

# STRUCTURAL PRINT PACKAGE - 240822

FREDERICK, IL 62639

RACKING PROVIDER



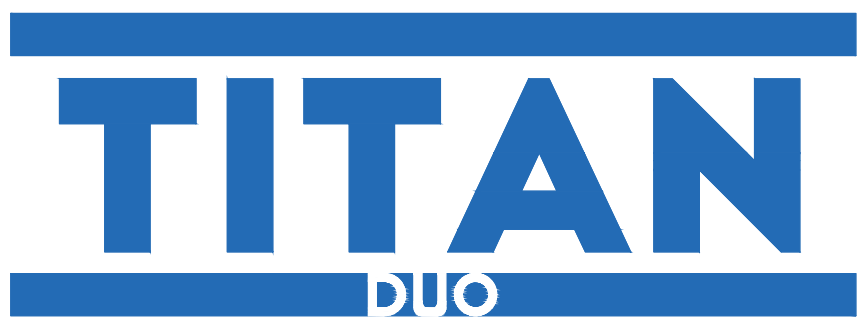
20-345 COUNTY ROAD X  
RIDGEVILLE CORNERS, OHIO 43555  
(P) 419.267.5280  
(F) 419.267.5214  
WWW.APASOLAR.COM

STRUC. ENGINEER OF RECORD



360 W. DUSSEL DR.  
MAUMEE, OH 43537  
(P) 419.725.7161  
(F) 419.725.7160

RACKING PRODUCT LINE



USE WITH THE FOLLOWING PRINTS  
& PACKAGES. INCLUDE WITH  
SUBMISSION TO PERMIT/INSPECTION  
AGENCY:

- ☒ CALCULATION PACKAGE:  
240822 CALC SET – STAMPED
- ☒ FOUNDATION DESIGN REPORT (SITE  
SPECIFIC, & ONLY WHERE REQUIRED  
BY EOR OR AHJ)



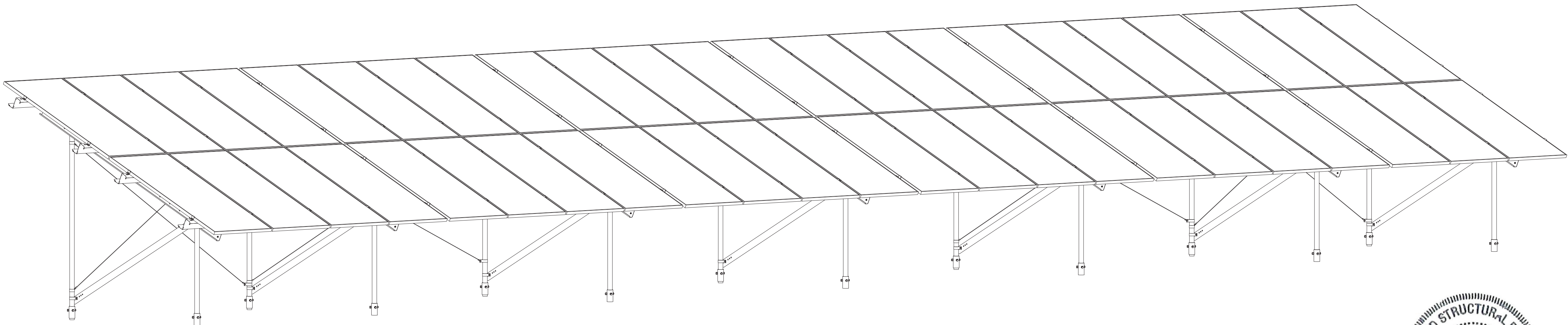
SITE ADDRESS: 24613 ADAMS RD  
FREDERICK, IL 62639

REVISION: B

PERMIT SET/  
STRUCTURAL PACKET

APPROVED

## SOLAR PHOTOVOLTAIC GROUND MOUNT



SHEET INDEX		
STRUCTURAL		
S-000	B	STRUCTURAL COVER
S-100	B	RACKING OVERVIEW
S-300	A	STRUCTURAL COMPONENTS
S-400	A	CONNECTIONS
S-500	A	STRUCTURAL PURLINS
S-600	A	CLAMPS & BRACES

GOVERNING STRUCTURAL CODE/S

2021 INTERNATIONAL BUILDING CODE

PACKAGE COVERAGE – LOADING  
AND SETUP RANGES & CONSTANTS

TILT ANGLES: 25°  
MAX GROUND SNOW LOAD (PSF): 20  
MAX WIND LOADS (MPH): 101  
WIND EXPOSURE CATEGORY: C  
MAX SEISMIC Ss: 0.149 g  
MAX SEISMIC S1: 0.087 g

PV MODULE: HELIENE 156HC M10 TPC SL BIFACIAL  
OR SIMILAR

MAX. PANEL WIDTH: 44.65"  
MAX. PANEL LENGTH: 97.01"  
MAX. PANEL HEIGHT: 2.00"  
MAX. PANEL WEIGHT: 69.00 LBS

RISK CATEGORY: I  
MAX LIP CLEARANCE: 42"

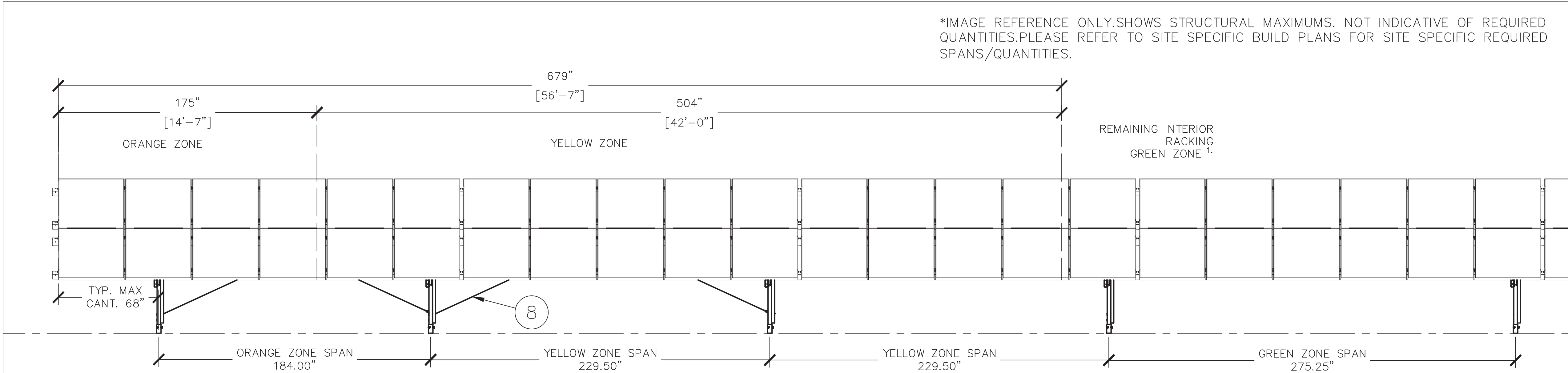
IMAGE FOR REFERENCE ONLY

SEE VIEW A1 ON S600 FOR VIEW OF TRANSVERSE BRACE

1. STANDARD FRONT LIP HEIGHT AND TILT ANGLES MEASURED FROM LEVEL GROUND
2. FOUNDATION TESTING, WHERE REQUIRED, SHALL BE DONE ACCORDING TO THE "QUICK TEST METHOD" PER ASTM D1143 & D3689.
3. PRINT DIMENSIONS: DIMENSIONS SHOWN REFLECT POST HEIGHTS ON LEVEL GROUND. ON UNEVEN TERRAIN, REAR FOUNDATION POST HEIGHT WILL BE DICTATED BY FRONT LIP HEIGHT, PANEL TILT, AND NORTH/SOUTH POST SPACING.
4. ADDITIONAL TOLERANCES: POST PLUMBNESS SHOULD BE WITHIN  $\pm 2^{\circ}$
5. SPECIAL INSPECTIONS (WHERE REQUIRED):

SPECIAL INSPECTIONS ARE NOT REQUIRED BY APA  
SOLAR OR THE STRUCTURAL ENGINEER OF RECORD  
THE JDI GROUP. WHERE REQUIRED BY OWNER,  
 CUSTOMER, AND/OR AUTHORITY HAVING  
 JURISDICTION, MINIMUM INSPECTION SHALL FOLLOW  
 IBC OR LOCAL AHJ SPECIAL INSPECTIONS  
 GUIDELINES.

C1	PROFILE VIEW: RACK OVERVIEW
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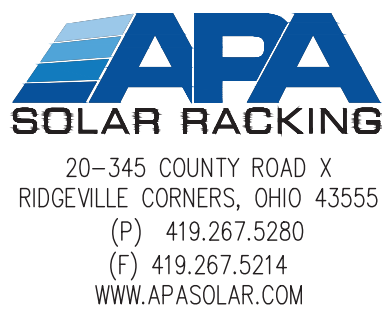


A1	ELEVATION VIEW FROM FRONT (NORTH-FACING)
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\*IMAGE REFERENCE ONLY.SHOWS STRUCTURAL MAXIMUMS. NOT INDICATIVE OF REQUIRED QUANTITIES.PLEASE REFER TO SITE SPECIFIC BUILD PLANS FOR SITE SPECIFIC REQUIRED SPANS/QUANTITIES.

CUSTOMER

RACKING PROVIDER



RACKING TYPE



ENGINEER OF RECORD



360 W. DUSSEL DR.  
MAUMEE, OH 43537  
[P] 419.725.7161 [F] 419.725.7160

PROFESSIONAL SEAL/STAMP



DOCUMENT NAME: STRUCTURAL PRINT PACKAGE

SITE STREET ADDRESS:  
24613 ADAMS RD

SITE CITY, STATE, ZIP:  
FREDERICK, IL 62639

SHEET REVISIONS		
REV.	DESCRIPTION	DATE
A	INITIAL RELEASE	10/21/202
B	UPDATED NS CHORD	11/5/202

A P P R O V E D

DRAWN	REVIEWED	APPROVED	SIZE
CW	TM	JDI	D
SHEET NAME			

## RACKING OVERVIEW

PROJECT NUMBER

DRAWING NUMBER

REV.



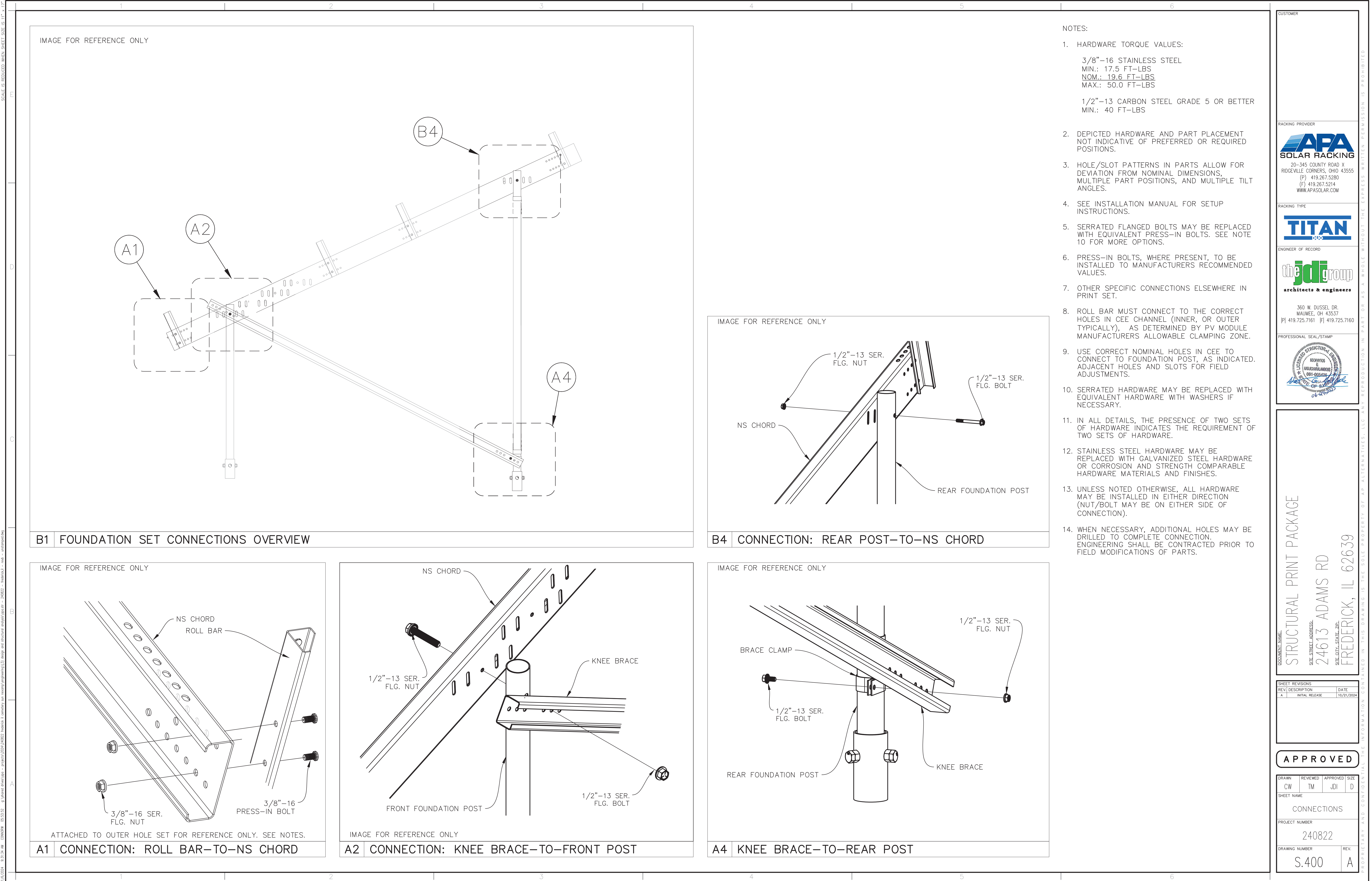


Technical drawing of a rectangular frame with the following specifications:

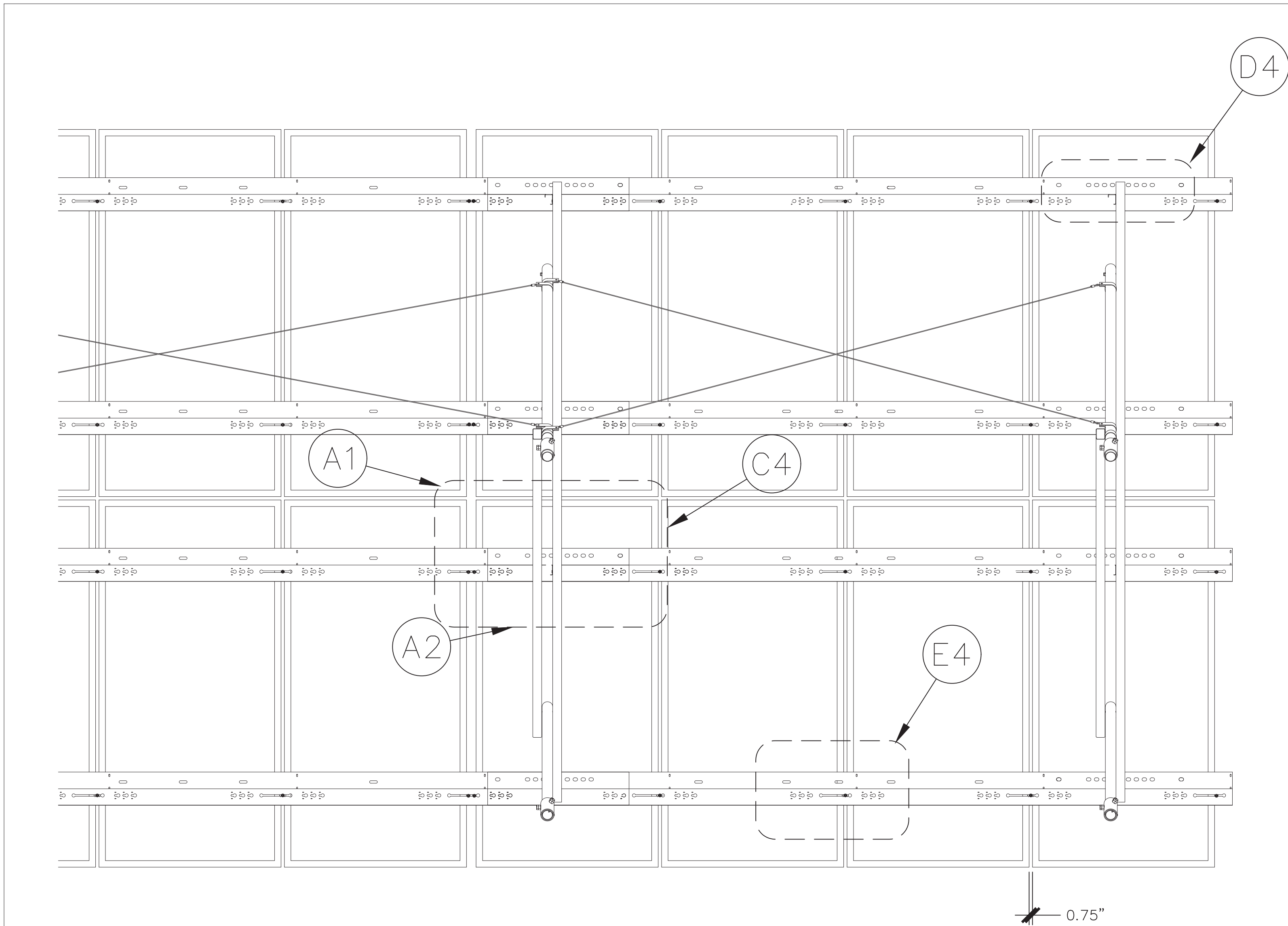
- MIN. THICKNESS:** 0.055"
- 16 GA**
- WEB HEIGHT:** 6.0"
- FLANGE:** 3.0"
- RETURN:** 1.0"
- Angle:** (135.0°)
- Radius:** R.187 TYP.

D5	PART: ZEE PURLIN
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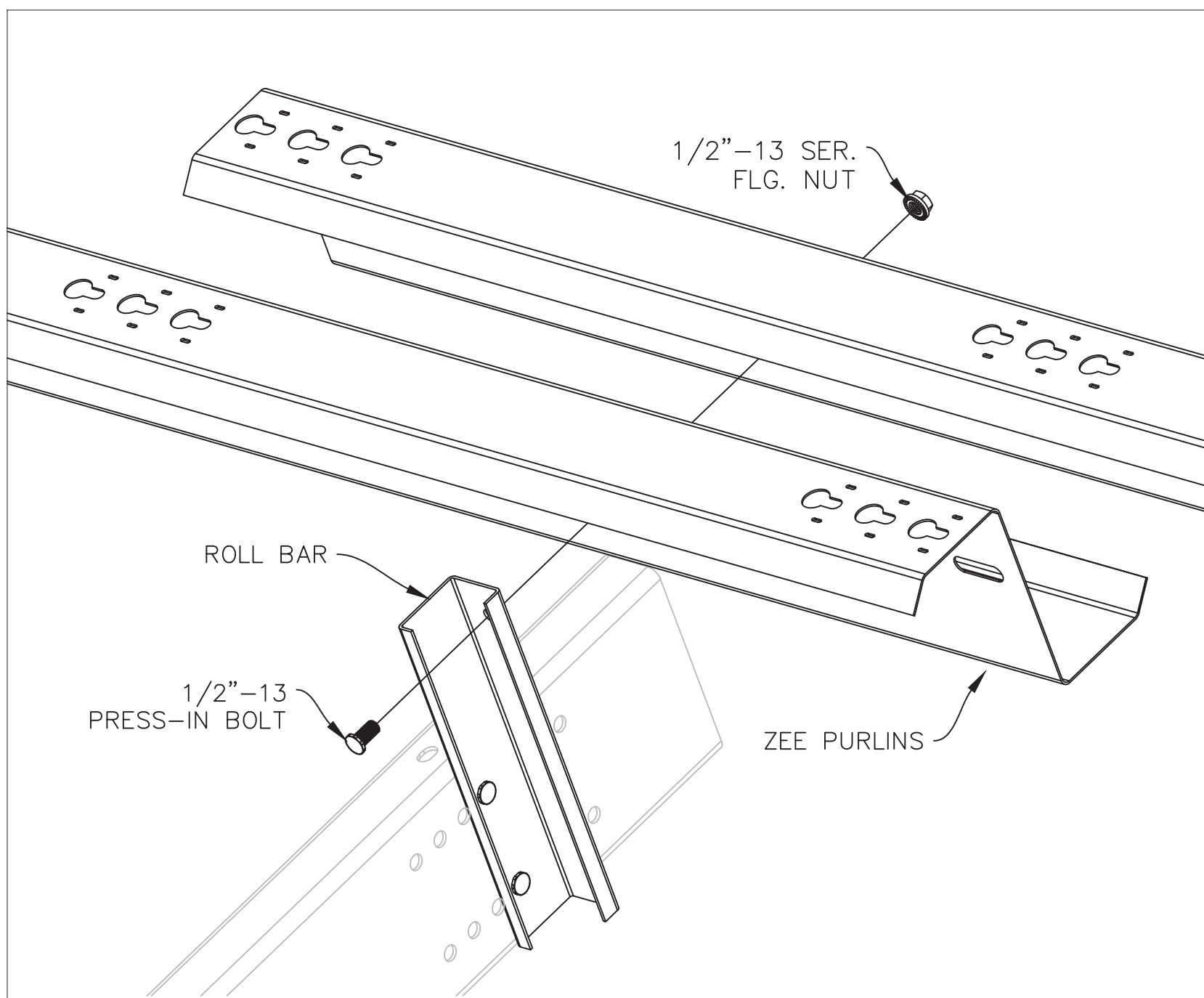
S.300	A
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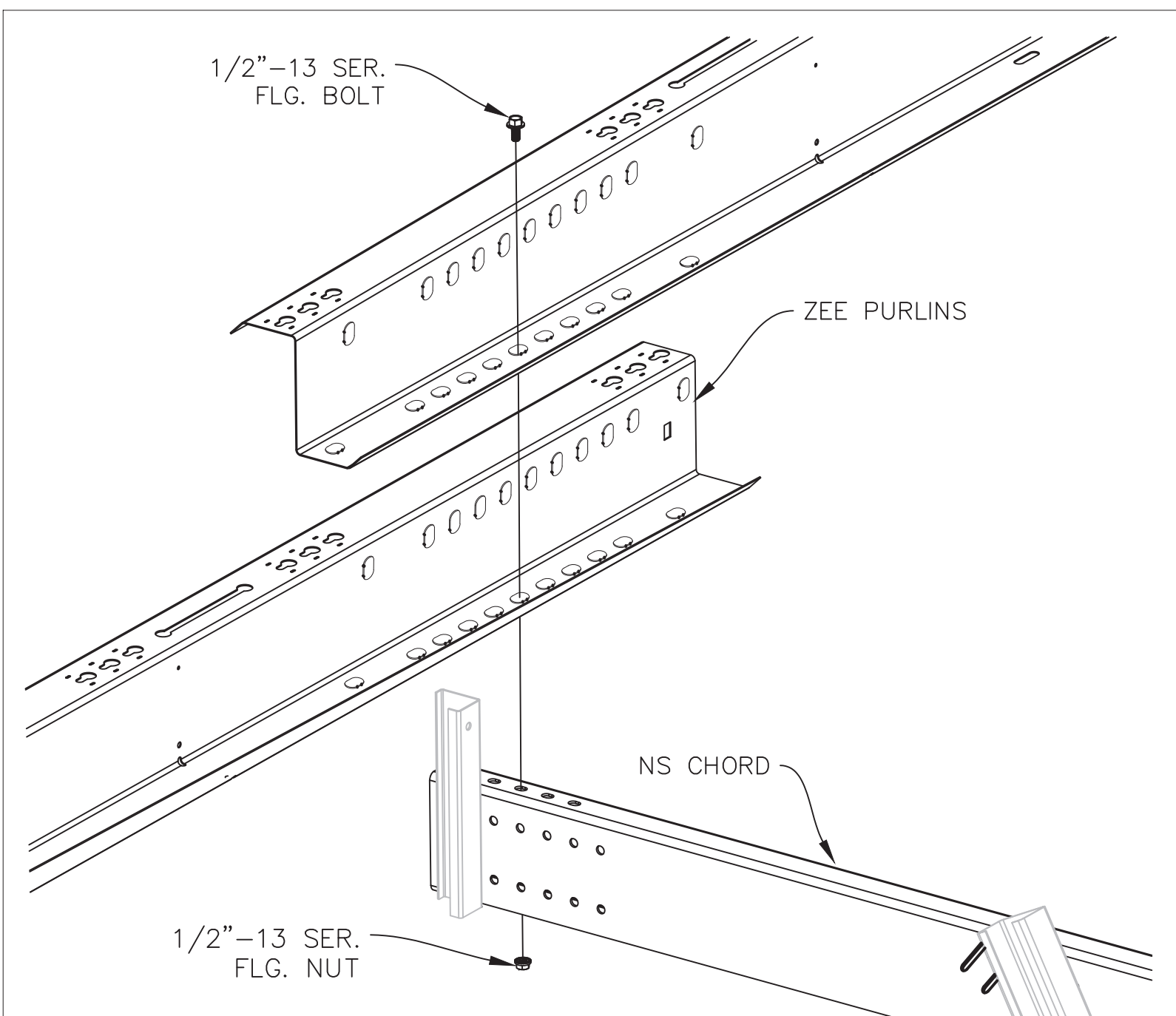




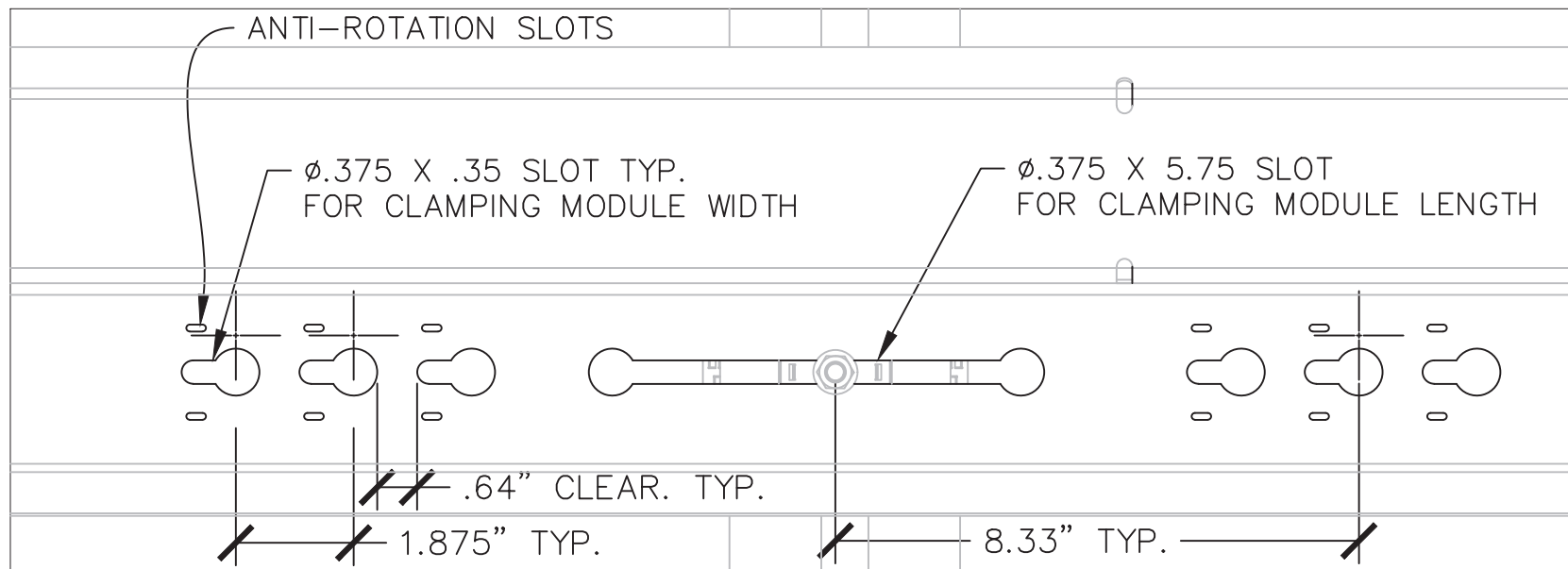
B1	OVERVIEW: ZEE PURLIN CONNECTIONS (RACK UNDERSIDE)
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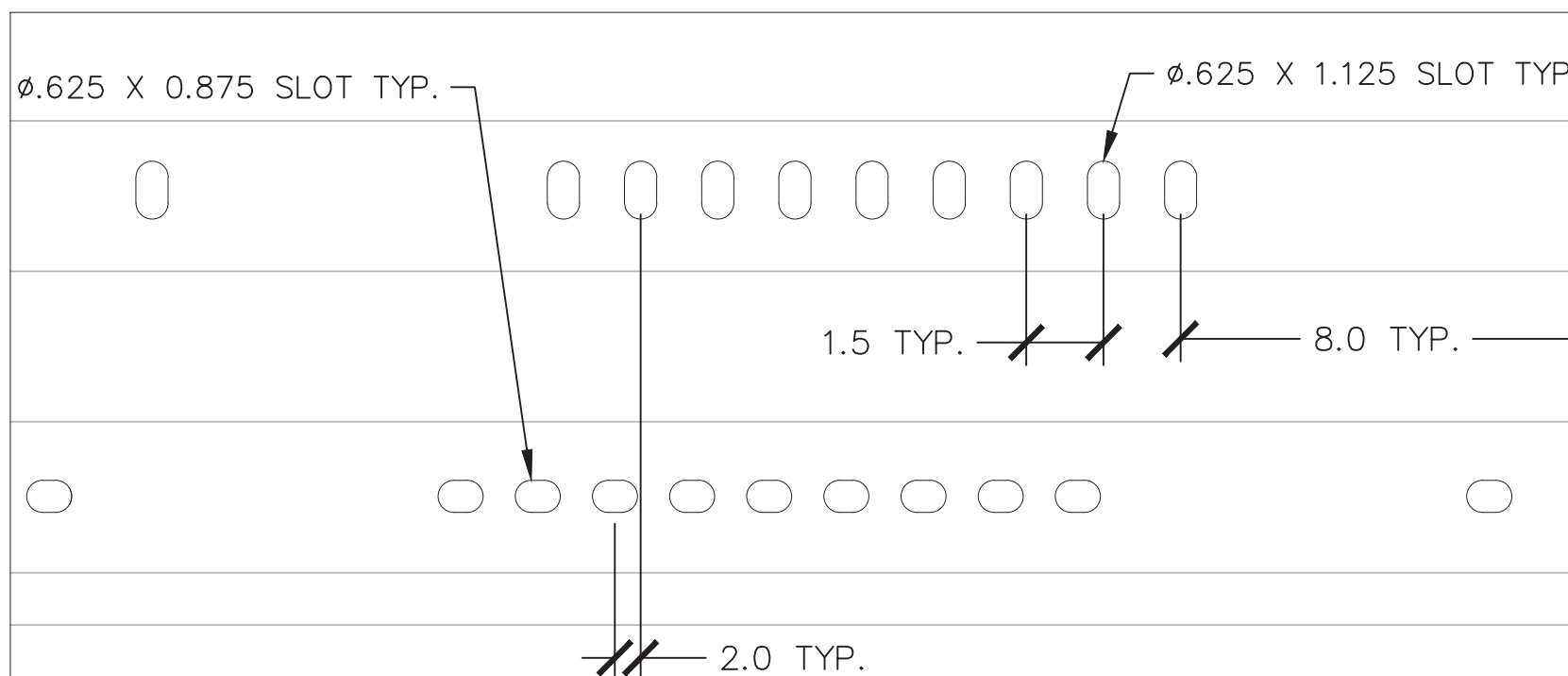
A1	CONNECTION: ZEE PURLINS-TO-ROLL BAR
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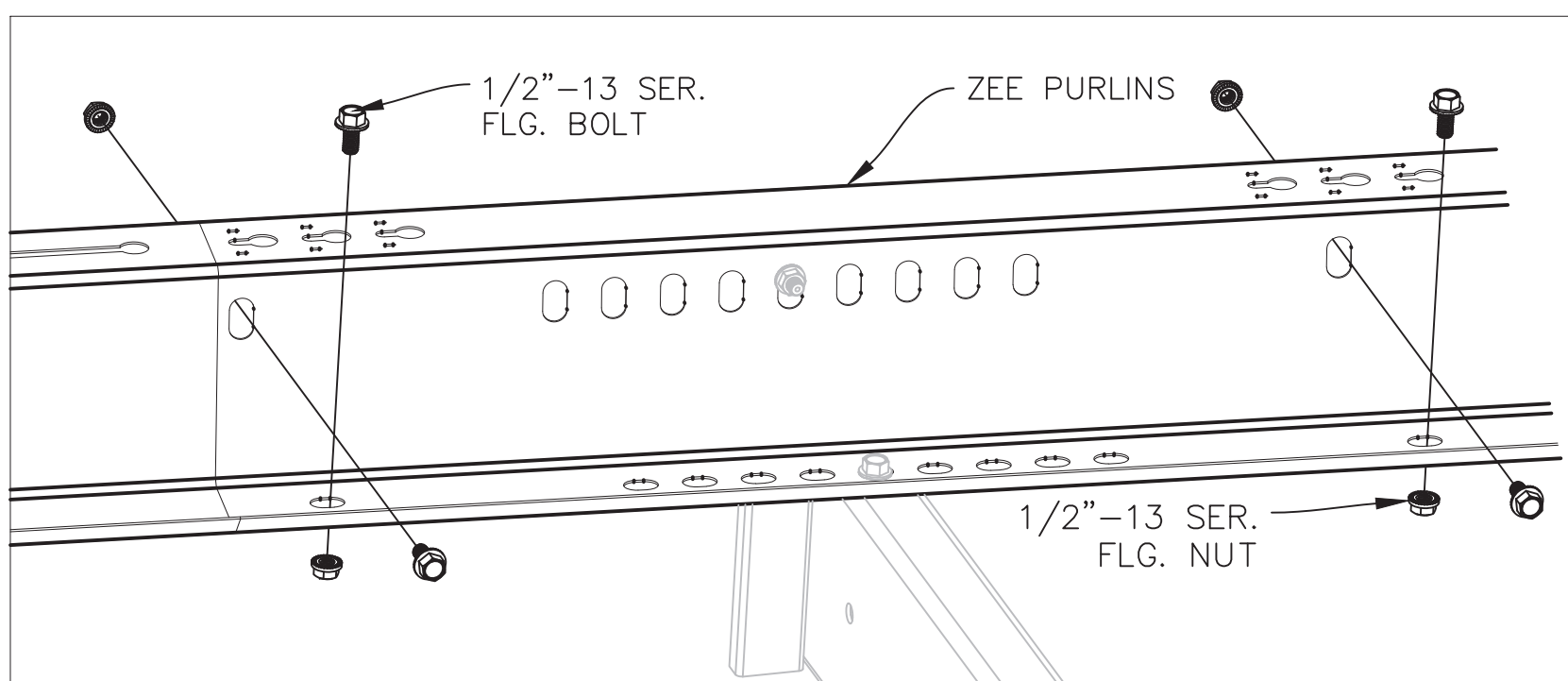
A2	CONNECTION: ZEE PURLINS-TO-NS CHORD
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E4	DETAIL: ZEE PURLIN PANEL SLOTS
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D4	DETAIL: ZEE PURLIN SPLICE SLOTS
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C4	CONNECTION: ZEE-TO-ZEE PURLINS SPLICE
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- NOTES:
1. HARDWARE TORQUE VALUES:  
3/8"—16 STAINLESS STEEL  
MIN.: 17.5 FT-LBS  
NOM.: 19.6 FT-LBS  
MAX.: 50.0 FT-LBS
  2. DEPICTED HARDWARE AND PART PLACEMENT NOT INDICATIVE OF PREFERRED OR REQUIRED POSITIONS.
  3. HOLE/SLOT PATTERNS IN PARTS ALLOW FOR DEVIATION FROM NOMINAL DIMENSIONS, MULTIPLE PART POSITIONS, AND MULTIPLE TIL ANGLES.
  4. SEE INSTALLATION MANUAL FOR SETUP INSTRUCTIONS.
  5. SERRATED FLANGED BOLTS MAY BE REPLACED WITH EQUIVALENT PRESS-IN BOLTS.
  6. PRESS-IN BOLTS, WHERE PRESENT, TO BE INSTALLED TO MANUFACTURERS RECOMMENDED VALUES.
  7. OTHER SPECIFIC CONNECTIONS ELSEWHERE IN PRINT SET.
  8. SERRATED HARDWARE MAY BE REPLACED WITH EQUIVALENT HARDWARE WITH WASHERS IF NECESSARY.
  9. IN ALL DETAILS, THE PRESENCE OF TWO SETS OF HARDWARE INDICATES THE REQUIREMENT OF TWO SETS OF HARDWARE.
  10. STAINLESS STEEL HARDWARE MAY BE REPLACED WITH GALVANIZED STEEL HARDWARE OR CORROSION AND STRENGTH COMPARABLE HARDWARE MATERIALS AND FINISHES.
  11. UNLESS NOTED OTHERWISE, ALL HARDWARE MAY BE INSTALLED IN EITHER DIRECTION (NUT/BOLT MAY BE ON EITHER SIDE OF CONNECTION).
  12. WHEN NECESSARY, ADDITIONAL HOLES MAY BE DRILLED TO COMPLETE CONNECTION. ENGINEERING SHALL BE CONTRACTED PRIOR TO FIELD MODIFICATIONS OF PARTS.
  13. CONNECTION IN DETAIL A1 & A2 SHOWN IN NOMINAL POSITION. ACTUAL CONNECTION MAY BE  $\pm 6"$ .
  14. WHEN CONNECTIONS IN DETAIL A1 & A2 ARE AT THEIR MAX/MIN POSITIONS ( $\pm 2"$ ) INTERFERING SPLICE HARDWARE MAY BE RELOCATED TO NEXT NEAREST SLOTS.
  15. WHERE PRESENT, TRANSVERSE BRACE MAY UTILIZE LOWER SPLICE BOLTS. SEE CONNECTIONS SHEET FOR MORE INFORMATION.
  16. ZEE-TO-ZEE SPLICE SHALL ALWAYS OVERLAP MINIMUM 32", AS INDICATED, EXCEPT AT ENDS OF ROW, WHERE NO SPLICE IS REQUIRED.
  17. SPLICE MAY OVERLAP IN EITHER DIRECTION.
  18. ZEE PURLIN MATERIAL AND FINISH ARE MANUFACTURED TO SPECIFICATIONS THAT MEET OR EXCEED OUR STANDARD PRODUCT WARRANTY.
  19. ZEE PURLINS GALVANIZED TO CONFORM TO A MINIMUM THICKNESS DESIGNATION EQUAL TO G90 OR INLINE GALVANIZED TO COMPARABLE THICKNESS AS PER ASTM A1057.
  20. TYPICAL ZEE PURLIN RETURN LIP ANGLE SHOWN. ACTUAL ANGLE MAY VARY.
  21. SLOT DIMENSIONS FOR REFERENCE ONLY. FINAL SHAPE, FREQUENCY, AND DIMENSIONS MAY VARY.
  22. LENGTH OF PURLIN VARIES BY PROJECT AND LOCATION WITHIN ARRAY.

SHEET REVISIONS		
REV.	DESCRIPTION	DATE
A	INITIAL RELEASE	10/21/202

APPROVED

DRAWN CW	REVIEWED TM	APPROVED JDI	SIZE D
SHEET NAME STRUCTURAL PURLINS			
PROJECT NUMBER 240822			
DRAWING NUMBER S.500			REV. A



E1	REAR VIEW: CABLE BRACE FREQUENCY
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- NOTES:
1. HARDWARE TORQUE VALUES:  
  
1/2"—13 CARBON STEEL GRADE 8 OR 5  
MIN.: 40 FT-LBS  
  
M8-1.25 STAINLESS STEEL  
MIN.: 14.0 FT-LBS  
NOM.: 15.6 FT-LBS  
MAX.: 25 FT-LBS
  2. DEPICTED HARDWARE AND PART PLACEMENT NOT INDICATIVE OF PREFERRED OR REQUIRED POSITIONS.
  3. HOLE/SLOT PATTERNS IN PARTS ALLOW FOR DEVIATION FROM NOMINAL DIMENSIONS, MULTIPLE PART POSITIONS, AND MULTIPLE TILT ANGLES.
  4. SEE INSTALLATION MANUAL FOR SETUP INSTRUCTIONS.
  5. SERRATED FLANGED BOLTS MAY BE REPLACED WITH EQUIVALENT PRESS-IN BOLTS. SEE NOTE 8 FOR MORE INFORMATION.
  6. PRESS-IN BOLTS, WHERE PRESENT, TO BE INSTALLED TO MANUFACTURERS RECOMMENDED VALUES.
  7. OTHER SPECIFIC CONNECTIONS ELSEWHERE IN PRINT SET.
  8. SERRATED HARDWARE MAY BE REPLACED WITH EQUIVALENT HARDWARE WITH WASHERS IF NECESSARY.
  9. STAINLESS STEEL HARDWARE MAY BE REPLACED WITH GALVANIZED STEEL HARDWARE OR CORROSION AND STRENGTH COMPARABLE HARDWARE MATERIALS AND FINISHES.
  10. UNLESS NOTED OTHERWISE, ALL HARDWARE MAY BE INSTALLED IN EITHER DIRECTION (NUT/BOLT MAY BE ON EITHER SIDE OF CONNECTION).
  11. WHEN NECESSARY, ADDITIONAL HOLES MAY BE DRILLED TO COMPLETE CONNECTION. ENGINEERING SHALL BE CONTRACTED PRIOR TO FIELD MODIFICATIONS OF PARTS.
  12. EASE/WEST CABLE BRACING (C1) TO BE INSTALLED IN THE SPACE BETWEEN ANCHOR SETS (BAY).
  13. MINIMUM CABLE BREAKING STRENGTH DETERMINED BY PROJECT SPECIFIC STRUCTURAL CALCULATIONS.
  14. CABLE TO BE STAINLESS STEEL AIRCRAFT CABLE.
  15. CABLE MAY BE OF ANY CONFIGURATION (IE. 7X7 OR 7X19) AS LONG AS IT MEETS THE REQUIREMENTS LISTED ON THIS SHEET.
  16. LENGTH OF BRACES WILL VARY DEPENDENT ON PROJECT SPECIFICS.
  17. TRANSVERSE BRACE SETS SHALL BE INSTALLED AT FREQUENCY INDICATED.
  18. TRANSVERSE BRACES ARE NOT A REQUIREMENT OF THE STRUCTURAL MODELS. APA REQUIRES THEIR PRESENCE AS AN ASSEMBLY AID ONLY.
  19. DUE TO IT'S NON-STRUCTURAL NATURE, TRANSVERSE BRACE PROFILE, THICKNESS, MATERIAL, STRENGTH, COATING, FREQUENCY, AND INSTALLATION MAY CHANGE AT ANY TIME AT THE DISCRETION OF APA, BY APPROVAL OF APA ENGINEERING.
  20. WHERE TRANSVERSE BRACE CANNOT BE INSTALLED DUE TO NS CHORD (OUT OF NOMINAL LOCATION), BRACE SHALL BE RELOCATED TO NEXT NEAREST REASONABLE SPLICE.
  21. TRANSVERSE BRACE MAY UTILIZE LOWER SPLICE BOLTS, WHERE PRESENT. SEE PURLIN SHEET FOR MORE INFORMATION.
  22. EACH PV MODULE SHALL BE CLAMPED IN 4 PLACES.
  23. A MAJORITY OF THE CLAMP BOLT FLANGES MUST TERMINATE OVER THE SLOT, AND NOT OVER THE KEYHOLE.
  24. SPRING, & PANEL GUIDE MAY NOT BE PRESENT AT ALL LOCATIONS, OR ANY LOCATIONS.
  25. ALL PANELS MUST BE GROUNDED/BONDED TO ZEE PURLINS. THIS MAY BE ACCOMPLISHED WITH THE PANEL GUIDE, BONDING WASHERS, DYNABOND EQUIPMENT OR OTHER APPROVED GROUNDING DEVICE.