

**GENERAL/CONSTRUCTION/SAFETY:**

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE APPLICABLE CONSTRUCTION CODE AND THE PROJECT SPECIFICATIONS.
2. LOCATION OF UNDERGROUND UTILITIES SHALL BE VERIFIED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
3. DIMENSIONS SHOWN ON PLAN SHALL BE VERIFIED IN FIELD.
4. LAYOUT IS SUBJECT TO CHANGE PER REQUEST AND/OR EXISTING CONDITIONS IN THE FIELD.
5. ENGINEER SHALL NOT BE RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OF CONSTRUCTION SELECTED BY CONTRACTOR.
6. CONTRACTOR SHALL FIELD MEASURE AND VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. ANY UNEXPECTED CONDITIONS OR DISCREPANCIES WITH THE DESIGN DOCUMENTS SHALL BE REPORTED TO THE ENGINEER PRIOR TO INSTALLATION OR ERECTION OF MATERIALS.
7. THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. WHEN ON SITE, THE ENGINEER IS RESPONSIBLE FOR HIS OWN SAFETY BUT HAS NO RESPONSIBILITY FOR THE SAFETY OF OTHER PERSONNEL OR SAFETY CONDITIONS AT THE SITE.
8. NO PERSONNEL SHALL STEP OR STAND ON PHOTOVOLTAIC (PV) MODULES (SOLAR PANELS) AT ANY TIME. RACK STRUCTURE AND PV MODULES ARE NOT DESIGNED FOR LIVE LOADS AND MAY VOID WARRANTY.
9. THIS TERRASMART CONSTRUCTION SET IS DESIGNED FROM PV MODULE DATA SHEET(S) PROVIDED BY THE CUSTOMER. CUSTOMER IS RESPONSIBLE FOR VERIFYING THAT THE PV MODULE(S) DELIVERED TO SITE MATCH DATA SHEET(S) PROVIDED TO TERRASMART. TERRASMART IS NOT RESPONSIBLE FOR PV MODULE DIMENSIONAL DISCREPANCIES DUE TO FURNISHED PV MODULES NOT MATCHING CUSTOMER FURNISHED PV MODULE DATA SHEETS.
10. CONTRACTOR SHALL ABIDE BY PERMITTING AND CONSTRUCTION GUIDELINE NOTES AS LISTED IN PAGE 2 SECTION I TERRASMART CONSTRUCTION PACKAGE.
11. CONTRACTOR SHALL ABIDE BY SITE PREPARATION GUIDELINE NOTES AS LISTED IN PAGE 2 SECTION II OF THE TERRASMART CONSTRUCTION PACKAGE.
12. CONTRACTOR SHALL ABIDE BY FOUNDATION NOTES AS LISTED IN PAGE 2 SECTION III OF THE TERRASMART CONSTRUCTION PACKAGE.

**SPECIAL FIELD INSPECTIONS:**

SPECIAL INSPECTION NOT REQUIRED BY TERRASMART, AS REQUIRED BY OWNER/CUSTOMER AND/OR AUTHORITY HAVING JURISDICTION, MINIMUM INSPECTION SHALL INCLUDE THE FOLLOWING NOTES AND TABLE:

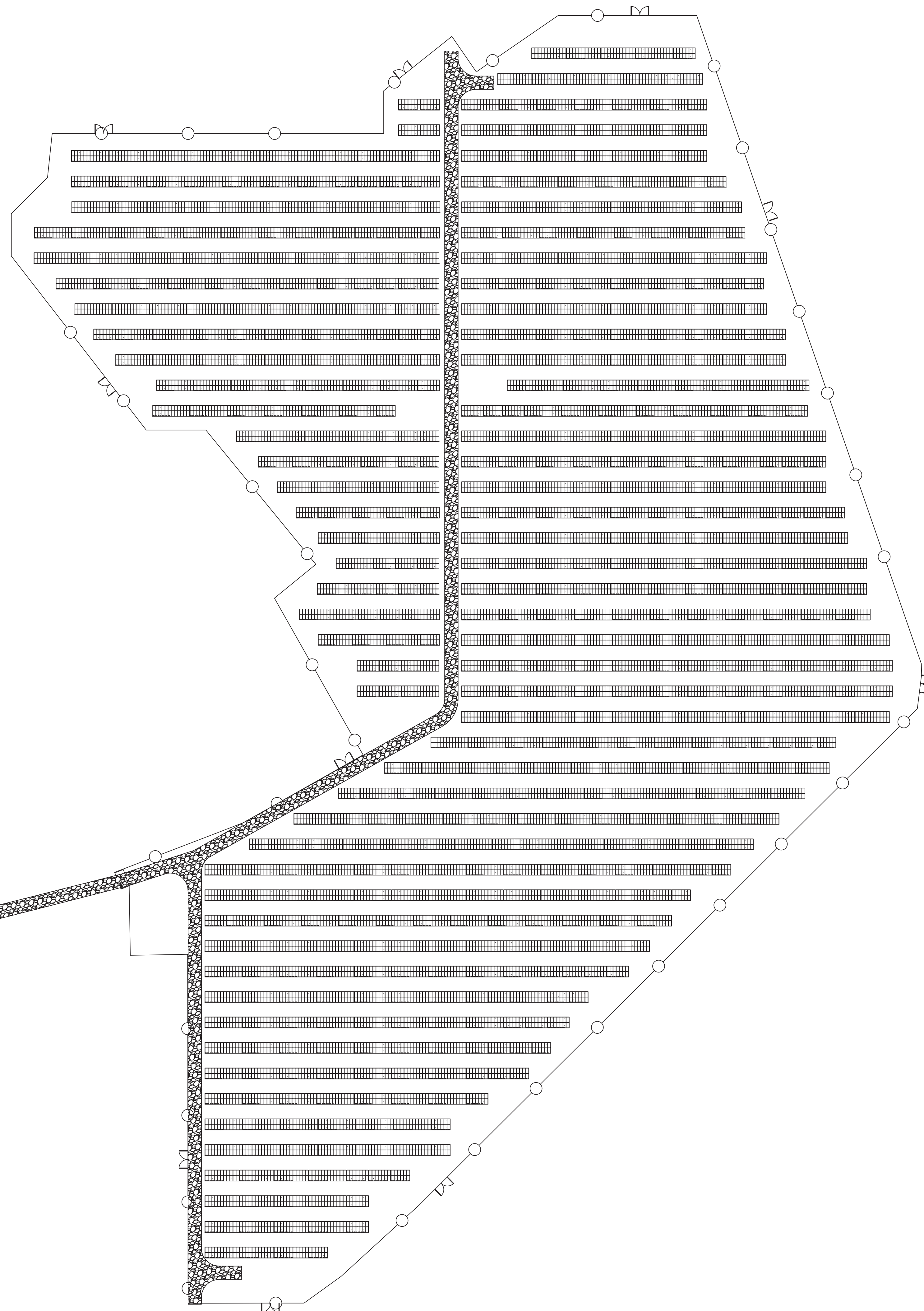
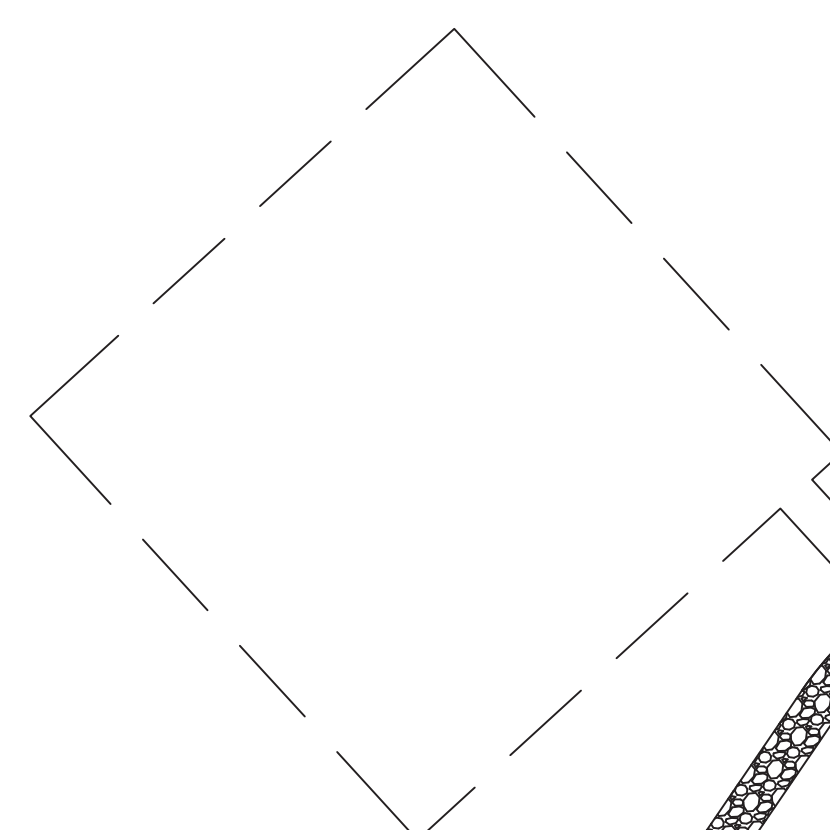
1. ALL SPECIAL INSPECTORS SHALL BE RETAINED BY OWNER/CUSTOMER. THE EXTENT OF THE INSPECTION SHALL COMPLY WITH THE CONTRACT DOCUMENTS, THE BUILDING CODE REQUIREMENTS, AND LOCAL JURISDICTION. IT IS THE OWNER/CUSTOMER'S RESPONSIBILITY TO GIVE PROPER NOTIFICATION TO THE SPECIAL INSPECTOR AND PROCEED WITH THE WORK ONLY AFTER THE SPECIAL INSPECTOR'S APPROVAL.
2. FAILURE TO NOTIFY THE SPECIAL INSPECTOR MAY RESULT IN OWNER/CUSTOMER HAVING TO REMOVE WORK FOR THE PURPOSE OF INSPECTION AT THE OWNER'S/CUSTOMER'S EXPENSE.
3. PREMATURE NOTIFICATION FOR INSPECTION WILL RESULT IN AN ADDITIONAL INSPECTION WITH ALL EXPENSES AND FEES PAID BY THE OWNER/CUSTOMER.
4. SPECIAL INSPECTORS SHALL KEEP RECORDS OF ALL INSPECTIONS. RECORDS SHALL BE FURNISHED TO THE OWNER, ENGINEER OF RECORD, AND LOCAL JURISDICTION AS REQUIRED. ANY AND ALL DISCREPANCIES SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR. CORRECTIONS SHALL BE MADE AND A FINAL REPORT OF INSPECTIONS SHALL BE PROVIDED NOTING COMPLETION OF INSPECTIONS AND CORRECTIONS OF DISCREPANCIES. FAILURE TO CORRECT DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER OF RECORD AND THE LOCAL JURISDICTION AND MAY RESULT IN REMOVAL OF COMPLETED WORK AND ADDITIONAL WORK TO CORRECT DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.

**MISCELLANEOUS FASTENERS:**

1. ALL BOLTS SHALL BE THE TYPE AND SIZE INDICATED ON DRAWINGS.
2. ALL HARDWARE USED FOR MOUNTING PV MODULES SHALL BE STAINLESS STEEL UNLESS NOTED OTHERWISE.
3. ALL PV MODULE MOUNTING HARDWARE SHALL BE INSTALLED AND TORQUED PER THE LATEST TERRASMART TGP INSTALLATION GUIDE.

**WORK BY OTHERS:**

1. SITE WORK AND DEVELOPMENT.
2. ALL ELECTRICAL WORK INCLUDING WIRING, CONDUIT, PANELS AND LIGHTS TO BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR.
3. GROUNDING REQUIREMENTS.
4. ALL SHADING ANALYSIS AND/OR PRODUCTION ANALYSIS SHALL BE PERFORMED AND VERIFIED BY OTHERS. TERRASMART IS NOT RESPONSIBLE FOR PV SYSTEM DESIGN AS IT PERTAINS TO ELECTRICAL OR PV SYSTEM PRODUCTION.



PROJECT INFORMATION	
TITLE & ADDRESS	BOOM BRIDGE
	BOOM BRIDGE ROAD NORTH STONINGTON, CT 06359
PROJECT NUMBER:	20-6575
DRAWN BY:	BS
DRAWING TYPE:	SITE LAYOUT
SHEET NUMBER	<b>1</b>

**TERRASMART**



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**INFORMATION**

DATE:	3/22/2021
REV. NUMBER	3
ORIENTATION	PORTRAIT
MODULE	CS3W-395PB-AG
2x12 TABLES	106
2x11 TABLES	28
2x7 TABLES	24
2x6 TABLES	12
TOTAL MODULES	3,640
MODULE	HT72-166M
2x12 TABLES	338
2x11 TABLES	23
2x7 TABLES	97
2x6 TABLES	31
TOTAL MODULES	10,348
TOTAL ARRAY	13,988

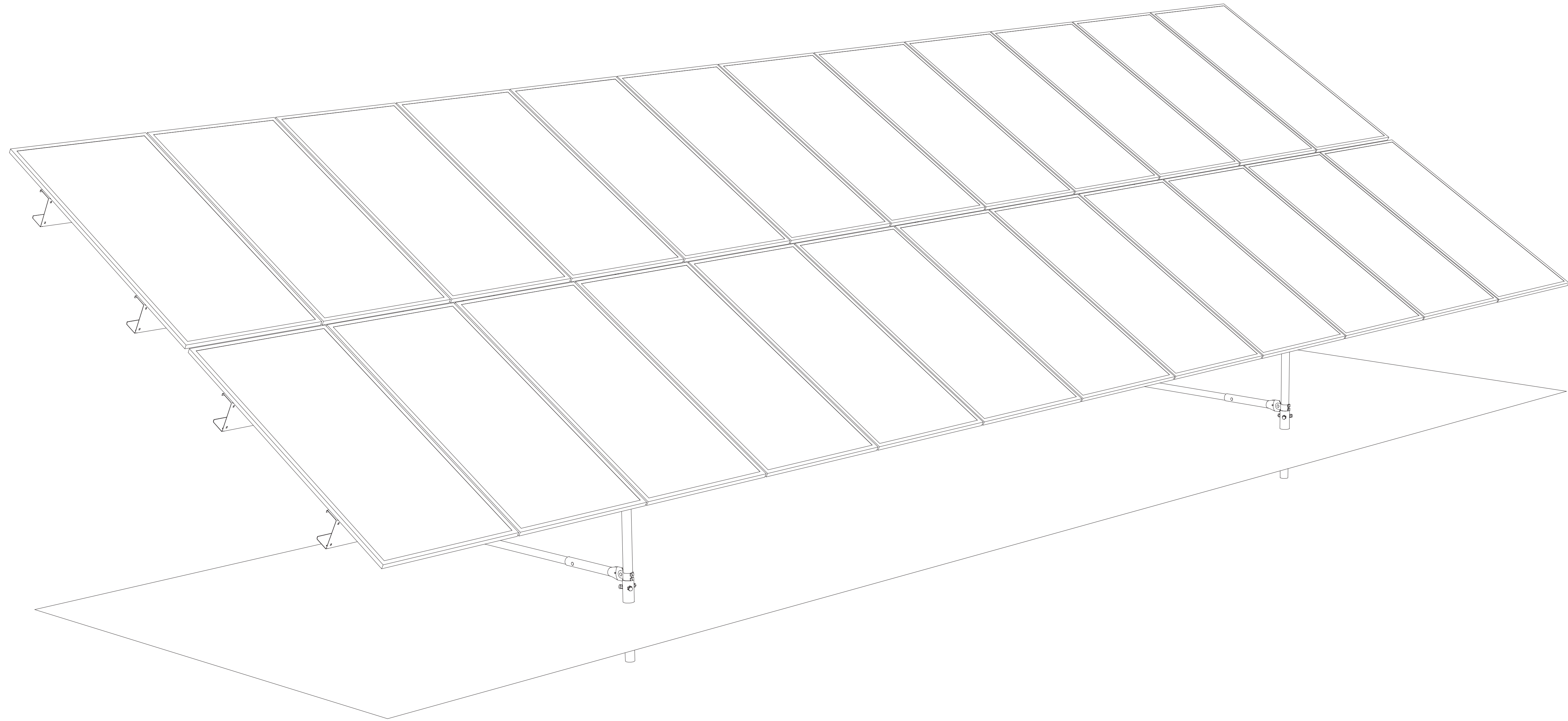




# TERRAGLIDE RACKING ENGINEERING PLANS

## GREENSKIES - BOOM BRIDGE

### 2X12 - TERRAGLIDE PORTRAIT - 30° RACK - CS3W-XXXPB-AG



ZEYN B. UZMAN  
CT PE# PEN.0023151

**NOTES:**  
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

<p><b>DESIGN CRITERIA</b> ASCE = 7-10 WIND SPEED = 115.53110187 MPH WIND LOAD BUILDING CATEGORY = I WIND LOAD EXPOSURE CATEGORY = C GROUND SNOW LOAD, Pg = 30 PSF FLAT ROOF SNOW LOAD, Pf = 30 PSF SEISMIC SITE CLASS = D SEISMIC Ss = 0.161 SEISMIC S1 = 0.058</p>	<p><b>GROUND SCREW</b> KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 83.94 (2132mm) EAST/ WEST EDGE - 41.26 (1048mm) NORTH/ SOUTH BOLT SPACING - 45.47 (1155mm) EAST/ WEST BOLT SPACING - 40.12 (1019mm) THICKNESS - 1.18 (30mm)</p>	<p><b>PROJECT SPECIFICATIONS:</b> TILT ANGLE - 30° RACK SIZE - 2X12 MODULE ORIENTATION - PORTRAIT</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">DRAWN BY TMC - 3/16/2021</td> <td style="width: 50%;">CHECKED BY MF - 3/16/2021</td> </tr> <tr> <td>ENG. APPROVED BY MF - 3/16/2021</td> <td>PROJ. ENG. APPROVED BY BS - 3/16/2021</td> </tr> <tr> <td>MFG. APPROVED BY SS - 3/16/2021</td> <td></td> </tr> <tr> <td>PROJECT NUMBER 20-6575</td> <td>CLIENT GREENSKIES</td> </tr> </table>	DRAWN BY TMC - 3/16/2021	CHECKED BY MF - 3/16/2021	ENG. APPROVED BY MF - 3/16/2021	PROJ. ENG. APPROVED BY BS - 3/16/2021	MFG. APPROVED BY SS - 3/16/2021		PROJECT NUMBER 20-6575	CLIENT GREENSKIES
DRAWN BY TMC - 3/16/2021	CHECKED BY MF - 3/16/2021										
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MFG. APPROVED BY SS - 3/16/2021											
PROJECT NUMBER 20-6575	CLIENT GREENSKIES										
		<p><b>TERRASMART, LLC</b> 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM</p>									
		<p>PROJECT NAME <b>BOOM BRIDGE</b></p>	<p>MODULE CS3W-XXXPB-AG</p>								
		<p>REV 0</p>	<p>SHEET NUMBER 1 OF 18</p>								
<p>PROPRIETARY AND CONFIDENTIAL. THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TERRASMART. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT WRITTEN PERMISSION OF TERRASMART IS PROHIBITED.</p>											



**I. PERMITTING, CONSTRUCTION, AND ERECTION NOTES**

- FRAME AND FOUNDATION CONFORMS TO THE REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE BASED UPON DESIGN CRITERIA AS OUTLINED ON THE COVER SHEET. TERRASMART MAKES NO REPRESENTATION AS TO THE ACCURACY OF THE DESIGN CRITERIA AS IT WAS SUPPLIED BY CLIENT. PLEASE REFER TO STRUCTURAL CALCULATIONS FOR FRAME AND FOUNDATION DESIGN.
- THE STRUCTURAL INTEGRITY OF THE TERRAGLIDE RACK DEPENDS ON INTERACTION OF VARIOUS CONNECTED COMPONENTS. PROVIDE ADEQUATE BRACING, SHORING, AND OTHER TEMPORARY SUPPORTS AS REQUIRED TO SAFELY COMPLETE THE WORK.
- FOUNDATION INSTALLATION SUB-CONTRACTOR SHALL COORDINATE WITH THE ENGINEER IF ANY UNFORESEEN CONFLICTS ARISE, SUCH AS EXISTING UNDULATION THAT COULD POTENTIALLY CAUSE RACKING INSTALLATION ISSUES.
- STRUCTURAL STEEL SHALL BE ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS, UNLESS OTHERWISE NOTED.
- DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.
- CROSS BRACING TO BE FIT ON SITE, PER INSTALLATION MANUAL.
- COLD GALVANIZING COMPOUND SHALL BE USED PER MANUFACTURER'S DIRECTIONS AND IN ACCORDANCE WITH ASTM-A780 IN AREAS WHERE GALVANIZATION WAS REMOVED DURING TRANSPORTATION, OR ERECTION/INSTALLATION.
- BOLTS TO BE TIGHTENED PER THE PROCEDURES DESCRIBED IN THE INSTALLATION MANUAL.
- THIS STRUCTURAL DRAWING DOES NOT INCLUDE INFORMATION REGARDING ELECTRICAL CONNECTIONS, INCLUDING GROUNDING. REFER TO INSTALLATION MANUAL AND ELECTRICAL PLANS PREPARED BY OTHERS.
- SHADING ANALYSIS WAS NOT PERFORMED BY TERRASMART AND WAS NOT CONSIDERED IN THE LAYOUT OF THE FOUNDATION. TERRASMART RECOMMENDS CONSULTING A SOLAR SHADING EXPERT PRIOR TO INSTALLATION TO AVOID POWER REDUCTION DUE TO SHADOWS.
- SNOW BANKING ANALYSIS WAS NOT PERFORMED BY TERRASMART AND WAS NOT CONSIDERED IN THE STRUCTURAL DESIGN. THE FRONT EDGE CLEARANCE WAS SUPPLIED BY CLIENT AND IT IS ASSUMED THAT THE SYSTEM OWNER WILL REMOVE SNOW AS NEEDED TO MAINTAIN AN UNOBSTRUCTED FRONT EDGE. ADVERSE EFFECTS OF SNOW BANKING, INCLUDING SHADING OR OTHER STRUCTURAL CONSIDERATIONS ARE BEYOND TERRASMART'S SCOPE.
- MINIMUM AND TYPICAL FRONT EDGE CLEARANCE SHOWN ON SIDE ELEVATION. MAXIMUM FRONT EDGE CLEARANCE DETERMINED PER FIELD CONDITIONS.
- SOUTHERN EDGES OF MODULES SHALL BE ALIGNED WITHIN 2" HORIZONTALLY OF THE SOUTHERN EDGE OF MODULES OF THE ADJACENT RACK.
- EASTERN AND WESTERN EDGES OF MODULES SHALL BE ALIGNED WITHIN 2" VERTICALLY AND HORIZONTALLY OF THE SOUTHERN EDGE OF MODULES OF THE ADJACENT RACK.
- TILT ANGLE TOLERANCE: ± 2° FROM ANGLE SHOWN ON SIDE ELEVATION.
- RACK SPACING TOLERANCE: 6" TYPICAL, 4" MINIMUM, FOR SECTIONS OF THE SITE THAT HAVE A RIDGE OR VALLEY, TERRASMART RECOMMENDS INCREASING THE TABLE SPACING TO 10 INCHES AS MEASURED BETWEEN THE CLOSEST MODULES EDGE BETWEEN ADJACENT RACKS. REFER TO CIVIL ENGINEERING PLANS FOR MORE INFORMATION AND FURTHER DETAIL.
- AZIMUTH TOLERANCE: ± 2° FROM APPROVED CIVIL ENGINEERING PLANS.
- TERRAGLIDE RACKING IS DESIGNED TO ACCOMMODATE A MAXIMUM EAST/WEST SLOPE OF 25%, A MAXIMUM NORTH FACING SLOPE OF 30%, AND A MAXIMUM SOUTH FACING SLOPE OF 20%. THESE SLOPES WERE PROVIDED BY THE CLIENT.
- PANEL SPACING TOLERANCE: MINIMUM 1/4" FOR N/S AND E/W SPACING DIMENSION, AS SHOWN ON SIDE ELEVATION AND REAR ELEVATION TO SUIT FIELD CONDITIONS.
- FOR MODULE MOUNTING HARDWARE, TERRASMART PROVIDES STAINLESS STEEL HEX BOLT WITH INTEGRATED STAR WASHER AND SERRATED FLANGE NUT. THE CLIENT IS RESPONSIBLE TO CONFIRM THAT TERRASMART'S MODULE MOUNTING HARDWARE IS COMPATIBLE WITH THE MODULE THAT THE CLIENT WILL PROVIDE.

**II. SITE PREPARATION**

- PRIOR TO COMMENCING WORK AND FOR THE DURATION OF THE PROJECT, GENERAL CONTRACTOR SHALL ENSURE THE SITE IS PREPARED AND MAINTAINED AS FOLLOWS (TO AVOID CHANGE ORDERS):
  - ALL REQUIRED PERMITS SHALL BE OBTAINED AND CURRENT.
  - LOCATE ALL UNDERGROUND UTILITIES AND ENSURE THAT THE PROPOSED INSTALLATION DOES NOT CONFLICT WITH ANY EXISTING INFRASTRUCTURE. MARKINGS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT.
  - ALL REQUIRED EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN PLACE AND OPERATIONAL.
  - GRASS SHALL BE MOWED WITH BLADES NO HIGHER THAN 3" TALL.
  - ALL VEGETATION, INCLUDING TREES AND SHRUBS SHALL BE CLEARED AND ROOT SYSTEMS GRUBBED. ALL ORGANIC MATTER SHALL BE STRIPPED AND REMOVED FROM THE BUILDING ENVELOPE BEFORE EARTH WORK OCCURS, IF ANY.
  - LOOSE SURFACE IMPEDIMENTS, INCLUDING ROCKS, COBBLES, BOULDERS, CONSTRUCTION DEBRIS, AND OTHER OBSTRUCTIONS SHALL BE REMOVED.
  - SITE SHALL BE SAFE FOR OPERATING MACHINERY AND FOR PERSONNEL ON FOOT. SITE CONDITIONS SHALL NOT BE AN ENCUMBRANCE TO THE PERFORMANCE OF WORK.
  - GROUND WATER, INCLUDING WATER TABLE AND PERCHED WATER, SHALL NOT ENCROACH BETWEEN THE GROUND SURFACE AND THE EMBEDMENT DEPTH OF THE GROUND SCREW. DEWATERING IS REQUIRED IF GROUND WATER IS ENCOUNTERED DURING PILOT HOLE DRILLING AND/OR GROUND SCREW INSTALLATION.
  - SITE SHALL BE GRADED TO PROVIDE CONTROLLED POSITIVE DRAINAGE AWAY FROM FOUNDATIONS. STANDING WATER AND/OR WATER WITH SUFFICIENT VELOCITY TO ERODE SOIL IS NOT ALLOWED WITHIN 20 FEET OF THE FOUNDATION.
  - NO FINISHED GRADE SOIL SHALL BE DISTURBED WITHIN 24" OF THE PROPOSED OR INSTALLED LOCATION OF A GROUND SCREW. SEE ADDITIONAL REQUIREMENTS FOR TRENCHES AND OTHER EXCAVATIONS IN SECTION II.3.
- ALL EARTHWORK SHALL BE NOTED ON THE PLANS AND PROPERLY AS-BUILT. CUT AREAS SHALL BE PROOF ROLLED AFTER REMOVAL OF SOIL. FILL AREAS SHALL BE STRIPPED OF ALL VEGETATION AND PROOF ROLLED PRIOR TO PLACING FILL MATERIAL.
- TRENCHES AND OTHER EXCAVATIONS MAY BE CUT EITHER BEFORE OR AFTER GROUND SCREW INSTALLATION PROVIDED THEY MEET THE REQUIREMENTS OF II.1, II.5. IF THEY ARE CUT AFTER GROUND SCREW INSTALLATION, THE HORIZONTAL DISTANCE BETWEEN THE GROUND SCREW AND THE EDGE OF THE EXCAVATION MUST BE GREATER THAN OR EQUAL TO THE VERTICAL DEPTH OF THE EXCAVATION (1:1 RATIO), PLUS 24". 2. IF THEY ARE CUT BEFORE GROUND SCREW INSTALLATION, THE HORIZONTAL DISTANCE BETWEEN EXCAVATION AND PROPOSED GROUND SCREW LOCATION SHOULD BE 24" OR GREATER.
- IMPORTED GRANULAR FILL MATERIAL SHALL BE USED FOR EARTHWORK UNLESS ON-SITE SOILS MEET THE FOLLOWING REQUIREMENTS:
  - FREE OF PARTICLES LARGER THAN 2" IN DIAMETER, ORGANIC MATTER, AND OTHER DELETERIOUS MATERIALS; AND
  - CAN BE PROPERLY MOISTURE CONDITIONED.
- GRANULAR ON-SITE SOILS OR IMPORTED GRANULAR MATERIAL MAY BE USED AS FILL AS LONG AS THEY MEET THE FOLLOWING REQUIREMENTS:
  - WELL GRADED BETWEEN COARSE AND FINE SIZES;
  - CONTAINING NO CLAY BALLS, ROOTS, ORGANIC MATTER OR OTHER DELETERIOUS MATERIALS;
  - MAXIMUM PARTICLE SIZE OF 2", WITH LESS THAN 12% PASSING THE U.S. NO. 200 SIEVE; AND
  - IMPORTED FILL MATERIALS SHALL BE SAMPLED AND TESTED BY A GEOTECHNICAL ENGINEER OR OTHER QUALIFIED SOIL TESTING AGENCY PRIOR TO BEING TRANSPORTED TO THE SITE.
- FILL SOILS SHALL BE COMPACTED AT MOISTURE CONTENTS THAT ARE NEAR OPTIMUM. THE OPTIMUM MOISTURE CONTENT VARIES WITH THE SOIL GRADATION AND SHALL BE EVALUATED DURING CONSTRUCTION. FILL MATERIAL THAT IS NOT NEAR OPTIMUM MOISTURE CONTENT SHALL BE MOISTURE CONDITIONED. FILL MATERIAL SHALL BE PLACED IN UNIFORM, HORIZONTAL LIFTS, AND BE COMPACTED WITH APPROPRIATE EQUIPMENT TO AT LEAST 90% OF THE MAXIMUM DRY DENSITY PER ASTM D1557. THE MAXIMUM LIFT THICKNESS WILL VARY DEPENDING ON THE MATERIAL AND COMPACTION EQUIPMENT USED, BUT SHALL NOT BE GREATER THAN 12" AND SHOULD BE CONSISTENT THROUGHOUT THE DEPTH OF THE COMPACTED SOIL.
- TERRASMART REQUIRES THAT FILL COMPACTION BE TESTED BY A GEOTECHNICAL ENGINEER OR OTHER QUALIFIED SOIL TESTING AGENCY DURING THE PLACEMENT AND COMPACTION OF FILL TO VALIDATE THE WORK.
- ROCK DRILLING SHALL BE PERFORMED IF REQUIRED BY PRESENCE OF UNDERGROUND ROCK. PILOT HOLE DIAMETER SHALL BE DETERMINED BY ONSITE TESTING AND APPROVED BY TERRASMART.

**III. FOUNDATION NOTES**

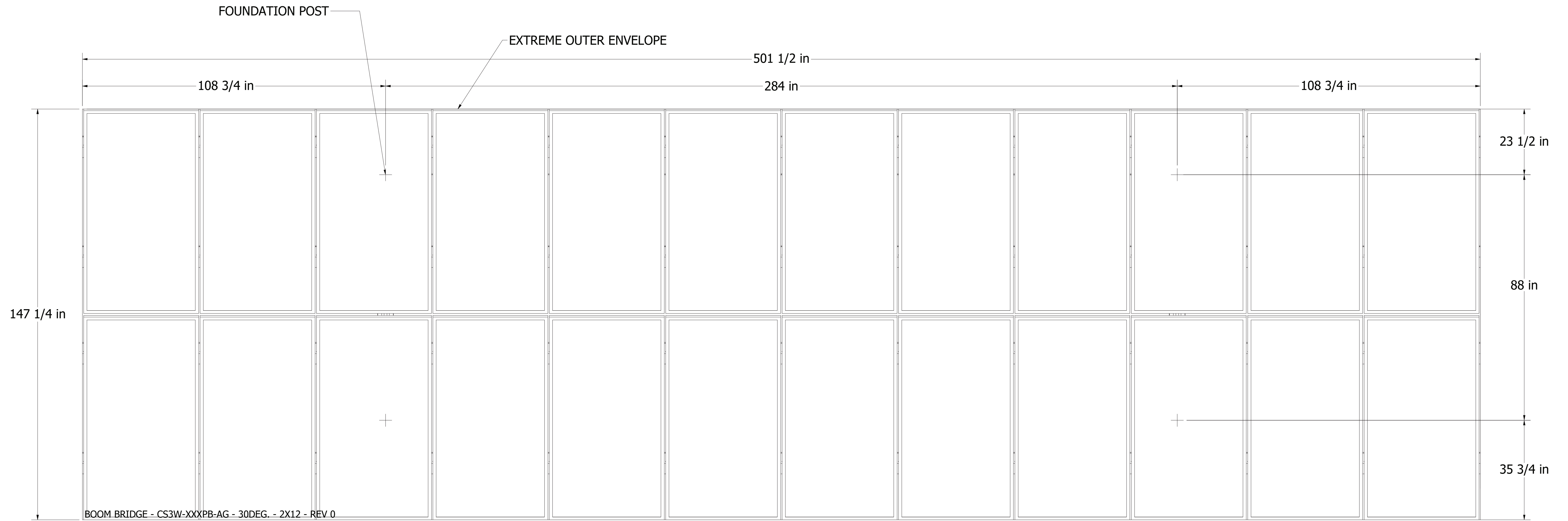
- GROUND SCREW FOUNDATIONS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER SPECIFICATIONS BY A CERTIFIED INSTALLER TRAINED ON THIS TECHNOLOGY.
- GROUND SCREW FOUNDATIONS SHALL BE INSTALLED IN UNDISTURBED, NATURAL SOIL, UNLESS OTHERWISE NOTED AND PROPERLY PREPARED AS DESCRIBED IN SECTION II. SITE PREPARATION.
- FOUNDATION INSTALLATION SUB-CONTRACTOR SHALL DETERMINE DIAMETER AND DEPTH OF PRE-DRILLED PILOT HOLE AS REQUIRED BY SITE CONDITIONS.
- SHOULD UNFORESEEN LOOSE SOIL CONDITIONS BE ENCOUNTERED ONSITE, CONCRETE OR OTHER ADDITIVES MAY BE USED TO STABILIZE THE SOIL AT CLIENTS EXPENSE. SHOULD UNDERGROUND WATER BE ENCOUNTERED, THE CLIENT SHALL REMEDIATE THE ISSUE.
- THE USE OF WATER AS LUBRICANT IS ALLOWED.
- TOLERANCES IN THE POSITION OF EACH SCREW ARE ± 2" Laterally (North-South and East-West) and ± 3" Vertically (Up-Down) with a typical 76.7" Embedment, as measured from grade. In the rare case that a ground settlement occurs, no remediation is required if the settlement results in a racking configuration that is still within tolerance of the project's construction plans or installation manual and does not over stress the racking structure.
- MINIMUM REQUIRED TORQUE FOR GROUND SCREW INSTALLATION: 2000 N-m.
- AT THIS TIME NO GROUND SCREW TESTING DATA IS AVAILABLE. GROUND SCREW FOUNDATIONS HAVE BEEN DESIGNED BASED ON EXTENSIVE TESTING IN MEDIUM/ DENSE SOILS.
- NO GEOTECH REPORT WAS PROVIDED BY THE CLIENT.

v-1.11



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GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 83.94 (2132mm) EAST/ WEST EDGE - 41.26 (1048mm) NORTH/ SOUTH BOLT SPACING - 45.47 (1155mm) EAST/ WEST BOLT SPACING - 40.12 (1019mm) THICKNESS - 1.18 (30mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X12 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/16/2021	CHECKED BY MF - 3/16/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D
		ENG. APPROVED BY MF - 3/16/2021	PROJ. ENG. APPROVED BY BS - 3/16/2021			
TERRASMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM	PROJECT NUMBER 20-6575	CLIENT GREENSKIES		MODULE CS3W-XXXPB-AG	REV 0	SHEET NUMBER 2 OF 18
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FLATTENED LAYOUT  
SCALE 1/18

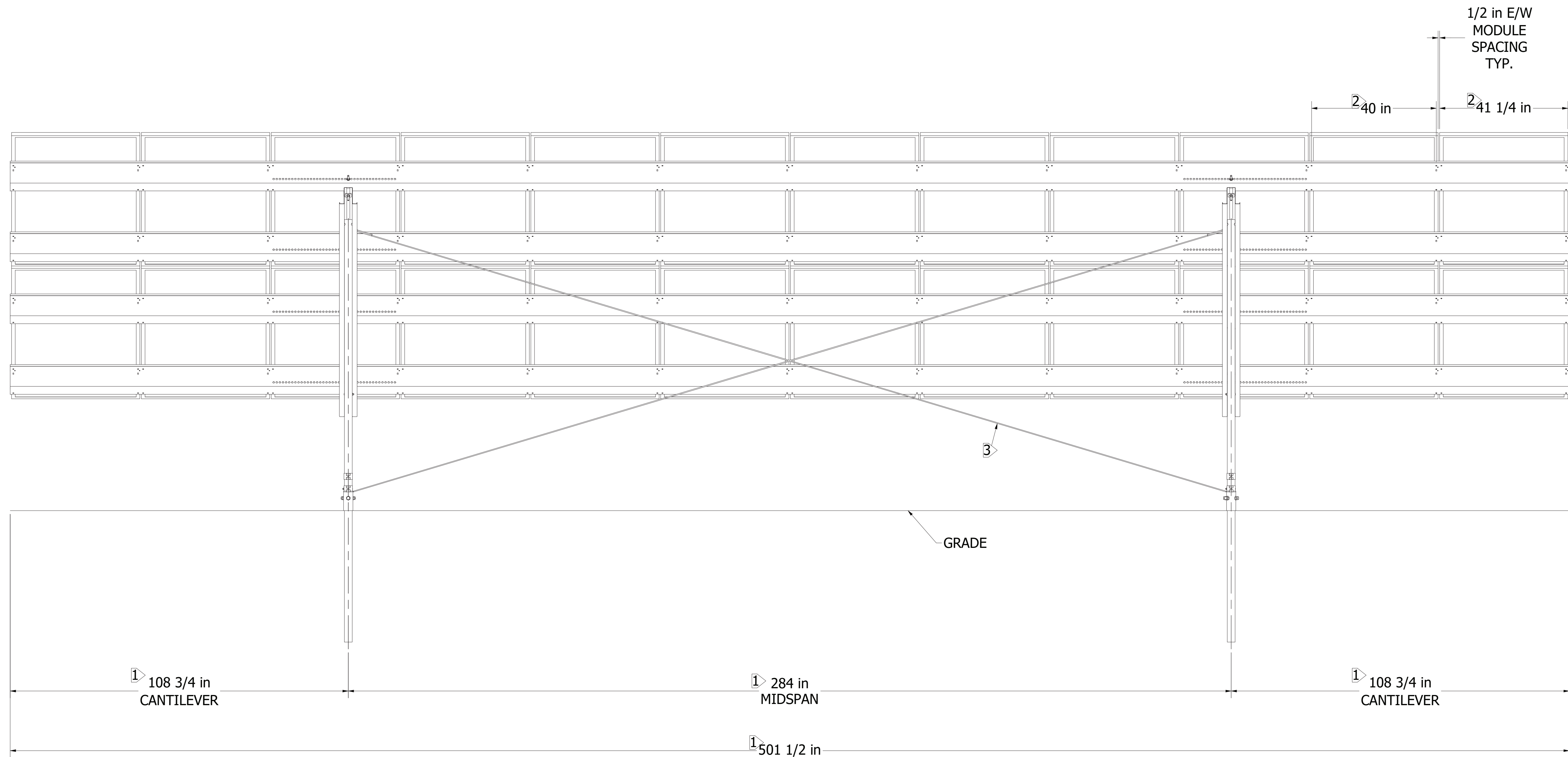


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GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 83.94 (2132mm) EAST/ WEST EDGE - 41.26 (1048mm) NORTH/ SOUTH BOLT SPACING - 45.47 (1155mm) EAST/ WEST BOLT SPACING - 40.12 (1019mm) THICKNESS - 1.18 (30mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X12 MODULE ORIENTATION - PORTRAIT		DRAWN BY TMC - 3/16/2021	CHECKED BY MF - 3/16/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D
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REAR ELEVATION VIEW  
SCALE 1/18



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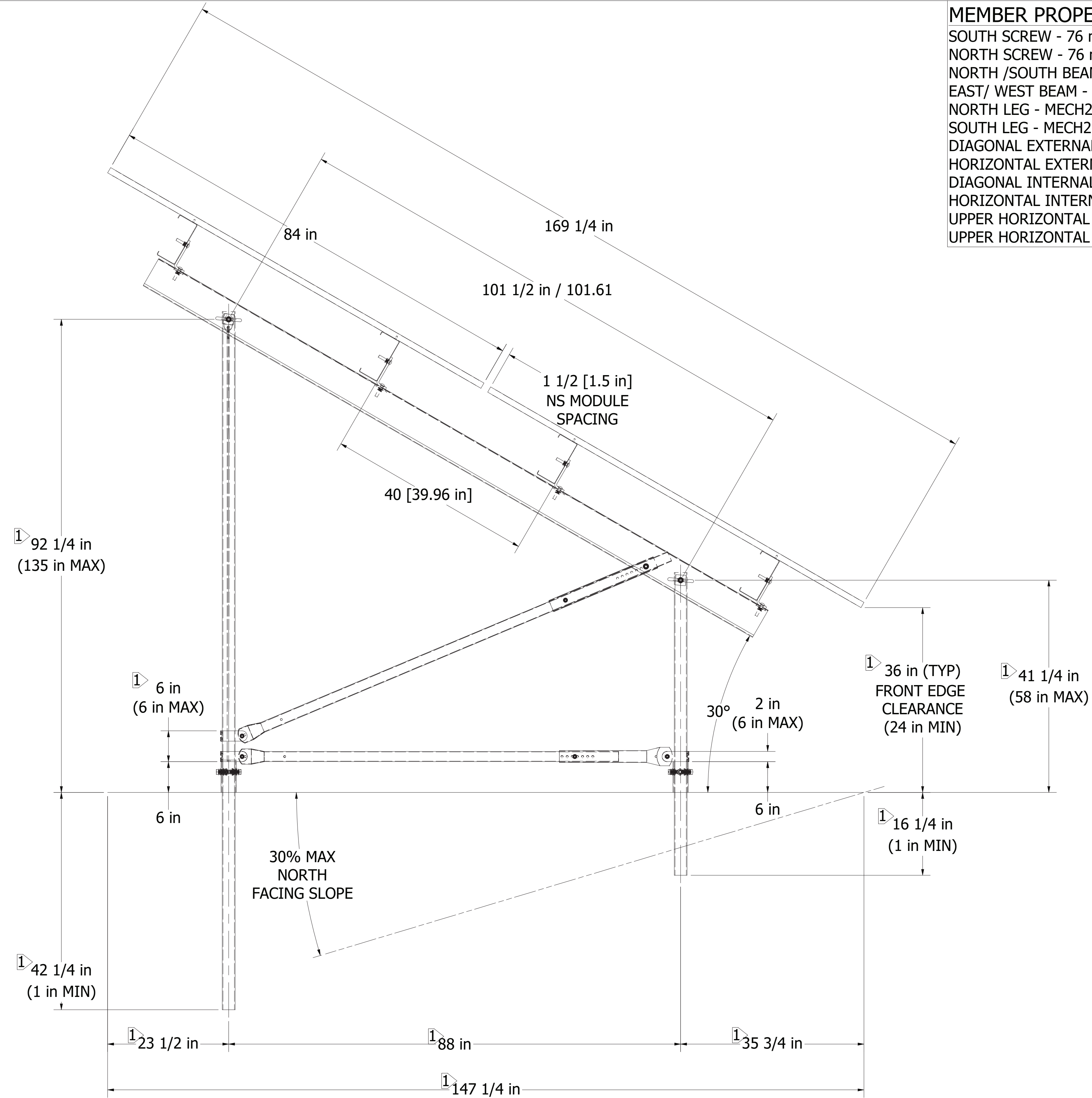
NOTES:

1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. PURLIN SPACING IS DEPENDENT ON MODULE SPECIFICATIONS, REFER TO PROJECT NOTES FOR MODULE SPECIFICATIONS.
3. SEISMIC CROSS BRACING TO BE FIELD FIT.

GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 83.94 (2132mm) EAST/ WEST EDGE - 41.26 (1048mm) NORTH/ SOUTH BOLT SPACING - 45.47 (1155mm) EAST/ WEST BOLT SPACING - 40.12 (1019mm) THICKNESS - 1.18 (30mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X12 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/16/2021	CHECKED BY MF - 3/16/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D		
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**MEMBER PROPERTIES**

SOUTH SCREW - 76 mm X 2100 mm  
 NORTH SCREW - 76 mm X 2100 mm  
 NORTH /SOUTH BEAM - RAFTER - LENGTH = 137.00 in  
 EAST/ WEST BEAM - C-BEAM 9.0x4.0x0.0860 - LENGTH = 501.48 in  
 NORTH LEG - MECH2.375 x 9GA. - LENGTH = 136.00 in  
 SOUTH LEG - MECH2.375 x 9GA. - LENGTH = 59.00 in  
 DIAGONAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 23.00 in  
 HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 22 in  
 DIAGONAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = 91 in  
 HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = 74 in  
 UPPER HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 23 in  
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SIDE ELEVATION VIEW  
 SCALE 1/12

**NOTES:**

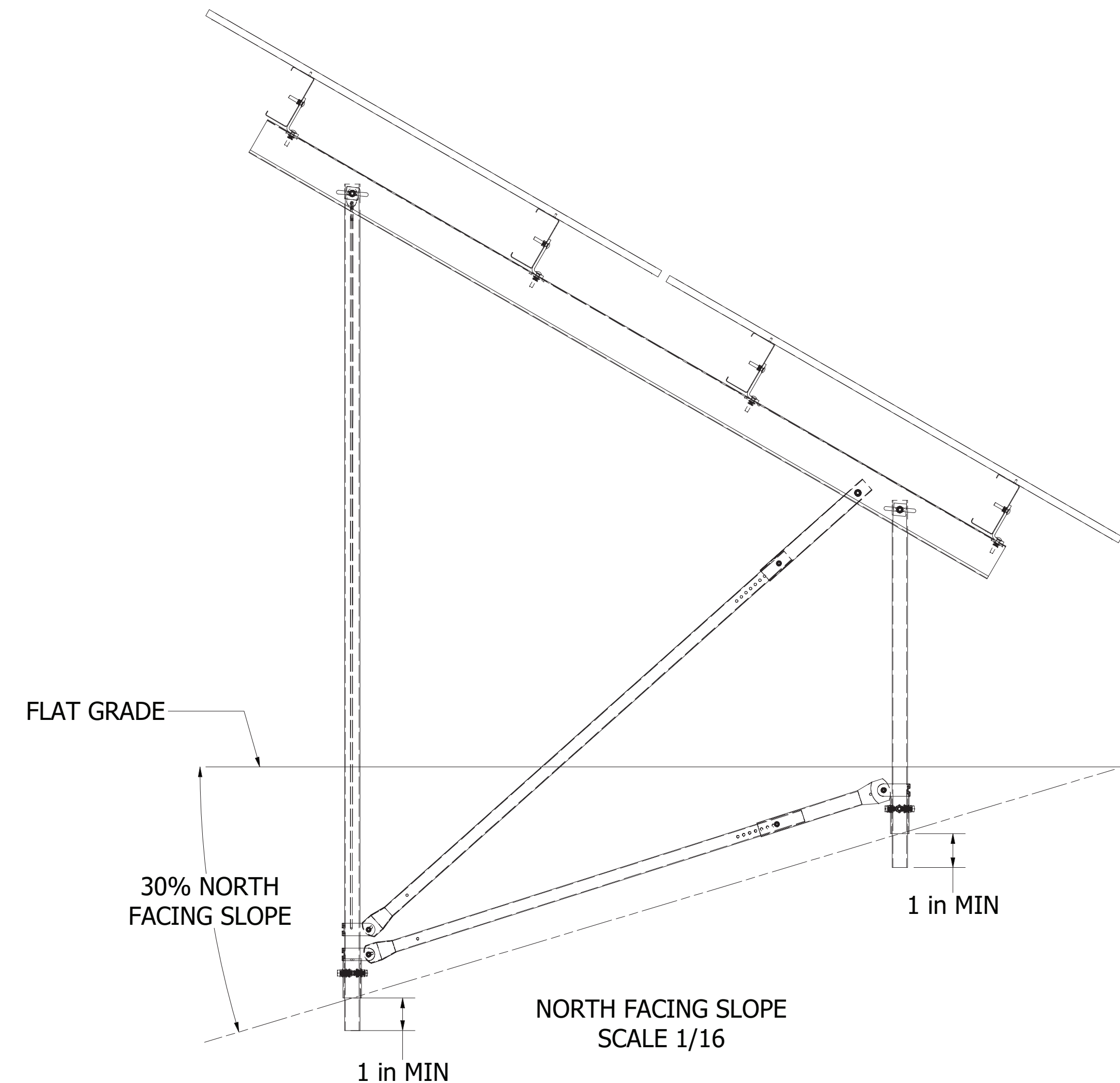
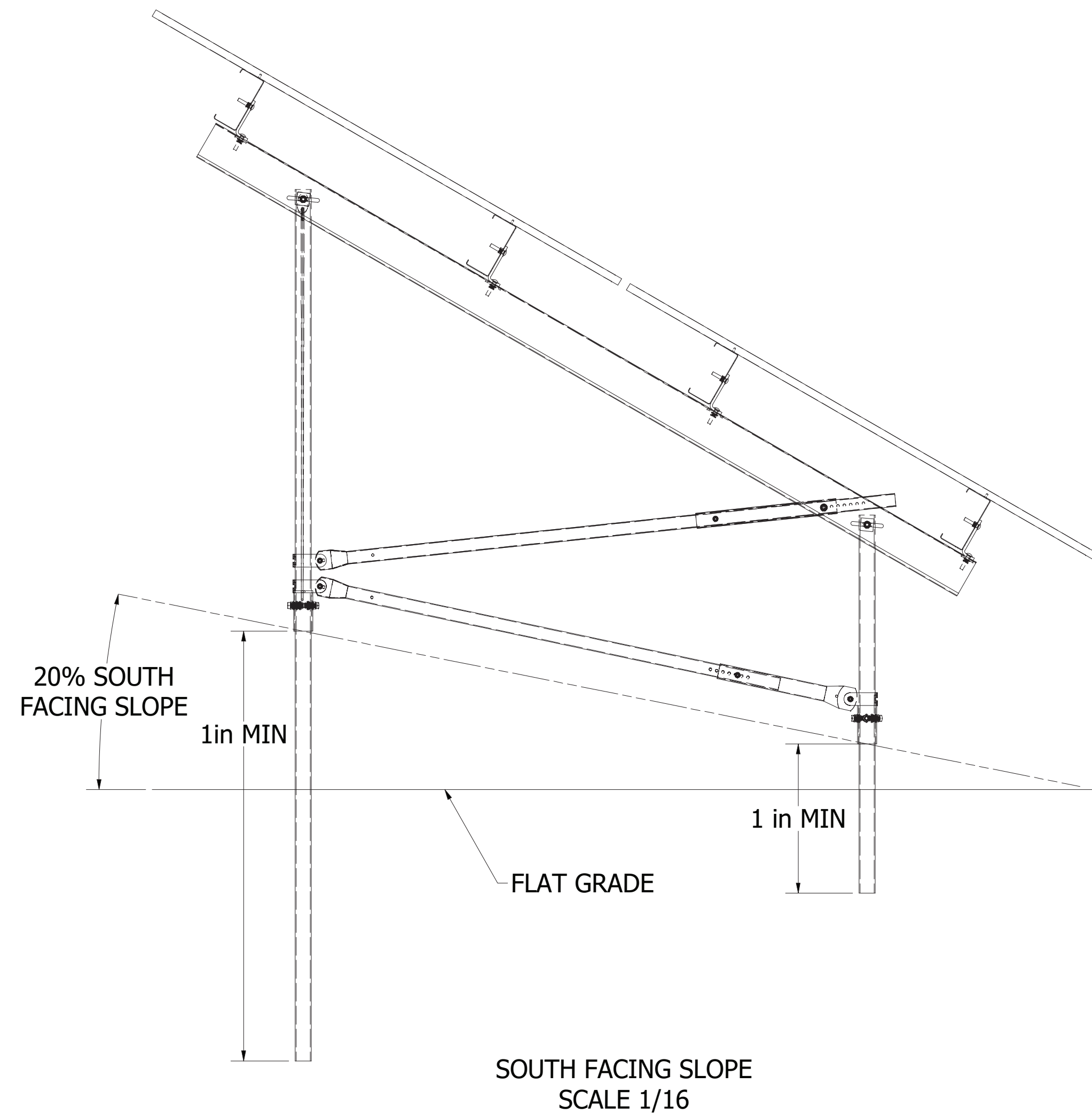
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ZEYN B. UZMAN  
 CT PE# PEN.0023151

GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 83.94 (2132mm) EAST/ WEST EDGE - 41.26 (1048mm) NORTH/ SOUTH BOLT SPACING - 45.47 (1155mm) EAST/ WEST BOLT SPACING - 40.12 (1019mm) THICKNESS - 1.18 (30mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X12 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/16/2021	CHECKED BY MF - 3/16/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D	
		ENG. APPROVED BY MF - 3/16/2021	PROJ. ENG. APPROVED BY BS - 3/16/2021				
TERRASMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM		MFG. APPROVED BY SS - 3/16/2021	CLIENT GREENSKIES		MODULE CS3W-XXXPB-AG	REV 0	SHEET NUMBER 5 OF 18
PROPRIETARY AND CONFIDENTIAL. THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TERRASMART. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT WRITTEN PERMISSION OF TERRASMART IS PROHIBITED.							



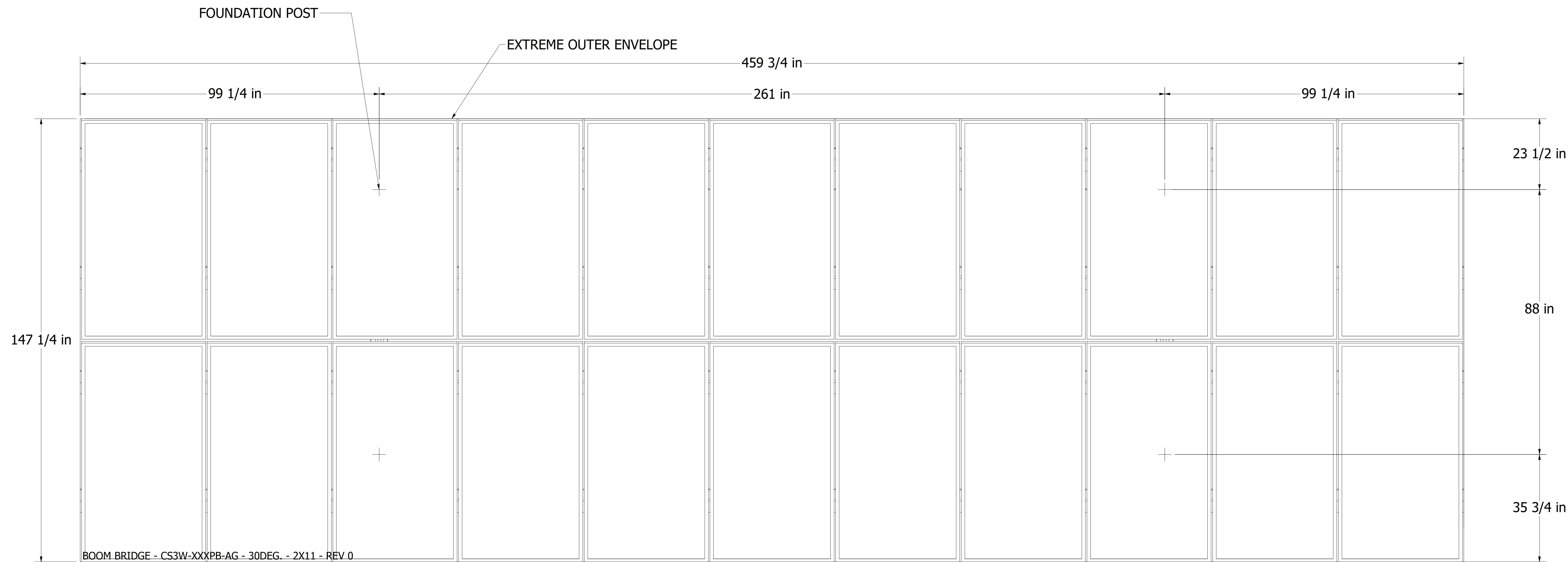


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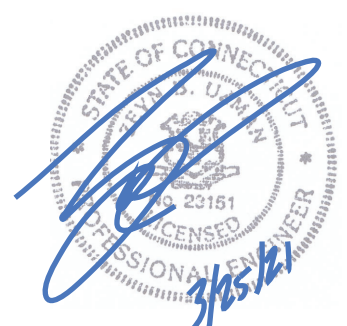
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		MFG. APPROVED BY SS - 3/16/2021	PROJECT NAME BOOM BRIDGE		
		PROJECT NUMBER 20-6575	CLIENT GREENSKIES	MODULE CS3W-XXXXPB-AG	REV 0
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SHEET NUMBER 6 OF 18					



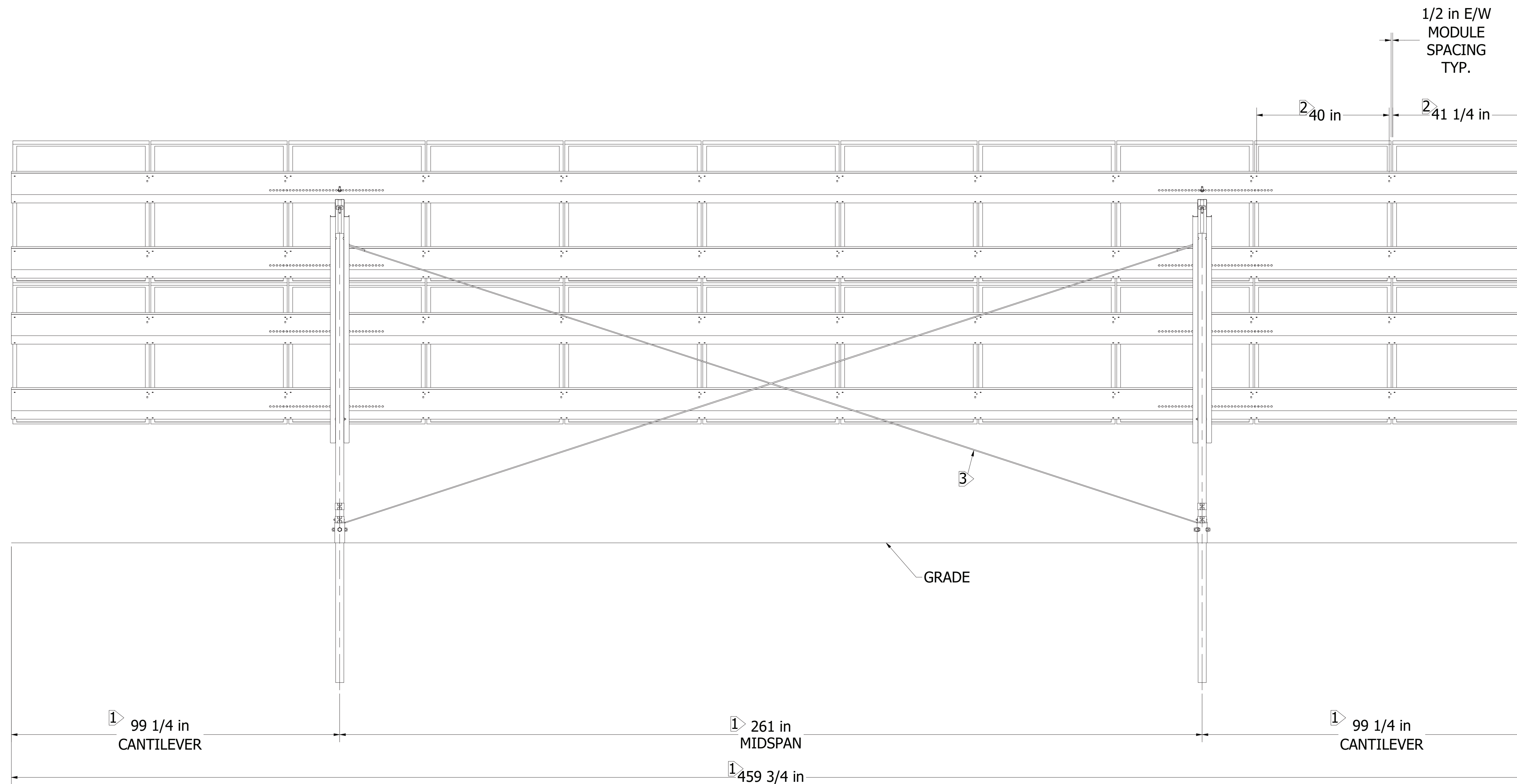
FLATTENED LAYOUT  
SCALE 1/18



ZEYIN B. UZMAN  
CT PE# PEN.0023151

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		MFG. APPROVED BY SS - 3/16/2021			CLIENT GREENSKIES	MODULE CS3W-XXXPB-AG	REV 0	SHEET NUMBER 7 OF 18
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REAR ELEVATION VIEW  
SCALE 1/18



ZEYIN B. UZMAN  
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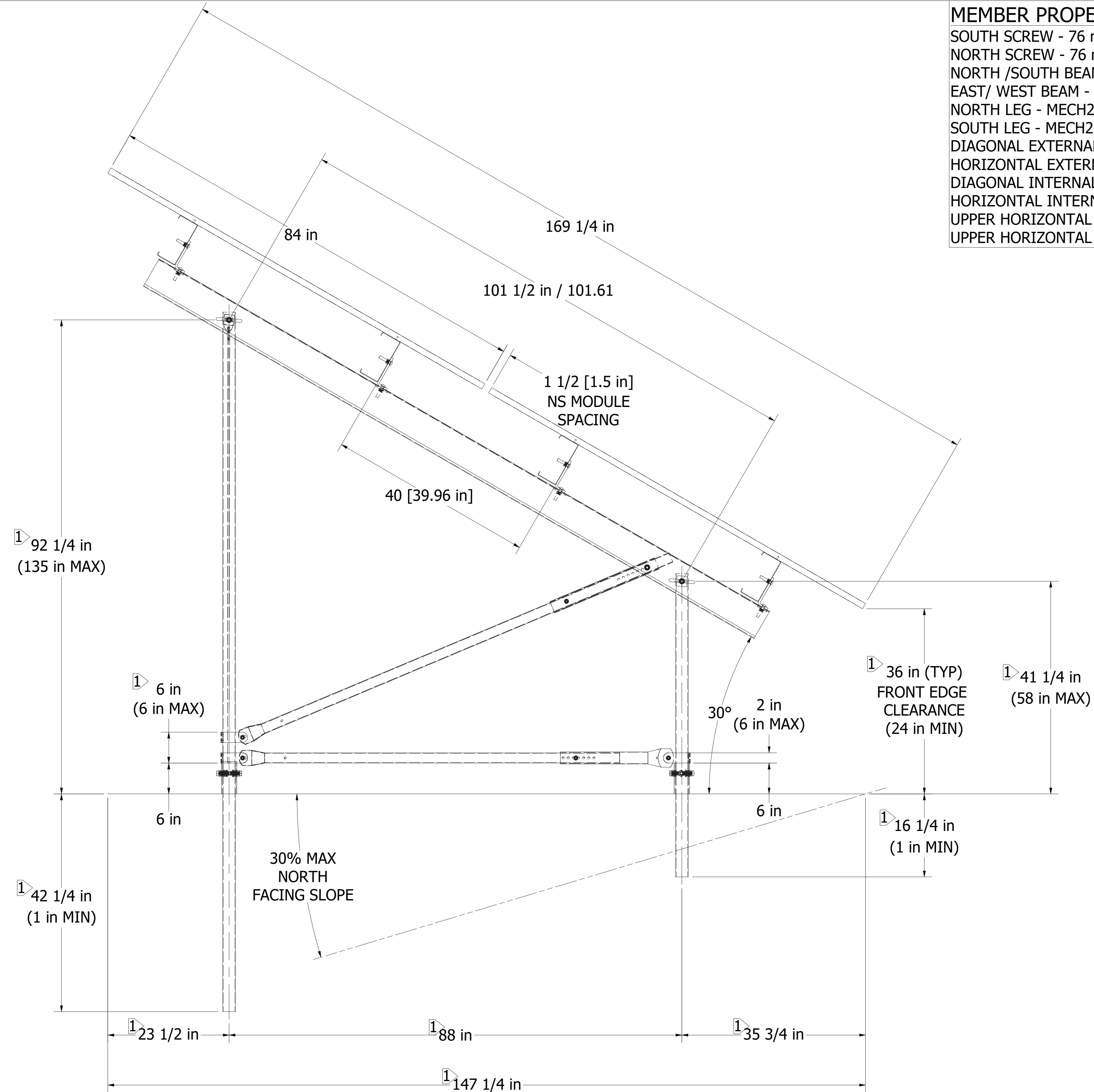
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 NORTH SCREW - 76 mm X 2100 mm  
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 EAST/ WEST BEAM - C-BEAM 9.0x4.0x0.0860 - LENGTH = 459.72 in  
 NORTH LEG - MECH2.375 x 9GA. - LENGTH = 136.00 in  
 SOUTH LEG - MECH2.375 x 9GA. - LENGTH = 59.00 in  
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**SIDE ELEVATION VIEW**  
 SCALE 1/12

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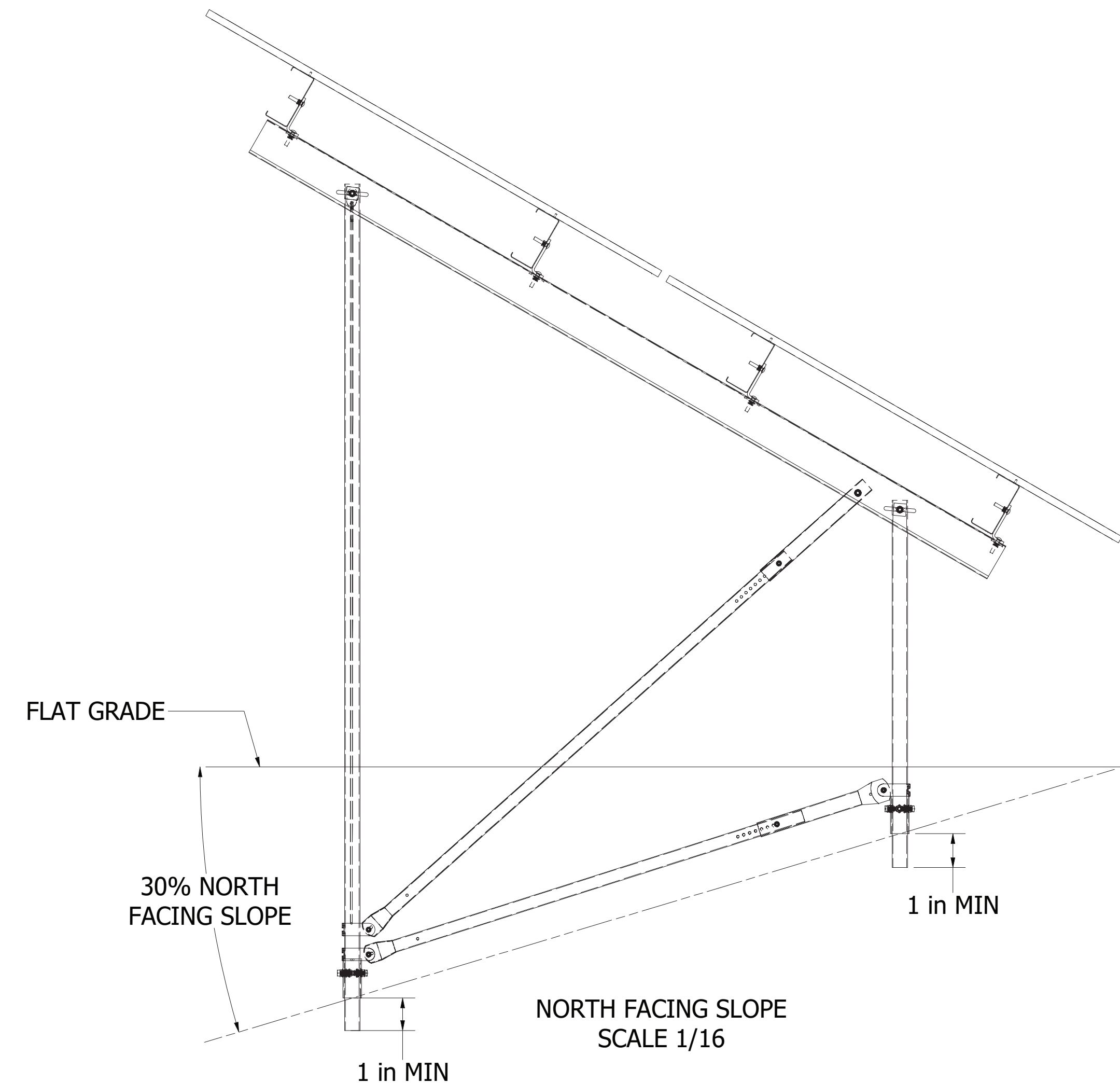
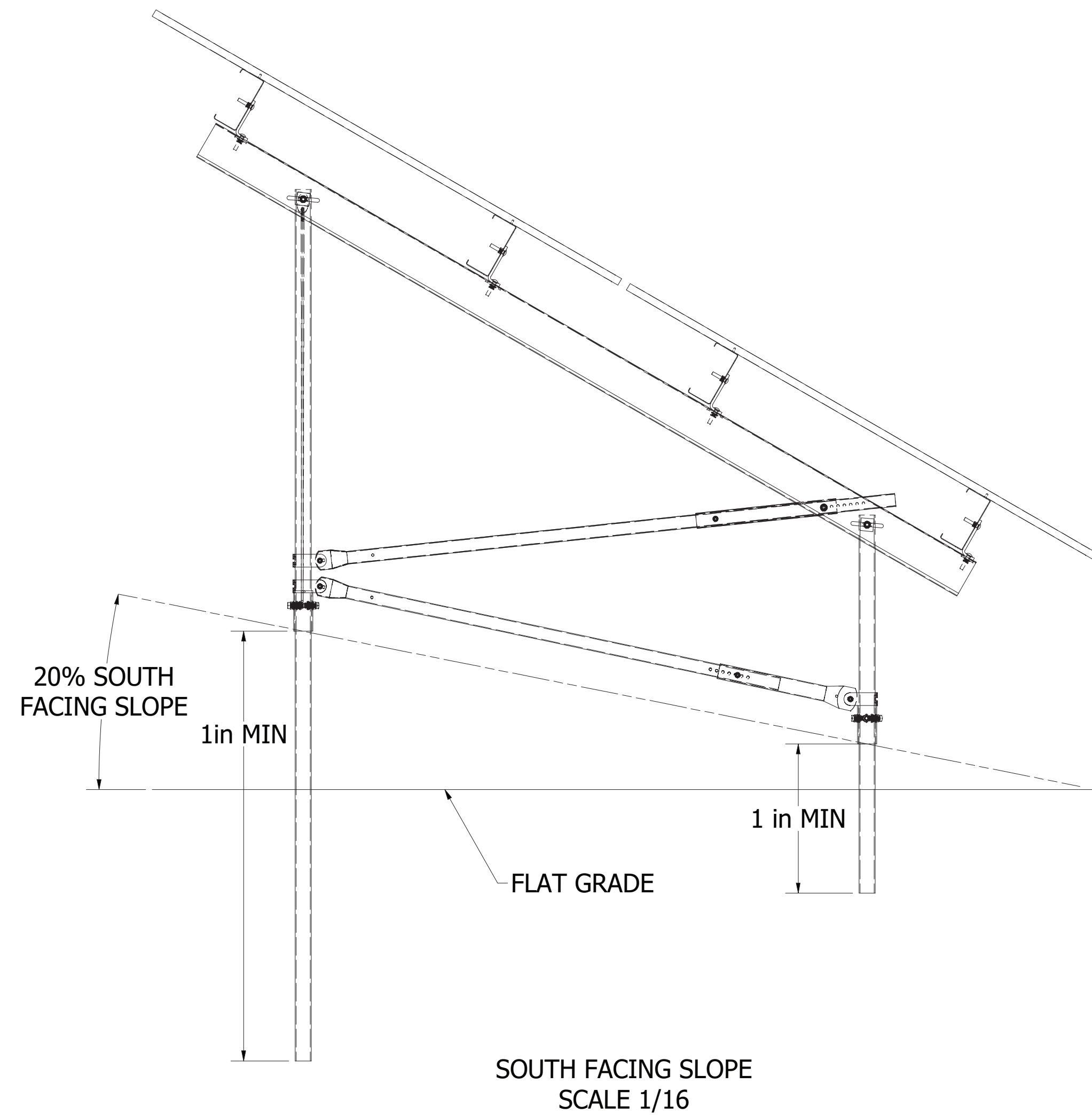
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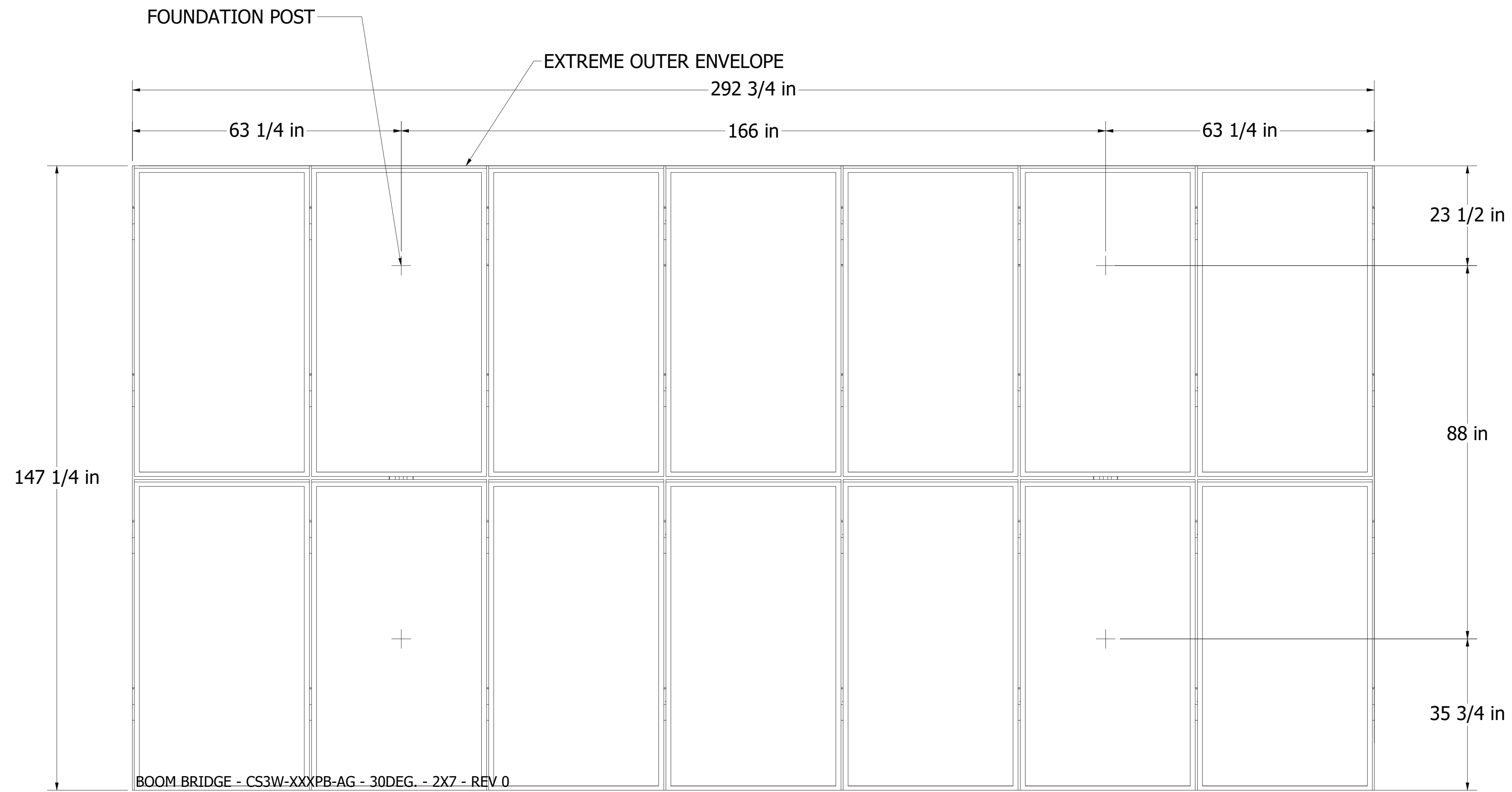


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		PROJECT NUMBER 20-6575				CLIENT GREENSKIES
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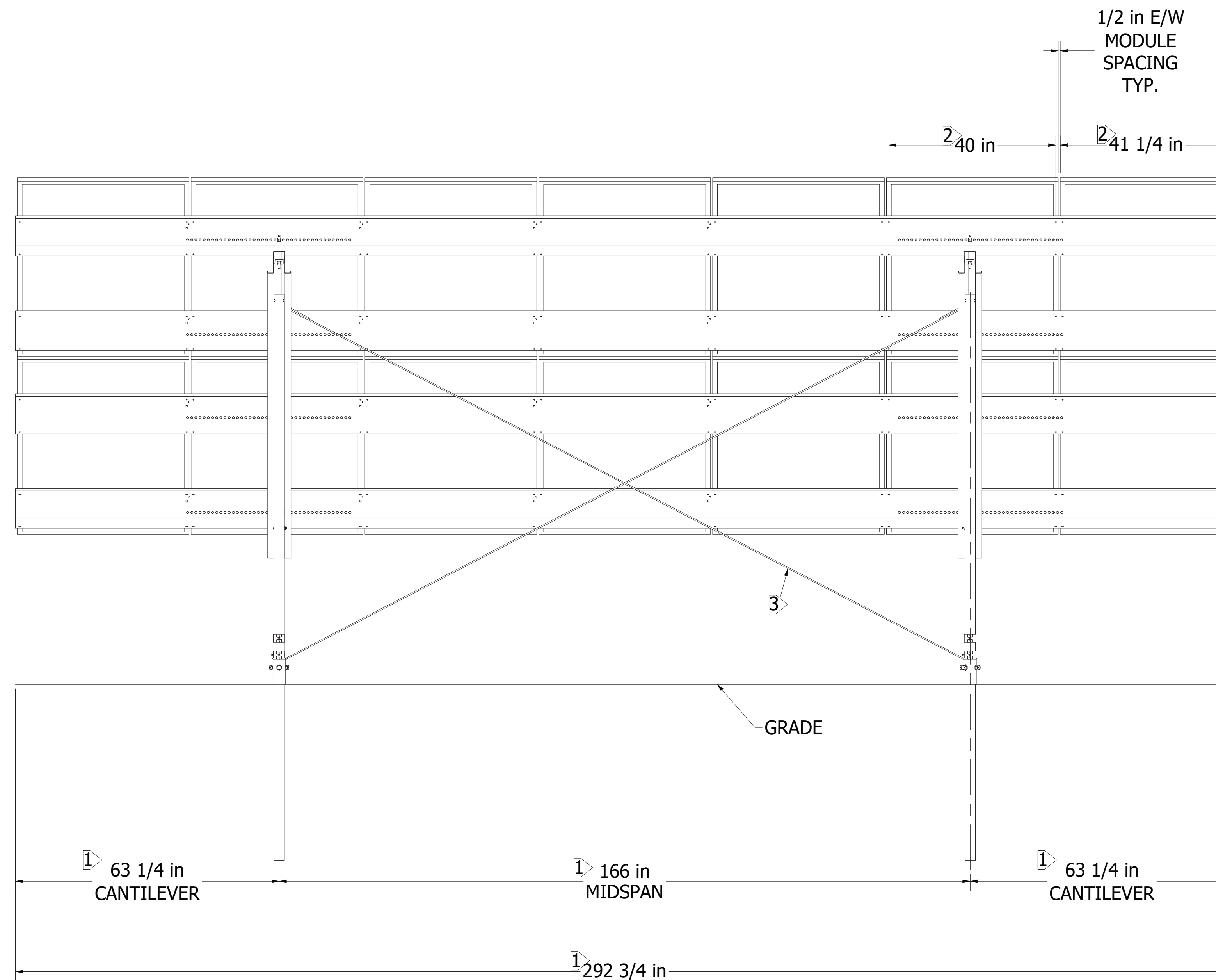
FLATTENED LAYOUT  
SCALE 1/18



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TERRASMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM		MFG. APPROVED BY SS - 3/16/2021	CLIENT GREENSKIES		MODULE CS3W-XXXPB-AG	REV 0	SHEET NUMBER 11 OF 18
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REAR ELEVATION VIEW  
SCALE 1/18



ZEYIN B. UZMAN  
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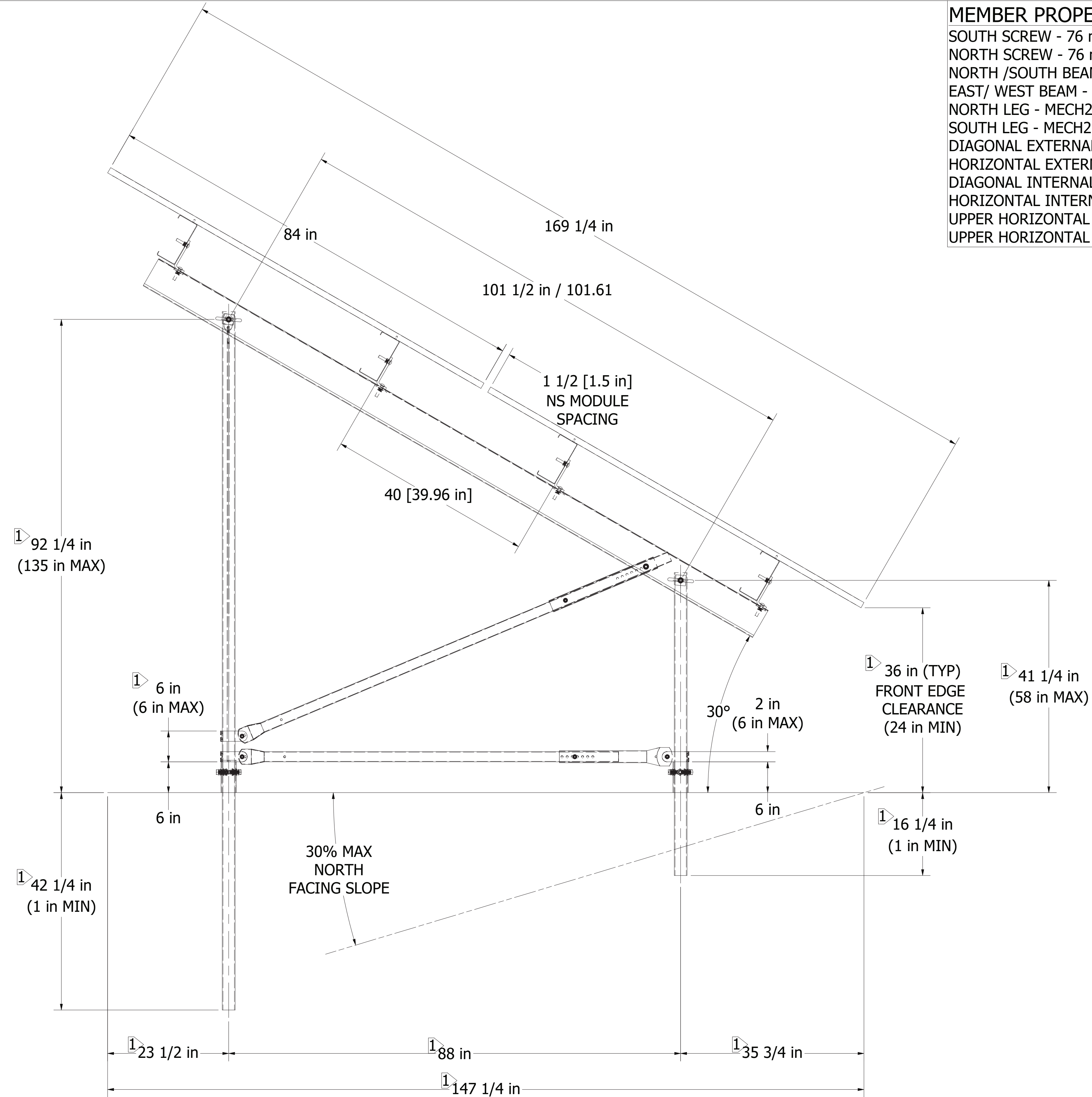
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**SIDE ELEVATION VIEW**  
 SCALE 1/12

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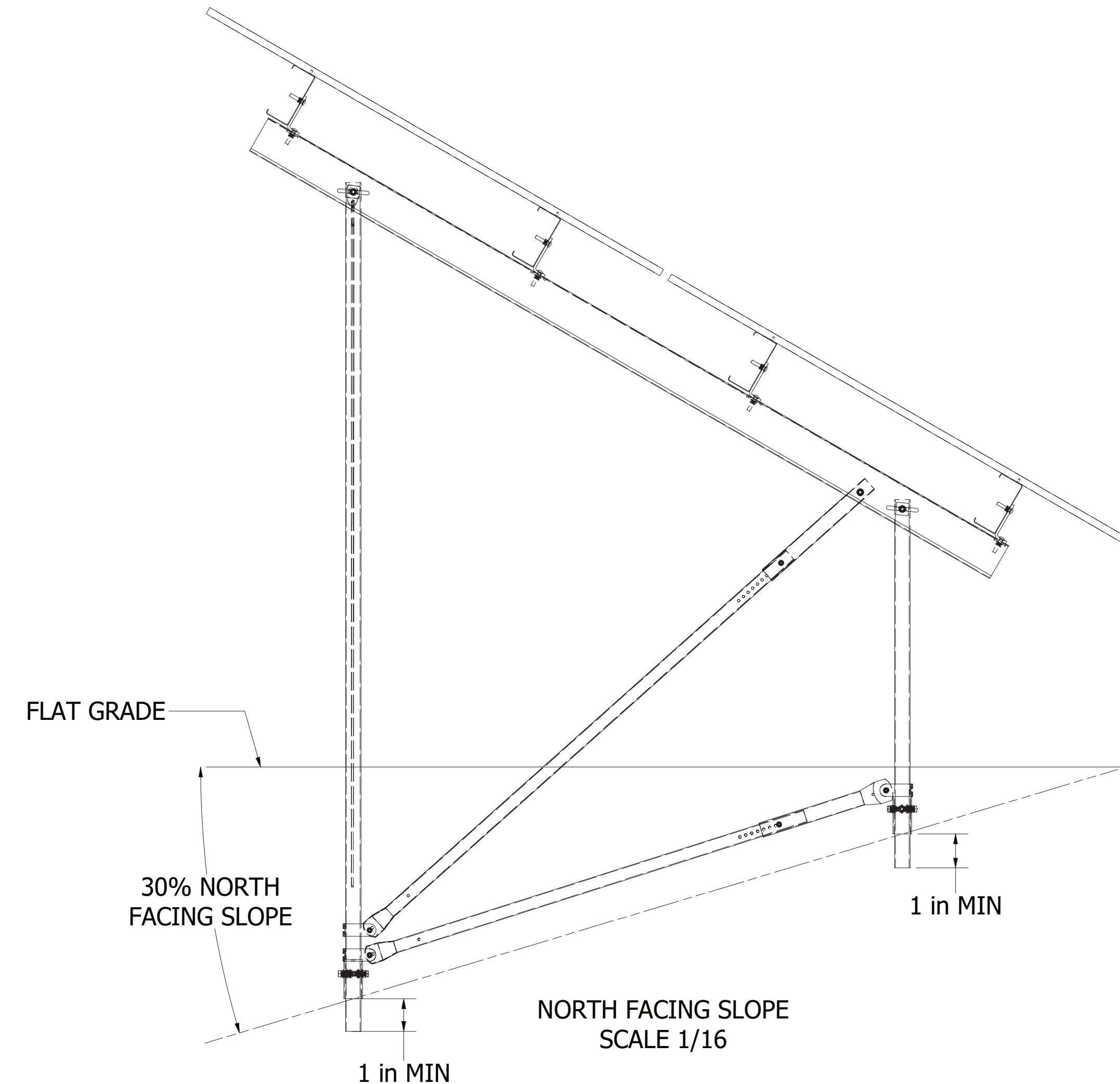
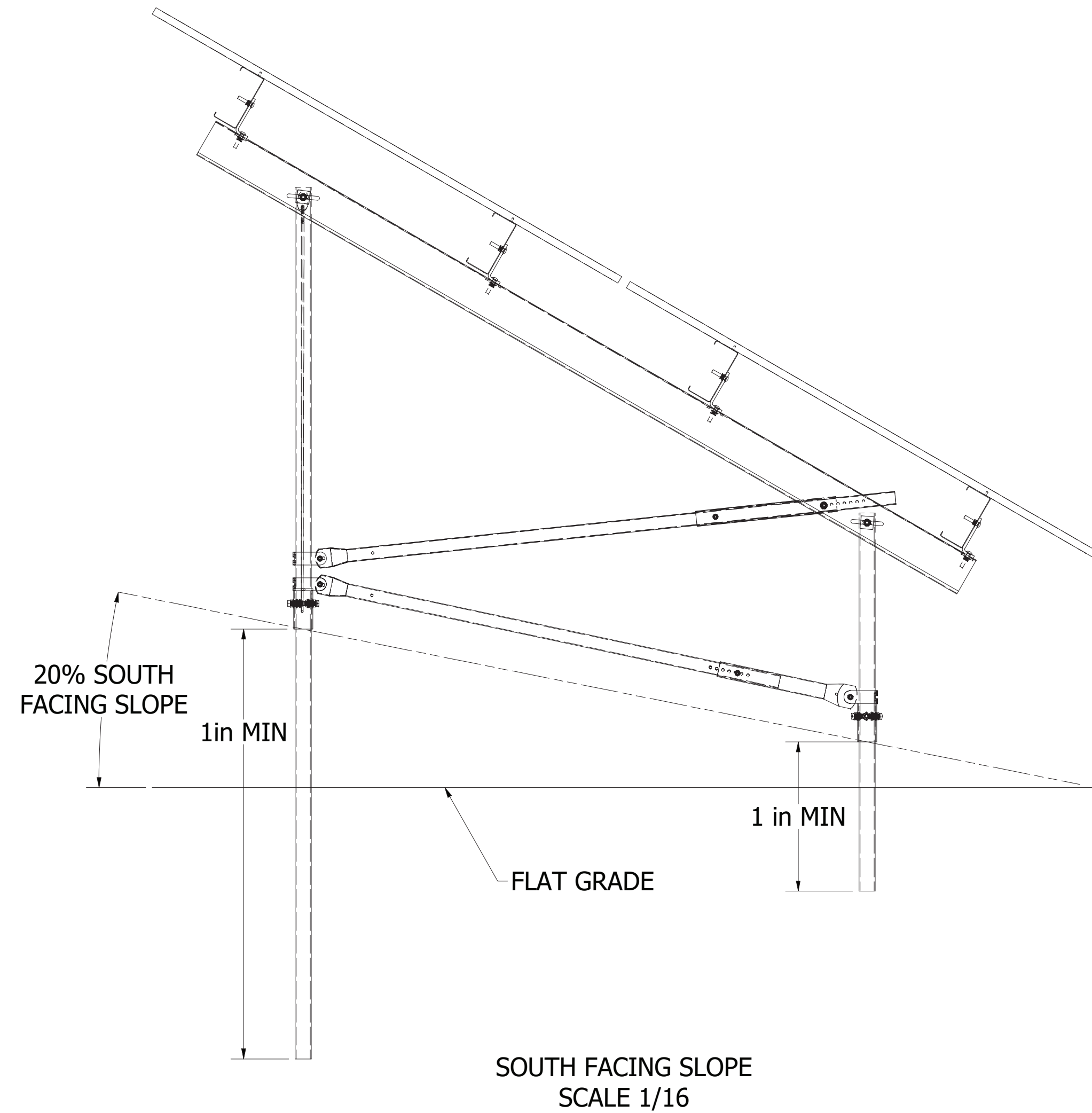
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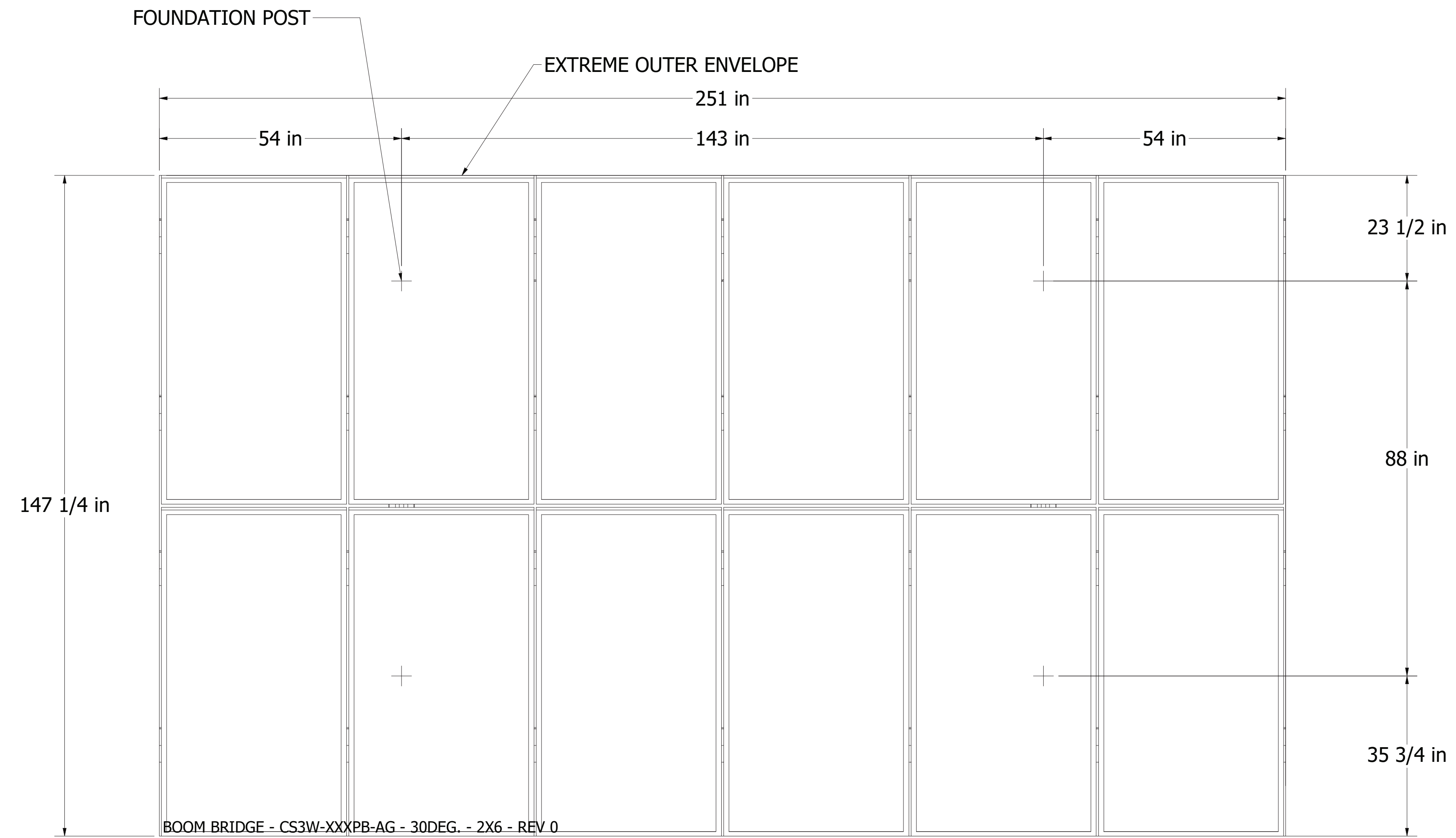


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		ENG. APPROVED BY MF - 3/16/2021	PROJ. ENG. APPROVED BY BS - 3/16/2021				MFG. APPROVED BY SS - 3/16/2021
PROPRIETARY AND CONFIDENTIAL. THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TERRASMART. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT WRITTEN PERMISSION OF TERRASMART IS PROHIBITED.							



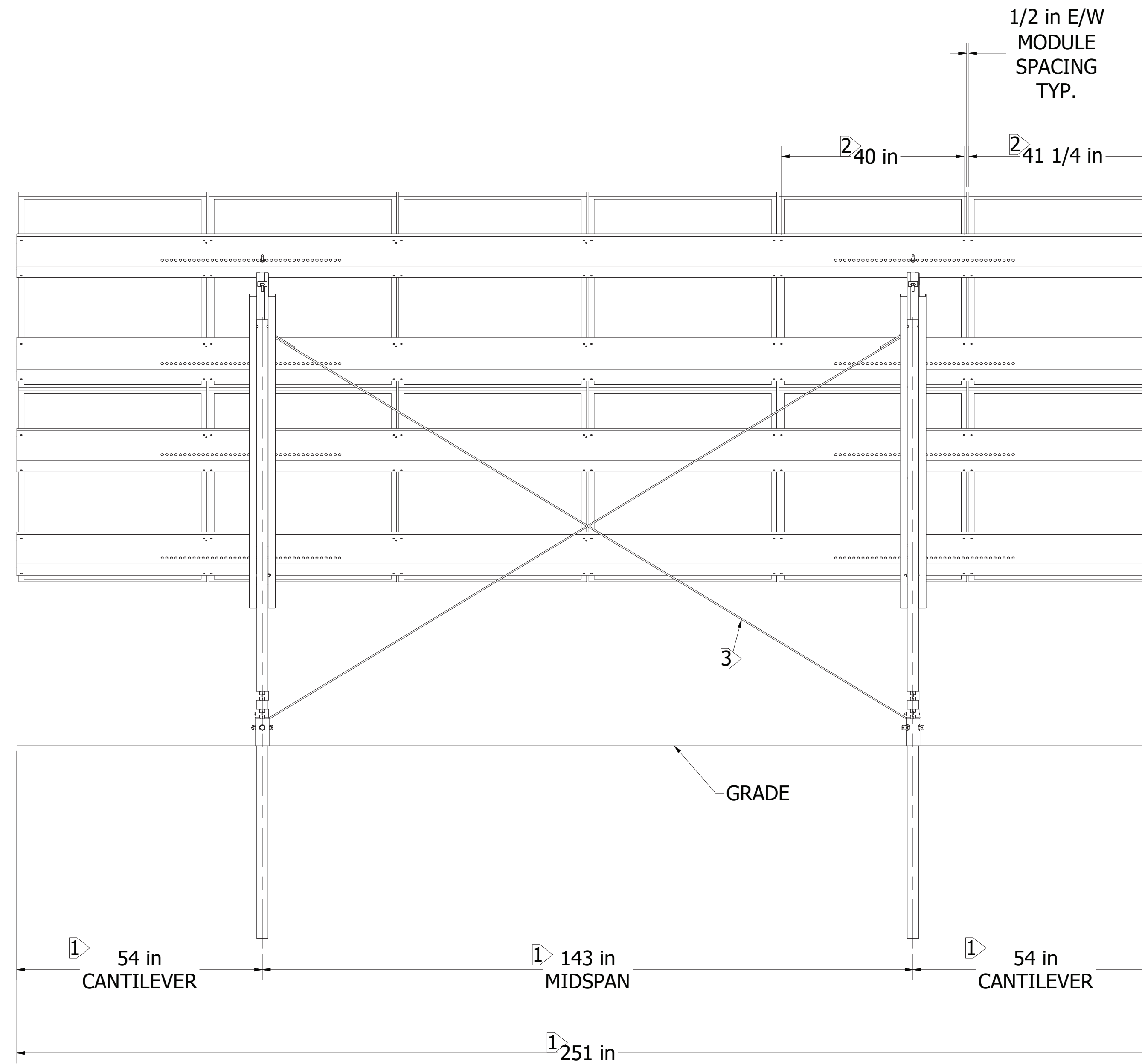
FLATTENED LAYOUT  
SCALE 1/18



ZEYN B. UZMAN  
CT PE# PEN.0023151

GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 83.94 (2132mm) EAST/ WEST EDGE - 41.26 (1048mm) NORTH/ SOUTH BOLT SPACING - 45.47 (1155mm) EAST/ WEST BOLT SPACING - 40.12 (1019mm) THICKNESS - 1.18 (30mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X6 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/16/2021	CHECKED BY MF - 3/16/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D			
		ENG. APPROVED BY MF - 3/16/2021	PROJ. ENG. APPROVED BY BS - 3/16/2021						
		MFG. APPROVED BY SS - 3/16/2021			PROJECT NUMBER 20-6575	CLIENT GREENSKIES	MODULE CS3W-XXXPB-AG	REV 0	SHEET NUMBER 15 OF 18
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REAR ELEVATION VIEW  
SCALE 1/18



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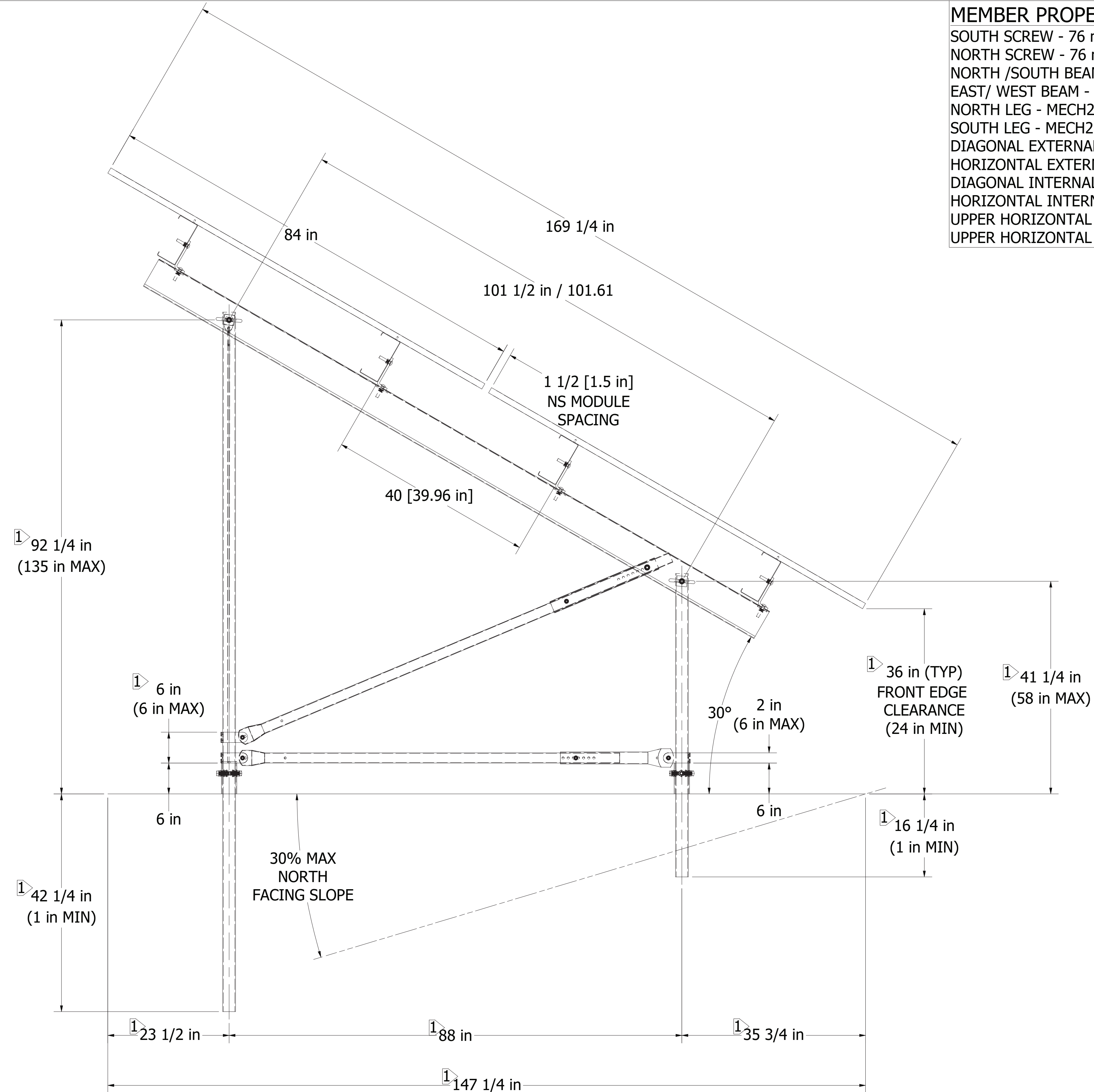
NOTES:

1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. PURLIN SPACING IS DEPENDENT ON MODULE SPECIFICATIONS, REFER TO PROJECT NOTES FOR MODULE SPECIFICATIONS.
3. SEISMIC CROSS BRACING TO BE FIELD FIT.

GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 83.94 (2132mm) EAST/ WEST EDGE - 41.26 (1048mm) NORTH/ SOUTH BOLT SPACING - 45.47 (1155mm) EAST/ WEST BOLT SPACING - 40.12 (1019mm) THICKNESS - 1.18 (30mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X6 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/16/2021	CHECKED BY MF - 3/16/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D	
		ENG. APPROVED BY MF - 3/16/2021	PROJ. ENG. APPROVED BY BS - 3/16/2021				
TERRASMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM		MFG. APPROVED BY SS - 3/16/2021	CLIENT GREENSKIES		MODULE CS3W-XXXXB-AG	REV 0	SHEET NUMBER 16 OF 18
PROPRIETARY AND CONFIDENTIAL. THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TERRASMART. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT WRITTEN PERMISSION OF TERRASMART IS PROHIBITED.							

**MEMBER PROPERTIES**

- SOUTH SCREW - 76 mm X 2100 mm
- NORTH SCREW - 76 mm X 2100 mm
- NORTH /SOUTH BEAM - RAFTER - LENGTH = 137.00 in
- EAST/ WEST BEAM - C-BEAM 9.0x4.0x0.0860 - LENGTH = 250.92 in
- NORTH LEG - MECH2.375 x 9GA. - LENGTH = 136.00 in
- SOUTH LEG - MECH2.375 x 9GA. - LENGTH = 59.00 in
- DIAGONAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 23.00 in
- HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 22 in
- DIAGONAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = 91 in
- HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = 74 in
- UPPER HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 23 in
- UPPER HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = 74 in



SIDE ELEVATION VIEW  
SCALE 1/12

**NOTES:**

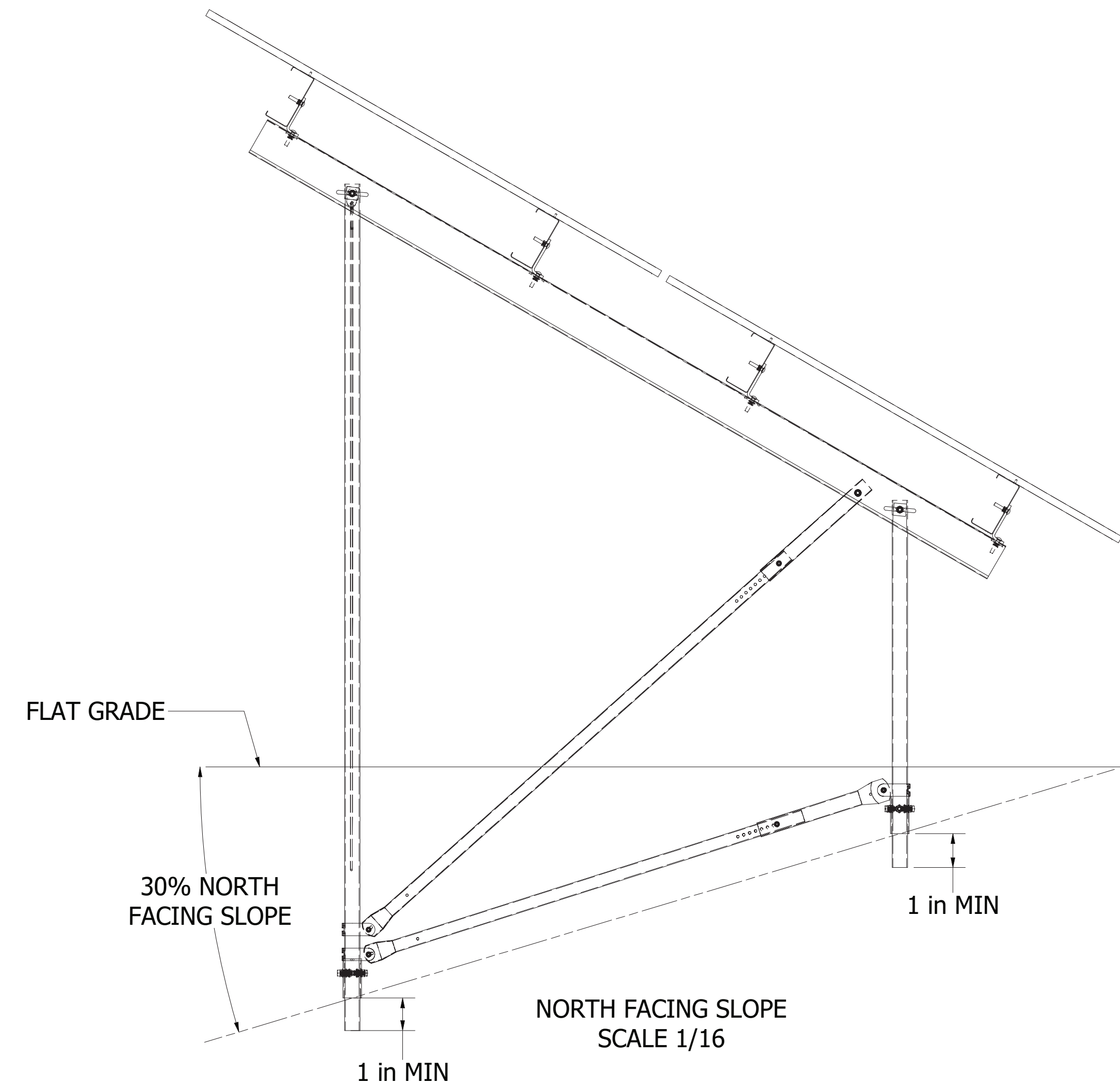
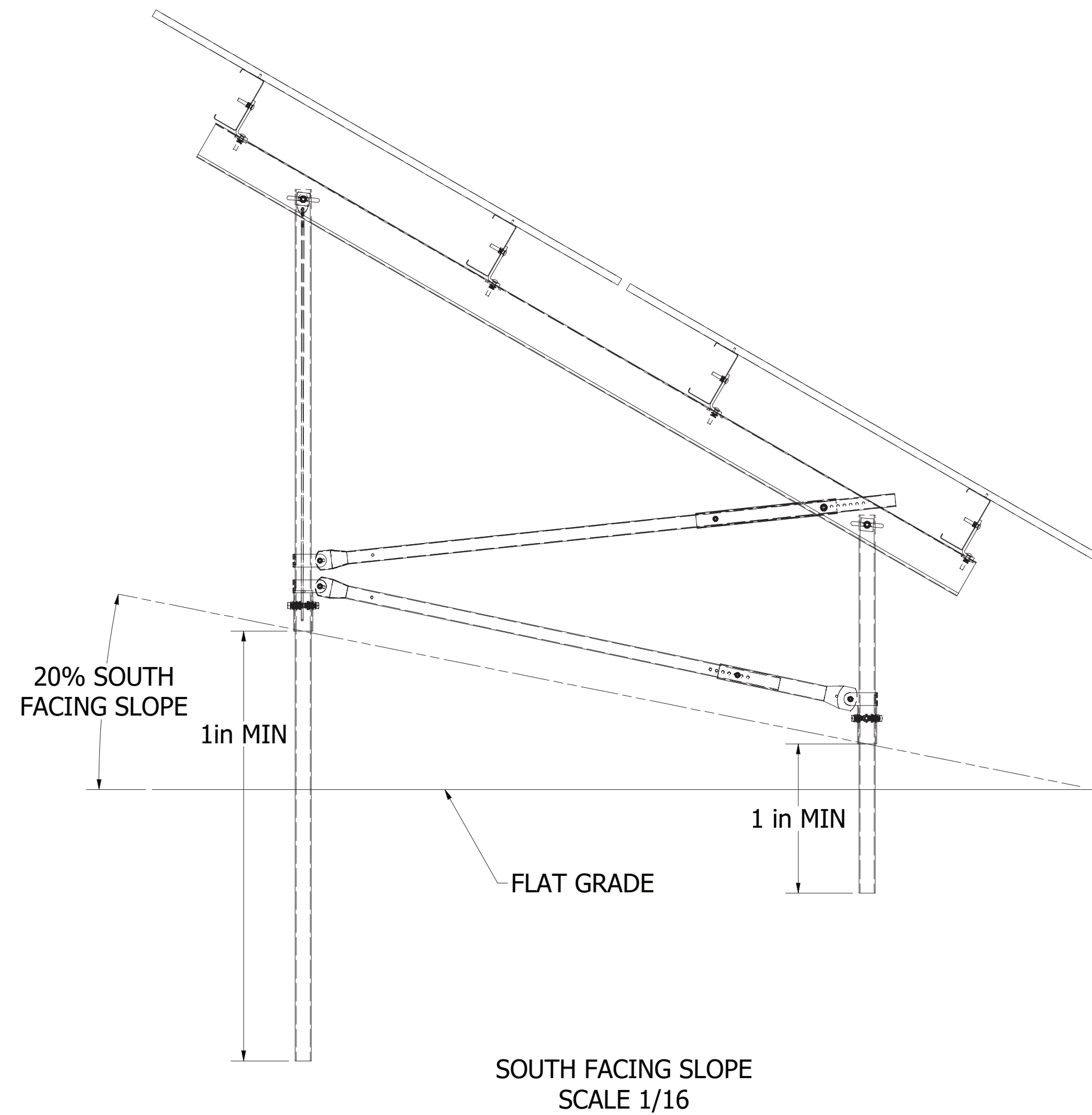
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2. LEGS SHALL BE INSTALLED PLUMB, IF MECHANICALLY POSSIBLE. MAXIMUM 3° OUT OF PLUMB.
3. LATERAL BRACES ARE DESIGNED TO ALLOW FOR 7" OF TOTAL ADJUSTMENT. IF FIELD CONDITIONS REQUIRE ADDITIONAL ADJUSTMENT AND LATERAL BRACES ARE TOO LONG, THEY MAY BE CUT DOWN AND DRILLED TO FIT BY THE RACK INSTALLER. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.
4. FOR SOUTH FACING SLOPES, THE DIAGONAL AND HORIZONTAL LATERAL BRACES CAN BE SWITCHED TO PROVIDE ADDITIONAL ADJUSTABILITY.
5. ON NORTH FACING SLOPES LEGS CAN BE FULLY EXTENDED TO MEET MINIMUM FRONT EDGE REQUIREMENTS. ALL LEGS REQUIRE A MINIMUM OF 1 INCH EMBEDMENT BELOW GRADE. FULL EXTENSION OF LEGS MAY RESULT IN LATERAL BRACES NOT FITTING. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.



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		ENG. APPROVED BY MF - 3/16/2021	PROJ. ENG. APPROVED BY BS - 3/16/2021				
TERRASMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM		MFG. APPROVED BY SS - 3/16/2021	CLIENT GREENSKIES		MODULE CS3W-XXXPB-AG	REV 0	SHEET NUMBER 17 OF 18
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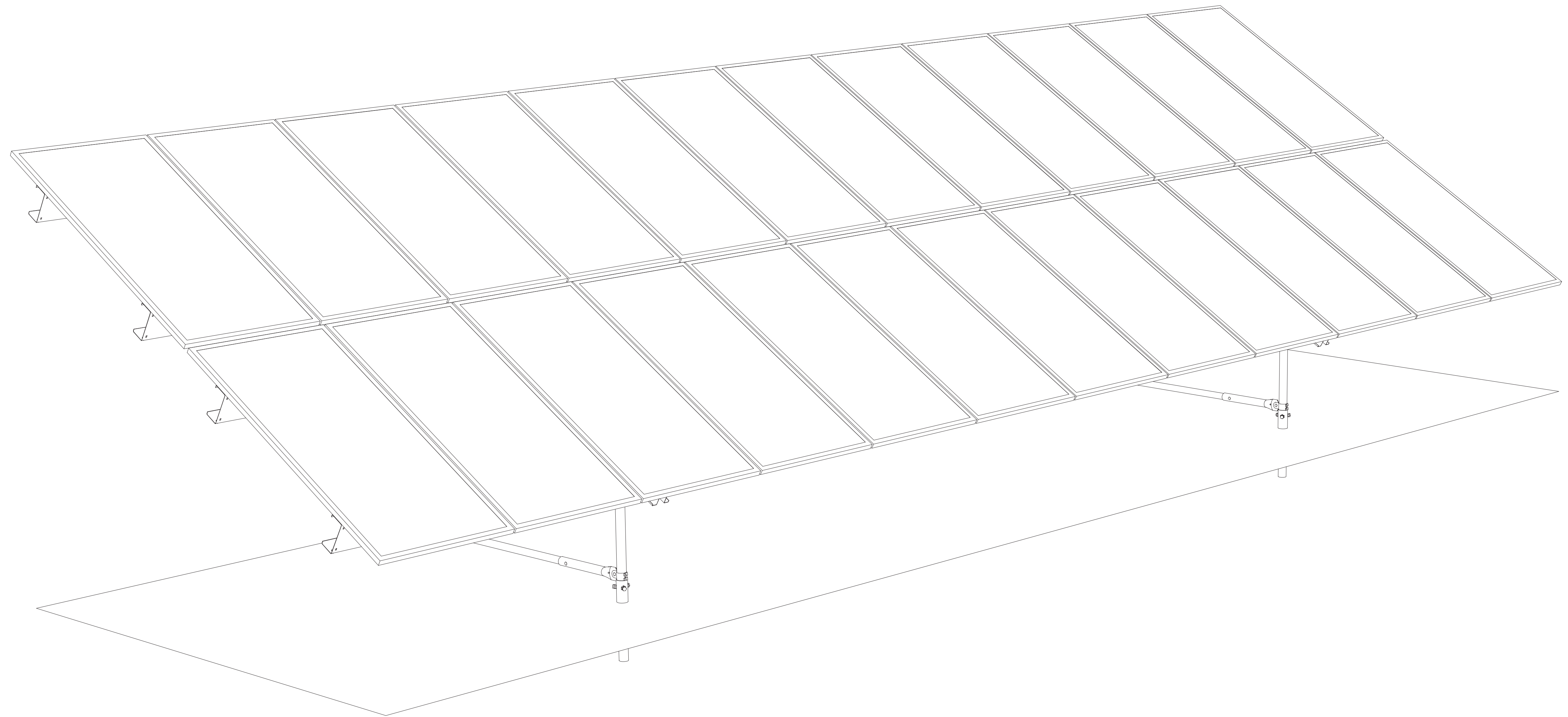
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		ENG. APPROVED BY MF - 3/16/2021	PROJ. ENG. APPROVED BY BS - 3/16/2021		
MFG. APPROVED BY SS - 3/16/2021		PROJECT NAME BOOM BRIDGE		MODULE CS3W-XXXXPB-AG	REV 0
PROJECT NUMBER 20-6575		CLIENT GREENSKIES			
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# TERRAGLIDE RACKING ENGINEERING PLANS

## GREENSKIES - BOOM BRIDGE

### 2X12 - TERRAGLIDE PORTRAIT - 30° RACK - HT72-166M



ZEYN B. UZMAN  
CT PE# PEN.0023151

NOTES:  
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

<b>DESIGN CRITERIA</b> ASCE = 7-10 WIND SPEED = 115.53110187 MPH WIND LOAD BUILDING CATEGORY = I WIND LOAD EXPOSURE CATEGORY = C GROUND SNOW LOAD, Pg = 30 PSF FLAT ROOF SNOW LOAD, Pf = 30 PSF SEISMIC SITE CLASS = D SEISMIC Ss = 0.161 SEISMIC S1 = 0.058	<b>GROUND SCREW</b> KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 82.44 (2094mm) EAST/ WEST EDGE - 40.87 (1038mm) NORTH/ SOUTH BOLT SPACING - 50.24 (1276mm) EAST/ WEST BOLT SPACING - 38.94 (989mm) THICKNESS - 1.38 (35mm)	<b>PROJECT SPECIFICATIONS:</b> TILT ANGLE - 30° RACK SIZE - 2X12 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/24/2021	CHECKED BY BS - 3/24/2021		
			ENG. APPROVED BY MF - 3/24/2021	PROJ. ENG. APPROVED BY BS - 3/24/2021		
		MFG. APPROVED BY SS - 3/24/2021	PROJECT NUMBER 20-6575	CLIENT GREENSKIES	PROJECT NAME BOOM BRIDGE	SHEET SIZE D
		TERRASMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM	MODULE HT72-166M	REV 0	SHEET NUMBER 1 OF 18	PROPRIETARY AND CONFIDENTIAL. THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TERRASMART. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT WRITTEN PERMISSION OF TERRASMART IS PROHIBITED.



I. PERMITTING, CONSTRUCTION, AND ERECTION NOTES

- FRAME AND FOUNDATION CONFORMS TO THE REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE BASED UPON DESIGN CRITERIA AS OUTLINED ON THE COVER SHEET. TERRASSMART MAKES NO REPRESENTATION AS TO THE ACCURACY OF THE DESIGN CRITERIA AS IT WAS SUPPLIED BY CLIENT. PLEASE REFER TO STRUCTURAL CALCULATIONS FOR FRAME AND FOUNDATION DESIGN.
- THE STRUCTURAL INTEGRITY OF THE TERRAGLIDE RACK DEPENDS ON INTERACTION OF VARIOUS CONNECTED COMPONENTS. PROVIDE ADEQUATE BRACING, SHORING, AND OTHER TEMPORARY SUPPORTS AS REQUIRED TO SAFELY COMPLETE THE WORK.
- FOUNDATION INSTALLATION SUB-CONTRACTOR SHALL COORDINATE WITH THE ENGINEER IF ANY UNFORESEEN CONFLICTS ARISE, SUCH AS EXISTING UNDULATION THAT COULD POTENTIALLY CAUSE RACKING INSTALLATION ISSUES.
- STRUCTURAL STEEL SHALL BE ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS, UNLESS OTHERWISE NOTED.
- DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.
- CROSS BRACING TO BE FIT ON SITE, PER INSTALLATION MANUAL.
- COLD GALVANIZING COMPOUND SHALL BE USED PER MANUFACTURER'S DIRECTIONS AND IN ACCORDANCE WITH ASTM-A780 IN AREAS WHERE GALVANIZATION WAS REMOVED DURING TRANSPORTATION, OR ERECTION/INSTALLATION.
- BOLTS TO BE TIGHTENED PER THE PROCEDURES DESCRIBED IN THE INSTALLATION MANUAL.
- THIS STRUCTURAL DRAWING DOES NOT INCLUDE INFORMATION REGARDING ELECTRICAL CONNECTIONS, INCLUDING GROUNDING. REFER TO INSTALLATION MANUAL AND ELECTRICAL PLANS PREPARED BY OTHERS.
- SHADING ANALYSIS WAS NOT PERFORMED BY TERRASSMART AND WAS NOT CONSIDERED IN THE LAYOUT OF THE FOUNDATION. TERRASSMART RECOMMENDS CONSULTING A SOLAR SHADING EXPERT PRIOR TO INSTALLATION TO AVOID POWER REDUCTION DUE TO SHADOWS.
- SNOW BANKING ANALYSIS WAS NOT PERFORMED BY TERRASSMART AND WAS NOT CONSIDERED IN THE STRUCTURAL DESIGN. THE FRONT EDGE CLEARANCE WAS SUPPLIED BY CLIENT AND IT IS ASSUMED THAT THE SYSTEM OWNER WILL REMOVE SNOW AS NEEDED TO MAINTAIN AN UNOBSTRUCTED FRONT EDGE. ADVERSE EFFECTS OF SNOW BANKING, INCLUDING SHADING OR OTHER STRUCTURAL CONSIDERATIONS ARE BEYOND TERRASSMART'S SCOPE.
- MINIMUM AND TYPICAL FRONT EDGE CLEARANCE SHOWN ON SIDE ELEVATION. MAXIMUM FRONT EDGE CLEARANCE DETERMINED PER FIELD CONDITIONS.
- SOUTHERN EDGES OF MODULES SHALL BE ALIGNED WITHIN 2" HORIZONTALLY OF THE SOUTHERN EDGE OF MODULES OF THE ADJACENT RACK.
- EASTERN AND WESTERN EDGES OF MODULES SHALL BE ALIGNED WITHIN 2" VERTICALLY AND HORIZONTALLY OF THE SOUTHERN EDGE OF MODULES OF THE ADJACENT RACK.
- TILT ANGLE TOLERANCE: ± 2° FROM ANGLE SHOWN ON SIDE ELEVATION.
- RACK SPACING TOLERANCE: 6" TYPICAL, 4" MINIMUM, FOR SECTIONS OF THE SITE THAT HAVE A RIDGE OR VALLEY, TERRASSMART RECOMMENDS INCREASING THE TABLE SPACING TO 10 INCHES AS MEASURED BETWEEN THE CLOSEST MODULES EDGE BETWEEN ADJACENT RACKS. REFER TO CIVIL ENGINEERING PLANS FOR MORE INFORMATION AND FURTHER DETAIL.
- AZIMUTH TOLERANCE: ± 2° FROM APPROVED CIVIL ENGINEERING PLANS.
- TERRAGLIDE RACKING IS DESIGNED TO ACCOMMODATE A MAXIMUM EAST/WEST SLOPE OF 25%, A MAXIMUM NORTH FACING SLOPE OF 30%, AND A MAXIMUM SOUTH FACING SLOPE OF 20%. THESE SLOPES WERE PROVIDED BY THE CLIENT.
- PANEL SPACING TOLERANCE: MINIMUM 1/4" FOR N/S AND E/W SPACING DIMENSION, AS SHOWN ON SIDE ELEVATION AND REAR ELEVATION TO SUIT FIELD CONDITIONS.
- FOR MODULE MOUNTING HARDWARE, TERRASSMART PROVIDES STAINLESS STEEL HEX BOLT WITH INTEGRATED STAR WASHER AND SERRATED FLANGE NUT. THE CLIENT IS RESPONSIBLE TO CONFIRM THAT TERRASSMART'S MODULE MOUNTING HARDWARE IS COMPATIBLE WITH THE MODULE THAT THE CLIENT WILL PROVIDE.

II. SITE PREPARATION

- PRIOR TO COMMENCING WORK AND FOR THE DURATION OF THE PROJECT, GENERAL CONTRACTOR SHALL ENSURE THE SITE IS PREPARED AND MAINTAINED AS FOLLOWS (TO AVOID CHANGE ORDERS):
  - ALL REQUIRED PERMITS SHALL BE OBTAINED AND CURRENT.
  - LOCATE ALL UNDERGROUND UTILITIES AND ENSURE THAT THE PROPOSED INSTALLATION DOES NOT CONFLICT WITH ANY EXISTING INFRASTRUCTURE. MARKINGS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT.
  - ALL REQUIRED EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN PLACE AND OPERATIONAL.
  - GRASS SHALL BE MOWED WITH BLADES NO HIGHER THAN 3" TALL.
  - ALL VEGETATION, INCLUDING TREES AND SHRUBS SHALL BE CLEARED AND ROOT SYSTEMS GRUBBED. ALL ORGANIC MATTER SHALL BE STRIPPED AND REMOVED FROM THE BUILDING ENVELOPE BEFORE EARTH WORK OCCURS, IF ANY.
  - LOOSE SURFACE IMPEDIMENTS, INCLUDING ROCKS, COBBLES, BOULDERS, CONSTRUCTION DEBRIS, AND OTHER OBSTRUCTIONS SHALL BE REMOVED.
  - SITE SHALL BE SAFE FOR OPERATING MACHINERY AND FOR PERSONNEL ON FOOT. SITE CONDITIONS SHALL NOT BE AN ENCUMBRANCE TO THE PERFORMANCE OF WORK.
  - GROUND WATER, INCLUDING WATER TABLE AND PERCHED WATER, SHALL NOT ENCROACH BETWEEN THE GROUND SURFACE AND THE EMBEDMENT DEPTH OF THE GROUND SCREW. DEWATERING IS REQUIRED IF GROUND WATER IS ENCOUNTERED DURING PILOT HOLE DRILLING AND/OR GROUND SCREW INSTALLATION.
  - SITE SHALL BE GRADED TO PROVIDE CONTROLLED POSITIVE DRAINAGE AWAY FROM FOUNDATIONS. STANDING WATER AND/OR WATER WITH SUFFICIENT VELOCITY TO ERODE SOIL IS NOT ALLOWED WITHIN 20 FEET OF THE FOUNDATION.
  - NO FINISHED GRADE SOIL SHALL BE DISTURBED WITHIN 24" OF THE PROPOSED OR INSTALLED LOCATION OF A GROUND SCREW. SEE ADDITIONAL REQUIREMENTS FOR TRENCHES AND OTHER EXCAVATIONS IN SECTION II.3.
- ALL EARTHWORK SHALL BE NOTED ON THE PLANS AND PROPERLY AS-BUILT. CUT AREAS SHALL BE PROOF ROLLED AFTER REMOVAL OF SOIL. FILL AREAS SHALL BE STRIPPED OF ALL VEGETATION AND PROOF ROLLED PRIOR TO PLACING FILL MATERIAL.
- TRENCHES AND OTHER EXCAVATIONS MAY BE CUT EITHER BEFORE OR AFTER GROUND SCREW INSTALLATION PROVIDED THEY MEET THE REQUIREMENTS OF II.1, II.5. IF THEY ARE CUT AFTER GROUND SCREW INSTALLATION, THE HORIZONTAL DISTANCE BETWEEN THE GROUND SCREW AND THE EDGE OF THE EXCAVATION MUST BE GREATER THAN OR EQUAL TO THE VERTICAL DEPTH OF THE EXCAVATION (1:1 RATIO), PLUS 24". 2. IF THEY ARE CUT BEFORE GROUND SCREW INSTALLATION, THE HORIZONTAL DISTANCE BETWEEN EXCAVATION AND PROPOSED GROUND SCREW LOCATION SHOULD BE 24" OR GREATER.
- IMPORTED GRANULAR FILL MATERIAL SHALL BE USED FOR EARTHWORK UNLESS ON-SITE SOILS MEET THE FOLLOWING REQUIREMENTS:
  - FREE OF PARTICLES LARGER THAN 2" IN DIAMETER, ORGANIC MATTER, AND OTHER DELETERIOUS MATERIALS; AND
  - CAN BE PROPERLY MOISTURE CONDITIONED.
- GRANULAR ON-SITE SOILS OR IMPORTED GRANULAR MATERIAL MAY BE USED AS FILL AS LONG AS THEY MEET THE FOLLOWING REQUIREMENTS:
  - WELL GRADED BETWEEN COARSE AND FINE SIZES;
  - CONTAINING NO CLAY BALLS, ROOTS, ORGANIC MATTER OR OTHER DELETERIOUS MATERIALS;
  - MAXIMUM PARTICLE SIZE OF 2", WITH LESS THAN 12% PASSING THE U.S. NO. 200 SIEVE; AND
  - IMPORTED FILL MATERIALS SHALL BE SAMPLED AND TESTED BY A GEOTECHNICAL ENGINEER OR OTHER QUALIFIED SOIL TESTING AGENCY PRIOR TO BEING TRANSPORTED TO THE SITE.
- FILL SOILS SHALL BE COMPACTED AT MOISTURE CONTENTS THAT ARE NEAR OPTIMUM. THE OPTIMUM MOISTURE CONTENT VARIES WITH THE SOIL GRADATION AND SHALL BE EVALUATED DURING CONSTRUCTION. FILL MATERIAL THAT IS NOT NEAR OPTIMUM MOISTURE CONTENT SHALL BE MOISTURE CONDITIONED. FILL MATERIAL SHALL BE PLACED IN UNIFORM, HORIZONTAL LIFTS, AND BE COMPACTED WITH APPROPRIATE EQUIPMENT TO AT LEAST 90% OF THE MAXIMUM DRY DENSITY PER ASTM D1557. THE MAXIMUM LIFT THICKNESS WILL VARY DEPENDING ON THE MATERIAL AND COMPACTION EQUIPMENT USED, BUT SHALL NOT BE GREATER THAN 12" AND SHOULD BE CONSISTENT THROUGHOUT THE DEPTH OF THE COMPACTED SOIL.
- TERRASSMART REQUIRES THAT FILL COMPACTION BE TESTED BY A GEOTECHNICAL ENGINEER OR OTHER QUALIFIED SOIL TESTING AGENCY DURING THE PLACEMENT AND COMPACTION OF FILL TO VALIDATE THE WORK.
- ROCK DRILLING SHALL BE PERFORMED IF REQUIRED BY PRESENCE OF UNDERGROUND ROCK. PILOT HOLE DIAMETER SHALL BE DETERMINED BY ONSITE TESTING AND APPROVED BY TERRASSMART.

III. FOUNDATION NOTES

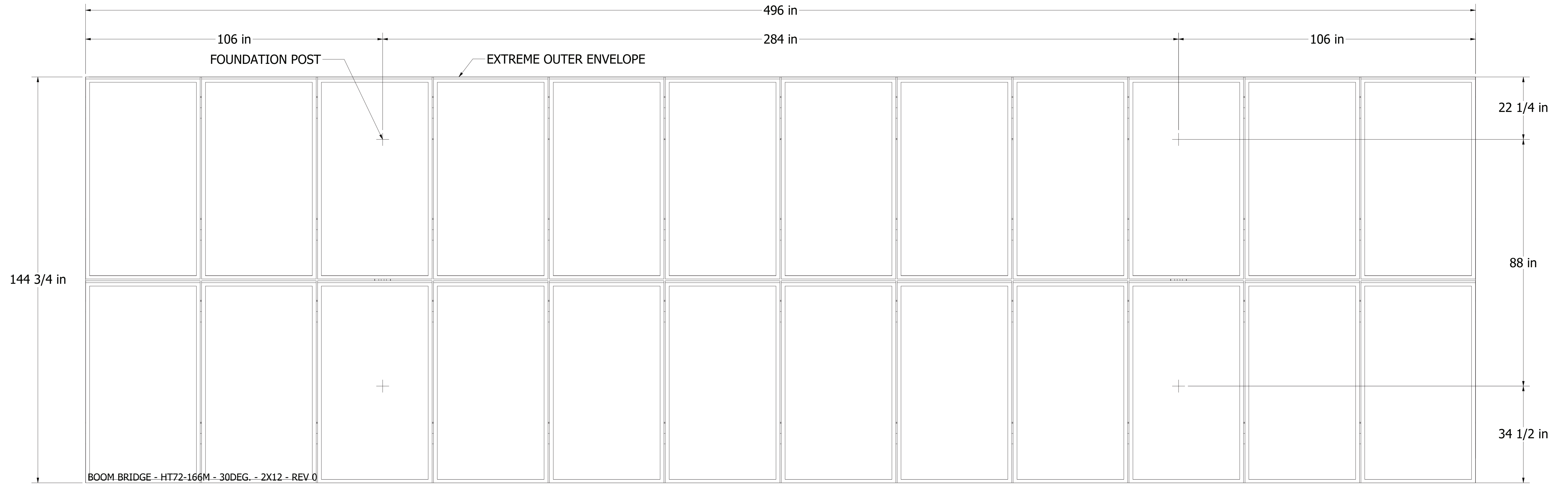
- GROUND SCREW FOUNDATIONS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER SPECIFICATIONS BY A CERTIFIED INSTALLER TRAINED ON THIS TECHNOLOGY.
- GROUND SCREW FOUNDATIONS SHALL BE INSTALLED IN UNDISTURBED, NATURAL SOIL, UNLESS OTHERWISE NOTED AND PROPERLY PREPARED AS DESCRIBED IN SECTION II. SITE PREPARATION.
- FOUNDATION INSTALLATION SUB-CONTRACTOR SHALL DETERMINE DIAMETER AND DEPTH OF PRE-DRILLED PILOT HOLE AS REQUIRED BY SITE CONDITIONS.
- SHOULD UNFORESEEN LOOSE SOIL CONDITIONS BE ENCOUNTERED ONSITE, CONCRETE OR OTHER ADDITIVES MAY BE USED TO STABILIZE THE SOIL AT CLIENTS EXPENSE. SHOULD UNDERGROUND WATER BE ENCOUNTERED, THE CLIENT SHALL REMEDIATE THE ISSUE.
- THE USE OF WATER AS LUBRICANT IS ALLOWED.
- TOLERANCES IN THE POSITION OF EACH SCREW ARE ± 2" Laterally (North-South and East-West) and ± 3" Vertically (Up-Down) with a typical 76.7" Embedment, as measured from grade. In the rare case that a ground settlement occurs, no remediation is required if the settlement results in a racking configuration that is still within tolerance of the project's construction plans or installation manual and does not over stress the racking structure.
- MINIMUM REQUIRED TORQUE FOR GROUND SCREW INSTALLATION: 2000 N-m.
- AT THIS TIME NO GROUND SCREW TESTING DATA IS AVAILABLE. GROUND SCREW FOUNDATIONS HAVE BEEN DESIGNED BASED ON EXTENSIVE TESTING IN MEDIUM/ DENSE SOILS.
- NO GEOTECH REPORT WAS PROVIDED BY THE CLIENT.

v-1.11



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 CT PE# PEN.0023151

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TERRASSMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASSMART.COM	PROJECT NUMBER 20-6575	CLIENT GREENSKIES		MODULE HT72-166M	REV 0	SHEET NUMBER 2 OF 18
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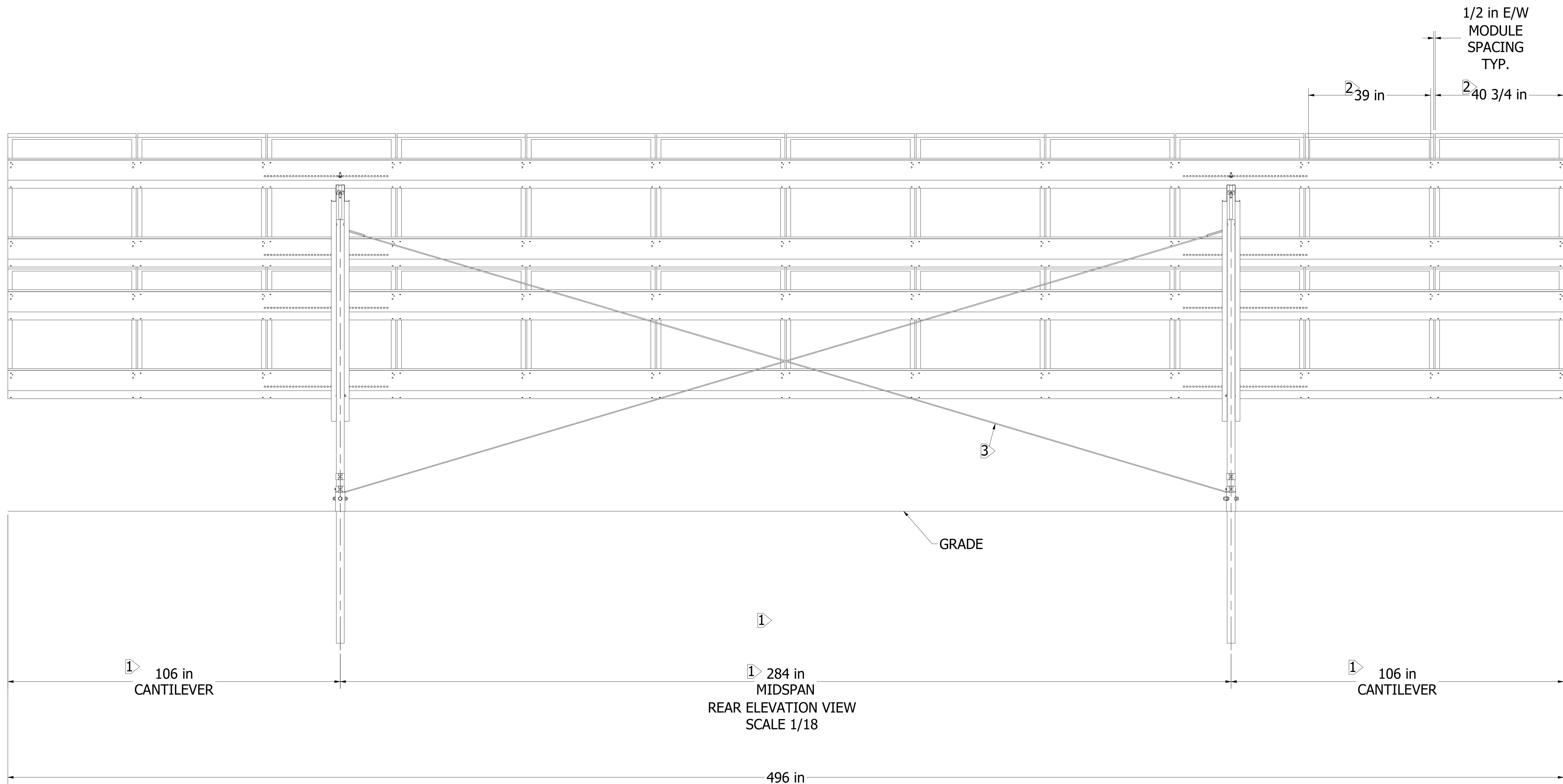
FLATTENED LAYOUT  
SCALE 1/18



ZEYN B. UZMAN  
CT PE# PEN.0023151

GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 82.44 (2094mm) EAST/ WEST EDGE - 40.87 (1038mm) NORTH/ SOUTH BOLT SPACING - 50.24 (1276mm) EAST/ WEST BOLT SPACING - 38.94 (989mm) THICKNESS - 1.38 (35mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X12 MODULE ORIENTATION - PORTRAIT		DRAWN BY TMC - 3/24/2021	CHECKED BY BS - 3/24/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D
	TERRASMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM		ENG. APPROVED BY MF - 3/24/2021	PROJ. ENG. APPROVED BY BS - 3/24/2021			
	PROJECT NUMBER 20-6575		MFG. APPROVED BY SS - 3/24/2021	CLIENT GREENSKIES			
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1 106 in  
CANTILEVER

1 284 in  
MIDSPAN

1 106 in  
CANTILEVER

496 in

REAR ELEVATION VIEW  
SCALE 1/18



ZEYIN B. UZMAN  
CT PE# PEN.0023151

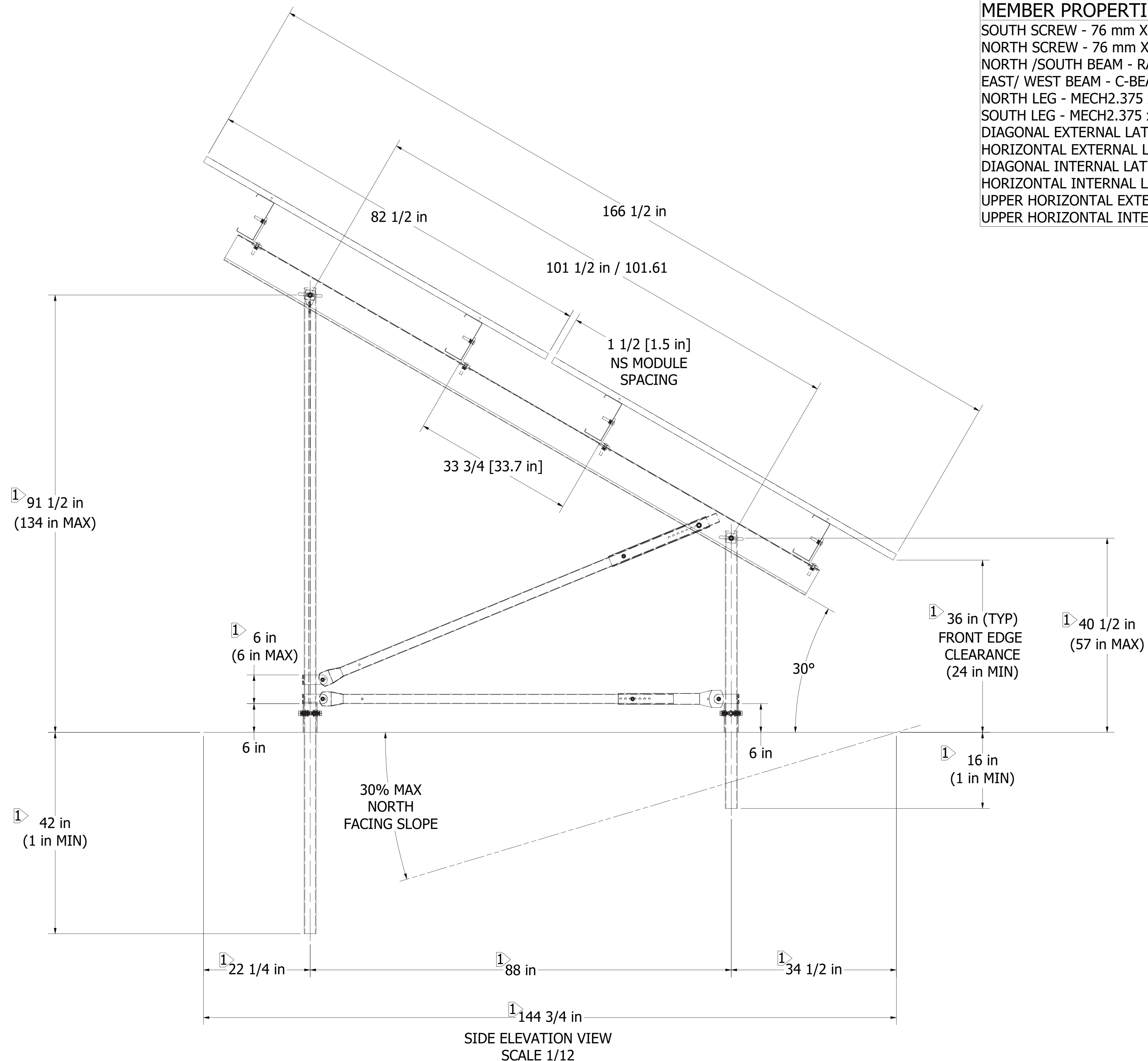
**NOTES:**

- 1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
- 2. PURLIN SPACING IS DEPENDENT ON MODULE SPECIFICATIONS, REFER TO PROJECT NOTES FOR MODULE SPECIFICATIONS.
- 3. SEISMIC CROSS BRACING TO BE FIELD FIT.

GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 82.44 (2094mm) EAST/ WEST EDGE - 40.87 (1038mm) NORTH/ SOUTH BOLT SPACING - 50.24 (1276mm) EAST/ WEST BOLT SPACING - 38.94 (989mm) THICKNESS - 1.38 (35mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X12 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/24/2021	CHECKED BY BS - 3/24/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D
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TERRASMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM		MFG. APPROVED BY SS - 3/24/2021	CLIENT GREENSKIES	MODULE HT72-166M	REV 0	SHEET NUMBER 4 OF 18
PROPRIETARY AND CONFIDENTIAL. THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TERRASMART. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT WRITTEN PERMISSION OF TERRASMART IS PROHIBITED.						

**MEMBER PROPERTIES**

SOUTH SCREW - 76 mm X 2100 mm  
 NORTH SCREW - 76 mm X 2100 mm  
 NORTH /SOUTH BEAM - RAFTER - LENGTH = 140.25 in  
 EAST/ WEST BEAM - C-BEAM 9.0x4.0x0.0860 - LENGTH = 495.96 in  
 NORTH LEG - MECH2.375 x 9GA. - LENGTH = 135.00 in  
 SOUTH LEG - MECH2.375 x 9GA. - LENGTH = 58.00 in  
 DIAGONAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 23.00 in  
 HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 22 in  
 DIAGONAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = 90 in  
 HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = 74 in  
 UPPER HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A in  
 UPPER HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = 74 in



SIDE ELEVATION VIEW  
SCALE 1/12

**NOTES:**

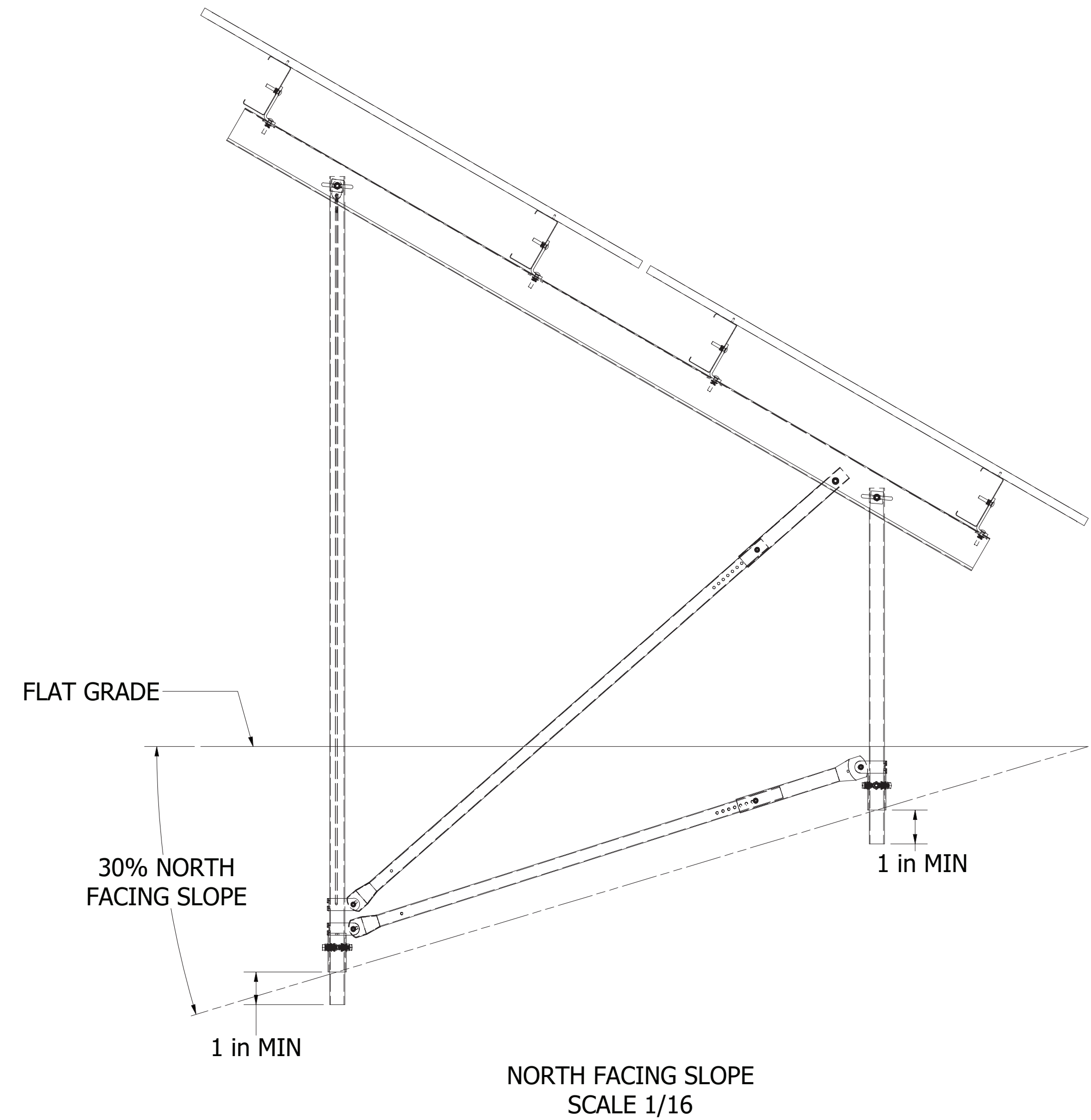
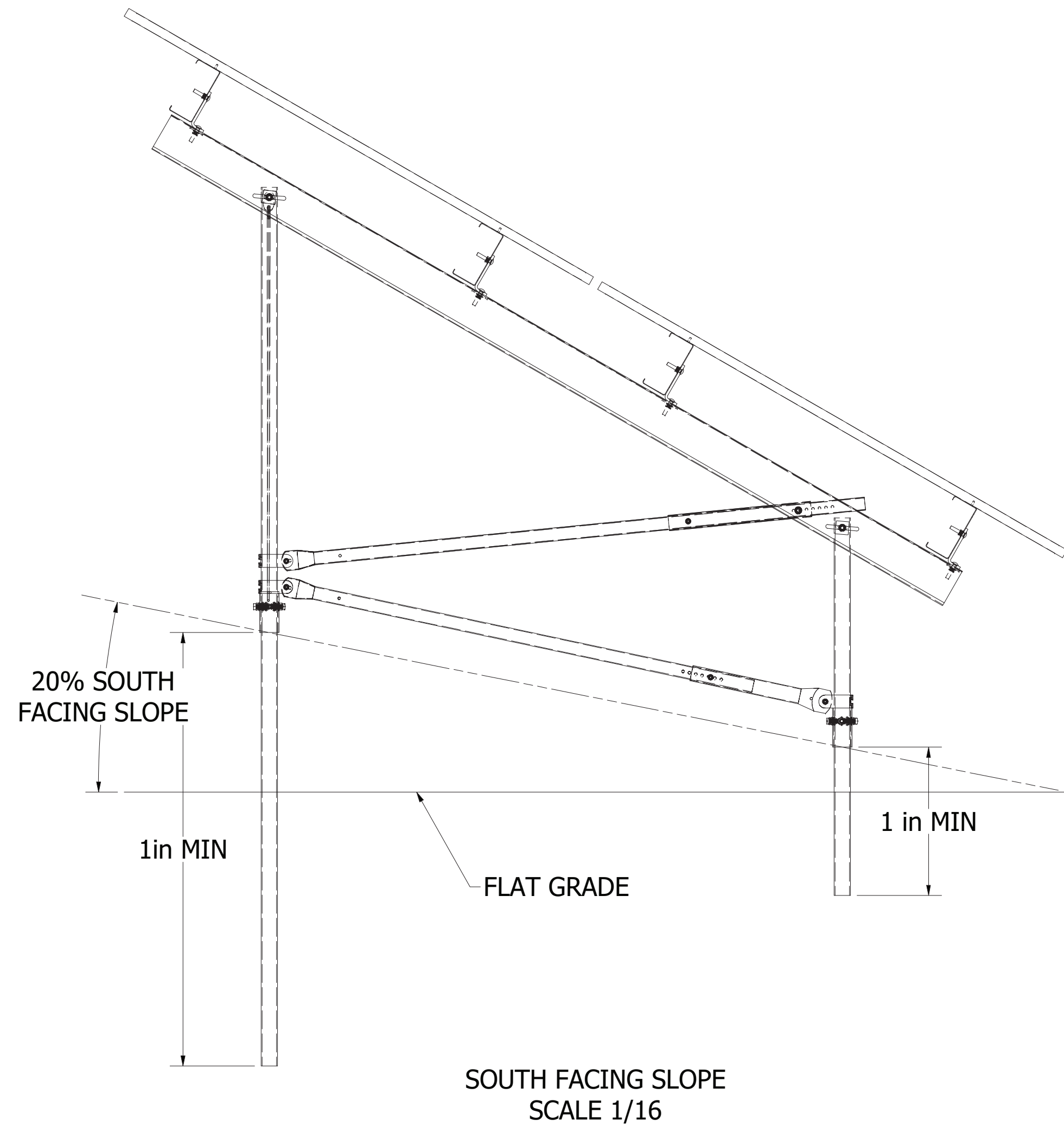
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2. LEGS SHALL BE INSTALLED PLUMB, IF MECHANICALLY POSSIBLE. MAXIMUM 3° OUT OF PLUMB.
3. LATERAL BRACES ARE DESIGNED TO ALLOW FOR 7" OF TOTAL ADJUSTMENT. IF FIELD CONDITIONS REQUIRE ADDITIONAL ADJUSTMENT AND LATERAL BRACES ARE TOO LONG, THEY MAY BE CUT DOWN AND DRILLED TO FIT BY THE RACK INSTALLER. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.
4. FOR SOUTH FACING SLOPES, THE DIAGONAL AND HORIZONTAL LATERAL BRACES CAN BE SWITCHED TO PROVIDE ADDITIONAL ADJUSTABILITY.
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ZEYN B. UZMAN  
CT PE# PEN.0023151

GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 82.44 (2094mm) EAST/ WEST EDGE - 40.87 (1038mm) NORTH/ SOUTH BOLT SPACING - 50.24 (1276mm) EAST/ WEST BOLT SPACING - 38.94 (989mm) THICKNESS - 1.38 (35mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X12 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/24/2021	CHECKED BY BS - 3/24/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D		
		ENG. APPROVED BY MF - 3/24/2021	PROJ. ENG. APPROVED BY BS - 3/24/2021					
		MFG. APPROVED BY SS - 3/24/2021			CLIENT GREENSKIES	MODULE HT72-166M	REV 0	SHEET NUMBER 5 OF 18
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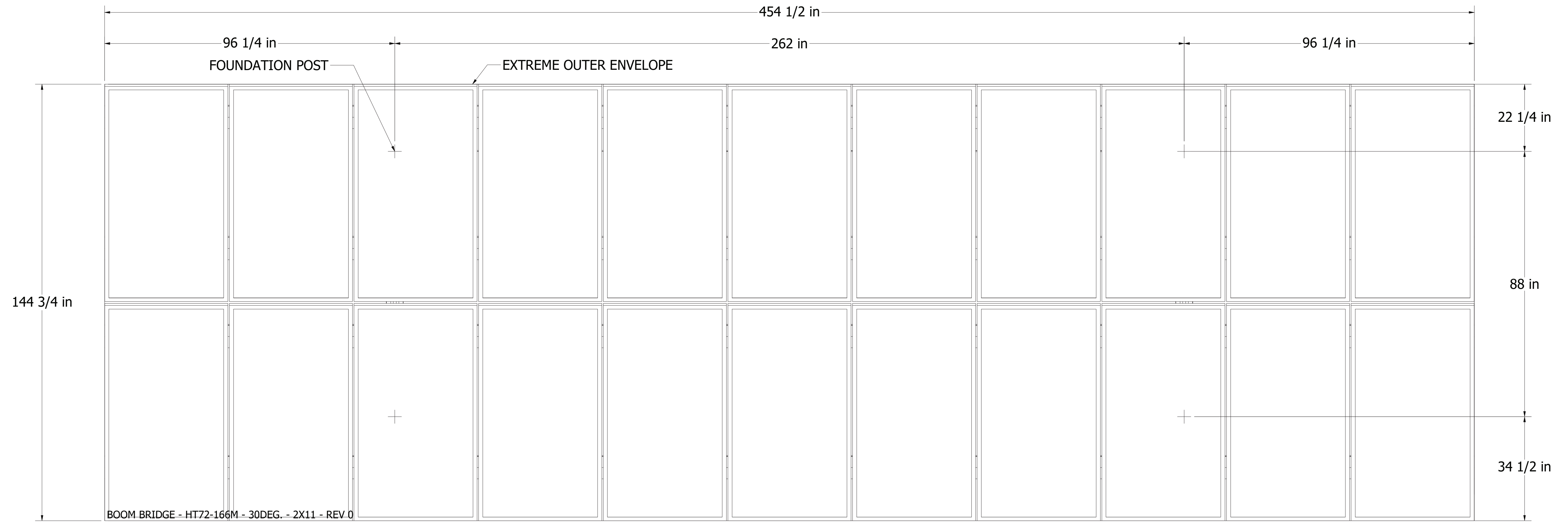


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<b>GROUND SCREW</b> KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm <b>MODULE DIMENSIONS</b> NORTH/ SOUTH EDGE - 82.44 (2094mm) EAST/ WEST EDGE - 40.87 (1038mm) NORTH/ SOUTH BOLT SPACING - 50.24 (1276mm) EAST/ WEST BOLT SPACING - 38.94 (989mm) THICKNESS - 1.38 (35mm)	<b>PROJECT SPECIFICATIONS:</b> TILT ANGLE - 30° RACK SIZE - 2X12 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/24/2021	CHECKED BY BS - 3/24/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D	
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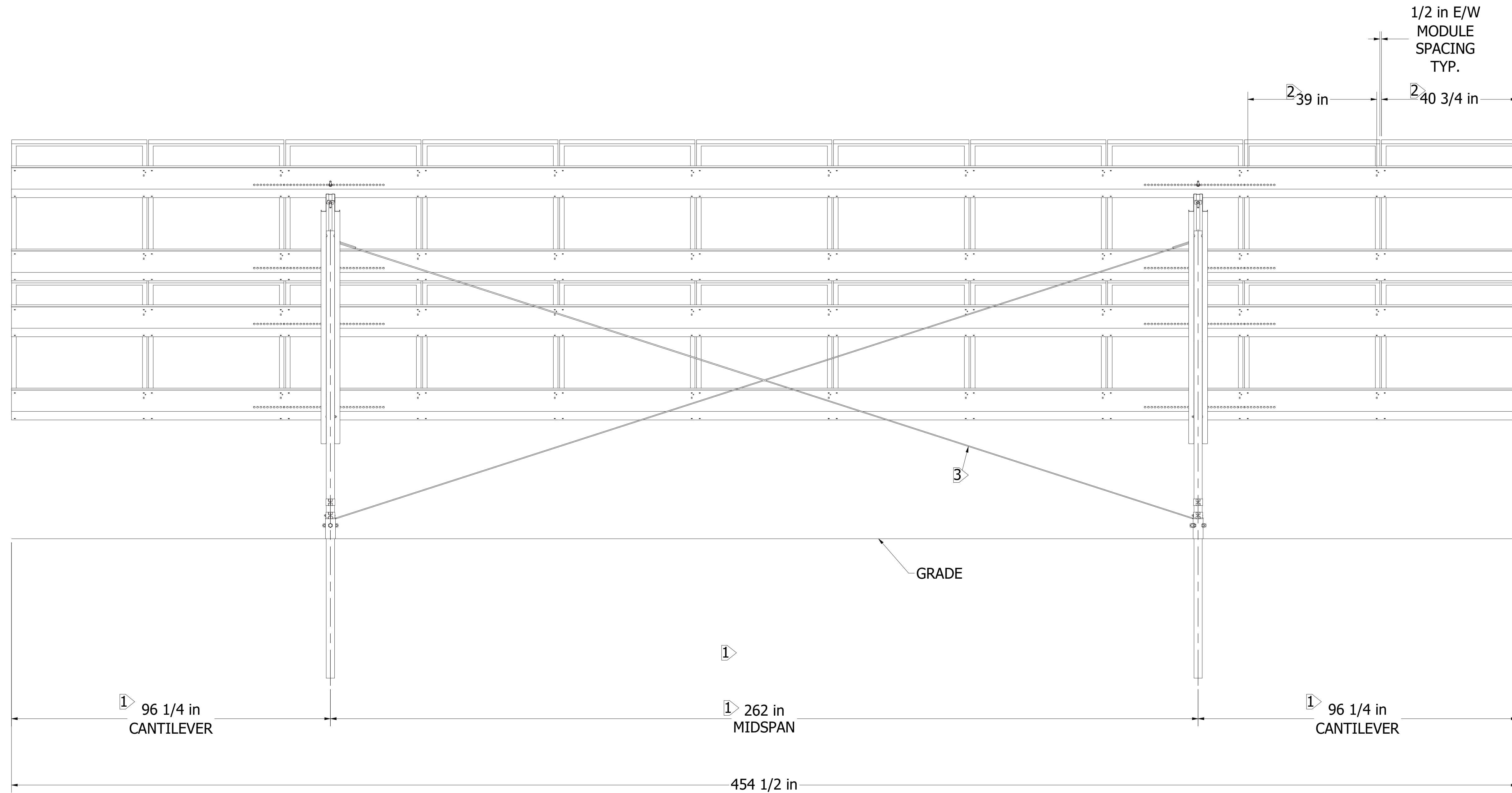
FLATTENED LAYOUT  
SCALE 1/18



ZEYN B. UZMAN  
CT PE# PEN.0023151

GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 82.44 (2094mm) EAST/ WEST EDGE - 40.87 (1038mm) NORTH/ SOUTH BOLT SPACING - 50.24 (1276mm) EAST/ WEST BOLT SPACING - 38.94 (989mm) THICKNESS - 1.38 (35mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X11 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/24/2021	CHECKED BY BS - 3/24/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D		
		ENG. APPROVED BY MF - 3/24/2021	PROJ. ENG. APPROVED BY BS - 3/24/2021					
		MFG. APPROVED BY SS - 3/24/2021			CLIENT GREENSKIES	MODULE HT72-166M	REV 0	SHEET NUMBER 7 OF 18
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REAR ELEVATION VIEW  
SCALE 1/18



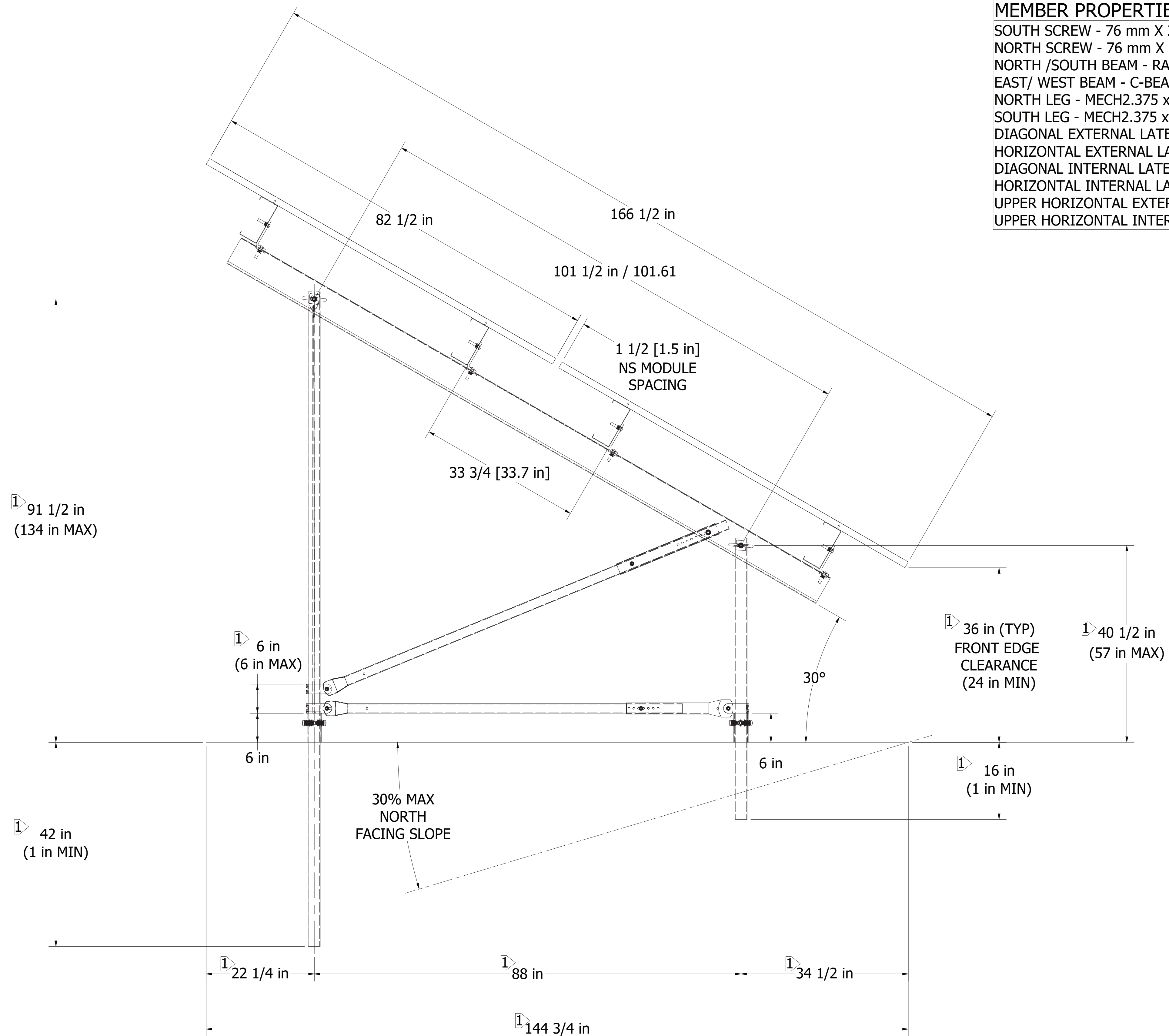
ZEYIN B. UZMAN  
CT PE# PEN.0023151

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 SOUTH LEG - MECH2.375 x 9GA. - LENGTH = 58.00 in  
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 HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 22 in  
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SIDE ELEVATION VIEW  
 SCALE 1/12

**NOTES:**

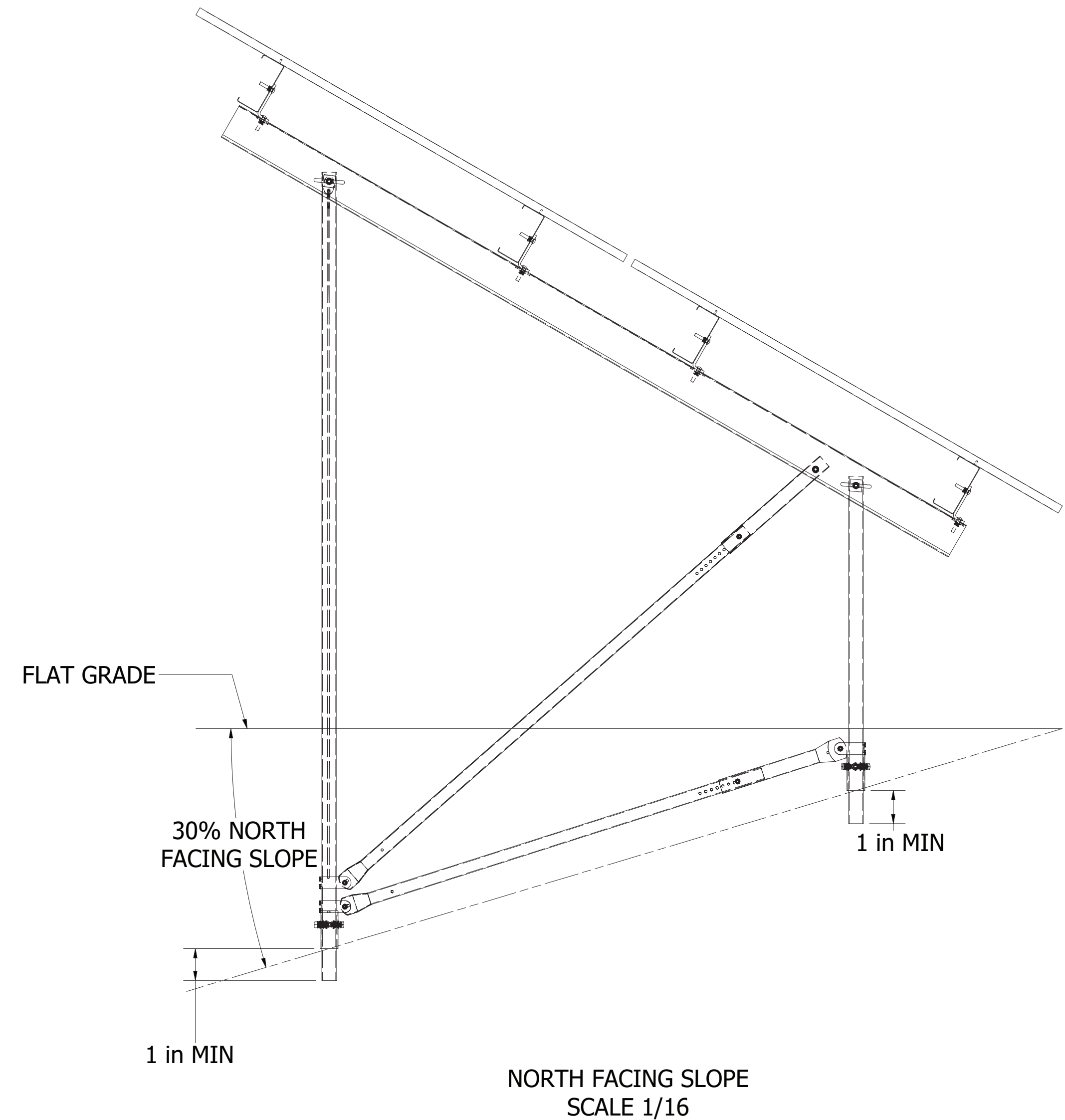
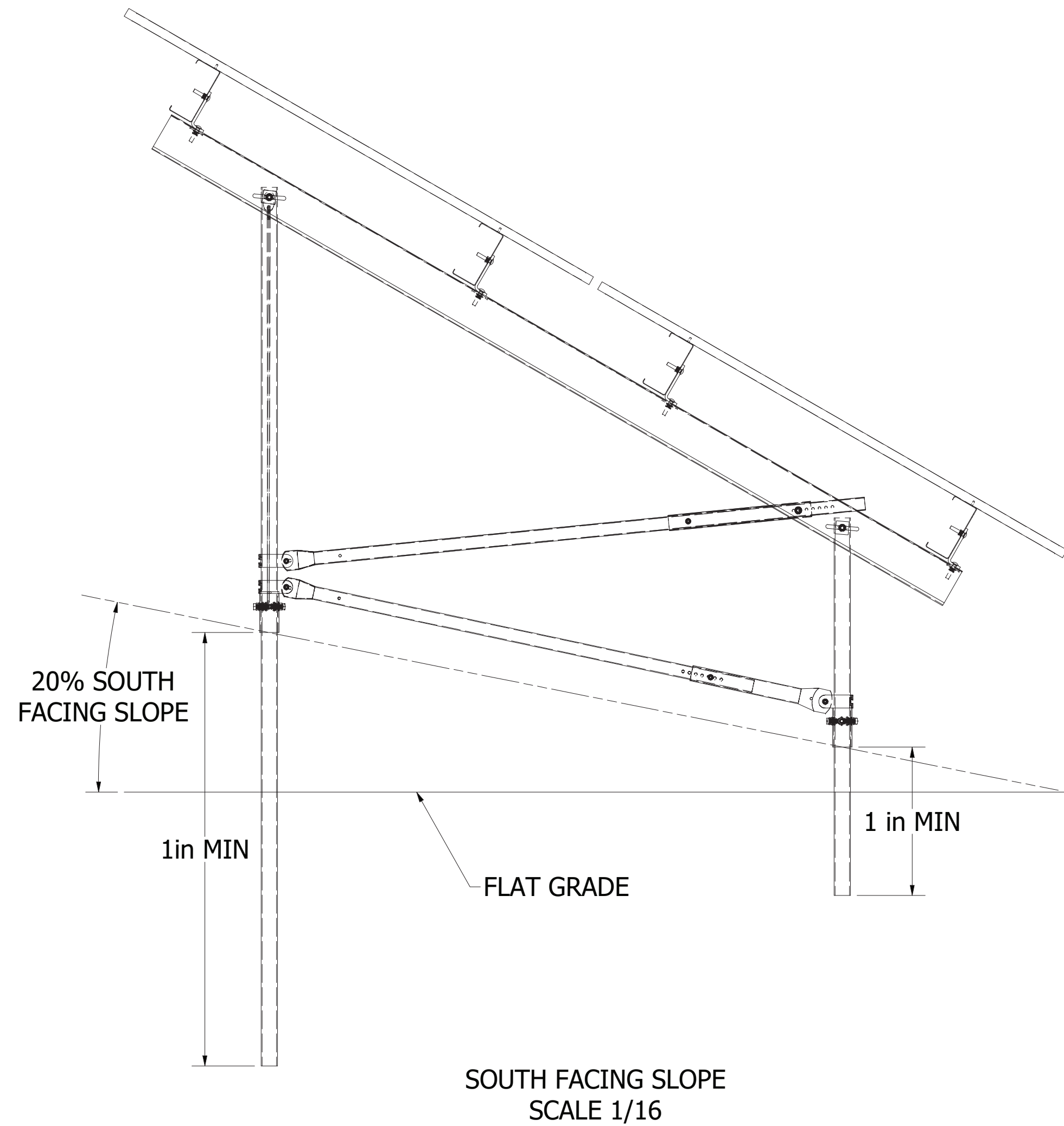
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TERRASMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM		MFG. APPROVED BY SS - 3/24/2021	CLIENT GREENSKIES		MODULE HT72-166M	REV 0	SHEET NUMBER 9 OF 18
PROPRIETARY AND CONFIDENTIAL. THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TERRASMART. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT WRITTEN PERMISSION OF TERRASMART IS PROHIBITED.							



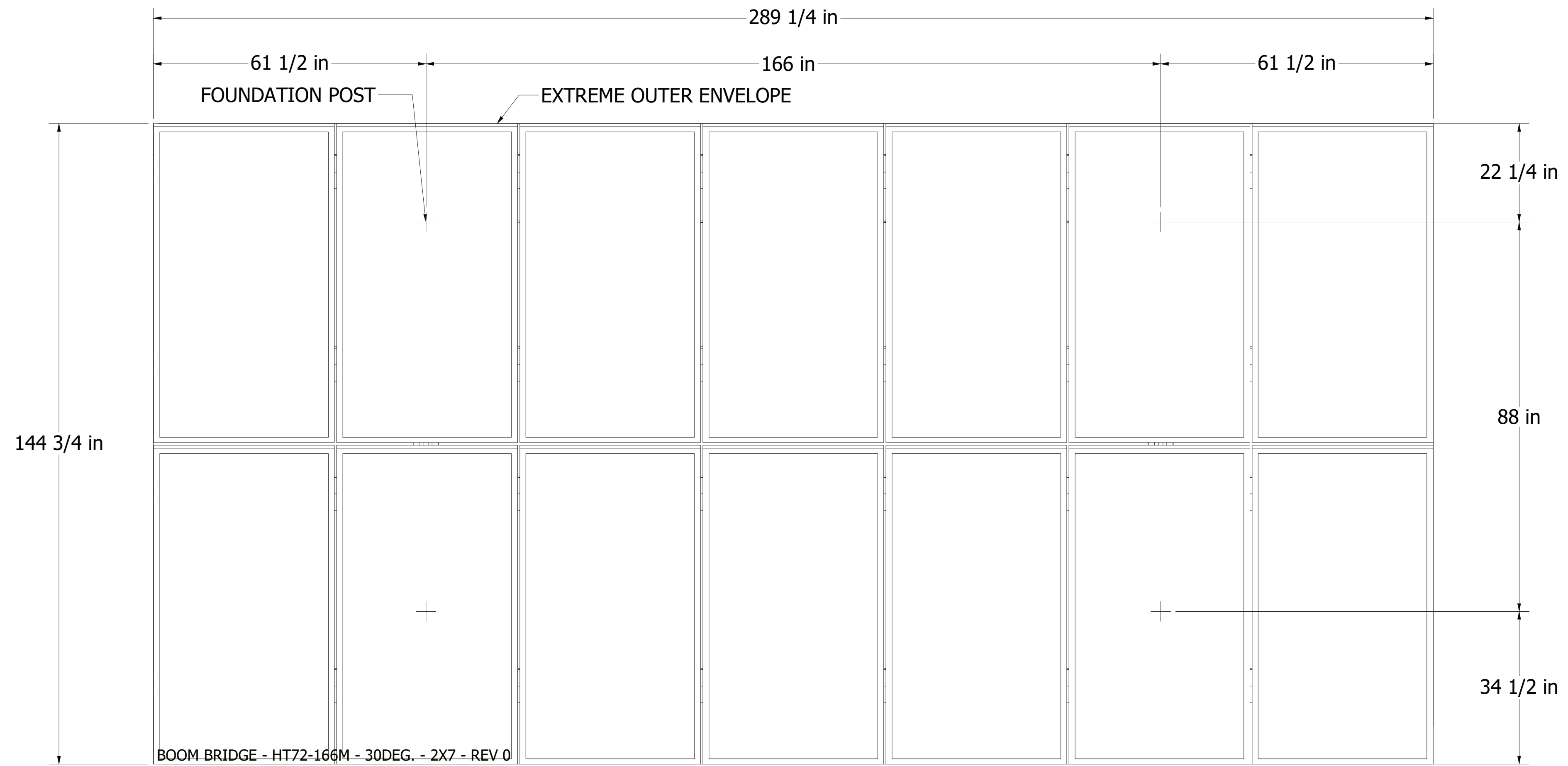


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<b>GROUND SCREW</b> KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm <b>MODULE DIMENSIONS</b> NORTH/ SOUTH EDGE - 82.44 (2094mm) EAST/ WEST EDGE - 40.87 (1038mm) NORTH/ SOUTH BOLT SPACING - 50.24 (1276mm) EAST/ WEST BOLT SPACING - 38.94 (989mm) THICKNESS - 1.38 (35mm)	<b>PROJECT SPECIFICATIONS:</b> TILT ANGLE - 30° RACK SIZE - 2X11 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/24/2021	CHECKED BY BS - 3/24/2021		PROJECT NAME <b>BOOM BRIDGE</b>	SHEET SIZE <b>D</b>		
		ENG. APPROVED BY MF - 3/24/2021	PROJ. ENG. APPROVED BY BS - 3/24/2021					
		MFG. APPROVED BY SS - 3/24/2021			CLIENT <b>GREENSKIES</b>	MODULE <b>HT72-166M</b>	REV <b>0</b>	SHEET NUMBER <b>10 OF 18</b>
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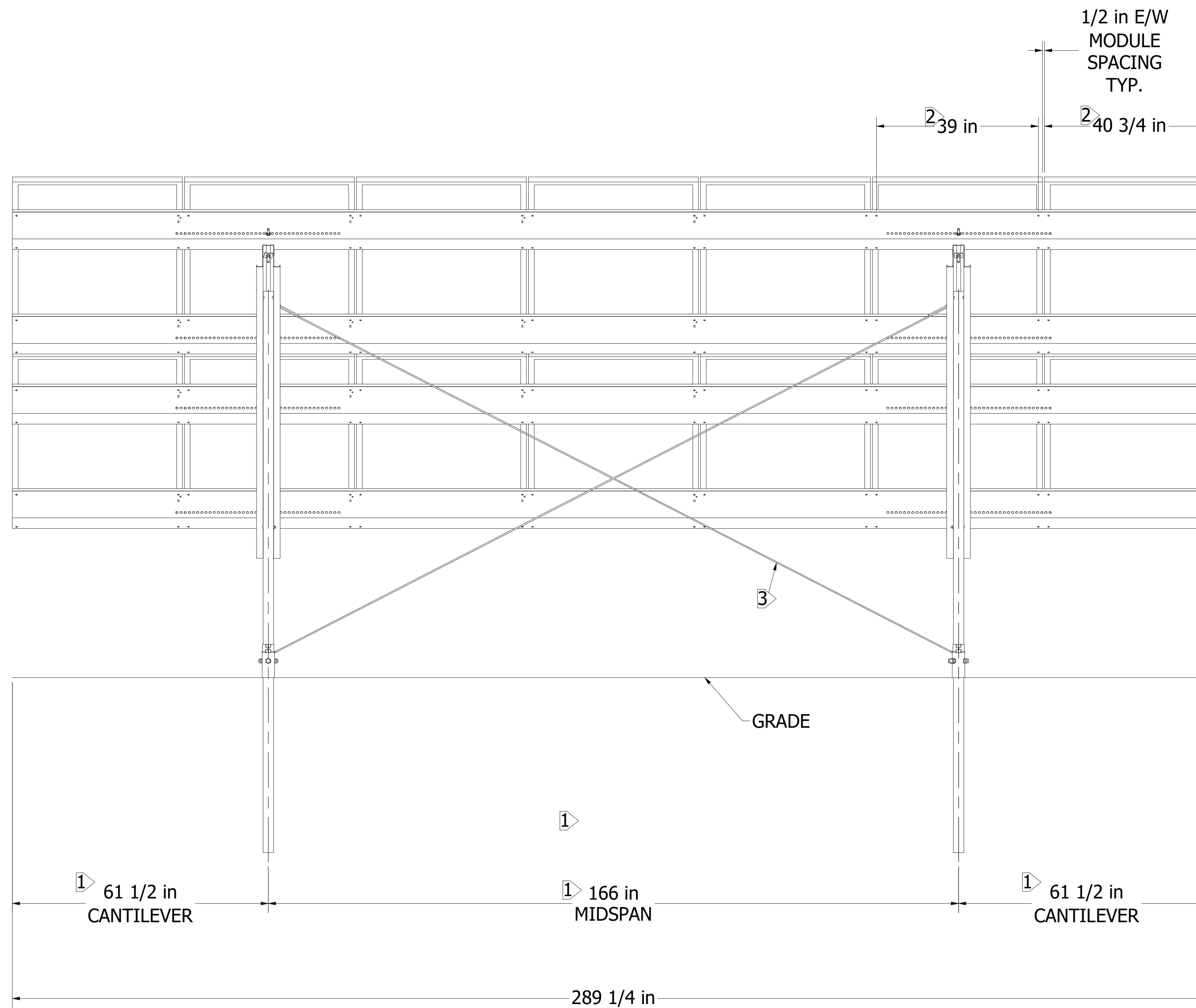
FLATTENED LAYOUT  
SCALE 1/18



ZEYN B. UZMAN  
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	TERRASMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM		ENG. APPROVED BY MF - 3/24/2021	PROJ. ENG. APPROVED BY BS - 3/24/2021	
	PROJECT NUMBER 20-6575		CLIENT GREENSKIES	PROJECT NAME BOOM BRIDGE	
MFG. APPROVED BY SS - 3/24/2021		MODULE HT72-166M	REV 0	SHEET NUMBER 11 OF 18	PROPRIETARY AND CONFIDENTIAL. THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TERRASMART. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT WRITTEN PERMISSION OF TERRASMART IS PROHIBITED.





REAR ELEVATION VIEW  
SCALE 1/18



ZEYIN B. UZMAN  
CT PE# PEN.0023151

NOTES:

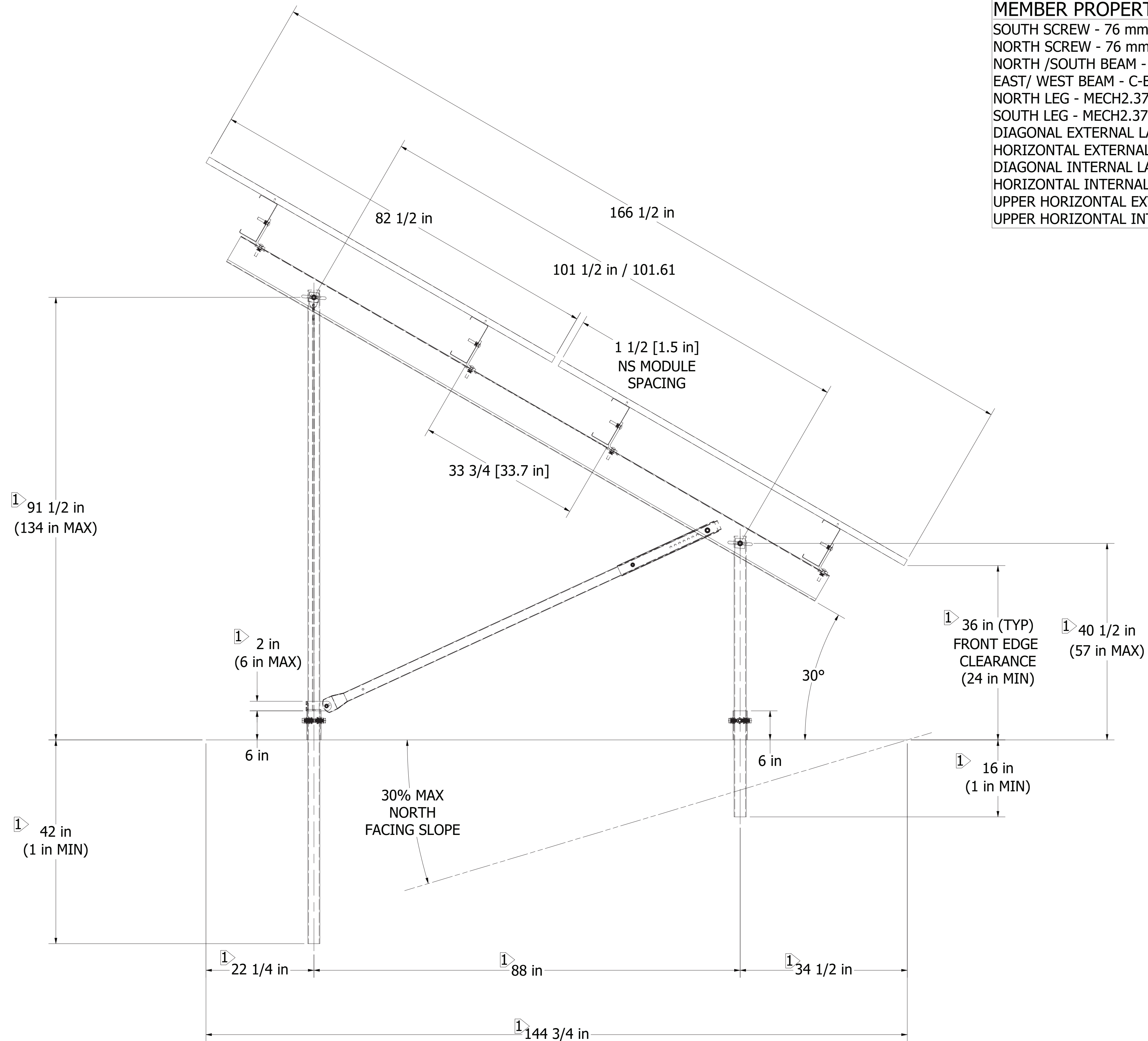
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SHEET NUMBER  
12 OF 18

**MEMBER PROPERTIES**

SOUTH SCREW - 76 mm X 2100 mm  
 NORTH SCREW - 76 mm X 2100 mm  
 NORTH /SOUTH BEAM - RAFTER - LENGTH = 140.25 in  
 EAST/ WEST BEAM - C-BEAM 9.0x4.0x0.0860 - LENGTH = 289.13 in  
 NORTH LEG - MECH2.375 x 9GA. - LENGTH = 135.00 in  
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 DIAGONAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 23.00 in  
 HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A in  
 DIAGONAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = 90 in  
 HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = N/A in  
 UPPER HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A in  
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SIDE ELEVATION VIEW  
 SCALE 1/12

**NOTES:**

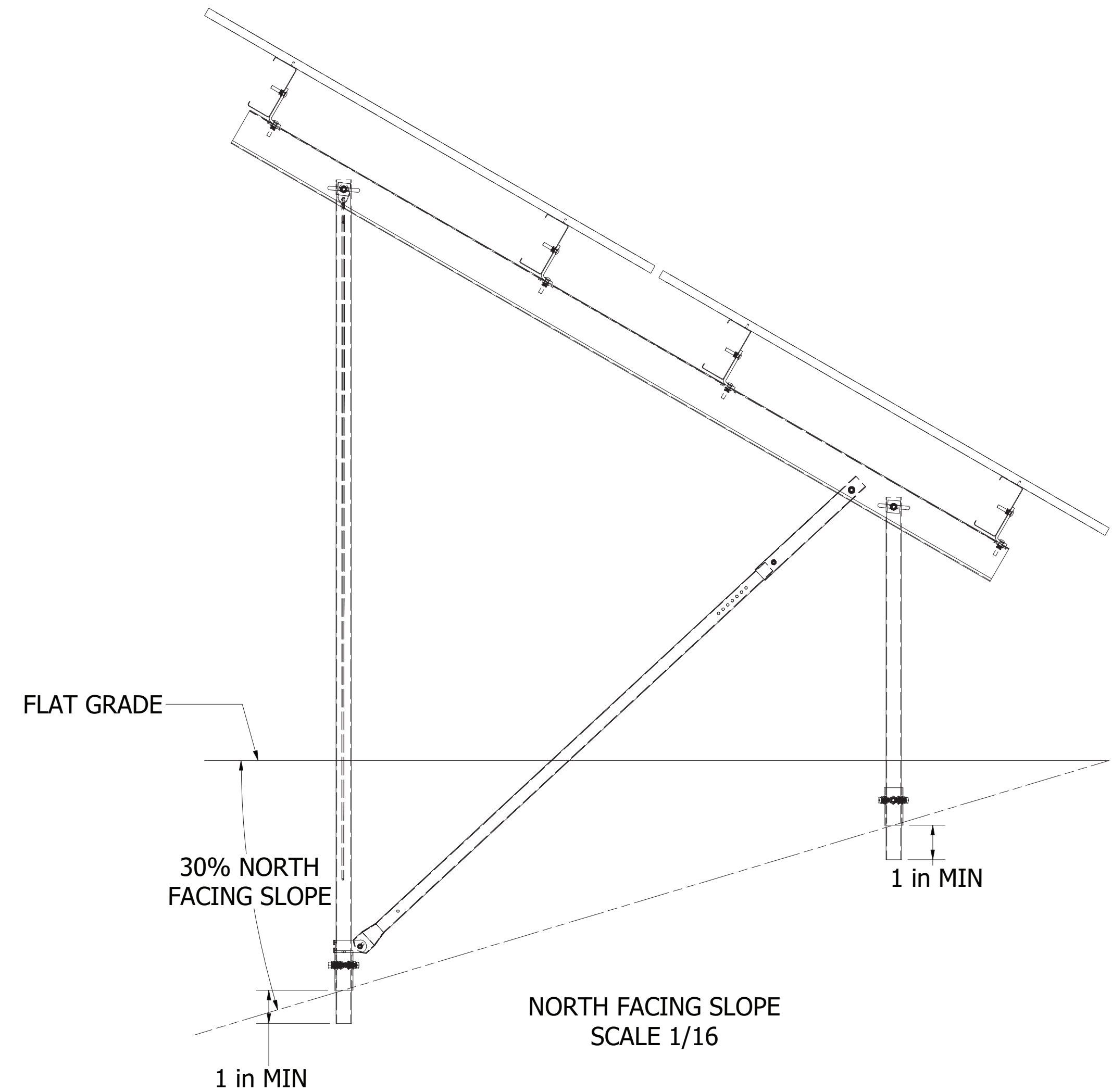
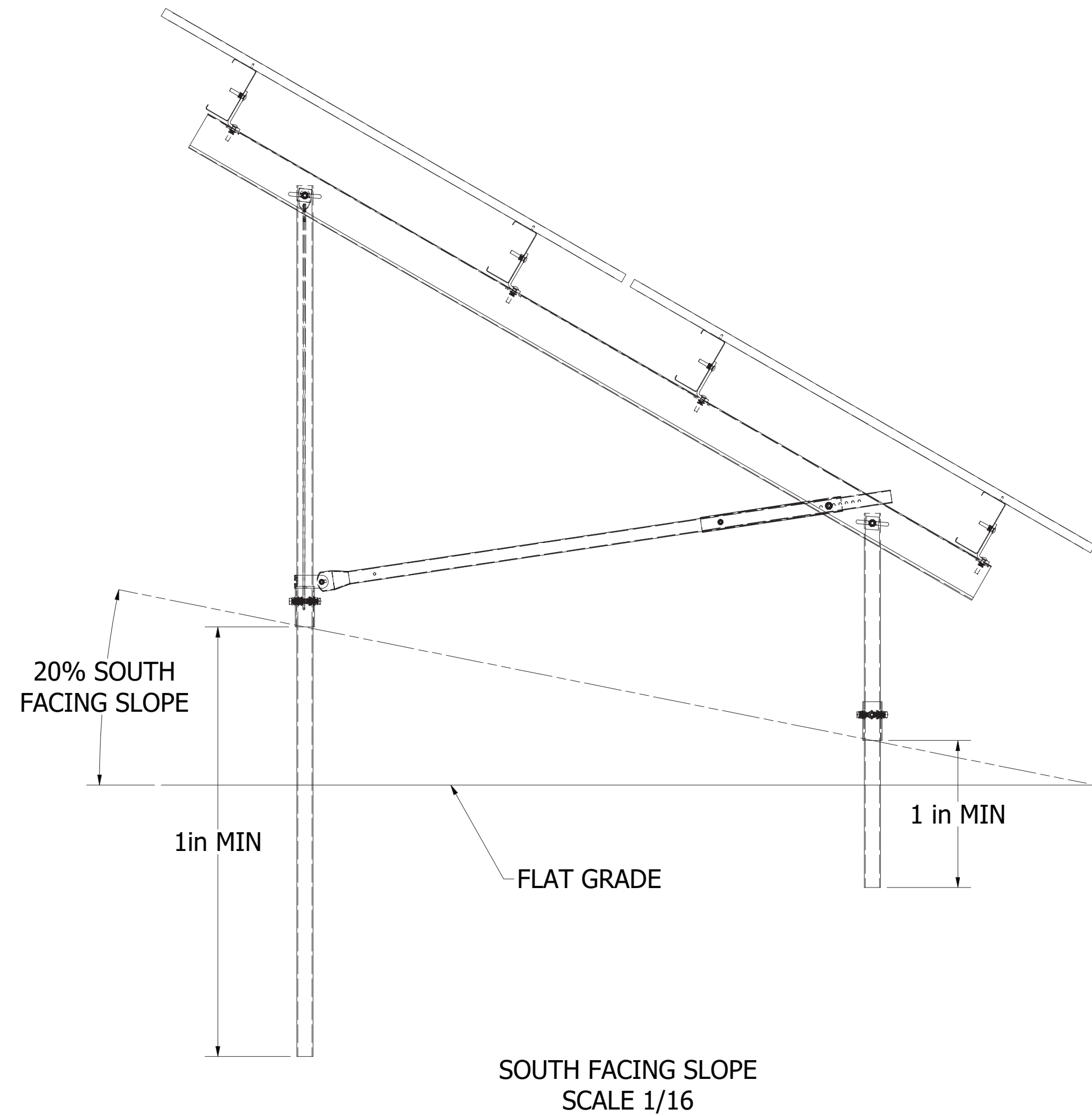
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ZEYN B. UZMAN  
 CT PE# PEN.0023151

GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 82.44 (2094mm) EAST/ WEST EDGE - 40.87 (1038mm) NORTH/ SOUTH BOLT SPACING - 50.24 (1276mm) EAST/ WEST BOLT SPACING - 38.94 (989mm) THICKNESS - 1.38 (35mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X7 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/24/2021	CHECKED BY BS - 3/24/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D		
		ENG. APPROVED BY MF - 3/24/2021	PROJ. ENG. APPROVED BY BS - 3/24/2021					
		MFG. APPROVED BY SS - 3/24/2021			CLIENT GREENSKIES	MODULE HT72-166M	REV 0	SHEET NUMBER 13 OF 18
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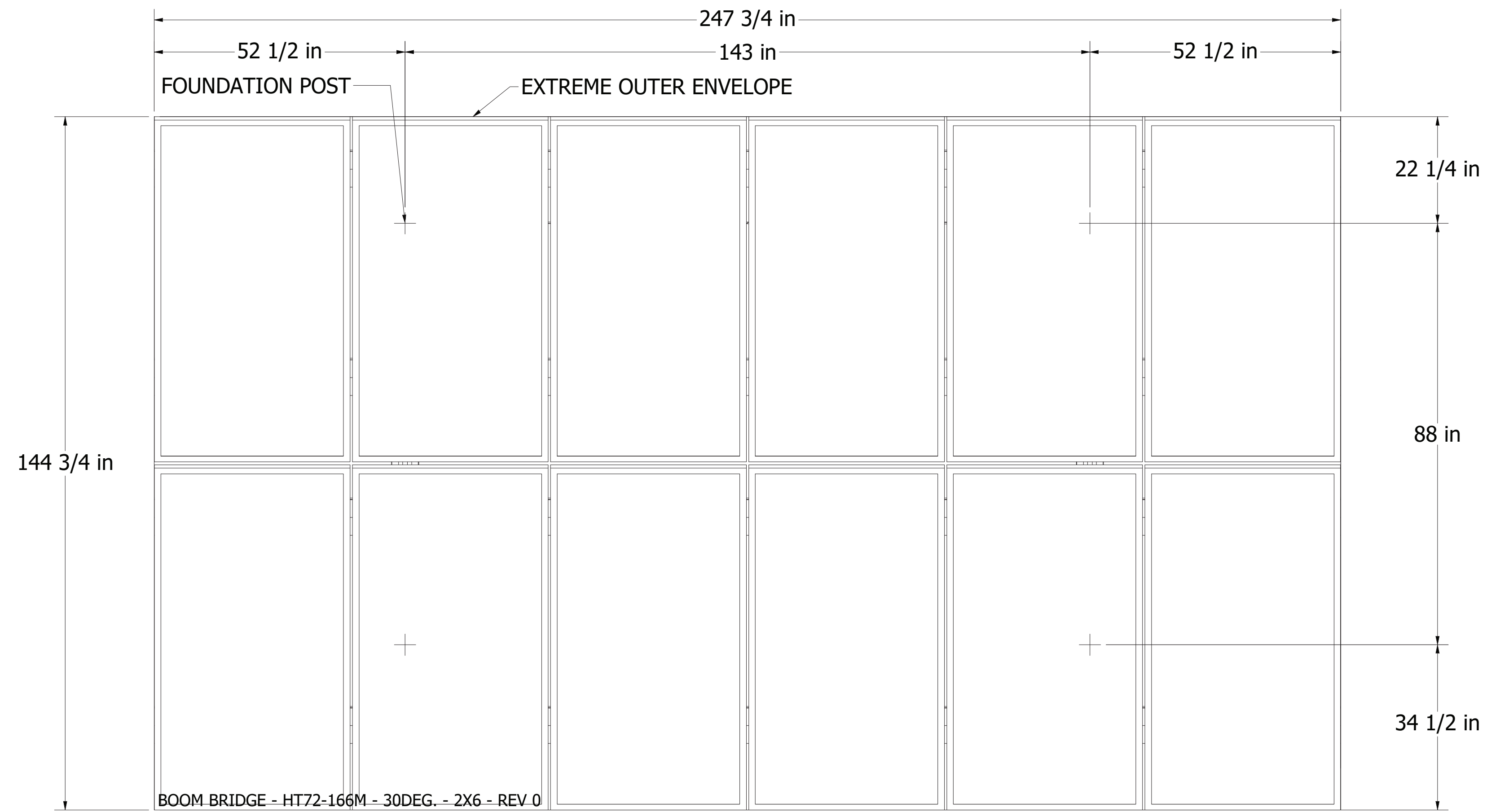


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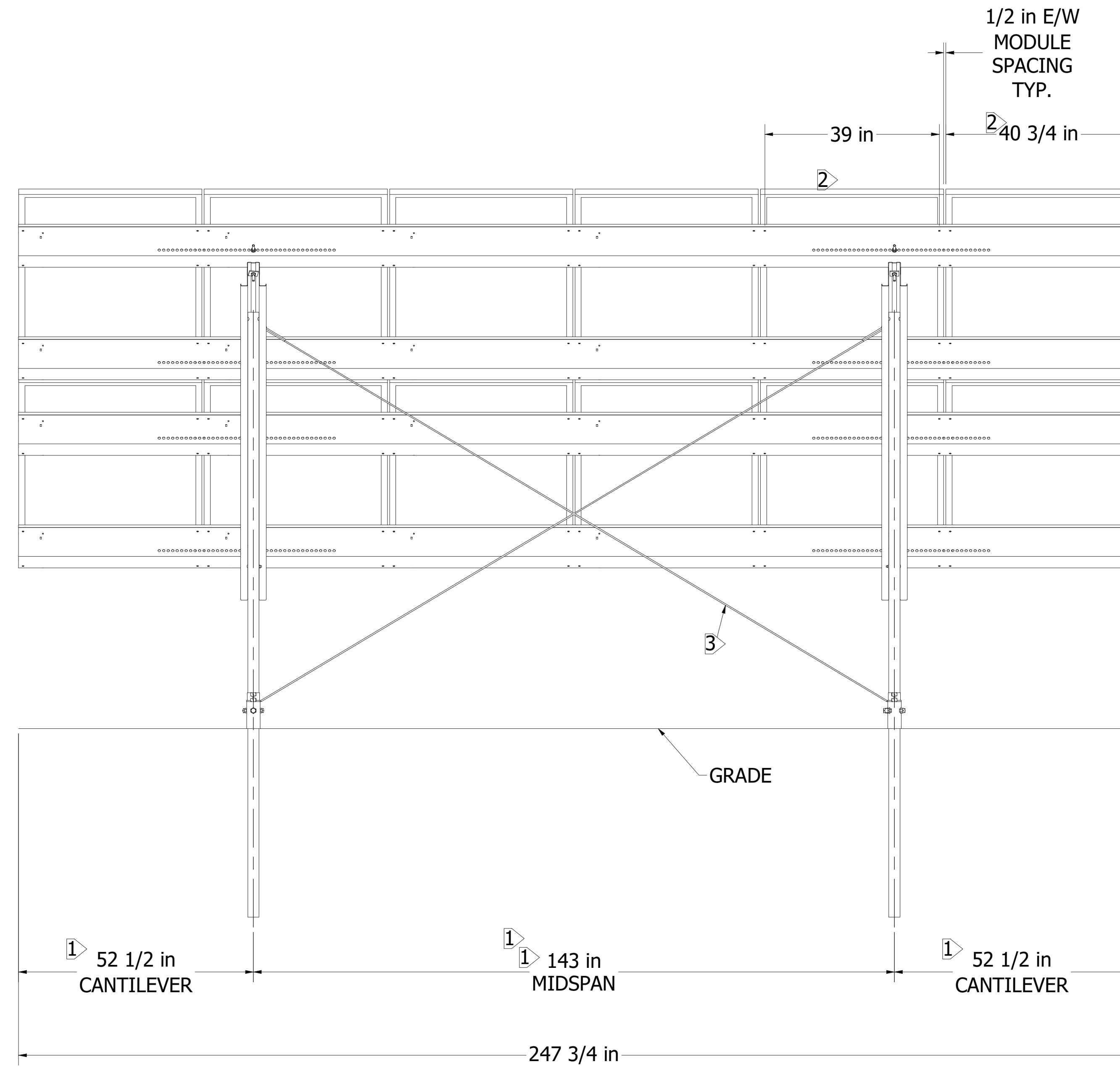
FLATTENED LAYOUT  
SCALE 1/18



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	TERRASMART, LLC 14590 GLOBAL PARKWAY FORT MYERS, FL 33913 P 239.362.0211   F 239.676.1900 WWW.TERRASMART.COM		ENG. APPROVED BY MF - 3/24/2021	PROJ. ENG. APPROVED BY BS - 3/24/2021	
PROJECT NUMBER 20-6575			PROJECT NAME BOOM BRIDGE		SHEET SIZE D
CLIENT GREENSKIES			MODULE HT72-166M		REV 0
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					SHEET NUMBER 15 OF 18





REAR ELEVATION VIEW  
SCALE 1/18



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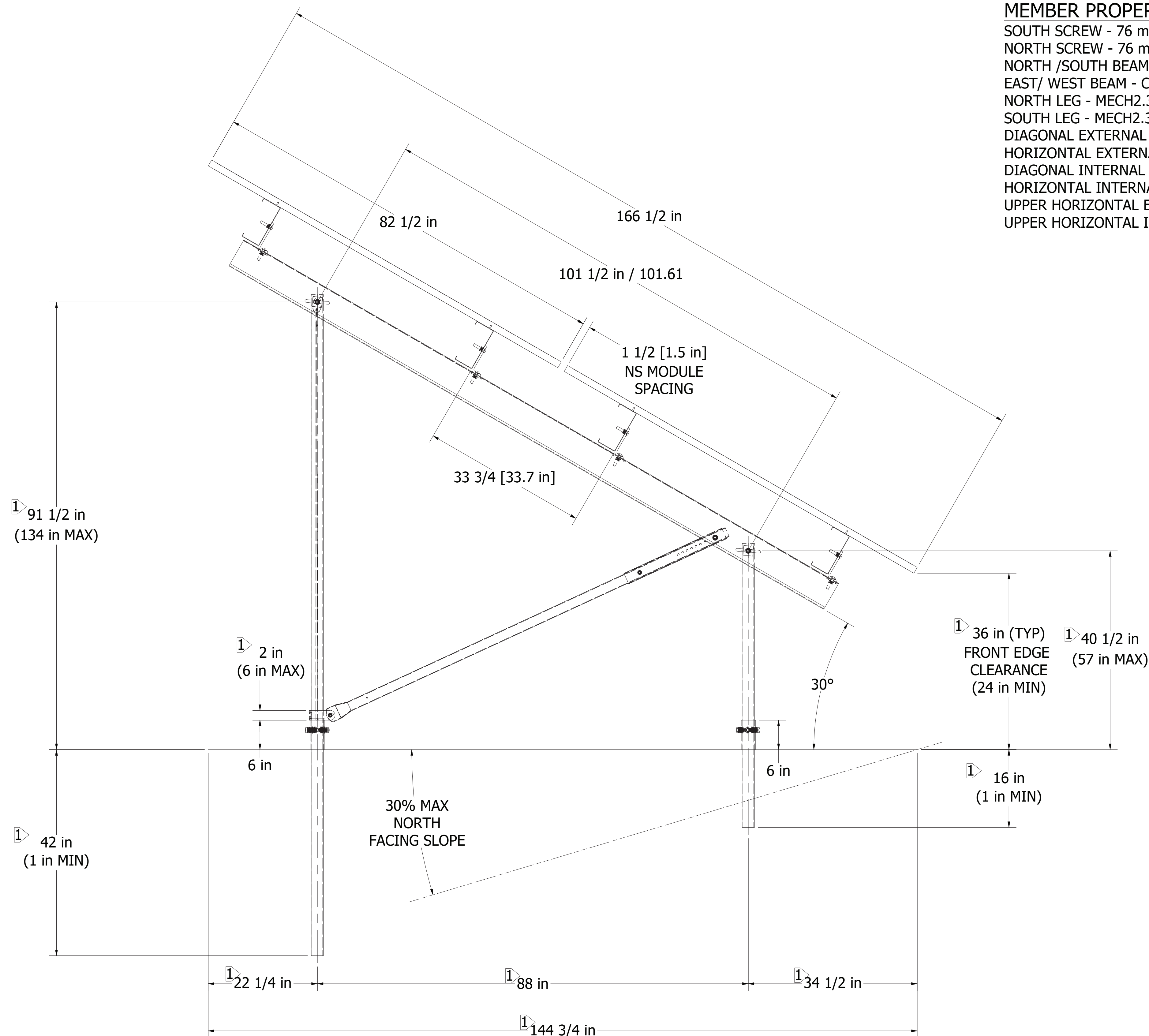
NOTES:

1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. PURLIN SPACING IS DEPENDENT ON MODULE SPECIFICATIONS, REFER TO PROJECT NOTES FOR MODULE SPECIFICATIONS.
3. SEISMIC CROSS BRACING TO BE FIELD FIT.

GROUND SCREW KRINNER G SERIES GROUND SCREW SOUTH SCREW - 76mm X 2100mm NORTH SCREW - 76mm X 2100mm MODULE DIMENSIONS NORTH/ SOUTH EDGE - 82.44 (2094mm) EAST/ WEST EDGE - 40.87 (1038mm) NORTH/ SOUTH BOLT SPACING - 50.24 (1276mm) EAST/ WEST BOLT SPACING - 38.94 (989mm) THICKNESS - 1.38 (35mm)	PROJECT SPECIFICATIONS: TILT ANGLE - 30° RACK SIZE - 2X6 MODULE ORIENTATION - PORTRAIT	DRAWN BY TMC - 3/24/2021	CHECKED BY BS - 3/24/2021		PROJECT NAME BOOM BRIDGE	SHEET SIZE D		
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**MEMBER PROPERTIES**

SOUTH SCREW - 76 mm X 2100 mm  
 NORTH SCREW - 76 mm X 2100 mm  
 NORTH /SOUTH BEAM - RAFTER - LENGTH = 140.25 in  
 EAST/ WEST BEAM - C-BEAM 9.0x4.0x0.0860 - LENGTH = 247.77 in  
 NORTH LEG - MECH2.375 x 9GA. - LENGTH = 135.00 in  
 SOUTH LEG - MECH2.375 x 9GA. - LENGTH = 58.00 in  
 DIAGONAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 23.00 in  
 HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A in  
 DIAGONAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = 90 in  
 HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = N/A in  
 UPPER HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A in  
 UPPER HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000x12GA.- LENGTH = N/A in



SIDE ELEVATION VIEW  
 SCALE 1/12

**NOTES:**

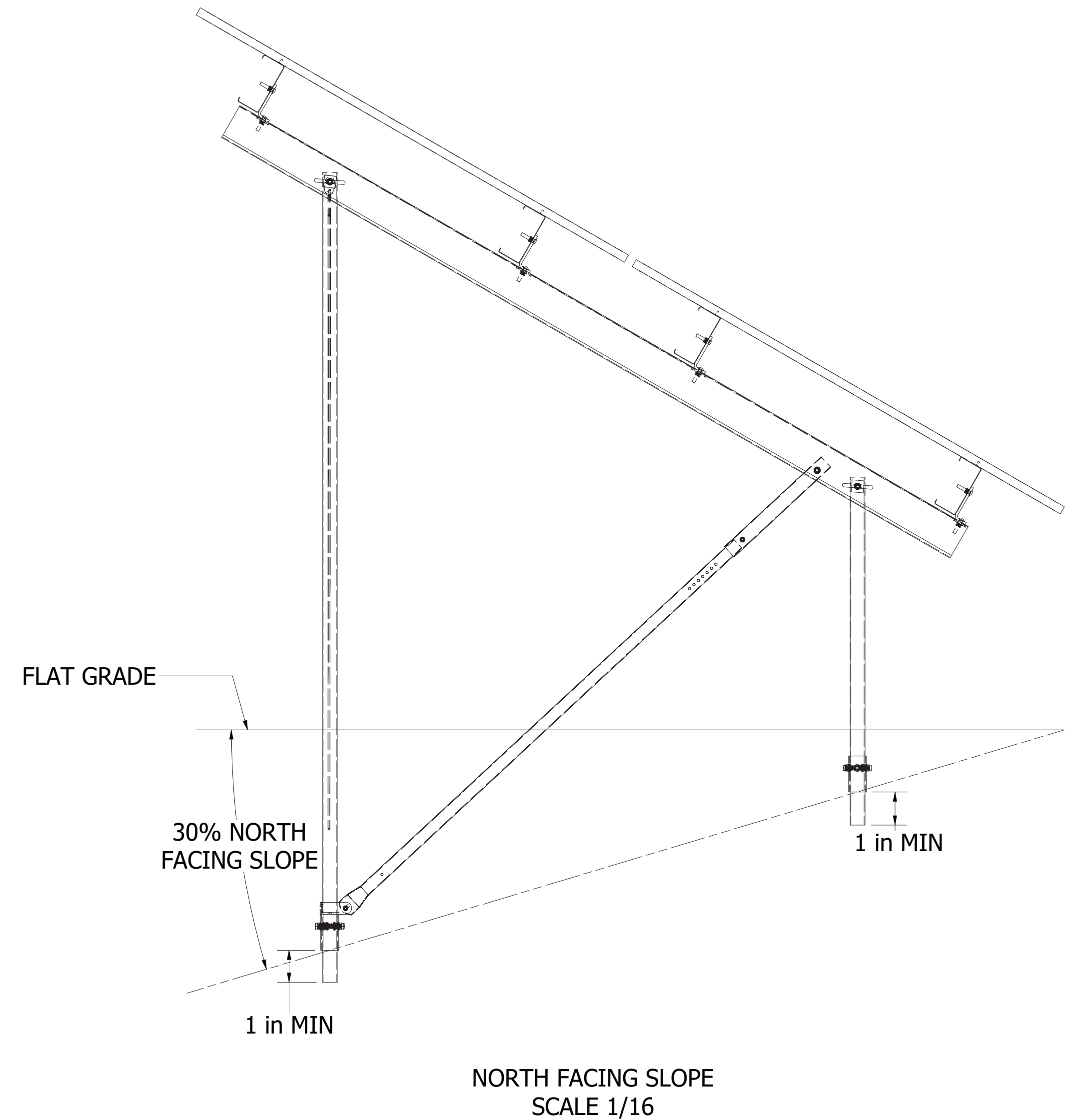
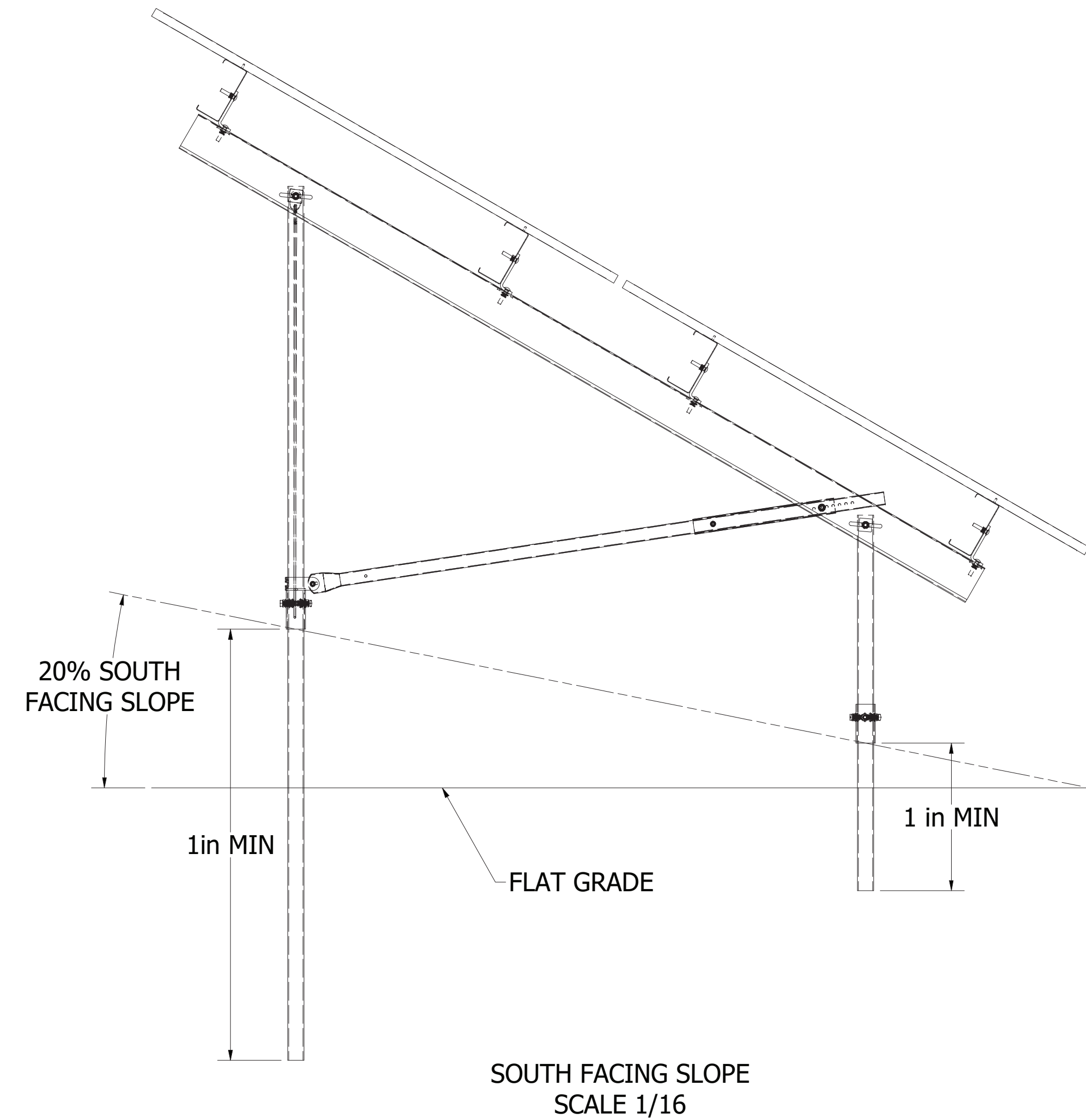
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# STRUCTURAL CALCULATION REPORT



# TERRAS**SMART**

## GREENSKIES - BOOM BRIDGE

PROJECT NUMBER	20-6575
PRODUCT	TERRAGLIDE PORTRAIT
REVISION	0

### ENGINEER OF RECORD



ZEYN B. UZMAN - CT PEN.0023151



14590 GLOBAL PARKWAY

FORT MYERS, FL 33913

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ENG@TERRASMART.COM

WWW.TERRASMART.COM

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PAGE 1 OF 13

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# GREENSKIES - BOOM BRIDGE

## GENERAL INFORMATION

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HARDWARE DESIGN	PAGE 11
CONNECTION DESIGN	PAGE 12
THRU BOLT DESIGN	PAGE 13

### NOTES

- 1) TERRASMART RACKING CONFORMS TO UL2703 STANDARDS.
- 2) TERRASMART USES INFORMATION PROVIDED BY OUR CLIENT TO PROPERLY DESIGN OUR PRODUCT. IF CERTAIN INFORMATION IS NOT PROVIDED, GENERAL ASSUMPTIONS WILL BE MADE. IT IS THE RESPONSIBILITY OF THE CLIENT TO VERIFY AND APPROVE ALL DESIGN CRITERIA AND RACKING SPECIFICATIONS.
- 3) RACKING AND FOUNDATION STRUCTURAL CALCULATIONS CONFORM TO APPLICABLE STATE OR FEDERAL BUILDING CODES.
- 4) TERRASMART IS NOT RESPONSIBLE FOR THE ACCURACY OF THE ENVIRONMENTAL DESIGN CRITERIA (WIND SPEED, SNOW LOAD, EXPOSURE, ETC.)
- 5) SNOW BANKING ANALYSIS WAS NOT PERFORMED BY TERRASMART AND WAS NOT CONSIDERED IN THE DESIGN OF THE STRUCTURE. THE FRONT EDGE CLEARANCE WAS PROVIDED BY THE CLIENT AND ADVERSE EFFECTS OF SNOW BANKING ARE BEYOND TERRASMART'S SCOPE.
- 6) TERRASMART IS NOT RESPONSIBLE FOR ANY DAMAGE TO PV MODULES MOUNTED TO TERRASMART RACKING DUE TO THE EXTREME VARIETY IN MODULE FRAME DESIGN, MOUNTING STYLE, AND MANUFACTURING PROCESS. TERRASMART RECOMMENDS THAT THE CLIENT WORK WITH THE MODULE MANUFACTURER TO UNDERSTAND ALL RESTRICTIONS AND LIMITATIONS.
- 7) MOUNTING OF COMBINER BOXES, STRING INVERTERS, OR OTHER ITEMS NOT INCLUDED IN TERRASMARTS CALCULATION PACKAGE TO THE RACKING MUST BE REVIEWED AND APPROVED BY TERRASMART.
- 8) TERRASMART STRUCTURAL CALCULATIONS APPLY TO RACKING INSTALLED WITHIN THE TOLERANCES AND INSTALL PROCEDURES PROVIDED IN THE RACKING CONSTRUCTION PLANS AND ASSOCIATED INSTALLATION MANUAL. ANY DEVIATION FROM THE SPECIFIED TOLERANCES OR INSTALL PROCEDURES MUST BE REVIEWED AND APPROVED BY TERRASMART.

# GREENSKIES - BOOM BRIDGE

## PROJECT SPECIFICATIONS

### GENERAL PROJECT INFORMATION

ADDRESS	BOOM BRIDGE ROAD
CITY	NORTH STONINGTON
STATE	CT
ZIP	06359

### DESIGN CRITERIA

EXPOSURE CATEGORY	C	ASCE/IBC
RISK/OCCUPANCY CATEGORY	I	ASCE/IBC
BASIC WIND SPEED (DESIGN LIFE = 25YR)	115.5 MPH	ASCE/IBC
GROUND SNOW LOAD	30.0 PSF	ASCE/IBC
FLAT ROOF SNOW LOAD	30.0 PSF	ASCE/IBC
MAPPED ACCELERATION, S <sub>s</sub>	0.161	ASCE/IBC
MAPPED ACCELERATION, S <sub>1</sub>	0.058	ASCE/IBC

### PV MODULE SPECIFICATIONS

PV MODULE MODEL	CS3W-XXXPB-AG	CLIENT PROVIDED
WATTAGE	395 W	
SHORT EDGE DIMENSION	41.260 IN	
LONG EDGE DIMENSION	83.937 IN	
SHORT BOLT SPACING	40.118 IN	
LONG BOLT SPACING	45.472 IN	
THICKNESS	1.181 IN	
WEIGHT	62.61 LBS	
HARDWARE SIZE	M8	

### PV RACKING SPECIFICATIONS

MODULE ORIENTATION	PORTRAIT
FOUNDATION TYPE	TERRASMART GROUND SCREWS
MODULE ROWS	2
MODULE COLUMNS	6
TILT ANGLE	30.0°
FRONT EDGE CLEARANCE	36 IN
MAX E-W SLOPE	25.0%
MAX NORTH FACING SLOPE	30.0%
MAX SOUTH FACING SLOPE	20.0%
E-W MODULE SPACING	0.500 IN
N-S MODULE SPACING	1.500 IN
EW SCREW SPACING	143 IN
NS SCREW SPACING	88 IN
OVERALL RACK WIDTH (E-W)	250.06 IN

### GEOTECHNICAL SPECIFICATIONS

GEOTECHNICAL REPORT DATE	-	-
GROUND SCREW REPORT DATE	-	TERRASMART
FROST DEPTH	20 IN	CORNELL ATLAS

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# GREENSKIES - BOOM BRIDGE

## MEMBER SPECIFICATIONS

C PURLIN	
SECTION	CEE 9X4-0.086
LENGTH	250.917 IN
WEIGHT	103.38 LBS
MATERIAL	ASTM A653 - GRADE 80 SS

HAT RAFTER	
SECTION	HAT 6.1X5.76-0.1017
LENGTH	137.000 IN
WEIGHT	68.28 LBS
MATERIAL	ASTM A653 - GRADE 80

SOUTH LEG	
SECTION	2.375X9GA
LENGTH	59.000 IN
WEIGHT	16.66 LBS
MATERIAL	ASTM A500 - GRADE C

NORTH LEG	
SECTION	2.375X9GA
LENGTH	136.000 IN
WEIGHT	38.41 LBS
MATERIAL	ASTM A500 - GRADE C

EXTERNAL LATERAL BRACE	
SECTION	2.36X13GA
LENGTH	23.000 IN
WEIGHT	4.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL DIAGONAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	91.000 IN
WEIGHT	16.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL HORIZONTAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	74.000 IN
WEIGHT	13.06 LBS
MATERIAL	ASTM A500 - GRADE C

# GREENSKIES - BOOM BRIDGE

## DESIGN LOADS

### DEAD LOAD

TOTAL MODULE WEIGHT	751 LBS
---------------------	---------

### SNOW LOAD

EXPOSURE FACTOR, $C_e$	0.90
THERMAL FACTOR, $C_t$	1.20
IMPORTANCE FACTOR, $I_s$	0.80
FLAT ROOF SNOW LOAD, $P_f$	30.0 PSF
SLOPE FACTOR, $C_s$	0.73
SLOPED ROOF SNOW LOAD, $P_s$	21.8 PSF

### WIND LOAD

IMPORTANCE FACTOR, $I$	1.00
VELOCITY PRESSURE COEF., $K_z$	0.85
TOPOGRAPHIC FACTOR, $K_{zt}$	1.00
DIRECTIONALITY FACTOR, $K_d$	0.85
GUST FACTOR	0.85
VELOCITY PRESSURE, $q_z$	24.7 PSF

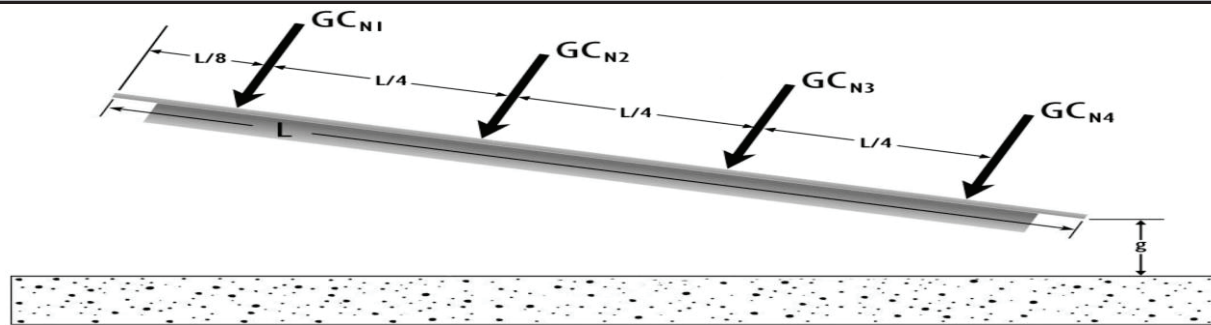
### ASCE WIND PRESSURE COEFFICIENTS - CASE A

$GC_n$	WIND UP	WIND DOWN
1	-1.80	2.10
2	-1.80	2.10
3	-1.80	2.10
4	-1.80	2.10

### ASCE WIND PRESSURE COEFFICIENTS - CASE B

$GC_n$	WIND UP	WIND DOWN
1	-2.50	1.00
2	-2.50	1.00
3	-0.50	2.60
4	-0.50	2.60

### ASCE WIND PRESSURE DIAGRAM





# GREENSKIES - BOOM BRIDGE

## PURLIN DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.086 IN

### ALLOWABLE CAPACITY (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	121.1 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	46.7 KIP-IN
ALLOWABLE SHEAR, $V_y$	6.7 KIP
ALLOWABLE SHEAR, $V_x$	17.8 KIP

### APPLIED LOADS (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-22.5 KIP-IN
ABOUT Y AXIS	-5.4 KIP-IN
APPLIED SHEAR, $V_y$	-0.7 KIP
APPLIED SHEAR, $V_x$	-0.2 KIP

### UNITY CHECKS

AISI EQ H1.1-1	21%
AISI EQ H1.1-2	27%
AISI EQ H1.2-1	30%
AISI EQ H2-1 X	20%
AISI EQ H2-1 Y	15%
CONTROLLING LOAD CASE	1D - 0.45WD - 0.75S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/1761
CLEARSPAN DEAD DEFLECTION	0.012 IN
CANTELIVER DEAD DEFLECTION	0.010 IN

# GREENSKIES - BOOM BRIDGE

## RAFTER DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.102 IN

### ALLOWABLE CAPACITY (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	135.0 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	59.9 KIP-IN
ALLOWABLE SHEAR, $V_y$	34.2 KIP
ALLOWABLE SHEAR, $V_x$	13.2 KIP

### APPLIED LOADS (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-18.5 KIP-IN
ABOUT Y AXIS	-4.3 KIP-IN
APPLIED SHEAR, $V_y$	-1.0 KIP
APPLIED SHEAR, $V_x$	-0.2 KIP

### UNITY CHECKS

AISI EQ H1.1-1	21%
AISI EQ H1.1-2	23%
AISI EQ H1.2-1	25%
AISI EQ H2-1 X	17%
AISI EQ H2-1 Y	7%
CONTROLLING LOAD CASE	0.6D - 0.6WU - 0S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/1547
------------------	--------



# GREENSKIES - BOOM BRIDGE

## LEG DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### SOUTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	22.1 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### NORTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	9.9 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### SOUTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.5 KIP-IN
APPLIED TENSION	-0.4 KIP
APPLIED COMPRESSION	1.7 KIP

### NORTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.1 KIP-IN
APPLIED TENSION	-2.7 KIP
APPLIED COMPRESSION	3.4 KIP

### UNITY CHECKS

SOUTH LEG COMBINED STRESS	7%
NORTH LEG COMBINED STRESS	35%

# GREENSKIES - BOOM BRIDGE

## BRACE DESIGN

### DIAGONAL AND HORIZONTAL BRACE MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### INTERNAL DIAGONAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	3.3 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL HORIZONTAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	5.4 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL DIAGONAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-2.7 KIP
APPLIED COMPRESSION	2.3 KIP

### INTERNAL HORIZONTAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-2.1 KIP
APPLIED COMPRESSION	2.1 KIP

### SEISMIC CABLE BRACE CAPACITY

CABLE BREAKING STRENGTH	2.3 KIP
-------------------------	---------

### SEISMIC CABLE BRACE APPLIED LOAD

MAXIMUM TENSION	0.1 KIP
-----------------	---------

### BRACE UNITY CHECKS

INTERNAL DIAGONAL BRACE COMBINED STRESS	70%
INTERNAL HORIZONTAL BRACE COMBINED STRESS	7%
SEISMIC CABLE BRACE	1%

# GREENSKIES - BOOM BRIDGE

## FOUNDATION DESIGN

### GROUND SCREW MINIMUM REQUIRED TORQUE

DESIGN TORQUE VARIABLE	285.29
DESIGN TORQUE EXPONENT	0.45
MINIMUM REQUIRED TORQUE	2000 N-m

### GROUND SCREW ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION	10.1 KIP
ALLOWABLE TENSION	7.3 KIP
ALLOWABLE LATERAL	2.6 KIP

### GROUND SCREW APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED COMPRESSION	4.6 KIP
APPLIED TENSION	3.9 KIP
APPLIED LATERAL	1.1 KIP

### UNITY CHECK

GROUND SCREW STRESS	54%
---------------------	-----

### FROST HEAVE ANALYSIS

FOUNDATION EMBEDMENT DEPTH	74 IN
APPROXIMATE FROST DEPTH	20 IN
SCREW PENETRATION BELOW FROST DEPTH	54 IN
UPLIFT PRESSURE DUE TO ICE LENSING	0.29 KSI
UPLIFT PRESSURE DUE TO ADFREEZING	0.01 KSI
UPLIFT FORCE DUE TO ICE LENSING	0.00 KIP
UPLIFT FORCE DUE TO ADFREEZING	2.73 KIP
TOTAL FROST HEAVE FORCE	2.73 KIP
TOTAL DEAD LOAD	0.35 KIP
RESULTANT HEAVE FORCE	2.39 KIP
FROST HEAVE PREVENTION STRESS	33%



# GREENSKIES - BOOM BRIDGE

## HARDWARE DESIGN

### PV MODULE TO C PURLIN

HARDWARE SPECIFICATION	M8 - GRADE 18-8
APPLIED TENSION	0.32 KIP
APPLIED SHEAR	0.06 KIP
UNITY CHECK	8%

### C PURLIN TO SLOPE BRACKET

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	1.51 KIP
UNITY CHECK	24%

### SLOPE BRACKET TO RAFTER

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	1.26 KIP
APPLIED SHEAR	0.36 KIP
UNITY CHECK	12%

### RAFTER TO LEG

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	3.35 KIP
UNITY CHECK	26%

### DIAGONAL BRACE HARDWARE

HARDWARE SPECIFICATION	3/8-16 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	2.71 KIP
UNITY CHECK	43%

### TERRASMART SET BOLT (INDEPENDENT LAB TESTING)

ALLOWABLE VERTICAL FORCE	8.00 KIP
APPLIED VERTICAL FORCE	2.71 KIP
UNITY CHECK	34%

# GREENSKIES - BOOM BRIDGE

## CONNECTION DESIGN

### C PURLIN TO SLOPE BRACKET BEARING CHECK

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	5.63 KIP
APPLIED VERTICAL FORCE	1.51 KIP
UNITY CHECK	27%

### SLOPE BRACKET TO RAFTER CONNECTION

ALLOWABLE UPLIFT FORCE	2.52 KIP
ALLOWABLE MOMENT	4.10 KIP-IN
APPLIED UPLIFT FORCE	1.26 KIP
APPLIED MOMENT	2.06 KIP-IN
UNITY CHECK	50%

### RAFTER TO LEG CONNECTION

ALLOWABLE VERTICAL FORCE	7.47 KIP
APPLIED VERTICAL FORCE	3.35 KIP
UNITY CHECK	45%

### RAFTER TO LATERAL BRACE CONNECTION

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	13.31 KIP
APPLIED PULL-OUT	2.71 KIP
UNITY CHECK	20%

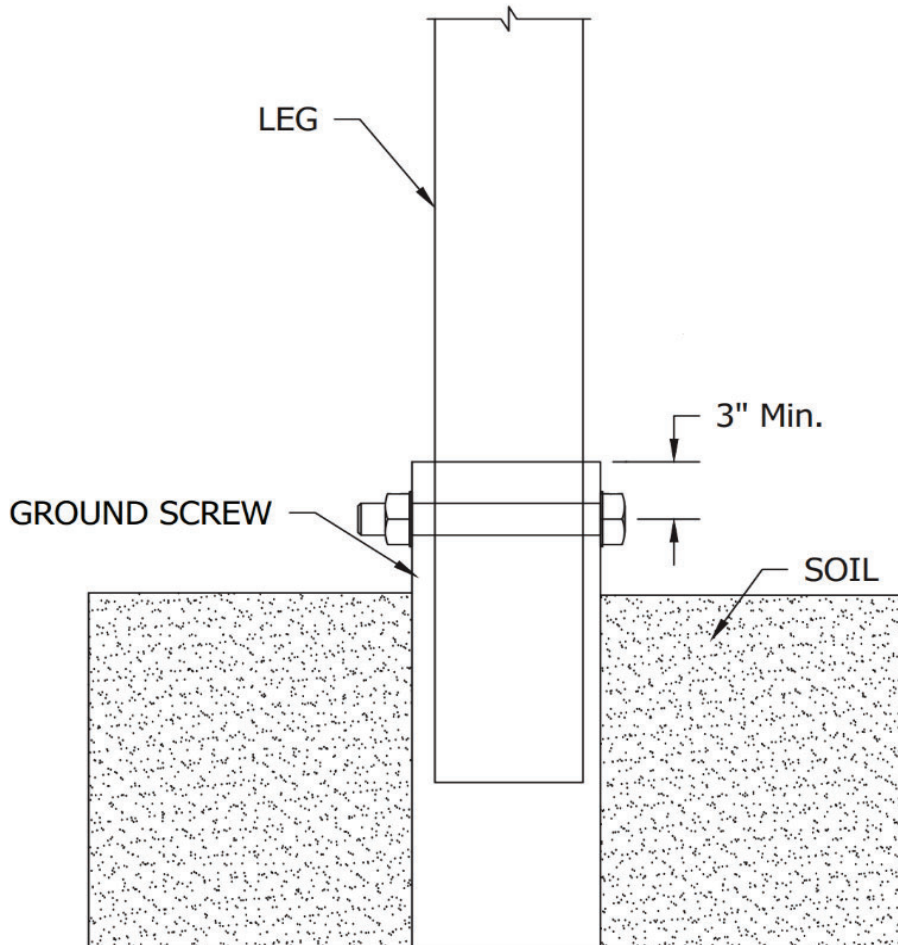
# GREENSKIES - BOOM BRIDGE

## THRU BOLT DESIGN

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED SHEAR	4.63 KIP
UNITY CHECK	36%

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)



### NOTE

A THRU BOLT MAY BE USED IN THE RARE EVENT THAT A GROUND SCREW WELD NUT IS DAMAGED DURING INSTALLATION.



# STRUCTURAL CALCULATION REPORT



# TERRAS<sub>SMART</sub>

## GREENSKIES - BOOM BRIDGE

PROJECT NUMBER	20-6575
PRODUCT	TERRAGLIDE PORTRAIT
REVISION	0

### ENGINEER OF RECORD



ZEYN B. UZMAN - CT PEN.0023151



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# GREENSKIES - BOOM BRIDGE

## GENERAL INFORMATION

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### NOTES

- 1) TERRASMART RACKING CONFORMS TO UL2703 STANDARDS.
- 2) TERRASMART USES INFORMATION PROVIDED BY OUR CLIENT TO PROPERLY DESIGN OUR PRODUCT. IF CERTAIN INFORMATION IS NOT PROVIDED, GENERAL ASSUMPTIONS WILL BE MADE. IT IS THE RESPONSIBILITY OF THE CLIENT TO VERIFY AND APPROVE ALL DESIGN CRITERIA AND RACKING SPECIFICATIONS.
- 3) RACKING AND FOUNDATION STRUCTURAL CALCULATIONS CONFORM TO APPLICABLE STATE OR FEDERAL BUILDING CODES.
- 4) TERRASMART IS NOT RESPONSIBLE FOR THE ACCURACY OF THE ENVIRONMENTAL DESIGN CRITERIA (WIND SPEED, SNOW LOAD, EXPOSURE, ETC.)
- 5) SNOW BANKING ANALYSIS WAS NOT PERFORMED BY TERRASMART AND WAS NOT CONSIDERED IN THE DESIGN OF THE STRUCTURE. THE FRONT EDGE CLEARANCE WAS PROVIDED BY THE CLIENT AND ADVERSE EFFECTS OF SNOW BANKING ARE BEYOND TERRASMART'S SCOPE.
- 6) TERRASMART IS NOT RESPONSIBLE FOR ANY DAMAGE TO PV MODULES MOUNTED TO TERRASMART RACKING DUE TO THE EXTREME VARIETY IN MODULE FRAME DESIGN, MOUNTING STYLE, AND MANUFACTURING PROCESS. TERRASMART RECOMMENDS THAT THE CLIENT WORK WITH THE MODULE MANUFACTURER TO UNDERSTAND ALL RESTRICTIONS AND LIMITATIONS.
- 7) MOUNTING OF COMBINER BOXES, STRING INVERTERS, OR OTHER ITEMS NOT INCLUDED IN TERRASMARTS CALCULATION PACKAGE TO THE RACKING MUST BE REVIEWED AND APPROVED BY TERRASMART.
- 8) TERRASMART STRUCTURAL CALCULATIONS APPLY TO RACKING INSTALLED WITHIN THE TOLERANCES AND INSTALL PROCEDURES PROVIDED IN THE RACKING CONSTRUCTION PLANS AND ASSOCIATED INSTALLATION MANUAL. ANY DEVIATION FROM THE SPECIFIED TOLERANCES OR INSTALL PROCEDURES MUST BE REVIEWED AND APPROVED BY TERRASMART.

# GREENSKIES - BOOM BRIDGE

## PROJECT SPECIFICATIONS

### GENERAL PROJECT INFORMATION

ADDRESS	BOOM BRIDGE ROAD
CITY	NORTH STONINGTON
STATE	CT
ZIP	06359

### DESIGN CRITERIA

EXPOSURE CATEGORY	C	ASCE/IBC
RISK/OCCUPANCY CATEGORY	I	ASCE/IBC
BASIC WIND SPEED (DESIGN LIFE = 25YR)	115.5 MPH	ASCE/IBC
GROUND SNOW LOAD	30.0 PSF	ASCE/IBC
FLAT ROOF SNOW LOAD	30.0 PSF	ASCE/IBC
MAPPED ACCELERATION, S <sub>s</sub>	0.161	ASCE/IBC
MAPPED ACCELERATION, S <sub>1</sub>	0.058	ASCE/IBC

### PV MODULE SPECIFICATIONS

PV MODULE MODEL	HT72-166M	CLIENT PROVIDED
WATTAGE	450 W	
SHORT EDGE DIMENSION	40.866 IN	
LONG EDGE DIMENSION	82.441 IN	
SHORT BOLT SPACING	38.937 IN	
LONG BOLT SPACING	50.236 IN	
THICKNESS	1.378 IN	
WEIGHT	51.81 LBS	
HARDWARE SIZE	M8	

### PV RACKING SPECIFICATIONS

MODULE ORIENTATION	PORTRAIT
FOUNDATION TYPE	TERRASMART GROUND SCREWS
MODULE ROWS	2
MODULE COLUMNS	6
TILT ANGLE	30.0°
FRONT EDGE CLEARANCE	36 IN
MAX E-W SLOPE	25.0%
MAX NORTH FACING SLOPE	30.0%
MAX SOUTH FACING SLOPE	20.0%
E-W MODULE SPACING	0.500 IN
N-S MODULE SPACING	1.500 IN
EW SCREW SPACING	143 IN
NS SCREW SPACING	88 IN
OVERALL RACK WIDTH (E-W)	247.70 IN

### GEOTECHNICAL SPECIFICATIONS

GEOTECHNICAL REPORT DATE	-	-
GROUND SCREW REPORT DATE	-	TERRASMART
FROST DEPTH	20 IN	CORNELL ATLAS

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# GREENSKIES - BOOM BRIDGE

## MEMBER SPECIFICATIONS

C PURLIN	
SECTION	CEE 9X4-0.086
LENGTH	247.768 IN
WEIGHT	102.08 LBS
MATERIAL	ASTM A653 - GRADE 80 SS

HAT RAFTER	
SECTION	HAT 6.1X5.76-0.1017
LENGTH	140.250 IN
WEIGHT	69.90 LBS
MATERIAL	ASTM A653 - GRADE 80

SOUTH LEG	
SECTION	2.375X9GA
LENGTH	58.000 IN
WEIGHT	16.38 LBS
MATERIAL	ASTM A500 - GRADE C

NORTH LEG	
SECTION	2.375X9GA
LENGTH	135.000 IN
WEIGHT	38.12 LBS
MATERIAL	ASTM A500 - GRADE C

EXTERNAL LATERAL BRACE	
SECTION	2.36X13GA
LENGTH	23.000 IN
WEIGHT	4.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL DIAGONAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	90.000 IN
WEIGHT	15.88 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL HORIZONTAL LATERAL BRACE	
SECTION	-
LENGTH	-
WEIGHT	-
MATERIAL	-

# GREENSKIES - BOOM BRIDGE

## DESIGN LOADS

### DEAD LOAD

TOTAL MODULE WEIGHT	622 LBS
---------------------	---------

### SNOW LOAD

EXPOSURE FACTOR, $C_e$	0.90
THERMAL FACTOR, $C_t$	1.20
IMPORTANCE FACTOR, $I_s$	0.80
FLAT ROOF SNOW LOAD, $P_f$	30.0 PSF
SLOPE FACTOR, $C_s$	0.73
SLOPED ROOF SNOW LOAD, $P_s$	21.8 PSF

### WIND LOAD

IMPORTANCE FACTOR, $I$	1.00
VELOCITY PRESSURE COEF., $K_z$	0.85
TOPOGRAPHIC FACTOR, $K_{zt}$	1.00
DIRECTIONALITY FACTOR, $K_d$	0.85
GUST FACTOR	0.85
VELOCITY PRESSURE, $q_z$	24.7 PSF

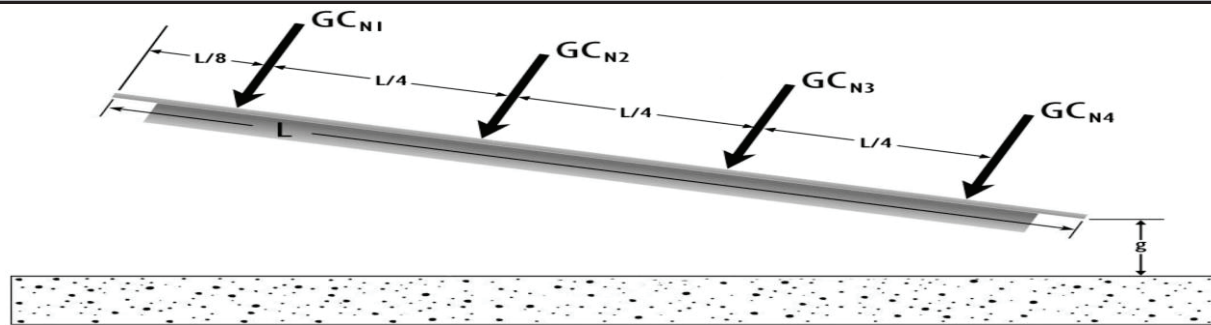
### ASCE WIND PRESSURE COEFFICIENTS - CASE A

$GC_n$	WIND UP	WIND DOWN
1	-1.80	2.10
2	-1.80	2.10
3	-1.80	2.10
4	-1.80	2.10

### ASCE WIND PRESSURE COEFFICIENTS - CASE B

$GC_n$	WIND UP	WIND DOWN
1	-2.50	1.00
2	-2.50	1.00
3	-0.50	2.60
4	-0.50	2.60

### ASCE WIND PRESSURE DIAGRAM



# GREENSKIES - BOOM BRIDGE

## PURLIN DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.086 IN

### ALLOWABLE CAPACITY (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	121.5 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	46.7 KIP-IN
ALLOWABLE SHEAR, $V_y$	6.7 KIP
ALLOWABLE SHEAR, $V_x$	17.8 KIP

### APPLIED LOADS (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-21.3 KIP-IN
ABOUT Y AXIS	-5.0 KIP-IN
APPLIED SHEAR, $V_y$	-0.6 KIP
APPLIED SHEAR, $V_x$	-0.2 KIP

### UNITY CHECKS

AISI EQ H1.1-1	20%
AISI EQ H1.1-2	25%
AISI EQ H1.2-1	29%
AISI EQ H2-1 X	19%
AISI EQ H2-1 Y	14%
CONTROLLING LOAD CASE	1D - 0.45WD - 0.75S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/1624
CLEARSPAN DEAD DEFLECTION	0.011 IN
CANTELIVER DEAD DEFLECTION	0.007 IN



# GREENSKIES - BOOM BRIDGE

## RAFTER DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.102 IN

### ALLOWABLE CAPACITY (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	129.6 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	59.9 KIP-IN
ALLOWABLE SHEAR, $V_y$	34.2 KIP
ALLOWABLE SHEAR, $V_x$	13.2 KIP

### APPLIED LOADS (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-20.2 KIP-IN
ABOUT Y AXIS	-4.6 KIP-IN
APPLIED SHEAR, $V_y$	-1.0 KIP
APPLIED SHEAR, $V_x$	-0.2 KIP

### UNITY CHECKS

AISI EQ H1.1-1	23%
AISI EQ H1.1-2	23%
AISI EQ H1.2-1	27%
AISI EQ H2-1 X	18%
AISI EQ H2-1 Y	8%
CONTROLLING LOAD CASE	0.6D - 0.6WU - 0S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/1559
------------------	--------

# GREENSKIES - BOOM BRIDGE

## LEG DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### SOUTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	22.1 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### NORTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	9.9 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### SOUTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.5 KIP-IN
APPLIED TENSION	-0.4 KIP
APPLIED COMPRESSION	1.6 KIP

### NORTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.1 KIP-IN
APPLIED TENSION	-2.6 KIP
APPLIED COMPRESSION	3.2 KIP

### UNITY CHECKS

SOUTH LEG COMBINED STRESS	6%
NORTH LEG COMBINED STRESS	33%

# GREENSKIES - BOOM BRIDGE

## BRACE DESIGN

### DIAGONAL AND HORIZONTAL BRACE MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### INTERNAL DIAGONAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	3.3 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL HORIZONTAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	-
ALLOWABLE TENSION, T	-

### INTERNAL DIAGONAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-2.6 KIP
APPLIED COMPRESSION	2.3 KIP

### INTERNAL HORIZONTAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-
APPLIED COMPRESSION	-

### SEISMIC CABLE BRACE CAPACITY

CABLE BREAKING STRENGTH	2.3 KIP
-------------------------	---------

### SEISMIC CABLE BRACE APPLIED LOAD

MAXIMUM TENSION	0.1 KIP
-----------------	---------

### BRACE UNITY CHECKS

INTERNAL DIAGONAL BRACE COMBINED STRESS	68%
INTERNAL HORIZONTAL BRACE COMBINED STRESS	-
SEISMIC CABLE BRACE	1%



# GREENSKIES - BOOM BRIDGE

## FOUNDATION DESIGN

### GROUND SCREW MINIMUM REQUIRED TORQUE

DESIGN TORQUE VARIABLE	285.29
DESIGN TORQUE EXPONENT	0.45
MINIMUM REQUIRED TORQUE	2000 N-m

### GROUND SCREW ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION	10.1 KIP
ALLOWABLE TENSION	7.3 KIP
ALLOWABLE LATERAL	2.6 KIP

### GROUND SCREW APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED COMPRESSION	4.5 KIP
APPLIED TENSION	3.8 KIP
APPLIED LATERAL	2.1 KIP

### UNITY CHECK

GROUND SCREW STRESS	79%
---------------------	-----

### FROST HEAVE ANALYSIS

FOUNDATION EMBEDMENT DEPTH	74 IN
APPROXIMATE FROST DEPTH	20 IN
SCREW PENETRATION BELOW FROST DEPTH	54 IN
UPLIFT PRESSURE DUE TO ICE LENSING	0.29 KSI
UPLIFT PRESSURE DUE TO ADFREEZING	0.01 KSI
UPLIFT FORCE DUE TO ICE LENSING	0.00 KIP
UPLIFT FORCE DUE TO ADFREEZING	2.73 KIP
TOTAL FROST HEAVE FORCE	2.73 KIP
TOTAL DEAD LOAD	0.32 KIP
RESULTANT HEAVE FORCE	2.42 KIP
FROST HEAVE PREVENTION STRESS	33%

# GREENSKIES - BOOM BRIDGE

## HARDWARE DESIGN

### PV MODULE TO C PURLIN

HARDWARE SPECIFICATION	M8 - GRADE 18-8
APPLIED TENSION	0.31 KIP
APPLIED SHEAR	0.06 KIP
UNITY CHECK	8%

### C PURLIN TO SLOPE BRACKET

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	1.47 KIP
UNITY CHECK	23%

### SLOPE BRACKET TO RAFTER

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	1.24 KIP
APPLIED SHEAR	0.35 KIP
UNITY CHECK	12%

### RAFTER TO LEG

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	3.24 KIP
UNITY CHECK	26%

### DIAGONAL BRACE HARDWARE

HARDWARE SPECIFICATION	3/8-16 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	2.63 KIP
UNITY CHECK	41%

### TERRASMART SET BOLT (INDEPENDENT LAB TESTING)

ALLOWABLE VERTICAL FORCE	8.00 KIP
APPLIED VERTICAL FORCE	2.63 KIP
UNITY CHECK	33%

# GREENSKIES - BOOM BRIDGE

## CONNECTION DESIGN

### C PURLIN TO SLOPE BRACKET BEARING CHECK

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	5.63 KIP
APPLIED VERTICAL FORCE	1.47 KIP
UNITY CHECK	26%

### SLOPE BRACKET TO RAFTER CONNECTION

ALLOWABLE UPLIFT FORCE	2.52 KIP
ALLOWABLE MOMENT	4.10 KIP-IN
APPLIED UPLIFT FORCE	1.24 KIP
APPLIED MOMENT	2.00 KIP-IN
UNITY CHECK	49%

### RAFTER TO LEG CONNECTION

ALLOWABLE VERTICAL FORCE	7.47 KIP
APPLIED VERTICAL FORCE	3.24 KIP
UNITY CHECK	43%

### RAFTER TO LATERAL BRACE CONNECTION

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	13.31 KIP
APPLIED PULL-OUT	2.63 KIP
UNITY CHECK	20%



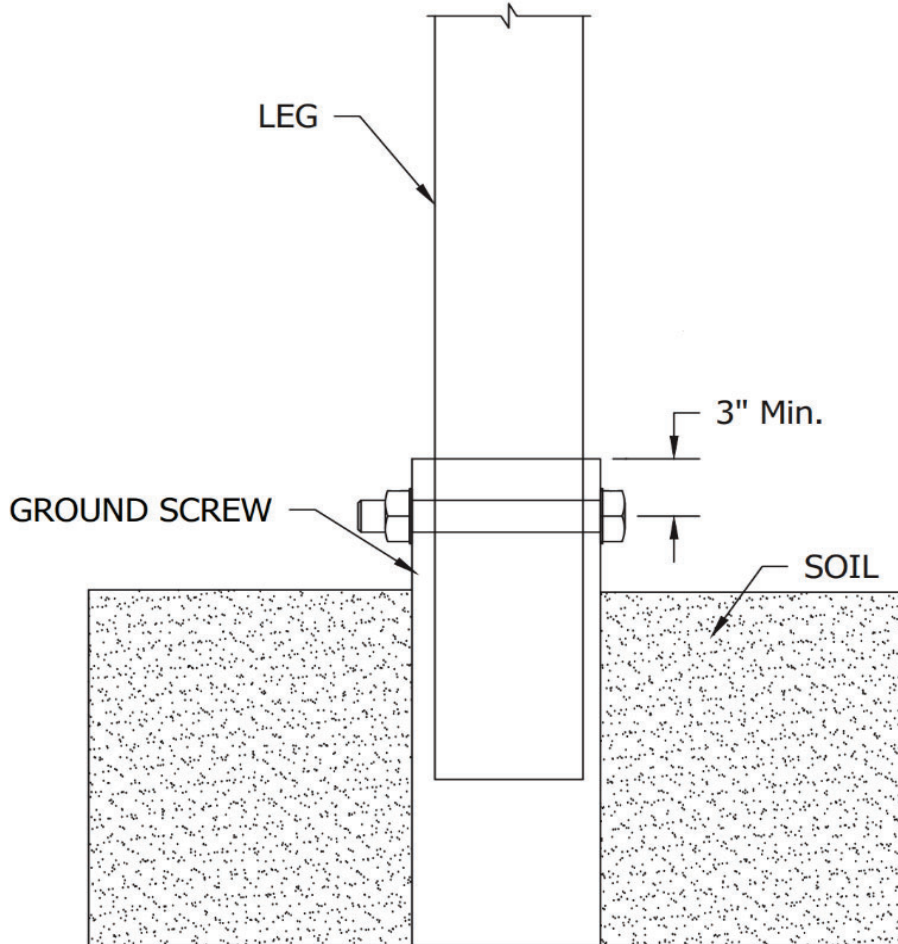
# GREENSKIES - BOOM BRIDGE

## THRU BOLT DESIGN

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED SHEAR	4.48 KIP
UNITY CHECK	35%

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)



### NOTE

A THRU BOLT MAY BE USED IN THE RARE EVENT THAT A GROUND SCREW WELD NUT IS DAMAGED DURING INSTALLATION.

# STRUCTURAL CALCULATION REPORT

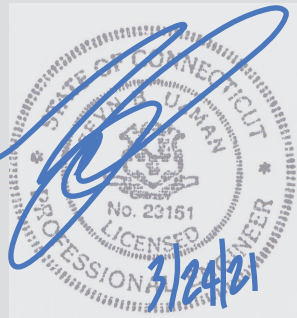


# TERRAS**SMART**

## GREENSKIES - BOOM BRIDGE

PROJECT NUMBER	20-6575
PRODUCT	TERRAGLIDE PORTRAIT
REVISION	0

### ENGINEER OF RECORD



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# GREENSKIES - BOOM BRIDGE

## GENERAL INFORMATION

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### NOTES

- 1) TERRASMART RACKING CONFORMS TO UL2703 STANDARDS.
- 2) TERRASMART USES INFORMATION PROVIDED BY OUR CLIENT TO PROPERLY DESIGN OUR PRODUCT. IF CERTAIN INFORMATION IS NOT PROVIDED, GENERAL ASSUMPTIONS WILL BE MADE. IT IS THE RESPONSIBILITY OF THE CLIENT TO VERIFY AND APPROVE ALL DESIGN CRITERIA AND RACKING SPECIFICATIONS.
- 3) RACKING AND FOUNDATION STRUCTURAL CALCULATIONS CONFORM TO APPLICABLE STATE OR FEDERAL BUILDING CODES.
- 4) TERRASMART IS NOT RESPONSIBLE FOR THE ACCURACY OF THE ENVIRONMENTAL DESIGN CRITERIA (WIND SPEED, SNOW LOAD, EXPOSURE, ETC.)
- 5) SNOW BANKING ANALYSIS WAS NOT PERFORMED BY TERRASMART AND WAS NOT CONSIDERED IN THE DESIGN OF THE STRUCTURE. THE FRONT EDGE CLEARANCE WAS PROVIDED BY THE CLIENT AND ADVERSE EFFECTS OF SNOW BANKING ARE BEYOND TERRASMART'S SCOPE.
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- 8) TERRASMART STRUCTURAL CALCULATIONS APPLY TO RACKING INSTALLED WITHIN THE TOLERANCES AND INSTALL PROCEDURES PROVIDED IN THE RACKING CONSTRUCTION PLANS AND ASSOCIATED INSTALLATION MANUAL. ANY DEVIATION FROM THE SPECIFIED TOLERANCES OR INSTALL PROCEDURES MUST BE REVIEWED AND APPROVED BY TERRASMART.

# GREENSKIES - BOOM BRIDGE

## PROJECT SPECIFICATIONS

### GENERAL PROJECT INFORMATION

ADDRESS	BOOM BRIDGE ROAD
CITY	NORTH STONINGTON
STATE	CT
ZIP	06359

### DESIGN CRITERIA

EXPOSURE CATEGORY	C	ASCE/IBC
RISK/OCCUPANCY CATEGORY	I	ASCE/IBC
BASIC WIND SPEED (DESIGN LIFE = 25YR)	115.5 MPH	ASCE/IBC
GROUND SNOW LOAD	30.0 PSF	ASCE/IBC
FLAT ROOF SNOW LOAD	30.0 PSF	ASCE/IBC
MAPPED ACCELERATION, S <sub>s</sub>	0.161	ASCE/IBC
MAPPED ACCELERATION, S <sub>1</sub>	0.058	ASCE/IBC

### PV MODULE SPECIFICATIONS

PV MODULE MODEL	CS3W-XXXPB-AG	CLIENT PROVIDED
WATTAGE	395 W	
SHORT EDGE DIMENSION	41.260 IN	
LONG EDGE DIMENSION	83.937 IN	
SHORT BOLT SPACING	40.118 IN	
LONG BOLT SPACING	45.472 IN	
THICKNESS	1.181 IN	
WEIGHT	62.61 LBS	
HARDWARE SIZE	M8	

### PV RACKING SPECIFICATIONS

MODULE ORIENTATION	PORTRAIT
FOUNDATION TYPE	TERRASMART GROUND SCREWS
MODULE ROWS	2
MODULE COLUMNS	7
TILT ANGLE	30.0°
FRONT EDGE CLEARANCE	36 IN
MAX E-W SLOPE	25.0%
MAX NORTH FACING SLOPE	30.0%
MAX SOUTH FACING SLOPE	20.0%
E-W MODULE SPACING	0.500 IN
N-S MODULE SPACING	1.500 IN
EW SCREW SPACING	166 IN
NS SCREW SPACING	88 IN
OVERALL RACK WIDTH (E-W)	291.82 IN

### GEOTECHNICAL SPECIFICATIONS

GEOTECHNICAL REPORT DATE	-	-
GROUND SCREW REPORT DATE	-	TERRASMART
FROST DEPTH	20 IN	CORNELL ATLAS

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# GREENSKIES - BOOM BRIDGE

## MEMBER SPECIFICATIONS

C PURLIN	
SECTION	CEE 9X4-0.086
LENGTH	292.677 IN
WEIGHT	120.58 LBS
MATERIAL	ASTM A653 - GRADE 80 SS

HAT RAFTER	
SECTION	HAT 6.1X5.76-0.1017
LENGTH	137.000 IN
WEIGHT	68.28 LBS
MATERIAL	ASTM A653 - GRADE 80

SOUTH LEG	
SECTION	2.375X9GA
LENGTH	59.000 IN
WEIGHT	16.66 LBS
MATERIAL	ASTM A500 - GRADE C

NORTH LEG	
SECTION	2.375X9GA
LENGTH	136.000 IN
WEIGHT	38.41 LBS
MATERIAL	ASTM A500 - GRADE C

EXTERNAL LATERAL BRACE	
SECTION	2.36X13GA
LENGTH	23.000 IN
WEIGHT	4.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL DIAGONAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	91.000 IN
WEIGHT	16.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL HORIZONTAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	74.000 IN
WEIGHT	13.06 LBS
MATERIAL	ASTM A500 - GRADE C

# GREENSKIES - BOOM BRIDGE

## DESIGN LOADS

### DEAD LOAD

TOTAL MODULE WEIGHT	877 LBS
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### SNOW LOAD

EXPOSURE FACTOR, $C_e$	0.90
THERMAL FACTOR, $C_t$	1.20
IMPORTANCE FACTOR, $I_s$	0.80
FLAT ROOF SNOW LOAD, $P_f$	30.0 PSF
SLOPE FACTOR, $C_s$	0.73
SLOPED ROOF SNOW LOAD, $P_s$	21.8 PSF

### WIND LOAD

IMPORTANCE FACTOR, $I$	1.00
VELOCITY PRESSURE COEF., $K_z$	0.85
TOPOGRAPHIC FACTOR, $K_{zt}$	1.00
DIRECTIONALITY FACTOR, $K_d$	0.85
GUST FACTOR	0.85
VELOCITY PRESSURE, $q_z$	24.7 PSF

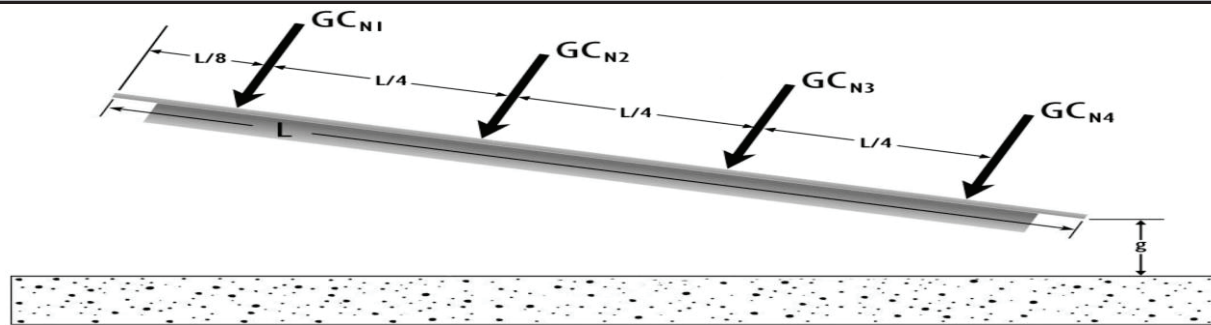
### ASCE WIND PRESSURE COEFFICIENTS - CASE A

$GC_n$	WIND UP	WIND DOWN
1	-1.80	2.10
2	-1.80	2.10
3	-1.80	2.10
4	-1.80	2.10

### ASCE WIND PRESSURE COEFFICIENTS - CASE B

$GC_n$	WIND UP	WIND DOWN
1	-2.50	1.00
2	-2.50	1.00
3	-0.50	2.60
4	-0.50	2.60

### ASCE WIND PRESSURE DIAGRAM



# GREENSKIES - BOOM BRIDGE

## PURLIN DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.086 IN

### ALLOWABLE CAPACITY (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	120.7 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	46.7 KIP-IN
ALLOWABLE SHEAR, $V_y$	6.7 KIP
ALLOWABLE SHEAR, $V_x$	17.8 KIP

### APPLIED LOADS (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-28.9 KIP-IN
ABOUT Y AXIS	-6.9 KIP-IN
APPLIED SHEAR, $V_y$	-0.8 KIP
APPLIED SHEAR, $V_x$	-0.2 KIP

### UNITY CHECKS

AISI EQ H1.1-1	27%
AISI EQ H1.1-2	35%
AISI EQ H1.2-1	39%
AISI EQ H2-1 X	24%
AISI EQ H2-1 Y	19%
CONTROLLING LOAD CASE	1D - 0.45WD - 0.75S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/1244
CLEARSPAN DEAD DEFLECTION	0.019 IN
CANTELIVER DEAD DEFLECTION	0.015 IN

# GREENSKIES - BOOM BRIDGE

## RAFTER DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.102 IN

### ALLOWABLE CAPACITY (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	135.0 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	59.9 KIP-IN
ALLOWABLE SHEAR, $V_y$	34.2 KIP
ALLOWABLE SHEAR, $V_x$	13.2 KIP

### APPLIED LOADS (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-21.1 KIP-IN
ABOUT Y AXIS	-4.9 KIP-IN
APPLIED SHEAR, $V_y$	-1.2 KIP
APPLIED SHEAR, $V_x$	-0.3 KIP

### UNITY CHECKS

AISI EQ H1.1-1	25%
AISI EQ H1.1-2	26%
AISI EQ H1.2-1	28%
AISI EQ H2-1 X	20%
AISI EQ H2-1 Y	8%
CONTROLLING LOAD CASE	0.6D - 0.6WU - 0S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/1345
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# GREENSKIES - BOOM BRIDGE

## LEG DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
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### SOUTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	22.1 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### NORTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	9.9 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### SOUTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.6 KIP-IN
APPLIED TENSION	-0.4 KIP
APPLIED COMPRESSION	1.9 KIP

### NORTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.1 KIP-IN
APPLIED TENSION	-3.0 KIP
APPLIED COMPRESSION	3.8 KIP

### UNITY CHECKS

SOUTH LEG COMBINED STRESS	7%
NORTH LEG COMBINED STRESS	39%

# GREENSKIES - BOOM BRIDGE

## BRACE DESIGN

### DIAGONAL AND HORIZONTAL BRACE MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
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### INTERNAL DIAGONAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	3.3 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL HORIZONTAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	5.4 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL DIAGONAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-3.1 KIP
APPLIED COMPRESSION	2.7 KIP

### INTERNAL HORIZONTAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-2.4 KIP
APPLIED COMPRESSION	2.4 KIP

### SEISMIC CABLE BRACE CAPACITY

CABLE BREAKING STRENGTH	2.3 KIP
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### SEISMIC CABLE BRACE APPLIED LOAD

MAXIMUM TENSION	0.1 KIP
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### BRACE UNITY CHECKS

INTERNAL DIAGONAL BRACE COMBINED STRESS	81%
INTERNAL HORIZONTAL BRACE COMBINED STRESS	8%
SEISMIC CABLE BRACE	1%

# GREENSKIES - BOOM BRIDGE

## FOUNDATION DESIGN

### GROUND SCREW MINIMUM REQUIRED TORQUE

DESIGN TORQUE VARIABLE	285.29
DESIGN TORQUE EXPONENT	0.45
MINIMUM REQUIRED TORQUE	2000 N-m

### GROUND SCREW ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION	10.1 KIP
ALLOWABLE TENSION	7.3 KIP
ALLOWABLE LATERAL	2.6 KIP

### GROUND SCREW APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED COMPRESSION	5.3 KIP
APPLIED TENSION	4.5 KIP
APPLIED LATERAL	1.2 KIP

### UNITY CHECK

GROUND SCREW STRESS	61%
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### FROST HEAVE ANALYSIS

FOUNDATION EMBEDMENT DEPTH	74 IN
APPROXIMATE FROST DEPTH	20 IN
SCREW PENETRATION BELOW FROST DEPTH	54 IN
UPLIFT PRESSURE DUE TO ICE LENSING	0.29 KSI
UPLIFT PRESSURE DUE TO ADFREEZING	0.01 KSI
UPLIFT FORCE DUE TO ICE LENSING	0.00 KIP
UPLIFT FORCE DUE TO ADFREEZING	2.73 KIP
TOTAL FROST HEAVE FORCE	2.73 KIP
TOTAL DEAD LOAD	0.40 KIP
RESULTANT HEAVE FORCE	2.34 KIP
FROST HEAVE PREVENTION STRESS	32%

# GREENSKIES - BOOM BRIDGE

## HARDWARE DESIGN

### PV MODULE TO C PURLIN

HARDWARE SPECIFICATION	M8 - GRADE 18-8
APPLIED TENSION	0.32 KIP
APPLIED SHEAR	0.06 KIP
UNITY CHECK	8%

### C PURLIN TO SLOPE BRACKET

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	1.74 KIP
UNITY CHECK	27%

### SLOPE BRACKET TO RAFTER

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	1.44 KIP
APPLIED SHEAR	0.41 KIP
UNITY CHECK	14%

### RAFTER TO LEG

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	3.83 KIP
UNITY CHECK	30%

### DIAGONAL BRACE HARDWARE

HARDWARE SPECIFICATION	3/8-16 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	3.12 KIP
UNITY CHECK	49%

### TERRASMART SET BOLT (INDEPENDENT LAB TESTING)

ALLOWABLE VERTICAL FORCE	8.00 KIP
APPLIED VERTICAL FORCE	3.12 KIP
UNITY CHECK	39%



# GREENSKIES - BOOM BRIDGE

## CONNECTION DESIGN

### C PURLIN TO SLOPE BRACKET BEARING CHECK

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	5.63 KIP
APPLIED VERTICAL FORCE	1.74 KIP
UNITY CHECK	31%

### SLOPE BRACKET TO RAFTER CONNECTION

ALLOWABLE UPLIFT FORCE	2.52 KIP
ALLOWABLE MOMENT	4.10 KIP-IN
APPLIED UPLIFT FORCE	1.44 KIP
APPLIED MOMENT	2.36 KIP-IN
UNITY CHECK	58%

### RAFTER TO LEG CONNECTION

ALLOWABLE VERTICAL FORCE	7.47 KIP
APPLIED VERTICAL FORCE	3.83 KIP
UNITY CHECK	51%

### RAFTER TO LATERAL BRACE CONNECTION

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	13.31 KIP
APPLIED PULL-OUT	3.12 KIP
UNITY CHECK	23%

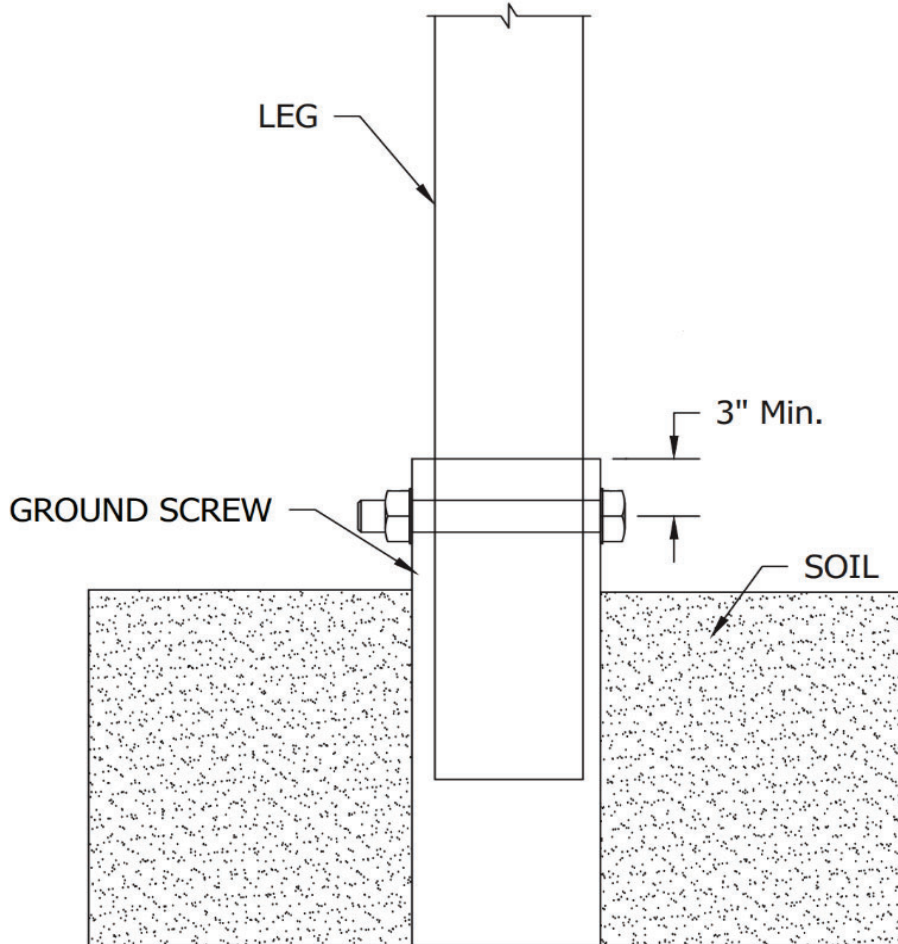
# GREENSKIES - BOOM BRIDGE

## THRU BOLT DESIGN

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED SHEAR	5.30 KIP
UNITY CHECK	42%

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)



### NOTE

A THRU BOLT MAY BE USED IN THE RARE EVENT THAT A GROUND SCREW WELD NUT IS DAMAGED DURING INSTALLATION.

# STRUCTURAL CALCULATION REPORT



# TERRASmart

## GREENSKIES - BOOM BRIDGE

PROJECT NUMBER	20-6575
PRODUCT	TERRAGLIDE PORTRAIT
REVISION	0

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BASIC WIND SPEED (DESIGN LIFE = 25YR)	115.5 MPH	ASCE/IBC
GROUND SNOW LOAD	30.0 PSF	ASCE/IBC
FLAT ROOF SNOW LOAD	30.0 PSF	ASCE/IBC
MAPPED ACCELERATION, S <sub>s</sub>	0.161	ASCE/IBC
MAPPED ACCELERATION, S <sub>1</sub>	0.058	ASCE/IBC

### PV MODULE SPECIFICATIONS

PV MODULE MODEL	HT72-166M	CLIENT PROVIDED
WATTAGE	450 W	
SHORT EDGE DIMENSION	40.866 IN	
LONG EDGE DIMENSION	82.441 IN	
SHORT BOLT SPACING	38.937 IN	
LONG BOLT SPACING	50.236 IN	
THICKNESS	1.378 IN	
WEIGHT	51.81 LBS	
HARDWARE SIZE	M8	

### PV RACKING SPECIFICATIONS

MODULE ORIENTATION	PORTRAIT
FOUNDATION TYPE	TERRASMART GROUND SCREWS
MODULE ROWS	2
MODULE COLUMNS	7
TILT ANGLE	30.0°
FRONT EDGE CLEARANCE	36 IN
MAX E-W SLOPE	25.0%
MAX NORTH FACING SLOPE	30.0%
MAX SOUTH FACING SLOPE	20.0%
E-W MODULE SPACING	0.500 IN
N-S MODULE SPACING	1.500 IN
EW SCREW SPACING	166 IN
NS SCREW SPACING	88 IN
OVERALL RACK WIDTH (E-W)	289.06 IN

### GEOTECHNICAL SPECIFICATIONS

GEOTECHNICAL REPORT DATE	-	-
GROUND SCREW REPORT DATE	-	TERRASMART
FROST DEPTH	20 IN	CORNELL ATLAS

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# GREENSKIES - BOOM BRIDGE

## MEMBER SPECIFICATIONS

C PURLIN	
SECTION	CEE 9X4-0.086
LENGTH	289.134 IN
WEIGHT	119.12 LBS
MATERIAL	ASTM A653 - GRADE 80 SS

HAT RAFTER	
SECTION	HAT 6.1X5.76-0.1017
LENGTH	140.250 IN
WEIGHT	69.90 LBS
MATERIAL	ASTM A653 - GRADE 80

SOUTH LEG	
SECTION	2.375X9GA
LENGTH	58.000 IN
WEIGHT	16.38 LBS
MATERIAL	ASTM A500 - GRADE C

NORTH LEG	
SECTION	2.375X9GA
LENGTH	135.000 IN
WEIGHT	38.12 LBS
MATERIAL	ASTM A500 - GRADE C

EXTERNAL LATERAL BRACE	
SECTION	2.36X13GA
LENGTH	23.000 IN
WEIGHT	4.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL DIAGONAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	90.000 IN
WEIGHT	15.88 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL HORIZONTAL LATERAL BRACE	
SECTION	-
LENGTH	-
WEIGHT	-
MATERIAL	-

# GREENSKIES - BOOM BRIDGE

## DESIGN LOADS

### DEAD LOAD

TOTAL MODULE WEIGHT	725 LBS
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### SNOW LOAD

EXPOSURE FACTOR, $C_e$	0.90
THERMAL FACTOR, $C_t$	1.20
IMPORTANCE FACTOR, $I_s$	0.80
FLAT ROOF SNOW LOAD, $P_f$	30.0 PSF
SLOPE FACTOR, $C_s$	0.73
SLOPED ROOF SNOW LOAD, $P_s$	21.8 PSF

### WIND LOAD

IMPORTANCE FACTOR, $I$	1.00
VELOCITY PRESSURE COEF., $K_z$	0.85
TOPOGRAPHIC FACTOR, $K_{zt}$	1.00
DIRECTIONALITY FACTOR, $K_d$	0.85
GUST FACTOR	0.85
VELOCITY PRESSURE, $q_z$	24.7 PSF

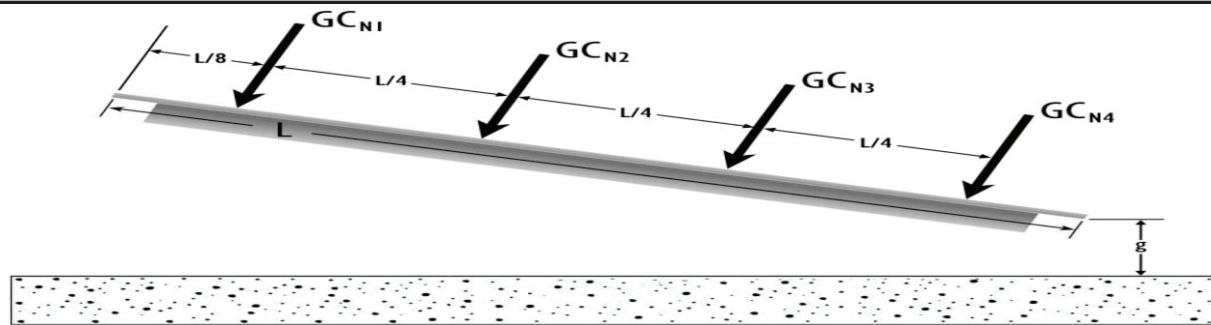
### ASCE WIND PRESSURE COEFFICIENTS - CASE A

$GC_n$	WIND UP	WIND DOWN
1	-1.80	2.10
2	-1.80	2.10
3	-1.80	2.10
4	-1.80	2.10

### ASCE WIND PRESSURE COEFFICIENTS - CASE B

$GC_n$	WIND UP	WIND DOWN
1	-2.50	1.00
2	-2.50	1.00
3	-0.50	2.60
4	-0.50	2.60

### ASCE WIND PRESSURE DIAGRAM



# GREENSKIES - BOOM BRIDGE

## PURLIN DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.086 IN

### ALLOWABLE CAPACITY (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	120.7 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	46.7 KIP-IN
ALLOWABLE SHEAR, $V_y$	6.7 KIP
ALLOWABLE SHEAR, $V_x$	17.8 KIP

### APPLIED LOADS (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-27.4 KIP-IN
ABOUT Y AXIS	-6.5 KIP-IN
APPLIED SHEAR, $V_y$	-0.7 KIP
APPLIED SHEAR, $V_x$	-0.2 KIP

### UNITY CHECKS

AISI EQ H1.1-1	26%
AISI EQ H1.1-2	33%
AISI EQ H1.2-1	37%
AISI EQ H2-1 X	23%
AISI EQ H2-1 Y	18%
CONTROLLING LOAD CASE	1D - 0.45WD - 0.75S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/1132
CLEARSPAN DEAD DEFLECTION	0.019 IN
CANTELIVER DEAD DEFLECTION	0.012 IN



# GREENSKIES - BOOM BRIDGE

## RAFTER DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.102 IN

### ALLOWABLE CAPACITY (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	129.6 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	59.9 KIP-IN
ALLOWABLE SHEAR, $V_y$	34.2 KIP
ALLOWABLE SHEAR, $V_x$	13.2 KIP

### APPLIED LOADS (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-23.0 KIP-IN
ABOUT Y AXIS	-5.3 KIP-IN
APPLIED SHEAR, $V_y$	-1.1 KIP
APPLIED SHEAR, $V_x$	-0.3 KIP

### UNITY CHECKS

AISI EQ H1.1-1	26%
AISI EQ H1.1-2	26%
AISI EQ H1.2-1	31%
AISI EQ H2-1 X	21%
AISI EQ H2-1 Y	9%
CONTROLLING LOAD CASE	0.6D - 0.6WU - 0S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/1355
------------------	--------

# GREENSKIES - BOOM BRIDGE

## LEG DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### SOUTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	22.1 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### NORTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	9.9 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### SOUTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.6 KIP-IN
APPLIED TENSION	-0.4 KIP
APPLIED COMPRESSION	1.8 KIP

### NORTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.1 KIP-IN
APPLIED TENSION	-3.0 KIP
APPLIED COMPRESSION	3.7 KIP

### UNITY CHECKS

SOUTH LEG COMBINED STRESS	7%
NORTH LEG COMBINED STRESS	38%

# GREENSKIES - BOOM BRIDGE

## BRACE DESIGN

### DIAGONAL AND HORIZONTAL BRACE MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### INTERNAL DIAGONAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	3.3 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL HORIZONTAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	-
ALLOWABLE TENSION, T	-

### INTERNAL DIAGONAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-3.0 KIP
APPLIED COMPRESSION	2.6 KIP

### INTERNAL HORIZONTAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-
APPLIED COMPRESSION	-

### SEISMIC CABLE BRACE CAPACITY

CABLE BREAKING STRENGTH	2.3 KIP
-------------------------	---------

### SEISMIC CABLE BRACE APPLIED LOAD

MAXIMUM TENSION	0.1 KIP
-----------------	---------

### BRACE UNITY CHECKS

INTERNAL DIAGONAL BRACE COMBINED STRESS	79%
INTERNAL HORIZONTAL BRACE COMBINED STRESS	-
SEISMIC CABLE BRACE	1%

# GREENSKIES - BOOM BRIDGE

## FOUNDATION DESIGN

### GROUND SCREW MINIMUM REQUIRED TORQUE

DESIGN TORQUE VARIABLE	285.29
DESIGN TORQUE EXPONENT	0.45
MINIMUM REQUIRED TORQUE	2000 N-m

### GROUND SCREW ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION	10.1 KIP
ALLOWABLE TENSION	7.3 KIP
ALLOWABLE LATERAL	2.6 KIP

### GROUND SCREW APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED COMPRESSION	5.1 KIP
APPLIED TENSION	4.4 KIP
APPLIED LATERAL	2.4 KIP

### UNITY CHECK

GROUND SCREW STRESS	91%
---------------------	-----

### FROST HEAVE ANALYSIS

FOUNDATION EMBEDMENT DEPTH	74 IN
APPROXIMATE FROST DEPTH	20 IN
SCREW PENETRATION BELOW FROST DEPTH	54 IN
UPLIFT PRESSURE DUE TO ICE LENSING	0.29 KSI
UPLIFT PRESSURE DUE TO ADFREEZING	0.01 KSI
UPLIFT FORCE DUE TO ICE LENSING	0.00 KIP
UPLIFT FORCE DUE TO ADFREEZING	2.73 KIP
TOTAL FROST HEAVE FORCE	2.73 KIP
TOTAL DEAD LOAD	0.36 KIP
RESULTANT HEAVE FORCE	2.37 KIP
FROST HEAVE PREVENTION STRESS	32%



# GREENSKIES - BOOM BRIDGE

## HARDWARE DESIGN

### PV MODULE TO C PURLIN

HARDWARE SPECIFICATION	M8 - GRADE 18-8
APPLIED TENSION	0.31 KIP
APPLIED SHEAR	0.06 KIP
UNITY CHECK	8%

### C PURLIN TO SLOPE BRACKET

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	1.69 KIP
UNITY CHECK	27%

### SLOPE BRACKET TO RAFTER

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	1.41 KIP
APPLIED SHEAR	0.40 KIP
UNITY CHECK	13%

### RAFTER TO LEG

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	3.70 KIP
UNITY CHECK	29%

### DIAGONAL BRACE HARDWARE

HARDWARE SPECIFICATION	3/8-16 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	3.03 KIP
UNITY CHECK	48%

### TERRASMART SET BOLT (INDEPENDENT LAB TESTING)

ALLOWABLE VERTICAL FORCE	8.00 KIP
APPLIED VERTICAL FORCE	3.03 KIP
UNITY CHECK	38%

# GREENSKIES - BOOM BRIDGE

## CONNECTION DESIGN

### C PURLIN TO SLOPE BRACKET BEARING CHECK

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	5.63 KIP
APPLIED VERTICAL FORCE	1.69 KIP
UNITY CHECK	30%

### SLOPE BRACKET TO RAFTER CONNECTION

ALLOWABLE UPLIFT FORCE	2.52 KIP
ALLOWABLE MOMENT	4.10 KIP-IN
APPLIED UPLIFT FORCE	1.41 KIP
APPLIED MOMENT	2.27 KIP-IN
UNITY CHECK	56%

### RAFTER TO LEG CONNECTION

ALLOWABLE VERTICAL FORCE	7.47 KIP
APPLIED VERTICAL FORCE	3.70 KIP
UNITY CHECK	50%

### RAFTER TO LATERAL BRACE CONNECTION

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	13.31 KIP
APPLIED PULL-OUT	3.03 KIP
UNITY CHECK	23%

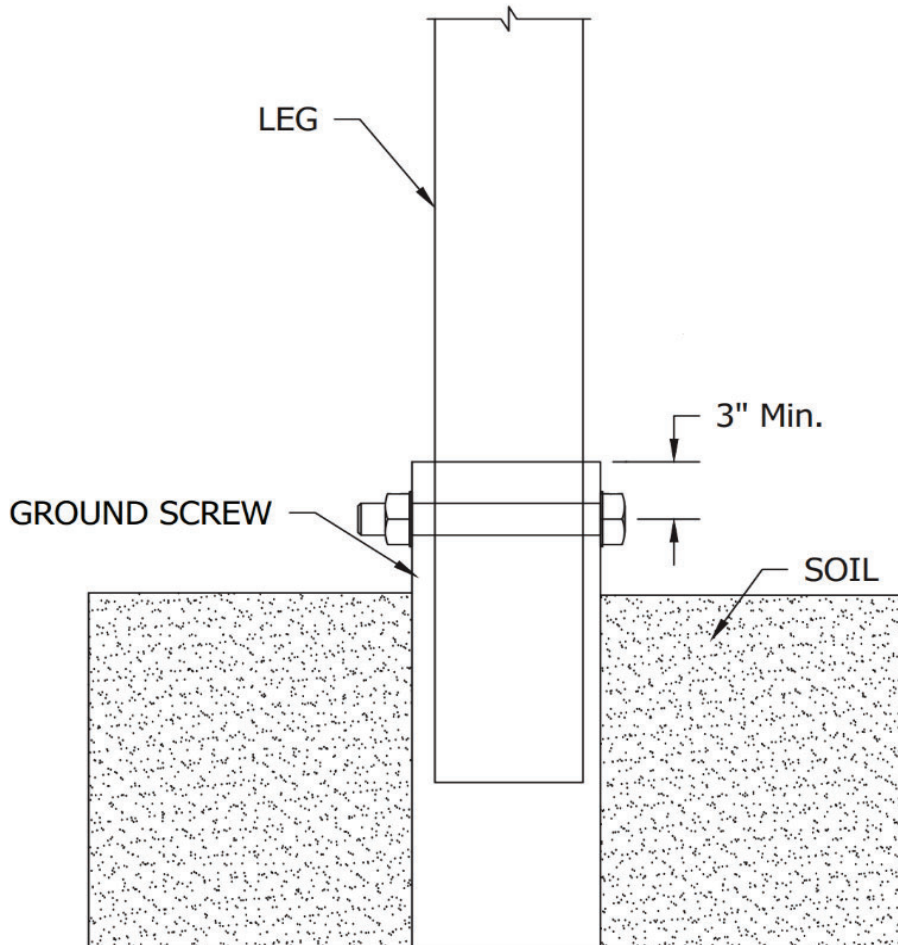
# GREENSKIES - BOOM BRIDGE

## THRU BOLT DESIGN

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED SHEAR	5.13 KIP
UNITY CHECK	40%

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)



### NOTE

A THRU BOLT MAY BE USED IN THE RARE EVENT THAT A GROUND SCREW WELD NUT IS DAMAGED DURING INSTALLATION.

# STRUCTURAL CALCULATION REPORT



# TERRASmart

## GREENSKIES - BOOM BRIDGE

PROJECT NUMBER	20-6575
PRODUCT	TERRAGLIDE PORTRAIT
REVISION	0

### ENGINEER OF RECORD



ZEYN B. UZMAN - CT PEN.0023151



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TERRASMART LLC - 2020

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# GREENSKIES - BOOM BRIDGE

## GENERAL INFORMATION

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### NOTES

- 1) TERRASMART RACKING CONFORMS TO UL2703 STANDARDS.
- 2) TERRASMART USES INFORMATION PROVIDED BY OUR CLIENT TO PROPERLY DESIGN OUR PRODUCT. IF CERTAIN INFORMATION IS NOT PROVIDED, GENERAL ASSUMPTIONS WILL BE MADE. IT IS THE RESPONSIBILITY OF THE CLIENT TO VERIFY AND APPROVE ALL DESIGN CRITERIA AND RACKING SPECIFICATIONS.
- 3) RACKING AND FOUNDATION STRUCTURAL CALCULATIONS CONFORM TO APPLICABLE STATE OR FEDERAL BUILDING CODES.
- 4) TERRASMART IS NOT RESPONSIBLE FOR THE ACCURACY OF THE ENVIRONMENTAL DESIGN CRITERIA (WIND SPEED, SNOW LOAD, EXPOSURE, ETC.)
- 5) SNOW BANKING ANALYSIS WAS NOT PERFORMED BY TERRASMART AND WAS NOT CONSIDERED IN THE DESIGN OF THE STRUCTURE. THE FRONT EDGE CLEARANCE WAS PROVIDED BY THE CLIENT AND ADVERSE EFFECTS OF SNOW BANKING ARE BEYOND TERRASMART'S SCOPE.
- 6) TERRASMART IS NOT RESPONSIBLE FOR ANY DAMAGE TO PV MODULES MOUNTED TO TERRASMART RACKING DUE TO THE EXTREME VARIETY IN MODULE FRAME DESIGN, MOUNTING STYLE, AND MANUFACTURING PROCESS. TERRASMART RECOMMENDS THAT THE CLIENT WORK WITH THE MODULE MANUFACTURER TO UNDERSTAND ALL RESTRICTIONS AND LIMITATIONS.
- 7) MOUNTING OF COMBINER BOXES, STRING INVERTERS, OR OTHER ITEMS NOT INCLUDED IN TERRASMARTS CALCULATION PACKAGE TO THE RACKING MUST BE REVIEWED AND APPROVED BY TERRASMART.
- 8) TERRASMART STRUCTURAL CALCULATIONS APPLY TO RACKING INSTALLED WITHIN THE TOLERANCES AND INSTALL PROCEDURES PROVIDED IN THE RACKING CONSTRUCTION PLANS AND ASSOCIATED INSTALLATION MANUAL. ANY DEVIATION FROM THE SPECIFIED TOLERANCES OR INSTALL PROCEDURES MUST BE REVIEWED AND APPROVED BY TERRASMART.



# GREENSKIES - BOOM BRIDGE

## PROJECT SPECIFICATIONS

### GENERAL PROJECT INFORMATION

ADDRESS	BOOM BRIDGE ROAD
CITY	NORTH STONINGTON
STATE	CT
ZIP	06359

### DESIGN CRITERIA

EXPOSURE CATEGORY	C	ASCE/IBC
RISK/OCCUPANCY CATEGORY	I	ASCE/IBC
BASIC WIND SPEED (DESIGN LIFE = 25YR)	115.5 MPH	ASCE/IBC
GROUND SNOW LOAD	30.0 PSF	ASCE/IBC
FLAT ROOF SNOW LOAD	30.0 PSF	ASCE/IBC
MAPPED ACCELERATION, S <sub>s</sub>	0.161	ASCE/IBC
MAPPED ACCELERATION, S <sub>1</sub>	0.058	ASCE/IBC

### PV MODULE SPECIFICATIONS

PV MODULE MODEL	CS3W-XXXPB-AG	CLIENT PROVIDED
WATTAGE	395 W	
SHORT EDGE DIMENSION	41.260 IN	
LONG EDGE DIMENSION	83.937 IN	
SHORT BOLT SPACING	40.118 IN	
LONG BOLT SPACING	45.472 IN	
THICKNESS	1.181 IN	
WEIGHT	62.61 LBS	
HARDWARE SIZE	M8	

### PV RACKING SPECIFICATIONS

MODULE ORIENTATION	PORTRAIT
FOUNDATION TYPE	TERRASMART GROUND SCREWS
MODULE ROWS	2
MODULE COLUMNS	11
TILT ANGLE	30.0°
FRONT EDGE CLEARANCE	36 IN
MAX E-W SLOPE	25.0%
MAX NORTH FACING SLOPE	30.0%
MAX SOUTH FACING SLOPE	20.0%
E-W MODULE SPACING	0.500 IN
N-S MODULE SPACING	1.500 IN
EW SCREW SPACING	261 IN
NS SCREW SPACING	88 IN
OVERALL RACK WIDTH (E-W)	458.86 IN

### GEOTECHNICAL SPECIFICATIONS

GEOTECHNICAL REPORT DATE	-	-
GROUND SCREW REPORT DATE	-	TERRASMART
FROST DEPTH	20 IN	CORNELL ATLAS

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# GREENSKIES - BOOM BRIDGE

## MEMBER SPECIFICATIONS

C PURLIN	
SECTION	CEE 9X4-0.086
LENGTH	459.717 IN
WEIGHT	189.40 LBS
MATERIAL	ASTM A653 - GRADE 80 SS

HAT RAFTER	
SECTION	HAT 6.1X5.76-0.1017
LENGTH	137.000 IN
WEIGHT	68.28 LBS
MATERIAL	ASTM A653 - GRADE 80

SOUTH LEG	
SECTION	2.375X9GA
LENGTH	59.000 IN
WEIGHT	16.66 LBS
MATERIAL	ASTM A500 - GRADE C

NORTH LEG	
SECTION	2.375X9GA
LENGTH	136.000 IN
WEIGHT	38.41 LBS
MATERIAL	ASTM A500 - GRADE C

EXTERNAL LATERAL BRACE	
SECTION	2.36X13GA
LENGTH	23.000 IN
WEIGHT	4.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL DIAGONAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	91.000 IN
WEIGHT	16.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL HORIZONTAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	74.000 IN
WEIGHT	13.06 LBS
MATERIAL	ASTM A500 - GRADE C

# GREENSKIES - BOOM BRIDGE

## DESIGN LOADS

### DEAD LOAD

TOTAL MODULE WEIGHT	1377 LBS
---------------------	----------

### SNOW LOAD

EXPOSURE FACTOR, $C_e$	0.90
THERMAL FACTOR, $C_t$	1.20
IMPORTANCE FACTOR, $I_s$	0.80
FLAT ROOF SNOW LOAD, $P_f$	30.0 PSF
SLOPE FACTOR, $C_s$	0.73
SLOPED ROOF SNOW LOAD, $P_s$	21.8 PSF

### WIND LOAD

IMPORTANCE FACTOR, $I$	1.00
VELOCITY PRESSURE COEF., $K_z$	0.85
TOPOGRAPHIC FACTOR, $K_{zt}$	1.00
DIRECTIONALITY FACTOR, $K_d$	0.85
GUST FACTOR	0.85
VELOCITY PRESSURE, $q_z$	24.7 PSF

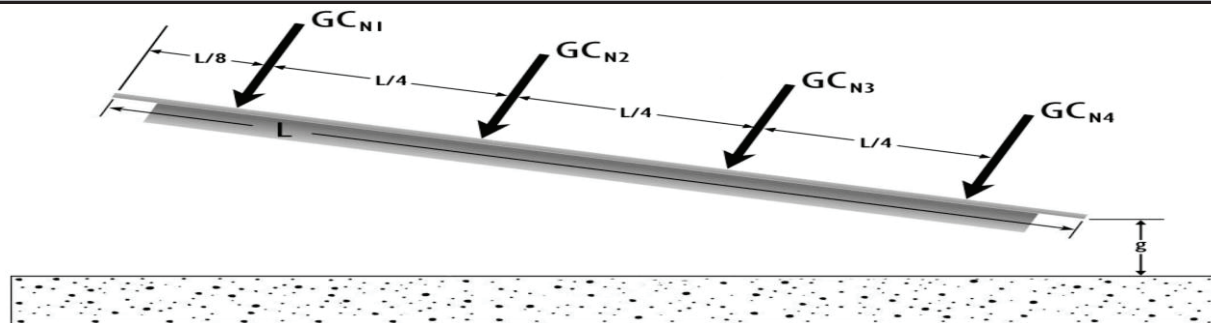
### ASCE WIND PRESSURE COEFFICIENTS - CASE A

$GC_n$	WIND UP	WIND DOWN
1	-1.80	2.10
2	-1.80	2.10
3	-1.80	2.10
4	-1.80	2.10

### ASCE WIND PRESSURE COEFFICIENTS - CASE B

$GC_n$	WIND UP	WIND DOWN
1	-2.50	1.00
2	-2.50	1.00
3	-0.50	2.60
4	-0.50	2.60

### ASCE WIND PRESSURE DIAGRAM



# GREENSKIES - BOOM BRIDGE

## PURLIN DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.086 IN

### ALLOWABLE CAPACITY (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	120.7 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	46.7 KIP-IN
ALLOWABLE SHEAR, $V_y$	6.7 KIP
ALLOWABLE SHEAR, $V_x$	17.8 KIP

### APPLIED LOADS (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-60.7 KIP-IN
ABOUT Y AXIS	-14.5 KIP-IN
APPLIED SHEAR, $V_y$	-1.1 KIP
APPLIED SHEAR, $V_x$	-0.3 KIP

### UNITY CHECKS

AISI EQ H1.1-1	57%
AISI EQ H1.1-2	73%
AISI EQ H1.2-1	82%
AISI EQ H2-1 X	47%
AISI EQ H2-1 Y	39%
CONTROLLING LOAD CASE	1D - 0.45WD - 0.75S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/340
CLEARSPAN DEAD DEFLECTION	0.123 IN
CANTELIVER DEAD DEFLECTION	0.071 IN

# GREENSKIES - BOOM BRIDGE

## RAFTER DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.102 IN

### ALLOWABLE CAPACITY (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	135.0 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	59.9 KIP-IN
ALLOWABLE SHEAR, $V_y$	34.2 KIP
ALLOWABLE SHEAR, $V_x$	13.2 KIP

### APPLIED LOADS (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-31.1 KIP-IN
ABOUT Y AXIS	-7.2 KIP-IN
APPLIED SHEAR, $V_y$	-1.8 KIP
APPLIED SHEAR, $V_x$	-0.4 KIP

### UNITY CHECKS

AISI EQ H1.1-1	38%
AISI EQ H1.1-2	40%
AISI EQ H1.2-1	42%
AISI EQ H2-1 X	30%
AISI EQ H2-1 Y	13%
CONTROLLING LOAD CASE	0.6D - 0.6WU - 0S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/885
------------------	-------



# GREENSKIES - BOOM BRIDGE

## LEG DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### SOUTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	22.1 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### NORTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	9.9 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### SOUTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.9 KIP-IN
APPLIED TENSION	-0.5 KIP
APPLIED COMPRESSION	2.8 KIP

### NORTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.2 KIP-IN
APPLIED TENSION	-4.5 KIP
APPLIED COMPRESSION	5.7 KIP

### UNITY CHECKS

SOUTH LEG COMBINED STRESS	11%
NORTH LEG COMBINED STRESS	59%

# GREENSKIES - BOOM BRIDGE

## BRACE DESIGN

### DIAGONAL AND HORIZONTAL BRACE MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### INTERNAL DIAGONAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	3.3 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL HORIZONTAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	5.4 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL DIAGONAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-4.7 KIP
APPLIED COMPRESSION	4.1 KIP

### INTERNAL HORIZONTAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-3.7 KIP
APPLIED COMPRESSION	3.7 KIP

### SEISMIC CABLE BRACE CAPACITY

CABLE BREAKING STRENGTH	2.3 KIP
-------------------------	---------

### SEISMIC CABLE BRACE APPLIED LOAD

MAXIMUM TENSION	0.2 KIP
-----------------	---------

### BRACE UNITY CHECKS

INTERNAL DIAGONAL BRACE COMBINED STRESS	123%
INTERNAL HORIZONTAL BRACE COMBINED STRESS	12%
SEISMIC CABLE BRACE	2%

# GREENSKIES - BOOM BRIDGE

## FOUNDATION DESIGN

### GROUND SCREW MINIMUM REQUIRED TORQUE

DESIGN TORQUE VARIABLE	285.29
DESIGN TORQUE EXPONENT	0.45
MINIMUM REQUIRED TORQUE	2000 N-m

### GROUND SCREW ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION	10.1 KIP
ALLOWABLE TENSION	7.3 KIP
ALLOWABLE LATERAL	2.6 KIP

### GROUND SCREW APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED COMPRESSION	7.9 KIP
APPLIED TENSION	6.7 KIP
APPLIED LATERAL	1.9 KIP

### UNITY CHECK

GROUND SCREW STRESS	91%
---------------------	-----

### FROST HEAVE ANALYSIS

FOUNDATION EMBEDMENT DEPTH	74 IN
APPROXIMATE FROST DEPTH	20 IN
SCREW PENETRATION BELOW FROST DEPTH	54 IN
UPLIFT PRESSURE DUE TO ICE LENSING	0.29 KSI
UPLIFT PRESSURE DUE TO ADFREEZING	0.01 KSI
UPLIFT FORCE DUE TO ICE LENSING	0.00 KIP
UPLIFT FORCE DUE TO ADFREEZING	2.73 KIP
TOTAL FROST HEAVE FORCE	2.73 KIP
TOTAL DEAD LOAD	0.59 KIP
RESULTANT HEAVE FORCE	2.14 KIP
FROST HEAVE PREVENTION STRESS	29%

# GREENSKIES - BOOM BRIDGE

## HARDWARE DESIGN

### PV MODULE TO C PURLIN

HARDWARE SPECIFICATION	M8 - GRADE 18-8
APPLIED TENSION	0.32 KIP
APPLIED SHEAR	0.06 KIP
UNITY CHECK	8%

### C PURLIN TO SLOPE BRACKET

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	2.68 KIP
UNITY CHECK	42%

### SLOPE BRACKET TO RAFTER

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	2.13 KIP
APPLIED SHEAR	0.61 KIP
UNITY CHECK	20%

### RAFTER TO LEG

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	5.71 KIP
UNITY CHECK	45%

### DIAGONAL BRACE HARDWARE

HARDWARE SPECIFICATION	3/8-16 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	4.74 KIP
UNITY CHECK	75%

### TERRASMART SET BOLT (INDEPENDENT LAB TESTING)

ALLOWABLE VERTICAL FORCE	8.00 KIP
APPLIED VERTICAL FORCE	4.74 KIP
UNITY CHECK	59%

# GREENSKIES - BOOM BRIDGE

## CONNECTION DESIGN

### C PURLIN TO SLOPE BRACKET BEARING CHECK

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	5.63 KIP
APPLIED VERTICAL FORCE	2.68 KIP
UNITY CHECK	48%

### SLOPE BRACKET TO RAFTER CONNECTION

ALLOWABLE UPLIFT FORCE	2.52 KIP
ALLOWABLE MOMENT	4.10 KIP-IN
APPLIED UPLIFT FORCE	2.13 KIP
APPLIED MOMENT	3.47 KIP-IN
UNITY CHECK	85%

### RAFTER TO LEG CONNECTION

ALLOWABLE VERTICAL FORCE	7.47 KIP
APPLIED VERTICAL FORCE	5.71 KIP
UNITY CHECK	76%

### RAFTER TO LATERAL BRACE CONNECTION

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	13.31 KIP
APPLIED PULL-OUT	4.74 KIP
UNITY CHECK	36%



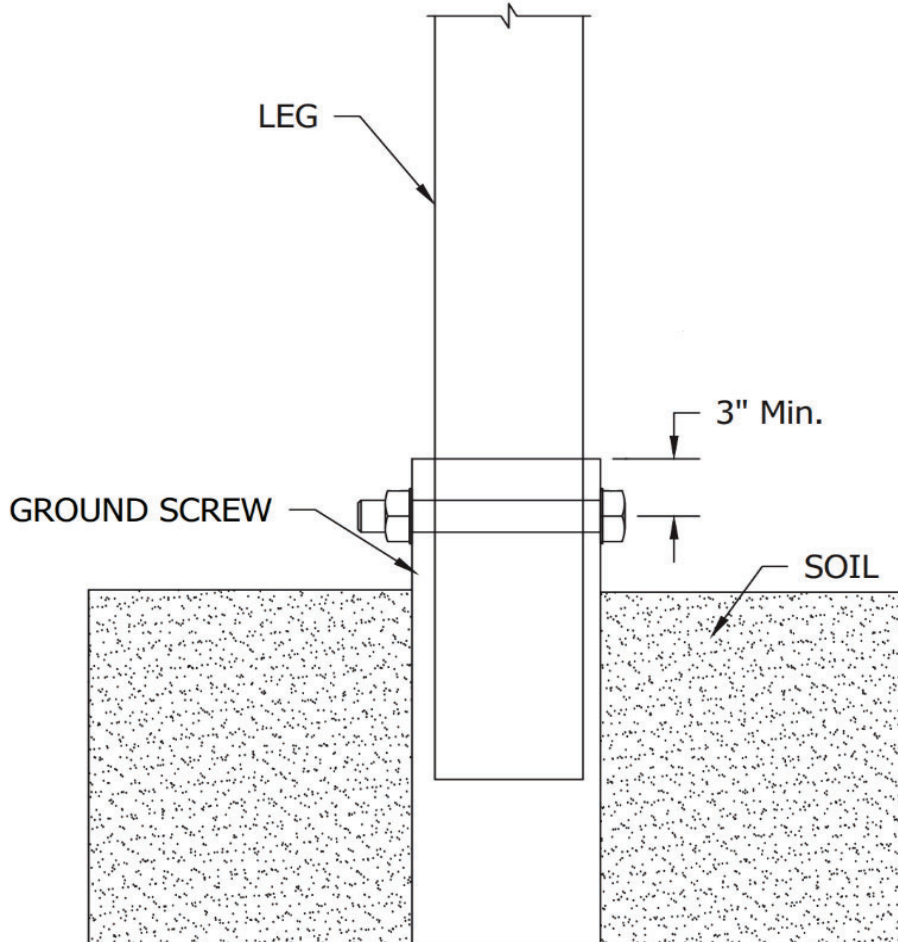
# GREENSKIES - BOOM BRIDGE

## THRU BOLT DESIGN

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED SHEAR	7.95 KIP
UNITY CHECK	63%

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)



### NOTE

A THRU BOLT MAY BE USED IN THE RARE EVENT THAT A GROUND SCREW WELD NUT IS DAMAGED DURING INSTALLATION.

# STRUCTURAL CALCULATION REPORT



# TERRAS<sub>M</sub>MART

## GREENSKIES - BOOM BRIDGE

PROJECT NUMBER	20-6575
PRODUCT	TERRAGLIDE PORTRAIT
REVISION	0

### ENGINEER OF RECORD



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# GREENSKIES - BOOM BRIDGE

## GENERAL INFORMATION

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### NOTES

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- 3) RACKING AND FOUNDATION STRUCTURAL CALCULATIONS CONFORM TO APPLICABLE STATE OR FEDERAL BUILDING CODES.
- 4) TERRASMART IS NOT RESPONSIBLE FOR THE ACCURACY OF THE ENVIRONMENTAL DESIGN CRITERIA (WIND SPEED, SNOW LOAD, EXPOSURE, ETC.)
- 5) SNOW BANKING ANALYSIS WAS NOT PERFORMED BY TERRASMART AND WAS NOT CONSIDERED IN THE DESIGN OF THE STRUCTURE. THE FRONT EDGE CLEARANCE WAS PROVIDED BY THE CLIENT AND ADVERSE EFFECTS OF SNOW BANKING ARE BEYOND TERRASMART'S SCOPE.
- 6) TERRASMART IS NOT RESPONSIBLE FOR ANY DAMAGE TO PV MODULES MOUNTED TO TERRASMART RACKING DUE TO THE EXTREME VARIETY IN MODULE FRAME DESIGN, MOUNTING STYLE, AND MANUFACTURING PROCESS. TERRASMART RECOMMENDS THAT THE CLIENT WORK WITH THE MODULE MANUFACTURER TO UNDERSTAND ALL RESTRICTIONS AND LIMITATIONS.
- 7) MOUNTING OF COMBINER BOXES, STRING INVERTERS, OR OTHER ITEMS NOT INCLUDED IN TERRASMARTS CALCULATION PACKAGE TO THE RACKING MUST BE REVIEWED AND APPROVED BY TERRASMART.
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# GREENSKIES - BOOM BRIDGE

## PROJECT SPECIFICATIONS

### GENERAL PROJECT INFORMATION

ADDRESS	BOOM BRIDGE ROAD
CITY	NORTH STONINGTON
STATE	CT
ZIP	06359

### DESIGN CRITERIA

EXPOSURE CATEGORY	C	ASCE/IBC
RISK/OCCUPANCY CATEGORY	I	ASCE/IBC
BASIC WIND SPEED (DESIGN LIFE = 25YR)	115.5 MPH	ASCE/IBC
GROUND SNOW LOAD	30.0 PSF	ASCE/IBC
FLAT ROOF SNOW LOAD	30.0 PSF	ASCE/IBC
MAPPED ACCELERATION, S <sub>s</sub>	0.161	ASCE/IBC
MAPPED ACCELERATION, S <sub>1</sub>	0.058	ASCE/IBC

### PV MODULE SPECIFICATIONS

PV MODULE MODEL	HT72-166M	CLIENT PROVIDED
WATTAGE	450 W	
SHORT EDGE DIMENSION	40.866 IN	
LONG EDGE DIMENSION	82.441 IN	
SHORT BOLT SPACING	38.937 IN	
LONG BOLT SPACING	50.236 IN	
THICKNESS	1.378 IN	
WEIGHT	51.81 LBS	
HARDWARE SIZE	M8	

### PV RACKING SPECIFICATIONS

MODULE ORIENTATION	PORTRAIT
FOUNDATION TYPE	TERRASMART GROUND SCREWS
MODULE ROWS	2
MODULE COLUMNS	11
TILT ANGLE	30.0°
FRONT EDGE CLEARANCE	36 IN
MAX E-W SLOPE	25.0%
MAX NORTH FACING SLOPE	30.0%
MAX SOUTH FACING SLOPE	20.0%
E-W MODULE SPACING	0.500 IN
N-S MODULE SPACING	1.500 IN
EW SCREW SPACING	262 IN
NS SCREW SPACING	88 IN
OVERALL RACK WIDTH (E-W)	454.53 IN

### GEOTECHNICAL SPECIFICATIONS

GEOTECHNICAL REPORT DATE	-	-
GROUND SCREW REPORT DATE	-	TERRASMART
FROST DEPTH	20 IN	CORNELL ATLAS

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# GREENSKIES - BOOM BRIDGE

## MEMBER SPECIFICATIONS

C PURLIN	
SECTION	CEE 9X4-0.086
LENGTH	454.598 IN
WEIGHT	187.29 LBS
MATERIAL	ASTM A653 - GRADE 80 SS

HAT RAFTER	
SECTION	HAT 6.1X5.76-0.1017
LENGTH	140.250 IN
WEIGHT	69.90 LBS
MATERIAL	ASTM A653 - GRADE 80

SOUTH LEG	
SECTION	2.375X9GA
LENGTH	58.000 IN
WEIGHT	16.38 LBS
MATERIAL	ASTM A500 - GRADE C

NORTH LEG	
SECTION	2.375X9GA
LENGTH	135.000 IN
WEIGHT	38.12 LBS
MATERIAL	ASTM A500 - GRADE C

EXTERNAL LATERAL BRACE	
SECTION	2.36X13GA
LENGTH	23.000 IN
WEIGHT	4.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL DIAGONAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	90.000 IN
WEIGHT	15.88 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL HORIZONTAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	74.000 IN
WEIGHT	13.06 LBS
MATERIAL	ASTM A500 - GRADE C



# GREENSKIES - BOOM BRIDGE

## DESIGN LOADS

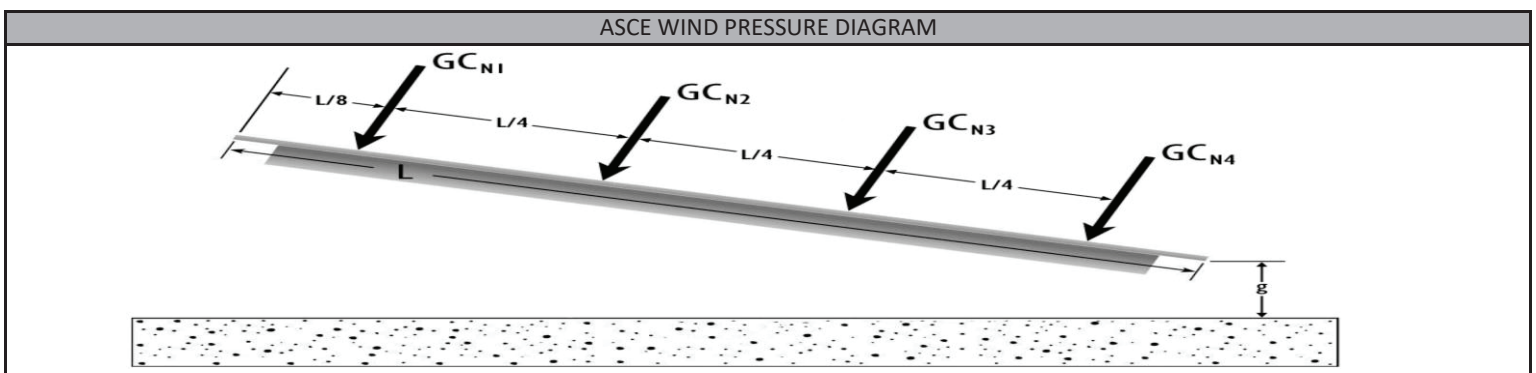
DEAD LOAD	
TOTAL MODULE WEIGHT	1140 LBS

SNOW LOAD	
EXPOSURE FACTOR, $C_e$	0.90
THERMAL FACTOR, $C_t$	1.20
IMPORTANCE FACTOR, $I_s$	0.80
FLAT ROOF SNOW LOAD, $P_f$	30.0 PSF
SLOPE FACTOR, $C_s$	0.73
SLOPED ROOF SNOW LOAD, $P_s$	21.8 PSF

WIND LOAD	
IMPORTANCE FACTOR, $I$	1.00
VELOCITY PRESSURE COEF., $K_z$	0.85
TOPOGRAPHIC FACTOR, $K_{zt}$	1.00
DIRECTIONALITY FACTOR, $K_d$	0.85
GUST FACTOR	0.85
VELOCITY PRESSURE, $q_z$	24.7 PSF

ASCE WIND PRESSURE COEFFICIENTS - CASE A		
$GC_n$	WIND UP	WIND DOWN
1	-1.80	2.10
2	-1.80	2.10
3	-1.80	2.10
4	-1.80	2.10

ASCE WIND PRESSURE COEFFICIENTS - CASE B		
$GC_n$	WIND UP	WIND DOWN
1	-2.50	1.00
2	-2.50	1.00
3	-0.50	2.60
4	-0.50	2.60



# GREENSKIES - BOOM BRIDGE

## PURLIN DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.086 IN

### ALLOWABLE CAPACITY (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	121.1 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	46.7 KIP-IN
ALLOWABLE SHEAR, $V_y$	6.7 KIP
ALLOWABLE SHEAR, $V_x$	17.8 KIP

### APPLIED LOADS (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-56.6 KIP-IN
ABOUT Y AXIS	-13.4 KIP-IN
APPLIED SHEAR, $V_y$	-1.0 KIP
APPLIED SHEAR, $V_x$	-0.2 KIP

### UNITY CHECKS

AISI EQ H1.1-1	53%
AISI EQ H1.1-2	74%
AISI EQ H1.2-1	76%
AISI EQ H2-1 X	44%
AISI EQ H2-1 Y	36%
CONTROLLING LOAD CASE	1D - 0.45WD - 0.75S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/311
CLEARSPAN DEAD DEFLECTION	0.123 IN
CANTILEVER DEAD DEFLECTION	0.076 IN

# GREENSKIES - BOOM BRIDGE

## RAFTER DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.102 IN

### ALLOWABLE CAPACITY (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	129.6 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	59.9 KIP-IN
ALLOWABLE SHEAR, $V_y$	34.2 KIP
ALLOWABLE SHEAR, $V_x$	13.2 KIP

### APPLIED LOADS (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-34.0 KIP-IN
ABOUT Y AXIS	-7.8 KIP-IN
APPLIED SHEAR, $V_y$	-1.7 KIP
APPLIED SHEAR, $V_x$	-0.4 KIP

### UNITY CHECKS

AISI EQ H1.1-1	39%
AISI EQ H1.1-2	39%
AISI EQ H1.2-1	47%
AISI EQ H2-1 X	32%
AISI EQ H2-1 Y	13%
CONTROLLING LOAD CASE	0.6D - 0.6WU - 0S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/892
------------------	-------

# GREENSKIES - BOOM BRIDGE

## LEG DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### SOUTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	22.1 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### NORTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	9.9 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### SOUTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.8 KIP-IN
APPLIED TENSION	-0.6 KIP
APPLIED COMPRESSION	2.7 KIP

### NORTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.2 KIP-IN
APPLIED TENSION	-4.4 KIP
APPLIED COMPRESSION	5.5 KIP

### UNITY CHECKS

SOUTH LEG COMBINED STRESS	11%
NORTH LEG COMBINED STRESS	56%

# GREENSKIES - BOOM BRIDGE

## BRACE DESIGN

### DIAGONAL AND HORIZONTAL BRACE MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### INTERNAL DIAGONAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	3.3 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL HORIZONTAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	5.4 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL DIAGONAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-4.6 KIP
APPLIED COMPRESSION	3.9 KIP

### INTERNAL HORIZONTAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-3.6 KIP
APPLIED COMPRESSION	3.6 KIP

### SEISMIC CABLE BRACE CAPACITY

CABLE BREAKING STRENGTH	2.3 KIP
-------------------------	---------

### SEISMIC CABLE BRACE APPLIED LOAD

MAXIMUM TENSION	0.2 KIP
-----------------	---------

### BRACE UNITY CHECKS

INTERNAL DIAGONAL BRACE COMBINED STRESS	119%
INTERNAL HORIZONTAL BRACE COMBINED STRESS	12%
SEISMIC CABLE BRACE	2%



# GREENSKIES - BOOM BRIDGE

## FOUNDATION DESIGN

### GROUND SCREW MINIMUM REQUIRED TORQUE

DESIGN TORQUE VARIABLE	285.29
DESIGN TORQUE EXPONENT	0.45
MINIMUM REQUIRED TORQUE	2000 N-m

### GROUND SCREW ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION	10.1 KIP
ALLOWABLE TENSION	7.3 KIP
ALLOWABLE LATERAL	2.6 KIP

### GROUND SCREW APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED COMPRESSION	7.7 KIP
APPLIED TENSION	6.5 KIP
APPLIED LATERAL	1.8 KIP

### UNITY CHECK

GROUND SCREW STRESS	89%
---------------------	-----

### FROST HEAVE ANALYSIS

FOUNDATION EMBEDMENT DEPTH	74 IN
APPROXIMATE FROST DEPTH	20 IN
SCREW PENETRATION BELOW FROST DEPTH	54 IN
UPLIFT PRESSURE DUE TO ICE LENSING	0.29 KSI
UPLIFT PRESSURE DUE TO ADFREEZING	0.01 KSI
UPLIFT FORCE DUE TO ICE LENSING	0.00 KIP
UPLIFT FORCE DUE TO ADFREEZING	2.73 KIP
TOTAL FROST HEAVE FORCE	2.73 KIP
TOTAL DEAD LOAD	0.53 KIP
RESULTANT HEAVE FORCE	2.20 KIP
FROST HEAVE PREVENTION STRESS	30%

# GREENSKIES - BOOM BRIDGE

## HARDWARE DESIGN

### PV MODULE TO C PURLIN

HARDWARE SPECIFICATION	M8 - GRADE 18-8
APPLIED TENSION	0.31 KIP
APPLIED SHEAR	0.06 KIP
UNITY CHECK	8%

### C PURLIN TO SLOPE BRACKET

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	2.60 KIP
UNITY CHECK	41%

### SLOPE BRACKET TO RAFTER

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	2.09 KIP
APPLIED SHEAR	0.59 KIP
UNITY CHECK	20%

### RAFTER TO LEG

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	5.51 KIP
UNITY CHECK	43%

### DIAGONAL BRACE HARDWARE

HARDWARE SPECIFICATION	3/8-16 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	4.61 KIP
UNITY CHECK	73%

### TERRASMART SET BOLT (INDEPENDENT LAB TESTING)

ALLOWABLE VERTICAL FORCE	8.00 KIP
APPLIED VERTICAL FORCE	4.61 KIP
UNITY CHECK	58%

# GREENSKIES - BOOM BRIDGE

## CONNECTION DESIGN

### C PURLIN TO SLOPE BRACKET BEARING CHECK

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	5.63 KIP
APPLIED VERTICAL FORCE	2.60 KIP
UNITY CHECK	46%

### SLOPE BRACKET TO RAFTER CONNECTION

ALLOWABLE UPLIFT FORCE	2.52 KIP
ALLOWABLE MOMENT	4.10 KIP-IN
APPLIED UPLIFT FORCE	2.09 KIP
APPLIED MOMENT	3.36 KIP-IN
UNITY CHECK	83%

### RAFTER TO LEG CONNECTION

ALLOWABLE VERTICAL FORCE	7.47 KIP
APPLIED VERTICAL FORCE	5.51 KIP
UNITY CHECK	74%

### RAFTER TO LATERAL BRACE CONNECTION

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	13.31 KIP
APPLIED PULL-OUT	4.61 KIP
UNITY CHECK	35%

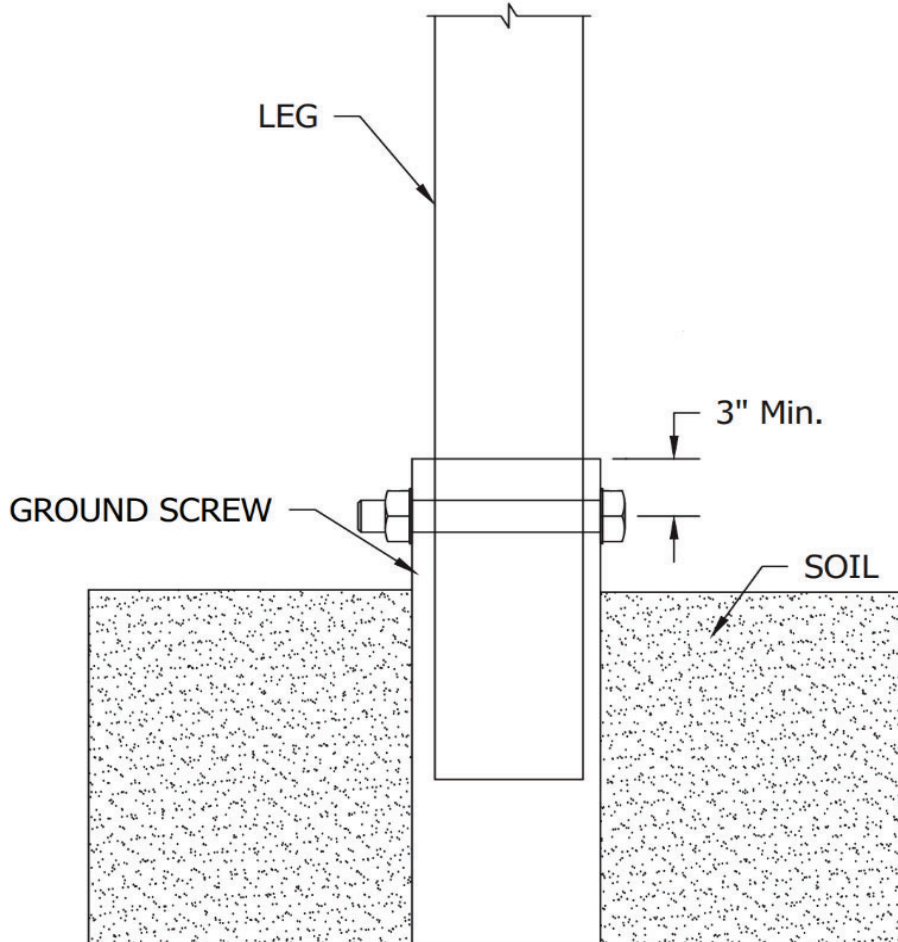
# GREENSKIES - BOOM BRIDGE

## THRU BOLT DESIGN

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED SHEAR	7.68 KIP
UNITY CHECK	60%

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)



### NOTE

A THRU BOLT MAY BE USED IN THE RARE EVENT THAT A GROUND SCREW WELD NUT IS DAMAGED DURING INSTALLATION.

# STRUCTURAL CALCULATION REPORT



# TERRAS**SMART**

## GREENSKIES - BOOM BRIDGE

PROJECT NUMBER	20-6575
PRODUCT	TERRAGLIDE PORTRAIT
REVISION	0

### ENGINEER OF RECORD



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# GREENSKIES - BOOM BRIDGE

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# GREENSKIES - BOOM BRIDGE

## PROJECT SPECIFICATIONS

### GENERAL PROJECT INFORMATION

ADDRESS	BOOM BRIDGE ROAD
CITY	NORTH STONINGTON
STATE	CT
ZIP	06359

### DESIGN CRITERIA

EXPOSURE CATEGORY	C	ASCE/IBC
RISK/OCCUPANCY CATEGORY	I	ASCE/IBC
BASIC WIND SPEED (DESIGN LIFE = 25YR)	115.5 MPH	ASCE/IBC
GROUND SNOW LOAD	30.0 PSF	ASCE/IBC
FLAT ROOF SNOW LOAD	30.0 PSF	ASCE/IBC
MAPPED ACCELERATION, S <sub>s</sub>	0.161	ASCE/IBC
MAPPED ACCELERATION, S <sub>1</sub>	0.058	ASCE/IBC

### PV MODULE SPECIFICATIONS

PV MODULE MODEL	CS3W-XXXPB-AG	CLIENT PROVIDED
WATTAGE	395 W	
SHORT EDGE DIMENSION	41.260 IN	
LONG EDGE DIMENSION	83.937 IN	
SHORT BOLT SPACING	40.118 IN	
LONG BOLT SPACING	45.472 IN	
THICKNESS	1.181 IN	
WEIGHT	62.61 LBS	
HARDWARE SIZE	M8	

### PV RACKING SPECIFICATIONS

MODULE ORIENTATION	PORTRAIT
FOUNDATION TYPE	TERRASMART GROUND SCREWS
MODULE ROWS	2
MODULE COLUMNS	12
TILT ANGLE	30.0°
FRONT EDGE CLEARANCE	36 IN
MAX E-W SLOPE	25.0%
MAX NORTH FACING SLOPE	30.0%
MAX SOUTH FACING SLOPE	20.0%
E-W MODULE SPACING	0.500 IN
N-S MODULE SPACING	1.500 IN
EW SCREW SPACING	284 IN
NS SCREW SPACING	88 IN
OVERALL RACK WIDTH (E-W)	500.62 IN

### GEOTECHNICAL SPECIFICATIONS

GEOTECHNICAL REPORT DATE	-	-
GROUND SCREW REPORT DATE	-	TERRASMART
FROST DEPTH	20 IN	CORNELL ATLAS

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# GREENSKIES - BOOM BRIDGE

## MEMBER SPECIFICATIONS

C PURLIN	
SECTION	CEE 9X4-0.086
LENGTH	501.476 IN
WEIGHT	206.61 LBS
MATERIAL	ASTM A653 - GRADE 80 SS

HAT RAFTER	
SECTION	HAT 6.1X5.76-0.1017
LENGTH	137.000 IN
WEIGHT	68.28 LBS
MATERIAL	ASTM A653 - GRADE 80

SOUTH LEG	
SECTION	2.375X9GA
LENGTH	59.000 IN
WEIGHT	16.66 LBS
MATERIAL	ASTM A500 - GRADE C

NORTH LEG	
SECTION	2.375X9GA
LENGTH	136.000 IN
WEIGHT	38.41 LBS
MATERIAL	ASTM A500 - GRADE C

EXTERNAL LATERAL BRACE	
SECTION	2.36X13GA
LENGTH	23.000 IN
WEIGHT	4.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL DIAGONAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	91.000 IN
WEIGHT	16.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL HORIZONTAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	74.000 IN
WEIGHT	13.06 LBS
MATERIAL	ASTM A500 - GRADE C

# GREENSKIES - BOOM BRIDGE

## DESIGN LOADS

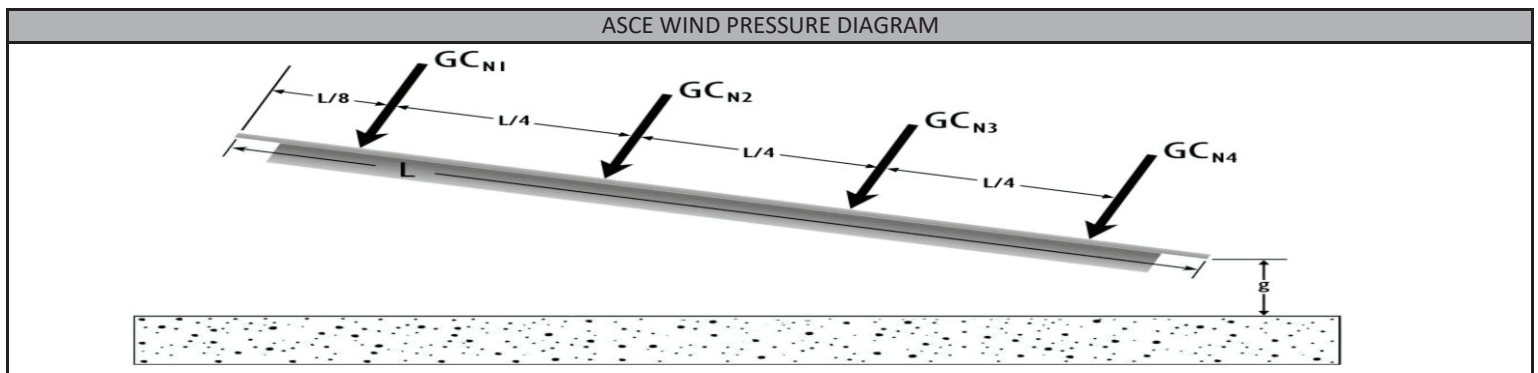
DEAD LOAD	
TOTAL MODULE WEIGHT	1503 LBS

SNOW LOAD	
EXPOSURE FACTOR, $C_e$	0.90
THERMAL FACTOR, $C_t$	1.20
IMPORTANCE FACTOR, $I_s$	0.80
FLAT ROOF SNOW LOAD, $P_f$	30.0 PSF
SLOPE FACTOR, $C_s$	0.73
SLOPED ROOF SNOW LOAD, $P_s$	21.8 PSF

WIND LOAD	
IMPORTANCE FACTOR, $I$	1.00
VELOCITY PRESSURE COEF., $K_z$	0.85
TOPOGRAPHIC FACTOR, $K_{zt}$	1.00
DIRECTIONALITY FACTOR, $K_d$	0.85
GUST FACTOR	0.85
VELOCITY PRESSURE, $q_z$	24.7 PSF

ASCE WIND PRESSURE COEFFICIENTS - CASE A		
$GC_n$	WIND UP	WIND DOWN
1	-1.80	2.10
2	-1.80	2.10
3	-1.80	2.10
4	-1.80	2.10

ASCE WIND PRESSURE COEFFICIENTS - CASE B		
$GC_n$	WIND UP	WIND DOWN
1	-2.50	1.00
2	-2.50	1.00
3	-0.50	2.60
4	-0.50	2.60



# GREENSKIES - BOOM BRIDGE

## PURLIN DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.086 IN

### ALLOWABLE CAPACITY (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	120.7 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	46.7 KIP-IN
ALLOWABLE SHEAR, $V_y$	6.7 KIP
ALLOWABLE SHEAR, $V_x$	17.8 KIP

### APPLIED LOADS (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-70.9 KIP-IN
ABOUT Y AXIS	-17.0 KIP-IN
APPLIED SHEAR, $V_y$	-1.2 KIP
APPLIED SHEAR, $V_x$	-0.3 KIP

### UNITY CHECKS

AISI EQ H1.1-1	66%
AISI EQ H1.1-2	86%
AISI EQ H1.2-1	96%
AISI EQ H2-1 X	54%
AISI EQ H2-1 Y	46%
CONTROLLING LOAD CASE	1D - 0.45WD - 0.75S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/265
CLEARSPAN DEAD DEFLECTION	0.175 IN
CANTELIVER DEAD DEFLECTION	0.095 IN

# GREENSKIES - BOOM BRIDGE

## RAFTER DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.102 IN

### ALLOWABLE CAPACITY (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	135.0 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	59.9 KIP-IN
ALLOWABLE SHEAR, $V_y$	34.2 KIP
ALLOWABLE SHEAR, $V_x$	13.2 KIP

### APPLIED LOADS (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-33.7 KIP-IN
ABOUT Y AXIS	-7.8 KIP-IN
APPLIED SHEAR, $V_y$	-1.9 KIP
APPLIED SHEAR, $V_x$	-0.4 KIP

### UNITY CHECKS

AISI EQ H1.1-1	41%
AISI EQ H1.1-2	43%
AISI EQ H1.2-1	46%
AISI EQ H2-1 X	33%
AISI EQ H2-1 Y	14%
CONTROLLING LOAD CASE	0.6D - 0.6WU - 0S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/815
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# GREENSKIES - BOOM BRIDGE

## LEG DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### SOUTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	22.1 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### NORTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	9.9 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### SOUTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.9 KIP-IN
APPLIED TENSION	-0.6 KIP
APPLIED COMPRESSION	3.0 KIP

### NORTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.2 KIP-IN
APPLIED TENSION	-4.9 KIP
APPLIED COMPRESSION	6.2 KIP

### UNITY CHECKS

SOUTH LEG COMBINED STRESS	12%
NORTH LEG COMBINED STRESS	64%

# GREENSKIES - BOOM BRIDGE

## BRACE DESIGN

### DIAGONAL AND HORIZONTAL BRACE MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### INTERNAL DIAGONAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	3.3 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL HORIZONTAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	5.4 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL DIAGONAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-5.1 KIP
APPLIED COMPRESSION	4.4 KIP

### INTERNAL HORIZONTAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-4.0 KIP
APPLIED COMPRESSION	4.0 KIP

### SEISMIC CABLE BRACE CAPACITY

CABLE BREAKING STRENGTH	2.3 KIP
-------------------------	---------

### SEISMIC CABLE BRACE APPLIED LOAD

MAXIMUM TENSION	0.2 KIP
-----------------	---------

### BRACE UNITY CHECKS

INTERNAL DIAGONAL BRACE COMBINED STRESS	134%
INTERNAL HORIZONTAL BRACE COMBINED STRESS	13%
SEISMIC CABLE BRACE	2%

# GREENSKIES - BOOM BRIDGE

## FOUNDATION DESIGN

### GROUND SCREW MINIMUM REQUIRED TORQUE

DESIGN TORQUE VARIABLE	285.29
DESIGN TORQUE EXPONENT	0.45
MINIMUM REQUIRED TORQUE	2000 N-m

### GROUND SCREW ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION	10.1 KIP
ALLOWABLE TENSION	7.3 KIP
ALLOWABLE LATERAL	2.6 KIP

### GROUND SCREW APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED COMPRESSION	8.6 KIP
APPLIED TENSION	7.2 KIP
APPLIED LATERAL	2.0 KIP

### UNITY CHECK

GROUND SCREW STRESS	99%
---------------------	-----

### FROST HEAVE ANALYSIS

FOUNDATION EMBEDMENT DEPTH	74 IN
APPROXIMATE FROST DEPTH	20 IN
SCREW PENETRATION BELOW FROST DEPTH	54 IN
UPLIFT PRESSURE DUE TO ICE LENSING	0.29 KSI
UPLIFT PRESSURE DUE TO ADFREEZING	0.01 KSI
UPLIFT FORCE DUE TO ICE LENSING	0.00 KIP
UPLIFT FORCE DUE TO ADFREEZING	2.73 KIP
TOTAL FROST HEAVE FORCE	2.73 KIP
TOTAL DEAD LOAD	0.64 KIP
RESULTANT HEAVE FORCE	2.09 KIP
FROST HEAVE PREVENTION STRESS	29%

# GREENSKIES - BOOM BRIDGE

## HARDWARE DESIGN

### PV MODULE TO C PURLIN

HARDWARE SPECIFICATION	M8 - GRADE 18-8
APPLIED TENSION	0.32 KIP
APPLIED SHEAR	0.06 KIP
UNITY CHECK	8%

### C PURLIN TO SLOPE BRACKET

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	2.91 KIP
UNITY CHECK	46%

### SLOPE BRACKET TO RAFTER

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	2.30 KIP
APPLIED SHEAR	0.66 KIP
UNITY CHECK	22%

### RAFTER TO LEG

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	6.18 KIP
UNITY CHECK	49%

### DIAGONAL BRACE HARDWARE

HARDWARE SPECIFICATION	3/8-16 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	5.14 KIP
UNITY CHECK	81%

### TERRASMART SET BOLT (INDEPENDENT LAB TESTING)

ALLOWABLE VERTICAL FORCE	8.00 KIP
APPLIED VERTICAL FORCE	5.14 KIP
UNITY CHECK	64%

# GREENSKIES - BOOM BRIDGE

## CONNECTION DESIGN

### C PURLIN TO SLOPE BRACKET BEARING CHECK

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	5.63 KIP
APPLIED VERTICAL FORCE	2.91 KIP
UNITY CHECK	52%

### SLOPE BRACKET TO RAFTER CONNECTION

ALLOWABLE UPLIFT FORCE	2.52 KIP
ALLOWABLE MOMENT	4.10 KIP-IN
APPLIED UPLIFT FORCE	2.30 KIP
APPLIED MOMENT	3.75 KIP-IN
UNITY CHECK	91%

### RAFTER TO LEG CONNECTION

ALLOWABLE VERTICAL FORCE	7.47 KIP
APPLIED VERTICAL FORCE	6.18 KIP
UNITY CHECK	83%

### RAFTER TO LATERAL BRACE CONNECTION

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	13.31 KIP
APPLIED PULL-OUT	5.14 KIP
UNITY CHECK	39%

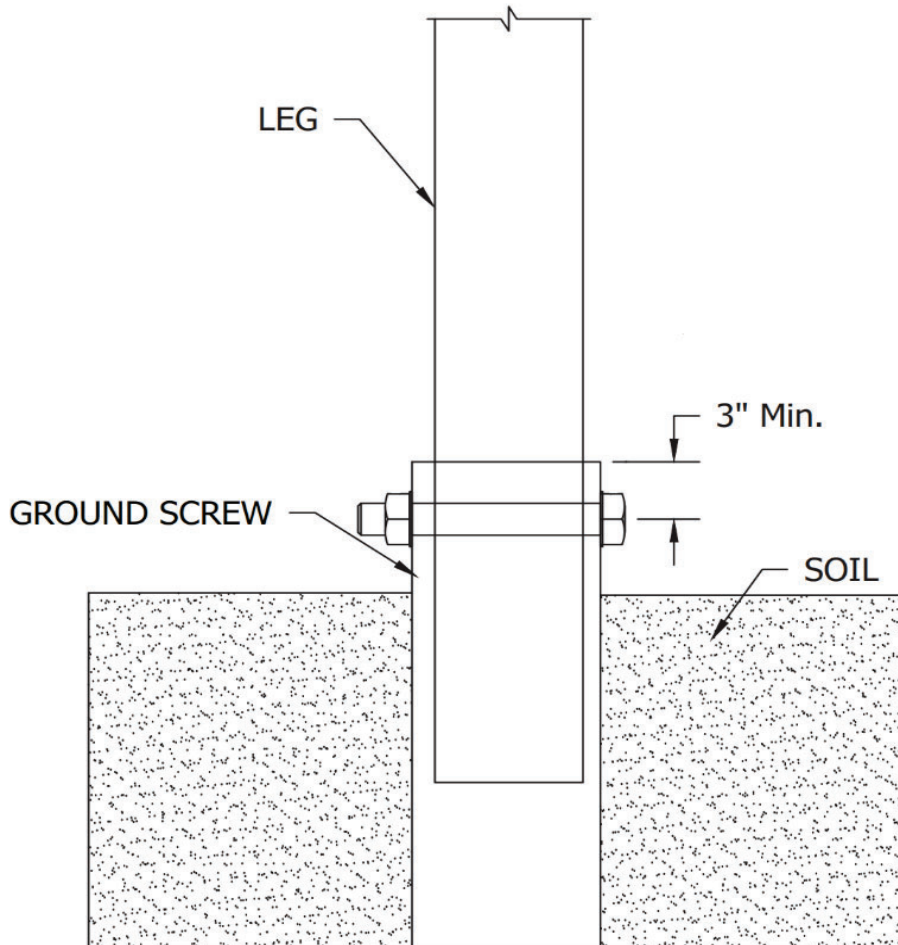
# GREENSKIES - BOOM BRIDGE

## THRU BOLT DESIGN

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED SHEAR	8.61 KIP
UNITY CHECK	68%

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)



### NOTE

A THRU BOLT MAY BE USED IN THE RARE EVENT THAT A GROUND SCREW WELD NUT IS DAMAGED DURING INSTALLATION.



# STRUCTURAL CALCULATION REPORT



# TERRAS<sub>M</sub>MART

## GREENSKIES - BOOM BRIDGE

PROJECT NUMBER	20-6575
PRODUCT	TERRAGLIDE PORTRAIT
REVISION	0

### ENGINEER OF RECORD



ZEYN B. UZMAN - CT PEN.0023151



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# GREENSKIES - BOOM BRIDGE

## GENERAL INFORMATION

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### NOTES

- 1) TERRASMART RACKING CONFORMS TO UL2703 STANDARDS.
- 2) TERRASMART USES INFORMATION PROVIDED BY OUR CLIENT TO PROPERLY DESIGN OUR PRODUCT. IF CERTAIN INFORMATION IS NOT PROVIDED, GENERAL ASSUMPTIONS WILL BE MADE. IT IS THE RESPONSIBILITY OF THE CLIENT TO VERIFY AND APPROVE ALL DESIGN CRITERIA AND RACKING SPECIFICATIONS.
- 3) RACKING AND FOUNDATION STRUCTURAL CALCULATIONS CONFORM TO APPLICABLE STATE OR FEDERAL BUILDING CODES.
- 4) TERRASMART IS NOT RESPONSIBLE FOR THE ACCURACY OF THE ENVIRONMENTAL DESIGN CRITERIA (WIND SPEED, SNOW LOAD, EXPOSURE, ETC.)
- 5) SNOW BANKING ANALYSIS WAS NOT PERFORMED BY TERRASMART AND WAS NOT CONSIDERED IN THE DESIGN OF THE STRUCTURE. THE FRONT EDGE CLEARANCE WAS PROVIDED BY THE CLIENT AND ADVERSE EFFECTS OF SNOW BANKING ARE BEYOND TERRASMART'S SCOPE.
- 6) TERRASMART IS NOT RESPONSIBLE FOR ANY DAMAGE TO PV MODULES MOUNTED TO TERRASMART RACKING DUE TO THE EXTREME VARIETY IN MODULE FRAME DESIGN, MOUNTING STYLE, AND MANUFACTURING PROCESS. TERRASMART RECOMMENDS THAT THE CLIENT WORK WITH THE MODULE MANUFACTURER TO UNDERSTAND ALL RESTRICTIONS AND LIMITATIONS.
- 7) MOUNTING OF COMBINER BOXES, STRING INVERTERS, OR OTHER ITEMS NOT INCLUDED IN TERRASMARTS CALCULATION PACKAGE TO THE RACKING MUST BE REVIEWED AND APPROVED BY TERRASMART.
- 8) TERRASMART STRUCTURAL CALCULATIONS APPLY TO RACKING INSTALLED WITHIN THE TOLERANCES AND INSTALL PROCEDURES PROVIDED IN THE RACKING CONSTRUCTION PLANS AND ASSOCIATED INSTALLATION MANUAL. ANY DEVIATION FROM THE SPECIFIED TOLERANCES OR INSTALL PROCEDURES MUST BE REVIEWED AND APPROVED BY TERRASMART.

# GREENSKIES - BOOM BRIDGE

## PROJECT SPECIFICATIONS

### GENERAL PROJECT INFORMATION

ADDRESS	BOOM BRIDGE ROAD
CITY	NORTH STONINGTON
STATE	CT
ZIP	06359

### DESIGN CRITERIA

EXPOSURE CATEGORY	C	ASCE/IBC
RISK/OCCUPANCY CATEGORY	I	ASCE/IBC
BASIC WIND SPEED (DESIGN LIFE = 25YR)	115.5 MPH	ASCE/IBC
GROUND SNOW LOAD	30.0 PSF	ASCE/IBC
FLAT ROOF SNOW LOAD	30.0 PSF	ASCE/IBC
MAPPED ACCELERATION, S <sub>s</sub>	0.161	ASCE/IBC
MAPPED ACCELERATION, S <sub>1</sub>	0.058	ASCE/IBC

### PV MODULE SPECIFICATIONS

PV MODULE MODEL	HT72-166M	CLIENT PROVIDED
WATTAGE	450 W	
SHORT EDGE DIMENSION	40.866 IN	
LONG EDGE DIMENSION	82.441 IN	
SHORT BOLT SPACING	38.937 IN	
LONG BOLT SPACING	50.236 IN	
THICKNESS	1.378 IN	
WEIGHT	51.81 LBS	
HARDWARE SIZE	M8	

### PV RACKING SPECIFICATIONS

MODULE ORIENTATION	PORTRAIT
FOUNDATION TYPE	TERRASMART GROUND SCREWS
MODULE ROWS	2
MODULE COLUMNS	12
TILT ANGLE	30.0°
FRONT EDGE CLEARANCE	36 IN
MAX E-W SLOPE	25.0%
MAX NORTH FACING SLOPE	30.0%
MAX SOUTH FACING SLOPE	20.0%
E-W MODULE SPACING	0.500 IN
N-S MODULE SPACING	1.500 IN
EW SCREW SPACING	284 IN
NS SCREW SPACING	88 IN
OVERALL RACK WIDTH (E-W)	495.89 IN

### GEOTECHNICAL SPECIFICATIONS

GEOTECHNICAL REPORT DATE	-	-
GROUND SCREW REPORT DATE	-	TERRASMART
FROST DEPTH	20 IN	CORNELL ATLAS

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# GREENSKIES - BOOM BRIDGE

## MEMBER SPECIFICATIONS

C PURLIN	
SECTION	CEE 9X4-0.086
LENGTH	495.965 IN
WEIGHT	204.33 LBS
MATERIAL	ASTM A653 - GRADE 80 SS

HAT RAFTER	
SECTION	HAT 6.1X5.76-0.1017
LENGTH	140.250 IN
WEIGHT	69.90 LBS
MATERIAL	ASTM A653 - GRADE 80

SOUTH LEG	
SECTION	2.375X9GA
LENGTH	58.000 IN
WEIGHT	16.38 LBS
MATERIAL	ASTM A500 - GRADE C

NORTH LEG	
SECTION	2.375X9GA
LENGTH	135.000 IN
WEIGHT	38.12 LBS
MATERIAL	ASTM A500 - GRADE C

EXTERNAL LATERAL BRACE	
SECTION	2.36X13GA
LENGTH	23.000 IN
WEIGHT	4.06 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL DIAGONAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	90.000 IN
WEIGHT	15.88 LBS
MATERIAL	ASTM A500 - GRADE C

INTERNAL HORIZONTAL LATERAL BRACE	
SECTION	2.0X12GA
LENGTH	74.000 IN
WEIGHT	13.06 LBS
MATERIAL	ASTM A500 - GRADE C

# GREENSKIES - BOOM BRIDGE

## DESIGN LOADS

### DEAD LOAD

TOTAL MODULE WEIGHT	1243 LBS
---------------------	----------

### SNOW LOAD

EXPOSURE FACTOR, $C_e$	0.90
THERMAL FACTOR, $C_t$	1.20
IMPORTANCE FACTOR, $I_s$	0.80
FLAT ROOF SNOW LOAD, $P_f$	30.0 PSF
SLOPE FACTOR, $C_s$	0.73
SLOPED ROOF SNOW LOAD, $P_s$	21.8 PSF

### WIND LOAD

IMPORTANCE FACTOR, $I$	1.00
VELOCITY PRESSURE COEF., $K_z$	0.85
TOPOGRAPHIC FACTOR, $K_{zt}$	1.00
DIRECTIONALITY FACTOR, $K_d$	0.85
GUST FACTOR	0.85
VELOCITY PRESSURE, $q_z$	24.7 PSF

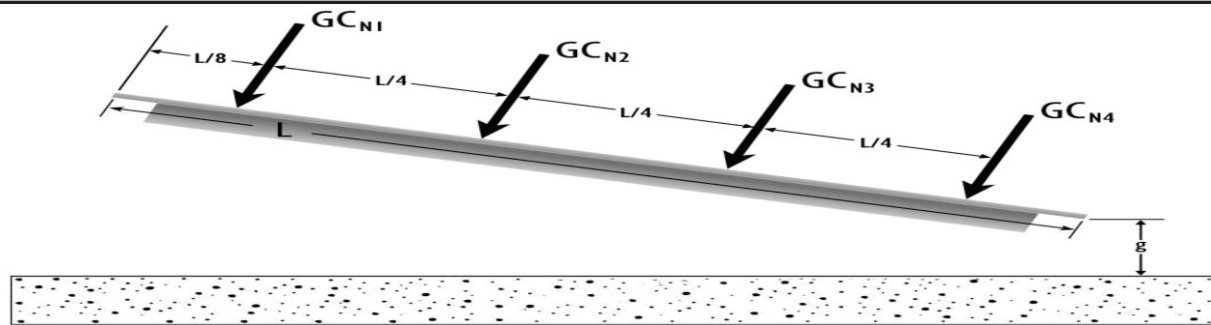
### ASCE WIND PRESSURE COEFFICIENTS - CASE A

$GC_n$	WIND UP	WIND DOWN
1	-1.80	2.10
2	-1.80	2.10
3	-1.80	2.10
4	-1.80	2.10

### ASCE WIND PRESSURE COEFFICIENTS - CASE B

$GC_n$	WIND UP	WIND DOWN
1	-2.50	1.00
2	-2.50	1.00
3	-0.50	2.60
4	-0.50	2.60

### ASCE WIND PRESSURE DIAGRAM



# GREENSKIES - BOOM BRIDGE

## PURLIN DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.086 IN

### ALLOWABLE CAPACITY (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	120.7 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	46.7 KIP-IN
ALLOWABLE SHEAR, $V_y$	6.7 KIP
ALLOWABLE SHEAR, $V_x$	17.8 KIP

### APPLIED LOADS (VALUES BASED ON PURLIN LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-66.8 KIP-IN
ABOUT Y AXIS	-15.8 KIP-IN
APPLIED SHEAR, $V_y$	-1.1 KIP
APPLIED SHEAR, $V_x$	-0.3 KIP

### UNITY CHECKS

AISI EQ H1.1-1	62%
AISI EQ H1.1-2	88%
AISI EQ H1.2-1	90%
AISI EQ H2-1 X	51%
AISI EQ H2-1 Y	43%
CONTROLLING LOAD CASE	1D - 0.45WD - 0.75S

### DEFLECTION CHECKS

DEFLECTION RATIO	$L/255$
CLEARSPAN DEAD DEFLECTION	0.168 IN
CANTELIVER DEAD DEFLECTION	0.098 IN



# GREENSKIES - BOOM BRIDGE

## RAFTER DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	80 KSI
TENSILE STRENGTH, $F_u$	82 KSI
DESIGN THICKNESS, $t$	0.102 IN

### ALLOWABLE CAPACITY (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_{ax}$	129.6 KIP-IN
ALLOWABLE MOMENT, $M_{ay}$	59.9 KIP-IN
ALLOWABLE SHEAR, $V_y$	34.2 KIP
ALLOWABLE SHEAR, $V_x$	13.2 KIP

### APPLIED LOADS (VALUES BASED ON RAFTER LOCATION WITH HIGHEST UNITY RATIO)

ABOUT X AXIS	-36.7 KIP-IN
ABOUT Y AXIS	-8.4 KIP-IN
APPLIED SHEAR, $V_y$	-1.9 KIP
APPLIED SHEAR, $V_x$	-0.4 KIP

### UNITY CHECKS

AISI EQ H1.1-1	43%
AISI EQ H1.1-2	43%
AISI EQ H1.2-1	50%
AISI EQ H2-1 X	35%
AISI EQ H2-1 Y	15%
CONTROLLING LOAD CASE	0.6D - 0.6WU - 0S

### DEFLECTION CHECKS

DEFLECTION RATIO	L/821
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# GREENSKIES - BOOM BRIDGE

## LEG DESIGN

### MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### SOUTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	22.1 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### NORTH LEG ALLOWABLE CAPACITY (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

ALLOWABLE MOMENT, $M_a$	17.8 KIP-IN
ALLOWABLE COMPRESSION, $P_{cr}$	9.9 KIP
ALLOWABLE TENSION, $T$	25.1 KIP

### SOUTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.9 KIP-IN
APPLIED TENSION	-0.6 KIP
APPLIED COMPRESSION	2.9 KIP

### NORTH LEG APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED MOMENT	0.2 KIP-IN
APPLIED TENSION	-4.8 KIP
APPLIED COMPRESSION	6.0 KIP

### UNITY CHECKS

SOUTH LEG COMBINED STRESS	12%
NORTH LEG COMBINED STRESS	61%

# GREENSKIES - BOOM BRIDGE

## BRACE DESIGN

### DIAGONAL AND HORIZONTAL BRACE MATERIAL PROPERTIES

YIELD STRENGTH $F_y$	42 KSI
----------------------	--------

### INTERNAL DIAGONAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	3.3 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL HORIZONTAL BRACE ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION, $P_{cr}$	5.4 KIP
ALLOWABLE TENSION, T	15.7 KIP

### INTERNAL DIAGONAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-5.0 KIP
APPLIED COMPRESSION	4.3 KIP

### INTERNAL HORIZONTAL BRACE APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED TENSION	-3.9 KIP
APPLIED COMPRESSION	3.9 KIP

### SEISMIC CABLE BRACE CAPACITY

CABLE BREAKING STRENGTH	2.3 KIP
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### SEISMIC CABLE BRACE APPLIED LOAD

MAXIMUM TENSION	0.2 KIP
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### BRACE UNITY CHECKS

INTERNAL DIAGONAL BRACE COMBINED STRESS	130%
INTERNAL HORIZONTAL BRACE COMBINED STRESS	13%
SEISMIC CABLE BRACE	2%

# GREENSKIES - BOOM BRIDGE

## FOUNDATION DESIGN

### GROUND SCREW MINIMUM REQUIRED TORQUE

DESIGN TORQUE VARIABLE	285.29
DESIGN TORQUE EXPONENT	0.45
MINIMUM REQUIRED TORQUE	2000 N-m

### GROUND SCREW ALLOWABLE CAPACITY

ALLOWABLE COMPRESSION	10.1 KIP
ALLOWABLE TENSION	7.3 KIP
ALLOWABLE LATERAL	2.6 KIP

### GROUND SCREW APPLIED LOADS (VALUES BASED ON LOCATION WITH HIGHEST UNITY RATIO)

APPLIED COMPRESSION	8.3 KIP
APPLIED TENSION	7.0 KIP
APPLIED LATERAL	2.0 KIP

### UNITY CHECK

GROUND SCREW STRESS	96%
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### FROST HEAVE ANALYSIS

FOUNDATION EMBEDMENT DEPTH	74 IN
APPROXIMATE FROST DEPTH	20 IN
SCREW PENETRATION BELOW FROST DEPTH	54 IN
UPLIFT PRESSURE DUE TO ICE LENSING	0.29 KSI
UPLIFT PRESSURE DUE TO ADFREEZING	0.01 KSI
UPLIFT FORCE DUE TO ICE LENSING	0.00 KIP
UPLIFT FORCE DUE TO ADFREEZING	2.73 KIP
TOTAL FROST HEAVE FORCE	2.73 KIP
TOTAL DEAD LOAD	0.58 KIP
RESULTANT HEAVE FORCE	2.16 KIP
FROST HEAVE PREVENTION STRESS	29%

# GREENSKIES - BOOM BRIDGE

## HARDWARE DESIGN

### PV MODULE TO C PURLIN

HARDWARE SPECIFICATION	M8 - GRADE 18-8
APPLIED TENSION	0.31 KIP
APPLIED SHEAR	0.06 KIP
UNITY CHECK	8%

### C PURLIN TO SLOPE BRACKET

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	2.82 KIP
UNITY CHECK	44%

### SLOPE BRACKET TO RAFTER

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	2.26 KIP
APPLIED SHEAR	0.63 KIP
UNITY CHECK	21%

### RAFTER TO LEG

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	5.97 KIP
UNITY CHECK	47%

### DIAGONAL BRACE HARDWARE

HARDWARE SPECIFICATION	3/8-16 - GRADE 5
APPLIED TENSION	0.00 KIP
APPLIED SHEAR	5.00 KIP
UNITY CHECK	79%

### TERRASMART SET BOLT (INDEPENDENT LAB TESTING)

ALLOWABLE VERTICAL FORCE	8.00 KIP
APPLIED VERTICAL FORCE	5.00 KIP
UNITY CHECK	63%

# GREENSKIES - BOOM BRIDGE

## CONNECTION DESIGN

### C PURLIN TO SLOPE BRACKET BEARING CHECK

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	5.63 KIP
APPLIED VERTICAL FORCE	2.82 KIP
UNITY CHECK	50%

### SLOPE BRACKET TO RAFTER CONNECTION

ALLOWABLE UPLIFT FORCE	2.52 KIP
ALLOWABLE MOMENT	4.10 KIP-IN
APPLIED UPLIFT FORCE	2.26 KIP
APPLIED MOMENT	3.63 KIP-IN
UNITY CHECK	90%

### RAFTER TO LEG CONNECTION

ALLOWABLE VERTICAL FORCE	7.47 KIP
APPLIED VERTICAL FORCE	5.97 KIP
UNITY CHECK	80%

### RAFTER TO LATERAL BRACE CONNECTION

HOLE SIZE	0.500 IN
ALLOWABLE BEARING	13.31 KIP
APPLIED PULL-OUT	5.00 KIP
UNITY CHECK	38%



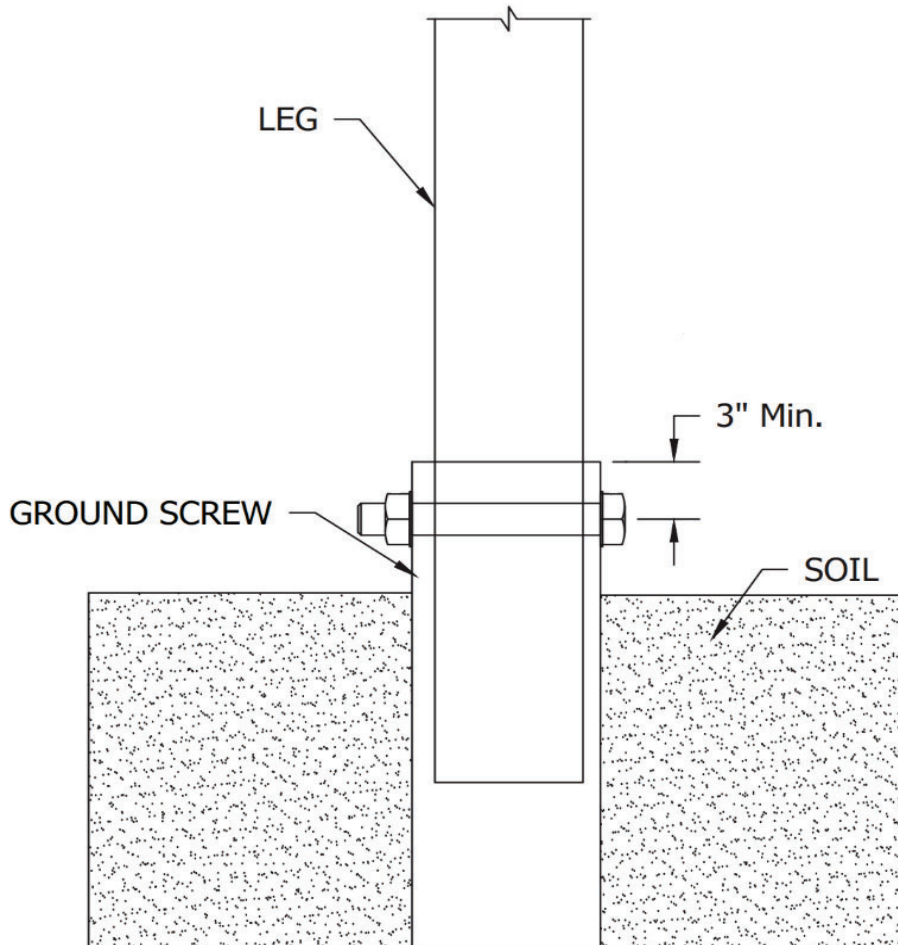
# GREENSKIES - BOOM BRIDGE

## THRU BOLT DESIGN

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)

HARDWARE SPECIFICATION	1/2-13 - GRADE 5
APPLIED SHEAR	8.32 KIP
UNITY CHECK	66%

### GROUND SCREW TO LEG THRU BOLT (USE AS NEEDED)



### NOTE

A THRU BOLT MAY BE USED IN THE RARE EVENT THAT A GROUND SCREW WELD NUT IS DAMAGED DURING INSTALLATION.