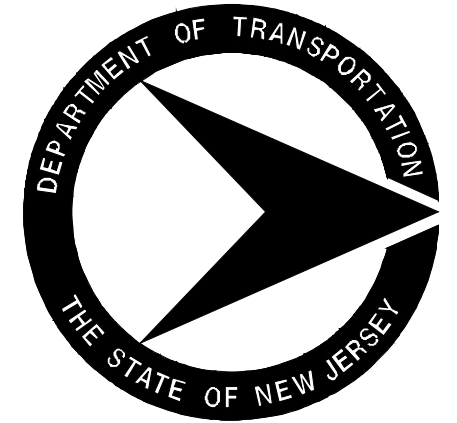


*State of New Jersey*  
*Department of Transportation*



**GENERAL DESIGN CRITERIA AND  
STANDARD DRAWINGS FOR OVERHEAD AND  
CANTILEVER SIGN SUPPORT STRUCTURES**

**2007**

*(U.S. Customary English Units)*

**GENERAL NOTES**

**A. DESIGN CRITERIA**

**DESIGN SPECIFICATIONS**

2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS WITH CURRENT INTERIM.

NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL, CURRENT EDITION.

**DESIGN LOADS**

DESIGN WIND VELOCITY --- 80 MPH; (ABOVE AASHTO SPECIFICATIONS APPENDIX C)  
DESIGN ICE LOAD ----- 3 PSF

**FATIGUE LOADS**

ALL STRUCTURAL DETAILS HAVE BEEN ANALYZED AGAINST FATIGUE CATEGORY II IMPORTANCE FACTOR VALUES AS DESIGNATED IN THE ABOVE AASHTO SPECIFICATIONS.

**VARIABLE MESSAGE SIGN (VMS) STRUCTURES**

REFER TO THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL WHEN FURNISHING SUPPORT STRUCTURES FOR VARIABLE MESSAGE SIGNS (VMS).

**CONCRETE DESIGN STRESSES**

SPECIFIED COMPRESSIVE STRENGTH ( $f_c$ ) (CLASS B) --- 3,000 PSI  
EXTREME FIBER COMPRESSIVE STRESS ( $f_c$ ) ----- 1,200 PSI

**REINFORCEMENT STEEL DESIGN STRESS**

YIELD STRENGTH ( $f_y$ ) (A615, GRADE 60) --- 60 KSI  
TENSILE STRESS ( $f_s$ ) --- 24 KSI

**STRUCTURAL STEEL DESIGN STRENGTHS**

YIELD STRENGTH ( $F_y$ ): PIPES (A53, TYPE S OR TYPE E, GRADE B) --- 35 KSI (MIN.) \*  
(API 5L, GRADE B) --- REFER TO API SPECIFICATIONS

\* FABRICATORS ARE ADVISED THAT REPAIRS TO THE MATERIALS WILL NOT BE PERMITTED. IF TEARING, CRACKING OR ANY DEFECT OCCURS, THE MATERIAL WILL BE REQUIRED TO BE REPLACED.

**FOUNDATIONS**

MAXIMUM FOUNDATION DESIGN BEARING PRESSURE --- 2.5 KSF  
FOOTINGS ARE DESIGNED SUCH THAT A MINIMUM OF 75 PERCENT OF THE FOOTING IS ALWAYS IN CONTACT; A MAXIMUM OF 25 PERCENT OF THE FOOTING IS IN UPLIFT.

BEARING PILES SHALL BE CAST-IN-PLACE CONCRETE PILES WITH A MINIMUM BEARING CAPACITY EQUAL TO 50 KIPS.

REFER TO THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL FOR ALTERNATE FOUNDATION DESIGN CRITERIA.

**CAMBER**

PERMANENT CAMBER EQUAL TO  $L/1000$  HAS BEEN PROVIDED IN ADDITION TO THE DEAD LOAD CAMBER.

**B. MATERIALS**

**I. STEEL**

STEEL PIPE SHALL BE CERTIFIED BY MILL TEST REPORT TO MEET ASTM SPECIFICATION A53, TYPE E OR S, GRADE B WITH THE EXCEPTION THAT API 5L, GRADE B MAY BE USED WHEN THE SPECIFIED WALL THICKNESS IS GREATER THAN  $\frac{1}{2}$ ". ONLY ELECTRICAL RESISTANCE WELDED (ERW) MANUFACTURED SINGLE SEAM PIPE IS PERMITTED. HOWEVER, WHEN THE REQUIRED PIPE SIZE IS GREATER THAN 24", DOUBLE SEAM PIPE MAY BE USED. A MILL TEST REPORT MUST BE PROVIDED, CERTIFIED AND SIGNED BY THE PIPE MANUFACTURER, CONTAINING PHYSICAL AND CHEMICAL PROPERTIES AND THE MANUFACTURING PROCESS USED TO PRODUCE THE PIPE.

ALL OTHER STEEL SHALL CONFORM TO ASTM SPECIFICATION A709 (AASHTO M270) GRADE 36 OR GRADE 50. ALL SPECIFIED STEEL PLATES SHALL MEET SUPPLEMENTARY REQUIREMENTS FOR NOTCH TOUGHNESS (CHARPY TESTING, ZONE #2).

UPON COMPLETION OF FABRICATION, THE FABRICATOR SHALL PROVIDE A NOTARIZED CERTIFICATION OF COMPLIANCE AS PER THE REQUIREMENT OF THE NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, INCLUDING A LEGIBLE COPY OF ALL MILL TEST REPORTS FOR MATERIALS INCORPORATED INTO THE WORK. ALSO, A COPY OF QC REPORTS SHALL BE PROVIDED.

STEEL ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM SPECIFICATION F1554, GRADE 36 OR 55. THE ANCHOR BOLTS SHALL BE HOT DIP GALVANIZED AS PER ASTM SPECIFICATION A153, CLASS C.

CHORD SPLICE ASSEMBLY FASTENERS SHALL BE HIGH STRENGTH STEEL BOLTS CONFORMING TO ASTM SPECIFICATION A325 AND SHALL BE HOT DIP GALVANIZED AS PER ASTM SPECIFICATION A153, CLASS C. ALL OTHER FASTENERS SHALL BE STAINLESS STEEL CONFORMING TO ASTM SPECIFICATION A320, GRADE B8, CLASS 1.

CAPS FOR THE ENDS OF CHORDS AND TOPS OF POSTS SHALL BE STEEL CONFORMING TO ASTM SPECIFICATION A709 (AASHTO M270) GRADE 36 OR 50 AND SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM SPECIFICATION A123.

WELDING OF STEEL SHALL BE AS SPECIFIED IN AWS D1.1, CURRENT EDITION, AND IN THE NJDOT STANDARD SPECIFICATIONS.

AFTER COMPLETE FABRICATION, EACH STEEL SECTION SHALL BE HOT DIP GALVANIZED ACCORDING TO THE REQUIREMENTS OF ASTM SPECIFICATION A123, AND AS MODIFIED BY THE NJDOT STANDARD

SPECIFICATIONS. A SINGLE DIP GALVANIZING PROCESS IS PREFERRED IF SIZE PERMITS.

REFER TO THE NJDOT STANDARD SPECIFICATIONS FOR CRITERIA ON FURNISHING MATERIALS OTHER THAN SPECIFIED ABOVE.

**II. ALUMINUM**

ALUMINUM SHALL CONFORM TO THE ASTM SPECIFICATIONS AND ALLOYS LISTED BELOW:

APPLICATION	ASTM SPECIFICATION	ASTM ALLOY
ROLLED OR EXTRUDED SHAPES	B308	6061 - T6
PLATES	B209	6061 - T6
DRAWN SEAMLESS TUBES	B210	6061 - T6
EXTRUDED TUBES	B221	6061 - T6

WELDING OF ALUMINUM SHALL BE AS SPECIFIED IN AWS D1.2, CURRENT EDITION, AND IN THE NJDOT STANDARD SPECIFICATIONS.

**III. REINFORCEMENT STEEL**

ALL REINFORCEMENT STEEL SHALL BE ASTM A615, GRADE 60.

**IV. CONCRETE**

ALL CONCRETE SHALL BE "CLASS B" AS DEFINED IN THE NJDOT STANDARD SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED BY THE DESIGNER.

**V. SIGN LIGHTING**

WHEN NECESSARY, AN APPROVED SIGN LIGHTING SYSTEM MAY BE USED AND THE DETAILS OF THE SYSTEM SHALL BE PROVIDED WITH THE WORKING DRAWING SUBMISSION. NJDOT TRAFFIC SIGNAL AND SAFETY ENGINEERING SHOULD BE CONTACTED FOR REQUIREMENTS REGARDING THE PROVISION OF SIGN LIGHTING OR REFLECTORIZED SIGN PANELS ON PROJECT TO PROJECT BASIS.

**VI. SIGN PANEL AND LIGHTING SYSTEM SUPPORTS**

SIGN HANGERS SHALL BE ALUMINUM OR STEEL. LUMINAIRE SUPPORTS SHALL BE ALUMINUM OR STEEL. THE STEEL SHALL CONFORM TO ASTM A709 GRADE 36 OR GRADE 50 AND SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM SPECIFICATION A123. STEEL SURFACES SHALL BE PREVENTED FROM COMING INTO CONTACT WITH ALUMINUM SURFACES BY MEANS OF APPROVED PADS PLACED BETWEEN THE DISSIMILAR METALS. PADS SHALL BE STAINLESS STEEL CONFORMING TO ASTM SPECIFICATION A240, TYPE 304 OR APPROVED EQUAL. CONNECTING U BOLTS SHALL BE STAINLESS STEEL CONFORMING TO THE NJDOT STANDARD SPECIFICATIONS. INSTALLATION OF SIGN LIGHTING SYSTEM SHALL BE ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

THE PROVISION OF MAINTENANCE WALKWAYS IS NOT REQUIRED.

**INSTRUCTIONS FOR DESIGNERS**

STEP #1: PREPARE A SIGN SUPPORT LOCATION PLAN AND ELEVATION VIEW FOR EACH STRUCTURE.

STEP #2: ENTER THE SIGN SUPPORT NUMBER AND STATION IN THE SCHEDULE OF STRUCTURES ON SIGN STRUCTURE DRG. OH-D2 OF THE CONTRACT PLANS.

STEP #3: DETERMINE THE TRUSS SPAN LENGTH AND HEIGHT OF THE STRUCTURE USING SIGN STRUCTURE DRG. OH-G2. RECORD THE ACTUAL TRUSS SPAN LENGTH IN THE SCHEDULE OF STRUCTURES ON SIGN STRUCTURE DRG. OH-D2 OF THE CONTRACT PLANS. ROUND THIS NUMBER TO THE NEXT HIGHER LISTED SPAN LENGTH. IF THE TRUSS SPAN LENGTH IS OVER 165'-0", PROCEED TO STEP #17.

STEP #4: DETERMINE THE SIGN DESIGN LENGTH USING SIGN STRUCTURE DRG. OH-G2. DIVIDE THE SIGN DESIGN LENGTH BY THE TRUSS SPAN LENGTH DETERMINED IN STEP #3 TO OBTAIN THE PERCENT SIGN DESIGN LENGTH. USE THE NEXT HIGHER PERCENT FROM THOSE LISTED (40%, 60%, 70%, OR 80%). IF THE PERCENT IS MORE THAN 80, PROCEED TO STEP #5. OTHERWISE, SKIP TO STEP #6.

STEP #5: TO SELECT A STANDARD DESIGN, DIVIDE THE SIGN DESIGN LENGTH BY 80% AND ROUND THIS NUMBER TO THE NEXT HIGHER LISTED SPAN LENGTH. IF THE NUMBER IS LESS THAN 165'-0", RETURN TO STEP #4. OTHERWISE, PROCEED TO STEP #17.

STEP #6: HAVING OBTAINED THE TRUSS SPAN LENGTH (FROM STEP #3 OR STEP #5) AND THE PERCENT SIGN DESIGN LENGTH (FROM STEP #4), SELECT THE TRUSS SIZE AND THE TRUSS ELEMENT SIZES (I.E., CHORDS, DIAGONALS, AND STRUTS) USING THE APPROPRIATE DESIGN TABLES ON SIGN STRUCTURE DRGS. OH-G3 AND OH-G4. RECORD THE DATA IN THE SCHEDULE OF STRUCTURES ON SIGN STRUCTURE DRGS. OH-D2 OF THE CONTRACT PLANS.

STEP #7: WITH THE TRUSS SPAN LENGTH KNOWN, DETERMINE THE MAXIMUM CAMBER REQUIRED FOR THE TRUSS FROM THE CAMBER TABLE SHOWN ON SIGN STRUCTURE DRG. OH-G3. RECORD THIS CAMBER IN THE SCHEDULE OF STRUCTURES ON SIGN STRUCTURE DRG. OH-D2 OF THE CONTRACT DRAWINGS.

STEP #8: WITH THE HEIGHT OF THE STRUCTURE OBTAINED IN STEP #3 AND USING THE ELEVATION OF THE BOTTOM OF BASE PLATE, DETERMINE THE ELEVATION OF THE CENTER LINE OF THE TRUSS AND THE DESIGN HEIGHT OF THE TOWERS. IF THE TOWERS ARE MORE THAN 40'-0", SKIP TO STEP #17. OTHERWISE, SELECT THE NEXT HIGHER NUMBER FROM THOSE LISTED (25, 30, OR 40 FEET). USING THE SAME TABLE USED IN STEP #6, SELECT THE SIZES OF THE TOWER ELEMENTS (I.E., SHAFTS, DIAGONALS, AND STRUTS). RECORD THE DATA IN THE SCHEDULE OF STRUCTURES ON SIGN STRUCTURE DRG. OH-D2 OF THE CONTRACT DRAWINGS.

STEP #9: CHECK AVAILABILITY OF SHAPES SELECTED IN STEPS #6 AND #8.

STEP #10: USING SOIL TEST AND SOIL BORING INFORMATION, DETERMINE THE ALLOWABLE SOIL PRESSURE AND THE REQUIRED DEPTH OF FOOTINGS.

STEP #11: DETERMINE THE PEDESTAL HEIGHT. IF THE PEDESTAL HEIGHT IS BETWEEN 4'-0" AND 6'-0", PROCEED TO STEP #12. OTHERWISE, SKIP TO STEP #17. THE PREFERRED PEDESTAL HEIGHT OF 4'-6" IS TO BE USED WHENEVER POSSIBLE. WHEN USING A BARRIER PEDESTAL, THE "COVERED" HEIGHT MUST BE 3'-0". OTHERWISE, SKIP TO STEP # 17

STEP #12: DETERMINE THE REQUIRED FOOTING SIZES USING THE DESIGN TABLES ON SIGN STRUCTURE DRGS. OH-G3 AND OH-G4. RECORD THE DATA IN THE SIGN SUPPORT FOUNDATION TABLE ON SIGN STRUCTURE DRG. OH-D3 OF THE CONTRACT PLANS.

STEP #13: DETERMINE THE REQUIRED FOOTING DESIGN DATA USING SIGN STRUCTURE DRG. OH-G6. RECORD THIS DATA IN THE SIGN SUPPORT FOUNDATION TABLE ON SIGN STRUCTURE DRG. OH-D3 OF THE CONTRACT PLANS. IF THE ALLOWABLE SOIL PRESSURE IS GREATER THAN 2.5 KSF, SKIP TO STEP #15. OTHERWISE, PROCEED TO STEP #14.

STEP #14: SELECT THE NUMBER OF CAST-IN-PLACE CONCRETE PILES NEEDED TO SUPPORT THE STRUCTURE USING SIGN STRUCTURE DRG. OH-G6. RECORD THE DATA IN THE SIGN SUPPORT FOUNDATION TABLE ON SIGN STRUCTURE DRG. OH-D3 OF THE CONTRACT PLANS.

STEP #15: DETERMINE WHETHER A PEDESTAL OR BARRIER PEDESTAL IS TO BE USED FOR THE FOUNDATION. SELECT ALL PEDESTAL OR BARRIER PEDESTAL DATA FROM SIGN STRUCTURE DRG. OH-G5. RECORD THE DATA IN THE SIGN SUPPORT FOUNDATION TABLE ON SIGN STRUCTURE DRG. OH-D3 OF THE CONTRACT PLANS.

STEP #16: THE DESIGN OF THE OVERHEAD SIGN SUPPORT STRUCTURE IS COMPLETE. DISREGARD STEP #17.

STEP #17: THE PARAMETERS OF THE SIGN SUPPORT STRUCTURE EXCEED THE RESTRICTIONS RELATED TO THESE STANDARD DESIGN TABLES. DESIGN THE SIGN SUPPORT STRUCTURE ON AN INDIVIDUAL BASIS.

INDEX OF DRAWINGS	
DRG. NO.	DESCRIPTION
OH-G1	GENERAL INFORMATION
OH-G2	GENERAL CRITERIA
OH-G3	DESIGN TABLES - STEEL TRUSSES AND STEEL TOWERS (SPAN LENGTH 45' TO 75')
OH-G4	DESIGN TABLES - STEEL TRUSSES AND STEEL TOWERS (SPAN LENGTH 85' TO 165')
OH-G5	PEDESTAL AND BARRIER PEDESTAL DESIGN TABLES AND DETAILS
OH-G6	FOOTING DESIGN TABLES AND DETAILS

THIS PLATE FOR DESIGN INFORMATION ONLY. DO NOT INCLUDE IN CONTRACT PLANS.

**SIGN STRUCTURE DRG. OH-G1**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

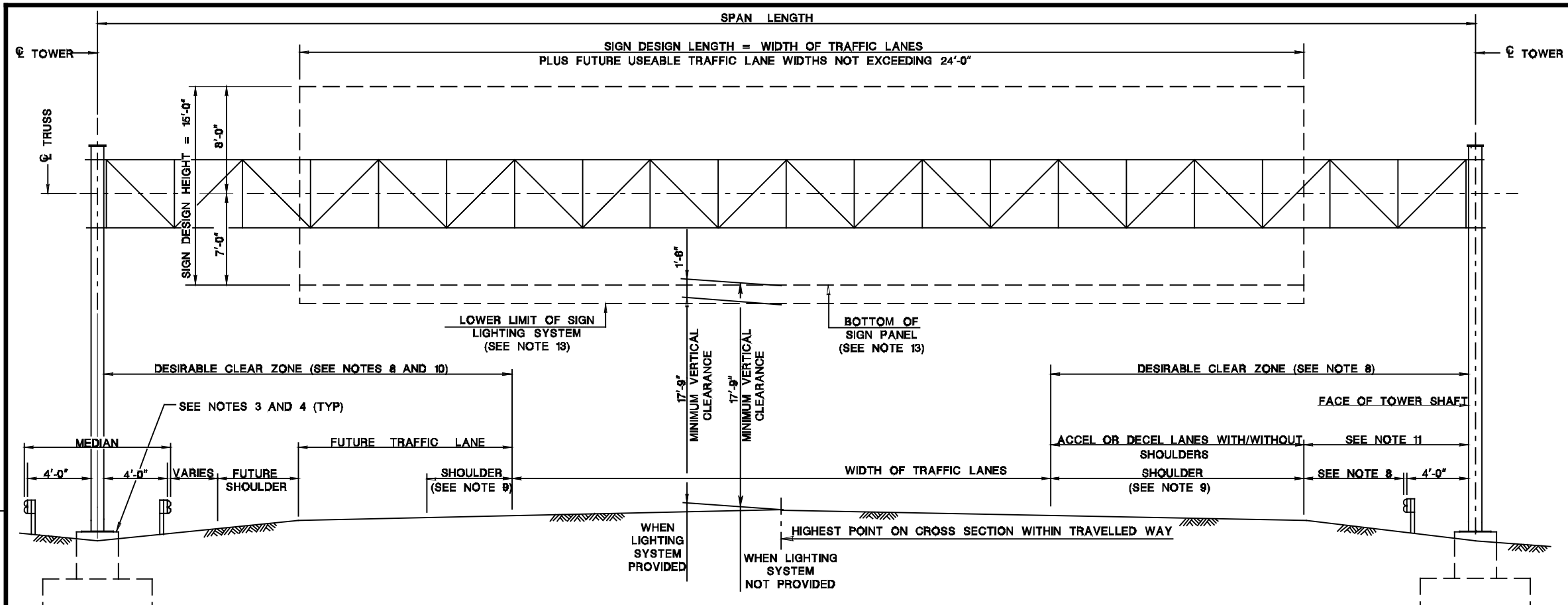
**OVERHEAD SIGN SUPPORT STANDARDS**

**GENERAL INFORMATION**

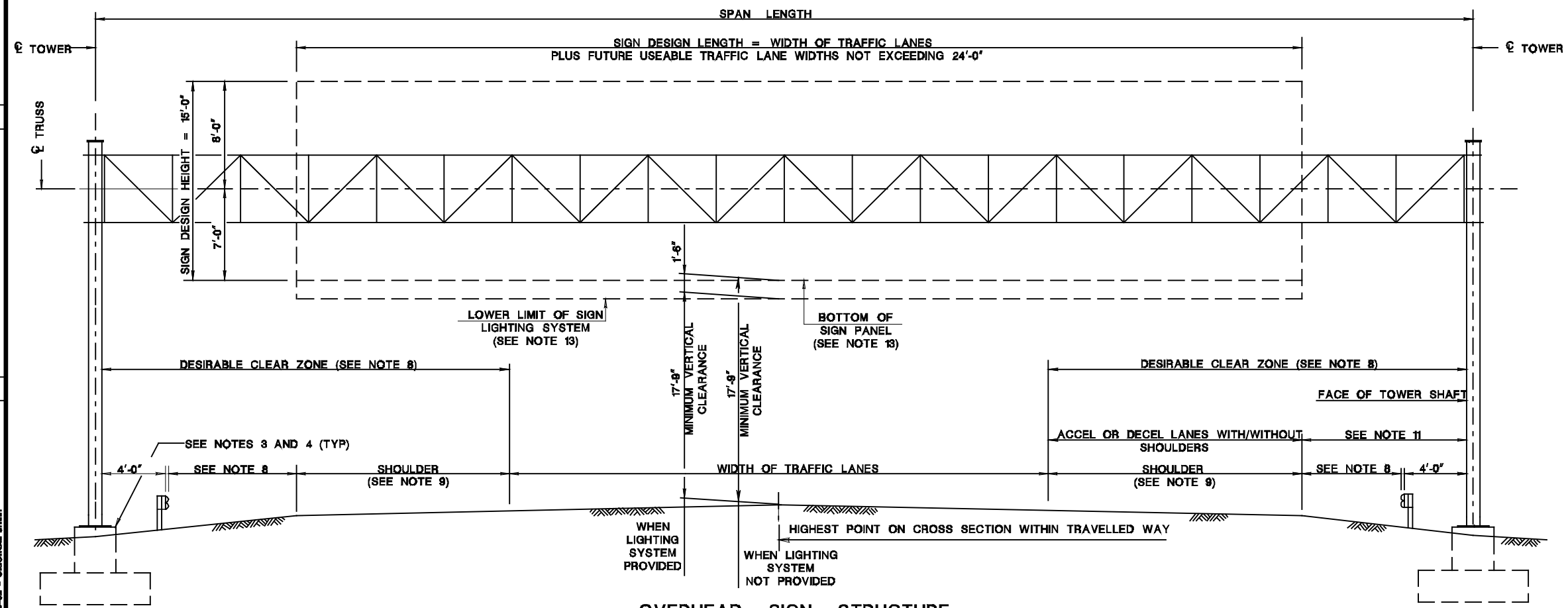
SCALE : NONE

1

6



**OVERHEAD SIGN STRUCTURE**  
DIVIDED HIGHWAY SYSTEMS



**OVERHEAD SIGN STRUCTURE**  
NONDIVIDED HIGHWAY SYSTEM AND RAMP

**NOTES:**

1. THE BOTTOM EDGE OF ALL SIGN PANELS SHALL BE LEVEL AND AT THE SAME ELEVATION.
2. THE TOP EDGE OF ALL SIGN PANELS SHALL PROJECT NOT LESS THAN 6" ABOVE THE TOP OF THE TOP CHORD. THE SIGN PANEL SIZES AND LOCATIONS SHALL BE VERIFIED AND APPROVED BY THE DESIGNER.
3. TOP OF PEDESTALS SHALL BE SET 4" ABOVE THE FINISHED GROUND LINE.
4. THE ELEVATION OF THE BOTTOM OF THE TOWER SHAFT BASE PLATES SHALL BE SET AT (ANCHOR BOLT DIA. + 1") ABOVE TOP OF PEDESTAL OR TOP OF BARRIER PEDESTAL (SEE SIGN STRUCTURE DRG. OH-D8).
5. THE TRUSS SHALL BE A FOUR-CHORD, BOX SHAPED TRUSS.
6. UNLESS OTHERWISE SPECIFIED, THE LUMINAIRE SUPPORTS SHALL BE PROVIDED CONTINUOUSLY FOR THE ENTIRE SIGN DESIGN LENGTH. THE NEED FOR LUMINAIRE SUPPORTS SHALL BE VERIFIED AS PART OF THE PRELIMINARY SUBMISSION.
7. IF THE TOWER FOUNDATION IS WITHIN THE CLEAR ZONE, IT SHALL BE PROTECTED BY GUIDE RAIL, BARRIER OR OTHER SUITABLE MEANS, DEPENDING ON SITE CONDITIONS.
8. SEE NJDOT ROADWAY DESIGN MANUAL FOR CLEAR ZONE CRITERIA AND FOR GUIDE RAIL OFFSET CRITERIA.
9. SHOULDER IS NOT TO BE INCLUDED IN THE SIGN DESIGN LENGTH UNLESS THE SHOULDER IS WITHIN AN AREA PRESCRIBED AS A FUTURE USEABLE TRAFFIC LANE.
10. IF MEDIAN IS LESS THAN 5'-0" WIDE, PLACE THE CENTERLINE OF TOWER AT THE CENTERLINE OF MEDIAN.
11. THIS DIMENSION SHALL NOT BE LESS THAN 1'-0" GREATER THAN THE MINIMUM CLEARANCE REQUIRED FOR OVERPASS STRUCTURES.
12. LEFT AND RIGHT TOWERS ARE DEFINED LOOKING UPSTATION.
13. THE 17'-9" MINIMUM VERTICAL UNDERCLEARANCE SHALL BE PROVIDED TO THE BOTTOM OF SIGN LIGHTING SYSTEM, OR TO THE BOTTOM OF SIGN PANEL WHEN LIGHTING SYSTEM IS NOT PROVIDED.

THIS PLATE FOR DESIGN INFORMATION ONLY.  
DO NOT INCLUDE IN CONTRACT PLANS.

<b>SIGN STRUCTURE DRG. OH-G2</b> NEW JERSEY DEPARTMENT OF TRANSPORTATION BUREAU OF STRUCTURAL ENGINEERING
SCALE : NONE <span style="margin-left: 20px;">2</span> <span style="margin-left: 100px;">6</span>

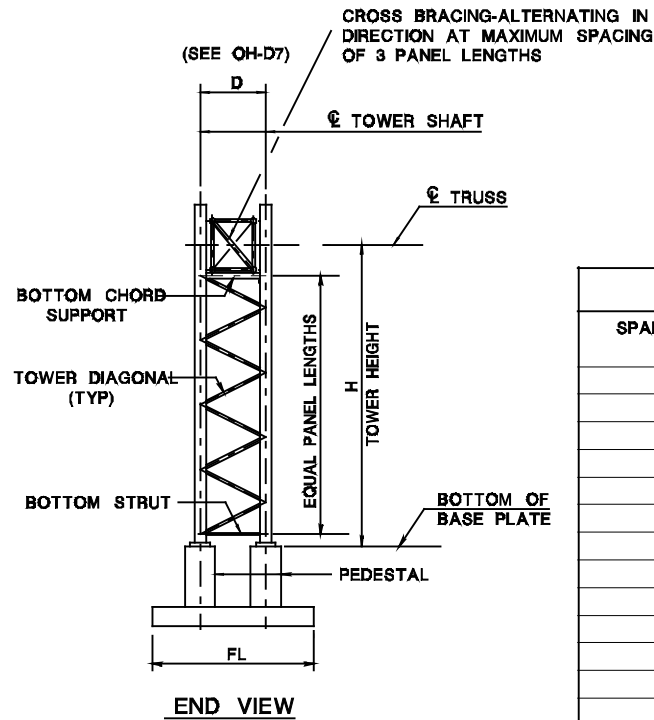
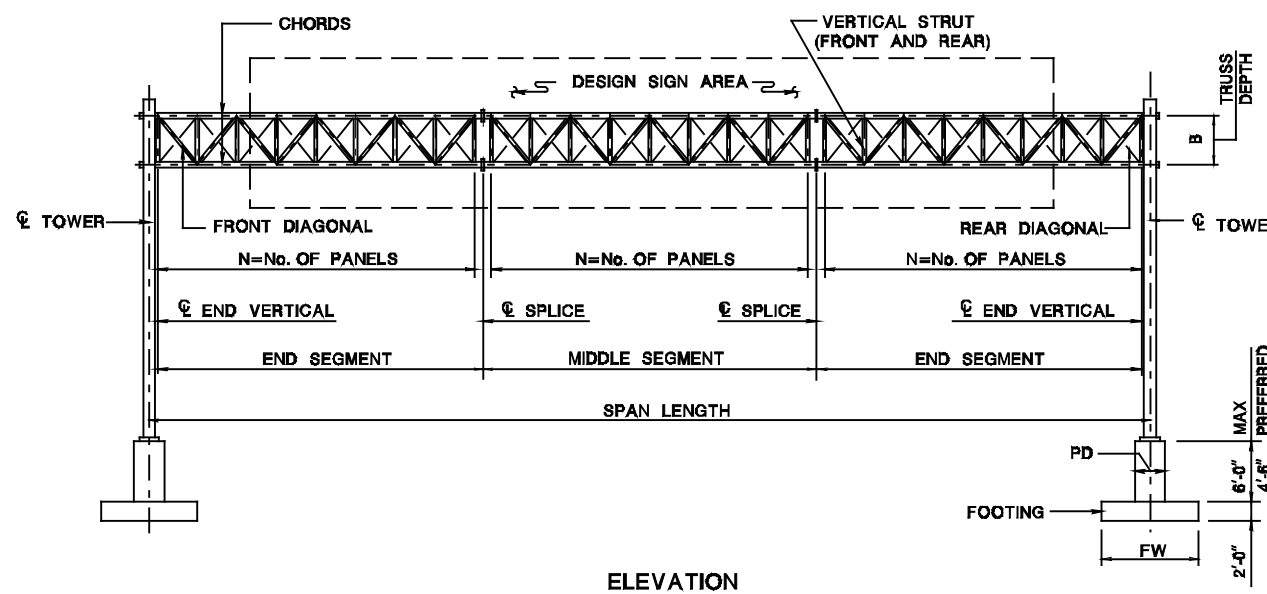
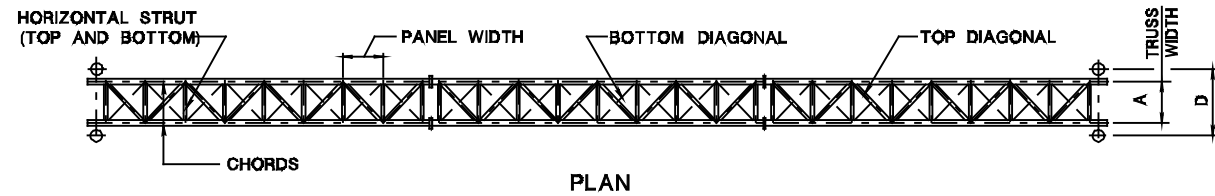
BD-07D-02 - ORIGINAL SHEET

SPAN LENGTH (FT)	SIGN LENGTH (%)	TRUSS SIZE	TRUSS MEMBERS				TOWER MEMBERS						FOOTINGS			PEDESTALS						BARRIER PEDESTALS						AXB TRUSS SIZE	SIGN LENGTH (%)	SPAN LENGTH (FT)		
			CHORDS O.D.xTHICK (IN)	DIAGONALS O.D.xTHICK (IN)	STRUTS O.D.xTHICK (IN)	END STRUTS O.D.xTHICK (IN)	H = 25 FT		H = 30 FT		H = 40 FT		STRUTS O.D.xTHICK (IN)	H=25 FT	H=30 FT	H=40 FT	H=25 FT		H=30 FT		H=40 FT		H = 25 FT		H = 30 FT		H = 40 FT					
							SHAFT O.D.xTHICK (IN)	DIAGONAL O.D.xTHICK (IN)	SHAFT O.D.xTHICK (IN)	DIAGONAL O.D.xTHICK (IN)	SHAFT O.D.xTHICK (IN)	DIAGONAL O.D.xTHICK (IN)		FLxFW (FT)	FLxFW (FT)	FLxFW (FT)	PD (FT)	VERT REBARS No. & SIZE	PD (FT)	VERT REBARS No. & SIZE	PD (FT)	VERT REBARS No. & SIZE	BLxBWT (FT)	VERT REBARS No. & SIZE	BLxBWT (FT)	VERT REBARS No. & SIZE	BLxBWT (FT)				VERT REBARS No. & SIZE	BLxBWT (FT)
45	40	4' (WIDTH) x 4' (DEPTH)	3.500 x .216	2.875 x .203	2.875 x .203	3.500 x .216	10.750 x .365	3.500 x .300	10.750 x .365	3.500 x .300	12.750 x .375	3.500 x .300	12.750 x .375	3.500 x .300	12.750 x .375	3.500 x .300	15 x 7	16 x 7	16 x 8	3.00	10-#19	3.00	11-#19	3.25	12-#19	9 x 2.50	31-#13	9 x 2.50	31-#13	9 x 2.50	31-#13	40
	60		3.500 x .216	2.875 x .203	2.875 x .203	3.500 x .216	10.750 x .365	3.500 x .300	12.750 x .375	3.500 x .300	12.750 x .375	3.500 x .300	14.000 x .375	5.563 x .258	3.500 x .300	16 x 7	16 x 8	18 x 8	3.00	9-#22	3.25	13-#19	3.25	14-#19	9 x 2.50	31-#13	9 x 2.50	23-#16	9 x 2.50	26-#16	60	
	80		3.500 x .216	2.875 x .203	2.875 x .203	3.500 x .216	10.750 x .365	3.500 x .300	12.750 x .375	3.500 x .300	14.000 x .375	5.563 x .258	3.500 x .300	16 x 8	18 x 8	19 x 8	3.00	10-#22	3.25	13-#19	3.50	11-#22	9 x 2.50	23-#16	9 x 2.50	26-#16	10 x 2.75	28-#16	70			
55	40	4' (WIDTH) x 4' (DEPTH)	3.500 x .216	2.875 x .203	2.875 x .203	3.500 x .216	10.750 x .365	3.500 x .300	10.750 x .365	3.500 x .300	12.750 x .375	3.500 x .300	15 x 7	16 x 7	16 x 8	3.00	11-#19	3.00	12-#19	3.25	13-#19	9 x 2.50	31-#13	9 x 2.50	31-#13	9 x 2.50	31-#13	9 x 2.50	24-#16	40		
	60		3.500 x .216	2.875 x .203	2.875 x .203	3.500 x .216	10.750 x .365	3.500 x .300	12.750 x .375	3.500 x .300	14.000 x .375	5.563 x .258	3.500 x .300	16 x 7	18 x 8	19 x 8	3.00	9-#22	3.25	10-#22	3.50	11-#22	9 x 2.50	23-#16	9 x 2.50	26-#16	10 x 2.75	28-#16	60			
	80		3.500 x .216	2.875 x .203	2.875 x .203	3.500 x .216	12.750 x .375	3.500 x .300	14.000 x .375	5.563 x .258	16.000 x .375	5.563 x .258	3.500 x .300	16 x 8	19 x 9	20 x 9	3.25	10-#22	3.50	11-#22	3.75	12-#22	9 x 2.50	26-#16	10 x 2.75	29-#16	10 x 3.00	32-#16	70			
65	40	4' (WIDTH) x 4' (DEPTH)	3.500 x .216	2.875 x .203	2.875 x .203	3.500 x .216	10.750 x .365	3.500 x .300	12.750 x .375	3.500 x .300	12.750 x .375	3.500 x .300	16 x 7	16 x 8	19 x 8	3.00	9-#22	3.25	9-#22	3.25	10-#22	9 x 2.50	31-#13	9 x 2.50	35-#13	9 x 2.50	26-#16	40				
	60		3.500 x .216	2.875 x .203	2.875 x .203	3.500 x .216	10.750 x .365	3.500 x .300	12.750 x .375	3.500 x .300	16.000 x .375	5.563 x .258	3.500 x .300	16 x 8	18 x 9	20 x 9	3.00	10-#22	3.25	11-#22	3.75	12-#22	9 x 2.50	26-#16	9 x 2.50	29-#16	10 x 3.00	30-#16	60			
	80		4.000 x .226	2.875 x .203	2.875 x .203	3.500 x .216	12.750 x .375	3.500 x .300	14.000 x .375	5.563 x .258	16.000 x .375	5.563 x .258	3.500 x .300	18 x 8	19 x 9	20 x 10	3.25	10-#22	3.50	11-#22	3.75	12-#22	9 x 2.50	26-#16	10 x 2.75	30-#16	10 x 3.00	32-#16	70			
75	40	4' (WIDTH) x 4' (DEPTH)	4.000 x .226	2.875 x .203	2.875 x .203	3.500 x .216	10.750 x .365	3.500 x .300	12.750 x .375	3.500 x .300	14.000 x .375	5.563 x .258	3.500 x .300	16 x 7	16 x 8	19 x 8	3.00	9-#22	3.25	10-#22	3.50	11-#22	9 x 2.50	23-#16	9 x 2.50	23-#16	10 x 2.75	28-#16	40			
	60		4.500 x .237	2.875 x .203	2.875 x .203	3.500 x .216	12.750 x .375	3.500 x .300	14.000 x .375	5.563 x .258	16.000 x .375	5.563 x .258	3.500 x .300	18 x 8	19 x 8	21 x 9	3.25	10-#22	3.50	11-#22	3.75	12-#22	9 x 2.50	26-#16	10 x 2.75	30-#16	10 x 3.00	32-#16	60			
	80		4.500 x .237	2.875 x .203	2.875 x .203	3.500 x .216	12.750 x .375	3.500 x .300	14.000 x .375	5.563 x .258	16.000 x .375	5.563 x .258	3.500 x .300	19 x 8	20 x 9	21 x 10	3.25	11-#22	3.50	12-#22	3.75	13-#22	9 x 2.50	29-#16	10 x 2.75	32-#16	10 x 3.00	26-#16	70			
80	4.500 x .237	2.875 x .203	2.875 x .203	3.500 x .216	12.750 x .375	3.500 x .300	14.000 x .500	5.563 x .258	16.000 x .500	5.563 x .258	3.500 x .300	19 x 9	20 x 10	22 x 10	3.25	12-#22	3.50	10-#25	3.75	11-#25	9 x 2.50	31-#16	10 x 2.75	32-#16	10 x 3.00	28-#16	80					

**NOTES:**

1. THE NUMBER OF SPLICES AND PANELS SHOWN IN THE TABLE ARE OPTIONAL. ONE OR MORE SPLICES IN THE TRUSS MAY BE ADDED OR ELIMINATED AT THE OPTION OF THE FABRICATOR. THE FABRICATOR MUST MAINTAIN A TRUSS UNIT LENGTH No. WHICH CAN BE GALVANIZED IN ONE PIECE. A MINIMUM OF ONE SPLICE IS REQUIRED FOR OBTAINING CAMBER.
2. END STRUTS ARE DEFINED AS THE TWO HORIZONTAL AND TWO VERTICAL STRUTS LOCATED IMMEDIATELY ADJACENT TO THE TOWERS (SEE DRG. OH-D5).

SUGGESTED STEEL TRUSS UNITS								ALTERNATIVE					
No. OF ACTUAL SPAN		DESIGN SPAN (FT)	No. OF SPLICES	No. OF SEGMENTS		No. OF PANELS		No. OF SPLICES	No. OF SEGMENTS		No. OF TOTAL PANELS		
FROM (FT)	TO (FT)			END	MIDDLE	EACH SEGMENT	TOTAL		MIN	MAX			
--	45	45	1	2	0	6	12	1	2	0	10	14	
45	55	55	1	2	0	7	14	1	2	0	12	18	
55	65	65	2	2	1	5	15	1	2	0	14	22	
65	75	75	2	2	1	6	18	1	2	0	16	24	
75	85	85	2	2	1	7	21	1	2	0	18	28	
85	95	95	3	2	2	6	24	2	2	1	20	30	
95	105	105	3	2	2	6	24	2	2	1	22	33	
105	115	115	3	2	2	7	28	2	2	1	25	37	
115	125	125	4	2	3	6	30	2	2	1	27	40	
125	135	135	4	2	3	6	30	2	2	1	29	43	
135	145	145	4	2	3	7	35	3	2	2	31	46	
145	155	155	5	2	4	6	36	3	2	2	33	49	
155	165	165	5	2	4	6	36	3	2	2	35	53	



CAMBER	
SPAN LENGTH (FT)	REQUIRED CAMBER (IN)
45	1 1/4
55	1 1/2
65	2
75	2 3/4
85	2 3/4
95	3
105	3 3/4
115	4 1/4
125	5 1/4
135	5 3/4
145	7
155	7 3/4
165	9

THIS PLATE FOR DESIGN INFORMATION ONLY. DO NOT INCLUDE IN CONTRACT PLANS.

**SIGN STRUCTURE DRG. OH-G3**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

**OVERHEAD SIGN SUPPORT STANDARDS  
DESIGN TABLES**

**STEEL TRUSSES AND STEEL TOWERS  
(SPAN LENGTH 45'-0" TO 75'-0")**

SCALE : NONE

3  
6

SD-07D-03 - ORIGINAL SHEET



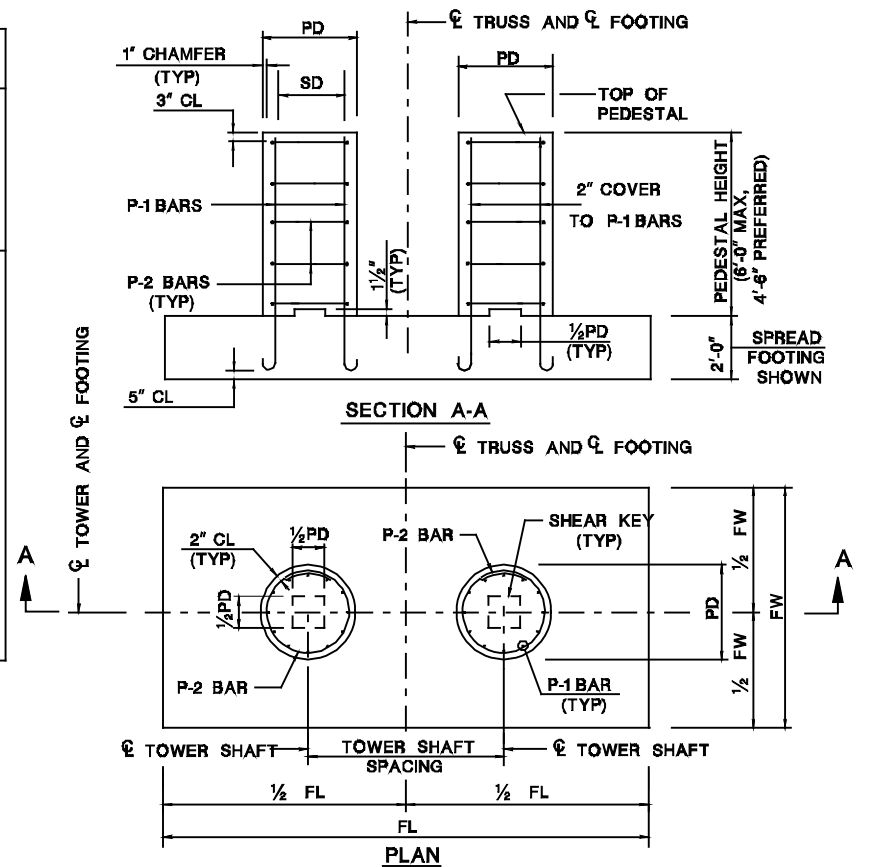


BARRIER PEDESTAL REINFORCEMENT														
BARRIER SIZE BLxBWT (FT)	VOL OF CONC (C.Y.)	HORIZONTAL BARS												WEIGHT TOTAL (LBS)
		#13 BAR, TYPE "B-2"				#13 BAR, TYPE "B-3"				#13 BAR, TYPE "B-4"				
		No.	B	C	LENGTH	No.	E	F	LENGTH	No.	E	G	LENGTH	
9 x 2.50	7.1	10	2'-0"	1'-0"	4'-0"	8	5'-8"	2'-2"	10'-0"	8	5'-8"	2'-8"	11'-0"	139
10 x 2.75	8.5	11	2'-3"	1'-0"	4'-3"	8	6'-4"	2'-4"	11'-0"	8	6'-4"	2'-9"	11'-10"	153
10 x 3.00	9.0	11	2'-6"	1'-0"	4'-6"	8	6'-4"	2'-5"	11'-2"	8	6'-4"	2'-10"	12'-0"	158
11 x 3.25	10.6	12	2'-9"	1'-0"	4'-9"	8	7'-0"	2'-7"	12'-2"	8	7'-0"	2'-11"	12'-10"	172
11 x 4.00	12.4	12	3'-6"	1'-0"	5'-6"	8	7'-0"	2'-11"	12'-10"	8	7'-0"	3'-4"	13'-8"	185
11.5 x 4.00	13.0	13	3'-6"	1'-0"	5'-6"	8	7'-4"	2'-11"	13'-2"	8	7'-4"	3'-4"	14'-0"	192

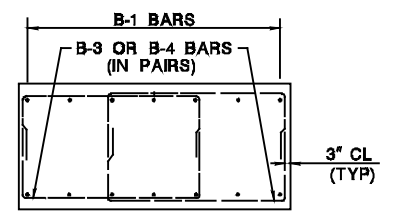
VERTICAL "B-1" BARS				BAR SHAPES			
SIZE	A (IN)	LENGTH	WEIGHT (LBS)				
#13	6	7'-11"	5.290				
#16	7	8'-0"	8.377				
#19	8	8'-1"	12.125				
#22	10	8'-3"	16.976				

PEDESTAL DIAMETER (FT)	VOL OF CONC (C.Y.)	PEDESTAL REINFORCEMENT								BAR SHAPES
		VERTICAL BARS				HORIZ BARS				
		SIZE (NOTE 9)	A	LENGTH	WEIGHT (LBS)	#13 BARS, TYPE "P-2"	SD	LENGTH	WEIGHT (LBS)	
3'-1"	1.6	#19	0'-8"	8'-1"	11.9	2'-8"	10'-0"	46.7	 TYPE "P-1"  TYPE "P-2"	
3'-1"	1.6	#22	0'-10"	8'-3"	16.8	2'-8"	10'-0"	46.7		
3'-5"	1.8	#19	0'-8"	8'-1"	11.9	3'-0"	11'-0"	51.6		
3'-5"	1.8	#22	0'-10"	8'-3"	16.8	3'-0"	11'-0"	51.6		
3'-7"	2.1	#22	0'-10"	8'-3"	16.8	3'-2"	11'-6"	53.8		
3'-7"	2.1	#25	0'-11"	8'-4"	22.3	3'-2"	11'-6"	53.8		
3'-9"	2.5	#22	0'-10"	8'-3"	16.8	3'-4"	12'-0"	56.2		
3'-9"	2.5	#25	0'-11"	8'-4"	22.3	3'-4"	12'-0"	56.2		
4'-1"	2.8	#25	0'-11"	8'-4"	22.3	3'-8"	13'-0"	61.1		
4'-1"	3.2	#25	0'-11"	8'-4"	22.3	4'-0"	14'-1"	65.9		
4'-5"	3.2	#29	1'-3"	8'-8"	29.3	4'-0"	14'-1"	65.9		
4'-9"	3.9	#25	0'-11"	8'-4"	22.3	4'-4"	15'-1"	70.8		
4'-9"	3.9	#29	1'-3"	8'-8"	29.3	4'-4"	15'-1"	70.8		

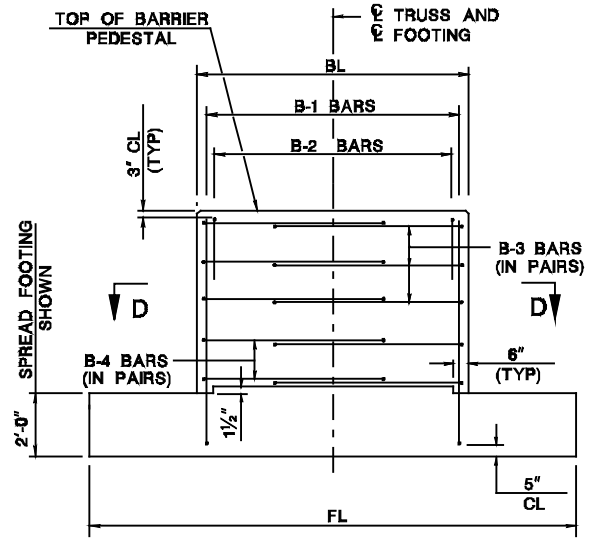


PEDESTAL DETAILS

- NOTES:**
- FOUNDATION DESIGN CONFORMS TO THE 2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SECTION 13. REFER TO THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL FOR ALTERNATE FOUNDATION DESIGN CRITERIA.
  - FOR PEDESTAL AND BARRIER PEDESTAL DIMENSIONS AND REINFORCEMENT, SEE DESIGN TABLES ON SIGN STRUCTURE DRGS. OH-G3 AND OH-G4.
  - ALL REINFORCEMENT IN PEDESTALS AND BARRIER PEDESTALS SHALL BE CORROSION PROTECTED.
  - EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 1"x 1" UNLESS NOTED OTHERWISE.
  - BARS SHALL NOT BE SPLICED EXCEPT AS PROVIDED ON THIS DRAWING OR AUTHORIZED BY THE ENGINEER. WHEN SPLICING IS APPROVED, THE REINFORCEMENT BARS SHALL BE LAPPED FOR A LENGTH OF AT LEAST 36 DIAMETERS AND SHALL BE SECURELY WIRED TOGETHER.
  - LENGTH OF BARS SHOWN IN TABLE ALREADY CONSIDER BENDS. DIMENSIONS DESCRIBED IN BAR SHAPES TABLE ARE OUT-TO-OUT OF BAR.
  - CONCRETE VOLUMES AND REINFORCEMENT SHOWN IN TABLES ARE FOR A 6'-0" HIGH PEDESTAL OR 6'-0" HIGH BARRIER PEDESTAL.
  - WEIGHT SHOWN IN TABLE FOR B-1 AND P-1 BARS IS FOR ONE BAR ONLY. TOTAL WEIGHT OF BARS TO BE DETERMINED BY THE DESIGNER.
  - REFER TO THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL FOR CLARIFICATION OF REINFORCEMENT STEEL DESIGNATION.

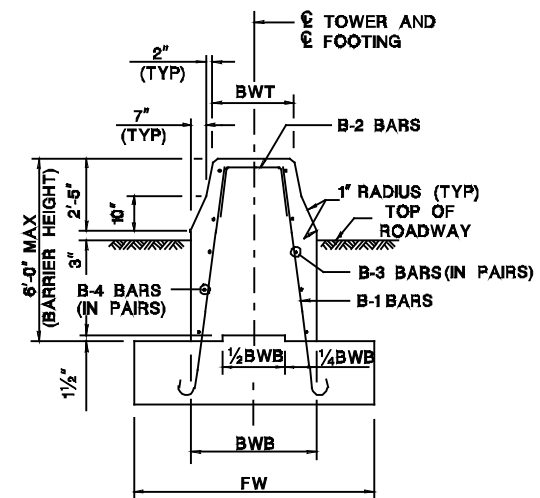


SECTION D-D

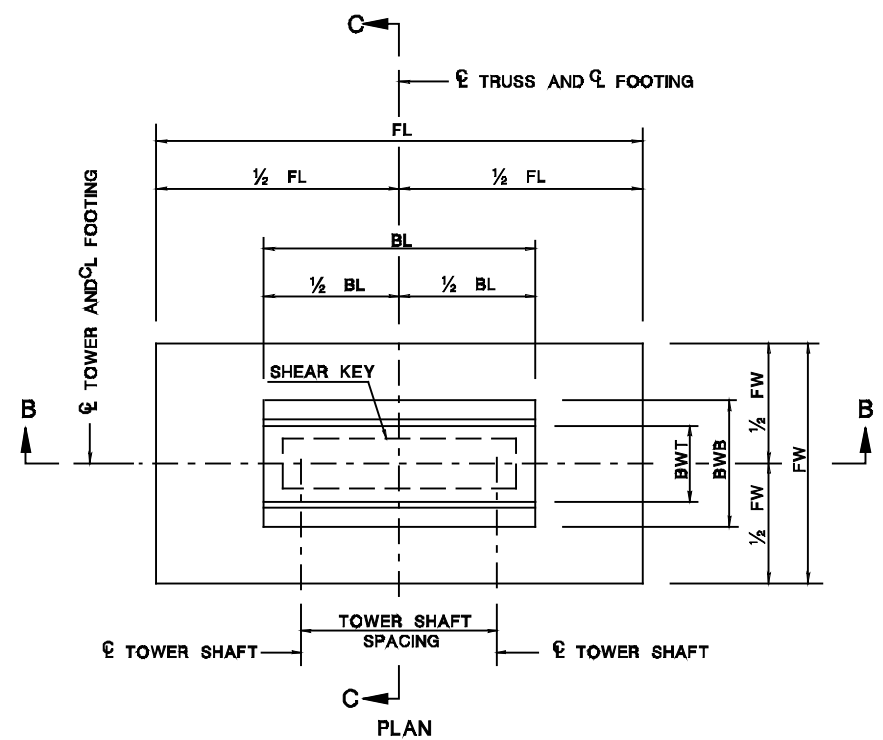


SECTION B-B

BARRIER PEDESTAL DETAILS



SECTION C-C



PLAN

**SIGN STRUCTURE DRG. OH-G5**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

**OVERHEAD SIGN SUPPORT STANDARDS**

**PEDESTAL AND BARRIER PEDESTAL  
DESIGN TABLES AND DETAILS**

SCALE : NONE 5  
6

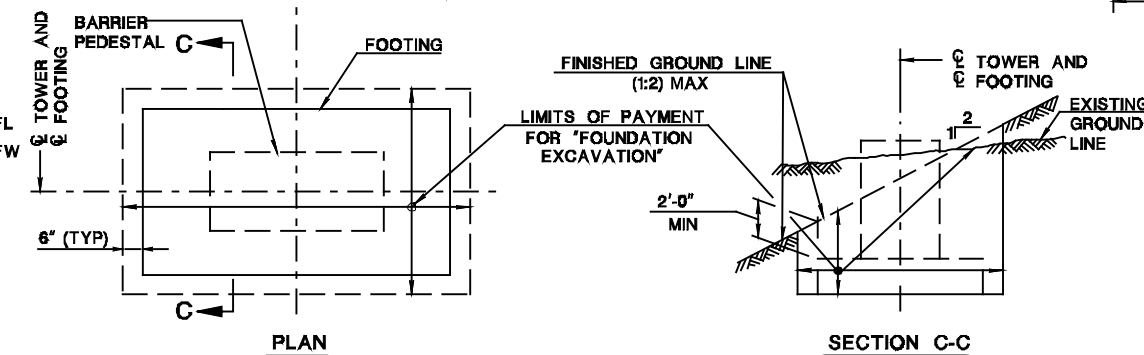
BD-07D-03 - ORIGINAL SHEET

SPREAD FOOTINGS			PILE FOOTINGS				FOOTING REINFORCEMENT					
SIZE FLxFW (FT)	CONCRETE VOLUME (C.Y.)	EXCAV VOLUME (C.Y.)	CONCRETE VOLUME (C.Y.)	EXCAV ** VOLUME (C.Y.)	No. OF PILES IN ROW		TOTAL No.	No. AND SIZE OF BARS				TOTAL WEIGHT (LBS)
					"X" LONG	"Y" TRANS		FLB	FWB	FLT	FWT	
15 x 7	7.8	37.9	9.8	40.3	4	3	12	6-#16	11-#16	6-#16	11-#16	342.6
16 x 7	8.3	40.3	10.4	42.8	4	3	12	8-#16	11-#16	6-#16	11-#16	384.5
16 x 8	9.5	45.3	11.9	48.1	4	3	12	10-#16	12-#16	6-#16	12-#16	465.4
18 x 8	10.7	50.7	13.4	53.9	5	3	15	12-#16	13-#16	6-#16	13-#16	546.1
18 x 9	12.0	56.3	15.0	59.8	5	3	15	13-#16	13-#16	7-#16	13-#16	605.2
19 x 8	11.3	53.3	14.1	56.6	5	3	15	10-#19	13-#16	7-#16	14-#16	635.4
19 x 9	12.7	59.2	15.9	62.9	5	3	15	12-#19	13-#16	7-#16	14-#16	714.3
20 x 9	13.3	62.2	16.6	66.1	5	3	15	13-#19	14-#16	8-#16	14-#16	793.2
20 x 10	14.8	68.4	18.5	72.7	5	3	15	13-#19	14-#16	8-#16	14-#16	817.3
21 x 9	14.0	65.2	17.5	69.3	5	3	15	14-#19	15-#16	9-#16	15-#16	910.5
21 x 10	15.6	71.7	19.5	76.2	5	3	15	17-#19	15-#16	10-#16	15-#16	1,052.7
21 x 11	17.1	78.3	21.4	83.2	5	4	20	18-#19	16-#16	10-#16	15-#16	1,120.8
22 x 10	16.3	75.0	20.4	79.7	5	3	15	15-#22	16-#16	8-#16	15-#16	1,238.8
22 x 11	17.9	81.8	22.4	86.9	5	4	20	16-#22	18-#16	8-#16	15-#16	1,331.4
23 x 10	17.0	78.2	21.3	83.1	5	4	20	17-#22	16-#16	9-#16	16-#16	1,410.1
23 x 11	18.7	85.3	23.4	90.6	5	4	20	19-#22	20-#16	9-#16	16-#16	1,573.2
24 x 11	19.6	88.9	24.5	94.5	5	4	20	22-#22	20-#16	12-#16	17-#16	1,928.2
24 x 12	21.3	96.3	26.6	102.3	5	4	20	22-#22	23-#16	12-#16	17-#16	1,994.7
24 x 13	23.1	103.7	28.9	110.2	6	4	24	24-#22	28-#16	13-#16	17-#16	2,265.5
25 x 11	20.4	92.4	25.5	98.2	5	4	20	21-#22	19-#16	13-#16	18-#16	1,966.3
25 x 12	22.2	100.1	27.8	106.4	5	4	20	19-#25	23-#16	13-#16	18-#16	2,240.1
26 x 12	23.1	104.0	28.9	110.5	6	4	24	19-#25	22-#16	14-#16	18-#16	2,325.0
27 x 12	24.0	107.9	30.3	114.6	6	4	24	21-#25	23-#16	15-#16	18-#16	2,590.0
27 x 13	26.0	116.1	32.5	123.4	6	4	24	24-#25	31-#16	16-#16	18-#16	3,023.0

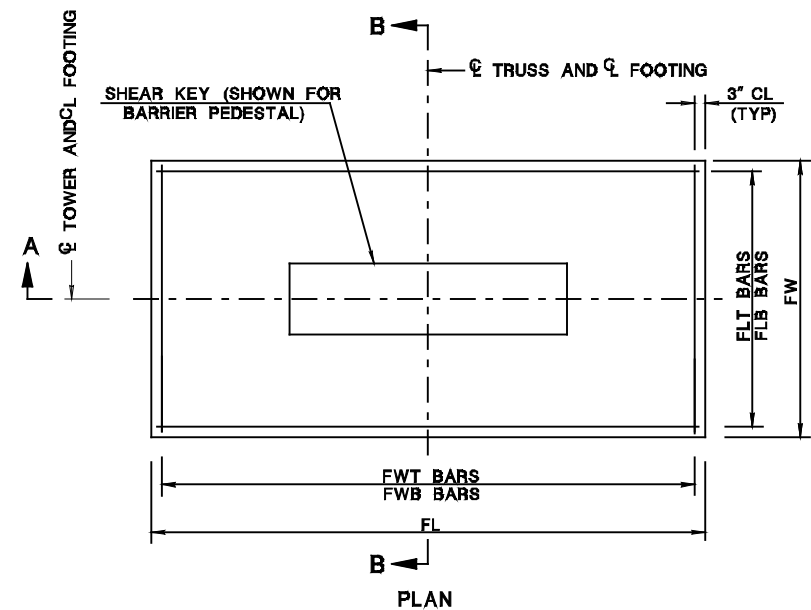
\* SPREAD FOOTING EXCAVATION VOLUME BASED ON 8'-0" TOTAL DEPTH OF EXCAVATION.  
 \*\* PILE FOOTING EXCAVATION VOLUME BASED ON 8'-6" TOTAL DEPTH OF EXCAVATION.

**LEGEND:**

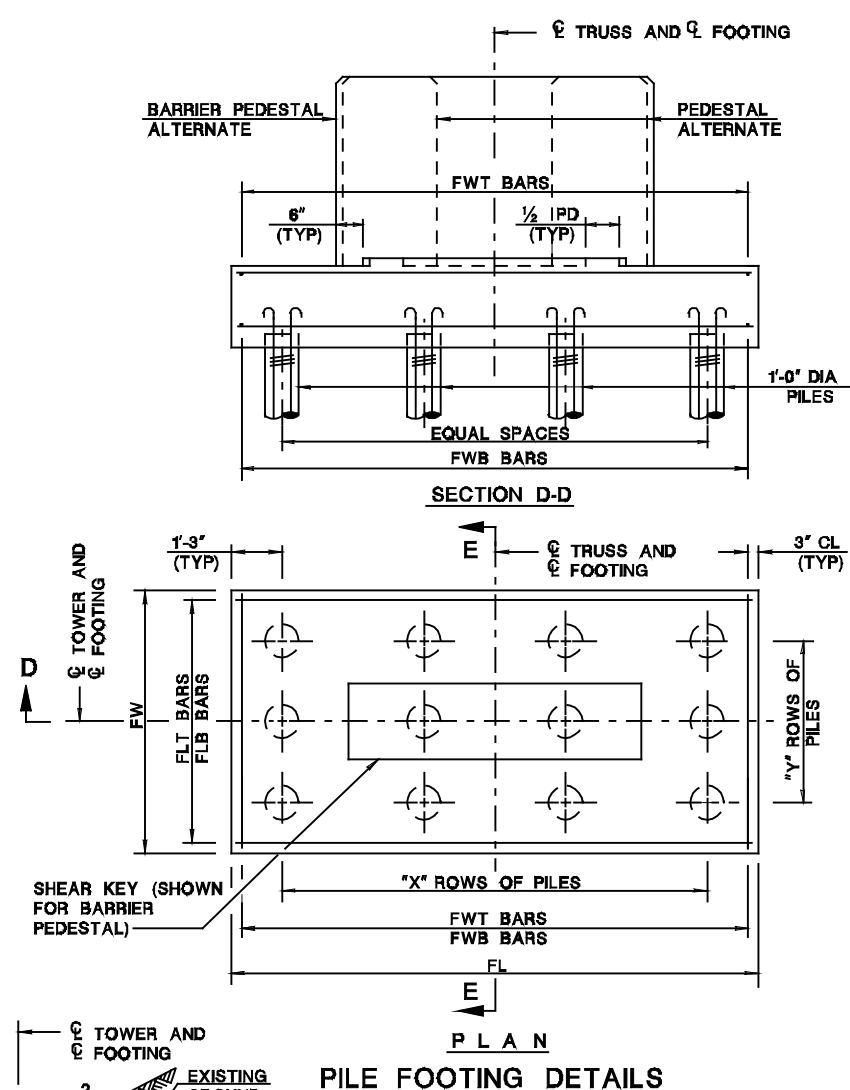
- FL : FOOTING LENGTH
- FW : FOOTING WIDTH
- FLB : No. AND SIZE OF BOTTOM BARS IN DIRECTION FL
- FWB : No. AND SIZE OF BOTTOM BARS IN DIRECTION FW
- FLT : No. AND SIZE OF TOP BARS IN DIRECTION FL
- FWT : No. AND SIZE OF TOP BARS IN DIRECTION FW
- PD : PEDESTAL DIAMETER
- BWT : BARRIER WIDTH AT TOP



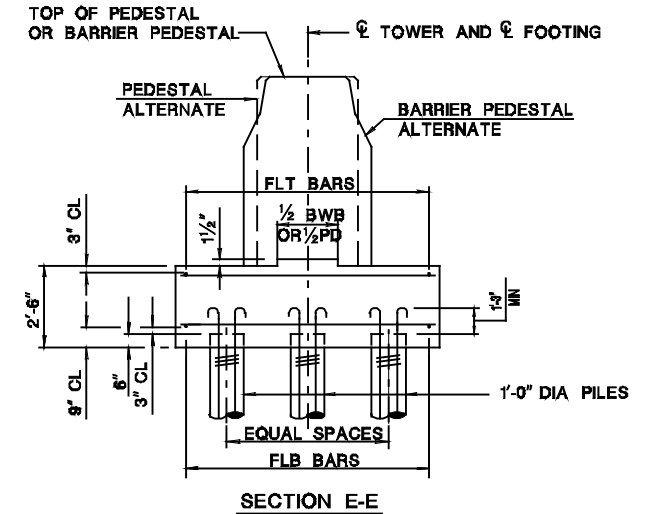
**FOOTING EXCAVATION DETAILS**



**SPREAD FOOTING DETAILS**



**PILE FOOTING DETAILS**



**NOTES:**

1. FOUNDATION DESIGN CONFORMS TO THE 2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRE AND TRAFFIC SIGNALS, SECTION 13.
2. FOR FOOTING DIMENSIONS, SEE DESIGN TABLES ON SIGN STRUCTURE DRGS. OH-G3 AND OH-G4.
3. BARS SHALL NOT BE SPLICED EXCEPT AS PROVIDED ON THIS DRAWINGS OR AUTHORIZED BY THE ENGINEER. WHEN SPLICING IS APPROVED, THE REINFORCEMENT BARS SHALL BE LAPPED FOR A LENGTH OF AT LEAST 36 DIAMETERS AND SHALL BE SECURELY WIRED TOGETHER.
4. PILES SHALL BE CAST-IN-PLACE CONCRETE PILES WITH A MINIMUM BEARING CAPACITY EQUAL TO 50 KIPS.
5. THE CASING OF THE CAST-IN-PLACE CONCRETE PILES SHALL BE LEFT IN PLACE AND IS DESIGNED TO RESIST BOTH DIRECT COMPRESSION AND BENDING. THE THICKNESS OF THE CASING SHALL BE NOT LESS THAN 3 / 16".
6. THE LONGITUDINAL REINFORCING STEEL OF THE CAST-IN-PLACE CONCRETE PILES SHALL BE A MINIMUM OF 6-#18 BARS AND SHALL EXTEND THROUGH THE UPPER THIRD OF THE PILE OR 15'-0" DOWN INTO THE CASING, WHICHEVER IS GREATER, AND EMBEDDED INTO THE FOOTING WITH STANDARD HOOKS AS SHOWN.
7. THE SPIRAL REINFORCING FOR THE CAST-IN-PLACE CONCRETE PILES SHALL BE #18 REBARS AND SHALL EXTEND THROUGH THE UPPER THIRD OF THE PILE OR 15'-0" DOWN FROM THE TOP OF CASING, WHICHEVER IS GREATER.
8. ALTERNATE FOUNDATION DESIGNS MAY BE CONSIDERED BY THE DESIGNER WHERE APPROPRIATE. LOADS FOR THE DESIGN OF NON-STANDARD FOUNDATIONS ARE AVAILABLE IN THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL.

THIS PLATE FOR DESIGN INFORMATION ONLY. DO NOT INCLUDE IN CONTRACT PLANS.



**SIGN STRUCTURE DRG. OH-G6**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

**OVERHEAD SIGN SUPPORT STANDARDS**

**FOOTING DESIGN TABLES AND DETAILS**

SCALE : NONE

6  
6

REFER TO THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL FOR ALTERNATE FOUNDATION DESIGN CRITERIA.

**CAMBER**

PERMANENT CAMBER EQUAL TO L/1000 HAS BEEN PROVIDED IN ADDITION TO THE DEAD LOAD CAMBER.

**B. MATERIALS**

**I. STEEL**

STEEL PIPE SHALL BE CERTIFIED BY MILL TEST REPORT TO MEET ASTM SPECIFICATION A53, TYPE E OR S, GRADE B WITH THE EXCEPTION THAT API 5L, GRADE B MAY BE USED WHEN THE SPECIFIED WALL THICKNESS IS GREATER THAN 1/2". ONLY ELECTRICAL RESISTANCE WELDED (ERW) MANUFACTURED SINGLE SEAM PIPE IS PERMITTED. HOWEVER, WHEN THE REQUIRED PIPE SIZE IS GREATER THAN 24", DOUBLE SEAM PIPE MAY BE USED. A MILL TEST REPORT MUST BE PROVIDED, CERTIFIED AND SIGNED BY THE PIPE MANUFACTURER, CONTAINING PHYSICAL AND CHEMICAL PROPERTIES AND THE MANUFACTURING PROCESS USED TO PRODUCE THE PIPE.

ALL OTHER STEEL SHALL CONFORM TO ASTM SPECIFICATION A709 (AASHTO M270) GRADE 36 OR GRADE 50. ALL SPECIFIED STEEL PLATES SHALL MEET SUPPLEMENTARY REQUIREMENTS FOR NOTCH TOUGHNESS (CHARPY TESTING, ZONE #2).

UPON COMPLETION OF FABRICATION, THE FABRICATOR SHALL PROVIDE A NOTARIZED CERTIFICATION OF COMPLIANCE AS PER THE REQUIREMENT OF THE NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, INCLUDING A LEGIBLE COPY OF ALL MILL TEST REPORTS FOR MATERIALS INCORPORATED INTO THE WORK. ALSO, A COPY OF QC REPORTS SHALL BE PROVIDED.

STEEL ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM SPECIFICATION F1554, GRADE 36 OR 55. THE ANCHOR BOLTS SHALL BE HOT DIP GALVANIZED AS PER ASTM SPECIFICATION A153, CLASS C.

CHORD SPLICE ASSEMBLY FASTENERS SHALL BE HIGH STRENGTH STEEL BOLTS CONFORMING TO ASTM SPECIFICATION A325 AND SHALL BE HOT DIP GALVANIZED AS PER ASTM SPECIFICATION A153, CLASS C. ALL OTHER FASTENERS SHALL BE STAINLESS STEEL CONFORMING TO ASTM SPECIFICATION A320, GRADE B8, CLASS 1.

CAPS FOR THE ENDS OF CHORDS AND TOPS OF POSTS SHALL BE STEEL CONFORMING TO ASTM SPECIFICATION A709 (AASHTO M270) GRADE 36 OR 50 AND SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM SPECIFICATION A123.

WELDING OF STEEL SHALL BE AS SPECIFIED IN AWS D1.1, CURRENT EDITION, AND THE NJDOT STANDARD SPECIFICATIONS.

AFTER COMPLETE FABRICATION, EACH STEEL SECTION SHALL BE HOT DIP GALVANIZED ACCORDING TO THE REQUIREMENTS OF ASTM SPECIFICATION A123, AND AS MODIFIED BY THE NJDOT STANDARD SPECIFICATIONS. A SINGLE DIP GALVANIZING PROCESS IS PREFERRED IF SIZE PERMITS.

REFER TO THE NJDOT STANDARD SPECIFICATIONS FOR CRITERIA ON FURNISHING MATERIALS OTHER THAN SPECIFIED ABOVE.

**II. ALUMINUM**

ALUMINUM SHALL CONFORM TO THE ASTM SPECIFICATIONS AND ALLOYS LISTED BELOW:

APPLICATION	ASTM SPECIFICATION	ASTM ALLOY
ROLLED OR EXTRUDED SHAPES	B308	6061 - T6
PLATES	B209	6061 - T6
DRAWN SEAMLESS TUBES	B210	6061 - T6
EXTRUDED TUBES	B221	6061 - T6

WELDING OF ALUMINUM SHALL BE AS SPECIFIED IN AWS D1.2, CURRENT EDITION, AND THE NJDOT STANDARD SPECIFICATIONS.

THE SIGN PANEL SHALL BE INSTALLED LEVEL. THE CONTRACTOR MAY FIELD DRILL THE SIGN SUPPORTS AS REQUIRED TO ACHIEVE THIS.

**III. REINFORCEMENT STEEL**

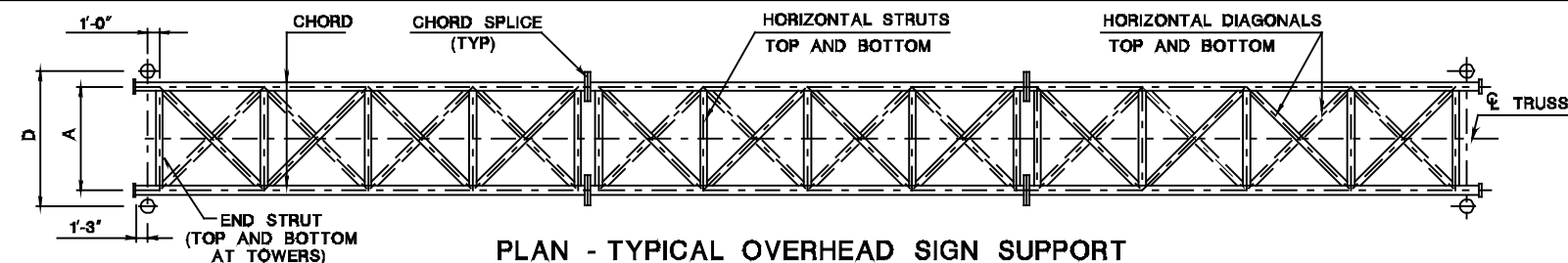
ALL REINFORCEMENT STEEL SHALL BE ASTM A615, GRADE 60.

**IV. CONCRETE**

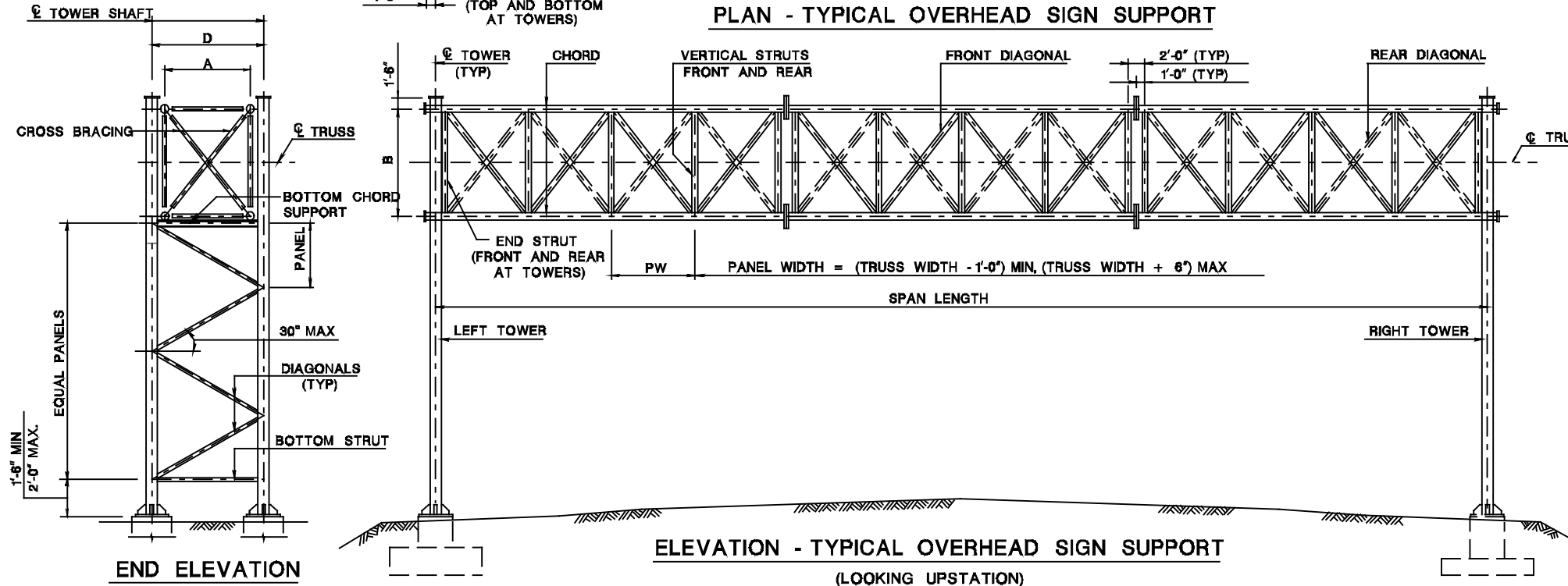
ALL CONCRETE SHALL BE "CLASS B" AS DEFINED IN THE NJDOT STANDARD SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED BY THE DESIGNER.

**V. SIGN LIGHTING SYSTEM SUPPORTS**

SIGN HANGERS SHALL BE ALUMINUM OR STEEL. LUMINAIRE SUPPORTS SHALL BE ALUMINUM OR STEEL. THE STEEL SHALL CONFORM TO ASTM A709 GRADE 36 OR GRADE 50 AND SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM SPECIFICATION A123. STEEL SURFACES SHALL BE PREVENTED FROM COMING INTO CONTACT WITH ALUMINUM SURFACES BY MEANS OF APPROVED PADS PLACED BETWEEN THE DISSIMILAR METALS. PADS SHALL BE STAINLESS STEEL CONFORMING TO ASTM SPECIFICATION A240, TYPE 304 OR APPROVED EQUAL. CONNECTING U BOLTS SHALL BE STAINLESS STEEL CONFORMING TO THE NJDOT STANDARD SPECIFICATIONS. INSTALLATION OF SIGN LIGHTING SYSTEM SHALL BE ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.



**PLAN - TYPICAL OVERHEAD SIGN SUPPORT**



**ELEVATION - TYPICAL OVERHEAD SIGN SUPPORT (LOOKING UPSTATION)**

**GENERAL NOTES**

**A. DESIGN CRITERIA**

**DESIGN SPECIFICATIONS**

2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS WITH CURRENT EDITION.

NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL, CURRENT EDITION.

**DESIGN LOADS**

DESIGN WIND VELOCITY --- 80 MPH; (ABOVE AASHTO SPECIFICATIONS APPENDIX C)

DESIGN ICE LOAD ----- 3 PSF

**FATIGUE LOADS**

ALL STRUCTURAL DETAILS HAVE BEEN ANALYZED AGAINST FATIGUE CATEGORY II IMPORTANCE FACTOR VALUES AS DESIGNATED IN THE ABOVE AASHTO SPECIFICATIONS.

**VARIABLE MESSAGE SIGN (VMS) STRUCTURES**

REFER TO THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL WHEN FURNISHING SUPPORT STRUCTURES FOR VARIABLE MESSAGE SIGNS (VMS).

**CONCRETE DESIGN STRESSES**

SPECIFIED COMPRESSIVE STRENGTH (f'c) (CLASS B) --- 3,000 PSI

EXTREME FIBER COMPRESSIVE STRESS (fc) ----- 1,200 PSI

**REINFORCEMENT STEEL DESIGN STRESS**

YIELD STRENGTH (fy) (A615, GRADE 60) --- 60 KSI

TENSILE STRESS (ft) --- 24 KSI

**STRUCTURAL STEEL DESIGN STRENGTHS**

YIELD STRENGTH (Fy)

PIPES (A53, TYPE S OR TYPE E, GRADE B) --- 35 KSI (MIN.) \*

API 5L, GRADE B --- REFER TO API SPECIFICATIONS

\* FABRICATORS ARE ADVISED THAT REPAIRS TO THE MATERIALS WILL NOT BE PERMITTED. IF TEARING, CRACKING OR ANY DEFECT OCCURS, THE MATERIAL WILL BE REQUIRED TO BE REPLACED.

**FOUNDATIONS**

MAXIMUM FOUNDATION DESIGN BEARING PRESSURE --- 2.5 KSF

FOOTINGS ARE DESIGNED SUCH THAT A MINIMUM OF 75 PERCENT OF THE FOOTING IS ALWAYS IN CONTACT; A MAXIMUM OF 25 PERCENT OF THE FOOTING IS IN UPLIFT.

BEARING PILES SHALL BE CAST-IN-PLACE CONCRETE PILES WITH A MINIMUM BEARING CAPACITY EQUAL TO 50 KIPS.

INDEX OF DRAWINGS	
DRG NO.	DESCRIPTION
OH-D1	GENERAL NOTES, PLAN AND ELEVATIONS
OH-D2	SCHEDULE OF STRUCTURES
OH-D3	SCHEDULE OF FOUNDATIONS AND MISCELLANEOUS DETAILS
OH-D4	FOUNDATION DETAILS
OH-D5	STEEL TRUSS DETAILS - SHEET 1
OH-D6	STEEL TRUSS DETAILS - SHEET 2
OH-D7	STEEL TOWER DETAILS
OH-D8	TOWER SHAFT BASE AND TRUSS SEAT DETAILS
OH-D9	MAINTENANCE WALKWAY DETAILS
OH-D10	TYPICAL ELECTRICAL DETAILS

BD-0719-02 - ORIGINAL SHEET

**⊗ SIGN STRUCTURE DRG. OH-D1**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

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**OVERHEAD SIGN SUPPORT STRUCTURES  
GENERAL NOTES, PLAN AND ELEVATIONS**

ROUTE:            SECTION:

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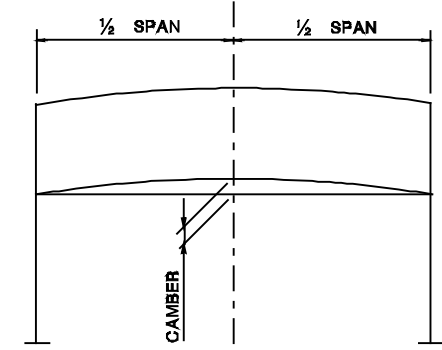
SCALE :    NONE    ⊗

BRIDGE  
SHEET NO.    OF

OVERHEAD SIGN SUPPORTS (STEEL TRUSSES AND STEEL TOWERS)															
SIGN SUPPORTS		ELEVATIONS			SPAN LENGTH (FT)	TRUSSES							TOWERS		
STRUCTURE No.	STATION	☐ TRUSS	BOT OF BASE PLATE			A x B (FT)	CHORDS O.D.xTHICK (IN)	DIAGONALS O.D.xTHICK (IN)	STRUTS O.D.xTHICK (IN)	END STRUTS O.D.xTHICK (IN)	No. OF TRUSS UNITS	CAMBER (IN)	D (FT-IN)	SHAFTS O.D.xTHICK (IN)	DIAGONALS O.D.xTHICK (IN)

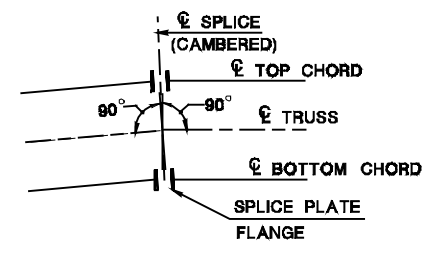
- NOTES:**
1. ALL ELEVATIONS SHALL BE VERIFIED IN THE FIELD PRIOR TO FABRICATION AND CONSTRUCTION.
  2. LEFT AND RIGHT TOWERS ARE DEFINED LOOKING UPSTATION.
  3. THE NUMBER OF TRUSS UNITS SHOWN IN THE SCHEDULE OF STRUCTURES IS OPTIONAL. ALTERNATES MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
  4. THE DIAGONALS ON EACH FACE OF THE TRUSS MUST FORM CONTINUOUS TRUSSING BETWEEN TOWERS (SEE TYPICAL PLAN AND ELEVATION VIEWS ON SIGN STRUCTURE DRG. OH-D1).

SUMMARY OF QUANTITIES				
PAY ITEM NO.	STANDARD ITEM NO.	DESCRIPTION	UNIT	CONTRACT QUANTITY



**CAMBER REQUIRED**

**CAMBER NOTE:**  
 CAMBER SHALL BE OBTAINED BY INCREASING THE TOP CHORD LENGTH AND DECREASING THE BOTTOM CHORD LENGTH AS SHOWN. CHORD SPLICE FLANGES SHALL BE SKEWED TO THE ANGLE SO OBTAINED BEFORE WELDING TO CHORDS. NO FORCE SHALL BE APPLIED IN PROVIDING CAMBER. AN ALTERNATE METHOD OF OBTAINING CAMBER MAY BE USED AS APPROVED BY THE ENGINEER.

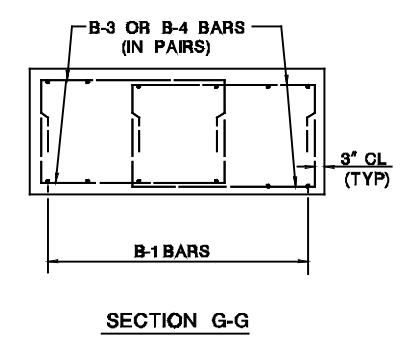
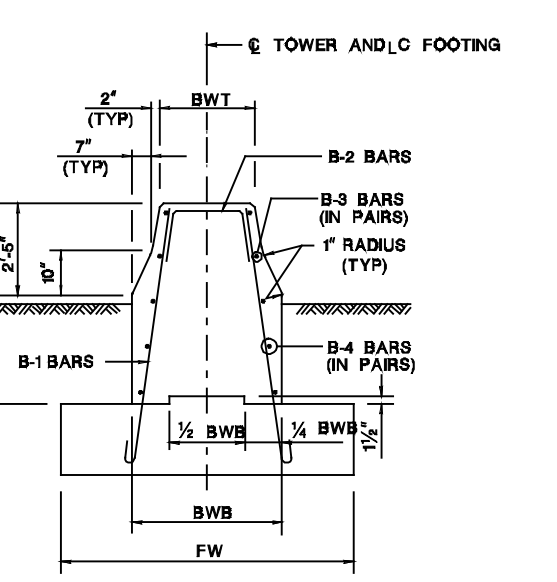
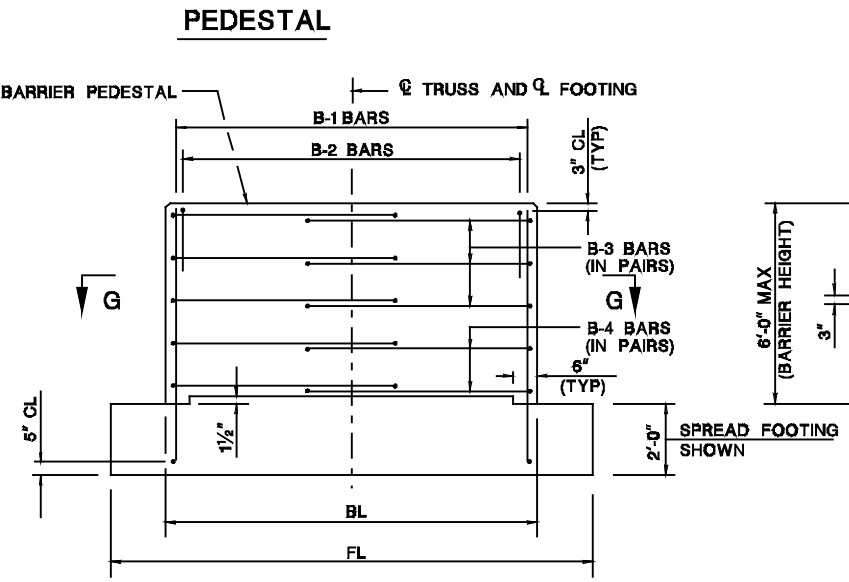
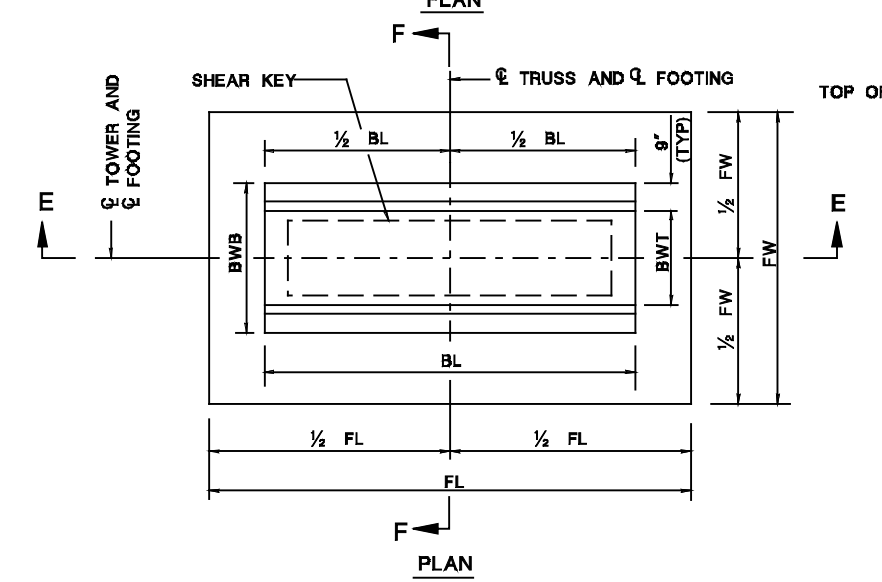
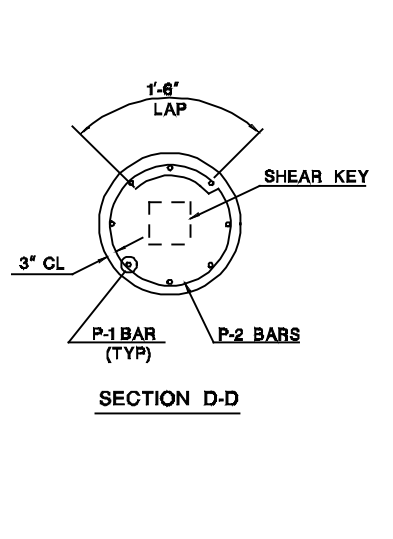
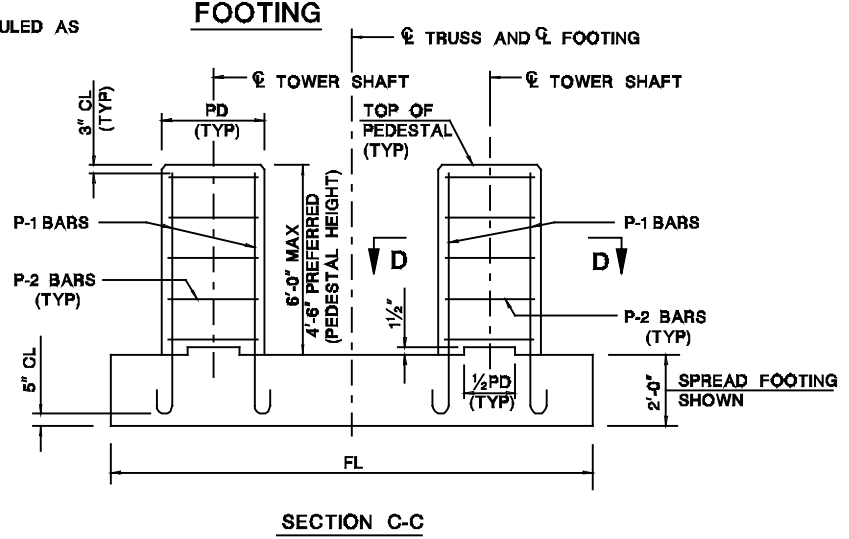
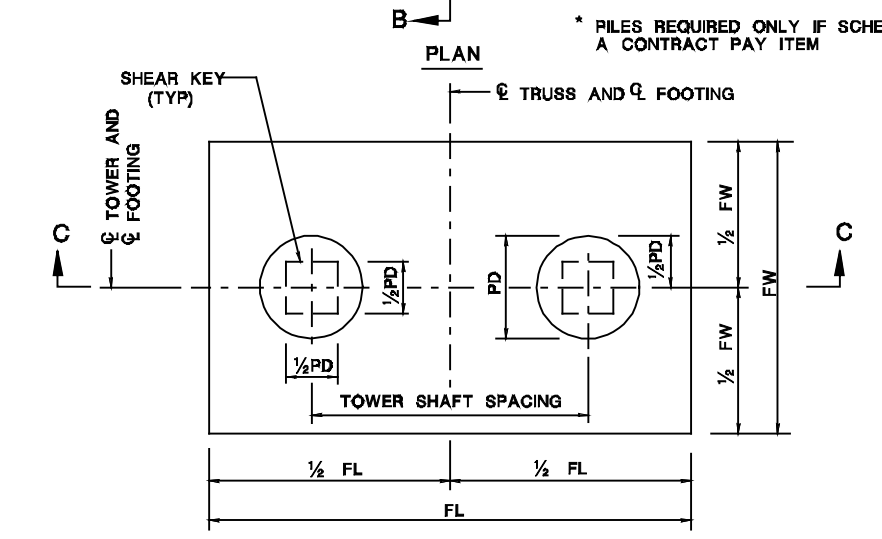
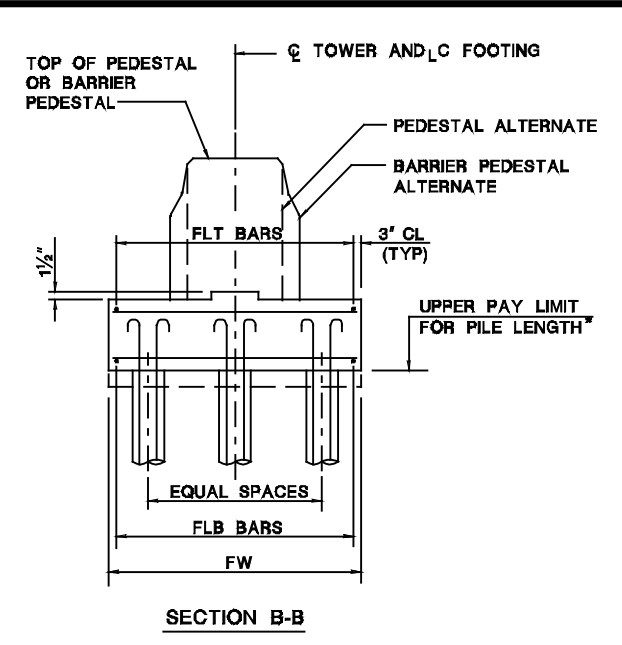
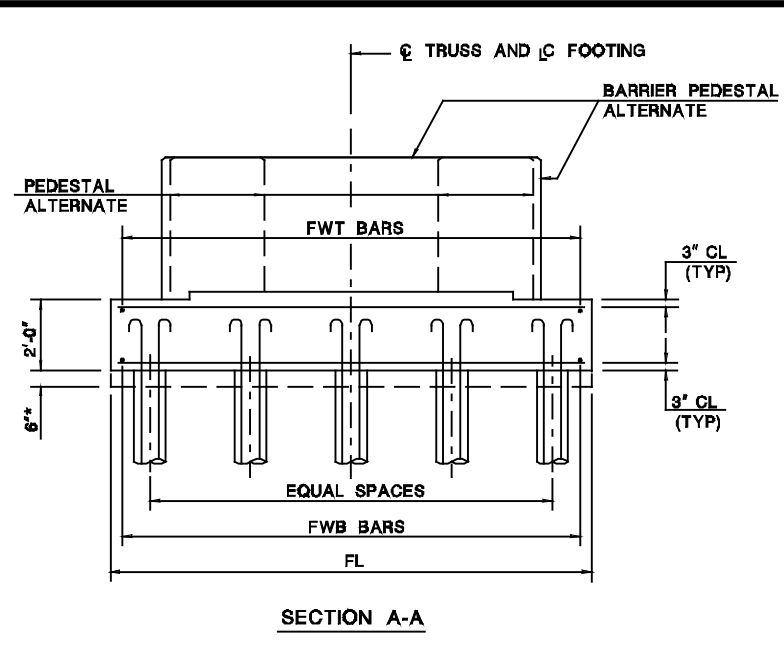
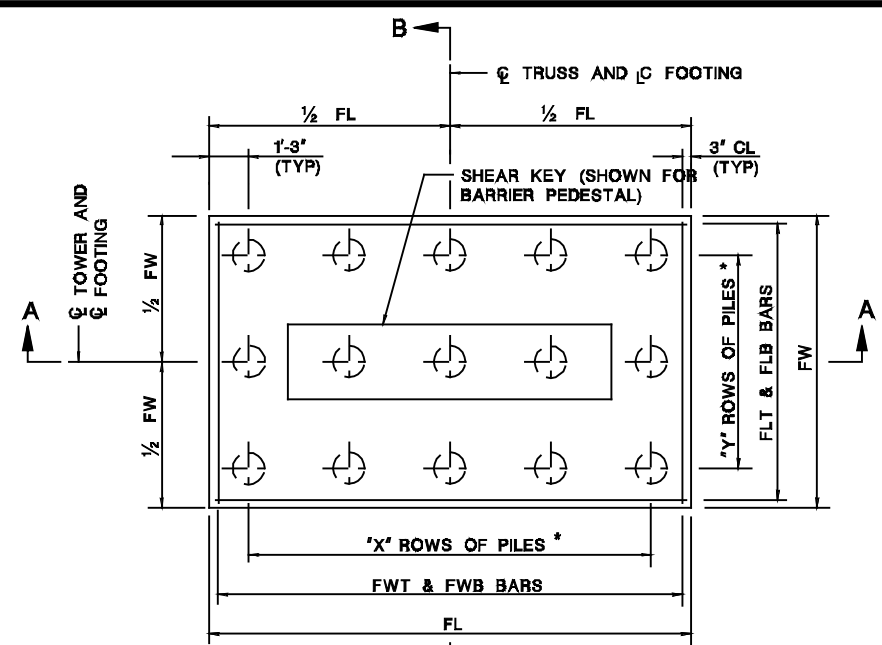


**CAMBER DETAIL**

CONTROL SECTION	JOB NO.
DES. BY	CHK. BY
DWN. BY	
EST. BY	CHK. BY
SPEC. BY	
IN CHARGE OF	

**SIGN STRUCTURE DRG. OH-D2**  
 NEW JERSEY DEPARTMENT OF TRANSPORTATION  
 BUREAU OF STRUCTURAL ENGINEERING  
**OVERHEAD SIGN SUPPORT STRUCTURES**  
**SCHEDULE OF STRUCTURES**  
 ROUTE:                      SECTION  
 SCALE : NONE   
 BRIDGE SHEET NO. OF





- NOTES:**
1. ALL REINFORCEMENT IN PEDESTALS OR BARRIER PEDESTALS SHALL BE CORROSION PROTECTED.
  2. EXPOSED CONCRETE EDGES SHALL BE CHAMFERED '1x1' UNLESS NOTED OTHERWISE.
  3. BARS SHALL NOT BE SPLICED EXCEPT AS PROVIDED ON THIS DRAWING OR AUTHORIZED BY THE ENGINEER. WHEN SPLICING IS APPROVED, THE REINFORCEMENT BARS SHALL BE LAPPED FOR A LENGTH OF AT LEAST 36 DIAMETERS AND SHALL BE SECURELY WIRED TOGETHER.
  4. FOR DETAILS OF CAST-IN-PLACE CONCRETE PILES, SEE SIGN STRUCTURE DRG. OH-D3..

**⊙ SIGN STRUCTURE DRG. OH-D4**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

**OVERHEAD SIGN SUPPORT STRUCTURES  
FOUNDATION DETAILS**

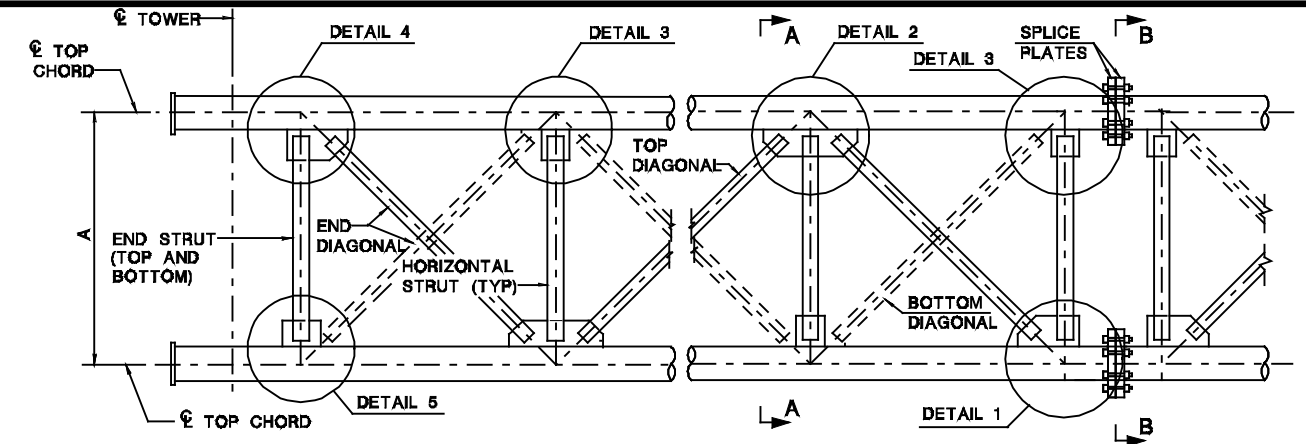
ROUTE: \_\_\_\_\_ SECTION \_\_\_\_\_

SCALE: NONE

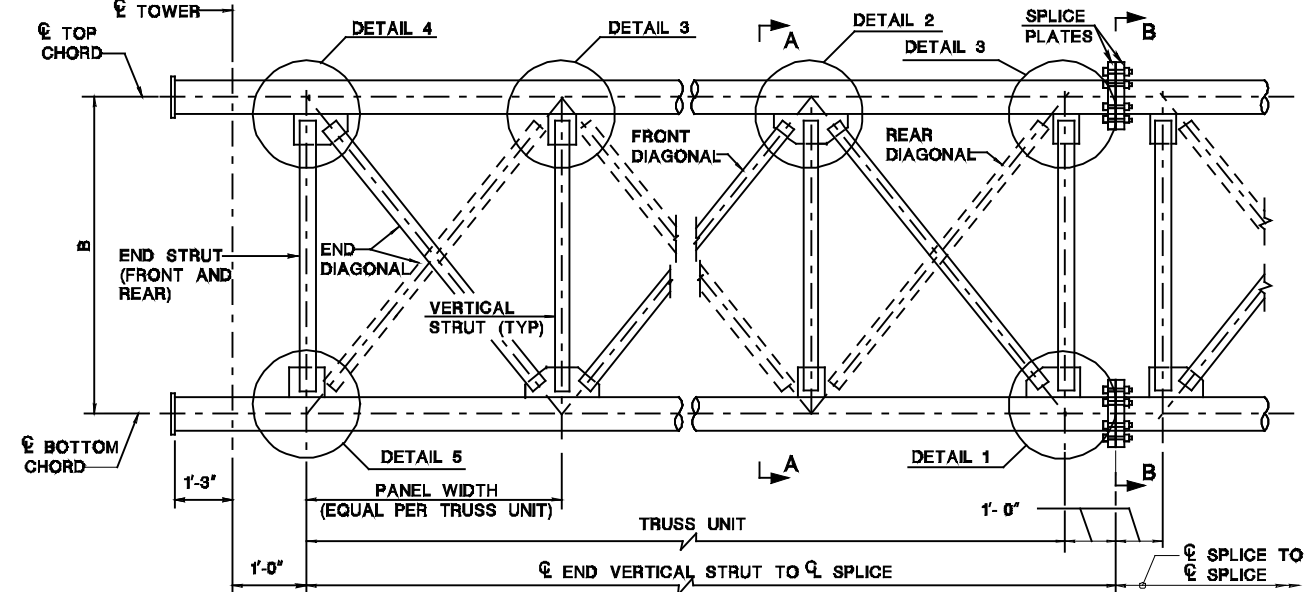
BRIDGE SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

BD-07D-03 - ORIGINAL SHEET

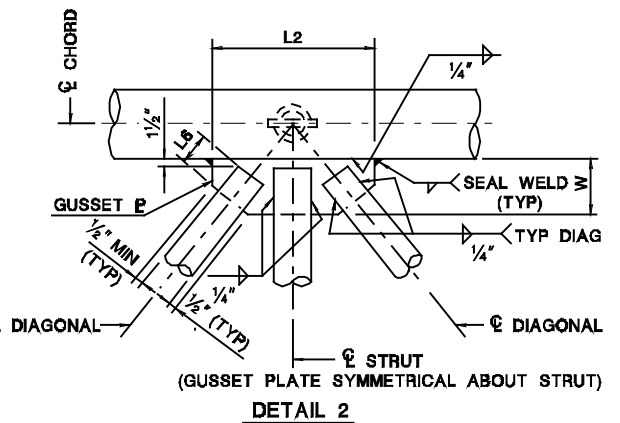




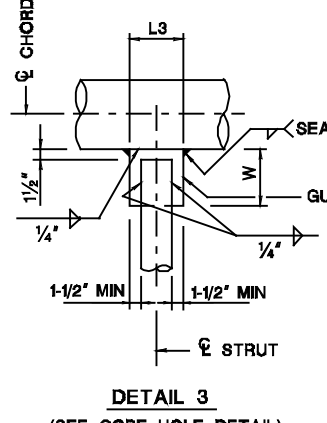
TOP VIEW OF TRUSS



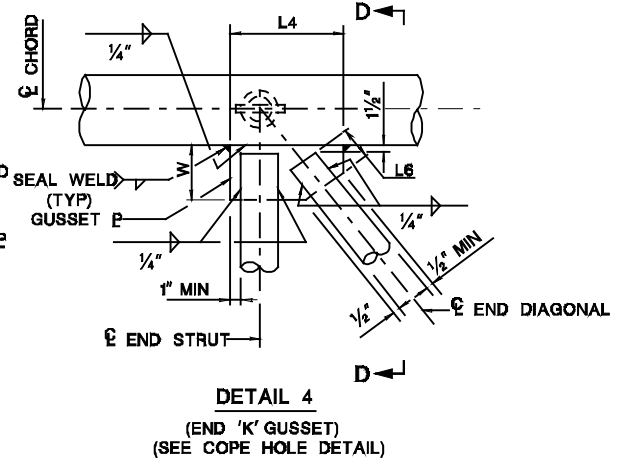
FRONT VIEW OF TRUSS



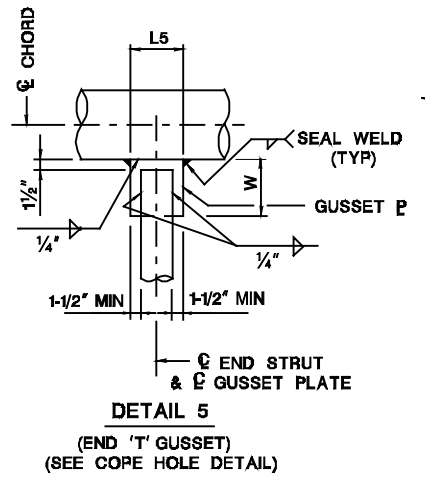
DETAIL 2  
(SEE COPE HOLE DETAIL)



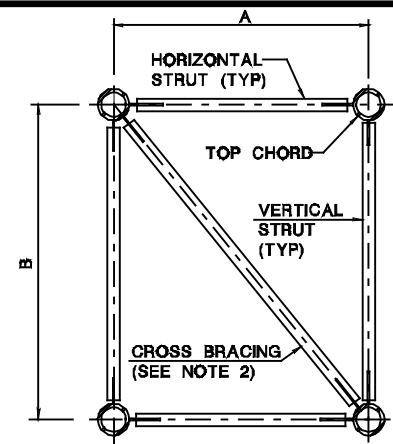
DETAIL 3  
(SEE COPE HOLE DETAIL)



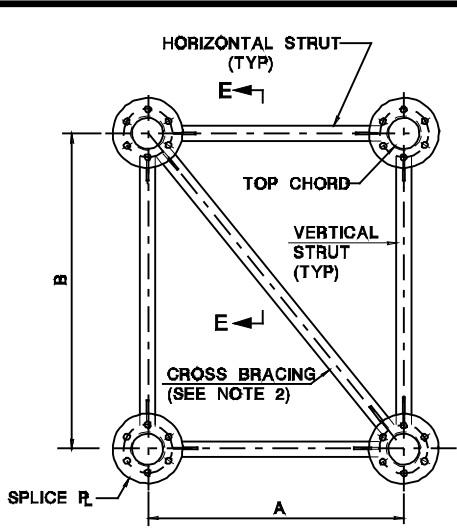
DETAIL 4  
(END 'K' GUSSET)  
(SEE COPE HOLE DETAIL)



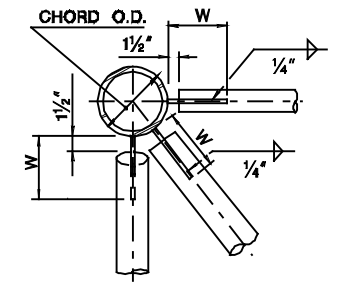
DETAIL 5  
(END 'T' GUSSET)  
(SEE COPE HOLE DETAIL)



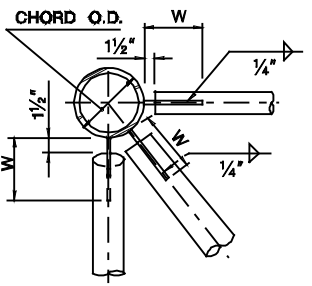
SECTION A-A



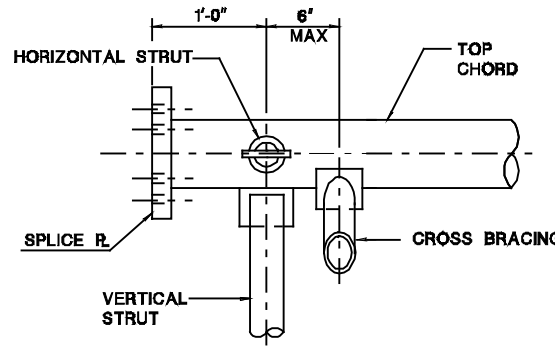
SECTION B-B



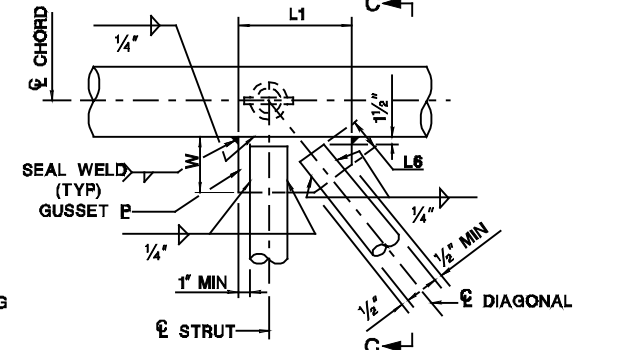
SECTION C-C



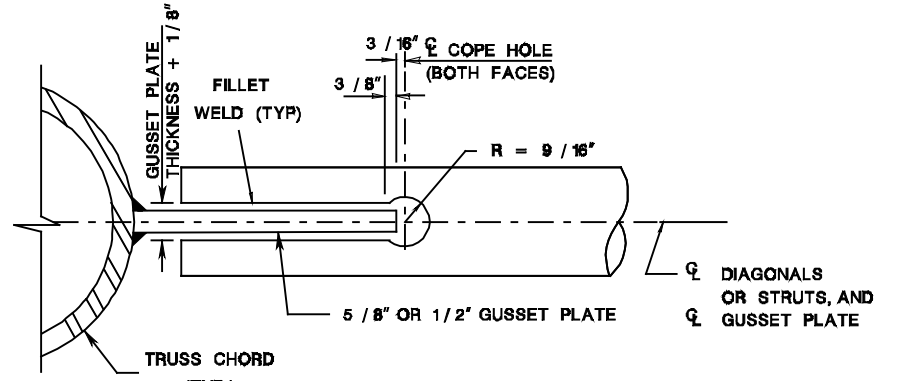
SECTION D-D



SECTION E-E



DETAIL 1 (SEE COPE HOLE DETAIL)



COPE HOLE DETAIL

NOTE:  
COPE HOLES TO BE PROVIDED AT BOTH ENDS AND BOTH FACES OF ALL STRUTS AND DIAGONALS.

TRUSS GUSSET PLATE DIMENSIONS								
CHORD O.D. (IN)	PLATE THICKNESS	PLATE WIDTH W	"K" GUSSET MIN. L1	"K-T" GUSSET MIN. L2	"T" GUSSET MIN. L3	"END - K" GUSSET MIN. L4	"END - T" GUSSET MIN. L5	WELD LENGTH MIN. L6
3.500	1/2"	6 1/2"	10"	1'-2"	6 1/2"	10"	6 1/2"	3 1/2"
4.000	1/2"	6 1/2"	10"	1'-2"	6 1/2"	10"	6 1/2"	3 1/2"
4.500	1/2"	6 1/2"	10"	1'-2"	6 1/2"	10"	6 1/2"	3 1/2"
5.563	1/2"	6 1/2"	10"	1'-2"	6 1/2"	10"	6 1/2"	3 1/2"
6.625	5/8"	7"	10 3/8"	1'-3"	6 1/2"	1'-0"	6 1/2"	4"
8.625	3/4"	7 1/2"	11 1/4"	1'-5"	6 1/2"	1'-0 1/2"	6 1/2"	4 3/4"
10.750	3/4"	8"	1'-0 1/4"	1'-7"	6 1/2"	1'-4"	6 1/2"	5"
12.750	3/4"	8 1/2"	1'-1"	1'-8 1/2"	6 1/2"	1'-4"	6 1/2"	5 1/2"
14.000	3/4"	8 1/2"	1'-1 1/2"	1'-9 1/2"	6 1/2"	1'-4 1/2"	6 1/2"	5 1/2"

- NOTES:
- THE SIZE OF CROSS BRACING MEMBERS SHALL BE THE SAME AS THAT OF THE DIAGONALS. CROSS BRACING SHALL BE LOCATED AT THE ENDS OF EACH TRUSS UNIT AND SPACED AT EVERY THIRD PANEL MAXIMUM, ALTERNATING IN DIRECTION.
  - FOR CHORD CAP DETAILS, SEE SIGN STRUCTURE DRG. OH-D8.
  - FOR CHORD SPLICES, SEE SIGN STRUCTURE DRG. OH-D6.
  - THE LENGTHS SHOWN IN THE TABLE FOR THE TRUSS GUSSET PLATE ARE ABSOLUTE MINIMUM DIMENSIONS. THE ACTUAL DIMENSIONS REQUIRED WILL DEPEND ON THE PANEL DEPTH AND WIDTH USED.

**⊙ SIGN STRUCTURE DRG. OH-D5**

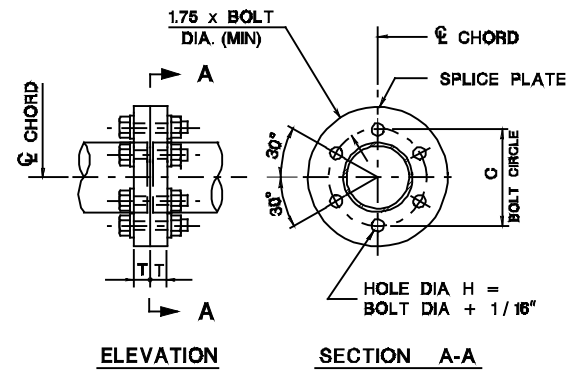
NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

**OVERHEAD SIGN SUPPORT STRUCTURES**  
**STEEL TRUSS DETAILS - SHEET 1**

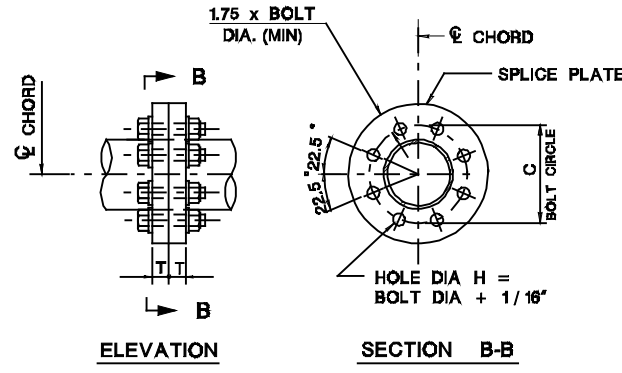
ROUTE: \_\_\_\_\_ SECTION \_\_\_\_\_

SCALE: NONE

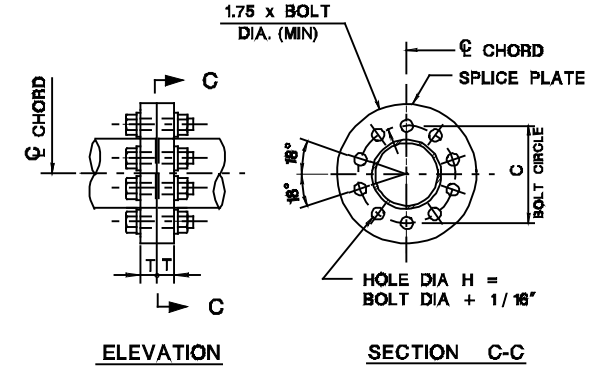
BRIDGE SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_



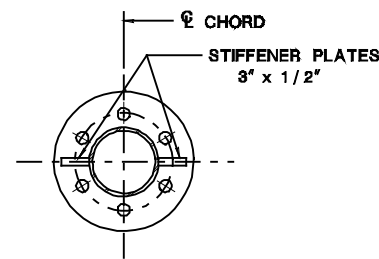
SIX-BOLT CHORD SPLICE DETAIL



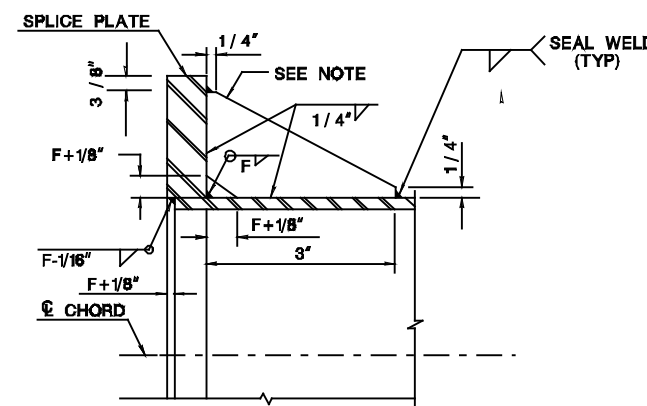
EIGHT-BOLT CHORD SPLICE DETAIL



TEN-BOLT CHORD SPLICE DETAIL



CHORD SPLICE WITH STIFFENERS  
(SIX-BOLT SPLICE SHOWN)



CHORD SPLICE WELD DETAIL

NOTES:

1. ASTM A325 SPLICE BOLTS SHALL BE HEAVY HEXAGON TYPE AND SHALL BE FURNISHED WITH HEAVY HEXAGON NUTS AND WASHERS.
2. THE THREADED PORTION OF THE SPLICE BOLTS SHALL BE EXCLUDED FROM THE SHEAR PLANE OF THE SPLICE.
3. THE PROVISIONS OF THE NJDOT STANDARD SPECIFICATIONS SHALL BE FOLLOWED IN FURNISHING THE REQUIRED CHORD SPLICE ASSEMBLY.
4. REFER TO THE NJDOT STANDARD SPECIFICATIONS FOR SPLICE BOLT TIGHTENING PROCEDURES. WHEN CALIBRATED WRENCHES ARE USED FOR BOLT INSTALLATION, THEY SHALL BE SET TO PROVIDE THE TENSION THAT IS SPECIFIED IN THE TABLE PROVIDED HEREIN.

NOTES:

1. CHORD SPLICE STIFFENER PLATES ARE TO BE USED FOR CHORD SPLICES LOCATED AT MIDSPAN (CENTERLINE) OF TRUSS ONLY (I.e. 2-SEGMENT, 4-SEGMENT AND 6-SEGMENT SPANS). (SEE CHORD SPLICE ASSEMBLY WELD DETAIL FOR MORE INFORMATION).
2. CHORD SPLICE STIFFENER PLATES ARE SHOWN HORIZONTAL. STIFFENER PLATES MAY BE REPOSITIONED, AS NECESSARY, TO PROVIDE SUFFICIENT CLEARANCE FOR BOLTING OF THE SPLICE, BUT THEY SHALL ALWAYS BE POSITIONED OPPOSITE TO EACH OTHER AS SHOWN.

TRUSS CHORD SPLICES						
CHORD O.D.xTHICK (IN)	SPLICE PLATES		SPLICE BOLTS			
	THICKNESS T	WELD SIZE F	No. OF BOLTS	BOLT CIRCLE C	DIAMETER	BOLT TENSION (KIPS)
3.500x.216	1/2"	1/4"	6	6 1/8"	3/4"	28
4.000x.226	1/2"	1/4"	6	8 3/8"	3/4"	28
4.500x.237	1/2"	1/4"	6	7 1/8"	3/4"	28
5.563x.258	1/2"	3/32"	6	9"	1"	51
6.625x.280	2"	3/32"	8	10 1/4"	1"	51
8.625x.322	2"	5/16"	8	1'-1"	1 1/4"	71
10.750x.365	2"	11/32"	8	1'-4"	1 1/2"	103
12.750x.375	2"	3/8"	10	1'-6"	1 1/2"	103
14.000x.375	2"	3/8"	10	1'-7 1/4"	1 1/2"	103

**OH-D6** SIGN STRUCTURE DRG. OH-D6

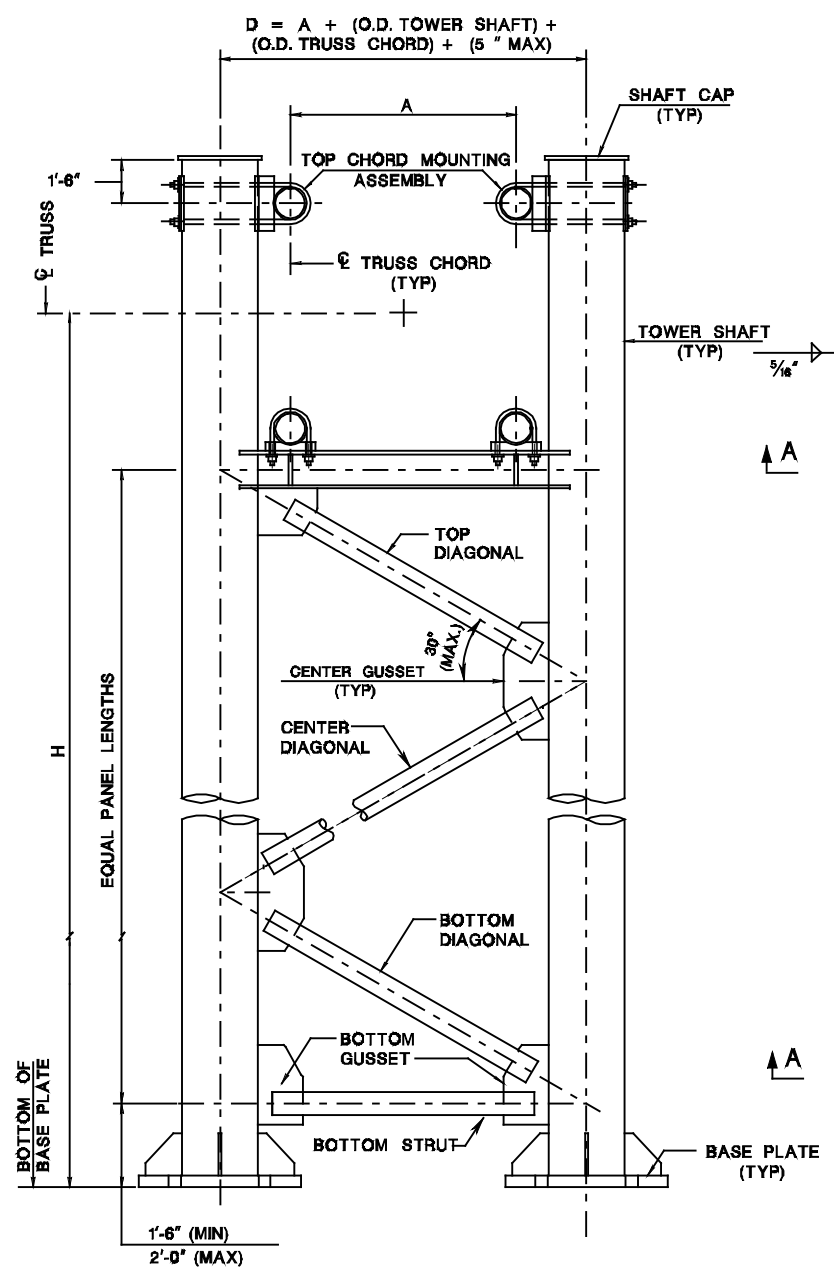
NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

OVERHEAD SIGN SUPPORT STRUCTURES  
STEEL TRUSS DETAILS - SHEET 2

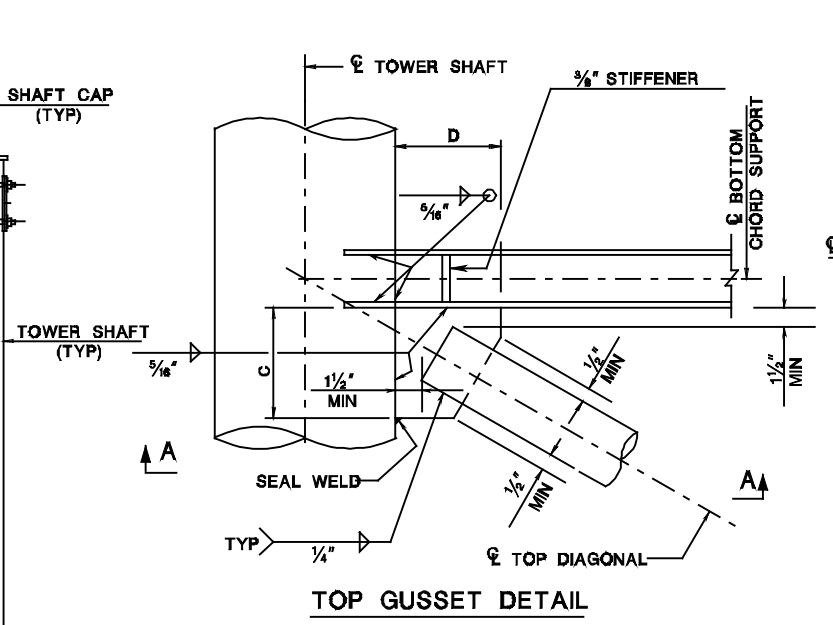
ROUTE: SECTION

SCALE : NONE

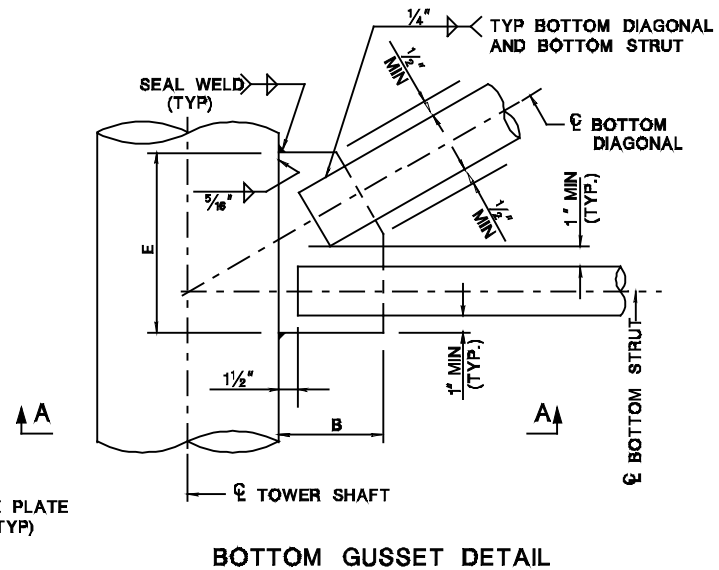
BRIDGE SHEET NO. OF



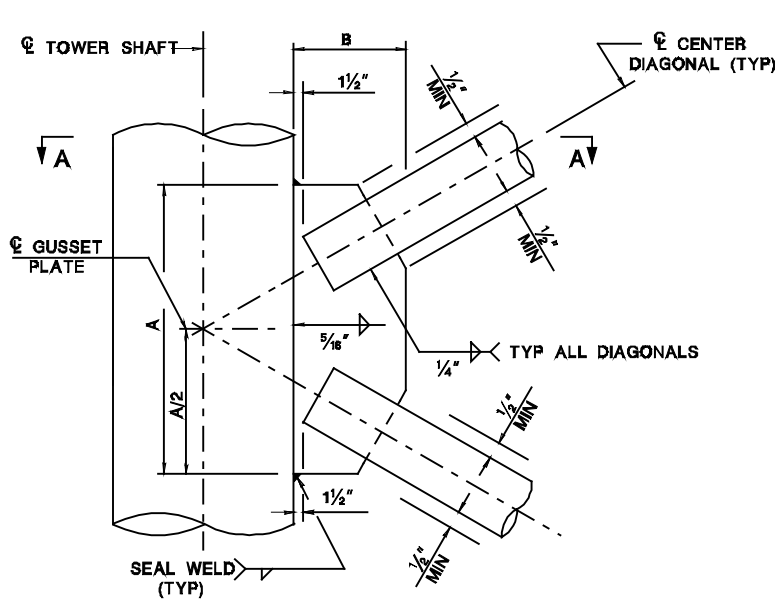
TOWER ELEVATION



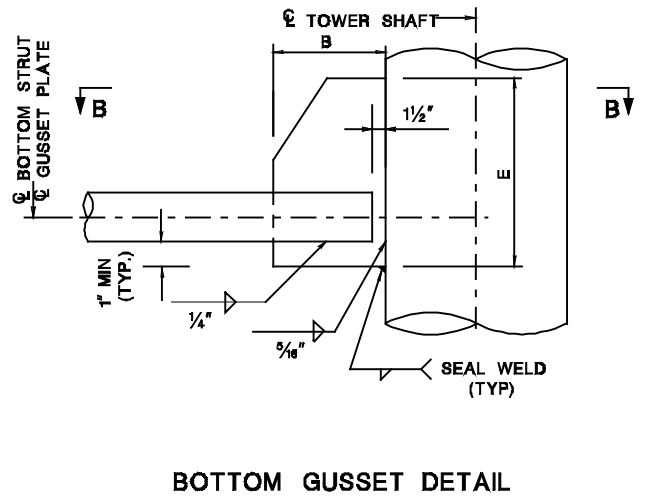
TOP GUSSET DETAIL



BOTTOM GUSSET DETAIL



CENTER GUSSET DETAIL



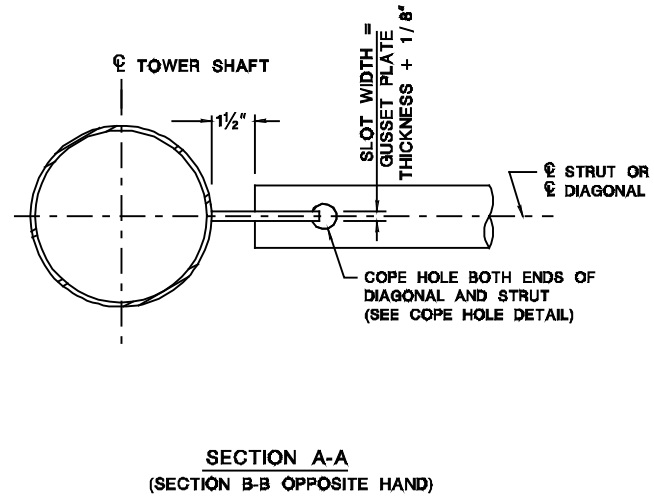
BOTTOM GUSSET DETAIL

**7/8" GUSSET PLATES**

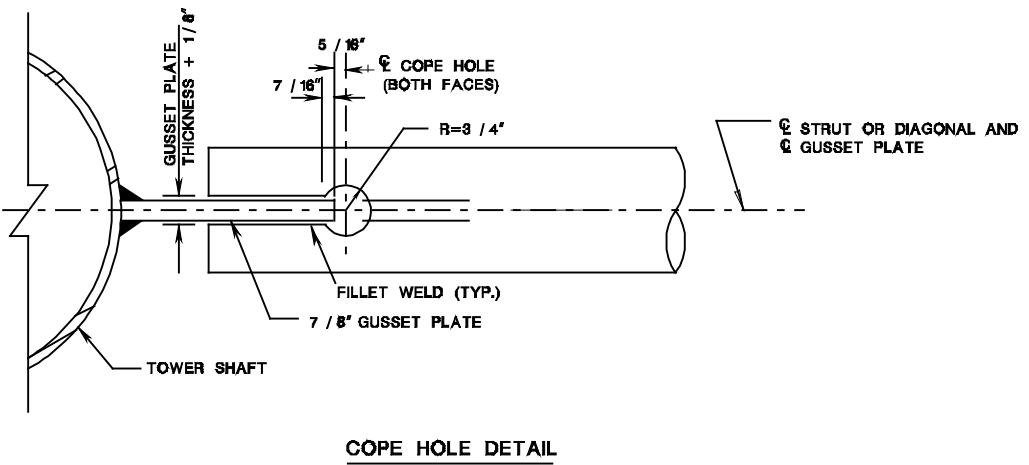
TOWER SHAFT O.D. (IN)	A (FT-IN) MIN.	B (IN) MIN.	C (IN) MIN.	D (IN) MIN.	E (IN) MIN.
10.750	1'-6"	7"	6 1/4"	12 1/4"	13"
12.750	1'-7 1/2"	7 1/4"	7"	12 3/4"	13 3/8"
14.000	1'-11"	8"	8 1/2"	16"	17 1/2"
16.000	2'-1 5/8"	10 1/4"	11 3/8"	16 1/2"	17 1/2"
18.000	2'-4"	11"	11 3/8"	17 3/4"	19"
20.000	2'-5 1/2"	11"	11 3/8"	15 1/2"	19"
24.000	2'-8 1/2"	11"	12 3/8"	15"	19"

NOTES:

- FOR DETAILS OF THE SADDLE BLOCK, SEE SIGN STRUCTURE DRG. OH-D8.
- FOR TOWER SHAFT CAP DETAILS, SEE SIGN STRUCTURE DRG. OH-D8.
- FOR DETAILS OF TOP AND BOTTOM CHORD MOUNTING ASSEMBLIES, SEE SIGN STRUCTURE DRG. OH-D8.
- COPE HOLES SHALL BE PROVIDED ON BOTH ENDS AND BOTH FACES OF ALL TUBULAR DIAGONALS AND BRACING MEMBERS.



SECTION A-A  
(SECTION B-B OPPOSITE HAND)



COPE HOLE DETAIL

**SIGN STRUCTURE DRG. OH-D7**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

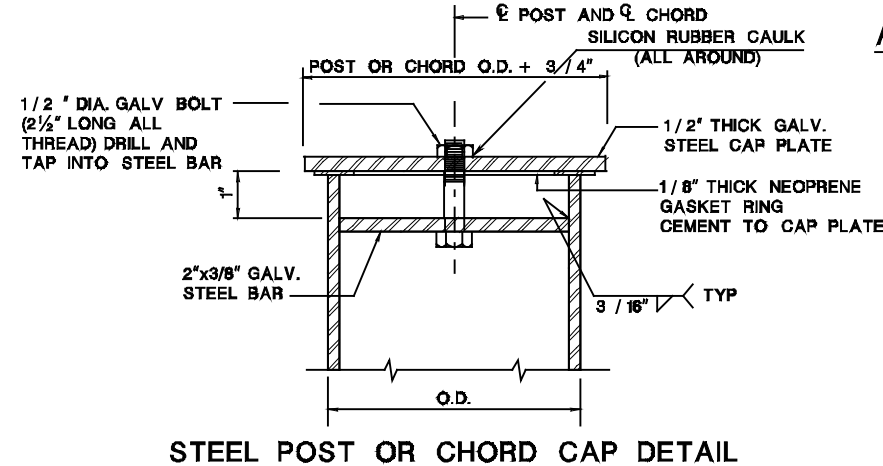
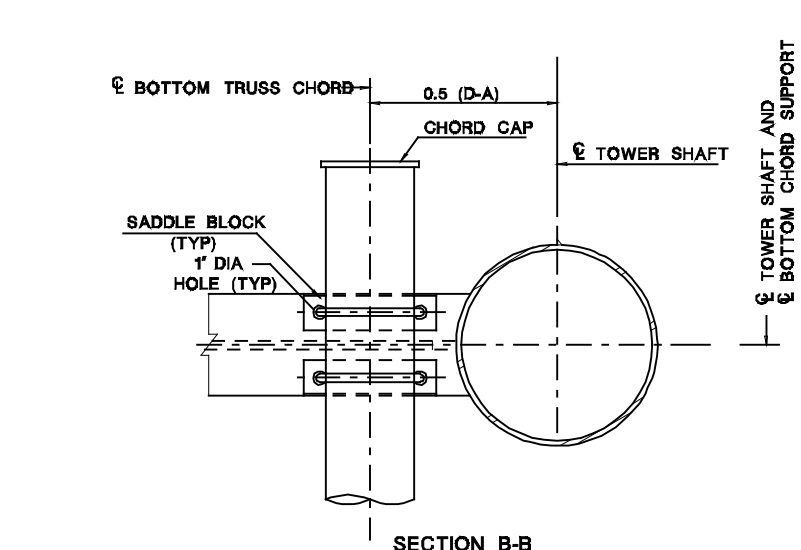
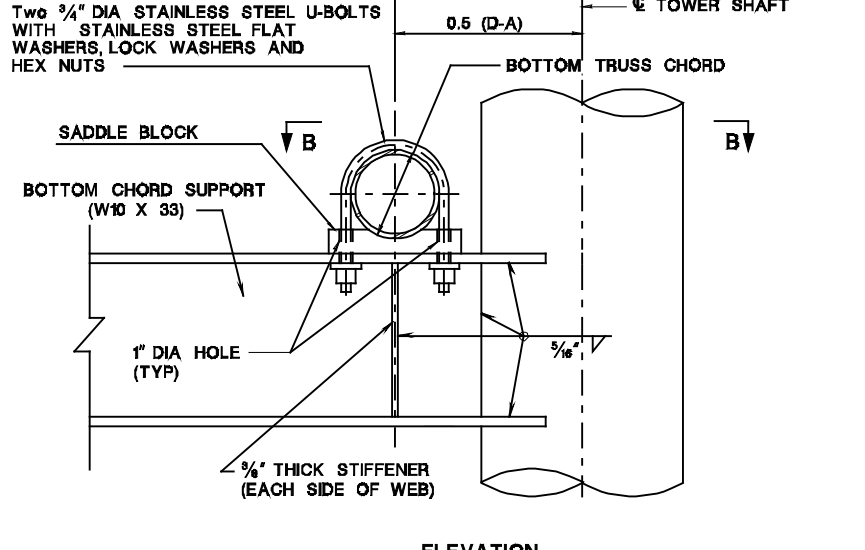
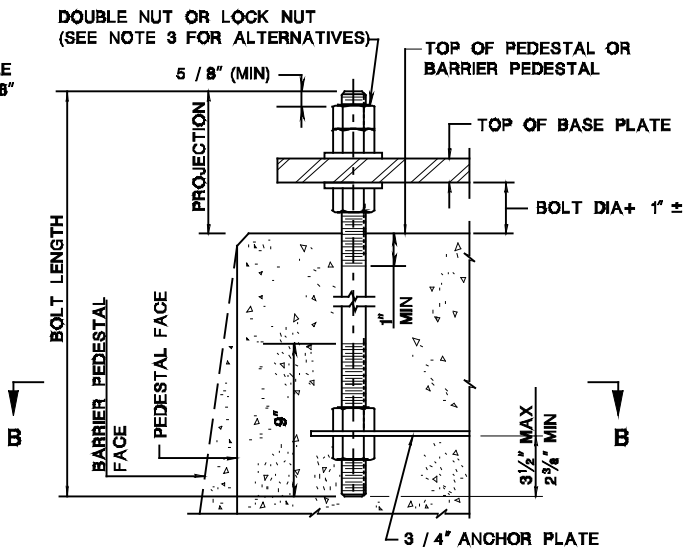
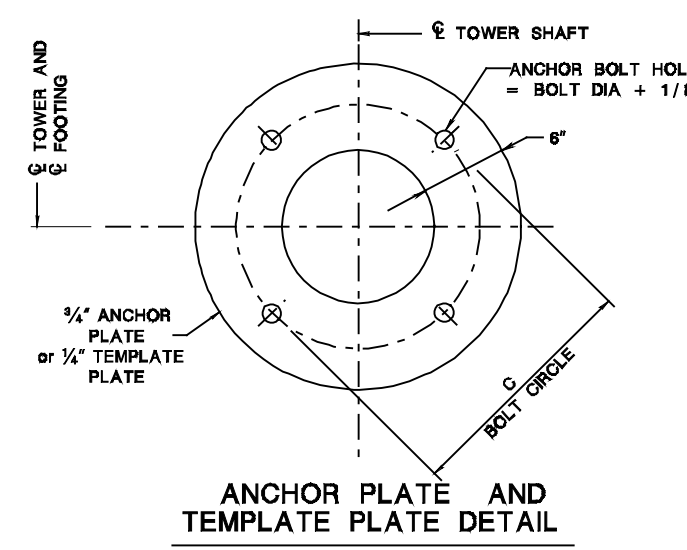
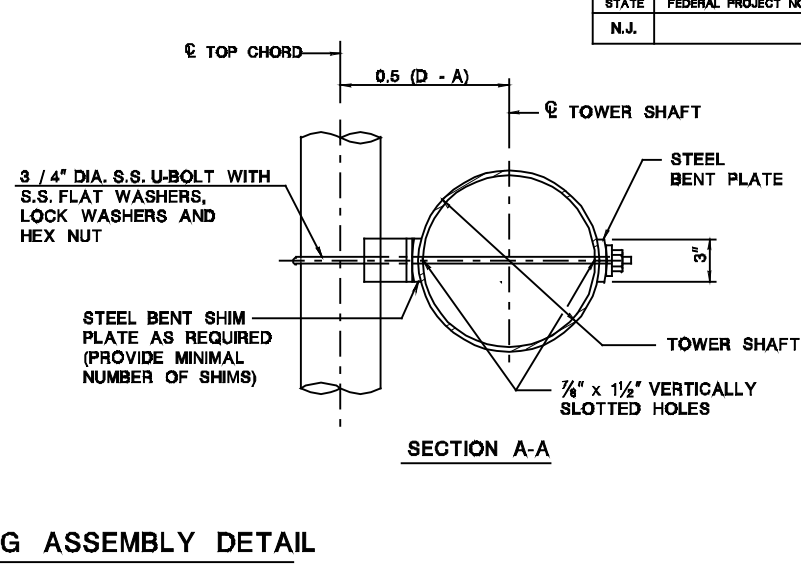
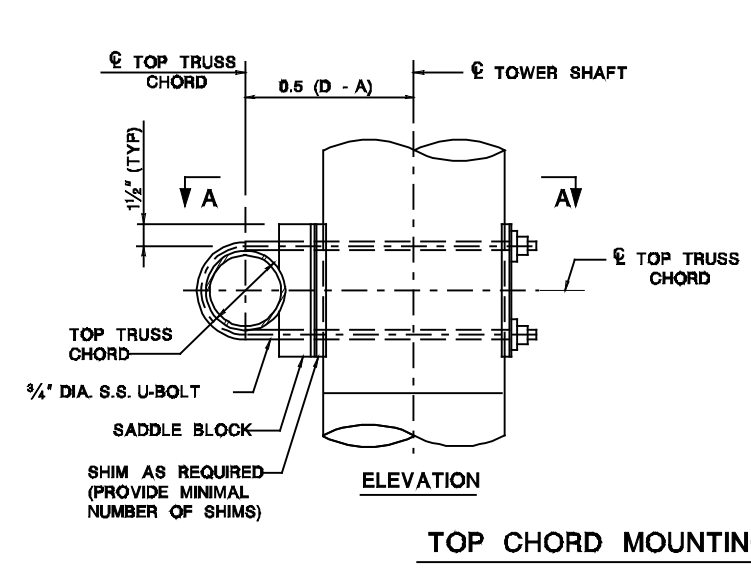
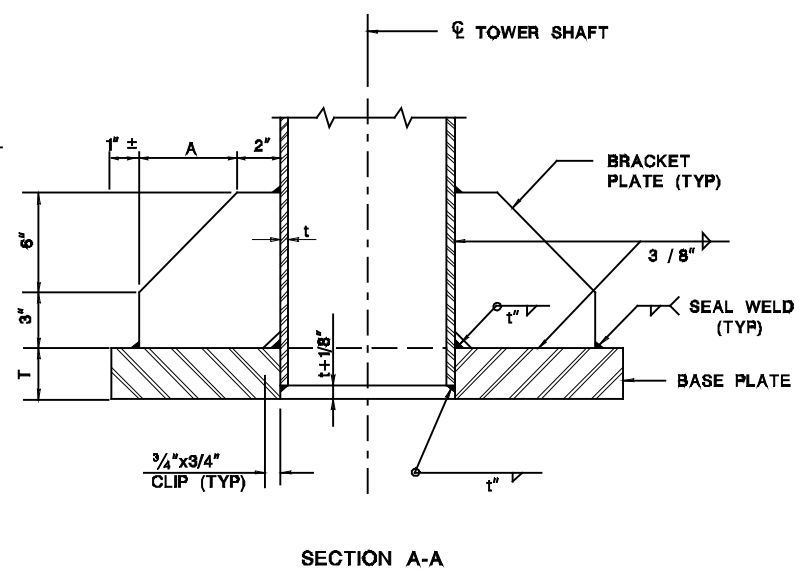
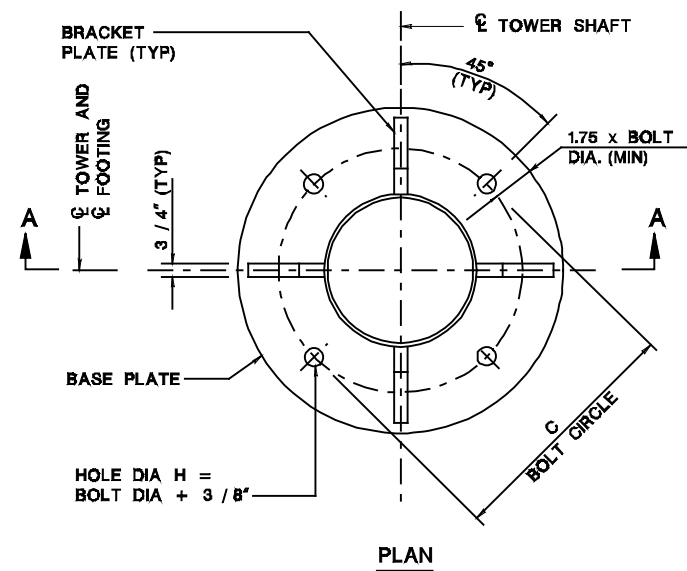
**OVERHEAD SIGN SUPPORT STRUCTURES  
STEEL TOWER DETAILS**

ROUTE: SECTION

SCALE: NONE

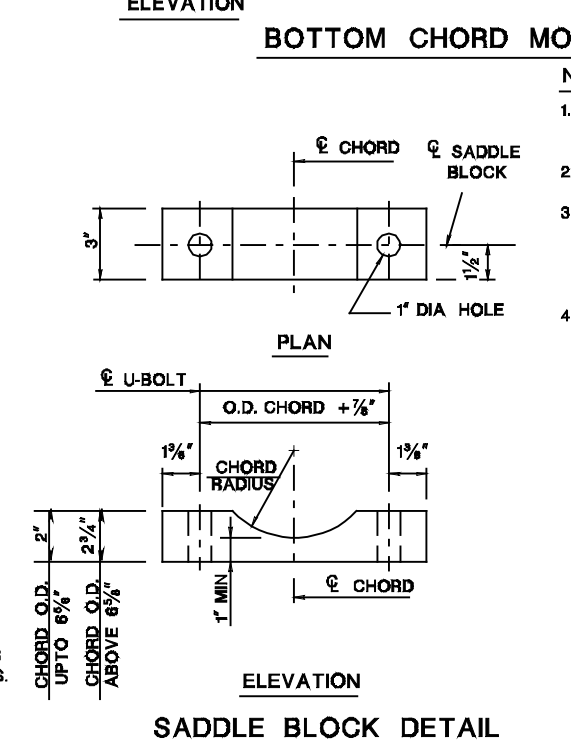
BRIDGE SHEET NO. OF

SD-07D-02 - ORIGINAL SHEET



**TOWER SHAFT BASE ASSEMBLY**

TOWER SHAFT O.D.xTHICK (IN)	BASE PLATE		ANCHOR BOLTS			BRACKET PLATES
	THICKNESS T	BOLT CIRCLE C	SIZE DIAxLGTH	BOLT TENSION (KIPS)	PROJ*	A
10.750x.365	2"	1'-8 3/4"	2" X 54"	87	10 3/4"	4 1/2"
12.750x.375	2 1/4"	1'-8 3/8"	2" X 54"	87	10 3/4"	4 1/2"
14.000x.375	2 1/4"	1'-9 3/8"	2 3/4" X 72"	172	13 1/4"	5 1/2"
14.000x.500	2 1/2"	1'-9 3/8"	2 3/4" X 72"	172	13 1/4"	5 1/2"
16.000x.375	2 1/2"	2'-1 1/8"	2 3/4" X 72"	172	13 1/4"	6 1/2"
16.000x.500	2 3/4"	2'-1 1/8"	2 3/4" X 72"	172	13 1/4"	6 1/2"
18.000x.375	2 3/4"	2'-4 3/4"	2 3/4" X 72"	172	13 1/4"	7 1/4"
18.000x.500	2 3/4"	2'-4 3/4"	2 3/4" X 72"	172	13 1/4"	7 1/4"
20.000x.500	3 1/4"	2'-8 1/8"	3" X 78"	208	14 3/4"	8 1/2"
24.000x.500	3 1/4"	3'-2 1/2"	3" X 78"	208	14 3/4"	8 1/2"



- NOTES:**
- ANCHOR BOLTS SHALL BE PROVIDED WITH HEAVY HEXAGON NUTS AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
  - ANCHOR BOLTS SHALL BE GALVANIZED AFTER THREADING.
  - REFER TO THE NJDOT STANDARD SPECIFICATIONS FOR ANCHOR BOLT TIGHTENING PROCEDURES. WHEN CALIBRATED WRENCHES ARE USED FOR BOLT INSTALLATION, THEY SHALL BE SET TO PROVIDE THE TENSION THAT IS SPECIFIED IN THE TABLE PROVIDED HEREIN.
  - 3/4" STAINLESS STEEL U-BOLTS SHALL HAVE THE THREADS EXCLUDED FROM THE SHEAR PLANE BETWEEN THE SADDLE BLOCK AND BOTTOM CHORD SUPPORT.

\* PROJECTION LENGTH SHOWN IS BASED ON USING DOUBLE NUTS.

**SIGN STRUCTURE DRG. OH-D8**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
 BUREAU OF STRUCTURAL ENGINEERING

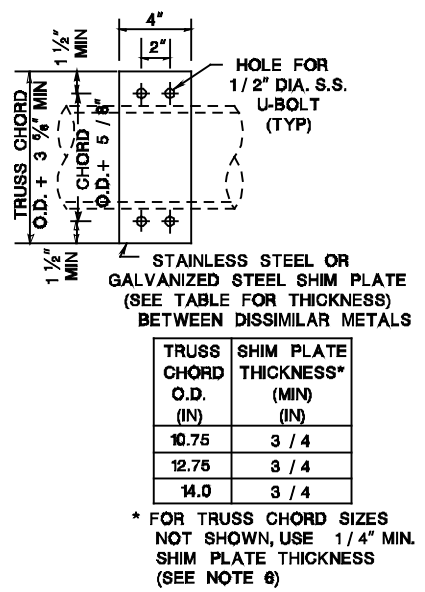
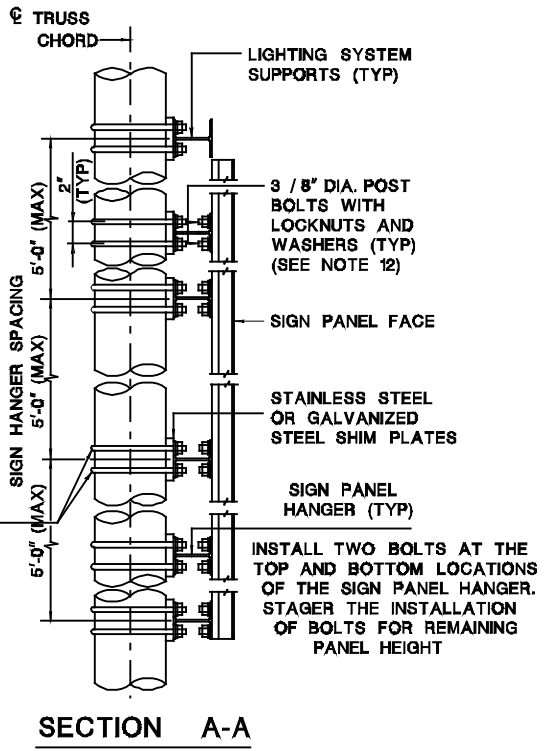
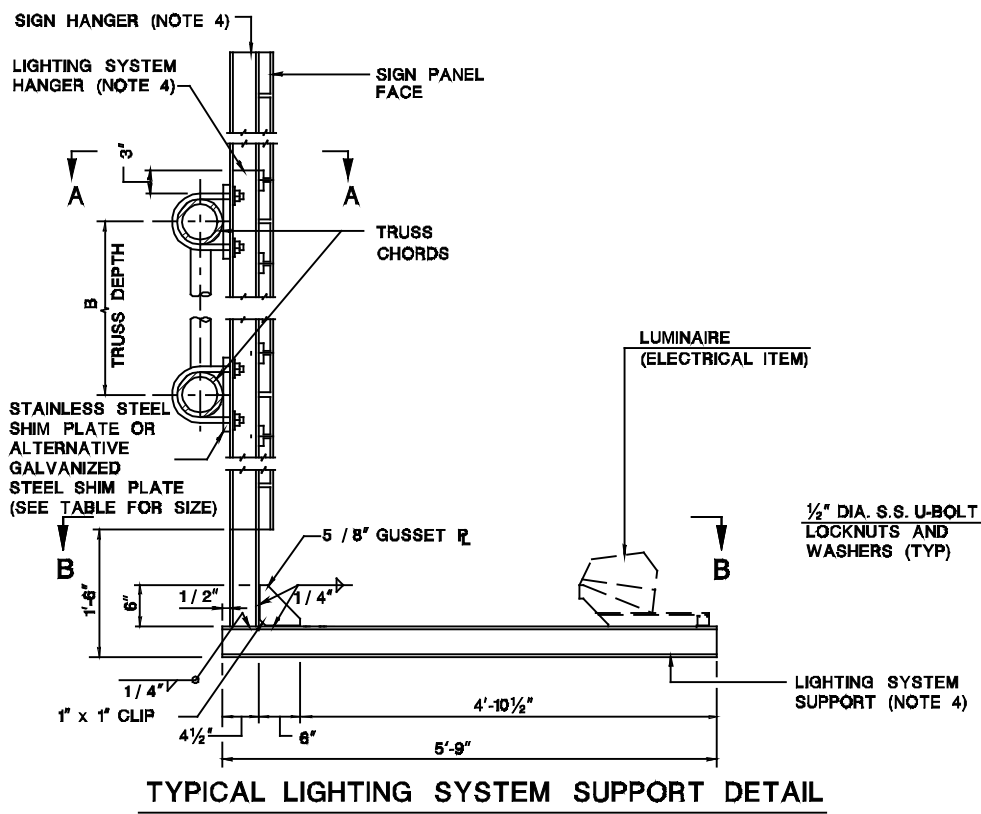
**OVERHEAD SIGN SUPPORT STRUCTURES**  
 TOWER SHAFT BASE AND TRUSS SEAT DETAILS

ROUTE: SECTION

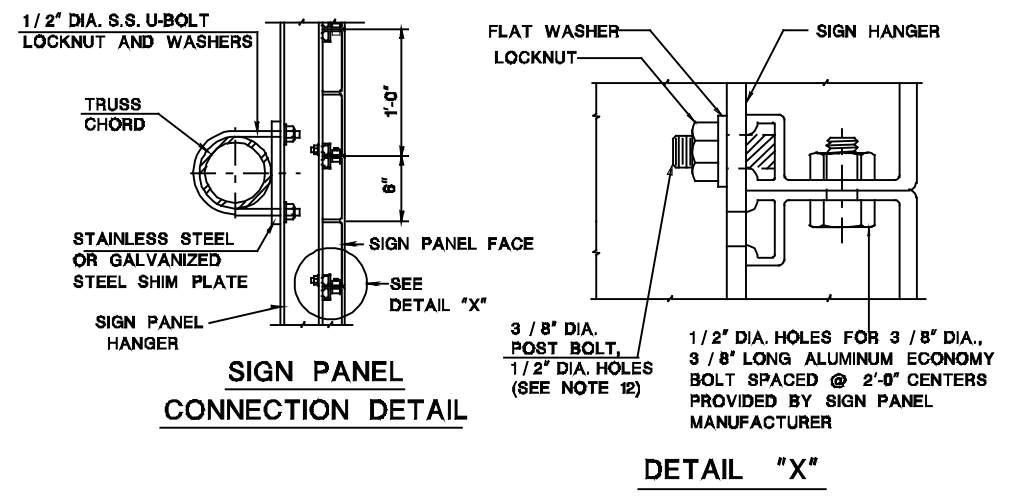
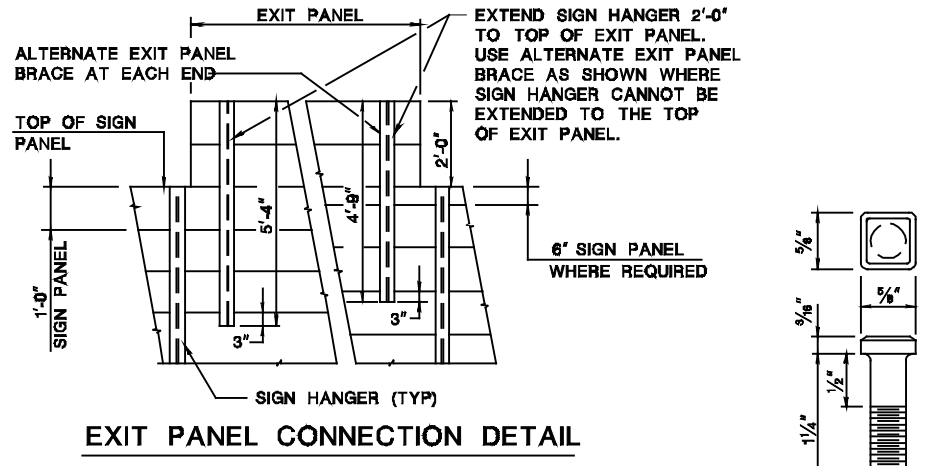
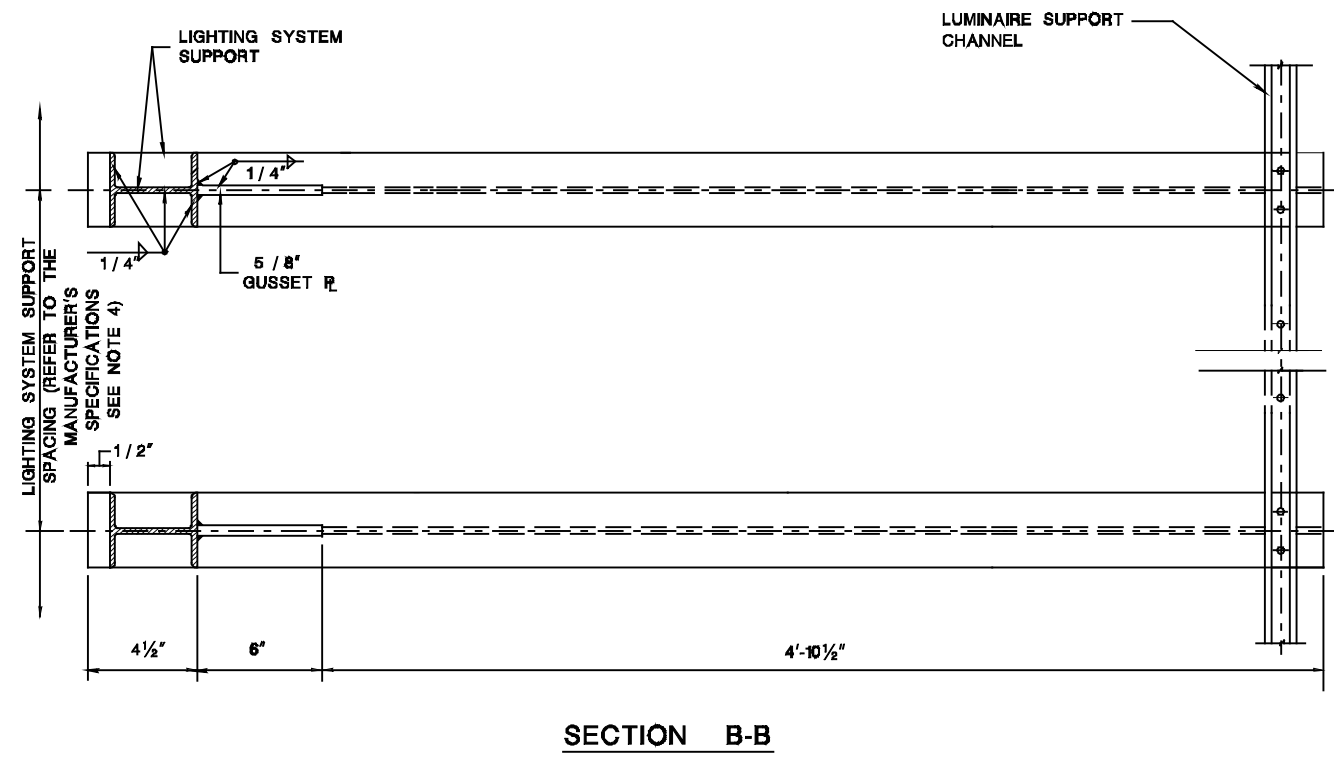
SCALE: NONE

BRIDGE SHEET NO. OF

SD-077D-03 - ORIGINAL SHEET



- NOTES**
- ALL ALUMINUM MATERIAL SHALL BE ALUMINUM ALLOY 6061-T6 UNLESS OTHERWISE NOTED
  - ALL BOLTS, U-BOLTS, WASHERS AND NUTS SHALL BE STAINLESS STEEL CONFORMING TO ASTM SPECIFICATION A320 GRADE B8, CLASS 1 AND ASTM A194. STAINLESS STEEL SHIM PLATES SHALL CONFORM TO ASTM SPECIFICATION A167, TYPE 304, OR AS NOTED.
  - WELDING OF ALUMINUM SHALL BE AS SPECIFIED IN AWS D1.2 AND THE NJDOT STANDARD SPECIFICATIONS.
  - SIGN PANEL HANGERS SHALL BE ALUMINUM OR GALVANIZED STEEL: ALUMINUM I-BEAM (DEPTH = 4", WEB AND FLANGE THICKNESS = 1/4", FLANGE WIDTH = 3 1/2"); STEEL I-BEAM (W6x9). SIGN HANGER SPACING DESIGNED FOR 15'-0" MAXIMUM SIGN PANEL HEIGHT.
- LIGHTING SYSTEM SUPPORTS SHALL BE ALUMINUM OR GALVANIZED STEEL. THE SUPPORT MEMBER SIZE, SPACING, CONNECTION AND INSTALLATION SHALL ADHERE TO THE WORKING DRAWINGS BASED ON THE COORDINATION OF THE SIGN SUPPORT STRUCTURE FABRICATOR, LIGHTING SYSTEM MANUFACTURER AND DESIGN ENGINEER.
- WHEN SIGN HANGERS AND LIGHTING SYSTEM SUPPORTS ARE PLANNED TO BE GALVANIZED STEEL, THEY MAY BE COMBINED. STAINLESS STEEL OR GALVANIZED SHIM PLATES ARE NOT NECESSARY.



- SIGN HANGERS SHALL BE USED TO SUPPORT SIGN PANELS ONLY, UNLESS OTHERWISE NOTED.
- THE THICKNESSES OF THE SHIM PLATES MAY BE MODIFIED TO AVOID INTERFERENCE BETWEEN THE CHORD SPLICE PLATES AND THE SIGN PANELS.
- LIGHTING SYSTEM SUPPORTS SHALL BE PROVIDED CONTINUOUSLY FOR THE ENTIRE SIGN DESIGN LENGTH UNLESS OTHERWISE SHOWN.
- LIGHTING SYSTEM SUPPORT HANGERS SHALL PROJECT 3" MIN. ABOVE THE TOP OF THE TOP CHORD AND SHALL NOT SUPPORT SIGN PANELS, UNLESS OTHERWISE NOTED.
- LENGTH OF SIGN HANGERS SHALL BE EQUAL TO THE SIGN PANEL HEIGHT. BEHIND AN EXIT PANEL, THE HANGERS SHALL BE EXTENDED TO THE TOP OF THE EXIT PANEL.
- EXIT PANEL CONNECTION DETAIL SHOWN SHALL ALSO BE USED FOR THE ATTACHMENT OF NEW EXIT PANELS TO EXISTING SIGN PANELS.
- SIGN PANELS SHALL NOT EXTEND MORE THAN 3'-0" BEYOND THE LAST SIGN HANGER.
- FRICITION TYPE CLIPS OR SIMILAR DEVICES ARE NOT PERMITTED.

**SIGN STRUCTURE DRG. OH-D9**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

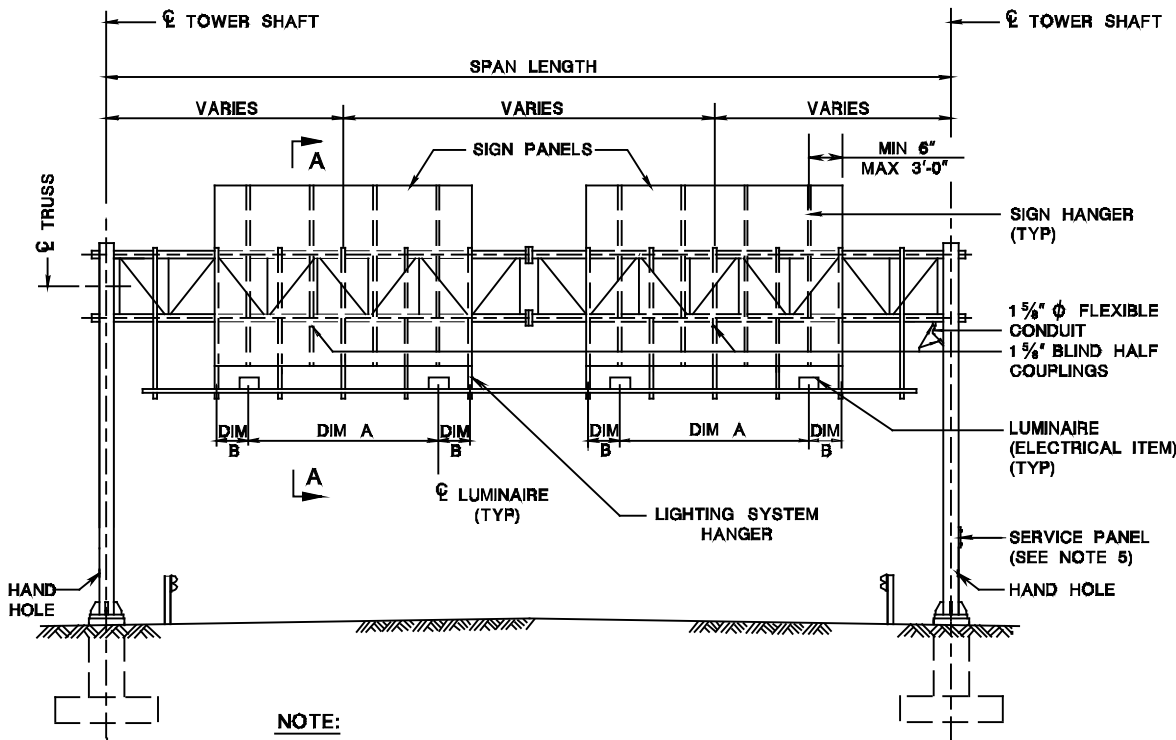
**OVERHEAD SIGN SUPPORT STRUCTURES  
SIGN AND LIGHTING SYSTEM  
SUPPORT DETAILS**

ROUTE: SECTION

SCALE: NONE

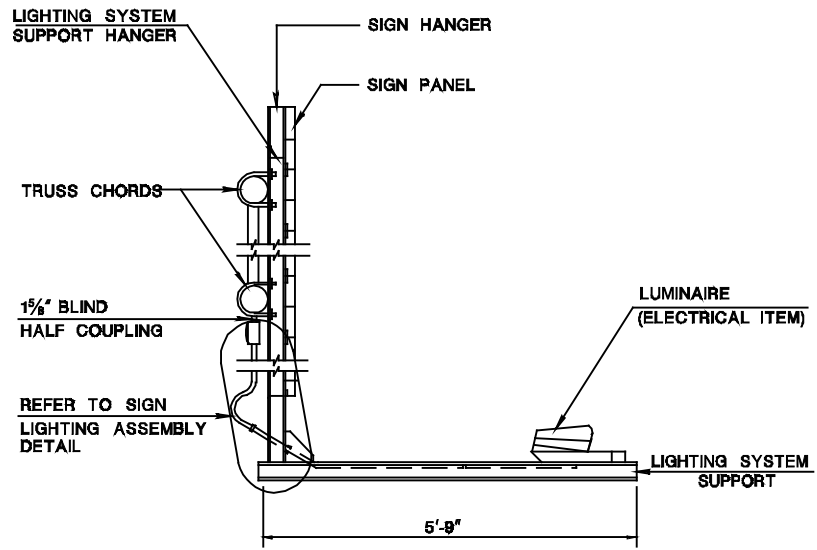
BRIDGE SHEET NO. OF

ED-07D-02 - ORIGINAL SHEET

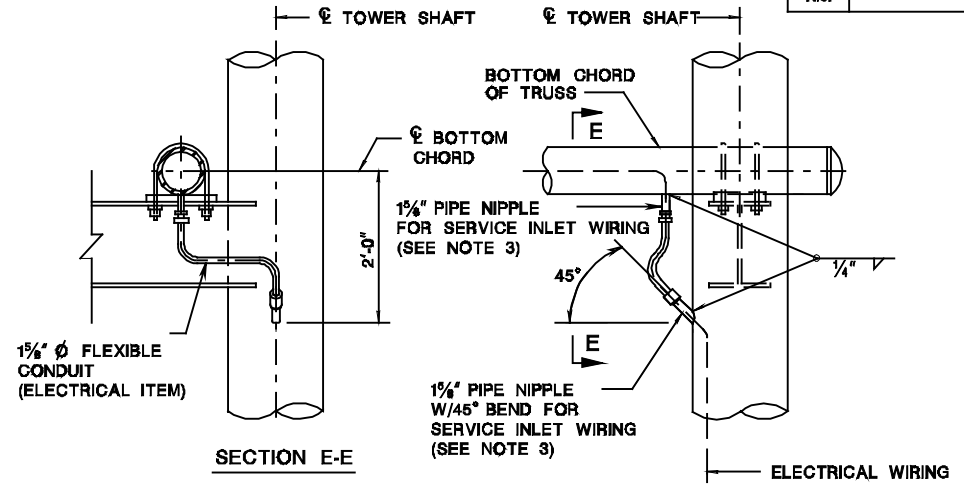


**NOTE:**  
FOR LUMINAIRE SPACING DIMENSIONS 'A' & 'B'  
SEE SIGN LIGHTING ASSEMBLY DETAIL.

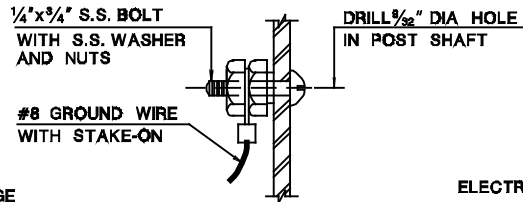
**ELEVATION - TYPICAL OVERHEAD SIGN SUPPORT**



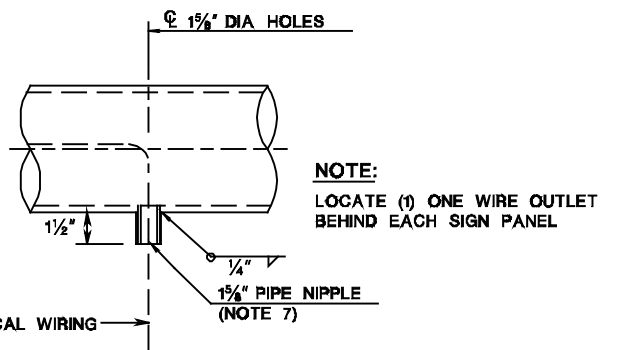
**SECTION A-A**



**DETAILS OF WIRE OUTLETS**

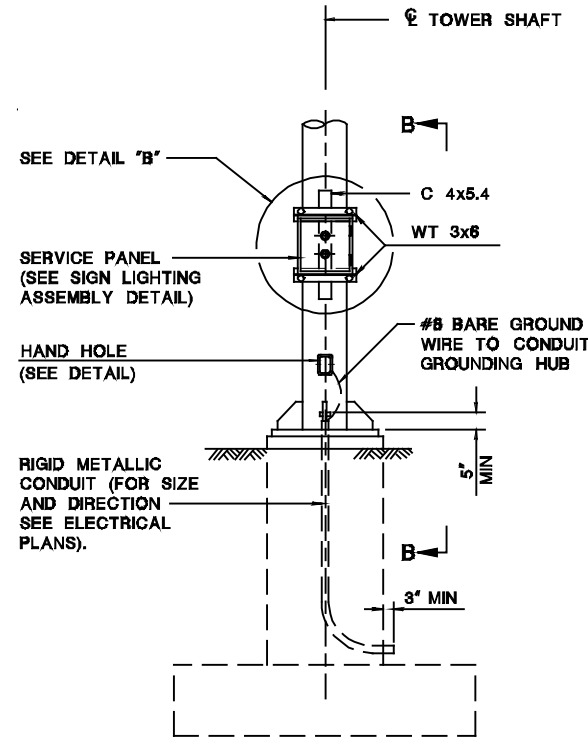


**GROUND STUD**



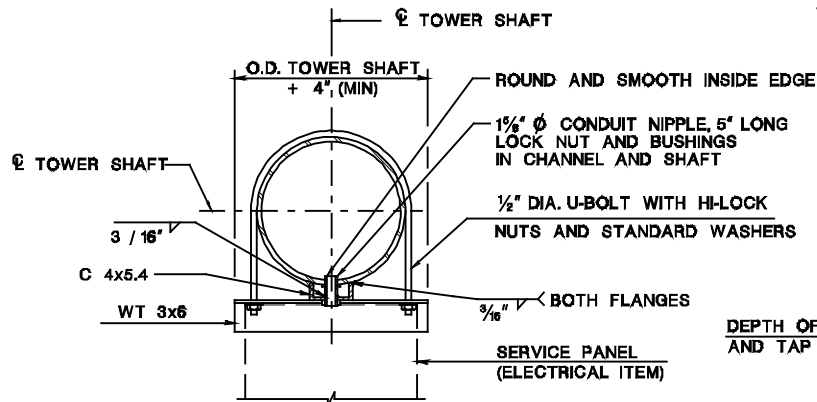
**DETAIL OF WIRE OUTLET ON TUBE**

**NOTE:**  
LOCATE (1) ONE WIRE OUTLET  
BEHIND EACH SIGN PANEL

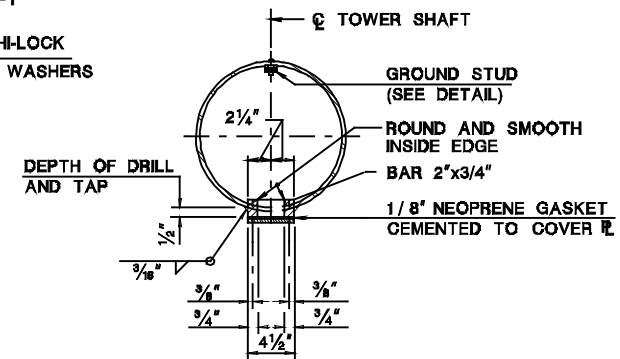


**SIDE ELEVATION**

**NOTE:**  
HAND HOLE AND GROUND  
STUD TO BE PROVIDED IN  
EACH TOWER SHAFT

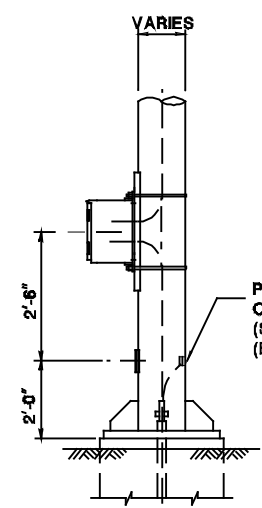


**SECTION C-C**

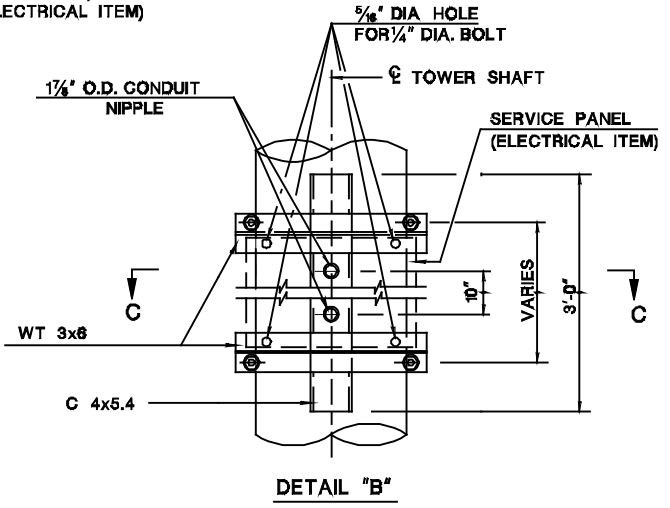


**SECTION D-D**

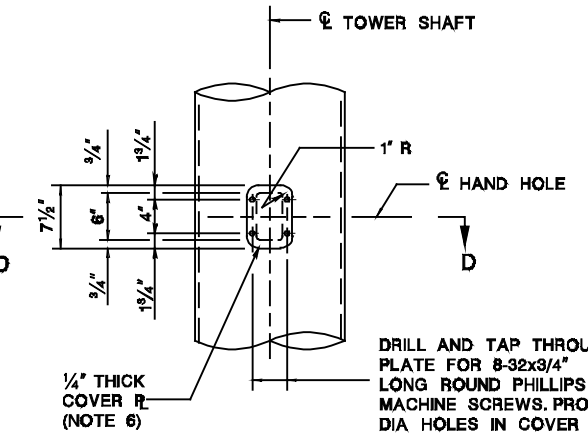
- NOTES:**
1. WHEN SIGN LIGHTING IS REQUIRED, AN APPROVED SIGN LIGHTING SYSTEM SHALL BE PROVIDED.
  2. ALL BOLTS TO BE INSTALLED WITH WASHERS, LOCKWASHERS AND NUTS. ALL HARDWARE SHALL BE STAINLESS STEEL CONFORMING TO ASTM A320, GRADE B8, CLASS 1.
  3. 1 1/2" STANDARD PIPE NIPPLES SHALL BE OF APPROVED MATERIAL AND BE COMPATIBLE WITH THE MATERIAL TO WHICH THEY ARE WELDED.
  4. IF REQUIRED, LUMINAIRE SUPPORT CHANNELS SHALL BE CONTINUOUS FROM HANGER TO HANGER. REFER TO THE MANUFACTURER'S SPECIFICATIONS.
  5. SEE ELECTRICAL PLANS FOR LOCATION AND DIRECTION OF SERVICE PANEL, RIGID CONDUITS, AND FLEXIBLE CONDUITS.
  6. HANDHOLES SHALL NOT BE ORIENTED TO THE SIDE OF THE ROADWAY.
  7. NIPPLE SIZE SHALL NOT PROJECT BEYOND THICKNESS OF CHORD.



**SECTION B-B**



**DETAIL "B"**



**HAND HOLE AND COVER DETAIL**

**TYPICAL SERVICE PANEL DETAIL AT SIGN STRUCTURE**

**SIGN STRUCTURE DRG. OH-D10**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

**OVERHEAD SIGN SUPPORT STRUCTURES**  
TYPICAL ELECTRICAL DETAILS

ROUTE: \_\_\_\_\_ SECTION \_\_\_\_\_

SCALE: NONE

BRIDGE SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

**GENERAL NOTES**

**A. DESIGN CRITERIA**

**DESIGN SPECIFICATIONS**

2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS WITH CURRENT INTERIM.

NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL, CURRENT EDITION.

**DESIGN LOADS**

DESIGN WIND VELOCITY --- 80 MPH; (ABOVE AASHTO SPECIFICATIONS APPENDIX C)  
DESIGN ICE LOAD ----- 3 PSF

**FATIGUE LOADS**

ALL STRUCTURAL DETAILS HAVE BEEN ANALYZED AGAINST FATIGUE CATEGORY II IMPORTANCE FACTOR VALUES AS DESIGNATED IN THE ABOVE AASHTO SPECIFICATIONS.

**VARIABLE MESSAGE SIGN (VMS) STRUCTURES**

REFER TO THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL WHEN FURNISHING SUPPORT STRUCTURES FOR VARIABLE MESSAGE SIGNS (VMS).

**CONCRETE DESIGN STRESSES**

SPECIFIED COMPRESSIVE STRENGTH (f'c) (CLASS B) --- 3,000 PSI  
EXTREME FIBER COMPRESSIVE STRESS (fc) ----- 1,200 PSI

**REINFORCEMENT STEEL DESIGN STRESS**

YIELD STRENGTH (fy) (A615, GRADE 60) --- 60 KSI  
TENSILE STRESS (fs) --- 24 KSI

**STRUCTURAL STEEL DESIGN STRENGTHS**

YIELD STRENGTH (Fy)  
PIPES (A53, TYPE S OR TYPE E, GRADE B) --- 35 KSI (MIN.) \*  
(API 5L, GRADE B) --- REFER TO API SPECIFICATIONS

\* FABRICATORS ARE ADVISED THAT REPAIRS TO THE MATERIALS WILL NOT BE PERMITTED. IF TEARING CRACKING OR ANY DEFECT OCCURS, THE MATERIAL WILL BE REQUIRED TO BE REPLACED.

**FOUNDATIONS**

MAXIMUM FOUNDATION DESIGN BEARING PRESSURE --- 2.5 KSF  
FOOTINGS ARE DESIGNED SUCH THAT A MINIMUM OF 75 PERCENT OF THE FOOTING IS ALWAYS IN CONTACT; A MAXIMUM OF 25 PERCENT OF THE FOOTING IS IN UPLIFT.

BEARING PILES SHALL BE CAST-IN-PLACE CONCRETE PILES WITH A MINIMUM BEARING CAPACITY EQUAL TO 50 KIPS.

REFER TO THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL FOR ALTERNATE FOUNDATION DESIGN CRITERIA.

**CAMBER**

PERMANENT CAMBER EQUAL TO L/1000 HAS BEEN PROVIDED IN ADDITION TO THE DEAD LOAD CAMBER.

**B. MATERIALS**

**I. STEEL**

STEEL PIPE SHALL BE CERTIFIED BY MILL TEST REPORT TO MEET ASTM SPECIFICATION A53, TYPE E OR S, GRADE B WITH THE EXCEPTION THAT API 5L, GRADE B MAY BE USED WHEN THE SPECIFIED WALL THICKNESS IS GREATER THAN 1/2". ONLY ELECTRICAL RESISTANCE WELDED (ERW) MANUFACTURED SINGLE SEAM PIPE IS PERMITTED. HOWEVER, WHEN THE REQUIRED PIPE SIZE IS GREATER THAN 24", DOUBLE SEAM PIPE MAY BE USED. A MILL TEST REPORT MUST BE PROVIDED, CERTIFIED AND SIGNED BY THE PIPE MANUFACTURER, CONTAINING PHYSICAL AND CHEMICAL PROPERTIES AND THE MANUFACTURING PROCESS USED TO PRODUCE THE PIPE.

ALL OTHER STEEL SHALL CONFORM TO ASTM SPECIFICATION A709 (AASHTO M270) GRADE 36 OR GRADE 50. ALL SPECIFICATED STEEL PLATES SHALL MEET SUPPLEMENTARY REQUIREMENTS FOR NOTCH TOUGHNESS (CHARPY TESTING, ZONE #2)

UPON COMPLETION OF FABRICATION, THE FABRICATOR SHALL PROVIDE A NOTARIZED CERTIFICATION OF COMPLIANCE AS PER THE REQUIREMENT OF THE NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, INCLUDING A LEGIBLE COPY OF ALL MILL TEST REPORTS FOR MATERIALS INCORPORATED INTO THE WORK. ALSO, A COPY OF QC REPORTS SHALL BE PROVIDED.

STEEL ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM SPECIFICATION F1554, GRADE 36 OR 55. THE ANCHOR BOLTS SHALL BE HOT DIP GALVANIZED AS PER ASTM SPECIFICATION A153, CLASS C.

CHORD SPLICE ASSEMBLY FASTENERS SHALL BE HIGH STRENGTH STEEL BOLTS CONFORMING TO ASTM SPECIFICATION A325 AND SHALL BE HOT DIP GALVANIZED AS PER ASTM SPECIFICATION A153, CLASS C. ALL OTHER FASTENERS SHALL BE STAINLESS STEEL CONFORMING TO ASTM SPECIFICATION A320, GRADE B8, CLASS 1.

CAPS FOR THE ENDS OF CHORDS AND TOPS OF POSTS SHALL BE STEEL CONFORMING TO ASTM SPECIFICATION A36 AND SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM SPECIFICATION A123.

WELDING OF STEEL SHALL BE AS SPECIFIED IN AWS D1.1, CURRENT EDITION, AND IN THE NJDOT STANDARD SPECIFICATIONS.

AFTER COMPLETE FABRICATION, EACH STEEL SECTION SHALL BE HOT DIP GALVANIZED ACCORDING TO THE REQUIREMENTS OF ASTM SPECIFICATION A123, AS MODIFIED BY THE NJDOT STANDARD

SPECIFICATIONS. A SINGLE DIP GALVANIZING PROCESS IS PREFERRED IF SIZE PERMITS.

REFER TO THE NJDOT STANDARD SPECIFICATIONS FOR CRITERIA ON FURNISHING MATERIALS OTHER THAN SPECIFIED ABOVE.

**II. ALUMINUM**

ALUMINUM SHALL CONFORM TO THE ASTM SPECIFICATIONS AND ALLOYS LISTED BELOW:

APPLICATION	ASTM SPECIFICATION	ASTM ALLOY
ROLLED OR EXTRUDED SHAPES	B308	6061 - T6
PLATES	B209	6061 - T6
DRAWN SEAMLESS TUBES	B210	6061 - T6
EXTRUDED TUBES	B221	6061 - T6

WELDING OF ALUMINUM SHALL BE AS SPECIFIED IN AWS D1.2, CURRENT EDITION, AND IN THE NJDOT STANDARD SPECIFICATIONS.

**III. REINFORCEMENT STEEL**

ALL REINFORCEMENT STEEL SHALL BE ASTM A615, GRADE 60.

**IV. CONCRETE**

ALL CONCRETE SHALL BE "CLASS B" AS DEFINED IN THE NJDOT STANDARD SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED BY THE DESIGNER.

**V. SIGN LIGHTING**

WHEN NECESSARY, AN APPROVED SIGN LIGHTING SYSTEM MAY BE USED AND THE DETAILS OF THE SYSTEM SHALL BE PROVIDED WITH WORKING DRAWING SUBMISSION. NJDOT TRAFFIC SIGNAL AND SAFETY ENGINEERING SHOULD BE CONTACTED FOR REQUIREMENTS REGARDING THE PROVISION OF SIGN LIGHTING OR REFLECTORIZED SIGN PANELS ON A PROJECT TO PROJECT BASIS.

**VI. SIGN PANEL AND LIGHTING SYSTEM SUPPORTS**

SIGN HANGERS SHALL BE ALUMINUM OR STEEL. LUMINAIRE SUPPORTS SHALL BE ALUMINUM OR STEEL. THE STEEL SHALL CONFORM TO ASTM A709 GRADE 36 OR GRADE 50 AND SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM SPECIFICATION A123. STEEL SURFACES SHALL BE PREVENTED FROM COMING INTO CONTACT WITH ALUMINUM SURFACES BY MEANS OF APPROVED PADS PLACED BETWEEN THE DISSIMILAR METALS. PADS SHALL BE STAINLESS STEEL CONFORMING TO ASTM SPECIFICATION A240, TYPE 304 OR APPROVED EQUAL. CONNECTING U BOLTS SHALL BE STAINLESS STEEL CONFORMING TO THE NJDOT STANDARD SPECIFICATIONS. INSTALLATION OF SIGN LIGHTING SYSTEM SHALL BE ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

THE PROVISION OF MAINTENANCE WALKWAY IS NOT REQUIRED.

**INSTRUCTIONS FOR DESIGNERS**

STEP #1: PREPARE A SIGN SUPPORT LOCATION PLAN AND ELEVATION VIEW FOR EACH STRUCTURE.

STEP #2: ENTER THE SIGN SUPPORT NUMBER AND STATION IN THE SCHEDULE OF STRUCTURES ON SIGN STRUCTURE DRG. CA-D2 OF THE CONTRACT PLANS.

STEP #3: DETERMINE THE TRUSS SPAN LENGTH AND HEIGHT OF THE STRUCTURE USING SIGN STRUCTURE DRG. CA-G2. RECORD THE ACTUAL TRUSS SPAN LENGTH IN THE SCHEDULE OF STRUCTURES ON SIGN STRUCTURE DRG. CA-D2 OF THE CONTRACT PLANS. ROUND THIS NUMBER TO THE NEXT HIGHER LISTED SPAN LENGTH. IF THE TRUSS SPAN LENGTH IS OVER 40'-0", PROCEED TO STEP #10.

STEP #4: DETERMINE THE SIGN DESIGN LENGTH USING SIGN STRUCTURE DRG. CA-G2. DIVIDE THE SIGN DESIGN LENGTH BY THE TRUSS SPAN LENGTH DETERMINED IN STEP #3 TO OBTAIN THE PERCENT SIGN DESIGN LENGTH. USE THE NEXT HIGHER PERCENT FROM THOSE LISTED (40%, 60%, 70%, OR 80%). IF THE PERCENT IS MORE THAN 80, PROCEED TO STEP #5. OTHERWISE, SKIP TO STEP #6.

STEP #5: TO SELECT A STANDARD DESIGN, DIVIDE THE SIGN DESIGN LENGTH BY 80% AND ROUND THIS NUMBER TO THE NEXT HIGHER LISTED SPAN LENGTH. IF THE NUMBER IS LESS THAN 40'-0", RETURN TO STEP #4. OTHERWISE, PROCEED TO STEP #10.

STEP #6: HAVING OBTAINED THE TRUSS SPAN LENGTH (FROM STEP #3 OR STEP #5) AND THE PERCENT SIGN DESIGN LENGTH (FROM STEP #4), SELECT THE TRUSS SIZE AND THE TRUSS ELEMENT SIZES (I.E., CHORDS, DIAGONALS, AND STRUTS) USING THE APPROPRIATE DESIGN TABLES ON SIGN STRUCTURE DRG. CA-G3. RECORD THE DATA IN THE SCHEDULE OF STRUCTURES ON SIGN STRUCTURE DRG. CA-D2 OF THE CONTRACT PLANS.

STEP #7: WITH THE HEIGHT OF THE STRUCTURE OBTAINED IN STEP #3 AND USING THE ELEVATION OF THE BOTTOM OF BASE PLATE, DETERMINE THE ELEVATION OF THE CENTER LINE OF THE TRUSS AND THE DESIGN HEIGHT OF THE POST. IF THE POST HEIGHT IS MORE THAN 40'-0", SKIP TO STEP #10. OTHERWISE, SELECT THE NEXT HIGHER NUMBER FROM THOSE LISTED (25, 30, OR 40 FEET). USING THE SAME TABLE USED IN STEP #6, SELECT THE SIZE OF THE POST (I.E., OUTSIDE DIAMETER AND THICKNESS). RECORD THE DATA IN THE SCHEDULE OF STRUCTURES ON SIGN STRUCTURE DRG. CA-D2 OF THE CONTRACT DRAWINGS.

STEP #8: CHECK AVAILABILITY OF SHAPES SELECTED IN STEPS #6 AND #7.

STEP #9: USING SOIL TEST AND SOIL BORING INFORMATION, DETERMINE THE ALLOWABLE SOIL PRESSURE AND THE REQUIRED DEPTH OF FOOTINGS.

STEP #10: DETERMINE THE PEDESTAL HEIGHT. IF THE PEDESTAL HEIGHT IS BETWEEN 4'-0" AND 6'-0", PROCEED TO STEP #11. OTHERWISE, SKIP TO STEP #16. THE PREFERRED PEDESTAL HEIGHT OF 4'-6" IS TO BE USED WHENEVER POSSIBLE. WHEN USING A BARRIER PEDESTAL, THE "COVERED" HEIGHT MUST BE 3'-0". OTHERWISE, SKIP TO STEP # 16

STEP #11: DETERMINE THE REQUIRED FOOTING SIZES USING THE DESIGN TABLE ON SIGN STRUCTURE DRGS. CA-G3. RECORD THE DATA IN THE SIGN SUPPORT FOUNDATION TABLE ON SIGN STRUCTURE DRG. CA-D2 OF THE CONTRACT PLANS.

STEP #12: DETERMINE THE REQUIRED FOOTING DESIGN DATA USING SIGN STRUCTURE DRG. CA-G5. RECORD THIS DATA IN THE SIGN SUPPORT FOUNDATION TABLE ON SIGN STRUCTURE DRG. CA-D2 OF THE CONTRACT PLANS. IF THE ALLOWABLE SOIL PRESSURE IS GREATER THAN 2.5 KSF, SKIP TO STEP #14. OTHERWISE, PROCEED TO STEP #13.

STEP #13: SELECT THE NUMBER OF CAST-IN-PLACE CONCRETE PILES NEEDED TO SUPPORT THE STRUCTURE USING SIGN STRUCTURE DRG. CA-G5. RECORD THE DATA IN THE SIGN SUPPORT FOUNDATION TABLE ON SIGN STRUCTURE DRG. CA-D2 OF THE CONTRACT PLANS.

STEP #14: DETERMINE WHETHER A PEDESTAL OR BARRIER PEDESTAL IS TO BE USED FOR THE FOUNDATION. SELECT ALL PEDESTAL OR BARRIER PEDESTAL DATA FROM SIGN STRUCTURE DRG. CA-G4. RECORD THE DATA IN THE SIGN SUPPORT FOUNDATION TABLE ON SIGN STRUCTURE DRG. CA-D2 OF THE CONTRACT PLANS.

STEP #15: THE DESIGN OF THE CANTILEVER SIGN SUPPORT STRUCTURE IS COMPLETE. DISREGARD STEP #16.

STEP #16: THE PARAMETERS OF THE SIGN SUPPORT STRUCTURE EXCEED THE RESTRICTIONS RELATED TO THESE STANDARD DESIGN TABLES. DESIGN THE SIGN SUPPORT STRUCTURE ON AN INDIVIDUAL BASIS.

INDEX OF DRAWINGS	
DRG. NO.	DESCRIPTION
CA-G1	GENERAL INFORMATION
CA-G2	GENERAL CRITERIA
CA-G3	DESIGN TABLES - STEEL TRUSSES AND STEEL POSTS
CA-G4	PEDESTAL AND BARRIER PEDESTAL DESIGN TABLES AND DETAILS
CA-G5	FOOTING DESIGN TABLES AND DETAILS

THIS PLATE FOR DESIGN INFORMATION ONLY. DO NOT INCLUDE IN CONTRACT PLANS.

**SIGN STRUCTURE DRG. CA-G1**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

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**CANTILEVER SIGN SUPPORT STANDARDS**

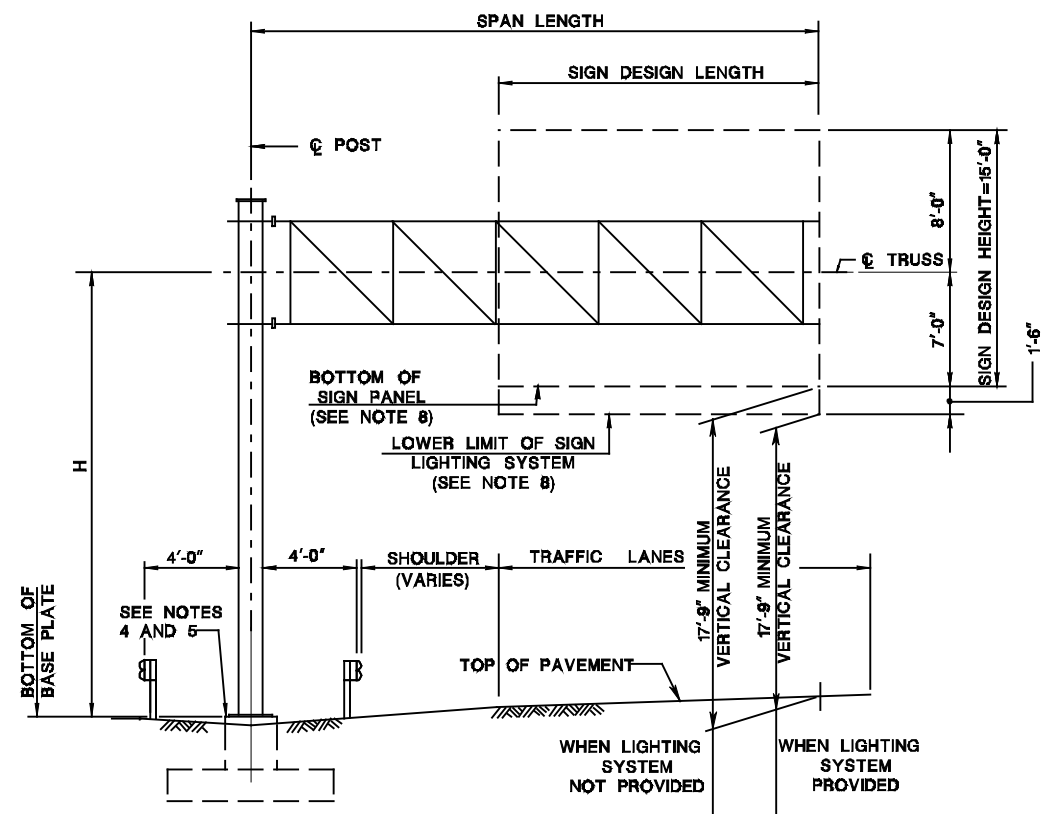
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**GENERAL INFORMATION**

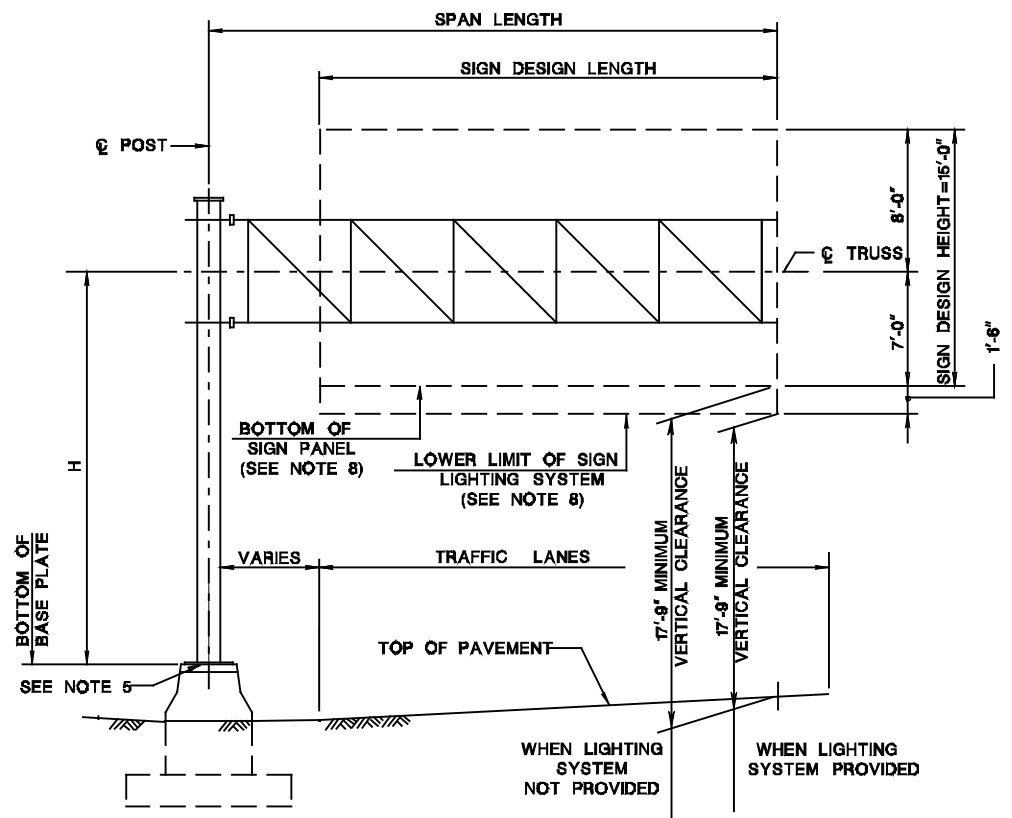
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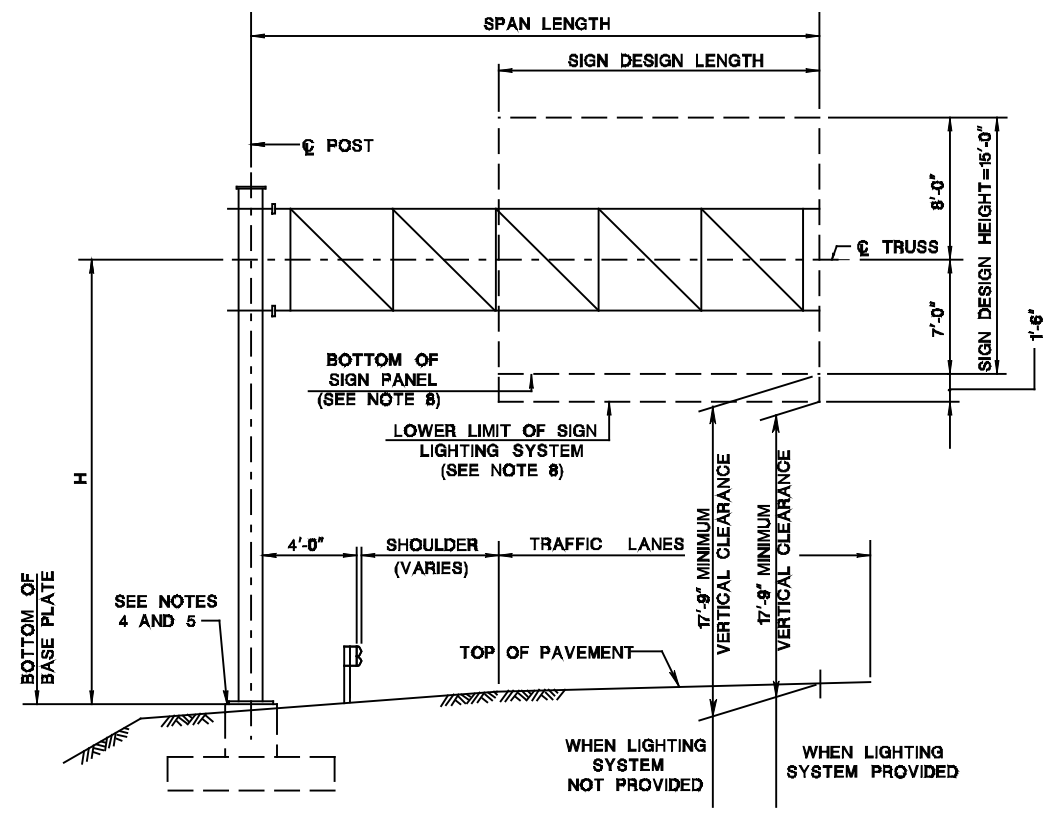




**CANTILEVER SIGN STRUCTURE**  
DIVIDED HIGHWAY  
PEDESTAL MOUNTED



**CANTILEVER SIGN STRUCTURE**  
DIVIDED HIGHWAY  
BARRIER MOUNTED



**CANTILEVER SIGN STRUCTURE**  
NONDIVIDED HIGHWAY AND RAMPS  
PEDESTAL MOUNTED

**NOTES:**

1. THE SIGN DESIGN LENGTH EXTENDS FROM THE END OF THE CANTILEVER TO THE EDGE OF THE USEABLE TRAFFIC LANES.
2. THE BOTTOM EDGE OF ALL SIGN PANELS SHALL BE LEVEL AND AT THE SAME ELEVATION.
3. THE TOP EDGE OF ALL SIGN PANELS SHALL PROJECT NOT LESS THAN 6" ABOVE THE TOP OF THE TOP CHORD. THE SIGN PANEL SIZES AND LOCATIONS SHALL BE VERIFIED AND APPROVED BY THE DESIGNER.
4. TOP OF PEDESTALS SHALL BE SET 4" ABOVE THE FINISHED GROUND LINE.
5. THE ELEVATION OF THE BOTTOM OF THE POST BASE PLATE SHALL BE SET AT (ANCHOR BOLT DIAMETER + 1") ABOVE TOP OF PEDESTAL OR TOP OF BARRIER PEDESTAL (SEE DRG CA-08).
6. THE TRUSS SHALL BE A TWO-CHORD PLANAR TRUSS.
7. IF THE POST FOUNDATION IS WITHIN THE CLEAR ZONE, IT SHALL BE PROTECTED BY GUIDE RAIL, BARRIER OR OTHER SUITABLE MEANS, DEPENDING UPON SITE CONDITIONS.
8. THE 17'-9" MINIMUM VERTICAL UNDERCLEARANCE SHALL BE PROVIDED TO THE BOTTOM OF SIGN LIGHTING SYSTEM, OR TO THE BOTTOM OF SIGN PANEL WHEN LIGHTING SYSTEM IS NOT PROVIDED.

THIS PLATE FOR DESIGN INFORMATION ONLY.  
DO NOT INCLUDE IN CONTRACT PLANS.

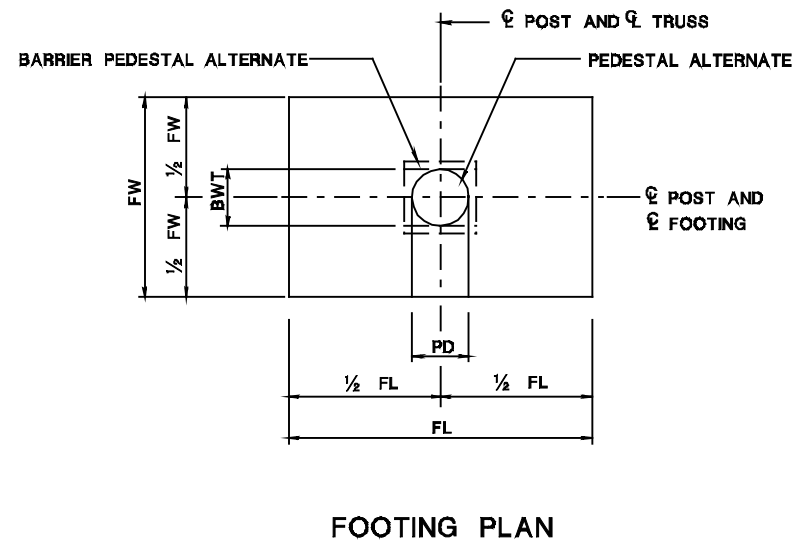
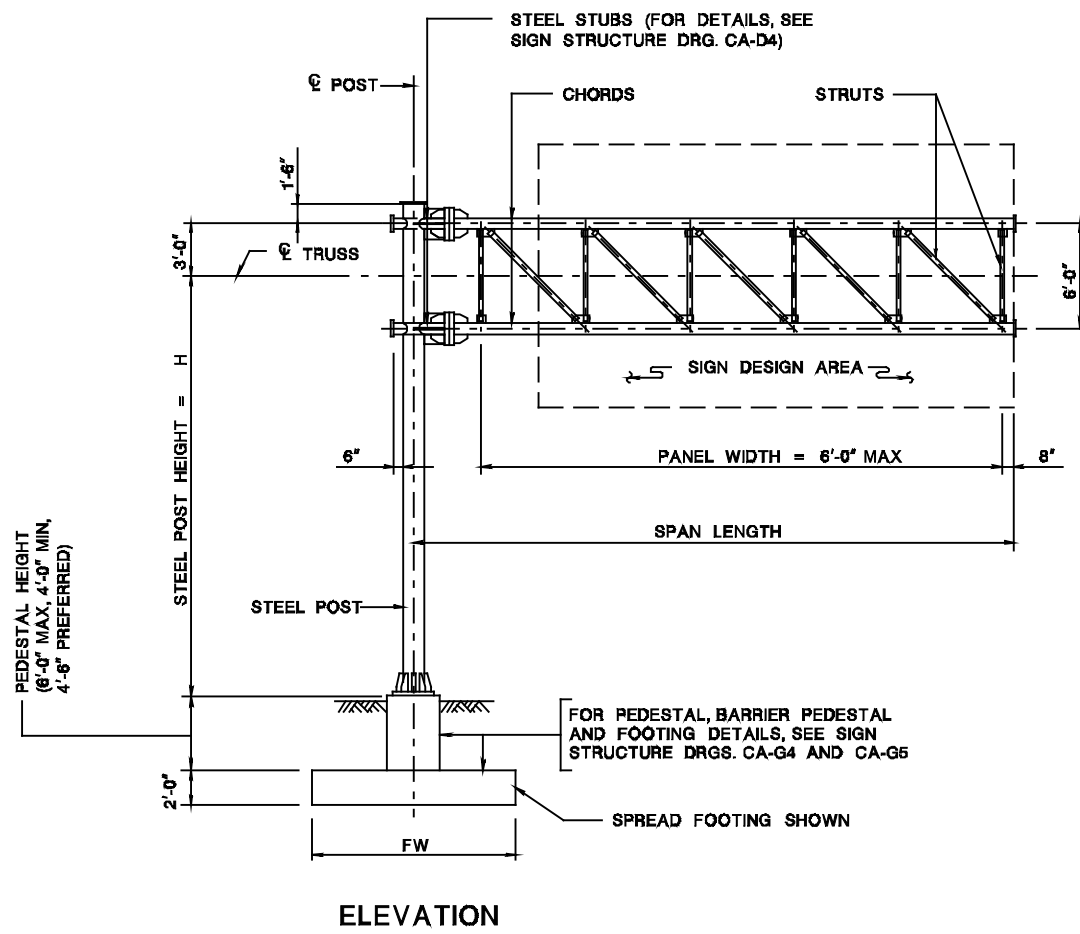
	<b>SIGN STRUCTURE DRG. CA-G2</b>
	NEW JERSEY DEPARTMENT OF TRANSPORTATION BUREAU OF STRUCTURAL ENGINEERING
	<b>CANTILEVER SIGN SUPPORT STANDARDS</b>
<b>GENERAL CRITERIA</b>	
SCALE : NONE	2
BRIDGE SHEET NO. OF	5

BD-07D-02 - ORIGINAL SHEET

SPAN LENGTH (FT)	SIGN LENGTH (%)	STEEL TRUSS MEMBERS				STEEL POSTS			PEDESTALS				BARRIER PEDESTALS				FOOTINGS			SIGN LENGTH (%)	SPAN LENGTH (FT)				
		CHORDS O.D.xTHICK (IN)	STRUTS O.D.xTHICK (IN)	STEEL STUBS O.D.xTHICK (IN)	CAMBER (IN)	POST HEIGHT			H = 25 FT		H = 30 FT		H = 40 FT		H = 25 FT		H = 30 FT		H = 40 FT						
						H = 25FT	H = 30FT	H = 40FT	PD	VERT REBARS No. & SIZE	PD	VERT REBARS No. & SIZE	PD	VERT REBARS No. & SIZE	BWT	VERT REBARS No. & SIZE	BWT	VERT REBARS No. & SIZE	BWT			VERT REBARS No. & SIZE	FLxFW	FLxFW	FLxFW
						O.D.xTHICK (IN)	O.D.xTHICK (IN)	O.D.xTHICK (IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)			(IN)	(IN)	(IN)	(IN)
20	40	8.625x.322	2.875x.276	8.625x.322	3 1/2	14.000x.500	16.000x.500	18.000x.500	40	21-#25	42	23-#25	44	25-#25	40	21-#25	42	23-#25	44	25-#25	11'-6"x8'	11'-6"x8'	12'-6"x8'	40	20
	50	8.625x.500	2.875x.276	8.625x.500	3 3/8	16.000x.500	16.000x.500	18.000x.500	42	23-#25	42	25-#25	44	27-#25	42	23-#25	42	25-#25	44	27-#25	11'-6"x8'	12'-6"x8'	13'x8'	50	
	60	8.625x.500	2.875x.276	8.625x.500	2 3/4	16.000x.500	18.000x.500	20.000x.500	42	24-#25	44	26-#25	46	29-#25	42	24-#25	44	26-#25	46	29-#25	12'-6"x8'	13'x8'	14'x10'	60	
	70	8.625x.500	2.875x.276	8.625x.500	2 5/8	18.000x.500	18.000x.500	20.000x.500	44	26-#25	44	27-#25	46	30-#25	44	26-#25	44	27-#25	46	30-#25	13'x8'	13'x9'	14'x10'	70	
	80	8.625x.500	2.875x.276	8.625x.500	2	18.000x.500	20.000x.500	24.000x.500	44	27-#25	46	30-#25	48	33-#25	44	27-#25	46	30-#25	48	33-#25	13'x9'	14'x10'	15'x10'	80	
30	40	12.750x.375	3.500x.300	12.750x.375	6	20.000x.500	20.000x.500	24.000x.500	46	28-#25	46	30-#25	48	33-#25	46	28-#25	46	30-#25	48	33-#25	13'x9'	14'x9'	14'x10'	40	
	50	12.750x.500	4.000x.318	12.750x.500	5 1/2	20.000x.500	24.000x.500	24.000x.500	46	29-#25	48	33-#25	50	36-#25	46	29-#25	48	33-#25	50	36-#25	14'x9'	14'x10'	15'x10'-6"	50	
	60	12.750x.500	4.000x.318	12.750x.500	4 3/4	24.000x.500	24.000x.500	24.000x.500	48	31-#25	50	35-#25	50	37-#25	48	31-#25	50	35-#25	50	37-#25	14'x10'	15'x10'-6"	16'-6"x10'-6"	60	30
	70	12.750x.500	4.000x.318	12.750x.500	4 5/8	24.000x.500	24.000x.500	26.000x.500	48	31-#25	50	36-#25	52	41-#25	48	31-#25	50	36-#25	52	41-#25	15'x10'	15'-6"x10'-6"	16'-6"x11'-6"	70	
	80	12.750x.500	4.000x.318	12.750x.500	3 1/2	24.000x.500	26.000x.500	26.000x.750	50	34-#25	52	39-#25	52	42-#25	50	34-#25	52	39-#25	52	42-#25	15'x10'-6"	16'-6"x10'-6"	17'-6"x11'-6"	80	
40	40	18.000x.375	5.563x.375	18.000x.375	8	24.000x.500	26.000x.500	26.000x.750	50	30-#25	52	35-#25	52	37-#25	50	30-#25	52	35-#25	52	37-#25	15'x10'-6"	16'-6"x10'-6"	16'-6"x11'-6"	40	
	50	18.000x.500	5.563x.375	18.000x.500	9	26.000x.500	26.000x.750	26.000x.750	52	33-#25	52	35-#25	52	37-#25	52	33-#25	52	35-#25	52	37-#25	16'-6"x11'-6"	16'-6"x11'-6"	17'x12'-6"	50	
	60	18.000x.500	5.563x.375	18.000x.500	7 1/2	26.000x.750	26.000x.750	26.000x.750	52	33-#25	52	35-#25	52	38-#25	52	33-#25	52	35-#25	52	38-#25	16'-6"x11'-6"	17'x12'-6"	18'x12'-6"	60	40
	70	18.000x.500	5.563x.375	18.000x.500	7 1/2	26.000x.750	26.000x.750	26.000x.750	52	33-#25	52	35-#25	52	38-#25	52	33-#25	52	35-#25	52	38-#25	17'x11'-6"	17'x12'-6"	18'x13'	70	
	80	18.000x.500	5.563x.375	18.000x.500	6 3/4	28.000x.750	26.000x.750	26.000x.875	52	33-#25	52	37-#25	52	40-#25	52	33-#25	52	37-#25	52	40-#25	17'x12'-6"	18'x12'-6"	18'x13'	80	

**NOTE:**

1. % SIGN LENGTH =  $\frac{\text{SIGN DESIGN LENGTH}}{\text{SPAN LENGTH}} \times 100$
2. DESIGNER SHOULD VERIFY THE AVAILABILITY OF STEEL POST SIZES IN PLANNING A STRUCTURE'S CONFIGURATION.



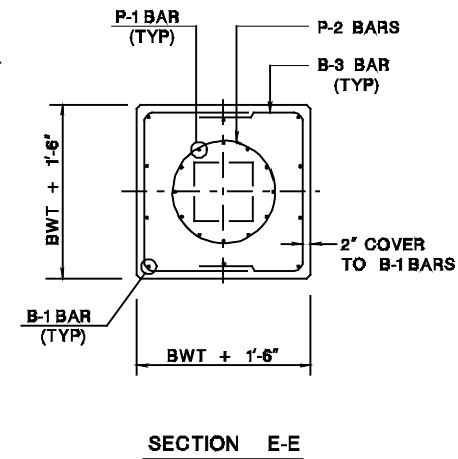
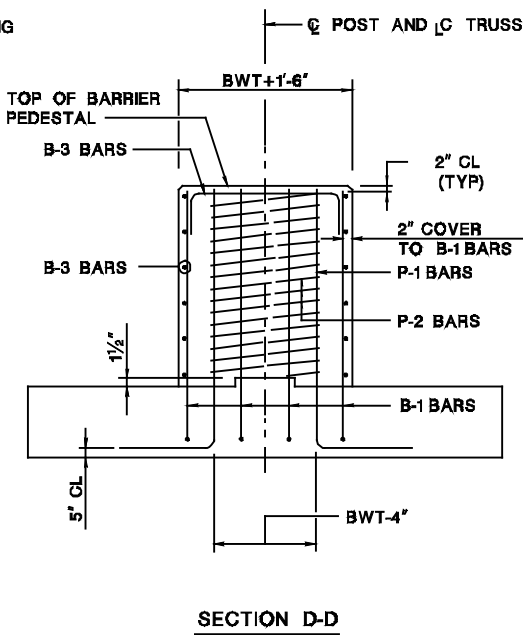
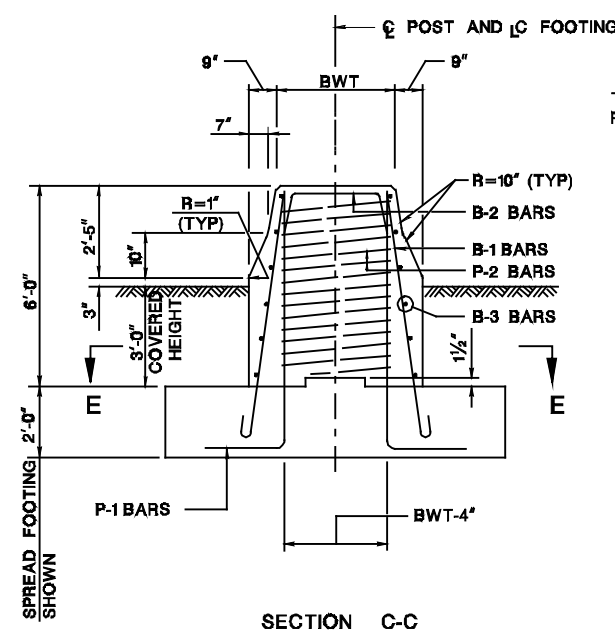
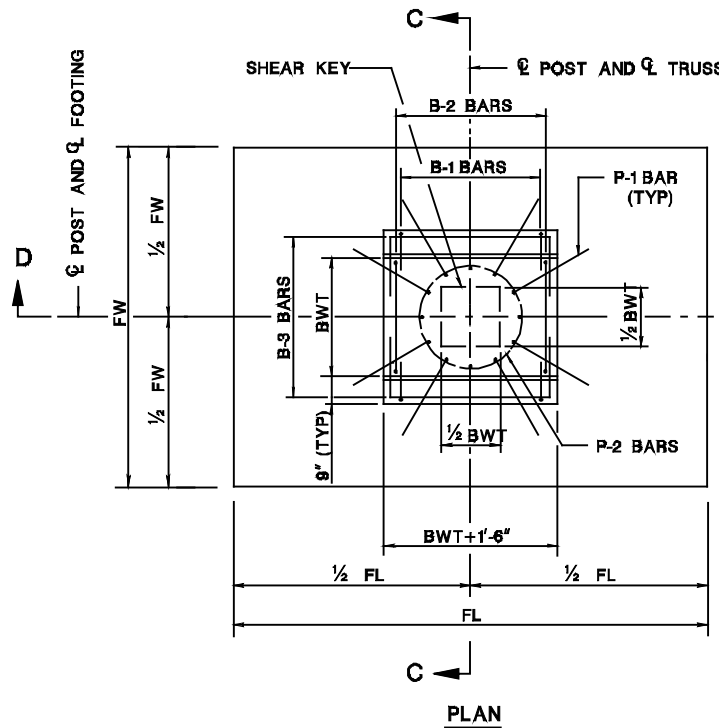
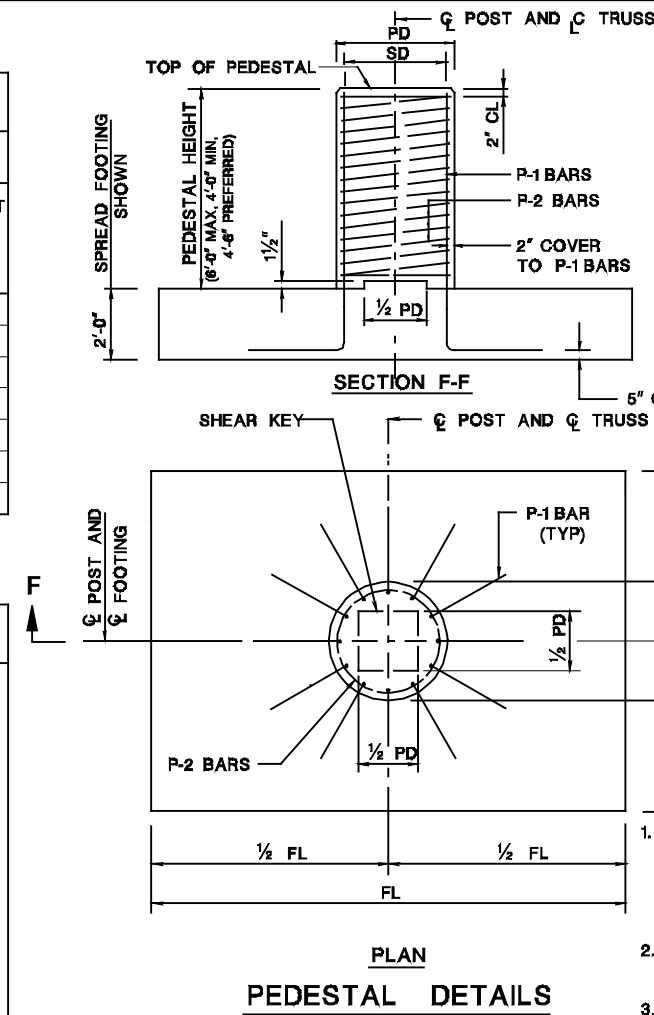
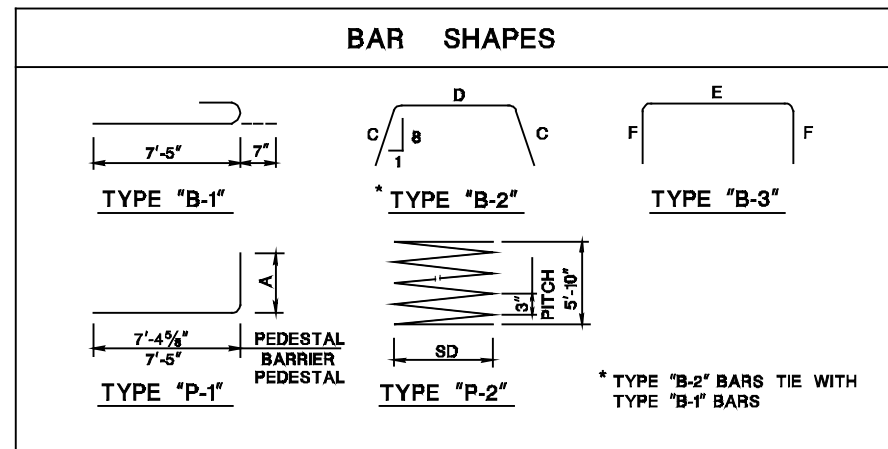
THIS PLATE FOR DESIGN INFORMATION ONLY.  
DO NOT INCLUDE IN CONTRACT PLANS.

**SIGN STRUCTURE DRG. CA-G3**  
 NEW JERSEY DEPARTMENT OF TRANSPORTATION  
 BUREAU OF STRUCTURAL ENGINEERING  
**CANTILEVER SIGN SUPPORT STANDARDS  
 DESIGN TABLES**  
**STEEL TRUSSES AND STEEL POSTS**

SCALE : NONE  
 BRIDGE SHEET NO. OF 3  
 5

BARRIER PEDESTAL REINFORCEMENT																								
BARRIER TOP DIMENSION	VOL OF CONG (C.Y.)	VERTICAL BARS			SPIRAL BARS			STANDARD BARRIER REBARS															WEIGHT SUB TOTAL (LBS)	
		TYPE "P-1"			TYPE "P-2"			#16 BAR, TYPE "B-1"					#16 BAR, TYPE "B-2"					#16 BAR, TYPE "B-3"						
		SIZE	A	LENGTH	WEIGHT (LBS)	SIZE	SD (IN)	LENGTH	WEIGHT (LBS)	LENGTH	No.	TOTAL LENGTH	WEIGHT (LBS)	D (IN)	C (IN)	LENGTH	No.	WEIGHT (LBS)	E (IN)	F (IN)	LENGTH	No.		WEIGHT (LBS)
40	4.5	#25	2'-4"	9'-9"	25.8	#13	36	259'-9"	173.5	8'-0"	10	80'-0"	83.4	34	12	4'-8"	4	19.5	54	32	9'-8"	12	121.0	223.9
42	4.8	#25	2'-4"	9'-9"	25.8	#13	38	274'-2"	183.2	8'-0"	10	80'-0"	83.4	36	12	4'-10"	4	20.2	56	33	10'-0"	12	125.2	228.8
44	5.2	#25	2'-4"	9'-9"	25.8	#13	40	288'-7"	192.8	8'-0"	10	80'-0"	83.4	38	12	5'-0"	4	20.9	58	34	10'-4"	12	129.3	233.6
46	5.5	#25	2'-4"	9'-9"	25.8	#13	42	303'-0"	202.4	8'-0"	10	80'-0"	83.4	40	12	5'-2"	4	21.6	60	35	10'-8"	12	133.5	238.5
48	5.9	#25	2'-4"	9'-9"	25.8	#13	44	317'-6"	212.1	8'-0"	12	96'-0"	100.1	42	12	5'-4"	5	27.8	62	36	11'-0"	12	137.7	265.6
50	6.3	#25	2'-4"	9'-9"	25.8	#13	46	331'-11"	221.7	8'-0"	12	96'-0"	100.1	44	12	5'-6"	5	28.7	64	37	11'-4"	12	141.9	270.7
52	6.7	#25	2'-4"	9'-9"	25.8	#16	48	346'-4"	361.2	8'-0"	12	96'-0"	100.1	46	12	5'-8"	5	29.6	66	38	11'-8"	12	146.0	275.7

PEDESTAL REINFORCEMENT										
PEDESTAL DIAMETER	VOL OF CONG (C.Y.)	VERTICAL BARS			SPIRAL BARS			PD (IN)	SIZE (NOTE 9)	WEIGHT (LBS)
		SIZE	A	LENGTH	WEIGHT (LBS)	SIZE	SD (IN)			
41	1.8	#25	2'-4"	9'-7 1/2"	25.7	#13	36	259'-9"	173.5	
43	2.1	#25	2'-4"	9'-7 1/2"	25.7	#13	38	274'-2"	183.2	
45	2.2	#25	2'-4"	9'-7 1/2"	25.7	#13	40	288'-7"	192.8	
47	2.5	#25	2'-4"	9'-7 1/2"	25.7	#13	42	303'-0"	202.4	
49	2.6	#25	2'-4"	9'-7 1/2"	25.7	#13	44	317'-6"	212.1	
51	2.9	#25	2'-4"	9'-7 1/2"	25.7	#13	46	331'-11"	221.7	
53	3.1	#25	2'-4"	9'-7 1/2"	25.7	#16	48	346'-4"	361.2	



BARRIER PEDESTAL DETAILS

**THIS PLATE FOR DESIGN INFORMATION ONLY. DO NOT INCLUDE IN CONTRACT PLANS.**

**SIGN STRUCTURE DRG. CA-G4**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

**OVERHEAD SIGN SUPPORT STANDARDS**

**GENERAL INFORMATION**

SCALE : NONE 4

BRIDGE SHEET NO. OF 5

BD-07D-03 - ORIGINAL SHEET

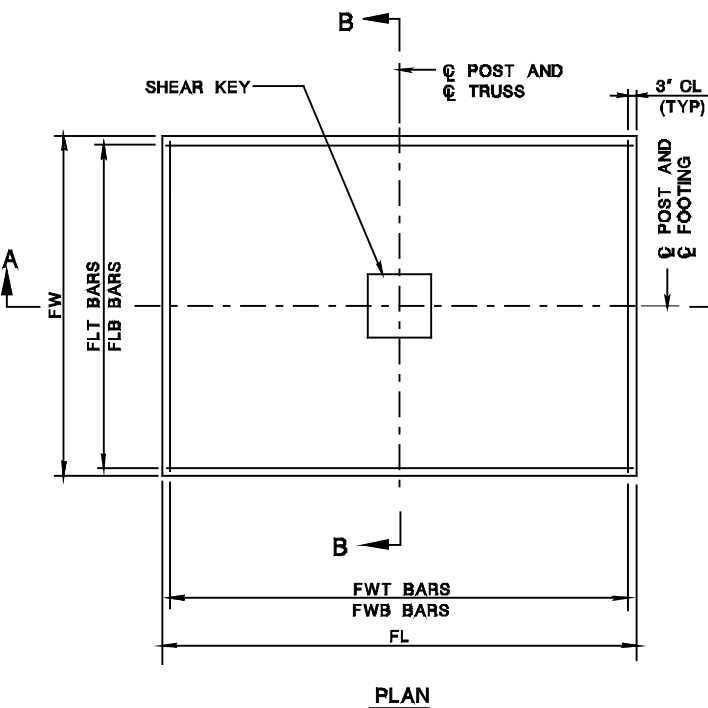
SPREAD FOOTINGS			PILE FOOTINGS				FOOTING REINFORCEMENT					
SIZE FLxFW	CONCRETE VOLUME	EXCAV VOLUME	CONCRETE VOLUME	EXCAV VOLUME	No. OF PILES IN ROW	TOTAL	No. AND SIZE OF BARS				TOTAL WEIGHT	
	(C.Y.)	(C.Y.)	(C.Y.)	(C.Y.)	"X" LONG	"Y" TRANS	No.	FLB	FWB	FLT	FWT	(LBS)
11'-6"X8'	6.8	33.3	8.5	35.4	4	3	12	10-#16	8-#16	8-#16	8-#16	317.5
12'-6"X8'	7.4	36.0	9.3	38.2	4	3	12	13-#16	9-#16	8-#16	9-#16	385.2
13'X8'	7.7	37.3	9.6	39.6	4	3	12	10-#19	9-#16	8-#19	9-#16	455.3
13'X9'	8.7	41.5	10.8	44.1	4	3	12	12-#19	9-#16	7-#19	9-#16	528.2
14'X9'	9.3	44.4	11.7	47.2	4	3	12	14-#19	10-#16	7-#19	10-#16	610.7
14'X10'	10.4	48.9	13.0	51.9	4	3	12	15-#19	10-#16	7-#19	10-#16	648.4
15'X10'	11.1	52.1	13.9	55.8	4	3	12	17-#19	11-#16	7-#19	11-#16	738.6
15'X10'-6"	11.7	54.5	14.6	57.9	4	4	16	19-#19	14-#16	8-#19	11-#16	854.7
15'-6"X10'-6"	12.1	56.2	15.1	59.7	4	4	16	15-#22	11-#19	8-#22	11-#19	1,056.7
16'-6"X10'-6"	12.8	59.6	15.3	63.3	4	4	16	17-#22	12-#19	8-#22	12-#19	1,194.0
16'-6"X11'-6"	14.1	64.8	17.6	68.8	4	4	16	19-#22	13-#19	8-#22	12-#19	1,306.0
17'X11'-6"	14.5	66.7	18.1	70.8	4	4	16	17-#25	13-#19	8-#25	12-#19	1,546.5
17'X12'-6"	15.7	72.0	19.7	76.5	4	4	16	18-#25	15-#19	9-#25	12-#19	1,703.5
18'X12'-6"	16.7	76.0	20.8	80.7	4	4	16	20-#25	15-#19	9-#25	13-#19	1,875.3
18'X13'	17.3	78.8	21.7	83.7	4	4	16	20-#25	17-#19	9-#25	13-#19	1,948.2
19'X13'	18.3	83.0	22.9	88.1	5	4	20	22-#25	17-#19	9-#25	13-#19	2,110.7

\* SPREAD FOOTING EXCAVATION VOLUME BASED ON 8'-0" TOTAL DEPTH OF EXCAVATION.

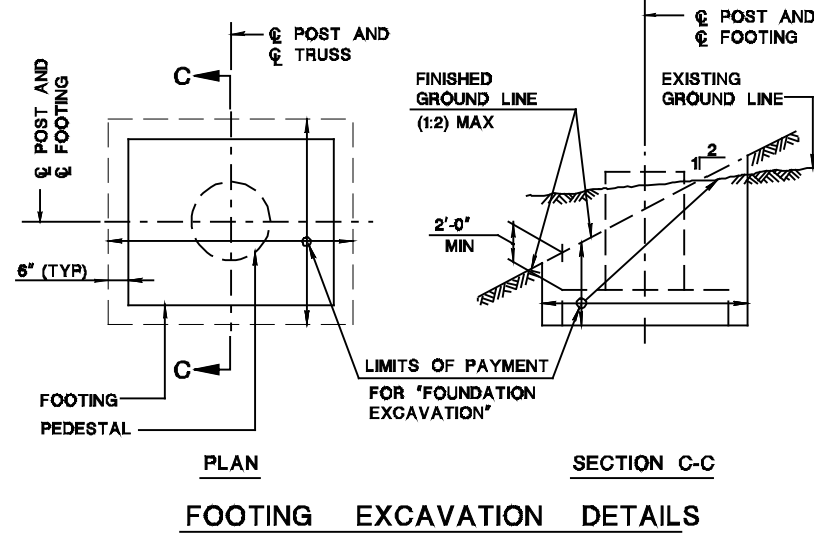
\*\* PILE FOOTING EXCAVATION VOLUME BASED ON 8'-6" TOTAL DEPTH OF EXCAVATION.

**LEGEND:**

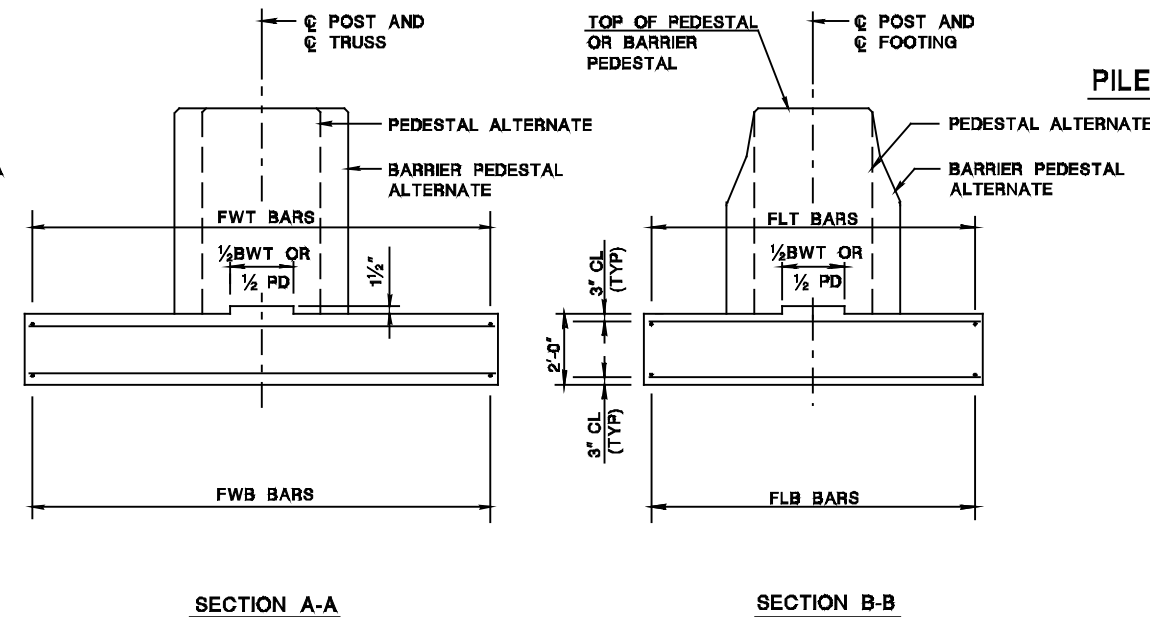
- FL : FOOTING LENGTH
- FW : FOOTING WIDTH
- FLB : No. AND SIZE OF BOTTOM BARS IN DIRECTION FL
- FWB : No. AND SIZE OF BOTTOM BARS IN DIRECTION FW
- FLT : No. AND SIZE OF TOP BARS IN DIRECTION FL
- FWT : No. AND SIZE OF TOP BARS IN DIRECTION FW
- PD : PEDESTAL DIAMETER
- BWT : BARRIER WIDTH AT TOP



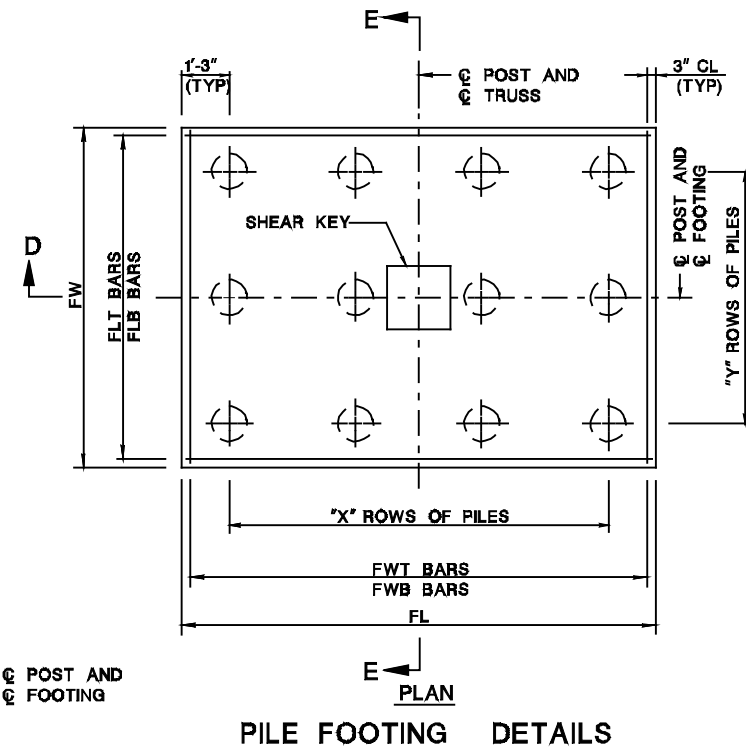
PLAN



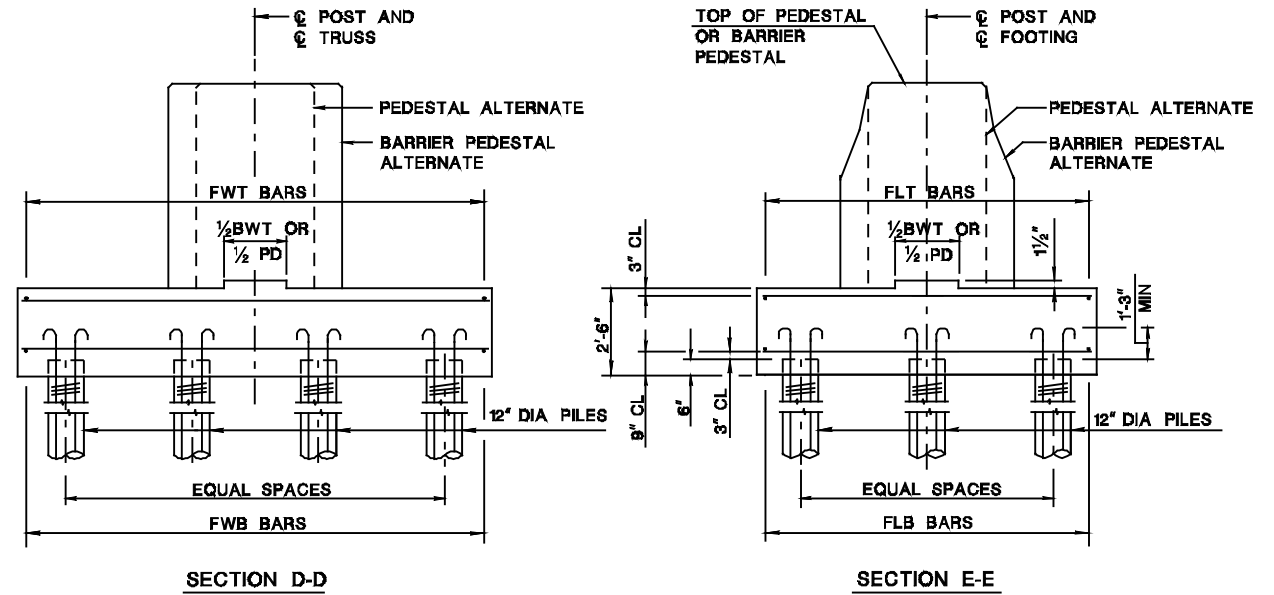
FOOTING EXCAVATION DETAILS



SECTION A-A  
SECTION B-B  
SPREAD FOOTING DETAILS



PILE FOOTING DETAILS



SECTION D-D

SECTION E-E

**NOTES:**

1. FOUNDATION DESIGN CONFORMS TO THE 2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SECTION 13.
2. FOR FOOTING DIMENSIONS, SEE DESIGN TABLES ON SIGN STRUCTURE DRG. CA-G5.
3. BARS SHALL NOT BE SPLICED EXCEPT AS PROVIDED ON THIS DRAWING OR AUTHORIZED BY THE ENGINEER. WHEN SPLICING IS APPROVED, THE REINFORCEMENT BARS SHALL BE LAPPED FOR A LENGTH OF AT LEAST 38 DIAMETERS AND SHALL BE SECURELY WIRED TOGETHER.
4. PILES SHALL BE CAST-IN-PLACE CONCRETE PILES WITH A MINIMUM BEARING CAPACITY EQUAL TO 50 KSI.
5. THE CASING OF THE CAST-IN-PLACE CONCRETE PILES SHALL BE LEFT IN PLACE AND SHALL BE DESIGNED TO RESIST BOTH DIRECT COMPRESSION AND BENDING. THE THICKNESS OF THE CASING SHALL BE NOT LESS THAN 3/8".
6. THE LONGITUDINAL REINFORCING STEEL OF THE CAST-IN-PLACE CONCRETE PILES SHALL BE A MINIMUM OF 6-#16 BARS AND SHALL EXTEND THROUGH THE UPPER THIRD OF THE PILE OR 15'-0" DOWN INTO THE CASING, WHICHEVER IS GREATER, EMBEDDED INTO THE FOOTING WITH STANDARD HOOKS AS SHOWN.
7. THE SPIRAL REINFORCING FOR THE CAST-IN-PLACE CONCRETE PILES SHALL BE #13 BARS AND SHALL EXTEND THROUGH THE UPPER THIRD OF THE PILE OR 15'-0" DOWN FROM THE TOP OF THE CASING.
8. ALTERNATE FOUNDATION DESIGNS MAY BE CONSIDERED BY THE DESIGNER WHERE APPROPRIATE. LOADS FOR THE DESIGN OF NON-STANDARD FOUNDATIONS ARE AVAILABLE IN THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL.

THIS PLATE FOR DESIGN INFORMATION ONLY. DO NOT INCLUDE IN CONTRACT PLANS.



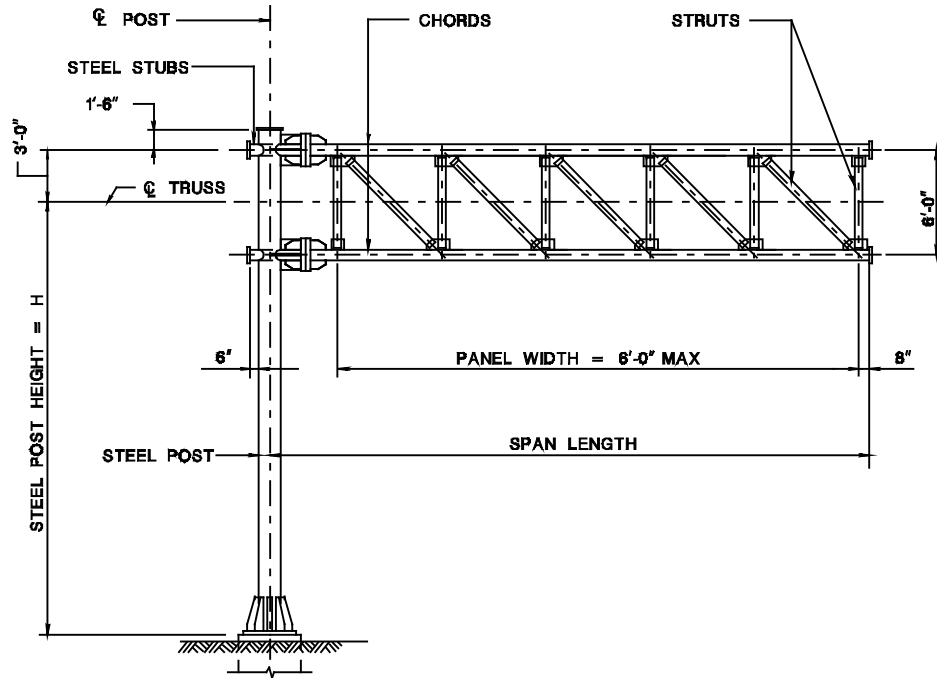
**SIGN STRUCTURE DRG. CA-G5**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

**CANTILEVER SIGN SUPPORT STANDARDS**

**FOOTING DESIGN TABLES AND DETAILS**

SCALE : NONE 5  
BRIDGE SHEET NO. OF 5



**ELEVATION - TYPICAL CANTILEVER SIGN SUPPORT**  
(LOOKING UPSTATION)

**SUMMARY OF QUANTITIES**

PAY ITEM NO.	STANDARD ITEM NO.	DESCRIPTION	UNIT	CONTRACT QUANTITY
		CLEARING SITE, STRUCTURE	LUMP SUM	
		FOUNDATION EXCAVATION	C.Y.	
		TEMPORARY SHEETING	S.F.	
		CONCRETE IN STRUCTURES, FOOTINGS	C.Y.	
		REINFORCEMENT STEEL IN STRUCTURES	LB	

**GENERAL NOTES**

**A. DESIGN CRITERIA**

**DESIGN SPECIFICATIONS**

2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS WITH CURRENT INTERIM.

NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL, CURRENT EDITION.

**DESIGN LOADS**

DESIGN WIND VELOCITY --- 80 MPH; (ABOVE AASHTO SPECIFICATIONS APPENDIX C)

DESIGN ICE LOAD ----- 3 PSF

**FATIGUE LOADS**

ALL STRUCTURAL DETAILS HAVE BEEN ANALYZED AGAINST FATIGUE CATEGORY II IMPORTANCE FACTOR VALUES AS DESIGNATED IN THE ABOVE AASHTO SPECIFICATIONS.

**VARIABLE MESSAGE SIGN (VMS) STRUCTURES**

REFER TO THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL WHEN FURNISHING SUPPORT STRUCTURES FOR VARIABLE MESSAGE SIGNS (VMS).

**CONCRETE DESIGN STRESSES**

SPECIFIED COMPRESSIVE STRENGTH (f'c) (CLASS B) --- 3,000 PSI

EXTREME FIBER COMPRESSIVE STRESS (fc) ----- 1,200 PSI

**REINFORCEMENT STEEL DESIGN STRESS**

YIELD STRENGTH (fy) (A615, GRADE 60) --- 60 KSI

TENSILE STRESS (fs) --- 24 KSI

**STRUCTURAL STEEL DESIGN STRENGTHS**

YIELD STRENGTH (Fy)

PIPES (A53, TYPE S OR TYPE E, GRADE B) --- 35 KSI (MIN.) \*

(API 5L, GRADE B) --- REFER TO API SPECIFICATIONS

\* FABRICATORS ARE ADVISED THAT REPAIRS TO THE MATERIALS WILL NOT BE PERMITTED. IF TEARING, CRACKING OR ANY DEFECT OCCURS, THE MATERIAL WILL BE REQUIRED TO BE REPLACED.

**FOUNDATIONS**

MAXIMUM FOUNDATION DESIGN BEARING PRESSURE --- 2.5 KSF

FOOTINGS ARE DESIGNED SUCH THAT A MINIMUM OF 75 PERCENT OF THE FOOTING IS ALWAYS IN CONTACT; A MAXIMUM OF 25 PERCENT OF THE FOOTING IS IN UPLIFT.

BEARING PILES SHALL BE CAST-IN-PLACE CONCRETE PILES WITH A MINIMUM BEARING CAPACITY EQUAL TO 50 KIPS.

REFER TO THE NJDOT BRIDGES AND STRUCTURES DESIGN MANUAL FOR ALTERNATE FOUNDATION DESIGN CRITERIA.

**CAMBER**

PERMANENT CAMBER EQUAL TO L/1000 HAS BEEN PROVIDED IN ADDITION TO THE DEAD LOAD CAMBER.

**B. MATERIALS**

**I. STEEL**

STEEL PIPE SHALL BE CERTIFIED BY MILL TEST REPORT TO MEET ASTM SPECIFICATION A53, TYPE E OR S, GRADE B WITH THE EXCEPTION THAT API 5L, GRADE B MAY BE USED WHEN THE SPECIFIED WALL THICKNESS IS GREATER THAN 1/2". ONLY ELECTRICAL RESISTANCE WELDED (ERW) MANUFACTURED SINGLE SEAM PIPE IS PERMITTED. HOWEVER, WHEN THE REQUIRED PIPE SIZE IS GREATER THAN 24", DOUBLE SEAM PIPE MAY BE USED. A MILL TEST REPORT MUST BE PROVIDED, CERTIFIED AND SIGNED BY THE PIPE MANUFACTURER, CONTAINING PHYSICAL AND CHEMICAL PROPERTIES AND THE MANUFACTURING PROCESS USED TO PRODUCE THE PIPE.

ALL OTHER STEEL SHALL CONFORM TO ASTM SPECIFICATION A709 (AASHTO M270) GRADE 36 OR GRADE 50. ALL SPECIFIED STEEL PLATES SHALL MEET SUPPLEMENTARY REQUIREMENTS FOR NOTCH TOUGHNESS (CHARPY TESTING, ZONE #2)

UPON COMPLETION OF FABRICATION, THE FABRICATOR SHALL PROVIDE A NOTARIZED CERTIFICATION OF COMPLIANCE AS PER THE REQUIREMENT OF THE NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, INCLUDING A LEGIBLE COPY OF ALL MILL TEST REPORTS FOR MATERIALS INCORPORATED INTO THE WORK. ALSO, A COPY OF QC REPORTS SHALL BE PROVIDED.

STEEL ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM SPECIFICATION F1554, GRADE 36 OR 55. THE ANCHOR BOLTS SHALL BE HOT DIP GALVANIZED AS PER ASTM SPECIFICATION A153, CLASS C.

CHORD SPLICE ASSEMBLY FASTENERS SHALL BE HIGH STRENGTH STEEL CONFORMING TO ASTM SPECIFICATION A325 AND SHALL BE HOT DIP GALVANIZED AS PER ASTM SPECIFICATION A153, CLASS C. ALL OTHER FASTENERS SHALL BE STAINLESS STEEL CONFORMING TO ASTM SPECIFICATION A320, GRADE B8, CLASS 1.

CAPS FOR THE ENDS OF CHORDS AND TOPS OF POSTS SHALL BE STEEL BOLTS CONFORMING TO ASTM SPECIFICATION A709 (AASHTO M270) GRADE 36 OR 50 AND SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM SPECIFICATION A123.

WELDING OF STEEL SHALL BE AS SPECIFIED IN AWS D1.1, CURRENT EDITION, AND THE NJDOT STANDARD SPECIFICATIONS.

AFTER COMPLETE FABRICATION, EACH STEEL SECTION SHALL BE HOT DIP GALVANIZED ACCORDING TO THE REQUIREMENTS OF ASTM SPECIFICATION A123, AND AS MODIFIED BY THE NJDOT STANDARD SPECIFICATIONS. A SINGLE DIP GALVANIZING PROCESS IS PREFERRED IF SIZE PERMITS.

REFER TO THE NJDOT STANDARD SPECIFICATIONS FOR CRITERIA ON FURNISHING MATERIALS OTHER THAN SPECIFIED ABOVE.

**II. ALUMINUM**

ALUMINUM SHALL CONFORM TO THE ASTM SPECIFICATIONS AND ALLOYS LISTED BELOW:

APPLICATION	ASTM SPECIFICATION	ASTM ALLOY
ROLLED OR EXTRUDED SHAPES	B308	6061 - T6
PLATES	B209	6061 - T6
DRAWN SEAMLESS TUBES	B210	6061 - T6
EXTRUDED TUBES	B221	6061 - T6

WELDING OF ALUMINUM SHALL BE AS SPECIFIED IN AWS D1.2, CURRENT EDITION, AND THE NJDOT STANDARD SPECIFICATIONS.

THE SIGN PANEL SHALL BE INSTALLED LEVEL. THE CONTRACTOR MAY FIELD DRILL THE SIGN SUPPORTS AS REQUIRED TO ACHIEVE THIS.

**III. REINFORCEMENT STEEL**

ALL REINFORCEMENT STEEL SHALL BE ASTM A615, GRADE 60.

**IV. CONCRETE**

ALL CONCRETE SHALL BE "CLASS B" AS DEFINED IN THE NJDOT STANDARD SPECIFICATIONS UNLESS OTHERWISE SPECIFIED BY THE DESIGNER.

**V. SIGN LIGHTING SYSTEM SUPPORTS**

SIGN HANGERS SHALL BE ALUMINUM OR STEEL. LUMINAIRE SUPPORTS SHALL BE ALUMINUM OR STEEL. THE STEEL SHALL CONFORM TO ASTM SPECIFICATION A709 GRADE 36 OR GRADE 50 AND SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM SPECIFICATION A123. STEEL SURFACES SHALL BE PREVENTED FROM COMING INTO CONTACT WITH ALUMINUM SURFACES BY MEANS OF APPROVED PADS PLACED BETWEEN THE DISSIMILAR METALS. PADS SHALL BE STAINLESS STEEL CONFORMING TO ASTM SPECIFICATION A240, TYPE 304 OR APPROVED EQUAL. CONNECTING U BOLTS SHALL BE STAINLESS STEEL CONFORMING TO THE NJDOT STANDARD SPECIFICATIONS. INSTALLATION OF SIGN LIGHTING SYSTEM SHALL BE ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

**INDEX OF DRAWINGS**

DRG. NO.	DESCRIPTION
CA-D1	GENERAL NOTES AND ELEVATION
CA-D2	STRUCTURE AND FOUNDATION SCHEDULES
CA-D3	FOUNDATION DETAILS
CA-D4	TRUSS AND POST DETAILS - SHEET 1
CA-D5	TRUSS AND POST DETAILS - SHEET 2
CA-D6	POST BASE AND FOUNDATION DETAILS
CA-D7	MAINTENANCE WALKWAY DETAILS
CA-D8	TYPICAL ELECTRICAL DETAILS



**SIGN STRUCTURE DRG. CA-D1**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

**CANTILEVER SIGN SUPPORT STRUCTURES  
GENERAL NOTES AND ELEVATION**

ROUTE: \_\_\_\_\_ SECTION: \_\_\_\_\_

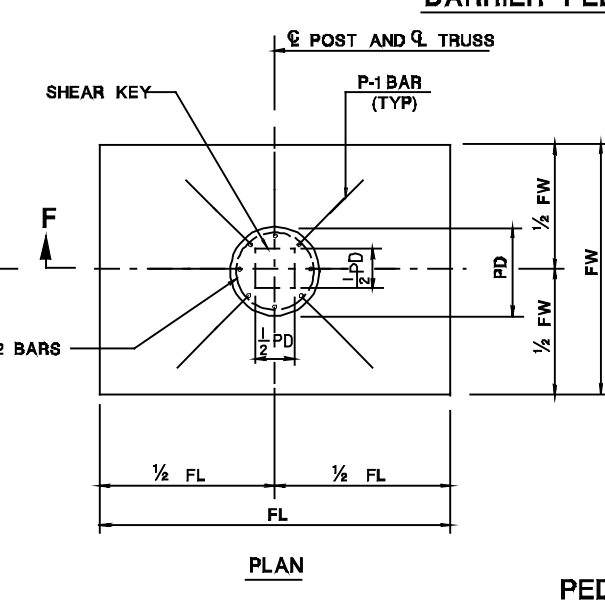
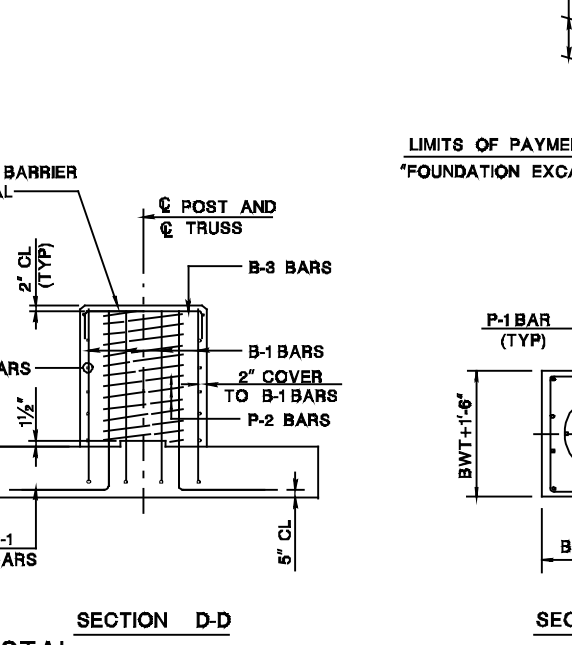
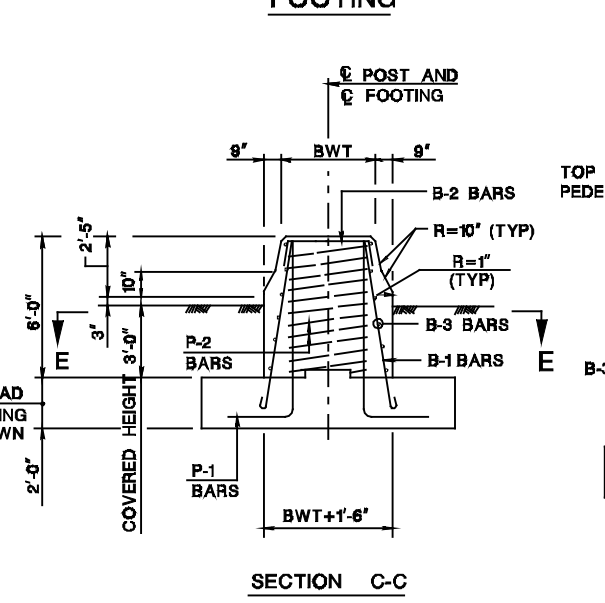
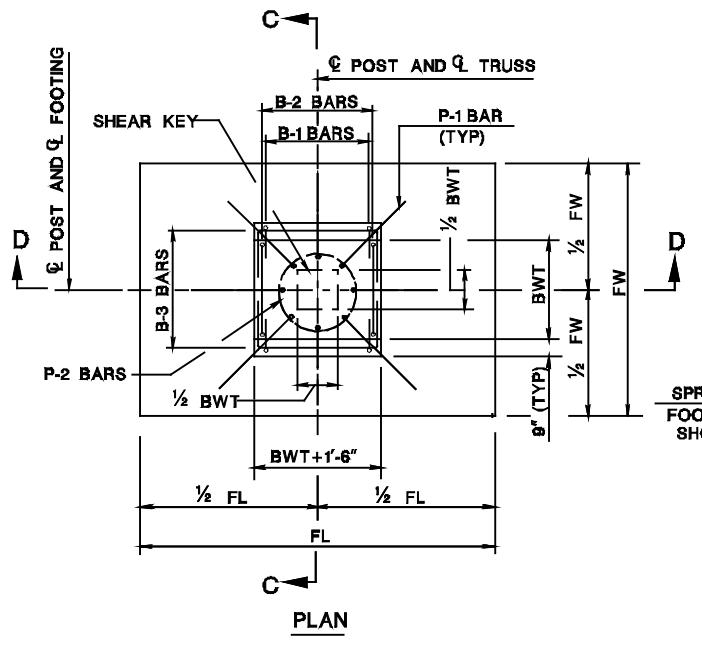
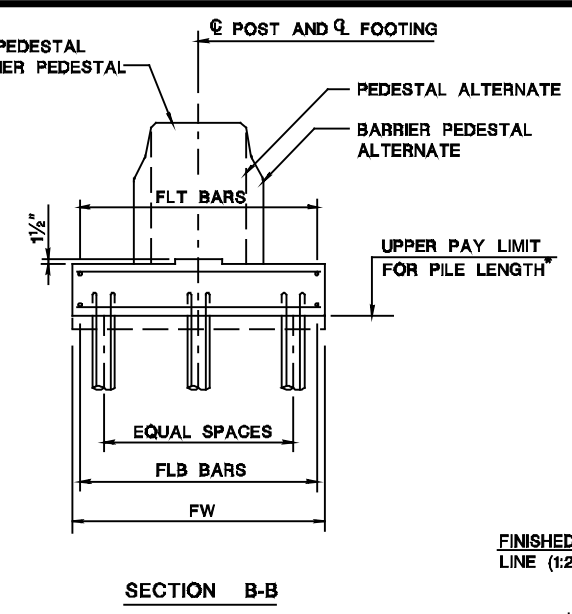
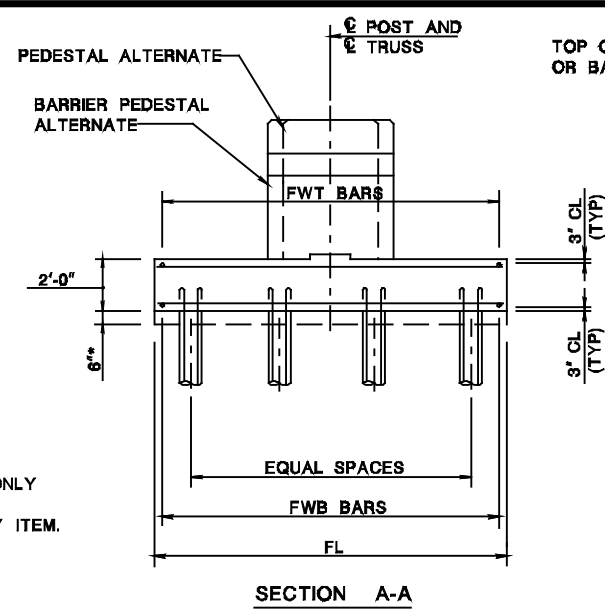
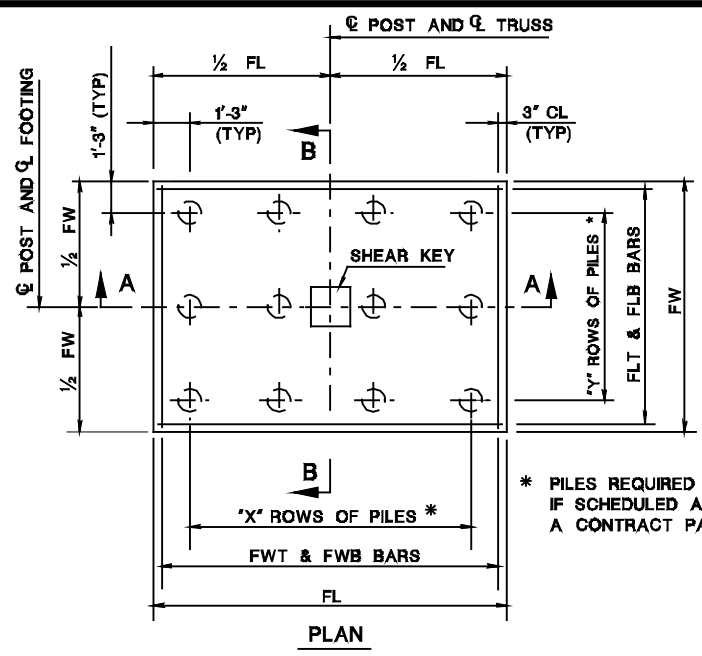
SCALE: NONE

BRIDGE SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_



ED-001B-02 - ORIGINAL SHEET	CONTROL SECTION		JOB NO.	
	DES. BY		CHK. BY	
	DWN. BY		CHK. BY	
	EST. BY		CHK. BY	
	SPECS. BY		CHK. BY	
IN CHARGE OF _____				





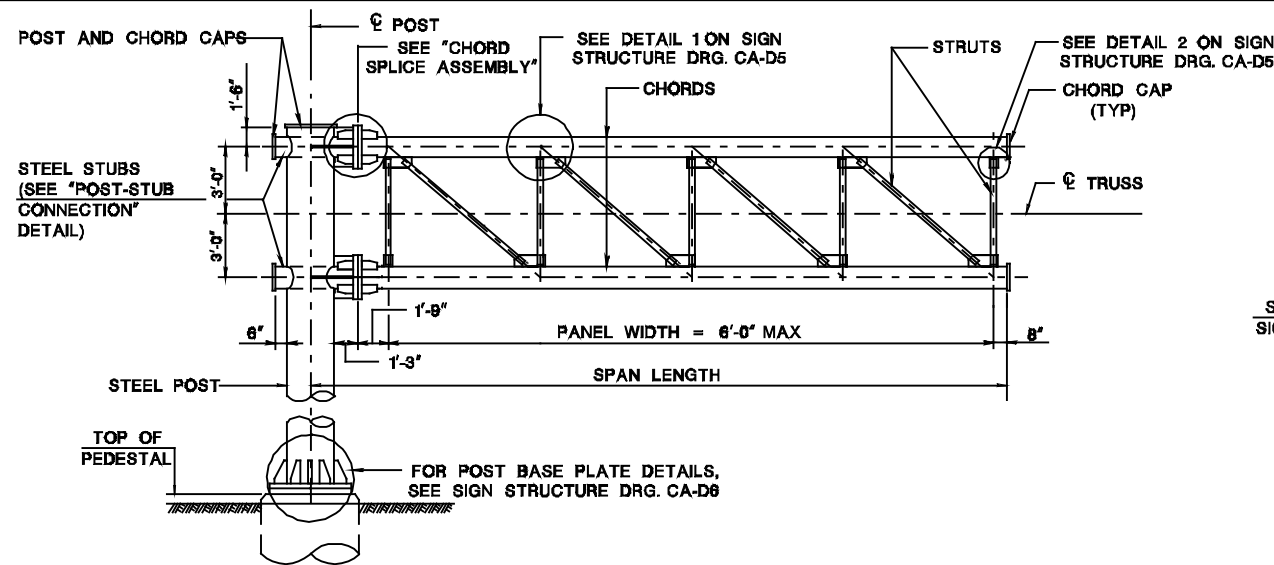
**TEMPORARY SHEETING AND EXCAVATION DETAILS**

- NOTES:**
1. WHEN TEMPORARY SHEETING IS REQUIRED, H IS 3'-0" WHEN ADJACENT TO PEDESTRIAN OR VEHICULAR TRAFFIC AND 1'-0" MINIMUM FOR ALL OTHER CONDITIONS.
  2. PAYMENT LIMITS FOR TEMPORARY SHEETING SHALL BE MEASURED FROM THE FINISHED GRADE LINE OR FROM THE EXISTING GROUND LINE, WHICHEVER IS LOWER.
  3. EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 1"X1" UNLESS NOTED OTHERWISE.
  4. BARS SHALL NOT BE SPLICED EXCEPT AS PROVIDED ON THIS DRAWING OR AUTHORIZED BY THE ENGINEER. WHEN SPLICING IS APPROVED, THE REINFORCEMENT BARS SHALL BE LAPPED FOR A LENGTH OF AT LEAST 36 DIAMETERS (48 DIAMETERS FOR SPIRAL BARS) AND SHALL BE SECURELY WIRED TOGETHER.
  5. FOR DETAILS OF CAST-IN-PLACE CONCRETE PILES, SEE SIGN STRUCTURE DRG. CA-D6.
  6. ALL REINFORCEMENT IN PEDESTALS AND BARRIER PEDESTALS SHALL BE CORROSION PROTECTED.

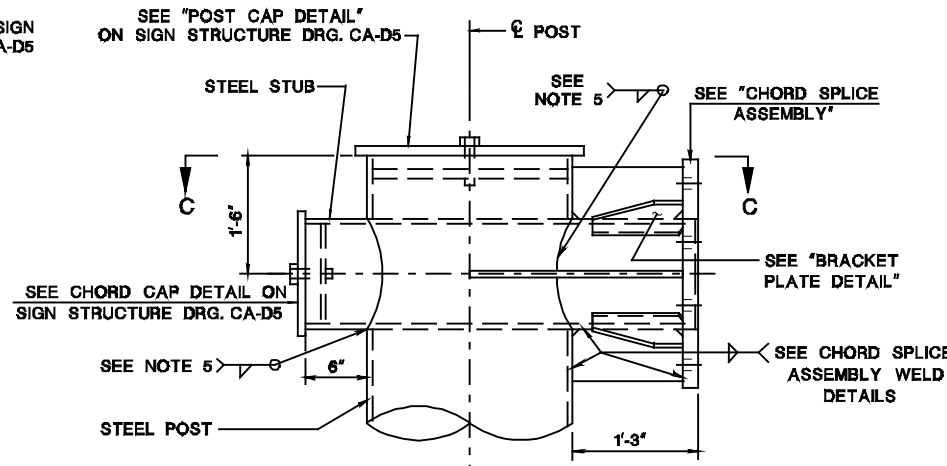
<b>SIGN STRUCTURE DRG. CA-D3</b>	
NEW JERSEY DEPARTMENT OF TRANSPORTATION BUREAU OF STRUCTURAL ENGINEERING	
<b>CANTILEVER SIGN SUPPORT STRUCTURES</b> <b>FOUNDATION DETAILS</b>	
ROUTE:	SECTION
SCALE : NONE	
BRIDGE SHEET NO. OF	

ED-07D-03 - ORIGINAL SHEET

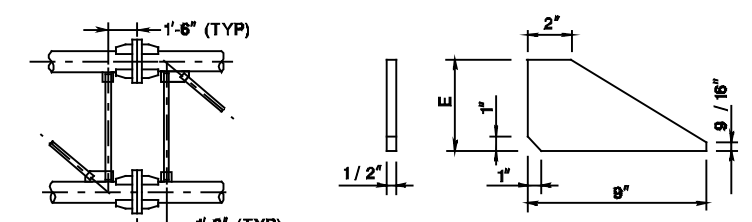




ELEVATION -TYPICAL CANTILEVER SIGN SUPPORT

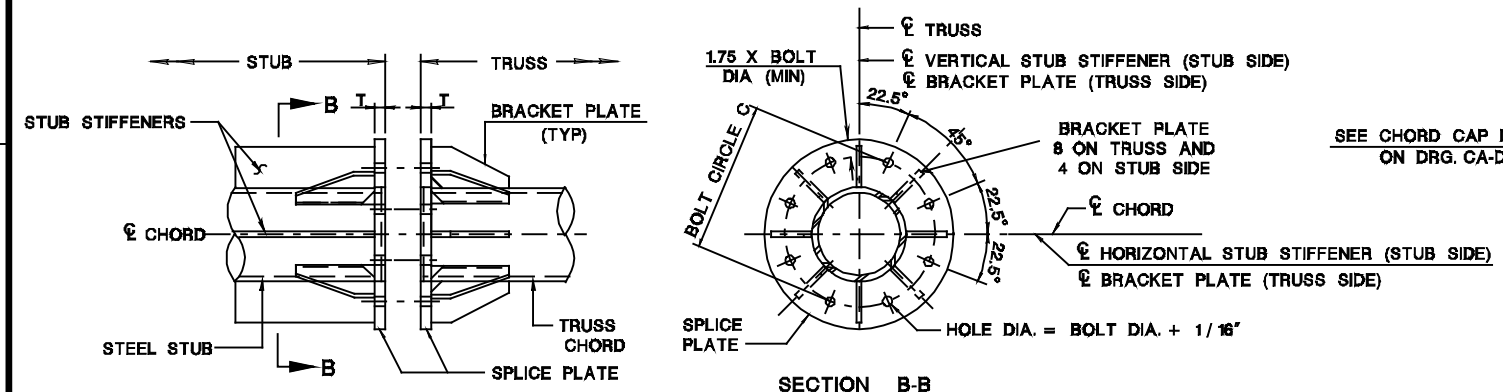


POST-STUB CONNECTION  
(TWELVE-BOLT SPLICE SHOWN)

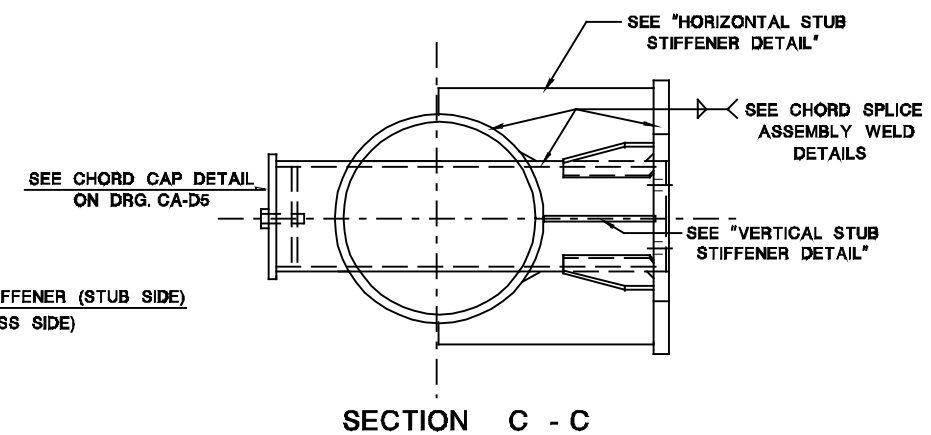


INTERMEDIATE SPLICE DETAIL  
(SEE NOTE No. 4)

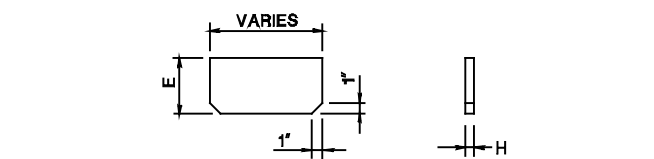
BRACKET PLATE DETAIL



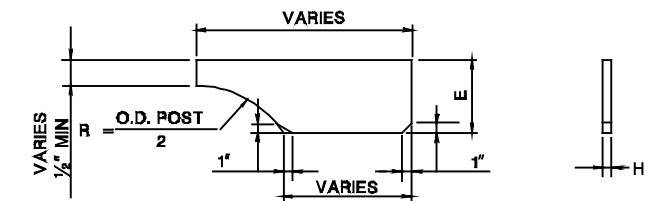
CHORD SPLICE ASSEMBLY - EIGHT-BOLT



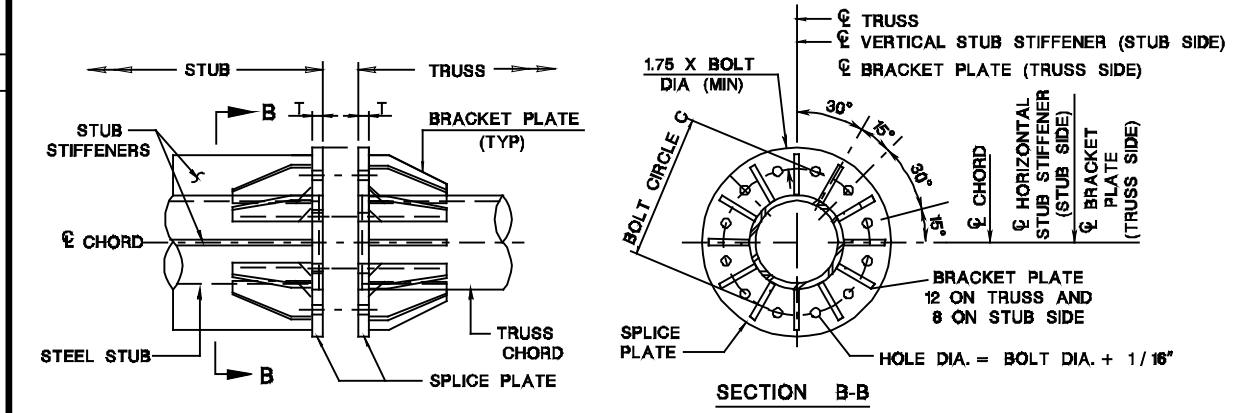
SECTION C - C



VERTICAL STUB STIFFENER DETAIL



HORIZONTAL STUB STIFFENER DETAIL

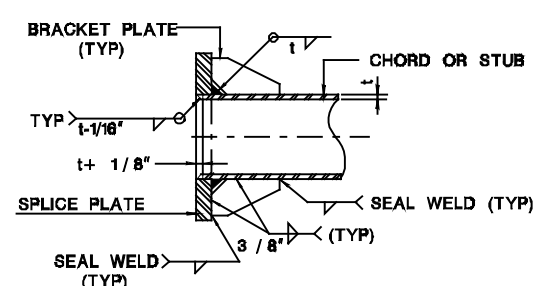


CHORD SPLICE ASSEMBLY - TWELVE-BOLT

TRUSS CHORD SPLICE ASSEMBLY							
CHORD O.D.xTHICK (IN)	SPLICE PLATES		STUB STIFFENER PLATES		SPLICE BOLTS		
	THICKNESS T (IN)	E (IN)	H (IN)	No. OF BOLTS	BOLT CIRCLE C (IN)	DIAMETER (IN)	BOLT TENSION (KIPS)
8.625x.322	1 1/2	4 3/4	5 / 8	8	16	1	51.0
8.625x.500	1 1/2	4 3/4	5 / 8	8	16	1	51.0
12.750x.375	1 1/2	6 1/2	5 / 8	12	23	1 1/4	56.0
12.750x.500	1 1/2	6 1/2	5 / 8	12	23	1 1/4	56.0
18.000x.375	2 1/4	6	5 / 8	12	27	1 1/2	103.0
18.000x.500	2 1/4	6	3 / 4	12	27	1 1/2	103.0

NOTES:

- BOLT HOLES IN SPLICE PLATES SHALL BE DRILLED TO 1/16" LARGER THAN THE BOLT SIZE SPECIFIED, UNLESS OTHERWISE NOTED BY THE DESIGNER.
- ASTM A325 SPLICE BOLTS SHALL BE HEAVY HEXAGON TYPE AND SHALL BE FURNISHED WITH HEAVY HEXAGON NUTS AND WASHERS.
- THE THREADED PORTION OF THE SPLICE BOLTS SHALL BE EXCLUDED FROM THE SHEAR PLANE OF THE SPLICE.
- CHORD INTERMEDIATE SPLICING WILL NOT BE PERMITTED UNLESS AUTHORIZED BY THE ENGINEER. WHEN INTERMEDIATE SPLICING IS AUTHORIZED, THE SPLICE SHALL BE AS SHOWN ON THE INTERMEDIATE SPLICE DETAIL AND AS PER CHORD SPLICE ASSEMBLY TABLE ON THIS SHEET.
- IF FILLET WELD SIZE IS NOT SHOWN ON DETAILS, THE WELD SIZE SHALL BE THE SAME AS THE THICKNESS OF THE THINNER PART BEING JOINED.
- FOR THE OUTSIDE DIAMETER (O.D.) OF THE STEEL STUB PIPE SEE SCHEDULE OF STRUCTURES ON SIGN STRUCTURE DRG. CA-D2.
- THE PROVISIONS OF THE NJDOT STANDARD SPECIFICATIONS SHALL BE FOLLOWED IN FURNISHING THE REQUIRED SPLICE ASSEMBLY.
- REFER TO THE NJDOT STANDARD SPECIFICATIONS FOR THE SPLICE BOLT TIGHTENING PROCEDURES. WHEN CALIBRATED WRENCHES ARE USED FOR BOLT INSTALLATION, THEY SHALL BE SET TO PROVIDE A TENSION THAT IS SPECIFIED IN THE TABLE ABOVE.
- HORIZONTAL AND VERTICAL STUB STIFFENER PLATE DIMENSIONS MAY BE VARIED TO ACCOUNT FOR CAMBER (SEE CAMBER DETAIL ON SIGN STRUCTURE DRG. CA-D5).



CHORD SPLICE ASSEMBLY WELD DETAIL

**SIGN STRUCTURE DRG. CA-D4**

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

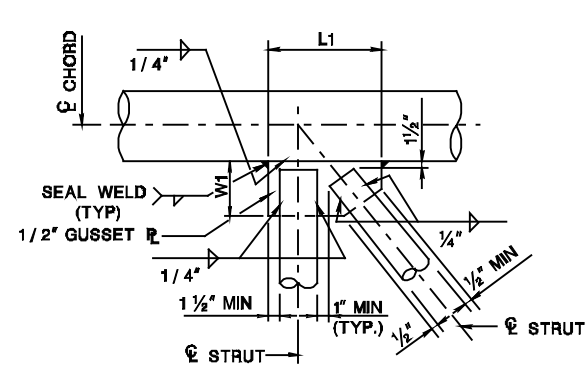
**CANTILEVER SIGN SUPPORT STRUCTURES  
TRUSS AND POST DETAILS - SHEET 1**

ROUTE: SECTION

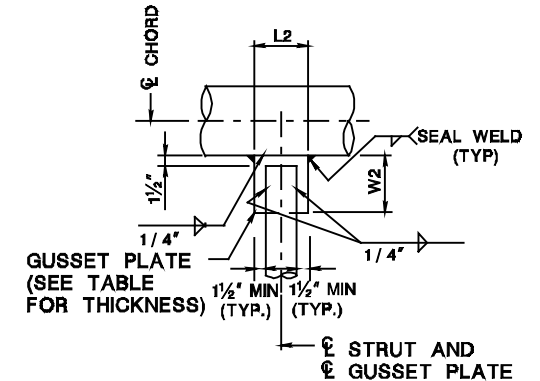
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BRIDGE SHEET NO. OF

BD-071D-02 - ORIGINAL SHEET

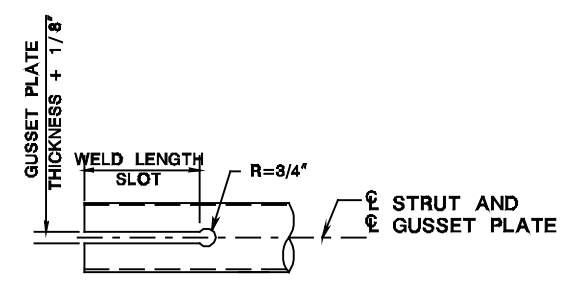


**DETAIL 1**  
('K' GUSSET)

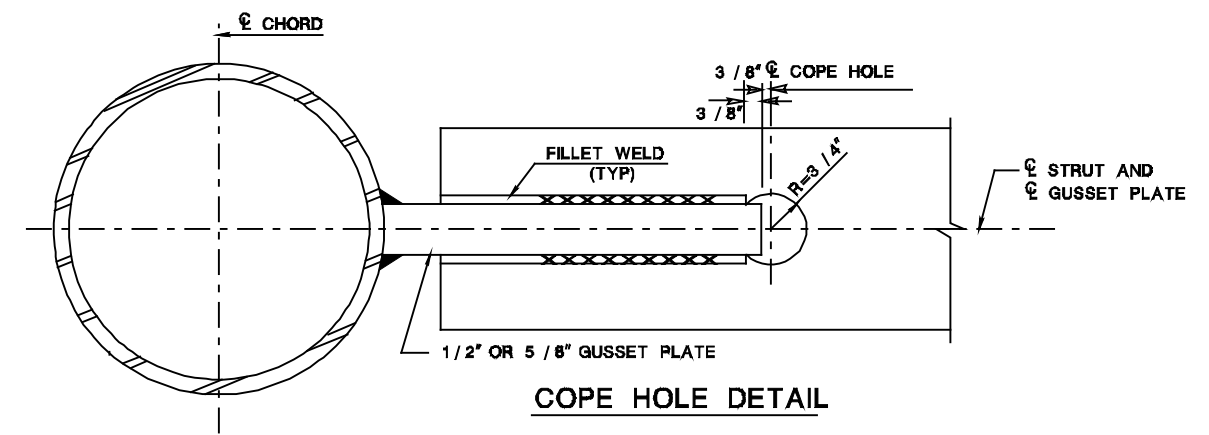


**DETAIL 2**  
('T' GUSSET)

CHORD O.D. x THICK (IN)	'K' GUSSET		'T' GUSSET		THICK- NESS (IN)
	L1 (IN)	W1 (IN)	L2 (IN)	W2 (IN)	
8.625X.322	13 1/2	6 1/4	6 1/4	6 1/4	1/2
8.625X.500	14 1/2	6 1/4	6 1/4	6 1/4	1/2
12.750X.375	16 1/2	7	7	7	3/4
12.750X.500	19 1/2	7 3/4	10	7 1/4	5/8
18.000X.375	21 1/2	9 1/2	11	8 1/4	5/8
18.000X.500	24 1/2	9 1/2	15 3/4	9	5/8

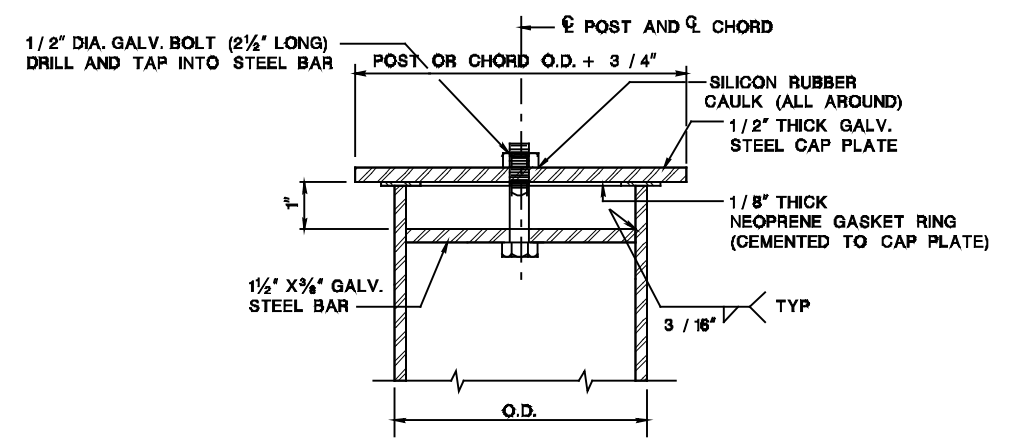


**DETAIL A**

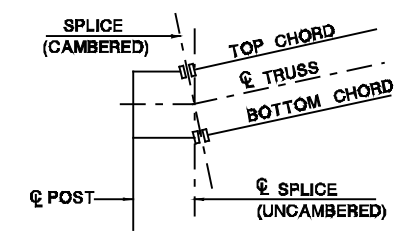


**COPE HOLE DETAIL**

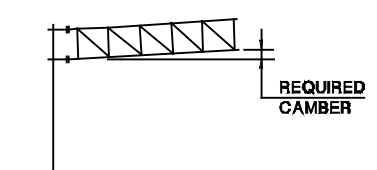
**NOTE:**  
COPE HOLES TO BE PROVIDED AT BOTH ENDS AND BOTH FACES OF ALL STRUTS.



**POST OR CHORD CAP DETAIL**  
**NOTE:** ALTERNATE CAP DETAILS MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.



**CAMBER DETAIL**




**CAMBER DIAGRAM**

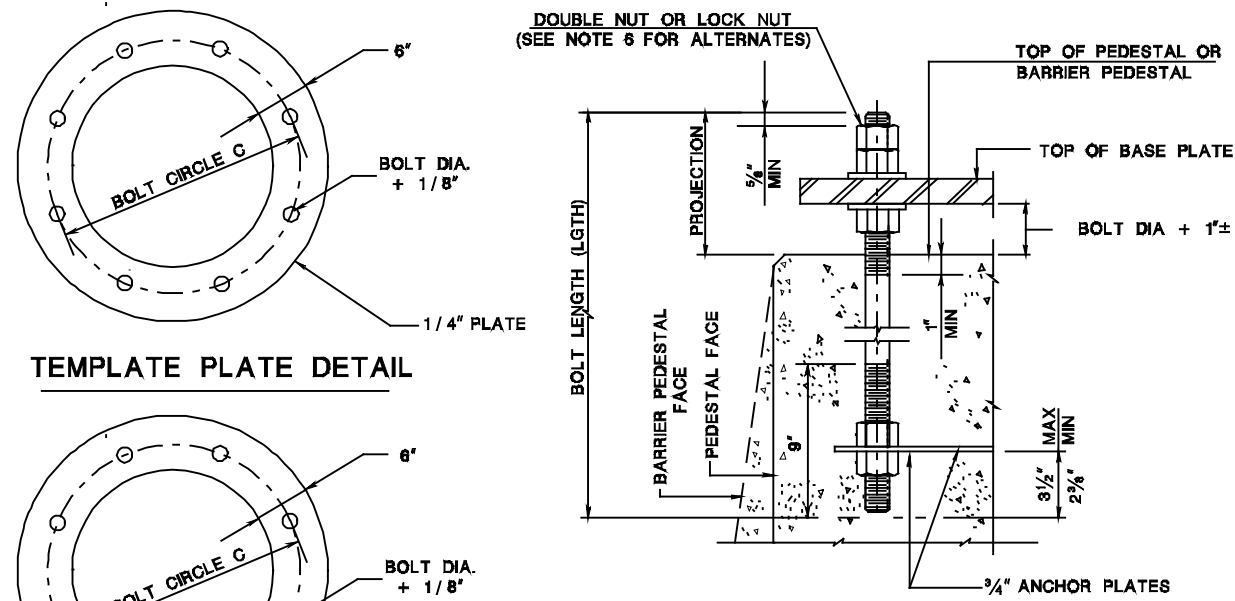
**CAMBER NOTE:**  
CAMBER SHALL BE OBTAINED BY SHORTENING THE TOP CHORD STUB LENGTH AND LENGTHENING THE BOTTOM CHORD STUB LENGTH. CHORD SPLICE PLATES SHALL BE SKEWED ACCORDINGLY BEFORE WELDING TO CHORDS. NO FORCE SHALL BE APPLIED IN PROVIDING CAMBER. AN ALTERNATE METHOD OF OBTAINING CAMBER MAY BE USED AS APPROVED BY THE ENGINEER. FOR REQUIRED CAMBER, REFER TO DRG. CA-03 AND SEE SCHEDULE OF STRUCTURES ON DRG. CA-D2.

**⊗ SIGN STRUCTURE DRG. CA-D5**  
NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

**CANTILEVER SIGN SUPPORT STRUCTURES  
TRUSS AND POST DETAILS - SHEET 2**

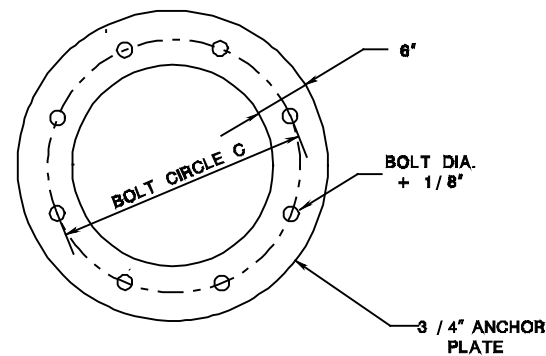
ROUTE: SECTION

SCALE : NONE   
BRIDGE SHEET NO. OF



ANCHOR BOLT DETAIL

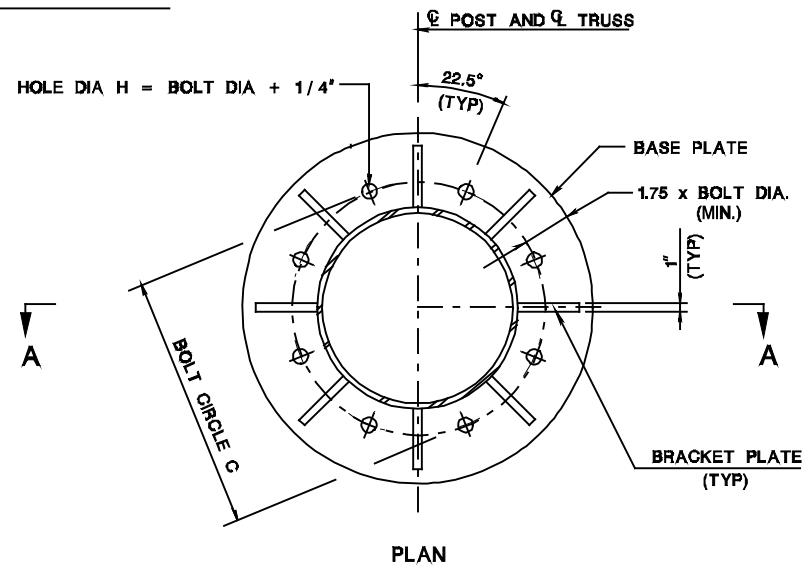
TEMPLATE PLATE DETAIL



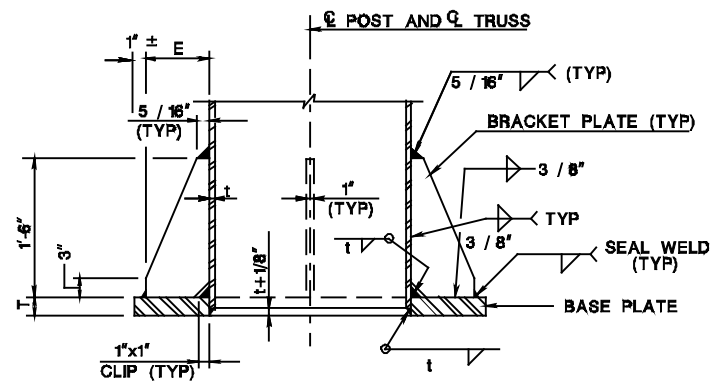
ANCHOR PLATE DETAIL

POST SHAFT BASE ASSEMBLY						
POST O.D.xTHICK (IN)	BASE PLATE	BRACKET PLATES	ANCHOR BOLTS			
	THICKNESS T (IN)	E (IN)	BOLT CIRCLE C (IN)	SIZE DIA.xLGTH (IN)	BOLT TENSION (KIPS)	PROJ* (IN)
14.000X.500	2	7	22	2 1/4 X 57	113	11 1/2
16.000X.500	2 3/4	7	24	2 1/4 X 57	113	11 1/2
18.000X.500	2 3/4	7	26	2 1/4 X 57	113	11 1/2
20.000X.500	2 3/4	7 1/2	28	2 1/2 X 67	139	12 1/2
24.000X.500	3	8	32	2 3/4 X 72	172	13 1/2
26.000X.500	3	10	36	3 1/4 X 82	247	15
26.000X.750	3	10	36	3 1/4 X 82	247	15
26.000X.875	3	10	36	3 1/4 X 82	247	15
30.000X.625	3	10	40	3 1/4 X 82	247	15

\* PROJECTION LENGTH SHOWN IS BASED ON USING DOUBLE NUTS.

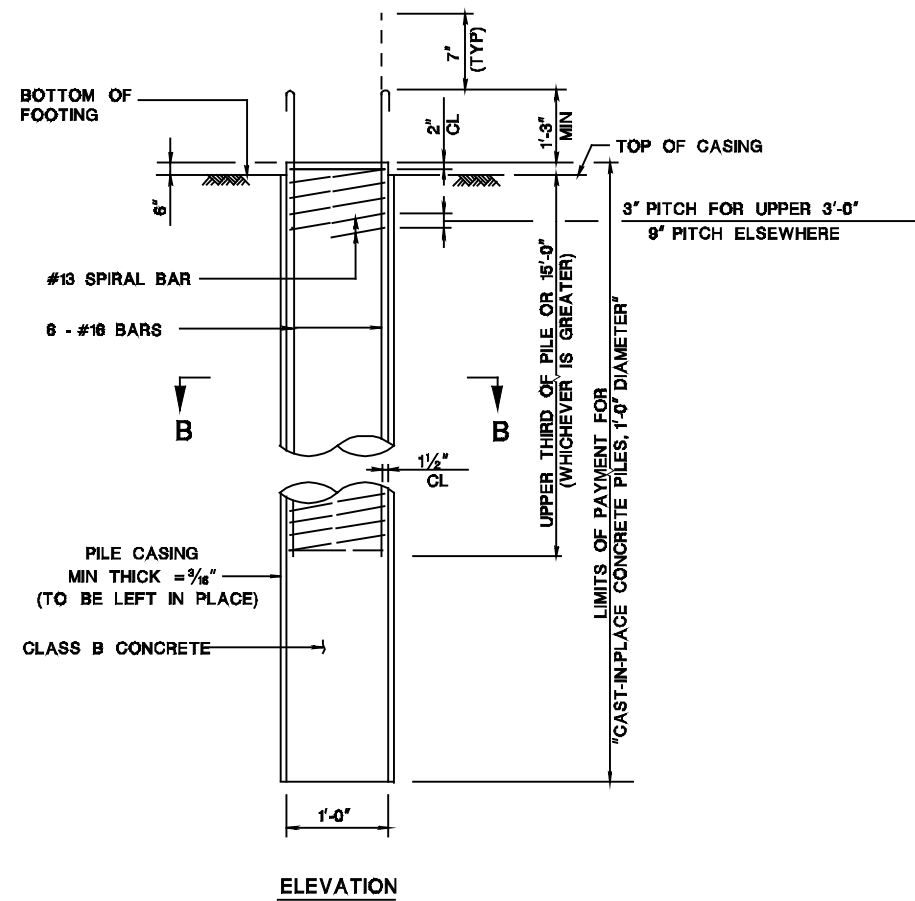


PLAN

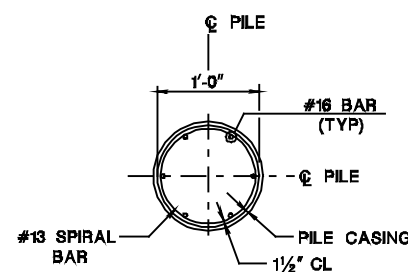


SECTION A-A

POST BASE PLATE DETAIL



ELEVATION



SECTION B-B

CAST-IN-PLACE CONCRETE PILE

NOTES:

1. BEARING PILES SHALL BE CAST-IN-PLACE CONCRETE PILES. ALL PILES SHALL BE 1'-0" IN DIAMETER OR EQUIVALENT AND SHALL HAVE A MINIMUM BEARING CAPACITY OF 50 KIPS. THE NUMBER AND SPACING OF PILES SHALL BE AS INDICATED ON SIGN STRUCTURE DRG. CA-D3.
2. APPROVED METAL SPACERS SHALL BE ATTACHED TO THE TOP AND BOTTOM SPIRALS TO ENSURE THAT THE REQUIRED CLEAR DISTANCE TO THE CASING IS MAINTAINED.
3. NO CONCRETE SHALL BE PLACED IN CAST-IN-PLACE PILES UNTIL AFTER ALL PILE CASINGS FOR THE FOOTING HAVE BEEN DRIVEN.
4. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEXAGON NUTS AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
5. ANCHOR BOLTS SHALL BE GALVANIZED AFTER THREADING.
6. REFER TO THE NJDOT STANDARD SPECIFICATIONS FOR ANCHOR BOLT TIGHTENING PROCEDURES. WHEN CALIBRATED WRENCHES ARE USED FOR BOLT INSTALLATION, THEY SHALL BE SET TO PROVIDE THE TENSION THAT IS SPECIFIED IN THE TABLE ABOVE.
7. TEMPLATE PLATE WITH NUTS ON BOTH SIDES SHALL BE USED TO MAINTAIN THE SPACING AND ALIGNMENT OF ANCHOR RODS.



SIGN STRUCTURE DRG. CA-D6

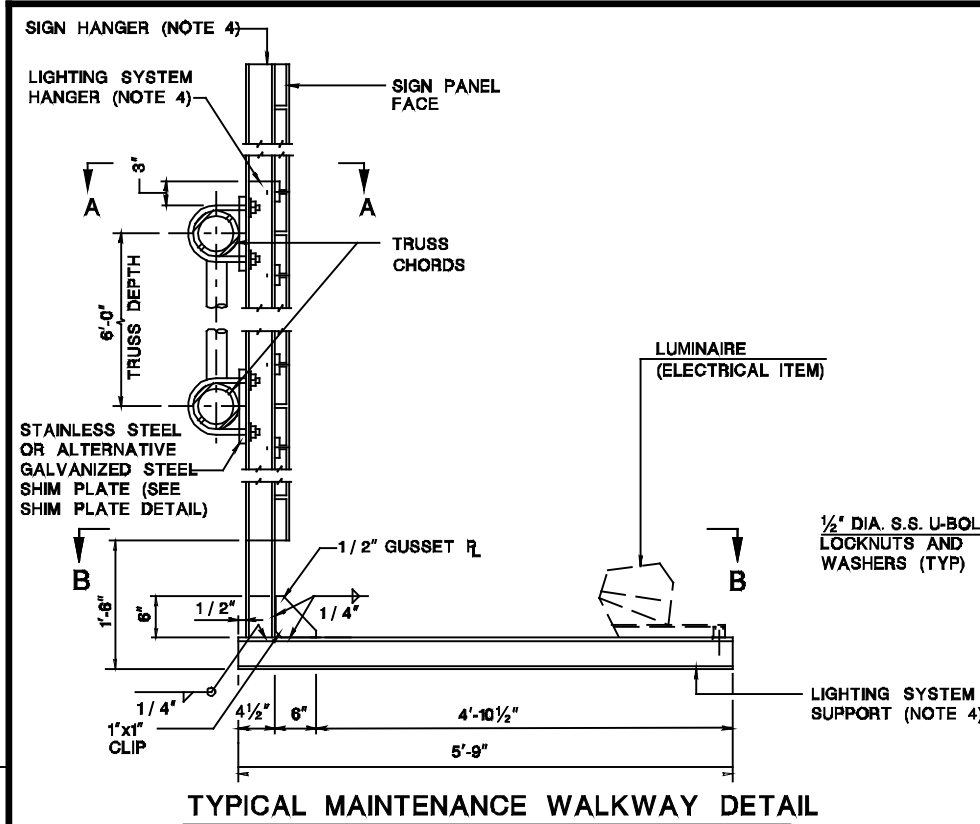
NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

CANTILEVER SIGN SUPPORT STRUCTURES  
POST BASE AND FOUNDATION DETAILS

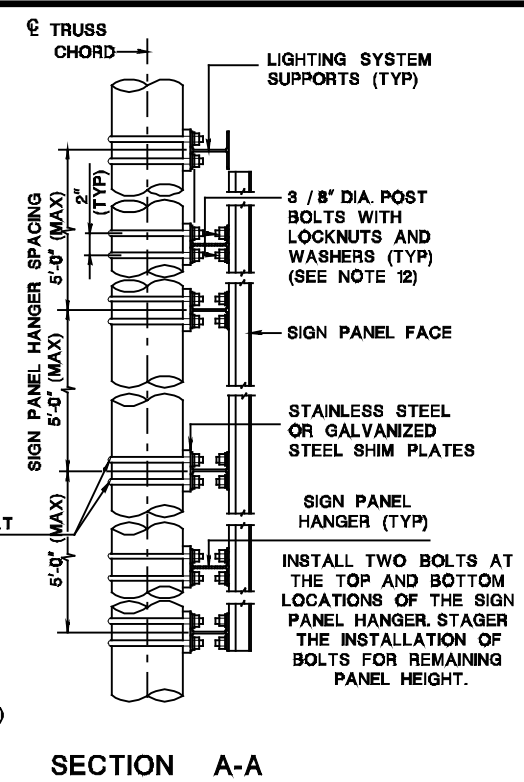
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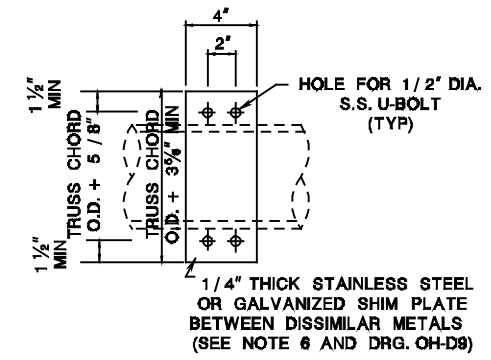
BRIDGE SHEET NO. OF



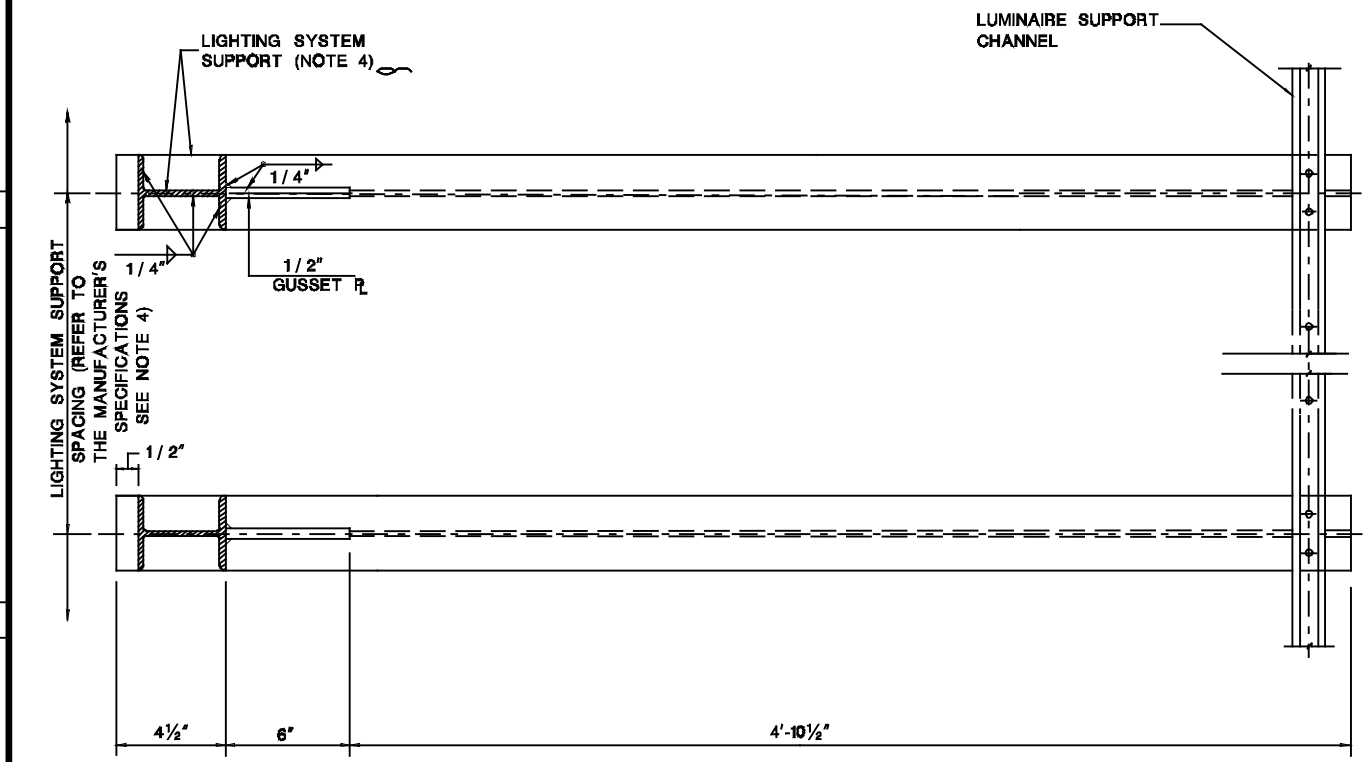
TYPICAL MAINTENANCE WALKWAY DETAIL



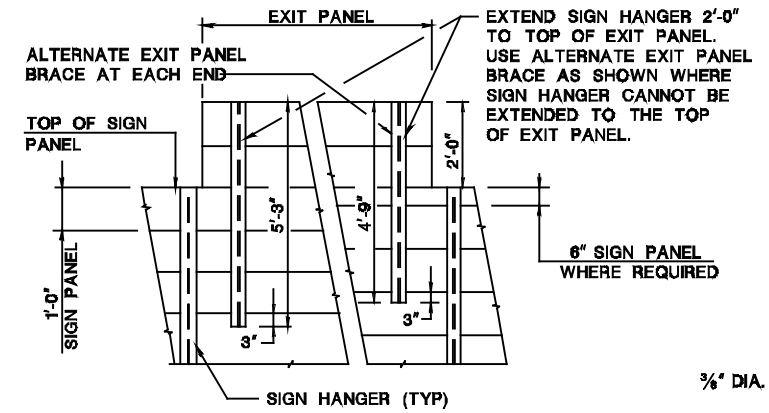
SECTION A-A



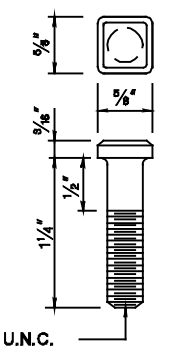
SHIM PLATE DETAIL



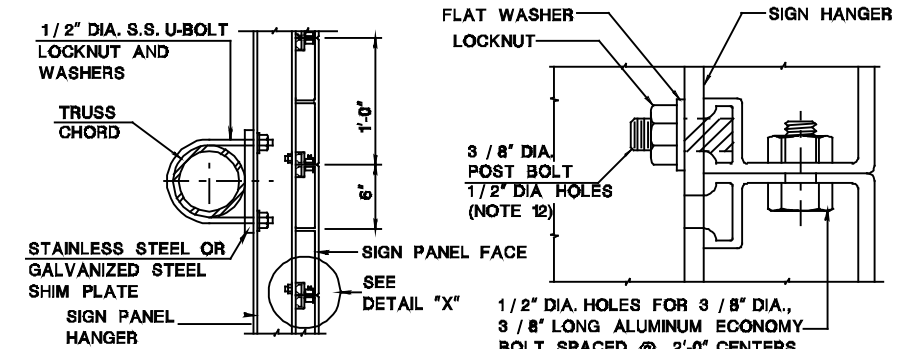
SECTION B-B



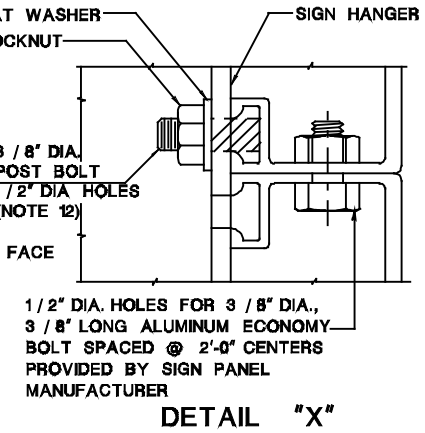
EXIT PANEL CONNECTION DETAIL



POST BOLT



SIGN PANEL CONNECTION DETAIL



DETAIL "X"

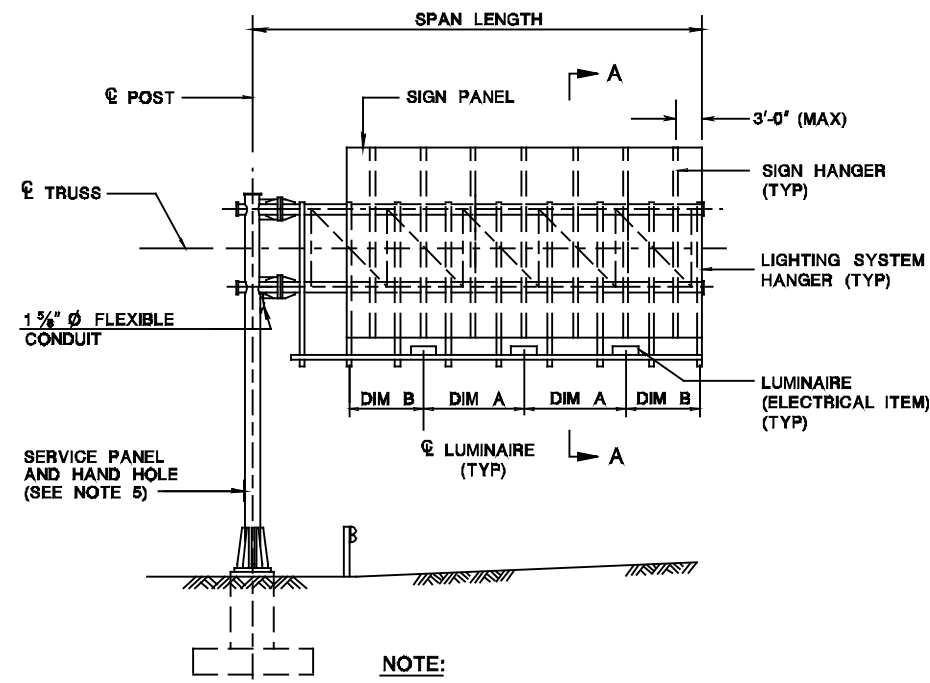
NOTES

1. ALL ALUMINUM MATERIAL SHALL BE ALUMINUM ALLOY 6061-T6 UNLESS OTHERWISE NOTED.
2. ALL BOLTS, U-BOLTS, WASHERS AND NUTS SHALL BE STAINLESS STEEL CONFORMING TO ASTM SPECIFICATION A320 GRADE B8, CLASS 1 AND ASTM A194. STAINLESS STEEL SHIM PLATES SHALL CONFORM TO ASTM SPECIFICATION A167, TYPE 304, OR AS NOTED.
3. WELDING OF ALUMINUM SHALL BE AS SPECIFIED IN AWS D1.2 AND THE NJDOT STANDARD SPECIFICATIONS.
4. SIGN PANEL HANGER SHALL BE ALUMINUM OR GALVANIZED STEEL: ALUMINUM I-BEAM (DEPTH = 4", WEB AND FLANGE THICKNESS = 1/4", FLANGE WIDTH = 3 1/2"); STEEL I-BEAM (W8x9). SIGN HANGER SPACING DESIGNED FOR 15'-0" MAXIMUM SIGN PANEL HEIGHT.
5. SIGN HANGERS SHALL BE USED TO SUPPORT SIGN PANELS ONLY, UNLESS OTHERWISE NOTED.
6. IF INTERMEDIATE TRUSS CHORD SPLICES ARE USED, THE THICKNESSES OF SHIM PLATES MUST BE INCREASED TO AVOID INTERFERENCE BETWEEN THE CHORD SPLICE PLATES AND THE SIGN PANELS.
7. LIGHTING SYSTEM SUPPORTS SHALL BE PROVIDED CONTINUOUSLY FOR THE ENTIRE SIGN DESIGN LENGTH UNLESS OTHERWISE SHOWN.
8. LIGHTING SYSTEM SUPPORT HANGERS SHALL PROJECT 3" ABOVE THE TOP OF THE TOP CHORD AND SHALL NOT SUPPORT SIGN PANELS, UNLESS OTHERWISE NOTED.
9. LENGTH OF SIGN HANGERS SHALL BE EQUAL TO THE SIGN PANEL HEIGHT. BEHIND AN EXIT PANEL, THE HANGERS SHALL BE EXTENDED TO THE TOP OF THE EXIT PANEL.
10. EXIT PANEL CONNECTION DETAIL SHOWN SHALL ALSO BE USED FOR THE ATTACHMENT OF NEW EXIT PANELS TO EXISTING SIGN PANELS.
11. SIGN PANELS SHALL NOT EXTEND MORE THAN 3'-0" BEYOND THE LAST SIGN HANGER.
12. FRICTION TYPE CLIPS OR SIMILAR DEVICES ARE NOT PERMITTED.

**SIGN STRUCTURE DRG. CA-D7**  
 NEW JERSEY DEPARTMENT OF TRANSPORTATION  
 BUREAU OF STRUCTURAL ENGINEERING

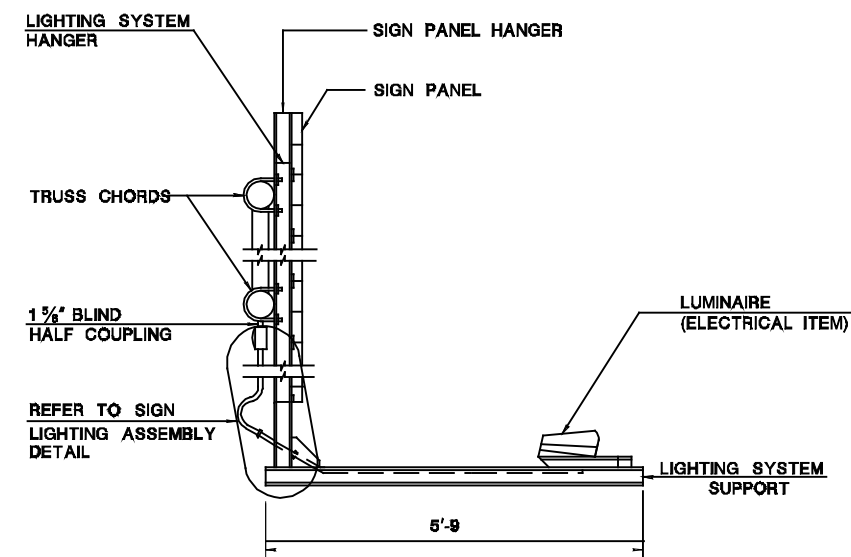
**CANTILEVER SIGN SUPPORT STRUCTURES  
 MAINTENANCE WALKWAY DETAILS**  
 ROUTE: \_\_\_\_\_ SECTION \_\_\_\_\_

SCALE: NONE  
 BRIDGE SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

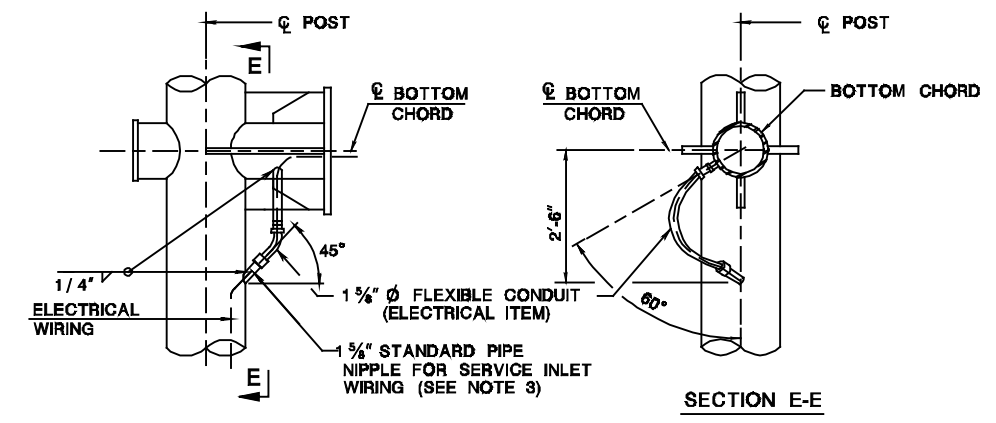


**NOTE:**  
FOR LUMINAIRE SPACING DIMENSIONS "A" & "B"  
SEE SIGN LIGHTING ASSEMBLY DETAIL.

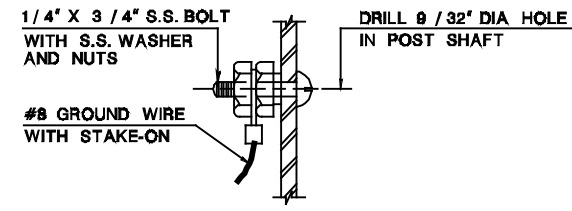
**ELEVATION - TYPICAL CANTILEVER SIGN SUPPORT**



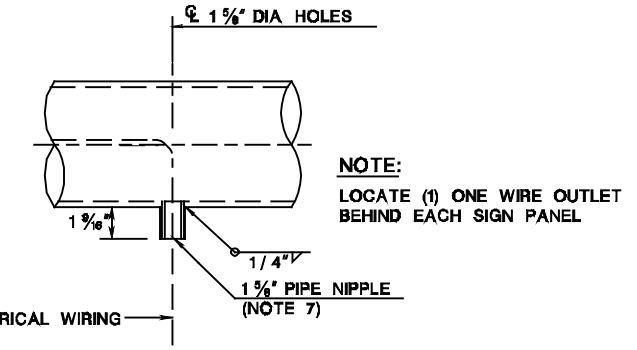
**SECTION A-A**



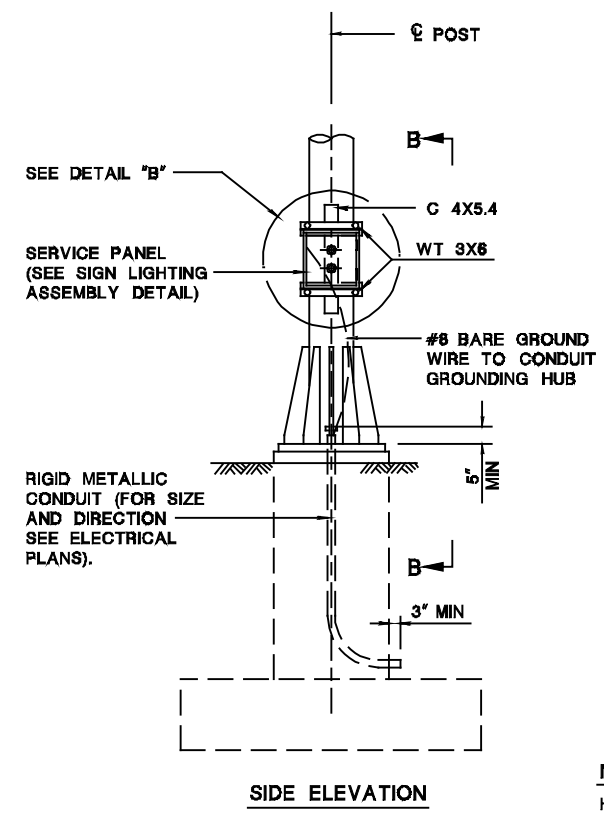
**DETAILS OF WIRE OUTLETS**



**GROUND STUD**



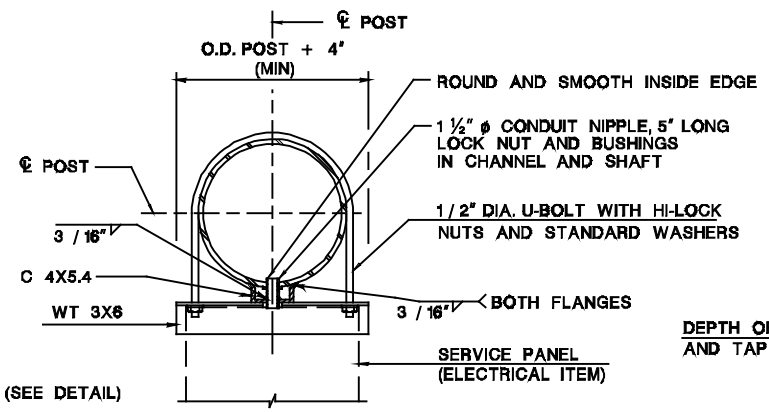
**DETAIL OF WIRE OUTLET ON TUBE**



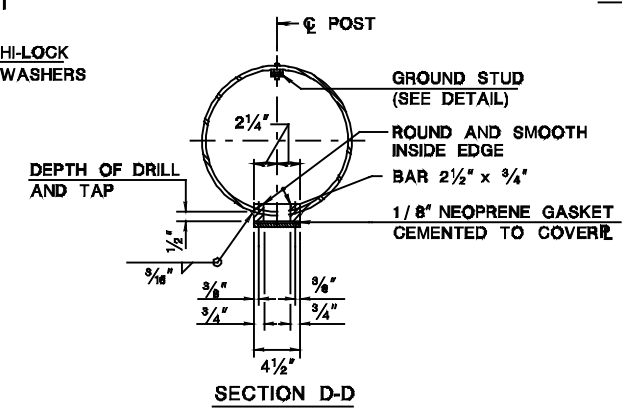
**SIDE ELEVATION**

**NOTE:**  
HAND HOLE AND GROUND STUD TO BE PROVIDED IN STEEL POST AT LOCATION OF RIGID METALLIC CONDUIT (SEE ELECTRICAL PLANS FOR LOCATION).

**TYPICAL SERVICE PANEL DETAIL AT SIGN STRUCTURE**

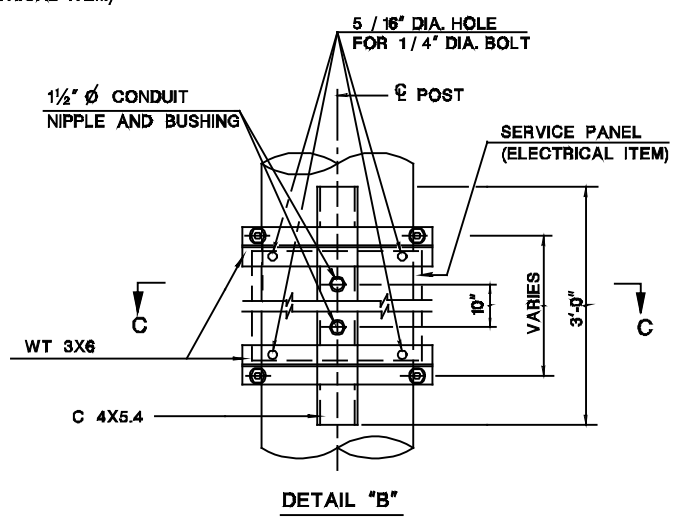


**SECTION C-C**

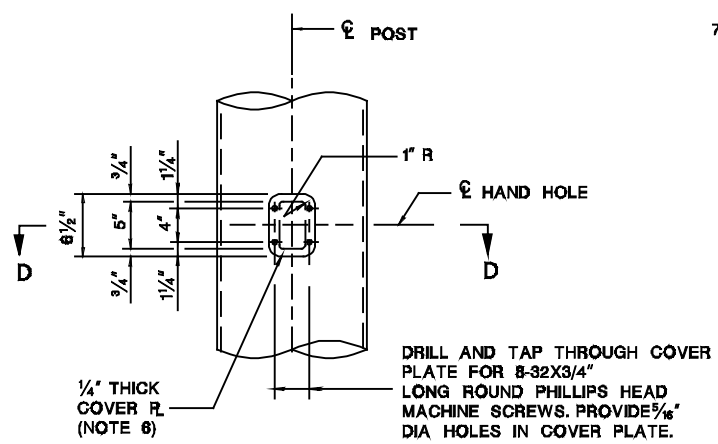


**SECTION D-D**

- NOTES:**
1. WHEN SIGN LIGHTING IS REQUIRED, AN APPROVED SIGN LIGHTING SYSTEM SHALL BE PROVIDED.
  2. ALL BOLTS TO BE INSTALLED WITH WASHERS, LOCKWASHERS AND NUTS. ALL HARDWARE SHALL BE STAINLESS STEEL CONFORMING TO ASTM A320, GRADE B8, CLASS 1.
  3. 1 1/2" STANDARD PIPE NIPPLES SHALL BE OF APPROVED MATERIAL AND BE COMPATIBLE WITH THE MATERIAL TO WHICH THEY ARE WELDED.
  4. IF REQUIRED, LIGHTING SYSTEM SUPPORT CHANNELS SHALL BE CONTINUOUS FROM HANGER TO HANGER. REFER TO THE MANUFACTURER'S SPECIFICATIONS.
  5. SEE ELECTRICAL PLANS FOR LOCATION AND DIRECTION OF SERVICE PANEL, RIGID CONDUITS, AND FLEXIBLE CONDUITS.
  6. HANDHOLES SHALL NOT BE ORIENTED TO THE SIDE OF THE ROADWAY.
  7. NIPPLE SIZE SHALL NOT PROJECT BEYOND THICKNESS OF CHORD.



**DETAIL "B"**




**HAND HOLE AND COVER DETAIL**

**SIGN STRUCTURE DRG. CA-D8**  
NEW JERSEY DEPARTMENT OF TRANSPORTATION  
BUREAU OF STRUCTURAL ENGINEERING

**CANTILEVER SIGN SUPPORT STRUCTURES**  
TYPICAL ELECTRICAL DETAILS

ROUTE: \_\_\_\_\_ SECTION \_\_\_\_\_

SCALE: NONE 

BRIDGE SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_