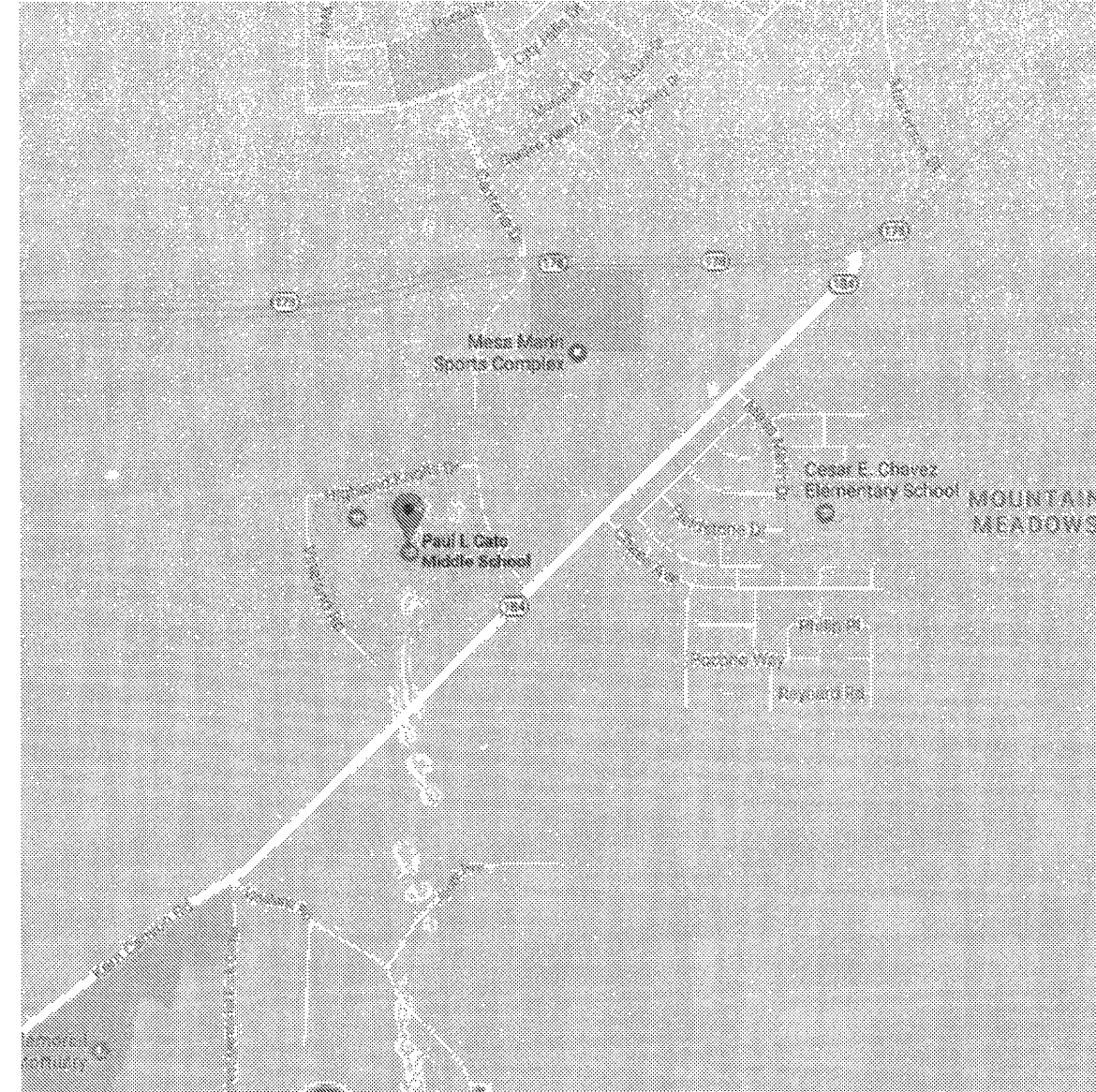


# CATO MIDDLE SCHOOL

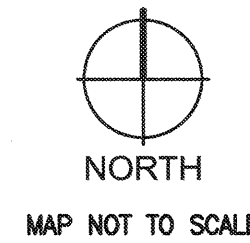
## 482.4 kW DC SOLAR PHOTOVOLTAIC SYSTEM

BAKERSFIELD, CA

### VICINITY MAP



**CATO MIDDLE SCHOOL**  
4115 VINELAND RD, BAKERSFIELD, CA 93306



### CODES

**GOVERNING CODES:**  
CALIFORNIA CODE OF REGULATIONS:  
2016 CALIFORNIA ADMINISTRATIVE CODE, PART 1, TITLE 24 C.C.R.  
2016 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 C.C.R.  
(2015 INTERNATIONAL BUILDING CODE VOLUMES 1-2 AND 2016 CALIFORNIA AMENDMENTS)  
2016 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 C.C.R.  
(2014 NATIONAL ELECTRICAL CODE AND 2016 CALIFORNIA AMENDMENTS)  
2016 CALIFORNIA MECHANICAL CODE (CMC) PART 4, TITLE 24 C.C.R.  
(2015 UNIFORM MECHANICAL CODE AND 2016 CALIFORNIA AMENDMENTS)  
2016 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 C.C.R.  
(2015 UNIFORM PLUMBING CODE AND 2016 CALIFORNIA AMENDMENTS)  
2016 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 C.C.R.  
2016 CALIFORNIA FIRE CODE, PART 9, TITLE 24 C.C.R.  
(2015 INTERNATIONAL FIRE CODE AND 2016 CALIFORNIA AMENDMENTS)  
2016 CALIFORNIA GREEN BUILDING STANDARDS CODE, PART 11, TITLE 24 C.C.R.  
2016 CALIFORNIA REFERENCED STANDARDS, PART 12, TITLE 24 C.C.R.  
TITLE 19 C.C.R., PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS.  
NFPA 13 AUTOMATIC FIRE SPRINKLER SYSTEMS 2016 EDITION  
NFPA 72 NATIONAL FIRE ALARM & SIGNALING CODE 2016 EDITION  
**INSPECTIONS:**  
ALL INDEPENDENT TESTING AND INSPECTIONS SHALL BE PAID FOR AND SCHEDULED BY THE OWNER (DISTRICT).  
A PROJECT INSPECTOR EMPLOYED BY THE OWNER (DISTRICT) AND APPROVED BY THE DIVISION OF THE STATE ARCHITECT SHALL PROVIDE CONTINUOUS INSPECTIONS OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, PART 1, TITLE 24, 2016 CALIFORNIA BUILDING CODE. A MINIMUM OF A CLASS II (TWO) INSPECTOR SHALL BE USED.  
SAFETY DURING CONSTRUCTION TO COMPLY WITH 2016 CFC CHAPTER 33

### GENERAL NOTES

- ALL WORK SHALL CONFORM TO TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR).
- CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY ADDENDA OR CONSTRUCTION CHANGE DOCUMENTS APPROVED BY THE DIVISION OF THE STATE ARCHITECT, AS REQUIRED BY SECTION 4-338, PART 1, TITLE 24, CCR.
- A DSA CERTIFIED PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY THE DIVISION OF THE STATE ARCHITECT SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE (PART 1, TITLE 24, CCR).
- A DSA CERTIFIED INSPECTOR WITH CLASS 2 CERTIFICATION IS REQUIRED FOR THIS PROJECT.
- A DSA CERTIFIED INSPECTOR WHO IS SPECIFICALLY QUALIFIED IN MECHANICAL AND ELECTRICAL WORK WILL BE REQUIRED FOR THIS PROJECT.
- A DSA ACCEPTED TESTING LABORATORY DIRECTLY EMPLOYED BY THE SCHOOL BOARD SHALL CONDUCT ALL THE REQUIRED TESTS AND INSPECTIONS FOR THIS PROJECT.
- NO FUTURE ROOF DECKING OR SHEATHING MAY BE APPLIED TO OPEN GRID FRAMING.
- ONLY BOXED OPTIONS IN THE PC MAY BE UTILIZED.

### PROJECT TEAM

**DEVELOPER**  
ONYX RENEWABLE PARTNERS  
880 3RD AVE., 11TH FLOOR  
NEW YORK, NY 10022  
PHONE: (646) 217-0713

**GENERAL CONTRACTOR**  
COLLINS ELECTRICAL COMPANY, INC.  
3412 METRO DR.  
STOCKTON, CA 95215  
PHONE: (209) 466-3691  
FAX: (209) 466-3146

**GEOTECHNICAL ENGINEER**  
GEOTEK, INC.  
EDWARD H. LAMONT, P.E., G.E.  
710 EAST PARKRIDGE AVENUE, SUITE 105  
CORONA, CA 92789  
PHONE: (951) 710-1160

**DISTRICT**  
BAKERSFIELD CITY SCHOOL DISTRICT  
1300 BAKER STREET  
BAKERSFIELD, CALIFORNIA 93305  
PHONE: (861) 631-4600

**ENGINEERING FIRM**  
4 S.T.E.L. ENGINEERING, INC.  
DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE:  
DUSTIN K. ROSEPKIN, S5885  
PROJECT MANAGER: CHRISTOPHER D. LOCKRIDGE, C86564  
26030 ACERO, SUITE 200  
MISSION VIEJO, CA 92691  
PHONE: (949) 305-1150  
FAX: (949) 305-1420

### SCOPE OF WORK

WORK CONSISTS OF INSTALLING (3) PHOTOVOLTAIC (PV) PC# 04-113425 CANOPIES OVER EXISTING SCHOOL CAMPUSES. SOLAR POWER SYSTEM CONSISTS OF PV CANOPIES, ELECTRICAL WALL MOUNTED EQUIPMENT, PV MONITORING AND METERING COMMUNICATIONS, AND POWER INTERCONNECT TO THE UTILITY GRID. THE PV CONTRACTOR SHALL COORDINATE WITH THE OTHER TRADES FOR UNDERGROUND UTILITIES ASSOCIATED WITH THE PV SOLAR SYSTEM, ALONG WITH MINOR SITE WORK.


### GENERAL RESPONSIBILITY OF CHARGE

THE DRAWINGS OR SHEETS LISTED BELOW HAVE BEEN PREPARED BY OTHER DESIGN PROFESSIONALS OR CONSULTANTS WHO ARE LICENSED AND/OR AUTHORIZED TO PREPARE SUCH DRAWINGS IN THE STATE OF CALIFORNIA. THE DRAWINGS HAVE BEEN EXAMINED BY ME FOR:

- DESIGN INTENT AND APPEARS TO MEET THE APPROPRIATE REQUIREMENTS OF TITLE 24, CALIFORNIA CODE OF REGULATIONS AND PROJECT SPECIFICATIONS PREPARED, AND;
- COORDINATION WITH MY PLANS AND SPECIFICATIONS AND IS ACCEPTABLE FOR INCORPORATION INTO THE CONSTRUCTION OF THIS PROJECT.

THE STATEMENT OF GENERAL CONFORMANCE "SHALL NOT BE CONSTRUED AS RELIEVING ME OF MY RIGHTS, DUTIES, AND RESPONSIBILITIES UNDER SECTIONS 17302 AND 81138 OF THE EDUCATION CODE AND SECTIONS 4-336, 4-341, AND 4-344" OF TITLE 24, PART 1.

THE STATEMENT OF GENERAL CONFORMANCE "SHALL NOT BE CONSTRUED AS RELIEVING ME OF MY RIGHTS, DUTIES, AND RESPONSIBILITIES UNDER SECTIONS 17302 AND 81138 OF THE EDUCATION CODE AND SECTIONS 4-336, 4-341, AND 4-344" OF TITLE 24, PART 1.

  
SIGNATURE DATE 01-13-2017

DESIGN PROFESSIONAL DESIGNATED TO BE GENERAL RESPONSIBLE CHARGE

DUSTIN K. ROSEPKIN, S.E.  
S5885  
LICENSE NUMBER EXPIRATION DATE 06-30-2018

THE DRAWINGS THAT HAVE BEEN PREPARED BY OTHERS ARE AS FOLLOWS:

ALL ELECTRICAL DRAWINGS:  
COLLINS ELECTRICAL COMPANY, INC.  
3412 METRO DR.  
STOCKTON, CA 95215  
PHONE: (209) 466-3691  
FAX: (209) 466-3146

### ACCESSIBILITY NOTES

- ACCESSIBLE PATH OF TRAVEL AS INDICATED ON PLAN IS A BARRIER-FREE ACCESS ROUTE WITHOUT ANY ABRUPT LEVEL CHANGES EXCEEDING 1/2" IF BEVELED AT 1:2 MAX. SLOPE OR VERTICAL LEVEL CHANGES NOT EXCEEDING 1/4" MAX. AND AT LEAST 48" IN WIDTH. SURFACE IS STABLE, FIRM, AND SLIP RESISTANT. CROSS SLOPE DOES NOT EXCEED 2% AND SLOPE IN THE DIRECTION OF TRAVEL IS LESS THAN 5%, UNLESS OTHERWISE INDICATED. ACCESSIBLE PATH OF TRAVEL SHALL BE MAINTAINED FREE OF OVERHANGING OBSTRUCTIONS TO 80" MINIMUM AND PROTRUDING OBJECTS GREATER THAN 4" PROJECTION FROM WALL AND ABOVE 27" AND LESS THAN 80". STRUCTURAL ENGINEER SHALL VERIFY THAT THERE ARE NO BARRIERS IN THE PATH OF TRAVEL.
- SEE ENLARGED PLANS FOR MORE INFORMATION ON P.O.T.

### SHEET INDEX

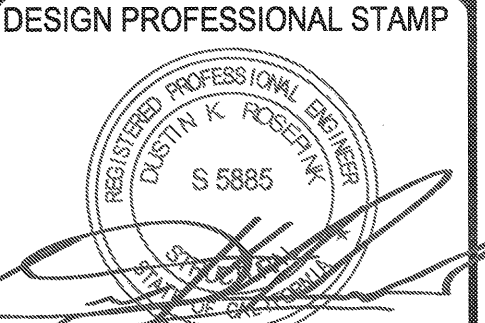
CT-T.1	TITLE SHEET
<b>ARCHITECTURAL</b>	
CT-A0.1	OVERALL SITE PLAN
CT-A0.2	ENLARGED AREA OF WORK
CT-A0.3	ENLARGED EQUIPMENT YARD AREA
CT-F0.1	FIRE ACCESS SITE PLAN
<b>STRUCTURAL</b>	
CT-S.1	COLUMN PLAN 1
CT-S.2	6 PANEL T-STRUCTURE SITE SPECIFIC DETAILS
CT-S.3	
<b>ELECTRICAL</b>	
CT-E1.0	ELECTRICAL SITE PLAN
CT-E2.0	ELECTRICAL SINGLE LINE DIAGRAM
CT-E2.1	ELECTRICAL SINGLE LINE DIAGRAM
CT-E3.0	TYPICAL ELEC. THREE LINE DIAGRAM
CT-E4.0	ELECTRICAL DETAILS
CT-E5.0	TYPICAL ELEC. SOLAR WARNING LABELS
CT-E6.0	ELECTRICAL SOLAR EQUIP. CUT SHEETS
<b>ULTIMATE GUARDIAN 3.2 ALL 02-112027: 04-113425</b>	
S-1	COVER SHEET 1
S-2	COVER SHEET 2
S-3	GENERAL NOTE SPECIFICATIONS
S-4	SAMPLE DSA-103 FORMS
S-5	SECTION PROPERTIES & REBAR DETAILS
S-6	T-STRUCTURE FRAMING PLAN
S-7	R=1.25 T-STRUCTURE BEAM/COLUMN SCHEDULE
S-8	R=1.25 T-STRUCTURE NON-CONSTRAINED PIER FOUNDATION SCHEDULE
S-9	R=1.25 T-STRUCTURE SPREAD FOOTING SCHEDULE
S-10	R=1.25 T-STRUCTURE BEAM TO COLUMN SCHEDULE
S-12	PURLIN SCHEDULE (ALL SLOPES)
S-32	STANDARD PURLIN DETAILS
S-33	STANDARD SOLAR PANEL SUPPORT DETAILS
S-34	ALTERNATE PANEL CONNECTIONS
S-35	OPTIONAL GROUNDING DETAILS
S-36	STANDARD ELECTRICAL DETAILS
S-37	ALTERNATE CONNECTION DETAILS
S-37.1	EQUIPMENT PAD
S-38	BRACED UNISTRUT EQUIPMENT RACK 1
S-39	TUBE STEEL EQUIPMENT RACK 2
S-40	UNISTRUT EQUIPMENT RACK 3
S-41	EQUIPMENT PAD ENCLOSURE
S-42	EQUIPMENT PAD ENCLOSURE SCHEDULE
S-43	PERIMETER FENCE/SCHEDULE
S-44	

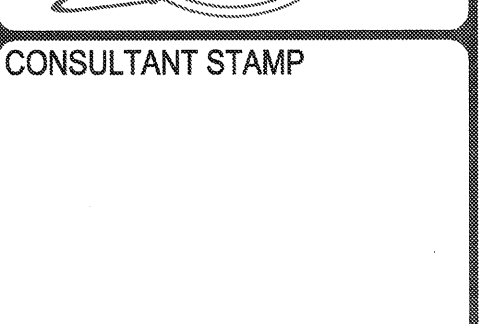
DISTRICT  
1300 BAKER STREET  
BAKERSFIELD, CA 93305  
861.631.4600

DEVELOPER  
**ONYX**  
880 3RD AVE., 11TH FLOOR  
NEW YORK, NY 10022  
646.217.0713

CONTRACTOR  
**COLLINS ELECTRICAL COMPANY INC.**

DESIGN PROFESSIONAL  
**ASTEL ENGINEERING**  
26030 ACERO, SUITE 200  
MISSION VIEJO, CA 92691  
949.305.1150 | FAX 949.305.1420

DESIGN PROFESSIONAL STAMP  


CONSULTANT STAMP  


CATO MIDDLE SCHOOL  
MIDDLE SCHOOL  
4115 VINELAND RD  
BAKERSFIELD, CA 93306

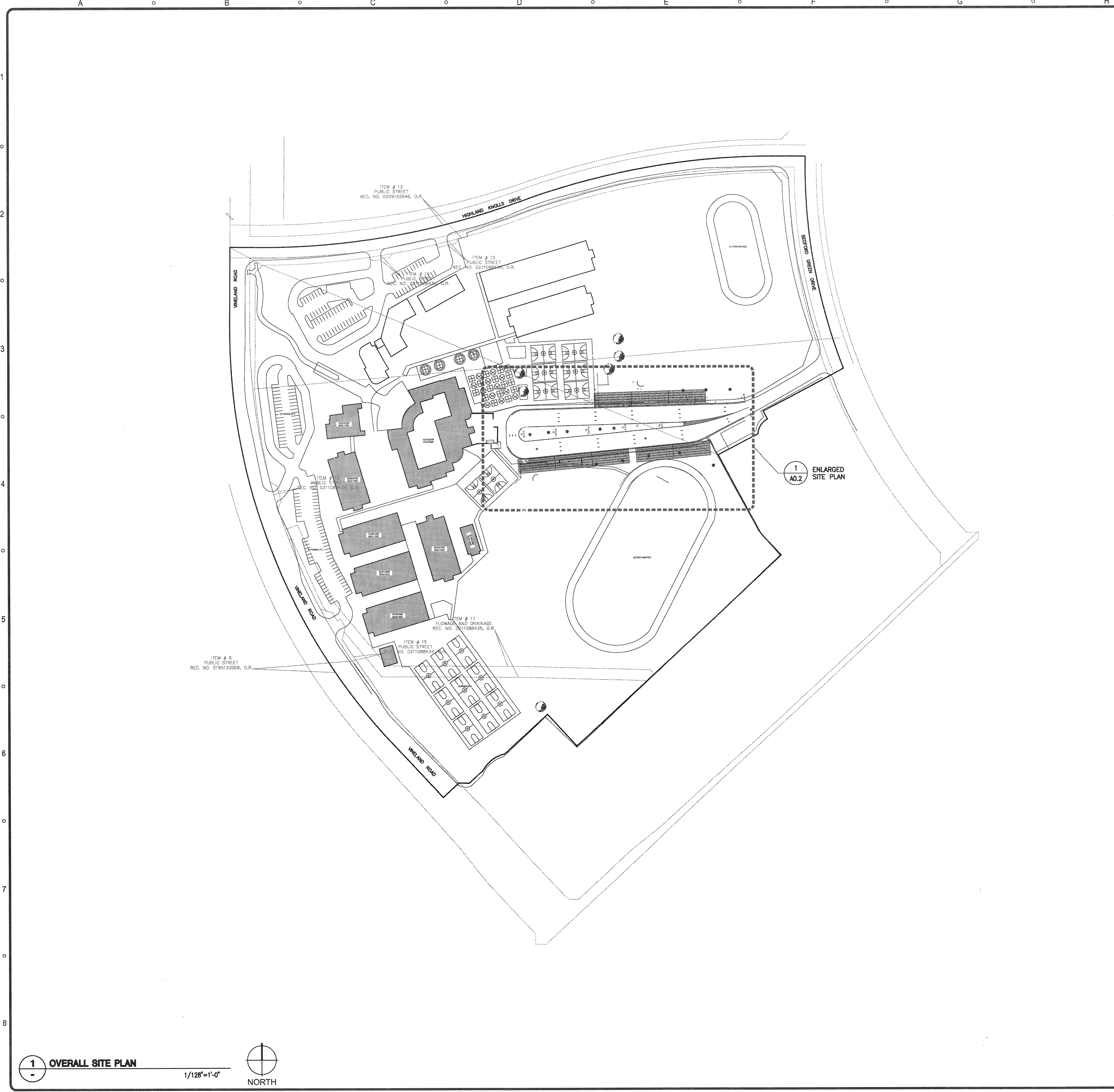
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DIV. OF THE STATE ARCHITECT  
A# 03-117835  
AC [Signature] FLS [Signature] SS TN  
DATE JAN 17 2017

REVISIONS		
MARK	DATE	DESCRIPTION
	01-17-17	DSA SUBMITTAL

PROJECT# CA-16-0025  
ACCOUNTING # P10216  
4 STEL JOB # 16-1312  
DATE 01-13-17  
DRAWN BY MAP  
CHECKED CDL

TITLE SHEET  
**CT-T.1**

NOTE: IF DWG IS NOT 24x36, IT IS NOT FULL SIZE



**LEGEND**

(N) PHOTOVOLTIC ARRAYS

DISTRICT

1300 BAKER STREET  
BAKERSFIELD, CA 93305  
661.631.4600

DEVELOPER

**ONYX**  
880 3RD AVE, 11TH FLOOR  
NEW YORK, NY 10022  
646.217.0713

CONTRACTOR

**COLLINS**  
ELECTRICAL COMPANY INC.

DESIGN PROFESSIONAL

**STEL ENGINEERING**  
26030 ACERO, SUITE 200  
MISSION VIEJO, CA 92691  
949.305.1150 | FAX 949.305.1420

DESIGN PROFESSIONAL STAMP

REGISTERED PROFESSIONAL ENGINEER  
ELECTRICAL  
S 5885  
[Signature]

CONSULTANT STAMP

**CATO**  
MIDDLE SCHOOL  
4115 VINELAND RD  
BAKERSFIELD, CA 93306

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
A# 03-117835  
AC [Signature] FLS [Signature] SS TN  
DATE JAN 17 2017

REVISIONS

MARK	DATE	DESCRIPTION
	01-17-17	DSA SUBMITTAL

PROJECT# CA-16-0025

ACCOUNTING # P10216

4 STEL JOB # 16-1312

DATE 01-13-17

DRAWN BY MAP

CHECKED CDL

OVERALL SITE PLAN

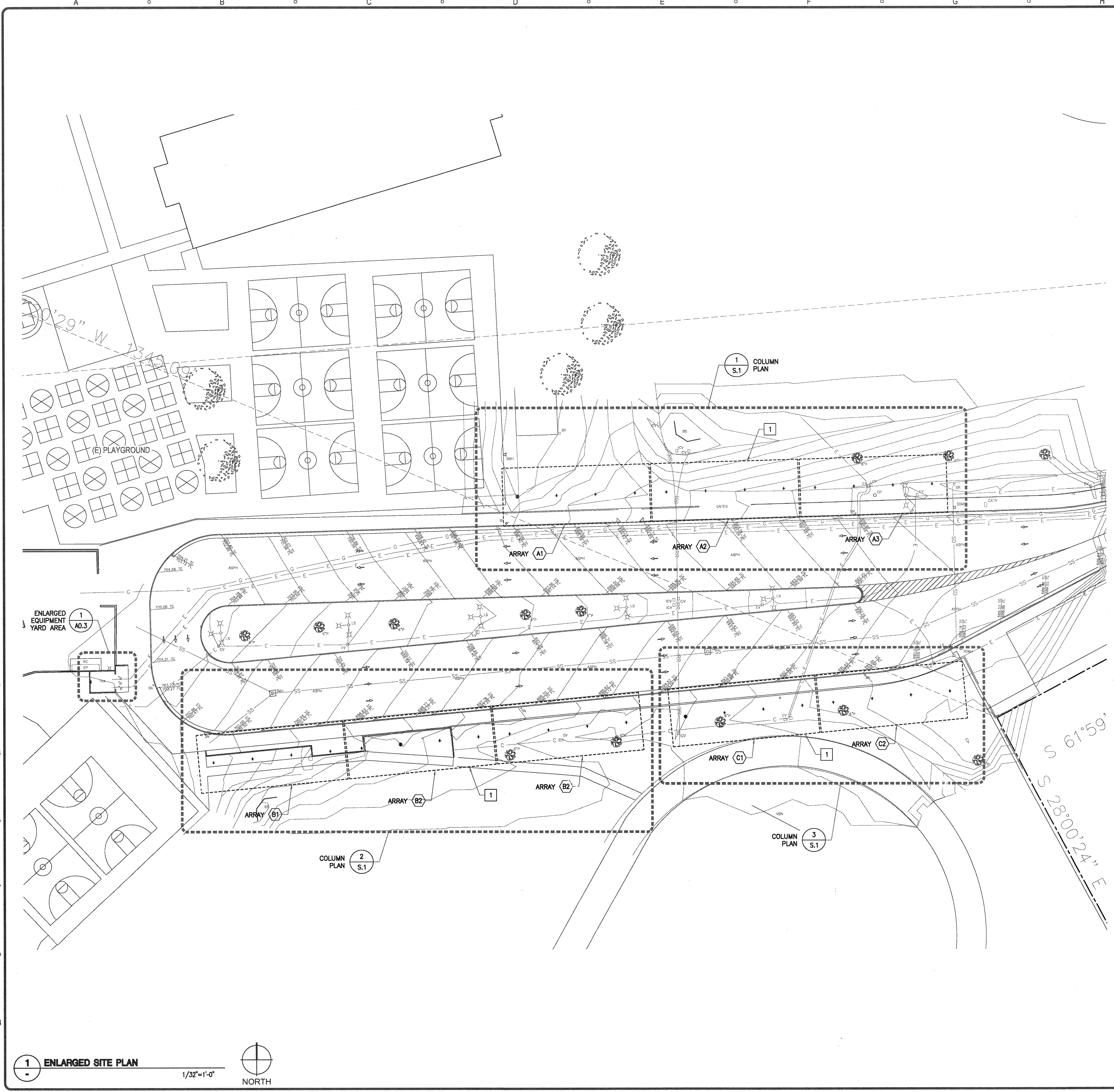
**CT-A0.1**

**1** OVERALL SITE PLAN

1/128"=1'-0"

NORTH

DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS, PREPARED BY THE DESIGN PROFESSIONAL (DP) AND THE DP'S CONSULTANTS ARE INSTRUMENTS OF SERVICE FOR USE SOLELY WITH RESPECT TO THIS PROJECT. THIS INCLUDES DOCUMENTS IN ELECTRONIC FORM. THE DP AND THE DP'S CONSULTANTS SHALL BE DEEMED THE AUTHORS AND OWNERS OF THEIR RESPECTIVE INSTRUMENTS OF SERVICE AND SHALL RETAIN ALL COMMON LAW, STATUTORY AND OTHER RESERVED RIGHTS, INCLUDING COPYRIGHTS. THE INSTRUMENTS OF SERVICE SHALL NOT BE USED BY THE OWNER FOR FUTURE ADDITIONS OR ALTERATIONS TO THIS PROJECT OR FOR OTHER PROJECTS, WITHOUT THE PRIOR WRITTEN AGREEMENT OF THE DP. ANY UNAUTHORIZED USE OF THE INSTRUMENTS OF SERVICE SHALL BE AT THE OWNER'S SOLE RISK AND WITHOUT LIABILITY TO THE DP AND THE DP'S CONSULTANTS.



### LEGEND

- (N) PHOTOVOLTAIC ARRAY OUTLINES
- TOPOGRAPHY
- (E) CHAIN LINK FENCE
- WATER UNDERGROUND
- ELECTRICAL UNDERGROUND
- SEWER UNDERGROUND
- (E) PATH OF TRAVEL (P.O.T.)

(N) PATH OF TRAVEL (P.O.T.) AS INDICATED IS A BARRIER FREE ACCESS WITHOUT ANY ABRUPT VERTICAL CHANGES EXCEEDING 1/2" BEVELED AT 1:2 MAXIMUM SLOPE, EXCEPT THAT LEVEL CHANGES DO NOT EXCEED 1/4" VERTICAL AND IS AT LEAST 48" WIDE. SURFACE IS SLIP RESISTANT, STABLE, FIRM AND SMOOTH. CROSS-SLOPE DOES NOT EXCEED 2% AND SLOPE IN THE DIRECTION OF TRAVEL IS LESS THAN 5% UNLESS OTHERWISE INDICATED. (POT) SHALL BE MAINTAINED FREE OF OVERHANGING OBSTRUCTIONS TO 80" MINIMUM (11B-307.4) AND PROTRUDING OBJECTS GREATER THAN 4" PROJECTION FROM WALL AND ABOVE 27" AND LESS THAN 80" (11B-307.2). ENGINEER TO VERIFY THAT ALL BARRIERS IN THE PATH OF TRAVEL HAVE BEEN REMOVED UNDER THIS PROJECT, AND PATH OF TRAVEL COMPLIES WITH 2013 CBC 11B DIVISION 3 AND 4.

### NOTES

1. \*DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE STATEMENT: THE POT IDENTIFIED IN THESE CONSTRUCTION DOCUMENTS IS COMPLIANT WITH THE CURRENT APPLICABLE CALIFORNIA BUILDING CODE ACCESSIBILITY PROVISIONS FOR PATH OF TRAVEL REQUIREMENTS FOR ALTERATIONS, ADDITIONS AND STRUCTURAL REPAIRS. AS PART OF THE DESIGN OF THIS PROJECT, THE POT WAS EXAMINED AND ANY ELEMENTS, COMPONENTS OR PORTIONS OF THE POT THAT WERE DETERMINED TO BE NONCOMPLIANT 1) HAVE BEEN IDENTIFIED AND 2) THE CORRECTIVE WORK NECESSARY TO BRING THEM INTO COMPLIANCE HAS BEEN INCLUDED WITHIN THE SCOPE OF THIS PROJECT'S WORK THROUGH DETAILS, DRAWINGS AND SPECIFICATIONS INCORPORATED INTO THESE CONSTRUCTION DOCUMENTS. DURING CONSTRUCTION, IF POT ITEMS WITHIN THE SCOPE OF THE PROJECT REPRESENTED AS CODE COMPLIANT ARE FOUND TO BE NONCONFORMING BEYOND REASONABLE CONSTRUCTION TOLERANCES, THEY SHALL BE BROUGHT INTO COMPLIANCE WITH THE CBC AS A PART OF THIS PROJECT BY MEANS OF A CONSTRUCTION CHANGE DOCUMENT.\*

### KEY NOTES

1. SIGNAGE TO BE POSTED ON EACH ARRAY: NOT FOR STORAGE OR USE OF FLAMMABLE, COMBUSTIBLE OR HAZARDOUS MATERIALS.

### BUILDING DATA

CONSTRUCTION TYPE:  
IIB (TWO-B) - STEEL FRAMED

OCCUPANCY:  
FRONTAGE INCREASE CALCULATION (PER SECTION 506.2)

$$f = \frac{(F/P - 0.25) W}{30}$$

$$f = \frac{(884.25/884.25 - 0.25) 20}{30}$$

$$f = 0.5$$

A3:  $A_3 = A_1 + A_2 \times f = 9,500 \text{ ft}^2 + (9,500 \text{ ft}^2 \times 0.5) = 14,250 \text{ ft}^2 \text{ MAX}$   
 U:  $A_u = A_1 + A_2 \times f = 8,500 \text{ ft}^2 + (8,500 \text{ ft}^2 \times 0.5) = 12,750 \text{ ft}^2 \text{ MAX}$

A3 - ASSEMBLY  
PER SECTION 503  
TYPE IIB CONSTRUCTION: 14,250 ft<sup>2</sup> MAX  
(W/ 20' MIN. CLEAR AROUND PERIMETER OF STRUCTURE)

ARRAY 'B1': 3,917 ft<sup>2</sup>  
 + ARRAY 'B2': 3,917 ft<sup>2</sup>  
 + ARRAY 'B3': 3,917 ft<sup>2</sup> = 11,751 ft<sup>2</sup> < 14,250 ft<sup>2</sup>, OK

U - EQUIPMENT  
PER SECTION 503  
TYPE IIB CONSTRUCTION: 12,750 ft<sup>2</sup> MAX  
(W/ 20' MIN. CLEAR AROUND PERIMETER OF STRUCTURE)

ARRAY 'A1': 3,917 ft<sup>2</sup>  
 + ARRAY 'A2': 3,917 ft<sup>2</sup>  
 + ARRAY 'A3': 3,917 ft<sup>2</sup> = 11,751 ft<sup>2</sup> < 12,750 ft<sup>2</sup>, OK

ARRAY 'C1': 3,917 ft<sup>2</sup>  
 + ARRAY 'C2': 3,917 ft<sup>2</sup> = 7,834 ft<sup>2</sup> < 8,500 ft<sup>2</sup>, OK

DISTRICT

1300 BAKER STREET  
BAKERSFIELD, CA 93305  
661.631.4600

DEVELOPER

**ONYX**  
880 3RD AVE., 11TH FLOOR  
NEW YORK, NY 10022  
646.217.0713

CONTRACTOR

**COLLINS**  
ELECTRICAL COMPANY INC.

DESIGN PROFESSIONAL

**ASTEL ENGINEERING**  
26030 ACERO, SUITE 200  
MISSION VIEJO, CA 92691  
949.305.1150 | FAX 949.305.1420

DESIGN PROFESSIONAL STAMP

REGISTERED PROFESSIONAL ENGINEER  
DISTRICT 5  
S 5885

CONSULTANT STAMP

---

**CATO MIDDLE SCHOOL**  
4115 VINELAND RD  
BAKERSFIELD, CA 93306

---

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

A# 03-117835  
AC [Signature] FLS [Signature] SS [Signature] TH  
DATE JAN 17 2017

---

REVISIONS

MARK	DATE	DESCRIPTION
	01-17-17	DSA SUBMITTAL

---

PROJECT# CA-16-0025

ACCOUNTING# P10216

4 STEEL JOB# 16-1312

DATE 01-13-17

DRAWN BY MAP

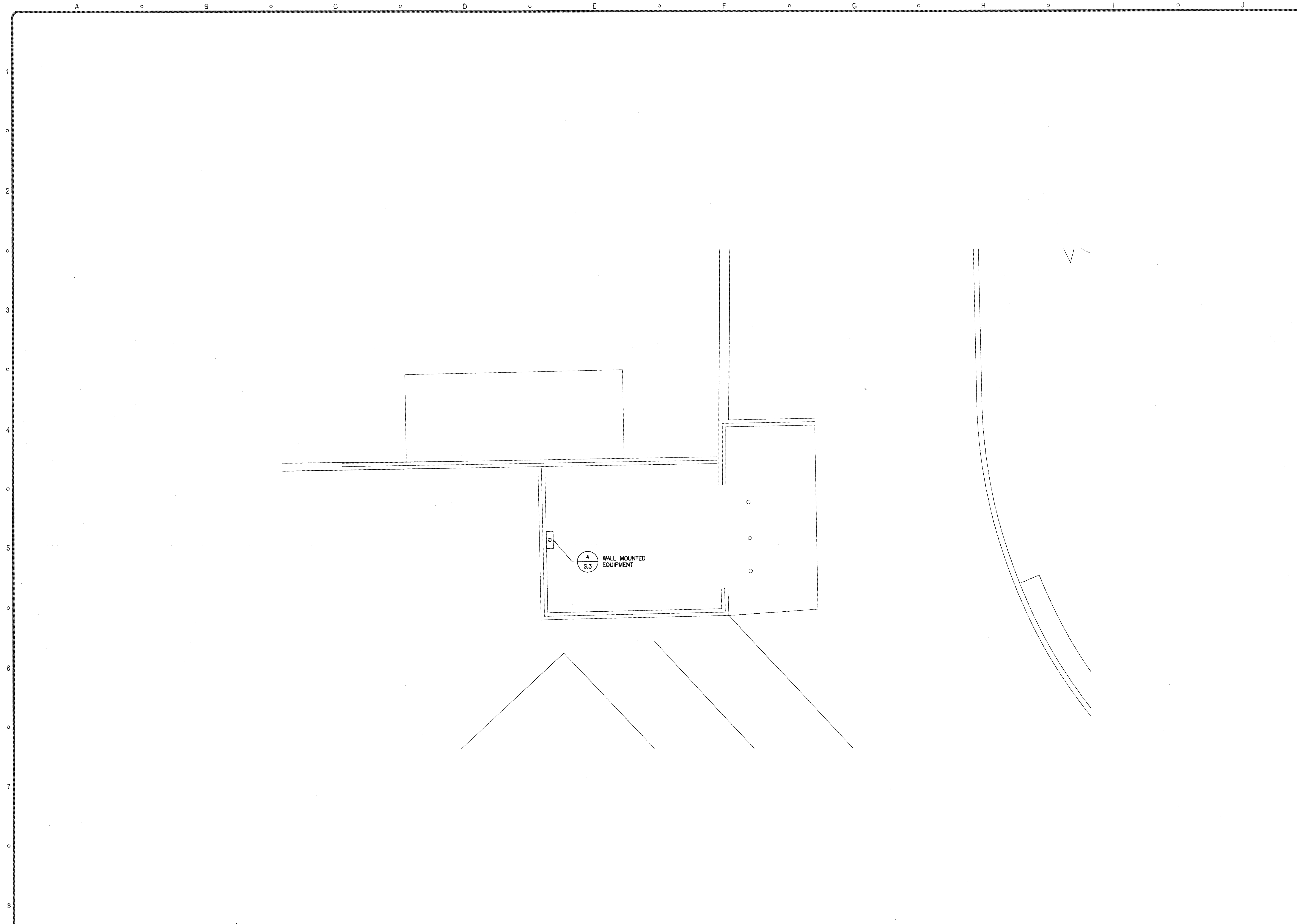
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**ENLARGED SITE PLAN**

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**CT-A0.2**



**1** ENLARGED EQUIPMENT YARD AREA  
 1/4"=1'-0"  
 NORTH

DISTRICT  
 1300 BAKER STREET  
 BAKERSFIELD, CA 93305  
 861.631.4800

DEVELOPER  
**ONYX**  
 880 3RD AVE., 11TH FLOOR  
 NEW YORK, NY 10022  
 646.217.0713

CONTRACTOR  
**COLLINS**  
 ELECTRICAL COMPANY INC.

DESIGN PROFESSIONAL  
**4 STEEL ENGINEERING**  
 28030 ACERO, SUITE 200  
 MISSION VIEJO, CA 92691  
 949.305.1150 | FAX 949.305.1420

DESIGN PROFESSIONAL STAMP  
 REGISTERED PROFESSIONAL ENGINEER  
 CODYN K. ROSS  
 S 5885

CONSULTANT STAMP

CATO  
 MIDDLE SCHOOL  
 4115 VINELAND RD  
 BAKERSFIELD, CA 93306

IDENTIFICATION STAMP  
 DIV. OF THE STATE ARCHITECT  
 A# 03-117835  
 AC BY FLS SS TN  
 DATE JAN 17 2017

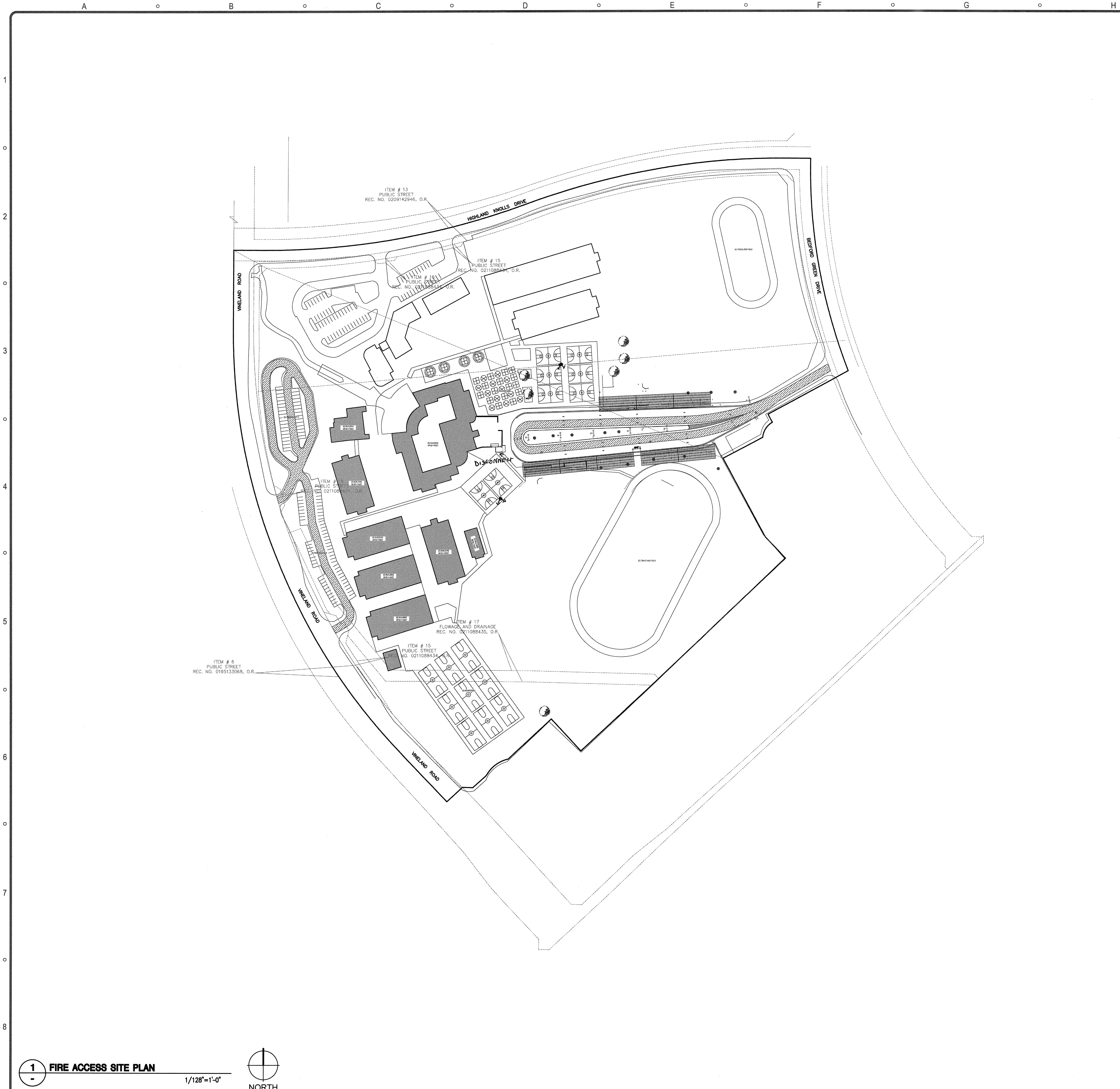
REVISIONS		
MARK	DATE	DESCRIPTION
	01-17-17	DSA SUBMITTAL

PROJECT# CA-16-0025  
 ACCOUNTING # P10216  
 4 STEEL JOB # 16-1312  
 DATE 01-13-17  
 DRAWN BY MAP  
 CHECKED CDL

ENLARGED EQUIPMENT YARD AREA

**CT-A0.3**

DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS, PREPARED BY THE DESIGN PROFESSIONAL (DP) AND THE DP'S CONSULTANTS ARE INSTRUMENTS OF SERVICE FOR USE SOLELY WITH RESPECT TO THIS PROJECT. THIS INCLUDES DOCUMENTS IN ELECTRONIC FORM. THE DP AND THE DP'S CONSULTANTS SHALL BE DEEMED THE AUTHORS AND OWNERS OF THEIR RESPECTIVE INSTRUMENTS OF SERVICE AND SHALL RETAIN ALL COMMON LAW, STATUTORY AND OTHER RESERVED RIGHTS, INCLUDING COPYRIGHTS. THE INSTRUMENTS OF SERVICE SHALL NOT BE USED BY THE OWNER FOR FUTURE ADDITIONS OR ALTERATIONS TO THIS PROJECT OR FOR OTHER PROJECTS, WITHOUT THE PRIOR WRITTEN AGREEMENT OF THE DP. ANY UNAUTHORIZED USE OF THE INSTRUMENTS OF SERVICE SHALL BE AT THE OWNER'S SOLE RISK AND WITHOUT LIABILITY TO THE DP AND THE DP'S CONSULTANTS.



### LEGEND

- (N) PHOTOVOLTAIC ARRAYS
- (E) FIRE LANES
- (E) FIRE HYDRANTS

### NOTES

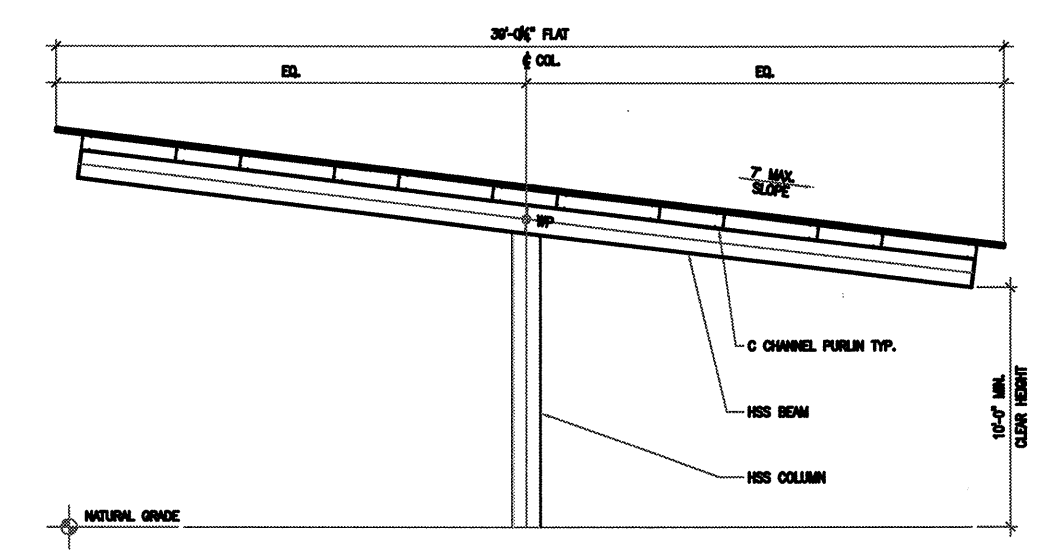
1. ALL FIRE LANES, FIRE HYDRANTS, FLOW RATES, AND CLEARANCES ARE EXISTING AND WILL REMAIN UNCHANGED.
2. ALL STRUCTURES ARE IN COMPLIANCE WITH STATE OF CALIFORNIA FIRE CODE STANDARDS.
3. SIGNAGE SHALL BE IN COMPLIANCE WITH CEC 690 AND THE CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION OFFICE OF THE STATE FIRE MARSHAL SOLAR PHOTOVOLTAIC INSTALLATION GUIDELINE.

## DSA 810 LOCAL FIRE AUTHORITY REVIEW

To facilitate the Division of the State Architect's (DSA) approval of the Fire/Life Safety portion of a project, DSA requires Local Fire Authority (LFA) review of certain elements as identified in this form. Use of this form is mandatory for projects that add square footage to a campus or if any item on the form is relevant to the project. For additional information, see DSA 810 Instructions and DSA Policy 09-01.

<b>PROJECT INFORMATION</b>				
School District/Owner: <b>BAKERSFIELD CITY SCHOOL DISTRICT</b>				
Project Name/School: <b>CATO MIDDLE SCHOOL</b>				
Project Address: <b>1000 HIGHLAND KNOLLS DR., BAKERSFIELD, CA 93303</b>				
<b>LOCAL FIRE AUTHORITY (LFA)</b>				
LFA Agency Name: <b>BAKERSFIELD FIRE DEPT.</b>				
LFA Reviewer Name: <b>GRACE MEDINA</b>		Title: <b>FIRE PLAN EXAMINER</b>		
Email: <b>EMEDINA@BAKERSFIELDFIRE.US</b>		Telephone Number: <b>(661) 326-3652</b>		
I have reviewed and responded to the applicable items for this project as listed below.				
Note: Only sign this form when it is stamped onto the site plan. A loose form is not acceptable to DSA.				
LFA Reviewer's Signature: <i>Grace Medina</i>		Date: <b>1/16/17</b>		
Review Key: "Y" = Complies with LFA requirements "N" = Not approved (complete Section 8) "NA" = Not applicable to the project "NR" = LFA elects not to review				
Description	Y	N	NA	NR
1 Where an elevator does not meet medical emergency service cab size, per the California Building Code (CBC), use of stairways for emergency rescue and patient transport is acceptable.				X
2 Access roads, fire lane markings, pavers and gate entrances are in accordance with Title 19, California Code of Regulations and the California Fire Code, Chapter 5.	X			
3 Fire hydrant location and distribution complies with the California Fire Code (or see # 4).	X			
4 Fire hydrant location and distribution complies with NFPA 1142, "Alternate Means." If "NR" is checked, DSA can only approve on-site water storage as an alternate. The signature of the school district official is required to acknowledge the use of alternate means.				X
Signature of School District Official: _____ Date: _____				
Print the School District Official's Name: _____				
5 The location(s) of the proposed post indicator valve and fire department connection meet the requirements of this jurisdiction.				X
6 The location(s) of the detector check valve assembly meet the requirements of this jurisdiction.				X
7 Is the project located in a hazard severity zone area? (CBC, Chapter 7A, Section 701A.) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>				
8 Check type if "Yes": <input type="checkbox"/> Moderate <input type="checkbox"/> High <input type="checkbox"/> Very High <input type="checkbox"/> WIFA (if one of these boxes is checked, the project design must meet the requirements of Chapter 7A.)				
COMMENTS (note deficiencies):				

DSA 810 (rev. 05-12-14) DIVISION OF THE STATE ARCHITECT DEPARTMENT OF GENERAL SERVICES STATE OF CALIFORNIA Page 1 of 1



2 6 PANEL T- STRUCTURE ELEVATION N.T.S.

DISTRICT  
1300 BAKER STREET  
BAKERSFIELD, CA 93305  
661.631.4600

DEVELOPER  
**ONYX**  
880 3RD AVE., 11TH FLOOR  
NEW YORK, NY 10022  
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CONTRACTOR  
**COLLINS ELECTRICAL COMPANY INC.**

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REGISTERED PROFESSIONAL ENGINEER  
ELECTRICAL  
S 5885

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1000 HIGHLAND KNOLLS DR.  
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IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
A# 03-117835  
ACAD FLS SS TN  
DATE JAN 17 2017

REVISIONS		
MARK	DATE	DESCRIPTION
	01-17-17	DSA SUBMITTAL

PROJECT# CA-16-0025  
ACCOUNTING # P10216  
4 STEL JOB # 16-1312  
DATE 01-06-17  
DRAWN BY MAP  
CHECKED CDL

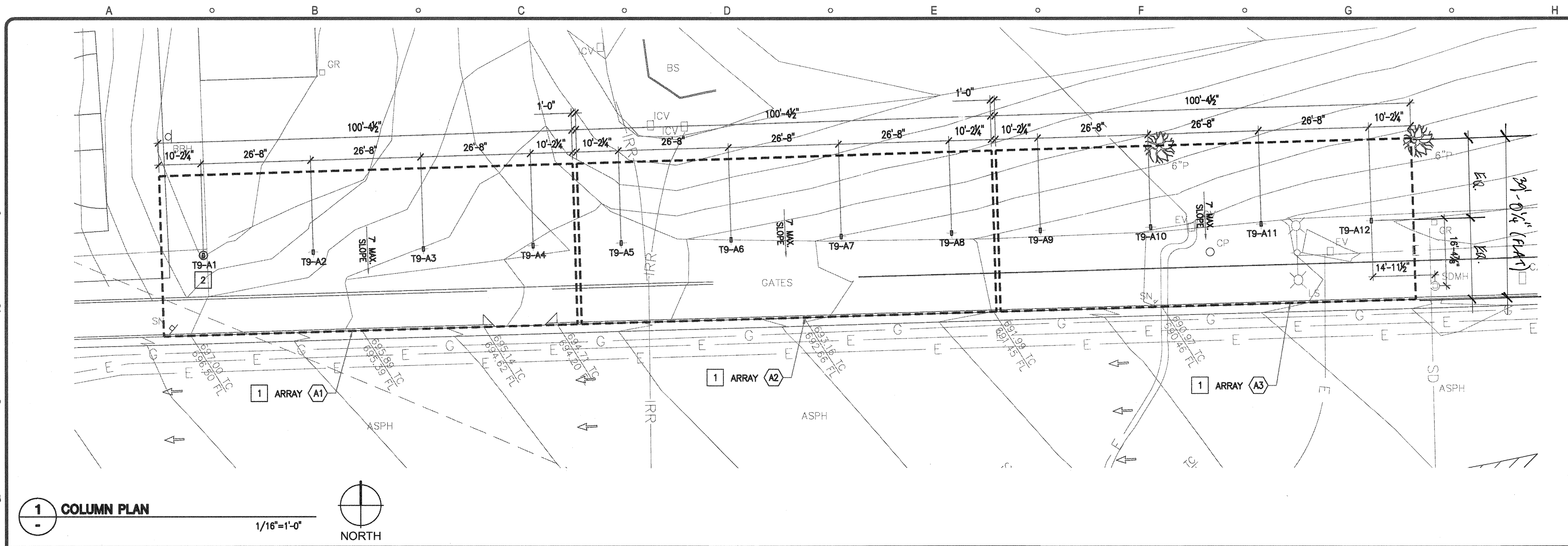
FIRE ACCESS SITE PLAN

CT-F0.1

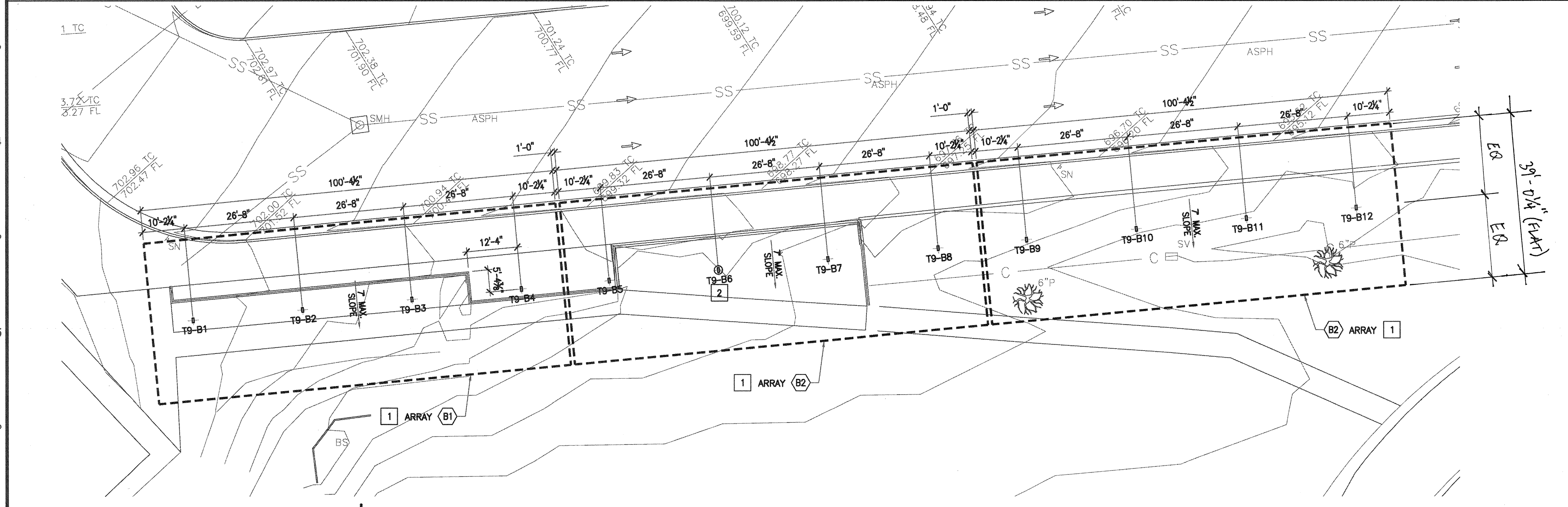
1 FIRE ACCESS SITE PLAN  
1/128"=1'-0"  
NORTH

DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS, PREPARED BY THE DESIGN PROFESSIONAL (DP) AND THE DPS CONSULTANTS ARE INSTRUMENTS OF SERVICE FOR USE SOLELY WITH RESPECT TO THIS PROJECT. THIS INCLUDES DOCUMENTS IN ELECTRONIC FORM. THE DP AND THE DPS CONSULTANTS SHALL BE DEEMED THE AUTHORS AND OWNERS OF THEIR RESPECTIVE INSTRUMENTS OF SERVICE AND SHALL RETAIN ALL COMMON LAW, STATUTORY AND OTHER RESERVED RIGHTS, INCLUDING COPYRIGHTS. THE INSTRUMENTS OF SERVICE SHALL NOT BE USED BY THE OWNER FOR FUTURE ADDITIONS OR ALTERATIONS TO THIS PROJECT OR FOR OTHER PROJECTS WITHOUT THE PRIOR WRITTEN AGREEMENT OF THE DP. ANY UNAUTHORIZED USE OF THE INSTRUMENTS OF SERVICE SHALL BE AT THE OWNER'S SOLE RISK AND WITHOUT LIABILITY TO THE DP AND THE DPS CONSULTANTS.

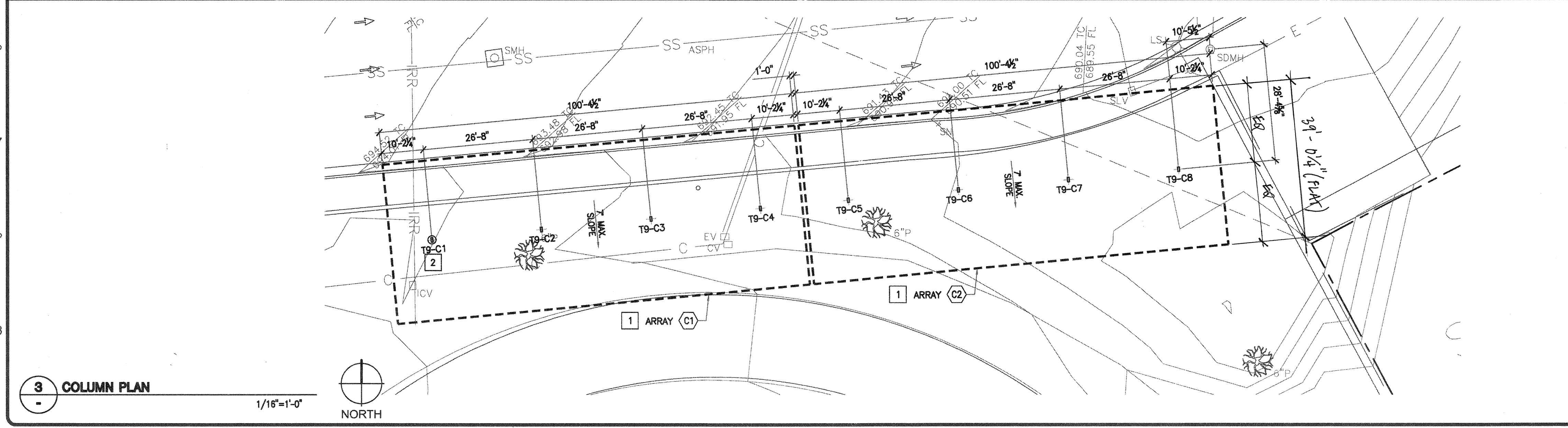
NOTE: IF DWG. IS NOT 24" X 36", IT IS NOT FULL SIZE.



**1 COLUMN PLAN**  
1/16"=1'-0"  
NORTH



**2 COLUMN PLAN**  
1/16"=1'-0"  
NORTH



**3 COLUMN PLAN**  
1/16"=1'-0"  
NORTH

**LEGEND**

- (N) PHOTOVOLTAIC ARRAY OUTLINES
- TOPOGRAPHY
- (E) CHAIN LINK FENCE
- WATER UNDERGROUND
- ELECTRICAL UNDERGROUND
- SEWER UNDERGROUND

**GENERAL NOTES**

- REFERS TO PC: A# 02-112027 04-113425
- G1. CONTRACTOR TO DEMO (E) LIGHT POLES AND LIGHT FIXTURES AS REQUIRED.
  - G2. SEE SHEET S-37 OR S.3 FOR TYPICAL CONDUIT ROUTING.
  - G3. SEE DETAIL 1/S.3 OR 5/S-37 FOR TYPICAL CONDUIT MOUNTING.
  - G4. SEE DETAIL 2/S.3 OR 6/S-37, 3 OR 4/S-37.1 FOR TYPICAL ELECTRICAL BOX MOUNTING.
  - G5. ALL DIMENSIONS ON THIS SHEET ARE PROJECTED FLAT.
  - G6. MIN. 3,000 PSI CONCRETE WITH TYPE II CEMENT.
  - G7. SOILS CLASS PER SITE SPECIFIC STRUCTURAL SHEET(S).
  - G8. DIMENSION INCLUDES 2.75" EXTRA LENGTH ON EACH END OF EACH ARRAY.
  - G9. CONTRACTOR TO DEMO EXISTING BUSHES AND TREES AS REQUIRED.
  - G10. MIN (1) STAR WASHER IN CONFORMANCE WITH ASME B18.21.1 EACH END OF EACH PURLINE.
  - G11. GEOTECHNICAL REPORT # 1550-CR DATED OCTOBER 13, 2016 AND ADDENDUM LETTER # 1550-CR DATED JANUARY 13, 2017 PROVIDED BY GEOTEK, INC.
  - G12. ARRAYS 'A', 'B' & 'C' SHALL IGNORE UPPER 1'-0" OF SOIL.
  - G13. FOUNDATIONS AT COLUMNS 'B4' & 'B5' SHALL IGNORE UPPER 3'-6" OF SOIL.
  - G14. FOUNDATION AT COLUMNS 'A1' & 'A2' SHALL IGNORE UPPER 2'-0" OF SOIL.
  - G15. PROVIDE PLAN REVIEW AND CONSTRUCTION OBSERVATIONS AS RECOMMENDED IN SOILS REPORT.

**KEY NOTES**

- 1** SEE SHEET S.2 FOR CANOPY DETAILS
- 2** 30" TALL BOLLARD PER DETAIL 3/S-8

**SEISMIC CRITERIA**

SHORT SPECTRAL RESPONSE:  $S_{0.5}$  = 1.094 g  
 LONG SPECTRAL RESPONSE:  $S_{1.0}$  = 0.399 g  
 SHORT SPECTRAL RESPONSE:  $S_{0.2}$  = 0.775 g  
 LONG SPECTRAL RESPONSE:  $S_{0.1}$  = 0.462 g  
 SEISMIC DESIGN CATEGORY: D

**DESIGN WIND SPEED**

BASIC WIND SPEED = 110 mph  
 WIND EXPOSURE = C

DISTRICT  
  
 1300 BAKER STREET  
 BAKERSFIELD, CA 93305  
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IDENTIFICATION STAMP  
 DIV. OF THE STATE ARCHITECT  
 A# 03-117835  
 AC: FLS SS: TN  
 DATE: JAN 17 2017

REVISIONS		
MARK	DATE	DESCRIPTION
01-17-17		DSA SUBMITTAL

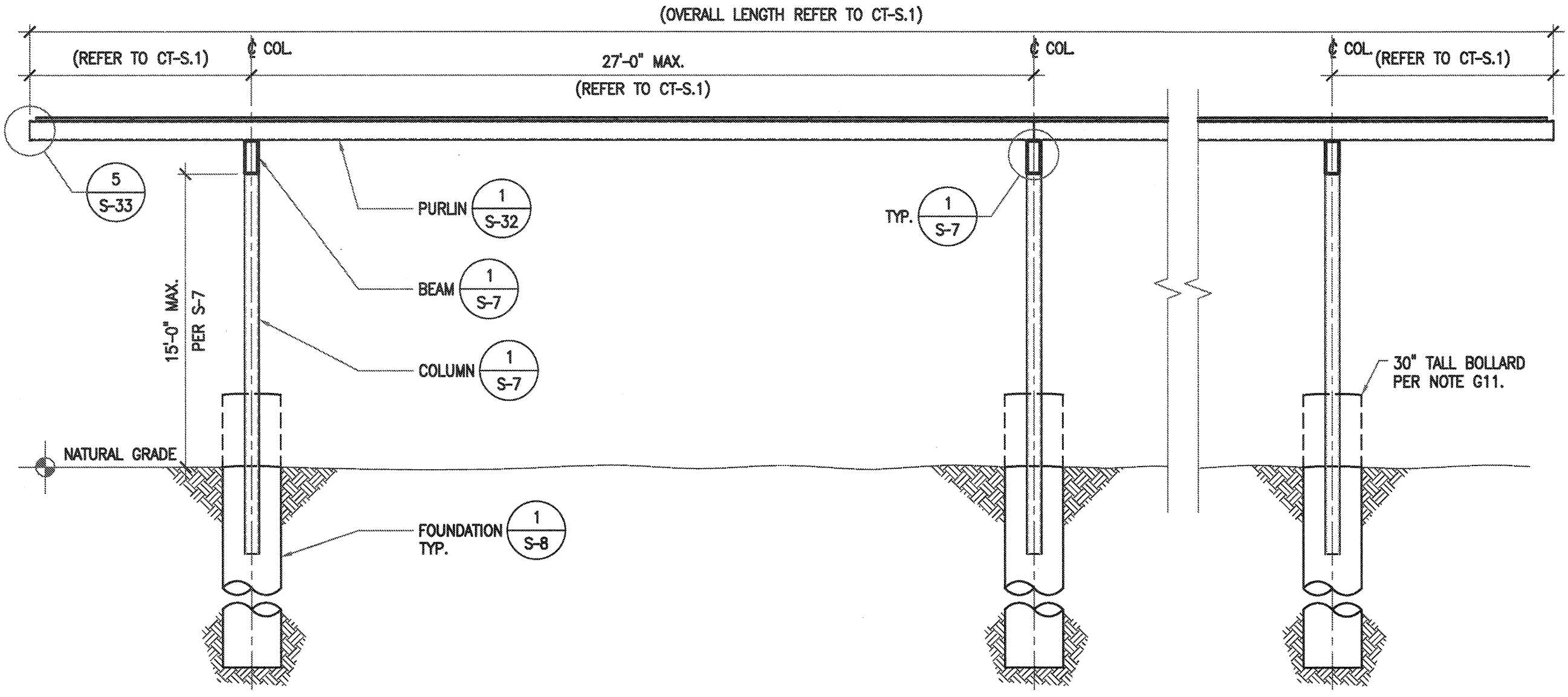
PROJECT# CA-16-0025  
 ACCOUNTING # P10216  
 4 STEL JOB # 16-1312  
 DATE 01-13-17  
 DRAWN BY MAP  
 CHECKED CDL

ENLARGED SITE PLAN

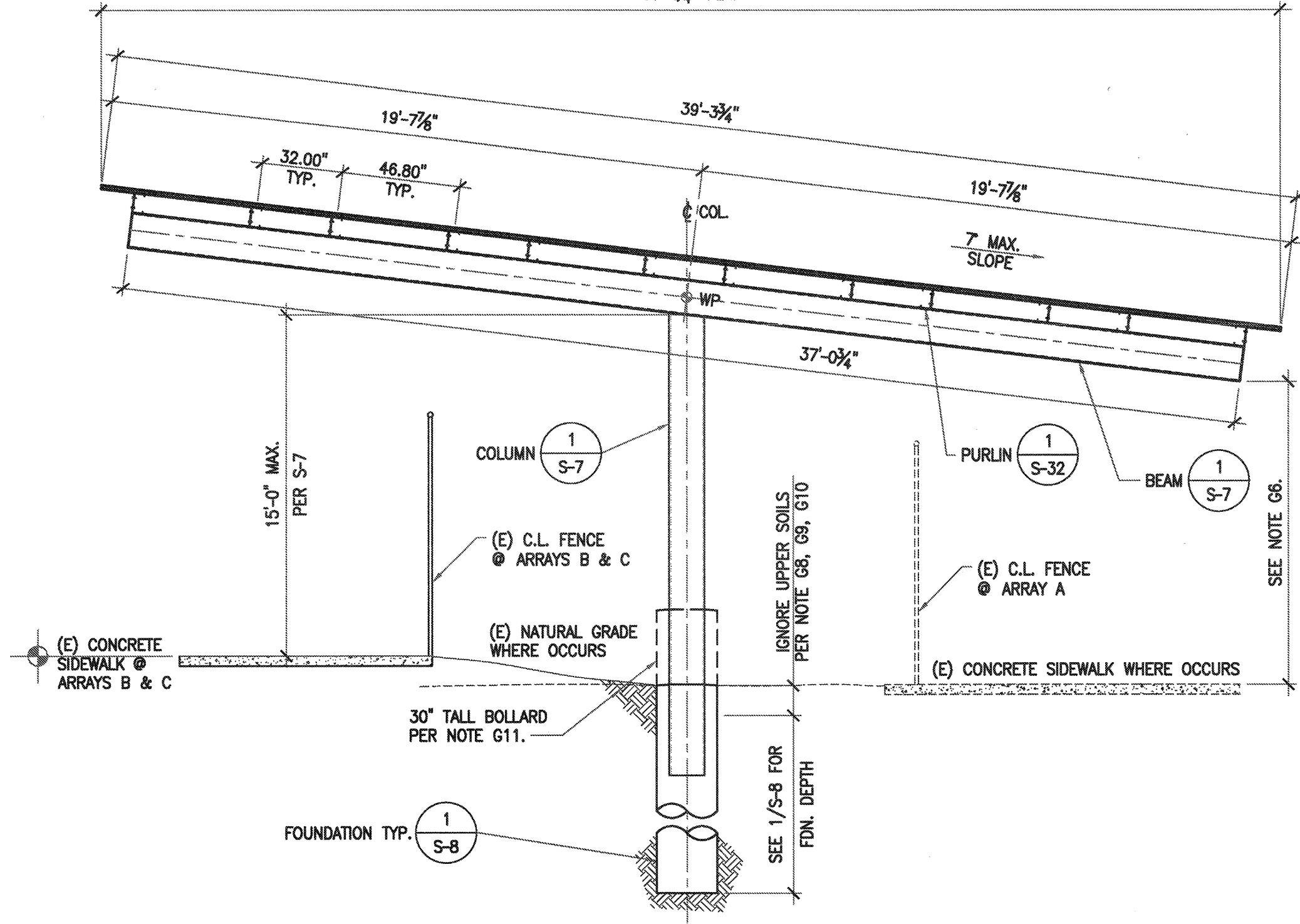
**CT-S.1**

NOTE: IF DWG. IS NOT 24x36, IT IS NOT FULL SIZE.

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**3 SIDE ELEVATION**  
1/4"=1'-0"

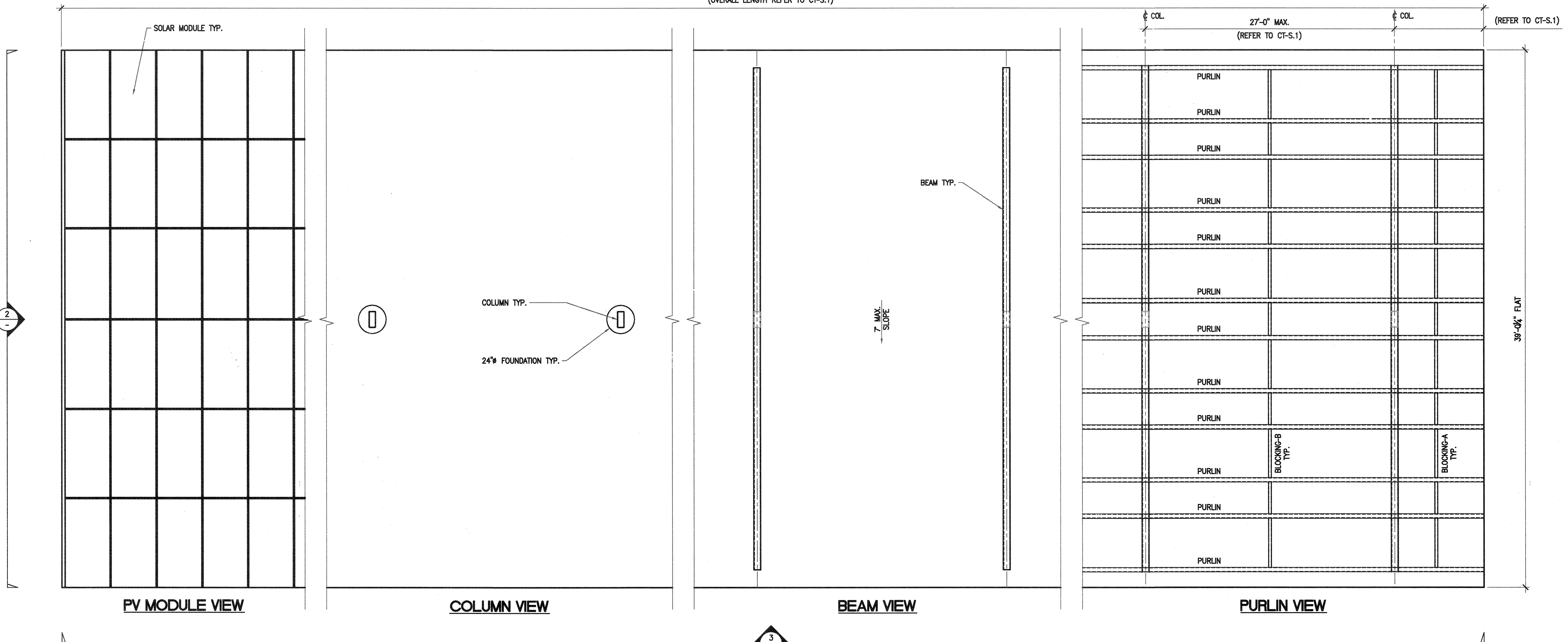


**2 FRONT ELEVATION**  
1/4"=1'-0"

**GENERAL NOTES**

REFERS TO PC: A# 02-112027 04-113425

- G1. FOR DETAILS, REFER TO (1 S-6) (2 S-6) (3 S-6)
- G2. MIN. 3,000 psi TYPE II CONCRETE.
- G3. T-STRUCTURE SOILS CLASS W PER SCHEDULE ON S-3.
- G4. STEEL SHALL BE ORDERED AND INSTALLED BASED ON THE SLOPED DIMENSIONS, NOT THE FLAT DIMENSIONS.
- G5. SOLAR PANEL ATTACHMENT PER DETAIL (1 S-34) (4 S-34)
- G6. STRUCTURES SHALL BE CONSTRUCTED TO MAXIMIZE CLEARANCE, 10'-0" MIN. CLR.
- G7. ALTERNATE SPREAD FOOTING PER 1/S-10 MAY BE USED IN LIEU OF PIER FOUNDATIONS.
- G8. ARRAYS 'A', 'B' & 'C' SHALL IGNORE UPPER 1'-0" OF SOIL.
- G9. FOUNDATIONS AT COLUMNS 'B4' & 'B5' SHALL IGNORE UPPER 3'-6" OF SOIL.
- G10. FOUNDATION AT COLUMNS 'A1' & 'A2' SHALL IGNORE UPPER 2'-0" OF SOIL.
- G11. 30" TALL BOLLARD PER DETAIL 3/S-8, LOCATION PER SHEET S.1.



**1 PLAN VIEW**  
1/4"=1'-0"

**NOTE:**  
1. ALL PLAN VIEW DIMENSIONS PROJECTED AS FLAT.

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DIV. OF THE STATE ARCHITECT  
**A# 03-117835**  
AC. FLS. SS. TH.  
DATE JAN 17 2017

REVISIONS		
MARK	DATE	DESCRIPTION
	01-17-17	DSA SUBMITTAL

PROJECT# CA-16-0025  
ACCOUNTING # P10216  
4 STEEL JOB # 16-1312  
DATE 01-13-17  
DRAWN BY MAP  
CHECKED CDL

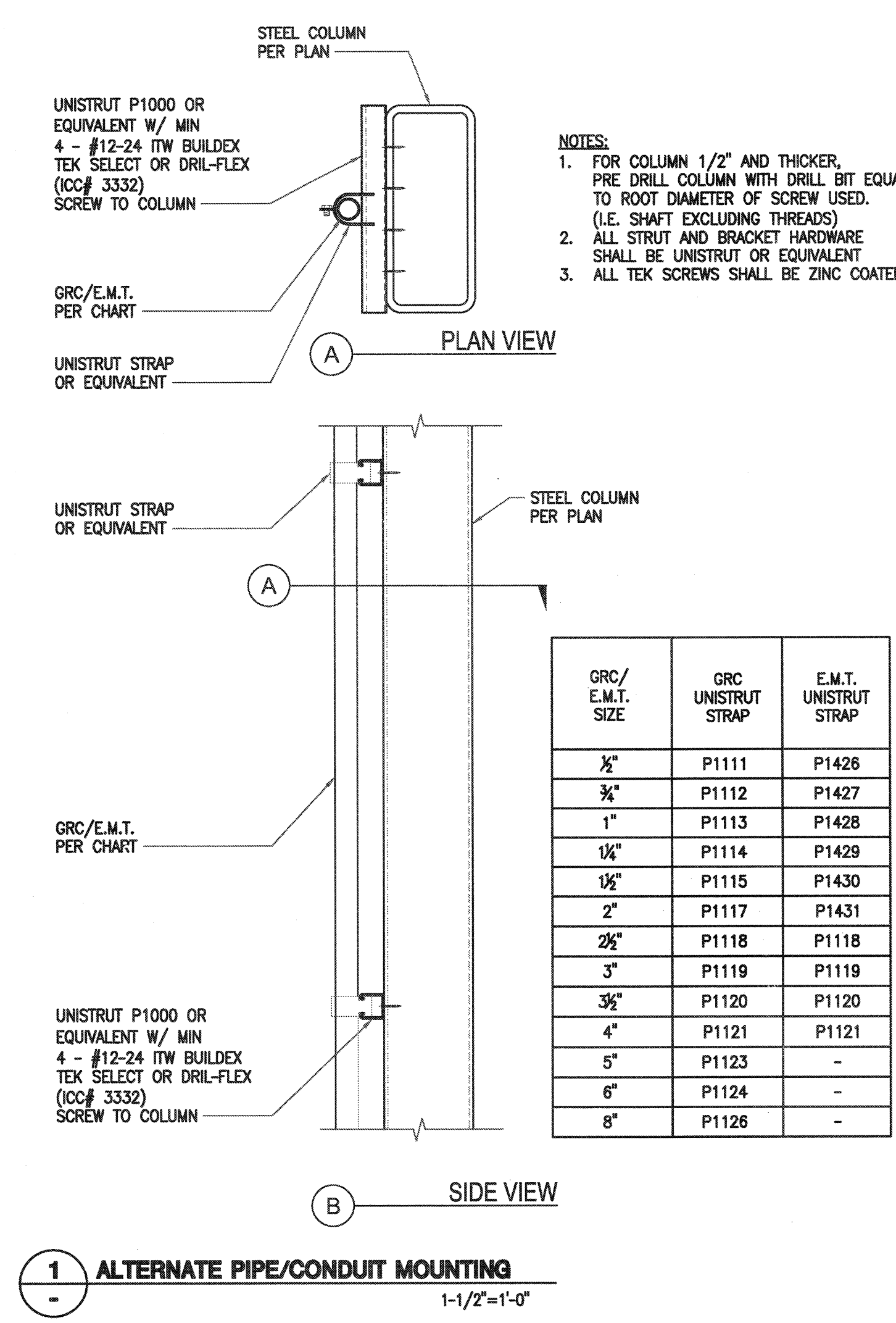
6 PANEL  
T-STRUCTURE  
SITE SPECIFIC

**CT-S.2**

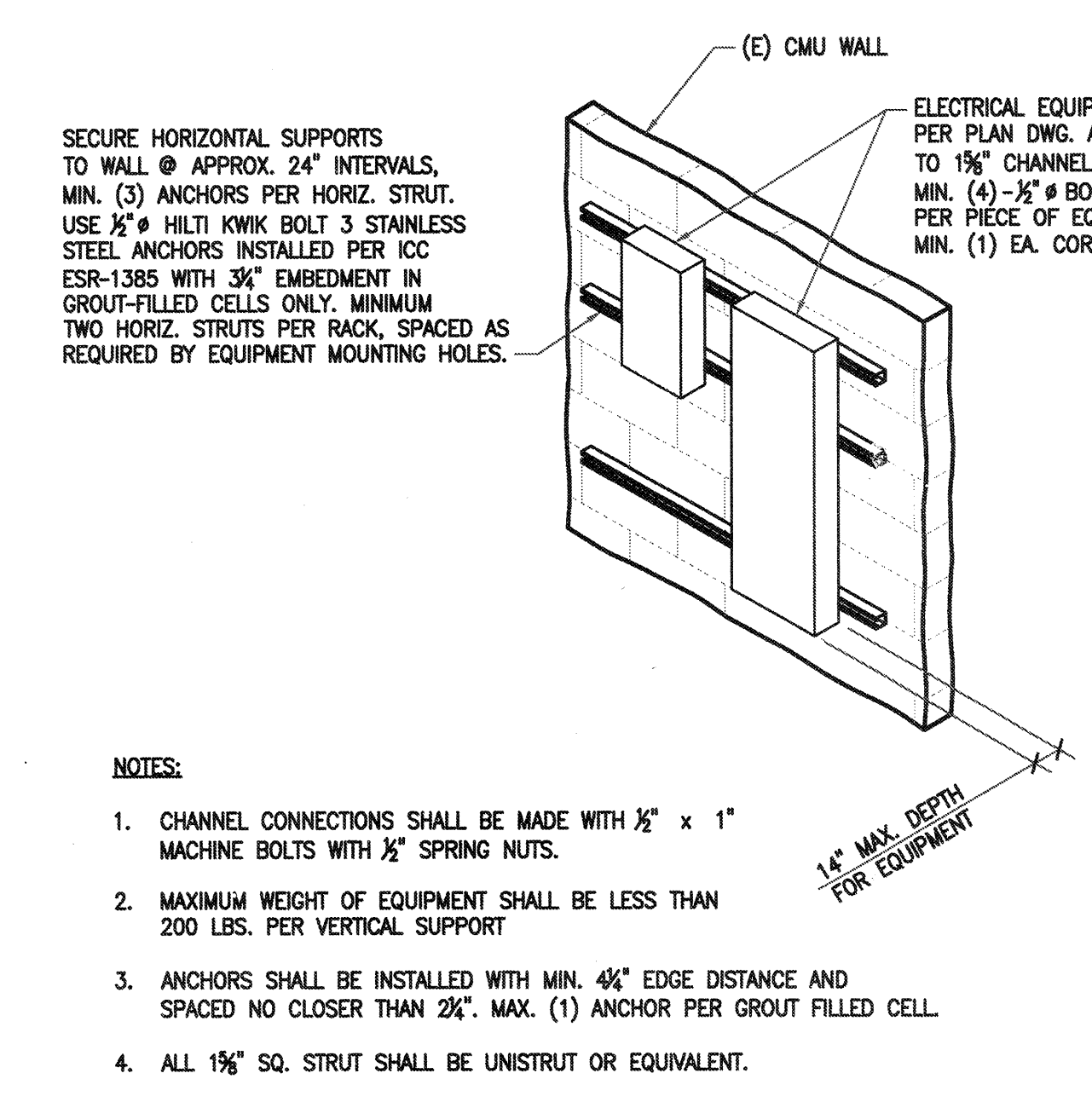
NOTE: IF DWG. IS NOT 24 X 36, IT IS NOT FULL SIZE.

1  
0  
2  
3  
4  
5  
6  
7  
8

A B C D E F G H I J



**1 ALTERNATE PIPE/CONDUIT MOUNTING**  
1-1/2"=1'-0"

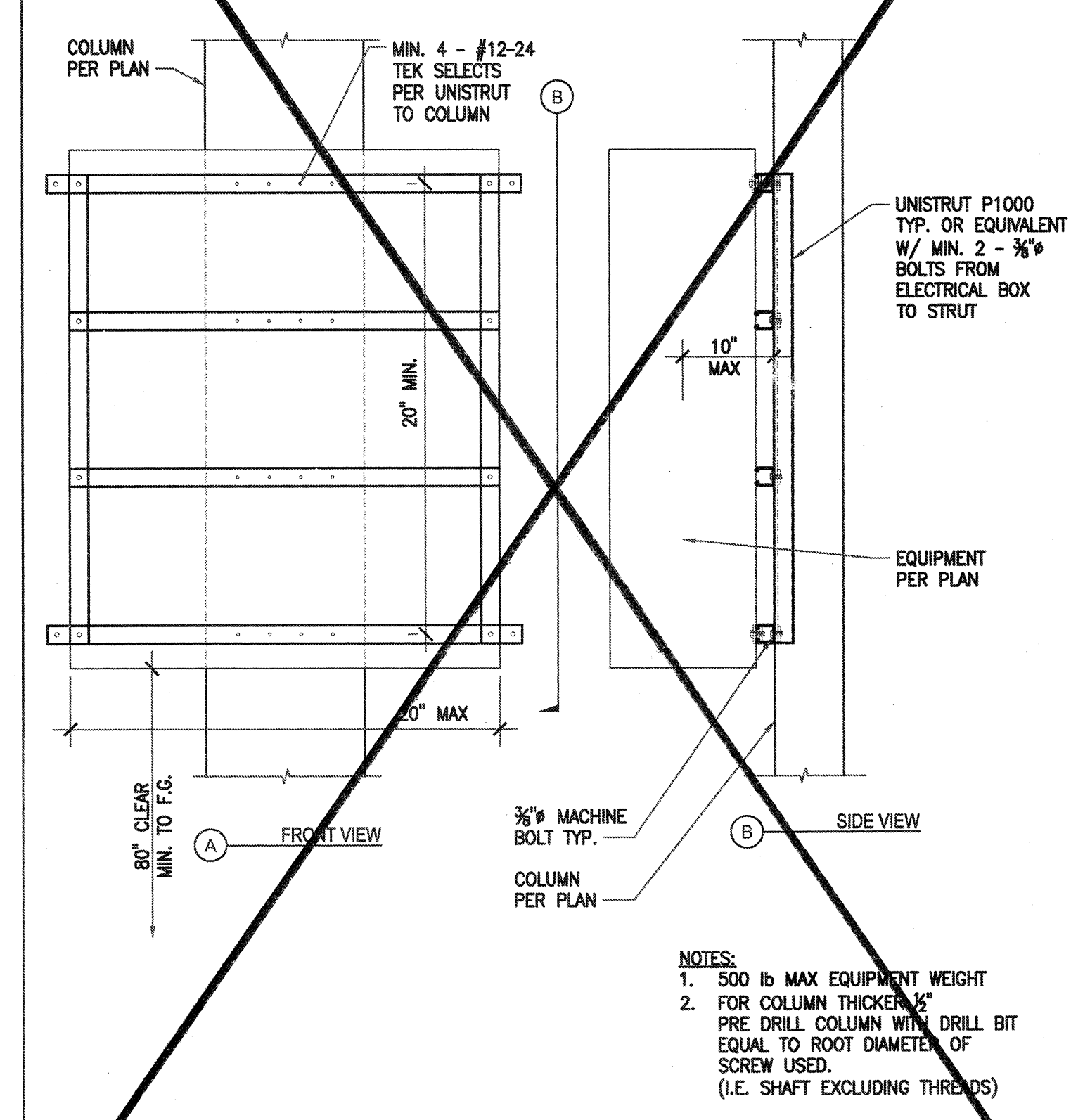


SECURE HORIZONTAL SUPPORTS TO WALL @ APPROX. 24" INTERVALS, MIN. (3) ANCHORS PER HORIZ. STRUT. USE 1/2" # HILTI KWIK BOLT 3 STAINLESS STEEL ANCHORS INSTALLED PER ICC ESR-1385 WITH 3/4" EMBEDMENT IN GROUT-FILLED CELLS ONLY. MINIMUM TWO HORIZ. STRUTS PER RACK, SPACED AS REQUIRED BY EQUIPMENT MOUNTING HOLES.

1" MAX. DEPTH FOR EQUIPMENT

- NOTES:**
- CHANNEL CONNECTIONS SHALL BE MADE WITH 1/2" x 1" MACHINE BOLTS WITH 1/2" SPRING NUTS.
  - MAXIMUM WEIGHT OF EQUIPMENT SHALL BE LESS THAN 200 LBS. PER VERTICAL SUPPORT
  - ANCHORS SHALL BE INSTALLED WITH MIN. 4 1/4" EDGE DISTANCE AND SPACED NO CLOSER THAN 2 1/2". MAX. (1) ANCHOR PER GROUT FILLED CELL.
  - ALL 1 1/2" SQ. STRUT SHALL BE UNISTRUT OR EQUIVALENT.

**4 EQUIPMENT RACK TO (E) CMU WALL**  
1/2"=1'-0"



- NOTES:**
- 500 lb MAX EQUIPMENT WEIGHT
  - FOR COLUMN THICKEN 2" PRE DRILL COLUMN WITH DRILL BIT EQUAL TO ROOT DIAMETER OF SCREW USED. (I.E. SHAFT EXCLUDING THREADS)

**2 EQUIPMENT TO COLUMN CONNECTION**  
1"=1'-0"

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S 5885

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A# 03-117835  
APD FLS SS TN  
DATE JAN 17 2017

REVISIONS

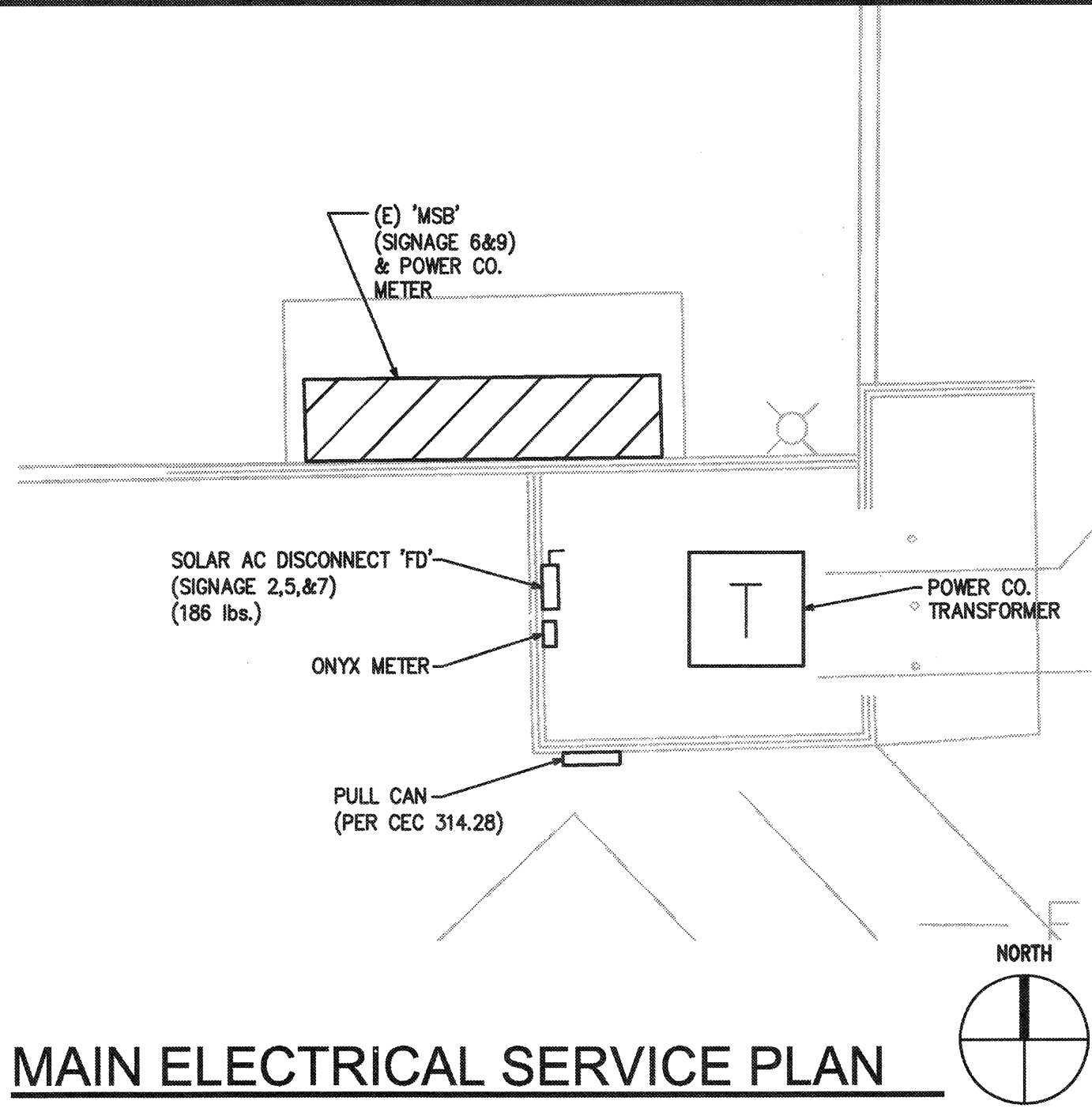
MARK	DATE	DESCRIPTION
	01-17-17	DSA SUBMITTAL

PROJECT# CA-16-0025  
ACCOUNTING # P10216  
4 STEL JOB # 16-1312  
DATE 01-13-17  
DRAWN BY MAP  
CHECKED CDL

DETAILS  
**CT-S.3**

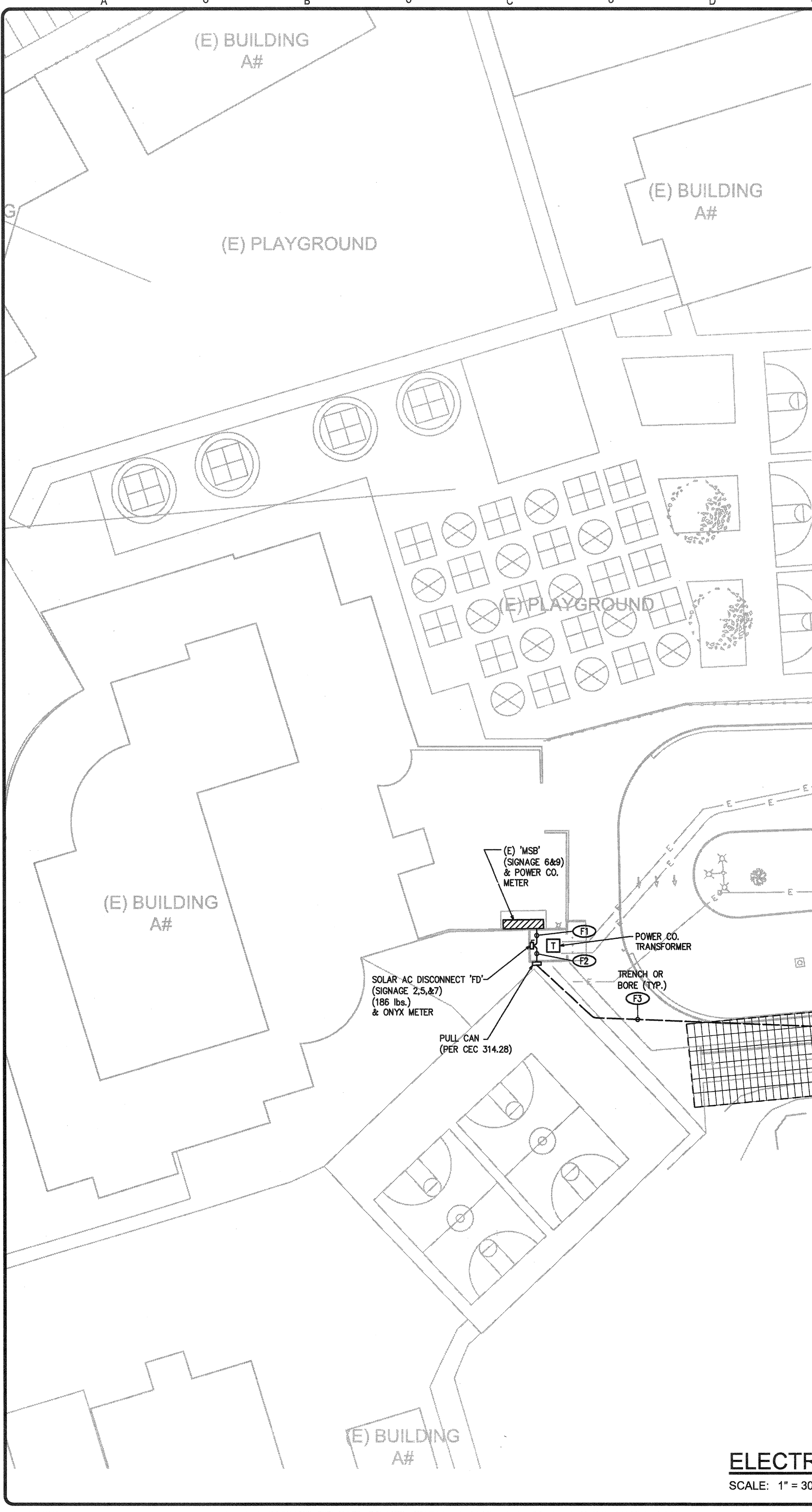
NOTE: P DWG. IS NOT 24"x36" IT IS NOT FULL SIZE





- GENERAL ELECTRICAL NOTES:**
- ALL WORK AND MATERIAL SHALL CONFORM TO 2016 CBC, DSA IR 16-8, 2016 CEC ARTICLE 690 & OTHER APPLICABLE ARTICLES, CODES AND ORDINANCES. IT IS THE INTENTION OF THESE PLANS AND SPECIFICATIONS TO COVER ALL THINGS REQUIRED TO PROVIDE COMPLETE AND OPERATIVE SYSTEMS.
  - ALL EQUIPMENT TO HAVE TESTING LABORATORY LABEL ATTACHED.
  - CONDUCTORS SHALL BE THWN COPPER (CU) UNLESS INDICATED AS ALUMINUM (AL).
  - ELECTRICAL ROUTING IS DIAGRAMMATIC ONLY. ACTUAL ROUTING & PHYSICAL CONDITION MAY VARY. CONTRACTOR TO DETERMINE ACTUAL ROUTING AND PROVIDE ALL RECONNECTIONS & ITEMS NECESSARY FOR COMPLETE & OPERATING SYSTEMS.
  - ALL SOLAR ELECTRICAL EQUIPMENT TO BE UL 1741 LISTED, IEEE 1547 RATED, & APPROVED BY THE CALIFORNIA ENERGY COMMISSION.
  - ELECTRICAL EQUIPMENT (BRANDS "OR EQUAL" NOTE REQUIRED). OR EQUAL MATERIALS NEED TO BE APPROVED BY OWNER OR OWNER'S REPRESENTATIVE. LAYOUT LOCATIONS ARE REPRESENTATIVE AND ARE SUBJECT TO CHANGE WITH APPROVAL OF OWNER AND PERMITTING AUTHORITY, ETC.
  - PROVIDE "CAUTION: SOLAR CIRCUITS" AFFIXED LABEL ON PV CONDUIT RUNS, BOXES, & CONDUIT BODIES INSIDE BUILDING.
  - STRING 1000V DC UL4703 (PV-WIRE) CABLING SHALL BE SUPPORTED TO MODULE & ARRAY STRUCTURE WITH WILEY ACME CABLE CLIPS.
  - ALL INVERTER DC STRING FUSES ARE 15 AMP UNLESS NOTED OTHERWISE.
  - HORIZONTAL DIRECTIONAL BORING OR TRENCHING FOR UNDERGROUND CONDUIT RUNS.
  - WHERE FEEDER CONDUCTORS ARE OVERSIZED FOR VOLTAGE DROP, PROVIDE CONDUCTOR REDUCING MEANS TO ACCOMMODATE INVERTER, PANEL, & DISCONNECT LUGS, SIZED PER CEC AMPACITY REQUIREMENTS. THE MINIMUM CONDUCTOR SIZE, FOR CIRCUIT BREAKERS LISTED FOR 75°C TERMINATING, SHALL BE:  
23kW INVERTER #6, #8 GND. (AL)  
28kW INVERTER #4, #6 GND. (AL)  
36kW INVERTER #4, #6 GND. (AL)  
50kW INVERTER #2, #6 GND. (AL)  
60kW INVERTER #2, #6 GND. (AL)

- ELECTRICAL SYMBOLS:**
- CONDUIT OR CABLE RUN ABOVE GRADE
  - CONDUIT OR CABLE RUN UNDERGROUND
  - CONDUIT STUB OUT
  - A-2 HOMERUN OF CONDUIT AND WIRING, CIRCUIT NO. 2 TO PANEL 'A'
  - POWER EQUIPMENT AS NOTED
  - INVERTER AS NOTED
  - JUNCTION BOX
  - GROUND
  - TRANSFORMER
  - CIRCUIT BREAKER
  - 600V 3 POLE LOCKABLE & VERIFIABLE AC DISCONNECT SWITCH
  - FUSE
  - METER
  - PARKING LOT LIGHT, POLE, & CONCRETE BASE
  - LED LIGHT FIXTURE, SURFACE MOUNTED
  - (E) EXISTING
  - (N) NEW



**ELECTRICAL SITE PLAN**  
SCALE: 1" = 30'-0"

DISTRICT  
1300 BAKER STREET  
BAKERSFIELD, CA 93305  
861.831.4600

DEVELOPER  
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CONTRACTOR  
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S 5885

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REGISTERED PROFESSIONAL ENGINEER  
F. J. HARDON  
NO. 9125

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DIV. OF THE STATE ARCHITECT  
A# 03-117835  
AC: FLS SS: TN  
DATE: JAN 17 2017

REVISIONS		
MARK	DATE	DESCRIPTION

PROJECT#  
ACCOUNTING #  
4 STEEL JOB # 16-1312  
DATE 01-13-17  
DRAWN BY HDE  
CHECKED RJH

**ELECTRICAL SITE PLAN**  
**CT-E1.0**

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# FEEDER SCHEDULE

No.	Feeder Origin	Feeder Destination	Potential at Origin (Pi) (Volts)	Phase	Design Current (Amps)	Raceway Type	Sets of Cond.	Conductor Trade Size	Conductor Cross-Sectional Area (CM)	Conductor Material	DC Conductor Material Constant (K)	Q	Distance (ft)	Voltage Drop (Vd) (Volts)	Potential at Load (Pl) (Volts)	Percent Voltage Drop (%Vd)	Total Voltage Drop (%Vd AC)	Conduit & Conductors
F1	MSB	AC Disconnect	480	Three	480	Steel	2	350 kCMIL	700000	CU	12.9	1.0627	15	0.24	479.76	0.05	0.05	TWO: 3" C-4#350 KCMIL, 1#2/0 GND. (CU)
F2	AC Disconnect	Pull Can	480	Three	480	Steel	2	500 kCMIL	1000000	AL	21.2	1.0613	10	0.19	479.81	0.04	0.09	TWO: 3-1/2" C-4#500 KCMIL, 1#2/0 GND. (AL)
F3	Pull Can	Panel 'S'	480	Three	480	PVC	2	500 kCMIL	1000000	AL	21.2	1.0142	230	4.11	475.89	0.86	0.95	TWO: 4" C-4#500 KCMIL, 1#2/0 GND. (AL)
F4	Panel 'S'	Inverter No. 1	480	Three	60	Steel	1	2	66360	AL	21.2	1.0031	10	0.33	479.67	0.07	1.02	1-1/2" C-4#2, 1#6 GND. (AL)
F5	Panel 'S'	Inverter No. 2	480	Three	60	Steel	1	2	66360	AL	21.2	1.0031	35	1.17	478.83	0.24	1.19	1-1/2" C-4#2, 1#6 GND. (AL)
F6	Panel 'S'	Inverter No. 3	480	Three	60	Steel	1	2	66360	AL	21.2	1.0031	35	1.17	478.83	0.24	1.19	1-1/2" C-4#2, 1#6 GND. (AL)
F7	Panel 'S'	Inverter No. 4	480	Three	60	PVC	1	1	83690	AL	21.2	0.9881	195	5.07	474.93	1.06	2.00	1-1/2" C-4#1, 1#6 GND. (AL)
F8	Panel 'S'	Inverter No. 5	480	Three	60	PVC	1	1/0	105600	AL	21.2	0.9950	195	4.05	475.95	0.84	1.79	2" C-4#1/0, 1#4 GND. (AL)
F9	Panel 'S'	Inverter No. 6	480	Three	60	PVC	1	1	83690	AL	21.2	0.9881	195	5.07	474.93	1.06	2.00	1-1/2" C-4#1, 1#6 GND. (AL)
F10	Panel 'S'	Inverter No. 7	480	Three	60	PVC	1	1/0	105600	AL	21.2	0.9950	195	4.05	475.95	0.84	1.79	2" C-4#1/0, 1#4 GND. (AL)
F11	Panel 'S'	Inverter No. 8	480	Three	60	PVC	1	3/0	167800	AL	21.2	1.0317	220	2.98	477.02	0.62	1.57	2" C-4#3/0, 1#4 GND. (AL)

**STRING DC WIRE SIZE CALCULATION**  
 Isc:  $9.29 \times 1.56 = 14.49A$   
 $\#10 AWG = 40A$  (90°C) (PER TABLE CEC 310.16)

**21-30 CURRENT CARRYING CONDUCTORS IN A RACEWAY (SHARED CONDUIT)**  
 (PER TABLE CEC 310.15(B)(2)(a) = 0.45)

**40A x 0.45 = 18.0A > 14.49 A ALLOWABLE**  
 $\#10 AWG CONDUCTOR IS ALLOWABLE$

**STRING VOLTAGE DROP CALCULATION**  
 INVERTER NO. 1  
 Vmp: 682.2 VDC, Imp: 8.85 A @ 160 FT (WORST CASE FROM ARRAY TO INVERTER)  
 $\#10 AWG$  cir. mils. = 10380  
 $2 \times 12.9 \times 160 \times 8.85 / 10380 = 3.52$  VDC lost  
 $3.52 V / 682.2 VDC = 0.52\%$  VOLTAGE DROP  
 INVERTER NO. 2 = 0.18% VOLTAGE DROP (55')  
 INVERTER NO. 3 = 0.50% VOLTAGE DROP (155')  
 INVERTER NO. 4 = 0.36% VOLTAGE DROP (110')  
 INVERTER NO. 5 = 0.68% VOLTAGE DROP (210')  
 INVERTER NO. 6 = 0.36% VOLTAGE DROP (110')  
 INVERTER NO. 7 = 0.68% VOLTAGE DROP (210')  
 INVERTER NO. 8 = 0.92% VOLTAGE DROP (285')

**50 KW INVERTER AC WIRE & OCPD CALCULATION:**  
 INVERTER:  
 AC Output Power: 60.0A AC Output Current Max  
 $60.0A \times 1.25 = 75.0A$   
 80 AMP OCPD PER 50kW INVERTER OUTPUT

$\#2 AWG THWN-2 = 90A$  (75°C) (PER TABLE CEC 310.16) (CU)

TEMP. CONDITIONS: OUTDOOR WIRE RUN - AMBIENT TEMP. = 38°C  
 (3) CURRENT CARRYING CONDUCTORS IN A RACEWAY (SHARED CONDUIT)  
 (PER TABLE CEC 310.15(B)(3)(a) = 1.0)

$90A \times 1.0 = 90A = 90A$  TEMP. ADJUSTED  
 $\#2 AWG CONDUCTOR IS MINIMUM ALLOWABLE$  (CU)

**MAX/COLD TEMP PV VOLTAGE CALCULATION:**  
 SUN EDISON SILVANTIS F335EzC  
 Voc: 46.4V  
 Temp. Coefficient: -0.33%/°C  
 Record Low Temp\*: -3.3°C (28.3°F)

$\#$  Modules in Series: 18  
 $(46.4 V) \times (0.0033 V/°C) \times (28.3) = 4.33 V\Delta$   
 $46.4 Voc + 4.33 V\Delta = 50.73 Voc(corr)$   
 $(50.73 V) \times (18) = 913.2 VDC$  max (this is < 1000 VDC)

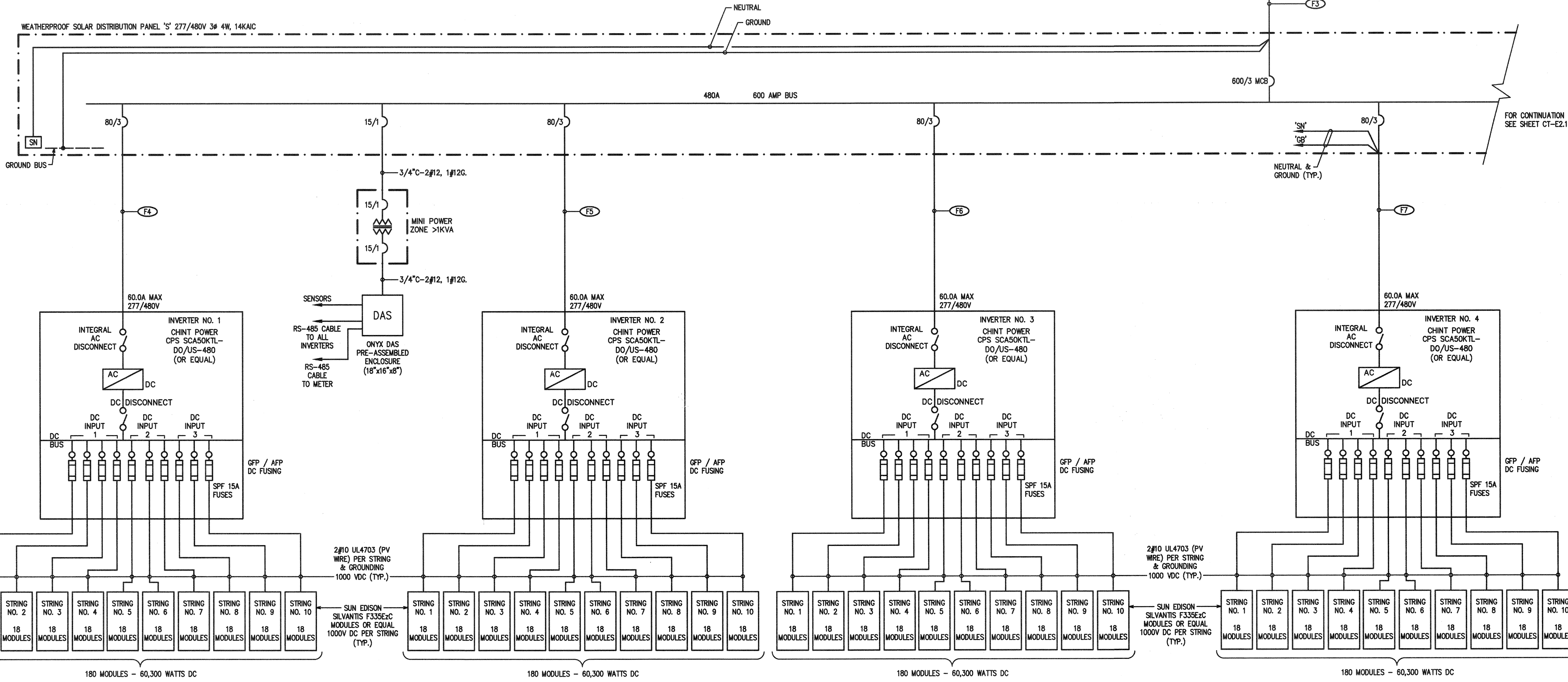
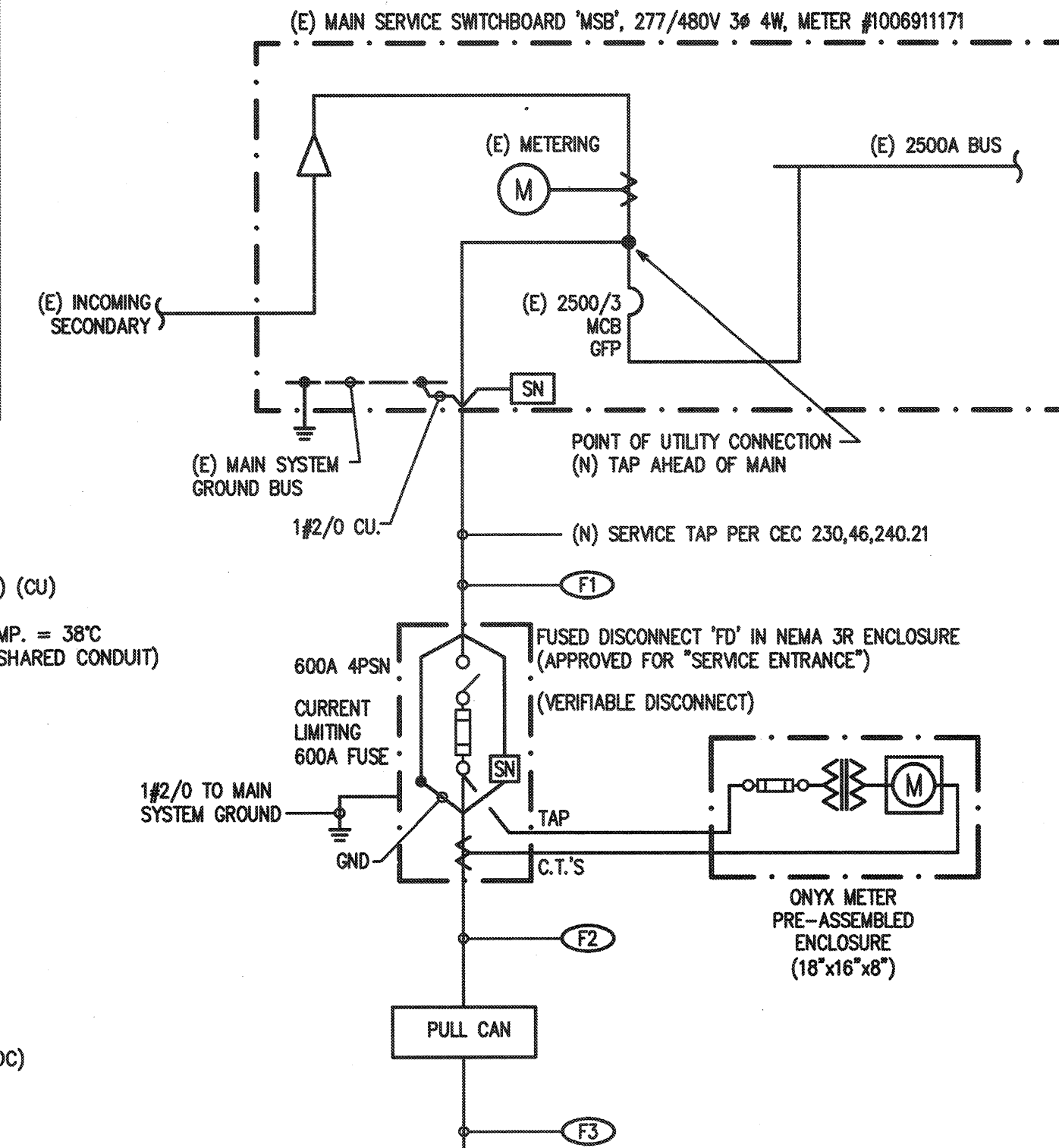
\* = Per ASHRAE table

## 600V HEAVY DUTY AC VERIFIABLE DISCONNECT SCHEDULE (WITH CLASS 'J' CURRENT LIMITING FUSING)

DISCONNECT SIZE (VERIFIABLE)	MANUFACTURER'S CAT NO.	AIC RATING
600A 4PSN 600VAC	SQUARE D #H366 NR	200,000 AIC

## SYSTEM SUMMARY

MODULE MODEL	SUN EDISON SILVANTIS F335EzC
MODULE STC DC RATING	335W
TOTAL MODULE COUNT	1440
TOTAL STC DC SYSTEM SIZE	482.4kW
TOTAL AC SYSTEM SIZE	400kW
INVERTER MODEL	(8) CHINT POWER CPS SCA50KTL-DO/US-480
MODULE TILT	7.5°
ARRAY AZIMUTH	174.5° & 177.5°
POINT OF SERVICE FAULT CURRENT CONTRIBUTION	3,480 AIC
POINT OF SERVICE RATING	65,000 AIC



## SINGLE LINE DIAGRAM 482.40 KW TOTAL

SCALE: NONE

DISTRICT

1300 BAKER STREET  
BAKERSFIELD, CA 93305  
861.631.4800

DEVELOPER

**ONYX**

880 3RD AVE, 11TH FLOOR  
NEW YORK, NY 10022  
646.217.0713

CONTRACTOR

**COLLINS ELECTRICAL COMPANY INC.**

DESIGN PROFESSIONAL

**ASTEL ENGINEERING**

28030 ACERO, SUITE 200  
MISSION VIEJO, CA 92691  
949.305.1150 | FAX 949.305.1420

DESIGN PROFESSIONAL STAMP

REGISTERED PROFESSIONAL ELECTRICAL ENGINEER  
DAVID K. ROSENBERG  
S 5885

CONSULTANT STAMP

REGISTERED PROFESSIONAL ELECTRICAL ENGINEER  
R. J. HARDON  
NO. 9125

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1000 HIGHLAND KNOLLS DR.  
BAKERSFIELD, CA 93303

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
A#03-117835  
AC FLS SS TJ  
DATE JAN 17 2017

REVISIONS

MARK	DATE	DESCRIPTION

PROJECT#

ACCOUNTING #

4 STEL JOB # 16-1312

DATE 01-13-17

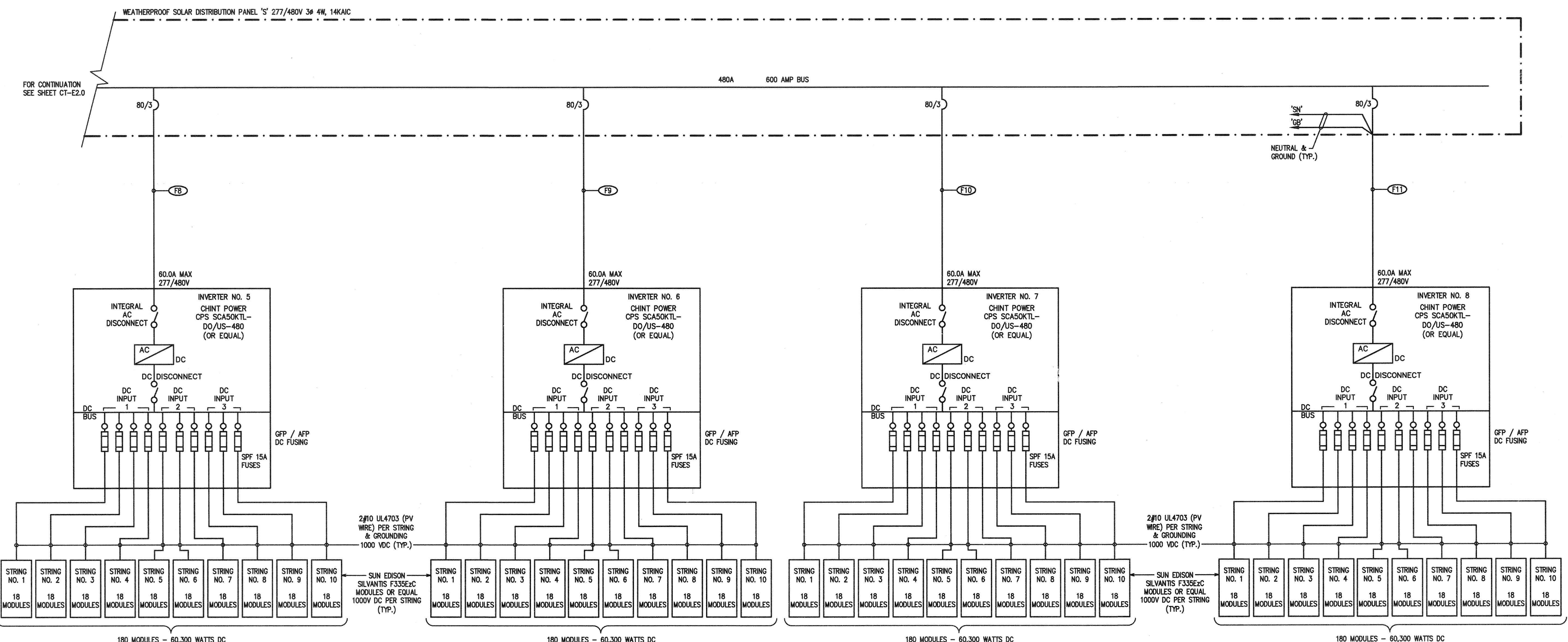
DRAWN BY HDE

CHECKED RJH

ELECTRICAL SINGLE LINE DIAGRAM

**CT-E2.0**

NOTE: IF DWG. IS NOT #4-38, IT IS NOT FULL SIZE



**SINGLE LINE DIAGRAM 489.60 KW TOTAL**  
SCALE: NONE

DISTRICT  
1300 BAKER STREET  
BAKERSFIELD, CA 93305  
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CONTRACTOR  
**COLLINS**  
ELECTRICAL COMPANY INC.

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S 5885

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R. J. HARDY  
NO. 9125

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
A# 03-117835  
AC FLS SS TN  
DATE JAN 17 2017

REVISIONS  
MARK DATE DESCRIPTION

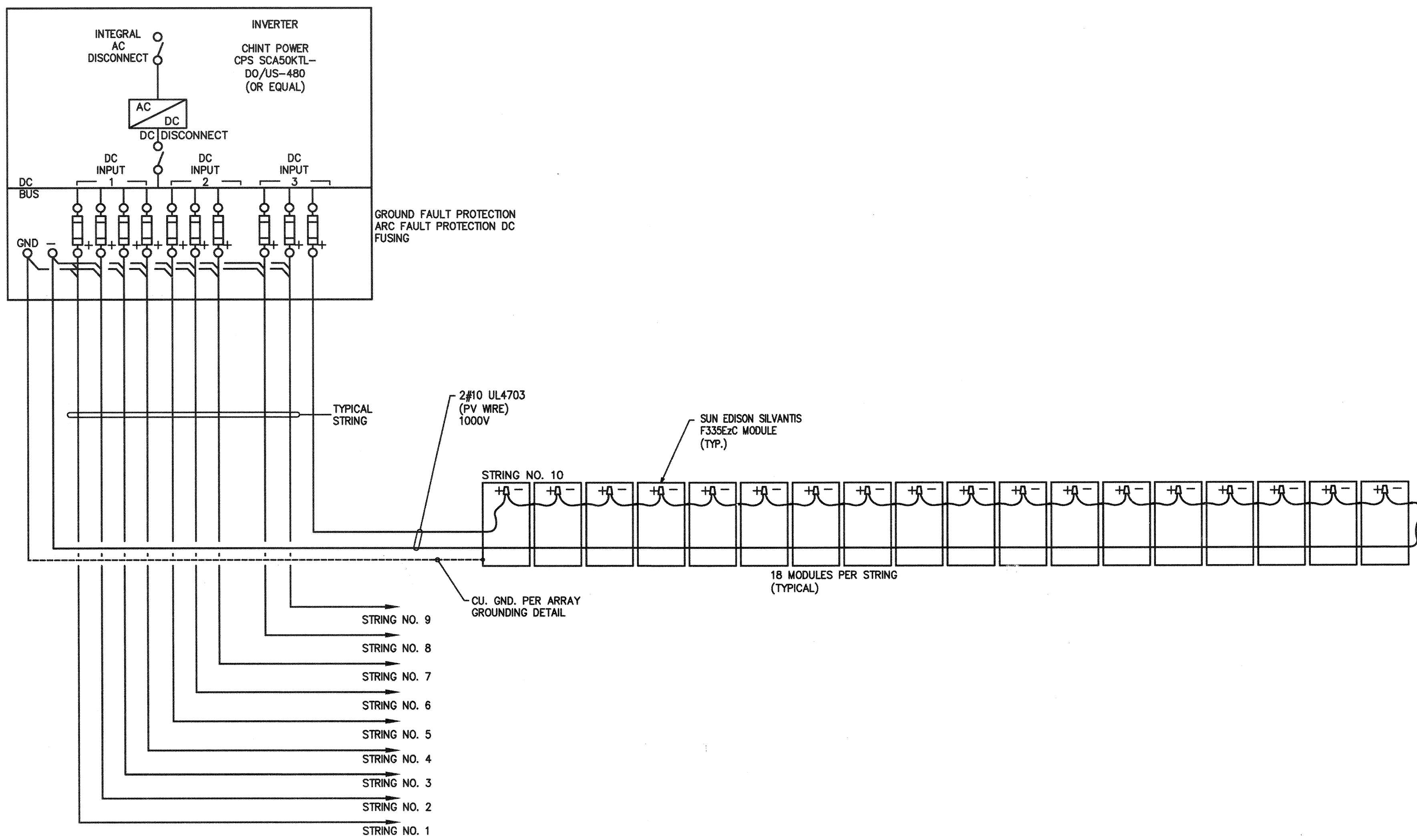
PROJECT#  
ACCOUNTING #  
4 STEEL JOB # 16-1312  
DATE 01-13-17  
DRAWN BY HDE  
CHECKED RJH

**ELECTRICAL SINGLE LINE DIAGRAM**

**CT-E2.1**

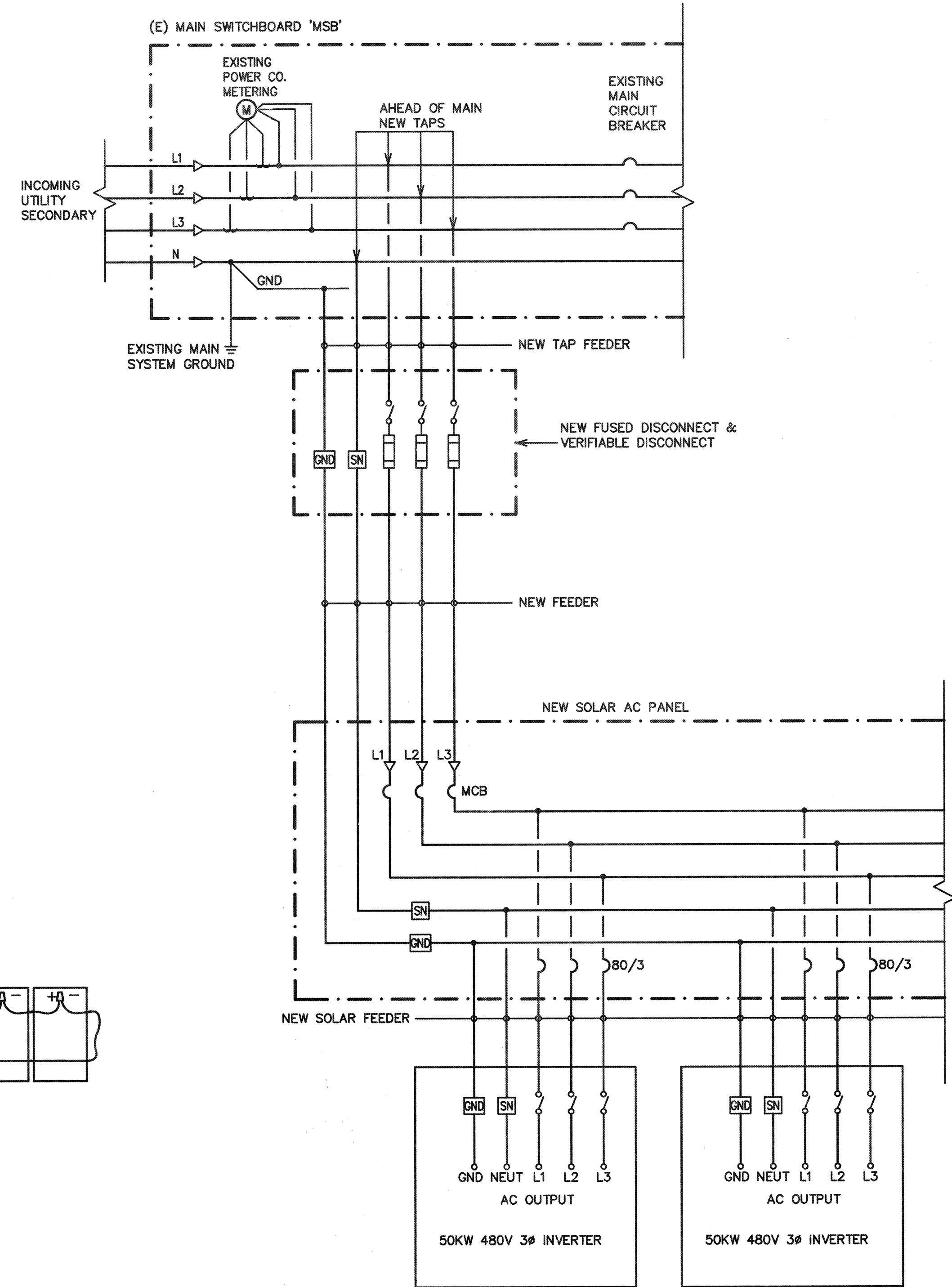
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MIDDLE SCHOOL  
1000 HIGHLAND  
KNOLLS DR.  
BAKERSFIELD, CA 93303

DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS, PREPARED BY THE DESIGN PROFESSIONAL, D/P AND THE D/P CONSULTANTS ARE INSTRUMENTS OF SERVICE FOR USE SOLELY WITH RESPECT TO THIS PROJECT. THIS INCLUDES DOCUMENTS IN ELECTRONIC FORM. THE D/P AND THE D/P CONSULTANTS SHALL BE DEEMED THE AUTHORS AND OWNERS OF THEIR RESPECTIVE INSTRUMENTS OF SERVICE AND SHALL RETAIN ALL COMMON LAW, STATUTORY AND OTHER RESERVED RIGHTS, INCLUDING COPYRIGHTS. THE INSTRUMENTS OF SERVICE SHALL NOT BE USED BY THE OWNER FOR FUTURE ADDITIONS OR ALTERATIONS TO THIS PROJECT OR FOR OTHER PROJECTS, WITHOUT THE PRIOR WRITTEN AGREEMENT OF THE D/P. ANY UNAUTHORIZED USE OF THE INSTRUMENTS OF SERVICE SHALL BE AT THE OWNER'S SOLE RISK AND WITHOUT LIABILITY TO THE D/P AND THE D/P CONSULTANTS.



TYPICAL DC LINE DIAGRAM

SCALE: NONE



TYPICAL THREE LINE DIAGRAM

SCALE: NONE

DISTRICT  
1300 BAKER STREET  
BAKERSFIELD, CA 93305  
861.631.4800

DEVELOPER  
**ONYX**  
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S 5885

CONSULTANT STAMP  
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R. J. HARDON  
EX 9125  
ELECTRICAL  
STATE OF CALIFORNIA

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MIDDLE SCHOOL  
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BAKERSFIELD, CA 93303

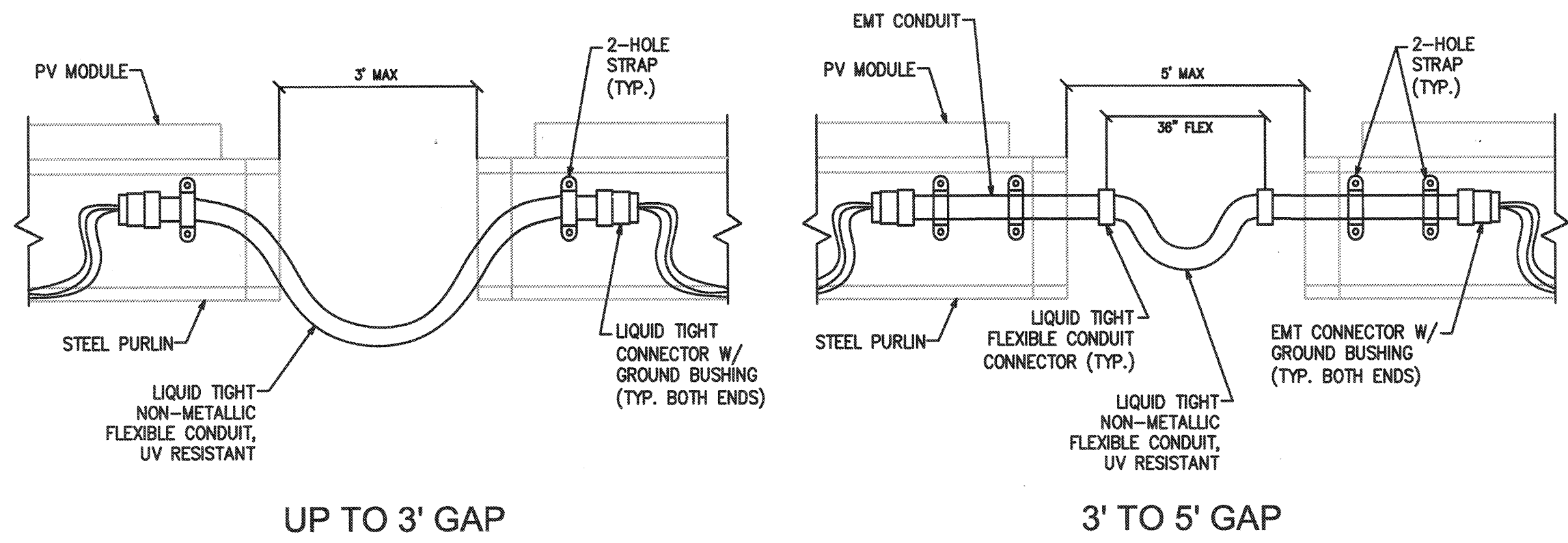
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AC FLS SS TN  
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REVISIONS		
MARK	DATE	DESCRIPTION

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4 STEL JOB # 16-1312  
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CHECKED RJH

TYPICAL ELEC. THREE LINE DIAGRAM

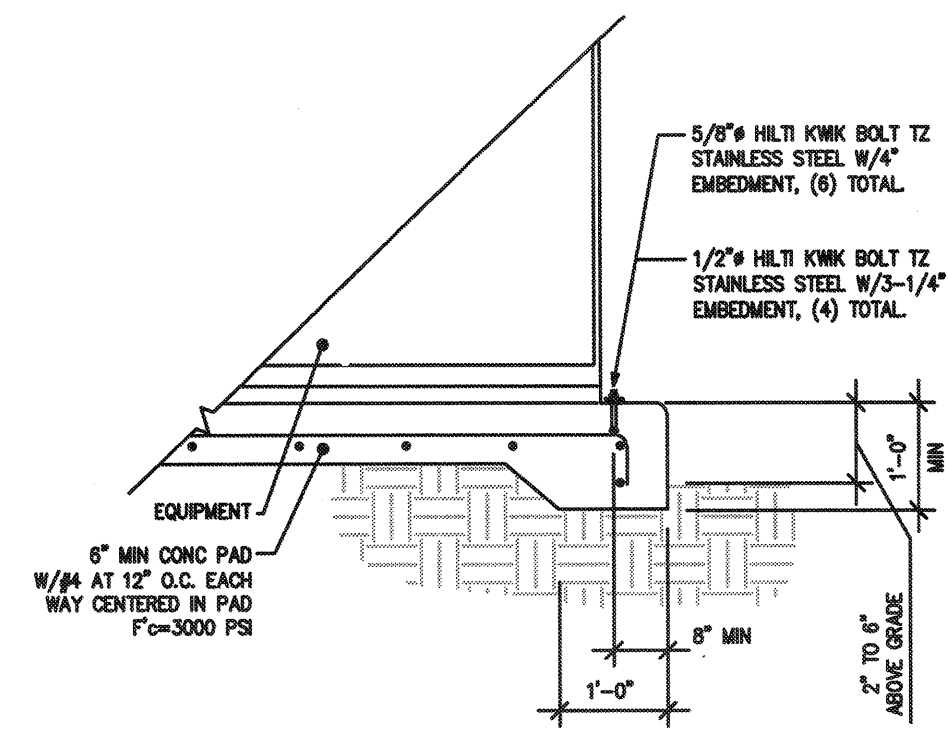
**CT-E3.0**



**WIRING BRIDGE DETAIL**

NO SCALE

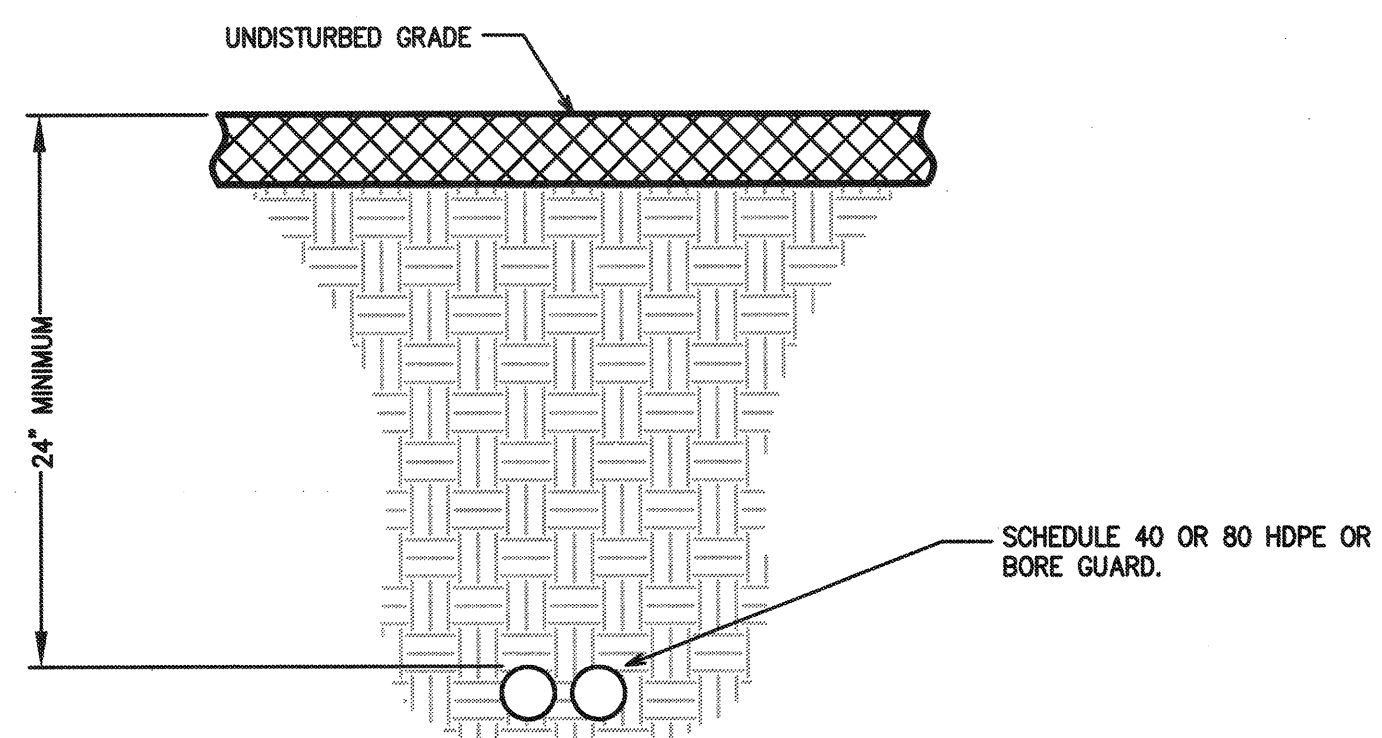
1



**EQUIPMENT PAD & ANCHORAGE DETAIL**

NO SCALE

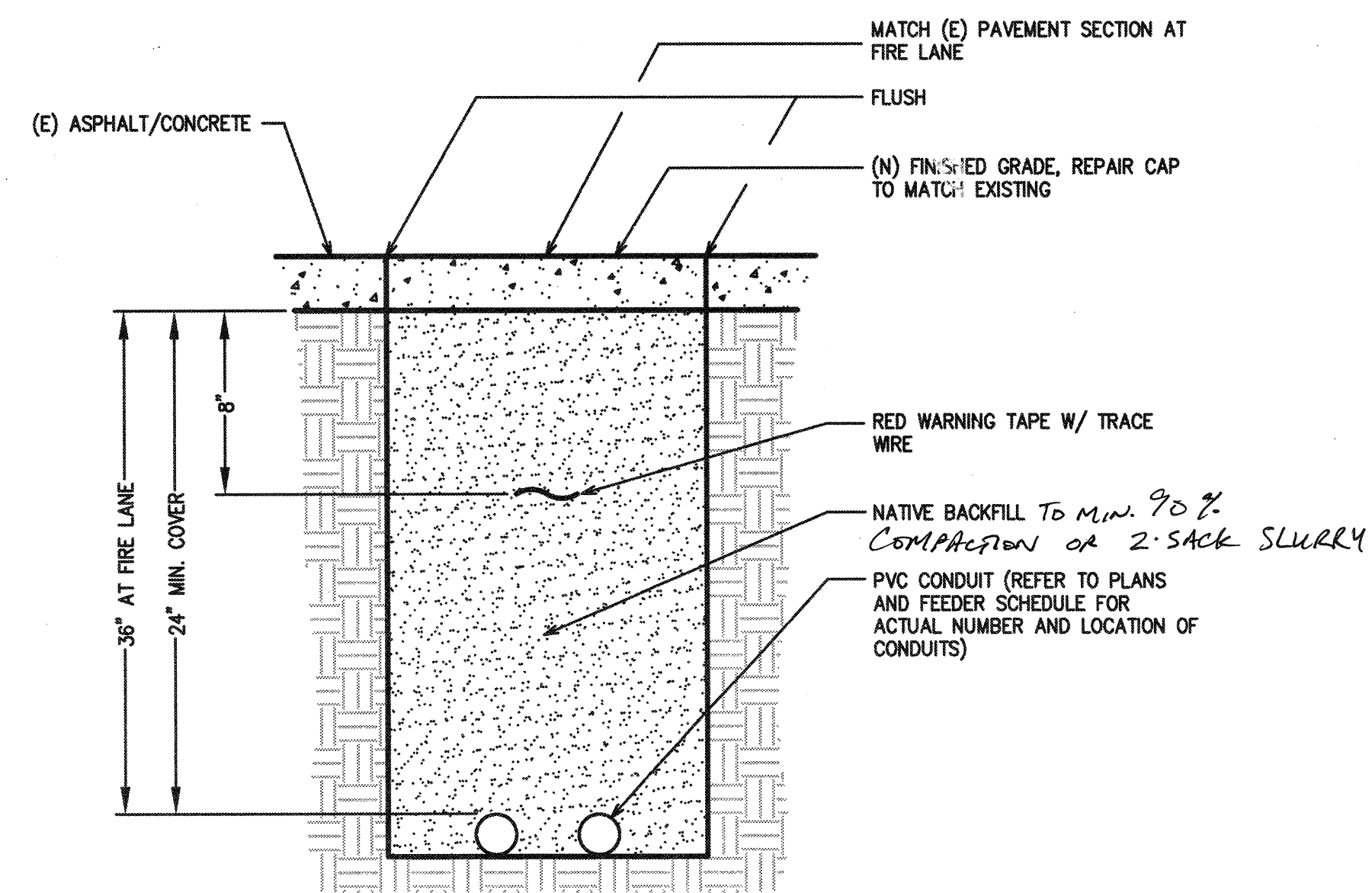
2



**HORIZONTAL BORE DETAIL**

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

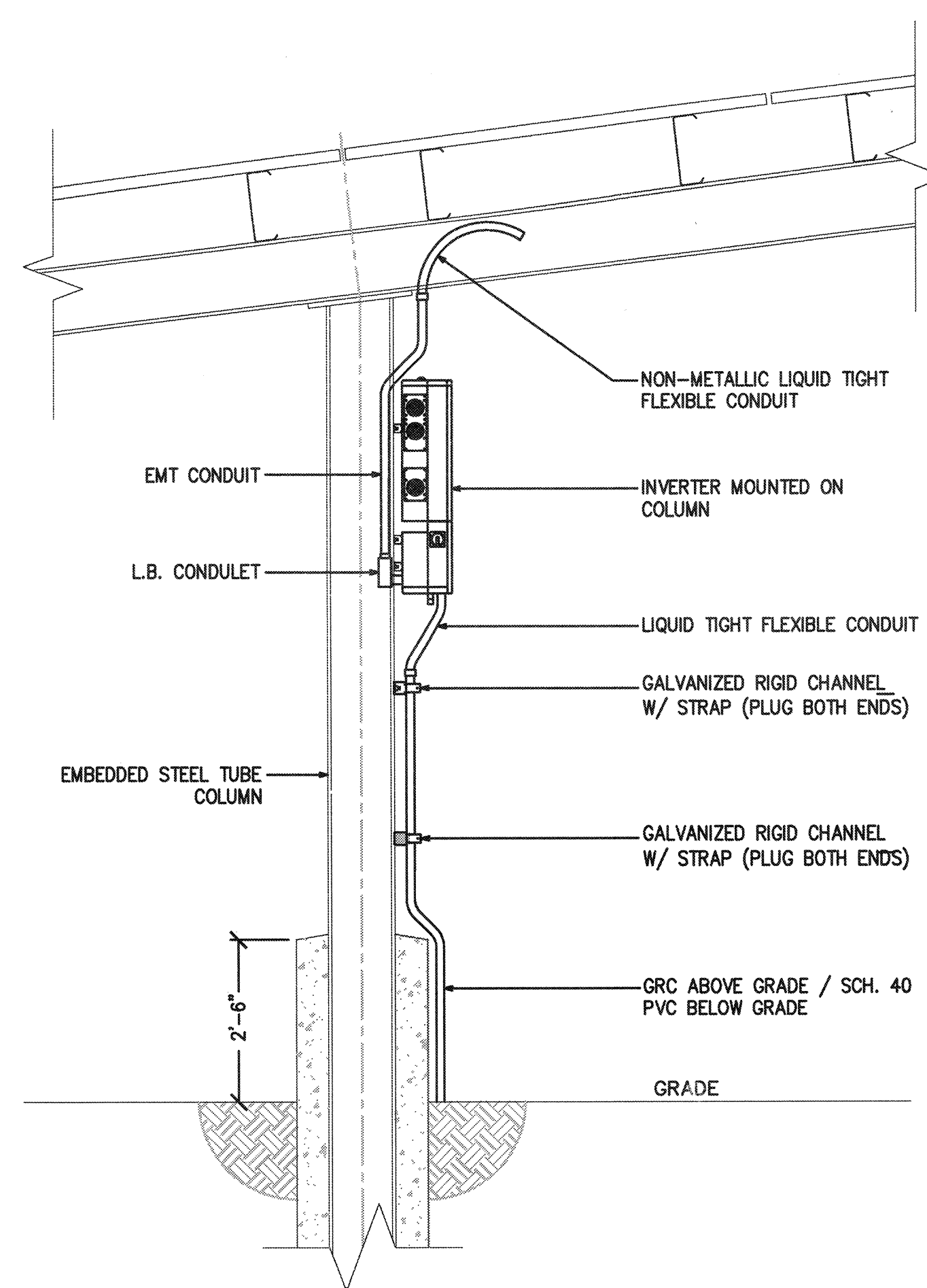
3



**TRENCH THROUGH PAVEMENT TRAFFIC DETAIL**

NO SCALE

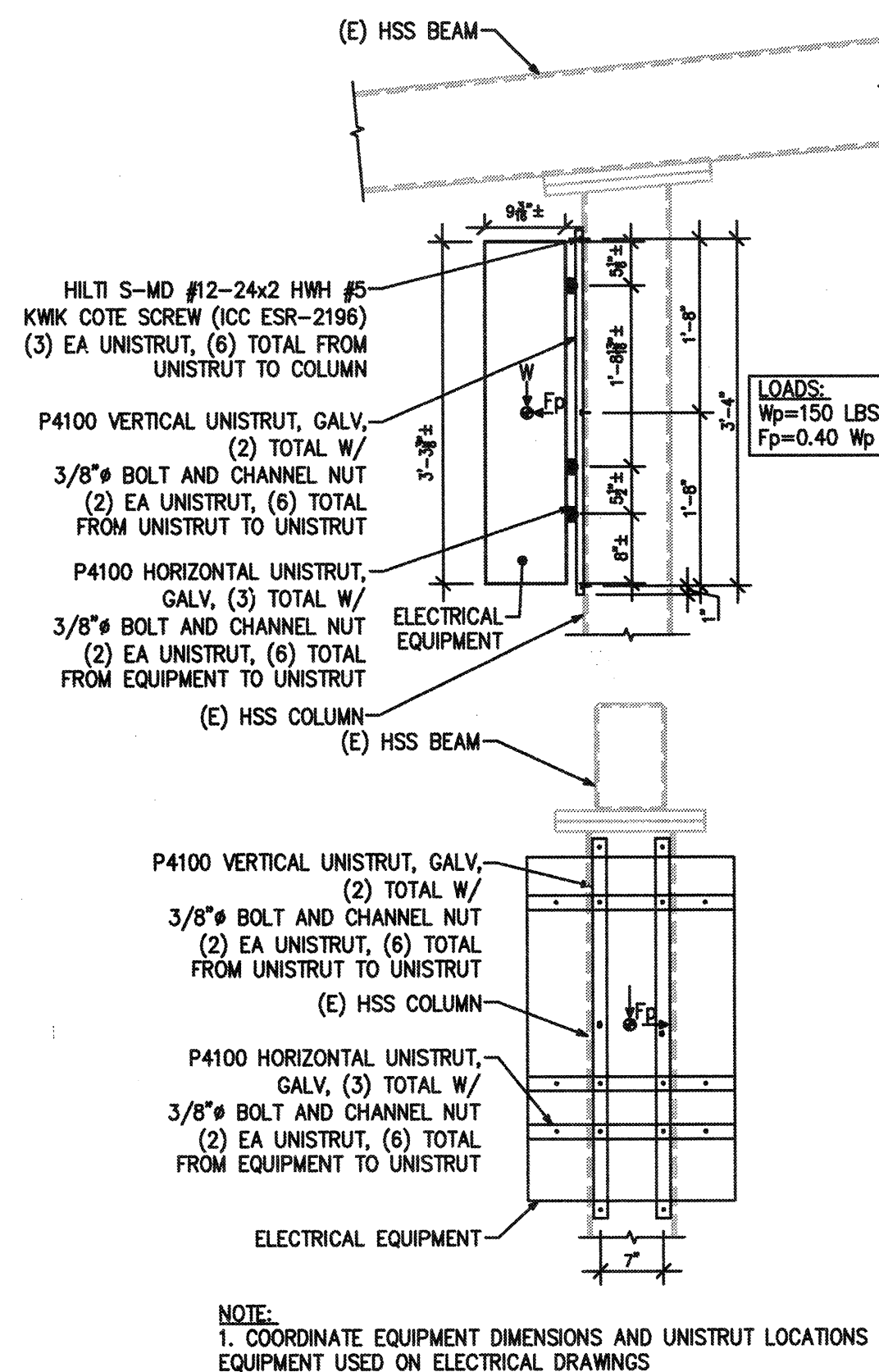
4



**TYPICAL SHADE STRUCTURE CONDUIT RISER DETAIL**

NO SCALE NOTE: ONE REQUIRED PER ARRAY STRUCTURE

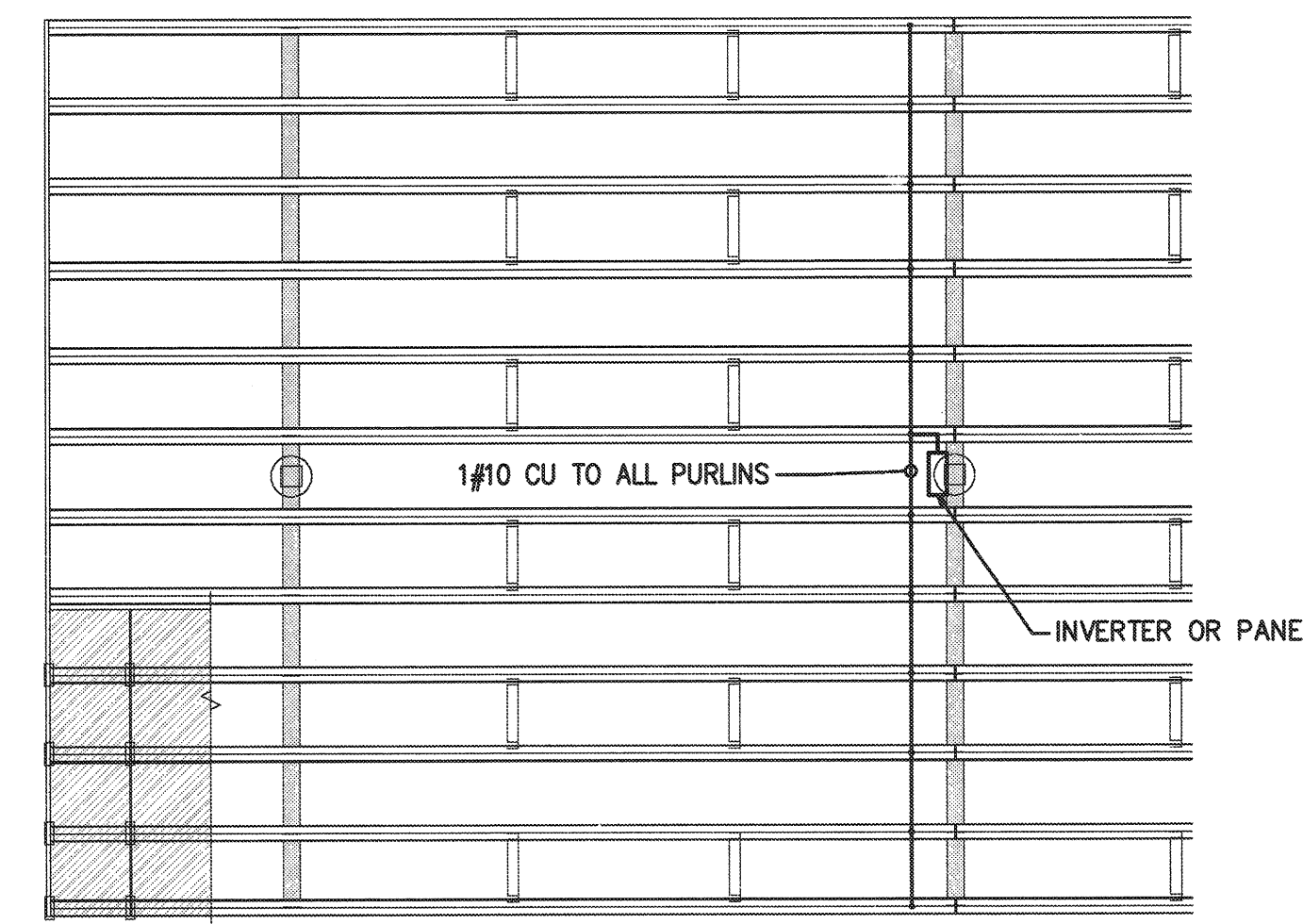
5



**COLUMN MOUNTED EQUIPMENT ANCHORAGE DETAIL**

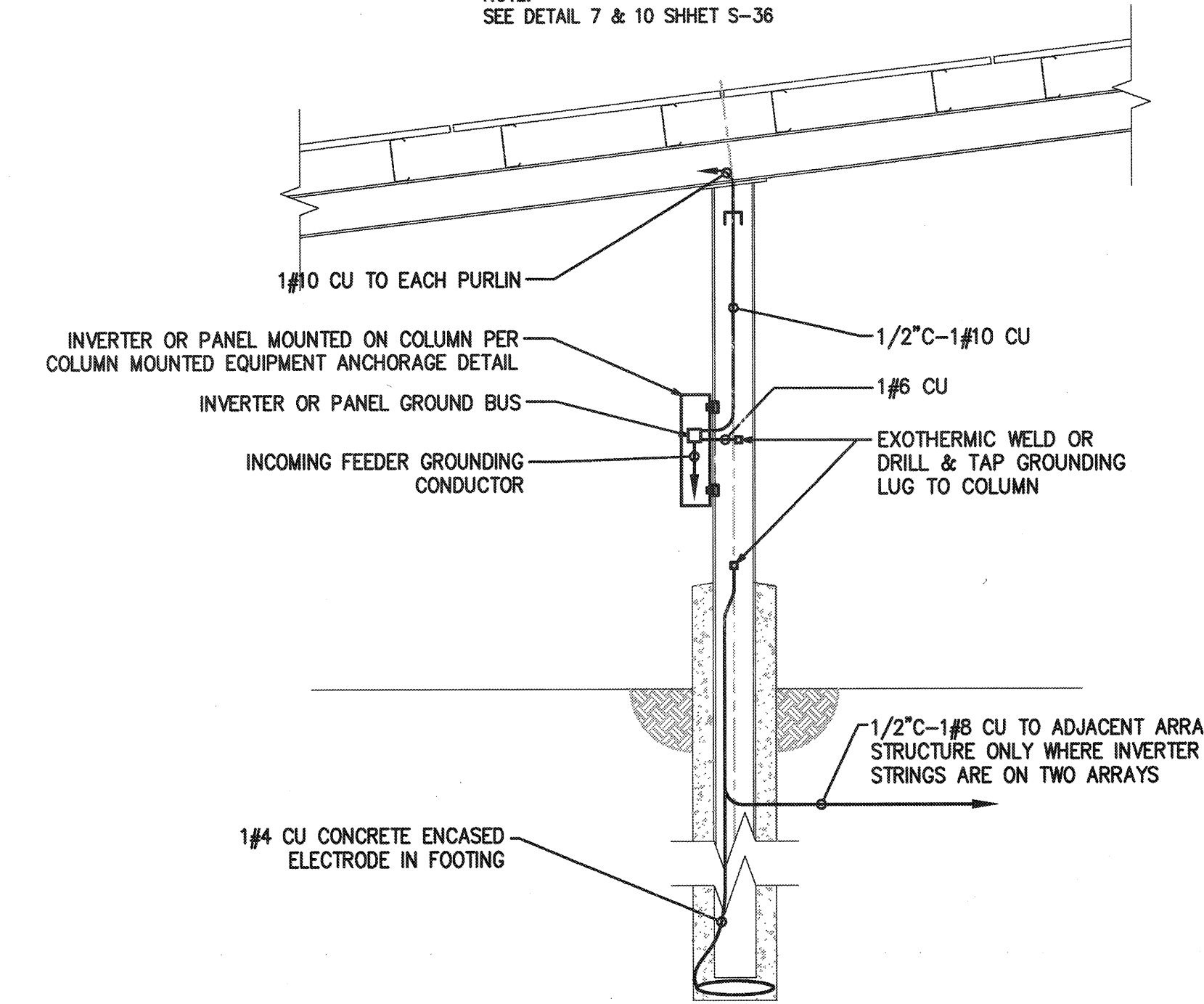
NO SCALE

6



**ARRAY GROUNDING DETAIL**

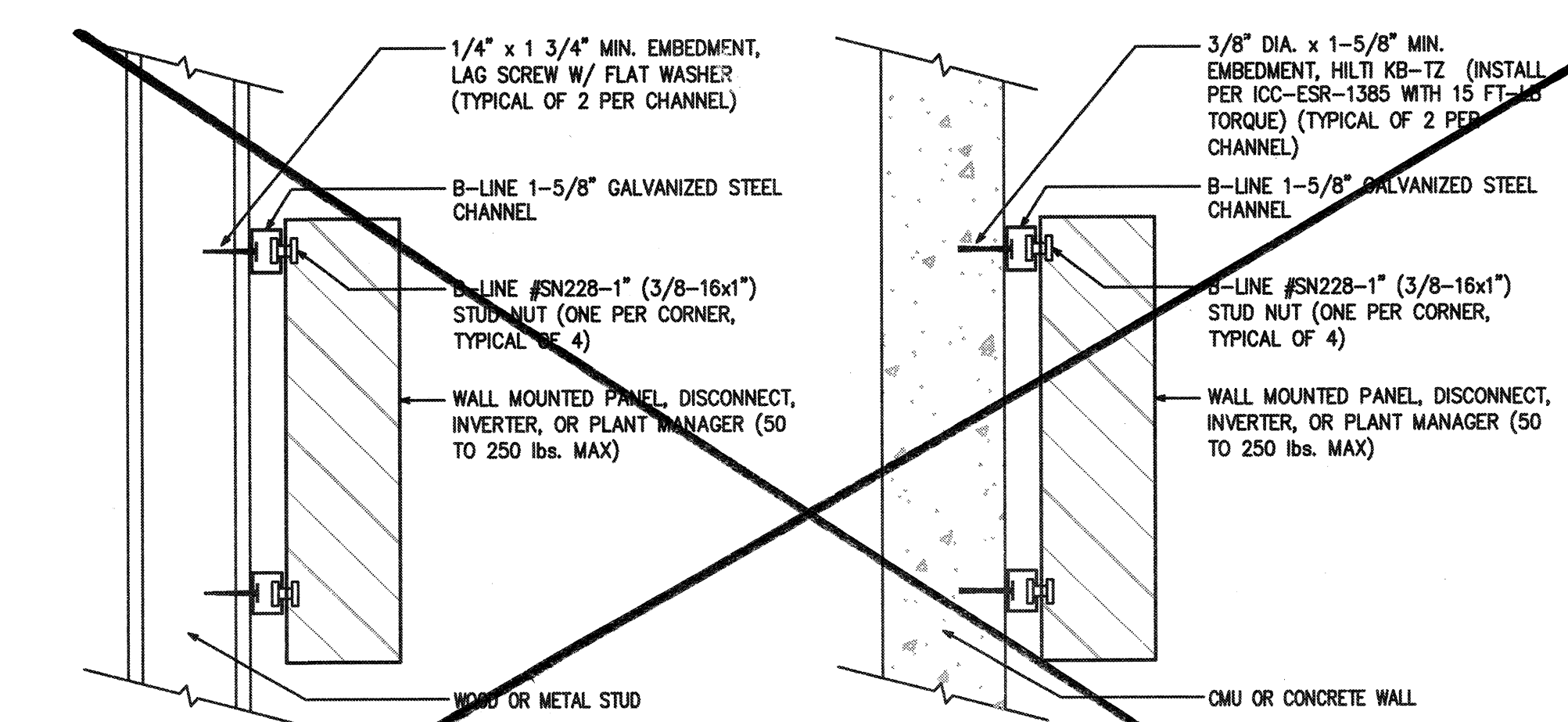
NOTE: SEE DETAIL 7 & 10 SHEET S-36



**SHADE STRUCTURE GROUNDING DETAIL**

NO SCALE NOTE: ONE REQUIRED PER ARRAY STRUCTURE

7



WOOD OR METAL STUD

CMU OR CONCRETE

**WALL MOUNTED EQUIPMENT DETAIL**

NO SCALE

8

DISTRICT  
1300 BAKER STREET  
BAKERSFIELD, CA 93305  
861.631.4600

DEVELOPER  
**ONYX**  
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S 5885

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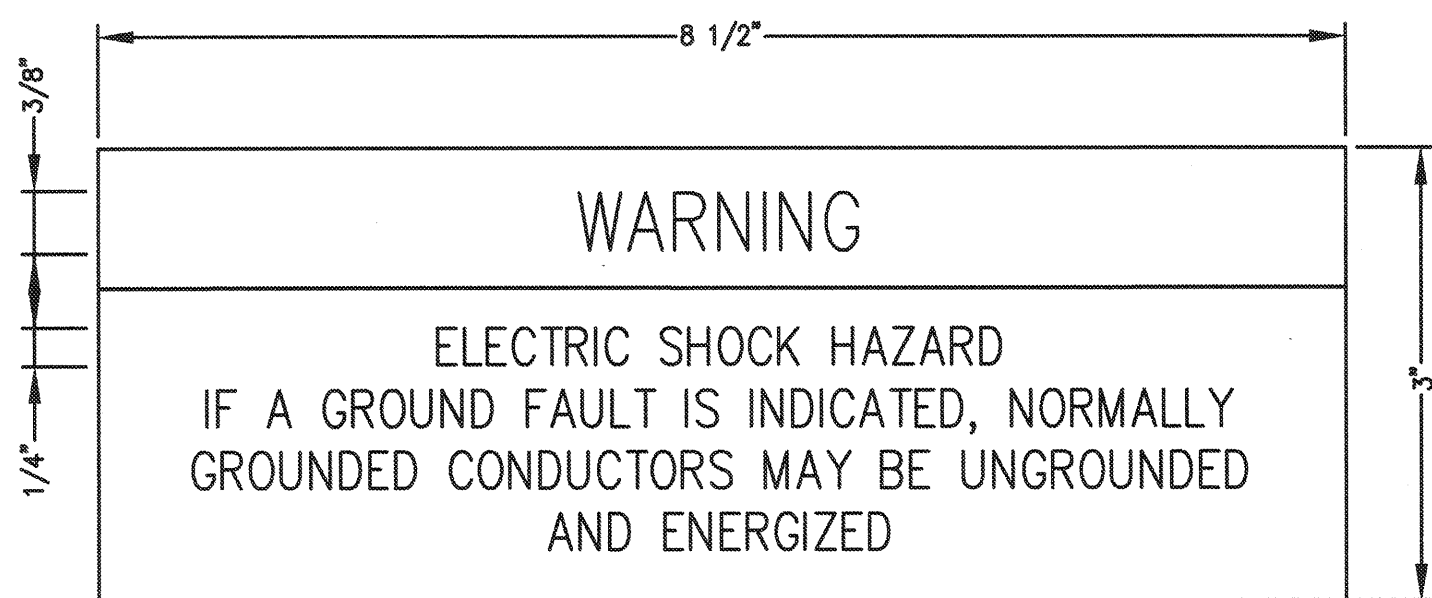
MARK	DATE	DESCRIPTION

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4 STEL JOB # 16-1312  
DATE 01-13-17  
DRAWN BY HDE  
CHECKED RJH

ELECTRICAL DETAILS

**CT-E4.0**

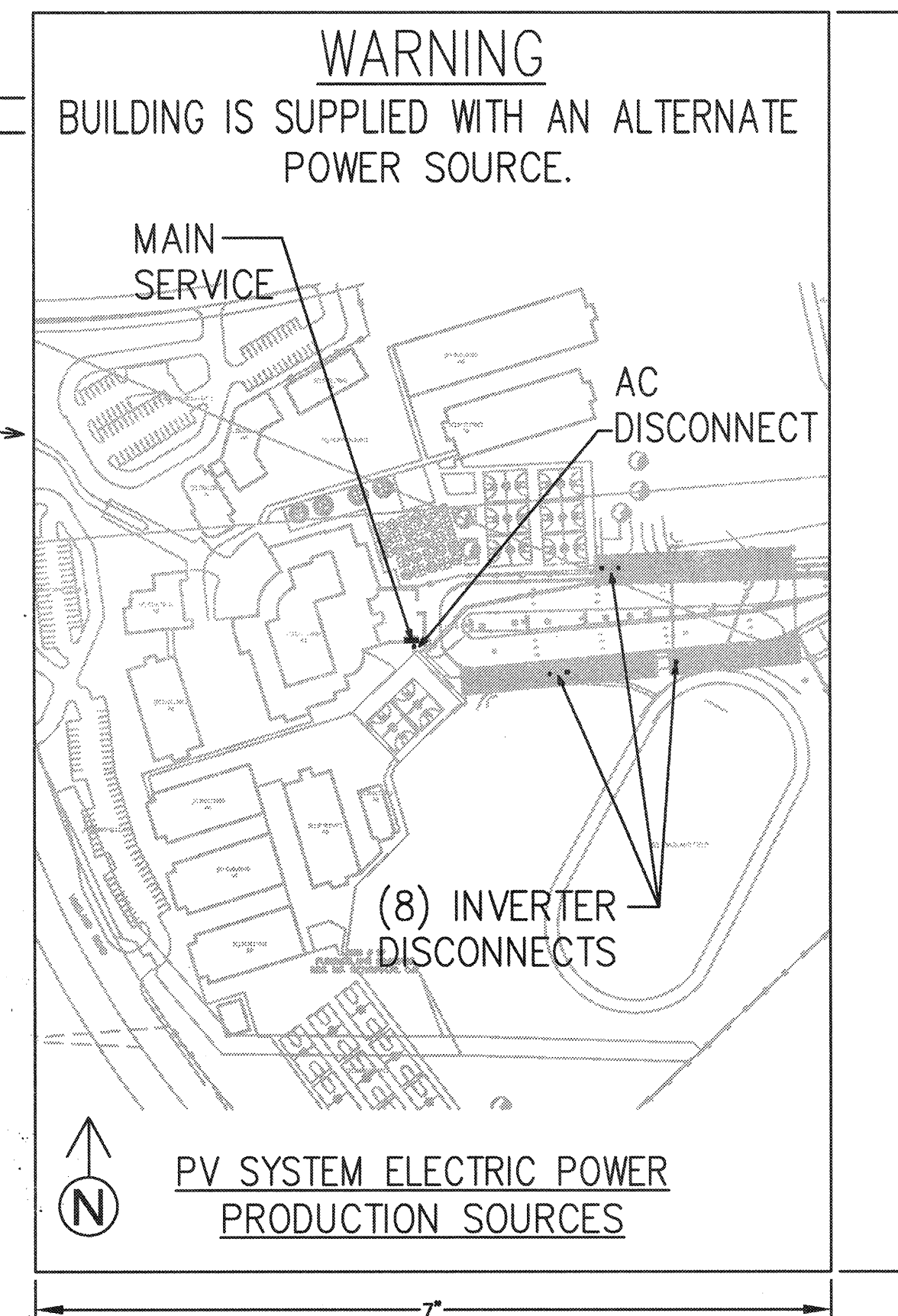
NOTE: IF DWG. IS NOT 24 X 36, IT IS NOT FULL SIZE



SIGNAGE - 1  
SCALE: NTS

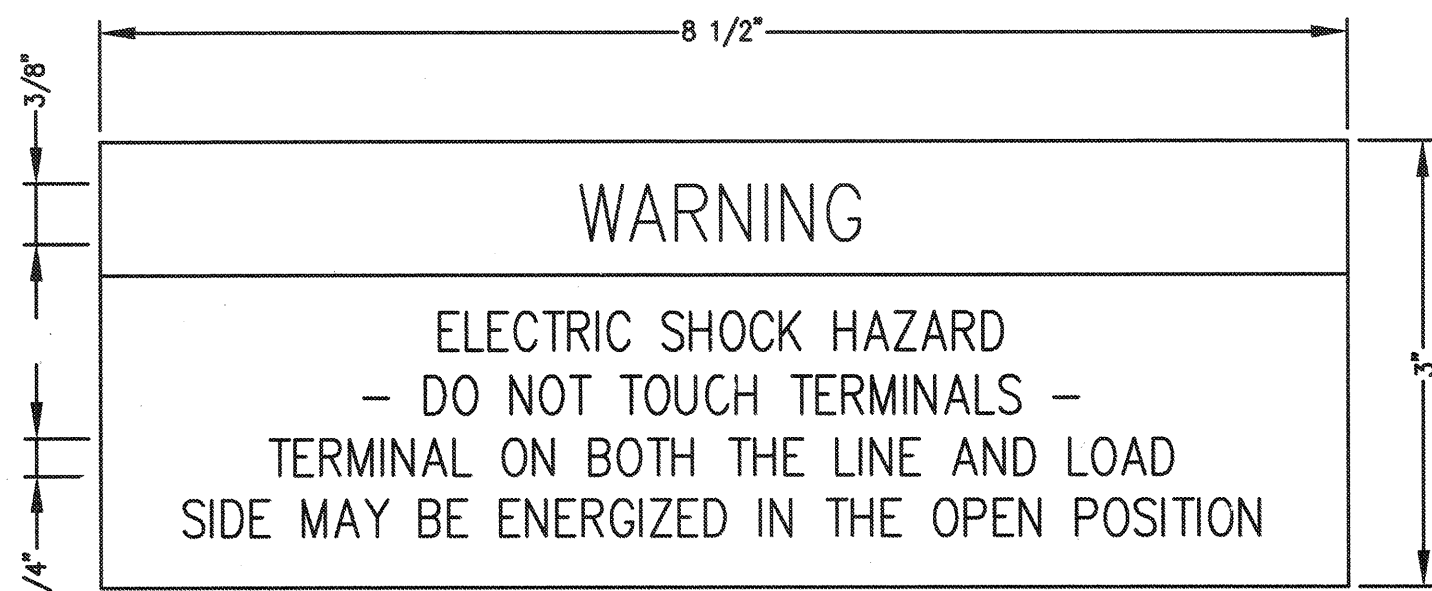
LOCATION:	INVERTERS
BACKGROUND:	RED
LETTERING:	WHITE
NOTES:	

SITE PLAN WITH LOCATIONS OF MAIN AC DISCONNECT, MAIN SERVICE, & INVERTERS.



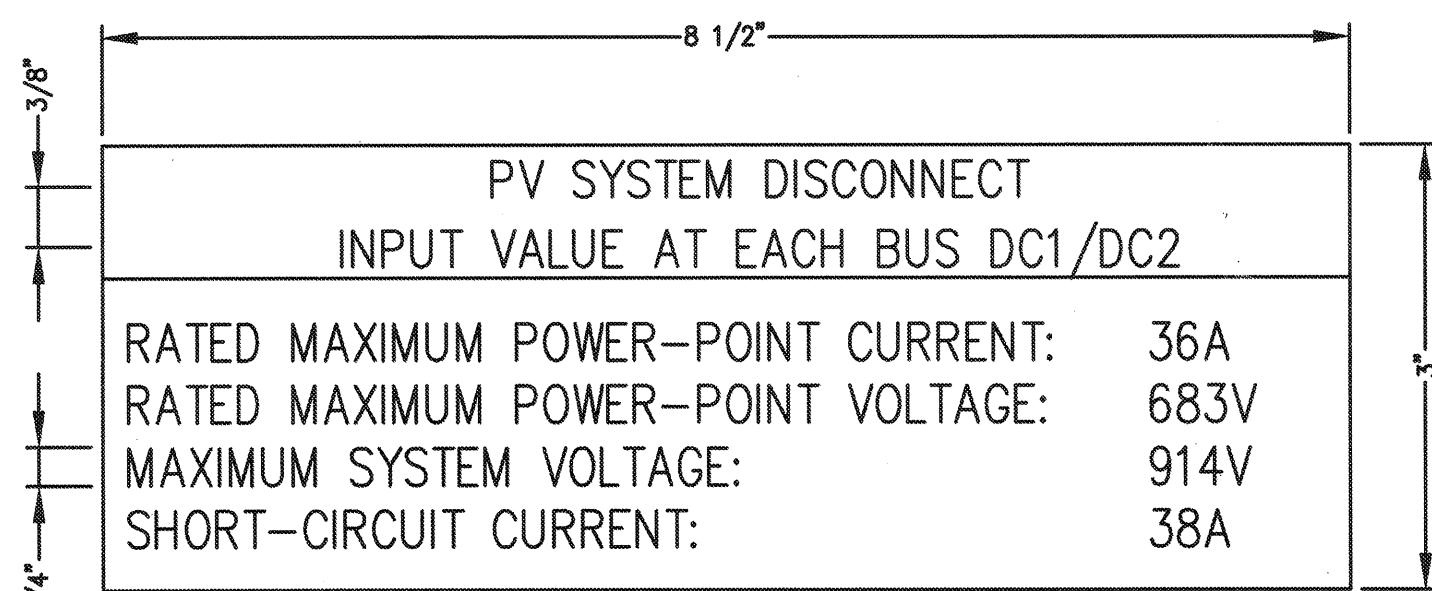
**WARNING LABELS & MARKING NOTES:**

- MARKING IS REQUIRED ON INTERIOR AND EXTERIOR DIRECT-CURRENT (DC) CONDUIT, ENCLOSURES, RACEWAYS, CABLE ASSEMBLIES, JUNCTION BOXES, COMBINER BOXES AND DISCONNECTS.
- THE MATERIALS USED FOR MARKING SHALL BE REFLECTIVE, WEATHER RESISTANT AND SUITABLE FOR THE ENVIRONMENT. MARKING AS REQUIRED IN SECTIONS 605.11.1.2 THROUGH 605.11.1.4 SHALL HAVE ALL LETTERS CAPITAL SIZED WITH A MINIMUM HEIGHT OF 3/8 INCH (9.5 MM) WHITE ON RED BACKGROUND.
- THE MARKING SHALL CONTAIN THE WORDS "WARNING: PHOTOVOLTAIC POWER SOURCE."
- THE MARKING SHALL BE PLACED ADJACENT TO THE MAIN SERVICE DISCONNECT IN A LOCATION CLEARLY VISIBLE FROM THE LOCATION WHERE THE DISCONNECT IS OPERATED.
- MARKING SHALL BE PLACED ON INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES AND CABLE ASSEMBLIES EVERY 10 FEET (3048 MM), WITHIN 1 FOOT (305 MM) OF TURNS OR BENDS AND WITHIN 1 FOOT (305 MM) ABOVE AND BELOW PENETRATIONS OF ROOF/CEILING ASSEMBLIES, WALLS OR BARRIERS.



SIGNAGE - 2  
SCALE: NTS

LOCATION:	AC DISCONNECTS & PANELBOARDS
BACKGROUND:	RED
LETTERING:	WHITE
NOTES:	

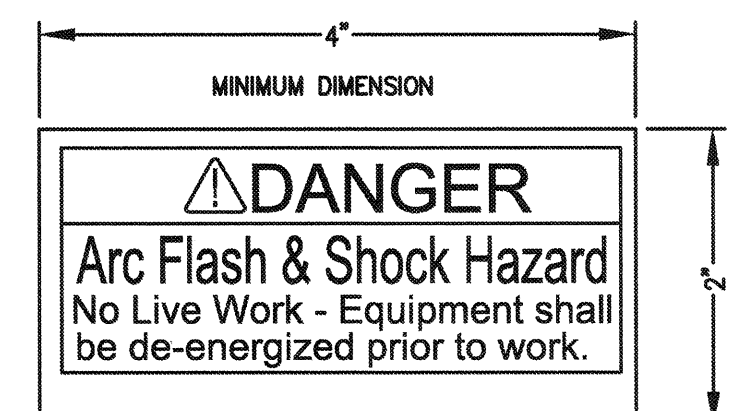


SIGNAGE - 3  
SCALE: NTS

LOCATION:	50.0kW INVERTERS
BACKGROUND:	RED
LETTERING:	WHITE
NOTES:	15-STRING INVERTER

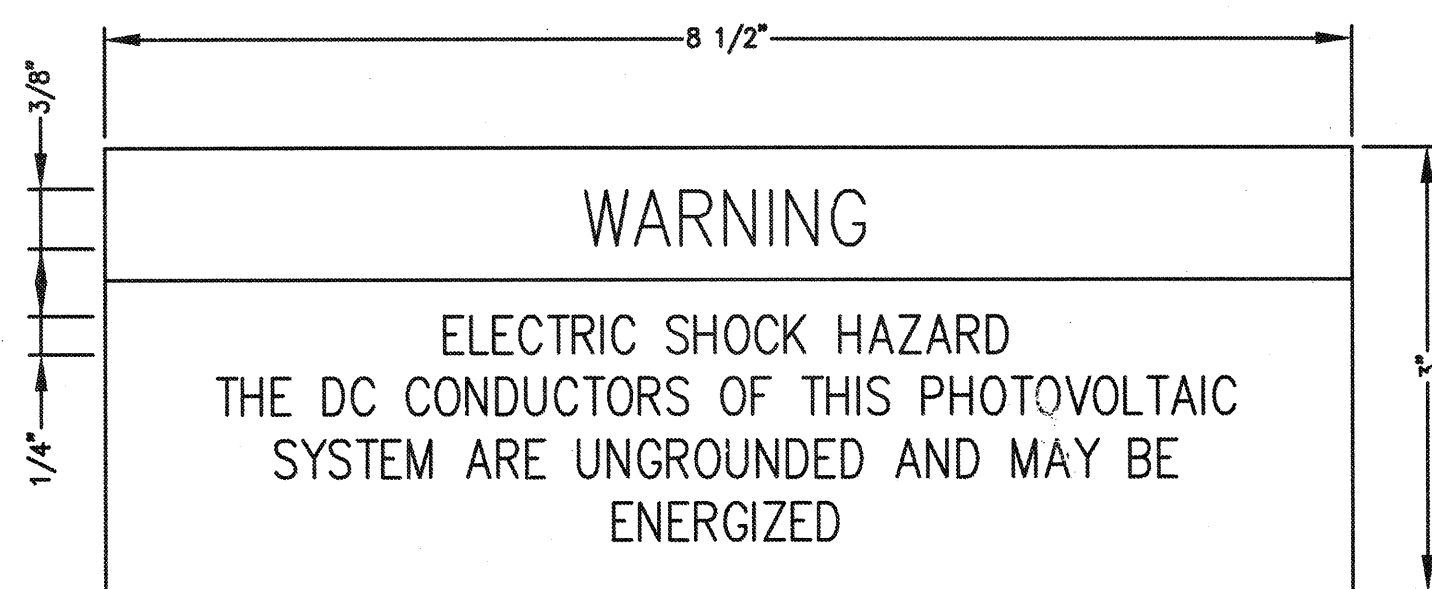
SIGNAGE - 6  
SCALE: NTS

LOCATION:	MAIN SERVICE DISCONNECT
BACKGROUND:	RED
LETTERING:	WHITE
NOTES:	1 SIGN AT (E) SERVICE METER. PLACE ADDITIONAL SIGN AT SOLAR AC SYSTEM DISCONNECT WHERE NOT LOCATED WITHIN 25' & IN VIEW OF (E) SERVICE METER.



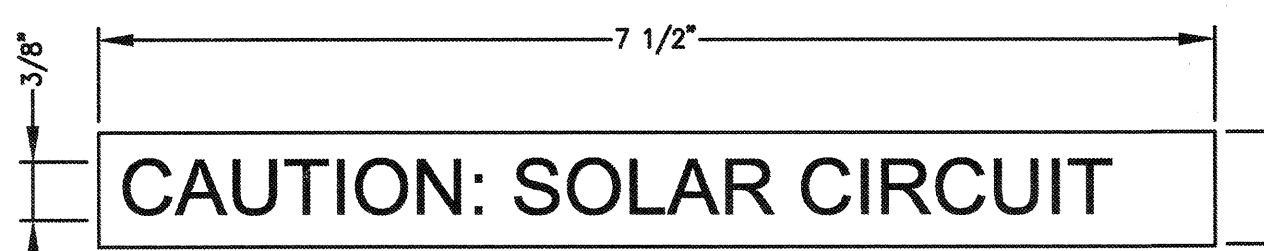
ARC FLASH WITH EXAMPLE TEXT AND DIMENSIONS  
SIGNAGE - 7  
SCALE: NTS

LOCATION:	INVERTER DISCONNECTS, AC DISCONNECT, PANEL
BACKGROUND:	WHITE, RED OR YELLOW
LETTERING:	BLACK AND/OR RED
NOTES:	



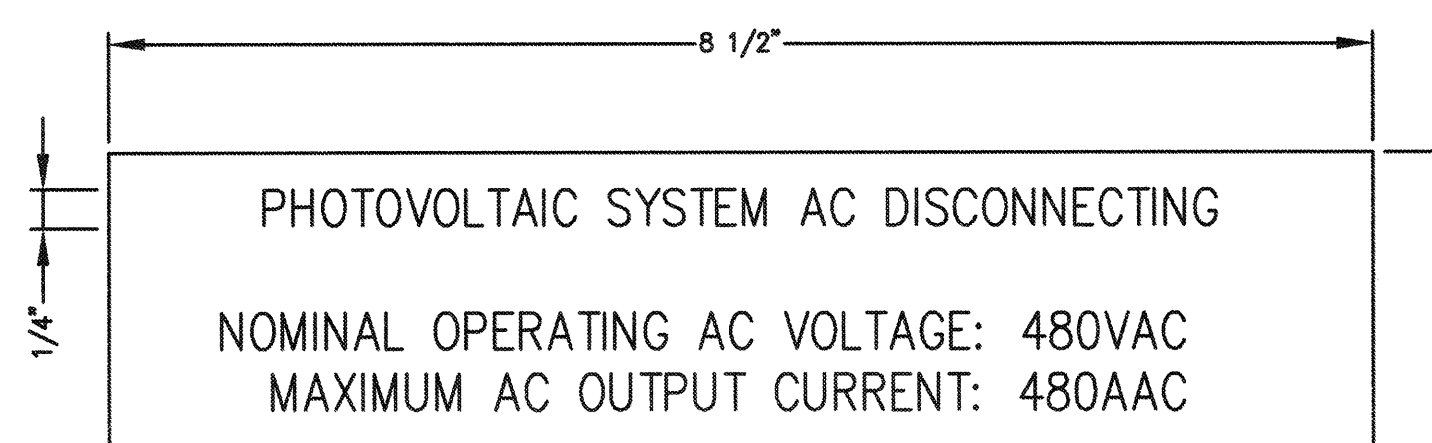
SIGNAGE - 4  
SCALE: NTS

LOCATION:	INVERTERS
BACKGROUND:	RED
LETTERING:	WHITE
NOTES:	



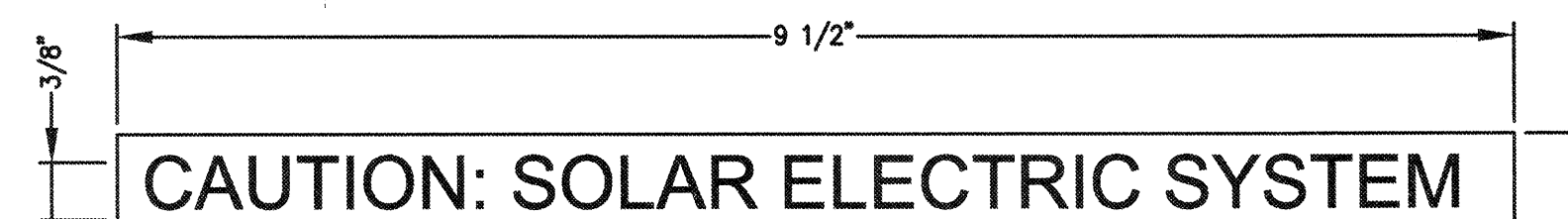
LOCATION:	DC ENCLOSURES, RACEWAYS AND CONDUITS
BACKGROUND:	RED
LETTERING:	WHITE
NOTES:	EXPOSED CONDUIT EVERY 10 FT.

SIGNAGE - 8  
SCALE: NTS



SIGNAGE - 5  
SCALE: NTS

LOCATION:	AC DISCONNECT
BACKGROUND:	RED
LETTERING:	WHITE
NOTES:	



LOCATION:	MAIN SERVICE DISCONNECT
BACKGROUND:	RED
LETTERING:	WHITE
NOTES:	

SIGNAGE - 9  
SCALE: NTS

DISTRICT  
1300 BAKER STREET  
BAKERSFIELD, CA 93305  
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DEVELOPER  
**ONYX**  
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CONTRACTOR  
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S 5885  
D. K. ROBERTSON

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1000 HIGHLAND KNOLLS DR.  
BAKERFIELD, CA 93303

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DIV. OF THE STATE ARCHITECT  
A# 03-117835  
AC FLS SS TN  
DATE JAN 17 2017

REVISIONS		
MARK	DATE	DESCRIPTION

PROJECT#  
ACCOUNTING #  
4 STEL JOB # 16-1312  
DATE 01-13-17  
DRAWN BY HDE  
CHECKED RJH

TYPICAL ELEC. SOLAR WARNING LABELS

**CT-E5.0**



# ULTIMATE GUARDIAN 3.2<sup>Δ</sup>

## PHOTOVOLTAIC SUPPORT STRUCTURES

### PC OWNERSHIP

#### STRUCTURAL ENGINEERING FIRM



109 EAST ESCALONES  
SAN CLEMENTE, CA 92672

PHONE: (949) 388-9333  
FAX: (949) 388-3773

STRUCTURAL ENGINEER  
OF RECORD:

DUSTIN K. ROSEPINK, SE 5885

POINT OF CONTACT:

BRADLEY STEVENS

#### STRUCTURAL STEEL CONTRACTOR



M BAR C  
CONSTRUCTION  
INC.

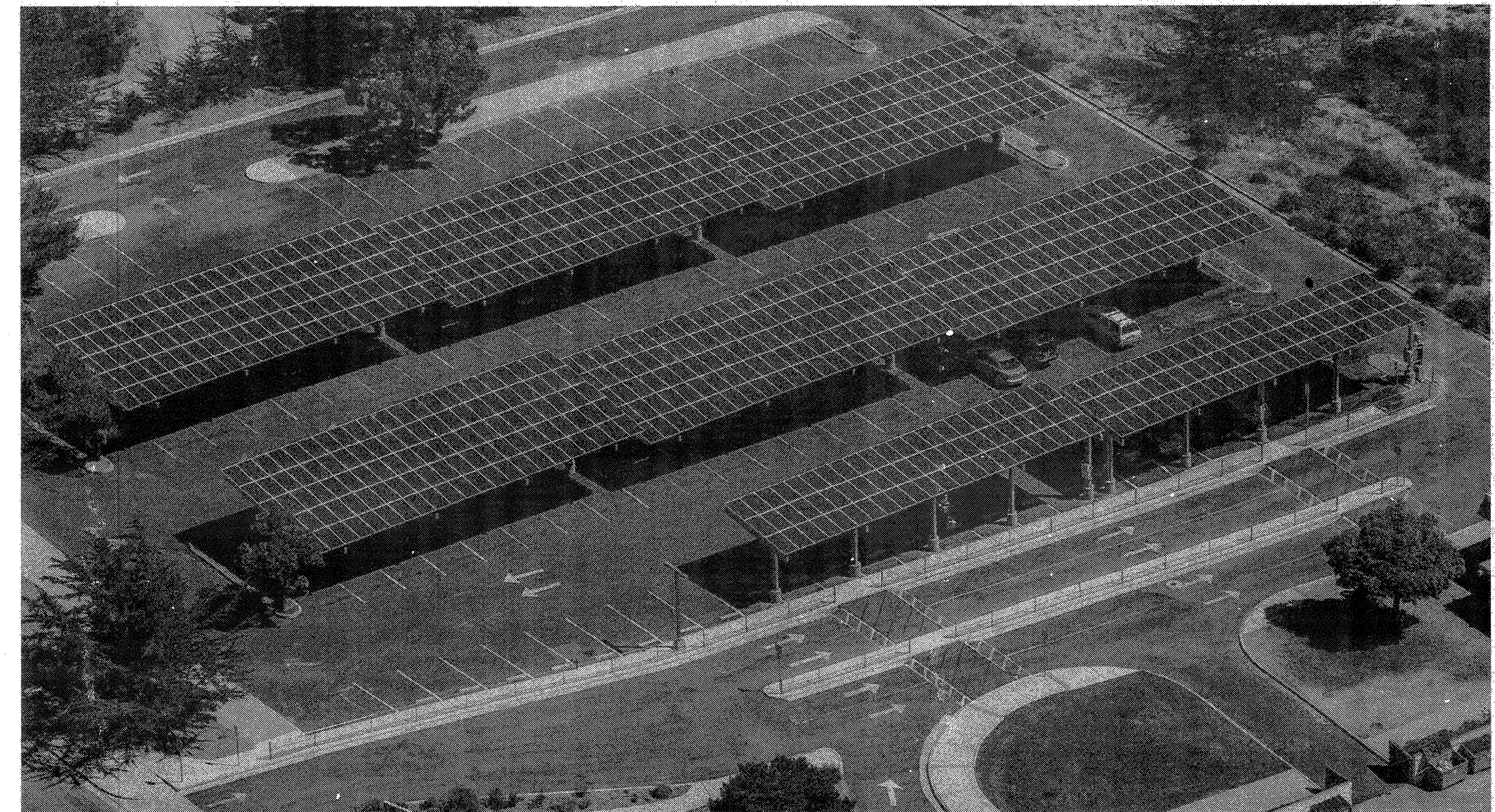
674 RANCHEROS DR  
SAN MARCOS, CA. 92069

PHONE: (760) 744-4131  
FAX: (760) 744-4449

LIC # 869960  
B AND C51

POINT OF CONTACT:

ERIK KRIVOKOPICH



### STANDARD NOTES FOR PC USE

- 4 S.T.E.L. ENGINEERING, INC. SHALL ALWAYS BE GIVEN THE OPPORTUNITY TO BID THE DSA SUBMITTAL PACKAGE (I.E. TO ACT AS THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE).
- FOR CONSTRUCTION COST INFORMATION, CONTACT M BAR C CONSTRUCTION, INC.
- CUSTOM SIZES AND LOADING REQUIRE SUPPLEMENTARY SHOP DRAWINGS AND CALCULATIONS.

### NOTES TO OTC PLAN REVIEWER AND DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE

- THIS PC CONTAINS MEMBERS DESIGNED TO THREE SEPARATE SETS OF SEISMIC CRITERIA.  
CRITERIA #1:  $S_s=1.7, S_1=1.39, C_s=0.907, R=1.25$   
CRITERIA #2:  $S_s=3.2, S_1=1.39, C_s=0.953, R=2.5$   
CRITERIA #3:  $S_s=3.2, S_1=1.39, C_s=1.707, R=1.25$
- THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE IS RESPONSIBLE FOR SELECTING AND UTILIZING THE CORRECT MEMBER SHEETS FOR THE SITE-SPECIFIC CONDITION SUCH THAT THE SITE-SPECIFIC  $S_s$  AND  $S_1$  ARE LESS THAN THOSE CONTAINED WITHIN ONE OF THE SETS OF CRITERIA; OR MEETS THE REQUIREMENTS OF NOTE 2 OF DESIGN PARAMETERS ON S-2.
- THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE IS RESPONSIBLE FOR VERIFYING SITE-SPECIFIC WIND PARAMETERS AT ANY AND ALL SITES WHERE THIS PC IS USED. THIS PC IS DESIGNED BASED ON 110 mph EXPOSURE C. SEE NOTE 1 OF DESIGN CRITERIA ON S-2.
- 3:ITE SPECIFIC PLANS TO SHOW SITE SPECIFIC SOLAR PANEL LAYOUT.
- SITE SPECIFIC SOLAR PANEL LAYOUT SHALL HAVE MAXIMUM DIMENSION TO THE OUTSIDE EDGES OF SOLAR PANELS OR STRUCTURAL STEEL - WHICHEVER IS GREATER - LESS THAN THE MAXIMUM DIMENSIONS OF THE STRUCTURES SHOWN ON THE PC PLANS (OR CHARTS).
- IF THE SNOW LOAD OPTION IS USED THEN  $P_g, P_f, P_s, C_e, I, C_t$  SHALL BE LISTED ON SITE SPECIFIC PLANS.
- IF THE SNOW LOAD OPTION IS USED THEN THE SITE SPECIFIC MAXIMUM SNOW LOADING INCLUDING DRIFT MUST BE EQUAL TO 0 PSF OR LESS THAN 20 PSF BASED ON OPTION SELECTED.
- A SITE SPECIFIC GEOTECHNICAL REPORT SHALL BE SUBMITTED JUSTIFYING THE SOILS VALUES SELECTED IF GREATER THAN 100 PCF FOR LATERAL BEARING AND 1,500 PSF FOR VERTICAL BEARING. SEE SOILS NOTES ON S-3.
- SITE SPECIFIC DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE TO SELECT SOILS CLASS FOR SITE SPECIFIC USE.
- IF A SOLAR PANEL CONNECTION DETAIL IS SHOWN ON THE SITE SPECIFIC PLANS IT SHALL BE IN ACCORDANCE WITH DETAILS ON S-34, S-35 AND/OR S-36 IN THE PC PLANS. IF NO SOLAR PANEL CONNECTION DETAIL IS SHOWN ON THE SITE SPECIFIC PLANS, DETAILS ON S-34, S-35 AND/OR S-36 SHALL GOVERN.
- NO FUTURE STRUCTURAL ROOF DECK OR SHEATHING MAY BE APPLIED TO THE OPEN GRID.
- THE MAXIMUM PSF ALLOWED FOR THE SOLAR PANEL, ELECTRICAL, AND OTHER NON STRUCTURAL ITEMS IS 3.15 PSF.
- WET STAMPED & SIGNED COPIES OF PC PLANS ARE NOT REQUIRED FOR SITE SPECIFIC PC USE.
- DUSTIN ROSEPINK IS NOT ACTING AS SITE SPECIFIC SEOR UNLESS HE IS THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR A SIGNED LETTER HAS BEEN SUBMITTED WITH DSA-1 FORM STATING HE ACCEPTS THE RESPONSIBILITY AS THE SEOR FOR THE SITE.
- DUSTIN ROSEPINK WILL NOT SIGN ANY DSA FORMS (I.E. DSA-5, DSA-8, ECT), REVIEW OR APPROVE ANY SUBMITTALS (I.E. CONCRETE MIX DESIGNS, SHOP DRAWINGS, ETC.) FOR THE SITE SPECIFIC PROJECT UNLESS HE IS ACTING AS THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR THE SITE SPECIFIC STRUCTURAL ENGINEER OF RECORD PER ABOVE NOTE 13.

### LEGAL INFO

- USE OF PC WITHOUT WRITTEN CONSENT FROM 4 S.T.E.L. ENGINEERING, INC. AND/ OR M BAR C CONSTRUCTION, INC. IS STRICTLY PROHIBITED.
- ALL INFORMATION HEREIN IS PROPRIETARY INFORMATION AND UNDER THE OWNERSHIP OF 4 S.T.E.L. ENGINEERING, INC & M BAR C CONSTRUCTION, INC.
- ALL INFORMATION COPYRIGHT 2009, 2011 & 2014.

### SHEET INDEX

S-1	COVER SHEET 1	S-31.3	NOT USED
S-2	COVER SHEET 2	S-31.5	NOT USED
S-3	GENERAL NOTE SPECIFICATIONS	S-31.6	NOT USED
S-4	SAMPLE DSA-103 FORMS	S-32	PURLIN SCHEDULE (ALL SLOPES)
S-5	SECTION PROPERTIES & REBAR DETAILS	S-33	STANDARD PURLIN DETAILS
S-6	T-STRUCTURE FRAMING PLAN	S-34	STANDARD SOLAR PANEL SUPPORT DETAILS
S-7	R=1.25 T-STRUCTURE BEAM/COLUMN SCHEDULE	S-35	ALTERNATE PANEL CONNECTIONS
S-8	R=1.25 T-STRUCTURE NON-CONSTRAINED PIER FOUNDATION SCHEDULE	S-36	OPTIONAL GROUNDING DETAILS
S-9	NOT USED	S-37	STANDARD ELECTRICAL DETAILS
S-10	R=1.25 T-STRUCTURE SPREAD FOOTING SCHEDULE	S-37.1	ALTERNATE CONNECTION DETAILS
S-11	NOT USED	S-38	EQUIPMENT PAD
S-12	R=1.25 T-STRUCTURE BEAM TO COLUMN SCHEDULE	S-39	BRACED UNISTRUT EQUIPMENT RACK 1
S-13	R=2.5 T-STRUCTURE BEAM/COLUMN SCHEDULE	S-40	TUBE STEEL EQUIPMENT RACK 2
S-14	R=2.5 T-STRUCTURE NON-CONSTRAINED PIER FOUNDATION SCHEDULE	S-41	UNISTRUT EQUIPMENT RACK 3
S-15	NOT USED	S-42	EQUIPMENT PAD ENCLOSURE
S-16	R=2.5 T-STRUCTURE SPREAD FOOTING SCHEDULE	S-43	EQUIPMENT PAD ENCLOSURE SCHEDULE
S-17	NOT USED	S-44	PERIMETER FENCE/SCHEDULE
S-18	R=2.5 T-STRUCTURE BEAM TO COLUMN SCHEDULE	S-45	STANDARD ACCESSIBILITY DETAILS
S-19	R=1.25 T-STRUCTURE BEAM/COLUMN SCHEDULE		
S-20	R=1.25 T-STRUCTURE NON-CONSTRAINED PIER FOUNDATION SCHEDULE		
S-21	NOT USED		
S-22	R=1.25 T-STRUCTURE SPREAD FOOTING SCHEDULE		
S-23	NOT USED		
S-24	R=1.25 T-STRUCTURE BEAM TO COLUMN SCHEDULE		
S-25	R=2.5 T-STRUCTURE BEAM/COLUMN SCHEDULE		
S-26	R=2.5 T-STRUCTURE NON-CONSTRAINED PIER FOUNDATION SCHEDULE		
S-27	NOT USED		
S-28	R=2.5 T-STRUCTURE SPREAD FOOTING SCHEDULE		
S-29	NOT USED		
S-30	R=2.5 T-STRUCTURE BEAM TO COLUMN SCHEDULE		
S-31	R=1.25 T-STRUCTURE BEAM/COLUMN SCHEDULE		
S-32	R=1.25 T-STRUCTURE NON-CONSTRAINED PIER FOUNDATION SCHEDULE		

TOTAL: 46 SHEETS

#### BID INFORMATION

THE STEEL STRUCTURES IN THIS PC ARE PROPRIETARY TO M BAR C AND 4 S.T.E.L. ENGINEERING, INC.  
THE STEEL PORTION OF WORK SHALL NOT GO OUT TO BID.

#### PRE-CHECK (PC) DOCUMENT

CODE: 2013 CBC

A SEPARATE PROJECT APPLICATION FOR CONSTRUCTION IS REQUIRED

ENGINEER'S APPROVAL



DATE SIGNED  
AUGUST 04, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

A 03-117835

AC: FLS / SS: TP  
DATE: JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES

APPL. C. 04-113425  
DATE: AUG 04 2015  
AC: S. DAVISON  
PLS: R. ROSEKAL  
SS: GARY LAW

M BAR C  
CONSTRUCTION  
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674 RANCHEROS DR  
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92069  
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LIC # 869960  
B AND C51

4 STEEL ENGINEERING  
STRUCTURAL ENGINEERING  
109 EAST ESCALONES  
SAN CLEMENTE, CA 92672  
PHONE: (949) 388-9333  
FAX: (949) 388-3773

PHOTOVOLTAIC  
STRUCTURES  
COVER SHEET 1

DRAWN  
MAP  
CHECKED  
DKR  
DATE  
8/04/15  
4 STEEL JOB NO.  
13-1010  
SHEET  
S-1  
1 OF 45 SHEETS



# PHOTOVOLTAIC CANOPIES

## CONSTRUCTION OPTIONS

\*ALL FRAMING OPTIONS AVAILABLE WITH 45" O.C. OR 80" O.C. MAXIMUM PURLIN SPACING.

\*ALL OPTIONS AVAILABLE WITH MAXIMUM COLUMN SPACING OF 18'-0", 20'-0" & 27'-0".

\*ALL 18'-0" AND 20'-0" COLUMN SPACING OPTIONS IN ALL WIDTHS ARE AVAILABLE IN A 20 psf SNOW LOAD OPTION.

\*ALL OPTIONS INCLUDE OPTIONS FOR DRILLED PIERS AND SPREAD FOOTINGS.

- ~~20'-0" WIDE, 7.49' SLOPE~~
- ~~21'-0" WIDE, 7.49' SLOPE~~
- ~~24'-9" WIDE, 7.49' SLOPE~~
- ~~36'-9" WIDE, 7.49' SLOPE~~
- ~~38'-6" WIDE, 7.49' SLOPE~~
- ~~42'-6" WIDE, 7.49' SLOPE~~
- ~~18'-6" WIDE, 10' SLOPE~~
- ~~21'-1" WIDE, 10' SLOPE~~
- ~~24'-6" WIDE, 10' SLOPE~~
- ~~36'-0" WIDE, 10' SLOPE~~
- ~~38'-4" WIDE, 10' SLOPE~~
- ~~41'-10" WIDE, 10' SLOPE~~

## STRUCTURAL DATA

LATERAL RESISTING SYSTEM.....CANTILEVERED COLUMN FOUNDATION.....PIER AND SPREAD FOOTING  
 MINIMUM REQUIRED SEISMIC SEPARATION.....8"  
 TESTING AND INSPECTION LIST.....SEE SHEETS S-3 & S-4  
 DESIGNED TO SUPPORT FIRE SPRINKLERS?.....CONDITIONAL  
 YES.....IF WEIGHT OF SPRINKLER SYSTEM COMBINED WITH SOLAR SYSTEM IS LESS THAN 3.15 psf  
 NO.....IF WEIGHT OF SPRINKLER SYSTEM COMBINED WITH SOLAR SYSTEM IS MORE THAN 3.15 psf

## CODES

TITLE 24 CODES:  
 2013 CALIFORNIA ADMINISTRATIVE CODE (CAC) .....(PART 1, TITLE 24, CCR)  
 2013 CALIFORNIA BUILDING CODE (CBC), VOLUMES 1 AND 2.....(PART 2, TITLE 24, CCR)  
 (2012 INTERNATIONAL BUILDING CODE WITH 2013 CALIFORNIA AMENDMENTS)  
 2013 CALIFORNIA ELECTRICAL CODE .....(PART 3, TITLE 24, CCR)  
 (2011 NATIONAL ELECTRICAL CODE WITH 2013 CALIFORNIA AMENDMENTS)  
 2013 CALIFORNIA MECHANICAL CODE (CMC) .....(PART 4, TITLE 24, CCR)  
 (2012 UNIFORM MECHANICAL CODE WITH 2013 CALIFORNIA AMENDMENTS)  
 2013 CALIFORNIA PLUMBING CODE (CPC) .....(PART 5, TITLE 24, CCR)  
 (2012 UNIFORM PLUMBING CODE WITH 2013 CALIFORNIA AMENDMENTS)  
 2013 CALIFORNIA ENERGY CODE .....(PART 6, TITLE 24, CCR)  
 (2013 EDITION CALIFORNIA ENERGY COMMISSION BUILDING ENERGY STANDARDS)  
 2013 CALIFORNIA FIRE CODE (CFC) .....(PART 9, TITLE 24, CCR)  
 (2012 INTERNATIONAL FIRE CODE WITH 2013 CALIFORNIA AMENDMENTS)  
 2013 CALIFORNIA GREEN BUILDING STANDARDS CODE .....(PART 11, TITLE 24, CCR)  
 2013 CALIFORNIA REFERENCED STANDARDS CODE .....(PART 12, TITLE 24, CCR)

NFPA 13 - 2013  
 NFPA 72 - 2013

REFERENCE CODE SECTIONS FOR APPLICABLE STANDARDS:  
 2013 CBC, CHAPTER 35  
 2013 CFC, CHAPTER 47

## DESIGN PARAMETERS

RISK CATEGORY II  
 ROOF LIVE LOAD (Lr):  
 WITH SOLAR PANELS INSTALLED: 0 psf (PER IR 16-8)  
 OPEN TRELLIS SYSTEM: 10 psf (PER IR 16-8)  
 POINT LOAD: 300 lb (PER IR 16-8)  
 MAX SNOW LOAD (GROUND) (S): 0 psf, 20 psf (SEE OPTIONS)

MAX DEAD LOAD:  
 SOLAR PANEL/RACKING/ELEC: 3.15 psf  
 PURLIN: 1.59 psf  
 ROOF DEAD LOAD TO BEAM (D): 4.74 psf MAX

WIND: DIRECTIONAL PROCEDURE  
 BASIC WIND SPEED: 110' mph (3 SECOND GUST)  
 WIND EXPOSURE: C'  
 INTERNAL PRESSURE: N/A (OPEN STRUCTURE)  
 Kd=0.85  
 Kz=0.88  
 Kzt=1.00

SEISMIC:  
 SEISMIC IMPORTANCE FACTOR: 1.0  
 CRITERIA #1  
 SHORT SPECTRAL RESPONSE: S<sub>s</sub>=1.700<sup>2</sup>  
 LONG SPECTRAL RESPONSE: S<sub>l</sub>=1.390<sup>2</sup>  
 SITE CLASS: D  
 SHORT SPECTRAL RESPONSE: S<sub>ps</sub>=1.133<sup>2</sup>  
 LONG SPECTRAL RESPONSE: S<sub>pl</sub>=1.390<sup>2</sup>  
 RESPONSE MODIFICATION FACTOR: R=1.25  
 SEISMIC RESPONSE COEFFICIENT: C<sub>s</sub>=0.907<sup>2</sup>

DESIGN BASE SHEAR:  
 T-STRUCTURES: 8,257.9<sup>2</sup> lb MAX (VARIES DUE TO OPTIONS)  
 OFFSET T-STRUCTURES: 4,761.0<sup>2</sup> lb MAX (VARIES DUE TO OPTIONS)

CRITERIA #2  
 SHORT SPECTRAL RESPONSE: S<sub>s</sub>=3.20<sup>2</sup>  
 LONG SPECTRAL RESPONSE: S<sub>l</sub>=1.390<sup>2</sup>  
 SITE CLASS: D  
 SHORT SPECTRAL RESPONSE: S<sub>ps</sub>=2.133<sup>2</sup>  
 LONG SPECTRAL RESPONSE: S<sub>pl</sub>=1.390<sup>2</sup>  
 RESPONSE MODIFICATION FACTOR: R=2.5  
 SEISMIC RESPONSE COEFFICIENT: C<sub>s</sub>=0.853<sup>2</sup>

DESIGN BASE SHEAR:  
 T-STRUCTURES: 7,663.2<sup>2</sup> lb MAX (VARIES DUE TO OPTIONS)  
 OFFSET T-STRUCTURES: 4,888.3<sup>2</sup> lb MAX (VARIES DUE TO OPTIONS)

CRITERIA #3  
 SHORT SPECTRAL RESPONSE: S<sub>s</sub>=3.20<sup>2</sup>  
 LONG SPECTRAL RESPONSE: S<sub>l</sub>=1.390<sup>2</sup>  
 SITE CLASS: D  
 SHORT SPECTRAL RESPONSE: S<sub>ps</sub>=2.133<sup>2</sup>  
 LONG SPECTRAL RESPONSE: S<sub>pl</sub>=1.390<sup>2</sup>  
 RESPONSE MODIFICATION FACTOR: R=1.25  
 SEISMIC RESPONSE COEFFICIENT: C<sub>s</sub>=1.707<sup>2</sup>

DESIGN BASE SHEAR:  
 T-STRUCTURES: 15,544.3<sup>2</sup> lb MAX (VARIES DUE TO OPTIONS)  
 OFFSET T-STRUCTURES: 9,994.5<sup>2</sup> lb MAX (VARIES DUE TO OPTIONS)

SEISMIC DESIGN CATEGORY: E  
 SEISMIC FORCE RESISTING SYSTEM: CANTILEVERED COLUMN EQUIVALENT LATERAL FORCE

ANALYSIS PROCEDURE:.....

### NOTES:

- THIS PC'S WIND FORCE RESISTING SYSTEM IS DESIGNED TO q<sub>w</sub> = 23.24 psf, WHICH CORRESPONDS TO 110 mph EXPOSURE C WITH THE ABOVE USED K<sub>z</sub> K<sub>d</sub> AND K<sub>zt</sub>. THIS PC MAY BE USED IN ANY WIND ZONE WITH q<sub>w</sub> ≤ 23.24 psf. FOR EXAMPLE: THIS PC MAY BE USED AT A SITE WITH 133 mph WIND EXPOSURE B WITH K<sub>d</sub> = 0.85, K<sub>z</sub> = 0.60 AND K<sub>zt</sub> = 1.00 RESULTS IN q<sub>w</sub> = 23.20 psf.
- THIS PC'S SEISMIC FORCE RESISTING SYSTEM IS GOVERNED BY C<sub>s</sub> = 0.907, C<sub>s</sub> = 0.853, OR C<sub>s</sub> = 1.707, DEPENDING ON THE DESIGN CRITERIA AS GIVEN ABOVE (FOR EXAMPLE: R = 1.25, S<sub>s</sub> = 1.7 OR R=2.5, S<sub>s</sub> = 3.2). THIS PC MAY BE USED AT ANY SITE SUCH THAT THE SITE SPECIFIC VALUE OF C<sub>s</sub> IS LESS THAN THE C<sub>s</sub> VALUE OF THE DESIRED CRITERIA SET (E.G. CRITERIA #2) WHILE USING EITHER R = 1.25 OR R = 2.5 WITH SITE SPECIFIC SEISMIC PARAMETERS. FOR EXAMPLE: S<sub>s</sub> = 3.3, S<sub>l</sub> = 1.4, R = 2.5 WITH SITE CLASS A WILL HAVE C<sub>s</sub> = 0.704 < 0.853 THEREFORE CRITERIA #2 OF THE PC MAY BE USED AT THIS SITE.

## OPTIONS SHEET INDEX

THE FOLLOWING CHART LISTS THE DRAWING SHEETS REQUIRED FOR EACH MAJOR OPTION. WHEN ONE OR MORE OF THE OPTIONS ARE CHOSEN THE LISTED REFERENCE SHEETS MUST BE INCLUDED IN THE SITE SPECIFIC DRAWING SET.

OPTIONS	SHEET
ALWAYS REQUIRED	S-1 THROUGH S-5; S-32 THOUGH S-37
T-STRUCTURE, R=1.25 S <sub>s</sub> ≤ 1.7	S-6 THROUGH S-12
T-STRUCTURE, R=2.5 S <sub>s</sub> ≤ 3.2	S-6, S-13 THROUGH S-18
T-STRUCTURE, R=1.25 S <sub>s</sub> ≤ 3.2	S-6, S-18.1 THROUGH S-18.6
OFFSET T-STRUCTURE, R=1.25 S <sub>s</sub> ≤ 1.7	S-19 THROUGH S-25
OFFSET T-STRUCTURE, R=2.5 S <sub>s</sub> ≤ 3.2	S-19, S-26 THROUGH S-31
OFFSET T-STRUCTURE, R=1.25 S <sub>s</sub> ≤ 3.2	S-19, S-31.1 THROUGH S-31.6
EQUIPMENT PAD	S-38
BRACED UNISTRUT EQUIPMENT RACK	S-39
TUBE STEEL EQUIPMENT RACK	S-40
UNISTRUT EQUIPMENT RACK	S-41
EQUIPMENT PAD ENCLOSURE	S-42 & S-43
PERIMETER FENCE	S-44
STANDARD ACCESSIBILITY DETAILS	S-45

## GENERAL NOTES

- ALL WORK SHALL CONFORM TO TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
- CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY ADDENDA OR CONSTRUCTION CHANGE DOCUMENTS APPROVED BY THE DIVISION OF THE STATE ARCHITECT, AS REQUIRED BY SECTION 4-338, PART 1, TITLE 24, CCR.
- A 'DSA CERTIFIED' PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY THE DIVISION OF THE STATE ARCHITECT SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE (PART 1, TITLE 24, CCR).
- A 'DSA CERTIFIED' INSPECTOR WITH CLASS 2 CERTIFICATION IS REQUIRED FOR THIS PROJECT.
- A 'DSA CERTIFIED' INSPECTOR WHO IS SPECIFICALLY QUALIFIED IN MECHANICAL AND ELECTRICAL WORK WILL BE REQUIRED FOR THIS PROJECT.
- A DSA ACCEPTED TESTING LABORATORY DIRECTLY EMPLOYED BY THE SCHOOL BOARD SHALL CONDUCT ALL THE REQUIRED TESTS AND INSPECTIONS FOR THE PROJECT.
- FOOD HANDLING FACILITIES SHALL COMPLY WITH ALL LOCAL HEALTH REQUIREMENTS AND CALIFORNIA UNIFORM RETAIL FOOD FACILITIES LAWS.
- SWIMMING POOL SHALL COMPLY WITH ALL LOCAL HEALTH DEPARTMENT REQUIREMENTS.
- DRINKING WATER WELL SHALL COMPLY WITH ALL LOCAL HEALTH DEPARTMENT REQUIREMENTS.
- GRADING PLANS, DRAINAGE IMPROVEMENTS, ROAD AND ACCESS REQUIREMENTS AND ENVIRONMENTAL HEALTH CONSIDERATIONS SHALL COMPLY WITH ALL LOCAL ORDINANCES.
- IF THE PROJECT IS DIVIDED INTO INCREMENTS: THE SCOPE OF WORK FOR EACH INCREMENT MUST BE CLEARLY SPECIFIED ON THE TITLE SHEET OF ALL INCREMENTS SUBMITTED.

## FIRE LIFE SAFETY

AUTOMATIC FIRE SPRINKLERS REQUIRED? (Y/N).....N

## BUILDING DATA

TYPE OF CONSTRUCTION.....IIB  
 OCCUPANCY.....S-2

NOTE: OCCUPANCIES OTHER THAN S-2 (OPEN PARKING AREAS) MAY BE UTILIZED AS LONG AS THEY CONFORM TO THE FOLLOWING:

- THE RISK CATEGORY OF THE STRUCTURE REMAINS RISK II PER THE 2013 CBC TABLE 1604A.5.
- THE OCCUPANCY IS DETERMINED TO MEET WITH THE 2013 CBC CHAPTER 3 AND ITS REQUIREMENTS.
- THE ALLOWABLE HEIGHT AND BUILDING AREA IS LIMITED TO THE REQUIREMENTS IN THE 2013 CBC TABLE 503, AND THE REQUIREMENTS OF THE 2013 CBC TABLE 1604A.5 TO REMAIN A CATEGORY II STRUCTURE.

NUMBER OF STORIES.....1  
 BUILDING AREAS.....UNLIMITED  
 (PER 2013 CBC SECTIONS 406.5.4 AND 406.5.5)

MODULE SIZES.....VARY WITH OPTIONS  
 BUILDING LENGTH:  
 18'-6" TO 42'-6" WIDTH.....MAX 500'-0" LENGTH

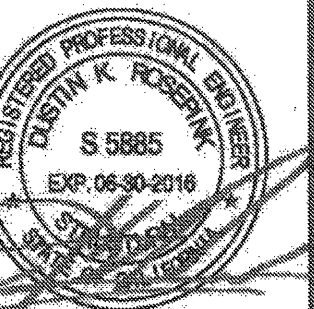
NOTE: NO SEISMIC AND/OR THERMAL EXPANSION JOINTS REQUIRED ALONG THE LENGTH OF THE STRUCTURES. (ALL JOINTS ARE INTERNAL)

## PRE-CHECK (PC) DOCUMENT

CODE: 2013 CBC

A SEPARATE PROJECT APPLICATION FOR CONSTRUCTION IS REQUIRED

ENGINEER'S APPROVAL



7/22/15

DATE SIGNED  
 MMM DD, 2015

IDENTIFICATION STAMP  
 DIV. OF THE STATE ARCHITECT

A03-117835

AC FLS SS TH  
 DATE JAN 17 2017

SITE SPECIFIC  
 DSA APPROVAL

IDENTIFICATION STAMP  
 DIV. OF THE STATE ARCHITECT  
 OFFICE OF REGULATION SERVICES

APPLP: 04-118425

AC FLS PF SS G  
 DATE JUL 27 2015

PRE-CHECK (PC) DOCUMENT  
 CODE: 2013 CBC  
 A SEPARATE PROJECT APPLICATION FOR CONSTRUCTION IS REQUIRED.

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ASTEL ENGINEERING  
 STRUCTURAL ENGINEERING  
 PHONE: (949) 388-9333  
 FAX: (949) 388-3773  
 107 EAST ESCALONES  
 SAN CLEMENTE, CA 92672

PHOTOVOLTAIC STRUCTURES COVER SHEET 2

DRAWN MAP  
 CHECKED DKR  
 DATE 5/29/15  
 4STEL JOB NO. 13-1010  
 SHEET S-2

2 OF 46 SHEETS

## SOILS NOTES:

- IF NO GEOTECHNICAL REPORT IS SUPPLIED AT THE TIME OF DSA REVIEW ADDRESSING SITE-SPECIFIC PARAMETERS, FOUNDATION SELECTIONS SHALL BE BASED ON CLASS W SOILS (SOIL CLASS 5 OF CBC TABLE 1806A.2 WITH DOUBLING OF LATERAL BEARING PRESSURE FOR STRUCTURES NOT ADVERSELY AFFECTED BY 1/2" MOTION AT GROUND SURFACE) IN THE SOIL CLASS TABLE BELOW.
- WHEN A GEOTECHNICAL REPORT IS SUPPLIED, THE GEOTECHNICAL ENGINEER SHALL REVIEW THE SITE CONDITIONS AND SUPPLY THE FINAL SOILS CLASS TO BE USED FROM THE BELOW TABLE. IN MAKING A SELECTION OF THE APPROPRIATE SOILS CLASS, THE GEOTECHNICAL ENGINEER SHOULD TAKE INTO CONSIDERATION: ANY AND ALL ALLOWED INCREASES, BASIS OF DEPTH CALCULATION, ACTUAL LOADING CONDITIONS, AND SITE CONDITIONS. THESE CONSIDERATIONS INCLUDE BUT ARE NOT LIMITED TO:
  - ALLOWABLE LATERAL BEARING PRESSURE MAY BE DOUBLED DUE TO THE STRUCTURES NOT BEING ADVERSELY AFFECTED BY 1/2" MOTION AT THE GROUND SURFACE DUE TO SHORT-TERM LATERAL LOADS PER 2013 CBC 1806A.3.4.
  - ALLOWABLE LATERAL BEARING PRESSURE MAY BE CONSIDERED TO ACT OVER AN AREA EQUAL TO TWO TIMES THE PIER DIAMETER DUE TO LARGE PIER SPACING. IF THIS IS ALLOWED, THE ALLOWABLE LATERAL BEARING PRESSURE MAY BE DOUBLED, ACTING OVER THE ACTUAL PIER DIAMETER.
  - THE GEOTECHNICAL REPORT SHALL SPECIFY WHETHER THE INCREASES TO ALLOWABLE LATERAL BEARING PRESSURE FOR 1/2" MOTION AT GROUND SURFACE AND FOR INCREASED PIER SPACING MAY BE APPLIED AT THE SAME TIME.
  - THE SOILS CLASSES IN THE CHART BELOW REFLECT THE BASE VALUES USED IN THE CALCULATIONS TO DETERMINE THE REQUIRED FOUNDATION DEPTHS.
  - THE FOUNDATION DEPTHS SHOWN ON SHEETS S-8, S-10, S-14, S-16, S-18.2, S-18.4, S-21, S-23, S-27, S-29, S-31.2 AND S-31.4, REFLECT THE GOVERNING DEPTH REQUIREMENT DUE TO EITHER LATERAL LOAD OR VERTICAL LOAD.
  - FOR LATERAL LOADING, THE FOUNDATION DEPTHS SHOWN ON SHEETS S-8, S-10, S-14, S-16, S-18.2, S-18.4, S-21, S-23, S-27, S-29, S-31.2 AND S-31.4, UTILIZE THE LATERAL BEARING PRESSURES FROM THE BELOW SOIL CLASS CHART, WHICH HAVE BEEN INCREASED BY 33% FOR SHORT DURATION LOADS USING ALTERNATIVE ASD LOAD COMBINATIONS PER 2013 CBC 1806A.1.
  - FOR VERTICAL LOADING, THE FOUNDATION DEPTHS SHOWN ON SHEETS S-8, S-14, S-18.2, S-18.4, S-21, S-27, S-31.2 AND S-31.4 ARE DESIGNED BASED ON EITHER END BEARING OR SKIN FRICTION, WHERE SKIN FRICTION HAS BEEN BASED ON 2013 CBC 1810A.3.3.1.4 (I.E. SKIN FRICTION BASED ON 1/6 THE VALUE OF END BEARING, AND END BEARING AND SKIN FRICTION NOT BEING COMBINED).
  - THE GOVERNING LOAD COMBINATIONS FOR FOUNDATION DESIGN ARE SHOWN ON SHEETS S-7, S-13, S-18.1, S-20, S-26 AND S-31.1. IF THE GEOTECHNICAL REPORT USES LOADS FROM THE CHART, A CCD SHALL BE PROCESSED THROUGH DSA TO USE ALTERNATIVE FOUNDATION DEPTHS GIVEN IN THE GEOTECHNICAL REPORT.
  - FOR SITES WITH HIGH GROUND WATER AND/OR POTENTIAL CAVING ISSUES DURING EXCAVATION, THE GEOTECHNICAL REPORT SHALL INCLUDE ALTERNATIVE SKIN FRICTION OR VERTICAL BEARING VALUES FOR PIERS UTILIZING STEEL CASING.
- THE GEOTECHNICAL ENGINEER MAY SPECIFY DIFFERENT SOILS CLASSES TO BE USED FOR THE DIFFERENT STRUCTURE TYPES (T OR OT), DIFFERENT AREAS OF THE SITE (I.E. NORTH LOT OR WEST LOT), OR THE ENGINEER MAY SPECIFY ONE SOILS CLASS TO BE USED FOR THE ENTIRE SITE.
- THE GEOTECHNICAL ENGINEER SHALL ADDRESS IN THE REPORT ANY CONCRETE DURABILITY REQUIREMENTS IN ACCORDANCE WITH ACI 318-11 CHAPTER 4.
- THE GEOTECHNICAL REPORT SHALL BE SPECIFIC TO THE LOCATION OF THE PHOTOVOLTAIC STRUCTURES. BORING(S) SHALL BE DONE AT THE SPECIFIC LOCATION(S) WHERE THE PHOTOVOLTAIC STRUCTURES ARE TO OCCUR. THE GEOTECHNICAL REPORT SHALL CONFORM TO 2013 CBC SECTION 1803A.
- A COPY OF THE GEOTECHNICAL REPORT SHALL BE PROVIDED AT THE TIME OF PLAN REVIEW.
- AT THE TIME OF PLAN REVIEW, THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE SHALL SELECT A SOILS CLASS ON THE SITE-SPECIFIC PLANS BASED ON THE GEOTECHNICAL REPORT (OR NOTE 1 ABOVE).

### ALLOWABLE VERTICAL AND LATERAL BEARING

SOILS CLASS	ALLOWABLE VERTICAL BEARING PRESSURE (psf)	ALLOWABLE LATERAL BEARING (psf/ft BELOW NATURAL GRADE)
CLASS Y	1500	100
CLASS W	1500	200
CLASS X	2000	300
CLASS Y	2000	400
CLASS Z	3000	600

## SPECIAL INSPECTION

- SOILS:
  - VERIFY THE SITE HAS BEEN PREPARED PROPERLY PRIOR TO PLACEMENT OF CONTROLLED FILL AND/OR EXCAVATIONS FOR FOUNDATIONS.
  - VERIFY THAT THE FOUNDATION EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.
  - VERIFY THAT MATERIALS BELOW FOOTINGS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.
- PIER FOUNDATIONS:
  - INSPECT DRILLING OPERATIONS AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH PIER.
  - VERIFY LOCATIONS OF PIERS.
- CONCRETE:
  - VERIFY USE OF REQUIRED DESIGN MIX, DETERMINE THE TEMPERATURE OF THE CONCRETE, AND (WHERE REQUIRED) PERFORM AIR CONTENT TEST.
  - TEST CONCRETE (COMPRESSION TEST).
  - INSPECT PLACEMENT OF FORMWORK, REINFORCING STEEL, EMBEDDED ITEMS, AND CONCRETE. INSPECT CURING AND FORM REMOVAL.
  - INSPECT INSTALLATION OF POST-INSTALLED ANCHORS.
  - TEST POST-INSTALLED ANCHORS PER 2013 CBC 1913A.
  - ALL 1/2" Ø HILTI STAINLESS STEEL KB-TZ BOLTS TO BE INSTALLED TO 40 FT-LB OF TORQUE. ALL 3/8" Ø HILTI STAINLESS STEEL KB-TZ BOLTS TO BE INSTALLED TO 60 FT-LB OF TORQUE. ALL 1/2" Ø HILTI STAINLESS STEEL KB-TZ BOLTS TO BE INSTALLED TO 110 FT-LB OF TORQUE. AT LEAST 50% OF THE INSTALLED ANCHORS SHALL BE TESTED.
  - SLUMP TEST SHALL BE PERFORMED PER SITE SPECIFIC DSA-103
- STEEL:
  - VERIFY THAT ALL MATERIALS ARE APPROPRIATELY MARKED AND THAT:
    - MILL CERTIFICATES INDICATE MATERIAL PROPERTIES THAT COMPLY WITH REQUIREMENTS.
    - MATERIAL SIZES, TYPES AND GRADES COMPLY WITH REQUIREMENTS.
  - TEST UNIDENTIFIED MATERIALS.
  - VERIFY MEMBER LOCATIONS, BRACING AND ALL DETAILS CONSTRUCTED IN THE FIELD.
  - VERIFY STIFFENER LOCATIONS, CONNECTION TAB LOCATIONS, AND ALL CONSTRUCTION DETAILS FABRICATED IN THE SHOP.
  - VERIFY WELD FILLER MATERIAL IDENTIFICATION MARKINGS PER AWS DESIGNATION LISTED ON THE DSA APPROVED DOCUMENTS AND THE WPS.
  - VERIFY WELD FILLER MATERIAL MANUFACTURER'S CERTIFICATE OF COMPLIANCE.
  - VERIFY WPS, WELDER QUALIFICATIONS, AND EQUIPMENT.
  - INSPECT GROOVE, MULTI-PASS, AND FILLET WELDS > 3/8" (BOTH SHOP AND FIELD WELDS).
- SHOP FABRICATION:
  - VERIFY FABRICATOR'S FABRICATION AND QUALITY CONTROL PROCEDURES.
  - VERIFY ALL ASPECTS OF SHOP FABRICATION INCLUDING MEMBER LOCATIONS, DIMENSIONAL LAYOUT OF ALL PARTS AND PIECES, ALL WELDING, BOLTING, ETC.
- SEE DSA APPROVED 103 FOR ADDITIONAL REQUIREMENTS.

## GENERAL NOTES:

- DESIGN PER 2013 C.B.C. AND ITS PRESCRIBED LOADING AND MATERIAL SPECIFICATIONS:
  - ASCE 7-10
  - 14TH EDITION AISC STEEL MANUAL
  - 2007 AISI COLD FORMED STEEL STANDARD
  - ACI 318-11
- THESE STRUCTURES ARE NOT DESIGNED TO BE, NOR SHALL THEY BE, ENCLOSED.
- ALL DIMENSIONS, CONDITIONS, AND ELEVATIONS ARE TO BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING WORK OR FABRICATION. IF ANY DISCREPANCIES ARE FOUND OR IF ANY CONDITION EXISTS NOT AS SHOWN ON THE DRAWINGS THE DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE SHALL BE NOTIFIED IMMEDIATELY.
- IF THE SNOW LOAD OPTION IS USED THEN THE SITE-SPECIFIC MAX GROUND SNOW LOADING INCLUDING DRIFT MUST BE LESS THAN OR EQUAL TO 20 PSF.
- NO FUTURE STRUCTURAL ROOF DECK OR SHEATHING MAY BE APPLIED TO THE OPEN GRID.
- THE ALLOWABLE MAXIMUM PSF ALLOWED FOR THE SOLAR PANEL, ELECTRICAL, AND OTHER NON-STRUCTURAL ITEMS IS 3.15 PSF.
- ALL SCREWS OTHER THAN THE SOLAR PANEL CLIP SCREW TO BE ITW BUILDEX TEK SCREWS PER ICC ESR-1976 OR ELCO DRILL SCREW PER ICC-ESR# 3294.
- SOLAR PANEL ATTACHMENT CLIPS AND SOLAR FIT SYSTEM DO NOT HAVE SPECIAL INSPECTIONS REQUIREMENTS NOR DO THEY REQUIRE INSPECTION OR VERIFICATION BY THE TESTING INSPECTION LAB OR IOR.

## IFORCE CLIP AND SCREW NOTES:

NOTES BELOW PERTAIN TO THE IFORCE SOLAR CLIP INSTALLATION. SOLAR PANEL CLIPS, WHEN USED, THE PROJECT INSPECTOR SHALL INSPECT THE INSTALLATION OF THE CLIP (NOT THE PHYSICAL CLIP).

- SCREWS USED TO ATTACH THE SOLAR PANELS (I.E. SOLAR PANEL CLIP SCREW) - THE ONLY APPROVED SCREWS THAT WILL BE ACCEPTED FOR SOLAR PANEL CLIP IS THE ITW BUILDEX TEKS SELECT #12 SCREW PER CITY OF LOS ANGELES RR 25915 AND PER ICC ESR 3223 OR DRILL-FLEX SCREW PER ICC-ESR# 3332. NO SUBSTITUTES WILL BE ACCEPTED.
- TO ENSURE ALL REQUIREMENTS OF ICC-ESR-3223 OR ICC-ESR# 3332 AND SPECIFICATIONS ON THESE PLANS HAVE BEEN MET, FORMAL SUBMITTALS ARE REQUIRED TO BE APPROVED BY THE DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE FOR:
  - THE SOLAR PANEL CLIP
  - SOLAR PANEL CLIP SCREW
  - THE SCREW GUN USED TO INSTALL THE SOLAR PANEL CLIP
- SOLAR PANEL CLIP TO HAVE A SHOP DRAWING SUBMITTED FOR SIZE. THE MINIMUM GRIP HEIGHT IS 1/8" LESS THAN THE SOLAR PANEL HEIGHT; THE MAXIMUM GRIP HEIGHT IS 1/8" LESS THAN THE SOLAR PANEL HEIGHT.
- SOLAR PANEL CLIP INSTALLATION LOCATION ON PANEL TO BE VERIFIED WITH MANUFACTURER FOR WARRANTY CONFORMANCE.
- FORMAL SUBMITTALS ARE REQUIRED TO BE APPROVED BY THE DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE FOR:
  - A WRITTEN DESCRIPTION DETAILING THE PROPOSED SOLAR PANEL INSTALLATION PROCEDURE
  - SOLAR PANEL CLIP
  - SCREW INSTALLATION PROCEDURE
- THE IOR NEEDS TO BE PRESENT AT THE START OF INSTALLATION OF THE SOLAR PANEL CLIP SCREWS TO PROPERLY DETERMINE THE PROPER CLUTCH SETTING ON THE SCREW GUNS IS BEING UTILIZED, AND CONFORMANCE TO ICC ESR-3223 OR ICC-ESR# 3332. IT IS RECOMMENDED, BUT NOT REQUIRED, THAT SOME SAMPLE PURLIN MATERIAL BE USED TO DO SOME TEST INSTALLS ON THE GROUND PRIOR TO THE IN AIR INSTALLATION. THIS WILL MAKE DETERMINING THE CORRECT CLUTCH SETTING EASIER.
- THE IOR IS REQUIRED TO PERIODICALLY INSPECT THE INSTALLATION OF THE SOLAR PANEL CLIPS TO ENSURE THE INSTALLATION MEETS WITH THE WRITTEN DESCRIPTION OF INSTALLATION AS APPROVED THROUGH THE SUBMITTAL PROCESS AND TO VERIFY THE PROPER SCREW GUN SETTINGS ARE BEING UTILIZED.
- THE IOR NEEDS TO PERFORM AN END OF PROJECT INSPECTION OF EACH CANOPY FROM A LIFT TO VERIFY ALL CLIPS HAVE BEEN INSTALLED AND THAT THERE ARE NO MISSING CLIPS.

## STEEL NOTES

- COLD FORMED STEEL SIZES ARE BASED ON GAUGE THICKNESS.
- PURLINS, BEAMS, POSTS (FRAMING MEMBERS) HAVE MIN. YIELD STRENGTHS AS INDICATED.
- ZINC COATED CONFORMANCE WITH G60 STANDARD OR BETTER. COLD FORM MEMBERS TO BE GALVANIZED IN ACCORDANCE WITH ASTM A653. TUBE STEEL MEMBERS AND PLATES IN ACCORDANCE WITH ASTM A123.
- FASTENERS SHALL BE GALVANIZED, CADMIUM PLATED, OR ZINC COATED.
- ALL STEEL FABRICATION SHALL COMPLY WITH LATEST AISC SPECIFICATIONS.
- ALL WELDING SHALL COMPLY WITH THE LATEST AWS D1.1. ALL WELD FILLER MATERIAL SHALL HAVE A MINIMUM CHARPY V-NOTCH (CVN) VALUE OF 20 FT-LBS AT A TEMPERATURE OF -20DEG F
- ALL BOLTS TO MEET OR EXCEED ASTM A307. NO BOLTING INSPECTIONS REQUIRED.
- ALL PLATES AND ANGLES TO BE ASTM A36 U.N.O.
- ALL STRUCTURAL TUBING TO BE ASTM A1085 U.N.O.
- ALL PURLINS TO BE ASTM A653 OR. 55
- REPAIR ANY DAMAGED GALVANIZATION AFTER FIELD WELDS WITH AN APPROVED REPAIR METHOD.
- ALL MEMBERS TO BE GALVANIZED OR PRIMED AND PAINTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. ALL CONTRACT DOCUMENTS SHALL SPECIFY THE TYPE OF SSPC CORROSION RESISTING SYSTEM TO BE UTILIZED AND THE SSPC GRADE FOR CLEANING, MINIMUM SSPC GRADE SP2
- ALL BEAM TO COLUMN CONNECTIONS TO MEET WITH DETAILS 3 OR 4/S-12, 3 OR 4/S-18, 3 OR 4/S-18.6, 3 OR 4/S-25, 3 OR 4/S-31, 3 OR 4/S-31.6 FOR CORROSION PROTECTION
- ALL A307 BOLTS MAY BE SUBSTITUTED WITH THE SAME QUANTITY OF SAE J429 GRADE 2 BOLTS OF THE SAME DIAMETER.
- A1085 STEEL HAS SAME OR BETTER PROPERTIES AND WELDABILITY THAN A500 GR. B
- BOLT HOLES FOR 1/2" DIAMETER BOLTS SHALL BE AS FOLLOWS: 9/16" DIAMETER FOR STANDARD HOLES; 9/16" X 11/16" FOR SHORT SLOTTED HOLES.

## CONCRETE NOTES:

- CONCRETE MIN. 3000 psi AT 28 DAYS. (NOTE: DESIGN BASED ON 3000 psi) IF 3500 psi OR GREATER IS UTILIZED, CONTINUOUS BATCH PLANT INSPECTION MAY BE WAIVED PER 2013 CBC 1705A.3.3 AND PERIODIC INSPECTION SHALL COMPLY WITH NOTE 10.
- CONCRETE TO REACH 1000 psi PRIOR TO REMOVAL OF SHORING AND/OR INSTALLATION OF BEAMS AND PURLINS. (NOTE: A HIGHER COMPRESSIVE CONCRETE MAY BE USED TO ACHIEVE 1000 psi SOONER. SUBMIT AN APPROVED CONCRETE MIX DESIGN TO JUSTIFY)
- CONCRETE TO REACH 3000 psi PRIOR TO INSTALLATION OF SOLAR PANELS. (NOTE: A HIGHER COMPRESSIVE CONCRETE MAY BE USED TO ACHIEVE 3000 psi SOONER. SUBMIT AN APPROVED CONCRETE MIX DESIGN TO JUSTIFY)
- REINFORCEMENT BARS SHALL BE ASTM A615, GR60. MINIMUM U.N.O.
- MINIMUM CONCRETE COVER SHALL BE 2 1/2" TO EARTH (DRILLED PIER FOUNDATIONS ONLY), 3" TO EARTH ALL OTHER CONCRETE, 2" TO SKY. PER CBC TABLE 1808A.8.2
- ALL REINFORCING STEEL AND OTHER EMBEDDED ITEMS SHALL BE SECURELY POSITIONED PRIOR TO THE POURING OF CONCRETE.
- ALL CONCRETE WORK SHALL COMPLY WITH ACI 301 & 318 LATEST EDITION.
- AGGREGATE GRADATION AND QUALITY SHALL BE IN ACCORDANCE WITH ACI 302-r.
- COLD JOINTS SHALL HAVE A ROUGHENED SURFACE. BONDING AGENT SHALL COMPLY WITH ASTM C1059. A SUBMITTAL FOR CONCRETE BONDING AGENT SHALL BE APPROVED BY DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE PRIOR TO INSTALLATION. DSA INSPECTOR OF RECORD TO PERIODICALLY INSPECT INSTALLATION OF BONDING AGENT.
- WHEN CONTINUOUS BATCH PLANT INSPECTION IS WAIVED, THE FOLLOWING PERIODIC INSPECTION REQUIREMENTS SHALL APPLY:
  - QUALIFIED TECHNICIAN OF THE TESTING LABORATORY SHALL CHECK THE FIRST BATCH AT THE START OF THE DAY.
  - LICENSED WEIGHMASTER TO POSITIVELY IDENTIFY MATERIALS AS TO QUANTITY AND CERTIFY TO EACH LOAD BY A BATCH TICKET.
  - BATCH TICKETS, INCLUDING MATERIAL QUANTITIES AND WEIGHTS SHALL ACCOMPANY THE LOAD, SHALL BE TRANSMITTED TO THE INSPECTOR OF RECORD BY A TRUCK DRIVER WITH LOAD IDENTIFIED THEREON. THE LOAD SHALL NOT BE PLACED WITHOUT A BATCH TICKET IDENTIFYING THE MIX. THE INSPECTOR WILL KEEP A DAILY RECORD OF PLACEMENTS, IDENTIFYING EACH TRUCK, ITS LOAD, AND TIME OF RECEIPT, AND APPROXIMATE LOCATION OF DEPOSIT IN THE STRUCTURE AND WILL TRANSMIT A COPY OF THE DAILY RECORD TO THE ENFORCEMENT AGENCY.
- CONCRETE MAY BE PUMPED, Poured, TREMIED, TAILGATED, FUNNELED OR OTHER SUCH METHODS INTO PLACE. CONCRETE SHALL BE ALLOWED TO FREE FALL THE ENTIRE DEPTH OF THE FOUNDATION. PLACEMENT OF ANY FREE-FALL CONCRETE SHALL BE SUCH THAT THE CONCRETE DOES NOT ALTER THE EMBEDMENT DEPTH OR THE CLEARANCE OF THE REINFORCING BAR CAGE OR OTHER EMBEDDED MATERIALS.

ENGINEER'S APPROVAL



7/22/15

DATE SIGNED  
MMMM DD, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

A03-117835

AC: FLS / SS THE  
DATE: JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES

APPL. #: 04-113425

AC: FLS / SS  
DATE: JUL 27 2015

PRE-CHECK (P) DOCUMENT  
CODE 2013 CBC  
A SEPARATE PROJECT APPLICATION  
FOR CONSTRUCTION IS REQUIRED.

MBARC  
CONSTRUCTION  
INC.  
674 RANCHEROS DR  
SAN MARCOS, CA  
92069  
LIC # 869940  
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ASTEL ENGINEERING  
STRUCTURAL ENGINEERING  
109 EAST ESCALONES  
SAN CLEMENTE, CA 92672  
PHONE: (949) 388-9833  
FAX: (949) 388-3773

PHOTOVOLTAIC  
STRUCTURES  
GENERAL NOTE  
SPECIFICATIONS

DRAWN  
MAP  
CHECKED  
DKR  
DATE  
5/29/15  
ASTEL JOB NO.  
13-1010  
SHEET

S-3

3 OF 46 SHEETS

**SAMPLE - DSA-103**  
STRUCTURES WITH ONLY PIER FOOTINGS  
WITH OUT POST INSTALLED ANCHORS

**DSA** DSA-103 Statement of Structural Tests & Special Inspections - 2013 CBC

Project: \_\_\_\_\_ Date Submitted: \_\_\_\_\_ DSA File No.: \_\_\_\_\_ Application No.: \_\_\_\_\_

**REPORT:** This form is a summary of all structural tests and special inspections performed on the project. It is intended to be used as a record of the project's compliance with the 2013 California Building Code (CBC) and other applicable codes. The project owner is responsible for providing the necessary information to complete this form. The DSA-103 form is a summary of all structural tests and special inspections performed on the project. It is intended to be used as a record of the project's compliance with the 2013 California Building Code (CBC) and other applicable codes. The project owner is responsible for providing the necessary information to complete this form.

**TEST OF SPECIAL INSPECTION:** \_\_\_\_\_ CODE REFERENCE AND NOTES

**SOILS**

**1. GENERAL** Table 1705A.4

**4. CAST-IN PLACE DEEP FOUNDATIONS (PIERS)** Table 1705A.7

**7. CAST IN PLACE CONCRETE** Table 1705A.6

**CONCRETE**

**CAST IN PLACE CONCRETE** Table 1705A.6

**MASONRY** Table 1705A.11

**STEEL**

**STRUCTURAL STEEL AND COLD-FORMED STEEL USED FOR STRUCTURAL PURPOSES** Table 1705A.11

**WELDING** Table 1705A.11

**WOOD**

**OTHER**

**28. FORCE PANEL CLIP INSTALLATION** \_\_\_\_\_

**SAMPLE - DSA-103**  
STRUCTURES WITH ONLY PIER FOOTINGS  
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Project: \_\_\_\_\_ Date Submitted: \_\_\_\_\_ DSA File No.: \_\_\_\_\_ Application No.: \_\_\_\_\_

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STRUCTURES WITH PIER & SPREAD FOOTINGS  
WITH OUT POST INSTALLED ANCHORS

**DSA** DSA-103 Statement of Structural Tests & Special Inspections - 2013 CBC

Project: \_\_\_\_\_ Date Submitted: \_\_\_\_\_ DSA File No.: \_\_\_\_\_ Application No.: \_\_\_\_\_

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WITH OUT POST INSTALLED ANCHORS

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Project: \_\_\_\_\_ Date Submitted: \_\_\_\_\_ DSA File No.: \_\_\_\_\_ Application No.: \_\_\_\_\_

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**OTHER**

**28. FORCE PANEL CLIP INSTALLATION** \_\_\_\_\_

THE EXAMPLE FORM DSA-103'S SHOWN ON THIS SHEET ARE FOR ILLUSTRATION PURPOSES ONLY TO ASSIST IN THE COMPLETION OF FUTURE PROJECT-SPECIFIC FORM DSA-103'S. A FORM DSA-103 IS TO BE COMPLETED FOR EACH APPLICATION THAT THIS PC IS BEING INCORPORATED INTO AND ALL EXAMPLE FORM DSA-103'S ARE TO BE CROSSED OUT ON THIS DRAWING

**ENGINEER'S APPROVAL**

PROFESSOR OF CIVIL ENGINEERING  
S 5885  
EXPIRES 12/31/2014  
STATE OF CALIFORNIA

**DATE SIGNED**  
JUNE 25, 2014

**IDENTIFICATION STAMP**  
DIV. OF THE STATE ARCHITECT  
A03-117835  
AC: FLS SS TH  
DATE: JAN 17 2017  
**SITE SPECIFIC DSA APPROVAL**

**IDENTIFICATION STAMP**  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES  
APPL. P. 04-112425  
AC: FLS SS TH  
DATE: JUN 25 2014

**MBARC CONSTRUCTION INC.**  
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PHONE: (760) 744-4131  
FAX: (760) 744-4449  
LIC # 869960  
B AND C51

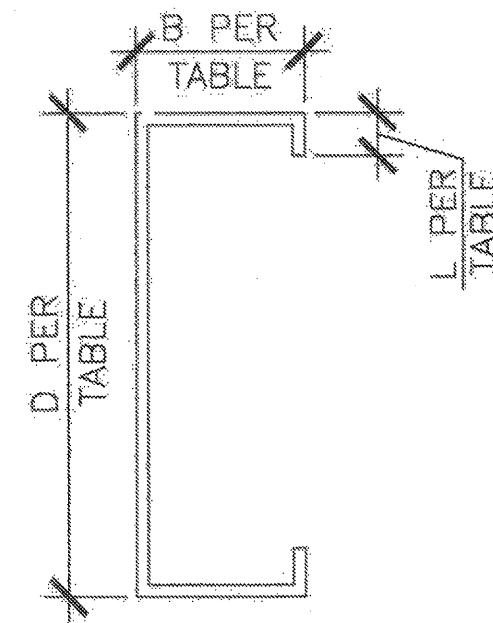
**ASTEL ENGINEERING**  
STRUCTURAL ENGINEERING  
109 EAST ESCALONES  
SAN CLEMENTE, CA 92672  
PHONE: (949) 388-9333  
FAX: (949) 388-3773

**PHOTOVOLTIC STRUCTURES SAMPLE DSA-103 FORMS**

**DRAWN MAP**  
**CHECKED DKR**  
**DATE 6/25/14**  
**45TEL JOB NO. 13-1010**  
**SHEET S-4**  
**4 of 45 SHEETS**

SECTION NAME	D (in)	B (in)	L (in)	GA	WT (lb/ft)	A (in <sup>2</sup> )	AXIS X-X			AXIS Y-Y		
							lx (in4)	Sxx (in <sup>3</sup> )	rx (in)	ly (in4)	Syy (in <sup>3</sup> )	ry (in)
C 8 x 4 14 GA	8	4.0	0.750	14	4.007	1.179	12.440	2.259	3.25	2.453	0.889	1.443
C 8 x 4 12 GA	8	4.0	0.750	12	5.960	1.760	18.270	3.687	3.23	3.554	1.289	1.425
C 10 x 4 14 GA	10	4.0	0.831	14	4.522	1.330	20.940	2.923	3.97	2.726	0.953	1.432
C 10 x 4 12 GA	10	4.0	0.816	12	6.783	1.995	31.138	5.242	3.95	4.093	1.444	1.433

ALL PURLINS ARE ASTM A653, GR 55, F<sub>y</sub>=55 ksi  
 ALL LIGHT GAGE STEEL DESIGNED USING 2007 AISI COLD-FORMED STEEL DESIGN MANUAL.  
 PROPERTIES PER A.E.P. STANDARD SIZES.  
 ACTUAL MANUFACTURER'S PROPERTIES MUST MEET OR EXCEED A.E.P. STANDARD PROPERTIES.

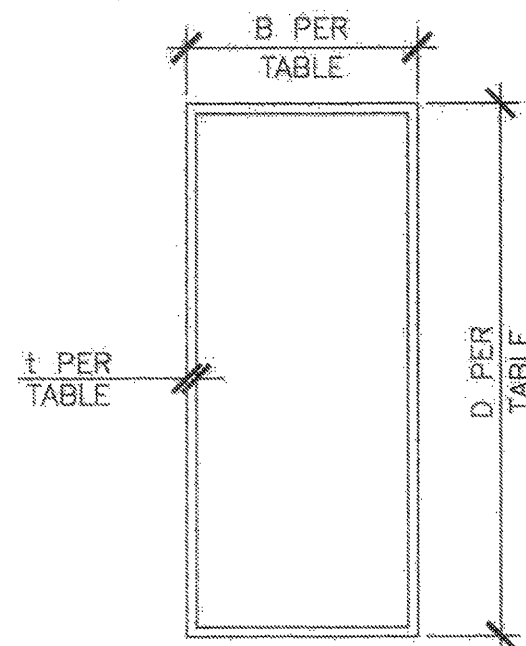


1 PURLIN DETAIL

SCALE: 3" = 1'-0"

SECTION NAME	D (in)	B (in)	t (in)	WEIGHT (lb/ft)	A (in <sup>2</sup> )	AXIS X-X			AXIS Y-Y		
						lx (in4)	Sx (in <sup>3</sup> )	rx (in)	ly (in4)	Sy (in <sup>3</sup> )	ry (in)
HSS8x8x1/2	8	8	1/2	48.85	14.40	131.0	32.8	3.02	131.0	32.8	3.02
HSS8x8x5/8	8	8	5/8	59.32	17.40	163.0	38.2	2.97	153.0	38.2	2.97
HSS10x8x5/8	10	8	5/8	67.82	19.90	266.0	53.2	3.66	187.0	46.8	3.07
HSS10x10x5/8	10	10	5/8	76.33	22.40	321.0	64.2	3.79	321.0	64.2	3.79
HSS10x10x3/4	10	10	3/4	89.50	26.30	364.0	72.8	3.72	364.0	72.8	3.72
HSS12x8x3/16	12	8	3/16	24.73	7.29	151.0	25.2	4.55	81.3	20.3	3.34
HSS12x8x1/4	12	8	1/4	32.63	9.59	196.0	32.7	4.52	105.0	28.2	3.31
HSS12x8x5/16	12	8	5/16	40.35	11.90	239.0	39.8	4.48	128.0	32.0	3.28
HSS12x8x3/8	12	8	3/8	47.90	14.10	279.0	46.5	4.45	148.0	37.2	3.25
HSS12x8x1/2	12	8	1/2	62.46	18.40	363.0	58.8	4.38	188.0	47.0	3.20
HSS12x8x5/8	12	8	5/8	76.33	22.40	419.0	69.8	4.32	221.0	55.2	3.14
HSS14x8x3/16	14	8	3/16	24.73	7.29	182.0	28.0	5.00	49.2	16.4	2.60
HSS14x8x1/4	14	8	1/4	32.63	9.59	237.0	33.9	4.97	63.4	21.1	2.57
HSS14x8x5/16	14	8	5/16	40.35	11.90	289.0	41.3	4.93	76.9	25.8	2.54
HSS14x8x3/8	14	8	3/8	47.90	14.10	337.0	48.1	4.89	89.1	28.7	2.51
HSS14x8x1/2	14	8	1/2	62.46	18.40	426.0	60.9	4.81	111.0	37.0	2.46
HSS14x8x5/8	14	8	5/8	76.33	22.40	504.0	72.0	4.74	130.0	43.3	2.41
HSS14x10x1/4	14	10	1/4	39.43	11.60	331.0	47.3	5.34	198.0	39.6	4.13
HSS14x10x5/16	14	10	5/16	48.86	14.40	406.0	58.0	5.31	242.0	48.4	4.10
HSS14x10x3/8	14	10	3/8	58.10	17.10	476.0	68.0	5.28	284.0	56.8	4.08
HSS14x10x1/2	14	10	1/2	76.07	22.40	608.0	86.9	5.21	361.0	72.2	4.01
HSS14x10x5/8	14	10	5/8	93.34	27.40	728.0	104.0	5.15	431.0	86.2	3.97

ALL BEAMS AND COLUMNS ARE ASTM A1085, F<sub>y</sub>=50 ksi

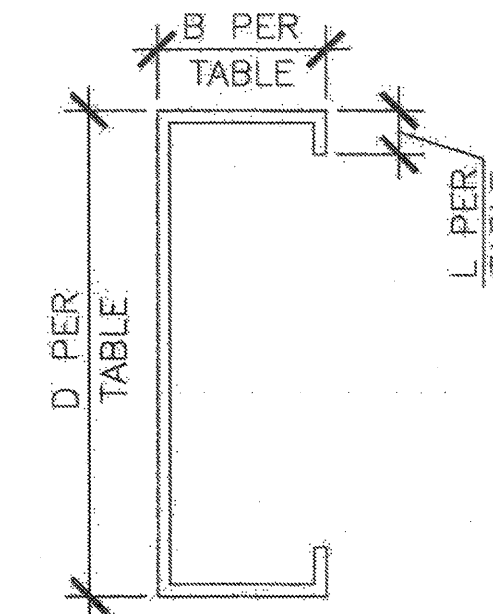


2 HSS DETAIL

SCALE: 3" = 1'-0"

SECTION NAME	D (in)	B (in)	L (in)	GA	WT (lb/ft)	A (in <sup>2</sup> )	AXIS X-X			AXIS Y-Y		
							lx (in4)	Sxx (in <sup>3</sup> )	rx (in)	ly (in4)	Syy (in <sup>3</sup> )	ry (in)
C 8 x 2.5 16 GA	8	2.5	0.805	16	2.41	0.444	3.990	1.173	2.374	0.626	0.369	0.840

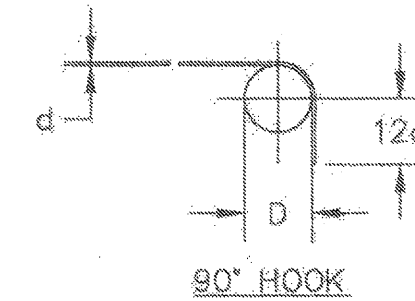
ALL BLOCKING SECTIONS ARE ASTM A653, GR 55, F<sub>y</sub>=55 ksi  
 ALL LIGHT GAGE STEEL DESIGNED USING 2007 AISI COLD-FORMED STEEL DESIGN MANUAL.  
 PROPERTIES PER A.E.P. STANDARD SIZES.  
 ACTUAL MANUFACTURER'S PROPERTIES MUST MEET OR EXCEED A.E.P. STANDARD PROPERTIES.



4 BLOCKING DETAIL

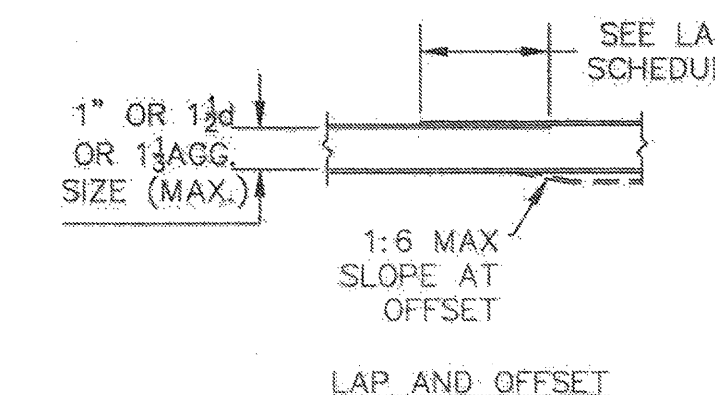
SCALE: 6" = 1'-0"

BEND SCHEDULE	
BAR SIZES	D
#3 THRU #8	6d
#9 THRU #11	8d
#14 THRU #18	10d



LAP SCHEDULE			
BAR SIZES	TOP BARS	OTHER BARS	ALL BARS
#3	21"	15"	24"
#4	29"	20"	26"
#5	36"	28"	32"
#6	46"	33"	28"
#7	63"	45"	44"
#8	82"	59"	-
#9	104"	74"	-
#10	132"	95"	-
#11	168"	116"	-

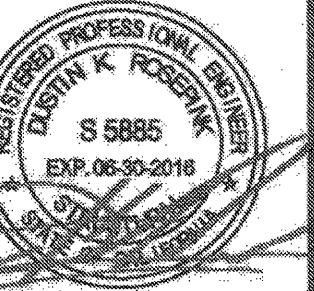
NOTES:  
 1. THESE LENGTHS SHALL BE USED UNLESS SPECIFICALLY DETAILED OTHERWISE.  
 2. TOP BARS ARE BARS LOCATED ≥12" FROM BOTTOM. OTHER BARS ARE BARS LOCATED WITHIN 12" FROM BOTTOM. THE LAP FOR ALL BARS SHALL BE USED IF ALL THE BARS TERMINATE WITHIN THE SAME LAP LENGTH.



5 TYPICAL REINFORCEMENT BAR BENDS AND LAPS

SCALE: N.T.S.

ENGINEER'S APPROVAL



7/22/15

DATE SIGNED  
MMMM DD, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

A 03-117835

AC: FLS / SS TM  
DATE: JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATORY SERVICES

APPL.P. 04-113425

AC: FLS / SS G  
DATE: JUL 22 2015

PRE-CHECK (PC) DOCUMENT  
CODE: 2013 DEC  
A SEPARATE PROJECT APPLICATION  
FOR CONSTRUCTION IS REQUIRED.

**MBARC CONSTRUCTION INC.**  
 LIC # 86996A0 B AND C51  
 PHONE: (760) 744-4131  
 FAX: (760) 744-4449  
 674 RANCHOS DR  
 SAN MARCOS, CA 92569

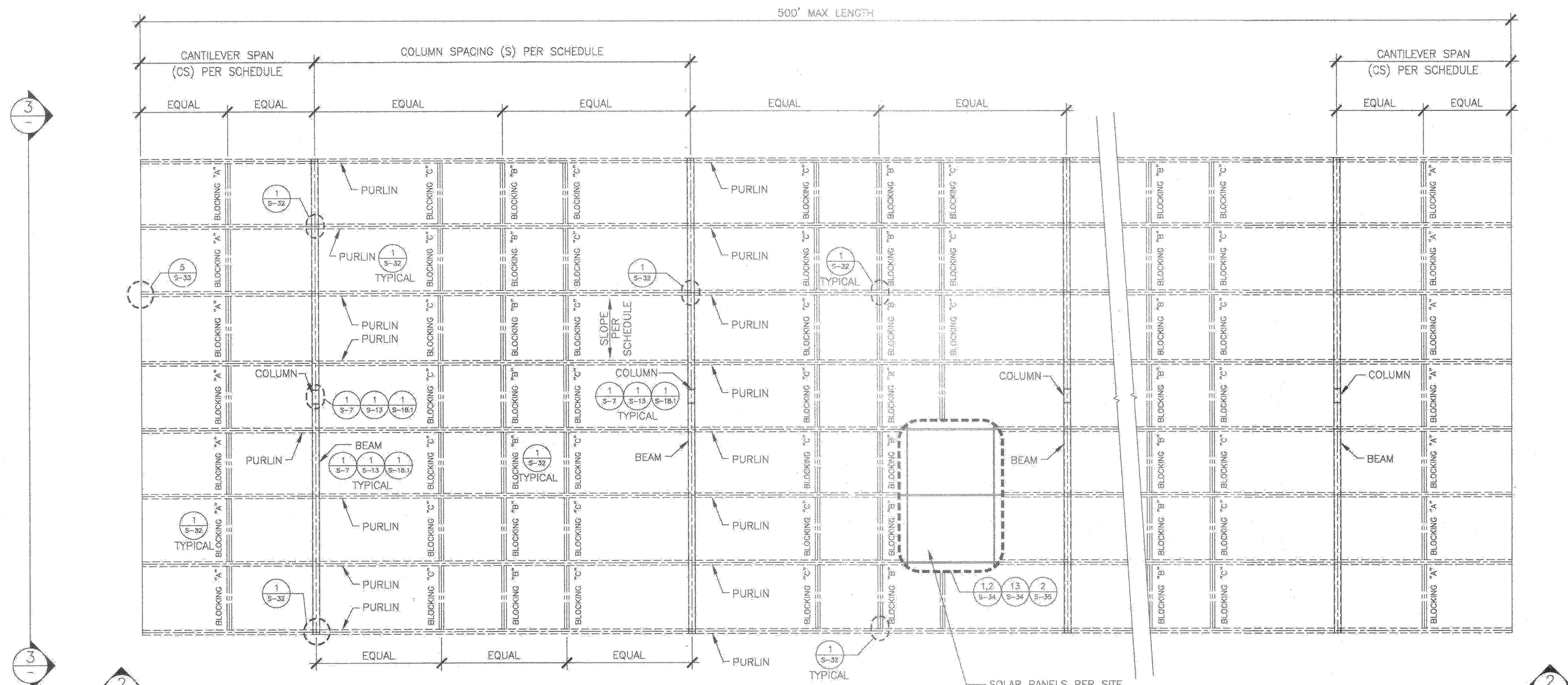
**STEL ENGINEERING**  
 STRUCTURAL ENGINEERING  
 PHONE: (949) 388-9333  
 FAX: (949) 388-3773  
 109 EAST ESCALONES  
 SAN CLEMENTE, CA 92672

PHOTOVOLTAIC STRUCTURES SECTION PROPERTIES & REBAR DETAILS

DRAWN MAP  
CHECKED DKR  
DATE 5/29/15  
STEL JOB NO. 13-1010  
SHEET

S-5

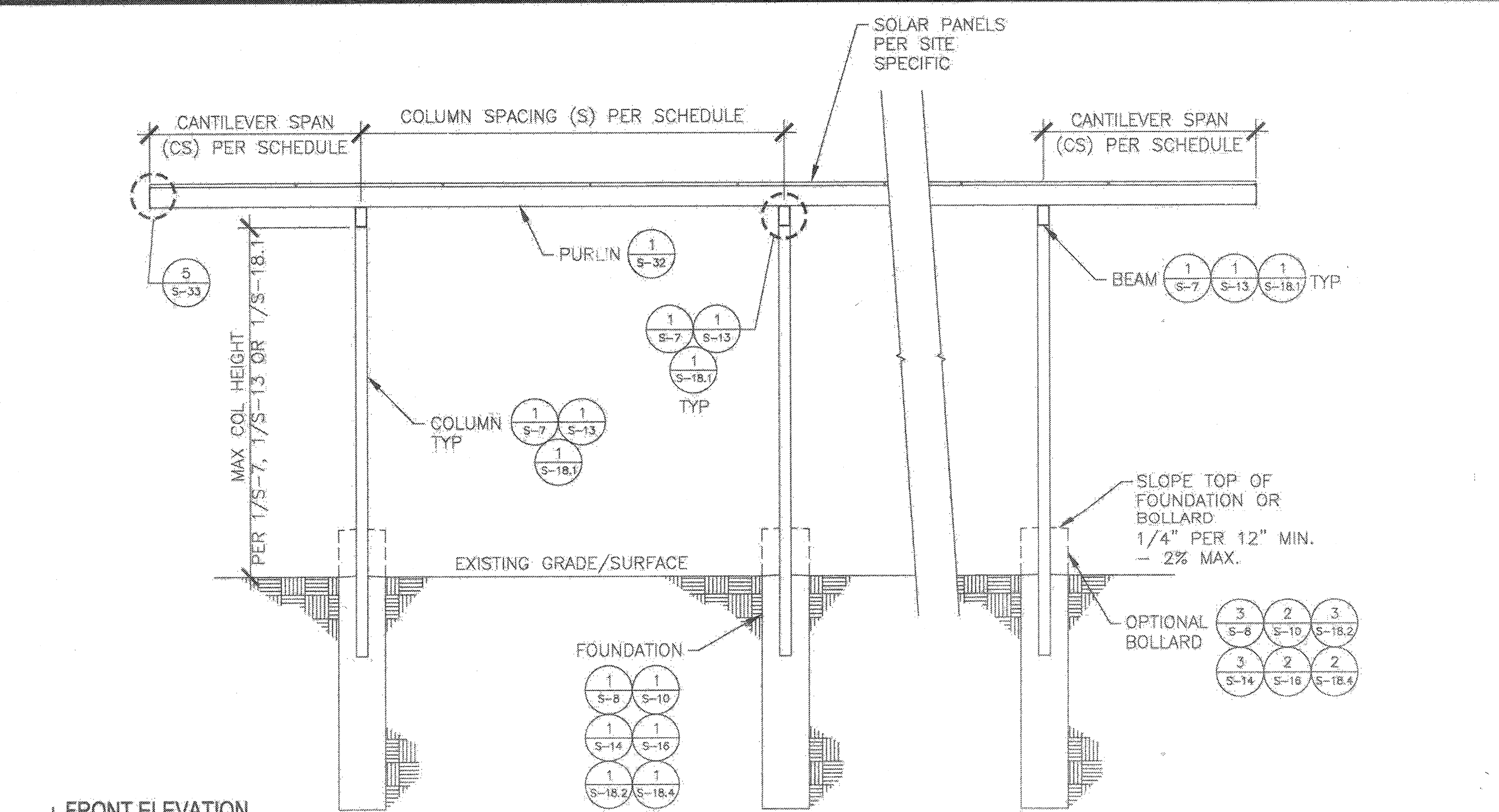
5 OF 46 SHEETS



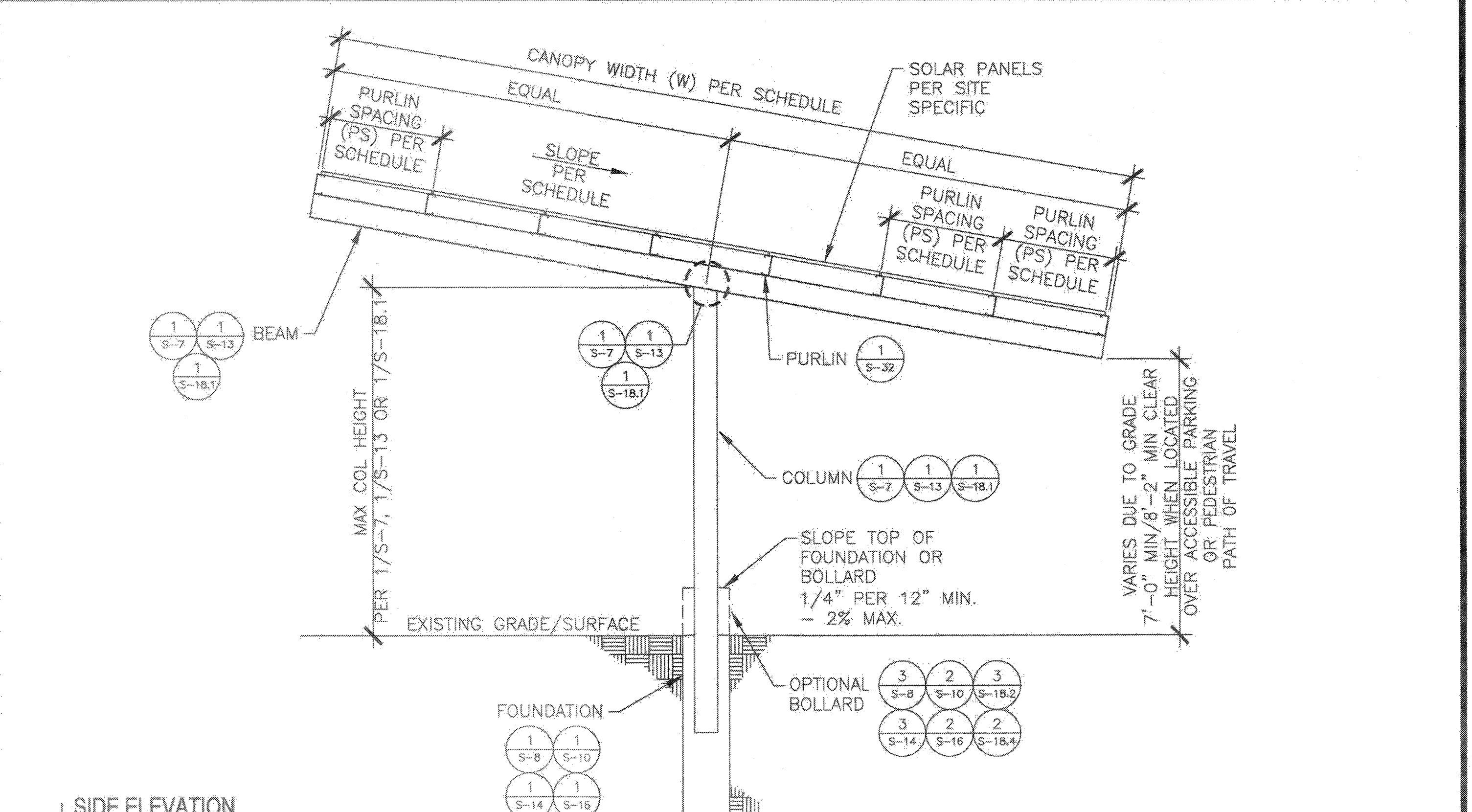
1 PLAN VIEW T-STRUCTURE  
SCALE: 1/4"=1'-0"

NOTE: BEAM, COLUMN, CONNECTION, AND FOUNDATION SIZES AT ENDS OF STRUCTURE MAY NEED TO BE INCREASED DEPENDING ON PURLIN CANTILEVER. SEE NOTE 6/S-32.

SOLAR PANELS PER SITE SPECIFIC. MAX WEIGHT OF PANELS AND ELECTRICAL SYSTEM = 3.15 psf



2 FRONT ELEVATION T-STRUCTURE  
SCALE: 1/4"=1'-0"



3 SIDE ELEVATION T-STRUCTURE  
SCALE: 1/4"=1'-0"

ENGINEER'S APPROVAL  
  
 7/22/15  
 DATE SIGNED  
 MMM DD, 2015

IDENTIFICATION STAMP  
 DIV. OF THE STATE ARCHITECT  
 A 03-117835  
 AC FLS SS  
 DATE JAN 17 2017  
 SITE SPECIFIC  
 DSA APPROVAL

IDENTIFICATION STAMP  
 DIV. OF THE STATE ARCHITECT  
 OFFICE OF REGULATION SERVICES  
 APPL. 04-113425  
 AC FLS SS  
 DATE JUL 22 2015  
 PRE-DRY (P) DOCUMENT  
 CODE 2013 CBO  
 A SEPARATE PROJECT APPLICATION  
 FOR CONSTRUCTION IS REQUIRED.

MBARC CONSTRUCTION INC.  
  
 674 RANCHEROS DR  
 SAN MARCOS, CA 92069  
 PHONE: (760) 744-4131  
 FAX: (760) 744-4449  
 LIC. # 869940  
 B AND CS1

ASTEL ENGINEERING  
 STRUCTURAL ENGINEERING  
  
 109 EAST ESCALONES  
 SAN CLEMENTE, CA 92672  
 PHONE: (949) 388-9333  
 FAX: (949) 388-3773

PHOTOVOLTAIC STRUCTURES T-STRUCTURE FRAMING PLAN

DRAWN MAP  
 CHECKED DKR  
 DATE 5/29/15  
 ASTEL JOB NO. 13-1010  
 SHEET S-6  
 6 OF 46 SHEETS

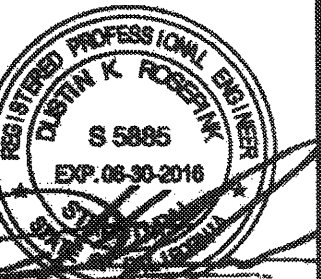
# T-STRUCTURE BEAM/COLUMN SCHEDULE

## BASED ON R=1.25, S<sub>s</sub> ≤ 1.7

I.D. #	MAX WIDTH (W)	MAX COLUMN SPACING (S)	ROOF SLOPE	GROUND SNOW LOAD	BEAM		BEAM TO COLUMN DETAIL	COLUMN		MAX COLUMN HEIGHT	LOADS TO FOUNDATIONS					
					SECTION	DETAIL		SECTION	DETAIL		AXIAL		SHEAR		MOMENT	
											GOVERNING LOAD COMBINATION	P (lb)	GOVERNING LOAD COMBINATION	V (lb)	GOVERNING LOAD COMBINATION	M (lb-ft)
T1	36'-9"	18'-0"	7.49° MAX	0 psf	HSS14x6x3/16	2 S-5	2 S-12	HSS14x6x1/4	2 S-5	15'-0"	D + 0.6wWDOWN-3	10,627	0.9D + E/1.4	3,815	0.9D + E/1.4	60,857
T2	36'-9"	20'-0"	7.49° MAX	0 psf	HSS14x6x3/16	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + 0.6wWDOWN-3	11,769	0.9D + E/1.4	4,206	0.9D + E/1.4	66,506
T3	36'-9"	27'-0"	7.49° MAX	0 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x1/2	2 S-5	15'-0"	D + 0.6wWDOWN-3	16,960	0.9D + E/1.4	5,755	0.9D + E/1.4	89,723
T4	38'-6"	18'-0"	7.49° MAX	0 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + 0.6wWDOWN-3	11,527	0.9D + E/1.4	4,331	0.9D + E/1.4	68,275
T5	38'-6"	20'-0"	7.49° MAX	0 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + 0.6wWDOWN-3	12,602	0.9D + E/1.4	4,638	0.9D + E/1.4	73,481
T6	38'-6"	27'-0"	7.49° MAX	0 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x1/2	2 S-5	15'-0"	D + 0.6wWDOWN-3	16,696	0.9D + E/1.4	5,992	0.9D + E/1.4	93,671
T7	42'-6"	18'-0"	7.49° MAX	0 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x3/8	2 S-5	15'-0"	D + 0.6wWDOWN-3	12,775	0.9D + E/1.4	4,823	0.9D + E/1.4	75,546
T8	42'-6"	20'-0"	7.49° MAX	0 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x3/8	2 S-5	15'-0"	D + 0.6wWDOWN-3	13,962	0.9D + E/1.4	5,162	0.9D + E/1.4	81,290
T9	42'-6"	27'-0"	7.49° MAX	0 psf	HSS14x6x5/16	2 S-5	2 S-12	HSS14x6x1/2	2 S-5	15'-0"	D + 0.6wWDOWN-3	18,659	0.9D + E/1.4	6,809	0.9D + E/1.4	107,056
T10	36'-9"	18'-0"	7.49° MAX	20 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-3	17,882	0.9D + E/1.4	4,157	D + 0.2S + E/1.4	70,032
T11	36'-9"	20'-0"	7.49° MAX	20 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-3	19,670	0.9D + E/1.4	4,450	D + 0.2S + E/1.4	75,526
T12	38'-6"	18'-0"	7.49° MAX	20 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-3	18,705	0.9D + E/1.4	4,331	D + 0.2S + E/1.4	73,375
T13	38'-6"	20'-0"	7.49° MAX	20 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x3/8	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-3	20,691	0.9D + E/1.4	4,732	D + 0.2S + E/1.4	79,815
T14	42'-6"	18'-0"	7.49° MAX	20 psf	HSS14x6x5/16	2 S-5	2 S-12	HSS14x6x3/8	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-3	21,024	0.9D + E/1.4	5,099	D + 0.2S + E/1.4	86,105
T15	42'-6"	20'-0"	7.49° MAX	20 psf	HSS14x6x5/16	2 S-5	2 S-12	HSS14x6x1/2	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-3	23,309	0.9D + E/1.4	5,622	D + 0.2S + E/1.4	93,834
T51	36'-0"	18'-0"	10° MAX	0 psf	HSS14x6x3/16	2 S-5	2 S-12	HSS14x6x1/4	2 S-5	15'-0"	D + 0.6wWDOWN-2	13,956	0.9D + E/1.4	3,746	D + 0.6wWDOWN-1	67,355
T52	36'-0"	20'-0"	10° MAX	0 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + 0.6wWDOWN-2	15,751	0.9D + E/1.4	4,370	D + 0.6wWDOWN-1	74,984
T53	36'-0"	27'-0"	10° MAX	0 psf	HSS14x6x5/16	2 S-5	2 S-12	HSS14x6x1/2	2 S-5	15'-0"	D + 0.6wWDOWN-2	21,253	0.9D + E/1.4	5,888	D + 0.6wWDOWN-1	101,396
T54	38'-4.5"	18'-0"	10° MAX	0 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + 0.6wWDOWN-2	15,259	0.9D + E/1.4	4,318	D + 0.6wWDOWN-1	75,673
T55	38'-4.5"	20'-0"	10° MAX	0 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + 0.6wWDOWN-2	16,751	0.9D + E/1.4	4,624	D + 0.6wWDOWN-1	83,904
T56	38'-4.5"	27'-0"	10° MAX	0 psf	HSS14x6x5/16	2 S-5	2 S-12	HSS14x6x1/2	2 S-5	15'-0"	D + 0.6wWDOWN-2	22,593	0.9D + E/1.4	6,224	D + 0.6wWDOWN-1	113,471
T57	41'-10"	18'-0"	10° MAX	0 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + 0.6wWDOWN-2	16,580	0.9D + E/1.4	4,662	D + 0.6wWDOWN-1	88,179
T58	41'-10"	20'-0"	10° MAX	0 psf	HSS14x6x5/16	2 S-5	2 S-12	HSS14x6x3/8	2 S-5	15'-0"	D + 0.6wWDOWN-2	18,637	0.9D + E/1.4	5,363	D + 0.6wWDOWN-1	98,073
T59	41'-10"	27'-0"	10° MAX	0 psf	HSS14x6x1/2	2 S-5	2 S-12	HSS14x6x5/8	2 S-5	15'-0"	D + 0.6wWDOWN-2	25,664	0.9D + E/1.4	7,668	D + 0.6wWDOWN-1	132,654
T60	36'-0"	18'-0"	10° MAX	20 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-2	19,218	0.9D + E/1.4	4,083	D + 0.5S + 0.6wWDOWN-1	78,676
T61	36'-0"	20'-0"	10° MAX	20 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-2	21,157	0.9D + E/1.4	4,370	D + 0.5S + 0.6wWDOWN-1	87,295
T62	38'-4.5"	18'-0"	10° MAX	20 psf	HSS14x6x1/4	2 S-5	2 S-12	HSS14x6x5/16	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-2	20,445	0.9D + E/1.4	4,318	D + 0.5S + 0.6wWDOWN-1	88,253
T63	38'-4.5"	20'-0"	10° MAX	20 psf	HSS14x6x5/16	2 S-5	2 S-12	HSS14x6x3/8	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-2	22,918	0.9D + E/1.4	4,969	D + 0.5S + 0.6wWDOWN-1	98,121
T64	41'-10"	18'-0"	10° MAX	20 psf	HSS14x6x5/16	2 S-5	2 S-12	HSS14x6x3/8	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-2	22,665	0.9D + E/1.4	5,029	D + 0.5S + 0.6wWDOWN-1	103,371
T65	41'-10"	20'-0"	10° MAX	20 psf	HSS14x6x3/8	2 S-5	2 S-12	HSS14x6x1/2	2 S-5	15'-0"	D + S + 0.5*0.6wWDOWN-2	25,448	0.9D + E/1.4	5,812	D + 0.5S + 0.6wWDOWN-1	115,032

- MULTIPLE STRUCTURE ID'S MAY BE SELECTED WITHIN THE SAME SITE AND/OR STRUCTURE.
- WHEN UTILIZING A STRUCTURE ID READ FROM WITHIN THAT ID ROW ONLY.
- LOADS TO FOUNDATION BASED ON ALTERNATIVE ASD LOAD COMBINATIONS WITH  $\omega = 1.3$ . FOR LATERAL LOADS AND  $\omega = 1.0$  FOR VERTICAL LOADS.

ENGINEER'S  
APPROVAL



7/22/15

DATE SIGNED  
MMMM DD, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

A03-117835

AC: FLS / SS / TN  
DATE: JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES

APPL. C. 04-113425

AC: FLS / SS / G  
DATE: JUL 22 2015

PRE-CHECK (PC) DOCUMENT  
CODE: 2013 CBC  
A SEPARATE PROJECT APPLICATION  
FOR CONSTRUCTION IS REQUIRED

**MBARC CONSTRUCTION INC.**  
674 RANCHEROS DR  
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PHONE: (760) 744-4131  
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LIC # 86980  
B AND C51

**4 STEEL ENGINEERING**  
STRUCTURAL ENGINEERING  
109 EAST ESCALONES  
SAN CLEMENTE, CA 92672  
PHONE: (949) 388-9333  
FAX: (949) 388-3773

PHOTOVOLTAIC  
STRUCTURES  
R=1.25  
T-STRUCTURE  
BEAM/COLUMN  
SCHEDULE

DRAWN  
MAP  
CHECKED  
DKR  
DATE  
5/29/15  
4STEL JOB NO.  
13-1010  
SHEET  
**S-7**  
7 OF 46 SHEETS

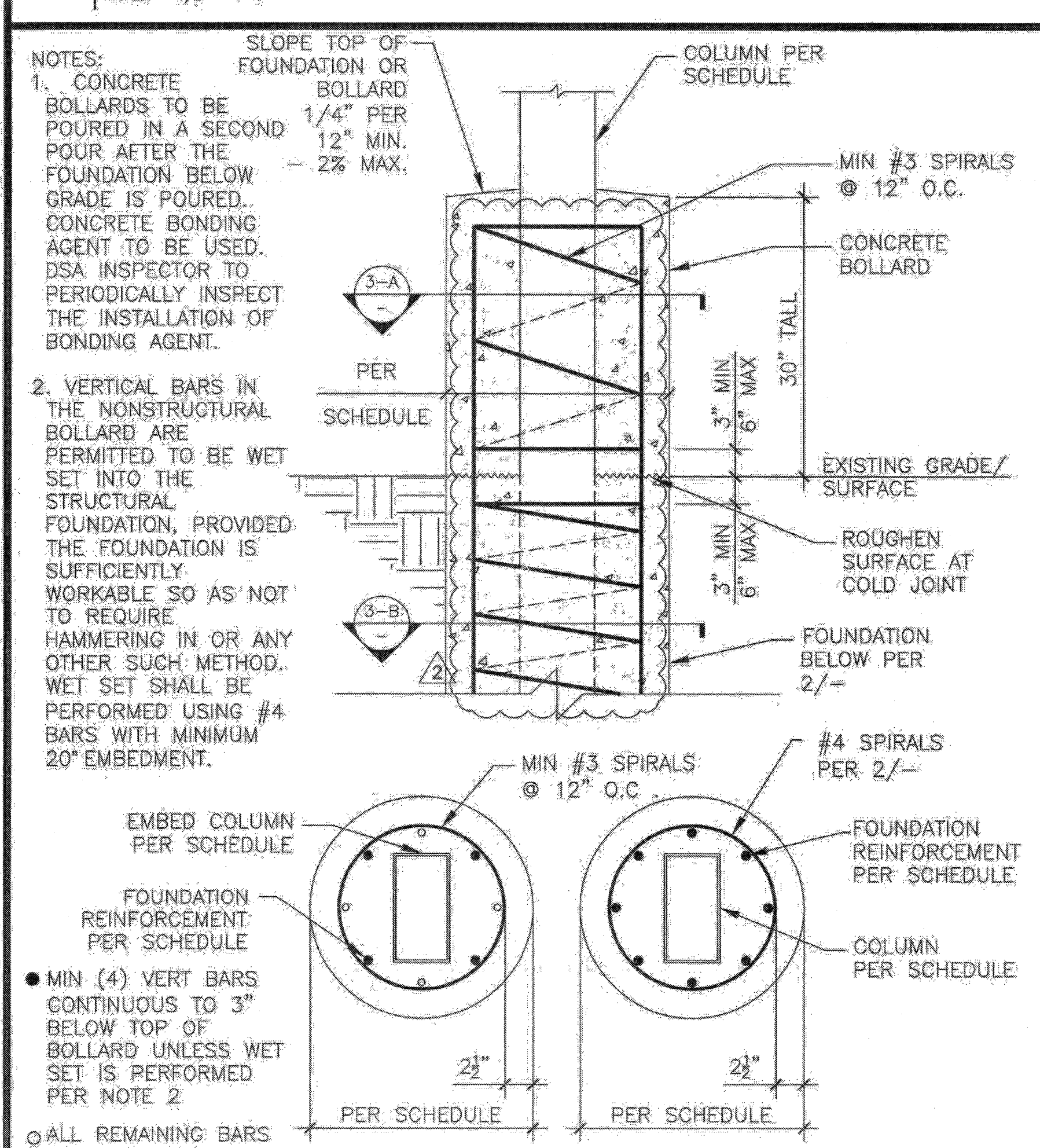
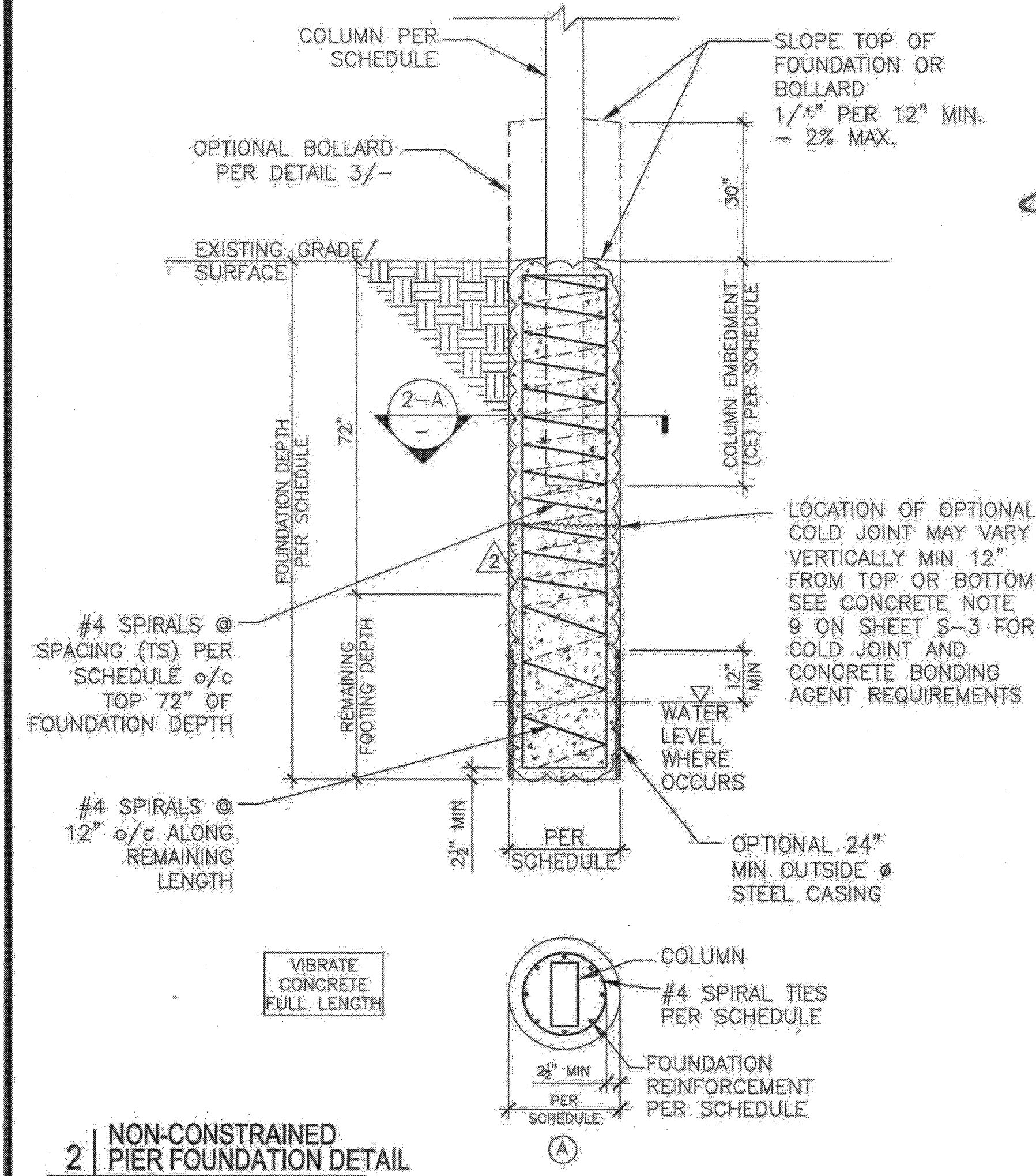
# T-STRUCTURE NON-CONSTRAINED PIER FOUNDATION SCHEDULE BASED ON R=1.25, S<sub>s</sub> ≤ 1.7

I.D. #	MAX WIDTH (W)	MAX COLUMN SPACING (S)	ROOF SLOPE	GROUND SNOW LOAD	FOUNDATION REINFORCEMENT	FOUNDATION DIAMETER	COLUMN EMBEDMENT (CE)	MAX TIE SPACING (TS) AT TOP	FOUNDATION DETAIL	PIER FOUNDATION				
										FOUNDATION WITH SOIL MATERIAL CLASS V (SOILS NOTES S-3)	FOUNDATION WITH SOIL MATERIAL CLASS W (SOILS NOTES S-3)	FOUNDATION WITH SOIL MATERIAL CLASS X (SOILS NOTES S-3)	FOUNDATION WITH SOIL MATERIAL CLASS Y (SOILS NOTES S-3)	FOUNDATION WITH SOIL MATERIAL CLASS Z (SOILS NOTES S-3)
										DEPTH	DEPTH	DEPTH	DEPTH	DEPTH
T1	36'-9"	18'-0"	7.49° MAX	0 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	15'-0"	11'-6"	9'-9"	8'-9"	7'-6"
T2	36'-9"	20'-0"	7.49° MAX	0 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	15'-6"	11'-9"	10'-3"	9'-3"	7'-9"
T3	36'-9"	27'-0"	7.49° MAX	0 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	17'-6"	12'-3"	11'-6"	10'-3"	8'-9"
T4	38'-6"	18'-0"	7.49° MAX	0 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	15'-9"	12'-0"	10'-3"	9'-3"	8'-0"
T5	38'-6"	20'-0"	7.49° MAX	0 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	16'-3"	12'-3"	10'-6"	9'-6"	8'-3"
T6	38'-6"	27'-0"	7.49° MAX	0 psf	(5) - #8 VERT REBAR	24"	36"	6"	2	17'-9"	13'-6"	11'-6"	10'-6"	9'-0"
T7	42'-6"	18'-0"	7.49° MAX	0 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	16'-3"	12'-6"	10'-8"	9'-6"	8'-3"
T8	42'-6"	20'-0"	7.49° MAX	0 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	17'-0"	13'-0"	11'-0"	10'-0"	8'-6"
T9	42'-6"	27'-0"	7.49° MAX	0 psf	(5) - #8 VERT REBAR	24"	36"	6"	2	19'-3"	14'-6"	12'-6"	11'-9"	8'-6"
T10	36'-9"	18'-0"	7.49° MAX	20 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	15'-9"	12'-0"	10'-3"	9'-3"	8'-0"
T11	36'-9"	20'-0"	7.49° MAX	20 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	16'-6"	12'-9"	10'-9"	9'-9"	8'-3"
T12	38'-6"	18'-0"	7.49° MAX	20 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	16'-3"	12'-6"	10'-9"	9'-6"	8'-3"
T13	38'-6"	20'-0"	7.49° MAX	20 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	17'-0"	13'-9"	11'-0"	10'-0"	8'-6"
T14	42'-6"	18'-0"	7.49° MAX	20 psf	(4) - #8 VERT REBAR	24"	36"	6"	2	17'-6"	13'-6"	11'-8"	10'-3"	8'-9"
T15	42'-6"	20'-0"	7.49° MAX	20 psf	(5) - #8 VERT REBAR	24"	36"	6"	2	18'-3"	15'-0"	12'-0"	11'-3"	9'-3"
T51	36'-0"	18'-0"	10° MAX	0 psf	(4) - #8 VERT REBAR	24"	48"	6"	2	17'-6"	12'-3"	11'-3"	10'-3"	8'-9"
T52	36'-0"	20'-0"	10° MAX	0 psf	(5) - #8 VERT REBAR	24"	48"	6"	2	18'-3"	13'-9"	11'-9"	10'-6"	9'-0"
T53	36'-0"	27'-0"	10° MAX	0 psf	(6) - #8 VERT REBAR	24"	48"	6"	2	20'-6"	15'-6"	13'-3"	12'-0"	10'-3"
T54	38'-4.5"	18'-0"	10° MAX	0 psf	(5) - #8 VERT REBAR	24"	48"	6"	2	18'-3"	13'-9"	11'-9"	10'-9"	9'-3"
T55	38'-4.5"	20'-0"	10° MAX	0 psf	(5) - #8 VERT REBAR	24"	48"	6"	2	19'-0"	14'-6"	12'-3"	11'-0"	9'-6"
T56	38'-4.5"	27'-0"	10° MAX	0 psf	(7) - #8 VERT REBAR	24"	48"	6"	2	21'-6"	16'-3"	13'-9"	12'-6"	10'-9"
T57	41'-10"	18'-0"	10° MAX	0 psf	(6) - #8 VERT REBAR	24"	48"	6"	2	19'-6"	14'-9"	12'-6"	11'-3"	9'-9"
T58	41'-10"	20'-0"	10° MAX	0 psf	(6) - #8 VERT REBAR	24"	48"	6"	2	20'-3"	15'-3"	13'-0"	11'-9"	10'-0"
T59	41'-10"	27'-0"	10° MAX	0 psf	(9) - #8 VERT REBAR	24"	48"	6"	2	23'-0"	18'-3"	14'-9"	13'-3"	11'-3"
T60	36'-0"	18'-0"	10° MAX	20 psf	(5) - #8 VERT REBAR	24"	48"	6"	2	18'-3"	14'-0"	12'-0"	10'-9"	9'-3"
T61	36'-0"	20'-0"	10° MAX	20 psf	(5) - #8 VERT REBAR	24"	48"	6"	2	19'-0"	14'-6"	12'-3"	11'-0"	9'-6"
T62	36'-4.5"	18'-0"	10° MAX	20 psf	(5) - #8 VERT REBAR	24"	48"	6"	2	19'-3"	14'-6"	12'-6"	11'-3"	9'-6"
T63	38'-4.5"	20'-0"	10° MAX	20 psf	(6) - #8 VERT REBAR	24"	48"	6"	2	20'-0"	15'-3"	13'-0"	11'-0"	10'-0"
T64	41'-10"	18'-0"	10° MAX	20 psf	(6) - #8 VERT REBAR	24"	48"	6"	2	20'-6"	15'-6"	13'-3"	11'-9"	10'-3"
T65	41'-10"	20'-0"	10° MAX	20 psf	(7) - #8 VERT REBAR	24"	48"	6"	2	21'-3"	16'-3"	13'-9"	12'-3"	10'-6"

- MULTIPLE STRUCTURE ID'S MAY BE SELECTED WITHIN THE SAME SITE AND/OR STRUCTURE.
- WHEN UTILIZING A STRUCTURE ID READ FROM WITHIN THAT ID ROW ONLY.
- SEE SOILS NOTES ON SHEET S-3 FOR INFORMATION ON SOILS CLASS SELECTION.
- FOR SITUATIONS WHERE WATER MITIGATION IS NECESSARY, OR FOR OTHER CONDITIONS REQUIRING MITIGATION, REFER TO DETAIL 2/- FOR SLEEVED FOUNDATION OPTION.

## R=1.25 T-STRUCTURE NON-CONSTRAINED PIER FOUNDATION SCHEDULE

SCALE: N/A



- NOTE: NUMBER AND SIZES OF BARS VARY SEE FOUNDATION CHARTS.

ENGINEER'S APPROVAL

DATE SIGNED  
AUGUST 4, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

A 03-117835

AC: FLS. / SS TH  
DATE: JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES

APPL. P.L.C. 04-118425

AC: FLS. / SS TH  
DATE: AUG 04 2015

PRE-CHECK (P) DOCUMENT  
CODE: 003 020

A SEPARATE PROJECT APPLICATION  
FOR CONSTRUCTION IS REQUIRED.

MBARC CONSTRUCTION INC.

674 RANCHEROS DR  
SAN MARCOS, CA 92069

PHONE: (760) 744-4131  
FAX: (760) 744-4469

LIC # 869960  
B AND CST

4 STEEL ENGINEERING  
STRUCTURAL ENGINEERING

109 EAST ESCALONES  
SAN CLEMENTE, CA 92672

PHONE: (949) 388-9333  
FAX: (949) 388-3773

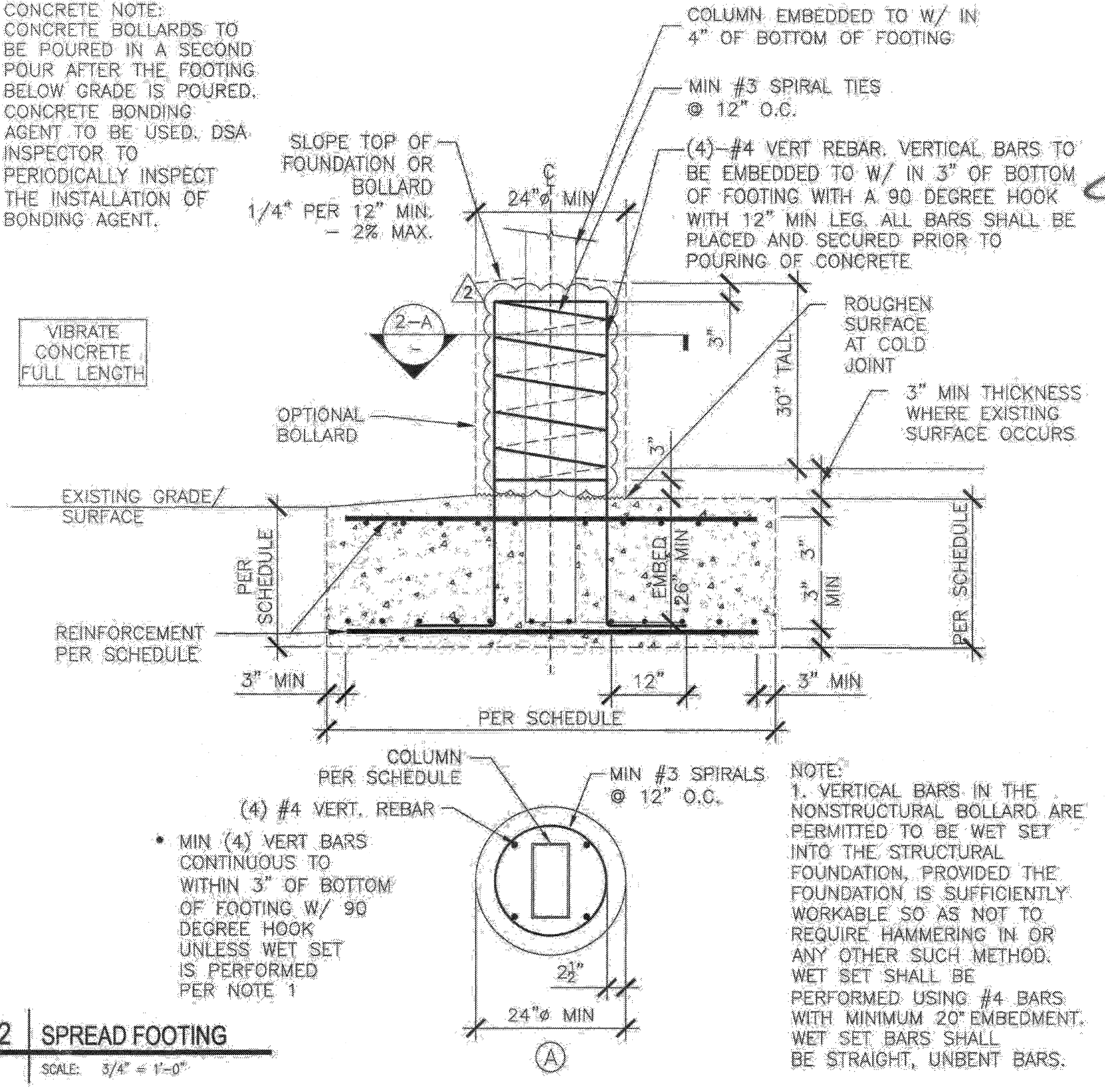
PHOTOVOLTAIC STRUCTURES  
R=1.25 T-STRUCTURE NON-CONSTRAINED PIER FOUNDATION SCHEDULE

DRAWN MAP  
CHECKED DKR  
DATE 8/04/15  
4STEEL JOB NO. 13-1010  
SHEET S-8  
8 OF 46 SHEETS

# T-STRUCTURE SPREAD FOOTING SCHEDULE BASED ON $R=1.25$ , $S_s \leq 1.7$

I.D. #	MAX WIDTH (W)	MAX COLUMN SPACING (S)	ROOF SLOPE	GROUND SNOW LOAD	FOOTING REINFORCEMENT	FOOTING DETAIL	SPREAD FOOTINGS FOR SOIL MATERIAL CLASS V (SOILS NOTES S-3)
<del>T1</del>	<del>36'-9"</del>	<del>18'-0"</del>	<del>7.49° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 15" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>8'-6" x 8'-6" x 30" DEEP</del>
<del>T2</del>	<del>36'-9"</del>	<del>20'-0"</del>	<del>7.49° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 16" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-0" x 8'-9" x 30" DEEP</del>
<del>T3</del>	<del>36'-9"</del>	<del>27'-0"</del>	<del>7.49° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 15" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-9" x 9'-9" x 30" DEEP</del>
<del>T4</del>	<del>38'-6"</del>	<del>18'-0"</del>	<del>7.49° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 16" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-0" x 9'-0" x 30" DEEP</del>
<del>T5</del>	<del>38'-6"</del>	<del>20'-0"</del>	<del>7.49° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 16" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-0" x 9'-0" x 30" DEEP</del>
<del>T6</del>	<del>38'-6"</del>	<del>27'-0"</del>	<del>7.49° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 15" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-9" x 9'-9" x 30" DEEP</del>
<del>T7</del>	<del>42'-6"</del>	<del>18'-0"</del>	<del>7.49° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-3" x 9'-3" x 30" DEEP</del>
<del>T8</del>	<del>42'-6"</del>	<del>20'-0"</del>	<del>7.49° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-6" x 9'-6" x 30" DEEP</del>
T9	42'-6"	27'-0"	7.49° MAX	0 psf	#6 BARS @ 16" O.C. MAX EACH WAY TOP & BOTTOM	(2)	10'-3" x 10'-3" x 30" DEEP
<del>T10</del>	<del>36'-9"</del>	<del>18'-0"</del>	<del>7.49° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 16" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>8'-9" x 8'-9" x 30" DEEP</del>
<del>T11</del>	<del>36'-9"</del>	<del>20'-0"</del>	<del>7.49° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 18" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-0" x 9'-0" x 30" DEEP</del>
<del>T12</del>	<del>38'-6"</del>	<del>18'-0"</del>	<del>7.49° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 16" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-0" x 9'-0" x 30" DEEP</del>
<del>T13</del>	<del>38'-6"</del>	<del>20'-0"</del>	<del>7.49° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-3" x 9'-3" x 30" DEEP</del>
<del>T14</del>	<del>42'-6"</del>	<del>18'-0"</del>	<del>7.49° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-3" x 9'-3" x 30" DEEP</del>
<del>T15</del>	<del>42'-6"</del>	<del>20'-0"</del>	<del>7.49° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-6" x 9'-6" x 30" DEEP</del>
<del>T51</del>	<del>36'-0"</del>	<del>18'-0"</del>	<del>10° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-3" x 9'-3" x 30" DEEP</del>
<del>T52</del>	<del>38'-0"</del>	<del>20'-0"</del>	<del>10° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-6" x 9'-6" x 30" DEEP</del>
<del>T53</del>	<del>36'-0"</del>	<del>27'-0"</del>	<del>10° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>10'-6" x 10'-6" x 30" DEEP</del>
<del>T54</del>	<del>38'-4.5"</del>	<del>18'-0"</del>	<del>10° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-6" x 9'-6" x 30" DEEP</del>
<del>T55</del>	<del>38'-4.5"</del>	<del>20'-0"</del>	<del>10° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 16" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>10'-0" x 10'-0" x 30" DEEP</del>
<del>T56</del>	<del>38'-4.5"</del>	<del>27'-0"</del>	<del>10° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 16" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>11'-0" x 11'-0" x 30" DEEP</del>
<del>T57</del>	<del>41'-10"</del>	<del>18'-0"</del>	<del>10° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 16" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>10'-0" x 10'-0" x 30" DEEP</del>
<del>T58</del>	<del>41'-10"</del>	<del>20'-0"</del>	<del>10° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>10'-6" x 10'-6" x 30" DEEP</del>
<del>T59</del>	<del>41'-10"</del>	<del>27'-0"</del>	<del>10° MAX</del>	<del>0 psf</del>	<del>#6 BARS @ 16" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>11'-6" x 11'-6" x 30" DEEP</del>
<del>T60</del>	<del>36'-0"</del>	<del>18'-0"</del>	<del>10° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-3" x 9'-3" x 30" DEEP</del>
<del>T61</del>	<del>36'-0"</del>	<del>20'-0"</del>	<del>10° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-6" x 9'-6" x 30" DEEP</del>
<del>T62</del>	<del>38'-4.5"</del>	<del>18'-0"</del>	<del>10° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-6" x 9'-6" x 30" DEEP</del>
<del>T63</del>	<del>38'-4.5"</del>	<del>20'-0"</del>	<del>10° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 16" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>10'-0" x 10'-0" x 30" DEEP</del>
<del>T64</del>	<del>41'-10"</del>	<del>18'-0"</del>	<del>10° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 17" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-3" x 9'-3" x 30" DEEP</del>
<del>T65</del>	<del>41'-10"</del>	<del>20'-0"</del>	<del>10° MAX</del>	<del>20 psf</del>	<del>#6 BARS @ 15" O.C. MAX EACH WAY TOP &amp; BOTTOM</del>	<del>(2)</del>	<del>9'-9" x 9'-9" x 30" DEEP</del>

1. MULTIPLE STRUCTURE ID'S MAY BE SELECTED WITHIN THE SAME SITE AND/OR STRUCTURE.  
 2. WHEN UTILIZING A STRUCTURE ID READ FROM WITHIN THAT ID ROW ONLY.  
 3. SEE SOILS NOTES ON SHEET S-3 FOR INFORMATION ON SOILS CLASS SELECTION.



**ENGINEER'S APPROVAL**

*[Professional Seal]*

**DATE SIGNED**  
AUGUST 4, 2015

IDENTIFICATION STAMP  
 DIV. OF THE STATE ARCHITECT

**A03-117835**

AC FLS SS TR  
 DATE JAN 17 2017

**SITE SPECIFIC DSA APPROVAL**

IDENTIFICATION STAMP  
 DIV. OF THE STATE ARCHITECT  
 OFFICE OF REGULATION SERVICES

APPL # C. 04-113425

FLS SS  
 DATE AUG 04 2015

PRE-CHECK (PC) DOCUMENT  
 CODE: 515-010  
 A SEPARATE PROJECT APPLICATION FOR CONSTRUCTION IS REQUIRED

**MBARC CONSTRUCTION INC.**  
 674 RANCHEROS DR | PHONE: (760) 744-4131 | UC # 869980  
 SAN MARCOS, CA | FAX: (760) 744-4489 | E AND CST 92069

**4 STEEL ENGINEERING**  
 STRUCTURAL ENGINEERING  
 109 EAST ESCALONES | PHONE: (949) 388-9333  
 SAN CLEMENTE, CA 92672 | FAX: (949) 388-3773

PHOTOVOLTAIC STRUCTURES  
 R=1.25 T-STRUCTURE SPREAD FOOTING SCHEDULE

DRAWN MAP  
 CHECKED DKR  
 DATE 8/04/15  
 4STEL JOB NO. 13-1010  
 SHEET **S-10**  
 10 OF 46 SHEETS



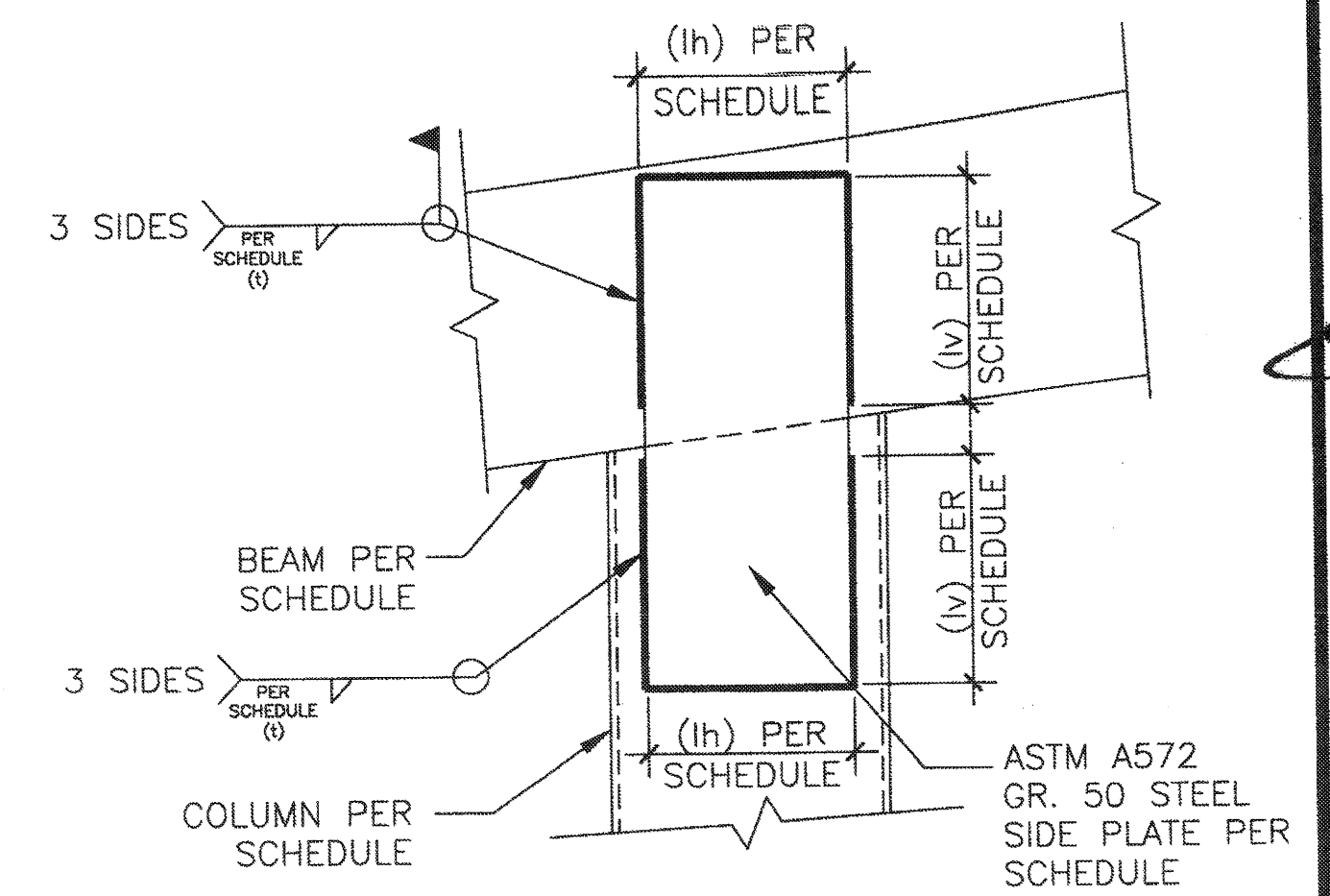
# T-STRUCTURE BEAM TO COLUMN CONNECTION

## SCHEDULE BASED ON R=1.25, Ss ≤ 1.7

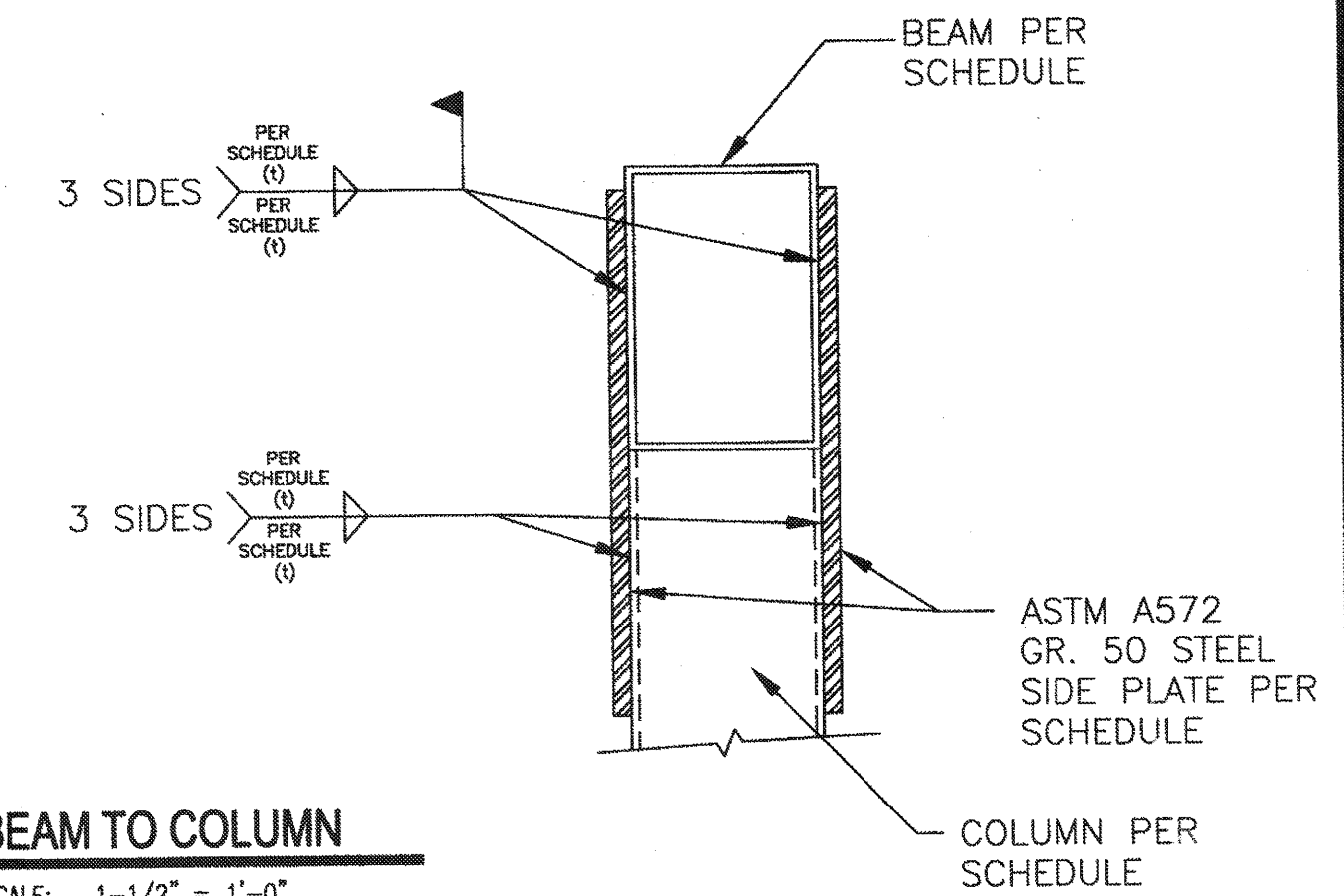
I.D. #	MAX WIDTH (W)	MAX COLUMN SPACING (S)	ROOF SLOPE	GROUND SNOW LOAD	BEAM TO COLUMN DETAIL	BEAM TO COLUMN SIDE PLATE	MIN WELD THICKNESS (t)	MIN STRUCTURAL WELD LENGTH (lv)	MIN STRUCTURAL WELD LENGTH (lh)
T1	36'-9"	18'-0"	7.49° MAX	0 psf	2	11 7/8" x 25 3/4" x 5/16" THICK	3/16" THICK	11.5" VERTICAL	11.5" HORIZONTAL
T2	36'-9"	20'-0"	7.49° MAX	0 psf	2	11 1/2" x 25 7/8" x 3/8" THICK	3/16" THICK	11.5" VERTICAL	11.5" HORIZONTAL
T3	36'-9"	27'-0"	7.49° MAX	0 psf	2	10 3/4" x 25 5/8" x 1/2" THICK	3/16" THICK	11.5" VERTICAL	10.5" HORIZONTAL
T4	38'-6"	18'-0"	7.49° MAX	0 psf	2	11 1/2" x 25 1/2" x 3/8" THICK	3/16" THICK	11" VERTICAL	11.5" HORIZONTAL
T5	38'-6"	20'-0"	7.49° MAX	0 psf	2	11 1/2" x 25 1/2" x 3/8" THICK	3/16" THICK	11" VERTICAL	11.5" HORIZONTAL
T6	38'-6"	27'-0"	7.49° MAX	0 psf	2	10 3/4" x 25 5/8" x 1/2" THICK	3/16" THICK	11.5" VERTICAL	10.5" HORIZONTAL
T7	42'-6"	18'-0"	7.49° MAX	0 psf	2	11 1/4" x 25 5/8" x 3/8" THICK	3/16" THICK	11.5" VERTICAL	11" HORIZONTAL
T8	42'-6"	20'-0"	7.49° MAX	0 psf	2	11 1/4" x 25 5/8" x 3/8" THICK	3/16" THICK	11.5" VERTICAL	11" HORIZONTAL
T9	42'-6"	27'-0"	7.49° MAX	0 psf	2	10 3/4" x 25 3/8" x 1/2" THICK	1/4" THICK	11" VERTICAL	10.5" HORIZONTAL
T10	36'-9"	18'-0"	7.49° MAX	20 psf	2	11 1/2" x 25 1/2" x 3/8" THICK	3/16" THICK	11" VERTICAL	11.5" HORIZONTAL
T11	36'-9"	20'-0"	7.49° MAX	20 psf	2	11 1/2" x 25 1/2" x 3/8" THICK	3/16" THICK	11" VERTICAL	11.5" HORIZONTAL
T12	38'-6"	18'-0"	7.49° MAX	20 psf	2	11 1/2" x 25 1/2" x 3/8" THICK	3/16" THICK	11" VERTICAL	11.5" HORIZONTAL
T13	38'-6"	20'-0"	7.49° MAX	20 psf	2	11 1/4" x 25 5/8" x 3/8" THICK	3/16" THICK	11.5" VERTICAL	11" HORIZONTAL
T14	42'-6"	18'-0"	7.49° MAX	20 psf	2	11 1/4" x 25 1/4" x 3/8" THICK	3/16" THICK	11" VERTICAL	11" HORIZONTAL
T15	42'-6"	20'-0"	7.49° MAX	20 psf	2	10 3/4" x 25 3/8" x 1/2" THICK	1/4" THICK	11" VERTICAL	10.5" HORIZONTAL
T51	38'-0"	18'-0"	10° MAX	0 psf	2	11 7/8" x 25 1/2" x 5/16" THICK	3/16" THICK	11" VERTICAL	11.5" HORIZONTAL
T52	38'-0"	20'-0"	10° MAX	0 psf	2	11 1/2" x 25 1/4" x 3/8" THICK	3/16" THICK	11" VERTICAL	11.5" HORIZONTAL
T53	36'-0"	27'-0"	10° MAX	0 psf	2	10 3/4" x 25" x 5/8" THICK	5/16" THICK	10.5" VERTICAL	10.5" HORIZONTAL
T54	38'-4.5"	18'-0"	10° MAX	0 psf	2	11 1/2" x 25 1/4" x 3/8" THICK	3/16" THICK	11" VERTICAL	11.5" HORIZONTAL
T55	38'-4.5"	20'-0"	10° MAX	0 psf	2	11 1/2" x 25 1/4" x 1/2" THICK	1/4" THICK	11" VERTICAL	11.5" HORIZONTAL
T56	38'-4.5"	27'-0"	10° MAX	0 psf	2	10 3/4" x 25" x 3/4" THICK	5/16" THICK	10.5" VERTICAL	10.5" HORIZONTAL
T57	41'-10"	18'-0"	10° MAX	0 psf	2	11 1/2" x 25 1/4" x 1/2" THICK	1/4" THICK	11" VERTICAL	11.5" HORIZONTAL
T58	41'-10"	20'-0"	10° MAX	0 psf	2	11 1/4" x 24 7/8" x 5/8" THICK	5/16" THICK	10.5" VERTICAL	11" HORIZONTAL
T59	41'-10"	27'-0"	10° MAX	0 psf	2	10 1/8" x 24 1/4" x 7/8" THICK	7/16" THICK	10" VERTICAL	10" HORIZONTAL
T60	36'-0"	18'-0"	10° MAX	20 psf	2	11 1/2" x 25 1/4" x 3/8" THICK	3/16" THICK	11" VERTICAL	11.5" HORIZONTAL
T61	36'-0"	20'-0"	10° MAX	20 psf	2	11 1/2" x 25 1/4" x 1/2" THICK	1/4" THICK	11" VERTICAL	11.5" HORIZONTAL
T62	38'-4.5"	18'-0"	10° MAX	20 psf	2	11 1/2" x 25 1/4" x 1/2" THICK	1/4" THICK	11" VERTICAL	11.5" HORIZONTAL
T63	38'-4.5"	20'-0"	10° MAX	20 psf	2	11 1/4" x 24 7/8" x 1/2" THICK	1/4" THICK	10.5" VERTICAL	11" HORIZONTAL
T64	41'-10"	18'-0"	10° MAX	20 psf	2	11 1/4" x 24 7/8" x 1/2" THICK	1/4" THICK	10.5" VERTICAL	11" HORIZONTAL
T65	41'-10"	20'-0"	10° MAX	20 psf	2	10 3/4" x 24 3/4" x 5/8" THICK	5/16" THICK	10.5" VERTICAL	10.5" HORIZONTAL

- MULTIPLE STRUCTURE ID'S MAY BE SELECTED WITHIN THE SAME SITE AND/OR STRUCTURE.
- WHEN UTILIZING A STRUCTURE ID READ FROM WITHIN THAT ID ROW ONLY.

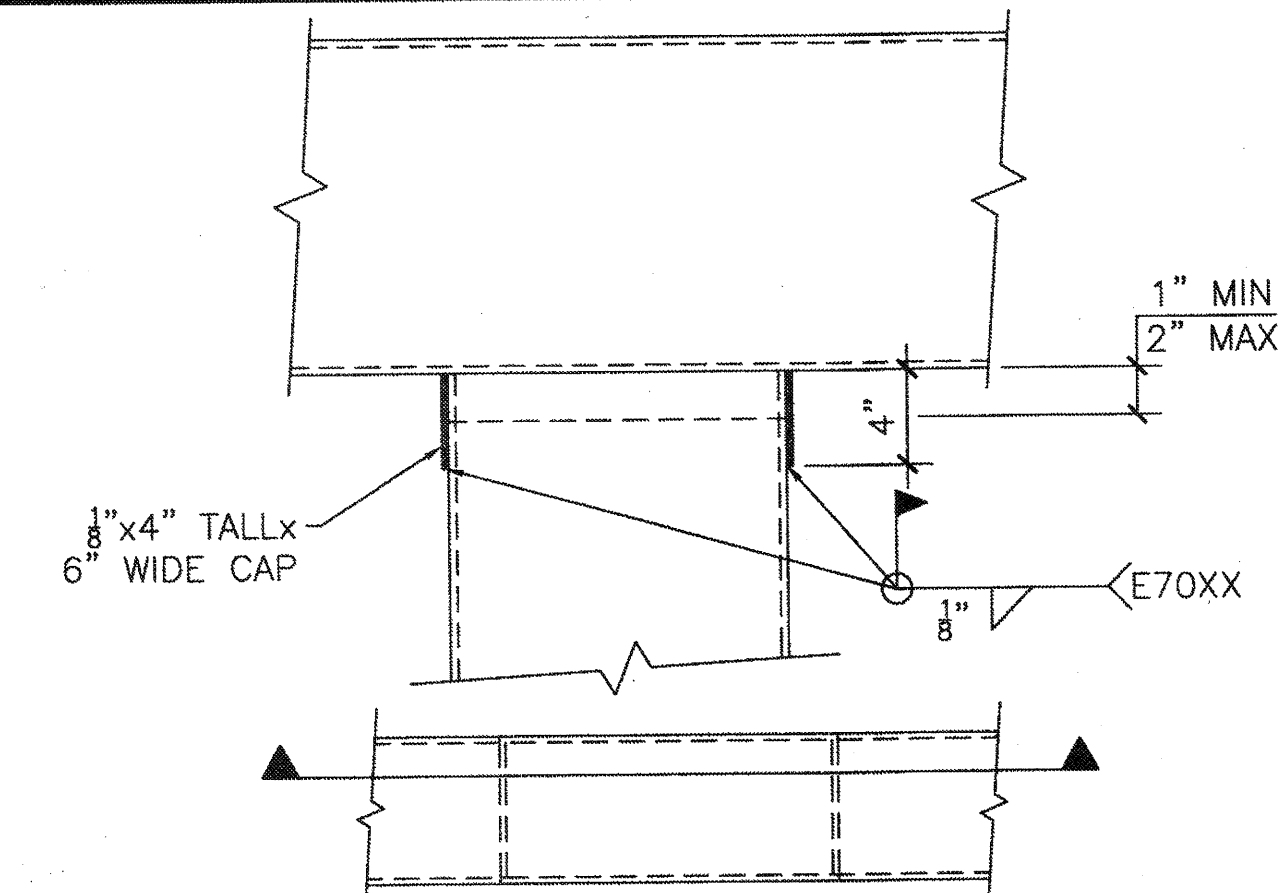
1 R=1.25 T-STRUCTURE BEAM TO COLUMN SCHEDULE  
SCALE: N/A



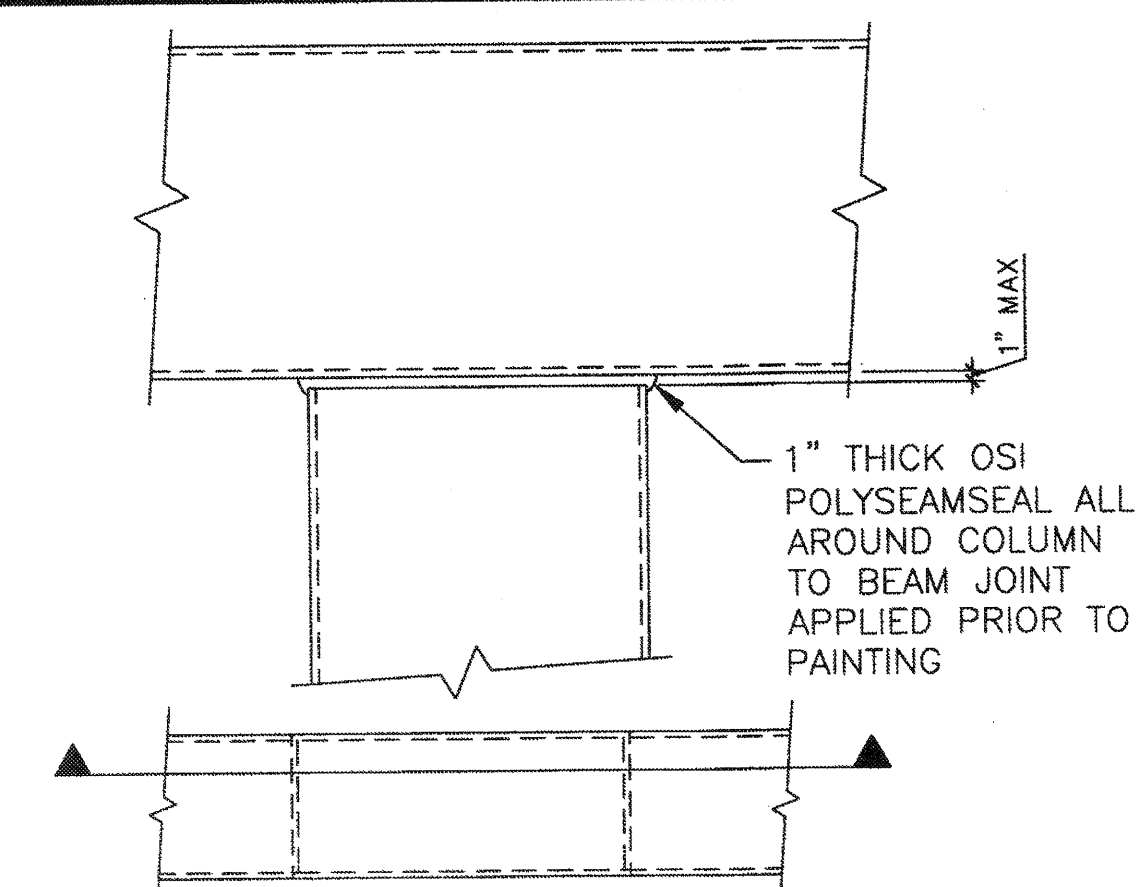
- NOTE:
- WELD TO BE ALL AROUND PLATE. PORTIONS OF THE WELD ALL AROUND JOINT ARE STRUCTURAL AND OTHER PORTIONS ARE NON STRUCTURAL. MINIMUM STRUCTURAL WELD LENGTHS (lv) AND (lh) PER SCHEDULE. WELDS BEYOND THESE MIN LENGTHS ARE NON STRUCTURAL SEAL WELDS.
  - PURLIN, SOLAR PANEL NOT SHOWN



2 BEAM TO COLUMN  
SCALE: 1-1/2" = 1'-0"

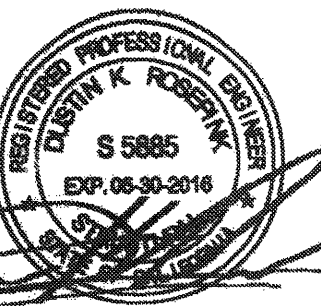


3 BEAM TO COLUMN CORROSION PROTECTION OPTION 1  
SCALE: 1 1/2" = 1'-0"



4 BEAM TO COLUMN CORROSION PROTECTION OPTION 2  
SCALE: 1 1/2" = 1'-0"

ENGINEER'S APPROVAL



7/22/15

DATE SIGNED  
MMMM DD, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

A03-117835

AC FLS SS TH  
DATE JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES

APPL. C. 04-113425

AC FLS SS TH  
DATE JUL 22 2015

PRE-CHECK (PC) DOCUMENT  
CODE 2015-010  
A SEPARATE PROJECT APPLICATION  
FOR CONSTRUCTION IS REQUIRED.

**MBARC CONSTRUCTION INC.**  
674 RANCHEROS DR  
SAN MARCOS, CA 92069  
LIC # 865960  
B AND C 51  
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**4 STEEL ENGINEERING**  
STRUCTURAL ENGINEERING  
109 EAST ESCALONES  
SAN CLEMENTE, CA 92672  
PHONE: (949) 388-9333  
FAX: (949) 388-3773

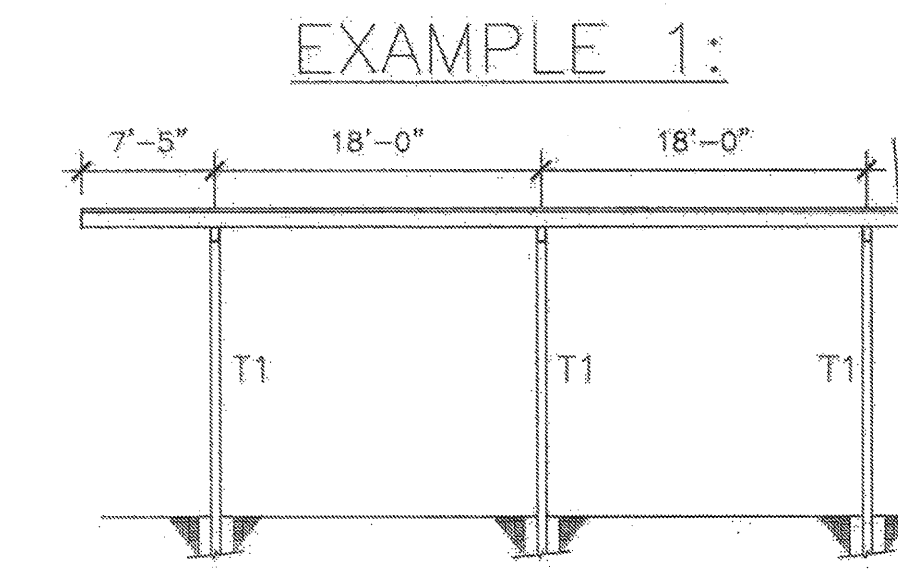
PHOTOVOLTAIC  
STRUCTURES  
R=1.25 T-STRUCTURE  
BEAM TO  
COLUMN SCHEDULE

DRAWN  
MAP  
CHECKED  
DKR  
DATE  
5/29/15  
4STEL JOB NO.  
13-1010

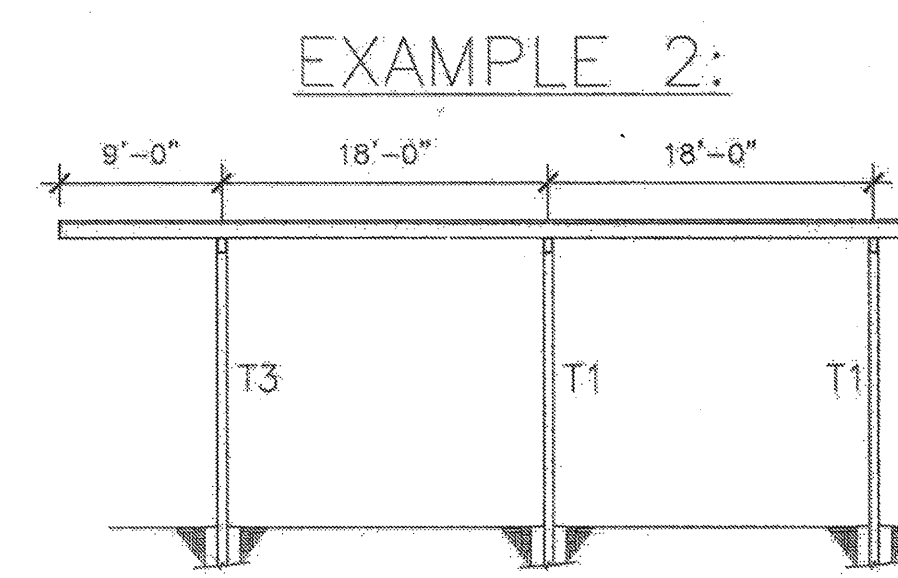
SHEET  
S-12

12 OF 46 SHEETS

I.D. #	MAX PURLIN SPACING (PS)	MAX COLUMN SPACING (S)	MAX CANTILEVER SPAN, NO BLOCKING (CS)	MAX CANTILEVER SPAN, BLOCKING (CS)	MAX GROUND SNOW LOAD	PURLIN		BLOCKING "A" MID SPAN OF CANTILEVER		BLOCKING "B" MID SPAN OF SIMPLE SPAN		BLOCKING "C" 1/3 SPAN OF SIMPLE SPAN		BLOCKING TO INTERIOR PURLIN DETAIL	BLOCKING TO EXTERIOR PURLIN DETAIL	BEAM TO PURLIN DETAIL			
						SECTION	DETAIL	SECTION	DETAIL	SECTION	DETAIL	SECTION	DETAIL			INTERIOR SPLICE	INTERIOR @ CANTILEVER	EXTERIOR SPLICE	EXTERIOR @ CANTILEVER
A	45"	18'-0"	7'-5"	10'-0"	0 psf	C8 x 4 14 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	7 S-33	8 S-33	4 S-33	12 S-33	2 S-33	13 S-33
B	45"	20'-0"	7'-9"	10'-0"	0 psf	C8 x 4 14 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	7 S-33	8 S-33	1 S-33	12 S-33	2 S-33	13 S-33
C	45"	27'-0"	8'-9"	11'-2"	0 psf	C8 x 4 12 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	7 S-33	8 S-33	1 S-33	12 S-33	2 S-33	13 S-33
D	80"	18'-0"	6'-9"	8'-3"	0 psf	C8 x 4 14 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	7 S-33	8 S-33	1 S-33	12 S-33	2 S-33	13 S-33
E	80"	18'-0"	7'-3"	9'-0"	0 psf	C10 x 4 14 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	7 S-33	8 S-33	1 S-33	12 S-33	2 S-33	13 S-33
F	80"	20'-0"	7'-9"	10'-3"	0 psf	C8 x 4 12 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	7 S-33	8 S-33	1 S-33	12 S-33	2 S-33	13 S-33
G	80"	20'-0"	7'-3"	9'-0"	0 psf	C10 x 4 14 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	7 S-33	8 S-33	1 S-33	12 S-33	2 S-33	13 S-33
H	80"	27'-0"	8'-6"	11'-2"	0 psf	C10 x 4 12 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	C6 x 2.5 x 16 GA	4 S-5	7 S-33	8 S-33	1 S-33	12 S-33	2 S-33	13 S-33
J	45"	18'-0"	7'-3"	9'-3"	20 psf	C8 x 4 14 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	7 S-33	8 S-33	1 S-33	12 S-33	2 S-33	13 S-33
K	45"	20'-0"	7'-3"	9'-3"	20 psf	C8 x 4 14 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	7 S-33	8 S-33	1 S-33	12 S-33	2 S-33	13 S-33
L	80"	18'-0"	7'-5"	10'-6"	20 psf	C10 x 4 12 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	7 S-33	8 S-33	1 S-33	12 S-33	2 S-33	13 S-33
M	80"	20'-0"	8'-0"	10'-6"	20 psf	C10 x 4 12 GA	1 S-5	C6 x 2.5 x 16 GA	4 S-5	C6 x 2.5 x 16 GA	4 S-5	N/A	N/A	7 S-33	8 S-33	1 S-33	12 S-33	2 S-33	13 S-33



PURLIN CANTILEVER DOES NOT REQUIRE MEMBER SIZE INCREASE AT END.



PURLIN CANTILEVER EXCEEDS LIMITS SHOWN IN CHART AND REQUIRES MEMBER SIZE INCREASE AT END.

2 PURLIN CONDITION EXAMPLES  
SCALE: N.T.S.

- MULTIPLE STRUCTURE ID'S MAY BE SELECTED WITHIN THE SAME SITE AND/OR STRUCTURE.
- WHEN UTILIZING A STRUCTURE ID READ FROM WITHIN THAT ID ROW ONLY.
- BEAM TO PURLIN DETAIL AT SPLICE SHALL NOT OCCUR ON A PURLIN WITH A CANTILEVER SPAN.
- WHEN THE CANTILEVER SPAN SHOWN ON THE SITE SPECIFIC SHEETS DOES NOT EXCEED THE MAX CANTILEVER SPAN NO BLOCKING, MID SPAN BLOCKING OF THE CANTILEVER IS NOT REQUIRED.
- PURLIN SPACING MAY BE INCREASED BEYOND THE MAXIMUMS GIVEN IN THE CHART ABOVE AS LONG AS THE TRIBUTARY WIDTH TO THE PURLIN DOES NOT EXCEED PS.
- LONG PURLIN CANTILEVERS INCREASE THE TRIBUTARY AREA TO THE END BEAM AND MAY REQUIRE THE SUPPORTING MEMBERS TO INCREASE IN SIZE PER THE SCHEDULE BELOW. THE LEFT COLUMN OF THE SCHEDULE REPRESENTS THE COLUMN SPACING CURRENTLY USED, AND THE CENTER COLUMN OF THE SCHEDULE REPRESENTS THE PURLIN CANTILEVER RANGE. USING THE COLUMN SPACING AND PURLIN CANTILEVER ADJACENT TO THE END BEAM, DETERMINE THE APPROPRIATE MEMBER SIZING PER THE RIGHTMOST COLUMN OF THE SCHEDULE. FOR EXAMPLE, SEE 2/-

PURLIN CANTILEVER SCHEDULE

COLUMN SPACING	MAX CANTILEVER	MEMBER SIZING
18'-0"	CS ≤ 7'-5"	18'-0"
18'-0"	7'-5" < CS ≤ 8'-9"	20'-0"
18'-0"	8'-9" < CS ≤ 13'-2"	27'-0"
20'-0"	CS ≤ 8'-3"	20'-0"
20'-0"	8'-3" < CS ≤ 12'-10"	27'-0"
27'-0"	CS ≤ 11'-2"	27'-0"

1 PURLIN SCHEDULE (ALL SLOPES)  
SCALE: N/A

ENGINEER'S APPROVAL

7/22/15  
DATE SIGNED  
MMMM DD, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

403-117835  
AC FLS SS TN  
DATE JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES

APPLD.C. 04-113425  
AC FLS SS  
DATE JUL 22 2015

PRE-CHECK (PC) DOCUMENT  
CODE: 2013 CBC  
A SEPARATE PROJECT APPLICATION  
FOR CONSTRUCTION IS REQUIRED.

MBARC CONSTRUCTION INC.

674 RANCHEROS DR  
SAN MARCOS, CA 92069

PHONE: (760) 744-4131  
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LIC # 849940  
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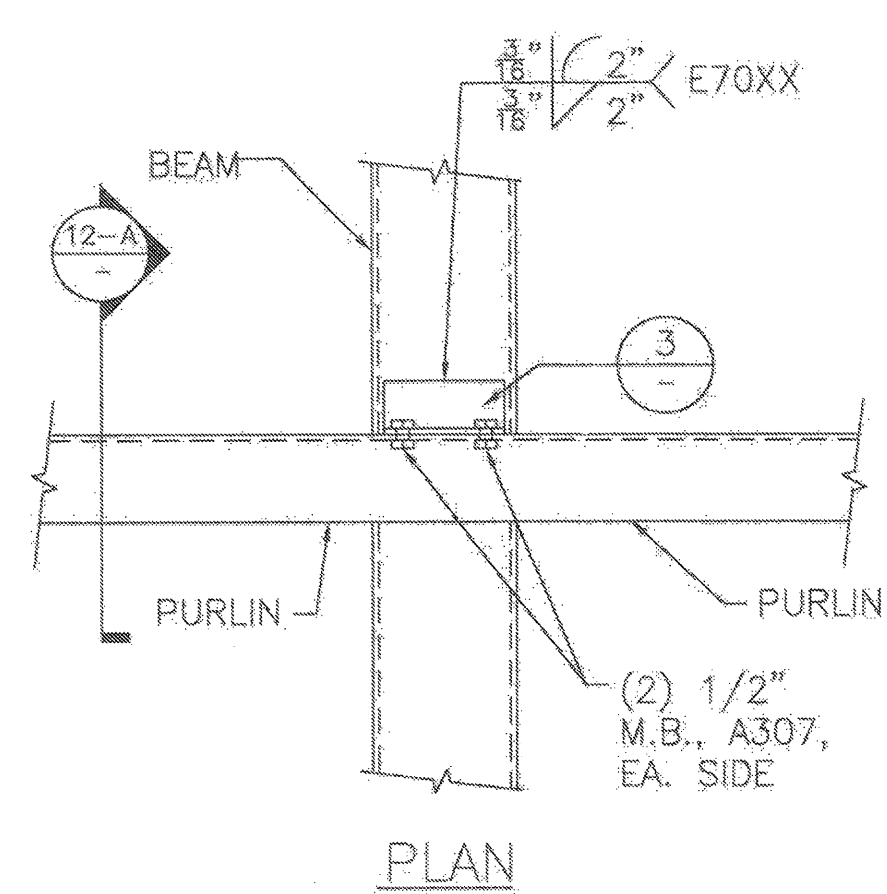
ASTEL ENGINEERING  
STRUCTURAL ENGINEERING

109 EAST ESCALONES  
SAN CLEMENTE, CA 92672

PHONE: (949) 388-9333  
FAX: (949) 388-3773

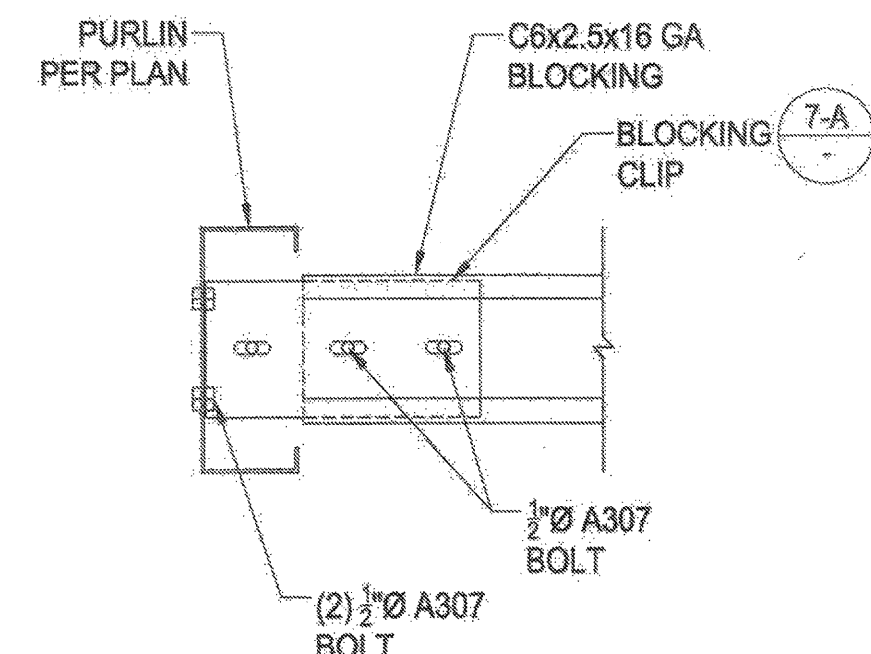
PHOTOVOLTAIC STRUCTURES PURLIN SCHEDULE (ALL SLOPES)

DRAWN MAP  
CHECKED DKR  
DATE 5/29/15  
ASTEL JOB NO. 13-1010  
SHEET S-32  
32 OF 46 SHEETS



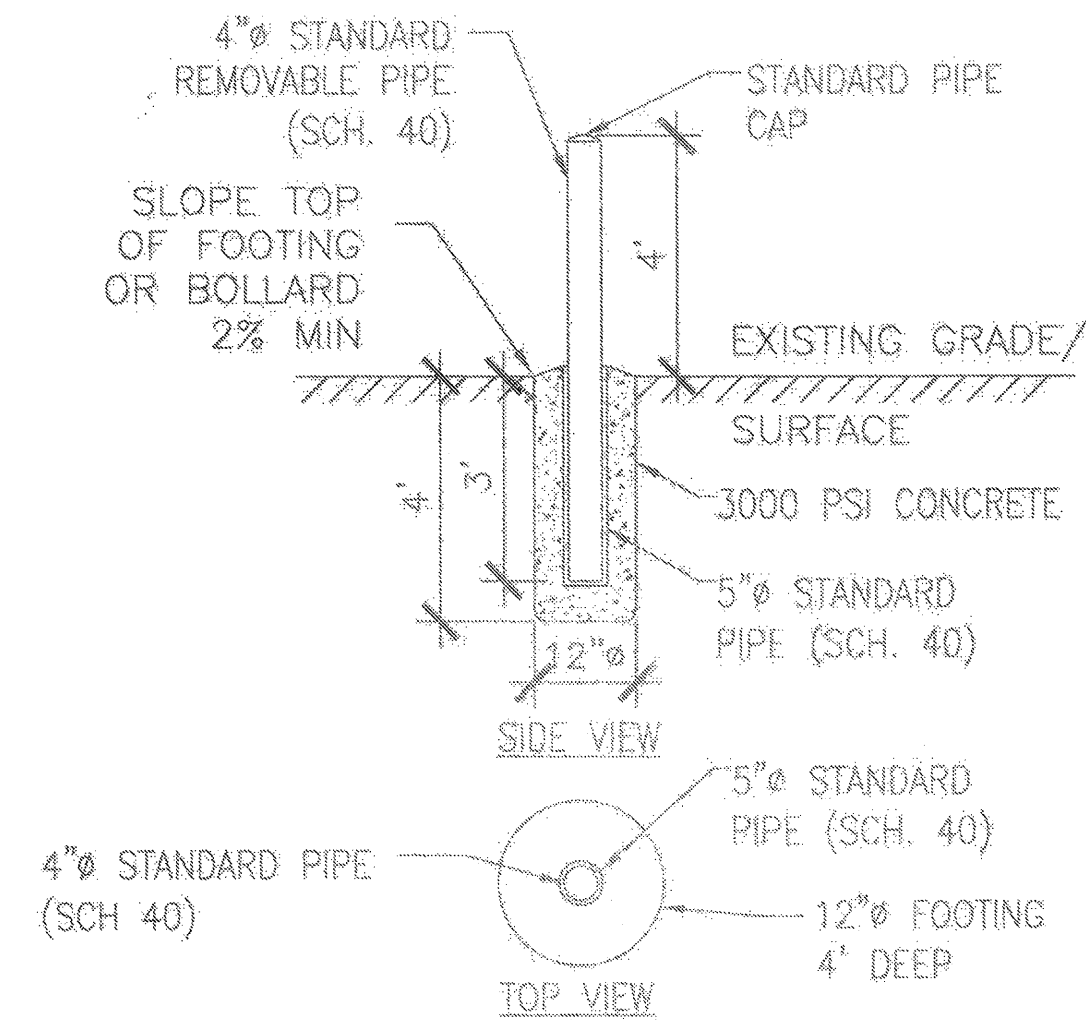
**8 PURLIN BLOCKING CONNECTION AT EXTERIOR**

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



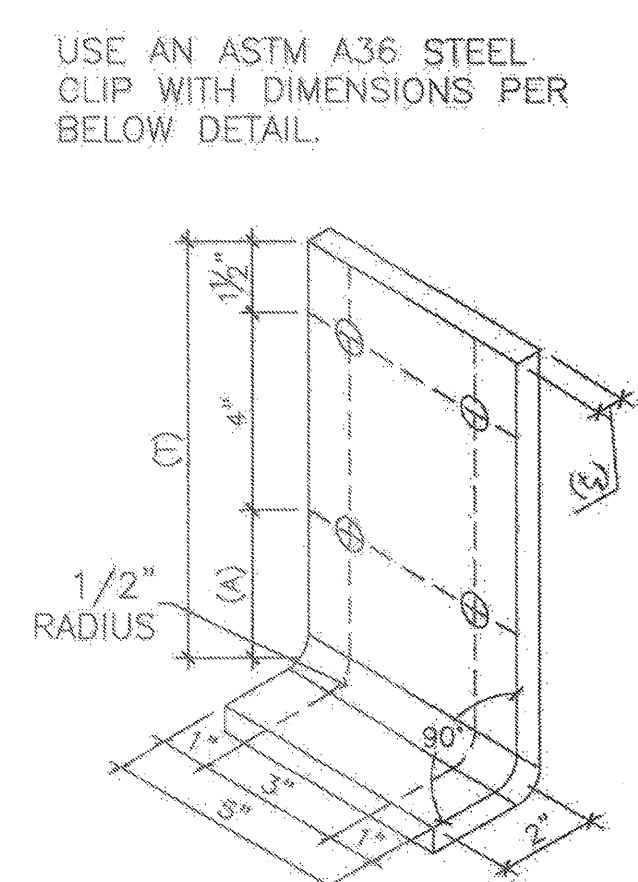
**9 DECK FLASHING**

SCALE: 6" = 1'-0"



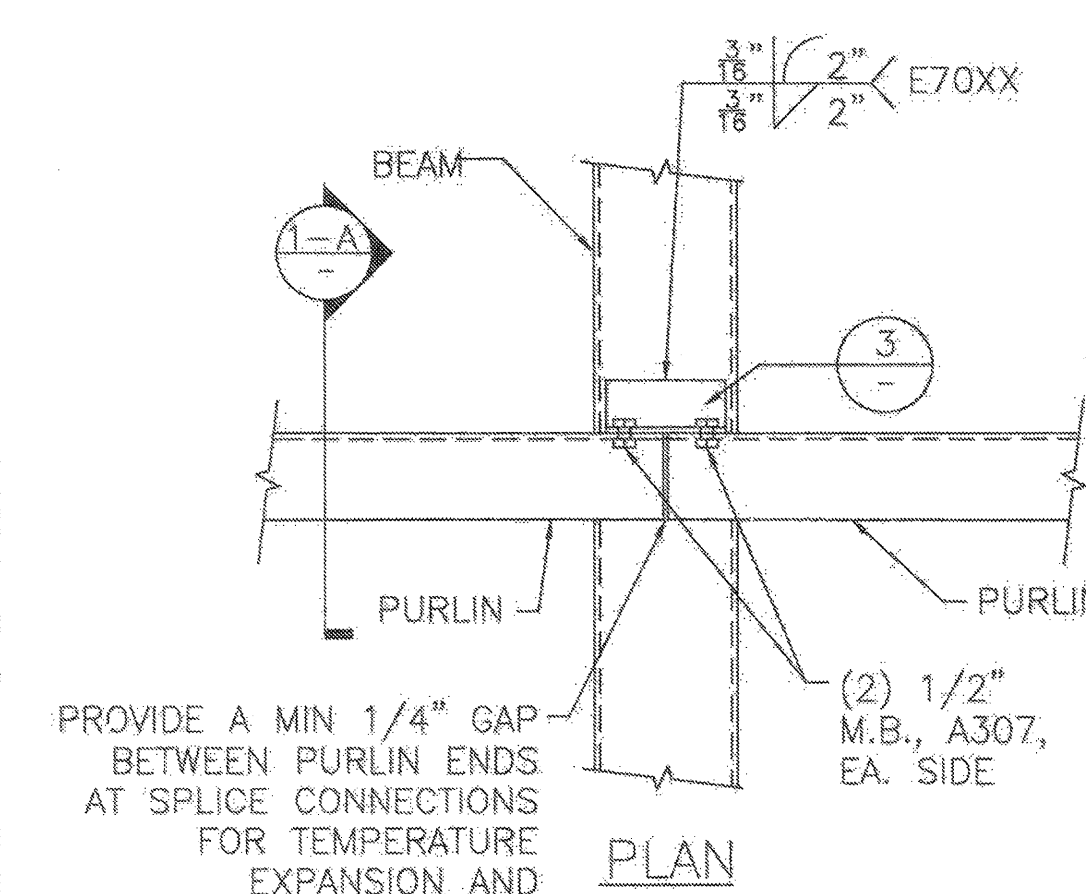
**6 OPTIONAL BOLLARD**

SCALE: NTS



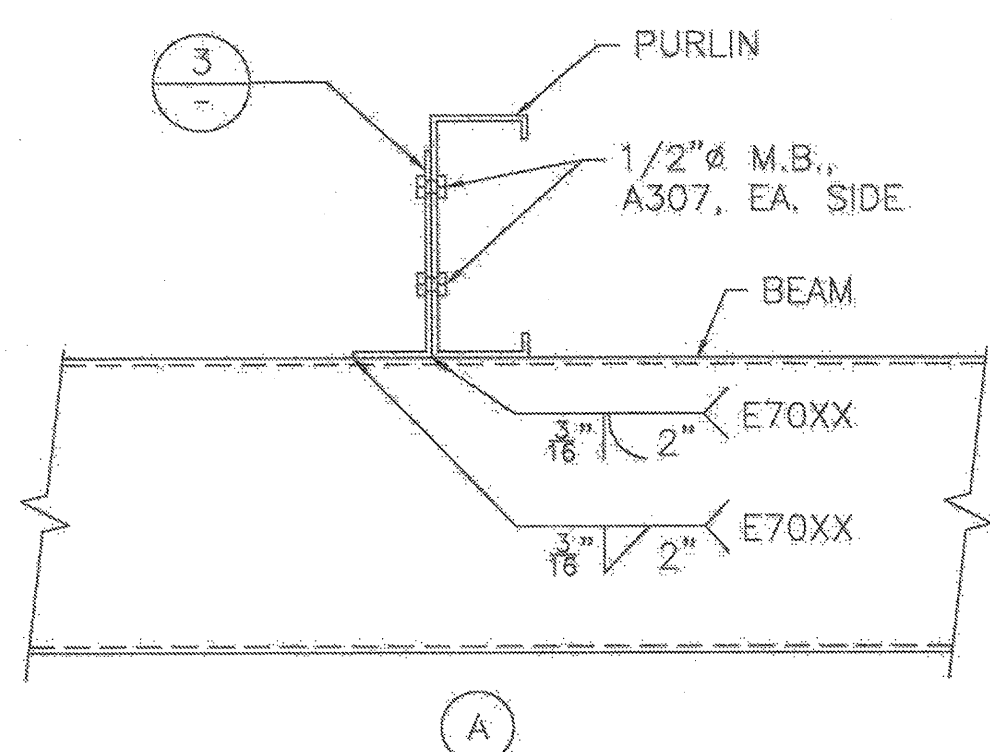
**3 CLIP ANGLE**

SCALE: 3" = 1'-0"



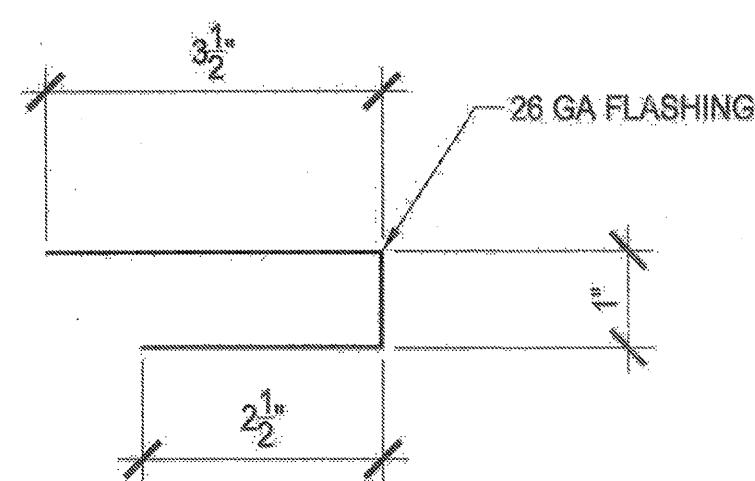
**1 BEAM TO PURLIN AT SPLICE**

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



**12 BEAM TO PURLIN**

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



**7 PURLIN BLOCKING CONNECTION AT INTERIOR**

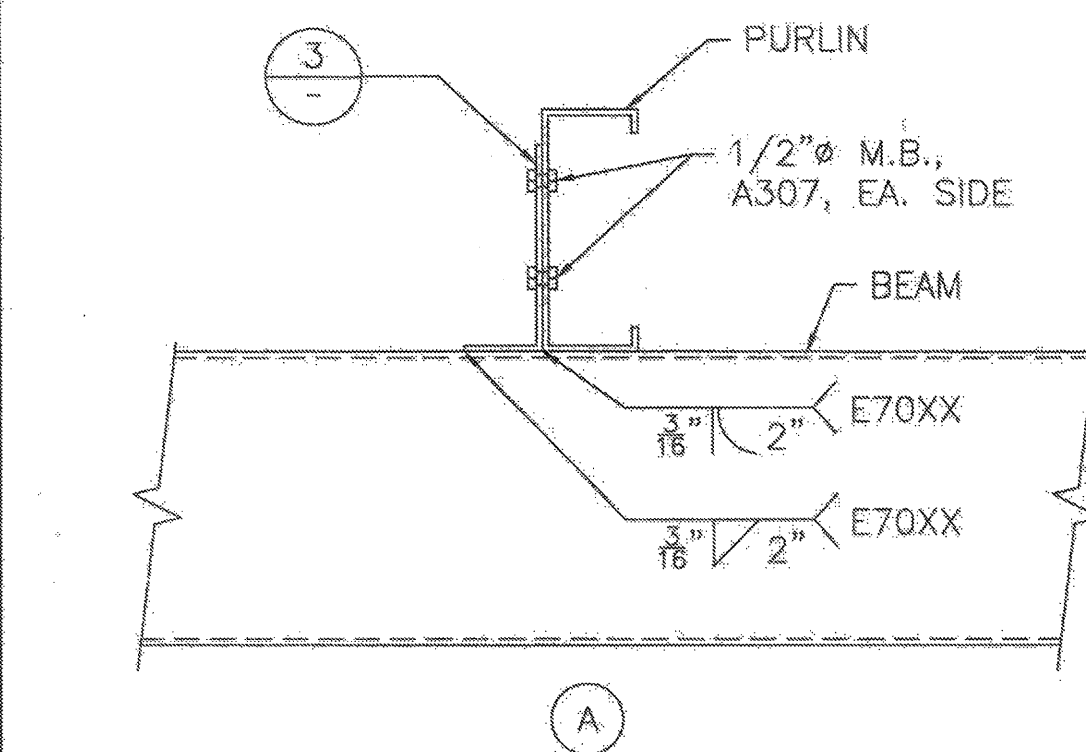
SCALE: 1-1/2" = 1'-0"

FABRICATION INSTRUCTIONS:  
USE A 5" WIDE BY (L) LONG BY (t) THICK ASTM A36 STEEL PLATE BENT WITH A 1/2" INSIDE RADIUS TO CREATE THE CLIP.

PURLIN HEIGHT	CLIP ANGLE		PURLIN SPACING	COLUMN SPACING	GROUND SNOW	t1
	T	A				
8"	7.5"	2"	≤ 45"	≤ 20'-0"	≤ 20 psf	1/4"
8"	7.5"	2"	> 45"	> 20'-0"	≤ 20 psf	5/16"
10"	8.5"	3"	≤ 80"	≤ 20'-0"	0 psf	5/16"
10"	8.5"	3"	≤ 80"	> 20'-0"	0 psf	7/16"
10"	8.5"	3"	≤ 80"	> 20'-0"	≤ 20 psf	3/8"

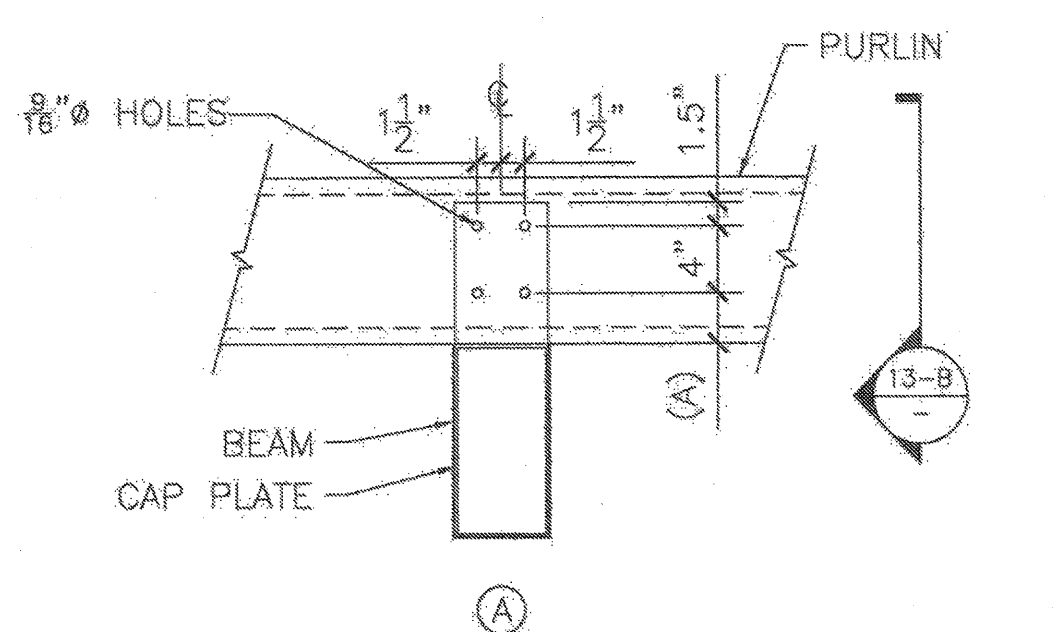
**4 BEAM TO END PLATE**

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



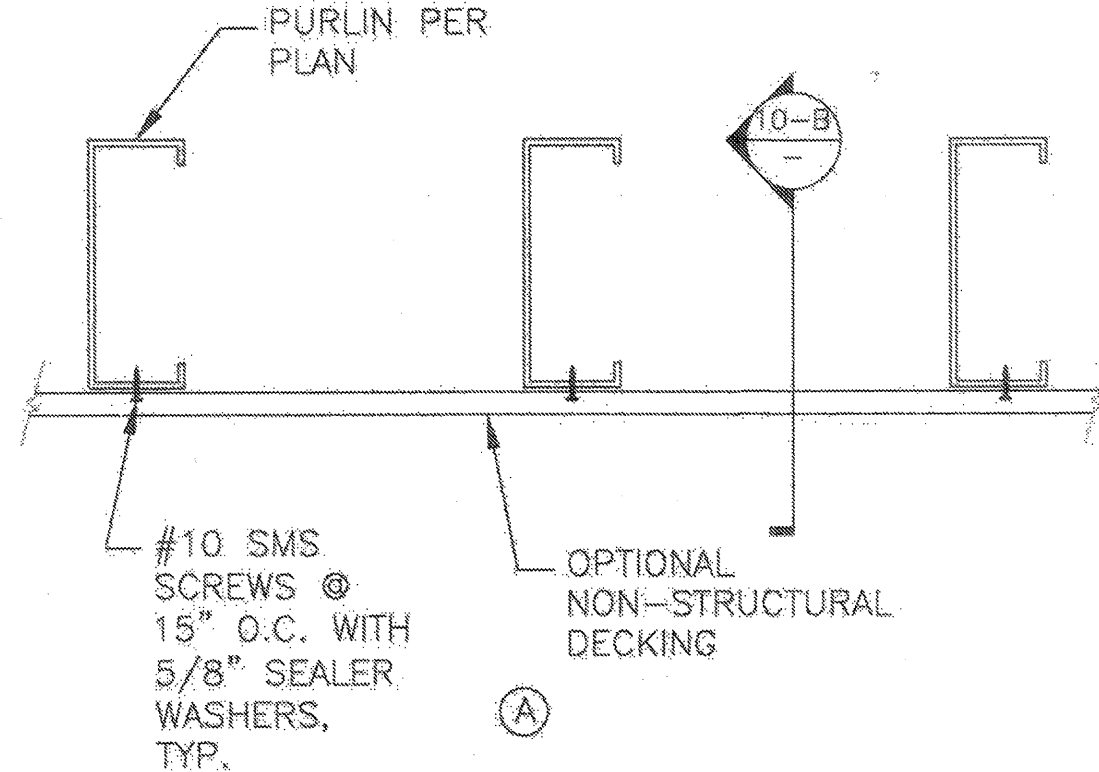
**2 BEAM END PLATE AT SPLICE**

SCALE: 1" = 1'-0"



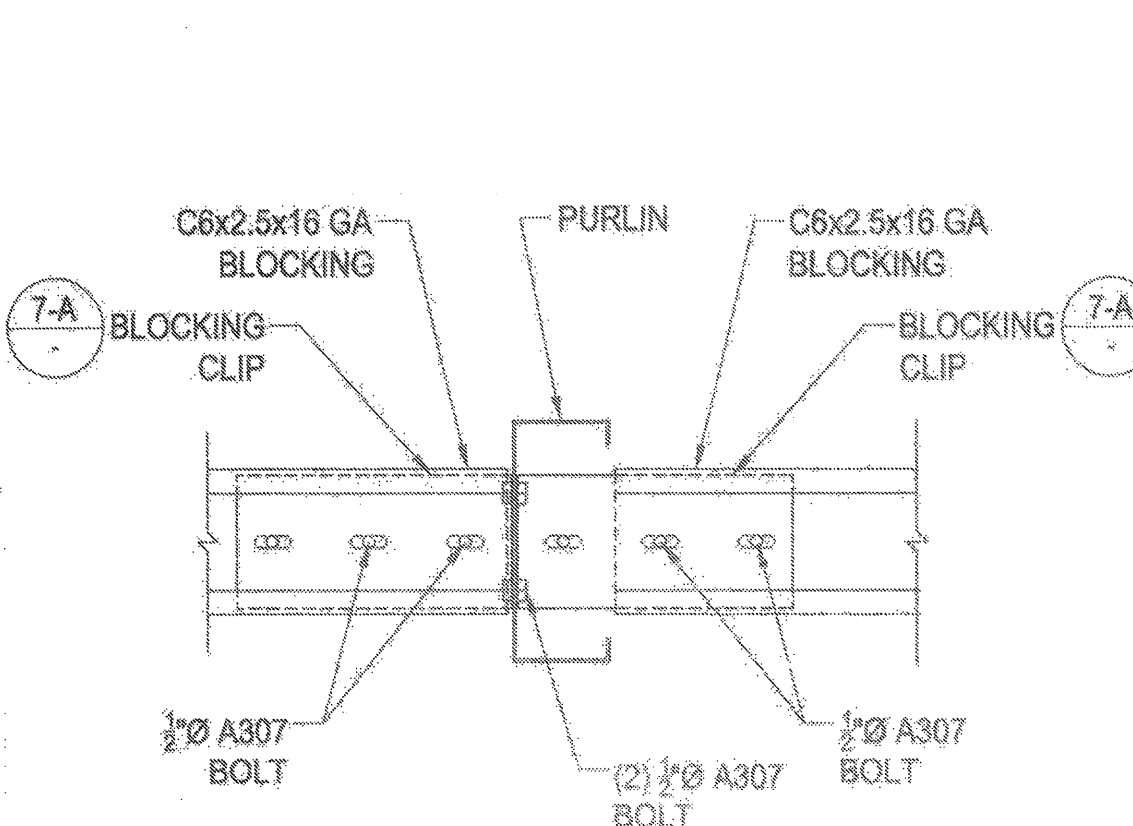
**13 BEAM END PLATE**

SCALE: 1" = 1'-0"



**10 OPTIONAL DECKING**

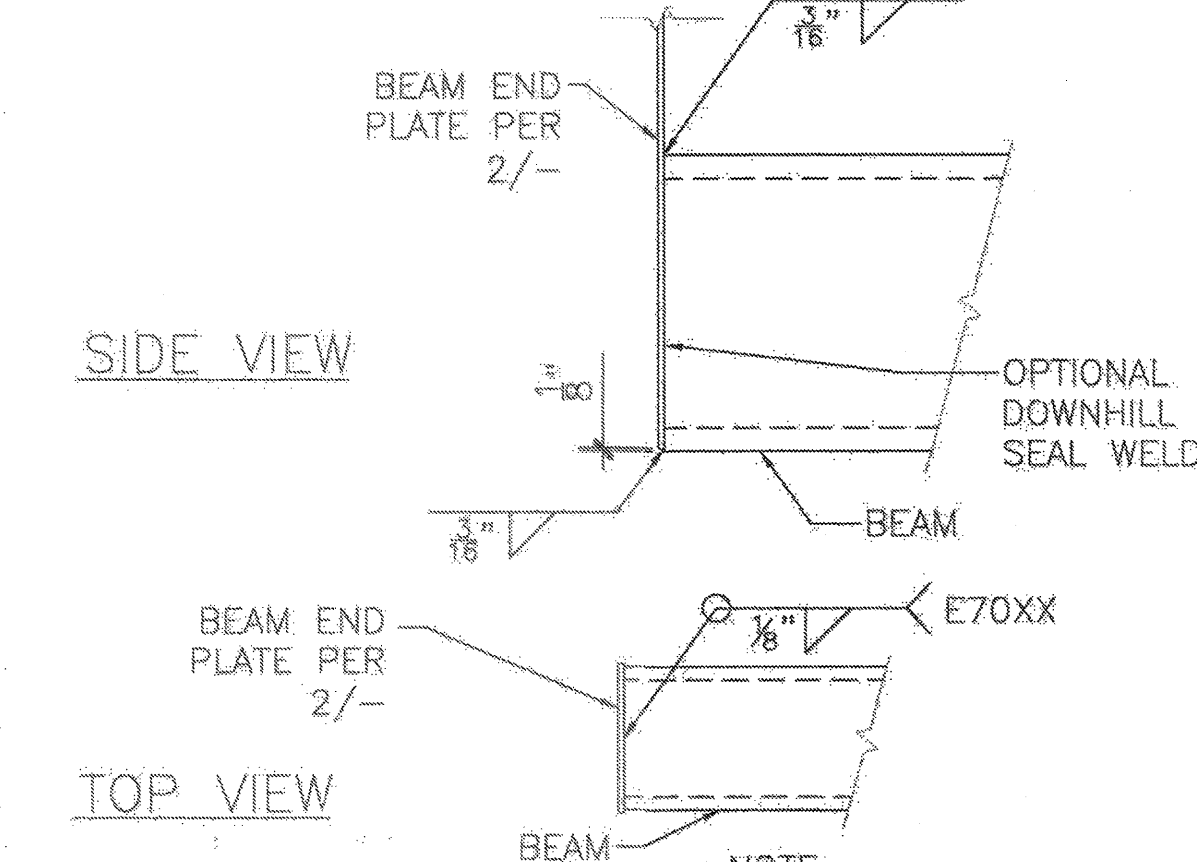
SCALE: 3" = 1'-0"



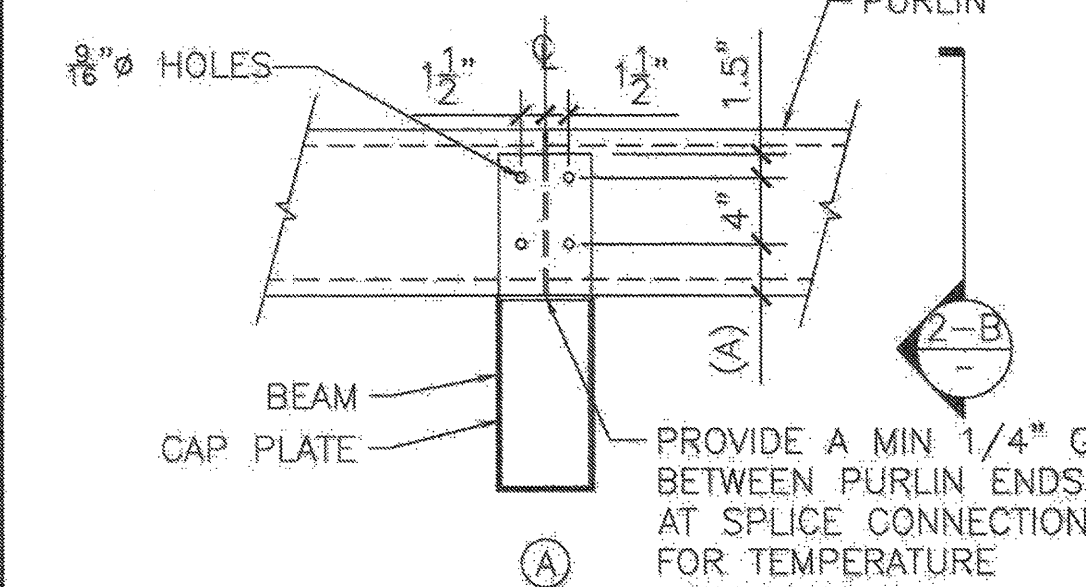
NOTE:  
1. BLOCKING SECTIONS SHALL BE 2 1/2" WIDE.  
2. SHORT-SLOTTED HOLES OPTIONAL. STANDARD ROUND HOLES MAY BE USED.

**5 PURLIN END CAP**

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



NOTE:  
TOP & BOTTOM WELDS ARE STRUCTURAL. SEAL WELDS ON SIDES ARE NOT STRUCTURAL.



SPLICE CONNECTION AT INTERIOR BEAMS. EXTERIOR BEAMS USE FULL LENGTH PURLIN WITH CANTILEVER. SEE 13/-

PURLIN HEIGHT	END PLATE		PURLIN SPACING	COLUMN SPACING	GROUND SNOW	t2
	T	A				
8"	7.5"	2"	≤ 45"	≤ 20'-0"	≤ 20 psf	1/4"
8"	7.5"	2"	> 45"	> 20'-0"	≤ 20 psf	5/16"
10"	8.5"	3"	≤ 80"	≤ 20'-0"	0 psf	5/16"
10"	8.5"	3"	≤ 80"	> 20'-0"	0 psf	3/8"
10"	8.5"	3"	≤ 80"	> 20'-0"	≤ 20 psf	5/16"

ENGINEER'S APPROVAL  
REGISTERED PROFESSIONAL ENGINEER  
CHRISTOPHER K. ROBERTSON  
S 5885  
EXP. 06-30-2016  
7/22/15  
DATE SIGNED  
MMMM DD, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
A03-117835  
AC FLS SS TN  
DATE JAN 17 2017  
SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES  
APPLR: 04-113425  
AC FLS SS TN  
DATE JUL 22 2015  
PRE - CHECK (PC) DOCUMENT  
CODE: 303 CMC  
A SEPARATE PROJECT APPLICATION  
FOR CONSTRUCTION IS REQUIRED.

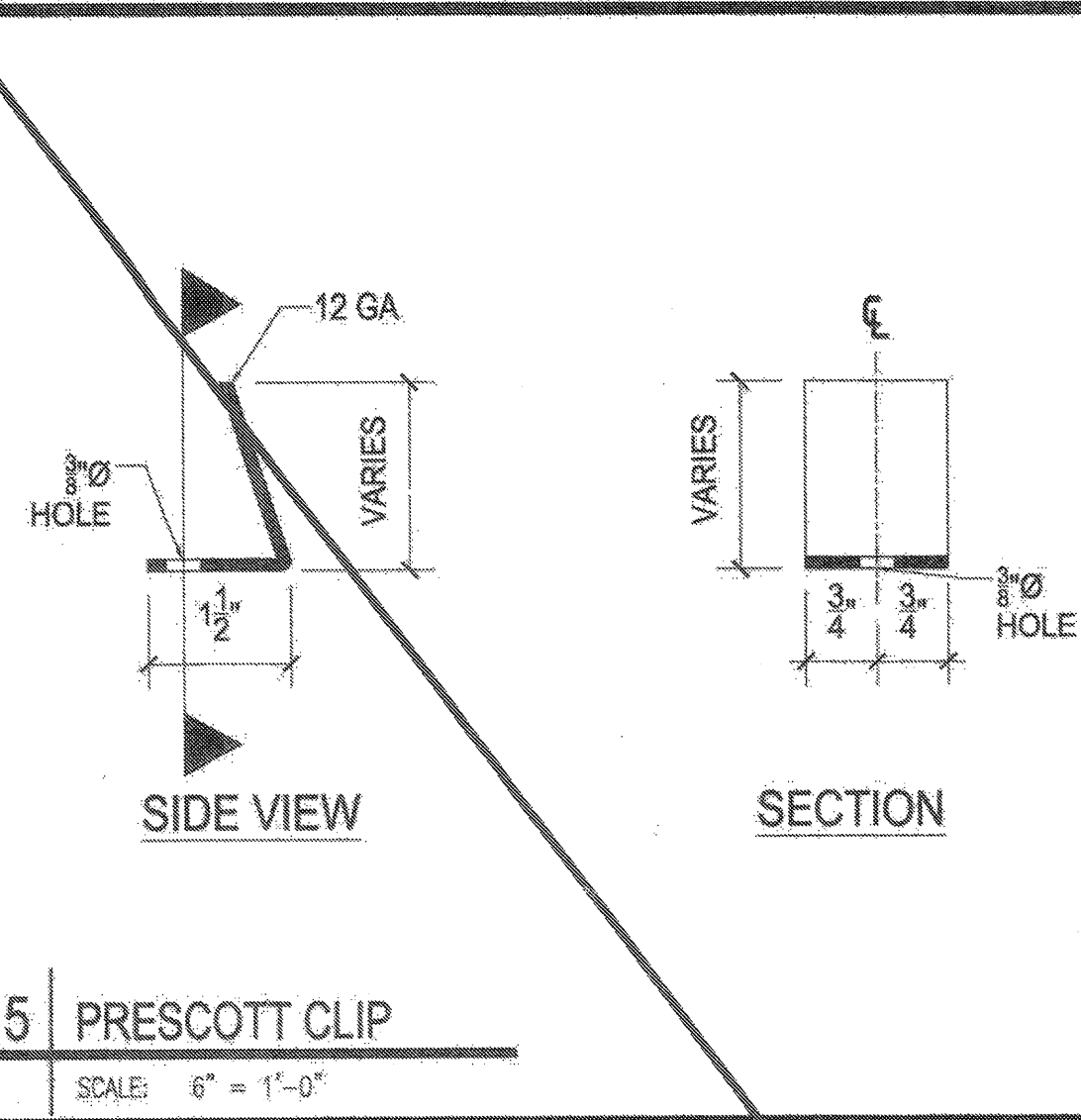
MBARC CONSTRUCTION INC.  
INC.  
674 RANCHEROS DR  
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PHOTOVOLTAIC STRUCTURES STANDARD PURLIN DETAILS

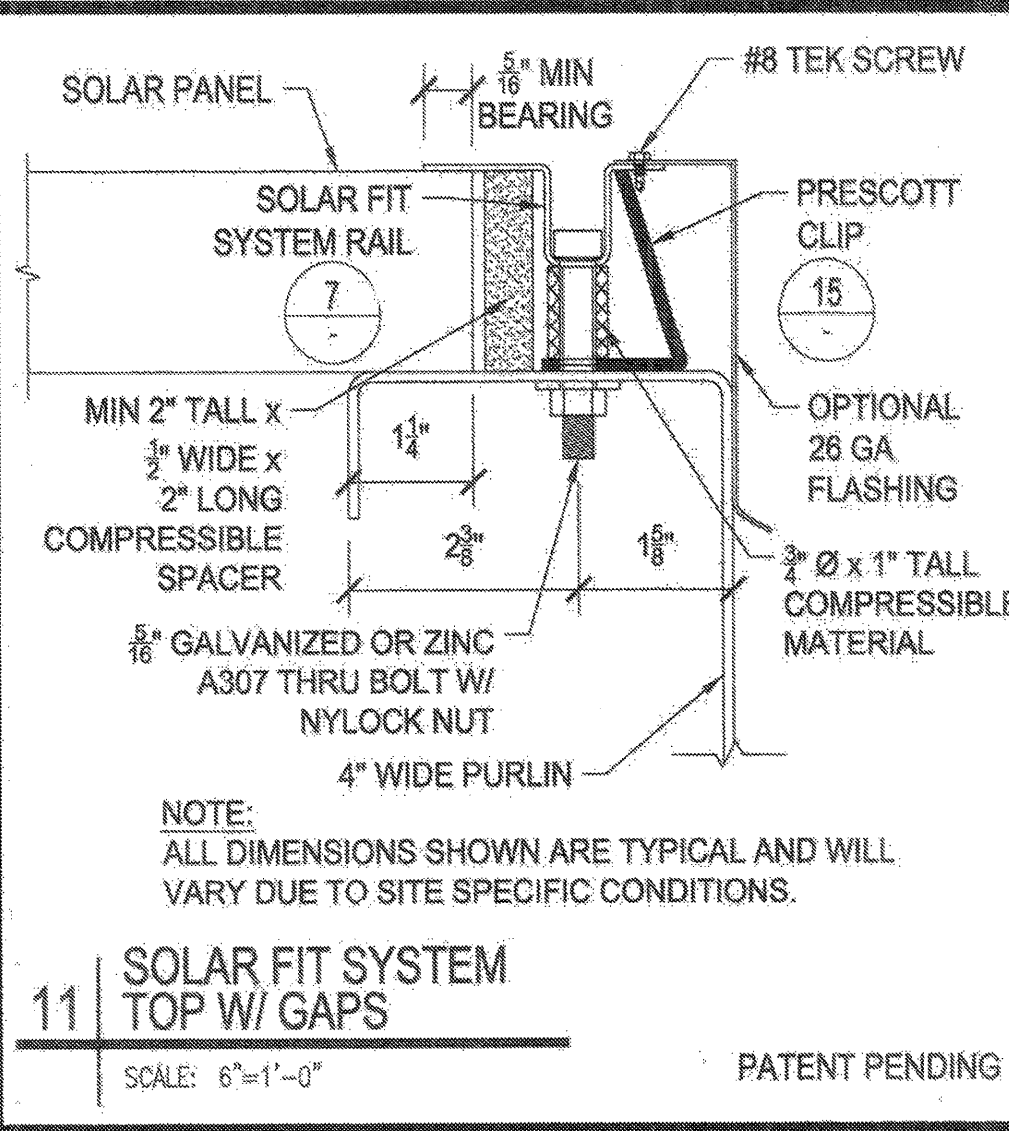
DRAWN MAP  
CHECKED DKR  
DATE 5/29/15  
ASTEL JOB NO. 13-1010  
SHEET

S-33  
33 OF 46 SHEETS



15 PRESCOTT CLIP

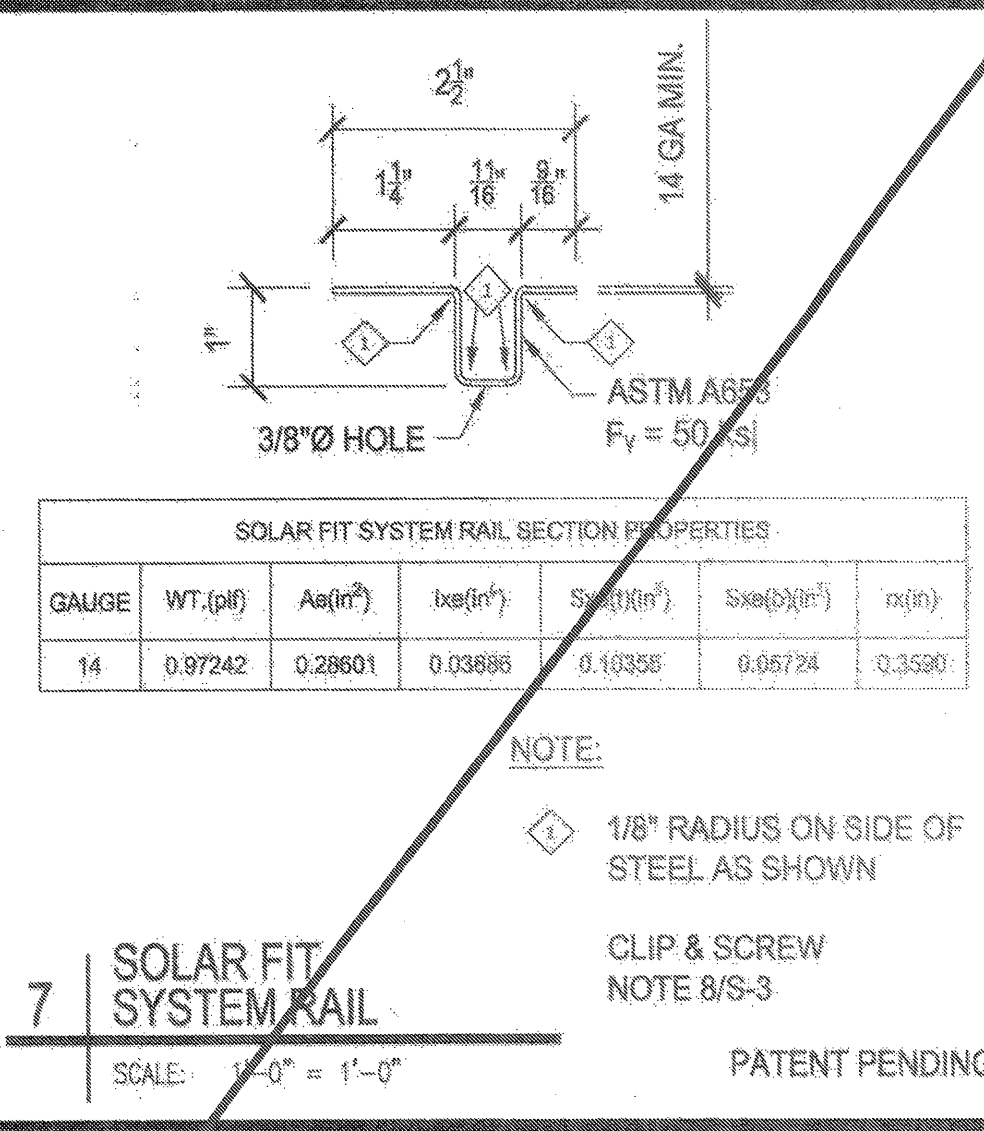
SCALE: 6" = 1'-0"



11 SOLAR FIT SYSTEM TOP W/ GAPS

SCALE: 6" = 1'-0"

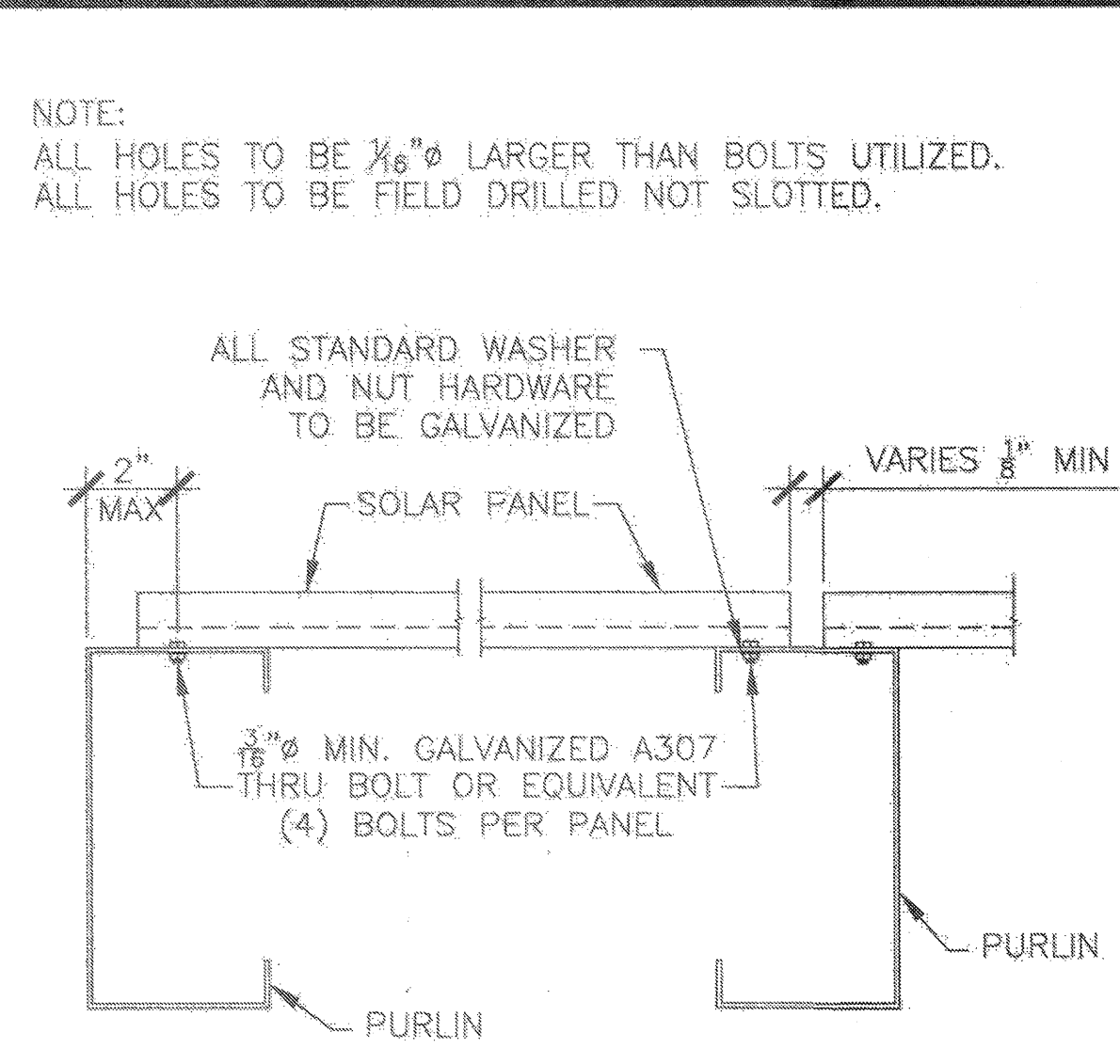
PATENT PENDING



7 SOLAR FIT SYSTEM RAIL

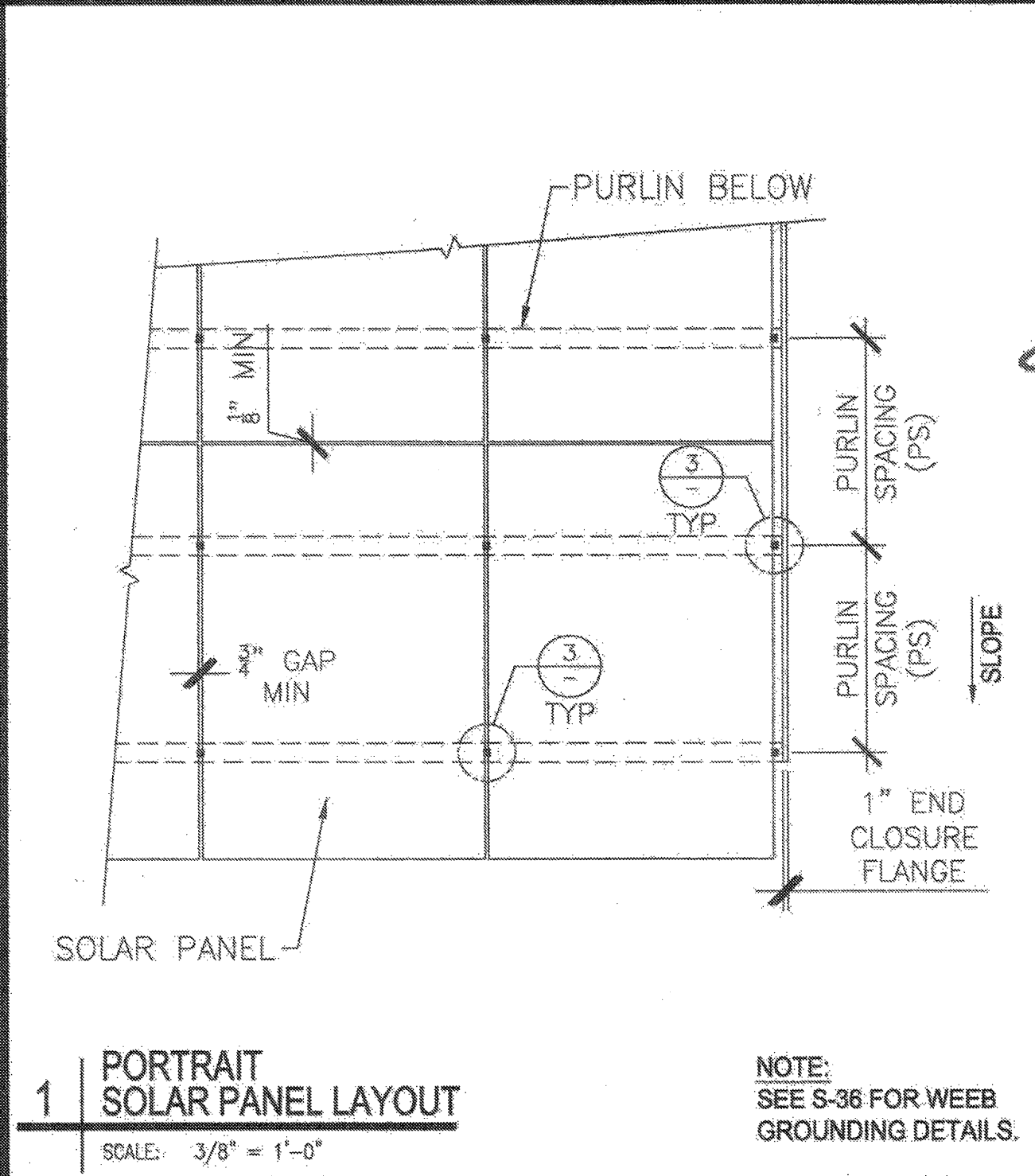
SCALE: 1'-0" = 1'-0"

PATENT PENDING



4 ALTERNATE PANEL ATTACHMENT

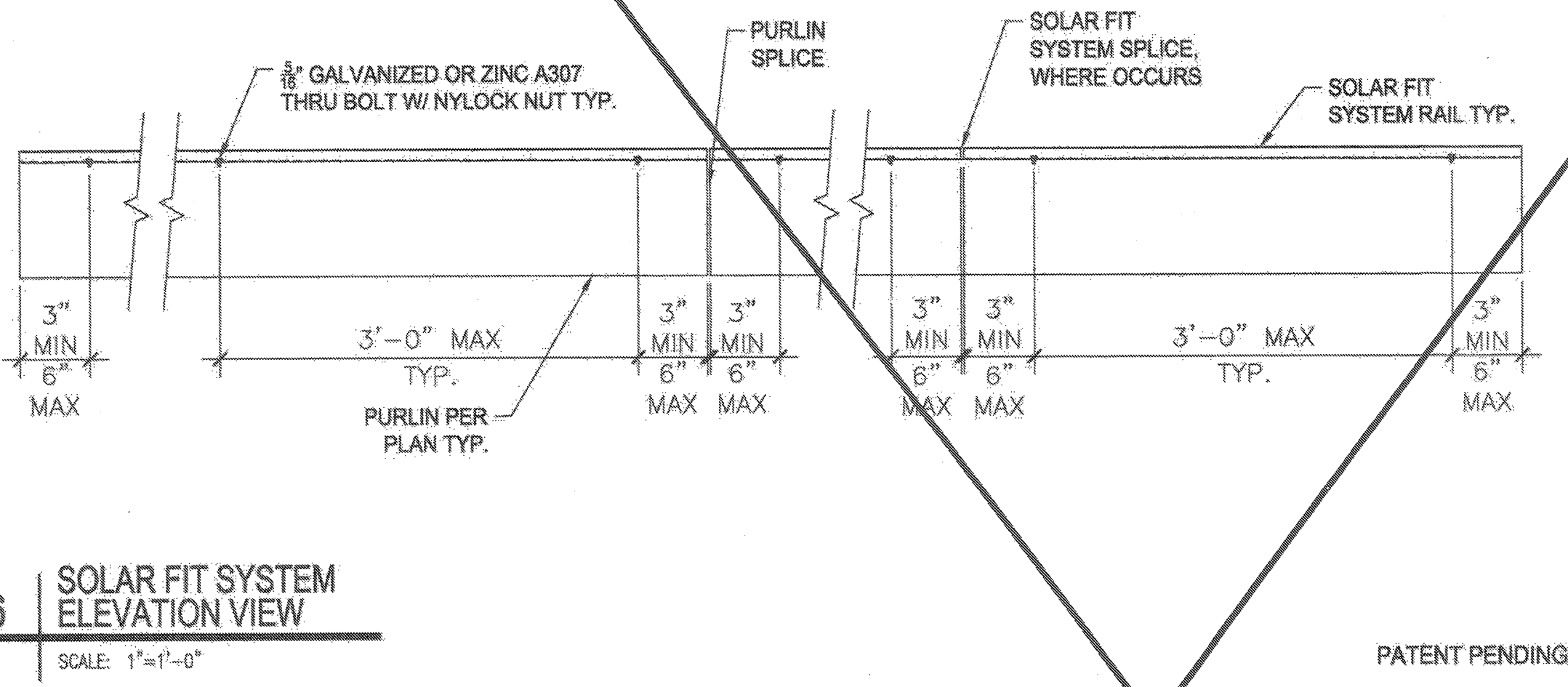
SCALE: 3" = 1'-0"



1 PORTRAIT SOLAR PANEL LAYOUT

SCALE: 3/8" = 1'-0"

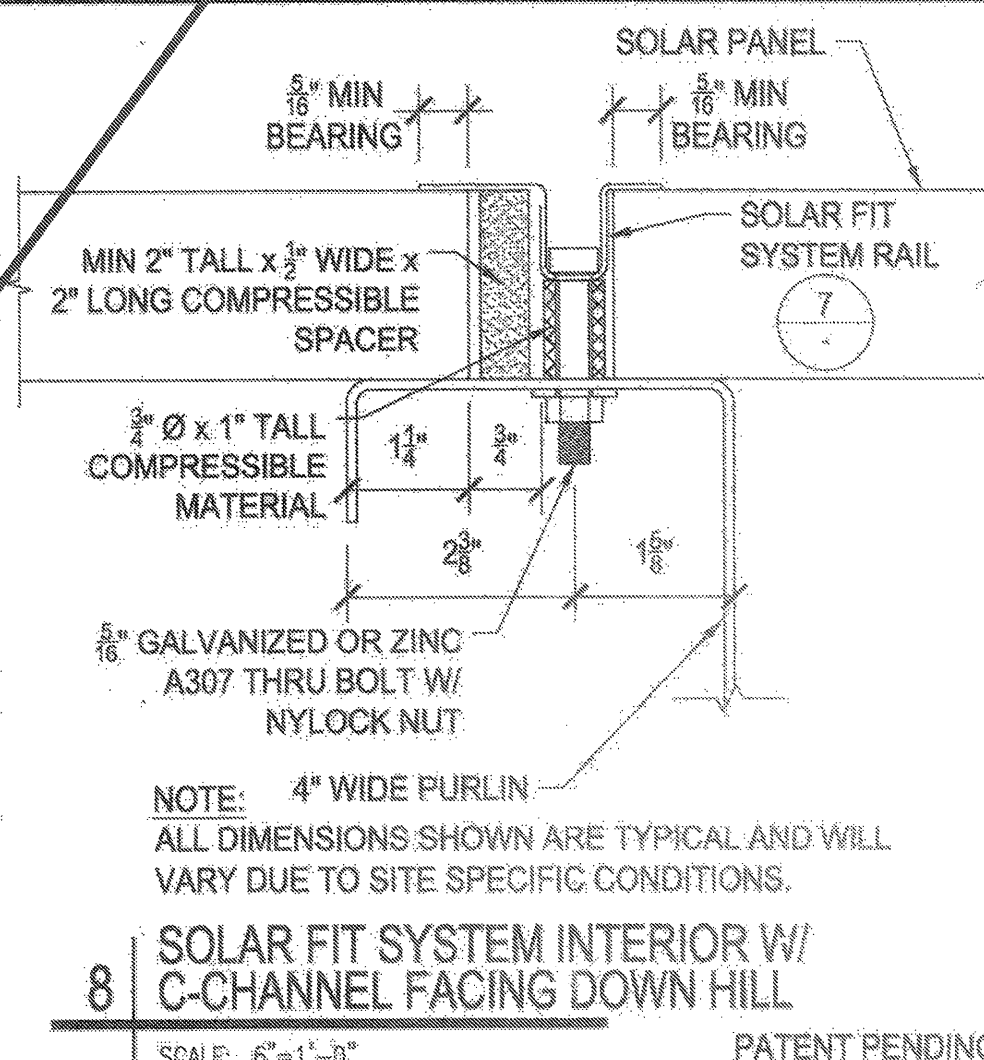
NOTE: SEE S-36 FOR WEEB GROUNDING DETAILS.



6 SOLAR FIT SYSTEM ELEVATION VIEW

SCALE: 1" = 1'-0"

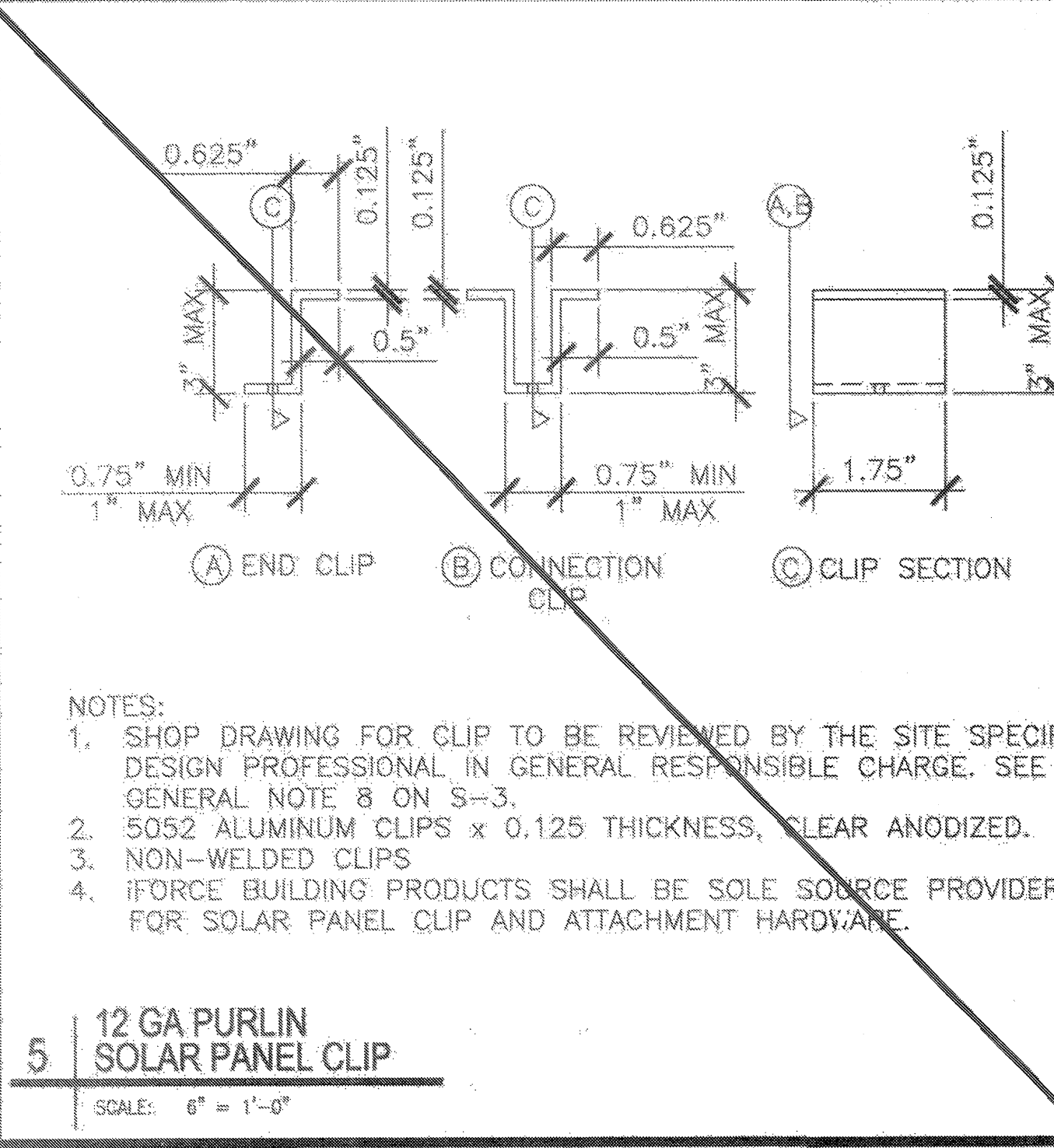
PATENT PENDING



8 SOLAR FIT SYSTEM INTERIOR W/ C-CHANNEL FACING DOWN HILL

SCALE: 6" = 1'-0"

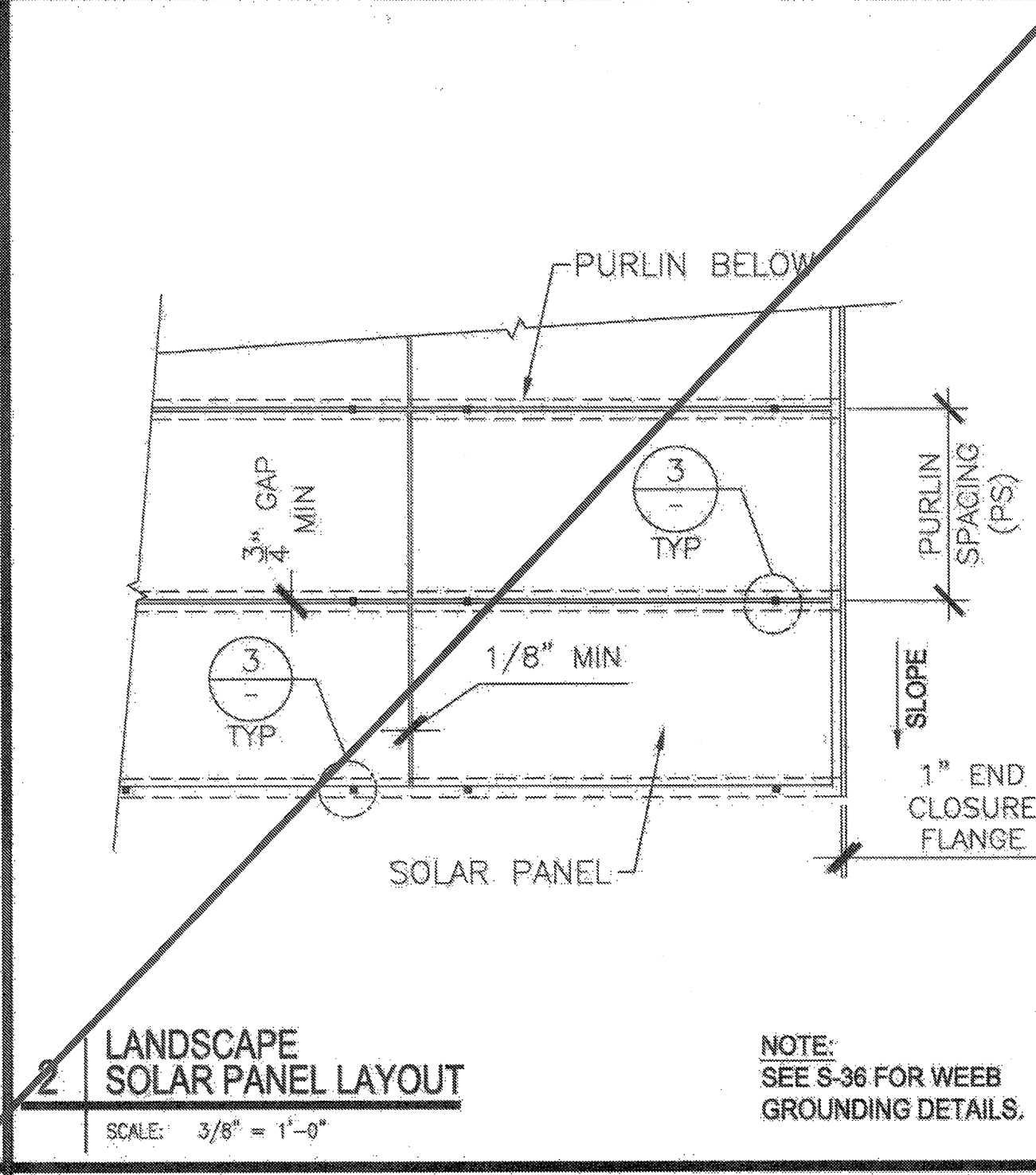
PATENT PENDING



5 12 GA PURLIN SOLAR PANEL CLIP

SCALE: 6" = 1'-0"

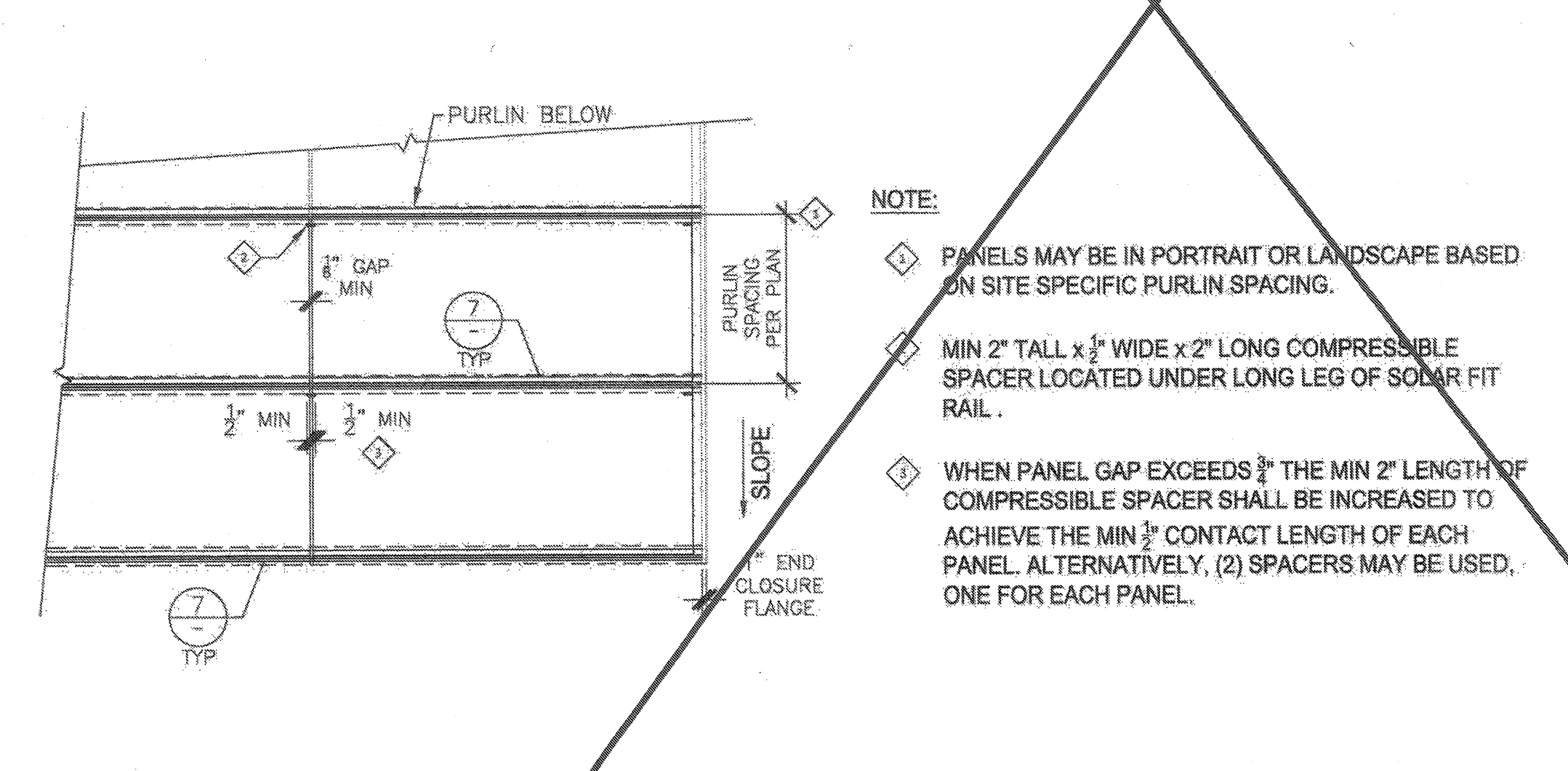
- NOTES:
- SHOP DRAWING FOR CLIP TO BE REVIEWED BY THE SITE SPECIFIC DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE. SEE GENERAL NOTE 8 ON S-3.
  - 5052 ALUMINUM CLIPS x 0.125 THICKNESS, CLEAR ANODIZED.
  - NON-WELDED CLIPS
  - IFORCE BUILDING PRODUCTS SHALL BE SOLE SOURCE PROVIDER FOR SOLAR PANEL CLIP AND ATTACHMENT HARDWARE.



2 LANDSCAPE SOLAR PANEL LAYOUT

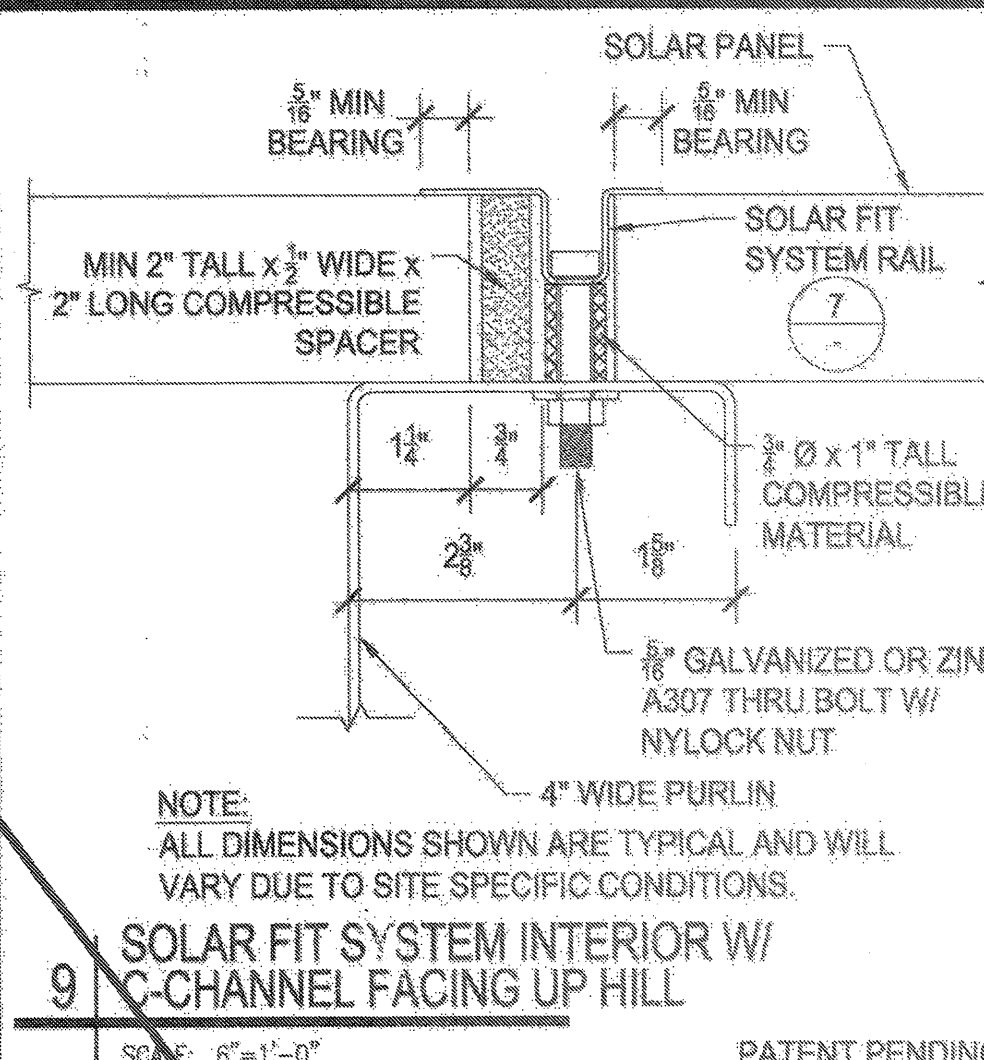
SCALE: 3/8" = 1'-0"

NOTE: SEE S-36 FOR WEEB GROUNDING DETAILS.



13 SOLAR PANEL LAYOUT

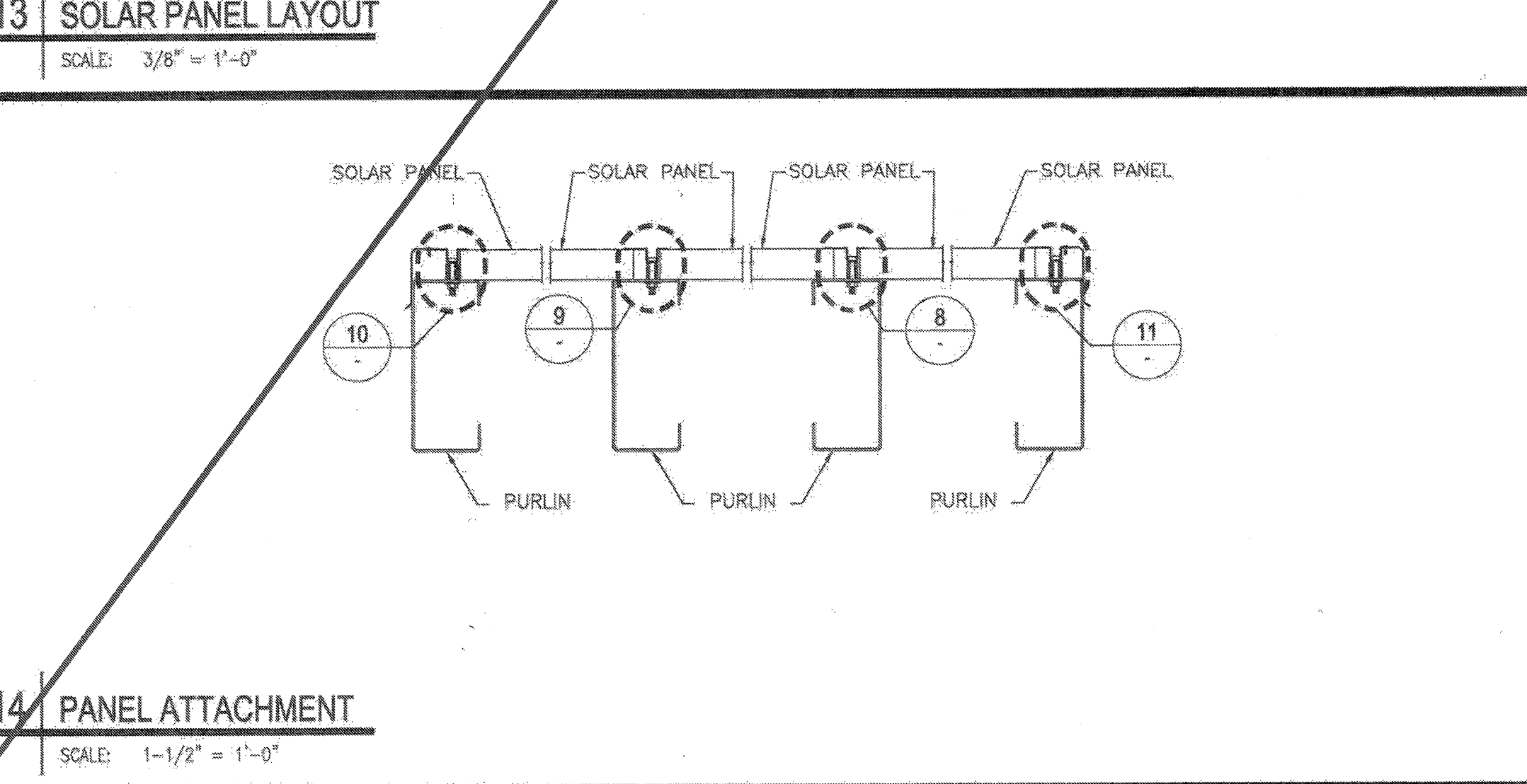
SCALE: 3/8" = 1'-0"



9 SOLAR FIT SYSTEM INTERIOR W/ C-CHANNEL FACING UP HILL

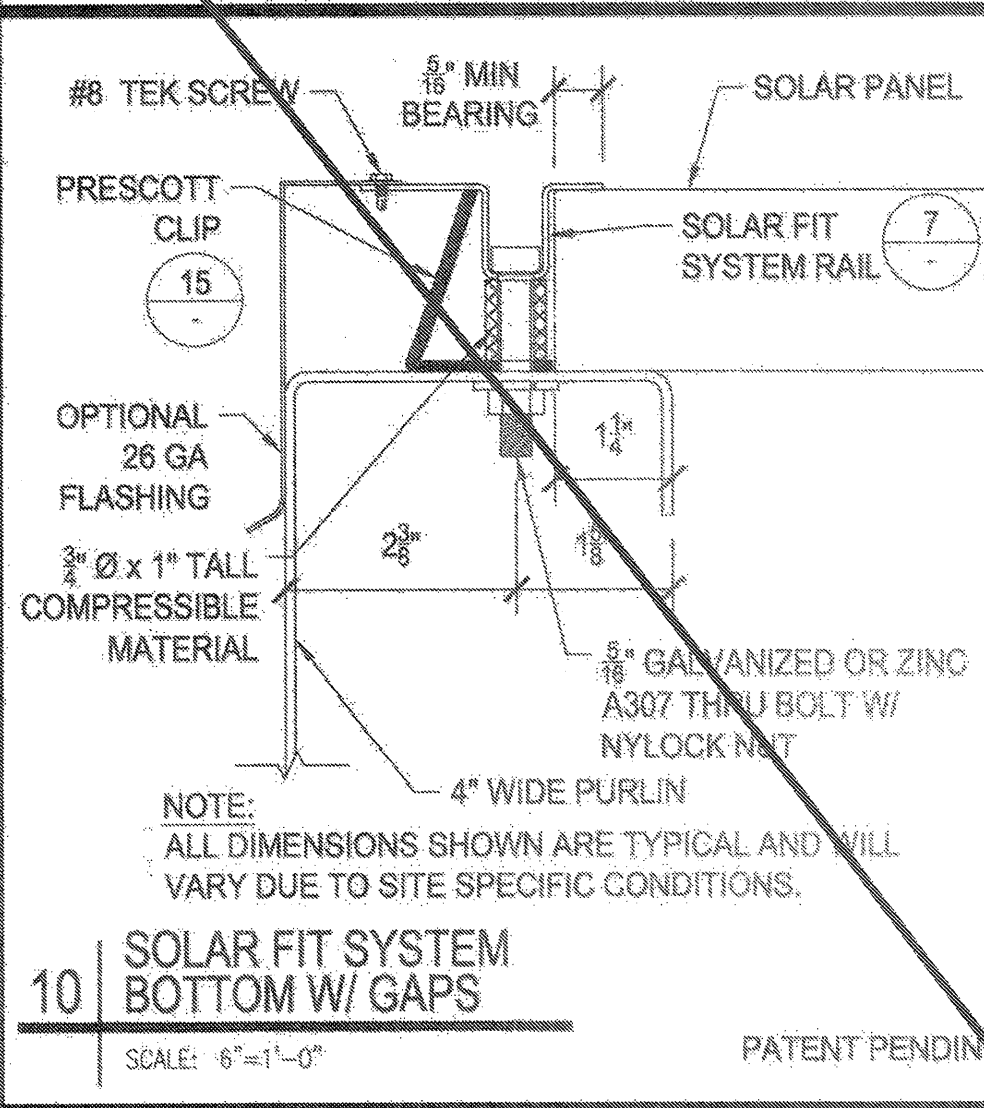
SCALE: 6" = 1'-0"

PATENT PENDING



14 PANEL ATTACHMENT

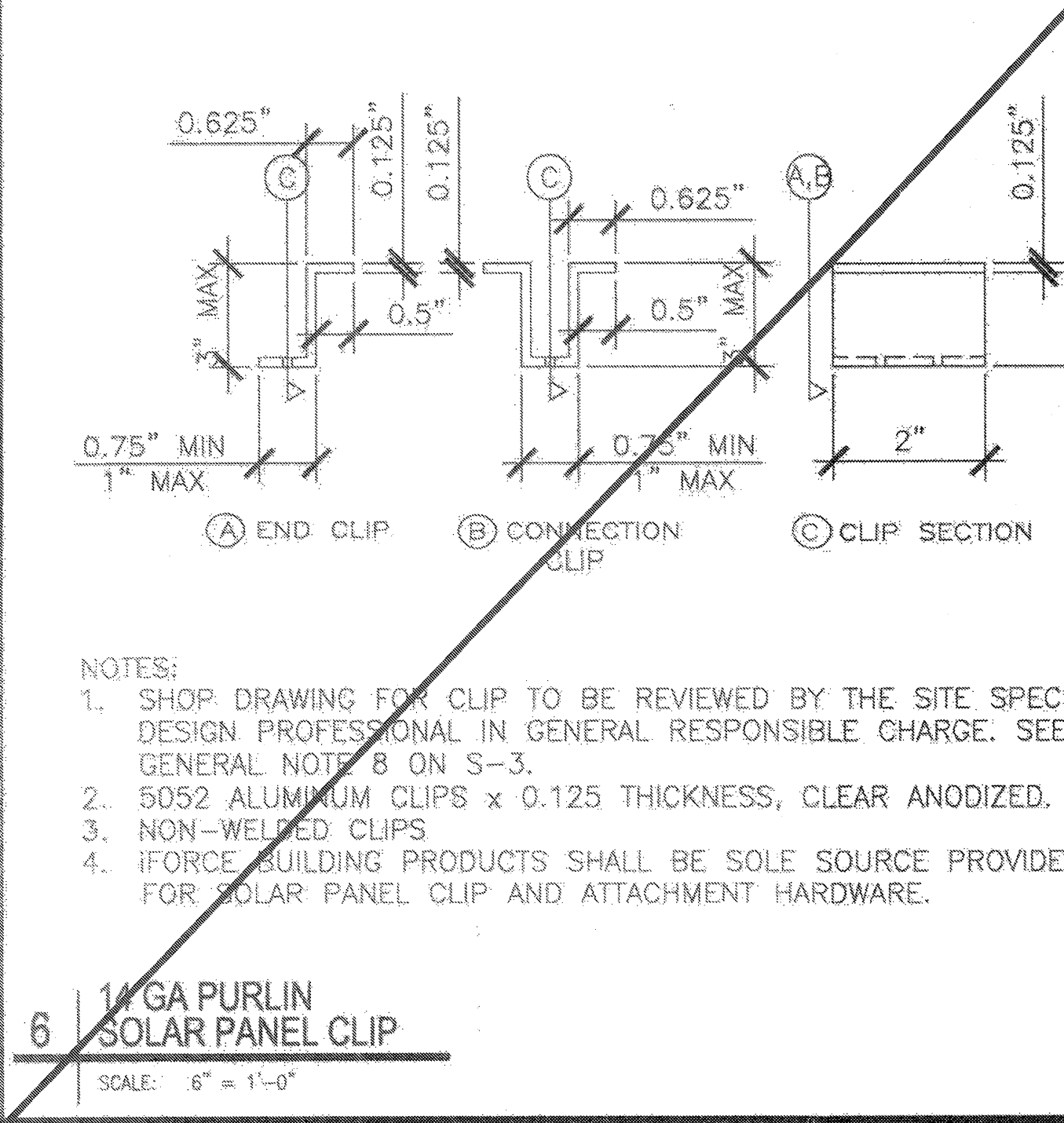
SCALE: 1-1/2" = 1'-0"



10 SOLAR FIT SYSTEM BOTTOM W/ GAPS

SCALE: 6" = 1'-0"

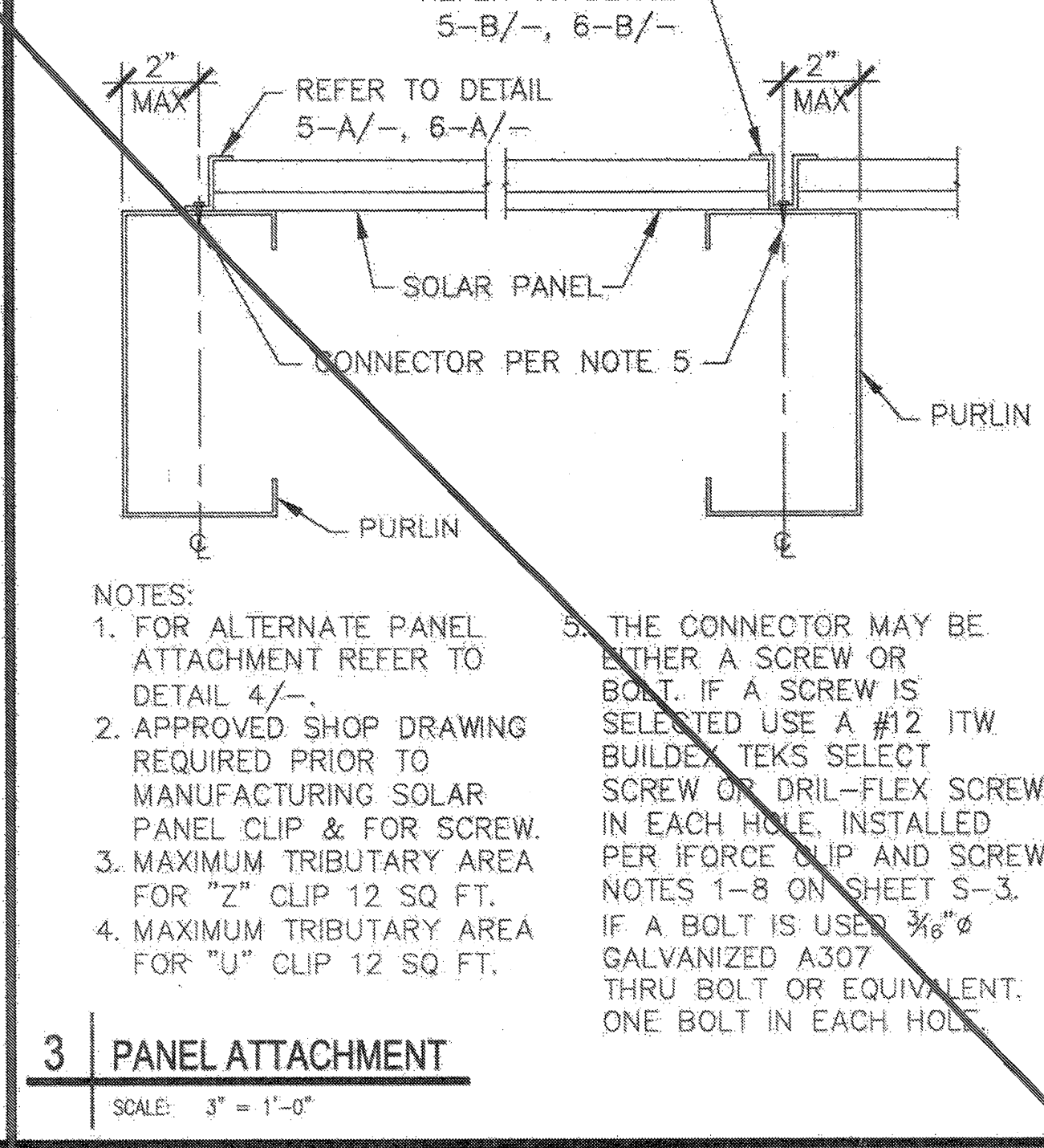
PATENT PENDING



6 14 GA PURLIN SOLAR PANEL CLIP

SCALE: 6" = 1'-0"

- NOTES:
- SHOP DRAWING FOR CLIP TO BE REVIEWED BY THE SITE SPECIFIC DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE. SEE GENERAL NOTE 8 ON S-3.
  - 5052 ALUMINUM CLIPS x 0.125 THICKNESS, CLEAR ANODIZED.
  - NON-WELDED CLIPS
  - IFORCE BUILDING PRODUCTS SHALL BE SOLE SOURCE PROVIDER FOR SOLAR PANEL CLIP AND ATTACHMENT HARDWARE.



3 PANEL ATTACHMENT

SCALE: 3" = 1'-0"

- NOTES:
- FOR ALTERNATE PANEL ATTACHMENT REFER TO DETAIL 4/-.
  - APPROVED SHOP DRAWING REQUIRED PRIOR TO MANUFACTURING SOLAR PANEL CLIP & FOR SCREW.
  - MAXIMUM TRIBUTARY AREA FOR "Z" CLIP 12 SQ FT.
  - MAXIMUM TRIBUTARY AREA FOR "U" CLIP 12 SQ FT.
  - THE CONNECTOR MAY BE EITHER A SCREW OR BOLT. IF A SCREW IS SELECTED USE A #12 ITW BUILD EX SELECT SCREW OR DRIL-FLEX SCREW. IN EACH HOLE, INSTALLED PER IFORCE CLIP AND SCREW NOTES 1-8 ON SHEET S-3. IF A BOLT IS USED 3/8\"/>

ENGINEER'S APPROVAL

7/22/15  
DATE SIGNED  
MMMM DD, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

A 03-117835  
AC FLS SS TN  
DATE JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES

APPL. C. 04-113425  
AC FLS SS TN  
DATE JUL 2 2015

PREL - CHECK (PC) DOCUMENT  
CODE: 2013 CAC  
A SEPARATE PROJECT APPLICATION  
FOR CONSTRUCTION IS REQUIRED.

MBARC CONSTRUCTION INC.

674 RANCHEROS DR  
SAN MARCOS, CA 92069

PHONE: (760) 744-4131  
FAX: (760) 744-4449

LIC # 849940  
B AND C51

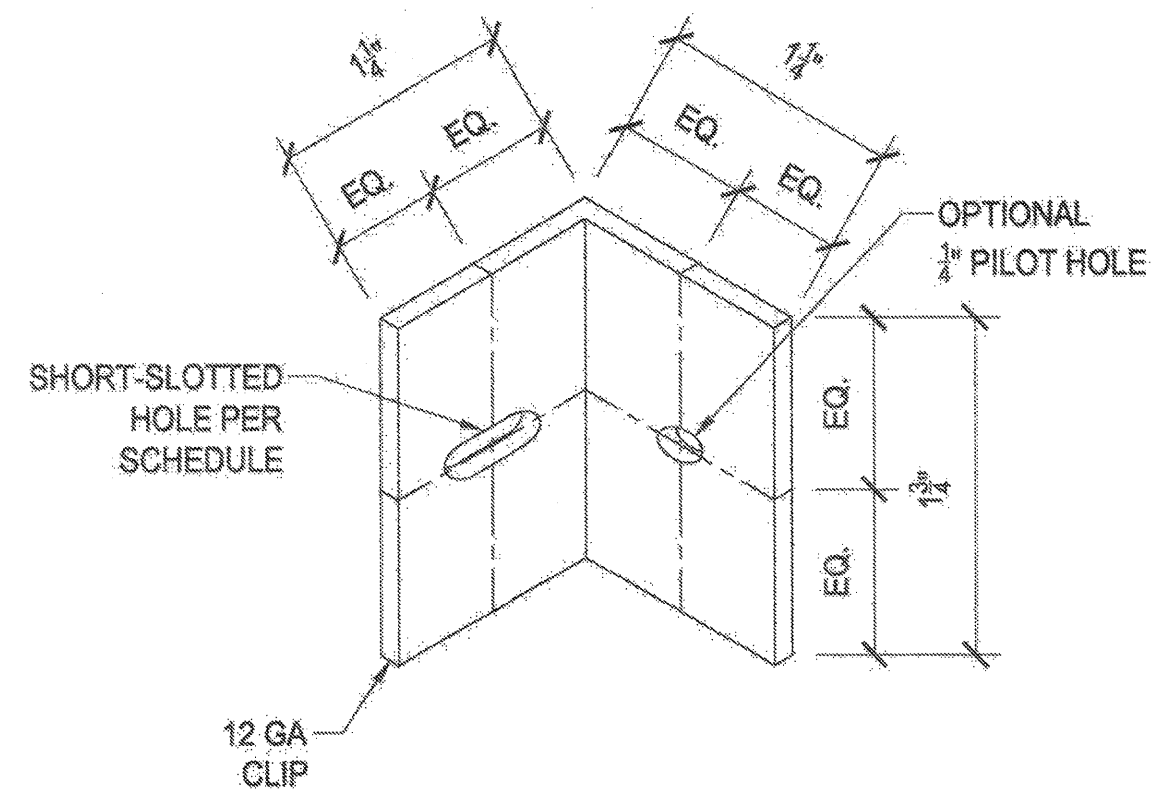
ASTEL ENGINEERING  
STRUCTURAL ENGINEERING

109 EAST ESCALONES  
SAN CLEMENTE, CA 92672

PHONE: (949) 386-9333  
FAX: (949) 386-3773

PHOTOVOLTAIC  
STRUCTURES  
STANDARD  
SOLAR PANEL  
SUPPORT  
DETAILS

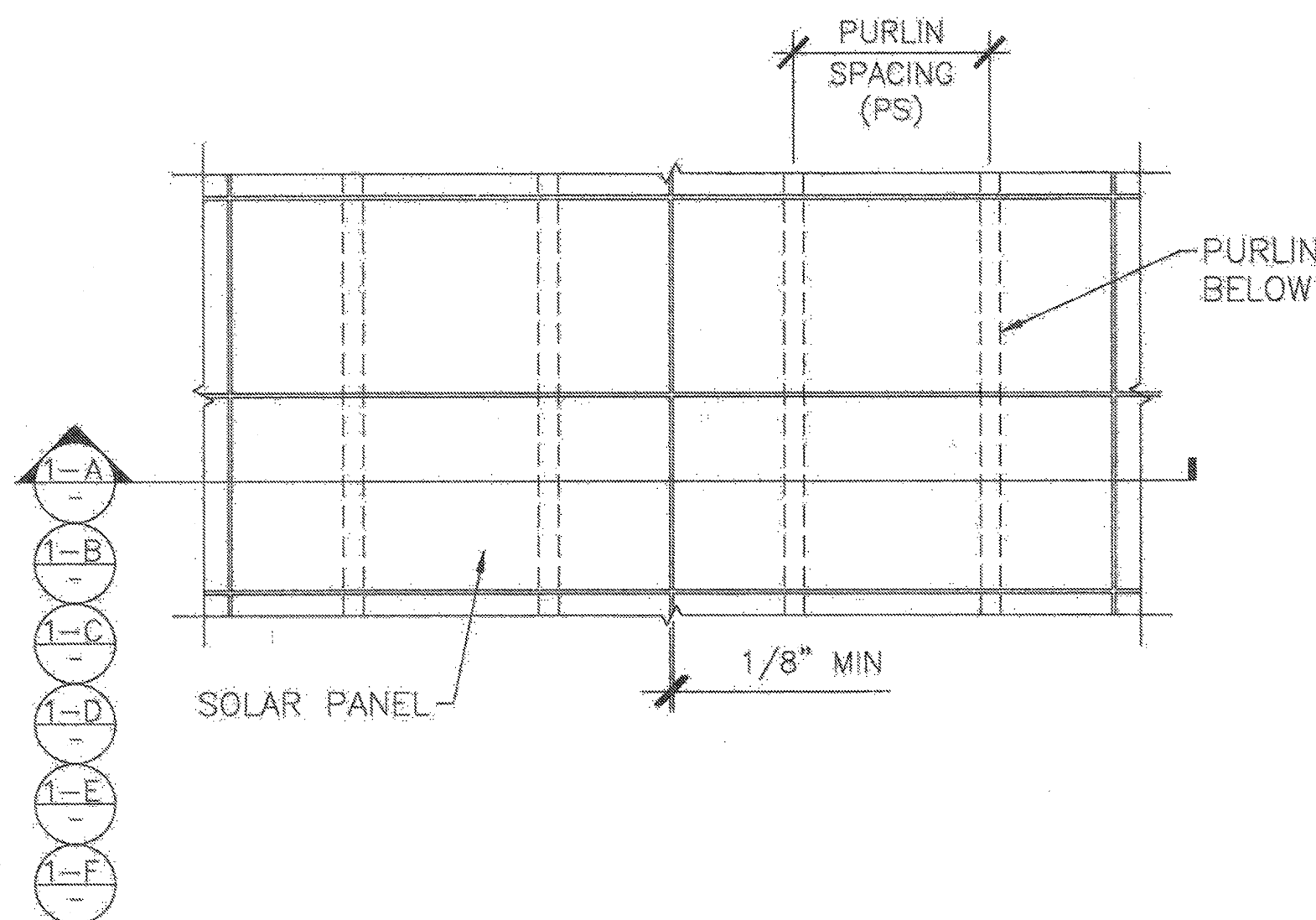
DRAWN MAP  
CHECKED DKR  
DATE 5/29/15  
ASTEL JOB NO. 13-1010  
SHEET S-34  
34 OF 46 SHEETS



ANGLE CLIP SCHEDULE	
BOLT DIAMETER	SHORT SLOT DIMENSIONS
3/8"	3/8" x 1/2"
1/2"	1/2" x 3/4"
5/8"	5/8" x 1"
3/4"	3/4" x 1 1/4"

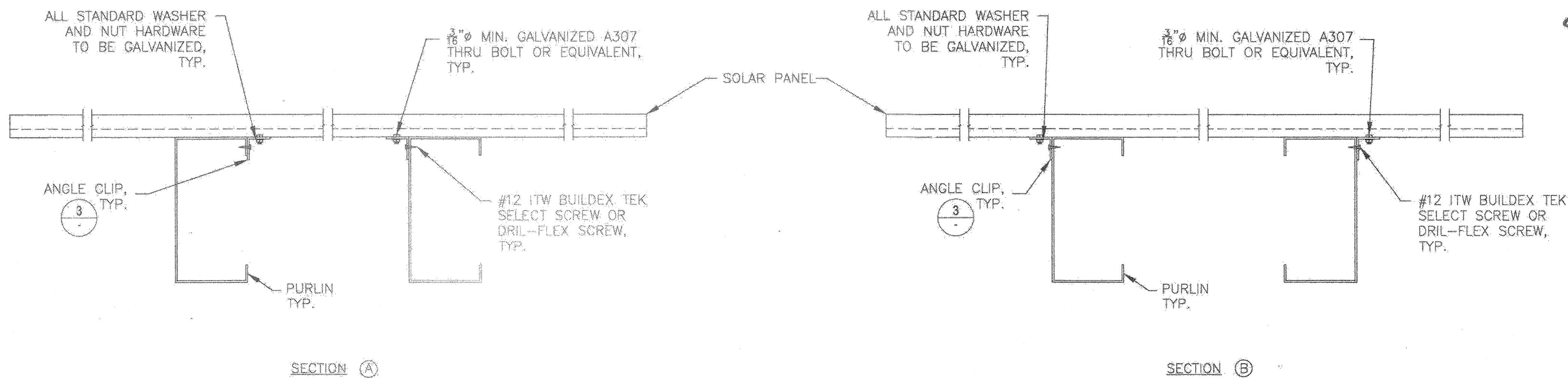
**3 ANGLE CLIP**

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



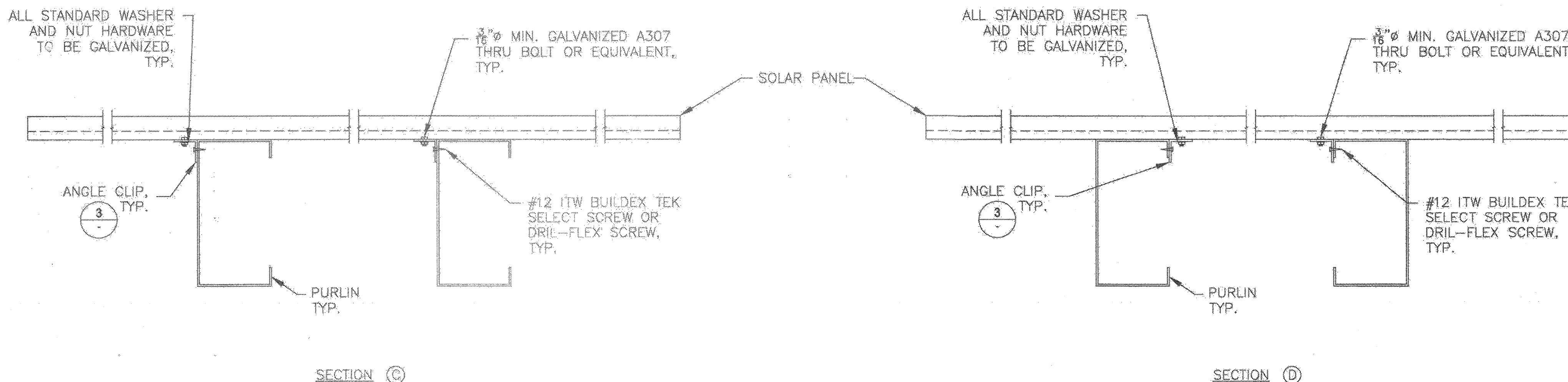
**2 SOLAR PANEL LAYOUT**

SCALE: 3/8" = 1'-0"



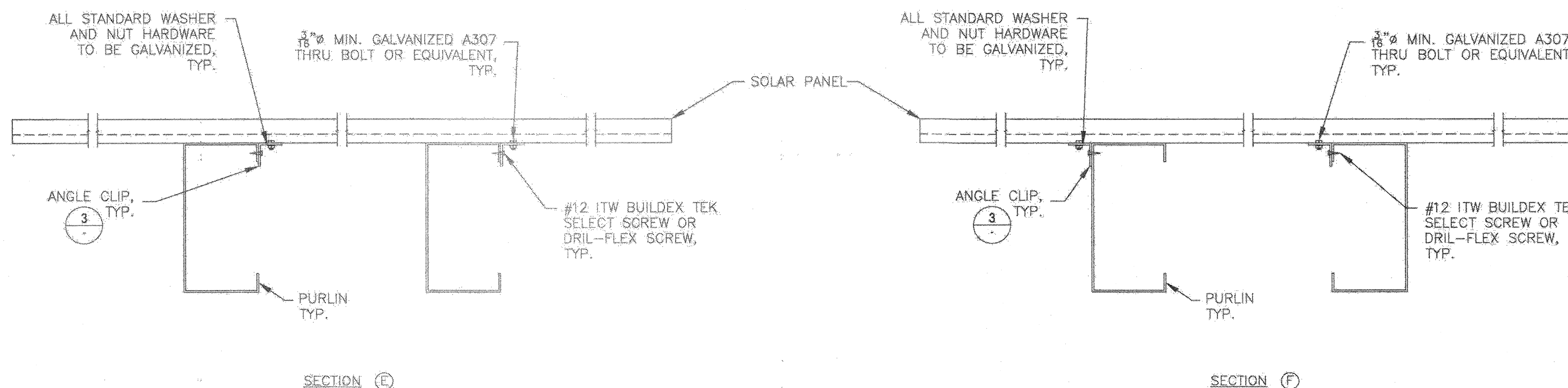
SECTION A

SECTION B



SECTION C

SECTION D



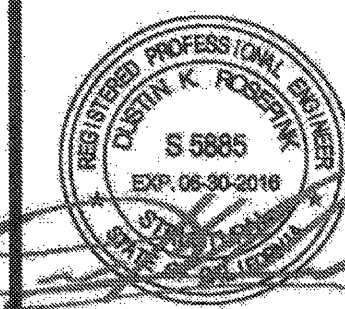
SECTION E

SECTION F

**1 ALTERNATE PANEL CONNECTIONS**

SCALE: 3" = 1'-0"

ENGINEER'S APPROVAL



7/22/15

DATE SIGNED  
MMMM DD, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

A03-117835

AC: FLS / SS-TN  
DATE: JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES

APPLP. C-04-113425

AC: FLS / SS  
DATE: JUL 22 2015

PRE-CHECK (PC) DOCUMENT  
CODE: 2013 CSO  
A SEPARATE PROJECT APPLICATION  
FOR CONSTRUCTION IS REQUIRED.

**MBARC CONSTRUCTION INC.**  
LIC # 869960  
674 RANCHEROS DR  
SAN MARCOS, CA 92069  
PHONE: (760) 744-4131  
FAX: (760) 744-4449  
B AND CST

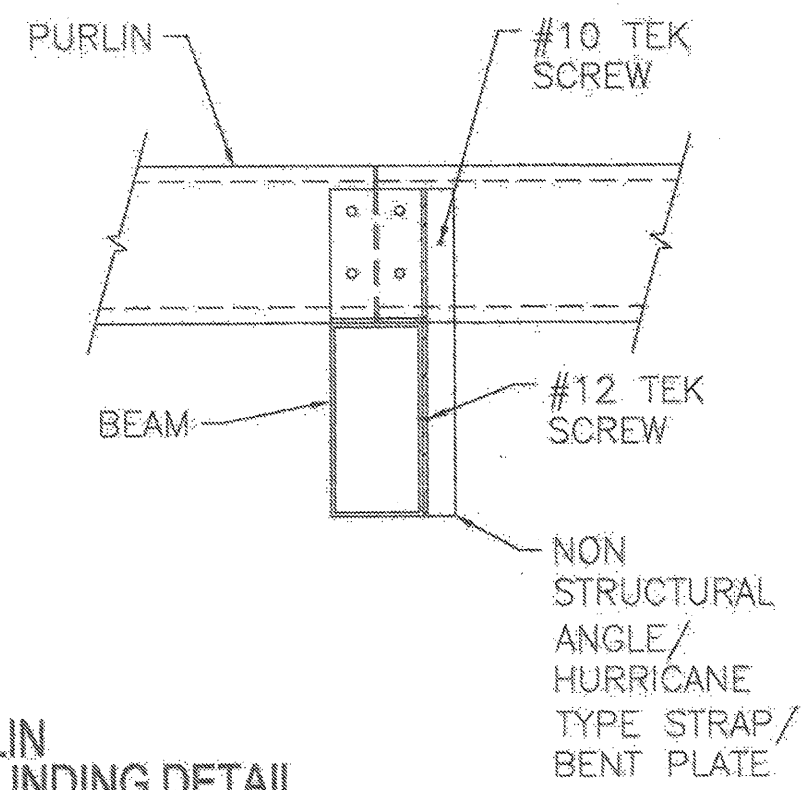
**4STEL ENGINEERING**  
STRUCTURAL ENGINEERING  
PHONE: (949) 388-9333  
FAX: (949) 388-3773  
109 EAST ESCALONES  
SAN CLEMENTE, CA 92672

PHOTOVOLTAIC  
STRUCTURES  
ALTERNATE  
PANEL  
CONNECTIONS

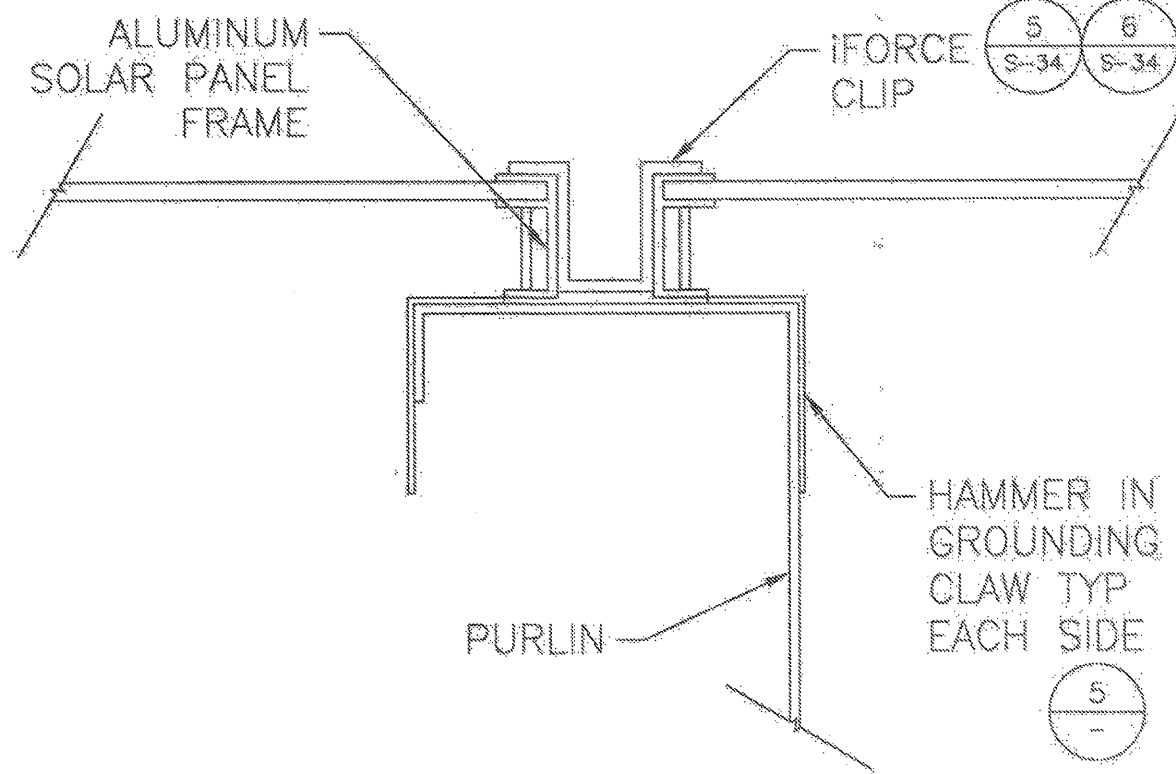
DRAWN  
MAP  
CHECKED  
DKR  
DATE  
5/29/15  
4STEL JOB NO.  
13-1010  
SHEET

**S-35**

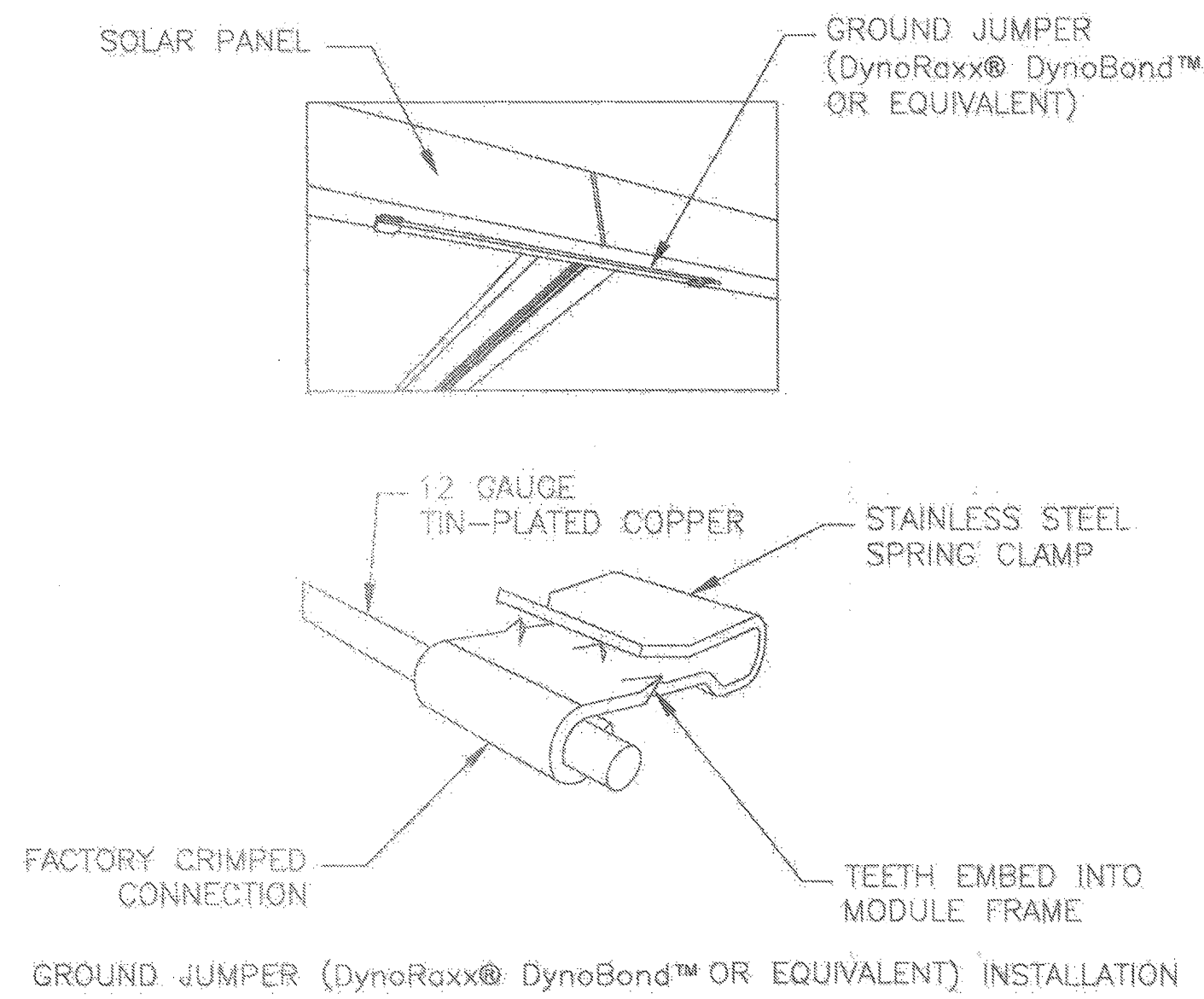
35 OF 46 SHEETS



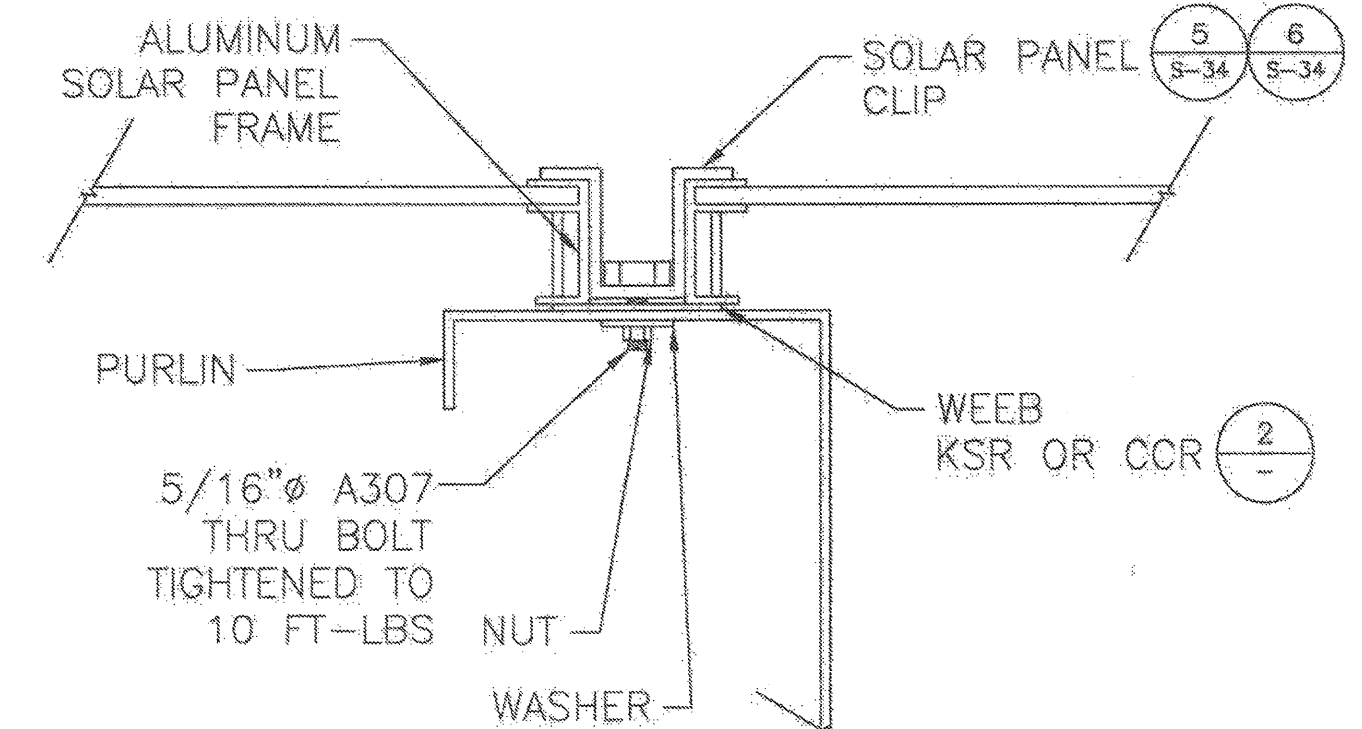
**9 PURLIN GROUNDING DETAIL**  
SCALE: N.T.S.



**6 OPTIONAL GROUNDING CLAW MOUNTING MEMBER**  
SCALE: 6" = 1'-0"



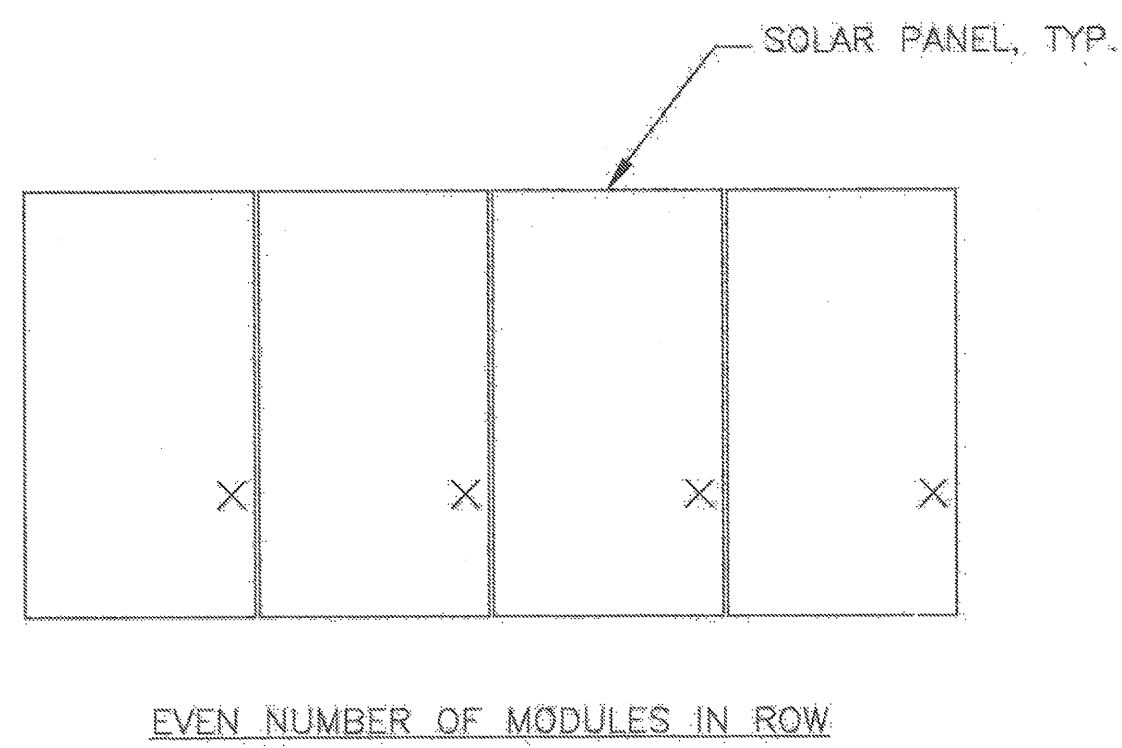
**3 OPTIONAL GROUND JUMPER**  
SCALE: N.T.S.



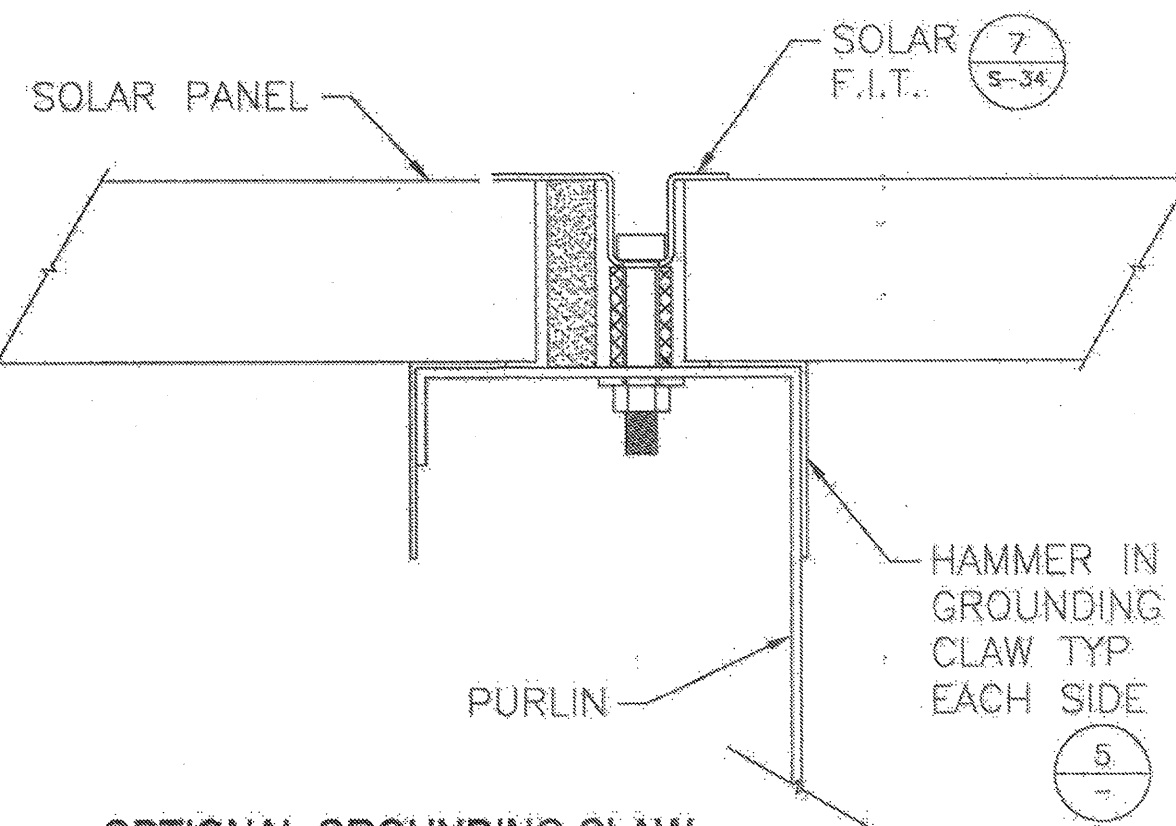
- NOTES:
- SOLAR PANEL CLIP, BOLT, NUT AND WASHER SHALL BE SUPPLIED BY iFORCE BUILDING PRODUCTS - NO OTHER SUPPLIER IS ALLOWED.
  - WEEB - KSR OR CCR MAY BE SUPPLIED BY iFORCE BUILDING PRODUCTS OR OTHER VENDOR.
  - WHEN WEEB KSR OR CCR IS UTILIZED ALL SOLAR PANEL CLIPS MUST BE INSTALLED WITH A BOLT NOT A SCREW.
  - BOLT, NUT AND WASHER SHALL BE CORROSION RESISTANT VIA ZINC OR GALVANIZED OR STAINLESS STEEL.
  - INSTALLATION OF BOLT REQUIRES NO TOOL ON THE BOLT HEAD; ALL TORQUE APPLIED TO NUT.

NOTE:  
iFORCE CLIP ONLY. DOES NOT APPLY TO SOLAR F.I.T. OR POWERS PURLIN

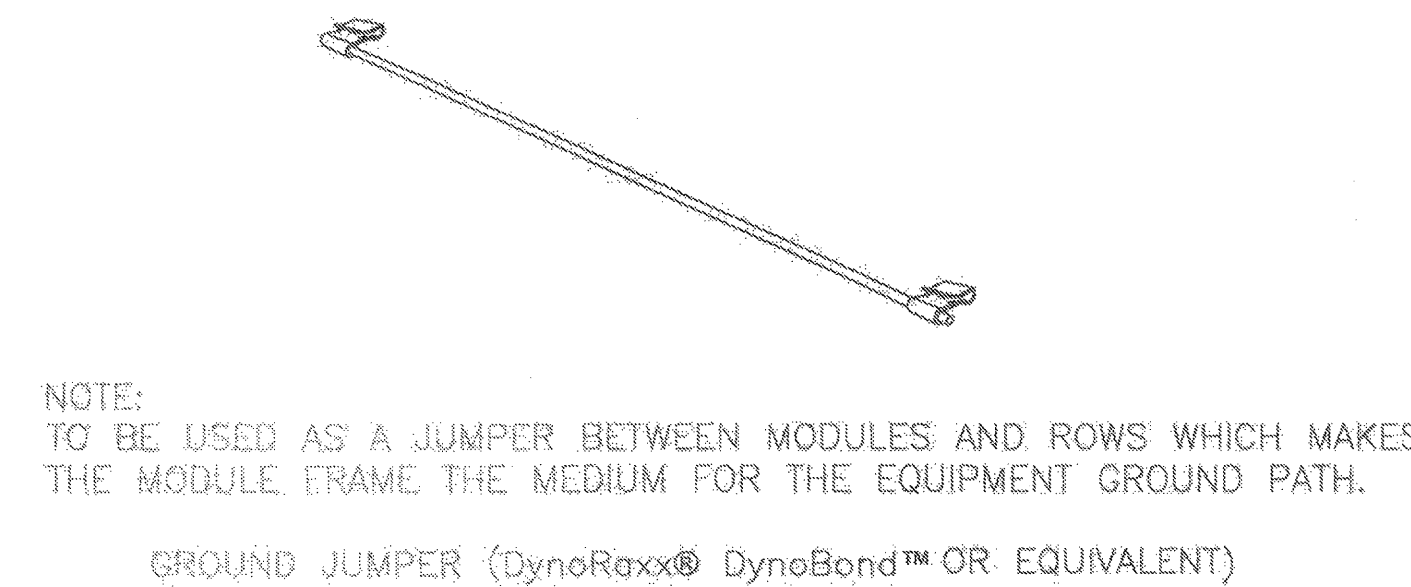
**1 OPTIONAL WEEB CLIP MOUNTING MEMBER**  
SCALE: 6" = 1'-0"



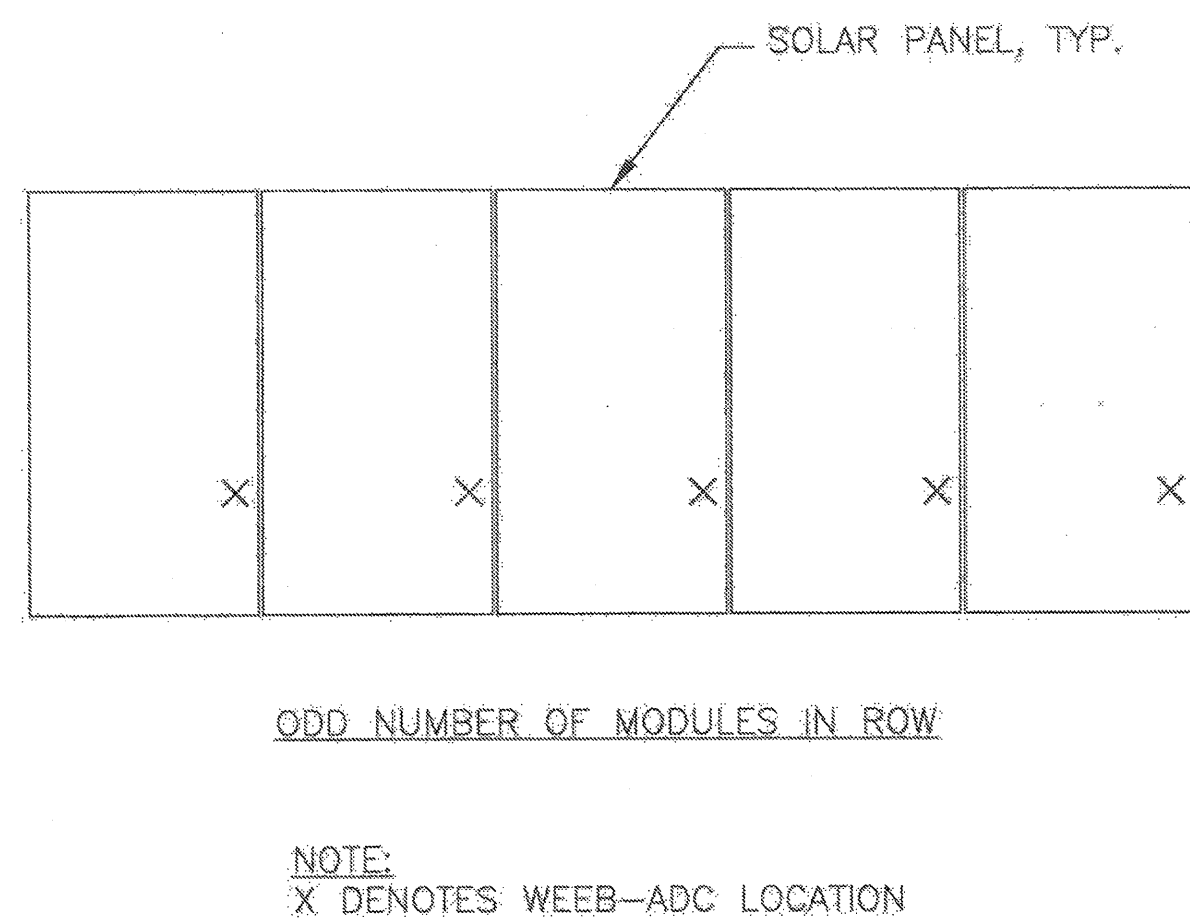
EVEN NUMBER OF MODULES IN ROW



**7 WEEB-ADC OPTIONAL GROUNDING DETAIL**  
SCALE: N.T.S.



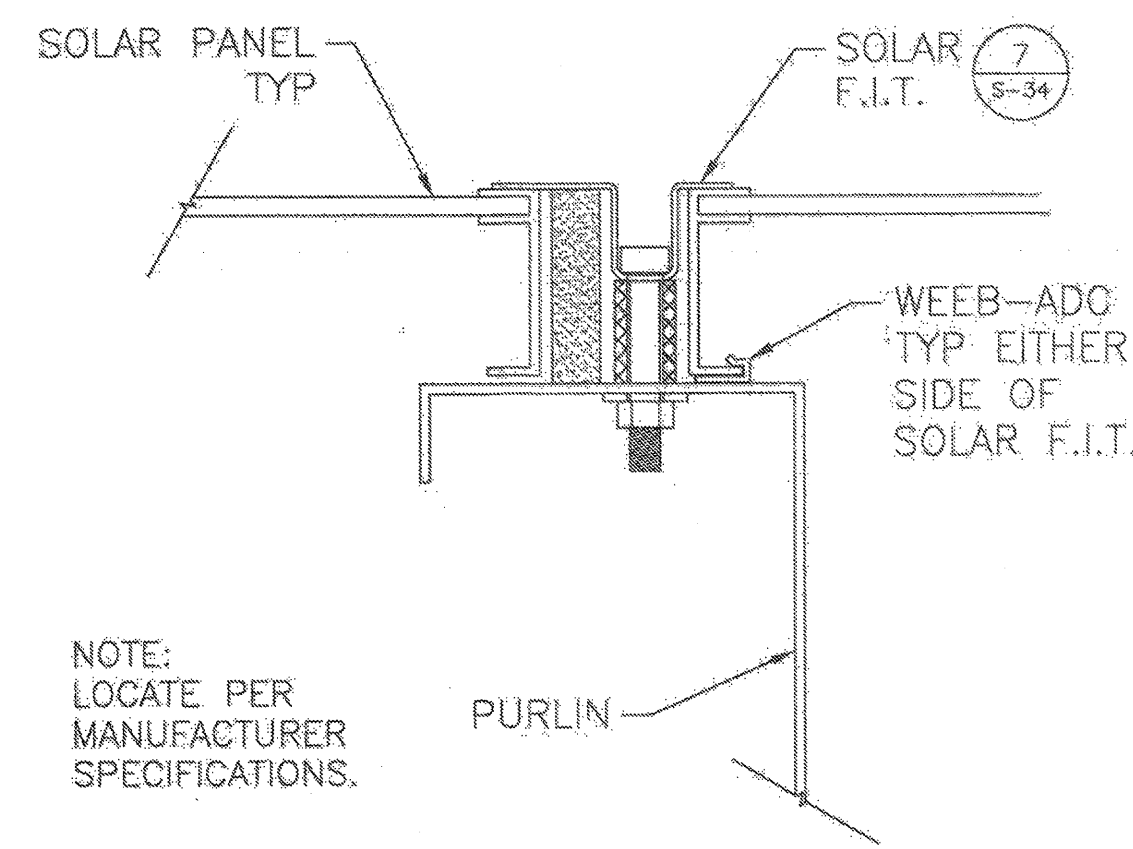
**4 OPTIONAL GROUNDING LUG**  
SCALE: 6" = 1'-0"



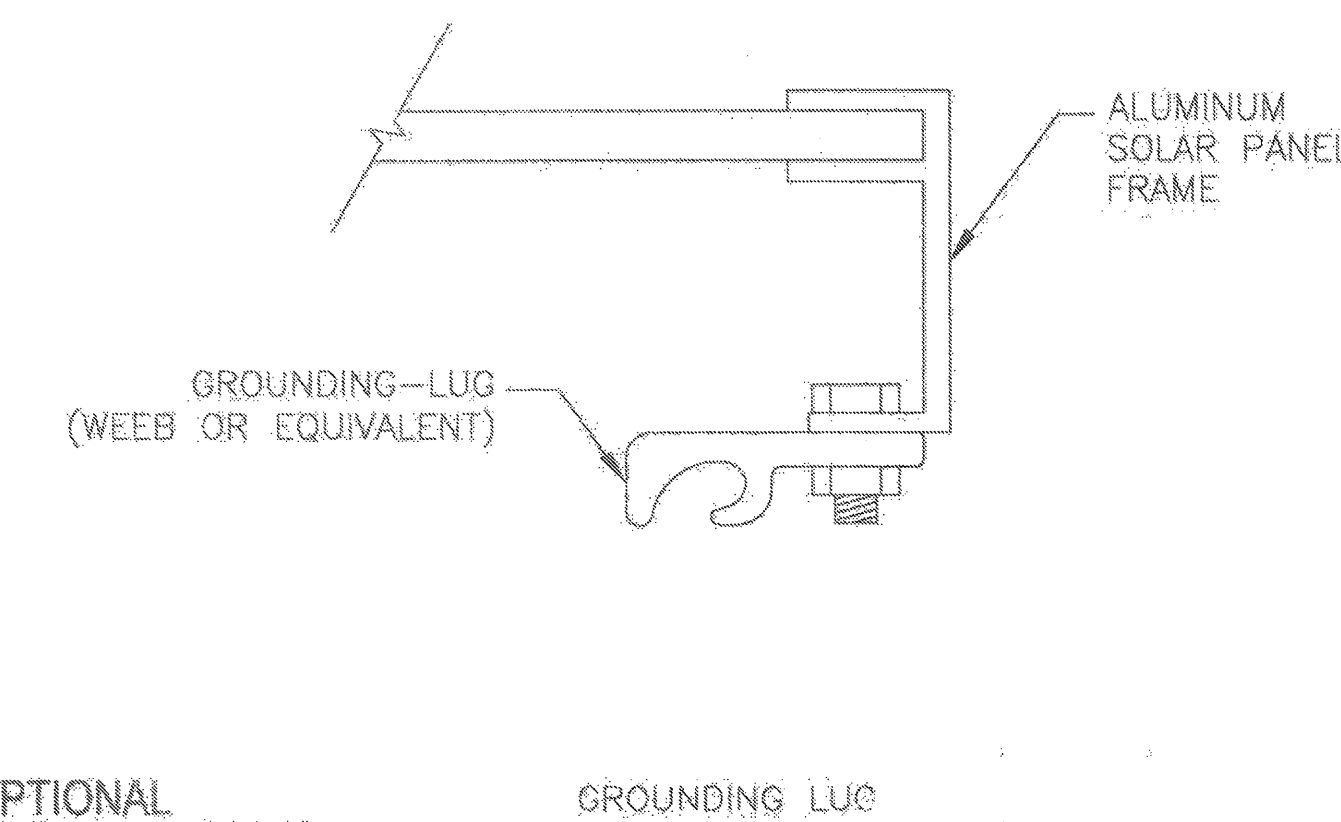
ODD NUMBER OF MODULES IN ROW

NOTE:  
X DENOTES WEEB-ADC LOCATION

**10 OPTIONAL WEEB-ADC LAYOUT**  
SCALE: 3/8" = 1'-0"

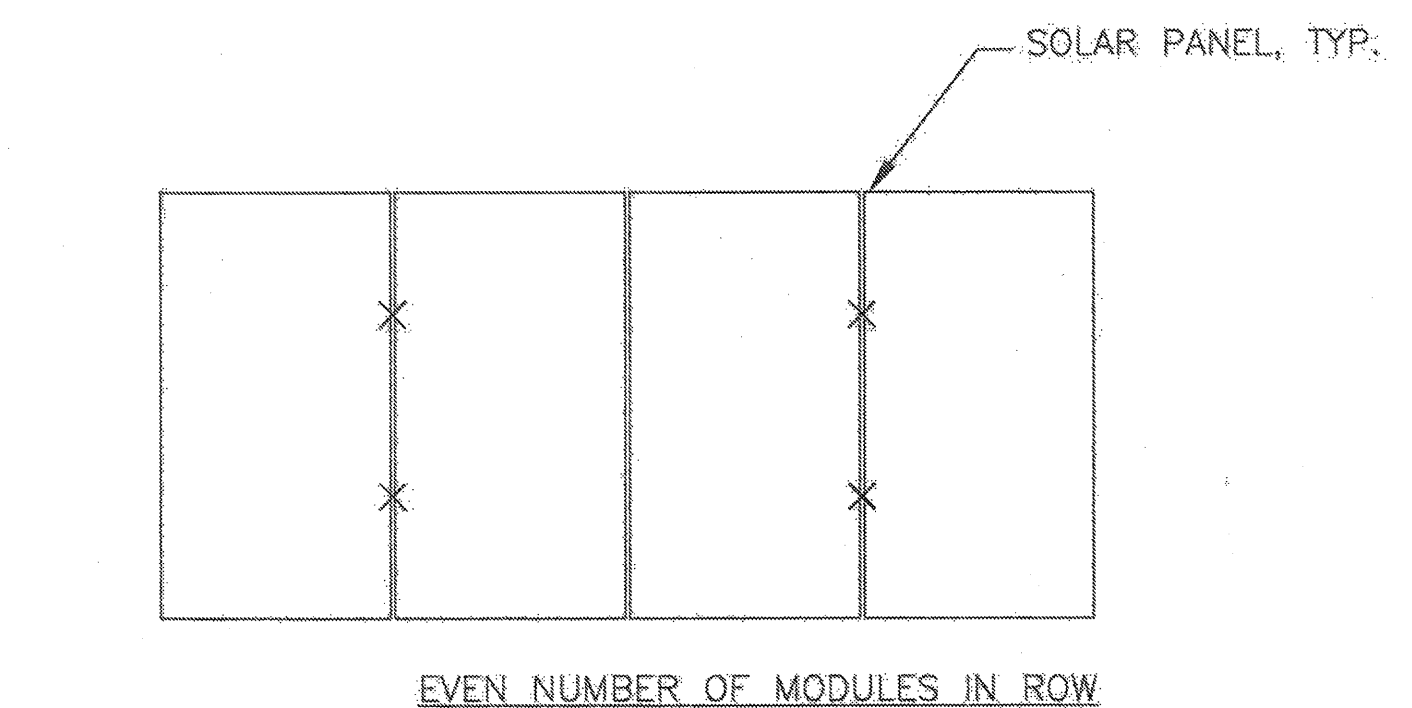


**8 PURLIN GROUNDING DETAIL**  
SCALE: N.T.S.

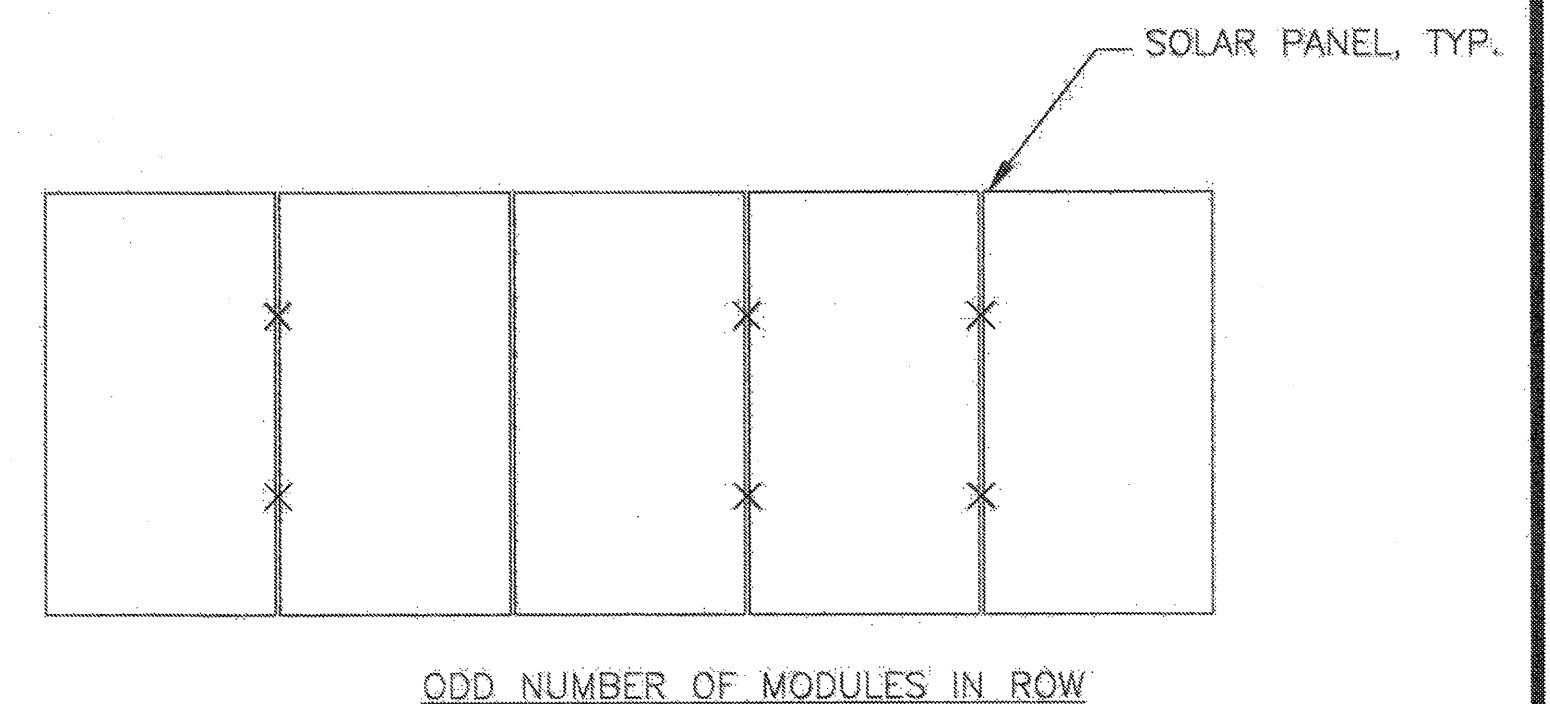


**5 OPTIONAL 28 GA GROUNDING CLAW**  
SCALE: 6" = 1'-0"

MINIMUM 28 GA ASTM A653 GALVANIZED MATERIAL



EVEN NUMBER OF MODULES IN ROW

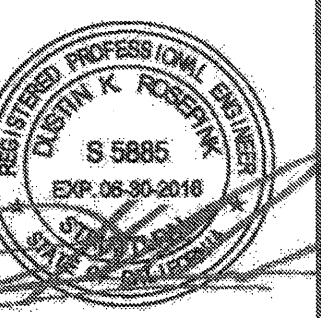


ODD NUMBER OF MODULES IN ROW

NOTE:  
X DENOTES WEEB-KSR OR CCR LOCATION

**2 OPTIONAL WEEB-KSR OR CCR LAYOUT**  
SCALE: 3/8" = 1'-0"

ENGINEER'S APPROVAL



7/22/15  
DATE SIGNED  
MMMM DD, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

A03-117835

AC: FLS / SS / TN  
DATE: JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES

APPL. C. 04-113425

AC: FLS / SS / CL  
DATE: JUL 22 2015

PRE - CHECK (PD) DOCUMENT  
CODE: 2013 C80  
A SEPARATE PROJECT APPLICATION  
FOR CONSTRUCTION IS REQUIRED.

**MBARC CONSTRUCTION INC.**  
LIC # 849940 B AND C51  
PHONE: (760) 744-4131  
FAX: (760) 744-4449  
674 RANCHEROS DR  
SAN MARCOS, CA 92069

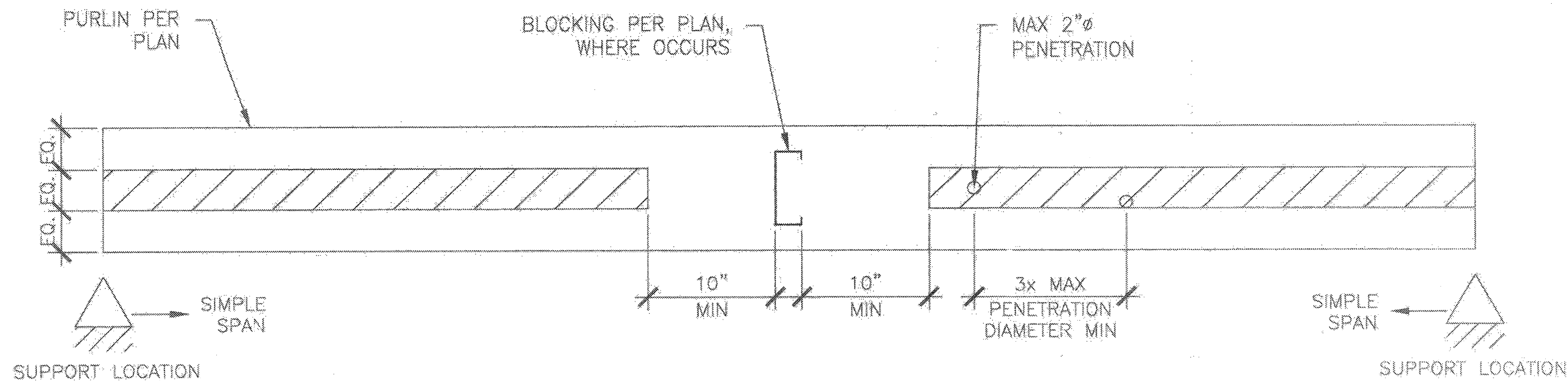
**4STEL ENGINEERING**  
STRUCTURAL ENGINEERING  
PHONE: (949) 388-9333  
FAX: (949) 388-3773  
109 EAST ESCALONES  
SAN CLEMENTE, CA 92672

PHOTOVOLTAIC STRUCTURES  
OPTIONAL GROUNDING DETAILS

DRAWN MAP  
CHECKED DKR  
DATE 5/29/15  
4STEL JOB NO. 13-1010  
SHEET

S-36

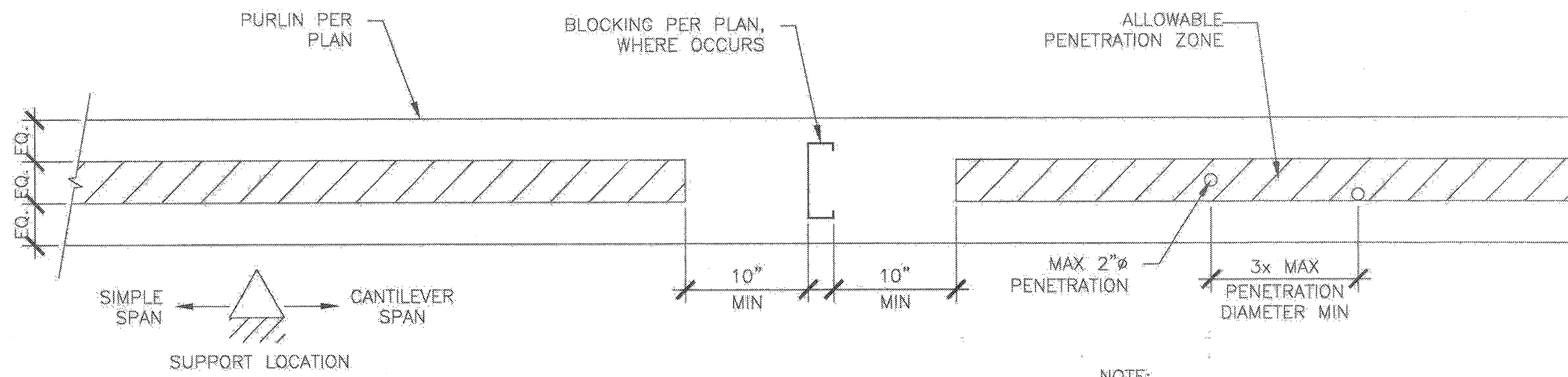
36 OF 46 SHEETS



**7 ALLOWABLE PURLIN PENETRATION SIMPLE SPAN**

SCALE: NTS

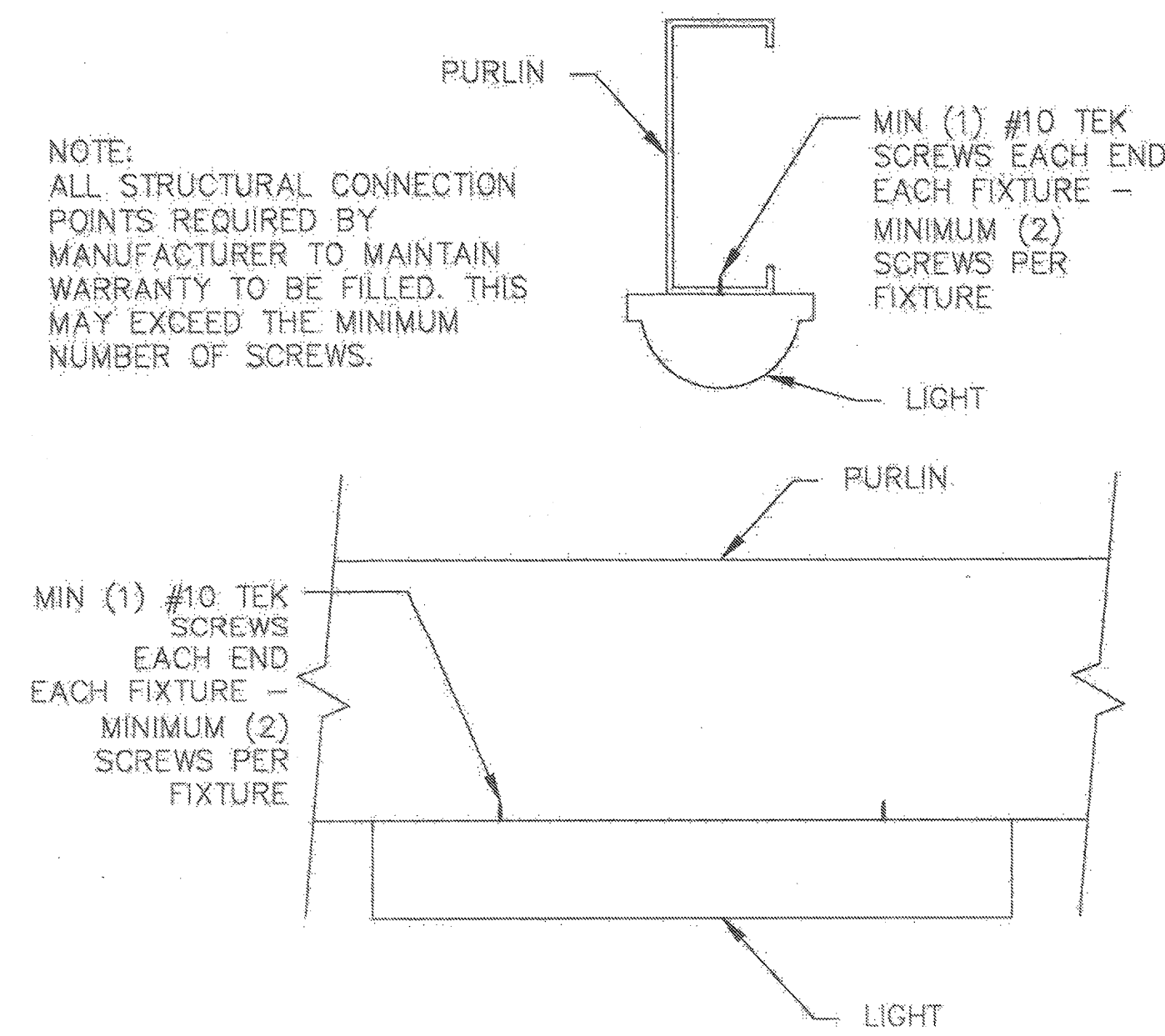
**NOTE:**  
IF MORE THAN 5 PENETRATIONS PER SPAN ARE NEEDED, CONTRACTOR TO SUBMIT AN RFI TO DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE TO ENSURE REQUIREMENTS OF THIS DETAIL ARE MET; AND TO JUSTIFY THE QUANTITY OF PENETRATIONS NEEDED.



**8 ALLOWABLE PURLIN PENETRATION CANTILEVER SPAN**

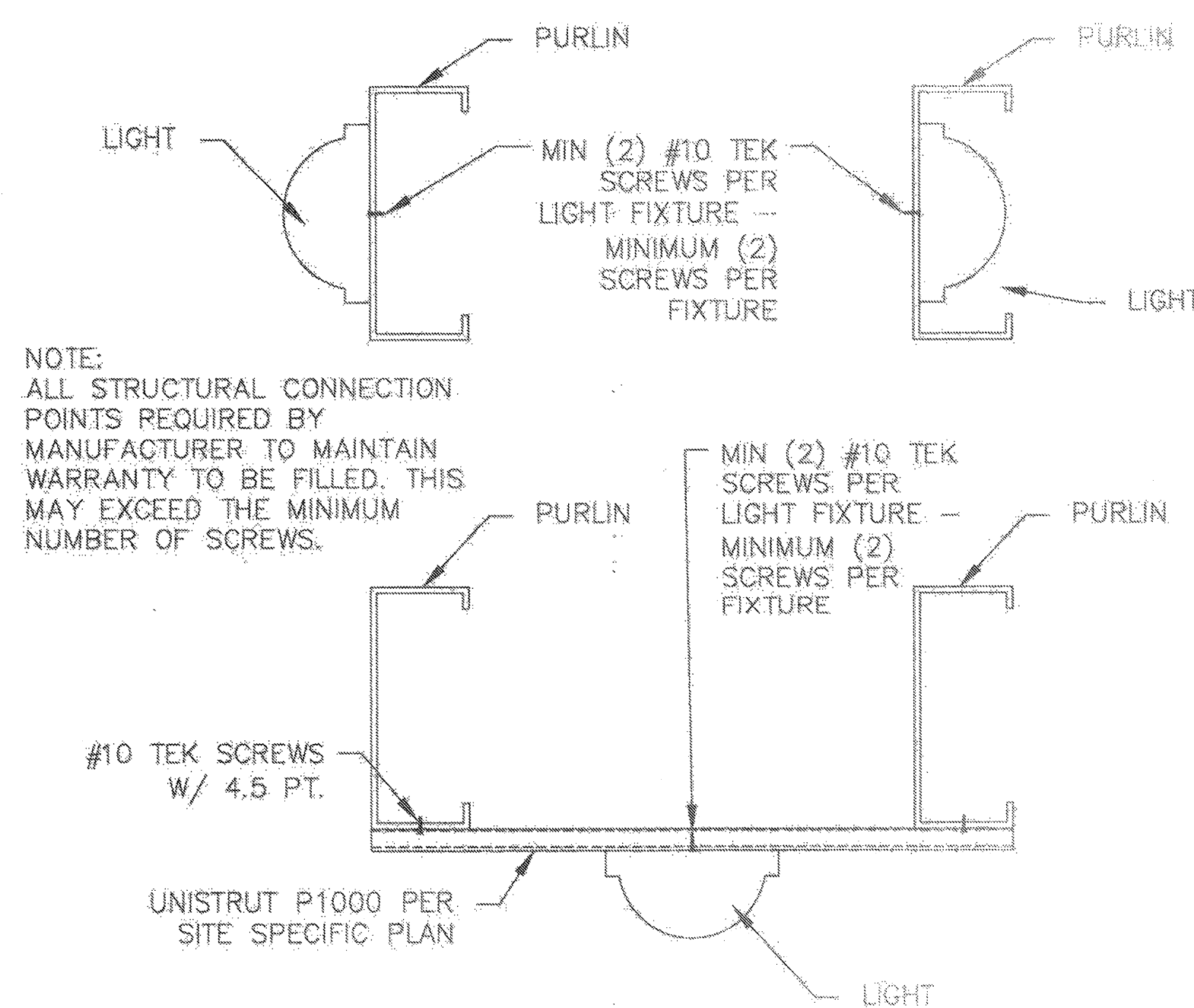
SCALE: NTS

**NOTE:**  
IF MORE THAN 5 PENETRATIONS PER SPAN ARE NEEDED, CONTRACTOR TO SUBMIT AN RFI TO DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE TO ENSURE REQUIREMENTS OF THIS DETAIL ARE MET; AND TO JUSTIFY THE QUANTITY OF PENETRATIONS NEEDED.



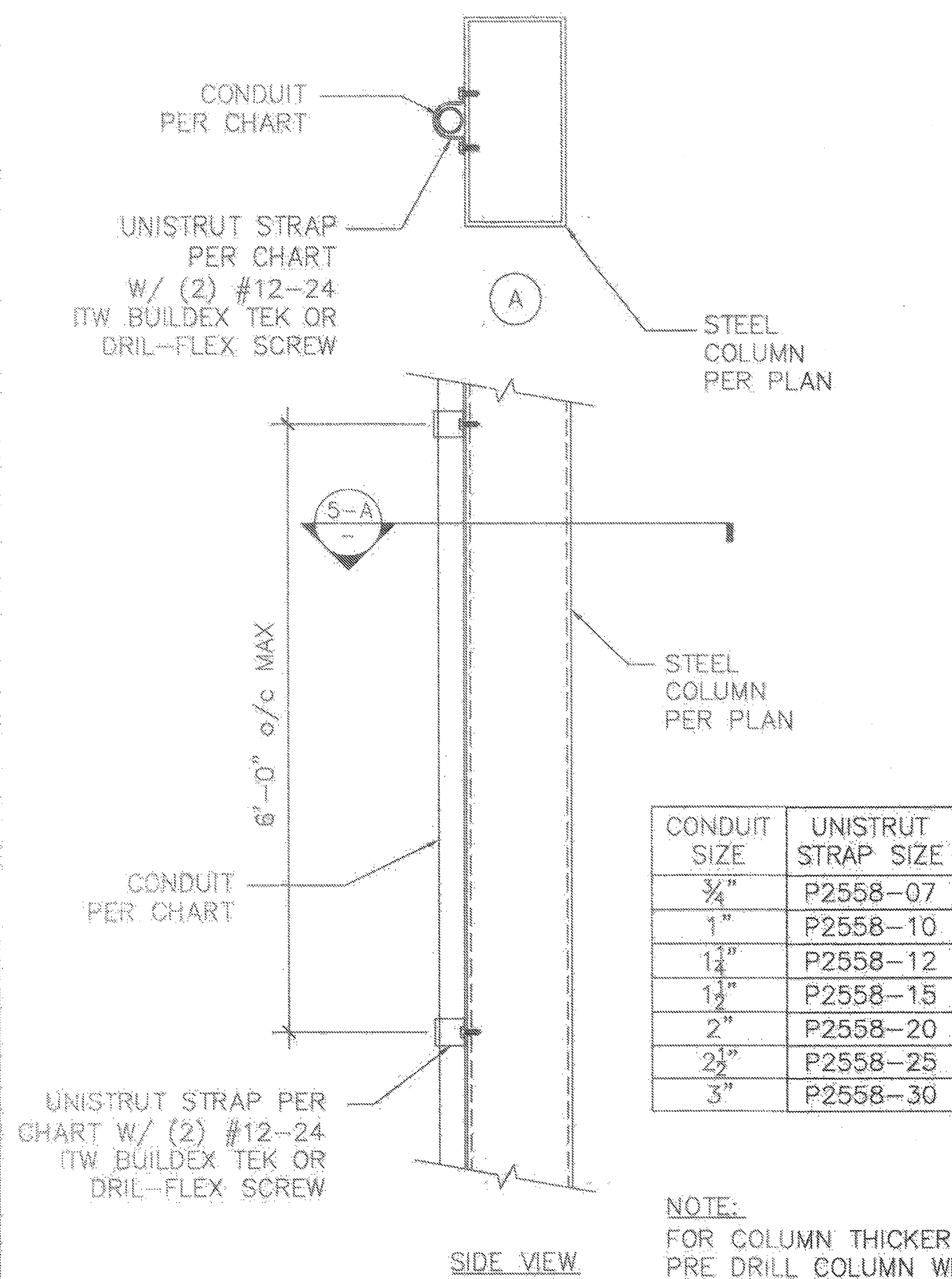
**10 ALTERNATE LIGHT INSTALLATION OPTIONS**

SCALE: 1" = 1'-0"



**9 LIGHT INSTALLATION OPTIONS**

SCALE: 1" = 1'-0"

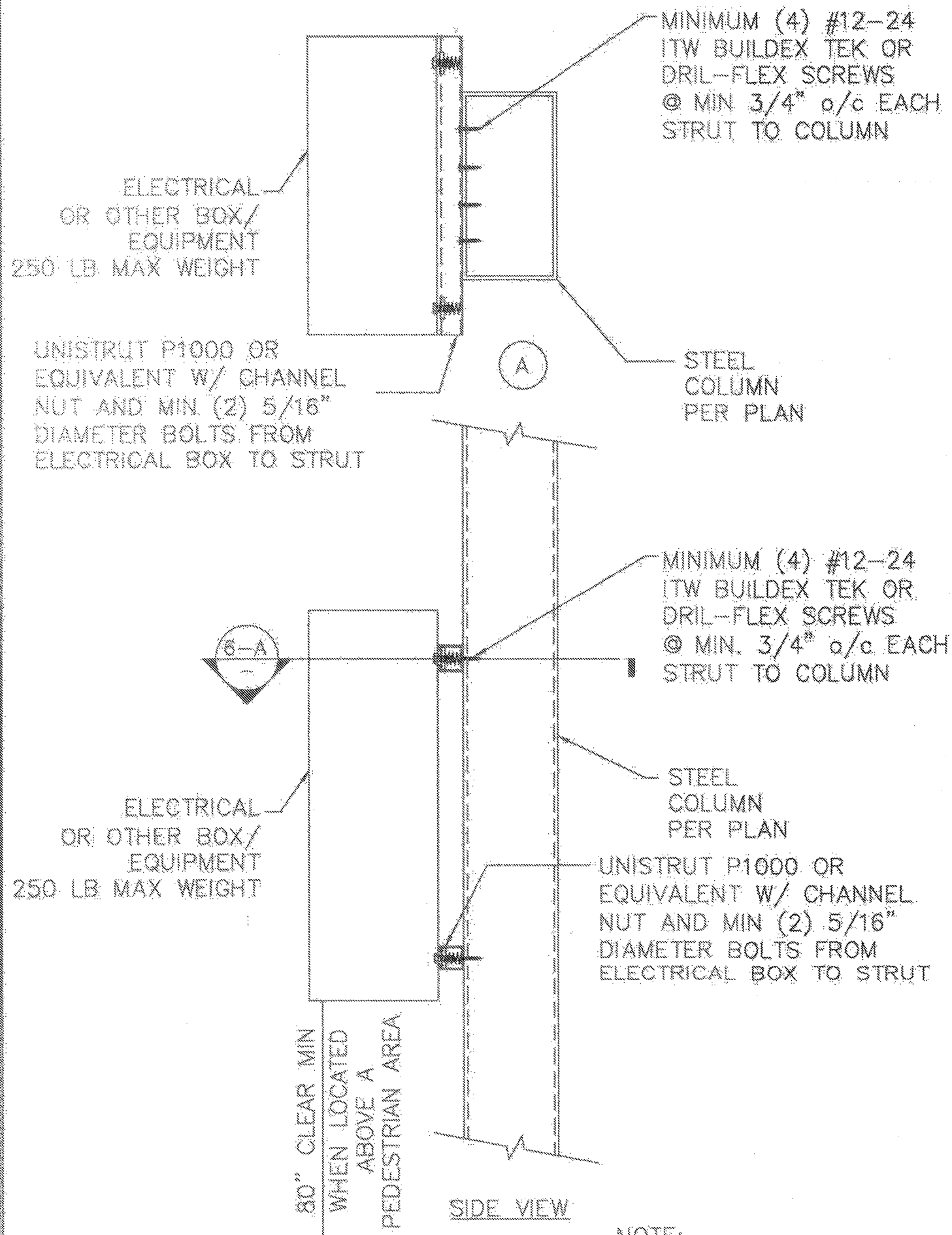


**5 PIPE/CONDUIT MOUNTING**

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

CONDUIT SIZE	UNISTRUT STRAP SIZE
3/4"	P2558-07
1"	P2558-10
1 1/2"	P2558-12
1 3/4"	P2558-15
2"	P2558-20
2 1/2"	P2558-25
3"	P2558-30

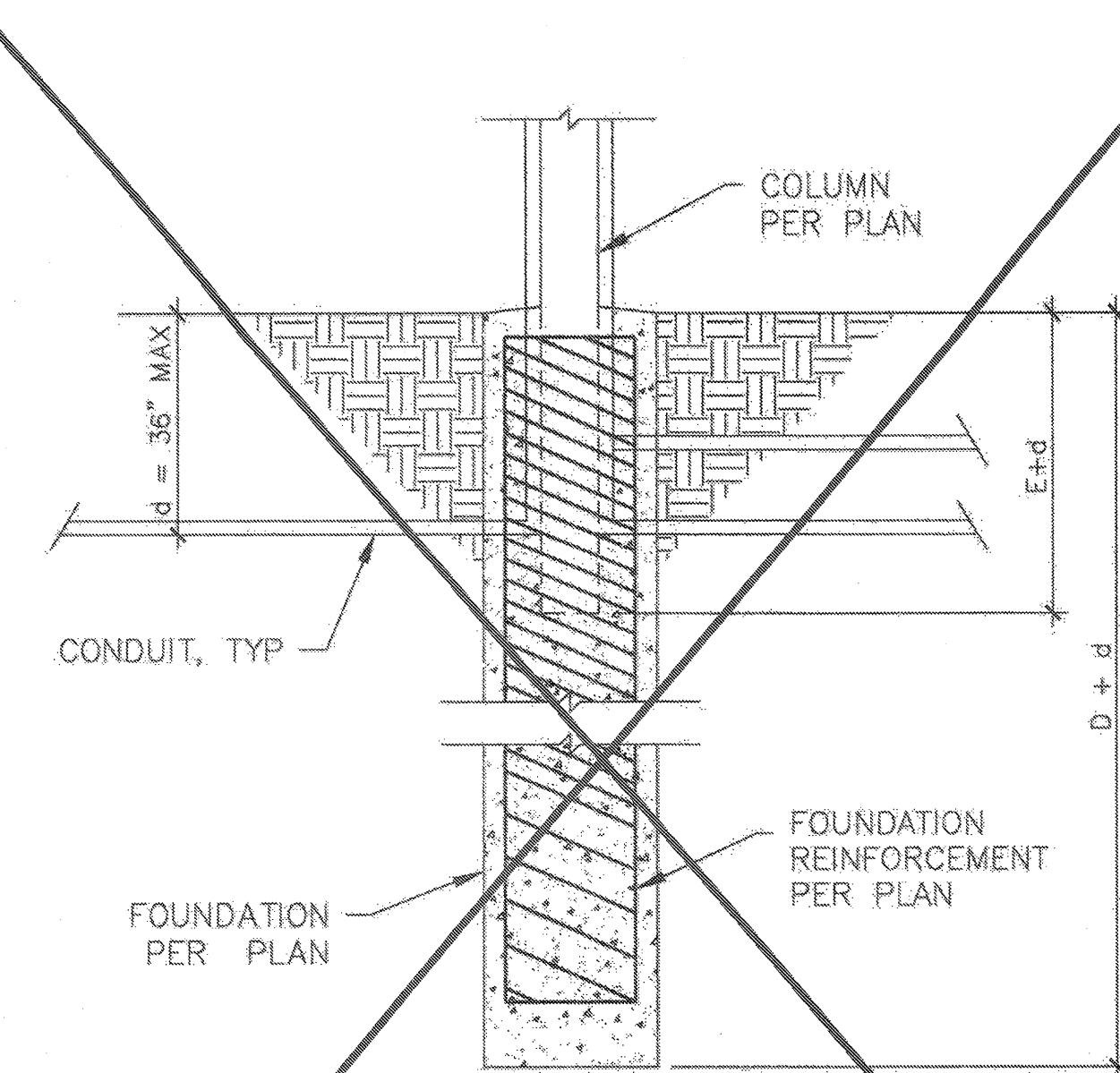
**NOTE:**  
FOR COLUMN THICKER 3/4" PRE DRILL COLUMN WITH DRILL BIT EQUAL TO ROOT DIAMETER OF SCREW USED. (I.E. SHAFT EXCLUDING THREADS)



**6 ELECTRICAL BOX MOUNTING**

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

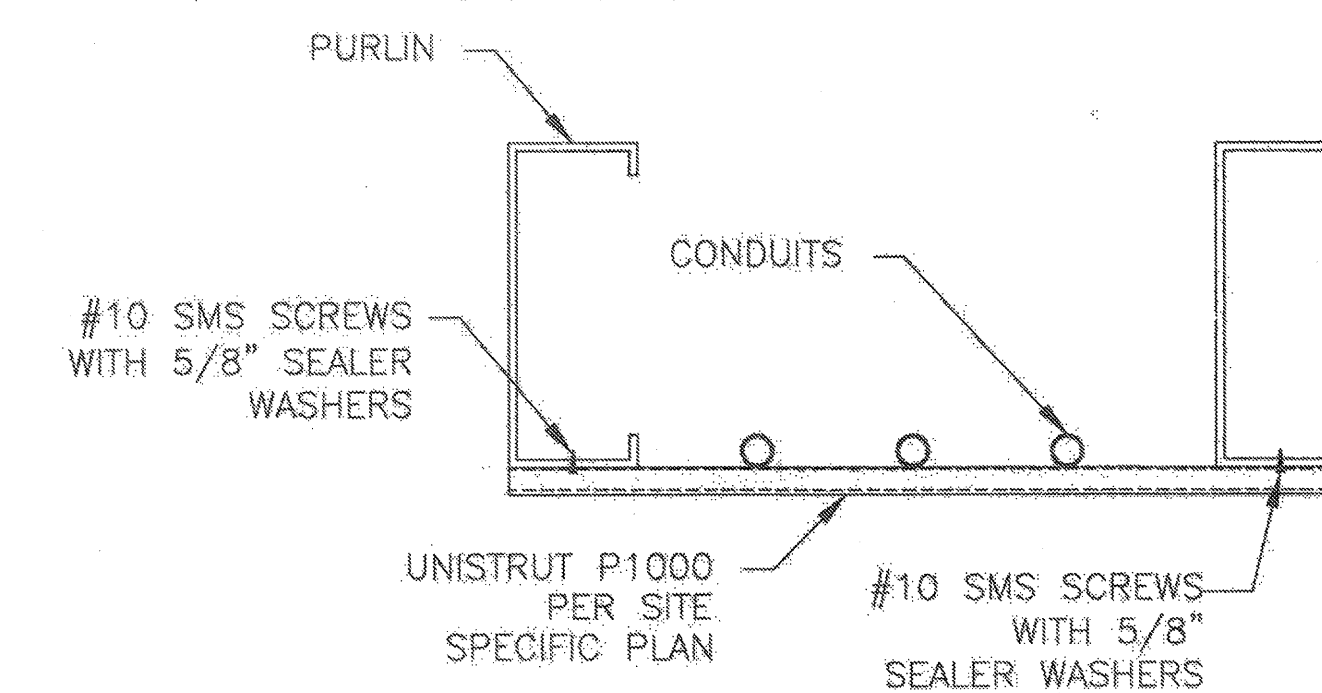
**NOTE:**  
FOR COLUMN THICKER 3/4" PRE DRILL COLUMN WITH DRILL BIT EQUAL TO ROOT DIAMETER OF SCREW USED. (I.E. SHAFT EXCLUDING THREADS)



**1 CONDUIT OR PIPE THROUGH FOOTING**

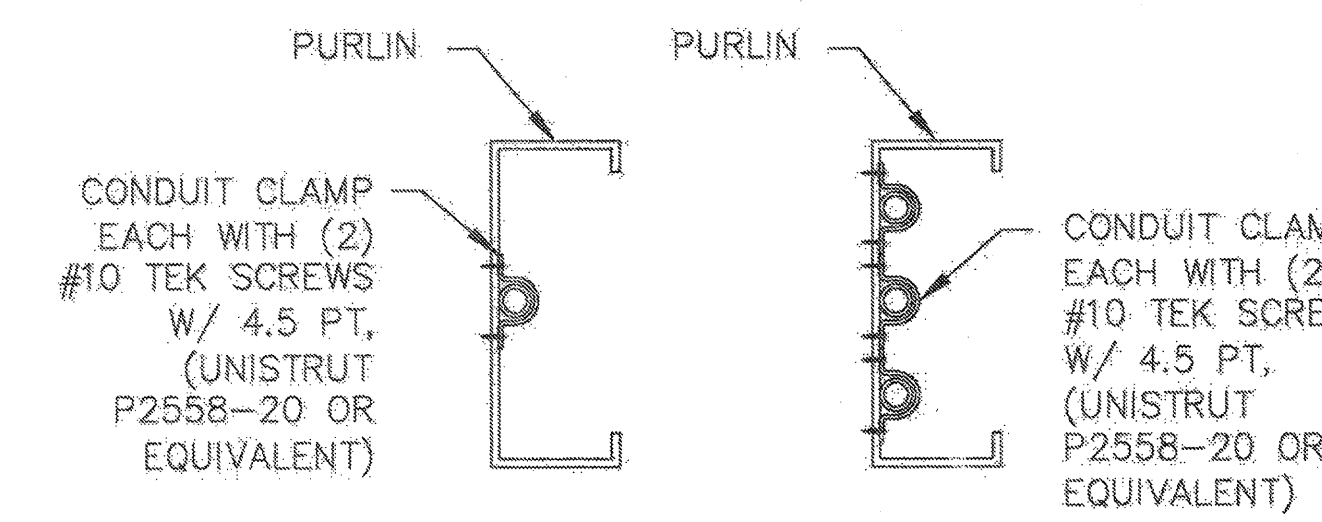
SCALE: 1" = 1'-0"

**NOTE:**  
WHEN CONDUIT IS PRESENT, FOUNDATION DEPTH PER PLAN, D, SHALL BE INCREASED BY THE MAXIMUM CONDUIT DEPTH, d AND COLUMN EMBEDMENT, E, SHALL BE INCREASED BY MAX CONDUIT DEPTH, d.



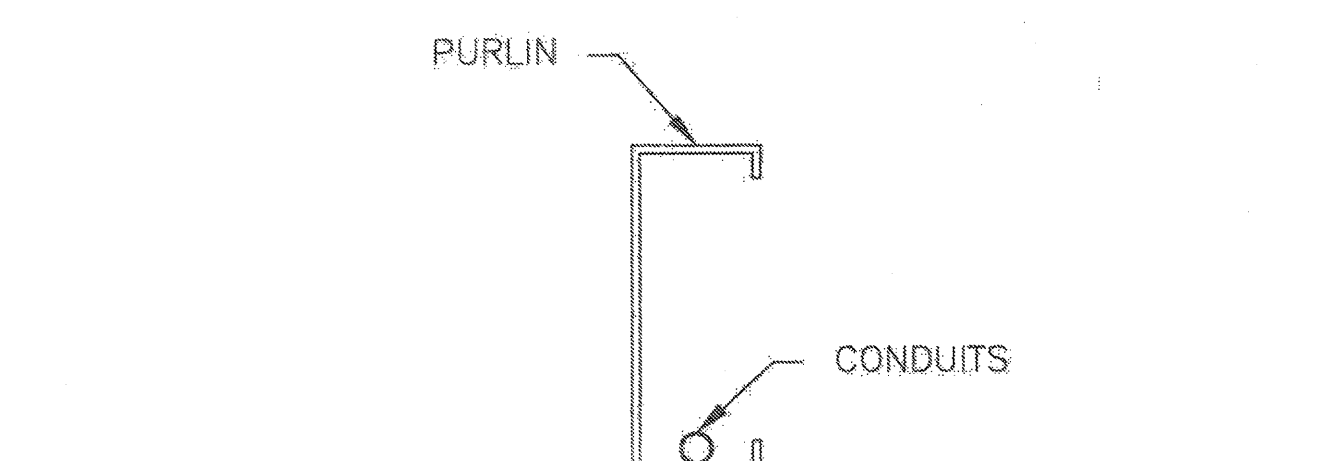
**2 OPTIONAL CONDUIT SUPPORT 1**

SCALE: 1" = 1'-0"



**3 OPTIONAL CONDUIT SUPPORT 2**

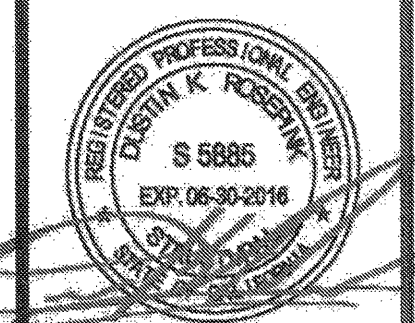
SCALE: 1" = 1'-0"



**4 OPTIONAL CONDUIT LOCATION 3**

SCALE: 1" = 1'-0"

ENGINEER'S APPROVAL



7/22/15  
DATE SIGNED  
MMMM DD, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

A 03-117835

AC FLS SS TN  
DATE JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT

APPL. 04-113425

AC FLS SS TN  
DATE JUL 22 2015

PREL-CHECK (PC) DOCUMENT  
CODE: 2013 CFC  
A SEPARATE PROJECT APPLICATION  
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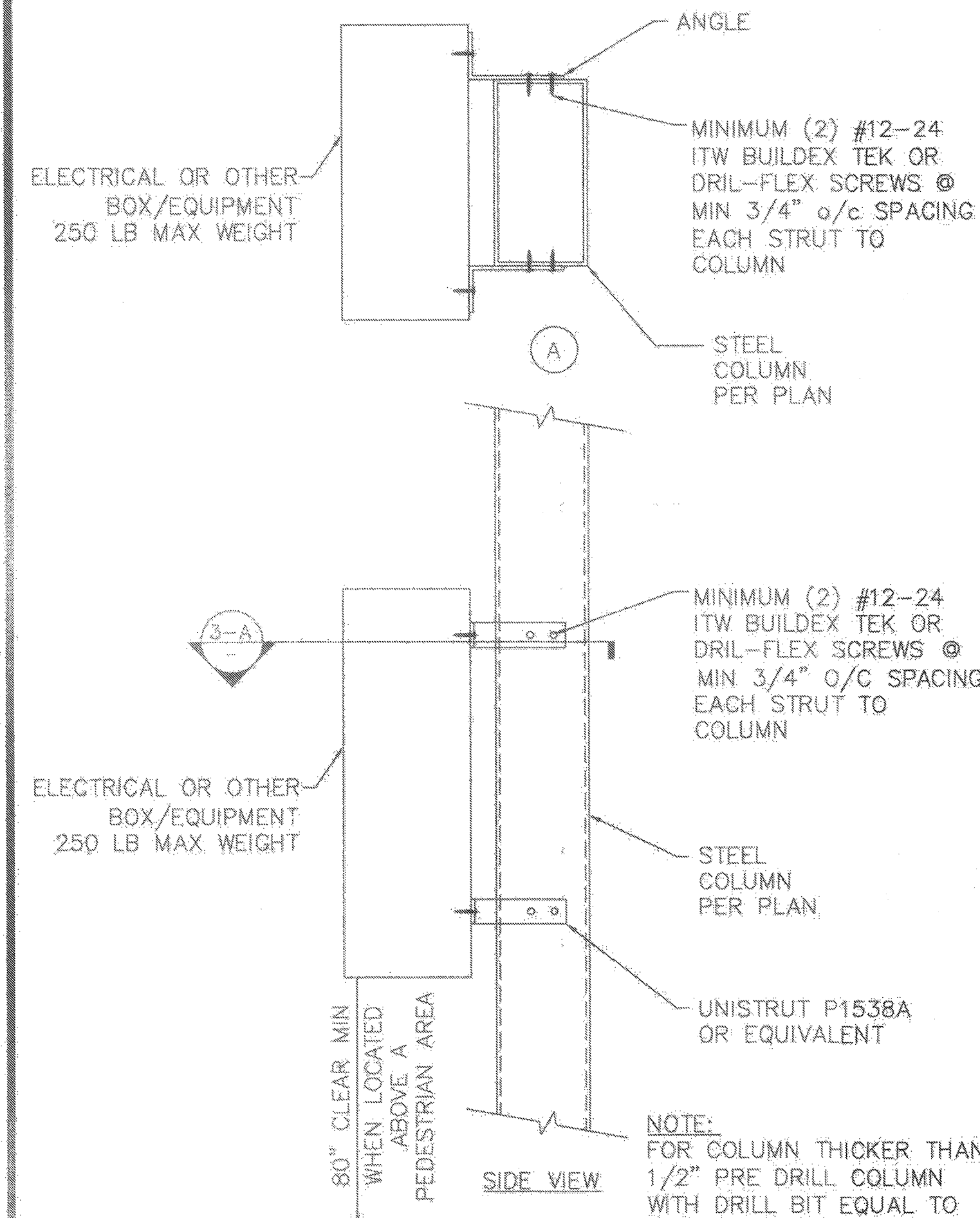
**MBARC CONSTRUCTION INC.**  
674 RANCHEROS DR  
SAN MARCOS, CA 92069  
PHONE: (760) 744-4131  
FAX: (760) 744-4449  
LIC # 869940  
B AND C51

**4 STEEL ENGINEERING**  
STRUCTURAL ENGINEERING  
109 EAST ESCALONES  
SAN CLEMENTE, CA 92672  
PHONE: (949) 388-9333  
FAX: (949) 388-3773

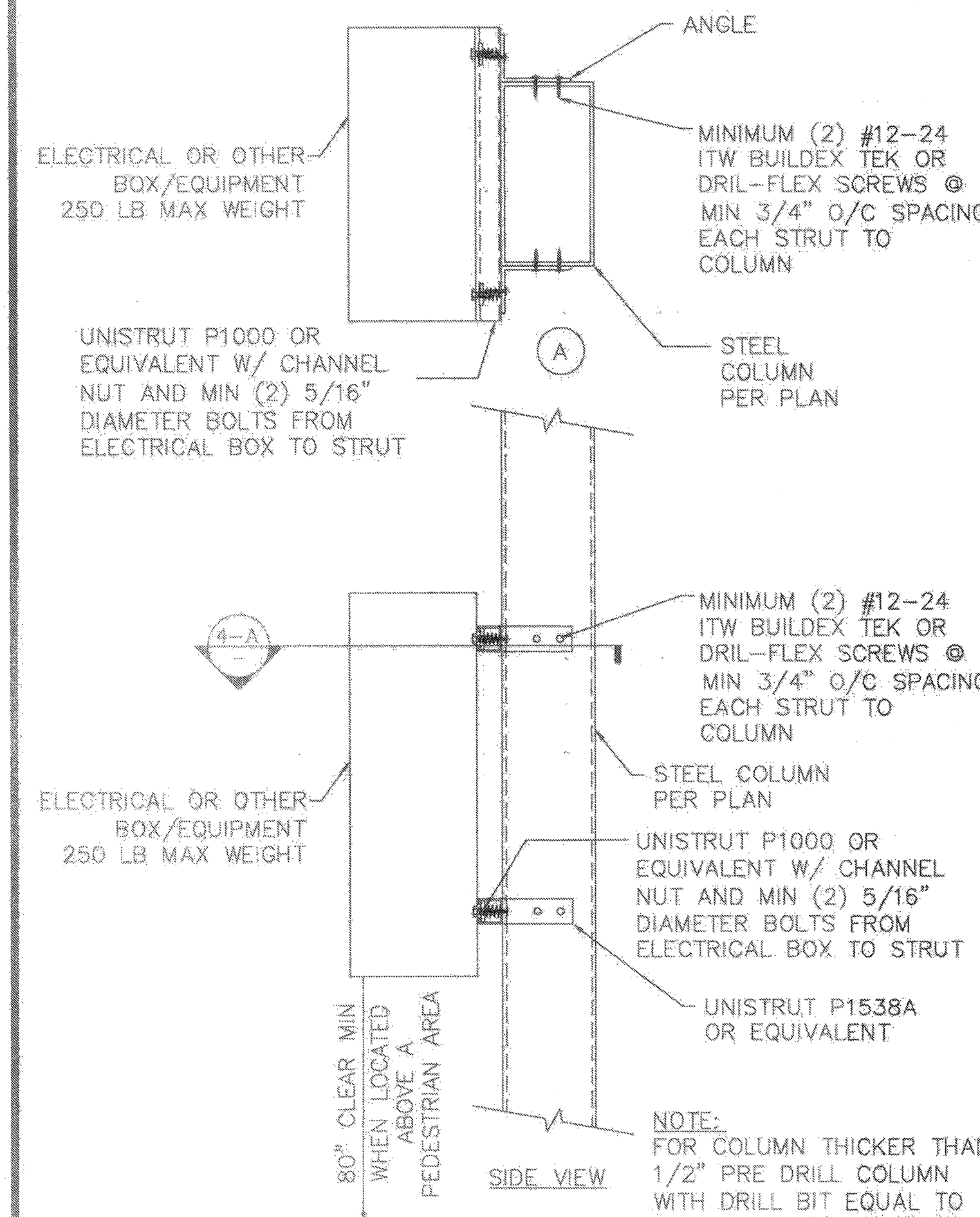
PHOTOVOLTAIC  
STRUCTURES  
STANDARD  
ELECTRICAL  
DETAILS

DRAWN  
MAP  
CHECKED  
DKR  
DATE  
5/29/15  
4STEL JOB NO.  
13-1010  
SHEET  
**S-37**

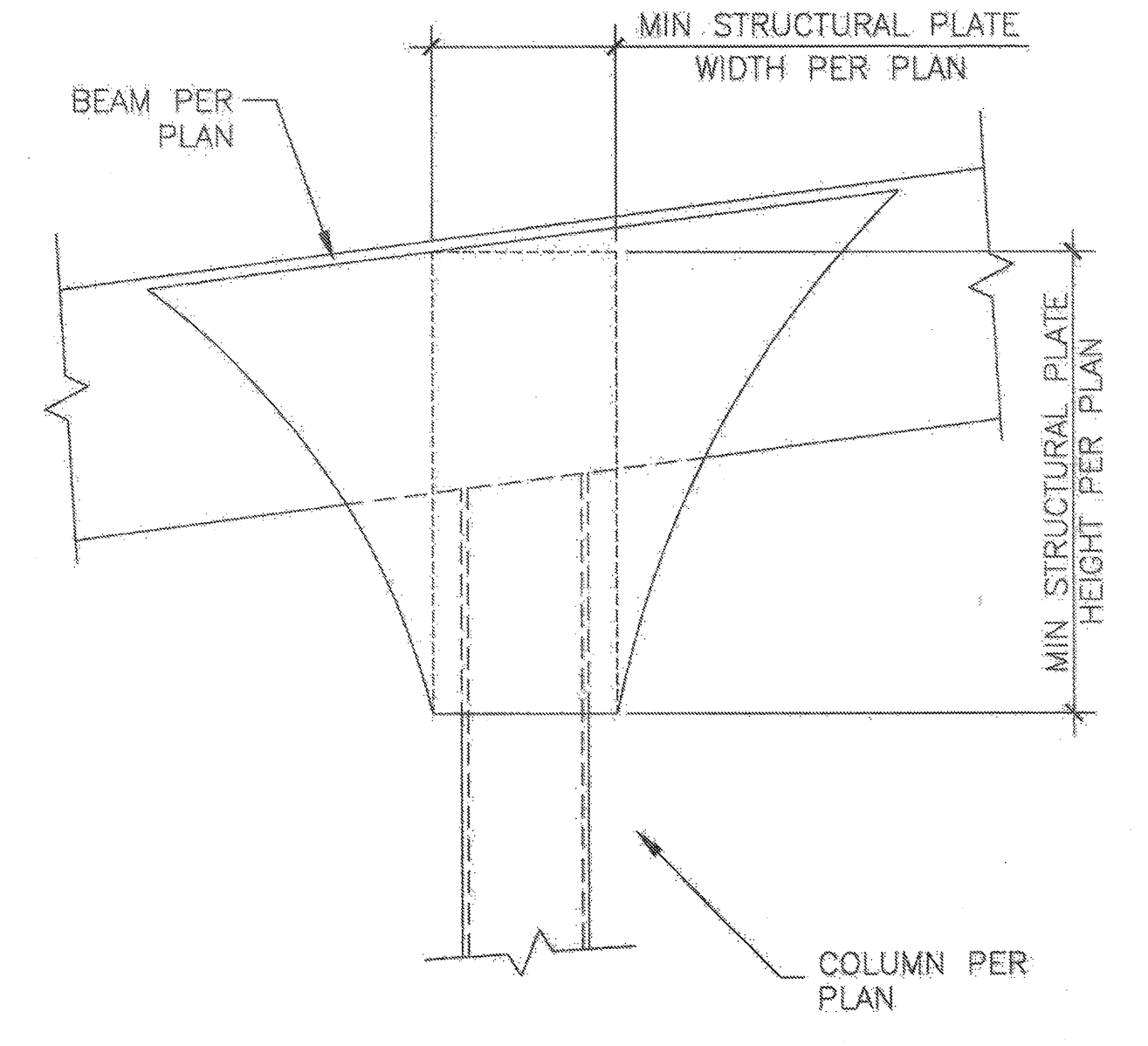
37 OF 46 SHEETS



**3 ALTERNATE EQUIPMENT ATTACHMENT DETAIL**  
SCALE: 1 1/2" = 1'-0"

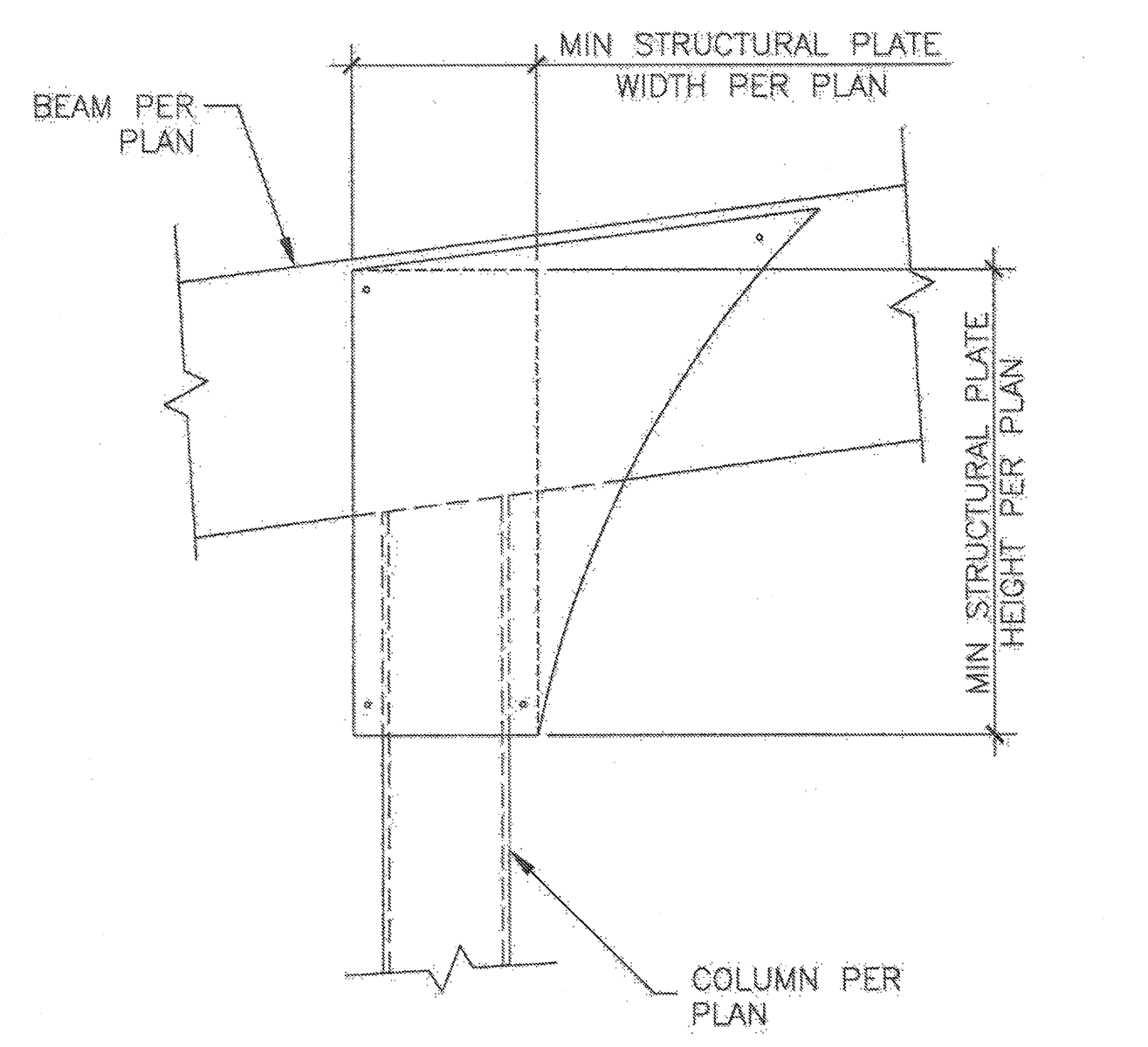


**4 ALTERNATE EQUIPMENT ATTACHMENT DETAIL**  
SCALE: 1 1/2" = 1'-0"



**NOTE:**  
SIZE OF PLATES & WELDS SHALL MEET OR EXCEED THE THICKNESS AND DIMENSIONS SHOWN ON S-12, S-18, S-18.6, S-25, S-31 OR S-31.6

**1 ALTERNATE BEAM TO COLUMN**  
SCALE: 1-1/2" = 1'-0"



**NOTE:**  
SIZE OF PLATES & WELDS SHALL MEET OR EXCEED THE THICKNESS AND DIMENSIONS SHOWN ON S-12, S-18, S-18.6, S-25, S-31 OR S-31.6

**2 ALTERNATE BEAM TO COLUMN**  
SCALE: 1-1/2" = 1'-0"

**ENGINEER'S APPROVAL**  
REGISTERED PROFESSIONAL ENGINEER  
DIANE K. ROBERTS  
S 5885  
EXP. 08-30-2016  
7/22/15  
DATE SIGNED  
MMMM DD, 2015

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
**A03-117835**  
AC: FLS / SS / TX  
DATE: JAN 17 2017  
**SITE SPECIFIC DSA APPROVAL**

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES  
APPL. C. 04-113425  
AC: FLS / SS / CA  
DATE: JUL 22 2015  
PRE-CHECK (PC) DOCUMENT  
CODE: 2013 CBC  
A SEPARATE PROJECT APPLICATION  
FOR CONSTRUCTION IS REQUIRED.

**MBARC CONSTRUCTION INC.**  
LIC # 869740 B AND C1  
PHONE: (760) 744-4131  
FAX: (760) 744-4449  
674 RANCHEROS DR  
SAN MARCOS, CA 92069

**4STEL ENGINEERING**  
STRUCTURAL ENGINEERING  
PHONE: (949) 388-9333  
FAX: (949) 388-3773  
109 EAST ESCALONES  
SAN CLEMENTE, CA 92672

**PHOTOVOLTAIC STRUCTURES ALTERNATE CONNECTION DETAILS**

**DRAWN MAP**  
CHECKED DKR  
DATE 5/29/15  
4STEL JOB NO. 13-1010  
SHEET  
**S-37.1**

37.1 OF 46 SHEETS



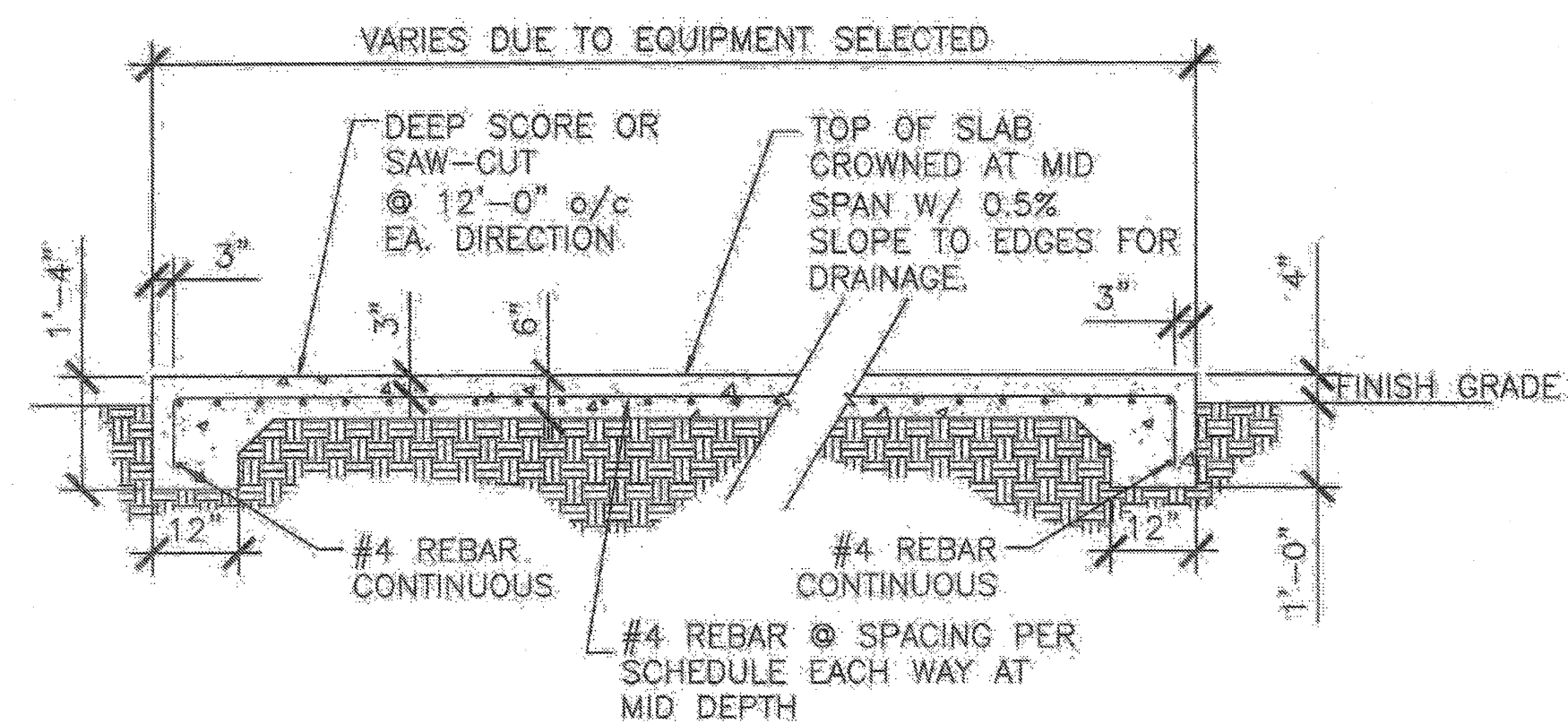
# ELECTRICAL EQUIPMENT ANCHORAGE AND PAD SIZES

EQUIPMENT SCHEDULE							
DESIGNATION	DESCRIPTION	DIMENSIONS (LENGTH x WIDTH x HEIGHT)	WEIGHT (LBS.)	DESIGNATION	ANCHORAGE	DETAIL	MINIMUM PAD SIZE & REINFORCEMENT
1	INVERTER-1	75" x 31" x 80"	2977	150KW	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 51"x19" MIN PATTERN	6/-	7'-3" LONG BY 5'-0" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH
2	INVERTER-2	117.7" x 43.3" x 92.6"	4500	250KW	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 93.7"x31.3" MIN PATTERN	6/-	11'-3" LONG BY 6'-6" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH
3	INVERTER-3	106.33" x 39.59" x 89.18"	3300	375KW	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 82.33"x27.59" MIN PATTERN	6/-	10'-6" LONG BY 6'-0" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH
4	INVERTER-4	138.75" x 42.47" x 93.47"	5900	500KW	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 114.75"x30.47" MIN PATTERN	6/-	13'-0" LONG BY 7'-0" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH
5	INVERTER-5	148" x 84" x 107"	12000	1MW	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 124"x72" MIN PATTERN	6/-	14'-0" LONG BY 9'-0" WIDE BY 6" THICK SLAB W/ #4 BARS @ 8" o/c AT MID DEPTH
6	TRANSFORMER-1	49" x 30.5" x 77"	2500	250TRANS	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 25"x18.5" MIN PATTERN	6/-	6'-6" LONG BY 5'-9" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH
7	TRANSFORMER-2	49" x 30.5" x 77"	3200	500TRANS	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 25"x18.5" MIN PATTERN	6/-	6'-6" LONG BY 6'-6" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH
8	TRANSFORMER-3	96" x 77" x 96"	17600	3750KVA	(6) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT. TWO ROWS OF 3 BOLTS. ROWS SPACED 71" MIN APART W/ BOLTS EQUALLY SPACED IN EA. ROW	6/-	10'-3" LONG BY 10'-3" WIDE BY 6" THICK SLAB W/ #4 BARS @ 6" o/c AT MID DEPTH
9	TRANSFORMER-4	94" x 74" x 72.5"	12500	1500KVA	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-3/4" EMBEDMENT IN A 70"x62" MIN PATTERN	6/-	9'-3" LONG BY 8'-0" WIDE BY 6" THICK SLAB W/ #4 BARS @ 9" o/c AT MID DEPTH
10	HVL SWITCH	60" x 38" x 97.7"	1300	HVL	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 36"x24" MIN PATTERN	6/-	6'-6" LONG BY 5'-3" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH
11	54" WIDE SWITCHBOARD COMPONENT	96" x 54" x 91.5" (MAX) 54" x 54" x 91.5" (MIN)	2400	54SB	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 30"x30" MIN PATTERN	6/-	6'-6" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH LENGTH IS EQUAL TO COMPONENT LENGTH (6'-6" MIN, 8'-0" MAX)
12	48" WIDE SWITCHBOARD COMPONENT	96" x 48" x 91.5" (MAX) 48" x 48" x 91.5" (MIN)	1700	48SB	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 24"x24" MIN PATTERN	6/-	6'-0" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH LENGTH IS EQUAL TO COMPONENT LENGTH (6'-0" MIN, 8'-0" MAX)
13	42" WIDE SWITCHBOARD COMPONENT	96" x 42" x 91.5" (MAX) 42" x 42" x 91.5" (MIN)	2200	42SB	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 18"x18" MIN PATTERN	6/-	6'-0" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH LENGTH IS EQUAL TO COMPONENT LENGTH (6'-0" MIN, 8'-0" MAX)
14	24" WIDE SWITCHBOARD COMPONENT	96" x 24" x 91.5" (MAX) 24" x 24" x 91.5" (MIN)	1000	24SB	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 18"x18" MIN PATTERN	6/-	5'-3" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH LENGTH IS EQUAL TO COMPONENT LENGTH (5'-3" MIN, 8'-0" MAX)
15	22" WIDE SWITCHBOARD COMPONENT	96" x 22" x 91.5" (MAX) 22" x 22" x 91.5" (MIN)	1970	22SB	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 16"x16" MIN PATTERN	6/-	6'-0" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH LENGTH IS EQUAL TO COMPONENT LENGTH (6'-0" MIN, 8'-0" MAX)
16	30" WIDE SWITCHBOARD COMPONENT	96" x 30" x 91.5" (MAX) 30" x 30" x 91.5" (MIN)	2020	30SB	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 25"x25" MIN PATTERN	6/-	6'-3" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH LENGTH IS EQUAL TO COMPONENT LENGTH (6'-3" MIN, 8'-0" MAX)
17	36" WIDE SWITCHBOARD COMPONENT	96" x 36" x 91.5" (MAX) 36" x 36" x 91.5" (MIN)	2070	36SB	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 31"x31" MIN PATTERN	6/-	6'-3" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH LENGTH IS EQUAL TO COMPONENT LENGTH (6'-3" MIN, 8'-0" MAX)
18	SWITCHBOARD	72" x 43" x 90"	1450	800ASB	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 48"x31" MIN PATTERN	6/-	7'-6" LONG BY 5'-0" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH
19	FREE STANDING RACK-1	SEE S-39	1500/BAY	UNISTRUT BRACED RACK	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 30"x46.5" MIN PATTERN	6/-	RACK LENGTH PLUS 12" BY 5'-0" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH
20	FREE STANDING RACK-2	SEE S-40	2000/BAY	RACK	(4) - 3/4" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 4" EMBEDMENT IN A 9"x9" MIN PATTERN. PER COLUMN. BASE PLATE PER PLAN	6/-	RACK LENGTH PLUS 18" BY 3'-6" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH
21	FREE STANDING RACK-3	SEE S-41	495/BAY	UNISTRUT RACK	(4) - 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS PER ICC ESR-1917 W/ 3-1/4" EMBEDMENT IN A 9"x9" MIN PATTERN	6/-	RACK LENGTH PLUS 24" BY 4'-0" WIDE BY 6" THICK SLAB W/ #4 BARS @ 12" o/c AT MID DEPTH

- NOTES:
- EQUIPMENT MAY BE INSTALLED ON A SINGLE PAD AS LONG AS EACH PIECE OF EQUIPMENT HAS THE REQUIRED PAD SIZE WITHOUT OTHER EQUIPMENT'S PAD REQUIREMENTS OVERLAPPING.
  - POST WARNING SIGNS PER DETAIL 4/3-38 REQUIRED AT ALL ENTRY POINTS TO PAD LOCATION. ALSO SEE SITE SPECIFIC ELECTRICAL PLANS FOR ADDITIONAL SIGNAGE REQUIREMENTS.
  - WHEN SWITCHBOARD COMPONENTS ARE ATTACHED TOGETHER THE PAD SIZE MUST BE THE MAXIMUM PAD WIDTH FOR ANY OF THE INDIVIDUAL COMPONENTS AND THE LENGTH MUST BE EQUIVALENT TO THE SUM OF ALL USED COMPONENTS REQUIRED LENGTHS.
  - NOT ALL EQUIPMENT NEEDS TO BE USED. ELECTRICAL ENGINEER TO SPECIFY SITE SPECIFIC EQUIPMENT TO BE USED AND TO PROVIDE ELECTRICAL DOCUMENTS DEMONSTRATING GROUNDING OF EQUIPMENT AND OF THE SOLAR PANELS.
  - IF OTHER EQUIPMENT IS SUBSTITUTED THE PAD SIZE MAY BE ADJUSTED BY RATIONAL PROPORTIONS [EX: (ACTUAL PAD WIDTH) = (WIDTH OF ACTUAL EQUIPMENT) / (WIDTH OF EQUIPMENT IN THE CHART) \* (PAD WIDTH IN CHART)]
  - SITE SPECIFIC DESIGN FOR THE DUCT BANK LOCATIONS SHALL TAKE INTO CONSIDERATION POSSIBLE FENCE POST FOUNDATIONS AND/OR THE IMPACTS OF THE SLAB PERIMETER FOUNDATION.
  - ALL STRUCTURAL CONNECTION POINTS REQUIRED BY MANUFACTURER TO MAINTAIN WARRANTY TO BE FILLED. THIS MAY EXCEED THE MINIMUM NUMBER OF BOLTS INDICATED IN THE ABOVE CHART.
  - ALL 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS TO BE INSTALLED TO 40 FT-LB OF TORQUE. ALL 3/8" HILTI STAINLESS STEEL KB-TZ BOLTS TO BE INSTALLED TO 60 FT-LB OF TORQUE. ALL 1/2" HILTI STAINLESS STEEL KB-TZ BOLTS TO BE INSTALLED TO 110 FT-LB OF TORQUE.
  - MINIMUM EDGE DISTANCE FOR ALL HILTI STAINLESS STEEL KB-TZ BOLTS TO BE 6" U.N.O. THE MINIMUM PAD SIZE SHOWN IN CHART MAY NEED TO INCREASE TO ACCOMMODATE THIS MINIMUM REQUIREMENT.
  - IF CHAIN LINK FENCE ENCLOSURE IS USED SEE S-43 FOR CONNECTION OPTIONS WHICH MAY REQUIRE A WIDER PERIMETER FOOTING.

## 1 EQUIPMENT PAD SCHEDULE

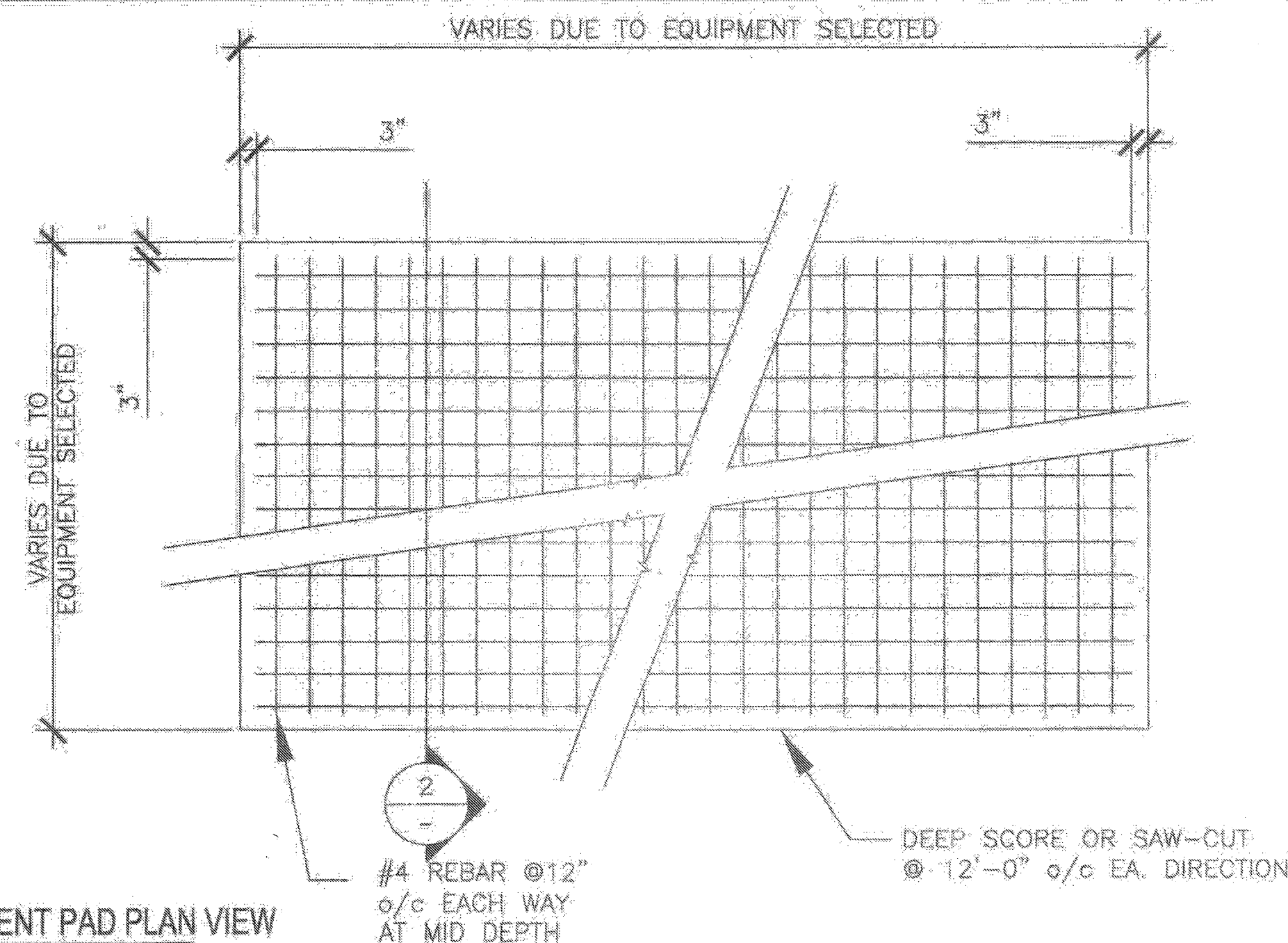
SCALE: N/A



- NOTES:
- IF CHAIN LINK FENCE ENCLOSURE IS USED SEE S-43 FOR CONNECTION OPTIONS WHICH MAY REQUIRE A WIDER PERIMETER FOOTING.

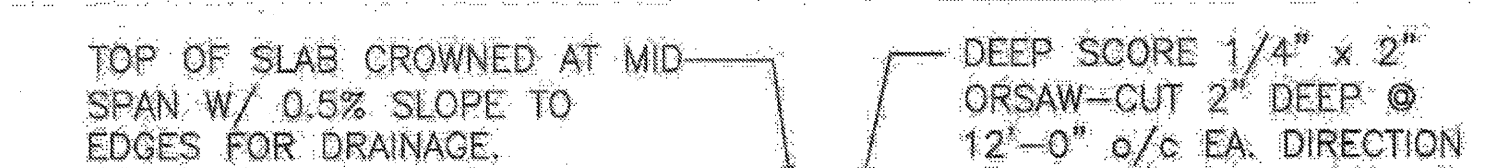
## 2 EQUIPMENT PAD SECTION

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



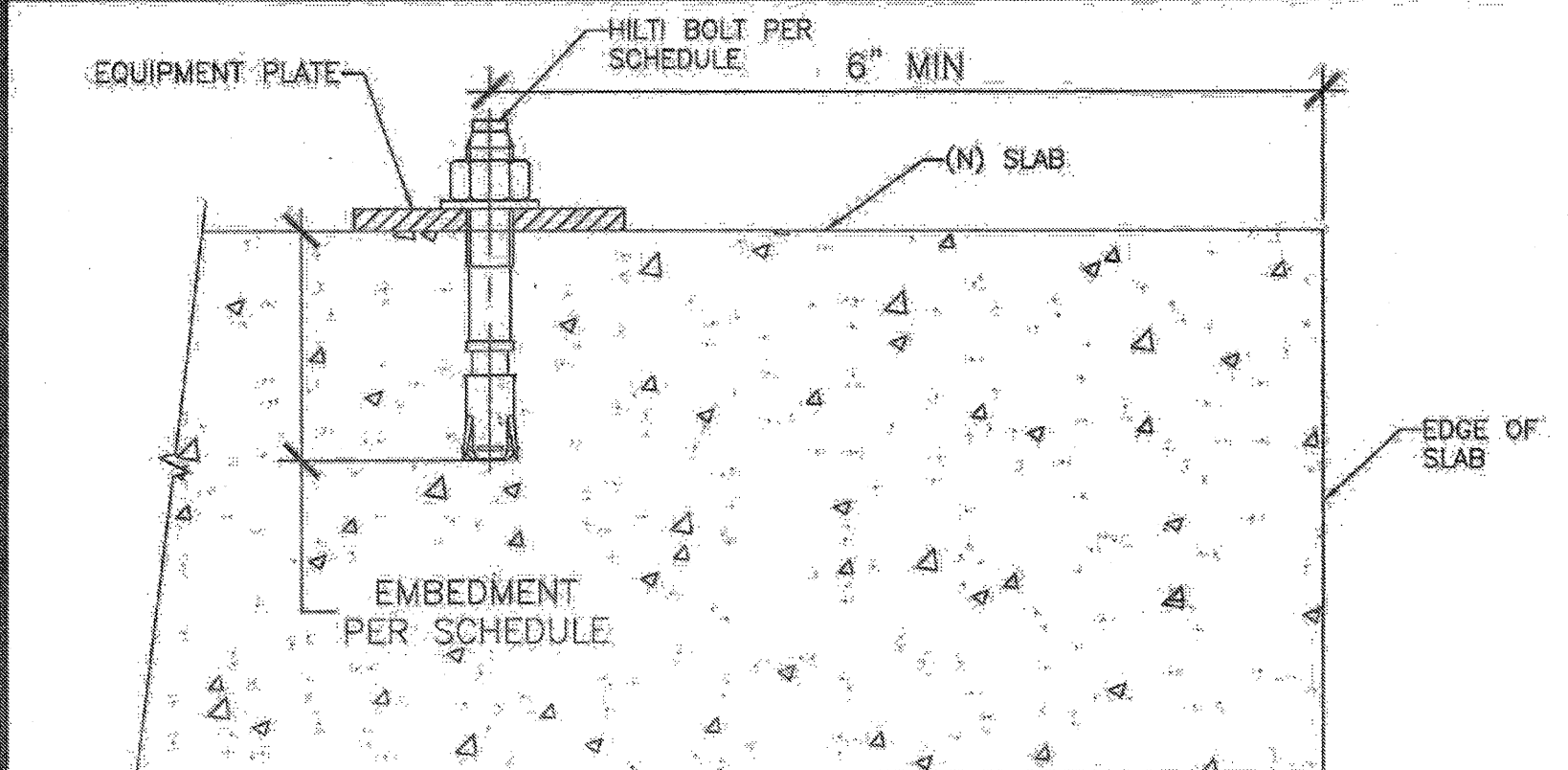
## 3 EQUIPMENT PAD PLAN VIEW

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



## 5 CONTROL JOINT

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



## 6 HILTI KB-TZ

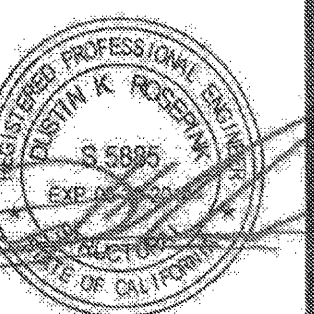
SCALE: 6" = 1'-0"



## 4 WARNING SIGN

SCALE: N/A

ENGINEER'S APPROVAL



DATE SIGNED  
JUNE 25, 2014

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
A 03-117835

AC: FLS, SS, TN  
DATE: JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES  
APPL. C. 66-11325  
AC: FLS, SS, TN  
DATE: JUN 25 2014

MBARC CONSTRUCTION INC.  
674 RANCHEROS DR  
SAN MARCOS, CA 92069  
PHONE: (760) 744-4131  
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LIC # 869940  
B AND C51

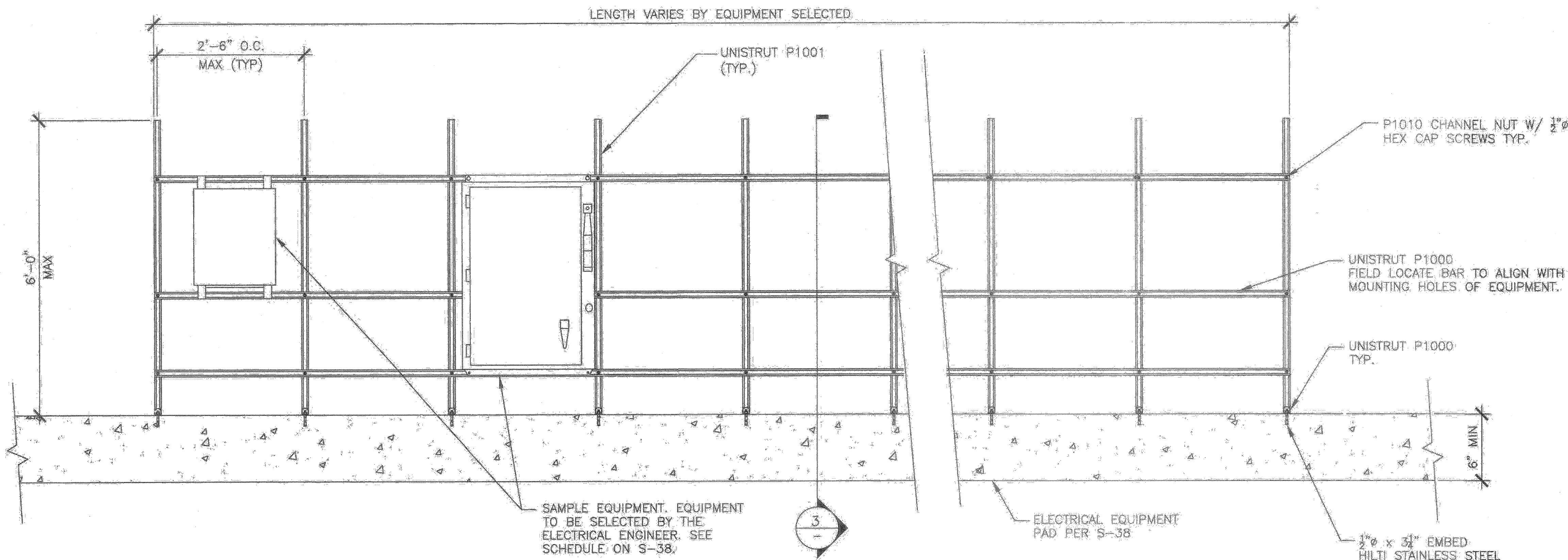
ASTEL ENGINEERING  
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FAX: (949) 388-3773

PHOTOVOLTAIC STRUCTURES EQUIPMENT PAD

DRAWN MAP  
CHECKED DKR  
DATE 6/25/14  
4STEL JOB NO. 13-1010  
SHEET

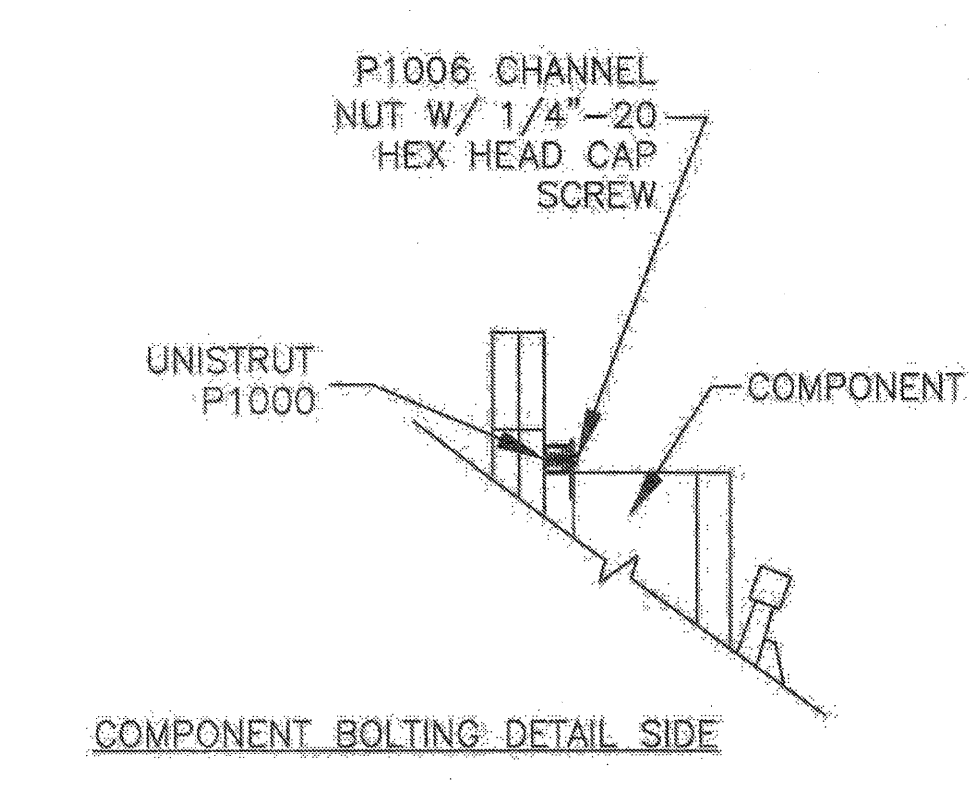
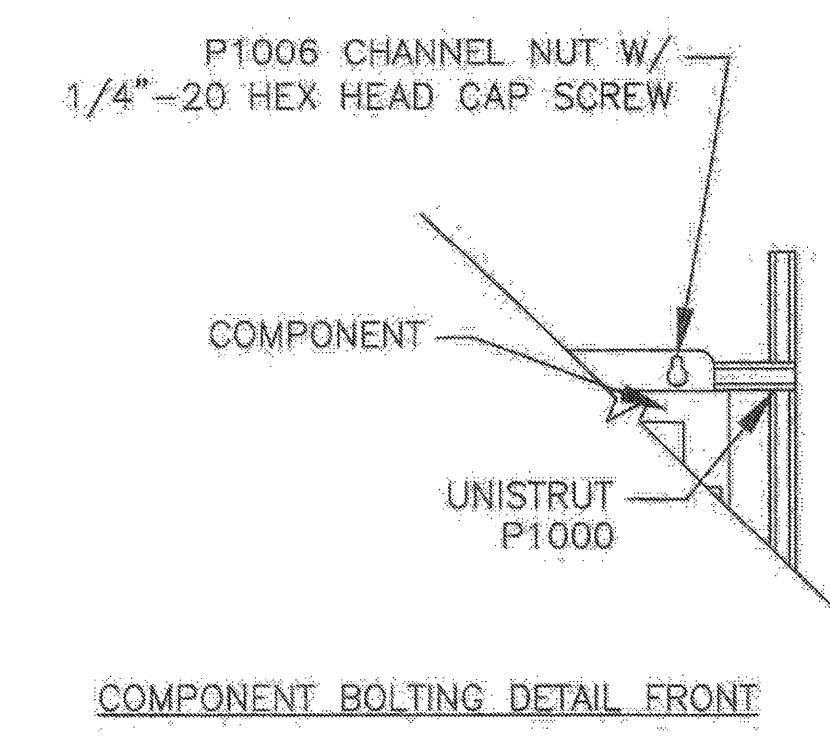
S-38

38 OF 45 SHEETS

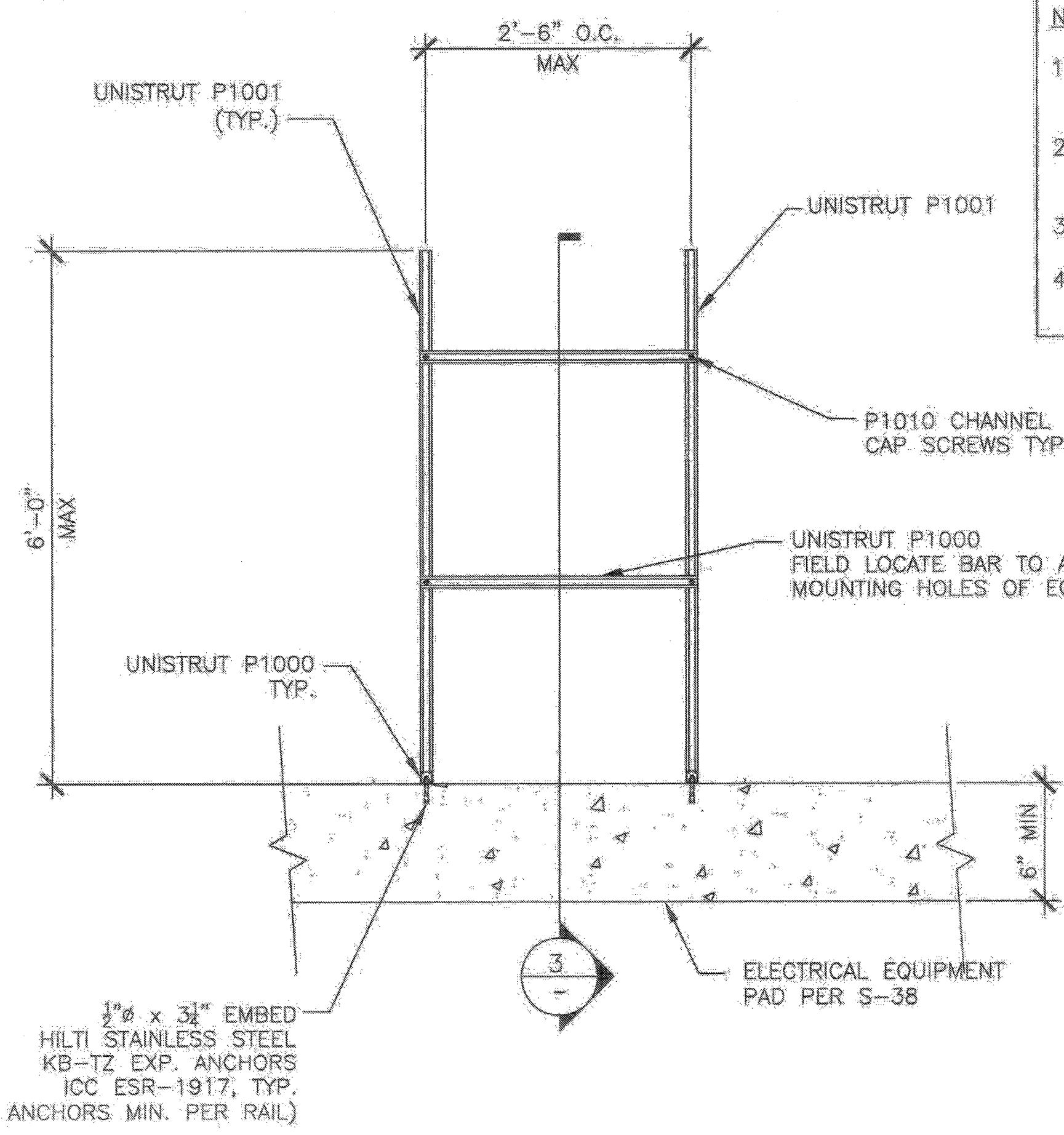


**1 MULTI-BAY FREESTANDING RACK 1**  
SCALE: 3/4" = 1'-0"

- NOTES:
- 1) ALL STEEL TO BE GALVANIZED OR PAINTED PER STEEL NOTE 12 ON S-3
  - 2) ALL STEEL TO MEET WITH STEEL NOTES PER S-3
  - 3) SEE DETAIL 4 FOR CONNECTIONS
  - 4) MAXIMUM EQUIPMENT WEIGHT PER BAY GIVEN IN SCHEDULE 1/S-38

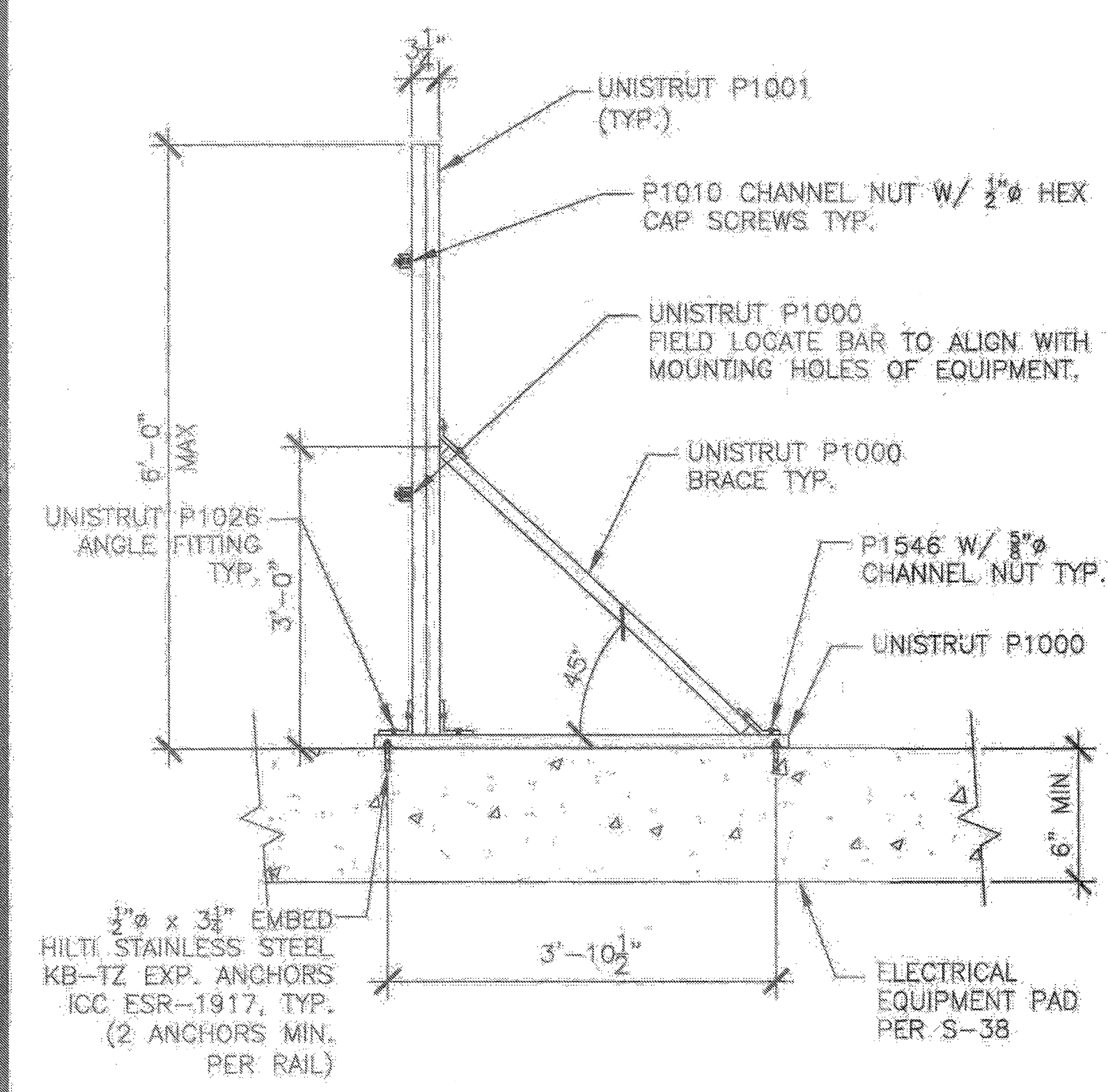


**4 RACK 1 CONNECTION DETAILS**  
SCALE: 1" = 1'-0"



**2 SINGLE BAY FREESTANDING RACK 1**  
SCALE: 3/4" = 1'-0"

- NOTES:
- 1) ALL STEEL TO BE GALVANIZED OR PAINTED PER STEEL NOTE 12 ON S-3
  - 2) ALL STEEL TO MEET WITH STEEL NOTES PER S-3
  - 3) SEE DETAIL 4 FOR CONNECTIONS
  - 4) MAXIMUM EQUIPMENT WEIGHT PER BAY GIVEN IN SCHEDULE 1/S-38



**3 DISCONNECT RACK 1 SIDE VIEW**  
SCALE: 3/4" = 1'-0"

ENGINEER'S APPROVAL

DATE SIGNED  
JUNE 25, 2014

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DIV. OF THE STATE ARCHITECT  
A03-117835  
AC FLS SS TR  
DATE JAN 17 2017  
SITE SPECIFIC  
DSA APPROVAL

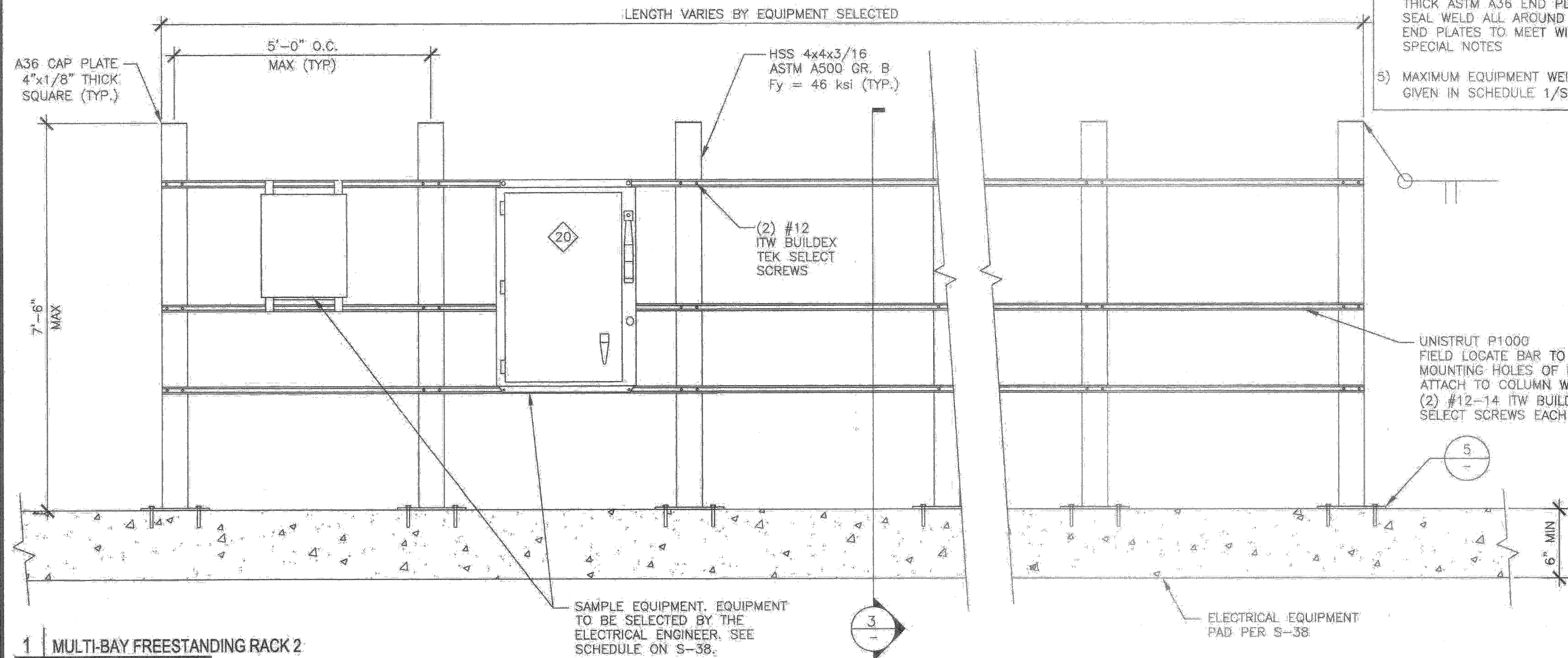
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OFFICE OF REGULATION SERVICES  
APPL. C. 04-113425  
AC FLS SS TR  
DATE JUN 25 2014

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**ASTEL ENGINEERING**  
STRUCTURAL ENGINEERING  
107 EAST ESCALONES  
SAN CLEMENTE, CA 92672  
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FAX: (949) 388-3773

PHOTOVOLTAIC  
STRUCTURES  
BRACED  
UNISTRUT  
EQUIPMENT  
RACK 1

DRAWN  
MAP  
CHECKED  
DKR  
DATE  
6/25/14  
ASTEL JOB NO.  
13-1010  
SHEET  
**S-39**

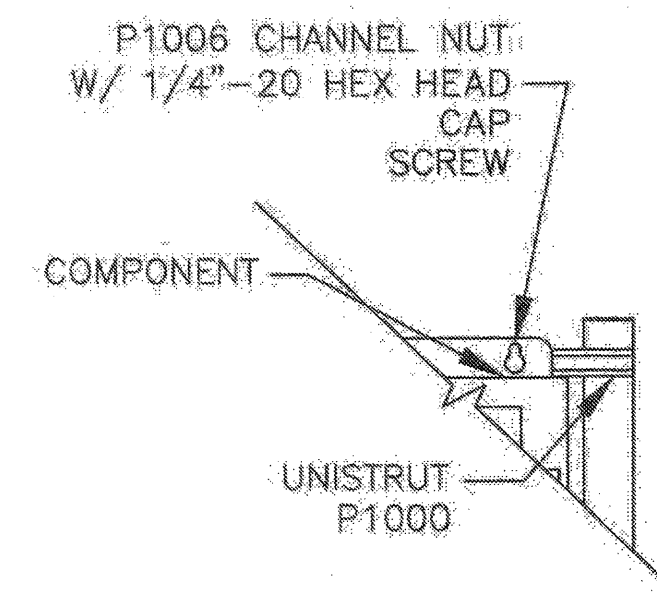


1 MULTI-BAY FREESTANDING RACK 2

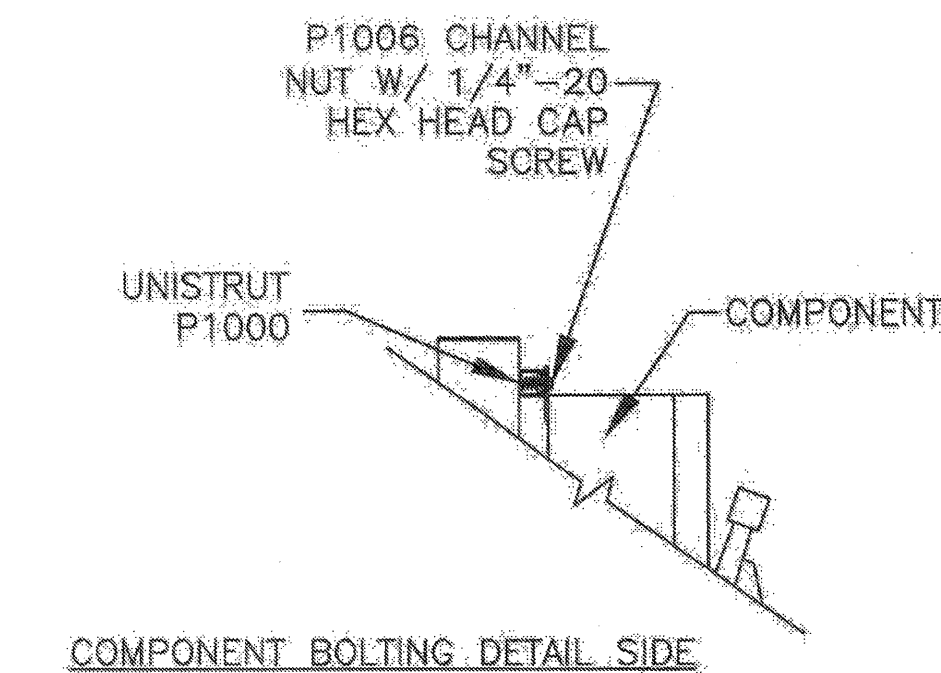
SCALE: 3/4" = 1'-0"

NOTES:

- 1) ALL STEEL TO BE GALVANIZED OR PAINTED PER STEEL NOTE 12 ON S-3
- 2) ALL STEEL TO MEET WITH STEEL NOTES PER S-3
- 3) SEE DETAIL (4) FOR CONNECTIONS.
- 4) ALL OPEN ENDS OF HSS STEEL TO BE PROVIDED WITH A MINIMUM 1/2" THICK ASTM A36 END PLATE WITH A SEAL WELD ALL AROUND ALL EDGES. END PLATES TO MEET WITH ALL OTHER SPECIAL NOTES
- 5) MAXIMUM EQUIPMENT WEIGHT PER BAY GIVEN IN SCHEDULE 1/S-38



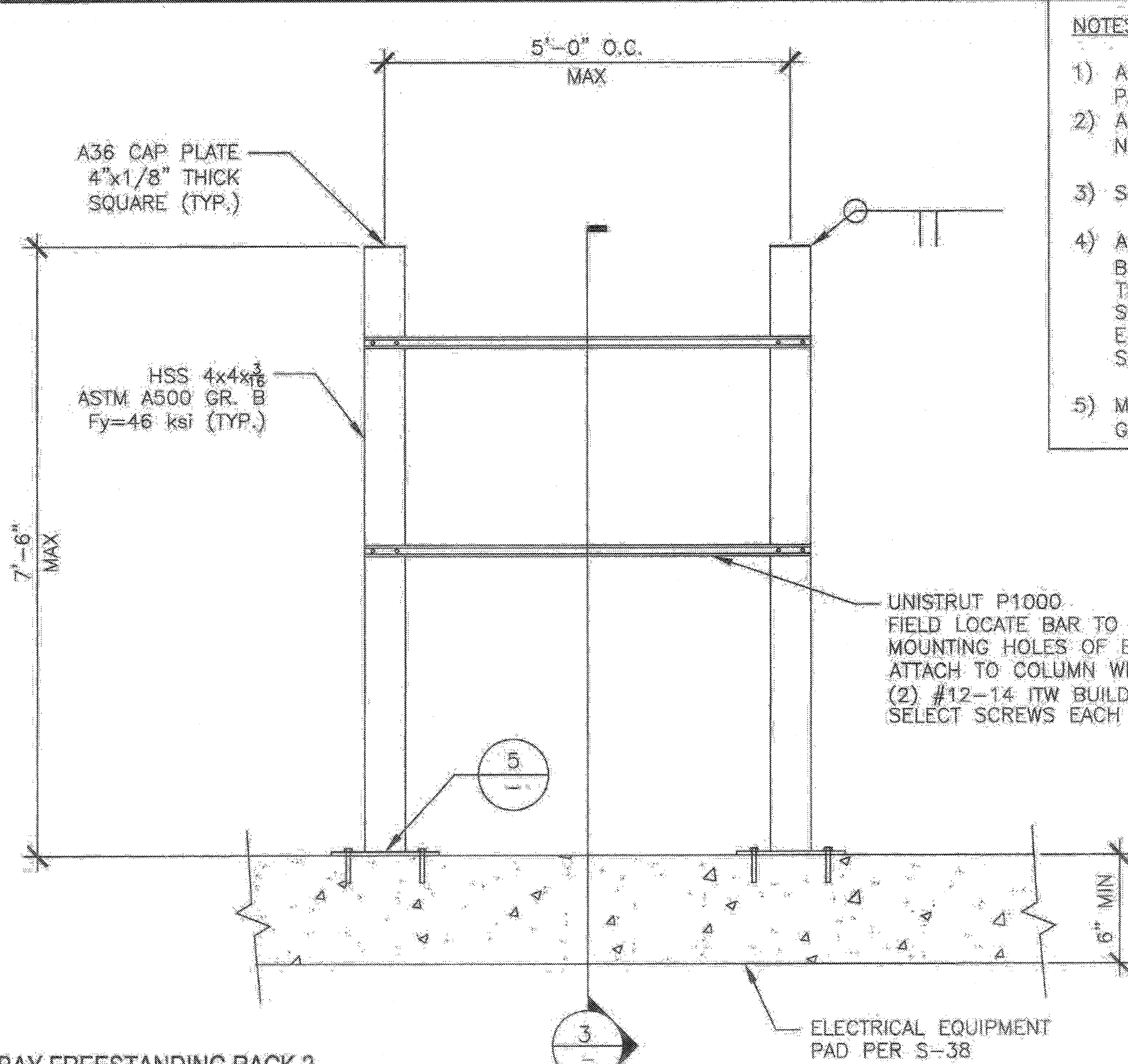
COMPONENT BOLTING DETAIL FRONT



COMPONENT BOLTING DETAIL SIDE

4 RACK 2 CONNECTION DETAILS

SCALE: 1" = 1'-0"

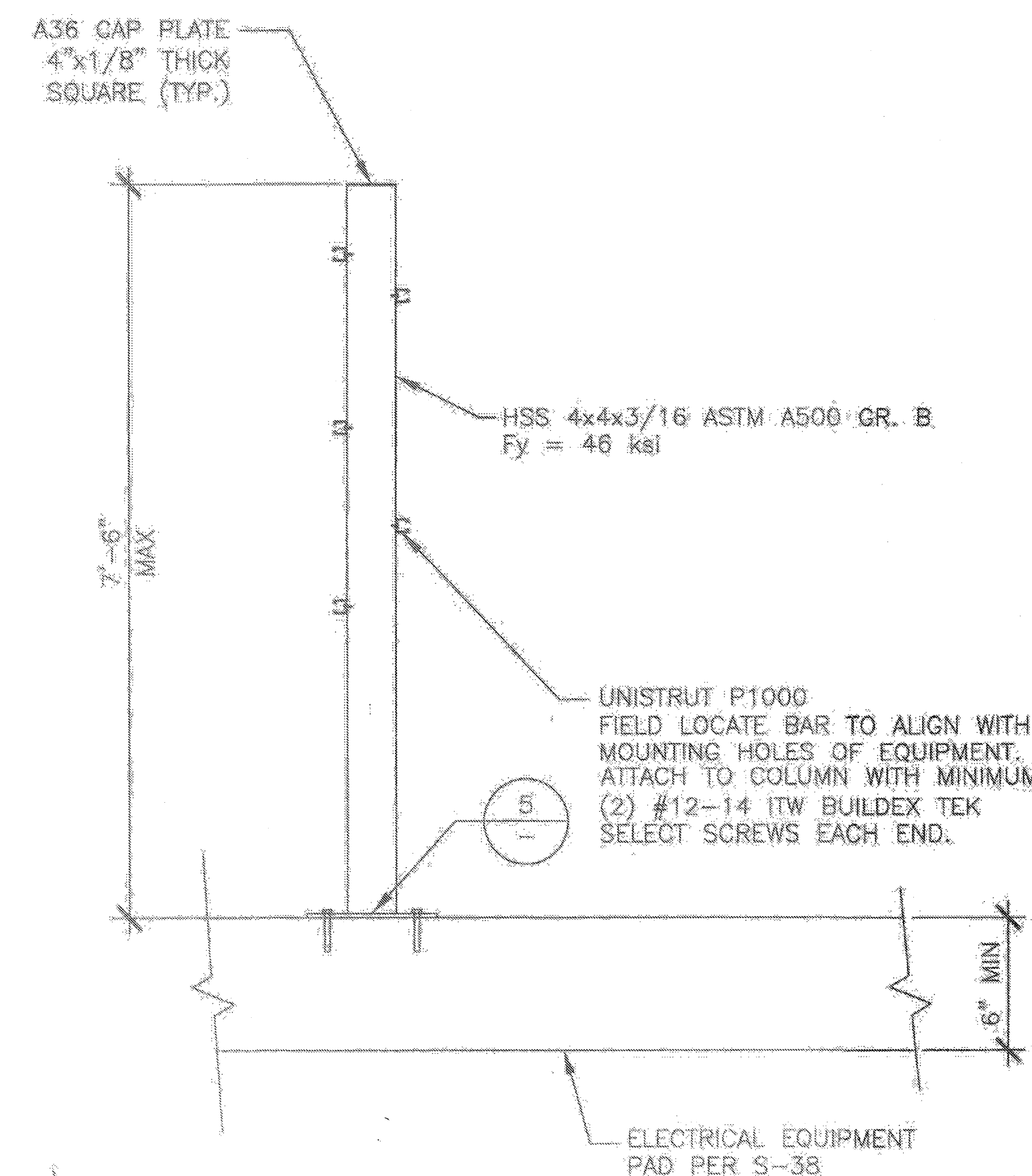


2 SINGLE BAY FREESTANDING RACK 2

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

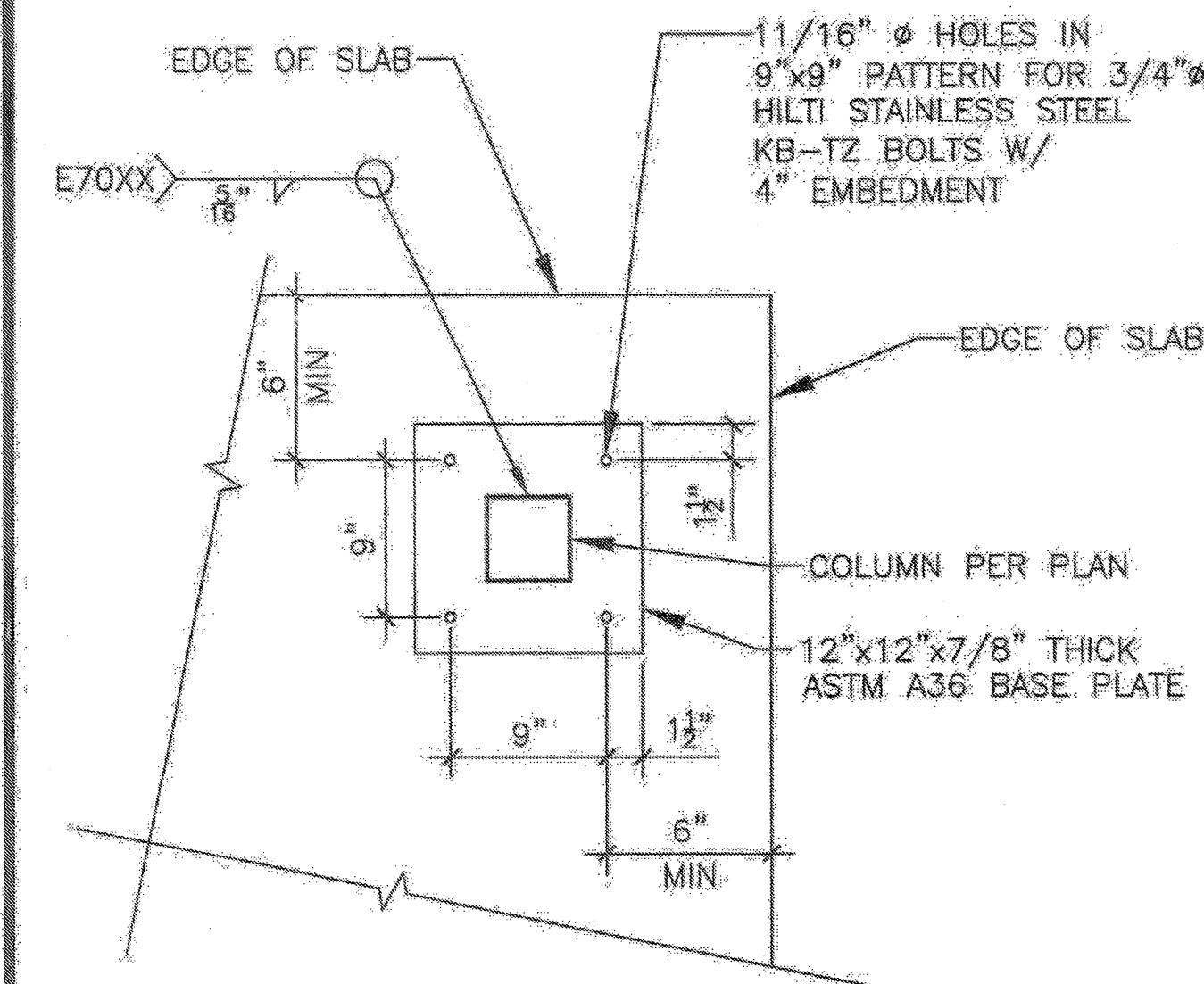
NOTES:

- 1) ALL STEEL TO BE GALVANIZED OR PAINTED PER STEEL NOTE 12 ON S-3
- 2) ALL STEEL TO MEET WITH STEEL NOTES PER S-3
- 3) SEE DETAIL (4) FOR CONNECTIONS.
- 4) ALL OPEN ENDS OF HSS STEEL TO BE PROVIDED WITH A MINIMUM 1/2" THICK ASTM A36 END PLATE WITH A SEAL WELD ALL AROUND ALL EDGES. END PLATES TO MEET WITH ALL OTHER SPECIAL NOTES
- 5) MAXIMUM EQUIPMENT WEIGHT PER BAY GIVEN IN SCHEDULE 1/S-38



3 DISCONNECT RACK 2 SIDE VIEW

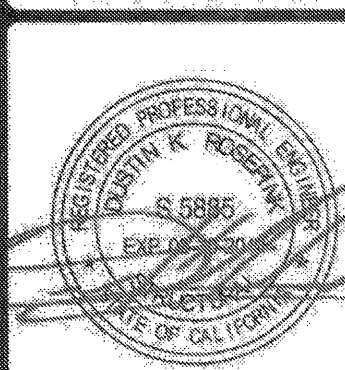
SCALE: 3/4" = 1'-0"



5 BASE PLATE

SCALE: 1" = 1'-0"

ENGINEER'S APPROVAL



DATE SIGNED  
JUNE 25, 2014

IDENTIFICATION STAMP  
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A03-117835

AC / FLS / SS / H  
DATE JAN 17 2017

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DSA APPROVAL

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DIV. OF THE STATE ARCHITECT  
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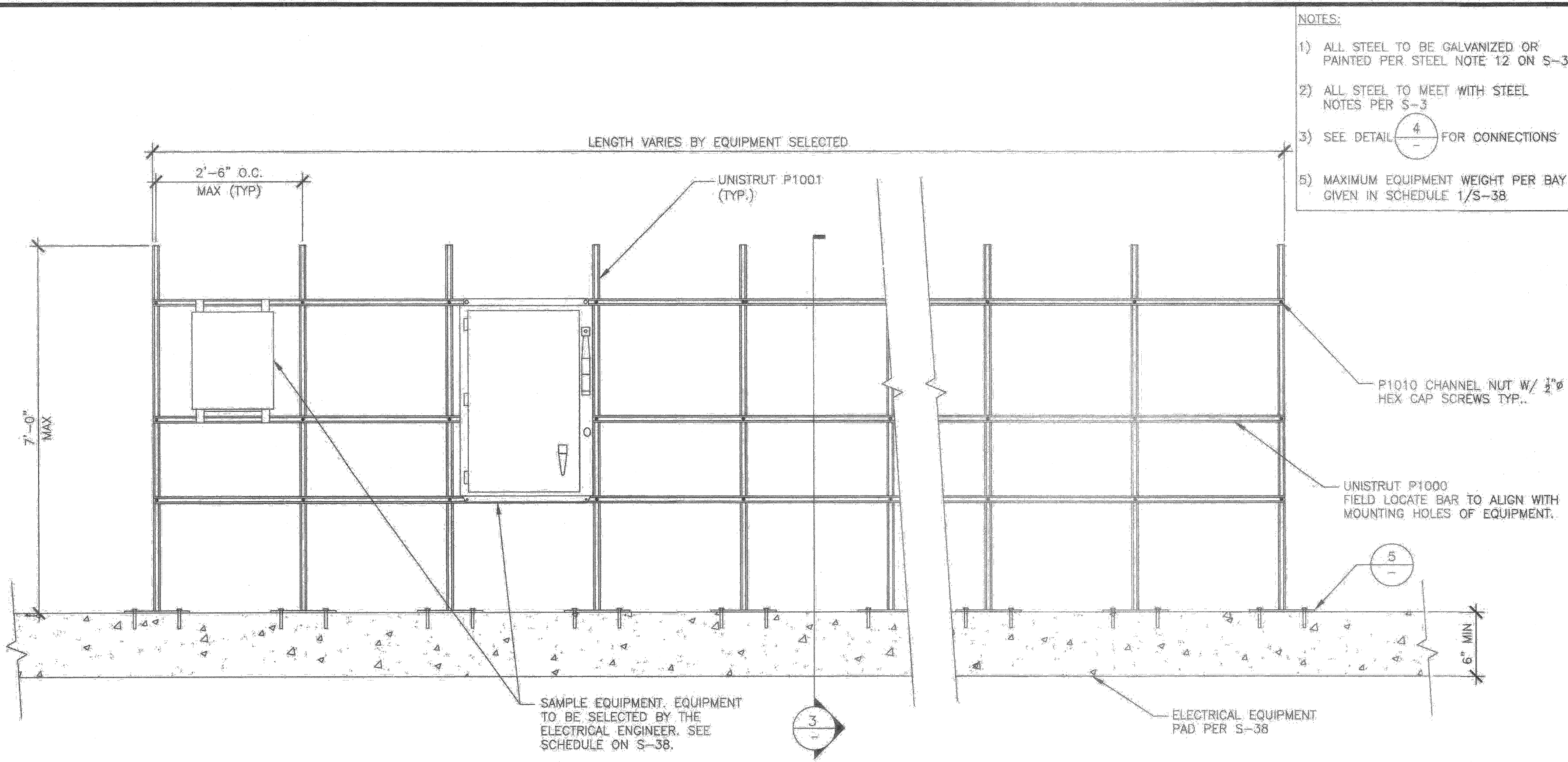
APPL. P. C. 04-113425  
AC / FLS / SS / H  
DATE JUN 25 2014

**MBARC CONSTRUCTION INC.**  
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SAN MARCOS, CA 92069  
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LIC # 869980  
B AND C51

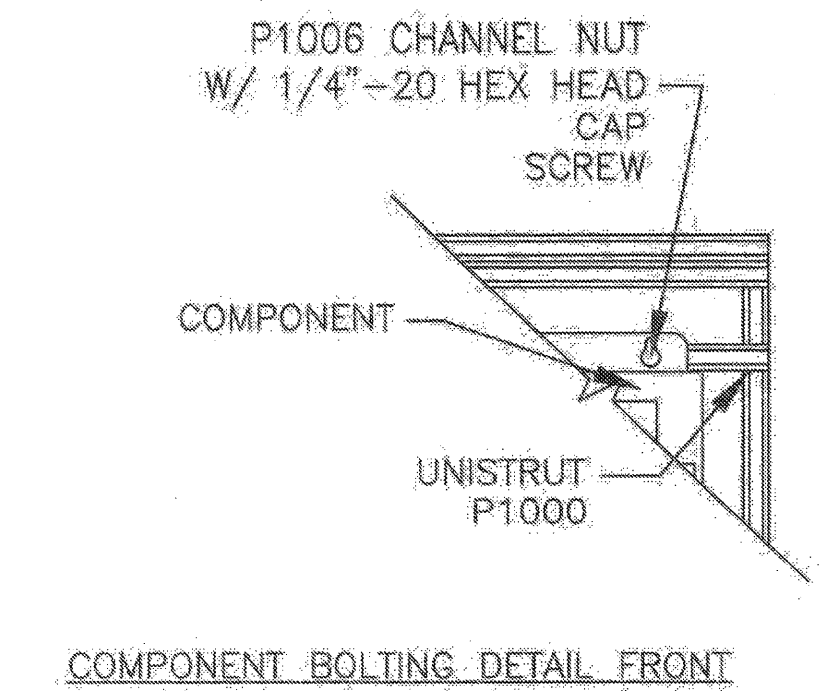
**STEL ENGINEERING**  
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109 EAST ESCALONES  
SAN CLEMENTE, CA 92672  
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FAX: (949) 388-3773

PHOTOVOLTAIC  
STRUCTURES  
TUBE STEEL  
EQUIPMENT  
RACK 2

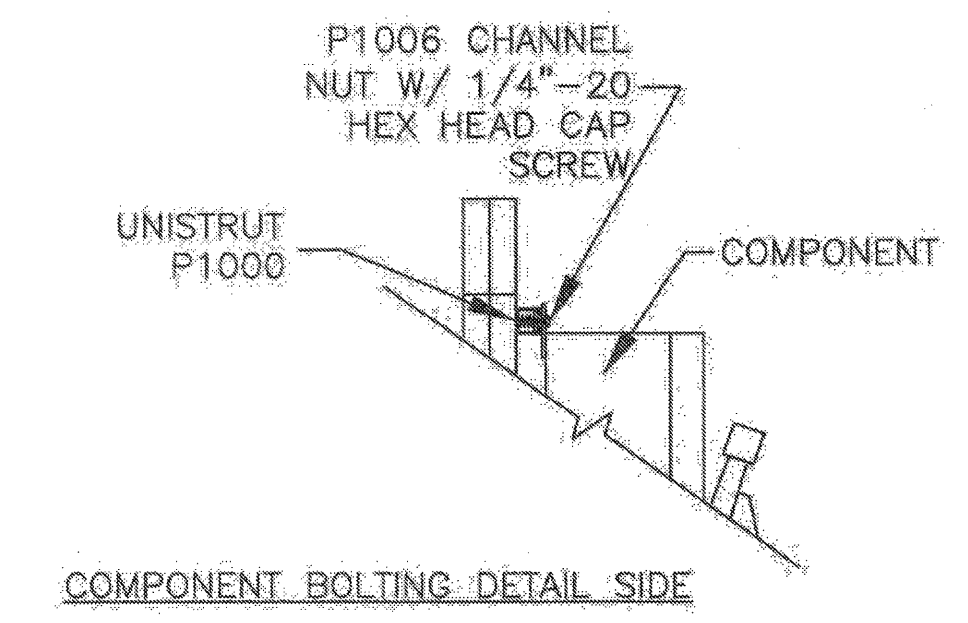
DRAWN  
MAP  
CHECKED  
DKR  
DATE  
6/25/14  
4STEL JOB NO.  
13-1010  
SHEET  
**S-40**



- NOTES:
- 1) ALL STEEL TO BE GALVANIZED OR PAINTED PER STEEL NOTE 12 ON S-3
  - 2) ALL STEEL TO MEET WITH STEEL NOTES PER S-3
  - 3) SEE DETAIL (4) FOR CONNECTIONS
  - 4) SEE DETAIL (4) FOR CONNECTIONS
  - 5) MAXIMUM EQUIPMENT WEIGHT PER BAY GIVEN IN SCHEDULE 1/S-38.



COMPONENT BOLTING DETAIL FRONT



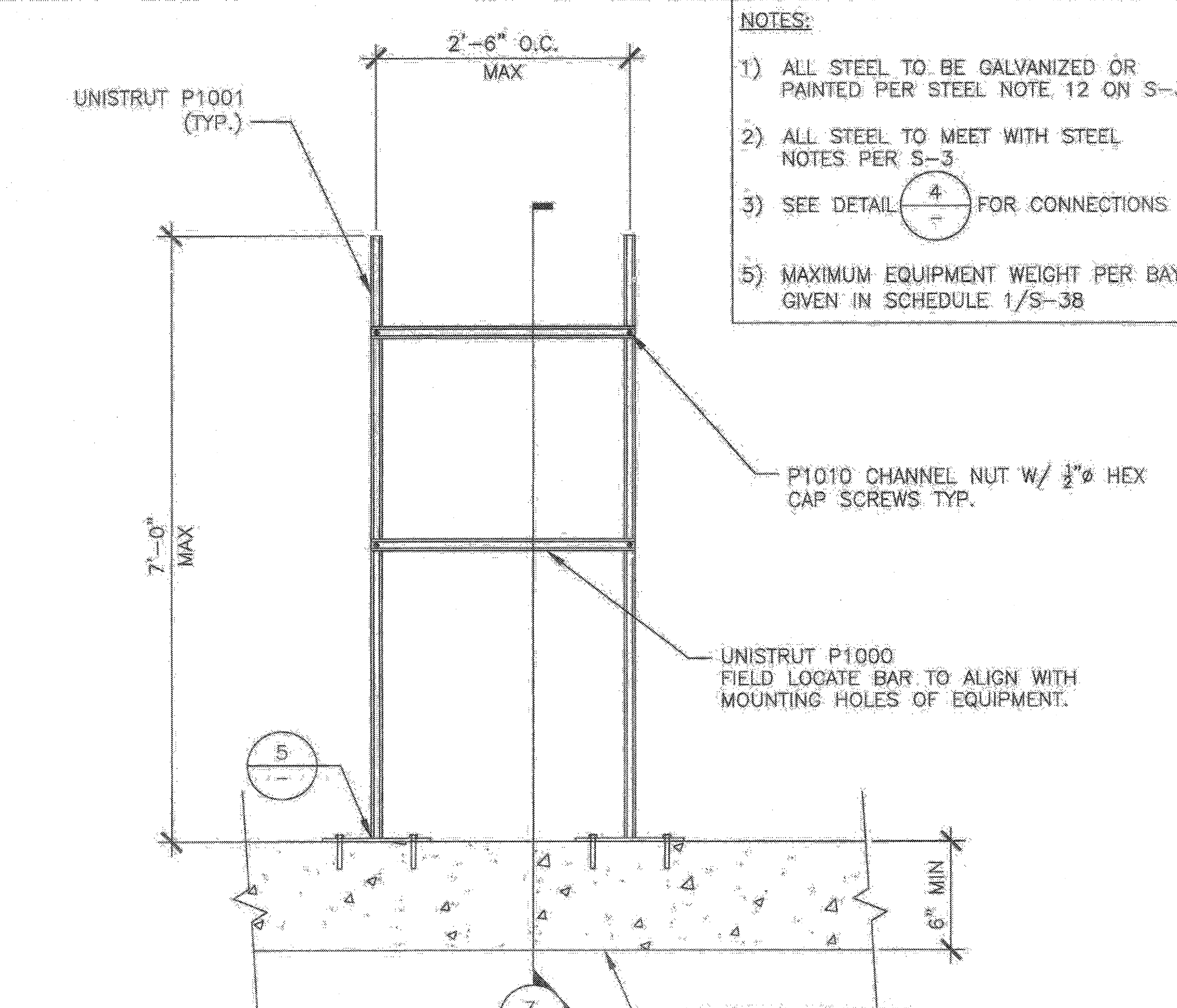
COMPONENT BOLTING DETAIL SIDE

1 MULTI-BAY FREESTANDING RACK 3

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

4 RACK 3 CONNECTION DETAILS

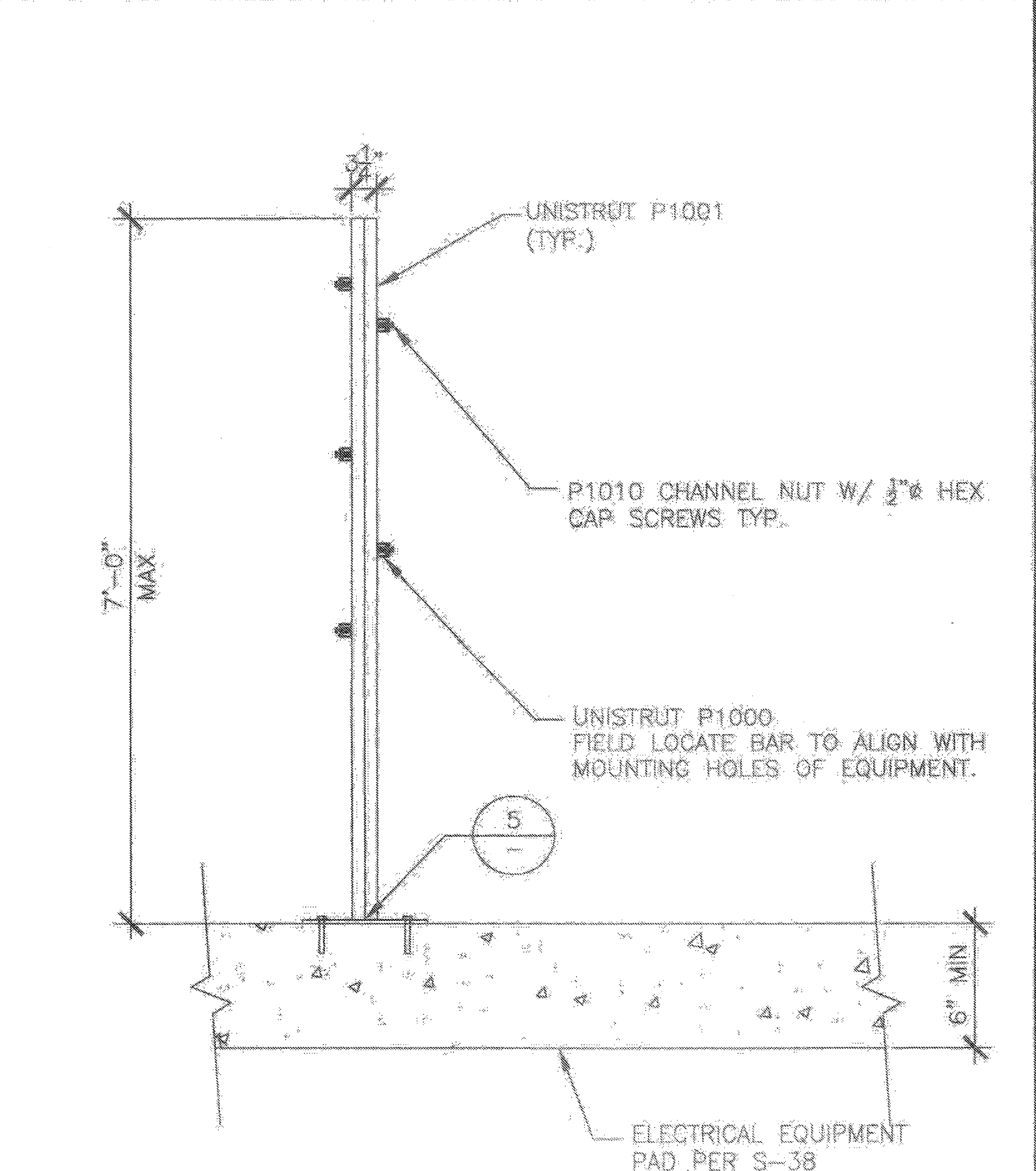
SCALE: 1" = 1'-0"



- NOTES:
- 1) ALL STEEL TO BE GALVANIZED OR PAINTED PER STEEL NOTE 12 ON S-3
  - 2) ALL STEEL TO MEET WITH STEEL NOTES PER S-3
  - 3) SEE DETAIL (4) FOR CONNECTIONS
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  - 5) MAXIMUM EQUIPMENT WEIGHT PER BAY GIVEN IN SCHEDULE 1/S-38

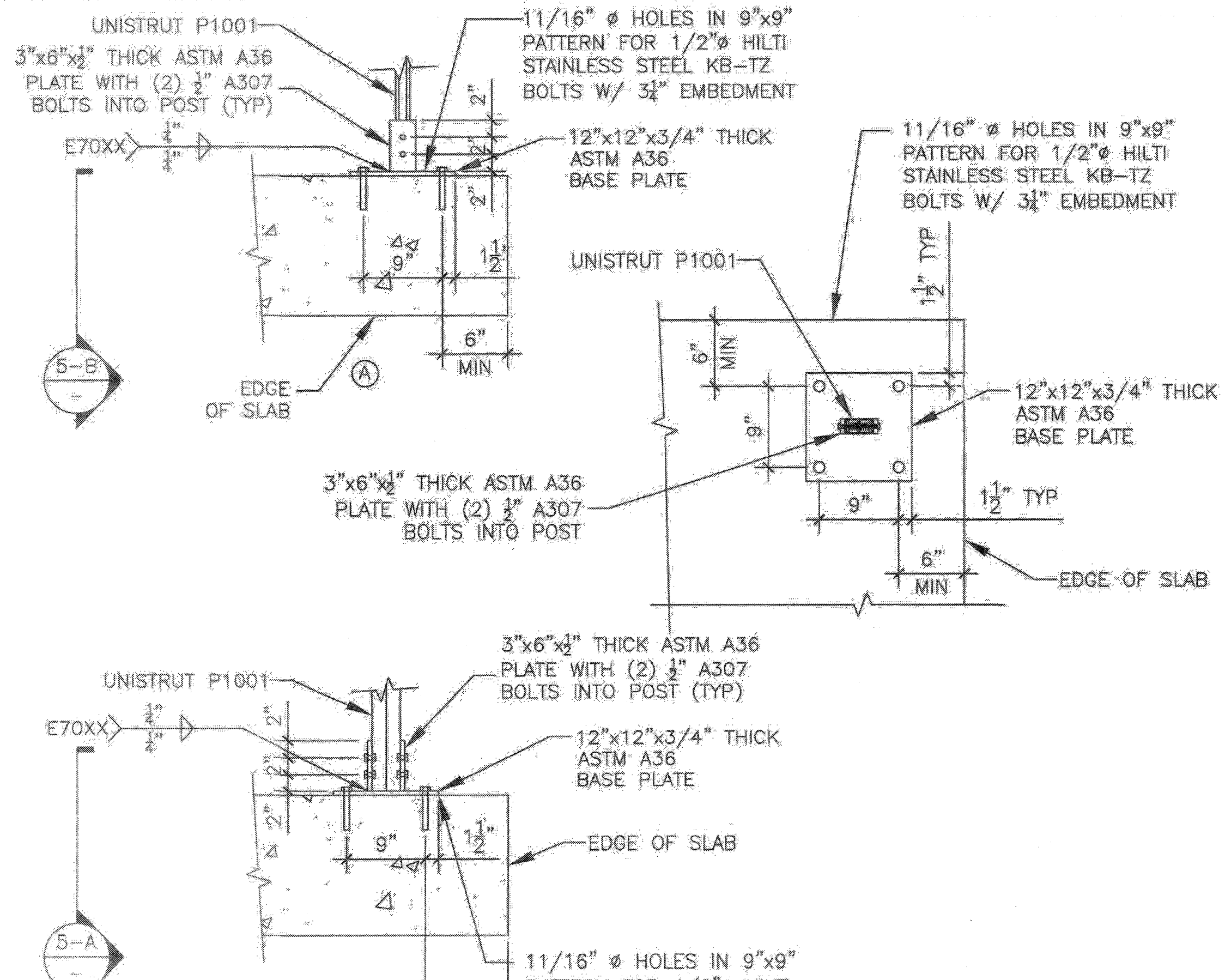
2 SINGLE BAY FREESTANDING RACK 3

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



3 DISCONNECT RACK 3 SIDE VIEW

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



5 BASE PLATE

SCALE: 1" = 1'-0"

ENGINEER'S APPROVAL

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APPL. C. 04-113425

AC: FLS/ SS/TN  
DATE: JUN 25 2014

MBARC CONSTRUCTION INC.

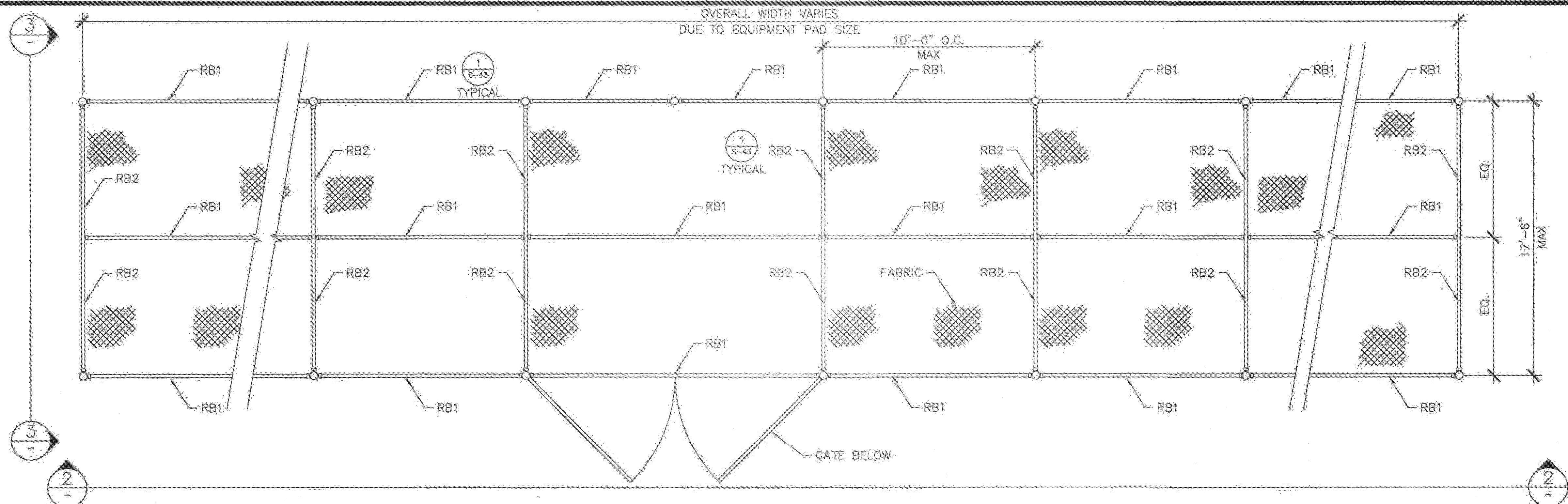
674 RANCHEROS DR. PHONE: (760) 744-4131 LIC. # 869960  
SAN MARCOS, CA FAX: (760) 744-4449 B AND C51

ASTEL ENGINEERING STRUCTURAL ENGINEERING

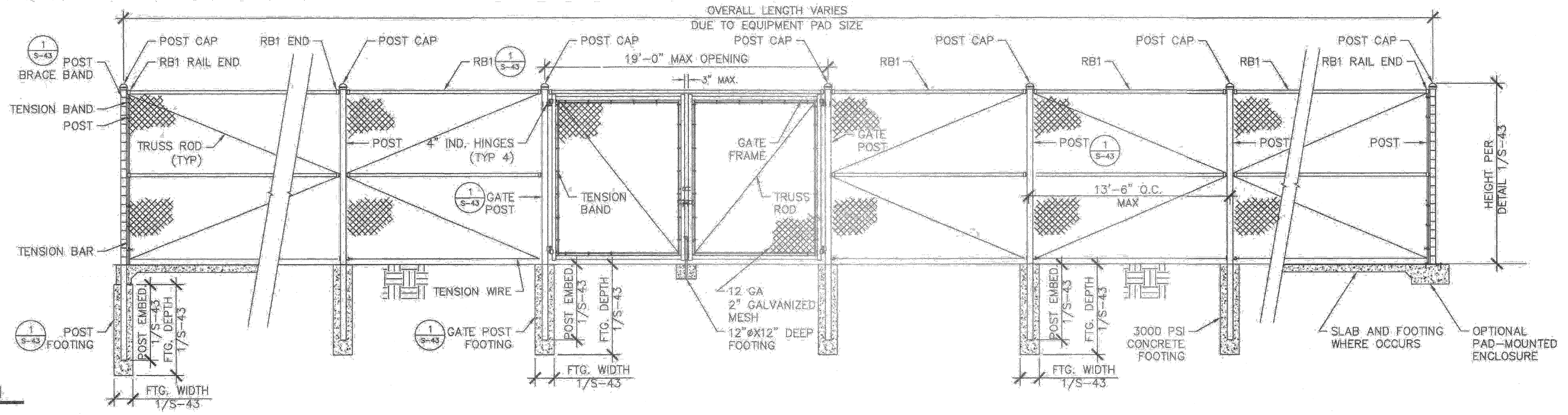
109 EAST ESCALONES SAN CLEMENTE, CA 92672 PHONE: (949) 388-9333 FAX: (949) 388-3773

PHOTOVOLTAIC STRUCTURES UNISTRUT EQUIPMENT RACK 3

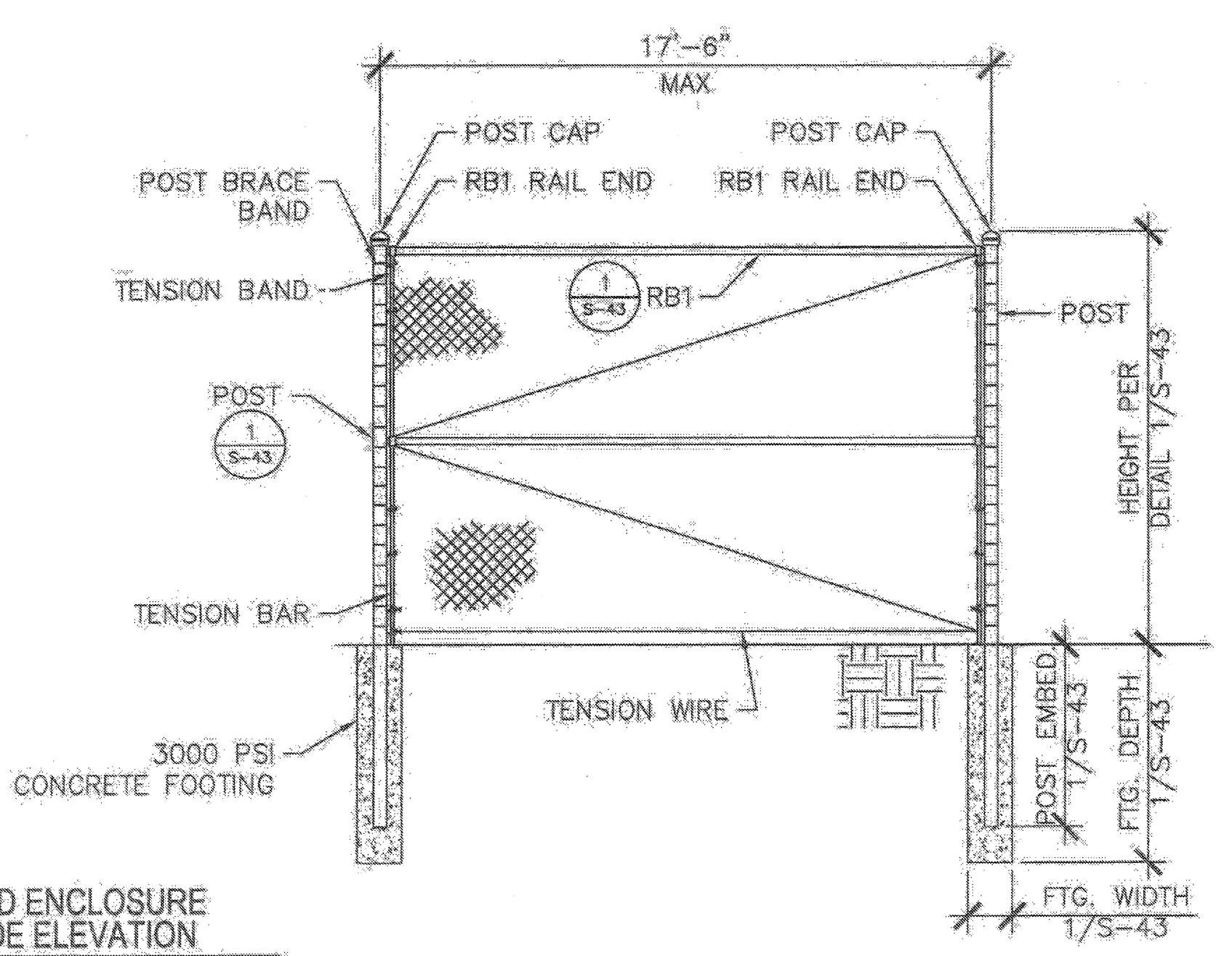
DRAWN MAP  
CHECKED DKR  
DATE 6/25/14  
4STEL JOB NO. 13-1010  
SHEET S-41  
41 OF 45 SHEETS



1 PAD ENCLOSURE TOP VIEW  
SCALE: 1/4" = 1'-0"



2 PAD ENCLOSURE FRONT ELEVATION  
SCALE: 1/4" = 1'-0"



3 PAD ENCLOSURE SIDE ELEVATION  
SCALE: 1/4" = 1'-0"

- NOTES:**
1. ALL FENCE COMPONENTS TO BE GALVANIZED.
  2. PROVIDE FLEXIBLE BONDING JUMPER BETWEEN GATE POST AND FENCE POST.
  3. PROVIDE PROPER CLAMP TO BOND FENCE TO THE GROUNDING SYSTEM.
  4. SEE SITE SPECIFIC ELECTRICAL DRAWINGS FOR GROUNDING SPECIFICATIONS.

**EQUIPMENT PAD ENCLOSURE SPECIFICATIONS:**

**FABRIC:** 2" GALVANIZED 11 GA STD ALTERNATES PERMITTED PROVIDED SUBMITTAL SHOW % OF AIR FLOW BLOCKAGE VISUAL/WIND BARRIER - PROVIDE SUBMITTAL TO SHOW % OF AIR FLOW BLOCK.

**BARRIER:** ASTM A53, GRADE B,  $F_y=30$  KSI

**TOP RAIL:** ASTM A53, GRADE B,  $F_y=30$  KSI. SEE DETAIL 1/S-43 FOR FOOTING SIZE.

**LINE POST:** ASTM A53, GRADE B,  $F_y=30$  KSI.

**TERMINAL POST:** SEE DETAIL 1/S-43 FOR FOOTING SIZE.

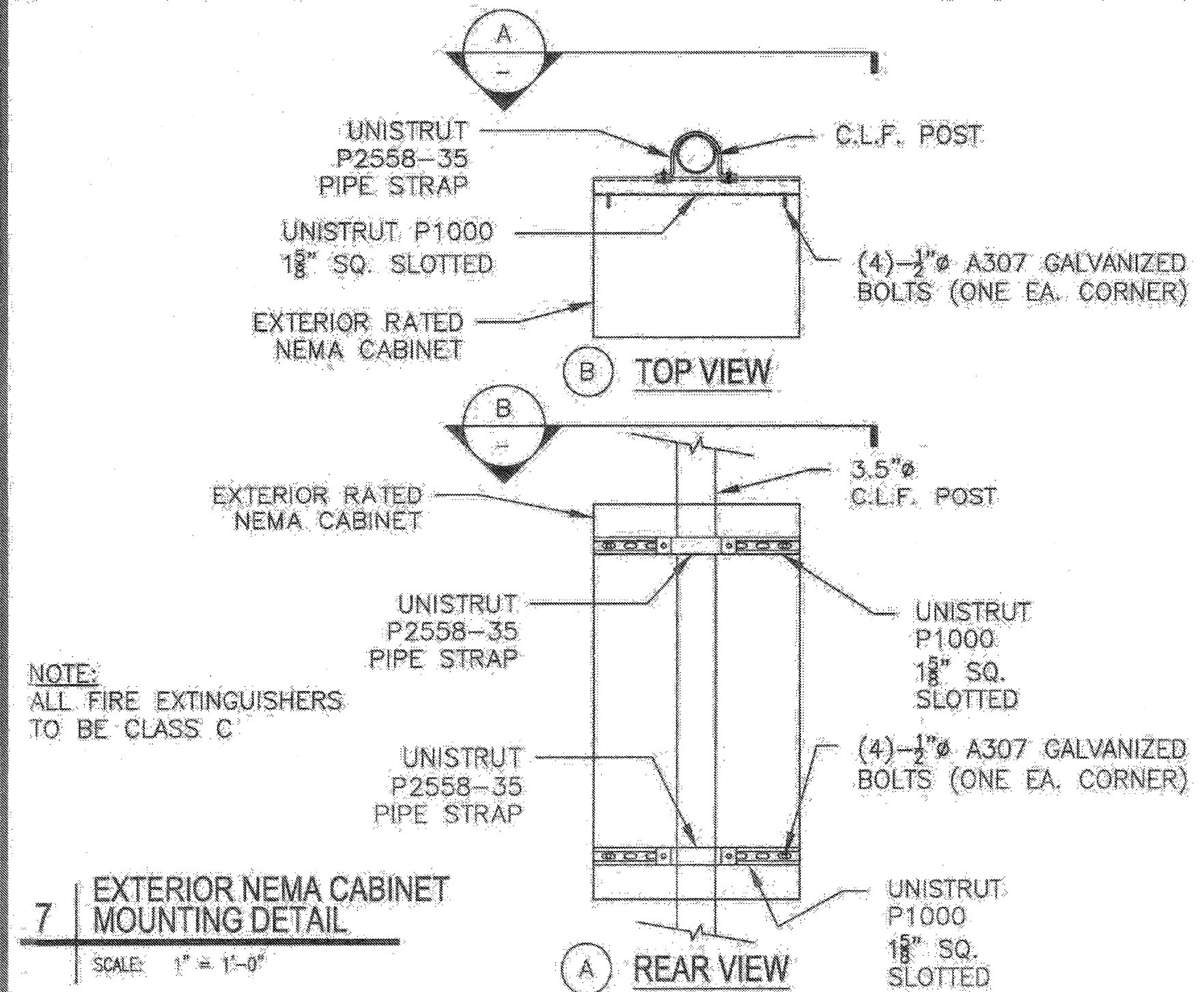
**GATE:** FRAMEWORK TO BE 1 1/4" STANDARD STEEL PIPE, ASTM A53, GRADE B,  $F_y=30$  KSI

**GATE POSTS:** ASTM A53, GRADE B,  $F_y=30$  KSI SEE DETAIL FOR FOOTING SIZE.

**TOP BEAMS:** ASTM A53, GRADE B,  $F_y=30$  KSI

**TOP BRACING:** ASTM A53, GRADE B,  $F_y=30$  KSI

4 NOTES  
SCALE: N/A



7 EXTERIOR NEMA CABINET MOUNTING DETAIL  
SCALE: 1" = 1'-0"

ENGINEER'S APPROVAL

DATE SIGNED  
JUNE 25, 2014

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
A03-117835  
AC FLS SS  
DATE JAN 17 2017  
SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES  
APPL. C-14-113425  
AC FLS SS  
DATE JUN 25 2014

**MBARC CONSTRUCTION INC.**  
LIC # 849960  
B AND C51  
74 RANCHEROS DR  
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FAX: (949) 388-3773  
100 EAST ESCALONES  
SAN CLEMENTE, CA 92672

PHOTOVOLTAIC STRUCTURES EQUIPMENT PAD ENCLOSURE

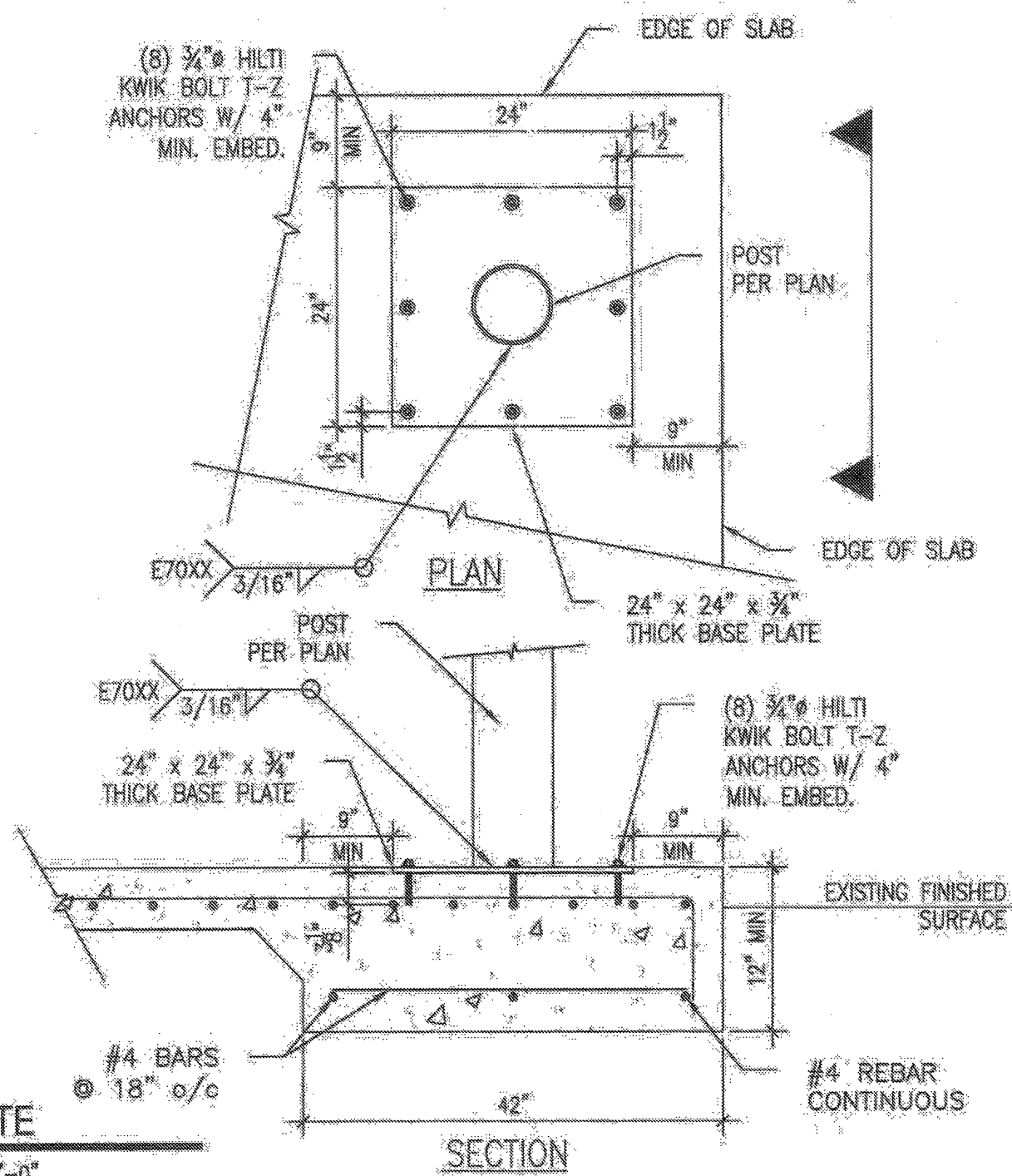
DRAWN MAP  
CHECKED DKR  
DATE 6/25/14  
ASTEL JOB NO. 13-1010  
SHEET  
**S-42**  
42 OF 45 SHEETS

% SOLID <sup>3</sup>	HEIGHT	RB1	RB2	POST	BASE PLATE/ FOOTING CONNECTION	PIER FOOTING DEPTH	PIER FOOTING DIAMETER	PIER EMBEDMENT INTO FOOTING	GATE POST	BASE PLATE/ FOOTING CONNECTION	GATE PIER FOOTING DEPTH	GATE PIER FOOTING DIAMETER	GATE PIER EMBEDMENT INTO FOOTING
100%	8'-0"	3 1/2" φ	5" φ	5" φ	(4) -	7'-3"	24"	6'-9"	6" φ	(2) -	8'-0"	24"	7'-6"
50%	8'-0"	3" φ	3 1/2" φ	3 1/2" φ	(5) -	6'-0"	18"	5'-6"	5" φ	(5) -	7'-0"	18"	6'-6"
15%	8'-0"	2" φ	2 1/2" φ	2 1/2" φ	(5) -	4'-6"	12"	4'-0"	2 1/2" φ	(5) -	5'-3"	12"	4'-9"
100%	10'-0"	3 1/2" φ	5" φ	6" φ	(2) -	8'-3"	24"	7'-9"	8" φ	(2) -	9'-3"	24"	8'-9"
50%	10'-0"	3" φ	3 1/2" φ	5" φ	(5) -	7'-0"	18"	6'-6"	5" φ	(2) -	8'-0"	18"	7'-6"
15%	10'-0"	2" φ	2 1/2" φ	3" φ	(5) -	5'-3"	12"	4'-9"	3" φ	(5) -	6'-0"	12"	5'-6"
100%	12'-0"	3 1/2" φ	5" φ	8" φ	(2) -	9'-0"	24"	8'-6"	8" φ	N/A	10'-3"	24"	9'-9"
50%	12'-0"	3" φ	3 1/2" φ	5" φ	(3) -	7'-9"	18"	7'-3"	6" φ	(2) -	8'-9"	18"	8'-3"
15%	12'-0"	2" φ	2 1/2" φ	3" φ	(5) -	5'-9"	12"	5'-3"	3 1/2" φ	(5) -	6'-6"	12"	6'-0"

1. READ FROM ONE LINE ONLY.
2. MAY USE EITHER BASE PLATE TO CONTINUOUS FOOTING OR PIER FOOTING OPTIONS.
3. EXAMPLE OF % SOLID FENCING MATERIAL:  
15%: CHAIN-LINK ONLY  
50%: CHAIN-LINK WITH MESH  
100%: CHAIN-LINK WITH SLATS

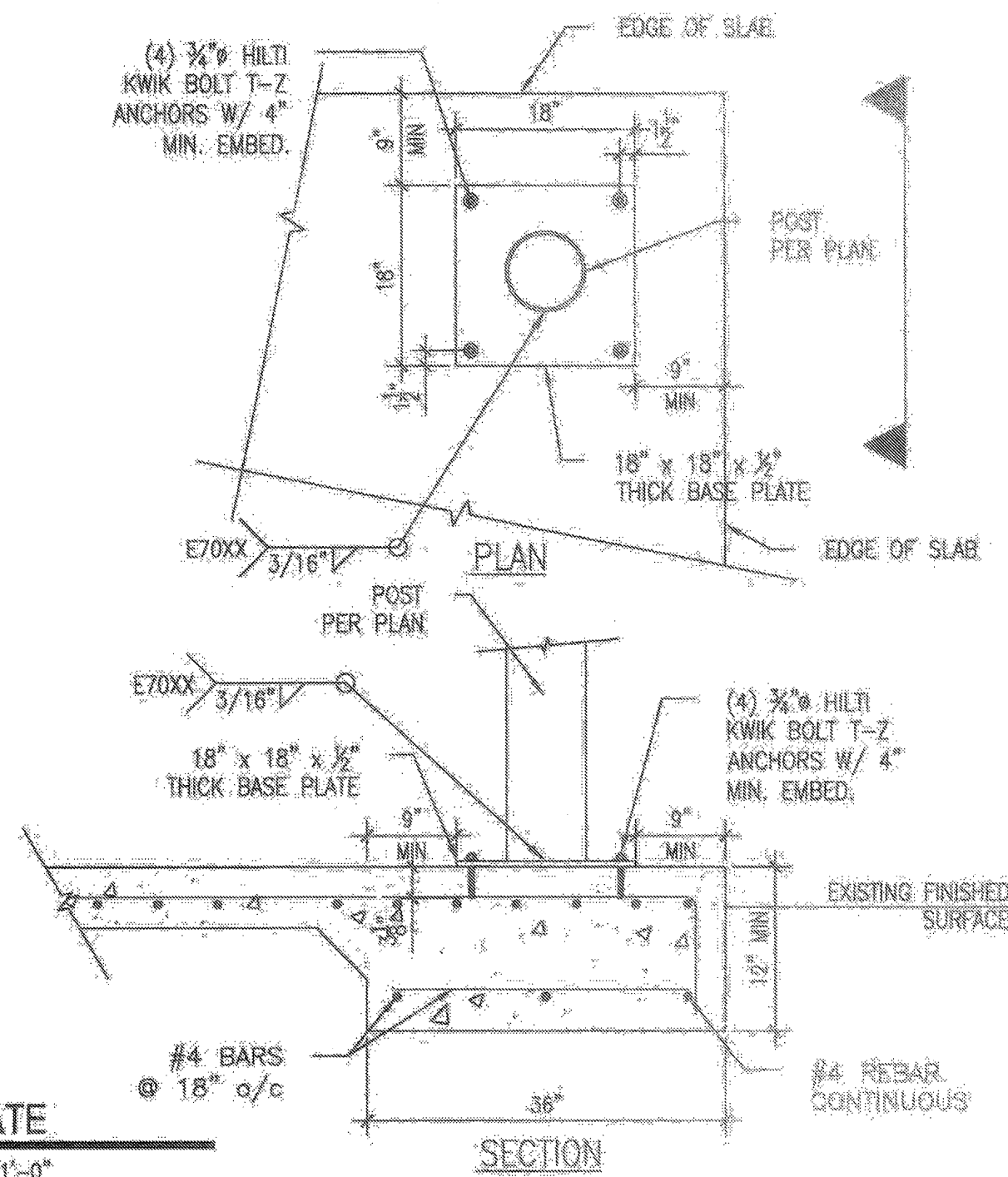
### 1 PAD ENCLOSURE SCHEDULE

SCALE: N/A



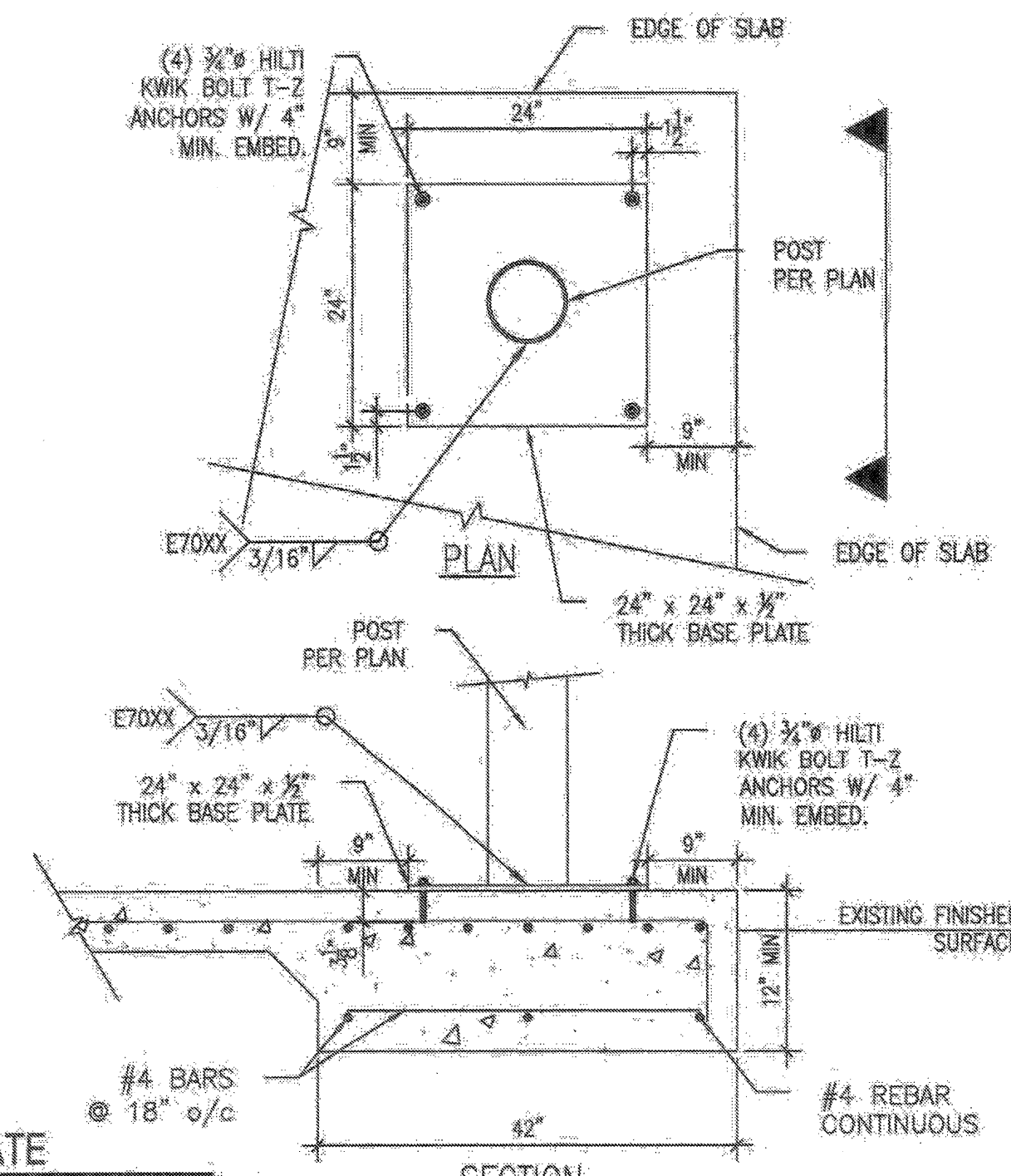
### 2 BASE PLATE

SCALE: 1" = 1'-0"



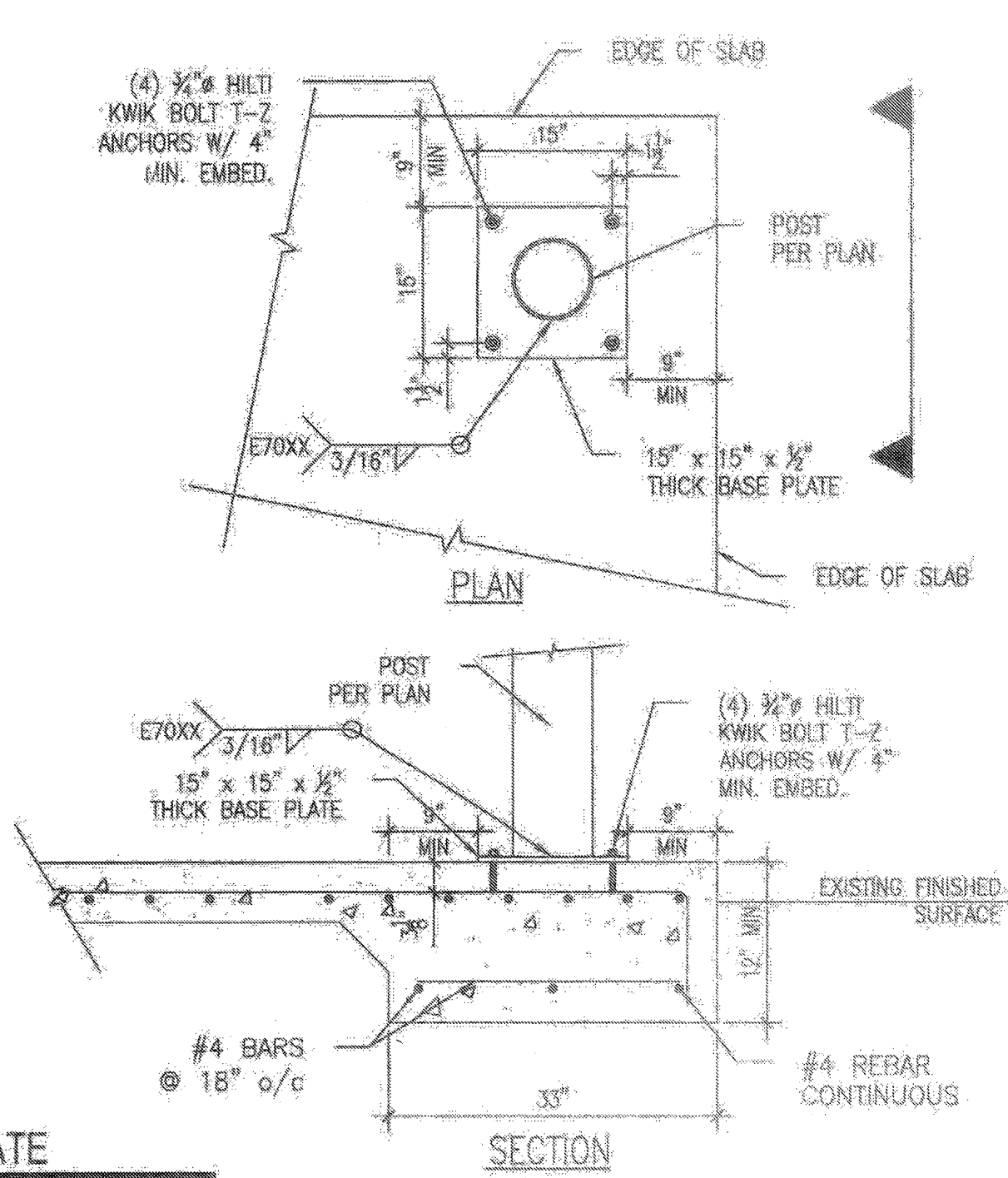
### 4 BASE PLATE

SCALE: 1" = 1'-0"



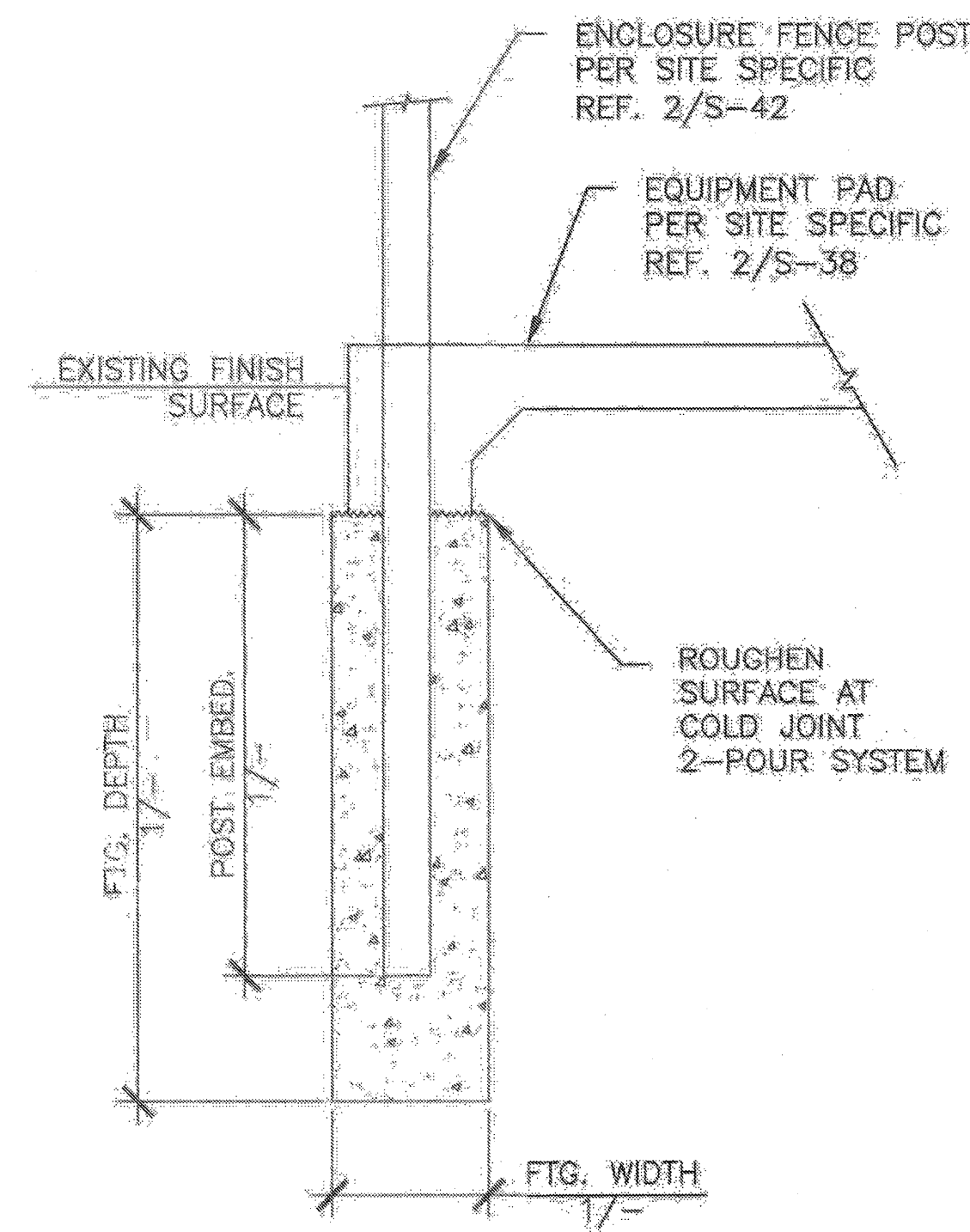
### 3 BASE PLATE

SCALE: 1" = 1'-0"



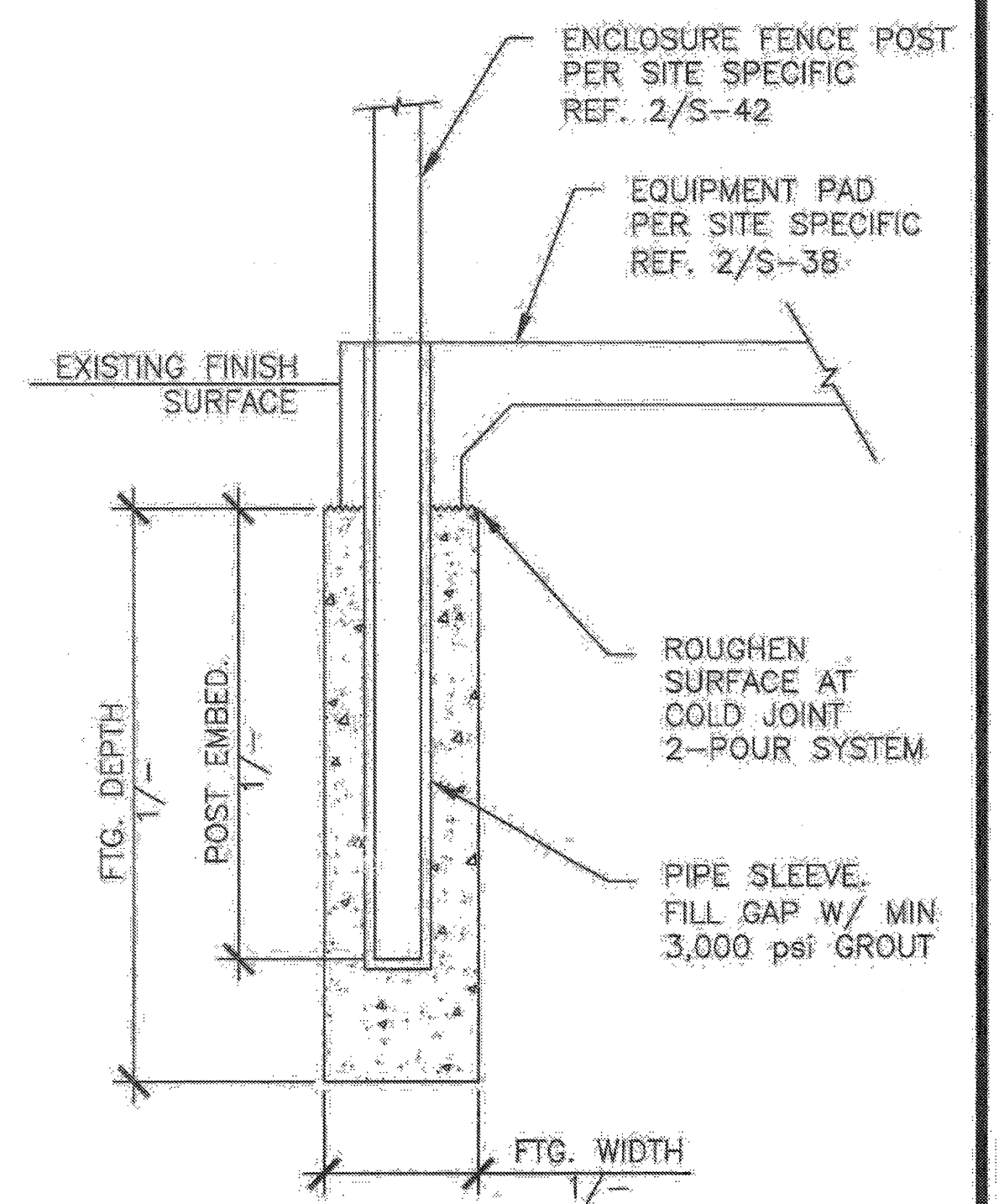
### 5 BASE PLATE

SCALE: 1" = 1'-0"



### 6 PIER FOOTING

SCALE: 1" = 1'-0"

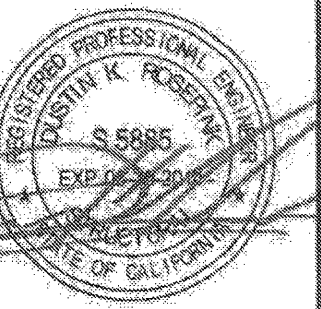


### 7 ALTERNATE PIER FOOTING

SCALE: 1" = 1'-0"

- NOTES:
1. SEE DETAIL 7/- FOR ALTERNATE CONSTRUCTION METHOD.

ENGINEER'S APPROVAL



DATE SIGNED  
JUNE 25, 2014

IDENTIFICATION STAMP  
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A03-117835

AC  FLS  SS  TH  
DATE JAN 17 2017

SITE SPECIFIC  
DSA APPROVAL

IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES

APPL.P. 04-113425

AC  FLS  SS  TH  
DATE JUN 25 2014

**MARC CONSTRUCTION INC.**  
674 RANCHEROS DR  
SAN MARCOS, CA 92069  
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FAX: (760) 744-4449  
LIC # 849940  
B AND CSI

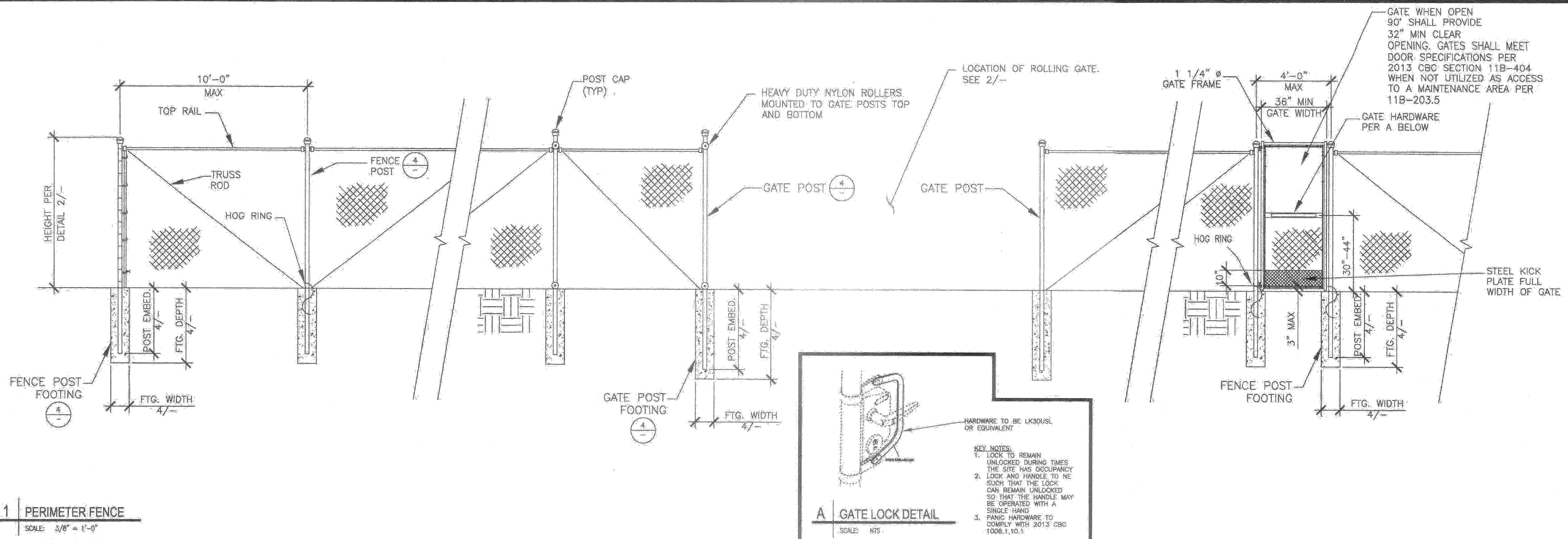
**ASTEL ENGINEERING**  
STRUCTURAL ENGINEERING  
109 EAST ESCALONES  
SAN CLEMENTE, CA 92672  
PHONE: (949) 386-9333  
FAX: (949) 386-3773

PHOTOVOLTAIC  
STRUCTURES  
EQUIPMENT PAD  
ENCLOSURE  
SCHEDULE

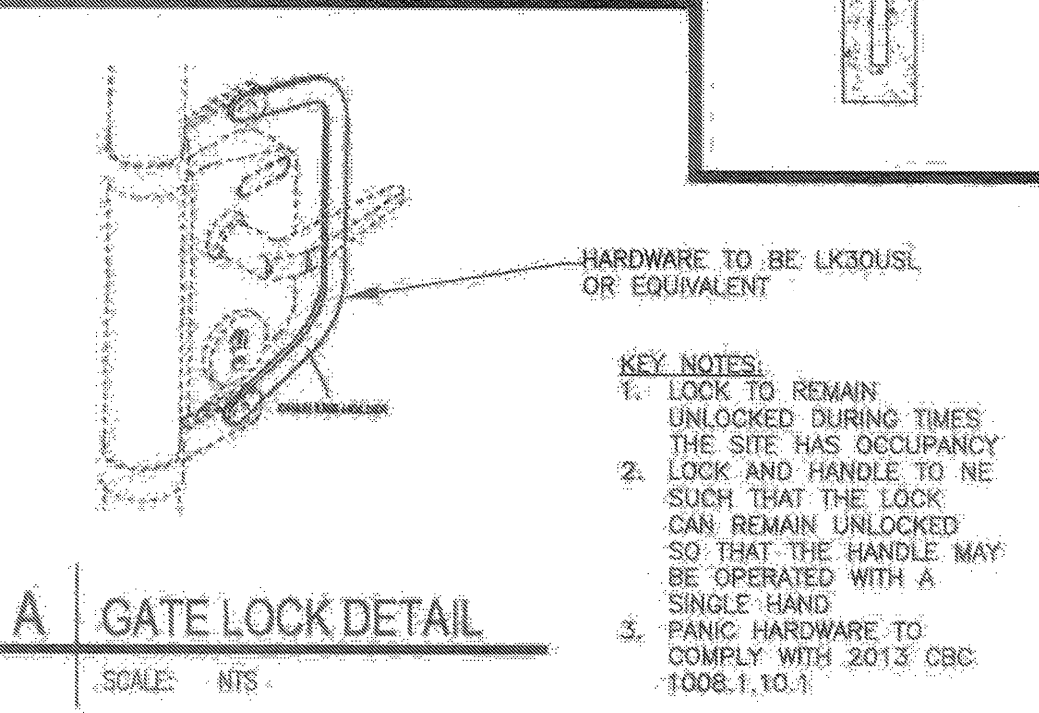
DRAWN  
MAP  
CHECKED  
DKR  
DATE  
6/25/14  
ASTEL JOB NO.  
13-1010  
SHEET

S-43

43 OF 45 SHEETS



**1 PERIMETER FENCE**  
SCALE: 3/8" = 1'-0"

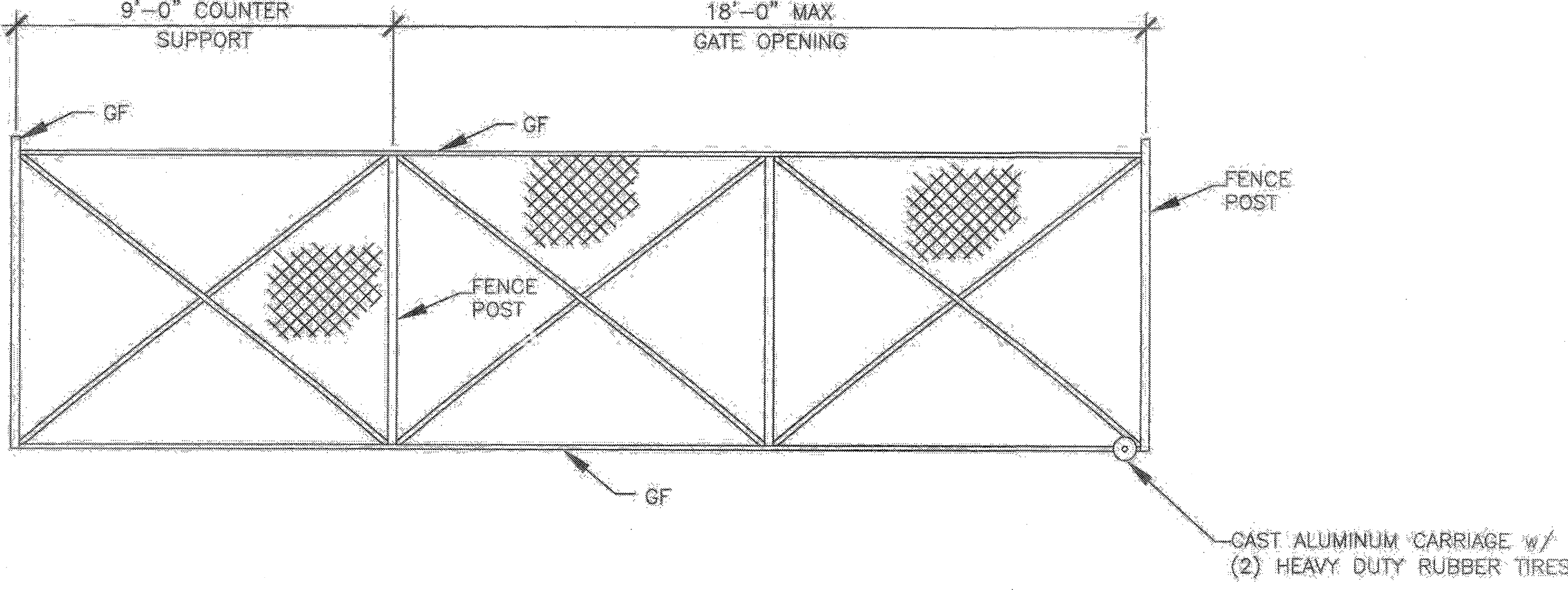


**A GATE LOCK DETAIL**  
SCALE: NTS

- NOTES:**
1. ALL FENCE COMPONENTS TO BE GALVANIZED.
  2. PROVIDE FLEXIBLE BONDING JUMPER BETWEEN GATE POST AND FENCE POST.
  3. PROVIDE PROPER CLAMP TO BOND FENCE TO THE GROUNDING SYSTEM.
  4. SEE SITE SPECIFIC ELECTRICAL DRAWINGS FOR GROUNDING SPECIFICATIONS.

- PERIMETER FENCE SPECIFICATIONS:**
- FABRIC:** 2" GALVANIZED 11 GA STD ALTERNATES PERMITTED. PROVIDED SUBMITTAL SHOW % OF AIR FLOW BLOCKAGE
- BARRIER:** VISUAL/WIND BARRIER - PROVIDE SUBMITTAL TO SHOW % OF AIR FLOW BLOCK
- TOP RAIL:** ASTM A53, GRADE B, F<sub>y</sub>=30 KSI
- LINE POST:** ASTM A53, GRADE B, F<sub>y</sub>=30 KSI. SEE DETAIL 4/S-44 FOR FOOTING SIZE.
- TERMINAL POST:** ASTM A53, GRADE B, F<sub>y</sub>=30 KSI. SEE DETAIL 4/- FOR FOOTING SIZE.
- GATE:** FRAMEWORK TO BE 1 1/4" STANDARD STEEL PIPE, ASTM A53, GRADE B, F<sub>y</sub>=30 KSI
- GATE POSTS:** ASTM A53, GRADE B, F<sub>y</sub>=30 KSI. SEE DETAIL FOR FOOTING SIZE.
- TOP BEAMS:** ASTM A53, GRADE B, F<sub>y</sub>=30 KSI
- TOP BRACING:** ASTM A53, GRADE B, F<sub>y</sub>=30 KSI

**3 NOTES**  
SCALE: N/A



**2 ROLLING GATE**  
SCALE: 3/8" = 1'-0"

% SOLID <sup>1</sup>	HEIGHT	FENCE POST/ GF	FENCE POST FOOTING DEPTH	FENCE POST FOOTING DIAMETER	FENCE POST EMBEDMENT INTO FOOTING	GATE POST	GATE POST FOOTING DEPTH	GATE POST FOOTING DIAMETER	GATE POST EMBEDMENT INTO FOOTING
100%	8'-0"	5" Ø	7'-0"	24"	6'-6"	6" Ø	8'-0"	24"	7'-6"
50%	8'-0"	3 1/2" Ø	6'-0"	18"	5'-6"	5" Ø	7'-0"	18"	6'-6"
15%	8'-0"	2 1/2" Ø	4'-6"	12"	4'-0"	2 1/2" Ø	5'-3"	12"	4'-9"
100%	6'-0"	4" Ø	6'-0"	24"	5'-6"	5" Ø	6'-9"	24"	6'-3"
50%	6'-0"	3" Ø	5'-3"	18"	4'-9"	3 1/2" Ø	5'-9"	18"	5'-3"
15%	6'-0"	2 1/2" Ø	3'-9"	12"	3'-3"	2 1/2" Ø	4'-3"	12"	3'-9"

**4 PERIMETER FENCE SCHEDULE**  
SCALE: N/A

1. READ FROM ONE LINE ONLY.
2. EXAMPLE OF % SOLID FENCING MATERIAL:  
15%: CHAIN-LINK ONLY  
50%: CHAIN-LINK WITH MESH  
100%: CHAIN-LINK WITH SLATS

ENGINEER'S APPROVAL



DATE SIGNED  
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SITE SPECIFIC DSA APPROVAL

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OFFICE OF REGULATION SERVICES  
APPL. 04-112426  
AC FLS SS TH  
DATE JUN 25 2014

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PHOTOVOLTAIC STRUCTURES PERIMETER FENCE/ SCHEDULE

DRAWN MAP  
CHECKED DKR  
DATE 6/25/14  
4STEL JOB NO. 13-1010

SHEET  
**S-44**