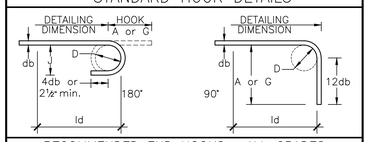
STANDARD DRAWING ABBREVIATIONS

ADL	Additional Dead Load
AB	Anchor Bolt
A/C	Air Conditioner
ADD'L	Additional
AFF	Above Finish Floor
AL	Aluminum
ALT	Alternate
APP	Approximate
ARCH	Architect, Architectual
BCX	Bottom Chord Extension
BF	Both Faces
BLDG	Building
BLKG	Blockage
BM (s)	Beams (s)
BO	By Others, Blockout, Bottom of opening
B	Bottom
BP	Base Plate
BRDG	Bridging
BRG	Bearing
BOM	Bottom of Beam
CANT	Cantilever
CG	Center of Gravity
CIP	Cast-in-Place Concrete
COS	Center of Gravity of Strands (steel)
CJ	Control or Construction Joint
CL	Centerline
CLG	Ceiling
CLKG	Caulking
CLR	Clear, Clearance
CMU	Concrete Masonry Unit
COL	Column
CONC	Concrete
CONN	Connection
CONST	Construction
CONT	Continuos
CORR	Corrugated
CTR	CTR
C.C.	Center to Center
DBA	Deformed Bar Anchor
DBL	Double
DEG	Degrees
DIA	Diameter
DIAG	Diagonal
DIM	Dimension
DKG	Decking
DN	Down
DO	Ditto
DTL	Detail
DWG	Drawing
DWL	Dowel
DL	Dead Load
E	East
EA	Each
EMB	Embedment
EF	Each Face
EJ	Expansion Joint
EL	Elevation
ELEV	Elevation, Elevator
ENGR	Structural Engineer of Record
EQ	Equal
EXIST	Existing
EXP BOLT	Expansion Bolt
EXT	Exterior
EW	Each Way
ETC	Etcetera
FF	For Face, Finished Floor
FIN	Finish
FLG	Flange
FND	Foundation
FRMG	Framing
FT	Foot, Feet
FTG	Footing
FS	Far Side
GA	Gage or Gauge
GALV	Galvanized
GC	General Contractor
GR	Grade
HBF	Horizontal Both Faces
HORIZ	Horizontal
HDAS	Headed Anchor Stud
HSB	High Strength Bolt
HT	Height
ID	Inside Diameter
INFO	Information
INT	Interior
JST	Joist
JT	Joint
K	Kips
KLF	Kips per linear foot
KSF	Kips per square foot
KSI	Kips per square inch
LAM	Laminated
LBS	Pounds
LEV	Level
LLV	Long Leg Vertical
LLH	Long Leg Horizontal
LOCT	Location
LWT	Lightweight
LL	Live Load
MAX	Maximum
MECH	Mechanical
MEZZ	Mezzanine
MFG	Manufacturer
MID	Middle
MIN	Minimum
MISC	Miscellaneous
MK	Mark
MTL	Material, Metal
N	North
NIC	Not in Contract
NF	Near Face
NO or #	Number
NOM	Nominal
NTS	Not to Scale
NS	Near Side
OC	On Center
OD	Outside Diameter
OPNG	Opening
OPP	Opposite
OPP HAND	Opposite Hand
O.O.	Out to Out
PL	Plate
P/C	Pre-Cast
PCF	Pounds per Cubic Foot
Perim	Perimeter
PERP	Perpendicular
PLF	Pounds per Linear Foot
PROJ	Projection
PSF	Pounds per Square Foot
PSI	Pounds per Square Inch
PT	Post-Tensioned
QTY	Quantity
R	Radius, Riser (Stairs)
RECT	Rectangular
RE	Refer (ence)
REINF	Reinforcement/ Reinforce
REV	Revision
REQ'D	Required
S	South
SCHD	Schedule
SECT	Section
SHT	Sheet
SIM	Similar
SLV	Sleeve
SPCS	Spaces
SPCG	Spacing
SPEC	Specification
SQ	Square
STD	Standard
STFF	Stiffener
SOG	Slab on Grape
STIRR	Stirrup
STL	Steel
STR	Structure
SYM	Symmetrical
THK	Thickness
THRD	Threaded
TOPG	Topping
TYP	Typical
T.O.B.	Top of Beam
T.O.C.	Top of Concrete
T.O.COL	Top of Column
T.O.F.	Top of Footing
T.O.J.	Top of Joist
T.O.OP.	Top of Opening
T.O.P.	Top of Parapet
T.O.S.	Top of Slab or Steel
T.O.W.	Top of Wall
T & B	Top and Bottom
U	Units
UNO	Unless Noted Otherwise
VERT	Vertical
W	West, Wire Size Designation
WD	Wood
WP	Work Point
WT	Weight
WWF	Welded Wire Fabric
W/	With
W/O	Without
W/S	Waterstop
WWM	Welded Wire Mesh
&	And

STRUCTURAL SHEET INDEX

STANDARD HOOK DETAILS



RECOMMENDED END HOOKS , ALL GRADES

BAR SIDE	D	180° HOOKS A or G	180° HOOKS J	90° HOOKS A or G
#3	2 ½"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 ¾"	7"	5"	10"
#6	4 ½"	8"	6"	1'-0"
#7	5 ¼"	10"	7"	1'-2"
#8	6"	11"	8"	1'-4"
#9	9 ½"	1'-3"	11¾"	1'-7"
#10	10 ¾"	1'-5"	1'-1 ¼"	1'-10"
#11	12"	1'-7"	1'-2 ¾"	2'-0"
#14	19 ¼"	2'-3"	1'-9 ¾"	2'-7"
#18	24"	3'-0"	2'-4 ½"	3'-5"

STANDARD HOOK TENSION DEVELOPMENT LENGTH

BAR SIZE ENGLISH UNIT	BAR SIZE METRIC UNIT	3,000	4,000	5,000
#3	#10	8.2	7.1	6.4
#4	#13	11.0	9.5	8.5
#5	#16	13.7	11.9	10.6
#6	#19	16.4	14.2	12.7
#7	#22	19.2	16.6	14.8
#8	#25	21.9	19.0	17.0
#9	#29	24.7	21.4	19.1
#10	#32	27.8	24.1	21.6
#11	#36	30.9	26.8	23.9
#14	#43	37.1	32.1	28.7
#18	#57	49.4	42.8	38.3

ACI 318 Class B required Lap splice Length

	f'c (psi)	No. 6 and smaller bars and deformed bars	No.7 and larger bars
Clear spacing of bars being developed or not less than db clear cover not less than db, and beam stirrups or columns ties throughout ld not less that code minimum or Clear spacing of bars being developed or spliced not less than 2 db andclear cover no less than db.	3,000	58db	72db
	4,000	50db	61db
	5,000	45db	55db
	6,000	41db	51db
	8,000	36db	45db
	10,000	32db	39db
Other Cases	3,000	86db	107db
	4,000	75db	93db
	5,000	67db	84db
	6,000	60db	76db
	8,000	52db	65db
	10,000	47db	59db

Note:
1) All lap splices shall be considered case B unless otherwise noted.
2) For class A lap splices divide the values given on table by 1.3.
3) Rebar development length is equivalent to values in table divided by 1.3

GENERAL NOTES

1. THE STRUCTURAL PLANS AND SPECIFICATIONS, TO THE BEST OF OUR KNOWLEDGE, COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE 2009 INTERNATIONAL BUILDING CODE WITH AMMENDMENTS AS ADOPTED BY THE GOVERNMENT OF PUERTO RICO.
2. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE ABOVE REFERENCED CODE, AND ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES, STANDARDS, REGULATIONS, AND LAWS.
3. ALL REFERENCED STANDARDS REFER TO THE EDITION IN FORCE AT THE TIME THESE PLANS AND SPECIFICATIONS ARE ISSUED FOR PERMIT.
4. IN ANY CASE OF CONFLICT BETWEEN THE NOTES, DETAILS AND SPECIFICATIONS, THE MOST STRINGENT REQUIREMENTS SHALL GOVERN. CONTRACTOR SHALL MAKE NO DEVIATION FROM DESIGN DRAWINGS WITHOUT WRITTEN APPROVAL OF THE ENGINEER.
5. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AND COORDINATE WITH ARCHITECTURAL DRAWINGS, DRAWINGS FROM OTHER CONSULTANTS, PROJECT SHOP DRAWINGS AND FIELD CONDITIONS.
6. THE CONTRACTOR SHALL PROTECT EXISTING FACILITIES, STRUCTURES, AND UTILITY LINES FROM ALL DAMAGE.
7. JOB SAFETY AND CONSTRUCTION PROCEDURES ARE THE RESPONSIBILITY OF THE CONTRACTOR.

EXCAVATION AND FOUNDATIONS

1. FOUNDATIONS HAVE BEEN DESIGNED FOR AN ASSUMED ALLOWABLE SOIL PRESSURE OF 1500 PSF . THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE ASSUMED SOIL BEARING PRESSURE WITH A GEOTHECNICAL STUDY.
2. COMPACT FILL MATERIAL MUST BE AS SPECIFIED BY GEOTECHNICAL ENGINEER.

REINFORCED CONCRETE NOTES

1. STRUCTURAL CONCRETE AND CONCRETING PRACTICES SHALL CONFORM WITH THE PUERTO RICO BUILDING CODE AND ACI-318-08 "AMERICAN CONCRETE INSTITUTE, BUILDING CODE FOR STRUCTURAL CONCRETE". DETAILS SHALL BE IN ACCORDANCE WITH ACI-315, "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" UNLESS OTHERWISE NOTED ON THE DRAWINGS.
2. ALL CONCRETE SHALL DEVELOP A 28 DAY COMPRESSIVE STRENGTH AS FOLLOWS:

   A) POST FOUNDATION 4000 PSI W/C=0.55

3. NOMINAL MAXIMUM SIZE OF COARSE AGGREGATE SHALL BE NOT LARGER THAN:
   A) 1/5 THE NARROWEST DIMENSION BETWEEN SIDES OF FORMS NOR,
   B) 1/3 THE MINIMUM CLEAR SPACING BETWEEN INDIVIDUAL REINFORCING BARS OR WIRES, BUNDLES OF BARS, OR PRESTRESSING TENDONS OR DUCTS.
4. STEEL PROTECTION SHALL BE AS FOLLOWS:

   A) FOOTINGS
      I. SIDE AND BOTTOM..... 3"
      II. TOP..... 2"

   B) WALLS
      I. POUR..... 3"
      II. EXPOSED TO EARTH OR WEATHER..... 1½" TO #5
      2" FOR #6 AND LARGER
      III. NOT EXPOSED TO EARTH OR WEATHER..... ¾" UP TO #11
      1½" FOR #14 AND LARGER

   C) SLABS AND JOISTS..... ¾" UP TO #11
      1½" FOR #14 AND LARGER

   D) BEAMS AND COLUMNS..... 1½"

   E) STRUCTURAL SLAB ON GRADE OR MAT FOUNDATION WITH VAPOR BARRIER (BOTTOM BAR)..... 1"

5. DOWELS SHALL BE SAME SIZE AND NUMBER AS WALL OR COLUMN VERTICAL REINFORCEMENT EMBEDDED 36 DIAMETERS INTO FOOTING AND 40 DIAMETERS ABOVE IT. (UNLESS NOTED)
6. ALL SLAB ON GRADE SHALL BE 5" THICK REINFORCED WITH #3 @ 12" (E.W.).
7. ALL REINFORCING STEEL BARS SHALL BE NEW BILLET DEFORMED HIGH STRENGTH GRADE STEEL CONFORMING TO ASTM A615 LATEST EDITION (Fy=60,000 PSI), EXCEPT (1) THE MAXIMUM YIELD STRENGTH SHALL BE 78,000 PSI AND (2) THE TENSILE STRENGTH SHALL NOT BE LESS THAN 1.25 THE ACTUAL YIELD STRENGTH. ALL REINF. BARS TO BE WELDED ON EMBEDS OR CROSS-BARS (SUCH AS AT BRACKETS) SHALL COMPLY WITH ASTM A706 REQUIREMENTS WITH A MINIMUM Fy = 60,000 PSI.
8. ALL REINFORCEMENT SHALL BE SECURELY HELD IN PLACE WHILE PLACING CONCRETE. IF REQUIRED, ADDITIONAL BARS OR STIRRUPS SHALL BE PROVIDED BY THE CONTRACTOR TO FURNISH SUPPORT FOR ALL BARS.
9. NO CONCRETE TEST WILL BE ACCEPTED IF CONCRETE IS TAMPERED WITH IN ANY WAY AFTER SAID TEST IS PERFORMED. REPEAT TEST IF WATER IS ADDED AFTER INITIAL SAMPLING.
10. CONTRACTOR SHALL VERIFY AND COORDINATE DIMENSIONS AND LOCATIONS OF ALL OPENINGS, PIPE SLEEVES, CURBS, ETC. AS REQUIRED BY OTHER TRADES BEFORE CONCRETE IS PLACED.
11. FOR LOCATION OF FLOOR DRAINS, CURBS, CONCRETE PADS AND FLOOR DEPRESSIONS, SEE ARCHITECTURAL AND MECHANICAL DRAWINGS.

STRUCTURAL STEEL NOTES

1- ALL STRUCTURAL STEEL WORK SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE A.I.S.C., LATEST EDITION.

2- STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING: Fy

WIDE FLANGE SHAPES	ASTM A992	50 K.S.I.
CHANNELS AND ANGLES	ASTM A36	36 K.S.I.
PLATES	A36	36 K.S.I.
HOLLOW STRUCTURAL SECTIONS (HSS)		
SQUARE	ASTM A500 GR B	46 K.S.I.
ROUND	ASTM A500 GR B	42 K.S.I.
HIGH STRENGTH BOLTS	ASTM A325	
ANCHOR BOLTS	ASTM F1554 GR 55	

NOTE: ALL ELEMENTS SHALL BE HOT DIPPED GALVANIZED

3- ALL HIGH STRENGTH BOLTS SHALL CONFORM TO ASTM STANDARD A325 AND SHALL BE PROVIDED WITH HARDENED WASHERS UNDER THE TURNED ELEMENT.

4- STEEL CONTRACTOR SHALL PROVIDE STEEL FRAMING AS SHOWN IN THE TYPICAL DETAILS. FOR ALL ROOF & FLOOR OPENING.

5- AL WELDING SHALL BE DONE BY QUALIFIED WELDERS AND SHALL BE IN ACCORDANCE WITH AWS D1.1 "STRUCTUAL WELDING CODE – STEEL" OF THE AMERICAN WELDING SOCIETY. ALL WELDS SHALL BE MADE WITH SERIES E70XX ELECTRODES. MINIMUM FILLET WELD SIZE SHALL COMPLY WITH ALL AISC REQUIREMENT BUT IN NO CASE SHALL THE WELD BE LESS THAN 6-MM.

6- THE STRUCTURAL STEEL CONTRACTOR SHALL PROVIDE ALL NECESSARY TEMPORATY GUYING AND BRACING REQUIRED TO ERECT AND HOLD THE FRAME FOR WIND AND CONSTRUCTION LOADS.

7- THE MINIMUM NUMBER OF BOLTS PER CONNECTION SHALL BE TWO (2).

8- ALL SIMPLE SHEAR CONNECTIONS SHALL BE CAPABLE OF END ROTATION AS PER THE REQUIREMENTS OF THE AISC CODE SECTION ON UNRESTRAINED MEMBERS, SECTIONS A2.2 AND J1.2.

9- ALL BEAMS SHALL BE FABRICATED WITH THEIR NATURAL CAMBER UP, PROVIDE CAMBER AS INDICATED ON CONTRACT DRAWINGS. CAMBER INDICATED ON PLAN DRAWINGS IS THE REQUIRED CAMBER AT THE TIME OF ERECTION.

10- AFTER FABRICATION ALL STEEL SHALL BE CLEANED OF ALL RUST, LOOSE MILL SCALE, AND OTHER FOREIGN MATERIALS.

11- THERE SHALL BE NO FIELD CUTTIING OF STRUCTURAL STEEL MEMBERS FOR THE WORK OF OTHER TRADES WITHOUT THE PRIOR APPROVAL OF THE ARCHITECT.

12- PROVIDE A 1/4" CAP PLATE CONTINUOUSLY WELDED AT ENDS OF HOLLOW STRUCTURAL SECTIONS AND STEL PIPE UNLESS OTHERWISE NOTED.

13- CONTRACTOR SHALL PROVIDE ACCESS FOR INSPECTION OF ALL SHOP AND FIELD CONNECTIONS FOR PROPER MATERIALS AND WORKMANSHIP.

14- ALL STRUCTURAL STEEL AT AND BELOW FINISHED GRADE OR FLOOR SLAB SHALL RECEIVE TWO (2) COATS OF BITUMINOUS PAINT OR 3" MINIMUM CONCRETE COVER.

15- THE GENERAL CONTRACTOR SHALL NOTIFY THE STRUCTURAL ENGINEER OF ANY FABRICATION OR ERECTION ERRORS OR DEVIATIONS AND RECEIVE WRITTEN APPROVAL BEFORE ANY FIELD CORRECTIONS ARE MADE.

G. DESIGN LOADS

1. LIVE LOADS
   A) ROOF 40 psf
2. WIND LOADS
   A) AS PER ANSI/ASCE 7-05.
3. SEISMIC LOADS
   A) AS PER IBC – 2009 WITH PR AMENDMENTS.

H. APPLICABLE CODES

1. ACI 318-08
2. 2009 IBC WITH PR AMENDMENTS.
3. ANSI/ASCE 7-05

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Project No: 17-170 Date: Feb-18

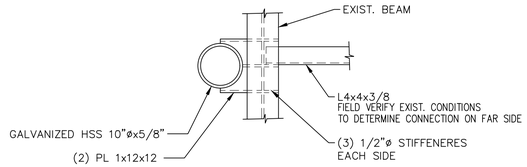
No.	Description	By	Chk.	App.	Date
Issues					

Project Title: APRONS 1 TO 4 LIGHTING UPGRADE SJU AIRPORT
CAROLINA, PR
Sheet Title: STRUCTURAL NOTES

Client: AEROSTAR	Project No.: 17-170
Date: JUNE 4, 2018	Drawing No.
Approved	
Checked	Sheet No.: S-000
Drawn By	

POLE DESIGN GROUP TABLE

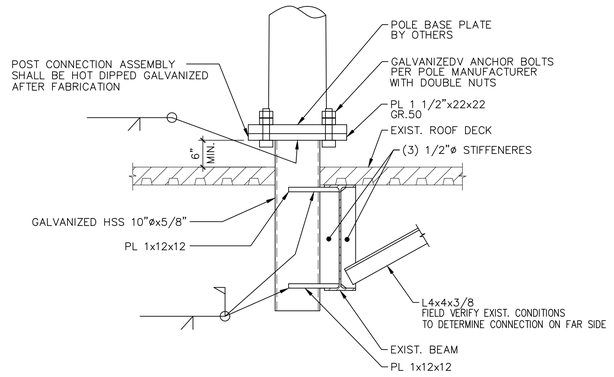
POLE ID	POLE HEIGHT	CROSS ARMS	MOMENT (FT-K)	SHEAR (K)	AXIAL LOAD (K)	GROUP ID
L1-3, P20	20 FT.	CR-3	29.4	1.57	0.997	1
L1-4, P20	20 FT.	CR-4	37.0	1.92	1.18	1
L1-2, P25	25 FT.	CR-2	29.2	1.38	0.98	1
L1-3, P25	25 FT.	CR-3	39.6	1.77	1.15	1
L1-4, P25	25 FT.	CR-4	49.4	2.14	1.33	1
L1-2, P30	30 FT.	CR-2	39.3	1.66	1.23	1
L1-4, P30	30 FT.	CR-4	64.3	2.45	1.58	2
L1-5, P30	30 FT.	CR-5	76.8	2.84	1.75	2
L1-2, P40	40 FT.	CR-2	60.45	2.04	1.79	2
L1-4, P40	40 FT.	CR-4	95.6	2.87	2.14	2
L1-5, P40	40 FT.	CR-5	113.17	3.29	2.3	3
DRILLED, P45	45 FT.	DRILLED	44.9	1.46	1.08	1
L1-2, P45	45 FT.	CR-2	74.08	2.3	2.11	2
L1-3, P45	45 FT.	CR-3	94.8	2.74	2.29	2
L1-4, P45	45 FT.	CR-4	114.5	3.15	2.47	3
L1-5, P45	45 FT.	CR-5	134.7	3.58	2.64	3
L1-5, P70	70 FT.	CR-5	267.5	5.08	4.9	4



TOP VIEW

ALTERNATE SIDE CONNECTION AT TERMINAL B

3/4"=1'-0"



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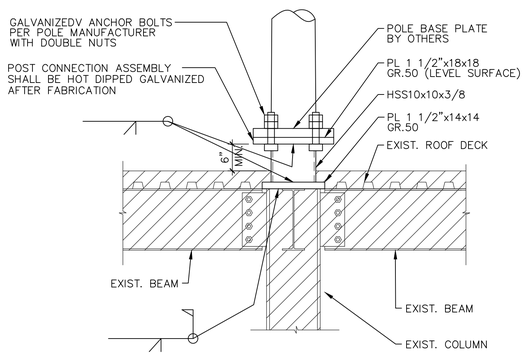
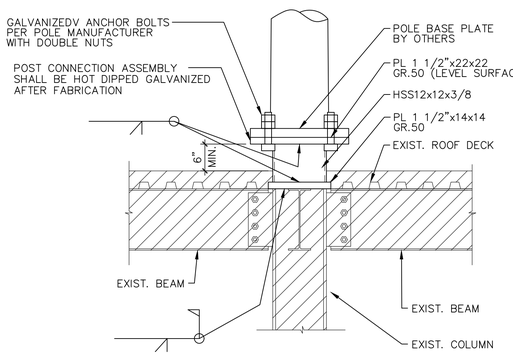
3/4"=1'-0"



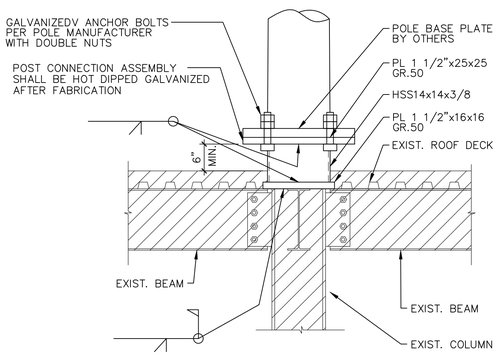
POLE SUPPORT FOR GROUP 1 AT TYP. COLUMN

3/4"=1'-0"



POLE SUPPORT FOR GROUP 2 AT TYP. COLUMN

3/4"=1'-0"



POLE SUPPORT FOR GROUP 3 AT TYP. COLUMN

3/4"=1'-0"

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No.	Description	By	Chk.	App.	Date

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Sheet Title
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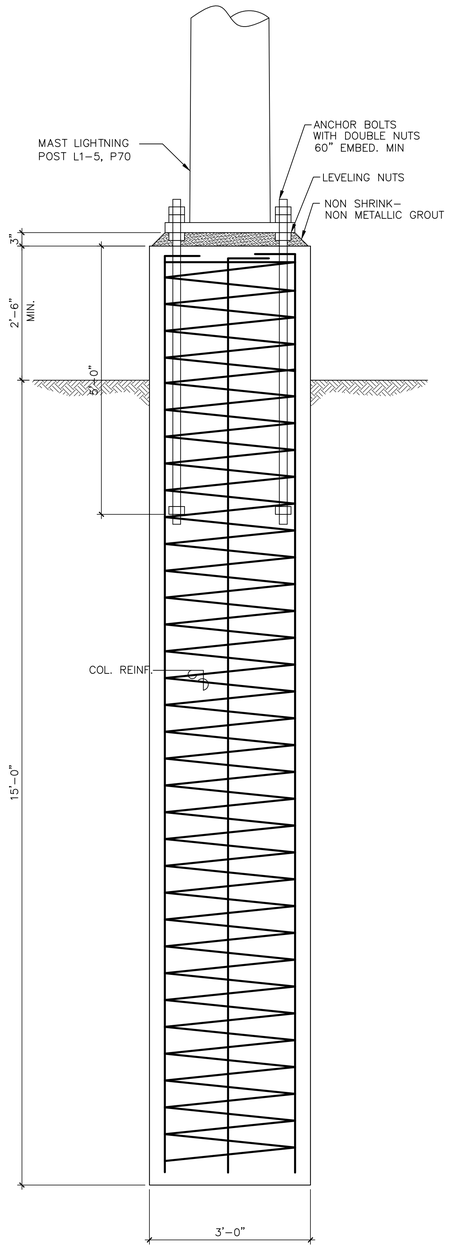
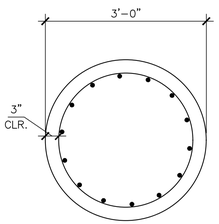


DETAIL

3/4"=1'-0"

C
S-303



FOUNDATION SECTION

VERT. REINF. 14#8
SPIRAL 1/2"@2"

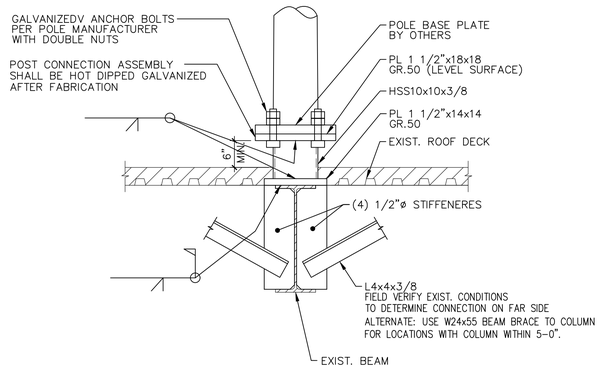
NOTES:

1. POST BASE DESIGN ASSUMES A QUALIFIED SUBSOIL CONTRACTOR SHALL CONFIRM W/SOIL REPORT. REMOVE ALL ORGANIC AND/OR UNSUITABLE MATERIALS UNDER THE FOOTING SUBGRADE AND BACKFILL WITH ACCEPTABLE GRANULAR AND/OR COMPACTED FILL.

2. SUBGRADE SHALL BE COMPACTED TO 95% PROCTOR.

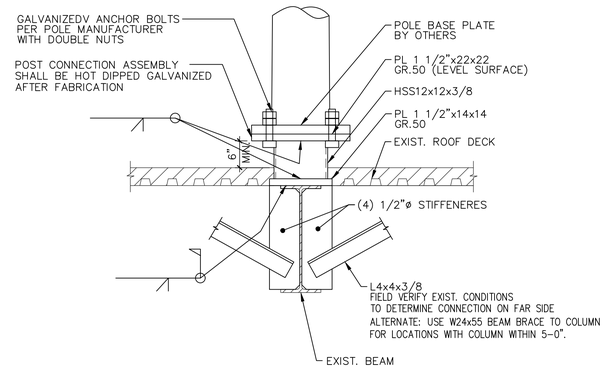
3. DETAILS WERE DEVELOPED BASED ON EXISTING INFORMATION PROVIDED TO US. STRUCTURAL ENGINEERS SHALL BE CONTACTED IF ANY DISCREPANCY OCCURS DURING CONSTRUCTION.

4. ADDITIONAL INFORMATION NEEDED REGARDING VARIATION OF SUBSOIL IN ORDER TO CONFIRM COMPLIANCE WITH DESIGN PARAMETERS. PLEASE CONFIRM BEFORE CONSTRUCTION.



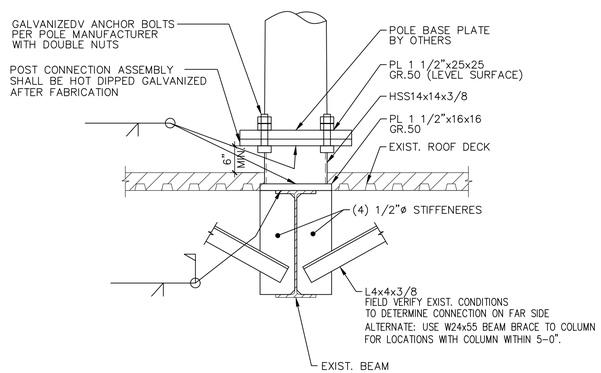
POLE SUPPORT FOR GROUP 1 AT BEAM

3/4"=1'-0"



POLE SUPPORT FOR GROUP 2 AT BEAM

3/4"=1'-0"



POLE SUPPORT FOR GROUP 3 AT BEAM

3/4"=1'-0"

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