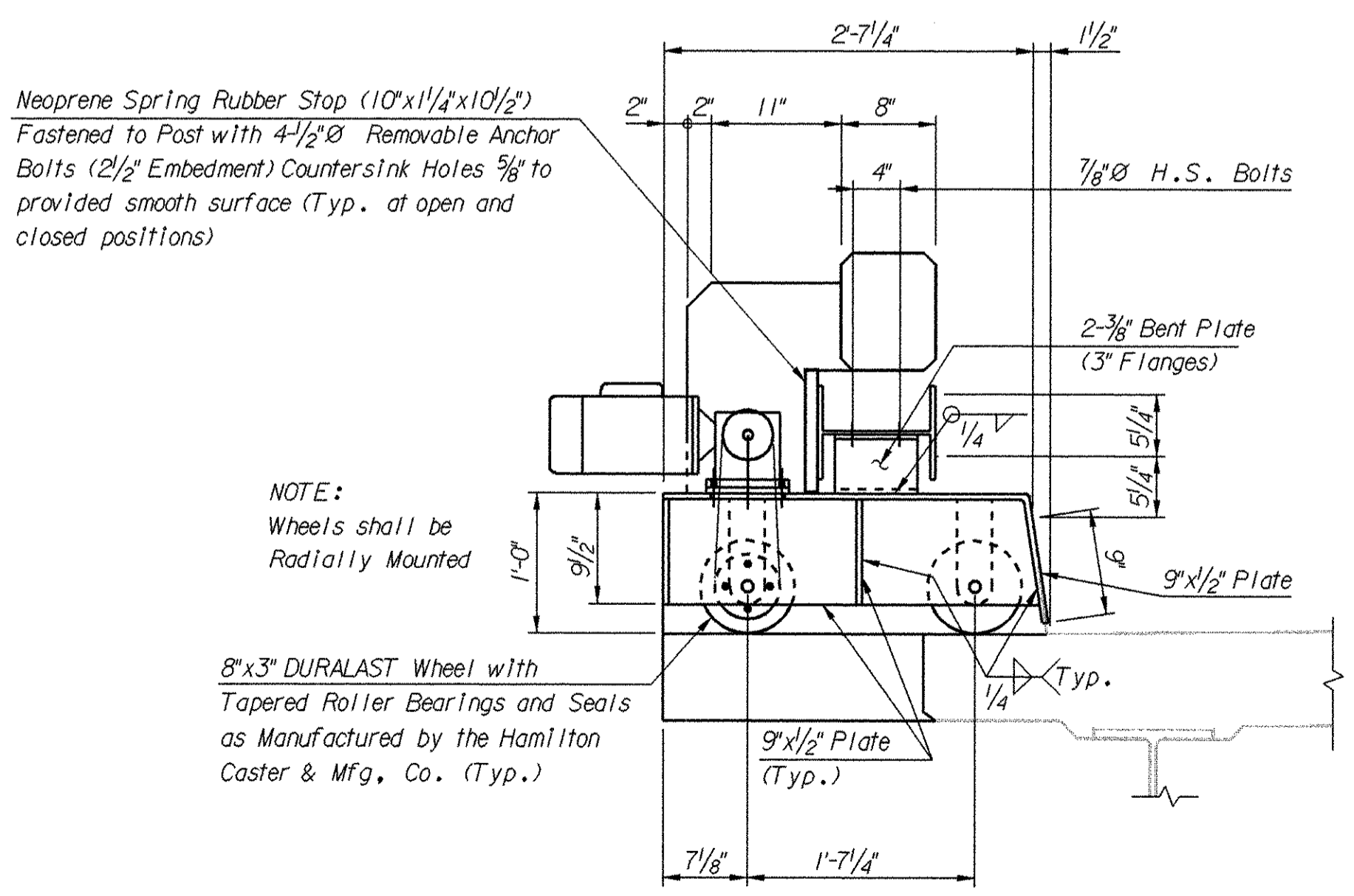
PLAN
East Barrier Gate Shown
West Barrier Gate Similar and Opposite Hand
see Drawing No. M-22 for Location
3/8" = 1'-0"



NOTE:
Set Anchor Bolts 6" in Concrete.
Project Bolts 1" Max. above Concrete.



- NOTES**
- 1/2 HP A.C. Motor, totally enclosed non-ventilated 1750 rpm with integral disc brake. Brake set at 1.5 lbs.-ft. Baldor Motor FUTF-B (66223) 460V, 3-Phase, 60Hz as supplied by Boston Gear.
Single Reduction Worm Gear Reducer FT00 Series-Flanged Quill Type, Size 721, B position horizontal base, assembly type G, 30:1 ratio, rated output of 680 lbs.-in. at 58.3 output rpm as manufactured by Boston Gear.
 - Barrier Chain Drive as manufactured by Boston Gear.
Single width, Stainless Steel No. 60 Chain-3/4" Pitch (ANSI Standard).
No. 60-3/4" pitch Steel Drive Sprocket: 23 Teeth, 5.508 pitch diameter, Type B single hub, 1" bore with 1/4 x 1/4 x 1/4 key to suit worm gear drive output shaft.
No. 60-3/4" pitch Steel Driven Sprocket: 23 Teeth, 5.508 pitch diameter, Type A no hub, 1 1/4" bore.
 - Cost to furnish and install New Barrier Gate to be included in Pay Item "New Barrier Gates" unless otherwise noted. Cost to furnish and install Gate Limit Switches, Conduits and Wiring to be included under Section 610 Bridge Electrical Work.
 - Contractor to provide all necessary Hardware and Strike Plates to shim and align Limit Switches for proper operation and stopping of Gate.



SECTION F-F
1" = 1'-0"

VIEW E-E
1" = 1'-0"

HNTB ARCHITECTS ENGINEERS PLANNERS The HNTB Companies					
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C. HARBOR RIVER					
NEW BARRIER GATE					
REV.					
REV.					
REV.					
REVIEWED					
QUAN.	EK	SN	2-97	FILE NO.	ROUTE
DR.	RM	SN	2-97	US-21	COUNTY
DES.	SN	EK	2-97	BEAUFORT	DRAWING NO.
BY	CHK	DATE			M-23

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FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	77	115

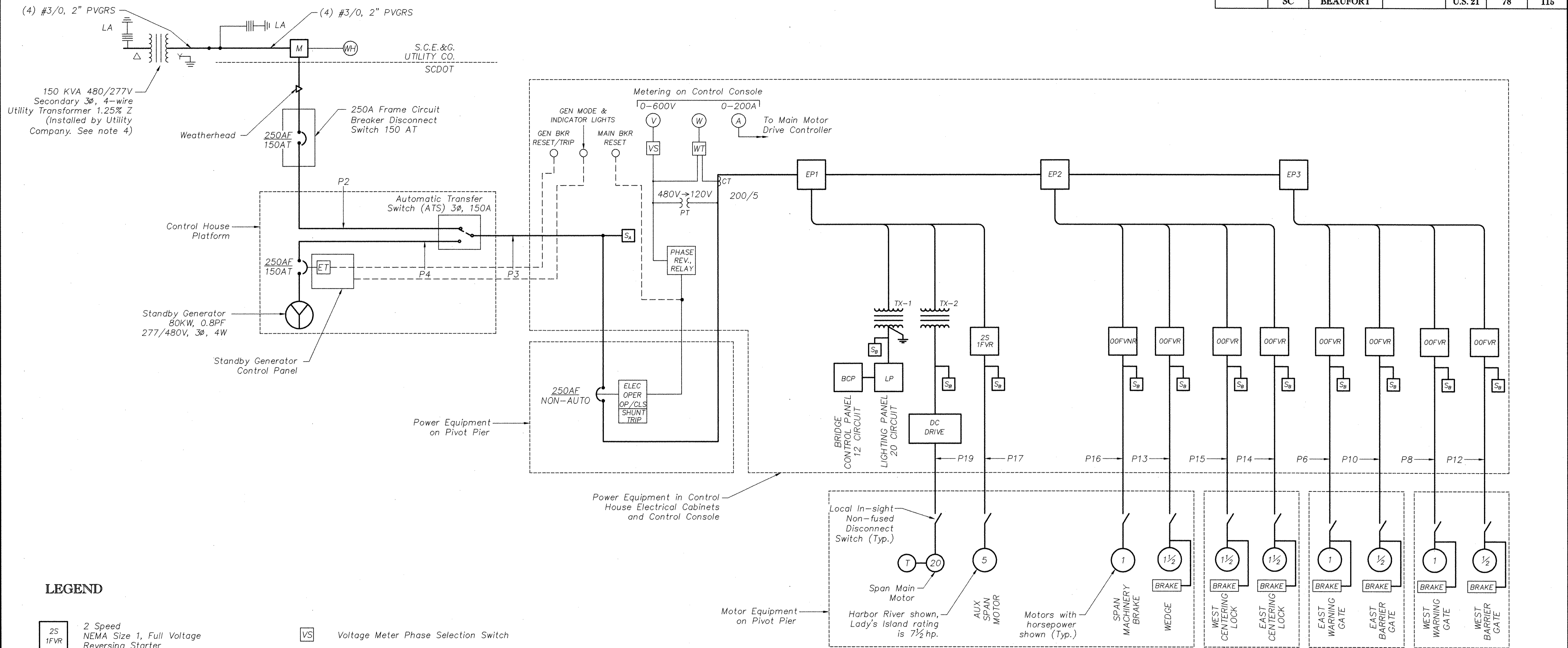
SHEET NO.	TITLE
E-1	INDEX OF DRAWINGS
E-2	ONE-LINE DIAGRAM
E-3	PANELBOARD SCHEDULES
E-4	ROADWAY LEVEL - PLAN VIEW (HARBOR RIVER)
E-5	ROADWAY LEVEL - PLAN VIEW (LADY'S ISLAND)
E-6	INCOMING SERVICE DETAILS
E-7	EQUIPMENT LAYOUT PLAN
E-8	CONTROL HOUSE - CABINET ELEVATIONS
E-9	CONTROL CONSOLE LAYOUT
E-10	ANNUNCIATOR DETAILS
E-11	CONTROL CONSOLE DEVICE LIST
E-12	ELECTRICAL CABINET DETAILS
E-13	LIGHTING AND INTERCOM SYSTEMS
E-14	MISCELLANEOUS DETAILS - I
E-15	MISCELLANEOUS DETAILS - II
E-16	SYSTEM FLOW DIAGRAM
E-17	SPEED/TIME CURVES
E-18	MOTOR STARTER CIRCUITS
E-19	CONTROL SYSTEM BLOCK DIAGRAM
E-20	SCHEMATIC LEGEND
E-21	SCHEMATIC NO. 1
E-22	SCHEMATIC NO. 2
E-23	SCHEMATIC NO. 3
E-24	SCHEMATIC NO. 4
E-25	SCHEMATIC NO. 5
E-26	SCHEMATIC NO. 6
E-27	SCHEMATIC NO. 7
E-28	SCHEMATIC NO. 8
E-29	SCHEMATIC NO. 9
E-30	SCHEMATIC NO. 10
E-31	SCHEMATIC NO. 11
E-32	SCHEMATIC NO. 12
E-33	BRIDGE EQUIPMENT DEVICE LIST
E-34	WIRING TABLE - I
E-35	WIRING TABLE - II
E-36	WIRING TABLE - III
E-37	CIRCUIT SCHEDULE - I
E-38	CIRCUIT SCHEDULE - II
E-39	RACEWAY SCHEDULE

GENERAL NOTES:

- These electrical plans shall be used for both Harbor River and Lady's Island Bridges except where noted in the drawing titles where a drawing shall be applicable to a specific bridge only.
- All electrical equipment shall be removed from the bridge unless otherwise noted. All existing electrical equipment which shall be removed and not used as part of the proposed bridge electrical system shall become the property of the electrical contractor.
- All proposed electrical equipment shall be installed in the locations depicted on the plans. Slight deviations in location shall be permitted only upon approval by the engineer. Details of equipment installations shall be as indicated in the specifications, or otherwise as directed by the engineer.
- Lightning and surge protection of the control house and electrical equipment is not shown on the plans. The contractor shall obtain a lightning protection system vendor for the sole purpose in recommending specific equipment and a system design as per the given structural, architectural, and electrical plans. See the specifications for more information.
- Roadway lighting shall be installed on the movable span utilizing six (6) Holophane 250W Metal Halide Wall-Pack fixtures. Three (3) shall be mounted on each side of the span truss members in a manner as directed by the engineer. Fixtures shall be operated by a remote photocell with a manual bypass switch for operation by maintenance personnel. All fixtures shall be mounted at the same height off of the roadway and at no less than 20 feet above the roadway.
- The contractor shall be responsible for the coordination of the removal of existing, installation of temporary and proposed electrical service from S.C.E.&G. The contractor is also responsible for incurring utility costs associated with any temporary electrical service including operating costs.
- The contractor shall field verify all dimensions relating to electrical equipment installations prior to performing the actual installation. Any deviations noted as part of the field verification or construction deviations regarding the structure, shall immediately be brought to the attention of the engineer.
- All structural, mechanical, and architectural information shown within the electrical plans is for reference only. The contractor is advised to refer to the structural, mechanical, and architectural plans for all proper dimensioning and structural aspects.
- All electrical raceways shown throughout the plans are designated with an appropriate R* number. The contractor shall furnish and install brass tags with these designations engraved as required. Payment for these tags shall be included under the various pay items to which the raceway pertains. For information regarding raceways and circuits therein, refer to the drawings entitled Circuit Schedules and Raceway Schedules.
- All electrical raceways shown in plan view throughout these drawings are diagrammatic and are intended to show a conceptual layout. The contractor shall follow these layouts as closely as possible, realizing that actual installations may vary slightly due to field conditions and structural coordination.
- All electrical raceways that are exposed to the outside environment, such as those to be installed on the pivot pier, rest piers, roadway approaches, and those leaving the control house shall be PVC-coated rigid steel with a 40 mil coating as described in the specifications. All other electrical raceways within this contract shall be galvanized rigid steel.
- Electrical schematics 1 through 12 are intended to show bridge control system operation and communications only, excluding common control house electrical facilities such as receptacles and lighting which shall be paid for under a separate pay item. Bridge control circuitry on these schematics include operation of all traffic signals and gates, wedges, centering locks, and span control. The contractor shall follow these schematics as strictly as possible. Any deviation from these schematics in terms of control logic and hardwiring arrangements shall be submitted to the engineer in complete detail for approval, prior to construction.
- Terminal numbering as shown on schematics is provided for cross reference between schematics and wiring schedules. The system vendor may substitute an alternate numbering scheme with prior approval from the engineer.
- All directional references throughout the electrical plans depict orientation as it applies to the Harbor River Bridge. For the Lady's Island bridge, plan references indicating North shall imply East, East shall imply South, South shall imply West, and West shall imply North.
- A temporary drive control system cabinet will need to be designed and furnished by the system vendor and installed by the electrical contractor in a location at the lower platform of the new stairwell to the control house. This cabinet shall provide control of all traffic signals, warning gates, barrier gates, wedges, and the auxiliary two-speed motor all from the cabinet location. Local indication will not be required; however, all traffic control facilities shall be electrically interlocked in accordance with AASHTO requirements. Staging for the installation of new incoming utility service, new control house bridge system, and other electrical installations shall be driven by mechanical and structural staging requirements. See the specifications for more information.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

REV.				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
REV.							
REV.							
REVIEWED				INDEX OF DRAWINGS			
QUAN.	GSB	ALB	2-97				
DR.	MDC	ALB	2-97				
DES.	GSB	ALB	2-97				
BY	CHK.	DATE		FILE NO.	ROUTE U.S. 21	COUNTY BEAUFORT	DRAWING NO. E-1



LEGEND

- | | |
|---|--------------------------------------|
| 2 Speed NEMA Size 1, Full Voltage Reversing Starter | Voltage Meter Phase Selection Switch |
| NEMA Size 00, Full Voltage Reversing Starter | Emergency Trip |
| NEMA Size 0, Full Voltage Reversing Starter | Watt Transducer |
| NEMA Size 1, Full Voltage Reversing Starter | Control Console Voltmeter |
| NEMA Size 00, Full Voltage Non-Reversing Starter | Control Console Ammeter |
| National Lightning Protection Surge Suppressor TP4000 Plus. (See note 6 this sheet.) | Control Console Wattmeter |
| National Lightning Protection Surge Suppressor Para 1 4000 Plus TVSS unit. (See note 6 this sheet.) | Tachometer - Generator |
| Watt-Hour Meter | TX-1 480-120/208V, 3Ø 4W 45KVA |
| Lightning Arrestor | TX-2 480-277/480V, 3Ø 4W 27KVA |
| | Potential Transformer |
| | Current Transformer |

NOTES:

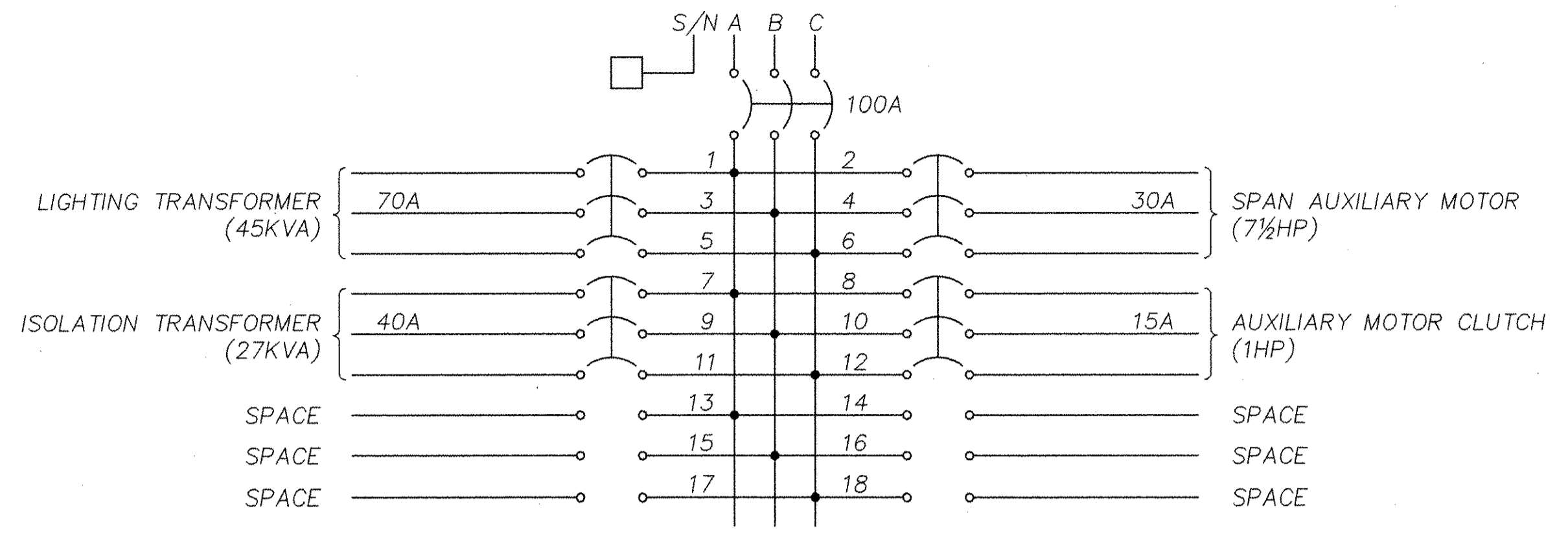
- Local in-site disconnect switches shall be provided for all moving equipment on the bridge and shall be sized in accordance with the NEC. Local disconnect switches shall be located no more than 50 feet from the motor, and must be in-site, as required by the NEC and OSHA. All switches which may be exposed to the outside environment or are to be installed near wet locations, shall be in NEMA 4X enclosures. All switches shall be clearly labelled for their function or purpose with engraved laminated nameplates.
- For information regarding the coordination and responsibility of electrical utility service, refer to the General Notes on Drawing E-1.
- For information regarding P* designations for power circuit wiring, see the drawings entitled "Circuit Schedules" and "Raceway Schedules".
- 480V metering and relaying shall be provided by the Utility Company.
- All equipment locations shall be as shown on electrical drawings E-6 through E-9.
- Surge Suppression shall be paid for as part of the Lightning Protection System. Actual amount of protection shall be as recommended by NLP. Included with the installation of the complete surge suppression and lightning protection system shall be a \$6,000,000 insurance policy provided by the manufacturer.
- For Bridge Equipment Device List, See Drawing E-33.

HNTB ARCHITECTS ENGINEERS PLANNERS
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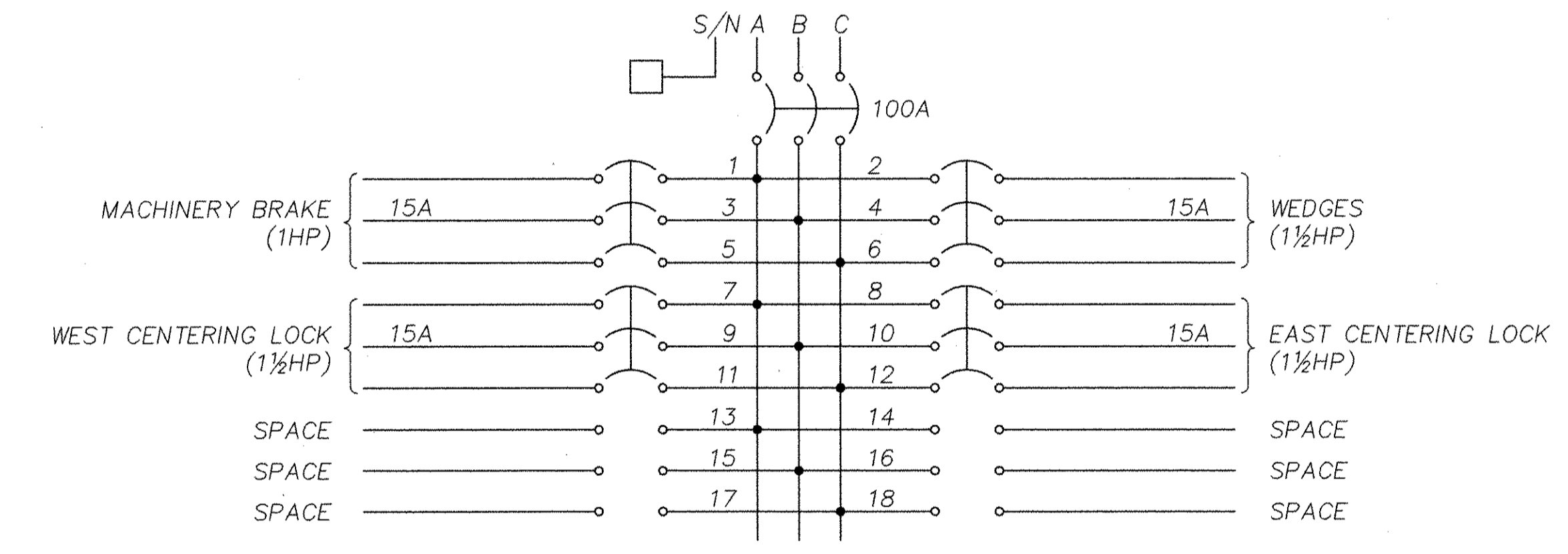
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

ONE-LINE DIAGRAM

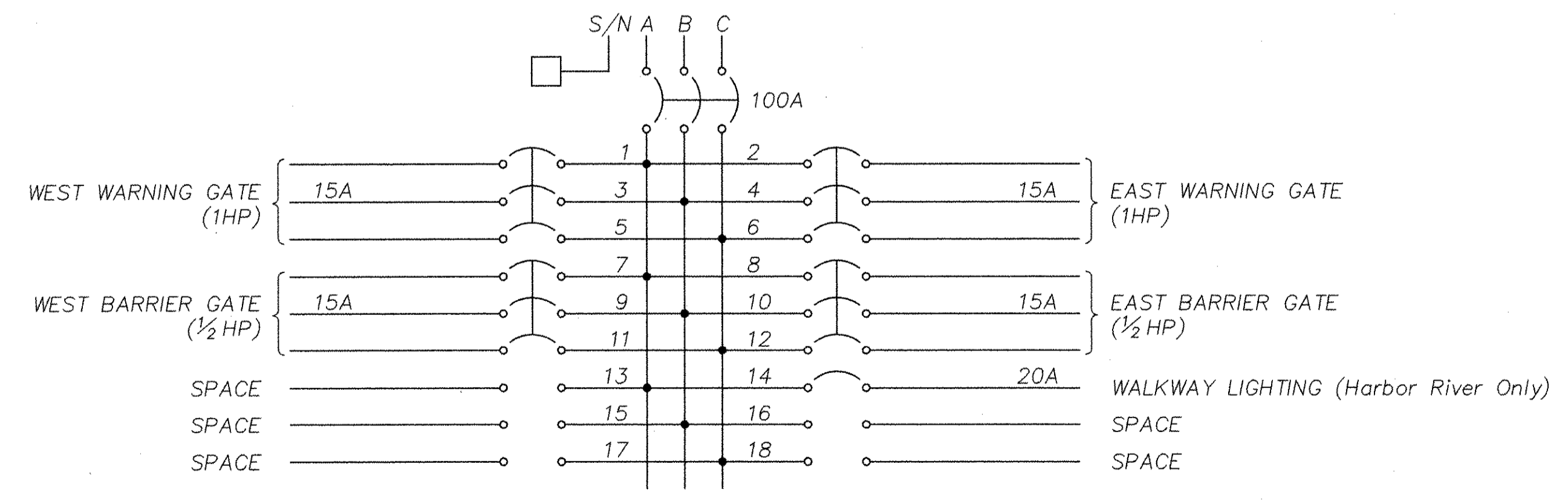
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REVIEWED						
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DR.	MDC	ALB	2-97			
DES.	GSB	ALB	2-97			
BY	CHK	DATE				
FILE NO.	ROUTE	COUNTY	DRAWING NO.			
	U.S. 21	BEAUFORT	E-2			



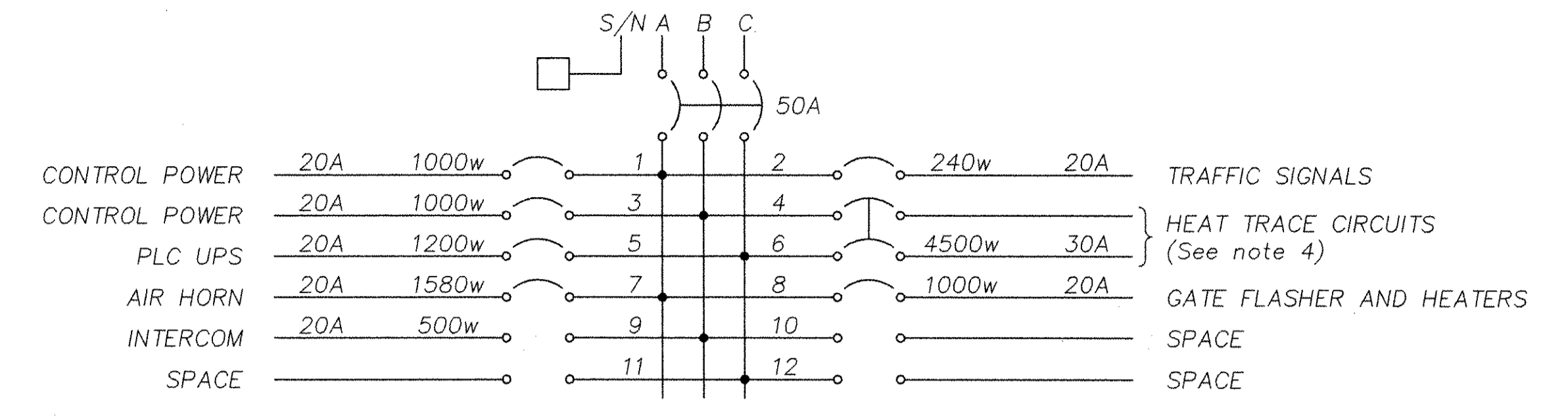
PANEL EP1 SCHEDULE
(277/480V, 3Ø, 4W)



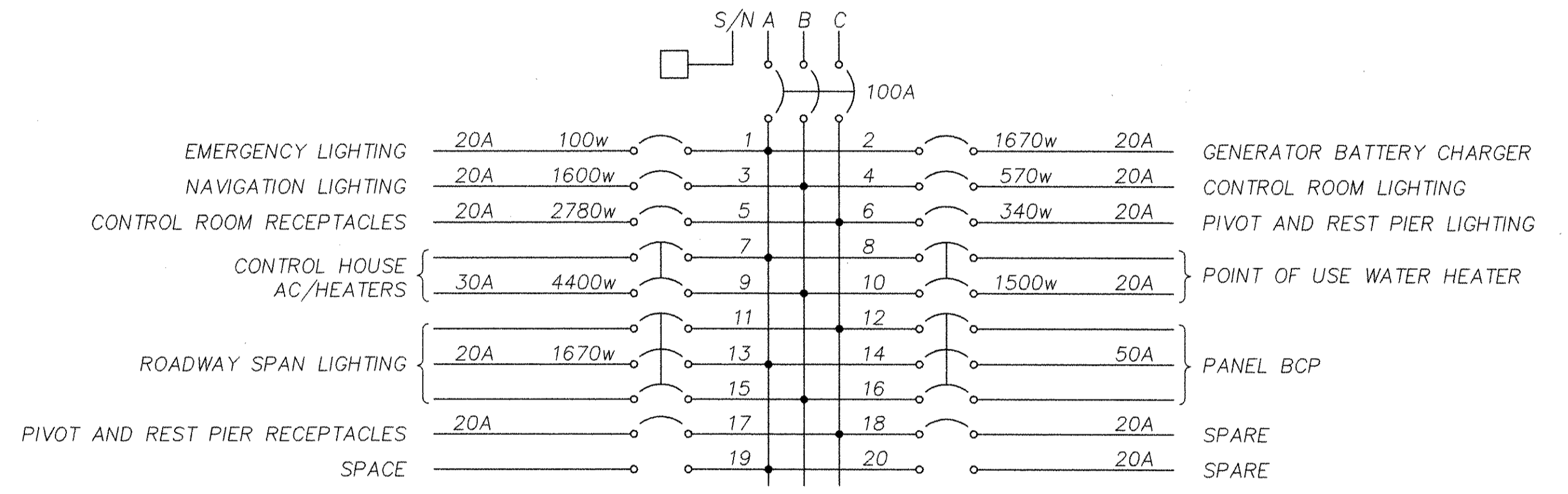
PANEL EP2 SCHEDULE
(277/480V, 3Ø, 4W)



PANEL EP3 SCHEDULE
(277/480V, 3Ø, 4W)



PANEL BCP SCHEDULE
(120/208V, 3Ø, 4W)



PANEL LP SCHEDULE
(120/208V, 3Ø, 4W)

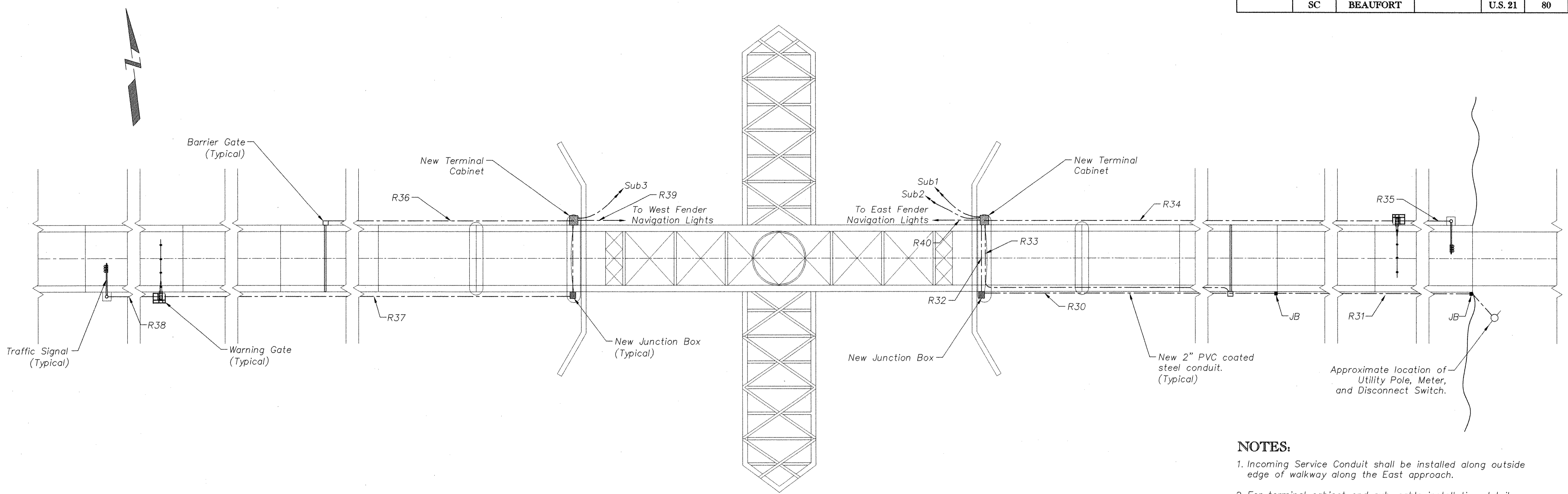
NOTES:

- For the locations of panelboards, see drawing E-8.
- All panelboards shall have typed legends clearly identifying each circuit breaker in accordance with the terminology shown on this drawing with the exception of spare circuit breakers and spaces which shall have no label.
- All panelboard covers shall have nameplates on the front side to identify the panelboard as shown on this drawing. Nameplates shall be as described in the specifications.
- The Heat Trace branch circuit from Panel BCP shall provide power to four (4) heat trace systems on Lady's Island Bridge and three (3) heat trace systems on Harbor River Bridge as follows:

Approach Water Pipe (2 Systems for Lady's, 1 System for Harbor)
Swing Span Pipe and Water Holding Tank (1 System)
Sewage Holding Tank (1 System)
- Demand loads shown in the schedules are approximate and may vary slightly upon actual installation.

HNTB ARCHITECTS ENGINEERS PLANNERS The HNTB Companies				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
				PANELBOARD SCHEDULES			
REV.				FILE NO.	ROUTE	COUNTY	DRAWING NO.
REV.				U.S. 21	BEAUFORT	E-3	
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REVIEWED							
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DR.	MDC	ALB	2-97				
DES.	GSB	ALB	2-97				
BY	CHK	DATE					

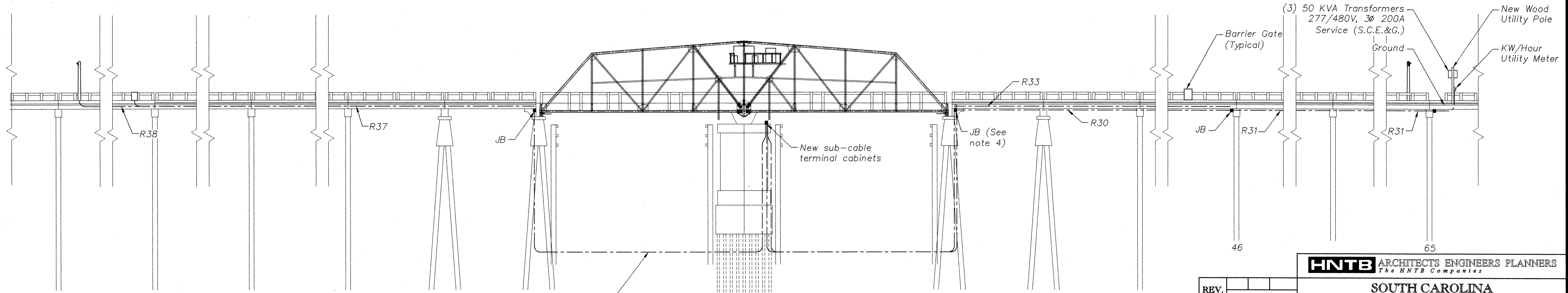
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	80	115



PLAN
Not to scale

NOTES:

1. Incoming Service Conduit shall be installed along outside edge of walkway along the East approach.
2. For terminal cabinet and sub-cable installation details see Drawings E-14 and E-15.
3. See Drawing E-6 for Service Installation Details.
4. Maximum spacing between junction boxes shall be 200ft.



ELEVATION
Not to scale

REV.			
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QUAN.	GSB	ALB	2-97
DR.	MDC	ALB	2-97
DES.	GSB	ALB	2-97
BY	CHK	DATE	

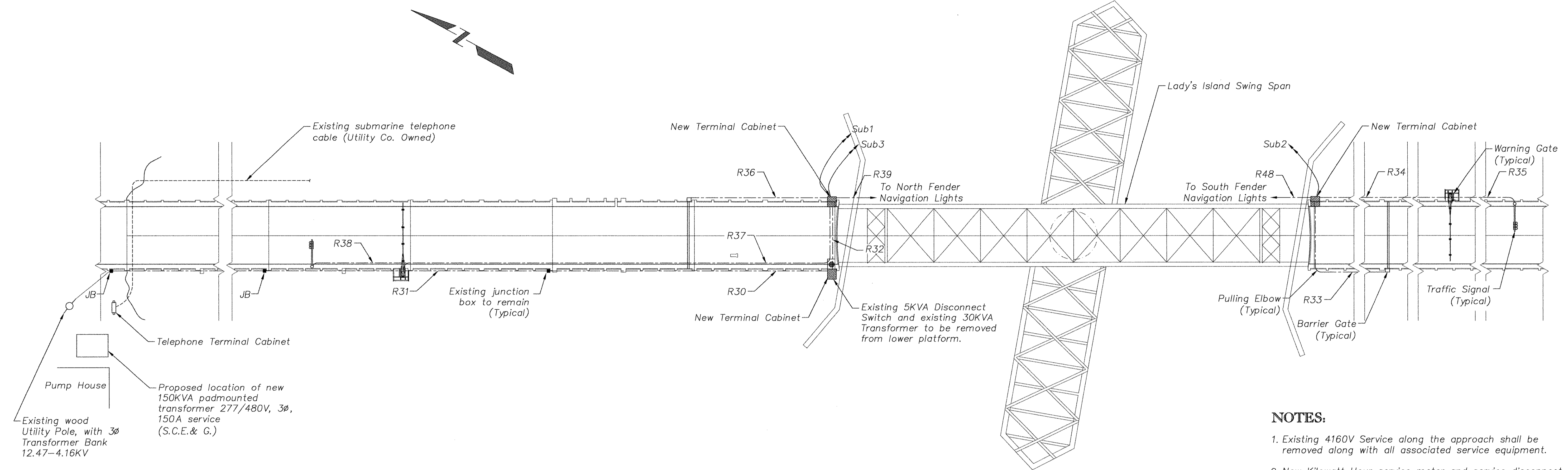
HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

**HARBOR RIVER
ROADWAY LEVEL
PLAN VIEW**

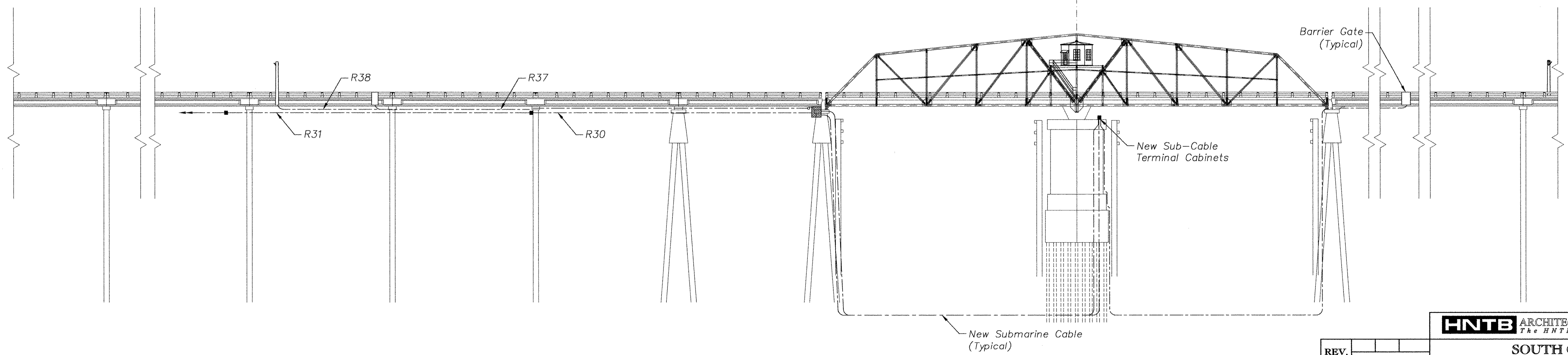
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-4

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	81	115



PLAN
Not To Scale

- NOTES:**
- Existing 4160V Service along the approach shall be removed along with all associated service equipment.
 - New Kilowatt Hour service meter and service disconnect switch to be installed adjacent to the new transformer.
 - Approximate size of the concrete transformer pad is 87"x 97" with #4 rebar set at 12" o/c spacing.
 - See Drawing E-6 for Service Installation Details.



ELEVATION
Not To Scale

REV.			
REV.			
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QUAN.	GSB	ALB	2-97
DR.	MDC	ALB	2-97
DES.	GSB	ALB	2-97
BY	CHK	DATE	

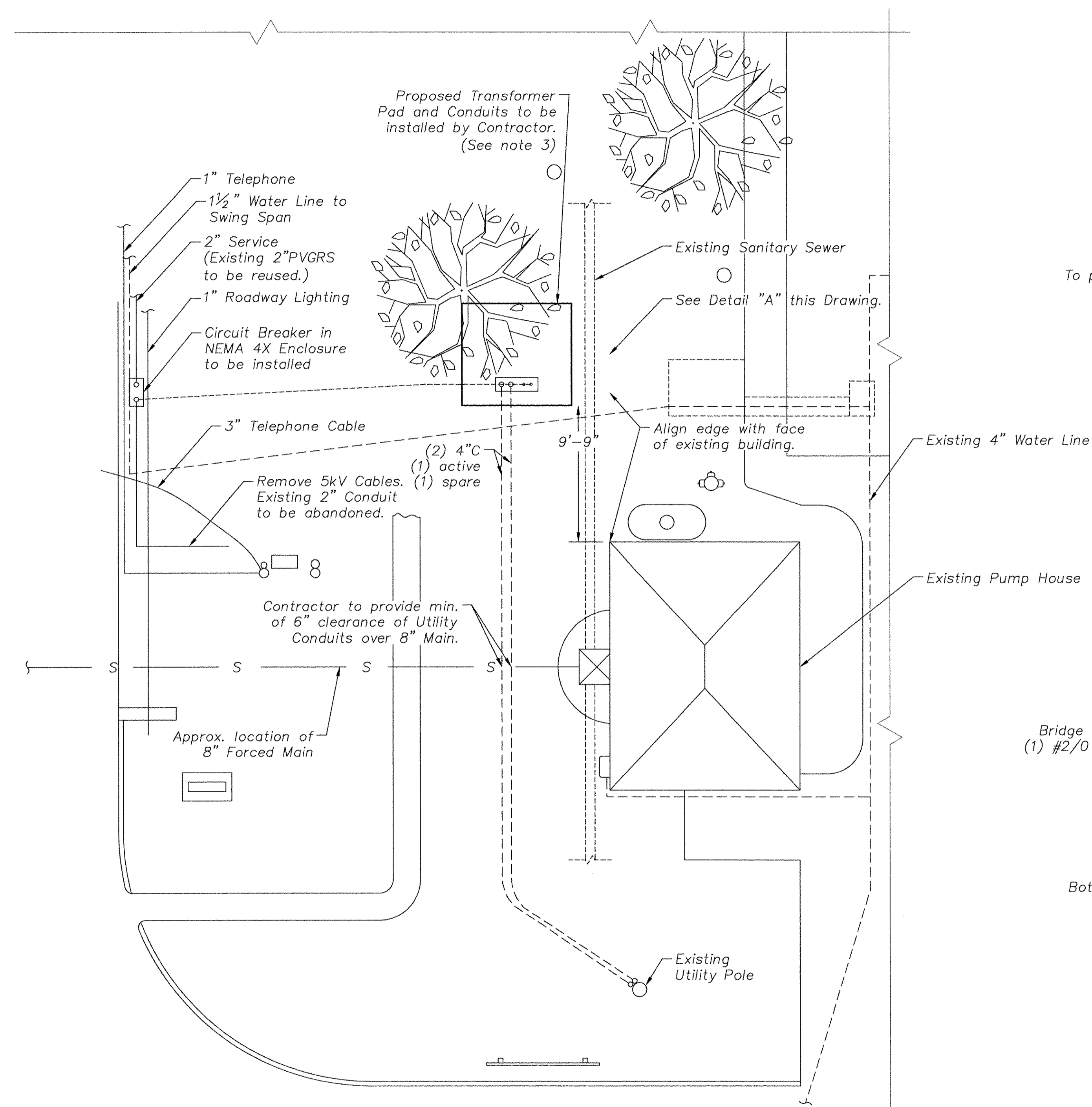
HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

**LADY'S ISLAND
ROADWAY LEVEL
PLAN VIEW**

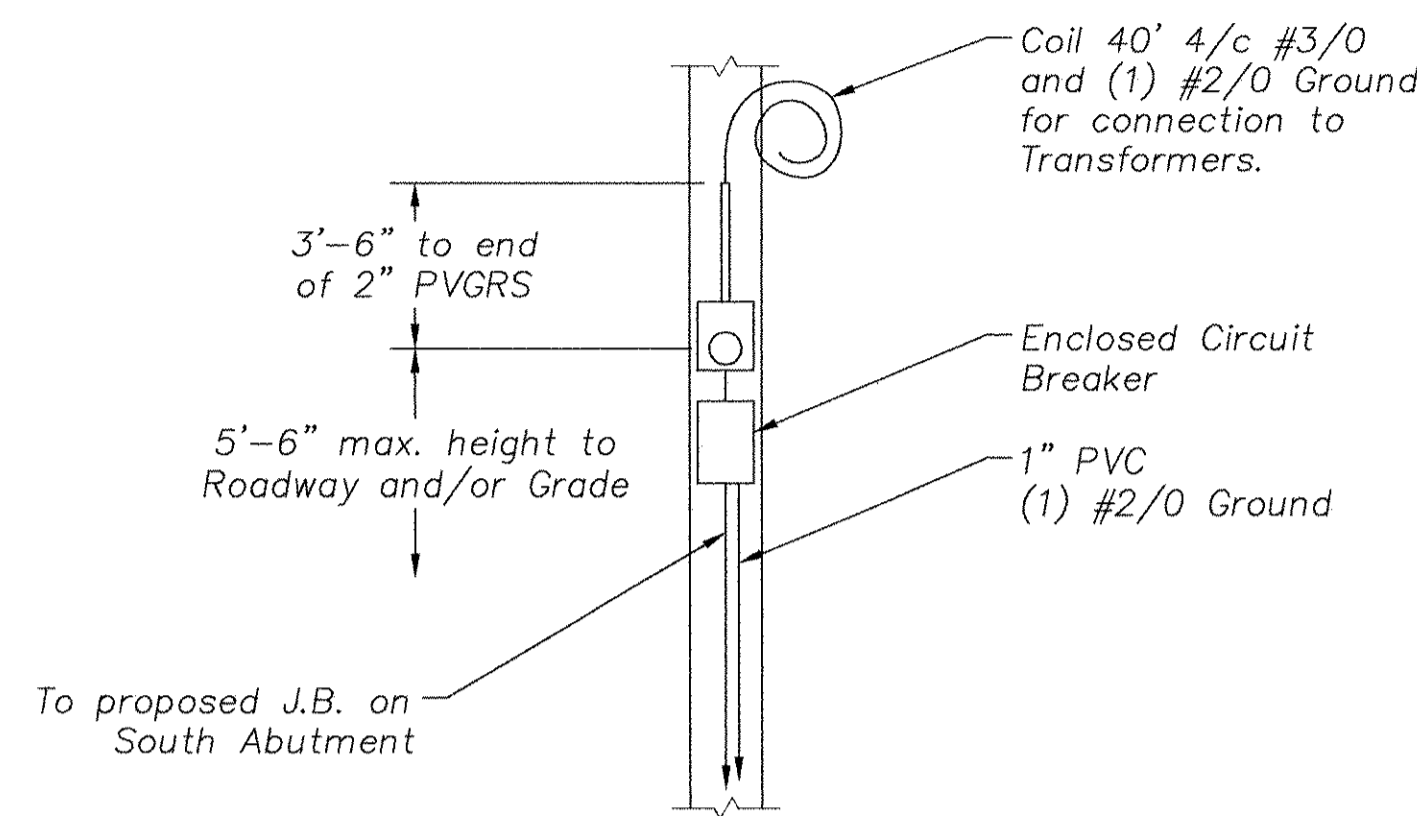
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-6

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
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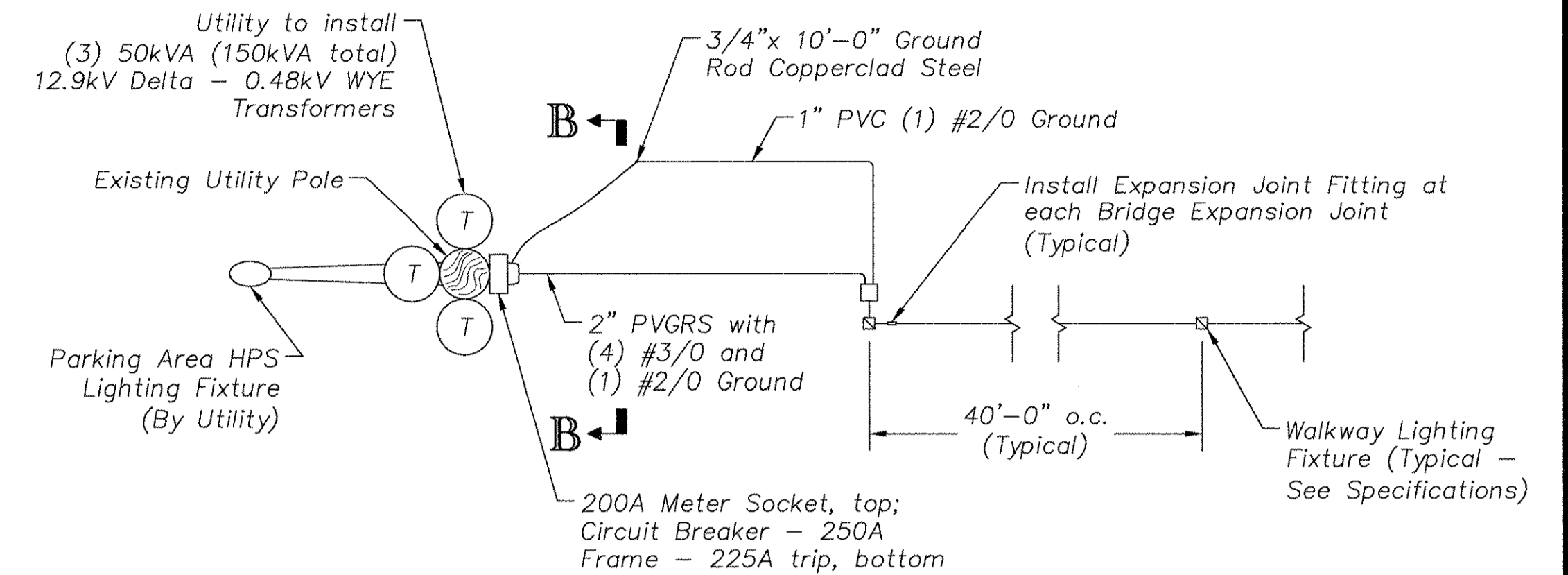


PLAN VIEW
Not to scale

LADY'S ISLAND

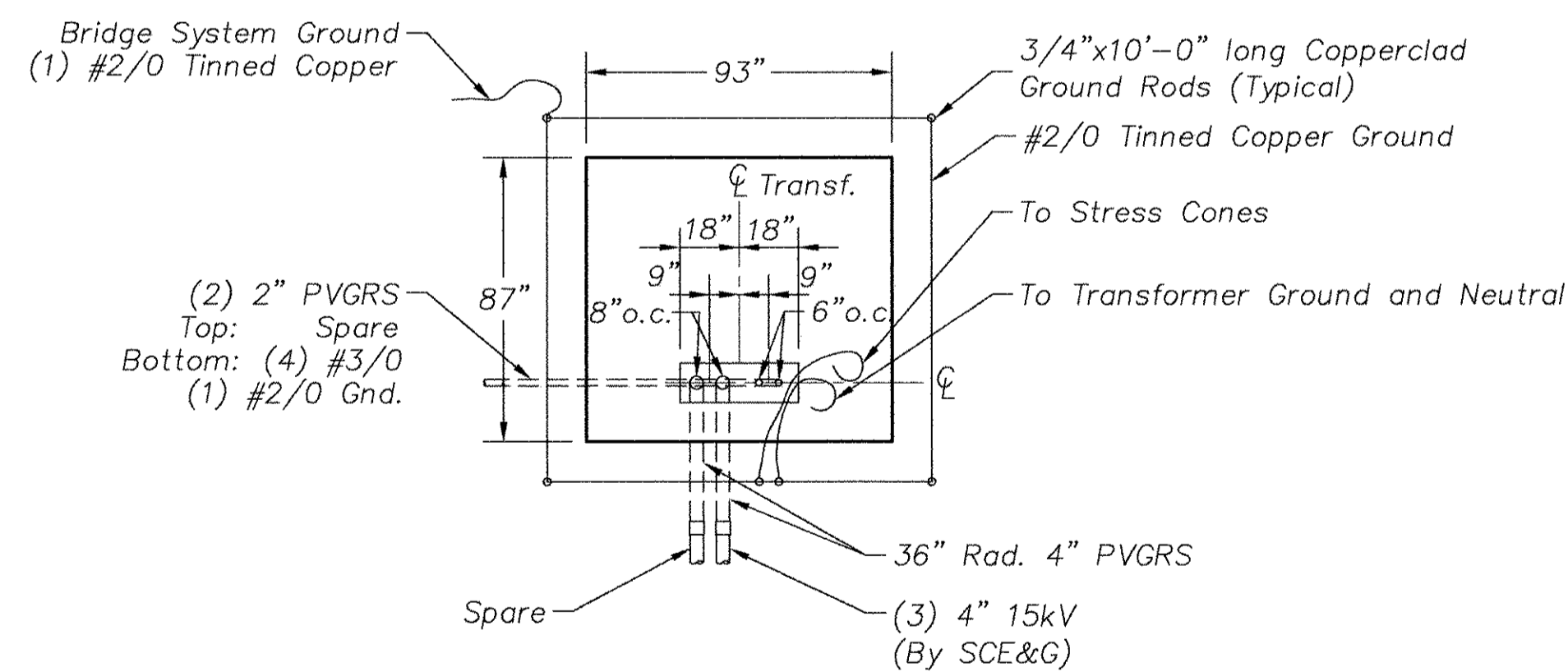


DETAIL "B"
Not to scale



PLAN VIEW
Not to scale

HARBOR RIVER

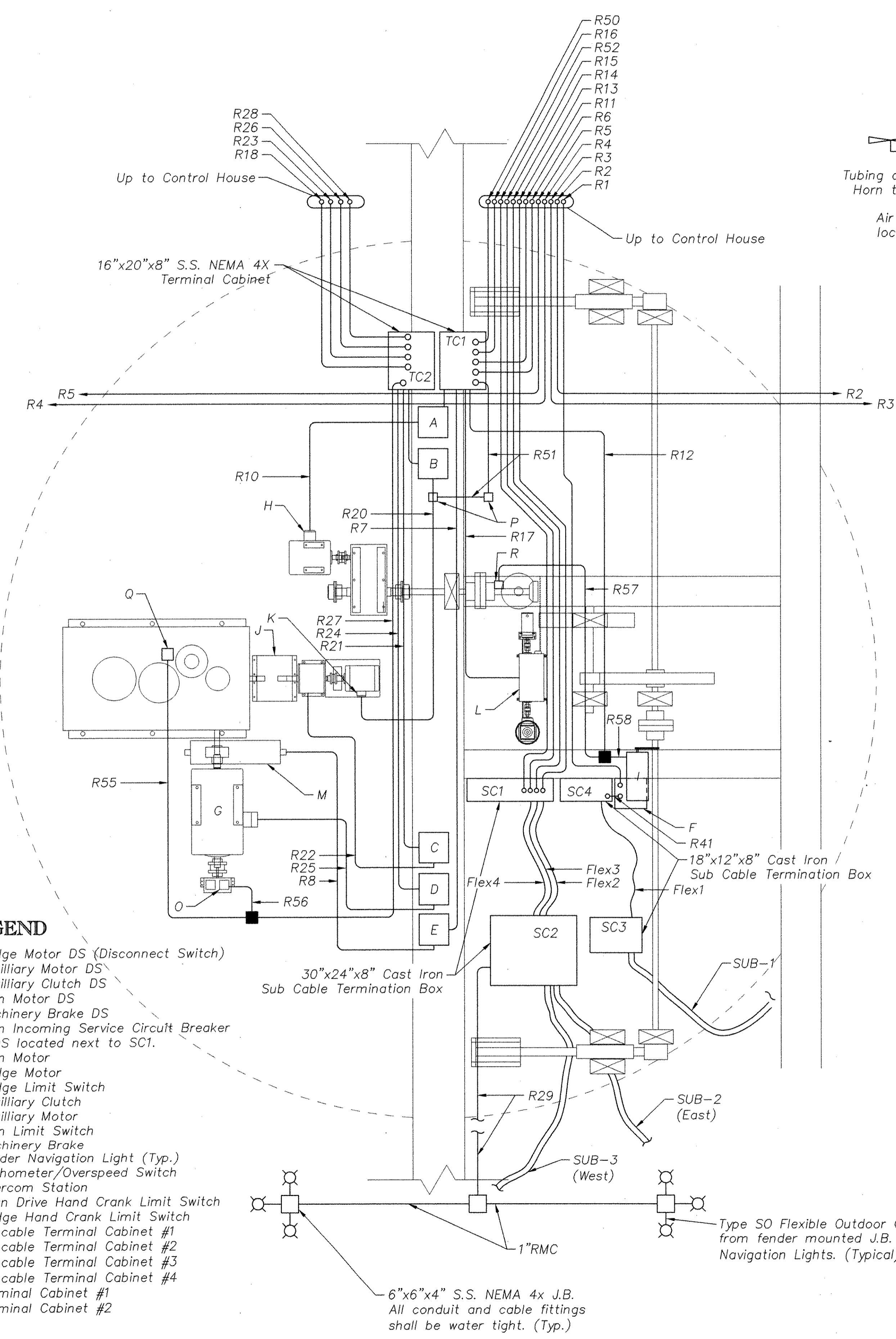
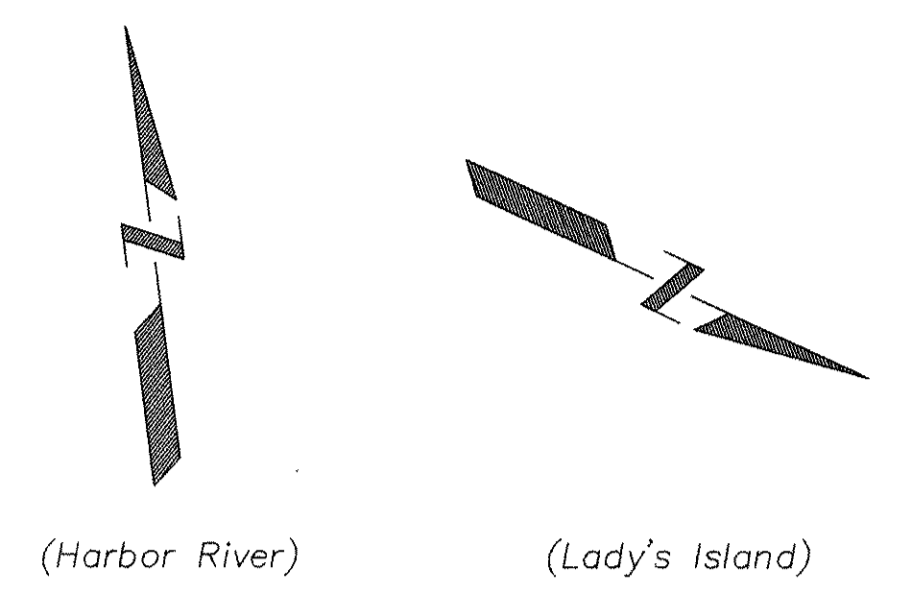


DETAIL "A"
Scale: 1/2" = 1'-0"

NOTES:

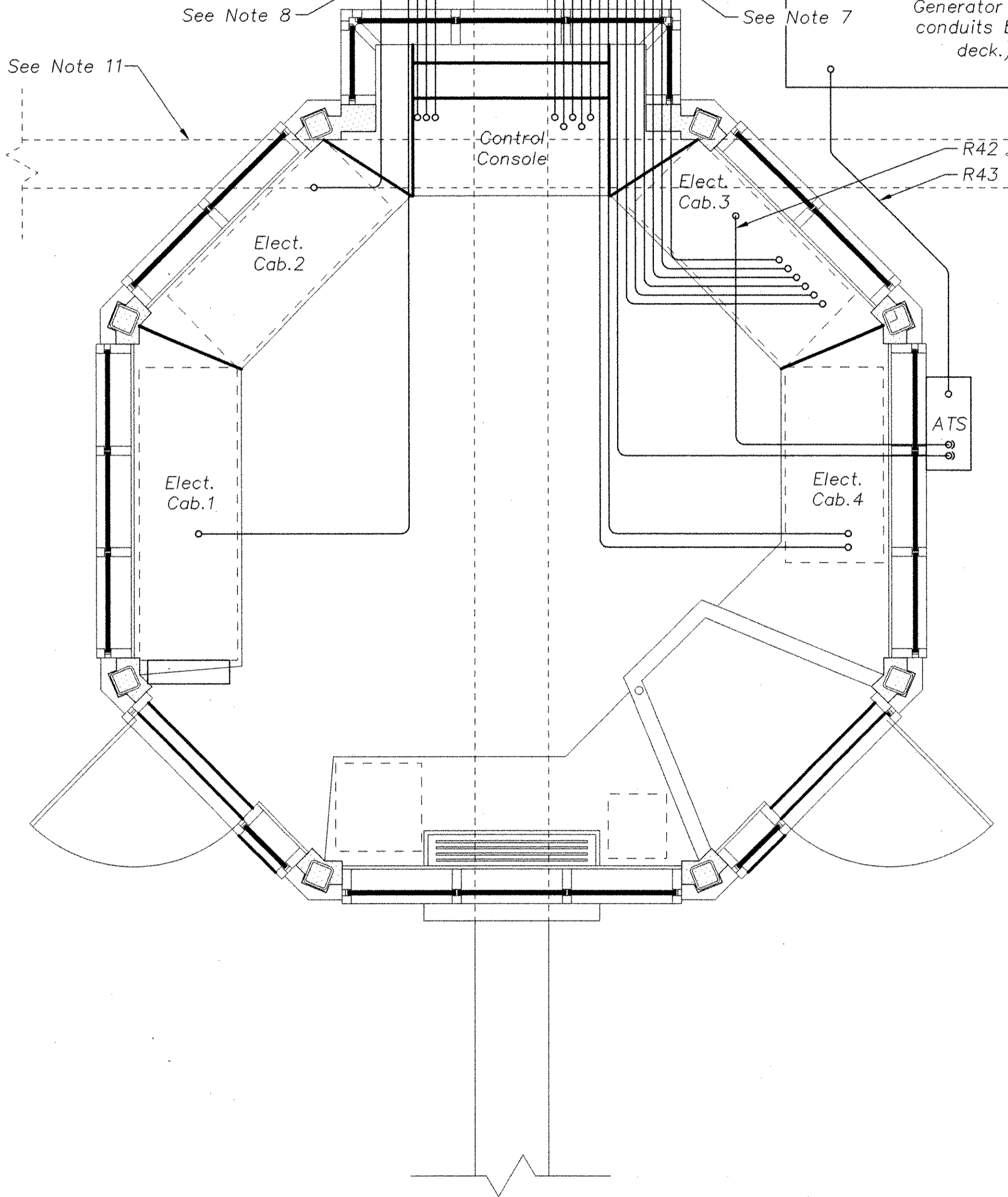
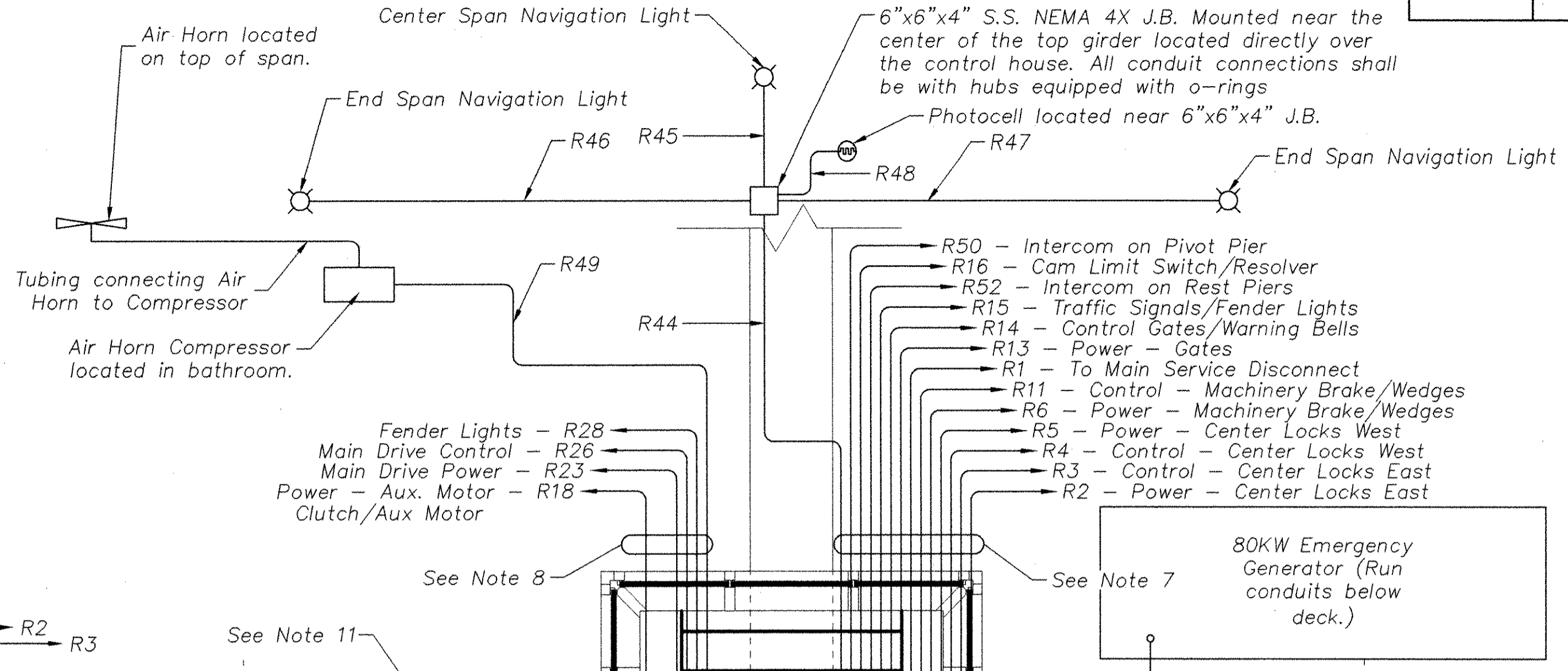
- For plan and elevation views of the Lady's Island Bridge, see Drawing E-5.
- For plan and elevation views of the Harbor River Bridge, see Drawing E-4.
- The Contractor shall be responsible for installing the transformer pad, conduits, enclosed circuit breaker, and service feeders to the Lady's Island Bridge. The transformer installation and service feeders to the Utility Pole shall be by the Utility Company.
- New enclosed circuit breakers for service feeds shall be in locked NEMA 4X enclosures. Keys shall be turned over to the SCDOT Maintenance Department.

REV.				HNTB ARCHITECTS ENGINEERS PLANNERS The HNTB Companies			
REV.				INCOMING SERVICE DETAILS			
REV.							
REVIEWED				FILE NO.			
QUAN.	GSB	ALB	2-97	ROUTE	U.S. 21	COUNTY	BEAUFORT
DR.	MDC	ALB	2-97	DRAWING NO.		E-6	
DES.	GSB	ALB	2-97				
BY				CHK. DATE			



LEGEND

- A Wedge Motor DS (Disconnect Switch)
- B Auxiliary Motor DS
- C Auxiliary Clutch DS
- D Main Motor DS
- E Machinery Brake DS
- F Main Incoming Service Circuit Breaker DS located next to SC1.
- G Main Motor
- H Wedge Motor
- I Wedge Limit Switch
- J Auxiliary Clutch
- K Auxiliary Motor
- L Cam Limit Switch
- M Machinery Brake
- N Fender Navigation Light (Typ.)
- O Tachometer/Overspeed Switch
- P Intercom Station
- Q Span Drive Hand Crank Limit Switch
- R Wedge Hand Crank Limit Switch
- SC1 Subcable Terminal Cabinet #1
- SC2 Subcable Terminal Cabinet #2
- SC3 Subcable Terminal Cabinet #3
- SC4 Subcable Terminal Cabinet #4
- TC1 Terminal Cabinet #1
- TC2 Terminal Cabinet #2



NOTES:

1. Sub-cable box locations are diagrammatic. Sub-cable boxes shall be located in same location as existing and may be adjusted in the field as necessary to accommodate field conditions, after obtaining approval from the Engineer.
 2. Location of sub-cable terminal boxes shall be such that the flexible cables connecting the boxes are kept as short as possible while allowing adequate access to all boxes.
 3. Sub-cable box covers shall be hinged on one side to allow access to box without complete removal of the cover. A support rod shall be incorporated into the box to hold the cover in the open position.
 4. All conduit connections and fittings shall be weatherproof and installed in a neat and professional manner.
 5. All conduits leaving the Control House shall have conduit stubs and couplings pre-installed by others and shall be extended in the field to the locations shown on plans or as directed by the engineer.
- All conduits leaving the Control House, with the exception of R42, R43, R44 and R49, shall be extended horizontally straight to the side of the bridge structure. They shall then run down the bridge structure, being adequately supported along the way, and finally run under the bridge to their associated equipment as shown on the plans or as directed by the engineer.
7. Flex cables between sub-cable terminal boxes on pivot pier and movable structure shall be multi-conductor, heavy-duty, extra flexible, outdoor type cable. Due to the quantity of conductors in Flex3, this cable may consist of 2 separate cables.
 8. For location of navigation lights and airhorns, see Structural Drawings.
 9. Conduit layout shown is for the Harbor River Bridge. This layout shall also be used for Lady's Island Bridge, making any adjustments necessary to accommodate changes in physical layout and field conditions. All changes shall be approved by the Engineer before installation.
 10. For internal layout of TC-1, TC-2, SC1, SC2, SC3 and SC4 see Miscellaneous Details Drawing.
 11. All conduits entering Control Console through Control House floor shall be located in front of structural beam as shown.
 12. Although not shown, terminations at all machinery devices shall be by means of flexible watertight conduit from a local junction box. Flexible conduit runs shall not exceed 24 inches.

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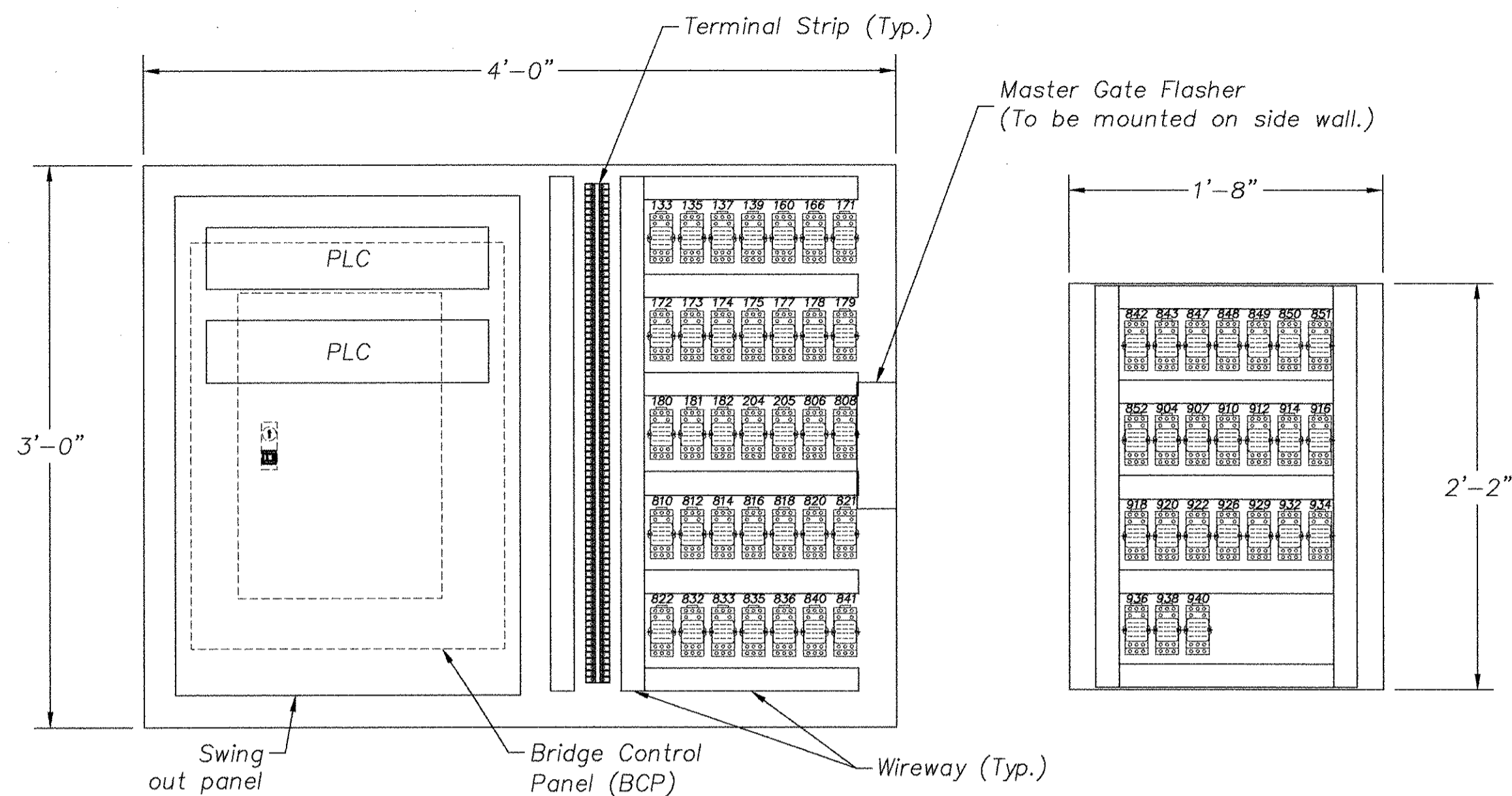
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

EQUIPMENT LAYOUT PLAN

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	GSB	ALB	2-97
DR.	MDC	ALB	2-97
DES.	GSB	ALB	2-97
BY	CHK.	DATE	

FILE NO.	ROUTE U.S. 21	COUNTY BEAUFORT	DRAWING NO. E-7
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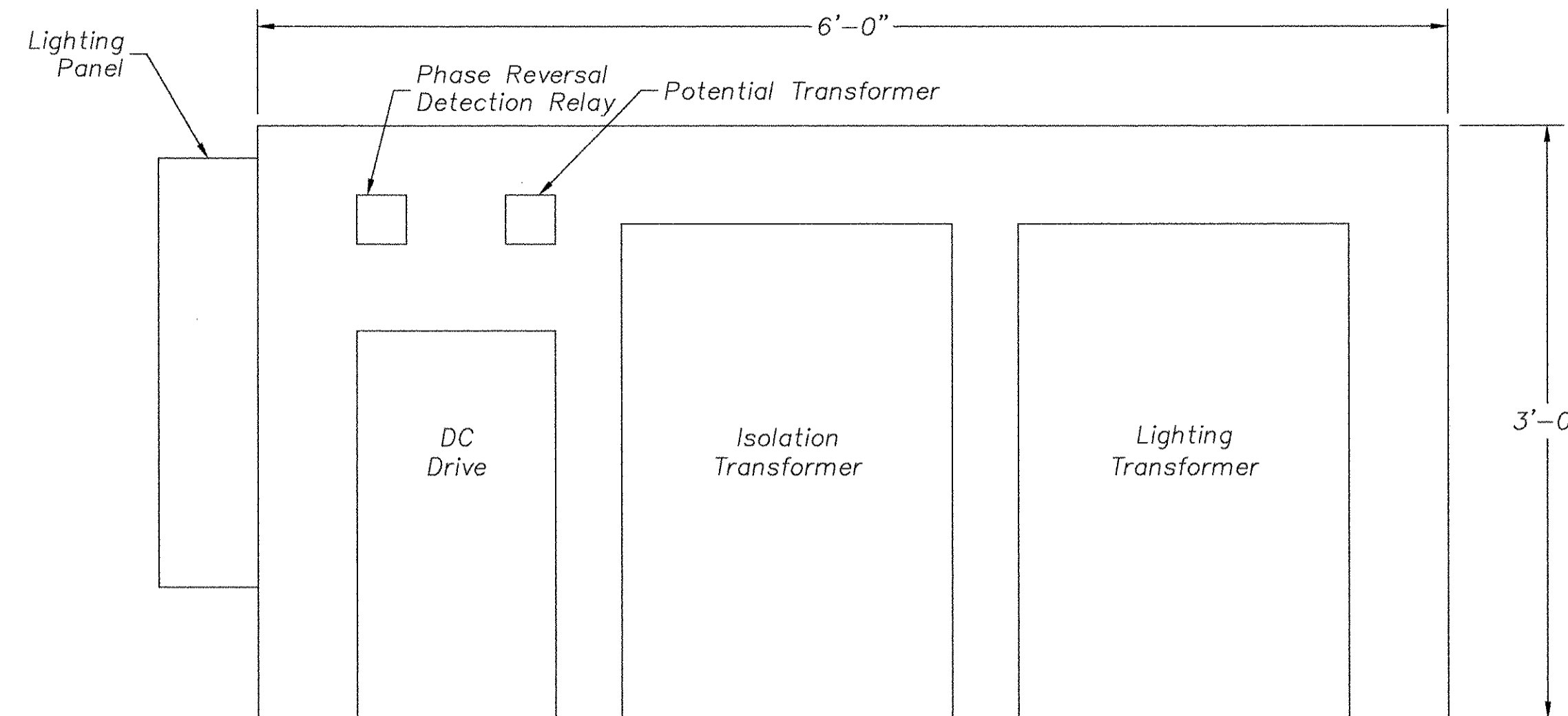


REAR PANEL

CONTROL CONSOLE

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

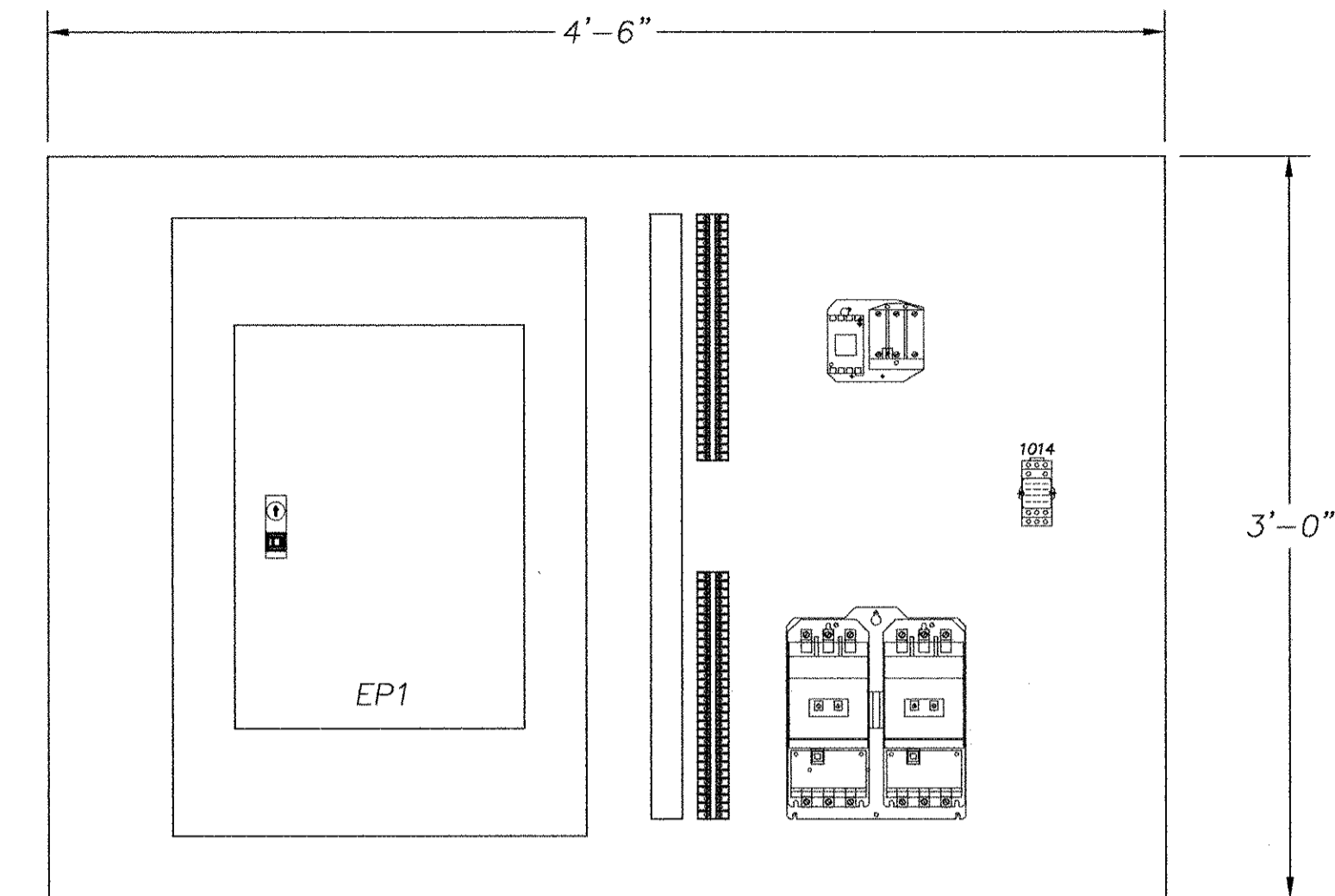
SWING OUT PANEL



REAR PANEL

CABINET 1

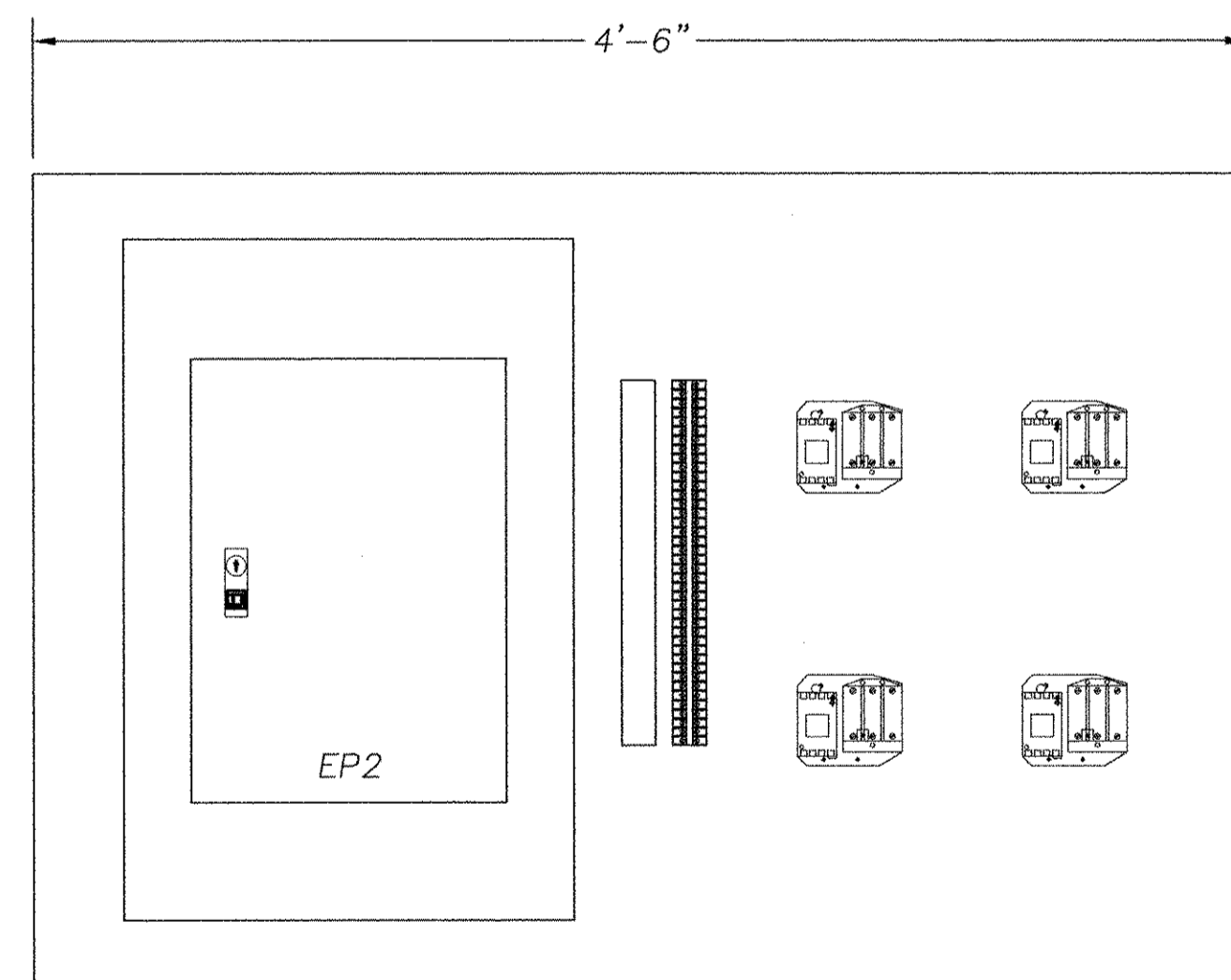
Scale: 1 1/2" = 1'-0"



REAR PANEL

CABINET 2

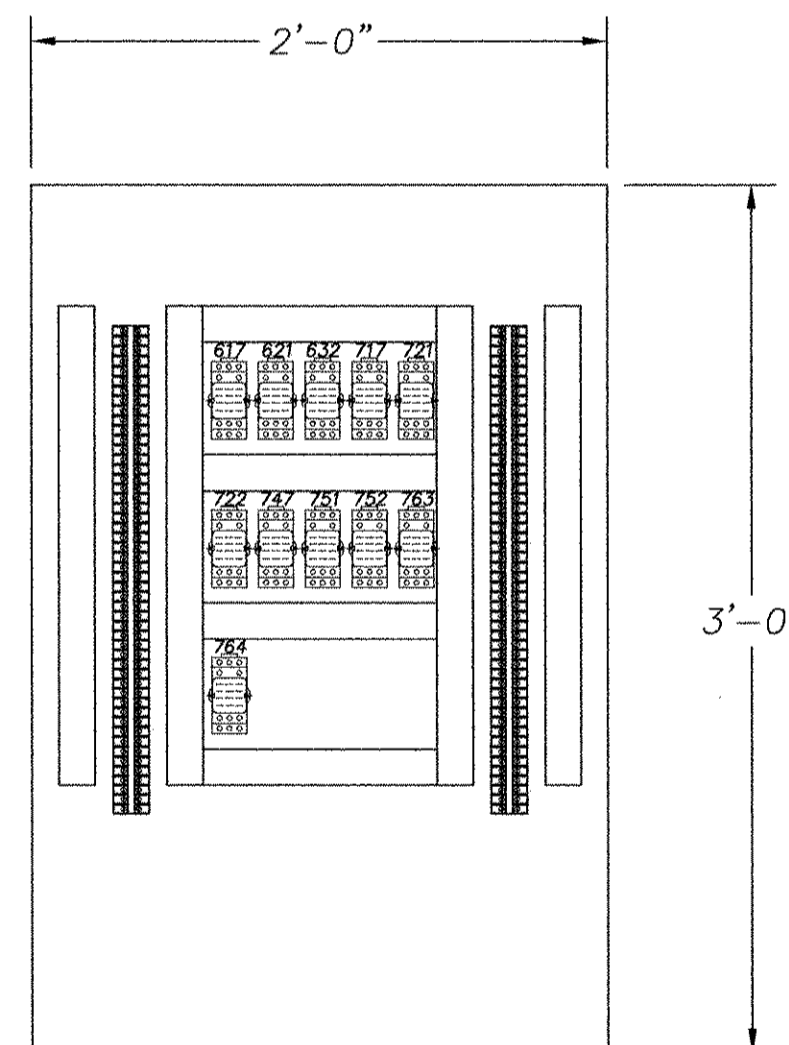
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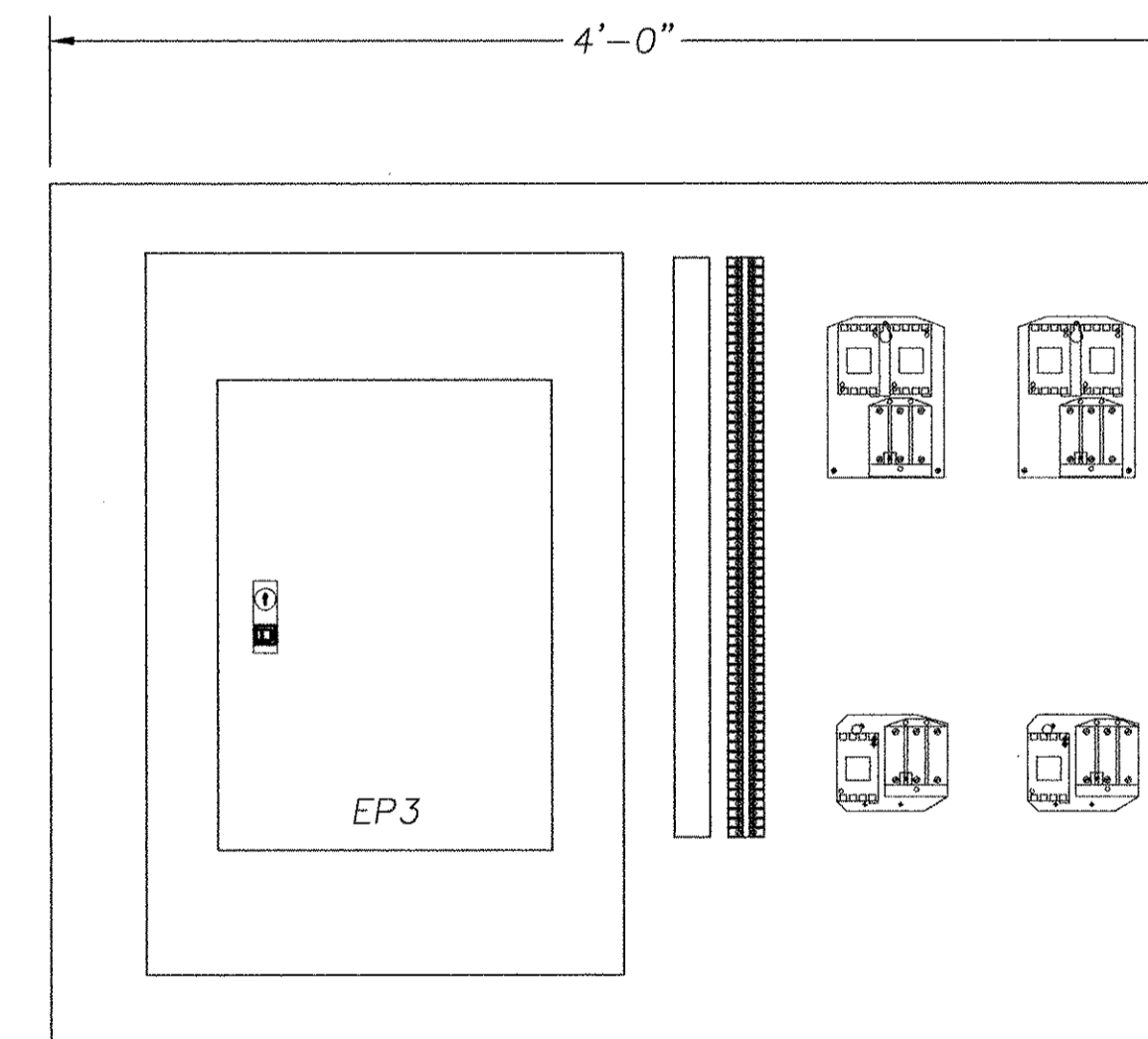
REAR PANEL

CABINET 3

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



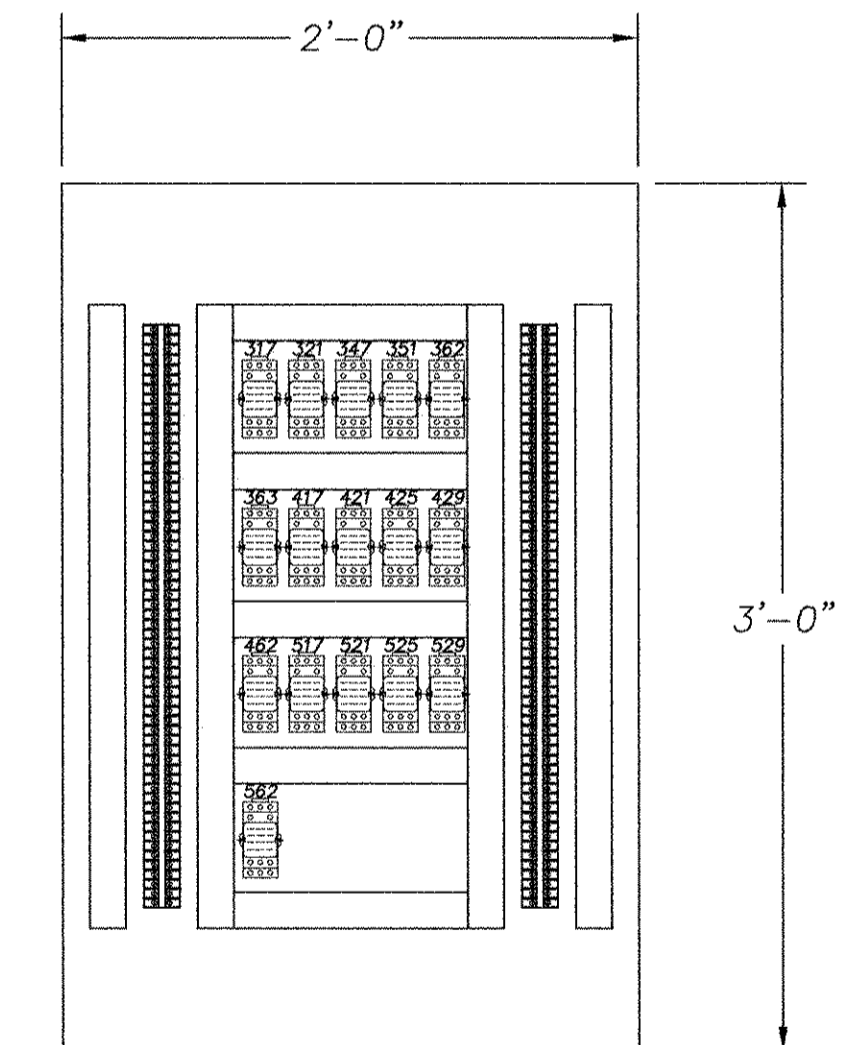
SIDE PANEL



REAR PANEL

CABINET 4

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



SIDE PANEL

NOTES:

1. Additional wireways and terminal strips may be mounted on both side walls inside Control Console Cabinet, as well as on the back of the Swing Out Panel, as needed to accommodate necessary wiring.
2. Additional wireways and terminal strips may be placed on back and side walls of Electrical Cabinets 1, 2, 3, & 4 as necessary to accommodate control wiring and wiring to motor starters and other electrical equipment located within these cabinets.
3. For terminal block connection details, see Miscellaneous Details - II Drawing E-15.

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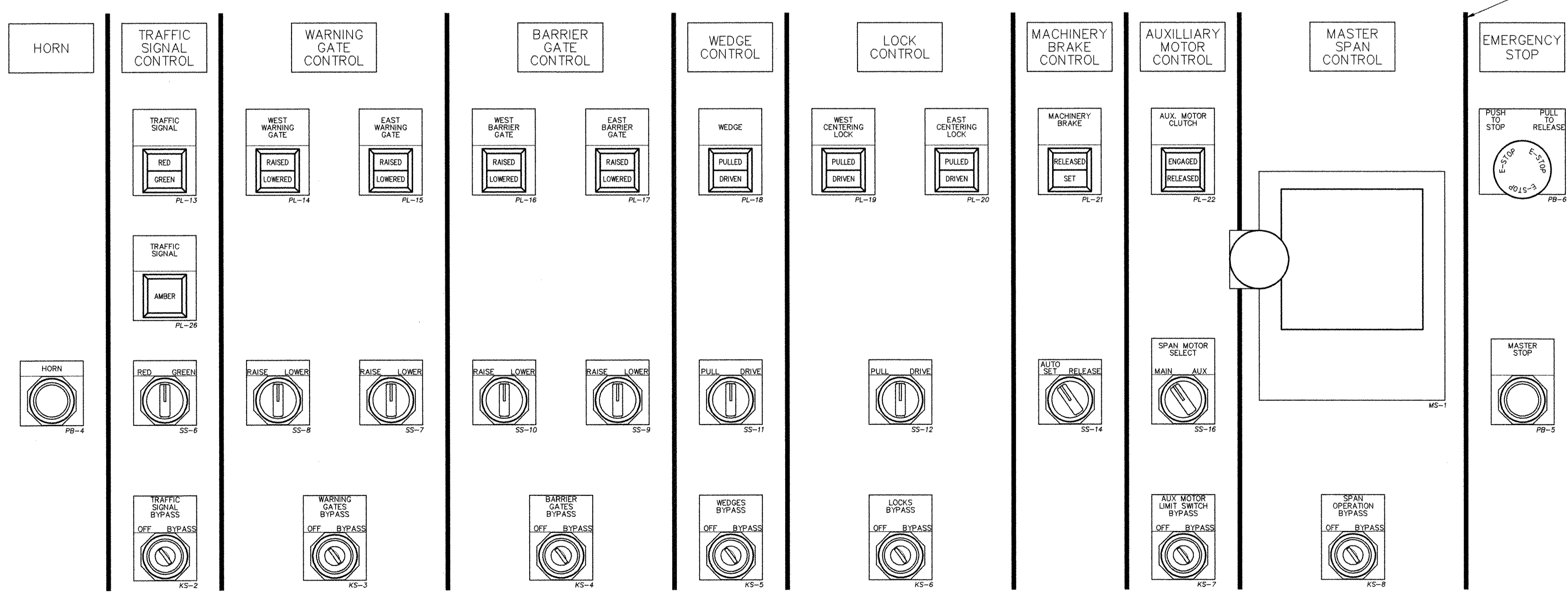
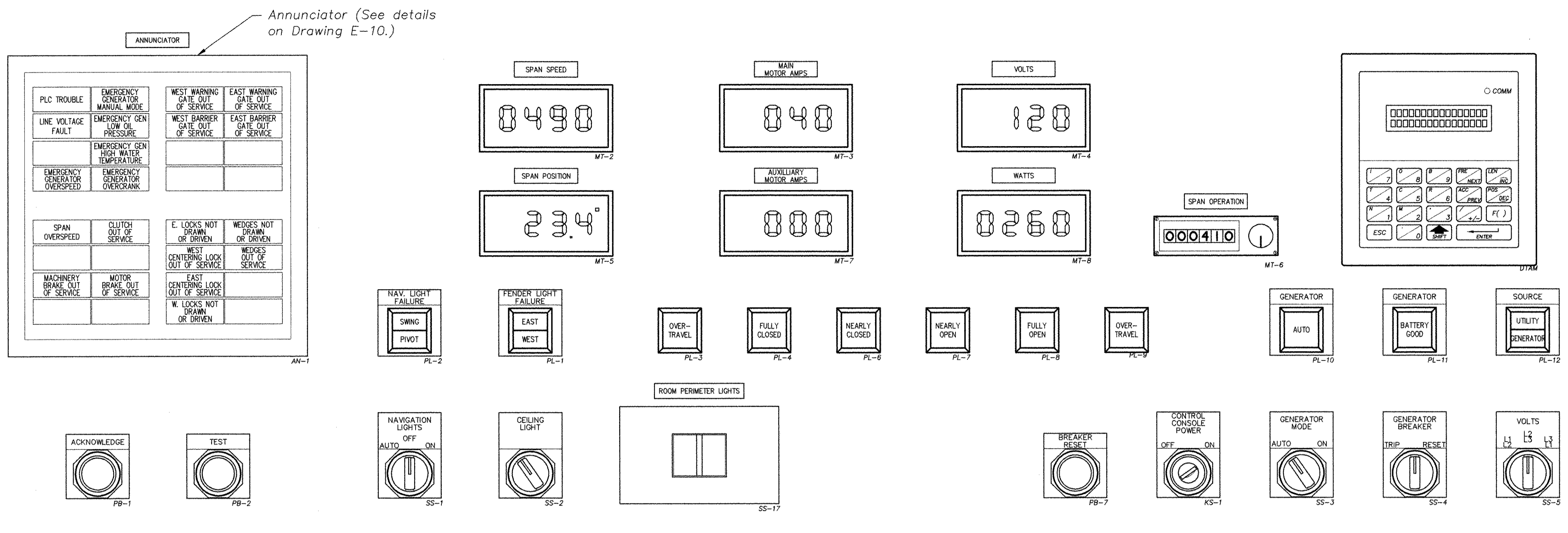
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

CONTROL HOUSE
CABINET ELEVATIONS

REV.	BY	CHK	DATE
REVIEWED			
QUAN.	GSB	ALB	2-97
DR.	MDC	ALB	2-97
DES.	GSB	ALB	2-97
BY	CHK	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-8

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	85	115



48"
CONTROL CONSOLE PLAN VIEW
 Scale: 1/2" = 1"

Permanent Black Dividing Line Mark (Typical)

38 5/16"

- NOTES:**
- All Escutcheon Plates to be 3/16" hot polished, black and white laminated phenolic compound with 1/32" black surface, 1/32" intermediate white layer, and 1/8" black back.
 - All legends on Escutcheon Plates to be engraved with standard gothic characters cut through black surface into intermediate white layers.
 - All equipment shown on this drawing shall be as listed in the legend on Drawing E-11.
 - See Drawing entitled, "Control Console Details" for information on control console cabinet.
 - Time of day will be displayed on the Data Terminal Access Module (DTAM).
 - Directional notation will be different for Lady's Island Bridge as per General Note on Drawing E-1.

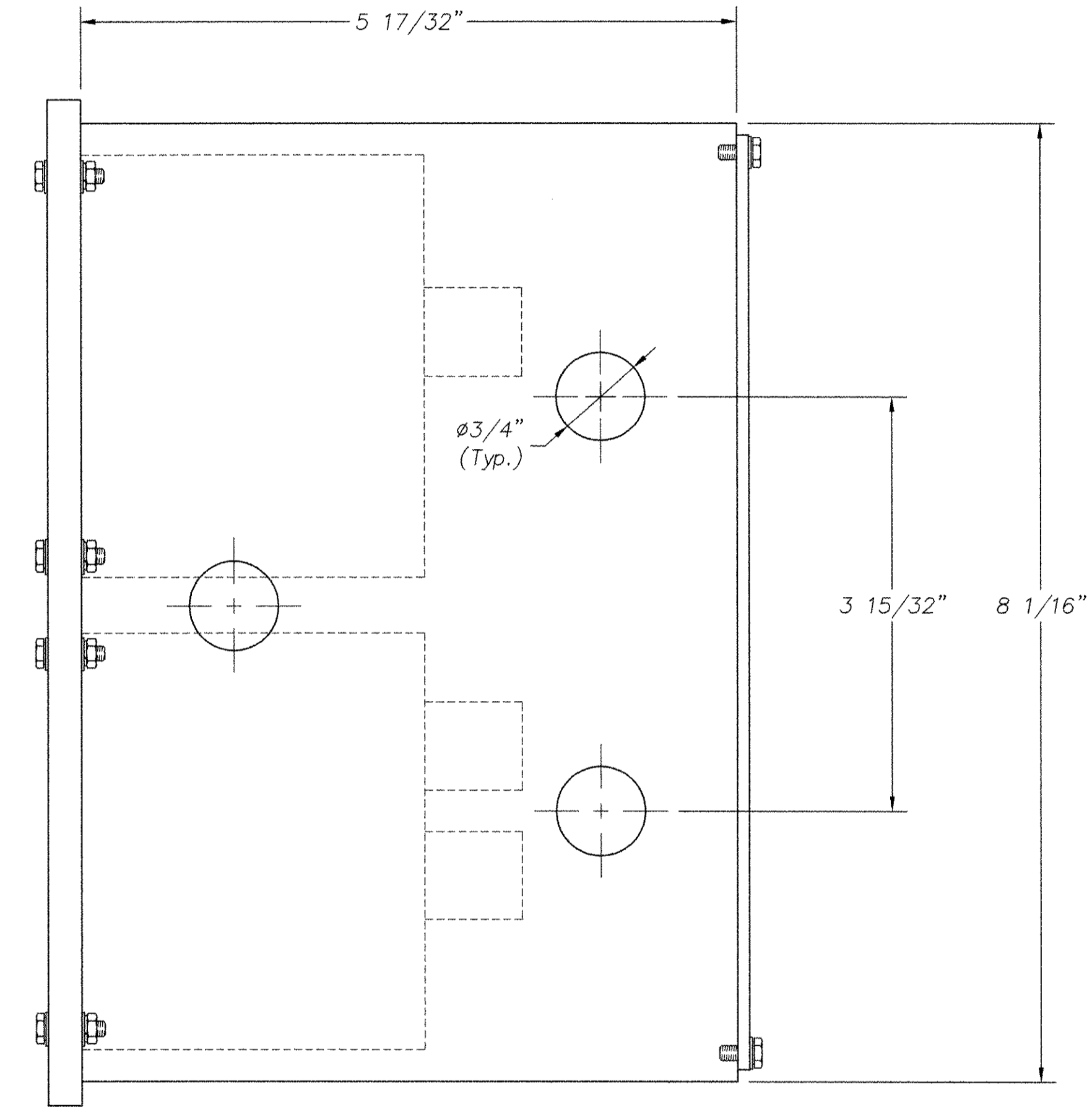
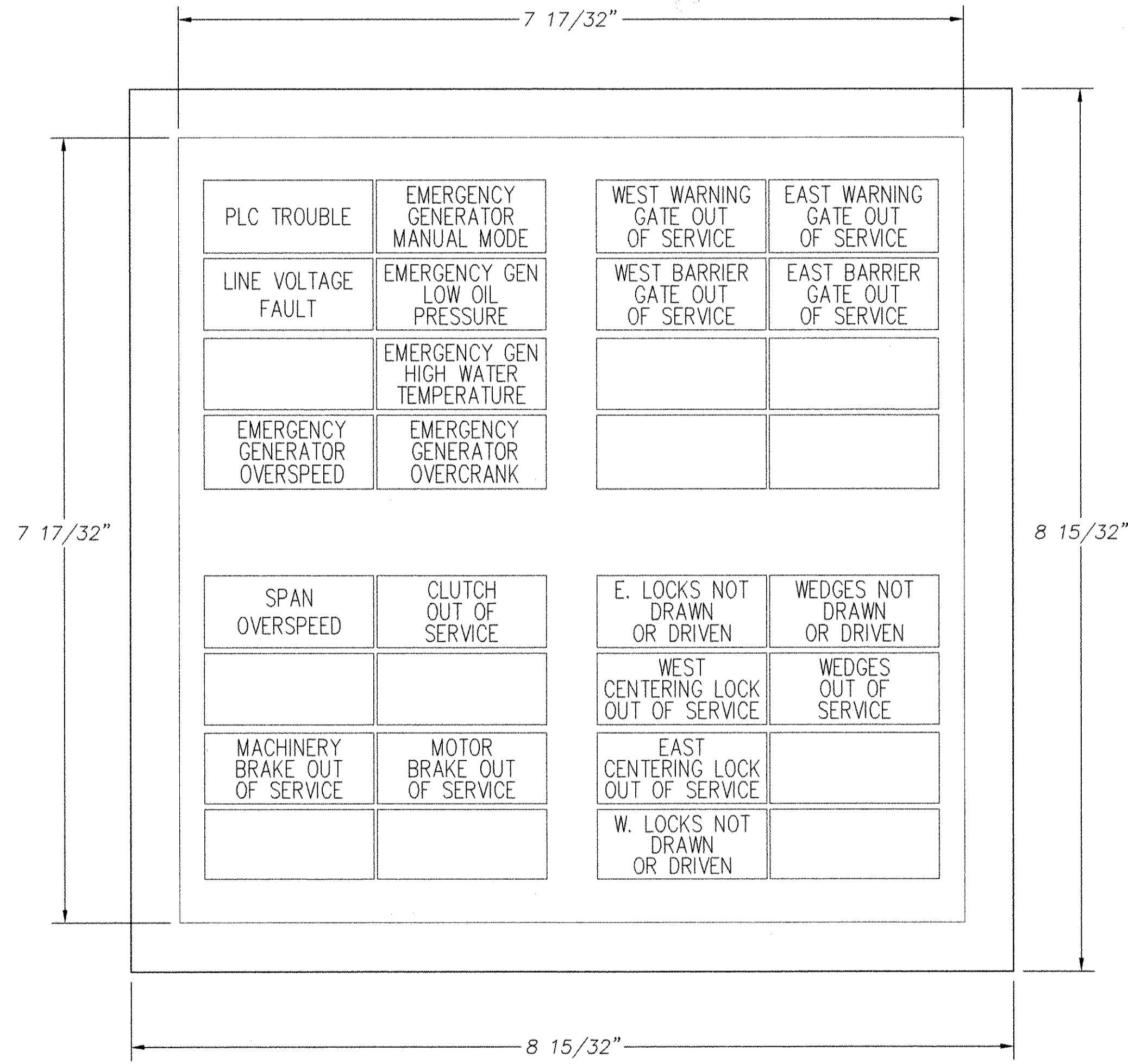
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 DEPARTMENT OF TRANSPORTATION
 BRIDGE DESIGN COLUMBIA, S.C.

CONTROL CONSOLE LAYOUT

REV.			
REV.			
REV.			
QUAN.	GSB	ALB	2-97
DR.	MDC	ALB	2-97
DES.	GSB	ALB	2-97
BY	CHK	DATE	

FILE NO.	ROUTE U.S. 21	COUNTY BEAUFORT	DRAWING NO. E-9
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NOTES:

- Annunciator lamp cabinet shall be flush mounted, with 120 VAC lamps. Lamps may be line voltage or transformer type.
- Window engraving shall accommodate 3 lines of 13 characters per line. Actual engraving text shall be as shown on this drawing. Window arrangements shall be as shown.
- One cabinets shall be furnished complete with lamps and terminal strips, and shall be Riley-Panalarm Series 90 with a Model HSA Horn, or approved equal.
- Connections to the annunciator panel shall be as indicated in the schematic drawings.
- Emergency Generator indicators are activated via relay kit (Onan cat. no. KJ03).

<p>HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i></p> <p>SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.</p> <p>ANNUNCIATOR DETAILS</p>							
				REV.			
				REV.			
REV.							
REVIEWED							
QUAN.	GSB	ALB	2-97				
DR.	MDC	ALB	2-97				
DES.	GSB	ALB	2-97				
BY	CHK.	DATE					
FILE NO.	ROUTE	COUNTY	DRAWING NO.				
	U.S. 21	BEAUFORT	E-10				

DEVICE	FUNCTION	DESCRIPTION	VOLTAGE/COLOR/TEXT	MFR.	CATALOG#
AN-1	ANNUNCIATOR	LAMP CABINET LIGHTBOXES NAMEPLATES	120V	RILEY-PANALARM RILEY-PANALARM	98LBX01D6T 98NP1WH
DTAM	REPORT PRINTER	DATA LABEL ACCESS MODULE		ALLEN BRADLEY	1747-DTAM-E
KS-1	CONTROL CONSOLE POWER	KEY SWITCH - NO SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-31D1 800T-X559JE
KS-2	TRAFFIC SIGNAL BYPASS	KEY SWITCH - SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-H48D1 800T-X559JE
KS-3	WARNING GATES BYPASS	KEY SWITCH - SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-H48D1 800T-X559JE
KS-4	BARRIER GATES BYPASS	KEY SWITCH - SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-H48D1 800T-X559JE
KS-5	WEDGES BYPASS	KEY SWITCH - SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-H48D1 800T-X559JE
KS-6	LOCKS BYPASS	KEY SWITCH - SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-H48D1 800T-X559JE
KS-7	AUX MOTOR LIMIT SWITCH BYPASS	KEY SWITCH - NO SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-H48D1 800T-X559JE
KS-8	SPAN OPERATION BYPASS	KEY SWITCH - NO SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-31D1 800T-X559JE
MS-1	SPAN SPEED & DIRECTION	MASTER SWITCH	120V	HUBBELL	4216-49033-002
MT-2	MAIN MOTOR SPEED	DIGITAL RPM METER	4-20mA / 0-1600RPM	CROMPTON	262-DDKU-HGXS
MT-3	MAIN MOTOR AMPS	DIGITAL CURRENT METER	5A IN / 0-200AAC	CROMPTON	262-DBBU-LSRL-C6-PQ-02
MT-4	MAIN BUS VOLTS	DIGITAL VOLTAGE METER	150V / 0-600VAC	CROMPTON	262-DDWU-PZSJ-C6-PQ-15
MT-5	SPAN POSITION	RESOLVER DECODER		GEMCO	1994R-1-T-H-4
MT-6	SPAN COUNTER	BRIDGE OPERATIONS COUNTER	240VAC/10CPS	KEP	MKS161024VAC-10CPSB
MT-7	AUXILIARY MOTOR AMPS	DIGITAL CURRENT METER	5A IN / 0-200AAC	CROMPTON	262-DBBU-LSRL-C6-PQ-02
MT-8	MAIN BUS WATTS	DIGITAL WATT METER	1mA=200KW	CROMPTON	262-DDTU-FARL-PQ-21
PB-1	ANNUNCIATOR ACKNOWLEDGE	FLUSHHEAD PUSHBUTTON N.O. STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-A2D1 800T-X559E
PB-2	ANNUNCIATOR TEST	FLUSHHEAD PUSHBUTTON N.O. STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-A2D1 800T-X559E
PB-4	HORN	FLUSHHEAD PUSHBUTTON N.O. STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-A2D1 800T-X559E
PB-5	MASTER STOP	EXTENDED HEAD PUSHBUTTON N.O. JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-B2D1 800T-X559JE
PB-6	EMERGENCY STOP	2 POSITION PUSH/PULL BUTTON E-STOP PUSH/PULL CAP AUTOMOTIVE LEGEND PLATE	120V FOR 800T OPERATORS GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY ALLEN BRADLEY	800T-FX6D4 800T-N209RE1 800T-X700E
PB-7	MAIN BREAKER RESET	FLUSHHEAD PUSHBUTTON N.O. STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-A2D1 800T-X559E
PL-1	NAV. LIGHT FAILURE	PILOT LIGHTS - DOUBLE STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559E
PL-2	FENDER LIGHT FAILURE	PILOT LIGHTS - DOUBLE STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559E
PL-3	OVERTRAVEL CLOSING	PILOT LIGHTS - SINGLE	120V	ALLEN BRADLEY	800MB-CQT16X
PL-4	FULLY ALIGNED CLOSING	PILOT LIGHTS - SINGLE	120V	ALLEN BRADLEY	800MB-CQT16X
PL-5	NEARLY ALIGNED CLOSING	PILOT LIGHTS - SINGLE	120V	ALLEN BRADLEY	800MB-CQT16X
PL-6	NEARLY CLOSED	PILOT LIGHTS - SINGLE	120V	ALLEN BRADLEY	800MB-CQT16X
PL-7	NEARLY OPEN	PILOT LIGHTS - SINGLE	120V	ALLEN BRADLEY	800MB-CQT16X
PL-8	FULLY OPEN	PILOT LIGHTS - SINGLE	120V	ALLEN BRADLEY	800MB-CQT16X
PL-9	OVERTRAVEL OPENING	PILOT LIGHTS - SINGLE	120V	ALLEN BRADLEY	800MB-CQT16X
PL-10	GENERATOR AUTO	PILOT LIGHTS - SINGLE STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-CQT16X 800T-X559E
PL-11	GENERATOR BATTERY GOOD	PILOT LIGHTS - SINGLE STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-CQT16X 800T-X559E
PL-12	POWER SOURCE INDICATOR	PILOT LIGHTS - DOUBLE STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559E
PL-13	TRAFFIC SIGNAL STATUS	PILOT LIGHTS - DOUBLE JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559JE

DEVICE	FUNCTION	DESCRIPTION	VOLTAGE/COLOR/TEXT	MFR.	CATALOG#
PL-14	EAST WARNING GATE STATUS	PILOT LIGHTS - DOUBLE JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559JE
PL-15	WEST WARNING GATE STATUS	PILOT LIGHTS - DOUBLE JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559JE
PL-16	EAST BARRIER GATE STATUS	PILOT LIGHTS - DOUBLE JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559JE
PL-17	WEST BARRIER GATE STATUS	PILOT LIGHTS - DOUBLE JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559JE
PL-18	WEDGES STATUS	PILOT LIGHTS - DOUBLE JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559JE
PL-19	EAST LOCK STATUS	PILOT LIGHTS - DOUBLE JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559JE
PL-20	WEST LOCK STATUS	PILOT LIGHTS - DOUBLE JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559JE
PL-21	MACHINERY BRAKE STATUS	PILOT LIGHTS - DOUBLE JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559JE
PL-22	MOTOR BRAKE STATUS	PILOT LIGHTS - DOUBLE JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-DTL10XX 800T-X559JE
PL-26	TRAFFIC SIGNAL AMBER	PILOT LIGHT - SINGLE JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800MB-CQT16X 800T-X559JE
SS-1	NAVIGATION LIGHTS	3 POSITION KNOB SWITCH - NO SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-J2A 800T-X559JE
SS-2	CEILING LIGHT	2 POSITION KNOB - NO SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-H2A 800T-X559JE
SS-3	GENERATOR MODE	2 POSITION KNOB - NO SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-H2A 800T-X559JE
SS-4	GENERATOR BREAKER RESET/TRIP	3 POSITION KNOB SWITCH - SPRING RETURN TO CENTER JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-J91A 800T-X559JE
SS-5	VOLTMETER PHASE SELECTION	VOLTMETER PHASE SELECTION SWITCH	120V	ENTRELEC	VY 10/T/V11/ST/C88
SS-6	TRAFFIC SIGNAL	3 POSITION KNOB SWITCH - SPRING RETURN TO CENTER STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-J91A 800T-X559E
SS-7	EAST WARNING GATE	3 POSITION KNOB SWITCH - SPRING RETURN TO CENTER STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-J91A 800T-X559E
SS-8	WEST WARNING GATE	3 POSITION KNOB SWITCH - SPRING RETURN TO CENTER STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-J91A 800T-X559E
SS-9	EAST BARRIER GATE	3 POSITION KNOB SWITCH - SPRING RETURN TO CENTER STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-J91A 800T-X559E
SS-10	WEST BARRIER GATE	3 POSITION KNOB SWITCH - SPRING RETURN TO CENTER STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-J91A 800T-X559E
SS-11	WEDGE CONTROL	3 POSITION KNOB SWITCH - SPRING RETURN TO CENTER STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-J91A 800T-X559E
SS-12	CONTROL LOCK	3 POSITION KNOB SWITCH - SPRING RETURN TO CENTER STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-J91A 800T-X559E
SS-14	MACHINERY BRAKE	2 POSITION KNOB - NO SPRING RETURN STANDARD LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-H2A 800T-X559E
SS-16	AUXILIARY MOTOR	2 POSITION KNOB - NO SPRING RETURN JUMBO LEGEND PLATE	120V GREY W/CUSTOM TEXT	ALLEN BRADLEY ALLEN BRADLEY	800T-H2A 800T-X559JE
SS-17	ROOM LIGHTS	DIMMER - SLIDE TO OFF	120V GRAY	NOVA CONTROLS	NF-10-GR

NOTES:

1. Refer to Drawing E-9 for Control Console Layout.
2. All devices shall be as specified, or approved equal.

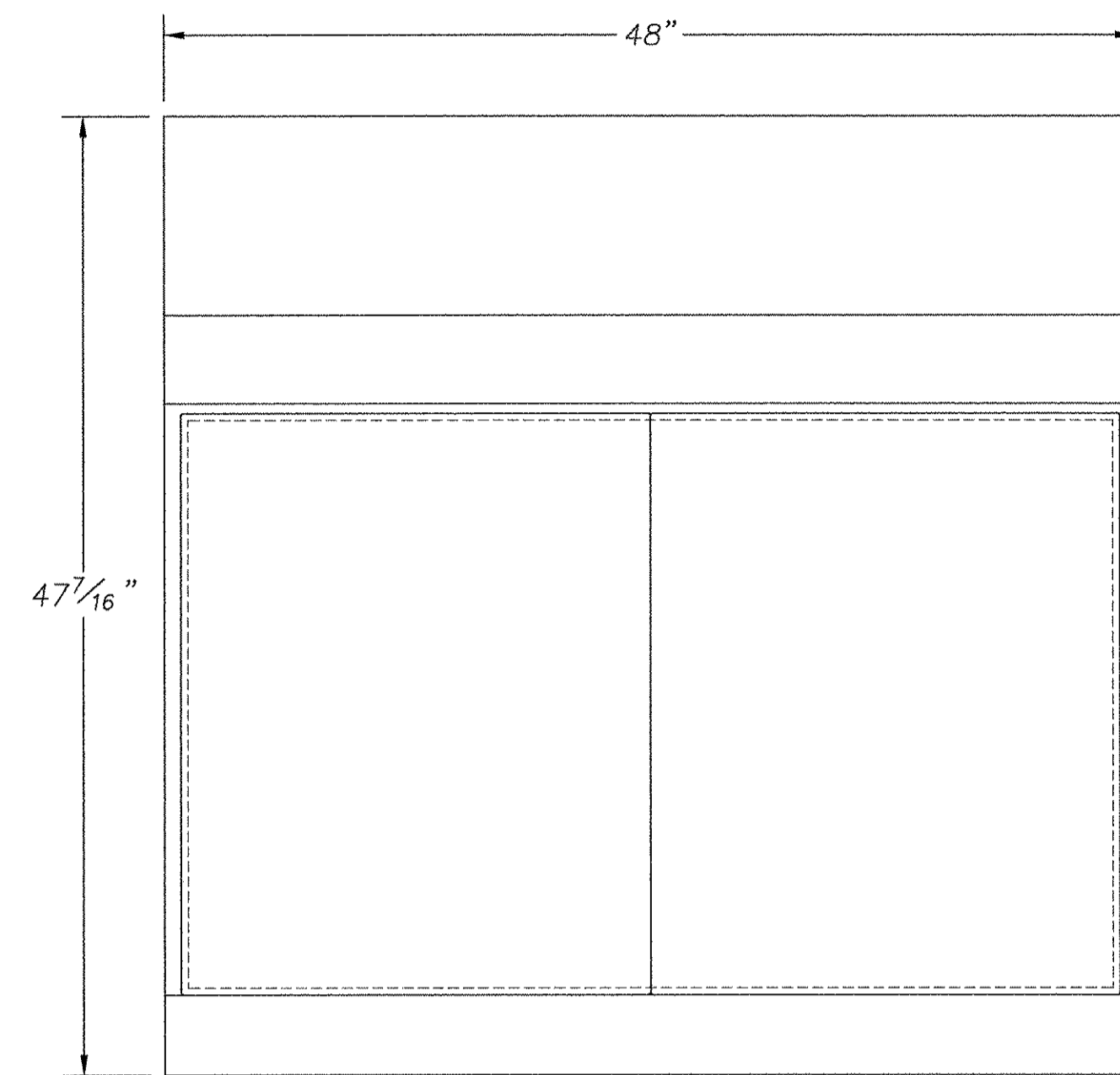
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BRIDGE DESIGN COLUMBIA, S.C.

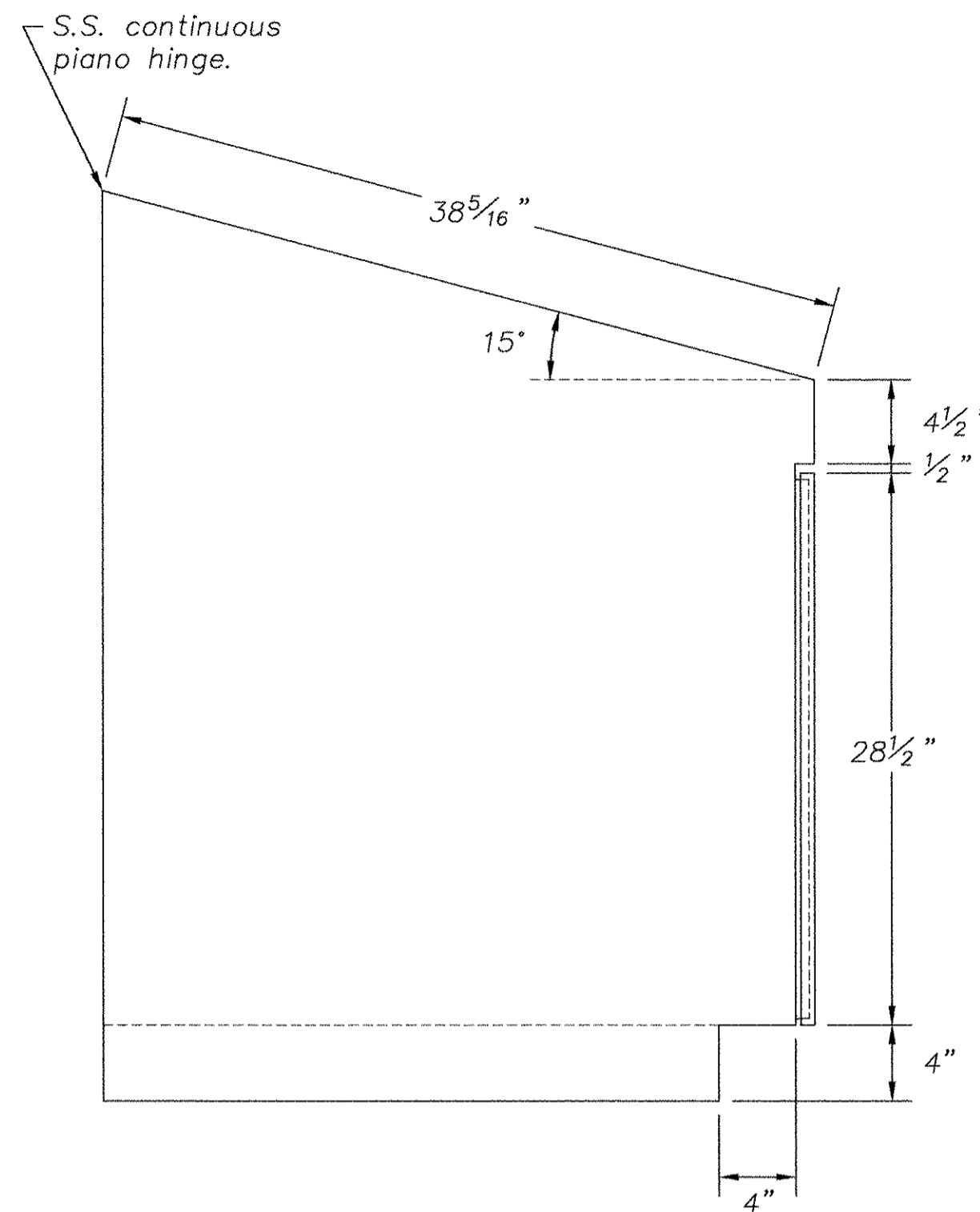
**CONTROL CONSOLE
DEVICE LIST**

REV.					
REV.					
REV.					
REVIEWED					
QUAN.	GSB	ALB	2-97		
DR.	MDC	ALB	2-97		
DES.	GSB	ALB	2-97		
BY	CHK	DATE			
FILE NO.	ROUTE	COUNTY	DRAWING NO.		
	U.S. 21	BEAUFORT	E-11		

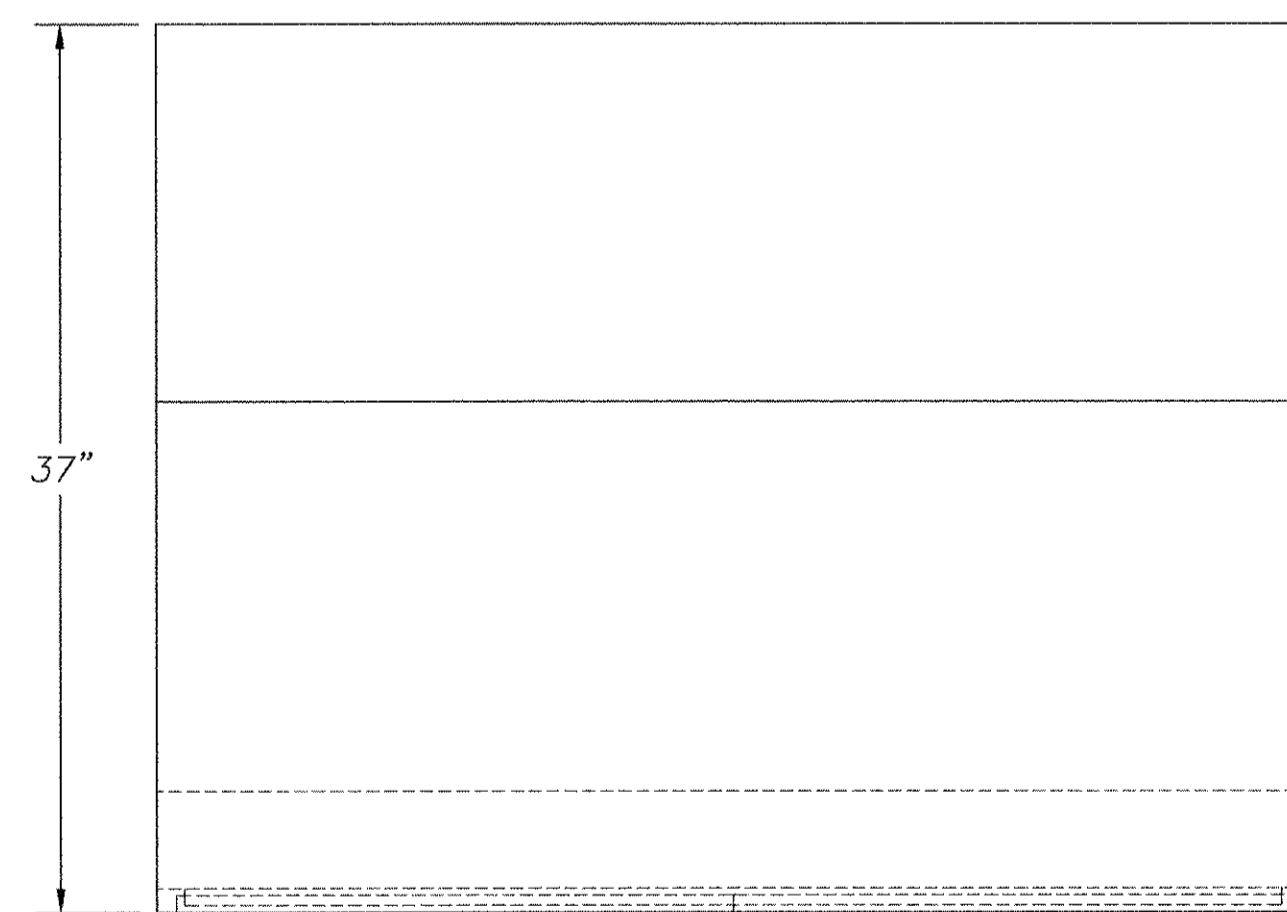
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	SC	BEAUFORT		U.S. 21	88	115



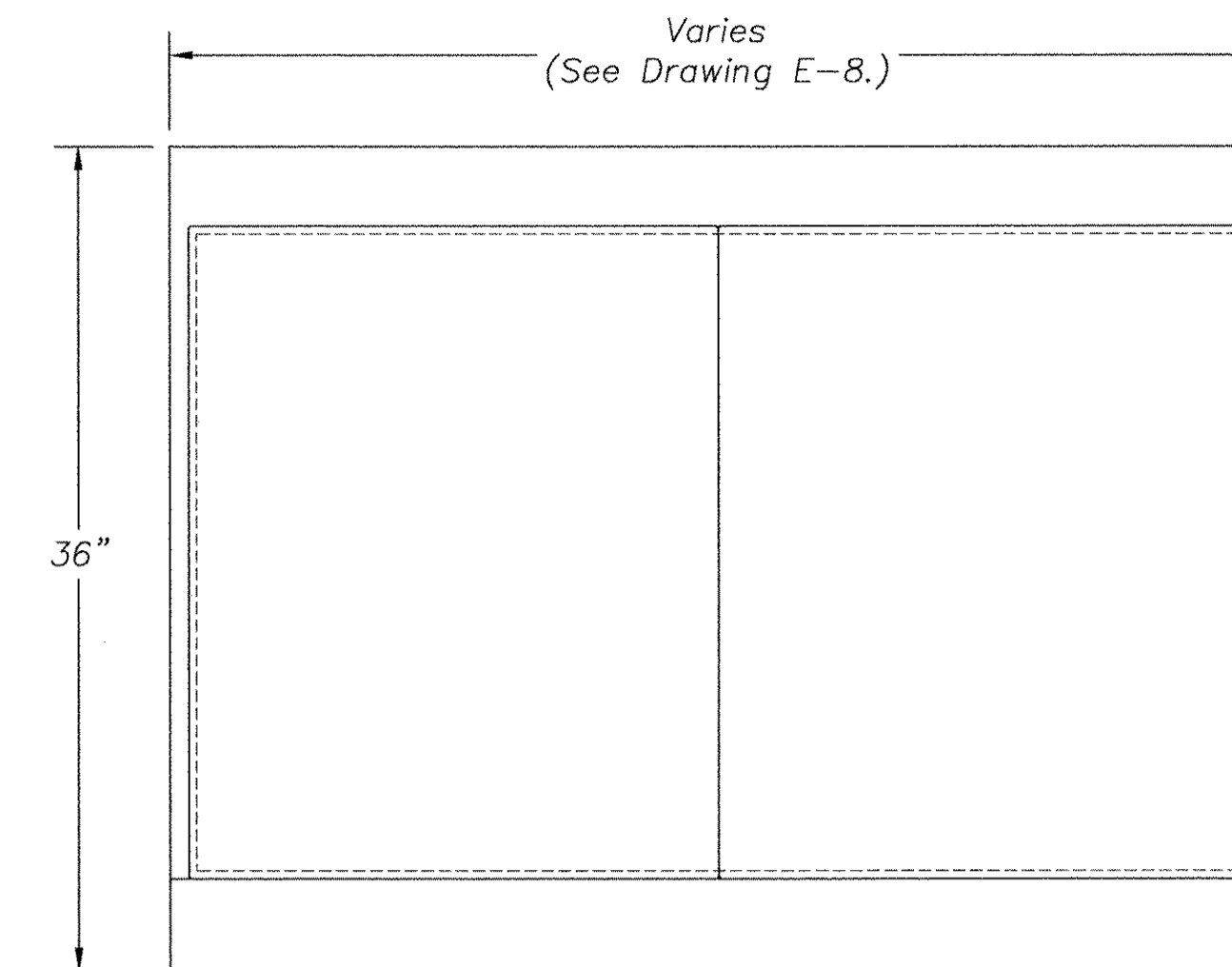
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NOT TO SCALE



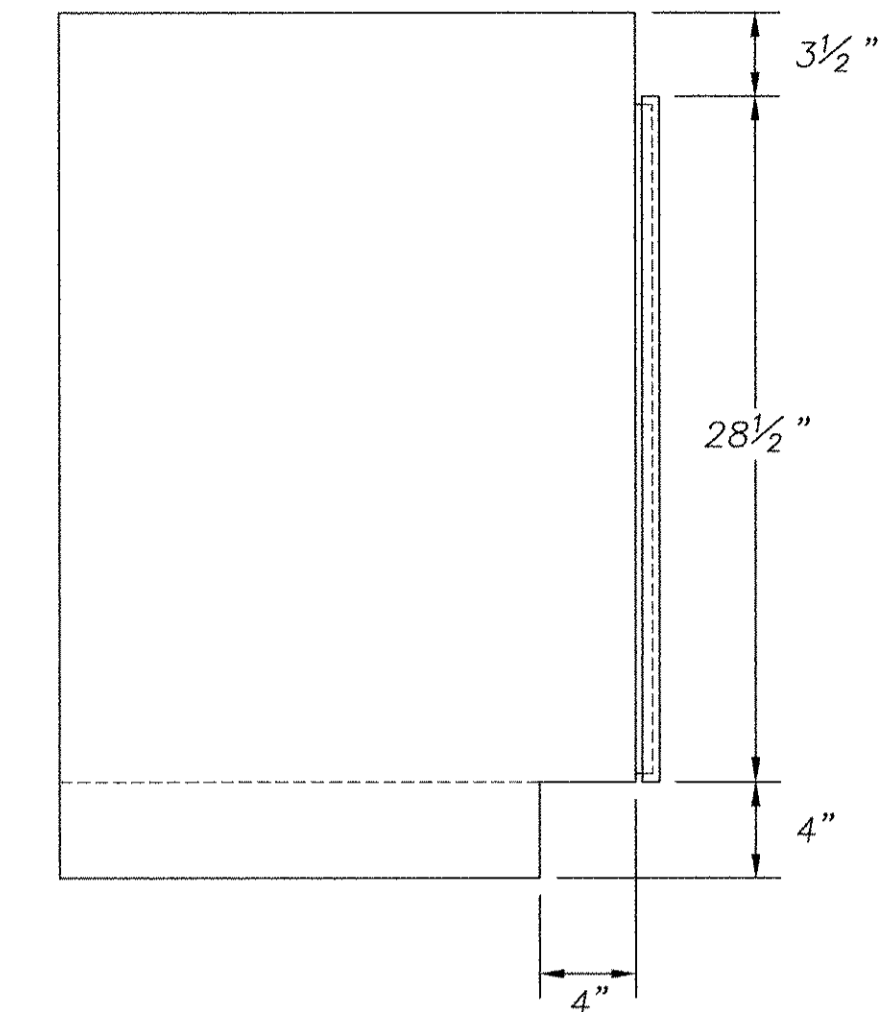
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LEFT ELEVATION**
NOT TO SCALE



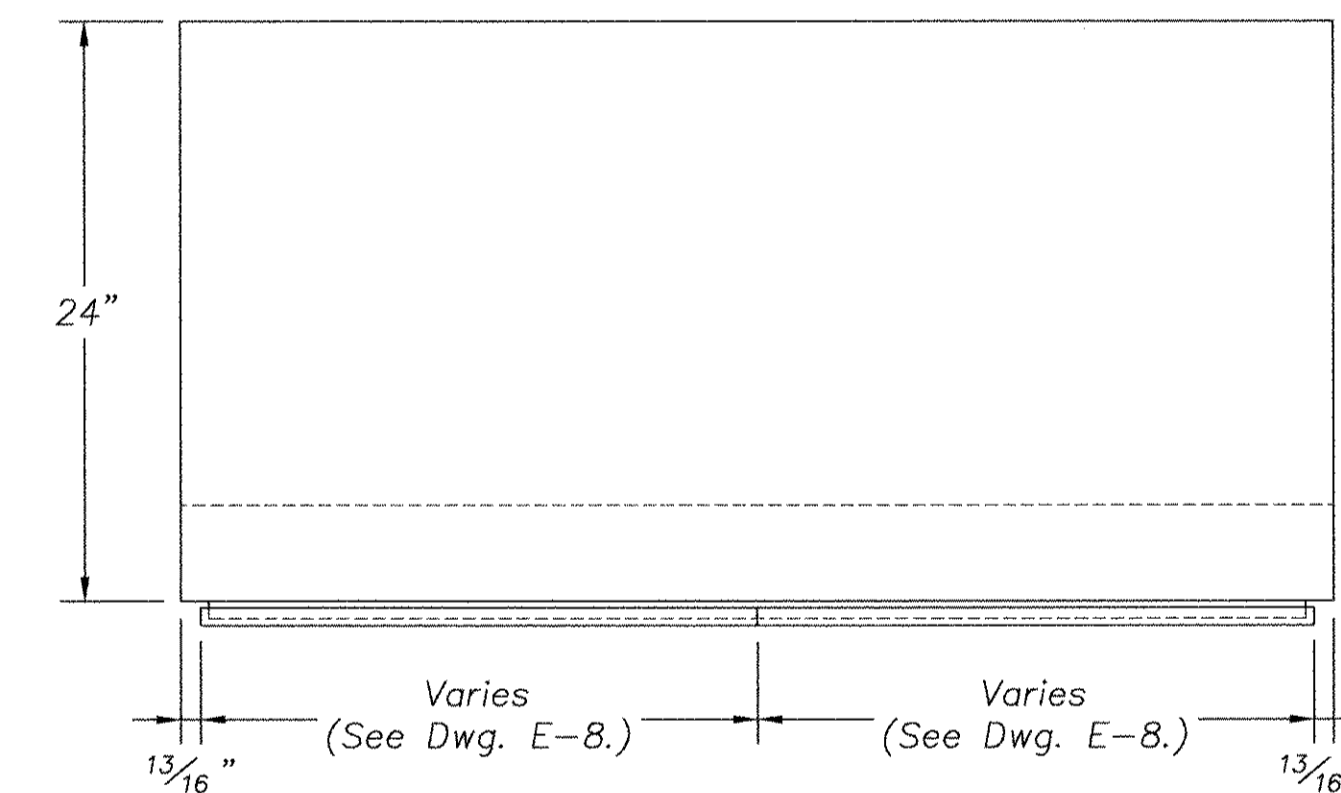
**CONTROL CONSOLE
PLAN VIEW**
NOT TO SCALE



**ELECTRICAL CABINET
FRONT ELEVATION**
NOT TO SCALE



**ELECTRICAL CABINET
LEFT ELEVATION**
NOT TO SCALE



**ELECTRICAL CABINET
PLAN VIEW**
NOT TO SCALE

NOTES:

- For Control Console desktop panel details, see drawing entitled "Control Console Layout".
- Control Console Cabinet shall be constructed of 11 gauge S.S.
- Cabinet doors shall be flush type with 3-point latching system. Door handle shall be flush Southco type.
- Cabinet shall have neoprene gasketing.
- Cabinet shall have continuous piano type hinge between the desk top panels and base.
- Desk top panels shall be made of 1/8" thick 302 stainless steel with No. 4 satin finish on exposed side.
- Console desk top panels shall have a 1-inch return lip on the 3 sides except where hinged.
- All corners shall be welded and ground to a smooth round finish.
- Pockets shall be provided on the inside of the cabinet doors to hold instruction manuals and drawings.
- Construction of the electrical Cabinet shall be of the same materials as the control console cabinet, including the same type of 3-point door latching system and handles.
- Desk top shall be hinged so that it opens upward and backward. Hardware shall be supplied to safely lock the console top in the open position for servicing.

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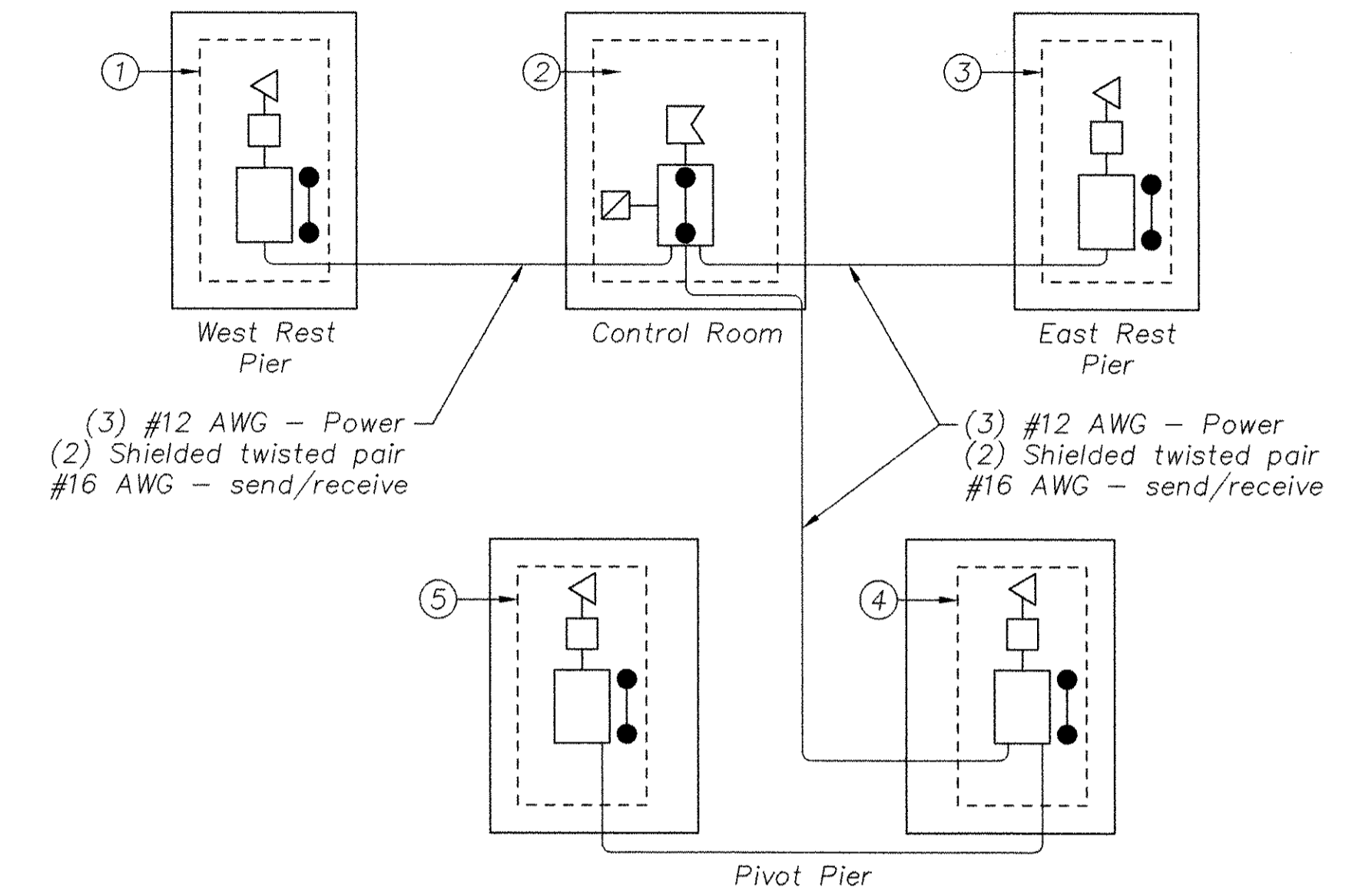
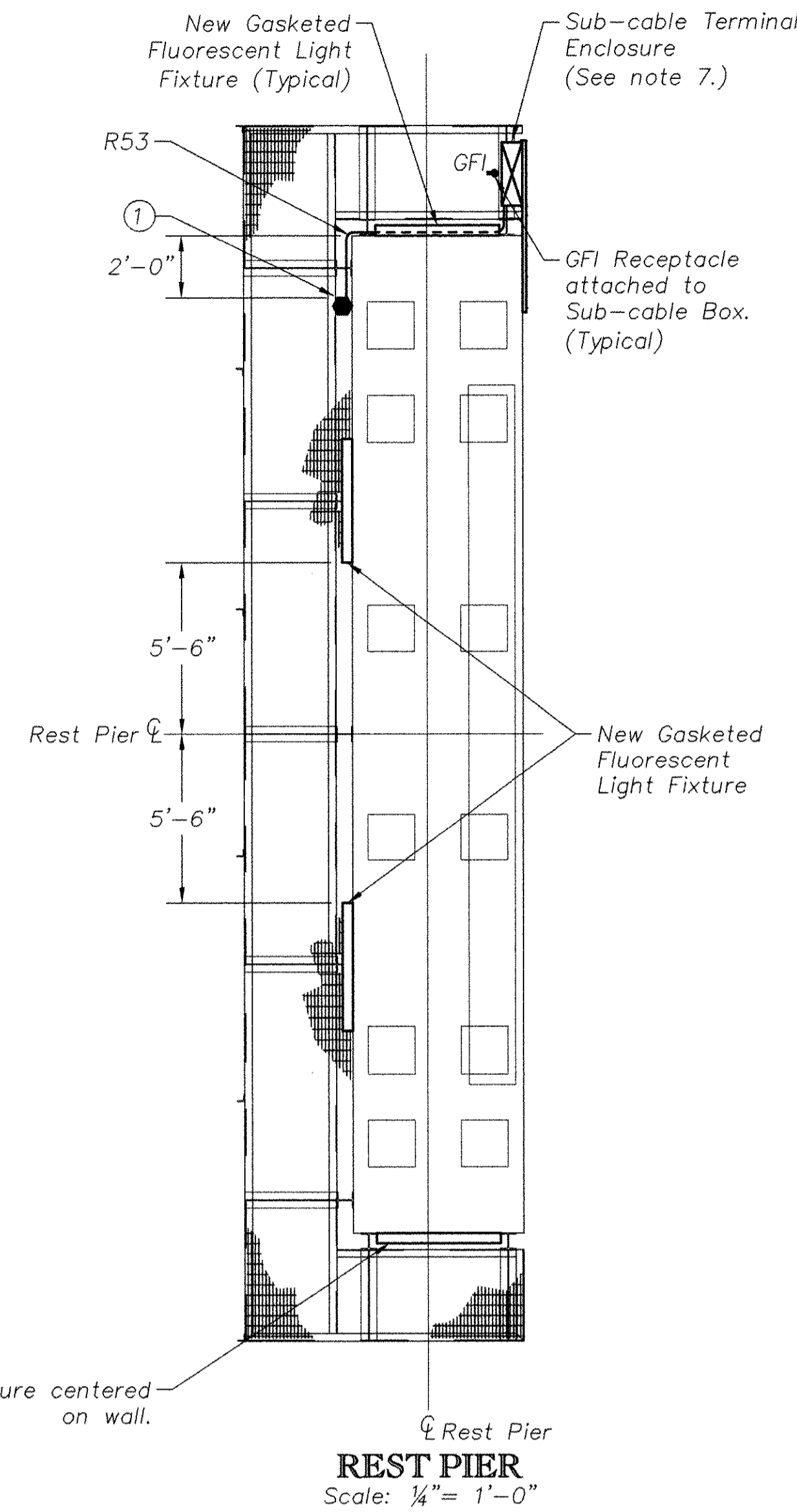
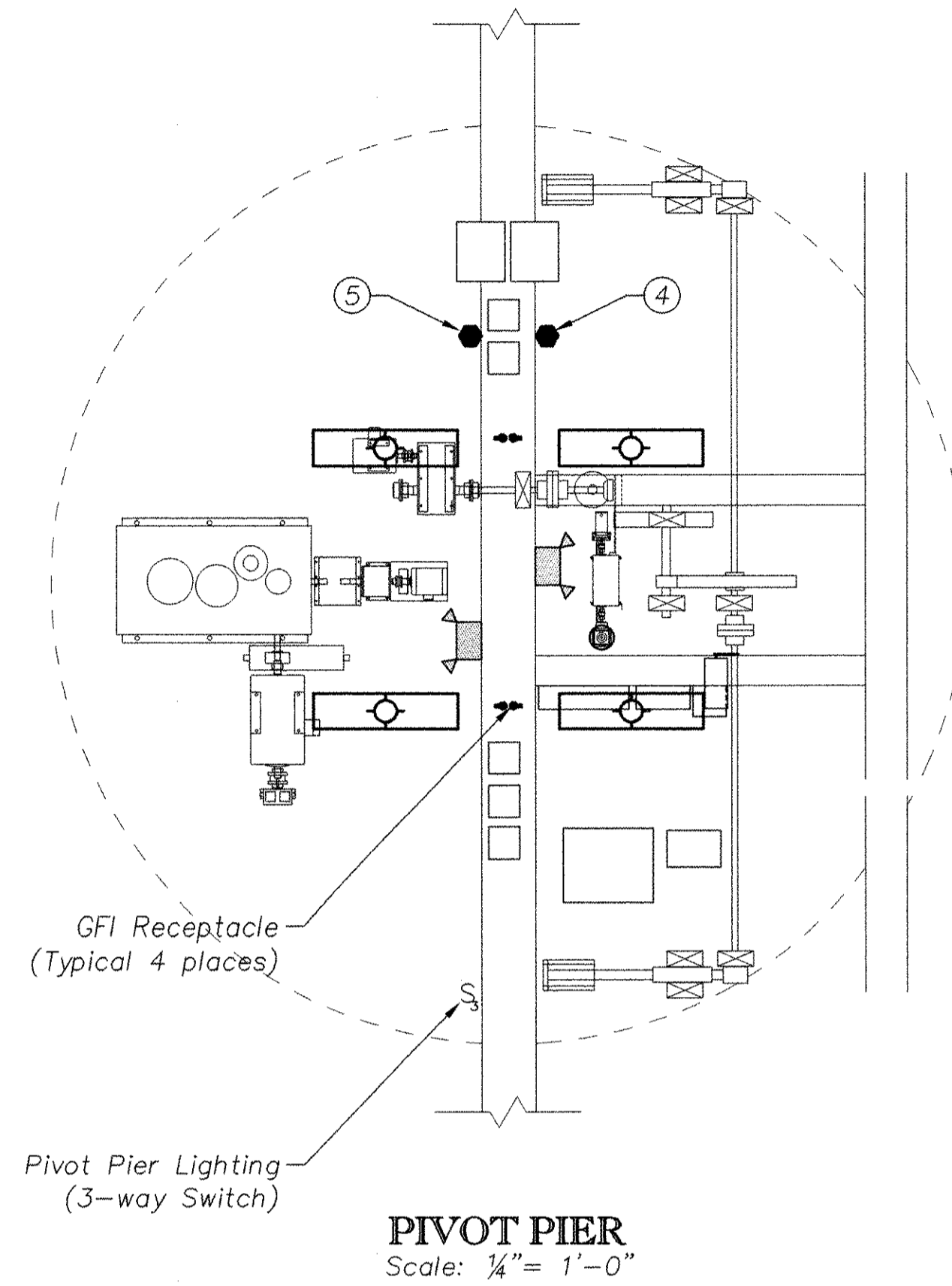
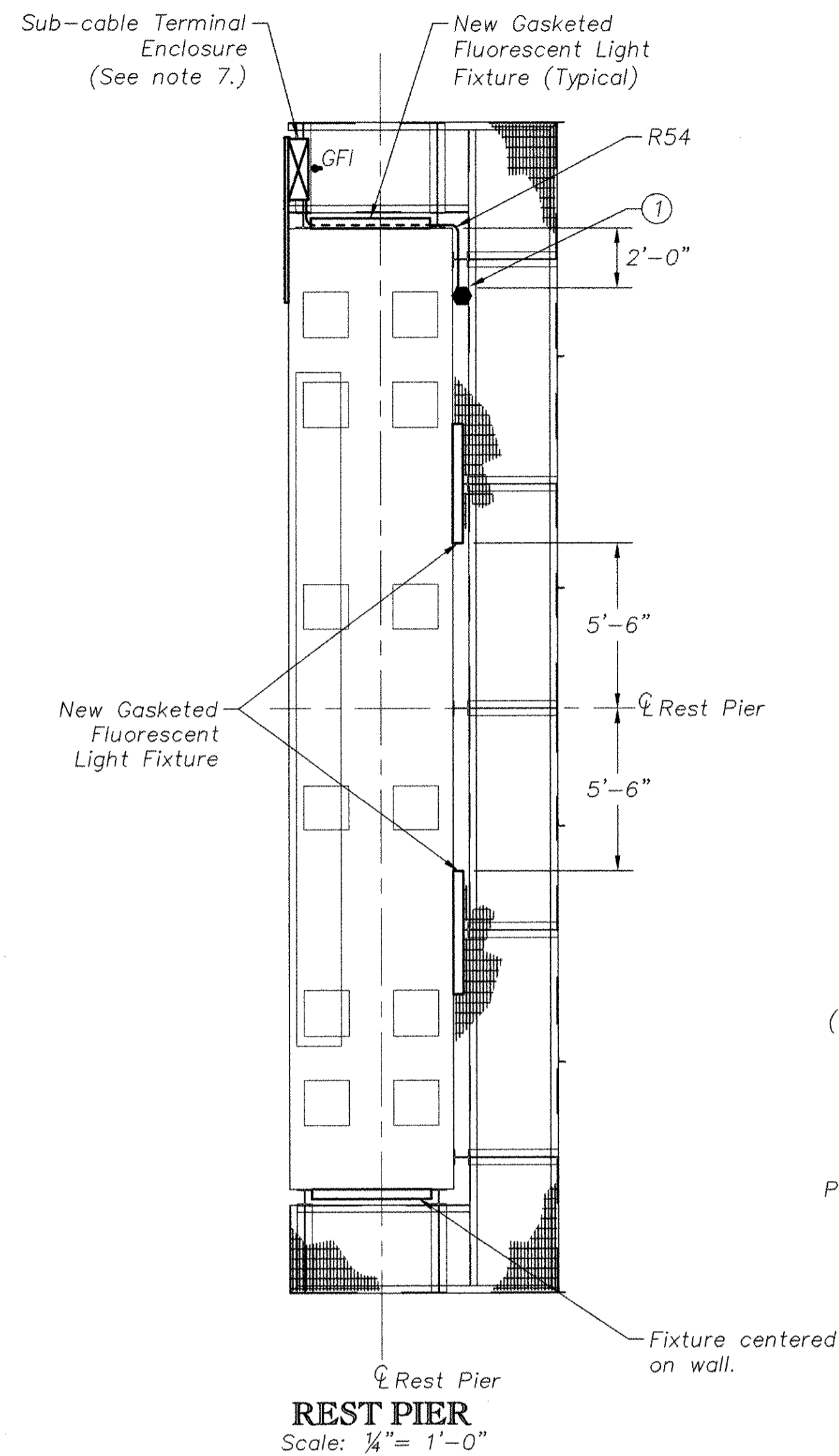
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

**ELECTRICAL
CABINET DETAILS**

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	GSB	ALB	2-97
DR.	MDC	ALB	2-97
DES.	GSB	ALB	2-97
	BY	CHK.	DATE

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-12

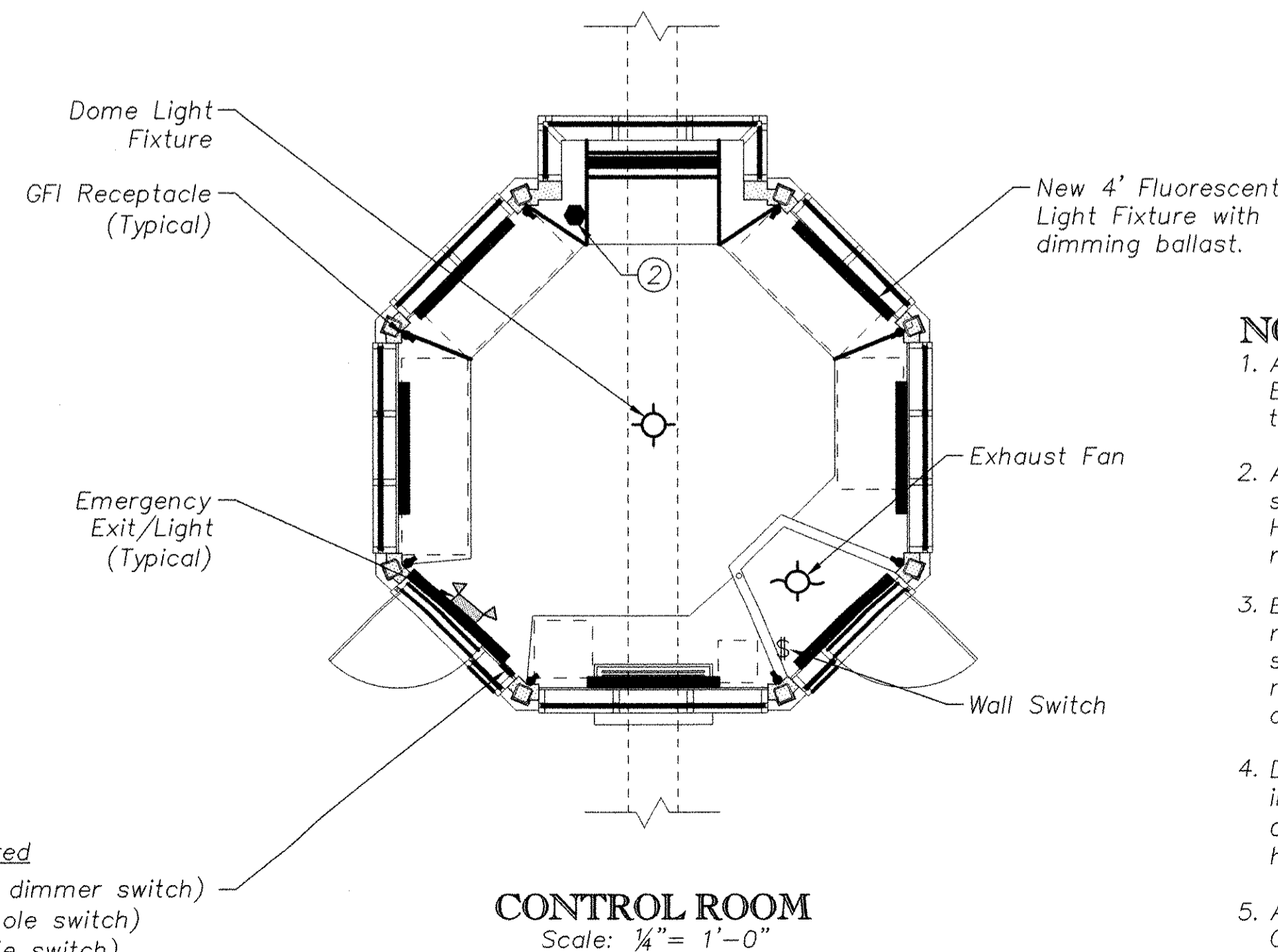
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	89	115



INTERCOM SYSTEM SCHEMATIC
Not to Scale

LEGEND (INTERCOM SYSTEM)

- 13350 Speaker
- 730-104-TS Handset
- 726-102-SK-TR-TS Desktop Handset
- 13304-002 Speaker
- 13314-002 Driver
- 411A Mounting Assembly
- 305-001-TS Line Balance
- Equipment Assembly As Denoted



NOTES:

- All equipment shall be located as shown on plans. Equipment location may be adjusted as necessary to accommodate existing field conditions.
- All intercom equipment located on the rest pier shall be surface mounted using expansion anchors. Handset shall be placed approximately 54" from rest pier floor.
- Equipment located on the pivot pier shall be mounted in the approximate location shown and shall be attached by means of field drilling where necessary. The handset shall be placed approximately 54" from pivot pier floor.
- Due to the potentially wet locations of the intercom equipment on the rest and pivot piers, all shall be installed in tropicalized weatherproof housings.
- All equipment shown on this sheet is based on Gaitronics Corporation's 700 Series Page Party System. A system with equal physical and operational characteristics may be submitted for approval.
- Attach speaker in control house to house frame closest to desktop handset.
- For exact location and mounting of sub-cable terminal boxes, see sheet S-13.
- Harbor River layout is shown on this sheet. Lady's Island is similar and shall be installed accordingly.
- The Pivot Pier Lighting Switches shall also control the platform area lights.
- An in-floor recessed quadruplex receptacle shall be installed under the back of the Operator's Desk.
- Lighting and receptacle circuits shall be connected to Electrical Panel LP as indicated on Drawing E-3.

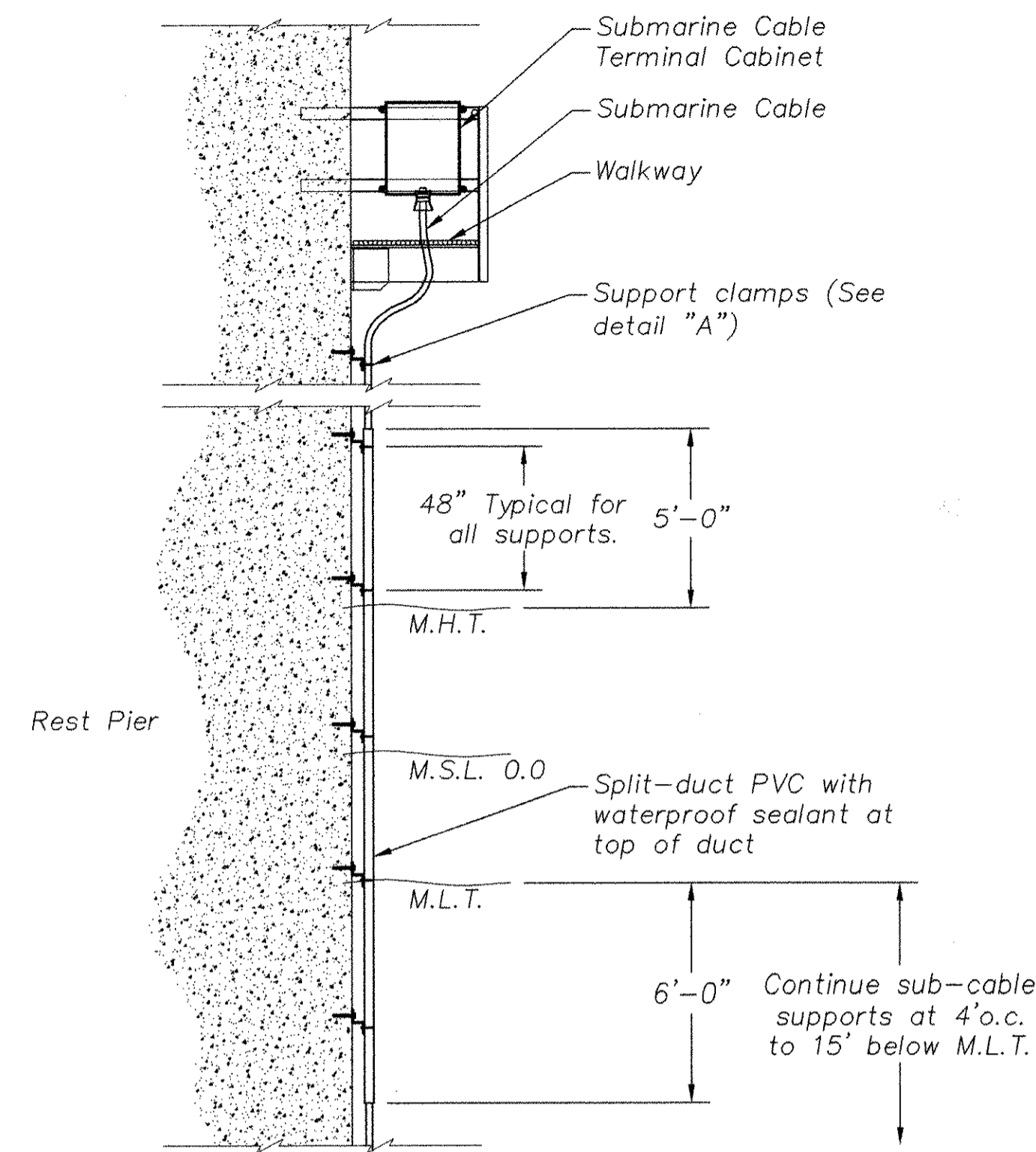
HNTB ARCHITECTS ENGINEERS PLANNERS
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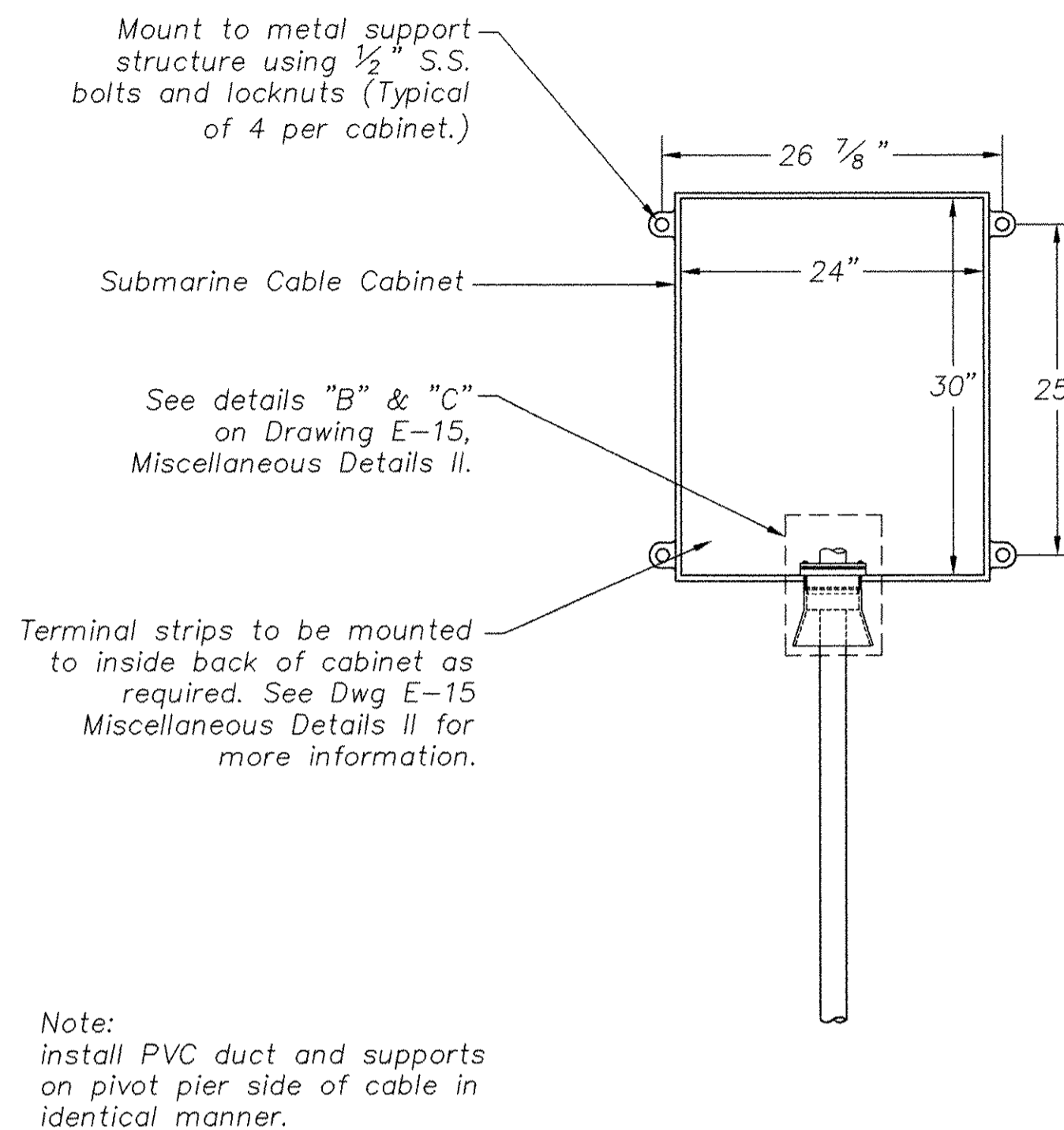
LIGHTING AND INTERCOM SYSTEM DETAILS

REV.	BY	CHK.	DATE
REVIEWED			
QUAN.	GSB	ALB	2-97
DR.	MDC	ALB	2-97
DES.	GSB	ALB	2-97
BY	CHK.	DATE	

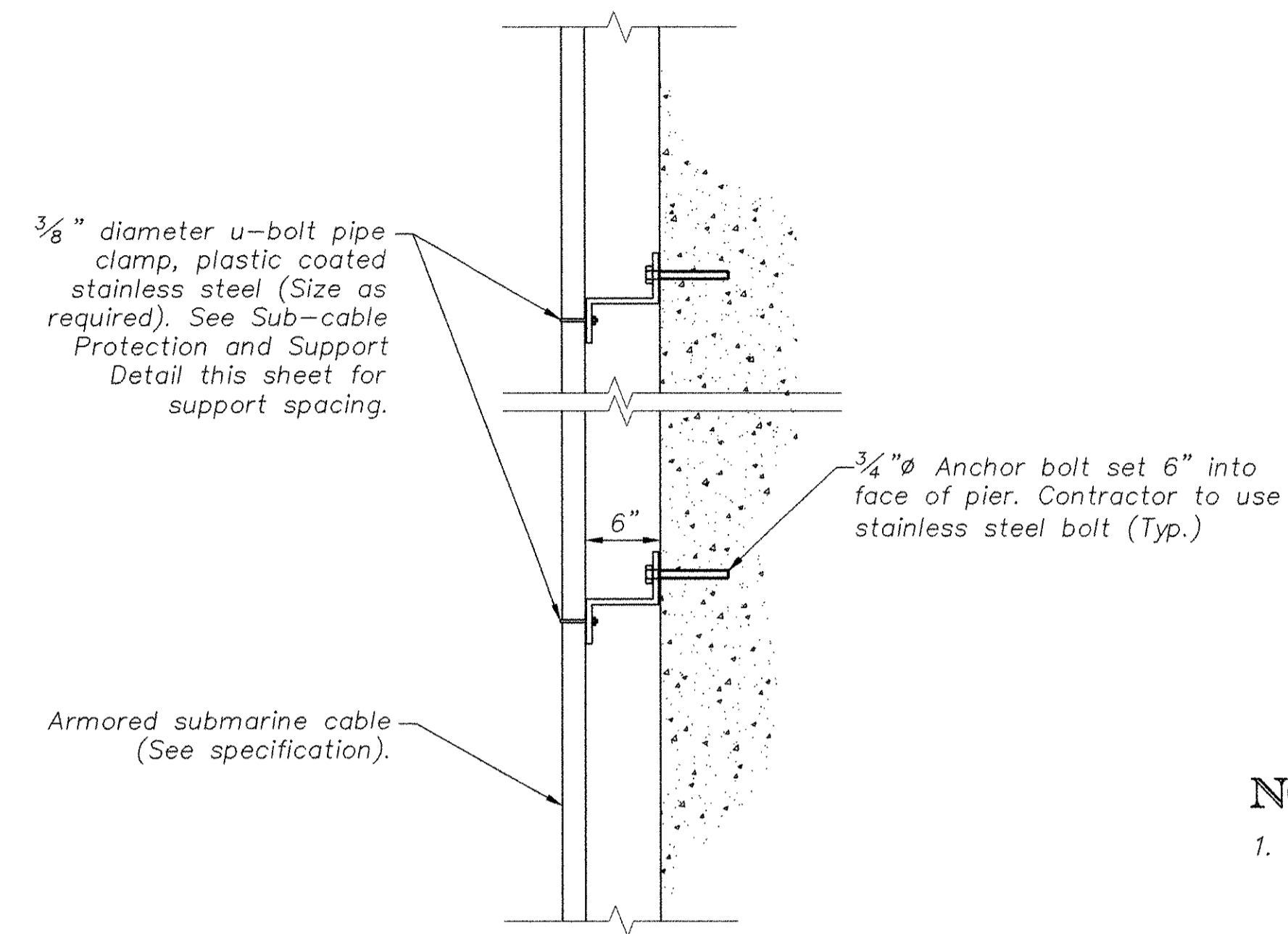
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-13



TYPICAL SUB-CABLE PROTECTION AND SUPPORT DETAIL
Scale: $\frac{3}{16}'' = 1''$



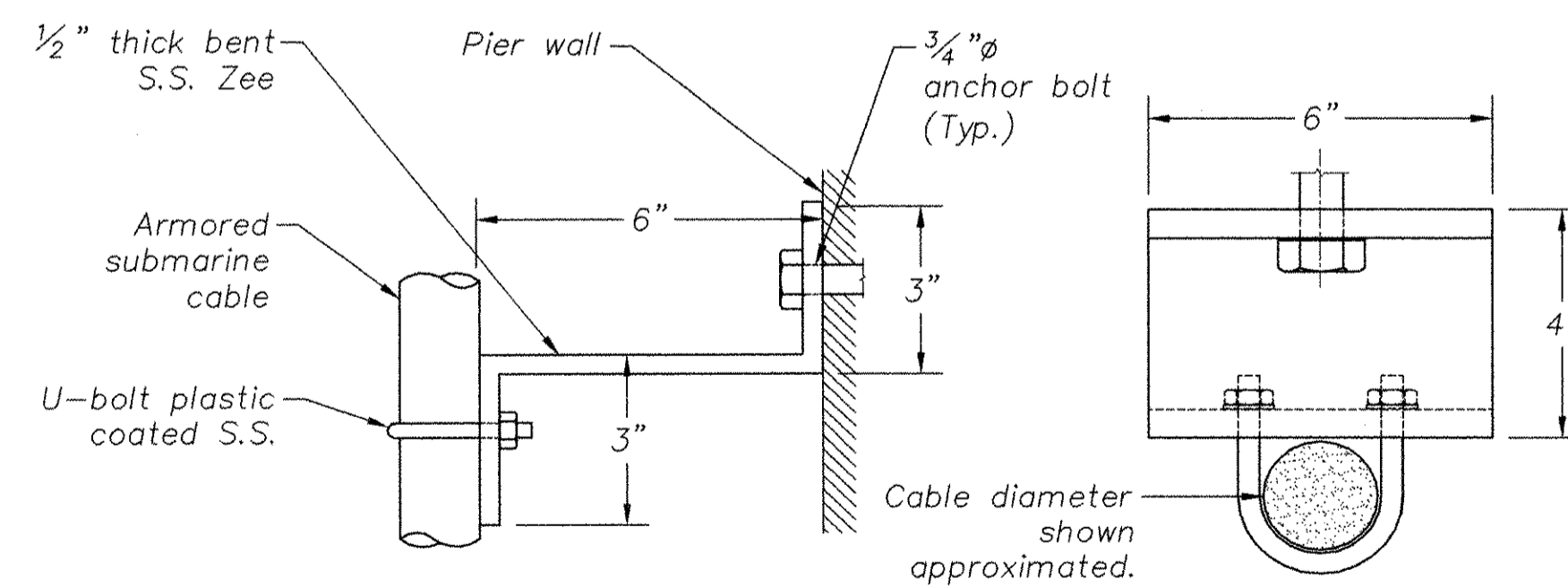
REST PIER TERMINAL CABINET ELEVATION
(Shown with cover removed, for cover details see Drawing E-15 Miscellaneous Details II)
Scale: 1" = 1'-0"



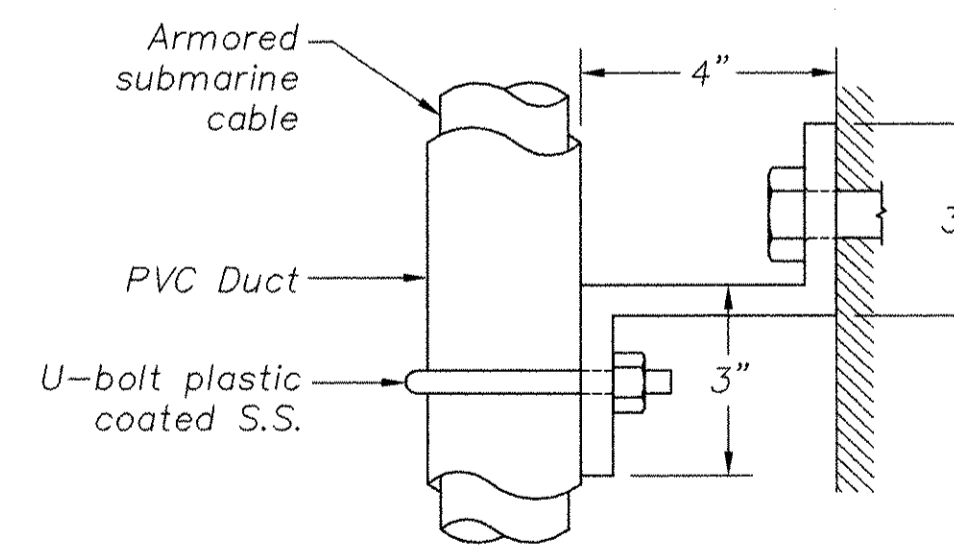
DETAIL "A" PARTIAL ELEVATION
Scale: $\frac{3}{16}'' = 1''$

NOTES:

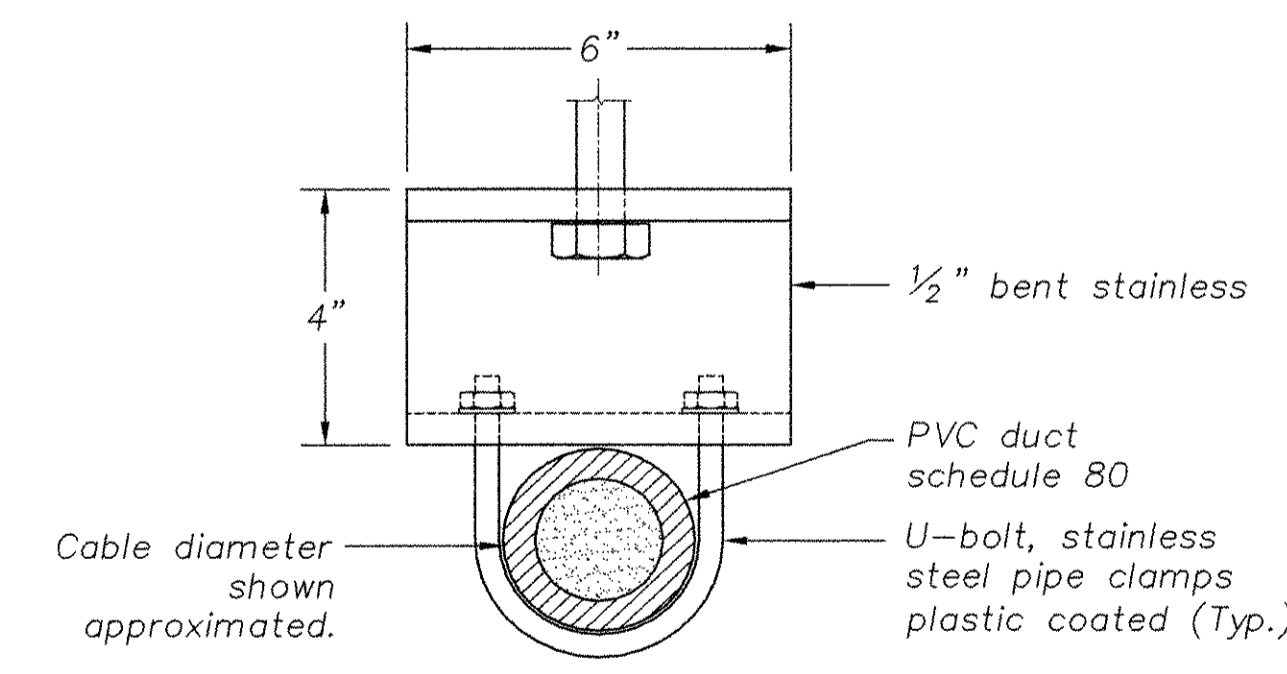
- Submarine cable terminal cabinets shall be O-Z/Gedney hinged cover cast aluminum, Cat. No. YW-242412A, or approved equal. All four terminal cabinets shall contain neoprene gaskets all around. The contractor shall order the cabinets with accordance with the connecting raceways and the determined size of the submarine cables and fittings.
- Each terminal cabinet and electrical cabinet shall contain Allen-Bradley series 1492-PD3113, BE, CA1L, CE2 terminal strips, or approved equal, with all points identified on the strip in type-face. Point identifications shall be coordinated to reflect the as-built drawings to be provided by the contractor at the completion of construction. The drawings shall be located within the door pocket of the control console.
- The front cover of each terminal cabinet shall be labeled with Textolite nameplates as shown in the plans.
- Sub-cable terminal cabinet SC-1 is an identical enclosure to SC-2. The internal layout and sub-cable installation location shall be field adjusted to accommodate the vertical installation of cabinet SC-1.
- Sub-cable terminal cabinet SC-3 is an identical enclosure to SC-4. The internal layout and sub-cable installation location shall be field adjusted to accommodate the vertical installation of cabinet SC-3.
- Layout of terminal cabinets shown is diagrammatic and may be adjusted as necessary to accommodate existing field conditions.
- Rest pier terminal cabinet which contains both incoming service conductors as well as other power and control conductors, must have a barrier installed to isolate incoming service terminals.
- For more details regarding sub-cable and terminal cabinets, see Dwg E-15 Miscellaneous Details II.



SUBMARINE CABLE SUPPORT ASSEMBLY
Not to scale



PVC SPLIT DUCT SUPPORT ASSEMBLY
Not to scale

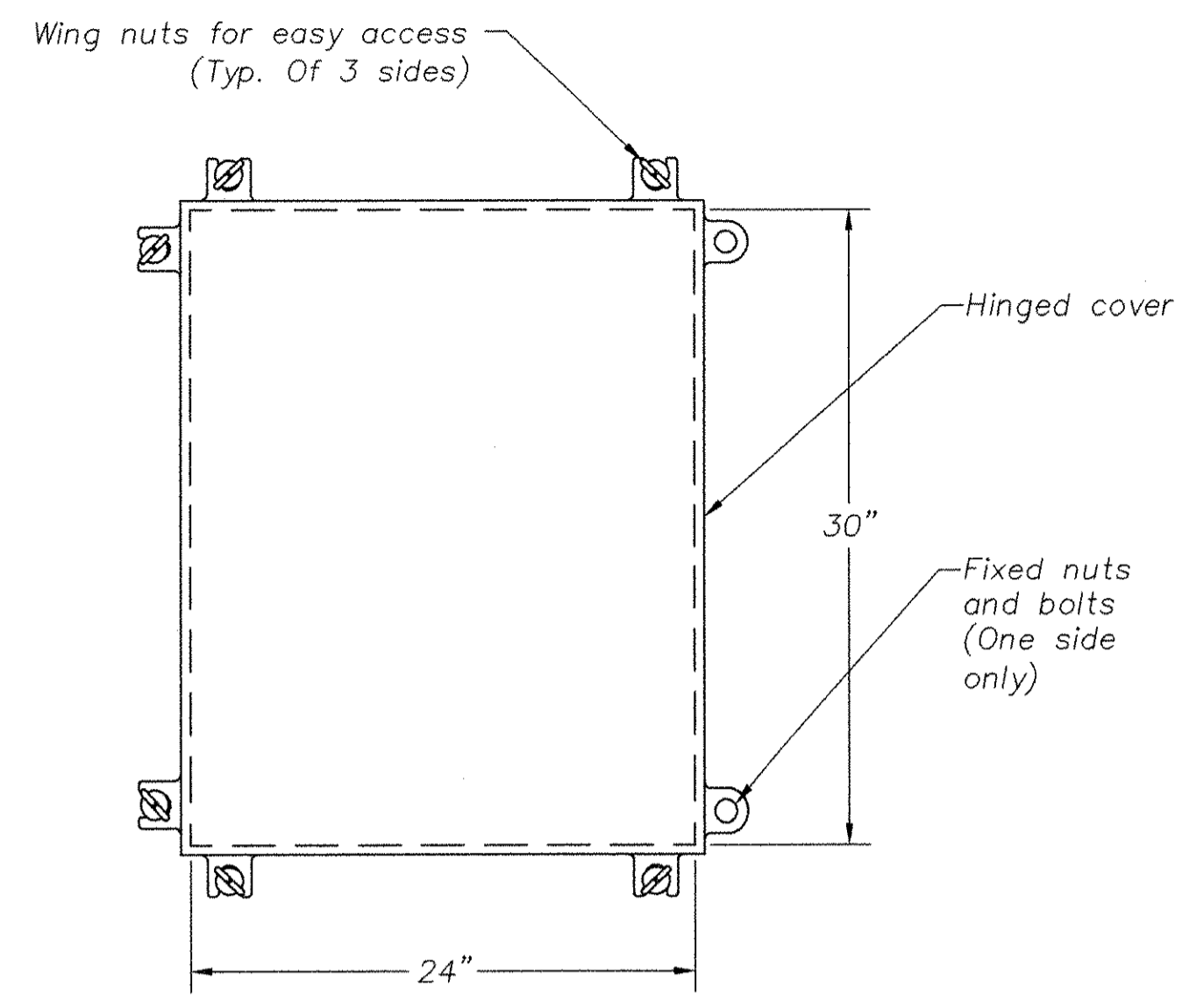


HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	GSB	ALB	2-97
DR.	MDC	ALB	2-97
DES.	GSB	ALB	2-97
BY	CHK	DATE	
FILE NO.		ROUTE	COUNTY
		U.S. 21	BEAUFORT
		DRAWING NO.	
		E-14	

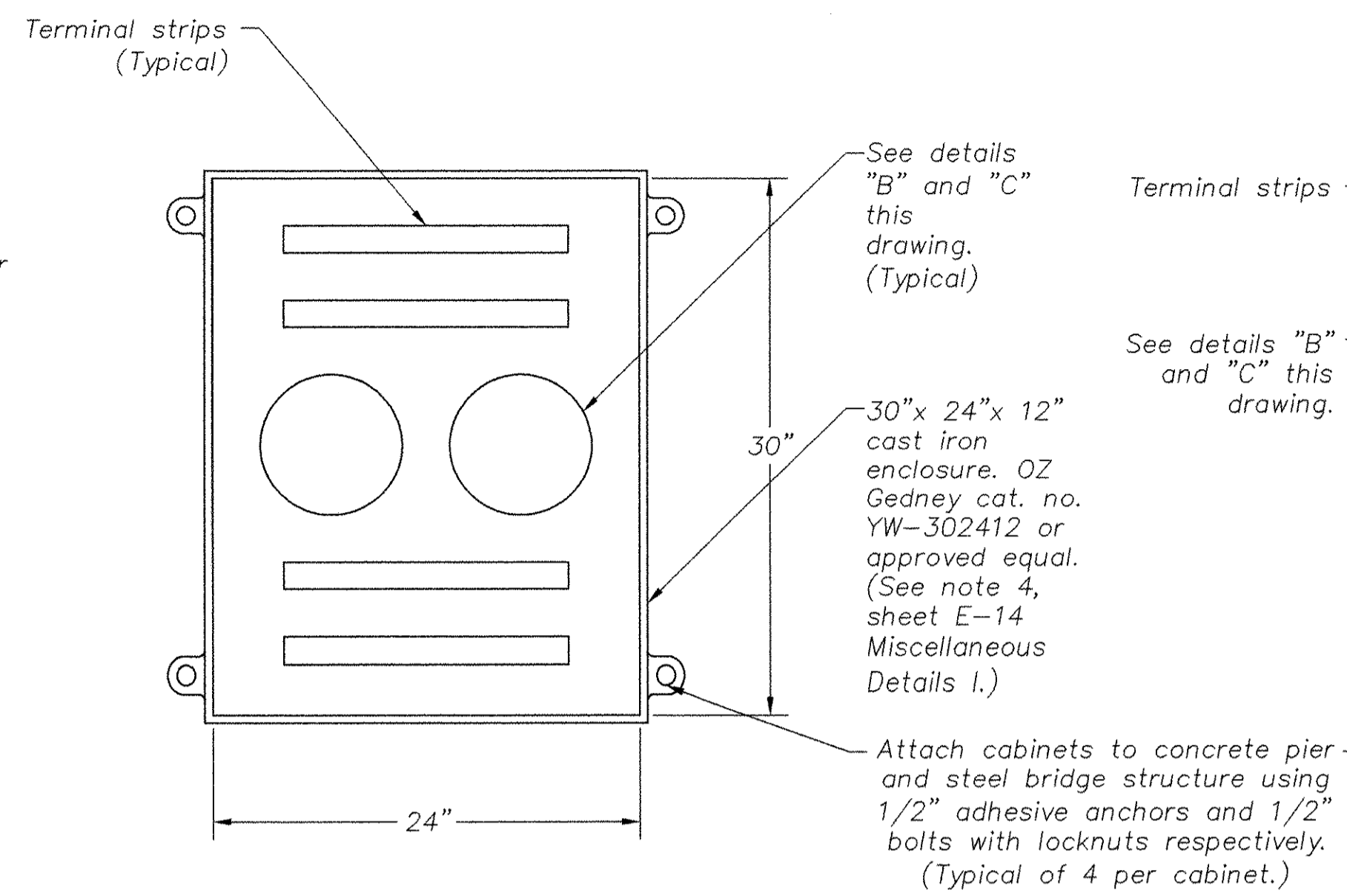
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

MISCELLANEOUS
DETAILS I

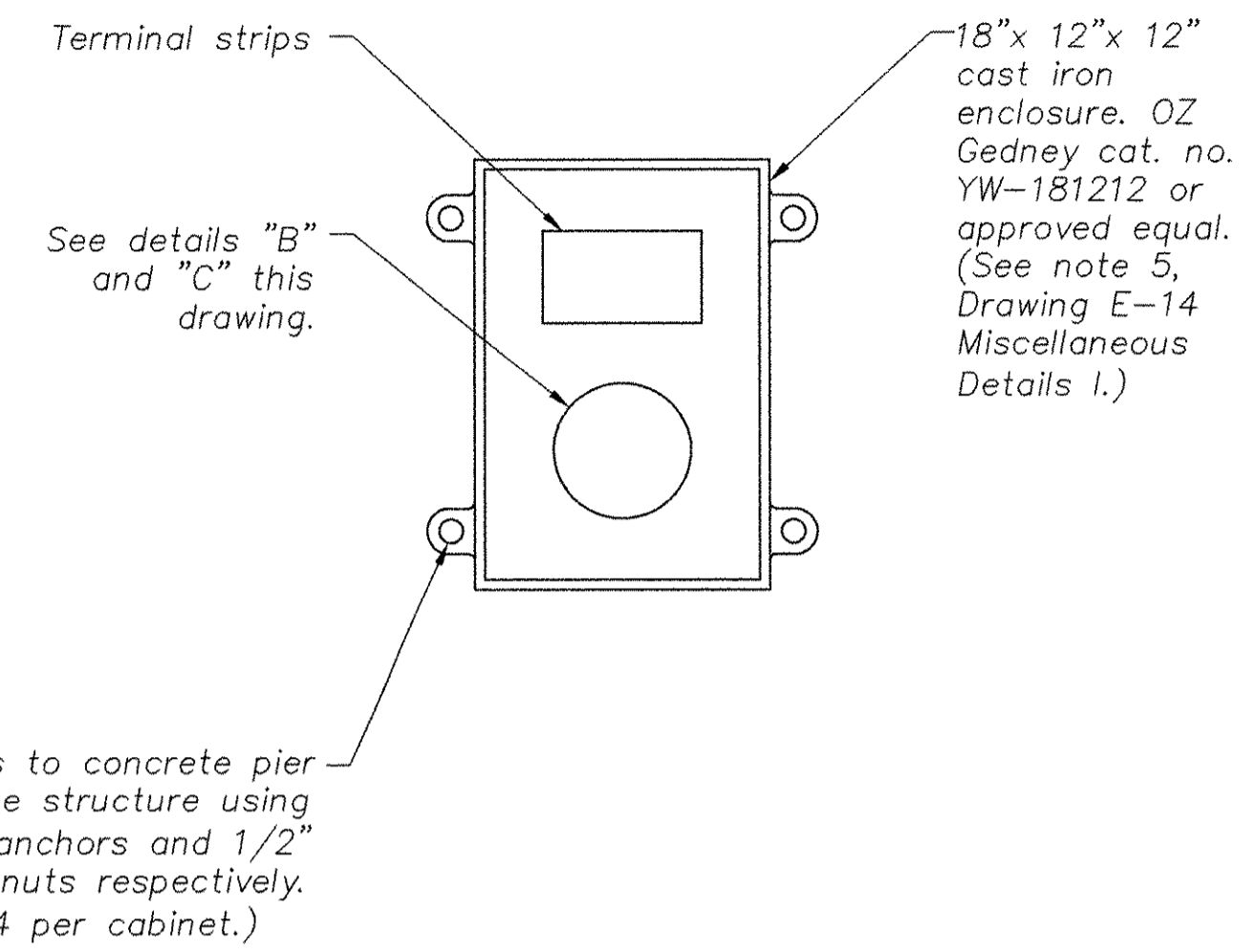
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	91	115



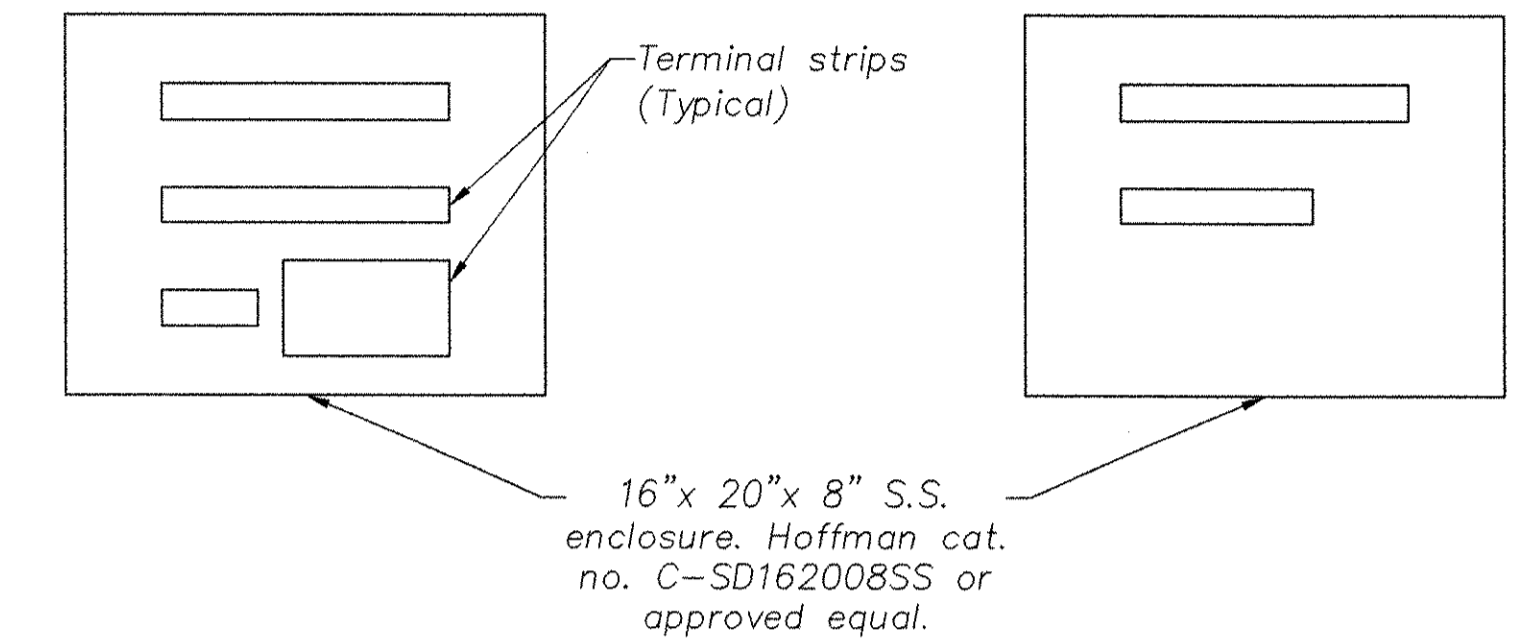
SUBMARINE CABLE TERMINAL CABINET COVER
Scale: 1 1/2" = 1'-0"



SUBMARINE CABLE TERMINAL CABINET SC-2 INTERNAL LAYOUT
Scale: 1 1/2" = 1'-0"



SUBMARINE CABLE TERMINAL CABINET SC-3 INTERNAL LAYOUT
Scale: 1 1/2" = 1'-0"

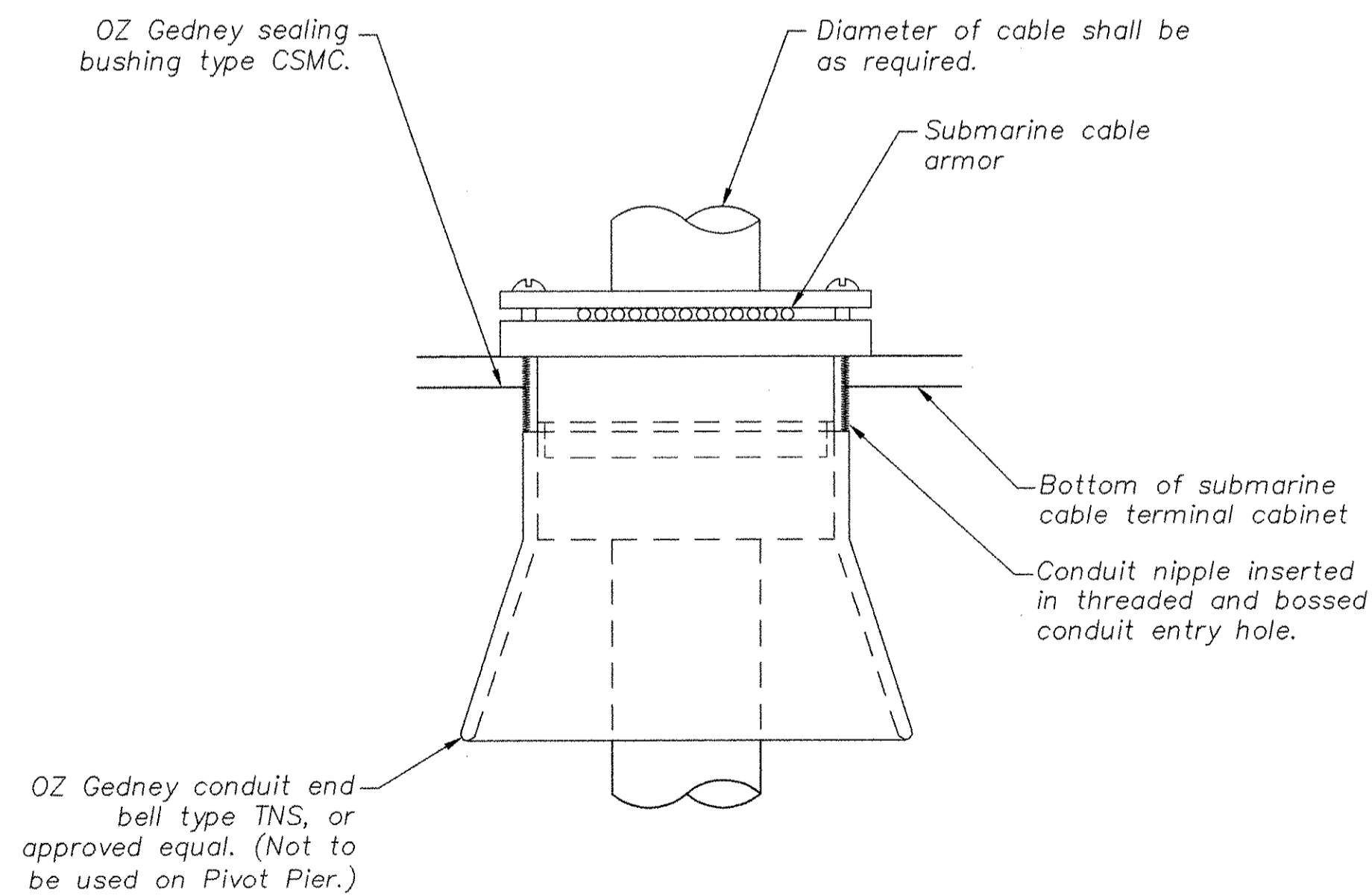


TERMINAL CABINET TC-1 INTERNAL LAYOUT
Scale: 1 1/2" = 1'-0"

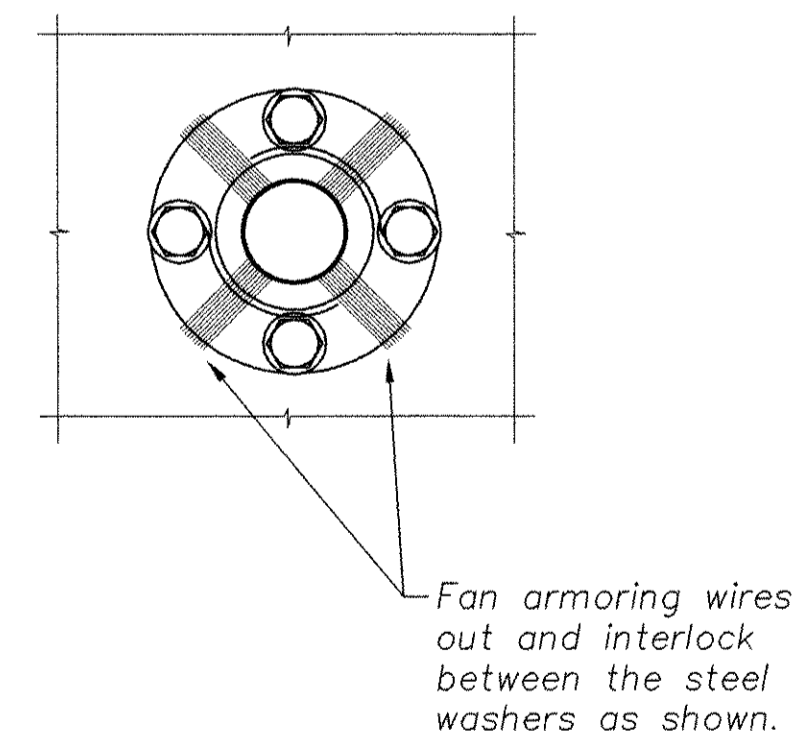
TERMINAL CABINET TC-2 INTERNAL LAYOUT
Scale: 1 1/2" = 1'-0"

NOTES:

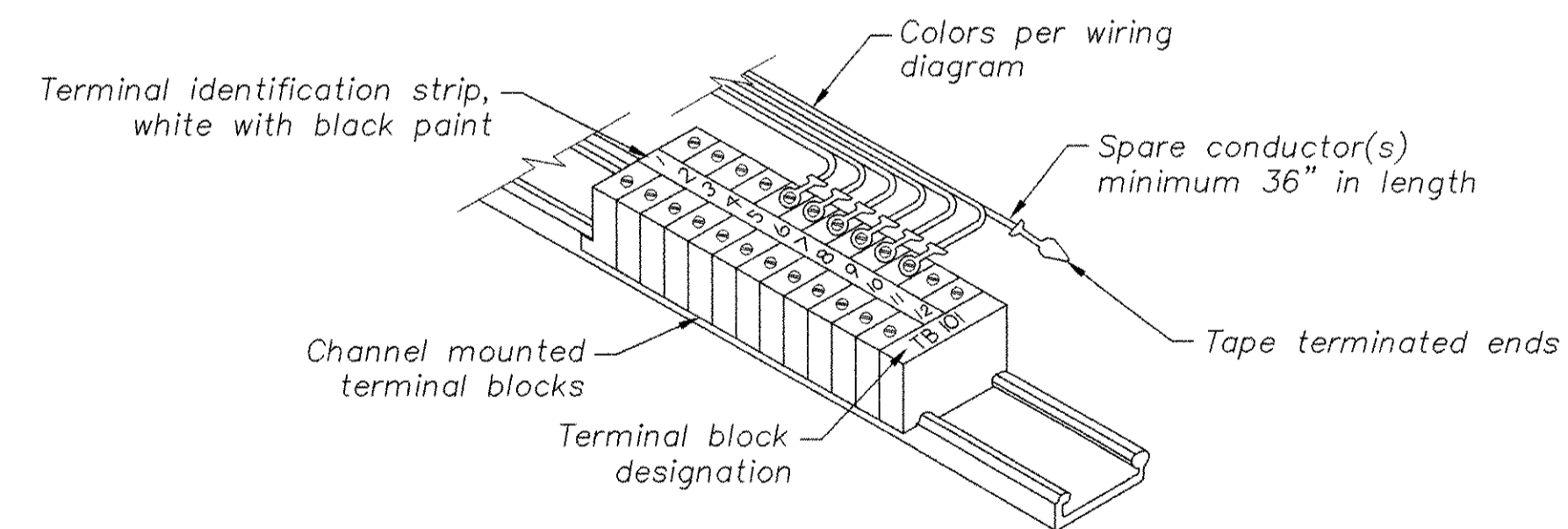
- For notes pertaining to this drawing, see Drawing E-14 Miscellaneous Details I.
- Cabinets SC-1 through SC-4 are located on the Pivot Pier.



DETAIL "B" PARTIAL ELEVATION
Not to scale

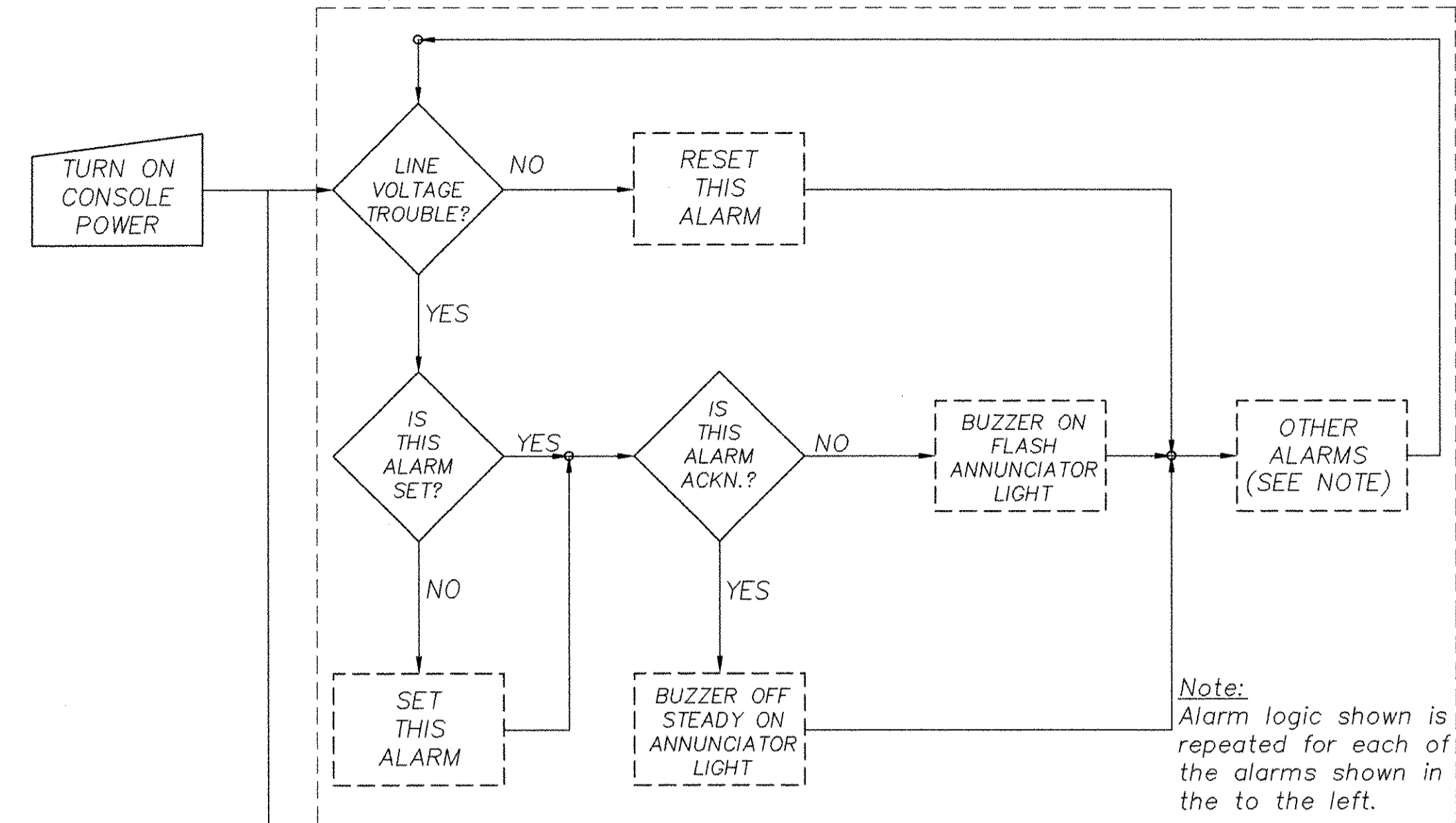


DETAIL "C" PART PLAN
Not to scale

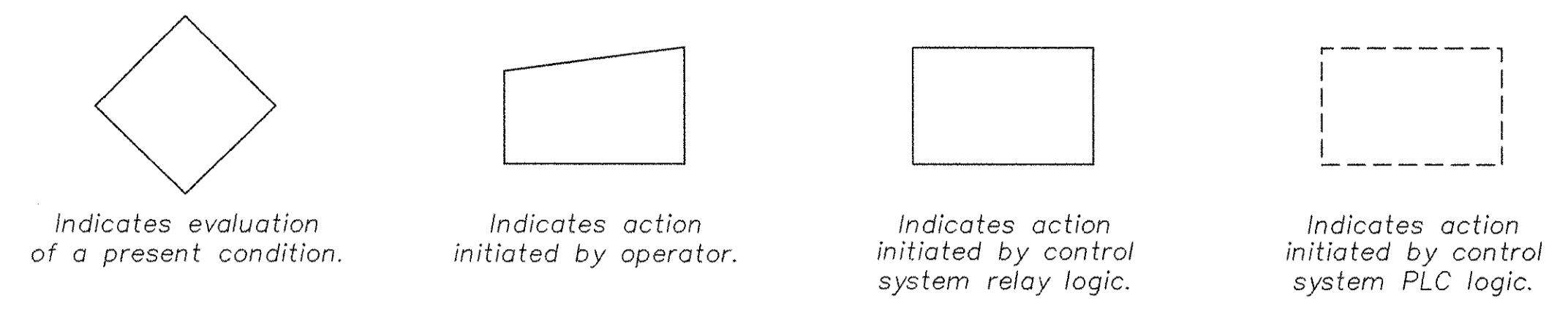


TERMINAL BLOCK & TERMINATION DETAIL
Not to scale

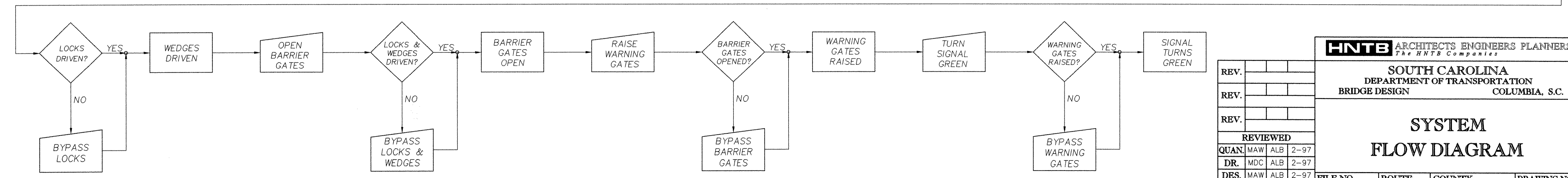
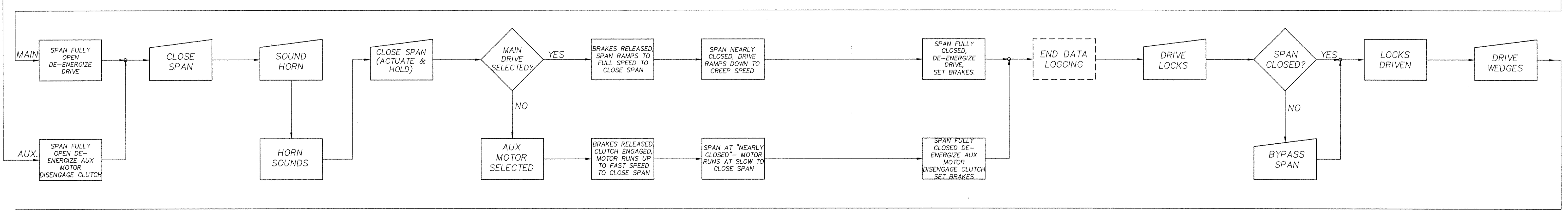
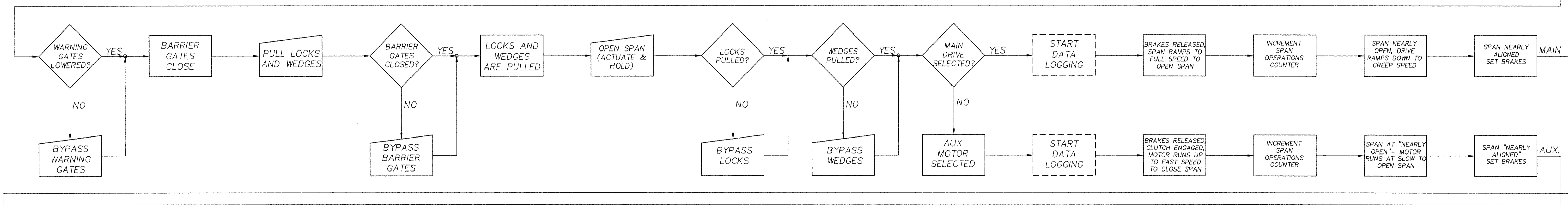
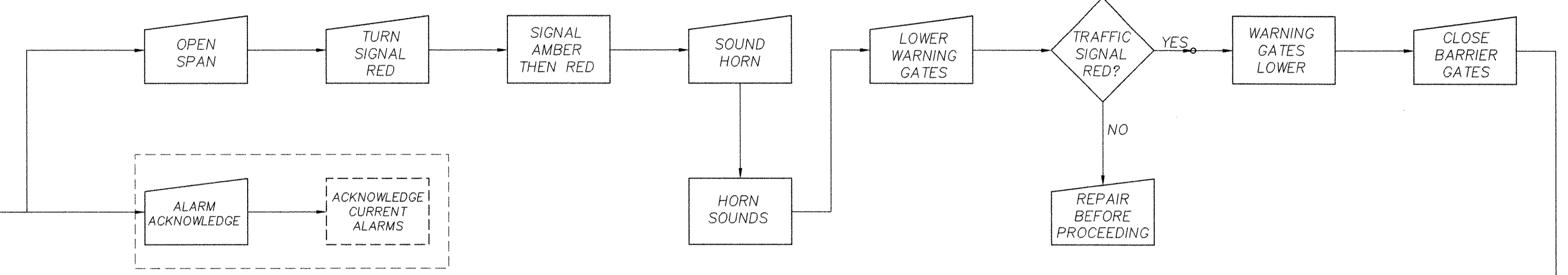
REV.					HNTB ARCHITECTS ENGINEERS PLANNERS The HNTB Companies SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C. MISCELLANEOUS DETAILS II								
REV.													
REV.													
REVIEWED													
QUAN.	GSB	ALB	2-97		<table border="1"> <tr> <td>FILE NO.</td> <td>ROUTE</td> <td>COUNTY</td> <td>DRAWING NO.</td> </tr> <tr> <td></td> <td>U.S. 21</td> <td>BEAUFORT</td> <td>E-15</td> </tr> </table>	FILE NO.	ROUTE	COUNTY	DRAWING NO.		U.S. 21	BEAUFORT	E-15
FILE NO.	ROUTE	COUNTY	DRAWING NO.										
	U.S. 21	BEAUFORT	E-15										
DR.	MDC	ALB	2-97										
DES.	GSB	ALB	2-97										
BY	CHK	DATE											



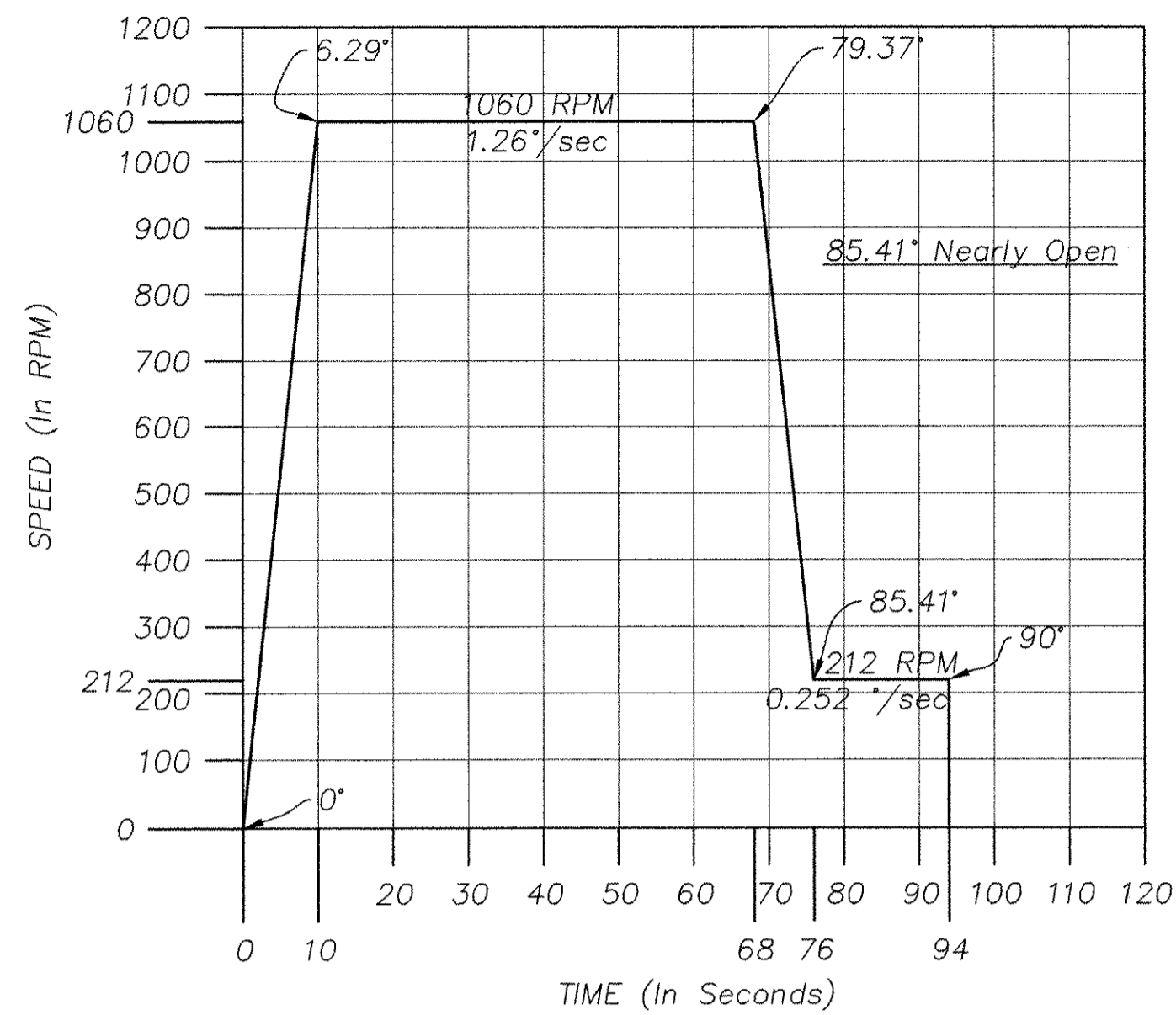
- OTHER ALARMS:**
- PLC TROUBLE
 - LOCKS NOT DRAWN OR DRIVEN
 - WEDGES NOT DRAWN OR DRIVEN
 - EAST WARNING GATE OUT OF SERVICE
 - WEST WARNING GATE OUT OF SERVICE
 - EAST BARRIER GATE OUT OF SERVICE
 - WEST BARRIER GATE OUT OF SERVICE
 - CLUTCH OUT OF SERVICE
 - MACHINERY BRAKE OUT OF SERVICE
 - MOTOR BRAKE OUT OF SERVICE
 - EAST CENTERING LOCK OUT OF SERVICE
 - WEST CENTERING LOCK OUT OF SERVICE
 - WEDGES OUT OF SERVICE
 - SPAN OVERSPEED
 - LINE VOLTAGE FAULT
 - E.G.(EMERGENCY GENERATOR) LOW OIL PRESSURE
 - E.G. HIGH WATER TEMP.
 - E.G. OVERSPEED
 - E.G. OVERCRANK
 - E.G. MANUAL MODE



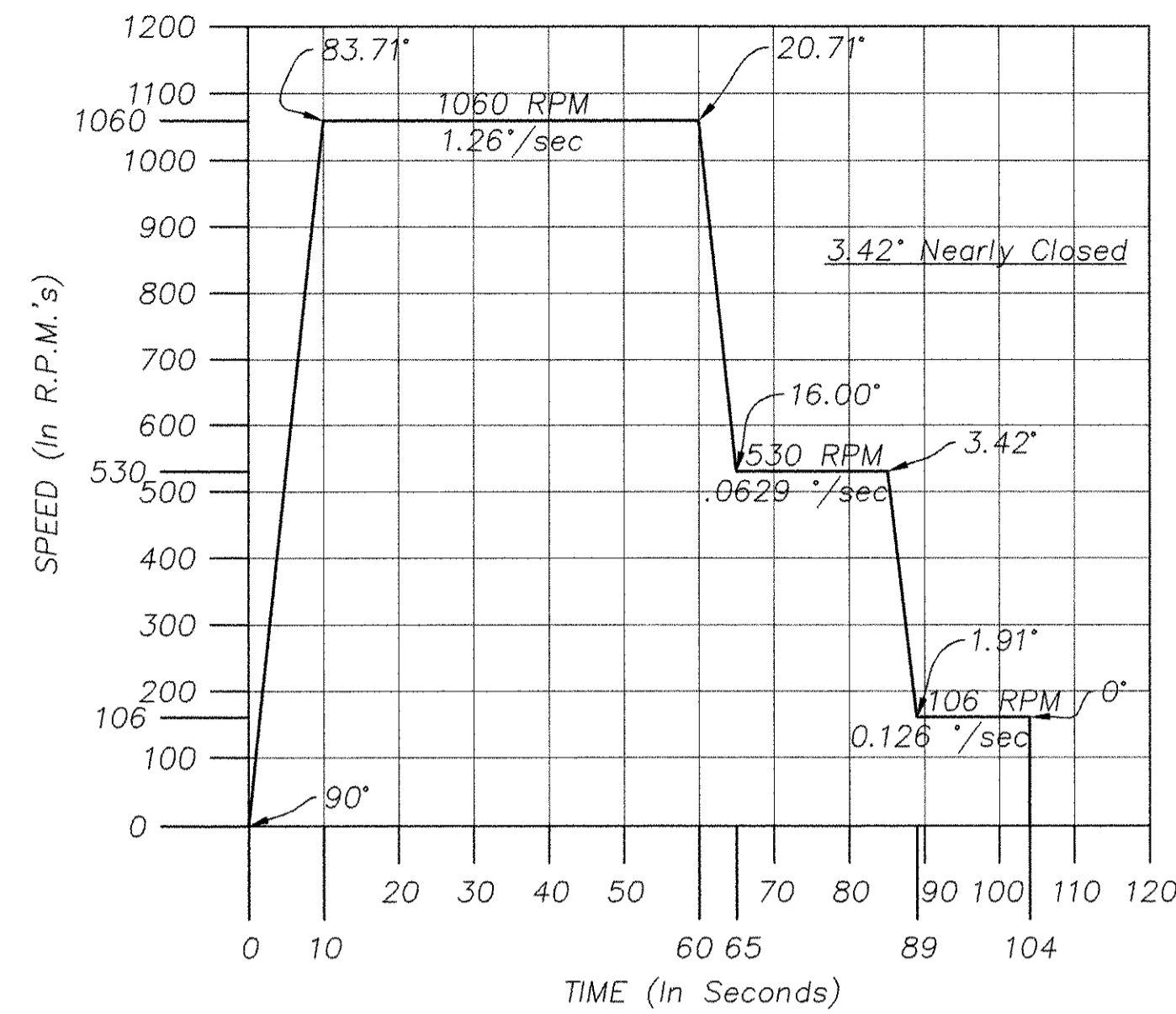
Note: Alarm logic shown is repeated for each of the alarms shown in the to the left.



HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
SYSTEM FLOW DIAGRAM			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-16

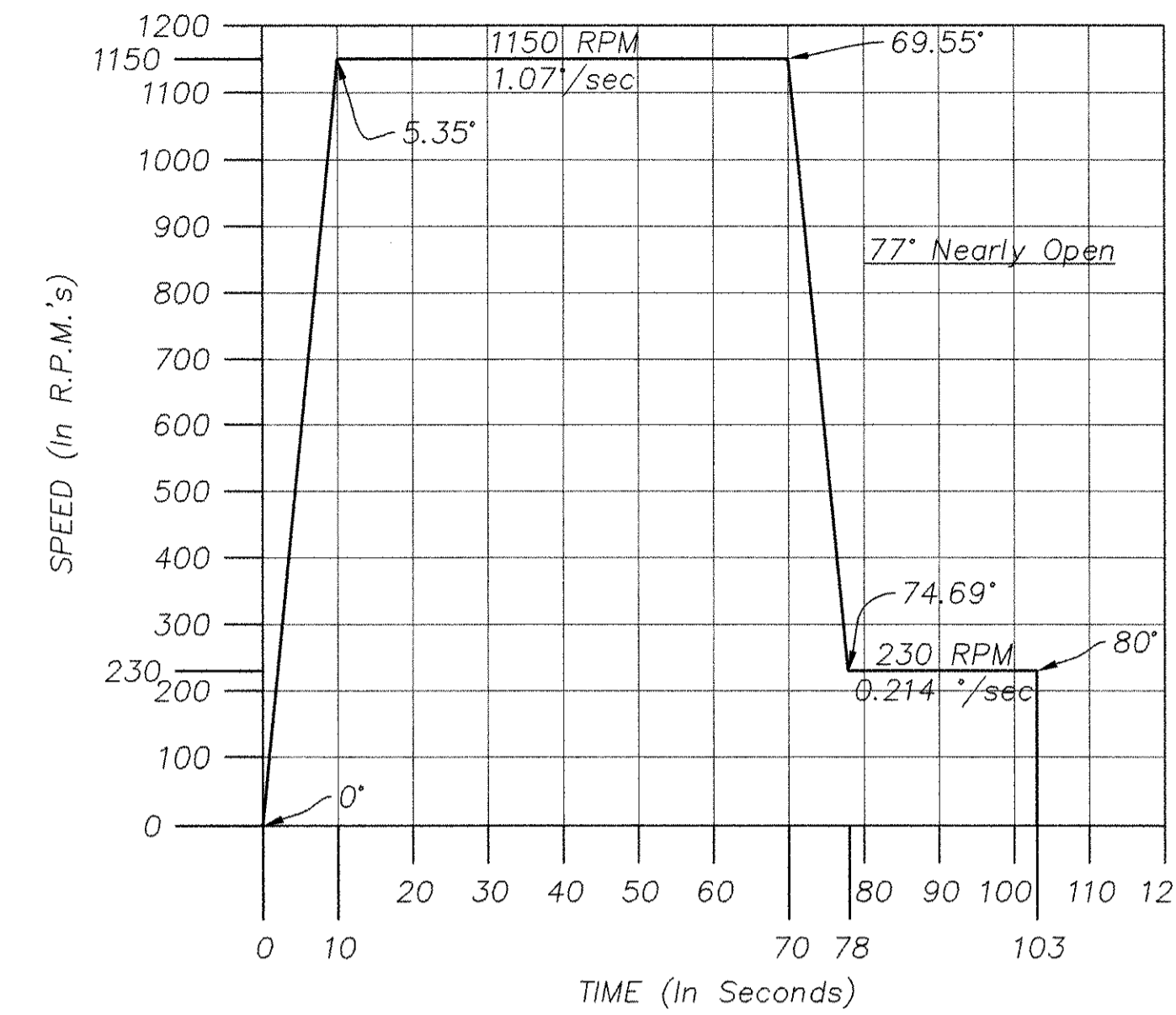


**SPEED VS. TIME
OPENING**

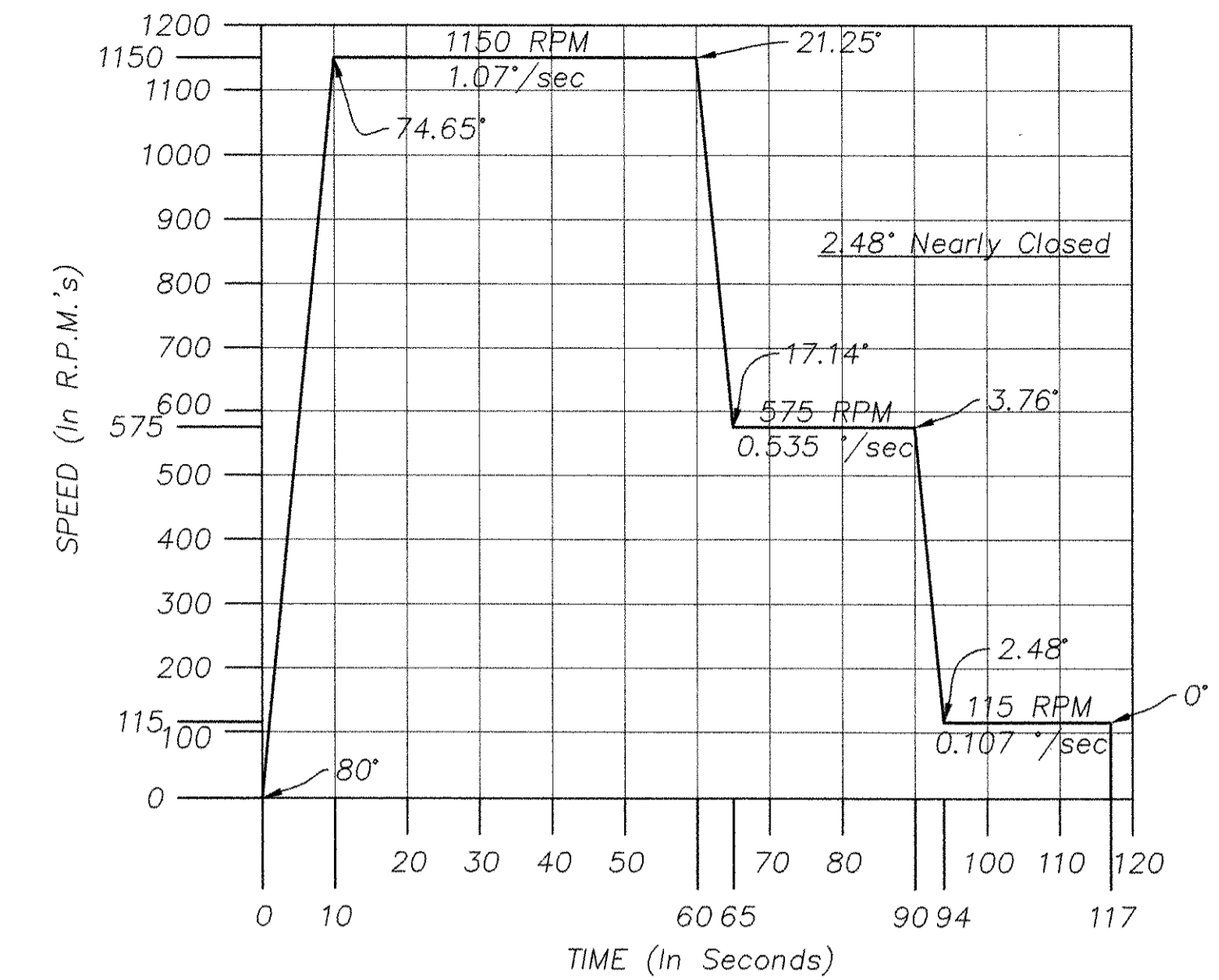


**SPEED VS. TIME
CLOSING**

HARBOR RIVER
Note: 0°=Fully Closed;
90°=Fully Open



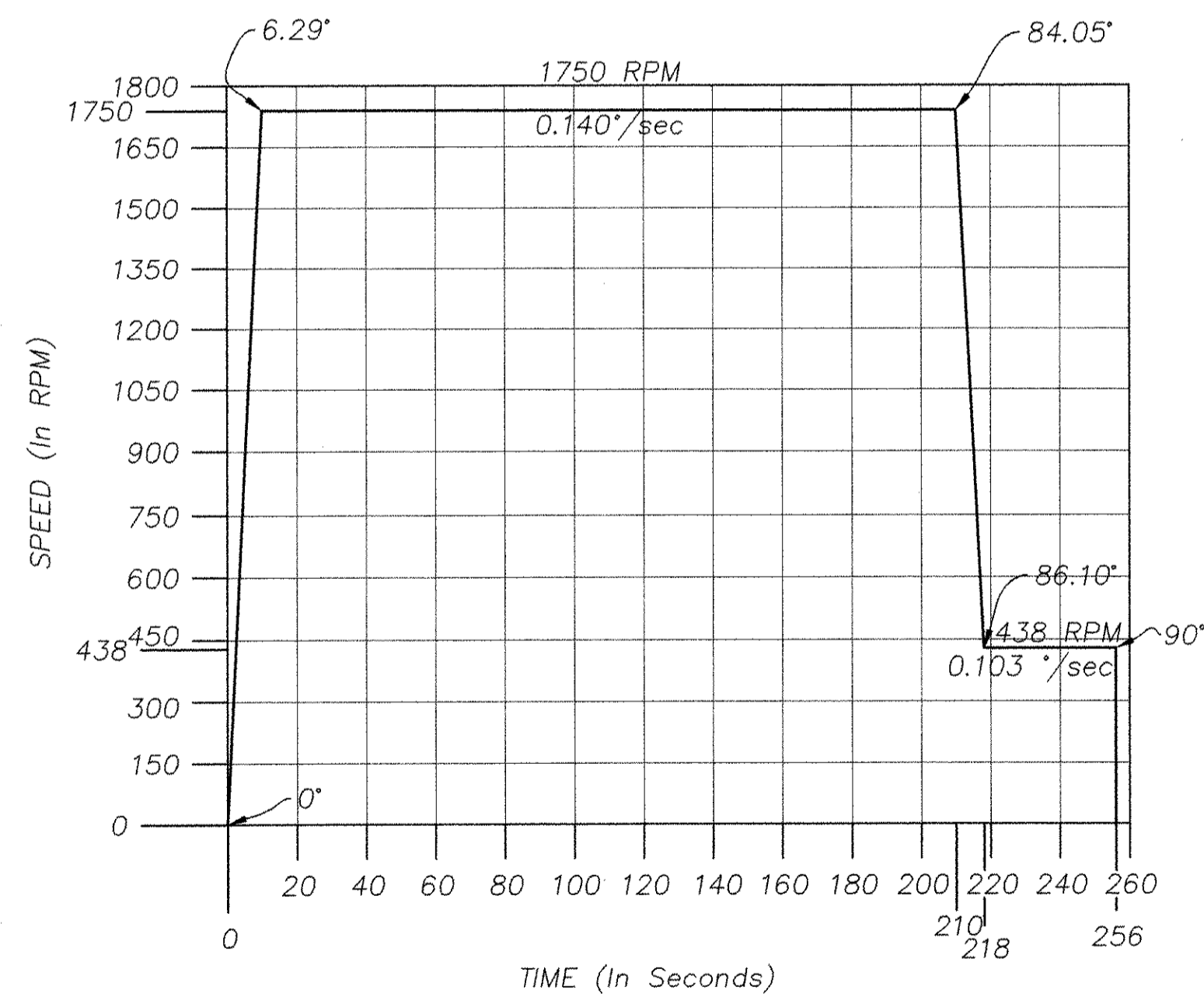
**SPEED VS. TIME
OPENING**



**SPEED VS. TIME
CLOSING**

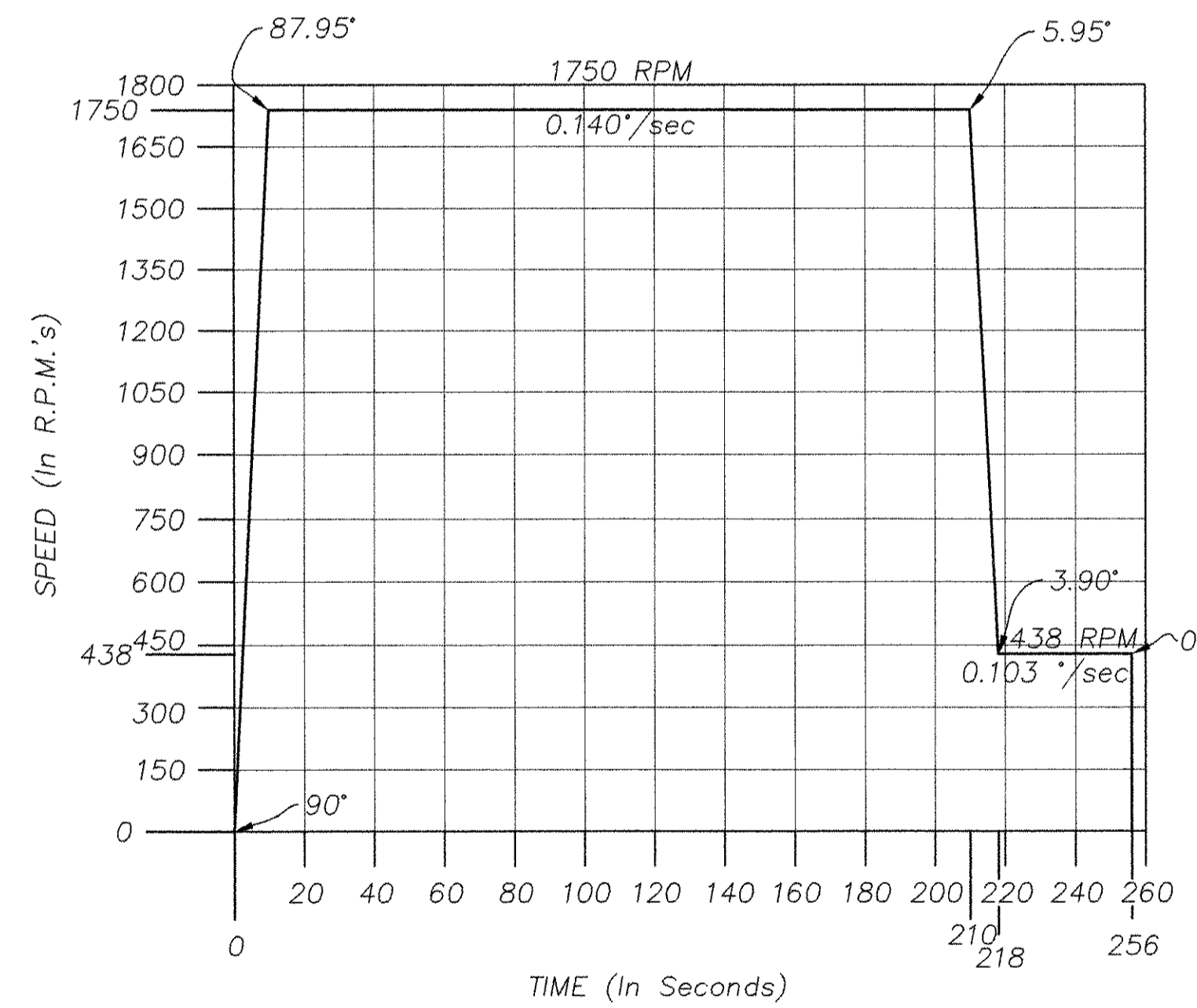
LADY'S ISLAND
Note: 0°=Fully Closed;
80°=Fully Open

**MAIN DRIVE
SPEED - TIME CURVES**



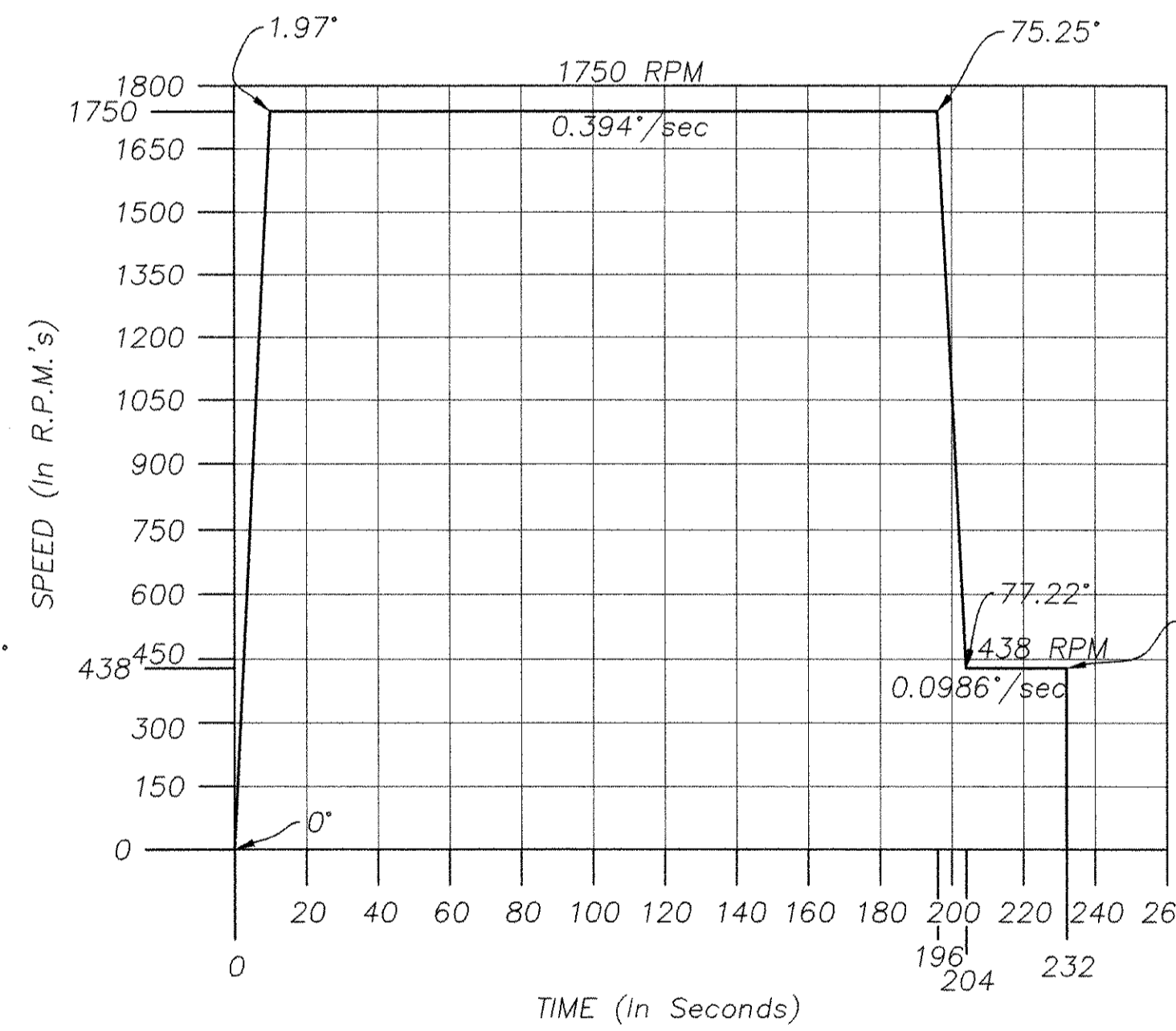
**SPEED VS. TIME
OPENING**

HARBOR RIVER
Note: 0°=Fully Closed;
90°=Fully Open



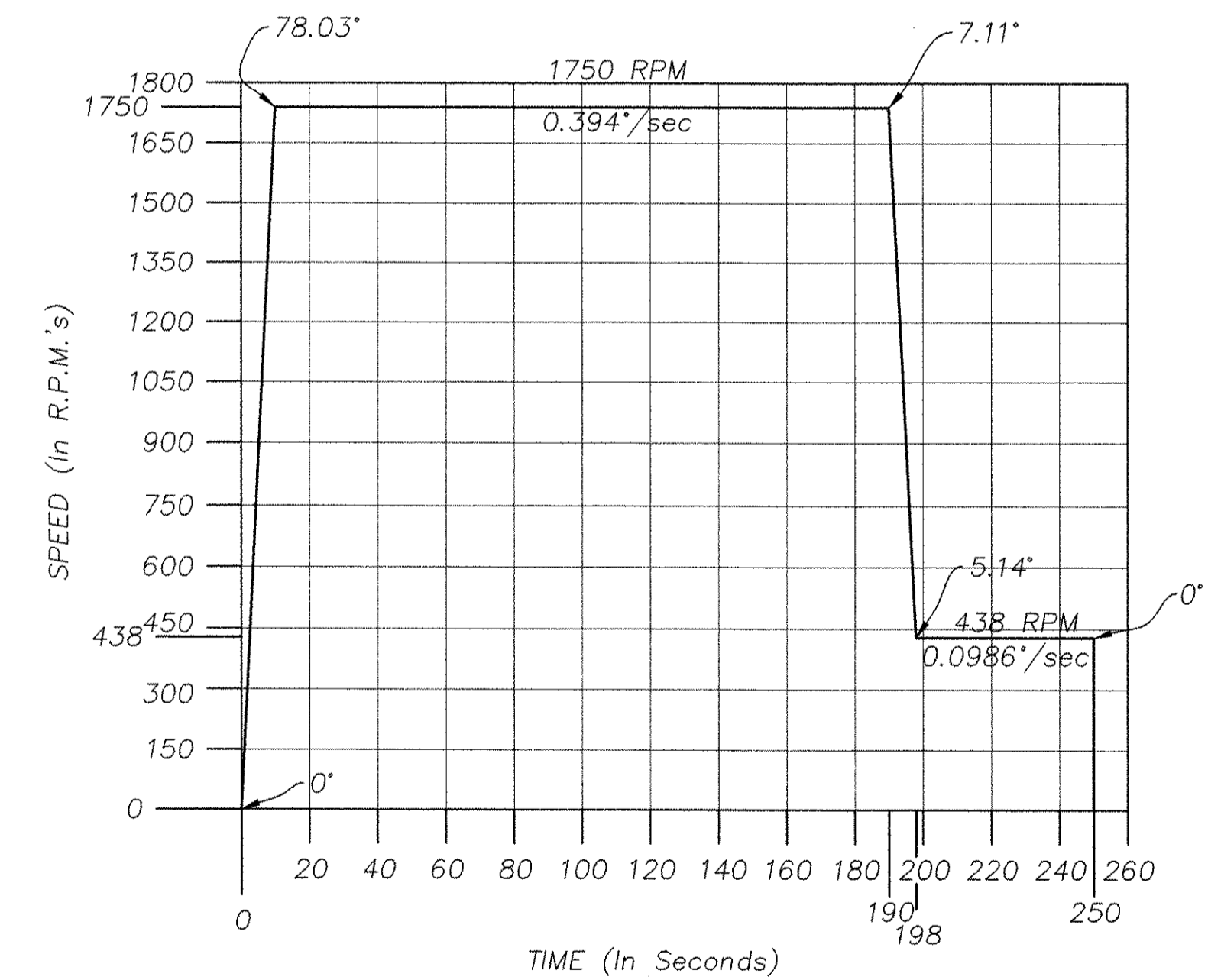
**SPEED VS. TIME
CLOSING**

**AUXILLIARY DRIVE
SPEED - TIME CURVES**



**SPEED VS. TIME
OPENING**

LADY'S ISLAND
Note: 0°=Fully Closed;
80°=Fully Open



**SPEED VS. TIME
CLOSING**

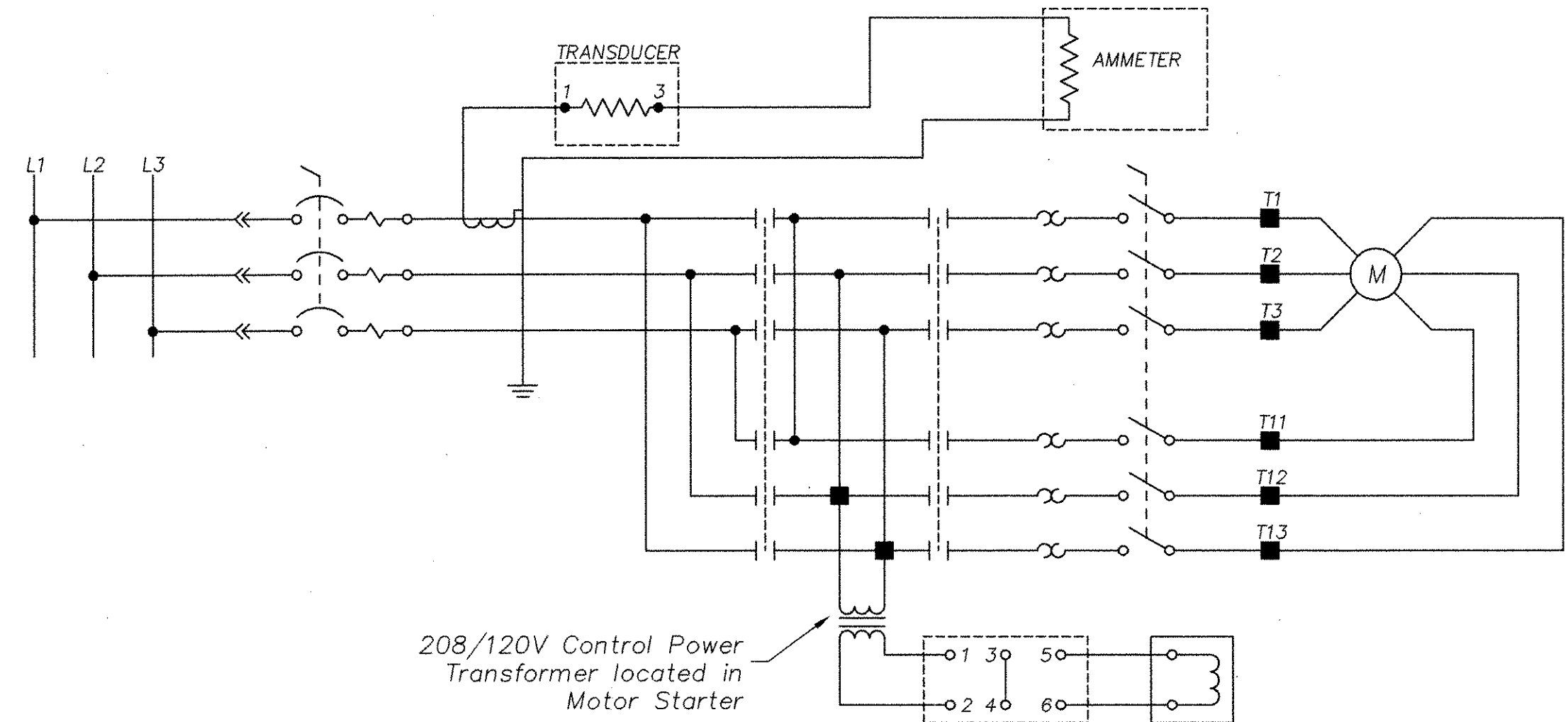
REV.				
REV.				
REV.				
REVIEWED				
QUAN.	MAW	ALB	2-97	
DR.	MDC	ALB	2-97	
DES.	MAW	ALB	2-97	
BY	CHK	DATE		

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The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

**SPEED / TIME
CURVES**

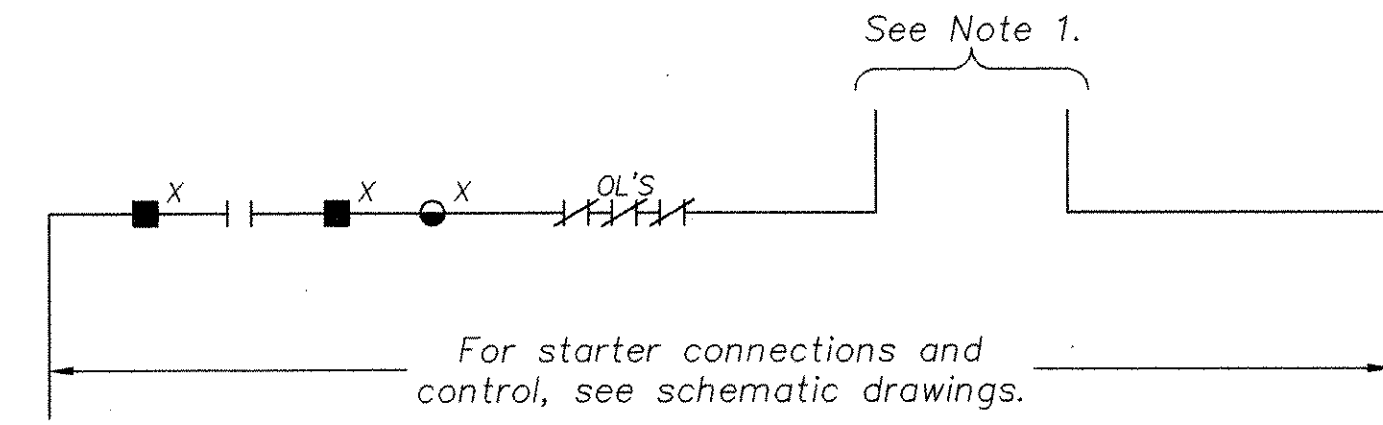
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-17



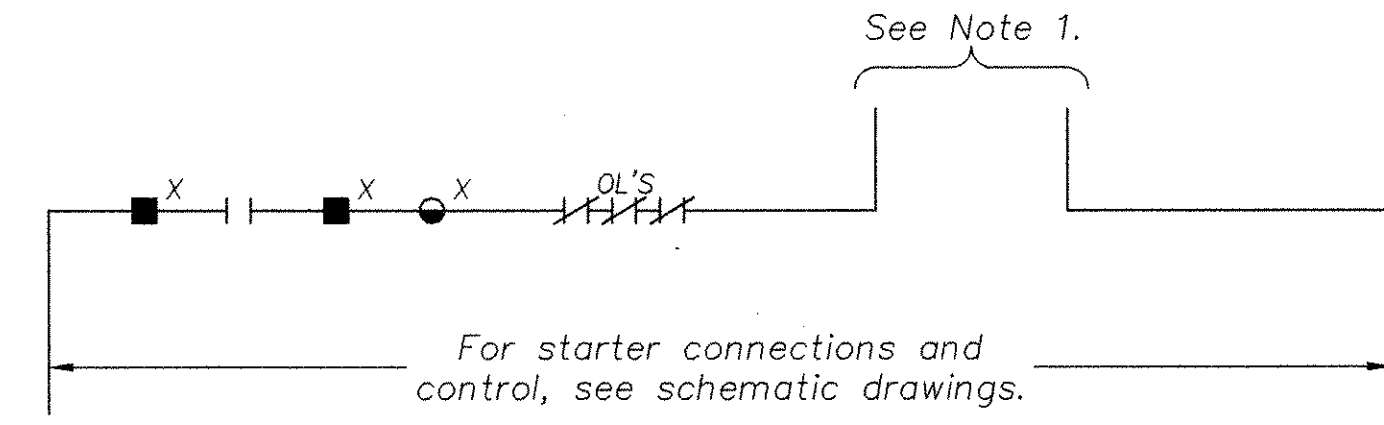
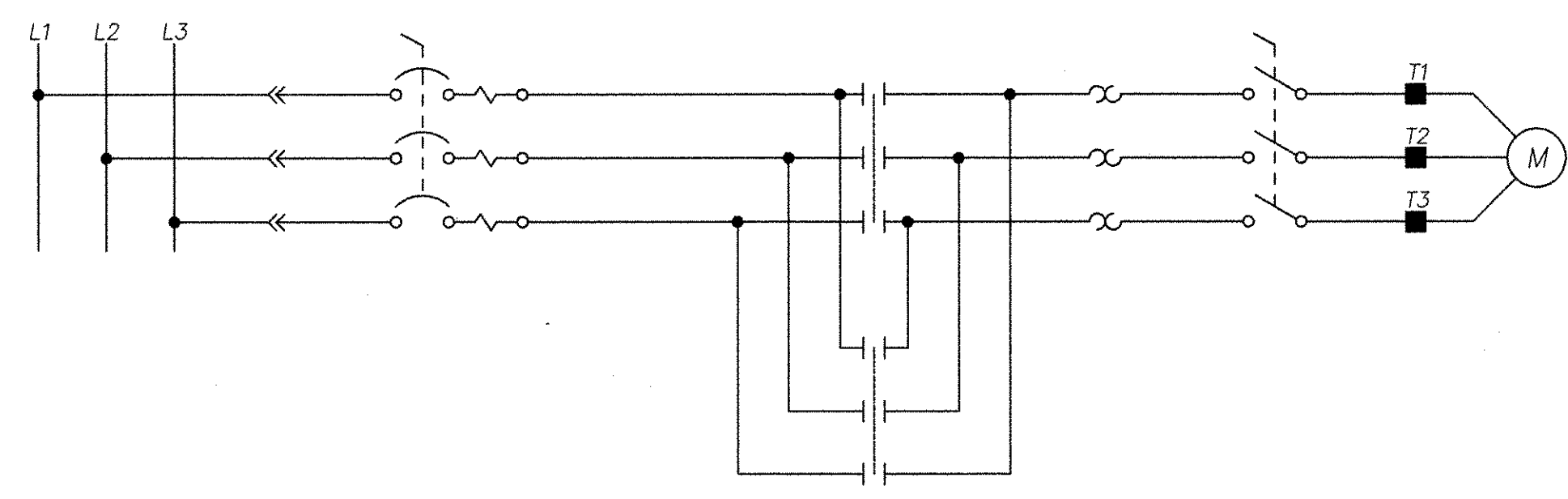
208/120V Control Power Transformer located in Motor Starter

Clutch Rectifier

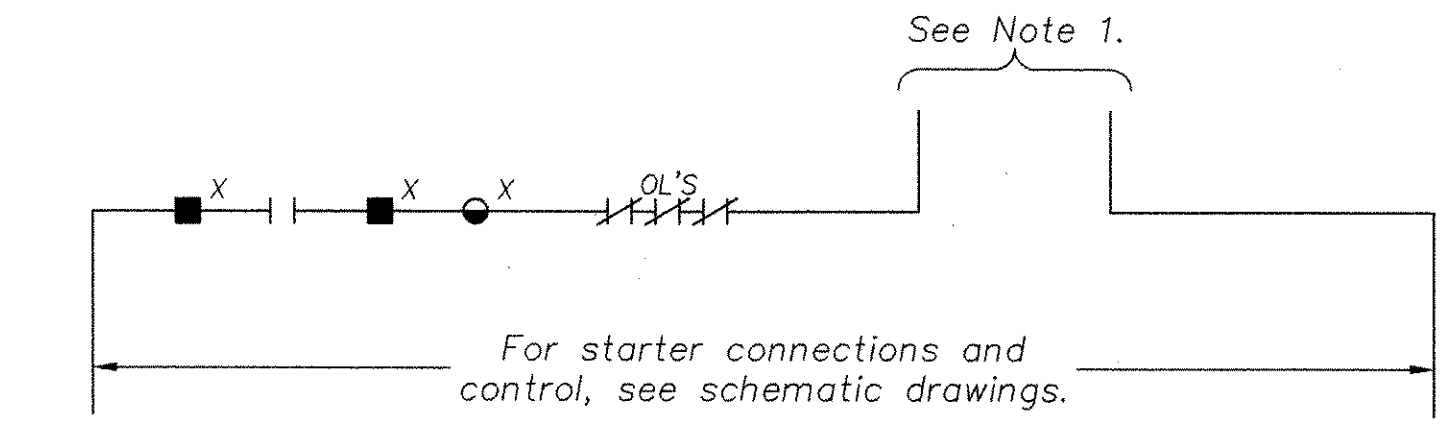
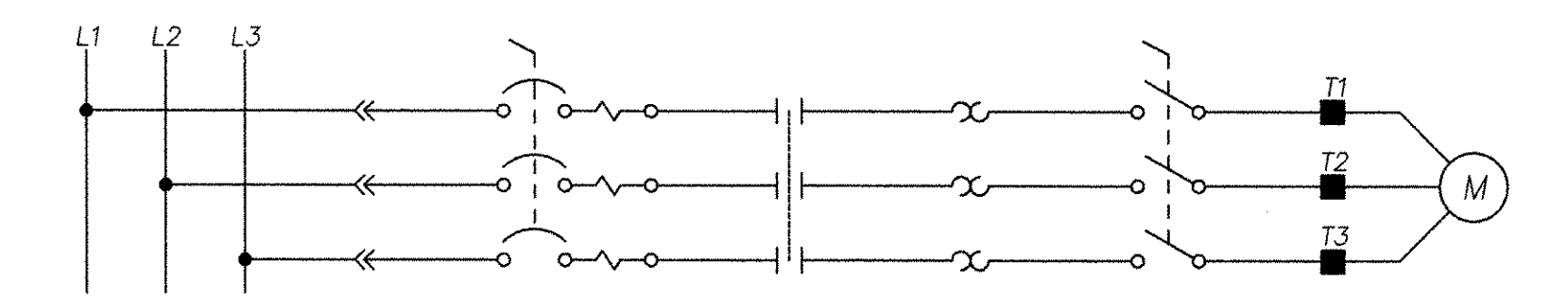
Clutch



TYPICAL FULL VOLTAGE TWO SPEED REVERSING STARTER



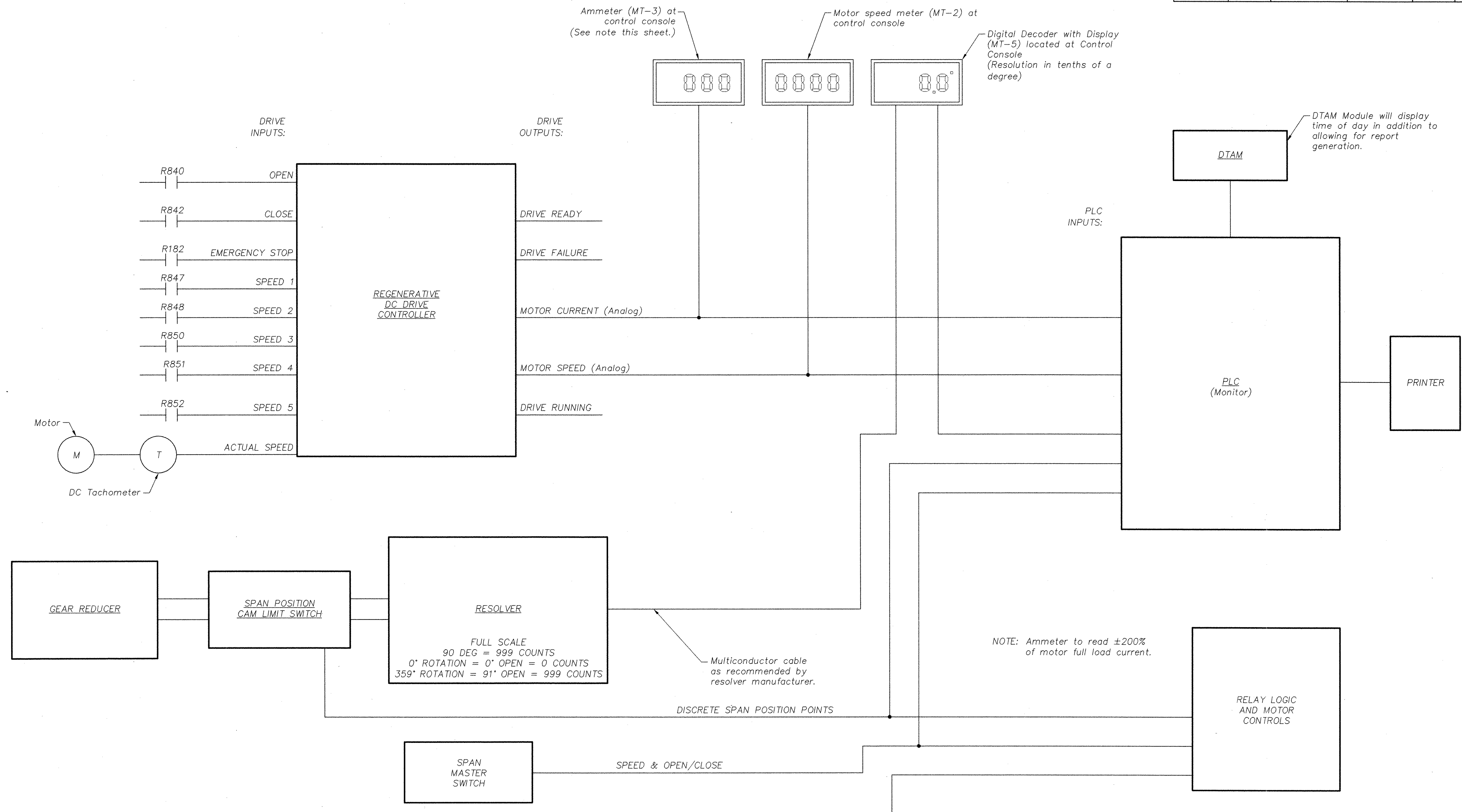
TYPICAL FULL VOLTAGE REVERSING STARTER



TYPICAL FULL VOLTAGE NON-REVERSING STARTER

NOTES:
 1. Starter control power shall be obtained from Panel BCP. See Schematic Drawings for specific starter information.

HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
MOTOR STARTER CIRCUITS			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK.	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-18

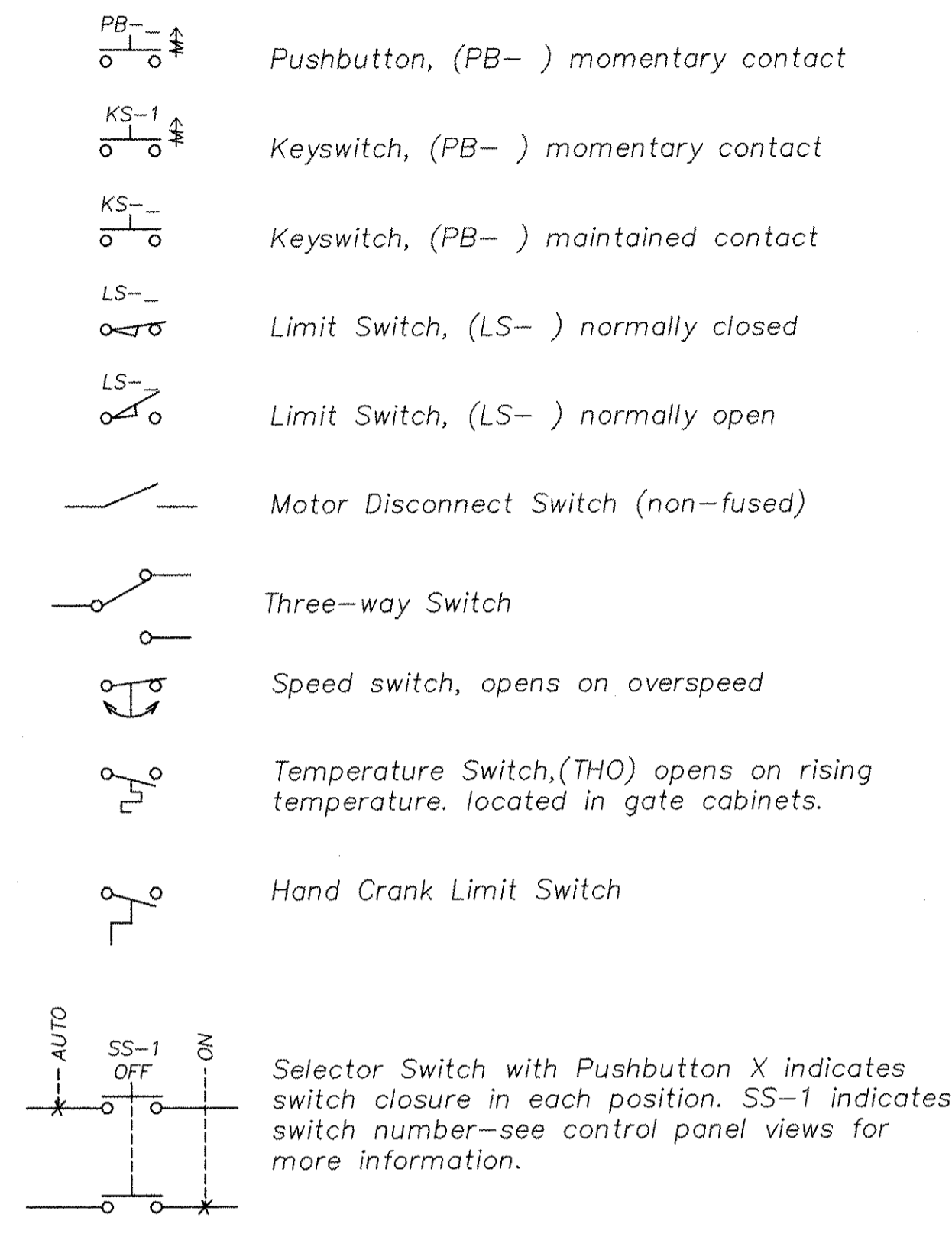


NOTES:
 1. The intent of this drawing is to show general bridge control equipment interface, actual development shall be based on the schematic drawings.

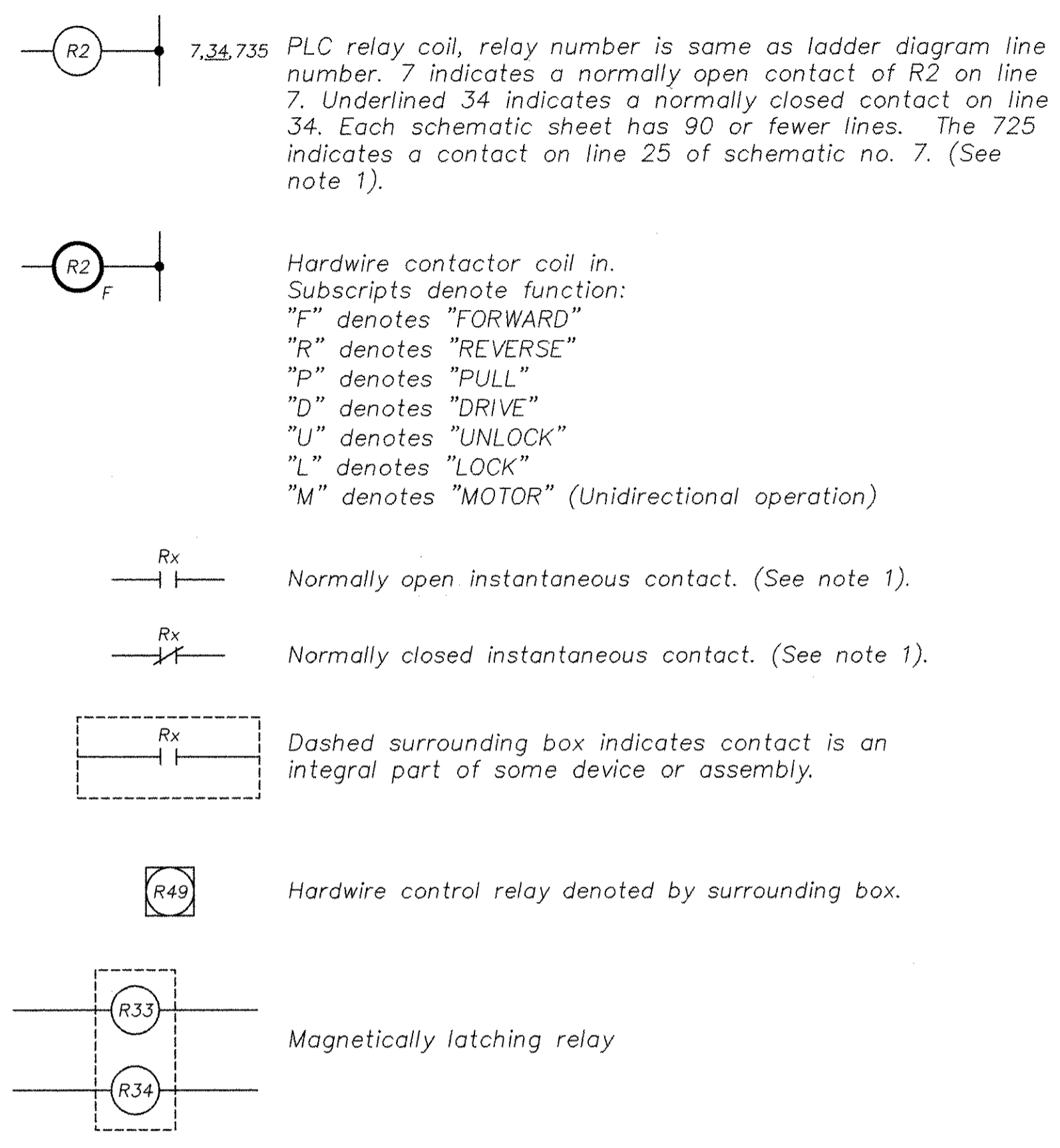
HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
CONTROL SYSTEM BLOCK DIAGRAM			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK.	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-19

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	96	115

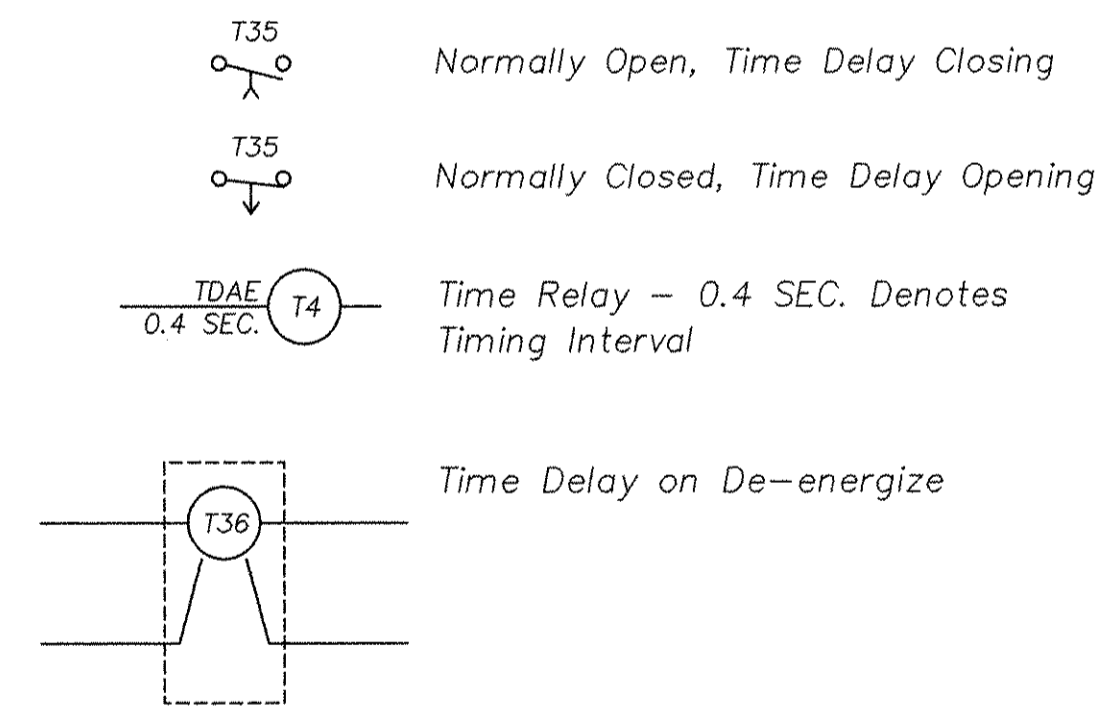
SWITCHES



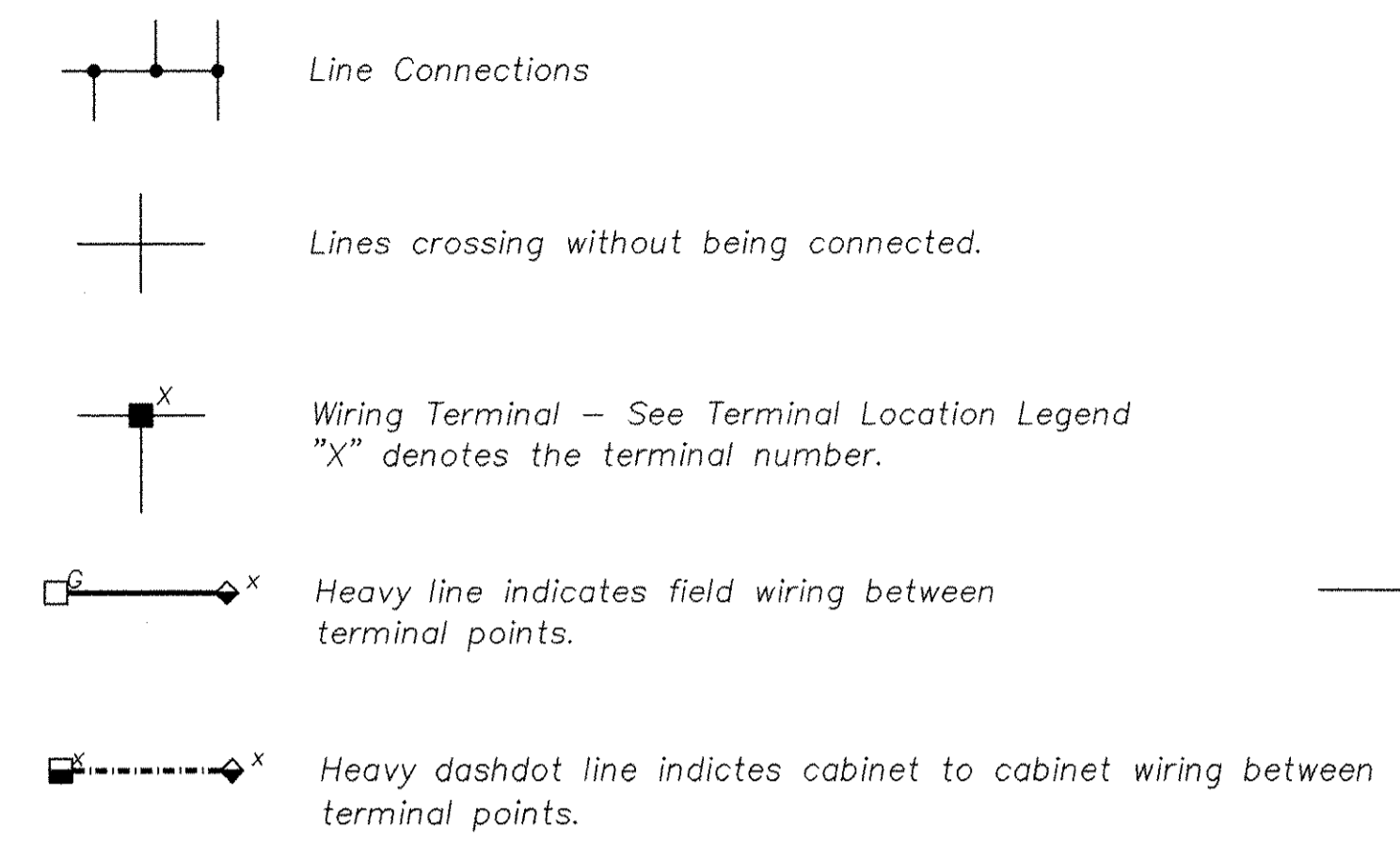
RELAYS



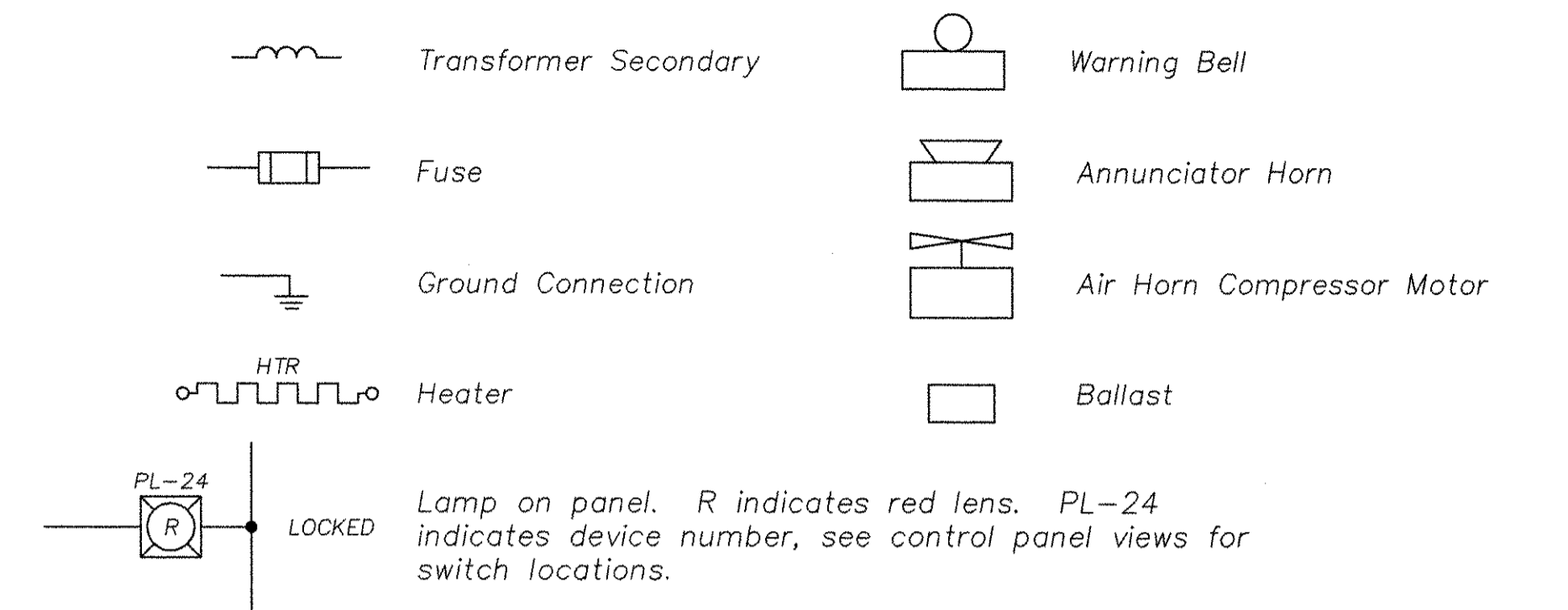
TIMING RELAYS



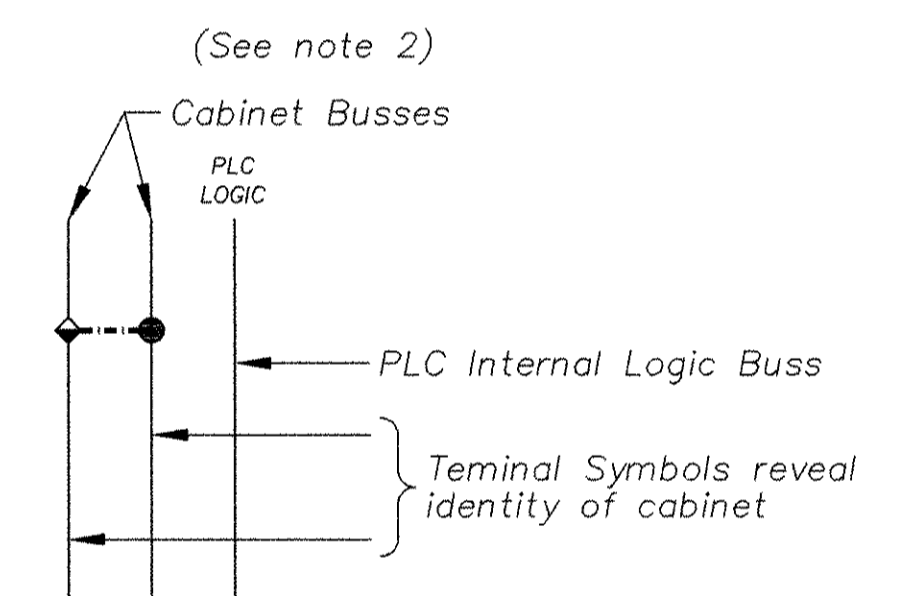
WIRING



MISC. DEVICES



TYPICAL LADDER NOTATION



TERMINAL LOCATION LEGEND

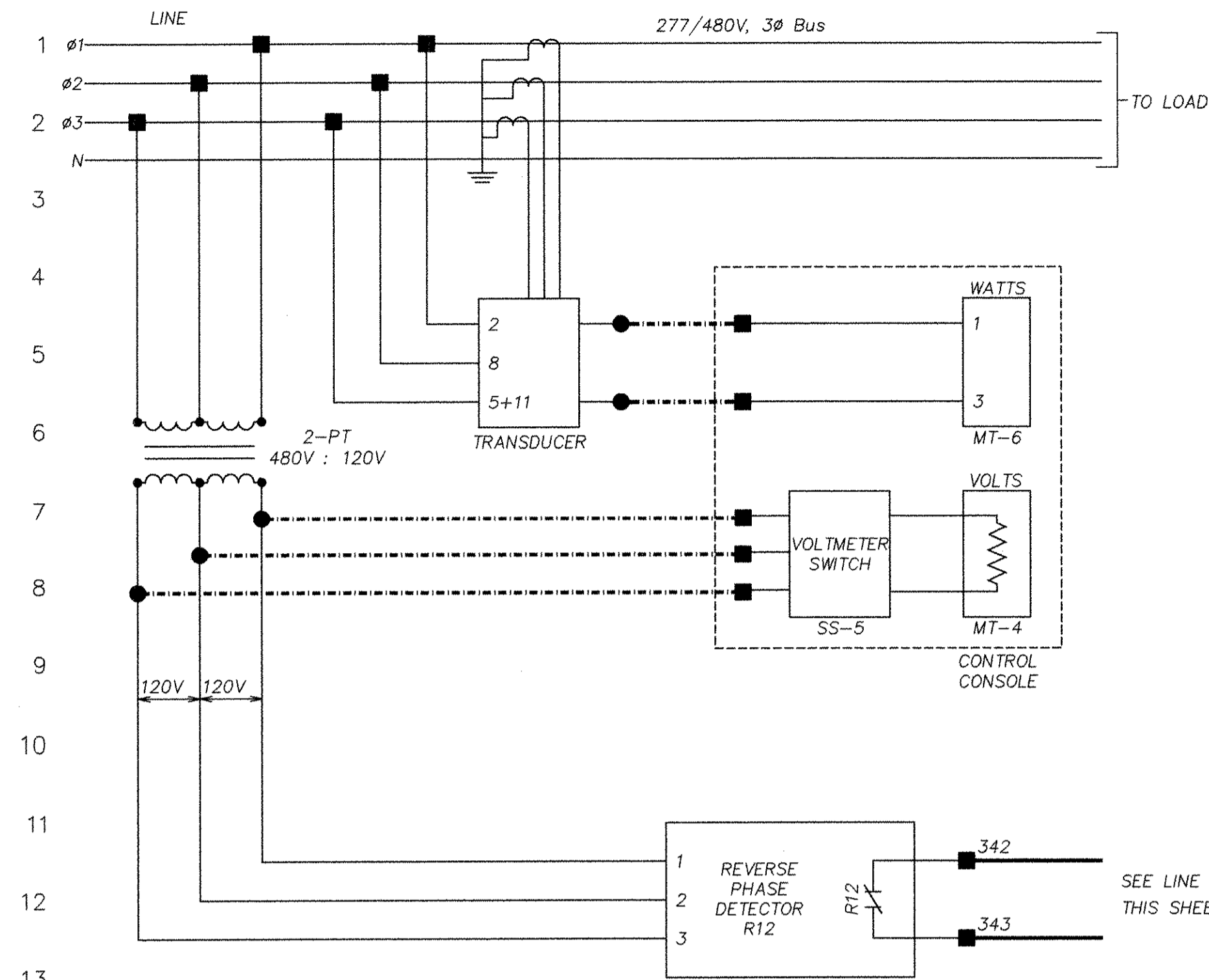
- ^x Terminal in Control Console
 - ^x Terminal in Cabinet #1
 - ^x Terminal in Cabinet #2
 - ^x Terminal in Cabinet #3
 - ◆^x Terminal in Cabinet #4
 - ^G Terminal in Generator
- Note:
In all cases except Generator Terminals, "x" denotes the terminal number.

NOTES:

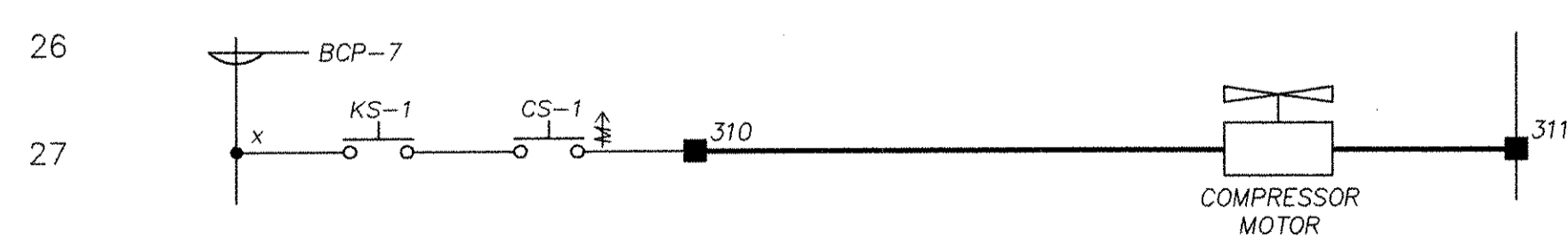
1. One and two-digit line reference numbers imply that the relay coil is on a line located on the same schematic drawing sheet. Three and four-digit line reference numbers imply that the relay coil is on a line located on another schematic drawing.
 Examples:
 7—Relay coil on line 7 of same drawing
 34—Relay coil on line 34 of same drawing
 725—Relay coil on line 25 of schematic no. 7
 1078—Relay coil on line 78 of schematic no. 10
2. Ladder logic notation in its worst case will contain three vertical buses. These buses will be denoted by terminal location symbol to indicate in which cabinet the bus resides, as required. PLC internal ladder logic will contain no such symbol, but rather, will be indicated by the term "PLC LOGIC" above the bus line. See typical ladder notation on this sheet.
3. All cross referencing described as "REPORT" refers to data which will be provided to the operator by the PLC at the DTAM on the Control Console or in the printed reports.

REV.				HNTB ARCHITECTS ENGINEERS PLANNERS <small>The HNTB Companies</small> SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.							
								REVIEWED QUAN. MAW ALB 2-97 DR. MDC ALB 2-97 DES. MAW ALB 2-97			
BY CHK. DATE				SCHEMATIC LEGEND							

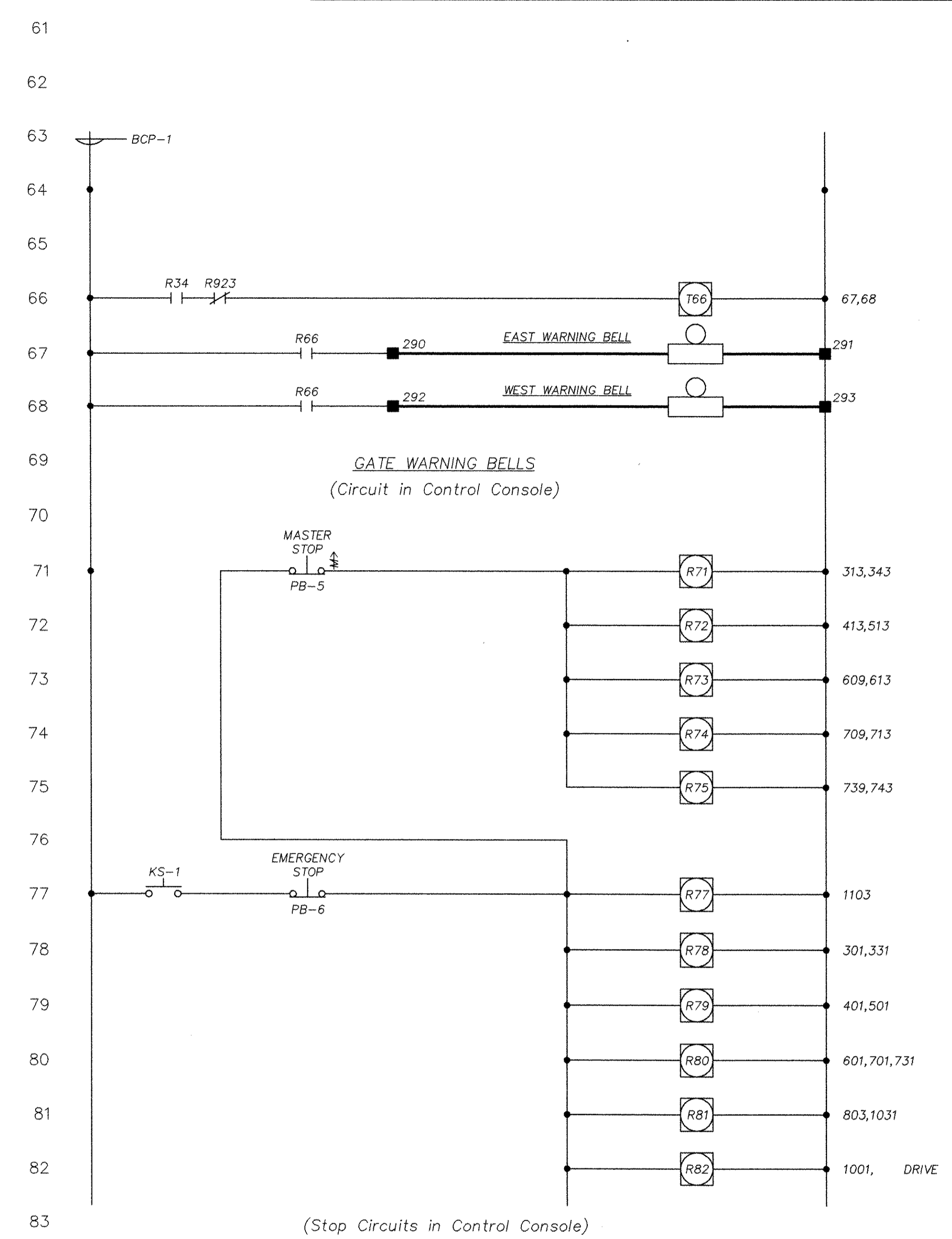
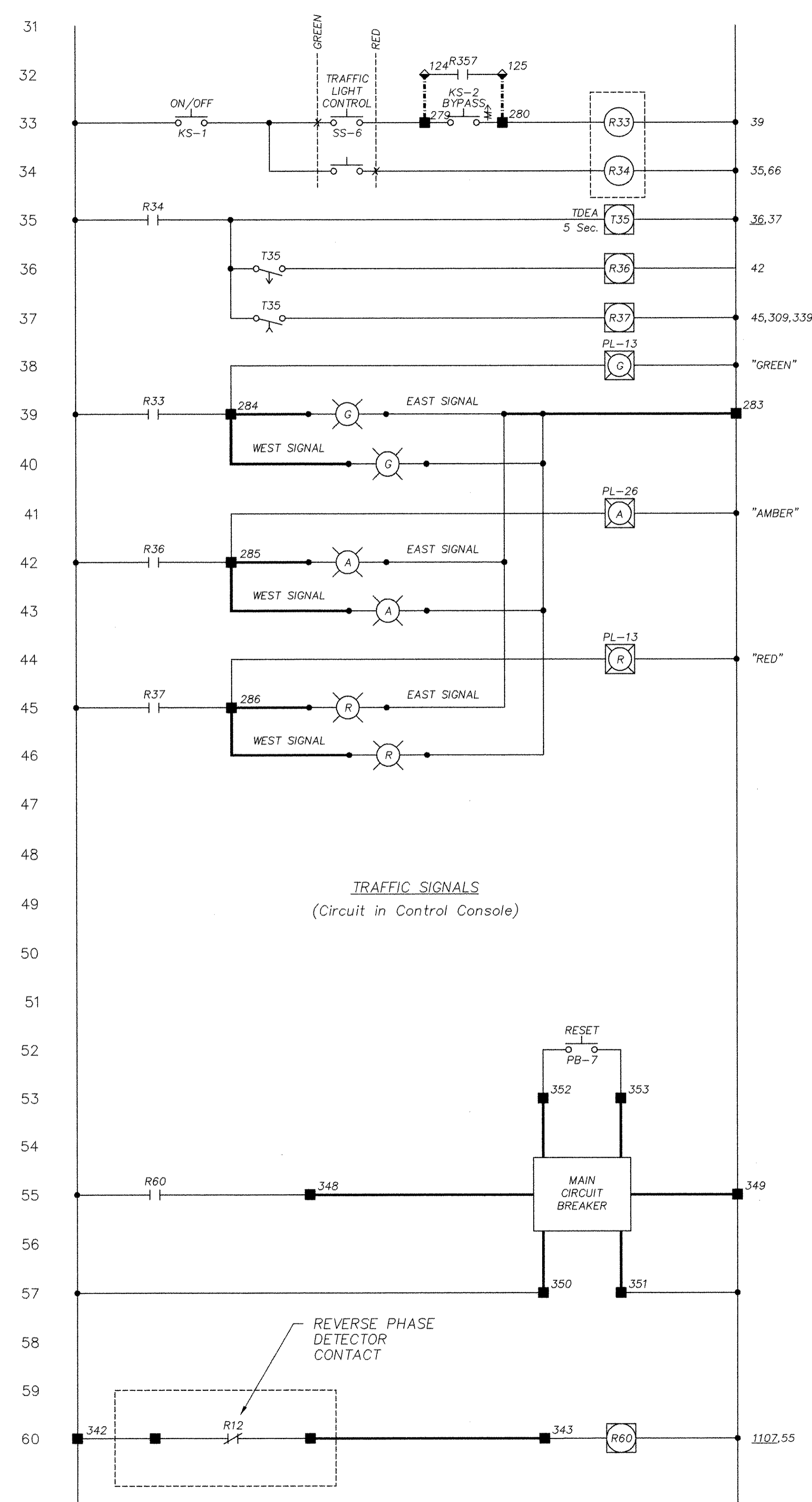
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	97	115



POWER LINE METERING

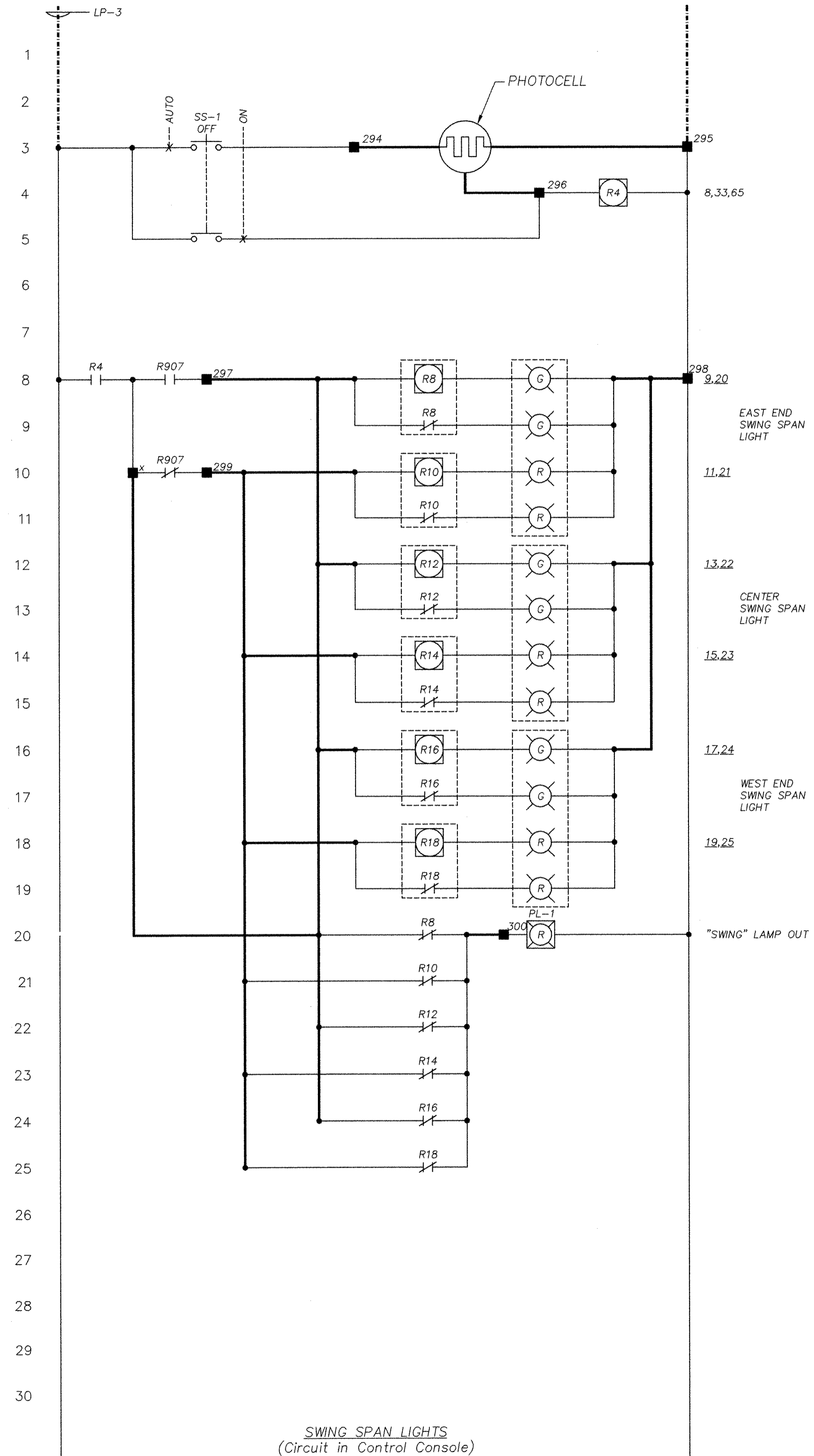


AIR HORN
(Circuit in Control Console)

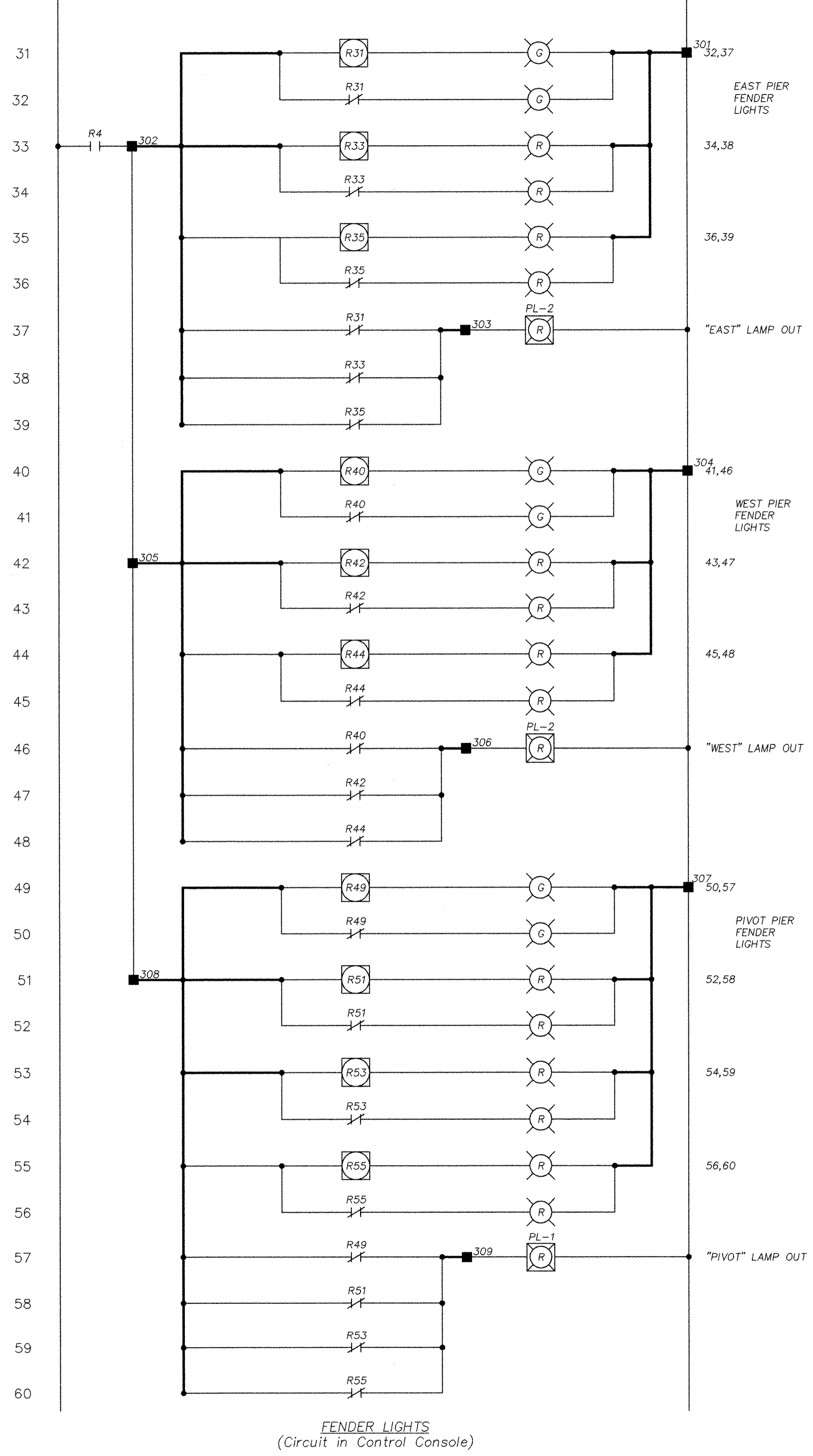


HNTB ARCHITECTS ENGINEERS PLANNERS <small>The HNTB Companies</small>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
SCHEMATIC NO. 1			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-21

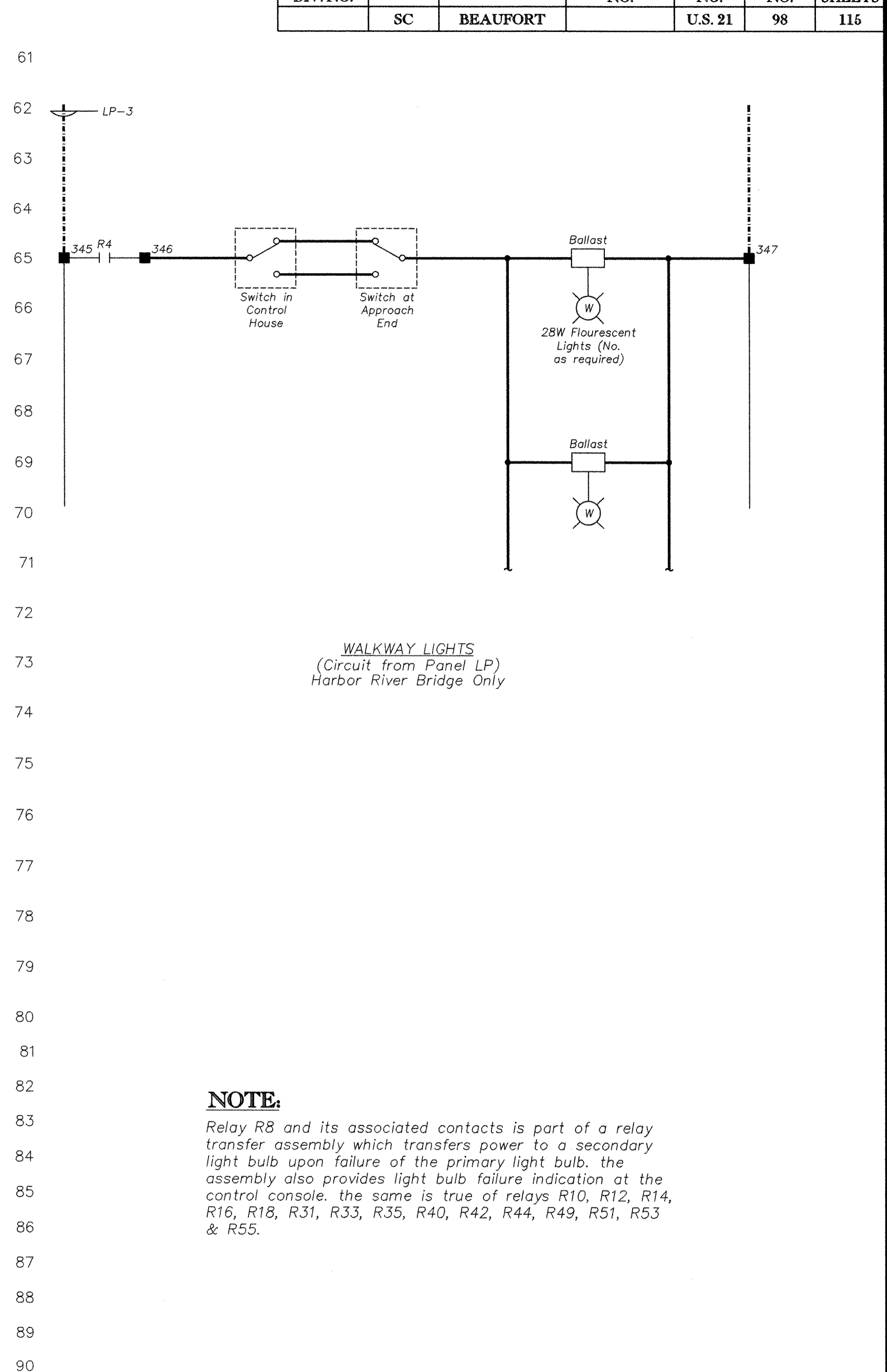
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	98	116



SWING SPAN LIGHTS
(Circuit in Control Console)



FENDER LIGHTS
(Circuit in Control Console)



WALKWAY LIGHTS
(Circuit from Panel LP)
Harbor River Bridge Only

NOTE:
Relay R8 and its associated contacts is part of a relay transfer assembly which transfers power to a secondary light bulb upon failure of the primary light bulb. the assembly also provides light bulb failure indication at the control console. the same is true of relays R10, R12, R14, R16, R18, R31, R33, R35, R40, R42, R44, R49, R51, R53 & R55.

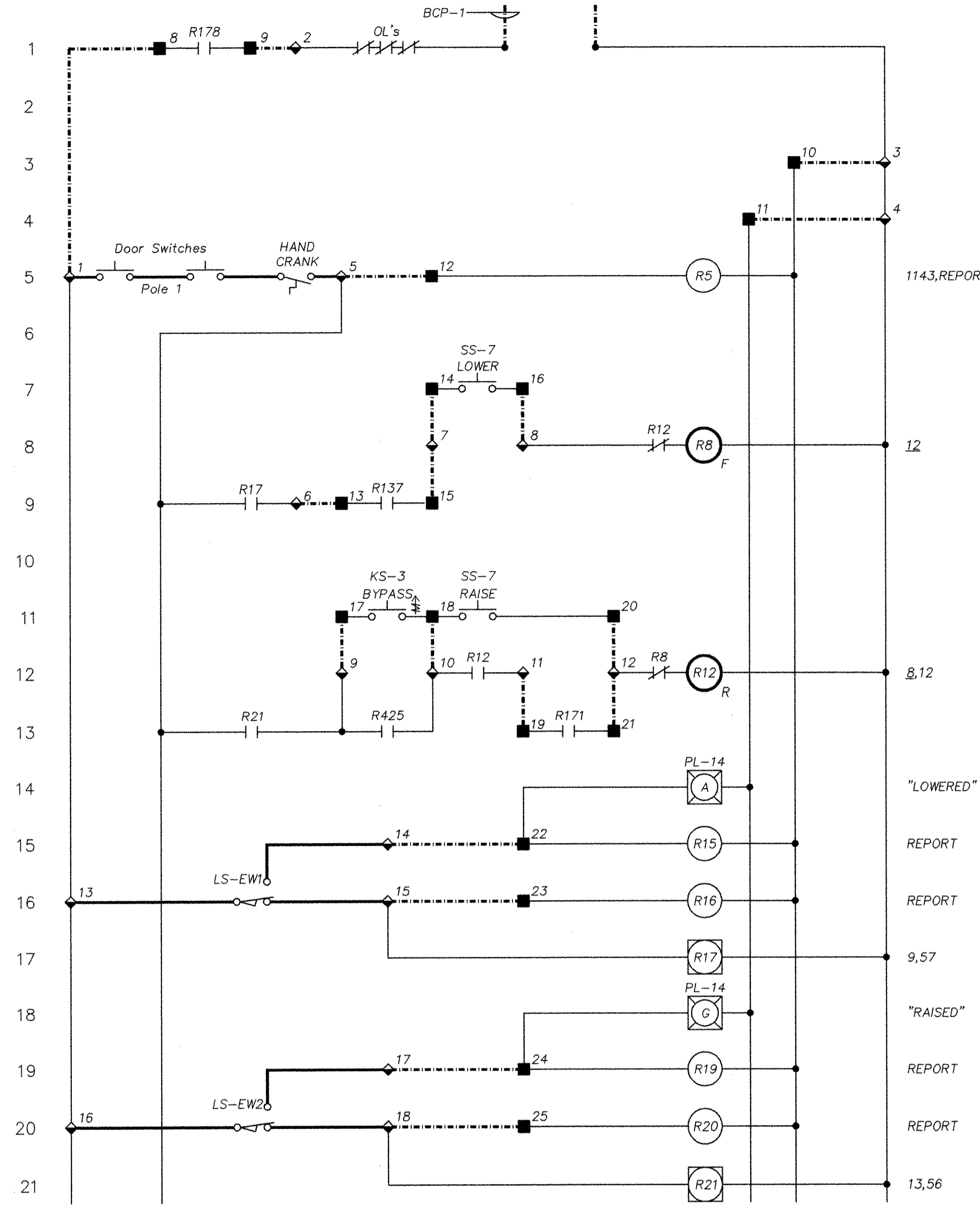
HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

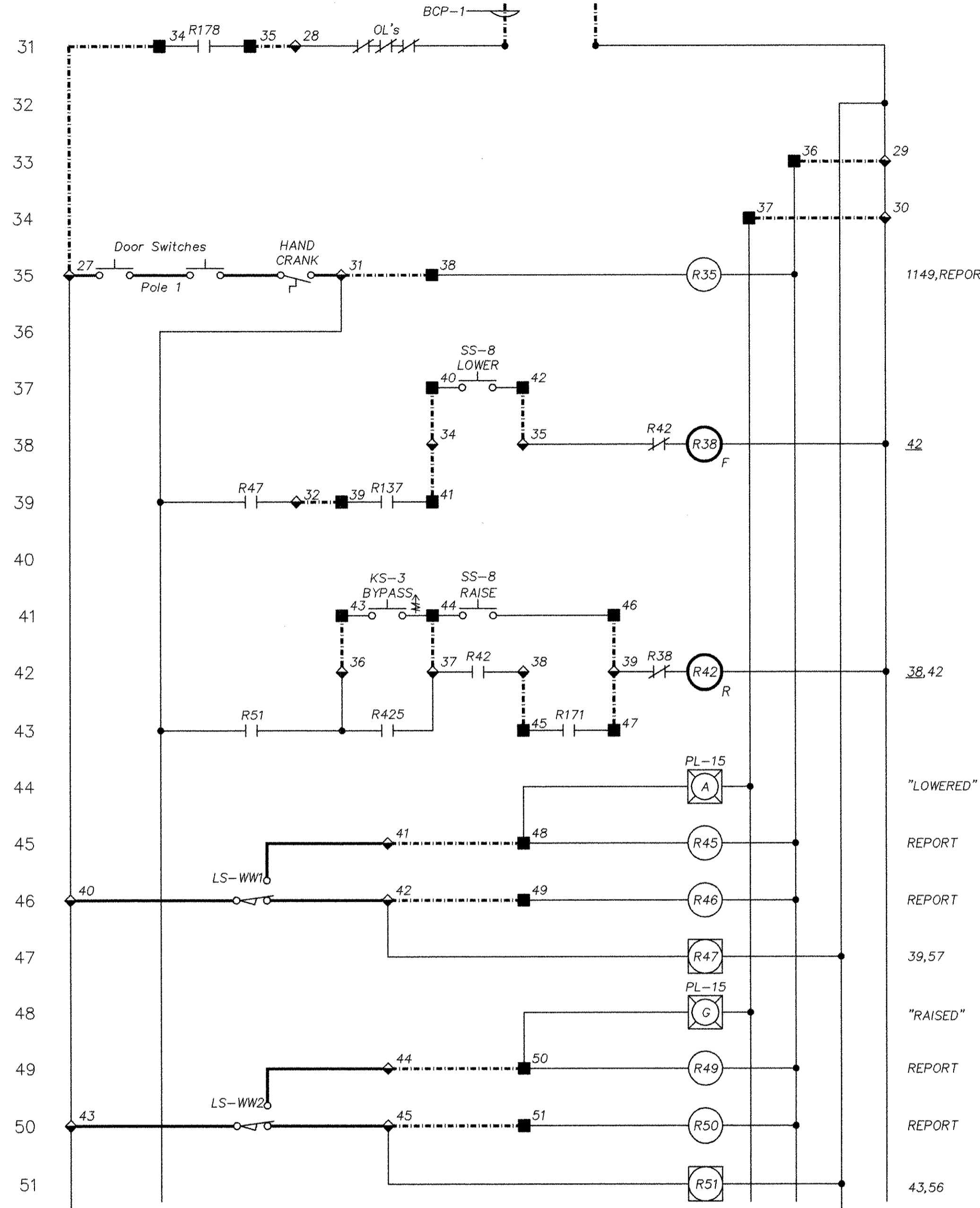
SCHEMATIC NO. 2

REV.			
REV.			
REV.			
REVIEWED			
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DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK	DATE	

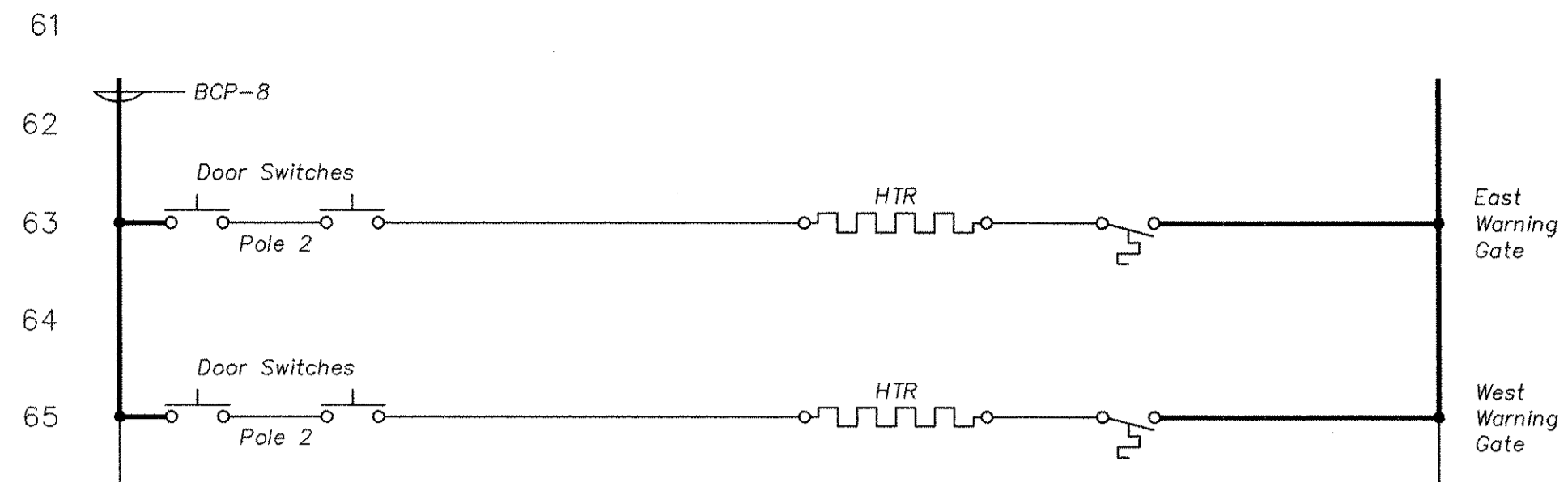
FILE NO.	ROUTE U.S. 21	COUNTY BEAUFORT	DRAWING NO. E22
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EAST WARNING GATE
(Circuit in Cabinet #4)



WEST WARNING GATE
(Circuit in Cabinet #4)



WARNING GATE HEATERS

LIMIT SWITCH CONTACT DEVELOPMENT

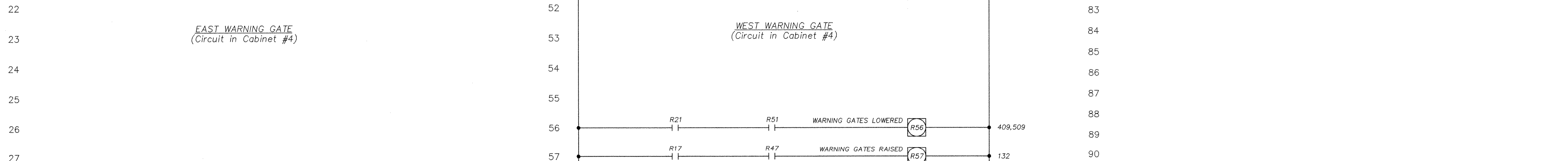
CONTACT	FULLY LOWERED	OPERATOR POSITION	FULLY RAISED	FUNCTION THIS DWG OR DWG WHERE CONTACT IS SHOWN
LS-EW1				LOWER LIMIT
LS-EW1				IND LIGHT
LS-EW2				RAISE LIMIT
LS-EW2				IND LIGHT

EAST WARNING GATE

LIMIT SWITCH CONTACT DEVELOPMENT

CONTACT	FULLY LOWERED	OPERATOR POSITION	FULLY RAISED	FUNCTION THIS DWG OR DWG WHERE CONTACT IS SHOWN
LS-WW1				LOWER LIMIT
LS-WW1				IND LIGHT
LS-WW2				RAISE LIMIT
LS-WW2				IND LIGHT

WEST WARNING GATE



HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

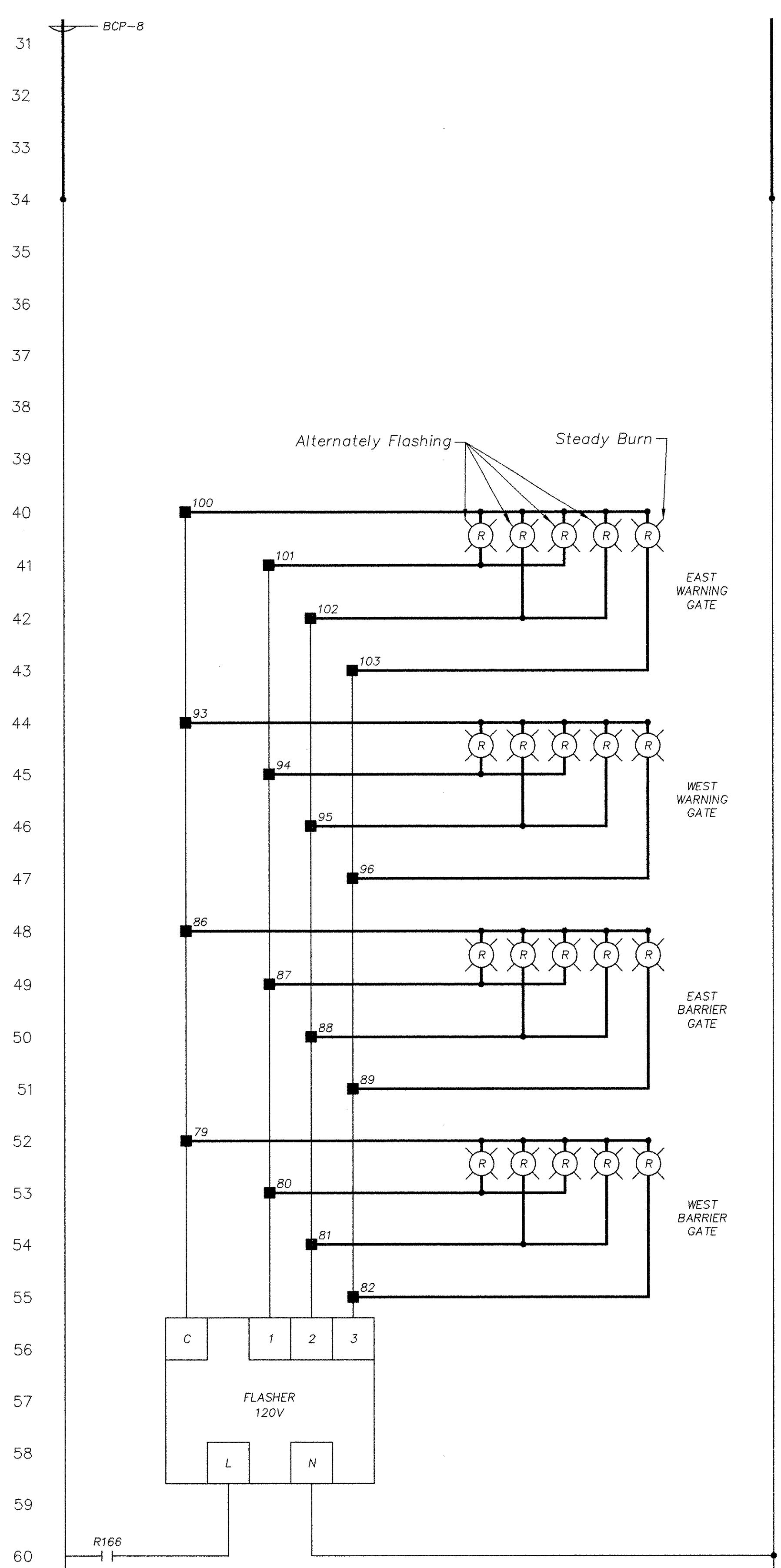
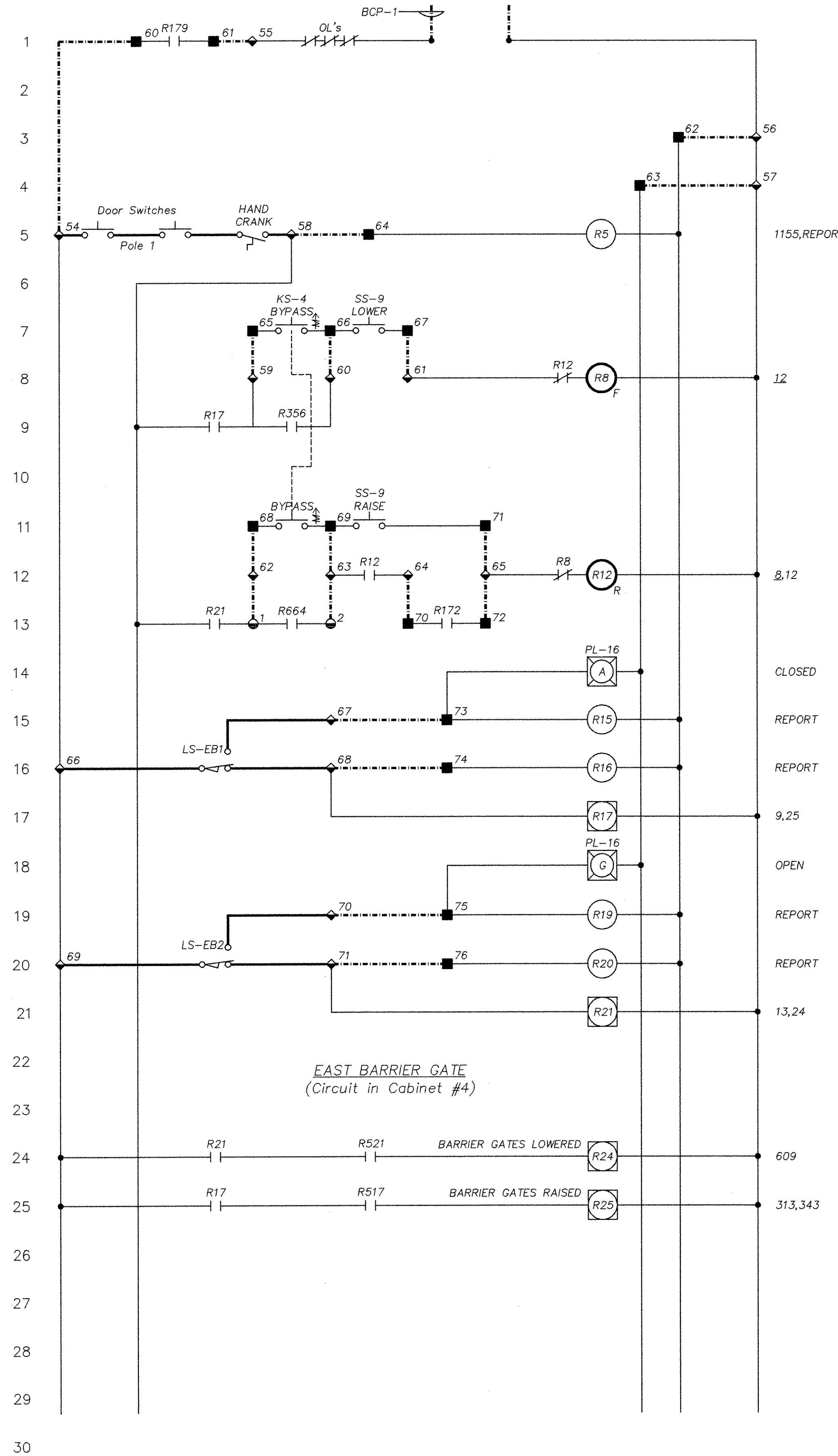
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

SCHEMATIC NO. 3

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK	DATE	

FILE NO.	ROUTE U.S. 21	COUNTY BEAUFORT	DRAWING NO. E-23
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FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	100	115



EAST BARRIER GATE 61
 WEST BARRIER GATE 62
 EAST WARNING GATE 63
 WEST WARNING GATE 64
 EAST BARRIER GATE 65
 WEST BARRIER GATE 66
 EAST WARNING GATE 67
 WEST WARNING GATE 68
 EAST BARRIER GATE 69
 WEST BARRIER GATE 70
 EAST WARNING GATE 71
 WEST WARNING GATE 72
 EAST BARRIER GATE 73
 WEST BARRIER GATE 74
 EAST WARNING GATE 75
 WEST WARNING GATE 76
 EAST BARRIER GATE 77
 WEST BARRIER GATE 78
 EAST WARNING GATE 79
 WEST BARRIER GATE 80
 EAST BARRIER GATE 81
 WEST BARRIER GATE 82
 EAST WARNING GATE 83
 WEST BARRIER GATE 84
 EAST BARRIER GATE 85
 WEST BARRIER GATE 86
 EAST WARNING GATE 87
 WEST BARRIER GATE 88
 EAST BARRIER GATE 89
 WEST BARRIER GATE 90

GATE FLASHER CIRCUIT
 (Circuit in Control Console)

NOTE:
 Refer to Mechanical Drawing(s) for
 actual quantity of lamps.

HNTB ARCHITECTS ENGINEERS PLANNERS
 The HNTB Companies

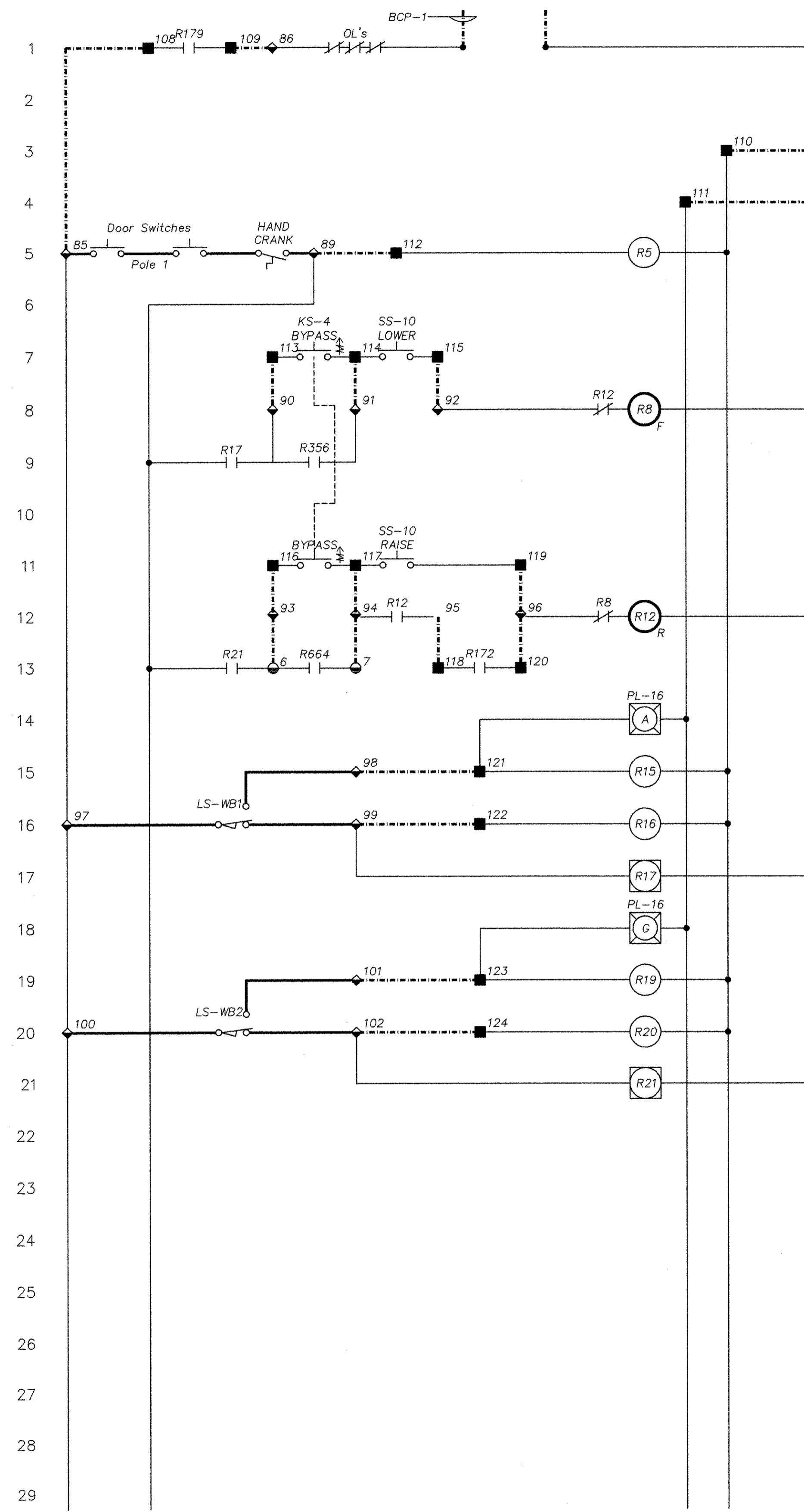
SOUTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 BRIDGE DESIGN COLUMBIA, S.C.

SCHEMATIC NO. 4

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK	DATE	

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-24

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	101	116

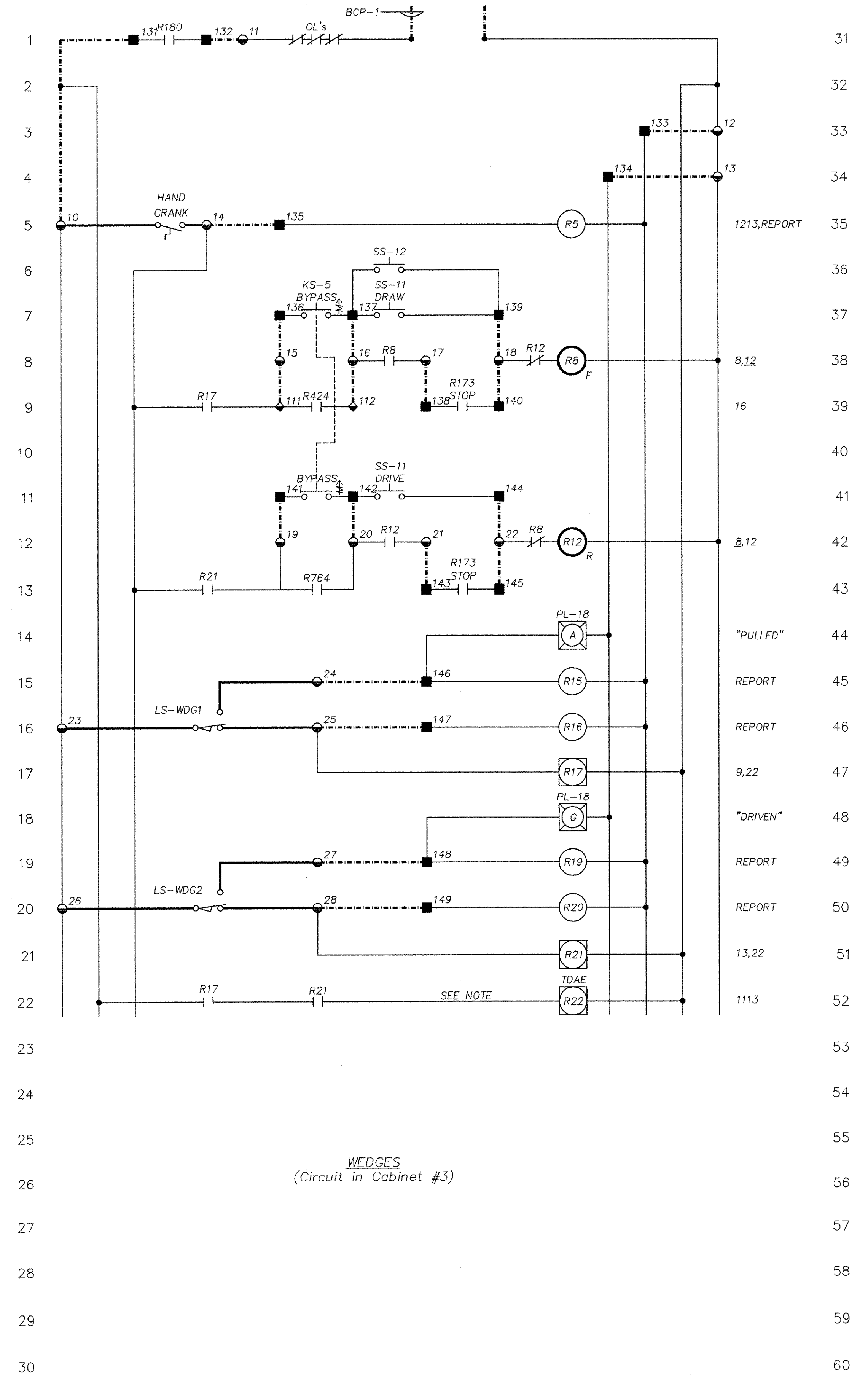


31	61
32	62
33	63
34	64
35	65
36	66
37	67
38	68
39	69
40	70
41	71
42	72
43	73
44	74
45	75
46	76
47	77
48	78
49	79
50	80
51	81
52	82
53	83
54	84
55	85
56	86
57	87
58	88
59	89
60	90

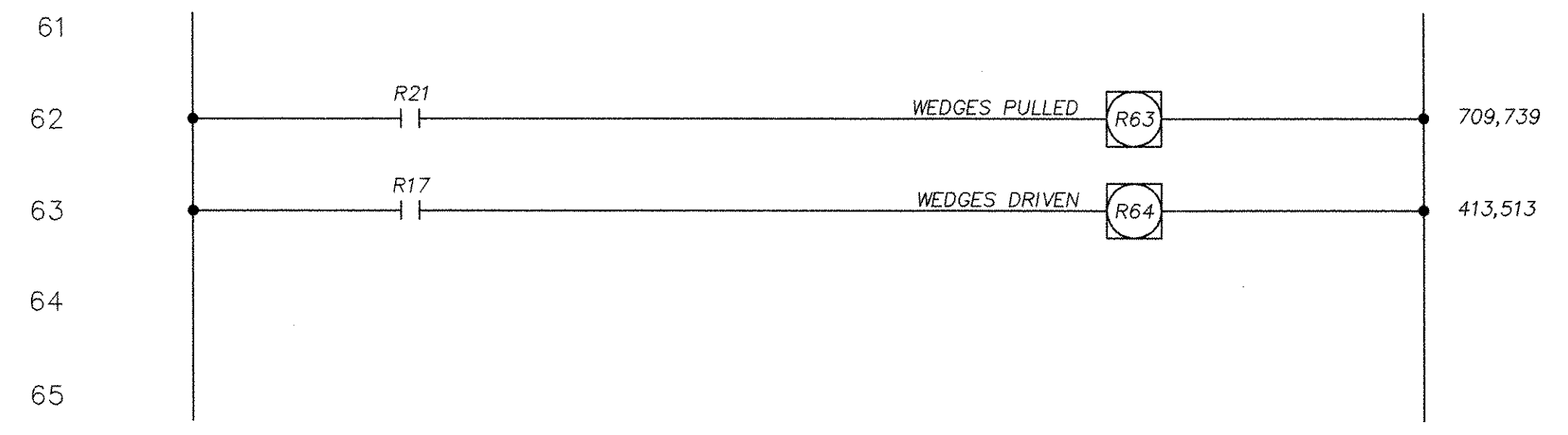
WEST BARRIER GATE
(Circuit in Cabinet #4)

HNTB ARCHITECTS ENGINEERS PLANNERS <small>The HNTB Companies</small>				
				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.
REV.				SCHEMATIC NO. 5
REV.				
REV.				
REV.				
REVIEWED				FILE NO. ROUTE COUNTY DRAWING NO. U.S. 21 BEAUFORT E-25
QUAN.	MAW	ALB	2-97	
DR.	MDC	ALB	2-97	
DES.	MAW	ALB	2-97	
BY	CHK	DATE		

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	102	115



WEDGES
(Circuit in Cabinet #3)



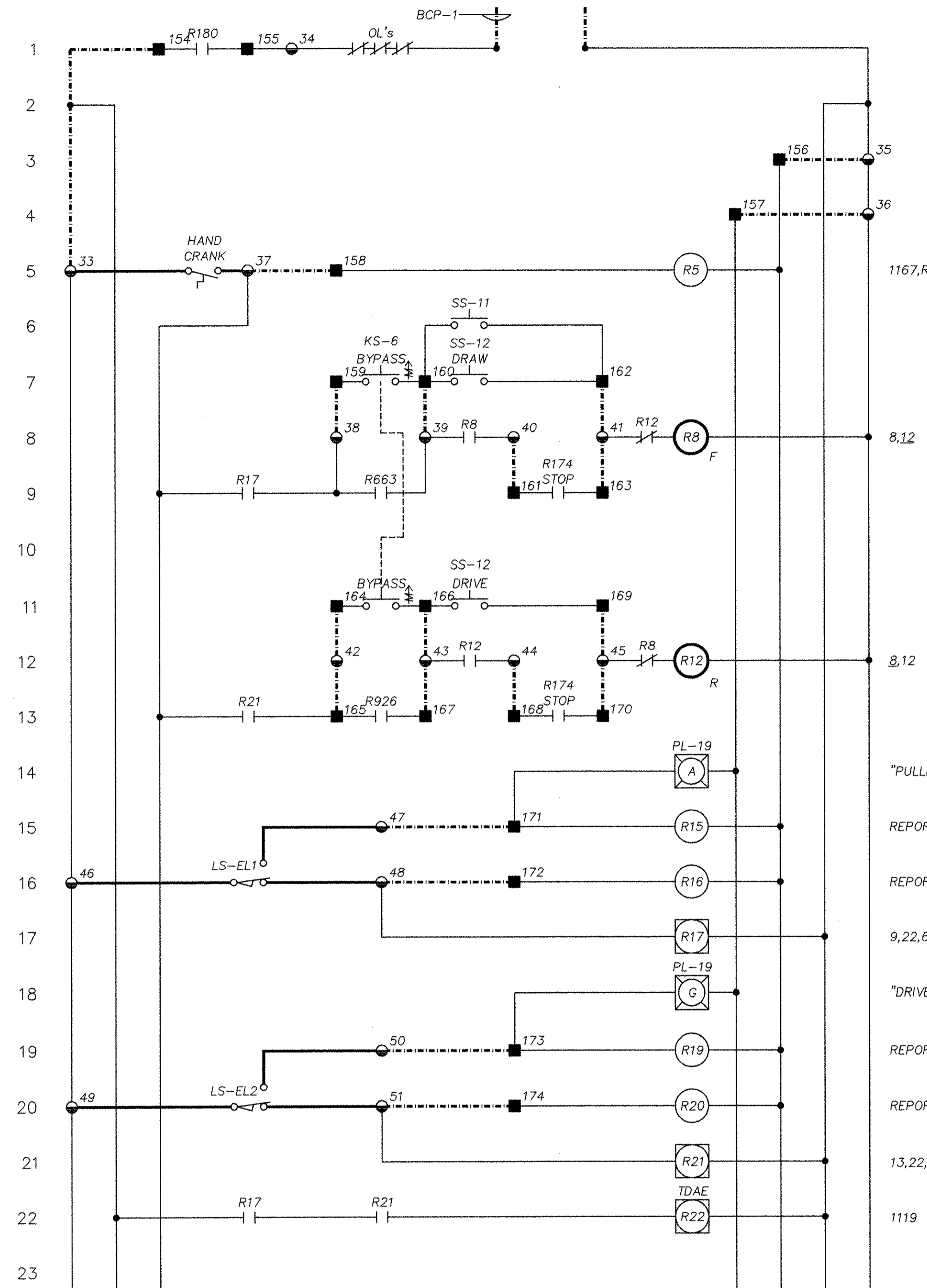
LIMIT SWITCH CONTACT DEVELOPMENT

CONTACT	FULLY PULLED	OPERATOR POSITION	FULLY DRIVEN	FUNCTION THIS DWG OR DWG WHERE CONTACT IS SHOWN
LS-WDG1				DRAWN LIMIT
LS-WDG1				IND LIGHT
LS-WDG2				DRIVEN LIMIT
LS-WDG2				IND LIGHT

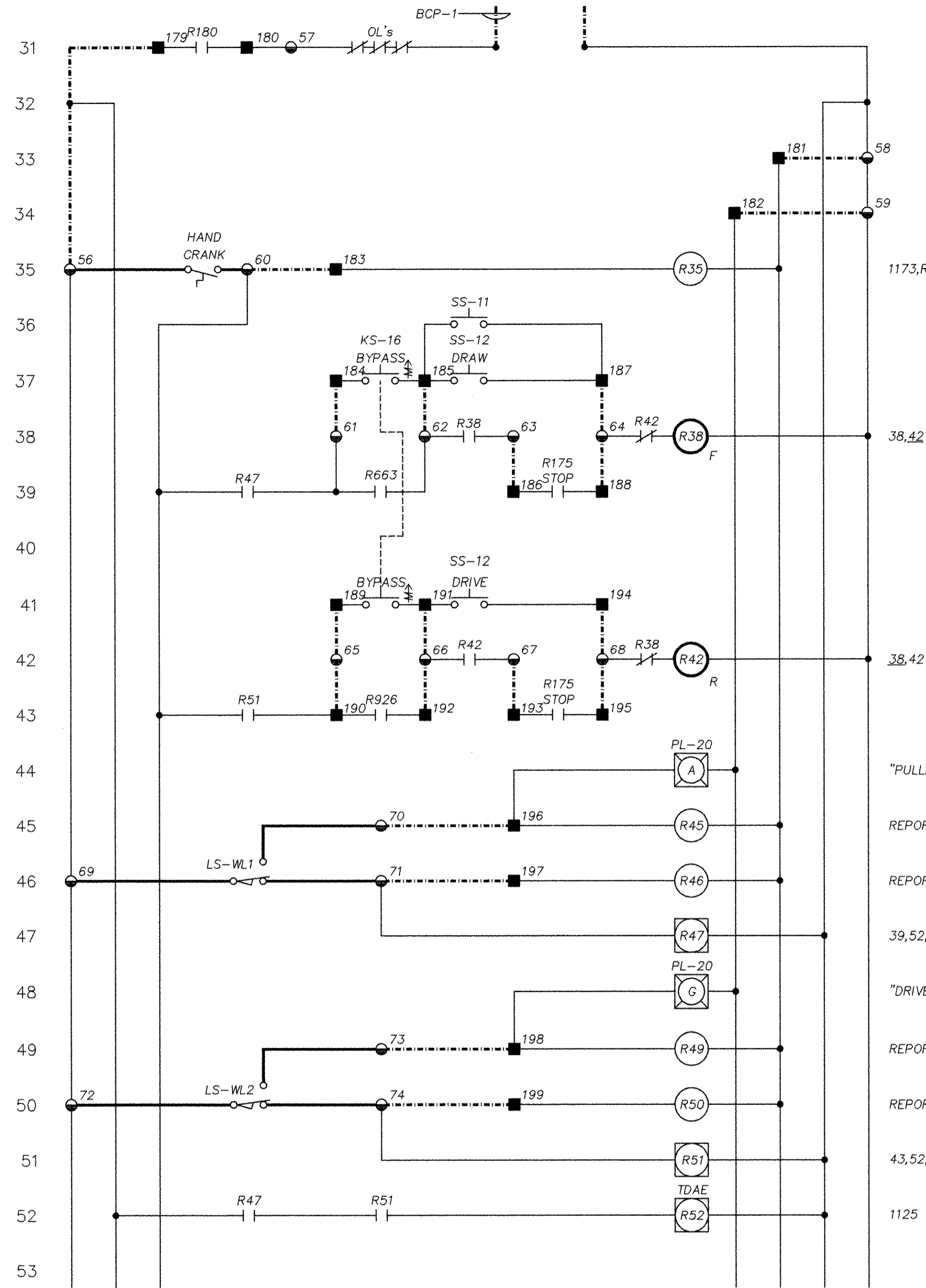
NOTE: TIME LIMIT TO BE SET 10 SECONDS LONGER THAN LOCK OPERATION TIME.

WEDGES

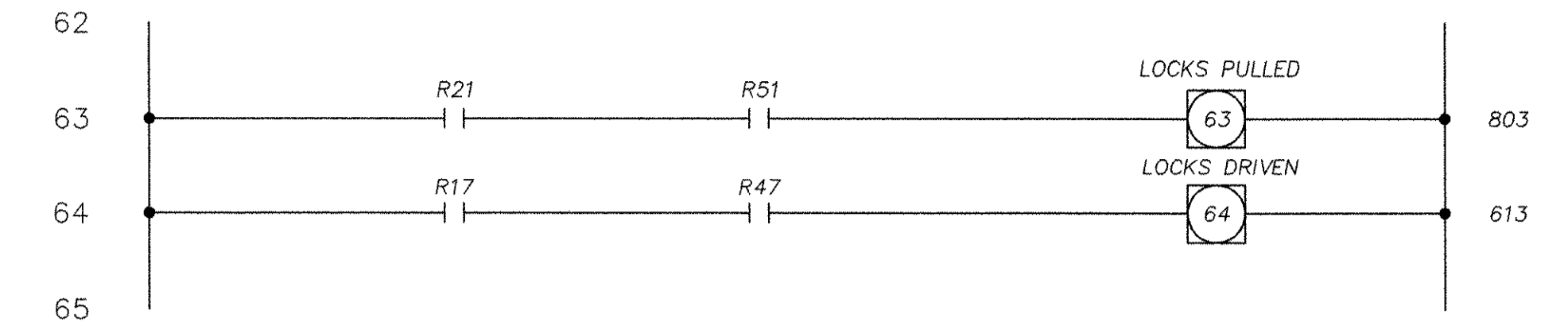
HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
SCHEMATIC NO. 6			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK.	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-26



EAST CENTERING LOCK
(Circuit in Cabinet #3)



WEST CENTERING LOCK
(Circuit in Cabinet #3)



LIMIT SWITCH CONTACT DEVELOPMENT

CONTACT	FULLY PULLED	OPERATOR POSITION	FULLY DRIVEN	FUNCTION THIS DWG OR DWG WHERE CONTACT IS SHOWN
LS-EL1				DRAWN LIMIT
LS-EL1				IND LIGHT
LS-EL2				DRIVEN LIMIT
LS-EL2				IND LIGHT

NOTE: TIME LIMIT TO BE SET 10 SECONDS LONGER THAN LOCK OPERATION TIME.

EAST CENTERING LOCK

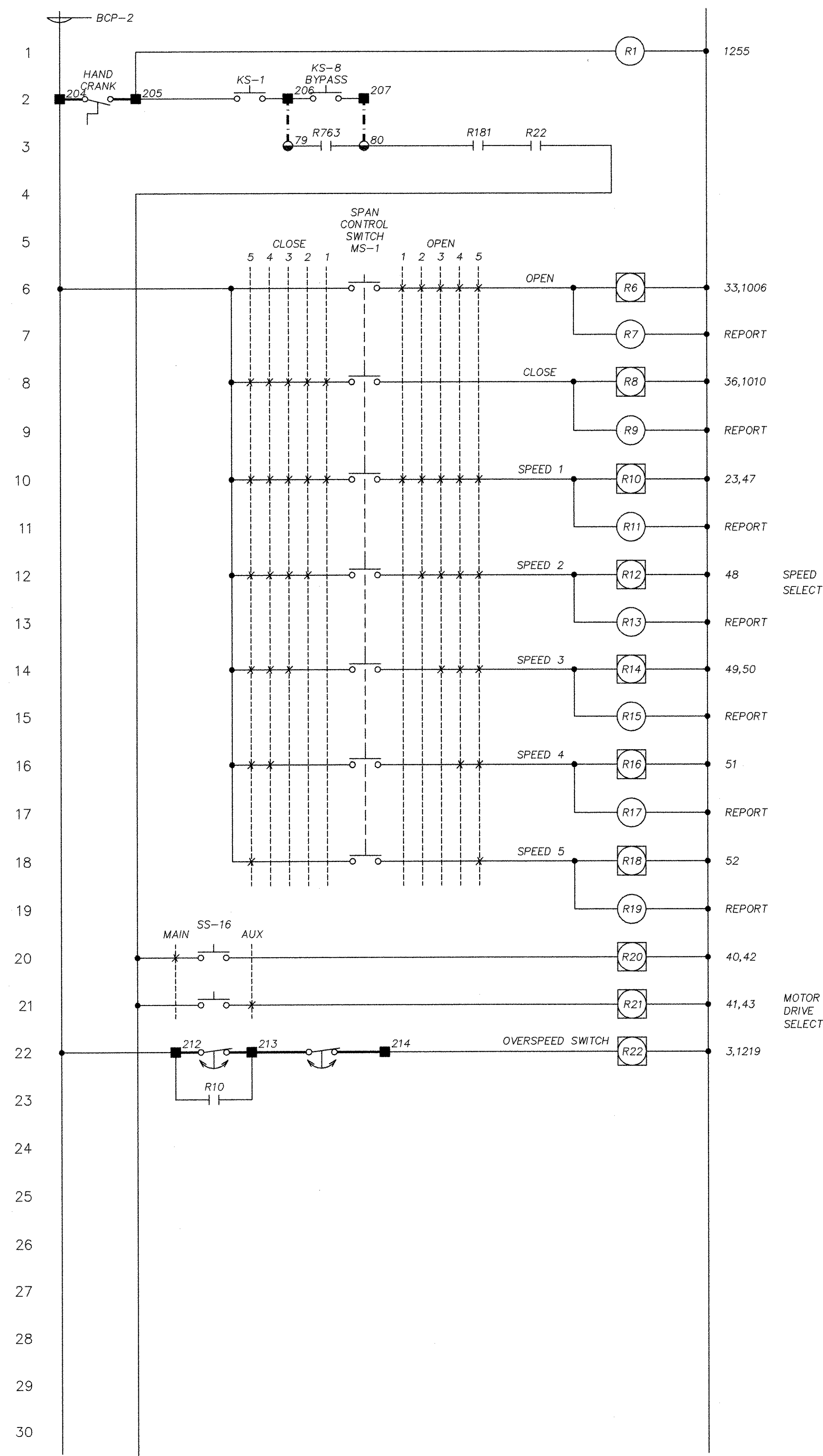
LIMIT SWITCH CONTACT DEVELOPMENT

CONTACT	FULLY PULLED	OPERATOR POSITION	FULLY DRIVEN	FUNCTION THIS DWG OR DWG WHERE CONTACT IS SHOWN
LS-WL1				DRAWN LIMIT
LS-WL1				IND LIGHT
LS-WL2				DRIVEN LIMIT
LS-WL2				IND LIGHT

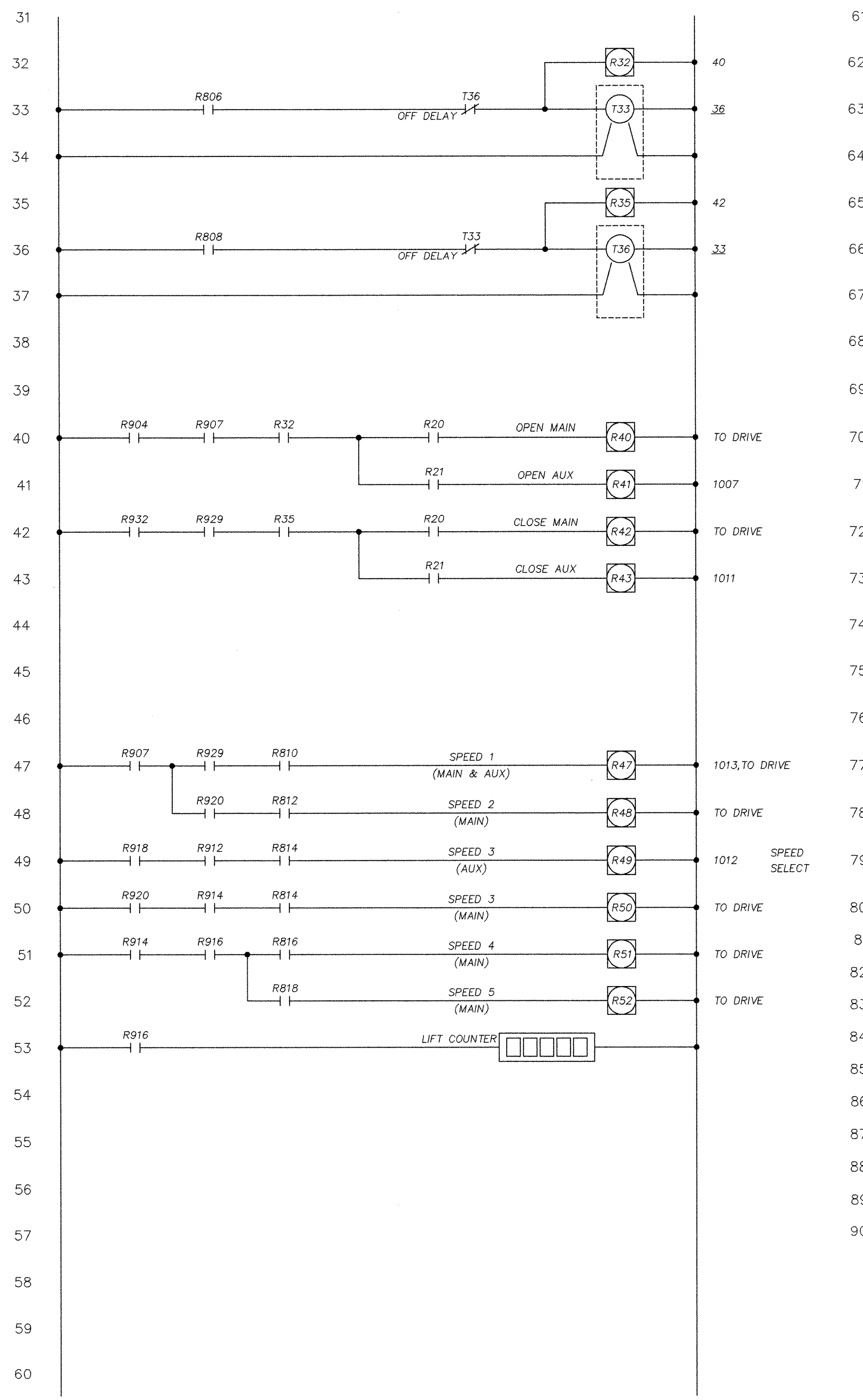
NOTE: TIME LIMIT TO BE SET 10 SECONDS LONGER THAN LOCK OPERATION TIME.

WEST CENTERING LOCK

HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
SCHEMATIC NO. 7			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK.	DATE	
FILE NO.	ROUTE U.S. 21	COUNTY BEAUFORT	DRAWING NO. E-27



SPAN CONTROL
(Circuit in Control Console)



SPAN CONTROL
(Circuit in Control Console)

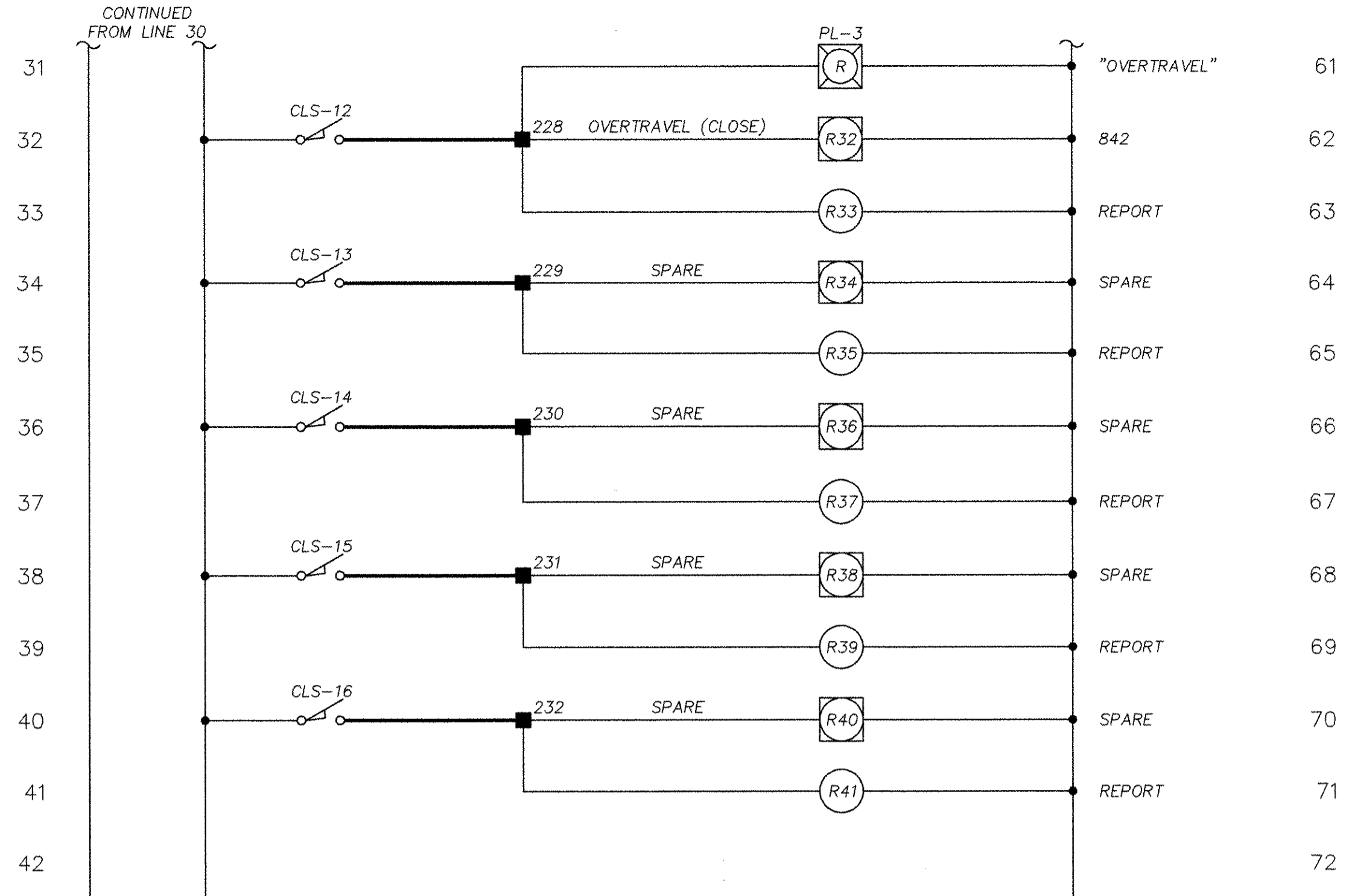
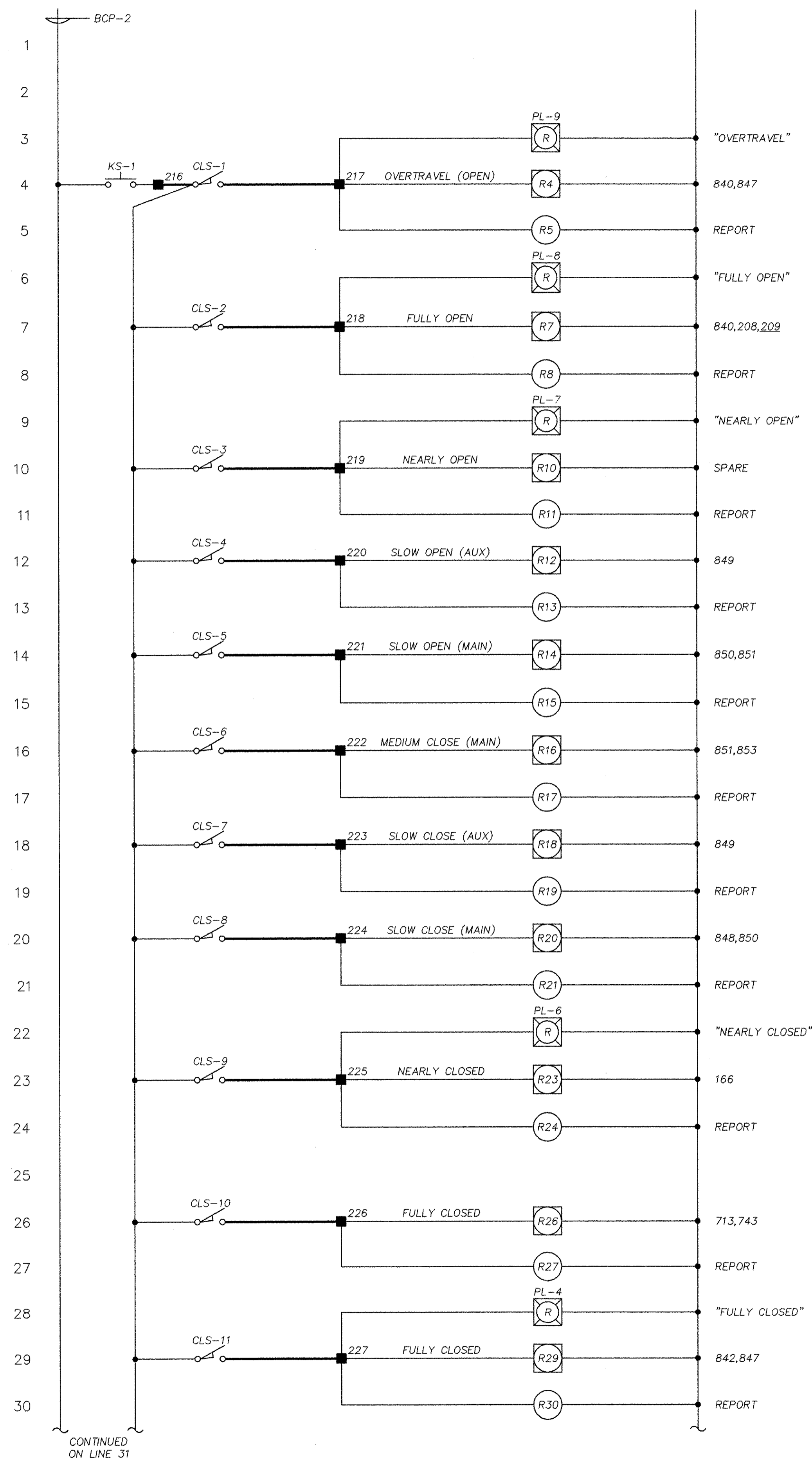
Span Speeds Harbor River Bridge			
Span Control Switch Position	Maximum Speed		
	Main Motor	Aux. Motor	
1	106	438	
2	212	438	
3	530	1750	
4	760	1750	
5	1060	1750	

Span Speeds Lady's Island Bridge			
Span Control Switch Position	Maximum Speed		
	Main Motor	Aux. Motor	
1	115	438	
2	230	438	
3	575	1750	
4	800	1750	
5	1150	1750	

Note: Signals wired to the DC drive for the main motor are shown on Drawing E-19 (Drive Control Diagram).

HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
SCHEMATIC NO. 8			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK	DATE	
FILE NO.	ROUTE U.S. 21	COUNTY BEAUFORT	DRAWING NO. E-28

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	105	115



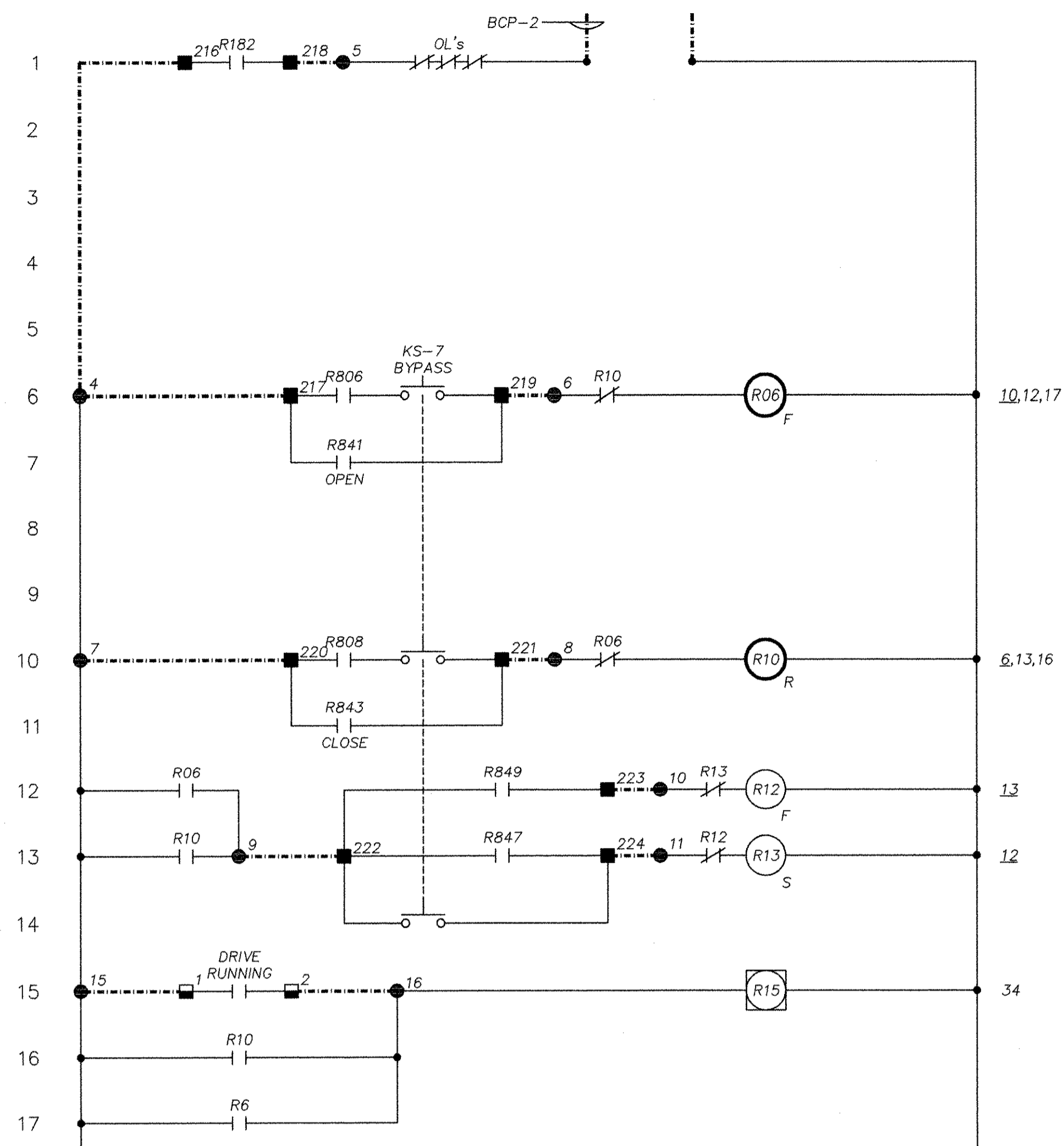
SPAN POSITION
CAM LIMIT SWITCH
(Circuit in Control Console)

NOTE:
Contacts identified by "spare"
denote spare contacts for future
use.

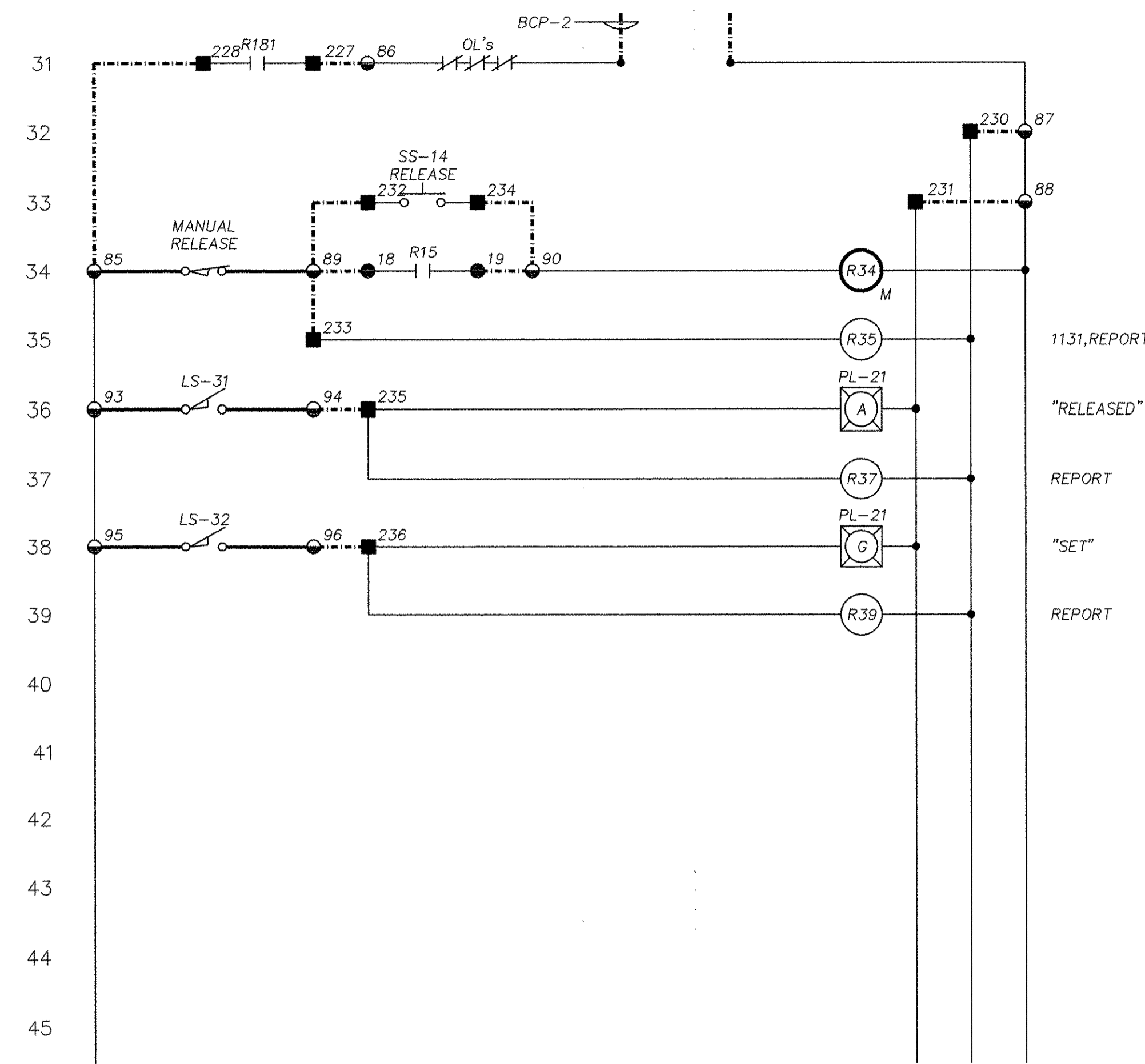
CONTINUED
ON LINE 31

CONTINUED
FROM LINE 30

HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
SCHEMATIC NO. 9			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK	DATE	
FILE NO.	ROUTE U.S. 21	COUNTY BEAUFORT	DRAWING NO. E-29



AUXILIARY SPAN MOTOR
(Circuit in Cabinet #2)



MACHINERY BRAKE
(Circuit in Cabinet #3)

CAM LIMIT SWITCH CONTACT DEVELOPMENT

CONTACT	FULLY CLOSED	← OPERATOR POSITION →	FULLY OPEN	FUNCTION
CLS-1				Overtravel Open
CLS-2				Fully Open
CLS-3				Nearly Open
CLS-4				Slow Open Limit (Aux. Mtr.)
CLS-5				Slow Open Limit (Main. Mtr.)
CLS-6				Med. Close Limit (Main Mtr.)
CLS-7				Slow Close Limit (Aux. Mtr.)
CLS-8				Slow Close Limit (Main. Mtr.)
CLS-9				Nearly Closed
CLS-10				Nearly Aligned
CLS-11				Fully Aligned
CLS-12				Overtravel Close
CLS-13				SPARE
CLS-14				SPARE
CLS-15				SPARE
CLS-16				SPARE

0' 3.42' 5.95' 20.71' 79.37' 84.05' 85.41' 90'

HARBOR RIVER BRIDGE

CAM LIMIT SWITCH CONTACT DEVELOPMENT

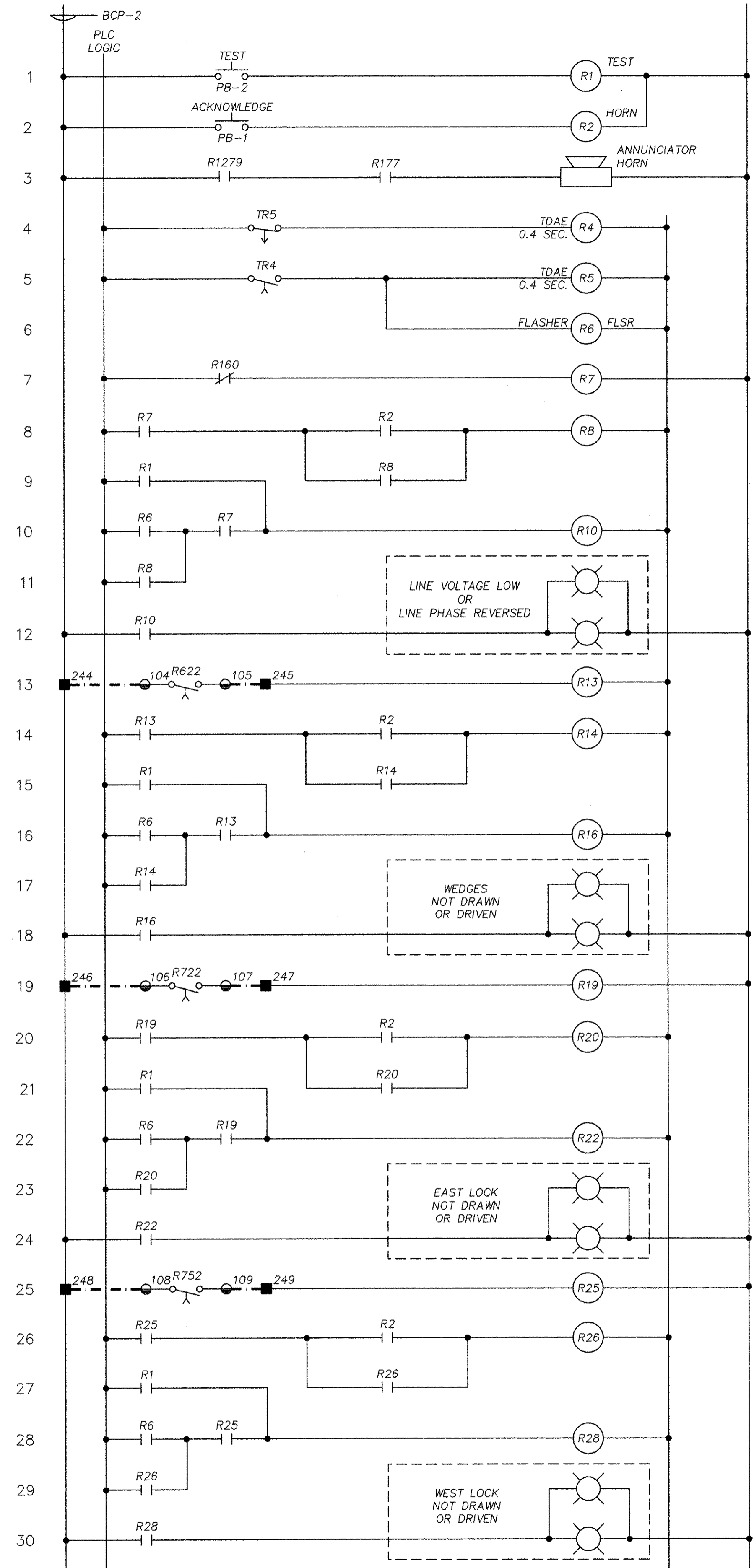
CONTACT	FULLY CLOSED	← OPERATOR POSITION →	FULLY OPEN	FUNCTION
CLS-1				Overtravel Open
CLS-2				Fully Open
CLS-3				Nearly Open
CLS-4				Slow Open Limit (Aux. Mtr.)
CLS-5				Slow Open Limit (Main. Mtr.)
CLS-6				Med. Close Limit (Main Mtr.)
CLS-7				Slow Close Limit (Aux. Mtr.)
CLS-8				Slow Close Limit (Main. Mtr.)
CLS-9				Nearly Closed
CLS-10				Nearly Aligned
CLS-11				Fully Aligned
CLS-12				Overtravel Close
CLS-13				SPARE
CLS-14				SPARE
CLS-15				SPARE
CLS-16				SPARE

0' 2.48' 3.76' 7.11' 21.15' 69.55' 75.25' 77.00' 80'

LADY'S ISLAND BRIDGE

SCHEMATIC NO. 10

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK	DATE	



9,15,21,27,33,39,45,51,57,63,69,75,1301
8,14,20,26,32,38,44,50,56,62,68,74,1302

10,16,22,28,34,40,46,52,58,64,70,76,1206

14,16

15,17

18

20,22,81

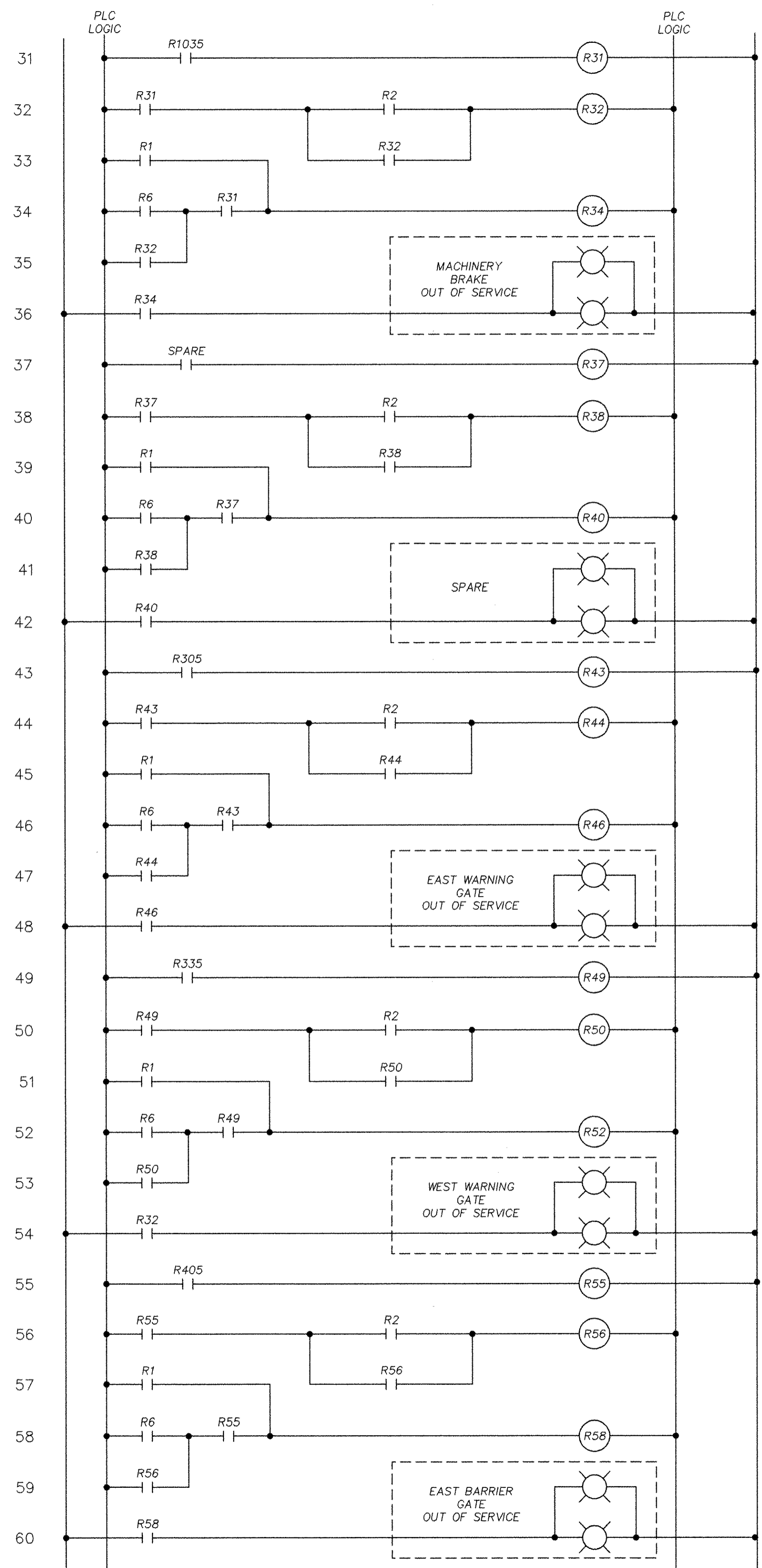
21,23,81

24

26,28,82

27,28,82

30



32,34,83

33,35,83

36

38,40,84

39,41,84

42

44,46,85

45,47,85

42

50,57,86

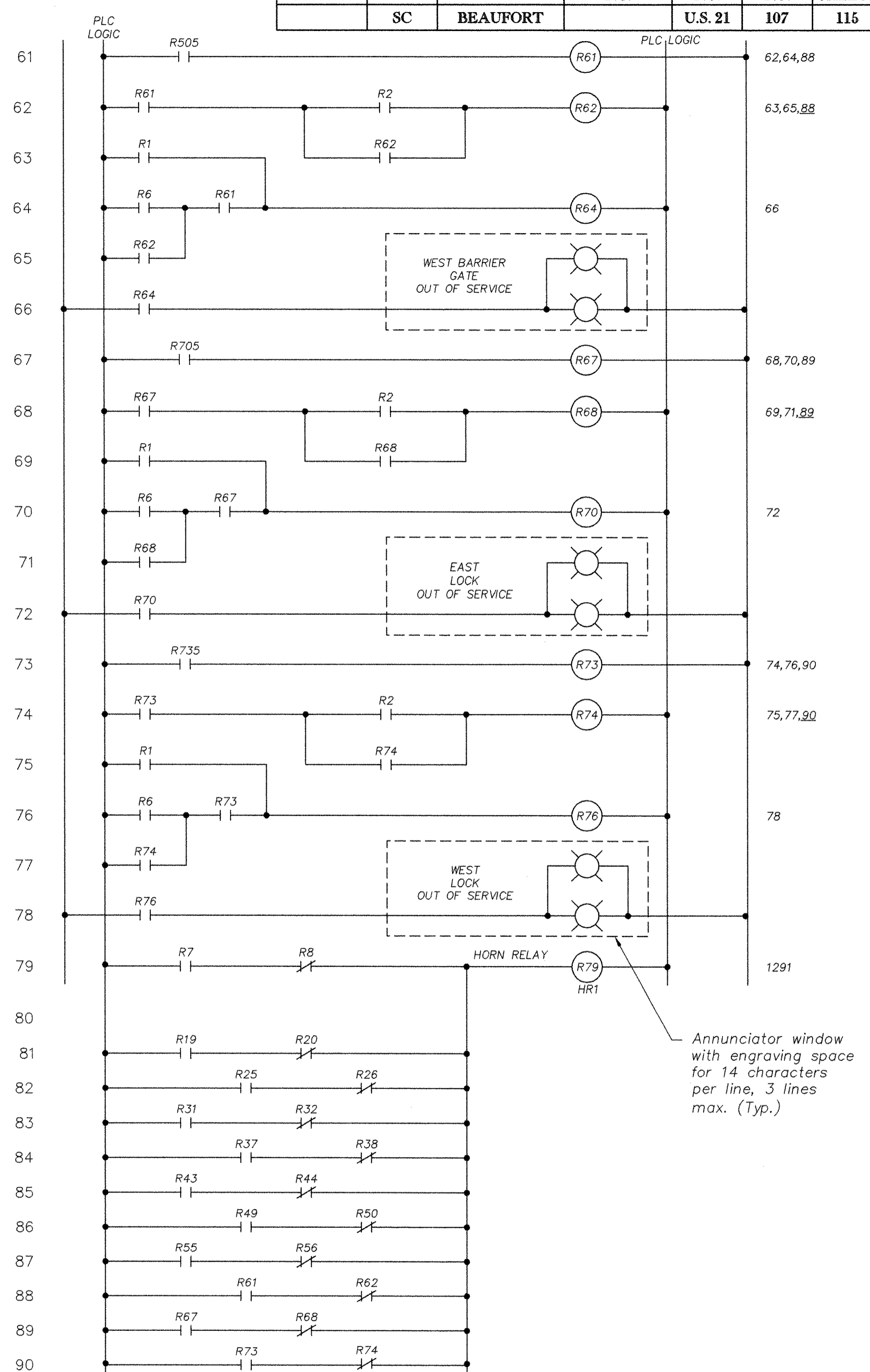
50,57,86

48

56,58,87

57,59,87

60



62,64,88

63,65,88

66

68,70,89

69,71,89

72

74,76,90

75,77,90

78

1291

Annunciator window with engraving space for 14 characters per line, 3 lines max. (Typ.)

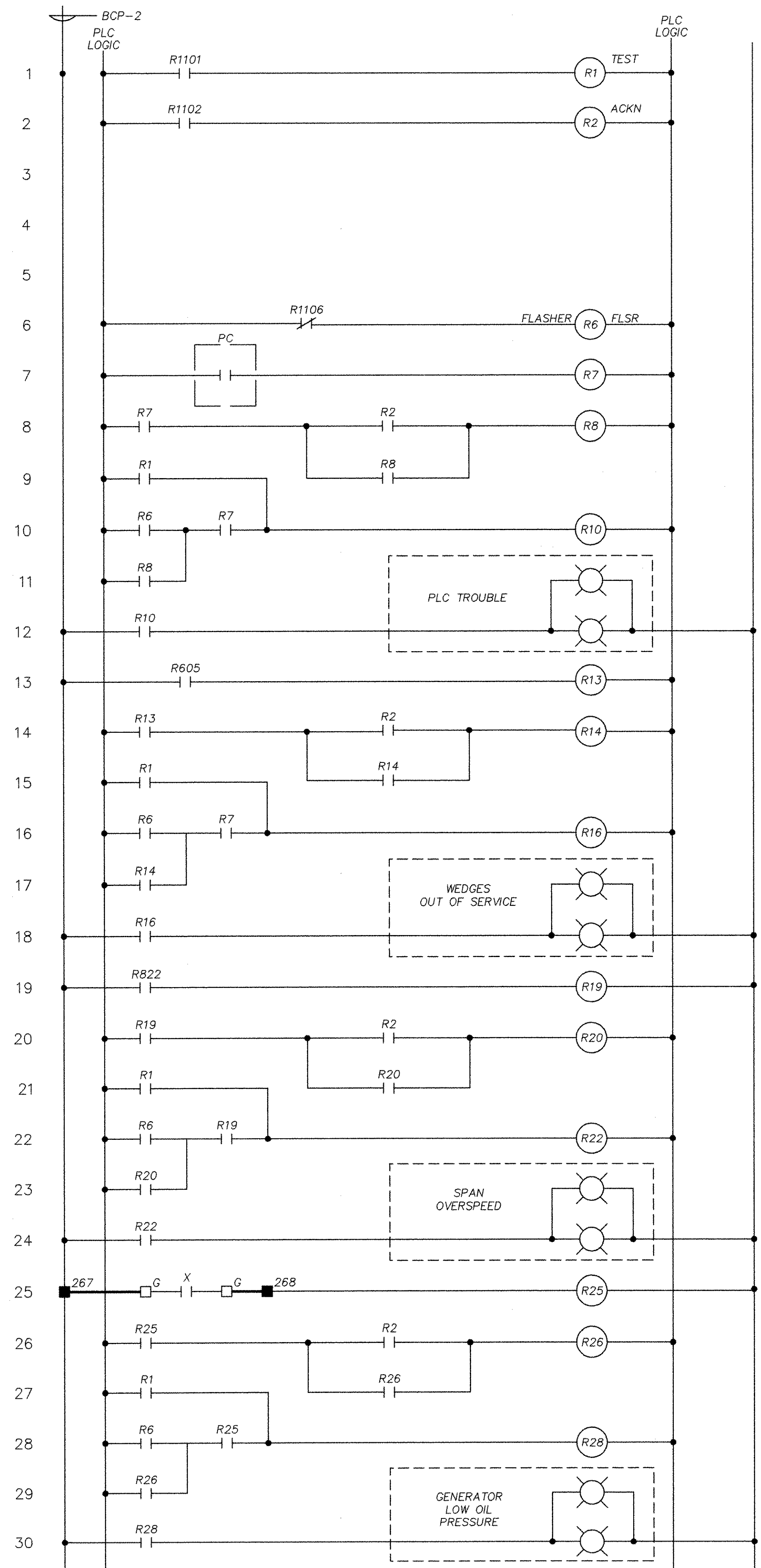
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK	DATE	

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

SCHEMATIC NO. 11

FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-51



9,15,21,27,33,
39,45,51,57,63,
69,75,1301
8,14,20,26,32,
38,44,50,56,62,
68,74,1302

5

4

10,16,22,28,34,
40,46,52,58,64,
70,76,1306

8,10,79

9,11,29

12

14,16

15,17

18

20,22,81

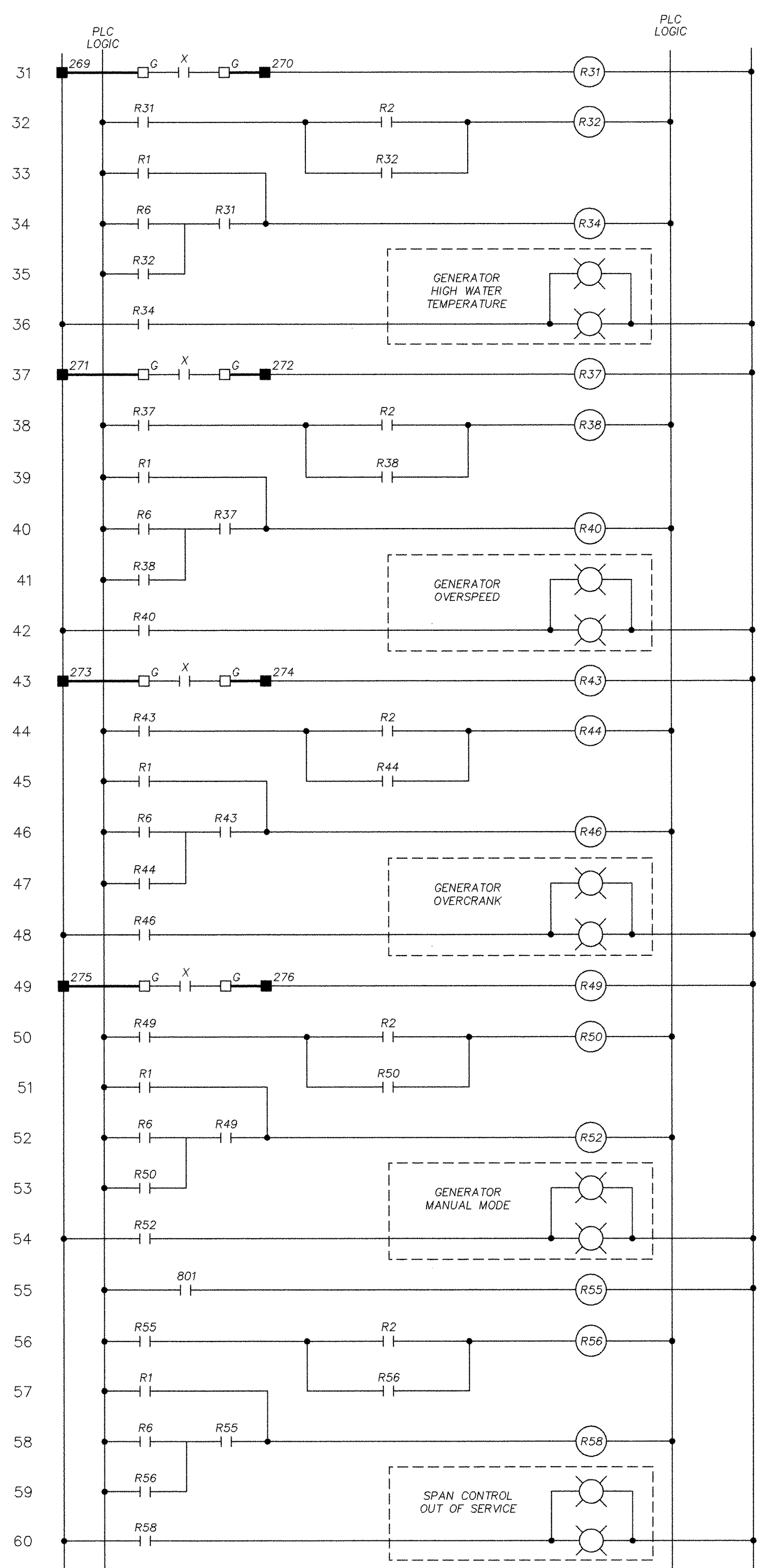
21,23,81

24

26,28,82

27,28,82

30



32,34,83

33,35,83

36

38,40,84

39,41,84

42

44,46,85

45,47,85

42

50,57,86

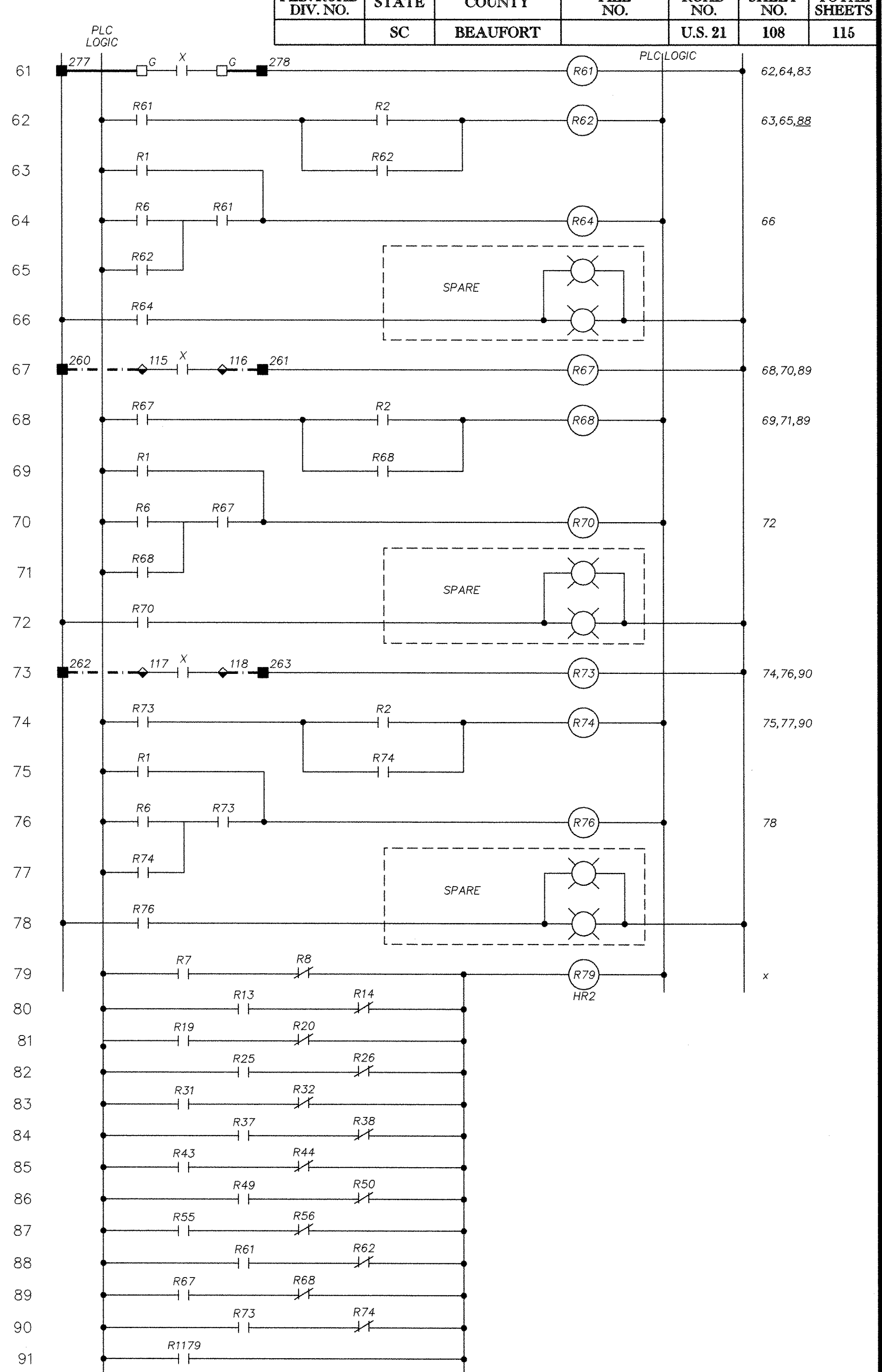
50,57,86

48

56,58,87

57,59,87

60



62,64,83

63,65,88

66

68,70,89

69,71,89

72

74,76,90

75,77,90

78

x

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	MAW	ALB	2-97
DR.	MDC	ALB	2-97
DES.	MAW	ALB	2-97
BY	CHK	DATE	

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

SCHEMATIC NO. 12

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	109	116

EQUIPMENT DESCRIPTION	OPERATION	LOCATION	RATING	MANUFACTURER	CATALOG #
FVR Starter with O.L. (horizontal)	Wedges	Cabinet 3	NEMA 00 - 460 V	Allen Bradley	505-TO
Eutectic O.L. w/Auto Reset (3)	Wedges	Cabinet 3		Allen Bradley	
FVR Starter with O.L. (horizontal)	E. Centering Lock	Cabinet 3	NEMA 00 - 460 V	Allen Bradley	505-TO
Eutectic O.L. w/Auto Reset (3)	E. Centering Lock	Cabinet 3		Allen Bradley	
FVR Starter with O.L. (horizontal)	W. Centering Lock	Cabinet 3	NEMA 00 - 460 V	Allen Bradley	505-TO
Eutectic O.L. w/Auto Reset (3)	W. Centering Lock	Cabinet 3		Allen Bradley	
FVNR Starter with O.L. (horizontal)	Span Machinery Brake	Cabinet 3	NEMA 00 - 460 V	Allen Bradley	509-TO
Eutectic O.L. w/Auto Reset (3)	Span Machinery Brake	Cabinet 3		Allen Bradley	
FVNR Starter with O.L. (horizontal)	Auxiliary Motor Clutch	Cabinet 2	NEMA 00 - 460 V	Allen Bradley	509-TO
Eutectic O.L. w/Auto Reset (3)	Auxiliary Motor Clutch	Cabinet 2		Allen Bradley	
2S-FVR Starter with O.L. (horizontal)	Span Auxiliary Motor	Cabinet 2	NEMA 2 - 460 V	Allen Bradley	520E-CO
Eutectic O.L. w/Auto Reset (3)	Span Auxiliary Motor	Cabinet 2		Allen Bradley	
FVR Starter with O.L. (horizontal)	E. Warning Gate	Cabinet 4	NEMA 00 - 460 V	Allen Bradley	505-TO
Eutectic O.L. w/Auto Reset (3)	E. Warning Gate	Cabinet 4		Allen Bradley	
FVR Starter with O.L. (horizontal)	W. Warning Gate	Cabinet 4	NEMA 00 - 460 V	Allen Bradley	505-TO
Eutectic O.L. w/Auto Reset (3)	W. Warning Gate	Cabinet 4		Allen Bradley	
FVR Starter with O.L. (horizontal)	E. Barrier Gate	Cabinet 4	NEMA 00 - 460 V	Allen Bradley	505-TO
Eutectic O.L. w/Auto Reset (3)	E. Barrier Gate	Cabinet 4		Allen Bradley	
FVR Starter with O.L. (horizontal)	W. Barrier Gate	Cabinet 4	NEMA 00 - 460 V	Allen Bradley	505-TO
Eutectic O.L. w/Auto Reset (3)	W. Barrier Gate	Cabinet 4		Allen Bradley	
Non-fused Local Disconnect - NEMA 4X	All Moving Equipment	Pivot Pier Span Girder	30 A. - 460 V	Allen Bradley	1494F-CNP30
EP1 - 18 Ckt. w/100A Main	Span Drive Circuits	Cabinet 2	3P4W - 600V - NEMA 1	Square D	NF418M1C
EP2 - 18 Ckt. w/100A Main	Brakes and Locks Circuits	Cabinet 3	3P4W - 600V - NEMA 1	Square D	NF418M1C
EP3 - 18 Ckt. w/100A Main	Gate Circuits	Cabinet 4	3P4W - 600V - NEMA 1	Square D	NF418M1C
15A Type EGB Breaker	W. Barrier Gate	Panelboard EP3	480V - 3P - 35KAIC	Square D	EGB34015
15A Type EGB Breaker	E. Barrier Gate	Panelboard EP3	480V - 3P - 35KAIC	Square D	EGB34015
15A Type EGB Breaker	W. Warning Gate	Panelboard EP3	480V - 3P - 35KAIC	Square D	EGB34015
15A Type EGB Breaker	E. Warning Gate	Panelboard EP3	480V - 3P - 35KAIC	Square D	EGB34015
15A Type EGB Breaker	Span Machinery Brake	Panelboard EP2	480V - 3P - 35KAIC	Square D	EGB34015
15A Type EGB Breaker	Auxiliary Motor Clutch	Panelboard EP1	480V - 3P - 35KAIC	Square D	EGB34015
15A Type EGB Breaker	Wedges	Panelboard EP2	480V - 3P - 35KAIC	Square D	EGB34015
15A Type EGB Breaker	Centering Locks	Panelboard EP2	480V - 3P - 35KAIC	Square D	EGB34015
30A Type EGB Breaker	Auxiliary Motor	Panelboard EP1	480V - 3P - 35KAIC	Square D	EGB34030
2-60 HP D.C. Drive	Main Span Drive	Cabinet 1	460VAC/2-60 HP	Fincor	
LP - 20 Circuit P.B. w/ 100A Main	Lighting Circuits	Outside of Cabinet 1	3P4W - 240V - NEMA1	Square D	NQ0D424M100CU
45 KVA Transformer	Lighting and Control Panels	Cabinet 1	480V to 120/208V	Square D	45T3H
B/C/P - 20 Circuit P.B. w/100A Main	Control Circuits	Control Console	3P4W - 240V - NEMA1	Square D	NQ0D424M100CU
KAL 225AT Main Service Disconnect C.B.	Main Power	Pivot Pier Span Girder	277/480V-250AF-25KAIC	Square D	KAL36225
Main Service Disconnect Breaker Enclosure	Main Power	Pivot Pier Span Girder	NEMA4X	Square D	KA225DS
Emergency Generator	Emergency Power	Control House Platform	60KW - 277/480V	Onan	60DCCB
Automatic Transfer Switch	Emergency Power	Control House Platform	480V - 260A	Onan	OT III
Emergency Lighting Fixture	Lighting	Control Room	120V - 90 Min. Operation	Duallight	EZ-21
Emergency Lighting Fixture	Lighting	Pivot Pier	120V - 90 Min. Operation	Duallight	N4X-21
Emergency Exit Sign	Lighting	Control Room	120V - 90 Min. Operation	Duallight	CWRWW-I-LPLEDE
Fender Navigation Lights (10)	Navigation	Fender System	120V-Dual Lamp-180 Red	B&B	MS53-PM-DLK1-JB-A-R180
Span Navigation Lights (3)	Navigation	Top of Span Truss	120V-Dual Lamp-90 RGRG	B&B	MS54-PM-DLK1-JB-A-R90-G90-R40-G90
2 Lamp Moisture Tight Fluorescent Fixture	Lighting	Center Pier	4Ft.-2 Lamp-Rapid Start	Hubbell	EWL042R-SPDR-E1
1 Lamp Fluorescent Fixture	Lighting	Control Room	4Ft.-T8 Lamp W/Elec. Dim.	Norbert Belfer Lighting Mfg. Co.	2830
Flourescent Tube Holders	All Fluorescent Lamps	Where Required	B1 Pin Thru 40W	McGill	Turtle & Hughes No.175
D.C. Drive Isolation Transformer	Main Span Drive	Cabinet 1	460V to 460V / 27KVA	Westinghouse	MD27E
Control Relays - 3 Pole	Bridge Control	Console & Cabinets	120V-10A	Allen Bradley	700-HB33A1
Control Timing Relay	Bridge Control	Control Console	120V	Allen Bradley	700-HS12AA1
Relay Socket	Bridge Control	Console & Cabinets	120V	Allen Bradley	700-HN127
Relay Retainer Clips	Bridge Control	Console & Cabinets	-	Allen Bradley	700-HN113
Watt Transducer	Wattmeter Control	Cabinet 2	1-1mA Output	Crompton	256-TWNU-QYFA-C6
Current Transformer	Bridge Control	Cabinets 1 and 2	600V - 200:5	Crompton	802-940Y-NL5
Potential Transformer	277V Line	Cabinet 2	4:1 - 480/480V to 120V	Crompton	756-95PU-SEPQ
Master Gate Flasher	Gate Flasher Lights	Control Console	120V	B & B	AW25-400
70 A Type EGB Breaker	Lighting Transformer TX-1	Panelboard EP1	480V - 3P - 35KAIC	Square D	EGB34070
50 A Type EGB Breaker	Isolation Transformer TX-2	Panelboard EP1	480V - 3P - 35KAIC	Square D	EGB34050
Stainless Steel Terminal Box (16"x 20"x 8")	Power and Control Wiring	Pivot Pier Span Girder	NEMA 4X	Hoffman	C-SD1620BSS
Sub-Cable Box - 18x12x12	Submarine Cable	Pivot Pier	Cast Aluminum - Hinged	OZ Gedney	YWA-181212
Sub-Cable Box - 30x24x12	Submarine Cable	Pivot and Rest Piers	Cast Aluminum - Hinged	OZ Gedney	YWA-302412
Terminal Strips for # 3/0 AWG Cables	Wiring	Sub-Cable Boxes	600V - 1Pole	Allen Bradley	1492-PD3113
Terminal Strips for # 10 AWG Cables	Wiring	Where Required	600V - 55A	Allen Bradley	1492-CA1L
Terminal Strips for # 4 AWG Cables	Wiring	Terminal Boxes	600V - 195A	Allen Bradley	1492-CE2
Spiral Cable Wrap	Flexible Cables	Pier Boxes to Span Girder	Nylon - Up To 4" Cable	Allied	805-3040

NOTES:

1. All bridge electrical equipment shall be as listed on this drawing and in the specifications. No alternates will be acceptable unless the device is no longer available. Should this occur, the contractor must submit the proposed alternate to the engineer for approval.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

REV.				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
REV.							
REV.							
REVIEWED				BRIDGE EQUIPMENT DEVICE LIST			
QUAN.	GSB	ALB	2-97				
DR.	MDC	ALB	2-97				
DES.	GSB	ALB	2-97				
BY	CHK	DATE		FILE NO.	ROUTE U.S. 21	COUNTY BEAUFORT	DRAWING NO. E-33

CABLE	COLOR	FROM	TO
INCOMING SERVICE			
P1	B1	UTILITY METER	MAIN DISCONNECT
	B2	PHASE A	PHASE A
	B3	PHASE B	PHASE B
	B3	PHASE C	PHASE C
	GND	GROUND	GROUND
P2		MAIN DISCONNECT	ATS
	B1	PHASE A	PHASE A
	B2	PHASE B	PHASE B
	B3	PHASE C	PHASE C
	GND	GROUND	GROUND
P3		ATS	EP1
	B1	PHASE A	PHASE A
	B2	PHASE B	PHASE B
	B3	PHASE C	PHASE C
	GND	GROUND	GROUND
BC1		EP1	EP2
	B1	PHASE A	PHASE A
	B2	PHASE B	PHASE B
	B3	PHASE C	PHASE C
	GND	GROUND	GROUND
BC2		EP2	EP3
	B1	PHASE A	PHASE A
	B2	PHASE B	PHASE B
	B3	PHASE C	PHASE C
	GND	GROUND	GROUND
GENERATOR			
P4		GENERATOR	ATS
	B1	PHASE A	PHASE A
	B2	PHASE B	PHASE B
	B3	PHASE C	PHASE C
	GND	GROUND	GROUND
C1		GENERATOR	ATS
	B	BY MANUFACTURER	BY MANUFACTURER
	R	BY MANUFACTURER	BY MANUFACTURER
	BL	BY MANUFACTURER	BY MANUFACTURER
	O	BY MANUFACTURER	BY MANUFACTURER
	Y	BY MANUFACTURER	BY MANUFACTURER
C2		GENERATOR	PLC
	B	LOW OIL PRESSURE	C-1
	R	HIGH WATER TEMPERATURE	C-2
	BL	OVERSPEED	C-3
	O	OVER CRANK	C-4
	Y	MANUAL MODE	C-5
	BN	COMMON	C-6
	RB	SPARE	SPARE C-7
EAST WARNING GATE			
P5		LIGHTING PANEL LP	GATE CABINET
	B1	LIGHTING PANEL LP	HEATER
	N	LIGHTING PANEL LP	HEATER
	GND	LIGHTING PANEL LP	HEATER
P6		MOTOR STARTER	GATE MOTOR
	B1	P4-1	PHASE A
	B2	P4-2	PHASE B
	B3	P4-3	PHASE C
	GND	P4-4	GROUND
BC3		ELECTRICAL CAB. #4	CONTROL CONSOLE
	B	4-1	C-8
	R	4-2	C-9
	BL	4-3	C-10
	O	4-4	C-11
	Y	4-5	C-12
	BN	4-6	C-13
	RB	4-7	C-14
	BLB	4-7	C-15
	OB	4-8	C-16
	YB	4-9	C-17
	BNB	4-10	C-18
	BR	4-11	C-19
BC4		ELECTRICAL CAB. #4	CONTROL CONSOLE
	B	4-12	C-20
	R	4-12	C-21
	BL	4-14	C-22
	O	4-15	C-23
	Y	4-17	C-24
	BN	4-18	C-25
	RB	SPARE 4-19	C-26
BC5		ELECTRICAL CAB. #4	CONTROL CONSOLE
	B	SPARE 4-20	C-27
	R	SPARE 4-21	C-28
	BL	SPARE 4-22	C-29
	O	SPARE 4-23	C-30
	Y	SPARE 4-24	C-31
	BN	SPARE 4-25	C-32
	RB	SPARE 4-26	C-33
C3		MOTOR STARTER	LIMIT SWITCH
	B	4-1	HAND CRANK LS
	R	4-5	HAND CRANK LS
	BL	4-13	EW1
	O	4-14	EW1

CABLE	COLOR	FROM	TO
EAST WARNING GATE (Circuit C3 continued)			
	Y	4-15	EW1
	BN	4-16	EW2
	RB	4-17	EW2
	BLB	4-18	EW2
	OB	SPARE	SPARE
C36		CONTROL CONSOLE	GATE
	B	C-79	FLASHER
	R	C-80	FLASHER
	BL	C-81	FLASHER
	O	C-82	FLASHER
	Y	SPARE C-83	SPARE
	BN	SPARE C-84	SPARE
	RB	SPARE C-85	SPARE
WEST WARNING GATE			
P7		LIGHTING PANEL LP	GATE CABINET
	B1	LIGHTING PANEL LP	HEATER
	N	LIGHTING PANEL LP	HEATER
	GND	LIGHTING PANEL LP	HEATER
P8		MOTOR STARTER	GATE MOTOR
	B1	P4-5	PHASE A
	B2	P4-6	PHASE B
	B3	P4-7	PHASE C
	GND	P4-8	GROUND
BC6		ELECTRICAL CAB. #4	CONTROL CONSOLE
	B	4-27	C-34
	R	4-28	C-35
	BL	4-29	C-36
	O	4-30	C-37
	Y	4-31	C-38
	BN	4-32	C-39
	RB	4-34	C-40
	BLB	4-34	C-41
	OB	4-35	C-42
	YB	4-36	C-43
	BNB	4-37	C-44
	BR	4-38	C-45
BC7		ELECTRICAL CAB. #4	CONTROL CONSOLE
	B	4-39	C-46
	R	4-39	C-47
	BL	4-41	C-48
	O	4-42	C-49
	Y	4-44	C-50
	BN	4-45	C-51
	RB	SPARE 4-46	C-52
BC8		ELECTRICAL CAB. #4	CONTROL CONSOLE
	B	SPARE 4-47	C-53
	R	SPARE 4-48	C-54
	BL	SPARE 4-49	C-55
	O	SPARE 4-50	C-56
	Y	SPARE 4-51	C-57
	BN	SPARE 4-52	C-58
	RB	SPARE 4-53	C-59
C4		ELECTRICAL CAB. #4	LIMIT SWITCH
	B	4-27	HAND CRANK LS
	R	4-31	HAND CRANK LS
	BL	4-40	WW1
	O	4-41	WW1
	Y	4-42	WW1
	BN	4-43	WW2
	RB	4-44	WW2
	BLB	4-45	WW2
	OB	SPARE	SPARE
C37		CONTROL CONSOLE	GATE
	B	C-86	FLASHER
	R	C-87	FLASHER
	BL	C-88	FLASHER
	O	C-89	FLASHER
	Y	SPARE C-90	SPARE
	BN	SPARE C-91	SPARE
	RB	SPARE C-92	SPARE
EAST BARRIER GATE			
P9		LIGHTING PANEL LP	GATE CABINET
	B1	LIGHTING PANEL LP	HEATER
	N	LIGHTING PANEL LP	HEATER
	GND	LIGHTING PANEL LP	HEATER
P10		MOTOR STARTER	GATE MOTOR
	B1	P4-9	PHASE A
	B2	P4-10	PHASE B
	B3	P4-11	PHASE C
	GND	P4-12	GROUND
BC9		ELECTRICAL CAB. #4	CONTROL CONSOLE
	B	4-54	C-60
	R	4-55	C-61
	BL	4-56	C-62
	O	4-57	C-63
	Y	4-58	C-64
	BN	4-59	C-65
	RB	4-60	C-66
	BLB	4-61	C-67
	OB	4-62	C-68
	YB	4-63	C-69
	BNB	4-64	C-70
	BR	4-65	C-71

CABLE	COLOR	FROM	TO
EAST BARRIER GATE (Continued)			
BC10		MOTOR STARTER	CONTROL CONSOLE
	B	4-65	C-72
	R	4-67	C-73
	BL	4-68	C-74
	O	4-70	C-75
	Y	4-71	C-76
	BN	SPARE 4-72	SPARE C-77
	RB	SPARE 4-73	SPARE C-78
BC11		ELECTRICAL CAB. #4	ELECTRICAL CAB.#3
	B	4-62	3-1
	R	4-63	3-3
	BL	SPARE 4-72	SPARE 3-4
	O	SPARE 4-73	SPARE 3-5
C5		ELECTRICAL CAB.#4	GATE
	B	SPARE 4-74	SPARE
	R	SPARE 4-75	SPARE
	BL	SPARE 4-76	SPARE
	O	SPARE 4-77	SPARE
	Y	SPARE 4-78	SPARE
	BN	SPARE 4-79	SPARE
	RB	SPARE 4-80	SPARE
BC12		ELECTRICAL CAB. #4	CONTROL CONSOLE
	B	SPARE 4-81	SPARE C-104
	R	SPARE 4-82	SPARE C-105
	BL	SPARE 4-83	SPARE C-106
	O	SPARE 4-84	SPARE C-107
C6		ELECTRICAL CAB. #4	LIMIT SWITCH
	B	4-54	HAND CRANK LS
	R	4-58	HAND CRANK LS
	BL	4-66	LS-EB1
	O	4-67	LS-EB1
	Y	4-68	LS-EB1
	BN	4-69	LS-EB2
	RB	4-70	LS-EB2
	BLB	4-71	LS-EB2
	OB	SPARE	SPARE
C7		MOTOR STARTER	GATE
	B	SPARE	SPARE
	R	SPARE	SPARE
	BL	SPARE	SPARE
	O	SPARE	SPARE
C38		CONTROL CONSOLE	GATE
	B	C-93	FLASHER
	R	C-94	FLASHER
	BL	C-95	FLASHER
	O	C-96	FLASHER
	Y	SPARE C-97	SPARE
	BN	SPARE C-98	SPARE
	RB	SPARE C-99	SPARE
WEST BARRIER GATE			
P11		LIGHTING PANEL LP	GATE CABINET
	B1	LIGHTING PANEL LP	HEATER
	N	LIGHTING PANEL LP	HEATER
	GND	LIGHTING PANEL LP	HEATER
P12		MOTOR STARTER	GATE MOTOR
	B1	P4-13	PHASE A
	B2	P4-14	PHASE B
	B3	P4-15	PHASE C
	GND	P4-16	GROUND
BC13		ELECTRICAL CAB. #4	CONTROL CONSOLE
	B	4-85	C-108
	R	4-86	C-109
	BL	4-87	C-110
	O	4-88	C-111
	Y	4-89	C-112
	BN	4-90	C-113
	RB	4-91	C-114
	BLB	4-92	C-115
	OB	4-93	C-116
	YB	4-94	C-117
	BNB	4-95	C-118
	BR	4-96	C-119

NOTES:

- Cable refers to the cable designation.
- Color refers to the color of the conductors in each individual cable.
- Wiring Tables reflect inter-cabinet connections as denoted by BC* cables and Field Wiring as denoted by P* and C* cables only. Internal wiring within each cabinet is not shown and shall be as depicted on the Schematic Drawings.

REV.			
REV.			
REV.			
REVIEWED			
QUAN.	GSB	ALB	2-97
DR.	MDC	ALB	2-97
DES.	GSB	ALB	2-97
BY	CHK	DATE	

HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
WIRING TABLE I			
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-54

CABLE	COLOR	FROM	TO
WEST BARRIER GATE (Continued)			
BC14		ELECTRICAL CAB. #4	CONTROL CONSOLE
	B	4-96	C-120
	R	4-98	C-121
	BL	4-99	C-122
	O	4-101	C-123
	Y	4-102	C-124
	BN	SPARE 4-103	SPARE C-125
	RB	SPARE 4-104	SPARE C-126
BC15		ELECTRICAL CAB. #4	ELECTRICAL CAB. #3
	B	4-94	3-6
	R	4-93	3-7
	BL	SPARE 4-105	SPARE 3-8
	O	SPARE 4-106	SPARE 3-9
C8		ELECTRICAL CAB. #4	GATE
	B	SPARE	SPARE
	R	SPARE	SPARE
	BL	SPARE	SPARE
	O	SPARE	SPARE
BC16		ELECTRICAL CAB. #4	CONTROL CONSOLE
	B	SPARE 4-107	C-127
	R	SPARE 4-108	C-128
	BL	SPARE 4-109	C-129
	O	SPARE 4-110	C-130
C9		ELECTRICAL CAB. #4	LIMIT SWITCH
	B	4-85	HAND CRANK LS
	R	4-89	HAND CRANK LS
	BL	4-97	LS-WB1
	O	4-98	LS-WB1
	Y	4-99	LS-WB1
	BN	4-100	LS-WB2
	RB	4-101	LS-WB2
	BLB	4-102	LS-WB2
	OB	SPARE	SPARE
C10		ELECTRICAL CAB. #4	GATE
	B	SPARE	SPARE
	R	SPARE	SPARE
	BL	SPARE	SPARE
	O	SPARE	SPARE
C39		CONTROL CONSOLE	GATE
	B	C-79	FLASHER
	R	C-80	FLASHER
	BL	C-81	FLASHER
	O	C-82	FLASHER
	Y	SPARE C-83	SPARE
	BN	SPARE C-84	SPARE
	RB	SPARE C-85	SPARE
WEDGES			
P13		MOTOR STARTER	WEDGE MOTOR
	B1	P3-1	PHASE A
	B2	P3-2	PHASE B
	B3	P3-3	PHASE C
	GND	P3-4	GROUND
BC17		ELECTRICAL CAB. #3	CONTROL CONSOLE
	B	3-10	C-131
	R	3-11	C-132
	BL	3-12	C-133
	O	3-13	C-134
	Y	3-14	C-135
	BN	3-15	C-136
	RB	3-16	C-137
	BLB	3-17	C-138
	OB	3-18	C-139
	YB	3-18	C-140
	BNB	3-19	C-141
	BR	3-20	C-142
BC18		ELECTRICAL CAB. #3	CONTROL CONSOLE
	B	3-21	C-143
	R	3-22	C-144
	BL	3-22	C-145
	O	3-24	C-146
	Y	3-25	C-147
	BN	3-27	C-148
	RB	3-28	C-149
BC19		ELECTRICAL CAB. #3	ELECTRICAL CAB. #4
	B	3-15	4-111
	R	3-16	4-112
	BL	SPARE 3-27	SPARE 4-113
	O	SPARE 3-28	SPARE 4-114
BC20		ELECTRICAL CAB. #3	CONTROL CONSOLE
	B	SPARE 3-29	C-150
	R	SPARE 3-30	C-151
	BL	SPARE 3-31	C-152
	O	SPARE 3-32	C-153
C11		ELECTRICAL CAB. #3	LIMIT SWITCH
	B	3-10	HAND CRANK LS
	R	3-14	HAND CRANK LS
	BL	3-23	LS-WDG1
	O	3-24	LS-WDG1
	Y	3-25	LS-WDG1
	BN	3-26	LS-WDG2
	RB	3-27	LS-WDG2
	BLB	3-28	LS-WDG2
	OB	SPARE	SPARE

CABLE	COLOR	FROM	TO
EAST CENTERING LOCK			
P14		MOTOR STARTER	LOCK
	B1	P3-5	PHASE A
	B2	P3-6	PHASE B
	B3	P3-7	PHASE C
	GND	P3-8	GROUND
BC21		ELECTRICAL CAB. #3	CONTROL CONSOLE
	B	3-33	C-154
	R	3-34	C-155
	BL	3-35	C-156
	O	3-36	C-157
	Y	3-37	C-158
	BN	3-38	C-159
	RB	3-39	C-160
	BLB	3-40	C-161
	OB	3-41	C-162
	YB	3-41	C-163
	BNB	3-42	C-164
	BR	3-42	C-165
BC22		ELECTRICAL CAB. #3	CONTROL CONSOLE
	B	3-43	C-166
	R	3-43	C-167
	BL	3-44	C-168
	O	3-45	C-169
	Y	3-45	C-170
	BN	3-47	C-171
	RB	3-48	C-172
	BLB	SPARE 3-50	SPARE C-173
	OB	SPARE 3-51	SPARE C-174
BC23		ELECTRICAL CAB. #3	CONTROL CONSOLE
	B	SPARE 3-52	SPARE C-175
	R	SPARE 3-53	SPARE C-176
	BL	SPARE 3-54	SPARE C-177
	O	SPARE 3-55	SPARE C-178
C12		ELECTRICAL CAB. #3	LIMIT SWITCH
	B	3-33	HAND CRANK LS
	R	3-37	HAND CRANK LS
	BL	3-46	LS-EL1
	O	3-47	LS-EL1
	Y	3-48	LS-EL1
	BN	3-49	LS-EL2
	RB	3-50	LS-EL2
	BLB	3-51	LS-EL2
	OB	SPARE	SPARE
WEST CENTERING LOCK			
P15		MOTOR STARTER	LOCK
	B1	P3-9	PHASE A
	B2	P3-10	PHASE B
	B3	P3-11	PHASE C
	GND	P3-12	GROUND
BC24		ELECTRICAL CAB. #3	CONTROL CONSOLE
	B	3-56	C-179
	R	3-57	C-180
	BL	3-58	C-181
	O	3-59	C-182
	Y	3-60	C-183
	BN	3-61	C-184
	RB	3-62	C-185
	BLB	3-63	C-186
	OB	3-104	C-187
	YB	3-64	C-188
	BNB	3-65	C-189
	BR	3-65	C-190
BC25		MOTOR STARTER	CONTROL CONSOLE
	B	3-66	C-191
	R	3-66	C-192
	BL	3-67	C-193
	O	3-68	C-194
	Y	3-68	C-195
	BN	3-70	C-196
	RB	3-71	C-197
	BLB	3-73	C-198
	OB	3-74	C-199
BC26		ELECTRICAL CAB. #3	CONTROL CONSOLE
	B	SPARE 3-75	SPARE C-200
	R	SPARE 3-76	SPARE C-201
	BL	SPARE 3-77	SPARE C-202
	O	SPARE 3-78	SPARE C-203
C13		MOTOR STARTER	LIMIT SWITCH
	B	3-56	HAND CRANK LS
	R	3-60	HAND CRANK LS
	BL	3-69	LS-WL1
	O	3-70	LS-WL1
	Y	3-71	LS-WL1
	BN	3-72	LS-WL2
	RB	3-73	LS-WL2
	BLB	3-74	LS-WL2
	OB	SPARE	SPARE
MACHINERY BRAKE			
P16		ELECTRICAL CAB. #3	BRAKE MOTOR
	B1	P3-13	PHASE A
	B2	P3-14	PHASE B
	B3	P3-15	PHASE C
	GND	P3-16	GROUND

CABLE	COLOR	FROM	TO
MACHINERY BRAKE (Continued)			
BC27		ELECTRICAL CAB. #3	CONTROL CONSOLE
	B	3-85	C-228
	R	3-86	C-229
	BL	3-87	C-230
	O	3-88	C-231
	Y	3-89	C-232
	BN	3-89	C-233
	RB	3-90	C-234
	BLB	3-92	C-235
	OB	3-94	C-236
BC28		ELECTRICAL CAB. #3	CONTROL CONSOLE
	B	SPARE 3-97	C-237
	R	SPARE 3-98	C-238
	BL	SPARE 3-99	C-239
	O	SPARE 3-100	C-240
	Y	SPARE 3-101	C-241
	BN	SPARE 3-102	C-242
	RB	SPARE 3-103	C-243
BC29		ELECTRICAL CAB. #3	ELECTRICAL CAB. #2
	B	3-89	2-18
	R	3-90	2-19
	BL	SPARE 3-91	2-20
	O	SPARE 3-92	2-21
C40		ELECTRICAL CAB. #3	LIMIT SWITCHES
	B	3-85	LS-B3
	R	3-89	LS-B3
	BL	3-93	LS-B1
	O	3-94	LS-B1
	Y	3-95	LS-B2
	BN	3-96	LS-B2
	RB	SPARE	SPARE
	BLB	SPARE	SPARE
	OB	SPARE	SPARE
AUXILIARY MOTOR			
P17		ELECTRICAL CAB. #2	AUXILIARY MOTOR
	B1	P2-1	PHASE A
	B2	P2-2	PHASE B
	B3	P2-3	PHASE C
	B1	P2-4	PHASE A
	B2	P2-5	PHASE B
	B3	P2-6	PHASE C
	GND	P2-7	GROUND
P18		CLUTCH RECTIFIER	CLUTCH
	D1	P2-8	PHASE
	D2	P2-9	NEUTRAL
	GND	P2-10	GROUND
BC30		ELECTRICAL CAB. #2	CONTROL CONSOLE
	B	2-4	C-216
	R	2-4	C-217
	BL	2-5	C-218
	O	2-6	C-219
	Y	2-7	C-220
	BN	2-8	C-221
	RB	2-9	C-222
	BLB	2-10	C-223
	OB	2-11	C-224
	YB	SPARE 2-12	SPARE C-225
	BNB	SPARE 2-13	SPARE C-226
	BR	SPARE 2-14	SPARE C-227
BC31		RELAY IN CABINET #2	DC DRIVE IN CABINET #1
	B	2-15	1-1
	R	2-16	1-2
	BL	SPARE 2-17	SPARE 1-3
SPAN CONTROL			
P19		DC DRIVE	DC MOTOR
	P1-1		ARMATURE
	P1-2		ARMATURE
	P1-3		FIELD
	P1-4		FIELD
	P1-5		GROUND

NOTES:

- Cable refers to the cable designation.
- Color refers to the color of the conductors in each individual cable.
- Wiring Tables reflect intercabinet connections as denoted by BC* cables and Field Wiring as denoted by P* and C* cables only. Internal wiring within each cabinet is not shown and shall be as depicted on the Schematic Drawings.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN
COLUMBIA, S.C.

WIRING TABLE II

REV.				
REV.				
REV.				
REVIEWED				
QUAN.	GSB	ALB	2-97	
DR.	MDC	ALB	2-97	
DES.	GSB	ALB	2-97	
BY	CHK	DATE		
FILE NO.		ROUTE U.S. 21	COUNTY BEAUFORT	DRAWING NO. E-55

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	115	115

CIRCUIT	FROM	TO	CABLES	SPEC	ROUTING (LEFT TO RIGHT)
P1	UTILITY METER	MAIN SERVICE DISCONNECT BREAKER	4	3/0-B-1	R31 R30 R32 SUB1 SC3 FLEX 1 SC4 R41
P2	MAIN SERVICE DISCONNECT BREAKER	AUTOMATIC TRANSFER SWITCH	4	3/0-B-1	R1
P3	AUTOMATIC TRANSFER SWITCH	POWER PANEL EP1	4	3/0-B-1	R42 EC3 CC EC2 EC1
P4	EMERGENCY GENERATOR	AUTOMATIC TRANSFER SWITCH	4	3/0-B-1	R43
P4A	EMERGENCY GENERATOR	LOAD BANK	4	2-B-1	R55
P5	LIGHTING PANEL LP	EAST WARNING GATE	3	10-B-1	EC1 EC2 CC EC3 EC4 R13 SC1 FLEX2 SC2 SUB2 R34
P6	EAST WARNING GATE MOTOR STARTER	EAST WARNING GATE	1	10-H-3	R13 SC1 FLEX2 SC2 SUB2 R34
P7	LIGHTING PANELBOARD	WEST WARNING GATE	3	10-B-1	EC1 EC2 CC EC3 EC4 R13 SC1 FLEX2 SC2 SUB3 R37
P8	WEST WARNING GATE MOTOR STARTER	WEST WARNING GATE	1	10-H-3	R13 SC1 FLEX2 SC2 SUB3 R37
P9	LIGHTING PANELBOARD	EAST BARRIER GATE	3	10-B-1	EC1 EC2 CC EC3 EC4 R13 SC1 FLEX2 SC2 SUB2 R33
P10	EAST BARRIER GATE MOTOR STARTER	EAST BARRIER GATE	1	10-H-3	R13 SC1 FLEX2 SC2 SUB2 R33
P11	LIGHTING PANEL LP	WEST BARRIER GATE	3	10-B-1	EC1 EC2 CC EC3 EC4 R13 SC1 FLEX2 SC2 SUB3 R36
P12	WEST BARRIER GATE MOTOR STARTER	WEST BARRIER GATE	1	10-H-3	R13 SC1 FLEX2 SC2 SUB3 R36
P13	WEDGE MOTOR STARTER	WEDGE MOTOR	1	10-H-3	R6 TC1 R9 R10
P14	EAST CENTERING LOCK MOTOR STARTER	EAST CENTERING LOCK	3	10-B-1	R2
P15	WEST CENTERING LOCK MOTOR STARTER	WEST CENTERING LOCK	3	10-B-1	R5
P16	MACHINERY BRAKE MOTOR STARTER	MACHINERY BRAKE	3	10-B-1	R6 TC1 R7 R8
P17	AUX. MOTOR STARTER	AUX. MOTOR	6	10-B-1	R18 TC2 R19 R20
P18	AUX. MOTOR CLUTCH RECTIFIER	AUXILIARY MOTOR CLUTCH	2	10-B-1	R18 TC2 R21 R22
P19	DC DRIVE CONTROLLER	DC SPAN MOTOR	4	4-B-1	R23 TC2 R24 R25
P20	CONTROL HOUSE INTERCOM	EAST REST PIER INTERCOM	3	12-B-1	R52 SC1 FLEX2 SC2 SUB2 R53
P21	CONTROL HOUSE INTERCOM	PIVOT PIER INTERCOM	3	12-B-1	R50 TC1 R51
P22	CONTROL HOUSE INTERCOM	WEST REST PIER INTERCOM	3	12-B-1	R52 SC1 FLEX2 SC2 SUB3
C1	GENERATOR ANNUNCIATOR AND CONTROL	AUTOMATIC TRANSFER SWITCH	1	12-D-7	R43
C2	GENERATOR ANNUNCIATOR AND CONTROL	PROGRAMMABLE LOGIC CONTROLLER (PLC)	1	12-D-7	R42 CC
C3	EAST WARNING GATE MOTOR STARTER	EAST WARNING GATE LIMIT SWITCHES	1	12-D-9	R14 SC1 FLEX3 SC2 SUB2 R34
C4	WEST WARNING GATE MOTOR STARTER	WEST WARNING GATE LIMIT SWITCHES	1	12-D-9	R14 SC1 FLEX3 SC2 SUB3 R37
C5	ELECTRICAL CABINET 4	EAST BARRIER GATE (SPARE)	1	12-D-7	R14 SC1 FLEX3 SC2 SUB2 R33
C6	EAST BARRIER GATE MOTOR STARTER	EAST BARRIER GATE LIMIT SWITCHES	1	12-D-9	R14 SC1 FLEX3 SC2 SUB2 R33
C7	EAST BARRIER GATE MOTOR STARTER	EAST BARRIER GATE LIMIT SWITCHES	1	12-D-4	R14 SC1 FLEX3 SC2 SUB2 R33

AWG
Cable Specifications
Number of conductors in each cable

NOTES:

1. Sub indicates routing via submarine cables.
2. FLEX* indicates routing of flexible cables between the Pivot Pier and Pivot Girder Subcable Cabinets.
3. Sub-cable Cabinets are designated by SC*.
4. Terminal Cabinets are designated by TC*.
5. Electrical Cabinets and Control Console are designated by EC* and CC*, respectively.

HNTB ARCHITECTS ENGINEERS PLANNERS <i>The HNTB Companies</i>			
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.			
CIRCUIT SCHEDULE I			
REV.			
REV.			
REV.			
REVIEWED			
QUAN.	GSB	ALB	2-97
DR.	MDC	ALB	2-97
DES.	GSB	ALB	2-97
BY	CHK.	DATE	
FILE NO.	ROUTE	COUNTY	DRAWING NO.
	U.S. 21	BEAUFORT	E-37

CIRCUIT	FROM	TO	CABLES	SPEC	ROUTING (LEFT TO RIGHT)
C8	ELECTRICAL CABINET 4	WEST BARRIER GATE (SPARE)	1	12-D-7	R14 SC1 FLEX3 SC2 SUB3 R36
C9	WEST BARRIER GATE MOTOR STARTER	WEST BARRIER GATE LIMIT SWITCHES	1	12-D-9	R14 SC1 FLEX3 SC2 SUB3 R36
C10	WEST BARRIER GATE MOTOR STARTER	WEST BARRIER GATE LIMIT SWITCHES	1	12-D-4	R14 SC1 FLEX3 SC2 SUB3 R36
C11	WEDGE MOTOR STARTER	WEDGE LIMIT SWITCHES	1	12-D-9	R11 TC1 R12 R58
C12	EAST CENTERING LOCK MOTOR STARTER	EAST CENTERING LOCK LIMIT SWITCHES	1	12-D-9	R3
C13	WEST CENTERING LOCK MOTOR STARTER	WEST CENTERING LOCK LIMIT SWITCHES	1	12-D-9	R4
C14	CONTROL CONSOLE	MAIN DRIVE MOTOR OVERSPEED SWITCH	1	12-D-7	R26 TC2 R27 R56
C14A	CONTROL CONSOLE	SPAN HAND CRANK LIMIT SWITCH	1	12-D-4	R26 TC2 R27 R55
C15	CONTROL CONSOLE	SPAN POSITION CAM LIMIT SWITCH	1	12-D-12	R16 TC1 R17
C16	CONTROL CONSOLE	SPAN POSITION CAM LIMIT SWITCH	1	12-D-12	R16 TC1 R17
C17	CONTROL CONSOLE	GENERATOR ANNUNCIATORS AND CONTROL	1	12-D-12	EC3 R42 R43
C18	DC DRIVE CONTROLLER	TACHOMETER OVERSPEED SWITCH	1	BY MANUF.	EC1 EC2 CC R26 TC2 R27
C19	CONTROL CONSOLE	SPAN POSITION RESOLVER	1	BY MANUF.	R16 TC1 R17
C20	CONTROL CONSOLE	EAST TRAFFIC SIGNAL	1	12-D-7	R15 SC1 FLEX4 SC2 SUB2 R34 R35
C21	CONTROL CONSOLE	WEST TRAFFIC SIGNAL	1	12-D-7	R15 SC1 FLEX4 SC2 SUB3 R37 R38
C22	CONTROL CONSOLE	EAST WARNING BELL	1	12-D-4	EC3 R14 SC1 FLEX3 SC2 SUB2 R34
C23	CONTROL CONSOLE	WEST WARNING BELL	1	12-D-4	EC3 R14 SC1 FLEX3 SC2 SUB3 R37
C24	CONTROL CONSOLE	EAST SPAN NAVIGATION LIGHTS	1	12-D-7	R44 R47
C25	CONTROL CONSOLE	CENTER SPAN NAVIGATION LIGHTS	1	12-D-7	R44 R45
C26	CONTROL CONSOLE	WEST SPAN NAVIGATION LIGHTS	1	12-D-7	R44 R46
C27	CONTROL CONSOLE	PHOTOCELL	1	12-D-4	R44 R48
C28	CONTROL CONSOLE	EAST FENDER NAVIGATION LIGHTS	1	12-D-7	R15 SC1 FLEX4 SC2 SUB2 R40
C29	CONTROL CONSOLE	WEST FENDER NAVIGATION LIGHTS	1	12-D-7	R15 SC1 FLEX4 SC2 SUB3 R39
C30	CONTROL CONSOLE	CENTER PIER FENDER NAV. LIGHTS	1	12-D-7	R28 TC2 R29
C31	CONTROL CONSOLE	AIR HORN	1	12-D-4	R49
C32	PHASE REVERSAL DETECTION RELAY	CONTROL CONSOLE	1	12-D-4	EC1 CC R54
C33	CONTROL HOUSE INTERCOM	EAST REST PIER INTERCOM	2	16-E-2	R52 SC1 FLEX4 SC2 SUB2 R53
C34	CONTROL HOUSE INTERCOM	PIVOT PIER INTERCOM	2	16-E-2	R50 TC1 R51
C35	CONTROL HOUSE INTERCOM	WEST REST PIER INTERCOM	2	16-E-2	R52 SC1 FLEX4 SC2 SUB3 R54
C36	CONTROL CONSOLE	EAST WARNING GATE FLASHERS	1	12-D-7	CC EC4 R14 SC1 FLEX3 SC2 SUB2 R34
C37	CONTROL CONSOLE	WEST WARNING GATE FLASHERS	1	12-D-7	CC EC4 R14 SC1 FLEX3 SC2 SUB3 R37
C38	CONTROL CONSOLE	EAST BARRIER GATE FLASHERS	1	12-D-7	CC EC4 R14 SC1 FLEX3 SC2 SUB2 R33
C39	CONTROL CONSOLE	WEST BARRIER GATE FLASHERS	1	12-D-7	CC EC4 R14 SC1 FLEX3 SC2 SUB3 R36
C40	ELECTRICAL CABINET 3	MACHINERY BRAKE LIMIT SWITCHES	1	12-D-9	R6 TC1 R7 R8
C41	CONTROL CONSOLE	ELECTRICAL CABINET 4	1	12-D-4	CC EC4

NOTES:

1. Sub indicates routing via submarine cables.
2. FLEX* indicates routing of flexible cables between the Pivot Pier and Pivot Girder Subcable Cabinets.
3. Sub-cable Cabinets are designated by SC*.
4. Terminal Cabinets are designated by TC*.
5. Electrical Cabinets and Control Console are designated by EC* and CC*, respectively.

AWG
Cable Specifications
Number of conductors in each cable

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

REV.				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.
REV.				
REV.				
REVIEWED				CIRCUIT SCHEDULE II
QUAN.	GSB	ALB	2-97	
DR.	MDC	ALB	2-97	
DES.	GSB	ALB	2-97	FILE NO.
BY	CHK.	DATE		
				COUNTY BEAUFORT
				DRAWING NO. E-38

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	ROAD NO.	SHEET NO.	TOTAL SHEETS
	SC	BEAUFORT		U.S. 21	115	115

RACEWAY	TYPE	FILL SQUARE IN.	TRADE SIZE	SPECIFICATION
R1	PVGRS	1.08	2.00	P2
R2	PVGRS	0.08	1.00	P14
R3	PVGRS	0.30	1.25	C12
R4	PVGRS	0.30	1.25	C13
R5	PVGRS	0.08	1.00	P15
R6	PVGRS	0.64	1.75	C40 P13 P16
R7	PVGRS	0.38	1.25	C40 P16
R8	PVGRS	0.38	1.25	C40 P16
R9	PVGRS	0.26	1.00	P13
R10	PVGRS	0.26	1.00	P13
R11	PVGRS	0.30	1.25	C11
R12	PVGRS	0.30	1.25	C11
R13	PVGRS	1.34	2.50	P5 P6 P7 P8 P9 P10 P11 P12
R14	PVGRS	2.86	3.25	C3 C4 C5 C6 C7 C8 C9 C10 C22 C23 C36 C37 C38 C39
R15	PVGRS	0.80	2.00	C20 C21 C28 C29
R16	PVGRS	0.87	2.00	C15 C16 C19
R17	PVGRS	0.87	2.00	C15 C16 C19
R18	PVGRS	0.20	1.00	P17 P18
R19	PVGRS	0.15	1.00	P17
R20	PVGRS	0.15	1.00	P17
R21	PVGRS	0.05	1.00	P18
R22	PVGRS	0.05	1.00	P18
R23	PVGRS	0.38	1.25	P19
R24	PVGRS	0.38	1.25	P19
R25	PVGRS	0.38	1.25	P19
R26	PVGRS	0.31	1.25	C14 C14A C18
R27	PVGRS	0.31	1.25	C14 C14A C18
R28	PVGRS	0.20	1.00	C30
R29	PVGRS	0.20	1.00	C30
R30	PVGRS	1.08	2.00	P1
R31	PVGRS	1.08	2.00	P1
R32	PVGRS	1.08	2.00	P1
R33	PVGRS	1.12	2.00	C5 C6 C7 C38 P9 P10
R34	PVGRS	1.18	2.00	C3 C20 C22 C36 P5 P6
R35	PVGRS	0.20	1.00	C20
R36	PVGRS	1.12	2.00	C8 C9 C10 C39 P11 P12
R37	PVGRS	1.18	2.00	C40 C21 C23 C37 P7 P8
R38	PVGRS	0.20	1.00	C21
R39	PVGRS	0.20	1.00	C29
R40	PVGRS	0.20	1.00	C28
R41	PVGRS	1.08	2.00	P1
R42	PVGRS	1.66	2.75	C2 P3 C17
R43	PVGRS	1.66	2.75	C1 C17 P4
R44	PVGRS	0.74	1.75	C24 C25 C26 C27
R45	PVGRS	0.20	1.00	C25
R46	PVGRS	0.20	1.00	C26
R47	PVGRS	0.20	1.00	C24
R48	PVGRS	0.14	1.00	C27
R49	PVGRS	0.14	1.00	C31
R50	PVGRS	0.34	1.25	C34 P21
R51	PVGRS	0.34	1.25	C34 P21
R52	PVGRS	0.67	1.75	C33 C35 P20 P22
R53	PVGRS	0.34	1.25	C33 P20
R54	PVGRS	0.34	1.25	C35 P22
R55	PVGRS	0.14	1.00	C14A
R56	PVGRS	0.20	1.00	C14
R57	PVGRS	0.30	1.00	C11
R58	PVGRS	0.30	1.00	C11
FLEX1	FLEX	1.08	2.00	P1
FLEX2	FLEX	1.46	2.00	P5 P6 P7 P8 P9 P10 P11 P12 P20 P22
FLEX3	FLEX	2.86	3.25	C3 C4 C5 C6 C7 C8 C9 C10 C22 C23 C36 C37 C38 C39
FLEX4	FLEX	1.35	2.00	C20 C21 C28 C29 C33 C35
SUB1	ARMOR	1.08	3.75	P1
SUB2	ARMOR	2.83	3.75	P5 P6 P9 P10 P20 C3 C5 C6 C7 C20 C22 C28 C33 C36 C38
SUB3	ARMOR	2.83	3.75	P7 P8 P11 P12 P22 C4 C8 C9 C10 C21 C23 C29 C35 C37 C39

NOTES:

- PVGRS indicates PVC-coated Galvanized Rigid Steel Conduit.
- Actual fill may vary depending upon differences in manufacturer's insulation thicknesses for cable.

HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

REV.				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN COLUMBIA, S.C.
REV.				
REV.				
REVIEWED				RACEWAY SCHEDULE
QUAN.	G.S.B.	ALB.	2-97	
DR.	M.D.C.	ALB.	2-97	
DES.	G.S.B.	ALB.	2-97	FILE NO. ROUTE U.S. 21 COUNTY BEAUFORT DRAWING NO. E-39
BY	CHK.	DATE		